WATER QUALITY STANDARD SETTING UNDER THE CLEAN WATER ACT: IS IT NIMBLE ENOUGH TO AVOID WASTEFUL SPENDING ON THE WRONG GOALS?

*Christopher B. Power**
*Jennifer J. Hicks***

* Christopher B. ("Kip") Power is a partner in the Charleston, West Virginia, office of the law firm of Dinsmore & Shohl LLP. Mr. Power's practice is primarily devoted to helping clients comply with environmental laws and regulations while keeping their businesses running profitably. He also engages in civil and administrative litigation, as well as alternative dispute resolution proceedings, with a particular emphasis on the energy industry. He is listed in The Best Lawyers in America and Chambers USA Guide to America's Leading Business Lawyers, holds a *Martindale-Hubbell* AV rating, and has published extensively on environmental law and related topics. Mr. Power received a B.A. in Economics from Washington & Lee University in 1983; received an M.B.A. from the West Virginia University College of Business and Economics in 1985; and is a 1986 graduate of the West Virginia University College of Law. He is a member of the Energy and Mineral Law Foundation; the West Virginia State Bar's Energy Committee; the West Virginia Defense Trial Counsel; and the Christian Legal Society.

** Jennifer J. Hicks is an associate in the Charleston, West Virginia, office of the law firm of Dinsmore & Shohl LLP. Ms. Hicks is a member of the firm's Environmental and Toxic Torts practice group and the Shale Resources Team. In her practice, Ms. Hicks handles an array of matters for clients, including litigation, environmental permitting, and due diligence reviews. Ms. Hicks received a B.A. in Women's Studies from West Virginia University in 2007 and is a 2010 graduate of the West Virginia University College of Law. Ms. Hicks is a member of the West Virginia Defense Trial Counsel.

The views expressed herein are those of the authors only, and do not reflect the position of any of their clients or other third parties.

I. INTRODUCTION

Enacted in 1972 and amended several times since, the federal Water Pollution Control Act, 33 U.S.C. §§ 1251–1387 ("Clean Water Act" or "Act"), is intended to "restore and maintain the chemical, physical and biological integrity of the Nation's waters."[1] One of the primary means of achieving this purpose is the establishment of minimum "water quality standards" for all surface waters—levels of pollutant concentrations that may not be exceeded, in order to preserve streams for use by aquatic life, for recreation, and for public water consumption.[2] A second way of advancing this statutory goal is found in § 301 of the Act, which prohibits the discharge of any pollutant into waters of the United States without a permit.[3] This Article addresses the efficiency of water-quality-based permit limits in fulfilling the overall purpose of the Clean Water Act.

More particularly, we focus on one of two permitting options established by the Clean Water Act—the National Pollutant Discharge Elimination System ("NPDES"). The NPDES is a program that authorizes the issuance of permits for "point source"[4] discharges of pollutants into surface waters.[5] We discuss how surface water quality standards are translated into effluent limitations that are imposed on individual dischargers through NPDES permits, and the effect on those dischargers of delays in updating the water quality standards that form the basis for their permit limits. It is our position that the process of revising water quality standards is too lengthy and onerous, leading to substantial inefficiencies as NPDES permittees are forced to expend scarce resources in assuring compliance with out-of-date standards, without any improvement in stream water quality. The result is both diminished economic performance for United States businesses and delayed progress in furthering the goals of the Act.

---

1 33 U.S.C. § 1251(a) (2012).

2 *Id.* § 1313(c)(2)(A).

3 *Id.* § 1311(a). "Pollutant" is defined broadly to include (among other things) "industrial, municipal and agricultural waste discharged into water." *Id.* § 1362(6).

4 "Point source" is defined as "any discernible, confined and discrete conveyance, including but not limited to any pipe, ditch, channel, [or] conduit . . . ," as well as several other named mechanisms "from which pollutants are or may be discharged." *Id.* § 1362(14). All "point sources" are required to have an NPDES permit. *Id.* § 1342(a).

5 The other permitting program, established under 33 U.S.C. § 1344, generally applies to the filling of waters (i.e., replacing water with dry land). Unless there has been a delegation of authority to a state, it is administered by the U.S. Army Corps of Engineers. *Id.* § 1344.

II. THE FEDERAL CLEAN WATER ACT GOALS AND FRAMEWORK

To better understand the complexities of complying with the mature NPDES program that is in effect today, it is helpful to consider the evolution of this program since the passage of the Clean Water Act, how effluent limitations are determined, and the roles of the federal and state governments in both establishing water quality standards and implementing the NPDES permitting program. Armed with a proper understanding of how the generally laudable goals of clean water and state autonomy are intended to be achieved by the Act, one can better appreciate why the lack of timely action or coordination between the federal and state governments can sometimes lead to the imposition of unnecessary and inefficient standards.

A. General Purposes and Regulatory Tools

Consistent with its overall purpose of restoring the quality of the country's surface waters, one of the specific goals that was sought to be achieved through the passage of the Clean Water Act was that "the discharge of pollutants into the navigable waters be *eliminated* by 1985."[6] This, of course, would require that no industrial facilities, municipal water treatment plants, natural resource extraction operations, or other discharger be permitted to route polluted process water to any stream or other surface water. In addition, this would mandate an absolute prohibition against allowing any stormwater (or other precipitation runoff) that has come in contact with any surface area disturbed by industrial, agricultural, or other activities, from entering any surface water.

Recognizing the difficulty of achieving the goal of preventing all discharges of pollutants from point sources, Congress also established an "interim goal," aimed not at pollutant dischargers, but at attaining and maintaining levels of stream water quality that will provide for the "protection and propagation of fish, shellfish and wildlife, and provides for recreation in

---

[6] *Id.* § 1251(a)(1) (emphasis added). This focus on the imposition of limits on individual dischargers of pollutants, rather than simply mandating that states take steps to maintain in-stream (ambient) water quality, constituted a "sea change" in the national strategy for addressing water pollution. The immediate predecessor to the Clean Water Act was known as the Water Quality Act of 1965. It relied upon state administration of in-stream water quality standards as the means of improving the nation's waters, reserving to the federal government the right to impose such standards if a state failed to do so. Before the Clean Water Act was enacted in 1972, the federal government had never before claimed the authority to directly impose effluent limits on dischargers. *See* N. William Hines, *History of the 1972 Clean Water Act: The Story Behind How the 1972 Act Became the Capstone on a Decade of Extraordinary Environmental Reform*, J. ENERGY & ENVTL. L. 80, 95 (2013), *available at* http://gwujeel.files.wordpress.com/2013/10/4-2-hines.pdf; *see also* Friends of the Earth, Inc. v. Gaston Copper Recycling Corp., 204 F.3d 149, 151 (4th Cir. 2000).

and on the water."[7] This objective is commonly referred to as the "fishable and swimmable" goal, and it is advanced through the promulgation of water quality standards. This objective also implicitly recognizes that some discharge of pollutants would continue, albeit subject to increasingly stringent controls as incorporated into permits issued to dischargers.

1. The NPDES Permitting Program

The NPDES permitting program has been described as the "centerpiece" of the Clean Water Act.[8] To obtain an NPDES permit, an applicant must submit an application to the appropriate state agency or (in states that have not been delegated permitting authority under the Act) to the U.S. Environmental Protection Agency ("EPA"). Permit applications must include a description of the activity that requires coverage under the NPDES program; a narrative description of the operations and/or production areas contributing wastewater and/or stormwater to the effluent for each outfall; information on effluent characteristics; and data on average flows and any treatment that the effluent will receive prior to discharge.

Permit applications must be submitted at least 180 days prior to the date on which the discharge is to begin, and applicants proposing new discharges are "encouraged to submit their applications well in advance" of the 180-day deadline.[9] Both applications for new NPDES permits and for renewals are subject to a one-time public notice and 30-day comment period.[10] Draft permits are prepared for any application that the issuing agency plans to grant, and a fact sheet must be prepared for every "major NPDES facility," as determined by the agency.[11] In the discretion of the issuing agency, a public hearing may be held when the head of the agency finds, on the basis of requests, "a significant degree of public interest" in the draft permit.[12]

Sampling and analysis of the concentrations of regulated pollutants in discharges authorized by an NPDES permit must be undertaken by the permittee in such a way as to be "representative of the monitored activity," typically on a twice-monthly basis, with copies of such Discharge Monitoring Reports ("DMRs") submitted on a regular basis (typically, quarterly).[13] In

---

7 33 U.S.C. § 1251(a)(2). It specified that this interim goal should be achieved by July 1, 1983. *Id.*

8 Friends of the Everglades v. S. Fla. Water Mgmt. Dist., 570 F.3d 1210, 1225 (11th Cir. 2009).

9 40 C.F.R. § 122.21(c)(1) (2013).

10 *Id.* § 122.21.

11 *Id.* §§ 124.6, 124.8.

12 *Id.* § 124.12(a)(1).

13 *Id.* §§ 122.41(j)(1), 122.41(l)(4).

addition, permittees must obtain and analyze in-stream samples of water from the immediate receiving stream (upstream and downstream of the discharge points) and report those results in order to allow the regulatory authority to detect any adverse impact of the discharges on the maintenance of water quality standards in the streams.[14]

2. Technology-Based Effluent Limits

Pursuant to its authority to administer the NPDES permit program (including oversight of delegated state NPDES programs under 33 U.S.C. § 1342(c)), EPA has established technology-based Effluent Limitation Guidelines ("ELGs") applicable to various categories of industrial sources. A technology-based limit is essentially a pollution limit established after consideration of the best available treatment technology and cost, without regard to the quality of any particular receiving stream. EPA has established technology-based limits for a wide variety of industrial activities.

To the extent that a published technology-based limit applies to the activity seeking coverage, the limitations set forth in the EPA-issued ELGs must be incorporated into an NPDES permit for that operation. If there is no technology-based limit that applies (and there are no water quality standards involved, as discussed below), the issuing agency must use its best professional judgment ("BPJ") in deriving a limitation for pollutants found in the permittee's discharge.[15]

3. Water Quality Standards and Water Quality-Based Effluent Limits

Pursuant to § 303(c) of the Clean Water Act, each state is required to adopt "water quality standards," consisting of "the designated uses of the navigable waters involved and the water quality criteria [limits] for such waters based on such uses."[16] Such standards must be established "taking into consideration their use and value for public water supplies, propagation of fish and wildlife, recreational purposes, and agricultural, industrial and other purposes . . . ."[17] In most cases, these standards are based on studies and recommended criteria published by EPA pursuant to Clean Water Act § 304(a), 33 U.S.C. § 1314(a).[18]

---

14 *Id.* § 122.44(d)(1)(i)–(vi).

15 *Id.* §§ 125.3, 122.44(d).

16 33 U.S.C. § 1313(c) (2012).

17 *Id.* § 1313(c)(2)(A).

18 Typically, though not uniformly, in this context the term "criteria" is used to refer to EPA-developed limits on ambient pollutant concentrations and the term "standards" refers to the limits

All state water quality standards (and revisions to such standards) must be approved by EPA in order to be effective.[19] If a state fails to adopt water quality standards—or a particular water quality standard for a certain pollutant—EPA has the power to impose what it deems to be appropriate water quality standards.[20]

Where application of designated technology-based effluent limits (or BPJ limits) to a proposed discharge will not assure compliance with the water quality standards established for the receiving water, the NPDES permit authorizing that discharge must incorporate water quality-based effluent limits ("WQBELs").[21] This means that a proposed discharger might be faced with new requirements, or requirements that are far more stringent than promulgated technology-based ELGs for particular pollutants, where the condition of the receiving stream is such that it cannot assimilate the projected volume and concentrations of those pollutants and remain in compliance with the water quality standards established by the state.[22]

Water quality standards are usually expressed as a numeric value of the maximum concentration of a particular pollutant that may be present in a water body without impairing one or more uses of the water.[23] Like many ELGs, they are typically expressed in both an "acute" (maximum daily concentration) form and a "chronic" (maximum average over a designated period) form.[24] The effluent limit is calculated to establish a concentration of the pollutant that, if discharged at that level and taking into account a conservative estimate of probable low flow stream conditions, would not cause a violation of the respective water quality standard. Thus, the daily maximum effluent limit is usually set at a concentration considerably lower than the actual acute water quality standard, and the monthly average concentration limit in a permit is normally lower than the actual chronic water quality standard.[25]

---

adopted by states to establish maximum pollutant levels in their streams. However, the Clean Water Act, at §§ 303 and 304, seems to use the terms "water quality standards" and "water quality criteria" interchangeably, as do most practitioners and commentators.

19 33 U.S.C. § 1313(c)(3).

20 40 C.F.R. § 131.22 (2013).

21 33 U.S.C. § 1312(a); 40 C.F.R. § 122.44(d).

22 40 C.F.R. § 122.44(d) (2007).

23 *Id.* § 131.3(b).

24 U.S. ENVTL. PROT. AGENCY, EPA-823-B-12-002, WATER QUALITY STANDARDS HANDBOOK: SECOND EDITION § 3.5.1 (2012) [hereinafter WQS HANDBOOK], *available at* http://water.epa.gov/scitech/swguidance/standards/handbook/index.cfm ; *see also* 40 C.F.R. § 131.3(b) (Water quality standards may also be "narrative"— i.e., describe prohibited conditions in the water, such as certain appearances (scum or sheen), odors, tastes, or turbidity).

25 40 C.F.R. § 131.11(b)(2); WQS HANDBOOK, *supra* note 24, § 3.5.2.

B. Cooperative Federalism

"The boundary between federal and local water resources is uniquely permeable; state water generally becomes federal along its journey to the sea, while federal waters from sources other than rainfall always begin as local water somewhere."[26] For this reason, the Clean Water Act "anticipates a partnership between the states and the Federal Government . . . ."[27] To effectuate this partnership, the Act provides that a state may be authorized to take the primary regulatory role if the proposed state program meets federal criteria.[28] Specifically, 33 U.S.C. § 1342(b) provides that "[t]he Governor of each State desiring to administer its own permit program for discharges into navigable waters within its jurisdiction may submit to the Administrator a full and complete description of the program it proposes to establish and administer under State law or under an interstate compact."[29] If the proposed state program meets all criteria listed in 33 U.S.C. § 1342(b)(1)–(9), EPA must approve it.[30]

After EPA approves a state program, the state agency assumes EPA's authority to issue NPDES permits. However, even after a state becomes the issuer of NPDES permits, EPA retains substantial oversight authority, including the power to "veto" a state's decision to issue a permit (or its terms) in certain circumstances.[31]

The Act generally requires all states to promulgate water quality standards for waters within their respective borders.[32] After issuing those standards, "states are primarily responsible for monitoring progress, and identifying those waters for which the current pollution controls 'are not stringent enough to implement any water quality standard applicable to such waters.'"[33]

However, even where a state takes on primary administration of the water pollution control programs under the Clean Water Act, EPA may have a high level of involvement in overseeing the implementation of those state

---

[26] Envtl. Def. Ctr., Inc. v. EPA, 319 F.3d 398, 414 (9th Cir. 2003), *vacated*, 344 F.3d 832 (9th Cir. 2003).

[27] Arkansas v. Oklahoma, 503 U.S. 91, 101 (1992).

[28] S. Ohio Coal Co. v. Office of Surface Mining, Reclamation and Enforcement, 20 F.3d 1418, 1420 (6th Cir. 1994); Ohio Valley Envtl. Coal., Inc. v. Coal-Mac, Inc., 775 F. Supp. 2d 900, 904 (S.D.W. Va. 2011); Ohio Valley Envtl. Coal., Inc. v. Hobet Mining, LLC, 717 F. Supp. 2d 541, 556 (S.D.W. Va. 2010).

[29] 33 U.S.C. § 1342(b) (2012).

[30] *Id.*

[31] 40 C.F.R. § 123.44(a) (2013).

[32] 33 U.S.C. § 1313(a); Am. Farm Bureau Fed'n. v. EPA, No. 1:11-CV-0067, 2013 U.S. Dist. LEXIS 131075, at *10 (M.D. Pa. Sept. 13, 2013).

[33] *Id.* at *11–12 (quoting 33 U.S.C. § 1313(d)(1)(A)).

provisions.[34] For example, EPA retains authority to review state water quality standards,[35] to object to the issuance of particular permits,[36] to monitor the state program for continuing compliance with federal directives,[37] and to enforce the terms of state permits when the state has not timely instituted enforcement proceedings.[38]

Importantly, the Act effectively incorporates state law *into* the federal enforcement scheme, with all federal laws and regulations remaining in effect in a state with delegated authority, rather than "dropping out"[39] as inoperative upon approval of the state's submission.[40] This partnership between EPA and states in implementing and enforcing the Clean Water Act has "been aptly characterized as a 'distinctive variety of cooperative federalism.'"[41] Accordingly, to understand the Clean Water Act's complete regulatory framework, one must consider both federal and state law.

III. WATER QUALITY STANDARDS

Though the focus of the last several decades of enforcement of the Clean Water Act has generally been on limiting the discharge of pollutants from point and nonpoint sources, the heart of the regulatory programs developed under this statute is the ambient water quality standards that are meant to be achieved and maintained through such effluent limitations. As described below, water quality standards regulations consist of much more than simple numeric limits on the concentrations of pollutants in surface waters; they encompass a broad range of characteristics of water bodies and the aquatic and other forms of life living within and nearby, the many functions served by those waters, and several fundamental issues associated with imposing restrictions on those dischargers who may affect surface waters. Even a general understanding of the volume and complexity of water quality standards rules is

---

34 Save the Valley, Inc. v. EPA, 223 F. Supp. 2d 997, 1006 (S.D. Ind. 2002).

35 33 U.S.C. § 1313(c)(2)(A).

36 *Id.* § 1342(d)(2).

37 *Id.* § 1342(c).

38 *Id.* § 1319(a)(1).

39 This is in contrast to the effect of approval of a state program under the federal Surface Mining Control and Reclamation Act of 1977, where *either* federal or state performance standards apply in a primacy state, but not both. Ohio Valley Envtl. Coal., Inc. v. Apogee Coal Co., 555 F. Supp. 2d 640, 643 (S.D.W. Va. 2008).

40 *Id.* at 643 (quoting Arkansas v. Oklahoma, 503 U.S. 91, 109 (1992)); *see also* Ohio Valley Entvl. Coal, Inc., v. Hobet Mining, LLC, 717 F. Supp. 2d 541, 556 (S.D.W. Va. 2010).

41 Save the Valley, Inc., v. EPA, 223 F. Supp. 2d 997, 1006 (S.D. Ind. 2002) (quoting U.S. Dep't. of Energy v. Ohio, 503 U.S. 607, 633 (1992)).

enough to give one an appreciation of the burdens imposed by the various administrative procedures that have been developed to implement them.

A. Content, Mandated Elements, Procedure for Adoption, and EPA-Recommended Criteria

"A water quality standard defines the water quality goals of a water body, or portion thereof, by designating the use or uses to be made of the water and by setting criteria necessary to protect the uses."[42] Further, "[w]ater quality standards are a critical component of the [Clean Water Act] regulatory scheme because such standards serve as a guideline for setting applicable limitations in individual discharge permits."[43]

As noted, the Act requires all states to adopt water quality standards applicable to state waters, and submit the proposed standards to EPA for approval.[44] Further, all states "are responsible for reviewing, establishing, and revising water quality standards."[45]

To assist with water quality standard development, EPA provides "substantial guidance" to states, including regulations that delineate EPA and state authority; set federal minimum criteria; and provide procedures for the establishment, review, and approval of all state water quality standards.[46] At a minimum, state water quality standards must consist of "(1) designated uses; (2) water quality criteria defining the amounts of pollutants that the water can contain without impairment of the designated uses; and (3) antidegradation requirements, which apply to bodies of water whose quality is better than required."[47] Each of these elements is discussed in more detail below.

1. Designation of Uses

For each intrastate water body, states must designate "appropriate water uses to be achieved and protected."[48] Specifically, states must consider the uses listed in 33 U.S.C. § 1313, including public water supplies, propagation of fish and wildlife, recreation, agriculture, industrial purposes, and navigation.[49] While states are also free to adopt any *other* use classification

---

42 40 C.F.R. § 131.2 (2013).

43 Nat'l Res. Def. Council v. EPA, 16 F.3d 1395, 1399 (4th Cir. 1993).

44 33 U.S.C. § 1313(a)(3)(A) (2012).

45 40 C.F.R. § 131.4(a).

46 Arkansas v. Oklahoma, 503 U.S. 91, 101; *see* 40 C.F.R. § 131.

47 Thomas v. Jackson, 581 F.3d 658, 661 (8th Cir. 2009).

48 40 C.F.R. § 131.10(a).

49 WQS HANDBOOK, *supra* note 24, § 2.1.

(i.e., not listed in the Clean Water Act), "[s]tates *must* provide water quality for the protection and propagation of fish, shellfish, and wildlife, and provide for recreation in and on the water ('fishable/swimmable') where attainable."[50] Water uses are "attainable" when the use can be achieved through placing effluent limits on point sources discharging into the water body, and by using cost-effective and reasonable best management practices on nonpoint source dischargers.[51]

In addition, the Clean Water Act distinguishes between "existing uses" and "designated uses." Existing uses are water uses that were being achieved prior to enactment of the Act and *must* be protected. An "existing use cannot be removed unless a use requiring more stringent criteria is added."[52] Designated uses, however, are attributed to a water body and may be designated essentially as a water quality goal. Further, states may designate several uses to one water body, but "[o]nce a use has been designated for a particular water body or segment, the water body or water body segment cannot be reclassified for a different use except under specific conditions."[53] More stringent uses may always be added; however, once uses are attributed, those uses become the bases of the specific water quality criteria that must be applied to the water body to achieve the use.[54] As with all state water quality standards, use designations (and changes to them) are subject to EPA approval.[55]

2. Water Quality Criteria or Standards

The actual water quality "criteria" or "standards" are the specific limits on in-stream concentration of pollutants that are deemed necessary to achieve the existing or designated uses of a water body.[56] States must adopt water quality standards based on a "*sound scientific rationale*" and containing "sufficient parameters or constituents to protect the designated use."[57] As explained above, once adopted, state water quality standards or "ambient criteria" become regulatory requirements and will in many cases be used to determine individual NPDES permit limits.

---

50 *Id.* (first emphasis added) (second emphasis omitted).

51 *Id*. at § 2.4.

52 *Id.* at § 2.7.

53 *Id.*

54 *See* 40 C.F.R. § 131.11(a)(1) (2013).

55 *See id.* §§ 131.5, 131.6.

56 *See id.* §§ 131.6, 131.11(a).

57 *Id.* § 131.11(a) (emphasis added).

States may express ambient standards as (1) numerical chemical-specific concentrations, (2) toxicity levels, and/or (3) narrative statements.[58] Narrative criteria are simply general statements that describe the desired water quality goal.[59] Such narrative standards must often be interpreted and are therefore more difficult to enforce. Like narrative standards, whole-effluent toxicity ("WET") standards focus on the quality of a water body as a whole by examining a combination of pollutants.[60] By comparison, numeric chemical-specific standards apply to individual pollutants and set forth specific numeric limitations for a pollutant necessary to achieve the existing or designated water uses.

To assist states with the development of water quality standards, EPA must develop, publish, and periodically update its own recommended water quality criteria, "accurately reflecting the latest scientific knowledge."[61] Specifically, EPA regulations *require* states to "develop numerical criteria based on EPA's criteria guidance under § 304(a) of the Clean Water Act, EPA's criteria guidance modified to reflect site-specific conditions, or other scientifically defensible methods."[62] Thus, while EPA's recommended water quality criteria are merely guidelines, states must essentially defend any decision to stray from EPA recommendations.

3. Antidegradation Policy

Each state must also "develop and adopt a statewide antidegradation policy and identify the methods for implementing such [a] policy[.]"[63] "If not included in the standards regulation of a State, the policy must be specifically referenced in the water quality standards so that the functional relationship between the policy and the standards is clear."[64] Antidegradation policies must, at a minimum, achieve the following goals labeled as "Tiers."

---

58 *Id.* § 131.11(b).

59 WQS HANDBOOK, *supra* note 24, § 3.5.2.

60 *See* 40 C.F.R. § 136.3 tbl.1A (2013); 67 Fed. Reg. 69,951–72 (Nov. 19, 2002).

61 *See* 33 U.S.C. § 1314(a)(1)–(2) (2012).

62 Nat'l Res. Def. Council v. EPA, 16 F.3d 1395, 1400 (4th Cir. 1993) (citing 40 C.F.R. § 131.11(b)(1)).

63 40 C.F.R. § 131.12(a).

64 WQS HANDBOOK, *supra* note 24, § 4.3.

a. Tier 1

Tier 1, the first of the three goals that must be achieved by antidegradation policies, states that antidegredation policies must maintain and protect "[e]xisting instream water uses and the level of water quality necessary to protect the existing uses . . . ."[65] Tier 1 protection "provides the absolute floor of water quality in all waters of the United States."[66] "If a planned activity will foreseeably lower water quality to the extent that it no longer is sufficient to protect and maintain the existing uses in that water body, such an activity is inconsistent with EPA's antidegradation policy, which requires that existing uses are to be maintained."[67] Thus, "planned activity must be avoided or adequate mitigation or preventative measures must be taken to ensure that the existing uses and the water quality to protect them will be maintained."[68]

b. Tier 2

Tier 2, the second of the three goals that must be achieved by antidegradation policies, states that antidegredation policies must maintain and protect existing water quality where it "exceed[s] levels necessary to support propagation of fish . . . and recreation . . . unless the State finds . . . that allowing lower water quality is necessary to accommodate important economic or social development . . . ."[69] Tier 2 protection applies to "high quality waters" that exceed the water quality necessary to protect the fishable/swimmable goals of the Act. For Tier 2 waters, "water quality may not be lowered to less than the level necessary to fully protect the 'fishable/swimmable' uses and other existing uses and may be lowered to those levels only after following all the provisions described in 40 C.F.R. § 131.12(a)(2)."[70] Before lowering water quality in Tier 2 waters, there must be an antidegradation review consisting of the following:

1. a finding that it is necessary to accommodate important economical or social development in the area in which the waters are located;

2. full satisfaction of all intergovernmental coordination and public participation provisions; and

---

65 40 C.F.R. § 131.12(a)(1).

66 WQS HANDBOOK, *supra* note 24, § 4.2.

67 *Id.* at § 4.4.

68 *Id.*

69 40 C.F.R. § 131.12(a)(2).

70 WQS HANDBOOK, *supra* note 24, § 4.2; *see also id.* § 4.5.

> 3. assurance that the highest statutory and regulatory requirements for point sources, including new source performance standards, and best management practices for nonpoint source pollutant controls, are achieved.[71]

In short, "[t]his provision is intended to provide relief only in a few extraordinary circumstances where the economic and social need for the activity clearly outweighs the benefit of maintaining water quality above that required for 'fishable/swimmable' water, and both cannot be achieved."[72] The burden for obtaining EPA approval of a request to exceed Tier 2 limits is very high.[73]

c. Tier 3

Tier 3, the last of the three goals that must be achieved by antidegradation policies, states that antidegredation policies must maintain and protect "high-quality waters [that] constitute an *outstanding National resource . . . .*"[74] Tier 3 protection "applies to Outstanding National Resource Waters (ONRW) where the ordinary use classifications and supporting criteria may not be sufficient or appropriate."[75] ONRW, such as waters of national and state parks, water refuges, and "waters of exceptional recreational or ecological significance" are regarded as the highest-quality waters of the United States and require special protection.[76] EPA interprets its regulation at 40 C.F.R. § 131.12(a)(3) to mean that "no new or increased discharges to ONRW's and no new or increased discharge into tributaries to ONRW's that would result in lower water quality in the ONRWs" will be allowed.[77] The only exception is for activities that result in temporary and short-term changes (as in weeks or months, but not years) to water quality, but do not permanently degrade it.[78]

B. Initial Establishment, Revision, and EPA Review

The Clean Water Act initially required all states that had not previously adopted water quality standards to do so within 180 days after October 18,

---

71 WQS HANDBOOK, *supra* note 24, § 4.5.

72 *Id.*

73 *Id.*

74 40 C.F.R. § 131.12(a)(3) (emphasis added).

75 WQS HANDBOOK, *supra* note 24, § 4.2.

76 *Id.* at § 4.7.

77 *Id.*

78 *Id.*

1972.[79] All states have complied with the Act's mandate; however, many initially chose to develop narrative criteria rather than numeric water quality criteria.[80] Because such narrative standards "require interpretation to be able to apply to specific requirements of [Total Maximum Daily Loads] and NPDES permits[,]" in recent years, EPA has increasingly required that states develop numeric criteria to implement such narrative standards.[81]

Regardless, at least every three years, all states must "hold public hearings for the purpose of reviewing applicable water quality standards and, as appropriate, modifying and adopting standards."[82] Among other revisions, any water body with water quality standards that do not designate fishable/swimmable uses must be re-examined every three years to determine whether those uses are attainable.[83] These "triennial reviews" consist of public hearings in which current water quality standards are examined to assure that Clean Water Act goals and purposes are being served.[84] States must further "consider a variety of competing policy concerns during these reviews, including a waterway's use and value for public water supplies, propagation of fish and wildlife, recreational purposes, and agricultural, industrial, and other purposes."[85]

As mentioned above, triennial reviews begin with a public hearing held by the state authority in accordance with state law, pursuant to EPA's water quality management regulation (40 C.F.R. § 130.3(b)(6)) and public participation regulations (40 C.F.R., Part 25).[86] Prior to the hearing, states must make the proposed revisions and analyses in support of the changes available to the public.[87] Although federal law requires only one public hearing, state law may require multiple hearings and, further, EPA has "urged" states to "involve the public more actively in the review process."[88]

---

79 33 U.S.C. § 1313(a)(3)(A) (2012).

80 *See* WATER ENVIRONMENTAL RESEARCH FOUNDATION, WATER QUALITY AND REGULATORY FAQS 3 (Oct. 31, 2008) [hereinafter WERF FAQs], *available at* https://www.werf.org/c/KnowledgeAreas/NutrientRemoval/HDRContributions/NutrientCompendium/Water_Quality_Compen.aspx.

81 *Id.*

82 40 C.F.R. § 131.20(a) (2013).

83 *Id.*

84 Am. Paper Inst. v. United States EPA, 996 F.2d 346, 349 (D.C. Cir. 2005) (citing 33 U.S.C. § 1313 (c)(2)(A) (2000)).

85 *Id.* (internal quotations omitted).

86 40 C.F.R. § 131.20(b).

87 *Id.*

88 WQS HANDBOOK, *supra* note 24, § 6.1.2.

If a state chooses to revise or adopt a new water quality standard, it must submit each revised or new water quality standard to EPA.[89] However, EPA policy suggests that "state consultation with EPA regional offices should occur when states begin activities to revise or adopt new water quality standards and *long before the state standards are formally submitted for EPA review*."[90] EPA further suggests that "[w]hile not a regulatory requirement, prudence dictates that *draft* state water quality standards be submitted to EPA for review."[91] Regardless, within 30 days of final state action to revise or adopt a water quality standard, states *must* "submit the results of the review, any supporting analysis for the use attainability analysis, the methodologies used for site-specific criteria development, any general policies applicable to water quality standards and any revisions of the standards to the Regional Administrator for review and approval . . . ."[92]

After submission, EPA has 60 days to review new or revised state water quality standards.[93] If EPA determines that the water quality standard meets all statutory and regulatory requirements, the standard "shall thereafter be the water quality standard for the applicable waters of that State."[94] If, however, the EPA determines that the new or revised water quality standard is not consistent with the Act, EPA must notify the state within 90 days of its submission and specify the changes necessary to meet the requirements.[95] The state then has 90 days to make necessary changes.[96] "If the EPA recommends changes to the standards and the state fails to comply with that recommendation," however, EPA must promulgate standards on behalf of the state.[97]

In addition, the Clean Water Act allows EPA to promulgate federal water quality standards independent of the triennial review process, if and when EPA determines that new or revised standards are necessary to meet the Act's requirements.[98] Thus, if either state water quality standard submissions are insufficient or EPA independently determines a new or revised standard is necessary, EPA "must promptly prepare and publish proposed regulations

89 33 U.S.C. § 1313(c)(2)(A) (2012).

90 WQS HANDBOOK, *supra* note 24, § 6.1.1 (emphasis added).

91 *Id.* (emphasis added).

92 40 C.F.R. § 131.20(c).

93 33 U.S.C. § 1313(c)(3).

94 *Id.*

95 *Id.*

96 *Id.*

97 Arkansas v. Oklahoma, 503 U.S. 91, 101 (1992) (citing 33 U.S.C. § 1313(c) (2012)).

98 33 U.S.C. § 1313(c)(4)(B).

setting forth a revised or new water quality standard" for the waters at issue.[99] EPA must promulgate any revised or new standard within 90 days after it publishes the proposed standards, unless the state adopts a proper standard prior to EPA promulgation.[100]

In short, the process to adopt, revise, and review state water quality standards is lengthy and onerous. It entails state legislative or rulemaking procedures, and a mandated federal administrative review process. Moreover, when the time required to revise EPA's recommended water quality criteria (discussed below) is coupled with the time required to implement state water quality standard changes, it can become nearly impossible to keep those standards in line with current scientific understanding of the parameters used to gauge stream health and how they should be applied.

C. Implementation by States

1. State Water Quality Standards

As explained above, state water quality standards are essentially the "state's goals for individual water bodies and provide the legal basis for control decisions under the Act."[101] Accordingly, states must monitor water quality to provide data needed to determine current water quality and identify pollution sources.[102] States then use the data to make an assessment of state water, which is then submitted to EPA under 33 U.S.C. § 1315(b) (the "305(b) Report").[103] State 305(b) Reports and other water quality assessments are then used to develop a state Water Quality Management ("WQM") plan that identifies priority water quality problems.[104] The WQM plans recommend control measures necessary to achieve state water quality standards.[105] Those control measures are then implemented through permits, the building of publicly-owned treatment works ("POTWs"), best management practices for nonpoint source pollution, and other methods.[106]

Thus, state water quality standards "serve the dual purposes of establishing the water quality goals for a specific water body and serving as the regulatory basis for establishment of water quality-based treatment controls and

---

99 *Id.* § 1313(c)(4).

100 *Id.* § 1313(c)(4)(B).

101 40 C.F.R. § 130.0(a) (2013).

102 *Id.* § 130.0(b).

103 *Id.*

104 *Id.* § 130.0(c).

105 *Id.*

106 *Id.* § 130.0(d).

strategies beyond the technology-based level of treatment required by sections 301(b) and 306 of the Act."[107] Because of the importance of this function of state NPDES programs, the implementation of water quality standards through state-issued permits is discussed generally below.[108]

2. State-Issued NPDES Permits

In issuing NPDES permits, state agencies must adhere to their own regulations that roughly mirror those promulgated by EPA. The status of the proposed receiving waters in terms of compliance with designated water quality standards, and any special circumstances that should be taken into consideration based upon the causes of any existing impairment and the nature of the proposed discharge, are among the fundamental issues that the rules seek to address.

a. Antidegradation and "Reasonable Potential" Determinations

As noted, the Clean Water Act requires each state to adopt an "antidegradation policy" as a part of its water quality standards. In general, an antidegradation policy must be designed to maintain and protect existing water body uses, prevent degradation of water quality levels necessary to maintain existing uses, and protect certain designated "high quality" waters, such as streams in state or national parks.[109] Most states classify their waters in one of the three "Tiers" mentioned above.[110]

When presented with a request for a permit to allow discharges into a Tier 1 water, the Clean Water Act permitting authority must determine whether a WQBEL is necessary to ensure the maintenance of water quality standards in the stream.[111] This process is commonly referred to as a "reasonable potential" analysis, based on the federal regulations that require effluent limits be

---

107 *Id.* § 130.3.

108 Although the text of the Clean Water Act does not clearly allow EPA or authorized states to take enforcement action based on alleged violations of water quality standards by a discharger, some have argued that state water quality standards are directly enforceable against NPDES permittees, even where the permit does not contain WQBELs. In the only decisions supporting this concept (in the context of citizens suits rather than an agency enforcement action), the NPDES permit in question included a broadly worded condition that required that no discharge from the permitted facility cause a violation of the state water quality standards. Nw. Envtl. Advocates v. City of Portland, 56 F.3d 979, 990 (9th Cir. 1995); Ohio Valley Envtl. Coal., Inc. v. Marfork Coal Co., No. 5:12-cv-1464, 2013 WL 4506175 (S.D.W. Va. Aug. 22, 2013).

109 40 C.F.R. § 131.12.

110 *See supra* Part III.A.3.

111 40 C.F.R. § 122.44(d)(1).

included in permits for all pollutants that "are or may be discharged at a level [that] will cause, have the reasonable potential to cause, or contribute to an excursion above any state water quality standard . . . ."[112]

In the event a state revises a water quality standard that served as the basis for an effluent limit set forth in a permit, a permittee may submit a request for modification of the permit to include revised permit limits within ninety (90) days after publication in the Federal Register of EPA's approval of the change.[113] However, no change in a state water quality standard will be deemed effective until the state has completed its legislative or regulatory process for adopting such an amendment and has submitted it to EPA.[114] That process must include a public hearing, prior to which the proposed revised standards and supporting analyses must be made available to the public for review.[115] Upon completion of the state process, the results must be submitted to EPA for its consideration as it determines whether to approve any such change.[116] In addition, under the Act's "anti-backsliding" provision, there is some basis for contending that once a WQBEL has been established, it may *never* be changed to allow a higher effluent limit for a particular pollutant based on changes to the underlying water quality standard.[117]

b. Total Maximum Daily Loads ("TMDLs") and TMDL-Based Effluent Limits

While the antidegradation requirements generally aim to preserve *existing* water quality, the Clean Water Act's "total maximum daily load" ("TMDL") program is designed to improve the quality of waters that do not

---

112 *Id.* § 122.44(d)(1)(i), (iii).

113 *Id.* § 122.62(a)(3)(i).

114 *Id.* § 131.21.

115 *Id.* § 131.20.

116 *Id.*

117 Section 402(o)(1) of the Clean Water Act ("anti-backsliding") provides, in relevant part "[i]n the case of [water quality-based effluent limits], a permit may not be renewed, reissued, or modified to contain effluent limitations which are less stringent than the comparable effluent limitations in the previous permit . . . ." 33 U.S.C. § 1342(o)(1) (2012). There are exceptions, set forth in 33 U.S.C. § 1342(o)(2). In addition, whether this prohibition would apply when a water quality standard is changed in a manner that is deemed to be equally protective as the previous version of the standard; what constitute "comparable effluent limitations"; and whether this provision applies to effluent limits that have not yet become effective and are incorporated into a compliance schedule, are topics that have been subject to debate. *See, e.g.*, Am. Iron and Steel Inst. v. EPA, 115 F.3d 979, 993 n.6 (D.C. Cir. 1997). As one court has noted, "[t]he anti-backsliding rule may not be used as a device to keep in place a regulation which, over the march of time and scientific progress, becomes arbitrary and irrational." Am. Petroleum Inst. v. EPA, 787 F.2d 965, 974 (5th Cir. 1986).

meet certain water quality standards, by further limiting the amounts of the problematic pollutants that may be discharged into such a receiving water.[118] Generally, a TMDL is a pollution reduction plan that allocates the amounts of a particular pollutant that may be discharged from point sources and from nonpoint sources, taking into account natural background levels, and developed so as to include some reserve assimilative capacity for future development on the stream in question and a scientifically defensible margin of error.[119]

Section 303 of the Clean Water Act requires that states identify, every three years, waters within their borders that fail to meet applicable water quality standards.[120] This list of waters, commonly known as the "303(d) list" or "impaired waters list," includes the specific water quality standards that are not being met, and establishes a priority for improving the water quality of state streams based on the severity of the pollution, the type of water body, and uses of the water.[121] After identifying and prioritizing the waters, the states must prepare a TMDL for each pollutant causing "impairment" (transcendence of water quality standards).[122] The TMDL must consider the quantity of pollutants from existing and future point sources, known as a "waste load allocation" and the quantity of pollutants from existing and future non-point sources, which includes natural background concentrations.[123] The TMDL must also account for seasonal variations and build in a "margin of safety" to account for unknowns about the relationship between water quality and the applicable standards.[124]

Once a TMDL is implemented on an "impaired water," NPDES permit holders (or applicants) who discharge (or desire to discharge) into that water will be required to comply with the more stringent TMDL-based effluent limits for the pollutant(s) causing an exceedance of water quality standards.[125] These new effluent limits are usually imposed upon permit issuance or renewal (which generally occurs every five years).[126] One must obtain a waste load allocation in order to be permitted to discharge a TMDL-limited pollutant.[127] TMDLs developed by a state, like water quality standards, must be approved by

---

118 33 U.S.C. § 1313(d) (2012).

119 *See* 40 C.F.R. § 130.2(i) (2013).

120 33 U.S.C. §§ 1313(c), (d).

121 33 U.S.C. § 1313(d)(1)(A); 40 C.F.R. §§ 130.2(j), 130.7(b)(4).

122 33 U.S.C. § 1313(d)(1)(C).

123 *Id.*; *see also* 40 C.F.R. § 130.2(h).

124 40 C.F.R. § 130.7(c).

125 33 U.S.C. § 1319 (2012).

126 33 U.S.C. § 1342(b)(1)(B) (2012).

127 *See* Monongahela Power Co. v. Chief, Office of Water Res., Div. Envtl. Prot., 567 S.E.2d 629 (W. Va. 2002).

EPA before they take effect.[128] Accordingly, any challenge to a state's issuance or failure to issue a waste load allocation must be filed in federal court based on EPA's action with respect to that matter.[129]

c. Variances and Site-Specific Criteria

i. Variances

A variance is a temporary exemption from the water quality standard, granted to a particular discharger for a particular pollutant, based on site-specific data and circumstances.[130] It thus constitutes a change to the state water quality standards that must be reviewed and approved by EPA, like any other such change.[131] It is temporary because any variance must be re-assessed and (if appropriate) renewed at least during every triennial review of the state's water quality standards as required by the Act.[132]

Thus although not explicitly described in the Clean Water Act, states may grant temporary variances from otherwise-applicable water quality standards if a requesting NPDES permittee can demonstrate that it is unable to achieve compliance with the water quality standard in the receiving stream due to certain conditions that make compliance infeasible.[133] The recognized grounds for seeking a variance include:

> (1) Naturally occurring pollutant concentrations prevent the attainment of the use; or
>
> (2) Natural, ephemeral, intermittent or low flow conditions or water levels prevent the attainment of the use, unless these conditions may be compensated for by the discharge of sufficient volume of effluent discharges without violating state water conservation requirements to enable uses to be met; or
>
> (3) Human caused conditions or sources of pollution prevent the attainment of the use and cannot be remedied or would cause more environmental damage to correct than to leave in place; or

---

128 33 U.S.C. § 1313(d)(2) (2012); 40 C.F.R. § 130.34.

129 *Monongahela Power Co.*, 567 S.E.2d at 640–41.

130 *See* Water Quality Standards Regulatory Clarifications, 78 Fed. Reg. 54,518, 54,531 (Sept. 4, 2013).

131 *Id.*

132 *Id.*

133 *Id.*; 40 C.F.R. § 131.10.

> (4) Dams, diversions or other types of hydrologic modifications preclude the attainment of the use, and it is not feasible to restore the water body to its original condition or to operate such modification in a way that would result in the attainment of the use; or
>
> (5) Physical conditions related to the natural features of the water body, such as the lack of a proper substrate, cover, flow, depth, pools, riffles[, and] the like, unrelated to water quality, preclude attainment of aquatic life protection uses; or
>
> (6) [Compliance with the use would require imposition of] [c]ontrols more stringent than those required by sections 301(b) and 306 of the Act, and would result in substantial and widespread economic and social impact.[134]

EPA has approved of variance procedures in many state programs[135] under the Act. However, in practice, it is very difficult to obtain approvals of specific water quality variance applications. For example, in August 2004, EPA denied an application for variances from the water quality standards for cadmium, lead, and zinc sought by Hecla Mining Company, for its Lucky Friday Mine located in Idaho, based (in part) on the report of an independent economist retained by EPA Region X that disagreed with the financial analysis submitted by Hecla.[136] Similarly, on September 5, 2007, the West Virginia Department of Environmental Protection ("WVDEP") disapproved a variance application submitted on behalf of Consolidation Coal Company and Windsor Coal Company for relief from WVDEP chloride water quality standards because those companies were unable to adequately demonstrate a complete inability to pay treatment costs at the time the application was submitted (i.e., that it would bankrupt them).[137]

---

134 40 C.F.R. § 131.10(g).

135 Including the WVDEP regulations at W. VA. CODE. R. § 47-2-6.1.b (2013).

136 *See* Press Release, Environmental Protection Agency, EPA Proposes to Deny Hecla Request for Water Quality Relief (Aug. 18, 2004), http://yosemite.epa.gov/opa/admpress.nsf/2004+press+releases (follow "Earlier Releases" hyperlink; then repeat until the page displays releases from August 2004).

137 Letter from Lisa A. McClung, Director, Division of Water and Waste Management, WVDEP, to Jonathan M. Pachter, Consol Energy, Inc. (Sept. 5, 2007) (citing economic review conducted by EPA) (available from WVDEP and on file with authors).

ii. Site-Specific Criteria

Site-specific criteria are separately derived numeric standards applicable to specific stream segments, and represent another possible method of obtaining relief from state-wide water quality standards.[138] EPA regulations provide the authority for approval of state regulations allowing for the development of site-specific criteria for use in water quality standards.[139] In West Virginia, such criteria may be granted based upon a demonstration that (1) the "existing numeric criteria are either over-protective or under-protective of the aquatic life residing in the stream or stream segment" and (2) a "site-specific numeric criterion . . . will be fully protective of the aquatic life and the existing and designated uses in the stream or stream segment."[140] Unlike a variance, site-specific criteria apply to an entire stream (or stream segment) and any dischargers to it.[141]

The site-specific numeric criteria provision was implemented based on substantiated concerns that EPA's laboratory-derived water quality criteria might not accurately reflect site-specific conditions (e.g. changing water chemistry and the ability of native species to adapt over time).[142] Indeed, EPA was conservative and overly protective when developing the national criteria.[143] Consequently, site-specific criteria tend to be less restrictive than the national standards.[144] EPA has issued guidance for three methodologies that may be used to develop site-specific criterion: (1) the "Recalculation Procedure," (2) the "Water-Effect Ratio procedure," and (3) the "Resident Species Procedure."[145] As with variances, site-specific criteria represent changes to state water quality standards, and the methodology used in preparing the

---

138 Water Quality Standards Regulatory Clarifications, 78 Fed. Reg. 54,518, 54,524 (Sept. 4, 2013); *see also* WQS HANDBOOK, *supra* note 24, § 3.7.

139 40 C.F.R. § 131.5.

140 W. VA. CODE. R. § 47-2-8.5 (2013).

141 WQS HANDBOOK, *supra* note 24, § 3.7.3.

142 *See* Memorandum from Tudor T. Davies, Director, EPA Office of Science and Technology, to the Water Management Division Directors, Regions I–X and State Water Quality Standards Programs Directors 1 (Feb. 22, 1994) (on file with authors).

143 *See* WQS HANDBOOK, *supra* note 24, Appendix L at 14 (1994) (stating "[t]he reason that national criteria are conservative in the first place is the uncertainty concerning the linkage of analytical chemistry and toxicity"); Jerry W. Raisch, *TMDLS—Crouching Tiger or Paper Dragon?*, 47 RMMLF-INST 18, 18–33 at §18.04 (2001) ("[E]xperience has shown that site-specific criteria tend to be less restrictive because EPA was inherently conservative and overly protective when it developed the national criteria.").

144 *See* Raisch, *supra* note 143.

145 WQS HANDBOOK, *supra* note 24, § 3.7.1.

proposed criteria, as well as the final state-approved changes, must be approved by EPA.[146]

d. Consent Orders and Permit Compliance Schedules

i. Consent Orders

Consent Orders, including various administrative settlement mechanisms known under other names (e.g., "Administrative Order on Consent," "Agreed Order,") and judicial decrees or settlement documents (e.g., "Consent Decrees"), may sometimes include a schedule of compliance ("compliance schedule") for achieving WQBELs. When incorporated into a Consent Order or similar settlement, compliance schedules can be effective enforcement tools in seeking to address WQBEL violations, but they cannot modify any NPDES permit.[147]

ii. Permit Compliance Schedules

Compliance schedules may be incorporated into NPDES permits only for WQBELs that were based upon water quality standards adopted after July 1, 1977, and only when there is a specific, "reasonable" determination by the issuing agency that the discharger cannot immediately comply.[148] For new sources or dischargers, the first NPDES permit may include a compliance schedule only as to water quality standards issued or revised after construction of the source has started and no less than three years before the commencement of a discharge.[149]

In determining whether it is appropriate to include a compliance schedule in a permit, the agency must consider a number of factors including how much time the discharger has had to meet the WQBELs; good faith efforts to comply; and whether there is need for modification of treatment facilities, and if so, how long it will take to implement those changes.[150] Because a compliance schedule is, by definition, comprised of "an enforceable sequence

---

146 Water Quality Standards Regulatory Clarifications, 78 Fed. Reg. 54,518, 54,520 (Sept. 4, 2013).

147 *See* Memorandum, Jon M. Capacasa, Director, Water Protection Division, EPA Region III, Implementation of Compliance Schedules under the Clean Water Act (Nov. 16, 2007) [hereinafter *Capacasa Memo*].

148 40 C.F.R. §§ 122.2, 122.4, 122.47(a)(1) (2013); Memorandum, James M. Hanlon, Director, EPA Office of Wastewater Management, Compliance Schedules for Water Quality-Based Effluent Limitations in NPDES Permits (May 10, 2007) [hereinafter *Hanlon Memo*].

149 40 C.F.R. § 122.47(a)(2).

150 *Id.*; *Hanlon Memo*, *supra* note 148.

of [actions or operations] leading to compliance [with WQBELs]," the fact that a permittee needs time to seek a variance, obtain a site-specific standard, or seek other changes to the underlying water quality standard is not a valid basis for entering into a compliance schedule as part of a new or modified NPDES permit.[151]

e. The Permit Shield

Under what is commonly referred to as the "permit shield" provision, CWA § 402(k), compliance with the terms of an NPDES permit will shield a permittee from enforcement action, by either the government or citizens, for the discharge of pollutants into jurisdictional waters. The pertinent portion of the statute reads

> Compliance with a permit issued pursuant to this section shall be deemed compliance, for purposes of sections 1319 [government enforcement action] and 1365 [citizen enforcement action] of this title, with sections 1311 [effluent limits], 1312 [water quality related effluent limits], 1316 [industry standard performance], 1317 [toxic and pretreatment effluent standards], and 1343 [ocean discharges] of this title, except any standard imposed under section 1317 [toxic and pretreatment effluent standards] of this title for a toxic pollutant injurious to human health.[152]

As indicated, this provision clearly encompasses WQBELs, and therefore compliance with WQBELs insulates a permittee from enforcement based on violations of such limits. However, the question of whether a NPDES permittee may be subject to enforcement for violating other water quality standards (that are *not* a part of a WQBEL) is more uncertain. That is because the permit shield provision does not explicitly address § 303 of the Act, which governs the establishment of water quality standards. One interpretation is that the absence of a reference to § 303 in the permit shield provision may be explained by the absence of a reference to that section in the Clean Water Act's enforcement provision (33 U.S.C. § 1319). If Congress did not intend to allow EPA or the states to enforce water quality standards independent of WQBELs, then there would be no reason to include § 303 in the list of sections affected by the permit shield provision.

---

151 40 C.F.R. § 122.2; *Hanlon Memo*, *supra* note 148; *Capacasa Memo*, *supra* note 147.

152 33 U.S.C. § 1342(k) (2012).

As noted above,[153] although there has been some debate on the issue, arguably, the most reasonable interpretation of the Clean Water Act is that water quality standards are not directly enforceable against NPDES permittees outside of WQBELs. Accordingly, the permit shield provision (and corresponding state statutes) is primarily significant in this context as one that protects a permittee from enforcement actions or citizen suits for violating WQBELs if the permittee is in compliance with the terms of its permit.[154]

D. Revisions to Recommended Water Quality Criteria

EPA is required to publish recommended water quality criteria that set forth concentrations or levels of pollutants in water necessary to protect aquatic life and human health.[155] As described above, states are "encouraged" to use EPA's recommended criteria to establish state water quality standards. While EPA acknowledges that "states have primary authority to determine the appropriate [maximum] level [of a substance] to protect human health or welfare," it has made it clear that it has the true authority, noting that EPA must review and approve all state water quality standards.[156] As stated by EPA, "[S]tates may make their own judgments on [human health criterion considerations] within reasonable scientific bounds, but documentation to support their judgments, *when different from EPA's recommendation*, must be clear and in the public record."[157] By comparison, "If a state relies on EPA's section 304(a) criteria document (or other EPA documents), the state may reference and rely on the data in these documents and need not create duplicative or new material for inclusion in their records."[158] Further, where a state strays from EPA recommended criteria, "the state must explain its reasons in a manner sufficient for a reviewer to determine that the approach chosen is based on sound scientific rationale."[159]

---

153 *See supra* note 108.

154 What constitutes "compliance with a permit" for purposes of the "permit shield" provision can be unclear, especially when a permittee discharges pollutants that are not addressed by a NPDES permit, or a specific effluent limit is not assigned to a pollutant. EPA published a memorandum on July 1, 1994, subsequently revised on April 11, 1995, that sets forth EPA's interpretation of the scope of the "permit shield" provision. Revised Policy Statement from Robert Perciasepe, Assistant Administrator for Water, Steven A. Herman, Assistant Administrator for Enforcement and Compliance Assurance, Jean C. Nelson, General Counsel to Regional Administrators and Regional Counsels, on Scope of Discharge Authorization and Shield Associated with NPDES Permits (Apr. 11, 1995).

155 33 U.S.C. § 1314(a) (2012).

156 WQS HANDBOOK, *supra* note 24, § 3.1.1.

157 *Id.* (emphasis added).

158 *Id.*

159 *Id.*

Obviously, EPA's recommended water quality criteria play an important role in shaping state water quality standards. Accordingly, unless EPA promptly revises its water quality criteria guidelines to keep up with the latest scientific knowledge, states are virtually certain to fall far behind in revising their own water quality standards.

The Clean Water Act merely requires EPA to develop and publish national recommended water quality criteria and to revise them "from time to time."[160] Consequently, EPA adopted its own process for developing new or revised water quality criteria and published that policy in an EPA document entitled "National Recommended Water Quality Criteria – Correction" ("EPA Revision Procedures") in 1999. Pursuant to that policy, EPA takes seven steps when deriving new criteria or initiating a major[161] reassessment of existing criteria.[162]

First, EPA "undertakes a comprehensive review of available data and information."[163] Second, EPA publishes a notice in the *Federal Register* and on EPA's website announcing the upcoming assessment. Such a notice describes available data and solicits the public to provide additional helpful data and views.[164] Third, EPA develops draft recommended water quality criteria using the agency's literature review and information received from the public.[165] Fourth, EPA initiates a peer review of the draft criteria by "qualified independent experts."[166] Fifth, EPA publishes a second notice in the *Federal Register* and on its website, "of the availability of the draft water quality criteria and solicit[s] views from the public on issues of science pertaining to the information used in deriving the draft criteria."[167] While EPA invites and responds to written comments at this stage, it maintains that it is not required to do so.[168] Sixth, EPA evaluates the peer review results and prepares a response

---

160 33 U.S.C. § 1314(a)(1).

161 For minor revisions (where there is no change in the underlying scientific methodologies), EPA does not generally follow its peer review procedures, but instead simply publishes minor revisions directly as EPA's recommended water quality criteria. U.S. EPA, NATIONAL RECOMMENDED WATER QUALITY CRITERIA—CORRECTION 4 (Apr. 1999) [hereinafter NATIONAL RECOMMENDED WATER QUALITY CRITERIA], *available at* http://water.epa.gov/scitech/swguidance/standards/upload/2008_03_11_criteria_wqctable_1999table.pdf.

162 EPA has not, however, imposed any timing restrictions or deadlines on itself for evaluating possible revisions to its recommended water quality criteria.

163 NATIONAL RECOMMENDED WATER QUALITY CRITERIA, *supra* note 161, at 4.

164 *Id.*

165 *Id.*

166 *Id.*

167 *Id.*

168 *Id.*

document to include in the administrative record. At this time, EPA also considers public views on scientific issues and will address major scientific issues in the administrative record, whether from the peer review or the public.[169] Finally, EPA revises the draft criteria as necessary and announces the availability of the final recommended water quality criteria in the *Federal Register* and on its website. Once announced, the final criteria become the national recommended water quality criteria.[170]

Because EPA national recommended water quality criteria are merely policy and not rules *per se*, EPA maintains that it need not strictly follow the procedures required by the Administrative Procedures Act when revising them.[171] In addition, EPA maintains broad discretion when formulating policy.[172] Further, the Act simply mandates that EPA revise recommended water quality criteria "from time to time."[173] Thus, EPA has clearly determined that it may take as long as it deems necessary to review data and information and develop recommended water quality criteria "accurately reflecting the latest scientific knowledge."

A prime example of EPA delay in this area is EPA's draft revised selenium criteria (discussed further below), which have been pending finalization for *more than nine years*. Unfortunately, even after EPA announces an impending change to the national recommended water quality criteria, the current (and often outdated) criteria remain EPA's recommended water quality criteria until EPA officially revises or withdraws them.[174]

IV. PROBLEMS WITH DELAYS IN RESPONDING TO UPDATED SCIENCE: CASE STUDIES

A. Selenium

1. Original Criteria

According to EPA, "[s]elenium is a naturally-occurring element that is nutritionally essential," but "it has been toxic to aquatic life and terrestrial wildlife where concentrations were excessive."[175] "Being a natural element,

---

169 *Id.*

170 *Id.*

171 *See id.*

172 Chevron, U.S.A., Inc. v. Nat'l Res. Def. Council, Inc., 467 U.S. 837, 838 (1984).

173 33 U.S.C. § 1314(a) (2012).

174 NATIONAL RECOMMENDED WATER QUALITY CRITERIA, *supra* note 161, at 4.

175 Notice of Draft Aquatic Life Criteria for Selenium, 69 Fed. Reg. 75,541, 75,543 (Dec. 17, 2004).

selenium is everywhere in the environment . . . ."[176] The extent of its occurrence varies geographically, however, and while selenium is typically encountered in earthmoving operations, it also enters aquatic resources through natural weathering processes.[177]

In 1987, EPA published its current recommended criteria for selenium.[178] There, EPA indicated that aquatic life and their uses were considered to be adequately protected if the average concentration of selenium does not exceed five (5) micrograms per liter of water ("5 µg/l") more than once in three years (the chronic criterion) and if the one-hour average concentration does not exceed twenty (20) micrograms per liter of water ("20 µg/l") more than once every three years (the acute criterion).[179] With the exception of some minor adjustments to the criteria concentrations, EPA's recommended standards have remained unchanged for *more than twenty-six years*.

2. Reasons for Change

As mentioned above, EPA made minor changes to the selenium criteria concentrations between 1987 and 1999.[180] In addition, "[i]n 2000, EPA revoked the existing acute criterion for the Great Lakes system [. . .] in response to a lawsuit challenging the use of a single acute criterion applicable to selenite and selenate, the two common chemical forms of selenium (see *AISI v. EPA*, 115 F. 3d 979 (D.C. Cir. 1997))."[181] In 1998, EPA held a peer consultation workshop to evaluate current selenium aquatic life criteria.[182] As a result of that workshop, EPA prepared draft revisions to its aquatic life criteria document and submitted its revisions for peer review in 2002.[183] Following issuance of its draft revisions, EPA reviewed comments and advice from the peer reviewers and made additional changes. On December 17, 2004, EPA published official public notice of its Draft [Revised] Aquatic Life Criteria for Selenium ("2004

176 *Id.*

177 *See id.*

178 *Id.*

179 *Id.*

180 *See id.* at 75,543.

181 *Id.* Under Clean Water Act § 118, EPA is the responsible agency for implementation of all water quality standards applicable to the Great Lakes, through its Great Lakes National Program Office. 33 U.S.C. § 1268 (2012).

182 Notice of Draft Aquatic Life Criteria for Selenium, 69 Fed. Reg. at 75,543.

183 *Id.*

Draft Criteria") in the Federal Register and requested scientific information, data, and views from the public.[184]

As EPA conceded, prior to publication of its 2004 Draft Criteria, it had last reassessed all available toxicity data when it published its 1987 aquatic life criteria. Since then, much new scientific data has become available.[185] The 2004 Draft Criteria include a water column acute criterion and a chronic criterion based on whole-body fish tissue analysis.[186]

With regard to the chronic criterion, the 2004 Draft Criteria propose to change the current 5 µg/l chronic criterion to a standard based upon whole-body fish tissue concentrations.[187] Specifically, the 2004 Draft Criteria requires that the concentration of selenium in whole-body fish tissue not exceed 7.91 micrograms per gram dry weight µg/g dw ("7.91 µg/g").[188] To address seasonal changes that may impact monitoring, the draft criteria further requires that "if whole-body fish tissue concentrations exceed 5.85 µg/g dw during summer or fall, fish tissue should be monitored during the winter to determine whether the selenium concentration exceeds 7.91 µg/g dw."[189] According to EPA,

> a fish-tissue approach is better than a conventional water concentration approach to protect aquatic life from the chronic adverse effects of selenium. Because fish and aquatic invertebrates are exposed to selenium primarily through their diet rather than directly through water, the fish-tissue concentration better reflects site-specific exposure and risk than does the water concentration. Therefore, using the fish-tissue approach allows users to consider site-specific factors in translating to a water concentration.[190]

While EPA recognized that fish ovary tissue may provide a more accurate causal link between selenium and reproductive effects than whole-body tissue, fish ovary tissue is only available seasonally and, under certain circumstances, may not be available in sufficient quantities for analysis.[191]

---

184 *Id.*

185 U.S. EPA, FACT SHEET, DRAFT REVISED AQUATIC LIFE CRITERIA FOR SELENIUM (EPA-822-D-04-001) 1 (Dec. 2004) [hereinafter FACT SHEET], *available at* http://water.epa.gov/scitech/swguidance/standards/criteria/aqlife/selenium.

186 *Id.* at 48, 82–83.

187 *Id.* at 82–83.

188 *Id.* at 82.

189 *Id.*

190 Notice of Draft Aquatic Life Criteria for Selenium, 69 Fed. Reg. 75,541, 75,544 (Dec. 17, 2004).

191 FACT SHEET, *supra* note 185, at 56.

Accordingly, EPA made the practical decision to rely upon whole-body fish tissue and, therefore, included conversion factors in its recommendation while also urging local agencies to use site-specific data to calculate local conversion factors.[192]

3. Status of Revisions

With the publication of its 2004 Draft Criteria, EPA specifically requested scientific information, data, and views on (1) the appropriateness of basing the freshwater chronic criterion on a tissue concentration, (2) studies of freshwater aquatic life effects and chronic effect concentrations, (3) alternative values for the freshwater chronic criterion, (4) site-specific factors affecting the freshwater chronic criterion, (5) saltwater chronic criterion, and (6) acute criteria concentrations.[193] By all accounts, a host of parties accepted this invitation and submitted relevant materials to EPA.

Since publishing its 2004 Draft Criteria, EPA has recognized at least 13 references as relevant to its proposed recommendations. Importantly, of those identified, the studies that evaluate the effects of whole body or egg/ovary selenium concentrations appear to support the 7.9 µg/g whole-body tissue concentration (which roughly converts to a 17 µg/g egg/ovary concentration) as protective.[194] In addition, the North American Metals Council ("NAMC") commissioned a summary of available selenium studies.[195] While the NAMC summary indicates that egg/ovary tissue is superior to whole-body tissue, it further recognizes that a 17 µg/g egg/ovary standard is protective of aquatic life.[196] Yet, more than nine years later, the 2004 Draft Criteria have not yet been finalized.

---

192 *Id*. at 56, 58.

193 Notice of Draft Aquatic Life Criteria for Selenium, 69 Fed. Reg. at 75,544–75,546.

194 *See, e.g.*, J. Holm et al., *Developmental Effects of Bioaccumulated Selenium in Eggs and Larvae of Two Salmonid Species*. 24 ENVTL. TOXICOL. & CHEM. 2373 (2005); R. Muscatello Jr. et al., *Larval Deformities Associated with Selenium Accumulation in Northern Pike (Esox Lucius) Exposed to Metal Mining Effluent*, 40 ENVTL. SCI. & TECH. 6506 (2006); S.C. de Rosemond, K. Liber, & A. Rosaasen, *Relationship Between Embryo Selenium Concentration and Early Life Stage Development in White Sucker (Catostomus Commersoni) from a Northern Canadian Lake*, 74 BULL. ENVTL. CONTAM. & TOXICOL. 1134 (2005); B.L. Rudolph et al., *Reproductive Success, Early Life Stage Development, and Survival of Westslope Cutthroat Trout (Oncorhynchus Clarki Lewisi) Exposed to Elevated Selenium in an Area of Active Coal Mining*, 42 ENVTL. SCI. & TECH. 3109 (2008).

195 *See* CH2M HILL, *Review of Available Technologies for the Removal of Selenium from Water*, NORTH AMERICAN METALS COUNCIL, (June 2010) [hereinafter NAMC Report], *available at* www.namc.org/docs/00062756.PDF.

196 *Id.* As noted above, a 17 µg/g egg/ovary concentrations generally converts to a whole-body concentration of 7.9 µg/g, the EPA's proposed recommended chronic criteria.

Despite EPA delays, state regulators have started to move forward with their own revised criteria. For example, on September 1, 2012, the Kentucky Energy and Environment Cabinet published proposed changes to the Kentucky water quality standards, among which it proposed a chronic criterion for selenium that is more lenient than the current EPA recommended criterion.[197] The Cabinet reasoned that it was concerned that the current EPA recommended criteria is no longer "scientifically sound or defensible."[198] Accordingly, the Cabinet proposed a fish-tissue based chronic criterion. That criterion, however, will be implemented via a threshold water column concentration of total selenium of 5.0 µg/l, the current Kentucky and EPA recommended criterion.[199] This means simply that a concentration of 5.0 µg/l or greater in the water column will trigger further sampling and analysis of either whole-body fish tissue or fish egg/ovary tissue, rather than triggering an immediate violation. EPA agreed to approve Kentucky's proposed chronic criterion for selenium on November 15, 2013.[200]

Likewise, in West Virginia, the Legislature recently called for the WVDEP to revise its water quality criteria for selenium, because "EPA has been contemplating a revision to the federally recommended criteria for several years but has yet to issue a revised standard."[201] Specifically, "[b]ecause of the uncertainty regarding the applicability of the current selenium standard," the statute requires that WVDEP develop a plan for the current selenium standard that will (1) "implement[] the criteria as a threshold standard;" (2) include "a monitoring plan that will include chemical speciation of any selenium discharge;" (3) include "a fish population survey and monitoring plan that will be implemented at a representative location to assess any possible impacts from selenium discharges if the threshold criteria are exceeded;" and (4) require reporting of monitoring results for use in the development of state-specific criteria.[202] According to the Legislature, the new rules to be proposed by the WVDEP should "establish a state-specific selenium standard that protects

---

197 *Division of Water Proposes Changes to Water Quality Standards for Selenium*, KY. DEPARTMENT ENVTL. PROTECTION (Feb. 5, 2013), http://kydep.wordpress.com/2013/11/15/kentuckys-receives-epas-final-decision-on-water-quality-standards/.

198 *Id.*

199 *Id.*

200 On December 13, 2013, several groups filed suit against EPA, challenging its approval of Kentucky's revised chronic selenium criterion. *See* Complaint, Kentucky Waterways Alliance v. McCarthy, No. 3:13-CV-1207-H, 2013 WL 6579796 (W.D. Ky. Dec. 13, 2013).

201 W. VA. CODE ANN. § 22-11-6 (West 2013).

202 *Id.* § 22-11-6(5).

aquatic life."[203] Per the statute, those rules must be proposed by July 12, 2015.[204]

Regardless of state efforts, however, the EPA recommended criteria remain unchanged. While EPA's approval of Kentucky's fish-tissue based criterion may indicate some change on the federal level is possible, the related litigation may ensure that EPA—not just individual states—finally makes *some* kind of decision.

4. Costs of Compliance

In the meantime, permittees still struggle to comply with the current selenium standards. A perfect example of the extreme costs of compliance with current selenium WQBELs can be found in the coal industry of Appalachia. Prior to 2003, NPDES permits issued to mine operators generally did not include effluent limits for selenium. In 2003, however, EPA prepared an Environmental Impact Statement ("EIS") on mountaintop removal mining and valley fills that indicated that selenium discharges from surface mines had the potential to violate EPA's recommended 5 µg/l standard for selenium that had been adopted by several states in the region.[205] Accordingly, state regulatory agencies were forced to carefully consider the selenium water quality standards when they issued NPDES permits to mine operators, and in many cases, included WQBELs for selenium in those permits.[206]

However, because little information and technology were available to treat for selenium, operators simply could not bring their discharges into compliance.[207] Thus, state regulators were forced to file suit against operators in state court seeking both civil penalties and injunctive relief, including the requirement that companies come into full compliance with the selenium standards within a reasonable time. Understanding the difficulty of achieving compliance, and perhaps in recognition of the lack of scientific evidence supporting the continued use of the current criteria, state regulators in most cases agreed to impose compliance schedules wherein interim effluent limits gradually increased until full compliance could be reached. Before most of those operators could come into compliance, however, outside groups filed "citizen suits" against numerous coal mining operators in federal court. In several of those cases, the district court determined that compliance schedules

---

203 *Id.* § 22-11-6(6).

204 *Id.*

205 Ohio Valley Envtl. Coal., Inc. v. Maple Coal Co., 808 F. Supp. 2d 868 (S.D.W. Va. 2011).

206 *Id.*; *see also* Ohio Valley Envtl. Coal., Inc. v. Hobet Mining, LLC (*Hobet II*), 723 F. Supp. 2d 886, 900–02 (S.D.W. Va. 2010).

207 *See* Ohio Valley Envtl. Coal., Inc. v. Hobet Mining, LLC, No. 3:08-0088, 2008 U.S. Dist. LEXIS 105559 (S.D.W. Va. Dec. 18, 2008).

entered into between the NPDES permittees and the WVDEP were inadequate to either prevent selenium effluent limits in draft permits from taking effect, or in showing "diligent prosecution" by the state so as to preclude the filing under the Clean Water Act's citizen suit provision.[208]

Thus, operators were forced to pay hundreds of thousands of dollars in litigation costs to defend themselves against simultaneous lawsuits filed at the administrative, state, and federal levels.[209] In addition, operators paid heavy civil penalties to both state regulators and environmental groups. Under §1319(d) of the CWA, a permittee may be held liable for up to $37,500 per day for each violation of its effluent limits. Thus, as a result of lawsuits filed by regulators and environmental groups, mine operators have been forced to pay civil penalties and Supplemental Environmental Project ("SEP") costs ranging anywhere from $300,000 to $20 million.[210]

Perhaps the highest costs, however, were those spent on compliance technology. For example, one company reported that while some remote sites may utilize constructed wetlands for compliance, costing anywhere from $1–$5 million per unit, other sites have no alternative but to install "Fluidized Bed Reactors" and "Moving Bed Reactors" that can range between $8–$50 million

---

[208] *See, e.g.*, Ohio Valley Envtl. Coal. Inc. v. Patriot Coal Corp., No. 3:11-0115, 2012 U.S. Dist. LEXIS 35161 (S.D.W. Va. March 15, 2012) (Memorandum Opinion and Order); Ohio Valley Envtl. Coal. Inc. v. Hobet Mining, LLC, 717 F. Supp. 2d 541 (S.D.W. Va. 2010); *Hobet II*, 723 F. Supp. 2d 886; *Maple Coal Co.*, 808 F. Supp. 2d 868; Ohio Valley Envtl. Coal., Inc. v. Apogee Coal Co., LLC, 531 F. Supp. 2d 747 (S.D.W. Va. 2008).

[209] In several of those cases, plaintiffs relied upon a report issued by the WVDEP in January, 2010. W. VA. DEP'T ENVTL. PROT., *SELENIUM-INDUCED DEVELOPMENTAL EFFECTS AMONG FISHES IN SELECT WEST VIRGINIA WATERS* (Jan. 2010) [hereinafter MUD RIVER RESERVOIR STUDY], *available at* http://www.dep.wv.gov/WWE/watershed/wqmonitoring/Documents/Selenium/Se%20Larvae%202010%20final.pdf. That study, however, involved analysis of selenium levels in the Mud River *Reservoir*—an *impoundment* (holding lentic (or standing) water), located at the endpoint of a large river system, where concentrations of selenium (and other constituents) would be expected to be higher than in lotic (flowing) waters such as streams. *Id.* at 4; *see* Affidavit of Paul Ziemkiewicz, Defendant's Motion to Dismiss Ohio Valley Environmental Coalition v. Hobet Mining, LLC, No. 3:09-1167, 2010 U.S. Dist. LEXIS 29848, at 2–4 (S.D.W. Va. Mar. 29, 2010). The same deficiency applies to EPA's current 5 µg/l chronic criterion; it was promulgated based on field data obtained from Belews Lake in North Carolina, rather than data from lotic waters. *See* Proposed Selenium Criterion Maximum Concentration for the Water Quality Guidance for the Great Lake Systems, 61 Fed. Reg. 58,443, 58,444 (Nov. 14, 1996).

[210] *See Patriot Coal Corp.*, 2012 U.S. Dist. LEXIS 35161; *Hobet Mining*, 2008 U.S. Dist. LEXIS 105559; Ohio Valley Envtl. Coalition v. Independence Coal Co., No. 3:10-0836, 2011 U.S. Dist. LEXIS 55467, (S.D.W. Va. May 20, 2011); Sierra Club v. ICG Eastern, LLC, 833 F. Supp. 2d 571 (N.D.W. Va. 2011); *Apogee Coal Co.*, 744 F.Supp.2d 561 (S.D.W. Va. 2010); United States v. Patriot Coal Corp., 2:09-0099, 2009 U.S. Dist. LEXIS 38216 (S.D.W. Va. Apr. 30, 2009).

for a single unit.[211] Given that multiple units may be required for a particular company's operations, compliance costs can thus easily skyrocket.

Indeed, according to documents filed by one mine operator with the United States Securities and Exchange Commission ("SEC"), that company expected to incur in excess of $400 million in company-wide selenium water treatment liabilities, in large part in response to lawsuits filed by various national and local public interest groups.[212] In what is probably no mere coincidence, that same company filed for bankruptcy protection in 2012.[213]

Obviously, NPDES permit holders have paid (and continue to pay) a steep price in seeking to comply with the current water quality standards for selenium in those states that adopted EPA's 1987 recommended criteria. Given that EPA published its draft revisions in 2004 and has expressly acknowledged that the current criteria are no longer deemed to be appropriate, there is clearly an unwarranted administrative delay that has caused these unnecessary expenditures to mount. Despite state regulatory efforts to move forward and meet the demands of science, it remains unclear when EPA will muster the political will to do so on a national level.

B. Chloride

1. Original Criteria

EPA published notice of the availability of its final aquatic life chloride water quality criteria on May 26, 1988. That criteria document indicates that aquatic life and their uses were considered to be adequately protected if the four-day average concentration of dissolved chloride does not exceed 230 mg/l more than once every three years (the chronic criterion) and if the one-hour average concentration does not exceed 860 mg/l more than once every three years on average (the acute criterion).[214] The acute criterion was developed

---

[211] Gene Kitts, *Coal & Water—The Cost to Comply*, WEST VIRGINIA 2013 ENERGY SUMMIT (2013), *available at* http://www.wvcommerce.org/App_Media/assets/doc/energy/Energy_Summits/presentations_2013/03_940_GeneKitts_Coal-and-Water-TheCost-to-Comply.pdf.

[212] *See* Patriot Coal Corp., Quarterly Report (Form 10-Q) 27 (Oct. 30, 2012), *available at* http://www.sec.gov/Archives/edgar/data/1376812/000137681212000015/pcx9302012x10q.htm.

[213] *See In re* Patriot Coal Corp., 482 B.R. 718 (Bankr. S.D.N.Y. 2012) (later transferred to the Bankruptcy Court for the Eastern District of Missouri, Case No. 12-51502-659).

[214] Water Quality Criteria, 53 Fed. Reg. 19,028 (May 26, 1988); U.S. EPA, AMBIENT WATER QUALITY CRITERIA FOR CHLORIDE—1988 (Feb. 1988), *available at* http://www.environmentalhealthnews.org/ehs/news/2013/pdflinks/EPA%201988%20chloride.pdf. There are no human health or contact recreation criteria for chloride, as humans routinely ingest up to 12 grams per day (12,000 mg) with approximately 0.6 grams (600 mg) per day in a "salt free" diet. There is no primary maximum contaminant level ("MCL") for chloride under the

using a limited database of only 12 species, and the chronic criterion was based on three "acute to chronic" ratios, at least one of which (15.17, for fathead minnows) was not substantiated in later testing. The criteria were developed based on testing of sodium chloride toxicity in laboratory reconstituted water. In addition, the criteria document includes EPA's finding that (based on scientific studies to date) no relationships had been observed between acute toxicity of chloride and hardness, alkalinity, or pH.[215]

In responding to comments on the draft criteria document that questioned how few chronic tests were used and other aspects of the datasets analyzed by EPA, the agency responded by noting that it must "continually balance the risks and benefits of regulating a chemical based on [the limited amount of] available data" as compared to the risks and benefits of not regulating the chemical at all. Noting that the Science Advisory Board had approved of the recommended criteria, EPA represented that it would "consider new data that become available and will revise [the] criteria when appropriate."[216] The criteria, however, have never been formally re-evaluated or revised since they were released in 1988.

2. Reasons for Change

As noted, when the chloride criteria were first published over 25 years ago, some reviewers believed that the dataset upon which they were based was insufficient to support the development of nationally applicable criteria, and there were apparent contradictions within the analyses found in the Chloride Criteria Document. For example, EPA concluded that chloride salt (like common salt) was not a toxicant in the category of heavy metals or other toxic substances.[217] Accordingly, if an aquatic organism does not die as a result of the osmotic shock from initially being exposed to chloride, it would be expected to continue to live indefinitely in the presence of chloride salts, and acute-to-chronic ratios would be expected to be relatively low.[218]

The acute-to-chronic ratios used to calculate EPA's criteria in 1988, however, were 3.951, 7.308, and 15.17 for three separate organisms—the last two of which are notably higher than one would expect. Perhaps not

federal Safe Drinking Water Act, 42 U.S.C. § 300f, and the secondary MCL of 250 mg/l is based on taste and odor, not risk to human health.

215 Water Quality Criteria, 53 Fed. Reg. at 19,036.

216 *Id.* at 19,029.

217 *Id.* at 19,037.

218 *See* Potesta & Associates, Inc., *Application for Site-Specific Criteria for Chlorides for the West Virginia Fork of Dunkard Creek and Downstream Segments of Dunkard Creek*, Consolidation Coal Company 7 (June 30, 2008) [hereinafter *SSC Application*] (available from the WVDEP and on file with authors).

surprisingly, further testing based on newer data from various state studies and the National Exposure Research Laboratory produced higher chronic tolerance levels and much lower acute-to-chronic ratios for the same species.[219]

In addition, there have been significant advances in the development of whole effluent toxicity ("WET") tests, the kind of testing traditionally used in developing water quality criteria. Tests conducted 20 to 25 years ago had variable methods and did not incorporate the quality assurance procedures that are standard today. Years ago, such tests were not standardized for such things as control mortality, temperature control, or the culturing methods employed today.[220]

The database of acceptable toxicity tests has also expanded substantially since 1988. In the Chloride Criteria Document, EPA relied on calculations involving 12 genera. The current national dataset (known as the "ECOTOX" database) contains over 500 data points for chloride toxicity, representing 54 organisms. Further, studies conducted by Birge, et al., in 1985 found that chlorides tested in laboratory water (as was done in the studies that EPA relied upon when formulating the criteria) have twice the toxicity of testing when natural waters were used.[221]

Based on the Birge studies, the Kentucky Natural Resources and Environmental Protection Cabinet adopted water quality criteria for chloride that are substantially higher than Kentucky's original standards (that adopted the 230 mg/l and 860 mg/l EPA criteria). In 1986, EPA approved a change to Kentucky's state-wide water quality standards for chloride, which now consist of an acute criteria of 1,200 mg/l and a chronic criteria of 600 mg/l.[222]

Finally, as discussed further below, several states have recently adopted or proposed chloride water quality standards that are expressed as 1-hour and 96-hour acute and chronic equations, with acceptable levels of chloride varying based upon the hardness of the water in the subject stream. These new criteria are based upon updated scientific studies conducted by EPA, along with the Great Lakes Environmental Center and the Illinois Natural History Survey ("INHS").[223] These new studies disprove EPA's finding in its 1988 Criteria Document that there is no apparent relationship between acute chloride toxicity and water hardness.[224]

---

219 *See id.*

220 *See id.* at 6.

221 *See id.* at 4.

222 401 KY. ADMIN. REGS. 10:031 § 6 (2014).

223 ENVTL. PROT. AGENCY ET AL., ACUTE TOXICITY OF CHLORIDE TO SELECT FRESHWATER INVERTEBRATES (October 28, 2008), *available at* http://www.dnr.mo.gov/env/wpp/rules/rir/so4-cl-GLEC-INHSchloriderpt.pdf.

224 *Id.* at 11.

3. Status of Revisions

The State of Iowa adopted revised chloride water quality standards, based on updated toxicity studies, in 2009. Those criteria consist of formulae that derive a standard based upon the hardness and concentration of sulfates in the stream, with statewide default values used for those variables in the absence of site-specific hardness or sulfate data. These criteria were approved by EPA on May 19, 2010.[225] Indiana, Maryland, and Pennsylvania have all proposed to adopt similar standards, citing the same updated scientific studies that were commissioned and/or accepted by EPA in approving Iowa's revised regulations.[226]

For its part, EPA has indicated that it plans to propose revisions to the Chloride Criteria sometime in 2014. However, no explanation of the exact nature of any expected revisions have been provided, and as of this writing, no advance notice of proposed rulemaking has been published.[227] Further, it is worth noting that several states (including Pennsylvania, Maryland, and Ohio) have never adopted state-wide water quality standards for chloride. In those states, EPA has presumably determined that sufficient water quality standards exist to protect designated stream uses without imposing *any* chloride standards.[228]

4. Costs of Compliance

Like selenium, treating water to reduce concentrations of chloride is very expensive due to the high costs associated with treatment and removal of dissolved anions. The only truly effective treatment technology for industrial operations handling large volumes of water is reverse osmosis, a water

---

[225] *See* PA. DEP'T ENVTL. PROT., BUREAU OF POINT AND NON-POINT SOURCE MANAGEMENT, RATIONALE FOR THE DEVELOPMENT OF AMBIENT WATER QUALITY CRITERIA FOR CHLORIDE (AQUATIC USE PROTECTION) 3–4, *available at* http://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&ved=0CCQQFjAA&url=http%3A%2F%2Fwww.oa.state.pa.us%2Fportal%2Fserver.pt%2Fgateway%2FPTARGS_0_2_1234578_0_0_18%2FTR13_Rationale-Sulfate_Criteria-021412.doc&ei=cxIZU7IziMOqAazPgeAC&usg=AFQjCNFXYgO3cv-2jUsPo2OvPZsZ__8rIQ&bvm=bv.62578216,d.aWM (discussing alternative chloride criteria promulgated by states and interstate commissions).

[226] *See* IND. DEP'T ENVTL. MGMT., FACT SHEET, CHLORIDE AND SULFATE WATER QUALITY CRITERIA AMENDMENTS (Feb. 29, 2012), *available at* http://www.in.gov/idem/files/wpcb_2012_mar_11-320_factsheet.pdf.

[227] *See Grappling with Science, EPA Delays New Water Quality Criteria for Chloride*, INSIDEEPA.COM (June 17, 2013), http://insideepa.com/201306172437836/EPA-Daily-News/Daily-News/grappling-with-science-epa-delays-new-water-quality-criteria-for-chloride.html.

[228] 40 C.F.R. § 131.11 (2014).

treatment methodology that is normally used for converting seawater to drinking water standards. It requires substantial pre-treatment to condition the water prior to membrane processing; post-treatment of the waste stream by an evaporative technology to minimize the amount of reject; disposal of rejected solids in a landfill; and treatment of the resulting discharge water to add salts back prior to release (pH and TDS buffering) to avoid aquatic toxicity from the purified nature of the produced water.[229] In general, reverse osmosis is one of the most expensive technologies for treating water to meet regulatory limits.[230]

a. Consolidation Coal Company Variance Application

Some indication of the specific costs of complying with EPA's 1988 criteria can be obtained from a review of the"Application for a Variance from the Numeric Criteria for Chloride set forth in the West Virginia Water Quality Standards," submitted to the West Virginia Department of Environmental Protection ("WVDEP") in May 2005, by Consolidation Coal Company ("CCC"). That application sought site-specific adjustments in chloride criteria for streams that received discharges from ten (10) permitted outfalls associated with mines in West Virginia. Those outfalls had been assigned water quality-based chloride limits of 218 mg/l (monthly average) and 378 mg/l (daily maximum), derived based upon the West Virginia chloride water quality standards of 230 mg/l and 860 mg/l (the EPA criteria). The application included comprehensive studies by Civil and Environmental Consultants, Inc. ("CEC"), addressing various compliance alternatives, concluding that reverse osmosis (with evaporation/crystallization) was the only technically effective method of meeting the NPDES limits imposed on the subject outlets. CEC studies determined that implementation of reverse osmosis technology at all of the outlets would require more than $64 million in capital costs and $9 million in annual operating costs.[231]

The CCC variance application also included a report by Michael J. Hicks, Ph.D., entitled "Financial and Socioeconomic Effects of Compliance with the West Virginia Department of Environmental Protection Water Quality Standards Concerning Chloride at Consolidation Coal Company Mines in

---

[229] CIVIL AND ENVIRONMENTAL CONSULTANTS, INC., FINAL ENGINEERING REPORT: REVIEW OF CHLORIDE COMPLIANCE ALTERNATIVES AT FIVE WEST VIRGINIA MINES, CONSOLIDATION COAL COMPANY 6–8 (June, 2003) [hereinafter CEC REPORT] (available from the WVDEP and on file with authors).

[230] *See* NAMC Report, *supra* note 195. Typical capital costs for a reverse osmosis plant capable of treating 100 gallons per minute was estimated at $10 million, with up to $ 1 million per year in operation and maintenance costs. *Id.* at 4-15 to 4-18.

[231] CEC REPORT, *supra* note 232.

Northern West Virginia."[232] The Hicks report found that imposition of the estimated treatment costs would have a substantial effect on CCC's financial status and could cause widespread adverse social and economic impact on the affected communities. Specifically, Professor Hicks found that forcing these costs on CCC would cause it to suspend or phase-out current operations, and forego opportunities for additional mine development in West Virginia, costing the affected region over 750 jobs and $122 million in economic activity.[233]

Ultimately, the WVDEP denied the CCC socio-economic variance application, based on a finding that CCC had not sufficiently demonstrated that the treatment costs would have a substantial adverse impact on the company. In doing so, the WVDEP noted that its water quality regulations do not provide for a cost/benefit analysis or any consideration of "whether [the] standard is indeed beneficial."[234]

b. Consolidation Coal Company—EPA Consent Decree, Centralized Treatment System

Many of the discharges that were the subject of CCC's variance application formed the basis for a Clean Water Act enforcement action filed by EPA in 2011 against CCC and related companies in the U.S. District Court for the Northern District of West Virginia.[235] That civil action was resolved by a Consent Decree that required CCC's parent, Consol Energy, Inc., to spend over $200 million on a state-of-the-art treatment system, approximately 36 miles of pipelines to route mine discharges covered by the Consent Decree to a reverse osmosis-based treatment system, construction of a landfill for disposal of reject from the plant, and related facilities.[236]

---

[232] MICHAEL J. HICKS, FINANCIAL AND SOCIOECONOMIC EFFECTS OF COMPLIANCE WITH THE WEST VIRGINIA DEPARTMENT OF ENVIRONMENTAL PROTECTION WATER QUALITY STANDARDS CONCERNING CHLORIDE AT CONSOLIDATION COAL COMPANY MINES IN NORTHERN WEST VIRGINIA (available from the WVDEP and on file with authors).

[233] *Id.* at 10–11.

[234] Letter from Lisa A. McClung, Director, WVDEP Division of Water and Waste Management, to CCC (Sept. 5, 2007) (available from WVDEP and on file with authors). This approach stands in contrast to Clean Water Act § 302(b)(2)(A), which authorizes EPA to grant modified effluent limits when an applicant is able to demonstrate that there is "no reasonable relationship between the economic and social costs and the benefits to be obtained (including attainment of the objective of this chapter) from achieving [a WQBEL]." 33 U.S.C. § 1312(b)(2)(A) (2013). This provision does not apply to states in establishing WQBELs in permits issued by state agencies. Homestake Mining Co. v. EPA, 477 F. Supp. 1279, 1286 (D.S.D. 1979).

[235] *See* Complaint, United States v. Consol Energy, Inc., No. 1:11cv-00028 (N.D.W. Va.).

[236] *See* United States v. Consol Energy, Inc., No. 1:11cv-00028 (N.D.W.Va.) (Declaration of Chad Harsh in Support of United States' Motion to Enter Consent Decree) (12, 27).

Obviously, treatment to achieve the West Virginia chloride water quality standards (which are identical to EPA's recommend criteria) is an expensive proposition. Although no analysis has been undertaken to determine how the availability of a hardness-based equation might have affected CCC's ability to achieve compliance at its northern West Virginia mines, it is reasonable to assume that at least some of the subject outlets could have obtained different chloride limits based on the more recent scientific studies and satisfied those limits without having to apply reverse osmosis technology. Indeed, at least one state agency (the Indiana Department of Environmental Management) has noted that use of equations based on hardness and sulfates will "in most instances [result in a standard] that is less stringent than the 230 mg/l [chronic] standard" (although the resulting acute standard may be lower).[237] That change, however, was driven by concerned individuals in the State of Indiana, rather than any effort by EPA to revise its 1988 criteria.

V. CONCLUSION: U.S. INDUSTRY IS SPENDING ENORMOUS RESOURCES ON ACHIEVING GOALS THAT HAVE NO DEMONSTRABLE ENVIRONMENTAL BENEFIT

Cost-benefit analysis ("CBA") must be employed in any governmental regulation of private activity, including the issuance of environmental rules. Otherwise, the government (or public interest groups via citizens suits) may well force industry to engage in irrational economic behavior, wasting scarce resources that could be put to more productive use in society.[238] Hence, CBA is a generally well-established principle in the federal regulatory policy structure.[239]

End-of-pipe effluent limits based on EPA-mandated water quality standards represent a form of nonmarket, "command and control" regulation of environmental externalities that has been identified as one of the least desirable

---

[237] IND. DEP'T ENVTL. MGMT., CHLORIDE AND SULFATE WATER QUALITY CRITERIA AMENDMENTS: ECONOMIC IMPACT OF THE RULE (Feb. 29, 2012), *available at* http://www.in.gov/idem/files/wpcb_2012_mar_11-320_factsheet.pdf.

[238] As one commentator put it, "[c]urrent selenium limits in other Appalachian states like West Virginia have helped the Sierra Club and other nonprofits force coal companies to hand over millions of dollars in fines and cleanup costs, but those standards are based on older EPA water criteria that were issued in [1987]." Sean McLernon, *EPA's Selenium Decision Will Transform Coal War*, LAW360 (Aug. 29, 2013, 5:38 PM ET), http://www.law360.com/articles/468561/epa-s-selenium-decision-will-transform-coal-war.

[239] Ted Gayer, *A Better Approach to Environmental Regulation: Getting the Costs and Benefits Right* 8 (The Hamilton Project, Discussion Paper 2011-06, 2011), *available at* http://www.brookings.edu/~/media/research/files/papers/2011/5/environment%20regulation%20gayer/05_environment_regulation_gayer_paper.pdf.

approaches in terms of maximizing societal benefits.[240] Obviously, this is especially so when the mandated performance standard bears no reasonable relationship to the overall goal of the regulatory program.

As described herein, in water quality standard-setting under the Clean Water Act, once water quality criteria have been published there is rarely *any* effort by the government to reconsider or re-assess whether the criteria remain rationally related to the Act's goals in light of continued advancements in scientific understandings of the effects of the various regulated pollutants on water resources and their uses. Moreover, even when such an effort is undertaken and the current water quality criteria come to be widely recognized as overly stringent, the process for revising those criteria (and the state water quality standards that are based upon them) is so unwieldy and slow that it virtually guarantees that significant resources are wasted in the interim.[241] Unfortunately, other potential forms of relief from outdated standards that are ostensibly available, such as variances and site-specific criteria, are so rarely granted by EPA that they are effectively meaningless.

Protection of our environmental resources through reasonable regulation aimed at internalizing industrial externalities is generally accepted as a proper governmental role. However, over-regulation in the form of outdated, excessively stringent water quality standards inflicts unnecessary harm to our economy, leading to loss of employment and development opportunities, and diminished faith in the efficacy of government regulation. Improvements in the process for revising water quality criteria to ensure that they remain scientifically justified, and granting exceptions where it is clear that they are not, would enhance both our economy and the public's views on the value of such regulatory programs.

---

240 *Id.* at 20.

241 Illustrative of the lack of concern with correcting overly-stringent criteria, EPA proposed new regulations on September 4, 2013, intended to clarify various key issues surrounding the water quality standards program. Water Quality Standards Regulatory Clarifications, 78 Fed. Reg. 54,518 (Sept. 4, 2013). Although EPA has proposed a rule that would impose a "re-examination" requirement on states to "assure that designated uses continue to be protected" in light of new or updated EPA criteria, the proposal notably does not address criteria that are *overly* restrictive or may no longer be necessary to protect water uses.