Neal Run Abandoned Coal Refuse Removal

Project Summary

A Public-Private Partnership Effort

AWARE & Stream Restoration Inc.

Aultmans Run Watershed

Young Township

Indiana County, Pennsylvania

July 2012

Neal Run Abandoned Coal Refuse Removal
Project Summary – 2012

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EXECUTIVE SUMMARY

The Neal Run Abandoned Coal Refuse Removal project is the first step in the restoration of a major stream that has been heavily impacted by acidic coal mine drainage within the 7-sq. mi. Reeds Run Subwatershed. Even after completion of land reclamation efforts to address the large piles of coal refuse remaining from historic coal mining and preparation operations in the community of McIntyre, Neal Run continued to be heavily impacted. Based on water monitoring data, drainage from a coal disposal area was identified as the greatest source of AMD pollution in the entire 28-sq. mi. Aultmans Run Watershed. Furthermore, water quality data included some of the highest known concentrations of iron, aluminum, and acidity of any abandoned mine drainage in western PA.

A $14,000 grant from the PA Department of Environmental Protection **(PADEP)** Growing Greener program was received in March 2008 to evaluate options and to develop a conceptual restoration plan for the site. A consensus by members of the Aultman Watershed Association for Restoring the Environment **(AWARE)**, the PADEP Watershed Manager, Robindale Energy Services, US Environmental Research Service, and the design team was developed. As the cost of actively or passively treating the drainage to the desired water quality was determined to be prohibitive, only partial treatment could be realized at that time. With the support of the landowner, Central Blair Electric, and of Robindale Energy Services, a restoration plan was developed that included the recovery of acid-producing coal refuse for power generation and the construction of oxidation and precipitation channels **(OPCs)** to remove iron from the mine drainage by encouraging the formation and storage of iron solids at low pH.

A $200,000 Growing Greener 2 remining grant was awarded to AWARE to implement the design plan. Construction occurred over the course of 2011 and 2012 during which 37,608 tons of refuse were removed. As non-fuel grade material was to remain onsite, over 7,753 tons of Mineral CSA, a PADEP-approved co-product, were blended with potentially acid-producing material to provide alkaline addition. (Please note that the Mineral CSA was donated by project partner Harsco Minerals.) In addition, Synagro donated, permitted, placed, and incorporated 487 tons of biosolids onto the re-graded site, which provided an excellent growth medium for revegetation with a seed mixture that included warm and cool season grasses and flowers.

Dramatic decreases in acidity, iron, manganese, and aluminum concentrations of >60% for each parameter were noted in Neal Run as a result of implementing the restoration project.

This project would not have been possible without the support and generosity of the project partners including AWARE, PADEP, Robindale Energy Services, Central Blair Electric Company, Harsco Minerals, Synagro, US Environmental Research Service, Kiski-Conemaugh Stream Team, Indiana University of Pennsylvania, BioMost, Inc. and Stream Restoration Incorporated **(SRI)**.

PROJECT OVERVIEW

Site Description

The Neal Run Abandoned Coal Refuse Removal project is located on the 7½' USGS McIntyre, PA topographic map at latitude 40° 34' 1.8" and longitude 79° 17' 40". The site is on private property owned by Central Blair Electric Company and lies to the east and west of McIntyre Road (SR-3031) within the community of McIntyre, PA. The western side of the project site is located south of Hill Street (T-971). An existing culvert carries the drainage beneath McIntyre Road and into a channel to Neal Run.
(Neal Run→Reeds Run→Aultmans Run→Conemaugh River→Kiskiminetas River→Allegheny River→Ohio River)

Site History

As the site lies within the old mining town of McIntyre, in order to gain some insight relating to the AMD problem, the mining history of the area was briefly reviewed. (Please note a part of the current restoration effort includes AMD issuing in the backyard of a residence.) Based on information available at www.mcintyrepa.com, the town was built in 1910 by Rochester & Pittsburg Coal Company and was named in honor of H. B. McIntire, a coal, mercantile, and property business man. (The reason for the change in spelling is unknown.) By 1928, Hyde-Murphy Company of Ridgeway, PA built about 72 residences that included double- and single-family homes and miners' barracks. By 1920, a coal-fired power plant built in neighboring Lucerne provided electricity to the town, which also included a company store that served as the post office from 1911 until 1948, a Roman Catholic Church built in 1918, a four-room school house, a railroad connection, and a tipple coal separation (preparation) plant. Because of the proximity of the coal preparation plant, coal refuse from the plant was also placed into several large "rock dumps", more commonly known today as coal refuse piles, within the town of McIntyre. Note that two "rock dumps" are represented on a map (Figure 2) drawn from recollection in 1997 by a local citizen depicting the town of McIntyre in 1934. The remains of the four railroad sidings (oriented northeast-southwest) are visible in the photographs (Figures 3 & 4) which are used to help illustrate the history of the current project site, located just south of the area depicted on the map.

Figure 1: Aerial view of McIntyre, PA. Burning refuse pile can be seen at the top of the photo. (ca. 1945) (Ref. Washlaski, 2010)

In 1931, the prominent mines in the area, known as the Jacksonville No. 1 and No. 2, were bought by the Kent Coal Mining Co. and renamed the Kent No. 1 (closed 1952) and No. 2 (closed 1962), respectively. As mining slowed, the town of McIntyre,

as well as 17 other company towns in the area, was sold to Kovalchick Company of Indiana County in 1947.

Since the mine closures, land reclamation projects have been implemented. During the 1990s, the PADEP Bureau of Abandoned Mine Reclamation successfully completed a project in which material from the large refuse pile [Figure 1 (top center) - northern portion of pile] was stabilized with a portion of the pile moved to an area just upgradient of the current project site. As part of the reclamation efforts, an attempt was made to extinguish the fire within the coal refuse (Figure 1 - note smoke rising from pile). As reported by Robindale Energy Services, the 3 million^{+} tons of refuse within the pile averages 4300 BTU and 2.5% sulfur.

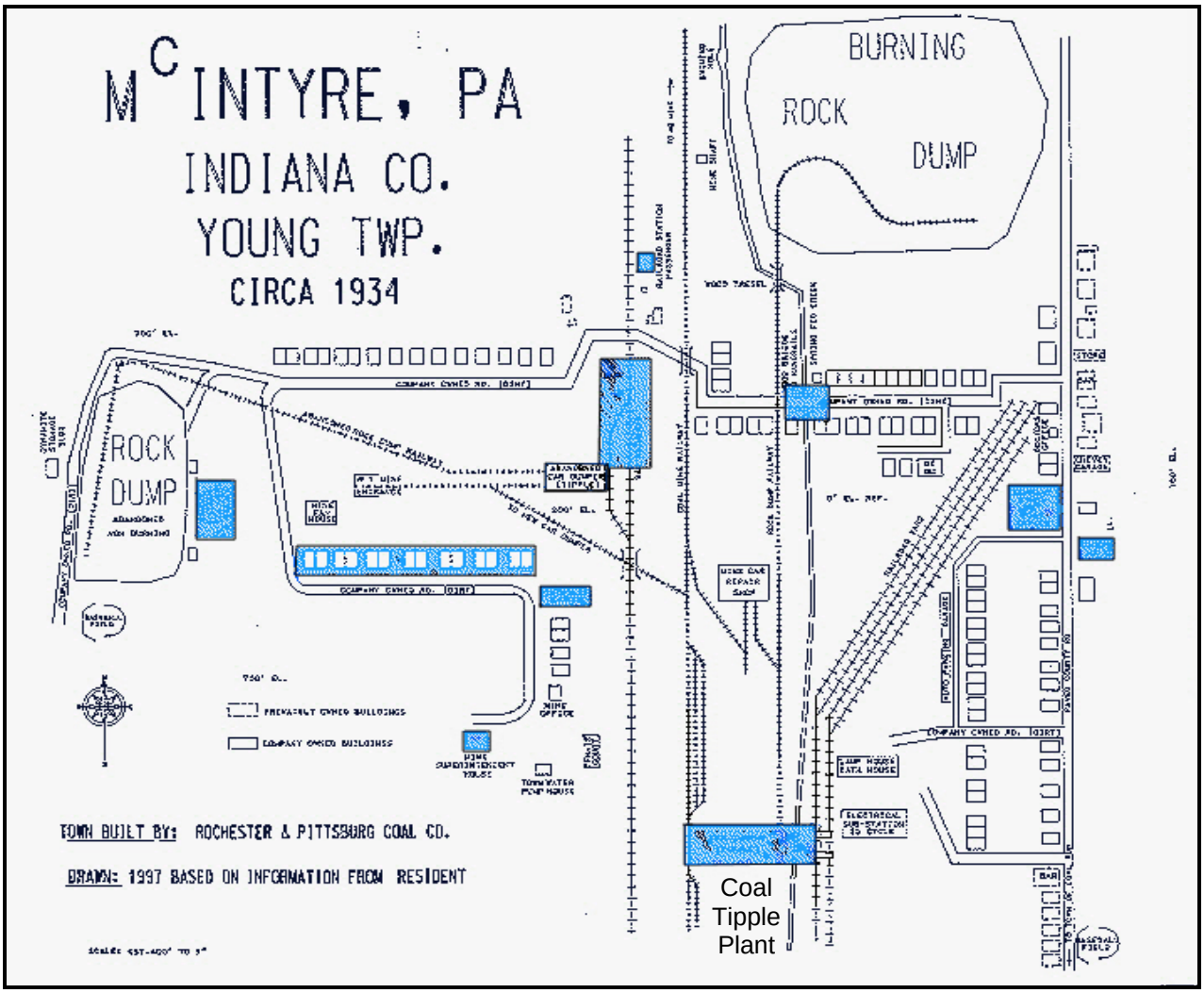

Figure 2: Map drawn from memory by McIntyre citizen. (Ref: Ferrandiz, 2001)

The following aerial photographs (Figures 3 & 4) depict changes throughout the history of the project site.

Figure 3: Comparison of aerial photos from 1939 (left) and 1962 (right). Note the coal refuse pile has been enlarged significantly to the south in the 1962 photo.

Figure 4: Comparison of aerial photos from 1993 (left) and 2011 (right). The 1993 aerial photo shows the recently reclaimed coal refuse site. Coal refuse was spread further south for stabilization and to attempt to extinguish the fire. The 2011 aerial shows the newly constructed treatment system.

SITE ASSESSMENT

To characterize the AMD at the site and to develop a reclamation plan, a small grant was awarded to SRI in 2007. Through this grant, existing data was collected and additional water samples were taken by AWARE. Discharges NL0-D3, NL0-D4, and NL0-D5 were identified by AWARE in the original assessment of the watershed in 2000 and were determined to be the greatest source of degradation to Neal Run and the entire Aultmans Run Watershed. According to the Management Recommendations Matrix from the assessment report, which ranks and schedules activities to meet short- and long-term goals, NL0-D3, NL0-D4, and NL0-D5 were assigned a high treatment priority. NL0-D3 is located at a culvert crossing for McIntyre Road (SR-3031). NL0-D3 flows from the channel directly into Neal Run. NL0-D4 and NL0-D5 issue within the backyards of several houses in the town of McIntyre. Downstream of NL0-D3, NL0-D4, and NL0-D5, bright-orange and white precipitates accumulate and coat the substrate of Neal Run and Reeds Run.

Additional sample points, D3, D4, D5, D6, and D7, were established to better characterize the discharges. Table 1 contains a description of each of these sample points.

Table 1: Descriptions of Additional Sample Points

Sample Pt.	Description	
D3	Low flow, degraded discharge below the reclaimed coal refuse disposal area within a ditch upgradient of an existing access road at the eastern edge of the project site.	
D4	Effluent of an AMD impacted wetland near NL0-D4	
D5	Pre-construction:	degraded discharge about 50' downstream of NL0-D5
	Post-construction:	effluent from french drain recently installed by landowner
D6	Pre-construction:	seep emanating along the left bank of the existing channel
	Post-construction:	effluent of OPC2
D7	Pre-construction:	AMD about 300' upgradient of McIntyre Road and NLO-D3. Original discharge location of D2. As refuse was removed from the project area, the discharge was discovered to emanate at the D2 location.
	Post-construction:	OPC1 upstream of confluence with OPC2 effluent

At no cost to the Commonwealth, Robindale Energy Services excavated a series of test pits, some of which were logged by BioMost personnel, within the project site to determine material characteristics including the coal refuse. Furthermore, a piezometer was installed in December 2009 within the project area. Also, at no cost to the Commonwealth, as part of the partnership effort, John Foreman, PG, representing Central Blair Electric Company, provided the drilling services.

RECLAMATION EFFORT

An Erosion and Sedimentation Control Plan was prepared by BioMost, Inc. and was approved by the Indiana County Conservation District in May 2011. This plan was sent to Robindale Energy Services for implementation prior to coal refuse removal. The fuel-grade coal refuse removal operations began in June 2011 by Robindale Energy Services. The remining operation was made possible by authorization and funding from the PADEP through a Growing Greener Grant. A total of 37,608 tons of refuse was hauled to Seward Generating Station, which uses circulating-fluidized bed technology to cleanly produce electricity from waste coal. Some refuse on the site, however, was not suitable for power generation. To help offset the acid-producing potential of the remaining material, this non-fuel grade **(NFG)** refuse was mixed with 7,753 tons of alkaline Mineral CSA which was generously donated by Harsco Minerals of Sarver, PA. (Mineral CSA has received a co-product designation by PADEP for use as an alkaline amendment.) Once mixed, the Mineral CSA and NFG refuse was placed in several areas of the site to avoid contact, as feasible, with water. The Mineral CSA and NFG refuse mixture was not placed in, or in close proximity to, the OPC construction area. The mixture placement areas were then graded to drain and covered with about a foot of onsite soil material.

During refuse removal, the site was graded in anticipation of constructing the OPCs. OPCs, also known as aeration terraces, have been successfully installed at other AMD sites in PA that are highly acidic with high iron content, such as the Dents Run 3895 site in Elk County. (Refer to water monitoring data at www.datashed.org.) In addition, the selection of OPCs for this particular effort is supported by specific research conducted at Penn State University on samples collected from this site on 12/7/06 by AWARE and the PADEP. The report stated: "…the numbers of culturable FeOB [iron-oxidizing bacteria] from 030 and 032 are higher than any we have observed at Gum Boot (McKean County), Fridays-2 (Elk County), or JB-2 (Washington County), though they are roughly on the same order of magnitude." At the previously noted Dents Run 3895 site, no maintenance has been required since installation of the OPCs in 2005.

A total of three OPCs were constructed to help improve the remaining discharges located on site. The longest, OPC1, carries the seep emanating from the toe of the large, reclaimed refuse pile located upgradient of the site through an existing culvert and into Neal Run. OPC2 was constructed to address any lingering discharges and lower the water table within the remaining NFG refuse located to the south of an existing ditch. Some refuse was fuel grade; however, the majority of the refuse within this area of the site had been mixed with soil material and, therefore, unusable for power generation. OPC3 is west of McIntyre Road (SR-3031) and was constructed to intercept and to convey AMD seepage, which is located behind a residence, to OPC1. Primarily NFG refuse was present west of SR-3031; however, the site was re-graded and Mineral CSA was utilized for alkaline addition.

The OPCs were constructed in original ground to help avoid potential leaks. Once graded, the OPCs were lined with a permeable geotextile and with limestone riprap (R4

& R5) from the Torrance Quarry of Hanson Aggregates (average calcium carbonate of 62%). Most of the construction work was completed by July 2011.

A temporary cover was seeded after construction in anticipation of adding biosolids to the soils in 2012. Synagro, the largest sewage recycling company in the USA, applied for, and received, a permit to land apply biosolids at the site. Synagro donated not only the resources to acquire the necessary permits but also the biosolids and the application effort as part of the partnership effort. The biosolids were produced by treating the residual sewage sludge from the Johnstown Redevelopment Authority with calcium oxide (quicklime). The calcium oxide increases the pH and temperature to inactivate pathogens and control odors (pH of 12 for over 24 hours before the biosolids are transported to the project site). The biosolids were then spread over the reclamation site and incorporated by disking with a tractor. A total of 487 tons of biosolids were spread at the site, approximately 80 tons per acre. The site was seeded and mulched shortly after the application of the biosolids. The seed mixture used at the site included a combination of warm and cool season grasses and flowers along with a temporary cover crop, *Secale cerale.* (Refer to Table 3.)

Table 2: Permanent Seed Mixture

Common Name	Scientific Name
Big Bluestem	*Andropogon gerardii*
Grain Rye	*Secale cerale*
Switchgrass	*Panicum virgatum*
Indiangrass	*Sorghastrum nutans*
Little Bluestem	*Andorpogon scoparius*
Black Eyed Susan	*Rudbeckia hirta*
Oxeye Sunflower	*Heliopsis helianthoides*
Virginia Wild Rye	*Elymus virginicus*
Partridge Pea	*Chamaecrista fasciculata*

ENVIRONMENTAL RESULTS

Improvement in Neal Run, The Receiving Stream

Thanks to water monitoring conducted by the Kiski-Conemaugh Stream Team, the recent observed improvement in Neal Run appears to be strongly related to the successful implementation of the restoration project. (Refer to Table 4.) Note that upstream (MP2) monitoring data is fairly consistent both before and after project implementation. In contrast, comparing the downstream (MP3) water quality of Neal Run before and after construction demonstrates **substantial decreases in acidity, iron, aluminum, and sulfates of 60%, 61%, 62%, and 52%, respectively**. Future monitoring, however, is needed to substantiate the long-term improvement. Note that review of data for the individual monitoring events, indicated variability in both the upstream and downstream water quality, which is assumed to be in response to precipitation.

Table 3: Neal Run Upstream & Downstream of OPC1 Effluent

Sample Point		Date	pH	Alkalinity	Acidity	TFe	TMn	TAl	SO_4
MP2 ***upstream***	Pre-Const.	01/2002 *to* 07/2011	**6.9** 4.4/7.5	**69** 16/184	**-36** -146/137	**2** 1/26	**<1** <1/1	**3** <1/18	**174** 61/464
	Post-Const.	09/2011 *to* 02/2012	**7.2** 6.9/7.4	**60** 39/82	**-46** -61/-35	**1** <1/1	**<1** <1/<1	**0** 0/0	**153** 115/189
MP3 ***downstream***	Pre-Const.	01/2002 *to* 07/2011	**4.2** 3.0/6.3	**6** 0/17	**326** 92/1385	**66** 1/424	**3** <1/15	**52** 1/359	**726** 81/3667
	Post-Const.	09/2011 *to* 02/2012	**4.5** 4.4/4.7	**10** 10/10	**131** 99/164	**26** 17/31	**1** 1/2	**20** 16/24	**348** 285/428

mean
min/max

all water quality values in mg/L, except pH; $n_{(pre\text{-}construction)}$ = 24@MP2; 21@MP3; $n_{(post\text{-}construction;\ after\ 8/2011)}$ = 5; MP2 ~675' upstream & MP3 ~200' downstream of confluence with OPC1 effluent; individual sample analyses available at www.datashed.org

Improvement in Onsite Drainage

As coal refuse was removed during construction, the mine discharge was "traced" from sample point D7 up the hill to the toe of the large, reclaimed refuse pile and is identified as sample point D2. A small, metal-laden discharge (D3) also issues below the reclaimed coal refuse placement area within a ditch upgradient of an existing access road at the eastern edge of the project site. The water quality of these discharges is summarized in Table 4 below.

Table 4: Raw AMD Monitoring Points D2 & D3 (Post-Construction)

Sample Point	pH	Alk	Acidity	TFe	$Fe2^+$	TMn	TAl	SO_4
D2	**3.1** 3.0/3.2	**0**	**6605** 6277/6906	**1308** 1226/1390	**1419** 1274/1581	**25** 22/26	**>500**	**8478** 7387/9403
D3	**3.1** 3.0/3.3	**0**	**424** 357/527	**81** 54/106	**67** 34/91	**13** 11/16	**34** 26/43	**1049** 947/1218

mean
min/max

all water quality values in mg/L, except pH; $n_{(post\text{-}construction)}$ = 3; sampling period – 09/2011 thru 02/2012; all TFe values >300 mg/L reported as "(for information purposes) exact value not validated" (PADEP sample analyses)

Points D7 and NL0-D3 were monitored to aid in documenting the mine drainage characteristics both before and after completion of the current restoration effort. Before project implementation, monitoring points D7 and NL0-D3 were intermediate points in a previously constructed ditch that conveyed highly acidic drainage with high metal concentrations from the large, reclaimed, coal refuse pile through an area of more gently-graded and reclaimed coal refuse, beneath public road SR-3031 within the community of McIntyre, and to the receiving stream, Neal Run. Part of the current restoration project included redesigning, relocating and lengthening the section within the coal refuse removal area, and broadening the ditch to form an oxidation-precipitation channel, OPC1. Limestone (~60% $CaCO_3$) riprap was used as a liner. Nonetheless, monitoring points D7 and NL0-D3 are in the same approximate locations both pre- and post-construction.

Table 5: OPC1 Intermediate Monitoring Points D7 & NL0-D3

Sample Point		Flow	pH	Alk	Acidity	TFe	$Fe2^+$	TMn	TAl	SO_4
D7	Pre-Const.	**1** 0/3	**2.6** 2.6/2.7	**0**	**5238** 1400/8355	**1135** 1080/1190	NA	**24** 17/35	**531** 371/667	**7026** 4750/10406
	Post-Const.	**6** 3/10	**2.9** 2.8/2.9	**0**	**5091** 4884/5334	**849** 804/893	**723** 559/835	**23** 19/25	**>500**	**6189** 4367/7247
NL0-D3	Pre-Const.	**9** 1/28	**2.7** 2.4/3.0	**0**	**6243** 900/17441	**1098** 398/2350	NA	**31** 12/71	**798** 268/2168	**6068** 2977/11626
	Post-Const.	**13** 10/20	**2.9** 2.8/3.0	**0**	**2656** 2549/2846	**437** 372/502	**352** 262/434	**13** 12/14	**304** 294/313	**3331** 3219/3461
mean min/max	all water quality values in mg/L, except pH; flow (gpm) estimated for D7 and measured and estimated for NLO-D3; $n_{(pre\text{-}construction)}$ = 7@D7; 24 to 27@NL0-D3; $n_{(post\text{-}construction;\ after\ 8/2011)}$ = 3; statistical values for TFe and TAl tenuous as >300 mg/L and >500 mg/L, respectively, often reported; total iron measurements higher than 300 mg/L reported as not validated; individual sample analyses available at www.datashed.org									

Monitoring Point D7 (Pre- and Post-Construction)

A preliminary review of the monitoring data at D7 indicates that the **total iron concentration may have decreased by about 25%**, on average, post-construction. Note that as measured values were not included in development of the table when total iron was reported as >300 mg/L, comparing pre-construction data with post-construction data is tenuous. [Note that "ball-park" total iron concentrations may be determined for individual samples by subtracting acidity associated with total metals (assuming dissolved manganese and aluminum) and pH from the measured acidity.]

For D7 located below the confluence of D2 & D3, selected factors relating to the decrease in iron concentration being considered are the following:

- Formation and storage of iron solids at low pH within OPC1 supported by
  - decrease in sulfates;
  - similar pre- and post-construction manganese concentrations;
  - only slight decrease in acidity; and
  - field observations of iron solids in OPC1 (See attached photographs.).
- Dilution supported by
  - increase in flow rate;
  - decrease in sulfates; and
  - slight decrease in manganese concentrations.

Reporting of the measured iron concentrations, even when in excess of 300 mg/L, in future analyses of D7 water samples will enable a more accurate determination and discernment of the post-construction impacts associated with dilution compared to that of iron removal.

Monitoring Points NL0-D3 and D6 (Pre- and Post-Construction)

For the same reasons as D7, the statistical evaluation for NL0-D3 pre- and post-construction is considered tenuous. Nonetheless, an initial comparison of data indicates a **marked decrease in the average values of acidity (57%), total iron (60%), total manganese (58%), total aluminum (62%), and sulfates (45%).** The

noted decreases are considered to be in response not only to the formation and storage of iron solids within OPC1 but also to the substantial improvement of D6, which is currently measured at the OPC2 outlet prior to entering OPC1. Note in the following table, that D6 after project implementation is no longer a major AMD source but is a source of both dilution and treatment of the AMD in OPC1.

The improvement in D6 with dramatic decreases in the average values of acidity (103%), total iron (91%), total manganese (83%), total aluminum (~100%), and sulfates (87%) can be contributed to the removal of coal refuse, addition of alkaline Mineral CSA, dissolution of limestone (~60% $CaCO_3$) riprap, and/or intercepting and conveying drainage in OPC2 to aid in eliminating contact with acid-producing material. *[Collecting water samples at the inlet and outlet of OPC2 and comparing analyses (including calcium) would aid in identifying the major factors resulting in the observed improvement.]*

Table 6: OPC2 Outlet Monitoring Point D6

Sample Point		Flow	pH	Alk	Acidity	TFe	TMn	TAl	SO_4
D6	Pre-Const.	**1** 0/3	**2.9** 2.7/3.1	**0**	**1196** 75/4616	**11** 2.8/40	**6** 1/18	**79** 2/417	**1347** 98/5607
	Post-Const.	**4** 2/5	**7.4** 7.1/7.8	**52** 46/58	**-36** -40/-34	**1** 1/2	**1** 1/2	**<1** <1/<1	**174** 98/288
mean min/max	all water quality values in mg/L, except pH; flow (gpm) estimated; $n_{(pre\text{-}construction)} = 7$; $n_{(post\text{-}construction;\ after\ 8/2011)} = 3$; individual sample analyses available at www.datashed.org								

Monitoring Points D7 & NL0-D3 (Post-Construction)

Post-construction analyses at monitoring point D7 were also compared to NL0-D3, which is located at the SR-3031 road culvert outlet, ~300 feet downgradient of D7. (Refer to Table 5.) Note that the **average concentrations in acidity (48%), total iron (49%), total manganese (43%), total aluminum (>41%), and sulfates (46%) decrease by almost half.** As mentioned previously, the improvements in water quality are considered to be the result of iron removal at low pH in the OPCs and to dilution and improvements in site drainage quality due to coal refuse removal and alkaline addition. As flow rates were typically reported as estimated, concentrations were used to depict water quality changes.

Decrease in Ferrous Iron Concentrations Along OPC1

The improvement in site drainage in response to the restoration effort can be summarized by the changes observed as the drainage is conveyed along OPC1. For instance, a significant change in average dissolved Fe^{+2} concentrations is noted as the AMD is conveyed in OPC1 from the inlet (raw water) to the intermediate monitoring points D7 and NL0-D3, at the SR-3031 road culvert. (Monitoring of the OPC1 effluent prior to entering Neal Run has not been conducted but is recommended.)

Monitoring Pt.:	D2 (OPC1 inlet) →	D7 (OPC1 ~1250' below D2) →	NL0-D3 (OPC1 <300' below D7)
Fe^{+2}:	1419 mg/L	723 mg/L	352 mg/L
% Fe^{+2} Decrease:		*49% (D2→D7)*	*51% (D7→NL0-D3); 75% (D2→NL0-D3)*

The observed decrease in ferrous concentrations is considered to be in response not only to dilution from D3 and D6 but also to the oxidation of ferrous to ferric within OPC1 at low pH.

Monitoring of OPC3

To date, OPC3 has not been monitored post-construction. The intent was to intercept and to convey AMD seepage, as feasible, to OPC1. Mineral CSA was applied to the area prior to revegetation in order to help address the AMD.

SUMMARY

The Neal Run Abandoned Coal Refuse Removal project is an excellent “first step” in the remediation of Neal Run. Removal of fuel-grade refuse, incorporating alkaline material with the NFG refuse, and the construction of the OPCs resulted in substantial improvement of the water quality in Neal Run downstream. Future monitoring of the site would enable evaluation of the long-term success and of implementation practices specifically attributing to the dramatic improvement in site water quality.

APPENDIX

PUBLIC-PRIVATE PARTNERSHIP EFFORT

This project has been completed as a public-private partnership effort. Team members have donated numerous hours and resources to this project and other restoration efforts in the watershed. Thanks to everyone for making this project possible!

Grant Oversight, State Administration, and Water Monitoring
PA Department of Environmental Protection, District Mining Operations, Cambria Office, 286 Industrial Park Road, Ebensburg, PA 15931 (814) 472-1900
CRITTENDEN, Malcolm, Watershed Manager

Landowner Support
Central Blair Electric Co., 101 Lakemont Park Blvd, Altoona, PA 16602 (814) 949-8280
DEVORRIS, Don, Owner

Grant Administration, Public Outreach, Environmental Education, Volunteer Effort, and Water Monitoring
Aultman Watershed Association for Restoring the Environment, PO Box 27, Kent, PA 15752
OKEY, Brian, President; CALVETTI, Paul, Vice-President; MARSHALL, Ken, Treasurer; CUMMINS, Carol, Secretary

Site Evaluation and Design, Construction Supervision, and Seeding/Mulching
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OKEY, Brian, Asst. Prof.; MUDER, Mike, student

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Ferrandiz, Susan, McIntyre, Pennsylvania, The Everyday Life Of A Coal Mining Company Town: 1910-1947. 2001. Web. 7/13/12. <http://www.mcintyrepa.com>.

Skelly & Loy, Inc. Water Qualiy and Riparian Health Watershed Assessment for the Aultman Watershed. 2/03.

Washlaski, Raymond A., Historian, Virtual Museum of Coal Mining in Western PA. <patholdminer.rootsweb.ancestry.com>. updated 6/20/10.

COMPREHENSIVE TIMELINE

Date	*Event*
11/21/05	Field Meeting; site/GPS investigation
(undated)	Letter of Support received from Indiana Co. Office of Planning and Development
01 - 02/06	Letters of Support received from the Aultmans Run Watershed Residents
02/27/06	Letter of Support received from State Representative David Reed
03/02/06	Letter of Support received from Indiana Univ. of PA, Geography & Regional Planning Dept.
03/03/06	Letter of Support received from Young Twp. Supervisors
03/03/06	Growing Greener Grant Application submitted to DEP
05/01/06	Letter of Support received from Indiana Co. Senior Environment Corps (PaSEC)
06/25/06	Letter of Support received from U.S. Environmental Research Service
12/07/06	Growing Greener Grant Application denied by DEP
12/15/06	Permit Waiver of 25PA code Section 86.133 sent to DEP; Approved (01/04/07)
04/06/07	Letter of Acknowledgement received from WPCAMR
04/08/07	Executed Landowner Agreement Form from Donald Devorris, Pres., Central Blair
04/11/07	Neal Run Conceptual Plan & Dedication Letter sent to DEP Grant Center
04/12/07	Letter of Support received from BioMost, Inc.
04/12/07	Letter of Commitment sent to DEP from Stream Restoration Inc.
04/25/07	Field Meeting; met with Robindale Energy Services
12/10/07	Snapshot of AMD entering Neal Run
01/21/08	AWARE meeting
01/22/08	Conceptual Plan Drafts sent to DEP
02/15/08	Dimensions for Remining & Aeration Terraces sent to DEP
02/18/08	AWARE meeting
03/11/08	Letter of Congratulations for Receiving Growing Greener Grant received from DEP
04/11/08	Growing Greener Grant Agreement & Worksheet App. submitted to DEP
06/06/08	Executed Growing Greener Grant Agreement (Doc. 4100044914; Id CD070264)
10/07/08	Landowner Agreement Form submitted to DEP
10/17/08	Qtr. Report submitted to Crittenden, DEP
01/26/09	Qtr. Report submitted to Crittenden, DEP
04/03/09	Test Pit Excavation Began
04/07/09	Landowner Grantee Agreement w/ Operation, Maintenance & Restoration Plan sent to DEP
04/09/09	Qtr. Report submitted to Crittenden, DEP
07/20/09	Qtr. Report submitted to Crittenden, DEP
10/15/09	Qtr. Report submitted to Crittenden, DEP
12/16/09	1 piezometer installed to monitor near subsurface conditions
01/14/10	Qtr. Report submitted to Crittenden, DEP
01/14/10	Minor SOW Change (refuse removal); request sent to DEP w/ Spec. Auth. Approved by DMO
01/19/10	Minor SOW Change Amendment approved by DEP
01/20/10	Article on Neal Run Project Printed in Indiana Gazette
02/02/10	Field Meeting; discussed grant projects with Robindale Energy
02/25/10	1-year Growing Greener Grant Extension Request submitted to DEP
08/13/10	1-year Growing Greener Grant Extension Request approved by DEP
04/19/10	Qtr. Report submitted to Crittenden, DEP

06/28/10	Field Meeting; took photos & reviewed permit
07/19/10	Qtr. Report submitted to Crittenden, DEP
08/12/10	Field Meeting; Tested Refuse Quality
10/05/10	Qtr. Report submitted to Crittenden, DEP
10/27/10	Field Meeting; investigated and discussed design plan
11/15/10	Remediation Agreement Between Robindale & AWARE
Jan-11	Final Design Plan Map
01/13/11	Qtr. Report submitted to Crittenden, DEP
01/13/11	Letter of Notification of Intent sent to Young Twp. Supervisors
01/13/11	Letter of Notification of Intent sent to Indiana Co. Commissioners
01/20/11	Notice of Intent…Under General (PAG-02) NPDES Permit sent to Indiana Co. Cons. Dist.
02/15/11	PAG02 003211002 approved by Indiana Co. Cons. Dist.
03/24/11	Request for Revision of E&S Plan Approval sent to Indiana Co. Cons. Dist.
03/29/11	PAG02 003211002 revision approved by Indiana Co. Cons. Dist.
03/31/11	Field Meeting; discussed site preparation for construction
04/08/11	Qtr. Report submitted to Crittenden, DEP
04/15/11	Landowner Agreement sent to AWARE
04/19/11	Approved E&S Plan, Design Plan, and Details sent to Robindale Energy Services, Inc.
04/19/11	Partially completed Co-Permittee App. for Stormwater Const. NPDES sent to Robindale Energy
04/25/11	PA One Call Completed by BioMost Inc.
05/11/11	Co-Permit Addition (executed by Robindale 4/26/11) sent to Indiana Co. Cons. Dist.
05/19/11	Co-Permit Addition & Agrmt. sent to Robindale Energy Services Inc.
05/25/11	Field Meeting; met with Turm Oil
06/02/11	Co-Permitted Acknowledgement Letter from Indiana Co. Cons. Dist.
06/02/11	Field Meeting; collected samples & discussed construction
06/14/11	Field Meeting; site/construction investigation
06/30/11	ARIPPA Grant Application submitted
07/2011	Final Report for Neal Run Conceptual Restoration
07/05/11	Field Meeting; recorded progress of site construction
07/12/11	Field Meeting; discussed moving gas line
07/19/11	Field Meeting; construction inspection
07/19/11	Qtr. Report submitted to Crittenden, DEP
08/12/11	Field Meeting
08/17/11	Land Application of Biosolids Permit submitted to DEP
08/25/11	Field Meeting; discussed site conditions
09/15/11	DEP approves permit to apply biosolids to reclamation site
10/24/11	Qtr. Report submitted to Crittenden, DEP
10/31/11	ARIPPA Grant Extension Approval received (11/11 to 7/12) from DEP
01/19/12	Qtr. Report submitted to Crittenden, DEP
04/06/12	Qtr. Report submitted to Crittenden, DEP
04/20/12	Field Meeting; discussed site access with Synagro
05/07/12	Letter of Acknowledgement sent to Blair Companies
05/16/12	Fish observed upstream of PTS effluent
06/26/12	Week of final seeding and mulching

PHOTOS

9/23/10 - Before

4/20/12 - After

8/12/10 - Test Pit Excavation

6/2/11 – Coal Refuse Removal

6/14/11 – Mineral CSA Overlying NFG Coal Refuse

7/7/11 – Iron-Bearing Material that Formed at the Site During Construction

7/19/11 – OPC Excavation

7/19/11 – OPC Installation of Geotextile Liner

7/19/11 – OPC Placement of Limestone Aggregate

8/2/11 – OPC Completed

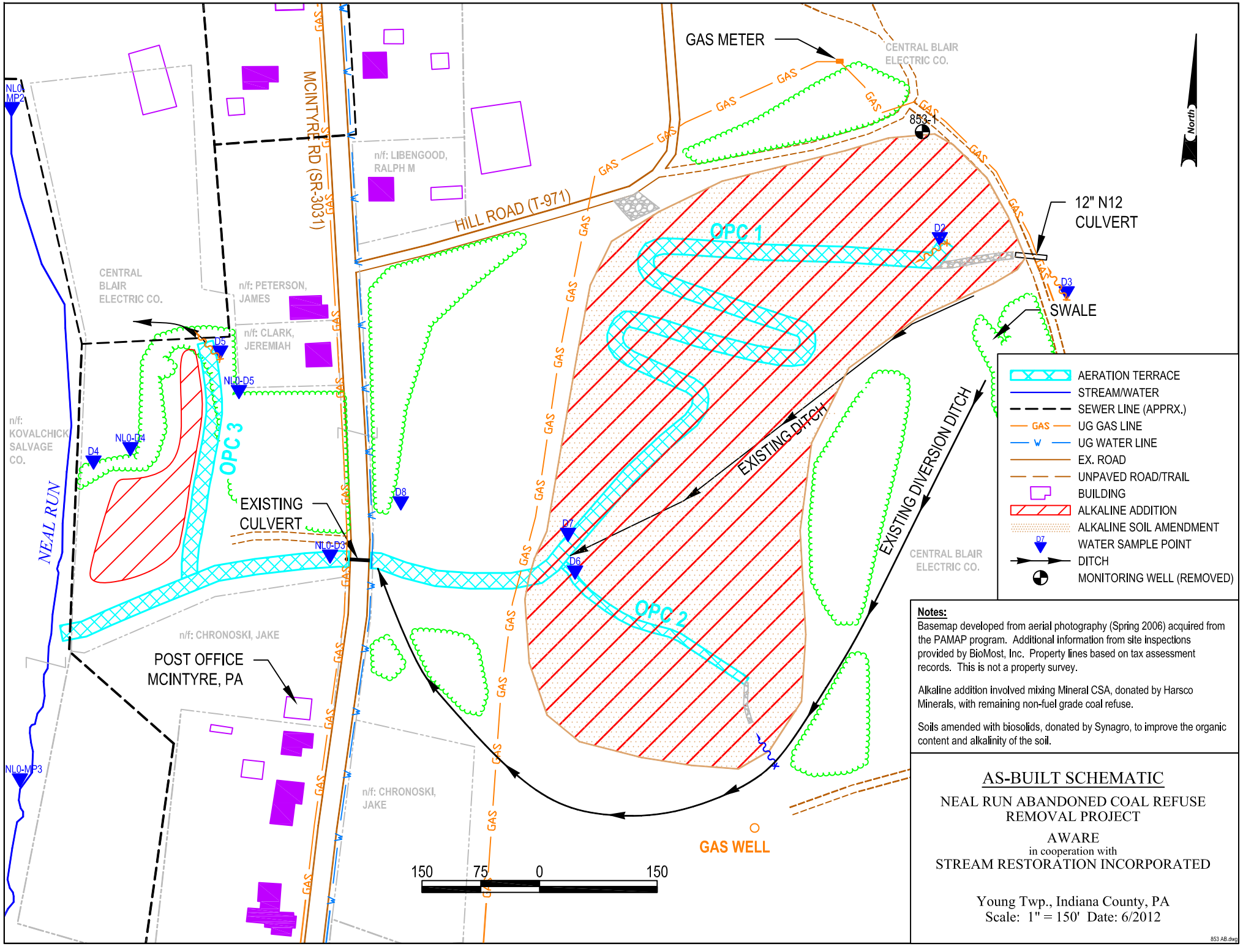
8/12/11- OPC Precipitate Formation

1/15/11 – Initial Seeding (west of McIntyre Rd.)

11/15/11 Site Tour

6/28/12 – Permanent Seeding and Mulching

2011 Aerial Photo of Neal Run Abandoned Coal Refuse Removal Project



Notes:

Basemap developed from aerial photography (Spring 2006) acquired from the PAMAP program. Additional information from site inspections provided by BioMost, Inc. Property lines based on tax assessment records. This is not a property survey.

Alkaline addition involved mixing Mineral CSA, donated by Harsco Minerals, with remaining non-fuel grade coal refuse.

Soils amended with biosolids, donated by Synagro, to improve the organic content and alkalinity of the soil.

AS-BUILT SCHEMATIC

NEAL RUN ABANDONED COAL REFUSE REMOVAL PROJECT

AWARE
in cooperation with
STREAM RESTORATION INCORPORATED

Young Twp., Indiana County, PA
Scale: 1" = 150' Date: 6/2012

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