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Hampden Coal Company, LLC

Canebrake Contour Surface Mine

Aquatic Ecosystem Protection Plan

I. Background

On August 18, 2010, WVDEP released a revised, "Permitting Guidance for Surface Coal Mining Operations to Protect West Virginia's Narrative Water Quality Standards, 47 C.S.R. 2 §§ 3.2.e and 3.2.i". The introduction of this document states, "This Guidance does not apply to outlets that are primarily precipitation induced, or for which the activities associated with those outlets have been substantially completed." *Footnote Omitted. (Revised August 18, 2010, Permitting Guidance for Surface Coal Mining Operations to Protect West Virginia's Narrative Water Quality Standards, 47 C.S.R. 2 §§ 3.2.e and 3.2.i).*

Hampden Coal Company, LLC ("HCC") has applied to the West Virginia Department of Environmental Protection ("WVDEP") for its Canebrake Contour Surface Mine (WVDEP Article 3 Permit No. S-5004-10; WVDEP Article 11 Permit No. WV 1024892). The Article 11 permit application proposes twenty-one outlets (Outlets 001, 002, 003, 004, 005, 006, 007, 008, 009, 010, 011, 012, 013, 014, 015, 016, 017, 018, 019, 020, and 021), covering 1027.28 acres. Outlets 001 (On-Bench Outlet with a drainage area of 5.50 acres), 002 (On-Bench Outlet with a drainage area of 73.69 acres), 003 (On-Bench Outlet with a drainage area of 43.95 acres), 004 (On-Bench Outlet with a drainage area of 12.79 acres), 005 (On-Bench Outlet with a drainage area of 32.07 acres), 006 (On-Bench Outlet with a drainage area of 24.90 acres), 007 (On-Bench Outlet with a drainage area of 6.90 acres), 008 (On-Bench Outlet with a drainage area of 3.67 acres), 020 (In-Stream Outlet with a drainage area of 353.31 acres), 021 (In-Stream Outlet with a drainage area of 247.75 acres), are all located in the Canebrake Branch Watershed. Outlets 009 (On-Bench Outlet with a drainage area of 5.32 acres) and 010 (On-Bench Outlet with a drainage area of 10.35 acres) are all located in the Guyandotte River Watershed. Outlets 011 (On-Bench Outlet with a drainage area of 38.46 acres), 012 (On-Bench Outlet with a drainage area of 23.86 acres), 013(On-Bench Outlet with a drainage area of 10.10 acres), 014 (On-Bench Outlet with a drainage area of 26.75 acres), 015 (On-Bench Outlet with a drainage area of 38.77 acres), 016 (On-Bench

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Outlet with a drainage area of 10.42 acres), 017 (On-Bench Outlet with a drainage area of 9.80 acres), 018 (On-Bench Outlet with a drainage area of 24.33 acres), and 019 (On-Bench Outlet with a drainage area of 24.59 acres) are all located in the Browning Fork Watershed.

Proposed outlets (001, 002, 003, 004, 005, 006, 007, 008, 009, 010, 012, 013, 014, 015, 016, 017, and 019) are on-bench outlets that should be primarily precipitation induced and discharge into areas above the end of the ordinary high water mark of any jurisdictional channel. As such, these outlets do not directly discharge into any ephemeral, intermittent, or perennial stream. Therefore, the Guidance should only apply to outlets 020 and 021 (In-Stream Outlets) and 011 and 018 which are below intermittent stream areas.

In accordance with said Guidance, Compliance Monitoring Laboratories, Inc. ("CMLI") of Chapmanville, West Virginia, was contracted on behalf of HCC to establish with concurrence with the WVDEP appropriate Benthic Assessment Sites ("BAS") for the pending WV National Pollutant Discharge Elimination System ("NPDES") permit WV1024892 for the proposed Canebrake Contour Surface Mine. The Guidance provides for the establishment of In-Stream BAS Monitoring to allow for a holistic assessment of the aquatic ecosystem and a determination of the impacts of the permitted activity, although other criteria may be considered by the WVDEP in the assessment of stream health. In part, the Guidance requires that the applicant work with the NPDES permit writer and the WVDEP biologist to establish a monitoring strategy with the most appropriate monitoring locations for said holistic evaluation of the aquatic ecosystem. CMLI conducted reconnaissance to locate and map the first appropriate riffle/run habitat downstream, in a perennial stream segment, of new outlets that are not substantially complete or do not have precipitation only flow. CMLI then coordinated with and obtained concurrence from Melissa Johnson and Tom Satterfield, representatives of the WVDEP, establishing that the in-stream monitoring points, located by CMLI, were appropriate for BAS monitoring in the context of the Guidance.

Proposed outlets 020 and 021 are in-stream outlets that are not principally precipitation induced and therefore require the establishment of BAS sites. Proposed outlets 011 and 018 are located on-bench and below mine through areas. The jurisdictional waters that are being mined through are intermittent. Because the outlets are located in intermittent areas, the discharge from these outlets may be, in part, non-precipitation induced, therefore, the applicant or their representative has consulted with WVDEP and established BAS. BAS #1 is located at Latitude 37° 39' 04.2", Longitude 81° 52' 27.3" and is associated with Outlet 020; BAS #2 is located at Latitude 37° 39' 08.3", Longitude 81° 52' 44.7" and is associated

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with Outlet 021;BAS #3 is located at Latitude 37° 38' 28.8", Longitude 81° 54' 17.5" and is associated with Outlet 011; and BAS #4 is located at Latitude 37° 39' 13.3", Longitude 81° 54' 34.4" and is associated with Outlet 018. WETT, Labs Inc. ("WETT Labs") performed Benthic Surveys at BAS #1, BAS #2, BAS #3, and BAS #4 to obtain baseline benthic data for comparison with data from benthic surveys that will be conducted during active mining on the proposed Canebrake Contour Surface Mine. Benthic Surveys for BAS sites will be conducted within the appropriate time frames. The baseline data report for all four BAS sites is attached. *See Attachment A, Hampden Coal Company, LLC. Canebrake Contour Surface Mine Biological Assessment Station ("BAS") Sampling Report – Spring 2012*

II. Existing Conditions

The BAS sampling sites recorded by WETT Labs on April 18, 2012 based on the West Virginia Stream Condition Index ("WVSCI"), show that BAS 1 has a WVSCI score in the 68 to 78 range (Good); BAS 2 has a WVSCI score in the 78 to 100 range (Very Good); and both BAS 3 and BAS 4 have WVSCI scores in the 45 to 60 range (Slightly Impaired). *See Attachment A, Hampden Coal Company, LLC. Canebrake Contour Surface Mine Biological Assessment Station ("BAS") Sampling Report – Spring 2012.*

The Habitat assessment scores recorded by WETT Labs on April 18, 2012 indicate that all four BAS sites are Suboptimal. Suboptimal is habitat with 40% to 70% of the necessary structure and stability of substrate to sustain a viable benthic macroinvertebrate population. *Id.*

The stream characteristics recorded by WETT Labs on April 18, 2012 show that both BAS 1, BAS 2, and BAS 3 have moderate erosion levels and some potential for local watershed pollution and BAS 4 also, has moderate erosion levels but has obvious sources of local watershed pollution. *Id.*

Taxa	Functional Feeding	BAS 1	BAS 2	BAS 3	BAS 4

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	Group*				
Amphipoda					
Gammaridae	Sh		4		1
Coleoptera					
Elmidae	Sc			23	5
Gyrinidae	P			1	
Psephenidae	Sc	3			
Decapoda					
Cambaridae	Sh, Sc		1		
Diptera					
Chironomidae	CG	31	12	112	83
Empididae	P, CG		2	2	
Simulidae	CF			3	1
Tabanidae	P	1	2	1	
Tipulidae	Sh, CG	1	5	1	
Ephemeroptera					
Ameletidae	CG	5	35	5	40
Baetidae	CG, Sc				
Ephemerellidae	CG, Sc, Sh	78		19	
Ephemeridae	CG, CF, P		65		
Heptageniidae	CG, Sc	9	9	5	8
Siphionuridae	CF, P			1	
Hemiptera					
Belostomatidae	P		1		

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Gerridae	P		3		
Nepidae	P			1	
Odonata					
Gomphidae	P	1			
Plecoptera					
Capniidae/Leuctridae	Sh				
Chloroperlidae	P, Sc, CG	20	33		23
Nemouridae	Sh, CG, Sc				
Peltoperlidae	Sh		1		
Perlodidae	P, Sc, CG	19			1
Trichoptera					
Hydropsychidae	CG	26	22		6
Limnephilidae	Sh, Sc, CG		1	1	
Philopotamidae	CF	1	1	1	

Attachment A, Hampden Coal Company, LLC. Canebrake Contour Surface Mine Biological Assessment Station ("BAS") Sampling Report – Spring 2012.

Site Name	WVSCI	Rank	Not Impaired/ Impaired
BAS 1	74.2	Good	Not Impaired
BAS 2	83.2	Very Good	Not Impaired
BAS 3	45.4	Slightly Impaired	Impaired
BAS 4	51.2	Slightly Impaired	Impaired

See Attachment A, Hampden Coal Company, LLC. Canebrake Contour Surface Mine Biological Assessment Station ("BAS") Sampling Report – Spring 2012.

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III. Reasonable Potential Analysis for non-flow, On-Bench Outlets

Mining was previously conducted on Skillet Creek No. 1 Surface Mine and Haulroad (S-5082-86) (WV0099929), in the Alma, Upper Cedar Grove and Lower Cedar Grove coal seams, which are, in part, the same coal seams proposed to be mined on the Canebrake Contour Surface Mine. The Skillet Creek No. 1 Surface Mine is located approximately 4.2 miles from the proposed Canebrake Contour Surface Mine.

Table 2: 2004 Monitoring Data							
Skillet Creek WV0099929							
Year 2004	**001 Outlet**	**002 Outlet**	**003 Outlet**	**004-010 Outlets**	**011- 014 and 016 Outlets**	**017 Outlet**	**020-023 Outlets**
JAN	Reclaimed	No flow	No flow	No flow	No flow	Not Constructed	No flow
FEB	Reclaimed	No flow	No flow	No flow	No flow	Not Constructed	No flow
MAR	Reclaimed	No flow	No flow	No flow	No flow	Not Constructed	No flow
APRIL	Reclaimed	No flow	No flow	No flow	No flow	Not Constructed	No flow
MAY	Reclaimed	No flow	No flow	No flow	No flow	Not Constructed	No flow
JUNE	Reclaimed	No flow	No flow	No flow	No flow	Not Constructed	No flow
JULY	Reclaimed	No flow	No flow	No flow	No flow	Not Constructed	No flow
AUG	Reclaimed	No flow	No flow	No flow	No flow	Not Constructed	No flow

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SEPT	Reclaimed	No flow	No flow	No flow	No flow	Not Constructed	No flow
OCT	Reclaimed	No flow	No flow	No flow	No flow	Not Constructed	No flow
NOV	Reclaimed	No flow	No flow	No flow	No flow	Not Constructed	No flow
DEC	Reclaimed	No flow	No flow	No flow	No flow	Not Constructed	No flow

Table 3: 2005 Monitoring Data							
Skillet Creek WV0099929							
Year 2005	**001 Outlet**	**002 Outlet**	**003 Outlet**	**004-010 Outlets**	**011- 014 and 016 Outlets**	**017 Outlet**	**020-023 Outlets**
JAN	Reclaimed	No flow	No flow	No flow	No flow	Not Constructed	No flow
FEB	Reclaimed	No flow	No flow	No flow	No flow	Not Constructed	No flow
MAR	Reclaimed	No flow	No flow	No flow	No flow	Not Constructed	No flow

Based on the Discharge Monitoring Report ("DMR") data obtained from the NPDES monitoring points on Skillet Creek No. 1 Surface Mine and Haulroad (S-5082-86) (WV0099929), during the year of 2004 (*See Table 2*) and the first quarter of 2005 (*See Table 3*), Outlet 001 was reclaimed, Outlet 017 was not constructed and On-Bench Outlets 002-014 and 016 and 020-023 had no flow on any of the sampling days. Outlet 015 was not used because it is the outlet for a valley fill pond which is not representative of the on-bench outlets referenced. Outlets 018 and 019 were not used because they are located on the Upper Cedar Grove level, none of the outlets for Canebrake are located at this elevation.

Outlets 001, 002, 003, 004, 005, 006, 007, 008, 009, 010, 012, 013, 014, 015, 016, 017, and 019 are on-bench outlets that are primarily precipitation induced. Based on the historical data provided above on an adjacent surface mine where mining was conducted, in part, in the same seams, these outlets are not expected to flow except during precipitation events.

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Proposed outlets 011 and 018 are located on-bench and below mine through areas. The jurisdictional waters that are being mined through are intermittent. Because the outlets are located in intermittent areas, the discharge from these outlets may be, in part, non-precipitation induced, therefore, the applicant or their representative has consulted with WVDEP and established Biological Assessment Sites.

IV. Potential Stressors

Disturbance within the proposed project area consists of past timbering, oil and gas activities, current and past (pre-law) mining operations and the Hatfield/McCoy ATV Trail System. Disturbances consist of existing access roads, pre-law un-reclaimed strip mine benches, gas wells and gas lines and ATV recreational trails associated with the Hatfield/McCoy Trail System.

Mines (Surface and Underground), adjacent to the proposed project area, discharge into Browning Fork of Horsepen Creek of Gilbert Creek of the Guyandotte River. The Hernshaw Deep Mine No. 1, Permit No. U-5011-02, discharges into Browning Fork at a point above the proposed Canebrake Contour Surface Mine. Densely populated residential areas are located upstream of monitoring points and a substantial number of gas wells exist in close proximity to monitoring points for the proposed Canebrake Contour Surface Mine. Major local highways, such as Route 52, which borders portions of Horsepen Creek and Route 80, which borders the Guyandotte River, will require road maintenance, including, but not limited to, salting of highways during seasonal snowfall, which could adversely affect effluent limits. All of the above-mentioned stressors have the potential to affect the water quality downstream of the proposed project.

V. Measures to Protect the Aquatic Ecosystem

The Guidelines require that an Aquatic Ecosystem Protection Plan ("AEPP") be prepared for new and expanded discharge permit applications. "The permittee shall use the measures outlined in its AEPP as a means of maintaining the health of the aquatic ecosystem and complying with the State's narrative water quality standards." *(Revised August 18, 2010, Permitting Guidance for surface Coal Mining Operations to Protect West Virginia's*

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Narrative Water Quality Standards, 47 C.S.R. 2 §§ 3.2.e and 3.2.i). Quarterly Reports will be submitted to WVDEP documenting the performance of the AEPP and identifying the any changes that may be needed.

The Applicant proposes to implement the following control measures that can be implemented to reduce or minimize the ionic strength in a stream, as recommended by West Virginia's permitting guidance to protect narrative water quality standards.[1]

- Test overburden to determine the material that contains sulfur or other ionic strength-bearing material, so it can be isolated through material handling;
- Minimize the amount of area disturbed at one time;
- Minimize stormwater contact with pulverized material;
- Minimize fill areas;
- Mine down-dip instead of up-dip
- Cap fills and spoil so as to minimize pass-through of rain water;
- Revegetate any disturbed areas to minimize runoff;
- Develop a plan to reduce or prevent ionic stress;
- Expedite reclamation;
- Enhance riparian plantings;
- Restore natural streams.

Measures that are not being proposed at this time but that the permittee may consider later include:

- Increase stream buffer zones;
- If necessary, conduct TRE/TRI pursuant to EPA's TSD;
- Segregate weathered rock and return to surface;
- Limit the number of active fills

[1] *Revised August 18, 2010, Permitting Guidance for surface Coal Mining Operations to Protect West Virginia's Narrative Water Quality Standards, 47 C.S.R. 2 §§ 3.2.e and 3.2.i).*

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The Applicant has expanded on some of the above Best Management Practices ("BMPs") and included additional BMPs, as described below.

Hampden Coal Company, LLC has performed geochemical testing (Acid-Base Accounting, Selenium Concentration, and Slake Durability) of the overburden to be disturbed by the proposed Canebrake Contour Surface Mine. The overall results of the acid-base accounting indicate the overburdens to be non-acid producers. Any potentially acid producing or selenium bearing material with potential selenium concentrations in excess of 1kg/mg will be placed in the backfill thereby segregating said material from drainage paths. Any overburden strata determined to be potentially toxic or acid producing will be placed in the backfill within thirty days after exposure, isolating it away from drainage paths. As part of the handling plan for potentially selenium bearing strata, testing will be conducted during active mining to supplement and verify the results of the baseline selenium evaluation.- Subsequent overburden should not pose any environmental hazards. Current grading and re-vegetation will help prevent erosion and control water and air infiltration into the backfill.-

All coal seams, all coal partings, and all pit cleanings will be treated as toxic material that will be special handled as outlined in this plan. Any overburden materials that are determined to be potentially toxic or acid producing will be placed in the backfill within thirty (30) days after it is exposed. The toxic overburden will be blended with non-toxic/acidic strata and then placed in the backfill area in a controlled manner as mining progresses according to the attached typical diagram. The toxic/acidic overburden as well as all pit scrapings and floor cleanings in the Lower Alma seam will be isolated from the pavement and highwall with a minimum of four (4) feet of non-toxic, non-acidic, non-combustible material (which will be predominately calcareous sandstone capped with a fine lift of material which will have an acid-base account in excess of +5 tons/1000 tons (NP of +5 or greater). This will form somewhat of a seal to isolate the toxic overburden and pit cleanings from the fluctuation of movement of water within the "drain" of sandstone. The material will be capped with a minimum of four (4) feet of non-toxic, non-acidic, non-combustible material (which will be the best available impervious material which will have an acid-base account in excess of +5 tons/1000 tons (NP of +5 or greater)). In addition, any material requiring special handling shall not be placed within any excess overburden structure. Also, none of these materials shall be buried or stored in close proximity to any drainage course or groundwater system. The natural blending of the overburden materials will mitigate any adverse problems.

In addition to the special handling of the potentially toxic materials identified above, the strata with greater than 1 mg/kg of selenium as identified by laboratory tested will be

handled in a similar manner. As part of the handling plan for potentially selenium bearing strata, testing of potentially selenium bearing strata will be conducted during active mining to supplement and verify the results of the baseline selenium evaluation. Subsequent overburden should not pose any environmental hazard. Grading and re-vegetation will be kept current to prevent erosion and control water and air infiltration into the backfill.

The lack of potential for acid mine drainage associated with the spoil materials in accordance with the proposed Reclamation Plan will reduce any acid mine drainage potential by isolating any identified acidic materials and covering the material with at least four (4) feet of non-toxic, non-acidic material thus isolating the material from atmospheric conditions. In absence of various factors necessary to obtain an acid drainage reaction, the potential for a long term acid drainage problem is negligible.

The baseline data indicated existing waters are non-acidic and exhibit low concentrations of metals. It is anticipated that discharge from the proposed permit area would show that the metals are within acceptable limits.

Consideration will be given to the ionic strength (i.e. concentration of calcium carbonate) of material to be used to construct the underdrains of said canted valley fills. The most inert material, that is known to be available at the time of construction of the underdrains that does not contain potentially acid producing material or selenium concentrations in excess of 1 kg/mg, will be utilized in said construction. Utilization of said material with low ionic strength in the underdrains should reduce chemical reactions that would result in the production of salts, thereby, lowering the probability of increased conductivity.

Active diversion, via phase dependant ditch designs, of surface water away from the proposed fills both during and post mining will reduce the quantity of water available within the area of the proposed canted valley fills. The down-gradient direction of the pavement of each strata away from the proposed canted valley fills will reduce the amount of groundwater infiltration into the proposed fills. These measures to reduce groundwater infiltration and surface water penetration into the proposed fills, also, will reduce the contact time of water with overburden material resulting in less potential for adverse effects on downstream effluent.

In addition, a recirculation system installed below the toe of each fill can be used to pump base flow of the underdrain back onto the permitted area to avoid discharging water with

higher conductivity levels until the source of increased conductivity levels can be determined and remedied. The recirculation system will be in place to pump base flow of underdrain only of approximately 25-30 gallons per minute. In storm events where higher flows are present, some flow will discharge due to the inability of the system to pump enough water, however, the increase in flow should allow for dilution of any parameters of concern contained in the discharge.

Measures to reduce infiltration of the water into the canted valley fills should protect the hydrologic balance downstream by reducing contact time of water with the overburden material which constitutes the fill. This will reduce the likelihood of substances leaching from the material that could have an adverse effect the hydrologic regime.

Sediment structures will be built and designed to treat the surface runoff and any gravity discharge that might be produced by this mine prior to discharging. The spillways have been designed to safely pass the applicable storm event frequency.

Hampden Coal Company, LLC is proposing to construct the canted valley fills by the 'bottom up' construction method. The 'bottom up' construction method should reduce the contribution of suspended/dissolved solids as well as other parameters of interest. This construction method should further reduce any off-site impacts to jurisdictional waters.

The 'bottom up' construction method will be initiated by establishing an underdrain and the bottom two lifts of said fill. Each lift of the canted fills will be immediately seeded on completion.

Prior to construction, the main stem of jurisdictional waters within the footprint of the proposed fill will be re-located. This will be done in such a manner designed to direct the flow of water away from the proposed fills and to retain a riparian zone adjacent and up-gradient of the re-located stream. The pre-mining stream re-locations for the proposed fills as well as post mining stream establishment, re-establishment, and enhancement will be capable of supporting a viable benthic population.

Highwall mining from Canebrake Branch only is proposed. No highwall mining is proposed from Browning Fork. Limiting the highwall mining entries to Canebrake Branch only allows all highwall mining to be oriented in a manner to avoid up-dip mining. *See Exhibit 2.*

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The regional dip of the coal seams is approximately 1%. The maximum depth of the highwall miner entries will be 1000 feet. Highwall mining entries will be sealed with non-acid producing spoil material backfilled during bench reclamation activities. Outcrop barrier widths are calculated using the formula, W= 50 + H, where W is the outcrop barrier width and H is the head. All highwall mining will be oriented down-dip. Using the above mentioned parameters, (1000 X 1% = 10 + 50 = 60ft.) outcrop barriers will be a minimum of 60 feet.

Monitoring Proposed

The applicant believes that the measures outlined above will protect the aquatic regime adequately. Additionally, the applicant believes that the Whole Effluent Toxicity Testing and biological monitoring as outlined by WVDEP to be included as part of the monitoring program for the pending NPDES permit, WV 1024892 for this project will provide adequate notice in the event that there are adverse impacts on the aquatic ecosystem downstream of the project. A plan for enhanced monitoring is described below.

Monitoring Parameters

Each sample will be monitored for the following:

- Flow
- pH
- Iron
- Manganese
- Aluminum
- Selenium
- TDS
- TSS
- Conductivity

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- Calcium
- Potassium
- Magnesium
- Sulfate
- Bicarbonate Alkalinity
- Chloride
- Sodium
- Total Alkalinity
- Carbonate Alkalinity
- Temperature
- Dissolved oxygen

Sampling Frequency

Sampling will occur two times per month from each agreed sampling location. The day of the month on which the sampling occurs will be consistent for each sampling location, for example on the first Tuesday and third Tuesday of the month, however, sampling events may be adjusted to avoid times when unusual events (i.e. flooding, drought) have occurred. Sampling will be conducted in an efficient and timely manner to ensure a proper comparative analysis can be extracted from the data. Precipitation during the seven day period preceding testing will be recorded by the company.

Chemical Sampling Location

The following sampling points will be included in the sampling protocol:

- NPDES Outlets 020 and 021
- The points at which the flow discharges from the underdrains of the valley fills
- BAS #1
- The baseline monitoring point in Canebrake Branch at the confluence of the Guyandotte River (Sampling Site DCB-2)

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A map depicting the locations of these monitoring points is shown in Attachment C.

As an additional control, the monitoring plan will include the Orchard Branch watershed, which has similar stream lengths and conditions, drainage area, slope, and other characteristics as the Canebrake watershed and also flows into the Guyandotte River.

Chemical Sampling Site

Each of the selected sampling sites will be prepared to allow repetitive, reproducible sampling results. For the in-stream sampling points, cross-sections will be surveyed and permanent depth gauges installed to measure stream flow.

Biological Monitoring

In addition to the twice monthly sampling, benthic sampling will be conducted two (2) times per year at two separate monitoring points. The first point will be located at BAS Site 1. The second point will add biological monitoring to the existing baseline monitoring point at the mouth of Canebrake (DCB-2). A map depicting the benthic sampling locations will be provided to the WVDEP and EPA. Sampling will be conducted once in the spring (April 15th through May 30th), and once during the summer (July 15th through September 1st). No benthic sampling will be conducted between October and February.

Sampling will occur as close as possible to the sampling anniversary dates, avoiding to the maximum extent practicable times when the sample location is influenced by abnormal conditions including drought and/or scouring flood events.

Sampling will be conducted using West Virginia Department of Environmental Protection (WVDEP) standard field and laboratory methods. The WVDEP protocol shall be followed closely, including the use of a random 200 (+/- 20%) organism fixed-subsample for calculation of the West Virginia Stream Condition Index (WVSCI) score. In addition to WVSCI metrics, genus-level EPT richness, Ephemeroptera Richness, Plecoptera Richness, Clinger Taxa Richness, and % Ephemeroptera will be provided, at a minimum, for each sample.

At the time of benthic sampling, the habitat score of the sampling location will be calculated utilizing the rapid bioassessment protocol (Barbour 1999). In addition to benthic and habitat scores and other information described above, the following information also will be collected and recorded: precipitation for the seven days immediately preceding the sampling event and representative photographs upstream and downstream (from mid-reach) of each site and the area 30 feet upstream and 30 feet downstream of the sample site (from

the upper and lower ends of the reach).

Data Submittal

All collected monitoring data will be published to a dedicated ftp site within five (5) working days of receiving the sample results. WVDEP and the EPA will be provided password protected access to information on this site. This data will be published in both raw (chemical values and taxa) and summarized (e.g., WVSCI and metrics) formats.

Quality Assurance and Quality Control

Replicate chemical samples should be collected at one site during each sampling trip. A field blank sample should be collected once per sampling trip to document that there is no contamination from containers or samplers. Preservative blanks should also be run for each trip to ensure that any preservatives are free of contaminants.

A replicate biological sample (properly labeled and preserved in ethanol) should be collected at one of the monitoring stations each season and sent to WVDEP and the EPA Region III-Wheeling for a quality assurance comparison check of biological field and laboratory methodologies. Additionally, one of the biological samples per season should be sent to WVDEP and the EPA Region III-Wheeling for a quality assurance check of taxonomic classification.

If the agency finds the condition of the aquatic ecosystem at the assessment station prior to initiation of the permitted activity to be satisfactory, taking into account all potentially criteria, then the acceptable future biological conditions is a WVSCI score greater than or equal to the WVSCI value representing the 5th percentile of reference (currently 68.0). If the agency finds the condition of the aquatic ecosystem at the assessment stations is less than satisfactory (currently 68.0), taking into account all potentially applicable criteria, then the applicant shall identify existing conditions within the watershed that may be contributing to the problem. If a TMDL addressing biological impairment for ionic stress is not in effect, a WVSCI score greater than or equal to the baseline value would represent an acceptable future condition. A WVSCI score below 68 at BAS 1 shall be a violation of this permit until such time as a biological score from the comparable season (Spring/Summer) at the same station reaches acceptable future biological condition. There will be an affirmative defense for violation of this provision if the violation arose from causes other than activities associated with the Permittee's operation and beyond the control of the Permittee, including its employees, agents, consultants and contractors, which could not be overcome by due diligence, and provided that the permittee demonstrates that it was in compliance with all provisions of this permit, including implementation of the AEPP at the time the violation was detected. The permittee bears the burden of proof and must establish the affirmative defense in a report submitted to WVDEP within 30 days of discovering the violation. This affirmative defense will not be afforded if the Permittee fails to establish any element of this

affirmative defense or if operational error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventive maintenance, or careless or improper operation caused or contributed in any way to the violation.

VI. Conductivity Adaptive Management Plan

In addition to incorporating best management practices to protect the aquatic ecosystem, an adaptive management plan for conductivity is also incorporated into the NPDES permit in order to understand changes in conductivity that may occur over time in the Canebrake watershed and to implement measures to protect the aquatic ecosystem if conductivity levels increase beyond acceptable levels. This plan assesses baseline conductivity data and biological data to determine the baseline aquatic health of Canebrake Branch. A plan for conductivity monitoring post-mining is incorporated to understand how the operation may impact water quality. In addition, adaptive management measures are included to ensure the protection of the aquatic ecosystem should conductivity levels increase.

Baseline Condition and Monitoring

Baseline data and monitoring are used as part of this adaptive management plan to understand any changes in conductivity levels in Canebrake Branch over time. A separate monitoring point, described below, is used to identify trends that may trigger adaptive management. The baseline and monitoring data described in this section are for informational purposes only and will not trigger adaptive management.

Baseline data for conductivity was collected as part of the SMCRA permitting process. The monitoring point DCB-2 was used to assess baseline conductivity conditions in the watershed since it is located in Canebrake Branch downstream of the valley fills and any discharging NPDES outlets. As shown on the chart and associated graph below, conductivity levels were measured from August of 2008 to February of 2010 and averaged around 318 umhos.[2] However, the standard deviation was 117 umhos, with the highest level measured at 795 umhos. Despite the average conductivity of 318 umhos, HAV and WVSCI scores derived from baseline sampling sites BAS #1 and BAS #2 in Canebrake Branch do not seem to indicate biological impairment. (See Attachment A).

[2] Average Conductivity was determined based on samples taken between August 1, 2008 and February 5, 2010. More recent samples have been taken and that data was requested and will be incorporated into this document when it is received. WVSCI Scores and HAV Scores are taken from the Compensatory Mitigation Plan.

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Background Surface Water Quality at Sampling Point DCB-2	
Sample Date	Conductivity (umhos)
1-Aug-08	324.51
22-Aug-08	359.9
28-Aug-08	370.72
15-Sep-08	363.06
10-Nov-08	408.39
17-Nov-08	426.27
3-Dec-08	431.64
10-Dec-08	368.44
8-Feb-09	244.6
19-Feb-09	244.32
11-Mar-09	285.76
24-Mar-09	262.82
23-Apr-09	258.64
30-Apr-09	324.01
7-May-09	795.57
11-Jun-09	239.3
30-Jun-09	286.85
24-Jul-09	321.8
31-Jul-09	122.3
5-Aug-09	211.41
21-Aug-09	327.06
2-Sep-09	379.79
18-Sep-09	403.86
1-Oct-09	363.67
16-Oct-09	355.4
9-Nov-09	301.71
18-Nov-09	322.64
2-Dec-09	316.83
21-Dec-09	179.81
5-Jan-10	193.03
18-Jan-10	157.58
5-Feb-10	244.36
Mean	318.63
Standard Deviation	117.2582176

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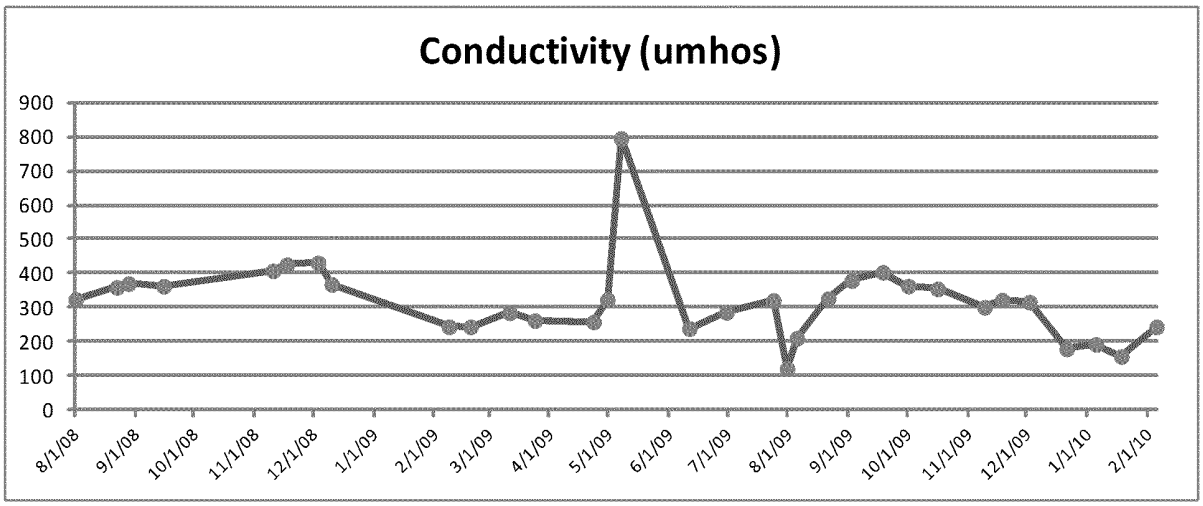

In addition to the baseline data, the Applicant will also undertake additional monitoring to better determine the source of increased trends should these occur. Additional monitoring will take place at the NPDES Outlets 020 and 021 below the valley fills and at the point where the sump flow discharges from the underdrain of each fill. Increases in conductivity levels at the monitoring points alone will **not** trigger adaptive management as outlined in this plan. Rather, these sites will be monitored to assess baseline conductivity levels of surface water and determine whether the mining operation is contributing to increases in conductivity or other parameters of concern that may trigger adaptive management. The sampling locations selected also presume that addition dilution will be provided between 020/021 and BAS #1. The baseline sampling points and additional monitoring points are shown in the map in Attachment C.

Adaptive Management Actions

This adaptive management plan consists of two components. The first component addresses the concern that increases in conductivity may affect the condition of the benthic community, while the second component addresses any excursions from the narrative criterion associated therewith.

Applicability

This adaptive management plan will be triggered by trends in conductivity or benthic sampling from BAS#1 (Canebrake Branch). BAS#1 was chosen as the adaptive management sampling point since it is located below the two valley fills and downstream of all NPDES discharge outlets. As described above, additional points will be monitored (NPDES Outlets 020 and 021 and the point of sump flow discharge into the fill underdrain) to assess baseline conductivity levels and to understand the sources of any increases in conductivity, but sampling results at these additional points will not trigger this AMP.

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Monitoring for the adaptive management sampling point will occur as described in the Enhanced Monitoring Plan (See Section V, above).

The AMP will not take effect until and unless the all sediment ponds are constructed and certified and the construction of the canted fills have been initiated with overburden from mining being placed within the footprint of the canted fill and the applicable NPDES Outlets 020 and 021 discharging. Any sampling at the AMP sampling point (BAS #1) or the additional monitoring points described above prior to the ponds being certified and overburden from mining being places within the confines of a canted fill will be used to study the variability of the conductivity and flow and as input data to the trend analysis, but cannot be used for triggering the AMP until the construction of the sediment ponds and valley fills has been completed and certified. Any exceedences of the trigger limit for conductivity will not be considered as violations of water quality standards or violations of the WVNPDES permit conditions as long as the AMP is implemented as required.

Trend Analysis

There will be two alternative triggers for activating the AMP. The first trigger will be when the conductivity at the BAS #1 rises above one standard deviation, based on the standard deviation identified from the baseline data from sampling point DCB-2 in Canebrake Branch at the confluence of the Guyandotte River, which is 435 microsiemens. When that occurs, repeat samples will be taken for two additional consecutive days at BAS#1 (Canebrake Branch). Additional sampling may occur at other sample locations to evaluate the source of elevated conductivity.

If the three-day average conductivity at the BAS#1 rises above one standard deviation (435 microsiemens.), then the recirculation system at the toe of each fill will be activated and used to pump basal flow of the underdrain back onto the permitted area. The recirculation system will be in place to pump base flow of underdrain only of approximately 25-30 gallons per minute. In storm events where higher flows are present, some flow will discharge but the increase in flow should allow for dilution of any parameters of concern. The recirculation system will remain activated until such time as the next scheduled water chemistry sampling date. The recirculation system will be deactivated if the next scheduled water chemistry sampling is below one standard deviation (435 microsiemens). If the recirculation system is activated more than nine times over a nine-month period, then the recirculation system will remain activated for a 6 month period.

The second trigger will be if two sampling events in any month produce a monthly average conductivity value of 500 microsiemens. When that occurs, the recirculation system at the toe of each fill be activated and used to pump basal flow of the underdrain back onto the permitted area. The recirculation system will remain activated until the next scheduled water chemistry sampling event which causes the rolling 30-day average conductivity to be

below 500 microsiemens.

In addition, the Applicant will conduct a trend analysis to identify potential instances where conductivity levels may reach a trigger point in the future so that adaptive management measures can be implemented prior to reaching the threshold level. To determine conductivity trends at BAS#1, the results from each of the twice-monthly enhanced chemical monitoring points will be plotted separately as a time series to detect any evidence of trending in the conductivity levels. If the linear trend of the conductivity indicates that the result will exceed the threshold of 500 microsiemens within the subsequent 12-month period, then the Applicant will conduct a detailed analysis to identify the reasons for increased conductivity. The Applicant shall submit a report to the WVDEP describing this analysis within 90 days after three consecutive sets of sampling data indicate that the trend will exceed the threshold within the stated period. The report also shall include proposed actions to address the increased conductivity. If permitting revisions or modifications are needed to implement these actions, then the actions will be implemented within 45 days following approval by the WVDEP and other applicable regulatory authorities of said permitting actions.

Potential actions for addressing increased levels of conductivity may include, but are not limited to, revisions to the material handling plans, revisions to the in-pit storage of stormwater, expedites grading and revegetation of mined areas, the addition of pre-treatment ponds, and the enhancement of internal stormwater diversions.

Furthermore, as described above, monitoring will occur at each sediment pond to monitor the quality of the underdrain flow and the surface water flow in order to identify discharges with elevated conductivity. Sump pumps below the base of each fill can pump base flow back onto the permitted area to avoid any discharges of flow with elevated conductivity until the source of the elevated conductivity levels can be determined and remedied. At any time that the water quality at the BAS#1 exceeds the threshold value of 435 microsiemens, the basal flow at the interception pumps will be operated until monitoring of the quality and flow from each of the underdrain flow and surface water flows indicates that the quality at the BAS #1 will be below the threshold.

In addition, the Applicant will engage in adaptive management when a WVSCI score less than or equal to 70 results after assessment of the aquatic ecosystem. Acceptable biological condition for BAS #1 is defined as WVSCI =/> 68. In order to prevent biological conditions at BAS #1 from reaching unacceptable biological condition, the following plan will be implemented as appropriate when a biological sampling at BAS #1 yields a WVSCI score of 70 or lower:

- Identifying existing conditions in the watershed that may be contributing to the problem.
- Expedite reclamation. Reduction of impact through expedited backfilling, grading and

revegetation of operational areas. Slopes shall be protected by immediate seeding and mulching to deter erosion to be followed by longer term revegetation utilizing appropriate species that are native to the locality and suitable for site conditions.

• Enhanced riparian plantings. A vegetated riparian zone along the stream channel will be enhanced using native grasses, shrub and tree species. The native plantings will consist of a minimum of 70% tree stems and no more than 25% of these trees should be soft mast producers. Woody stems will be irregularly placed and low growing shrubs will be planted between trees. Loosely graded non-compacted topsoil or topsoil substitutes that include, when possible, woody debris and native seeds will be used. Selection of ground cover will be based on soil pH and the growth habitat of the species. Slow growing ground cover species enhancing soil stabilization while allowing tree seedlings to emerge above ground cover. Native and non-competitive domestic ground covers (tree-compatible) will be used to quickly protect the area, encourage native plants and animals, and enhance forest succession. Invasive species management measures will be implemented.

• Stream restoration/enhancement as appropriate. In-stream enhancement measures may be taken such as step pools, eddy rocks, and aquatic habitat structures, if appropriate for the applicable stream reach.

• Any other measures that are identified at the time of implementation.

Biological Compliance

If the condition of the aquatic ecosystem at the assessment station prior to initiation of the permitted activity to be satisfactory, taking into account all potentially applicable criteria, then the acceptable future biological conditions is a WVSCI score greater than or equal to the WVSCI value representing the 5th percentile of reference (currently 68.0). If the condition of the aquatic ecosystem at the assessment stations is less than satisfactory (currently 68.0), taking into account all potentially applicable criteria, then the applicant shall identify existing conditions within the watershed that may be contributing to the problem. If a TMDL addressing biological impairment for ionic stress is not in effect, a WVSCI score greater than or equal to the baseline value would represent an acceptable future condition. A WVSCI score below 68 at BAS 1 shall be a violation of this permit until such time as a biological score from the comparable season (Spring/Summer) at the same station reaches acceptable future biological condition. There will be an affirmative defense for violation of this provision if the violation arose from causes other than activities associated with the Permittee's operation and beyond the control of the Permittee, including its employees, agents, consultants and contractors, which could not be overcome by due diligence, and provided that the permittee demonstrates that it was in compliance with all provisions of this permit, including implementation of the AEPP at the time the violation was detected. The permittee bears the burden of proof and must establish the affirmative

defense in a report submitted to WVDEP within 30 days of discovering the violation. This affirmative defense will not be afforded if the Permittee fails to establish any element of this affirmative defense or if operational error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventive maintenance, or careless or improper operation caused or contributed in any way to the violation.