



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
REGION III  
1650 Arch Street  
Philadelphia, Pennsylvania 19103-2029

JUN 15 2017

Mr. Scott Mandirola, Director  
Division of Water & Waste Management  
West Virginia Department of Environmental Protection  
601 57<sup>th</sup> Street, S.E.  
Charleston, WV 25304

Dear Mr. Mandirola:

On June 2, 2016, the West Virginia Legislature approved revisions to the State's water quality standards rule (47CSR2 Requirements Governing Water Quality Standards). Those revisions were then signed by the Governor on June 7, 2016. The West Virginia Department of Environmental Protection's (WVDEP) General Counsel certified on June 8, 2016 that the regulations were duly adopted in accordance with State law. In accordance with Section 303(c)(2)(A) of the Clean Water Act (CWA), 33 U.S.C. §1313(c)(2)(A), and 40 CFR §131.20(c), WVDEP forwarded the amended regulation to the Environmental Protection Agency, Region III, on June 8, 2016, and we received it on June 9, 2016. Included in this submittal is a variance that applies to the Muddy (Martin) Creek watershed in Preston County, West Virginia. The purpose of this letter is to approve the Muddy (Martin) Creek variance pursuant to CWA §303(c) and the implementing regulation at 40 CFR §131.

West Virginia adopted the variance in accordance with its procedural rules at 46 CSR Section 5. The variance was granted based on human-caused conditions which prevent the full attainment of the designated use and cannot be immediately remedied, or would cause more environmental damage to correct than leave in place (40 CFR 131.10(g)(3)). The variance as it appears in regulation identifies the discharges that will be addressed by the variance; the geographic area to which this variance will apply; interim instream criteria that will be in place during the term of the variance; a requirement for re-evaluation during each triennial review throughout the variance term; and an expiration date (July 1, 2025), absent any action by the Secretary to review the variance, whichever comes first.

Along with the submittal of the variance, West Virginia provided more specific information supporting the variance as well as information on restoration measures to be implemented throughout the watershed. West Virginia subsequently revised this supplemental information to address a number of concerns raised during the adoption process. The enclosed March 9, 2017 document addresses those concerns.

The WVDEP, Division of Land Restoration's Office of Special Reclamation (OSR) looked at a number of options to determine the best approach for addressing the impaired conditions in the Muddy Creek watershed. OSR has been treating a number of forfeited mine sites within the watershed but was achieving no meaningful water quality improvement. WVDEP determined through a treatment study



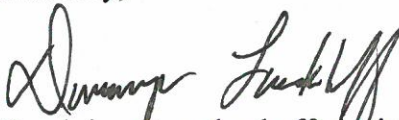
that the most effective treatment, with the least amount of inadvertent impact to the stream when correctly located and implemented, is the use of instream lime dosers. In combination with other restoration measures being implemented in the Muddy Creek watershed, including the construction of a treatment facility, EPA has determined that the variance will result in optimal water quality improvement given the constraints. When fully implemented, the lime dosers and other restoration measures implemented during the term of the variance are expected to restore to its designated use the lower 3.4 miles of Muddy Creek below the confluence with Martin Creek. This will effectively reestablish biologic connectivity throughout the entire 15.6 miles of Muddy Creek.

EPA has also determined that the 10-year variance term is warranted to allow for all restoration measures to be fully implemented and fully effective, including construction and optimization of the treatment facility. Due to the long-term, multifaceted acid mine drainage problem in the watershed, it is difficult to determine precisely how long it will take the water quality, and subsequently aquatic life, to be restored. The supplemental information includes plans for monitoring and assessment throughout the variance term. Based on that information, the variance will be re-evaluated during each triennial review throughout the variance term, and the WVDEP Secretary can remove or modify the variance should they find it is no longer needed or no longer effective. Any future new or revised variances would need to be submitted to EPA for review and approval in accordance with CWA section 303(c).

Section 7(a) of the Endangered Species Act (ESA) states that each Federal agency shall ensure that any action authorized, funded, or carried out by such agency is not likely to jeopardize the continued existence of any endangered or threatened species or result in the destruction or adverse modification of critical habitat. EPA has determined that West Virginia's adoption of this variance will have no effect on any ESA-listed species or critical habitat as there are no listed threatened or endangered species in the Muddy Creek watershed.

If you have any questions regarding this action, please do not hesitate to contact me or have your staff contact Denise Hakowski, at 215-814-5726.

Sincerely,



Dominique Lueckenhoff, Acting Director  
Water Protection Division

Enclosure

cc: Laura Cooper (WVDEP)  
John E. Schmidt (USFWS)



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west virginia department of environmental protection

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Earl Ray Tomblin, Governor  
Randy C. Huffman, Cabinet Secretary  
[www.dep.wv.gov](http://www.dep.wv.gov)

March 9, 2017

Denise Hakowski  
EPA Region 3  
1650 Arch Street  
Mail Code: 3RA00  
Philadelphia, PA 19103-2029

Re: Additional information for WVDEP Special Reclamation Muddy Creek Variance

Dear Ms. Hakowski:

The West Virginia Department of Environmental Protection (DEP) is hereby submitting additional information for the water quality standards variances for Muddy Creek watershed to the United States Environmental Protection Agency (EPA). The rule containing these variances, "47CSR2 Requirements Governing Water Quality Standards," was legally certified on June 8, 2016 and submitted to EPA for approval on that day. The rule became effective July 8, 2016. DEP is submitting this additional information to aid in the review and approval of this variance for WVDEP Special Reclamation. These varied criteria are needed to facilitate the use of alternative restoration measures to treat not only the bond-forfeited for which Special Reclamation is not responsible, but also all of the acid mine drainage in this historically impaired watershed.

As stated in EPA's Water Quality Standards Regulatory Clarifications document, "A variance is a time-limited designated use and criterion that is targeted to a specific pollutant(s), source(s), and or water body or waterbody segment(s) that reflects the highest attainable condition during the specified time period" (FR Vol 78 No 171 pg 54531). The proposed alternative approach to restoring the historically polluted Muddy Creek watershed is a perfect example of how a variance of water quality standards can be used to improve water quality. This unique approach treats bond forfeiture sites as well as abandoned mine lands together in order to address a situation which has existed in this watershed for decades. This is a situation in which "it is known that the designated use and criterion are unattainable" (FR Vol 78 No 171 pg 54532). Because the designated use and water quality criteria are not being met, but West Virginia intends to retain the designated use as a long-term goal, West Virginia has chosen to pursue a variance for these streams, which will allow the time necessary to implement adaptive management approaches to getting these streams to meet their designated uses.

DEP respectfully requests EPA's timely review and approval of the revisions to the State's water quality standards in accordance with 40 C.F.R. §131.21. If you have any questions or need any additional information, please contact Laura Cooper at (304) 926-0499 extension 1110 or via email at [Laura.K.Cooper@wv.gov](mailto:Laura.K.Cooper@wv.gov).

Sincerely,

Digitally signed by Laura's  
Signature  
Date: 2017.03.09 10:39:25 -05'00'

Laura Cooper  
Assistant Director, DWWM Water Quality Standards

cc: Evelyn MacKnight, EPA Region 3

Promoting a healthy environment.

## **Additional Information for Muddy Creek Watershed Variance**

### **I. Variance Language**

from WV Rule, Requirements Governing Water Quality Standards, §47 CSR 2 7.2.d.8.2.

A variance pursuant to 46 CSR 6, Section 5.1, based on human-caused conditions which prohibit the full attainment of any designated use and cannot be immediately remedied, shall apply to WV DEP Division of Land Restoration's Office of Special Reclamation's discharges into Martin Creek of Preston County and its tributaries, including Glade Run, Fickey Run, and their unnamed tributaries. The following existing conditions will serve as instream interim criteria while this variance is in place: pH range of 3.2-9.0, 10 mg/L total iron, and 15 mg/L dissolved aluminum. Alternative restoration measures, as described in the variance application submitted by WV DEP Division of Land Restoration's Office of Special Reclamation (OSR), shall be used to achieve significant improvements to existing conditions in these waters during the variance period. Conditions will be evaluated during each triennial review throughout the variance period. This variance shall remain in effect until action by the Secretary to revise the variance or until July 1, 2025, whichever comes first.

### **II. Watershed Information**

#### **A. Streams**

- i. Drainage Area - Glade Run is a perennial stream with a watershed area of approximately 3.74 square miles (2,391 acres) and an average flow of approximately 403.14 cfs. Fickey Run is a perennial stream with a watershed area of approximately 1.72 square miles (1,100 acres) and an average flow of approximately 160.54 cfs. Martin Creek is a perennial stream with a watershed area of approximately 7.1 square miles (4,645 acres) and an average flow of approximately 896.26 cfs.
- ii. Existing Conditions - The majority of the Muddy Creek watershed is minimally impacted by AMD, with almost all of the impacts entering Muddy Creek at or downstream of its confluence with Martin Creek. Muddy Creek is designated as a trout stream from the Woolen Mill Road bridge (which is immediately upstream of Martin Creek) to its headwaters. AMD impacts in Martin Creek are primarily from two of its tributaries, Glade Run and Fickey Run, see Figure 1. Martin Creek is considered a "dead stream" with impairments in Aluminum (d), CNA-Biological, Iron, and pH for the entire length. Fickey Run is considered a "dead stream" with impairments in Aluminum (d), CNA-Biological, Fecal Coliform, Iron, and pH for the entire length. Glade Run is considered a "dead stream" with impairments in Aluminum (d) CNA-Biological, Iron, and pH for the entire length. This information is from the approved 2010 TMDL 303(d) list. It should be noted that Kingwood Mining has an NPDES permit.

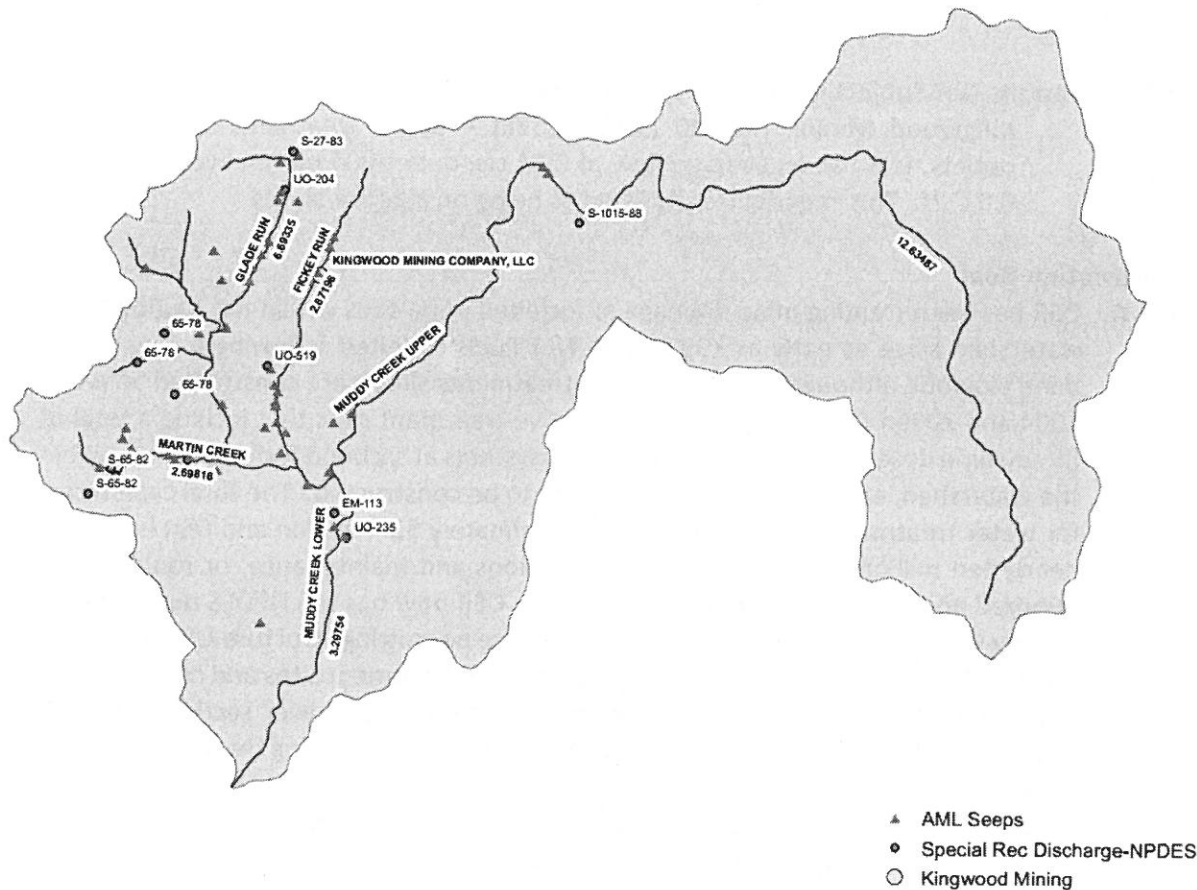


Figure 1 AMD sources within Muddy Creek

### III. Office of Special Reclamation (OSR) NPDES Permits Subject to Watershed Variance

#### A. Current Dischargers in Watershed, including Average Flows and Current Treatment

- i. **Crane Coal S-27-83** (WV1027107) – passive treatment site with 1 outlet and an average flow of 0.03 cfs
- ii. **Lobo Capital UO-204** (WV1029151) – active treatment site with 1 outlet, 1 sodium hydroxide tank, and an average flow of 0.13 cfs
- iii. **Rockville Mining 65-78/S-65-82** (WV1023535) – active treatment site with 6 outlets and 11 lime dosing units. Permit 65-78 has 3 outlets, 004 has 2 dosers and an average flow 0.19 cfs. 005 has 2 dosers and an average flow of 0.13 cfs. 006 has 1 doser and an average flow 0.04 cfs. Permit S-65-82 has 3 outlets, 009 has 2 dosers and an average flow of 0.68 cfs. 010 has 2 dosers and an average flow of 0.09 cfs. 011 has 2 dosers and an average flow of 0.37 cfs.
- iv. **T&T Fuels U-125-83** (WV1027131) – active treatment site with one outlet and an average flow of 0.13 cfs.

#### **IV. NPDES Permits Not Subject to Watershed Variance**

- i. **Kingwood Mining R-67-30 (WV0063576)** – active treatment site with two outlets, 003 has an average flow of 0.14 cfs, outlet 004 has an average flow of 0.02 cfs. This site is currently listed as being on inactive status.

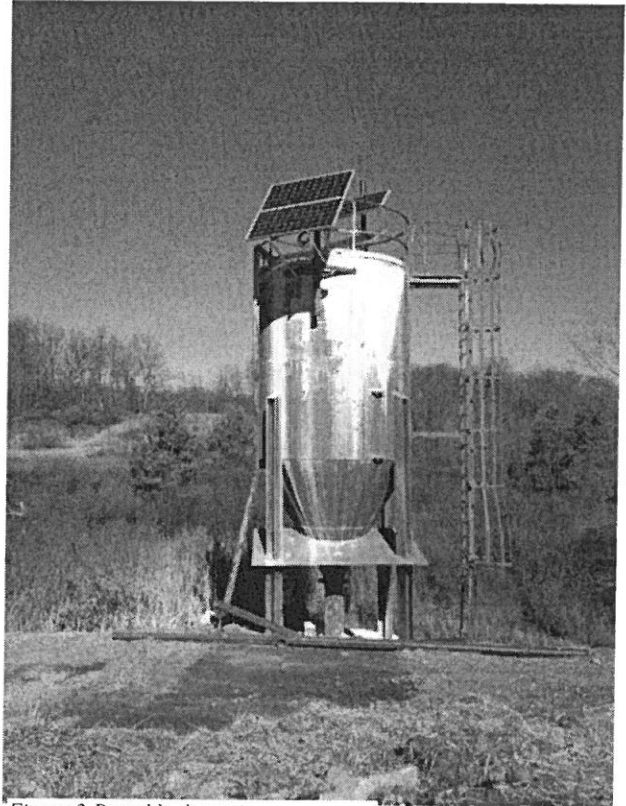
#### **V. Restoration Goal**

- A. OSR has been treating mine drainage at forfeited mine sites within the Muddy Creek watershed since as early as 1995 when T&T Fuels forfeited following a devastating mine blowout, although a majority of the treatments sites were constructed between 2004 and 2006. OSR has constructed 9 active treatment sites that include a total of fifteen lime dosers, and 1 passive treatment systems at six bond forfeiture sites within the watershed, and three other sites are yet to be constructed. The total capital cost for water treatment construction was approximately \$3.4 million and OSR has spent nearly ten million dollars to date for operations and maintenance, or roughly nine hundred and forty thousand dollars annually. OSR now has ten NPDES outlets in the Muddy Creek watershed. Without an alternative permitting structure OSR will spend an additional \$1.6 million to retrofit seven existing treatment sites and construct two new sites within Martin Creek and its tributaries - and the lower section of Muddy Creek will remain dead. OSR has set a restoration goal of restoring the lower 3.4 miles of Muddy Creek to its designated stream usage by decreasing the water quality impairment from pre, and post-law coal mine discharges within the watershed. This will effectively reestablish biologic connectivity throughout the entire 15.6 miles of Muddy Creek.

## VI. In-Stream Treatment Study

### A. Purpose

The West Virginia Water Research Institute (WRI) was contracted by OSR to conduct a study that would utilize portable dosers to treat in-stream. The purpose of the study was to assist in determining the optimal location for placement of permanent dosers within the Martin Creek watershed that would effectively address both pre, and post-law mine discharges. The dosers were modified with skids and solar power to enable them to be moved by truck from one location to another and be placed alongside the targeted stream, see Figure 2. Initially three dosers were used; one was placed near the headwaters of Fickey Run, one at the headwaters of Glade Run, and one at the headwaters of Martin Creek. Water quality



*Figure 2 Portable doser*

samples were collected on a weekly basis at locations upstream of the dosers and at tributary mouths to monitor water quality conditions in response to the dosers. The sample point at the mouth of Martin Creek was initially used to determine the success of the project in terms of water quality, and in meeting the interim criteria as outlined in the variance application (pH 3.2 – 9 s.u., total iron 10 mg/l, dissolved aluminum 15 mg/l). However, due to the unacceptable results with the dosing on Fickey Run, which will be described in more detail below, the sample point used to determine success was moved to Martin Creek immediately upstream of Fickey Run, see Figure 3.

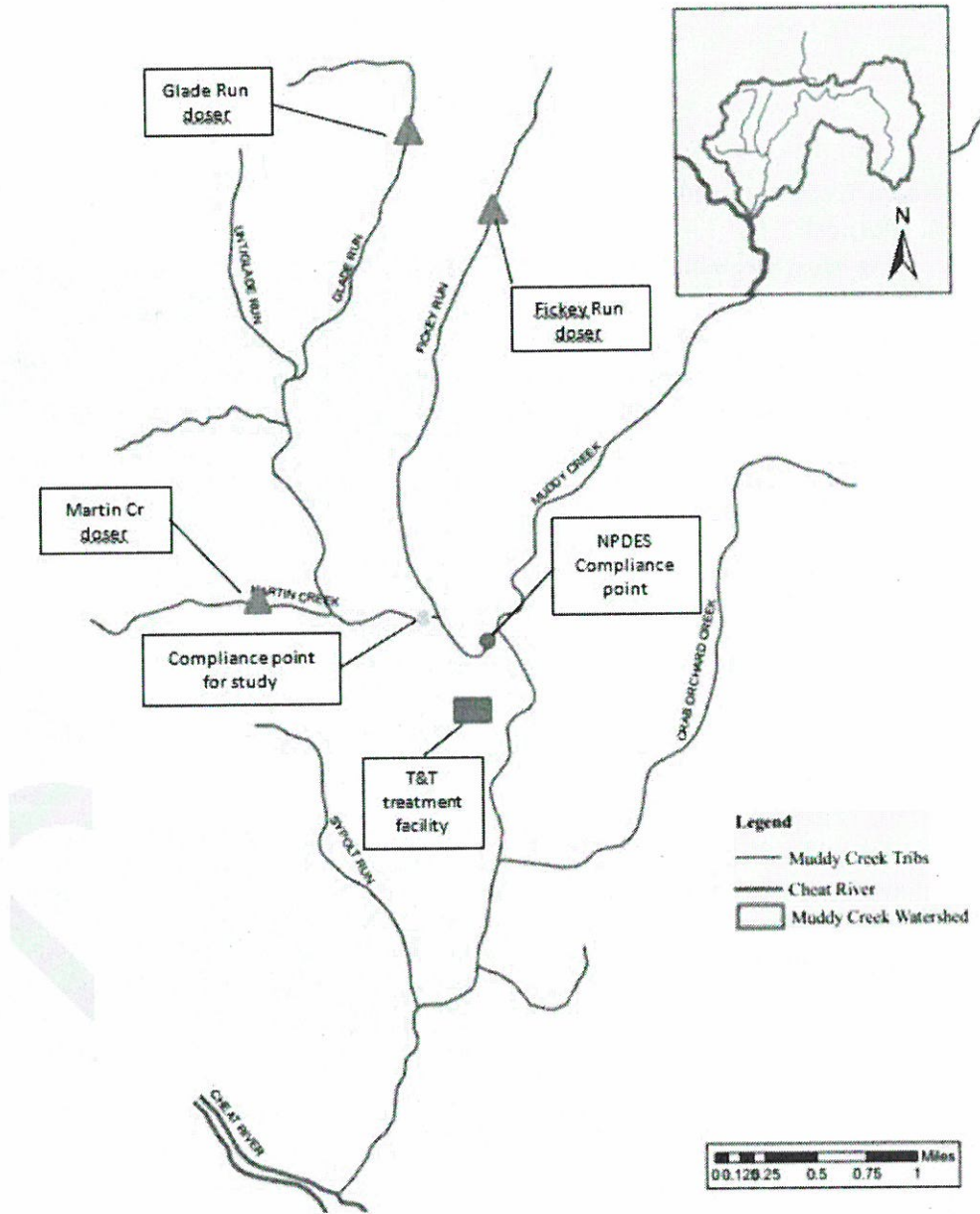


Figure 3 Initial location of dosers

## B. Challenges

There were challenges encountered during the study such as power outages due to inadequate sun light and clogged silos, both of which lead to inconsistent dosing to the receiving stream and consequently inconsistent water quality results. To compensate for the lack of power, primarily during the evening hours, gasoline powered generators were used. Theoretically, the solar panels were to run the motors which dispensed the lime while also charging the batteries to last through the evening hours. Unfortunately, the high dosing rate, primarily on Glade Run, put a larger demand on the power supply than anticipated. The clogging issue was



addressed by installing vibrators on the silos, but this also added to the power demand. Therefore, it was decided that since positive water quality results were observed during periods of consistent dosing electricity would be run to the Glade Run doser since this one required a much higher power demand.

### **C. Final Plans**

It was determined that the doser on Martin Creek was in an appropriate location and therefore it remained. The doser on Glade Run however had to be moved further downstream because there wasn't enough flow in the headwater reaches during the summer months to allow for adequate mixing and movement of the lime, and due to the poor results of dosing efforts on Fickey Run, as described below, this doser was removed completely. Figure 4 depicts the final placement of the two remaining dosers within Martin Creek.

It was evident early on during the study that in-stream dosing on Fickey Run was not appropriate. An earlier in-stream study conducted on Fickey Run in 2012 resulted in large amounts of iron sludge from Fickey Run entering Martin Creek and Muddy Creek. This was a concern raised by the Friends of the Cheat and other environmental advocacy groups when in-stream treatment was first proposed by the OSR. But this earlier study placed the dosing point a mere one mile from the mouth of Fickey Run. The most recent

study moved the dosing point upstream another mile to a portion of the stream with a much lower gradient in hopes that more metals would be retained in the upper reaches of the stream and periodically flushed during high flow events. But this was not the case and similar results to the earlier study were observed in Martin Creek and Muddy Creek, see Figures 5 and 6. This was not an acceptable outcome, therefore, OSR had to come up with an alternative treatment approach for Fickey Run.

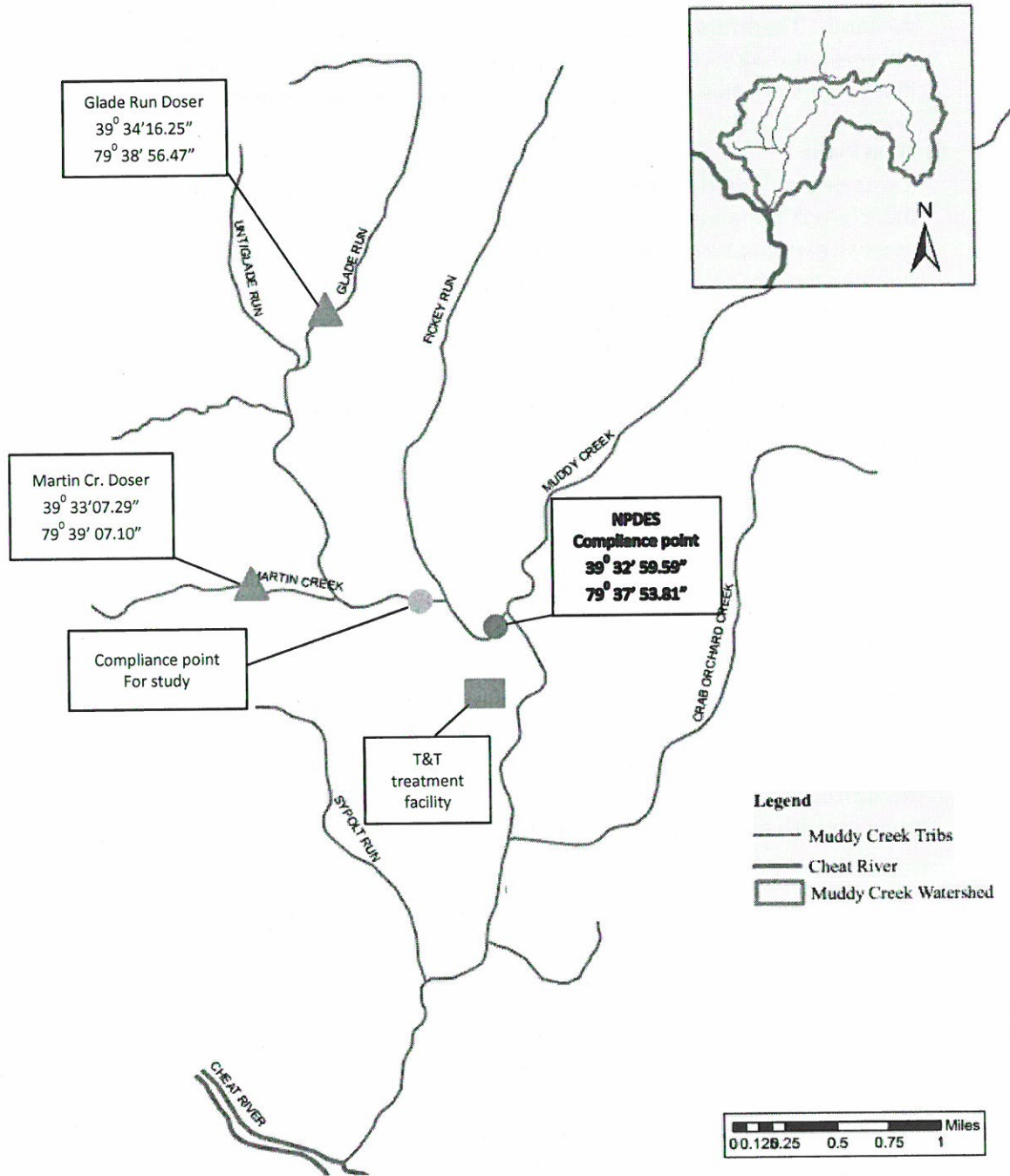


Figure 4 Final location for dosers

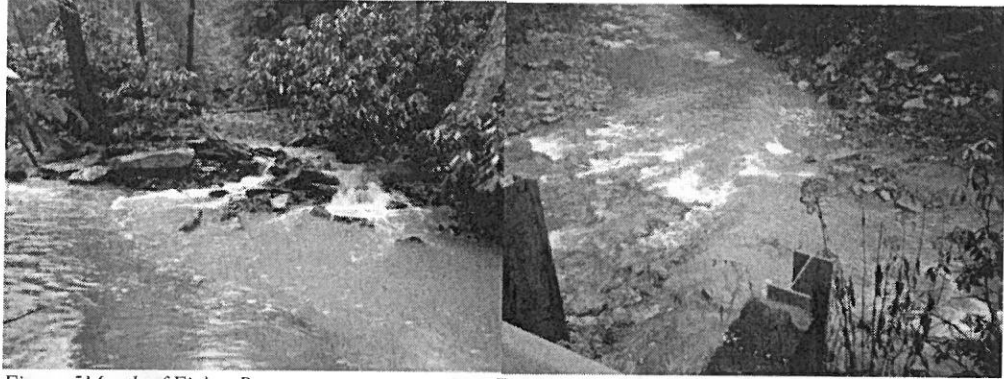


Figure 5 Mouth of Fickey Run

Figure 6 Confluence of Martin Cr and Muddy Cr

#### **D. Alternative Treatment Plan for Fickey Run**

The Abandoned Mine Land Program (AML) partnered with OSR for fifty percent (50%) of the cost for the in-stream study on Martin Creek. AML has agreed to install an AMD seep collector to capture the pre-law mine drainage that is currently entering Fickey Run on the left descending bank approximately two miles from the mouth of Fickey Run. The seep collector will convey the pre-law mine drainage directly into a pipe line that will flow south approximately one mile to intersect with the pipe line from Viking Coal (see Sec. VII). Additional mine drainage from pre-law wet mine seals, located north of the proposed seep collector, will also be directed into the pipe line, see Figure 7. OSR will also collect, and convey to the pipe line, some mine drainage from Rockville Mining, S-91-85, a bond forfeiture site adjacent to Fickey Run. This alternative treatment approach will effectively remove approximately 86% of the acid and metal loads from Fickey Run. It should also be noted that roughly 68% of the load reductions would come from pre-law mine discharges that would otherwise go untreated according to conventional, at-source, treatment methods carried out by OSR to date. AML will be responsible for the installation cost of the seep collector and the 1 mile pipe line, and will also reimburse OSR for additional treatment cost associated with any pre-law mine drainage.

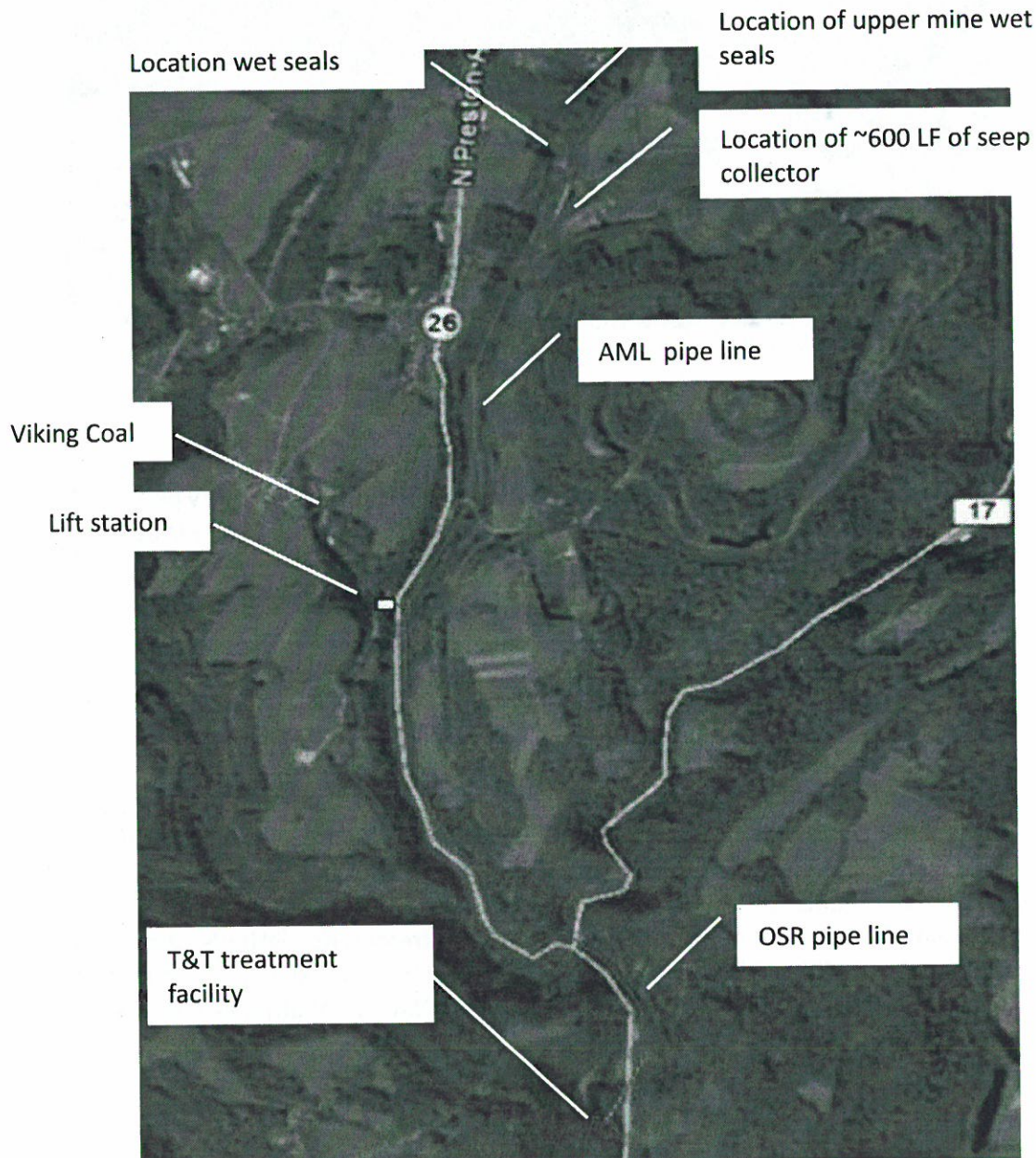


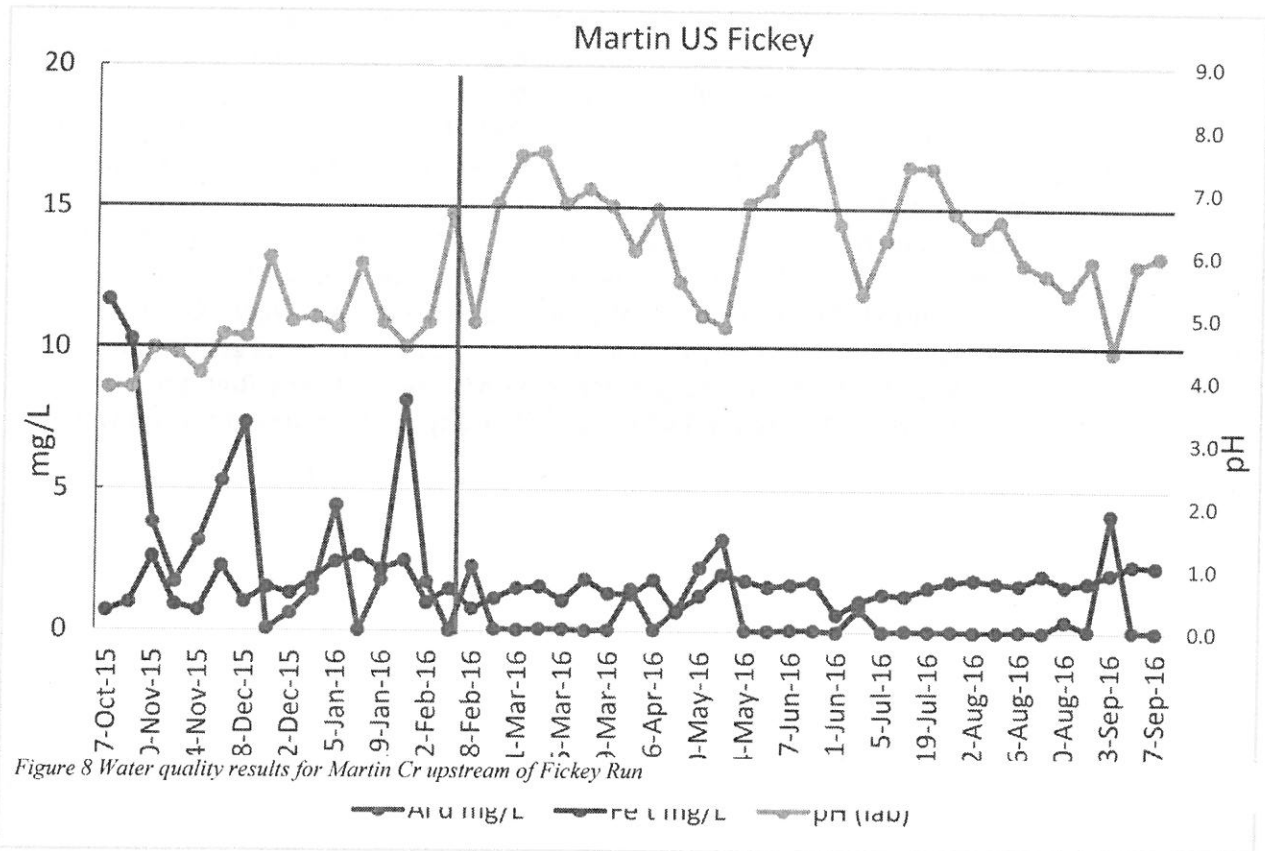
Figure 7 Alternative treatment plan for Fickey Run

### E. Conclusion

The in-stream treatment study conducted by WRI did identify the appropriate location for the permanent installation of dosers within the Martin Creek watershed. The study also provided undeniable evidence that in-stream treatment was not an acceptable approach for treating AMD in Fickey Run. Therefore, one doser will be placed on Glade Run, one on Martin Creek near the headwaters, and according to the alternative treatment plan for Fickey Run approximately eighty-six percent (86%) of the acid and metal loads will be removed from Fickey Run, transported through a

pipeline, then treated at the T&T treatment facility. Since Fickey Run was not being treated throughout a large portion of the study period, for the purpose of this study, WRI and OSR decided to move the “compliance point” from the mouth of Martin Creek to Martin Creek immediately upstream of Fickey Run, otherwise it would not be feasible to determine if the in-stream treatment strategy would be successful in meeting the interim in-stream criteria established in the variance application (pH 3.2 – 9 s.u., total iron 10 mg/l, dissolved aluminum 15 mg/l). **The NPDES permit will establish the compliance point at the mouth of Martin Creek.**

It was evident that when the dosers were running properly and the pH was maintained at acceptable levels (between 6 and 9 s.u.) the in-stream interim criteria were easily achieved, see Figure 8. Therefore, it is anticipated that during the first triennial review the total iron and dissolved aluminum in-stream criteria would be adjusted appropriately.



## **VII. Term of the variance**

### **A. Treatment**

As part of the 10 -year variance term, OSR will be constructing a treatment facility at the T&T Fuels site, see Figure 9, located in Preston County along route 26, south of Valley Point, WV and downstream of Martin Creek. Construction is scheduled to begin December 2016 and should be complete within the following year. This facility was originally planned to treat water from the T&T, Viking Coal, and Preston Energy mines, but as was described above the facility will also be used to treat a majority of the mine drainage within Fickey Run as well. The treatment facility is capable of treating 4,200 gallons per minute. The facility will consist of two eighty foot clarifiers, a lime slurry (liquefied lime) feed system, a mixing tank, a pump building, and a control building. The lime slurry will be produced on-site using hydrated lime and the final effluent as make-up water for the 35% slurry mix. After treatment, the resulting sludge will be pumped back into an isolated area of the deep mine through an injection borehole. Secondary sludge disposal will utilize Geo Tubes (woven filtering bags) situated adjacent to the treatment facility. The treatment facility will be automated with all pumps (sludge and chemical feed) and motors (flocculators, mixers, clarifier drives) controlled through a PLC (Programmable Logic Controller). The facility will be capable of monitoring pH and flow. The target pH is set by the PLC and the mix tank pH is adjusted accordingly. The final effluent pH will be monitored and alarms will be triggered, notifying OSR staff, if the pH exceeds set parameters. A pipe line approximately one and one-quarter miles long (1 ¼ miles) is to be installed that will convey the AMD downstream from Viking Coal to the T&T treatment facility. Preston Energy will be piped directly across route 26. Installation of the pipe line that will convey the pre-law mine drainage in Fickey Run, and the mine drainage from Viking Coal, to the T&T treatment facility will be done concurrent with the

construction of the T&T treatment facility. It is anticipated that the entire treatment facility will be operational by December 2017.

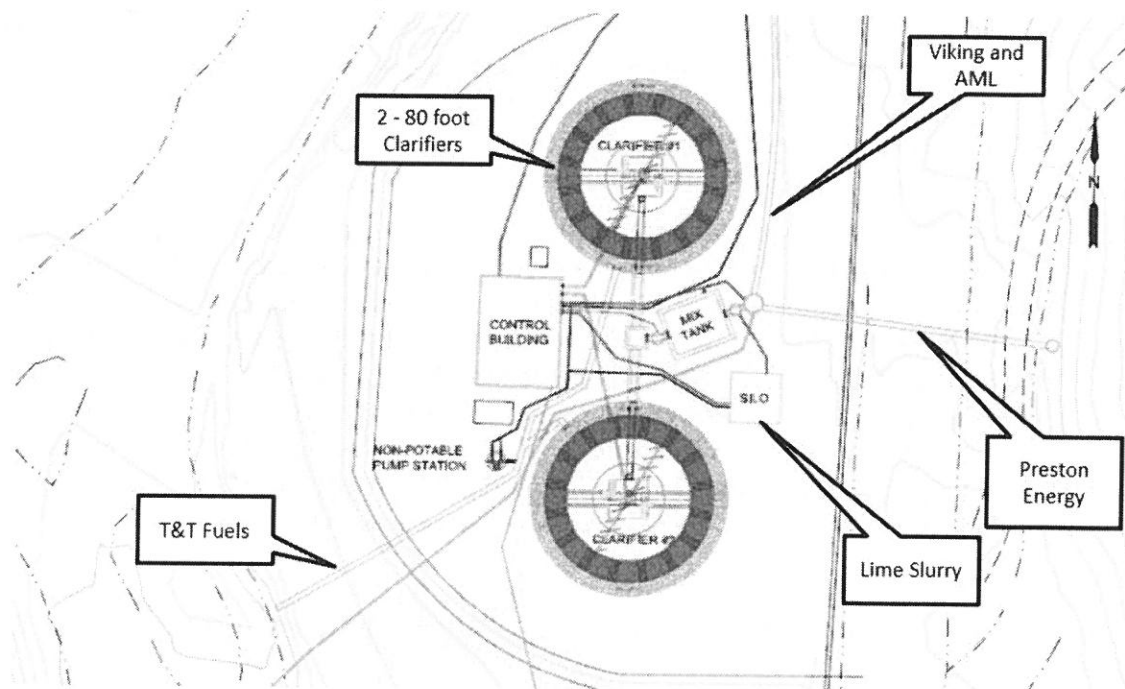


Figure 9 T&T treatment facility

**The permanent in-stream dosers will be installed upon approval of the variance.** The in-stream dosers will dispense a highly soluble hydrated lime or lime slurry. Glade Run has the highest chemical demand, therefore this in-stream doser will utilize a lime slurry which will be produced on-site. Since this particular site is in close proximity to public water and electrical service OSR will tap into the water supply to use as make-up water to produce the lime slurry and will also have electricity supplied to the site (this has already been done). The site will also have a propane generator that will turn on automatically in the event of a power outage. The Glade Run site will also have a communication link to the T&T treatment facility's PLC. This gives the OSR remote monitoring capabilities for parameters such as exceedances in pH, power outages, and lime level in the silo. Dosing rates will be regulated by pH sensors placed downstream of the doser. The sensor will measure the pH of the stream and send a signal back to the doser that will enable the dosing rate to increase or decrease accordingly. The doser on Martin Creek will be modified slightly to serve as secondary treatment. Since this doser has run successfully with solar power, electricity will not be necessary.

#### **B. Term of the Variance**

This variance will be in place until the watershed has been restored to meet water quality standards or until 10 years has passed, whichever comes first. It is not yet clear how long it will take the alternative restoration measures described in this application to be fully effective in restoring water quality. The long-term multifaceted acid drainage problem in this watershed—from both bond forfeited sites and AML sites—makes it difficult to

determine how long it will take before water quality is restored, and subsequently for aquatic life to return to these streams.

WVDEP consistently reviews state Water Quality Standards at least every three years, and conducts several public meetings each year. As stated in the variance language, DEP will evaluate conditions during each triennial review to determine if the alternative measures are having the desired impact. Each triennial review will include further review and update of achievable interim water quality standards.

The highest attainable interim criteria used in this variance was determined by examining existing in-stream conditions at the proposed watershed permit compliance point, which is at the mouth of Martin Creek's discharge into Muddy Creek (39° 32' 59.59" 79°37'53.81"). According to the most recent data prior to submittal of the variance application, on May 12, 2015, this point had a flow of 7.8245 CFS, pH 3.26, 9.63 mg/L total iron, and 14.8mg/L dissolved aluminum. For the initial portion of the 10-year life of the variance, it is unknown what water quality improvements can be expected; therefore, use of the existing conditions as interim criteria, at least until a Triennial Review can be done to update the interim criteria, ensures compliance with criteria can be met.

#### **VIII. Monitoring and Assessment**

Figure 10 represents the locations for the monitoring and assessment plan described below.



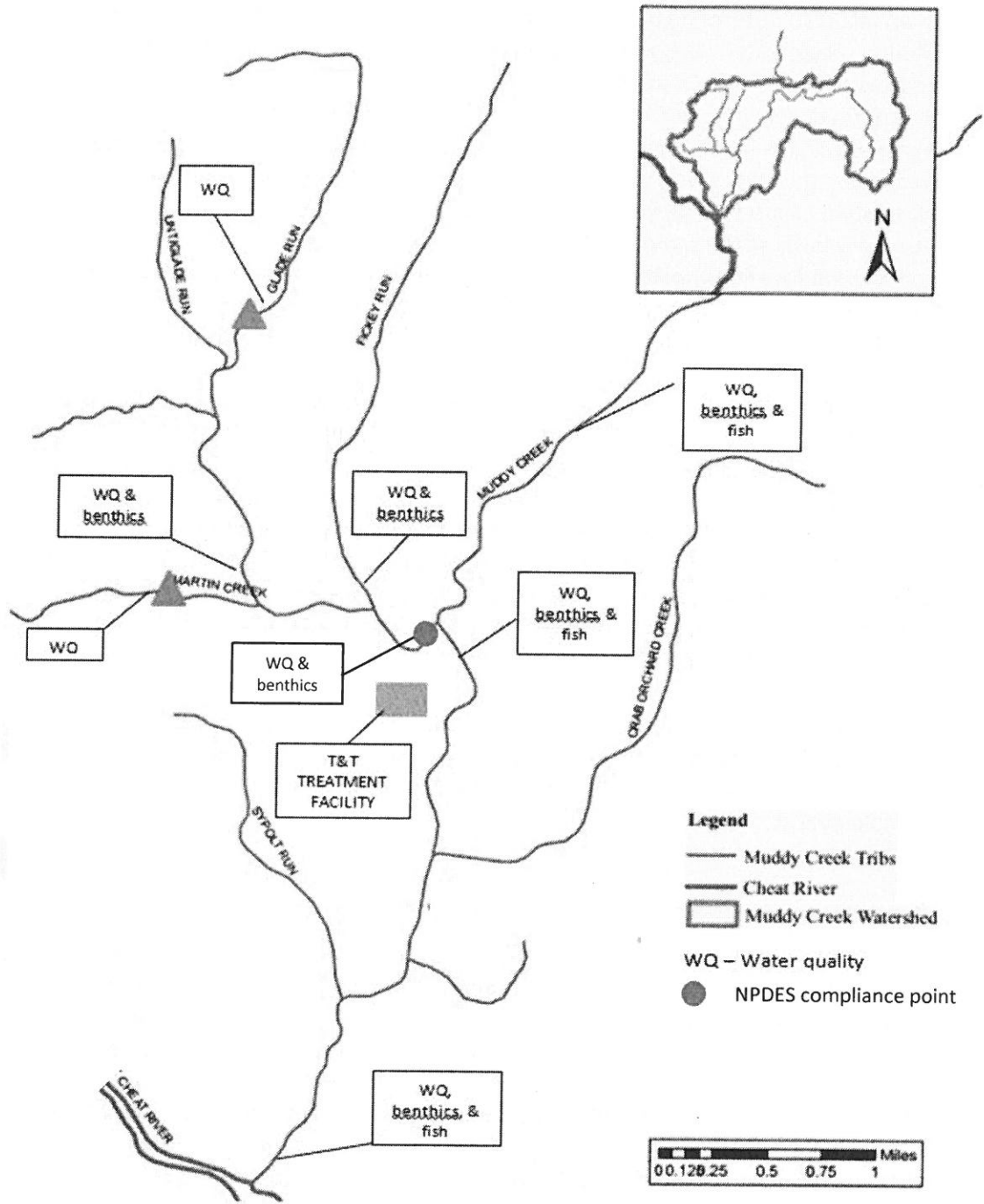


Figure 10 Proposed monitoring and assessment plan

A. Surface water quality monitoring

In an effort to determine the efficacy of the Acid Mine Drainage treatment in the Muddy Creek watershed, water quality samples (grab) will be collected on a monthly basis at 8 locations for a period of two (2) years following start-up of the permanent In-stream dosers and T&T treatment facility. This information is fundamental in managing OSR's In-stream dosers and permanent treatment facilities and is needed to address questions vital to the long-term environmental integrity of the watershed. After two (2) years, water quality samples (grab) will be collected on a quarterly basis at the same eight (8) locations. Specifically, grab samples will be collected at locations upstream of the dosers and at the tributary mouths. Water quality sampling techniques will follow the OSR's Standard Operating Procedures (SOP) that adhere to scientifically sound, quality-assured field methods.

Field parameters will include: temperature (°C), dissolved oxygen (ppm), specific conductance (µS/cm), and total dissolved solids (mg/L) using a YSI 556 multi-parameter probe (Yellow Springs Instruments, Yellow Springs, OH, USA), and turbidity via transparency tube. Stream discharge will be measured using the area-velocity technique with an OTT MF pro Flow Meter. Additionally, grab water samples will be collected at each site and stored on ice until analysis at a laboratory approved by the WVDEP. Parameters to be analyzed include: pH, alkalinity, acidity, conductivity, sulfates, and total suspended solids along with total and dissolved metals (iron, magnesium, aluminum, calcium, and manganese).

Additionally, in-stream data loggers located near the Route 26 bridge (or Martin Creek Mouth) and the Muddy Creek mouth will record pH, conductivity, and temperature at 20 minute intervals. Data will be downloaded monthly during water quality grab sample events.

#### **B. Benthic macroinvertebrate and fish sampling**

In an effort to determine the efficacy of the acid mine drainage treatment and overall stream health of the Muddy Creek watershed, benthic macroinvertebrate and fish surveys will be conducted. Following start-up of the permanent In-stream dosers and T&T treatment facility, benthic macroinvertebrate surveys will be conducted every six (6) months for a period of two (2) years at the tributary Mouths (Figure 10). After two (2) years, benthic sampling will be conducted on a yearly basis. Fish surveys will be conducted six (6) months following start-up of the permanent treatment systems, then one (1) year (18 months), and every two (2) years thereafter (Figure 10). Survey and collection procedures will follow the WVDEP's Watershed Assessment Branch's (WAB) protocol. The WAB's protocol can be found at: <http://www.dep.wv.gov/WWE/watershed/Pages/WBSOPs.aspx>

### **IX. Watershed Permit**

- A.** OSR will obtain an NPDES permit at the mouth of Martin Creek. This in-stream NPDES permit will supersede all other OSR permits covered under the variance. It is

anticipated that the initial in-stream permit limits will be equal to the in-stream interim criteria established in the variance application (pH 3.2 – 9 s.u., total iron 10 mg/l, dissolved aluminum 15 mg/l). Upon each triennial review, as required by the variance, the stream conditions and compliance history shall be reviewed and the in-stream limits shall be adjusted appropriately, but under no circumstances may they be made worse than the original criteria as established in the variance without justification and approval by the WVDEP.

i. Baseline Monitoring

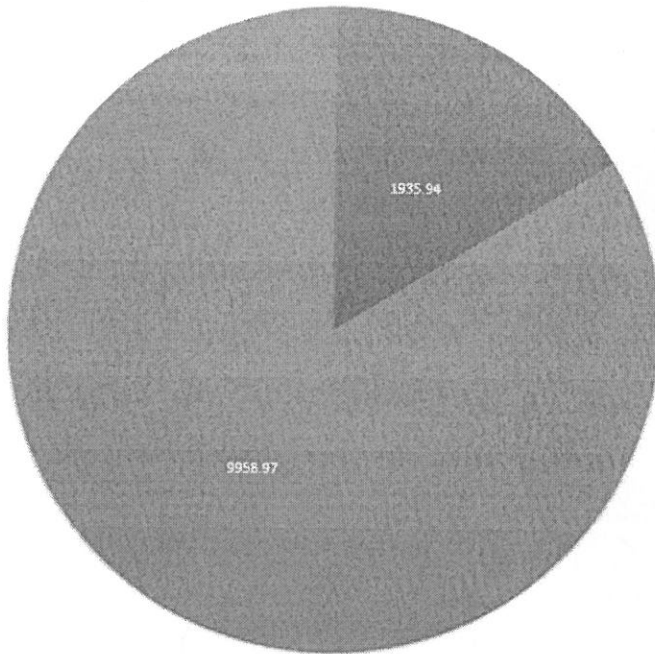
Prior to the in-stream study WAB has collected water quality samples above and below Martin Creek and have also done benthic and fish surveys at the same locations. These same sites, among others, are included in the proposed monitoring plan described above.

# Appendix

## Loading Data

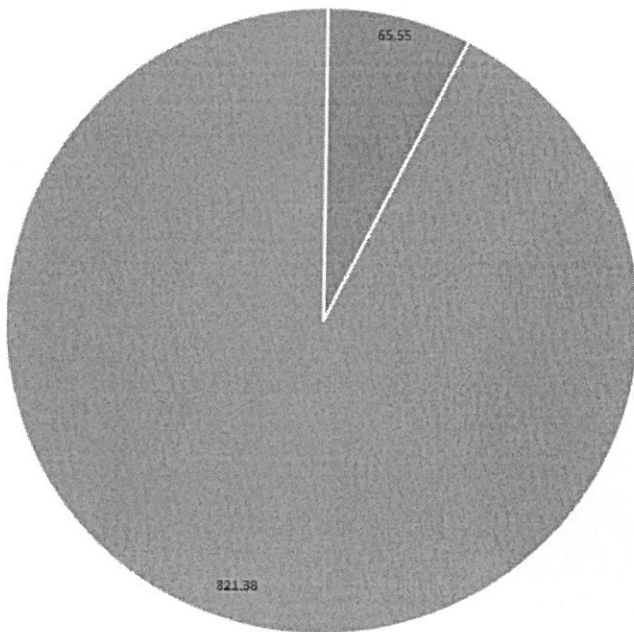
	GPM	Acidity LD lbs/day	Fe LD lbs/day	Mn LD lbs/day	Al LD lbs/day
UO-204	43.18	78.42	17.20	0.47	5.33
U-125-83	31.22	33.83	3.90	0.59	1.88
S-65-82	267.55	92.49	8.83	12.43	10.33
Viking UO-519 Raw	66.20	240.25	16.31	3.25	31.18
Rockville S-91-85	35.54	1252.65	17.09	10.62	13.48
65-78 Site 1	77.13	175.53	1.22	9.72	28.91
65-78 Site 2	5.36	9.72	0.18	0.95	1.41
65-78 Site 4	43.61	53.04	0.82	2.46	6.97
Spec Rec Average Totals	569.79	1935.94	65.55	40.49	99.48
Mouth of Martin	4435.89	11894.91	886.93	272.99	872.92
Martin Creek without Spec Rec contribution	3866.10	9958.97	821.38	232.50	773.44
		<b>16.28%</b>	<b>7.39%</b>	<b>14.83%</b>	<b>11.40%</b>

### Acidity Loading (lbs/day)

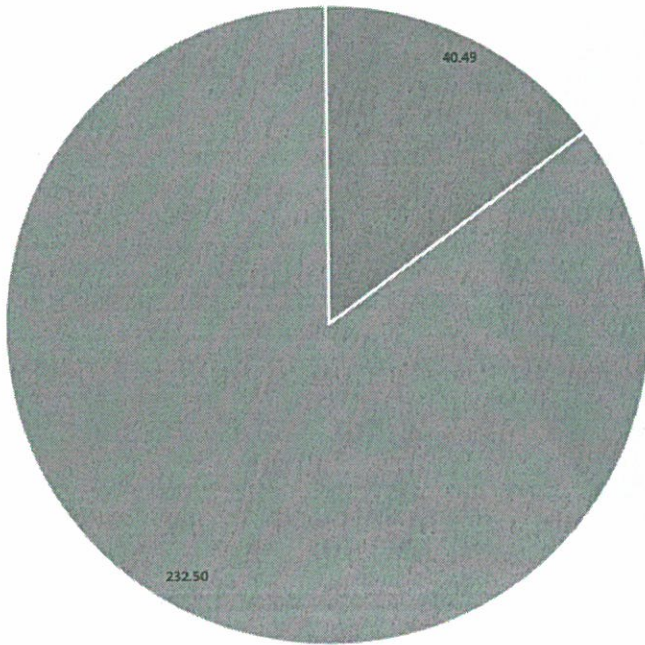


■ Spec Rec Average Totals   ■ Martin Creek without Special Rec contribution

### Total Iron Loading (lbs/day)



**Manganese Loading (lbs/day)**



**Aluminum Loading (lbs/day)**

