IN THE UNITED STATES DISTRICT COURT FOR THE SOUTHERN DISTRICT OF WEST VIRGINIA

CHARLESTON DIVISION

OHIO VALLEY ENVIRONMENTAL COALITION, INC., WEST VIRGINIA HIGHLANDS CONSERVANCY, INC., and SIERRA CLUB,

Plaintiffs,

v. CIVIL ACTION NO. 2:13-5006

FOLA COAL COMPANY, LLC,

Defendant.

MEMORANDUM OPINION AND ORDER

Pending before the Court is Defendant's oral Motion for Judgment on Partial Findings made at the close of Plaintiffs' case on August 20, 2014. ECF No. 111 at 158–61.[1] Upon hearing response from Plaintiffs and further reply from Defendant, the Court held the motion in abeyance. *Id.* at 161. For the reasons explained below, the Court **DENIES** Defendant's Motion for Judgment on Partial Findings.

I. BACKGROUND

Plaintiffs Ohio Valley Environmental Coalition ("OVEC"), West Virginia Highlands Conservancy, and Sierra Club filed this case pursuant to the citizen suit provisions of the Federal Water Pollution Control Act ("Clean Water Act" or "CWA"), 33 U.S.C. § 1251 et seq., and the Surface Mining Control and Reclamation Act ("SMCRA"), 30 U.S.C. § 1201 et seq. Compl., ECF

[1] In making its oral motion, Defendant used the terminology "directed verdict," ECF No. 111 at 158; there is no such motion in the Federal Rules of Civil Procedure. The Court understands Defendant's motion as a motion for judgment on partial findings pursuant to Rule 52(c) of the Federal Rules of Civil Procedure.

No. 1. Before proceeding to the parties' arguments, the Court will first discuss the relevant regulatory framework and then the factual background of this case.

A. Regulatory Framework

The primary goal of the CWA is "to restore and maintain the chemical, physical, and biological integrity of the Nation's waters." 33 U.S.C. § 1251(a). To further this goal, the Act prohibits the "discharge of any pollutant by any person" unless a statutory exception applies; the primary exception is the procurement of a National Pollutant Discharge Elimination System ("NPDES") permit. 33 U.S.C. §§ 1311(a), 1342. Under the NPDES, the U.S. Environmental Protection Agency ("EPA") or an authorized state agency can issue a permit for the discharge of any pollutant, provided that the discharge complies with the conditions of the CWA. 33 U.S.C. § 1342. A state may receive approval to administer a state-run NPDES program under the authority of 33 U.S.C. § 1342(b). West Virginia received such approval, and its NPDES program is administered through the West Virginia Department of Environmental Protection ("WVDEP"). 47 Fed. Reg. 22363-01 (May 24, 1982). All West Virginia NPDES permits for coal mining incorporate by reference West Virginia Code of State Rules § 47-30-5.1.f, which states that "discharges covered by a WV/NPDES permit are to be of such quality so as not to cause violation of applicable water quality standards promulgated by [West Virginia Code of State Rules § 47-2]." This is an enforceable permit condition. *See, e.g., OVEC v. Elk Run Coal Co., Inc.*, No. 3:12-cv-0785, 2014 WL 29562, at *3, 6 (S.D. W. Va. Jan. 3, 2014).

Coal mines are also subject to regulation under the SMCRA, which prohibits any person from engaging in or carrying out surface coal mining operations without first obtaining a permit from the Office of Surface Mining Reclamation and Enforcement ("OSMRE") or an authorized

state agency. 30 U.S.C. §§ 1211, 1256, 1257. A state may receive approval to administer a state-run surface mining permit program under the authority of 30 U.S.C. § 1253. In 1981, West Virginia received conditional approval of its state-run program, which is administered through the WVDEP pursuant to the West Virginia Surface Coal Mining and Reclamation Act ("WVSCMRA"). W. Va. Code §§ 22-3-1 to -33; 46 Fed. Reg. 5915-01 (Jan. 21, 1981). Regulations passed pursuant to the WVSCMRA require permittees to comply with the terms and conditions of their permits and all applicable performance standards. W. Va. Code R. § 38-2-3.33.c. One of these performance standards requires that mining discharges "shall not violate effluent limitations or cause a violation of applicable water quality standards." *Id.* § 38-2-14.5.b. Another performance standard mandates that "[a]dequate facilities shall be installed, operated and maintained using the best technology currently available . . . to treat any water discharged from the permit area so that it complies with the requirements of subdivision 14.5.b of this subsection." *Id.* § 38-2-14.5.c.

B. Factual Background

Defendant holds WV/NPDES Permit WV1014005 and West Virginia Surface Mining Permit S200995, which regulate Defendant's mining activities at Surface Mine No. 3, located in Clay and Nicholas Counties, West Virginia. Compl. ¶¶ 33-35. This mine's Outfall 29 discharges into Stillhouse Branch, close to the Branch's confluence with Twentymile Creek. *Id.* ¶ 36.

Defendant's WV/NPDES Permit WV1014005 incorporates by reference the WV/NPDES Rules for Coal Mining and Facilities found in Title 47, Series 30, which include § 47-30-5.1.f: "The discharge or discharges covered by a WV/NPDES permit are to be of such quality so as not to cause violation of applicable water quality standards promulgated by [West Virginia Code of State

Rules § 47-2]. . . ." WV/NPDES Permit WV1014005 § C (2009 renewal of permit, noting that, among the terms and conditions incorporated by reference from the WV/NPDES Rules for Coal Mining and Facilities are the provisions found in § 47-30-5.1), ECF No. 57-8. This incorporation by reference is in accordance with state rules, which require that the water quality standards rule—among other rules —"be incorporated into the WV/NPDES permits either expressly or by reference." W. Va. Code R. § 47-30-5.

West Virginia's narrative water quality standards are violated if wastes discharged from a surface mining operation "cause . . . or materially contribute to" 1) "[m]aterials in concentrations which are harmful, hazardous or toxic to man, animal or aquatic life" or 2) "[a]ny other condition . . . which adversely alters the integrity of the waters of the State." *Id.* § 47-2-3.2.e, -3.2.i. Additionally, "no significant adverse impact to the chemical, physical, hydrologic, or biological components of aquatic ecosystems shall be allowed." *Id.* § 47-2-3.2.i. In their Complaint, Plaintiffs allege that Defendant violated these narrative water quality standards and, therefore, the CWA and the SMCRA, by discharging excessive amounts of ionic pollution, measured as conductivity and sulfates, into the waters of West Virginia in violation of its WV/NPDES Permit and its West Virginia Surface Mining Permit.[2] Under the CWA, Plaintiffs are required to prove that Defendant has committed the alleged violation by a preponderance of the evidence. *Ohio Valley Envtl. Coal. v. Elk Run Coal Co., Inc.*, 2014 WL 2526569 (S.D.W.Va. June 4, 2014).

Pursuant to a Scheduling Order entered June 21, 2013, ECF No. 16, this case is proceeding in two phases. In Phase I, the Court will resolve jurisdictional and liability issues. In Phase II, if

[2] The Complaint also alleges that Defendant violated these statutes by discharging excessive amounts of selenium into the waters of West Virginia. However, the parties subsequently filed a joint motion to dismiss the claims relating to selenium, ECF No. 72, which this Court granted, ECF No. 75. Therefore, Plaintiffs' selenium claims need not be discussed.

necessary, the Court will determine appropriate injunctive relief and civil penalties. On August 19–22, 2014, the Court held a bench trial to consider Phase I issues of jurisdiction and liability. ECF Nos. 97, 98, 100, and 101. On August 20, 2014, at the close of Plaintiffs' case in chief, Defendant orally moved for judgment on partial findings, arguing that Plaintiffs had failed to present evidence showing that Defendant had discharged a pollutant into Stillhouse Branch. ECF No. 111 at 158–61. After hearing oral argument on the motion, the Court held the motion in abeyance. *Id.* at161. On August 25, 2014, after the conclusion of Phase I proceedings, the Court ordered the parties to brief the threshold issue of plaintiffs' burden. ECF No. 102.

II. ANALYSIS

The question before the Court is whether Plaintiffs have provided evidence sufficient to support the allegation that Defendant has discharged excessive amounts of ionic pollution, measured as conductivity and sulfates, into Stillhouse Branch in violation of Defendant's permits. Pursuant to Rule 52(c) of the Federal Rules of Civil Procedure, a Court may enter judgment based on partial findings in a bench trial. The rule states:

> If a party has been fully heard on an issue during a nonjury trial and the court finds against the party on that issue, the court may enter judgment against the party on a claim or defense that, under the controlling law, can be maintained or defeated only with a favorable finding on that issue. The court may, however, decline to render any judgment until the close of the evidence. A judgment on partial findings must be supported by findings of fact and conclusions of law as required by Rule 52(a).

Fed. R. Civ. P. 52(c). For purposes of this motion, the Court will look to evidence introduced by Plaintiffs during Phase I proceedings to determine whether judgment against Plaintiffs is appropriate at this early stage.

Defendant argues that Plaintiffs have failed to meet their burden of showing that a pollutant is causing a violation of West Virginia's narrative water quality standards. ECF No. 104 at 2. In

support of this contention, Defendant principally relies on two arguments. First, Defendant offers that Plaintiffs' evidence supporting some causal link between high conductivity and failing West Virginia Stream Condition Index ("WVSCI") scores applies only to a particular mixture of constituent ions; therefore, Plaintiffs must show that Stillhouse Branch also has that same mixture of constituent ions, namely sulfate, biocarbonate, calcium, and magnesium. ECF No. 104 at 3–5. Because Plaintiffs' admitted evidence does not include bicarbonate and magnesium, Defendant concludes that Plaintiffs have failed to demonstrate that Defendant discharged a pollutant is causing a violation of West Virginia's narrative water quality standards. *Id.*

Second, Defendant offers that conductivity is not a "pollutant" that is causally linked to depressed WVSCI scores. *Id.* at 5–6. Because conductivity is a mere proxy for ionic pollution, and is not itself the cause of toxic effect, Defendant concludes that Plaintiffs have not demonstrated discharge of a pollutant. *Id.* In its reply brief, Defendant further asserts that in order to use an indicator, like conductivity, EPA's NPDES rules, specifically 40 C.F.R. § 122.44(d)(1)(vi), require that the permitting agency first determine the specific pollutants that have no numeric standard, but might otherwise cause a violation of narrative water quality standards. ECF No. 106 at 3–4. Without adhering to the requirements of 40 C.F.R. § 122.44(d), Defendant concludes it is inappropriate to rely on conductivity to find a NPDES violation. *Id.*

Plaintiffs respond that they have met the burden of showing discharge of a pollutant that causes or materially contributes to impairment by showing that Defendant discharged alkaline mine drainage and high levels of sulfates and dissolved solids, measured as conductivity, both of which are recognized as pollutants under the CWA and SMCRA. ECF No. 105. Agreeing that conductivity itself is not a pollutant, Plaintiffs nonetheless maintain that they have presented

sufficient evidence to show that the particular high conductivity discharges by Defendant are of a characteristic composition known to cause or materially contribute to biological impairment in central Appalachian streams. *Id.* Finally, Plaintiffs contend that 40 C.F.R. § 122.44(d)(1)(iv) is applicable only with respect to administrative determinations by state agencies in deciding what effluent limits to include in NPDES permits, and thus it has no relevance here. ECF No. 109.

As an initial matter, the Court agrees that in order to prevail Plaintiffs are required to show discharge of a pollutant that causes or materially contributes to impairment. The Court further recognizes that conductivity itself is not a pollutant, but rather is a measure of ionic pollution, which depending on composition, may or may not cause or materially contribute to impairment. As a matter of law, Plaintiffs' burden is therefore to show that the high conductivity measured at Stillhouse Branch is composed of some mixture of ions that is known to cause or materially contribute to impairment. Here, Plaintiffs have met that burden. The Court makes the following findings in reaching that conclusion.

1. *EPA's Benchmark is applicable to this region precisely because there is sufficient similarity in the composition of ionic pollution to enable use of conductivity as an indicator for pollutants causing impairment.*

In March 2011, the EPA released "A Field-Based Aquatic Life Benchmark for Conductivity in Central Appalachian Streams" ("EPA's Benchmark"). Joint Ex. 58. EPA's Benchmark is within the core of the agency's authority as a scientific study, within its area of expertise, regarding the causal relationship between conductivity levels and biological impairment. *Cf. Envtl. Def. Ctr., Inc. v. U.S. E.P.A.*, 344 F.3d 832, 869 (9th Cir. 2003) ("We treat [the] EPA's decision with great deference because we are reviewing the agency's technical analysis and judgments, based on an evaluation of complex scientific data within the agency's

technical expertise."). Plaintiffs relied on EPA's Benchmark as one among a number of scientific studies supporting Plaintiffs' general causation argument that high conductivity levels in a particular region of central Appalachia consistently lead to the extirpation of sensitive benthic macroinvertebrates, and as a result, impairment.

Designed with the purpose of protecting aquatic life in the region, EPA's Benchmark "uses field data to derive an aquatic life benchmark for conductivity that can be applied to waters in the Appalachian Region that are dominated by salts of Ca^{2+}, Mg^{2+}, SO_4^{2-} and HCO_3^- at circum-neutral to mildly alkaline pH." Joint Ex. 58 at JE381; *see also*, Testimony of Dr. Palmer, ECF No. 110 at 61 (Explaining the benchmark as "describing the work [EPA] did to establish a relationship between extirpation of organisms and conductivity."). Because the "salt matrix and background is expected to be similar throughout the ecoregions," EPA's Benchmark is applicable to those parts of West Virginia and Kentucky within Ecoregions 68, 69, and 70. *Id.* at JE382. As explained in the Executive Summary, key advantages to the field-based methodology include that the benchmark "represents the actual exposure conditions for elevated conductivity in the region, the actual temporal variation in exposure, and *the actual mixture of ions* that contribute to salinity as measured by conductivity. *Id.* at JE381 (emphasis added).

Salinity can result from a variety of sources. *Id.* at JE384. Potential sources of elevated salinity include reduced flow due to evaporation or diversions, salt water intrusion, addition of brines or wastes, minerals dissolved from surrounding rocks, and road runoff. *Id.* EPA's Benchmark notes that "prominent sources of salts in Ecoregions 69 and 70 are mine overburden and valley fills from large-scale surface mining, but they may also come from slurry impoundments, coal refuse fills, or deep mines. Other sources include effluent from waste water

treatment facilities and brines from natural gas drilling and coalbed methane production." *Id.* at JE386. It is precisely because water in the examined regions is so consistently and uniformly dominated by a distinct mixture of ionic pollutants that setting a benchmark for the Appalachian Region is possible. *Id.* ("Because relationships between conductivity and biological responses appear to vary among different mixtures of ions, this benchmark is limited to two contiguous *regions with a particular dominant source of salinity*.") (emphasis added).

Defendant calls attention to comments made by EPA's Science Advisory Board ("SAB") in summarizing its review of EPA's Benchmark. ECF No. 104 at 5. In those review comments, SAB noted that "the scientific credibility of the benchmark would be strengthened by analysis relating the constituent ions to observed biological community changes." Pl. Ex. 25 at PE371. Defendant further notes that, on final publication, EPA's Benchmark acknowledges that "[t]his causal assessment does not attempt to identify constituents of the mixture that account for the effects." Joint Ex. 58 at JE468. Similarly, when EPA employees Suter and Cormier produced a series of articles published in *Environmental Toxicology and Chemistry* relating to EPA's Benchmark, they noted that their "causal assessment does not attempt to identify constituents of the mixture that account for the effects." Pl. Ex. 5 at PE93.

Defendant's arguments along these lines ultimately do little to suggest that identification of the constituent ions or a precisely determined mixture of ions is absolutely scientifically necessary to establish a causal relationship between high conductivity and impairment in this region. As an initial matter, it would be a logical error to conclude that a study is weak based on identification of a way that study might be "strengthened." That the SAB observed that EPA's Benchmark might be improved by further research and analysis does not suggest to the Court that the SAB considered it

to be weak or otherwise scientifically unsupportable. To the contrary, immediately preceding the comment highlighted by Defendant, SAB explained that "[a]lthough conductivity is a surrogate measure for the constituent ions that may contribute to toxicity, the resulting benchmark provides a degree of protection comparable to, if not greater than, a conventional water quality criterion based on traditional chronic toxicity testing." Pl. Ex. 25 at PE371. The SAB observed that the benchmark was derived from an "extensive data set from West Virginia" and "independent data … was an important validation of the approach …" which supported its applicability to this geographic region and ionic mixture. *Id*. Consistent with the published literature, the SAB further noted in its review that EPA's Benchmark similarly "presents a convincing case" for the underlying linkages necessary to determine a causal relationship between conductivity and loss of macroinvertebrates. Pl. Ex. 25 at PE383; ECF No. 110 at 73.

Not only is it evident that SAB was satisfied with the rigor and precision of EPA's Benchmark, but subsequent publication by Suter and Cormier in the peer-reviewed scientific literature further suggests the adequacy of EPA methods and conclusions. Pl. Exs. 3, 4, 5, 6, 7, and 8. While it is absolutely the case that these papers all accept the proposition that conductivity itself is not a pollutant, that alone does not undermine Plaintiffs' case. It must be remembered that EPA's Benchmark looked to this particular region in which waters are known to be dominated by a particular mixture of constituent ions related to surface mining. On the basis of that known characteristic mixture, EPA was able to develop a regionally specific benchmark that has been accepted by the scientific community, as evident by peer-reviewed publication, and characterized by the SAB as providing protection comparable to or greater than what might be achieved through chronic toxicity testing.

Thus, while it is readily understood that conductivity is not itself a pollutant, it is nonetheless clear that in this region, if the site is impacted by surface mining or valley fills and there is high conductivity at that site, it is more likely than that biological impairment, as measured by WVSCI, will result.

2. *Plaintiffs produced further published, peer-reviewed literature demonstrating a connection between high conductivity and impairment of central Appalachian streams impacted by surface mining.*

Plaintiffs do not stand only on EPA's Benchmark, but also on a formidable collection of peer-reviewed, published scientific studies and the testimony of two experts, all finding a connection between high conductivity and impairment in central Appalachian streams impacted by alkaline mine drainage.

According to Dr. Palmer, the relationship between surface mining, alkaline mine drainage, and ionic stress is firmly established in the published scientific literature. Testimony of Dr. Palmer, ECF No. 110 at 26. She opined that alkaline discharges with high concentrations of sulfates, and accompanied by high conductivity, are characteristic of mine drainage in this region. *Id.* at 23–26. Furthermore, Dr. Palmer reported that some twenty articles including over fifty authors examine the relationship between taxonomic composition and conductivity. *Id.* at 26, 28–29. At the time of her testimony, Dr. Palmer was aware of no published, peer-reviewed papers contradicting the broadly supported conclusion in the literature that there is a strong relationship between high conductivity and impairment. *Id.* at 30, 74.

Like Dr. Palmer, Dr. King offered testimony that studies have consistently shown that the ions associated with conductivity from mine discharges cause impairment. Testimony of Dr. King, ECF No. 110 at 212. For instance, Dr. King explained that the mixture of ions elevating specific

conductance, or conductivity, in this region has a known effect on aquatic macroinvertebrates, particularly mayflies, independent of other potentially confounding factors. *Id.* at 211 (explaining the significance of Merriam, et al, Additive Effects of Mining and Residential Development on Stream Conditions in Central Appalachia, 30(2) *Journal of N. Am. Benthological Soc'y* 399 (2011), Pl. Ex. 12). As articulated by Merriam, et al., and published in the *Journal of the North American Benthological Society*, now *Freshwater Science*:

> Our results are similar to those of recent studies that have identified changes in water quality to be the dominant stressor in mined systems. Increased specific conductance is consistently the dominant stressor in streams affected by mountaintop removal mining in southern West Virginia. . . . Our results corroborate those of numerous studies in which Ephemeroptera was identified as one of the most sensitive taxa to increases in ionic strength associated with large-scale surface mining in the central Appalachian region.

Pl. Ex. 12 at PE168 (internal citations omitted); ECF No. 110 at 210–11. The scientists responsible for drafting these articles, as well as the collection of scientists that would have considered the reliability and quality of the methodology and conclusions therein in the course of peer-review, were evidently satisfied to conclude that, when considering mining impacted streams in southern West Virginia, high conductivity, without further constituent analysis, was causing biological impairment.

Like EPA, these scientists rely on conductivity, without specifically identifying constituent ions, based on regionally common sources resulting in a characteristic ionic mixture. In Dr. King's expert opinion, the main constituent ions influencing conductivity levels in alkaline mine drainage found in West Virginia streams are bicarbonate, sulfate, calcium, and magnesium. Testimony of Dr. King, ECF No. 110 at 215. Dr. King further explained that Mr. Gregory Pond's findings are consistent with what is "almost a mountain of literature now that repeatedly shows a series of taxa,

mostly mayflies, that are highly sensitive to conductivity associated with surface mines." *Id.* at 217. In other words, not simply conductivity levels, but conductivity levels in particularly affected waters in the region with a resultantly common ionic composition, is known across the scientific literature to cause biological impairment.

Moreover, despite the significant potential for different data and methodologies to yield different results, researchers consistently identified remarkably similar thresholds at which high conductivity at sites in this region would suffer biological impairment. In "How Many Mountains Can We Mine? Assessing the Regional Degradation of Central Appalachian Rivers by Surface Coal Mining," ("How Many Mountains"), Pl. Ex. 2, a paper co-authored by Dr. King and published in *Environmental Science and Technology*, researchers identified a threshold for impairment as measured by both WVSCI and GLIMPSS at conductivity levels of 308 µS/cm. Testimony of Dr. King, ECF No. 111 at 10. These researchers also identified a similar threshold for impairment using the TITAN method, derived to identify a community-level threshold, at conductivity levels of 283 µS/cm. *Id.* at 9–10. Both findings are remarkably close to the impairment threshold of 297 µS/cm identified in EPA's Benchmark which used species sensitivity distribution. *Id.*

Multiple studies have similarly categorized macroinvertebrates as variously sensitive or tolerant to conductivity levels, and they have reached these similar classifications through distinct methods and relying on distinct datasets. *Compare* Gregory J. Pond, et al, "Long-Term Impacts on Macroinvertebrates Downstream of Reclaimed Mountaintop Mining Valley Fills in Central Appalachia, *Environmental* Management, July 3, 2014 ("Pond 2014"), Pl. Ex. 19 at PE294, *with* How Many Mountains, Pl. Ex. 2 at PE24. These studies reached similar results with respect to

alkaline mine drainage whether considering responses to sulfates particularly—one of the four constituent ions known to be common in alkaline mine drainage with high conductivity—or responses to ionic pollution generally as measured by conductivity. Testimony of Dr. King, ECF No. 110 at 224-25 (comparing findings of Pond 2014 and How Many Mountains). These same similarities in macroinvertebrate responses are further shared in EPA's Benchmark findings of macroinvertebrate response to conductivity levels in waters within Ecoregions 68, 69 and 70. Testimony of Dr. King, ECF No. 110 at 226-28 (reviewing Joint Ex. 58 at JE525). While there is bound to be some uncertainty in virtually every scientific analysis, these studies epitomize an ideal scientific process whereby multiple researchers have approached a question by examination of discrete datasets, employing distinct methodologies, and yet consistently reaching the same general conclusion.

Despite the apparent consensus within the scientific community, Defendant points to this same of body of literature to support the proposition that there is material variation in the ionic mixture of mine waters, particularly focusing on the Kuntz, et al., paper, "Use of Reconstituted Waters to Evaluate Effects of Elevated Major Ions Associated with Mountaintop Coal Mining on Freshwater Invertebrates," Pl. Ex. 10. ECF No. 104 at 4-5. In the Kuntz study, researchers reconstituted water mixtures to match those found at three different mine sites, namely Winding Shoals, Boardtree, and Upper Dempsey. Pl. Ex. 10 at PE140. All three had high levels of conductivity; however, they did not all share the same mixture of constituent ions and one site differently affected aquatic organisms. *Id.* Defendant correctly restates what the authors parenthetically explained: that two of these waters—Winding Shoals and Boardtree—contained elevated levels of magnesium, calcium, potassium, sulfate, and bicarbonate. ECF No. 104 at 5.

Defendant also correctly restates the authors' further parenthetical description of the final water body—Upper Dempsey—which had a different mixture of constituent ions and was not toxic to mayflies. *Id.* On this basis, Defendant argues that "the components of the mixture matter," and therefore Plaintiffs must identify evidence specifically identifying the mixture of constituent ions at Stillhouse Branch. ECF No. 104 at 5.

Defendant's argument, however, focuses on parenthetical detail without addressing the surrounding text provided by the authors. More fully, the abstract explains that "[t]wo of the reconstituted waters had ionic compositions *representative of alkaline mine drainage* associated with mountaintop removal and valley fill-impacted streams and a third reconstituted water had an ionic composition *representative of neutralized mine drainage*." Pl. Ex. 10 at PE140 (parenthetical elaborations omitted) (emphasis added). These descriptions, when read in their entirety, are better understood to suggest that ionic mixtures found in alkaline discharges are distinguishable from neutralized mine drainage. However, it introduces no suggestion of variation in the composition of ionic pollution among sites representative of alkaline mine drainage. Accordingly, it does nothing to contradict the otherwise accepted notion that high conductivity observed at sites impacted by alkaline mine drainage is dominated by a common set of constituent ions. This commonality across alkaline mine drainage sites is sufficiently compelling that the absence of magnesium levels in Plaintiffs' case in chief does little to detract from Plaintiffs' evidence otherwise meeting the applicable evidentiary standard, provided, of course, that Plaintiffs also demonstrated that the waters at Stillhouse Branch more likely than not share this common composition.

3. *Based on evidence produced by Plaintiffs, the Court finds that Plaintiffs have shown that Defendant's mining activities caused high levels of conductivity and sulfates in Stillhouse Branch.*

Plaintiffs produced evidence supporting a finding that Stillhouse Branch has high levels of conductivity and sulfates. This evidence begins with pre-mining water quality data. According to a Stipulation of the parties filed June 3, 2014, ECF No. 52, Joint Ex. 43, Defendant reported baseline surface water analysis in its 1996 mining permit application. That baseline data included samples taken roughly monthly from December 1994, through May 1995, and reported conductivity ranging from 47 µS/cm to 104 µS/cm and sulfates ranging from 4 mg/L to 22 mg/L. Joint Ex. 43 at JE126.

After mining had commenced, samples taken by WVDEP at Stillhouse Branch from 2003 through 2012 showed conductivity ranging from 2,610 µS/cm on May 9, 2012, to 3,964 µS/cm on May 12, 2004. *Id.* at JE127–28. All of the recorded samples taken by WVDEP during this time period reported conductivity levels above 300 µS/cm. *Id.* Dr. Palmer characterized these numbers as significantly elevated relative to the pre-mining sampling data. Testimony of Dr. Palmer, ECF No. 110 at 88–89.

Also after mining had commenced, samples taken by WVDEP at Stillhouse Branch showed sulfate levels consistently above 1,500 mg/L, in some instances nearly as high as 3,000 mg/L. Joint Ex. 43 at JE127–28. Not only are these measurements extremely high relative to the background sulfate levels, but the measurements are also well above the 50 mg/L threshold identified by WVDEP as indicative of mining impacts. *See* Testimony of Dr. Palmer, ECF No. 110 at 92.

Again, also after mining had commenced, more than half of the bi-monthly samples taken by Defendant at Outfall 029 from October 2011 through December 2012 showed conductivity

above 3,000 µS/cm. Joint Ex. 43 at JE129. All bi-monthly samples collected by Defendant during this time period reported conductivity levels above 300 µS/cm. *Id.*

Plaintiffs' expert Evan Hansen analyzed water samples taken on September 30, 2013, at Outfall 29 and in Stillhouse Branch. *See* Joint Ex. 4 at JE25.[3] Hansen reported conductivity measurements of 2,826 µS/cm at the outfall and 2,825 µS/cm in the stream. *Id.*

Plaintiffs introduced evidence from multiple sources showing that conductivity at Stillhouse Branch is appreciably elevated, consistently resulting in measurements above 3,000 µS/cm, and that these elevated measurements occurred coincident to Defendant's mining activity in the Stillhouse Branch watershed. Similarly, Plaintiffs introduced evidence from multiple sources showing that sulfate levels at Stillhouse Branch are appreciably elevated and that these elevated levels occurred coincident to Defendant's mining activity in the Stillhouse Branch watershed. On the basis of this evidence, the Court finds that Plaintiffs have produced evidence showing that Defendant's discharges caused high levels of conductivity and sulfates in Stillhouse Branch.

4. The Court further finds that Stillhouse Branch is biologically impaired.

Plaintiffs produced evidence to support the finding that Stillhouse Branch is biologically impaired. This finding is most plainly based on the uncontroverted fact that West Virginia's 2012 Section 303(d) List reports Stillhouse Branch as biologically impaired throughout the entire length of the stream, noting mining as the source of impairment. Joint Ex. 59 at JE693.

Not only is Stillhouse Branch recognized by the state and reported to EPA as impaired, but Plaintiffs' experts also confirmed the biological impairment at Stillhouse Branch. West Virginia

[3] Outfall 29 samples were taken at the bottom of the spillway. Pl. Ex. 4.

relies on the West Virginia Stream Condition Index ("WVSCI"), a multimetric index, to assess whether waters are biologically impaired. Streams with a WVSCI score below 68 are considered biologically impaired. The EPA also uses a multimetric index to assess impairment, but the EPA's methodology examines aquatic life at a higher order of specificity. This more precise multimetric index is known as "GLIMPSS." According to Dr. Palmer, a GLIPMSS score of 53 indicates impairment. Testimony of Dr. Palmer, ECF No. 110 at 80.[4] Sampling conducted by Plaintiffs' expert, Dr. Christopher Swan, on September 30, 2013, returned a WVSCI score of 58.17, and a GLIMPSS score of 27.71, both below the respective impairment thresholds for each multimetric index. Joint Ex. 13. On the basis of this evidence, the Court finds that Plaintiffs have offered sufficient evidence showing impairment.

5. *The Court further finds that Stillhouse Branch is a central Appalachian stream impacted by surface coal mining activities, particularly alkaline mine drainage.*

Plaintiffs produced evidence showing that Stillhouse Branch is a central Appalachian stream impacted by surface coal mining activities. As already noted, in its 2012 303(d) listing, WVDEP reported mining as the cause of biological impairment at Stillhouse Branch. Joint Ex. 59 at JE693. This conclusion reached by WVDEP and shared by Plaintiffs' experts is supported by the fact that mining covers over 90% of the Stillhouse Branch watershed. Testimony by Dr. Palmer, ECF No. 110 at 78. Dr. Palmer conducted sampling at Stillhouse Branch, just below Outfall 29. Dr. Palmer noted no impacts other than the mine upstream of her sampling location. *Id.* Additional downstream impacts include culvert piping and a road crossing. *Id.* While these

[4] The Court recognizes that GLIMPSS does not provide a legal standard to determine impairment in West Virginia and relies on this evidence only insofar as it helps to indicate the relative quality of the aquatic ecosystem of the stream.

downstream features have the potential to impact water quality, they certainly could not be identified as a source of impairment found by Plaintiffs' expert at upstream sampling locations.

Furthermore, there is no indication that the impairment observed by WVDEP and Plaintiffs' experts might have resulted from any of the other sources for high conductivity noted in EPA's Benchmark and discussed above. Most notably, there is no indication of gas drilling operations within the Stillhouse Branch watershed, an activity expected to potentially "shift the toxicity of salinity in this region." Joint Ex. 58 at JE408. As observed by the EPA, mining discharges and gas drilling discharges have distinguishable ionic composition, with the former being dominated by sulfate, bicarbonate, calcium and magnesium and while the latter is dominated by sodium and chloride. *Id.* at JE408–09. In short, there is clear and uncontroverted evidence that high conductivity at Stillhouse Branch is a result of alkaline mine drainage.

Consistent with the foregoing analysis, Dr. Palmer offered that, in her opinion, data showing "very high levels of conductivity and sulfate and in some cases selenium" is causing biological impairment at Stillhouse Branch. Testimony of Dr. Palmer, ECF No. 110 at 21. Dr. Palmer further testified that this case concerns ionic pollution of alkaline mine drainage, a particular type of water "that's characteristic of this particular region in the Appalachians." *Id.* at 24. Commenting on the markedly high conductivity measurements consistently reported at Stillhouse Branch, Dr. Palmer testified that "[o]ther than in the mining area, [she has] never noted [conductivity] that high in any other streams." *Id.* at 90. In Dr. Palmer's opinion, there is "absolutely no question" that elevated conductivity resulting from alkaline mine drainage is the cause of impairment at Stillhouse Branch. *Id.* She reached this conclusion without specific

measurements from Stillhouse Branch of each of the four constituent ions known to be characteristic of similarly affected waters in this region.

6. EPA's NPDES rules found at 40 C.F.R. § 122.44(d)(1)(iv) have limited application and are not applicable to the case at hand.

Finally, Defendant's reply brief argues for the application of 40 C.F.R. § 122.44(d)(1)(iv), claiming that these NPDES rules require that "to serve as an 'indicator' or surrogate, the permitting agency must determine that there are specific pollutants that have no numeric standards, but which, absent indirect control, will cause a violation of the narrative standards at a specific location." ECF No. 106 at 4. Section 122.44 speaks to the requirements for establishing limitations, standards, and other permit conditions applicable to State NPDES programs. 40 C.F.R. § 122.44. Quite simply, in the case at hand, Plaintiffs are not seeking to require West Virginia to establish or adopt an effluent limit for conductivity. Plaintiffs instead seek to prove that Defendant's discharges into Stillhouse Branch constitute a violation of an already established and enforceable condition of West Virginia NPDES permits. In developing the narrative water quality standard that Plaintiffs seek to enforce, West Virginia has operated well within its authority pursuant to 40 C.F.R. § 131.3(b), which provides that "[c]riteria are elements of State water quality standards, expressed as constituent concentrations, levels, or *narrative statements*, representing a quality of water that supports a particular use." 40 C.F.R. § 131.3(b) (emphasis added). Section 40 C.F.R. § 122.44(d) is simply inapplicable here.

III. CONCLUSION

If the Court were considering high conductivity relating to, say, a residential development in Arizona, Plaintiffs evidence as presented here may well have been insufficient. But that is

simply not the case here. In alleging a CWA violation for discharge of alkaline mine drainage with high levels of conductivity and sulfates, Plaintiffs have presented evidence showing that through a variety of methods and examining a range of data, numerous researchers have come to a generally consistent conclusion: high conductivity at central Appalachian sites associated with alkaline mine drainage is dominated by a unique mixture of ions and that particular variety of ionic pollution is known to cause or materially contribute to biological impairment. Thus, while conductivity may not generally be considered a pollutant, in this unique and well-studied region, it is a reasonable proxy for specific ionic pollutants known to cause violations of West Virginia's narrative water quality standards. The Court reserves judgment on whether Plaintiffs have met their ultimate persuasive burden of showing that a violation occurred by a preponderance of the evidence, and here concludes merely that the character and quantity of evidence presented by Plaintiffs is sufficient to defeat a motion for judgment on partial findings.

For the reasons stated above, the Court **DENIES** Defendant's oral Motion for Judgment on Partial Findings.

The Court **DIRECTS** the clerk to send a copy of this written Opinion and Order to counsel of record and any unrepresented parties.

ENTER: September 30, 2014

ROBERT C. CHAMBERS, CHIEF JUDGE