A Subsidiary of
ARCH COAL, INC.

PATRIOT MINING COMPANY, INC.

January 16, 2012

Mr. Greg Currey
United States Army Corps of Engineers - Pittsburgh District
William S. Moorhead Federal Building
1000 Liberty Avenue
Pittsburgh, Pennsylvania 15222

RE: Response to Comments
New Hill West Surface Mine
Monongalia County, West Virginia
USACE File No. 2009-759

Dear Mr. Currey:

I am writing in reference to your December 7, 2010 correspondence regarding Patriot Mining Company, Inc.'s (Patriot) New Hill West Surface Mine (Public Notice 2010-43; 2009-759). In this correspondence, you indicated that you had comments and required additional information for completion of this Department of the Army permit application submitted for the aforementioned project. This letter and its enclosures contain the requested information.

Comment 1a: Discuss how spoil placement throughout the project area will be controlled to reduce drainage through overburden into streams, including the backfill area, i.e., the side hill fill, compaction of this fill, etc.

Response 1a: *The New Hill West project is unique in that no additional fill structures are being constructed for the proposed activity. Instead, Patriot would use an existing side hill fill for the disposal of approximately 0.943 M yds^3 of overburden. The remaining overburden, as well as the ash used to amend the overburden, would be placed back in the permit area. This material would be used to restore the permit area to the approximate original contour (AOC).*

Patriot has, to the extent practical, minimized the potential for drainage through overburden into streams by not filling channels within the footprint of the proposed permit area. Stream impacts associated with the proposed project area are limited to mining through stretches of intermittent and ephemeral channel. During the reclamation process, these areas would be re-created. Appropriate material would be used to construct these channels.

As noted in Patriot's surface mine application (SMA), the additional material in the existing side hill fill would be placed in four foot, relatively horizontal layers (lifts) starting at the toe of the fill. At the same time, a D-9 class or larger dozer would be utilized for further placement and compaction to insure fill stability and proper construction. According to State mining regulations, surface water run-off from the fill and from surrounding areas must be diverted away from the fill (38 CSR 2.14.14f9). This design feature minimizes the amount of surface water that moves over the surface of the fill and that can seep through the overburden. Additionally, State rules do not allow for intentional pooling of water on these structures (38 CSR 2.14.14f10) (with few exceptions that do not apply to Patriot's proposed permit).

As with all mining plans, the proposed project must be designed to meet contemporaneous reclamation standards or the applicant must apply for a variance. For multiple seam contour mining, which is the mining type being proposed at the New Hill West Surface Mine, disturbed and unreclaimed acreage, including excess spoil disposal sites, shall not exceed 50 percent of the permit area. This standard limits the amount of exposed material at any given time within the permit area.

Comment 1b: Discuss whether the data from Scotts Run and its tributaries and from adjacent surface mines (NPDES outlet data for example) demonstrate that excursions from applicable water quality standards have or have not occurred, and whether the proposed surface mine is similar enough to these adjacent surface mines, i.e. geology, acid-base accounting data, mining methods and techniques, to infer that excursions from applicable water quality standards also should or should not occur due to the proposed surface mine or from cumulative effects in the watershed.

Response 1b: *The New Hill West Surface Mine is an existing facility that is expanding and utilizing an existing side hill fill structure. The materials placed in the side hill fill, as well as new material to be placed as a result of the proposed mining activity, are from the same coal seams (Waynesburg and Waynesburg A) and would be mined from similar geological strata. The mining methods and techniques are also similar. Therefore, an examination of existing NPDES data from the existing NPDES permit (WV1017535) would be appropriate to determine potential water quality from the proposed activity.*

Enclosed in Appendix A are data sheets from WV1017535 from January 2010 to August 2011. This data, which include 914 sampling events from 27 outlets, are from the monthly monitoring reports for WV1017535 and include the parameters that Patriot is required to monitor for NPDES compliance. The parameters at some outlets include pH, total suspended solids, sulfates, iron, aluminum, dissolved aluminum, total dissolved solids and conductivity.

During this timeframe, WV1017535 had three excursions. The first two occurred in January 2010 and they were on Outlet 002 for TSS and Aluminum. The other excursion occurred in April 2011 for Aluminum at Outlet 001. To address this issue, Patriot is pursing an Aluminum Translator for this outlet. As noted in the provided data, aluminum discharging from the outlets at the existing fill is not primarily in the dissolved form. Patriot's NPDES limit for aluminum, like many in the Monongahela River drainage, is based on the existence of a TMDL as well as the change to the dissolved criteria in 2006. As a result of the criteria change, most permits assume that the aluminum discharging from an outlet is in the dissolved form and if this is not the case, the limit found in the NPDES permit is over-protective or too stringent. This is believed to be the case for WV1017535.

An examination of the pH and acidity information indicates that the existing surface mine is not discharging acidic material. The material handling plan that is in place, as well as augmentation (with ash material) done onsite, appear to be preventing the discharge of acidic material into waters. The same material handling plan and augmentation plan would be used for the proposed project; therefore, no acidic discharges are anticipated.

With regard to cumulative effects from this permit, Dr. Paul Ziemkiewicz testified in a hearing before the West Virginia Environmental Quality Board for the State regarding the potential effects for the proposed project. As part of work as a witness for the State, Dr. Ziemkiewicz examined the effect additional mining would have on total dissolved solids and sulfates in Scott's Run. To make this determination Dr. Ziemkiewicz used a conservative estimate that assumed the new mining would be 2.5 times greater than the existing facility (which is obviously an over-estimate). Using this assumption, Dr. Ziemkiewicz recalculated the load (for TDS and Sulfates) that would potentially be discharging from the proposed facility. As per his calculations, Dr. Ziemkiewicz found that the sulfate concentration in Scotts Run downstream of this facility would increase (on average) 3 mg/L. The TDS I Scotts Run would increase 4 mg/L. This increase is negligible and would not be notable in downstream water quality or in the Monongahela River where Scotts Run discharges into this larger waterbody.

Comment 2a: Baseline chemical and biological data will be needed for the streams that are proposed to be mined through. This data will be needed for Tributaries 1, 1-1, 5, 6, and 7. Two water quality chemistry samples will be needed for each of these streams. The following parameters must be analyzed: pH, Total Hot Acidity, Total Alkalinity, Total Iron, Total manganese, Total aluminum, Total Dissolved Solids, Specific Conductance or Conductivity, Sulfates, and Selenium. These chemistry samples must be taken at least three weeks apart. One biological sample must be provided for each of the above streams. A West Virginia Stream Condition Index (WVSCI) score must be provided for each of these sample sites, along with the raw taxonomic data used to generate these scores.

Response 2a:

Tributary 1 *– Tributary 1 was visited twice by Potesta & Associates, Inc. (POTESTA) to collect biological, physical, and chemical data (March 2009 and April 2010) and a site was established near the mouth (Site 1). During both of these site visits this tributary was* ***DRY*** *or under extreme low flow and therefore could not be sampled for benthics. Field water quality data were collected and can be found on page 47 of the compensatory mitigation plan (CMP).*

Table 1
Water Quality Data – Tributary 1

Parameters	pH	Total Acidity (mg/L)	Total Alkalinity (mg/L)	Total Fe (mg/L)	Total Mn (mg/L)	Total Al (mg/L)	TDS (mg/L)	Specific Conductance (uS/cm)	Sulfates (mg/L)	Se (ug/L)
March 2009	8.02	<2.0	100	---	12.41	---	284	337	80	<0.80
April 2010	---	---	---	---	---	---	---	---	---	---

Tributary 1-1 *– Tributary 1-1 was visited twice by POTESTA to collect biological, physical, and chemical data (March 2009 and April 2010). During both of these site visits, this tributary was* ***DRY****.*

Tributary 5 *- Tributary 5 was visited by POTESTA to collect biological, physical, and chemical data (April 2010). A sampling station was established near the mouth (Site 15) well below any impact areas. The tributary was exhibiting low flow conditions but data were collected. Field water quality data can be found on page 47 of Patriot's CMP. A benthic sample was collected. Due to the flow conditions, this sample only contained 63 individuals and was flagged as having an abundance that was too low for WVSCI scoring. The data contained the following taxanomic information:*

- *Baetis – 5 individuals*
- *Leuctra – 37 individuals*
- *Acroneuria – 3 individuals*
- *Tipula – 3 individuals*
- *Optioservus – 11 individuals*
- *Boyeria – 1 individual*
- *Sialis – 1 individual*
- *Camberidae – 2 individuals*

Based on additional data collected by Patriot's consultants and the WVDEP, it is likely that the sample collected is not representative.

Tributary 6 *– Tributary 6 was visited by POTESTA to collect biological, physical, and chemical data (March 2009). Due to flow conditions, a monitoring station could not be established in this tributary.*

Tributary 7 *- Tributary 7 was visited by POTESTA to collect biological, physical, and chemical data (March 2009) and a site was established near the mouth (Site 1). During both of these site visits, this tributary was under extreme low flow and therefore could not be sampled for benthics. Field water quality data were collected and can be found on page 47 of the CMP.*

Table 2
Water Quality Data – Tributary 7

Parameters	pH	Total Acidity (mg/L)	Total Alkalinity (mg/L)	Total Fe (mg/L)	Total Mn (mg/L)	Total Al (mg/L)	TDS (mg/L)	Specific Conductance (uS/cm)	Sulfates (mg/L)	Se (ug/L)
March 2009	4.53	20.0	<2.0	---	11.93	---	204	342	155	<0.80

Comment 2b: Provide a biological sample for each of the following downstream sampling sites: BWQ-B, BWQ-C, BWQ-E, NH-3 (DSR), and SS-5. A West Virginia Stream Condition Index (WVSCI) score must be provided for each of these sample sites, along with the raw taxonomic data used to generate these scores. Also, provide chemistry data of Site SS-5 of the full spectrum of mining parameters (listed in 2a. above).

Response 2b: ***BWQ-B*** *– A biological sample was collected by AllStar Ecology, LLC (AllStar) at BWQ-B (or USUTSR as referred to by AllStar) on October 8, 2010. The company provided the biological data found in Table 3.*

Table 3
Benthic Macroinvertebrate Data – BWQ-B

Taxa	Count	Taxa	Count	Taxa	Count
Oligochaeta	27	Unknown Snails	2	Camberidae	2
Asellidae	2	Baetidae	2	Heptageniidae	6
Hydropsychidae	37	Philopotamidae	1	Polycentropodidae	1
Limnephilidae	5	Chloroperlidae	1	Perlidae	1
Gomphidae	4	Cordulegastridae	1	Aeshnidae	3
Calopterygidae	13	Elmidae	3	Psephenidae	23
Corydalidae	1	Sialidae	1	Corixidae	1
Saldidae	1	Chironomidae	2	Tipulidae	5
Tabanidae	1	Gerridae	1		

These data resulted in a WVSCI score of 76.3. The overall abundance in this sample was low but it contained more than average taxa richness. The table below provides a range of the requested parameters collected at BWQ-B over the 2008 to 2010 timeframe. This data can be found in Appendix E of the CMP.

Table 4
Water Quality Data – BWQ-B

Sample Date	pH	Total Acidity (mg/L)	Total Alkalinity (mg/L)	Total Fe (mg/L)	Total Mn (mg/L)	Total Al (mg/L)	TDS (mg/L)	Specific Conductance (uS/cm)	Sulfates (mg/L)	Se (ug/L)
8/15/2008	7.90	---	---	0.114	0.005	0.231	---	---	---	<0.856
8/22/2008	8.00	---	---	<0.014	<0.003	<0.065	---	---	---	2.32
9/5/2008	7.80	---	---	0.025	<0.003	0.145	---	---	---	<0.856
9/16/2008	8.30	---	---	0.07	<0.003	0.204	---	---	---	<0.856
10/1/2008	8.00	---	---	<0.014	<0.003	0.153	---	---	---	<0.856
10/13/2008	8.30	---	---	0.108	0.029	0.190	---	---	---	<0.856
11/1/2008	8.40	---	---	0.102	<0.003	<0.065	---	---	---	1.13
11/10/2008	8.20	---	---	0.018	<0.003	<0.065	---	---	---	<0.856
12/3/2008	8.00	<3	113	0.108	<0.003	<0.065	220	400	70	<0.856
12/15/2008	8.20	---	---	0.097	0.008	0.079	---	---	---	<0.856
1/3/2009	8.00	3	97	0.075	<0.002	0.04	268	335	75	0.84
1/13/2009	8.00	----	---	0.061	<0.002	0.073	---	---	---	1.08
2/28/2009	8.00	<2	108	0.078	0.008	0.06	292	392	75	<0.80
3/10/2009	8.00	<2	117	0.082	0.006	0.05	336	388	80	<0.80
4/01/2009	8.00	<2	73	0.08	0.004	0.056	268	269	65	<0.80
5/01/2009	7.80	<2	68	0.251	0.029	0.205	144	210	42	1.76
1/14/20010	8.00	<2	77	0.081	0.004	0.097	188	291	50	<0.80
1/21/2010	8.00	<2	57	0.078	0.004	0.078	140	293	50	<0.80

BWQ-C – This sampling location does not have appropriate habitat for benthic macroinvertebrate data collection. The table below provides a range of the requested parameters collected at BWQ-C over the 2008 to 2010 timeframe. This data can be found in Appendix E of the CMP.

Table 5
Water Quality Data – BWQ-C

Sample Date	pH	Total Acidity (mg/L)	Total Alkalinity (mg/L)	Total Fe (mg/L)	Total Mn (mg/L)	Total Al (mg/L)	TDS (mg/L)	Specific Conductance (uS/cm)	Sulfates (mg/L)	Se (ug/L)
8/15/2008	7.00	---	---	32.54	4.043	0.321	---	---	---	7.57
8/22/2008	7.00	---	---	44.77	4.506	1.037	---	---	---	3.82
9/5/2008	7.00	---	---	66.83	6.864	0.421	---	---	---	2.07
9/16/2008	7.00	---	---	30.28	4.115	0.405	---	---	---	1.62
10/1/2008	7.00	---	---	0.797	0.778	0.317	---	---	---	<0.856
10/13/2008	7.00	---	---	52.43	7.642	0.227	---	---	---	3.30
11/1/2008	7.00	---	---	33.124	6.053	0.073	---	---	---	5.18
11/10/2008	7.00	---	---	34.744	7.36	<0.065	---	---	---	<0.856
12/3/2008	7.00	<3	24	24.236	3.455	0.202	1600	2150	1350	1.95
12/15/2008	7.00	---	---	2.453	0.334	0.399	---	---	---	<0.856
1/3/2009	7.00	3	59	5.855	0.975	0.140	1712	2170	1450	5.41
2/28/2009	7.00	<2	41	10.404	1.381	0.140	1820	2320	1450	1.72
3/10/2009	7.00	<2	37	10.388	1.389	0.130	1724	360	1450	<0.80
4/01/2009	7.00	<2	49	4.601	0.535	0.123	1264	1752	1050	2.59
5/01/2009	7.00	<2	56	2.799	0.492	0.403	672	1011	525	4.27
1/14/2010	7.00	<2	39	7.878	1.137	0.295	968	1382	750	2.71
1/21/2010	7.00	<2	38	7.800	1.116	0.294	936	1385	775	1.67

***BWQ-E**– A biological sample was collected by AllStar at BWQ-C (or USR as referred to by AllStar) on October 8, 2010. The company provided the biological data found in Table 6.*

Table 6
Benthic Macroinvertebrate Data – BWQ-E

Taxa	Count	Taxa	Count	Taxa	Count
Planorbidae	2	Unknown Snails	1	Asellidae	9
Baetidae	2	Caenidae	2	Heptageniidae	13
Hydropsychidae	115	Philopotamidae	1	Chloroperlidae	1
Capniidae/Leuctridae	3	Perlilodae	2	Aeshnidae	1
Elmidae	6	Psephenidae	10	Chironomidae	60
Tipulidae	7	Athericidae	2		

These data resulted in a WVSCI score of 72.3. The table below provides a range of the requested parameters collected at BWQ-E over the 2008 to 2010 timeframe. These data can be found in Appendix E of the CMP.

Table 7
Water Quality Data – BWQ-E

Sample Date	pH	Total Acidity (mg/L)	Total Alkalinity (mg/L)	Total Fe (mg/L)	Total Mn (mg/L)	Total Al (mg/L)	TDS (mg/L)	Specific Conductance (uS/cm)	Sulfates (mg/L)	Se (ug/L)
8/15/2008	7.80	---	---	0.120	0.008	0.194	---	---	---	<0.856
8/22/2008	8.40	---	---	0.056	<0.003	<0.065	---	---	---	3.71
9/5/2008	8.50	---	---	0.047	<0.003	0.144	---	---	---	<0.856
9/16/2008	7.80	---	---	0.051	<0.003	0.202	---	---	---	<0.856
10/1/2008	8.00	---	---	<0.014	<0.003	0.120	---	---	---	<0.856
10/13/2008	8.00	---	---	0.139	0.040	0.166	---	---	---	1.00
11/1/2008	8.30	---	---	0.112	0.021	<0.065	---	---	---	2.23
11/10/2008	8.30	---	---	0.125	<0.003	<0.065	---	---	---	<0.856
12/3/2008	8.00	<3	137	<0.014	<0.003	<0.065	260	442	100	<0.856
12/15/2008	8.00	---	---	0.128	0.011	0.082	---	---	---	<0.856
Sample Date	pH	Total Acidity (mg/L)	Total Alkalinity (mg/L)	Total Fe (mg/L)	Total Mn (mg/L)	Total Al (mg/L)	TDS (mg/L)	Specific Conductance (uS/cm)	Sulfates (mg/L)	Se (ug/L)
1/3/2009	8.20	3	136	0.035	<0.002	0.025	312	409	110	1.19
2/28/2009	8.20	<2	136	0.064	0.006	0.050	336	471	115	<0.800
3/10/2009	8.30	<2	150	0.050	0.006	0.030	344	470	100	<0.800
4/01/2009	8.00	<2	84	0.071	0.006	0.047	292	315	60	<0.800
5/01/2009	8.00	<2	73	0.250	0.028	0.207	216	263	50	1.21
1/14/20010	8.00	<2	93	0.077	0.005	0.082	196	357	65	<0.800
1/21/2010	8.00	<2	80	0.079	0.016	0.081	204	346	60	<0.800

NH3 (DSR) *- A biological sample was collected by AllStar at NH3 (or DSR) by Allstar on October 8, 2010. The company provided the biological data found in Table 8.*

Table 8
Benthic Macroinvertebrate Data – NH3

Taxa	Count	Taxa	Count	Taxa	Count
Oligochaeta	9	Physidae	5	Unknown Snails	1
Asellidae	2	Caeniidae	3	Heptageniidae	1
Ephemeridae	1	Hydropsychidae	19	Gomphidae	2
Aeshnidae	1	Calopterygidae	6	Elmidae	27
Psephenidae	16	Hydrophilidae	3	Tipulidae	12
Athericidae	3	Muscidae	1		

These data resulted in a WVSCI score of 66.1 which falls in the State's "grey zone" and would be considered unimpaired. This sampling location is below the sometimes toxic inputs from seeps located near BWQ-C.

The table below provides a range of the requested parameters collected at NH3 over the 2008 to 2010 timeframe. These data can be found in Appendix E of the CMP.

Table 9
Water Quality Data – NH3

Sample Date	pH	Total Acidity (mg/L)	Total Alkalinity (mg/L)	Total Fe (mg/L)	Total Mn (mg/L)	Total Al (mg/L)	TDS (mg/L)	Specific Conductance (µS/cm)	Sulfates (mg/L)	Se (ug/L)
1/4/2008	7.70	<3	86	1.450	0.221	0.836	384	542	---	---
1/21/2008	7.80	---	---	1.095	0.199	0.597	---	---	---	---
2/4/2008	7.60	<3	64	0.898	0.103	0.514	284	367	---	---
2/18/2008	7.80	---	---	0.829	0.161	0.467	---	---	---	---
3/3/2008	7.60	<3	63	0.750	0.151	0.475	308	377	---	---
3/17/2008	7.60	---	---	0.644	0.216	0.482	---	---	---	---
4/1/2008	7.60	<3	86	0.375	0.117	0.351	360	479	---	---
4/14/2008	7.60	---	---	0.334	0.221	0.312	---	---	---	---
5/1/2008	7.60	---	---	0.417	0.110	0.305	---	---	---	---
5/12/2008	7.60	<3	65	1.084	0.200	0.742	310	380	---	---
6/1/2008	7.60	---	---	0.240	0.105	0.212	---	---	---	---
6/16/2008	7.80	<3	112	0.116	0.210	0.159	408	606	---	---
7/1/2008	7.80	<3	107	0.154	0.115	0.250	388	550	---	---
7/14/2008	7.80	---	---	0.061	0.098	<0.065	---	---	---	---
8/1/2008	7.80	<3	151	0.077	0.065	0.110	472	758	---	---
8/18/2008	7.60	---	---	0.183	0.264	0.186	---	---	---	---
9/2/2008	7.80	<3	152	<0.014	<0.003	0.081	736	1037	---	---
9/15/2008	7.80	---	---	0.083	0.044	0.150	---	---	---	---
10/1/2008	7.60	<3	188	<0.014	<0.003	0.141	684	1045	---	---
10/13/2008	7.80	---	---	<0.014	<0.003	0.103	---	---	---	---
11/1/2008	7.80	<3	187	0.025	0.013	<0.065	720	1088	---	---
11/10/2008	7.80	---	---	0.188	0.022	<0.065	---	---	---	---
12/1/2008	7.80	<3	106	0.214	<0.003	0.167	332	456	---	---
12/15/2008	7.80	---	---	0.336	0.061	0.205	---	---	---	---
1/3/2009	7.80	3	120	0.695	0.097	0.385	376	555	---	---
1/13/2009	7.80	---	---	0.961	0.099	0.650	---	---	---	---
2/2/2009	7.80	---	---	0.438	0.089	0.290	---	---	---	---
2/16/2009	7.80	<2	86	0.780	0.124	0.414	256	465	---	---
3/2/2009	7.80	<2	100	0.354	0.180	0.181	368	598	---	---
3/24/2009	7.30	---	---	1.138	0.327	0.150	---	---	---	---

SS-5 *– Benthic macroinvertebrates were not collected at this location; however, the sampling location immediately upstream did not indicate impairment. The table below provides a range of the requested parameters collected at SS-5 (or USR-5) over the 2008 to 2010 timeframe. These data can be found in Appendix E of the CMP.*

Table 10
Water Quality Data – SS5

Sample Date	pH	Total Acidity (mg/L)	Total Alkalinity (mg/L)	Total Fe (mg/L)	Total Mn (mg/L)	Total Al (mg/L)	TDS (mg/L)	Specific Conductance (uS/cm)	Sulfates (mg/L)	Se (ug/L)
1/5/2008	7.60	---	---	0.939	0.349	0.523	---	---	---	---
1/21/2008	7.60	---	---	1.019	0.247	0.474	---	---	---	---
2/5/2008	7.60	---	---	0.901	0.231	0.484	---	---	---	---
2/19/2008	7.60	---	---	0.739	0.442	0.513	---	---	---	---
3/4/2008	7.60	---	---	0.857	0.421	0.628	---	---	---	---
3/17/2008	7.60	---	---	2.886	0.726	1.484	---	---	---	---
4/2/2008	7.60	---	---	0.465	0.580	0.362	---	---	---	---
4/14/2008	7.60	---	---	0.371	0.439	0.345	---	---	---	---
5/2/2008	7.50	---	---	0.456	0.343	0.459	---	---	---	---
5/13/2008	7.60	---	---	0.603	0.318	0.486	---	---	---	---
6/3/2008	7.60	---	---	0.396	0.402	0.414	---	---	---	---
6/16/2008	7.60	---	---	0.288	0.382	0.255	---	---	---	---
7/2/2008	7.60	---	---	0.293	0.153	0.209	---	---	---	---
7/14/2008	7.60	---	---	0.165	<0.003	<0.065	---	---	---	---
8/4/2008	7.60	---	---	0.186	0.028	0.124	---	---	---	---
8/19/2008	7.60	---	---	0.302	0.148	0.150	---	---	---	---
9/3/2008	7.60	---	---	0.029	<0.003	0.119	---	---	---	---
9/15/2008	7.60	---	---	0.095	<0.003	0.109	---	---	---	---
10/2/2008	7.60	---	---	0.163	0.016	0.180	---	---	---	---
10/14/2008	7.60	---	---	0.079	<0.003	0.137	---	---	---	---
11/3/2008	7.60	---	---	0.063	0.016	<0.065	---	---	---	---
11/11/2008	7.00	---	---	0.021	<0.003	<0.065	---	---	---	---
12/3/2008	7.60	---	---	0.163	0.025	<0.065	---	---	---	---
12/15/2008	7.60	---	---	0.388	0.130	0.196	---	---	---	---
1/2/2009	7.60	---	---	0.766	0.186	0.334	---	---	---	---
1/13/2009	7.60	---	---	0.856	0.163	0.414	---	---	---	---
2/3/2009	7.60	---	---	0.400	0.141	0.198	---	---	---	---
2/16/2009	7.60	---	---	0.512	0.180	0.230	---	---	---	---
3/3/2009	7.60	---	---	0.016	2.375	0.054	---	---	---	---
3/20/2009	8.00	---	---	0.299	0.209	0.066	---	---	---	---

Comment 2c: Provide NPDES Outlet data from Article 3 Permits S-2010-01 and S-2010-04. One year of data from these outlets would suffice.

Response 2c: *Please see **Enclosure A**.*

Comment 2c: Sample Sites DSR, USR, and SS-5 in Scotts Run show elevated conductivity levels (DSR) or no conductivity data is available (USR and SS-5). Therefore, provide a one-time sample and analyze these sites for conductivity or specific conductance, Ca+2, Mg+2, BCO3-, SO4, and Cl-.

Response 2c: *The data requested is provided in Table 11.*

Table 11
Water Quality Data – DSR, USR, and SS-5

Sample Date	Site	Specific Conductance (uS/cm)	Bicarbonate Ion (mg/L)	Calcium (mg/L)	Magnesium (mg/L)	Sodium (mg/L)	Potassium (mg/L)	Chloride (mg/L)	Sulfate (mg/L)	Se (ug/L)
5/16/2011	DSR	793	<2.0	96.74	24.80	25.11	8.22	5.73	314.02	<0.28
5/16/2011	USR	498	<2.0	59.24	12.24	12.91	2.58	8.41	221.98	<0.28
5/16/2011	SS-5	893	<2.0	96.79	23.70	27.78	8.0	6.49	441.95	<0.28
6/01/2011	DSR	955	129	124.40	29.91	23.61	7.23	10.53	616.71	<0.28
6/01/2011	USR	595	30	69.98	14.13	10.23	2.75	12.28	211.45	<0.28
6/01/2011	SS-5	1333	163	175.84	50.60	37.07	10.01	10.62	586.49	<0.28

Comment 2d: Coal ash has been placed on most of the recent surface mines (2000-2010) in the Scotts Run watershed. The NPDES Outlets at many of these mines have being monitored for "coal ash parameters" as have some of the receiving streams. Provide as much data from these sites as possible that demonstrates seasonal variation (at least one year).

Response 2d: *Please see data provided in **Enclosure B***

Comment 2e: Provide conductivity or specific conductance data of tributaries of Scotts Run that have had significant mining discharges to them, such as Guston Run, Wades Run, Jere Hollow, and the tributary just west of Guston Run (between S-2010-04 and S-2010-06).

Response 2d: *Please see data provided in **Enclosure C**. Mapping is also provided in this appendix.*

Comment 2f: Provide selenium data, two samples at least three weeks apart, for Sites DSR, USR, and DSR-5 (SS-5) in Scotts Run.

Response 2f: *See Table 11*

Comment 2g: Provide a "Cumulative Impact Assessment" (CIA) of the Scotts Run watershed. This includes an analysis of past, present, and reasonably foreseeable activities. This analysis should include a description of all man-made activities in this watershed, such as mining, timbering and timbering due to mining, other industrial activity, commercial and residential construction, sewage discharges (municipal and otherwise), etc.

Response 2f: *A cumulative impact assessment of Scotts Run is provided in Enclosure D; however, Patriot would like to remind the USACE that the WVDEP conducted a cumulative hydrologic impact assessment ("CHIA") as part of its evaluation of Patriot's WVSCMRA permit applications, and* ***the Fourth Circuit recently affirmed that the USACE may properly rely upon the CHIA when evaluating a proposed project's cumulative impacts. Aracoma, 556 F.3d at 208-09****. With respect to the New Hill West Surface Mine, WVDEP's findings indicate that the project* ***would not*** *result in cumulative hydrologic impacts. Given these cumulative layers of independent environmental review and protection at the state level, the USACE has ample bases for its conclusion that the New Hill West project complied with all applicable regulations and guidance, and that the discharges to be authorized would not result in significant adverse impacts to the aquatic ecosystem.*

Comment 4a: The length of the "historical drainage areas" stream restoration areas presented in the application is different than what I am measuring from your maps. I get 137 ft for Reach 4, 563 ft for Reach 5, 90 ft for Reach 6, and 248 ft for Reach 7 for a total of 1,038 ft. The total length you present is 2,193 ft. Please correct or clarify this.

Response 4a: *This has been addressed in the CMP. A new version of the document is provided in* ***Enclosure E****. It now list 2,011 linear feet. This includes additional length associated with Tributary 6 (800 linear feet), Tributary 10 (463 linear feet), Reach 5 (530 linear feet) and Reach 7 (218 linear feet). This totals 2,011 feet. The 2,193 feet total accidentally contained some culverted length. Revised figures and tables are provided in* ***Enclosure F****.*

Comment 4b: Please provide more detail on how the mine-through streams will be re-constructed. Cross-sections and profiles would help with this. What will be the stream dimensions, the shape of the stream bottom, etc.? What size of substrate will be replaced and will it mimic the natural existing size of the substrate? Will the sinuosity or straightness of the streams be the same as the original existing stream? Please address.

Response 4b: *Cross-sections and profiles are provided in* ***Enclosure G****. Stream substrate and dimensions are discussed below. Patriot would attempt to return stream post mining to the original pattern, dimension, and profile as practicably possible. Descriptions of the restored areas are provided below.*

Tributary 1 *– Work in Tributary 1 would temporarily impact 465 linear ft of intermittent channel. Two cross-sections were established within the reach (Station 01+50 and Station 03+25). At station 01+50, the bankfull width (W_{bkf}) was 2.6 ft, bankfull depth (D_{bkf}) was 0.3 ft and bankfull cross-sectional area (A_{bkf}) was 0.8 ft^2. Station 03+25 had a W_{bkf} of 4.9 ft, D_{bkf} of 0.1 ft, and A_{bkf} of 0.4 ft^2. Two stations were established for pebble counts, Station 03+00 and Station 05+00. The D_{50} at Station 03+00 was 24.95 mm, while the D_{95} was 117.14 mm. Station 05+00 had a D_{50} of 0.41 mm and a D95 of 38.5 mm. A flow analysis was conducted for the reach utilizing SEDCAD4. The analysis was based on a 100-year flow event. The results indicated that the normal depth was 1.16 ft. while the top width was 14.65 ft. Presently, the channel had an entrenchment ratio ranging from 1.34 to 1.71 (ft) with a width-to-depth ratio ranging from 8.67 to 49.00 (ft). Sinuosity within the reach was moderate. The flow regime within the reach can best be described as a step:pool transitioning into a cascade flow regime. The channel can be categorized as a B-stream type transitioning into an A-stream type.*
The restored channel would have a slope of approximately 6 percent. The restoration of the channel would be initiated through excavation using equipment with a small-bucket size which would aid in the creation of proper channel dimensions. Loose, organic, native fill from the site (where and when available) would be utilized to backfill along the channel to aid in the creation of the appropriately-sized channel. Such work would be performed during low flow conditions and would, as discussed, proceed in a downstream manner (to avoid sediment transport into newly restored channel) when practicable and after BMPs to reduce erosion and sedimentation have been implemented. The completed streambed would be lined with appropriately sized non-toxic, non-acid forming rock ranging from gravel to small boulders. Channel design for the restored tributary would mimic as close as practical the pre-mining pattern dimensions and profile of Tributary 1. Cross-sectional dimensions would be determined based on the regional curve for the Appalachian Plateau (or other applicable data). Approximate post construction cross-section dimensions for Station 01+50 would be a W_{bkf} of 4.0 ft, D_{bkf} of 0.5 ft, and A_{bkf} of 2.0 ft^2. The cross-sectional dimension for Station 03+25 would be a W_{bkf} of 3.7 ft, D_{bkf} of 0.4 ft, and A_{bkf} of 1.5 ft^2. It should be noted that specific dimensions may need to be field adjusted due to the final regraded slope as well as limitations with available operating equipment.

The channel would be too small for more complex in-stream structures and would focus on the installation of grade control structures such as step:pools and drop structures as appropriately necessary. Grade control structures, such as appropriately-sized rock and/or wood material, would be secured into the channel. These structures are low-elevation structures that span the entire channel width and create an immediate drop in channel bed and water surface elevation. Pool spacing within the channel that has a slope of approximately 6 percent would generally be between 1 to 4 stream widths.

***Tributary 1-1** – Work in Tributary 1-1 would temporarily impact 325 linear ft of intermittent channel. Two cross-sections were established within the reach (Station 01+25 and Station 02+73). At Station 01+25, the W_{bkf} was 1.9 ft, D_{bkf} was 0.1 ft, and A_{bkf} was 0.2 ft^2. Station 02+73 had a W_{bkf} of 3.2 ft, D_{bkf} of 0.5 ft, and A_{bkf} of 1.5 ft^2. Station 02+00 was established for the purpose of the pebble count. The D_{50} at Station 02+00 was 0.3 mm, while the D_{95} was 32 mm. A flow analysis was conducted for the reach utilizing SEDCAD4. The analysis was based on 100-year flow event. The results indicated that the normal depth was 0.48 ft. while the top width was 8.33 ft. Presently, the channel has an entrenchment ration ranging from 3.42 to 3.75 (ft) with a width-to-depth ratio of 19.00 (ft). Sinuosity within the reach was low to moderate. The flow regime within the reach can best be described as cascade. The channel can be categorized as a B-stream type transitioning into an A-stream type.*

The restored channel shall have a slope of approximately 13 percent. The restoration activities in this channel would proceed as described for Tributary 1. Channel design for this tributary would mimic as close as practical the pre-mining pattern dimension and profile of Tributary 1-1. Approximate post construction cross-section dimensions for Station 01+25 would be a W_{bkf} of 4.0 ft, D_{bkf} of 0.5 ft, and A_{bkf} of 2.0 ft^2. The cross-sectional dimensions for Station 02+73 would be a W_{bkf} of 3.4 ft, D_{bkf} of 0.5 ft, and A_{bkf} of 1.7 ft^2. It should be noted that specific dimensions may need to be field adjusted due to the final regraded slope as well as limitations with available operating equipment.

Like Tributary 1, in-stream structures would focus on grade control and habitat development. Pool spacing within the channel that has a slope of approximately 13 percent would generally be less than one stream width.

Tributary 4 *– Work in Tributary 4 would temporarily impact 422 linear ft of ephemeral channel. Two cross-sections were established within the reach (Station 00+00 and Station 05+04). At Station 00+00, the W_{bkf} was 6.1 ft, D_{bkf} was 0.6 ft, and A_{bkf} was 4.0 ft^2. Station 05+04 had a W_{bkf} of 2.6 ft, D_{bkf} of 0.1 ft, and A_{bkf} of 0.3 ft^2. Two stations were established for pebble count, Station 00+00 and Station 05+04. The D_{50} at Station 00+00 was 5.13 mm. while the D_{95} was 162.67 mm.*
Station 05+04 had a D_{50} of 85.67 mm and a D_{95} of 2048 mm. Presently, the channel has an entrenchment ration ranging from 1.27 to 3.57 (ft) with a width-to-depth ratio ranging from 10.17 to 26.00 (ft). Sinuosity within the reach was low. The flow regime within the reach can best be described as cascade. The channel can be categorized as an A-stream type.

The restored channel shall have a slope of approximately 25 percent. The restoration activities in this channel would proceed as described for Tributary 1. Channel design for this tributary would mimic as close as practical the pre-mining pattern dimension and profile of Tributary 4. Approximate post construction cross-section dimensions for Station 00+00 would be a W_{bkf} of 4.0 ft, D_{bkf} of 0.5 ft, and A_{bkf} of 2.0 ft^2. The cross-sectional dimension for Station 05+04 would be a W_{bkf} of 3.9 ft, D_{bkf} of 0.3 ft, and A_{bkf} of 1.3 ft^2. It should be noted that specific dimensions may need to be field adjusted due to the final regraded slope as well as limitations with available operating equipment.

Like Tributary 1, in-stream structures would focus on grade control and habitat development. Pool spacing within the channel that has a slope of approximately 25 percent would generally be less than one stream width.

Tributary 5 *– Work in Tributary 5 would temporarily impact 86 linear ft of intermittent channel. A cross-section was established within the reach at Station 00+56. The W_{bkf} was 5.2 ft, D_{bkf} was 0.9 ft, and A_{bkf} was 4.4 ft^2. Particle information was collected at Station 00+18. The D_{50} was 90 mm, while the D_{95} was 322.25 mm. A flow analysis was conducted for the reach utilizing SEDCAD 4. The analysis was based on a 100-year flow event. The results indicated that the normal depth was 0.91 ft., while the top width was 12.03 ft. Presently, the channel has an entrenchment ration of 2.31 (ft) with a width-to-depth ration of 5.78 (ft). Sinuosity within the reach was low. The flow regime within the reach can best be described as cascade. The channel can be categorized as an A-stream type.*

The restored channel shall have a slope of approximately 20 percent. The restoration activities in this channel would proceed as described for Tributary 1. Channel design for this tributary would mimic as close as practical the pre-mining pattern dimension and profile of Tributary 5. Approximate post construction cross-section dimensions for Station 00+56 would be a W_{bkf} of 4.0 ft, D_{bkf} of 0.5 ft, and A_{bkf} of 2.0 ft^2. It should be noted that specific dimensions may need to be field adjusted due to the final regraded slope as well as limitations with available operating equipment.

Like the other restored tributaries, in-stream structures would focus on grade control and habitat development. Pool spacing within the channel that has a slope of approximately 20 percent would generally be less than one stream width.

***Tributary 6** – Work in Tributary 6 would temporarily impact 100 linear ft of intermittent channel and 469 linear ft of ephemeral channel. Two cross-sections were established within the reach (Station 02+41 and Station 04+20). At Station 02+41, the W_{bkf} was 3.2 ft, D_{bkf} was 0.8 ft, and A_{bkf} was 2.7 ft^2. Station 04+20 had a W_{bkf} of 4.2 ft, D_{bkf} of 0.2 ft, and A_{bkf} of 0.7 ft^2. Particle information was collected at Station 04+00. The D_{50} was 1.25 mm, while the D_{95} was 70.5 mm. A flow analysis was conducted for the reach utilizing SEDCAD 4. The analysis was based on a 100-year flow event. The results indicated that the normal depth was 1.16 ft while the top width was 13.35 ft. Presently, the channel has an entrenchment ratio ranging from 1.19 to 3.13 (ft) with a width-to-depth ratio ranging from 4.00 to 210.00 (ft). Sinuosity within the reach was moderate. The flow regime within the reach can best be described as a step:pool transitioning into a cascade flow regime. The channel can be categorized as a C-stream type transitioning to a B-stream type transitioning with portions of the reach with characteristics of an F-stream type.*

The restored channel shall have a slope of approximately 7 percent. The restoration activities in this channel would proceed as described for Tributary 1. Channel design for this tributary would mimic as close as practical the pre-mining pattern dimension and profile of Tributary 6. Approximately post construction cross-section dimensions for Station 02+41 would be a W_{bkf} of 4.0 ft, D_{bkf} of 0.5 ft, and A_{bkf} of 2.0 ft^2. The cross-sectional dimension for Station 04+20 would be a Wbkf of 3.7 ft, Dbkf of 0.4 ft, and A_{bkf} of 1.5 ft^2. It should be noted that specific dimensions may need to be field adjusted due to the final regraded slope as well as limitations with available operating equipment.

Like the other restored tributaries, in-stream structures would focus on grade control and habitat development. Pool spacing within the channel that has a slope of approximately 7 percent would generally be less than one stream width.

***Tributary** 7 – Work in Tributary 7 would temporarily impact 870 linear ft of intermittent channel and 652 linear ft of ephemeral channel. Two cross-sections were established within the reach (Station 06+47 and Station 15+00). At Station 06+47, the W_{bkf} was 2.5 ft, D_{bkf} was 0.4 ft, and A_{bkf} was 1.1 ft^2. Station 15+00 had a W_{bkf} of 2.0 ft, D_{bkf} of 0.2 ft, and A_{bkf} of 0.4 ft^2. Two stations were established for pebble count, Station 06+30 and Station 15+00. The D_{50} at Station 06+30 was 6.47 mm, while the D_{95} was 180mm. Station 15+00 had a D_{50} of 0.63 mm and a D_{95} of 38.5. The slope of Tributary 7 was approximately 4 percent. A flow analysis was conducted for the reach utilizing SEDCAD 4. The analysis was based on a 100-year flow event. The results indicated that the normal depth was 1.75 ft., while the top width was 21.47 ft. Presently, the channel has an entrenchment ratio of approximately 1.96 (ft) with a width-to-depth ratio of approximately 6.25 (ft). Sinuosity within the reach was moderate. The flow within the reach can best be described as a step:pool flow regime. The channel can be categorized as a C-stream type transitioning to a B-stream type transitioning with portions of the reach with characteristics of an F-stream type.*

The restored channel shall have a slope of approximately 4 percent. The restoration activities in this channel would proceed as described for Tributary 1. Channel design for this tributary would mimic as close as practical the pre-mining pattern dimension and profile of Tributary 7. Approximate post construction cross-section dimensions for Station 06+47 would be a Wbkf of 8.0 ft, Dbkf of 1.0 ft, and A_{bkf} of 7.9 ft^2. The cross-sectional dimension for Station 15+00 would be a W_{bkf} of 6.0 ft, D_{bkf} of 0.7 ft, and A_{bkf} of 4.2 ft_2. It should be noted that specific dimensions may need to be field adjusted due to the final regraded slope as well as limitations with available operating equipment.

Like the other restored tributaries, in-stream structures would focus on grade control and habitat development. Pool spacing within the channel that has a slope of approximately 4 percent would generally be between 1 and 4 stream widths.

***Tributary** 7-1 – Work in Tributary 7-1 would temporarily impact 37 linear ft of ephemeral channel. A cross-section was established at Station 00+00. The W_{bkf} was 3.4 ft, D_{bkf} was 0.4 ft, and A_{bkf} was 1.3 ft_2. The pebble count was collected at Station 00+00. The D_{50} was 16 mm, while the D_{95} was 148.8 mm. Presently, the channel has an entrenchment ration of 2.36 (ft) with a width-to-depth ratio of 5.50 (ft). Sinuosity within the reach was low. The flow within the reach can best be described as a cascade flow regime. The channel can be categorized as an A-stream type.*

The restored channel shall have a slope of approximately 11 percent. The restoration activities in this channel would proceed as described for Tributary 1. Channel design for this tributary would mimic as close as practical the pre-mining pattern dimension and profile of Tributary 7-1. Approximate post construction cross-section dimensions for Station 01+50 would be a W_{bkf} of 4.0 ft, D_{bkf} of 0.5 ft, and A_{bkf} of 2.0 ft^2. It should be noted that specific dimensions may need to be field adjusted due to the final regraded slope as well as limitations with available operating equipment.

In-stream structures would focus on grade control and habitat development. Pool spacing within a channel that has a slope of approximately 11 percent would generally be less than one stream width.

***Tributary 7-3** – Work in Tributary 7-3 would temporarily impact 209 linear ft of ephemeral channel. A cross-section was established at Station 01+73. The W^{bkf} was 3.4 ft, D^{bkf} was 0.4 ft, and A_{bkf} was 1.3 ft^2. The pebble count was collected at Station 00+00. The D_{50} was 16 mm, while the D_{95} was 148.8 mm. Presently, the channel has an entrenchment ratio of 5.00 (ft) with a width-to-depth ratio of 22.00 (ft). Sinuosity within the reach was low to moderate. The flow regime within the reach can best be described as a step:pool transitioning into a cascade flow regime. The channel can be categorized as a B-stream type transitioning into an A-stream type.*

The restored channel shall have a slope of approximately 7 percent. The restoration activities in this channel would proceed as described for Tributary 1. Channel design for this tributary would mimic as close as practical the pre-mining pattern dimension and profile of Tributary 7-3. Approximate post construction cross-section dimensions for Station 01+73 would be a W_{bkf} of 4.0 ft, D_{bkf} of 0.5 ft, and A_{bkf} of 2.0 ft^2. It should be noted that specific dimensions may need to be field adjusted due to the final regraded slope as well as limitations with available operating equipment.

In-stream structures would focus on grade control and habitat development. Pool spacing within the channel that has a slope of approximately 7 percent would generally be between 1 to 4 stream widths.

Tributary 8 *– Work in Tributary 8 would temporarily impact 139 linear ft of intermittent channel. A cross-section was established within the reach at Station 01+58. The W_{bkf} was 5.7 ft, D_{bkf} was 0.3 ft, and A_{bkf} was 1.7 ft^2. The pebble count was collected at Station 03+00. The D_{50} was 19 mm, while the D_{95} was 104 mm. Flow analysis was conducted for the reach utilizing SEDCAD 4. The analysis was based on a 100 year flow event. The results indicated that the normal depth of 1.75 ft. while the top width was 16.41 ft. Presently, the channel has an entrenchment ratio of 1.14 (ft) with a width-to-depth ration of 19.00 (ft). Sinuosity within the reach was moderate. The flow regime within the reach can best be described as a step:pool transitioning into a cascade flow regime. The channel can be categorized as a B-stream type transitioning into an A-stream type.*

The restored channel shall have a slope of approximately 9 percent. The restoration activities in this channel would proceed as described for Tributary 1. Channel design for this tributary would mimic as close as practical the pre-mining pattern dimension and profile of Tributary 8. Approximate post construction cross-section dimensions for Station 01+58 would be a W_{bkf} of 4.0 ft, D_{bkf} of 0.5 ft, and A_{bkf} of 2.0 ft_2. It should be noted that specific dimensions may need to be field adjusted due to the final regraded slope as well as limitations with available operating equipment.

In-stream structures would focus on grade control and habitat development. Pool spacing within the channel that has a slope of approximately 9 percent would be less than 1 stream width.

Tributary 9 *– Work in Tributary 9 would temporarily impact 127 linear ft of intermittent channel. Two cross-sections were established within the reach (Station 06+60 and Station 07+12). At Station 06+60, the Wbkf was 3.5 ft, Dbkf was 0.4 ft, and bankfull cross-sectional area was 1.3 ft^2. Station 07+12 had a Wbkf of 4.5 ft, Dbkf of 0.2 ft, and bankfull cross-sectional area of 0.9 ft^2. The pebble count was collected at Station 09+00. The D_{50} was 60.8 mm, while the D_{95} was 296 mm. A flow analysis was conducted for the reach utilizing SEDCAD 4. The analysis was based on a 100-year flow event. The results indicated that the normal depth was 3.10 ft., while the top width was 26.61 ft. Presently, the channel has an entrenchment ratio ranging from 1.27 to 3.69 (ft) with a width-to-depth ratio ranging from 8.75 to 22.50 (ft). Sinuosity within the reach was moderate. The flow regime within the reach can best be described as step:pool. The channel can be categorized as a B-stream type.*

The restored channel shall have a slope of approximately 4 percent. The restoration activities in this channel would proceed as described for Tributary 1. Channel design for this tributary would mimic as close as practical the pre-mining pattern dimension and profile of Tributary 9. Post construction, cross-section dimensions for Station 06+60 would be a W_{bkf} of 5.5 ft, D_{bkf} of 0.7 ft, and A_{bkf} of 3.7 ft^2. The cross-sectional dimension for Station 07+12 would be a W_{bkf} of 5.5 ft, D_{bkf} of 0.5 ft, and A_{bkf} of 3.0 ft^2. It should be noted that specific dimensions may need to be field adjusted due to the final regraded slope as well as limitations with available operating equipment.

In-stream structures would focus on grade control and habitat development. Pool spacing within the channel that has a slope of approximately 4 percent would generally be between 1 to 4 stream widths.

***Tributary 10** – Work in Tributary 10 would temporarily impact 217 linear ft of ephemeral channel. Two cross-sections were established within the reach (Station 00+00 and Station 01+15). At Station 00+00, the W_{bkf} was 3.9 ft, D_{bkf} was 0.7 ft, and A_{bkf} was 2.8 ft^2. Station 01+15 had a W_{bkf} of 3.4 ft, D_{bkf} of 0.3 ft, and A_{bkf} of 1.1 ft^2. The pebble count was collected at Station 00+00. The D_{50} was 13.26 mm, while the D_{95} was 90 mm. Presently the channel has an entrenchment ratio ranging from 1.24 to 1.77(ft) with a width-to-depth ratio ranging from 5.57 to 11.33 (ft). Sinuosity within the reach was low. The flow within the reach can best be described as a cascade flow regime. The channel can be categorized as an A-stream type.*

The restored channel shall have a slope of approximately 27 percent. The restoration activities in this channel would proceed as described for Tributary 1. Channel design for this tributary would mimic as close as practical the pre-mining pattern dimension and profile of Tributary 10. Approximate post construction cross-section dimensions for Station 00+00 would be a W_{bkf} of 3.7 ft, D_{bkf} of 0.5 ft, and A_{bkf} of 1.8 ft^2. The cross-sectional dimension for Station 01+15 would be a W_{bkf} of 3.7 ft, D_{bkf} of 0.5 ft, and A_{bkf} of 1.8 ft^2. It should be noted that specific dimensions may need to be field adjusted due to the final regraded slope as well as limitations with available operating equipment.

In-stream structures would focus on grade control and habitat development. Pool spacing within the channel that has a slope of approximately 27 percent would be less than 1 stream width.

*Please see **Enclosure G**.*

Comment 4c: How many tree or shrub species will be planted in the riparian areas that will be created adjacent to the mitigated streams? There should be a minimum of two species of trees and three species of shrubs. State this.

Response 4c: *At least 5 herbaceous species, 4 shrub species and 5 tree species shall be used along each of the 50-foot mitigation riparian buffer zones (25 ft on each side). Woody stems would be irregularly placed along the corridor and low growing shrubs will be planted between trees.*

The planting density specifications are as follows:

Plant Types/Heights (ft):	*On-Center Spacing (ft)*
Shrubs ≤ 10	*3*
Shrubs and trees 10 ≤ 25	*20*
Trees ≥ 25	*40*

Trees and shrubs would be selected based upon their hydrologic and edaphic tolerances, wildlife food and cover value and shall be native to the project area. The use of chicken wire, hardware cloth, repellants, or other materials may be necessary to achieve succession requirements in areas with a beaver population. A tree species list is provided in ***Table 12****. This list is not limiting, i.e., substitutions may be necessary.*

Table 12
Species List

Tree Species List			
Large Trees (Dominant Over-Story)			
Chinese chestnut	*Castanea mollissima*	White pine	*Pinus strobus*
American beech	*Fagus grandifolia*	American sycamore	*Platanus occidentalis*
Black walnut	*Juglans nigra*	Eastern hemlock	*Tsuga canadensis*
Tuliptree	*Liriodendron tulipifera*		
Large Trees (Less Dominant)			
Silver maple	*Acer saccharinum*	Sourwood	*Oxydendrum arboreum*
Sugar maple	*Acer saccharum*	White oak	*Quercus alba*
Yellow buckeye	*Aesculus flava*	Scarlet oak	*Quercus coccinea*
Yellow birch	*Betula alleghaniensis*	Southern red oak	*Quercus falcata*
Black birch	*Betula lenta*	Bur oak	*Quercus macrocarpa*
River birch	*Betula nigra*	Pin oak	*Quercus palustris*
Bitternut hickory	*Carya cordiformis*	Chestnut oak	*Quercus prinus*
Shellbark hickory	*Carya laciniosa*	Northern red oak	*Quercus rubra*
Hawthorn	*Crataegus viridis*	Shumard oak	*Quercus shumardii*
Sweetgum	*Liquidambar styraciflua*	Black oak	*Quercus velutina*
Umbrella magnolia	*Magnolia tripetala*	American basswood	*Tilia americana*
Blackgum	*Nyssa sylvatica*		
Small - Medium Trees and Shrubs			
Common alder	*Alnus serrulata*	American holly	*Ilex opaca*
Common serviceberry	*Amelanchier arborea*	Redtwig doghobble	*Leucothoe recurva*
Sugarberry	*Celtis laevigata*	Northern spicebush	*Lindera benzoin*
Buttonbush	*Cephalanthus occidentalis*	Crabapple	*Malus coronaria*
Eastern redbud	*Cercis canadensis*	Sandbar willow	*Salix interior*
Swamp dogwood	*Cornus obliqua*	Black willow	*Salix nigra*
Gray dogwood	*Cornus racemosa (foemina)*	Common elderberry	*Sambucus nigra*
Common persimmon	*Diospyros virginiana*	Silky willow	*Salix sericea*
Witchhazel	*Hamamelis virginiana*	Slippery elm	*Ulmus rubra*

Table 12
Species List

Herbs and Forbs			
Winter bentgrass	*Agrostis hyemalis*	Spotted joe-pye	*Eupatorium maculatum*
Little bluestem	*Andropogon scoparius*	White wood aster	*Eurybia divaricata*
Jack-in-the-pulpit	*Arisaema triphyllum*	Fragrant bedstraw	*Galium triflorum*
Long-awned wood grass	*Brachyelytrum erectum*	Canada mannagrass	*Glyceria canadensis*
Fringed brome	*Bromus ciliatus*	Fowl mannagrass	*Glyceria striata*
Tall brome	*Bromus latiglumis*	Daylily	*Hemerocallis spp.*
Woodland Brome	*Bromus pubescens*	Spotted touch-me-not	*Impatiens capensis*
Bluejoint reedgrass	*Calamagrostis canadensis*	Pale touch-me-not	*Impatiens pallida*
Fringed sedge	*Carex crinita*	Baltic rush	*Juncus balticus*
Beechwood sedge	*Carex laxiflora*	Rice cutgrass	*Leersia oryzoides*
Woolly sedge	*Carex pellita*	Cardinal flower	*Lobelia cardinalis*
Narrow-leaved cattail sedge	*Carex squarrosa*	Monkeyflower	*Mimulus ringens*
Owlfruit sedge	*Carex stipata*	Partridgeberry	*Mitchella repens*
Northern sea oats	*Chasmanthium latifolium*	Fowl bluegrass	*Poa palustris*
Herbs and Forbs			
Shasta daisy	*Chrysanthemum maximum*	Mayapple	*Podophyllum peltatum*
Sweet woodreed	*Cinna arundinacea*	Cutleaf coneflower	*Rudbeckia laciniata*
Deertongue	*Dichanthelium clandestinum*	Dark green bulrush	*Scirpus atrovirens*
Purple coneflower	*Echinacea purpurea*	Reddish bulrush	*Scirpus pendulus*
Virginia wildrye	*Elymus virginicus*	Prarie dropseed	*Spartina pectinata*
Riverbank wildrye	*Elymus riparius*	Alsike clover	*Trifolium hybridum*

Comment 4d: Conservation easements need to be established for the vegetated riparian zones that are to be established at the mitigation stream reaches. These should encompass 25 feet on both sides of these streams. Provide a draft conservation easement document.

Response 4d: *Patriot is working on conservation easements with associated landowners. An example of these easements is provided in* ***Enclosure H****.*

Comment 4e: For the off-site stream restoration in Scotts Run, is there a Reach 4 as listed on Page 94 of the CMP? If so, where is this reach? Is this the same stream reach as identified in Comment 4a. above.

Response 4e: *Reach 4 may be found on Figure 1 in Appendix F and is addressed in the CMP on page 69. It is part of tributary that would be created in an area that likely contained a stream prior to agricultural disturbance. It is directly downstream of Reach 5. Both Reach 4 and Reach 5 would discharge into the same unnamed tributary of Scotts Run that Tributary 1 discharges into, slightly downstream of Tributary 1.*

Comment 4f: For the off-site stream restoration in Scotts Run, Reaches 2 and 3 comprise 2,750 linear ft. What reach comprised 202 ft, as shown in the table on Page 64? Please address.

Response 4f: *The 202 linear feet found on page 64 is the total amount from Reach 4 and Reach 6 which are both technically "off-site" mitigation. The length of each of these reaches, as well as a table (Table 13) containing the lengths of on and off-site mitigation is provided below in an effort to make the evaluation of mitigation less confusing (assessment was done using SWMV instead of length in CMP). The CMP text has the 202 linear feet listed in Reach 4 and Reach 6 in Section 6.2.1.1 with Reach 5 and Reach 7 which discuss on-site mitigation in historical areas; however, in the text describing Reach 4 and Reach 6, it does indicate that these locations are actually off-site, downstream, but outside of the footprint of the proposed activities.*

Table 13
Summary of Impact and Mitigation Lengths

Reach	Location	Site Description	Total Length Impacts	Total Mitigation Length
Reach 2	Off-Site	Scotts Run – See Figures 10 and 11 – Appendix F	---	
Reach 3	Off-Site	Scotts Run – See Figures 12 and 13 – Appendix F	---	
Reach 4*	Off Site	Historical Drain downstream of Tributary 1 ***	---	137
Reach 6*	Off-Site	Historical Drain downstream of Reach 4 ***	---	95
Trib. 1	On-site	Tributary 1 – See Figure 2 in Appendix F	465	465
Trib.1-1	On-site	Tributary 1-1 – See Figure 2 in Appendix F	325	325
Trib. 4	On-site	Tributary 4 – See Figure 3 in Appendix F	422	422
Trib. 5	On-site	Tributary 5 – See Figure 4 in Appendix F	86	86
Trib. 6	On-site	Tributary 6 – See Figure 5 in Appendix F	569	1,369
Trib. 7	On-site	Tributary 7 – See Figures 6, 7, and 8 in Appendix F	1,492	1,522
Trib. 7-1	On-site	Tributary 7-1 – See Figure 8 in Appendix F	37	37
Trib. 7-3	On-site	Tributary 7-3 - See Figure 8 in Appendix F	209	209
Trib. 8	On-site	Tributary 8 – See Figure 6 in Appendix F	139	139
Trib. 9	On-site	Tributary 9 – See Figure 6 in Appendix F	127	127**
Trib. 10	On-site	Tributary 10 – See Figure 9 in Appendix F	217	680
Reach 5	On-site	Historical Drain downstream of Tributary 1 ***	---	563
Reach 7	On-site	Historical Drain downstream of Reach 4 ***	---	243
Totals On-site			4,118	6,129
Totals Off-site			---	2,952

**** Accounts for the 202 linear feet of mitigation off-site***
*****24 feet of culvert will be mitigated when road crossing can be eliminated.***
******See Figure 1 – Appendix F***

Comment 4g: What are joint plantings? Please address.

Response 4g: *A description of Joint Plantings may be found in* ***Enclosure I.***

If you should have any questions or need any additional information please feel free to contact me and Jessica Yeager of Potesta & Associates. I can be reached at (304) 594-4240 or via email at gnair@archcoal.com. Jessica can be contacted at (304) 342-1400 or via email at JLYeager@ potesta.com.

Sincerely,

Greg Nair
Manager Surface Mine Planning

Enclosures