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# EPA EFFLUENT GUIDELINES

**PROPOSED REGULATION OF SHALE GAS AND COALBED METHANE EFFLUENT**

by Andrea Campbell and Shippen Howe, Van Ness Feldman (Washington, DC)

### INTRODUCTION

The US Environmental Protection Agency (EPA) issued a final *2010 Effluent Guidelines Program Plan* (Effluent Guidelines Plan) on October 26, 2011, which, if implemented, will expand federal regulatory oversight of water discharges from oil and gas activities involving hydraulic fracturing and coalbed methane production. *Notice of Final 2010 Effluent Guidelines Program Plan*, 76 Fed. Reg. 66,286 (Oct. 26, 2011).

Existing EPA effluent guideline limitations already address direct discharges of shale gas extraction wastewater and prohibit any direct discharges into waters of the US. However, EPA does not yet regulate shale gas extraction wastewater sent to Publicly Owned Treatment Works (POTWs). After studying the shale gas extraction industry, EPA announced that it will initiate a rulemaking process to decide the appropriate level of pretreatment standards for discharge of water to POTWs from the extraction of natural gas from shale. EPA also announced that it will initiate an effluent limitations guideline rulemaking for the coalbed methane industry to address direct discharges to surface waters, and discharges to POTWs.

The Effluent Guidelines Plan marks the conclusion of EPA's survey and review of the need for regulation of wastewater from shale gas and coalbed methane extraction and the first step toward new wastewater regulations for these activities. Proposed regulations are not expected until 2013 for coalbed methane and 2014 for shale gas extraction. Assuming that EPA keeps to this schedule, a final rule would be issued in the 2015-16 timeframe, at the earliest.

This article focuses on the parts of the Effluent Guidelines Plan that affect the oil and gas industry. The Effluent Guidelines Plan also announced that EPA will develop pretreatment requirements for discharges of mercury from the dental industry and solicited comments on EPA's reviews of other existing effluent guidelines and pretreatment standards.

This article first provides an overview of hydraulic fracturing and shale gas extraction, followed by a summary of current federal oversight of hydraulic fracturing, a description of basic federal Clean Water Act (CWA) requirements, and EPA's conclusions regarding the need for pretreatment standards for wastewater from shale gas extraction. Next, this article provides an overview of coalbed methane extraction, current federal oversight, and EPA's proposal to issue effluent guideline limitations for direct discharges of wastewater from coalbed methane extraction.

## Effluent Guidelines

**Shale Rock**

**Depth**

**Groundwater Impacts**

**Shale Areas**

**Increasing Production**

**The Water Report**
(ISSN 1946-116X)
is published monthly by
Envirotech Publications, Inc.
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Eugene, OR 97402

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**Subscription Rates:**
$249 per year
Multiple subscription rates available.

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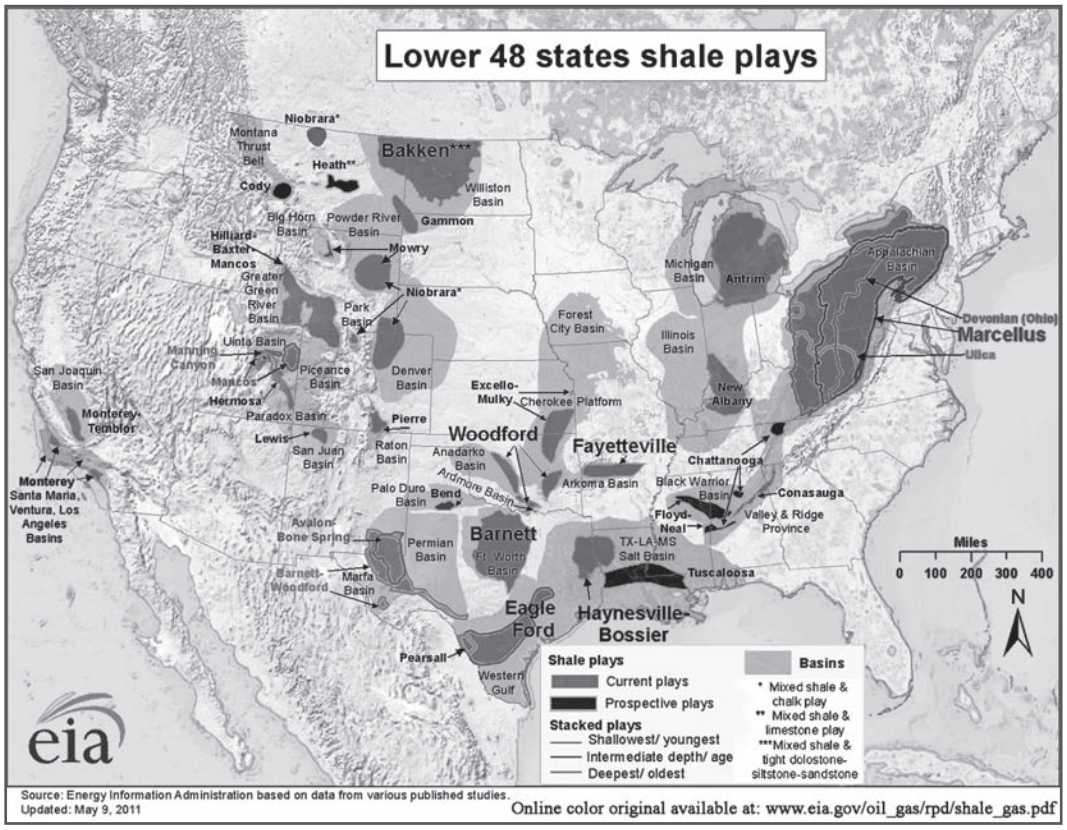
### HYDRAULIC FRACTURING AND SHALE GAS EXTRACTION

#### Overview

Hydraulic fracturing allows oil and gas producers to capture hydrocarbons from low permeability sandstone, or "shale," that, because of its impermeability, would otherwise remain in the ground. Shale rock is a fine-grained sandstone that can vary in permeability. "Conventional" sandstone has a permeability of 0.5 to 20 **mi**lli**d**arcies (md) and does not require as much pressure to produce oil or gas. "Unconventional" sandstone may have permeabilities of 0.000001 to 0.0001 md and require high pressures to produce oil or gas. The process typically requires the construction of a wellbore approximately 5,000-7,000 feet below ground level (which is usually at least 4,000 feet below the water table) to a layer of sandstone or "shale" that contains hydrocarbons. Once the sandstone layer is reached the wellbore is drilled horizontally into the sandstone.

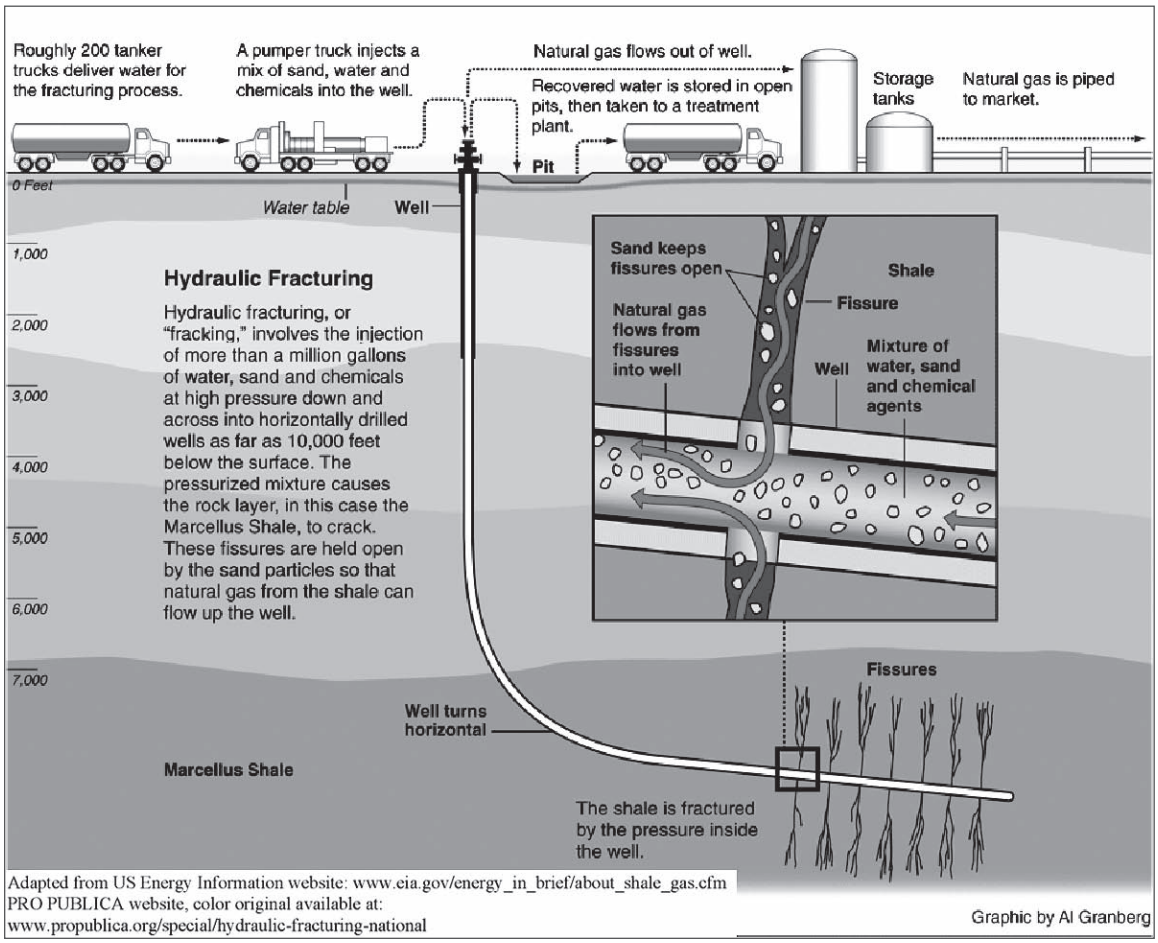
There may be notable exceptions to the depth of the wellbore below the water table. For example, on December 8, 2011, EPA released a press release of a draft analysis it conducted with respect to a complaint of water contamination due to hydraulic fracturing in Pavillion, Wyoming. Hydraulic fracturing may have been conducted in depths as shallow as 372 meters below the surface. EPA stated that its draft analysis found a connection between hydraulic fracturing and contamination of drinking water. The investigation continues. Press Release, *EPA Releases Draft Findings of Pavillion, Wyoming Ground Water Investigation for Public Comment and Independent Scientific Review* (Dec. 8, 2011), available at: http://yosemite.epa.gov/opa/admpress.nsf/0/ef35bd26a80d6ce3852579600065c94e?OpenDocument. *See also TWR* #95, Briefs.

The practice of hydraulic fracturing has been conducted by the oil and gas industry for over 50 years. George E. King, Apache Corp., *Explaining and Estimating Fracture Risk: Improving Fracture Performance in Unconventional Gas and Oil Wells* at 2 (Nov. 8, 2011) See http://gekengineering.com/Downloads/Free_Downloads/Estimating_and_Explaining_Fracture_Risk_and_Improving_Fracture_Performance_in_Unconventional_Gas_and_Oil_Wells.pdf. Currently, there are several areas of the country where oil and gas hydraulic fracturing take place, including the Bakken Shale in North Dakota, the Barnett Woodford and Haynesville Shales in the southwest (Texas, Oklahoma and Louisiana) and the Marcellus Shale in the northeast (New York, Pennsylvania and West Virginia). In 2000, hydraulic fracturing accounted for approximately 2% of total natural gas production in the US lower 48. IHS Global Insight (USA), Inc., *The Economic and Employment Contributions of Shale Gas in the United States* at 9 (Dec. 2011) (IHS). By 2010, that percentage had risen to 27%. Studies estimate that in 2011, hydraulic fracturing from shale accounted for 34% of total lower 48 production. *Id.*



## Effluent Guidelines




**Fracture Process**

To obtain hydrocarbons from sandstone, producers "fracture" the sandstone/shale and thereby cause it to release hydrocarbons. In order to "frac" a well, millions of gallons of water, sand, and chemicals, are injected into the wellbore under pressure. Typically, the injected liquid includes the following compounds in the following percentages: water (98-99% of total volume), proppant (usually sand or ceramic particles that keep the fractures open when hydraulic pressure is released, 1-1.9%); friction reducer (polyacrylamide, 0.025%); and disinfectant (0.005%). The industry states that other chemicals that may be used are surfactants, gelation chemicals (thickeners such as guar gum and cellulose polymers); scale inhibitors, hydrochloric acid and corrosion inhibitors — all typically at less than .05% of total volume. The industry also states that BTEX (**b**enzene, **t**oluene, **e**thyl benzene, and **x**ylene), diesel and fluorocarbons have largely been removed from frac fluids. *Explaining and Estimating Fracture Risk* at 7–10. The liquids that are injected into the wellbore ("frac fluids") are released back up to the surface as "flowback." Frac fluid technology is evolving. In addition to using water for fracking, sometimes other materials are used, such as compressible gases like carbon dioxide and nitrogen. See EPA, *Evaluation of Impacts to Underground Sources of Drinking Water by Hydraulic Fracturing of Coalbed Methane Reservoirs Study* at 4-5 (2004).

**Involved Chemicals**

**Flowback**

With respect to flowback, the industry has stated that "flowback of frac fluids during the first two to three weeks after a shale frac may experience fluid recovery rates of 3 to as much as 6 BPM (**b**arrels **p**er **m**inute) or 125 to 250 gallons per minute, for a few hours, often dropping to…29 gallons per minute… within 24 hours and then quickly decreasing over several days." *Explaining and Estimating Fracture Risk* at 10. The amount of frac fluid recovered on flowback may range from as little as 5%, such as in the Haynesville shale to as much as 50%, such as in the Barnett and Marcellus shales, depending on the region and makeup of the shale. *Id.* Returning chemicals after injection are at a fraction (usually 20% or less for chemicals and about 40% for polymers) of what was pumped down the well. IHS at 8. Flowback is primarily composed of salt water commonly found in shale but, in some areas, also may contain naturally occurring ions, including barium, strontium, bromine, and low levels of heavy metals and radioactive isotopes (collectively referred to as **n**aturally **o**ccurring **r**adioactive **m**aterials, or NORM). *Id.* at 10.

## Effluent Guidelines

**"Produced Water"**

**Effluent Pretreatment**

"Produced water" also is recovered. Produced water is naturally occurring water found in the sedimentary shale beds traversed by the wellbore. There is a point where the fluids that flow up a well (mostly water) shift from being primarily recovered fracturing fluid to produced water. The dividing line can be difficult to discern, yet can be distinguished by comparing the different chemical signatures of the recovered frac fluid to that of the naturally occurring shale formation water. Produced water has very high salinity and **t**otal **d**issolved **s**olids (TDS). It picks up various minerals from the shale formation including barium, calcium, iron, magnesium and sulfur. Dissolved hydrocarbons also are present in produced water. Produced water also may include low levels of naturally occurring NORM.

Following the return of the injected frac fluids and produced water, natural gas or oil is released up the wellbore and delivered by pipeline for downstream processing and transmission. EPA refers to produced water and frac fluid collectively as "shale gas wastewaters." Because existing EPA regulations prohibit the discharge of any shale gas extraction wastewater into waters of the US, this wastewater is often discharged to a POTW or shipped to an underground injection site. EPA's Effluent Guidelines Plan announces the decision to issue a rulemaking to address the level of pretreatment that will be necessary before such wastewater can be discharged to POTWs in the future.

### Federal Oversight of Hydraulic Fracturing

Several federal agencies currently are addressing different aspects of hydraulic fracturing. This section discusses oversight activities by the US Department of Energy, EPA, the Delaware River Basin Commission, and the US Department of Interior.

**Department of Energy Study**

**DOE Committee**

The Department of Energy (DOE), pursuant to a request by President Obama, formed a Shale Gas Subcommittee as part of the Secretary of Energy Advisory Board (SEAB) to make recommendations to address the safety and environmental performance of shale gas production. The Subcommittee issued a preliminary report in August 2011 and a second, follow-up report in November 2011. See *Secretary of Energy Advisory Board, Shale Gas Production Subcommittee 90-Day Report* (Aug. 18, 2011), available at: www.shalegas.energy.gov/resources/081811_90_day_report_final.pdf and *Shale Gas Subcommittee Second Ninety Day Report* (Nov. 18, 2011), available at: http://energy.gov/sites/prod/files/90day_Report_Second_11.18.11.pdf.

**Recommendations**

The Subcommittee, among its final, prioritized recommendations, recommended mandatory:

> "[d]isclosure of fracturing fluid composition" and "[e]limination of diesel use in fracturing fluid." *Id.* at 4, Table 1.

Additionally, the Subcommittee recommended that procedures be implemented to:

> (1) "measure and publicly report the composition of water stocks and flow throughout the fracturing process," (*Id.* at 7, Table 2, and 16, Annex C) ; and
>
> (2) establish procedures for the "[p]rotection of water quality through a systems [or life-cycle] approach." *Id.* at 8, Table 3, and 16, Annex C.

**EPA Drinking Water Study**

**Drinking Water Research**

On a parallel track, EPA has commenced several other initiatives addressing hydraulic fracturing in addition to the Effluent Guidelines Plan referenced above. Specifically, in 2009, Congress directed EPA to conduct research to examine the relationship between hydraulic fracturing and drinking water. H.R. Rep. No. 111-316 at 109 (2009) (Conf. Rep.).

The overarching goal of the ongoing drinking water study is to answer two questions:

> (1) whether hydraulic fracturing can impact drinking water resources and, if so;
>
> (2) what conditions are associated with these potential impacts.

A Final Study Plan, establishing the technical basis upon which the drinking water resource study is to be conducted, was issued in November 2011. EPA Office of Research and Development, *Plan to Study the Potential Impacts of Hydraulic Fracturing on Drinking Water Resources* (Nov. 2011), available at: http://water.epa.gov/type/groundwater/uic/class2/hydraulicfracturing/upload/hf_study_plan_110211_final_508.pdf (Final Study Plan).

An initial EPA drinking water resource study report is due in 2012; a final report is due in 2014.

**EPA Regulation of Diesel in Injected Water**

**Diesel Use**

EPA is also addressing the use of diesel in injected water. Pursuant to the Energy Policy Act of 2005, the EPA's regulatory oversight of the injection of fluids underground *excludes* "the underground injection

## Effluent Guidelines

### UIC Regulation

of fluids or propping agents (*other than diesel fuels*) pursuant to hydraulic fracturing operations related to oil, gas, or geothermal production activities." Pub. L. No. 109-58, 119 Stat. 594, 694 (codified at 42 U.S.C. §300f(d) (2006)) (amending the Safe Drinking Water Act at §1421(d)) (emphasis added). Thus, while the Safe Drinking Water Act (SDWA) specifically excludes hydraulic fracturing from EPA's Underground Injection Control (UIC) regulation under the SDWA, the use of diesel fuel during hydraulic fracturing is still regulated by the UIC program. EPA currently is engaged in issuing regulatory guidelines for the use of diesel in hydraulic fracturing, and has announced that injection wells receiving diesel fuel as a hydraulic fracturing additive will be considered Class II wells by the UIC program. See *Regulation of Hydraulic Fracturing Under the Safe Drinking Water Act,* http://water.epa.gov/type/groundwater/uic/class2/hydraulicfracturing/wells_hydroreg.cfm (last visited Jan. 17, 2012). The UIC regulations can be found in Title 40 of the Code of Federal Regulations Parts 144-148.

**EPA Regulation of Air Impacts from Hydraulic Fracturing**

EPA is addressing air impacts from oil and gas activities, including hydraulic fracturing. On August 23, 2011, EPA published a comprehensive proposed rule that would, among other things, substantially amend and expand emission standards for **v**olatile **o**rganic **c**ompounds (VOCs), sulfur dioxide ($SO_2$) and **h**azardous **a**ir **p**ollutants (HAPs) from oil and gas facilities. *Oil and Natural Gas Sector: New Source Performance Standards and National Emission Standards for Hazardous Air Pollutants Reviews*, 76 Fed. Reg. 52,738 (Aug. 23, 2011) (Proposed Rule). The proposed standards would affect oil and gas production activities such as hydraulic fracturing. The proposed VOC and $SO_2$ standards (which EPA would codify as a new "Subpart OOOO" of 40 C.F.R. Part 60) would generally apply to new and modified equipment for which construction commenced after August 23, 2011. *Id.* at 52,745. If finalized, the new standards would, among other things, require **r**educed **e**missions **c**ompletion (REC), also known as "green completion." REC generally can be performed by separating the flowback water, sand, hydrocarbon condensate and natural gas that is produced in a well in order to reduce the portion of natural gas and VOC vented to the atmosphere, all while maximizing recovery of natural gas and VOC condensate. Equipment required to conduct REC may include tankage, special gas-liquids and separator traps and gas dehydration. *Id.*

### "Green Completion"

### Flowback Water

Over 4,000 comments were received on the proposed rule in November 2011. EPA is under a court-ordered deadline to issue final standards by April 3, 2012. Third Stipulation of the Parties to Modify Consent Decree, *Wildearth Guardians v. Jackson*, Docket No. 09-00089 (D.D.C. Oct. 28, 2011), available at: www.epa.gov/airquality/oilandgas/pdfs/20111028stipulation.pdf.

**Delaware River Basin Commission Regulations**

The Delaware River Basin Commission (DRBC) also is issuing proposed regulations addressing hydraulic fracturing. DRBC is a federal-interstate compact government agency that was formed by concurrent legislation enacted in 1961 by the United States and the four basin states (Pennsylvania, New York, New Jersey, and Delaware). Its five members include the basin state governors and the Division Engineer, North Atlantic Division, US Army Corps of Engineers, who serves as the federal representative. DRBC has federal authority over both water quality and water quantity-related issues throughout the basin. In November 2011, DRBC posted proposed rules for natural gas development that addressed issues such siting of well pads, well construction and operation procedures, and wastewater disposal within the Commission's jurisdiction. The proposed rules are available at: www.state.nj.us/drbc/naturalgas-REVISEDdraftregs110811.pdf. In late November 2011, DRBC postponed implementing its proposed regulations; they remained pending as of the date of this article. Both the environmental community and the states have objected to these proposals because they maintain the regulations are either too lenient or too stringent, respectively. See, e.g., Ada Kulesza, *Anti Fracking Advocates See Stalled DRBC Vote as a Victory*, Philadelphia Weekly, Nov. 30, 2011, www.philadelphiaweekly.com/news-and-opinion/news/134698133.html (environmentalist position); Scott Detrow, *Toomey Calls DRBC Voting Delay "Unfortunate,"* State Impact, Jan. 10, 2012, http://stateimpact.npr.org/pennsylvania/2012/01/10/toomey-calls-drbc-voting-delay-unfortunate/.

### Postponed Regulation

**Department of Interior**

The US Department of Interior may publish draft rules for strengthening the requirements for hydraulic fracturing on BLM-managed lands. See Jeremy Fugleberg, *Official: BLM "seriously considering" fracking rules*, Trib.com, Sept. 27, 2011, http://trib.com/news/state-and-regional/article_c70833af-1f48-54fa-9eec-b4cfeeaad00a.html (BLM official states that agency is "'seriously considering' regulating hydraulic fracturing, or fracking, at oil and gas wells on federal lands"). No official document had been released as of the date of this article's submission.

### BLM Rules

## VARIOUS CURRENT AGENCY EFFORTS ADDRESSING SHALE GAS & COALBED METHANE EXTRACTION

| Agency | Activity Description | Initiated | Status | Deadlines | Comments |
|---|---|---|---|---|---|
| **EPA (Water)** | **Study on Hydraulic Fracturing Impacts on Drinking Water.** | By Congress in 2010. Peer Review by SAB in 2011. | Final Study Plan Issued 11/11. See website reference "**A**" - below<br>EPA has requested 9 companies to provide data on 350 wells. Website **B** | Initial Report due in 2012.<br><br>Final Report due in 2014. | Potential controversy over whether focus should be on surface spills or underground seepage upwards. |
| | **Final Effluent Guidelines Program Plan** - Review of effluent guidelines and pretreatment standards under CWA 301, 304 and 307. | EPA published preliminary plan on 12/28/09 in accordance with EPA biennial requirement 304(m). | Proposes rulemaking to decide the appropriate level of pretreatment standards for wastewater from HF. Effluent Guidelines Plan. Website **C.** | Specific rulemaking for shale gas pre-treatment requirement has not been initiated. | EPA intends to proposed pretreatment guidelines in 2014. |
| | **SDWA - UIC Class II Permitting Guidance** for hydraulic fracturing activities that use diesel fuels in fracturing fluids. | Announcement issued April 2011. | EPA guidance pending. Website **D**. | | **Litigation** pending in D.C. Circuit, ***IPAA v. EPA***, Case No. 10-1233. |
| **EPA (Air)** | **New Source Performance Standards and National Emission Standards for Hazardous Air Pollutants Reviews** – Proposed Rule to amend and expand emission standards for **v**olatile **o**rganic **c**ompounds (VOCs), **s**ulfur **d**ioxide ($SO_2$) and **h**azardous **a**ir **p**ollutants (HAPs) from oil and gas facilities. | August 23, 2011. | Final rule pending. Proposed rule can be found at Website **E** | Comments on the proposed rule were filed November 30, 2011. | EPA is under a court-ordered deadline to issue a final rule by April 3, 2012. |
| **DOE** | **Recommendations to Improve the Safety and Environmental Performance of Natural Gas Hydraulic Fracturing from Shale Formations** (by DOE's SEAB, Natural Gas Subcommittee). | Initiated in May 2011 by Secretary Chu at the request of the President. | Initial 90-day report issued August 2011. Website **F**<br><br>Second, final, report issued on Nov. 10, 2011. DOE overview and the report are at Website **G.** | | Among other things, the SEAB: (1) reiterates its recommendation that diesel fuel should be eliminated in hydraulic fracturing fluids and (2) encourages EPA to complete NSPS rule (above). |
| **DOI** | **BLM holding Regional Forums** addressing best management practices, disclosure of the chemicals used in fracturing fluids, well construction and integrity, production wastewater management, and other techniques for protecting drinking water resources. | | BLM has indicated that proposed rules may be released before the 2012 elections. | | |
| **DELAWARE RIVER BASIN COMMISSION** | **Issuing natural gas development regulations addressing all natural gas development projects in NY, NJ, DE, and PA**, including the construction or use of production, exploratory or other natural gas wells in the Basin regardless of the target geologic formation, and to water withdrawals, well pad and related activities, and wastewater management. | Implements Section 7 of the DelawareRiver Basin Compact.<br><br>US Army Corps of Engineers is the federal government member of DRBC. | Revised regulations were proposed on November 8, 2011. | On November 21, 2011, the Commission postponed the adoption of the revised regulations (joint exercise of the sovereign authority of DE, NY, NJ, PA and the federal government pursuant to the Compact). | **Litigation:**<br>(1) ***State of New York v. Army Corps of Engineers***, et al., CV-11–2599 (E.D.N.Y.) (EIS is required).<br><br>(2) ***Del. Riverkeeper v. DRBC***, No. 3:10-cv-05639-AET -LHG (D.N.J.) (DRBC allowed unlawful drilling ). |

**WEBSITE REFERENCES FOR AGENCIES'ACTIVITIES**

A — http://water.epa.gov/type/groundwater/uic/class2/hydraulicfracturing/upload/hf_study_plan_110211_final_508.pdf
B — http://water.epa.gov/type/groundwater/uic/class2/hydraulicfracturing/info_requests.cfm
C — http://www.gpo.gov/fdsys/pkg/FR-2011-10-26/pdf/2011-27742.pdf
D — http://water.epa.gov/type/groundwater/uic/class2/hydraulicfracturing/wells_hydroout.cfm#diesel
E — http://www.epa.gov/ttn/atw/oilgas/oilgaspg.html
F — http://www.shalegas.energy.gov/resources/081811_90_day_report_final.pdf
G — http://energy.gov/sites/prod/files/90day_Report_Second_11.18.11.pdf

## Effluent Guidelines

**CLEAN WATER ACT & PRODUCED WATER**

### Clean Water Act Overview

**CWA Point Sources**

Subchapter III of the federal Clean Water Act (CWA), enacted in 1972, requires EPA to issue effluent limitation guidelines to reduce the level of pollutants found in effluent, which is water that is discharged by an industrial source. 33 U.S.C. §§ 1311 – 1330. Section 502(11) of the CWA defines ''effluent limitation'' as a "restriction…on quantities, rates, and concentrations of chemical, physical, biological, and other constituents which are discharged from *point sources* into *navigable waters*, the waters of the contiguous zone, or the ocean, including schedules of compliance." *Id.* § 1362(11) (emphasis added). A "point source" is a "discernible, confined and discrete conveyance…from which pollutants are or may be discharged." Id. § 1362(14).

Since the enactment of the CWA, the term "point source" has been construed very broadly and covers everything from ditches to bulldozers. "Navigable waters" or "waters of the United States" include waters used in interstate commerce, including tidal areas; all interstate waters; all other waters such as lakes, rivers, streams, and wetlands — including intermittent waters; and tributaries of such waters. 40 C.F.R. § 122.2 (2011).

**"Navigable Waters"**

The definition and scope of the term "navigable waters" have been the controversial subject of numerous federal court decisions over the last two decades, including the US Supreme Court's decisions in *Solid Waste Agency v. U.S. Army Corps of Engineers*, 531 U.S. 159 (2001) and *Rapanos v. United States*, 547 U.S. 715 (2006). In May 2011, EPA and the US Army Corps of Engineers (Corps) issued proposed guidance intended to reflect the two Supreme Court decisions. *EPA and Army Corps of Engineers Guidance Regarding Identification of Waters Protected by the Clean Water Act*, 76 Fed. Reg. 24,479 (May 2, 2011) (notice of availability). However, in the Fall of 2011, EPA and the Corps announced that the agencies would not implement the draft guidance and would instead proceed with a rulemaking to clarify which waters of the US are protected by the CWA. The proposed rule could be issued as early as February 2012.

**Effluent Guidelines**

The effluent guidelines have regulatory effect and set substantive and binding standards once implemented. All point sources discharging effluent directly into waters of the US must hold a National Pollutant Discharge Elimination System (NPDES) permit. 33 U.S.C § 1342(a). Most states have received permitting authority from EPA and issue NPDES permits to dischargers; if a state does not have NPDES permitting authority, then the relevant EPA Regional Office issues the permit for all discharges in that state. Each permit imposes enforceable effluent limitations and other requirements on the permit-holder.

### CWA Planning and Review Requirements

**Direct Discharges**

**EPA Reviews**

The CWA requires EPA to conduct an annual review of its existing effluent guidelines for direct discharges and determine whether revisions are necessary. CWA § 304(b), 33 U.S.C § 1314(b). The statute also requires EPA to identify categories of sources that discharge toxic or non-conventional pollutants that are not already subject to effluent limitations, as well as a schedule for issuing effluent limitations for those categories. *Id.* Every two years, EPA must issue a plan describing the schedule of review. *Id.* § 304(m), 33 U.S.C § 1314(m). To ensure that EPA acts on the unregulated categories the agency identifies, the CWA further requires final effluent guidelines to be issued within three years after the category is identified in a final plan. *Id.* § 304(m)(1)(C), 33 U.S.C § 1314(m)(1)(C).

**Discharges to POTWs**

**Pretreatment Standards**

Existing pretreatment regulations for categories that discharge to POTWs (as opposed to direct discharges) also are reviewed annually. EPA must identify categories or subcategories of sources that are not subject to regulation but which discharge pollutants that may interfere with POTW operation. The CWA does not set a deadline by which EPA must issue pretreatment standards for those industrial categories.

**EPA's Effluent Guidelines Plan**

**EPA Guidelines Plan**

The Effluent Guidelines Plan marked the culmination of EPA's two-year review of effluent guidelines and pretreatment standards, and identification of potential new categories of sources for which new pretreatment standards should be established.

## Effluent Guidelines

**Types of Effluent Guideline Limitations, Pretreatment Standards, and Other Permit Limits**

**Direct Discharges into Waters of the US — Effluent Limitations**

Effluent limitations apply to direct discharges into waters of the US and are based on the availability of technology to reduce the concentration of pollutants found in the effluent from a particular category of sources. EPA develops effluent limitations for each industrial category of point sources. To date, EPA has issued effluent limitation guidelines for nearly 70 categories of sources. 40 C.F.R. Parts 405-471.

### Conventional Pollutants

**Effluent guidelines for existing sources**

*Conventional Pollutants*: Best Practicable Control Technology (BPT) standards apply to both conventional pollutants and to toxic and non-conventional pollutants. Existing point sources were to comply with the initial BPT standards for the particular category or subcategory of industrial source by July 1, 1977. CWA § 301(b)(1)(A), 33 U.S.C § 1311(b)(1)(A). EPA continues to issue BPT standards for new categories of point sources or for previously unregulated subcategories of point sources. When identifying BPT and the appropriate effluent limitation for a category of sources, EPA first considers the total cost of applying the technology compared to the benefit of reducing the level of pollutants in the effluent.

### EPA Considerations

In addition to cost/benefits, EPA also considers:

- The age of the equipment and facilities currently in use
- Any process changes that might be required
- Engineering aspects of installing new technology
- Non-water quality environmental impacts

### BPT Determinations

The EPA Administrator also may identify additional factors for consideration. In general, EPA determines BPT based on the average performance of the best-performing facilities in the industry of similar age, size, process, and other common characteristics.

EPA also issues more stringent standards for specific conventional pollutants discharged by existing industrial point sources — i.e., for biochemical oxygen, total suspended solids, fecal coliform, pH, and oil and grease. *Id.* § 301(b)(2)(E), 33 U.S.C § 1311(b)(2)(E). For these substances, EPA identifies Best Conventional Pollutant Control Technology (BCT), which is based on the same factors as BPT but also includes a two-part reasonableness test. This flexibility was intended to reflect the difficulty in reducing levels of conventional pollutants.

### Toxics

*Toxic and Non-Conventional Pollutants*: In addition to BPT standards, EPA establishes Best Available Economically Achievable Technology (BAT) standards for toxic and non-conventional pollutants. BAT standards are more stringent that BPT standards. Although sources had to comply with initial BAT standards by March 31, 1989, EPA continues to issue BAT standards for new categories or subcategories of point sources. Unlike BPT, EPA can set BAT at a level that requires process changes or internal controls, even if these are not industry-standard practices. *Id.* § 301(b)(2)(A), 33 U.S.C § 1311(b)(2)(A). EPA determines BAT based on the same factors as BPT but also considering whether the standards are economically achievable.

### New Source Standards

**Effluent guidelines for new sources — new source performance standards**

Newly-constructed sources are subject to more stringent standards than those applicable to existing sources. Under EPA regulations, a new source is one for which construction begins after EPA promulgates a final **n**ew **s**ource **p**erformance **s**tandard (NSPS) applicable to the source category. NSPS standards must reflect "the greatest degree of effluent reduction…achievable through application of the best available demonstrated control technology, processes, operating methods, or other alternatives, including, where practicable, a standard permitting no discharge of pollutants." *Id.* § 306(a)(1), 33 U.S.C § 1316(a)(1).

**Acronyms**

BAT — Best Available Economically Achievable Technology
BCT — Best Conventional Pollutant Control Technology
BPJ — **b**est **p**rofessional **j**udgment
BPT — Best Practicable Control Technology
BTEX — **b**enzene, **t**oluene, **e**thyl benzene, and **x**ylene
HAPs — **h**azardous **a**ir **p**ollutants
NORM — **n**aturally **o**ccurring **r**adioactive **m**aterials
NPDES — National Pollutant Discharge Elimination System
NSPS — **n**ew **s**ource **p**erformance **s**tandard
POTWs — Publicly Owned Treatment Works
PSES — **p**retreatment **s**tandards for **e**xisting **s**ources
PSNS — **p**retreatment **s**tandards for **n**ew **s**ources
REC — **r**educed **e**missions **c**ompletion
TDS — **t**otal **d**issolved **s**olids
VOCs — **v**olatile **o**rganic **c**ompounds

**Best Professional Judgment Permits — Case-by-Case Limitations**

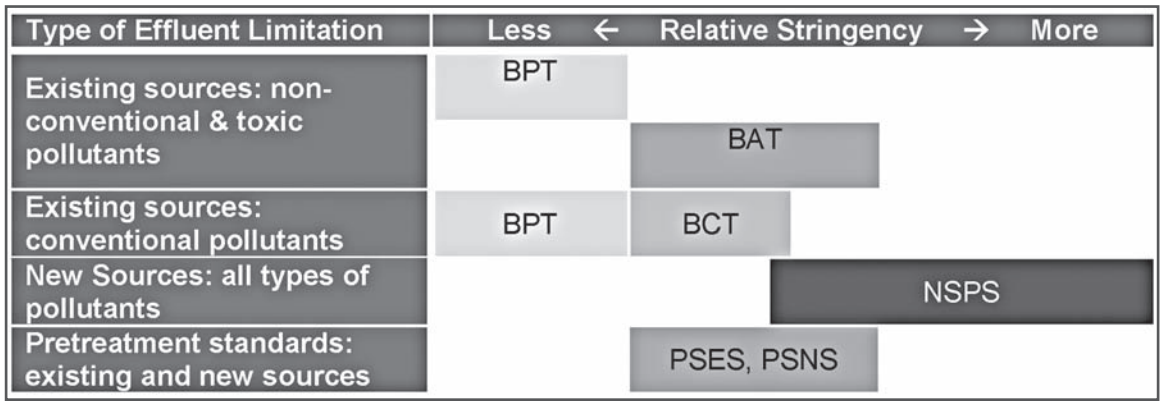
For categories of point sources for which EPA has not yet issued effluent limitation guidelines, the NPDES permit writer will apply "**b**est **p**rofessional **j**udgment" (BPJ) in developing effluent limitations. The permit writer must take into consideration all available information when developing the limits, including: EPA guidance; performance of other facilities in the industry; and technologies used in similar industrial categories. 40 C.F.R. § 125.3(c) and (d). If use of BPT, BCT, or BAT is warranted, then the permit writer must apply the criteria for each level of stringency that would have been examined when determining the BPT, BCT, or BAT standard for an entire category of point sources. *Id.* § 125.3(d).

## Effluent Guidelines

**Treatment Discharges**

**Discharges to POTWs — Pretreatment Standards**

A separate set of requirements applies to those industrial sources that do not discharge effluent directly into waters of the US but instead discharge to POTWs. CWA § 307(b), 33 U.S.C § 1317(b). These **p**retreatment **s**tandards for **e**xisting **s**ources (PSES) and **p**retreatment **s**tandards for **n**ew **s**ources (PSNS) are designed to reduce or prevent the discharge of pollutants that pass through, interfere with, or are incompatible with POTWs' ability to remove pollutants from water undergoing treatment. 40 C.F.R. § 403.5(a)(1). EPA sets the PSES and PSNS at levels that are generally as stringent as the BAT standards established for discharges directly into waters of the US. See Effluent Guidelines Plan, 76 Fed. Reg. at 66,289; 40 C.F.R. Part 403.




**EPA Produced Water Data Survey**

EPA conducted a review of its CWA effluent limitations and pretreatment standards in 2010, covering 57 point source categories and more than 450 subcategories. In the 2010 *Preliminary Effluent Guidelines Plan* (published December 28, 2009) EPA asked for comment on whether to expand the existing Coalbed Methane Extraction Study to include shale gas extraction. *Notice of Availability of Preliminary 2010 Effluent Guidelines Program Plan*, 74 Fed. Reg. 68,599 (Dec. 28, 2009). Although EPA decided not to expand the coalbed methane study, the agency nevertheless began a review of available data to determine whether pretreatment standards for shale gas extraction were justified.

**Shale Gas Wastewater**

EPA examined data on shale gas extraction wastewater, finding that this wastewater generally contains elevated levels of fracking fluid additives, salt, conventional pollutants, organic substances, metals, and naturally-occurring radioactive materials. Effluent Guidelines Plan, 76 Fed. Reg. at 66,296. EPA found that total dissolved solids of 100,000 **p**arts **p**er **m**illion (ppm) were common, with the highest levels reaching up to 400,000 ppm and the concentration of TDS increasing over the lifetime of the well. *Id.* [Editor's Note: By comparison, sea water contains approximately 35,000 ppm TDS.] Of the TDS, EPA found chloride to be the most prominent, making up approximately 60% of the total at 8,800-153,000 ppm. *Id.* EPA also noted the presence of barium, strontium, calcium, magnesium, and sodium. After reviewing data on organic and inorganic compounds, EPA found that these substances are often found in produced water, but not at the levels of TDS. Among the organic and inorganic compounds EPA noted are phenol, pyridine, benzene, ethyl benzene, toluene, xylenes, and glycol. *Id.* Particularly in produced waters from fracking wells in the Marcellus Shale in New York State, radium 226 is the primary naturally-occurring radioactive material. Levels up to 16,030 picocuries per liter (pCi/L) have been found in New York State, which exceeds EPA's Maximum Contaminant Level of 5 pCi/L. *Id.*

**Compounds in Wastewater**

**Ability of POTWs to Impose Limits on Produced Water**

**"Pass Through"**

As part of the review, EPA noted that POTWs are able to set limits on the level of pollutants contained in wastewater introduced into the system, if higher levels would either interfere with the POTW's ability to treat the water and comply with the regulatory standards applicable to POTWs. Thus, if a pollutant will pass through the POTW system and be present at levels exceeding the standard for the POTW (known as "pass through"), or if a pollutant at certain levels would interfere with the POTW operation, the POTW can limit those pollutants. However, EPA concluded that the secondary treatment effluent limitations applicable to POTWs do not address the compounds that are at issue in shale gas extraction wastewater — particularly TDS, chloride, and radionuclides. EPA stated that these pollutants, at the levels found in produced waters, could have harmful effects on aquatic life and drinking water. *Id.* at 66,297.

**Problematic Compounds**

## Effluent Guidelines

**Produced Water Regulations**

**Pass Through & Interference**

**Pretreatment Standards**

**POTW Rulemaking**

**EPA Data Gathering**

**Congressional Direction**

**Standards Timeline**

### EPA'S PROPOSED EFFLUENT GUIDELINES FOR SHALE GAS EXTRACTION

#### Pretreatment Standards for Shale Gas Extraction Produced Water

EPA established an Onshore Oil and Gas Extraction subcategory in 1979. Shale gas extraction is currently regulated as part of the onshore subcategory and is subject to effluent guidelines under 40 C.F.R. Part 435. These regulations prohibit any direct discharges of effluent into waters of the US, but do not include any pretreatment requirements for discharges to POTWs that are specific to the subcategory. 40 C.F.R. § 435.32. However, 40 C.F.R. § 403.5(a) generally prohibits the discharge of any pollutant to a POTW that causes pass through or interference with POTW operation. In other words, current regulations do not allow the discharge of shale gas extraction wastewater to a POTW if it contains pollutants at levels that will pass through the POTW and be present in the treated water at unacceptably high levels or will otherwise interfere with the POTW's operation. One interpretation of this rule is that, under the current regulatory regime, shale gas extraction wastewater can be discharged to a POTW only in limited quantities (to prevent pass-through or interference) or according to local POTW rules and discharge limits.

Based on the 2010 review, EPA concluded that it is appropriate to develop pretreatment standards for produced water from shale gas extraction. These pretreatment standards will establish a national, uniform baseline for shale gas extraction wastewater pretreatment and will be based on the availability of technology to remove pollutants from the wastewater before it is discharged to a POTW. EPA justified this approach based on the assertion that produced water is generated at very large volumes and often with a heavy load of pollutants that are not being treated effectively by POTWs. Further, EPA asserted that because the pollutants have adverse effects on aquatic life and on drinking water, and because shale gas extraction is expected to continue to increase, the development of pretreatment standards is necessary. Effluent Guidelines Plan, 76 Fed. Reg. at 66,297.

EPA's October 26, 2011 notice provided interested parties with an opportunity to comment on the agency's determination that pretreatment standards for shale gas extraction wastewater were necessary. Several organizations requested additional time to submit comments, citing a lack of time to review all of the background documents on which EPA relied in the 30-day timeframe. Only a handful of substantive comments were filed, including comments from the American Petroleum Institute (API), the Marcellus Shale Coalition, and Range Resources—Appalachia, LLC. The Marcellus Shale Coalition and Range Resources generally opposed the decision to development pretreatment standards for shale gas extraction wastewater, pointing toward a lack of scientific basis for initiating a new rulemaking and the existing prohibition against discharging any pollutants into a POTW that cause pass through or interference.

In contrast, API supported the development of a pretreatment standard that would allow greater volumes of shale gas extraction wastewater to be discharged to POTWs. API noted that POTWs currently accept such wastewater only at very low volumes in order to avoid adverse impacts on treatment systems and water quality. Additional discussion and arguments both for and against the need for standards can be expected when EPA releases the proposed text of the standards in 2014.

#### Next Steps

Before issuing a proposal, EPA intends to conduct an extensive data-gathering effort. The agency plans to visit fracking sites to sample wastewater and gather first-hand information on the well-drilling process, the characteristics of wastewater, and how that wastewater is managed on-site. *Id.* EPA also plans to conduct outreach to stakeholders to gather information on concerns about the environmental and drinking water effects of shale gas extraction wastewater. *Id.* The agency also intends to develop and obtain approval for a nationwide survey on the shale gas extraction industry, including data on operations, economics, wastewater characteristics, and the availability of wastewater pretreatment technologies. *Id.*

Ongoing studies also will inform EPA's proposed rule on shale gas wastewater pretreatment standards. Congress directed EPA in 2009 to conduct a study of the effects of fracking on drinking water, based on the best available science. EPA solicited extensive input on the design of the study and in February 2011 submitted a draft study plan to the Science Advisory Board (SAB). The SAB provided feedback and EPA is in the process of revising the study to reflect SAB input. EPA expects to have preliminary study results by the end of 2012, but the complete study will take several more years. If the results of the study affect EPA's conclusions that pretreatment standards are necessary in order to ensure that POTW operations are not affected, EPA indicated its intent to revise the rulemaking plans as necessary. *Id.* at 66,298.

At this time, EPA plans to issue a proposed rule on pretreatment standards for shale gas extraction wastewater sometime during 2014. *Id.* at 66,302. If EPA follows this schedule, a final rule would likely be issued in 2015. Compliance with the final rule would be required within three years of the effective date of the rule for existing sources and within 90 days of commencement of discharge for new sources. The standards will set numerical limits on the concentration of pollutants that can be present in shale gas

## Effluent Guidelines

extraction wastewater at the time it is discharged to a POTW. Previously-issued pretreatment standards for other categories of sources have established a daily maximum standard for individual pollutants as well as monthly maximum average standards. EPA will set standards for both existing sources (PSES) and new sources (PSNS) in the shale gas extraction subcategory.

### Coalbed Methane Extraction

**Overview of Coalbed Methane Direct Discharge Effluent Limitations**

**C**oal**b**ed **m**ethane (CBM) refers to natural gas "produced by drilling into coal seams, reducing the pressure that traps methane on the surfaces of coal molecules, and pumping the methane into natural gas distribution systems." Gary C. Bryner, *Coalbed Methane Development: The Costs and Benefits of an Emerging Energy Resource*, 43 Nat. Resources J. 519, 520 (2003). The process is based on the fact that methane attaches to the surface areas of coal and is held in place by water pressure. The coal must be dewatered (i.e., pumped out) before the gas will flow. Drilling dewaters the coal and accelerates the desorption process. Most coal deposits contain methane, but it cannot be economically extracted unless there are open fractures that provide the pathway for the desorbed gas to flow to the well. When the water is released, the gas flows through the fractures into a well bore or migrates to the surface.

CBM has been produced in commercial quantities since 1981. *Id.* at 523. US production of coalbed methane reached 91 Bcf in 1989 and grew to nearly 1.3 Tcf by 1999. *Id.* (citation omitted). The Effluent Guidelines Plan estimates that, today, "[c]oalbed methane production represents 8% of natural gas production in this country," and is expected to continue for decades. Effluent Guidelines Plan, 76 Fed. Reg. at 66,294.

### States With Discharges

CBM is currently produced in 15 basins, as shown in the map below. The states in which direct or indirect discharges to surface waters are occurring are Alabama, Colorado, Illinois, Montana, Pennsylvania, West Virginia, Wyoming, and Virginia.

### Produced Water Attributes

The quality and quantity of water produced from each coalbed methane well varies within basins, as well as across the different basins. In general, the deeper the coalbed, the less the volume of water in the fractures, but the more saline it becomes. 43 Nat. Resources J. at 538-9. For example, in the San Juan basin, TDS levels of 20,000 ppm have been found in the southern portion, compared to 500 ppm near the outcrops. *Id.* at 539. The Effluent Guidelines Plan indicates that preliminary estimates show that "approximately 47 billion gallons of produced water are pumped annually from coal seams across the country. Approximately 45% of those produced waters are directly discharged to waters of the U.S. for a total national discharge of 22 billion gallons a year." *Notice of Final 2010 Effluent Guidelines Program Plan*, 76 Fed. Reg. at 66,293.

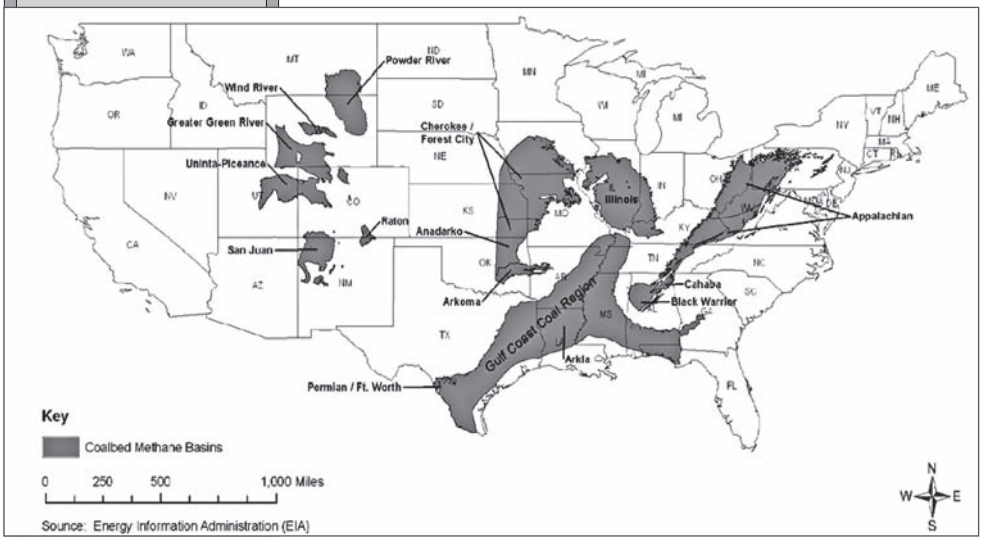
**Current Regulation of Coalbed Methane**

### BPJ Permits

Coalbed methane extraction is not currently regulated under the Oil and Gas Extraction category of EPA's regulations (40 CFR Part 435). Instead, it is regulated on a case-by-case basis via Best Professional Judgment (BPJ) Permits. As discussed above, BPJ Permits are an alternative to technology-based permits, with limits established on a case-by-case basis for each source when other effluent limitations are inapplicable, and issued pursuant to the authority of EPA's Administrator under CWA § 402(a)(1)(B), 33 U.S.C. § 1342(a)(1)(B).

### EPA Study

In 2005, EPA identified the coalbed methane extraction industry as a candidate for a preliminary study to determine whether regulation of wastewater from this industry was necessary. In 2006, EPA commenced collection of data on the number of active basins producing coalbed methane and the practices used for disposal of produced water. In December 2010, EPA issued a report that evaluated the following: "the quality and quantity of produced water generated from coalbed methane extraction; the available management, storage, treatment, and disposal options; and the potential environmental impacts of surface discharges." Office of Water, Environmental Protection Agency, *Coalbed Methane Extraction: Detailed Study Report* at 1-2 (December 2010), available at http://water.epa.gov/lawsregs/lawsguidance/cwa/304m/upload/cbm_report_2011.pdf.



## Effluent Guidelines

### Produced Water Impacts

Findings from EPA's report include the following:

- Approximately 45 percent of all produced water is discharged to waters of the United States.
- Various pollutants such as sodium, calcium, and magnesium (used to calculate the **s**odium **a**dsorption **r**atio (SAR)), total suspended solids (TSS), and metals (e.g., selenium, chromium) are present in discharges.
- Surface water discharges of produced water can increase stream volume, streambed erosion, suspended sediment, and salinity.
- Pollutants from CBM discharges may negatively affect fish populations over time.
- Surface impoundment and land application of produced waters may impact groundwater from infiltration and the concentration and/or bioaccumulation of CBM-associated pollutants.
- Advanced water treatment options are being used in the field in some operations to remove pollutants in produced water.
- Widely practiced zero discharge options may be available depending on well location.
- Although the recent downturn in the economy has negatively impacted the CBM industry, projections going forward appear more optimistic, with higher prices for gas predicted over the longer term. *Id.* at 1-2 – 1-3.

### Rulemaking Proposal

Based on the findings from EPA's multi-year study of the coalbed methane extraction industry, the agency has proposed to initiate rulemakings for the industry — as announced in the Effluent Guidelines Plan released last October. Effluent Guidelines Plan, 76 Fed. Reg. at 66,301.

### Direct Discharge & Pretreatment

**EPA's Proposed Effluent Guidelines for Coalbed Methane**

EPA has offered little detail regarding its plans for effluent limitation guidelines and pretreatment standards for coalbed methane extraction wastewater discharges. However, the agency did note that readily-available technologies exist to treat the 22 billion gallons of water discharged to the surface each year. *Id.* at 66,294. The rulemaking process may be contentious, as the industry has generally opposed the need for regulation in the past citing successful control of pollutants through the use of site-specific BPJs. *Id.* EPA intends to issue proposed effluent guideline limitations for direct discharges to surface waters and pretreatment standards for discharges to POTWs in 2013. A final rule is likely within one to two years after proposal.

### Guidelines Alternatives

The proposed effluent guidelines for coalbed methane extraction could include numerical limits on the allowable concentration of pollutants that can be present in wastewater that is discharged directly into waters of the US. If EPA sets numerical limits, the agency would establish BPT and BAT standards for non-conventional and toxic pollutants, and BPT and BCT standards for conventional pollutants found in discharges from existing sources. EPA would issue NSPS standards for direct discharges from new sources.

In the alternative, EPA could prohibit the direct discharge of any coalbed methane wastewater into any waters of the US. EPA also could propose a hybrid standard, requiring the collection and treatment of a certain percentage of wastewater and establishing a numerical limit on the concentration of pollutants that can be present in wastewater before it can be directly discharged into waters of the US. EPA took such an approach in the recently-proposed *Effluent Limitations Guidelines and New Source Performance Standards for the Airport Deicing Category*. 74 Fed. Reg. 44,676 (Aug. 28, 2009). Once EPA issues final effluent guideline limitations for coalbed methane wastewater, sources in this category would have to obtain NPDES permits incorporating these limitations.

### NPDES Permits

### POTW Discharges

Finally, if EPA determines that pretreatment standards are necessary for coalbed methane wastewater, the agency is likely to set numerical PSES and PSNS limits on the pollutant concentrations allowed in wastewater that is discharged to a POTW. These limits are likely to contain both a daily maximum limit and a monthly average maximum limit. Compliance with the PSES standards for existing sources would be within three years of the effective date of the final rule and new sources would have to comply with PSNS within 90 days of commencing discharge.

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**Stormwater Retrofit**

**International Port**

**Stormwater Requirements**

**Benchmarks Missed**

**Bioswale to Bioretention Fix**

# LOW IMPACT STORMWATER RETROFIT

**PORT CONVERTS STANDARD BIOSWALE TO BIORETENTION TO MEET WATER QUALITY GOALS**

by Kim Slack, Kennedy/Jenks Consultants (Portland, OR)

## Introduction

The Port of Vancouver, USA in Washington State, operates over 800 acres of industrial and marine transportation property with about 50 tenants. Primarily used for exports, the Port of Vancouver's (Port's) five marine terminals are used for the trade of bulk, break bulk, automobiles, and a variety of special project cargoes with Japan, Southeast Asia, China, South America, Europe, and Egypt. About 16 percent of US wheat exports are shipped through the port, which also provides one of Subaru's two points of entry on the West Coast.

Providing permanent treatment Best Management Practices (BMPs) for stormwater runoff was required when the Port of Vancouver, Washington developed its 50-acre Terminal 2 facility for the handling and staging of marine cargo in 1999. The port constructed a parallel bioswale to treat stormwater runoff from Terminal 2 in accordance with the City of Vancouver's Phase II municipal stormwater permit requirements. In Washington, many industries — including ports — are required to monitor their stormwater discharges and compare monitoring results to benchmark levels included in the State of Washington Department of Ecology (Ecology) Industrial Stormwater General Permit (ISGP). Sampling results showed over time that the bioswale was not performing up to industrial discharge benchmark levels so the port took corrective action.

Kennedy/Jenks Consultants worked with the Port to analyze several supplementary treatment alternatives, and recommended installation of a high flow bypass and conversion of the bioswale system to a bioretention system. The Port constructed the bioretention system in late 2009. Effluent water quality data collected in 2010 and 2011 has shown vastly improved removal of total and dissolved copper, zinc, and turbidity.

## Terminal 2 Activities and Water Quality Challenges

Terminal 2 contains four berths and approximately 50 acres of paved area used for the handling and staging of marine cargo, including bulk, break bulk, wind turbine components, equipment, and mobile harbor cranes. Within Terminal 2 there is a handling area for the export of recycled scrap metal. While stormwater runoff from this area is treated separately and discharges to the municipal sewer system, truck dragout and fugitive emissions from the process frequently reach surrounding areas in Terminal 2.

**Photo 1: Parallel Bioswale,** constructed during 1999 Terminal 2 improvements

With the exception of some tenants' individual stormwater permit coverage areas, stormwater discharges from Terminal 2 are covered under the ISGP. The ISGP requires quarterly monitoring of turbidity, pH, oil sheen, total copper, and total zinc in stormwater discharge against established benchmark values. S5, Tables 2 and 3, Industrial Stormwater General Permit, Washington Department of Ecology, Issued 21 October 2009. Water quality data collected from the bioswale effluent from 2003—2009 showed good removal of solids and oil/grease, but poor removal of metals and turbidity. ISGP permit benchmarks and historical effluent data from the bioswale are compared in Table 1 below.

**Table 1: Bioswale Effluent Water Quality Data** collected between 2003 and 2009 shows insufficient metals removal to meet 2010 ISGP benchmarks.

| Parameter | Units | 2010 ISGP Benchmark Value1 | Bioswale Effluent Data 2003-2009 |
|---|---|---|---|
| **Turbidity** | NTU | 25 | 2.98 - 55.2* |
| **PH** | Standard Units | 5.0 – 9.0 | 5.0 – 9.0 |
| **Oil Sheen** | Yes/No | No Visible Oil Sheen | No Visible Oil Sheen |
| **Total Suspended Solids** | mg/L | 100 | 10 - 20 |
| **Total Copper** | µg/L | 14 | 8.6 – 114* |
| **Total Zinc** | µg/L | 117 | 195 – 1,930* |
| *** = Benchmark Exceedances** | | | |

## Stormwater Retrofit

**Photo 2: Parallel Bioswale** showing preferential pathways

**Photo 3: Initial Bioretention System**
showing poor infiltration due to improper aggregate/compost mix

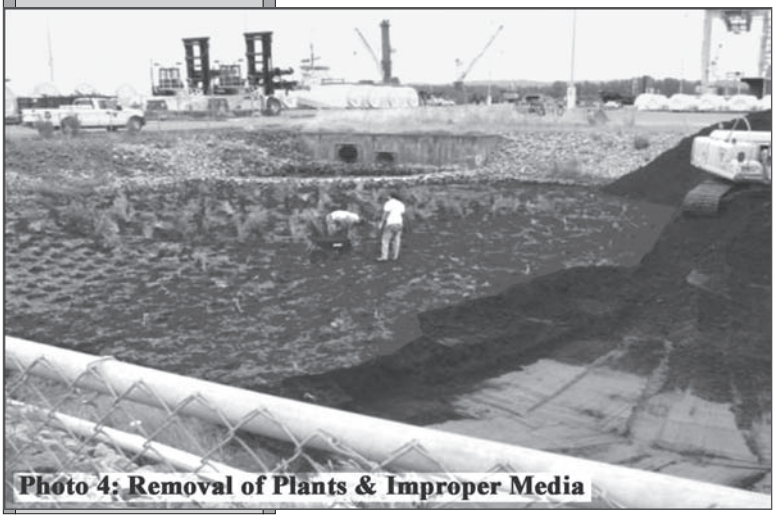


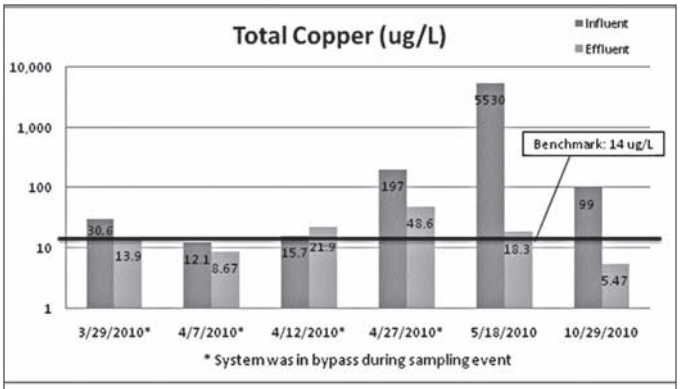
**Photo 4: Removal of Plants & Improper Media**

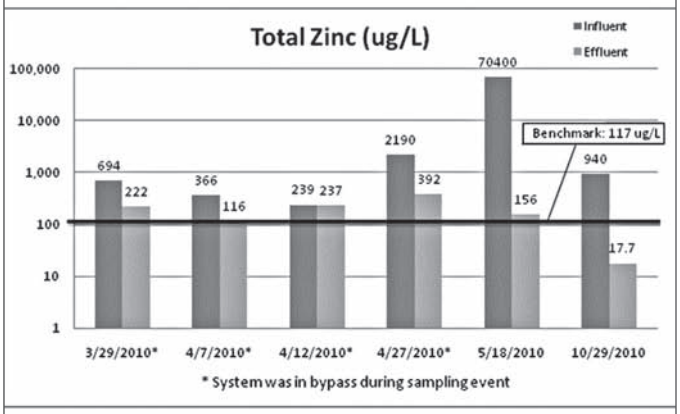
**Bioswale-Bioretention Conversion**

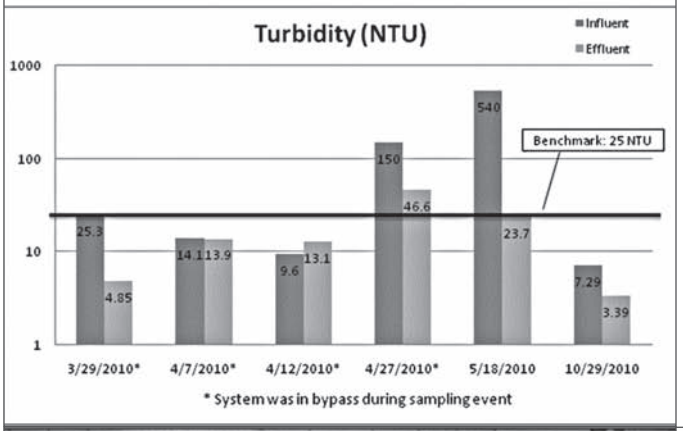
In response to the benchmark exceedances, and in preparation for increasing cargo volumes and new commodities to be handled in the terminals, the Port entered into a Level 3 Corrective Action to re-evaluate the treatment of Terminal 2's stormwater runoff. Kennedy/ Jenks Consultants conducted an analysis of Terminal 2's drainage and treatment system and provided four alternative corrective actions. These alternatives included rehabilitation of the existing bioswale, conversion of the bioswale to a bioretention system with a high flow bypass, installation of a stormwater filtration system downstream of the bioswale, and installation of an active stormwater treatment system downstream of the bioswale. The Port elected to convert the bioswale to a bioretention system, which would offer hydrologic and water quality benefits through the retention of runoff, evapotranspiration, and plant uptake of the metals that have proved to be so problematic and prevalent in industrial stormwater runoff. Further water quality testing of the facility's influent and effluent flow, including both total and dissolved fractions of metals, was also recommended to more fully assess the site's treatment needs.

The Terminal 2 bioswale was converted to a bioretention system in December 2009. The bioretention system was designed to treat up to and including the water quality flow rate defined as the flow rate at or below which 91 percent of the runoff volume — as estimated by an approved continuous runoff model — will be treated as required by Ecology and City of Vancouver standards. A high flow bypass structure was installed upstream so that flows exceeding the water quality flow rate are diverted directly to the system's effluent piping. Treatment flows first enter the upgraded system through CleanWay Metal Zorb® media inserts installed in the system's two inlet pipes for preliminary metals removal through ion adsorption and filtration. An inlet bay with an oil boom installed along its perimeter then collects runoff and provides preliminary sedimentation and oil reduction. Flow is then dispersed evenly across the facility's 12,500 square feet of surface area and infiltrated through 30 inches of engineered soil media, which was specified in final design as gravelly sand with 40% compost by volume to be mixed until a minimum infiltration rate of 20 inches per hour is achieved.

The surface of the bioretention system was planted with common and spreading rushes, Columbia sedges, and New Zealand orange sedges, which are particularly suited for metals uptake in the Pacific Northwest environment. The system design allows for ponding of the treatment flows to a depth of one foot in the facility, and three catch basins installed along the outlet end provide internal bypass drainage for depths exceeding one foot. All three internal bypass catch basins are equipped with CleanWay MetalZorb® inserts to provide treatment for bypassed flows. As silt-rich soils exist beneath the facility, which severely limits infiltration, eight-inch perforated PVC underdrain piping was installed beneath the engineered treatment media to collect and discharge treated runoff through the existing outfall to the Columbia River.




Initial performance of the bioretention system experienced what might be described as "overflowing bathtub" conditions following irregular heavy rains that occurred during the 2009-2010 winter season. This unsatisfactory performance indicated that the infiltration capacity of the media blend that was initially installed was insufficient to handle these high flows. As a result, ponding occurred up to the internal bypass catch basins, so most runoff passed through the system in bypass mode. During this time, an infiltration rate of only approximately one-sixteenth of an inch per hour was measured and the virtual bathtub overflowed. After the heavy rains had passed and the ponding had subsided, plant plugs were found uprooted and deposited around the internal bypass catch basins. Post-construction soil testing indicated that the engineered soil blend was nearly 90% compost by volume, rather than the 40% specified by design. These conditions were rectified in August 2010 by the removal and re-installation of the plants and infiltration media. This re-installation established the originally specified compost ratio (40%) mixed to achieve the specified minimum infiltration rate of 20 inches per hour.

Influent and effluent water quality data was collected following the completion of the project, as summarized in the accompanying bar charts.

Although much of the preliminary influent and effluent water quality testing was conducted during bypass conditions, the data shows good removal efficiency of turbidity and metals. Additional influent and effluent testing for dissolved metals will be conducted as the site activities occurring in Terminal 2 continue to evolve to more fully assess the system's treatment efficiency. 2011 quarterly monitoring under the Port's ISGP requirements shows effluent concentrations of turbidity, copper, and zinc below benchmark values.

The construction project to convert the existing bioswale to a bioretention system took 62 days and required a city grading permit and stormwater plan review. The project was completed according to the State Environmental Policy Act (SEPA) process. Final design and permitting costs were approximately $43,700 and the final construction cost was approximately $246,700.

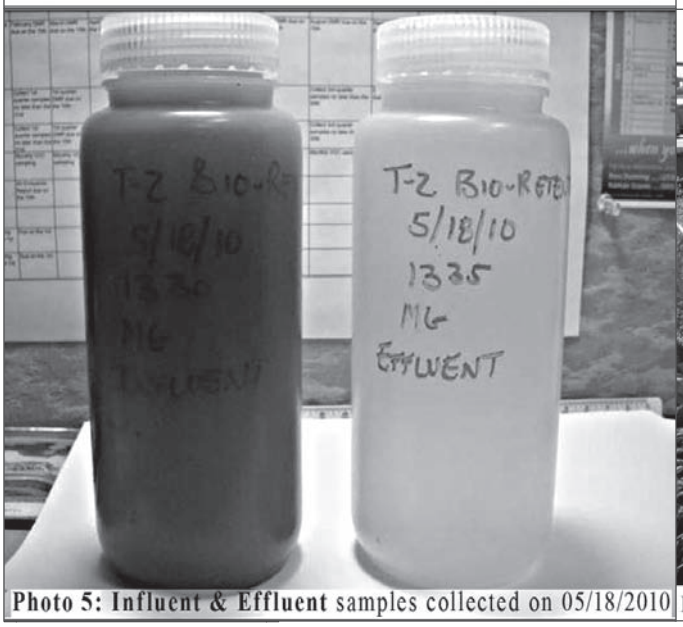



**Photo 5: Influent & Effluent** samples collected on 05/18/2010

**Photo 6: Installation,** following replacement of plants & improper media

## Stormwater Retrofit

### Model for Other Ports

**Summary/Conclusions**

The Port of Vancouver should be commended for its vision in development of this ground-breaking retrofit project. Providing approximately 12,500 square feet of infiltration area and sized to handle a treatment flow rate represented by the 91st runoff percentile for approximately 50 acres of area, the Terminal 2 bioretention system is the largest facility of its kind known to exist. This bioretention system also represents one of the first treatment facilities implementing Low Impact Development technology to treat runoff from a large industrial facility. The early success of the system in reducing concentrations of difficult to control metals in stormwater runoff has piqued the interest of Washington State's Department of Ecology and is already the model for large bioretention facilities being designed for other northwest port industrial properties at the Ports of Tacoma and Seattle.

*The author would like to acknowledge Matt Graves, Environmental Project Manager for the Port of Vancouver, for the water quality data cited in the article.*

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**Photo 7: Conversion of Existing Bioswale to a Bioretention System Completed in 2009**

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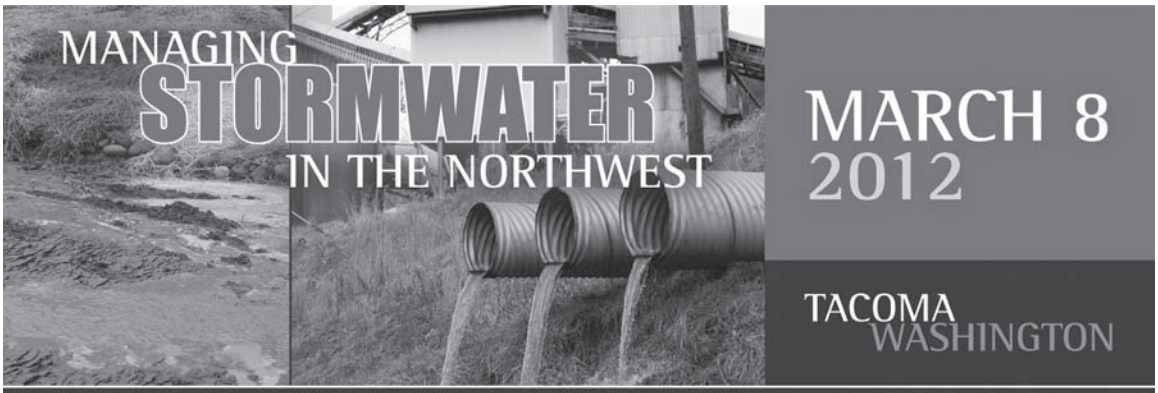
**Photo Credits**

Photos 1, 2, 3, 4, 5, 6
Matt Graves
Port of Vancouver

Photos 7 & 8
Ross Dunning
Kennedy/Jenks Consultants


**Photo 8: Conversion of Existing Bioswale to a Bioretention System Completed in 2009**

## Upcoming Stormwater Conference




**Agenda Includes:**

**Stormwater Regulation - The Big Picture**

MODERATOR: Robert Grott, Northwest Environmental Business Council

SPEAKERS: John Palmer, EPA Region 10; Jenine Camilleri, Oregon Department of Environmental Quality; Bill Moore, Washington State Department of Ecology

**Sharpening Your Stormwater Plan**

MODERATOR: Ross Stainsby, Hart Crowser

SPEAKERS: Kelly Garber, APL; Michael Depew, Lafarge; Rand Lymangrover, Totem Ocean Trailer Express (TOTE)

**The New Municipal Permit Requirements**

MODERATOR: Paul Bucich, Parametrix

SPEAKERS: Ed O'Brien, Washington State Department of Ecology; Ross Dunning, Kennedy/Jenks Consultants; Robin Kirschbaum, HDR Engineering Inc

**Effective Control Techniques**

**Low Impact Development as a Stormwater Retrofit Solution**

MODERATOR: Scott Kindred, Aspect Consulting LLC

SPEAKERS: Christopher May, Kitsap County Public Works; Tracy Tackett, City of Seattle; Jennifer Belknap Williamson, City of Gresham

**Luncheon Presentation**

Speaker: Gerry O'Keefe, Executive Director, Puget Sound Partnership

**Risk Management & Stormwater**

SPEAKERS: Bradford Doll, Tupper/Mack/Wells PLLC; Michael Nesteroff, Lane Powell PC

**Determining the Feasibility of Low Impact Development**

MODERATOR: Lee Holder, Golder Associates

SPEAKERS: Curtis Hinman, Washington State University Stormwater Research Center; Tim Kurtz, City of Portland; Scott Kindred, Aspect Consulting LLC

**It All Runs Downhill - Stormwater At the Shoreline**

MODERATOR: Warren Hansen, Windward Environmental LLC

SPEAKERS: Thomas Newlon, Stoel Rives LLP; Kym Takasaki, Port of Seattle; Pam Elardo, King County Wastewater Treatment Division

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**Brazos River Basin Water**

**Water Availability & Senior Rights Impairment**

**Remand Deadline**

**Plan Aspects**

# CONSTRUING SPECULATIVE USE

TCEQ REMANDS MILLION ACRE-FOOT WATER APPLICATION FOR BRAZOS RIVER BASIN

by David Moon, Editor

## Introduction

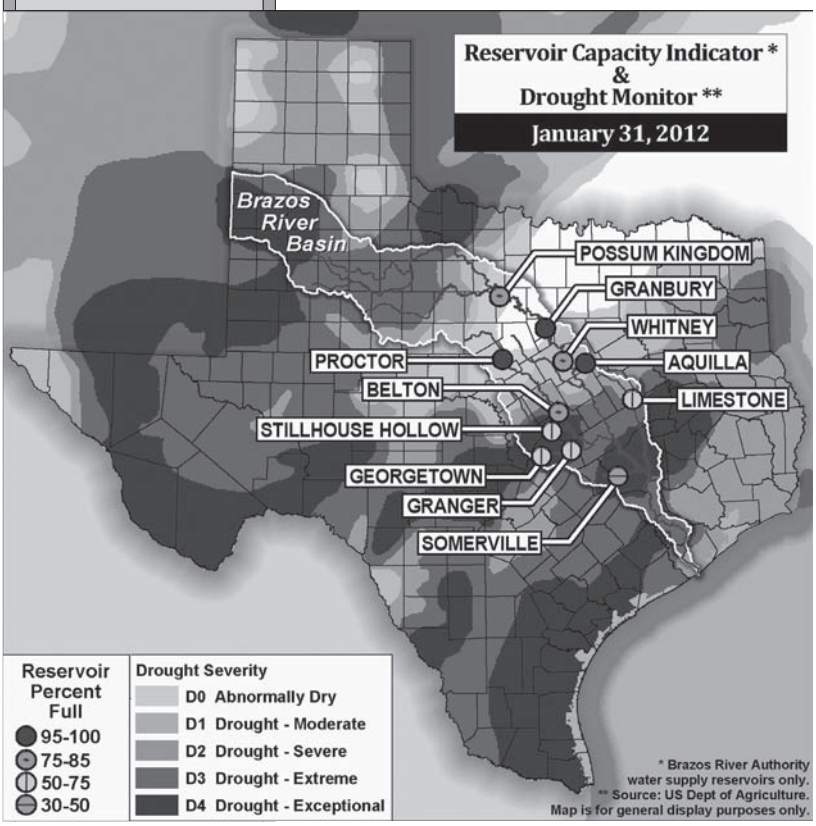
APPLICATION RAISES "SPECULATION" ISSUES

The Texas Commission of Environmental Quality (TCEQ) at its January 25, 2012 meeting rejected a water use permit application (Application) by the Brazos River Authority (BRA) to appropriate over one million acre-feet of water from the Brazos River. The Application essentially requested all water remaining in the Brazos River Basin (Basin) — including existing and future return flows. Granting the Application would put the BRA in the position of controlling all new uses of water in the Basin.

Administrative Law Judges (ALJs) Newchurch and Burkhalter concluded that the Application cannot be approved and should either be denied or remanded to the State Office of Administrative Hearings (SOAH) for further hearing on the Water Management Plan. The ALJs determined that they "cannot find that BRA has shown that water is available for appropriation at the points where BRA would eventually divert water or that senior water rights would not be impaired by proposed diversions. That is mostly due to BRA's proposed two-step process, which the ALJs also believe might result in a non-final order." Proposal for Decision (Proposal), October 17, 2011, page 193. The ALJs also provided TCEQ with an alternative recommendation to grant the Application in part by only authorizing diversions at four locations for specific quantities identified in the Application.

TCEQ's Interim Order (January 30, 2012) remanded Permit #5851 back to SOAH with instructions to "abate the hearing to allow the Applicant to submit additional information related to the application in the form of a Water Management Plan." A timeline was set out in the Interim Order (Order) for submittal of the detailed Plan within ten months. Meanwhile, TCEQ also directed the ALJs overseeing the case to "draft a proposed order denying BRA's permit application if BRA fails to meet that deadline." Order at 1.

Although the Order is clearly not a final order denying the Application outright, TCEQ left little doubt about its current view of the Application. TCEQ required the ALJs to prepare the proposed "denial order" so that it is "consistent with the ALJs' analysis and conclusion that BRA's original application did not meet the requirements for permit issuance and should be focused on the issues that led to their recommended denial." *Id.* However, BRA comes away from this decision with the opportunity to obtain the additional water requested provided it can provide sufficient detail to the ALJs and TCEQ to convince them of the Application's merit and overcome some fundamental issues of water law. The remand gives BRA another shot at providing needed specificity to their plans for use of the water, even though the permit was filed over seven years ago and the parties have already participated in an eleven day hearing.




Following submittal of the Water Management Plan, TCEQ provided for seven months for review and compliance with public participation requirements. If supplemental information is necessary, BRA was ordered to "promptly respond to any requests for additional information…within 20 days… ." *Id.* at 2. After that the record was to be reopened and a hearing held on the new information, including the proposed permit application as modified by the Water Management Plan. TCEQ also placed a strict deadline on the end of the process, by directing the ALJs to issue a revised proposal for decision and proposed order within 24 months from January 30, 2012, after which the parties would have an opportunity to file exceptions and replies. *Id.*

The original application was filed with TCEQ on June 25, 2004. The ALJs conducted the hearing regarding the permit over 11 days in May and June of 2011. Apparently, TCEQ's Order is designed to keep the process on a strict timeline as BRA continues to pursue the massive appropriation by preparing a Water Management Plan.

**Brazos River Basin Water**

**Brazos River Authority**

**DOW Downstream**

**System Operations Permit (Proposed)**

**Return Flows**

**Flexibility**

**Diversions**

An unusual coalition of critics oppose the application as Protestants, including: landowners; farmers; environmentalists; and the Dow Chemical Company (which runs a complex near the mouth of the Brazos).

### Background

#### BRA system and "systems operation permit" application

BRA was created by the Texas Legislature in 1929 and was the first State agency in the United States created specifically for the purpose of developing and managing the water resources of an entire river basin. BRA's staff of 250 develop and distribute water supplies, provide water and wastewater treatment, monitor water quality, and pursue water conservation through public education programs.

BRA owns several major dams on the Brazos River and its tributaries; the Application encompasses twelve reservoirs — one of which is not yet constructed — in Texas' largest river basin. BRA has existing water rights to 705,000 AF of water, but 99% of that supply is already under contract to various cities and industry. See Proposal at 5 for details. An "acre-foot" (AF) is equal to about 326,000 gallons; as a volume figure in water parlance, when one refers to an acre-foot that implicitly means an acre-foot for every year.

The Dow Chemical Company (DOW) owns 235 AF of relatively senior water rights in the Basin, most of which are senior to BRA's existing rights; those rights, however, are the most downstream water rights on the Brazos River due to the location of DOW's diversion points. DOW was particularly concerned that there is no watermaster for the Brazos River and that there is no simple priority call system in place. As noted in the Proposal for Decision, BRA did not oppose the appointment of a watermaster. Proposal at 182.

BRA applied for a "systems operation permit" in June 2004. In its Post-Hearing Written Argument BRA Argument) at page 2, BRA refers to the Application as "truly unique, in terms of its complexity, its scope, and its benefits."

The Application was filed pursuant to rules of the TCEQ & TWC Ch. 11 to:

- Authorize a new appropriation of state water in the amount of 421,449 acre-feet (AF) per year for multiple uses, including domestic, municipal, agricultural, industrial, mining and other beneficial uses on a "firm" basis in the Basin. The new appropriation amount includes the current and future return flows requested in the application. BRA indicated that the entire amount of 421,449 AF is available only if all of it is diverted at the mouth of the Brazos River, and can only be made available by the Applicant through the system operation of its water rights [reservoir system].
- Use of up to 90,000 AF of its firm supply (part of the 421,449 AF of firm water requested above) to produce — along with other unappropriated flows — an "interruptible" water supply of 670,000 AF and the appropriation of that interruptible water supply. ["Firm" water means water from a water right that will be available during the drought of record. "Interruptible" water ("non-firm " water) will not be available at all times, not during the drought of record and not even during many other times, and thus may be interrupted to provide for more senior users. BRA will sell interruptible water on a yearly basis, when it predicts it will have sufficient water.]
- Create an exempt interbasin transfer authorization to transfer and use, on a firm and interruptible basis, such water in the adjoining San Jacinto-Brazos Coastal Basin and the Brazos-Colorado Coastal Basin, and to transfer such water to any county or municipality or the municipality's retail service area that is partially within the BRB for use (on a firm and interruptible basis) in that part of the county or municipality and the municipality's retail service area not within the BRB.
- Appropriate current and future return flows to the extent that such return flows continue to be discharged or returned into the bed and banks of the Brazos River, its tributaries, and Applicant's reservoirs.
- Allow operational flexibility to: (1) use any source of water available to the Applicant to satisfy the diversion requirements of senior water rights to the same extent that those water rights would have been satisfied by passing inflows through the Applicant's reservoirs on a priority basis; and (2) release, pump and transport water from any of Applicant's reservoirs for subsequent storage, diversion and use throughout the Applicant's service area.
- Divert water from existing and other diversion points, some of which are not yet identified
- Allow use of the bed and banks of the Brazos River, its tributaries, and BRA's reservoirs for the conveyance, storage, and subsequent water diversion
- Recognize that the SysOp Permit will prevail over inconsistent provisions in BRA's existing water rights regarding system operation

BRA "seeks authority to take advantage of water savings achieved through coordinated operation of its various existing water rights, as well as the right to make additional appropriations." *Id*. at 6.

**Brazos River Basin Water**

**Protestants' Position**

**Positions of the Contending Parties**

The Protestants "complain that BRA has not properly proposed points and rates of diversion as required, making it impossible to determine whether unappropriated water is available at the point where BRA would eventually divert water and whether senior water rights would be impaired." They also argue that the permit would be detrimental to the public welfare and raised claims that "BRA was required, but failed, to adequately consider the protection of instream uses, recreation, tourism, water quality, fish and wildlife habitat, the availability of water for family farmers, and water salinity levels." Proposal at 2.

BRA claimed that its proposal will protect the environment, fish and wildlife habitat, and instream uses. It proposed "complex interim restrictions on instream flows that it contends would accomplish those purposes. It also agrees that those interim restrictions are subject to adjustment to comply with the environmental flow standards that the Commission eventually will adopt in the future." *Id.* at 3.

The Executive Director (ED) of TCEQ recommended that BRA's Application be approved in part. He "agrees with BRA on every significant point but one." The ED's position differs only as to the handling of return flows, maintaining that BRA may use return flows only to the extent of current discharges (not future return flows) and "BRA may only use return flows that originate from BRA or from treatment facilities owned or operated by BRA." *Id.*

**Speculation**

**Beneficial Use**

The critical issue of speculation was highlighted in the Friends of Brazos River (FBR) Post Hearing Argument at page 1: "At the heart of BRA's approach is an attempt to circumvent requirements of existing laws and permit, including one of the most fundamental provisions of Texas surface water law: demonstration of actual beneficial uses for the specific amounts of water to be appropriated." FBR also asserted that "BRA's approach also seeks to circumvent the requirements related to protection of instream flows that are found in both existing law and prior permit issued to BRA." *Id.*

**The "Texas Two-Step" Process**

FUTURE UNKNOWNS AND THE PERMITTING PROCESS

**Permit Process**

BRA pushed for a two-step process, where TCEQ would grant the water rights to BRA first and later address specific requests for a diversion and use of water when BRA filed a water management plan as an amendment to the permit. BRA maintained that it could not develop a water management plan until it knows how much water it can divert. Proposal at 2 and 160.

**Water Availability & Impacts**

Protestants, on the other hand, asserted that such a two-step process is "unprecedented" and "doesn't fit within the structure of Texas water rights permitting." Relying on BRA to address the "details and necessary protections for how that permit can be effectively managed to protect existing water rights and the environment" should not be allowed, especially since there is no "statutory structure, or at least rules, governing operations under such a water management plan scenario" — "Once BRA has its perpetural water right, the risk is squarely placed on existing water rights and the environment." National Wildlife Federation (NWF) Post-Hearing Argument at 1. In addition, the objectors maintain that it is impossible to gauge the availability of water or the potential impacts on water rights holders, water quality, fish, and wildlife habitat without knowing the location of diversion points or the flow rates to be diverted. They further maintain that granting the permit without such details is clearly premature and speculative.

**Two-Step Rejected**

The ALJs agreed that the two-step process was "unprecedented" — rejecting BRA assertions that various other permits cited by BRA were pertinent prior examples. Proposal at 165. "Most notably, none of the precedents cited by BRA and the ED [Executive Director, TCEQ] involved the TCEQ issuing a water right without requiring the applicant to prove all the elements required by Water Code § 11.134 at the time of permit issuance. Thus, the ALJs conclude that there is no precedent in water rights permitting in Texas which supports the use of the two-step process envisioned by BRA and the ED." *Id.*

**Unknowns**

The two-step process has additional problems, according to the ALJs' Proposal, including: theoretical diversion points; the failure to specify diversion rates; and the fact that the actual amounts of water that will be appropriated by BRA would remain unknown until completion of the water management plan process. *Id.* at 165-172. "The most prominent aspects of the SysOp Permit, however, are far from definitive." *Id.* at 170. The Permit "as it is currently proposed, would likely not be considered to be a final and appealable order." *Id.* at 173.

**Diversion Points**

The failure to identify the actual diversion points that would be utilized by the permit — i.e. the "Imaginary Diversion Points" alluded to in FBR's Post-Hearing Argument — is a key factual omission. "The specific locations of diversion points for new appropriations throughout the basin are required to be identified in the permit application and permit. § 11.125(b)(2), Tex. Water Code and 30 TAC §295.7. Both Texas law and TCEQ rules require BRA's application identify the location of point(s) of diversion and show the locations on a map in the application." FBR Argument at 14. FBR went on to argue that "Only when the diversion points are proposed, can the specific impacts on the stream and instream uses at and

**Brazos River Basin Water**

just downstream of the diversion points be identified and assessed. That type of analysis is, however, required *before* a new appropriation is approved under § 11.134, Tex. Water Code." *Id.* at 15 (emphasis added). Under BRA's proposed two-step process, however, the diversion points for the permit were not all identified, since the proposal was to have the later Water Management Plan specify diversion points, rates of diversion, etc.

**Remand to SOAH and the ALJs**

**Water Management Plan**

Once BRA submits its Water Management Plan to the ALJs, many of the factual questions and related water law issues will need to be addressed by the ALJs. Although the Application was not granted and BRA clearly has much to do to prepare an adequate Water Management Plan to secure a permit, it should also be noted that the ALJs rejected eighteen proposed permit conditions as part of their Proposal for Decision (see pages 185-189). In addition, the ALJs Proposal for Decision also made findings on some of the myriad of issues involved, such that one could expect they will be reluctant to change their rulings upon remand. At this point, it is unclear if the TCEQ will later uphold the ALJs holdings or rule otherwise.

While the "Texas Two-Step" may be dead, the ALJs concluded that BRA has already shown that "granting its System Operation Permit would be in the public interest and not detrimental to the public welfare, the environment, instream water uses, or CCG's [Comanche County Growers] or Mr. Ware's [both are Protestants to the Application] water rights." *Id.* at 4. Other important rulings in the ALJs Proposal for Decision are discussed below.

**Diversion Rates and Adverse Affects on Existing Rights**

**Diversion Rates**

The ALJs decided that the Application does not adequately identify a maximum rate of diversion, as required by a TCEQ rule governing permitting (30 TAC § 295.6). Due to its decision to request the two-step process, BRA's Application is "silent as to rates of diversion" and BRA conceded that "it is seeking a permit that would not specify any maximum diversion rate." BRA asserted that "the diversion rates will be subsequently identified in the process of developing the WMP [Water Management Plan]." Proposal at 19.

**Adverse Affect**

The Protestants, however, maintained that the lack of information was critical because "the impacts of the proposed permit cannot be adequately determined now without knowing diversion rates." The ALJs agreed with this assertion. The ALJs also stated that "by leaving diversion rates unspecified, it is impossible, at this stage, to determine whether the SysOp Permit will adversely affect senior water rights." The ALJs concluded that "the Application cannot be granted without knowing the maximum rates of diversion." Proposal at 19-20.

**Diversion Points (Infinite)**

The Application's failure to identify the actual diversion points for the proposed water rights and reliance on the two-step process resulted in further problems noted by the ALJs. They finally concluded that "the BRA Application fails to comply with the requirement in Section 295.7 to identify the specific locations where water will be diverted pursuant to the SysOp Permit. Ironically, the Application either: (1) identifies *no* diversion points, or (2) identifies *infinite* diversion points." Proposal at 28 (emphasis in original).

**Impacts on Senior Rights**

Besides failing to comply with the rule regarding diversion points, the ALJs explain the importance of such information to a permitting decision: "Moreover, without knowing the actual diversion points, the impacts the SysOp Permit may have on senior water rights cannot be known. When conducting a water availability analysis during consideration of a water-right application, it is critically necessary to know the location divesion point in order to assess the impact that a proposed permit may have on senior water rights and instream uses. BRA concedes this point: 'the amount of water made available by system operation depends significantly upon the location in the basin at which the water is diverted.'" *Id.* at 28-29.

**Water Availability and Impairment of Existing Rights**

**Unappropriated Water**

Like all the western states, Texas law requires that a water right cannot be granted unless "unappropriated water is available in the source of supply" for the proposed right. Water Code § 11.314(b)(2). In addition, an application for a water right cannot be granted unless the TCEQ decides that the new appropriation will "not impair existing water rights or vested riparian rights." Water Code § 11.314(b)(3)(B).

**Sources**

The SysOp Permit includes three sources of unappropriated water: 1) unappropriated river flows; 2) return flows of treated wastewater; and 3) water available for appropriation from BRA's existing reservoirs. The underlying reason for BRA's application is that BRA "has a great deal of storage throughout the basin" and "can convert this unappropriated water into a reliable supply by using stream flows not being used by senior water rights when that water is available, and providing water from storage when there are little or no stream flows available for use." Proposal at 43.

**Brazos River Basin Water**

**Theoretical Information**

**Impacts Unknown**

**DOW Condition**

**BRA Needs Forecast**

**Beneficial Use**

**Speculation Alleged**

The issue of water availability and potential impairment of existing water rights led the ALJs to find that BRA had failed to prove "that the full amount of water sought to be diverted under the SysOp Permit is available and that the diversion will not impair existing water-right holders." The failure was primarily "due to BRA's requested Two-Step Process, under which BRA did not propose and offer evidence concerning specific points and rates of diversion but deferred those decisions until it files a WMP." Proposal at 41. Joe Trungale, a civil engineer who specializes in water resource planning and environmental flows studies, testified on behalf of FBR. The ALJs Proposal summarized his opinion succinctly: "…because the Application does not identify actual, as opposed to only theoretical, information on issues such as diversion points, amounts of water to be diverted, places of use, and so on, the amount of unappropriated water available for the SysOp Permit cannot be accurately determined." *Id*. at 46.

"The inescapable fact is that, assuming BRA's application was granted in this matter, it would be impossible to know whether senior water rights would be impacted by the permit until the WMP is approved. In essence, BRA and the ED argue that the exercise of the SysOp Permit will not negatively impact senior water rights because the WMP will ensure that such negative impacts do not occur. In the absence of the WMP, BRA and the ED would simply have the Commission take them at their word." *Id*. at 48.

**DOW Condition - Downstream User**

DOW proposed a condition regarding flow protections for its downstream rights. BRA and the ED proposed a specific condition for the permit that the ALJs recommended be incorporated into any future permit. No diversion or impoundment is to be allowed by BRA unless the flow of the river at USGS Gauge 081166550 (near Rosharon) is 630 cubic feet per second or more, or if the flow is below DOW's projected daily pumping rate (which DOW must provide to BRA or the appointed watermaster). Proposal at 185.

**Beneficial Use vs. Speculation**

BRA addressed the issue of "beneficial use" in its Post-Hearing Argument by noting that "Even though BRA has contracted nearly all of its reliable water supply, a demand for additional water supplies currently exists…BRA also has pending requests for water from approximately twenty different entities that would contract, collectively, for over 150,000 af/yr of water." BRA also cited to the 2011 Regional Water Plans for Regions G and H in regard to forecasts of substantial additional water supply needs. BRA Argument at 5-6. "The evidence shows there is an immediate need for additional water supplies in a large portion of the Brazos River Basin and BRA intends to beneficially use the newly appropriated water by contracting with its existing and future customers who have a need for these additional supplies. *Id*. at 6-7.

The ALJs ruled on the "Beneficial Use" issue and set forth its views on that term of art (Proposal at 63): "BRA met its burden to prove that the SysOp Permit appropriations are intended for beneficial use. Pursuant to Water Code § 11.134(b)(3)(A), an application for a water right cannot be granted unless the TCEQ first finds that the appropriation contemplated in the application 'is intended for a beneficial use.' The requirement for showing beneficial use follows from the concept that the state holds the water of the state in trust for the benefit of the people of the state. It is in the state's interest, therefore, to make sure that a person seeking an appropriation of water will beneficially use it, because appropriating water to an applicant reduces the amount of water the state will have to appropriate to others." Water Code § 11.134, the statute addressing action on water rights applications is cited in full in the Proposal at 16-17.

The ALJs ruling was based on the "substantial amount of evidence to prove that water appropriated under the SysOp Permit would be put to beneficial use" that BRA presented regarding general water needs in the Basin. *Id*. at 63.

In the Proposal, the ALJs concisely set out the Protestants' position regarding speculative use of water. "The Protestants' second argument is essentially that BRA cannot obtain the SysOp Permit based upon 'speculation' that it will be able to sell its water rights to others. The Water Code defines 'beneficial use' as 'use of the amount of water which is economically necessary for a purpose authorized by this chapter, when reasonable intelligence and reasonable diligence are used in applying the water to that purpose and shall include conserved water.' In reliance upon that definition, NWF [National Wildlife Federation] asserts that BRA must identify specific unmet demands that will be met by the SysOp Permit. NWF asserts that BRA has failed to do so because, for example, the amount of total demands for SysOp Permit water projected in the approved plans for Regions G and H is only about 112,000 acre-feet, whereas BRA is requesting much more than that. Similarly, NWF notes that, while roughly 700,000 of BRA's existing water rights are already committed to be used by BRA customers, the highest ever annual use under those contracts was only 303,301 acre-feet." Proposal at 65-66.

"Similarly, FBR contends that BRA bears the burden to prove that the requested amount of water is necessary and reasonable for the authorized purposes, but it concedes there is not much Texas case law

**Brazos River Basin Water**

**Monopoly**

**Water Amount Necessary**

on beneficial use to support this contention. Instead, FBR relies upon a substantial body of case law from western states to contend that water rights in Texas should not be issued 'based upon the speculative sale or transfer of …appropriative rights.' That is, FBR contends that, in order to show beneficial use, BRA must prove an actual, current need for the water, such as by showing that it currently has in hand executed contracts to sell all the water to be appropriated under the SysOp Permit. In reliance upon out-of-state case law, Dow argues that BRA is attempting to achieve a monopoly in the Brazos River Basin, and that this, somehow, runs contrary to BRA's obligation to prove its intention to beneficially use the SysOp Permit water." Proposal at 66 (citations omitted).

FBR also cited the definition of "beneficial use" in their Post-Hearing Argument: "Beneficial use is defined as the amount of water that is economically necessary for a purpose authorized by Chapter 11 of the Water Code, when reasonable intelligence and reasonable diligence are used in applying the water to that purpose and shall include conserved water. Tex. Water Code § 11.002(4). The purpose of the requested water must also be beneficial, as specified in Section 11.023(a) and (b) of the Water Code…Thus, an applicant must demonstrate that the requested *amount* of water is necessary and reasonable for the authorized *purpose(s)*." FBR Argument at 28-29 (emphasis in original). FBR then went on to make its case regarding speculation:

**Speculation Prohibition**

> That the Legislature required a water right applicant to specify its intended beneficial use reveals the Legislature's intent to prohibit speculative permitting for a scarce, public and valuable resource. This requirement is particularly apt today, with our ongoing drought issues. The standard must be scrupulously and deliberately applied to ensure that this public resource is not indiscriminately appropriated to permittees whose only use for the water is to hoard it in the hope of being able to sell it sometime in the future. Although there is not much Texas case law on beneficial use, other Western states have addressed this requirement and provide useful and relevant insight as to its purpose. FBR Argument at 28-29

**Colorado on Speculation**

FBR tried to convince the ALJs to look to Colorado for guidance regarding the issue of speculation, citing *Upper Yampa Water Conservancy Dist. v. Dequine Family L.L.C.,* 249 P.3d 794 (Colo. 2011). Colorado's Supreme Court addressed a similar beneficial use requirement under their laws. "The court there noted that the intent to appropriate water for a beneficial use is an integral part of the applicant's obligation, and it 'cannot be based on the speculative sale or transfer of the appropriative rights.' *Id*. at 798. Mere storage of diverted water is not itself a beneficial use, noted the Court. *Id*. at 799. Moreover, the Court held that the existence of firm contractual commitments are insufficient to satisfy the beneficial use requirement if there is no specific plan and intent for application of the appropriated waters to a beneficial use. *Id*. at 798-99." FBR Argument at 29. FBR cited a California case (*Central Delta Water Agency v. State Water Res. Control Bd*., 124 Cal. App.4th 245 (App. Ct. 2004)) and a Washington case (*Dep't of Ecology v. Theodoratus*, 957 P.2d 1241 (Wash. 1998)), among others, to bolster their argument. FBR also pushed the fact that "Hypothetical diversions do not satisfy the beneficial use requirement." FBR Argument at 30-32. (*See* Water Briefs, *TWR* #87 and #88 regarding recent Colorado holdings.)

**"Low Threshold" Standard**

Ultimately, the ALJs found that Texas Water Code § 11.134(b)(3)(a) merely asks whether the appropriation contemplated is *intended* for a beneficial use. "This is a low threshold to overcome… Contrary to Protestants' suggestions, there are no requirements that BRA must specifically identify each diversion and the amount needed at each diversion to demonstrate the proposed appropriation is intended for beneficial use." The ALJs pointed out that BRA provided a number of statutory provisions in the Water Code that support a flexible construction of "intended for beneficial use." The ALJs also noted that BRA identified Texas case law that supports the position that BRA "need not have actual water use contracts in hand in order to prove beneficial use" citing two cases, *Texas River Protection Assoc. v. TNRCC*, 910 S.W.2d 147 (Tex. App. - Austin 1995, writ denied) and *City of San Antonio v. Texas Water Comm'n*, 407 S.W.2d 752 (Tex. 1966). Proposal at 67.

**Low Threshold v. Permit Requirements**

The ALJs were clearly convinced that Texas' "low threshold" (i.e., that the "appropriation contemplated in the application is 'intended for a beneficial use'" - Proposal at 63) in combination with BRA's evidence of future water needs and its intent to supply water for those needs was sufficient to avoid being deemed speculative. This portion of the ALJs Proposal came despite strong findings and rulings earlier in their Proposal regarding the requirements in Texas to specify "maximum diversion rates" and to identify the locations of the actual points of diversions (see discussion above). Indeed, earlier in its Proposal the ALJs noted that Kathy Alexander, the Technical Specialist who served as the ED's technical lead on the BRA Application, "conceded that she currently has 'no idea' how or where BRA will actually use the water authorized by the permit it seeks. She also conceded that BRA would probably not make any diversions from the control points identified in the application." Proposal at 26-27.

**Brazos River Basin Water**

**Environmental Conditions**

**Public Interest**

**Water Supply Needs**

**Other Issues**

Many important issues raised by the parties are beyond the scope of this article, including the impacts on instream flows and water quality. Interested readers should refer to the detailed Proposal, as well as the excellent briefs filed by both the Applicants and Protestants. The Water Report anticipates covering TCEQ's pending decision regarding the Application. What follows are brief descriptions of some of the more salient issues.

**Environmental Flows**

BRA proposed interim special conditions to ensure that the exercise of water rights sought would not negatively impact the environment. They contended that their proposed interim flows go well beyond the requirements to protect all of the environmental resources that TCEQ is required to consider as part of the permitting process. The Texas Parks & Wildlife Department (TPWD) agreed with BRA and Cindy Loeffler, Chief of TPWD's Water Resources Branch, testified that the provisions proposed by CRA will be protective of fish, wildlife, and other instream uses.

The ALJs concluded that "BRA's and the ED's environmental flow review was sufficiently complete. They also find that the Proposed Permit contains reasonable conditions necessary to protect existing instream uses, water quality, fish and wildlife habitat, bays, estuaries, groundwater, and groundwater recharge, and to maintain the biological soundness of the state's rivers, lakes, bays, and esturaries." *Id*. at 70.

**Public Welfare, Public Interest, and Instream Uses**

The Proposal contains an interesting discussion of the scope of the public interest and welfare inquiry in a water rights permitting case, beginning at page 109 of the Proposal, eventually stating what is included and what is not. The decision ultimately focuses on "the need for additional water supplies in the Brazos River Basin. Water retailers and others are looking to BRA to provide wholesale water to them, and the proposed permit would allow BRA to supply that demand at a very low cost. The ALJs find that approval of BRA's application would serve the public interest and support the public welfare by making additional reliable water available to the public and reducing pressure on BRA to increase its rates." *Id.* at 112.

Referring to BRA's provisions for environmental flow, the ALJs "conclude that approval of the proposed permit would be in the public interest because it would avoid the environmental impact of the construction of additional reservoirs to provide the same amount of water, and it would protect environmental flows from future appropriations through the environmental flow restrictions included in the permit and the dedication of additional water to the Texas Water Trust for environmental needs including instream flows." *Id.* at 114.

**Conservation and Drought Planning**

The section concerning conservation and drought planning provides background on Texas' approach on these matters in water permitting. BRA did agree to the inclusion of language proposed by NWR that requires updated water conservation plans and drought contingency plans every ten years. The ALJs recommended including the condition in any permit TCEQ issues to BRA. Proposal at 136.

**Return Flows**

As noted by BRA, returns flows are treated wastewater or unused portions of diversions that are discharged into watercourses in the state. The Application raised several complex issues related to return flows, particularly since BRA based part of its request on current and future return flows. The issues become even more complicated because under the wholesale "approach advocated by BRA…the original sources of the return flow would include groundwater, surface water from the Brazos River Basin, and surface water imported from other basins. Proposal at 137.

**Conclusion**

The rule against speculation in western water law is a fundamental principle that states throughout the West have upheld in one form or another over the years. *The Water Report* has covered this issue several times, including a recent article on a massive application in Oregon for water from the McKenzie River (Moon, *TWR* #94; see also Hobbs, *TWR* #36 regarding Colorado; and Zellmer, *TWR* #50: *Anti-Speculation & Water Law - Ghost-Busting, Trust-Busting, or Ensuring Beneficial Use*).

Texas' water permitting agency, the TCEQ, will soon be squarely faced with how it will address the issue. By not denying the application outright, TCEQ has given BRA an opportunity to provide enough details to allay concerns and gain control over a tremendous supply of water. It remains to be seen what specifics will be supplied on the planned uses and whether or not that will be sufficient to meet the requirements of Texas water law.

In deciding not to deny the permit, TCEQ will eventually have to address difficult water law issues — critical to how Texas will proceed with its water future — when the case arrives back with a new Proposal for Decision.

**For Additional Information:**

Relevant documents available from TCEQ at:
www10.tceq.state.tx.us/epic/efilings/index.cfm?fuseaction=search.home
>>> then Search for TCEQ Docket Number 2005-1490-WR.
See *Service List in the Proposal for Decision* for a comprehensive list of all parties' attorneys.

## WATER BRIEFS

### GRAND CANYON MINING AZ

**URANIUM MINING BAN**

Secretary of the Interior Ken Salazar announced on January 9 his decision to protect the Grand Canyon and its vital watershed from the potential adverse effects of additional uranium and other hardrock mining on over 1 million acres of federal land for the next 20 years. Secretary Salazar's Record of Decision establishes the ban on new uranium mining and mining of current claims without valid permits across more than 1,500 square miles. The Public Land Order to withdraw these acres for 20 years from new mining claims and sites under the 1872 Mining Law, subject to valid existing rights, is authorized by the Federal Land Policy and Management Act.

The withdrawal does not prohibit previously approved uranium mining, new projects that could be approved on claims, and sites with valid existing rights. The withdrawal would allow other natural resource development in the area, including mineral leasing, geothermal leasing and mineral materials sales, to the extent consistent with the applicable land use plans. Approximately 3,200 mining claims are currently located in the withdrawal area.

"The withdrawal maintains the pace of hardrock mining, particularly uranium, near the Grand Canyon," said Bureau of Land Management Director Bob Abbey, "but also gives the Department a chance to monitor the impacts associated with uranium mining in this area. It preserves the ability of future decision-makers to make thoughtful decisions about managing this area of national environmental and cultural significance based on the best information available." During the withdrawal period, BLM projects that up to 11 uranium mines, including four that are currently approved, could still be developed based on valid pre-existing rights — meaning the jobs supported by mining in the area would increase or remain flat as compared to the current level, according to the BLM's analysis.
**For info:** BLM, 602/ 417-9504 or www.blm.gov/az/st/en/prog/mining/timeout.html; Roger Clark, Grand Canyon Trust, 928/ 890-7515

### TRIBAL WATER RIGHTS WA

**QUANTIFICATION SOUGHT**

Six years of multi-party water rights negotiations in the Nooksack basin of Whatcom County have been suspended while the Lummi Nation and Nooksack Indian Tribe seek federal support to quantify their water rights. At issue is how much water should remain in various reaches and streams of the Nooksack River, and how much should be available for other uses. The tribes asked the US Department of the Interior to file a lawsuit that will result in a declaration of their treaty-reserved water rights and protection of those rights. If Interior grants the request, the federal action would provide clarity about the quantity of water reserved for the tribes. It also would be the starting point for determining how much water is available for other uses and be a major step in resolving long-standing water allocation challenges in the Nooksack River. Details of the negotiations are protected by a confidentiality agreement signed by the negotiating parties — the tribes, the City of Bellingham and the Washington Department of Ecology.

Bob Kelly, Chairman of the Nooksack Tribe, said, "We all knew that federal court action would be needed to establish the Indian water rights. We made a lot of progress together, and, if the parties continue to cooperate, this can be noncontroversial." Bellingham Mayor Dan Pike noted that clarifying these issues is important to planning for the City's water supply over the long term. "We are disappointed that the process has stalled because we believed negotiations were the best prospect of resolution for all parties. But at this point we look forward to continuing to work with the parties to resolve these issues in the future."

The Nooksack basin supplies water for a number of competing needs, including cities, industries, farms, homes, fish and other animals. Most of the Nooksack basin is closed to new water rights for all or part of the year.
**For info:** Richard Grout, Ecology, 360/ 715-5200; Merle Jefferson, Lummi Natural Resources Depart., 360/ 384-2225 or merlej@lummi-nsn.gov; Bob Kelly, Nooksack Indian Tribe, 360/ 739-4055; Clare Fogelsong, Bellingham Environmental Resources, 360/ 778-7965 or cfogelsong@cob.org

### WATER POLLUTION DATA US

**EPA ONLINE TOOL**

EPA announced the release of a new tool on January25 that provides the public with important information about pollutants released into local waterways. The Discharge Monitoring Report (DMR) Pollutant Loading Tool brings together millions of records and allows for easy searching and mapping of water pollution by local area, watershed, company, industry sector, and pollutant.

Searches using the pollutant loading tool result in "top 10" lists to help users easily identify facilities and industries that are discharging the most pollution and impacted waterbodies. When discharges are above permitted levels, users can view the violations and link to details about enforcement actions that EPA and states have taken to address these violations.
**For info:** Tool available at: www.epa.gov/pollutantdischarges

### NUCLEAR POWER WATER UT

**WATER RIGHT CHANGE APPLICATIONS**

Two water right change applications for a proposed nuclear power plant near Green River, Utah have been approved by Kent Jones, State Engineer with the Utah Division of Water Rights. The decisions follow more than two years of study. Kane County Water Conservancy District and San Juan County Water Conservancy District are leasing rights to Blue Castle Holdings (BCH) to provide water from the Green River for a nuclear power plant for the expected 60 years of operations. The request raised many concerns such as the safety and oversight of nuclear power, local water use interference, wildlife concerns including endangered fishes, over-appropriation of Colorado River water, the economic viability of the project, and the financial ability of BCH to complete the project.

The water right approval criteria dictated in Utah law directs the state engineer to evaluate and investigate

applications. An application is statutorily required to be approved if the state engineer believes: water is available from the source; the proposed use will not impair existing rights or interfere with the more beneficial use of water; the project is economically and physically feasible; it would not be detrimental to the public welfare; the applicant has the financial ability to complete the project; and, the application is filed in good faith and not for speculative or monopolistic purposes.

Nearly 4.4 million acre-feet of water flows by the city of Green River every year. BCH is seeking 53,600 acre-feet of that water to be allocated for its project. "That amount of water is not a lot on the Green River," said Jones. "But it is a significant portion of the water Utah has left to develop on the Colorado River and a significant new diversion from the Green River where efforts are underway to provide habitat for recovery of endangered fish." Approval of the application does not guarantee sufficient water will always be available from the river to operate the plant. Plant design will need to address the possibility of interruptions in water supply.

The state engineer's decision on the applications authorizes the use of water for the plant after the Nuclear Regulatory Commission (NRC) approvals for the project are obtained. Prior to any construction, NRC will oversee an exhaustive design process to make certain the proposed site is safe for a nuclear power plant and the National Environmental Protection Act and Endangered Species Act requirements are complied with.

**For info:** Utah Division of Water Rights website: www.waterrights.utah.gov; BCH website: www.bluecastleproject.com

**KLAMATH DAMS CA/OR**

**DAM REMOVAL REPORTS ISSUED**

On January 24, the US Department of Interior (Interior) published a draft report summarizing two years of scientific and technical studies conducted to help inform the Secretary of the Interior on a forthcoming decision on whether to remove four hydroelectric dams on the Klamath River, per the Klamath Hydroelectric Settlement Agreement (KHSA) of 2010. The most probable estimate of the cost of full dam removal, and associated mitigation actions, is $291.6 million (in 2020 dollars since this is when the dams would be removed). This is significantly less than the $450 million state cost cap identified in the KHSA. The comprehensive draft report, entitled *Klamath Dam Removal Overview Report for the Secretary of the Interior: an Assessment of Science and Technical Information* (*Overview Report*), and each individual study conducted on the environmental and economic impacts of the potential dam removal, are available at www.KlamathRestoration.gov.

The draft report presents in plain language a summary of dozens of peer-reviewed reports that have been prepared by the federal government and made public as part of the effort to fill important data gaps prior to a Secretarial Determination. Many of the findings — in disciplines including economics, engineering, biology, water quality, recreation and real estate — were first published in September. Public comment on the draft closed on February 5.

Interior also released an updated Economics and Tribal Summary Technical Report and the *Klamath River Basin Restoration Nonuse Value Survey Final Report.* The Economics and Tribal Summary Report provides an assessment of the economic benefits and costs of dam removal. The Klamath NED analysis (national economic development) evaluated the net economic benefits of the dams out scenario (which included a partial facilities removal scenario). The low range estimate for net economic benefits was $14.1 billion with corresponding benefit-cost ratio of 8.7 to 1. The *Nonuse Value Survey Final Report* provides estimates of one important component of the economic benefits: nonuse values.

The economic reports analyzed in the draft *Overview Report* find that dam removal and implementation of the related watershed-wide restoration program provide an opportunity to bring significant additional jobs to the region and strengthen local economies in the Klamath Basin for reasons that include improved fish populations; additional recreational and commercial fishing opportunities; and increased agricultural output due to more certainty in water deliveries. The one-year dam removal project is estimated to result in 1,400 jobs during the year of construction. Implementation of restoration programs of the Klamath Basin Restoration Agreement (KBRA) is estimated to result in 4,600 jobs over its 15 years of implementation.

Removal of the dams, combined with restoration of aquatic habitats as anticipated in the KBRA, will enable steelhead trout to migrate to historical habitat. Distribution of steelhead in the watershed is expected to expand to a greater degree than that of any other anadromous salmonid species (Chinook salmon and coho salmon). Access to approximately 420 miles of historical habitat is estimated to again be available for steelhead upstream of the lowest dam following dam removal.

Interior has arranged for a scientific peer review of the draft *Overview Report* by a six member independent panel. Interior also encouraged the public to review and offer technical comments on the draft report for the peer reviewers to consider during their deliberations, but public comment closed on February 5.

The final *Overview Report,* and the dozens of reports it summarizes, along with the final Environmental Impact Statement/Environmental Impact Report on Klamath River dam removal, will help inform the Secretarial Determination, which is due March 31st in accordance with the KHSA.

**For info:** Adam Fetcher, DOI, 202/ 208-6416; Pete Lucero, BOR, 916/ 978-5100; Overview Report: Executive Summary & Summary of Key Conclusions at: www.KlamathRestoration.gov

## WATER BRIEFS

### CLIMATE CHANGE US

**DRAFT STRATEGY PROPOSED**

In partnership with state, tribal, and federal agency partners, the Obama Administration has released the first draft national strategy to help decision makers and resource managers prepare for and help reduce the impacts of climate change on species, ecosystems, and the people and economies that depend on them. The National Fish, Wildlife and Plants Climate Adaptation Strategy represents a draft framework for unified action to safeguard fish, wildlife and plants, as well as the important benefits and services the natural world provides the nation every day, including jobs, food, clean water, clean air, building materials, storm protection, and recreation. The Strategy is available for public review and comment through March 5, 2012.

**For info:** www.wildlifeadaptationstrategy.gov

### WATER REUSE US

**MUNICIPAL WASTEWATER REPORT**

On January 10, the National Research Council released a report co-sponsored by EPA titled, "*Water Reuse: Potential for Expanding the Nation's Water Supply through Reuse of Municipal Wastewater.*" The report highlights the potential that reuse of municipal wastewater can play in augmenting traditional water supplies, particularly in areas that are experiencing or expect to face challenges in meeting demand for water. EPA agrees that advancements in water treatment processes make reuse of municipal wastewater a more viable option when risks are appropriately managed. EPA will review the findings and recommendations to determine how they can inform the agency's ongoing efforts to promote a more integrated view of the nation's water resources. The report will also inform efforts underway to revise and update EPA 2004 guidelines for water reuse.

**For info:** Report available at: http://dels.nas.edu/Report/water-reuse/13303

### TOXICS RELEASES NW

**2010 NORTHWEST ANALYSIS**

Recent data from the federal Toxics Release Inventory (TRI), which includes a section on the Columbia River basin, shows that toxic chemical releases rose in the Region 10 states of Alaska, Idaho, Oregon, and Washington, according to the Environmental Protection Agency (EPA). The 2010 TRI National Analysis shows that TRI releases rose 16 percent across the nation between 2009 and 2010, reversing a downward trend from recent years.

This year, almost 90 percent of all TRI chemical releases in Region 10 are attributed to the metal mining industry in Alaska. Throughout the region, the mining industry increased reported releases by 19 percent compared to 2009. Increases reported from metal mines can be due to increased production, variations in ore composition, or changes in production processes.

The 2010 TRI reports how over 600 chemicals on the TRI list were managed, where they ended up, and how 2010 releases compare to 2009. In Alaska, 32 facilities reported a total of 835 million pounds of toxic chemical releases, an increase of 20 percent; Idaho: 95 facilities reported a total of 67 million pounds of toxic chemical releases, an increase of 17 percent; Oregon: 271 facilities reported a total of 18 million pounds of toxic chemical releases, an increase of 20 percent; and Washington: 304 facilities reported a total of 20 million pounds of toxic chemical releases, an increase of 27 percent.

For the Columbia River basin, the report said, "Recent studies and monitoring programs have found significant levels of toxic chemicals in fish and the waters they inhabit, including DDT, PCBs, mercury, dioxins, and other anthropogenic toxic chemicals. According to EPA Region 10's 'Columbia River Basin Toxics Reduction Action Plan,' such accumulation of toxics in fish threatens the species, and human consumption of fish with significant body burdens of toxics can lead to health problems."

Surface water discharges in the Columbia Basin "were 5 percent of total on-site disposal or other releases in 2010. They decreased by 51 percent from 2001 to 2010, including a 9 percent decrease from 2009 to 2010. The food processing industry accounted for half of the surface water discharges in 2010, almost all of which was nitrate compounds."

**For info:** www.epa.gov/tri/tridata/tri10/nationalanalysis/tri-lae-columbia.html

### TEXAS WATER PLAN TX

**WATER DEVELOPMENT BOARD**

The 2012 Texas State Water Plan (Plan) was adopted by the Texas Water Development Board on December 15, 2011, and sent to the Governor on January 5, 2012. In serious drought conditions, Texas does not and will not have enough water to meet its needs. This Plan presents the information regarding the recommended conservation and other types of water management strategies that would be necessary to meet the state's needs in drought conditions, the cost of such strategies, and estimates of the state's financial assistance that would be required to implement these strategies. The Plan also presents the sobering news of the economic losses likely to occur if these water supply needs cannot be met. As the state continues to experience rapid growth and declining water supplies, implementation of the plan is crucial to ensure public health, safety, and welfare and economic development in the state.

Not only are existing water supplies projected to decline by 10 percent by 2060, but Texas' population is expected to grow 82 percent, from 25.4 million to 46.3 million. The nexus of a growing population and diminishing water supplies means that by 2060, the state is projected to have water shortages of 8.3 million acre-feet per year during a severe drought if no further water supplies are developed.

To address those shortages, the state's 16 regional water planning groups recommended 562 strategies to create additional water supplies at an estimated total cost of $53 billion. These costs consist of the funds

## WATER BRIEFS

needed to permit, design, and construct projects, with the majority of the costs used to meet the needs of residential, commercial, and institutional water users across Texas. Of the $53 billion, an estimated $27 billion will need to come from financial assistance provided by the state. The $53 billion needed to implement the state water plan is, however, only about a quarter of the total needs for water supplies, water treatment and distribution, wastewater treatment and collection, and flood control required for the state in the next 50 years.

**For info:** 2012 Plan at: www.twdb.state.tx.us/publications/; Previous water plans at: www.twdb.state.tx.us/wrpi/swp/previous.asp

### MILITARY MS4 PERMT WA

**DRAFT EPA PERMIT INCLUDES LID**

Due to its size, population and proximity to Puget Sound, Joint Base Lewis-McChord (JBLM) has received a proposed Municipal Stormwater discharge permit from EPA. The permit, when final, is expected to help guide how stormwater is managed across nearly 142 square miles of base property over the next decade and beyond.

Located just south of Tacoma, WA, JBLM is recognized as the largest military installation on the West Coast. The most recent population estimate for the base was 95,000 people, including military personnel, military dependants residing on base, civilian employees, and visitors.

Stormwater (surface runoff from rain and snow melt) is recognized as a major source of pollution to the Puget Sound. Commercial and housing development alters the land's natural ability to absorb and evaporate rainfall. Expanding impervious surfaces (like roads and roofs) then converge with a growing population to produce more vehicle related pollution that settles on those surfaces. When it rains, it all runs off into lakes, rivers, streams and ultimately the Puget Sound.

EPA's draft municipal separate storm sewer system (MS4) permit for JBLM is the first such proposed permit for a military or other federal facility in western Washington. The draft permit requires specific actions and activities that must be accomplished over at least the next five years to protect local waters.

JBLM has been implementing a stormwater program for several years in anticipation of receiving a permit from EPA. Among the new requirements under the proposed permit, the base must: control runoff from all construction sites; control runoff from all new development and redevelopment sites; map, inspect, and maintain the storm system; and engage JBLM employees and the community about preventing pollutants in storm water runoff.

The Base MS4 permit also requires:

- stormwater runoff from redevelopment and new projects must meet performance standards through use of Low Impact Development (LID) techniques and, if needed, traditional stormwater features (detention ponds)
- a new construction project threshold of 5,000 square feet or greater
- a program to reduce runoff from the existing developed areas
- a biological stream health monitoring program using aquatic insects in Clover and Murray Creeks

EPA's proposed permit requires LID practices such as rain gardens, permeable pavement, native vegetation areas, and green roofs to avoid or lessen the reliance on traditional stormwater pipes and ponds. By using LID, a larger portion of rainfall will be intercepted, infiltrated, evaporated, or reused to avoid excess runoff. These actions will help maintain or restore a more natural stream flow throughout the year, replenish groundwater, and help protect fish and other aquatic organisms. It will also reduce the influx of pollutants washed into the streams, creeks and lakes on the base or into Puget Sound.

Comments on the Draft Permit will be accepted through March 30, 2012. After the comment period ends EPA will consider and respond to all comments, and make any necessary changes to the draft permit. The Washington Department of Ecology will also consider certifying the permit in accordance with Section 401 of the Clean Water Act. The EPA Director of the Office of Water & Watersheds will then make a final decision about permit issuance.

**For info:** John Palmer, EPA, 206/ 553-6521 or palmer.john@epa.gov

For a copy of the Draft Permit: http://yosemite.epa.gov/R10/WATER.NSF/stormwater/homehttp://yosemite.epa.gov/r10/water.nsf/npdes+public+notices/jblm-ms4-pn-2011

EPA Region 10 stormwater program: www.epa.gov/region10/stormwater

### USDA CRP SIGN-UP US

**CONSERVATION RESERVE PROGRAM**

The US Department of Agriculture (USDA) will conduct a four-week Conservation Reserve Program (CRP) general signup, beginning on March 12 and ending on April 6. CRP has a 25-year legacy of successfully protecting the nation's natural resources through voluntary participation, while providing significant economic and environmental benefits to rural communities across the US.

USDA expects strong competition to enroll acres into CRP and urges interested producers to maximize their environmental benefits and to make cost-effective offers.

CRP is a voluntary program available to agricultural producers to help them use environmentally sensitive land for conservation benefits. Producers enrolled in CRP plant long-term, resource-conserving covers to improve the quality of water, control soil erosion and develop wildlife habitat. In return, USDA provides participants with rental payments and cost-share assistance. Contract duration is between 10 and 15 years. Producers with expiring contracts and producers with environmentally sensitive land are encouraged to evaluate their options under CRP. Producers also are encouraged to look into CRP's other enrollment opportunities offered on a continuous, non-competitive, signup basis.

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Currently, about 30 million acres are enrolled in CRP; and contracts on an estimated 6.5 million acres will expire on Sept. 30, 2012.

Offers for CRP contracts are ranked according to the Environmental Benefits Index (EBI). USDA's Farm Service Agency (FSA) collects data for each of the EBI factors based on the relative environmental benefits for the land offered. Each eligible offer is ranked in comparison to all other offers and selections made from that ranking.

EBI factors include:

- Wildlife habitat benefits resulting from covers on contract acreage
- Water quality benefits from reduced erosion, runoff, and leaching
- On-farm benefits from reduced erosion
- Benefits that will likely endure beyond the contract period
- Air quality benefits from reduced wind erosion
- Cost

Over the past 25 years, farmers, ranchers, conservationists, hunters, fishermen, and other outdoor enthusiasts have made CRP the largest and one of the most important in USDA's conservation portfolio. CRP continues to improve water and air quality, prevent soil erosion by protecting the most sensitive areas including those prone to flash flooding and runoff. At the same time, CRP has helped increase populations of pheasants, quail, ducks, and other rare species, like the sage grouse, the lesser prairie chicken, and others.

Highlights of CRP include:

- CRP has restored more than two million acres of wetlands and two million acres of riparian buffers.
- Each year, CRP keeps more than 600 million pounds of nitrogen and more than 100 million pounds of phosphorous from flowing into our nation's streams, rivers, and lakes.
- CRP provides $1.8 billion annually to landowners.
- CRP is the largest private lands carbon sequestration program in the country. By placing vulnerable cropland into conservation, CRP sequesters carbon in plants and soil, and reduces both fuel and fertilizer usage. In 2010, CRP resulted in carbon sequestration equal to taking almost 10 million cars off the road.

In 2011, USDA enrolled a record number of acres of private working lands in conservation programs, working with more than 500,000 farmers and ranchers to implement conservation practices that clean filter water and prevent soil erosion.

**For info:** www.fsa.usda.gov

### WATER SUSTAINABILITY US EPA HANDBOOK FOR WATER UTILITIES

EPA has released a comprehensive handbook to help water sector utilities build sustainability considerations into their planning. "*Planning for Sustainability: A Handbook for Water and Wastewater Utilities*" is designed to help utilities ensure that water infrastructure projects across the nation, including those funded through the state revolving fund programs, are sustainable and support the long-term sustainability of the communities these utilities serve.

The handbook is based on EPA's clean water and safe drinking water infrastructure sustainability policy, which was issued in September 2010. In developing the handbook, EPA worked closely with a number of utility and state program managers around the country. The handbook describes four core elements where utilities can explicitly build sustainability considerations into their existing planning processes. Each element contains relevant examples from utilities around the country and other implementation tips for utilities to consider.

**For info:** water.epa.gov/infrastructure/sustain/sustainable_systems.cfm.

### ILLEGAL FILL SETTLEMENT CA $500,000 IN RESTORATION STIPULATED

In California, a Ventura County contractor, Thomas Staben, and his construction company, TA Staben, Inc., will pay a $225,000 penalty for illegally dumping imported material into a Ventura County creek. Thomas Staben illegally filled Calleguas Creek with 40,000 cubic yards of material — the equivalent of about 2,000 large dump truck loads. As part of the settlement, Staben will also spend at least $500,000 on restoration and mitigation projects, including removing the fill and restoring the creek's natural functions. Calleguas Creek is the main freshwater source for the Mugu Lagoon Estuary, one of Southern California's largest coastal wetland systems and home to various endangered species.

Between 2005 and 2006, Staben filled approximately five acres of Calleguas Creek, also known as Arroyo Las Posas, without the necessary federal Clean Water Act (CWA) permit despite several warnings by the Army Corps of Engineers (Corps) to stop. The illegal fill substantially reduced the active floodplain in this portion of the creek, increasing potential flooding of adjacent properties and contributing to the bioaccumulation problems harmful to the health of endangered species and other wildlife in Mugu Lagoon. Staben, who has a history of noncompliance dating back to 1989, was cited by the Corps on various occasions for unpermitted work in Calleguas Creek and the Ventura River.

The creek has been the subject of extensive studies and protection efforts at federal, state, and local levels due to its ecological significance and impaired water quality. As part of the restoration project Staben will remove the illegal fill material, restore the five acres of filled active floodplain, and create another two acres of vegetated embankment buffer between the floodplain and the upland property. Restoration will allow the creek to perform the important ecological functions of recharging groundwater, retaining nutrients, attenuating floodwaters, and providing habitats and movement corridors for wildlife. The project will also address long-term erosion problems of the adjacent property and reduce non-point source pollution.

Staben will also spend $150,000 on mitigation by paying into the Ventura River Watershed Habitat Restoration Fund to help fund the Rice Creek Re-Alignment Project, which aims to create

 

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about nine acres of new stream habitats and help maintain water quality for steelhead in the downstream Ventura River.

The proposed consent decree for the settlement, lodged with the federal district court on December 30, 2011, was subject to a 30-day comment period and final court approval.

**For info:** Proposed decree is available at: www.justice.gov/enrd/Consent_Decrees.html

### WATER QUALITY MARKETS US

**USDA FUNDING - PROPOSALS REQUESTED**

USDA's Natural Resources Conservation Service (NRCS) is providing up to $10 million in Conservation Innovation Grants (CIG) for water quality trading projects, with up to $5 million focused on water quality credit trading in the Chesapeake Bay watershed. Proposals for projects are due March 2, 2012.

This is the first time USDA has offered funding specifically for water quality trading. USDA's goal is to demonstrate that markets are a cost-effective way to improve water quality and considers agricultural producers are critical to the function of such markets.

Water quality credit trading is a market-based approach to lowering the costs of reducing pollution, and has the potential to engage more farmers and ranchers in water quality improvement efforts through the implementation of more conservation practices on agricultural lands. Through water quality credit trading, a producer who implements conservation practices to reduce water quality pollutants can also benefit by generating water quality market credits that could be sold in an open market, which would reduce the costs of implementing and maintaining the conservation practices.

NRCS requests CIG proposals for projects that:

- Support the completion of state water quality market rules and infrastructure needed to carry out water quality trading between point and non-point sources
- Deploy and test tools and metrics needed for crediting and verifying the effectiveness of conservation practices on agricultural lands
- Establish certification, registry and reporting systems
- Educate and reach out to agriculture and other sectors

CIG funds will be awarded through a competitive grants process. At least 50 percent of the total cost of CIG projects must come from non-Federal matching funds, including cash and in-kind contributions provided by the grant recipient. Projects must involve producers who are eligible for the NRCS Environmental Quality Incentives Program.

**For info:** NRCS website: www.nrcs.usda.gov/wps/portal/nrcs/main/national/programs/financial/cig

### WATER QUALITY AZ

**DRAFT CWA REPORT AVAILABLE**

Arizona Department of Environmental Quality officials announced in mid-January that a draft version of a report that examines surface water quality in Arizona is available for public review and comment.

The public comment period for the Draft 2010 Status of Water Quality in Arizona 305(b) Assessment and 303(d) Listing Report ends on Friday, Feb. 17 and is the first step in the approval process for the document. Following the close of the public comment period, a summary of responses to comments received and the 303(d) Impaired Waters List with any revisions will be published in the Arizona Administrative Register (AAR) for a 45-day public notice. Only those persons who submitted comments during the original 30-day notice may also comment during the AAR notice. Upon completion of the 45-day AAR notice, the 303(d) list will be submitted to EPA for final approval. EPA can approve or disapprove the state's 303(d) list as well as add additional surface waters to the list that EPA assesses as impaired.

Every two years, the federal Clean Water Act requires states to assess water quality data and publish a list of surface waters that are not meeting water quality standards or beneficial uses. The reports are named after the appropriate sections of the Clean Water Act.

**For info:** Draft Report available at: http://azdeq.gov/environ/water/assessment/assess.html

### AQUIFER RECHARGE ID

**FIVE-YEAR PILOT PROGRAM**

In January, the Idaho Water Resource Board (Board) approved a resolution to fund a five-year pilot program for managed recharge on the Eastern Snake Plain Aquifer (ESPA).

The Board approved the expenditure of $1.5 million over five years from Idaho's Secondary Aquifer Planning, Management and Implementation Fund in order to compensate canal companies and irrigation districts for their costs in delivering water for managed recharge. The Board is requesting the University of Idaho's Idaho Water Resource Research Institute (IWRRI) to recommend the high-priority locations for managed recharge. Based on the recommendations from IWWRI, the Board will contract with canal companies and irrigation districts to deliver the Board's natural flow water right into the high-priority locations.

Since the passage and approval of the ESPA Comprehensive Aquifer Management Plan (CAMP) managed recharge for the ESPA has been undertaken by the Water Resource Board. Phase 1 of the ESPA CAMP is to recharge 100,000 acre-feet of water on an average annual basis. By partnering with IWRRI and monitoring the effects of recharge the Board will be able to use the data to better determine and prioritize managed recharge on the ESPA.

The Water Resource Board will limit the State of Idaho's recharge efforts to the Water Resource Board's natural flow water right above Milner Dam.

**For info:** Neeley Miller, Idaho Water Resources, 208/ 287-4831 or neeley.miller@idwr.idaho.gov

ESPA CAMP website: www.idwr.idaho.gov/waterboard/WaterPlanning/CAMP/ESPA/

# CALENDAR

**February 15 AZ**
**Reverse Osmosis Concentrate Management Through Wetlands (Brownbag), Tucson.** WRRC, 350 N. Campbell Ave., 12-1:30pm. For info: Jane Cripps, Water Resources Research Center, 520/ 621-2526, jcripps@cals.arizona.edu or cals.arizona.edu/azwater

**February 15-16 FL**
**Sustainable Water Resources - Nutrient Dynamics, Policy & Management in Watershed: 3rd Water Institute Symposium, Gainesville.** J. Wayne Reitz Union. Sponsored by U of Florida Water Institute. For info: http://waterinstitute.ufl.edu/symposium2012/index.asp

**February 16 CA**
**Endangered Species Regulation & Protection Course, Sacramento.** Sutter Square Galleria, 2901 K Street. For info: UC Davis Extension, 800/ 752-0881 or www.extension.ucdavis.edu/landuse

**February 16 GA**
**Wetlands & Water Law Update Seminar, Atlanta.** Marriott Suite Downtown. For info: The Seminar Group, 800/ 574-4852, email: info@theseminargroup.net, or website: www.theseminargroup.net

**February 17 OR**
**Water for the World Banquet, Corvallis.** Corvallis Country Club. Sponsored by Engineers Without Borders. For info: www.ewb-osu.org/banquet

**February 21 AZ**
**Cienega de Santa Clara Restoration (Brownbag), Tucson.** WRRC, 350 N. Campbell Ave., 12-1:30pm. For info: Jane Cripps, Water Resources Research Center, 520/ 621-2526, jcripps@cals.arizona.edu or cals.arizona.edu/azwater

**February 21 WA**
**Opportunity & Crisis - Renegotiation of the Columbia River Treaty (Dinner), Seattle.** Pyramid Ale House, 1201 1st Ave. South. Sponsored by AWRA-WA Section. For info: http://earth.golder.com/waawra/ASP/Home.asp

**February 21-22 OR**
**Reservoir System Modeling Technologies Conference, Portland.** DoubleTree by Hilton Hotel, 1000 NE Multhomah. Sponsored by Bonneville Power Administration. For info: BPA: www.bpa.gov/corporate/business/innovation/

**February 21-23 OR**
**Northwest Hydroelectric Ass'n 2012 Annual Conference, Portland.** Marriott Hotel Waterfront. For info: www.nwhydro.org/default.htm

**February 22-24 CA**
**30th Annual ABA Water Law Conference, San Diego.** Westin San Diego, 400 W. Broadway. Sponsored by American BAR Association. For info: www.americanbar.org/

**February 23-24 TX**
**The Changing Face of Water Rights Advanced Course, San Antonio.** Hyatt Hill Country Resort. Sponsored by TexasBarCLE. For info: http://texasbarcle.com/CLE/AABuy1.asp?sProductType=EV&lID=10913

**February 23-24 NV**
**Family Farm Alliance Annual Meeting & Conference, Las Vegas.** Monte Carlo Resort. For info: FFA: www.familyfarmallicance.org

**February 23-24 CA**
**Planning in California: Overview & Update Course, Sacramento.** Sutter Square Galleria, 2901 K Street. For info: UC Davis Extension, 800/ 752-0881 or www.extension.ucdavis.edu/landuse

**February 23-24 CA**
**Water 101: The Basics & Beyond Seminar, Davis.** University of California - Davis. Sponsored by Water Education Foundation. For info: www.watereducation.org/doc.asp?id=2230&parentID=849

**February 24 OR**
**The Freshwater Trust's Annual Gala & Auction, Portland.** Portland Art Museum. For info: Sierra Smith, FWT, 503/ 222-9091 x14, sierra@thefreshwatertrust.org or www.thefreshwatertrust.org

**February 25 OR**
**Oregon Academy of Science 71st Annual Meeting, Portland.** Portland Community College. For info: www.oas.pdx.edu/

**February 27-28 DC**
**NGWA's 15th Annual Groundwater Industry Legislative Conference, Washington.** Holiday Inn Capitol. For info: NGWA: www.ngwa.org/flyin/Pages/default.aspx

**February 27-28 TX**
**Emerging Issues in Groundwater Conference, San Antonio.** St. Anthony Riverwalk Wyndham Hotel. For info: NGWA: www.ngwa.org/Events-Education/conferences/5013/Pages/5013feb12.aspx

**February 27-29 ND**
**North Dakota Water Quality Monitoring Conference: State of Our Research, Information & Knowledge, Bismarck.** For info: Mike Ell, mell@nd.gov, 701/ 328-5210, or www.ndwatermonit.org

**February 28-March 1 DC**
**ACWA 2012 Washington, DC Conference: Bringing California Water Conversations to DC, Washington.** Washington Court Hotel. For info: Ass'n of California Water Agencies, www.acwa.com/content/event-registration

**February 29 AZ**
**Water Quality Challenges & Priorities for the EPA Border 2012 Program - Arizona-Sonora Border Region (Brownbag), Tucson.** WRRC, 350 N. Campbell Ave., 12-1:30pm. For info: Jane Cripps, Water Resources Research Center, 520/ 621-2526, jcripps@cals.arizona.edu or cals.arizona.edu/azwater

**February 29-March 1 TX**
**NGWA Phytoremediation of Common Groundwater Contaminants Conference, San Antonio.** St. Anthony Riverwalk Wyndham Hotel. For info: NGWA: www.ngwa.org

**March 1-2 NV**
**Law of the Colorado River - 14th Annual Conference, Las Vegas.** Planet Hollywood Resort. For info: CLE International, 800/ 873-7130 or website: www.cle.com

**March 1-2 CA**
**Sea to Sierra Train Tour: Rolling Seminar on California Water Issues, San Francisco.** California Zephry. Sponsored by Water Education Foundation. For info: www.watereducation.org/toursdetail.asp?id=2214&parentID=821

**March 1-4 OR**
**30th Annual Public Interest Environmental Law Conference: New Frontier - The Political Crossroads of Our Environmental Future, Eugene.** University of Oregon. Sponsored by the Environmental & Natural Resources Law Program (UO Law School). For info: www.pielc.org

**March 2 CA**
**Annual Land Use Law Review & Update Course, Sacramento.** Sutter Square Galleria, 2901 K Street. For info: UC Davis Extension, 800/ 752-0881 or www.extension.ucdavis.edu/landuse

**March 4-5 AK**
**Groundwater Modeling - Fundamentals & Applications Workshop, Juneau.** Centennial Hall. Conjunctive with 2012 AWRA Alaska Section Conference. For info: http://state.awra.org/alaska/ameetings/2012am/workshop.shtml

**March 5-6 NV**
**2012 Lake Mead Symposium, Las Vegas.** Tuscany Suites & Casino. In Conjunction w/Nevada Water Resources Ass'n Annual Conference. For info: Tina Triplett, NWRA, 775/ 473-5473 or www.nvwra.org

**March 5-7 AK**
**Alaska's Waters: Challenges & Opportunities (2012 AWRA Alaska Section Annual Conference), Juneau.** Centennial Hall Convention Ctr. For info: http://state.awra.org/alaska/ameetings/2012am/index.shtml

**March 7 CA**
**ACWA's 2012 California Legislative Symposium, Sacramento.** Convention Ctr. For info: Ass'n of California Water Agencies, www.acwa.com/content/event-registration

**March 8 AK**
**Explore Juneau Hydropower Facilities Workshop, Juneau.** In conjunction with 2012 AWRA Alaska Section Conference. For info: http://state.awra.org/alaska/ameetings/2012am/fieldtrip.shtml

**March 8 WA**
**Managing Stormwater in the Northwest Conference, Tacoma.** Greater Tacoma Convention & Trade Ctr. Sponsored by Northwest Environmental Business Council. For info: Sue Moir, NEBC, 503/ 227-6361, sue@nebc.org or www.nebc.org

**March 8 CA**
**Climate Change Adaptation Planning Course, Sacramento.** Sutter Square Galleria, 2901 K Street. For info: UC Davis Extension, 800/ 752-0881 or www.extension.ucdavis.edu/landuse

**March 9 WA**
**CERCLA & MTCA: Advanced Sediment Conference, Seattle.** For info: Holly Duncan, Environmental Law Education Center, 503/ 282-5220, hduncan@elecenter.com or www.elecenter.com

**March 12-17 France**
**6th World Water Forum: Time for Solutions, Marseille.** For info: www.worldwaterforum6.org/en/news/

**March 14-16 DC**
**Western States Water Council Spring Water Policy Roundtable, Washington.** L'Enfant Plaza Hotel. For info: WSWC, www.westgov.org/wswc/

**March 14-16 NV**
**Lower Colorado River Tour (Field Trip), Las Vegas.** Train Tour. Sponsored by Water Education Foundation. For info: www.watereducation.org/toursdetail.asp?id=822&parentID=821

**March 14-16 CA**
**The Environmental Industry Summit X, San Diego.** Hotel del Coronado. Special Rate for NEBC. For info: www.ebiresearch.com/Environmental_Industry_Summit_X_2012

**March 15 OR**
**7th Annual Future of Oregon's Water Supply & Management Seminar, Portland.** World Trade Ctr. For info: The Seminar Group, 800/ 574-4852, email: info@theseminargroup.net, or website: www.theseminargroup.net

**March 15-16 CA**
**Planning & Environmental Law Course, Sacramento.** Sutter Square Galleria, 2901 K Street. For info: UC Davis Extension, 800/ 752-0881 or www.extension.ucdavis.edu/landuse

**March 18-21 OR**
**2012 Sustainable Water Management Conference & Exposition, Portland.** Marriott Waterfront Hotel. Sponsored by American Water Works Ass'n. For info: www.awwa.org/Conferences

**March 20-23 LA**
**Environmental Awareness Bootcamp, New Orleans.** Hilton Garden Inn French Qtr. For info: EPA Alliance Training Group, 713/ 703-7016 or www.epaalliance.com

**March 22-24 UT**
**41st Annual Conference on Environmental Law, Salt Lake City.** The Grand America. Sponsored by the American Bar Ass'n. For info: www.ambar.org/EnvironACEL

**March 25-27 Quebec, Canada**
**3rd IWA-WEF Wastewater Treatment Modelling Seminar 2012, Mont-Sainte-Anne.** Sponsored by International Water Ass'n & Water Environment Federation. For info: Bruce Johnson, bruce.johnson2@ch2m.com

**March 25-27 CA**
**WateReuse California Annual Conference, Sacramento.** Sheraton Grand. For info: WateReuse: www.watereuse.org/sections/california/conference

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## CALENDAR

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**March 26-28 LA**
**GIS & Water Resources VII: 2012 AWRA Spring Specialty Conference, New Orleans.** Sheraton Hotel. For info: American Water Resources Ass'n, www.awra.org/meetings/

**March 27 OR**
**Sediment - CERCLA & Oregon Cleanup Law Conference (Portland Harbor), Portland.** For info: Holly Duncan, Environmental Law Education Center, 503/ 282-5220, hduncan@elecenter.com or www.elecenter.com

**March 27-28 CA**
**29th Annual Executive Briefing: Decision Points 2012, Sacramento.** Doubletree Hotel. Sponsored by Water Education Foundation. For info: www.watereducation.org/doc.asp?id=850

**March 28 NM**
**Hydraulic Fracturing Conference, Santa Fe.** Inn & Spa at Loretto. For info: CLE International, 800/ 873-7130 or website: www.cle.com

**March 29-30 NM**
**Law of the Rio Grande Conference, Santa Fe.** Inn & Spa at Loretto. For info: CLE International, 800/ 873-7130 or website: www.cle.com

**March 30 AZ**
**Macro-Rainwater Harvesting/ Evaporation Interception (Brownbag), Tucson.** WRRC, 350 N. Campbell Ave., 12-1:30pm. For info: Jane Cripps, Water Resources Research Center, 520/ 621-2526, jcripps@cals.arizona.edu or cals.arizona.edu/azwater

**April 4-5 WA**
**Clean Water & Stormwater Seminar, Seattle.** TENTATIVE. For info: Law Seminars Int'l, 800/ 854-8009, email: registrar@lawseminars.com, or website: www.lawseminars.com

**April 4-5 OK**
**Student Water Research Conference, Stillwater.** OSU. For info: Dr. Garey Fox, 405/ 744-8423, garey.fox@okstate.edu or http://agwater.okstate.edu/news-events/student-water-research-conference

**April 9-11 CO**
**The Colorado River Basin: Agenda for Use, Restoration & Sustainability for the Next Generation (State of the Rockies Conference), Colorado Springs.** Colorado College. For info: www2.coloradocollege.edu/stateoftherockies/conference.html

**April 10-12 MT**
**Strategies & Solutions for Managing Storm Water - 2012 Montana Stormwater Conference, Kalispell.** Hilton Garden Inn. For info: Janet Bender-Keigley, 406/ 994-6671 or Jkeigley@montana.edu

**April 11-13 CA**
**Central Valley Tour (Field Trip), San Joaquin Valley.** Sponsored by Water Education Foundation. For info: www.watereducation.org/toursdetail.asp?id=826&parentID=821



*See Page 17 for Abbreviated Agenda*