PEABODY MIDWEST MINING, LLC
7100 Eagle Crest Boulevard
Evansville, IN 47715
812.434.8500

Sent via UPS

November 14, 2012

Janet Pellegrini
Environmental Scientist
USEPA Region 5, Water Division, NPDES Branch
77 West Jackson Blvd. #WN-16J
Chicago, IL 60604-3590

RE: Peabody Midwest Mining, LLC – Bear Run Mine
Request for Information Pursuant to Section 308 of the Clean Water Act
Effluent Sampling Data Report for October 2012

Dear Ms. Pellegrini:

Pursuant to the EPA approved Effluent Sampling Plan, Peabody Midwest Mining, LLC is providing you with the results of the final month of effluent monitoring (October 2012) under the Plan at the Bear Run Mine and confirming for the Agency the satisfaction of all of Peabody's obligations under the EPA Request for Information under Section 308 of the Clean Water Act, dated March 22, 2012. Information comprising the October Effluent Sampling Data Report is attached and consists of the following:

1. Monthly rainfall record as measured at the Bear Run office
2. Laboratory analyses sheets for collected samples
3. Chain of custody for collected samples

The approved Effluent Sampling Plan provided for the collection of one base flow (dry weather) condition sample and one precipitation (wet weather) condition sample per month, dependent on precipitation and discharge conditions. Because of unusually dry weather during the Spring and Summer months, Peabody agreed to collect five additional samples in September and October in an effort to provide more data as requested by EPA. Continued low pool levels present in the sediment basins resulted in no dry weather flows in October from outfalls 03R, 18R, 044, 058 and 062. A dry weather flow at outfall 053 was sampled on October 5th due to pit dewatering from previous mining operations (as was the case for all dry weather samples). Wet weather samples were collected from outfalls 18R and 053 on October 2nd and from outfalls 18R, 044 and 062 on October 6th.

With the submittal of this report, Peabody has completed the agreed upon four months of effluent sampling provided in the Effluent Sampling Plan as well as the additional sampling requested by the Agency. A table summarizing the samples collected since the plan was initiated in July is attached, the results of which have been submitted to EPA documenting the compliance with the requirements of the Mine's IDEM NPDES permit. Also attached is the Biological Assessment Report conducted downstream of outfalls 03R, 18R and 062 per the approved Biomonitoring Assessment Plan. Peabody has also confirmed, through a review of its files, that all material documentation and information requested by EPA in the Agency's March 22, 2012 Section 308 Request for Information has been provided to the Agency through Peabody's numerous information submittals and other exchanges of information among the parties and IDEM.

Please contact me at 812-434-8593 or smcgarvie@peabodyenergy.com with any questions.

Sincerely,

Scott D. McGarvie
Authorized Representative

Attachments

c: Bear Run Mine

Bear Run Mine
Precipitation Data
October 2012

Date	Precip (in)
10/1/2012	0.60
10/2/2012	0.05
10/3/2012	0.00
10/4/2012	0.00
10/5/2012	1.21
10/6/2012	0.00
10/7/2012	0.00
10/8/2012	0.00
10/9/2012	0.00
10/10/2012	0.00
10/11/2012	0.00
10/12/2012	0.00
10/13/2012	0.00
10/14/2012	0.19
10/15/2012	0.00
10/16/2012	0.00
10/17/2012	0.56
10/18/2012	0.08
10/19/2012	0.21
10/20/2012	0.00
10/21/2012	0.00
10/22/2012	0.01
10/23/2012	0.04
10/24/2012	0.00
10/25/2012	0.00
10/26/2012	0.28
10/27/2012	0.00
10/28/2012	0.00
10/29/2012	0.00
10/30/2012	0.00
10/31/2012	0.00

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Certificate of Analysis

Robert Pendleton
Peabody Midwest Mining LLC
7100 Eagle Crest Blvd
Evansville IN, 47715

Report Printed: 10/19/2012 16:36

Project Name:	Indiana	Workorder:	2101362

Dear Robert Pendleton

Enclosed are the analytical results for samples received at the lab on 10/03/2012 16:49.

McCoy & McCoy Laboratories, Inc located in Madisonville, Kentucky is a National Environmental Laboratory Accreditation Program (NELAP) accredited laboratory and as such, certifies that all applicable test results meet the requirements of NELAP.

If you have any questions regarding this certificate of analysis, please contact us at (270) 821-7375.

Please visit us at www.mccoylabs.com for a listing of NELAP accreditations and Scope of Work, as well as other links to Water Quality documentation on the internet.

This laboratory report may not be reproduced, except in full, without the written approval of McCoy & McCoy Laboratories, Inc.

Syd Tate

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BY

This page is included as part of the Analytical Report and must be retained as a permanent record thereof.

Syd Tate, Data Reviewer

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SAMPLE SUMMARY

Lab ID	Client Sample ID/Alias	Matrix	Date Collected	Date Received	Sampled By
2101362-01	INSB-ALK/1630_BRP018EPA_10022012	Surfacewater	10/02/2012 14:00	10/03/2012 16:49	Forrest Crowe
2101362-02	INSB-ALK/1630_BRP018EPA_10022012	Surfacewater	10/02/2012 14:00	10/03/2012 16:49	Forrest Crowe
2101362-03	INSB-ALK/1630_BRE053EPA_10022012	Surfacewater	10/02/2012 15:21	10/03/2012 16:49	Forrest Crowe
2101362-04	INSB-ALK/1630_BRE053EPA_10022012	Surfacewater	10/02/2012 15:31	10/03/2012 16:49	Forrest Crowe
2101362-05	INSB-ALK/1630_FIELDBLANKEPA_10022012	Surfacewater	10/02/2012 14:00	10/03/2012 16:49	Forrest Crowe

LabNumber	Measurement	Value
2101362-01	Field Flow (MGD)	0.67
	Field pH	7.5
	Field Temp (C)	16.7
2101362-03	Field Flow (MGD)	0.67
	Field pH	7.5
	Field Temp (C)	16.8
2101362-05	Field pH	8.3
	Field Temp (C)	20.6

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ANALYTICAL RESULTS

Lab Sample ID: **2101362-01**
Description: **INSB-ALK 1630_BRP018EPA_10022012**

Sample Collection Date Time: 10/02/2012 14:00
Sample Received Date Time: 10/03/2012 16:49

Metals by SW846 6000 Series Methods

Analyte	Result	Flag	Units	MRL	MDL	Method	Prepared	Analyzed	Analyst
Mercury	**7.0**		ng/L	0.5	0.2	EPA 1631E	10/04/2012 18:00	10/05/2012 16:19	JBP
Mercury in Field Blank	ND	u	ng/L	0.5	0.2	EPA 1631E	10/04/2012 18:00	10/05/2012 12:20	JBP

Metals by EPA 200 Series Methods

Analyte	Result	Flag	Units	MRL	MDL	Method	Prepared	Analyzed	Analyst
Antimony	ND	L1, u	mg/L	0.002	0.001	EPA 200.8	10/05/2012 09:59	10/12/2012 23:44	JCD
Arsenic	**0.0018**		mg/L	0.0005	0.0002	EPA 200.8	10/05/2012 09:59	10/08/2012 03:35	JCD
Beryllium	ND	u	mg/L	0.0010	0.0005	EPA 200.8	10/05/2012 09:59	10/06/2012 22:24	JCD
Cadmium	ND	u	mg/L	0.0005	0.0002	EPA 200.8	10/05/2012 09:59	10/06/2012 22:24	JCD
Calcium	**27.9**		mg/L	0.20	0.06	EPA 200.7	10/05/2012 09:59	10/12/2012 21:36	MLC
Chromium	**0.002**		mg/L	0.001	0.0003	EPA 200.8	10/05/2012 09:59	10/12/2012 23:44	JCD
Copper	**0.002**		mg/L	0.002	0.0005	EPA 200.8	10/05/2012 09:59	10/06/2012 22:24	JCD
Iron	**1.53**	A-01	mg/L	0.06	0.02	EPA 200.7	10/05/2012 09:59	10/08/2012 03:35	JCD
Lead	**0.0014**		mg/L	0.0010	0.0005	EPA 200.8	10/05/2012 09:59	10/06/2012 22:24	JCD
Magnesium	**11.0**		mg/L	0.100	0.045	EPA 200.7	10/05/2012 09:59	10/12/2012 21:36	MLC
Manganese	**0.153**		mg/L	0.003	0.001	EPA 200.8	10/05/2012 09:59	10/06/2012 22:24	JCD
Nickel	**0.0031**		mg/L	0.0015	0.0005	EPA 200.8	10/05/2012 09:59	10/06/2012 22:24	JCD
Potassium	**3.00**	A-01, B1, B	mg/L	0.01	0.01	EPA 200.7	10/05/2012 09:59	10/08/2012 03:35	JCD
Selenium	**0.0006**	J	mg/L	0.002	0.0005	EPA 200.8	10/05/2012 09:59	10/06/2012 22:24	JCD
Sodium	**21.2**		mg/L	0.13	0.05	EPA 200.7	10/05/2012 09:59	10/12/2012 21:36	MLC
Thallium	ND	u	mg/L	0.0010	0.0004	EPA 200.8	10/05/2012 09:59	10/06/2012 22:24	JCD
Vanadium	**0.003**		mg/L	0.002	0.002	EPA 200.8	10/05/2012 09:59	10/06/2012 22:24	JCD
Zinc	**0.019**		mg/L	0.010	0.010	EPA 200.8	10/05/2012 09:59	10/06/2012 22:24	JCD

Metals (Dissolved) by EPA 200 Series Methods

Analyte	Result	Flag	Units	MRL	MDL	Method	Prepared	Analyzed	Analyst
Aluminum	**0.009**	J	mg/L	0.02	0.007	EPA 200.8	10/04/2012 09:24	10/10/2012 04:20	JCD
Antimony	ND	u	mg/L	0.005	0.001	EPA 200.8	10/04/2012 09:24	10/10/2012 04:20	JCD
Arsenic	**0.0004**	J	mg/L	0.0005	0.0002	EPA 200.8	10/04/2012 09:24	10/10/2012 04:20	JCD
Beryllium	ND	u	mg/L	0.0005	0.0005	EPA 200.8	10/04/2012 09:24	10/10/2012 04:20	JCD
Cadmium	ND	u	mg/L	0.0005	0.0001	EPA 200.8	10/04/2012 09:24	10/10/2012 04:20	JCD
Chromium	ND	u	mg/L	0.002	0.0003	EPA 200.8	10/04/2012 09:24	10/10/2012 04:20	JCD
Copper	ND	u	mg/L	0.001	0.0002	EPA 200.8	10/04/2012 09:24	10/10/2012 04:20	JCD
Iron	ND	u	mg/L	0.02	0.006	EPA 200.7	10/04/2012 09:26	10/10/2012 19:32	MLC
Lead	ND	u	mg/L	0.0020	0.0020	EPA 200.8	10/04/2012 09:24	10/10/2012 04:20	JCD
Manganese	**0.0004**	J	mg/L	0.002	0.0001	EPA 200.8	10/04/2012 09:24	10/10/2012 04:20	JCD
Nickel	**0.0011**		mg/L	0.0005	0.0002	EPA 200.8	10/04/2012 09:24	10/10/2012 04:20	JCD
Selenium	ND	u	mg/L	0.001	0.0009	EPA 200.8	10/04/2012 09:24	10/10/2012 04:20	JCD
Silver	ND	u	mg/L	0.0005	0.0002	EPA 200.8	10/04/2012 09:24	10/10/2012 04:20	JCD
Thallium	ND	u	mg/L	0.0005	0.0005	EPA 200.8	10/04/2012 09:24	10/10/2012 04:20	JCD
Vanadium	ND	u	mg/L	0.002	0.002	EPA 200.8	10/04/2012 09:24	10/10/2012 04:20	JCD
Zinc	ND	u	mg/L	0.010	0.010	EPA 200.8	10/04/2012 09:24	10/10/2012 04:20	JCD

Conventional Chemistry Analyses_01

Analyte	Result	Flag	Units	MRL	MDL	Method	Prepared	Analyzed	Analyst

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Conventional Chemistry Analyses_01

Analyte	Result	Flag	Units	MRL	MDL	Method	Prepared	Analyzed	Analyst
Acidity	ND	u	mg/L	1	1	SM2310B	10/05/2012 14:30	10/05/2012 14:30	TLB
Bicarbonate Alkalinity as CaCO3	**82**	B	mg/L	1	1	SM2320B	10/05/2012 15:42	10/05/2012 15:42	DDM
Total Alkalinity	**82**	B	mg/L	1	1	SM2320B	10/05/2012 15:42	10/05/2012 15:42	DDM
Chloride	**4.6**		mg/L	0.1	0.1	EPA 300.0	10/15/2012 20:45	10/15/2012 20:45	DMH
Specific Conductance (Lab)	**316**		umhos/cm	1	1	SM2510B	10/05/2012 15:20	10/05/2012 15:20	TLB
Hardness as CaCO3	**110**		mg/L	1	1	SM2340C	10/11/2012 14:42	10/11/2012 14:42	JTL
pH (Lab)	**7.61**	H3	Std. Units	0.10	0.10	SM4500H+B	10/05/2012 14:00	10/05/2012 14:00	TLB
Sulfate	**75**		mg/L	1	0.2	EPA 300.0	10/15/2012 20:45	10/15/2012 20:45	DMH
Total Dissolved Solids	**202**		mg/L	10	10	SM2540C	10/04/2012 09:03	10/04/2012 11:54	DJK
Total Suspended Solids	**74**		mg/L	4	2	SM2540D	10/05/2012 09:55	10/05/2012 12:40	JTL

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ANALYTICAL RESULTS

Lab Sample ID: **2101362-01RE1**
Description: **INSB-ALK**

Sample Collection Date Time: 10/02/2012 14:00
Sample Received Date Time:

Matrix: Surfacewater
Discharge/Site No:
Regulatory ID:

Metals by EPA 200 Series Methods

Analyte	Result	Flag	Units	MRL	MDL	Method	Prepared	Analyzed	Analyst
Aluminum	**1.06**	D1	mg/L	0.18	0.06	EPA 200.8	10/05/2012 09:59	10/06/2012 22:30	JCD
Silver	ND	u	mg/L	0.0005	0.0002	EPA 200.8	10/09/2012 10:15	10/09/2012 22:41	JCD

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ANALYTICAL RESULTS

Lab Sample ID: **2101362-02**
Description: **INSB-ALK 1630_BRP018EPA_10022012**

Sample Collection Date Time: 10/02/2012 14:00
Sample Received Date Time: 10/03/2012 16:49

Metals by SW846 6000 Series Methods

Analyte	Result	Flag	Units	MRL	MDL	Method	Prepared	Analyzed	Analyst
Mercury, dissolved	**5.3**		ng/L	0.5	0.2	EPA 1631E	10/04/2012 18:00	10/05/2012 19:53	JBP
Mercury in Field Blank, dissolved	ND	u	ng/L	0.5	0.2	EPA 1631E	10/04/2012 18:00	10/05/2012 19:18	JBP

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ANALYTICAL RESULTS

Lab Sample ID: **2101362-03**
Description: **INSB-ALK 1630_BRE053EPA_10022012**

Sample Collection Date Time: 10/02/2012 15:21
Sample Received Date Time: 10/03/2012 16:49

Metals by SW846 6000 Series Methods

Analyte	Result	Flag	Units	MRL	MDL	Method	Prepared	Analyzed	Analyst
Mercury	**3.3**		ng/L	0.5	0.2	EPA 1631E	10/04/2012 18:00	10/05/2012 16:22	JBP
Mercury in Field Blank	ND	u	ng/L	0.5	0.2	EPA 1631E	10/04/2012 18:00	10/05/2012 12:23	JBP

Metals by EPA 200 Series Methods

Analyte	Result	Flag	Units	MRL	MDL	Method	Prepared	Analyzed	Analyst
Aluminum	**0.07**		mg/L	0.02	0.007	EPA 200.8	10/05/2012 09:57	10/10/2012 06:38	JCD
Antimony	ND	u	mg/L	0.002	0.001	EPA 200.8	10/05/2012 09:57	10/07/2012 09:46	JCD
Arsenic	**0.0015**		mg/L	0.0005	0.0002	EPA 200.8	10/05/2012 09:57	10/06/2012 09:47	JCD
Beryllium	ND	V1, u	mg/L	0.0010	0.0005	EPA 200.8	10/05/2012 09:57	10/06/2012 09:47	JCD
Cadmium	ND	u	mg/L	0.0005	0.0002	EPA 200.8	10/05/2012 09:57	10/06/2012 09:47	JCD
Calcium	**143**	A-01a	mg/L	0.20	0.06	EPA 200.7	10/05/2012 09:57	10/08/2012 02:48	JCD
Chromium	**0.0008**	L1, J	mg/L	0.001	0.0003	EPA 200.8	10/05/2012 09:57	10/07/2012 09:46	JCD
Copper	**0.002**		mg/L	0.002	0.0005	EPA 200.8	10/05/2012 09:57	10/06/2012 09:47	JCD
Iron	**0.18**	A-01a	mg/L	0.06	0.02	EPA 200.7	10/05/2012 09:57	10/08/2012 02:48	JCD
Lead	ND	u	mg/L	0.0010	0.0005	EPA 200.8	10/05/2012 09:57	10/07/2012 09:46	JCD
Magnesium	**89.3**		mg/L	0.100	0.045	EPA 200.7	10/05/2012 09:57	10/17/2012 12:59	MLC
Manganese	**0.304**		mg/L	0.003	0.001	EPA 200.8	10/05/2012 09:57	10/06/2012 09:47	JCD
Nickel	**0.0036**		mg/L	0.0015	0.0005	EPA 200.8	10/05/2012 09:57	10/06/2012 09:47	JCD
Potassium	**7.41**	A-01a	mg/L	0.01	0.01	EPA 200.7	10/05/2012 09:57	10/08/2012 02:48	JCD
Selenium	**0.003**		mg/L	0.002	0.0005	EPA 200.8	10/05/2012 09:57	10/07/2012 09:46	JCD
Sodium	**337**	E	mg/L	0.13	0.05	EPA 200.7	10/05/2012 09:57	10/08/2012 02:48	JCD
Thallium	**0.0008**	J	mg/L	0.0010	0.0004	EPA 200.8	10/05/2012 09:57	10/07/2012 09:46	JCD
Vanadium	ND	u	mg/L	0.002	0.002	EPA 200.8	10/05/2012 09:57	10/06/2012 09:47	JCD
Zinc	ND	u	mg/L	0.010	0.010	EPA 200.8	10/05/2012 09:57	10/07/2012 09:46	JCD

Metals (Dissolved) by EPA 200 Series Methods

Analyte	Result	Flag	Units	MRL	MDL	Method	Prepared	Analyzed	Analyst
Aluminum	ND	u	mg/L	0.02	0.007	EPA 200.8	10/04/2012 09:24	10/10/2012 04:26	JCD
Antimony	ND	u	mg/L	0.005	0.001	EPA 200.8	10/04/2012 09:24	10/10/2012 04:26	JCD
Arsenic	**0.0010**		mg/L	0.0005	0.0002	EPA 200.8	10/04/2012 09:24	10/10/2012 04:26	JCD
Beryllium	ND	u	mg/L	0.0005	0.0005	EPA 200.8	10/04/2012 09:24	10/10/2012 04:26	JCD
Cadmium	ND	u	mg/L	0.0005	0.0001	EPA 200.8	10/04/2012 09:24	10/10/2012 04:26	JCD
Chromium	ND	u	mg/L	0.002	0.0003	EPA 200.8	10/04/2012 09:24	10/10/2012 04:26	JCD
Copper	**0.012**		mg/L	0.001	0.0002	EPA 200.8	10/04/2012 09:24	10/10/2012 04:26	JCD
Iron	ND	u	mg/L	0.02	0.006	EPA 200.7	10/04/2012 09:26	10/10/2012 19:36	MLC
Lead	ND	u	mg/L	0.0020	0.0020	EPA 200.8	10/04/2012 09:24	10/10/2012 04:26	JCD
Manganese	**0.099**		mg/L	0.002	0.0001	EPA 200.8	10/04/2012 09:24	10/10/2012 04:26	JCD
Nickel	**0.0024**		mg/L	0.0005	0.0002	EPA 200.8	10/04/2012 09:24	10/10/2012 04:26	JCD
Selenium	ND	u	mg/L	0.001	0.0009	EPA 200.8	10/04/2012 09:24	10/10/2012 04:26	JCD
Silver	ND	u	mg/L	0.0005	0.0002	EPA 200.8	10/04/2012 09:24	10/10/2012 04:26	JCD
Thallium	ND	u	mg/L	0.0005	0.0005	EPA 200.8	10/04/2012 09:24	10/10/2012 04:26	JCD
Vanadium	ND	u	mg/L	0.002	0.002	EPA 200.8	10/04/2012 09:24	10/10/2012 04:26	JCD
Zinc	ND	u	mg/L	0.010	0.010	EPA 200.8	10/04/2012 09:24	10/10/2012 04:26	JCD

Conventional Chemistry Analyses_01

Analyte	Result	Flag	Units	MRL	MDL	Method	Prepared	Analyzed	Analyst

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Conventional Chemistry Analyses_01

Analyte	Result	Flag	Units	MRL	MDL	Method	Prepared	Analyzed	Analyst
Acidity	ND	u	mg/L	1	1	SM2310B	10/05/2012 14:30	10/05/2012 14:30	TLB
Bicarbonate Alkalinity as CaCO3	**391**	B	mg/L	1	1	SM2320B	10/05/2012 15:42	10/05/2012 15:42	DDM
Total Alkalinity	**391**	B	mg/L	1	1	SM2320B	10/05/2012 15:42	10/05/2012 15:42	DDM
Chloride	**10.4**		mg/L	0.1	0.1	EPA 300.0	10/15/2012 21:47	10/15/2012 21:47	DMH
Specific Conductance (Lab)	**2460**		umhos/cm	1	1	SM2510B	10/05/2012 15:20	10/05/2012 15:20	TLB
Hardness as CaCO3	**860**		mg/L	1	1	SM2340C	10/15/2012 10:39	10/15/2012 10:39	JTL
pH (Lab)	**7.90**	H3	Std. Units	0.10	0.10	SM4500H+B	10/05/2012 14:00	10/05/2012 14:00	TLB
Total Dissolved Solids	**1940**		mg/L	10	10	SM2540C	10/04/2012 09:03	10/04/2012 11:56	DJK
Total Suspended Solids	**8**		mg/L	4	2	SM2540D	10/05/2012 09:55	10/05/2012 12:42	JTL

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ANALYTICAL RESULTS

Lab Sample ID: **2101362-03RE1**
Description: **INSB-ALK**

Sample Collection Date Time: 10/02/2012 15:21
Sample Received Date Time:

Matrix: Surfacewater
Discharge/Site No:
Regulatory ID:

Metals by EPA 200 Series Methods

Analyte	Result	Flag	Units	MRL	MDL	Method	Prepared	Analyzed	Analyst
Silver	ND	L2, U	mg/L	0.0005	0.0002	EPA 200.8	10/12/2012 10:05	10/13/2012 05:51	JCD

Conventional Chemistry Analyses_01

Analyte	Result	Flag	Units	MRL	MDL	Method	Prepared	Analyzed	Analyst
Sulfate	**1120**	D	mg/L	20	4	EPA 300.0	10/16/2012 15:22	10/16/2012 15:22	DMH

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ANALYTICAL RESULTS

Lab Sample ID: **2101362-04**
Description: **INSB-ALK 1630_BRE053EPA_10022012**

Sample Collection Date Time: 10/02/2012 15:31
Sample Received Date Time: 10/03/2012 16:49

Metals by SW846 6000 Series Methods

Analyte	Result	Flag	Units	MRL	MDL	Method	Prepared	Analyzed	Analyst
Mercury, dissolved	**0.3**	M2, J	ng/L	0.5	0.2	EPA 1631E	10/04/2012 18:00	10/05/2012 19:27	JBP
Mercury in Field Blank, dissolved	ND	u	ng/L	0.5	0.2	EPA 1631E	10/04/2012 18:00	10/05/2012 18:58	JBP

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ANALYTICAL RESULTS

Lab Sample ID: **2101362-05**
Description: **INSB-ALK 1630_FIELDBLANKEPA_10022012**

Sample Collection Date Time: 10/02/2012 14:00
Sample Received Date Time: 10/03/2012 16:49

Metals by EPA 200 Series Methods

Analyte	Result	Flag	Units	MRL	MDL	Method	Prepared	Analyzed	Analyst
Aluminum	**0.01**	J	mg/L	0.02	0.007	EPA 200.8	10/05/2012 09:57	10/10/2012 06:45	JCD
Antimony	ND	U	mg/L	0.002	0.001	EPA 200.8	10/05/2012 09:57	10/07/2012 09:59	JCD
Arsenic	**0.0005**		mg/L	0.0005	0.0002	EPA 200.8	10/05/2012 09:57	10/06/2012 09:59	JCD
Beryllium	ND	V1, U	mg/L	0.0010	0.0005	EPA 200.8	10/05/2012 09:57	10/06/2012 09:59	JCD
Cadmium	ND	U	mg/L	0.0005	0.0002	EPA 200.8	10/05/2012 09:57	10/06/2012 09:59	JCD
Calcium	**0.12**	A-01a, J	mg/L	0.20	0.06	EPA 200.7	10/05/2012 09:57	10/08/2012 02:52	JCD
Chromium	**0.0005**	L1, J	mg/L	0.001	0.0003	EPA 200.8	10/05/2012 09:57	10/07/2012 09:59	JCD
Copper	ND	U	mg/L	0.002	0.0005	EPA 200.8	10/05/2012 09:57	10/06/2012 09:59	JCD
Iron	ND	A-01a, U	mg/L	0.06	0.02	EPA 200.7	10/05/2012 09:57	10/08/2012 02:52	JCD
Lead	ND	U	mg/L	0.0010	0.0005	EPA 200.8	10/05/2012 09:57	10/07/2012 09:59	JCD
Magnesium	**0.052**	J	mg/L	0.100	0.045	EPA 200.7	10/05/2012 09:57	10/08/2012 02:52	JCD
Manganese	ND	U	mg/L	0.003	0.001	EPA 200.8	10/05/2012 09:57	10/06/2012 09:59	JCD
Nickel	**0.0007**	J	mg/L	0.0015	0.0005	EPA 200.8	10/05/2012 09:57	10/06/2012 09:59	JCD
Potassium	**0.02**	A-01a	mg/L	0.01	0.01	EPA 200.7	10/05/2012 09:57	10/08/2012 02:52	JCD
Selenium	ND	U	mg/L	0.002	0.0005	EPA 200.8	10/05/2012 09:57	10/07/2012 09:59	JCD
Sodium	**0.28**		mg/L	0.13	0.05	EPA 200.7	10/05/2012 09:57	10/08/2012 02:52	JCD
Thallium	ND	U	mg/L	0.0010	0.0004	EPA 200.8	10/05/2012 09:57	10/07/2012 09:59	JCD
Vanadium	ND	U	mg/L	0.002	0.002	EPA 200.8	10/05/2012 09:57	10/06/2012 09:59	JCD
Zinc	ND	U	mg/L	0.010	0.010	EPA 200.8	10/05/2012 09:57	10/07/2012 09:59	JCD

Metals (Dissolved) by EPA 200 Series Methods

Analyte	Result	Flag	Units	MRL	MDL	Method	Prepared	Analyzed	Analyst
Aluminum	ND	U	mg/L	0.02	0.007	EPA 200.8	10/04/2012 09:24	10/10/2012 04:38	JCD
Antimony	ND	U	mg/L	0.005	0.001	EPA 200.8	10/04/2012 09:24	10/10/2012 04:38	JCD
Arsenic	ND	U	mg/L	0.0005	0.0002	EPA 200.8	10/04/2012 09:24	10/10/2012 04:38	JCD
Beryllium	ND	U	mg/L	0.0005	0.0005	EPA 200.8	10/04/2012 09:24	10/10/2012 04:38	JCD
Cadmium	ND	U	mg/L	0.0005	0.0001	EPA 200.8	10/04/2012 09:24	10/10/2012 04:38	JCD
Chromium	ND	U	mg/L	0.002	0.0003	EPA 200.8	10/04/2012 09:24	10/10/2012 04:38	JCD
Copper	ND	U	mg/L	0.001	0.0002	EPA 200.8	10/04/2012 09:24	10/10/2012 04:38	JCD
Iron	ND	U	mg/L	0.02	0.006	EPA 200.7	10/04/2012 09:26	10/10/2012 19:39	MLC
Lead	ND	U	mg/L	0.0020	0.0020	EPA 200.8	10/04/2012 09:24	10/10/2012 04:38	JCD
Manganese	ND	U	mg/L	0.002	0.0001	EPA 200.8	10/04/2012 09:24	10/10/2012 04:38	JCD
Nickel	ND	U	mg/L	0.0005	0.0002	EPA 200.8	10/04/2012 09:24	10/10/2012 04:38	JCD
Selenium	ND	U	mg/L	0.001	0.0009	EPA 200.8	10/04/2012 09:24	10/10/2012 04:38	JCD
Silver	ND	U	mg/L	0.0005	0.0002	EPA 200.8	10/04/2012 09:24	10/10/2012 04:38	JCD
Thallium	ND	U	mg/L	0.0005	0.0005	EPA 200.8	10/04/2012 09:24	10/10/2012 04:38	JCD
Vanadium	ND	U	mg/L	0.002	0.002	EPA 200.8	10/04/2012 09:24	10/10/2012 04:38	JCD
Zinc	ND	U	mg/L	0.010	0.010	EPA 200.8	10/04/2012 09:24	10/10/2012 04:38	JCD

Conventional Chemistry Analyses_01

Analyte	Result	Flag	Units	MRL	MDL	Method	Prepared	Analyzed	Analyst
Acidity	**37**	B	mg/L	1	1	SM2310B	10/05/2012 14:30	10/05/2012 14:30	TLB
Bicarbonate Alkalinity as CaCO3	**5**	B	mg/L	1	1	SM2320B	10/05/2012 15:42	10/05/2012 15:42	DDM
Total Alkalinity	**5**	B	mg/L	1	1	SM2320B	10/05/2012 15:42	10/05/2012 15:42	DDM

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Conventional Chemistry Analyses_01

Analyte	Result	Flag	Units	MRL	MDL	Method	Prepared	Analyzed	Analyst
Chloride	0.1		mg/L	0.1	0.1	EPA 300.0	10/15/2012 23:09	10/15/2012 23:09	DMH
Specific Conductance (Lab)	2		umhos/cm	1	1	SM2510B	10/05/2012 15:20	10/05/2012 15:20	TLB
Hardness as CaCO3	ND	u	mg/L	1	1	SM2340C	10/15/2012 10:39	10/15/2012 10:39	JTL
pH (Lab)	5.62	H3	Std. Units	0.10	0.10	SM4500H+B	10/05/2012 14:00	10/05/2012 14:00	TLB
Sulfate	0.9	J	mg/L	1	0.2	EPA 300.0	10/15/2012 23:09	10/15/2012 23:09	DMH
Total Dissolved Solids	14		mg/L	10	10	SM2540C	10/04/2012 09:03	10/04/2012 11:58	DJK
Total Suspended Solids	ND	u	mg/L	4	2	SM2540D	10/05/2012 09:55	10/05/2012 12:44	JTL

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ANALYTICAL RESULTS

Lab Sample ID: **2101362-05RE1**
Description: **INSB-ALK**

Sample Collection Date Time: 10/02/2012 14:00
Sample Received Date Time:

Matrix: Surfacewater
Discharge/Site No:
Regulatory ID:

Metals by EPA 200 Series Methods

Analyte	Result	Flag	Units	MRL	MDL	Method	Prepared	Analyzed	Analyst
Silver	ND	L2, U	mg/L	0.0005	0.0002	EPA 200.8	10/12/2012 10:05	10/13/2012 05:58	JCD

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Notes for work order 2101362

- Samples collected by MMLI personnel are done so in accordance with procedures set forth in MMLI field services SOPs.
- All Waste Water analyses comply with methodology requirements of 40 CFR Part 136.
- All Drinking Water analyses comply with methodology requirements of 40 CFR Part 141.
- Unless otherwise noted, all quantitative results for soils are reported on a dry weight basis.
- The Chain of Custody document is included as part of this report.
- All Library Search analytes should be regarded as tentative identification based on the presumptive evidence of the mass spectra.

L1	The associated blank spike recovery was above method acceptance limits.
A-01a	Analyzed by 200.8.
B	Target analyte detected in method blank at or above the method reporting limit.
B1	Target analyte detected in method blank at or above the method reporting limit. Concentration found in the sample was 10 times above the concentration found in the method blank.
D	Results reported from dilution.
D1	Sample required dilution due to high concentration of target analyte.
E	Concentration exceeds calibration range
A-01	Analyzed by 200.8
J	Estimated value.
Y2	MS/MSD RPD exceeded the method control limit. Recovery met acceptance criteria.
L2	The associated blank spike recovery was below method acceptance limits.
M1	Matrix spike recovery was high; the method control sample recovery was acceptable.
M2	Matrix spike recovery was low; the method control sample recovery was acceptable.
M3	The accuracy of the spike recovery value is reduced since the analyte concentration in the sample is disproportionate to spike level. The method control sample recovery was acceptable.
U	Target analyte was analyzed for, but was below detection limit (the value associated with the qualifier is the laboratory method detection limit in our LIMS system).
V1	CCV recovery was above method acceptance limits. This target analyte not detected in the sample.
H3	Sample received and analyzed past holding time.

Standard Quallifiers/Acronymns

MDL	Method Detection Limit
MRL	Minimum Reporting Limit
ND	Not Detected
LCS	Laboratory Control Sample
MS	Matrix Spike
MSD	Matrix Spike Duplicate
DUP	Sample Duplicate
% Rec	Percent Recovery
RPD	Relative Percent Difference
>	Greater than permit limits
<	Less than permit limits

Analyses performed at the Madisonville KY location unless specified with the following location codes.

02	Pikeville, KY
03	Paducah, KY
04	Lexington, KY
05	Louisville, KY

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Certified Analyses included in this Report

Analyte	Certifications
EPA 1631E in Water	
Mercury	VA NELAC (460210)
Mercury, dissolved	VA NELAC (460210)
Mercury in Field Blank	VA NELAC (460210)
Mercury in Field Blank, dissolved	VA NELAC (460210)
EPA 200.7 in Water	
Calcium	VA NELAC (460210)
Magnesium	VA NELAC (460210)
Potassium	VA NELAC (460210)
Sodium	VA NELAC (460210)
EPA 200.8 in Water	
Aluminum	VA NELAC (460210)
Beryllium	KY Drinking Water (00030)
Antimony	VA NELAC (460210)
Arsenic	VA NELAC (460210)
Beryllium	VA NELAC (460210)
Cadmium	VA NELAC (460210)
Chromium	VA NELAC (460210)
Copper	VA NELAC (460210)
Lead	VA NELAC (460210)
Manganese	VA NELAC (460210)
Nickel	VA NELAC (460210)
Selenium	VA NELAC (460210)
Silver	VA NELAC (460210)
Thallium	VA NELAC (460210)
Vanadium	VA NELAC (460210)
Zinc	VA NELAC (460210)
EPA 300.0 in Water	
Chloride	KY Drinking Water (00030) VA NELAC (460210)
Sulfate	KY Drinking Water (00030) VA NELAC (460210)
SM2320B in Water	
Total Alkalinity	KY Drinking Water (00030) VA NELAC (460210)
Bicarbonate Alkalinity as CaCO3	KY Drinking Water (00030)
SM2340C in Water	
Hardness as CaCO3	KY Drinking Water (00030)
SM2510B in Water	
Specific Conductance (Lab)	KY Drinking Water (00030) VA NELAC (460210)
SM2540C in Water	
Total Dissolved Solids	KY Drinking Water (00030) VA NELAC (460210)
SM4500H+B in Water	
pH (Lab)	KY Drinking Water (00030) VA NELAC (460210)

Peabody Midwest Mining, LLC. - CHAIN OF CUSTODY

SAMPLER: Forrest L. Crowe 2101362

1630 - Bear Run Mine

	SAMPLE #	LABEL	DATE	TIME	# CONTAINERS	BASE	PRECIP	Flow (GPM)	pH	Temp	SS	TYPE SAMPLE	COMMENTS
		Precip.	01oct12 - 02oct12		—		0.61						
	003R	1630BRP03REPA	02 Oct 12	1040	—	6	X	0.00	—	—	—	ALK - EPA	
01	013R	1630BRP13REPA	02 Oct 12	1400	X	6	X	0.67	7.5	16.7	<0.4	ALK - EPA	
	044	1630BRE44EPA	02 Oct 12	1100	—	6	X	0.00	—	—	—	ALK - EPA	
02	053	1630BRE53EPA	02 Oct 12	1521	X	6	X	0.67	7.5	16.8	<0.4	ALK - EPA	
	058	1630BRE058EPA	02 Oct 12	1137	—	6	X	0.00	—	—	—	ALK - EPA	
	062	1630BRE062EPA	02 Oct 12	1257	—	6	X	0.00	—	—	—	ALK - EPA	
03		1630FIELDBLANKEPA	02 Oct 12	1400	X	3	X	—	8.3	20.6		ALK - EPA	NO TOTAL AND DISSOLVED MERCURY ANALYSIS
		1630DUPLICATEEPA				6						ALK - EPA	

RELINQUISHED BY:	DATE:	TIME:	RECEIVED BY:	DATE:	TIME:
[illegible]	02 oct 12	1730	Monty Parke	10/2/2012	17:31
Monty Parke	10/3/12	15:43	DAN WILLIAMSON	10/3/2012	[illegible]

* pH and TDS are measured using an electronic pH or TDS meter — pH meter Calibrated 4, 7, and 10 02 oct 12 1000

* Reports of Settleable Solids prepared using EPA Method 160.5, and LaMotte Imhoff Cone.

Analysis date, if other than sample date:

ANALYZED BY:

Precip. Event Statistics:
Date event Started: 01 Oct 12
Date event Ended: 02 Oct 12
Total Rinfall: 0.61"

ALK-EPA Field
Base - Flow, pH, & Temp.
Precip - Flow, pH, & Temp.
ALK-EPA Lab
Cations - Ca, Mg, Na & K
Anions - Chloride, Sulfate & Bicarbonate
Metals - Metals (total & Dissolved) Al, Cd, Cr, Fe, Mn, Hg*, Se*, V, Zn, Sb, As, Be, Cu, Pb, Ni, Ag & Tl (* Low Level Method)
Additional Parameters - TDS, SpC, Acidity, Alkalinity, Hardness & Total Suspended Solids

Rec: Dan Williamson 10/3/12 16:49 Rec: Sawana Lancon

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Certificate of Analysis

Robert Pendleton
Peabody Midwest Mining LLC
7100 Eagle Crest Blvd
Evansville IN, 47715

Report Printed: 10/23/2012 10:22

Project Name:	Indiana	Workorder:	2101636

Dear Robert Pendleton

Enclosed are the analytical results for samples received at the lab on 10/06/2012 07:55.

McCoy & McCoy Laboratories, Inc located in Madisonville, Kentucky is a National Environmental Laboratory Accreditation Program (NELAP) accredited laboratory and as such, certifies that all applicable test results meet the requirements of NELAP.

If you have any questions regarding this certificate of analysis, please contact us at (270) 821-7375.

Please visit us at www.mccoylabs.com for a listing of NELAP accreditations and Scope of Work, as well as other links to Water Quality documentation on the internet.

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Syd Tate

This page is included as part of the Analytical Report and must be retained as a permanent record thereof.

Syd Tate, Data Reviewer

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SAMPLE SUMMARY

Lab ID	Client Sample ID/Alias	Matrix	Date Collected	Date Received	Sampled By
2101636-01	INSB-ALK/1630_BRE053EPA_10052012	Surfacewater	10/05/2012 10:43	10/06/2012 7:55	Forrest Crowe
2101636-02	INSB-ALK/1630_BRE053EPA_10052012	Surfacewater	10/05/2012 10:43	10/06/2012 7:55	Forrest Crowe
2101636-03	INSB-ALK/1630_FIELDBLANKEPA_10052012	Surfacewater	10/05/2012 10:43	10/06/2012 7:55	Forrest Crowe

LabNumber	Measurement	Value
2101636-01	Field pH	7.9
	Field Temp (C)	17.2

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ANALYTICAL RESULTS

Lab Sample ID: **2101636-01**
Description: **INSB-ALK 1630_BRE053EPA_10052012**

Sample Collection Date Time: 10/05/2012 10:43
Sample Received Date Time: 10/06/2012 07:55

Metals by SW846 6000 Series Methods

Analyte	Result	Flag	Units	MRL	MDL	Method	Prepared	Analyzed	Analyst
Mercury	**0.5**		ng/L	0.5	0.2	EPA 1631E	10/08/2012 09:31	10/09/2012 13:38	JBP
Mercury in Field Blank	ND	U	ng/L	0.5	0.2	EPA 1631E	10/08/2012 09:31	10/09/2012 12:35	JBP

Metals by EPA 200 Series Methods

Analyte	Result	Flag	Units	MRL	MDL	Method	Prepared	Analyzed	Analyst
Aluminum	ND	U	mg/L	0.02	0.007	EPA 200.8	10/12/2012 09:55	10/15/2012 19:20	JCD
Antimony	ND	L1, V1, U	mg/L	0.002	0.001	EPA 200.8	10/12/2012 09:55	10/18/2012 16:01	JCD
Arsenic	**0.0005**		mg/L	0.0005	0.0002	EPA 200.8	10/12/2012 09:55	10/15/2012 19:20	JCD
Beryllium	ND	U	mg/L	0.0010	0.0005	EPA 200.8	10/12/2012 09:55	10/15/2012 19:20	JCD
Cadmium	ND	U	mg/L	0.0005	0.0002	EPA 200.8	10/12/2012 09:55	10/15/2012 19:20	JCD
Calcium	**189**		mg/L	0.20	0.06	EPA 200.7	10/12/2012 09:55	10/18/2012 15:45	MLC
Chromium	ND	U	mg/L	0.001	0.0003	EPA 200.8	10/12/2012 09:55	10/15/2012 19:20	JCD
Copper	**0.0009**	J	mg/L	0.002	0.0005	EPA 200.8	10/12/2012 09:55	10/15/2012 19:20	JCD
Iron	**0.18**		mg/L	0.06	0.02	EPA 200.7	10/12/2012 09:55	10/18/2012 15:45	MLC
Lead	ND	U	mg/L	0.0010	0.0005	EPA 200.8	10/12/2012 09:55	10/15/2012 19:20	JCD
Magnesium	**106**		mg/L	0.100	0.045	EPA 200.7	10/12/2012 09:55	10/17/2012 02:50	MLC
Manganese	ND	U	mg/L	0.003	0.001	EPA 200.8	10/12/2012 09:55	10/15/2012 19:20	JCD
Nickel	**0.0044**		mg/L	0.0015	0.0005	EPA 200.8	10/12/2012 09:55	10/15/2012 19:20	JCD
Potassium	**7.61**		mg/L	0.01	0.01	EPA 200.7	10/12/2012 09:55	10/17/2012 02:50	MLC
Selenium	**0.010**		mg/L	0.002	0.0005	EPA 200.8	10/12/2012 09:55	10/15/2012 19:20	JCD
Silver	ND	U	mg/L	0.0005	0.0002	EPA 200.8	10/12/2012 09:55	10/15/2012 19:20	JCD
Sodium	**362**	E	mg/L	0.13	0.05	EPA 200.7	10/12/2012 09:55	10/17/2012 02:50	MLC
Thallium	ND	U	mg/L	0.0010	0.0004	EPA 200.8	10/12/2012 09:55	10/15/2012 19:20	JCD
Vanadium	ND	U	mg/L	0.002	0.002	EPA 200.8	10/12/2012 09:55	10/15/2012 19:20	JCD
Zinc	**0.011**		mg/L	0.010	0.010	EPA 200.8	10/12/2012 09:55	10/15/2012 19:20	JCD

Metals (Dissolved) by EPA 200 Series Methods

Analyte	Result	Flag	Units	MRL	MDL	Method	Prepared	Analyzed	Analyst
Aluminum	ND	U	mg/L	0.02	0.007	EPA 200.8	10/15/2012 13:28	10/15/2012 19:20	JCD
Antimony	ND	B, U	mg/L	0.005	0.001	EPA 200.8	10/15/2012 13:28	10/15/2012 19:20	JCD
Arsenic	**0.0005**		mg/L	0.0005	0.0002	EPA 200.8	10/15/2012 13:28	10/15/2012 19:20	JCD
Beryllium	ND	U	mg/L	0.0005	0.0005	EPA 200.8	10/15/2012 13:28	10/15/2012 19:20	JCD
Cadmium	ND	U	mg/L	0.0005	0.0001	EPA 200.8	10/15/2012 13:28	10/15/2012 19:20	JCD
Chromium	ND	U	mg/L	0.002	0.0003	EPA 200.8	10/15/2012 13:28	10/15/2012 19:20	JCD
Copper	**0.0009**	J	mg/L	0.001	0.0002	EPA 200.8	10/15/2012 13:28	10/15/2012 19:20	JCD
Iron	**0.008**	J	mg/L	0.02	0.006	EPA 200.7	10/15/2012 13:24	10/15/2012 14:29	MLC
Lead	ND	U	mg/L	0.0020	0.0020	EPA 200.8	10/15/2012 13:28	10/15/2012 19:20	JCD
Manganese	**0.0002**	J	mg/L	0.002	0.0001	EPA 200.8	10/15/2012 13:28	10/15/2012 19:20	JCD
Nickel	**0.0044**		mg/L	0.0005	0.0002	EPA 200.8	10/15/2012 13:28	10/15/2012 19:20	JCD
Selenium	**0.010**		mg/L	0.001	0.0009	EPA 200.8	10/15/2012 13:28	10/15/2012 19:20	JCD
Silver	ND	U	mg/L	0.0005	0.0002	EPA 200.8	10/15/2012 13:28	10/15/2012 19:20	JCD
Thallium	ND	U	mg/L	0.0005	0.0005	EPA 200.8	10/15/2012 13:28	10/15/2012 19:20	JCD
Vanadium	ND	U	mg/L	0.002	0.002	EPA 200.8	10/15/2012 13:28	10/15/2012 19:20	JCD
Zinc	**0.011**		mg/L	0.010	0.010	EPA 200.8	10/15/2012 13:28	10/15/2012 19:20	JCD

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Conventional Chemistry Analyses_01

Analyte	Result	Flag	Units	MRL	MDL	Method	Prepared	Analyzed	Analyst
Acidity	ND	U	mg/L	1	1	SM2310B	10/09/2012 10:30	10/09/2012 10:30	TLB
Bicarbonate Alkalinity as CaCO3	**335**	B	mg/L	1	1	SM2320B	10/09/2012 13:06	10/09/2012 13:06	DDM
Total Alkalinity	**401**	B	mg/L	1	1	SM2320B	10/09/2012 13:06	10/09/2012 13:06	DDM
Chloride	**11.6**		mg/L	0.1	0.1	EPA 300.0	10/14/2012 03:31	10/14/2012 03:31	DMH
Specific Conductance (Lab)	**2540**		umhos/cm	1	1	SM2510B	10/09/2012 09:48	10/09/2012 15:00	TLB
Hardness as CaCO3	**840**		mg/L	1	1	SM2340C	10/17/2012 09:51	10/17/2012 15:53	JTL
pH (Lab)	**8.23**	H3	Std. Units	0.10	0.10	SM4500H+B	10/09/2012 15:30	10/09/2012 15:30	TLB
Total Dissolved Solids	**1990**		mg/L	10	10	SM2540C	10/08/2012 08:47	10/09/2012 17:09	DDM
Total Suspended Solids	**8**		mg/L	4	2	SM2540D	10/10/2012 10:26	10/10/2012 12:50	JTL

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ANALYTICAL RESULTS

Lab Sample ID: **2101636-01RE1**
Description: **INSB-ALK**

Sample Collection Date Time: 10/05/2012 10:43
Sample Received Date Time:

Matrix: Surfacewater

Discharge/Site No:

Regulatory ID

Conventional Chemistry Analyses_01

Analyte	Result	Flag	Units	MRL	MDL	Method	Prepared	Analyzed	Analyst
Sulfate	**1120**	D, B	mg/L	20	**4**	EPA 300.0	10/16/2012 11:15	10/16/2012 11:15	DMH

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ANALYTICAL RESULTS

Lab Sample ID: **2101636-02**
Description: **INSB-ALK 1630_BRE053EPA_10052012**

Sample Collection Date Time: 10/05/2012 10:43
Sample Received Date Time: 10/06/2012 07:55

Metals by SW846 6000 Series Methods

Analyte	Result	Flag	Units	MRL	MDL	Method	Prepared	Analyzed	Analyst
Mercury, dissolved	**0.7**		ng/L	0.5	0.2	EPA 1631E	10/08/2012 09:31	10/09/2012 13:53	JBP
Mercury in Field Blank, dissolved	ND	U	ng/L	0.5	0.2	EPA 1631E	10/08/2012 09:31	10/09/2012 12:41	JBP

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ANALYTICAL RESULTS

Lab Sample ID: **2101636-03**
Description: **INSB-ALK 1630_FIELDBLANKEPA_10052012**

Sample Collection Date Time: 10/05/2012 10:43
Sample Received Date Time: 10/06/2012 07:55

Metals by EPA 200 Series Methods

Analyte	Result	Flag	Units	MRL	MDL	Method	Prepared	Analyzed	Analyst
Aluminum	ND	U	mg/L	0.02	0.007	EPA 200.8	10/12/2012 09:55	10/16/2012 03:49	JCD
Antimony	ND	L1, V1, U	mg/L	0.002	0.001	EPA 200.8	10/12/2012 09:55	10/18/2012 16:14	JCD
Arsenic	ND	U	mg/L	0.0005	0.0002	EPA 200.8	10/12/2012 09:55	10/16/2012 03:49	JCD
Beryllium	ND	U	mg/L	0.0010	0.0005	EPA 200.8	10/12/2012 09:55	10/16/2012 03:49	JCD
Cadmium	ND	U	mg/L	0.0005	0.0002	EPA 200.8	10/12/2012 09:55	10/16/2012 03:49	JCD
Calcium	**0.11**	J	mg/L	0.20	0.06	EPA 200.7	10/12/2012 09:55	10/18/2012 15:48	MLC
Chromium	ND	U	mg/L	0.001	0.0003	EPA 200.8	10/12/2012 09:55	10/16/2012 03:49	JCD
Copper	ND	U	mg/L	0.002	0.0005	EPA 200.8	10/12/2012 09:55	10/16/2012 03:49	JCD
Iron	ND	U	mg/L	0.06	0.02	EPA 200.7	10/12/2012 09:55	10/18/2012 15:48	MLC
Lead	ND	U	mg/L	0.0010	0.0005	EPA 200.8	10/12/2012 09:55	10/16/2012 03:49	JCD
Magnesium	ND	U	mg/L	0.100	0.045	EPA 200.7	10/12/2012 09:55	10/17/2012 02:54	MLC
Manganese	ND	U	mg/L	0.003	0.001	EPA 200.8	10/12/2012 09:55	10/16/2012 03:49	JCD
Nickel	ND	U	mg/L	0.0015	0.0005	EPA 200.8	10/12/2012 09:55	10/16/2012 03:49	JCD
Potassium	ND	U	mg/L	0.01	0.01	EPA 200.7	10/12/2012 09:55	10/17/2012 02:54	MLC
Selenium	ND	U	mg/L	0.002	0.0005	EPA 200.8	10/12/2012 09:55	10/16/2012 03:49	JCD
Silver	ND	U	mg/L	0.0005	0.0002	EPA 200.8	10/12/2012 09:55	10/16/2012 03:49	JCD
Sodium	**0.14**		mg/L	0.13	0.05	EPA 200.7	10/12/2012 09:55	10/17/2012 02:54	MLC
Thallium	ND	U	mg/L	0.0010	0.0004	EPA 200.8	10/12/2012 09:55	10/16/2012 03:49	JCD
Vanadium	ND	U	mg/L	0.002	0.002	EPA 200.8	10/12/2012 09:55	10/16/2012 03:49	JCD
Zinc	ND	U	mg/L	0.010	0.010	EPA 200.8	10/12/2012 09:55	10/16/2012 03:49	JCD

Metals (Dissolved) by EPA 200 Series Methods

Analyte	Result	Flag	Units	MRL	MDL	Method	Prepared	Analyzed	Analyst
Aluminum	ND	U	mg/L	0.02	0.007	EPA 200.8	10/15/2012 13:28	10/15/2012 19:27	JCD
Antimony	ND	B, U	mg/L	0.005	0.001	EPA 200.8	10/15/2012 13:28	10/15/2012 19:27	JCD
Arsenic	ND	U	mg/L	0.0005	0.0002	EPA 200.8	10/15/2012 13:28	10/15/2012 19:27	JCD
Beryllium	ND	U	mg/L	0.0005	0.0005	EPA 200.8	10/15/2012 13:28	10/15/2012 19:27	JCD
Cadmium	ND	U	mg/L	0.0005	0.0001	EPA 200.8	10/15/2012 13:28	10/15/2012 19:27	JCD
Chromium	ND	U	mg/L	0.002	0.0003	EPA 200.8	10/15/2012 13:28	10/15/2012 19:27	JCD
Copper	ND	U	mg/L	0.001	0.0002	EPA 200.8	10/15/2012 13:28	10/15/2012 19:27	JCD
Iron	ND	U	mg/L	0.02	0.006	EPA 200.7	10/15/2012 13:24	10/15/2012 14:33	MLC
Lead	ND	U	mg/L	0.0020	0.0020	EPA 200.8	10/15/2012 13:28	10/15/2012 19:27	JCD
Manganese	ND	U	mg/L	0.002	0.0001	EPA 200.8	10/15/2012 13:28	10/15/2012 19:27	JCD
Nickel	ND	U	mg/L	0.0005	0.0002	EPA 200.8	10/15/2012 13:28	10/15/2012 19:27	JCD
Selenium	ND	U	mg/L	0.001	0.0009	EPA 200.8	10/15/2012 13:28	10/15/2012 19:27	JCD
Silver	ND	U	mg/L	0.0005	0.0002	EPA 200.8	10/15/2012 13:28	10/15/2012 19:27	JCD
Thallium	ND	U	mg/L	0.0005	0.0005	EPA 200.8	10/15/2012 13:28	10/15/2012 19:27	JCD
Vanadium	ND	U	mg/L	0.002	0.002	EPA 200.8	10/15/2012 13:28	10/15/2012 19:27	JCD
Zinc	ND	U	mg/L	0.010	0.010	EPA 200.8	10/15/2012 13:28	10/15/2012 19:27	JCD

Conventional Chemistry Analyses_01

Analyte	Result	Flag	Units	MRL	MDL	Method	Prepared	Analyzed	Analyst
Acidity	**13**	B	mg/L	1	1	SM2310B	10/09/2012 10:30	10/09/2012 10:30	TLB
Bicarbonate Alkalinity as CaCO3	**7**	B	mg/L	1	1	SM2320B	10/09/2012 13:06	10/09/2012 13:06	DDM
Total Alkalinity	**7**	B	mg/L	1	1	SM2320B	10/09/2012 13:06	10/09/2012 13:06	DDM

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Conventional Chemistry Analyses_01

Analyte	Result	Flag	Units	MRL	MDL	Method	Prepared	Analyzed	Analyst
Chloride	ND	u	mg/L	0.1	0.1	EPA 300.0	10/14/2012 04:11	10/14/2012 04:11	DMH
Specific Conductance (Lab)	**1**		umhos/cm	1	1	SM2510B	10/09/2012 09:48	10/09/2012 15:00	TLB
Hardness as CaCO3	ND	u	mg/L	1	1	SM2340C	10/17/2012 09:51	10/17/2012 15:53	JTL
pH (Lab)	**5.19**	H3	Std. Units	0.10	0.10	SM4500H+B	10/09/2012 15:30	10/09/2012 15:30	TLB
Sulfate	**1**	B	mg/L	1	0.2	EPA 300.0	10/14/2012 04:11	10/14/2012 04:11	DMH
Total Dissolved Solids	ND	u	mg/L	10	10	SM2540C	10/08/2012 08:47	10/09/2012 17:11	DDM
Total Suspended Solids	ND	u	mg/L	4	2	SM2540D	10/10/2012 10:26	10/10/2012 12:52	JTL

Notes for work order 2101636

- Samples collected by MMLI personnel are done so in accordance with procedures set forth in MMLI field services SOPs.
- All Waste Water analyses comply with methodology requirements of 40 CFR Part 136.
- All Drinking Water analyses comply with methodology requirements of 40 CFR Part 141.
- Unless otherwise noted, all quantitative results for soils are reported on a dry weight basis.
- The Chain of Custody document is included as part of this report.
- All Library Search analytes should be regarded as tentative identification based on the presumptive evidence of the mass spectra.

Y2	MS/MSD RPD exceeded the method control limit. Recovery met acceptance criteria.
V1	CCV recovery was above method acceptance limits. This target analyte not detected in the sample.
U	Target analyte was analyzed for, but was below detection limit (the value associated with the qualifier is the laboratory method detection limit in our LIMS system).
M2	Matrix spike recovery was low; the method control sample recovery was acceptable.
M1	Matrix spike recovery was high; the method control sample recovery was acceptable.
L1	The associated blank spike recovery was above method acceptance limits.
J	Estimated value.
H3	Sample received and analyzed past holding time.
E	Concentration exceeds calibration range
D	Results reported from dilution.
B	Target analyte detected in method blank at or above the method reporting limit.

Standard Quallifiers/Acronymns

MDL	Method Detection Limit
MRL	Minimum Reporting Limit
ND	Not Detected
LCS	Laboratory Control Sample
MS	Matrix Spike
MSD	Matrix Spike Duplicate
DUP	Sample Duplicate
% Rec	Percent Recovery
RPD	Relative Percent Difference
>	Greater than permit limits
<	Less than permit limits

Analyses performed at the Madisonville KY location unless specified with the following location codes.

02	Pikeville, KY
03	Paducah, KY
04	Lexington, KY
05	Louisville, KY

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Certified Analyses included in this Report

Analyte	Certifications
EPA 1631E in Water	
Mercury	VA NELAC (460210)
Mercury, dissolved	VA NELAC (460210)
Mercury in Field Blank	VA NELAC (460210)
Mercury in Field Blank, dissolved	VA NELAC (460210)
EPA 200.7 in Water	
Calcium	VA NELAC (460210)
Magnesium	VA NELAC (460210)
Potassium	VA NELAC (460210)
Sodium	VA NELAC (460210)
EPA 200.8 in Water	
Aluminum	VA NELAC (460210)
Beryllium	KY Drinking Water (00030)
Antimony	VA NELAC (460210)
Arsenic	VA NELAC (460210)
Beryllium	VA NELAC (460210)
Cadmium	VA NELAC (460210)
Chromium	VA NELAC (460210)
Copper	VA NELAC (460210)
Lead	VA NELAC (460210)
Manganese	VA NELAC (460210)
Nickel	VA NELAC (460210)
Selenium	VA NELAC (460210)
Silver	VA NELAC (460210)
Thallium	VA NELAC (460210)
Vanadium	VA NELAC (460210)
Zinc	VA NELAC (460210)
EPA 300.0 in Water	
Chloride	KY Drinking Water (00030) VA NELAC (460210)
Sulfate	KY Drinking Water (00030) VA NELAC (460210)
SM2320B in Water	
Total Alkalinity	KY Drinking Water (00030) VA NELAC (460210)
Bicarbonate Alkalinity as CaCO3	KY Drinking Water (00030)
SM2340C in Water	
Hardness as CaCO3	KY Drinking Water (00030)
SM2510B in Water	
Specific Conductance (Lab)	KY Drinking Water (00030) VA NELAC (460210)
SM2540C in Water	
Total Dissolved Solids	KY Drinking Water (00030) VA NELAC (460210)
SM4500H+B in Water	
pH (Lab)	KY Drinking Water (00030) VA NELAC (460210)

2101636

Peabody Midwest Mining, LLC. - CHAIN OF CUSTODY

SAMPLER: Forrest L. Crowe

1630 - Bear Run Mine

BASIN #	LAB #	DATE	TIME	GRAB	# CONTAINERS	EAST	PRECIP	Flow (GPM)	pH [1]	Temp				TYPE SAMPLE	COMMENTS:
003R	1630BRP03REPA	05 Oct 12	1015	—	←	X	0.00	0.00	—	—				ALK - EPA	
018R	1630BRP018REPA	05 Oct 12	0736	—	←	X	0.00	0.00	—	—				ALK - EPA	
044	1630BRE044EPA	05 Oct 12	0900	—	←	X	0.00	0.00	—	—				ALK - EPA	
-01 053	1630BRE053EPA	05 Oct 12	1043	X	←	X	0.00	0.67	7.9	17.2				ALK - EPA	
058	1630BRE058EPA	05 Oct 12	1100	—	6	X	0.00	0.00	—	—				ALK - EPA	
062	1630BRE062EPA	05 Oct 12	0940	—	←	X	0.00	0.00	—	—				ALK - EPA	
-02	1630FIELDBLANKEPA	05 Oct 12	1043	X	3									ALK - EPA	NO TOTAL AND DISSOLVED MERCURY ANALYSIS
	1630DUPLICATEEPA				←									ALK - EPA	

RELINQUISHED BY:	DATE:	TIME:	RECEIVED BY:	DATE:	TIME:
[signature]	05 Oct 12	1200	[signature]	10/05/2012	12:05
RELINQUISHED BY:	DATE:	TIME:	RECEIVED BY:	DATE:	TIME:
[signature]	10/05/2012	3:20	[signature]	10/05/2012	15:20

[1] pH and TDS are measured using an electronic pH or TDS meter

[2] Report of Settleable Solids prepared using EPA Method 160.5, and LaMotte Imhoff Cone.

pH Meter Calibrated 05 Oct 12 @ 0603

Analysis date, if other than sample date:

ANALYZED BY: [signature] 10-6-12 7:55 Rec. by: [signature] 10-6-12 0705

Precip. Event Statistics
Date event Started:
Date event Ended:
Total Rinfall:

ALK-EPA Field
Base - Flow, pH, & Temp.
Precip - Flow, pH, & Temp.

ALK-EPA Lab
Cations - Ca, Mg, Na & K
Anions - Chloride, Sulfate & Bicarbonate
Metals - Metals (total & Dissolved) Al, Cd, Cr, Fe, Mn, Hg*, Se*, V, Zn, Sb, As, Be, Cu, Pb, Ni, Ag & Tl (* Low Level Method)
Additional Parameters - TDS, SpC, Acidity, Alkalinity, Hardness & Total Suspended Solids

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Certificate of Analysis

Robert Pendleton
Peabody Midwest Mining LLC
7100 Eagle Crest Blvd
Evansville IN, 47715

Report Printed: 10/26/2012 13:32

Project Name:	Indiana	Workorder:	2101729

Dear Robert Pendleton

Enclosed are the analytical results for samples received at the lab on 10/08/2012 10:55.

McCoy & McCoy Laboratories, Inc located in Madisonville, Kentucky is a National Environmental Laboratory Accreditation Program (NELAP) accredited laboratory and as such, certifies that all applicable test results meet the requirements of NELAP.

If you have any questions regarding this certificate of analysis, please contact us at (270) 821-7375.

Please visit us at www.mccoylabs.com for a listing of NELAP accreditations and Scope of Work, as well as other links to Water Quality documentation on the internet.

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Syd Tate

This page is included as part of the Analytical Report and must be retained as a permanent record thereof.

Syd Tate, Data Reviewer

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SAMPLE SUMMARY

Lab ID	Client Sample ID/Alias	Matrix	Date Collected	Date Received	Sampled By
2101729-01	INSB-ALK/1630_BRE018REPA_10062012	Surfacewater	10/06/2012 13:25	10/08/2012 10:55	Forrest Crowe
2101729-02	INSB-ALK/1630_BRE018REPA_10062012	Surfacewater	10/06/2012 13:25	10/08/2012 10:55	Forrest Crowe
2101729-03	INSB-ALK/1630_FIELDBLANKEPA_10062012	Surfacewater	10/06/2012 13:25	10/08/2012 10:55	Forrest Crowe
2101729-04	INSB-ALK/1630_BRE044EPA_10062012	Surfacewater	10/06/2012 14:26	10/08/2012 10:55	Forrest Crowe
2101729-05	INSB-ALK/1630_BRE044_10062012	Surfacewater	10/06/2012 13:25	10/08/2012 10:55	Forrest Crowe
2101729-06	INSB-ALK/1630_BRE062EPA_10062012	Surfacewater	10/06/2012 15:18	10/08/2012 10:55	Forrest Crowe
2101729-07	INSB-ALK/1630_BRE062EPA_10062012	Surfacewater	10/06/2012 15:18	10/08/2012 10:55	Forrest Crowe

LabNumber	Measurement	Value
2101729-01	Field Flow (CFS)	0.67
	Field pH	8.3
	Field Temp (C)	16.1
2101729-04	Field Flow (CFS)	0.55
	Field pH	8.0
	Field Temp (C)	17.1
2101729-06	Field Flow (CFS)	0.17
	Field pH	8.2
	Field Temp (C)	18.6

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ANALYTICAL RESULTS

Lab Sample ID: **2101729-01**
Description: **INSB-ALK 1630_BRE018REPA_10062012**

Sample Collection Date Time: 10/06/2012 13:25
Sample Received Date Time: 10/08/2012 10:55

Metals by SW846 6000 Series Methods

Analyte	Result	Flag	Units	MRL	MDL	Method	Prepared	Analyzed	Analyst
Mercury	**8.1**		ng/L	0.5	0.2	EPA 1631E	10/08/2012 09:31	10/09/2012 13:56	JBP
Mercury in Field Blank	**0.3**	J	ng/L	0.5	0.2	EPA 1631E	10/08/2012 09:31	10/09/2012 12:43	JBP

Metals by EPA 200 Series Methods

Analyte	Result	Flag	Units	MRL	MDL	Method	Prepared	Analyzed	Analyst
Antimony	ND	V1, U	mg/L	0.025	0.010	EPA 200.8	10/12/2012 09:55	10/18/2012 20:38	JCD
Arsenic	**0.0031**		mg/L	0.0005	0.0002	EPA 200.8	10/12/2012 09:55	10/16/2012 04:10	JCD
Beryllium	ND	U	mg/L	0.0010	0.0005	EPA 200.8	10/12/2012 09:55	10/16/2012 04:10	JCD
Cadmium	ND	U	mg/L	0.0005	0.0002	EPA 200.8	10/12/2012 09:55	10/16/2012 04:10	JCD
Calcium	**22.0**		mg/L	0.20	0.08	EPA 200.7	10/12/2012 09:55	10/18/2012 15:59	MLC
Chromium	**0.007**		mg/L	0.001	0.0003	EPA 200.8	10/12/2012 09:55	10/16/2012 04:10	JCD
Copper	**0.006**		mg/L	0.002	0.0005	EPA 200.8	10/12/2012 09:55	10/16/2012 04:10	JCD
Iron	**8.54**		mg/L	0.06	0.02	EPA 200.7	10/12/2012 09:55	10/18/2012 15:59	MLC
Lead	**0.0038**		mg/L	0.0010	0.0005	EPA 200.8	10/12/2012 09:55	10/16/2012 04:10	JCD
Magnesium	**9.12**		mg/L	0.100	0.045	EPA 200.7	10/12/2012 09:55	10/17/2012 03:12	MLC
Manganese	**0.156**		mg/L	0.003	0.001	EPA 200.8	10/12/2012 09:55	10/16/2012 04:10	JCD
Nickel	**0.0075**		mg/L	0.0015	0.0005	EPA 200.8	10/12/2012 09:55	10/16/2012 04:10	JCD
Potassium	**3.20**		mg/L	0.01	0.01	EPA 200.7	10/12/2012 09:55	10/17/2012 03:12	MLC
Selenium	**0.002**		mg/L	0.002	0.0005	EPA 200.8	10/12/2012 09:55	10/16/2012 04:10	JCD
Silver	ND	U	mg/L	0.0005	0.0002	EPA 200.8	10/12/2012 09:55	10/16/2012 04:10	JCD
Sodium	**17.1**		mg/L	0.13	0.05	EPA 200.7	10/12/2012 09:55	10/17/2012 03:12	MLC
Thallium	ND	U	mg/L	0.0010	0.0004	EPA 200.8	10/12/2012 09:55	10/16/2012 04:10	JCD
Vanadium	**0.012**		mg/L	0.002	0.002	EPA 200.8	10/12/2012 09:55	10/16/2012 04:10	JCD
Zinc	**0.027**		mg/L	0.010	0.010	EPA 200.8	10/12/2012 09:55	10/16/2012 04:10	JCD

Metals (Dissolved) by EPA 200 Series Methods

Analyte	Result	Flag	Units	MRL	MDL	Method	Prepared	Analyzed	Analyst
Aluminum	ND	U	mg/L	0.02	0.007	EPA 200.8	10/15/2012 13:28	10/15/2012 19:48	JCD
Antimony	ND	B, U	mg/L	0.005	0.001	EPA 200.8	10/15/2012 13:28	10/15/2012 19:48	JCD
Arsenic	**0.0003**	J	mg/L	0.0005	0.0002	EPA 200.8	10/15/2012 13:28	10/15/2012 19:48	JCD
Beryllium	ND	U	mg/L	0.0005	0.0005	EPA 200.8	10/15/2012 13:28	10/15/2012 19:48	JCD
Cadmium	ND	U	mg/L	0.0005	0.0001	EPA 200.8	10/15/2012 13:28	10/15/2012 19:48	JCD
Chromium	ND	U	mg/L	0.002	0.0003	EPA 200.8	10/15/2012 13:28	10/15/2012 19:48	JCD
Copper	ND	U	mg/L	0.001	0.0002	EPA 200.8	10/15/2012 13:28	10/15/2012 19:48	JCD
Iron	ND	U	mg/L	0.02	0.006	EPA 200.7	10/15/2012 13:24	10/15/2012 14:44	MLC
Lead	ND	U	mg/L	0.0020	0.0020	EPA 200.8	10/15/2012 13:28	10/15/2012 19:48	JCD
Manganese	**0.0006**	J	mg/L	0.002	0.0001	EPA 200.8	10/15/2012 13:28	10/15/2012 19:48	JCD
Nickel	**0.0011**		mg/L	0.0005	0.0002	EPA 200.8	10/15/2012 13:28	10/15/2012 19:48	JCD
Selenium	ND	U	mg/L	0.001	0.0009	EPA 200.8	10/15/2012 13:28	10/15/2012 19:48	JCD
Silver	ND	U	mg/L	0.0005	0.0002	EPA 200.8	10/15/2012 13:28	10/15/2012 19:48	JCD
Thallium	ND	U	mg/L	0.0005	0.0005	EPA 200.8	10/15/2012 13:28	10/15/2012 19:48	JCD
Vanadium	ND	U	mg/L	0.002	0.002	EPA 200.8	10/15/2012 13:28	10/15/2012 19:48	JCD
Zinc	ND	U	mg/L	0.010	0.010	EPA 200.8	10/15/2012 13:28	10/15/2012 19:48	JCD

Conventional Chemistry Analyses_01

Analyte	Result	Flag	Units	MRL	MDL	Method	Prepared	Analyzed	Analyst

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Conventional Chemistry Analyses_01

Analyte	Result	Flag	Units	MRL	MDL	Method	Prepared	Analyzed	Analyst
Acidity	33	B	mg/L	1	1	SM2310B	10/09/2012 10:30	10/09/2012 10:30	TLB
Bicarbonate Alkalinity as CaCO3	59	B	mg/L	1	1	SM2320B	10/09/2012 13:06	10/09/2012 13:06	DDM
Total Alkalinity	59	B	mg/L	1	1	SM2320B	10/09/2012 13:06	10/09/2012 13:06	DDM
Chloride	4.6		mg/L	0.1	0.1	EPA 300.0	10/14/2012 04:52	10/14/2012 04:52	DMH
Specific Conductance (Lab)	238		umhos/cm	1	1	SM2510B	10/09/2012 09:48	10/09/2012 15:00	TLB
Hardness as CaCO3	120		mg/L	1	1	SM2340C	10/17/2012 09:51	10/17/2012 15:53	JTL
pH (Lab)	7.20	H3	Std. Units	0.10	0.10	SM4500H+B	10/09/2012 15:30	10/09/2012 15:30	TLB
Sulfate	54	B	mg/L	1	0.2	EPA 300.0	10/14/2012 04:52	10/14/2012 04:52	DMH
Total Dissolved Solids	144		mg/L	10	10	SM2540C	10/09/2012 09:00	10/09/2012 16:51	DDM
Total Suspended Solids	110		mg/L	7	3	SM2540D	10/10/2012 10:26	10/10/2012 12:58	JTL

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ANALYTICAL RESULTS

Lab Sample ID: **2101729-01RE2**
Description: **INSB-ALK**

Sample Collection Date Time: 10/06/2012 13:25
Sample Received Date Time:

Matrix: Surfacewater

Discharge/Site No:

Regulatory ID:

Metals by EPA 200 Series Methods

Analyte	Result	Flag	Units	MRL	MDL	Method	Prepared	Analyzed	Analyst
Aluminum	6.86	D1	mg/L	0.20	0.07	EPA 200.8	10/12/2012 09:55	10/24/2012 16:46	JCD

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ANALYTICAL RESULTS

Lab Sample ID: **2101729-02**
Description: **INSB-ALK 1630_BRE018REPA_10062012**

Sample Collection Date Time: 10/06/2012 13:25
Sample Received Date Time: 10/08/2012 10:55

Metals by SW846 6000 Series Methods

Analyte	Result	Flag	Units	MRL	MDL	Method	Prepared	Analyzed	Analyst
Mercury, dissolved	9.7		ng/L	0.5	0.2	EPA 1631E	10/08/2012 09:31	10/09/2012 13:59	JBP
Mercury in Field Blank, dissolved	0.3	J	ng/L	0.5	0.2	EPA 1631E	10/08/2012 09:31	10/09/2012 12:46	JBP

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ANALYTICAL RESULTS

Lab Sample ID: **2101729-03**
Description: **INSB-ALK 1630_FIELDBLANKEPA_10062012**

Sample Collection Date Time: 10/06/2012 13:25
Sample Received Date Time: 10/08/2012 10:55

Metals by EPA 200 Series Methods

Analyte	Result	Flag	Units	MRL	MDL	Method	Prepared	Analyzed	Analyst
Aluminum	ND	U	mg/L	0.02	0.007	EPA 200.8	10/11/2012 11:04	10/12/2012 22:10	JCD
Antimony	ND	U	mg/L	0.002	0.001	EPA 200.8	10/11/2012 11:04	10/13/2012 06:04	JCD
Arsenic	ND	U	mg/L	0.0005	0.0002	EPA 200.8	10/11/2012 11:04	10/12/2012 22:10	JCD
Beryllium	ND	U	mg/L	0.0010	0.0005	EPA 200.8	10/11/2012 11:04	10/12/2012 22:10	JCD
Cadmium	ND	U	mg/L	0.0005	0.0002	EPA 200.8	10/11/2012 11:04	10/12/2012 22:10	JCD
Calcium	ND	U	mg/L	0.20	0.06	EPA 200.7	10/11/2012 11:04	10/12/2012 22:38	MLC
Chromium	ND	U	mg/L	0.001	0.0003	EPA 200.8	10/11/2012 11:04	10/12/2012 22:10	JCD
Copper	ND	U	mg/L	0.002	0.0005	EPA 200.8	10/11/2012 11:04	10/12/2012 22:10	JCD
Iron	ND	U	mg/L	0.06	0.02	EPA 200.7	10/11/2012 11:04	10/12/2012 22:38	MLC
Lead	ND	U	mg/L	0.0010	0.0005	EPA 200.8	10/11/2012 11:04	10/12/2012 22:10	JCD
Magnesium	ND	U	mg/L	0.100	0.045	EPA 200.7	10/11/2012 11:04	10/12/2012 22:38	MLC
Manganese	ND	U	mg/L	0.003	0.001	EPA 200.8	10/11/2012 11:04	10/12/2012 22:10	JCD
Nickel	ND	U	mg/L	0.0015	0.0005	EPA 200.8	10/11/2012 11:04	10/12/2012 22:10	JCD
Potassium	ND	U	mg/L	0.01	0.01	EPA 200.7	10/11/2012 11:04	10/12/2012 22:38	MLC
Selenium	ND	U	mg/L	0.002	0.0005	EPA 200.8	10/11/2012 11:04	10/12/2012 22:10	JCD
Silver	ND	U	mg/L	0.0005	0.0002	EPA 200.8	10/11/2012 11:04	10/12/2012 22:10	JCD
Sodium	ND	U	mg/L	0.13	0.05	EPA 200.7	10/11/2012 11:04	10/12/2012 22:38	MLC
Thallium	ND	U	mg/L	0.0010	0.0004	EPA 200.8	10/11/2012 11:04	10/12/2012 22:10	JCD
Vanadium	ND	U	mg/L	0.002	0.002	EPA 200.8	10/11/2012 11:04	10/12/2012 22:10	JCD
Zinc	ND	U	mg/L	0.010	0.010	EPA 200.8	10/11/2012 11:04	10/12/2012 22:10	JCD

Metals (Dissolved) by EPA 200 Series Methods

Analyte	Result	Flag	Units	MRL	MDL	Method	Prepared	Analyzed	Analyst
Aluminum	ND	U	mg/L	0.02	0.007	EPA 200.8	10/15/2012 13:28	10/15/2012 20:08	JCD
Antimony	ND	B, U	mg/L	0.005	0.001	EPA 200.8	10/15/2012 13:28	10/15/2012 20:08	JCD
Arsenic	ND	U	mg/L	0.0005	0.0002	EPA 200.8	10/15/2012 13:28	10/15/2012 20:08	JCD
Beryllium	ND	U	mg/L	0.0005	0.0005	EPA 200.8	10/15/2012 13:28	10/15/2012 20:08	JCD
Cadmium	ND	U	mg/L	0.0005	0.0001	EPA 200.8	10/15/2012 13:28	10/15/2012 20:08	JCD
Chromium	ND	U	mg/L	0.002	0.0003	EPA 200.8	10/15/2012 13:28	10/15/2012 20:08	JCD
Copper	ND	U	mg/L	0.001	0.0002	EPA 200.8	10/15/2012 13:28	10/15/2012 20:08	JCD
Iron	ND	U	mg/L	0.02	0.006	EPA 200.7	10/15/2012 13:24	10/15/2012 14:47	MLC
Lead	ND	U	mg/L	0.0020	0.0020	EPA 200.8	10/15/2012 13:28	10/15/2012 20:08	JCD
Manganese	ND	U	mg/L	0.002	0.0001	EPA 200.8	10/15/2012 13:28	10/15/2012 20:08	JCD
Nickel	**0.0002**	J	mg/L	0.0005	0.0002	EPA 200.8	10/15/2012 13:28	10/15/2012 20:08	JCD
Selenium	ND	U	mg/L	0.001	0.0009	EPA 200.8	10/15/2012 13:28	10/15/2012 20:08	JCD
Silver	ND	U	mg/L	0.0005	0.0002	EPA 200.8	10/15/2012 13:28	10/15/2012 20:08	JCD
Thallium	ND	U	mg/L	0.0005	0.0005	EPA 200.8	10/15/2012 13:28	10/15/2012 20:08	JCD
Vanadium	ND	U	mg/L	0.002	0.002	EPA 200.8	10/15/2012 13:28	10/15/2012 20:08	JCD
Zinc	ND	U	mg/L	0.010	0.010	EPA 200.8	10/15/2012 13:28	10/15/2012 20:08	JCD

Conventional Chemistry Analyses_01

Analyte	Result	Flag	Units	MRL	MDL	Method	Prepared	Analyzed	Analyst
Acidity	**38**	B	mg/L	1	1	SM2310B	10/09/2012 10:30	10/09/2012 10:30	TLB
Bicarbonate Alkalinity as CaCO3	**3**	B	mg/L	1	1	SM2320B	10/09/2012 13:06	10/09/2012 13:06	DDM
Total Alkalinity	**3**	B	mg/L	1	1	SM2320B	10/09/2012 13:06	10/09/2012 13:06	DDM
Chloride	ND	U	mg/L	0.1	0.1	EPA 300.0	10/14/2012 05:33	10/14/2012 05:33	DMH

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Conventional Chemistry Analyses_01

Analyte	Result	Flag	Units	MRL	MDL	Method	Prepared	Analyzed	Analyst
Specific Conductance (Lab)	2		umhos/cm	1	1	SM2510B	10/09/2012 09:48	10/09/2012 15:00	TLB
Hardness as CaCO3	ND	U	mg/L	1	1	SM2340C	10/15/2012 10:39	10/15/2012 10:39	JTL
pH (Lab)	5.15	H3	Std. Units	0.10	0.10	SM4500H+B	10/09/2012 15:30	10/09/2012 15:30	TLB
Sulfate	1	B	mg/L	1	0.2	EPA 300.0	10/14/2012 05:33	10/14/2012 05:33	DMH
Total Dissolved Solids	ND	U	mg/L	10	10	SM2540C	10/09/2012 09:00	10/09/2012 16:53	DDM
Total Suspended Solids	ND	U	mg/L	4	2	SM2540D	10/10/2012 10:26	10/10/2012 13:00	JTL

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ANALYTICAL RESULTS

Lab Sample ID: **2101729-04**
Description: **INSB-ALK 1630_BRE044EPA_10062012**

Sample Collection Date Time: 10/06/2012 14:26
Sample Received Date Time: 10/08/2012 10:55

Metals by SW846 6000 Series Methods

Analyte	Result	Flag	Units	MRL	MDL	Method	Prepared	Analyzed	Analyst
Mercury	**0.4**	J	ng/L	0.5	0.2	EPA 1631E	10/08/2012 09:31	10/09/2012 14:02	JBP
Mercury in Field Blank	ND	U	ng/L	0.5	0.2	EPA 1631E	10/08/2012 09:31	10/09/2012 12:49	JBP

Metals by EPA 200 Series Methods

Analyte	Result	Flag	Units	MRL	MDL	Method	Prepared	Analyzed	Analyst
Aluminum	**0.09**		mg/L	0.02	0.007	EPA 200.8	10/12/2012 09:55	10/16/2012 04:17	JCD
Antimony	ND	D3, L1, U	mg/L	0.012	0.005	EPA 200.8	10/12/2012 09:55	10/24/2012 13:16	JCD
Arsenic	**0.0005**		mg/L	0.0005	0.0002	EPA 200.8	10/12/2012 09:55	10/16/2012 04:17	JCD
Beryllium	ND	U	mg/L	0.0010	0.0005	EPA 200.8	10/12/2012 09:55	10/16/2012 04:17	JCD
Cadmium	ND	U	mg/L	0.0005	0.0002	EPA 200.8	10/12/2012 09:55	10/16/2012 04:17	JCD
Calcium	**131**		mg/L	0.20	0.06	EPA 200.7	10/12/2012 09:55	10/18/2012 16:06	MLC
Chromium	ND	U	mg/L	0.001	0.0003	EPA 200.8	10/12/2012 09:55	10/16/2012 04:17	JCD
Copper	**0.002**		mg/L	0.002	0.0005	EPA 200.8	10/12/2012 09:55	10/16/2012 04:17	JCD
Iron	**0.18**		mg/L	0.06	0.02	EPA 200.7	10/12/2012 09:55	10/18/2012 16:06	MLC
Lead	ND	U	mg/L	0.0010	0.0005	EPA 200.8	10/12/2012 09:55	10/16/2012 04:17	JCD
Magnesium	**86.0**		mg/L	0.100	0.045	EPA 200.7	10/12/2012 09:55	10/17/2012 03:16	MLC
Manganese	**0.190**		mg/L	0.003	0.001	EPA 200.8	10/12/2012 09:55	10/16/2012 04:17	JCD
Nickel	**0.0079**		mg/L	0.0015	0.0005	EPA 200.8	10/12/2012 09:55	10/16/2012 04:17	JCD
Potassium	**7.71**		mg/L	0.01	0.01	EPA 200.7	10/12/2012 09:55	10/17/2012 03:16	MLC
Selenium	**0.008**		mg/L	0.002	0.0005	EPA 200.8	10/12/2012 09:55	10/16/2012 04:17	JCD
Silver	ND	U	mg/L	0.0005	0.0002	EPA 200.8	10/12/2012 09:55	10/16/2012 04:17	JCD
Thallium	ND	U	mg/L	0.0010	0.0004	EPA 200.8	10/12/2012 09:55	10/16/2012 04:17	JCD
Vanadium	ND	U	mg/L	0.002	0.002	EPA 200.8	10/12/2012 09:55	10/16/2012 04:17	JCD
Zinc	ND	U	mg/L	0.010	0.010	EPA 200.8	10/12/2012 09:55	10/16/2012 04:17	JCD

Metals (Dissolved) by EPA 200 Series Methods

Analyte	Result	Flag	Units	MRL	MDL	Method	Prepared	Analyzed	Analyst
Aluminum	ND	U	mg/L	0.02	0.007	EPA 200.8	10/15/2012 13:28	10/15/2012 20:15	JCD
Antimony	ND	B, U	mg/L	0.005	0.001	EPA 200.8	10/15/2012 13:28	10/15/2012 20:15	JCD
Arsenic	**0.0002**	J	mg/L	0.0005	0.0002	EPA 200.8	10/15/2012 13:28	10/15/2012 20:15	JCD
Beryllium	ND	U	mg/L	0.0005	0.0005	EPA 200.8	10/15/2012 13:28	10/15/2012 20:15	JCD
Cadmium	ND	U	mg/L	0.0005	0.0001	EPA 200.8	10/15/2012 13:28	10/15/2012 20:15	JCD
Chromium	ND	U	mg/L	0.002	0.0003	EPA 200.8	10/15/2012 13:28	10/15/2012 20:15	JCD
Copper	**0.002**		mg/L	0.001	0.0002	EPA 200.8	10/15/2012 13:28	10/15/2012 20:15	JCD
Iron	ND	U	mg/L	0.02	0.006	EPA 200.7	10/15/2012 13:24	10/15/2012 14:51	MLC
Lead	ND	U	mg/L	0.0020	0.0020	EPA 200.8	10/15/2012 13:28	10/15/2012 20:15	JCD
Manganese	**0.110**		mg/L	0.002	0.0001	EPA 200.8	10/15/2012 13:28	10/15/2012 20:15	JCD
Nickel	**0.0066**		mg/L	0.0005	0.0002	EPA 200.8	10/15/2012 13:28	10/15/2012 20:15	JCD
Selenium	**0.011**		mg/L	0.001	0.0009	EPA 200.8	10/15/2012 13:28	10/15/2012 20:15	JCD
Silver	ND	U	mg/L	0.0005	0.0002	EPA 200.8	10/15/2012 13:28	10/15/2012 20:15	JCD
Thallium	ND	U	mg/L	0.0005	0.0005	EPA 200.8	10/15/2012 13:28	10/15/2012 20:15	JCD
Vanadium	ND	U	mg/L	0.002	0.002	EPA 200.8	10/15/2012 13:28	10/15/2012 20:15	JCD
Zinc	ND	U	mg/L	0.010	0.010	EPA 200.8	10/15/2012 13:28	10/15/2012 20:15	JCD

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Conventional Chemistry Analyses_01

Analyte	Result	Flag	Units	MRL	MDL	Method	Prepared	Analyzed	Analyst
Acidity	ND	U	mg/L	1	1	SM2310B	10/09/2012 10:30	10/09/2012 10:30	TLB
Bicarbonate Alkalinity as CaCO3	**300**	B	mg/L	1	1	SM2320B	10/09/2012 13:06	10/09/2012 13:06	DDM
Total Alkalinity	**393**	B	mg/L	1	1	SM2320B	10/09/2012 13:06	10/09/2012 13:06	DDM
Chloride	**15.8**		mg/L	0.1	0.1	EPA 300.0	10/14/2012 06:13	10/14/2012 06:13	DMH
Specific Conductance (Lab)	**3290**		umhos/cm	1	1	SM2510B	10/09/2012 09:48	10/09/2012 15:00	TLB
Hardness as CaCO3	**660**		mg/L	1	1	SM2340C	10/17/2012 09:51	10/17/2012 15:53	JTL
pH (Lab)	**8.08**	H3	Std. Units	0.10	0.10	SM4500H+B	10/09/2012 15:30	10/09/2012 15:30	TLB
Total Dissolved Solids	**2500**		mg/L	10	10	SM2540C	10/09/2012 09:00	10/09/2012 16:55	DDM
Total Suspended Solids	**12**		mg/L	4	2	SM2540D	10/10/2012 10:26	10/10/2012 13:02	JTL

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ANALYTICAL RESULTS

Lab Sample ID: **2101729-04RE1**
Description: **INSB-ALK**

Sample Collection Date Time: 10/06/2012 14:26
Sample Received Date Time:

Matrix: Surfacewater
Discharge/Site No:
Regulatory ID:

Metals by EPA 200 Series Methods

Analyte	Result	Flag	Units	MRL	MDL	Method	Prepared	Analyzed	Analyst
Sodium	**640**	D1	mg/L	1.30	0.50	EPA 200.7	10/12/2012 09:55	10/18/2012 16:03	MLC

Conventional Chemistry Analyses_01

Analyte	Result	Flag	Units	MRL	MDL	Method	Prepared	Analyzed	Analyst
Sulfate	**1460**	D, B	mg/L	20	4	EPA 300.0	10/16/2012 11:36	10/16/2012 11:36	DMH

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ANALYTICAL RESULTS

Lab Sample ID: **2101729-05**
Description: **INSB-ALK 1630_BRE044_10062012**

Sample Collection Date Time: 10/06/2012 13:25
Sample Received Date Time: 10/08/2012 10:55

Metals by SW846 6000 Series Methods

Analyte	Result	Flag	Units	MRL	MDL	Method	Prepared	Analyzed	Analyst
Mercury, dissolved	**0.7**		ng/L	0.5	0.2	EPA 1631E	10/08/2012 09:31	10/09/2012 14:04	JBP
Mercury in Field Blank, dissolved	ND	u	ng/L	0.5	0.2	EPA 1631E	10/08/2012 09:31	10/09/2012 12:52	JBP

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ANALYTICAL RESULTS

Lab Sample ID: **2101729-06**
Description: **INSB-ALK 1630_BRE062EPA_10062012**

Sample Collection Date Time: 10/06/2012 15:18
Sample Received Date Time: 10/08/2012 10:55

Metals by SW846 6000 Series Methods

Analyte	Result	Flag	Units	MRL	MDL	Method	Prepared	Analyzed	Analyst
Mercury	**0.7**		ng/L	0.5	0.2	EPA 1631E	10/08/2012 09:31	10/09/2012 14:07	JBP
Mercury In Field Blank	**0.2**	J	ng/L	0.5	0.2	EPA 1631E	10/08/2012 09:31	10/09/2012 12:55	JBP

Metals by EPA 200 Series Methods

Analyte	Result	Flag	Units	MRL	MDL	Method	Prepared	Analyzed	Analyst
Aluminum	**0.08**		mg/L	0.02	0.007	EPA 200.8	10/12/2012 09:55	10/16/2012 04:24	JCD
Antimony	ND	D3, L1, U	mg/L	0.012	0.005	EPA 200.8	10/12/2012 09:55	10/24/2012 13:23	JCD
Arsenic	**0.0011**		mg/L	0.0005	0.0002	EPA 200.8	10/12/2012 09:55	10/16/2012 04:24	JCD
Beryllium	ND	U	mg/L	0.0010	0.0005	EPA 200.8	10/12/2012 09:55	10/16/2012 04:24	JCD
Cadmium	ND	U	mg/L	0.0005	0.0002	EPA 200.8	10/12/2012 09:55	10/16/2012 04:24	JCD
Calcium	**95.2**		mg/L	0.20	0.06	EPA 200.7	10/12/2012 09:55	10/18/2012 16:21	MLC
Chromium	ND	U	mg/L	0.001	0.0003	EPA 200.8	10/12/2012 09:55	10/16/2012 04:24	JCD
Copper	**0.002**		mg/L	0.002	0.0005	EPA 200.8	10/12/2012 09:55	10/16/2012 04:24	JCD
Iron	**0.19**		mg/L	0.06	0.02	EPA 200.7	10/12/2012 09:55	10/18/2012 16:21	MLC
Lead	ND	U	mg/L	0.0010	0.0005	EPA 200.8	10/12/2012 09:55	10/16/2012 04:24	JCD
Magnesium	**81.1**		mg/L	0.100	0.045	EPA 200.7	10/12/2012 09:55	10/17/2012 03:20	MLC
Manganese	**0.133**		mg/L	0.003	0.001	EPA 200.8	10/12/2012 09:55	10/16/2012 04:24	JCD
Nickel	**0.0041**		mg/L	0.0015	0.0005	EPA 200.8	10/12/2012 09:55	10/16/2012 04:24	JCD
Potassium	**8.35**		mg/L	0.01	0.01	EPA 200.7	10/12/2012 09:55	10/17/2012 03:20	MLC
Selenium	**0.009**		mg/L	0.002	0.0005	EPA 200.8	10/12/2012 09:55	10/16/2012 04:24	JCD
Silver	ND	U	mg/L	0.0005	0.0002	EPA 200.8	10/12/2012 09:55	10/16/2012 04:24	JCD
Thallium	ND	U	mg/L	0.0010	0.0004	EPA 200.8	10/12/2012 09:55	10/16/2012 04:24	JCD
Vanadium	ND	U	mg/L	0.002	0.002	EPA 200.8	10/12/2012 09:55	10/16/2012 04:24	JCD
Zinc	ND	U	mg/L	0.010	0.010	EPA 200.8	10/12/2012 09:55	10/16/2012 04:24	JCD

Metals (Dissolved) by EPA 200 Series Methods

Analyte	Result	Flag	Units	MRL	MDL	Method	Prepared	Analyzed	Analyst
Aluminum	ND	U	mg/L	0.02	0.007	EPA 200.8	10/15/2012 13:28	10/15/2012 20:22	JCD
Antimony	**0.001**	B, J	mg/L	0.005	0.001	EPA 200.8	10/15/2012 13:28	10/15/2012 20:22	JCD
Arsenic	**0.0010**		mg/L	0.0005	0.0002	EPA 200.8	10/15/2012 13:28	10/15/2012 20:22	JCD
Beryllium	ND	U	mg/L	0.0005	0.0005	EPA 200.8	10/15/2012 13:28	10/15/2012 20:22	JCD
Cadmium	ND	U	mg/L	0.0005	0.0001	EPA 200.8	10/15/2012 13:28	10/15/2012 20:22	JCD
Chromium	ND	U	mg/L	0.002	0.0003	EPA 200.8	10/15/2012 13:28	10/15/2012 20:22	JCD
Copper	**0.002**		mg/L	0.001	0.0002	EPA 200.8	10/15/2012 13:28	10/15/2012 20:22	JCD
Iron	**0.006**	J	mg/L	0.02	0.006	EPA 200.7	10/15/2012 13:24	10/15/2012 14:55	MLC
Lead	ND	U	mg/L	0.0020	0.0020	EPA 200.8	10/15/2012 13:28	10/15/2012 20:22	JCD
Manganese	**0.0005**	J	mg/L	0.002	0.0001	EPA 200.8	10/15/2012 13:28	10/15/2012 20:22	JCD
Nickel	**0.0026**		mg/L	0.0005	0.0002	EPA 200.8	10/15/2012 13:28	10/15/2012 20:22	JCD
Selenium	**0.014**		mg/L	0.001	0.0009	EPA 200.8	10/15/2012 13:28	10/15/2012 20:22	JCD
Silver	ND	U	mg/L	0.0005	0.0002	EPA 200.8	10/15/2012 13:28	10/15/2012 20:22	JCD
Thallium	ND	U	mg/L	0.0005	0.0005	EPA 200.8	10/15/2012 13:28	10/15/2012 20:22	JCD
Vanadium	ND	U	mg/L	0.002	0.002	EPA 200.8	10/15/2012 13:28	10/15/2012 20:22	JCD
Zinc	ND	U	mg/L	0.010	0.010	EPA 200.8	10/15/2012 13:28	10/15/2012 20:22	JCD

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Conventional Chemistry Analyses_01

Analyte	Result	Flag	Units	MRL	MDL	Method	Prepared	Analyzed	Analyst
Acidity	ND	u	mg/L	1	1	SM2310B	10/09/2012 10:30	10/09/2012 10:30	TLB
Bicarbonate Alkalinity as CaCO3	**344**	B	mg/L	1	1	SM2320B	10/09/2012 13:06	10/09/2012 13:06	DDM
Total Alkalinity	**453**	B	mg/L	1	1	SM2320B	10/09/2012 13:06	10/09/2012 13:06	DDM
Chloride	**24.7**		mg/L	0.1	0.1	EPA 300.0	10/14/2012 06:54	10/14/2012 06:54	DMH
Specific Conductance (Lab)	**3570**		umhos/cm	1	1	SM2510B	10/09/2012 09:48	10/09/2012 15:00	TLB
Hardness as CaCO3	**540**		mg/L	1	1	SM2340C	10/17/2012 09:51	10/17/2012 15:53	JTL
pH (Lab)	**8.21**	H3	Std. Units	0.10	0.10	SM4500H+B	10/09/2012 15:30	10/09/2012 15:30	TLB
Total Dissolved Solids	**2630**		mg/L	10	10	SM2540C	10/09/2012 09:00	10/09/2012 16:57	DDM
Total Suspended Solids	**9**		mg/L	4	2	SM2540D	10/10/2012 10:26	10/10/2012 13:04	JTL

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ANALYTICAL RESULTS

Lab Sample ID: **2101729-06RE1**
Description: **INSB-ALK**

Sample Collection Date Time: 10/06/2012 15:18
Sample Received Date Time:

Matrix: Surfacewater
Discharge/Site No:
Regulatory ID:

Metals by EPA 200 Series Methods

Analyte	Result	Flag	Units	MRL	MDL	Method	Prepared	Analyzed	Analyst
Sodium	**770**	D1	mg/L	1.30	0.50	EPA 200.7	10/12/2012 09:55	10/18/2012 16:10	MLC

Conventional Chemistry Analyses_01

Analyte	Result	Flag	Units	MRL	MDL	Method	Prepared	Analyzed	Analyst
Sulfate	**1550**	D, B	mg/L	20	4	EPA 300.0	10/16/2012 11:56	10/16/2012 11:56	DMH

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ANALYTICAL RESULTS

Lab Sample ID: **2101729-07**
Description: **INSB-ALK 1630_BRE062EPA_10062012**

Sample Collection Date Time: 10/06/2012 15:18
Sample Received Date Time: 10/08/2012 10:55

Metals by SW846 6000 Series Methods

Analyte	Result	Flag	Units	MRL	MDL	Method	Prepared	Analyzed	Analyst
Mercury, dissolved	0.5		ng/L	0.5	0.2	EPA 1631E	10/08/2012 09:31	10/09/2012 14:10	JBP
Mercury in Field Blank, dissolved	0.2	J	ng/L	0.5	0.2	EPA 1631E	10/08/2012 09:31	10/09/2012 12:58	JBP

Notes for work order 2101729
- Samples collected by MMLI personnel are done so in accordance with procedures set forth in MMLI field services SOPs.
- All Waste Water analyses comply with methodology requirements of 40 CFR Part 136.
- All Drinking Water analyses comply with methodology requirements of 40 CFR Part 141.
- Unless otherwise noted, all quantitative results for soils are reported on a dry weight basis.
- The Chain of Custody document is included as part of this report.
- All Library Search analytes should be regarded as tentative identification based on the presumptive evidence of the mass spectra.

Y2	MS/MSD RPD exceeded the method control limit. Recovery met acceptance criteria.
V1	CCV recovery was above method acceptance limits. This target analyte not detected in the sample.
U	Target analyte was analyzed for, but was below detection limit (the value associated with the qualifier is the laboratory method detection limit in our LIMS system).
M3	The accuracy of the spike recovery value is reduced since the analyte concentration in the sample is disproportionate to spike level. The method control sample recovery was acceptable.
M2	Matrix spike recovery was low; the method control sample recovery was acceptable.
M1	Matrix spike recovery was high; the method control sample recovery was acceptable.
L1	The associated blank spike recovery was above method acceptance limits.
J	Estimated value.
H3	Sample received and analyzed past holding time.
D3	Sample dilution required due to insufficient sample.
D1	Sample required dilution due to high concentration of target analyte.
D	Results reported from dilution.
B	Target analyte detected in method blank at or above the method reporting limit.

Standard Quallifiers/Acronymns

MDL	Method Detection Limit
MRL	Minimum Reporting Limit
ND	Not Detected
LCS	Laboratory Control Sample
MS	Matrix Spike
MSD	Matrix Spike Duplicate
DUP	Sample Duplicate
% Rec	Percent Recovery
RPD	Relative Percent Difference
>	Greater than permit limits
<	Less than permit limits

Analyses performed at the Madisonville KY location unless specified with the following location codes.

02	Pikeville, KY
03	Paducah, KY
04	Lexington, KY
05	Louisville, KY

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Certified Analyses included in this Report

Analyte	Certifications
EPA 1631E in Water	
Mercury	VA NELAC (460210)
Mercury, dissolved	VA NELAC (460210)
Mercury in Field Blank	VA NELAC (460210)
Mercury in Field Blank, dissolved	VA NELAC (460210)
EPA 200.7 in Water	
Calcium	VA NELAC (460210)
Magnesium	VA NELAC (460210)
Potassium	VA NELAC (460210)
Sodium	VA NELAC (460210)
EPA 200.8 in Water	
Aluminum	VA NELAC (460210)
Beryllium	KY Drinking Water (00030)
Antimony	VA NELAC (460210)
Arsenic	VA NELAC (460210)
Beryllium	VA NELAC (460210)
Cadmium	VA NELAC (460210)
Chromium	VA NELAC (460210)
Copper	VA NELAC (460210)
Lead	VA NELAC (460210)
Manganese	VA NELAC (460210)
Nickel	VA NELAC (460210)
Selenium	VA NELAC (460210)
Silver	VA NELAC (460210)
Thallium	VA NELAC (460210)
Vanadium	VA NELAC (460210)
Zinc	VA NELAC (460210)
EPA 300.0 in Water	
Chloride	KY Drinking Water (00030) VA NELAC (460210)
Sulfate	KY Drinking Water (00030) VA NELAC (460210)
SM2320B in Water	
Total Alkalinity	KY Drinking Water (00030) VA NELAC (460210)
Bicarbonate Alkalinity as CaCO3	KY Drinking Water (00030)
SM2340C in Water	
Hardness as CaCO3	KY Drinking Water (00030)
SM2510B in Water	
Specific Conductance (Lab)	KY Drinking Water (00030) VA NELAC (460210)
SM2540C in Water	
Total Dissolved Solids	KY Drinking Water (00030) VA NELAC (460210)
SM4500H+B in Water	
pH (Lab)	KY Drinking Water (00030) VA NELAC (460210)

EPA-R5-2017-008149INT_0000248

2101729

Peabody Midwest Mining, LLC - CHAIN OF CUSTODY

SAMPLER: Forrest L. Crowe

1630 - Bear Run Mine

BASIN #	LAB #	DATE	TIME	GRAB	# CONTAINERS	BASE	PRECIP	Flow (GPM) (GPS)	pH [1]	Temp		TYPE SAMPLE	COMMENTS
							1.05						
003R	1630BRP003REPA	06 Oct 12	1240	—	6	—	1.05	0.00	—	—		ALK - EPA	
018R	1630BRP018REPA	06 Oct 12	1325	X	6	—	1.05	0.67	8.3	16.1		ALK - EPA	-01 - 02
044	1630BRE044EPA	06 Oct 12	1426	X	6	—	1.05	0.55	8.0	17.1		ALK - EPA	-04 - 05
053	1630BRE053EPA	—	—		6	—	1.05	—	—	—		ALK - EPA	
058	1630BRE058EPA	06 Oct 12	1540	—	6	—	1.05	0.00	—	—		ALK - EPA	
062	1630BRE062EPA	06 Oct 12	1518	X	6	—	1.05	0.17	8.2	18.6		ALK - EPA	-06 - 07
	1630FIELDBLANKEPA	06 Oct 12	1325		3							ALK - EPA	NO TOTAL AND DISSOLVED MERCURY ANALYSIS -03
	1630DUPLICATEEPA				6							ALK - EPA	

RELINQUISHED BY:	DATE:	TIME:	RECEIVED BY:	DATE:	TIME:
[signature]	06 Oct 12	18:30	[signature]	10-6-12	18:30
RELINQUISHED BY:	DATE:	TIME:	RECEIVED BY:	DATE:	TIME:
[signature]	10-8-12	0950	Michael Walker	10-8-12	0950
Michael Walker	10-8-12	1055	[signature]	10-8-12	1055

[1] pH and TDS are measured using an electrometric pH or TDS meter

[2] Report of Settleable Solids prepared using EPA Method 160.5, and Labiotic Imhoff Cone.

Analysis date, if other than sample date: pH Meter Calibrated @ 1210 06 Oct 12

ANALYZED BY:

Precip. Event Statistics
Date event Started: 05 Oct 12
Date event Ended: 06 Oct 12
Total Rinfall: 1.05"

ALK-EPA Flds
Base - Flow, pH, & Temp.
Precip - Flow, pH, & Temp.

ALK-EPA Lab
Cations - Ca, Mg, Na & K
Anions - Chloride, Sulfate & Bicarbonate
Metals - Metals (total & Dissolved) Al, Cd, Cr, Fe, Mn, Hg*, Se*, V, Zn, Sb, As, Be, Cu, Pb, Ni, Ag & Tl (* Low Level Method)
Additional Parameters - TDS, SpC, Acidity, Alkalinity, Hardness & Total Suspended Solids

TRIP pH ✓

20121007.2220

Trip on 2101876

Effluent Sampling Plan - Samples Collected during July 12, 2012 to October 31, 2012

Samples (by date) collected through 10/31/12				
Date	Outfall	Condition		Precipitation (in)
		Base flow	Precipitation	
7/12/12	053	X		0.0
7/12/12	062	X		0.0
8/15/12	053	X		0.0
8/27/12	053		X	0.74
9/6/2012	18R		X	0.62
9/6/2012	053		X	0.62
9/8/2012	044		X	1.58
9/8/2012	062		X	1.58
9/24/2012	053	X		0.0
9/27/2012	18R*		X	1.74
9/27/2012	044*		X	1.74
9/27/2012	053*		X	1.74
9/27/2012	062*		X	1.74
10/02/2012	18R		X	0.61
10/02/2012	053		X	0.61
10/05/2012	053	X		0.0
10/06/2012	18R*		X	1.05
10/06/2012	044		X	1.05
10/06/2012	062		X	1.05

Samples (by outfall) collected through 10/31/12				
Outfall	Date	Condition		Precipitation (in)
		Base flow	Precipitation	
03R	No Discharges	-	-	-
18R	9/6/2012	-	X	0.62
18R*	9/27/2012	-	X	1.74
18R	10/02/2012	-	X	0.61
18R*	10/06/2012	-	X	1.05
044	9/8/2012	-	X	1.58
044*	9/27/2012	-	X	1.74
044	10/06/2012	-	X	1.05
053	7/12/12	X	-	0.00
053	8/15/12	X	-	0.00
053	8/27/12	-	X	0.74
053	9/6/2012	-	X	0.62
053	9/24/2012	X		0.00
053*	9/27/2012	-	X	1.74
053	10/02/2012	-	X	0.61
053	10/05/2012	X	-	0.0
058	No Discharges	-	-	-
062	7/12/12	X		0.0
062	9/8/2012		X	1.58
062*	9/27/2012	-	X	1.74
062	10/06/2012	-	X	1.05

Notes:
*Sample was collected in addition to the required one base flow (dry weather) condition sample and one precipitation (wet weather) condition sample per month.
Outfalls 03R, 044, 058 and 062 were visited on 10/18/2012 after 0.56 inch of precipitation occurred on 10/17/2012 but none were discharging.

EPA-R5-2017-0081491NT_0000248

Biological Assessment Report
Bear Run Mine Sites BR1, BR2 and BR3
Peabody Midwest Mining, LLC

Prepared by:

Wetland Services, Inc.

Producing Results Today and Tomorrow

Introduction: This report summarizes stream biological assessments conducted by Wetland Services at the request of Peabody Midwest Mining. Sampling was completed on June 6 and June 27, 2012. The report and contributing assessments have been designed to portray the condition and structure of aquatic communities. This report is based on one or more biological assemblages including benthic macroinvertebrates, fish, water chemistry, and physical habitat. Macroinvertebrate communities are utilized for bio-monitoring due to their ease of collection and their sensitivity to water quality (EPA CALM, 2002).

Methods

Biological Evaluation Methods: Macroinvertebrate sampling followed the modified EPA *Multihabitat (MHAB) Macroinvertebrate Collection Procedure Technical SOP* designed by IDEM. Fish sampling followed the EPA fish sampling protocol modified by IDEM in *Summary of Protocols: Probability Based Site Assessment.*

Physical Evaluation Methods: Physical habitat evaluation followed the EPA RBP II physical habitat evaluation method outlined by the EPA.

Chemical Evaluation Methods: An Orion 5 Star water quality analysis meter was utilized to record temperature, total dissolved solids, (TDS), conductivity, and pH. The instrument was first calibrated with known solutions, then placed in the center of the thalweg of each sample point to acquire the specified test readings.

Field and Laboratory Processing: Samples were first processed in the field where they were elutriated with a sieve bucket to remove excess material. Next, a 15-minute field pick was performed to attempt to collect at least 100 organisms. Once in the lab, the organisms were separated and identified down to the genus level. Due to the small size of Chironomidae and Culicidae families, these organisms were slide mounted using CMCP-9AF mounting medium, glass slides, and cover glass. The slides were cured for 24-hours and then placed under a Leica DME compound microscope for identification down to the genus level.

Results

Biological Evaluation Results: Scores are based on IDEM's 303(d) listing methodology using bio-assessment methods. IDEM's 303(d) methodology sets the standard for biotic communities at a macroinvertebrate index of biotic integrity (mIBI) score of <35 as being "not supporting", and ≥35 being "fully supporting". Fish index of biotic integrity (fIBI) scores are rated as 12-22 "very poor", 23-34 "poor", 35-46 "fair", 47-52 "good" and 53-60 "excellent". The collection tables detail the order, family, and genus present for macroinvertebrates, as well as genus and species for fish encountered during sampling at each assessment site. The mIBI and fIBI

scores are displayed in separate tables. All scores can be viewed in the data table section following this narrative.

Physical Evaluation Results: These results are based on the EPA RBP physical Habitat Assessment for low-gradient streams. The RBP score is based on 10 habitat parameters. The overall score is out of 200 with a higher score indicating a more "optimal habitat". The actual habitat assessment process involves rating the 10 parameters as optimal, suboptimal, marginal, or poor based on the criteria included on the Habitat Assessment Field Data Sheets, (EPA 841-B-99-002). See the data table section at the end of this narrative for a breakdown of each site's score.

Chemical Evaluation Results: Results of water chemistry analysis are displayed in a table following this narrative.

Quality Assurance/Quality Control (QA/QC): QA/QC in biological assessments involves labeling samples clearly and accurately so that collected data corresponds with the correct project, cleaning all nets, sieves, and gear used in sampling to ensure that organisms identified are representative of the sites sampled, along with performing duplicate sampling events on ten percent of the sampling sites to ensure that accurate species compositions are attained, and that sampling effort and technique are consistent.

Discussion: Upon investigation of the additional sites of interest it was found that one site (BR1) was dry. This site is located on a stream that is an outlet for an area of prelaw landscape and drains a series of intermittent/seasonal ponds. No collection occurred at BR1. Site BR2 is located on a perennial stream. BR3 is located on an intermittent stream. BR2 and BR3 are located in pre-law formed drainages. Weather conditions at the time of sampling were stable and hot with no heavy rain event within 7 days.

Results of the macroinvertebrate Index of Biotic Integrity were valued at 34 (BR2) and 24 (BR3). Scores place both streams below the non-impaired status of ≥35, and therefore can be listed as not fully supporting of macroinvertebrate communities. Low diversity of taxa, specifically the EPT taxa, and low percentages of intolerant taxa limited mIBI scores. Macroinvertebrate community at BR3 was dominated by benthic chironomid larva, specifically *Chironomus*, a genus tolerant of low dissolved oxygen levels (Stief, 2005).

Results of the fish Index of Biotic Integrity were valued at 42 (BR2) and 34 (BR3) placing streams in the fair (BR2) and poor (BR3) categories. Fish collection was performed via dip netting pools at BR3 due to lack of stream flow, small stream dimensions, and high conductivities affecting the efficiency of electrofishing. Overall, fIBI scores were limited by a lack of sucker and simple lithophilic species. High densities of insectivorous fish at BR3 may have also decreased macroinvertebrate abundance at BR3 and is supported in findings by Williams et al., (2003).

Physical habitat for all streams resulted in marginal habitat scores due to disturbed or low vegetative zone widths associated with land development. Degraded bank stability, vegetative protection, and increased sedimentation occur at all sites leading to marginal epifaunal substrate/available cover. Substrate of BR2 is dominated by *Corbicula* (Asian clam) shells in riffle habitat.

Upon completion of in-situ water chemistry analysis pH was 8.2 (BR2) and 6.6 (BR3). Both sites fell within Indiana pH standards (range of pH 6 – pH 9) for surface waters. Bio-assessment sites displayed high conductivities and TDS levels.

References

EPA Consolidated Assessment & Listing Methodology (CALM), 2002

EPA's Wadeable Stream Survey: A Collaborative Survey of the Nation's Streams.

http://www.in.gov/idem/5093.htm. IDEM Drinking Water Compliance Evaluation.

IDEM Multi-Habitat (MHAB) Macroinvertebrate Collection Procedure. S-001-OWQ-W-BS-10-T-R0 Technical Standard Operating Procedure. Office of Water Quality, Watershed Planning Assessment Branch, Biological Studies Section. October 2010.

IDEM, Office of Water Quality Assessment Branch Summary of Protocols: Probability Based Site Assessment. IDEM 32/03/002/1999 July 2005

Macroinvertebrate Index of Biotic Integrity (INmIBI) Based on Multi-Habitat D-Frame Sampling, 15-Minute Field Sort, Lowest Taxa Identifications. Draft

Stief, P. Nazarova, L. Beer, D. Chimney construction by *Chironomus riparius* larvae in response to hypoxia: microbial implications for freshwater sediments. J.N. Am. Benthological Society, Vol. 24 (4) pg 858-871. 2005

Williams, L. Taylor, C. Melvin, L. Influence of Fish Predation on Assemblage Structure of Macroinvertebrates in an Intermittent Stream. Transactions of the American Fisheries Society, Vol. 132 (4), pg 120-130. 2003

Data Tables

Sample Point Locations				
Sample Point	**Latitude**	**Longitude**	**Watershed size (acres)**	**Watershed**
BR1	39.0556	-87.2883	21	Busseron Creek
BR2	38.9775	-87.2605	165	White River
BR3	39.0325	-87.2585	287	White River

	Chemical Evaluation Results		
Variables	**BR1**	**BR2**	**BR3**
Temperature	NA	73° F	70° F
Conductivity	NA	2590 µs/cm	2540 µs/cm
TDS	NA	1314 mg/l	1288 mg/l
pH	NA	8.2	6.6
Turbidity	NA	Clear	Stained

Benthic Macroinvertebrates Collected by Sample Points					
Order	**Family**	**Genus**	**BR1**	**BR2**	**BR3**
Conchostraca					2
Copepoda					3
Decapoda	Cambaridae			1	
Veneroida	Corbiculidae	Corbicula		5	
Gastropoda	Physidae	Physa		1	2
Diptera	Chironomidae	Chironomus			25
		Dicrotendipes			4
		Polypedilum			1
		Tanypodinae		1	
		Procladius		1	2
		Ablabesmyia		2	2
		Psectrotanypus			1
		Tanytarsus			4
		Conchapelopia		2	
	Culicidae	Anopheles			7
		Culex			2
Megaloptera	Sialidae	Sialis		2	3
Hemiptera	Hydrometridae	Hydrometra		1	
	Corixidae	Corisella		1	
Coleoptera	Elmidae	Stenelmis		2	
		Promoresia		1	
		Macronychus		5	
		Narpus		4	
		Dubiraphia		2	
Odonata	Gomphidae	Hagenius		3	
		Gomphus		1	
	Corduliidae	Somatochlora			1
	Coenagrionidae	Argia		9	
		Enallagma		5	
	Aeshnidae	Anax		2	
Total			**No Water**	**51**	**59**

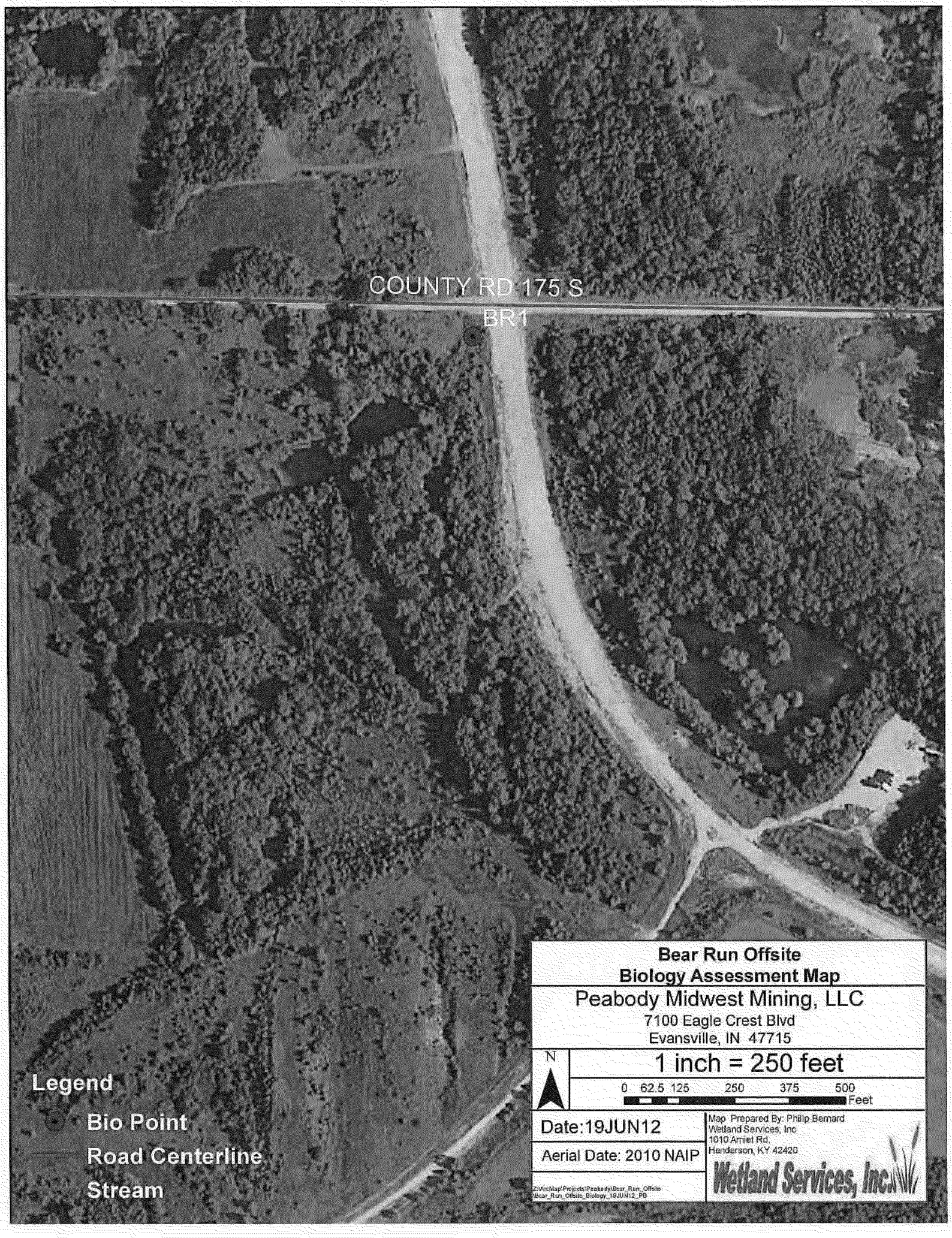
Fish Collected by Sample Point					
Genus	**Species**	**Common name**	**BR1**	**BR2**	**BR3**
Amerius	melas	black bullhead		2	
Amerius	natalis	yellow bullhead			1
Etheostoma	nigrum	johnny darter		3	
Lepomis	cyanellus	green sunfish		18	15
Lepomis	macrochirus	blue gill		21	16
Lepomis	megalotis	long ear sunfish		4	
Lepomis	x-hybrid	green/longear sunfish hybrid		5	
Micropterus	salmoides	largemouth bass		2	2
Campostoma	anomalum	central stoneroller		2	
Semotilus	atromaculatus	creek chub		4	
Gambusia	affinis	mosquito fish		3	
Fundulus	notatus	blackstripe topminnow			12
Lepisosteus	oculatus	spotted gar		1	
Amia	calva	bowfin		1	
		Technique		BPE	DIP
Total			**No Water**	**66**	**46**

Backpack electrofisher (BPE), Dip net (DIP)

Results of the mIBI						
	BR1		**BR2**		**BR3**	
Metric	Value	Score	Value	Score	Value	Score
# of taxa			20	1	14	1
# of individuals			51	1	59	1
# EPT taxa			1	1	0	1
% Orth + Tan of Chironomidae			0%	5	11.42%	5
% Non-insects			12%	5	11.86%	5
# Diptera taxa			4	1	9	3
% Intolerant taxa			15.68%	1	1.75%	1
% Tolerant taxa			3.92%	5	54.23%	1
% Predators			49%	5	11.86%	1
% Sh + Sc			8%	1	5.2%	1
%Collector/Filterers			9.8%	5	22.8%	1
% Sprawlers			5.8%	3	5.08%	3
mIBI	**NA**		**34**		**24**	

Results of the fIBI						
	BR1		**BR2**		**BR3**	
Metric	Value	Score	Value	Score	Value	Score
# Species			12	5	5	5
# Minnow sp.			2	3	0	1
# Sunfish sp.			4	5	2	3
# Sucker sp.			0	1	0	1
# Sensitive sp.			1	5	0	1
% Tolerant sp.			40.9%	3	34.78%	3
% Omnivore sp.			0%	5	0%	5
% Insectivore sp.			77.27%	5	95.65%	5
% Pioneer sp.			40.9%	3	32.61%	3
CPU			66	1	46	1
% Simple lithophilic sp.			0%	1	0%	1
% w/ Delt anomalies			0%	5	0%	5
fIBI	**NA**		**42**		**34**	

Results From the EPA RBP Physical Habitat Assessment			
Parameters	**BR1**	**BR2**	**BR3**
Epifaunal/Substrate available Cover	4	8	11
Pool Substrate Character	6	9	11
Pool Variability	6	8	10
Sediment deposit	12	13	16
Channel Flow Status	1	11	5
Channel Alteration	9	15	17
Channel Sinuosity	5	6	7
Bank Stability	12	14	12
Vegetative protection	8	12	14
Riparian Vegetative Zone Width	6	10	16
Total	**69**	**106**	**119**


COUNTY RD 175 S
BR1
Legend
Bio Point
Road Centerline
Stream
Bear Run Offsite
Biology Assessment Map
Peabody Midwest Mining, LLC
7100 Eagle Crest Blvd
Evansville, IN 47715
N
1 inch = 250 feet
0 62.5 125 250 375 500
Feet
Date:19JUN12
Aerial Date: 2010 NAIP
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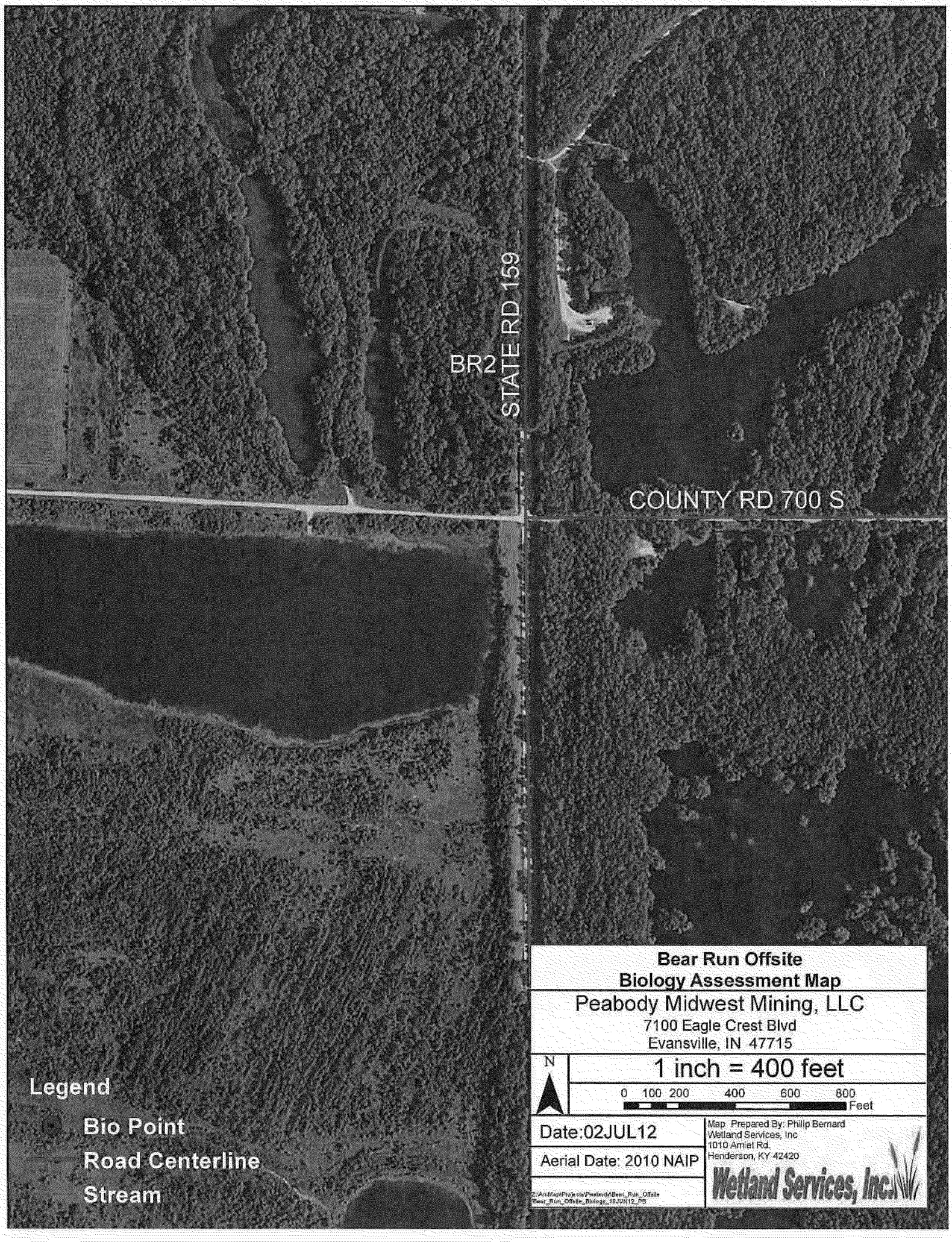
\Bear_Run_Offsite_Biology_19JUN12_PB
Map Prepared By: Philip Bernard
Wetland Services, Inc
1010 Amiet Rd.
Henderson, KY 42420
Wetland Services, Inc.


BR2
STATE RD 159
COUNTY RD 700 S
Legend
Bio Point
Road Centerline
Stream
Bear Run Offsite
Biology Assessment Map
Peabody Midwest Mining, LLC
7100 Eagle Crest Blvd
Evansville, IN 47715
N
1 inch = 400 feet
0 100 200 400 600 800
Feet
Date:02JUL12
Aerial Date: 2010 NAIP
Map Prepared By: Philip Bernard
Wetland Services, Inc
1010 Amiet Rd.
Henderson, KY 42420
Wetland Services, Inc.

STATE RD 159
BR3
COUNTY RD 350 S
Legend
Bio Point
Road Centerline
Stream
Bear Run Offsite
Biology Assessment Map
Peabody Midwest Mining, LLC
7100 Eagle Crest Blvd
Evansville, IN 47715
N
1 inch = 200 feet
0 50 100 200 300 400
Feet
Date:02JUL12
Aerial Date: 2010 NAIP
Map Prepared By: Philip Bernard
Wetland Services, Inc
1010 Amiet Rd.
Henderson, KY 42420
Wetland Services, Inc.

Project ID: BEAR RUN		Stream Class:	Ephemeral
Stream ID: BR 1		Location:	SULLIVAN IN
Lat: 39.0556	Long: -87.2883	River Basin	Busseron Creek/Wabash River

Investigators: Rajesh Poudel, Keith Michalski, Josh Iddings

Signature:

Date: 06-Jun-12
Time: 3:00 PM

Reason for Survey: Functional Assessment

WEATHER CONDITIONS

Current
- ☐ Storm (Heavy Rain)
- ☐ Rain Steady
- ☐ Showers (Intermittent)
- ☐ Cloud Cover % 0
- ☑ Clear/Sunny

Past 24 Hour
- ☐ Storm (Heavy Rain)
- ☐ Rain Steady
- ☐ Showers (Intermittent)
- ☐ Cloud Cover % 0
- ☑ Clear/Sunny

Heavy rain in last 7 days: ☑ No ☐ Yes

Air Temp F 75
Air Temp C 24
Other

STREAM CHARACTERIZATION

Stream Subsystem: ☐ Perennial ☐ Intermittent ☑ Ephemeral

Stream Type: ☐ Coldwater ☑ Warmwater

Stream Origin: ☐ Upland Runoff ☑ Mixture of Origin ☐ Spring-fed/Ground Water ☐ Wetland ☐ Other

Catchment Area: Mile^2 0.03; Km^2 0.08

WATERSHED FEATURES

Surrounding Land Use & Percentag
- ☑ Forest 20
- ☑ Field/Pasture 50
- ☑ Agriculture 30
- ☐ Residential 0
- ☐ Commercial 0
- ☐ Other 0

Local Watershed NPS Pollution: ☐ No evidence ☑ Some potential source ☐ Obvious sources

Local Watershed Erosion: ☐ None ☑ Moderate ☐ Heavy

RIPARIAN VEGETATION (18 meter buffer)

Indicate the dominant type and record the dominant species present: ☑ Trees ☐ Shrubs ☐ Grasses ☐ Herbs ☐ None

Dominant Species

INSTREAM FEATURES

Est Reach Length	ft	100	m	30
Est Stream Width	ft	2.2	m	0.7
Sampling Reach Area	ft^2	220.0	m^2	20.4
Sampling Area	mile^2	0.000008	km^2	0.000020
Est Water Depth	in	0.0	m	0.0
Surface Velocity	ft/s	0.0	m/s	0.0

Channelized: ☐ Yes ☑ No

Dam Present: ☐ Yes ☑ No

Canopy Cover: ☐ Open ☐ Partly Open ☐ Shaded ☑ Partly Shaded

High Water Mark ft 0.00

High Water Mark m 0.00

% of Stream Morphology
- ☑ Riffle % 20
- ☑ Run % 60
- ☑ Pool % 20
- ☐ Glide Pool
- ☐ Step Pool Series

LARGE WOODY DEBRIS

LWD 0.0 m^2 0 ft^2

Density of LW m^2/km^2 0.0000000000 ft^2/mile^2 0.0000000000

AQUATIC VEGETATION

Indicate the dominant type and record the dominant species present
- ☑ Rooted Emergent
- ☐ Rooted Submergent
- ☐ Rooted Floating
- ☐ None
- ☐ Free Floating
- ☐ Attached Algae
- ☐ Floating Algae

Portion of the reach with aquatic vegetation present: 25

WATER QUALITY

- ☑ No Water Present
- ☐ No Flow Present

Temperature 0 °C 0 °F

Conductivity µs/cm 0

Total Disolved Solids 0 mg/l

pH 0

Water Odors: ☑ Normal/None ☐ Sewage ☐ Petroleum ☐ Chemical ☐ Anaerobic

Turbidity: ☐ Clear ☐ Slightly Turbid ☐ Turbid ☐ Opaque ☐ Stained ☐ Other

Water Surface Oils: ☐ Slick ☐ Sheen ☐ Globs ☐ Flecks ☐ Other

SEDIMENT/ SUBSTRATE

Odors
- [x] Normal
- [ ] Sewage
- [ ] Petroleum
- [ ] Chemical
- [ ] Anaerobic
- [ ] None
- [ ] Other

Oils
- [x] Absent
- [ ] Slight
- [ ] Moderate
- [ ] Profuse

Deposits
- [ ] Sludge
- [ ] Sawdust
- [ ] Paper Fiber
- [ ] Sand
- [ ] Relic Shells
- [ ] Other

Looking at stones which are not deeply embedded, are undersides black in color?
- [ ] Yes
- [x] No

INORGANIC SUBSTRATE COMPONENTS			ORGANIC SUBSTRATE COMPONENTS		
Substrate Type	**Diameter**	**% Composite in Sampling Reach**	**Substrate Type**	**Characteristic**	**% Composition in Sampling Reach**
Bedrock		0	Dietritus	Sticks, wood, coarse plant material	1
Boulder	>10"	0			
Cobble	2.5 - 10"	0	Muck-Mud	Black, very fine organic matter	0
Gravel	0.1 - 2.5"	5			
Sand	gritty	30	Marl	Grey, shell fragments	0
Silt	gooey	45			
Clay	slick	20			

Habitat Parameter	HABITAT ASSESSMENT - LOW GRADIENT STREAMS			
	Optimal	**SubOptimal**	**Marginal**	**Poor**
1. Epifaunal Substrate/ Available Cover	Greater than 50% for low gradient streams) of substrate favorable for epifaunal colonization & fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat & at stage to allow full colonization potential (i.e., logs/snags that are not new fall and not transient).	30-50% for low gradient streams) mix ofstable habitat; well-suited for full colonization potential; adequate habitatfor maintenance ofpopulations; presence of additional substrate in form of new fall, but not yet prepared for colonization (may rate at high end of scale).	10-30% for low gradient streams) mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	10% for low gradient streams)stable habitat; lack of habitat is obvious;substrate unstable or lacking.
Score 4	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 ✔4 3 2 1 0
2. Pool Substrate Characterization	Mixture of substrate materials, with gravel and firm sand prevalent; root mats and submerged vegetation common.	Mixture of soft sand, mud or clay; mud may be dominant; some root mats and submerged vegetation present.	All mud or clay or sand bottom: little or no root mat: no submerged vegetation.	Hardpan clay of bedrock: no root mat or vegetation.
Score 6	20 19 18 17 16	15 14 13 12 11	10 9 8 7 ✔6	5 4 3 2 1 0
3. Pool Variability	Even mix of largeshallow, large-deep, smallshallow, small-deep pools present.	Majority of pools large deep; very few shallow	Shallow pools much more prevalent than deep pools.	Majority of pools small shallow or pools absent.
Score 6	20 19 18 17 16	15 14 13 12 11	10 9 8 7 ✔6	5 4 3 2 1 0
4. Sediment Deposition	Little or no enlargement of islands or point bars and less than <20% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 20-50% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 50-80% of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.	Heavy deposits of fine material, increased bar development; more than 80% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.
Score 12	20 19 18 17 16	15 14 13 ✔12 11	10 9 8 7 6	5 4 3 2 1 0

5. Channel Flow Status		Water reaches base of both lower banks, and mimimal amount of channel substrate is exposed.	Water fills >75% of the available channel; or <25% of channel substrate is exposed.	Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.	Very little water in channel and mostly present as standing pools.
Score	1	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 ✔ 1 0
6. Channel Alteration		Channelization or dredging absent or minimal; stream with normal pattern.	Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr) may be present, but recent channelization is not present.	Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.	Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.
Score	9	20 19 18 17 16	15 14 13 12 11	10 ✔ 9 8 7 6	5 4 3 2 1 0
7. Channel Sinuosity		The bends in the stream increase the stream length 3 to 4 times longer than if it was in a straight line. (Note - channel braiding is considered coastal plains and other normal low-lying areas. this parameter is not easily rated in these areas.)	The bends in the stream increase the stream length 2 to 3 times longer than if it was in a straight line.	The bends in the stream increase the stream length 1 to 2 times longer than if it was in a straight line.	Channel straight; waterway has been channelized for a long distance.
Score	5	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	✔ 5 4 3 2 1 0
8. Bank Stability (score each bank) **Note: determine left or right side by facing downstream.**		Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.	Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.	Unstable; many eroded areas; "raw" areas frequently along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.
Score (LB)	6	10 9	8 7 ✔ 6	5 4 3	2 1 0
Score (RB)	6	10 9	8 7 ✔ 6	5 4 3	2 1 0
9. Vegetative Protection (score each bank) **Note: determine left or right side by facing downstream.**		More than 90% of the streambank surfaces and immediate riparian zones covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the stream- -bank surfaces covered by native vegetation, but one class of plants is not not well represented disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.	50-70% of the stream- bank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.
Score (LB)	4	10 9	8 7 6	5 ✔ 4 3	2 1 0
Score (RB)	4	10 9	8 7 6	5 ✔ 4 3	2 1 0
10. Riparian Vegstative Zone Width (score each bank riparian zone)		Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.	Width of riparian zone 12- 18 meters; human activities have impacted zone only minimally.	Width of riparian zone 6- 12 meters; human activities have impacted zone a great deal.	Width of riparian zone <6 meters: little or no riparian vegetation due to human activities.
Score (LB)	3	10 9	8 7 6	5 4 ✔ 3	2 1 0
Score (RB)	3	10 9	8 7 6	5 4 ✔ 3	2 1 0
Total Score	69				

Project ID: BEAR RUN	Stream Class: Perennial
Stream ID: BR 2	Location: SULLIVAN IN
Lat: 38.9775 Long: -87.2605	River Basin: White River
Investigators: Rajesh Poudel, Keith Michalski, Josh Iddings	
Signature:	Date: 06-Jun-12 / Time: 3:35 PM / Reason for Survey: Functional Assessment

WEATHER CONDITIONS

Current: ☐ Storm (Heavy Rain) ☐ Rain Steady ☐ Showers (Intermittent) ☐ Cloud Cover % 0 ☑ Clear/Sunny

Past 24 Hour: ☐ Storm (Heavy Rain) ☐ Rain Steady ☐ Showers (Intermittent) ☐ Cloud Cover % 0 ☑ Clear/Sunny

Heavy rain in last 7 days: ☑ No ☐ Yes

Air Temp F 78
Air Temp C 26
Other

STREAM CHARACTERIZATION

Stream Subsystem: ☑ Perennial ☐ Intermittent ☐ Ephemeral

Stream Type: ☐ Coldwater ☑ Warmwater

Stream Origin: ☐ Upland Runoff ☑ Mixture of Origin ☐ Spring-fed/Ground Water ☐ Wetland ☐ Other

Catchment Area: Mile ^{2} 0.26; Km ^{2} 0.67

WATERSHED FEATURES

Surrounding Land Use & Percentag:
☑ Forest 30 ☐ Commercial 0
☑ Field/Pasture 40 ☐ Other 0
☑ Agriculture 30
☐ Residential 0

Local Watershed NPS Pollution: ☐ No evidence ☑ Some potential source ☐ Obvious sources

Local Watershed Erosion: ☐ None ☑ Moderate ☐ Heavy

RIPARIAN VEGETATION (18 meter buffer)

Indicate the dominant type and record the dominant species present: ☑ Trees ☐ Shrubs ☐ Grasses ☐ Herbs ☐ None

Dominant Species: Maple, River Birch, Dogwood, Pine, Sassafras

INSTREAM FEATURES

Est Reach Length	ft	100	m	30
Est Stream Width	ft	7.5	m	2.3
Sampling Reach Area	ft ^{2}	750.0	m ^{2}	69.7
Sampling Area	mile^2	0.000028	km^2	0.000070
Est Water Depth	in	4.0	m	0.1
Surface Velocity	ft/s	0.5	m/s	0.2

Canopy Cover: ☐ Open ☐ Partly Open ☑ Shaded ☐ Partly Shaded

High Water Mark ft 0.00
High Water Mark m 0.00

Channelized: ☐ Yes ☑ No
Dam Present: ☐ Yes ☑ No

% of Stream Morphology: ☑ Riffle % 30 ☑ Run % 60 ☑ Pool % 10 ☐ Glide Pool ☐ Step Pool Series

LARGE WOODY DEBRIS

LWD 0.5 m ^{2} 5 ft ^{2}

Density of LW m ^{2} /km ^{2} 0.0000004645 ft ^{2} /mile ^{2} 0.0000001794

AQUATIC VEGETATION

Indicate the dominant type and record the dominant species present: ☑ Rooted Emergent ☐ Rooted Submergent ☐ Rooted Floating ☐ None ☐ Free Floating ☐ Attached Algae ☐ Floating Algae

Portion of the reach with aquatic vegetation present: 2

WATER QUALITY

☐ No Water Present ☐ No Flow Present

Temperature	23 °C	73 °F
Conductivity	2590 µs/cm	
Total Disolved Solids	1314 mg/l	
pH	8.2	

Water Odors: ☑ Normal/None ☐ Sewage ☐ Petroleum ☐ Chemical ☐ Anaerobic

Turbidity: ☑ Clear ☐ Slightly Turbid ☐ Turbid ☐ Opaque ☐ Stained ☐ Other

Water Surface Oils: ☐ Slick ☐ Sheen ☐ Globs ☐ Flecks ☐ Other

SEDIMENT/ SUBSTRATE	
Odors	☑ Normal ☐ Sewage ☐ Petroleum ☐ Chemical ☐ Anaerobic ☐ None ☐ Other
Oils	☑ Absent ☐ Slight ☐ Moderate ☐ Profuse
Deposits	☐ Sludge ☐ Sawdust ☐ Paper Fiber ☑ Sand ☐ Relic Shells ☐ Other
Looking at stones which are not deeply embedded, are undersides black in color?	☐ Yes ☑ No

INORGANIC SUBSTRATE COMPONENTS			ORGANIC SUBSTRATE COMPONENTS		
Substrate Type	Diameter	% Composite in Sampling Reach	Substrate Type	Characteristic	% Composition in Sampling Reach
Bedrock		0	Dietritus	Sticks, wood, coarse plant material	1
Boulder	>10"	0			
Cobble	2.5 - 10"	0	Muck-Mud	Black, very fine organic matter	0
Gravel	0.1 - 2.5"	10			
Sand	gritty	40	Marl	Grey, shell fragments	15
Silt	gooey	25			
Clay	slick	25			

Habitat Parameter		HABITAT ASSESSMENT - LOW GRADIENT STREAMS			
		Optimal	SubOptimal	Marginal	Poor
1. Epifaunal Substrate/ Available Cover		Greater than 50% for low gradient streams) of substrate favorable for epifaunal colonization & fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat & at stage to allow full colonization potential (i.e., logs/snags that are not new fall and not transient).	30-50% for low gradient streams) mix ofstable habitat; well-suited for full colonization potential; adequate habitatfor maintenance ofpopulations; presence of additional substrate in form of new fall, but not yet prepared for colonization (may rate at high end of scale).	10-30% for low gradient streams) mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	10% for low gradient streams)stable habitat; lack of habitat is obvious;substrate unstable or lacking.
Score	8	20 19 18 17 16	15 14 13 12 11	10 9 ☑ 8 7 6	5 4 3 2 1 0
2. Pool Substrate Characterization		Mixture of substrate materials, with gravel and firm sand prevalent; root mats and submerged vegetation common.	Mixture of soft sand, mud or clay; mud may be dominant; some root mats and submerged vegetation present.	All mud or clay or sand bottom: little or no root mat: no submerged vegetation.	Hardpan clay of bedrock: no root mat or vegetation.
Score	9	20 19 18 17 16	15 14 13 12 11	10 ☑ 9 8 7 6	5 4 3 2 1 0
3. Pool Variability		Even mix of largeshallow, large-deep, smallshallow, small-deep pools present.	Majority of pools large deep; very few shallow	Shallow pools much more prevalent than deep pools.	Majority of pools small shallow or pools absent.
Score	8	20 19 18 17 16	15 14 13 12 11	10 9 ☑ 8 7 6	5 4 3 2 1 0
4. Sediment Deposition		Little or no enlargement of islands or point bars and less than <20% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 20-50% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 50-80% of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.	Heavy deposits of fine material, increased bar development; more than 80% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.
Score	13	20 19 18 17 16	15 14 ☑ 13 12 11	10 9 8 7 6	5 4 3 2 1 0

5. Channel Flow Status		Water reaches base of both lower banks, and mimimal amount of channel substrate is exposed.	Water fills >75% of the available channel; or <25% of channel substrate is exposed.	Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.	Very little water in channel and mostly present as standing pools.
Score	11	20 19 18 17 16	15 14 13 12 ✔ 11	10 9 8 7 6	5 4 3 2 1 0
6. Channel Alteration		Channelization or dredging absent or minimal; stream with normal pattern.	Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr) may be present, but recent channelization is not present.	Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.	Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.
Score	15	20 19 18 17 16	✔ 15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
7. Channel Sinuosity		The bends in the stream increase the stream length 3 to 4 times longer than if it was in a straight line. (Note - channel braiding is considered coastal plains and other normal low-lying areas. this parameter is not easily rated in these areas.)	The bends in the stream increase the stream length 2 to 3 times longer than if it was in a straight line.	The bends in the stream increase the stream length 1 to 2 times longer than if it was in a straight line.	Channel straight; waterway has been channelized for a long distance.
Score	6	20 19 18 17 16	15 14 13 12 11	10 9 8 7 ✔ 6	5 4 3 2 1 0
8. Bank Stability (score each bank) **Note: determine left or right side by facing downstream.**		Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.	Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.	Unstable; many eroded areas; "raw" areas frequently along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.
Score (LB)	7	10 9	8 ✔ 7 6	5 4 3	2 1 0
Score (RB)	7	10 9	8 ✔ 7 6	5 4 3	2 1 0
9. Vegetative Protection (score each bank) **Note: determine left or right side by facing downstream.**		More than 90% of the streambank surfaces and immediate riparian zones covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the stream- -bank surfaces covered by native vegetation, but one class of plants is not not well represented disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.	50-70% of the stream- bank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.
Score (LB)	6	10 9	8 7 ✔ 6	5 4 3	2 1 0
Score (RB)	6	10 9	8 7 ✔ 6	5 4 3	2 1 0
10. Riparian Vegstative Zone Width (score each bank riparian zone)		Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.	Width of riparian zone 12- 18 meters; human activities have impacted zone only minimally.	Width of riparian zone 6- 12 meters; human activities have impacted zone a great deal.	Width of riparian zone <6 meters: little or no riparian vegetation due to human activities.
Score (LB)	5	10 9	8 7 6	✔ 5 4 3	2 1 0
Score (RB)	5	10 9	8 7 6	✔ 5 4 3	2 1 0
Total Score	106				

Project ID: BEAR RUN		Stream Class:	Intermittent
Stream ID: BR 3		Location:	SULLIVAN IN
Lat: 39.0325	Long: -87.2585	River Basin	White River
Investigators: Keith Michalski, Nate Noland			
Signature:	Date: 27-Jun-12	Reason for Survey:	
	Time: 12:32 PM	Functional Assessment	

WEATHER CONDITIONS

Current: ☐ Storm (Heavy Rain) ☐ Rain Steady ☐ Showers (Intermittent) ☐ Cloud Cover % 0 ☑ Clear/Sunny

Past 24 Hour: ☐ Storm (Heavy Rain) ☐ Rain Steady ☐ Showers (Intermittent) ☐ Cloud Cover % 0 ☑ Clear/Sunny

Heavy rain in last 7 days: ☑ No ☐ Yes

Air Temp F 84
Air Temp C 29
Other

STREAM CHARACTERIZATION

Stream Subsystem: ☐ Perennial ☑ Intermittent ☐ Ephemeral

Stream Type: ☐ Coldwater ☑ Warmwater

Stream Origin: ☐ Upland Runoff ☑ Mixture of Origin ☐ Spring-fed/Ground Water ☐ Wetland ☐ Other

Catchment Area: Mile ^{2} 0.45; Km ^{2} 1.16

WATERSHED FEATURES

Surrounding Land Use & Percentag:
☑ Forest 60 ☐ Commercial 0
☐ Field/Pasture 0 ☑ Other 40
☐ Agriculture 0 Reclaim mine land
☐ Residential 0

Local Watershed NPS Pollution: ☐ No evidence ☑ Some potential source ☐ Obvious sources

Local Watershed Erosion: ☐ None ☑ Moderate ☐ Heavy

RIPARIAN VEGETATION (18 meter buffer)

Indicate the dominant type and record the dominant species present: ☑ Trees ☐ Shrubs ☐ Grasses ☐ Herbs ☐ None

Dominant Species: Acer sp., Ulmus americana, Asimina triloba

INSTREAM FEATURES

Est Reach Length	ft	100	m	30
Est Stream Width	ft	15.0	m	4.6
Sampling Reach Area	ft ^{2}	1500.0	m ^{2}	139.4
Sampling Area	mile^2	0.000055	km^2	0.000139
Est Water Depth	in	6.0	m	0.2
Surface Velocity	ft/s	0.0	m/s	0.0

Channelized: ☐ Yes ☑ No
Dam Present: ☐ Yes ☑ No

Canopy Cover: ☐ Open ☐ Partly Open ☐ Shaded ☑ Partly Shaded

High Water Mark ft 0.00
High Water Mark m 0.00

% of Stream Morphology: ☑ Riffle % 40 ☑ Run % 25 ☑ Pool % 35 ☐ Glide Pool ☐ Step Pool Series

LARGE WOODY DEBRIS

LWD 0.9 m ^{2} 10 ft ^{2}
Density of LW m ^{2} /km ^{2} 0.0000009290 ft ^{2} /mile ^{2} 0.0000003587

AQUATIC VEGETATION

Indicate the dominant type and record the dominant species present: ☐ Rooted Emergent ☐ Rooted Submergent ☐ Rooted Floating ☐ None ☐ Free Floating ☑ Attached Algae ☐ Floating Algae

Portion of the reach with aquatic vegetation present: 2

WATER QUALITY

☐ No Water Present ☑ No Flow Present

Temperature	21 °C	70 °F
Conductivity	2540 µs/cm	
Total Disolved Solids	1288 mg/l	
pH	6.6	

Water Odors: ☑ Normal/None ☐ Sewage ☐ Petroleum ☐ Chemical ☐ Anaerobic

Turbidity: ☐ Clear ☐ Slightly Turbid ☐ Turbid ☐ Opaque ☑ Stained ☐ Other

Water Surface Oils: ☐ Slick ☐ Sheen ☐ Globs ☐ Flecks ☐ Other

SEDIMENT/ SUBSTRATE

Odors
- [x] Normal
- [ ] Sewage
- [ ] Petroleum
- [ ] Chemical
- [ ] Anaerobic
- [ ] None
- [ ] Other

Oils
- [x] Absent
- [ ] Slight
- [ ] Moderate
- [ ] Profuse

Deposits
- [ ] Sludge
- [ ] Sawdust
- [ ] Paper Fiber
- [ ] Sand
- [ ] Relic Shells
- [ ] Other

Looking at stones which are not deeply embedded, are undersides black in color?
- [x] Yes
- [ ] No

INORGANIC SUBSTRATE COMPONENTS			ORGANIC SUBSTRATE COMPONENTS		
Substrate Type	**Diameter**	**% Composite in Sampling Reach**	**Substrate Type**	**Characteristic**	**% Composition in Sampling Reach**
Bedrock		0	Dietritus	Sticks, wood, coarse plant material	5
Boulder	>10"	0			
Cobble	2.5 - 10"	3	Muck-Mud	Black, very fine organic matter	0
Gravel	0.1 - 2.5"	25			
Sand	gritty	37	Marl	Grey, shell fragments	0
Silt	gooey	30			
Clay	slick	5			

Habitat Parameter	HABITAT ASSESSMENT - LOW GRADIENT STREAMS			
	Optimal	**SubOptimal**	**Marginal**	**Poor**
1. Epifaunal Substrate/ Available Cover	Greater than 50% for low gradient streams) of substrate favorable for epifaunal colonization & fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat & at stage to allow full colonization potential (i.e., logs/snags that are not new fall and not transient).	30-50% for low gradient streams) mix ofstable habitat; well-suited for full colonization potential; adequate habitatfor maintenance ofpopulations; presence of additional substrate in form of new fall, but not yet prepared for colonization (may rate at high end of scale).	10-30% for low gradient streams) mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	10% for low gradient streams)stable habitat; lack of habitat is obvious;substrate unstable or lacking.
Score 11	20 19 18 17 16	15 14 13 12 ✓ 11	10 9 8 7 6	5 4 3 2 1 0
2. Pool Substrate Characterization	Mixture of substrate materials, with gravel and firm sand prevalent; root mats and submerged vegetation common.	Mixture of soft sand, mud or clay; mud may be dominant; some root mats and submerged vegetation present.	All mud or clay or sand bottom: little or no root mat: no submerged vegetation.	Hardpan clay of bedrock: no root mat or vegetation.
Score 11	20 19 18 17 16	15 14 13 12 ✓ 11	10 9 8 7 6	5 4 3 2 1 0
3. Pool Variability	Even mix of largeshallow, large-deep, smallshallow, small-deep pools present.	Majority of pools large deep; very few shallow	Shallow pools much more prevalent than deep pools.	Majority of pools small shallow or pools absent.
Score 10	20 19 18 17 16	15 14 13 12 11	✓ 10 9 8 7 6	5 4 3 2 1 0
4. Sediment Deposition	Little or no enlargement of islands or point bars and less than <20% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 20-50% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 50-80% of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.	Heavy deposits of fine material, increased bar development; more than 80% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.
Score 16	20 19 18 17 ✓ 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0

5. Channel Flow Status	Water reaches base of both lower banks, and mimimal amount of channel substrate is exposed.	Water fills >75% of the available channel; or <25% of channel substrate is exposed.	Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.	Very little water in channel and mostly present as standing pools.
Score 5	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	✔5 4 3 2 1 0
6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.	Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr) may be present, but recent channelization is not present.	Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.	Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.
Score 17	20 19 18 ✔17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
7. Channel Sinuosity	The bends in the stream increase the stream length 3 to 4 times longer than if it was in a straight line. (Note - channel braiding is considered coastal plains and other normal low-lying areas. this parameter is not easily rated in these areas.)	The bends in the stream increase the stream length 2 to 3 times longer than if it was in a straight line.	The bends in the stream increase the stream length 1 to 2 times longer than if it was in a straight line.	Channel straight; waterway has been channelized for a long distance.
Score 7	20 19 18 17 16	15 14 13 12 11	10 9 8 ✔7 6	5 4 3 2 1 0
8. Bank Stability (score each bank) **Note: determine left or right side by facing downstream.**	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.	Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.	Unstable; many eroded areas; "raw" areas frequently along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.
Score (LB) 6	10 9	8 7 ✔6	5 4 3	2 1 0
Score (RB) 6	10 9	8 7 ✔6	5 4 3	2 1 0
9. Vegetative Protection (score each bank) **Note: determine left or right side by facing downstream.**	More than 90% of the streambank surfaces and immediate riparian zones covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the stream- -bank surfaces covered by native vegetation, but one class of plants is not not well represented disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.	50-70% of the stream- bank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.
Score (LB) 7	10 9	8 ✔7 6	5 4 3	2 1 0
Score (RB) 7	10 9	8 ✔7 6	5 4 3	2 1 0
10. Riparian Vegstative Zone Width (score each bank riparian zone)	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.	Width of riparian zone 12- 18 meters; human activities have impacted zone only minimally.	Width of riparian zone 6- 12 meters; human activities have impacted zone a great deal.	Width of riparian zone <6 meters: little or no riparian vegetation due to human activities.
Score (LB) 8	10 9	✔8 7 6	5 4 3	2 1 0
Score (RB) 8	10 9	✔8 7 6	5 4 3	2 1 0
Total Score 119				