Appendix I1:
QA by PADEP on University’s TGD-563-2000-655 Sampling Protocol
Pennsylvania Department of Environmental Protection

Division of Water Quality Standards

Benthic Macroinvertebrate Field sampling QA audit form:

Name: Keith Garmire
Date: April 25, 2013
Location: Blockhouse Run
Station ID: BSW23 (Lat. 39.773555 Long. -80.34321)
Type of Stream Sampled: Freestone Low-gradient Limestone

Is stream reach appropriate for sampling? Yes No

The sampling reach collected was a monitoring station used by CONSOL Coal Co. to determine if mining affected the use of Blockhouse Run within this mining panel. As part of the Act 54 five year studies this monitoring sampling point was being sampled to determine if the sampling protocol were being met.

Is sample reach representative of the stream segment? Yes No

The stream sampling segment (100 meters) was mapped prior to sampling. The reach had the five habitats needed to meet the requirements of the Surface Water Protection (563-2000-655) - Underground Bituminous Coal Mining Operations (Protocol).

Were field parameters (water temperature, specific conductance, pH, dissolved oxygen, alkalinity, turbidity, etc.) collected and recorded appropriately. Yes No
Were water chemistry samples collected? If yes, PA DEP BOL# = _____; SAC = _____

Not Collected  Yes  No

Were manual flows measurements taken? If yes, meter manufacturer/model = _________

Not Taken  Yes  No

Is there a variety of flow/depth regimes being sampled?  

Yes  No

The stream segments lower portion had a small mining induced pool with the middle and upper portions of the sampling segment was a normal riffle, run, pool configuration. Samples collected: (2) CPOM, (2) Vegetation, (2) Snags, (2) Cobble / Gravel, and (2) Silt / Sands; equaling 10 total samples required by Surface Water Protection (563-2000-655) - Underground Bituminous Coal Mining Operations (Protocol).

Is the kick duration between 45 and 60 seconds?  

Yes  No

Kick duration was between 45 and 60 seconds with substrate thoroughly disturbed.

Is an appropriate area (100 cm x 100 cm) being disturbed for each kick?  

Yes  No

Yes, 100 cm X 100 cm area was properly disturbed.
Is net being emptied after each kick in order to minimize clogging / back wash?  

Yes  No

The D-frame net was emptied after each kick cycle. No clogging or backwash was observed.

Are samples being composited carefully to avoid loss of material?  

Yes  No

The D-frame net was being cleaned and the debris was being transferred to a sample container with a bucket and sieve.

Are sample bottles being labeled clearly and properly?  

Yes  No

Sample bottles were labeled properly.

Are nets and sieves checked carefully for bugs prior to cleaning?  

Yes  No

The D-frame and Sieves were examined very carefully after each kick.

Is habitat assessment conducted after careful observation and walking of sample reach?  

Yes  No

A habitat assessment was conducted after careful observation, mapping and walking the sampling reach.
Is Investigator meeting QA requirements?

<table>
<thead>
<tr>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
</table>

Comments/Recommendations:

Sampling procedure was performed according to the Surface Water Protection (563-2000-655) - Underground Bituminous Coal Mining Operations (Protocol), completed all necessary tasks to meet QA requirements: I recommend that Keith Garmire consider collecting water chemistry samples when collecting macroinvertebrate samples if the Act 54 contract permits. I also recommend checking D.O. calibrations against the D.O. chart available @ http://water.usgs.gov/owc/FieldManual/.

Reviewer: Joel C. Folman
Employee: Keith Garmire
Signature: 

5/7/2013
Pennsylvania Department of Environmental Protection

Division of Water Quality Standards

Benthic Macroinvertebrate Field sampling QA audit form:

Name: Alison Hale PhD

Date: April 30, 2013

Location: Maple Run

Station ID: MR-4 (Lat. 39.82312 Long. -80.24027)

Type of Stream Sampled: Freestone Low-gradient Limestone

Is stream reach appropriate for sampling?  Yes  No

The sampling reach collected was a monitoring station used by Alpha / Cumberland Mine to determine if mining affected the use of Maple Run within this mining panel. As part of the Act 54 five year studies this monitoring sampling point was being sampled to determine if the sampling protocol were being met.

Is sample reach representative of the stream segment?  Yes  No

The stream sampling segment (100 meters) was mapped prior to sampling. The reach had the five habitats needed to meet the requirements of the Surface Water Protection (563-2000-655) - Underground Bituminous Coal Mining Operations (Protocol).

Were field parameters (water temperature, specific conductance, pH, dissolved oxygen, alkalinity, turbidity, etc.) collected and recorded appropriately.  Yes  No
Were water chemistry samples collected? If yes, PA DEP BOL# = _____; SAC = _____

Not Collected  Yes  No

Were manual flows measurements taken? If yes, meter manufacturer/model = ______

Not Taken  Yes  No

Is there a variety of flow/depth regimes being sampled?  Yes  No

The stream segment is located in a small 2 order stream channel, the sampling segment was a normal riffle, run, pool configuration. Samples collected: (1) CPOM, (2) Vegetation, (2) Snags, (3) Cobble / Gravel, and (2) Silt / Sands; equaling 10 total samples required by Surface Water Protection (563-2000-655) - Underground Bituminous Coal Mining Operations (Protocol).

Is the kick duration between 45 and 60 seconds?  Yes  No

Kick duration was between 45 and 60 seconds with substrate thoroughly disturbed.

Is an appropriate area (100 cm x 100 cm) being disturbed for each kick?  Yes  No

Yes, 100 cm x 100 cm area was properly disturbed.
Is net being emptied after each kick in order to minimize clogging / back wash?

Yes  No

The D-frame net was emptied after each kick cycle. No clogging or backwash was observed.

Are samples being composited carefully to avoid loss of material?

Yes  No

The D-frame net was being cleaned and the debris was being transferred to a sample container with a bucket and sieve.

Are sample bottles being labeled clearly and properly?

Yes  No

Sample bottles were labeled properly.

Are nets and sieves checked carefully for bugs prior to cleaning?

Yes  No

The D-frame and Sieves were examined very carefully after each kick.

Is habitat assessment conducted after careful observation and walking of sample reach?

Yes  No

A habitat assessment was conducted after careful observation, mapping and walking the sampling reach.
<table>
<thead>
<tr>
<th>Is Investigator meeting QA requirements?</th>
<th>Yes</th>
<th>No</th>
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</table>

**Comments/Recommendations:**

Sampling procedure was performed according to the Surface Water Protection (563-2000-655) - Underground Bituminous Coal Mining Operations (Protocol), completed all necessary tasks to meet QA requirements: I recommend that Alison Hale PhD consider collecting water chemistry samples when collecting macroinvertebrate samples if the Act 54 contract permits. I also recommend checking D.O. calibrations against the D.O. chart available @ [http://water.usgs.gov/owq/FieldManual/](http://water.usgs.gov/owq/FieldManual/).

**Reviewer:** Joel C. Folman  
**Employee:** Alison Hale PhD

**Signature:** [Signature]

**Date:** 5/2/2013
Pennsylvania Department of Environmental Protection
Division of Water Quality Standards
Benthic Macroinvertebrate Field sampling QA audit form

Name: Tom Hann
Date: 3/29/2013
Location: UNT 40944 to Crafts Creek
Station ID: BSW13 (Lat. 40.05639 Long. -80.355253)
Type of Stream Sampled: Freestone Low-gradient Limestone

Is stream reach appropriate for sampling?  Yes  No

The sampling reach collected was a monitoring station used by CONSOL Coal Co. to determine if mining affected the use of this tributary 40944 to Crafts Creek. As part of the Act 54 five year studies this monitoring sampling point was being sampled to determine if the sampling protocol was being met.

Is sample reach representative of the stream segment?  Yes  No

The sampling stream segment (100 meter) was mapped prior to sampling. The reach had the five habitats needed to meet the requirements of the Surface Water Protection (563-2000-655)-Underground Bituminous Coal Mining Operations (protocol).

Were field parameters (water temperature, specific conductance, pH, dissolved oxygen, alkalinity, turbidity, etc.) collected and recorded appropriately?  Yes  No
Were water chemistry samples collected? If yes, PA DEP BOL# = _____; SAC = _____

- Not Collected
- Yes
- No

Were manual flows measurements taken? If yes, meter manufacturer/model = _____

- Not Taken
- Yes
- No

Is there a variety of flow/depth regimes being sampled?

- Other
- Yes
- No

Samples collected: (2) Cobble/Gravel, (2) Silt/Sand, (2) Vegetation, (2) Snags and (2) CPOM, equaling 10 total samples required by Surface Water Protection (563-2000-655)-Underground Bituminous Coal Mining Operations (protocol).

Is the kick duration between 45 and 60 seconds?

- Yes
- No

Kick duration was between 45 and 60 seconds with substrate thoroughly disturbed.

Is an appropriate area (100 cm x 100 cm) being disturbed for each kick?

- Yes
- No

Yes, 100 cm X 100 cm area was properly disturbed.
Is net being emptied after each kick in order to minimize clogging / back wash?

Yes  No

The D-frame net was emptied after each kick cycle. No clogging or back wash was observed.

Are samples being composited carefully to avoid loss of material?

Yes  No

The D-frame net was being cleaned and the debris was being transferred to a sample container with a bucket and sieve.

Are sample bottles being labeled clearly and properly?

Yes  No

Sample bottles were labeled properly.

Are nets and sieves checked carefully for bugs prior to cleaning?

Yes  No

The D-frame was examined very carefully after each kick.

Is habitat assessment conducted after careful observation and walking of sample reach?

Yes  No

A habitat assessment was conducted after careful observation, mapping and walking the sample reach.
Is investigator meeting QA requirements?  

Yes  No

Comments/Recommendations:

Sampling procedure was performed according to the Surface Water Protection protocol (563-2000-655). **Tom Hann** completed all necessary tasks to meet QA requirements; I recommend that **Tom Hann** consider collecting water chemistry samples when collecting macroinvertebrate samples if the Act 54 contract permits.

Reviewer: Joel C. Folman  
Employee: Tom Hann

Signature: [Signature]  
Signature: [Signature]  
Date: [Signature]  
Date: [Signature]
Pennsylvania Department of Environmental Protection
Division of Water Quality Standards
Benthic Macroinvertebrate Field sampling QA audit form

Name: Grace Noble
Date: 4/5/2013
Location: Crafts Creek
Station ID: B5W20 (Lat. 40° 3.3569' Long. -80° 20.1215)
Type of Stream Sampled: Freestone Low-gradient Limestone

Is stream reach appropriate for sampling? Yes No
The sampling reach collected was a monitoring station used by CONSOL Coal Co. to determine if mining affected the use of Crafts Creek. As part of the Act 54 five year studies this monitoring sampling point was being sampled to determine if the sampling protocol were being met.

Is sample reach representative of the stream segment? Yes No
The sampling stream segment (100 meter) was mapped prior to sampling. The reach had the five habitats needed to meet the requirements of the Surface Water Protection (563-2000-655)-Underground Bituminous Coal Mining Operations (protocol).

Were field parameters (water temperature, specific conductance, pH, dissolved oxygen, alkalinity, turbidity, etc.) collected and recorded appropriately? Yes No
Were water chemistry samples collected? If yes, PA DEP BOL: ______; SAC: ______

Not Collected  Yes  No

Were manual flows measurements taken? If yes, meter manufacturer/model: ______

Not Taken  Yes  No

Is there a variety of flow/depth regimes being sampled?  Other: ______  Yes  No

Samples collected: (2) Cobble/Gravel, (2) Silt/Sand, (2) Vegetation, (2) Snags and (2) CPOM; equaling 10 total samples required by Surface Water Protection (563-2000-655)-Underground Bituminous Coal Mining Operations (protocol).

Is the kick duration between 45 and 60 seconds?  Yes  No

Kick duration was between 45 and 60 seconds with substrate thoroughly disturbed.

Is an appropriate area (100 cm x 100 cm) being disturbed for each kick?  Yes  No

Yes, 100 cm x 100 cm area was properly disturbed.
Is net being emptied after each kick in order to minimize clogging / back wash?

The D-frame net was emptied after each kick cycle. No clogging or back wash was observed.

Are samples being composited carefully to avoid loss of material?

The D-Frame net was being cleaned and the debris was being transferred to a sample container with a bucket and sieve.

Are sample bottles being labeled clearly and properly?

Sample bottles were labeled properly.

Are nets and sieves checked carefully for bugs prior to cleaning?

The D-Frame and Sieves were examined very carefully after each kick.

Is habitat assessment conducted after careful observation and walking of sample reach?

A habitat assessment was conducted after careful observation, mapping and walking the sample reach.
Is investigator meeting QA requirements? Yes No

Comments/Recommendations:

Sampling procedure was performed according to the Surface Water Protection protocol (563-2000-655). **Grace Noble** completed all necessary tasks to meet QA requirements; I recommend that **Grace Noble** consider collecting water chemistry samples and flow measurements when collecting macroinvertebrate samples if the Act 54 contract permits.

**Grace Noble** was reminded that in cobble/gravel habitats that using her toe and heal to dig and agitate the substrate is very important when collecting this habitat.

Reviewer: Joel G. Folman  Employee: Grace Noble

Signature: [Signature]  Signature: [Signature]  Date: 4/8/2013
Appendix I2: QA by PADEP on University’s Macroinvertebrate Identification
### FORM 8.8C: QUANTITATIVE MULTI-HABITAT BIOASSESSMENT OF DIVERSE COMMUNITY

**Mine Name:** Blacksville #2  
**Stream Name:** Roberts Run, 41813, BSW22  
**Stream NHID:**  
**Sample Date:** 4/25/2013  
**Pre-Mining Sampling Survey:** 1 or 2 (check one)  
**Post-Mining Sampling Survey:** X1 or 2 (check one)  
**Length of Sampled Reach:** 100 meters  
**Sampler(s):** A. Hale, K. Garmire  
**Comments:**

#### Composite of 10 jabs from 10 sampling locations that effectively represents the observed habitats

<table>
<thead>
<tr>
<th>Class or Order</th>
<th>Family</th>
<th>Genus</th>
<th>Functional Feeding Group</th>
<th>Pollution Tolerance Value</th>
<th>Number of Jabs</th>
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</table>

**Total Number of Individuals:** 58 123

**Lab sub-sample 1-4 (200 +/- 20%)**
(Continue to sub-sample if numbers are <160 or >240.)

- Isoperla 3  
- Leuctra 3  
- 2 pupae  
- 1 exuvia  
- 1 adult stonefly  

**Do NOT Count** 8.8C
**FORM 8.8C: QUANTITATIVE MULTI-HABITAT BIOASSESSMENT OF DIVERSE COMMUNITY**

**Mine Name:** Enlow Fork Mine  
**Stream Name:** UNT to Templeton Fork, 32740  
**Sample Date:** 5/9/2013  
**Pre-Mining Sampling Survey:** 1 or 2 (check one)  
**Post-Mining Sampling Survey:** 1 or X2 (check one)  
**Length of Sampled Reach:** 100 meters  
**Sampler(s):** A. Hale, G. Noble, K. Piper, L. Kiefer  
**Comments:**

<table>
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<tr>
<th>Class or Order</th>
<th>Family</th>
<th>Genus</th>
<th>Functional Feeding Group</th>
<th>Pollution Tolerance</th>
<th>Number of Jabs</th>
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<td>Vol. Status (M) Multi, (U) uni, (S) semi</td>
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**Composite of 10 Jabs from 10 Sampling Locations that Effectively Represents the Observed Habitats**

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</tbody>
</table>

**Total Number of Individuals:** 70 122

**Lab sub-sample 1-4 (200 +/- 20%) (Continue to sub-sample if numbers are <160 or >240.)**