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September 4, 2014

Jackie Shultz, Clerk
Environmental Quality Board
601 57th Street, SE
Charleston, WV 25304

**Re: Keenan, et al. v. WV DEP
Environmental Quality Board
Appeal No.: 14-04-EQB**

Dear Clerk Shultz:

Enclosed for filing are an original and six copies of Appellant's Brief and a Certificate of Service. Copies have been served upon all interested parties.

If you should have any questions, do not hesitate to contact me.

Respectfully,

Thomas A. Rist

Enclosures

cc: Jason Wandling, Esq., WV DEP
Danny Webb Construction Co., Inc.
Bradley Keenan
Natural Resources Defense Council
WV Surface Owners' Rights Organization
Plateau Action Network



100% RECYCLED
100% POST CONSUMER CONTENT

**WEST VIRGINIA ENVIRONMENTAL QUALITY BOARD
CHARLESTON, WEST VIRGINIA**

BRADLEY KEENAN,
NATURAL RESOURCES
DEFENSE COUNCIL,
WV SURFACE OWNERS'
RIGHTS ORGANIZATION, and
PLATEAU ACTION NETWORK,

Appellants,

v.

Appeal No.: 14-04-EQB

DIRECTOR, DIVISION
OF WATER AND WASTE MANAGEMENT,
WEST VIRGINIA DEPARTMENT OF
ENVIRONMENTAL PROTECTION;

Appellee.

APPELLANT'S BRIEF

Appellants Bradley Keenan, Natural Resources Defense Council, WV Surface Owners' Rights Organization, and Plateau Action Network, through counsel, Rist Law Offices, by Thomas A. Rist, submit the following brief pursuant to the order of the board and request that the board either reverse or vacate the permit issued by the WV DEP in this matter.

I. PROCEDURAL HISTORY

On October 25, 2007, Danny E. Webb Construction, Inc. ("Webb") was issued UIC Permit Number UIC2Do190460. (CR 551). The letter issuing the permit provided that the "duration of the permit is for a period of five (5) years. *Id.* The permit therefore expired on October 25, 2012. On January 3, 2013, Webb submitted a renewal application. (CR 395). The UIC permit at issue was reissued by the WV DEP on

February 6, 2014. (CR 6). The appellants filed an appeal of the permit on March 3, 2014.

The next day, the WV DEP issued an order revoking the permit. (CR 9). However, the WV DEP concurrently issued Order 2014-UIC-13, which mirrored many of the provisions of the original February 6, 2014 permit. (CR 1). Restated, the order revoking the permit granted Webb the ability to continue injection.

The appellants therefore dismissed the original appeal and filed an appeal of the second order on March 17, 2014. It is from this appeal that the subject case arises. On June 12, 2014, the parties appeared before the board to present testimony on the issues raised by the appellants.

II. THE ORDERS ISSUED ON MARCH 4, 2014 DO NOT REVOKE THE PERMIT ISSUED AND ALLOW WEBB TO CONTINUE INJECTION UNABATED

When the WV DEP “revoked” the permit issued to Webb on March 4, 2014, the order that was issued did not actually “revoke” any activities of Webb. To the contrary, the revocation order follows almost exactly the earlier permit issued to Webb. One key difference is that the order states in Paragraph 8 that the permit was revoked due to “procedural deficiencies”:

8. Due to certain procedural deficiencies with regard to the February 6, 2014 Permit No. UIC 2D0190460, Permit No. UIC2D0190460 was revoked by ORDER of this Office dated March 4, 2014.

What is completely unclear from the revocation order, the original permit, and the certified record in this case is exactly what procedural deficiency caused this revocation and why the DEP chose to revoke the permit yet allowed Webb to carry on business as usual. The failure of the revocation order to clearly state what deficiencies were present is a violation of the West Virginia Water Pollution Control Act. “Any order

of revocation, suspension or modification made and entered pursuant to this subsection ...shall specify the reasons for such revocation, suspension or modification...” W. Va. Code § 22-11-11(h). The vagueness of “procedural deficiencies” simply does not meet this standard.

III. THE ONGOING INJECTION AT THIS WELL WHEN A PERMIT EXPIRES OR HAS BEEN REVOKED IS UNLAWFUL

There are two separate issues that are raised by the appellants regarding continued injection at the well. First, Webb continued injection into this well after the expiration of the 2007 permit issued by the WV DEP. The prior permit terminated on October 25, 2012 and injections continued after that date. This injection occurred before the reissuance of the permit in violation of 47 CSR 13-13.2.a, 47 CSR 13-13.12.b and W. Va. Code § 22-11-8(b).

47 CSR 13-13.2.a states that “underground injections not authorized by rule or permit are prohibited.” Additionally, 47 C.S.R. 13-13.12.b places the duty on Webb to reapply for a permit if they wish to continue activity regulated by the original permit:

Duty to Reapply. If the permittee wishes to continue activity regulated by this permit after the expiration date of the permit, the permittee must apply for and obtain a new permit.

This rule follows the West Virginia Water Pollution Control Act, which makes a permit necessary for the type of operation being conducted by Webb. See W. Va. Code § 22-6-7(b)(6). From October 25, 2012 until February 6, 2014, Webb operated an injection well without a permit. Importantly, Webb did not even reapply for the current permit during the time that the prior permit was active. Instead, the permit expired on October 25, 2012 and reapplication did not occur until more than two months later. (CR

395). This is undisputed evidence that Webb was operating a well without a permit and the WV DEP failed to take any actions to prevent this from occurring.

Webb's operation of an injection well after the permit expired is also a violation of federal law. Federal law allows state-issued UIC permits to continue in effect after expiration only if (1) the permittee has submitted a complete and timely application for a new permit, (2) through no fault of the permittee the new permit is not issued with an effective date on or before the previous permit's expiration, and (3) state law allows for a UIC permit to continue in effect until the effective date of a new permit. 40 C.F.R. § 144.37. None of these three requirements were fulfilled for the permit in question. A complete and timely application was not submitted before the permit expired, much less far enough in advance that the issuance of the permit before the previous permit expired was not the fault of the permittee. And West Virginia state law does not allow for the continuation of the permit. As noted above, West Virginia law requires a permittee to "apply for and obtain a new permit." 47 C.S.R. 13-13.12.b (emphasis added). Therefore, Webb's continued operation of the site violated federal legal standards for the operation of state Underground Injection Control (UIC) programs.

The second issue raised by appellants regarding the continued injection is that the well is currently being operated under an order that "revoked" the prior permit, but then granted the ability to continue injection. Stated more simply, the WV DEP has issued an order allowing injection at the site to continue, yet there are admitted deficiencies with the permit that need to be corrected. As such, the permit and/or order violate the West Virginia Water Pollution Control Act, W. Va. Code § 22-11-1 *et seq.* and the West Virginia Groundwater Protection Act, W. Va. Code § 22-12-1 *et seq.*

The Injection Reauthorization Order also purports to authorize injection activities *indefinitely*. The order merely states that injection is authorized “until such time as a reissuance application package is submitted by Danny E. Webb Construction, Inc. and a permit is reissued by this Office or is explicitly denied.” (CR 2). No deadline for resubmission of an application package is provided. The DEP does not have the authority under state or federal law to authorize injection activities indefinitely. West Virginia regulations specifically provide that permits for Class II injection wells “shall be effective for a fixed term not to exceed five (5) years,” 47 CSR 13-13, and the DEP cannot circumvent this rule by issuance of an order with no clear basis in law.

Additionally, federal law requires that state UIC programs prohibit underground injection unless authorized by a permit. 42 U.S.C. § 300h (b)(1)(A). Federal approval of West Virginia’s state UIC program was contingent upon the state’s compliance with this law, and the state cannot simply authorize injection via other means when a permit cannot be legally issued, as is apparently the case here.

IV. THE PROPOSED WORK AT THIS WELL IS DAMAGING PUBLICLY OWNED RESOURCES AND THE PERMIT FAILS TO PROTECT FRESH WATER SOURCES OR SUPPLIES

The issuance of this order violates W. Va. Code § 22-6-11 because the proposed work at this well constitutes a hazard to the safety of persons; damage would occur to publicly owned resources, and the proposed work fails to protect fresh water sources or supplies.

A permit should not be issued if the WV DEP determines that the well will constitute a hazard to the safety of persons, damage would occur to publicly owned land or resources, or the proposed well work fails to protect fresh water sources or supplies. W. Va. Code § 22-6-11. The appellants presented evidence that the stream adjacent to

this permit is a tributary of Wolf Creek, which flows directly into the New River upstream from the current drinking water source for the town of Fayetteville and surrounding area. (Transcript 101-103). Obviously, the New River is a publicly owned resource that is critical to the whitewater rafting and tourism industry in southern West Virginia. Wolf Creek flows into the New River almost directly below the New River Gorge Bridge, upstream from Fayette Station, where the rafting industry has a critical take out for the river. (Transcript 132:11-16). This river is not being adequately protected by the issuance of this order.

Moreover, Webb has a history of substantial violations that were not timely abated. By failing to adequately address (1) the operator's history of violations and to ensure they will not recur, and (2) continuing unsafe conditions at the site, this order fails to protect fresh water sources and supplies.

A. Evidence Submitted Reflects Substantial Problems at this Site

Bradley Keenan, a named appellant in this case, testified to smelling gas in the area near this well. (Transcript 18:9-14). It was at this time that Mr. Keenan discovered the open pits that were placed beside the site. (Transcript 18:13-14). Mr. Keenan also presented a water sample from Wolf Creek from 2007 showing that there was a "high concentration of diesel and other petroleum products in the water at that time." (Transcript 20:13-23 and Exhibit 2). Mr. Keenan testified that the WV DEP did not do anything about this issue. (Transcript 21:7-8).

On November 6, 2008, the DEP issued an Order for Compliance which related to the pits and sampling of water. (CR 544-547). The order states that Webb has introduced fluids into the holding pits that resulted in odor complaints from neighbors. (CR 544). The order required certain precautions regarding the introduction of fluids

into the pits. *Id.* Importantly, the order required Webb to test the stream located adjacent to the pits and downstream, as well as testing of the pits themselves. *Id.* The order provides for a \$2,500 per day stipulated penalty if any action remains incomplete. *Id.*

B. Webb has Failed to Comply with the 2008 Order for Compliance

James Peterson from the DEP confirmed that an Order for Compliance was issued by the DEP on November 6, 2008. (Transcript 55-56 and CR 544-547). Mr. Peterson also agreed, to a certain extent, that Webb had not complied with the order. (Transcript 58:8-18). The watershed restoration expert called by the appellants at the hearing, Levi Rose, agreed that Webb has not complied with the consent order. (Transcript 87-88). Mr. Rose noted that Webb has not complied with the consent order *in any given year since 2009*. (Transcript 98-99). Mr. Rose went further in describing how out of compliance Webb has been:

We looked at all of the water quality sampling to see if [Webb] had sampled to meet the requirements. So it was not only to sample twice a year, but it was also to sample for several parameters that are listed.

So what I have done is, I have prepared a spreadsheet [Exhibit 7] that went through and we just made -- we just kind of double checked, did [Webb] sample these parameters and we found that for any given year the 3 sampling locations were not properly sampled. Meaning they didn't include all of the parameters or they weren't sampled twice a year.

(Transcript 88:13-23).

The expert witness for the appellants additionally identified that elevated Chloride concentrations were present in samples taken downstream from the Webb operation. (Transcript 80:9). Mr. Rose traced this back directly to Webb because the "water that is being injected coming from oil and gas operations would have a high Chloride concentration" and the water tests upstream from the Webb operation were

low in Chloride (Transcript 79:15-17). As such, his well-supported opinion is that high Chloride concentrations are not due to background levels in the stream, but are associated with the site itself, and the reason for this is that injection water from Webb's site is being discharged into Wolf Creek. (Transcript 82:9-11).

Importantly, all of this data was taken directly from DEP information contained in the certified record. (Transcript 89:17-22). Even though both the DEP and Mr. Rose agree that Webb has not complied with the consent order, the DEP has not issued a single citation or violation to Webb as a result of its failures to conduct sampling, as required by the consent order.

To be clear, the consent order issued on November 6, 2008 required Webb to do the following:

5. Webb shall sample the stream adjacent to the pits twice a year for pH, Iron, Manganese, Chlorides, Sodium, Barium, TPH (DRO, GRO, ORO), TDS, BTEX, and Oil/Grease. The samples are to be taken as immediately downstream of the pits as possible, but in no case more than 50 feet downstream of the pits.

6. Webb shall sample the stream downgrade of pits twice a year submitting results to the DEP for pH, Iron, Manganese, Chlorides, Sodium, Barium, TPH (DRO, GRO, ORO), TDS, BTEX, and Oil/Grease.

7. Simultaneously with the stream sampling, Webb shall sample the pits for pH, Iron, Manganese, Chlorides, Sodium, Barium, TPH (DRO, GRO, ORO), TDS, BTEX, and Oil/Grease.

(Paragraphs 5-7, CR 544-547). Between the time frame of 2009 through 2012, Danny Webb did not meet the minimum monitoring requirements for any given year. The evidence presented demonstrates that Danny Webb not only failed to correctly meet the minimum sampling requirements as directed by the consent order, but also lacked the proper sample collection and preservation techniques that would assure integrity of the

samples being collected. Each requirement from the Consent Order and the violations shown by the Appellants at the hearing are highlighted below for clarity.

Item 5 of Consent Order

Item 5 of the 2008 Consent Order requires that Webb sample the stream adjacent to the pits twice a year for a list of fifteen parameters. The order was issued on November, 6 2008 so it can be presumed that 2009 is the first year in which Webb can be expected to comply. Webb appears to have sampled for all the required parameters in a location adjacent to the pits only three times since the Consent Order was issued: twice in 2009 and once in December of 2010. On three other occasions (twice in December of 2011 and once in January 2012) Webb sampled for a subset of the required parameters. No sampling by Webb appears to have been conducted adjacent to the pits since January of 2012. In several cases the arrival temperature range exceeded lab requirements. The pH holding time was expired in all cases, except for one in which it was not reported at all. It should be noted that unless an onsite pH measurement was taken, it is highly likely that all pH lab analysis will exceed holding time. In sum, Webb has not complied with Item 5 in any year since 2009. Webb has therefore committed *at least* four violations of Item 5 of the Consent Order due to their failure to conduct the required sampling in the stream adjacent to the pits in 2009, 2010, 2011, and 2012. (See Appellants Exhibits 6-10 and Rose testimony, Transcript 70-104).

Item 6 of Consent Order

Item 6 of the 2008 Consent Order requires that Webb sample the stream downgrade of the pits twice a year for a list of fourteen parameters. The order was issued on November, 6 2008 so it can be presumed that 2009 is the first year in which Webb can be expected to comply. Webb appears to have sampled for all the required

parameters in a location downstream of the pits only four times since the Consent Order was issued: twice in 2009, once in December of 2010, and once in October of 2012. On three other occasions (twice in December of 2011 and once in January 2012) Webb sampled for a subset of the required parameters. No sampling by Webb appears to have been conducted downstream of the pits since October of 2012. In several cases the arrival temperature range exceeded lab requirements. The pH holding time was expired in all cases, except for one in which it was not reported at all. It should be noted that unless an onsite pH measurement was taken, it is highly likely that all pH lab analysis will exceed holding time. In sum, Webb has not complied with Item 6 of the Consent Order in any year since 2009. Webb has therefore committed *at least* four violations of Item 6 of the Consent Order due to their failure to conduct the required sampling in the stream downstream of the pits in 2009, 2010, 2011, and 2012. (See Appellants Exhibits 6-10 and Rose testimony, Transcript 70-104).

Item 7 of Consent Order

Item 7 of the 2008 Consent Order requires that Webb sample the pits twice a year for a list of fifteen parameters. The order was issued on November, 6 2008 so it can be presumed that 2009 is the first year in which Webb can be expected to comply. Webb appears to have sampled for all the required parameters in the pits only once, in March, 2009. On one other occasion (December of 2012) Webb sampled for a subset of the required parameters. No sampling by Webb appears to have been conducted in the pits since December of 2012. In several cases the arrival temperature range exceeded lab requirements. It should be noted that unless an onsite pH measurement was taken, it is highly likely that all pH lab analysis will exceed holding time. In sum, Webb has not complied with item 7 of the Consent Order for any given year. Webb has therefore

committed *at least* four violations of item 7 of the Consent Order due to their failure to conduct the required sampling in the stream downstream of the pits in 2009, 2010, 2011, and 2012. (See Appellants Exhibits 6-10 and Rose testimony, Transcript 70-104).

C. Further Testing of Wolf Creek Shows Substantial Continuing Problems From Oil and Gas Wastewater

Following the hearing that occurred in this matter, the appellants were provided with an affidavit from Avner Vengosh from Duke University regarding testing that was performed downstream of the Webb site. The affidavit is attached as Exhibit 1. Although this information was not available at the time of the hearing, it is directly on point in showing that 1) there are serious water quality issues downstream of Webb's site; 2) these are not being caused by acid mine drainage; and 3) the WV DEP is not adequately addressing serious issues at this site.

The affidavit notes that Duke University researchers collected water samples approximately 200 feet downstream of Webb's operation. Dr. Vengosh's expert opinion is on point in this case:

[T]he two surface water samples we sampled exceed typical surface water quality parameters observed in streams in West Virginia, with elevated levels of several dissolved constituents in water such as chloride, bromide, sodium, manganese, strontium, and barium. This chemical composition is typical of oil and gas wastewater observed in Pennsylvania and West Virginia. The elevated water quality parameters observed in the stream samples downstream of the Danny Webb UIC site are not consistent with the theory that the elevated contaminant levels of chloride, bromides and others originate from an acid mine drainage source. Acid mine drainage originating from bituminous coal is typically characterized by high levels of iron and sulfate while the water samples have low contents of these elements. Instead, oil and gas wastewater is characterized by high content of chloride, bromide, strontium, and barium. This composition was observed in the two water samples, which suggest that surface water at wolf creek, downstream of the eastern discharge pit of the Danny Webb injection site originated from migration of oil and gas wastewater discharged into the environment.

Vengosh Affidavit, Paragraph 4.

To summarize, the appellants have shown without question that both Webb and the DEP have failed to protect the publicly owned resources of the state of West Virginia. Item 9 of the Consent Order requires Webb to pay a stipulated \$2,500 fine for each day that an action remains incomplete. Read literally, the Consent Order would require daily penalties for the four years of violations as set forth above that would easily reach into the millions of dollars. Yet there is no evidence in the Certified Record that the WV DEP has done anything to encourage compliance with the sampling requirements, much less levy the agreed-upon fines.

West Virginia law precludes the issuance of a permit if damage would occur to publicly owned resources or the well fails to protect fresh water sources or supplies:

The permit shall not be issued, or shall be conditioned including conditions with respect to the location of the well and access roads prior to issuance if the director determines that:

- (1) The proposed well work will constitute a hazard to the safety of persons; or
- (2) The plan for soil erosion and sediment control is not adequate or effective; or
- (3) *Damage would occur to publicly owned lands or resources; or*
- (4) *The proposed well work fails to protect fresh water sources or supplies.*

W. Va. Code 22-6-11. The appellants have submitted indisputable evidence that damage has occurred to publicly owned resources and that this permit and subsequent orders fail to protect fresh water sources.

V. CONCLUSION

Injection liquid from these sites is making its way into Wolf Creek. The DEP has failed to enforce state and federal law in dealing with this permit and have allowed Webb to continue operating even though 1) no permit is in place and, 2) water quality data submitted to the DEP shows that Webb is failing to comply with a consent order. The DEP must be required to protect the New River and the drinking water of the citizens in Fayette County. As such, the appellants request that the board revoke Order 2014-UIC-13. Alternatively, the appellants request that the Board, at a minimum, order the DEP put into place effective stream monitoring and enforcement actions, including shutting down any injection activities at the site if water quality data shows that Webb is impairing the waters of Fayette County.

Respectfully Submitted,

BRADLEY KEENAN,
NATURAL RESOURCES
DEFENSE COUNCIL,
WV SURFACE OWNERS'
RIGHTS ORGANIZATION, and
PLATEAU ACTION NETWORK,

By Counsel



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Exhibit 1

**WEST VIRGINIA ENVIRONMENTAL QUALITY BOARD
CHARLESTON, WEST VIRGINIA**

**BRADLEY KEENAN,
NATURAL RESOURCES
DEFENSE COUNCIL,
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**DIRECTOR, DIVISION
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WEST VIRGINIA DEPARTMENT OF
ENVIRONMENTAL PROTECTION;**

Appellee.

I Avner Vengosh declare as follows:

- 1.) I am a Professor of Geochemistry and Water Quality in the Nicholas School of Environment at Duke University with a professional experience of over 25 years in the field of water contamination and water quality. Since 2010 I have been working on issues related to water contamination directly associated with shale gas exploration and hydraulic fracturing in the US. My group has published 13 papers in the top peer-review scientific journals on different issues related to environmental effects and water contamination associated with oil and gas and hydraulic fracturing.**
- 2.) On September 14, 2013 myself and my graduate student Jennie Harkness collected two water samples from wolf creek, approximately 200 feet directly downstream of**

elevated levels of several dissolved constituents in water such as chloride, bromide, sodium, manganese, strontium, and barium. This chemical composition is typical of oil and gas wastewater observed in PA and WV (Warner et al., 2013; Haluszczak et al., 2013; Ferrar et al., 2013; Vengosh et al., 2014). The elevated water quality parameters observed in the stream samples downstream of the Danny Webb UIC site are not consistent with the concept that the elevated contaminant levels of chloride, bromides and others originate from an acid mine drainage (AMD) source. Acid mine drainage originating from bituminous coal is typically characterized by high levels of iron and sulfate while the water samples have low contents of these elements. Instead, oil and gas wastewater is characterized by high content of chloride, bromide, strontium, and barium. This composition was observed in the two water samples, which suggest that surface water at wolf creek, downstream of the eastern discharge pit of the Danny Webb injection site originated from migration of oil and gas wastewater discharged into the environment.

- 5.) My opinion is supported by data my team has collected from numerous sources including 75 flowback and produced waters samples from both conventional and unconventional oil and gas wells in the Appalachian Basin, as well as 40 effluent samples from discharge sites (outfalls) in PA. This large dataset show that effluents originated from oil and gas wastewater have typical geochemical affinities that are consistent with the geochemical fingerprint observed in the two water samples. This composition is different from AMD water composition measured in the region (Cravotta 2008; Larson et al. 2014), and scientific research on low-pH trace metal leaching from AMD sites (Romero et al. 2010).

- 6.) Acid mine drainage (AMD) occurs when pyrite (FeS_2), a mineral in coal ore, becomes exposed to atmospheric oxygen and water. When this reaction occurs, acidity, iron, and sulfate are released into the stream, causing low pH water (hence 'acid mine drainage'), high iron, and high sulfate concentrations. Consequently, elevated concentrations of sulfate are typical of AMD impaired streams. The sulfate concentrations in the stream samples downstream of Danny Webb UIC were low (0.8 and 5.1 mg/L). It is not uncommon to observe sulfate in AMD samples two orders of magnitude or more in AMD impacted streams (~500 – 2000 mg/L; Larson et al. 2014).
- 7.) Depending on the geology of the coal, AMD conditions can also produce elevated levels of various other trace metals, such as arsenic, chromium, lead, and selenium. In an inventory study of 140 abandoned and AMD impacted sites, the USGS has determined statistical percentile distribution ranges for numerous water quality parameters originating from AMD produced water (Cravotta 2008). However, certain elements, such as barium, bromide, chloride, and strontium are not observed in elevated concentrations in AMD, such as those observed in the two stream samples.
- 8.) In studying barium leaching from AMD producing ore; research observed that barium minerals are insoluble (not released to the water) under low-pH conditions, similar to AMD (Romero et al. 2010). Therefore, elevated concentrations of barium observed in the downstream water samples (2,068 and 1,296 ppb) could not be produced from AMD. This is consistent with the USGS data, which found the 100 percentile barium

concentrations were 39 ppb (Cravotta 2008). In contrast, oil and gas wastewater in the Appalachian Basin is characterized by high barium concentrations.

- 9.) In conclusion, the chemical profile of the water samples downstream of Danny Webb UIC leads me to the conclusion that the stream is impacted by contamination of oil and gas wastewater, and that any assertion that contamination is due to Acid Mine Drainage is contrary to the actual scientific evidence.

I declare under penalty of perjury that the foregoing is true and correct. Executed in Durham, North Carolina on August 26, 2014.



Avner Vengosh, Ph.D.
Professor,
Nicholas School of the Environment
Duke University

Sources:

Cravotta III, C. A. (2008). Dissolved metals and associated constituents in abandoned coal-mine discharges, Pennsylvania, USA. Part 1: Constituent quantities and correlations. *Applied Geochemistry*, 23(2), 166-202.

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Warner, N. R.; Christie, C. A.; Jackson, R. B.; Vengosh, A. (2013) Impacts of Shale Gas Wastewater Disposal on Water Quality in Western Pennsylvania. *Environmental Science & Technology*, 47, 11849–11857.

Name	Latitude	Longitude	County	Sample	Date Sampled
WV-LG-1	38.01499	-81.15038	Fayette	WV-LG-1	9/14/2013
WV-LG-2	38.01499	-81.15038	Fayette	WV-LG-2	9/14/2013

Name	Latitude	Longitude	County	Ra 226 (Bq/Kg)	Ra 228 (Bq/Kg)
WV-LG1-Sed	38.01499	-81.15038	Fayette	24.00	34.70
WV-LG2-Sed	38.01499	-81.15038	Fayette	46.60	37.40

pH	Conductivity	TDS (mg/L)	Cl (mg/L)	Br (mg/L)	NO3 (mg/L)	SO4 (mg/L)
6.22	1640	#REF!	575.07	2.78	n.a.	0.08
6.2	1053	#REF!	366.96	2.48	n.a.	5.02

471.01

Ca(mg/L)	Mg(mg/L)	Na(mg/L)	Fe (mg/L)	Mn(mg/L)	Si(mg/L)	Trace elements
112.32	21.00	199.00	113.80	6.23	7.17	WV-LG-1
44.93	14.43	178.92	11.28	2.96	2.69	WV-LG-2

Li	Be	B	V	Cr	Co	Ni	Cu	Zn
11.61	0.17	0.36	3.18	8.77	8.12	2.45	<DL	1.18
33.86	0.13	24.10	2.27	5.52	6.13	1.35	<DL	<DL

As	Se	Rb	Sr	Mo	Ag	Cd	Sb	Ba
1.48	4.14	6.75	1702.47	<DL	<DL	<DL	<DL	2068.30
0.36	0.78	5.03	2218.02	<DL	<DL	<DL	<DL	1296.16

TI	Pb	Th	U
0.00	<DL	<DL	<DL
0.00	<DL	<DL	<DL

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Appellants,

v.

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WEST VIRGINIA DEPARTMENT OF
ENVIRONMENTAL PROTECTION;

Appellee.

CERTIFICATE OF SERVICE

I, Thomas A. Rist, certify that the Appellant's Brief was served on this the 4th day
of September, 2014 by United States Mail upon the following:

Jason Wandling
West Virginia DEP
Office of Legal Services
601 57th Street, SE
Charleston, WV 25304

Danny Webb Construction Co., Inc.
PO Box 267
Lochgelly, WV 25866



Thomas A. Rist