# Chapter 12
# PRODUCED WATER: WATER RIGHTS AND WATER QUALITY: "A 'MEETING' OF THE WATERS"?

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## Synopsis

## § 12.01 Introduction

Water is the lifeblood of the arid West. The handling of water produced from mining, conventional oil and gas, and, particularly, coalbed natural gas (CBNG) development is a water management issue of keen interest to federal and state regulators, farmers and ranchers trying to make a living, thirsty urban residents, and visitors to this spectacular landscape. As energy development accelerates, produced water management issues have become increasingly important.

Five years ago, the authors examined the issue of produced water in the context of the early stages of the CBNG boom in the Powder River Basin of Wyoming.[1] This article is an update and expanded examination of produced water handling. The management of produced water, particularly from CBNG development, is a complex, overlapping system of state and federal water quality and water quantity laws. The article will address the relationship between produced water, groundwater protection, beneficial use, and the existing water rights structure. This article will also address state and federal water quality regulation and permitting and examine technological and legislative proposals to handle produced water.[2]

## § 12.02 Coalbed Natural Gas (CBNG) Background

The Department of Energy's Energy Information Administration (EIA) projects that energy demand will grow at 0.7% per year through 2030—a 20% increase.[3] The energy industry has turned

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[1] Holly J. Franz & Rebecca W. Watson, "Coalbed Natural Gas and Water Management: Water Appropriation, Water Quality, and Water Conflicts," 47 *Rocky Mt. Min. L. Inst.* 17-1 (2001).

[2] The subject of water quality and produced water has been addressed in several recent Rocky Mountain Mineral Law Foundation papers. *See, e.g.*, Colin Harris, Robert Tuckman & Jennifer Hall, "New Brine, Old Bottle: NEPA and NPDES Bottlenecks and Potential Solutions in Coalbed Methane Production in the Powder River Basin," 49 *Rocky Mt. Min. L. Inst.* 13-1 (2003); Kevin R. Murray & Patrick S. Malone, "The Future of NPDES Permitting: Watersheds, TMDLs and Jurisdictional Issues," 50 *Rocky Mt. Min. L. Inst.* 24-1 (2004); Richard E. Schwartz, Ellen B. Steen, Kirsten L. Nathanson & Bridget E. Littlefield, "Bridge Over Muddy Waters, *SWANCC*, Stormwater, TMDLs, SPCC, and Section 404 Permitting," 49 *Rocky Mt. Min. L. Inst.* 22-1 (2003).

[3] *See* Energy Info. Admin., U.S. Dep't of Energy, Annual Energy Outlook 2006 With Projections to 2030, at 11 (Feb. 2006), *available at* http://www.eia.doe.gov/oiaf/aeo/index.html.

to the West for the region's abundant supplies of unconventional natural gas and coal.

The availability and choice of water disposal and management options directly impact the volume of economically-producible CBNG. In Wyoming, "the coalbed methane industry is trailing 20% behind last year's average of 50 rigs . . . [t]he delay is attributed to difficulties in obtaining discharge permits for the produced groundwater. . . ."[4] In the last five years, there have been major changes in the regulation of produced water making it more expensive and difficult, if not impossible, to discharge untreated produced water.

### [1] Physical Properties of CBNG Production

Methane, a natural gas, is adsorbed into coal micropores and coal cleats and held in place by water pressure. Water pressure is reduced by pumping out the water to allow the CBNG to desorb and flow to the well bore.[5] Fracturing the coal (frac'ing) is used to enhance gas flow. Although basins produce water at different rates and water production slows over the life of a well, as a general rule, CBNG development results in water production in greater quantities than conventional oil and gas development. For example in 2005, Powder River Basin CBNG wells generated 548 million bbl of produced water from 15,200 wells with an average daily per-well production of 1,230 bbl of produced water.[6] The Ruckelshaus Report estimated that cumulative CBNG water production in Wyoming from 1987-2004 was more than 2.9 billion barrels—enough to fill Cody's Buffalo Bill Reservoir over half full.[7]

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[4] Dustin Bleizeffer, "Methane Drilling Lags," *Casper Star Trib.*, June 26, 2006, *available at* http://www.trib.com/articles/2006/06/26/news/wyoming; *see also* Ruckelshaus Inst. of Env't & Natural Resources, Univ. of Wyo., Water Production From Coalbed Methane Development in Wyoming: A Summary of Quantity, Quality and Management Options (Dec. 2005), *available at* http://www.uwyo.edu/enr/ienr/CBMWaterFinalReportDec2005.pdf (prepared for the Office of the Governor, State of Wyoming) [hereinafter Ruckelshaus Report].

[5] Michael J. Day & Arthur P. O'Hayre, "Management of Produced Water in Coalbed Methane Operations," *Regulation and Development of Coalbed Methane* 12A-1 (Rocky Mt. Min. L. Fdn. 2002).

[6] James K. Otton, U.S. Geological Survey, "Estimated Volume and Quality of Produced Water Associated with Projected Energy Resources in the Western U.S." (Produced Waters Workshop, Ft. Collins, Colo., Apr. 4, 2006).

[7] Ruckelshaus Report, *supra* note 4, at v-vi.

## § 12.03 Dewatering, Water Rights, and Too Much of a "Good Thing"

An interesting dichotomy has developed over the last five years. In the ground, the water holding CBNG in place is regulated by the state as a resource for livestock and domestic use. Concerns are raised over the potential for CBNG development to cause aquifer drawdown, loss of springs, wells, and groundwater availability. Once this same water is produced, however, it is regarded by some as both a waste and a potential threat to agriculture. This dichotomy has recently resulted in attempts to use the law of water rights to regulate issues of water quantity—a "meeting of the waters."

Water right issues are largely controlled by state law and regulation.[8] The Western states that are experiencing CBNG development generally apply the prior appropriation doctrine to groundwater.[9] Under the prior appropriation doctrine, water may be taken and put to a beneficial use by private users. Once water is put to a beneficial use, a water right to that amount of water is established. As between two persons putting water to beneficial use, the senior user with the earliest priority date has the better right. Water that is wasted or used for non-beneficial purposes cannot be protected against impairment by subsequent users.[10]

A water right is a property right that protects the owner against impairment by subsequent users. It is more than simply a regulatory permit. Only beneficial uses of water can create a water right. For a use to be beneficial under the prior appropriation doctrine, the user generally must want a continuing supply of water. Since CBNG produced water is generally an unwanted byproduct, the appropriation doctrine has little application to CBNG withdrawals and cannot be relied on to regulate the quantity of diversions and discharges.

When groundwater is appropriated for a beneficial use, a water right or appropriation permit must be obtained from the state

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[8] *See* California v. United States, 438 U.S. 645, 675-79 (1978).

[9] *See* Michael F. Browning, "Mine Dewatering: Water Right and Water Quality Issues," 38 *Rocky Mt. Min. L. Inst.* 24-1, 24-9 (1992).

[10] *See* Gail Gottlieb, "New Mexico's Mine Dewatering Act: The Search for Rehoboth," 20 *Nat. Resources J.* 653, 655-56 (1980).

engineer or other appropriate state entity.[11] A water right is not required, and in fact cannot be issued, if the water is being put to a use that is not considered a beneficial use under the state water statutes. An entity cannot voluntarily subject itself to water right regulation since a water right is a property right as opposed to a regulatory permit.

With the exception of Wyoming, none of the Western states consider groundwater pumping for CBNG production, by itself, to be a beneficial use of water. Instead, most states regulate the withdrawal of CBNG water in the same manner as production water from traditional oil and gas development. Under this regulatory scenario, produced water is treated as a waste product under the control and authority of the oil and gas commission. If, however, withdrawn CBNG water is subsequently put to a beneficial use, such as stock watering or dust abatement, a water right is required from the state engineer or permitting agency.

Even though CBNG dewatering is generally not considered a beneficial use requiring a water right, there may be other state regulatory requirements designed to protect the water rights of others. Montana is the only state to statutorily require the replacement of water rights impacted by CBNG development.[12] There are other state remedies available, however, to address negative impacts on water rights owners, including civil suits for damages and injunctive relief.

Certain commentators have suggested that the pumping of groundwater for CBNG production without subsequently putting the water to a beneficial use should be considered a waste of water.[13] Under the prior appropriation doctrine, it is generally unlawful to divert water pursuant to an appropriation if the wa-

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[11] Colo. Rev. Stat. § 37-90-137 (elec. 2006); Mont. Code Ann. § 85-2-301 (elec. 2006); N.M. Stat. Ann. § 72-12-1 (elec. 2006); Utah Code Ann. § 73-3-8 (elec. 2006); Wyo. Stat. Ann. § 41-3-930 (elec. 2006).

[12] Mont. Code Ann. § 82-11-175(3) (elec. 2006).

[13] *See, e.g.*, Thomas F. Darin, "Waste or Wasted?—Rethinking the Regulation of Coalbed Methane Byproduct Water in the Rocky Mountains: A Comparative Analysis of Approaches to Coalbed Methane Produced Water Quantity Legal Issues in Utah, New Mexico, Colorado, Montana and Wyoming," 17 *J. Envtl. L. & Litig.* 281, 340-41 (2002).

ter will be wasted.[14] Wasting of water may be enjoined by the state engineer or by private actions for injunctive relief. Most states, however, specifically exclude CBNG production and other dewatering activities from their waste statutes.[15]

Other issues include possible allegations of damages, trespass, and nuisance based upon discharges of CBNG produced water.[16] These allegations may be brought by both surface owners and adjacent land owners. The ability of surface owners to recover damages as a result of CBNG operations is generally limited by the common law rule of reasonable use. The rule of reasonable use recognizes the mineral interest as the dominant estate with the right to use as much of the surface as is reasonable to develop the resource.[17] Some states have modified this rule through legislative or judicial action.[18]

Since requirements differ from state to state, CBNG producers must be familiar with the laws in each state in which they operate. A detailed survey of the impact of each state's water quantity laws on CBNG development is beyond the scope of this article; however, the experience of a few Western states will be reviewed for illustrative purposes.

**[1] Wyoming**

Unlike the other Western states, Wyoming designates the withdrawal of groundwater solely for CBNG production as a beneficial use of water requiring a permit from the State Engineer's Office (SEO). The SEO considers CBNG production to be different than traditional natural gas production because the production of water

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[14] *See, e.g.*, Colo. Rev. Stat. § 37-90-138 (elec. 2006); Mont. Code Ann. § 85-2-114 (elec. 2006).

[15] *See, e.g.*, Mont. Code. Ann. § 85-2-505(1)(a) (elec. 2006); Darin, *supra* note 13, at 305 n.111.

[16] A thorough discussion of these causes of action is beyond the scope of this article. For more information, see, e.g., M. Kristeen Hand & Kyle R. Smith, Comment, "The Deluge: Potential Solutions to Emerging Conflicts Regarding On-Lease and Off-Lease Surface Damage Caused by Coal Bed Methane Production," 1 *Wyo. L. Rev.* 661 (2001).

[17] *See* Kinney-Coastal Oil Co. v. Kieffer, 277 U.S. 488, 506-07 (1928).

[18] Phillip Wm. Lear & Stephanie Barber-Renteria, "Split Estates and Severed Minerals: Rights of Access and Surface Use After the Divorce (And Other Leasehold Access-Related Problems)," 50 *Rocky Mt. Min. L. Inst.* 10-1 (2004); *see, e.g.*, Gerrity Oil & Gas Corp. v. Magness, 946 P.2d 913, 933 (Colo. 1997).

is necessary to produce the coal bed gas resource.[19] Even though the water is not the object of the production, the intentional withdrawal of water to produce CBNG led to the designation of CBNG as a beneficial use of water. Wyoming has a similar rule requiring water rights for active coal mine dewatering wells.[20]

As required for other beneficial uses, a CBNG producer must apply for the SEO permit prior to commencing construction of the well.[21] The permit is granted as a matter of course as long as the proposed means of diversion and construction are adequate and the well is not within a controlled groundwater area.[22] Unlike other Western states, there is no requirement to show an absence of adverse impacts on other water right owners. The SEO can deny a permit if it is not in the public's water interest.[23] This authority, however, is rarely exercised.

Despite its permit requirement, Wyoming does not treat CBNG wells identically to other beneficial uses of groundwater. For most other wells, a proof of appropriation must be filed within 30 days of completing the well. The SEO then inspects the well and a certificate of appropriation is issued.[24] This process, known as adjudication, is not applied to CBNG wells due to their temporary nature.[25] The conditions attached to CBNG well permits specifically state that beneficial use of groundwater for the production of natural gas is assumed as of the well completion date and no proof of appropriation and beneficial use of groundwater form is required.[26]

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[19] Wyo. State Engineer's Office, Guidance: CBM/Ground Water Permits 1 (Mar. 2004), *available at* http://seo.state.wy.us/PDF/GW_CBM%20Guidance.pdf.

[20] Wyo. State Engineer's Office, Guidance: Permitting of Active Mine Dewatering Wells at Permitted Coal Mining Operations 1-2 (Jan. 2005), *available at* http://seo.state.wy.us/docs.aspx (follow "Guidance" hyperlink).

[21] *See* Wyo. Stat. Ann. § 41-3-930 (elec. 2006).

[22] *See* Wyo. Stat. Ann. § 41-3-931 (elec. 2006).

[23] *Id*.

[24] Wyo. Stat. Ann. § 41-3-935 (elec. 2006).

[25] Telephone Interview with Sue Lowry, Director of Policy, Wyo. SEO (June 2001); Telephone Interview with Lisa Lindemann, Groundwater Administrator, Wyo. SEO (July 2006).

[26] Additional Conditions and Limitations attached to CBNG groundwater permits, Wyoming SEO (2001); *see* Guidance: CBM/Ground Water Permits, *supra* note 19, at 1.

By statute, Wyoming treats the appropriation of by-product water the same as groundwater if the by-product water is intercepted before it has commingled with the waters of any live stream, lake, reservoir, or other surface watercourse or any part of any groundwater aquifer, and if the appropriator is the developer of the water or has entered into an agreement with the developer of the water. If these conditions are not met, the by-product water is treated as surface water and is subject to use by appropriators with existing water rights.[27] Wyoming has developed a single groundwater application form for producers that simultaneously apply for both the initial withdrawal of CBNG water and any subsequent beneficial use of the CBNG by-product water.[28] Unless specified in the groundwater permit, CBNG by-product water has no other beneficial use and is considered unappropriated waters of the state.[29]

Wyoming provides no specific protection against adverse impacts to water rights from CBNG wells. Wyoming statutes do provide, however, general protection against adverse impacts from groundwater diversions.[30] The statute requires the person alleging interference to prove it by a preponderance of the evidence.[31]

There have been relatively few complaints to the SEO alleging interference by a CBNG well.[32] For example, during fiscal year 2000, the SEO investigated water supply problems in 13 separate wells at the request of nine different groundwater appropriators.[33] While nearly every groundwater supply problem reported to the SEO by appropriators in the area of CBNG development was alleged to be the fault of depletions from CBNG wells, the SEO found the vast majority of the problems were not related to groundwater availability. Instead, most problems were attributable to pump failures, leaking plumbing fixtures, and biological fouling and/or plug-

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[27] Wyo. Stat. Ann. § 41-3-904 (elec. 2006).

[28] *See* State Engineer's Office, Form U.W. 5 (Rev. 7/03), *available at* http://seo.state.wy.us/pdf/UW-5.pdf.

[29] Patrick T. Tyrrell, Revised Interim Policy Memo (Apr. 26, 2004), *available at* http://seo.state.wy.us/pdf/CBMpolicy_SW_2.pdf.

[30] Wyo. Stat. Ann. § 41-3-911 (elec. 2006).

[31] Willadsen v. Christopulos, 731 P.2d 1181, 1184 (Wyo. 1987).

[32] Lowry, *supra* note 25.

[33] State of Wyo., 2000 Annual Report of the State Engineer 55, *available at* http://seo.state.wy.us/Press/report2000.pdf.

ging of well casing perforations.[34] The SEO has received anecdotal accounts of water well failures attributable to CBNG activities that have been mitigated by CBNG producers without involving the SEO.[35] In fiscal year 2004, the SEO formally investigated one CBNG interference complaint that was settled by the parties prior to the completion of the investigation.[36]

While there may be few complaints concerning the withdrawal of groundwater for CBNG production, there has been plenty of legal wrangling over the quantity of CBNG produced water discharged for subsequent beneficial use. On December 7, 2005, 19 ranchers and the Powder River Basin Resource Council filed a petition for rulemaking with the Wyoming Environmental Quality Council, a citizen board with authority to adopt regulations necessary for the implementation of the Environmental Quality Act. The petition seeks to limit the quantity of surface discharges of produced water to only that amount that can be demonstrated to have actually been put to a subsequent beneficial use.[37] In response to this petition, Wyoming's Department of Environmental Quality expressed its opinion that the request "exceeds our legal authority and goes well beyond our traditional approach to setting limits on the quantity of discharge;"[38] and the Wyoming Attorney General issued a formal opinion determining that the Environmental Quality Act only allows the regulation of water quantity if the quantity has an unacceptable effect on the quality of the water.[39] On July 17, 2006, the Environmental Quality Council decided to proceed with the rulemaking process on the citizens' petition as amended to accommodate the concerns articulated by the

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[34] *Id.* at 55-56.

[35] *Id.* at 56.

[36] State of Wyo., 2004 Annual Report of the State Engineer 57-58, *available at* http://seo.state.wy.us/pdf/2004AnnualReport.pdf.

[37] Petition to Amend Wyoming Water Quality Rule, Chapter 2, Appendix H (Envtl. Quality Council, No. 05-3102, filed Dec. 7, 2005), *available at* http://deq.state.wy.us/eqc/docket.htm (follow "05-3102" hyperlink, then follow "Petition" hyperlink).

[38] Letter from John F. Wagner, Administrator, Water Quality Division, Wyo. Dep't of Envtl. Quality, to Wyo. Envtl. Quality Council (Feb. 3, 2006), *available at* http://deq.state.wy.us/eqc/docket.htm (follow "05-3102" hyperlink, then follow "Comment" hyperlink).

[39] Wyo. Op. Att'y Gen., Formal Opinion No. 2006-001 (Apr. 12, 2006), *available at* http://attorneygeneral.state.wy.us/FormalOpinion2006-001.pdf.

Wyoming Attorney General.[40] The amended petition seeks to prohibit CBNG discharges that will cause "contamination or other alteration of the physical, chemical or biological properties of any waters of the state" which creates a nuisance, renders the waters harmful, degrades the water for its intended use, or adversely affects the environment.[40.1] No date has been set for the public hearing on these rules.[40.2]

In the judicial arena, a recent Wyoming district court decision limits the disposal alternatives for produced water.[41] In Wyoming, any water legally placed in a natural watercourse belongs to the state and benefits from the state's easement allowing water to flow within natural watercourses across private property. In *Williams Production RMT Co. v. Maycock*,[42] the district court determined that a drainage that experiences rare, intermittent flows is not a natural watercourse subject to the state's easement. To avoid a trespass claim, the CBNG producer must seek to condemn an easement.

A CBNG producer may pursue condemnation even if an access agreement exists with the landowner. In *Wyoming Resources Corp. v. T-Chair Land Co.*, the Wyoming Supreme Court ruled that allegations that an existing access agreement had been breached, when the CBNG producer allowed a reservoir to overflow, did not preclude a condemnation action.[43]

In *Swartz v. Beach*,[44] a landowner sued the Wyoming Department of Environmental Quality and a CBNG producer in federal court alleging nuisance, trespass, violation of the federal Clean

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[40] Letter from Mark Gordon, Chairman, Wyo. Envtl. Quality Council, to Interested Parties (Aug. 8, 2006), *available at* http://deq.state.wy.us/eqc/docket.htm (follow "05-3102" hyperlink, then follow "Gordon Letter to Mailing List.8-8-06 with attachments" hyperlink).

[40.1] Petitioner's First Status Report, app. I (May 8, 2006), *available at* http://deq.state.wy.us/eqc/docket.htm (follow "05-3102" hyperlink, then follow "Petitioner's First Status Report" hyperlink).

[40.2] Gordon Letter, *supra* note 40.

[41] Williams Production RMT Co. v. Maycock, Civ. A. No. 26099 (Wyo. 8th Jud. Dist.) (Decision Letter filed Mar. 17, 2006).

[42] *Id.*

[43] 49 P.3d 999, 1002 (Wyo. 2002).

[44] 229 F. Supp. 2d 1239, 1274 (D. Wyo. 2002).

Water Act, and other constitutional claims based upon the discharge of CBNG water. In response to defendants' motions to dismiss, the federal district court allowed the various claims to go forward, with the claims against the state agency limited to injunctive relief.

The Ruckelshaus Report, prepared for the Governor of Wyoming, identifies alternative technical, regulatory, and statutory strategies related to CBNG water management.[45] The Ruckelshaus Report notes that CBNG production has been largely regulated the same as conventional oil and gas despite major differences in the associated impacts. The Report suggests that the CBNG industry may need to be regulated as a unique kind of development with its own state management act and suggests a number of possible next steps.[46] Whether any of these suggestions, which are disputed by industry, will be taken remains to be seen.

**[2] Montana**

Montana applies the prior appropriation doctrine to groundwater. Except for small developments, a water use permit must be obtained from the Montana Department of Natural Resources and Conservation (DNRC) prior to appropriating groundwater for a beneficial use.[47] Under DNRC policy, the mere dewatering of a water source is not a beneficial use and cannot establish a water right.[48] This applies to "water withdrawn from a well for the sole purpose of mining a mineral such as uranium, oil or gas, etc."[49] To address potential adverse impacts to other water users, DNRC suggests the use of waiver agreements as a practical device to overcome the legal uncertainties of dewatering.[50]

When determining whether groundwater pumping is a beneficial use, DNRC considers the operator's need for legal standing to pro-

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[45] *See generally* Ruckelshaus Report, *supra* note 4.

[46] *Id*. at 52-58.

[47] Mont. Code Ann. §§ 85-2-301, 85-2-306(3) (elec. 2006).

[48] Mont. DNRC Water Rights Bureau, New Appropriations Program Admin. Policy No. 7, "Dewatering (Drainage) Policy" (1981).

[49] *Id.* § 4(b).

[50] *Id.* § 5.

tect the water supply from depletion.[51] If the operator does not need a continuing supply of water, the withdrawal is not considered a beneficial use. Since water is not a desired product of CBNG operations, DNRC ruled CBNG dewatering is not a beneficial use requiring a water right permit.[52] If, however, the produced water is subsequently put to some other beneficial use, such as stock watering or dust abatement, a water right permit is required.

This did not, however, end DNRC's involvement in CBNG water quantity issues. Acting under its authority to designate controlled groundwater areas where extensive withdrawals are likely to occur,[53] DNRC established the Powder River Basin Controlled Groundwater Area (PRBCGA). The PRBCGA only applies to CBNG wells in the Powder River Basin. The PRBCGA requires that permits be obtained from the Board of Oil and Gas Conservation prior to drilling all wells. By statute, the Board has jurisdiction over oil and gas produced water within a controlled groundwater area if the volume of produced water is entirely dependent on the oil and gas withdrawals.[54]

The PRBCGA also requires CBNG operators to offer water mitigation agreements to owners of water wells or natural springs within one-half mile of a CBNG well or within the area the operator reasonably believes may be impacted by CBNG production, whichever is greater.[55] This area automatically extends one-half mile beyond any well impacted by CBNG. The mitigation agreement must provide for prompt replacement of the water adversely impacted by CBNG operations. The PRBCGA requires CBNG operators to characterize baseline hydrologic conditions and to monitor groundwater levels within and outside the production field during development.[56]

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[51] Opinion on Threshold Issue of Beneficial Use, *In re* Applications for Beneficial Water Use Permits 41T-104524 by CR Kendall Corp. (DNRC 1999).

[52] Mont. DNRC, Final Order, *In re* Designation of the Powder River Basin Controlled Groundwater Area (1999).

[53] *See* Mont. Code Ann. § 85-2-506 (elec. 2006).

[54] Mont. Code Ann. § 85-2-510 (elec. 2006).

[55] *See* Final Order, *supra* note 52, at 5.

[56] *See id.* at 6.

In response to concerns about the impact of CBNG development on groundwater resources, the Board of Oil and Gas Conservation requires the CBNG field development plan to include a description of the existing hydrologic resources, including water wells or springs that may be affected by the project, and a copy of the water mitigation agreement being used or proposed for use in the project area.[57] The mitigation agreement may exclude mechanical, electrical, or similar loss of productivity not resulting from a reduction in the amount of available water due to production from CBNG wells. The Board reviews the proposed mitigation agreement and the area covered by the agreement as part of its review of field development proposals. Prior to the Board's hearing on the proposal, the CBNG producer must provide written notice to all record water rights owners within one-half mile of the exterior boundary of the proposed field area.

The Montana legislature adopted on a statewide basis protections modeled after the PRBCGA.[58] If a CBNG well will produce groundwater from an aquifer that is the source of supply for water rights, the CBNG producer must notify and offer a mitigation agreement to the owners of all groundwater rights within one mile of a CBNG well or one-half mile of a well adversely affected by a CBNG well.[59] The mitigation agreements must address the reduction or loss of water resources and must provide for prompt replacement of water from any natural spring or groundwater well adversely affected by any CBNG well.[60] The mitigation agreement is not required to address losses of water well productivity that are not related to CBNG production.

Montana also amended its waste statute to specifically provide that CBNG groundwater pumping is not a prohibited waste of groundwater.[61] CBNG production was added to an existing list of groundwater uses, including the draining of land, mine dewater-

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[57] *In re* Board's Own Motion for an Order Establishing Coal Bed Methane Operating Practices Within the Powder River Basin Controlled Groundwater Area In Big Horn, Powder River, Rosebud, Treasure and Custer Counties, Mont. Docket 130-99, Order No. 99-99 (1999).

[58] Mont. Code Ann. § 82-11-175(3) (elec. 2006).

[59] *Id*. § 82-11-175(3)(a).

[60] *Id*. § 82-11-175(3)(b).

[61] *Id*. § 85-2-505(1)(e).

ing, and water monitoring, which are not considered an unlawful waste of water. The legislation also contains a non-exclusive list of acceptable CBNG groundwater management techniques, including use as irrigation or stock water or other beneficial uses, reinjection, or discharge to the surface or surface waters in compliance with water quality requirements.[62]

Montana has also established a CBNG protection program which sets aside a percentage of CBNG taxes to compensate private landowners or water rights owners for damages caused by CBNG development.[63] The program, administered by the local conservation districts, may pay up to $50,000 for loss of agricultural production, decreased land value, reduction in quantity or quality of water available from a surface water or groundwater source that affects the beneficial use of water, or the contamination of surface water or groundwater that prevents its beneficial use.[64] Payments from the fund cannot exceed 75% of the cost of total damages and are not available until June 30, 2011, except for emergency compensation which was available beginning June 30, 2005.[65]

Montana has the most comprehensive statutory and administrative requirements for CBNG produced water in the Western states. The requirement of prompt replacement of any natural spring or groundwater well adversely affected by CBNG production provides protection for other groundwater users even though the withdrawal of CBNG water is not considered a beneficial use. Ironically, a lawsuit has recently been filed challenging the constitutionality of this provision and Montana's waste statute.[66]

### [3] Colorado

Colorado is a prior appropriation state[67] with an elaborate system of groundwater regulation designed to protect senior water rights. A key element of Colorado's groundwater regulation is the requirement for augmentation plans to increase the supply of

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[62] *Id*. § 82-11-175(2).

[63] *Id*. § 76-15-905(1).

[64] *Id*. § 76-15-905(3) & (6).

[65] *Id*. § 76-15-905(6).

[66] Diamond Cross Properties, LLC v. State, Civ. No. DV-2-2005-70 (Mont. 22d Jud. Dist. 2006).

[67] Colo. Const. art. XVI, § 6.

available water.[68] The Division of Water Resources (State Engineer's Office) permits groundwater appropriations outside of designated groundwater basins.[69] In order for a groundwater permit to be issued, unappropriated water must be available and the vested water rights of others must not be materially injured.[70] As in other prior appropriation states, a permit can only be issued for beneficial uses of water.

The Colorado Supreme Court's decision in *Three Bells Ranch Associates v. Cache la Poudre Water Users Ass'n*[71] examined the issue of beneficial use. In *Three Bells*, the operator of a gravel quarry argued that the excavation of recreational ponds for reclamation purposes was not a beneficial use of water. The quarry operator claimed that it was only interested in mining sand and gravel, and the water encountered was simply a nuisance. In rejecting this argument, the court focused on the quarry operator's plan to excavate the pits and reclaim the land by creating ponds.[72] Since the quarry operator's intent to reclaim the land required a water source, the court ruled that it was an appropriation of water for a beneficial use. The court also concluded that the applicable Mined Land Reclamation Act did not reflect a legislative intent to preempt the State Engineer's groundwater authority.[73]

While the Colorado Supreme Court has not ruled on the issue, the State Engineer does not consider CBNG groundwater pumping to be a beneficial use of water.[74] The State Engineer also recognizes the Colorado Oil and Gas Conservation Commission's (Commission) "authority over all oil and gas operations including the generation, transportation, storage, treatment, or disposal of exploration and production wastes," including production water.[75] Wells subject to the jurisdiction of the Commission are specifically

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[68] Colo. Rev. Stat. § 37-90-137(9) (elec. 2006).

[69] *Id*. § 37-90-137(1).

[70] *Id.* § 37-90-137(2)(b).

[71] 758 P.2d 164 (Colo. 1988).

[72] *Id.* at 173.

[73] *Id.* at 171.

[74] Mem. from Dick Wolfe, Off. of the State Engineer, and Ted Kowalski, Off. of the Att'y Gen., to Legislative Interim Committee on Oil & Gas (Sept. 27, 1999) (on file with author) [hereinafter Wolfe & Kowalski Mem.].

[75] *Id*.; *see also* Colo. Rev. Stat. § 34-60-106(2)(a)-(d) (elec. 2006).

excluded from the statutory definition of a well in the water well construction and pump installation contractors provisions.[76] Unless the CBNG produced water is put to some other beneficial use, no permit is required from the State Engineer.

The Commission's regulations allow produced CBNG water to be injected in a Safe Drinking Water Act Class II well (*see infra* § 12.06), evaporated or percolated in a permitted lined or unlined pit, disposed of at permitted commercial facilities, discharged into state water in compliance with water quality regulations, or disposed of by road spreading on lease roads outside sensitive areas with the permission of the landowner if the produced water has less than 5,000 mg/l total dissolved solids (TDS).[77] CBNG production water may also be used to provide an alternate domestic water supply to surface owners within the oil or gas field.[78]

The State Engineer may have jurisdiction if withdrawals from a CBNG well cause injury to a vested water right. Colorado statutes allow the State Engineer to order total or partial discontinuance of any diversion that is causing material injury to a senior water right.[79] The Colorado Supreme Court has interpreted this statute to allow the State Engineer "to order a discontinuance of diversions that injure senior water rights, regardless of whether there is a beneficial use. The water user may choose to develop a plan for augmentation rather than discontinuing the diversion."[80] Despite this ruling, the State Engineer is not clear whether the Commission's authority over CBNG produced water or the State Engineer's authority to protect vested water rights will prevail.[81]

A declaratory judgment action currently pending before the Colorado Water Court, Division 7, challenges the State Engineer's

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[76] *See* Colo. Rev. Stat. § 37-91-102(16)(b)(I) (elec. 2006), *available at* http://oil-gas.state.co.us/RR_Docs/Rules_policies.html (follow "900 Series" hyperlink).

[77] Colo. Oil & Gas Conserv. Comm'n Rules & Regs. (Exploration & Production Waste Management) § 907(c)(2) (elec. 2006), *available at* http://oil-gas.state.co.us/RR_Docs/Rules_policies.html (follow "900 Series" hyperlink).

[78] *Id*. § 907(c)(4).

[79] *See* Colo. Rev. Stat. § 37-92-502(2)(a) (elec. 2006).

[80] Zigan Sand & Gravel, Inc. v. Cache la Poudre Water Users Ass'n, 758 P.2d 175, 185 (Colo. 1988).

[81] Wolfe & Kowalski Mem., *supra* note 74.

treatment of CBNG produced water.[82] Among other relief, the action seeks a determination that produced water is subject to the State Engineer's well permitting requirements and that CBNG production is a beneficial use of water.[83]

In Colorado's San Juan Basin, the most productive source of CBNG in North America, the majority of produced water is disposed of by reinjection into deep formations. Due to concerns that the removal of groundwater from aquifers that may be tributary to surface streams could result in stream depletions or reduced spring flows sufficient to cause injury to senior water right holders on over-appropriated streams, the Colorado Department of Natural Resources commissioned a CBNG stream depletion assessment study. The study estimated that current CBNG stream depletion in the San Juan Basin is "relatively low," about the same as exempt domestic wells.[84] Of the total estimated depletion of 156 acre-feet per year, one-third occurs during active surface administration (i.e., when a senior water right is placing a call on water).[85] Public comment has closed and the sponsoring agencies are considering what, if any, further steps should be taken.

**[4] New Mexico**

The New Mexico Office of the State Engineer also concluded that groundwater pumping for CBNG production is not a beneficial use requiring a water right.[86] In 2004, the New Mexico legislature codified this determination, specifically providing that a permit is not required from the Office of the State Engineer for the disposition of produced water.[87] Similar to Montana and Colorado, the New Mexico Oil Conservation Division has primary au-

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[82] Vance v. Simpson, No. 2005CW063 (Colo. Water Ct. Div. 7, filed Nov. 21, 2005).

[83] Amended Complaint for Declaratory Judgment, Vance v. Simpson, No. 2005CW063 (filed Mar. 24, 2006).

[84] Coalbed Methane Stream Depletion Assessment Study—Northern San Juan Basin, Colorado 2 (Apr. 4, 2006), *available at* http://oil-gas.state.co.us (follow "Coalbed Methane Stream Depletion Assessment Study" hyperlink).

[85] *Id.*

[86] Telephone Interview with Mary Young, N.M. Off. of the State Engineer, Water Rights Div. (Apr. 2001); Telephone Interview with Jim Sizemore, N.M. Off. of the State Engineer (June 2006).

[87] N.M. Stat. Ann. § 70-2-12.1 (elec. 2006).

thority over CBNG production. By statute, the division regulates the disposition of CBNG produced water.[88]

While New Mexico does not have a statutory scheme specifically for CBNG development, its Mine Dewatering Act serves as an interesting model. New Mexico adopted the Mine Dewatering Act in 1980 to address anticipated impacts from open pit uranium mining. Prior to the adoption of the Act, the State Engineer determined that it had no jurisdiction over mine dewatering since it was not a beneficial use of water. As a result, injured water right owners had to seek redress by filing private civil actions to enjoin the mining activity.[89] The Act was passed to allow mining to continue while protecting existing water rights.[90]

The Act defines mine dewatering as diverting groundwater by "depressurizing wells, mine shaft pumping or by other means necessary to displace water from an area of mining operations."[91] Mine dewatering is neither an appropriation of water nor a waste of water.[92] If mine dewatering impacts vested water rights, the mine may still operate by offering a substitute water supply, by drilling a new or deeper well for the impaired water right owner, or by negotiating a waiver of protection with the water right owner.[93] If the water right owner is unsatisfied with the replacement plan, an appeal may be filed with the State Engineer. The State Engineer also permits mine dewatering in declared underground basins.[94] The State Engineer may seek injunctive relief if the Act is being violated; however, no private actions are allowed.[95]

Following passage of the Act, one commentator predicted that it "leaves questions which will need to be resolved by both the State Engineer and the courts in coming years."[96] This prediction has not been realized since the anticipated growth in the uranium

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[88] *Id*. § 70-2-12(B)(15).

[89] Gottlieb, *supra* note 10, at 659-60.

[90] N.M. Stat. Ann. § 72-12A-2(B) (elec. 2006).

[91] *Id*. § 72-12A-3(B).

[92] *Id*. § 72-12A-5(A).

[93] *Id*. § 72-12A-3(D) & -4.

[94] *Id*. § 72-12A-7(A), (F).

[95] *Id*. § 72-12A-11.

[96] Gottlieb, *supra* note 10, at 679.

mining industry never materialized and the Act has been seldom, if ever, used.[97]

Although the Act does not define mining operations, New Mexico's Mining Act defines "mine" and "mineral" to exclude oil and gas operations.[98] While the Act does not apply to CBNG water production, it provides a model of an alternative approach to address water quantity impacts.

### [5] Conclusion

The Western states generally treat CBNG produced water as a waste product under the control and authority of the state oil and gas commissions. Wyoming is the only state that considers CBNG production as a beneficial use of water requiring a water right. Wyoming's requirement is largely a reporting matter that does not result in an adjudicated water right.

While there is public concern over adverse impacts on other water right owners from CBNG groundwater withdrawals, the experiences of the state water management agencies, to date, do not substantiate these concerns. Unless significant problems occur, Western states will likely continue to rely on state oil and gas commissions to address impacts.

Montana is the only state that has adopted specific statutory provisions to protect against adverse impacts from CBNG production. With Montana's still-limited CBNG experience, it is too early to reach any conclusion concerning the effectiveness of these provisions. If significant adverse impacts do occur elsewhere, other states may consider adopting legislation tailored to meet the challenges of CBNG development.

## § 12.04 Surface Discharge and the Clean Water Act

In theory, the least expensive way of handling produced water is to surface discharge the water. Doing so can involve the federal Clean Water Act (CWA)[99] and several federal and state agencies. Numerous CWA issues are raised by surface discharge of pro-

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[97] Telephone Interview with Paul Saavedra, N.M. Off. of the State Engineer (July 2001); Telephone Interview with Jim Sizemore, N.M. Off. of the State Engineer (June 2006).

[98] N.M. Stat. Ann. §§ 69-4-1, 69-36-3(G) (elec. 2006).

[99] Federal Water Pollution Control Act Amendments of 1972, Pub. L. No. 92-500, 86 Stat. 816; 33 U.S.C. §§ 1251-1387 (elec. 2006).

duced water: the effect of CBNG produced water on waters used for irrigation; interstate and tribal water quality standards; the assimilative capacity of waters for CBNG produced water; CBNG stormwater runoff; and the impact of CBNG impoundment seepage on groundwater.[100] Litigation, legislation, and policymaking have addressed some of these issues, while others remain unclear or under development.

### [1] NPDES Permits for Produced Water

The CWA jurisdictional trigger is the discharge *of any pollutant, from a point source, to navigable waters*.[101] If produced water meets this regulatory threshold, CWA § 402 National Pollutant Discharge Elimination System (NPDES) permits from the Environmental Protection Agency (EPA), or from a state with a delegated program, must be obtained before discharge.

#### [a] Addition

The CWA defines "discharge" to include "any addition of any pollutant."[102] The EPA and courts have broadly defined "addition." A discharge does not have to be "new" to be a CWA regulated addition. In *Sierra Club v. El Paso Gold Mines, Inc.*,[103] the Tenth Circuit concluded, "[t]he better view is that point source owners such as El Paso can be liable for a discharge of pollutants occurring on their land, whether or not they acted in some way to cause the discharge." In *Rybachek v. EPA*,[104] the resuspension of stream solids as a result of placer mining was a discharge. More recently, in *Borden Ranch Partnership v. Army Corps of Engineers*,[105] deep ripping of wetlands was deemed an addition. But water flowing over dams, to date, has not been found to trigger the need for an NPDES permit.[106] In *South Florida Water Management District v.*

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[100] Franz & Watson, *supra* note 1, at 17-17.

[101] *See* 33 U.S.C. §§ 1311(a), 1342(a)(1), 1362(12) (elec. 2006).

[102] 30 U.S.C. § 1362(12) (elec. 2006).

[103] 421 F.3d 1133, 1145 (10th Cir. 2005), *as corrected, reh'g granted* Oct. 21, 2005, *cert. denied*, 126 S. Ct. 1653 (Apr. 3, 2006).

[104] 904 F.2d 1276, 1285-86 (9th Cir. 1990).

[105] 261 F.3d 810, 815 (9th Cir. 2001), *aff'd by an equally divided court*, 537 U.S. 99 (2002).

[106] *See* Nat'l Wildlife Fed'n v. Gorsuch, 693 F.2d 156 (D.C. Cir. 1982).

*Miccosukee Tribe*,[107] the Supreme Court left open the question of whether the mere transfer of water between water bodies that may or may not be "meaningfully distinct" constitutes a discharge of a pollutant under CWA § 402. The government, as amicus, argued that all "navigable waters" should be considered unitary "waters of the United States" and, thus, transfers between two such water bodies would not trigger an NPDES permit.[108] The Court declined to address this theory without more development by the government. On June 7, 2006, EPA sought to address the *Miccosukee* water transfer issue with a proposed rule that concludes that transfer of water, without subjecting it to intervening industrial, municipal, or commercial use, would not require NPDES permits.[109] The EPA notes that this proposed rule codifies "the Agency's longstanding practice" that was described in an August 2005 legal opinion.[110]

The EPA's water transfer interpretation has already been challenged and rejected. In *Catskill Mountains Chapter of Trout Unlimited, Inc. v. New York City*,[111] the Second Circuit rejected EPA's interpretation of "water transfers," finding that transfers between two distinct "navigable waters" will require an NPDES permit.

**[b] Pollutants**

The term "pollutants" is broadly defined in CWA to include "dredged spoil, solid waste . . . chemical wastes, biological materials . . . heat . . . rock, sand [and] cellar dirt. . . ."[112] In *U.S. PIRG v. Atlantic Salmon of Maine, LLC*,[113] the First Circuit found that

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[107] 541 U.S. 95 (2004) (remand on issue of "unitary water" and transfer of unaltered waters).

[108] *Id.* at 96.

[109] Proposed Rule, National Pollutant Discharge Elimination System (NPDES) Water Transfers, 71 Fed. Reg. 32,887 (June 7, 2006).

[110] *Id.* at 32,889; *see also* Mem. from Ann R. Klee, General Counsel, & Benjamin H. Grumbles, Ass't Admin'r for Water, to the Reg'l Admin'r of EPA (Aug. 5, 2005), *available at* http://www.epa.gov/ogc/documents/water_transfers.pdf.

[111] 451 F.3d 77, 84 (2d Cir. 2006).

[112] 33 U.S.C. § 1362(6) (elec. 2006). Uncontaminated stormwater runoff from mining or oil and gas operations must comply with stormwater permit requirements. *See infra* § 12.04[5][b].

[113] 215 F. Supp. 2d 239, 247 (D. Me. 2002), *aff'd*, 339 F.3d 23, 28 (1st Cir. 2003).

escaped fish, their feces, and fish food from a fish farm constitute a pollutant under CWA.

In *Northern Plains Resource Council v. Fidelity Exploration & Development Co.*,[114] the Ninth Circuit ruled that produced, unaltered groundwater from CBNG wells satisfies the CWA definition of "pollutant" because it is an "industrial waste."[115] The Ninth Circuit also struck down the Montana water quality law permitting the discharge of unaltered groundwater, reasoning that states are not authorized to exempt discharges under the CWA.[116]

**[c] Point Source**

The CWA defines a point source as "any discernable, confined and discrete conveyance including . . . pipe, ditch . . . tunnel, conduit. . . ."[117] The Supreme Court in *Miccosukee* addressed the issue of what a point source is and specifically found that actual generation of pollution was not required, a mere conveyance was enough to be found a point source.[118] In *United States v. Earth Sciences, Inc.*,[119] the Tenth Circuit found that a gold leaching system that was capable of overflowing its sumps and ditches was a regulated point source. In *Fishermen Against the Destruction of the Environment, Inc. v. Cloister Farms, Inc.*,[120] the Eleventh Circuit held that an NPDES permit was not required for channelized runoff from otherwise exempt agricultural stormwater and return flows. Unchanneled and uncollected surface waters are excluded from the

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[114] 325 F.3d 1155, 1160-61 (9th Cir. 2003), *cert. denied*, 540 U.S. 967 (2003).

[115] *Id.* "Industrial waste" includes "any useless or worthless byproduct derived from the commercial production and sale of goods and services." *Id.* at 1161 (quoting *Am. Heritage Dictionary* 672 (1979)). The court also found that produced water is consistent with the CWA's definition of pollutants (man-made alteration). *Id.* at 1162; *see* 33 U.S.C. § 1362(19) (elec. 2006).

[116] 325 F.3d at 1164-65 (striking down Mont. Code. Ann. § 75-5-41(1)(b) (2001)).

[117] 43 U.S.C. § 1362(14) (elec. 2006); *see, e.g.*, Headwaters Inc. v. Talent Irrigation Dist., 243 F.3d 526, 533-34 (9th Cir. 2001) (herbicides in irrigation canal are a discharge from a point source).

[118] S. Fla. Water Mgmt. Dist. v. Miccosukee Tribe, 541 U.S. 95, 105 (2004).

[119] 599 F.2d 368, 374 (10th Cir. 1979).

[120] 300 F.3d 1294, 1297 (11th Cir. 2002).

NPDES permitting system as nonpoint source pollution and are addressed by the states under a different section of the Act.[121]

### [d] Navigable Waters

CWA § 303(d) defines "navigable water" as "the waters of the United States."[122] The battleground area has been wetlands. Recent Supreme Court rulings had begun to define some limits, but what is and is not jurisdictional "navigable water" remains unclear.

#### [i] Surface Water

Surface water is generally covered by the CWA if it meets EPA's broad regulatory definition of waters of the United States. The EPA's definition includes water used in interstate commerce, interstate waters, intrastate lakes, rivers, streams, mudflats, prairie potholes and wetlands, tributaries, and wetlands adjacent to navigable water.[123] Litigation has sought to define the limits of federal jurisdiction. In 1985, the Court in *United States v. Riverside Bayview Homes, Inc.* held that CWA jurisdiction extends to wetlands abutting traditional navigable waters.[124] In 2001, in *Solid Waste Agency of Northern Cook County v. U.S. Army Corps of Engineers* (*SWANCC*),[125] the Court rejected the Corps's "migratory bird" rule as enough of an interstate commerce hook to bring an isolated intrastate water body under CWA jurisdiction.[126] Citing *Riverside Bayview*, the *SWANCC* Court observed that a "significant nexus" between the subject water and navigable water is sufficient to establish jurisdiction.[127] The Court cautioned, however, that "Congress' separate definitional use of the phrase 'waters of the United States,' [does not] constitute a basis for reading the term 'navigable waters' out of the statute."[127.1] Courts prior to *SWANCC* had found that non-navigability was not a hindrance to

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[121] *See infra* § 12.04[5][a]; NRDC v. Train, 396 F. Supp. 1393 (D.D.C. 1975), *aff'd*, 568 F.2d 1369 (D.C. Cir. 1977) (unchanneled and uncollected runoff is not a point source).

[122] 33 U.S.C. § 1362(7) (elec. 2006); *see also* 33 C.F.R. § 328.3; 40 C.F.R. §§ 110.1, 122.1(b)(1), 230.3 (elec. 2006); *see also infra* at note 194.

[123] 40 C.F.R. § 122.2 (elec. 2006).

[124] 474 U.S. 121, 131 (1985).

[125] 531 U.S. 159, 172 (2001).

[126] *Id*. at 171-72.

[127] *See id.* at 167.

[127.1] *Id*. at 172.

finding CWA jurisdiction. For example, the Tenth Circuit, in *Quivira Mining Co. v. EPA*,[128] found the discharge into a dry arroyo was into "waters of the United States."

Despite the language in *SWANCC*, somewhat encouraging to industry, a majority of the courts post-*SWANCC* have continued to apply a broad definition of "waters of the United States" to include non-navigable tributaries to navigable waters.[129] In *United States v. Gerke Excavating, Inc.*,[130] fill and water connected to a tributary of navigable water by a ditch through a non-navigable creek and non-navigable river was found to be covered by the CWA. The Fifth Circuit has been the lone exception to narrow the application of the CWA after *SWANCC*.[131] In *United States v. Hubenka*,[132] the Tenth Circuit examined the Corps's "tributary rule" in a criminal case involving installation of dikes on tributaries of the Wind River. The court explicitly rejected the reasoning of the Fifth Circuit and followed the majority of courts post-*SWANCC*.[133]

In 2003, EPA announced a proposed rule and guidance to define the scope of "waters of the United States" post-*SWANCC*, but the pushback on the proposed rule resulted in a halt to the rulemaking.[134]

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[128] 765 F.2d 126, 129-30 (10th Cir. 1985).

[129] *See, e.g.*, United States v. Deaton, 332 F.3d 698 (4th Cir. 2003), *cert. denied*, 541 U.S. 972 (2004) (wetland adjacent to road ditch eight miles from navigable water); Baccarat Fremont Developers, LLC v. Army Corps of Engineers, 425 F.3d 1150 (9th Cir. 2005) (wetland separated by a berm from navigable flood channel); United States v. Johnson, 437 F.3d 157 (1st Cir. 2006).

[130] 412 F.3d 804, 807 (7th Cir. 2005), *cert. granted & judgment vacated*, 126 S. Ct. 2964 (2006), in light of the Supreme Court's ruling in *Rapanos v. United States*, 126 S. Ct. 2208 (2006); see *infra* notes 135-142 and accompanying text.

[131] *In re* Needham, 354 F.3d 340, 347 n.12 (5th Cir. 2003) (requiring navigability or a "significant measure of proximity"); Rice v. Harken Exploration Co., 250 F.3d 264 (5th Cir. 2001), *reh'g en banc denied*, 263 F.3d 167 (5th Cir. 2001).

[132] 438 F.3d 1026 (10th Cir. 2006).

[133] *Id*. at 1033-34.

[134] Advanced Notice of Proposed Rulemaking and Guidance on Clean Water Act Regulatory Definition of "Waters of the United States," 68 Fed. Reg. 1991 (Jan. 15, 2003), rulemaking halted, 68 Fed. Reg. 72,821 (Dec. 22, 2003). On May 18, 2006, the House attached a rider to the 2007 Appropriations Bill to prevent EPA from implementing the proposed rule. H. Rep. 109-402.

In 2006, the Supreme Court took up the issue in a consolidated appeal from *United States v. Rapanos*[135] and *Carabell v. U.S. Army Corps of Engineers*.[136] On June 19, 2006, the U.S. Supreme Court issued *Rapanos v. United States*,[137] a splintered decision ultimately remanding the cases to the Sixth Circuit without clear guidance. Justice Scalia wrote the plurality opinion for the Chief Justice and Justices Alito and Thomas. He set out a two-part test: (1) wetlands must be adjacent to a "relatively permanent, standing or continuously flowing" body of water; and (2) wetlands must have a continuous physical surface connection to that water and not merely a hydrologic connection.[138] Justice Stevens writing for the dissent (Justices Souter, Ginsberg, and Breyer) would have deferred to the Corps's broad "hydrologic connection" interpretation of its rules.[139] Justice Kennedy wrote the concurring opinion and called for the Corps, in the absence of a rule, to conduct a case-by-case analysis to determine if a wetland adjacent to a tributary has a "significant nexus."[140] Chief Justice Roberts (and Justice Breyer) lamented the failure of the Corps and EPA to promulgate rules. "Rather than refining its view of its authority in light of our decision in *SWANCC*, and providing guidance meriting deference under our generous standards, the Corps chose to adhere to its essentially boundless view of the scope of its power. The upshot today is another defeat for the agency."[141] On June 26, 2006, the Supreme Court vacated and remanded *Gerke Excavating, Inc. v. United States*[142] to the Seventh Circuit in light of the Court's ruling in *Rapanos*. It is expected that either the agencies will begin rulemaking or Congress will act to define this difficult

[135] 339 F.3d 447 (6th Cir. 2003) (a wetland adjacent to a drain connected to a non-navigable water 11 miles downstream of navigable water).

[136] 391 F.3d 704 (6th Cir. 2004) (wetland adjacent to navigable water but separated by a berm).

[137] 126 S. Ct. 2208 (2006).

[138] *Id.* at 2225.

[139] *Id.* at 2252.

[140] *Id.* at 2246. In *United States v. Chevron Pipeline Co.*, No. 5:05-CV-0293-C (N.D. Tex. filed June 28, 2006), the first case to apply *Rapanos*, the court decided, without clear guidance from the Supreme Court, that it would use the Fifth Circuit test and found dry channels and creek beds that seldom flow are not "waters of the U.S." Slip op. at 14.

[141] *Rapanos*, 126 S. Ct. at 2236.

[142] 126 S. Ct. 2964 (2006).

jurisdictional issue. In the meantime, EPA and the Corps are preparing guidance on how to implement the *Rapanos* decision.

**[ii] Groundwater**

Groundwater quality is generally not regulated by the CWA and regulation is left largely to the states.[143] A still unsettled issue, particularly post-*Rapanos*, is whether groundwater that is hydrologically connected or tributary to surface waters is under CWA jurisdiction.

In *Sierra Club v. Colorado Refining Co.*,[144] the court addressed the issue of whether a refinery that discharged pollutants onto the ground and into groundwater that eventually made it to Sand Creek implicates the CWA. The court reviewed the case law in several jurisdictions, concluded that case law conflicts, but found tributary groundwater regulated by the CWA,[145] relying on *United States v. Earth Sciences, Inc.*[146] and *Quivira Mining Co. v. EPA*,[147] where the Tenth Circuit chose to "interpret the terminology of CWA broadly."

The Seventh Circuit in *Village of Oconomowoc Lake v. Dayton Hudson Corp.*,[148] the First Circuit in *Town of Norfolk v. U.S. Army Corps of Engineers*,[149] and the Fifth Circuit in *Rice v. Harken Exploration Co.*[150] have explicitly rejected the hydrologic connection to surface water as a basis for CWA authority over discharges to groundwater.

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[143] CWA § 319; 33 U.S.C. § 1329 (elec. 2006); *see* Exxon Corp. v. Train, 554 F.2d 1310, 1325-29 (5th Cir. 1977); *see, e.g.*, Mont. Code Ann. § 75-5-103(29) (elec. 2006); Wyo. Stat. Ann. § 35-11-103(c)(vi) (elec. 2006); Colo. Rev. Stat. § 25-8-103(19) (elec. 2006).

[144] 838 F. Supp. 1428 (D. Colo. 1993).

[145] *Id.* at 1434; *see also* Friends of Santa Fe County v. LAC Minerals, Inc., 892 F. Supp. 1333, 1357-58 (D. N.M. 1995) (jurisdiction found even though it could take "centuries" for groundwater to discharge).

[146] 599 F.2d 368 (10th Cir. 1979).

[147] 765 F.2d 126 (10th Cir. 1985).

[148] 24 F.3d 962, 965 (7th Cir. 1994).

[149] 968 F.2d 1438, 1451 (1st Cir. 1992).

[150] 250 F.3d 264, 271 (5th Cir. 2001).

#### [iii] Surface Impoundments

NPDES permits are not required for "[d]ischarges into a privately owned treatment works."[151] The EPA's definition of "waters of the United States" specifically excludes "[w]aste treatment systems, including treatment ponds or lagoons designed to meet the requirements of CWA."[152] This exclusion is limited to manmade waters that do not discharge into surface waters. As will be discussed, *infra* § 12.05, the states regulate storage impoundments for oil and gas produced water in various ways.

### [2] CWA Permits and Water Quality Standards

The CWA imposes a requirement that point sources meet certain levels of technology-based controls and requires each state to adopt water quality standards to protect designated uses of the water.[153] A water quality standard consists of: (1) identification of the designated uses (e.g., agricultural, fisheries, recreational) of the water; (2) water quality criteria to protect those uses; and (3) an anti-degradation policy.[154] The anti-degradation requirement is designed to maintain current levels of water quality. The CWA requires the permitting authority to consider effluent limits based on the technology available to treat pollutants (technology-based limits) and on the protection of designated uses (water quality based limits).[155] An NPDES permit will limit the produced water discharge to protect designated beneficial uses of the particular receiving water. The CWA requires EPA to develop technology-based "effluent limitation guidelines" (ELGs) for industrial categories.[156] The EPA has provided national technology-based ELGs for more than 56 industrial categories.[157] In *Citizens Coal*

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[151] 40 C.F.R. § 122.3(g) (elec. 2006).

[152] 40 C.F.R. § 122.2 (elec. 2006).

[153] 33 U.S.C. § 1313 (elec. 2006); 40 C.F.R. § 131.10 (elec. 2006).

[154] *See* 40 C.F.R. § 131.6 (elec. 2006).

[155] 33 U.S.C. § 1311 (elec. 2006).

[156] 33 U.S.C. § 1314(b) (elec. 2006).

[157] *See, e.g.*, Coal Mining Point Source Category, 40 C.F.R. pt. 434 (elec. 2006) (drainage from coal mines) and Oil and Gas Extraction Point Source Category, 40 C.F.R. pt. 435 (elec. 2006).

*Council v. EPA*,[158] the Sixth Circuit ruled *en banc* (8-5) upholding EPA's 2002 coal mine remining ELG rule.

In the absence of an ELG, limitations can be developed on a case-by-case basis using "best professional judgment (BPJ)."[159] In 2001, EPA Region 8 took the position that existing ELGs do not cover CBNG water and undertook the preparation of a BPJ technical guidance for CBNG produced water, ostensibly to assist the tribes in preparation of their own water quality standards.[160] The Northern Plains Resource Council (NPRC) prepared a report, based on information in the draft BPJ guidance, arguing for technology-based standards that would support "zero discharge" and require injection and/or reinjection or water treatment in the Powder River Basin.[161] The Department of Energy and industry responded with their own studies that took issue with both the BPJ and NPRC report.[162] The BPJ was never finalized.

### [a] CBNG Water Quality Issues

The key water quality issues that regulators of CBNG produced water focus on are the salinity or amount of total dissolved salts in the water (TDS) and sodicity or sodium adsorption ratio (SAR). If the TDS, or its surrogate electrical conductivity (EC), is too high, the water can be harmful to plants. If the SAR is high, it can create problems for plant production by limiting the permeability of soils. In 2003, the Montana Department of Environmental Quality (DEQ) adopted numeric water quality criteria for EC and SAR.[163] Industry has filed litigation against EPA for its approval

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[158] 447 F.3d 879 (6th Cir. 2006).

[159] 40 C.F.R. § 125.3 (elec. 2006).

[160] EPA Region 8, "Best Professional Judgment" A Coalbed Methane BPJ (Feb. 2003) (unpublished interagency draft) [hereinafter EPA BPJ].

[161] Kuipers & Assocs., "Draft Technology Based Effluent Limitations for Coal Bed Methane Produced Wastewater Discharges in the Powder River Basin of Montana and Wyoming" (Aug. 2004) (prepared for NPRC).

[162] U.S. Dep't of Energy, Powder River Basin Coalbed Methane Development and Produced Water Management Study (DOE/NETL-2003/1184, Nov. 2002, *available at* http://fossil.energy.gov/programs/oilgas/publications/coalbed_methane/PowderRiverBasin2.pdf; CDM, Inc., Technical Review and Analysis of Kuipers'/NPRC Documents Related to the Management of CBNG Produced Water on the Powder River Basin, prepared for Petroleum Association of Wyoming (Dec. 21, 2004), *available at* http://deq.state.wy.us/wqd/WYPDES_Permitting.

[163] Mont. Admin. R. 17.30.670 (elec. 2006).

of Montana's EC and SAR water quality standards, *Pennaco Energy Inc. v. EPA*,[164] and the states of Wyoming and Montana have moved to intervene in the litigation.

In March 2006, the Montana Board of Environmental Review (Board) revised its anti-degradation policy, prohibiting discharges into state waters that exceed 10% of its numeric water quality criteria for EC and SAR.[165] The Board found that EC and SAR are "harmful parameters," triggering the need to obtain an "authorization to degrade." The Board rejected the portions of the proposed rule that would have required reinjection of produced water.[166] Although the Board's explanation of its action indicates that treatment of produced water prior to discharge is not required, that may be the only way to avoid the need for a state "authorization to degrade."[167]

The proposed adoption of the March 2006 rule has created interstate warfare. Wyoming is challenging the revised rule which it argues would severely hamper its CBNG industry.[168] The EPA is currently reviewing the revised rule under its CWA authority and Wyoming has asked EPA to mediate the dispute between the two states. In May 2006, EPA pledged to develop a suite of options to help the two states resolve the dispute.[169]

In Wyoming, the state has not adopted numeric standards for constituents in CBNG produced water. Recently, however, the state's water quality advisory board recommended an "agricul-

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[164] No. 06-CV-0100-B (D. Wyo. filed Apr. 25, 2006).

[165] Mont. Dep't of Envtl. Quality, Coalbed Methane Rule Update, *available at* http://www.deq.mt.gov/ber/doc/cbmsummary.pdf (last visited June 15, 2006) (summarizing the revisions to Mont. Admin. R. 17-30-670 & 17.30.1202).

[166] *Id*.

[167] *See, e.g.*, Mont. Envtl. Info. Ctr. v. Dep't of Envtl. Quality, 988 P.2d 1236, 1249 (Mont. 1999) (interpreting the environmental provisions of the Montana Constitution, "[i]n doing so, we conclude that the [constitutional] delegates' intention was to provide . . . protections which are both anticipatory and preventative").

[168] *See* Letter from Dave Freudenthal, Wyo. Gov., to Steven L. Johnson, EPA Adm'r (Apr. 5, 2006), *available at* http://Wyoming.gov/governor ("Montana's avowed purpose in adopting these rules is to impose stringent limits on discharges of produced water from coalbed natural gas operations in Wyoming . . . [which] could visit serious economic harm to Wyoming.").

[169] Daily News, EPA Pledges "Options" to Resolve Interstate Coalbed Methane Dispute (May 19, 2006), *available at* http://InsideEpa.com.

tural use policy" that would establish EC and SAR limits on water that may reach a certain category of agricultural lands.[170] Wyoming has also proposed an "assimilative capacity allocation and control process" and a watershed-based permitting and trading program to achieve compliance with stringent standards downstream in Montana.[171]

### [3] CWA § 401—State Certification

An applicant for a federal license or permit to conduct an activity that may result in a CWA discharge must also provide certification from the state to the federal permitting agency that the discharge complies with the CWA and the state may impose "appropriate requirements" on permit issuance.[172] The EPA must review the CWA § 401 state certification and the federal permit application to determine whether the water quality standards of any other state are affected.[173] There has been continued litigation interest in CWA § 401 as a means to take another "bite at the apple" at the issuance of a federal permit.[174] In 2006, the U.S. Supreme Court defined the reach of CWA § 401. The Court, in *S.D. Warren Co. v. Maine Board of Environmental Protection*,[175] held unanimously that the use of the term "discharge" in CWA § 401 differs from the term as it is used in CWA § 402 (NPDES permits).

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[170] Wyo. Dep't of Envtl. Quality, Agricultural Use Protection Policy 4-5 (5th draft, June 30, 2006), *available at* http://deq.state.wy.us.

[171] Wyo. Dep't of Envtl. Quality, Mem. by John Wagner, Wyoming Pollutant Discharge Elimination System (WYPDES) Program, Assimilative Capacity Allocation and Control Process (June 23, 2006), *available at* http://deq.state.wy.us; WYPDES Watershed Permitting Approach for Coalbed Methane Development, *available at* http://deq.state.wy.us/wqd/WYPDES_Permitting/WYPDES_cbm/Pages/CBM_Watershed_Permitting/Clear_Creek/wypdes_cbm_wsperm-ClearCk.asp (last visited June 10, 2006); Wyo. DEQ, Mem. by John Wagner, Updated Approach to CBM Watershed Based Permitting (Jan. 4, 2005), *available at* http://deq.state.wy.us/wqd/WYPDES_Permitting/WYPDES_cbm/Pages/CBM_Watershed_Permitting/Downloads/Wagner_Memo_01_05195.pdf; Daily News, Wyoming Eyes Coalbed Methane Water Quality Trading Program (Mar. 20, 2006), *available at* http://InsideEPA.com.

[172] 33 U.S.C. § 1341(a)(d) (elec. 2006); *see* PUD No. 1 v. Wash. Dep't of Ecology, 511 U.S. 700 (1994) (imposing state minimum flow requirements on a federal dam).

[173] 33 U.S.C. § 1341(a)(2) (elec. 2006); 40 C.F.R. §§ 121.11 - 121.16 (elec. 2006).

[174] *See, e.g.*, N. Plains Res. Council, Inc. v. Norton, No. CV-01-96-BLG-RWA (D. Mont. filed June 13, 2001) (CBNG operator and BLM failed to obtain a CWA § 401 certification) (issue settled); Wyo. Outdoor Council v. U.S. Army Corps of Eng'rs, 351 F. Supp. 2d 1232 (D. Wyo. 2005).

[175] 126 S. Ct. 1843 (2006).

The Court distinguished CWA § 401 from CWA § 402 by noting that "the triggering statutory term [in § 402] is not the word 'discharge' alone, but 'discharge of a pollutant,' a phrase made narrower by its specific definition requiring an 'addition' of a pollutant to the water."[176]

The Court held that in the case of CWA § 401, where "discharge" is unmodified and undefined by the CWA, its common sense meaning as "flowing or issuing out" should be employed and thus would apply to the relicensing of a dam.[177]

**[4] BLM Management of Produced Oil and Gas Water**

On federal lands, BLM Onshore Order No. 7 directs that oil and gas produced water be disposed of in one of three ways: (1) injection (the preferred method); (2) discharge into pits (lined or unlined); or (3) other methods approved by the authorized officers (pursuant to NPDES permits). For example, in the Wyoming portion of the Powder River Basin (PRB), BLM's PRB Plan Amendment approves direct surface discharge, treatment and direct discharge, infiltration, containment, and injection into disposal wells, with infiltration as the preferred method.[178] In *Pennaco Energy, Inc. v. U.S. Department of the Interior*,[179] the Tenth Circuit upheld an Interior Board of Land Appeals (IBLA) decision that PRB CBNG water production presents unique problems requiring pre-lease analysis. Litigants have not been entirely successful in transferring the reasoning of *Pennaco* to other basins. In 2005, in *Western Slope Environmental Resource Council*,[180] the IBLA found that the Piceance Basin production of coalbed natural gas did not present the same issues as the Powder River Basin, and it upheld the leases.

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[176] *Id*. at 1850.

[177] *Id*. at 1848, 1853.

[178] Record of Decision, Powder River Basin Environmental Impact Statement and Proposed Plan Amendment (2003) Wyoming 6. The Plan has been challenged in *W. Org. of Research Councils v. Bureau of Land Mgmt.*, No. CV-04-00018-ABJ (D. Wyo. 2003) and in *Am. Lands Alliance v. Bureau of Land Mgmt.*, No. CV-04-00019-ABJ (D. Wyo. 2003).

[179] 377 F.3d 1147, 1159 (10th Cir. 2004).

[180] 164 IBLA 329, 340, GFS(O&G) 11(2005).

### [5] Other CWA Permitting Challenges

#### [a] CWA § 303(d) (TMDL)

Section 303(d) of CWA[181] addresses nonpoint source pollution. This section requires states to: first, list water quality limited segments (waters not meeting water quality standards); and second, develop a pollution load allocation for background, point, and nonpoint sources to allow the water segment to achieve standards—a total maximum daily load (TMDL). Issues for produced water dischargers include whether their NPDES permits will be curtailed because the assimilative capacity of listed water segments is not adequate to accept produced water. For example, in Montana, work continues on the development of a TMDL for the Tongue and Powder Rivers incorporating the state's new TDS and SAR water quality standards which could further limit Wyoming CBNG discharges.[182]

#### [b] Stormwater

Regulation of stormwater is governed by the issuance of a state or federal CWA § 402 general permit or an individual NPDES permit.[183] Stormwater that comes into contact with overburden, waste, or other products is typically regulated by Best Management Practices and a Storm Water Pollution Prevention Plan (SWPPP).[184] However, the CWA contains an exemption for discharges of stormwater runoff from "mining operations or oil and gas exploration, production, processing, or treatment operations. . . ." that do not contact such materials.[185] In a long-running dispute, EPA as early as 1982 asserted that Phase II stormwater regulation could apply

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[181] 33 U.S.C. § 1313(d)(1)(A) (elec. 2006); *see also* 40 C.F.R. § 130.7 (elec. 2006); Am. Wildlands v. Browner, 260 F.3d 1192, 1194 (10th Cir. 2001) (discussing EPA and states' roles with respect to nonpoint source discharges).

[182] *See* Tetra Tech, Inc. TMDL Status Report: Powder River TMDL Planning Area 1 (Mar. 14, 2003), *available at* http://deq.mt.gov/wqinfo/TMDL/TPR/TPRModelingofFrameworkRpt.pdf; Friends of the Wild Swan, Inc. v. EPA, 130 F. Supp. 2d 1207, 1209 (D. Mont. 2000) (no issuance of new or revised NPDES permits on 1996 303(d) listed waters until "all necessary TMDLs" are developed); *see also* Daily News, *supra* note 169.

[183] 33 U.S.C. § 1342(p) (elec. 2006).

[184] 40 C.F.R. § 122.26(b)(14)(iii) (elec. 2006).

[185] 33 U.S.C. § 1342(*l*)(2) (elec. 2006), 40 C.F.R. § 122.26(a)(2) (elec. 2006).

to small (1-5 acres) oil and gas construction activities.[186] In 1999, the Phase II rule was issued under EPA's assumption that it would apply to few oil and gas construction sites.[187] Industry pointed out that the rule could cover approximately 30,000 oil and gas construction sites annually and would have a significant economic impact on the industry. In response, EPA deferred until 2006 the Phase II stormwater rule for small (1-5 acres) oil and gas construction activities.[188] In the Energy Policy Act of 2005, Congress put an end to the dispute by providing that exempt oil and gas construction activities would include "activities necessary to prepare a site for drilling and for the movement and placement of drilling equipment, whether or not such field activities or operations may be considered construction activities."[189] On June 12, 2006, EPA issued amendments to its stormwater regulations exempting oil and gas construction activities unless the stormwater discharges contain pollutants other than non-contaminated sediment.[190] Some environmental groups and states have objected to EPA's rule. Colorado, for example, has elected to continue to regulate stormwater discharges from construction activities for oil and gas sites that disturb between one and five acres, as well as sites over five acres.[191]

Litigation has challenged the use of stormwater general permits without numeric discharge limits and the opportunity for the public to comment.[192]

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[186] *See* Appalachian Energy Group v. EPA, 33 F.3d 319, 321 (4th Cir. 1994) (EPA 1982 memorandum to Region 8 challenged; case dismissed).

[187] 64 Fed. Reg. 68,722 (Dec. 8, 1999).

[188] 68 Fed. Reg. 11,327 (Mar. 10, 2003); Tex. Indep. Producers & Royalty Owners Ass'n v. EPA, 413 F.3d 479 (5th Cir. 2005) (challenge to Phase II rule dismissed as unripe).

[189] Energy Policy Act of 2005, § 323, Pub. L. No. 109-58, 119 Stat. 594 (2005).

[190] Final Rule, Amendments to the NPDES Regulations for Storm Water Discharges Associated with Oil and Gas Exploration, Production, Processing, or Treatment Operations or Transmission Facilities, 71 Fed. Reg. 33,628 (June 12, 2006).

[191] Colo. Water Quality Control Comm'n, Colo. Dep't of Health Order No. IR-99; Rules & Regs. of Colo. Oil & Gas Conservation Comm'n, Cause No.-IR (provisions added to Rule 1002 to implement BMPs to control stormwater runoff) (Feb. 2006); *see also* Daily News, EPA Oil and Gas Stormwater Rule Faces Likely Suit Over Legal Authority (June 16, 2006), *available at* http://InsideEPA.com.

[192] *See, e.g.*, Friends of the Earth v. EPA Region III, NPDES 06-07, No. DC-0000221 (Envtl. Appeals Bd. 2006, appeal pending); Tex. Indep. Producers & Royalty Owners Ass'n v. EPA, 410 F.3d 964, 978 (7th Cir. 2005) (general permit upheld). *But see* Envtl.

### [c] Tribal Water Quality Standards

Under the CWA, tribes may obtain "treatment as a state" (TAS) status which allows tribes to adopt their own water quality standards.[192.1] A tribe can propose its own water quality criteria, subject to EPA approval, which can be more stringent than the state's and protect unique cultural uses of water.[193] For example, Montana tribes on the border with Wyoming have been working with EPA for several years to obtain TAS status to issue water quality criteria.

### [d] Wetlands—CWA § 404

Construction activities for storage ponds, pipelines, or stream diversions to manage the discharge of produced water may result in impacts to wetlands. CWA § 404 prohibits the discharge of dredged or fill material into navigable waters without a permit from the Corps.[194] The Corps implements this program with EPA retaining veto authority over Corps permit issuance and other wetlands decision making. As discussed in § 12.04[1][d][i], this provision has been at the core of many disputes concerning the limits of the reach of the CWA. The Corps's regulations define what is a jurisdictional "water of the U.S.," and largely exclude ephemeral water bodies that do not demonstrate an ordinary high water mark, a channel clear of vegetation, or other physical evidence of the presence of water.[195] The Corps may issue individual CWA § 404 or general permits for categories of actions that "will cause only minimal adverse environmental effects."[196] In Wyoming, the Corps issued a

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Defense Center, Inc. v. EPA, 344 F.3d 832, 856 (9th Cir. 2003) (Notice of Intent requires notice and public hearing).

[192.1] *See* Kevin Gover, "Environmental Regulation in Indian Country," 20-1 in these *Proceedings*.

[193] *See* City of Albuquerque v. Browner, 97 F.3d 415, 423-24 (10th Cir. 1996) (more stringent standards may be approved by EPA without scientific support for their necessity if the water is used for cultural purposes).

[194] 33 U.S.C. § 1344(e) (elec. 2006). As the *Rapanos* plurality pointed out, there is an important jurisdictional distinction for "navigable waters" under CWA §§ 402 & 404. Rapanos v. United States, 126 S. Ct. 2208, 2222-23 (2006).

[195] 33 C.F.R. § 328.3 (elec. 2006).

[196] 33 U.S.C. § 1344(e)(1) (elec. 2006). The Corps established 43 nationwide permits in 2002 and can establish regional- or state-based general permits, 67 Fed. Reg. 2020 (Jan. 15, 2002); s*ee* Nat'l Ass'n of Home Builders v. Army Corps of Engineers, 417 F.3d 1272, 1275-76 (D.C. Cir. 2005).

general permit in 2000 to allow the construction of dams, reservoirs, pipelines, and related facilities for CBNG produced water. In *Wyoming Outdoor Council v. Army Corps of Engineers*,[197] the general permit was successfully challenged as having more than minimal impact and covering activities too dissimilar to be covered by a general permit.

Surface coal mining has spawned a series of cases examining the interplay between CWA § 402 and CWA § 404. In 1998, in *National Mining Ass'n v. Army Corps of Engineers*,[198] the D.C. Circuit invalidated the so-called *Tulloch* rule, which held that incidental fallback from dredging or drainage activities would be considered a prohibited discharge of dredged or fill material. After several years of rulemaking and litigation, in 2002 EPA and the Corps issued a joint regulation on the definitions of "fill material" and "discharge of fill material."[199] The rule codifies the long-standing practice of permitting mountaintop mining overburden (excess spoil) disposal (so-called valley fills) under CWA § 404 rather than under the NPDES permitting program. In *Bragg v. West Virginia Coal Ass'n*,[200] the Fourth Circuit reversed a lower court's decision that found excess spoil was "waste" and not CWA § 404 fill. The plaintiffs argued that the agency's stream buffer zone rule prohibits the placement of excess spoil in intermittent or perennial streams. The case was settled in 1998 when the Corps agreed to participate in a programmatic environmental impact statement (PEIS) addressing the impact of mountaintop removal mining and the use of valley fills. In *Kentuckians for the Commonwealth, Inc. v. Rivenburgh*,[201] the district court declared the 2002 EPA/Corps rule invalid, but the Fourth Circuit, in a split decision, reversed, vacated, and remanded.[202] In *Ohio Valley Environmental Coalition v. Bulen*,[203] an invalidation of a CWA § 404 nationwide permit (NWP21) authorizing discharges of fill associated with mountain-

[197] 351 F. Supp. 2d 1232, 1260 (D. Wyo. 2005).

[198] 145 F.3d 1399, 1407 (D.C. Cir. 1998).

[199] 67 Fed. Reg. 31,129 (May 9, 2002).

[200] 248 F.3d 275 (4th Cir. 2001).

[201] 204 F. Supp. 2d 927 (S.D. W.Va. 2002).

[202] Kentuckians for the Commonwealth, Inc. v. Rivenburgh, 317 F.3d 425 (4th Cir. 2003).

[203] 429 F.3d 493 (4th Cir. 2005) (reversing invalidation of NWP 21), *reh'g en banc denied*, 437 F.3d 421 (4th Cir. 2006).

top coal mining was reversed by the Fourth Circuit. In 2004, the Office of Surface Mining of the Department of the Interior issued a revised stream buffer zone rule.[204] In October 2005, EPA Region 3 issued the final PEIS for mountaintop mining/valley fills in Appalachia.[205]

### [e] Migratory Bird Treaty Act

The Migratory Bird Treaty Act prohibits, among other things, the take, capture, or killing "by any means or in any manner" of migratory birds.[206] This Act can be implicated by produced water stored in pits or CBNG evaporation reservoirs. For example, in comments submitted by the New Mexico Department of Game and Fish, on a state-proposed pit rule, the Department noted the discovery of bird and wildlife mortality at "reserve pits, flare pits, and open top tanks as well as centralized disposal and evaporation ponds."[207] The mining and oil and gas industries use noise devices, netting, and other physical or audio deterrents to birds landing in produced water storage facilities.

## § 12.05 Water Management Through Storage, Infiltration, Treatment, and Beneficial Uses

Produced water must be disposed of, used, treated, stored, or somehow managed. The fact that different basins have different geology, hydrology, and environmental and economic considerations has resulted in implementation of a flexible menu of options for water management.[208]

Since 2001, states, federal agencies, and non-governmental organizations have conducted numerous studies to examine the han-

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[204] Proposed Rule, Surface Coal Mining and Reclamation Operations; Excess Spoil; Stream Buffer Zones; Diversions, 69 Fed. Reg. 1036 (Jan. 7, 2004) ("We intend to revise rule language that is evidently confusing . . . has led to litigation. . . . ").

[205] Mountaintop Mining/Valley Fills in Appalachia Final Programmatic Environmental Impact Statement (Oct. 2005), *available at* http://www.epa.gov/region3/mtntop/pdf/mtm-vf_fpeis_full-document.pdf.

[206] 16 U.S.C. §§ 703-711 (elec. 2006) *see id.* § 703; 50 C.F.R. subpt. B (elec. 2006).

[207] Comments of N.M. Dep't of Game and Fish on proposed revisions to N.M. O.C.D. Rule 19.15.2.50, Pits and Below-Grade Tanks (Mar. 4, 2006).

[208] Gary C. Bryner, "Coalbed Methane Development: The Costs and Benefits of an Emerging Energy Resource," 43 *Nat. Resources J.* 519, 539 (2003); *see* Ruckelshaus Report, *supra* note 4, at 23-25 (Table 3).

dling of produced water.[209] The Energy Policy Act of 2005 required the Department of Energy (DOE) to have the National Academy of Sciences (NAS) investigate produced water management.[210] The NAS is expected to complete its study in August 2006.

This brief summary and § 12.06 explore the menu of water handling options used by CBNG dischargers.

### [1] Impoundments

CBNG producers may store water in impoundments as a method of managing produced water. Impoundments are manmade water bodies that vary in size (from less than an acre to hundreds of acres in size) and depth. Impoundments are used for storing, infiltrating, and evaporating produced water.[211]

Impoundments can be lined or unlined, and the design generally depends on the quality of the produced water. Unlined impoundments allow the impounded water to infiltrate the subsurface and seep into the groundwater. In contrast, lined impoundments reduce or completely prevent water seepage into the subsurface and groundwater. Because most Powder River Basin (PRB)-produced water initially meets water quality standards, many Wyoming PRB producers use unlined impoundments in combination with surface discharge.[212]

States and regulatory agencies have set requirements for the design and location of impoundments. To protect groundwater, Wyoming requires unlined off-channel impoundments to be located 500 feet from any surface waters, alluviums, and floodplains.[213] Colorado requires the lining of impoundments whenever

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[209] *See, e.g.*, ALL Consulting, Handbook on Coal Bed Methane Produced Water: Management and Beneficial Use Alternatives (July 2003) (prepared for Groundwater Protection Research Foundation, U.S. Dep't of Energy, Nat'l Petroleum Tech. Off. & Bureau of Land Management) [hereinafter ALL Handbook], *available at* http://www.all-llc.com/CBM/BU/Index.htm; EPA BPJ, *supra* note 160; Advanced Resources Int'l, The Economics of the Powder River Basin Coalbed Methane Development (Jan. 2006) (prepared for the U.S. Dep't of Energy), *available at* http://www.fossil.energy.gov/programs/ oilgas/publications/coalbed_methane/PRB_Coalbed_Methane_Development.html; Kuipers & Assocs., *supra* note 161; CDM, Inc., *supra* note 162.

[210] Pub. L. No. 109-58, § 1811, 119 Stat. 594 (2005).

[211] ALL Handbook, *supra* note 209, at 39.

[212] Bryner, *supra* note 208, at 540.

[213] Wyo. Dep't of Envtl. Quality, Mem. by Kevin Frederick, State Ground Water Program Supervisor, Revision: Off-Channel Unlined CBM Produced Water Pit Siting Guidelines for the

there is a "potential impact on an environmentally sensitive water area" (an area where the introduction of produced water will degrade the water to unacceptable levels).[214] New Mexico has recently proposed stringent revisions to its pit rule to require linings for all pits.[215]

Impoundments can provide a supplemental water supply for wildlife and livestock.[216] There are environmental concerns about the effect of impoundments on land surface, water quality, and water rights.[217] Produced water can contain higher TDS and SAR levels and can pick up additional constituents during infiltration. When this produced water flows from impoundments into surface waters or infiltrates into groundwater, it can degrade the quality of the existing water supply. Concern over reclamation of impoundments has caused some states, for example, Wyoming, to raise impoundment bond requirements.

**[2] Water Atomization**

CBNG producers use atomization in conjunction with impoundments or managed irrigation to reduce the volume of produced water. The atomization process utilizes a sprayer to disperse fine mists of water into the air so that the droplets can evaporate. If atomized water reaches CWA jurisdiction water, it could create water quality concerns. Atomization may also cause a concentration of contaminants on the ground beneath the atomizer.[218]

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Powder River Basin, Wyoming, August 6, 2002 (June 14, 2005), *available at* http://deq.state.wy.us/wqd/groundwater/downloads/CBM/PitGuidanceRevisionMemo_june14_%2005.DOC.

[214] ALL Handbook, *supra* note 209, at 41.

[215] N.M. Energy, Minerals & Natural Resources Dep't, Oil Conserv. Div., Proposed Pit Rule (Oct. 26, 2005), *available at* http://www.emnrd.state.nm.us/emnrd/ocd/documents/ProposedPitRule_001.pdf.

[216] Bryner, *supra* note 208, at 540 ("In . . . some parts of the Raton Basin, CBM companies and land owners have negotiated agreements to provide produced water for stock.").

[217] ALL Handbook, *supra* note 209, at 39.

[218] *Id.*

### [3] Managed Irrigation

CBNG producers also use managed irrigation as a method for managing produced water. It is one of the most common water management options in the PRB.[219]

If produced water contains higher TDS or SAR levels, several options are available to address the water quality challenges. These include soil flushing, irrigation of salt tolerant crops, and soil amendments. Farmers who irrigate with produced water can annually flush the soil (during the non-growing season) with higher quality water.[220] Producers can also choose to grow salt-tolerant crops such as barley, sugar beets, and sunflowers. Finally, producers can add minerals such as magnesium and calcium to the soil to maintain soil permeability.[221]

### [4] Water Treatment

Produced water can be treated through a variety of techniques such as reverse osmosis, freeze-thaw evaporation, ion exchange, and distillation[222] to raise water quality for beneficial uses or for discharge into surface waters. Reverse osmosis, also referred to as hyperfiltration, reduces the salinity levels in produced water by 95-99%. This process is expensive due to the technology required and the large amount of energy necessary to apply pressure to the water.[223] Reverse osmosis, freeze-thaw evaporation, distillation, and ion exchange all present a difficult environmental, technical, and economic issue—the disposal of the brine that is the result of these processes.[224] There are a variety of treatment options being analyzed, but the cost of treatment and the management of the waste have been deterrents to widespread use.

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[219] CDM, Inc., *supra* note 162, § 6.3 (managed irrigation yields two, and even three, crops a season).

[220] ALL Handbook, *supra* note 209, at 111.

[221] *Id.*

[222] U.S. DOE, Office of Fossil Energy, Eye on Environment: Coalbed Natural Gas Resources and Produced Water Management Issues, 5-7 (Fall 2003), *available at* http://www.netl.doe.gov/technologies/oil-gas/publications/newsletters/eoe/EyeFall03.pdf [hereinafter Eye on Environment].

[223] Advanced Resources, Int'l, *supra* note 209.

[224] CDM, Inc., *supra* note 162.

### [5] Commercial/Industrial Uses

Produced water can be used for commercial or industrial applications. For example, mining operations use produced water in numerous ways: to suppress road and coal dust, to wash coal, in drilling operations, to replenish aquifers depleted due to mining activities, and to keep operations cool to prevent spontaneous combustion.[225]

Produced water of any quality may be used to enhance oil recovery. For example, Anadarko has announced a plan to build a pipeline in the PRB to move produced water to the Salt Creek Field.

Produced water has been used to recharge depleted or partially depleted aquifers.[226] Produced water can also be used for firefighting as it was in Durango, Colorado.[227] Produced water with low TDS can be used in cooling towers for thermal exchange at industrial and chemical plants.[228]

## § 12.06 Water Disposal Through Injection and Reinjection

Injection and reinjection are used by oil and gas producers and the waste-management industry to dispose of water or other liquids in the ground via a well. Water that is "reinjected" is replaced into its location of origin, while "injected" liquids infuse new subterranean space.

While injection of produced water, particularly poor quality water, can be environmentally desirable, there are economic, technical, and regulatory obstacles that can make injection or reinjection economically or physically infeasible in certain areas.

Injection can be expensive depending on the difficulty of penetrating the formation. Injection sites must be analyzed for technical engineering and physical feasibility. Reinjection can interfere with ongoing CBNG production. Formation suitability depends on the porosity and permeability of the rocks, the storage capacity of

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[225] ALL Handbook, *supra* note 209, at 37.

[226] Eye on Environment, *supra* note 222.

[227] Jim Greenhill, "BP Accounts for 55% of Coal-Bed Gas Production," *Durango Herald*, Feb. 23, 2003.

[228] ALL Handbook, *supra* note 209, at 142.

the aquifer, and whether the receiving formation can tolerate the pressure limits caused by injection.[229] The regulatory challenge is compliance with the Safe Drinking Water Act (SDWA).

**[1] Safe Drinking Water Act of 1974**

Through the underground injection control (UIC) program, the SDWA regulates the underground injection of materials that may endanger drinking water sources.[230] States and tribes may implement the UIC program if approved by EPA. Ten states and all tribes lack their own UIC program, so their programs are implemented by EPA.[231] Underground injection is defined broadly by the Act to include "a subsurface emplacement of fluids by well injection."[232] Fluids are similarly defined broadly to include materials that flow or move, whether liquid, gaseous, or solid.[233] Aquifers may be exempt from the provisions of SDWA if the aquifer will not serve as drinking water because it is currently producing minerals or hydrocarbons.[234] The SDWA authorizes the issuance of UIC permits for classes of wells. There are five classes of wells, but only two (Classes II and V) are typically applicable to oil and gas producers.[235] Class II wells are used for deep injection to dispose of water commingled with waste fluids and for storage of fluids coproduced with oil and gas; they typically do not infiltrate drinking water.[236] Class V wells are used for shallow injection into sub-surface aquifers, may infiltrate drinking water, and do not include fluids covered in Classes I-IV wells.[237]

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[229] *Id.* at 5-20.

[230] 42 U.S.C. § 300h (elec. 2006).

[231] State UIC Programs, *available at* http://www.epa.gov/safewater/uic/primacy.html (last visited July 4, 2006).

[232] 42 U.S.C. § 300h(d)(1) (elec. 2006).

[233] 40 C.F.R. § 144.3 (elec. 2006).

[234] *Id*. § 146.4.

[235] Class I wells are used for disposal of hazardous, industrial, or municipal waste into deep isolated formations; Class III wells are those using injection for the extraction of minerals; and Class IV, which are prohibited, are those injecting hazardous or radioactive waste into or above sources of drinking water. 40 C.F.R. § 144.6 (elec. 2006).

[236] *Id*. § 144.6(b).

[237] *Id.* § 144.81.

### [a] Class II Wells and "Frac'ing"

In the Rockies, authority over Class II wells has been delegated to the state oil and gas commissions in Colorado, Montana, New Mexico, Utah, and Wyoming, and EPA retains authority on tribal lands.[238] The EPA retains jurisdiction over the issuance of UIC permits under the SDWA. The introduction of "frac'ing" substances into wells to stimulate production is also regulated under Class II wells.[239] In *Legal Environmental Assistance Foundation, Inc. (LEAF) v. EPA*,[240] environmental litigants were initially successful in removing Class II permitting authority for CBNG frac'ing activities from the Alabama oil and gas commission. In 2004, in response to that litigation and a study that EPA conducted after the *LEAF* litigation, EPA determined that the CBNG injection/hydrologic frac'ing fluids posed little to no threat to U.S. drinking water.[241] Prior to reaching this determination, EPA had entered into a memorandum of agreement with the major frac'ing service providers to eliminate the use of diesel fuel as a frac'ing substance. In the Energy Policy Act of 2005, Congress confirmed EPA's decision by excluding from the SDWA the injection of fluids (other than diesel fuels) for oil, gas, and gas thermal development.[242]

### [b] Class V Wells

In New Mexico, Utah, and Wyoming, the state environmental agencies have been granted primacy over Class V wells. In Wyoming, the DEQ approved a general permit for coalbed methane injection facilities and general permits have been written to cover

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[238] For example, in Wyoming a CBNG operator may obtain an individual or general permit depending on the pressure and quality of water to be injected. *See* Wyo. Dep't of Envtl. Quality, Underground Injection Control, *available at* http://deq.state.wy.us/wqd/groundwater/uicprogram/index.asp. In the Raton Basin of New Mexico and the San Juan Basin of Colorado and New Mexico, operators use Class II wells for disposal of CBNG water because the water is of poor quality and there is sufficient aquifer storage that is geologically suitable for injection. ALL Handbook, *supra* note 209, at 33.

[239] 40 C.F.R. § 144.6(b)(2) (elec. 2006).

[240] 118 F.3d 1467 (11th Cir. 1997).

[241] U.S. EPA, Evaluation of Impacts to Underground Sources of Drinking Water by Hydraulic Fracturing of Coalbed Methane Reservoirs (June 2004) (EPA Doc. No. 816-R-04-003), *available at* http://www.epa.gov/safewater/uic/cbmstudy/docs.html (follow "Download Entire Study" hyperlink).

[242] Pub. L. No. 109-58, § 322, 119 Stat. 594 (2005).

all of Campbell, Johnson, and Sheridan Counties.[243] EPA Region 8 retains authority over the Class V permits in Montana and Colorado and for all tribes.

## § 12.07 Emerging Solutions to Deal with CBNG Produced Water Quantities

### [1] Introduction: Water Demand in the West

Demand for water is extremely high in the arid and semi-arid West. The tremendous amount of water required to irrigate arid farmland and support urban expansion and population growth generates this high demand. More than half of the land and much of the water located in Colorado, Montana, North Dakota, South Dakota, Utah, and Wyoming is used for farming or ranching.[244] Seven of the ten fastest-growing cities in the United States are in the West.[245] Competition for water is acute.

The massive quantities of water produced from CBNG production may provide a new (or recycled) water supply that can help meet the high demands for water in the West. Through creative legislation and regulatory action, Western states are focusing on ways to put this produced water to a beneficial use and stretch limited water supplies.

#### [a] New Mexico

In New Mexico, legislators proposed a bill to help New Mexico replenish the Pecos River. New Mexico is obligated under the Pecos River Compact to deliver a portion of Pecos River water to Texas.[246] House Bill 144, proposed in 2006, would have provided up to $400,000 in tax credits to producers that delivered produced water, of at least minimum state water quality levels, to the Pecos River.[247] Although House Bill 144 was not approved in the 2006

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[243] General Permit 5C5 (Sept. 21, 2006), *available at* http://deq.state.wy.us/wqd/groundwater/uicprogram/index.asp (follow "Guidance Document" hyperlink under "Coalbed Methane UIC" heading).

[244] U.S. EPA, Region 8 Agricultural Priority, U.S. EPA, Region 8 priorities, http://www.epa.gov/Region8/agriculture (last visited July 4, 2006); *see also* http://www.epa.gov/Region8/about/priorities.html.

[245] U.S. Census Bureau News, U.S. Dep't of Commerce, Elk Grove, Cal., Named Fastest-Growing City (June 21, 2006), *available at* http://www.census.gov.

[246] N.M. Stat. Ann. § 72-15-19 (elec. 2006).

[247] H.B. 144 (N.M. 2006).

legislature, it has been incorporated into a new committee bill. In addition, DOE and Public Service Co. of New Mexico are conducting a study to assess the feasibility of using produced water to offset cooling water withdrawals from the San Jan River.

### [b] Wyoming

In Wyoming, the 2006 legislature approved a $500,000 appropriation to study the feasibility of building a pipeline to deliver produced water from the Powder River Basin to the North Platte River.[248] Historically, the North Platte River has experienced water shortages and has not been able to support its fish and irrigation demands. The study will fully examine the practice of piping produced water to the North Platte River and will address concerns associated with interstate commerce, water rights, technical feasibility, and water quality.[249]

### [c] Colorado

Colorado has established the Colorado Water Resources Research Institute (CWRRI) which is tasked with addressing emerging water problems, discussing and mediating solutions, publishing research reports, and providing citizens with information. CWRRI recently conducted a workshop in Fort Collins, Colorado, to address CBNG produced water management and how it could be used to assist agriculture.[250]

## § 12.08 Conclusion

The management of produced water is complex and involves a web of state and federal laws directed at both water quality and water quantity. Since 2001, management of CBNG produced water has become more difficult. Surface disposal, because of CWA concerns and state regulations, has become a less available option. Infiltration into groundwater has become more regulated. States continue to struggle with whether CBNG produced water is a

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[248] H.B. 145 (Wyo. 2006).

[249] ALL Consulting, Feasibility Study of Expanded Coal Bed Natural Gas Produced Water Management Alternatives in the Wyoming Portion of the Powder River Basin, Phase One 44 (Jan. 2006), *available at* http://wyoming.gov/governor/policies/documents/FinalWYCBNGFS.pdf.

[250] Colo. Water Resources Research Inst., Produced Waters Workshop (held in Fort Collins, Colo., Apr. 4-6, 2006), *available at* http://cwrri.colostate.edu (follow "Produced Waters Workshop" hyperlink).

blessing or a "curse." So far, state regulatory authorities and EPA agree that a menu of water management options for CBNG produced water is appropriate. Some states are looking for innovative ways to utilize higher quality CBNG water, while states like Montana move closer to narrowing the range of water management techniques.