STATE OF NEW MEXICO
WATER QUALITY CONTROL COMMISSION

IN THE MATTER OF THE TRIENNIAL REVIEW OF STANDARDS FOR INTERSTATE AND INTRASTATE SURFACE WATERS, 20.6.4 NMAC

WQCC No. 14-05(R)

PEABODY ENERGY'S NOTICE OF INTENT TO PRESENT TECHNICAL TESTIMONY

Peabody Energy (Peabody), pursuant to Section 303 of the Procedural Order, submits the following Notice of Intent to Present Technical Testimony.

1. Identify the person for whom the witness(es) will testify

   Peabody Energy

2. Identify each technical witness the person intends to present and state the qualifications of that witness including a description of their educational and work background.

   Steven P. Canton
   Vice President/Senior Principal and Certified Senior Ecologist
   GEI Consultants, Inc.

   John Cochran
   Manager of Environmental Hydrology
   Peabody Energy

   Copies of Mr. Canton's and Mr. Cochran's resumes are attached as Exhibit 1 to each of their pre-filed testimony accompanying this notice. Peabody reserves the right to offer additional technical witnesses if warranted, in response to the direct technical testimony of other parties in this proceeding.

3. Attach the full direct testimony of each technical witness

   A copy of Mr. Canton's and Mr. Cochran's direct testimony is attached to this notice.

4. State the anticipated duration of the direct testimony of each technical witness.

   Peabody anticipates that Mr. Canton's direct testimony should take approximately 30 minutes to complete; Mr. Cochran's direct testimony should take approximately 30 minutes to complete.

5. Include the text of any recommended modification to the proposed regulatory change

The proposed regulatory change to Section 20.6.4.900.J (selenium criteria) remains as presented in Peabody's *Proposed Changes to 20.6.4 NMAC* that was submitted to the New Mexico Water Quality Control Commission (Commission) on September 30, 2014.

However, Peabody wishes to modify its pond-related amendments made in their September, 2014 Proposed Revisions to 20.6.4 NMAC to clarify and narrowly tailor these proposed amendments. Specifically, as modified by the three new numbered subparagraphs under 20.6.4.900.D and E as set out below, the language of the proposed amendments identify three scenarios in which the human contact standards would not apply to man-made ponds and wetlands, which would depend on whether particular ponds or wetlands in question meet (or do not meet) either New Mexico's definition of "waters of the state," or the federal government's definition of "waters of the U.S."

20.6.4.900 CRITERIA APPLICABLE TO EXISTING, DESIGNATED OR ATTAINABLE USES UNLESS OTHERWISE SPECIFIED IN 20.6.4.97 THROUGH 20.6.4.899 NMAC.

D. Primary Contact: the monthly geometric mean of *E. coli* bacteria of 126 cfu/100 mL and single sample of 410 cfu/100 mL and pH within the range of 6.6 to 9.0 apply to this use. Notwithstanding the listing of designated uses for perennial or intermittent unclassified waters, it is not the intent of this regulation to require artificial ponds or man-made wetlands which are used or intended to be used for treatment, livestock watering, and/or wildlife habitat purposes, and that were built for such purposes, to meet primary human contact criteria if:

1. The artificial ponds or man-made wetlands are not surface waters of the state or waters of the U.S.; or
2. The artificial ponds or man-made wetlands are surface waters of the state, but are not waters of the U.S., and the intended uses are permitted or approved by a state governmental authority; or
3. A written determination has been made by a governmental authority with jurisdiction that the artificial ponds or man-made wetlands are waters of the U.S. but a use attainability analysis pursuant to 20.6.4.15 NMAC establishes that primary human contact criteria likely will not be met given the intended use.

E. Secondary Contact: the monthly geometric mean of *E. coli* bacteria of 548 cfu/100 mL and single sample of 2507 cfu/100 mL apply to this use. Notwithstanding the listing of designated uses for ephemeral, unclassified waters, it is not the intent of this regulation to require artificial ponds or man-made wetlands which are used or intended to be used for treatment,

livestock watering, and/or wildlife habitat purposes, and that were built for such purposes, to meet secondary human contact criteria if:

1. The artificial ponds or man-made wetlands are not surface waters of the state or waters of the U.S.; or
2. The artificial ponds or man-made wetlands are surface waters of the state, but are not waters of the U.S., and the intended uses are approved by a state governmental authority; or
3. A written determination has been made by a governmental authority with jurisdiction that the artificial ponds or man-made wetlands are waters of the U.S., but a use attainability analysis pursuant to 20.6.4.15 NMAC establishes that secondary human contact criteria likely will not be met given the intended use.

Peabody's modified proposal clarifies that human contact standards do not apply to artificial ponds or man-made wetlands that are used or will eventually be used for livestock watering, but only if the ponds or wetlands meet one of the three scenarios identified.

6. Identify and attach all exhibits to be offered by the person at the hearing

Exhibits for Direct Testimony of Steven P. Canton:

Pre-filed direct testimony of Steven P. Canton

Exhibit 1 – *Curriculum vitae* for Steven P. Canton

Exhibits for Direct Testimony of John Cochran

Pre-filed direct testimony of John Cochran

Exhibit 1 – *Resumé* of John Cochran

Exhibit 2 – Permit Excerpts on Post-Mine Land Uses

Exhibit 3 – Example of Surface Owner Letter

Exhibit 4 – NMED Testimony Regarding Lifestock Ponds

Exhibit 5 – SWQB Oct 8, 1008 Memo and Related Communications

Exhibit 6 – Federal Register Excerpt

7. Position on other proposed changes to the standards

Peabody takes the following positions on changes to the standards proposed by other parties.

a. Amigos Bravos

i. Aquatic Life Criteria for Aluminum

Peabody opposes Amigos Bravos' proposal to replace the current hardness-based criteria for aluminum that was approved by the Commission in 2010 and the U.S. Environmental Protection agency (USEPA) in 2012, and replace it with the aquatic life criteria that were in place prior to the 2009 Triennial Review. Amigos Bravos asserts that these criteria should not have been adopted primarily because USEPA has not updated their national recommended criteria, and because adequate studies were not available to update these criteria on the basis of hardness. However, the proposals filed by Chevron Mining, Inc. and LANL during the 2009 Triennial Review provided a thorough and rigorous analysis of appropriate hardness-based criteria derived on the basis of USEPA guidance, was reviewed and adopted by the Commission, and ultimately achieved USEPA approval. Therefore, Peabody supports the current hardness-based aquatic life criteria for aluminum as currently stated in 20.6.4.900 NMAC.

b. New Mexico Environment Department (NMED)

i. Temporary Standards

Peabody supports NMED's proposal to add a new provision under 20.6.4.10.F NMAC to adopt temporary standards for surface waters in the state. Peabody agrees with statements made by NMED in their *Petition to Amend the Surface Water Quality Standards (20.6.4 NMAC) and Request for Hearing* that temporary standards would represent a useful regulatory tool that is consistent with federal water quality standards, and would help point and non-point sources meet designated uses and applicable water quality criteria. The proposal also is consistent with similar tools used by other states, including "Temporary Modifications" used in Colorado with which Peabody is very familiar, and has been used to help improve aquatic life protection for waters into which Peabody's mining operations discharge in that state.

As written, Peabody believes that the current proposal may be limiting the potential use of the temporary modification regulatory tool. In the proposed basis for this proposed addition to NMAC, NMED states that "The central principal of this tool, as compared to site-specific studies or change of designated use(s), is that the underlying designated use and criteria are not changed, modified or replaced." This implies that the temporary modification is used when the underlying criteria are considered appropriate and accurate and will only temporarily change the criteria until such time that the discharger can apply the treatment technology needed to meet the standard.

However, Peabody recommends that the Commission also consider extending the application of temporary standards to include situations where significant

uncertainties exist with respect to the underlying water quality standard (particularly with respect to criteria) that can be resolved by additional study using a plan reviewed and approved by NMED. This is one of the additional applications offered by Colorado's Temporary Modifications that has provided an important regulatory tool for both the regulated and regulatory communities in the state for many years. Therefore, Peabody recommends expanding the application of temporary standards to include situations where uncertainties exist in the relevant aquatic life standards that could be resolved by additional study.

For example, temporary criteria are applied in Colorado when there is uncertainty in the underlying standard and the discharger intends to seek a site-specific or ambient based standard instead. The discharger develops a plan to address the site-specific and ambient based standard, which generally includes water quality or biological sample collection and data analysis. This plan is reviewed and approved by the Commission and the discharger then begins the data collection and analysis process. During the interim period, a temporary modification is applied to the waterbodies in question until the appropriate standard can be fully developed. Sometimes the temporary modification is set based on limited data that show ambient conditions in excess of the standard. Other times the temporary modification sets the standard at current condition. Both approaches allow the discharger time to collect the necessary data for development of site-specific or ambient standards.

ii. Aquatic Life Criteria for Aluminum

As stated above, Peabody supports the hardness-based water quality standard for aluminum as currently stated in 20.6.4.900 NMAC. Peabody further supports NMED's *Amended Petition to Amend the Surface Water Quality Standards (20.6.4 NMAC)* for aluminum which includes the following provision related to EPA's partial disapproval of one element of the hardness-based criteria in their 2012 Amended Record of Decision: "The EPA has disapproved the hardness-based equation for total recoverable aluminum in waters where the pH is less than 6.5 in the receiving stream for federal purposes of the Clean Water Act." EPA's 2012 disapproval presents a different position for waters of pH < 6.5: "In such cases, as the permitting authority in New Mexico, EPA will apply the previously approved 87 µg/L chronic total recoverable aluminum criterion." However, as extensively discussed in the proponent's direct testimony and the subsequent administrative record during the 2009 Triennial Review, not only were the hardness-based aluminum criteria never proposed for application below pH 6.5, there was no scientific basis for doing so at the time. Therefore, Peabody feels that NMED's proposal as stated in their *Amended Petition,* which effectively does not apply numeric criteria for Al in waters of pH < 6.5, is the most scientifically defensible approach until or unless acceptable scientific information is presented to develop aluminum criteria outside this pH range.

c. Freeport-McMoRan Chino Mines

Peabody supports Freeport-McMoRan's (Freeport's) *Petition to Amend the Surface Water Quality Standards (20.6.4. NMAC) and Request for Hearing* in which they propose to add site-specific criteria for copper for certain waters located within the Mimbres River Closed Basin. These site-specific criteria proposed by Freeport used a scientifically valid and rigorous study which lead to development of a site-specific Water Effect Ratio (WER) for copper that is expressed as a function of dissolved organic carbon, hardness, and alkalinity. This study takes into account site-specific water quality characteristics that modify copper toxicity to aquatic life, and so would be fully protective of aquatic life uses in these waters.

Respectfully Submitted,

MODRALL, SPERLING, ROEHL,
HARRIS & SISK, P.A.

By: _____
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CERTIFICATE OF SERVICE

I HEREBY CERTIFY that a copy of Peabody Energy's Notice of Intent To Present Technicial Testimony was served on the following persons by regular mail, or, where an e-mail address is specified, by e-mail, this 12th day of December, 2014:

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STATE OF NEW MEXICO
BEFORE THE WATER QUALITY CONTROL COMMISSION

IN THE MATTER OF THE TRIENNIAL REVIEW
OF PROPOSED AMENDMENTS FOR INTERSTATE
AND INTRASTATE SURFACE WATERS, 20.6.4 NMAC WQCC No. 14-05(R)

PRE-FILED TESTIMONY OF MR. STEVE CANTON,
A WITNESS ON BEHALF OF PEABODY ENERGY

I. INTRODUCTION

On behalf of Peabody Energy (Peabody), GEI Consultants, Inc. (GEI) has evaluated the appropriate selenium standards for wildlife habitat under Section 20.6.4.900.J. Based on GEI's evaluation, Peabody is proposing to revise the current selenium water quality standard for protection of wildlife habitat of 5 µg/L to 50 µg/L, which is equivalent to the current selenium water quality standard for protection of livestock.

This direct testimony provides 1) a general description of the basis of the current wildlife habitat water quality standard for selenium, 2) a summary of the data to support the proposal that the livestock water quality standard would also be protective of aquatic-dependent wildlife.

II. QUALIFICATIONS

I am a Vice President with GEI Consultants, Inc., and have over 30 years of professional experience in the design of aquatic evaluation programs, field sampling of aquatic habitats, water quality/biological data analysis, and statistical analysis of stressor effects. I frequently provide expert witness support and testimony with regard to water quality standards, use-classifications, and stream segmentation for water quality hearings around the United States. I have also participated as an invited expert for a workshop on selenium risk evaluation in aquatic environments for the Society of Environmental Toxicology and Chemistry, have provided peer review for selenium effects issues near coal mining sites in British Columbia (on behalf of the BC Ministry of the Environment) and peer reviewed new molybdenum water quality standards (on behalf of the International Molybdenum Association). My experience includes 1) providing expert witness in support of proposed site-specific ambient selenium standards for portions of the

Arkansas River basin in Colorado, 2) providing expertise to address proposed stream classification and standards changes on tributaries to the Colorado River near Grand Junction related to ammonia toxicity issues, flow modification, habitat quality, and water quality (e.g., selenium toxicity), and 3) providing a peer review for the draft U.S. EPA selenium criteria document, including review of data usage, analysis techniques, and preparation of written comments.

For additional details, my full curriculum vitae is attached as Exhibit 1 to this Direct Testimony.

III. CURRENT WILDLIFE HABITAT WATER QUALITY STANDARD FOR SELENIUM

The current selenium water quality standard for the protection of wildlife habitat is 5.0 µg/L (total recoverable), which is identical to and duplicative of the chronic aquatic life water quality standard. Because wildlife habitat is applied to all waters of the State by default, and chronic aquatic life is only applied to some waters, this results in situations where the wildlife habitat criteria is overprotective of the existing designated uses, particularly on ephemeral streams. The 5.0 µg/L concentration is based on the current national recommended EPA ambient water quality criteria for selenium based on the protection of fish, which were determined to be more sensitive than other aquatic life species (e.g. macroinvertebrates).

The NMAC definition of wildlife habitat under Section 20.6.4.6.W NMAC is:

> "Wildlife habitat shall be free from any substances at concentrations that are toxic to or will adversely affect plants and animals that use these environments for feeding, drinking, habitat or propagation; can bioaccumulate; or might impair the community of animals in a watershed or the ecological integrity of surface waters of the state."

While aquatic life such as fish and macroinvertebrates spend their entire lives or sensitive life stages in the water, as stated in the NMAC definition, wildlife use water only for drinking or through incidental consumption during feeding. Thus, different standards are appropriate for terrestrial wildlife than for aquatic life.

IV. APPROPRIATE SELENIUM WATER QUALITY STANDARD FOR PROTECTION OF WILDLIFE

As stated in the NMAC, terrestrial wildlife use water only for drinking or feeding, therefore, their potential for harmful effects due to exposure to waterborne selenium is much less than aquatic life such as fish and macroinvertebrates. Large herbivores are often exposed to dietary selenium through foraging on terrestrial plants; however, waterborne selenium comprises only a relatively small portion of their total exposure to selenium (Raisbeck et al. 2008). In ruminants, such as deer and elk, selenium is reduced to unabsorbable selenides in the rumen, and this provides protection against selenium poisoning (Raisbeck et al. 2008).

There are limited studies of the effects of selenium on large mammalian wildlife; however, there are a substantial number of studies on the effects of selenium on livestock such as cattle, sheep, and horses. While the majority of these studies are based on diet, rather than on consumption of waterborne selenium, conclusions can be drawn as to the relative toxicity of ingested selenium to these large ungulates. Several studies in Wyoming indicated that horses may be affected by selenium poisoning as a result of foraging and water consumption, while ruminants (deer and elk) using the same food and water sources were unaffected (Raisbeck et al. 2008). As a result of these and other types of studies it was concluded that horses are the most sensitive to oral selenium exposure, with cattle, sheep, and goats being less sensitive (Raisbeck et al. 2008). There have been reports of elk and deer sharing pastures and food and water sources with livestock, where the horses developed alkali disease, and there were no measureable effects in the elk and deer (Raisbeck et al. 2008), again indicating that horses are more sensitive than ruminants. Therefore, water with selenium concentrations that are safe for horses to drink, should be safe for ruminant wildlife species. It was concluded that under normal dietary conditions (assuming average selenium concentrations in forage), 100 µ/L of selenium in water should not have any hazardous effects on horses (Raisbeck et al. 2008), which in turn, would mean this concentration should have no effects on ruminant wildlife.

Other wildlife of concern may include smaller mammals such as mink, otters, or raccoons that rely on aquatic organisms for portions of their food ("aquatic-dependent") and have the potential for dietary ingestion of selenium. Quantitative studies on selenium sensitivity in small mammals

were conducted at the Kesterson National Wildlife Refuge in the 1980's. Kesterson Reservoir is located in the San Joaquin Valley in the southern Central Valley of California and was located adjacent to the San Luis Drain, a canal designed to collect subsurface irrigation water and transport it to a point in the San Francisco Bay (Janz et al. 2010). In 1983, water-column selenium concentrations entering Kesterson from the canal averaged 340 µg/L, which was much greater than concentrations in the nearby Volta Wildlife Management area (<2 µg/L), which did not receive agricultural drainage (Janz et al. 2010).

In studies conducted in 1986 by Clark et al. (1989), raccoons were collected from Kesterson and Volta to compare bioaccumulation and the potential effects of elevated selenium on mammals feeding on fish from high selenium waters. While selenium concentrations in animal tissues were extremely elevated in the Kesterson animals compared to the Volta animals, no negative impacts on the raccoons from Kesterson were observed (Janz et al. 2010). Despite selenium concentrations that were high enough to cause extirpation of fish species, the aquatic-dependent mammals appeared to be unaffected (Janz et al. 2010).

The other wildlife of potential concern with respect to selenium exposure are aquatic-dependent birds. While birds are known to be effected by elevated selenium concentrations, the effects of water-column selenium on bird populations are difficult to predict. Biodynamic modeling has often been recommended to predict tissue selenium concentrations in higher trophic levels using trophic transfer functions (TTFs) and measured tissue concentrations in lower trophic levels. Studies have been conducted in the San Diego Creek watershed in Southern California, which exhibits elevated selenium concentrations primarily due to groundwater sources as a result of urban development. Biodynamic modeling using default TTFs (derived from the literature) and measured fish tissue concentrations in this watershed results in predicted bird egg concentrations that are two to four times higher than the actual measured concentrations throughout the San Diego Creek watershed (Guth et al. 2014). This demonstrates that there are discrepancies between selenium tissue concentrations in aquatic prey and aquatic-dependent predators.

This discrepancy between selenium concentrations in birds and their prey is likely due to the feeding behavior of birds. Many aquatic birds are omnivores, and their food sources are a combination of terrestrial and aquatic items. Most aquatic birds are also migratory or transient,

and forage in many different watersheds, resulting in a varied diet which would consist of food sources with a wide variety of selenium concentrations. By foraging in diverse environments with varying food sources and selenium concentrations, selenium is essentially "diluted" in the birds and is not bioaccumulated at the levels predicted by biodynamic modeling. In addition, in New Mexico, riparian and wetland habitat is very limited due to the ephemeral and intermittent nature of the majority of the watersheds. This limited habitat availability for aquatic dependent birds would result in smaller resident populations, and the majority would expected to be transient and only feeding in these watersheds for brief time periods, limiting their exposure to waterborne selenium.

Based on these data, Peabody is proposing to revise the current selenium standard of 5.0 µg/L for wildlife habitat, to 50 µg/L which would be protective of this use based on the available scientific data on the effects of selenium on wildlife. It is recommended that the Water Quality Control Commission adopt Peabody's proposed revision, as summarized below:

Section 20.6.4.900.J - Proposed Revision to Use-Specific Numeric Criteria

Selenium

Pollutant	CAS Number	DWS	IRR	LW	WH	Aquatic Life			Type
						Acute	Chronic	HH-OO	
Selenium, dissolved	7782-49-2	50	b	50	50			4,200	P
Selenium, total recoverable	7782-49-2				~~5.0~~	20.0	5.0		

V. REFERENCES

Clark, D.R., P.A. Ogasawara, G.J. Smith, and H.M. Ohlendorf. 1989 Selenium accumulation by raccoons exposed to irrigation drainwater at Kesterson National Wildlife Refuge, California, 1986. *Archives of Environmental Contamination and Toxicology* 18(6):787-794.

Guth, D., S. Canton, S. Skigen, S. Pargee, and J. Peng. 2014. *Are fish tissue-based selenium criteria protective of aquatic-dependent birds?* Presentation at SETAC North American 35th Annual Meeting, Vancouver, British Columbia.

Janz, D.M., D.K. DeForest, M.L. Brooks, P.M. Chapman, G. Gilron, D. Hoff, W.A. Hopkins, D.O. McIntryre, C.A. Mebane, V.P. Palace, J.P. Skorupa, and M. Wayland. 2010. Selenium Toxicity to Aquatic Organisms. Pp. 141-231 IN Chapman, P.R., W.J. Adams, M.L. Brooks, C.G. Delos, S.N. Luoma, W.A. Maher, H.M. Ohlendorf, T.S. Presser and D.P. Shaw (eds.). *Ecological Assessment of Selenium in the Aquatic Environment*, CRC Press, New York, NY.

Raisbeck, M.F., S.L. Riker, C.M. Tate, R. Jackson, M.A. Smith, K.J. Reddy, and J.R. Zygmunt. 2008. *Water Quality for Wyoming Livestock & Wildlife. A Review of the Literature Pertaining to Health Effects of Inorganic Contaminants.* B-1183, University of Wyoming Department of Veterinary Sciences, Laramie, WY.

STATE OF NEW MEXICO
BEFORE THE WATER QUALITY CONTROL COMMISSION

IN THE MATTER OF THE TRIENNIAL REVIEW OF STANDARDS FOR INTERSTATE AND INTRASTATE SURFACE WATERS, 20.6.4 NMAC **WQCC No. 14-05(R)**

AFFIDAVIT OF STEVEN P. CANTON

STATE OF COLORADO)
) ss.
COUNTY OF DENVER)

I, Steven P. Canton, being first duly sworn, depose and state that I am the individual whose prepared Direct Testimony accompanies this Affidavit, and that said Direct Testimony is true and correct to the best of my knowledge and belief.

Steven P. Canton

SUBSCRIBED AND SWORN TO before me this 11th day of December 2014.

Sharon Kerver
Notary Public

My Commission Expires: April 30, 2015.

SHARON KERVER NOTARY PUBLIC STATE OF COLORADO

Steven P. Canton
Vice President/Regional Manager

resume

Mr. Canton has more than 30 years of professional experience in the design of aquatic evaluation programs, field sampling of aquatic habitats, water quality/biological data analysis, and statistical analysis of stressor effects. He is a recognized expert in water quality effects on aquatic life, and frequently provides expert testimony and support for regulatory water quality hearings, environmental assessments, and ambient water quality standards development.

Mr. Canton manages GEI's national Ecology Practice and also oversees GEI's Aquatic Laboratory where analyses are regularly conducted on aquatic macroinvertebrates and zooplankton, whole effluent toxicity (WET) testing, nutrient analysis, and various EPA approved water quality analyses. He has completed project work in more than 30 states. He has also participated as an invited expert for selenium risk evaluation in aquatic environments for the Society of Environmental Toxicology and Chemistry, has provided peer review for selenium effects issues near coal mining sites in British Columbia (on behalf of the BC Ministry of the Environment), peer reviewed new molybdenum water quality standards on behalf of the International Molybdenum Association, and provided technical review of water quality issues for the National Mining Association.

EDUCATION
M.S., Zoo/Stream Ecology/Limnology, Colorado State University
B.A., Biology, Saint Olaf College

EXPERIENCE IN THE INDUSTRY
34 years

EXPERIENCE WITH GEI
33 years

CERTIFICATIONS
Senior Ecologist

PROJECT EXPERIENCE

<u>Water Quality Standards</u>

Ghana Ahafo Mine Water Quality Assessment, Newmont Mining Company, Greenwood Village, CO. Project Manager: Provided technical review and oversight of water quality and biological sampling data from reservoir and receiving streams in the vicinity of the Ahafo Mine in central Ghana. This included assistance with evaluation of water quality, biological responses, and discussion of appropriate water quality standards. Provided recommendations for future monitoring, including coordination with studies being conducted locally by the Water Research Institute.

Aquatic Life Criteria Updates for Zinc, Cadmium and Aluminum, Colorado Mining Association, Denver, CO. Project Manager: Led an effort to provide significant technical updates to Colorado metals standards, with emphasis on zinc, cadmium, and aluminum. This included accumulation of relevant literature, updating of the toxicity databases, recalculation of the pooled-hardness slopes and acute-to-chronic ratios, and development of updated hardness-based equations. This effort resulted in new, state-wide standards for these metals, as approved by the Colorado Water Quality Control Commission and EPA Region 8.

Dolores River Baseline Study, Anaconda Minerals Company, Rico, CO. Project Manager. Designed and implemented a seasonal aquatic baseline and three-year monitoring study of the aquatic invertebrates of the Dolores River and Silver Creek, near the historic mining district at Rico, Colorado.

Lake Ogallala Dissolved Oxygen Study, Nebraska Public Power District, Ogallala, NE. Ecologist. Intensive study of Lake Ogallala downstream of the Kingsley Hydro power plant including trout population sampling, benthic invertebrates analyses, water quality, creel survey and other documentation for developing site-specific dissolved oxygen standards as part of FERC relicensing issues.

New World EIS, Montana DEQ, Cooke City, MT. Project Manager. Compiled and analyzed data on periphyton and aquatic invertebrates and assisted in report preparation for the Aquatic Resources Technical Report and EIS chapter for the New World Project Environmental Impact Statement.

Camas Creek Oil Spill Evaluation, Yellowstone Pipeline Company, Perma, MT. Project Manager. Designed and implemented study of invertebrate populations of Camas Creek, a small stream in northwest Montana with a historic oil pipeline spill. Reviewed impacts and assisted with determination of remediation alternatives.

Integrated Stressor Analysis Study, Water Environment Research Foundation, Nationwide. Project Manager. Provided aquatic biological expertise for research grant to help develop a method to integrate habitat and water quality in predicting the effects of stress on aquatic life. This was a multi-year project conducted with two other consulting firms, and a team of technical experts from academia, and federal, state, and local agencies. Includes data review for water quality, biota, and habitat parameters and assistance with review of statistical analysis of the relationships between these variables.

CSO Aquatic Life Study, City of Atlanta, Atlanta, GA. Project Manager. Assessment of potential impacts of Combined Sewer Overflows on the aquatic life in various urban streams. The study includes evaluation of fish and invertebrate populations to discern site-specific aquatic life criteria compliance points and water quality criteria issues.

Upper Clark Fork River RI/FS Support, Atlantic Richfield Company, Butte, MT. Project Manager. Technical review of historic seasonal aquatic data on benthic invertebrates near historic metal mine and smelter activity along the upper Clark Fork River drainage in western Montana for a CERCLA case. Included expert witness support.

Ammonia Criteria Review, Colorado Wastewater Utility Council, Denver, CO. Project Manager. Provided a detailed, technical evaluation of the 1999 U.S. EPA ammonia criteria document update. Efforts included scientific review of data usage, analysis techniques, accumulation of new scientific literature, and recommendations for potential changes in acute and chronic ammonia criteria for the protection of aquatic life, with specific emphasis on Colorado streams.

Regulatory Support, The Doe Run Company, Viburnum, MO. Project Manager. Evaluated issues related to appropriate lead water quality criteria for streams in southeastern Missouri.

Nutrient Standards Support, City of Boise, Boise, ID. Project Manager. Conducted a review of existing data on the lower Boise River and Brownlee Reservoir on the Snake River. Included analysis of proposed nutrient standards and assessment of stream and reservoir conditions for pending TMDL activities.

Sediment Impairment Study, Colorado Water Quality Control Division, Statewide, CO. Project Manager. Conducted an assessment of streams listed as "impaired" for sediment specific to lands controlled by the Bureau of Land Management. Included study design, field sampling of benthic invertebrates and habitat conditions at over 20 streams on the "monitoring and evaluation" list, as well as choosing appropriate reference streams, analysis of data, and preparation of a technical report with recommendations for determination of presence or absence of sediment impacts.

Temperature Criteria Development, Colorado Wastewater Utility Council, Statewide, CO. Senior Ecologist. Provided a technical evaluation of revised temperature standards proposed by the Colorado Water Quality Control Division as part of the Basic Standards Workgroup. Included detailed technical review of the Division's temperature spreadsheet, accumulation and review of original publications used as source of temperature data, development of updated and expanded data spreadsheet, revised summary statistics, and development of new proposed temperature standards (maximum weekly average temperature and daily maximum) for coldwater, coolwater, and warmwater fish communities.

Mosquito Creek Site-Specific Zinc Study, London Mine, Alma, CO. Project Manager. Provided water quality review and recommendations regarding appropriate site-specific water quality standards for Mosquito Creek and tributaries in the vicinity of an historic mine site. Included review of existing water quality data, TMDL report, and proposed management strategies to protect the aquatic life use, as well as expert witness support before the Colorado Water Quality Control Commission.

Cadmium Criteria Review, Association of Metropolitan Sewerage Agencies, Washington, DC. Project Manager. Provided a detailed, technical evaluation of the 2001 cadmium criteria document. Included review of data usage, analysis techniques, accumulation of new scientific literature, and recommendations for potential changes in acute and chronic cadmium criteria for the protection of aquatic life.

Arid West Water Quality Research Project, Pima County, Tucson AZ Walsenburg CO Albuquerque, NM. Project Manager. Conducted a number of research projects as part of the Arid West Water Quality Research Project, a U.S. EPA-funded research initiative managed by Pima County, Arizona. Conducted detailed literature reviews on 1) recovery patterns of stream populations in arid southwest streams following flood events and/or droughts, and 2) potential effects of naturally high alkalinity/TDS waters in the arid southwest on both resident biota (invertebrates and fish) and standard whole effluent toxicity test organisms. In a separate study, conducted an evaluation of the EPA Recalculation Procedure for the development of site-specific standards for arid west, effluent-dominated streams. Also conducted a third study of the aquatic communities of ephemeral streams, through sequential sampling in watersheds in Arizona, New Mexico, and Colorado.

Pueblo Viejo Gold Mine Fish Kill Investigation, Unidad Corporativa Minera, Sanchez Ramirez Province, Dominican Republic. Senior Ecologist. Provided expertise in review of water quality issues potentially related to a fish kill in Hatillo Reservoir in the vicinity of the Pueblo Viejo Mine. Include review of existing data and field collection of fish for tissue analysis from Arroyo Margajita and Hatillo Reservoir, as well as preparation of a technical report summarizing the findings.

Ralston Creek Use-Attainability-Analysis, City of Arvada, Arvada, CO. Project Manager. Use-attainability analysis of Ralston Creek and selected tributaries, Colorado. Designed and implemented study of fish, invertebrate and algal populations to discern nonpoint source impacts to assist in site-specific stream classification and water quality criteria issues. Included expert testimony before the Colorado Water Quality Control Commission.

Ecological Risk Assessment of Historic Kennecott Tailings, Rio Tinto, Magna, UT. Technical Project Lead. Provide technical and strategic oversight for a project to determine the potential for ecological risks associated with the historic deposition of copper mine tailings into the Great Salt Lake. A preliminary data screen is underway with anticipated future work to include: research on the fate and transport of deposited tailings, development of a conceptual site model and problem formulation for ecological risk assessment, implementation of a nature and extent field sampling program, and completion of a screening-level ecological risk assessment to inform the United States Environmental Protection Agency's (EPA) decision regarding the need to designate this a Superfund site.

Fountain Creek Use Attainability Analysis (UAA), City of Colorado Springs, Colorado Springs, CO. Project Manager. Use-attainability analysis of Fountain Creek, Colorado. Designed and implemented study of fish and invertebrate populations below a waste water treatment plant to assist in site-specific stream classification and water quality criteria. Included expert testimony before the Colorado Water Quality Control Commission.

Gowanus Canal Superfund Site, National Grid, Brooklyn, NY. Technical Lead. Mr. Canton provides technical and strategic oversight for this ongoing project to assess the potential role of legacy Manufactured Gas Plant (MGP) activities within the context of other potential stressors in the Canal. Select tasks include: development of the ecological risk assessment portion of a programmatic RI/FS work plan, technical review of screening-level and baseline ecological risk assessments prepared by EPA, preparation of a preliminary ecological risk assessment on pharmaceuticals and personal care products (PPCPs) originating from combined sewer

overflow discharges, including novel development of aquatic and sediment screening values for PPCPs, and coordination of a hydrodynamic/sedimentation-based contaminant fate and transport model.

Cabin Creek Dam FERC Relicensing, Xcel Energy, George Town, CO. In-House Consultant. Review previously collected sampling data, and develop new study plans for fish populations, macroinvertebrate populations, aquatic habitat, and flow studies on behalf of Xcel Energy for the Cabin Creek FERC relicensing project.

West Fork Clear Creek Site-Specific Zinc Standards Study, Upper Clear Creek Watershed Authority, Empire, CO. Project Manager. Conducted a use-attainability analysis (UAA) for West Fork Clear Creek in support of stream classification issues and development of approved site-specific water quality standards for zinc. Included expert testimony before the Colorado Water Quality Control Commission.

Copper WER Study, South Platte Coalition for Urban River Evaluation (SPCURE), Denver, CO. Project Manager. Provided technical support and laboratory toxicity testing with regard to water effects ratio testing for copper at five wastewater treatment discharge points in the South Platte Basin, as well as technical review of use of the biotic ligand model for copper WER development. This included testimony before the Colorado Water Quality Control Commission resulting in approved site-specific copper standards for four stream segments on the South Platte River.

Marcy Gulch Temperature Study, Centennial Water & Sanitation District, , CO. Project Manager. Assisted in the design, implementation, data analysis and report preparation for an intensive biological sampling program for a municipal reservoir in central Colorado, including sampling of phytoplankton and monitoring of benthic invertebrates of the reservoir and a nearby stream.

Development of Site-Specific pH Standard, Metro Wastewater Reclamation District, Denver, CO. Project Manager. Conducted a study of pH effects on aquatic life, with specific reference to populations in the South Platte River. Included a detailed literature review, combined with analysis of pH data from the river and effluent compared to resident invertebrate and fisheries data over a 10-year period. Analysis included recommendations for a site-specific adjustment to pH of 6.0 to 9.0.

Use Attainability Analysis (UAA) Study, CAM Holdings, Denver, CO. Project Manager. Conducted a UAA of the study area to determine appropriate use classifications and water quality standards. This study involved collecting fish, benthic macroinvertebrate, zooplankton, amphibian, reptile, and habitat data to assess potential impacts of mining/discharge on aquatic communities.

Plum Creek Use Attainability Analysis (UAA) Study, Plum Creek Wastewater Authority, Castle Rock, CO. Project Manager. Provided technical support and laboratory toxicity testing with regard to water effects ratio testing for copper, as well as technical review of use of the biotic ligand model. This included testimony before the Colorado Water Quality Control Commission resulting in approved site-specific copper standards for Plum Creek in the South Platte River Basin.

Xcel Energy Temperature Criteria, Xcel Energy, Boulder, CO. Technical Lead. Mr. Canton assisted with the design and implementation of a seasonal biological sampling on South Boulder Creek and continuous temperature monitoring on South Boulder Creek and the South Platte River to determine appropriate temperature criteria standards for segments associated with Xcel Energy discharges.

Coal Canyon Creek Aquatic Survey/Use Attainability Analysis (UAA), Xcel Energy, Palisade, CO. Project Manager. Designed and implemented a Use Attainability Analysis (UAA), which involved collection of fish, benthic macroinvertebrate, and zooplankton populations, and habitat data, to determine the uses in the study area and calculate site-specific water quality standards. Effort included derivation of resident species lists, review and updates of EPA 304(a) water quality criteria, and use of EPA recalculation procedure to develop site-specific standards for copper.

Yellow Creek Aquatic Biological Monitoring, Shell Oil Company, Rifle, CO. Project Manager. Conducted seasonal monitoring of fish and invertebrate populations in Yellow Creek near Rangely, Colorado. Provided technical support on water quality issues in the basin.

Aquatic Life Use Classification, Colorado Wastewater Utility Council, Denver, CO. Project Manager. Provide technical expertise with specific regard to participation in the Aquatic Life Workgroup (set up by the Colorado Water Quality Control Division and the Colorado Water Quality Forum). Includes technical review of workgroup products, attendance at workgroup meetings, and presentation at symposia concerning aquatic life use classification and water quality criteria issues.

St. Charles River Selenium and Temperature Criteria, Xcel Energy, Pueblo, CO. Technical Lead. Designed and implemented a seasonal biological, habitat, and water quality sampling program on the St. Charles River to determine appropriate selenium aquatic life standards. The data indicated a natural source of elevated selenium concentrations in portions of the river upstream of the Comanche Power Plant discharge. Based on the data, we were able to resegment the river and develop ambient-based site-specific selenium standards. Future issues relate to development of appropriate temperature criteria standards for the stream, which will include initiation of a temperature monitoring program.

Eco Risk Assessment, Dawn Mining Company, Ford, WA. Project Manager. Aquatic ecological risk assessment for a mine closure plan. Summarized biological and water quality data to provide baseline information for an aquatic ecological risk assessment. Included review of data quality and recommendations for additional sampling events and procedures.

Cripple Creek Aquatic Biological Monitoring, Cripple Creek / Victor Mining Co., Victor, CO. Project Manager. Conducted a use-attainability analysis (UAA) for Arequa Gulch and Cripple Creek in support of stream classification issues and development of appropriate site-specific water quality standards for pH, aluminum, manganese, and zinc. Also developed a Supplemental UAA to specifically address appropriate pH standards for Arequa Gulch, which also resulted in site-specific standards. Included expert testimony before the Colorado Water Quality Control Commission.

Santa Ana River Mercury Monitoring, City of San Bernardino Water Dept., Riverside, CA. Project Manager. Design and conduct an annual monitoring program incorporating fish and invertebrate population sampling, as well as tissue analysis of mercury in fish and crayfish for multiple sites in the Santa Ana River. Program has been in place since 1995 and continues through present, as a follow-up effort to a detailed Use-Attainability Analysis evaluation from 1990-1992. Also review the status of the Santa Ana sucker, a potentially threatened fish species, in the Santa Ana River system.

San Miguel River Temperature Study, Tri-State G & T Associates, Inc., Nucla, CO. Senior Ecologist. A temperature study of the San Miguel River was conducted to determine whether re-segmentation or re-classification of a coldwater segment was warranted, based on the natural temperature regime and the aquatic community. The thermal regime of the river was monitored with temperature loggers, and fish and macroinvertebrate populations were sampled on the longitudinal gradient of the river to determine where the coldwater segment ended and where the transition zone into a warmwater zone began.

Use Attainability Analysis (UAA) Evaluation, Tri-State G & T Associates, Inc., Rifle, CO. Project Manager. Designed and implemented aquatic monitoring in a stream near Rifle, Colorado, concentrating on fish, benthic invertebrate, zooplankton, and reptile and amphibian populations. In addition, habitat parameters were measured. This information was used to prepare a UAA, which evaluated appropriate water quality standards, use classifications, and stream segmentation. Included preparation of expert witness testimony for the Colorado Water Quality Control Commission.

Monument Creek Copper WER Study, Tri-Lakes Wastewater Facility, Monument, CO. Project Manager. Provided technical support and laboratory toxicity testing with regard to water effects ratio testing for copper for Monument Creek. This included testimony before the Colorado Water Quality Control Commission.

Technical Support, Thompson Creek Mining Co., Clayton, ID. Technical Lead. Provided aquatic biological expertise in support of development of a supplemental EIS for the mine, specifically with regard to potential effects of predicted water quality on resident fish and salmon in Thompson and Squaw Creeks.

Urban Streams "Expected Condition" Study, South Platte Coalition for Urban River Evaluation (SPCURE), South Platte, CO. Project Manager. Analysis of invertebrate and fish population data and water quality data to define a potential method for estimation of "expected condition" in urban streams. Specific role: 2007-2009; field studies including sampling of macroinvertebrate populations, thermistor deployment and retrieval, macroinvertebrate identification (freshwater), quality assurance for invertebrate identifications, data analysis, report preparation.

Red River Aquatic Biological Monitoring, Chevron Mining Inc., Questa, NM. Project Manager. Developed new aquatic life acute and chronic water quality criteria for molybdenum. Based the criteria on review of existing molybdenum toxicity data, along with new acute and chronic toxicity data developed for five species (daphnids, aquatic insect, flatworm, and fish) on behalf of Molycorp and TCMC. These criteria were used in risk assessment activities and were also recently proposed as new statewide molybdenum aquatic life standards at the New Mexico Triennial Review. Also conducted a major reanalysis of aquatic life standards for aluminum, resulting in a proposal for new hardness-based equations at the same hearing. In addition, updates to other statewide water quality standards were also proposed for zinc, cadmium, and manganese.

Aquatic Biological Monitoring, Wharf Resources, Inc., Lead, SD. Project Manager. Designed and implemented an aquatic biological study of Annie Creek and Spearfish Creek, South Dakota, to provide information on the effects of historic mining activities for a CERCLA/Superfund project in 1993. This study included sampling of fish, invertebrates habitat and acute/chronic toxicity testing. Biological monitoring of these streams has continued to present.

Arkansas River Biological Monitoring, Newmont Mining Company, Leadville, CO. Project Manager. Conducted a multi-year review of historical data base on aquatic biota, ambient toxicity, and water quality in support of aquatic ecological risk assessment activities in the upper Arkansas River/California Gulch CERCLA/Superfund site. Included intensive annual aquatic surveys of the fish populations, fish habitat, and invertebrates of streams relating to historic metal mining and milling activity in central Colorado. These data also supported development of site-specific water quality standards for zinc and cadmium, as adopted by the Colorado Water Quality Control Commission (and approved by EPA) in a 2007 hearing.

Cherry Creek Aquatic Biological Nutrient Monitoring Study and Cottonwood Creek Phosphorus Reduction Facilities Monitoring, Cherry Creek Basin Water, Greenwood Village, CO. Project Manager. Worked with technical consultants for the Authority (Dr. John Jones, University of Missouri, Dr. Mark Kaiser, Iowa State University, and Gertrud Nürnberg, Freshwater Research) to produce technical reports analyzing the nutrient/algal relationships and association to external phosphorus loadings for Cherry Creek Reservoir. This was conducted in support of the update of the Master Plan for the reservoir. Project evolved into providing technical support for revised lake modeling activities and development of appropriate management strategies for the lake. Included expert witness support before the Colorado Water Quality Control Commission.

Lower Whitewood Creek Aquatic Biological Monitoring, Homestake Mining Company, Lead, SD. Project Manager. Reviewed historical and current aquatic biological data on Whitewood Creek and the Belle Fourche River, South Dakota, as part of a CERCLA 5-year review. Included comparative analyses of fish, fish habitat, fish tissues, invertebrates, and algae, as well as initiation of a long-term monitoring program for benthic invertebrates and fish population. Monitoring includes collection and analysis of fish tissues for mercury,

selenium, and arsenic, to determine the potential bioaccumulation of these metals at sites adjacent to the legacy mine tailings deposits. Long term bioassessment activities have since been conducted and continue to present.

Eagle River Water Quality Standards, CBS Operations, Inc., Denver, CO. Project Manager. Prepared a Use Attainability Analysis (UAA) and calculated site-specific water quality standards for various stream segments on the Eagle River, including derivation of resident species lists, review and updates of EPA 304(a) water quality criteria, and use of EPA recalculation procedure to develop site-specific metals standards for zinc, cadmium, and copper.

National Grid (formerly KeySpan) MGP Services Program, National Grid, Various, NY. Technical Lead. Conducted a comprehensive multivariate "stressor analysis" to evaluate factors limiting aquatic biological communities in Gowanus Canal, NY, in the vicinity of former MGP sites and other activities. The analysis included evaluation of benthic invertebrate community data in the context of data on sediment quality, surface water quality, and sediment toxicity testing from multiple transects. Preliminary findings indicated a severely stressed biological community as a result of stressors from stormwater and combined sewer overflow inputs to the canal, with resulting tolerant communities closely related to habitat quality. No significant patterns related to MGP sites or residual compounds have been found.

Amesbury Former MGP Investigation and Remediation, National Grid, Amesbury, MA. Risk Assessment Support. Mr. Canton provided oversight on a screening-level ecological risk assessment for a terrestrial and wetland site with legacy MGP-related contamination, and provided strategic advice regarding potential development of ecologically-based remedial action goals.

<u>Selenium</u>

Centennial Selenium, Centennial Water & Sanitation District, Highlands Ranch, CO. Senior Ecologist. Review of data related to temporary modifications for selenium and temperature in two stream segments in central Colorado. Developed a study plan involving the collection of fish, benthic macroinvertebrate, periphyton, water quality, sediment and habitat data to evaluate appropriate use-classifications and possible development of site-specific water quality standards for selenium.

Kentucky Selenium Studies, Kentucky Chamber of Commerce, Lexington, KY. Senior Ecologist. Developed an updated toxicity database for selenium, based on recently published literature and expected EPA-approved studies. Fish tissue values from these studies were adjusted by tissue-type to allow development of either whole-body or egg/ovary tissue-based selenium standards. The updated toxicity database was then ranked by sensitivity and chronic whole-body and egg/ovary selenium criteria were developed using EPA criteria protocols. We also reviewed possible approaches for updating acute selenium criteria. Working closely with the Kentucky Department of Environmental Protection, these updated selenium acute and chronic standards were proposed and adopted.

Colorado Wastewater Utility Council - Selenium, Colorado Wastewater Utility Council, Denver, CO. Project Manager: Provided detailed technical review of EPA's 2004 draft selenium criteria document, including assistance with submitting comments to the docket. This effort also included assisting the CWWUC in development of a "Colorado Selenium Database", which involved collation of water quality, sediment, and tissue data from studies conducted by GEI and other parties throughout the state.

Expert Review, U.S. EPA, Washington, DC. Senior Ecologist. Provided a peer review for a draft U.S. EPA selenium criteria document, including review of data usage, analysis techniques, and preparation of written comments.

Site-Specific Selenium Standards, Cominco, Kotzebue, AK. Project Manager. Provided analysis of ambient water quality criteria issues, specifically with regard to selenium for streams in the vicinity of the Red Dog Mine, Alaska. Included preparation of a technical report summarizing selenium toxicity issues, review of monitoring data provided by the mine, and analysis of potential site-specific selenium standards for the site.

Nitrogen and Selenium Management Program (NSMP) Site-Specific Standards Study, Orange County, Santa Ana, CA. Technical Project Lead. Mr. Canton was responsible for the review and development of draft site-specific fish tissue-based selenium standards for the Newport Bay watershed, including San Diego Creek and its tributaries. Our review included analysis of the draft SSO, as well as preparation of a technical report developing alternative SSOs for different use classifications, as it relates to the objectives of the NSMP.

Selenium Expert Support, British Columbia Ministry of the Environment, Vancouver, BC. Project Manager. Was one of two aquatic biologists invited to serve on an Expert Panel to evaluate historic water quality, fisheries, and ecotoxicology data related to potential selenium impacts on aquatic life in the Elk River basin, southeastern British Columbia. Involved technical review of 15 reports, preparation of an expert report, and presentation of findings at an Expert Panel Workshop.

Persigo Wash Reclassification Studies, City of Grand Junction, Grand Junction, CO. Project Manager. Provided expertise to address proposed stream classification changes on tributaries to the Colorado River near Grand Junction. Included review of ammonia toxicity issues, flow modification, habitat quality, and water quality (e.g., selenium toxicity) on fish populations in Persigo, Washington. Included field sampling of fish populations and preparation of expert witness testimony for the Colorado Water Quality Control Commission.

Yankee Fork Selenium and Mercury Monitoring, Hecla Mining Company, Challis, ID. Senior Ecologist. Conducted an analysis of potential effects of installing an effluent diffuser on the Yankee Fork, a tributary of the Salmon River in central Idaho. The analysis included review of predicted water quality concentrations through the mixing zone with respect to potential acute and chronic toxicity to resident trout and salmon, including T&E species, avoidance by resident fish, and maintenance of a zone of passage.

Dixon Creek Selenium Study, ConocoPhillips Company, Borger, TX. Project Manager. Conduct seasonal monitoring of fish in the Canadian River and Dixon Creek, near the ConocoPhillips Refinery in Borger Texas in support of the site-specific standards for Selenium on Dixon Creek. This proposal was developed using site-specific bioaccumulation factors and evaluation of attainable uses in the creek. The draft proposal is currently in review by the Texas Commission on Environmental Quality staff.

Sand Creek Site-Specific Selenium and Mercury Study, Suncor, Commerce City, CO. Project Manager. Conducted sampling of fish, benthic macroinvertebrate populations, water quality, sediment, and tissue sampling in Sand Creek, Colorado, as part of a long-term assessment of attainable uses and appropriate water quality standards for selenium. This project also included an assessment of selenium thresholds for fathead minnows using a maternal transfer study approach. Additional effort was conducted on mercury bioaccumulation factors and evaluation of use of EPA's methylmercury fish tissue criterion as a potential site-specific standard.

Arkansas River Site-Specific Selenium and Use Attainability Analysis, City of Pueblo, Pueblo, CO. Project Manager. Conducted a multi-year review of historical data base on aquatic biota, ambient toxicity, and water quality in support of aquatic ecological risk assessment activities in the upper Arkansas River/California Gulch CERCLA/Superfund site. Included intensive annual aquatic surveys of the fish populations, fish habitat, and invertebrates of streams relating to historic metal mining and milling activity in central Colorado. These data also supported development of site-specific water quality standards for zinc and cadmium, as adopted by the Colorado Water Quality Control Commission (and approved by EPA) in a 2007 hearing.

Thompson Creek and Squaw Creek Biomonitoring and Bioaccumulation, Thompson Creek Mining Co., Clayton, ID. Senior Ecologist. Provided technical review of the new U.S. EPA cadmium criteria document. As part of this review, designed a study to conduct additional chronic cadmium tests using sensitive organisms (primarily the amphipod Hyalella) to confirm assumptions used in the document. Results of the testing were used to adjust the final chronic value for cadmium. These data were used by the State of Idaho in their updated cadmium criteria and also were included in updated cadmium standards for the State of Colorado. Conducted a

review of water quality criteria to determine if U.S. EPA ambient criteria, as used in the NPDES discharge permitting program, will provide protection for endangered chinook and sockeye salmon in the Salmon River drainage. This review was included as an attachment to a Biological Opinion by the NMFS. Incorporate analysis of bioaccumulative metals, with emphasis on selenium, as part of a monitoring program for a molybdenum mine along two tributaries of the Salmon River in central Idaho. Program includes biological sampling from stations on Thompson and Squaw Creeks, tributaries of the Salmon River, for an annual biological monitoring program. This long-term monitoring program of fish and invertebrate populations was initiated in 1980 and has continued to present. Permit reviews in early 2000s resulted in need to address potential bioaccumulative metals in their discharge, including mercury and selenium. Multi-stage analysis of fate and transport mechanisms include analysis of mercury and selenium in water, sediments, sediment detritus, benthic invertebrates, sculpin, and trout.

North Fork Humboldt River Biological Monitoring, AngloGold North America, Elko, NV. Project Manager. Provided review of aquatic life criteria issues, with specific reference to selenium, for the threatened species, Lahontan cutthroat trout (*Oncorhynchus clarkii henshawi*) in the North Fork Humboldt River, Nevada. Included review of water quality, historic data, and field sampling of fish for analysis of fish tissues and population structure.

Conductivity

Technical Review of EPA Aquatic Life Benchmark for Conductivity, National Mining Association, Washington, DC. Senior Ecologist. Mr. Canton assisted with the scientific review of a proposed aquatic life benchmark from the U.S. Environmental Protection Agency which was related to the effects of mountaintop mining and valley fill coal mining techniques on benthic macroinvertebrate populations and headwaters communities in southern West Virginia. He oversaw preparation of a technical review report submitted during public review of the draft conductivity benchmark, and communicated the results of GEI's review to EPA's Scientific Advisory Board. Mr. Canton designed and interpreted independent field studies to analyze the potential for conductivity to accurately predict aquatic life impairment in this region.

PROFESSIONAL ASSOCIATIONS

Society of Environmental Toxicology & Chemistry
Rocky Mountain - Society of Environmental Toxicology & Chemistry
North American Lake Management Society
Colorado Lake and Reservoir Management Society
Society for Freshwater Science
Water Environment Federation

STATE OF NEW MEXICO
BEFORE THE WATER QUALITY CONTROL COMMISSION

IN THE MATTER OF THE TRIENNIAL REVIEW OF PROPOSED AMENDMENTS FOR INTERSTATE AND INTRASTATE SURFACE WATERS, 20.6.4 NMAC **WQCC No. 14-05(R)**

PRE-FILED TESTIMONY OF MR. JOHN COCHRAN, A WITNESS ON BEHALF OF PEABODY ENERGY

John Cochran hereby submits his Pre-Filed Testimony on Behalf of Peabody for the Triennial Review of Proposed Amendments for Interstate and Intrastate Waters.

I. INTRODUCTION AND QUALIFICATIONS

My name is John Cochran, Manager of Environmental Hydrology with Peabody Energy ("Peabody"). I am testifying in support of Peabody Energy's proposed amendments to 20.6.4.900 NMAC that relate to man-made ponds and wetlands to be used for livestock and other non-recreational uses. As I discuss below in Part II, through this testimony Peabody proposes a refinement of its pond-related amendments to clarify and more narrowly confine the reach of those proposed amendments.

I currently hold the title of Manager Environmental Hydrology, and have been working as a hydrologist and environmental professional in the coal mining industry for more than 33 years. In my work for Peabody Energy and its affiliate companies, I have held numerous positions including Senior Hydrologist and Supervisor of Environmental Compliance. I am closely involved with mine- and region-specific water-related regulatory programs including those related to the CWA under Federal, State and Tribal rules. Recently, I have been directly involved with renewal applications for National Pollution Discharge Elimination System ("NPDES") permits in New Mexico, Montana, Colorado, and on Tribal lands, and the development of proposals for changing surface water quality standards in Colorado, New

Mexico, and the Navajo Nation under their Triennial Review Hearings. I have extensive experience with regulatory compliance at Western surface and underground coal mines under the Surface Mining Reclamation Control Act ("SMCRA"), and am very familiar with rules and regulatory programs on federal and state levels related to surface water performance standards, in particular how those programs relate to temporary and permanent impoundments. For additional details, my updated resume is attached as Exhibit 1 to this Direct Testimony.

II. PEABODY'S PROPOSED PONDS AMENDMENTS, AS REFINED

Peabody wishes to modify its pond-related amendments made in its September, 2014 *Proposed Revisions to 20.6.4 NMAC* to clarify and narrowly tailor the proposed amendments. Specifically, as modified by the three new numbered subparagraphs under 20.6.4.900.D and E that are set out below, the language of the proposed amendments identify three scenarios in which the human contact standards would not apply to man-made ponds and wetlands, which would depend on whether particular ponds or wetlands in question meet (or do not meet) either New Mexico's definition of "waters of the state," or the federal government's definition of "waters of the U.S." Peabody does not intend to put the Water Quality Control Commission (Commission) in the position of needing to resolve those jurisdictional issues, which to some extent are in flux, before approving of Peabody's offered amendments.

20.6.4.900 CRITERIA APPLICABLE TO EXISTING, DESIGNATED OR ATTAINABLE USES UNLESS OTHERWISE SPECIFIED IN 20.6.4.97 THROUGH 20.6.4.899 NMAC.

D. Primary Contact: the monthly geometric mean of *E. coli* bacteria of 126 cfu/100 mL and single sample of 410 cfu/100 mL and pH within the range of 6.6 to 9.0 apply to this use. Notwithstanding the listing of designated uses for perennial or intermittent unclassified waters, it is not the intent of this regulation to require artificial ponds or man-made wetlands which are used or intended to be used for treatment, livestock watering, and/or wildlife habitat purposes, and that were built for such purposes, to meet primary human contact criteria if:

1. The artificial ponds or man-made wetlands are not surface waters of the state or waters of the U.S.; or
2. The artificial ponds or man-made wetlands are surface waters of the state, but are not waters of the U.S., and the intended uses are permitted or approved by a state governmental authority; or
3. A written determination has been made by a governmental authority with jurisdiction that the artificial ponds or man-made wetlands are waters of the U.S. but a use attainability analysis pursuant to 20.6.4.15 NMAC establishes that primary human contact criteria likely will not be met given the intended use.

E. Secondary Contact: the monthly geometric mean of *E. coli* bacteria of 548 cfu/100 mL and single sample of 2507 cfu/100 mL apply to this use. Notwithstanding the listing of designated uses for ephemeral, unclassified waters, it is not the intent of this regulation to require artificial ponds or man-made wetlands which are used or intended to be used for treatment, livestock watering, and/or wildlife habitat purposes, and that were built for such purposes, to meet secondary human contact criteria if:

1. The artificial ponds or man-made wetlands are not surface waters of the state or waters of the U.S.; or
2. The artificial ponds or man-made wetlands are surface waters of the state, but are not waters of the U.S., and the intended uses are approved by a state governmental authority; or
3. A written determination has been made by a governmental authority with jurisdiction that the artificial ponds or man-made wetlands are waters of the U.S., but a use attainability analysis pursuant to 20.6.4.15 NMAC establishes that secondary human contact criteria likely will not be met given the intended use.

Peabody's modified proposal clarifies that human contact standards do not apply to artificial ponds that are used or will eventually be used for livestock watering, but only if the ponds meet one of the three scenarios identified. I will explain Peabody's reasoning in this testimony.

III. BACKGROUND ABOUT WHY PEABODY WISHES TO LIMIT THE APPLICATION OF HUMAN CONTACT CRITERIA TO CERTAIN PONDS

Peabody, like most regulated companies, is interested in ensuring that regulations make sense and lack ambiguities that may give rise to unforeseen enforcement risks and unintended consequences. At its two New Mexico mines—the Lee Ranch Mine and El Segundo Mine—Peabody extensively manages water to collect runoff, facilitate mining, control sediment and

prevent erosion, etc., by constructing numerous man-made water impoundments. Peabody manages these impoundments as set forth in its permits for the mines under the Surface Mining Control and Reclamation Act (SMCRA). Within the context of Peabody's identification of post-mining land uses under its SMCRA permits, the ponds are slated to be used after mining as livestock watering ponds. See Exhibit 2 (excerpts). The surface owners prefer these post-mining land use designations because having readily available water for livestock is critical to a successful ranching operation in an arid state like New Mexico. See, e.g., Exhibit 3. It makes sense not to apply human contact standards to those ponds while they exist to facilitate mining, and also after mining because they are intended to be used by cattle and wildlife, not people. In fact, human contact criteria historically have not been applied to such ponds, and witnesses for the New Mexico Environment Department (NMED) in the last Triennial Review testified that livestock watering ponds in general do not pose a regulatory issue. See Exhibit 4 (NMED witness cross-examination excerpt).

In October 2008, however, the Surface Water Quality Bureau (SWQB) of NMED issued a memorandum to the Coal Mine Reclamation Bureau, a sister agency within the Mining and Minerals Division (MMD), stating that such impoundments may be subject to meeting water quality criteria for livestock watering, wildlife habitat, aquatic life, secondary human contact and possibly primary human contact. That memorandum and associated written communications between SWQB and MMD are attached as Exhibit 5. The 2008 memorandum created risk and uncertainty for Peabody, prompting it to participate in the last Triennial Review, where Peabody sought an exemption for man-made ponds, and now in this Triennial Review, where Peabody seeks a useful articulation of when and under what circumstances human contact criteria need not be applied to artificial ponds and man-made wetlands. Peabody's more refined approach in

this Triennial Review takes into account and, we believe, effectively addresses reservations expressed during the last Triennial Review and should not be viewed as controversial in the least.

IV. DISCUSSION SUPPORTING THE PROPOSED PONDS AMENDMENTS

Many artificial ponds on mining, industrial and farming lands were never intended to be used for recreation; therefore, secondary and primary contact standards are not appropriate. Peabody, along with other mining companies, utilizes impoundments to treat or contain water at its surface coal mining operations in New Mexico. While these man-made impoundments are currently used primarily to ensure water quality standards are maintained in receiving streams at the mining facilities, they are also opportunistic sources of water for livestock grazing. At Peabody's mine sites, surface owners have specifically requested Peabody to leave as many ponds as possible after active mining to enhance the land for the post-mining use of livestock grazing. Even if a man-made pond on a mining site is categorized as a waste treatment system during active mining and reclamation (and hence exempt from water quality standards), the waste treatment exclusion will likely expire when the pond is turned over to the prospective landowner for providing a viable source of water for livestock and wildlife. At the time of final bond release, Peabody will be expected to make a demonstration that these ponds and impoundments are meeting applicable water quality standards, which is subject to approval by the Coal Mining Reclamation Bureau. As such, there is considerable uncertainty and a real threat that these man-made ponds would need to meet human contact standards post-mining regardless of the fact that they have been regulated in the past to meet the designated uses of livestock and wildlife watering and will be used solely for such purposes in the future.

Peabody's proposal is narrowly tailored.

In essence, Peabody's proposal only exempts artificial ponds and man-made wetlands from human contact standards that have not been determined to be waters of the U.S., whether or not they might be considered surface waters of the state (should waters of the state be deemed at any time to be more comprehensive in scope than waters of the U.S.). The Environmental Protection Agency ("EPA") has stated that "States need not adopt standards for any water body which is not a water of the United States." *Water Quality Standards for Surface Water in Arizona, 61 Fed. Reg. 20691*, key excerpts of which are attached as Exhibit 6. Peabody's proposal excludes the application of human contact standards to waters that the federal "agencies have by longstanding practice generally considered not to be 'waters of the United States'," and not within the purview of federal regulatory jurisdiction. *79 Fed. Reg. 2218.*

Peabody's proposal is logical and benefits the agricultural/ranching sector.

It simply is not practicable to require artificial ponds and man-made wetlands that are made or used for livestock watering uses to achieve human contact standards. Nor would it be good governance to do so. Cattle are known to stand in stock ponds and defecate into the water source. In addition, manure is carried into the water on the cattle's hooves and deposited, which can frequently result in the water exceeding primary and secondary human contact criteria for *E. coli*. By limiting the standards that apply to artificial ponds and man-made wetlands that are not considered to be waters of the U.S., the Commission would help to ensure protection of alternative water supplies for the essential New Mexico industry of agriculture/ranching.

Peabody's proposal removes uncertainties facing mining and ranching enterprises.

Importantly, Peabody's proposal in this proceeding seeks to address critiques of Peabody's proposal in the last Triennial Review. In the last proceeding, and in meetings with

NMED officials since that time, there has been some resistance to an unqualified exemption for artificial ponds and man-made wetlands, on the theory that the Clean Water Act (CWA) establishes a presumption that all waters of the U.S. will be used for recreational purposes, and that the presumption may be overcome only by preparation of a Use Attainability Analysis (UAA) that demonstrates that standards for recreational uses need not be applied. (*See* 20.6.4.15 NMAC) As refined, Peabody's proposal acknowledges that a UAA may be needed if the artificial ponds or man-made wetlands are deemed to be waters of the U.S., but clarifies that a UAA would not be required unless and until a written determination is made—by a governmental authority with jurisdiction—that the artificial, man-made features are in fact waters of the U.S. Without Peabody's clarifying proposal, the entire onus would unduly be placed on those entities or persons who, like Peabody, prudently manage water runoff to preserve environmental values, and the consequence of so placing the regulatory burden would be detrimental to the interests of surface owners who want to retain the ponds for livestock uses. For example, facing uncertainties about the status of particular water impoundments, mining companies like Peabody may be incentivized to remove those impoundments as part of their reclamation programs and then do away with water that has been opportunistically collected. Requiring Peabody and other entities to go through the UAA process for these features generally should be unnecessary, and should only be required if a governmental authority with jurisdiction has determined that the impoundments are waters of the U.S. Particularly given NMED's stated view in the last Triennial Review that livestock ponds do not pose a real regulatory issue, those creating such ponds should expect to avoid application of human contact standards, and generally should not have to incur the high cost of a UAA process in the absence of certainty about the status of the waters in the form of a determination.

The proposal respects agency jurisdiction and avoids undue burdens on the WQCC.

Peabody's proposal does not in any way challenge any state or federal agency's jurisdiction. Rather, it *clarifies* jurisdictional boundaries by expressly acknowledging the potential for differing jurisdictional reaches of "waters of the state" versus "waters of the U.S.," and honors and acts upon EPA's view that states may unilaterally control how they wish to apply (or not apply) standards to waters that are *not* waters of the U.S. As New Mexico's sole rulemaking authority for the adoption of surface water quality standards, the Commission is uniquely situated to adopt a sensible regulatory framework that provides greater certainty for two industries that are essential to New Mexico's economy. By adopting Peabody's proposal it also prevents crowding the Commission's docket with UAA-related proceedings initiated merely because of the absence of a determination by any agency with jurisdiction that a particular artificial pond or man-made wetland is considered a water of the U.S. By adopting Peabody's proposal, only if such a determination is made would it become necessary for an expensive and time-consuming UAA to be commissioned by private industry and processed through proceedings before the Commission. This UAA would only be needed if relief from human contact standards is desired in a given instance by the party that employs artificial ponds or man-made wetlands in prudently managing its operations for the good of the environment.

Further, as refined, Peabody's proposal cannot fairly be criticized as upsetting any presumption that waters of the U.S. must meet the CWA's so-called "fishable/swimmable" standards. While that presumption presumes application of those standards to waters of the U.S., it in no way establishes a presumption that all waters are waters of the U.S. This is an important distinction. Peabody's proposal creates certainty and relieves an undue burden for industry by allowing artificial ponds and man-made wetlands intended for non-recreational uses to avoid the

unnecessary application of human contact standards in the absence of a "waters of the U.S." determination. Only if and when such a determination is made by an agency that is appropriately tasked with making such a determination should any presumption arise that those waters need to meet human contact criteria, or any UAA burden arise to overcome that presumption.

Peabody's proposal is in harmony with federal agency views about artificial ponds.

The EPA and Army Corps of Engineers have long interpreted "navigable waters of the United States" to exclude artificial lakes and ponds used exclusively for things such as stock watering, irrigation, and settling basins. In its proposed rule on what constitutes a water of the United States, EPA and the Army Corps of Engineers state that they propose to exclude:

> [W]aters and features that *the agencies have by longstanding practice generally considered not to be 'waters of the United States.'* Specifically, the agencies propose that the following are not 'waters of the United States'…:
>
> - Ditches that are excavated wholly in uplands, drain only uplands, and have less than perennial flow.
> - Ditches that do not contribute flow either directly or through another water, to a traditional navigable water, interstate water, the territorial seas or impoundment.
> - The following features:
>   - Artificially irrigated areas that would revert to upland should application of irrigation water to the area cease;
>   - *Artificial lakes or ponds created by excavating and/or diking dry land and used exclusively for such purposes as stock watering, irrigation, settling basins, or rice growing*;
>   - Artificial reflecting pools or swimming pools created by excavating and/or diking dry land;
>   - Small ornamental waters created by excavating and/or diking dry land for primarily aesthetic reasons;
>   - Water-filled depressions created incidental to construction activity;
>   - Groundwater, including groundwater drained through subsurface drainage systems; and
>   - Gullies and rills and non-wetland swales.

79 Fed Reg. 22188, 22218 (April 21, 2014) (emphases added). In light of the longstanding practice of the key federal agencies not to treat livestock watering ponds as waters of the U.S., it would be incongruous for this Commission or anyone else to presume that water impoundments which are to be used for livestock watering purposes are waters of the U.S., and thereby put New

Mexico's mining or ranching communities through an expensive UAA process to avoid standards that do not make sense for such waters in the first place.

For these reasons, and for other related points I may make in my live testimony, or in rebuttal testimony, I strongly urge the Commission to end a period of uncomfortable uncertainty that has existed since the SWQB's 2008 memorandum, and adopt Peabody's proposal.

I thank the Commission for the opportunity to present this testimony, and for considering it carefully in the course of this proceeding.

STATE OF NEW MEXICO
BEFORE THE WATER QUALITY CONTROL COMMISSION

IN THE MATTER OF THE TRIENNIAL REVIEW OF STANDARDS FOR INTERSTATE AND INTRASTATE SURFACE WATERS, 20.6.4 NMAC **WQCC No. 14-05(R)**

AFFIDAVIT OF JOHN N. COCHRAN

STATE OF ARIZONA)
) ss.
COUNTY OF COCONINO)

I, John N. Cochran, being first duly sworn, depose and state that I am the individual whose prepared Direct Testimony accompanies this Affidavit, and that said Direct Testimony is true and correct to the best of my knowledge and belief.

John N. Cochran

SUBSCRIBED AND SWORN TO before me this 11th day of December 2014.

Notary Public

My Commission Expires: NOV 14 2018

JENNIFER L. BERRY
Notary Public - State of Arizona
COCONINO COUNTY
My Commission Expires
November 14, 2018

2114 S. Tombaugh Way
Flagstaff, Arizona 86001
(928) 779-1457 – Home
(928) 890-7146 - Mobile

John N. Cochran

Highlights of Qualifications

- Successful in managing environmental projects within budget and deadline constraints
- Strong interpersonal and communication skills; ability to work as part of an environmental management team
- Considerable experience in regulatory compliance, data analysis, and technical writing
- Qualified Environmental Professional, IPEP
- Registered Sanitarian, Class II Water Distribution Operator - State of Arizona

Education: B.S. Hydrology, University of Arizona, 1981
Amphitheater High School, Diploma, 1972

Professional Experience

2007 to Present - Peabody Investments Corporation, Flagstaff, AZ

Manager Environmental Hydrology – Manage contractors and supervise staff at Arizona, Colorado and Montana mines charged with permitting and compliance under water-related regulatory programs (CWA, SDWA, and SMCRA). Ensure compliance with federal, state, and tribal permits at all Western mining operations within budgetary constraints. Prepare budgets for monitoring programs and special projects. Develop strategies and programs for maintaining industry sustainability and minimizing regulatory risk. Provide company representation for inspections and permit negotiations with regulatory authorities.

2005 to 2007 - Peabody Investments Corporation, Flagstaff, AZ

Environmental Specialist – Coordinated permitting under State program for closed mines in Montana. Ensured compliance with federal, state, and tribal permits for operating mines in Arizona, Colorado, and New Mexico. Provided company representation for regulatory inspections and permit negotiations for Western mines (e.g., CWA, SDWA, and SMCRA).

2004 to 2005 – Aspen Environmental and Wastewater Management

Consultant – Provided consulting services to several Western coal mines for permitting and reporting under SDWA, CWA, and SMCRA regulations.

1998 to 2004 - Peabody Western Coal Co, Black Mesa, AZ

Supervisor Environmental Compliance - Supervised several permanent and temporary employees involved with operation and maintenance of air, water, solid waste and hazardous waste compliance programs. Ensured compliance with federal, state, and tribal permits within budgetary constraints. Prepared budgets for monitoring programs and special projects. Provided company representation for regulatory inspections and permit negotiations (e.g., CWA, SDWA, CAA, SMCRA, and RCRA).

1990 to 1998 - Peabody Western Coal Co, Flagstaff / Black Mesa, AZ

Senior Hydrologist - Ensured compliance with federal, state, and tribal permits, and hydrologic monitoring commitments at several western coal mines. Performed final review of hydrologic reports for regulatory authorities. Prepared environmental information for permit applications and permit renewals including impact assessments and monitoring plans. Managed environmental investigations within budgetary constraints that involved both field and office-related activities. Prepared budgets for monitoring programs and special projects. Designed and developed hydrologic databases and reporting utilities. Provided company representation for regulatory inspections and permit negotiations (e.g., CWA, SDWA, and SMCRA).

1987 to 1990 - Peabody Western Coal Co, Flagstaff, AZ

Hydrologist I - Performed final review of hydrologic information reported to regulatory authorities. Coordinated compliance with NPDES permits and hydrologic monitoring program requirements. Prepared hydrologic information for mining applications and routine reports. Designed and implemented hydrologic monitoring programs within budgets.

1984 to 1987 - Peabody Western Coal Co, Flagstaff, AZ

Hydrologist II - Designed and implemented an eight-year study of erosion on reclaimed lands. Coordinated data preparation, analysis, and reporting for routine submittal to regulatory authorities. Installed surface and ground water monitors within budgetary constraints, and developed associated monitoring protocol and documentation.

1981 to 1984 - Peabody Western Coal Co, Black Mesa, AZ

Environmental Technician - Conducted routine monitoring activities at surface and groundwater monitoring sites, including aquifer testing, water quality sampling, and discharge measurements. Maintained meteorological and air quality monitors, including data collection and performance audits. Prepared and analyzed data for routine reporting to regulatory authorities.

Skills

FIELD STUDIES - Aquifer testing, water quality sampling, discharge measurements, monitoring well installations, stream gauging installations, data loggers, soil infiltration measurements, surveying, percolation testing

DATA ANALYSIS - Extensive technical writing, geochemical analyses and interpretation, well and aquifer characteristics, analytical groundwater flow, surface water discharge and sediment modeling, statistical analysis of water quality and stream flows, storm distributions, infiltration and evapotranspiration

COMPUTERS - Considerable experience using a variety of operating systems and software, including Windows XP Office products (e.g., PowerPoint, Excel, Word, Access). Extensive use of hydrologic software, including custom hydrologic data analysis software

Coursework

Small Water System Operation and Maintenance, UCS-Sacramento, 4/98
40-hour Hazardous Waste Operations Training, University of Phoenix, 12/96
Surface Water Records Computations (USGS) - 5/95
MINTEQ-Modeling of Water/Rock Interactions (E3) - 8/94
Characterization and Modeling of the Vadose Zone, University of Arizona - 3/91
EASI/MULTSED Training Course (WET) - 5/90
Ground Water Geochemical Modeling (NWWA) - 11/89
SEDIMOT Training Course, Oklahoma State University, 1985

Honors and Affiliations

- Air and Waste Management Society membership since 2004
- Arizona Hydrological Society - Chapter Secretary, 2010 – 2014
- Co-recipient – Director's Award for Excellence in Reclamation for Big Sky Coal Company's Area B Mine, 2011
- Speaker - "Interactive Forum on Bond Release," sponsored by the U.S. OSMRE, Denver, Colorado, 1996
- Co-recipient - 1996 Excellence in Design Award, International Erosion Control Association
- Co-author - Peterson, M.R., Zevenbergen, L.W., and J. Cochran, 1996. "Application of a Watershed Computer Model to Assess Reclaimed Landform Stability in Support of Reclamation Liability Release"

References Available Upon Request

Menefee Formation. The combined effects of dilution, dispersion, and adsorption will further minimize changes to ground water quality.

The stratum immediately below the lowest coal seam to be mined is predominantly shale, which will form a barrier between the mining activities and the underlying Point Lookout Sandstone. At least 10' of undisturbed material will separate the Point Lookout Sandstone from the mining disturbance, unless previously approved by the Director. PLATE III-8 Isopach Map is reviewed to insure that at least 10' of undisturbed material is left in place above the Point Lookout Sandstone. Mining will not occur in the major recharge area for the Point Lookout Sandstone, which is in and around the sandstone outcrops located to the south and southwest of the permit area. The Point Lookout Sandstone is laterally continuous and exists in a confined condition throughout the permit area. Vertical permeabilities ranging from 0.1 to 0.51 gpd/ft^2 have been reported for the Point Lookout within and adjacent to the permit area. A limited amount of hydraulic communication is suspected of occurring between the Menefee Formation and the Point Lookout Sandstone due to faulting. Temporary lowering of the water levels in the Point Lookout Sandstone are anticipated in the vicinity of the active pits. Water level measurements indicate that the potentiometric surface of the Point Lookout Sandstone is dropping in the vicinity of monitor well PL-1.

The quality of the ground water in the Point Lookout Sandstone is not expected to be adversely impacted by the mining operations. This is attributable to the fact that the water in the Point Lookout Sandstone is at a head higher than the pit floor and pre-mining water table. It is expected, therefore, that there will continue to be flow upward from the Point Lookout before, during and after mining. The upward flow out of the Point Lookout Sandstone is expected to prevent adverse impacts on the quality of the water in this aquifer as a result of mining. Ground water monitoring information collected since 1983 at monitor well PL-1 has not revealed any changes in ground water quality within the Point Lookout Sandstone due to mining. The ground water monitoring plan described in CHAPTER X will be used to document any future changes that occur within the Point Lookout Sandstone.

Mining is expected to result in the removal of up to 11 domestic, stock and idle water wells and five springs within the permit area. The Four Corners Cow Camp well is the only domestic water supply well developed and utilized by the surface owner (Fernandez Company, Ltd.) that is expected to be removed during mining (see TABLE X-1 and X-2). Water wells uncovered or exposed by mining activities will be permanently closed unless approved for water monitoring, or otherwise managed in a manner approved by the Director, as provided for in Subparts 2001 and 2021 of 19 NMAC 8.2. The Four Corners Cow Camp well and any other wells utilized as a source of water by the surface owner that are permanently impaired by the mining operation will be replaced, modified or relocated. The five springs that are expected to be removed during mining are identified in TABLE X-2 and on PLATE X-1. Replacement well locations will be selected with the intent of enhancing the post-mining land use of rangeland. Alternative sources of water supply that could be developed to replace the existing sources are the Point Lookout Sandstone, the Crevasse Canyon Formation, or the Gallup Sandstone. These aquifers are sufficiently isolated from the mining activities to provide a comparable quantity and quality of water. Water wells used for the mining activities will be retained by the land surface owners enhancing the post mining land use.

Dewatering of the mine pits will result in lowering of the potentiometric surface within the Menefee Formation in the immediate vicinity of the permit area. The mine pits may require about 1000 years to resaturate. Groundwater modeling of the Point Lookout indicates minimal impacts to that aquifer.

908. POST-MINING LAND USE

Reclamation activities conducted at the Lee Ranch Mine will return disturbed areas to the pre-mining land use of rangeland. A landscape configuration compatible with the post-mining land use and surrounding terrain will be developed during the backfilling and grading operations. The development of rolling terrain with an increased drainage density will minimize erosion, conserve soil moisture and promote revegetation success in the dragline mining areas. Topographic diversity will encourage the interspersion of vegetation types and utilization by wildlife. The shovel/truck mining areas will have a surface configuration that resembles the pre-mining landscape. Final contours for the areas expected to be affected within the permit area are shown on PLATES II-10, II-11 and II-12. Redistribution of approximately 1' of topdressing materials over the final graded surface will encourage recovery of productivity levels compatible with the post-mining land use of rangeland. A 1' cover of topdressing materials is consistent with the post-mining land use, final contours, and surface water drainage system. Revegetation operations will establish a permanent vegetative cover with plant species that are adapted to the environmental conditions within the permit area. The species included in the seed mixture(s) are capable of stabilizing the soil surface and providing valuable forage for livestock and wildlife. Permanent impoundments left in the reclamation areas will enhance the post-mining land use of rangeland and encourage utilization by wildlife.

The utility and capacity of the pre-mining and post-mining areas to support a variety of alternative uses will be similar. Pasture, range, grazing, and wildlife are the only recommended uses for the pre-mine area, as described in CHAPTER XII. The post-mine area is expected to be capable of supporting the same uses. A change in the land use of rangeland is unlikely, due to the limited availability of water, climatic conditions, distance from population centers, and current socioeconomic trends. The historic use of rangeland is clearly the most appropriate post-mining land use. There are no local land use laws, plans, or programs in effect for the permit or adjacent areas.

The only support activities anticipated to be needed to achieve the post-mining land use following establishment of the permanent vegetation are the installation of fences to regulate grazing and placement of salt or mineral blocks to encourage proper livestock distribution. Livestock will not be allowed on the reclamation areas until the permanent vegetation is sufficiently established to support grazing. The capability of the land to support grazing will be demonstrated during at least the last two years of liability using cattle or director approved grazing simulation techniques. Stocking rates will be determined using vegetation sampling data collected from the reclamation areas. Utilization will be monitored to ensure proper use. A grazing plan will be submitted to the MMD for review and approval prior to initiating grazing or approved grazing simulation techniques. Three permanent impoundments are currently installed that will provide water for livestock.

909 . PONDS, IMPOUNDMENTS, BANKS, DAMS, EMBANKMENTS

Impoundments will be installed before surface mining activities are initiated in the drainage area to be disturbed. Temporary impoundments will be used individually or in series to contain the runoff from the 100-year/6-hour or safely pass a 25 year/6 hour precipitation event. A combination of excavated impoundments and embankment type impoundments may be constructed in future mine areas to receive water that accumulates in the pits and contain runoff from disturbed areas. The typical design of the excavated impoundments is shown on FIGURE II-5. The outlet side of an excavated impoundment is considered the spillway, since these structures are totally incised below the ground surface. A typical design for the embankment type impoundments is presented on FIGURE II-6. Detailed design plans and locations for future impoundments will be submitted to the MMD for review and approval prior to

construction. The impoundments will be designed and constructed in accordance with Subparts 2015 and 2017 of 19 NMAC 8.2.

Locations of the impoundments currently existing within the permit area and approved by the MMD are shown on PLATES IX-44 and IX-45. Impoundments SP-1 and SP-2 are designed to capture water from the mine facilities and hold ground water from wells for use in dust suppression. EVAP-2 is designed to receive water that has passed through the sewage treatment system for the mine. The other impoundments constructed within the permit area are used to receive water that accumulates in the pits and control sediment from disturbed areas.

Any future impoundments with dams or embankments will be examined for signs of structural weakness, erosion, and other hazardous conditions four times per year. The existing and future impoundments will be maintained as needed to ensure proper functioning.

LRCC proposes to retain the majority of the impoundments that are not removed during mining as permanent structures. SP-1, EVAP-1, EVAP-2, SP-3 and SP-5 are the only impoundments outside the area to be mined that are presently planned for removal. These two impoundments and any future impoundments that are not approved for retention as a permanent structures will be removed in accordance with Subpart 2014.K of 19 NMAC 8.2. The impoundments constructed in reclamation areas will be typically retained as permanent structures. Water levels in the permanent impoundments will be dependent upon precipitation. The permanent impoundments are expected to be dry for a portion of most years due to the ephemeral nature of the contributing drainages and the semi-arid to arid conditions existing within the permit area. Permanent impoundments will provide a source of water for livestock, which is compatible with the post-mining land use of rangeland. The permanent impoundments are intended to supplement other water sources which will enhance the livestock carrying capacity of the reclaimed areas. Vegetative cover and the nontoxic soil material will allow water quality standards to be met. Retention of as many impoundments as possible following mining was requested by the surface owner (Fernandez Company, Ltd.) in a letter to the MMD dated February 3, 1988. A copy of this letter is provided in EXHIBIT II-1. Permanent impoundments will be located in areas to encourage proper livestock distribution and minimize erosion.

No coal processing waste banks, dams, or embankments are planned to be constructed within the permit area.

910. SURFACE MINING NEAR UNDERGROUND MINING

No underground mines exist within or adjacent to the permit area. Therefore, the requirements of Subpart 910 of 19 NMAC 8.2 are not applicable.

911. DIVERSIONS

Diversions and dikes will be used to direct overland flow and runoff in ephemeral arroyos from undisturbed areas around or through disturbed areas. Temporary and permanent diversions/dikes will be designed, constructed, and maintained to divert water to treatment facilities or prevent undisturbed water from entering treatment facilities from the peak runoff of a 10-year, 24-hour precipitation event. A typical design for the channel type diversions is presented on FIGURE II-7. The typical design of a dike is shown on FIGURE II-8. Detailed design plans and locations for diversions and dikes will be submitted to the MMD for review and approval prior to construction. The diversions and dikes will be designed, constructed, and maintained to prevent additional contributions of suspended solids to stream flow and runoff outside the permit area, to the extent possible. Sediment control measures that may be used to

908. RECLAMATION PLAN: POST-MINING LAND USE

Reclamation activities conducted at El Segundo Mine will return disturbed areas to the pre-mining land use of rangeland. Comments from surface land owners have been solicited EXHIBIT 908-1.pdf,EXHIBIT 908-2.pdf,EXHIBIT 908-3.pdf,EXHIBIT 908-4.pdf, EXHIBIT 908-5.pdf, and EXHIBIT 908-6.pdf. The letters request any comments concerning post-mining land use be submitted to MMD. A landscape configuration compatible with the post-mining land use and surrounding terrain will be developed during the backfilling and grading operations. The development of rolling terrain with an increased drainage density will minimize erosion, conserve soil moisture and promote revegetation success in the dragline mining areas. Topographic diversity will encourage the interspersion of vegetation types and utilization by wildlife. The mining areas will have a surface configuration that resembles the pre-mining landscape. Final contours for the areas expected to be affected within the permit area are shown on PLATE 903-3 (PLATE 903-3.pdf). Redistribution of approximately one foot of topdressing materials over the final graded surface will encourage recovery of productivity levels compatible with the post-mining land use of rangeland. A one foot cover of topdressing materials is consistent with the post-mining land use, final contours, and surface water drainage system. Revegetation operations will establish a permanent vegetative cover with plant species that are adapted to the environmental conditions within the permit area. The species included in the seed mixture(s) are capable of stabilizing the soil surface and providing valuable forage for livestock and wildlife. Permanent impoundments left in the reclamation areas will enhance the post-mining land use of rangeland and encourage utilization by wildlife.

The utility and capacity of the pre-mining and post-mining areas to support a variety of alternative uses will be similar. Pasture, range, grazing, and wildlife are the only recommended uses for the pre-mine area, as described in Subpart 811. The post-mine area is expected to be capable of supporting the same uses. A change in the land use of rangeland is unlikely, due to the limited availability of water, climatic conditions, distance from population centers, and current socioeconomic trends. The historic use

of rangeland is clearly the most appropriate post-mining land use. There are no local land use laws, plans, or programs in effect for the permit or adjacent areas.

The only support activities anticipated to be needed to achieve the post-mining land use following establishment of the permanent vegetation are the installation of fences to regulate grazing and placement of salt or mineral blocks to encourage proper livestock distribution. Livestock will not be allowed on the reclamation areas until the permanent vegetation is sufficiently established to support grazing. The capability of the land to support grazing will be demonstrated during at least two of the last four years of bond liability using cattle or director approved grazing simulation techniques. Stocking rates will be determined using vegetation sampling data collected from the reclamation areas. Utilization will be monitored to ensure proper use. A grazing plan will be submitted to the Director for review and approval prior to initiating grazing or approved grazing simulation techniques. Three permanent impoundments are currently installed that will provide water for livestock.

Topdressing areas will be periodically inspected for rills and gullies. LRCC will monitor topdressed areas that have developing rills and gullies that do not disrupt the approved post-mining land use, not interfere with the establishment of permanent vegetation, nor result in a non-compliance of the applicable water quality standards for receiving streams. The monitoring activities will be designed to determine if the rills and gullies will naturally stabilize without remedial actions by LRCC. Active rills and gullies in topdressed areas which are expected to be detrimental will be filled, regraded or otherwise stabilized. Rill and gully repairs requiring heavy equipment will be initiated when the topdressing moisture conditions permit access and minimize rutting and compaction. The rill and gully repair areas will be mechanically or hand seeded in accordance with the revegetation plan.

FLOYD LEE RANCH
FERNANDEZ COMPANY, LTD.
CATTLE
\F/

LEE RANCH
GRANTED, NEW MEXICO — 87050
PHONE (505) 287-3811

February 3, 1988

Mr. Erling Brostuen, Director
New Mexico Mining and Minerals Division
525 Camino de los Marquez
Santa Fe, New Mexico 87501

Dear Mr. Brostuen:

Santa Fe Pacific Coal Corporation has asked me to clarify to you the use of roads and other areas on the Lee Ranch owned by the Fernandez Company, but built or constructed by Santa Fe Pacific Coal and included in their mining operations.

Regarding the paved road constructed by the coal company and running from Forest Service Road 456 through the mine office and coal mine to the road to the northwest ranch unit: It is our wish that this road be left after the cessation of the coal mining operation for continued use for ranching operations. Presently, the road is utilized by Fernandez Company personnel for access to our ranch areas to the north and west of the coal mine. Also, the first portion of the road between Forest Service Road 456 and the Leopoldo Pond is utilized by other ranch owners to access their properties to the north. The part of the road between the ponds and the mine office are utilized by Fernandez Company personnel in daily ranching operations.

As with the paved road, the road used by the mining operations to haul gravel from the gravel pit to the mine is also utilized by Fernandez Company for ranching operations.

The gravel pit itself is located on Fernandez Company property and gravel produced at this pit has been used on the Lee Ranch facilities and roads near the headquarters. Fernandez Company intends to bid sales of gravel out of this pit for other off-site uses.

Santa Fe Pacific Coal asked if we would want any of the ponds left after the mining operation ceased. Any ponds left would enhance the area for the post-mining use of livestock grazing, and the Fernandez Company would like as many ponds as possible left after cessation of mining operations.

I hope this answers the questions your staff has posed to the coal company.

Very truly yours,

Iona M. Lee

Iona M. Lee
General Partner

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propagation of fish and wildlife, recreational purposes, and agricultural, industrial and other purposes."

MR. BUTZIER: Okay.

MR. SAUMS: So --

MR. BUTZIER: And let me ask -- let me ask you this question.

Let's say somebody has a ranch in an arid corner of New Mexico, and there is a depression on the ranch that collects water naturally from precipitation events, and that water stays in that depression for some period of time and is actually used by the rancher for livestock watering purposes.

Do you understand -- do you follow the hypothetical there?

MR. SAUMS: I believe so far.

MR. BUTZIER: Am I correct that the position of the agency is that the fishable/swimmable standard applies to that livestock water use pond by a rancher, unless the rancher comes before the agency and with a use attainability analysis and that gets then moved on to a public proceeding before the Commission?

Am I understanding that correctly?

MS. LEAVITT: If the water is a surface water of the state -- you keep referring back to the fishable/swimmable federal rebuttable presumption, I

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think that's how you referred to it.

MR. BUTZIER: Actually, I wasn't referring to the rebuttal presumption in that context.

I was just saying that you presume -- the agency presumes a recreational human contact use for that livestock watering pond and the depression out there in somebody's ranch in New Mexico.

Am I correct? Am I interpreting your position correctly?

MS. LEAVITT: That's what the standards say.

MR. BUTZIER: Okay. So if -- if the state -- if the Department were diligent in, you know, making sure that its regulations are being followed, it would presumably require the ranchers to make a demonstration or take samples in that livestock watering pond to show that it meets the standards applicable to recreational uses?

MS. LEAVITT: No, that's not what we're saying.

What we're saying is that there could be -- a UAA, or a use attainability analysis, can take many forms. It could be something that's very simple that says, you know, "This pond is small, it's located in a remote area where people don't have access, it is -- you know, over the course of, you know, my lifetime I've

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only seen that it's used for livestock watering, not for recreational purposes, really nobody can get to it for recreational purposes," and we want to provide that information to the Department in support of the Department recognizing that a recreational use -- or to the Commission, actually, that a recreational use doesn't apply.

It could be something as simple as that.

I don't think anyone here has said and I don't think our testimony has stated that there has to be, you know, a lengthy sampling process or a lot of data collected.

There are other ways of demonstrating for these livestock watering ponds what applies and what doesn't. And also --

MR. BUTZIER: But the rancher -- I'm sorry, go ahead.

MS. LEAVITT: And also I want to point out that surface waters -- well, anyway, go ahead.

MR. BUTZIER: But the rancher is -- is -- as I understand the Department's proposals and position, the rancher is facing a regulatory system that -- that assumes that his livestock watering pond has to meet standards appropriate for recreational uses as well as warm water aquatic life; correct?

100

MS. LEAVITT: Well, what the standards do is they lay out the criteria that apply when -- in any implementation of the standards.

So in this case, it would be an NPDES permit, a 404 Clean Water Act permit, something that actually triggers implementation.

So if somebody was going to be discharging to that -- to that surface water of the state, then at that point the Department would work with EPA to make sure that the appropriate uses in the pond are protected.

In the situation where there is no NPDES permit, we're not going out and sampling livestock watering ponds as, you know, a routine work product that we produce in the state. So, really, there is a practical reality to implementation of the standards, and that is that when a permit is being issued, that's when the uses and the criteria that apply are generally being looked at.

MR. BUTZIER: Ms. Leavitt --

MS. LEAVITT: So we're not saying that every rancher in the state now has to go out and do a UAA and worry about the uses that apply, because there is no implementation that is taking place that triggers that sort of change being made.

MR. BUTZIER: Ms. Leavitt, thank you for that

testimony.

Can you point to anywhere in the existing regulations, either as they currently exist or as proposed by the Department, where that practical reality is anywhere discussed or incorporated?

MS. LEAVITT: I think in the -- Glenn can probably help me with this.

I think in the water quality management plan and the continuing planning process, there are other documents that actually describe how the standards are actually implemented.

There is a document that is adopted by the state and EPA for implementation of NPDES permits, and I don't recall what that document is called, but there are other documents that describe how the standards are implemented.

MR. BUTZIER: And are those documents anywhere a part of this triennial review proceeding?

MS. LEAVITT: They are not, but they are adopted by the Commission and they have been adopted in previous proceedings.

MS. HOMER: And Section 8 of the standards, Subsection B, "Implementation Plan," describes implementation activities of the Department and refers to some of those documents in a general way.

MR. BUTZIER: I'd like to direct your attention, Ms. Homer, to page 22 of your rebuttal testimony.

MS. HOMER: Okay.

MR. BUTZIER: In particular, the last inch or so thick paragraph that starts with "Freeport emphasizes."

MS. HOMER: Yes.

MR. BUTZIER: The second sentence of that talks -- well, the first sentence says, "Freeport emphasizes the large number of ephemeral and intermittent waters in New Mexico for which UAAs are needed."

And then your testimony goes on to say, "In fact, the vast majority of these waters do not require UAAs because they neither receive regulated discharges nor pose a regulatory issue."

Do you see where I'm reading?

MS. HOMER: I do.

MR. BUTZIER: Does that encapsulate, Ms. Leavitt, the point that you were just making a second ago?

MS. LEAVITT: I believe that it does.

MR. BUTZIER: What does the agency mean when it says "nor pose a regulatory issue"?

What's -- I guess, Ms. Homer, this is your testimony, so what do you mean by that testimony?

MS. HOMER: One example might be a cleanup situation, where somebody is needing to remediate and they need to know what standards they need to meet in a particular water body.

MS. LEAVITT: And the regulations that govern those cleanups are generally found in 20.6.2 NMAC, in the abatement requirements, which refer back to the surface water quality standards.

MR. BUTZIER: So I assume you're now referring to the small minority, because what I was asking about was the vast majority, and the vast majority of waters you say do not pose a regulatory issue.

My question is, what do you mean by -- by does not -- "does not pose a regulatory issue"?

Does not pose a CERCLA or a RCRA issue, is that what you mean?

MS. HOMER: Or doesn't receive a discharge -- an NPDES -- we have 120 NPDES permits and thousands of water bodies, so the vast majority of those don't call for someone to come out and, you know, confirm that the water -- impose the standards in some way, implement them in some regulatory way. It doesn't come up.

MR. BUTZIER: And that's something that --

well, who decides whether something does or does not pose a regulatory issue? Is that the Department that determines that?

MS. LEAVITT: The Department would determine that under the various programs that it implements.

Those decisions are generally reviewable by the Water Quality Control Commission, but I think some of the regulatory actions that you mentioned, like implementation of cleanups under federal and state programs, those would be regulatory -- those could fall under the category of regulatory issues.

MR. BUTZIER: So when we refer in this testimony to thousands of waters that don't pose a regulatory issue, might we be including within that the depression on the rancher's land that is a livestock watering pond?

MS. HOMER: Yes.

MR. BUTZIER: Okay.

MR. SAUMS: If I could add, I think the regulatory issues, you asked -- regulatory issues are usually responsive. Something comes up, a member of the public or industry or somebody wants to initiate a discharge and they want to obtain an NPDES permit, that would be a regulatory issue.

Marcy gave examples of if there is a cleanup,

NEW MEXICO
ENVIRONMENT DEPARTMENT

Surface Water Quality Bureau

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BILL RICHARDSON
Governor
DIANE DENISH
Lieutenant
Governor

RON CURRY
Secretary
JON GOLDSTEIN
Deputy Secretary

MEMORANDUM

To: James O'Hara, Program Manager, Coal Mine Reclamation Program

Through: Glenn Saums, Acting Bureau Chief, Surface Water Quality Bureau

Through: Pam Homer, Standards Coordinator, Surface Water Quality Bureau

From: Rich Powell, Industrial Team Leader, Point Source Regulation Section

Subject: Permanent Impoundments at Mines in New Mexico

Date: October 8, 2008

The Surface Water Quality Bureau ("SWQB") of the New Mexico Environment Department provides this memorandum in response to your request for guidance regarding the appropriate designated uses and associated water quality criteria for permanent impoundments at mines in New Mexico. As set forth below, such impoundments are subject to the uses of livestock watering, wildlife habitat, aquatic life, and secondary contact under state law. Such impoundments also may be subject to the uses of livestock watering, wildlife habitat, aquatic life, and primary contact under federal law.

1. Pursuant to Section 7.DDD of the New Mexico Water Quality Standards ("WQS"), 20.6.4 NMAC, a permanent impoundment at a mine is a "surface water of the state", absent evidence that it does not combine with other surface or subsurface water, does not fall within a tribe's regulatory jurisdiction pursuant to Section 518 of the Clean Water Act ("CWA"), or does not constitute a waste treatment system as defined below:

> "Surface water(s) of the state" means *all surface waters situated wholly or partly within or bordering upon the state*, including lakes, rivers, streams (including intermittent streams), mudflats, sandflats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, reservoirs or natural ponds. Surface waters of the state also means all tributaries of such waters, including adjacent wetlands,

any manmade bodies of water that were originally created in surface waters of the state or resulted in the impoundment of surface waters of the state, and any "waters of the United States" as defined under the Clean Water Act that are not included in the preceding description. *Surface waters of the state does not include private waters that do not combine with other surface or subsurface water or any water under tribal regulatory jurisdiction pursuant to Section 518 of the Clean Water Act. Waste treatment systems, including treatment ponds or lagoons designed and actively used to meet requirements of the Clean Water Act (other than cooling ponds as defined in 40 CFR Part 423.11(m) that also meet the criteria of this definition), are not surface waters of the state, unless they were originally created in surface waters of the state or resulted in the impoundment of surface waters of the state.*

(emphasis added).

2. Unless identified in Sections 101-899 of New Mexico's WQS, a permanent impoundment at a mine is considered an unclassified surface water. In July 2005, the New Mexico Water Quality Control Commission adopted Sections 97, 98, and 99, which identified the designated uses for unclassified surface waters:

Section 97 (ephemeral waters)	livestock watering, wildlife habitat, limited aquatic life, secondary contact
Section 98 (intermittent waters)	livestock watering, wildlife habitat, aquatic life, secondary contact
Section 99 (perennial waters)	livestock watering, wildlife habitat, aquatic life, secondary contact

20.6.4.97-99 NMAC. The SWQB has not determined the applicable subcategory of aquatic life for unclassified surface waters in Sections 98 and 99. This determination must be made on a site-specific basis.

3. Pursuant to the CWA, 33 U.S.C. §1251 et seq., a permanent impoundment at a mine may also be considered a "water of the United States" based on site-specific characteristics or if the mine's discharges are subject to NPDES requirements.

4. The U.S. Environmental Protection Agency ("EPA") imposes a rebuttable presumption that CWA Section 101(a)(2) uses are attainable for all "waters of the United States."[1] The EPA currently interprets the Section 101(a)(2) uses to be primary contact and either warmwater aquatic life for perennial waters or marginal warmwater aquatic life for intermittent and ephemeral waters. The presumption can be rebutted by a demonstration that the particular use is not attainable. *See* 40 C.F.R. 131.10(j). Additionally, when the EPA issues a NPDES permit, it must ensure that New Mexico's WQS are protected. Sections 97, 98, and 99 of New

[1] CWA Section 101(a)(2) calls for "water quality which provides for the protection and propagation of fish, shellfish, and wildlife and provides for recreation in and on the water."

Mexico's WQS designate the uses of livestock watering and wildlife habitat for unclassified surface waters.

5. The difference between the criteria for primary and secondary contact uses may not be significant for mine impoundments because bacterial contamination is not expected to be a concern in mine discharges, and neither the SWQB nor EPA routinely include monitoring requirements or effluent limitations for bacterial contamination in NPDES permits for such discharges.[2]

Conclusion

A permanent impoundment at a mine is subject to the uses of livestock watering, wildlife habitat, marginal warmwater or warmwater aquatic life, and primary contact under federal law unless (1) the impoundment is not a water of the United States; or (2) the federal presumption is rebutted through a use attainability analysis.

A permanent impoundment at a mine is subject to the uses of livestock watering, wildlife habitat, aquatic life, and secondary contact under state law. However, the distinction between the criteria for the marginal warmwater and warmwater aquatic life uses, and the primary and secondary contact uses, are not significant.

[2] For the primary contact use, the E. coli geometric mean criterion is 126 cfu/100 mL, the E. coli single sample criterion is 410 cfu/100 mL, and the pH is 6.6 to 9.0. For the secondary contact use, the E. coli geometric mean criterion is 548 cfu/100 mL, the E. coli simple sample criterion is 2507 cfu/100 mL, and the pH is 6.0 to 9.0.

Jim

From: Powell, Richard, NMENV
Sent: Thursday, September 11, 2008 4:00 PM
To: Ohara, Jim, EMNRD
Cc: Saums, Glenn, NMENV
Subject: WQS applicable to permanent impoundments

I understand that you may be using our previous standards to determine designated uses for permanent impoundments at coal mines. The old standards required only that these impoundments be protected for the designated uses of livestock watering and wildlife habitat. The current designated uses for these permanent impoundments include primary contact, livestock watering, wildlife habitat and aquatic life (marginal warmwater) since the standards were revised in 2005. The criteria applicable to these designated uses may be found in 20.6.4.900 D, F, G and H respectively (see http://www.nmcpr.state.nm.us/nmac/parts/title20/20.006.0004.htm). In addition to the criteria listed in those subparts, the numeric criteria for these uses are listed in Subpart J under livestock watering, wildlife habitat, acute and chronic aquatic life and *persistent* human health.

The Standards are currently undergoing another revision so these requirements may change within the next several months.

If you need further clarification or have questions, let me know.

Rich

Ohara, Jim, EMNRD

From: Ohara, Jim, EMNRD
Sent: Monday, September 15, 2008 10:34 AM
To: Powell, Richard, NMENV
Cc: Anderson, Monte, EMNRD; Saums, Glenn, NMENV; Ames, Eric, NMENV
Subject: RE: WQS applicable to permanent impoundments

Rich,

I think there is enough grey in the regulations to question the applicability of the aquatic and primary human contact standards to most of the stock ponds. Let me know when you locate your policy statement.

I'm going to do some work on finding out if we have any ponds with aquatic communities and we'll go from there. Otherwise, I intend to apply the livestock/wildlife standards.

Jim

From: Powell, Richard, NMENV
Sent: Friday, September 12, 2008 11:23 AM
To: Ohara, Jim, EMNRD
Cc: Anderson, Monte, EMNRD; Saums, Glenn, NMENV; Ames, Eric, NMENV
Subject: RE: WQS applicable to permanent impoundments

Unfortunately, as far as I know, the justification is included in the documents provided to the WQCC and the hearing record when the current standards were adopted in 2005. Although this is probably an extremely large volume of material, I presume the documents could be made available for your review.

From: Ohara, Jim, EMNRD
Sent: Friday, September 12, 2008 10:10 AM
To: Ohara, Jim, EMNRD; Powell, Richard, NMENV
Cc: Anderson, Monte, EMNRD
Subject: RE: WQS applicable to permanent impoundments

Sorry forgot the "don't" before the "see." Don't want to confuse the issue.

From: Ohara, Jim, EMNRD
Sent: Friday, September 12, 2008 10:03 AM
To: Powell, Richard, NMENV
Cc: Anderson, Monte, EMNRD
Subject: RE: WQS applicable to permanent impoundments

Richard,

I do need some clarification. We've always applied livestock and wildlife numeric values, but I **don't** see how the requirements for aquatic wildlife and primary human contact apply to stock ponds.

Please provide me a copy of the Department's legal opinion, policy or directive stating it is ED's opinion/position that stock ponds are aquatic habitat and subject to the numeric standards for primary human.

Thanks,

Ohara, Jim, EMNRD

From: Powell, Richard, NMENV
Sent: Wednesday, October 08, 2008 1:26 PM
To: Ohara, Jim, EMNRD
Cc: Saums, Glenn, NMENV; Homer, Pamela, NMENV; Ames, Eric, NMENV
Subject: RE: WQS applicable to permanent Impoundments
Attachments: Mine Site Permanent Impoundments.doc

Jim –

Sorry this took so long but, per your request, find attached a memorandum describing the legal framework for determining the uses and criteria applicable to permanent impoundments at McKinley Mine. If you would like to discuss this further, please call me at 827-2798.

Ohara, Jim, EMNRD

From: Ohara, Jim, EMNRD
Sent: Wednesday, October 08, 2008 6:06 PM
To: Powell, Richard, NMENV
Subject: RE: RE: WQS applicable to permanent impoundments

I would like a signed copy for the records.

One question the presumption the ponds are warm water aquatic habitat (The presumption can be rebutted by a demonstration that the particular use is not attainable. *See* 40 C.F.R. 131.10(j).) Is the secondary human consumption requirement also eliminated? It seems those are tied together.

From: Powell, Richard, NMENV
Sent: Wednesday, October 08, 2008 3:35 PM
To: Ohara, Jim, EMNRD
Subject: RE: RE: WQS applicable to permanent impoundments

Sorry about that. I thought I got rid of that version.

From: Ohara, Jim, EMNRD
Sent: Wednesday, October 08, 2008 1:53 PM
To: Powell, Richard, NMENV
Subject: RE: RE: WQS applicable to permanent impoundments

Thanks. It would be good if I didn't have a draft with redline and cross-outs. Can you send me a final version initialed or signed by whomever is in charge?

From: Powell, Richard, NMENV
Sent: Wednesday, October 08, 2008 1:26 PM
To: Ohara, Jim, EMNRD
Cc: Saums, Glenn, NMENV; Homer, Pamela, NMENV; Ames, Eric, NMENV
Subject: RE: WQS applicable to permanent impoundments

Jim –

Sorry this took so long but, per your request, find attached a memorandum describing the legal framework for determining the uses and criteria applicable to permanent impoundments at McKinley Mine. If you would like to discuss this further, please call me at 827-2798.

Ohara, Jim, EMNRD

From:	Powell, Richard, NMENV
Sent:	Tuesday, October 14, 2008 12:13 PM
To:	Ohara, Jim, EMNRD
Cc:	Ames, Eric, NMENV; Homer, Pamela, NMENV
Subject:	WQS applicable to permanent impoundments
Attachments:	permanent impundments signed.pdf

Per your request, attached is a signed copy. Sorry about sending the redline-strikeout version earlier, but I think I figured out how it happened. We would appreciate it if you would destroy any copies you have of the draft (redline-strikeout) version, including that in an email, since it is confidential.

You also asked:

"One question the presumption the ponds are warm water aquatic habitat (The presumption can be rebutted by a demonstration that the particular use is not attainable. *See* 40 C.F.R. 131.10(j).) is the secondary human consumption requirement also eliminated? It seems those are tied together."

I'm not sure I completely understand the question, but the memo says; at a minimum under state law, aquatic life and secondary contact apply to 97 waters with additional requirements for 98 and 99 waters. A UAA might find that warmwater aquatic life and primary contact are not attainable (the rebuttable presumption EPA uses), but aquatic life and secondary contact would still apply. As far as I know, these two uses are not tied together. A UAA might find that warmwater aquatic life is not attainable (for instance the dissolved oxygen is too low), but that primary contact is, so the uses might be limited aquatic life and primary contact. Or it might find that warmwater aquatic life is attainable, but that primary contact is not (for instance E. coli are too high), so the uses might be warmwater aquatic life and secondary contact.

Ohara, Jim, EMNRD

From: Ohara, Jim, EMNRD
Sent: Tuesday, October 14, 2008 8:12 AM
To: Ramsey Tim (Timothy.TC.Ramsey@bhpbilliton.com); 'Shepherd, Marie (MShepherd)'; Mark Hiles; 'Coats, Michael (MichaelCoats)'
Subject: FW: Highlights

FYI – Any thoughts on an Ad Hoc meeting date?

From: Jones, Dennis D. [mailto:DJones@PeabodyEnergy.com]
Sent: Monday, October 13, 2008 4:14 PM
To: Cochran, John N.; Murphree, Philip
Cc: Ohara, Jim, EMNRD
Subject: RE: Highlights

Yes, I have to deal with this all the time in Colorado. As stated in the memo, one way out is

"the federal presumption is rebutted through a use attainability analysis."

My suggestion is to do a general UAA on livestock ponds, indicating that the coliform standard can not be met.
Good luck
Dennis Jones
Hydrologist
Senca Coal / Peabody Energy

From: Cochran, John N.
Sent: Monday, October 13, 2008 15:34
To: Murphree, Philip; Jones, Dennis D.
Subject: FW: Highlights

Looks like New Mexico is on the verge of Colorado-esque CWA fervor...

From: White, Cybil B [mailto:Cybil.B.White@bhpbilliton.com]
Sent: Monday, October 13, 2008 15:12
To: Cochran, John N.
Subject: FW: Highlights

I'm not sure if you've seen this, but this has also surfaced:

From: Ohara, Jim, EMNRD [mailto:jim.ohara@state.nm.us]
Sent: Thursday, October 09, 2008 9:06 AM
To: Brancard, Bill, EMNRD
Cc: Shepherd, Holland, EMNRD; Leach, Carol, EMNRD; Smith, Mark A, EMNRD; Bada, Cheryl, EMNRD; Anderson, Monte, EMNRD; Clark, David, EMNRD; Delay, Linda, EMNRD; Guranich, John, EMNRD; Vinson, Joe, EMNRD
Subject: Highlights

Not too much going on this week.

Yesterday I received an e-mail from ED that is likely to have a significant impact on the Coal mines (Of course this will also apply MARP mines). The Surface water folks are telling me that our livestock impoundments have been designated

warm water aquatic habitat. This means the highest performance standards is now secondary human contact, which is based on a limit to fecal coliform and other bacterial contamination. I've enclosed the memo for you review.

We're talking about a range of pond sizes. Some pond do hold multiple acre feet of water and may contain aquatic life, but many are maybe less than a thousand gallon tops, with high TDS and low dissolved oxygen. All are run-off dependent and many are dry most years. It is certainly a mystery to me how these ponds could be considered warm water aquatic habitat.

My biggest concern is based on the nature and use of these ponds by cattle and wildlife. I do not believe many will meet the secondary human contact criteria. There are also a pretty substantial set of monitoring requirements for secondary human contact, which will be costly for the operators and may result in a decision to fill the ponds regardless of water quality.

Ultimately we may not be able to keep many (any) livestock ponds on our mines. Not only does this contradict over 25 years of post mining land use planning, it will likely make a number of private land owners very upset. **These ponds represent land improvements that have an attached dollar value in the minds of ranchers (even on federal or state land).** Case in point Vermejo ranch (who wants to volunteer to tell Ted about this?).

I have pointed out the big picture issues to ED, but they really don't care. As far as I know we were not given an opportunity to make a presentation before the Water Commission prior to their determination.

I want to get together with the operators and discuss this new situation. I've asked for a meeting of the Ad Hoc committee.

Any thoughts you may have on this issue would be appreciated. One possibility would be to apply the criteria of "warmwater" in 20.6.4.900.H.4 NMAC to see if any of the ponds meet the basic definition. I expect some will, but other may not.

I do not know if this is a draft memo. I have asked for a signed "official" copy, but so far no response.

Jim O'Hara
Coal Program Manager
Mining and Minerals Division
505-476-3413

New Mexico Energy, Minerals and Natural Resources Department

Bill Richardson
Governor

Joanna Prukop
Cabinet Secretary
Reese Fullerton
Deputy Cabinet Secretary

Bill Brancard
Division Director
Mining and Minerals Division

May 18, 2009

Marcy Leavitt
Division Director
Water and Waste Management Division
New Mexico Environment Department
1190 South St. Francis Drive
Santa Fe, NM 87505

Surface Water Quality Standards for Mine Impoundments

Dear Ms Leavitt:

At the request of the Mining and Minerals Division (MMD) of the Energy, Minerals and Natural Resources Department, the New Mexico Environment Department (NMED) provided a Memorandum, dated October 8, 2008, which sets forth the designated uses and associated water quality criteria that apply to permanent impoundments at mines in New Mexico. It has come to our attention that some parties may believe that a dispute exists between our agencies over the application of New Mexico's Water Quality Standards to permanent impoundments at mines.

The Surface Mining Act provides that "the quality of water impounded water will be suitable on a permanent basis for its intended use and that discharges from the impoundment will not degrade the water quality below water quality standards established pursuant to applicable federal and state law...". Section 69-25A-19.B(8)(c). Water quality standards in New Mexico are established by the Water Quality Control Commission and implemented by the New Mexico Environment Department. That is why we requested guidance from NMED on this issue. Having received this guidance, we will be implementing it.

We hope this clarifies any confusion.

Sincerely,

Bill Brancard
Division Director

FEDERAL REGISTER

Vol. 79 Monday,
No. 76 April 21, 2014

Part II

Department of Defense

Department of the Army, Corps of Engineers

33 CFR Part 328

Environmental Protection Agency

40 CFR Parts 110, 112, 116, et al.

Definition of "Waters of the United States" Under the Clean Water Act; Proposed Rule

DEPARTMENT OF DEFENSE

Department of the Army, Corps of Engineers

33 CFR Part 328

ENVIRONMENTAL PROTECTION AGENCY

40 CFR Parts 110, 112, 116, 117, 122, 230, 232, 300, 302, and 401

[EPA–HQ–OW- 2011–0880; FRL–9901–47–OW]

RIN 2040–AF30

Definition of "Waters of the United States" Under the Clean Water Act

AGENCY: U.S. Army Corps of Engineers, Department of the Army, Department of Defense; and Environmental Protection Agency (EPA).

ACTION: Proposed rule.

SUMMARY: The Environmental Protection Agency (EPA) and the U.S. Army Corps of Engineers (Corps) are publishing for public comment a proposed rule defining the scope of waters protected under the Clean Water Act (CWA), in light of the U.S. Supreme Court cases in *U.S.* v. *Riverside Bayview, Rapanos* v. *United States,* and *Solid Waste Agency of Northern Cook County* v. *U.S. Army Corps of Engineers (SWANCC),* and *Rapanos* v. *United States (Rapanos).* This proposal would enhance protection for the nation's public health and aquatic resources, and increase CWA program predictability and consistency by increasing clarity as to the scope of "waters of the United States" protected under the Act.

DATES: Submit comments on or before July 21, 2014.

ADDRESSES: Submit your comments, identified by Docket ID No. EPA–HQ–OW–2011–0880 by one of the following methods:

- *Federal eRulemaking Portal: http://www.regulations.gov.* Follow the instructions for submitting comments.
- *Email: ow-docket@epa.gov.* Include EPA–HQ–OW–2011–0880 in the subject line of the message.
- *Mail:* Send the original and three copies of your comments to: Water Docket, Environmental Protection Agency, Mail Code 2822T, 1200 Pennsylvania Avenue NW., Washington, DC 20460, Attention: Docket ID No. EPA–HQ–OW–2011–0880.
- *Hand Delivery/Courier:* Deliver your comments to EPA Docket Center, EPA West, Room 3334, 1301 Constitution Avenue NW., Washington, DC 20460, Attention Docket ID No. EPA–HQ–OW–2011–0880. Such deliveries are accepted only during the Docket's normal hours of operation, which are 8:30 a.m. to 4:30 p.m., Monday through Friday, excluding legal holidays. Special arrangements should be made for deliveries of boxed information. The telephone number for the Water Docket is 202–566–2426.

Instructions: Direct your comments to Docket ID No. EPA–HQ–OW–2011–0880. EPA's policy is that all comments received will be included in the public docket without change and may be made available on-line at *http://www.regulations.gov,* including any personal information provided, unless the comment includes information claimed to be Confidential Business Information (CBI) or other information whose disclosure is restricted by statute. Do not submit information that you consider to be CBI, or otherwise protected, through *http://www.regulations.gov* or email. The *http://www.regulations.gov* Web site is an "anonymous access" system, which means EPA will not know your identity or contact information unless you provide it in the body of your comment. If you send an email directly to EPA without going through *http://www.regulations.gov,* your email address will be automatically captured and included as part of the comment that is placed in the public docket and made available on the Internet. If you submit an electronic comment, EPA recommends that you include your name and other contact information in the body of your comment and with any disk or CD–ROM you submit. If EPA cannot read your comment due to technical difficulties and cannot contact you for clarification, EPA might not be able to consider your comment. Avoid the use of special characters and any form of encryption, and ensure that electronic files are free of any defects or viruses. For additional information about EPA's public docket, visit the EPA Docket Center homepage at *http://www.epa.gov/epahome/dockets.htm.*

Docket: All documents in the docket are listed in the *http://www.regulations.gov* index. Some information, however, is not publicly available, *e.g.,* CBI or other information whose disclosure is restricted by statute. Certain other material, such as copyrighted material, is publicly available only in hard copy. Publicly available docket materials are available electronically at *http://www.regulations.gov* or in hard copy at the Water Docket, EPA Docket Center, EPA West, Room 3334, 1301 Constitution Avenue NW., Washington, DC. The Public Reading Room is open from 8:30 a.m. to 4:30 p.m., Monday through Friday, excluding legal holidays. The telephone number for the Public Reading Room is 202–566–1744, and the telephone number for the Water Docket is 202–566–2426.

FOR FURTHER INFORMATION CONTACT: Ms. Donna Downing, Office of Water (4502–T), Environmental Protection Agency, 1200 Pennsylvania Avenue NW., Washington, DC 20460; telephone number 202–566–2428; email address: *CWAwaters@epa.gov.* Ms. Stacey Jensen, Regulatory Community of Practice (CECW–CO–R), U.S. Army Corps of Engineers, 441 G Street NW., Washington, DC 20314; telephone number 202–761–5856; email address: *USACE_CWA_Rule@usace.army.mil.*

SUPPLEMENTARY INFORMATION: The *SWANCC* and *Rapanos* decisions resulted in the agencies evaluating the jurisdiction of waters on a case-specific basis far more frequently than is best for clear and efficient implementation of the CWA. This approach results in confusion and uncertainty to the regulated public and results in significant resources being allocated to these determinations by Federal and State regulators. The agencies are proposing this rule to fully carry out their responsibilities under the Clean Water Act. The agencies are providing clarity to regulated entities as to whether individual water bodies are jurisdictional and discharges are subject to permitting, and whether individual water bodies are not jurisdictional and discharges are not subject to permitting.

Developing a final rule to provide the intended level of certainty and predictability, and minimizing the number of case-specific determinations, will require significant public involvement and engagement. Such involvement and engagement will allow the agencies to make categorical determinations of jurisdiction, in a manner that is consistent with the scientific body of information before the agencies—particularly on the category of waters known as "other waters."

The agencies propose to define "waters of the United States" in section (a) of the proposed rule for all sections of the CWA to mean: Traditional navigable waters; interstate waters, including interstate wetlands; the territorial seas; impoundments of traditional navigable waters, interstate waters, including interstate wetlands, the territorial seas, and tributaries, as defined, of such waters; tributaries, as defined, of traditional navigable waters, interstate waters,[1] or the territorial seas;

[1] "Interstate waters" in this preamble refers to all interstate waters including interstate wetlands.

gradient in the relation of waters to each other, and this is documented in the Report. The agencies propose a case-specific analysis in establishing jurisdiction over these "other waters" as consistent with the current science, the CWA, and the caselaw. A case-specific analysis allows for a determination of jurisdiction at the point on the gradient in the relationship that constitutes a "significant nexus."

The support for a determination that the nexus is significant will be based on a record that documents the scientific basis for concluding which functions are provided by the waters and why their effects on a traditional navigable water, interstate water, or the territorial seas are significant, including that they are more than speculative or insubstantial. The agencies considered multiple options for determining how best to balance the science and the policy options available to address "other waters." Those options ranged from establishing jurisdiction over all "other waters" with a nexus to traditionally navigable waters, interstate waters, or the territorial seas, with the agencies determining categorically the nexus to be significant, to declining to assert jurisdiction over any "other waters."

The agencies did not adopt the all in or the all out approach to "other waters." Based on the information currently available in the scientific literature, applicable caselaw, and the agencies' policy judgment about how best to provide clarity and certainty to the public regarding the jurisdictional status of "other waters" the agencies today propose the case-specific significant nexus analysis presented in this rule and explained in the preamble.

In addition to the proposed "other waters" approach in this rule, the agencies are requesting comment on a range of alternate approaches to inform their decision on how best to address "other waters." The agencies will consider the full administrative record, including comments requested and received, and the final Report, as revised in response to the SAB review, when developing the final rule, and may adopt one of the alternative approaches or combination of approaches and the proposal.

The agencies solicit comment on identifying subcategories of "other waters" that have a significant nexus to traditional navigable waters, interstate waters, and the territorial seas and could be jurisdictional by rule, and subcategories of "other waters" where a significant nexus or its absence could not be determined as a class and could be subject to a case-specific analysis under the rule. The Report indicates that there is evidence of very strong connections in some subcategories that are not included as jurisdictional by rule. The agencies solicit comment on making such subcategories of waters with very strong connections jurisdictional by rule as well as on making subcategories of waters that do not have such connections subject to a case-specific analysis or categorically non-jurisdictional under the rule. Such comment should explain with supporting documentation why a particular subcategory of "other waters" might or might not have a significant nexus to traditional navigable waters, interstate waters, or the territorial seas.

The agencies do not propose absolute standards such as flow rates, surface acres, or a minimum number of functions for "other waters" to establish a significant nexus. A determination of the relationship of "other waters" to traditional navigable waters, interstate waters, and the territorial seas, and consequently the significance to these waters, requires sufficient flexibility to account for the variability of conditions across the country and the varied functions that different waters provide. The case-specific analysis called for in the proposed rule recognizes geographic and hydrologic variability in determining whether an "other water" or group of "other waters" possesses a "significant nexus" with traditional navigable waters, interstate waters, or the territorial seas.

III. Proposed Definition of "Waters of the United States"

A. Summary of Proposed Rule

This proposed rule retains much of the structure of the agencies' longstanding definition of "waters of the United States," and many of the existing provisions of that definition where revisions are not warranted. The agencies' goal is to promulgate a rule that is clear and understandable and protects the nation's waters, supported by science and consistent with the law. Continuity with the existing regulations, where possible, will minimize confusion and will reduce transaction costs for the regulated community and the agencies. To that same end, the agencies also propose, where supported by scientific literature and consistent with the law, bright line categories of waters that are and are not jurisdictional. Waters in the "other waters" category are not a *per se* jurisdictional category. While the agencies considered multiple options for addressing jurisdiction over "other waters," the agencies concluded that they could not determine that all "other waters" were jurisdictional, or that all "other waters" were not jurisdictional. Therefore, the proposed rule requires a case-specific significant nexus evaluation to determine if such "other waters" are subject to CWA jurisdiction and the agencies are requesting comment on several alternate approaches, including approaches that would not include case-specific analysis, to inform the final rule. Finally, the agencies are for the first time proposing definitions for some of the terms used in the proposed regulation.

Under section (a) the agencies propose to define the "waters of the United States" for all sections of the CWA to mean:

- All waters which are currently used, were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide;
- All interstate waters, including interstate wetlands;
- The territorial seas;
- All impoundments of a traditional navigable water, interstate water, the territorial seas or a tributary;
- All tributaries of a traditional navigable water, interstate water, the territorial seas or impoundment;
- All waters, including wetlands, adjacent to a traditional navigable water, interstate water, the territorial seas, impoundment or tributary; and
- On a case-specific basis, other waters, including wetlands, provided that those waters alone, or in combination with other similarly situated waters, including wetlands, located in the same region, have a significant nexus to a traditional navigable water, interstate water or the territorial seas.

As discussed in further detail below, the agencies do not propose to change the following provisions (although some provisions have been renumbered): Traditional navigable waters ((a)(1), see Section III.B of this preamble); interstate waters ((a)(2), see Section III.C of this preamble); the territorial seas ((a)(3), see Section III.D of this preamble); and impoundments of "waters of the United States" ((a)(4), see Section III.E of this preamble). In paragraph (a)(5), the agencies are proposing that tributaries to waters identified in paragraphs (a)(1) through (a)(4) are "waters of the United States." While tributaries are "waters of the United States" under the existing regulation, the agencies propose for the first time a regulatory definition of "tributary" and propose that only those waters that meet the definition and flow

directly or indirectly to an (a)(1) through (a)(3) water are "waters of the United States" (see Section III.F of this preamble). In paragraph (a)(6), the agencies propose that adjacent waters, rather than simply adjacent wetlands, are "waters of the United States." The agencies also propose for the first time to define an aspect of adjacency—"neighboring"—and related terms (see Section III.G of this preamble). Finally, the agencies propose to define "waters of the United States" to include on a case-specific basis, other waters, including wetlands, provided that those waters alone, or in combination with other similarly situated waters, including wetlands, located in the same region, have a significant nexus to a water identified in paragraphs (a)(1) through (3). Unlike the *per se* jurisdictional categories in paragraphs (a)(1) through (6) of this section, such "other waters" are not *per se* jurisdictional under (a)(7); rather, these "other waters" are only jurisdictional provided that they have a significant nexus to (a)(1) through (a)(3) waters. Therefore, the agencies are providing a definition of "significant nexus" (see Section III.H of this preamble).

The second section of the proposed regulation, section (b), excludes specified waters from the definition of "waters of the United States." Those waters and features would not be "waters of the United States" even if they would otherwise be included within the categories in (a)(1) through (a)(7) above. They are:

- Waste treatment systems, including treatment ponds or lagoons, designed to meet the requirements of the Clean Water Act.
- Prior converted cropland. Notwithstanding the determination of an area's status as prior converted cropland by any other Federal agency, for the purposes of the Clean Water Act the final authority regarding Clean Water Act jurisdiction remains with EPA.
- Ditches that are excavated wholly in uplands, drain only uplands, and have less than perennial flow.
- Ditches that do not contribute flow, either directly or through another water, to a traditional navigable water, interstate water, the territorial seas or a jurisdictional impoundment.
- The following features:
  - artificially irrigated areas that would revert to upland should application of irrigation water to that area cease;
  - artificial lakes or ponds created by excavating and/or diking dry land and used exclusively for such purposes as stock watering, irrigation, settling basins, or rice growing;
  - artificial reflecting pools or swimming pools created by excavating and/or diking dry land;
  - small ornamental waters created by excavating and/or diking dry land for primarily aesthetic reasons;
  - water-filled depressions created incidental to construction activity;
  - groundwater, including groundwater drained through subsurface drainage systems; and
  - gullies and rills and non-wetland swales.

The agencies do not propose any changes to the existing exclusions for waste treatment systems designed consistent with the requirements of the CWA and for prior converted cropland. The CWA and current regulations also provide a number of exemptions from permitting for discharges associated with specific activities. The rule does not affect any of the exemptions from CWA section 404 permitting requirements provided by CWA section 404(f), including those for normal farming, silviculture, and ranching activities. CWA section 404(f); 40 CFR 232.3; 33 CFR 323.4. The rule also does not affect either the existing statutory and regulatory exemptions from NPDES permitting requirements, such as for agricultural stormwater discharges and return flows from irrigated agriculture, or the status of water transfers. CWA section 402(l)(1); CWA section 402(l)(2); CWA section 502(14); 40 CFR 122.3(f); 40 CFR 122.2. The agencies propose for the first time to exclude by rule in section (b) certain waters and features over which the agencies have as a policy matter generally not asserted jurisdiction (see Section III.I of this preamble).

Finally, in section (c) of the proposed rule the agencies define a number of terms, of which "adjacent" and "wetlands" are unchanged from existing definitions The term *adjacent* means bordering, contiguous or neighboring. Waters, including wetlands, separated from other waters of the United States by man-made dikes or barriers, natural river berms, beach dunes and the like are "adjacent waters." The term neighboring, for purposes of the term "adjacent" in this section, includes waters located within the riparian area or floodplain of a water identified in paragraphs (a)(1) through (5) of this section, or waters with a shallow subsurface hydrologic connection or confined surface hydrologic connection to such a jurisdictional water. The term riparian area means an area bordering a water where surface or subsurface hydrology directly influence the ecological processes and plant and animal community structure in that area. Riparian areas are transitional areas between aquatic and terrestrial ecosystems that influence the exchange of energy and materials between those ecosystems. The term floodplain means an area bordering inland or coastal waters that was formed by sediment deposition from such water under present climatic conditions and is inundated during periods of moderate to high water flows.

The term tributary means a water physically characterized by the presence of a bed and banks and ordinary high water mark, as defined at 33 CFR 328.3(e), which contributes flow, either directly or through another water, to a water identified in paragraphs (a)(1) through (4). In addition, wetlands, lakes, and ponds are tributaries (even if they lack a bed and banks or ordinary high water mark) if they contribute flow, either directly or through another water to a water identified in paragraphs (a)(1) through (3). A water that otherwise qualifies as a tributary under this definition does not lose its status as a tributary if, for any length, there are one or more man-made breaks (such as bridges, culverts, pipes, or dams), or one or more natural breaks (such as wetlands at the head of or along the run of a stream, debris piles, boulder fields, or a stream that flows underground) so long as a bed and banks and an ordinary high water mark can be identified upstream of the break. A tributary, including wetlands, can be a natural, man-altered, or man-made water and includes waters such as rivers, streams, lakes, ponds, impoundments, canals, and ditches not excluded in paragraphs (b)(3) or (4).

The term *wetlands* means those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs and similar areas.

The term *significant nexus* means that a water, including wetlands, either alone or in combination with other similarly situated waters in the region (i.e., the watershed that drains to the nearest water identified in paragraphs (a)(1) through (3)),[6] significantly affects

[6] The terms "in the region" and "watershed" are used interchangeably in this document. The agencies have interpreted "in the region" to mean the watershed that drains to the nearest water identified in paragraphs (a)(1) through (a)(3), which we refer to as the single point of entry watershed.

that additional categories of "other waters" are similarly situated and have a significant nexus and are jurisdictional by rule, or that as a class they do not have such a significant nexus and might not be jurisdictional.

If waters are categorized as non-jurisdictional because of a lack of science available today, the agencies request comment on how to best accommodate evolving science in the future that could indicate a significant nexus for these "other waters." Specifically, the agencies request comment as to whether this should be done through subsequent rulemaking, or through some other approach, such as through a process established in this rulemaking.

The agencies also seek comment on how the science supports retaining the case-specific determination for the remaining "other waters" that are neither specifically included nor excluded from jurisdiction. Retaining the case-specific analysis for these other waters would not enhance clarity of jurisdiction for these other waters, but it would retain the ability for a jurisdictional determination consistent with the objective of the CWA to restore and maintain the chemical, physical, and biological integrity of the nation's waters. In the alternative, the agencies seek comment on whether it would be appropriate to categorize remaining "other waters" as not jurisdictional. The agencies specifically seek comment on how these "other waters" should be considered.

3. Additional "other waters" approaches.

The agencies request comment on additional "other waters" approaches considered, but not proposed by the agencies.

The agencies could determine that no "other waters" are similarly situated, and all significant nexus analyses would be made on a case-specific basis for each individual "other water." The agencies expect that this likely would result in few if any other waters being found jurisdictional. The agencies recognize that if they determine there are no similarly situated "other waters," there are issues about consistency with existing scientific information and studies regarding the functional relationship of "other waters" of the same type, and their contribution to the chemical, physical, or biological integrity of streams, rivers, lakes, and similar waters. There are also questions of how finding no "other waters" to be similarly situated reconciles with the portion of Justice Kennedy's opinion discussing "similarly situated" waters in the region that "significantly affect" the chemical, physical, or biological integrity of waters more traditionally understood as navigable. While the agencies do not propose to determine that no "other waters" are similarly situated and aggregated, the agencies specifically seek comment on whether and how choosing to find no "other waters" similarly situated would be consistent with the science, the CWA, and the caselaw.

The agencies also considered and seek comment on all "other waters" in a single point of entry watershed being evaluated as a single landscape unit with regard to their effect on traditional navigable waters, interstate waters, and the territorial seas.

The agencies seek comment that would inform a decision that these "other waters" in a single point of entry watershed perform similar functions and are located sufficiently close together or to a paragraph (a)(1) through (a)(5) water so that they can be aggregated and evaluated as a single landscape unit with regard to their effects on the nearest (a)(1) through (a)(3) water. Generally, the agencies anticipate that if the other waters in a single point of entry watershed are aggregated as a single unit, these waters would be determined to have a significant nexus and be jurisdictional.

The agencies recognize that if they choose to aggregate all other waters in a single point of entry watershed, there likely is insufficient existing scientific information to support the determination that all "other waters" in watersheds across the nation are similarly situated as provided in this rule and described in the caselaw. There are also questions of how determining "other waters" in a single point of entry watershed to be similarly situated reconciles with the portion of Justice Kennedy's opinion discussing "similarly situated" waters in the region that "significantly affect" the chemical, physical, or biological integrity of waters more traditionally understood as navigable. While the agencies do not propose to determine that "other waters" in a single point of entry watershed are similarly situated and aggregated, the agencies seek comment on whether and how choosing to find such "other waters" similarly situated would be consistent with the science, the CWA, and the caselaw.

The agencies' determination will be informed by the final version of the Report and other available scientific information.

I. Waters That Are Not "Waters of the United States"

The agencies' longstanding regulations exclude waste treatment systems designed to meet the requirements of the CWA and prior converted cropland from the definition of "waters of the United States." The agencies propose no changes to these exclusions and therefore they would continue as a part of this rulemaking. The agencies also propose to codify for the first time longstanding practices that have generally considered certain features and types of waters not to be "waters of the United States." Codifying these longstanding practices supports the agencies' goals of providing greater clarity, certainty, and predictability for the regulated public and the regulators. Under today's proposal, the waters identified in section (b) as excluded would not be "waters of the United States,", even if they would otherwise fall within one of the categories in (a)(1) through (a)(7).

The agencies propose ministerial actions with respect to the placement of the two existing exemptions for waste treatment systems and prior converted cropland. They will be in proposed new section (b). For the waste treatment systems exclusion, the agencies propose to delete a cross-reference in the current language to an EPA regulation that is no longer in the Code of Federal Regulations. The parenthetical to be deleted states: "(other than cooling ponds as defined in 40 CFR 423.11(m) which also meet the criteria of this definition)." The agencies do not consider this deletion to be a substantive change to the waste treatment systems exclusion or how it is applied. In fact, the agencies do not propose to make conforming changes to ensure that each of the existing definitions of the "waters of the United States" for the various CWA programs have the exact same language with respect to the waste treatment system exclusion. The regulations implementing the various CWA programs were promulgated and amended at different times and therefore there are some differences in language. For example, compare EPA's regulations for the section 402 program, 40 CFR 122.2 with the Corps' regulations for the 404 program, 33 CFR 328.3. The agencies do not propose to address the substance of the waste treatment system exclusion and thus will leave each regulation as is with the exception of deleting the cross-reference.

In addition, this regulation does not address or change in any way the many

statutory exemptions from CWA permitting requirements. The proposed rule does not affect any of the exemptions provided by CWA section 404(f), including those for normal farming, silviculture, and ranching activities. CWA section 404(f); 40 CFR 232.3; 33 CFR 323.4. The proposed rule also does not address or change the statutory and regulatory exemptions from NPDES permitting requirements such as those for agricultural stormwater discharges, return flows from irrigated agriculture, or the status of water transfers. CWA section 402(l)(1) (exempting discharges composed entirely of return flows from irrigated agriculture from section 402 permit requirements); CWA section 502(14)(excluding agricultural stormwater discharges and return flows from irrigated agriculture from the term point source.); 40 CFR 122.3(f) (excluding return flows from irrigated agriculture from the NPDES program); 40 CFR 122.2 (excluding return flows from irrigated agriculture or agricultural storm water runoff from the term point source.).

Finally, in new paragraphs (b)(3) through (5), the agencies propose, for the first time by rule, to exclude some waters and features that the agencies have by longstanding practice generally considered not to be "waters of the United States." Specifically, the agencies propose that the following are not "waters of the United States" notwithstanding whether they would otherwise be jurisdictional under section (a):

- Ditches that are excavated wholly in uplands, drain only uplands, and have less than perennial flow.
- Ditches that do not contribute flow, either directly or through another water, to a traditional navigable water, interstate water, the territorial seas or impoundment.
- The following features:
  - Artificially irrigated areas that would revert to upland should application of irrigation water to that area cease;
  - Artificial lakes or ponds created by excavating and/or diking dry land and used exclusively for such purposes as stock watering, irrigation, settling basins, or rice growing;
  - Artificial reflecting pools or swimming pools created by excavating and/or diking dry land;
  - Small ornamental waters created by excavating and/or diking dry land for primarily aesthetic reasons;
  - Water-filled depressions created incidental to construction activity;
  - Groundwater, including groundwater drained through subsurface drainage systems; and
  - Gullies and rills and non-wetland swales.

Most of these features and waters have been identified by the agencies as generally not "waters of the United States" in previous preambles or guidance documents. The agencies' have always preserved the authority to determine in a particular case that any of these waters are a "water of the United States." One of the agencies' goals in this proposed rule is to increase clarity and certainty about the scope of "waters of the United States." To that end, the agencies propose not simply that these features and waters are "generally" not "waters of the United States," but that they are expressly not "waters of the United States" by rule. The agencies would not retain the authority to determine that any of these waters was a "water of the United States" because it would otherwise be jurisdictional under section (a). For example, the agencies could not find that a water had a significant nexus and was an "other waters" under paragraph (a)(7), or that it was an interstate water under paragraph (a)(2). These waters would not be jurisdictional by rule.

In determining that these features and waters are not "waters of the United States," the agencies are by the decisions of the Supreme Court. In *Riverside Bayview,* the Supreme Court deferred to the agencies' regulations and noted the difficulty of drawing lines identifying where waters end. The plurality opinion in *Rapanos* also noted that there were certain features that were not primarily the focus of the CWA. *See* 547 U.S. at 734. In this section of the proposed rule, the agencies are drawing lines and concluding that certain waters and features are not subject to the jurisdiction of the Clean Water Act.

A similar list of waters and features not generally "waters of the United States" was provided by the Corps in a 1986 preamble to the existing rule defining "waters of the United States" (51 FR 41206, 41217, November 13, 1986) and by the EPA in a 1988 preamble (53 FR 20764, June 6, 1988). In today's proposed rule, the agencies have clarified and added to the list in order to provide a full description of the waters that will not be "waters of the United States" by rule. The agencies have never interpreted "waters of the United States" to include groundwater and the proposed rule explicitly excludes groundwater, including groundwater drained through subsurface drainage systems.

In clarifying the list of waters not subject to CWA jurisdiction, the agencies did not include "puddles" from the lists of waters generally not considered jurisdictional in previous preambles or guidance documents. This is not because puddles are considered jurisdictional, it is because "puddles" is not a sufficiently precise hydrologic term or a hydrologic feature capable of being easily understood. Because of the lack of common understanding and precision inherent in the term "puddles," the agencies determined that adding puddles would be contrary to the agencies' stated goals of increased clarity, predictability, and certainty. In addition, one commonly understood meaning for the term "puddle" is a relatively small, temporary pool of water that forms on pavement or uplands immediately after a rainstorm, snow melt, or similar event. Such a puddle cannot reasonably be considered a water body or aquatic feature at all, because usually it exists for only a brief period of time before the water in the puddle evaporates or sinks into the ground. Puddles of this sort obviously are not, and have never been thought to be, waters of the United States subject to CWA jurisdiction. Listing puddles also could have created the misapprehension that anything larger than a puddle was jurisdictional. That is not the agencies' intent.

Gullies are relatively deep channels that are ordinarily formed on valley sides and floors where no channel previously existed. They are commonly found in areas with low-density vegetative cover or with soils that are highly erodible. *See, e.g.,* N.C. Brady and R.R. Weil, *The Nature and Properties of Soils,* 13th Edition (Upper Saddle River, NJ: Prentice Hall, 2002). Rills are formed by overland water flows eroding the soil surface during rain storms. *See, e.g.,* L.B. Leopold, *A View of the River* (Cambridge: Harvard University Press, 1994). Rills are less permanent on the landscape than streams and typically lack an OHWM, whereas gullies are younger than streams in geologic age and also typically lack an OHWM; time has shaped streams into geographic features distinct from gullies and rills. *See, e.g.,* American Society of Civil Engineers, Task Committee on Hydrology Handbook, *Hydrology Handbook* (ASCE Publications, 1996).

The two main processes that result in the formation of gullies are downcutting and headcutting, which are forms of longitudinal (incising) erosion. These actions ordinarily result in erosional cuts that are often deeper than they are wide, with very steep banks, often small

beds, and typically only carry water during precipitation events. The principal erosional processes that modify streams are also downcutting and headcutting. In streams, however, lateral erosion is also very important. The result is that streams, except on steep slopes or where soils are highly erodible, are characterized by the presence of bed and banks and an OHWM as compared to typical erosional features that are more deeply incised. It should be noted that some ephemeral streams are called "gullies" or the like when they are not "gullies" in the technical sense; such streams where they are tributaries under the proposed definition would be considered "waters of the United States," regardless of the name they are given locally. The agencies request comment on how they could provide greater clarity on how to distinguish between erosional features such as gullies, which are excluded from jurisdiction, and ephemeral tributaries, which are categorically jurisdictional.

Non-wetland natural and man-made swales would not be "waters of the United States" under this proposal. In certain circumstances, however, swales include areas that meet the regulatory definition of "wetlands." Swales generally are considered wetlands when they meet the applicable criteria in the *Corps of Engineers Wetland Delineation Manual* and the appropriate regional supplement to that *Wetland Delineation Manual.* Wetland swales would be evaluated as adjacent waters under proposed (a)(6) or as "other waters" under proposed (a)(7) depending upon whether they meet the proposed definition of adjacent. Swales are distinct from streams in that they are non-channelized, shallow trough-like depressions that carry water mainly during rainstorms or snowmelt. Report at A–19. Swales typically lack the OHWM that is characteristic of jurisdictional streams. The agencies request comment on how they could provide greater clarity on how to distinguish swales, which are excluded from jurisdiction, and ephemeral tributaries, which are categorically jurisdictional.

Finally, under paragraphs (b)(3) and (b)(4), the agencies propose to clearly exempt from the definition of "waters of the United States" two types of ditches: (1) Ditches that are excavated wholly in uplands, drain only uplands, and have less than perennial flow, and (2) ditches that do not contribute flow, either directly or through another water, to a water identified in paragraphs (a)(1) through (4).

The agencies have long distinguished between ditches that are "waters of the United States" and ditches that are not "waters of the United States." In a 1986 Corps preamble and a 1988 EPA preamble, the agencies each stated that they generally do not consider non-tidal drainage and irrigation ditches excavated on dry land to be "waters of the United States." 51 FR 41217, November 13, 1986, 53 FR 20764, June 6, 1988. More recently, the agencies have stated that they generally would not assert jurisdiction over "Ditches (including roadside ditches) excavated wholly in and draining only uplands and that do not carry a relatively permanent flow of water." "Clean Water Act Jurisdiction Following the Supreme Court's Decision in *Rapanos* v. *United States* and *Carabell* v. *United States*" (Dec. 2, 2008) at 1, 12 (2008 *Rapanos* guidance).

The agencies recognize that there have been inconsistencies in practice implementing agency policy with respect to ditches and this proposed rule is designed to improve clarity, predictability, and consistency. With this proposal, the agencies would no longer rely on "generally not" jurisdictional but would clearly establish that specific types of ditches are not "waters of the United States" by rule. Other ditches not excluded under paragraphs (b)(3) or (b)(4), if they meet the new proposed definition of "tributary" would continue to be "waters of the United States," as they have been under the longstanding implementation of the statute and regulations by the agencies.

The first type of ditch that is excluded needs to meet all three criteria: (1) It is excavated wholly in uplands; (2) it drains only uplands, and (3) it has less than perennial flow. Ditches that are excavated wholly in uplands means ditches that at no point along their length are excavated in a jurisdictional wetland (or other water). Members of the public should consider whether a wetland is jurisdictional before constructing a ditch that would drain the wetland and connect either directly or through other waters to an (a)(1) through (a)(3) water. The ditch must also contain less than perennial flow to be excluded under this proposed provision. Perennial flow means that the flow in the ditch occurs year-round under normal circumstances; therefore, excluded ditches must be dug only in uplands, drain only uplands, and have ephemeral or intermittent flow. As noted above, the 2008 *Rapanos* guidance stated that the agencies generally would not assert jurisdiction over "ditches (including roadside ditches) excavated wholly in and draining only uplands and that do not carry a relatively permanent flow of water." The agencies recognize that the term "relatively permanent" does not align with more commonly understood technical descriptions of flow regime. The agencies therefore believe it is appropriate to clarify the extent of this exclusion using the flow regime terms that are familiar to the public and agency field personnel. The agencies request comment on this formulation of the ditch exclusion. The agencies specifically seek comment on the appropriate flow regime for a ditch excavated wholly in uplands and draining only uplands to be covered by the exclusion in paragraph (b)(3). In particular, the agencies seek comment on whether the flow regime in such ditches should be less than intermittent flow or whether the flow regime in such ditches should be less than perennial flow as proposed.

The other type of ditch that would not be a "water of the United States" is a ditch that does not contribute flow, either directly or through another water, to a water identified in paragraphs (a)(1) through (4). Essentially, ditches that do not contribute flow to the tributary system of a traditional navigable water, interstate water or territorial sea would not be "waters of the United States."

It is important to note, however, that even when not jurisdictional waters, these non-wetland swales, gullies, rills and specific types of ditches may still be a surface hydrologic connection for purposes of the proposed definition of adjacent under paragraph (a)(6) or for purposes of a significant nexus analysis under paragraph (a)(7). For example, a wetland may be a "water of the United States," meeting the proposed definition of "neighboring" because it is connected to such a tributary by a non-jurisdictional ditch that does not meet the definition of a "tributary." In addition, these geographic features may function as "point sources" under CWA section 502(14)), such that discharges of pollutants to waters through these features would be subject to other CWA regulations (e.g., CWA section 402).

IV. Related Acts of Congress, Executive Orders, and Agency Initiatives

A. Executive Order 12866: Regulatory Planning and Review and Executive Order 13563: Improving Regulation and Regulatory Review

Under Executive Order 12866 (58 FR 51735, October 4, 1993), this action is a "significant regulatory action." Accordingly, the EPA and the Corps submitted this action to the Office of

pollutants such as excess nutrients or sediment, for example, or retaining precipitation or snow melt, thereby reducing contamination or flooding of traditional navigable waters, interstate waters, or the territorial seas.

Significant Nexus

The agencies propose to define the term "significant nexus" consistent with language in *SWANCC* and *Rapanos*. The proposed definition of "significant nexus" at (c)(7) relies most significantly on Justice Kennedy's *Rapanos* opinion which recognizes that not all waters have this requisite connection to waters covered by paragraphs (a)(1) through (a)(3) of the proposed regulations. Justice Kennedy was clear that the requisite nexus must be more than "speculative or insubstantial. . .," *Rapanos*, 547 U.S. at 780, in order to be significant and the proposed rule defines significant nexus in precisely those terms. In *Rapanos*, Justice Kennedy stated that in both the consolidated cases before the Court the record contained evidence suggesting the possible existence of a significant nexus according to the principles he identified. *See id.* at 783. Justice Kennedy concluded that "the end result in these cases and many others to be considered by the Corps may be the same as that suggested by the dissent, namely, that the Corps' assertion of jurisdiction is valid." *Id.* Justice Kennedy remanded the cases because neither the agency nor the reviewing courts properly applied the controlling legal standard—whether the wetlands at issue had a significant nexus. *See id.* Justice Kennedy was clear however, that "[m]uch the same evidence should permit the establishment of a significant nexus with navigable-in-fact waters, particularly if supplemented by further evidence about the significance of the tributaries to which the wetlands are connected." *Id.* at 784.

With respect to one of the wetlands at issue in the consolidated *Rapanos* cases, Justice Kennedy stated:

In *Carabell*, No. 04–1384, the record also contains evidence bearing on the jurisdictional inquiry. The Corps noted in deciding the administrative appeal that "[b]esides the effects on wildlife habitat and water quality, the [district office] also noted that the project would have a major, long-term detrimental effect on wetlands, flood retention, recreation and conservation and overall ecology. . . . The Corps' evaluation further noted that by 'eliminat[ing] the potential ability of the wetland to act as a sediment catch basin," the proposed project "would contribute to increased runoff and . . . accretion along the drain and further downstream in Auvase Creek.' . . . And it observed that increased runoff from the site would likely cause downstream areas to "see an increase in possible flooding magnitude and frequency."

Id. at 785–86. Justice Kennedy also expressed concern that "[t]he conditional language in these assessments—'potential ability,' 'possible flooding'—could suggest an undue degree of speculation." *Id.*at 786.

Justice Kennedy's observations regarding the above case provide guidance as to what it means for a nexus to be more than merely speculative or insubstantial and inform the proposed definition of "significant nexus." It is important to note, however, that where Justice Kennedy viewed the language "more than speculative or insubstantial" to suggest an undue degree of speculation, scientists do not equate certain conditional language (such as "may" or "could") with speculation, but rather with the rigorous and precise language of science necessary when applying specific findings in another individual situation or more broadly across a variety of situations. Certain terms used in a scientific context do not have the same implications that they have in a legal or policy context. Scientists use cautionary language, such as "may" or "could," when applying specific findings on a broader scale to avoid the appearance of overstating their research results and to avoid inserting bias into their findings (such that the reader may think the results of one study are applicable in all related studies). Words like "potential" are commonly used in the biological sciences, but when viewed under a legal and policy veil, may seem to mean the same as "speculative" or "insubstantial." Instead, potential in scientific terms means ability or capability. For example, when the term "potential" is used to describe how a wetland has the potential to act as a sink for floodwater and pollutants, scientists mean that wetlands in general do indeed perform those functions, but whether a particular wetland performs that function is dependent upon the circumstances that would create conditions for floodwater or pollutants in the watershed to reach that particular wetland to retain and transform. That does not mean, however, that this nexus to downstream waters is "speculative;" indeed the wetland would be expected to provide these functions under the proper circumstances.

Definition of "Waters of the United States" Under the Clean Water Act.

List of Subjects

33 CFR Part 328

Environmental protection, Administrative practice and procedure, Intergovernmental relations, Navigation, Water pollution control, Waterways.

40 CFR Part 110

Environmental protection, Water pollution control.

40 CFR Part 112

Environmental protection, Water pollution control.

40 CFR Part 116

Environmental protection, Water pollution control.

40 CFR Part 117

Environmental protection, Water pollution control.

40 CFR Part 122

Environmental protection, Water pollution control.

40 CFR Part 230

Environmental protection, Water pollution control.

40 CFR Part 232

Environmental protection, Water pollution control.

40 CFR Part 300

Environmental protection, Water pollution control.

40 CFR Part 302

Environmental protection, Water pollution control.

40 CFR Part 401

Environmental protection, Water pollution control.

Dated: March 25, 2014.

Gina McCarthy,

Administrator, Environmental Protection Agency.

Dated: March 24, 2014.

Jo Ellen Darcy,

Assistant Secretary of the Army (Civil Works), Department of the Army.

Title 33—Navigation and Navigable Waters

For the reasons set out in the preamble, title 33, chapter I of the Code of Federal Regulations is proposed to be amended as follows:

PART 328—DEFINITION OF WATERS OF THE UNITED STATES

■ 1. The authority citation for part 328 continues to read as follows:

Authority: The Clean Water Act, 33 U.S.C. 1251 *et seq.*

■ 2. Section 328.3 is amended by removing the introductory text and revising paragraphs (a), (b), and (c) to read as follows:

§ 328.3 Definitions.

(a) For purposes of all sections of the Clean Water Act, 33 U.S.C. 1251 *et. seq.* and its implementing regulations, subject to the exclusions in paragraph (b) of this section, the term "waters of the United States" means:

(1) All waters which are currently used, were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide;

(2) All interstate waters, including interstate wetlands;

(3) The territorial seas;

(4) All impoundments of waters identified in paragraphs (a)(1) through (3) and (5) of this section;

(5) All tributaries of waters identified in paragraphs (a)(1) through (4) of this section;

(6) All waters, including wetlands, adjacent to a water identified in paragraphs (a)(1) through (5) of this section; and

(7) On a case-specific basis, other waters, including wetlands, provided that those waters alone, or in combination with other similarly situated waters, including wetlands, located in the same region, have a significant nexus to a water identified in paragraphs (a)(1) through (3) of this section.

(b) The following are not "waters of the United States" notwithstanding whether they meet the terms of paragraphs (a)(1) through (7) of this section—

(1) Waste treatment systems, including treatment ponds or lagoons, designed to meet the requirements of the Clean Water Act.

(2) Prior converted cropland. Notwithstanding the determination of an area's status as prior converted cropland by any other Federal agency, for the purposes of the Clean Water Act the final authority regarding Clean Water Act jurisdiction remains with EPA.

(3) Ditches that are excavated wholly in uplands, drain only uplands, and have less than perennial flow.

(4) Ditches that do not contribute flow, either directly or through another water, to a water identified in paragraphs (a)(1) through (4) of this section.

(5) The following features:

(i) Artificially irrigated areas that would revert to upland should application of irrigation water to that area cease;

(ii) Artificial lakes or ponds created by excavating and/or diking dry land and used exclusively for such purposes as stock watering, irrigation, settling basins, or rice growing;

(iii) Artificial reflecting pools or swimming pools created by excavating and/or diking dry land;

(iv) Small ornamental waters created by excavating and/or diking dry land for primarily aesthetic reasons;

(v) Water-filled depressions created incidental to construction activity;

(vi) Groundwater, including groundwater drained through subsurface drainage systems; and

(vii) Gullies and rills and non-wetland swales.

(c) Definitions—

(1) *Adjacent.* The term *adjacent* means bordering, contiguous or neighboring. Waters, including wetlands, separated from other waters of the United States by man-made dikes or barriers, natural river berms, beach dunes and the like are "adjacent waters."

(2) *Neighboring.* The term *neighboring,* for purposes of the term "adjacent" in this section, includes waters located within the riparian area or floodplain of a water identified in paragraphs (a)(1) through (5) of this section, or waters with a shallow subsurface hydrologic connection or confined surface hydrologic connection to such a jurisdictional water.

(3) *Riparian area.* The term *riparian area* means an area bordering a water where surface or subsurface hydrology directly influence the ecological processes and plant and animal community structure in that area. Riparian areas are transitional areas between aquatic and terrestrial ecosystems that influence the exchange of energy and materials between those ecosystems.

(4) *Floodplain.* The term *floodplain* means an area bordering inland or coastal waters that was formed by sediment deposition from such water under present climatic conditions and is inundated during periods of moderate to high water flows.

(5) *Tributary.* The term *tributary* means a water physically characterized by the presence of a bed and banks and ordinary high water mark, as defined at 33 CFR 328.3(e), which contributes flow, either directly or through another water, to a water identified in paragraphs (a)(1) through (4) of this section. In addition, wetlands, lakes, and ponds are tributaries (even if they lack a bed and banks or ordinary high water mark) if they contribute flow, either directly or through another water to a water identified in paragraphs (a)(1) through (3) of this section. A water that otherwise qualifies as a tributary under this definition does not lose its status as a tributary if, for any length, there are one or more man-made breaks (such as bridges, culverts, pipes, or dams), or one or more natural breaks (such as wetlands at the head of or along the run of a stream, debris piles, boulder fields, or a stream that flows underground) so long as a bed and banks and an ordinary high water mark can be identified upstream of the break. A tributary, including wetlands, can be a natural, man-altered, or man-made water and includes waters such as rivers, streams, lakes, ponds, impoundments, canals, and ditches not excluded in paragraph (b)(3) or (4) of this section.

(6) *Wetlands.* The term *wetlands* means those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs and similar areas.

(7) *Significant nexus.* The term *significant nexus* means that a water, including wetlands, either alone or in combination with other similarly situated waters in the region (i.e., the watershed that drains to the nearest water identified in paragraphs (a)(1) through (3) of this section), significantly affects the chemical, physical, or biological integrity of a water identified in paragraphs (a)(1) through (3) of this section. For an effect to be significant, it must be more than speculative or insubstantial. Other waters, including wetlands, are similarly situated when they perform similar functions and are located sufficiently close together or sufficiently close to a "water of the United States" so that they can be evaluated as a single landscape unit with regard to their effect on the chemical, physical, or biological integrity of a water identified in paragraphs (a)(1) through (3) of this section.

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Title 40—Protection of Environment

For the reasons set out in the preamble, title 40, chapter I of the Code of Federal Regulations is proposed to be amended as follows:

PART 110—DISCHARGE OF OIL

■ 3. The authority citation for part 110 continues to read as follows:

Authority: The Clean Water Act, 33 U.S.C. 1321 *et seq.*

■ 4. Section 110.1 is amended by revising the definition of "navigable waters" to read as follows:

§ 110.1 Definitions.

* * * * *

Navigable waters means the waters of the United States, including the territorial seas.

(1) For purposes of all sections of the Clean Water Act, 33 U.S.C. 1251 *et. seq.* and its implementing regulations, subject to the exclusions in paragraph (2) of this definition, the term "waters of the United States" means:

(i) All waters which are currently used, were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide;

(ii) All interstate waters, including interstate wetlands;

(iii) The territorial seas;

(iv) All impoundments of waters identified in paragraphs (1)(i) through (iii) and (v) of this definition;