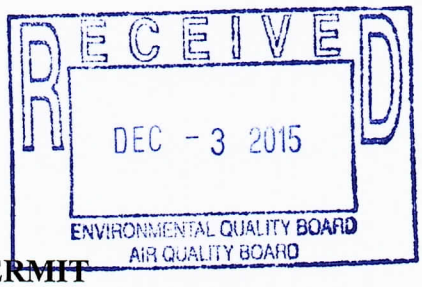


CERTIFIED RECORD INVENTORY

FOR

HALL DRILLING, LLC 2D0859909 UIC PERMIT

VS.

JAMES A. MARTIN, CHIEF, OFFICE OF OIL AND GAS, WEST VIRGINIA DEPARTMENT OF ENVIRONMENTAL PROTECTION

NO. 15-44-EQB

DOCUMENT	DATE	PAGES	PAGE
EQB Order, Notice of Prehearing Conference, Memo in Support of Appeal	11/25/2015	20	1
Notice of Appeal, Memo in Support of Notice, Joint Motion for Indefinite Stay	11/20/2015	15	21
WVDEP-OOG - Site Visit Report	10/19/2015	97	36
WVDEP-OOG - Order No. 2015-UIC-7	10/10/2015	3	133
WVDEP-OOG - Analytical Results Summary	10/06/2015	1	136
REIC Laboratory - WVDEP-OOG - Analytical Report - Streams & Drains	09/30/2015	25	137
Email J. Hall to T. Bass concerning monitoring well construction field notes	08/27/2015	13	162
CES-August 2015 Groundwater Monitoring Well Additional Sampling	08/24/2015	25	175
KC Harvey - Tech Service Center - Stream Assessment	08/06/2015	16	200
KC Harvey - Tech Service Center Pollutant Analysis	04/25/2015	5	216
CES-November 2014 Groundwater Monitoring Well Sampling	12/04/2014	17	221
CES-June 2014 Groundwater Monitoring Well Sampling	07/03/2014	17	238
Reliance Lab-Analytical Report-Injection Water-Jan 14 to Dec. 16, 2014	01/15/2014	36	255
REIC Laboratory - Analytical Report - Monitoring Wells	11/21/2013	7	291
Reliance Laboratory - Analytical Report - Injection Water	08/05/2013	3	298
CES-Groundwater Monitoring Well Development Report	07/15/2013	20	301
REIC Laboratory - Analytical Report - Monitoring Wells	06/27/2013	7	321
WVDEP-OOG - UIC Permit UIC2D0859909	06/07/2013	6	328

DOCUMENT	DATE	PAGES	PAGE
CES-Groundwater Monitoring Well Installation & Development	04/25/2013	6	334
Pace Laboratory - Analytical Report - Injection Water – Radiological	04/22/2013	12	340
Reliance Laboratory - Analytical Report - Domestic Water Wells	03/28/2013	3	352
Reliance Laboratory - Analytical Report - Injection Water	03/20/2013	3	355

As a representative of the West Virginia Department of Environmental Protection, I James Martin, certify that the enclosed documents comprise all the relevant documents related to Appeal No. 15-44-EQB Hall Drilling, LLC vs. James A. Martin, Chief, Office of Oil and Gas, West Virginia Department of Environmental Protection.

Office of Oil and Gas
West Virginia Department of
Environmental Protection
By:

JAMES MARTIN

DATE

ENVIRONMENTAL QUALITY BOARD

HALL DRILLING, LLC,

Appellant,

v.

Appeal No. 15-44-EQB

**CHIEF, OFFICE OF OIL AND GAS,
WEST VIRGINIA DEPARTMENT
OF ENVIRONMENTAL PROTECTION,**

Appellee.

ORDER

Appeal No. 15-44-EQB was filed with the West Virginia Environmental Quality Board ("Board") on November 20, 2015. In accordance with West Virginia Code §22B-1-7(f), an evidentiary hearing concerning matters as more fully set forth in the Notice of Appeal filed in Appeal No. 15-44-EQB is scheduled for December 20, 2015.

Contemporaneous with the Notice of Appeal, Appellant filed a Joint Motion for Indefinite Stay of Hearing and Discovery. After careful review, Appellant's motion for indefinite stay of hearing and discovery is denied.

The Board, on its own motion, determined that the evidentiary hearing in Appeal No. 15-44-EQB shall be continued until the **February 11, 2016,** Board meeting. Said hearing will begin at 8:30 a.m. at the Board's offices located at 601 57th Street, Charleston, Kanawha County, West Virginia 25304.

It is so **ORDERED** and **ENTERED** this 25th day of November, 2015.

Environmental Quality Board

Jackie D. Shultz
for Dr. Edward Snyder, Chairperson

ENVIRONMENTAL QUALITY BOARD

HALL DRILLING, LLC,

Appellant,

v.

Appeal No. 15-44-EQB

**CHIEF, OFFICE OF OIL AND GAS,
WEST VIRGINIA DEPARTMENT
OF ENVIRONMENTAL PROTECTION,**

Appellee.

NOTICE OF PREHEARING CONFERENCE

Appeal No. 15-44-EQB was filed with the West Virginia Environmental Quality Board ("Board") on November 20, 2015. In accordance with West Virginia Code §22B-1-7(f), an evidentiary hearing concerning the matters set forth in the Notice of Appeal is scheduled for February 11, 2016.

Pursuant to CSR §46-4-5.2 of the *Procedural Rules Governing Appeals Before the Environmental Quality Board*, a **Prehearing Conference will be held on January 28, 2016, at 10:00 a.m.** before the Board's legal counsel. Parties may appear in person or by telephone. If appearing in person, the said prehearing will be conducted at the Board's offices located at 601 57th Street, Charleston, Kanawha County, West Virginia 25304. If appearing by telephone, dial 1-877-302-0757. After the welcome message, dial the conference ID (8855847) followed by the pound (#) key.

The proceedings will be recorded and transcribed at a later date if necessary. The following will be discussed at the prehearing: (1) Presentation and consideration of preliminary legal issues;

(2) Stipulations to facts that are not contested by the parties;

(3) Stipulations to the admission of evidence to avoid unnecessary proof;

(4) Identification and reduction of number of witnesses; and

(5) Consideration of any other matters that will aid in the expeditious conduct of the hearing.

It is further ordered that each counselor representative attending the prehearing conference is required to have a thorough knowledge of the case, be prepared to discuss it, and to make stipulations or admissions where appropriate and to argue any pending motions. Each counselor representative must have full authority from the party represented and any law firm with which associated to take such action as may be necessary to comply with this order.

It is further ordered that at the conclusion of the conference, either orally for the record or by separate writing, an order will be entered which recites any action taken and agreements reached by the parties. The order will take the place of all that has gone before and will control the subsequent course of the hearing unless modified to prevent manifest injustice.

ORDERED and **ENTERED** this 25th day of November, 2015.

Environmental Quality Board

for Dr. Edward Snyder, Chairperson

ENVIRONMENTAL QUALITY BOARD

HALL DRILLING, LLC,

Appellant,

v.

Appeal No. 15-44-EQB

CHIEF, OFFICE OF OIL AND GAS, WEST VIRGINIA DEPARTMENT OF ENVIRONMENTAL PROTECTION,

Appellee.

CERTIFICATE OF SERVICE

This is to certify that I, Jackie D. Shultz, Clerk for the Environmental Quality Board, have this day, the 25th day of November, 2015, served a true copy of the foregoing **Order** and **Notice of Prehearing Conference** in Appeal No. 15-44-EQB, by mailing the same via United States Mail, with sufficient postage, to the following address:

via certified first-class mail:

Robert E. Lannan, Esq. *Certified Mail: 9171999991703566121096*
Elizabeth T. Schindzielorz, Esq.
Christopher L. Hamb, Esq.
Robinson & McElwee PLLC
Suite 400
700 Virginia St., E.
Charleston WV 25301

via personal service:

James P. Martin, Director
Office of Oil and Gas
WV Department of Environmental Protection
601 57th Street, S.E.
Charleston, WV 25304

Jason Wandling, Esquire
Office of Legal Services
WV Department of Environmental Protection
601 57th Street, S.E.
Charleston, WV 25304

Jackie D. Shultz, Clerk

West Virginia Environmental Quality Board

601 57th Street, S.E.
Charleston, West Virginia 25304

Phone: (304) 926-0445
Fax: (304) 926-0486
www.wveqb.org

MEMORANDUM

DATE: **November 25, 2015**

TO: **James P. Martin, Director**
Office of Oil and Gas
WV Department of Environmental Protection

FROM: **Jackie D. Shultz, Clerk**
Environmental Quality Board

RE: ***Request for Certified File - Appeal No. 15-44-EQB***

Attached is Appeal No. 15-44-EQB, which was filed with the Environmental Quality Board on November 20, 2015. Within fourteen (14) days after receipt of this appeal, you must prepare, certify and provide to the Environmental Quality Board a complete record of the proceedings out of which the appeal arises, including all documents and correspondence in the Director's file relating to the matter in question. The record must be presented in chronological order and each page must be consecutively numbers.

The Certified File in this matter is due on December 9, 2015.

Thank you for your attention to this matter.

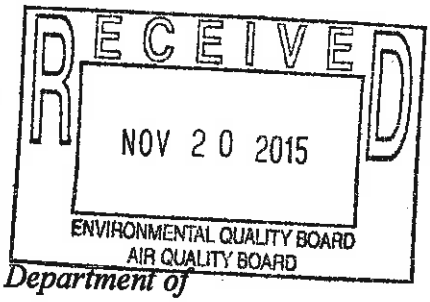
ROBINSON
&McELWEE
PLLC
attorneys at law

ROBERT E. LANNAN
ATTORNEY AT LAW

P.O. BOX 1791
CHARLESTON, WV 25326

DIRECT DIAL: (304) 347-8346
E-MAIL: rel@ramlaw.com

November 20, 2015



Ms. Jackie Shultz, Clerk
West Virginia Environmental Quality Board
601 57th St., SE
Charleston, WV 25304

Re: Hall Drilling, LLC v. Chief, Office of Oil and Gas, West Virginia Department of Environmental Protection – Appeal No. _____

Dear Ms. Shultz:

Enclosed herewith for filing with the West Virginia Environmental Quality Board please find the original and six copies of a **NOTICE OF APPEAL, MEMORANDUM IN SUPPORT OF NOTICE OF APPEAL** and **JOINT MOTION FOR INDEFINITE STAY OF HEARING AND DISCOVERY**. We appreciate your assistance.

Sincerely,

Robert E. Lannan

Counsel for
Hall Drilling, LLC

cc: Jason Wandling, Esq.
James A. Martin, Chief

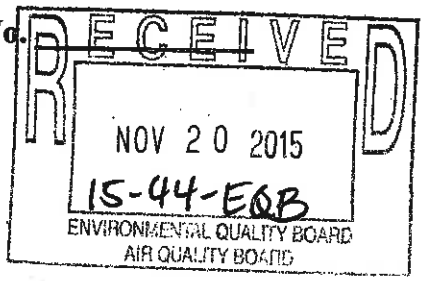
WEST VIRGINIA ENVIRONMENTAL QUALITY BOARD
CHARLESTON, WEST VIRGINIA

HALL DRILLING, LLC,

Appellant,

v.

Appeal No.



CHIEF, OFFICE OF OIL AND GAS, WEST VIRGINIA DEPARTMENT OF ENVIRONMENTAL PROTECTION,

Appellee.

NOTICE OF APPEAL

Action Complained Of: Appellant Hall Drilling, LLC respectfully represents that it is aggrieved by Order No. 2015-UIC-7, dated October 10, 2015.

Relief Requested: The Appellant therefore prays that this matter be reviewed and that the Board grant the following relief: Revoke the Order as written or modify the Order in accordance with the issues raised in the attached Memorandum of Law in Support of this Notice of Appeal.

Specific Objections: The specific objections to the action, including questions of fact and law to be determined by the Board, are set forth in the attached Memorandum of Law in Support of this Notice of Appeal.

Dated this 20th day of November, 2015.

Respectfully submitted,

Hall Drilling, LLC

By Counsel,

Robert E. Lannan (WV Bar No. 2139)
Elizabeth T. Schindzielorz (WV Bar No. 12305)
Christopher L. Hamb (WV Bar No. 6902)
Robinson & McElwee PLLC
700 Virginia St. East, Suite 400
Charleston, WV 25301
(304)-344-5800

WEST VIRGINIA ENVIRONMENTAL QUALITY BOARD
CHARLESTON, WEST VIRGINIA

HALL DRILLING, LLC,

Appellant,

v. **Appeal No.**

CHIEF, OFFICE OF OIL AND GAS, WEST VIRGINIA DEPARTMENT OF ENVIRONMENTAL PROTECTION,

Appellee.

MEMORANDUM IN SUPPORT OF NOTICE OF APPEAL

Appellant Hall Drilling, LLC ("Hall Drilling"), by and through undersigned counsel, pursuant to W. Va. Code R. § 46-4-2, hereby sets forth its specific objections to the October 10, 2015 Order issued by the Office of Oil and Gas of the West Virginia Department of Environmental Protection ("WVDEP") [sometimes collectively referred to as "the Parties"], and the questions of law and fact to be determined by the Board in the above-captioned appeal:

I. RELEVANT FACTS

1. Hall Drilling operates an underground injection control (UIC) facility located in Clay District, Ritchie County, West Virginia, pursuant to UIC Permit # 2D0859909.

2. The Office of Oil and Gas issued Order No. 2015-UIC-7, dated October 10, 2015, ordering, in pertinent part, that "Hall Drilling, LLC shall promptly obtain the services of a third party environmental contractor and within thirty (30) days submit a site investigation plan, including sampling and analysis, to OOG for comment and approval."

3. The Order cites to two laboratory reports of groundwater sampling from monitoring well MW-3, submitted by Hall Drilling on June 18 and November 20, 2014, that "reflect the possibility that environmental media at the facility may be impacted."

4. The Order cites to the September 21, 2015 laboratory report for sampling of an adjacent "seep" taken on September 10, 2015, which "reflect the possibility that environmental media at the facility may be impacted," and "reflect elevated levels of certain tested parameters . . . includ[ing] chloride, bromide, sulfate, strontium, barium, calcium, manganese, and sodium."

5. The Order does not state that Hall Drilling has violated its permit or other State or Federal law.

6. The Order does not state that any of the following have occurred, as referenced in Paragraph 4 of UIC Permit No. UIC2D0859909 for Well No. Tech Service Center #3H:

a. Any monitoring or other information which indicates that any contaminant has caused or may cause an endangerment to an underground source of drinking water;

b. Any non-compliance with a permit condition or any malfunction of the injection system which may cause fluid migration into or between underground sources of drinking water; and

c. Any noncompliance which may endanger health and environment.

7. The September 21, 2015 laboratory report does not indicate what, if any violations exist at the site.

8. The Order, dated October 10, 2015, was received by Hall Drilling on October 27 (as agreed to by the Parties).

9. The Parties met on November 9, 2015 at the offices of the WVDEP, and it was agreed that Hall Drilling would submit a plan by November 27, 2015.

10. Hall Drilling is in the process of gathering existing data through FOIA requests to the WVDEP and from its own records, and is preparing the requested plan it anticipates submitting to WVDEP on or before November 27, 2015.

II. OBJECTIONS TO THE ORDER

1. The Office of Oil and Gas lacks authority to issue the Order as written.

2. The Office of Oil and Gas lacks authority to issue the Order in the absence of a clear violation of applicable statutes, regulations, or permit.

3. The Office of Oil and Gas lacks authority to issue the Order based solely on alleged "elevated levels of certain testing parameters."

4. The 30-day compliance period is unreasonable and arbitrary.

5. The phrase "approvable plan and schedule" is vague.

6. The phrase "full compliance" is vague.

7. The grounds justifying issuance of the Order, including what standards, if any, were violated by Hall Drilling, are vague.

8. The September 21, 2015 laboratory report does not indicate what if any violations exist at the site.

9. The Office of Oil and Gas lacks authority to issue the Order in the absence of any of the following, as referenced in Paragraph 4 of UIC Permit No. UIC2D0859909 for Well No. Tech Service Center #3H:

a. Any monitoring or other information which indicates that any contaminant has caused or may cause an endangerment to an underground source of drinking water;

b. Any non-compliance with a permit condition or any malfunction of the injection system which may cause fluid migration into or between underground sources of drinking water; and

c. Any noncompliance which may endanger health and environment.

10. Hall Drilling reserves its right to add such other objections that may arise during the course of this proceeding.

III. QUESTIONS OF LAW

1. Do the cited authorities, W. Va. Code §§ 22-1-1 *et seq.*, 22-6-2, 22-11-1 *et seq.*, and 22-12-1 *et seq.*, provide the Office of Oil and Gas with the authority to issue this Order?

2. Are there other statutory or regulatory provisions that authorize the Office of Oil and Gas to issue this Order?

3. Is the Office of Oil and Gas authorized to issue this Order when there is no alleged or actual violation of a UIC permit or other standard, law, or regulation?

4. Is the Office of Oil and Gas authorized to issue this Order when there has been no finding of an imminent danger to persons or that a fresh water source or supply will be contaminated or lost?

5. Is the Office of Oil and Gas authorized to issue this Order when there is only a "possibility that environmental media at the facility may be impacted"?

6. Is the Order unreasonable, arbitrary, and vague in its directives to Hall Drilling?

7. What are the standards governing review and approval of the site investigation plan by the Office of Oil and Gas?

8. What constitutes an "approvable plan and schedule"?

9. What constitutes "failure to adhere to the approved schedule"?

10. Is thirty (30) days a legally sufficient period of time for compliance?

11. Do "elevated levels of certain tested parameters" constitute a violation of Hall Drilling's UIC permit or other standard, law, or regulation?

12. What constitutes "full compliance" with the Order for Compliance?

13. Is the Office of Oil and Gas authorized to issue this Order when none of the following have occurred, as referenced in Paragraph 4 of UIC Permit No. UIC2D0859909 for Well No. Tech Service Center #3H?

a. Any monitoring or other information which indicates that any contaminant has caused or may cause an endangerment to an underground source of drinking water;

b. Any non-compliance with a permit condition or any malfunction of the injection system which may cause fluid migration into or between underground sources of drinking water; and

c. Any noncompliance which may endanger health and environment.

14. Hall Drilling reserves its right to add such other questions of law that may arise during the course of this proceeding.

IV. QUESTIONS OF FACT

1. Has Hall Drilling violated its UIC permit?

2. Has Hall Drilling violated any applicable standards, laws, or regulations?

3. Is there an imminent danger to persons or that a fresh water source or supply will be or is contaminated or lost?

4. Has any of the following occurred, as referenced in Paragraph 4 of UIC Permit No. UIC2D0859909 for Well No. Tech Service Center #3H?

a. Any monitoring or other information which indicates that any contaminant has caused or may cause an endangerment to an underground source of drinking water;

b. Any non-compliance with a permit condition or any malfunction of the injection system which may cause fluid migration into or between underground sources of drinking water; and

c. Any noncompliance which may endanger health and environment.

5. Hall Drilling reserves its right to add other questions of fact that may arise during the course of this proceeding.

WHEREFORE, for the reasons set forth above, Appellant, Hall Drilling, LLC respectfully requests that the Board order the Appellee to revoke the Order as written or modify the Order in accordance with the issues raised in this Memorandum.

Dated this 20th day of November, 2015.

Respectfully submitted,

Hall Drilling, LLC

By Counsel,

Robert E. Lannan (WV Bar No. 2139)
Elizabeth T. Schindzielorz (WV Bar No. 12305)
Christopher L. Hamb (WV Bar No. 6902)
Robinson & McElwee PLLC
700 Virginia St. East, Suite 400
Charleston, WV 25301
(304)-344-5800

west virginia department of environmental protection

Office of Oil and Gas
601 57th Street, S.E.
Charleston, WV 25304
Phone: (304) 926-0450; Fax: (304) 926-0452

Earl Ray Tomblin, Governor
Randy C. Huffman, Cabinet Secretary
www.dep.wv.gov

ORDER
ISSUED UNDER
WEST VIRGINIA CODE CHAPTER 22

TO: Hall Drilling, LLC
Attn: Michael Hall
P.O. Box 249
Ellenboro, WV 26346

DATE: October 10, 2015

ORDER NO.: 2015-UIC-7

INTRODUCTION

This Order (hereinafter "Order") is issued by the Office of Oil and Gas (hereinafter "OOG"), by and through its Chief, pursuant to the authority of West Virginia Code §§ 22-1-1 *et seq.*, 22-6-2, 22-11-1 *et seq.* and 22-12-1 *et seq.* to Hall Drilling, LLC.

FINDINGS OF FACT

In support of this order, the Chief hereby finds the following:

1. Hall Drilling, LLC operates an underground injection control (UIC) facility located in Clay District, Ritchie County, West Virginia.

2. On June 6, 2013, Hall Drilling, LLC was issued an underground injection control (UIC) permit 2D0859909 from the OOG authorizing operation of a UIC facility. Associated with the UIC facility are two lined pits and corresponding groundwater monitoring wells utilized for leak detection.

3. On June 18, 2014 and November 20, 2014, Hall Drilling, LLC submitted laboratory reports of groundwater sample from monitoring well MW-3 that reflect the possibility that environmental media at the facility may be impacted.

4. On September 10, 2015, OOG staff sampled a spring adjacent to monitoring well MW-3 at the Hall Drilling, LLC UIC facility.

5. On September 21, 2015, OOG received the laboratory report for samples collected on September 10, 2015. The analytical results reflect the possibility that environmental media at the facility may be impacted. The analytical results reflect elevated levels of certain tested parameters requiring further investigation by the operator. These parameters include chloride, bromide, sulfate, strontium, barium, calcium, manganese, and sodium.

ORDER FOR COMPLIANCE

Therefore, in accordance with West Virginia Code §§ 22-1-1 *et seq.*, 22-6-2, 22-11-1 *et seq.* and 22-12-1 *et seq.*, it is hereby ORDERED by the Chief that:

Hall Drilling, LLC shall promptly obtain the services of a third party environmental contractor and within thirty (30) days submit a site investigation plan, including sampling and analyses, to OOG for comment and approval. The plan shall encompass a schedule for initiation and completion of the investigation. The plan shall be submitted to:

West Virginia Department of Environmental Protection
Office of Oil and Gas
UIC Program
601 57th Street
Charleston, WV 25304

Upon approval, the plan and schedule shall be incorporated into and become part of this Order, as if fully set forth herein. Failure to submit an approvable plan and schedule or failure to adhere to the approved schedule is a violation of this Order.

OTHER PROVISIONS

1. Compliance with the terms and conditions of this Order shall not in any way be construed as relieving Hall Drilling, LLC of the obligation to comply with any applicable law, permit, other order, or any other requirement otherwise applicable. Violations of the terms and conditions of this Order may subject Hall Drilling, LLC to additional enforcement actions in accordance with the applicable law.

2. The provisions of this Order are severable and should a court or board of competent jurisdiction declare any provisions to be invalid or unenforceable, all other provisions shall remain in full force and effect.

3. This Order is binding on Hall Drilling, LLC its successors and assigns.

4. This Order shall terminate upon Hall Drilling, LLC's notification of full compliance with the "Order for Compliance" and verification of this notification by OOG.

RIGHT OF APPEAL

Notice is hereby given of your right to appeal the terms and conditions of this Order which you are aggrieved to the Environmental Quality Board by filing a NOTICE of APPEAL on the form prescribed by such Board, in accordance with the provisions of Chapter 22, Article 11, Section 21 and /or Chapter 22, Article 12, Section 11 of the Code of West Virginia within thirty (30) days after receipt of this Order.

This Order shall become effective upon receipt.

16-10-15
DATE

James A. Martin, Chief
Office of Oil and Gas

WEST VIRGINIA ENVIRONMENTAL QUALITY BOARD
CHARLESTON, WEST VIRGINIA

HALL DRILLING, LLC,

Appellant,

v. **Appeal No. _____**

CHIEF, OFFICE OF OIL AND GAS, WEST VIRGINIA DEPARTMENT OF ENVIRONMENTAL PROTECTION,

Appellee.

JOINT MOTION FOR INDEFINITE STAY OF HEARING AND DISCOVERY

Appellant, Hall Drilling, LLC ("Hall Drilling"), by and through undersigned counsel, and Appellee, Chief of the Office of Oil and Gas of the West Virginia Department of Environmental Protection ("WVDEP"), by and through undersigned counsel [sometimes collectively referred to as "the Parties"], pursuant to W. Va. Code R. § 46-4-5.5, hereby submit this Joint Motion for an indefinite stay of the hearing for the above-styled appeal, and for an indefinite stay of time in which to serve and/or respond to all discovery requests permitted by law or with leave of the Board. In support of their Joint Motion, Hall Drilling and the Office of Oil and Gas state as follows:

1. Order No. 2015-UIC-7, dated October 10, 2015, relates to certain laboratory reports that "reflect the possibility that environmental media at [Appellant's underground injection control ("UIC")] facility [located in Clay District, Ritchie County, West Virginia, under UIC Permit No. 2D0859909] may be impacted."
2. On October 27, 2015, Appellant received the Order (as agreed to by the Parties).
3. On November 9, 2015, the Parties met at the offices of the WVDEP, and it was agreed that Appellant would submit a plan by November 27.

4. Contemporaneously with the filing of this Joint Motion, Appellant, by and through undersigned counsel, filed with this Board a Notice of Appeal and Memorandum in Support of its Notice of Appeal.
5. The fact that presently, and at all times since the Order, Appellant has worked cooperatively with representatives of the Office of Oil and Gas regarding the UIC facility at issue; considerations of judicial economy; and the potential for resolution of some or all appeal issues, if a stay is granted, all strongly favor an extension of time for the Hearing and all related discovery.
6. Counsel for Appellant has conferred with counsel for Appellee prior to the filing of this Joint Motion and both have no objections to an indefinite stay of all hearing and discovery deadlines.

WHEREFORE, for the reasons set forth above, Appellant Hall Drilling, LLC, and Appellee, Chief of the Office of Oil and Gas of the West Virginia Department of Environmental Protection, respectfully request that the Board enter an Order granting this Joint Motion for an indefinite stay of the hearing and all discovery permitted by right under the law or with leave of the Board and any responses thereto; ordering Appellant to submit status reports every 60 days to the Board; stating that the Board retains its rights to enter an Order setting the hearing upon at least 30 days' notice to the parties; and stating that either party may move the Board to end the extension and to set the hearing at the next available time that is convenient for the Board.

Respectfully submitted,

Hall Drilling, LLC

By Counsel,

Robert E. Lannan (WV Bar No. 2139)
Elizabeth T. Schindzielorz (WV Bar No. 12305)
Christopher L. Hamb (WV Bar No. 6902)
Robinson & McElwee PLLC
700 Virginia St. East, Suite 400
Charleston, WV 25301
(304)-344-5800

and

Chief, Office of Oil and Gas,
West Virginia Department of
Environmental Protection

By Counsel,

Jason E. Wandling (WV Bar No. 9259) RSL with written permission
WVDEP Office of Legal Services
601 57th St.
Charleston, WV 25304
(304)-926-0440

CERTIFICATE OF SERVICE

I, Robert E. Lannan, counsel for Appellant, Hall Drilling, LLC, do hereby certify that I, on this 20th day of November, 2015, served the attached **NOTICE OF APPEAL, MEMORANDUM IN SUPPORT OF APPEAL** and **JOINT MOTION FOR INDEFINITE STAY OF HEARING AND DISCOVERY** to the following by hand-delivery:

Jackie Shultz, Clerk
WV Environmental Quality Board
601 57th Street, SE
Charleston, WV 25304

Jason Wandling, Esq.
WVDEP – Office of Legal Services
601 57th St.
Charleston, WV 25304

James A. Martin, Chief
WVDEP – Office of Oil and Gas
601 57th St.
Charleston, WV 25304

Robert E. Lannan

Counsel for
Hall Drilling, LLC

ROBINSON
&McELWEE
PLLC
attorneys at law

ROBERT E. LANNAN
ATTORNEY AT LAW

P.O. BOX 1791
CHARLESTON, WV 25326

DIRECT DIAL: (304) 347-8346
E-MAIL: rel@ramlaw.com

November 20, 2015

Ms. Jackie Shultz, Clerk
West Virginia Environmental Quality Board
601 57th St., SE
Charleston, WV 25304

Re: Hall Drilling, LLC v. Chief, Office of Oil and Gas, West Virginia Department of Environmental Protection – Appeal No. _____

Dear Ms. Shultz:

Enclosed herewith for filing with the West Virginia Environmental Quality Board please find the original and six copies of a **NOTICE OF APPEAL, MEMORANDUM IN SUPPORT OF NOTICE OF APPEAL** and **JOINT MOTION FOR INDEFINITE STAY OF HEARING AND DISCOVERY.** We appreciate your assistance.

Sincerely,

Robert E. Lannan

Counsel for
Hall Drilling, LLC

cc: Jason Wandling, Esq.
James A. Martin, Chief

Received
Office of Oil & Gas
NOV 23 2015

WEST VIRGINIA ENVIRONMENTAL QUALITY BOARD
CHARLESTON, WEST VIRGINIA

HALL DRILLING, LLC,

Appellant,

v. **Appeal No. _____**

CHIEF, OFFICE OF OIL AND GAS, WEST VIRGINIA DEPARTMENT OF ENVIRONMENTAL PROTECTION,

Appellee.

NOTICE OF APPEAL

Action Complained Of: Appellant Hall Drilling, LLC respectfully represents that it is aggrieved by Order No. 2015-UIC-7, dated October 10, 2015.

Relief Requested: The Appellant therefore prays that this matter be reviewed and that the Board grant the following relief: Revoke the Order as written or modify the Order in accordance with the issues raised in the attached Memorandum of Law in Support of this Notice of Appeal.

Specific Objections: The specific objections to the action, including questions of fact and law to be determined by the Board, are set forth in the attached Memorandum of Law in Support of this Notice of Appeal.

Dated this 20th day of November, 2015.

Respectfully submitted,

Hall Drilling, LLC

By Counsel,

Robert E. Lannan (WV Bar No. 2139)
Elizabeth T. Schindzielorz (WV Bar No. 12305)
Christopher L. Hamb (WV Bar No. 6902)
Robinson & McElwee PLLC
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Charleston, WV 25301
(304)-344-5800

WEST VIRGINIA ENVIRONMENTAL QUALITY BOARD
CHARLESTON, WEST VIRGINIA

HALL DRILLING, LLC,

Appellant,

v. **Appeal No. _____**

CHIEF, OFFICE OF OIL AND GAS, WEST VIRGINIA DEPARTMENT OF ENVIRONMENTAL PROTECTION,

Appellee.

MEMORANDUM IN SUPPORT OF NOTICE OF APPEAL

Appellant Hall Drilling, LLC ("Hall Drilling"), by and through undersigned counsel, pursuant to W. Va. Code R. § 46-4-2, hereby sets forth its specific objections to the October 10, 2015 Order issued by the Office of Oil and Gas of the West Virginia Department of Environmental Protection ("WVDEP") [sometimes collectively referred to as "the Parties"], and the questions of law and fact to be determined by the Board in the above-captioned appeal:

I. RELEVANT FACTS

1. Hall Drilling operates an underground injection control (UIC) facility located in Clay District, Ritchie County, West Virginia, pursuant to UIC Permit # 2D0859909.

2. The Office of Oil and Gas issued Order No. 2015-UIC-7, dated October 10, 2015, ordering, in pertinent part, that "Hall Drilling, LLC shall promptly obtain the services of a third party environmental contractor and within thirty (30) days submit a site investigation plan, including sampling and analysis, to OOG for comment and approval."

3. The Order cites to two laboratory reports of groundwater sampling from monitoring well MW-3, submitted by Hall Drilling on June 18 and November 20, 2014, that "reflect the possibility that environmental media at the facility may be impacted."

4. The Order cites to the September 21, 2015 laboratory report for sampling of an adjacent "seep" taken on September 10, 2015, which "reflect the possibility that environmental media at the facility may be impacted," and "reflect elevated levels of certain tested parameters . . . includ[ing] chloride, bromide, sulfate, strontium, barium, calcium, manganese, and sodium."

5. The Order does not state that Hall Drilling has violated its permit or other State or Federal law.

6. The Order does not state that any of the following have occurred, as referenced in Paragraph 4 of UIC Permit No. UIC2D0859909 for Well No. Tech Service Center #3H:

a. Any monitoring or other information which indicates that any contaminant has caused or may cause an endangerment to an underground source of drinking water;

b. Any non-compliance with a permit condition or any malfunction of the injection system which may cause fluid migration into or between underground sources of drinking water; and

c. Any noncompliance which may endanger health and environment.

7. The September 21, 2015 laboratory report does not indicate what, if any violations exist at the site.

8. The Order, dated October 10, 2015, was received by Hall Drilling on October 27 (as agreed to by the Parties).

9. The Parties met on November 9, 2015 at the offices of the WVDEP, and it was agreed that Hall Drilling would submit a plan by November 27, 2015.

10. Hall Drilling is in the process of gathering existing data through FOIA requests to the WVDEP and from its own records, and is preparing the requested plan it anticipates submitting to WVDEP on or before November 27, 2015.

II. OBJECTIONS TO THE ORDER

1. The Office of Oil and Gas lacks authority to issue the Order as written.

2. The Office of Oil and Gas lacks authority to issue the Order in the absence of a clear violation of applicable statutes, regulations, or permit.

3. The Office of Oil and Gas lacks authority to issue the Order based solely on alleged "elevated levels of certain testing parameters."

4. The 30-day compliance period is unreasonable and arbitrary.

5. The phrase "approvable plan and schedule" is vague.

6. The phrase "full compliance" is vague.

7. The grounds justifying issuance of the Order, including what standards, if any, were violated by Hall Drilling, are vague.

8. The September 21, 2015 laboratory report does not indicate what if any violations exist at the site.

9. The Office of Oil and Gas lacks authority to issue the Order in the absence of any of the following, as referenced in Paragraph 4 of UIC Permit No. UIC2D0859909 for Well No. Tech Service Center #3H:

a. Any monitoring or other information which indicates that any contaminant has caused or may cause an endangerment to an underground source of drinking water;

b. Any non-compliance with a permit condition or any malfunction of the injection system which may cause fluid migration into or between underground sources of drinking water; and

c. Any noncompliance which may endanger health and environment.

10. Hall Drilling reserves its right to add such other objections that may arise during the course of this proceeding.

III. QUESTIONS OF LAW

1. Do the cited authorities, W. Va. Code §§ 22-1-1 *et seq.*, 22-6-2, 22-11-1 *et seq.*, and 22-12-1 *et seq.*, provide the Office of Oil and Gas with the authority to issue this Order?

2. Are there other statutory or regulatory provisions that authorize the Office of Oil and Gas to issue this Order?

3. Is the Office of Oil and Gas authorized to issue this Order when there is no alleged or actual violation of a UIC permit or other standard, law, or regulation?

4. Is the Office of Oil and Gas authorized to issue this Order when there has been no finding of an imminent danger to persons or that a fresh water source or supply will be contaminated or lost?

5. Is the Office of Oil and Gas authorized to issue this Order when there is only a "possibility that environmental media at the facility may be impacted"?

6. Is the Order unreasonable, arbitrary, and vague in its directives to Hall Drilling?

7. What are the standards governing review and approval of the site investigation plan by the Office of Oil and Gas?

8. What constitutes an "approvable plan and schedule"?

9. What constitutes "failure to adhere to the approved schedule"?

10. Is thirty (30) days a legally sufficient period of time for compliance?

11. Do "elevated levels of certain tested parameters" constitute a violation of Hall Drilling's UIC permit or other standard, law, or regulation?

12. What constitutes "full compliance" with the Order for Compliance?

13. Is the Office of Oil and Gas authorized to issue this Order when none of the following have occurred, as referenced in Paragraph 4 of UIC Permit No. UIC2D0859909 for Well No. Tech Service Center #3H?

a. Any monitoring or other information which indicates that any contaminant has caused or may cause an endangerment to an underground source of drinking water;

b. Any non-compliance with a permit condition or any malfunction of the injection system which may cause fluid migration into or between underground sources of drinking water; and

c. Any noncompliance which may endanger health and environment.

14. Hall Drilling reserves its right to add such other questions of law that may arise during the course of this proceeding.

IV. QUESTIONS OF FACT

1. Has Hall Drilling violated its UIC permit?

2. Has Hall Drilling violated any applicable standards, laws, or regulations?

3. Is there an imminent danger to persons or that a fresh water source or supply will be or is contaminated or lost?

4. Has any of the following occurred, as referenced in Paragraph 4 of UIC Permit No. UIC2D0859909 for Well No. Tech Service Center #3H?

a. Any monitoring or other information which indicates that any contaminant has caused or may cause an endangerment to an underground source of drinking water;

b. Any non-compliance with a permit condition or any malfunction of the injection system which may cause fluid migration into or between underground sources of drinking water; and

c. Any noncompliance which may endanger health and environment.

5. Hall Drilling reserves its right to add other questions of fact that may arise during the course of this proceeding.

WHEREFORE, for the reasons set forth above, Appellant, Hall Drilling, LLC respectfully requests that the Board order the Appellee to revoke the Order as written or modify the Order in accordance with the issues raised in this Memorandum.

Dated this 20th day of November, 2015.

Respectfully submitted,

Hall Drilling, LLC

By Counsel,

Robert E. Lannan (WV Bar No. 2139)
Elizabeth T. Schindzielorz (WV Bar No. 12305)
Christopher L. Hamb (WV Bar No. 6902)
Robinson & McElwee PLLC
700 Virginia St. East, Suite 400
Charleston, WV 25301
(304)-344-5800

91 7199 9991 7035 6693 5938

west virginia department of environmental protection

Office of Oil and Gas
601 57th Street, S.E.
Charleston, WV 25304
Phone: (304) 926-0450; Fax: (304) 926-0452

Earl Ray Tomblin, Governor
Randy C. Huffman, Cabinet Secretary
www.dep.wv.gov

ORDER
ISSUED UNDER
WEST VIRGINIA CODE CHAPTER 22

TO: Hall Drilling, LLC
Attn: Michael Hall
P.O. Box 249
Ellenboro, WV 26346

DATE: October 10, 2015

ORDER NO.: 2015-UIC-7

INTRODUCTION

This Order (hereinafter "Order") is issued by the Office of Oil and Gas (hereinafter "OOG"), by and through its Chief, pursuant to the authority of West Virginia Code §§ 22-1-1 *et seq.*, 22-6-2, 22-11-1 *et seq.* and 22-12-1 *et seq.* to Hall Drilling, LLC.

FINDINGS OF FACT

In support of this order, the Chief hereby finds the following:

1. Hall Drilling, LLC operates an underground injection control (UIC) facility located in Clay District, Ritchie County, West Virginia.

2. On June 6, 2013, Hall Drilling, LLC was issued an underground injection control (UIC) permit 2D0859909 from the OOG authorizing operation of a UIC facility. Associated with the UIC facility are two lined pits and corresponding groundwater monitoring wells utilized for leak detection.

3. On June 18, 2014 and November 20, 2014, Hall Drilling, LLC submitted laboratory reports of groundwater sample from monitoring well MW-3 that reflect the possibility that environmental media at the facility may be impacted.

4. On September 10, 2015, OOG staff sampled a spring adjacent to monitoring well MW-3 at the Hall Drilling, LLC UIC facility.

5. On September 21, 2015, OOG received the laboratory report for samples collected on September 10, 2015. The analytical results reflect the possibility that environmental media at the facility may be impacted. The analytical results reflect elevated levels of certain tested parameters requiring further investigation by the operator. These parameters include chloride, bromide, sulfate, strontium, barium, calcium, manganese, and sodium.

ORDER FOR COMPLIANCE

Therefore, in accordance with West Virginia Code §§ 22-1-1 *et seq.*, 22-6-2, 22-11-1 *et seq.* and 22-12-1 *et seq.*, it is hereby ORDERED by the Chief that:

Hall Drilling, LLC shall promptly obtain the services of a third party environmental contractor and within thirty (30) days submit a site investigation plan, including sampling and analyses, to OOG for comment and approval. The plan shall encompass a schedule for initiation and completion of the investigation. The plan shall be submitted to:

West Virginia Department of Environmental Protection
Office of Oil and Gas
UIC Program
601 57th Street
Charleston, WV 25304

Upon approval, the plan and schedule shall be incorporated into and become part of this Order, as if fully set forth herein. Failure to submit an approvable plan and schedule or failure to adhere to the approved schedule is a violation of this Order.

OTHER PROVISIONS

1. Compliance with the terms and conditions of this Order shall not in any way be construed as relieving Hall Drilling, LLC of the obligation to comply with any applicable law, permit, other order, or any other requirement otherwise applicable. Violations of the terms and conditions of this Order may subject Hall Drilling, LLC to additional enforcement actions in accordance with the applicable law.

2. The provisions of this Order are severable and should a court or board of competent jurisdiction declare any provisions to be invalid or unenforceable, all other provisions shall remain in full force and effect.

3. This Order is binding on Hall Drilling, LLC its successors and assigns.

4. This Order shall terminate upon Hall Drilling, LLC's notification of full compliance with the "Order for Compliance" and verification of this notification by OOG.

RIGHT OF APPEAL

Notice is hereby given of your right to appeal the terms and conditions of this Order which you are aggrieved to the Environmental Quality Board by filing a NOTICE of APPEAL on the form prescribed by such Board, in accordance with the provisions of Chapter 22, Article 11, Section 21 and /or Chapter 22, Article 12, Section 11 of the Code of West Virginia within thirty (30) days after receipt of this Order.

This Order shall become effective upon receipt.

11-10-15
DATE

James A. Martin, Chief
Office of Oil and Gas

WEST VIRGINIA ENVIRONMENTAL QUALITY BOARD
CHARLESTON, WEST VIRGINIA

HALL DRILLING, LLC,

Appellant,

v.

Appeal No. _____

CHIEF, OFFICE OF OIL AND GAS, WEST VIRGINIA DEPARTMENT OF ENVIRONMENTAL PROTECTION,

Appellee.

JOINT MOTION FOR INDEFINITE STAY OF HEARING AND DISCOVERY

Appellant, Hall Drilling, LLC ("Hall Drilling"), by and through undersigned counsel, and Appellee, Chief of the Office of Oil and Gas of the West Virginia Department of Environmental Protection ("WVDEP"), by and through undersigned counsel [sometimes collectively referred to as "the Parties"], pursuant to W. Va. Code R. § 46-4-5.5, hereby submit this Joint Motion for an indefinite stay of the hearing for the above-styled appeal, and for an indefinite stay of time in which to serve and/or respond to all discovery requests permitted by law or with leave of the Board. In support of their Joint Motion, Hall Drilling and the Office of Oil and Gas state as follows:

1. Order No. 2015-UIC-7, dated October 10, 2015, relates to certain laboratory reports that "reflect the possibility that environmental media at [Appellant's underground injection control ("UIC")] facility [located in Clay District, Ritchie County, West Virginia, under UIC Permit No. 2D0859909] may be impacted."
2. On October 27, 2015, Appellant received the Order (as agreed to by the Parties).
3. On November 9, 2015, the Parties met at the offices of the WVDEP, and it was agreed that Appellant would submit a plan by November 27.

4. Contemporaneously with the filing of this Joint Motion, Appellant, by and through undersigned counsel, filed with this Board a Notice of Appeal and Memorandum in Support of its Notice of Appeal.

5. The fact that presently, and at all times since the Order, Appellant has worked cooperatively with representatives of the Office of Oil and Gas regarding the UIC facility at issue; considerations of judicial economy; and the potential for resolution of some or all appeal issues, if a stay is granted, all strongly favor an extension of time for the Hearing and all related discovery.

6. Counsel for Appellant has conferred with counsel for Appellee prior to the filing of this Joint Motion and both have no objections to an indefinite stay of all hearing and discovery deadlines.

WHEREFORE, for the reasons set forth above, Appellant Hall Drilling, LLC, and Appellee, Chief of the Office of Oil and Gas of the West Virginia Department of Environmental Protection, respectfully request that the Board enter an Order granting this Joint Motion for an indefinite stay of the hearing and all discovery permitted by right under the law or with leave of the Board and any responses thereto; ordering Appellant to submit status reports every 60 days to the Board; stating that the Board retains its rights to enter an Order setting the hearing upon at least 30 days' notice to the parties; and stating that either party may move the Board to end the extension and to set the hearing at the next available time that is convenient for the Board.

Respectfully submitted,

Hall Drilling, LLC

By Counsel,

Robert E. Lannan (WV Bar No. 2139)
Elizabeth T. Schindzielorz (WV Bar No. 12305)
Christopher L. Hamb (WV Bar No. 6902)
Robinson & McElwee PLLC
700 Virginia St. East, Suite 400
Charleston, WV 25301
(304)-344-5800

and

Chief, Office of Oil and Gas,
West Virginia Department of
Environmental Protection

By Counsel,

Jason E. Wandling (WV Bar No. 9259)
WVDEP Office of Legal Services
601 57th St.
Charleston, WV 25304
(304)-926-0440

CERTIFICATE OF SERVICE

I, Robert E. Lannan, counsel for Appellant, Hall Drilling, LLC, do hereby certify that I, on this 20th day of November, 2015, served the attached **NOTICE OF APPEAL, MEMORANDUM IN SUPPORT OF APPEAL** and **JOINT MOTION FOR INDEFINITE STAY OF HEARING AND DISCOVERY** to the following by hand-delivery:

Jackie Shultz, Clerk
WV Environmental Quality Board
601 57th Street, SE
Charleston, WV 25304

Jason Wandling, Esq.
WVDEP – Office of Legal Services
601 57th St.
Charleston, WV 25304

James A. Martin, Chief
WVDEP – Office of Oil and Gas
601 57th St.
Charleston, WV 25304

Robert E. Lannan

Counsel for
Hall Drilling, LLC

west virginia department of environmental protection

Office of Oil and Gas
601 57th Street, S.E.
Charleston, WV 25304
Phone: (304) 926-0450; Fax: (304) 926-0452

Earl Ray Tomblin, Governor
Randy C. Huffman, Cabinet Secretary
www.dep.wv.gov

October 19, 2015

Site Visit – Storm Water Runoff Sample Collection
Hall Drilling, LLC – Tech Service Center
UIC Facility Permit No. 2D0859909
Lamberton, Richie County, WV
September 10, 2015 10:44-13:30

WVDEP Personnel On-Site:
T. Bass– WVDEP-OOG
A. Lockwood – WVDEP-OOG
J. King – WVDEP-Environmental Advocate
Hall Drilling Personnel On-Site:
Jason Hall – Manager, Hall Drilling, LLC

Site Conditions:
Temp: 73° F, Wind: 5 mph NNW, Overcast.
Rainfall: 0.91 inches in previous 24 hours.
All ditchlines and streams were running at moderate levels with cloudy and turbid discharge reflecting recent rains.

Field Narrative

Personnel from the WVDEP-Office of Oil & Gas visited the Hall Drilling, LLC–Tech Service Center on September 10, 2015 to collect water samples from surface drainage locations on-site and from Hushers Run located off-site south of the facility. WVDEP Environmental Advocate, J. King, observed the sampling activities and toured the facility in order to familiarize himself with the operation. The purpose of the sample collection was to assess the water quality conditions after a typical rainfall/runoff event. As noted above, the area had recently experienced 24 hours of steady rain (0.91 in.) and the ground surface was wet and saturated with all ditchlines and streams running at moderate levels.

Sample locations were chosen so that the contributions of various tributaries to Hushers Run that drain the Hall facility could be assessed. Sample No. 1, No. 2, and No. 5 were located on the main stem of Hushers Run. Sample No.1 was collected

downstream of the tributary that drains the center of the Hall facility. The flow at this point was moderate with a milky and turbid character.

Hushers Run Sample Point No. 1 – Downstream of center tributary

Sample No. 2 was collected downstream of the confluence of the tributary that drains the east side of the Hall facility. The flow at this point was also moderate with a milky and turbid character.

Hushers Run Sample Point No. 2 – Downstream of east tributary

Sample No. 3 was collected from the center tributary just north of the guardhouse at the entrance to the Hall facility. The flow was moderate and was clear to slightly turbid.

Sample Point No. 3 – center tributary

Sample No.4 was collected from a small seep approximately 50 feet east and downslope from Monitoring Well No.3 (MW-3) located at the west side of the west holding pit. During a previous site visit, a shallow sump was dug at the location of the seep in order to allow sufficient water to collect of sampling purposes. At the time of this visit, the sump was full and clear and recharged at a rapid rate after sample extraction.

Sample Point No.4 - Sump below Monitoring Well No.3

Sample No. 5 was collected upstream of the confluence of the east tributary that drains the east side of the complex. The flow upstream at this point was moderate and was clear to slightly turbid.

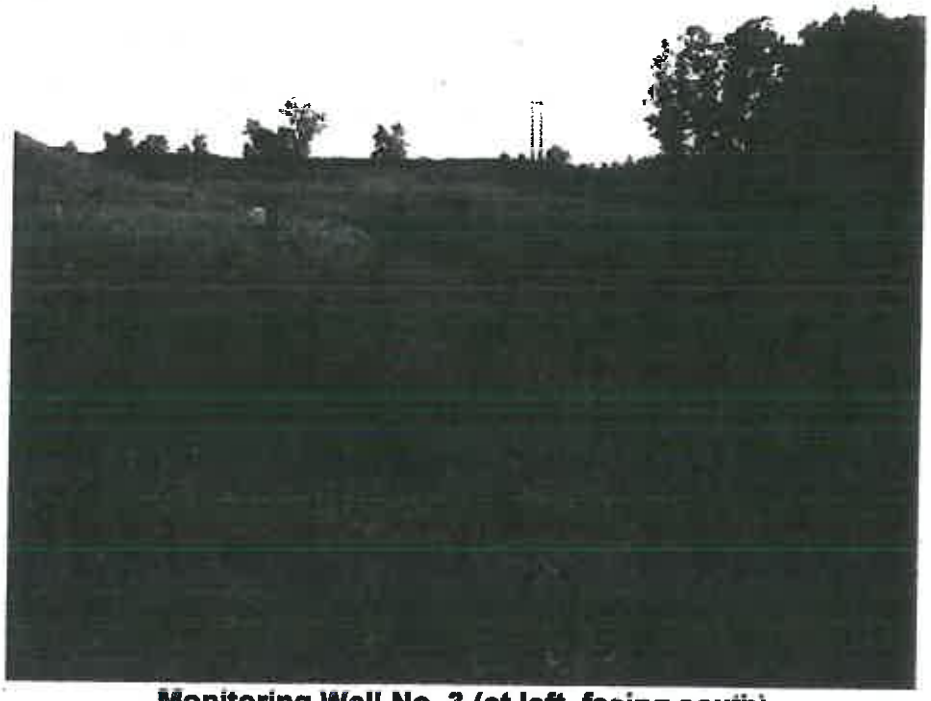
Hushers Run Sample Point No.5 – Upstream of east tributary

All samples were collected according to standard protocols including chain of custody documentation and refrigerated storage. The samples were delivered under seal to REIC laboratory in Beckley, West Virginia by Thomas L. Bass early on Friday, September 11, 2015.

WVDEP personnel toured the site with Jason Hall, Manager of the facility. All three groundwater monitoring wells were in good condition with locked caps.

Monitoring Well No. 1 (facing south)

Monitoring Well No. 2 (facing northwest)



Monitoring Well No. 3 (at left, facing south)

Field measurements of conductivity, temperature, pH, and GPS location were collected at each sample location. GPS locations were corrected using photos and Google Earth. Sample site locations are shown in Figure 1. Analytical data is summarized in Figure 2. Analytical results are attached as Appendix 1. Site photographs and a photo log are attached to this report as Appendix 2.

Prepared by:
Andrew L. Lockwood
Permitting Geologist
WVDEP-OOG

WVDEP - Office of Oil & Gas

- WVDEP Sample Point
- K.C. Harvey Sample Point
- Groundwater Monitoring Well
- Injection Well - Active
- Injection Well - Shut-In
- Stream
- Intermittent Stream
- Flow Direction
- Drainage Boundary
- Limit of Disturbance

0 150 300 Feet

1 inch = 300 feet

N

Hall Drilling, LLC
Tech Service Center

UIC Permit No. 2D0859669
Pennsboro, Richie County, West Virginia

WVDEP
Stream Sample Program
September 10, 2015

9/17/2015 | Figure 2

Figure 2

Hall Drilling, LLC

Ellenboro, Richie County, West Virginia
UIC Permit 2D0859909

Summary of Analytical Results

					Radiologics (1)		Metals (2)											Conventional Chemistry Parameters (2)												Field Measurements		
Sample Name	Lab ID No.	Type	Sampled By	Date Sampled	Ra-226	Ra-228	Al	Ba	Ca	Fe	Mg	Mn	K	Na	Sr	As	Pb	Chloride	Bromide	Nitrate	Nitrite	TDS	TSS	SO4	Sp Cond (3)	pH (4)	Hardness	Acidity	Alkalinity	Sp Cond (3)	pH (4)	Temp (5)
Sample 1 (Downstream)	1509E14-01A	Liquid - Grab	WVDEP-REIC	9/11/2015	6.15	5.78	2.90	0.132	38.6	3.98	6.92	0.151	4.64	13.8	0.286	0.0022	0.003	20.6	ND	0.63	1.08	168	98.0	18.1	335	7.48	125	17.6	96.5	300	6.93	20.43
Sample 2 (upstream of center tributary)	1509E14-02A	Liquid - Grab	WVDEP-REIC	9/11/2015	5.32	6.86	2.68	0.11	33.7	3.60	6.25	0.133	4.65	13.3	0.231	0.0019	0.0024	17.6	ND	0.56	1.05	164	55.0	14.9	312	7.28	110	14.2	91.8	285	6.82	20.59
Sample 3 (center trib at gatehouse)	1509E14-03A	Liquid - Grab	WVDEP-REIC	9/11/2015	5.78	6.14	0.731	0.153	67.0	0.938	12.3	0.147	3.90	19.3	0.763	ND	0.0009	47.3	0.24	1.09	1.35	286	29.0	43.3	572	7.86	218	2.1	138	520	7.16	19.9
Sample 4 (seep below MW-3)	1509E14-04A	Liquid - Grab	WVDEP-REIC	9/11/2015	4.72	5.35	1.40	1.34	173	1.23	55.9	13.8	8.61	350	15.3	ND	0.0023	938	12.5	2.76	ND	###	116	5.24	3,270	4.02	661	73.2	ND	2,751	5.86	22.01
Sample 5 (upstream of east tributary)	1509E14-05A	Liquid - Grab	WVDEP-REIC	9/11/2015	5.61	6.68	1.06	0.080	42.6	1.46	7.46	0.070	4.99	18.2	0.200	0.0025	0.0021	25.2	ND	0.58	1.26	193	18.0	16.0	399	7.35	137	2.4	119	404	7.01	20.04

Notes:

(1) pCi/L
(2) mg/L
(3) umhos/cm
(4) Standard Units
(5) Celsius

REI Consultants, Inc.
PO Box 286
Beaver, WV 25813
TEL: (304) 255-2500
Website: www.reiclabs.com

Improving the environment, one client at a time...

3029-C Peters Creek Road
Roanoke, VA 24019
TEL: 540.777.1276

101 17th Street
Ashland, KY 41101
TEL: 606.393.5027

1557 Commerce Road, Suite 201
Verona, VA 24482
TEL: 540.248.0183

16 Commerce Drive
Westover, WV 26501
TEL: 304.241.5861

Wednesday, September 30, 2015

TOM BASS
WEST VIRGINIA DEP / OFFICE OF OIL & GAS
601 57TH STREET
CHARLESTON, WV 25304

TEL: (304) 926-0450
FAX:

RE: STEAMS & DRAINS
Work Order #: 1509E14
Dear TOM BASS:

Stacy Heasley
Project Manager

REI Consultants, Inc. - Case Narrative

WO#: 1509E14

Date Reported: 9/30/2015

Client: WEST VIRGINIA DEP / OFFICE OF OIL & GAS

Project: STEAMS & DRAINS

The analytical results presented in this report were produced using documented laboratory SOPs that incorporate appropriate quality control procedures as described in the applicable methods. Verification of required sample preservation (as required) is recorded on associated laboratory logs. Any deviation from compliance or method modification is identified within the body of this report by a qualifier footnote which is defined at the bottom of this page.

All sample results for solid samples are reported on an "as-received" wet weight basis unless otherwise noted.

Results reported for sums of individual parameters, such as TTHM and HAA5, may vary slightly from the sum of the individual parameter results, due to rounding of individual results, as required by EPA.

The test results in this report meet all NELAP and/or VELAP requirements for parameters clearly designated as PA, VA, PA/VA, or VELAP in the column labeled NELAP.

Please note if the sample collection time is not provided on the Chain of Custody, the default recording will be 0:00:00. This may cause some tests to be apparently analyzed out of hold.

All tests performed by REIC Service Centers are designated by an annotation on the test code. All other tests were performed by REIC's Main Laboratory in Beaver, WV.

DEFINITIONS:
MCL: Maximum Contaminant Level
MDL: Method Detection Limit; The lowest concentration of analyte that can be detected by the method in the applicable matrix.
Mg/Kg or mg/L: Units of part per million (PPM) - milligram per Kilogram (weight/weight) or milligram per Liter (weight/volume).
NA: Not Applicable
ND: Not Detected at the PQL or MDL
PQL: Practical Quantitation Limit; The lowest verified limit to which data is quantified without qualifications. Analyte concentrations below PQL are reported either as ND or as a number with a "J" qualifier.
Qual: Qualifier that applies to the analyte reported.
TIC: Tentatively Identified Compound, Estimated Concentration denoted by "J" qualifier.
Ug/Kg or ug/L: Units of part per billion (PPB) - microgram per kilogram (weight/weight) or microgram per liter (weight/volume).

QUALIFIERS:
X: Reported value exceeds required MCL
B: Analyte detected in the associated Method Blank at a concentration > 1/2 the PQL
E: The sample result is within the method accepted Linear Dynamic Range determined by the lab for this analysis. However, it may be considered estimated when applying the TNI (The NELAC Institute) standard.
H: Holding time for preparation or analysis has been exceeded.
J: Analyte concentration is reported, and is less than the PQL and greater than or equal to the MDL. The result reported is an estimate.
S: % REC (% recovery) exceeds control limits

CERTIFICATIONS:
Beaver, WV: WVDHHR 00412CM, WVDEP 060, VADCLS 00281, KYDEP 90039, TNDEQ TN02926, NCDWQ 466, PADEP 68-00839, VADCLS (VELAP) 460148
Bioassay (Beaver, WV): WVDEP 060, VADCLS(VELAP) 460148, PADEP 68-00839
Roanoke, VA: VADCLS(VELAP) 460150
Verona, VA: VADCLS(VELAP) 460151
Ashland, KY: KYDEP 00094, WVDEP 369
Morgantown, WV: WVDHHR 003112M, WVDEP 387

REI Consultants, Inc. - Analytical Report

WO#: 1509E14

Date Reported: 9/30/2015

Client:	WEST VIRGINIA DEP / OFFICE OF OIL & GAS	**Collection Date:**	9/10/2015 10:35:00 AM
Project:	STEAMS & DRAINS	**Date Received:**	9/11/2015
Lab ID:	1509E14-01A	**Matrix:**	Liquid
Client Sample ID:	DOWNSTREAM	**Site ID:**	HALL - UIC

Analysis	Result	MDL	PQL	MCL	Qual	Units	Date Analyzed	NELAP
METALS BY ICP			**Method: EPA 200.7 Rev. 4.4 (1994)**				**Analyst: CGW**	
Aluminum	2.90	0.006	0.100	NA		mg/L	9/18/2015 6:20 PM	PA/VA
Barium	0.132	0.002	0.100	NA		mg/L	9/18/2015 11:08 AM	PA/VA
Calcium	38.6	0.050	1.00	NA		mg/L	9/18/2015 11:08 AM	PA/VA
Iron	3.98	0.010	0.100	NA		mg/L	9/18/2015 11:08 AM	PA/VA
Magnesium	6.92	0.050	0.500	NA		mg/L	9/18/2015 11:08 AM	PA/VA
Manganese	0.151	0.002	0.100	NA		mg/L	9/18/2015 11:08 AM	PA/VA
Potassium	4.64	0.050	0.500	NA		mg/L	9/18/2015 11:08 AM	PA/VA
Sodium	13.8	0.100	1.00	NA		mg/L	9/18/2015 11:08 AM	PA/VA
Strontium	0.286	0.001	0.010	NA		mg/L	9/17/2015 10:46 AM	

Notes:

Matrix spike recovery for Al does not meet laboratory control limits due to matrix interference. Recovery in the associated post-digestion spike meets laboratory control limits.

METALS BY ICP-MS			**Method: EPA 200.8 Rev. 5.4 (1994)**				**Analyst: LF**	
Arsenic	0.0022	0.0010	0.0050	NA	J	mg/L	9/15/2015 1:17 PM	PA/VA
Lead	0.0030	0.0002	0.0010	NA		mg/L	9/15/2015 1:17 PM	PA/VA
HARDNESS			**Method: SM2340 B-1997**				**Analyst: CGW**	
Hardness, Total (As CaCO3)	125	NA	1.00	NA		mg/L	9/18/2015 11:08 AM	VA
ANIONS by ION CHROMATOGRAPHY			**Method: EPA 300.0, Rev.2.1 (1993)**				**Analyst: CF**	
Bromide	ND	0.05	0.10	NA		mg/L	9/11/2015 4:40 PM	PA/VA
Chloride	20.6	0.20	1.00	NA		mg/L	9/11/2015 4:40 PM	PA/VA
Sulfate	18.1	1.00	5.00	NA		mg/L	9/11/2015 4:40 PM	PA/VA
ANIONS by ION CHROMATOGRAPHY-48 HOUR			**Method: EPA 300.0, Rev.2.1 (1993)**				**Analyst: CF**	
Nitrogen, Nitrate	0.63	0.02	0.10	NA		mg/L	9/11/2015 4:40 PM	PA/VA
Nitrogen, Nitrite	1.08	0.05	0.50	NA		mg/L	9/11/2015 4:40 PM	PA/VA
CONDUCTIVITY			**Method: SM2510 B - 1997**				**Analyst: KY**	
Specific Conductivity	335	NA	NA	NA		µmhos/cm	9/14/2015 2:45 PM	PA/VA
TOTAL DISSOLVED SOLIDS			**Method: SM2540 C-1997**				**Analyst: KY**	
Total Dissolved Solids	188	5	10	NA		mg/L	9/11/2015 5:06 PM	PA/VA

REI Consultants, Inc. - Analytical Report

WO#: 1509E14

Date Reported: 9/30/2015

Client:	WEST VIRGINIA DEP / OFFICE OF OIL & GAS	**Collection Date:**	9/10/2015 10:35:00 AM
Project:	STEAMS & DRAINS	**Date Received:**	9/11/2015
Lab ID:	1509E14-01A	**Matrix:**	Liquid
Client Sample ID:	DOWNSTREAM	**Site ID:**	HALL - UIC

Analysis	Result	MDL	PQL	MCL	Qual	Units	Date Analyzed	NELAP
TOTAL SUSPENDED SOLIDS			**Method: SM2540 D-1997**				**Analyst: KY**	
Total Suspended Solids	98.0	2.0	10	NA		mg/L	9/11/2015 4:48 PM	PA/VA
ACIDITY			**Method: SM2310 B-1997**				**Analyst: VS**	
Acidity, Total	17.6	1.0	10	NA		mg/L	9/14/2015 4:50 PM	PA/VA
ALKALINITY			**Method: SM2320 B-1997**				**Analyst: VS**	
Alkalinity, Total (As CaCO3)	96.5	1.0	20.0	NA		mg/L	9/14/2015 4:50 PM	PA/VA
pH - LAB TEST, HOLD TIME EXPIRED			**Method: SM4500-H+-B-2000**				**Analyst: VS**	
pH	7.48	NA	NA	NA		SU	9/14/2015 4:50 PM	

REI Consultants, Inc. - Analytical Report

WO#: 1509E14

Date Reported: 9/30/2015

Client:	WEST VIRGINIA DEP / OFFICE OF OIL & GAS	**Collection Date:**	9/10/2015 11:25:00 AM
Project:	STEAMS & DRAINS	**Date Received:**	9/11/2015
Lab ID:	1509E14-02A	**Matrix:**	Liquid
Client Sample ID:	SAMPLE 2	**Site ID:**	HALL - UIC

Analysis	Result	MDL	PQL	MCL	Qual	Units	Date Analyzed	NELAP
METALS BY ICP			**Method: EPA 200.7 Rev. 4.4 (1994)**				**Analyst: CGW**	
Aluminum	2.68	0.006	0.100	NA		mg/L	9/18/2015 11:32 AM	PA/VA
Barium	0.110	0.002	0.100	NA		mg/L	9/18/2015 11:32 AM	PA/VA
Calcium	33.7	0.050	1.00	NA		mg/L	9/18/2015 11:32 AM	PA/VA
Iron	3.60	0.010	0.100	NA		mg/L	9/18/2015 11:32 AM	PA/VA
Magnesium	6.25	0.050	0.500	NA		mg/L	9/18/2015 11:32 AM	PA/VA
Manganese	0.133	0.002	0.100	NA		mg/L	9/18/2015 11:32 AM	PA/VA
Potassium	4.65	0.050	0.500	NA		mg/L	9/18/2015 11:32 AM	PA/VA
Sodium	13.3	0.100	1.00	NA		mg/L	9/18/2015 11:32 AM	PA/VA
Strontium	0.213	0.001	0.010	NA		mg/L	9/17/2015 11:03 AM	
METALS BY ICP-MS			**Method: EPA 200.8 Rev. 5.4 (1994)**				**Analyst: LF**	
Arsenic	0.0019	0.0010	0.0050	NA	J	mg/L	9/15/2015 1:23 PM	PA/VA
Lead	0.0024	0.0002	0.0010	NA		mg/L	9/15/2015 1:23 PM	PA/VA
HARDNESS			**Method: SM2340 B-1997**				**Analyst: CGW**	
Hardness, Total (As CaCO3)	110	NA	1.00	NA		mg/L	9/18/2015 11:32 AM	VA
ANIONS by ION CHROMATOGRAPHY			**Method: EPA 300.0, Rev.2.1 (1993)**				**Analyst: CF**	
Bromide	ND	0.05	0.10	NA		mg/L	9/11/2015 4:59 PM	PA/VA
Chloride	17.6	0.20	1.00	NA		mg/L	9/11/2015 4:59 PM	PA/VA
Sulfate	14.9	1.00	5.00	NA		mg/L	9/11/2015 4:59 PM	PA/VA
ANIONS by ION CHROMATOGRAPHY-48 HOUR			**Method: EPA 300.0, Rev.2.1 (1993)**				**Analyst: CF**	
Nitrogen, Nitrate	0.56	0.02	0.10	NA		mg/L	9/11/2015 4:59 PM	PA/VA
Nitrogen, Nitrite	1.05	0.05	0.50	NA		mg/L	9/11/2015 4:59 PM	PA/VA
CONDUCTIVITY			**Method: SM2510 B - 1997**				**Analyst: KY**	
Specific Conductivity	312	NA	NA	NA		µmhos/cm	9/14/2015 2:46 PM	PA/VA
TOTAL DISSOLVED SOLIDS			**Method: SM2540 C-1997**				**Analyst: KY**	
Total Dissolved Solids	164	5	10	NA		mg/L	9/11/2015 5:06 PM	PA/VA
TOTAL SUSPENDED SOLIDS			**Method: SM2540 D-1997**				**Analyst: KY**	
Total Suspended Solids	55.0	2.0	10	NA		mg/L	9/11/2015 4:48 PM	PA/VA

REI Consultants, Inc. - Analytical Report

WO#: 1509E14

Date Reported: 9/30/2015

Client:	WEST VIRGINIA DEP / OFFICE OF OIL & GAS	**Collection Date:**	9/10/2015 11:25:00 AM
Project:	STEAMS & DRAINS	**Date Received:**	9/11/2015
Lab ID:	1509E14-02A	**Matrix:**	Liquid
Client Sample ID:	SAMPLE 2	**Site ID:**	HALL - UIC

Analysis	Result	MDL	PQL	MCL	Qual	Units	Date Analyzed	NELAP
ACIDITY			**Method: SM2310 B-1997**				**Analyst: VS**	
Acidity, Total	14.2	1.0	10	NA		mg/L	9/14/2015 4:50 PM	PA/VA
ALKALINITY			**Method: SM2320 B-1997**				**Analyst: VS**	
Alkalinity, Total (As CaCO3)	91.8	1.0	20.0	NA		mg/L	9/14/2015 4:50 PM	PA/VA
pH - LAB TEST, HOLD TIME EXPIRED			**Method: SM4500-H+-B-2000**				**Analyst: VS**	
pH	7.26	NA	NA	NA		SU	9/14/2015 4:50 PM	

REI Consultants, Inc. - Analytical Report

WO#: 1509E14

Date Reported: 9/30/2015

Client:	WEST VIRGINIA DEP / OFFICE OF OIL & GAS	**Collection Date:**	9/10/2015 11:45:00 AM
Project:	STEAMS & DRAINS	**Date Received:**	9/11/2015
Lab ID:	1509E14-03A	**Matrix:**	Liquid
Client Sample ID:	SAMPLE 3	**Site ID:**	HALL - UIC

Analysis	Result	MDL	PQL	MCL	Qual	Units	Date Analyzed	NELAP
METALS BY ICP			**Method: EPA 200.7 Rev. 4.4 (1994)**				**Analyst: CGW**	
Aluminum	0.731	0.006	0.100	NA		mg/L	9/18/2015 11:38 AM	PA/VA
Barium	0.153	0.002	0.100	NA		mg/L	9/18/2015 11:38 AM	PA/VA
Calcium	67.0	0.050	1.00	NA		mg/L	9/18/2015 11:38 AM	PA/VA
Iron	0.938	0.010	0.100	NA		mg/L	9/18/2015 11:38 AM	PA/VA
Magnesium	12.3	0.050	0.500	NA		mg/L	9/18/2015 11:38 AM	PA/VA
Manganese	0.147	0.002	0.100	NA		mg/L	9/18/2015 11:38 AM	PA/VA
Potassium	3.90	0.050	0.500	NA		mg/L	9/18/2015 11:38 AM	PA/VA
Sodium	19.3	0.100	1.00	NA		mg/L	9/18/2015 11:38 AM	PA/VA
Strontium	0.763	0.001	0.010	NA		mg/L	9/17/2015 11:06 AM	
METALS BY ICP-MS			**Method: EPA 200.8 Rev. 5.4 (1994)**				**Analyst: LF**	
Arsenic	ND	0.0010	0.0050	NA		mg/L	9/15/2015 1:28 PM	PA/VA
Lead	0.0009	0.0002	0.0010	NA	J	mg/L	9/15/2015 1:28 PM	PA/VA
HARDNESS			**Method: SM2340 B-1997**				**Analyst: CGW**	
Hardness, Total (As CaCO3)	218	NA	1.00	NA		mg/L	9/18/2015 11:38 AM	VA
ANIONS by ION CHROMATOGRAPHY			**Method: EPA 300.0, Rev.2.1 (1993)**				**Analyst: CF**	
Bromide	0.24	0.05	0.10	NA		mg/L	9/11/2015 5:18 PM	PA/VA
Chloride	47.3	0.20	1.00	NA		mg/L	9/11/2015 5:18 PM	PA/VA
Sulfate	43.3	1.00	5.00	NA		mg/L	9/11/2015 5:18 PM	PA/VA
ANIONS by ION CHROMATOGRAPHY-48 HOUR			**Method: EPA 300.0, Rev.2.1 (1993)**				**Analyst: CF**	
Nitrogen, Nitrate	1.09	0.02	0.10	NA		mg/L	9/11/2015 5:18 PM	PA/VA
Nitrogen, Nitrite	1.35	0.05	0.50	NA		mg/L	9/11/2015 5:18 PM	PA/VA
CONDUCTIVITY			**Method: SM2510 B - 1997**				**Analyst: KY**	
Specific Conductivity	572	NA	NA	NA		µmhos/cm	9/14/2015 2:45 PM	PA/VA
TOTAL DISSOLVED SOLIDS			**Method: SM2540 C-1997**				**Analyst: KY**	
Total Dissolved Solids	286	5	10	NA		mg/L	9/11/2015 5:08 PM	PA/VA
TOTAL SUSPENDED SOLIDS			**Method: SM2540 D-1997**				**Analyst: KY**	
Total Suspended Solids	29.0	2.0	10	NA		mg/L	9/11/2015 4:48 PM	PA/VA

REI Consultants, Inc. - Analytical Report

WO#: 1509E14

Date Reported: 9/30/2015

Client:	WEST VIRGINIA DEP / OFFICE OF OIL & GAS	**Collection Date:**	9/10/2015 11:45:00 AM
Project:	STEAMS & DRAINS	**Date Received:**	9/11/2015
Lab ID:	1509E14-03A	**Matrix:**	Liquid
Client Sample ID:	SAMPLE 3	**Site ID:**	HALL - UIC

Analysis	Result	MDL	PQL	MCL	Qual	Units	Date Analyzed	NELAP
ACIDITY			**Method: SM2310 B-1997**				**Analyst: VS**	
Acidity, Total	2.1	1.0	10	NA	J	mg/L	9/14/2015 4:50 PM	PA/VA
ALKALINITY			**Method: SM2320 B-1997**				**Analyst: VS**	
Alkalinity, Total (As CaCO3)	138	1.0	20.0	NA		mg/L	9/14/2015 4:50 PM	PA/VA
pH - LAB TEST, HOLD TIME EXPIRED			**Method: SM4500-H+-B-2000**				**Analyst: VS**	
pH	7.86	NA	NA	NA		SU	9/14/2015 4:50 PM	

REI Consultants, Inc. - Analytical Report

WO#: 1509E14

Date Reported: 9/30/2015

Client:	WEST VIRGINIA DEP / OFFICE OF OIL & GAS	**Collection Date:**	9/10/2015 12:00:00 PM
Project:	STEAMS & DRAINS	**Date Received:**	9/11/2015
Lab ID:	1509E14-04A	**Matrix:**	Liquid
Client Sample ID:	SAMPLE 4	**Site ID:**	HALL - UIC

Analysis	Result	MDL	PQL	MCL	Qual	Units	Date Analyzed	NELAP
METALS BY ICP			**Method: EPA 200.7 Rev. 4.4 (1994)**				**Analyst: CGW**	
Aluminum	1.40	0.006	0.100	NA		mg/L	9/18/2015 11:44 AM	PA/VA
Barium	1.34	0.002	0.100	NA		mg/L	9/18/2015 11:44 AM	PA/VA
Calcium	173	0.050	1.00	NA	E	mg/L	9/18/2015 11:44 AM	PA/VA
Iron	1.23	0.010	0.100	NA		mg/L	9/18/2015 11:44 AM	PA/VA
Magnesium	55.9	0.050	0.500	NA	E	mg/L	9/18/2015 11:44 AM	PA/VA
Manganese	13.8	0.002	0.100	NA	E	mg/L	9/18/2015 11:44 AM	PA/VA
Potassium	6.61	0.050	0.500	NA		mg/L	9/18/2015 11:44 AM	PA/VA
Sodium	350	10.0	100	NA		mg/L	9/18/2015 11:56 AM	PA/VA
Strontium	15.3	0.010	0.100	NA	E	mg/L	9/21/2015 10:18 AM	
METALS BY ICP-MS			**Method: EPA 200.8 Rev. 5.4 (1994)**				**Analyst: LF**	
Arsenic	ND	0.0010	0.0050	NA		mg/L	9/15/2015 1:34 PM	PA/VA
Lead	0.0023	0.0002	0.0010	NA		mg/L	9/15/2015 1:34 PM	PA/VA
HARDNESS			**Method: SM2340 B-1997**				**Analyst: CGW**	
Hardness, Total (As CaCO3)	661	NA	1.00	NA		mg/L	9/18/2015 11:44 AM	VA
ANIONS by ION CHROMATOGRAPHY			**Method: EPA 300.0, Rev.2.1 (1993)**				**Analyst: CF**	
Bromide	12.5	2.50	5.00	NA		mg/L	9/14/2015 9:26 AM	PA/VA
Chloride	938	10.0	50.0	NA		mg/L	9/14/2015 9:26 AM	PA/VA
Sulfate	5.24	1.00	5.00	NA		mg/L	9/11/2015 5:37 PM	PA/VA
ANIONS by ION CHROMATOGRAPHY-48 HOUR			**Method: EPA 300.0, Rev.2.1 (1993)**				**Analyst: CF**	
Nitrogen, Nitrate	2.76	0.10	0.50	NA	H	mg/L	9/14/2015 10:06 AM	PA/VA
Nitrogen, Nitrite	ND	0.05	0.50	NA		mg/L	9/11/2015 5:37 PM	PA/VA
CONDUCTIVITY			**Method: SM2510 B - 1997**				**Analyst: KY**	
Specific Conductivity	3,270	NA	NA	NA		µmhos/cm	9/14/2015 2:45 PM	PA/VA
TOTAL DISSOLVED SOLIDS			**Method: SM2540 C-1997**				**Analyst: KY**	
Total Dissolved Solids	2,390	5	10	NA		mg/L	9/11/2015 5:08 PM	PA/VA
TOTAL SUSPENDED SOLIDS			**Method: SM2540 D-1997**				**Analyst: KY**	
Total Suspended Solids	116	2.0	10	NA		mg/L	9/11/2015 4:48 PM	PA/VA

REI Consultants, Inc. - Analytical Report

WO#: 1509E14

Date Reported: 9/30/2015

Client:	WEST VIRGINIA DEP / OFFICE OF OIL & GAS	**Collection Date:**	9/10/2015 12:00:00 PM
Project:	STEAMS & DRAINS	**Date Received:**	9/11/2015
Lab ID:	1509E14-04A	**Matrix:**	Liquid
Client Sample ID:	SAMPLE 4	**Site ID:**	HALL - UIC

Analysis	Result	MDL	PQL	MCL	Qual	Units	Date Analyzed	NELAP
ACIDITY			**Method: SM2310 B-1997**				**Analyst: VS**	
Acidity, Total	73.2	1.0	10	NA		mg/L	9/14/2015 4:50 PM	PA/VA
ALKALINITY			**Method: SM2320 B-1997**				**Analyst: VS**	
Alkalinity, Total (As CaCO3)	ND	1.0	20.0	NA		mg/L	9/14/2015 4:50 PM	PA/VA
pH - LAB TEST, HOLD TIME EXPIRED			**Method: SM4500-H+-B-2000**				**Analyst: VS**	
pH	4.02	NA	NA	NA		SU	9/14/2015 4:50 PM	

REI Consultants, Inc. - Analytical Report

WO#: 1509E14

Date Reported: 9/30/2015

Client:	WEST VIRGINIA DEP / OFFICE OF OIL & GAS	**Collection Date:**	9/10/2015 1:05:00 PM
Project:	STEAMS & DRAINS	**Date Received:**	9/11/2015
Lab ID:	1509E14-05A	**Matrix:**	Liquid
Client Sample ID:	SAMPLE 5	**Site ID:**	HALL - UIC

Analysis	Result	MDL	PQL	MCL	Qual	Units	Date Analyzed	NELAP
METALS BY ICP			**Method: EPA 200.7 Rev. 4.4 (1994)**				**Analyst: CGW**	
Aluminum	1.06	0.006	0.100	NA		mg/L	9/18/2015 11:50 AM	PA/VA
Barium	0.080	0.002	0.100	NA	J	mg/L	9/18/2015 11:50 AM	PA/VA
Calcium	42.6	0.050	1.00	NA		mg/L	9/18/2015 11:50 AM	PA/VA
Iron	1.46	0.010	0.100	NA		mg/L	9/18/2015 11:50 AM	PA/VA
Magnesium	7.46	0.050	0.500	NA		mg/L	9/18/2015 11:50 AM	PA/VA
Manganese	0.070	0.002	0.100	NA	J	mg/L	9/18/2015 11:50 AM	PA/VA
Potassium	4.99	0.050	0.500	NA		mg/L	9/18/2015 11:50 AM	PA/VA
Sodium	18.2	0.100	1.00	NA		mg/L	9/18/2015 11:50 AM	PA/VA
Strontium	0.200	0.001	0.010	NA		mg/L	9/17/2015 11:12 AM	
METALS BY ICP-MS			**Method: EPA 200.8 Rev. 5.4 (1994)**				**Analyst: LF**	
Arsenic	0.0025	0.0010	0.0050	NA	J	mg/L	9/15/2015 1:40 PM	PA/VA
Lead	0.0021	0.0002	0.0010	NA		mg/L	9/15/2015 1:40 PM	PA/VA
HARDNESS			**Method: SM2340 B-1997**				**Analyst: CGW**	
Hardness, Total (As CaCO3)	137	NA	1.00	NA		mg/L	9/18/2015 11:50 AM	VA
ANIONS by ION CHROMATOGRAPHY			**Method: EPA 300.0, Rev.2.1 (1993)**				**Analyst: CF**	
Bromide	ND	0.05	0.10	NA		mg/L	9/11/2015 5:56 PM	PA/VA
Chloride	25.2	0.20	1.00	NA		mg/L	9/11/2015 5:56 PM	PA/VA
Sulfate	16.0	1.00	5.00	NA		mg/L	9/11/2015 5:56 PM	PA/VA
ANIONS by ION CHROMATOGRAPHY-48 HOUR			**Method: EPA 300.0, Rev.2.1 (1993)**				**Analyst: CF**	
Nitrogen, Nitrate	0.58	0.02	0.10	NA		mg/L	9/11/2015 5:56 PM	PA/VA
Nitrogen, Nitrite	1.26	0.05	0.50	NA		mg/L	9/11/2015 5:56 PM	PA/VA
CONDUCTIVITY			**Method: SM2510 B - 1997**				**Analyst: KY**	
Specific Conductivity	399	NA	NA	NA		µmhos/cm	9/14/2015 2:45 PM	PA/VA
TOTAL DISSOLVED SOLIDS			**Method: SM2540 C-1997**				**Analyst: KY**	
Total Dissolved Solids	193	5	10	NA		mg/L	9/11/2015 5:08 PM	PA/VA
TOTAL SUSPENDED SOLIDS			**Method: SM2540 D-1997**				**Analyst: KY**	
Total Suspended Solids	18.0	2.0	10	NA		mg/L	9/11/2015 4:48 PM	PA/VA

REI Consultants, Inc. - Analytical Report

WO#: 1509E14

Date Reported: 9/30/2015

Client:	WEST VIRGINIA DEP / OFFICE OF OIL & GAS	**Collection Date:**	9/10/2015 1:05:00 PM
Project:	STEAMS & DRAINS	**Date Received:**	9/11/2015
Lab ID:	1509E14-05A	**Matrix:**	Liquid
Client Sample ID:	SAMPLE 5	**Site ID:**	HALL - UIC

Analysis	Result	MDL	PQL	MCL	Qual	Units	Date Analyzed	NELAP
ACIDITY			**Method: SM2310 B-1997**				**Analyst: VS**	
Acidity, Total	2.4	1.0	10	NA	J	mg/L	9/14/2015 4:50 PM	PA/VA
ALKALINITY			**Method: SM2320 B-1997**				**Analyst: VS**	
Alkalinity, Total (As CaCO3)	119	1.0	20.0	NA		mg/L	9/14/2015 4:50 PM	PA/VA
pH - LAB TEST, HOLD TIME EXPIRED			**Method: SM4500-H+-B-2000**				**Analyst: VS**	
pH	7.35	NA	NA	NA		SU	9/14/2015 4:50 PM	

Pace Analytical Services, Inc.
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

September 30, 2015

Ms. Stacy Heasley
REI Consultants, Inc.
225 Industrial Park Drive
PO Box 286
Beaver, WV 25813

RE: Project: 1509E14
Pace Project No.: 30159379

Dear Ms. Heasley:
Enclosed are the analytical results for sample(s) received by the laboratory on September 16, 2015. The results relate only to the samples included in this report. Results reported herein conform to the most current TNI standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Carin A. Ferris

Carin Ferris
carin.ferris@pacelabs.com
Project Manager

Enclosures

Pace Analytical Services, Inc.
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

CERTIFICATIONS

Project: 1509E14
Pace Project No.: 30159379

Pennsylvania Certification IDs
1638 Roseytown Rd Suites 2,3&4, Greensburg, PA 15601
L-A-B DOD-ELAP Accreditation #: L2417
Alabama Certification #: 41590
Arizona Certification #: AZ0734
Arkansas Certification
California Certification #: 04222CA
Colorado Certification
Connecticut Certification #: PH-0694
Delaware Certification
Florida/TNI Certification #: E87683
Georgia Certification #: C040
Guam Certification
Hawaii Certification
Idaho Certification
Illinois Certification
Indiana Certification
Iowa Certification #: 391
Kansas/TNI Certification #: E-10358
Kentucky Certification #: 90133
Louisiana DHH/TNI Certification #: LA140008
Louisiana DEQ/TNI Certification #: 4086
Maine Certification #: PA00091
Maryland Certification #: 308
Massachusetts Certification #: M-PA1457
Michigan/PADEP Certification
Missouri Certification #: 235
Montana Certification #: Cert 0082
Nebraska Certification #: NE-05-29-14
Nevada Certification #: PA014572015-1
New Hampshire/TNI Certification #: 2976
New Jersey/TNI Certification #: PA 051
New Mexico Certification #: PA01457
New York/TNI Certification #: 10888
North Carolina Certification #: 42706
North Dakota Certification #: R-190
Oregon/TNI Certification #: PA200002
Pennsylvania/TNI Certification #: 65-00282
Puerto Rico Certification #: PA01457
Rhode Island Certification #: 65-00282
South Dakota Certification
Tennessee Certification #: TN2867
Texas/TNI Certification #: T104704188-14-8
Utah/TNI Certification #: PA014572015-5
USDA Soil Permit #: P330-14-00213
Vermont Dept. of Health: ID# VT-0282
Virgin Island/PADEP Certification
Virginia/VELAP Certification #: 460198
Washington Certification #: C868
West Virginia DEP Certification #: 143
West Virginia DHHR Certification #: 9964C
Wisconsin Certification
Wyoming Certification #: 8TMS-L

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

SAMPLE SUMMARY

Project: 1509E14
Pace Project No.: 30159379

Lab ID	Sample ID	Matrix	Date Collected	Date Received
30159379001	1509E14-01A	Water	09/10/15 10:35	09/16/15 10:30
30159379002	1509E14-02A	Water	09/10/15 11:25	09/16/15 10:30
30159379003	1509E14-03A	Water	09/10/15 11:45	09/16/15 10:30
30159379004	1509E14-04A	Water	09/10/15 12:00	09/16/15 10:30
30159379005	1509E14-05A	Water	09/10/15 13:05	09/16/15 10:30

Pace Analytical Services, Inc.
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Greensburg, PA 15601
(724)850-5600

SAMPLE ANALYTE COUNT

Project: 1509E14
Pace Project No.: 30159379

Lab ID	Sample ID	Method	Analysts	Analytes Reported
30159379001	1509E14-01A	EPA 903.1	WRR	1
		EPA 904.0	JLW	1
30159379002	1509E14-02A	EPA 903.1	WRR	1
		EPA 904.0	JLW	1
30159379003	1509E14-03A	EPA 903.1	WRR	1
		EPA 904.0	JLW	1
30159379004	1509E14-04A	EPA 903.1	WRR	1
		EPA 904.0	JLW	1
30159379005	1509E14-05A	EPA 903.1	WRR	1
		EPA 904.0	JLW	1

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PROJECT NARRATIVE

Project: 1509E14
Pace Project No.: 30159379

Method: EPA 903.1
Description: 903.1 Radium 226
Client: REI Consultants, Inc.
Date: September 30, 2015

General Information:
5 samples were analyzed for EPA 903.1. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

Pace Analytical Services, Inc.
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Greensburg, PA 15601
(724)850-5600

PROJECT NARRATIVE

Project: 1509E14
Pace Project No.: 30159379

Method: EPA 904.0
Description: 904.0 Radium 228
Client: REI Consultants, Inc.
Date: September 30, 2015

General Information:
5 samples were analyzed for EPA 904.0. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

This data package has been reviewed for quality and completeness and is approved for release.

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Greensburg, PA 15601
(724)850-5600

ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: 1509E14
Pace Project No.: 30159379

Sample: 1509E14-01A Lab ID: 30159379001 Collected: 09/10/15 10:35 Received: 09/16/15 10:30 Matrix: Water
PWS: Site ID: Sample Type:
Comments: • Sample Acceptance Policy Waiver on file from the client.

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	2.74 ± 4.31 (6.15) C:NA T:93%	pCi/L	09/30/15 10:08	13982-63-3	
Radium-228	EPA 904.0	7.28 ± 3.37 (5.79) C:94% T:75%	pCi/L	09/29/15 16:04	15262-20-1	

Sample: 1509E14-02A Lab ID: 30159379002 Collected: 09/10/15 11:25 Received: 09/16/15 10:30 Matrix: Water
PWS: Site ID: Sample Type:
Comments: • Sample Acceptance Policy Waiver on file from the client.

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	0.611 ± 3.39 (5.32) C:NA T:93%	pCi/L	09/30/15 10:12	13982-63-3	
Radium-228	EPA 904.0	5.17 ± 3.53 (6.66) C:93% T:79%	pCi/L	09/29/15 16:04	15262-20-1	

Sample: 1509E14-03A Lab ID: 30159379003 Collected: 09/10/15 11:45 Received: 09/16/15 10:30 Matrix: Water
PWS: Site ID: Sample Type:
Comments: • Sample Acceptance Policy Waiver on file from the client.

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	1.99 ± 3.91 (5.78) C:NA T:90%	pCi/L	09/30/15 10:12	13982-63-3	
Radium-228	EPA 904.0	5.59 ± 3.27 (5.14) C:94% T:79%	pCi/L	09/29/15 16:04	15262-20-1	

Sample: 1509E14-04A Lab ID: 30159379004 Collected: 09/10/15 12:00 Received: 09/16/15 10:30 Matrix: Water
PWS: Site ID: Sample Type:
Comments: • Sample Acceptance Policy Waiver on file from the client.

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	2.38 ± 3.31 (4.72) C:NA T:92%	pCi/L	09/30/15 10:19	13982-63-3	
Radium-228	EPA 904.0	7.89 ± 3.25 (5.35) C:91% T:87%	pCi/L	09/29/15 16:04	15262-20-1	

Sample: 1509E14-05A Lab ID: 30159379005 Collected: 09/10/15 13:05 Received: 09/16/15 10:30 Matrix: Water
PWS: Site ID: Sample Type:
Comments: • Sample Acceptance Policy Waiver on file from the client.

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	3.58 ± 4.07 (5.61) C:NA T:91%	pCi/L	09/30/15 10:29	13982-63-3	
Radium-228	EPA 904.0	9.53 ± 3.95 (6.68) C:89% T:71%	pCi/L	09/29/15 15:54	15262-20-1	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

QUALITY CONTROL - RADIOCHEMISTRY

Project: 1508E14
Pace Project No.: 30159379

QC Batch: RADC/26081 Analysis Method: EPA 904.0
QC Batch Method: EPA 904.0 Analysis Description: 904.0 Radium 228
Associated Lab Samples: 30159379001, 30159379002, 30159379003, 30159379004, 30159379005

METHOD BLANK: 953467 Matrix: Water
Associated Lab Samples: 30159379001, 30159379002, 30159379003, 30159379004, 30159379005

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-228	0.202 ± 0.338 (0.737) C:92% T:81%	pCi/L	09/29/15 12:26	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

Pace Analytical Services, Inc.
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

QUALIFIERS

Project: 1509E14
Pace Project No.: 30159379

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Act - Activity

Unc - Uncertainty: SDWA = 1.96 sigma count uncertainty, all other matrices = Expanded Uncertainty (95% confidence interval). Gamma Spec = Expanded Uncertainty (95.4% Confidence Interval)

(MDC) - Minimum Detectable Concentration

Trac - Tracer Recovery (%)

Carr - Carrier Recovery (%)

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

REIC

Improving the environment, one client at a time...

CHAIN OF CUSTODY RECORD

COC ID: 6806 PAGE: 1 OF: 1

ADDRESS
REI Consultants, Inc.
PO Box 286
Beaver, WV 25813
TEL: (304) 255-2500
FAX: (304) 255-2572
Website: www reiclabs com

Please Include Email Address of Report Recipient Whenever Possible!!!

SUB CONTRATOR	PACE_PA	COMPANY	PACE ANALYTICAL SERVIC
ADDRESS	1638 ROSEYTOWN ROAD		
CITY STATE ZIP	GREENSBURG, PA 15601		
PHONE	(724) 850-5600	FAX	
ACCOUNT	050719EVP1	EMAIL	

SPECIAL INSTRUCTIONS / COMMENTS

State Code: WV Please use SampleID as purchase order number
After analysis, the samples do not need to be returned and can be disposed per your standard laboratory practices. Results to sheasley@reiclabs com Thank you

ANALYTICAL PARAMETERS

RADIUM 228 SUB (EPA 904.0)
RADIUM 226 SUB (EPA 903.1)

30159370

* Preservation Codes
0 None
1 Hydrochloric Acid
2 Nitric Acid
3 Sulfuric Acid
4 Sodium Thiosulfate
5 Sodium Hydroxide
Sodium Arsenite
6 Sodium Hydroxide
7 Ascorbic Acid
8 Sodium Sulfite/HCL
9 Potassium Dihydrogen Citrate
10 Trisodium Citrate

COMMENTS

	SAMPLE ID	CLIENT SAMPLE ID	Date Time	MATRIX	DATE COLLECTED	NUMBER OF CONTAINERS	RADIUM 228 SUB	RADIUM 226 SUB	
1	1509E14-01A	DOWNSTREAM		Liquid	[illegible]			22	001
2	1509E14-02A	SAMPLE 2		Liquid	[illegible]				002
3	1509E14-03A	[illegible]		Liquid	[illegible]	4			003
4	1509E14-04A	[illegible]		Liquid	9/10/2015 12:07:00 PM	2	√	√	004
5	1509E14-05A	[illegible]		Liquid	9/10/2015 [illegible]		√	√	005

*Results by 9/18/15 Thank you

Relinquished By: Whitney Williams	Date: 9/14/15	Time: 16:00	Received By: UPS	Date: 9/14/15	Time: 16:00
Relinquished By:	Date:	Time:	Received By: [signature]	Date: 9/17/15	Time: 1030

TAT: Next BD 2nd BD 3rd BD

Are all results due within your timeframe?

REPORT TRANSMITTAL DESIRED:
HARDCOPY (extra cost) FAX ✓ EMAIL ONLINE

FOR LAB USE ONLY
Temp. on arrival °C Attempt to Cool?
Comments

Sample Condition Upon Receipt

BLM

Pace Analytical

Client Name: REIC

Project # 30159379

Courier: ☐ Fed Ex ☒ UPS ☐ USPS ☐ Client ☐ Commercial ☐ Pace Other _____

Tracking #: 1Z16x713037650745O

Custody Seal on Cooler/Box Present: ☐ yes ☒ no Seals Intact: ☐ yes ☐ no Biological Tissue is Frozen: Yes No

Packing Material: Bubble Wrap ___ Bubble Bags ___ None ___ Other _____

Thermometer Used NA Type of Ice: Wet Blue (None) ☐ Samples on ice, cooling process has begun

Cooler Temp.: Observed Temp.: NA °C Correction Factor: ___ °C Final Temp: ___ °C

Date and Initials of person examining contents: AMM 9/7/15

Temp should be above freezing to 6°C

Comments:

Chain of Custody Present:	☒Yes	☐No	☐N/A 1.
Chain of Custody Filled Out:	☒Yes	☐No	☐N/A 2.
Chain of Custody Relinquished:	☒Yes	☐No	☐N/A 3.
Sampler Name & Signature on COC:	☐Yes	☒No	☐N/A 4.
Samples Arrived within Hold Time:	☒Yes	☐No	☐N/A 5.
Short Hold Time Analysis (<72hr):	☐Yes	☒No	☐N/A 6.
Rush Turn Around Time Requested:	☒Yes	☐No	☐N/A 7.
Sufficient Volume:	☒Yes	☐No	☐N/A 8. low volume.
Correct Containers Used:	☒Yes	☐No	☐N/A 9.
-Pace Containers Used:	☐Yes	☒No	☐N/A
Containers Intact:	☒Yes	☐No	☐N/A 10.
Filtered volume received for Dissolved tests	☐Yes	☐No	☒N/A 11.
Sample Labels match COC: -Includes date/time/ID/Analysis Matrix: WT	☒Yes	☐No	☐N/A 12.
All containers needing preservation have been checked.	☒Yes	☐No	☐N/A 13.
All containers needing preservation are found to be in compliance with EPA recommendation. exceptions: VOA, coliform, TOC, O&G, Phenols	☒Yes ☐Yes	☐No ☒No	☐N/A PH<2 Initial when completed AMM Lot # of added preservative
Samples checked for dechlorination:	☐Yes	☐No	☒N/A 14.
Headspace in VOA Vials (>6mm):	☐Yes	☐No	☒N/A 15.
Trip Blank Present:	☐Yes	☐No	☒N/A 16.
Trip Blank Custody Seals Present	☐Yes	☐No	☒N/A
Pace Trip Blank Lot # (if purchased):			

Client Notification/ Resolution: Field Data Required? Y / N

Person Contacted: _____ Date/Time: _____

Comments/ Resolution: _____

Project Manager Review: Carrie Forrest Date: 9/7/15

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e out of hold, incorrect preservative, out of temp, incorrect containers)

Page 2

Project Number: 30159379

Client Name: REIC

Item No.														
	Matrix Code	WT	WT	WT										
	Glass Jar (120 / 250 / 500 / 1L)													
	Soil kit (2 SB, 1M, soil jar)													
	Chemistry (250 / 500 / 1L)													
	Organics (1L)													
	Nutrient (250 / 500)													
	Phenolics (250 ml)													
	TOO (40 ml / 250 ml)													
	TOX (250 ml)													
	Total Metals													
	Dissolved Metals preserved Y N													
	O & G (1L)													
	TPH (1L)													
	VOA (40 ml 30 ml)													
	Cyanide (250 ml)													
	Sulfide (500 ml)													
	Bacteria (120 ml)													
	Wipes / swipe/ smear/ filter													
	Radchem Nalgene (125 / 250 / 500 / 1L)		1											
	Radchem Nalgene (1/2 gal. / 1 gal.L)													
	Cubitainer (500 ml / 4L)													
	Ziploc													
	Other													
	Other													

SCURF Back (2016-4 15May2012).xls

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CHAIN OF CUSTODY RECORD

REIC

Research Environmental & Industrial Consultants, Inc.

MAIN LABORATORY & CORPORATE HEADQUARTERS:
P.O. Box 286 · 225 Industrial Park Rd, Beaver, WV 25813
800-999-0105 · 304-255-2500 · 304-255-2572/fax · www.reiclabs.com

MID-OHIO VALLEY Service Center	SHENANDOAH Service Center	ROANOKE Service Center	MORGANTOWN Service Center
101 12th Street, Ashland, KY 41101, 606-393-5027	1557 Commerce Rd., Ste 201, Verona, VA 24482, 540-248-0183	3020-C Peters Creek Rd, Roanoke, VA 24019, 540-777-1276	16 Commerce Drive, Westover, WV 26501, 304-241-5861

Client: WVDEP
Contact Person: Tom Bass
QUOTE #:
Address: 601 57th St. SE
Billing Address (if different):
Site ID & State: HALL-UIC
PO#:
Phone: 304 926-
Fax:
Email: Thomas L Bass@wv.gov
City: Charleston
State: WV
Zip: 253__
City:
State:
Zip:
Project ID: Stream & Drains
Sampler: T.B.

SAMPLE LOG & ANALYSIS REQUEST

TURNAROUND TIME: ☐ NORMAL ☑ 5 DAY ☐ 3 DAY ☐ 2 DAY ☐ 1 DAY

*Rush work needs prior laboratory approval and will incur additional charges.

ANALYSIS & METHOD REQUESTED: Alkalinity; [illegible]; [illegible]; [illegible]; [illegible]; TDS

Enter preservative code: 0, 2, 2, 0, 0, 0

Sample ID										
1. HS Down stream	4 P	9/10/15 1035	Lick	X						
2. Sample 2	↓	11:25	↓	↓						
3. Sample 3	↓	11:45	↓	↓						
4. Sample 4	↓	12:00	↓	↓						
5. Sample 5	↓	12:05	↓	↓						

Preservative Codes:
0 None
1 Hydrochloric Acid
2 Nitric Acid
3 Sulfuric Acid
4 Sodium Thiosulfate
5 Sodium Hydroxide/Sodium Arsenite
6 Sodium Hydroxide
7 Ascorbic Acid
8 Sodium Bisulfate/Methanol
9 Ammonium Chloride
10
11
*(Use blanks for preservatives not listed)

Nitrite, Aluminum, Iron

COMMENTS:
Mn, Mg, Calcium, Potassium, Sodium, Barium, Lead, Arsenic
Strontium, T. Acidity, Radium 226, Radium 228

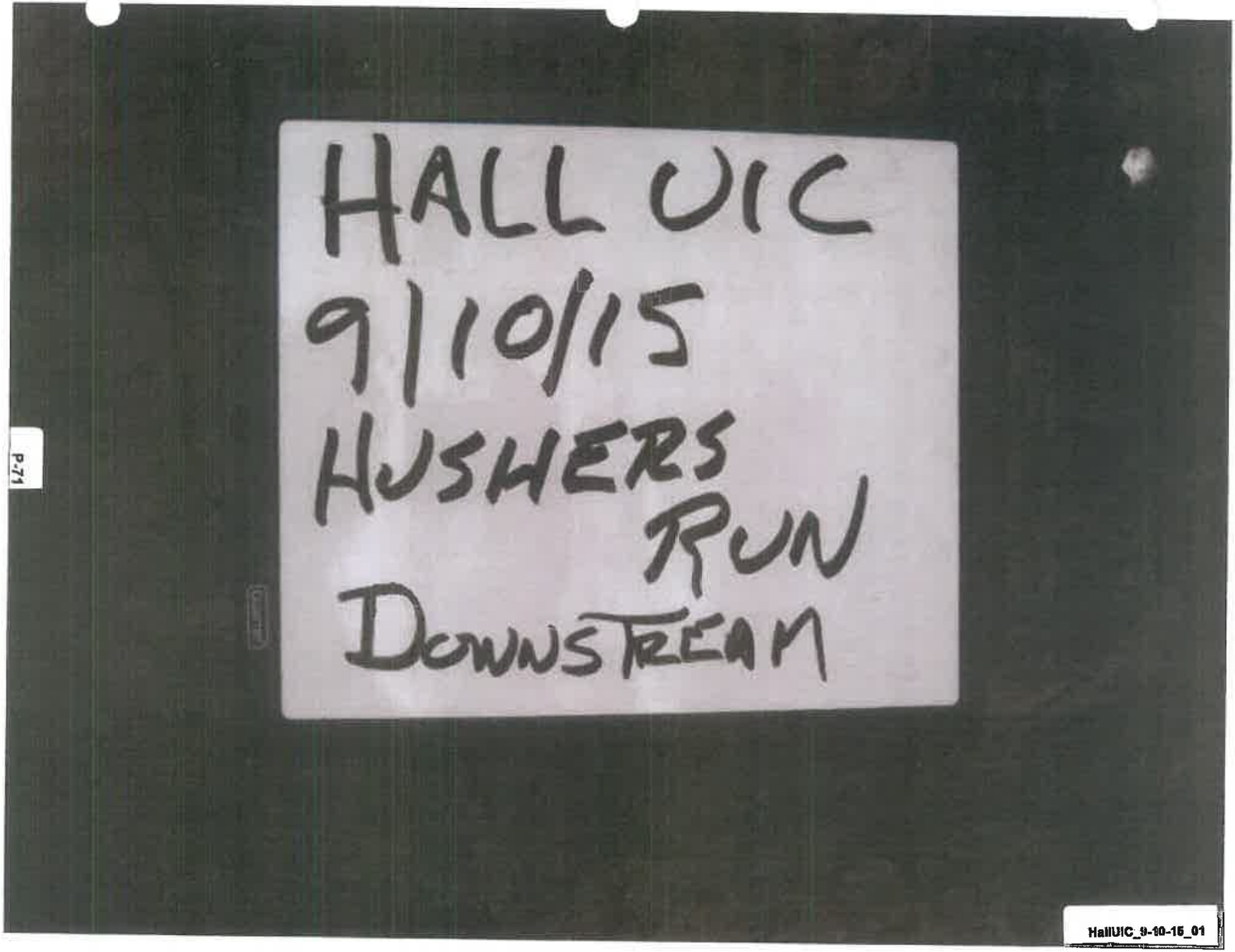
All sample requests are subject to REIC's Standard Terms and Conditions.

Relinquished by (Signature)	Date/Time	Relinquished by (Signature)	Date/Time	FAX RESULTS ☐	EMAIL RESULTS ☐
[signature]	9/10/15				
Received by (Signature)	Date/Time	Received by (Signature)	Date/Time		
[signature]	9/10/15				

COC-NCR-1015

Hall Drilling, LLC
UIC Facility Permit No. 2D0859909
Photo Log
September 10, 2015

Photo No.	Description
HallUIC_9-10-15_01	Marker Board - Hushers Run Downstream, 9-10-15
HallUIC_9-10-15_02	Sample Site No.1, Hushers Run, facing east, upstream
HallUIC_9-10-15_03	Sample Site No.1, Hushers Run
HallUIC_9-10-15_04	Sample Site No.1, Hushers Run, facing west, downstream
HallUIC_9-10-15_05	Sample Site No.1, Hushers Run, facing east, upstream
HallUIC_9-10-15_06	Sample Site No.1, Hushers Run, facing east, upstream
HallUIC_9-10-15_07	Sample Site No.1, Hushers Run, facing north
HallUIC_9-10-15_08	Culvert exit, from center tributary, facing north
HallUIC_9-10-15_09	Culvert entrance, from center tributary, facing south, panorama 1 of 5
HallUIC_9-10-15_10	Culvert entrance, from center tributary, facing south, panorama 2 of 5
HallUIC_9-10-15_11	Culvert entrance, from center tributary, facing south, panorama 3 of 5
HallUIC_9-10-15_12	Culvert entrance, from center tributary, facing south, panorama 4 of 5
HallUIC_9-10-15_13	Culvert entrance, from center tributary, facing south, panorama 5 of 5
HallUIC_9-10-15_14	Marker Board - Sample Site No.2, Hushers Run Midway, 9-10-15
HallUIC_9-10-15_15	Sample Site No.2, facing south
HallUIC_9-10-15_16	Sample Site No.2, panorama 1 of 3, north to east
HallUIC_9-10-15_17	Sample Site No.2, panorama 2 of 3, north to east
HallUIC_9-10-15_18	Sample Site No.2, panorama 3 of 3, north to east
HallUIC_9-10-15_19	Sample Site No.2, facing west downstream
HallUIC_9-10-15_20	Lamberton Rd., panorama 1 of 2, facing east
HallUIC_9-10-15_21	Lamberton Rd., panorama 2 of 2, facing east
HallUIC_9-10-15_22	Marker Board - Sample Site No.3, east side ditch, center tributary, facing north
HallUIC_9-10-15_23	Sample Site No.3, center tributary at guard shack, facing north
HallUIC_9-10-15_24	Guard shack area, facing south
HallUIC_9-10-15_25	West holding pit, panorama 1 of 3, facing south
HallUIC_9-10-15_26	West holding pit, panorama 2 of 3, facing south
HallUIC_9-10-15_27	West holding pit, panorama 3 of 3, facing south
HallUIC_9-10-15_28	Marker Board - Sample Site No.4, sump below MW-3, 9-10-15
HallUIC_9-10-15_29	Sample Site No.4, at MW-3, facing south
HallUIC_9-10-15_30	Sample Site No.4, at MW-3, facing north
HallUIC_9-10-15_31	Sample Site No.4, at MW-3
HallUIC_9-10-15_32	Sample Site No.4, at MW-3, panorama 1 of 4, east to south
HallUIC_9-10-15_33	Sample Site No.4, at MW-3, panorama 2 of 4, east to south
HallUIC_9-10-15_34	Sample Site No.4, at MW-3, panorama 3 of 4, east to south
HallUIC_9-10-15_35	Sample Site No.4, at MW-3, panorama 4 of 4, east to south
HallUIC_9-10-15_36	Skimmer storage tank, facing south
HallUIC_9-10-15_37	East holding pit, facing south, panorama 1 of 3
HallUIC_9-10-15_38	East holding pit, facing south, panorama 2 of 3
HallUIC_9-10-15_39	East holding pit, facing south, panorama 3 of 3
HallUIC_9-10-15_40	East holding pit, facing west, panorama 1 of 3
HallUIC_9-10-15_41	East holding pit, facing west, panorama 2 of 3
HallUIC_9-10-15_42	East holding pit, facing west, panorama 3 of 3
HallUIC_9-10-15_43	Oil skimmer boom at east holding pit
HallUIC_9-10-15_44	Monitoring well No. 1 (MW-1), facing south
HallUIC_9-10-15_45	East holding pit, facing north, panorama 1 of 3
HallUIC_9-10-15_46	East holding pit, facing north, panorama 2 of 3
HallUIC_9-10-15_47	East holding pit, facing north, panorama 3 of 3
HallUIC_9-10-15_48	Monitoring well No. 2 (MW-2), facing north, panorama 1 of 3
HallUIC_9-10-15_49	Monitoring well No. 2 (MW-2), facing north, panorama 2 of 3
HallUIC_9-10-15_50	Monitoring well No. 2 (MW-2), facing north, panorama 3 of 3
HallUIC_9-10-15_51	Monitoring well No. 2 (MW-2), facing south, panorama 1 of 2
HallUIC_9-10-15_52	Monitoring well No. 2 (MW-2), facing south, panorama 2 of 2
HallUIC_9-10-15_53	API tag at active injection well, API 085-09909
HallUIC_9-10-15_54	Injection well, tubing pressure gauge
HallUIC_9-10-15_55	Injection well, annular pressure gauge
HallUIC_9-10-15_56	Injection well and security fence
HallUIC_9-10-15_57	Injection well and security fence
HallUIC_9-10-15_58	Culvert under Lamberton Rd. carrying east tributary, facing north, panorama 1 of 2
HallUIC_9-10-15_59	Culvert under Lamberton Rd. carrying east tributary, facing north, panorama 2 of 2
HallUIC_9-10-15_60	Marker Board - Sample Site No.5, Hushers Run, upstream of east tributary, 9-10-15
HallUIC_9-10-15_61	Sample Site No.5, Hushers Run, upstream of east tributary
HallUIC_9-10-15_62	Sample Site No.5, Hushers Run, upstream of east tributary


HALL UIC
9/10/15
HUSHERS
RUN
DOWNSTREAM
P.71
HallUIC_9-10-15_01


P-72
HallUIC_9-10-15_02


HallUIC_9-10-16_03


P-74
HallUIC_9-10-15_04


P-75
HallUIC_9-10-15_05


P-76
HallUIC_9-10-15_06


P-77
HallUIC 9-10-15 07


P-78
HallUIC 9-10-15 08

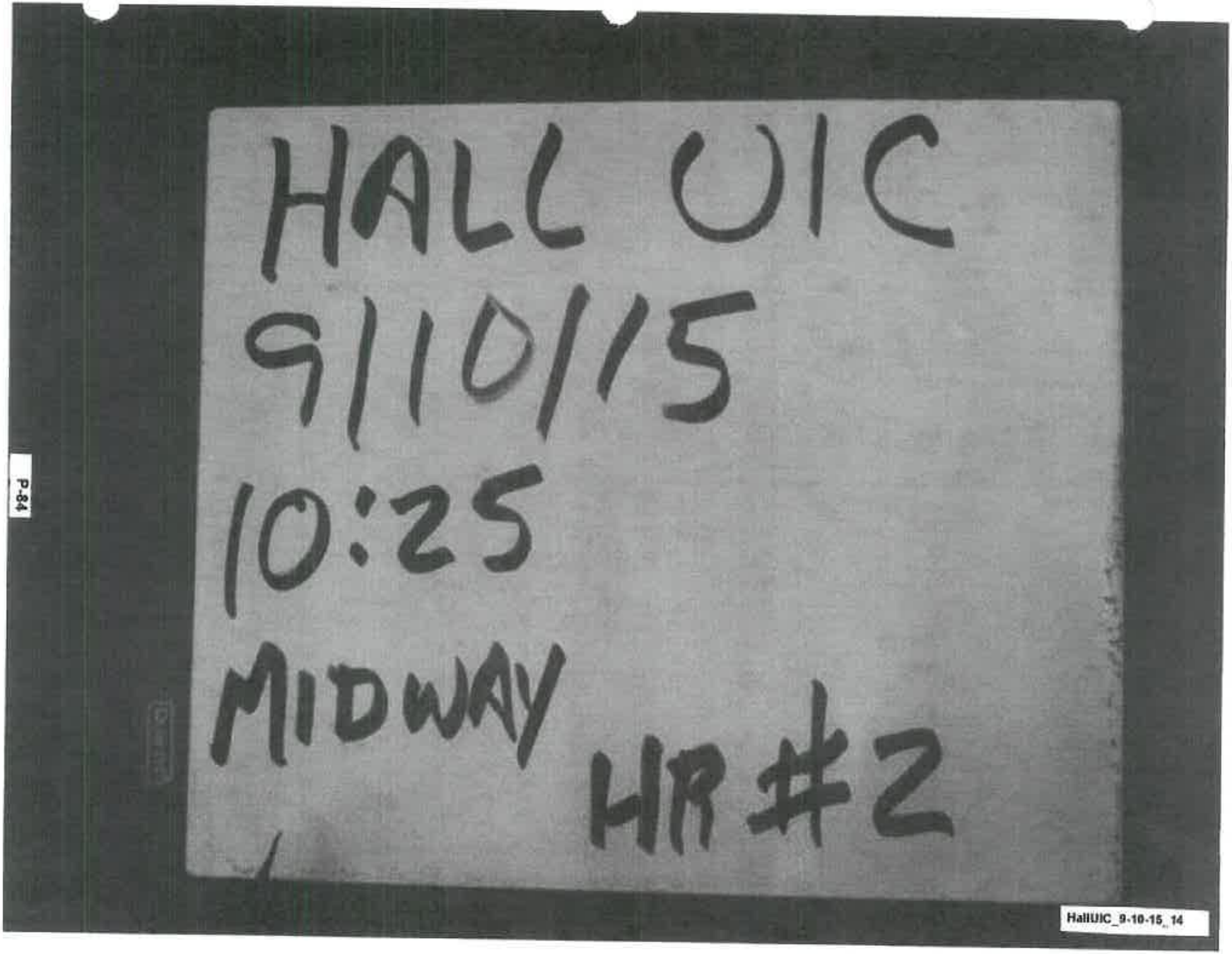

P-79
HallUIC_9-10-15_09


P-60
HallUIC_9-10-15_10


P-81
HallUIC_9-10-15_11


P-82
HallUIC_9-10-15_12


P-83
HallUIC_9-10-15_13


HALL UIC
9/10/15
10:25
MIDWAY
HR #2
P-84
HallUIC_9-10-15_14


P-86
Hall/UIC 9-10-15 15


P-96
HallUIC 9-10-15 16

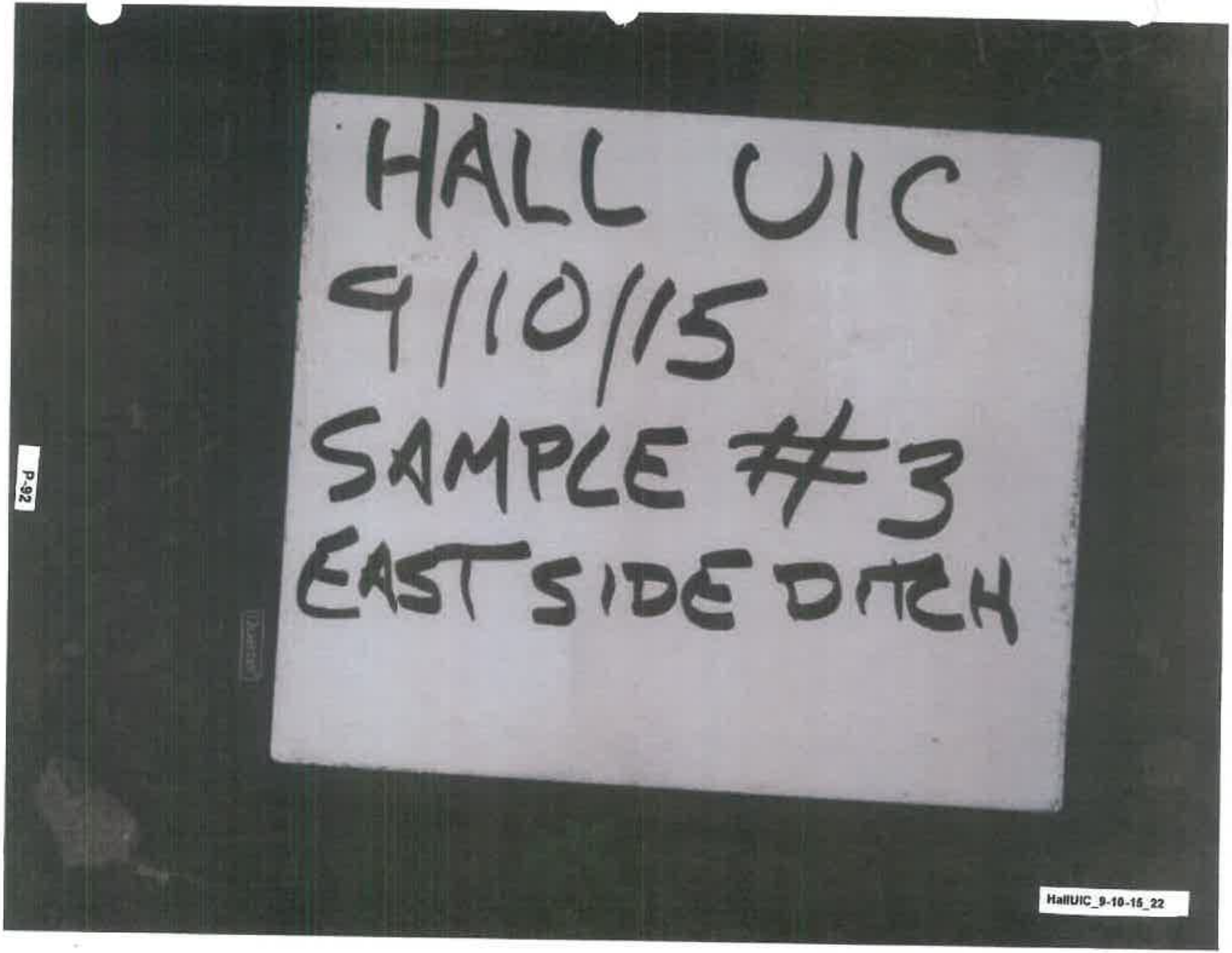

Pd87
HallUIC_9-10-15_17


P-88
HallUIC_9-10-15_18


P-89
HallUIC_9-10-15_19


P-30
HallUIC_9-10-15_20


P-91
HallUIC_9-10-15_21


HALL UIC
9/10/15
SAMPLE #3
EAST SIDE DITCH
P-92
HallUIC_9-10-15_22

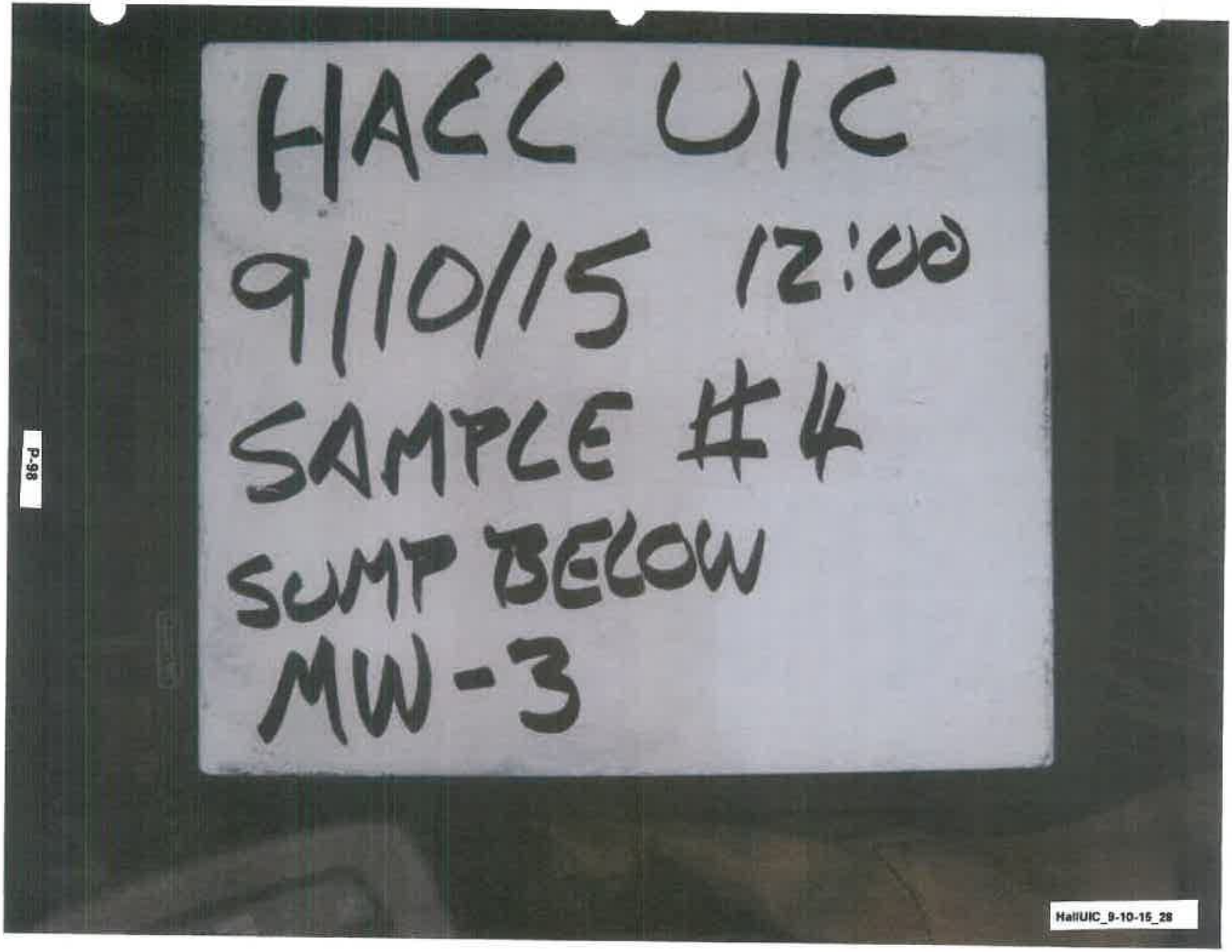

P-93
HallUIC 9-10-15 23


P-94
HallUIC 9-10-15 24


HallUIC_9-10-15_25


F-96
HallUIC_9-10-15_26


P-97
HallUIC_9-10-15_27


HACC UIC
9/10/15 12:00
SAMPLE #4
SUMP BELOW
MW-3
P-36
HallUIC_9-10-15_28


P-99
HallUIC_9-18-15_29


P-100
HallUIC_9-10-15_30

P-101


P-102
HallUIC 9-10-15 32


P-103
HallUIC_9-10-15_33

HallUIC_9-10-15_34
P-104

HallUIC_9-10-15_38
P-105


CRUDE OIL
P-106
HallUIC_9-10-15_36


P-107
HallUIC_9-10-15_37


P-108
HallUIC_9-10-15_38


P-109
Hall/UIC 9-10-15 39


P-110
HallUIC 9-10-15 40


P-111
HallUIC_9-10-15_41


P-112
HallUIC_9-10-15_42


P-113
HallUIC_9-10-16_43

HalliUIC_8-10-16_44
P-114


P-116
HallUIC_9-10-15_46


P-449
HallUIC_9-10-15_46


P-117
HallUIC 9-10-15 47


P-118
HallUIC 9-10-16 48


P-119
HallUIC_9-10-15_49


P-120
HallUIC_9-10-15_50

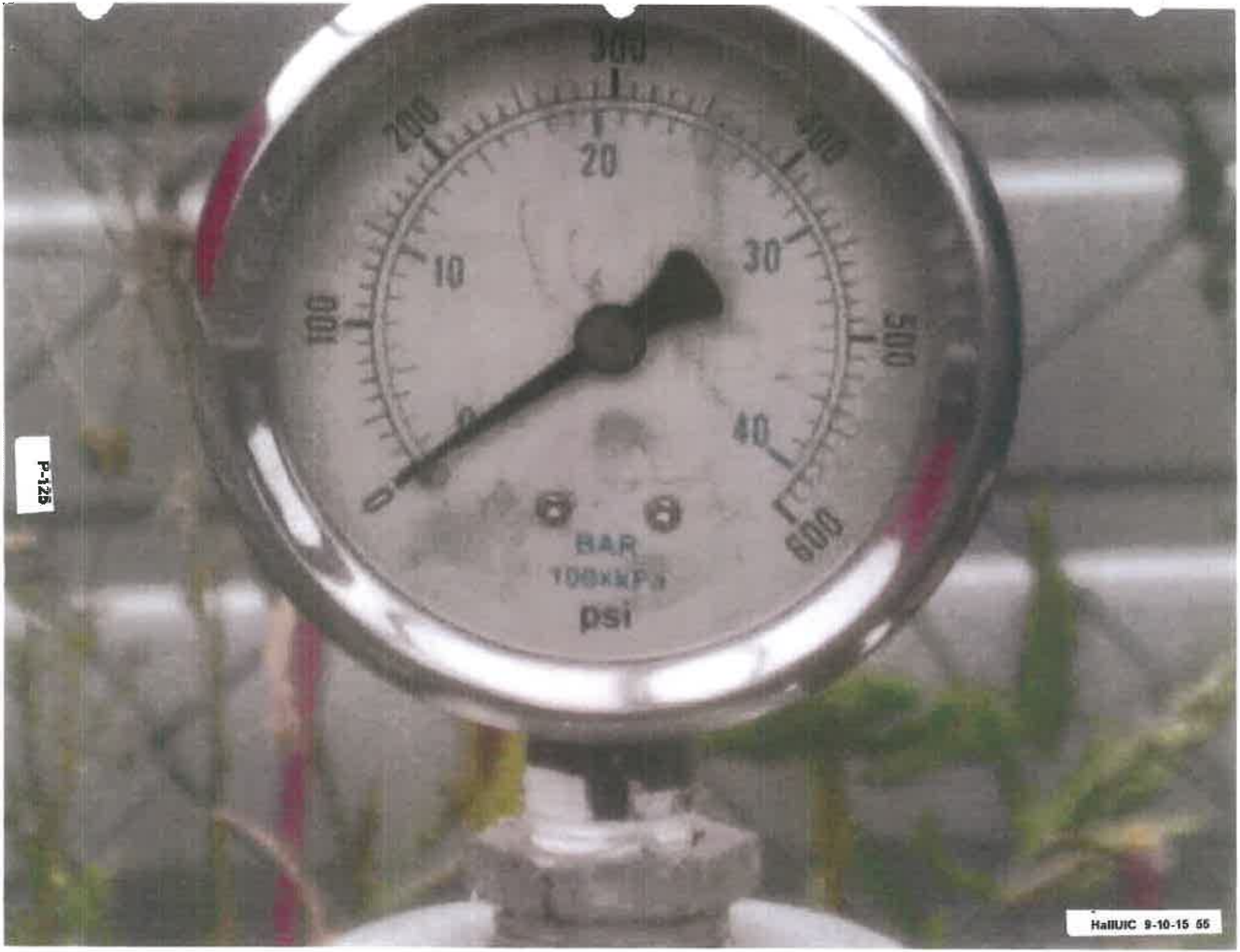

P-121
HallUIC_9-10-15_51


P-122
HallUIC_9-10-15_52

HallWIC_8-10-15_53
P-123

HallUIC_9-10-15_54

P-124


P-125
HallUIC 9-10-15 55


P-126
HallUIC 8-10-15 56


P-127
HallUIC_9-19-15_67


P-128
HallUIC_9-10-15_58


P-129
HallUIC_9-10-15_59


HALL UIC
9/10/15 13:05
SAMPLE #5
HUSHERS RUN
P-130
HallUIC_9-10-15_60

HallIIC_9-10-16_61
P-131


P-132
HallUIC_9-10-15_62

91 7199 9991 7035 6693 5938

west virginia department of environmental protection

Office of Oil and Gas
601 57th Street, S.E.
Charleston, WV 25304
Phone: (304) 926-0450; Fax: (304) 926-0452

Earl Ray Tomblin, Governor
Randy C. Huffman, Cabinet Secretary
www.dep.wv.gov

ORDER
ISSUED UNDER
WEST VIRGINIA CODE CHAPTER 22

TO: Hall Drilling, LLC
Attn: Michael Hall
P.O. Box 249
Ellenboro, WV 26346

DATE: October 10, 2015

ORDER NO.: 2015-UIC-7

INTRODUCTION

This Order (hereinafter "Order") is issued by the Office of Oil and Gas (hereinafter "OOG"), by and through its Chief, pursuant to the authority of West Virginia Code §§ 22-1-1 *et seq.*, 22-6-2, 22-11-1 *et seq.* and 22-12-1 *et seq.* to Hall Drilling, LLC.

FINDINGS OF FACT

In support of this order, the Chief hereby finds the following:

1. Hall Drilling, LLC operates an underground injection control (UIC) facility located in Clay District, Ritchie County, West Virginia.

2. On June 6, 2013, Hall Drilling, LLC was issued an underground injection control (UIC) permit 2D0859909 from the OOG authorizing operation of a UIC facility. Associated with the UIC facility are two lined pits and corresponding groundwater monitoring wells utilized for leak detection.

3. On June 18, 2014 and November 20, 2014, Hall Drilling, LLC submitted laboratory reports of groundwater sample from monitoring well MW-3 that reflect the possibility that environmental media at the facility may be impacted.

4. On September 10, 2015, OOG staff sampled a spring adjacent to monitoring well MW-3 at the Hall Drilling, LLC UIC facility.

5. On September 21, 2015, OOG received the laboratory report for samples collected on September 10, 2015. The analytical results reflect the possibility that environmental media at the facility may be impacted. The analytical results reflect elevated levels of certain tested parameters requiring further investigation by the operator. These parameters include chloride, bromide, sulfate, strontium, barium, calcium, manganese, and sodium.

ORDER FOR COMPLIANCE

Therefore, in accordance with West Virginia Code §§ 22-1-1 *et seq.*, 22-6-2, 22-11-1 *et seq.* and 22-12-1 *et seq.*, it is hereby ORDERED by the Chief that:

Hall Drilling, LLC shall promptly obtain the services of a third party environmental contractor and within thirty (30) days submit a site investigation plan, including sampling and analyses, to OOG for comment and approval. The plan shall encompass a schedule for initiation and completion of the investigation. The plan shall be submitted to:

West Virginia Department of Environmental Protection
Office of Oil and Gas
UIC Program
601 57th Street
Charleston, WV 25304

Upon approval, the plan and schedule shall be incorporated into and become part of this Order, as if fully set forth herein. Failure to submit an approvable plan and schedule or failure to adhere to the approved schedule is a violation of this Order.

OTHER PROVISIONS

1. Compliance with the terms and conditions of this Order shall not in any way be construed as relieving Hall Drilling, LLC of the obligation to comply with any applicable law, permit, other order, or any other requirement otherwise applicable. Violations of the terms and conditions of this Order may subject Hall Drilling, LLC to additional enforcement actions in accordance with the applicable law.

2. The provisions of this Order are severable and should a court or board of competent jurisdiction declare any provisions to be invalid or unenforceable, all other provisions shall remain in full force and effect.

3. This Order is binding on Hall Drilling, LLC its successors and assigns.

4. This Order shall terminate upon Hall Drilling, LLC's notification of full compliance with the "Order for Compliance" and verification of this notification by OOG.

RIGHT OF APPEAL

Notice is hereby given of your right to appeal the terms and conditions of this Order which you are aggrieved to the Environmental Quality Board by filing a NOTICE of APPEAL on the form prescribed by such Board, in accordance with the provisions of Chapter 22, Article 11, Section 21 and /or Chapter 22, Article 12, Section 11 of the Code of West Virginia within thirty (30) days after receipt of this Order.

This Order shall become effective upon receipt.

11-10-15
DATE

James A. Martin, Chief
Office of Oil and Gas

WVDEP-OOG
October 6, 2015

Analytical Results Summary
Streams, Seep, Monitoring Wells

Hall Drilling, LLC
Tech Service Center
Ellenboro, Richie County, West Virginia
UIC Permit 2D0859909

					Radiologics (1)		Organics (2)							Metals (2)												Conventional Chemistry Parameters (2)													Field Measurements		
Sample Name	Lab ID No.	Type	Sampled By	Date Sampled	Radium-226	Radium-228	Benzene	Toluene	Ethylbenzene	Total Xylene	TPH-GRO	TPH-DRO	TPH-ORO	Al	Ba	Ca	Fe	Mg	Mn	K	Na	Sr	As	Pb	Chloride	Bromide	Nitrate	Nitrite	TDS	TSS	TOC	SO4	Sp Cond (5)	pH (4)	Hardness	Acidity	Alkalinity	Sp Cond (5)	pH (4)	Temp (5)
Sample 1 (Downstream)	1509E14-01A	Liquid - Grab	WVDEP-REIC	9/11/2015	6.15	5.78								2.90	0.132	38.6	3.98	6.92	0.151	4.64	13.8	0.286	0.0022	0.003	20.6	ND	0.63	1.08	168	98.0		18.1	335	7.48	125	17.6	96.5	300	6.93	20.43
Sample 2 (upstream of west tributary)	1509E14-02A	Liquid - Grab	WVDEP-REIC	9/11/2015	5.32	6.86								2.66	0.11	33.7	3.60	6.25	0.183	4.65	13.8	0.231	0.0019	0.0024	17.6	ND	0.56	1.05	164	55.0		14.9	312	7.28	110	14.2	91.8	285	6.82	20.59
Sample 3 (west trib at gatehouse)	1509E14-03A	Liquid - Grab	WVDEP-REIC	9/11/2015	5.78	6.14								0.731	0.153	67.0	0.938	12.3	0.147	3.90	19.3	0.763	ND	0.0009	47.3	0.24	1.09	1.95	286	29.0		43.3	572	7.86	218	2.1	138	520	7.16	19.9
Sample 4 (seep below MW-3)	1508E14-04A	Liquid - Grab	WVDEP-REIC	9/11/2015	4.72	5.35								1.40	1.24	173	1.29	55.9	1.38	8.61	350	15.3	ND	0.0023	938	12.5	2.76	ND	2,390	116		5.24	3,270	4.01	661	73.2	ND	2,751	5.86	22.01
Sample 5 (upstream of east tributary)	1508E14-05A	Liquid - Grab	WVDEP-REIC	9/11/2015	5.61	6.68								1.06	0.080	47.6	1.46	7.46	0.070	4.99	18.2	0.200	0.0025	0.0021	25.2	ND	0.58	1.26	193	18.0		16.0	399	7.35	137	2.4	119	404	7.01	20.04
Downstream-Sample A	L15071692-01	Liquid - Grab	KCH-Microbac	7/31/2015											0.0976		ND		0.0127		17.4				37.0	ND			212		2.25	30.9		7.80						
Downstream-Sample A - Field Dup.	L15071692-02	Liquid - Grab	KCH-Microbac	7/31/2015											0.0968		ND		0.0153		17.4				33.5	ND			136		2.38	11.8		7.80						
Upstream-Sample B	L15071692-03	Liquid - Grab	KCH-Microbac	7/31/2015											0.0890		0.112		0.0256		19.3				26.4	ND			176		2.20	12.8		7.73						
MW-1 (Monitoring Well)		Liquid - MW	CORE-REIC	6/18/2013			ND(<.001)	ND(<.001)	ND(<.001)	ND(<.003)	ND(<.500)	ND(<.130)	ND(<.310)		0.233		11.4		0.344		58.1				3.03	ND(<.10)			175	66	1.71	ND(<5.00)								
		Liquid - MW	CORE-REIC	11/14/2013			ND(<.001)	ND(<.001)	ND(<.001)	ND(<.003)	ND(<.500)	ND(<.130)	ND(<.310)		0.306		6.37		0.249		30.1				2.37	ND(<.10)			219	181	ND(<1.00)	ND(<5.00)								
		Liquid - MW	CORE-REIC	6/18/2014			ND(<.001)	ND(<.001)	ND(<.001)	ND(<.003)	ND(<.500)	ND(<.270)	ND(<.670)		1.06		27.7		1.66		42.6				2.70				198	2,080	ND(<1.00)	ND(<5.00)								
	1411057-01A	Liquid - MW	CORE-REIC	11/20/2014			ND(<.001)	ND(<.001)	ND(<.001)	ND(<.003)	ND(<.500)	ND(<.120)	ND(<.120)		0.520		9.27		0.248		44.7				4.67	ND(<.10)			218	37	ND(<1.00)	ND(<5.00)						353 (avg)	8.42 (avg)	11.87 (avg)
MW-2 (Monitoring Well)		Liquid - MW	CORE-REIC	6/18/2013			ND(<.001)	ND(<.001)	ND(<.001)	ND(<.003)	ND(<.500)	ND(<.120)	ND(<.310)		0.147		3.07		N.D(<.100)		91.1				ND(<1.0)	ND(<.10)			252	70	ND(<1.00)	ND(<5.00)								
		Liquid - MW	CORE-REIC	11/14/2013			ND(<.001)	ND(<.001)	ND(<.001)	ND(<.003)	N.D(<.500)	ND(<.120)	ND(<.310)		0.134		1.76		ND(<.100)		85.6				ND(<1.0)	ND(<.10)			288	86	ND(<1.00)	18.1								
		Liquid - MW	CORE-REIC	6/18/2014			ND(<.001)	ND(<.001)	ND(<.001)	ND(<.003)	N.D(<.500)	ND(<.330)	ND(<.820)		0.218		16.8		0.464		99.8				N.D(<1.0)				299	563	ND(<1.00)	25.4								
	1411057-02A	Liquid - MW	CORE-REIC	11/20/2014			ND(<.001)	ND(<.001)	ND(<.001)	ND(<.003)	ND(<.500)	ND(<.120)	ND(<.170)		0.220		7.25		0.170		106				ND(<1.0)	ND(<.10)			298	97	ND(<1.00)	13.8						415 (avg)	8.00 (avg)	14.75 (avg)
MW-3 (Monitoring Well)		Liquid - MW	CORE-REIC	6/18/2013			ND(<.001)	ND(<.001)	ND(<.001)	ND(<.003)	ND(<.500)	ND(<.120)	ND(<.310)		0.351		0.721		ND(<.100)		39.1				2.49	ND(<.10)			152	6	ND(<1.00)	ND(<5.00)								
		Liquid - MW	CORE-REIC	11/14/2013			ND(<.001)	ND(<.001)	ND(<.001)	ND(<.003)	ND(<.500)	ND(<.120)	ND(<.310)		0.262		1.32		ND(<.100)		51.7				ND(<1.0)	ND(<.10)			212	29	ND(<1.00)	ND(<5.00)								
		Liquid - MW	CORE-REIC	6/18/2014			ND(<.001)	ND(<.001)	ND(<.001)	ND(<.003)	ND(<.500)	ND(<.190)	ND(<.470)		1.90		3.83		0.326		147				245				666	88	1.18	ND(<5.00)								
	1411057-03A	Liquid - MW	CORE-REIC	11/20/2014			ND(<.001)	ND(<.001)	ND(<.001)	ND(<.003)	ND(<.500)	ND(<.140)	ND(<.140)		1.83		0.505		0.289		202				249	2.40			747	5.5	1.00	11.8						1,121 (avg)	7.54 (avg)	13.24 (avg)

Notes:
(1) pCi/L
(2) mg/L
(3) umhos/cm
(4) Standard Units
(5) Celsius

REIC

Improving the environment, one client at a time...

REI Consultants, Inc.
PO Box 286
Beaver, WV 25813
TEL: (304) 255-2500
Website: www.reiclabs.com

3029-C Peters Creek Road
Roanoke, VA 24019
TEL: 540.777.1276

101 17th Street
Ashland, KY 41101
TEL: 606.393.5027

1557 Commerce Road, Suite 201
Verona, VA 24482
TEL: 540.248.0183

16 Commerce Drive
Westover, WV 26501
TEL: 304.241.5861

Wednesday, September 30, 2015

TOM BASS
WEST VIRGINIA DEP / OFFICE OF OIL & GAS
601 57TH STREET
CHARLESTON, WV 25304

TEL: (304) 926-0450
FAX:

RE: STEAMS & DRAINS
Work Order #: 1509E14
Dear TOM BASS:

Stacy Heasley
Project Manager

REI Consultants, Inc. - Case Narrative

WO#: 1509E14

Date Reported: 9/30/2015

Client: WEST VIRGINIA DEP / OFFICE OF OIL & GAS

Project: STEAMS & DRAINS

The analytical results presented in this report were produced using documented laboratory SOPs that incorporate appropriate quality control procedures as described in the applicable methods. Verification of required sample preservation (as required) is recorded on associated laboratory logs. Any deviation from compliance or method modification is identified within the body of this report by a qualifier footnote which is defined at the bottom of this page.

All sample results for solid samples are reported on an "as-received" wet weight basis unless otherwise noted.

Results reported for sums of individual parameters, such as TTHM and HAA5, may vary slightly from the sum of the individual parameter results, due to rounding of individual results, as required by EPA.

The test results in this report meet all NELAP and/or VELAP requirements for parameters clearly designated as PA, VA, PA/VA, or VELAP in the column labeled NELAP.

Please note if the sample collection time is not provided on the Chain of Custody, the default recording will be 0:00:00. This may cause some tests to be apparently analyzed out of hold.

All tests performed by REIC Service Centers are designated by an annotation on the test code. All other tests were performed by REIC's Main Laboratory in Beaver, WV.

DEFINITIONS:
MCL: Maximum Contaminant Level
MDL: Method Detection Limit; The lowest concentration of analyte that can be detected by the method in the applicable matrix.
Mg/Kg or mg/L: Units of part per million (PPM) - milligram per Kilogram (weight/weight) or milligram per Liter (weight/volume).
NA: Not Applicable
ND: Not Detected at the PQL or MDL
PQL: Practical Quantitation Limit; The lowest verified limit to which data is quantified without qualifications. Analyte concentrations below PQL are reported either as ND or as a number with a "J" qualifier.
Qual: Qualifier that applies to the analyte reported.
TIC: Tentatively Identified Compound, Estimated Concentration denoted by "J" qualifier.
Ug/Kg or ug/L: Units of part per billion (PPB) - microgram per kilogram (weight/weight) or microgram per liter (weight/volume).

QUALIFIERS:
X: Reported value exceeds required MCL
B: Analyte detected in the associated Method Blank at a concentration > 1/2 the PQL
E: The sample result is within the method accepted Linear Dynamic Range determined by the lab for this analysis. However, it may be considered estimated when applying the TNI (The NELAC Institute) standard.
H: Holding time for preparation or analysis has been exceeded.
J: Analyte concentration is reported, and is less than the PQL and greater than or equal to the MDL. The result reported is an estimate.
S: % REC (% recovery) exceeds control limits

CERTIFICATIONS:
Beaver, WV: WVDHHR 00412C/M, WVDEP 090, VADCLS 00281, KYDEP 90039, TNDEQ TN02926, NCDWQ 466, PADEP 68-00839, VADCLS (VELAP) 460148
Bluefield (Beaver, WV): WVDEP 090, VADCLS(VELAP) 460148, PADEP 68-00839
Roanoke, VA: VADCLS(VELAP) 460150
Verona, VA: VADCLS(VELAP) 460151
Ashland, KY: KYDEP 00094, WVDEP 389
Morgantown, WV: WVDHHR 003112M, WVDEP 387

REI Consultants, Inc. - Analytical Report

WO#: 1509E14

Date Reported: 9/30/2015

Client:	WEST VIRGINIA DEP / OFFICE OF OIL & GAS	**Collection Date:**	9/10/2015 10:35:00 AM
Project:	STEAMS & DRAINS	**Date Received:**	9/11/2015
Lab ID:	1509E14-01A	**Matrix:**	Liquid
Client Sample ID:	DOWNSTREAM	**Site ID:**	HALL - UIC

Analysis	Result	MDL	PQL	MCL	Qual	Units	Date Analyzed	NELAP
METALS BY ICP			**Method: EPA 200.7 Rev. 4.4 (1994)**				**Analyst: CGW**	
Aluminum	2.90	0.006	0.100	NA		mg/L	9/18/2015 6:20 PM	PA/VA
Barium	0.132	0.002	0.100	NA		mg/L	9/18/2015 11:08 AM	PA/VA
Calcium	38.6	0.050	1.00	NA		mg/L	9/18/2015 11:08 AM	PA/VA
Iron	3.98	0.010	0.100	NA		mg/L	9/18/2015 11:08 AM	PA/VA
Magnesium	6.92	0.050	0.500	NA		mg/L	9/18/2015 11:08 AM	PA/VA
Manganese	0.151	0.002	0.100	NA		mg/L	9/18/2015 11:08 AM	PA/VA
Potassium	4.64	0.050	0.500	NA		mg/L	9/18/2015 11:08 AM	PA/VA
Sodium	13.8	0.100	1.00	NA		mg/L	9/18/2015 11:08 AM	PA/VA
Strontium	0.286	0.001	0.010	NA		mg/L	9/17/2015 10:48 AM	

Notes:

Matrix spike recovery for Al does not meet laboratory control limits due to matrix interference. Recovery in the associated post-digestion spike meets laboratory control limits.

METALS BY ICP-MS			**Method: EPA 200.8 Rev. 5.4 (1994)**				**Analyst: LF**	
Arsenic	0.0022	0.0010	0.0050	NA	J	mg/L	9/15/2015 1:17 PM	PA/VA
Lead	0.0030	0.0002	0.0010	NA		mg/L	9/15/2015 1:17 PM	PA/VA
HARDNESS			**Method: SM2340 B-1997**				**Analyst: CGW**	
Hardness, Total (As CaCO3)	125	NA	1.00	NA		mg/L	9/18/2015 11:08 AM	VA
ANIONS by ION CHROMATOGRAPHY			**Method: EPA 300.0, Rev.2.1 (1993)**				**Analyst: CF**	
Bromide	ND	0.05	0.10	NA		mg/L	9/11/2015 4:40 PM	PA/VA
Chloride	20.6	0.20	1.00	NA		mg/L	9/11/2015 4:40 PM	PA/VA
Sulfate	18.1	1.00	5.00	NA		mg/L	9/11/2015 4:40 PM	PA/VA
ANIONS by ION CHROMATOGRAPHY-48 HOUR			**Method: EPA 300.0, Rev.2.1 (1993)**				**Analyst: CF**	
Nitrogen, Nitrate	0.63	0.02	0.10	NA		mg/L	9/11/2015 4:40 PM	PA/VA
Nitrogen, Nitrite	1.08	0.05	0.50	NA		mg/L	9/11/2015 4:40 PM	PA/VA
CONDUCTIVITY			**Method: SM2510 B - 1997**				**Analyst: KY**	
Specific Conductivity	335	NA	NA	NA		µmhos/cm	9/14/2015 2:45 PM	PA/VA
TOTAL DISSOLVED SOLIDS			**Method: SM2540 C-1997**				**Analyst: KY**	
Total Dissolved Solids	166	5	10	NA		mg/L	9/11/2015 5:08 PM	PA/VA

REI Consultants, Inc. - Analytical Report

WO#: 1509E14

Date Reported: 9/30/2015

Client:	WEST VIRGINIA DEP / OFFICE OF OIL & GAS	**Collection Date:**	9/10/2015 10:35:00 AM
Project:	STEAMS & DRAINS	**Date Received:**	9/11/2015
Lab ID:	1509E14-01A	**Matrix:**	Liquid
Client Sample ID:	DOWNSTREAM	**Site ID:**	HALL - UIC

Analysis	Result	MDL	PQL	MCL	Qual	Units	Date Analyzed	NELAP
TOTAL SUSPENDED SOLIDS			**Method: SM2540 D-1997**				**Analyst: KY**	
Total Suspended Solids	98.0	2.0	10	NA		mg/L	9/11/2015 4:48 PM	PA/VA
ACIDITY			**Method: SM2310 B-1997**				**Analyst: VS**	
Acidity, Total	17.6	1.0	10	NA		mg/L	9/14/2015 4:50 PM	PA/VA
ALKALINITY			**Method: SM2320 B-1997**				**Analyst: VS**	
Alkalinity, Total (As CaCO3)	96.5	1.0	20.0	NA		mg/L	9/14/2015 4:50 PM	PA/VA
pH - LAB TEST, HOLD TIME EXPIRED			**Method: SM4500-H+-B-2000**				**Analyst: VS**	
pH	7.48	NA	NA	NA		SU	9/14/2015 4:50 PM	

REI Consultants, Inc. - Analytical Report

WO#: 1509E14

Date Reported: 9/30/2015

Client:	WEST VIRGINIA DEP / OFFICE OF OIL & GAS	**Collection Date:**	9/10/2015 11:25:00 AM
Project:	STEAMS & DRAINS	**Date Received:**	9/11/2015
Lab ID:	1509E14-02A	**Matrix:**	Liquid
Client Sample ID:	SAMPLE 2	**Site ID:**	HALL - UIC

Analysis	Result	MDL	PQL	MCL	Qual	Units	Date Analyzed	NELAP
METALS BY ICP			**Method: EPA 200.7 Rev. 4.4 (1994)**				**Analyst: CGW**	
Aluminum	2.68	0.006	0.100	NA		mg/L	9/18/2015 11:32 AM	PA/VA
Barium	0.110	0.002	0.100	NA		mg/L	9/18/2015 11:32 AM	PA/VA
Calcium	33.7	0.050	1.00	NA		mg/L	9/18/2015 11:32 AM	PA/VA
Iron	3.60	0.010	0.100	NA		mg/L	9/18/2015 11:32 AM	PA/VA
Magnesium	6.25	0.050	0.500	NA		mg/L	9/18/2015 11:32 AM	PA/VA
Manganese	0.133	0.002	0.100	NA		mg/L	9/18/2015 11:32 AM	PA/VA
Potassium	4.65	0.050	0.500	NA		mg/L	9/18/2015 11:32 AM	PA/VA
Sodium	13.3	0.100	1.00	NA		mg/L	9/18/2015 11:32 AM	PA/VA
Strontium	0.213	0.001	0.010	NA		mg/L	9/17/2015 11:03 AM	
METALS BY ICP-MS			**Method: EPA 200.8 Rev. 5.4 (1994)**				**Analyst: LF**	
Arsenic	0.0019	0.0010	0.0050	NA	J	mg/L	9/15/2015 1:23 PM	PA/VA
Lead	0.0024	0.0002	0.0010	NA		mg/L	9/15/2015 1:23 PM	PA/VA
HARDNESS			**Method: SM2340 B-1997**				**Analyst: CGW**	
Hardness, Total (As CaCO3)	110	NA	1.00	NA		mg/L	9/18/2015 11:32 AM	VA
ANIONS by ION CHROMATOGRAPHY			**Method: EPA 300.0, Rev.2.1 (1993)**				**Analyst: CF**	
Bromide	ND	0.05	0.10	NA		mg/L	9/11/2015 4:59 PM	PA/VA
Chloride	17.8	0.20	1.00	NA		mg/L	9/11/2015 4:59 PM	PA/VA
Sulfate	14.9	1.00	5.00	NA		mg/L	9/11/2015 4:59 PM	PA/VA
ANIONS by ION CHROMATOGRAPHY-48 HOUR			**Method: EPA 300.0, Rev.2.1 (1993)**				**Analyst: CF**	
Nitrogen, Nitrate	0.56	0.02	0.10	NA		mg/L	9/11/2015 4:59 PM	PA/VA
Nitrogen, Nitrite	1.05	0.05	0.50	NA		mg/L	9/11/2015 4:59 PM	PA/VA
CONDUCTIVITY			**Method: SM2510 B - 1997**				**Analyst: KY**	
Specific Conductivity	312	NA	NA	NA		µmhos/cm	9/14/2015 2:45 PM	PA/VA
TOTAL DISSOLVED SOLIDS			**Method: SM2540 C-1997**				**Analyst: KY**	
Total Dissolved Solids	164	5	10	NA		mg/L	9/11/2015 5:08 PM	PA/VA
TOTAL SUSPENDED SOLIDS			**Method: SM2540 D-1997**				**Analyst: KY**	
Total Suspended Solids	55.0	2.0	10	NA		mg/L	9/11/2015 4:48 PM	PA/VA

REI Consultants, Inc. - Analytical Report

WO#: 1509E14

Date Reported: 9/30/2015

Client:	WEST VIRGINIA DEP / OFFICE OF OIL & GAS	**Collection Date:**	9/10/2015 11:25:00 AM
Project:	STEAMS & DRAINS	**Date Received:**	9/11/2015
Lab ID:	1509E14-02A	**Matrix:**	Liquid
Client Sample ID:	SAMPLE 2	**Site ID:**	HALL - UIC

Analysis	Result	MDL	PQL	MCL	Qual	Units	Date Analyzed	NELAP
ACIDITY			**Method: SM2310 B-1997**				**Analyst: VS**	
Acidity, Total	14.2	1.0	10	NA		mg/L	9/14/2015 4:50 PM	PA/VA
ALKALINITY			**Method: SM2320 B-1997**				**Analyst: VS**	
Alkalinity, Total (As CaCO3)	91.8	1.0	20.0	NA		mg/L	9/14/2015 4:50 PM	PA/VA
pH - LAB TEST, HOLD TIME EXPIRED			**Method: SM4500-H+-B-2000**				**Analyst: VS**	
pH	7.26	NA	NA	NA		SU	9/14/2015 4:50 PM	

REI Consultants, Inc. - Analytical Report

WO#: 1509E14

Date Reported: 9/30/2015

Client:	WEST VIRGINIA DEP / OFFICE OF OIL & GAS	**Collection Date:**	9/10/2015 11:45:00 AM
Project:	STEAMS & DRAINS	**Date Received:**	9/11/2015
Lab ID:	1509E14-03A	**Matrix:**	Liquid
Client Sample ID:	SAMPLE 3	**Site ID:**	HALL - UIC

Analysis	Result	MDL	PQL	MCL	Qual	Units	Date Analyzed	NELAP
METALS BY ICP			**Method: EPA 200.7 Rev. 4.4 (1994)**				**Analyst: CGW**	
Aluminum	0.731	0.006	0.100	NA		mg/L	9/18/2015 11:38 AM	PA/VA
Barium	0.153	0.002	0.100	NA		mg/L	9/18/2015 11:38 AM	PA/VA
Calcium	67.0	0.050	1.00	NA		mg/L	9/18/2015 11:38 AM	PA/VA
Iron	0.936	0.010	0.100	NA		mg/L	9/18/2015 11:38 AM	PA/VA
Magnesium	12.3	0.050	0.500	NA		mg/L	9/18/2015 11:38 AM	PA/VA
Manganese	0.147	0.002	0.100	NA		mg/L	9/18/2015 11:38 AM	PA/VA
Potassium	3.90	0.050	0.500	NA		mg/L	9/18/2015 11:38 AM	PA/VA
Sodium	19.3	0.100	1.00	NA		mg/L	9/18/2015 11:38 AM	PA/VA
Strontium	0.783	0.001	0.010	NA		mg/L	9/17/2015 11:06 AM	
METALS BY ICP-MS			**Method: EPA 200.8 Rev. 5.4 (1994)**				**Analyst: LF**	
Arsenic	ND	0.0010	0.0050	NA		mg/L	9/15/2015 1:28 PM	PA/VA
Lead	0.0009	0.0002	0.0010	NA	J	mg/L	9/15/2015 1:28 PM	PA/VA
HARDNESS			**Method: SM2340 B-1997**				**Analyst: CGW**	
Hardness, Total (As CaCO3)	218	NA	1.00	NA		mg/L	9/18/2015 11:38 AM	VA
ANIONS by ION CHROMATOGRAPHY			**Method: EPA 300.0, Rev.2.1 (1993)**				**Analyst: CF**	
Bromide	0.24	0.05	0.10	NA		mg/L	9/11/2015 5:18 PM	PA/VA
Chloride	47.3	0.20	1.00	NA		mg/L	9/11/2015 5:18 PM	PA/VA
Sulfate	43.3	1.00	5.00	NA		mg/L	9/11/2015 5:18 PM	PA/VA
ANIONS by ION CHROMATOGRAPHY-48 HOUR			**Method: EPA 300.0, Rev.2.1 (1993)**				**Analyst: CF**	
Nitrogen, Nitrate	1.09	0.02	0.10	NA		mg/L	9/11/2015 5:18 PM	PA/VA
Nitrogen, Nitrite	1.35	0.05	0.50	NA		mg/L	9/11/2015 5:18 PM	PA/VA
CONDUCTIVITY			**Method: SM2510 B - 1997**				**Analyst: KY**	
Specific Conductivity	572	NA	NA	NA		µmhos/cm	9/14/2015 2:45 PM	PA/VA
TOTAL DISSOLVED SOLIDS			**Method: SM2540 C-1997**				**Analyst: KY**	
Total Dissolved Solids	288	5	10	NA		mg/L	9/11/2015 5:06 PM	PA/VA
TOTAL SUSPENDED SOLIDS			**Method: SM2540 D-1997**				**Analyst: KY**	
Total Suspended Solids	29.0	2.0	10	NA		mg/L	9/11/2015 4:48 PM	PA/VA

REI Consultants, Inc. - Analytical Report

WO#: 1509E14

Date Reported: 9/30/2015

Client:	WEST VIRGINIA DEP / OFFICE OF OIL & GAS	Collection Date:	9/10/2015 11:45:00 AM
Project:	STEAMS & DRAINS	Date Received:	9/11/2015
Lab ID:	1509E14-03A	Matrix:	Liquid
Client Sample ID:	SAMPLE 3	Site ID:	HALL - UIC

Analysis	Result	MDL	PQL	MCL	Qual	Units	Date Analyzed	NELAP
ACIDITY			**Method: SM2310 B-1997**				**Analyst: VS**	
Acidity, Total	2.1	1.0	10	NA	J	mg/L	9/14/2015 4:50 PM	PA/VA
ALKALINITY			**Method: SM2320 B-1997**				**Analyst: VS**	
Alkalinity, Total (As CaCO3)	138	1.0	20.0	NA		mg/L	9/14/2015 4:50 PM	PA/VA
pH - LAB TEST, HOLD TIME EXPIRED			**Method: SM4500-H+-B-2000**				**Analyst: VS**	
pH	7.66	NA	NA	NA		SU	9/14/2015 4:50 PM	

REI Consultants, Inc. - Analytical Report

WO#: 1509E14

Date Reported: 9/30/2015

Client:	WEST VIRGINIA DEP / OFFICE OF OIL & GAS	**Collection Date:**	9/10/2015 12:00:00 PM
Project:	STEAMS & DRAINS	**Date Received:**	9/11/2015
Lab ID:	1509E14-04A	**Matrix:**	Liquid
Client Sample ID:	SAMPLE 4	**Site ID:**	HALL - UIC

Analysis	Result	MDL	PQL	MCL	Qual	Units	Date Analyzed	NELAP
METALS BY ICP			**Method: EPA 200.7 Rev. 4.4 (1994)**				**Analyst: CGW**	
Aluminum	1.40	0.006	0.100	NA		mg/L	9/18/2015 11:44 AM	PA/VA
Barium	1.34	0.002	0.100	NA		mg/L	9/18/2015 11:44 AM	PA/VA
Calcium	173	0.050	1.00	NA	E	mg/L	9/18/2015 11:44 AM	PA/VA
Iron	1.23	0.010	0.100	NA		mg/L	9/18/2015 11:44 AM	PA/VA
Magnesium	55.9	0.050	0.500	NA	E	mg/L	9/18/2015 11:44 AM	PA/VA
Manganese	13.8	0.002	0.100	NA	E	mg/L	9/18/2015 11:44 AM	PA/VA
Potassium	8.61	0.050	0.500	NA		mg/L	9/18/2015 11:44 AM	PA/VA
Sodium	350	10.0	100	NA		mg/L	9/18/2015 11:56 AM	PA/VA
Strontium	15.3	0.010	0.100	NA	E	mg/L	9/21/2015 10:18 AM	
METALS BY ICP-MS			**Method: EPA 200.8 Rev. 5.4 (1994)**				**Analyst: LF**	
Arsenic	ND	0.0010	0.0050	NA		mg/L	9/15/2015 1:34 PM	PA/VA
Lead	0.0023	0.0002	0.0010	NA		mg/L	9/15/2015 1:34 PM	PA/VA
HARDNESS			**Method: SM2340 B-1997**				**Analyst: CGW**	
Hardness, Total (As CaCO3)	661	NA	1.00	NA		mg/L	9/18/2015 11:44 AM	VA
ANIONS by ION CHROMATOGRAPHY			**Method: EPA 300.0, Rev.2.1 (1993)**				**Analyst: CF**	
Bromide	12.5	2.50	5.00	NA		mg/L	9/14/2015 9:28 AM	PA/VA
Chloride	936	10.0	50.0	NA		mg/L	9/14/2015 9:28 AM	PA/VA
Sulfate	5.24	1.00	5.00	NA		mg/L	9/11/2015 5:37 PM	PA/VA
ANIONS by ION CHROMATOGRAPHY-48 HOUR			**Method: EPA 300.0, Rev.2.1 (1993)**				**Analyst: CF**	
Nitrogen, Nitrate	2.76	0.10	0.50	NA	H	mg/L	9/14/2015 10:06 AM	PA/VA
Nitrogen, Nitrite	ND	0.05	0.50	NA		mg/L	9/11/2015 5:37 PM	PA/VA
CONDUCTIVITY			**Method: SM2510 B - 1997**				**Analyst: KY**	
Specific Conductivity	3,270	NA	NA	NA		µmhos/cm	9/14/2015 2:45 PM	PA/VA
TOTAL DISSOLVED SOLIDS			**Method: SM2540 C-1997**				**Analyst: KY**	
Total Dissolved Solids	2,390	5	10	NA		mg/L	9/11/2015 5:08 PM	PA/VA
TOTAL SUSPENDED SOLIDS			**Method: SM2540 D-1997**				**Analyst: KY**	
Total Suspended Solids	116	2.0	10	NA		mg/L	9/11/2015 4:48 PM	PA/VA

REI Consultants, Inc. - Analytical Report

WO#: 1509E14

Date Reported: 9/30/2015

Client:	WEST VIRGINIA DEP / OFFICE OF OIL & GAS	**Collection Date:**	9/10/2015 12:00:00 PM
Project:	STEAMS & DRAINS	**Date Received:**	9/11/2015
Lab ID:	1509E14-04A	**Matrix:**	Liquid
Client Sample ID:	SAMPLE 4	**Site ID:**	HALL - UIC

Analysis	Result	MDL	PQL	MCL	Qual	Units	Date Analyzed	NELAP
ACIDITY			**Method: SM2310 B-1997**				**Analyst: VS**	
Acidity, Total	73.2	1.0	10	NA		mg/L	9/14/2015 4:50 PM	PA/VA
ALKALINITY			**Method: SM2320 B-1997**				**Analyst: VS**	
Alkalinity, Total (As CaCO3)	ND	1.0	20.0	NA		mg/L	9/14/2015 4:50 PM	PA/VA
pH - LAB TEST, HOLD TIME EXPIRED			**Method: SM4500-H+-B-2000**				**Analyst: VS**	
pH	4.02	NA	NA	NA		SU	9/14/2015 4:50 PM	

REI Consultants, Inc. - Analytical Report

WO#: 1509E14

Date Reported: 9/30/2015

Client:	WEST VIRGINIA DEP / OFFICE OF OIL & GAS	**Collection Date:**	9/10/2015 1:05:00 PM
Project:	STEAMS & DRAINS	**Date Received:**	9/11/2015
Lab ID:	1509E14-05A	**Matrix:**	Liquid
Client Sample ID:	SAMPLE 5	**Site ID:**	HALL - UIC

Analysis	Result	MDL	PQL	MCL	Qual	Units	Date Analyzed	NELAP
METALS BY ICP			**Method: EPA 200.7 Rev. 4.4 (1994)**				**Analyst: CGW**	
Aluminum	1.06	0.006	0.100	NA		mg/L	9/18/2015 11:50 AM	PA/VA
Barium	0.080	0.002	0.100	NA	J	mg/L	9/18/2015 11:50 AM	PA/VA
Calcium	42.6	0.050	1.00	NA		mg/L	9/18/2015 11:50 AM	PA/VA
Iron	1.46	0.010	0.100	NA		mg/L	9/18/2015 11:50 AM	PA/VA
Magnesium	7.46	0.050	0.500	NA		mg/L	9/18/2015 11:50 AM	PA/VA
Manganese	0.070	0.002	0.100	NA	J	mg/L	9/18/2015 11:50 AM	PA/VA
Potassium	4.99	0.050	0.500	NA		mg/L	9/18/2015 11:50 AM	PA/VA
Sodium	18.2	0.100	1.00	NA		mg/L	9/18/2015 11:50 AM	PA/VA
Strontium	0.200	0.001	0.010	NA		mg/L	9/17/2015 11:12 AM	
METALS BY ICP-MS			**Method: EPA 200.8 Rev. 5.4 (1994)**				**Analyst: LF**	
Arsenic	0.0025	0.0010	0.0050	NA	J	mg/L	9/15/2015 1:40 PM	PA/VA
Lead	0.0021	0.0002	0.0010	NA		mg/L	9/15/2015 1:40 PM	PA/VA
HARDNESS			**Method: SM2340 B-1997**				**Analyst: CGW**	
Hardness, Total (As CaCO3)	137	NA	1.00	NA		mg/L	9/18/2015 11:50 AM	VA
ANIONS by ION CHROMATOGRAPHY			**Method: EPA 300.0, Rev.2.1 (1993)**				**Analyst: CF**	
Bromide	ND	0.05	0.10	NA		mg/L	9/11/2015 5:56 PM	PA/VA
Chloride	25.2	0.20	1.00	NA		mg/L	9/11/2015 5:56 PM	PA/VA
Sulfate	16.0	1.00	5.00	NA		mg/L	9/11/2015 5:56 PM	PA/VA
ANIONS by ION CHROMATOGRAPHY-48 HOUR			**Method: EPA 300.0, Rev.2.1 (1993)**				**Analyst: CF**	
Nitrogen, Nitrate	0.58	0.02	0.10	NA		mg/L	9/11/2015 5:56 PM	PA/VA
Nitrogen, Nitrite	1.26	0.05	0.50	NA		mg/L	9/11/2015 5:56 PM	PA/VA
CONDUCTIVITY			**Method: SM2510 B - 1997**				**Analyst: KY**	
Specific Conductivity	399	NA	NA	NA		µmhos/cm	9/14/2015 2:45 PM	PA/VA
TOTAL DISSOLVED SOLIDS			**Method: SM2540 C-1997**				**Analyst: KY**	
Total Dissolved Solids	193	5	10	NA		mg/L	9/11/2015 6:08 PM	PA/VA
TOTAL SUSPENDED SOLIDS			**Method: SM2540 D-1997**				**Analyst: KY**	
Total Suspended Solids	18.0	2.0	10	NA		mg/L	9/11/2015 4:48 PM	PA/VA

REI Consultants, Inc. - Analytical Report

WO#: 1509E14

Date Reported: 9/30/2015

Client:	WEST VIRGINIA DEP / OFFICE OF OIL & GAS	**Collection Date:**	9/10/2015 1:05:00 PM
Project:	STEAMS & DRAINS	**Date Received:**	9/11/2015
Lab ID:	1509E14-05A	**Matrix:**	Liquid
Client Sample ID:	SAMPLE 5	**Site ID:**	HALL - UIC

Analysis	Result	MDL	PQL	MCL	Qual	Units	Date Analyzed	NELAP
ACIDITY			**Method: SM2310 B-1997**				**Analyst: VS**	
Acidity, Total	2.4	1.0	10	NA	J	mg/L	9/14/2015 4:50 PM	PA/VA
ALKALINITY			**Method: SM2320 B-1997**				**Analyst: VS**	
Alkalinity, Total (As CaCO3)	119	1.0	20.0	NA		mg/L	9/14/2015 4:50 PM	PA/VA
pH - LAB TEST, HOLD TIME EXPIRED			**Method: SM4500-H+-B-2000**				**Analyst: VS**	
pH	7.35	NA	NA	NA		SU	9/14/2015 4:50 PM	

Pace Analytical Services, Inc.
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

September 30, 2015

Ms. Stacy Heasley
REI Consultants, Inc.
225 Industrial Park Drive
PO Box 286
Beaver, WV 25813

RE: Project: 1509E14
Pace Project No.: 30159379

Dear Ms. Heasley:
Enclosed are the analytical results for sample(s) received by the laboratory on September 16, 2015. The results relate only to the samples included in this report. Results reported herein conform to the most current TNI standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Carin A. Ferris

Carin Ferris
carin.ferris@pacelabs.com
Project Manager

Enclosures

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

CERTIFICATIONS

Project: 1509E14
Pace Project No.: 30159379

Pennsylvania Certification IDs
1638 Roseytown Rd Suites 2,3&4, Greensburg, PA 15601
L-A-B DOD-ELAP Accreditation #: L2417
Alabama Certification #: 41590
Arizona Certification #: AZ0734
Arkansas Certification
California Certification #: 04222CA
Colorado Certification
Connecticut Certification #: PH-0694
Delaware Certification
Florida/TNI Certification #: E87683
Georgia Certification #: C040
Guam Certification
Hawaii Certification
Idaho Certification
Illinois Certification
Indiana Certification
Iowa Certification #: 391
Kansas/TNI Certification #: E-10358
Kentucky Certification #: 90133
Louisiana DHH/TNI Certification #: LA140008
Louisiana DEQ/TNI Certification #: 4086
Maine Certification #: PA00091
Maryland Certification #: 308
Massachusetts Certification #: M-PA1457
Michigan/PADEP Certification
Missouri Certification #: 235
Montana Certification #: Cert 0082
Nebraska Certification #: NE-05-29-14
Nevada Certification #: PA014572015-1
New Hampshire/TNI Certification #: 2976
New Jersey/TNI Certification #: PA 051
New Mexico Certification #: PA01457
New York/TNI Certification #: 10888
North Carolina Certification #: 42706
North Dakota Certification #: R-190
Oregon/TNI Certification #: PA200002
Pennsylvania/TNI Certification #: 65-00282
Puerto Rico Certification #: PA01457
Rhode Island Certification #: 65-00282
South Dakota Certification
Tennessee Certification #: TN2867
Texas/TNI Certification #: T104704188-14-8
Utah/TNI Certification #: PA014572015-5
USDA Soil Permit #: P330-14-00213
Vermont Dept. of Health: ID# VT-0282
Virgin Island/PADEP Certification
Virginia/VELAP Certification #: 460198
Washington Certification #: C868
West Virginia DEP Certification #: 143
West Virginia DHHR Certification #: 9964C
Wisconsin Certification
Wyoming Certification #: 8TMS-L

Pace Analytical Services, Inc.
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

SAMPLE SUMMARY

Project: 1509E14
Pace Project No.: 30159379

Lab ID	Sample ID	Matrix	Date Collected	Date Received
30159379001	1509E14-01A	Water	09/10/15 10:35	09/16/15 10:30
30159379002	1509E14-02A	Water	09/10/15 11:25	09/16/15 10:30
30159379003	1509E14-03A	Water	09/10/15 11:45	09/16/15 10:30
30159379004	1509E14-04A	Water	09/10/15 12:00	09/16/15 10:30
30159379005	1509E14-05A	Water	09/10/15 13:05	09/16/15 10:30

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Greensburg, PA 15601
(724)850-5600

SAMPLE ANALYTE COUNT

Project: 1509E14
Pace Project No.: 30159379

Lab ID	Sample ID	Method	Analysts	Analytes Reported
30159379001	1509E14-01A	EPA 903.1	WRR	1
		EPA 904.0	JLW	1
30159379002	1509E14-02A	EPA 903.1	WRR	1
		EPA 904.0	JLW	1
30159379003	1509E14-03A	EPA 903.1	WRR	1
		EPA 904.0	JLW	1
30159379004	1509E14-04A	EPA 903.1	WRR	1
		EPA 904.0	JLW	1
30159379005	1509E14-05A	EPA 903.1	WRR	1
		EPA 904.0	JLW	1

Pace Analytical Services, Inc.
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

PROJECT NARRATIVE

Project: 1509E14
Pace Project No.: 30159379

Method: EPA 903.1
Description: 903.1 Radium 226
Client: REI Consultants, Inc.
Date: September 30, 2015

General Information:
5 samples were analyzed for EPA 903.1. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

Pace Analytical Services, Inc.
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

PROJECT NARRATIVE

Project: 1509E14
Pace Project No.: 30159379

Method: EPA 904.0
Description: 904.0 Radium 228
Client: REI Consultants, Inc.
Date: September 30, 2015

General Information:
5 samples were analyzed for EPA 904.0. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

This data package has been reviewed for quality and completeness and is approved for release.

Pace Analytical
www.pacelabs.com

Pace Analytical Services, Inc.
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: 1509E14
Pace Project No.: 30159379

Sample: 1509E14-01A Lab ID: 30159379001 Collected: 09/10/15 10:35 Received: 09/16/15 10:30 Matrix: Water
PWS: Site ID: Sample Type:
Comments: • Sample Acceptance Policy Waiver on file from the client.

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	2.74 ± 4.31 (6.15) C:NA T:93%	pCi/L	09/30/15 10:08	13982-63-3	
Radium-228	EPA 904.0	7.28 ± 3.37 (5.79) C:84% T:75%	pCi/L	09/29/15 16:04	15262-20-1	

Sample: 1509E14-02A Lab ID: 30159379002 Collected: 09/10/15 11:25 Received: 09/16/15 10:30 Matrix: Water
PWS: Site ID: Sample Type:
Comments: • Sample Acceptance Policy Waiver on file from the client.

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	0.611 ± 3.39 (5.32) C:NA T:93%	pCi/L	09/30/15 10:12	13982-63-3	
Radium-228	EPA 904.0	5.17 ± 3.53 (6.66) C:93% T:79%	pCi/L	09/29/15 16:04	15262-20-1	

Sample: 1509E14-03A Lab ID: 30159379003 Collected: 09/10/15 11:45 Received: 09/16/15 10:30 Matrix: Water
PWS: Site ID: Sample Type:
Comments: • Sample Acceptance Policy Waiver on file from the client.

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	1.99 ± 3.91 (6.78) C:NA T:80%	pCi/L	09/30/15 10:12	13982-63-3	
Radium-228	EPA 904.0	5.69 ± 3.27 (6.14) C:94% T:79%	pCi/L	09/29/15 16:04	15262-20-1	

Sample: 1509E14-04A Lab ID: 30159379004 Collected: 09/10/15 12:00 Received: 09/16/15 10:30 Matrix: Water
PWS: Site ID: Sample Type:
Comments: • Sample Acceptance Policy Waiver on file from the client.

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	2.35 ± 3.31 (4.72) C:NA T:92%	pCi/L	09/30/15 10:19	13982-63-3	
Radium-228	EPA 904.0	7.89 ± 3.25 (5.35) C:91% T:87%	pCi/L	09/29/15 16:04	15262-20-1	

Sample: 1509E14-05A Lab ID: 30159379005 Collected: 09/10/15 13:05 Received: 09/16/15 10:30 Matrix: Water
PWS: Site ID: Sample Type:
Comments: • Sample Acceptance Policy Waiver on file from the client.

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	3.58 ± 4.07 (6.91) C:NA T:91%	pCi/L	09/30/15 10:29	13982-63-3	
Radium-228	EPA 904.0	9.53 ± 3.95 (6.66) C:99% T:71%	pCi/L	09/29/15 16:54	15262-20-1	

Pace Analytical Services, Inc.
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

QUALITY CONTROL - RADIOCHEMISTRY

Project: 1509E14
Pace Project No.: 30159379

QC Batch: RADC/26081 Analysis Method: EPA 904.0
QC Batch Method: EPA 904.0 Analysis Description: 904.0 Radium 228
Associated Lab Samples: 30159379001, 30159379002, 30159379003, 30159379004, 30159379005

METHOD BLANK: 953467 Matrix: Water
Associated Lab Samples: 30159379001, 30159379002, 30159379003, 30159379004, 30159379005

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-228	0.202 ± 0.338 (0.737) C:92% T:81%	pCi/L	09/29/15 12:28	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

QUALIFIERS

Project: 1509E14
Pace Project No.: 30159379

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Act - Activity

Unc - Uncertainty: SDWA = 1.96 sigma count uncertainty, all other matrices = Expanded Uncertainty (95% confidence interval). Gamma Spec = Expanded Uncertainty (95.4% Confidence Interval)

(MDC) - Minimum Detectable Concentration

Trac - Tracer Recovery (%)

Carr - Carrier Recovery (%)

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

REIC

Improving the environment, one client at a time...

CHAIN OF CUSTODY RECORD

COC ID: 6806 PAGE: 1 OF: 1

ADDRESS
REI Consultants, Inc.
PO Box 286
Beaver, WV 25813
TEL: (304) 255-2500
FAX: (304) 255-2572
Website: www.reiclabs.com

Please Include Email Address of Report Recipient Whenever Possible!!!

SUB CONTRATOR: PACE_PA
COMPANY: PACE ANALYTICAL SERVIC
ADDRESS: 1638 ROSEYTOWN ROAD
CITY STATE ZIP: GREENSBURG, PA 15601
PHONE: (724) 850-5600
FAX:
PO: 050719EVF1
EMAIL:

SPECIAL INSTRUCTIONS / COMMENTS
State Code: WV Please use SampleID as purchase order number
After analysis, the samples do not need to be returned and can be disposed per your standard laboratory practices. Results to sheasley@reiclabs.com Thank you

ANALYTICAL PARAMETERS

30159379

* Preservation Codes
0 None
1 Hydrochloric Acid
2 Nitric Acid
3 Sulfuric Acid
4 Sodium Thiosulfate
5 Sodium Hydroxide
5* Zinc Acetate
6 Sodium Hydroxide
7 Ascorbic Acid
8 Sodium Sulfite/HCL
9 Potassium Dihydrogen Citrate
10 Potassium Chloride

COMMENTS

	SAMPLE ID	[illegible]	Date Time	MATRIX	DATE COLLECTED	NUMBER OF CONTAINERS	RADIUM 226 SUB (EPA 903.1)	RADIUM 228 SUB (EPA 904.0)	
1	1509E14-01A	DOWNSTREAM		Liquid	[illegible]				001
2	1509E14-02A	SAMPLE 2		Liquid	[illegible]				002
3	1509E14-03A	[illegible]		Liquid		2			003
4	1509E14-04A	[illegible]		Liquid	9/10/2015 12:00:00 PM	2	√	√	004
5	1509E14-05A	[illegible]		Liquid	9/10/2015 [illegible]		√	√	005

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*Results by 9/18/15 Thank you

Relinquished By: Whitney Williams	Date: 9/14/15	Time: 16:00	Received By: UPS	Date: 9/14/15	Time: 10:00
Relinquished By:	Date:	Time:	Received By: [signature]	Date: 9/17/15	Time: 1030

TAT: * Next BD 2nd BD 3rd BD

[illegible]

TRANSMITTAL DESIRED: HARDCOPY (extra cost) FAX ✓EMAIL ONLINE

FOR LAB USE ONLY
Temp [illegible] °C Attempt to Cool?

BUM

Sample Condition Upon Receipt

Pace Analytical

Client Name: REIC. Project # 30159379

Courier: ☐ Fed Ex ☒ UPS ☐ USPS ☐ Client ☐ Commercial ☐ Pace Other ______

Tracking #: 1Z2(6)X71303 76507450

Custody Seal on Cooler/Box Present: ☐ yes ☒ no Seals intact: ☐ yes ☐ no Biological Tissue is Frozen: Yes No

Packing Material: (Bubble Wrap) ____ Bubble Bags ____ None ____ Other ______________

Thermometer Used: NA Type of Ice: Wet Blue (None) ☐ Samples on ice, cooling process has begun

Cooler Temp.: Observed Temp.: NA °C Correction Factor: — °C Final Temp: — °C

Temp should be above freezing to 6°C

Date and initials of person examining contents: AML 9/17/15

				Comments:
Chain of Custody Present:	☒Yes	☐No	☐N/A	1.
Chain of Custody Filled Out:	☒Yes	☐No	☐N/A	2.
Chain of Custody Relinquished:	☒Yes	☐No	☐N/A	3.
Sampler Name & Signature on COC:	☐Yes	☒No	☐N/A	4.
Samples Arrived within Hold Time:	☒Yes	☐No	☐N/A	5.
Short Hold Time Analysis (<72hr):	☐Yes	☒No	☐N/A	6.
Rush Turn Around Time Requested:	☒Yes	☐No	☐N/A	7.
Sufficient Volume:	☒Yes	☐No	☐N/A	8. low volume.
Correct Containers Used:	☒Yes	☐No	☐N/A	9.
-Pace Containers Used:	☐Yes	☒No	☐N/A	
Containers Intact:	☒Yes	☐No	☐N/A	10.
Filtered volume received for Dissolved tests	☐Yes	☐No	☒N/A	11.
Sample Labels match COC:	☒Yes	☐No	☒N/A	12.
-Includes date/time/ID/Analysis Matrix: WT				
All containers needing preservation have been checked.	☒Yes	☐No	☐N/A	13.
All containers needing preservation are found to be in compliance with EPA recommendation.	☒Yes	☐No	☐N/A	pH<2
exceptions: VOA, coliform, TOC, O&G, Phenols	☐Yes	☒No		Initial when completed: AML / Lot # of added preservative
Samples checked for dechlorination:	☐Yes	☐No	☒N/A	14.
Headspace in VOA Vials (>6mm):	☐Yes	☐No	☒N/A	15.
Trip Blank Present:	☐Yes	☐No	☒N/A	16.
Trip Blank Custody Seals Present	☐Yes	☐No	☒N/A	
Pace Trip Blank Lot # (if purchased):				

Client Notification/ Resolution: Field Data Required? Y / N

Person Contacted: ______________ Date/Time: ______________

Comments/ Resolution: ______________

Project Manager Review: Carmo Serra **Date:** 9/17/15

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e. out of hold, incorrect preservative, out of temp, incorrect containers)

Pace Analytical

page 2

Project Number: 30159379
Client Name: REIC

Item No.	Matrix Code	Glass Jar (120 / 250 / 500 / 1L)	Soil kit (2 SB, 1M, soil jar)	Chemistry (250 / 500 / 1L)	Organics (1L)	Nutrient (250 / 500)	Phenolics (250 ml)	TOC (40 ml / 250 ml)	TOX (250 ml)	Total Metals	Dissolved Metals preserved Y N	O & G (1L)	TPH (1L)	VOA (40 ml 30 ml)	Cyanide (250 ml)	Sulfide (500 ml)	Bacteria (120 ml)	Wipes / swipe / smear / filter	Radchem Nalgene (125 / 250 / 500 / 1L)	Radchem Nalgene (1/2 gal. / 1 gal.L)	Cubitainer (500 ml / 4L)	Ziploc	Other	Other
001 ↓	WT ↓																		4					
005	WT																							

SCURF Back (C012-4 15May2012).xls

CHAIN OF CUSTODY RECORD

REIC

MAIN LABORATORY & CORPORATE HEADQUARTERS

MID-OHIO VALLEY Service Center, Ashland, KY 41101	SHENANDOAH Service Center, 1557 Commerce Rd., Ste 201, Verona, VA 24482, 540-248-0183	ROANOKE Service Center, Roanoke, VA 24019, 540-777-1276	MORGANTOWN Service Center, 18 Commerce Drive, Westover, WV 26501, 304-241-5861

Client: WUDEP

Contact Person: Tom Bass

Quote #

Fax

Address: 601 57th ST. SE

City: Charleston

Billing Address (if different)

City

State

Zip

Site ID & State: HALL-WIG

Project ID: Streams & Drains

Sampler: T.Bass

PO #

Phone: 304 926-0499

Email: Thomas.L.Bass@wv.gov

State: WV 25304

456...

SAMPLE LOG & ANALYSIS REQUEST

TURNAROUND TIME: NORMAL ☐ ☑ 5 DAY ☐ 3 DAY ☐ 2 DAY ☐ 1 DAY

*Rush work needs prior laboratory approval and will incur additional charges.

ANALYSIS & METHOD REQUESTED

Sample ID					
1- WB Downstream	YP	9/10/15 10:55	Liq	X	
2- Sample 2	↓	11:25	↓	↓	
3- Sample 3		11:55			
4- Sample 4		12:20			
5- Sample 5		13:05			

Preservative Codes: 0 None; 1 Hydrochloric Acid; 2 Nitric Acid; 3 Sulfuric Acid; 4 Sodium Thiosulfate; 5 Sodium Hydroxide/Sodium Arsenite; 6 Sodium Hydroxide; 7 Ascorbic Acid; 8 Sodium Bisulfate/Methanol; 9 Ammonium Chloride; 10; 11

ENTER PRESERVATIVE CODE

Nitrate, Aluminum, Iron

COMMENTS:

Al, Mg, Calcium, Potassium, Sodium, Barium, Lead, Arsenic

Strontium, T. Acidity, Radium 228

All ... requests are subject to REIC's Standard Terms and Conditions.

Relinquished by Signature | Date/Time | Received by Signature | Date/Time

FAX RESULTS ☐ EMAIL RESULTS ☐

COC-NCR-1015

Bass, Thomas L

From:	Jason Hall <jasonhall@halldrilling.com>
Sent:	Thursday, August 27, 2015 10:30 AM
To:	Bass, Thomas L
Cc:	Mike Hall; susanbaldwin@halldrilling.com
Subject:	FW: MW-3 Well Construction
Attachments:	MW-3 Construction-Boring Log.pdf; Boring Logs.xls; Core Hall drilling logs ellenboro 7-12-13.pdf

Tom,

Attached is the requested information . You can read the comments of Core's Brian Liptock below. MW-3 is the well that you were concerned about.

Jason

From: Brian Liptock [mailto:bliptock@core-env.com]
Sent: Thursday, August 27, 2015 7:49 AM
To: jasonhall@halldrilling.com
Subject: MW-3 Well Construction

Jason,

Sorry it took an extra day to get the info to you. I was trying to operate off my phone yesterday and could not extract the files I needed to. Attached is some info that will be helpful. I have attached my notes from the day that I installed the well (construction/lithology info) and also the construction log from the driller and a separate boring log on a larger spreadsheet to make it easier to read. I remember when I installed that well, we used bentonite chips for the seal and hydrated them as we put them in. In the event that if they were to ever dry out, as soon as water hits it again, it soaks the water up and seals it again so there is always a constant seal there. Also, when we drilled the well, we did not hit a true zone of saturation. However, that was probably because of the cuttings creating a wall pack upon return to the surface when they encountered any type of moisture. If you need anything, give me a shout.

Brian Liptock
Senior Field Technician
CORE Environmental Services, Inc.
4 Brookstone Plaza
Morgantown, WV 26508
Office (304) 292-2673
Fax (304) 292-2773
Mobile (304) 830-1603
Email: bliptock@core-env.com
Website: www.core-env.com

CORE
ENVIRONMENTAL SERVICES, INC
Consulting • Operation & Maintenance • Risk Assessment • Engineering

April 25, 2013

Hall Drilling, LLC
981 E. Washington, Ave.
Ellenboro, WV 26346

Attention: Susan Baldwin

Subject: Environmental Services Proposal
Groundwater Monitoring Well Installation and Development
UIC Well #3
Ellenboro, Ritchie County, West Virginia

Dear Ms. Baldwin,

On behalf of CORE Environmental Services, Inc. (CORE), we are pleased to provide this proposal and cost estimate for environmental services associated with the above referenced project. We appreciate the opportunity and look forward to assisting Hall Drilling, LLC (Hall Drilling) with this project.

Scope of Work

The proposed scope of work includes the following tasks:

Purpose: The purpose of the proposed scope of work is to satisfy the water quality monitoring requirements (section IV) of the West Virginia Department of Environmental Protection (WVDEP) guidance document, "Design and Construction Standards for Centralized Pits", as referenced in the WVDEP guidance, dated December 23, 2011 (attached).

Pre-Mobilization and HASP Preparation: Prior to mobilization to the site to initiate intrusive work, CORE will develop a site specific Health and Safety Plan (HASP) to address safety concerns and potential on-site hazards related to the proposed work scope. The HASP will be prepared in accordance to applicable Occupational Safety and Health Administrations (OHSA) guidelines, and provides emergency contact information and procedures to be followed in the event of an emergency.

At least 48 hours prior to commencing intrusive work, CORE will contact West Virginia's Miss Utility system and will provide the project-specific information needed for performance of the required utility mark-out. The mark-out service will identify subsurface utilities along the property frontage and the locations of known service laterals extending onto private property (if applicable). Miss utility does not identify private, on-site utility

4 Brookstone Plaza
Morgantown, WV 26508
(304) 292-CORE (2673)
Fax (304) 292-2773

Corporate Office
4068 Mt. Royal Blvd., Suite 225
Allison Park, PA 15101-2951
(412) 487-6000
Fax (412) 487-9785
www.core-env.com

130 George Street, Suite H
Beckley, WV 25801
(681) 238-5235
Fax (681) 238-5239

locations.

Groundwater Monitoring Well Installation and Development: CORE will retain Chatfield Drilling, Inc. (Chatfield) and provide supervision during the installation of three shallow water table monitoring wells (MW-1 through MW-3) at the approximate locations indicated in Hall Drillings UIC Impoundment and Groundwater Monitoring Plan, which establishes required construction details for the centralized impoundment pit. The monitoring wells will be situated hydraulically downgradient of the impoundment pit, in order to allow for detection of potential groundwater contamination from the contents of the pit. Estimated costs are based on the well locations being accessible with a truck mounted drill rig (track rig not required).

A CORE Field Technician will supervise the installation of the monitoring wells, provide site safety oversight and monitor the work area breathing zone with a calibrated photoionization detector (PID). CORE field personnel will keep in regular contact with the CORE Project Manager and provide details of the well installation activities as the work progresses.

CORE will supervise the installation of three 4-inch diameter monitoring wells to a sufficient depth to allow a standing water column which will accommodate the collection of groundwater samples from within the completed well casings. Costs included here are based on completion of the wells to 80 feet below ground surface (bgs), however the wells will be advanced to sufficient depth based on site conditions and the associated cost adjusted accordingly if greater depth is required.

Each well will be constructed with approximately 30 feet of 0.01 inch slotted PVC well screen and approximately 50 feet of solid 4-inch PVC riser, depending on site conditions. A clean sand filter pack will extend five feet above the screened interval in each well boring. The monitoring wells will be completed at the surface with high-visibility, lockable, protective steel casings, which will extend approximately four feet above surface grade. Drill cuttings generated during the monitoring well installation will be dispersed onsite at locations that will not affect the immediate work areas. Upon completion of the monitoring well installations, Chatfield personnel will develop each well by removing sediment-laden groundwater until minimal turbidity is achieved. Groundwater recovered during well development will be dispersed onsite at locations that will not affect the immediate work areas.

Following completion of the proposed field work, CORE will provide well construction documentation to Hall Drilling. Within five business days of receipt of documentation from the drilling contractor, CORE will provide an AutoCAD map showing approximate well locations, well construction logs, and a written summary of completion details.

Please note this proposal does not include costs for sampling the wells once completed. That proposal will be

UIC Impoundment and Groundwater Monitoring Plan
Hall Drilling Underground Injection Center, Ellenboro, West Virginia

Purpose

Monitoring and periodic routine investigative procedures will be performed on the impoundment area of the Hall Drilling Underground Injection Center by visual observations and by monitoring wells located down gradient from the impoundment site to ensure prompt notification of the migration of disposal fluids temporarily retained in the pond. The monitor wells will be designed to meet specifications as required by applicable laws, permits and regulations, and the Region 3 United States Environmental Protection Agency guidelines. Pertinent data will be reviewed regularly by qualified operators and forwarded to the agencies as required. Monitoring and testing will be designed to provide data regarding impoundment integrity and safe operation.

Design of the Monitoring Network

Monitoring Sites

Two to three monitoring well locations will be identified along the eastern slope of the impoundment area based upon the practicalities of installation and monitoring as well as the ability to detect contaminate releases in time to remediate before the substance enters groundwater wells in the area. The monitoring wells will be within the leased area of the Tech Service Center and will not require additional security measures to be installed. Data will be collected from sources such as drilling information, core samples, hydrological tests and/or geophysical logs to assist in determining the location distance from the impoundment and the sampling formation thickness, pressure, lithology and hydrologic properties. The zone for sampling will be selected for adequate transmissivity and formation pressure.

Well Installation

As the monitoring field is in the design phase, specific details regarding the construction, specific materials, drilling methods and well development are not available at this time. Construction of the monitoring field will begin after proper approval by the appropriate agencies. The monitoring wells will be constructed and developed based on the West Virginia Rules 47CST59 and Title 47 Series 60. The vertical depths and types of wells will be determined by the first permanent aquifer zone and the potential contaminants properties. Mechanical integrity of the wells will be maintained at all times to ensure proper sampling. Copies of all work reports and logs will be collected and the information dispersed to the DEP upon completion.

Design of Sampling and Analysis Plan

Control strategies will be developed based upon the properties of disposal fluid. A potential contaminant list will be based upon an analysis of a sample of disposal fluid and testing designed to detect these elements and compounds. The disposal fluid analysis includes tests for pH, chloride levels, sodium, TDS, TSS, arsenic, aluminum, barium, cadmium, chromium, iron, lead, manganese, MBAS, sulfate, BTEX, TPHs and

NORM. A sample of in-situ groundwater will also be analyzed to determine pre-existing levels of these chemicals. A baseline of sampling constituents is being created and the MCL will be determined in accordance to current EPA standards. A Quality Assurance Project Plan (QAPP) will be designed to ensure proper testing procedures are followed in accordance to EPA approved analytical methods.

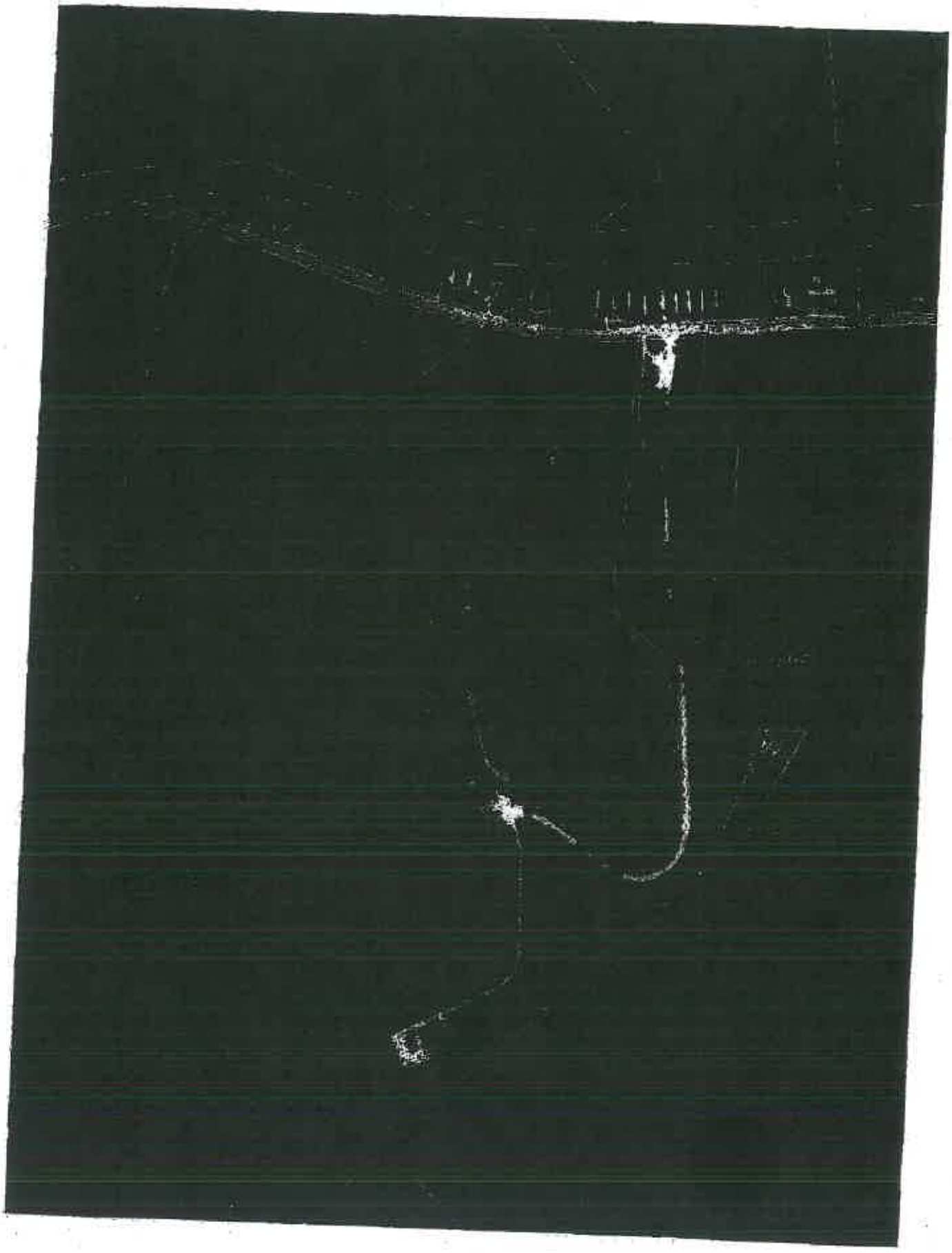
Monitoring Plan

A baseline for groundwater quality will be established in the first year. A schedule for sampling the monitor wells will be created after an analysis of the groundwater formation to ensure the prompt detection of disposal fluid migration. Anticipated sampling schedule for the monitoring wells will be quarterly pursuant to USEPA regulations at 146.13(d)(2) unless analysis of data contraindicates. The schedule of sampling will be determined and submitted to the DEP when completed.

If a monitor well fails required continuous monitoring or periodic testing standards, the well will be retested. After investigation into the cause for the failure, action may consist of notifying appropriate authorities, and taking remedial action for repairing the problem.

Plugging and Abandonment Plan

A component in the design of the monitoring field plan will be the plugging and abandonment of the monitor wells. The operator of the Tech Service Center will maintain financial responsibility and resources necessary to close, plug and abandon the monitoring wells consistent with 40 CFR 146.10.



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Location Ellenboro, WV Date 6-5-13

Project / Client Hall Drilling

1020 - MW-3 construction complete

1115 - Rig set up @ MW-3

1445 - MW-3 drilled to depth
- Rods pulled

1510 - Begin well construction

Well Construction (MW-3)
- 4" well
- 50' screen (to extend through shale layer)
- 60' riser (cut down to stick up height)
- 1 end cap
- 1 gripper plug
- 11 bags sand (5' above screen)
- 2 5g buckets of bentonite pellets
- 8 bag bags bentonite chips
- 10' steel casing w/ stick up
- 1 lock

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Location Ellenboro, WV Date 6-5-13

Project / Client Hall Drilling

ID	Depth	Lithology
MW-3	0-1'	Topsoil/Medium brown clay
	1'	Medium brown clay
	6'	Weathered brown sandstone
	12'	Brown sandstone
	15'	(Core Rubber applied)
	40'	Gray Sandstone
	49'	Gray Shale
	50'	Red Shale
	52'	Gray Shale
	54'	Red Shale
	55'	Gray Shale
	56'	Red Shale
	57'	Gray Shale
	59'	Red Shale
	61'	Gray Shale
	63'	Red Shale
	75'	Gray Sandstone
	92'	STOP

PROJECT NAME:	Hall Drilling	BORING NUMBER:	MW-2	DRILLING METHOD:	HSA
ADDRESS:		CONTRACTOR:	CORE Environmental Services, Inc.	DRILLING RIG:	Truck Mount Geoprobe
CITY, STATE:	Ellenboro, WV			DRILL CREW:	Chatfield
CORE Project No.:	HAL-2013-151	DATE STARTED:	6/3/2013	DATE FINISHED:	6/3/2013
LAND OWNER:	Hall Drilling	LOGGED BY:	Brian Liptock		

INTERVAL	DEPTH	LITHOLOGIC DESCRIPTIONS	OVM OVA (circle one) UNITS: ppm
0 - 12 ft. bgs.	1 2 ↓ to 12'	Medium brown clay; dry	
12-22 ft. bgs.	13 14 ↓ to 22'	Brown weathered sandstone; dry	
22 - 27 ft. bgs.	23 24 ↓ to 27'	Gray sandstone; dry	
27 - 28 ft. bgs.	28	Brown sandstone; dry	
28 - 76 ft. bgs.	29 30 ↓ to 76'	Gray sandstone; dry	

PROJECT NAME:	Hall Drilling	BORING NUMBER:	MW-2	DRILLING METHOD:	HSA
ADDRESS:		CONTRACTOR:	CORE Environmental Services, Inc.	DRILLING RIG:	Truck Mount Geoprobe
CITY, STATE:	Ellenboro, WV			DRILL CREW:	Chatfield
CORE Project No.:	HAL-2013-151	DATE STARTED:	6/3/2013	DATE FINISHED:	6/3/2013
LAND OWNER:	Hall Drilling	LOGGED BY:	Brian Liptock		

76 - 78 ft. bgs.	77 78	Red shale; dry
78 - 80 ft. bgs.	79 80	Gray shale; dry
80 - 81 ft. bgs.	81	Red shale; dry
81 - 84 ft. bgs.	82 83 84	Gray shale; dry
84 - 85 ft. bgs.	85 86	Red shale; dry
85 - 87 ft. bgs.	87	Gray shale; dry
87 - 99 ft. bgs.	88 89 ↓ 99	Red shale; dry
99 - 117 ft. bgs.	100 101 ↓ 117	Gray sandstone; dry

State of West Virginia
Department of Environmental Protection

Monitoring Well Construction

Well Number: ~~WV00634-0014-18~~

Site Name/Physical Address:
Site: Hall Pond Impoundment
Line 1: Old St Rt 50
Line 2:
City: Ellenboro
State: WV
Zip: 26346-
County: Ritchie

Well Registration No. WV00634-0014-18
Grid Location:
a. Latitude: 39 17 13 .0
b. Longitude: 81 0 47 .0
c. Method Used:Computer Mapped/Generated Coordinates

Company/Project Well No.:
MW1

Purpose of Monitoring Well:
Monitor groundwater around ponds

Well Owner (Name, Firm, Address):
Owner: Core Environmental
Line 1: 4 Brookstone Plaza
Line 2:
City: Morgantown
State: WV
Zip: 26508-
Phone: 304-292-2673

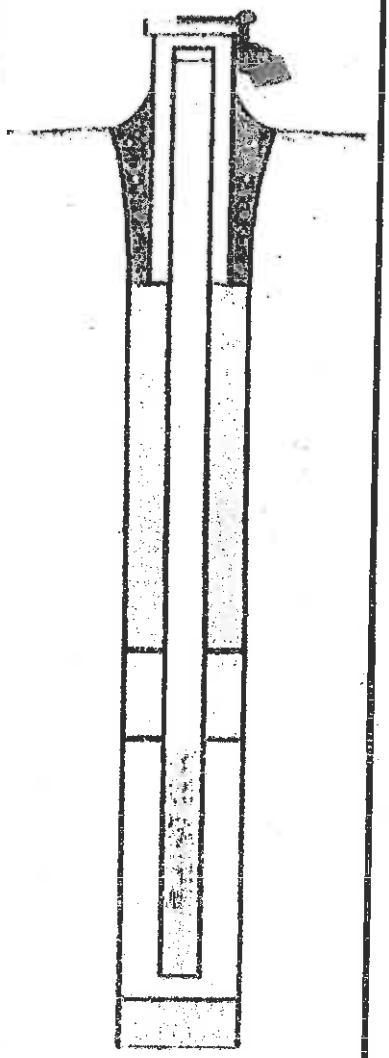
Installed By (Name, Firm, Address):
Installer: Aaron Hughes Chatfield Drilling
Line 1: 654 Mercer Rd
Line 2:
City: Greenville
State: PA
Zip: 16125-
Phone: 724-588-2662

Date Well Installed:
08/06/2013

Driller's WV Cert No.
WV00534

Section B: (all number fields must be in decimal format)

1. Cap and Lock: YES
2. Protective Cover: Protective Cover Pipe
3. Monitoring Well Reference Point: 0 ft.
4. Borehole Diameter: 8 inches.
5. Ground Surface Seal:
   a. Material: concrete
   b. Installation Procedure: concrete pad
6. Surface Seal Bottom/Annular Space Top: 3 ft.
7. Well Riser: a.OD Well Riser: 4.25 inches. b.ID Well Riser: 4 inches.
   c. Material: PVC
   d. Installation Procedure: Hand Lower
8. Annular Space Seal:
   a. Material: bentonite chip -
   b. Installation Procedure: pour
9. Well Development Procedure: surge/purge -
10. Drilling Method Used: hollow stem auger -
11. Annular Space Seal Bottom/Filter Seal Top: 52 ft.
12. Drilling Fluid Used: No Source:
13. Filter Pack Seal:
    a. Material: bentonite pellet
    b. Installation Procedure: Gravity Fed
    c. Volume Added: 100 pounds
14. Bottom of Bentonite Seal/Filter Pack Top: 62 ft.
15. Depth to Top of Screen: 67 ft.
16. Screen:
    a. Material: PVC
    b. Installation Procedure: Hand Lower
    c. Slot Size: 0.01 inches. d. Screen Length: 50 ft.
17. Filter Pack:
    a. Material: medium sand
    b. Installation Procedure: pour
18. Well Depth: 117 ft.
19. Bottom of Filter Pack: 117 ft.
20. Bottom of Borehole: 117 ft.
21. Backfill Material (below filter pack): N/A
22. Decontamination Procedures: Hot Water
23. Special Circumstances and Exceptions: No Variance Number:
24. WV Contractor License No. N/A



State of West Virginia
Department of Environmental Protection

Monitoring Well Construction

Well Number: WV00534-0015-13

Site Name/Physical Address:
Site: Hall Pond Impoundment
Line 1: Old St Rt 50
Line 2:
City: Ellenboro
State: WV
Zip: 26346-
County: Ritchie

Well Owner (Name, Firm, Address):
Owner: Core Environmental
Line 1: 4 Brookestone Plaza
Line 2:
City: Morgantown
State: WV
Zip: 26508-
Phone: 304-282-2673

Well Registration No. WV00534-0015-13
Grid Location:
a. Latitude: 39 17 11 .0
b. Longitude: 81 0 47 .0
c. Method Used: Computer Mapped/Generated Coordinates

Company/Project Well No.:
MW2

Installed By (Name, Firm, Address):
Installer: Aaron Hughes Chatfield Drilling, Inc.
Line 1: 854 Mercer Rd
Line 2:
City: Greenville
State: PA
Zip: 16125-
Phone: 724-588-2552

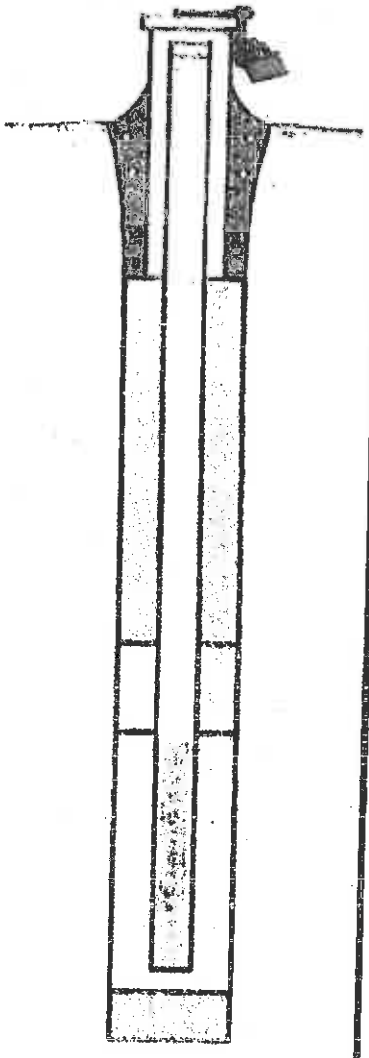
Purpose of Monitoring Well:
Monitor Ground water around ponds

Date Well Installed:
09/06/2013

Driller's WV Cert No.
WV00534

Section B: (all number fields must be in decimal format)

1.Cap and Lock:	YES
2.Protective Cover:	Protective Cover Pipe
3.Monitoring Well Reference Point:	0 ft.
4.Borehole Diameter:	6 inches.
5.Ground Surface Seal:	
a.Material: concrete	
b.Installation Procedure: Concrete Pad	
6.Surface Seal Bottom/Annular Space Top:	3 ft.
7.Well Riser: a.OD Well Riser: 4.25 inches. b.ID Well Riser: 4 inches.	
c.Material: PVC	
d.Installation Procedure: Hand Lower	
8.Annular Space Seal:	
a.Material: bentonite chip -	
b.Installation Procedure: pour	
9.Well Development Procedure: surge/purge -	
10.Drilling Method Used: hollow stem auger -	
11.Annular Space Seal Bottom/Filter Seal Top:	52 ft.
12.Drilling Fluid Used: No Source:	
13.Filter Pack Seal:	
a.Material: bentonite pellet	
b.Installation Procedure: Gravity Fed	
c.Volume Added: 100 pounds	
14.Bottom of Bentonite Seal/Filter Pack Top:	62 ft.
15.Depth to Top of Screen:	67 ft.
16.Screen:	
a.Material: PVC	
b.Installation Procedure: Hand Lower	
c.Slot Size: 0.01 inches. d.Screen Length: 50 ft.	
17.Filter Pack:	
a.Material: medium sand	
b.Installation Procedure: Pour	
18.Well Depth:	117 ft.
19.Bottom of Filter Pack:	117 ft.
20.Bottom of Borehole:	117 ft.
21.Backfill Material (below filter pack): N/A	
22.Decontamination Procedures: Hot Water	
23.Special Circumstances and Exceptions: No Variance Number:	
24.WV Contractor License No. N/A	



State of West Virginia
Department of Environmental Protection

Monitoring Well Construction

Well Number: WV00534-0016-13

Site Name/Physical Address:
Site: Halls Pond Impoundment
Line 1: Old St Rt 50
Line 2:
City: Ellenboro
State: WV
Zip: 26346-
County: Ritchie

Well Registration No: WV00534-0016-13
Grid Location:
a. Latitude: 39 17 11 .0
b. Longitude: 81 0 51 .0
c. Method Used: Computer Mapped/Generated Coordinates

Company/Project Well No.:
MW3

Purpose of Monitoring Well:
Monitor ground water around ponds

Well Owner (Name, Firm, Address):
Owner: Core Environmental
Line 1: 4 Brookestone Plaza
Line 2:
City: Morgantown
State: WV
Zip: 26508-
Phone: 304-292-2673

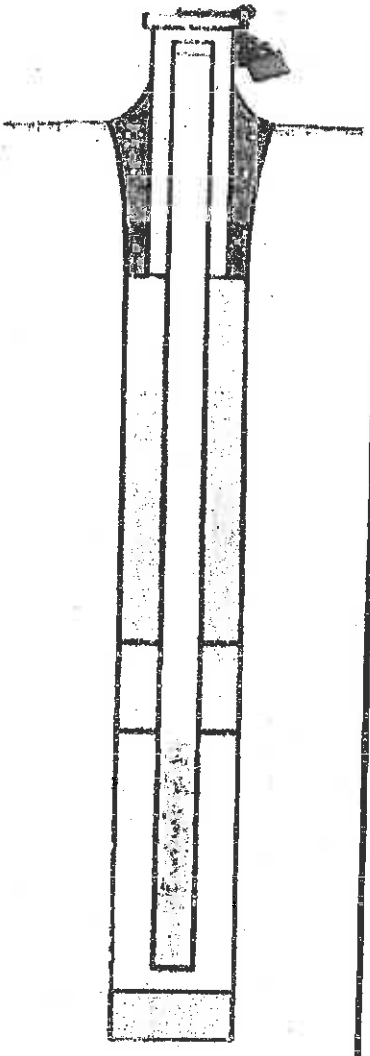
Installed By (Name, Firm, Address):
Installer: Aaron Hughes Chatfield Drilling, Inc.
Line 1: 854 Mercer Rd
Line 2:
City: Greenville
State: PA
Zip: 16125-
Phone: 724-588-2852

Date Well Installed:
08/08/2013

Driller's WV Cert No.
WV00534

Section B: (all number fields must be in decimal format)

1. Cap and Lock: YES
2. Protective Cover: Protective Cover Pipe
3. Monitoring Well Reference Point: 0 ft.
4. Borehole Diameter: 6 inches.
5. Ground Surface Seal:
   a. Material: concrete
   b. Installation Procedure: Concrete Pad
6. Surface Seal Bottom/Annular Space Top: 3 ft.
7. Well Riser: a. OD Well Riser: 4.26 inches. b. ID Well Riser: 4 inches.
   c. Material: PVC
   d. Installation Procedure: Hand Lower
8. Annular Space Seal:
   a. Material: bentonite chip -
   b. Installation Procedure: pour
9. Well Development Procedure: surge/purge -
10. Drilling Method Used: hollow stem auger -
11. Annular Space Seal Bottom/Filter Seal Top: 32 ft.
12. Drilling Fluid Used: No Source:
13. Filter Pack Seal:
    a. Material: bentonite pellet
    b. Installation Procedure: Gravity Fed
    c. Volume Added: 50 pounds
14. Bottom of Bentonite Seal/Filter Pack Top: 37 ft.
15. Depth to Top of Screen: 42 ft.
16. Screen:
    a. Material: PVC
    b. Installation Procedure: Hand Lower
    c. Slot Size: 0.01 inches. d. Screen Length: 50 ft.
17. Filter Pack:
    a. Material: medium sand
    b. Installation Procedure: Pour
18. Well Depth: 92 ft.
19. Bottom of Filter Pack: 92 ft.
20. Bottom of Borehole: 92 ft.
21. Backfill Material (below filter pack): NA
22. Decontamination Procedures: Hot Water
23. Special Circumstances and Exceptions: No Variance Number:
24. WV Contractor License No. N/A



CORE
ENVIRONMENTAL SERVICES, INC.
Consulting • Operation & Maintenance • Risk Assessment • Engineering

August 24, 2015

Hall Drilling, LLC
981 E. Washington Ave.
Ellenboro, West Virginia 26346

Attention: Jason Hall

Subject: **August 2015 Groundwater Monitoring Well Additional Sampling**
Underground Injection Control Facility
Ellenboro, Ritchie County, West Virginia

Dear Mr. Hall,

CORE Environmental Services, Inc. (CORE) is pleased to provide this letter report detailing monitoring well sampling activities conducted on August 6, 2015 at the above referenced site.

In a conversation with Hall Drilling on August 4, 2015, the WVDEP identified concerns regarding the June 18, 2015 results of groundwater sampling. Elevated concentrations of dissolved metals had been detected at monitoring well MW-3 during the last three monitoring events. In addition, an increasing temperature was observed at monitoring well MW-3 during well purging and accurate conductivity and dissolved oxygen readings were not obtained during field activities in June 2015.

Due to the factors identified above, CORE resampled monitoring well MW-3 on August 6, 2015. Monitoring well MW-3 was gauged prior to purging with a water level meter able to measure depth to water to within 1/100 of a foot. Prior to sample collection, the well was purged of a minimum of three well volumes or until the well was dry using a submersible pump and dedicated tubing. Based on previous laboratory analytical reports of the groundwater and field activities, purge water was disposed of on-site on the ground next to the monitoring well. A site map depicting the approximate location of the on-site monitoring wells is provided in Attachment 1.

Groundwater was also field analyzed with a multi-parameter field meter for pH, temperature and oxygen reduction potential before, during, and after purging activities. During the previous sampling event in June 2015, conductivity and dissolved oxygen were marked as "NA" because these parameters were measured but recorded in units of

4068 Mt. Royal Blvd., Suite 225
Allison Park, PA 15101-2951
(412) 487-6000
Fax (412) 487-9785

4 Brockstone Plaza
Morgantown, WV 26508
(304) 292-2673
Fax (304) 292-2773
www.core-env.com

533 N Jefferson St., Suite 3
Lewisburg, WV 24901
(681) 238-5235
Fax (681) 238-5239

measure that were inconsistent with previous sampling events. Field parameters were recorded on August 6, 2015 prior to sampling to indicate groundwater stability; however, they are unable to be directly compared to the previous sampling event. Groundwater temperatures remained stable during the purging of monitoring well MW-3 on August 6, 2015. Field parameters and field notes from the August 2015 sampling activities are provided in Attachments 2 and 3, respectively.

Groundwater samples were collected into laboratory supplied containers, labeled, packed on ice, and then dropped off at REI Consultants, Inc. (REIC), a WVDEP certified laboratory, under a chain-of-custody for analysis. Samples were laboratory analyzed for benzene, toluene, ethylbenzene, total xylenes (BTEX) via EPA Method 8021B; total petroleum hydrocarbons-gasoline range organics (TPH-GRO), TPH-diesel range organics (DRO), and TPH-oil range organics (ORO) via EPA Method 8015C; bromide, chloride, and sulfate via Method E300.00; total sodium, barium, iron, manganese via Method E200.7; Total Organic Carbon (TOC) via Method SM 5310; and Total Dissolved Solids (TDS) and Total Suspended Solids (TSS) via Method SM2540. The laboratory analytical results and a summary table of all historical groundwater analytical data are provided in Attachment 4.

Laboratory results were compared to Federal Drinking Water Standards as well as WVDEP Action Levels per the Groundwater Program Remediation Guidance Document dated February 2006 for TPHs. Based on the laboratory results, parameters were not detected above Primary Drinking Water Standards or WVDEP Action Levels. However, Iron, Manganese and Total Dissolved Solids were detected above the Secondary Drinking Water Standard in the groundwater sample collected from MW-3 in August 2015. Regardless, the Secondary Drinking Water Standards are non-enforceable guidelines to regulate the cosmetic and aesthetic effects of drinking water.

Please contact us at (304) 292-2673 if there are any additional questions.

Sincerely,

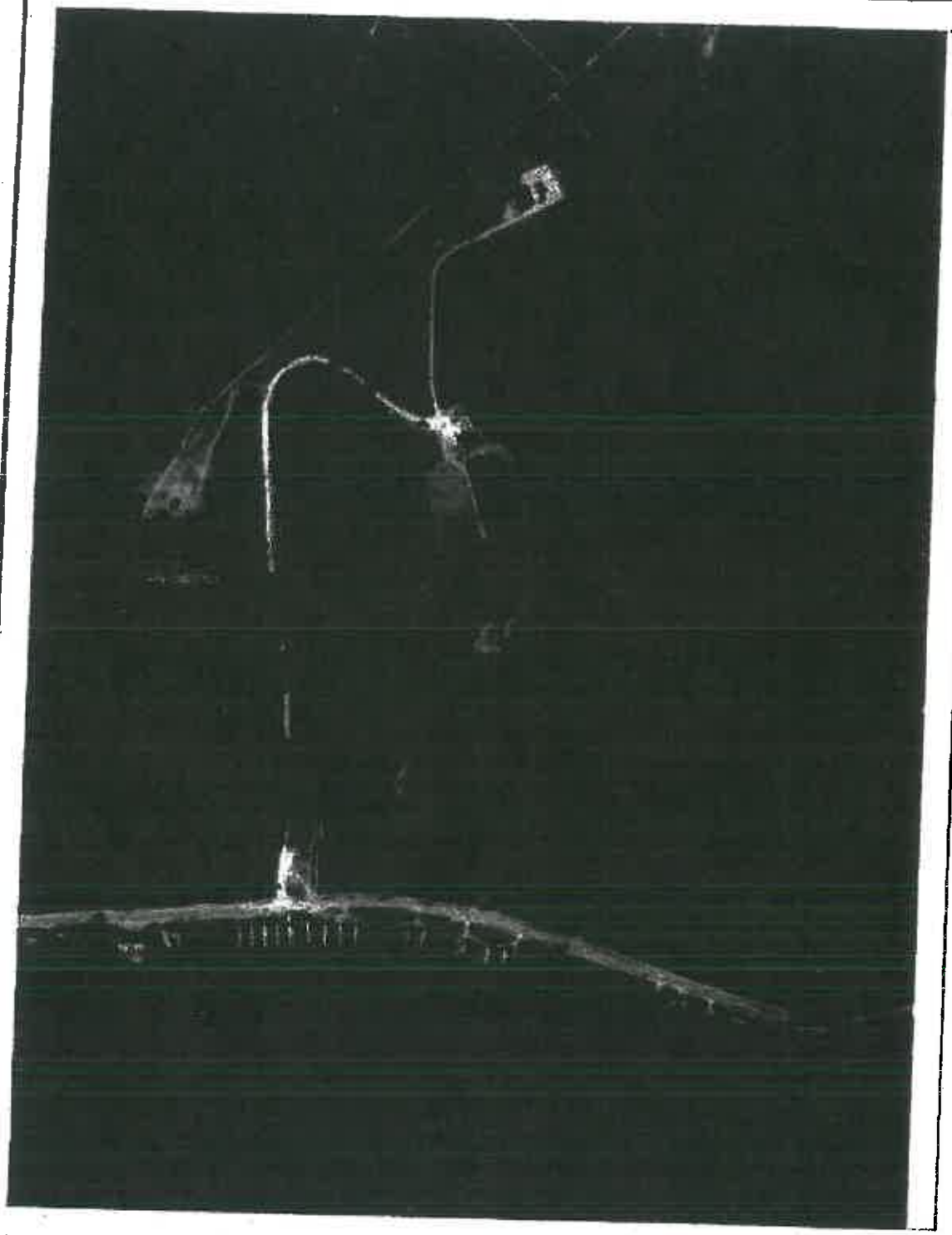
CORE Environmental Services, Inc.

Julie E. Barry, LRS
Project Manager

Attachments

ATTACHMENT 1

SITE MAP



CORE ENVIRONMENTAL SERVICES, INC.	TITLE: SITE MAP HALL DRILLING UIC IMPOUNDMENT ELLENBORO, WEST VIRGINIA .	DWN	DES.:	PROJECT NO: HAL-2013-151
		CHKD:	APPD:	
		DATE:	REV.:	FIGURE NO 1

ATTACHMENT 2

FIELD PARAMETERS

Monitoring Well #1 (MW-1)

Total depth of Well: (116 feet)
Diameter of Well (4 inches)
Riser height (66 feet)
Screened interval (50 feet)

Sample Date	Depth to Water (ft.)	Purge Volume (gallons)	Field Parameters	pH	Temperature (°C)	Conductivity (us/cm)	Dissolved Oxygen (%)	Oxygen Reduction Potential
6/18/2014	70.01	30.25 (dry)	Before	7.15	12.7	279	35.1	28.2
			During	7.5	13.5	205	68.7	22.4
			After	7.88	17.25	328	70.2	37
11/20/2014	70.53	90.43	Before	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
			During	[illegible]	[illegible]	350	[illegible]	[illegible]
			After	[illegible]	[illegible]	351	[illegible]	[illegible]
6/18/2015	70.52	90.38	Before	6.32	15.01	NA	NA	-34.3
			During	6.73	14.66	NA	NA	12
			After	6.92	16.42	NA	NA	38.6
8/6/2015	NG	NG	Before	NS	NS	NS	NS	NS
			During	NS	NS	NS	NS	NS
			After	NS	NS	NS	NS	NS

Notes:
°C: degrees Celcius
us/cm: micro siemens per centimeter
%: percent
NA: Not Available
NG: Not Gauged
NS: Not Sampled

Monitoring Well #2 (MW-2)

Total depth of Well: (117 feet)
Diameter of Well (4 inches)
Riser height (67 feet)
Screened interval (50 feet)

Sample Date	Depth to Water (ft.)	Purge Volume (gallons)	Field Parameters	pH	Temperature (°C)	Conductivity (us/cm)	Dissolved Oxygen (%)	Oxygen Reduction Potential
6/18/2014	69.02	93	Before	7.76	14.58	389	17.3	-45.5
			During	7.93	14.89	402	17.9	-51.5
			After	8.21	15.07	418	7.7	-77.8
11/20/2014	68.01	95.44	Before	8.20	14.57	410	15.33	-70.9
			During	8.16	14.59	415	15.51	-75.7
			After	8.16	15.10	420	15.35	-90.1
6/18/2015	70.07	91.45	Before	6.96	16.97	NA	NA	-64
			During	7.59	14.97	NA	NA	-25.5
			After	7.55	15.37	NA	NA	-1.7
8/6/2015	NG	NG	Before	NS	NS	NS	NS	NS
			During	NS	NS	NS	NS	NS
			After	NS	NS	NS	NS	NS

Notes:
°C: degrees Celcius
us/cm: micro siemens per centimeter
%: percent
NA: Not Available
NG: Not Gauged
NS: Not Sampled

Monitoring Well #3 (MW-3)

Total depth of Well: (92 feet)
Diameter of Well (4 inches)
Riser height (42 feet)
Screened interval (50 feet)

Sample Date	Depth to Water (ft.)	Purge Volume (gallons)	Field Parameters	pH	Temperature (°C)	Conductivity (us/cm)	Dissolved Oxygen (%)	Oxygen Reduction Potential
6/18/2014	34.95	80	Before	7.43	13.14	1005	8.0	23.6
			During	7.41	13.19	1035	11.5	30.1
			After	7.34	13.18	1031	11.8	21.8
11/20/2014	36.62	114.52	Before	7.52	[illegible]	1121	9.3	23.6
			During	7.53	[illegible]	1119	11.6	36.8
			After	[illegible]	13.27	1122	11.9	41.2
6/18/2015	36.54	108.64	Before	6.19	17.37	NA	NA	43.6
			During	6.64	16.58	NA	NA	23
			After	6.63	18.41	NA	NA	43.9
8/6/2015	35.50	116.40	Before	[illegible]	13.21	183	15.2	97.3
			During	[illegible]	[illegible]	145	29.7	69.6
			During	[illegible]	[illegible]	[illegible]	[illegible]	33.2
			After	[illegible]	[illegible]	65	10.5	83.8

Notes:
°C: degrees Celcius
us/cm: micro siemens per centimeter
%: percent
NA: Not Available

ATTACHMENT 3

FIELD NOTES

6

Location Morgantown, WV Date 8-5-15

Project / Client [illegible]

0845 - [illegible] @ 0905

0925 - [illegible]

1135 - [illegible]

1325 - [illegible]

[illegible]

[illegible] RETC [illegible]

Location [illegible], WV Date 8-6-15 7

Project / Client [illegible]

[illegible]

0820 - [illegible]

[illegible] - [illegible]

SD	[illegible]	[illegible]	[illegible]	[illegible]
MW-1	–	–	[illegible]	–
MW-2	–	–		–
MW-3	3.9 [illegible]	9.4 [illegible]		11.40

ID	pH	Temp °C	Cond	[illegible]	ORP
MW-3	7.27	13.81	133	1.58	77.3
	6.81	13.42	145	2.08	69.6
	7.03	13.24	68	1.04	35.9
	7.48	13.71	65	1.07	33.8

- Well [illegible]
- Well purged [illegible] @ [illegible]
- Well was [illegible] [illegible]

[illegible]

[illegible]

8

Location Ellenboro, WV Date 8-6-15

Project / Client Hall Drilling

Sample ID	Time		Parameters
MW-3	1140	BTEX	8021B
		TPH (GRO, DRO, ORO)	8015C
		Bromide, Chloride, Sulfate	E300.0
		Total Sodium, Barium, Iron, Manganese	E200.7
		TOC	SM5310
		TDS, TSS	SM2540

Bottleware

1 Hg, 1 L p, 2 500ml p - No preservative

1 500ml p HNO_3

4 vials HCl

1 Amber - H_2SO_4 [illegible]

1150 - Bill and Jason Hall (Hall Drilling) offsite to meet w/ Mike Hall to discuss days work - site secured

[illegible] - Samples dropped off @ REIC Mt. Hope on 8-6-15 @ 1505 [illegible]

Location

Project / Client

Date

9

ATTACHMENT 4

SUMMARY TABLE
LABORATORY ANALTYICAL REPORT

SUMMARY TABLE
GROUNDWATER ANALYTICAL RESULTS

Hall Drilling, LLC
UIC Well #3
Ellenboro, Ritchie County, West Virginia

Sample ID	Sample Date	Benzene	Toluene	Ethylbenzene	Total Xylenes	TPH-GRO	TPH-DRO	TPH-ORO	[illegible]	[illegible]	[illegible]	Iron	Manganese	[illegible]	[illegible]	Total Organic Carbon	Total Dissolved Solids	Total Suspended Solids
		mg/L																
MW-1	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	NA	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
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MW-2	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
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MW-3	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
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	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	NA	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Federal Drinking Water Standards/[illegible] Action Levels		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	*	[illegible]	[illegible]	[illegible]	*	[illegible]	*	[illegible]	*

* = Not Regulated
( ) = Reporting Limit (RL)
mg/L = milligrams per Liter
NA = Not Analyzed
NS = Not Sampled
Bold - Exceeds Groundwater Standards
Underlined Standards are guidelines set by the USEPA as Secondary Drinking Water Standards

REI Consultants, Inc.
PO Box 286
Beaver, WV 25813
TEL: (304) 255-2500
Website: www.reilabs.com

3029-C Peters Creek Road
Roanoke, VA 24019
TEL: 540.777.1276

101 17th Street
Ashland, KY 41101
TEL: 606.393.5027

1557 Commerce Road, Suite 201
Verona, VA 24482
TEL: 540.248.0183

16 Commerce Drive
Westover, WV 26501
TEL: 304.241.5861

Friday, August 14, 2015

Lafe Kunkel
CORE ENVIRONMENTAL SERVICES INC
4 BROOKSTONE PLAZA
MORGANTOWN, WV 26506

TEL: (304) 292-2673
FAX:

RE: HALL DRILLING
Work Order #: 1508888
Dear Lafe Kunkel:

REI Consultants, Inc. received 2 sample(s) on 8/7/2015 for the analyses presented in the following report.

Sincerely,

Jimmy Suttle
Project Manager

REI Consultants, Inc. - Case Narrative

WO#: 1508888

Date Reported: 8/14/2015

Client: CORE ENVIRONMENTAL SERVICES INC

Project: HALL DRILLING

The analytical results presented in this report were produced using documented laboratory SOPs that incorporate appropriate quality control procedures as described in the applicable methods. Verification of required sample preservation (as required) is recorded on associated laboratory logs. Any deviation from compliance or method modification is identified within the body of this report by a qualifier footnote which is defined at the bottom of this page.

All sample results for solid samples are reported on an "as-received" wet weight basis unless otherwise noted.

Results reported for sums of individual parameters, such as TTHM and HAA5, may vary slightly from the sum of the individual parameter results, due to rounding of individual results, as required by EPA.

The test results in this report meet all NELAP and/or VELAP requirements for parameters clearly designated as PA, VA, PA/VA, or VELAP in the column labeled NELAP.

Please note if the sample collection time is not provided on the Chain of Custody, the default recording will be 0:00:00. This may cause some tests to be apparently analyzed out of hold.

All tests performed by REIC Service Centers are designated by an annotation on the test code. All other tests were performed by REIC's Main Laboratory in Beaver, WV.

This report may not be reproduced, except in full, without the written approval of REIC.

DEFINITIONS:
MCL: Maximum Contaminent Level
MDL: Method Detection Limit; The lowest concentration of analyte that can be detected by the method in the applicable matrix.
Mg/Kg or mg/L: Units of part per million (PPM) - milligram per Kilogram (weight/weight) or milligram per Liter (weight/volume).
NA: Not Applicable
ND: Not Detected at the PQL or MDL
PQL: Practical Quantitation Limit; The lowest verified limit to which data is quantified without qualifications. Analyte concentrations below PQL are reported either as ND or as a number with a "J" qualifier.
Qual: Qualifier that applies to the analyte reported.
TIC: Tentatively Identified Compound, Estimated Concentration denoted by "J" qualifier.
Ug/Kg or ug/L: Units of part per billion (PPB) - microgram per kilogram (weight/weight) or microgram per liter (weight/volume).

QUALIFIERS:
X: Reported value exceeds required MCL
B: Analyte detected in the associated Method Blank at a concentration > 1/2 the PQL
E: The sample result is within the method accepted Linear Dynamic Range determined by the lab for this analysis. However, it may be considered estimated when applying the TNI (The NELAC Institute) standard.
H: Holding time for preparation or analysis has been exceeded.
J: Analyte concentration is reported, and is less than the PQL and greater than or equal to the MDL. The result reported is an estimate.
S: % REC (% recovery) exceeds control limits

CERTIFICATIONS:
Beaver, WV: WVDHHR 00412CM, WVDEP 060, VADCLS 00281, KYDEP 90039, TNDEQ TN02928, NCDWQ 466, PADEP 68-00839, VADCLS (VELAP) 460148
Bluefield (Beaver, WV): WVDEP 060, VADCLS(VELAP) 460148, PADEP 68-00839
Roanoke, VA: VADCLS(VELAP) 460150
Verona, VA: VADCLS(VELAP) 460151
Ashland, KY: KYDEP 00094, WVDEP 389
Morgantown, WV: WVDHHR 003112M, WVDEP 367

REI Consultants, Inc. - Analytical Report

WO#: 1508888

Date Reported: 8/14/2015

Client:	CORE ENVIRONMENTAL SERVICES INC	**Collection Date:**	8/6/2015 11:10:00 AM
Project:	HALL DRILLING	**Date Received:**	8/7/2015
Lab ID:	1508888-01A	**Matrix:**	Liquid
Client Sample ID:	MW-3	**Site ID:**	ELLENBORO WV

Analysis	Result	MDL	PQL	MCL	Qual	Units	Date Analyzed	NELAP
METALS BY ICP			**Method: EPA 200.7 Rev. 4.4 (1994)**				**Analyst: CGW**	
Barium	1.43	0.002	0.100	NA		mg/L	8/13/2015 6:32 PM	PA/VA
Iron	31.8	0.010	0.100	NA	E	mg/L	8/13/2015 6:32 PM	PA/VA
Manganese	1.18	0.002	0.100	NA		mg/L	8/13/2015 6:32 PM	PA/VA
Sodium	173	1.00	10.0	NA		mg/L	8/13/2015 6:36 PM	PA/VA
SEMI-VOLATILE RANGE ORGANICS			**Method: SW8015C (2000)**				**Analyst: CL**	
TPH (Diesel Range)	ND	0.08	0.12	NA		mg/L	8/12/2015 10:14 AM	
TPH (Oil Range)	ND	0.04	0.30	NA		mg/L	8/12/2015 10:14 AM	
Surr: o-Terphenyl	85.4	NA	28.3-152	NA		%REC	8/12/2015 10:14 AM	
VOLATILE RANGE ORGANICS			**Method: SW8015C (2000)**				**Analyst: CB**	
TPH (Gasoline Range)	ND	0.250	0.600	NA		mg/L	8/12/2015 2:22 PM	
Surr: 2,5-Dibromotoluene	108	NA	37.2-152	NA		%REC	8/12/2015 2:22 PM	
VOLATILE ORGANIC COMPOUNDS			**Method: SW8021B (1996)**				**Analyst: CB**	
Benzene	ND	0.500	1.00	NA		µg/L	8/12/2015 2:22 PM	
Toluene	ND	0.500	1.00	NA		µg/L	8/12/2015 2:22 PM	
Ethylbenzene	ND	0.500	1.00	NA		µg/L	8/12/2015 2:22 PM	
m,p-Xylene	ND	1.00	2.00	NA		µg/L	8/12/2015 2:22 PM	
o-Xylene	ND	0.500	1.00	NA		µg/L	8/12/2015 2:22 PM	
Surr: 1,1,1-Trifluorotoluene	89.7	NA	61.2-135	NA		%REC	8/12/2015 2:22 PM	
ANIONS by ION CHROMATOGRAPHY			**Method: EPA 300.0, Rev.2.1 (1993)**				**Analyst: CF**	
Bromide	2.19	0.10	0.20	NA		mg/L	8/10/2015 1:33 PM	
Chloride	201	2.00	10.0	NA		mg/L	8/10/2015 1:12 PM	
Sulfate	20.4	1.00	5.00	NA		mg/L	8/10/2015 12:23 PM	
TOTAL DISSOLVED SOLIDS			**Method: SM2540 C-1997**				**Analyst: KY**	
Total Dissolved Solids	611	5	10	NA		mg/L	8/10/2015 2:20 PM	PA/VA
TOTAL SUSPENDED SOLIDS			**Method: SM2540 D-1997**				**Analyst: KY**	
Total Suspended Solids	174	2.0	10	NA		mg/L	8/10/2015 2:20 PM	PA/VA
ORGANIC CARBON, TOTAL			**Method: SM5310 C-2000**				**Analyst: VS**	
Total Organic Carbon	0.45	0.20	1.00	NA	J	mg/L	8/10/2015 9:03 PM	PA/VA

REI Consultants, Inc. - Analytical Report

WO#: 1508888

Date Reported: 8/14/2015

Client:	CORE ENVIRONMENTAL SERVICES INC	**Collection Date:**	8/6/2015 12:00:00 AM
Project:	HALL DRILLING	**Date Received:**	8/7/2015
Lab ID:	1508888-02A	**Matrix:**	Trip Blank
Client Sample ID:	TRIP BLANK	**Site ID:**	ELLENBORO WV

Analysis	Result	MDL	PQL	MCL	Qual	Units	Date Analyzed	NELAP
VOLATILE ORGANIC COMPOUNDS			**Method: SW8021B (1996)**				**Analyst: CB**	
Benzene	ND	0.500	1.00	NA		µg/L	8/12/2015 2:52 PM	
Toluene	ND	0.500	1.00	NA		µg/L	8/12/2015 2:52 PM	
Ethylbenzene	ND	0.500	1.00	NA		µg/L	8/12/2015 2:52 PM	
m,p-Xylene	ND	1.00	2.00	NA		µg/L	8/12/2015 2:52 PM	
o-Xylene	ND	0.500	1.00	NA		µg/L	8/12/2015 2:52 PM	
Surr: 1,1,1-Trifluorotoluene	87.5	NA	81.2-135	NA		%REC	8/12/2015 2:52 PM	

REI Consultants, Inc.
PO Box 286
Beaver, WV 25813
TEL: (304)255-2500
Website: www.reiclabs.com

Sample Receipt Checklist

Client Name:	COR001	Work Order Number:	1508888
RCPNo:	1	Date and Time Received:	8/7/2015 8:44:43 PM
Received by:	John McGee		
Completed By:	Josh Lewis	Reviewed By:	Jimmy Suttle
Completed Date:	8/7/2015 6:45:59 PM	Reviewed Date:	8/10/2015 9:38 AM

Carrier Name: REIC

1.	Chain of custody present?	Yes [x]	No [ ]	
2.	Chain of custody signed when relinquished and received?	Yes [x]	No [ ]	
3.	Are matrices correctly identified on Chain of custody?	Yes [x]	No [ ]	
4.	Is it clear what analyses were requested?	Yes [x]	No [ ]	
5.	Custody seals intact?	Yes [ ]	No [ ]	Not Present [x]
6.	Samples in proper container type and preservative?	Yes [x]	No [ ]	
7.	Were correct preservatives noted on COC?	Yes [x]	No [ ]	NA [ ]
8.	Sample containers intact?	Yes [x]	No [ ]	
9.	Sufficient sample volume for indicated test?	Yes [x]	No [ ]	
10.	Were container labels complete?	Yes [x]	No [ ]	
11.	All samples received within holding time?	Yes [x]	No [ ]	
12.	Was an attempt made to cool the samples?	Yes [x]	No [ ]	NA [ ]
13.	Sample Temp. taken and recorded upon receipt?	Yes [x]	No [ ]	To 0.8 °C
14.	Water - Were bubbles absent in VOC vials?	Yes [x]	No [ ]	No Vials [ ]
15.	Are Samples considered acceptable?	Yes [x]	No [ ]	
16.	COC filled out properly?	Yes [x]	No [ ]	

Client Notification/Response

Client Name: COR001 Work Order Number: 1508888

Comment:

Client Contacted: Yes [ ] No [ ] NA [x] Person Contacted:

Contact Mode: Phone [ ] Fax: [ ] Email: [ ] In Person: [ ]

Date Contacted: Contacted By:

Regarding:

Client Instructions:

Corrective Action:

CHAIN OF CUSTODY RECORD

REIC

Research Environmental & Industrial Consultants, Inc.

MAIN LABORATORY & CORPORATE HEADQUARTERS:
P.O. Box 286 • 225 Industrial Park Rd. Beaver, WV 25813
800-999-0105 • 304-255-2500 • 304-255 2572/fax • www.reiclabs.com

MID-OHIO VALLEY Service Center, 101 17th Street, Ashland, KY 41101, 606-393-5027

SHENANDOAH Service Center, 1557 Commerce Rd., Ste 201, Verona, VA 24482, 540-248-0183

ROANOKE Service Center, 3029-C Peters Creek Rd, Roanoke, VA 24019, 540-777-1276

MORGANTOWN Service Center, 14 Commerce Drive, Westover, WV 26501, 304-241-5861

Client: CORE Environmental

Contact Person: Kate Kunkel

QUOTE #

PO #

Phone: 3042922673

Fax: 3042922773

Email: kkunkel@core-env.com

Address: 4 Brookstone [illegible] City: Morgantown State: WV Zip: 26505

Billing Address (if different):

City / State / Zip

Site ID & State: Ellenboro, WV Project ID: Hall Drilling

Sampler: [illegible]

SAMPLE LOG & ANALYSIS REQUEST

TURNAROUND TIME: ✓ NORMAL ☐ 5 DAY ☐ 3 DAY ☐ 2 DAY ☐ 1 DAY

*Rush work needs prior laboratory approval and will incur additional charges

ANALYSIS & METHOD REQUESTED

Sample ID	No. of Containers	Sample Date/Time	Matrix	Grab/Composite	1						
MW-3	8	8-6-15 / 1300	Water	Grab	X	X	X	X	X		
Trip Blank	1	8-6-15									

ENTER PRESERVATIVE CODE

Preservative Codes:
0 None
1 Hydrochloric Acid
2 Nitric Acid
3 Sulfuric Acid
4 Sodium Thiosulfate
5 Sodium Hydroxide/Sodium Ascorbate
6 Sodium Hydroxide
7 Ascorbic Acid
8 Sodium Bisulfate/Methanol
9 Ammonium Chloride
10
11
*(Use blanks for preservatives not listed)

COMMENTS:
4 VOAs g
1 1L g
1 1L p
3 500 mL p
1 40 mL g

All analytical requests are subject to REIC's Standard Terms and Conditions.

Relinquished by: [signature] 8-6-15 / 1500

Received by: [signature] 8/6/15 / 1500

FAX RESULTS ☐ EMAIL RESULTS ☒

Rec by [signature] 8-7-15

Rec'd by [signature]

www.reiclabs.com

REI Consultants, Inc.
PO Box 286
Beaver, WV 25813
TEL: (304) 255-2500
Website: www.reiclabs.com

3029-C Peters Creek Road
Roanoke, VA 24019
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101 17th Street
Ashland, KY 41101
TEL: 606.393.5027

1557 Commerce Road, Suite 201
Verona, VA 24482
TEL: 540.248.0183

16 Commerce Drive
Westover, WV 26501
TEL: 304.241.5861

Friday, August 14, 2015

Lafe Kunkel
CORE ENVIRONMENTAL SERVICES INC
4 BROOKSTONE PLAZA
MORGANTOWN, WV 26508

TEL: (304) 292-2673
FAX:

RE: HALL DRILLING
Work Order #: 1508888
Dear Lafe Kunkel:

REI Consultants, Inc. received 2 sample(s) on 8/7/2015 for the analyses presented in the following report.

Sincerely,

Jimmy Suttle
Project Manager

REI Consultants, Inc. - Case Narrative

WO#: 1508886

Date Reported: 8/14/2015

Client: CORE ENVIRONMENTAL SERVICES INC

Project: HALL DRILLING

The analytical results presented in this report were produced using documented laboratory SOPs that incorporate appropriate quality control procedures as described in the applicable methods. Verification of required sample preservation (as required) is recorded on associated laboratory logs. Any deviation from compliance or method modification is identified within the body of this report by a qualifier footnote which is defined at the bottom of this page.

All sample results for solid samples are reported on an "as-received" wet weight basis unless otherwise noted.

Results reported for sums of individual parameters, such as TTHM and HAA5, may vary slightly from the sum of the individual parameter results, due to rounding of individual results, as required by EPA.

The test results in this report meet all NELAP and/or VELAP requirements for parameters clearly designated as PA, VA, PA/VA, or VELAP in the column labeled NELAP.

Please note if the sample collection time is not provided on the Chain of Custody, the default recording will be 0:00:00. This may cause some tests to be apparently analyzed out of hold.

All tests performed by REIC Service Centers are designated by an annotation on the test code. All other tests were performed by REIC's Main Laboratory in Beaver, WV.

DEFINITIONS:
MCL: Maximum Contaminant Level
MDL: Method Detection Limit; The lowest concentration of analyte that can be detected by the method in the applicable matrix.
Mg/Kg or mg/L: Units of part per million (PPM) - milligram per Kilogram (weight/weight) or milligram per Liter (weight/volume).
NA: Not Applicable
ND: Not Detected at the PQL or MDL
PQL: Practical Quantitation Limit; The lowest verified limit to which data is quantified without qualifications. Analyte concentrations below PQL are reported either as ND or as a number with a "J" qualifier.
Qual: Qualifier that applies to the analyte reported.
TIC: Tentatively Identified Compound, Estimated Concentration denoted by "J" qualifier.
Ug/Kg or ug/L: Units of part per billion (PPB) - microgram per kilogram (weight/weight) or microgram per liter (weight/volume).

QUALIFIERS:
X: Reported value exceeds required MCL
B: Analyte detected in the associated Method Blank at a concentration > 1/2 the PQL
E: The sample result is within the method accepted Linear Dynamic Range determined by the lab for this analysis. However, it may be considered estimated when applying the TNI (The NELAC Institute) standard.
H: Holding time for preparation or analysis has been exceeded.
J: Analyte concentration is reported, and is less than the PQL and greater than or equal to the MDL. The result reported is an estimate.
S: % REC (% recovery) exceeds control limits

CERTIFICATIONS:
Beaver, WV: WVDHHR 00412CM, WVDEP 060, VADCLS 00281, KYDEP 90039, TNDEQ TN02926, NCDWQ 466, PADEP 68-00839, VADCLS (VELAP) 460148
Bioassay (Beaver, WV): WVDEP 060, VADCLS(VELAP) 460148, PADEP 68-00839
Roanoke, VA: VADCLS(VELAP) 460150
Verona, VA: VADCLS(VELAP) 460151
Ashland, KY: KYDEP 00094, WVDEP 389
Morgantown, WV: WVDHHR 003112M, WVDEP 387

REI Consultants, Inc. - Analytical Report

WO#: 1508888

Date Reported: 8/14/2015

Client:	CORE ENVIRONMENTAL SERVICES INC	Collection Date:	8/6/2015 11:10:00 AM
Project:	HALL DRILLING	Date Received:	8/7/2015
Lab ID:	1508888-01A	Matrix:	Liquid
Client Sample ID:	MW-3	Site ID:	ELLENBORO WV

Analysis	Result	MDL	PQL	MCL	Qual	Units	Date Analyzed	NELAP
METALS BY ICP			Method: EPA 200.7 Rev. 4.4 (1994)				Analyst: CGW	
Barium	1.43	0.002	0.100	NA		mg/L	8/13/2015 6:32 PM	PA/VA
Iron	31.8	0.010	0.100	NA	E	mg/L	8/13/2015 6:32 PM	PA/VA
Manganese	1.18	0.002	0.100	NA		mg/L	8/13/2015 6:32 PM	PA/VA
Sodium	173	1.00	10.0	NA		mg/L	8/13/2015 6:35 PM	PA/VA
SEMI-VOLATILE RANGE ORGANICS			Method: SW8015C (2000)				Analyst: CL	
TPH (Diesel Range)	ND	0.08	0.12	NA		mg/L	8/12/2015 10:14 AM	
TPH (Oil Range)	ND	0.04	0.30	NA		mg/L	8/12/2015 10:14 AM	
Surr: o-Terphenyl	85.4	NA	28.3-152	NA		%REC	8/12/2015 10:14 AM	
VOLATILE RANGE ORGANICS			Method: SW8015C (2000)				Analyst: CB	
TPH (Gasoline Range)	ND	0.250	0.500	NA		mg/L	8/12/2015 2:22 PM	
Surr: 2,5-Dibromotoluene	108	NA	37.2-152	NA		%REC	8/12/2015 2:22 PM	
VOLATILE ORGANIC COMPOUNDS			Method: SW8021B (1996)				Analyst: CB	
Benzene	ND	0.500	1.00	NA		µg/L	8/12/2015 2:22 PM	
Toluene	ND	0.500	1.00	NA		µg/L	8/12/2015 2:22 PM	
Ethylbenzene	ND	0.500	1.00	NA		µg/L	8/12/2015 2:22 PM	
m,p-Xylene	ND	1.00	2.00	NA		µg/L	8/12/2015 2:22 PM	
o-Xylene	ND	0.500	1.00	NA		µg/L	8/12/2015 2:22 PM	
Surr: 1,1,1-Trifluorotoluene	89.7	NA	61.2-135	NA		%REC	8/12/2015 2:22 PM	
ANIONS by ION CHROMATOGRAPHY			Method: EPA 300.0, Rev.2.1 (1993)				Analyst: CF	
Bromide	2.19	0.10	0.20	NA		mg/L	8/10/2015 1:33 PM	
Chloride	201	2.00	10.0	NA		mg/L	8/10/2015 1:12 PM	
Sulfate	20.4	1.00	5.00	NA		mg/L	8/10/2015 12:28 PM	
TOTAL DISSOLVED SOLIDS			Method: SM2540 C-1997				Analyst: KY	
Total Dissolved Solids	611	5	10	NA		mg/L	8/10/2015 2:20 PM	PA/VA
TOTAL SUSPENDED SOLIDS			Method: SM2540 D-1997				Analyst: KY	
Total Suspended Solids	174	2.0	10	NA		mg/L	8/10/2015 2:20 PM	PA/VA
ORGANIC CARBON, TOTAL			Method: SM5310 C-2000				Analyst: VS	
Total Organic Carbon	0.45	0.20	1.00	NA	J	mg/L	8/10/2015 9:03 PM	PA/VA

REI Consultants, Inc. - Analytical Report

WO#: 1508888

Date Reported: 8/14/2015

Client:	CORE ENVIRONMENTAL SERVICES INC	**Collection Date:**	8/6/2015 12:00:00 AM
Project:	HALL DRILLING	**Date Received:**	8/7/2015
Lab ID:	1508888-02A	**Matrix:**	Trip Blank
Client Sample ID:	TRIP BLANK	**Site ID:**	ELLENBORO WV

Analysis	Result	MDL	PQL	MCL	Qual	Units	Date Analyzed	NELAP
VOLATILE ORGANIC COMPOUNDS			**Method: SW8021B (1996)**				**Analyst: CB**	
Benzene	ND	0.500	1.00	NA		µg/L	8/12/2015 2:52 PM	
Toluene	ND	0.500	1.00	NA		µg/L	8/12/2015 2:52 PM	
Ethylbenzene	ND	0.500	1.00	NA		µg/L	8/12/2015 2:52 PM	
m,p-Xylene	ND	1.00	2.00	NA		µg/L	8/12/2015 2:52 PM	
o-Xylene	ND	0.500	1.00	NA		µg/L	8/12/2015 2:52 PM	
Surr: 1,1,1-Trifluorotoluene	87.5	NA	61.2-135	NA		%REC	8/12/2015 2:52 PM	

REIC
Improving the environment, one client at a time...

REI Consultants, Inc.
PO Box 286
Beaver, WV 25813
TEL: (304)255-2500
Website: www.reiclabs.com

Sample Receipt Checklist

Client Name:	COR001			Work Order Number:	1508685
RCPNo:	1	Date and Time Received:	8/7/2015 6:44:43 PM	Received by:	John McGee
Completed By:	Josh Lewis		Reviewed By:	Jimmy Suttle	
Completed Date:	8/7/2015 6:45:59 PM		Reviewed Date:	8/10/2015 9:38 AM	

Carrier Name: REIC

1.	Chain of custody present?	Yes [x]	No [ ]	
2.	Chain of custody signed when relinquished and received?	Yes [x]	No [ ]	
3.	Are matrices correctly identified on Chain of custody?	Yes [x]	No [ ]	
4.	Is it clear what analyses were requested?	Yes [x]	No [ ]	
5.	Custody seals intact?	Yes [ ]	No [ ]	Not Present [x]
6.	Samples in proper container type and preservative?	Yes [x]	No [ ]	
7.	Were correct preservatives noted on COC?	Yes [x]	No [ ]	NA [ ]
8.	Sample containers intact?	Yes [x]	No [ ]	
9.	Sufficient sample volume for indicated test?	Yes [x]	No [ ]	
10.	Were container labels complete?	Yes [x]	No [ ]	
11.	All samples received within holding time?	Yes [x]	No [ ]	
12.	Was an attempt made to cool the samples?	Yes [x]	No [ ]	NA [ ]
13.	Sample Temp. taken and recorded upon receipt?	Yes [x]	No [ ]	To 0.8 °C
14.	Water - Were bubbles absent in VOC vials?	Yes [x]	No [ ]	No Vials [ ]
15.	Are Samples considered acceptable?	Yes [x]	No [ ]	
16.	COC filed out properly?	Yes [x]	No [ ]	

Client Notification/Response

Client Name:	COR001					Work Order Number:	1508685
Comment:							
Client Contacted:	Yes [ ]	No [ ]	NA [x]	Person Contacted:			
Contact Mode:	Phone [ ]	Fax: [ ]	Email: [ ]	In Person: [ ]			
Date Contacted:				Contacted By:			
Regarding:							
Client Instructions:							
Corrective Action:							

CHAIN OF CUSTODY RECORD

REIC
Research Environmental & Industrial Consultants, Inc.
MAIN LABORATORY & CORPORATE HEADQUARTERS:
P.O. Box 286 • 225 Industrial Park Rd, Beaver, WV 25813
800-999-0105 • 304-255-2500 • 304-255-2572/fax • www.reiclabs.com

MID-OHIO VALLEY Service Center, 101 17th Street, Ashland, KY 41101, 606-393-5027
SHENANDOAH Service Center, 1557 Commerce Rd., Ste 201, Verona, VA 24482, 540-248-0183
ROANOKE Service Center, 5029-C Peters Creek Rd, Roanoke, VA 24019, 540-777-1276
MORGANTOWN Service Center, 16 Commerce Drive, Westover, WV 26501, 304-241-5861

Client: CORE Environmental
Contact Person: Luke Kunkel
QUOTE #:
Address: 4 Brookstone Plaza
City: Morgantown
Billing Address (if different):
PO #:
Phone: 3042922673
Fax: 3042922773
Email: lkunkel@core-env.com
State: WV Zip: 26507
Site ID & State: Ellenboro, WV
Project ID: Hall Drilling
Sampler: BL

SAMPLE LOG & ANALYSIS REQUEST

TURNAROUND TIME: NORMAL ✓ | 5 DAY | 3 DAY | 2 DAY | 1 DAY

*Rush work needs prior laboratory approval and will incur additional charges

Sample ID	# of Containers	Sample Date/Time	Matrix	Grab/Comp				
MW-3	10	8-6-15 / 1110	Water	Grab	X	X	X	X
Trip Blank	1	8-6-15						

ENTER PRESERVATIVE CODE

Preservation Codes:
0 None
1 Hydrochloric Acid
2 Nitric Acid
3 Sulfuric Acid
4 Sodium Thiosulfate
5 Sodium Hydroxide/Sodium Arsenite
6 Sodium Hydroxide
7 Ascorbic Acid
8 Sodium Bisulfite/Methanol
9 Ammonium Chloride
10

*Use blanks for preservatives not listed

COMMENTS:
4 VOAs
1 1Lg
1 1Lp
3 500mL p
1 60mLg

All analytical requests are subject to REIC's Standard Terms and Conditions.

FAX RESULTS ☐ EMAIL RESULTS ☒

Rec by [illegible] 8-7-15
Rec'd Y. Bishop 8-7-15

KC HARVEY
ENVIRONMENTAL, LLC

August 6, 2015

Mr. Mike Hall and Ms. Susan Baldwin
Hall Drilling, LLC
981 E Washington Ave
Ellenboro, WV 26346

RE: Tech Service Center- Stream Assessment

Dear Mike and Susan,

On behalf of Hall Drilling, LLC (Hall Drilling), KC Harvey Environmental, LLC (KC Harvey) collected water samples from Hushers Run after receiving a landowner complaint of high chlorides. The sample was collected south of the Tech Service Center in Ritchie County, West Virginia.

KC Harvey field scientists, Maureen Kertes and Jake Whytsell, collected the water quality samples on July 31, 2015. KC Harvey collected water samples for the following laboratory analytical suite:

- Total Organic Content
- pH
- Total Dissolved Solids
- Total Chloride
- Iron
- Total Manganese
- Total Barium
- Total Sodium
- Bromide
- Total Sulfate

Samples were collected from two locations on Hushers Run (Figure 1). A downstream sample (Sample A) was collected below a culvert outflow that drains water from the Tech Service Center. A background sample (Sample B) was collected approximately 800 feet upstream of Sample A. The samples were transported to Microbac Laboratories that afternoon for analysis of the nine parameters listed above.

Analytical laboratory results and reportable limits for each parameter are displayed in Table 1.

Table 1 Analytical laboratory results for stormwater runoff samples collected at the Tech Service Center

Location ID	Analyte									
	TOC[1] (mg/L)	pH	TDS[2] (mg/L)	Chloride	Iron			Barium	Sulfate (mg/L)	Sulfate
Water Quality Theshold	NA[4]	6.0-9.0	500[5]	250[5]	1.5	1.0	1.0	20[5]	NA[4]	250[5]
Sample A	2.25	7.80	212	32	ND[6]	0.0127	0.0946	17.4	ND	10.9
Sample B	2.38	7.73	176	26.4	0.112	0.0256	0.099	19.3	ND	12.8

NOTES:

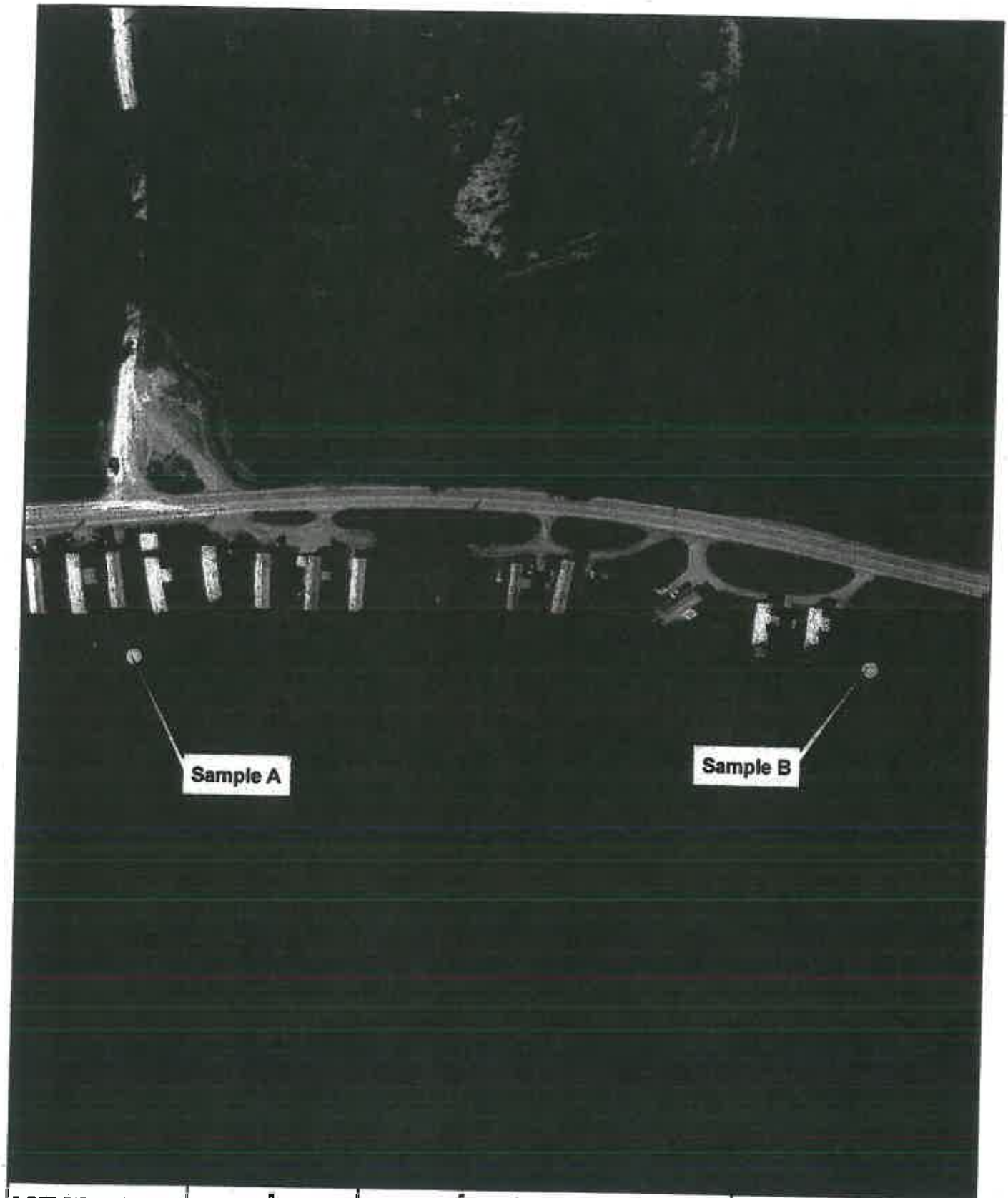
1 BOD- Biological Oxygen Demand
2 COD- Chemical Oxygen Demand
3 Barium- is a EPAs Primary Water Drinking Standard. All other analytes are considered secondary water quality parameters. Secondary standards were established to assist public water systems in managing their drinking water for aesthetic considerations, such as taste, color and odor
4 Not available
5 EPA Water Quality Secondary Standards
6 ND-Not detected

If you have any questions or require additional information, please feel free to contact me at 740-373-1970 or mkertes@kcharvey.com.

Respectfully submitted,
KC Harvey Environmental, LLC

Maureen Kertes

Maureen Kertes
Staff Scientist



KC HARVEY ENVIRONMENTAL, LLC
200 Union Square, Suite 1
Marietta, Ohio 45750
740-373-1970
www.kcharvey.com

W E
0 75 150 ft

Ritchie County, WV

USA Topo Maps

Hall Drilling

Stream Assessment

Date: 08/04/2015 | Version: 1

Microbac

Laboratory Report Number: L15071692 *(Revised)*

Revised report 8/5/15 to include Bromide analysis.

Shannon Thompson
KC Harvey
200 Union Square
Marietta, OH 45750

Please find enclosed the analytical results for the samples you submitted to Microbac Laboratories. Review and compilation of your report was completed by Microbac's Ohio Valley Division (OVD). If you have any questions, comments, or require further assistance regarding this report, please contact your service representative listed below.

Laboratory Contact:
– Data Specialist
(740) 373-4071
paige.lamb@microbac.com

I certify that all test results meet all of the requirements of the accrediting authority listed below. All results for soil samples are reported on a 'dry-weight' basis unless specified otherwise. Analytical results for water and wastes are reported on a 'as received' basis unless specified otherwise. A statement of uncertainty for each analysis is available upon request. This laboratory report shall not be reproduced, except in full, without the written approval of Microbac Laboratories. The reported results are related only to the samples analyzed as received.

This report was certified on August 05 2015

David E. Vandenberg

David Vandenberg – Managing Director

State of Origin: OH
Accrediting Authority: N/A ID:OH00218
QAPP: Microbac OVD

ACCREDITED IN ACCORDANCE WITH

Microbac

Lab Report #: L15071692
Lab Project #: 3191.002
Project Name: Stream Sampling
Lab Contact:

Record of Sample Receipt and Inspection

Comments/Discrepancies

This is the record of the shipment conditions and the inspection records for the samples received and reported as a sample delivery group (SDG). All of the samples were inspected and observed to conform to our receipt policies, except as noted below.

There were no discrepancies.

Discrepancy	Resolution

Coolers

Cooler #	Temperature Gun	Temperature	COC #	Airbill #	Temp Required?
0019957	I	4.0			X

Inspection Checklist

#	Question	Result
1	Were shipping coolers sealed?	Yes
2	Were custody seals intact?	Yes
3	Were cooler temperatures in range of 0-6?	Yes
4	Was ice present?	Yes
5	Were COC's received/information complete/signed and dated?	Yes
6	Were sample containers intact and match COC?	Yes
7	Were sample labels intact and match COC?	Yes
8	Were the correct containers and volumes received?	Yes
9	Were samples received within EPA hold times?	Yes
10	Were correct preservatives used? (water only)	Yes
11	Were pH ranges acceptable? (voa's excluded)	Yes
12	Were VOA samples free of headspace (less than 6mm)?	NA

Microbac

Lab Report #: L15071692
Lab Project #: 3191.002
Project Name: Stream Sampling
Lab Contact:

Samples Received

Client ID	Laboratory ID	Date Collected	Date Received
DOWNSTREAM20150731	L15071692-01	07/31/2015 09:37	07/31/2015 11:15
DOWNSTREAM20150731-FD	L15071692-02	07/31/2015 09:37	07/31/2015 11:15
UPSTREAM20150731	L15071692-03	07/31/2015 09:56	07/31/2015 11:15

Microbac

Lab Report #: L15071692
Lab Project #: 3191.002
Project Name: Stream Sampling
Lab Contact:

Certificate of Analysis

Sample #: L15071692-01
Client ID: DOWNSTREAM20150731
Matrix: Water
Workgroup #: WG533393
Collect Date: 07/31/2015 09:37
Sample Tag: 01

PrePrep Method: N/A
Prep Method: 3005
Analytical Method: 6010C
Analyst: JY
Dilution: 1
Units: mg/L

Instrument: ICP-THERMO3
Prep Date: 07/30/2015 12:13
Cal Date: 07/30/2015 12:13
Run Date: 07/30/2015 20:03
File ID: T3_073115_160312

Analyte	CAS #	Result	Qual	RL	MDL
Barium, Total	7440-39-3	0.0946		0.0100	0.00500
Iron, Total	7439-89-6		ND	0.100	0.0500
Manganese, Total	7439-96-5	0.0127		0.0100	0.00500
Sodium, Total	7440-23-5	17.4		0.500	0.250

ND Not detected at or above the reporting limit (RL/MDL).

Sample #: L15071692-01
Client ID: DOWNSTREAM20150731
Matrix: Water
Workgroup #: WG532799
Collect Date: 07/31/2015 09:37
Sample Tag: 01

Prep Method: 9056
Analytical Method: 9056
Analyst: ALS
Dilution: 1
Units: mg/L

Prep Date: 08/04/2015 15:00
Cal Date: 04/21/2015 15:58
Run Date: 08/04/2015 17:15
File ID: IL_080415-07

Analyte	CAS #	Result	Qual	RL	MDL
Bromide	24959-67-9		ND	0.200	0.100

ND Not detected at or above the reporting limit (RL/MDL).

Sample #: L15071692-01
Client ID: DOWNSTREAM20150731
Matrix: Water
Workgroup #: WG533327
Collect Date: 07/31/2015 09:37
Sample Tag: 01

PrePrep Method: N/A
Prep Method: 9040C
Analytical Method: 9040C
Analyst: SDC
Dilution: 1
Units: Degrees C

Instrument: TIAMO1
Prep Date: N/A
Cal Date:
Run Date: 07/31/2015 16:11
File ID: TI_073115_1611PH

Analyte	CAS #	Result	Qual	RL	MDL
pH	10-29-7	7.80	H1	0.000	0.000
Temperature At Determination (C)				0.000	0.000

H1 Sample analysis performed past holding time.

Microbac

Lab Report #: L15071692
Lab Project #: 3191.002
Project Name: Stream Sampling
Lab Contact:

Certificate of Analysis

Sample #: L15071692-01
Client ID: DOWNSTREAM20150731
Matrix: Water
Workgroup #: WG[illegible]
Collect Date: 07/31/2015 09:37
Sample Tag: 01

PrePrep Method: N/A
Prep Method: SM4500-Cl(-)-E-1997
Analytical Method: SM4500-Cl(-)-E-1997
Analyst: DCM
Dilution: 1
Units: mg/L

Instrument: SMARTCHEM
Prep Date: N/A
Cal Date: 08/03/2015 08:00
Run Date: 08/03/2015 08:06
File ID: SC150803001.015

Analyte	CAS #	Result	Qual	RL	MDL
Chloride	16887-00-6	32.0		2.00	1.00

Sample #: L15071692-01
Client ID: DOWNSTREAM20150731
Matrix: Water
Workgroup #: WG533847
Collect Date: 07/31/2015 09:37
Sample Tag: 01

PrePrep Method: N/A
Prep Method: SM4500-SO4E-1997
Analytical Method: SM4500-SO4E-1997
Analyst: DCM
Dilution: 1
Units: mg/L

Instrument: SMARTCHEM2
Prep Date: N/A
Cal Date: 08/03/2015 13:23
Run Date: 08/03/2015 13:26
File ID: S2150803004.014

Analyte	CAS #	Result	Qual	RL	MDL
Sulfate	14808-79-8	10.9		5.00	2.50

Sample #: L15071[illegible]
Client ID: DOWNSTREAM20150731
Matrix: Water
Workgroup #: WG533389
Collect Date: 07/31/2015 09:37
Sample Tag:

PrePrep Method: N/A
Prep Method: 160.1/SM2540C
Analytical Method: SM2540-C-1997
Analyst: ADG
Dilution: 1
Units: mg/L

Instrument: OVEN
Prep Date: N/A
Cal Date:
Run Date: 07/31/2015 10:30
File ID: EN150731033-26

Analyte	CAS #	Result	Qual	RL	MDL
Total Dissolved Solids		212		40.0	20.0

Sample #: L15071692-01
Client ID: DOWNSTREAM20150731
Matrix: Water
Workgroup #: WG533349
Collect Date: 07/31/2015 09:37
Sample Tag: 01

PrePrep Method: N/A
Prep Method: 415.1
Analytical Method: 415.1
Analyst: EPT
Dilution: 1
Units: mg/L

Instrument: TOC-VWP
Prep Date: N/A
Cal Date: 05/27/2015 15:47
Run Date: 07/31/2015 22:06
File ID: TC073120[illegible]

Analyte	CAS #	Result	Qual	RL	MDL
Total Organic Carbon	TOC	2.25		1.00	0.500

Microbac

Lab Report #: L15071692
Lab Project #: 3191.002
Project Name: Stream Sampling
Lab Contact:

Certificate of Analysis

Sample #: L15071692-02
Client ID: DOWNSTREAM20150731-FD
Matrix: Water
Workgroup #: WG533393
Collect Date: 07/31/2015 09:37
Sample Tag: 01

PrePrep Method: N/A
Prep Method: 30[illegible]
Analytical Method: 6010B
Analyst: JYH
Dilution: 1
Units: mg/L

Instrument: ICP-[illegible]
Prep Date: [illegible]
Cal Date: [illegible]
Run Date: 07/31/2015 16:26
File ID: T3.073115.162658

Analyte	CAS #	Result	Qual	RL	MDL
Barium, Total	7440-39-3	0.0968		0.0100	0.00500
Iron, Total	7439-89-6		ND	0.100	0.0500
Manganese, Total	7439-96-5	0.0153		0.0100	0.00500
Sodium, Total	7440-23-5	17.4		0.500	0.250
ND	Not detected at or above the reporting limit (RL/MDL).				

Sample #: L15071692-02
Client ID: DOWNSTREAM20150731-FD
Matrix: Water
Workgroup #: WG533799
Collect Date: 07/31/2015 09:37
Sample Tag: 01

PrePrep Method: N/A
Prep Method: 9056
Analytical Method: 9056
Analyst: ALS
Dilution: 1
Units: mg/L

Instrument: IC1
Prep Date: 08/04/2015 15:00
Cal Date: 04/21/2015 15:56
Run Date: 08/04/2015 18:26
File ID: I1_080415-11

Analyte	CAS #	Result	Qual	RL	MDL
Bromide	24959-67-9		ND	0.200	0.100
ND	Not detected at or above the reporting limit (RL/MDL).				

Sample #: L15071692-02
Client ID: DOWNSTREAM20150731-FD
Matrix: Water
Workgroup #: WG533327
Collect Date: 07/31/2015 09:37
Sample Tag: 01

PrePrep Method: N/A
Prep Method: 9040C
Analytical Method: 9040C
Analyst: SDC
Dilution: 1
Units: Degrees C

Instrument: TIAMO1
Prep Date: N/A
Cal Date:
Run Date: 07/31/2015 16:17
File ID: TI.073115.1617PH

Analyte	CAS #	Result	Qual	RL	MDL
pH	10-29-7	7.80	H1	0.000	0.000
Temperature At Determination (C)				0.000	0.000
H1	Sample analysis performed past holding time.				

Microbac

Lab Report #: L15071692
Lab Project #: 3191.002
Project Name: Stream Sampling
Lab Contact:

Certificate of Analysis

Sample #: L15071692-02
Client ID: DOWNSTREAM20150731-FD
Matrix: Water
Workgroup #: WG535470
Collect Date: 07/31/2015 09:37
Sample Tag: 01

PrePrep Method: N/A
Prep Method: SM4500-Cl(-)-E-1997
Analytical Method: SM4500-Cl(-)-E-1997
Analyst: DCM
Dilution: 1
Units: mg/L

Instrument: SMARTCHEM
Prep Date: N/A
Cal Date: 08/03/2015 08:06
Run Date: 08/03/2015 08:06
File ID: SC150803001.017

Analyte	CAS #	Result	Qual	RL	MDL
Chloride	16887-00-6	33.5		2.00	1.00

Sample #: L15071692-02
Client ID: DOWNSTREAM20150731-FD
Matrix: Water
Workgroup #: WG535547
Collect Date: 07/31/2015 09:37
Sample Tag: 01

Prep Method: SM4500-SO4E-1997
Analytical Method: SM4500-SO4E-1997
Analyst: DCM
Dilution: 1
Units: mg/L

Instrument: SMARTCHEM2
Prep Date: N/A
Cal Date: 08/03/2015 13:23
Run Date: 08/03/2015 13:27
File ID: S2150803004.015

Analyte	CAS #	Result	Qual	RL	MDL
Sulfate	14808-79-8	11.8		5.00	2.50

Sample #: L15071692-02
Client ID: DOWNSTREAM20150731-FD
Matrix: Water
Workgroup #: WG533339
Collect Date: 07/31/2015 09:37
Sample Tag:

PrePrep Method: N/A
Prep Method: 160.1/SM2540C
Analytical Method: SM2540-C-1997
Analyst: ADG
Dilution: 1
Units: mg/L

Instrument: OVEN
Prep Date: N/A
Cal Date:
Run Date: 07/31/2015 10:33
File ID: EN150731033-27

Analyte	CAS #	Result	Qual	RL	MDL
Total Dissolved Solids		136		40.0	20.0

Sample #: L15071692-02
Client ID: DOWNSTREAM20150731-FD
Matrix: Water
Workgroup #: WG533349
Collect Date: 07/31/2015 09:37
Sample Tag: 01

PrePrep Method: N/A
Prep Method: 415.1
Analytical Method: 415.1
Analyst: EPT
Dilution: 1
Units: mg/L

Instrument: TOC-VWP
Prep Date: N/A
Cal Date: 05/27/2015 15:47
Run Date: 07/31/2015 22:29
File ID: TC073120150.023

Microbac

Lab Report #: L15071692
Lab Project #: 3191.002
Project Name: Stream Sampling
Lab Contact:

Certificate of Analysis

Analyte	CAS #	Result	Qual	RL	MDL
Total Organic Carbon	TOC	2.38		1.00	0.500

Sample #: L15071692-03
Client ID: UPSTREAM20150731
Matrix: Water
Workgroup #: WG533393
Collect Date: 07/31/2015 09:56
Sample Tag: 01

Prep Method: 3015
Analytical Method: 6010B
Analyst: JYH
Dilution: 1
Units: mg/L

Instrument: ICPTHERMO2
Prep Date: 07/31/2015 12:35
Cal Date: 07/31/2015 12:13
Run Date: 07/31/2015 16:30
File ID: T3_073115.163059

Analyte	CAS #	Result	Qual	RL	MDL
Barium, Total	7440-39-3	0.0990		0.0100	0.00500
Iron, Total	7439-89-6	0.112		0.100	0.0500
Manganese, Total	7439-96-5	0.0256		0.0100	0.00500
Sodium, Total	7440-23-5	19.3		0.500	0.250

Sample #: L15071692-03
Client ID: UPSTREAM20150731
Matrix: Water
Workgroup #: WG533799
Collect Date: 07/31/2015 09:56
Sample Tag: 01

PrePrep Method:
Prep Method: 9056
Analytical Method: 9056
Analyst: ALS
Dilution: 1
Units: mg/L

Instrument: IC-1
Prep Date: 08/04/2015 15:00
Cal Date: 04/21/2015 15:58
Run Date: 08/04/2015 18:44
File ID: I1_080415-12

Analyte	CAS #	Result	Qual	RL	MDL
Bromide	24959-67-9		ND	0.200	0.100
ND	Not detected at or above the reporting limit (RL/MDL).				

Sample #: L15071692-03
Client ID: UPSTREAM20150731
Matrix: Water
Workgroup #: WG533827
Collect Date: 07/31/2015 09:56
Sample Tag: 01

PrePrep Method: N/A
Prep Method: 9040C
Analytical Method: 9040C
Analyst: SDC
Dilution: 1
Units: Degrees C

Instrument: TIAMO1
Prep Date: N/A
Cal Date:
Run Date: 07/31/2015 15:23
File ID: TI073115.1523PH

Analyte	CAS #	Result	Qual	RL	MDL
pH	10-29-7	7.73	H1	0.000	0.000
Temperature At Determination (C)				0.000	0.000
H1	Sample analysis performed past holding time.				

Microbac

Lab Report #: L15071692
Lab Project #: 3191.002
Project Name: Stream Sampling
Lab Contact:

Certificate of Analysis

Sample #: L15071692-03
Client ID: UPSTREAM20150731
Matrix: Water
Workgroup #: WG833470
Collect Date: 07/31/2015 09:56
Sample Tag: 01

PrePrep Method: N/A
Prep Method: SM4500-SO4E-1997
Analytical Method: SM4500-SO4E-1997
Analyst: DCM
Dilution: 1
Units: mg/L

Instrument: SMARTCHEM
Prep Date: N/A
Cal Date: 07/31/2015 17:39
Run Date: 07/31/2015 17:52
File ID: SC150731005.030

Analyte	CAS #	Result	Qual	RL	MDL
Chloride	16887-00-6	26.4		2.00	1.00

Analyte	CAS #	Result	Qual	RL	MDL
Sulfate	14808-79-8	12.8		5.00	2.50

Client ID: UPSTREAM20150731
Matrix: Water
Workgroup #: WG833339
Collect Date: 07/31/2015 09:56
Sample Tag:

Prep Method: 160.1/SM2540C
Analytical Method: SM2540-C-1997
Analyst: ADG
Dilution: 1

Prep Date: N/A
Cal Date:
Run Date: 07/31/2015 10:31

Analyte	CAS #	Result	Qual	RL	MDL
Total Dissolved Solids		176		40.0	20.0

Sample #: L15071692-03
Client ID: UPSTREAM20150731
Matrix: Water
Workgroup #: WG833549
Collect Date: 07/31/2015 09:56
Sample Tag: 01

Prep Method: 415.1
Analytical Method: 415.1
Analyst: EPT
Dilution: 1
Units: mg/L

Instrument: TOC-VWP
Prep Date: N/A
Cal Date: 05/27/2015 15:47
Run Date: 07/31/2015 22:50
File ID: TOC7312015.024

Analyte	CAS #	Result	Qual	RL	MDL
Total Organic Carbon	TOC	2.20		1.00	0.500

Microbac Laboratories Inc.
Ohio Valley Division Analyst List
August 5, 2015

001 - BIO-CHEM TESTING WVDEP 220
002 - REIC Consultants, Inc. WVDEP 060
003 - Sturm Environmental
004 - MICROBAC PITTSBURGH
005 - ES LABORATORIES
006 - ALCOSAN LABORATORIES
007 - ALS LABORATORIES
008 - BENCHMARK LABORATORIES
010 - MICROBAC CHICAGOLAND
AC - AMBER R. CARMICHAEL
ADC - ANTHONY D. CANTER
ADG - APRIL D. GREENE
AED - ALLEN E. DAVIS
ALS - ADRIANE L. STEED
AWE - ANDREW W. ESSIG
AZH - AFTER HOURS
BJO - BRIAN J. OGDEN
BKT - BRENDAN TORRENCE
BLG - BRENDA L. GREENWALT
BRG - BRENDA R. GREGORY
CAA - CASSIE A. AUGENSTEIN
CAF - CHERYL A. FLOWERS
CEB - CHAD E. BARNES
CJR - COURTNEY J. REXROAD
CLC - CHRYS L. CRAWFORD
CLS - CARA L. STRICKLER
CLW - CHARISSA L. WINTERS
CPD - CHAD P. DAVIS
CSH - CHRIS S. HILL
DAK - DEAN A. KETELSEN
DCM - DAVID C. MERCKLE
DEV - DAVID E. VANDENBERG
DIH - DEANNA I. HESSON
DLB - DAVID L. BUMGARNER
DLP - DOROTHY L. PAYNE
DLW - DIANA L. WRIGHT
DSM - DAVID S. MOSSOR
ECL - ERIC C. LAWSON
ENY - EMILY N. YOAK
EPT - ETHAN P. TIDD
ERP - ERIN R. PORTER
FJB - FRANCES J. BOLDEN
JBK - JEREMY B. KINNEY
JDH - JUSTIN D. HESSON
JDS - JARED D. SMITH
JJS - JOHN J. STE MARIE
JKP - JACQUELINE K. PARSONS
JLL - JOHN L. LENT
JMW - JEANA M. WHITE
JTP - JOSHUA T. PEMBERTON
JWR - JOHN W. RICHARDS
JWS - JACK W. SHEAVES
JYH - JI Y. HU
KAJ - KELLIE A. JOHNSON
KAT - KATHY A. TUCKER
KDW - KATHRYN D. WELCH
KEB - KATIE E. BARNES
KHR - KIM H. RHODES
KKB - KERRI K. BUCK
KRA - KATHY R. ALBERTSON
KRB - KAELY R. BECKER
KRP - KATHY R. PARSONS
LEC - LAURA E. CARPENTER
LKN - LINDA K. NEDEFF
LLS - LARRY L. STEPHENS
LSB - LESLIE S. BUCINA
MBK - MORGAN B. KNOWLTON
MDA - MIKE D. ALBERTSON
MDC - MIKE D. COCHRAN
MES - MARY E. SCHILLING
MLB - MEGAN L. BACHE
MMB - MAREN M. BEERY
MRT - MICHELLE R. TAYLOR
MSW - MATT S. WILSON
PDM - PIERCE D. MORRIS
PIT - MICROBAC WARRENDALE
PRL - PAIGE R. LAMB
PSW - PEGGY S. WEBB
QX - QIN XU
RAH - ROY A. HALSTEAD
REK - BOB E. KYER
RLB - BOB BUCHANAN
RM - RAYMOND MALEKE
RNP - RICK N. PETTY
RST - ROBIN S. TURNER
SAV - SARAH A. VANDENBERG
SCB - SARAH C. BOGOLIN
SDC - SHALYN D. CONLEY
SLM - STEPHANIE L. MOSSBURG
SLP - SHERI L. PFALZGRAF
TB - TODD BOYLE
TGF - TIM G. FELTON
TMB - TIFFANY M. BAILEY
TMM - TAMMY M. MORRIS
VC - VICKI COLLIER
WJB - WILL J. BEASLEY
WRR - WESLEY R. RICHARDS
WTD - WADE T. DELONG
XXX - UNAVAILABLE OR SUBCONTRACT

Microbac Laboratories Inc.
List of Valid Qualifiers
August 05, 2015

Qualkey: STD

Qualifier	Description
*	Surrogate or spike compound out of range
+	Correlation coefficient for the MSA is less than 0.995
<	Result is less than the associated numerical value.
>	Result is greater than the associated numerical value.
A	See the report narrative
B	Analyte present in method blank
B,H1	Analyte present in method blank. Sample analysis performed past holding time.
B1	Target analyte detected in method blank at or above the method reporting limit
B3	Target analyte detected in calibration blank at or above the method reporting limit
B4	The BOD unseeded dilution water blank exceeded 0.2 mg/L
C	Confirmed by GC/MS
CG	Confluent growth
CT1	The cooler temperature at receipt exceeded regulatory guidelines for requested testing.
DL	Surrogate or spike compound was diluted out
E	Estimated concentration due to sample matrix interference
E,CT1	Estimated results. The cooler temperature at receipt exceeded regulatory guidelines for requested testing.
EDL	Elevated sample reporting limits, presence of non-target analytes
EMPC	Estimated Maximum Possible Concentration
F, S	Estimated result below quantitation limit; method of standard additions(MSA)
F,CT1	Estimated value; the analyte concentration was less than the RL/LOQ. The cooler temperature at receipt exceeded regula
FL	Free Liquid
H1	Sample analysis performed past holding time.
H1,CT1	Sample analysis performed past holding time. The cooler temperature at receipt exceeded regulatory guidelines for reque
I	Semiquantitative result (out of instrument calibration range)
J	Estimated value; the analyte concentration was less than the RL/LOQ.
J,B	Analyte detected in both the method blank and sample above the MDL.
J,CT1	Estimated value; the analyte concentration was less than the RL/LOQ.
J,CT1	Estimated value; the analyte concentration was less than the RL/LOQ. The cooler temperature at receipt exceeded regula
J,P	Estimate; columns don't agree to within 40%
J,S	Estimated concentration; analyzed by method of standard addition (MSA)
L	Sample reporting limits elevated due to matrix interference
L1	The associated blank spike (LCS) recovery was above the laboratory acceptance limits.
L2	The associated blank spike (LCS) recovery was below the laboratory acceptance limits.
M	Matrix effect; the concentration is an estimate due to matrix effect.
N	Tentatively identified compound(TIC)
NA	Not applicable
ND	Not detected at or above the reporting limit (RL/MDL).
ND, B	Not detected at or above the reporting limit (RL). Analyte present in method blank.
ND, CT1	Analyte was not detected. The concentration is below the reported LOD. The cooler temperature at receipt exceeded reg
ND, L	Not detected; sample reporting limit (RL) elevated due to interference
ND, S	Not detected; analyzed by method of standard addition (MSA)
ND,H1	Not detected; Sample analysis performed past holding time.
ND,H1,CT1	Not detected; Sample analysis performed past holding time. The cooler temperature at receipt exceeded regulatory guide
NF	Not found by library search
NFL	No free liquid
NI	Non-ignitable
NR	Analyte is not required to be analyzed
NS	Not spiked
P	Concentrations >40% difference between the two GC columns
Q	One or more quality control criteria failed. See narrative.
QNS	Quantity of sample not sufficient to perform analysis
RA	Reanalysis confirms reported results
RE	Reanalysis confirms sample matrix interference
S	Analyzed by method of standard addition (MSA)
SMI	Sample matrix interference on surrogate
SP	Reported results are for spike compounds only
TIC	Library Search Compound
TNTC	Too numerous to count
TNTC, B	Too numerous to count. Analyte present in method blank.
TNTC,CT1	Too numerous to count. The cooler temperature at receipt exceeded regulatory guidelines for requested testing.
TNTC,H1	Too numerous to count. Sample analysis performed past holding time.
U	Analyte was not detected. The concentration is below the reported MDL.
UJ	Undetected; the MDL and RL are estimated due to quality control discrepancies.
UQ	Undetected; the analyte was analyzed for, but not detected.
W	Post-digestion spike for furnace AA out of control limits
X	Exceeds regulatory limit
X, S	Exceeds regulatory limit; method of standard additions (MSA)

Z	Cannot be resolved from isomer - see below

COC No. A 46976

158 Starlite Drive
Marietta, OH 45750

MICROBAC®

CHAIN-OF-CUSTODY RECORD

Phone: 740-373-4071
Toll Free: 800-373-4071

Company Name: KC Harvey Environmental

Project Contact: Shannon Thompson | Contact Phone #: 740-373-1970

Turn Around Requirements: Next Day | Location:

Project ID: Hall Drilling-Tech Service Center

Sampler (print): Maureen Kerkes | Signature: Maureen Kerkes

Program: ☐ CWA ☐ RCRA ☐ DOD ☐ AFCEE ☐ Other _____

Sample I.D. No.	Comp	Grab	Date	Time	Matrix*	NUMBER OF CONTAINERS	Hold	TDC (H2SO4) 250mL	TDS 250mL	Metals (HNO3) 500mL	SO4 250mL	PH 250mL	Cl 250mL	TOTAL # (LAB USE)	ADDITIONAL REQUIREMENTS
Downstream 20150731		X	7/31/15	0937				1	1	1	1	1	1		
Downstream 20150731-FD		X	7/31/15	0937				1	1	1	1	1	1		
Upstream 20150731		X	7/31/15	0956				1	1	1	1	1	1		

Microbac OVD
Received: 07/31/2015 11:15
By: BRENDA GREGORY 221000073324

Relinquished by: (Signature)	Date	Time	Received by: (Signature)
Maureen Kerkes	7/31/15	1107	
Relinquished by: (Signature)	Date	Time	Received for Laboratory by: (Signature)
			Brenda Gregory 07-31-15 1107

Received by: (Signature)

*Water (W), Soil (S), Solid Waste (SD), Unknown (X)

Page _____ of _____

KC HARVEY
ENVIRONMENTAL, LLC

April 25, 2015

Mr. Mike Hall and Ms. Susan Baldwin
Hall Drilling, LLC
981 E Washington Ave
Ellenboro, WV 26346

RE: Tech Service Center Stormwater Pollutant Analysis

Dear Mike and Susan,

On behalf of Hall Drilling, LLC (Hall Drilling), KC Harvey Environmental, LLC (KC Harvey) developed a stormwater management plan for the Tech Service Center in Ritchie County, West Virginia (Figure 1). The submittal of the stormwater plan included a Site Registration Application, a Stormwater Pollution Prevention Plan (SWPPP), and a Groundwater Protection Plan (GPP).

Hall Drilling is currently pursuing coverage of a multi-sector industrial stormwater permit (Permit Number: WV0111457) through the West Virginia Department of Environmental Protection (WVDEP). As part of the stormwater permit application process, the WV DEP requires baseline stormwater runoff sampling and analysis from three stormwater. The baseline stormwater runoff sample results are used to characterize water quality conditions from the Tech Service Center. The goal is to show the stormwater quality concentrations prior to entering local watersheds. To meet the conditions of the stormwater permit application, KC Harvey collected water samples for the following laboratory analytical suite:

- pH
- Biological Oxygen Demand
- Chemical Oxygen Demand
- Ammonia
- Nitrate-Nitrite
- Oil and Grease
- Total Phosphorus
- Total Kjeldahl Nitrogen
- Total Suspended Solids

Samples were collected from three pre-selected sample collection points in the facility's three drainage basins on April 9, 2015, by KC Harvey field scientists, Maureen Kertes and Shannon Thompson. The first sample collected was from Drainage Basin B, followed by Drainage Basin C and lastly Drainage Basin A (Figure 2). Samples were collected immediately following a precipitation event, with 0.90 inches falling on the day the samples

KC Harvey Environmental, LLC
200 Union Square, Suite 1
Marietta, OH 45750

www.kcharvey.com
T 740-373-1970

were collected. The samples were delivered to Microbac Laboratories in Marietta, Ohio on the morning of April 10, 2015, for analysis of the eight parameters listed above.

Analytical laboratory results and reportable limits for each parameter are displayed in Table 1. Results in bolded red text exceed thresholds for water quality standards identified in 47 CSR 2 Appendix E, Table 1 for pollutants which exceed the acute criteria for the protection of aquatic life.

Table 1 Analytical laboratory results for stormwater runoff samples collected at the Tech Service Center

Water Quality Standard[10]	--	--	--	**0.100**	**A – 1.79[11]** **B – 2.36** **C – 1.57**	--	--	--	--
Location A	7.49	1.31	ND[9]	0.175	0.661	ND	0.556	ND	121.0
Location B	7.44	1.58	12.3	0.144	0.530	ND	0.645	ND	76.5
Location C	7.37	14.30	28.0	0.154	0.548	ND	1.480	0.112	430.0

NOTES:

1 BOD- Biological Oxygen Demand
2 COD- Chemical Oxygen Demand
3 N-Nitrogen, NH_3- Ammonia
4 NO_3 -Nitrate, NO_2 -Nitrite
5 OG HEM- Oil and Grease, Hexane extractable material
6 P- Phosphorus
7 N-Nitrogen, TKN- Total Kjeldahl
8 TSS- Total Suspended Solids
9 ND-Not detected at or above the reporting limit
10 WV DEP does not have quality standards for analytes listed as "--"
11 From USEPA's 1999 Update of Ambient Water Quality Criteria for Ammonia (EPA-822-R-99-014, December 1999)

KC Harvey plans to perform the second round of stormwater sampling in September or October, 2015 as required by the multi-sector stormwater permit. If you have any questions or require additional information, please feel free to contact me at 406-585-7402 ext. 104 or mlarson@kcharvey.com.

Respectfully submitted,

Mike Larson
Principal Scientist

FIGURES

KC HARVEY ENVIRONMENTAL, LLC
200 Union Square, Suite 1
Marietta, Ohio 45750
740-373-1970
www.kcharvey.com

0 1,000 2,000 ft

Limits of Disturbance

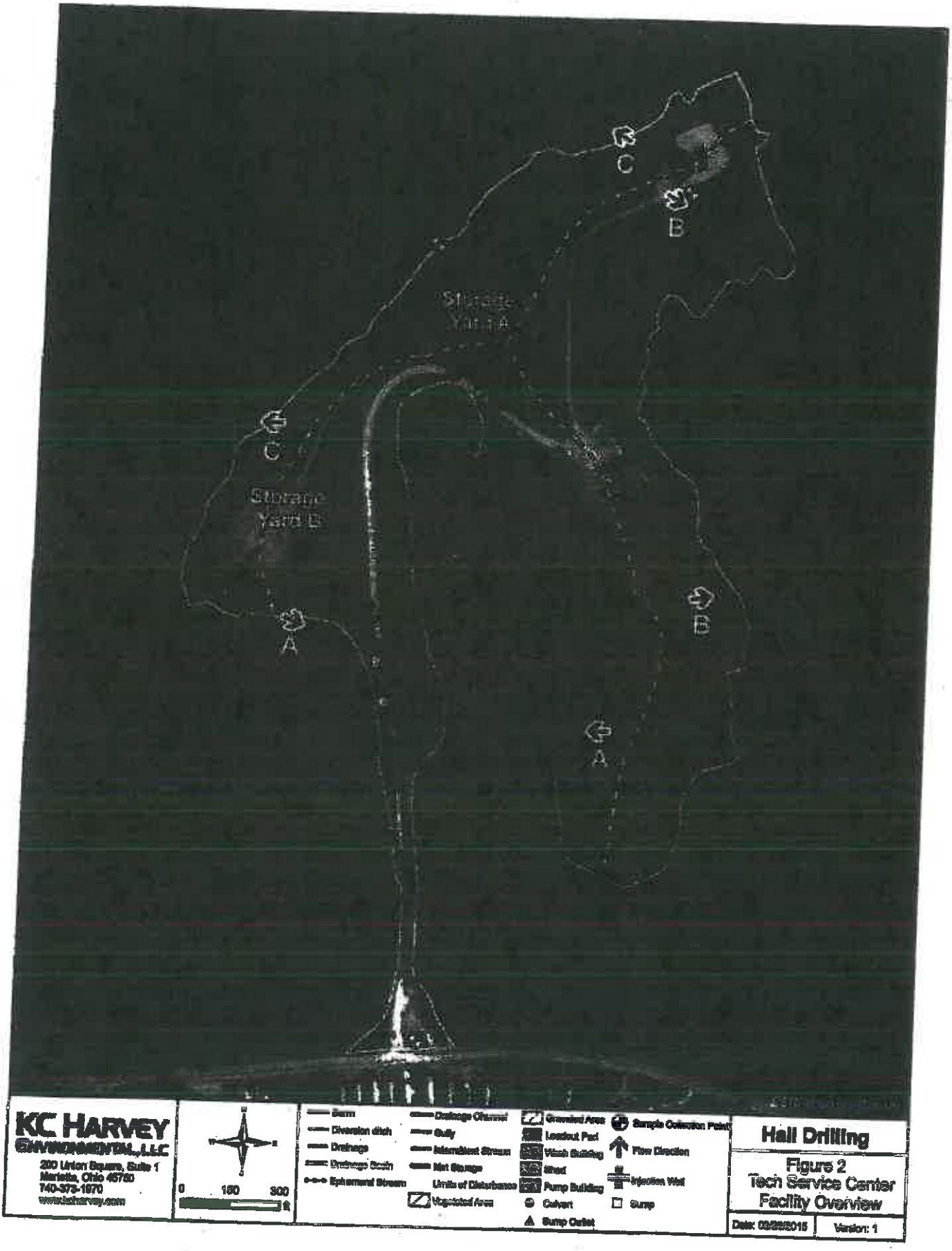
Ritchie County, West Virginia

USA Topo Maps

Hall Drilling

Figure 1.
Tech Service Center

Date: 02/03/2016 | Version: 1


C
B
Storage
Yard A
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Storage
Yard B
B
A
A
KC HARVEY
ENVIRONMENTAL, LLC
200 Union Square, Suite 1
Marietta, Ohio 45750
740-373-1970
www.kcharvey.com
0
150
300
ft
Berm
Diversion ditch
Drainage
Drainage Swale
Ephemeral Stream
Drainage Channel
Gully
Intermittent Stream
Mitigation
Limits of Disturbance
Vegetated Area
Graveled Area
Loadout Pad
Wash Building
Shed
Pump Building
Culvert
Sump Outlet
Sample Collection Point
Flow Direction
Injection Well
Sump
Hall Drilling
Figure 2
Tech Service Center
Facility Overview
Date: 03/26/2015
Version: 1

CORE
ENVIRONMENTAL SERVICES, INC.

December 4, 2014

Hall Drilling, LLC
981 E. Washington Ave.
Ellenboro, West Virginia 26346

Attention: Jason Hall

Subject: **November 2014 Groundwater Monitoring Well Sampling**
Underground Injection Control Facility
Ellenboro, Ritchie County, West Virginia
CORE Project Number: HAL-2014-226

Dear Mr. Hall,

CORE Environmental Services, Inc. (CORE) is pleased to provide this letter report detailing monitoring well sampling activities conducted on November 20, 2014 at the above referenced site. Field sampling activities were performed according to the scope of work provided in the proposal dated June 5, 2014 and approved by Hall Drilling, LLC on June 6, 2014 with the exception of purge water not being pumped into the impoundments.

CORE sampled three monitoring wells referred to as MW-1, MW-2, and MW-3. A site map depicting the approximate location of the monitoring wells is provided in Attachment 1. Each well was gauged prior to purging with a water level meter able to measure depth to water to within 1/100 of a foot. Prior to sample collection, each well was purged of a minimum of three well volumes or until the well was dry using a submersible pump and dedicated tubing. Groundwater was also field analyzed with a multi-parameter field meter for pH, temperature, conductivity, dissolved oxygen, and oxygen reduction potential before, during, and after purging activities. Based on previous laboratory analytical reports of the groundwater and field activities, purge water was disposed of on-site on the ground next to each monitoring well. Field parameters noted during field sampling activities are provided in Attachment 2.

4068 Mt. Royal Blvd., Suite 225
Allison Park, PA 15101-2951
(412) 487-6000
Fax (412) 487-9785

4 Brookstone Plaza
Morgantown, WV 26508
(304) 292-2673
Fax (304) 292-2773
www.core-env.com

533 N Jefferson St., Suite 3
Lewisburg, WV 24901
(681) 238-5235
Fax (681) 238-5239

Groundwater samples were collected into laboratory supplied containers, labeled, and packed on ice then dropped off at REI Consultants, Inc. (REIC), a WVDEP certified laboratory, under a chain-of-custody for analysis. Samples were laboratory analyzed for benzene, toluene, ethylbenzene, total xylenes (BTEX) via EPA Method 8021B; total petroleum hydrocarbons-gasoline range organics (TPH-GRO), TPH-diesel range organics (DRO), and TPH-oil range organics (ORO) via EPA Method 8015C; bromide, chloride, and sulfate via Method E300.00; total sodium, barium, iron, manganese via Method E200.7; Total Organic Carbon (TOC) via Method SM 5310; and Total Dissolved Solids (TDS) and Total Suspended Solids (TSS) via Method SM2540. TDS was analyzed outside of standard holding times due to a laboratory error and qualified as such in the laboratory analytical report. The laboratory analytical results and summary table is provided in Attachment 3.

Laboratory results were compared to Federal Drinking Water Standards as well as WVDEP Action Levels per the Groundwater Program Remediation Guidance Document dated February 2006 for TPHs. No parameters were observed above Primary Drinking Water Standards or WVDEP Action Levels. Iron, Manganese, and Total Dissolved Solids were observed above Secondary Drinking Water Standards. However, Secondary Drinking Water Standards are non-enforceable guidelines to regulate the cosmetic and aesthetic effects of drinking water.

Please contact Ms. Szymanek or Mr. Kunkel at (304) 292-2673 if there are any additional questions.

Sincerely,

CORE Environmental Services, Inc.

Julie Szymanek

Julie Szymanek, LRS
Project Manager

Attachments

ATTACHMENT 1

SITE MAP

CORE ENVIRONMENTAL SERVICES, INC.

TITLE:
SITE MAP
HALL DRILLING UIC IMPOUNDMENT
ELLENBORO, WEST VIRGINIA

DWN:	DES.:	PROJECT NO.:
		HAL-2013-151
CHKD:	APPD:	FIGURE NO.:
DATE:	REV.:	1

ATTACHMENT 2

FIELD PARAMETERS

Monitoring Well #1 (MW-1)

Total depth of Well: (116 feet)
Diameter of Well (4 inches)
Riser height (66 feet)
Screened interval (50 feet)

Sample Date	Depth to Water (ft.)	Purge Volume (gallons)	Field Parameters	pH	Temperature (°C)	Conductivity (us/cm)	Dissolved Oxygen (%)	Oxygen Reduction Potential
11/20/2014	70.53	90.43	Before	8.44	11.83	358	11.38	100.4
			During	8.44	11.89	350	11.31	112.7
			After	8.39	11.90	351	11.31	112.9

Notes:
°C: degrees Celcius
us/cm: micro siemens per centimeter
%: percent

Monitoring Well #2 (MW-2)

Total depth of Well: (117 feet)
Diameter of Well (4 inches)
Riser height (67 feet)
Screened interval (50 feet)

Sample Date	Depth to Water (ft.)	Purge Volume (gallons)	Field Paramaters	pH	Temperature (°C)	Conductivity (us/cm)	Dissolved Oxygen (%)	Oxygen Reduction Potential
11/20/2014	68.01	95.44	Before	8.20	14.57	410	15.21	-70.9
			During	7.65	14.59	415	15.31	-75.7
			After	8.15	15.10	420	15.35	-90.1

Notes:
°C: degrees Celcius
us/cm: micro siemens per centimeter
%: percent

Monitoring Well #3 (MW-3)

Total depth of Well: (92 feet)
Diameter of Well (4 inches)
Riser height (42 feet)
Screened interval (50 feet)

Sample Date	Depth to Water (ft.)	Purge Volume (gallons)	Field Parameters	pH	Temperature (°C)	Conductivity (us/cm)	Dissolved Oxygen (%)	Oxygen Reduction Potential
11/20/2014	36.62	114.52	Before	7.52	13.19	1121	9.3	23.6
			During	7.53	13.25	1119	11.6	36.8
			After	7.56	13.27	1122	11.9	41.2

Notes:
°C: degrees Celcius
us/cm: micro siemens per centimeter
%: percent

ATTACHMENT 3

SUMMARY TABLE
LABORATORY ANALTYICAL REPORT

SUMMARY TABLE
GROUNDWATER ANALYTICAL RESULTS

Hall Drilling, LLC
UIC Well # 3
Ellenboro, Ritchie County, West Virginia

Sample ID	Sample Date	Benzene (mg/L)	Toluene (mg/L)	Ethylbenzene (mg/L)	Total Xylenes (mg/L)	TPH-GRO (mg/L)	TPH-DRO (mg/L)	TPH-ORO (mg/L)	Chloride (mg/L)	Sodium (mg/L)	Barium (mg/L)	Iron (mg/L)	Manganese (mg/L)	Bromide (mg/L)	Sulfate (mg/L)	Total Organic Carbon	Total Dissolved Solids	Total Suspended Solids
MW-1	6/18/2013	ND(<0.001)	ND(<0.001)	ND(<0.001)	ND(<0.003)	ND(<0.500)	ND(<0.150)	ND(<0.330)	2.03	20.1	0.253	11.6	0.364	ND(<0.10)	ND(<5.00)	1.71	175	66
	11/14/2013	ND(<0.001)	ND(<0.001)	ND(<0.001)	ND(<0.003)	ND(<0.500)	ND(<0.130)	ND(<0.310)	2.37	30.1	0.306	4.97	0.340	ND(<0.10)	ND(<5.00)	ND(<1.00)	219	181
	6/18/2014	ND(<0.001)	ND(<0.001)	ND(<0.001)	ND(<0.003)	ND(<0.500)	ND(<0.220)	ND(<0.670)	2.70	42.6	1.05	27.5	1.66	NA	ND(<5.00)	ND(<1.00)	198	1080
	11/20/2014	ND(<0.001)	ND(<0.001)	ND(<0.001)	ND(<0.003)	ND(<0.500)	ND(<0.120)	ND(<0.120)	4.67	44.7	0.520	5.87	0.348	ND(<0.10)	ND(<5.00)	ND(<1.00)	212	37
MW-2	6/18/2013	ND(<0.001)	ND(<0.001)	ND(<0.001)	ND(<0.003)	ND(<0.500)	ND(<0.120)	ND(<0.318)	ND(<1.00)	91.1	0.147	3.87	ND(<0.100)	ND(<0.10)	ND(<5.00)	ND(<1.00)	232	70
	11/14/2013	ND(<0.001)	ND(<0.001)	ND(<0.001)	ND(<0.003)	ND(<0.500)	ND(<0.120)	ND(<0.340)	ND(<1.00)	85.6	0.134	1.76	ND(<0.100)	ND(<0.10)	18.1	ND(<2.00)	288	36
	6/18/2014	ND(<0.001)	ND(<0.001)	ND(<0.001)	ND(<0.003)	ND(<0.500)	ND(<0.280)	ND(<0.820)	ND(<1.00)	99.8	0.318	16.8	0.464	NA	25.4	ND(<1.00)	299	262
	11/20/2014	ND(<0.001)	ND(<0.001)	ND(<0.001)	ND(<0.003)	ND(<0.500)	ND(<0.120)	ND(<0.120)	ND(<1.00)	106	0.220	7.25	0.179	ND(<0.10)	13.8	ND(<1.00)	253	97
MW-3	6/18/2013	ND(<0.001)	ND(<0.001)	ND(<0.001)	ND(<0.003)	ND(<0.500)	ND(<0.120)	ND(<0.310)	2.49	59.1	0.241	0.721	ND(<0.100)	ND(<0.10)	ND(<5.00)	ND(<1.00)	152	6.0
	11/14/2013	ND(<0.001)	ND(<0.001)	ND(<0.001)	ND(<0.003)	ND(<0.500)	ND(<0.130)	ND(<0.310)	ND(<1.00)	51.7	0.262	1.12	ND(<0.100)	ND(<0.10)	ND(<5.00)	ND(<1.00)	212	29
	6/18/2014	ND(<0.001)	ND(<0.001)	ND(<0.001)	ND(<0.003)	ND(<0.500)	ND(<0.190)	ND(<0.470)	245	147	1.90	3.80	0.536	NA	ND(<5.00)	1.16	666	85
	11/20/2014	ND(<0.001)	ND(<0.001)	ND(<0.001)	ND(<0.003)	ND(<0.500)	ND(<0.140)	ND(<0.140)	249	202	1.33	0.987	0.289	2.40	13.8	1.80	747	2.5
Federal Drinking Water Standards/WVDEP Action Levels		0.005	1	0.70	10	1	1	1	250	*	2	0.30	0.05	*	250	*	500	*

* = Not regulated
( ) = Reporting Limit (RL)
mg/L = milligrams per Liter
NA = Not Analyzed
Bold = Exceeds Groundwater Standards
Underlined Standards are guidelines set by the USEPA as Secondary Drinking Water Standards.

REI Consultants, Inc.
PO Box 286
Beaver, WV 25813
TEL: 304.255.2500
Website: www.reiclabs.com

Improving the environment, one client at a time...

3029-C Peters Creek Road
Roanoke, VA 24019
TEL: 540.777.1276

101 17th Street
Ashland, KY 41101
TEL: 606.393.5027

1557 Commerce Road, Suite 201
Verona, VA 24482
TEL: 540.248.0183

16 Commerce Drive
Westover, WV 26501
TEL: 304.241.5861

Tuesday, December 02, 2014

Julie Szymanek
CORE ENVIRONMENTAL SERVICES INC
4 BROOKSTONE PLAZA
MORGANTOWN, WV 26508

TEL: (304) 292-2673
FAX:

RE: HALL DRILLING
Work Order #: 1411O57
Dear Julie Szymanek:

REI Consultants, Inc. received 4 sample(s) on 11/20/2014 for the analyses presented in the following report.
Sincerely,

Jimmy Suttle
Project Manager

REI Consultants, Inc. - Case Narrative

WO#: 1411057

Date Reported: 12/2/2014

Client: CORE ENVIRONMENTAL SERVICES INC

Project: HALL DRILLING

The analytical results presented in this report were produced using documented laboratory SOPs that incorporate appropriate quality control procedures as described in the applicable methods. Verification of required sample preservation (as required) is recorded on associated laboratory logs. Any deviation from compliance or method modification is identified within the body of this report by a qualifier footnote which is defined at the bottom of this page.

All sample results for solid samples are reported on an "as-received" wet weight basis unless otherwise noted.

Results reported for sums of individual parameters, such as TTHM and HAA5, may vary slightly from the sum of the individual parameter results, due to rounding of individual results, as required by EPA.

The test results in this report meet all NELAP (and/or VELAP) requirements for parameters except as noted in this report.

Please note if the sample collection time is not provided on the Chain of Custody, the default recording will be 0:00:00. This may cause some tests to be apparently analyzed out of hold.

All tests performed by REIC Service Centers are designated by an annotation on the test code. All other tests were performed by REIC's Main Laboratory in Beaver, WV.

DEFINITIONS:
MCL: Maximum Contaminant Level
MDL: Method Detection Limit; The lowest concentration of analyte that can be detected by the method in the applicable matrix.
Mg/Kg or mg/L: Units of part per million (PPM) - milligram per Kilogram (weight/weight) or milligram per Liter (weight/volume).
NA: Not Applicable
ND: Not Detected at the PQL or MDL
PQL: Practical Quantitation Limit; The lowest verified limit to which data is quantified without qualifications. Analyte concentrations below PQL are reported either as ND or as a number with a "J" qualifier.
Qual: Qualifier that applies to the analyte reported.
TIC: Tentatively Identified Compound, Estimated Concentration denoted by "J" qualifier.
Ug/Kg or ug/L: Units of part per billion (PPB) - microgram per kilogram (weight/weight) or microgram per liter (weight/volume).

QUALIFIERS:
X: Reported value exceeds required MCL
B: Analyte detected in the associated Method Blank at a concentration > 1/2 the PQL
E: Analyte concentration reported that exceeds the upper calibration standard. Greater uncertainty is associated with this result and data should be consider estimated.
H: Holding time for preparation or analysis has been exceeded.
J: Analyte concentration is reported, and is less than the PQL and greater than or equal to the MDL. The result reported is an estimate.
S: % REC (% recovery) exceeds control limits

CERTIFICATIONS:
Beaver, WV: WVDHHR 00412CM, WVDEP 060, VADCLS 00281, KYDEP 90039, TNDEQ TN02926, NCDWQ 466, PADEP 68-00839, VADCLS (VELAP) 460148
Bioassay (Beaver, WV): WVDEP 060, VADCLS(VELAP) 460148, PADEP 68-00839
Roanoke, VA: VADCLS(VELAP) 460150
Verona, VA: VADCLS(VELAP) 460151
Ashland, KY: KYDEP 00094, WVDEP 389
Morgantown, WV: WVDHHR 003112M, WVDEP 387

REI Consultants, Inc. - Analytical Report

WO#: 1411O57

Date Reported: 12/2/2014

Client:	CORE ENVIRONMENTAL SERVICES INC	**Collection Date:**	11/20/2014 8:15:00 AM
Project:	HALL DRILLING	**Date Received:**	11/20/2014
Lab ID:	1411O57-01A	**Matrix:**	Liquid
Client Sample ID:	MW-1	**Site ID:**	ELLENBORO, WV

Analysis	Result	MDL	PQL	MCL	Qual	Units	Prep Date	Date Analyzed	NELAC
METALS BY ICP				**Method: EPA 200.7 Rev. 4.4 (1994)**				**Analyst: CGW**	
Barium	0.520	NA	0.100	NA		mg/L	11/21/14 12:15PM	11/25/14 7:46PM	PA/VA
Iron	9.27	NA	0.100	NA		mg/L	11/21/14 12:15PM	11/25/14 7:46PM	PA/VA
Manganese	0.248	NA	0.100	NA		mg/L	11/21/14 12:15PM	11/25/14 7:46PM	PA/VA
Sodium	44.7	NA	10.0	NA		mg/L	11/21/14 12:15PM	11/26/14 1:49PM	PA/VA
SEMI-VOLATILE RANGE ORGANICS				**Method: SW8015C (2000)**				**Analyst: CL**	
TPH (Diesel Range)	ND	NA	0.12	NA		mg/L	11/24/14 11:19AM	11/25/14 4:41AM	PA/VA
TPH (Oil Range)	ND	NA	0.12	NA		mg/L	11/24/14 11:19AM	11/25/14 4:41AM	
Surr: o-Terphenyl	109	NA	28.3-152	NA		%REC	11/24/14 11:19AM	11/25/14 4:41AM	
VOLATILE RANGE ORGANICS				**Method: SW8015C (2000)**				**Analyst: CB**	
TPH (Gasoline Range)	ND	NA	0.500	NA		mg/L	11/21/14 1:20PM	11/24/14 1:50PM	PA/VA
Surr: 2,5-Dibromotoluene	94.2	NA	37.2-152	NA		%REC	11/21/14 1:20PM	11/24/14 1:50PM	
VOLATILE ORGANIC COMPOUNDS				**Method: SW8021B (1996)**				**Analyst: CB**	
Benzene	ND	NA	1.00	NA		µg/L	11/21/14 1:20PM	11/24/14 1:50PM	PA/VA
Toluene	ND	NA	1.00	NA		µg/L	11/21/14 1:20PM	11/24/14 1:50PM	PA/VA
Ethylbenzene	ND	NA	1.00	NA		µg/L	11/21/14 1:20PM	11/24/14 1:50PM	PA/VA
m,p-Xylene	ND	NA	2.00	NA		µg/L	11/21/14 1:20PM	11/24/14 1:50PM	PA/VA
o-Xylene	ND	NA	1.00	NA		µg/L	11/21/14 1:20PM	11/24/14 1:50PM	PA/VA
Surr: 1,1,1-Trifluorotoluene	97.6	NA	61.2-135	NA		%REC	11/21/14 1:20PM	11/24/14 1:50PM	
ANIONS by ION CHROMATOGRAPHY				**Method: EPA 300.0, Rev.2.1 (1993)**				**Analyst: CF**	
Bromide	ND	NA	0.10	NA		mg/L		11/21/14 11:22AM	PA/VA
Chloride	4.87	NA	1.00	NA		mg/L		11/21/14 11:22AM	PA/VA
Sulfate	ND	NA	5.00	NA		mg/L		11/21/14 11:22AM	PA/VA
TOTAL DISSOLVED SOLIDS				**Method: SM2540 C-1997**				**Analyst: KY**	
Total Dissolved Solids	218	NA	10	NA	H	mg/L		12/01/14 7:00PM	PA/VA
TOTAL SUSPENDED SOLIDS				**Method: SM2540 D-1997**				**Analyst: KY**	
Total Suspended Solids	37.0	NA	10	NA		mg/L		11/21/14 3:01PM	PA/VA
ORGANIC CARBON, TOTAL				**Method: SM5310 C-2000**				**Analyst: DSD**	
Total Organic Carbon	ND	NA	1.00	NA		mg/L		11/21/14 4:24PM	PA/VA

REI Consultants, Inc. - Analytical Report

WO#: 1411057

Date Reported: 12/2/2014

Client:	CORE ENVIRONMENTAL SERVICES INC	**Collection Date:**	11/20/2014 9:30:00 AM
Project:	HALL DRILLING	**Date Received:**	11/20/2014
Lab ID:	1411057-02A	**Matrix:**	Liquid
Client Sample ID:	MW-2	**Site ID:**	ELLENBORO, WV

Analysis	Result	MDL	PQL	MCL	Qual	Units	Prep Date	Date Analyzed	NELAC
METALS BY ICP				**Method: EPA 200.7 Rev. 4.4 (1994)**				**Analyst: CGW**	
Barium	0.220	NA	0.100	NA		mg/L	11/21/14 12:15PM	11/25/14 7:49PM	PA/VA
Iron	7.25	NA	0.100	NA		mg/L	11/21/14 12:15PM	11/25/14 7:49PM	PA/VA
Manganese	0.170	NA	0.100	NA		mg/L	11/21/14 12:15PM	11/25/14 7:49PM	PA/VA
Sodium	106	NA	10.0	NA		mg/L	11/21/14 12:15PM	11/26/14 1:52PM	PA/VA
SEMI-VOLATILE RANGE ORGANICS				**Method: SW8015C (2000)**				**Analyst: CL**	
TPH (Diesel Range)	ND	NA	0.12	NA		mg/L	11/24/14 11:19AM	11/25/14 5:14AM	PA/VA
TPH (Oil Range)	ND	NA	0.12	NA		mg/L	11/24/14 11:19AM	11/25/14 5:14AM	
Surr: o-Terphenyl	99.3	NA	28.3-152	NA		%REC	11/24/14 11:19AM	11/25/14 5:14AM	
VOLATILE RANGE ORGANICS				**Method: SW8015C (2000)**				**Analyst: CB**	
TPH (Gasoline Range)	ND	NA	0.500	NA		mg/L	11/21/14 1:20PM	11/24/14 12:47PM	PA/VA
Surr: 2,5-Dibromotoluene	99.7	NA	37.2-152	NA		%REC	11/21/14 1:20PM	11/24/14 12:47PM	
VOLATILE ORGANIC COMPOUNDS				**Method: SW8021B (1996)**				**Analyst: CB**	
Benzene	ND	NA	1.00	NA		µg/L	11/21/14 1:20PM	11/24/14 12:47PM	PA/VA
Toluene	ND	NA	1.00	NA		µg/L	11/21/14 1:20PM	11/24/14 12:47PM	PA/VA
Ethylbenzene	ND	NA	1.00	NA		µg/L	11/21/14 1:20PM	11/24/14 12:47PM	PA/VA
m,p-Xylene	ND	NA	2.00	NA		µg/L	11/21/14 1:20PM	11/24/14 12:47PM	PA/VA
o-Xylene	ND	NA	1.00	NA		µg/L	11/21/14 1:20PM	11/24/14 12:47PM	PA/VA
Surr: 1,1,1-Trifluorotoluene	101	NA	61.2-135	NA		%REC	11/21/14 1:20PM	11/24/14 12:47PM	
ANIONS by ION CHROMATOGRAPHY				**Method: EPA 300.0, Rev.2.1 (1993)**				**Analyst: CF**	
Bromide	ND	NA	0.10	NA		mg/L		11/21/14 11:41AM	PA/VA
Chloride	ND	NA	1.00	NA		mg/L		11/21/14 11:41AM	PA/VA
Sulfate	13.8	NA	5.00	NA		mg/L		11/21/14 11:41AM	PA/VA
TOTAL DISSOLVED SOLIDS				**Method: SM2540 C-1997**				**Analyst: KY**	
Total Dissolved Solids	293	NA	10	NA	H	mg/L		12/01/14 7:00PM	PA/VA
TOTAL SUSPENDED SOLIDS				**Method: SM2540 D-1997**				**Analyst: KY**	
Total Suspended Solids	97.0	NA	10	NA		mg/L		11/21/14 3:01PM	PA/VA
ORGANIC CARBON, TOTAL				**Method: SM5310 C-2000**				**Analyst: DSD**	
Total Organic Carbon	ND	NA	1.00	NA		mg/L		11/21/14 4:24PM	PA/VA

REI Consultants, Inc. - Analytical Report

WO#: 1411O57

Date Reported: 12/2/2014

Client:	CORE ENVIRONMENTAL SERVICES INC	**Collection Date:**	11/20/2014 10:45:00 AM
Project:	HALL DRILLING	**Date Received:**	11/20/2014
Lab ID:	1411O57-03A	**Matrix:**	Liquid
Client Sample ID:	MW-3	**Site ID:**	ELLENBORO, WV

Analysis	Result	MDL	PQL	MCL	Qual	Units	Prep Date	Date Analyzed	NELAC
METALS BY ICP				**Method: EPA 200.7 Rev. 4.4 (1994)**				**Analyst: CGW**	
Barium	1.83	NA	0.100	NA		mg/L	11/21/14 12:15PM	11/25/14 7:53PM	PA/VA
Iron	0.505	NA	0.100	NA		mg/L	11/21/14 12:15PM	11/25/14 7:53PM	PA/VA
Manganese	0.289	NA	0.100	NA		mg/L	11/21/14 12:15PM	11/25/14 7:53PM	PA/VA
Sodium	202	NA	10.0	NA		mg/L	11/21/14 12:15PM	11/26/14 1:55PM	PA/VA
SEMI-VOLATILE RANGE ORGANICS				**Method: SW8015C (2000)**				**Analyst: CL**	
TPH (Diesel Range)	ND	NA	0.14	NA		mg/L	11/24/14 11:19AM	11/25/14 5:47AM	PA/VA
TPH (Oil Range)	ND	NA	0.14	NA		mg/L	11/24/14 11:19AM	11/25/14 5:47AM	
Surr: o-Terphenyl	102	NA	28.3-152	NA		%REC	11/24/14 11:19AM	11/25/14 5:47AM	
VOLATILE RANGE ORGANICS				**Method: SW8015C (2000)**				**Analyst: CB**	
TPH (Gasoline Range)	ND	NA	0.500	NA		mg/L	11/21/14 1:20PM	11/24/14 1:19PM	PA/VA
Surr: 2,5-Dibromotoluene	91.9	NA	37.2-152	NA		%REC	11/21/14 1:20PM	11/24/14 1:19PM	
VOLATILE ORGANIC COMPOUNDS				**Method: SW8021B (1996)**				**Analyst: CB**	
Benzene	ND	NA	1.00	NA		µg/L	11/21/14 1:20PM	11/24/14 1:19PM	PA/VA
Toluene	ND	NA	1.00	NA		µg/L	11/21/14 1:20PM	11/24/14 1:19PM	PA/VA
Ethylbenzene	ND	NA	1.00	NA		µg/L	11/21/14 1:20PM	11/24/14 1:19PM	PA/VA
m,p-Xylene	ND	NA	2.00	NA		µg/L	11/21/14 1:20PM	11/24/14 1:19PM	PA/VA
o-Xylene	ND	NA	1.00	NA		µg/L	11/21/14 1:20PM	11/24/14 1:19PM	PA/VA
Surr: 1,1,1-Trifluorotoluene	99.4	NA	61.2-135	NA		%REC	11/21/14 1:20PM	11/24/14 1:19PM	
ANIONS by ION CHROMATOGRAPHY				**Method: EPA 300.0, Rev.2.1 (1993)**				**Analyst: CF**	
Bromide	2.40	NA	1.00	NA		mg/L		11/21/14 11:59AM	PA/VA
Chloride	249	NA	10.0	NA		mg/L		11/21/14 11:59AM	PA/VA
Sulfate	13.8	NA	5.00	NA		mg/L		11/21/14 11:59AM	PA/VA
TOTAL DISSOLVED SOLIDS				**Method: SM2540 C-1997**				**Analyst: KY**	
Total Dissolved Solids	747	NA	10	NA	H	mg/L		12/01/14 7:17PM	PA/VA
TOTAL SUSPENDED SOLIDS				**Method: SM2540 D-1997**				**Analyst: KY**	
Total Suspended Solids	5.5	NA	5.0	NA		mg/L		11/21/14 3:01PM	PA/VA
ORGANIC CARBON, TOTAL				**Method: SM5310 C-2000**				**Analyst: DSD**	
Total Organic Carbon	1.00	NA	1.00	NA		mg/L		11/21/14 4:24PM	PA/VA

REI Consultants, Inc. - Analytical Report

WO#: 1411057

Date Reported: 12/2/2014

Client:	CORE ENVIRONMENTAL SERVICES INC	**Collection Date:**	11/20/2014 12:00:00 AM
Project:	HALL DRILLING	**Date Received:**	11/20/2014
Lab ID:	1411057-04A	**Matrix:**	Trip Blank
Client Sample ID:	TRIP BLANK	**Site ID:**	ELLENBORO, WV

Analysis	Result	MDL	PQL	MCL Qual	Units	Prep Date	Date Analyzed	NELAC
VOLATILE ORGANIC COMPOUNDS				**Method: SW8021B (1996)**			**Analyst: CB**	
Benzene	ND	NA	1.00	NA	µg/L	11/21/14 1:20PM	11/24/14 12:15PM	PA/VA
Toluene	ND	NA	1.00	NA	µg/L	11/21/14 1:20PM	11/24/14 12:15PM	PA/VA
Ethylbenzene	ND	NA	1.00	NA	µg/L	11/21/14 1:20PM	11/24/14 12:15PM	PA/VA
m,p-Xylene	ND	NA	2.00	NA	µg/L	11/21/14 1:20PM	11/24/14 12:15PM	PA/VA
o-Xylene	ND	NA	1.00	NA	µg/L	11/21/14 1:20PM	11/24/14 12:15PM	PA/VA
Surr: 1,1,1-Trifluorotoluene	96.9	NA	61.2-135	NA	%REC	11/21/14 1:20PM	11/24/14 12:15PM	

DBPIx Evaluation

CHAIN OF CUSTODY RECORD

399938

REIC

Research Environmental & Industrial Consultants, Inc.

MAIN LABORATORY & CORPORATE HEADQUARTERS: P.O. Box 286 • 225 Industrial Park Rd, Beaver, WV 25813 • 800-999-0105 • 304-255-2500 • www.reiclabs.com

MID-OHIO VALLEY Service Center	SHENANDOAH Service Center	ROANOKE Service Center	MORGANTOWN Service Center
101 17th Street, Ashland, KY 41101, 606-393-5027	1557 Commerce Rd, Ste 201, Verona, VA 24482, 540-248-0183	3028-C Peters Creek Rd, Roanoke, VA 24019, 540-777-1276	18 Commerce Drive, Westover, WV 26501, 304-241-5861

Client: Core Environmental
Contact Person: Julie Szymanski
QUOTE #:
Fax: (304) 292-7773
Address: 41 Brookstone Place
City: Morgantown
State: WV Zip: 26505
PO #:
Phone: (304) 292-7677
Email: JSzymanski@core-env.com
Billing Address (if different):
City: State: Zip:
Site ID & State: Glenham, WV
Project ID: Hall Drilling
Sampler: [illegible]

SAMPLE LOG & ANALYSIS REQUEST

TURNAROUND TIME
X NORMAL ☐ 5 DAY ☐ 3 DAY ☐ 2 DAY ☐ 1 DAY
*Rush work needs prior laboratory approval and will incur additional charges

ANALYSIS & METHOD REQUESTED:
- [illegible] 8021B
- TPH (GRO, DRO, ORO) 8015C
- [illegible]
- TOC SM5310
- [illegible]
- total [illegible] boron, iron, manganese

Sample ID	No. & Type of Containers	Sample Date/Time	Matrix	Comp/Grab	Preservative			
MW-1	[illegible]	11/20/14 0815	Water	Grab		A	A	K
MW-2		0930						
MW-3		1045						
Trip Blank	X1							

PRESERVATIVE CODE:
0 None
1 Hydrochloric Acid
2 Nitric Acid
3 Sulfuric Acid
4 Sodium Thiosulfate
5 Sodium Hydroxide
6 Zinc Acetate
7 EDTA
8 Ascorbic Acid

COMMENTS:
* Duplicate liters are for MW-3 per Julie KB 11/21/14

All analytical requests are subject to REIC's Standard Terms and Conditions.

Temperature at arrival: °C ICED? Y N

Containers provided by: [X] REIC [ ] Client

Relinquished by: [signature] Date/Time: 11/20/14 1215
Received by: [signature] Date/Time: [illegible]
Relinquished by (Signature):
Received by (Signature):
Date/Time:

FAX RESULTS ☐ EMAIL RESULTS ☒

DELIVERY: Hand Delivered ___ Courier ___ UPS ___ FEDEX ___ USPS ___ OTHER

COC-[illegible]
www.reiclabs.com

CORE
ENVIRONMENTAL SERVICES, INC.
Consulting • Operation & Maintenance • Risk Assessment • Engineering

July 3, 2014

Hall Drilling, LLC
981 E. Washington Ave.
Ellenboro, West Virginia 26346

Attention: Jason Hall

Subject: **June 2014 Groundwater Monitoring Well Sampling**
Underground Injection Control Facility
Ellenboro, Ritchie County, West Virginia
CORE Project Number: HAL-2014-226

Dear Mr. Hall,

CORE Environmental Services, Inc. (CORE) is pleased to provide this letter report detailing monitoring well sampling activities conducted on June 18, 2014 at the above referenced site. Field sampling activities were performed according to the scope of work provided in the proposal dated June 5, 2014 and approved by Hall Drilling, LLC on June 6, 2014 with the exception of purge water not being pumped into the impoundments.

CORE sampled three monitoring wells referred to as MW-1, MW-2, and MW-3. A site map depicting the approximate location of the monitoring wells is provided in Attachment 1. Each well was gauged prior to purging with a water level meter able to measure depth to water to within 1/100 of a foot. Prior to sample collection, each well was purged of a minimum of three well volumes or until the well was dry using a submersible pump and dedicated tubing. Due to complications with the submersible pump, only two well volumes were purged at MW-3; 60-gallons were purged by the pump and 20-gallons were purged with a disposable bailer. Groundwater was also field analyzed with a multi-parameter field meter for pH, temperature, conductivity, dissolved oxygen, and oxygen reduction potential before, during, and after purging activities. Based on previous laboratory analytical reports of the groundwater and field activities, purge water was disposed of on-site on the ground next to each monitoring well. Field parameters noted during field sampling activities are provided in Attachment 2.

4068 Mt. Royal Blvd., Suite 225
Allison Park, PA 15101-2951
(412) 487-6000
Fax (412) 487-9785

4 Brookstone Plaza
Morgantown, WV 26508
(304) 292-2673
Fax (304) 292-2773
www.core-env.com

533 N Jefferson St., Suite 3
Lewisburg, WV 24901
(681) 238-5235
Fax (681) 238-5239

Groundwater samples were collected into laboratory supplied containers, labeled, and packed on ice then dropped off at REI Consultants, Inc. (REIC); a WVDEP certified laboratory, under a chain-of-custody for analysis. Samples were laboratory analyzed for benzene, toluene, ethylbenzene, total xylenes (BTEX) via EPA Method 8021B; total petroleum hydrocarbons-gasoline range organics (TPH-GRO), TPH-diesel range organics (DRO), and TPH-oil range organics (ORO) via EPA Method 8015C; chloride and sulfate via Method E300.00; total sodium, barium, iron, manganese via Method E200.7; Total Organic Carbon (TOC) via Method SM 5310; and Total Dissolved Solids (TDS) and Total Suspended Solids (TSS) via Method SM2540. Bromide was not analyzed due to an error in the chain-of-custody request. Laboratory analytical results and summary tables are provided in Attachment 3.

Laboratory results were compared to National Drinking Water Standards as well as WVDEP Action Levels per the Groundwater Program Remediation Guidance Document dated February 2006 for TPHs. No parameters were observed above Primary Drinking Water Standards or WVDEP Action Levels. Iron, Manganese, and Total Dissolved Solids were observed above Secondary Drinking Water Standards. However, Secondary Drinking Water Standards are non-enforceable guidelines to regulate the cosmetic and aesthetic effects of drinking water.

Please contact Ms. Szymanek or Mr. Kunkel at (304) 292-2673 if there are any additional questions.

Sincerely,

CORE Environmental Services, Inc.

Julie Szymanek

Julie Szymanek, LRS
Project Manager

Attachments

ATTACHMENT 1

SITE MAP

CORE ENVIRONMENTAL SERVICES, INC.	TITLE: SITE MAP HALL DRILLING UIC IMPOUNDMENT ELLENBORO, WEST VIRGINIA	DWN:	DES.:	PROJECT NO.: HAL-2013-151
		CHKD:	APPD:	
		DATE:	REV.:	FIGURE NO.: 1

ATTACHMENT 2

FIELD PARAMETERS

Monitoring Well #1 (MW-1)

Total depth of Well: (116 feet)
Diameter of Well (4 inches)
Riser height (66 feet)
Screened interval (50 feet)

Sample Date	Depth to Water (ft.)	Purge Volume (gallons)	Field Paramaters	pH	Temperature (°C)	Conductivity (us/cm)	Dissolved Oxygen (%)	Oxygen Reduction Potential
6/18/2014	70.01	30.25 (dry)	Before	7.15	12.7	279	35.1	28.2
			During	7.5	13.5	205	68.7	22.4
			After	7.88	17.25	328	70.2	37

Notes:
°C: degrees Celcius
us/cm: micro siemens per centimeter
%: percent

Monitoring Well #2 (MW-2)

Total depth of Well: (117 feet)
Diameter of Well (4 inches)
Riser height (67 feet)
Screened interval (50 feet)

Sample Date	Depth to Water (ft.)	Purge Volume (gallons)	Field Paramaters	pH	Temperature (°C)	Conductivity (us/cm)	Dissolved Oxygen (%)	Oxygen Reduction Potential
6/18/2014	69.02	93	Before	7.76	14.58	389	17.3	-45.5
			During	7.93	14.89	402	17.9	-51.5
			After	8.21	15.07	418	7.7	-77.8

Notes:
°C: degrees Celcius
us/cm: micro siemens per centimeter
%: percent

Monitoring Well #3 (MW-3)

Total depth of Well: (92 feet)
Diameter of Well (4 inches)
Riser height (42 feet)
Screened Interval (50 feet)

Sample Date	Depth to Water (ft.)	Purge Volume (gallons)	Field Paramaters	pH	Temperature (°C)	Conductivity (us/cm)	Dissolved Oxygen (%)	Oxygen Reduction Potential
6/18/2014	34.95	80	Before	7.43	13.14	1005	8.0	23.6
			During	7.41	13.19	1035	11.5	30.1
			After	7.34	13.18	1031	11.8	21.8

Notes:
°C: degrees Celcius
us/cm: micro siemens per centimeter
%: percent

ATTACHMENT 3

LABOARTORY ANALTYICAL REPORT
SUMMARY TABLES

SUMMARY TABLE
GROUNDWATER ANALYTICAL RESULTS

Hall Drilling, LLC
UIC Well # 3
Ellenboro, Ritchie County, West Virginia

Sample ID	Sample Date	Benzene (mg/L)	Toluene (mg/L)	Ethylbenzene (mg/L)	Total Xylene (mg/L)	TPH-GRO (mg/L)	TPH-DRO (mg/L)	TPH-ORO (mg/L)	Chloride (mg/L)	Sodium (mg/L)	Barium (mg/L)	Iron (mg/L)	Manganese (mg/L)	Bromide (mg/L)	Sulfate (mg/L)	Total Organic Carbon	Total Dissolved Solids	Total Suspended Solids
MW-1	6/15/2013	ND(<0.001)	ND(<0.001)	ND(<0.001)	ND(<0.003)	ND(<0.500)	ND(<0.130)	ND(<0.310)	3.05	58.1	0.233	11.4	0.544	ND(<0.10)	ND(<5.00)	1.71	175	65
	11/14/2013	ND(<0.001)	ND(<0.001)	ND(<0.001)	ND(<0.003)	ND(<0.500)	ND(<0.130)	ND(<0.310)	2.37	30.1	0.306	6.87	0.349	ND(<0.10)	ND(<5.00)	ND(<1.00)	229	181
	6/18/2014	ND(<0.001)	ND(<0.001)	ND(<0.001)	ND(<0.003)	ND(<0.500)	ND(<0.170)	ND(<0.670)	2.70	41.6	1.06	27.7	1.65	NA	ND(<5.00)	ND(<5.00)	198	2020
MW-2	6/18/2013	ND(<0.001)	ND(<0.001)	ND(<0.001)	ND(<0.003)	ND(<0.500)	ND(<0.120)	ND(<0.310)	ND(<1.00)	91.1	0.147	3.87	ND(<0.100)	ND(<0.10)	ND(<5.00)	ND(<1.00)	252	70
	11/14/2013	ND(<0.001)	ND(<0.001)	ND(<0.001)	ND(<0.003)	ND(<0.500)	ND(<0.120)	ND(<0.310)	ND(<1.00)	83.6	0.134	1.76	ND(<0.100)	ND(<0.10)	18.1	ND(<1.00)	288	36
	6/18/2014	ND(<0.001)	ND(<0.001)	ND(<0.001)	ND(<0.003)	ND(<0.500)	ND(<0.200)	ND(<0.620)	ND(<1.00)	99.2	0.318	30.8	0.464	NA	25.4	ND(<1.00)	280	303
MW-3	6/12/2013	ND(<0.001)	ND(<0.001)	ND(<0.001)	ND(<0.003)	ND(<0.500)	ND(<0.120)	ND(<0.310)	2.49	39.1	0.951	0.721	ND(<0.100)	ND(<0.10)	ND(<5.00)	ND(<1.00)	152	6.0
	11/14/2013	ND(<0.001)	ND(<0.001)	ND(<0.001)	ND(<0.003)	ND(<0.500)	ND(<0.130)	ND(<0.310)	ND(<1.00)	51.7	0.262	1.12	ND(<0.100)	ND(<0.10)	ND(<5.00)	ND(<1.00)	212	29
	6/18/2014	ND(<0.001)	ND(<0.001)	ND(<0.001)	ND(<0.003)	ND(<0.500)	ND(<0.150)	ND(<0.470)	245	147	1.50	3.80	0.936	NA	ND(<5.00)	1.18	666	58
Federal Drinking Water Standards/WVDEP Action Levels		0.005	1	0.70	10	1	1	1	250	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	500	[illegible]

* = Not regulated
() = Reporting Limit (RL)
mg/L = milligrams per Liter
NA = Not Analyzed
Bold = Exceeds Groundwater Standards
Underlined Standards are guidelines set by the USEPA as Secondary Drinking Water Standards

REI Consultants, Inc.
PO Box 286
Beaver, WV 25813
TEL: 304.255.2500
Website: www.reiclabs.com

Improving the environment, one client at a time...

3029-C Peters Creek Road
Roanoke, VA 24019
TEL: 540.777.1276

101 17th Street
Ashland, KY 41101
TEL: 606.393.5027

1557 Commerce Road, Suite 201
Verona, VA 24482
TEL: 540.248.0183

16 Commerce Drive
Westover, WV 26501
TEL: 304.241.5861

Friday, June 27, 2014

Julie Szymanek
CORE ENVIRONMENTAL SERVICES INC
4 BROOKSTONE PLAZA
MORGANTOWN, WV 26508

TEL: (304) 292-2673
FAX:

RE: HALL DRILLING
Work Order #: 1406026

Dear Julie Szymanek:

REI Consultants, Inc. received 4 sample(s) on 6/19/2014 for the analyses presented in the following report.

Sincerely,

Jimmy Suttle
Project Manager

REI Consultants, Inc. - Case Narrative

WO#: 1406026

Date Reported: 6/27/2014

Client: CORE ENVIRONMENTAL SERVICES INC

Project: HALL DRILLING

The analytical results presented in this report were produced using documented laboratory SOPs that incorporate appropriate quality control procedures as described in the applicable methods. Verification of required sample preservation (as required) is recorded on associated laboratory logs. Any deviation from compliance or method modification is identified within the body of this report by a qualifier footnote which is defined at the bottom of this page.

All sample results for solid samples are reported on an "as-received" wet weight basis unless otherwise noted.

Results reported for sums of individual parameters, such as TTHM and HAA5, may vary slightly from the sum of the individual parameter results, due to rounding of individual results, as required by EPA.

The test results in this report meet all NELAP (and/or VELAP) requirements for parameters except as noted in this report.

Please note if the sample collection time is not provided on the Chain of Custody, the default recording will be 0:00:00. This may cause some tests to be apparently analyzed out of hold.

All tests performed by REIC Service Centers are designated by an annotation on the test code. All other tests were performed by REIC's Main Laboratory in Beaver, WV.

DEFINITIONS:
MCL: Maximum Contaminant Level
MDL: Method Detection Limit; The lowest concentration of analyte that can be detected by the method in the applicable matrix.
Mg/Kg or mg/L: Units of part per million (PPM) - milligram per Kilogram (weight/weight) or milligram per Liter (weight/volume).
NA: Not Applicable
ND: Not Detected at the PQL or MDL
PQL: Practical Quantitation Limit; The lowest verified limit to which data is quantified without qualifications. Analyte concentrations below PQL are reported either as ND or as a number with a "J" qualifier.
Qual: Qualifier that applies to the analyte reported.
TIC: Tentatively Identified Compound, Estimated Concentration denoted by "J" qualifier.
Ug/Kg or ug/L: Units of part per billion (PPB) - microgram per kilogram (weight/weight) or microgram per liter (weight/volume).

QUALIFIERS:
X: Reported value exceeds required MCL
B: Analyte detected in the associated Method Blank at a concentration > 1/2 the PQL
E: Analyte concentration reported that exceeds the upper calibration standard. Greater uncertainty is associated with this result and data should be consider estimated.
H: Holding time for preparation or analysis has been exceeded.
J: Analyte concentration is reported, and is less than the PQL and greater than or equal to the MDL. The result reported is an estimate.
S: % REC (% recovery) exceeds control limits

CERTIFICATIONS:
Beaver, WV: WVDHHR 00412CM, WVDEP 060, VADCLS 00281, KYDEP 90039, TNDEQ TN02928, NCDWQ 466, PADEP 68-00839, VADCLS (VELAP) 460148
Bioassay (Beaver, WV): WVDEP 060, VADCLS(VELAP) 460148, PADEP 68-00839
Roanoke, VA: VADCLS(VELAP) 460150
Verona, VA: VADCLS(VELAP) 460151
Ashland, KY: KYDEP 00094, WVDEP 389
Morgantown, WV: WVDHHR 003112M, WVDEP 387

REI Consultants, Inc. - Analytical Report

WO#: 1406O26

Date Reported: 6/27/2014

Client:	CORE ENVIRONMENTAL SERVICES INC	**Collection Date:**	6/18/2014 11:55:00 AM
Project:	HALL DRILLING	**Date Received:**	6/19/2014
Lab ID:	1406O26-01A	**Matrix:**	Liquid
Client Sample ID:	MW-1	**Site ID:**	ELLENBORO, WV

Analysis	Result	PQL	MCL	Qual	Units	PrepDate	Date Analyzed
METALS BY ICP		**Method: EPA 200.7 Rev. 4.4 (1994)**			**EPA 200.2**		**Analyst: DS**
Barium	1.08	0.100	NA		mg/L	6/23/2014 10:30 AM	6/25/2014 4:38 PM
Iron	27.7	0.100	NA		mg/L	6/23/2014 10:30 AM	6/25/2014 4:38 PM
Manganese	1.66	0.100	NA		mg/L	6/23/2014 10:30 AM	6/25/2014 4:38 PM
Sodium	42.6	1.00	NA		mg/L	6/23/2014 10:30 AM	6/25/2014 4:38 PM
SEMI-VOLATILE RANGE ORGANICS		**Method: SW8015C (2000)**			**SW3510B**		**Analyst: CL**
TPH (Diesel Range)	ND	0.27	NA		mg/L	6/20/2014 6:48 AM	6/20/2014 8:51 PM
TPH (Oil Range)	ND	0.67	NA		mg/L	6/20/2014 6:48 AM	6/20/2014 8:51 PM
Surr: o-Terphenyl	98.4	28.3-152	NA		%REC	6/20/2014 6:48 AM	6/20/2014 8:51 PM
VOLATILE RANGE ORGANICS		**Method: SW8015C (2000)**			**SW5030**		**Analyst: CB**
TPH (Gasoline Range)	ND	0.500	NA		mg/L	6/23/2014 6:55 AM	6/24/2014 1:20 AM
Surr: 2,5-Dibromotoluene	75.5	37.2-152	NA		%REC	6/23/2014 6:55 AM	6/24/2014 1:20 AM
VOLATILE ORGANIC COMPOUNDS		**Method: SW8021B (1996)**			**SW5030**		**Analyst: CB**
Benzene	ND	1.00	NA		µg/L	6/23/2014 6:55 AM	6/24/2014 1:20 AM
Toluene	ND	1.00	NA		µg/L	6/23/2014 6:55 AM	6/24/2014 1:20 AM
Ethylbenzene	ND	1.00	NA		µg/L	6/23/2014 6:55 AM	6/24/2014 1:20 AM
m,p-Xylene	ND	2.00	NA		µg/L	6/23/2014 6:55 AM	6/24/2014 1:20 AM
o-Xylene	ND	1.00	NA		µg/L	6/23/2014 6:55 AM	6/24/2014 1:20 AM
Surr: 1,1,1-Trifluorotoluene	80.1	61.2-135	NA		%REC	6/23/2014 6:55 AM	6/24/2014 1:20 AM
ANIONS by ION CHROMATOGRAPHY		**Method: EPA 300.0, Rev.2.1 (1993)**					**Analyst: CF**
Chloride	2.70	1.00	NA		mg/L		6/20/2014 2:18 PM
Sulfate	ND	5.00	NA		mg/L		6/20/2014 2:18 PM
TOTAL DISSOLVED SOLIDS		**Method: SM2540 C-1997**					**Analyst: SF**
Total Dissolved Solids	198	20	NA		mg/L		6/20/2014 1:43 PM
TOTAL SUSPENDED SOLIDS		**Method: SM2540 D-1997**					**Analyst: SF**
Total Suspended Solids	3,080	20.0	NA		mg/L		6/20/2014 1:22 PM
ORGANIC CARBON, TOTAL		**Method: SM5310 C-2000**					**Analyst: DSD**
Total Organic Carbon	ND	1.00	NA		mg/L		6/23/2014 4:32 PM

REI Consultants, Inc. - Analytical Report

WO#: 1406O26

Date Reported: 6/27/2014

Client:	CORE ENVIRONMENTAL SERVICES INC	**Collection Date:**	6/18/2014 11:30:00 AM
Project:	HALL DRILLING	**Date Received:**	6/19/2014
Lab ID:	1406O26-02A	**Matrix:**	Liquid
Client Sample ID:	MW-2	**Site ID:**	ELLENBORO, WV

Analysis	Result	PQL	MCL	Qual	Units	PrepDate	Date Analyzed
METALS BY ICP		**Method: EPA 200.7 Rev. 4.4 (1994)**				**EPA 200.2**	**Analyst: DS**
Barium	0.318	0.100	NA		mg/L	6/23/2014 10:30 AM	6/25/2014 4:55 PM
Iron	16.8	0.100	NA		mg/L	6/23/2014 10:30 AM	6/25/2014 4:55 PM
Manganese	0.464	0.100	NA		mg/L	6/23/2014 10:30 AM	6/25/2014 4:55 PM
Sodium	99.8	1.00	NA		mg/L	6/23/2014 10:30 AM	6/25/2014 4:55 PM
SEMI-VOLATILE RANGE ORGANICS		**Method: SW8015C (2000)**				**SW3510B**	**Analyst: CL**
TPH (Diesel Range)	ND	0.33	NA		mg/L	6/20/2014 6:48 AM	6/20/2014 9:24 PM
TPH (Oil Range)	ND	0.82	NA		mg/L	6/20/2014 6:48 AM	6/20/2014 9:24 PM
Surr: o-Terphenyl	95.1	28.3-152	NA		%REC	6/20/2014 6:48 AM	6/20/2014 9:24 PM
VOLATILE RANGE ORGANICS		**Method: SW8015C (2000)**				**SW5030**	**Analyst: CB**
TPH (Gasoline Range)	ND	0.500	NA		mg/L	6/23/2014 6:55 AM	6/24/2014 1:50 AM
Surr: 2,5-Dibromotoluene	75.6	37.2-152	NA		%REC	6/23/2014 6:55 AM	6/24/2014 1:50 AM
VOLATILE ORGANIC COMPOUNDS		**Method: SW8021B (1996)**				**SW5030**	**Analyst: CB**
Benzene	ND	1.00	NA		µg/L	6/23/2014 6:55 AM	6/24/2014 1:50 AM
Toluene	ND	1.00	NA		µg/L	6/23/2014 6:55 AM	6/24/2014 1:50 AM
Ethylbenzene	ND	1.00	NA		µg/L	6/23/2014 6:55 AM	6/24/2014 1:50 AM
m,p-Xylene	ND	2.00	NA		µg/L	6/23/2014 6:55 AM	6/24/2014 1:50 AM
o-Xylene	ND	1.00	NA		µg/L	6/23/2014 6:55 AM	6/24/2014 1:50 AM
Surr: 1,1,1-Trifluorotoluene	79.0	61.2-135	NA		%REC	6/23/2014 6:55 AM	6/24/2014 1:50 AM
ANIONS by ION CHROMATOGRAPHY		**Method: EPA 300.0, Rev.2.1 (1993)**					**Analyst: CF**
Chloride	ND	1.00	NA		mg/L		6/20/2014 2:37 PM
Sulfate	25.4	5.00	NA		mg/L		6/20/2014 2:37 PM
TOTAL DISSOLVED SOLIDS		**Method: SM2540 C-1997**					**Analyst: SF**
Total Dissolved Solids	299	10	NA		mg/L		6/20/2014 1:43 PM
TOTAL SUSPENDED SOLIDS		**Method: SM2540 D-1997**					**Analyst: SF**
Total Suspended Solids	563	10	NA		mg/L		6/20/2014 1:22 PM
ORGANIC CARBON, TOTAL		**Method: SM5310 C-2000**					**Analyst: DSD**
Total Organic Carbon	ND	1.00	NA		mg/L		6/23/2014 4:32 PM

REI Consultants, Inc. - Analytical Report

WO#: 1406O26

Date Reported: 6/27/2014

Client:	CORE ENVIRONMENTAL SERVICES INC	**Collection Date:**	6/18/2014 1:45:00 PM
Project:	HALL DRILLING	**Date Received:**	6/19/2014
Lab ID:	1406O26-03A	**Matrix:**	Liquid
Client Sample ID:	MW-3	**Site ID:**	ELLENBORO, WV

Analysis	Result	PQL	MCL	Qual	Units	PrepDate	Date Analyzed
METALS BY ICP		**Method: EPA 200.7 Rev. 4.4 (1994)**				**EPA 200.2**	**Analyst: DS**
Barium	1.90	0.100	NA		mg/L	6/23/2014 10:30 AM	6/25/2014 5:05 PM
Iron	3.03	0.100	NA		mg/L	6/23/2014 10:30 AM	6/25/2014 5:05 PM
Manganese	0.326	0.100	NA		mg/L	6/23/2014 10:30 AM	6/25/2014 5:05 PM
Sodium	147	10.0	NA		mg/L	6/23/2014 10:30 AM	6/25/2014 5:06 PM
SEMI-VOLATILE RANGE ORGANICS		**Method: SW8015C (2000)**				**SW3510B**	**Analyst: CL**
TPH (Diesel Range)	ND	0.19	NA		mg/L	6/20/2014 6:48 AM	6/20/2014 9:57 PM
TPH (Oil Range)	ND	0.47	NA		mg/L	6/20/2014 6:48 AM	6/20/2014 9:57 PM
Surr: o-Terphenyl	91.1	28.3-152	NA		%REC	6/20/2014 6:48 AM	6/20/2014 9:57 PM
VOLATILE RANGE ORGANICS		**Method: SW8015C (2000)**				**SW5030**	**Analyst: CB**
TPH (Gasoline Range)	ND	0.500	NA		mg/L	6/23/2014 6:55 AM	6/24/2014 2:21 AM
Surr: 2,5-Dibromotoluene	78.4	37.2-152	NA		%REC	6/23/2014 6:55 AM	6/24/2014 2:21 AM
VOLATILE ORGANIC COMPOUNDS		**Method: SW8021B (1996)**				**SW5030**	**Analyst: CB**
Benzene	ND	1.00	NA		µg/L	6/23/2014 6:55 AM	6/24/2014 2:21 AM
Toluene	ND	1.00	NA		µg/L	6/23/2014 6:55 AM	6/24/2014 2:21 AM
Ethylbenzene	ND	1.00	NA		µg/L	6/23/2014 6:55 AM	6/24/2014 2:21 AM
m,p-Xylene	ND	2.00	NA		µg/L	6/23/2014 6:55 AM	6/24/2014 2:21 AM
o-Xylene	ND	1.00	NA		µg/L	6/23/2014 6:55 AM	6/24/2014 2:21 AM
Surr: 1,1,1-Trifluorotoluene	79.9	61.2-135	NA		%REC	6/23/2014 6:55 AM	6/24/2014 2:21 AM
ANIONS by ION CHROMATOGRAPHY		**Method: EPA 300.0, Rev.2.1 (1993)**					**Analyst: CF**
Chloride	245	10.0	NA		mg/L		6/20/2014 2:56 PM
Sulfate	ND	5.00	NA		mg/L		6/20/2014 2:56 PM
TOTAL DISSOLVED SOLIDS		**Method: SM2540 C-1997**					**Analyst: SF**
Total Dissolved Solids	656	10	NA		mg/L		6/20/2014 1:43 PM
TOTAL SUSPENDED SOLIDS		**Method: SM2540 D-1997**					**Analyst: SF**
Total Suspended Solids	88.0	10	NA		mg/L		6/20/2014 1:22 PM
ORGANIC CARBON, TOTAL		**Method: SM5310 C-2000**					**Analyst: DSD**
Total Organic Carbon	1.18	1.00	NA		mg/L		6/23/2014 4:32 PM

REI Consultants, Inc. - Analytical Report

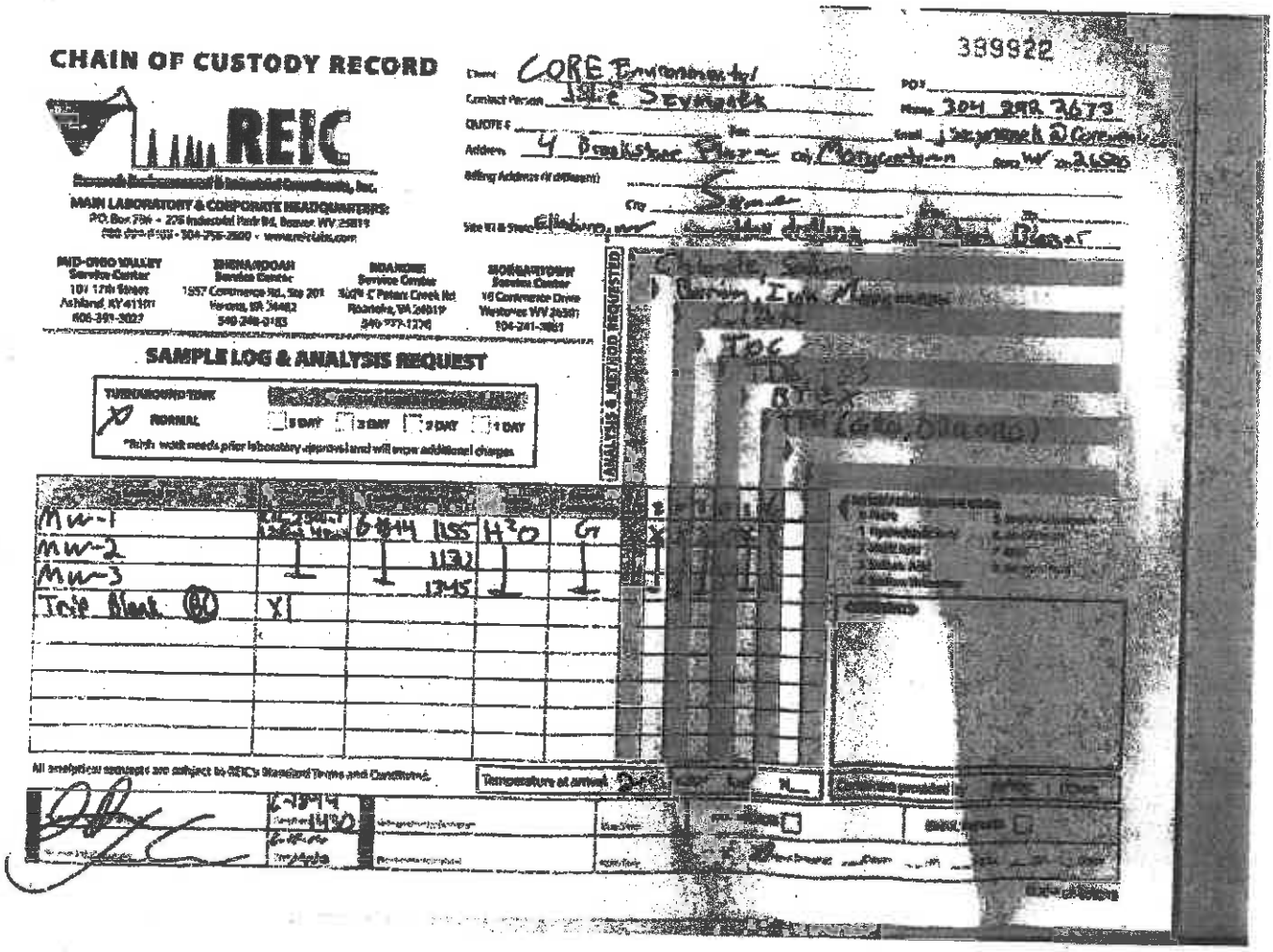
WO#: 1406O26

Date Reported: 6/27/2014

Client:	CORE ENVIRONMENTAL SERVICES INC	**Collection Date:**	6/18/2014 12:00:00 AM
Project:	HALL DRILLING	**Date Received:**	6/19/2014
Lab ID:	1406O26-04A	**Matrix:**	Trip Blank
Client Sample ID:	TRIP BLANK	**Site ID:**	ELLENBORO, WV

Analysis	Result	PQL	MCL	Qual	Units	PrepDate	Date Analyzed
VOLATILE ORGANIC COMPOUNDS		**Method: SW8021B (1996)**				**SW5030**	**Analyst: CB**
Benzene	ND	1.00	NA		µg/L	6/23/2014 6:55 AM	6/24/2014 6:48 AM
Toluene	ND	1.00	NA		µg/L	6/23/2014 6:55 AM	6/24/2014 6:48 AM
Ethylbenzene	ND	1.00	NA		µg/L	6/23/2014 6:55 AM	6/24/2014 6:48 AM
m,p-Xylene	ND	2.00	NA		µg/L	6/23/2014 6:55 AM	6/24/2014 6:48 AM
o-Xylene	ND	1.00	NA		µg/L	6/23/2014 6:55 AM	6/24/2014 6:48 AM
Surr: 1,1,1-Trifluorotoluene	73.2	61.2-135	NA		%REC	6/23/2014 6:55 AM	6/24/2014 6:48 AM

DBPix Evaluation



CHAIN OF CUSTODY RECORD

389922

REIC

MAIN LABORATORY & CORPORATE HEADQUARTERS:

SAMPLE LOG & ANALYSIS REQUEST

MW-1		6/9/14 1155	H_2O	G
MW-2		1132		
MW-3		1345		
Trip Blank (40)	X			

All analytical contracts are subject to REIC's Standard Terms and Conditions.

Temperature at arrival:

RELIANCE LABORATORIES, INC. - CHAIN OF CUSTODY RECORD

☐ 2044 MEADOWBROOK ROAD
POST OFFICE BOX 4657
BRIDGEPORT, WV 26330
TEL. (304) 842-5285 • FAX (304) 842-5351
E-MAIL [illegible]
INTERNET www.RelianceLabs.net

1-14-14

☐ RIDGEFIELD BUSINESS CENTER
25 CRIMSON CIRCLE
MARTINSBURG, WV 25403
TEL. (304) [illegible] • FAX (304) [illegible]

*CLIENT NAME Hall Drilling LLC
*ADDRESS PO Box 249 Ellenboro, WV 26346
CUSTOMER # CO [illegible]3
*SAMPLER (S) T. Hall
*TEL # 304 869 3329 FAX # 304 869 [illegible]
E-MAIL

SHEET NO. 1 OF 1

Analyses: [illegible] Fe Mn [illegible] / Dil/Cl 4500 / Silicate / TDS / TOC

[redacted]

LABORATORY #	*DATE	*TIME	COMP	GRAB	MATRIX W, DW, S, O, M	TEMP ≤ 4°C Yes No	# OF CONTAIN.	HNO3	H2SO4	HCL	NaOH	SAD-T	NO PRES.		Analyses	*PROJECT/REMARKS
206842	1-14-14	9:00 AM		X	W	22.8	3	1p		1v			1p		✓ ✓ ✓ ✓ ✓	Tech Service Center 3H Antero

SAMPLES DO ✓ DO NOT ____ MEET USEPA GUIDELINES FOR HOLDING TIMES
SAMPLES DO ✓ DO NOT ____ MEET USEPA GUIDELINES FOR CHEMICAL PRESERVATIVES
SAMPLES DO ✓ DO NOT ____ MEET USEPA GUIDELINES FOR SAMPLE CONTAINERS
SAMPLES ARE ✓ ARE NOT ____ FOR REGULATORY COMPLIANCE PURPOSES

*RELINQUISHED BY:	*DATE/TIME	*RECEIVED BY:
PRINT: [illegible] SIGN: [signature]	DATE: 1-15-14 TIME: 12:15	PRINT: Misaki Coffman SIGN: [signature]
*RELINQUISHED BY: PRINT: SIGN:	*DATE/TIME DATE: TIME:	*RECEIVED BY: PRINT: SIGN:
*RELINQUISHED BY: PRINT: SIGN:	*DATE/TIME DATE: TIME:	*RECEIVED BY: PRINT: SIGN:
*COURIER: TRACKING #:	*DATE/TIME DATE: TIME:	*RECEIVED BY: PRINT: SIGN:

REMARKS:

PWS# ____

WEATHER/TEMPERATURE:

☐ **RUSH STATUS** (INITIAL ACCEPTANCE ____)

*** ADDITIONAL LABORATORY FEES MAY APPLY***

EXTENT OF LIABILITY
[illegible]

[redacted]

ORIGINAL CHAIN OF CUSTODY DOCUMENT MUST BE EXECUTED IN INK

WHITE - LABORATORY YELLOW - CLIENT

Reliance Laboratories, Inc.
2044 Meadowbrook Road | P.O. Box 4657
Bridgeport, WV 26330
Phone: 304.842.5265 | Fax: 304.842.5351

Martinsburg Laboratory
Ridgefield Business Center | 25 Crimson Circle
Martinsburg, WV 25403
Phone: 304.596.2084 | Fax: 304.596.2088

Certifications: WV Department of Health #: 00354, 00443 | WV Department of Environmental Protection #: 158, 161
MD Department of Environment #: 336, 337 | US Environmental Protection Agency #: WV00042, WV00901

LABORATORY REPORT SUMMARY

Client: C08443

HALL DRILLING
981 E. WASHINGTON AVE.
ELLENBORO WV 26346-

Monday, January 27, 2014
Total Number of Pages: 2
(Not including C.O.C.)
Page 1 of 2

Lab ID	Sample ID	Sample ID 2	Sample Date
208842-2014-W	TECH SERVICE CENTER 3H	ANTERO	1/14/2014

The enclosed results have been analyzed according to the referenced method and SOP. Any deviations to the method have been noted on the report. Unless otherwise noted, all results have been verified to meet quality control requirements of the method. This report may not be reproduced, except in full, without written approval of Reliance Laboratories, Inc.

Report Reviewed By: Digitally signed by Tonley Miller
DN: cn=Tonley Miller, o=Reliance Laboratories, Inc., ou, email=tm@rlwvdsl.net, c=US
Date: 2014.01.30 17:06:08 -05'00'

Reliance Laboratories, Inc.
2044 Meadowbrook Road | P.O. Box 4657
Bridgeport, WV 26330
Phone: 304.842.5266 | Fax: 304.842.5351

Martinsburg Laboratory
Ridgefield Business Center | 25 Crimson Circle
Martinsburg, WV 25403
Phone: 304.596.2084 | Fax: 304.596.2088

Certifications: WV Department of Health #: 00354, 00443 | WV Department of Environmental Protection #: 156, 181
MD Department of Environment #: 338, 337 | US Environmental Protection Agency #: WV00042, WV00901

HALL DRILLING
981 E. WASHINGTON AVE.

ELLENBORO, WV 26346-

Lab Number: 206842-2014-W **Sample ID:** TECH SERVICE CENTER 3H ANTERO

Parameter	Value	Units	Method	Date/Time Analyzed	Analyst	MDL	MCL
Analyte Group: Inorganics							
Total Organic Carbon	432	mg/l	SM5310C-00	1/20/2014 10:41	MC	0.1	
pH	#6.02	S.U.	SM4500H+B-00	1/16/2014 15:00	KV		
Total Chloride	48985	mg/l	SM4500CLB-97	1/16/2014 10:00	KV	2.52	
Total Iron	68.9	mg/l	EPA 200.7 R4.4	1/27/2014 10:04	TH	0.004	
Total Manganese	ND	mg/l	EPA 200.7 R4.4	1/27/2014 10:04	TH	0.007	
Total Barium	442	mg/l	EPA 200.7 R4.4	1/27/2014 10:04	TH	0.003	
Total Sodium	22530	mg/l	EPA 200.7 R4.4	1/27/2014 10:04	TH	0.011	
Total Dissolved Solids	91244	mg/l	SM2540C-97	1/16/2014 12:00	CT	10	
Total Sulfate	ND	mg/l	ASTM D516-02	1/22/2014 9:00	KV	0.59	

Remarks:

Date Sample Collected: 1/14/2014 9:00
Sample Submitted By: T. HALL
Date Sample Received: 1/15/2014 12:15
ND = Not Detected at the MDL or MRL
MDL - Minimum Detectible Limit MRL - Minimum Reporting Limit
MCL - Maximum Contaminant Level, USEPA Regulated [MCL] = Maximum Contaminant Level, Non-Regulated

*Method Code: STANDARD METHODS 19TH ED; US EPA METHODS FOR THE CHEMICAL ANALYSIS OF WATER AND WASTES, Rev. 83; US EPA METHODS FOR THE DETERMINATION OF METALS IN ENVIRONMENTAL SAMPLES, May 1994; TEST METHODS FOR EVALUATING SOLID WASTE, SW-846, 3rd ED; USEPA Manual for Certification of Laboratories Analyzing Drinking Water, 5th ED. In accordance with EPA Regulations, all reports, including raw data and quality control data, are maintained by the laboratory for a minimum of 5 years.
NOTE: #Holding time exceeded for this analysis.

RELIANCE LABORATORIES, INC. - CHAIN OF CUSTODY RECORD

☐ 2044 MEADOWBROOK ROAD
POST OFFICE BOX 4857
BRIDGEPORT, WV 26330
TEL. (304) 842-5285 • FAX (304) 842-5351
E-MAIL [illegible]
INTERNET www.RelianceLabs.net

☐ RIDGEFIELD BUSINESS CENTER
25 CRIMSON CIRCLE
MARTINSBURG, WV 25403
TEL. (304) 596-2084 • FAX (304) 596-2086

2-13-14

*CLIENT NAME Hall Drilling
*ADDRESS PO Box 249, Ellenboro, WV
CUSTOMER # CD6443
*TEL. # 304 869 3309 FAX #
*SAMPLER (S) T Hall
E-MAIL

SHEET NO. 1 OF 1

Analyses (handwritten column headings): Ba Fe Mn Na | Cl 4500 | pH | TDS/Sulf | TOC

[redacted]

LABORATORY #	*DATE	*TIME	COMP	GRAB	MATRIX W, DW, S, O, M	TEMP ≤4°C Yes / No	# OF CONTAIN.	HNO3	H2SO4	HCL	NaOH	BAC-T	NO PRES.	Analyses	*PROJECT/REMARKS
207970	2-13-14	3:30		X	W	20.0	3	1p		1v			1p	✓ ✓ ✓ ✓ ✓	Tech Service Center 3H Antero

SAMPLES DO ✓ DO NOT ____ MEET USEPA GUIDELINES FOR HOLDING TIMES
SAMPLES DO ✓ DO NOT ____ MEET USEPA GUIDELINES FOR CHEMICAL PRESERVATIVES
SAMPLES DO ✓ DO NOT ____ MEET USEPA GUIDELINES FOR SAMPLE CONTAINERS
SAMPLES ARE ✓ ARE NOT ____ FOR REGULATORY COMPLIANCE PURPOSES

*RELINQUISHED BY:	*DATE/TIME	*RECEIVED BY:
PRINT: SIGN:	DATE: 2/14/14 TIME: 900	PRINT: SIGN: [signature]
*RELINQUISHED BY: PRINT: SIGN: [signature]	DATE: 2/14/14 TIME: 1355	*RECEIVED BY: PRINT: SIGN: [signature]
*RELINQUISHED BY: PRINT: SIGN:	DATE: TIME:	*RECEIVED BY: PRINT: SIGN:
*COURIER: TRACKING #:	DATE: TIME:	*RECEIVED BY: PRINT: SIGN:

REMARKS:

PWSID# ____

WEATHER/TEMPERATURE:

☐ **RUSH STATUS** (INITIAL ACCEPTANCE ____)
*** ADDITIONAL LABORATORY FEES MAY APPLY ***

EXTENT OF LIABILITY

SHOULD RELIANCE LABORATORIES, INC. BE AT FAULT AND ANY DISPUTE ARISE REGARDING ANALYTICAL DATA GENERATED BY THE LABORATORY, THE EXTENT OF THE LIABILITY TO RELIANCE WILL BE A DUPLICATE ANALYSIS OF THAT SAMPLE (PROVIDING ADEQUATE SAMPLE REMAINS) OR A REFUND OF THE ANALYTICAL FEE. IN NO EVENT WILL RELIANCE LABORATORIES BE LIABLE FOR DAMAGES INCLUDING BUT NOT LIMITED TO [illegible] ARISING FROM SUCH DISPUTE.

NOTE: TYPICAL SAMPLE TURN AROUND FOR ROUTINE SAMPLES IS 5 TO 10 WORKING DAYS. THIS IS NOT A GUARANTEE THAT SAMPLES WILL BE COMPLETED IN THIS TIME FRAME. [illegible] MAY REQUIRE ADDITIONAL TIME.

[redacted]

ORIGINAL CHAIN OF CUSTODY DOCUMENT MUST BE EXECUTED IN INK.

WHITE - LABORATORY YELLOW - CLIENT

Reliance Laboratories, Inc.
2044 Meadowbrook Road | P.O. Box 4657
Bridgeport, WV 26330
Phone: 304.842.5285 | Fax: 304.842.5351

Martinsburg Laboratory
Ridgefield Business Center | 25 Crimson Circle
Martinsburg, WV 25403
Phone: 304.596.2084 | Fax: 304.596.2086

Certifications: WV Department of Health #: 00354, 00443 | WV Department of Environmental Protection #: 168, 181
MD Department of Environment #: 336, 337 | US Environmental Protection Agency #: WV00042, WV00901

LABORATORY REPORT SUMMARY

Client: C06443

HALL DRILLING
981 E. WASHINGTON AVE.
ELLENBORO WV 26346-

Monday, February 24, 2014

Total Number of Pages: 2
(Not Including C.O.C.)
Page 1 of 2

Lab ID	Sample ID	Sample ID 2	Sample Date
207970-2014-W	TECH SERVICE CENTER 3H	ANTERO	2/13/2014

The enclosed results have been analyzed according to the referenced method and SOP. Any deviations to the method have been noted on the report. Unless otherwise noted, all results have been verified to meet quality control requirements of the method. This report may not be reproduced, except in full, without written approval of Reliance Laboratories, Inc.

Report Reviewed By: Digitally signed by Tenley Miller
DN: cn=Tenley Miller, o=Reliance Laboratories, Inc., ou, email=tmiller@wvdsl.net, c=US
Date: 2014.02.25 12:45:08 -05'00'

Reliance Laboratories, Inc.
2044 Meadowbrook Road | P.O. Box 4657
Bridgeport, WV 26330
Phone: 304.842.5285 | Fax: 304.842.5351

Martinsburg Laboratory
Ridgefield Business Center | 25 Crimson Circle
Martinsburg, WV 25403
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MD Department of Environment #: 336, 337 | US Environmental Protection Agency #: WV00042, WV00801

HALL DRILLING
981 E. WASHINGTON AVE.

ELLENBORO, WV 26346-

Lab Number: 207970-2014-W **Sample ID:** TECH SERVICE CENTER 3H
ANTERO

Parameter	Value	Units	Method	Date/Time Analyzed	Analyst	MDL	MCL
Analyte Group: Inorganics							
Total Organic Carbon	941	mg/l	SM5310C-00	2/21/2014 13:15	MC	0.1	
pH	# 5.98	S.U.	SM4500H+B-00	2/18/2014 10:15	KV		
Total Chloride	69978	mg/l	SM4500CLB-97	2/19/2014 13:25	KV	2.52	
Total Iron	87.0	mg/l	EPA 200.7 R4.4	2/20/2014 11:16	TH	0.004	
Total Manganese	2.80	mg/l	EPA 200.7 R4.4	2/20/2014 11:16	TH	0.007	
Total Barium	597	mg/l	EPA 200.7 R4.4	2/20/2014 11:16	TH	0.003	
Total Sodium	40580	mg/l	EPA 200.7 R4.4	2/20/2014 11:16	TH	0.011	
Total Dissolved Solids	110580	mg/l	SM2540C-97	2/17/2014 11:15	CT	10	
Total Sulfate	9.81	mg/l	ASTM D516-02	2/17/2014 9:30	KV	0.59	

Remarks:

Date Sample Collected:	2/13/2014	16:30
Sample Submitted By:	T.HALL	
Date Sample Received:	2/14/2014	12:55

ND = Not Detected at the MDL or MRL
MDL - Minimum Detectable Limit
MRL - Minimum Reporting Limit
MCL - Maximum Contaminant Level, USEPA Regulated
[MCL] = Maximum Contaminant Level, Non-Regulated

*Method Code: STANDARD METHODS 19TH ED; US EPA METHODS FOR THE CHEMICAL ANALYSIS OF WATER AND WASTES, Rev. 83; US EPA METHODS FOR THE DETERMINATION OF METALS IN ENVIRONMENTAL SAMPLES, May 1994; TEST METHODS FOR EVALUATING SOLID WASTE, SW-846, 3rd ED; USEPA Manual for Certification of Laboratories Analyzing Drinking Water, 5th ED. In accordance with EPA Regulations, all reports, including raw data and quality control data, are maintained by the laboratory for a minimum of 5 years.
NOTE: #Holding time exceeded for this analysis.

RELIANCE LABORATORIES, INC. - CHAIN OF CUSTODY RECORD

☐ 2044 MEADOWBROOK ROAD
POST OFFICE BOX 4657
BRIDGEPORT, WV 26330
TEL. (304) 842-5285 • FAX (304) 842-5351
E-MAIL: reliancelabs@wvdsl.net
INTERNET www.RelianceLabs.net

☐ RIDGEFIELD BUSINESS CENTER
25 CRIMSON CIRCLE
MARTINSBURG, WV 25403
TEL. (304) 596-2084 • FAX (304) 596-2086

*CLIENT NAME Hall Drilling

*ADDRESS PO Box 249 Ellenboro WV

CUSTOMER # 060413 *TEL.# ______ FAX # ______

*SAMPLER (S) T Hall E-MAIL ______

SHEET NO. 1 OF 1

*PROJECT/REMARKS [redacted]

Fe Mn [illegible] | 9045D [illegible] | TDS/TSS [illegible] | OC [illegible]

LABORATORY #	*DATE	*TIME	COMP	GRAB	MATRIX W, DW, S, O, M	TEMP ≤ 4°C Yes No	# OF CONTAIN.	HNO3	H2SO4	HCL	NaOH	BAC-T	NO PRES.								PROJECT/REMARKS
201288	3/14/14	9:00AM		X	W	19.6	3	1P		1V			1P		✓	✓	✓	✓			Tech Service Center Auteen

SAMPLES DO ✓ DO NOT ____ MEET USEPA GUIDELINES FOR HOLDING TIMES
SAMPLES DO ✓ DO NOT ____ MEET USEPA GUIDELINES FOR CHEMICAL PRESERVATIVES
SAMPLES DO ✓ DO NOT ____ MEET USEPA GUIDELINES FOR SAMPLE CONTAINERS
SAMPLES ARE ✓ ARE NOT ____ FOR REGULATORY COMPLIANCE PURPOSES

*RELINQUISHED BY:	*DATE/TIME	*RECEIVED BY:
PRINT: SIGN:	DATE: TIME:	PRINT: SIGN:
PRINT: [signature] SIGN: [signature]	DATE: 3/14/14 TIME: 1100	PRINT: [signature] SIGN:
PRINT: SIGN:	DATE: TIME:	PRINT: SIGN:
*COURIER: TRACKING #:	DATE: TIME:	PRINT: SIGN:

REMARKS:

PWS# ______

WEATHER/TEMPERATURE:

☐ ***RUSH STATUS*** (INITIAL ACCEPTANCE ______)

*** ADDITIONAL LABORATORY FEES MAY APPLY***

EXTENT OF LIABILITY

SHOULD RELIANCE LABORATORIES, INC. BE AT FAULT AND ANY DISPUTE ARISE REGARDING ANALYTICAL DATA GENERATED BY THE LABORATORY, THE EXTENT OF THE LIABILITY TO RELIANCE WILL BE A DUPLICATE ANALYSIS OF THAT SAMPLE (PROVIDING ADEQUATE SAMPLE REMAINS) OR A REFUND OF THE ANALYTICAL FEE. IN NO EVENT WILL RELIANCE LABORATORIES BE LIABLE FOR DAMAGES INCLUDING BUT NOT LIMITED TO DIRECT, INDIRECT OR CONSEQUENTIAL DAMAGES ARISING FROM SUCH DISPUTE.

NOTE: TYPICAL SAMPLE TURN AROUND FOR ROUTINE SAMPLES IS 5 TO 10 WORKING DAYS. THIS IS NOT A GUARANTEE THAT SAMPLES WILL BE COMPLETED IN THIS TIME FRAME, HOWEVER. [illegible] ADDITIONAL TIME.

[redacted]

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WHITE - LABORATORY YELLOW - CLIENT

Reliance LABORATORIES

Reliance Laboratories, Inc.
2044 Meadowbrook Road | P.O. Box 4657
Bridgeport, WV 26330
Phone: 304.842.5285 | Fax: 304.842.5351

Martinsburg Laboratory
Ridgefield Business Center | 25 Crimson Circle
Martinsburg, WV 25403
Phone: 304.596.2084 | Fax: 304.596.2086

Certifications: WV Department of Health #: 00364, 00443 | WV Department of Environmental Protection #: 158, 181
MD Department of Environment #: 336, 337 | US Environmental Protection Agency #: WV00042, WV00901

LABORATORY REPORT SUMMARY

Client: C06443

Thursday, March 27, 2014

HALL DRILLING
981 E. WASHINGTON AVE.
ELLENBORO WV 26346-

Total Number of Pages: 2
(Not Including C.O.C.)
Page 1 of 2

Lab ID	Sample ID	Sample ID 2	Sample Date
209288-2014-W	TECH SERVICE CENTER-ANTERO		3/14/2014

The enclosed results have been analyzed according to the referenced method and SOP. Any deviations to the method have been noted on the report. Unless otherwise noted, all results have been verified to meet quality control requirements of the method. This report may not be reproduced, except in full, without written approval of Reliance Laboratories, Inc.

Report Reviewed By: Tenley Miller

Reliance Laboratories, Inc.
2044 Meadowbrook Road | P.O. Box 4657
Bridgeport, WV 26330
Phone: 304.842.5285 | Fax: 304.842.5351

Martinsburg Laboratory
Ridgefield Business Center | 26 Crimson Circle
Martinsburg, WV 25403
Phone: 304.596.2084 | Fax: 304.596.2086

Certifications: WV Department of Health #: 00364, 00443 | WV Department of Environmental Protection #: 156, 181
MD Department of Environment #: 335, 337 | US Environmental Protection Agency #: WV00042, WV00901

HALL DRILLING
961 E. WASHINGTON AVE.

ELLENBORO, WV 26346-

Thursday, March 27, 2014

Lab Number: 209288-2014-W **Sample ID:** TECH SERVICE CENTER-ANTERO

Parameter	Value	Units	Method	Date/Time Analyzed	Analyst	MDL	MCL
Analyte Group: Inorganics							
Total Organic Carbon	728	mg/l	SM5310C-00	3/26/2014	8:23 MC	0.1	
pH	# 6.02	S.U.	SM4500H+B-00	3/18/2014	15:48 TH		
Total Chloride	89978	mg/l	SM4500CLB-97	3/18/2014	11:45 MC	2.52	
Total Iron	59.8	mg/l	EPA 200.7 R4.4	3/21/2014	14:36 TH	0.004	
Total Manganese	2.71	mg/l	EPA 200.7 R4.4	3/21/2014	14:36 TH	0.007	
Total Barium	417	mg/l	EPA 200.7 R4.4	3/21/2014	14:36 TH	0.003	
Total Sodium	27660	mg/l	EPA 200.7 R4.4	3/21/2014	14:36 TH	0.011	
Total Dissolved Solids	134380	mg/l	SM2540C-97	3/20/2014	12:00 CT	10	
Total Sulfate	ND	mg/l	ASTM D516-02	3/24/2014	13:35 KV	0.59	

Remarks:

Date Sample Collected: 3/14/2014 9:00
Sample Submitted By: T. HALL
Date Sample Received: 3/14/2014 11:20
ND = Not Detected at the MDL or MRL
MDL - Minimum Detectable Limit
MRL - Minimum Reporting Limit
MCL - Maximum Contaminant Level, USEPA Regulated
[MCL] = Maximum Contaminant Level, Non-Regulated

*Method Code: STANDARD METHODS 19TH ED; US EPA METHODS FOR THE CHEMICAL ANALYSIS OF WATER AND WASTES, Rev. 83; US EPA METHODS FOR THE DETERMINATION OF METALS IN ENVIRONMENTAL SAMPLES, May 1994; TEST METHODS FOR EVALUATING SOLID WASTE, SW-846, 3rd ED; USEPA Manual for Certification of Laboratories Analyzing Drinking Water, 5th ED. In accordance with EPA Regulations, all reports, including raw data and quality control data, are maintained by the laboratory for a minimum of 5 years.
NOTE: #Holding time exceeded for this analysis.

RELIANCE LABORATORIES, INC. - CHAIN OF CUSTODY RECORD

☐ 2044 MEADOWBROOK ROAD
POST OFFICE BOX 4657
BRIDGEPORT, WV 26330
TEL. (304) 842-5285 • FAX (304) 842-5351
E-MAIL relianceslabs@wvdsl.net
INTERNET www.RelianceLabs.net

4-14-14

☐ RIDGEFIELD BUSINESS CENTER
25 CRIMSON CIRCLE
MARTINSBURG, WV 25403
TEL. (304) 596-2084 • FAX (304) 596-2086

*CLIENT NAME Hall Drilling
*ADDRESS PO Box 249 Ellenboro, WV 26346
CUSTOMER # 006443
*SAMPLER (S) TJH
*TEL. # 304 869 3319 FAX # 304 869 4440
E-MAIL

SHEET NO. 1 OF 1

LABORATORY #	*DATE	*TIME			MATRIX W,DW,S,O,M	TEMP. ≤ 4°C Yes / No	# OF CONTAIN.	HNO3	H2SO4	HCL	NaOH	BAC-T	NO PRES.	T&C	TDS/SO4	Na	pH	Iron	Cl #500	Ba	*PROJECT/REMARKS
210792	4-14-14	4:00		1	W	16.8°	3	✓		✓			✓	/	/	/	/	/	/	/	[redacted] Hot Tech Svc. Cement Antero

SAMPLES DO ✓ DO NOT ____ MEET USEPA GUIDELINES FOR HOLDING TIMES
SAMPLES DO ✓ DO NOT ____ MEET USEPA GUIDELINES FOR CHEMICAL PRESERVATIVES
SAMPLES DO ✓ DO NOT ____ MEET USEPA GUIDELINES FOR SAMPLE CONTAINERS
SAMPLES ARE ✓ ARE NOT ____ FOR REGULATORY COMPLIANCE PURPOSES

*RELINQUISHED BY:	*DATE/TIME	*RECEIVED BY:
PRINT: John Gaston SIGN: [signature]	DATE: 4-15-14 TIME: 12:45	PRINT: SIGN: C. Baker
*RELINQUISHED BY: PRINT: SIGN:	*DATE/TIME DATE: TIME:	*RECEIVED BY: PRINT: SIGN:
*RELINQUISHED BY: PRINT: SIGN:	*DATE/TIME DATE: TIME:	*RECEIVED BY: PRINT: SIGN:
*COURIER: TRACKING #:	*DATE/TIME DATE: TIME:	*RECEIVED BY: PRINT: SIGN:

REMARKS:

PWS# ____

WEATHER/TEMPERATURE:

☐ **RUSH STATUS** (INITIAL ACCEPTANCE ____)
*** ADDITIONAL LABORATORY FEES MAY APPLY***

EXTENT OF LIABILITY
[illegible]

NOTE: TYPICAL SAMPLE TURN AROUND FOR ROUTINE SAMPLES IS 5 TO 10 WORKING DAYS. [illegible]

[redacted]

ORIGINAL CHAIN OF CUSTODY DOCUMENT MUST BE EXECUTED IN INK

WHITE - LABORATORY YELLOW - CLIENT

Reliance Laboratories, Inc.
2044 Meadowbrook Road | P.O. Box 4657
Bridgeport, WV 26330
Phone: 304.842.5265 | Fax: 304.842.5351

Martinsburg Laboratory
Ridgefield Business Center | 25 Crimson Circle
Martinsburg, WV 25403
Phone: 304.596.2084 | Fax: 304.596.2088

Certifications: WV Department of Health #: 00354, 00443 | WV Department of Environmental Protection #: 168, 181
MD Department of Environment #: 336, 337 | US Environmental Protection Agency #: WV00042, WV00901

LABORATORY REPORT SUMMARY

Client: C06443

HALL DRILLING
981 E. WASHINGTON AVE.
ELLENBORO WV 26346-

Tuesday, April 29, 2014
Total Number of Pages: 2
(Not including C.O.C.)
Page 1 of 2

Lab ID	Sample ID	Sample ID 2	Sample Date
210792-2014-W	TECH SERVICE CENTER 3H	ANTERO	4/14/2014

Report Reviewed By: Digitally signed by Tenley Miller
DN: cn=Tenley Miller, o=Reliance Laboratories, Inc., ou, email=tmiller@wvdsl.net, c=US
Date: 2014.05.01 09:07:51 -04'00'

Reliance Laboratories, Inc.
2044 Meadowbrook Road | P.O. Box 4657
Bridgeport, WV 26330
Phone: 304.842.5285 | Fax: 304.842.5351

Martinsburg Laboratory
Ridgefield Business Center | 26 Crimson Circle
Martinsburg, WV 25403
Phone: 304.596.2084 | Fax: 304.596.2085

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MD Department of Environment #: 336, 337 | US Environmental Protection Agency #: WV00042, WV00901

HALL DRILLING
981 E. WASHINGTON AVE.

ELLENBORO, WV 26346-

Tuesday, April 29, 2014

Lab Number: 210792-2014-W **Sample ID:** TECH SERVICE CENTER 3H
ANTERO

Parameter	Value	Units	Method	Date/Time Analyzed	Analyst	MDL	MCL
Analyte Group: Inorganics							
Total Organic Carbon	510	mg/l	SM5310C-00	4/18/2014	10:28 MC	0.1	
pH	# 6.89	S.U.	SM4500H+B-00	4/28/2014	11:35 KD		
Total Chloride	73977	mg/l	SM4500CLB-97	4/24/2014	14:00 KV	2.52	
Total Iron	85.2	mg/l	EPA 200.7 R4.4	4/25/2014	13:02 TH	0.004	
Total Manganese	8.50	mg/l	EPA 200.7 R4.4	4/25/2014	13:02 TH	0.007	
Total Barium	578	mg/l	EPA 200.7 R4.4	4/25/2014	13:02 TH	0.003	
Total Sodium	30080	mg/l	EPA 200.7 R4.4	4/25/2014	13:02 TH	0.011	
Total Dissolved Solids	112940	mg/l	SM2540C-97	4/17/2014	11:00 CT	10	
Total Sulfate	ND	mg/l	ASTM D516-02	4/16/2014	9:40 KV	0.59	

Remarks:

Date Sample Collected: 4/14/2014 16:00
Sample Submitted By: T.H
Date Sample Received: 4/15/2014 12:45
Sample temp. upon receipt: 16.8 Deg C
MDL - Minimum Detectable Limit
MCL - Maximum Contaminant Level, USEPA Regulated

ND = Not Detected at the MDL or MRL
MRL - Minimum Reporting Limit
[MCL] = Maximum Contaminant Level, Non-Regulated

*Method Code: STANDARD METHODS 19TH ED; US EPA METHODS FOR THE CHEMICAL ANALYSIS OF WATER AND WASTES, Rev. 83; US EPA METHODS FOR THE DETERMINATION OF METALS IN ENVIRONMENTAL SAMPLES, May 1994; TEST METHODS FOR EVALUATING SOLID WASTE, SW-846, 3rd ED; USEPA Manual for Certification of Laboratories Analyzing Drinking Water, 5th ED. In accordance with EPA Regulations, all reports, including raw data and quality control data, are maintained by the laboratory for a minimum of 5 years.
NOTE: #Holding time exceeded for this analysis.

RL1.001

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☐ 2044 MEADOWBROOK ROAD
POST OFFICE BOX 4657
BRIDGEPORT, WV 26330
TEL. (304) 842-5285 • FAX (304) 842-5351
E-MAIL reliancelabs@wvdsl.net
INTERNET www.RelianceLabs.net

☐ RIDGEFIELD BUSINESS CENTER
25 CRIMSON CIRCLE
MARTINSBURG, WV 25403
TEL. (304) 596-2084 • FAX (304) 596-2086

*CLIENT NAME Hall Drilling
*ADDRESS PO Box 249 Ellenboro,
CUSTOMER # C06443
*SAMPLER (S) T. Hall
*TEL. # 304 869 3209 FAX # 869 4040
E-MAIL

SHEET NO. 1 OF 1

LABORATORY #	*DATE	*TIME			MATRIX W, DW, S, O, M	TEMP. ≤4°C Yes (No)	# OF CONTAIN.	HNO3	H2SO4	HCL	NaOH	NAC-T	NO PRES.	Bac	Cl, TSS, TDS	Fe, Mn	pH, Na	TDS, Sal	TOC	*PROJECT/REMARKS
2103524	5-15-14	2:30		X	W	19.4	3	P		N			P	✓	✓	✓	✓	✓	✓	Teal Svc Ctr 3H Antero

[redacted]

SAMPLES DO ✓ DO NOT ____ MEET USEPA GUIDELINES FOR HOLDING TIMES
SAMPLES DO ✓ DO NOT ____ MEET USEPA GUIDELINES FOR CHEMICAL PRESERVATIVES
SAMPLES DO ✓ DO NOT ____ MEET USEPA GUIDELINES FOR SAMPLE CONTAINERS
SAMPLES ARE ✓ ARE NOT ____ FOR REGULATORY COMPLIANCE PURPOSES

*RELINQUISHED BY:	*DATE/TIME	*RECEIVED BY:
PRINT: John Gatto SIGN: [signature]	DATE: 5/16/14 TIME: 1120	PRINT: Ashley Fletcher SIGN: [signature]
*RELINQUISHED BY: PRINT: SIGN:	DATE: TIME:	*RECEIVED BY: PRINT: SIGN:
*RELINQUISHED BY: PRINT: SIGN:	DATE: TIME:	*RECEIVED BY: PRINT: SIGN:
*COURIER: TRACKING #:	DATE: TIME:	*RECEIVED BY: PRINT: SIGN:

REMARKS:

PWS# ____

WEATHER/TEMPERATURE:

☐ **RUSH STATUS** (INITIAL ACCEPTANCE ____)
*** ADDITIONAL LABORATORY FEES MAY APPLY ***

EXTENT OF LIABILITY

[illegible]

NOTE: TYPICAL SAMPLE TURN AROUND FOR ROUTINE SAMPLES IS 5 TO 10 WORKING DAYS. THIS IS NOT A GUARANTEE THAT SAMPLES WILL BE COMPLETED BY THIS TIME FRAME. HOWEVER, NON-ROUTINE SAMPLES MAY REQUIRE ADDITIONAL TIME.

[redacted]

ORIGINAL CHAIN OF CUSTODY DOCUMENT MUST BE EXECUTED IN INK

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Reliance Laboratories, Inc.
2044 Meadowbrook Road | P.O. Box 4657
Bridgeport, WV 26330
Phone: 304.842.5286 | Fax: 304.842.5351

Martinsburg Laboratory
Ridgefield Business Center | 25 Crimson Circle
Martinsburg, WV 25403
Phone: 304.596.2084 | Fax: 304.596.2086

Certifications: WV Department of Health #: 00354, 00443 | WV Department of Environmental Protection #: 158, 181
MD Department of Environment #: 336, 337 | US Environmental Protection Agency #: WV00042, WV00801

LABORATORY REPORT SUMMARY

Client: C06443

HALL DRILLING
961 E. WASHINGTON AVE.
ELLENBORO WV 26346-

Tuesday, May 27, 2014
Total Number of Pages: 2
(Not Including C.O.C.)
Page 1 of 2

Lab ID	Sample ID	Sample ID 2	Sample Date
212324-2014-W	TECH SVC CTR 3H	ANTERO	5/15/2014

The enclosed results have been analyzed according to the referenced method and SOP. Any deviations to the method have been noted on the report. Unless otherwise noted, all results have been verified to meet quality control requirements of the method. This report may not be reproduced, except in full, without written approval of Reliance Laboratories, Inc.

Report Reviewed By: Tenley Miller

Digitally signed by Tenley Miller
DN: cn=Tenley Miller, o=Reliance Laboratories, Inc., ou, email=tmiller@wvdsl.net, c=US
Date: 2014.05.30 15:07:26 -04'00'

Reliance Laboratories, Inc.
2044 Meadowbrook Road | P.O. Box 4657
Bridgeport, WV 26330
Phone: 304.842.5285 | Fax: 304.842.5351

Martinsburg Laboratory
Ridgefield Business Center | 25 Crimson Circle
Martinsburg, WV 25403
Phone: 304.596.2084 | Fax: 304.596.2086

Certifications: WV Department of Health #: 00354, 00443 | WV Department of Environmental Protection #: 168, 181
MD Department of Environment #: 336, 337 | US Environmental Protection Agency #: WV00042, WV00901

HALL DRILLING
981 E. WASHINGTON AVE.

Tuesday, May 27, 2014

ELLENBORO, WV 26346-

Lab Number: 212324-2014-W **Sample ID:** TECH SVC CTR 3H
ANTERO

Parameter	Value	Units	Method	Date/Time Analyzed		Analyst	MDL	MCL
Analyte Group: Inorganics								
Total Organic Carbon	473	mg/l	SM5310C-00	5/21/2014	8:52	MC	0.1	
pH	# 5.82	S.U.	SM4500H+B-00	5/19/2014	15:40	KV		
Total Chloride	8122	mg/l	SM4500CLB-97	5/21/2014	9:00	KV	2.52	
Total Iron	92.3	mg/l	EPA 200.7 R4.4	5/23/2014	10:11	TH	0.004	
Total Manganese	9.29	mg/l	EPA 200.7 R4.4	5/23/2014	10:11	TH	0.007	
Total Barium	627	mg/l	EPA 200.7 R4.4	5/23/2014	10:11	TH	0.003	
Total Sodium	29560	mg/l	EPA 200.7 R4.4	5/23/2014	10:11	TH	0.011	
Total Dissolved Solids	146540	mg/l	SM2540C-97	5/19/2014	11:15	CT	10	
Total Sulfate	ND	mg/l	ASTM D516-02	5/20/2014	13:45	KV	0.59	

Remarks:

Date Sample Collected: 5/15/2014 14:20
Sample Submitted By: T. HALL
Date Sample Received: 5/16/2014 11:20
Sample temp. upon receipt: 19.4 Deg C
MDL - Minimum Detectable Limit
MCL - Maximum Contaminant Level, USEPA Regulated

ND = Not Detected at the MDL or MRL
MRL - Minimum Reporting Limit
[MCL] = Maximum Contaminant Level, Non-Regulated

*Method Code: STANDARD METHODS 19TH ED; US EPA METHODS FOR THE CHEMICAL ANALYSIS OF WATER AND WASTES, Rev. 83; US EPA METHODS FOR THE DETERMINATION OF METALS IN ENVIRONMENTAL SAMPLES, May 1994; TEST METHODS FOR EVALUATING SOLID WASTE, SW-846, 3rd ED; USEPA Manual for Certification of Laboratories Analyzing Drinking Water, 5th ED. In accordance with EPA Regulations, all reports, including raw data and quality control data, are maintained by the laboratory for a minimum of 5 years.
NOTE: #Holding time exceeded for this analysis.

RLT.001

RELIANCE LABORATORIES, INC. - CHAIN OF CUSTODY RECORD

☐ 2044 MEADOWBROOK ROAD
POST OFFICE BOX 4657
BRIDGEPORT, WV 26330
TEL. (304) 842-5285 • FAX (304) 842-5351
E-MAIL reliancelabs@wvdsl.net
INTERNET www.RelianceLabs.net

☐ RIDGEFIELD BUSINESS CENTER
25 CRIMSON CIRCLE
MARTINSBURG, WV 25403
TEL. (304) 596-2084 • FAX (304) 596-2086

*CLIENT NAME Hall Drilling
*ADDRESS PO Box 249 Ellenboro, WV 26346
CUSTOMER # 06443
*SAMPLER (S) Ted H
*TEL. # 304 769 9404 FAX #
E-MAIL
SHEET NO. 1 OF 1

Analyses: Ba, Fe, Mn / Cl, SO4 / pH / Sodium / TDS/TSS / TOC

LABORATORY #	*DATE	*TIME			MATRIX W, DW, S, O, M	TEMP.	# OF CONTAIN.	HNO3	H2SO4	HCL	NaOH	BAC-T	NO PRES.	Analyses	*PROJECT/REMARKS
[redacted]														[redacted]	[redacted]
23930	6-15-14	4:30		X	W	26.8	3	P		V			P	✓ ✓ ✓ ✓ ✓ ✓	H&H Drilling Tech SVC, C+O 3H Antero

SAMPLES DO ✓ DO NOT ___ MEET USEPA GUIDELINES FOR HOLDING TIMES
SAMPLES DO ✓ DO NOT ___ MEET USEPA GUIDELINES FOR CHEMICAL PRESERVATIVES
SAMPLES DO ✓ DO NOT ___ MEET USEPA GUIDELINES FOR SAMPLE CONTAINERS
SAMPLES ARE ✓ ARE NOT ___ FOR REGULATORY COMPLIANCE PURPOSES

*RELINQUISHED BY:	*DATE/TIME	*RECEIVED BY:
PRINT: John L Gordon SIGN: [signature]	DATE: 6/17/14 TIME: 1905	PRINT: [signature] SIGN:
PRINT: SIGN:	DATE: TIME:	PRINT: SIGN:
PRINT: SIGN:	DATE: TIME:	PRINT: SIGN:
*COURIER: TRACKING #:	DATE: TIME:	PRINT: SIGN:

REMARKS:

PWS# ____

WEATHER/TEMPERATURE:

☐ **RUSH STATUS** (INITIAL ACCEPTANCE ____)
*** ADDITIONAL LABORATORY FEES MAY APPLY***

EXTENT OF LIABILITY
[illegible]

NOTE: TYPICAL SAMPLE TURN AROUND FOR ROUTINE SAMPLES IS 5 TO 10 WORKING DAYS. THIS IS NOT A GUARANTEE THAT SAMPLES WILL BE COMPLETED IN THIS TIME FRAME. [illegible]

[redacted]

ORIGINAL CHAIN OF CUSTODY DOCUMENT MUST BE [illegible]

WHITE - LABORATORY YELLOW - CLIENT

Reliance Laboratories, Inc.
2044 Meadowbrook Road | P.O. Box 4657
Bridgeport, WV 26330
Phone: 304.842.5265 | Fax: 304.842.5351

Martinsburg Laboratory
Ridgefield Business Center | 25 Crimson Circle
Martinsburg, WV 25403
Phone: 304.596.2084 | Fax: 304.596.2086

Certifications: WV Department of Health #: 00354, 00443 | WV Department of Environmental Protection #: 158, 161
MD Department of Environment #: 336, 337 | US Environmental Protection Agency #: WV00042, WV00901

LABORATORY REPORT SUMMARY

Client: C06443

HALL DRILLING
981 E. WASHINGTON AVE.
ELLENBORO WV 26346-

Monday, June 30, 2014

Total Number of Pages: 2
(Not Including C.O.C.)
Page 1 of 2

Lab ID	Sample ID	Sample ID 2	Sample Date
213936-2014-W	TECH SERVICE CENTER 3H	ANTERO	6/15/2014

The enclosed results have been analyzed according to the referenced method and SOP. Any deviations to the method have been noted on the report. Unless otherwise noted, all results have been verified to meet quality control requirements of the method. This report may not be reproduced, except in full, without written approval of Reliance Laboratories, Inc.

Report Reviewed By: Tenley Miller

Digitally signed by Tenley Miller
DN: cn=Tenley Miller, o=Reliance Laboratories, Inc., ou, email=env@wvdsl.net, c=US
Date: 2014.07.02 12:59:45 -04'00'

Reliance Laboratories, Inc.
2044 Meadowbrook Road | P.O. Box 4657
Bridgeport, WV 26330
Phone: 304.842.5285 | Fax: 304.842.5351

Martinsburg Laboratory
Ridgefield Business Center | 25 Crimson Circle
Martinsburg, WV 25403
Phone: 304.596.2084 | Fax: 304.596.2088

Certifications: WV Department of Health #: 00354, 00443 | WV Department of Environmental Protection #: 158, 161
MD Department of Environment #: 336, 337 | US Environmental Protection Agency #: WV00042, WV00901

HALL DRILLING
981 E. WASHINGTON AVE.

ELLENBORO, WV 26346-

Monday, June 30, 2014

Lab Number: 213936-2014-W **Sample ID:** TECH SERVICE CENTER 3H ANTERO

Parameter	Value	Units	Method	Date/Time Analyzed	Analyst	MDL	MCL
Analyte Group: Inorganics							
Total Organic Carbon	438	mg/l	SM5310C-00	6/24/2014 9:42	MC	0.1	
pH	# 5.46	S.U.	SM4500H+B-00	6/17/2014 15:43	KV		
Total Chloride	65980	mg/l	SM4500CLB-97	6/18/2014 12:50	KV	2.52	
Total Iron	115	mg/l	EPA 200.7 R4.4	6/27/2014 10:53	TH	0.004	
Total Manganese	1.90	mg/l	EPA 200.7 R4.4	6/27/2014 10:53	TH	0.007	
Total Barium	864	mg/l	EPA 200.7 R4.4	6/27/2014 10:53	TH	0.003	
Total Sodium	23500	mg/l	EPA 200.7 R4.4	6/27/2014 10:53	TH	0.011	
Total Dissolved Solids	113805	mg/l	SM2540C-97	6/19/2014 11:00	CT	10	
Total Sulfate	ND	mg/l	ASTM D516-02	6/23/2014 12:30	KV	0.59	

Remarks:

Date Sample Collected: 6/15/2014 16:30
Sample Submitted By: TJH
Date Sample Received: 6/17/2014 12:05
Sample temp. upon receipt: 23.8 Deg C

MDL - Minimum Detectable Limit
MCL - Maximum Contaminant Level, USEPA Regulated

ND = Not Detected at the MDL or MRL.
MRL - Minimum Reporting Limit
[MCL] = Maximum Contaminant Level, Non-Regulated

#Method Code: STANDARD METHODS 18TH ED; US EPA METHODS FOR THE CHEMICAL ANALYSIS OF WATER AND WASTES, Rev. III; US EPA METHODS FOR THE DETERMINATION OF METALS IN ENVIRONMENTAL SAMPLES, May 1994; TEST METHODS FOR EVALUATING SOLID WASTE, SW-846, 3rd ED; USEPA Manual for Certification of Laboratories Analyzing Drinking Water, 5th ED. In accordance with EPA Regulations, all reports, including raw data and quality control data, are maintained by the laboratory for a minimum of 5 years.
NOTE: #-Holding time exceeded for this analysis.

RLI.001

RELIANCE LABORATORIES, INC. - CHAIN OF CUSTODY RECORD

☐ 2044 MEADOWBROOK ROAD
POST OFFICE BOX 4657
BRIDGEPORT, WV 26330
TEL. (304) 842-5285 • FAX (304) 842-5351
E-MAIL relianceIabs@wvdsl.net
INTERNET www.RelianceLabs.net

☐ RIDGEFIELD BUSINESS CENTER
25 CRIMSON CIRCLE
MARTINSBURG, WV 25403
TEL. (304) 596-2084 • FAX (304) 596-2086

*CLIENT NAME Hall Drill

*ADDRESS PO Box 249, Ellenboro, WV 26346

CUSTOMER # Cold43

*TEL.# 869-3404 FAX# ______

*SAMPLER (S) TJH

E-MAIL ______

SHEET NO. 1 OF 1

LABORATORY #	*DATE	*TIME			MATRIX W, DW, S, O, M	TEMP. ≤4°C Yes No	# OF CONTAIN.	HNO3	H2SO4	HCL	NaOH	BAC-T	NO PRESV.	TDS	TDS/SO4	Na,Fe,Mn,Ba	Cl/SO4	pH			*PROJECT/REMARKS
[redacted]																					
26384	7-14-14	10:30		✓	W	21.4°	3	1		1			1	✓	✓	✓	✓	✓			Teel Sue Gtr 3H Antero

SAMPLES DO ✓ DO NOT ______ MEET USEPA GUIDELINES FOR HOLDING TIMES

SAMPLES DO ✓ DO NOT ______ MEET USEPA GUIDELINES FOR CHEMICAL PRESERVATIVES

SAMPLES DO ✓ DO NOT ______ MEET USEPA GUIDELINES FOR SAMPLE CONTAINERS

SAMPLES ARE ✓ ARE NOT ______ FOR REGULATORY COMPLIANCE PURPOSES

*RELINQUISHED BY:	*DATE/TIME	*RECEIVED BY:
PRINT: John L. Cl[illegible] SIGN: [signature]	DATE: 7-15-14 TIME: 11:00	PRINT: SIGN: C. Parker
*RELINQUISHED BY: PRINT: SIGN:	*DATE/TIME DATE: TIME:	*RECEIVED BY: PRINT: SIGN:
*RELINQUISHED BY: PRINT: SIGN:	*DATE/TIME DATE: TIME:	*RECEIVED BY: PRINT: SIGN:
*COURIER: TRACKING #:	*DATE/TIME DATE: TIME:	*RECEIVED BY: PRINT: SIGN:

REMARKS:

PWS# ______

WEATHER/TEMPERATURE:

☐ RUSH STATUS (INITIAL ACCEPTANCE ______)

*** ADDITIONAL LABORATORY FEES MAY APPLY***

EXTENT OF LIABILITY

[illegible]

NOTE: TYPICAL SAMPLE TURN AROUND FOR ROUTINE SAMPLES IS 5 TO 10 WORKING DAYS. THIS IS NOT A GUARANTEE THAT SAMPLES WILL BE COMPLETED IN THIS TIME FRAME, HOWEVER. [illegible]

[redacted]

ORIGINAL CHAIN OF CUSTODY DOCUMENT MUST BE EXECUTED IN INK

WHITE - LABORATORY YELLOW - CLIENT

Reliance Laboratories, Inc.
2044 Meadowbrook Road | P.O. Box 4657
Bridgeport, WV 26330
Phone: 304.842.5285 | Fax: 304.842.5351

Martinsburg Laboratory
Ridgefield Business Center | 25 Crimson Circle
Martinsburg, WV 25403
Phone: 304.596.2084 | Fax: 304.596.2086

Certifications: WV Department of Health #: 00354, 00443 | WV Department of Environmental Protection #: 156, 181
MD Department of Environment #: 336, 337 | US Environmental Protection Agency #: WV00042, WV00901

LABORATORY REPORT SUMMARY

Client: C08443

HALL DRILLING
981 E. WASHINGTON AVE.
ELLENBORO WV 26346-

Thursday, July 31, 2014

Total Number of Pages: 2
(Not Including C.O.C.)
Page 1 of 2

Lab ID	Sample ID	Sample ID 2	Sample Date
215364-2014-W	TECH SERVICE CENTER 3H	ANTERO	7/14/2014

The enclosed results have been analyzed according to the referenced method and SOP. Any deviations to the method have been noted on the report. Unless otherwise noted, all results have been verified to meet quality control requirements of the method. This report may not be reproduced, except in full, without written approval of Reliance Laboratories, Inc.

Report Reviewed By: Tanley Miller

Digitally signed by Tanley Miller
DN: cn=Tanley Miller, o=Reliance Laboratories, Inc., ou, email=tmiller@wvdsl.net, c=US
Date: 2014.08.11 100854 -04'00'

Reliance Laboratories, Inc.
2044 Meadowbrook Road | P.O. Box 4657
Bridgeport, WV 26330
Phone: 304.842.5285 | Fax: 304.842.5351

Martinsburg Laboratory
Ridgefield Business Center | 25 Crimson Circle
Martinsburg, WV 25403
Phone: 304.596.2084 | Fax: 304.596.2086

Certifications: WV Department of Health #: 00354, 00443 | WV Department of Environmental Protection #: 158, 181
MD Department of Environment #: 339, 337 | US Environmental Protection Agency #: WV00042, WV00901

HALL DRILLING
961 E. WASHINGTON AVE.

ELLENBORO, WV 26346-

Lab Number: 215384-2014-W **Sample ID:** TECH SERVICE CENTER 3H
ANTERO

Parameter	Value	Units	Method	Date/Time Analyzed	Analyst	MDL	MCL
Analyte Group: inorganics							
Total Organic Carbon	397	mg/l	SM5310C-00	7/17/2014	9:06 TH	0.1	
pH	# 5.22	S.U.	SM4500H+B-00	7/17/2014	11:53 KV		
Total Dissolved Solids	149264	mg/l	SM2540C-97	7/17/2014	10:30 CT	10	
Total Chloride	73977	mg/l	SM4500CLB-97	7/23/2014	9:45 KV	2.52	
Total Sulfate	295	mg/l	EPA 300.0 R2.1	7/29/2014	15:33 KD	0.05	
Total Iron	112	mg/l	EPA 200.7 R4.4	7/21/2014	13:05 TH	0.004	
Total Manganese	3.48	mg/l	EPA 200.7 R4.4	7/21/2014	13:05 TH	0.007	
Total Barium	503	mg/l	EPA 200.7 R4.4	7/21/2014	13:05 TH	0.003	
Total Sodium	21520	mg/l	EPA 200.7 R4.4	7/21/2014	13:05 TH	0.011	

Remarks:

Date Sample Collected: 7/14/2014 10:30
Sample Submitted By: TJH
Date Sample Received: 7/15/2014 11:00
Sample temp. upon receipt: 21.4 Deg C
MDL - Minimum Detectable Limit
MCL - Maximum Contaminant Level, USEPA Regulated

ND = Not Detected at the MDL or MRL
MRL - Minimum Reporting Limit
[MCL] = Maximum Contaminant Level, Non-Regulated

*Method Code: STANDARD METHODS 19TH ED; US EPA METHODS FOR THE CHEMICAL ANALYSIS OF WATER AND WASTES, Rev. 83; US EPA METHODS FOR THE DETERMINATION OF METALS IN ENVIRONMENTAL SAMPLES, May 1994; TEST METHODS FOR EVALUATING SOLID WASTE, SW-846, 3rd ED; USEPA Manual for Certification of Laboratories Analyzing Drinking Water, 5th ED. In accordance with EPA Regulations, all reports, including raw data and quality control data, are maintained by the laboratory for a minimum of 3 years.
NOTE: #Holding time exceeded for this analysis.

RLL001

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☐ 2044 MEADOWBROOK ROAD
POST OFFICE BOX 4657
BRIDGEPORT, WV 26330
TEL. (304) 842-5285 • FAX (304) 842-5351
E-MAIL reliancelabs@wvdsl.net
INTERNET www.RelianceLabs.net

☐ RIDGEFIELD BUSINESS CENTER
25 CRIMSON CIRCLE
MARTINSBURG, WV 25403
TEL. (304) 596-2084 • FAX (304) 596-2086

8-14-14

*CLIENT NAME Hall Drilling
*ADDRESS PO Box 249 Ellenboro, WV 26346
CUSTOMER # C00443
*SAMPLER (S) TJH
*TEL. # 3048695400 FAX #
E-MAIL

SHEET NO. 1 OF 1

Analyses: Fe, Mn, Ba, Na | Cl, pH | Sulfate | TDS, TOC

LABORATORY #	*DATE	*TIME	GRAB	COMP	MATRIX W, DW, S, O, M	TEMP ≤ 4°C Yes / No	# OF CONTAIN.	HNO3	H2SO4	HCL	NaOH	BAC-T	NO PRESERV.	Analyses	*PROJECT/REMARKS
217102	8-14-14	3:00		X	W	18.0	3	✓		1G			✓	[redacted]	[redacted] Tech. Svc. Ctr. 3H Antero Injection Water

SAMPLES DO ✓ DO NOT ___ MEET USEPA GUIDELINES FOR HOLDING TIMES
SAMPLES DO ✓ DO NOT ___ MEET USEPA GUIDELINES FOR CHEMICAL PRESERVATIVES
SAMPLES DO ✓ DO NOT ___ MEET USEPA GUIDELINES FOR SAMPLE CONTAINERS
SAMPLES ARE ✓ ARE NOT ___ FOR REGULATORY COMPLIANCE PURPOSES

*RELINQUISHED BY:	*DATE/TIME	*RECEIVED BY:
PRINT: John [illegible] SIGN: [signature]	DATE: 8-15-14 TIME: 11:51	PRINT: J. Hanshaw SIGN: J. Hanshaw
PRINT: SIGN:	DATE: TIME:	PRINT: SIGN:
PRINT: SIGN:	DATE: TIME:	PRINT: SIGN:
*COURIER: TRACKING #:	DATE: TIME:	PRINT: SIGN:

REMARKS:

PWS# ___

WEATHER/TEMPERATURE:

☐ **RUSH STATUS** (INITIAL ACCEPTANCE ___)
*** ADDITIONAL LABORATORY FEES MAY APPLY***

EXTENT OF LIABILITY

[illegible]

NOTE: TYPICAL SAMPLE TURN AROUND FOR ROUTINE SAMPLES IS 5 TO 10 WORKING DAYS. [illegible]

[redacted]

ORIGINAL CHAIN OF CUSTODY DOCUMENT MUST BE ENCLOSED IN BOX

WHITE - LABORATORY YELLOW - CLIENT

Reliance Laboratories, Inc.
2044 Meadowbrook Road | P.O. Box 4657
Bridgeport, WV 26330
Phone: 304.842.5285 | Fax: 304.842.5351

Martinsburg Laboratory
Ridgefield Business Center | 25 Crimson Circle
Martinsburg, WV 25403
Phone: 304.596.2084 | Fax: 304.596.2086

Certifications: WV Department of Health #: 00354, 00443 | WV Department of Environmental Protection #: 158, 161
MD Department of Environment #: 336, 337 | US Environmental Protection Agency #: WV00042, WV00901

LABORATORY REPORT SUMMARY

Client: C06443

HALL DRILLING
981 E. WASHINGTON AVE.
ELLENBORO WV 26346-

Thursday, August 28, 2014
Total Number of Pages: 2
(Not Including C.O.C.)
Page 1 of 2

Lab ID	Sample ID	Sample ID 2	Sample Date
217102-2014-W	TECH SERVICE CTR 3H	ANTERO INJECTION WATER	8/14/2014

The enclosed results have been analyzed according to the referenced method and SOP. Any deviations to the method have been noted on the report. Unless otherwise noted, all results have been verified to meet quality control requirements of the method. This report may not be reproduced, except in full, without written approval of Reliance Laboratories, Inc.

Report Reviewed By: Digitally signed by Tenley Miller
DN: cn=Tenley Miller, o=Reliance Laboratories, Inc., ou, email=tmiller@rlwvdsl.net, c=US
Date: 2014.08.28 12:18:10 -04'00'

Reliance Laboratories, Inc.
2044 Meadowbrook Road | P.O. Box 4657
Bridgeport, WV 26330
Phone: 304.842.5285 | Fax: 304.842.5351

Martinsburg Laboratory
Ridgefield Business Center | 25 Crimson Circle
Martinsburg, WV 25403
Phone: 304.596.2084 | Fax: 304.596.2086

Certifications: WV Department of Health #: 00854, 00449 | WV Department of Environmental Protection #: 168, 181
MD Department of Environment #: 336, 337 | US Environmental Protection Agency #: WV00042, WV00901

HALL DRILLING
981 E. WASHINGTON AVE.

ELLENBORO, WV 26346-

Lab Number: 217102-2014-W **Sample ID:** TECH SERVICE CTR 3H
ANTERO INJECTION WATER

Parameter	Value	Units	Method	Date/Time Analyzed	Analyst	MDL	MCL
Analyte Group: Inorganics							
Total Organic Carbon	252	mg/l	SM5310C-00	8/22/2014	8:52 MC	0.1	
pH	# 5.80	S.U.	SM4500H+B-00	8/18/2014	14:54 KV		
Total Dissolved Solids	137340	mg/l	SM2540C-97	8/18/2014	14:45 CT	10	
Total Chloride	79975	mg/l	SM4500CLB-97	8/20/2014	15:00 KV	2.62	
Total Iron	134	mg/l	EPA 200.7 R4.4	8/22/2014	10:12 TH	0.004	
Total Manganese	4.20	mg/l	EPA 200.7 R4.4	8/22/2014	10:12 TH	0.007	
Total Barium	653	mg/l	EPA 200.7 R4.4	8/22/2014	10:12 TH	0.003	
Total Sodium	27450	mg/l	EPA 200.7 R4.4	8/22/2014	10:12 TH	0.011	
Total Sulfate	ND	mg/l	ASTM D516-02	8/25/2014	13:00 KV	0.59	

Remarks:

Date Sample Collected: 8/14/2014 15:00
Sample Submitted By: TJH
Date Sample Received: 8/15/2014 11:51
Sample temp. upon receipt: 18.0 Deg C
MDL - Minimum Detectable Limit
MCL - Maximum Contaminant Level, USEPA Regulated
ND = Not Detected at the MDL or MRL
MRL - Minimum Reporting Limit
[MCL] = Maximum Contaminant Level, Non-Regulated

*Method Code: STANDARD METHODS 19TH ED; US EPA METHODS FOR THE CHEMICAL ANALYSIS OF WATER AND WASTES, Rev. 83; US EPA METHODS FOR THE DETERMINATION OF METALS IN ENVIRONMENTAL SAMPLES, May 1994; TEST METHODS FOR EVALUATING SOLID WASTE, SW-846, 3rd ED; USEPA Manual for Certification of Laboratories Analyzing Drinking Water, 5th ED. In accordance with EPA Regulations, all reports, including raw data and quality control data, are maintained by the laboratory for a minimum of 5 years.
NOTE: #-Holding time exceeded for this analysis.

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☐ 2044 MEADOWBROOK ROAD
POST OFFICE BOX 4657
BRIDGEPORT, WV 26330
TEL. (304) 842-5285 • FAX (304) 842-5351
E-MAIL reliancelabs@wvdsl.net
INTERNET www.RelianceLabs.net

☐ RIDGEFIELD BUSINESS CENTER
25 CRIMSON CIRCLE
MARTINSBURG, WV 25403
TEL. (304) 596-2084 • FAX (304) 596-2086

*CLIENT NAME Hall
*ADDRESS PO Box 24A Ellenboro, WV 26346
CUSTOMER # COX0043 *TEL. #304 [illegible] FAX #
*SAMPLER (S) J J H E-MAIL

SHEET NO. 1 OF 1

LABORATORY #	*DATE	*TIME	COMP	GRAB	MATRIX W, DW, S, O, M	TEMP. ≤4°C Yes No	*# OF CONTAIN.	HNO3	H2SO4	HCL	NaOH	BAC-T	NO PRES.	Bacteria	Chloride/Bromide	Barium	Oil/Grease/MBAS	SO4	TDS/TOC	*PROJECT/REMARKS
218794	9-15-14	2:00		X	W	21.8°	3	1		1			1							[redacted] Tech Svc. Grp. 3H Antero

SAMPLES DO ✓ DO NOT ____ MEET USEPA GUIDELINES FOR HOLDING TIMES
SAMPLES DO ✓ DO NOT ____ MEET USEPA GUIDELINES FOR CHEMICAL PRESERVATIVES
SAMPLES DO ✓ DO NOT ____ MEET USEPA GUIDELINES FOR SAMPLE CONTAINERS
SAMPLES ARE ✓ ARE NOT ____ FOR REGULATORY COMPLIANCE PURPOSES

*RELINQUISHED BY:	*DATE/TIME	*RECEIVED BY:
PRINT: John L. Gaston SIGN: [signature]	DATE: 9-16-14 TIME: 15:07	PRINT: SIGN: Crystal Parker
*RELINQUISHED BY: PRINT: SIGN:	*DATE/TIME DATE: TIME:	*RECEIVED BY: PRINT: SIGN:
*RELINQUISHED BY: PRINT: SIGN:	*DATE/TIME DATE: TIME:	*RECEIVED BY: PRINT: SIGN:
*COURIER: TRACKING #:	*DATE/TIME DATE: TIME:	*RECEIVED BY: PRINT: SIGN:

REMARKS:

PWS# ____

WEATHER/TEMPERATURE:

☐ **RUSH STATUS** (INITIAL ACCEPTANCE ____)
*** ADDITIONAL LABORATORY FEES MAY APPLY***

EXTENT OF LIABILITY
[illegible]

NOTE: TYPICAL SAMPLE TURN AROUND FOR ROUTINE SAMPLES IS 5 TO 10 WORKING DAYS. [illegible]

[redacted]

ORIGINAL CHAIN OF CUSTODY DOCUMENT MUST BE COMPLETED IN INK

WHITE - LABORATORY YELLOW - CLIENT

Reliance Laboratories, Inc.
2044 Meadowbrook Road | P.O. Box 4667
Bridgeport, WV 26330
Phone: 304.842.5285 | Fax: 304.842.5351

Martinsburg Laboratory
Ridgefield Business Center | 25 Crimson Circle
Martinsburg, WV 25403
Phone: 304.596.2084 | Fax: 304.596.2086

Certifications: WV Department of Health #: 00354, 00443 | WV Department of Environmental Protection #: 158, 181
MD Department of Environment #: 336, 337 | US Environmental Protection Agency #: WV00042, WV00901

LABORATORY REPORT SUMMARY

Client: C06443

HALL DRILLING
981 E. WASHINGTON AVE.
ELLENBORO WV 26346-

Wednesday, October 01, 2014

Total Number of Pages: 2
(Not Including C.O.C.)
Page 1 of 2

Lab ID	Sample ID	Sample ID 2	Sample Date
216794-2014-W	TECH SERVICE CENTER 3H	ANTERO	9/15/2014

The enclosed results have been analyzed according to the referenced method and SOP. Any deviations to the method have been noted on the report. Unless otherwise noted, all results have been verified to meet quality control requirements of the method. This report may not be reproduced, except in full, without written approval of Reliance Laboratories, Inc.

Report Reviewed By: Digitally signed by Tenley Miller
DN: cn=Tenley Miller, o=Reliance Laboratories, Inc., ou, email=tmiller@wvdsi.net, c=US
Date: 2014.10.15 09:51:25 -04'00'

Reliance Laboratories, Inc.
2044 Meadowbrook Road | P.O. Box 4657
Bridgeport, WV 26330
Phone: 304.842.5265 | Fax: 304.842.5351

Martinsburg Laboratory
Ridgefield Business Center | 25 Crimson Circle
Martinsburg, WV 25403
Phone: 304.596.2084 | Fax: 304.596.2086

Certifications: WV Department of Health #: 00354, 00443 | WV Department of Environmental Protection #: 158, 181
MD Department of Environment #: 336, 337 | US Environmental Protection Agency #: WV00042, WV00801

HALL DRILLING
981 E. WASHINGTON AVE.

ELLENBORO, WV 26346-

Wednesday, October 01, 2014

Lab Number: 218794-2014-W **Sample ID:** TECH SERVICE CENTER 3H ANTERO

Parameter	Value	Units	Method	Date/Time Analyzed	Analyst	MDL	MCL
Analyte Group: Inorganics							
Total Organic Carbon	347	mg/l	SM5310C-00	9/26/2014 10:17	MC	0.1	
pH	# 4.90	S.U.	SM4500H+B-00	9/17/2014 11:41	KV		
Total Dissolved Solids	151116	mg/l	SM2540C-97	9/18/2014 11:30	CT	10	
Total Chloride	82974	mg/l	SM4500CLB-97	9/24/2014 9:10	KV	2.52	
Total Iron	171	mg/l	EPA 200.7 R4.4	9/29/2014 14:50	MC	0.004	
Total Manganese	4.53	mg/l	EPA 200.7 R4.4	9/29/2014 14:50	MC	0.007	
Total Barium	670	mg/l	EPA 200.7 R4.4	9/29/2014 14:50	MC	0.003	
Total Sodium	39330	mg/l	EPA 200.7 R4.4	9/29/2014 14:50	MC	0.011	
Total Sulfate	ND	mg/l	ASTM D516-02	9/22/2014 14:00	KV	0.59	

Remarks:

Date Sample Collected:	9/16/2014	14:00
Sample Submitted By:	TJH	
Date Sample Received:	9/18/2014	16:07
Sample temp. upon receipt:	21.6 Deg C	

MDL - Minimum Detectable Limit
MCL - Maximum Contaminant Level, USEPA Regulated

ND = Not Detected at the MDL or MRL
MRL - Minimum Reporting Limit
(MCL) = Maximum Contaminant Level, Non-Regulated

*Method Code: STANDARD METHODS 19TH ED; US EPA METHODS FOR THE CHEMICAL ANALYSIS OF WATER AND WASTES, Rev. 83; US EPA METHODS FOR THE DETERMINATION OF METALS IN ENVIRONMENTAL SAMPLES, May 1994; TEST METHODS FOR EVALUATING SOLID WASTE, SW-846, 3rd ED; USEPA Manual for Certification of Laboratories Analyzing Drinking Water, 5th ED. In accordance with EPA Regulations, all reports, including raw data and quality control data, are maintained by the laboratory for a minimum of 5 years.
NOTE: #Holding time exceeded for this analysis.

RELIANCE LABORATORIES, INC. - CHAIN OF CUSTODY RECORD

☐ 2044 MEADOWBROOK ROAD
POST OFFICE BOX 4657
BRIDGEPORT, WV 26330
TEL. (304) 842-5285 • FAX (304) 842-5351
E-MAIL reliancelabs@wvdsl.net
INTERNET www.RelianceLabs.net

☐ RIDGEFIELD BUSINESS CENTER
25 CRIMSON CIRCLE
MARTINSBURG, WV 25403
TEL. (304) 596-2084 • FAX (304) 596-2086

*CLIENT NAME: Hall Drilling
*ADDRESS: PO Box 249 Ellenboro, WV 26346
CUSTOMER #: CO0443 *TEL #: 304 869 3944 FAX #:
*SAMPLER (S): TJH E-MAIL:

SHEET NO. 1 OF 1

LABORATORY #	*DATE	*TIME			MATRIX W, DW, S, O, M	TEMP. ≤ 6°C Yes (No)	# OF CONTAIN.	HNO3	H2SO4	HCL	NaOH	BAC-T	NO PRES.	Ba Fe Mn Na	Cl pH SO4	TDS TOC				*PROJECT/REMARKS
														[redacted]						
220587	10-15-14			/	W	23.6°	3	1		1			1	/	/	/				Antero Injection Water

SAMPLES DO ✓ DO NOT ______ MEET USEPA GUIDELINES FOR HOLDING TIMES
SAMPLES DO ✓ DO NOT ______ MEET USEPA GUIDELINES FOR CHEMICAL PRESERVATIVES
SAMPLES DO ✓ DO NOT ______ MEET USEPA GUIDELINES FOR SAMPLE CONTAINERS
SAMPLES ARE ✓ ARE NOT ______ FOR REGULATORY COMPLIANCE PURPOSES

*RELINQUISHED BY:	*DATE/TIME	*RECEIVED BY:
PRINT: John L. Cannon SIGN: [signature]	DATE: 10-16-14 TIME: 1150	PRINT: [signature] SIGN: [signature]
*RELINQUISHED BY: PRINT: SIGN:	*DATE/TIME DATE: TIME:	*RECEIVED BY: PRINT: SIGN:
*RELINQUISHED BY: PRINT: SIGN:	*DATE/TIME DATE: TIME:	*RECEIVED BY: PRINT: SIGN:
*COURIER: TRACKING #:	*DATE/TIME DATE: TIME:	*RECEIVED BY: PRINT: SIGN:

REMARKS:

PWS# ______

WEATHER/TEMPERATURE:

☐ ***RUSH STATUS*** (INITIAL ACCEPTANCE ______)
*** ADDITIONAL LABORATORY FEES MAY APPLY***

EXTENT OF LIABILITY
[illegible]

NOTE: TYPICAL SAMPLE TURN AROUND FOR ROUTINE SAMPLES IS [illegible] WORKING DAYS. THIS IS NOT A GUARANTEE THAT SAMPLES WILL BE COMPLETED IN THIS TIME FRAME. HOWEVER, NON-ROUTINE SAMPLES MAY REQUIRE ADDITIONAL TIME.

[redacted]

ORIGINAL CHAIN OF CUSTODY DOCUMENT MUST BE EXECUTED IN INK

WHITE - LABORATORY YELLOW - CLIENT

Reliance Laboratories, Inc.
2044 Meadowbrook Road | P.O. Box 4657
Bridgeport, WV 26330
Phone: 304.842.5285 | Fax: 304.842.5351

Martinsburg Laboratory
Ridgefield Business Center | 25 Crimson Circle
Martinsburg, WV 25403
Phone: 304.596.2084 | Fax: 304.596.2086

Certifications: WV Department of Health #: 00354, 00443 | WV Department of Environmental Protection #: 158, 181
MD Department of Environment #: 338, 337 | US Environmental Protection Agency #: WV00042, WV00901

LABORATORY REPORT SUMMARY

Client: C06443

HALL DRILLING
981 E. WASHINGTON AVE.
ELLENBORO WV 26346-

Thursday, October 30, 2014

Total Number of Pages: 2
(Not Including C.O.C.)
Page 1 of 2

Lab ID	Sample ID	Sample ID 2	Sample Date
220587-2014-W	ANTERO INJECTION WATER		10/15/2014

The enclosed results have been analyzed according to the referenced method and SOP. Any deviations to the method have been noted on the report. Unless otherwise noted, all results have been verified to meet quality control requirements of the method. This report may not be reproduced, except in full, without written approval of Reliance Laboratories, Inc.

Report Reviewed By: Tanley Miller

Digitally signed by Tanley Miller
DN: cn=Tanley Miller, o=Reliance Laboratories, Inc., [illegible], c=US
Date: 2014.11.04 16:12:10 -05'00'

Reliance Laboratories, Inc.
2044 Meadowbrook Road | P.O. Box 4667
Bridgeport, WV 26330
Phone: 304.842.5285 | Fax: 304.842.5351

Martinsburg Laboratory
Ridgefield Business Center | 25 Crimson Circle
Martinsburg, WV 25403
Phone: 304.596.2084 | Fax: 304.596.2086

Reliance LABORATORIES

Certifications: WV Department of Health #: 00354, 00445 | WV Department of Environmental Protection #: 168, 181
MD Department of Environment #: 336, 337 | US Environmental Protection Agency #: WV00042, WV00901

HALL DRILLING
981 E. WASHINGTON AVE.

ELLENBORO, WV 26346-

Thursday, October 30, 2014

Lab Number: 220587-2014-W **Sample ID:** ANTERO INJECTION WATER

Parameter	Value	Units	Method	Date/Time Analyzed	Analyst	MDL	MCL
Analyte Group: Inorganics							
Total Organic Carbon	657	mg/l	SM5310C-00	10/27/2014 8:34	MC	0.1	
pH	# 5.77	S.U.	SM4500H+B-00	10/21/2014 15:10	KV		
Total Dissolved Solids	136244	mg/l	SM2540C-97	10/17/2014 9:20	CP	10	
Total Chloride	89972	mg/l	SM4500CLB-97	10/23/2014 9:30	KV	2.52	
Total Iron	139	mg/l	EPA 200.7 R4.4	10/28/2014 18:01	MC	0.004	
Total Manganese	1.24	mg/l	EPA 200.7 R4.4	10/28/2014 18:01	MC	0.007	
Total Barium	711	mg/l	EPA 200.7 R4.4	10/28/2014 18:01	MC	0.003	
Total Sodium	41020	mg/l	EPA 200.7 R4.4	10/28/2014 18:01	MC	0.011	
Total Sulfate	ND	mg/l	ASTM D516-02	10/21/2014 9:40	KV	0.59	

Remarks:

Date Sample Collected: 10/15/2014
Sample Submitted By: TJH
Date Sample Received: 10/16/2014 11:50
Example temp. upon receipt: 23.6 Deg C
MDL - Minimum Detectable Limit
MCL - Maximum Contaminant Level, USEPA Regulated

ND = Not Detected at the MDL or MRL
MRL - Minimum Reporting Limit
[MCL] = Maximum Contaminant Level, Non-Regulated

*Method Code: STANDARD METHODS 19TH ED; US EPA METHODS FOR THE CHEMICAL ANALYSIS OF WATER AND WASTES, Rev. 83; US EPA METHODS FOR THE DETERMINATION OF METALS IN ENVIRONMENTAL SAMPLES, May 1994; TEST METHODS FOR EVALUATING SOLID WASTE, SW-846, 3rd ED; USEPA Manual for Certification of Laboratories Analyzing Drinking Water, 5th ED. In accordance with EPA Regulations, all reports, including raw data and quality control data, are maintained by the laboratory for a minimum of 5 years.
NOTE: #Holding time exceeded for this analysis.

RELIANCE LABORATORIES, INC. - CHAIN OF CUSTODY RECORD

☐ 2044 MEADOWBROOK ROAD
POST OFFICE BOX 4657
BRIDGEPORT, WV 26330
TEL. (304) 842-5285 • FAX (304) 842-5351
E-MAIL reliancelabs@wvdsl.net
INTERNET www.RelianceLabs.net

☐ RIDGEFIELD BUSINESS CENTER
25 CRIMSON CIRCLE
MARTINSBURG, WV 25403
TEL. (304) 596-2[illegible] • FAX (304) 596-2086

*CLIENT NAME Hall Drilling
*ADDRESS PO Box 249 Ellenboro, WV 26346
CUSTOMER # CO6443
*SAMPLER (S) T. Hall
*TEL. # 304 986 3404 FAX # ______
E-MAIL ______
SHEET NO. ______ OF ______

LABORATORY #	*DATE	*TIME	[illegible]	[illegible]	MATRIX W, DW, S, O, M	TEMP ≤ 4°C Yes No	# OF CONTAIN.	HNO3	H2SO4	HCL	NaOH	NAO-T	NO PRES.	TOC (w)	Barium	Chloride (w)	Iron (w)	Oil (w)	Sodium (w)	Sulfate (w)	TDS (w)	*PROJECT/REMARKS
222165	11-12-14	10 AM		X	W	17.2	3															[redacted]
																						Tech Svc Center 3H
																						Anchor Injection Water

SAMPLES DO ✓ DO NOT ______ MEET USEPA GUIDELINES FOR HOLDING TIMES
SAMPLES DO ______ DO NOT ______ MEET USEPA GUIDELINES FOR CHEMICAL PRESERVATIVES
SAMPLES DO ✓ DO NOT ______ MEET USEPA GUIDELINES FOR SAMPLE CONTAINERS
SAMPLES ARE ______ ARE NOT ______ FOR REGULATORY COMPLIANCE PURPOSES

*RELINQUISHED BY:	*DATE/TIME	*RECEIVED BY:
PRINT: John L. [illegible] SIGN: [signature]	DATE: 11/13/14 TIME: 11:05	PRINT: SIGN: [signature]
*RELINQUISHED BY: PRINT: SIGN:	*DATE/TIME DATE: TIME:	*RECEIVED BY: PRINT: SIGN:
*RELINQUISHED BY: PRINT: SIGN:	*DATE/TIME DATE: TIME:	*RECEIVED BY: PRINT: SIGN:
*COURIER: TRACKING #:	*DATE/TIME DATE: TIME:	*RECEIVED BY: PRINT: SIGN:

REMARKS:

PWS# ______

WEATHER/TEMPERATURE:

☐ *RUSH STATUS* (INITIAL ACCEPTANCE ______)
*** ADDITIONAL LABORATORY FEES MAY APPLY***

EXTENT OF LIABILITY

[illegible]

NOTE: TYPICAL SAMPLE TURN AROUND FOR ROUTINE SAMPLES IS 5 TO 10 WORKING DAYS. THIS IS NOT A GUARANTEE THAT SAMPLES WILL BE COMPLETED IN THIS TIME FRAME, HOWEVER. NON-ROUTINE SAMPLES MAY REQUIRE ADDITIONAL TIME.

[redacted]

ORIGINAL CHAIN OF CUSTODY DOCUMENT MUST BE [illegible] IN INK

WHITE - LABORATORY YELLOW - CLIENT

Reliance Laboratories, Inc.
2044 Meadowbrook Road | P.O. Box 4657
Bridgeport, WV 26330
Phone: 304.842.5285 | Fax: 304.842.5351

Martinsburg Laboratory
Ridgefield Business Center | 25 Crimson Circle
Martinsburg, WV 25403
Phone: 304.596.2084 | Fax: 304.596.2086

Certifications: WV Department of Health #: 00354, 00443 | WV Department of Environmental Protection #: 156, 181
MD Department of Environment #: 335, 337 | US Environmental Protection Agency #: WV00042, WV00901

LABORATORY REPORT SUMMARY

Client: C06443

HALL DRILLING
981 E. WASHINGTON AVE.
ELLENBORO WV 26346-

Tuesday, November 25, 2014

Total Number of Pages: 2
(Not Including C.O.C.)
Page 1 of 2

Lab ID	Sample ID	Sample ID 2	Sample Date
222165-2014-W	TECH SVC CENTER 3H	ANTERO INJECTION WATER	11/12/2014

The enclosed results have been analyzed according to the referenced method and SOP. Any deviations to the method have been noted on the report. Unless otherwise noted, all results have been verified to meet quality control requirements of the method. This report may not be reproduced, except in full, without written approval of Reliance Laboratories, Inc.

Report Reviewed By: Digitally signed by Tenley Miller
DN: cn=Tenley Miller, o=Reliance Laboratories, Inc., ou, email=...@wvdsl.net, c=US
Date: 2014.11.25 16:51:24 -05'00'

Reliance Laboratories, Inc.
2044 Meadowbrook Road | P.O. Box 4657
Bridgeport, WV 26330
Phone: 304.842.5285 | Fax: 304.842.5351

Martinsburg Laboratory
Ridgefield Business Center | 25 Crimson Circle
Martinsburg, WV 25403
Phone: 304.596.2084 | Fax: 304.596.2086

Certifications: WV Department of Health #: 00354, 00448 | WV Department of Environmental Protection #: 159, 161
MD Department of Environment #: 338, 337 | US Environmental Protection Agency #: WV00042, WV00601

HALL DRILLING
981 E. WASHINGTON AVE.

ELLENBORO, WV 26346-

Lab Number: 222165-2014-W **Sample ID:** TECH SVC CENTER 3H
ANTERO INJECTION WATER

Parameter	Value	Units	Method	Date/Time Analyzed	Analyst	MDL	MCL
Analyte Group: Inorganics							
Total Organic Carbon	783	mg/l	SM5310C-00	11/17/2014 10:55	MC	0.1	
pH	# 5.68	S.U.	SM4500H+B-00	11/14/2014 14:50	KV		
Total Dissolved Solids	159148	mg/l	SM2540C-97	11/14/2014 9:30	CP	10	
Total Chloride	92471	mg/l	SM4500CLB-97	11/19/2014 15:32	MC	2.52	
Total Iron	131	mg/l	EPA 200.7 R4.4	11/19/2014 10:55	TH	0.004	
Total Manganese	5.94	mg/l	EPA 200.7 R4.4	11/19/2014 10:55	TH	0.007	
Total Barium	744	mg/l	EPA 200.7 R4.4	11/19/2014 10:55	TH	0.003	
Total Sodium	35500	mg/l	EPA 200.7 R4.4	11/19/2014 10:55	TH	0.011	
Total Sulfate	ND	mg/l	ASTM D516-02	11/20/2014 14:30	MC	0.59	

Remarks:

Date Sample Collected:	11/12/2014	10:00
Sample Submitted By:	T.HALL	
Date Sample Received:	11/13/2014	11:05
Sample temp. upon receipt:	17.2 Deg C	

ND = Not Detected at the MDL or MRL
MDL - Minimum Detectable Limit
MRL - Minimum Reporting Limit
MCL - Maximum Contaminant Level, USEPA Regulated
[MCL] = Maximum Contaminant Level, Non-Regulated

*Method Code: STANDARD METHODS 19TH ED; US EPA METHODS FOR THE CHEMICAL ANALYSIS OF WATER AND WASTES, Rev. 83; US EPA METHODS FOR THE DETERMINATION OF METALS IN ENVIRONMENTAL SAMPLES, May 1994; TEST METHODS FOR EVALUATING SOLID WASTE, SW-846, 3rd ED; USEPA Manual for Certification of Laboratories Analyzing Drinking Water, 5th ED. In accordance with EPA Regulations, all reports, including raw data and quality control data, are maintained by the laboratory for a minimum of 5 years.
NOTE: #Holding time exceeded for this analysis.

RELIANCE LABORATORIES, INC. - CHAIN OF CUSTODY RECORD

☐ 2044 MEADOWBROOK ROAD
POST OFFICE BOX 4657
BRIDGEPORT, WV 26330
TEL. (304) 842-5285 • FAX (304) 842-5351
E-MAIL reliancelabs@wvdsl.net
INTERNET www.RelianceLabs.net

☐ RIDGEFIELD BUSINESS CENTER
25 CRIMSON CIRCLE
MARTINSBURG, WV 25408
TEL. (304) 596-[illegible] • FAX (304) 596-2056

*CLIENT NAME Hall Drilling

*ADDRESS PO Box 249 Ellenboro WV 26346

CUSTOMER # 10043 *TEL.# 869-3404 FAX #

*SAMPLER (S) T. Hall E-MAIL

SHEET NO. ____ OF ____

LABORATORY #	*DATE	*TIME	G	C	MATRIX W, DW, S, C, O	TEMP. ≤ 4°C Yes / No	# OF CONTAIN.	HNO3	H2SO4	HCL	NaOH	SAC-T	NO PRES.	*PROJECT/REMARKS
224049	11-16-14	5:00		X	W	18c	3							Antero Injection Water

SAMPLES DO X DO NOT ✓ MEET USEPA GUIDELINES FOR HOLDING TIMES
SAMPLES DO ___ DO NOT ___ MEET USEPA GUIDELINES FOR CHEMICAL PRESERVATIVES
SAMPLES DO ✓ DO NOT ___ MEET USEPA GUIDELINES FOR SAMPLE CONTAINERS
SAMPLES ARE ___ ARE NOT ___ FOR REGULATORY COMPLIANCE PURPOSES

*RELINQUISHED BY:	*DATE/TIME	*RECEIVED BY:
PRINT: Taylor Deutsch	DATE: 11/17/14	PRINT:
SIGN: Taylor Deutsch	TIME: 11:49	SIGN:
*RELINQUISHED BY:	*DATE/TIME	*RECEIVED BY:
PRINT:	DATE:	PRINT:
SIGN:	TIME:	SIGN:
*RELINQUISHED BY:	*DATE/TIME	*RECEIVED BY:
PRINT:	DATE:	PRINT:
SIGN:	TIME:	SIGN:
*COURIER:	*DATE/TIME	*RECEIVED BY:
TRACKING #:	DATE:	PRINT:
	TIME:	SIGN:

REMARKS:

PWS# ____

WEATHER/TEMPERATURE:

☐ ***RUSH STATUS*** (INITIAL ACCEPTANCE: ____)

*** ADDITIONAL LABORATORY FEES MAY APPLY***

EXTENT OF LIABILITY

[illegible]

ORIGINAL CHAIN OF CUSTODY DOCUMENT MUST BE RETURNED WITH

WHITE - LABORATORY YELLOW - CLIENT

Reliance Laboratories, Inc.
2044 Meadowbrook Road | P.O. Box 4657
Bridgeport, WV 26330
Phone: 304.842.5285 | Fax: 304.842.5351

Martinsburg Laboratory
Ridgefield Business Center | 25 Crimson Circle
Martinsburg, WV 25403
Phone: 304.596.2084 | Fax: 304.596.2086

Certifications: WV Department of Health #: 00354, 00443 | WV Department of Environmental Protection #: 156, 181
MD Department of Environment #: 336, 337 | US Environmental Protection Agency #: WV00042, WV00901

LABORATORY REPORT SUMMARY

Client: C06443

HALL DRILLING
981 E. WASHINGTON AVE.
ELLENBORO WV 26346-

Monday, January 05, 2015

Total Number of Pages: 2
(Not Including C.O.C.)
Page 1 of 2

Lab ID	Sample ID	Sample ID 2	Sample Date
224049-2014-W	ANTERO INJECTION WATER		12/16/2014

The enclosed results have been analyzed according to the referenced method and SOP. Any deviations to the method have been noted on the report. Unless otherwise noted, all results have been verified to meet quality control requirements of the method. This report may not be reproduced, except in full, without written approval of Reliance Laboratories, Inc.

Report Reviewed By: Digitally signed by Tonky Miller
DN: cn=Tonky Miller, o=Reliance Laboratories, Inc., ou, email=tmiller@wvdsl.net, c=US
Date: 2015.01.12 10:18:59 -05'00'

Reliance Laboratories, Inc.
2044 Meadowbrook Road | P.O. Box 4657
Bridgeport, WV 26330
Phone: 304.842.5285 | Fax: 304.842.5351

Martinsburg Laboratory
Ridgefield Business Center | 25 Crimson Circle
Martinsburg, WV 25403
Phone: 304.596.2084 | Fax: 304.596.2086

Certifications: WV Department of Health #: 00354, 00443 | WV Department of Environmental Protection #: 156, 161
MD Department of Environment #: 336, 337 | US Environmental Protection Agency #: WV00042, WV00901

HALL DRILLING
981 E. WASHINGTON AVE.

ELLENBORO, WV 26346-

Monday, January 05, 2015

Lab Number: 224049-2014-W **Sample ID:** ANTERO INJECTION WATER

Parameter	Value	Units	Method	Date/Time Analyzed	Analyst	MDL	MCL
Analyte Group: Inorganics							
Total Organic Carbon	3.56	mg/l	SM5310C-00	12/26/2014	10:58 MC	0.1	
pH	# 5.92	S.U.	SM4500H+B-00	12/29/2014	12:30 KV		
Total Dissolved Solids	117850	mg/l	SM2540C-97	12/19/2014	9:00 CP	10	
Total Chloride	78726	mg/l	SM4500CLB-97	12/26/2014	12:55 KV	2.52	
Total Iron	119	mg/l	EPA 200.7 R4.4	12/23/2014	12:21 TH	0.004	
Total Manganese	ND	mg/l	EPA 200.7 R4.4	12/23/2014	12:21 TH	0.007	
Total Barium	560	mg/l	EPA 200.7 R4.4	12/23/2014	12:21 TH	0.003	
Total Sodium	41550	mg/l	EPA 200.7 R4.4	12/23/2014	12:21 TH	0.011	
Total Sulfate	ND	mg/l	ASTM D516-02	12/29/2014	11:10 MC	0.59	

Remarks:

Date Sample Collected: 12/18/2014 5:00
Sample Submitted By: T.HALL
Date Sample Received: 12/18/2014 11:49
Sample temp. upon receipt: 18.6 Deg C
MDL - Minimum Detectable Limit
MCL - Maximum Contaminant Level, USEPA Regulated

ND = Not Detected at the MDL or MRL
MRL - Minimum Reporting Limit
[MCL] = Maximum Contaminant Level, Non-Regulated

*Method Code: STANDARD METHODS 19TH ED; US EPA METHODS FOR THE CHEMICAL ANALYSIS OF WATER AND WASTES, Rev. 83; US EPA METHODS FOR THE DETERMINATION OF METALS IN ENVIRONMENTAL SAMPLES, May 1994; TEST METHODS FOR EVALUATING SOLID WASTE, SW-846, 3rd ED; USEPA Manual for Certification of Laboratories Analyzing Drinking Water, 5th ED. In accordance with EPA Regulations, all reports, including raw data and quality control data, are maintained by the laboratory for a minimum of 5 years.
NOTE: #Holding time exceeded for this analysis.

NOTE: Sample temperature upon receipt exceeds 6 degrees C.

RLI001

Monitoring Well

REI Consultants, Inc.
PO Box 286
Beaver, WV 25813
TEL: 304.255.2500
Website: www.reiclabs.com

Improving the environment, one client at a time...

3029-C Peters Creek Road
Roanoke, VA 24019
TEL: 540.777.1276

101 17th Street
Ashland, KY 41101
TEL: 606.393.5027

1557 Commerce Road, Suite 201
Verona, VA 24482
TEL: 540.248.0183

16 Commerce Drive
Westover, WV 26501
TEL: 304.241.5861

Thursday, November 21, 2013

John Nock
CORE ENVIRONMENTAL SERVICES INC
4 BROOKSTONE PLAZA
MORGANTOWN, WV 26508

TEL: (304) 292-2673
FAX:

RE: HALL DRILLING
Work Order #: 1311F88

Dear John Nock:

REI Consultants, Inc. received 4 sample(s) on 11/14/2013 for the analyses presented in the following report.

Sincerely,

Jimmy Suttle
Project Manager

REI Consultants, Inc. - Case Narrative

WO#: 1311F88

Date Reported: 11/21/2013

Client: CORE ENVIRONMENTAL SERVICES INC

Project: HALL DRILLING

The analytical results presented in this report were produced using documented laboratory SOPs that incorporate appropriate quality control procedures as described in the applicable methods. Verification of required sample preservation (as required) is recorded on associated laboratory logs. Any deviation from compliance or method modification is identified within the body of this report by a qualifier footnote which is defined at the bottom of this page.

All sample results for solid samples are reported on an "as-received" wet weight basis unless otherwise noted.

Results reported for sums of individual parameters, such as TTHM and HAA5, may vary slightly from the sum of the individual parameter results, due to rounding of individual results, as required by EPA.

The test results in this report meet all NELAP (and/or VELAP) requirements for parameters except as noted in this report.

Please note if the sample collection time is not provided on the Chain of Custody, the default recording will be 0:00:00. This may cause some tests to be apparently analyzed out of hold.

All tests performed by REIC Service Centers are designated by an annotation on the test code. All other tests were performed by REIC's Main Laboratory in Beaver, WV.

DEFINITIONS:
MCL: Maximum Contaminant Level
MDL: Method Detection Limit; The lowest concentration of analyte that can be detected by the method in the applicable matrix.
Mg/Kg or mg/L: Units of part per million (PPM) - milligram per Kilogram (weight/weight) or milligram per Liter (weight/volume).
NA: Not Applicable
ND: Not Detected at the PQL or MDL
PQL: Practical Quantitation Limit; The lowest verified limit to which data is quantified without qualifications. Analyte concentrations below PQL are reported either as ND or as a number with a "J" qualifier.
Qual: Qualifier that applies to the analyte reported.
TIC: Tentatively Identified Compound, Estimated Concentration denoted by "J" qualifier.
Ug/Kg or ug/L: Units of part per billion (PPB) - microgram per kilogram (weight/weight) or microgram per liter (weight/volume).

QUALIFIERS:
X: Reported value exceeds required MCL
B: Analyte detected in the associated Method Blank at a concentration > 1/2 the PQL
E: Analyte concentration reported that exceeds the upper calibration standard. Greater uncertainty is associated with this result and data should be consider estimated.
H: Holding time for preparation or analysis has been exceeded.
J: Analyte concentration is reported, and is less than the PQL and greater than or equal to the MDL. The result reported is an estimate.
S: % REC (% recovery) exceeds control limits

CERTIFICATIONS:
Beaver, WV: WVDHHR 00412CM, WVDEP 060, VADCLS 00281, KYDEP 90039, TNDEQ TN02926, NCDWQ 496, PADEP 68-00839, VADCLS (VELAP) 460148
Bioassay (Beaver, WV): WVDEP 060, VADCLS(VELAP) 460149, PADEP 68-00339
Roanoke, VA: VADCLS(VELAP) 460150
Verona, VA: VADCLS(VELAP) 460151
Ashland, KY: KYDEP 00004, WVDEP 369
Morgantown, WV: WVDHHR 003112M, WVDEP 387

REI Consultants, Inc. - Analytical Report

WO#: 1311F88

Date Reported: 11/21/2013

Client:	CORE ENVIRONMENTAL SERVICES INC	Collection Date:	11/13/2013 2:40:00 PM
Project:	HALL DRILLING	Date Received:	11/14/2013
Lab ID:	1311F88-01A	Matrix:	Liquid
Client Sample ID:	MW-1	Site ID:	ELLENBORO, WV

Analysis	Result	PQL	MCL	Qual	Units	PrepDate	Date Analyzed
METALS BY ICP		Method: EPA 200.7				EPA 200.2	Analyst: LF
Barium	0.306	0.100	NA		mg/L	11/15/2013 12:59 P	11/19/2013 12:16 P
Iron	6.37	0.100	NA		mg/L	11/15/2013 12:59 P	11/19/2013 12:16 P
Manganese	0.249	0.100	NA		mg/L	11/15/2013 12:59 P	11/19/2013 12:16 P
Sodium	30.1	10.0	NA		mg/L	11/15/2013 12:59 P	11/20/2013 12:47 P
SEMI-VOLATILE RANGE ORGANICS		Method: SW8015C				SW3510B	Analyst: CL
TPH (Diesel Range)	ND	0.12	NA		mg/L	11/19/2013 8:30 AM	11/19/2013 4:13 PM
TPH (Oil Range)	ND	0.31	NA		mg/L	11/19/2013 8:30 AM	11/19/2013 4:13 PM
Surr: o-Terphenyl	106	28.3-152	NA		%REC	11/19/2013 8:30 AM	11/19/2013 4:13 PM
VOLATILE RANGE ORGANICS		Method: SW8015C					Analyst: TC
TPH (Gasoline Range)	ND	0.500	NA		mg/L	11/19/2013 1:00 PM	11/20/2013 3:29 AM
Surr: 2,5-Dibromotoluene	75.8	37.2-152	NA		%REC	11/19/2013 1:00 PM	11/20/2013 3:29 AM
VOLATILE ORGANIC COMPOUNDS		Method: SW8021B					Analyst: KH
Benzene	ND	1.00	NA		µg/L	11/19/2013 1:00 PM	11/20/2013 3:29 AM
Toluene	ND	1.00	NA		µg/L	11/19/2013 1:00 PM	11/20/2013 3:29 AM
Ethylbenzene	ND	1.00	NA		µg/L	11/19/2013 1:00 PM	11/20/2013 3:29 AM
m,p-Xylene	ND	2.00	NA		µg/L	11/19/2013 1:00 PM	11/20/2013 3:29 AM
o-Xylene	ND	1.00	NA		µg/L	11/19/2013 1:00 PM	11/20/2013 3:29 AM
Surr: 1,1,1-Trifluorotoluene	88.1	63.4-131	NA		%REC	11/19/2013 1:00 PM	11/20/2013 3:29 AM
ANIONS by ION CHROMATOGRAPHY		Method: EPA 300.0					Analyst: CF
Bromide	ND	0.10	NA		mg/L		11/15/2013 12:30 P
Chloride	2.37	1.00	NA		mg/L		11/15/2013 12:30 P
Sulfate	ND	5.00	NA		mg/L		11/15/2013 12:30 P
TOTAL DISSOLVED SOLIDS		Method: SM2540 C					Analyst: SF
Total Dissolved Solids	219	10	NA		mg/L	11/15/2013 11:21 A	11/15/2013 11:21 A
TOTAL SUSPENDED SOLIDS		Method: SM2540 D					Analyst: SF
Total Suspended Solids	181	10.0	NA		mg/L	11/15/2013 11:15 A	11/15/2013 11:15 A
ORGANIC CARBON, TOTAL		Method: SM5310 C					Analyst: DSD
Total Organic Carbon	ND	1.00	NA		mg/L		11/15/2013 5:19 PM

REI Consultants, Inc. - Analytical Report

WO#: 1311F88

Date Reported: 11/21/2013

Client:	CORE ENVIRONMENTAL SERVICES INC	**Collection Date:**	11/13/2013 5:20:00 PM
Project:	HALL DRILLING	**Date Received:**	11/14/2013
Lab ID:	1311F88-02A	**Matrix:**	Liquid
Client Sample ID:	MW-2	**Site ID:**	ELLENBORO, WV

Analysis	Result	PQL	MCL	Qual	Units	PrepDate	Date Analyzed
METALS BY ICP		**Method: EPA 200.7**				**EPA 200.2**	**Analyst: LF**
Barium	0.134	0.100	NA		mg/L	11/15/2013 12:59 P	11/19/2013 12:20 P
Iron	1.76	0.100	NA		mg/L	11/15/2013 12:59 P	11/19/2013 12:20 P
Manganese	ND	0.100	NA		mg/L	11/15/2013 12:59 P	11/19/2013 12:20 P
Sodium	85.6	10.0	NA		mg/L	11/15/2013 12:59 P	11/20/2013 12:50 P
SEMI-VOLATILE RANGE ORGANICS		**Method: SW8015C**				**SW3510B**	**Analyst: CL**
TPH (Diesel Range)	ND	0.13	NA		mg/L	11/19/2013 8:30 AM	11/19/2013 4:45 PM
TPH (Oil Range)	ND	0.33	NA		mg/L	11/19/2013 8:30 AM	11/19/2013 4:45 PM
Surr: o-Terphenyl	98.9	28.3-152	NA		%REC	11/19/2013 8:30 AM	11/19/2013 4:45 PM
VOLATILE RANGE ORGANICS		**Method: SW8015C**					**Analyst: TC**
TPH (Gasoline Range)	ND	0.500	NA		mg/L	11/19/2013 1:00 PM	11/20/2013 4:05 AM
Surr: 2,5-Dibromotoluene	78.0	37.2-152	NA		%REC	11/19/2013 1:00 PM	11/20/2013 4:05 AM
VOLATILE ORGANIC COMPOUNDS		**Method: SW8021B**					**Analyst: KH**
Benzene	ND	1.00	NA		µg/L	11/19/2013 1:00 PM	11/20/2013 4:05 AM
Toluene	ND	1.00	NA		µg/L	11/19/2013 1:00 PM	11/20/2013 4:05 AM
Ethylbenzene	ND	1.00	NA		µg/L	11/19/2013 1:00 PM	11/20/2013 4:05 AM
m,p-Xylene	ND	2.00	NA		µg/L	11/19/2013 1:00 PM	11/20/2013 4:05 AM
o-Xylene	ND	1.00	NA		µg/L	11/19/2013 1:00 PM	11/20/2013 4:05 AM
Surr: 1,1,1-Trifluorotoluene	90.0	63.4-131	NA		%REC	11/19/2013 1:00 PM	11/20/2013 4:05 AM
ANIONS by ION CHROMATOGRAPHY		**Method: EPA 300.0**					**Analyst: CF**
Bromide	ND	0.10	NA		mg/L		11/15/2013 12:49 P
Chloride	ND	1.00	NA		mg/L		11/15/2013 12:49 P
Sulfate	18.1	5.00	NA		mg/L		11/15/2013 12:49 P
TOTAL DISSOLVED SOLIDS		**Method: SM2540 C**					**Analyst: SF**
Total Dissolved Solids	288	10	NA		mg/L	11/15/2013 11:21 A	11/15/2013 11:21 A
TOTAL SUSPENDED SOLIDS		**Method: SM2540 D**					**Analyst: SF**
Total Suspended Solids	36.0	10.0	NA		mg/L	11/15/2013 11:15 A	11/15/2013 11:15 A
ORGANIC CARBON, TOTAL		**Method: SM5310 C**					**Analyst: DSD**
Total Organic Carbon	ND	1.00	NA		mg/L		11/15/2013 5:19 PM

REI Consultants, Inc. - Analytical Report

WO#: 1311F88

Date Reported: 11/21/2013

Client:	CORE ENVIRONMENTAL SERVICES INC	Collection Date:	11/13/2013 3:55:00 PM
Project:	HALL DRILLING	Date Received:	11/14/2013
Lab ID:	1311F88-03A	Matrix:	Liquid
Client Sample ID:	MW-3	Site ID:	ELLENBORO, WV

Analysis	Result	PQL	MCL	Qual	Units	PrepDate	Date Analyzed
METALS BY ICP		Method: EPA 200.7				EPA 200.2	Analyst: LF
Barium	0.262	0.100	NA		mg/L	11/15/2013 12:59 P	11/19/2013 12:29 P
Iron	1.12	0.100	NA		mg/L	11/15/2013 12:59 P	11/19/2013 12:29 P
Manganese	ND	0.100	NA		mg/L	11/15/2013 12:59 P	11/19/2013 12:29 P
Sodium	51.7	10.0	NA		mg/L	11/15/2013 12:59 P	11/20/2013 12:53 P
SEMI-VOLATILE RANGE ORGANICS		Method: SW8015C				SW3510B	Analyst: CL
TPH (Diesel Range)	0.20	0.12	NA		mg/L	11/19/2013 8:30 AM	11/19/2013 5:17 PM
TPH (Oil Range)	ND	0.30	NA		mg/L	11/19/2013 8:30 AM	11/19/2013 5:17 PM
Surr: o-Terphenyl	108	28.3-152	NA		%REC	11/19/2013 8:30 AM	11/19/2013 5:17 PM
VOLATILE RANGE ORGANICS		Method: SW8015C					Analyst: TC
TPH (Gasoline Range)	ND	0.500	NA		mg/L	11/19/2013 1:00 PM	11/20/2013 4:42 AM
Surr: 2,5-Dibromotoluene	75.8	37.2-152	NA		%REC	11/19/2013 1:00 PM	11/20/2013 4:42 AM
VOLATILE ORGANIC COMPOUNDS		Method: SW8021B					Analyst: KH
Benzene	ND	1.00	NA		µg/L	11/19/2013 1:00 PM	11/20/2013 4:42 AM
Toluene	ND	1.00	NA		µg/L	11/19/2013 1:00 PM	11/20/2013 4:42 AM
Ethylbenzene	ND	1.00	NA		µg/L	11/19/2013 1:00 PM	11/20/2013 4:42 AM
m,p-Xylene	ND	2.00	NA		µg/L	11/19/2013 1:00 PM	11/20/2013 4:42 AM
o-Xylene	ND	1.00	NA		µg/L	11/19/2013 1:00 PM	11/20/2013 4:42 AM
Surr: 1,1,1-Trifluorotoluene	88.0	63.4-131	NA		%REC	11/19/2013 1:00 PM	11/20/2013 4:42 AM
ANIONS by ION CHROMATOGRAPHY		Method: EPA 300.0					Analyst: CF
Bromide	ND	0.10	NA		mg/L		11/15/2013 1:06 PM
Chloride	ND	1.00	NA		mg/L		11/15/2013 1:06 PM
Sulfate	ND	5.00	NA		mg/L		11/15/2013 1:06 PM
TOTAL DISSOLVED SOLIDS		Method: SM2540 C					Analyst: SF
Total Dissolved Solids	212	10	NA		mg/L	11/15/2013 11:21 A	11/18/2013 11:21 A
TOTAL SUSPENDED SOLIDS		Method: SM2540 D					Analyst: SF
Total Suspended Solids	29.0	10.0	NA		mg/L	11/15/2013 11:15 A	11/15/2013 11:15 A
ORGANIC CARBON, TOTAL		Method: SM5310 C					Analyst: DSD
Total Organic Carbon	ND	1.00	NA		mg/L		11/15/2013 5:19 PM

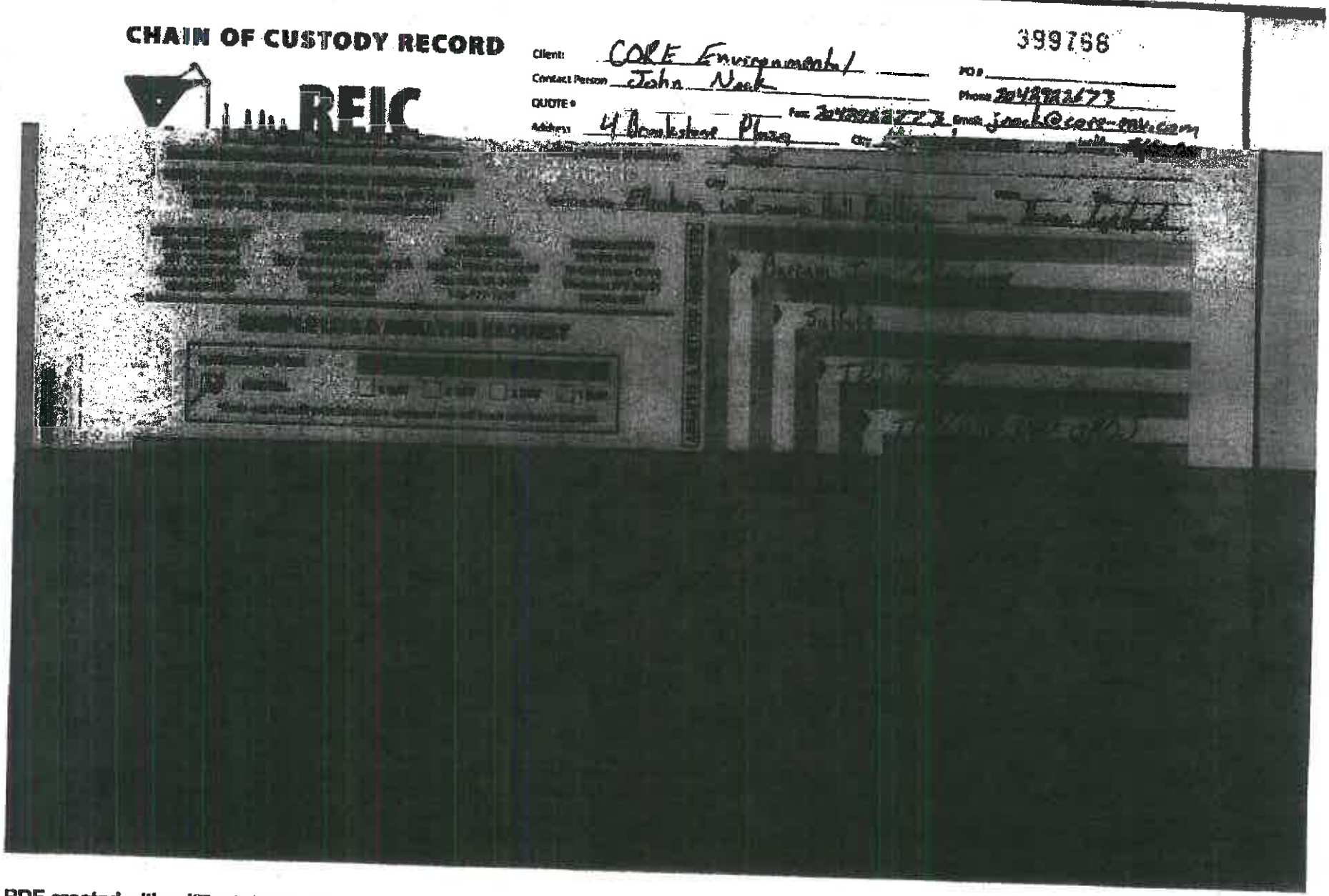
REI Consultants, Inc. - Analytical Report

WO#: 1311F88

Date Reported: 11/21/2013

Client:	CORE ENVIRONMENTAL SERVICES INC	**Collection Date:**	11/13/2013 12:00:00 AM
Project:	HALL DRILLING	**Date Received:**	11/14/2013
Lab ID:	1311F88-04A	**Matrix:**	Trip Blank
Client Sample ID:	TRIP BLANK	**Site ID:**	ELLENBORO, WV

Analysis	Result	PQL	MCL	Qual	Units	PrepDate	Date Analyzed
VOLATILE ORGANIC COMPOUNDS		**Method: SW8021B**					**Analyst: KH**
Benzene	ND	1.00	NA		µg/L	11/19/2013 1:00 PM	11/20/2013 6:31 AM
Toluene	ND	1.00	NA		µg/L	11/19/2013 1:00 PM	11/20/2013 6:31 AM
Ethylbenzene	ND	1.00	NA		µg/L	11/19/2013 1:00 PM	11/20/2013 6:31 AM
m,p-Xylene	ND	2.00	NA		µg/L	11/19/2013 1:00 PM	11/20/2013 6:31 AM
o-Xylene	ND	1.00	NA		µg/L	11/19/2013 1:00 PM	11/20/2013 6:31 AM
Surr: 1,1,1-Trifluorotoluene	87.9	63.4-131	NA		%REC	11/19/2013 1:00 PM	11/20/2013 6:31 AM



RELIANCE LABORATORIES, INC.

ENVIRONMENTAL ANALYSTS AND CONSULTANTS

BRIDGEPORT, WV | www.RelianceLabs.net | MARTINSBURG, WV

Certifications: WV Department of Health #: 00354, 00433 | WV Department of Environmental Protection #: 158, 181
MD Department of Environment #: 336, 337 | US Environmental Protection Agency #: WV00042, WV00901

LABORATORY REPORT SUMMARY

Client: C06443

HALL DRILLING
981 E. WASHINGTON AVE.
ELLENBORO WV 26346-

Monday, August 05, 2013
Total Number of Pages: 2
(Not Including C.O.C.)
Page 1 of 2

Lab ID	Sample ID	Sample ID 2	Sample Date
199045-2013-W	TECH SERVICE CENTER 3H		7/25/2013

The enclosed results have been analyzed according to the referenced method and SOP. Any deviations to the method have been noted on the report. Unless otherwise noted, all results have been verified to meet quality control requirements of the method. This report may not be reproduced, except in full, without written approval of Reliance Laboratories, Inc.

Report Reviewed By: Digitally signed by Tenley Miller
DN: cn=Tenley Miller, o=Reliance Laboratories, Inc., ou, email=tmiller@reliancelabs.net, c=US
Date: 2013.08.05 [illegible]

RELIANCE LABORATORIES, INC.

ENVIRONMENTAL ANALYSTS AND CONSULTANTS

BRIDGEPORT, WV www.RelianceLabs.net MARTINSBURG, WV

Certifications: WV Department of Health #: 00354, 00433 | WV Department of Environmental Protection #: 158, 181
MD Department of Environment #: 336, 337 | US Environmental Protection Agency #: WV00042, WV00901

HALL DRILLING
961 E. WASHINGTON AVE.

ELLENBORO, WV 26346-

Monday, August 05, 2013

Lab Number: 199045-2013-W **Sample ID:** TECH SERVICE CENTER 3H

Parameter	Value	Units	Method	Date/Time Analyzed	Analyst	MDL	MCL
Analyte Group: Inorganics							
Total Organic Carbon	171	mg/l	SM5310C	8/2/2013	11:07 M.Cottman	0.1	
pH	# 6.16	S.U.	SM4500H+B	8/1/2013	14:30 K.VanDusen		
Total Dissolved Solids	111276	mg/l	SM 2540C	7/29/2013	10:00 C.Tomaro	10	
Total Iron	73.8	mg/l	EPA 200.7	7/31/2013	10:31 T.Hanshaw	0.004	
Total Chloride	73977	mg/l	SM 4500CLB	8/1/2013	10:20 K.Davis	2.52	
Total Barium	463	mg/l	EPA 200.7	7/31/2013	10:31 T.Hanshaw	0.003	
Total Manganese	7.01	mg/l	EPA 200.7	7/31/2013	10:31 T.Hanshaw	0.007	
Total Sodium	22400	mg/l	EPA 200.7	7/31/2013	10:31 T.Hanshaw	0.011	
Total Sulfate	46.4	mg/l	D516-02	7/31/2013	9:30 K.VanDusen	0.59	

Remarks:

Date Sample Collected: 7/29/2013 15:00
Sample Submitted By: T. HALL
Date Sample Received: 7/30/2013 13:52
ND = Not Detected at the MDL or MRL
MDL - Minimum Detectable Limit MRL - Minimum Reporting Limit
MCL - Maximum Contaminant Level, USEPA Regulated [MCL] = Maximum Contaminant Level, Non-Regulated

*Method Code: STANDARD METHODS 19TH ED; US EPA METHODS FOR THE CHEMICAL ANALYSES OF WATER AND WASTES, Rev. 83; US EPA METHODS FOR THE DETERMINATION OF METALS IN ENVIRONMENTAL SAMPLES, May 1994; TEST METHODS FOR EVALUATING SOLID WASTE, SW-846, 3rd ED; USEPA Manual for Certification of Laboratories Analyzing Drinking Water, 5th ED. In accordance with EPA Regulations, all reports, including raw data and quality control data, are maintained by the laboratory for a minimum of 5 years.
NOTE: #Holding time exceeded for this analysis.

2044 MEADOWBROOK ROAD | P.O. BOX 4857 | BRIDGEPORT, WV 26330 | VOICE: 304-842-5285 | FAX: 304-842-5351
RIDGEFIELD BUSINESS CENTER | 25 CRIMSON CIRCLE | MARTINSBURG, WV 25403 | VOICE: 304-596-2084 | FAX: 304-596-2058
EMAIL: RELIANCELABS@WVDSL.NET | WEB: WWW.RELIANCELABS.NET

RELIANCE LABORATORIES, INC. - CHAIN OF CUSTODY RECORD

☐ 2044 MEADOWBROOK ROAD
POST OFFICE BOX 4657
BRIDGEPORT, WV 26330
TEL. (304) 842-5285 • FAX (304) 842-5351
E-MAIL reliancelabs@wvdsl.net
INTERNET www.RelianceLabs.net

☐ RIDGEFIELD BUSINESS CENTER
25 CRIMSON CIRCLE
MARTINSBURG, WV 25403
TEL. (304) 596-2084 • FAX (304) 596-2086

*CLIENT NAME Hall Drilling

*ADDRESS

CUSTOMER # C0443

*TEL. # 304 869-3404 FAX #

*SAMPLER (S) Tyler Hall

E-MAIL

SHEET NO. 1 OF 1

Analyses (column headings): Pb/TOC; Fe MN Cl; NA/Sulfate; TDS/BA

LABORATORY #	*DATE	*TIME	COMP	GRAB	MATRIX W, DW, S, O, M	TEMP. ≤4°C Yes	TEMP. ≤4°C No	# OF CONTAIN.	HNO3	H2SO4	HCL	NaOH	SAC-T	NO PRES.	Pb/TOC	Fe MN Cl	NA/Sulfate	TDS/BA				*PROJECT/REMARKS
																						[redacted]
199045	7/25/13	3pm		✓	W	30.0		3	1		1			1	✓	✓	✓	✓				Tech Service Center-3

SAMPLES DO ✓ DO NOT ___ MEET USEPA GUIDELINES FOR HOLDING TIMES
SAMPLES DO ✓ DO NOT ___ MEET USEPA GUIDELINES FOR CHEMICAL PRESERVATIVES
SAMPLES DO ✓ DO NOT ___ MEET USEPA GUIDELINES FOR SAMPLE CONTAINERS
SAMPLES ARE ✓ ARE NOT ___ FOR REGULATORY COMPLIANCE PURPOSES

*RELINQUISHED BY:	DATE/TIME	*RECEIVED BY:
PRINT: SIGN:	DATE: 7/30/13 TIME: 1332	PRINT: [illegible] SIGN: [illegible]
*RELINQUISHED BY: PRINT: SIGN:	DATE: TIME:	*RECEIVED BY: PRINT: SIGN:
*RELINQUISHED BY: PRINT: SIGN:	DATE: TIME:	*RECEIVED BY: PRINT: SIGN:
*COURIER: TRACKING #:	DATE: TIME:	*RECEIVED BY: PRINT: SIGN:

REMARKS:

See attached for analysis list

PWS#

Tyler Cell 481-1515

WEATHER/TEMPERATURE:

☐ **RUSH STATUS** (INITIAL ACCEPTANCE ________)

*** ADDITIONAL LABORATORY FEES MAY APPLY***

EXTENT OF LIABILITY

[illegible]

NOTE: [illegible]

[redacted]

ORIGINAL CHAIN OF CUSTODY DOCUMENT MUST BE EXECUTED IN INK

WHITE - LABORATORY YELLOW - CLIENT

CORE
ENVIRONMENTAL SERVICES, INC
Consulting • Operation & Maintenance • Risk Assessment • Engineering

85-09909

July 15, 2013

Hall Drilling, LLC
981 E. Washington, Ave.
Ellenboro, WV 26346

Attention: Susan Baldwin

Subject: **Groundwater Monitoring Well Development Report**
Hall Drilling, LLC
UIC Well #3
Ellenboro, Ritchie County, West Virginia

Dear Ms. Baldwin,

On behalf of CORE Environmental Services, Inc. (CORE), we are pleased to provide this report documenting the installation and construction details of the groundwater monitoring wells developed at the above referenced site. We appreciate this opportunity to provide our services to Hall Drilling, LLC (Hall).

The purpose of the proposed scope of work is to satisfy the water quality monitoring requirements (section IV) of the West Virginia Department of Environmental Protection (WVDEP) guidance document, "Design and Construction Standards for Centralized Pits", as referenced in the WVDEP guidance, dated December 23, 2011. This report provides a discussion of the scope of work and findings of groundwater monitoring well development activities performed at the subject site. CORE was retained by Hall to provide this summary of groundwater monitoring well development activities that took place on June 3, 2013.

Groundwater Monitoring Well Development Requirements

The groundwater monitoring wells were to be located based on site-specific conditions as determined from the centralized impoundment pit design and layout relative to the surroundings. These groundwater monitoring wells were to be drilled to intercept the first shallow water table aquifer near the base of the centralized impoundment pit to detect potential adverse effects on groundwater. Groundwater monitoring wells were to be situated hydraulically up-gradient and down-gradient from the centralized impoundment pit area in the direction of increasing and decreasing static head, respectively. Efforts were to be made to locate the groundwater monitoring wells in areas of preferential pathways of potential contaminant groundwater flow.

Received
Office of Oil & Gas
WV Dept. of Environmental Protection

4 Brookstone Plaza
Morgantown, WV 26508
(304) 292-CORE (2673)
Fax (304) 292-2773

Corporate Office
4068 Mt. Royal Blvd., Suite 225
Allison Park, PA 15101-2951
(412) 487-6000
Fax (412) 487-9785
www.core-env.com

130 George Street, Suite H
Beckley, WV 25801
[illegible]
Fax [illegible]

The groundwater monitoring system was to consist, at a minimum of:

- One groundwater monitoring well hydraulically up-gradient from the centralized impoundment area;
- One groundwater monitoring well hydraulically down-gradient from the impoundment area;
- Groundwater monitoring wells selected and designed to be representative of water quality;
- Groundwater monitoring wells located so that they do not interfere with routing well operations;
- Groundwater monitoring wells drilled by a driller licensed under the West Virginia Monitor Well Rules; and,
- Groundwater monitoring wells installed and constructed in accordance with the references "Design and Construction Standards for Centralized Pits".

The monitoring well designs were based on site-specific conditions as determined from the pit design and layout and the geotechnical investigation. Monitoring wells were to be positioned on the exterior edge of the crest of the embankment to insure the interception of the first water table beneath the impoundment, if present, and provide ready access for continued monitoring.

Wells would be drilled to intercept and monitor the seasonal high groundwater table and at a minimum of twenty (20) feet below the bottom elevation of the pit. If water was encountered, wells would be extended to a depth approximately ten (10) feet below the water table. Screened sections of the wells would utilize twenty (20) feet of 0.01 inch slotted screen and would be positioned such that the water table is situated approximately midway in the screened section. A clean sand filter pack would be extended five (5) feet above the screened section or a length of approximately twenty-five (25) feet. Details of specific monitoring wells are presented in the table below.

Standards for monitoring wells and casing of monitoring wells, as outlined by the West Virginia Department of Environmental Protection (WVDEP) Design and Construction Standards for Centralized Pits, shall be as follows:

1. The casing shall maintain the integrity of the monitoring well borehole and shall be constructed of material that will not react with the groundwater being monitored.
2. The minimum casing diameter shall be 4 inches unless otherwise approved by the Department in writing.
3. The well shall be constructed with a screen that meets the following requirements:
   - The screen shall be factory-made.
   - The screen may not react with the groundwater being monitored.
   - The screen shall maximize open area to minimize entrance velocities and allow rapid sample recovery.
4. The well shall be filter-packed with chemically inert clean quartz sand, silica or glass beads. The material shall be well rounded and dimensionally stable.

5. The casing shall be clearly visible and protrude at least 1 foot above the ground, unless the Department has approved flush mount wells.
6. The annular space above the sampling depth shall be sealed to prevent contamination of samples and the groundwater.
7. The casing shall be designed and constructed in a manner that prevents cross contamination between surface water and groundwater.
8. Alternative casing designs for wells in stable formations may be approved by the Department.
9. Monitoring well casings shall be enclosed in a protective casing that shall:
   - Be of sufficient strength to protect the well from damage by heavy equipment and vandalism.
   - Be installed for at least the upper 10 feet of the monitoring well, as measured from the well cap, with a maximum stick up of 3 feet, unless otherwise approved by the Department in writing.
   - Be grouted and placed with a concrete collar at least 3 feet deep to hold it firmly in position.
   - Be numbered for identification with a label capable of withstanding field conditions and painted in a highly visible color.
10. Protrude above the monitoring well casing.
11. Have a locked cap.
12. Be made of steel or another material of equivalent strength.

After drilling and completion of well installation, each well would be developed to remove excess sediment and minimize turbidity. Thereafter, wells would be purged and allow to stabilize prior to each sampling event. Water samples would be analyzed by a laboratory in compliance with WVDEP laboratory certification program requirements.

Samples would be transported to the approved laboratory and analyzed for the following suite of parameters:

- Field pH
- Lab pH
- Field Temperature
- Field Conductivity
- Sodium
- Iron
- Bromide
- Benzene
- Ethylbenzene
- Total Phase Hydrocarbons (TPH)-gasoline range organics (GRO) diesel range organics (DRO) and oil range organics (ORO)
- Total Dissolved Solids (TDS)
- Total Suspended Solids (TSS)
- Total Organic Carbon (TOC)
- Chloride
- Barium
- Manganese
- Sulfate
- Toluene
- Total Xylenes

Analysis of data collected would be submitted to the Department within 60 days of sampling or 15 days after the completion of the analysis, whichever was sooner.

Groundwater Monitoring Well Development

CORE was retained by Hall to advance three groundwater monitoring wells at the above referenced site in order to characterize groundwater flow, chemistry and flow systems on the site and adjacent areas. The groundwater monitoring wells were located for the purpose of establishing baseline data representative of the groundwater characteristics prior to the construction of the centralized impoundment pit. In the event of a leak from the centralized impoundment pit, the groundwater monitoring wells are located where they can intercept the contaminant flow. It should be noted that there is no liner monitoring system in place at the site.

CORE retained Chatfield Drilling, Inc. (Chatfield) of Greenville, Pennsylvania to advance the three groundwater monitoring wells at the site. Groundwater monitoring wells MW-1 through MW-3 were advanced on June 3, 2013, using a truck mounted hollow stem auger drill rig at their original proposed locations as per the groundwater monitoring well development requirements. Groundwater monitoring well MW-1 was advanced to a depth of 116 feet below ground surface (bgs). Groundwater monitoring well MW-2 was advanced to a depth of 117 feet bgs. Groundwater monitoring well MW-3 was advanced to a depth of 92 feet bgs. The groundwater monitoring well locations are illustrated in the attached figure 1. Groundwater monitoring well depth information is presented in the following table:

Groundwater Monitoring Well	Depth to Water (feet)	Depth to Bottom (feet)
MW-1	110.75	116.66
MW-2	73.40	116.75
MW-3	47.38	92.00

All groundwater monitoring wells were developed following the specified groundwater monitoring well development requirements. Groundwater monitoring well construction documentation is attached as Appendix A.

Groundwater Sampling

On June 18, 2013, groundwater samples were obtained from groundwater monitoring wells MW-1 through MW-3. After collection, the groundwater samples were containerized in the laboratory appropriate glassware, labeled, immediately placed on ice, and shipped under standard chain-of-custody procedures to Research Environmental & Industrial Consultants, Inc. (REIC) of Beaver, West Virginia, for analysis of benzene, toluene, ethylbenzene, xylenes (BTEX), TPH-GRO, TPH-DRO, TPH-ORO,

chloride, sodium, barium, iron, manganese, bromide, sulfate, TOC, TDS and TSS. Groundwater analytical results are summarized in Table 1. The laboratory analytical report for the June 18, 2013 samples is presented as Appendix B. Field measured analytical parameters obtained during the June 18, 2013 groundwater sampling event were recorded as follows:

Well ID	Temperature (°C)	Conductivity micro siemens per centimeter (us/cm)	Dissolved Oxygen (%)	pH	Oxygen Reduction Potential
MW-1	15.82	330	58.6	9.21	-110.7
MW-2	14.34	418	61.5	9.18	-130.8
MW-3	14.35	405	61.9	9.23	-116.5

Laboratory analytical results for the groundwater samples obtained from groundwater monitoring well MW-1 indicate sodium at a concentration of 58.1 milligrams per liter (mg/L), which exceeds the WVDEP De Minimis Standard for sodium in groundwater of 0.15 mg/L. Concentrations of chloride, barium, iron, manganese and TOC in the groundwater samples obtained from groundwater monitoring well MW-1 were detected above the laboratory detection limits, but below WVDEP De Minimis Standards for groundwater for the constituents that are regulated by the WVDEP. Laboratory analytical results for the groundwater samples obtained from groundwater monitoring well MW-1 also indicated TDS and TSS at concentrations of 175 mg/L and 66 mg/L, respectively. All other constituents analyzed for in the groundwater samples obtained from groundwater monitoring well MW-1 were reported below laboratory detection limits.

Laboratory analytical results for the groundwater samples obtained from groundwater monitoring well MW-2 indicate sodium at a concentration of 91.1 mg/L, which exceeds the WVDEP De Minimis Standard for sodium in groundwater of 0.15 mg/L. Concentrations of barium and iron in the groundwater samples obtained from groundwater monitoring well MW-2 were detected above the laboratory detection limits, but below WVDEP De Minimis Standards for groundwater. Laboratory analytical results for the groundwater samples obtained from groundwater monitoring well MW-2 also indicated TDS and TSS at concentrations of 252 mg/L and 70 mg/L, respectively. All other constituents analyzed for in the groundwater samples obtained from groundwater monitoring well MW-2 were reported below laboratory detection limits.

Laboratory analytical results for the groundwater samples obtained from groundwater monitoring well MW-3 indicate sodium at a concentration of 39.1 mg/L, which exceeds the WVDEP De Minimis Standard for sodium in groundwater of 0.15 mg/L. Concentrations of chloride, barium and iron in the

groundwater samples obtained from groundwater monitoring well MW-3 were detected above the laboratory detection limits, but below WVDEP De Minimis Standards for groundwater for the constituents that are regulated by the WVDEP. Laboratory analytical results for the groundwater samples obtained from groundwater monitoring well MW-3 also indicated TDS and TSS at concentrations of 152 mg/L and 6 mg/L, respectively. All other constituents analyzed for in the groundwater samples obtained from groundwater monitoring well MW-3 were reported below laboratory detection limits.

CORE appreciates this opportunity to provide you with our services and looks forward to working with you on this project. If you have any questions regarding this report, please contact us directly at (304) 292-2673.

Sincerely,

CORE Environmental Services, Inc.

John Nock
Senior Consultant

Lafe Kunkel
Staff Scientist

LIST OF ATTACHMENTS

Figure 1: Site Map
Appendix A: Monitoring Well Construction Documentation
Appendix B: Groundwater Laboratory Analytical Report

FIGURE 1: Site Map

CORE ENVIRONMENTAL SERVICES, INC.

TITLE:
SITE MAP
HALL DRILLING UIC IMPOUNDMENT
ELLENBORO, WEST VIRGINIA

DWN:	DES.:	PROJECT NO.:
CHKD:	APPD:	HAL-2013-151
DATE:	REV.:	FIGURE NO.: 1

APPENDIX A: Monitoring Well Construction Documentation

State of West Virginia
Department of Environmental Protection

Monitoring Well Construction

Well Number: WV00534-0014-13

Site Name/Physical Address:
Site: Hall Pond Impoundment
Line 1: Old St Rt 50
Line 2:
City: Ellenboro
State: WV
Zip: 26346-
County: Ritchie

Well Registration No. WV00534-0014-13
Grid Location:
a. Latitude: 39 17 13 .0
b. Longitude: 81 0 47 .0
c. Method Used:Computer Mapped/Generated Coordinates

Company/Project Well No.:
MW1

Purpose of Monitoring Well:
Monitor groundwater around ponds

Well Owner (Name, Firm, Address):
Owner: Core Environmental
Line 1: 4 Brockstone Plaza
Line 2:
City: Morgantown
State: WV
Zip: 26508-
Phone: 304-292-2673

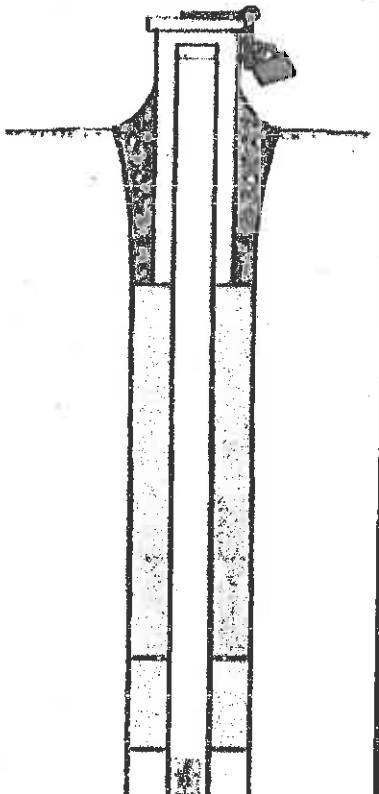
Installed By (Name, Firm, Address):
Installer: Aaron Hughes Chatfield Drilling
Line 1: 854 Mercer Rd
Line 2:
City: Greenville
State: PA
Zip: 16125-
Phone: 724-588-2662

Date Well Installed:
06/06/2013

Driller's WV Cert No.
WV00534

Section B: (all number fields must be in decimal format)

1.Cap and Lock: YES
2.Protective Cover: Protective Cover Pipe
3.Monitoring Well Reference Point: 0 ft.
4.Borehole Diameter: 6 inches.
5.Ground Surface Seal:
a.Material: concrete
b.Installation Procedure: concrete pad
6.Surface Seal Bottom/Annular Space Top: 3 ft.
7.Well Riser: a.OD Well Riser: 4.25 inches. b.ID Well Riser: 4 inches.
c.Material: PVC
d.Installation Procedure: Hand Lower
8.Annular Space Seal:
a.Material: bentonite chip -
b.Installation Procedure: pour
9.Well Development Procedure: surge/purge -
10.Drilling Method Used: hollow stem auger -
11.Annular Space Seal Bottom/Filter Seal Top: 52 ft.
12.Drilling Fluid Used: No Source:
13.Filter Pack Seal:
a.Material: bentonite pellet
b.Installation Procedure: Gravity Fed
c.Volume Added: 100 pounds
14.Bottom of Bentonite Seal/Filter Pack Top: 62 ft.
15.Depth to Top of Screen: 67 ft.
16.Screen:
a.Material: PVC
b.Installation Procedure: Hand Lower
c.Slot Size: 0.01 inches. d.Screen Length: 50 ft.
17.Filter Pack:
a.Material: medium sand
b.Installation Procedure: pour
18.Well Depth: 117 ft.
19.Bottom of Filter Pack: 117 ft.
20.Bottom of Borehole: 117 ft.
21.Backfill Material (below filter pack): N/A
22.Decontamination Procedures: Hot Water
23.Special Circumstances and Exceptions: No Variance Number:
24.WV Contractor License No. N/A



Received

Office of Oil and Gas
WV Dept. of Environmental Protection

State of West Virginia
Department of Environmental Protection

Monitoring Well Construction

Well Number: WV00534-0015-13

Site Name/Physical Address:
Site: Hall Pond Impoundment
Line 1: Old St Rt 60
Line 2:
City: Ellenboro
State: WV
Zip: 26346-
County: Ritchie

Well Registration No: WV00534-0015-13
Grid Location:
a. Latitude: 39 17 11 .0
b. Longitude: 81 0 47 .0
c. Method Used: Computer Mapped/Generated Coordinates

Company/Project Well No.:
MW2

Purpose of Monitoring Well:
Monitor Ground water around ponds

Well Owner (Name, Firm, Address):
Owner: Core Environmental
Line 1: 4 Brookestone Plaza
Line 2:
City: Morgantown
State: WV
Zip: 26508-
Phone: 304-292-2573

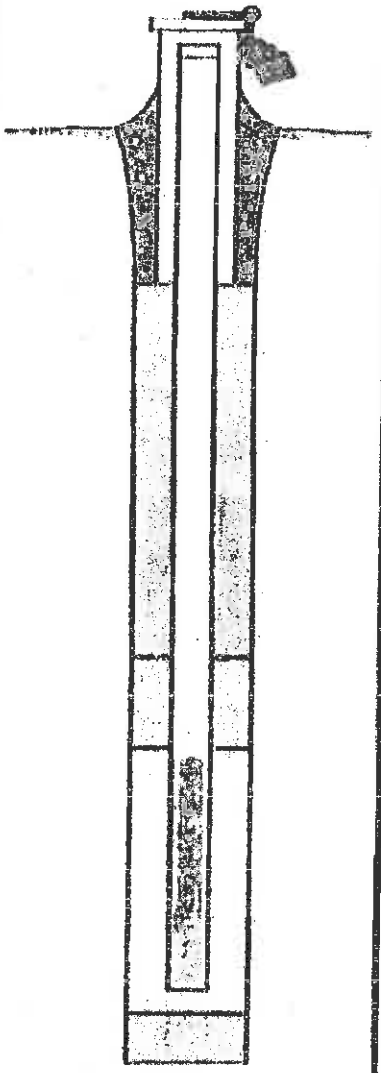
Installed By (Name, Firm, Address):
Installer: Aaron Hughes Chatfield Drilling, Inc.
Line 1: 854 Mercer Rd
Line 2:
City: Greenville
State: PA
Zip: 16125-
Phone: 724-588-2552

Date Well Installed:
06/06/2013

Driller's WV Cert No.
WV00534

Section B: (all number fields must be in decimal format)

1. Cap and Lock: YES
2. Protective Cover: Protective Cover Pipe
3. Monitoring Well Reference Point: 0 ft.
4. Borehole Diameter: 6 inches.
5. Ground Surface Seal:
   a. Material: concrete
   b. Installation Procedure: Concrete Pad
6. Surface Seal Bottom/Annular Space Top: 3 ft.
7. Well Riser: a. OD Well Riser: 4.25 inches. b. ID Well Riser: 4 inches.
   c. Material: PVC
   d. Installation Procedure: Hand Lower
8. Annular Space Seal:
   a. Material: bentonite chip -
   b. Installation Procedure: pour
9. Well Development Procedure: surge/purge -
10. Drilling Method Used: hollow stem auger -
11. Annular Space Seal Bottom/Filter Seal Top: 52 ft.
12. Drilling Fluid Used: No Source:
13. Filter Pack Seal:
    a. Material: bentonite pellet
    b. Installation Procedure: Gravity Fed
    c. Volume Added: 100 pounds
14. Bottom of Bentonite Seal/Filter Pack Top: 62 ft.
15. Depth to Top of Screen: 67 ft.
16. Screen:
    a. Material: PVC
    b. Installation Procedure: Hand Lower
    c. Slot Size: 0.01 inches. d. Screen Length: 50 ft.
17. Filter Pack:
    a. Material: medium sand
    b. Installation Procedure: Pour
18. Well Depth: 117 ft.
19. Bottom of Filter Pack: 117 ft.
20. Bottom of Borehole: 117 ft.
21. Backfill Material (below filter pack): N/A
22. Decontamination Procedures: Hot Water
23. Special Circumstances and Exceptions: No Variance Number:
24. WV Contractor License No. N/A



State of West Virginia
Department of Environmental Protection

Monitoring Well Construction

Well Number: WV00534-0016-13

Site Name/Physical Address:
Site: Halls Pond Impoundment
Line 1: Old St Rt 50
Line 2:
City: Ellenboro
State: WV
Zip: 26346-
County: Ritchie

Well Registration No. WV00534-0016-13
Grid Location:
a. Latitude: 39 17 11 .0
b. Longitude: 81 0 51 .0
c. Method Used:Computer Mapped/Generated Coordinates

Purpose of Monitoring Well:
Monitor ground water around ponds

Company/Project Well No.:
MW3

Well Owner (Name, Firm, Address):
Owner: Core Environmental
Line 1: 4 Brookestone Plaza
Line 2:
City: Morgantown
State: WV
Zip: 26508-
Phone: 304-292-2073

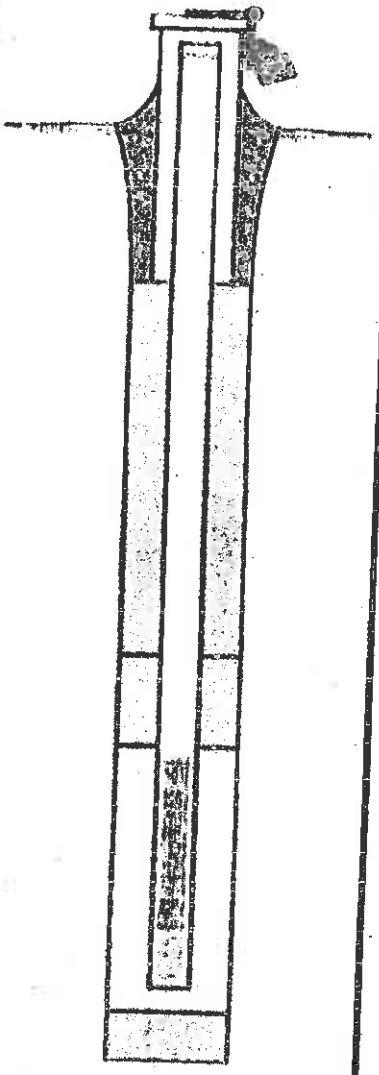
Installed By (Name, Firm, Address):
Installer: Aaron Hughes Chatfield Drilling, Inc.
Line 1: 854 Mercer Rd
Line 2:
City: Greenville
State: PA
Zip: 16125-
Phone: 724-588-2662

Date Well Installed:
06/06/2013

Driller's WV Cert No.
WV00534

Section B: (all number fields must be in decimal format)

1.Cap and Lock:	
2.Protective Cover:	YES
3.Monitoring Well Reference Point:	Protective Cover Pipe
4.Borehole Diameter:	0 ft.
5.Ground Surface Seal:	8 inches.
a.Material: concrete	
b.Installation Procedure: Concrete Pad	
6.Surface Seal Bottom/Annular Space Top:	3 ft.
7.Well Riser: a.OD Well Riser: 4.25 inches. b.ID Well Riser: 4 inches.	
c.Material: PVC	
d.Installation Procedure: Hand Lower	
8.Annular Space Seal:	
a.Material: bentonite chip	
b.Installation Procedure: pour	
9.Well Development Procedure: surge/purge	
10.Drilling Method Used: hollow stem auger	
11.Annular Space Seal Bottom/Filter Seal Top:	32 ft.
12.Drilling Fluid Used: No Source:	
13.Filter Pack Seal:	
a.Material: bentonite pellet	
b.Installation Procedure: Gravity Fed	
c.Volume Added: 50 pounds	
14.Bottom of Bentonite Seal/Filter Pack Top:	37 ft.
15.Depth to Top of Screen:	42 ft.
16.Screen:	
a.Material: PVC	
b.Installation Procedure: Hand Lower	
c.Slot Size: 0.01 inches. d.Screen Length: 50 ft.	
17.Filter Pack:	
a.Material: medium sand	
b.Installation Procedure: Pour	
18.Well Depth:	92 ft.
19.Bottom of Filter Pack:	92 ft.
20.Bottom of Borehole:	92 ft.
21.Backfill Material (below filter pack): NA	
22.Decontamination Procedures: Hot Water	
23.Special Circumstances and Exceptions: No Variance Number:	
24.WV Contractor License No. N/A	



APPENDIX B: Groundwater Laboratory Analytical Report

REI Consultants, Inc.
PO Box 286
Beaver, WV 25813
TEL: 304.255.2500
Website: www.reiclabs.com

Improving the environment, one client at a time...

3029-C Peters Creek Road
Roanoke, VA 24019
TEL: 540.777.1276

101 17th Street
Ashland, KY 41101
TEL: 606.393.5027

1557 Commerce Road, Suite 201
Verona, VA 24482
TEL: 540.777.1276

16 Commerce Drive
Westover, WV 26501
TEL: 304.241.5861

Thursday, June 27, 2013

John Nock
CORE ENVIRONMENTAL SERVICES INC
4 BROOKSTONE PLAZA
MORGANTOWN, WV 26508

TEL: (304) 292-2673
FAX:

RE: HALL DRILLING
Work Order #: 1306J70

Dear John Nock:

REI Consultants, Inc. received 4 sample(s) on 6/18/2013 for the analyses presented in the following report.

Sincerely,

Jimmy Suttle
Project Manager

REI Consultants, Inc. - Case Narrative

WO#: 1306J70

Date Reported: 6/27/2013

Client: CORE ENVIRONMENTAL SERVICES INC

Project: HALL DRILLING

The analytical results presented in this report were produced using documented laboratory SOPs that incorporate appropriate quality control procedures as described in the applicable methods. Verification of required sample preservation (as required) is recorded on associated laboratory logs. Any deviation from compliance or method modification is identified within the body of this report by a qualifier footnote which is defined at the bottom of this page.

All sample results for solid samples are reported on an "as-received" wet weight basis unless otherwise noted.

Results reported for sums of individual parameters, such as TTHM and HAA5, may vary slightly from the sum of the individual parameter results, due to rounding of individual results, as required by EPA.

The test results in this report meet all NELAP (and/or VELAP) requirements for parameters except as noted in this report.

DEFINITIONS:
MCL: Maximum Contaminant Level
MDL: Method Detection Limit; The lowest concentration of analyte that can be detected by the method in the applicable matrix.
Mg/Kg or mg/L: Units of part per million (PPM) - milligram per Kilogram (weight/weight) or milligram per Liter (weight/volume).
NA: Not Applicable
ND: Not Detected at the PQL or MDL
PQL: Practical Quantitation Limit; The lowest verified limit to which data is quantified without qualifications. Analyte concentrations below PQL are reported either as ND or as a number with a "J" qualifier.
Qual: Qualifier that applies to the analyte reported.
TIC: Tentatively Identified Compound, Estimated Concentration
Ug/Kg or ug/L: Units of part per billion (PPB) - microgram per kilogram (weight/weight) or microgram per liter (weight/volume).

QUALIFIERS:
X: Reported value exceeds required MCL
B: Analyte detected in the associated Method Blank at a concentration > 1/2 the PQL
E: Analyte concentration reported that exceeds the upper calibration standard. Greater uncertainty is associated with this result and data should be consider estimated.
H: Holding time for preparation or analysis has been exceeded.
J: Analyte concentration is reported, and is less than the PQL and greater than or equal to the MDL. The result reported is an estimate.
S: % REC (% recovery) exceeds control limits

CERTIFICATIONS:
Beaver, WV: WVDHHR 00412CM, WVDEP 060, VADCLS 00261, KYDEP 90039, TNDEQ TN02926, NCDWQ 466, PADEP 68-00839, VADCLS (VELAP) 460148
Bioassay (Beaver, WV): WVDEP 060, VADCLS(VELAP) 460149, PADEP 68-00839
Roanoke, VA: VADCLS(VELAP) 460150
Verona, VA: VADCLS(VELAP) 460151
Ashland, KY: KYDEP 00094

REI Consultants, Inc. - Analytical Report

WO#: 1306J70

Date Reported: 6/27/2013

Client:	CORE ENVIRONMENTAL SERVICES INC	**Collection Date:**	6/18/2013 12:20:00 PM
Project:	HALL DRILLING	**Date Received:**	6/18/2013
Lab ID:	1306J70-01A	**Matrix:**	Liquid
Client Sample ID:	MW-1	**Site ID:**	ELLENBORO, WV

Analysis	Result	PQL	MCL	Qual	Units	PrepDate	Date Analyzed
METALS BY ICP		**Method: E200.7**				**E200.2**	**Analyst: LF**
Barium	0.233	0.100	NA		mg/L	6/19/2013 10:05 AM	6/19/2013 5:51 PM
Iron	11.4	0.100	NA		mg/L	6/19/2013 10:05 AM	6/19/2013 5:51 PM
Manganese	0.344	0.100	NA		mg/L	6/19/2013 10:05 AM	6/19/2013 5:51 PM
Sodium	58.1	10.0	NA		mg/L	6/19/2013 10:05 AM	6/19/2013 5:54 PM
SEMI-VOLATILE RANGE ORGANICS		**Method: SW8015C**				**SW3510B**	**Analyst: CL**
TPH (Diesel Range)	ND	0.13	NA		mg/L	6/20/2013 1:00 PM	6/21/2013 5:10 AM
TPH (Oil Range)	ND	0.31	NA		mg/L	6/20/2013 1:00 PM	6/21/2013 5:10 AM
Surr: o-Terphenyl	113	28.3-152	NA		%REC	6/20/2013 1:00 PM	6/21/2013 5:10 AM
VOLATILE RANGE ORGANICS		**Method: SW8015C**					**Analyst: CB**
TPH (Gasoline Range)	ND	0.500	NA		mg/L	6/21/2013 1:39 PM	6/26/2013 9:53 PM
Surr: 2,5-Dibromotoluene	74.8	37.2-152	NA		%REC	6/21/2013 1:39 PM	6/26/2013 9:53 PM
VOLATILE ORGANIC COMPOUNDS		**Method: SW8021B**					**Analyst: CB**
Benzene	ND	1.00	NA		µg/L	6/21/2013 1:39 PM	6/26/2013 9:53 PM
Toluene	ND	1.00	NA		µg/L	6/21/2013 1:39 PM	6/26/2013 9:53 PM
Ethylbenzene	ND	1.00	NA		µg/L	6/21/2013 1:39 PM	6/26/2013 9:53 PM
m,p-Xylene	ND	2.00	NA		µg/L	6/21/2013 1:39 PM	6/26/2013 9:53 PM
o-Xylene	ND	1.00	NA		µg/L	6/21/2013 1:39 PM	6/26/2013 9:53 PM
Surr: 1,1,1-Trifluorotoluene	95.1	63.4-131	NA		%REC	6/21/2013 1:39 PM	6/26/2013 9:53 PM
ANIONS by ION CHROMATOGRAPHY		**Method: E300.0**					**Analyst: CF**
Bromide	ND	0.10	NA		mg/L		6/19/2013 2:34 PM
Chloride	3.03	1.00	NA		mg/L		6/19/2013 2:34 PM
Sulfate	ND	5.00	NA		mg/L		6/19/2013 2:34 PM
TOTAL DISSOLVED SOLIDS		**Method: SM2540 C**					**Analyst: SF**
Total Dissolved Solids	175	10	NA		mg/L		6/19/2013 4:11 PM
TOTAL SUSPENDED SOLIDS		**Method: SM2540 D**					**Analyst: SF**
Total Suspended Solids	66.0	10.0	NA		mg/L		6/19/2013 4:06 PM
ORGANIC CARBON, Total		**Method: SM5310 C**					**Analyst: DSD**
Total Organic Carbon	1.71	1.00	NA		mg/L		6/20/2013 4:40 PM

REI Consultants, Inc. - Analytical Report

WO#: 1306J70

Date Reported: 6/27/2013

Client:	CORE ENVIRONMENTAL SERVICES INC	**Collection Date:**	6/18/2013 12:45:00 PM
Project:	HALL DRILLING	**Date Received:**	6/18/2013
Lab ID:	1306J70-02A	**Matrix:**	Liquid
Client Sample ID:	MW-2	**Site ID:**	ELLENBORO, WV

Analysis	Result	PQL	MCL	Qual	Units	PrepDate	Date Analyzed
METALS BY ICP		**Method: E200.7**			**E200.2**		**Analyst: LF**
Barium	0.147	0.100	NA		mg/L	6/19/2013 10:05 AM	6/19/2013 5:58 PM
Iron	3.07	0.100	NA		mg/L	6/19/2013 10:05 AM	6/19/2013 5:58 PM
Manganese	ND	0.100	NA		mg/L	6/19/2013 10:05 AM	6/19/2013 5:58 PM
Sodium	91.1	10.0	NA		mg/L	6/19/2013 10:05 AM	6/19/2013 6:01 PM
SEMI-VOLATILE RANGE ORGANICS		**Method: SW8015C**			**SW3510B**		**Analyst: CL**
TPH (Diesel Range)	ND	0.12	NA		mg/L	6/20/2013 1:00 PM	6/21/2013 5:43 AM
TPH (Oil Range)	ND	0.31	NA		mg/L	6/20/2013 1:00 PM	6/21/2013 5:43 AM
Surr: o-Terphenyl	124	28.3-152	NA		%REC	6/20/2013 1:00 PM	6/21/2013 5:43 AM
VOLATILE RANGE ORGANICS		**Method: SW8015C**					**Analyst: CB**
TPH (Gasoline Range)	ND	0.500	NA		mg/L	6/21/2013 1:39 PM	6/26/2013 10:23 PM
Surr: 2,5-Dibromotoluene	79.3	37.2-152	NA		%REC	6/21/2013 1:39 PM	6/26/2013 10:23 PM
VOLATILE ORGANIC COMPOUNDS		**Method: SW8021B**					**Analyst: CB**
Benzene	ND	1.00	NA		µg/L	6/21/2013 1:39 PM	6/26/2013 10:23 PM
Toluene	ND	1.00	NA		µg/L	6/21/2013 1:39 PM	6/26/2013 10:23 PM
Ethylbenzene	ND	1.00	NA		µg/L	6/21/2013 1:39 PM	6/26/2013 10:23 PM
m,p-Xylene	ND	2.00	NA		µg/L	6/21/2013 1:39 PM	6/26/2013 10:23 PM
o-Xylene	ND	1.00	NA		µg/L	6/21/2013 1:39 PM	6/26/2013 10:23 PM
Surr: 1,1,1-Trifluorotoluene	94.0	63.4-131	NA		%REC	6/21/2013 1:39 PM	6/26/2013 10:23 PM
ANIONS by ION CHROMATOGRAPHY		**Method: E300.0**					**Analyst: CF**
Bromide	ND	0.10	NA		mg/L		6/19/2013 2:53 PM
Chloride	ND	1.00	NA		mg/L		6/19/2013 2:53 PM
Sulfate	ND	5.00	NA		mg/L		6/19/2013 2:53 PM
TOTAL DISSOLVED SOLIDS		**Method: SM2540 C**					**Analyst: SF**
Total Dissolved Solids	252	10	NA		mg/L		6/19/2013 4:11 PM
TOTAL SUSPENDED SOLIDS		**Method: SM2540 D**					**Analyst: SF**
Total Suspended Solids	70.0	10.0	NA		mg/L		6/19/2013 4:08 PM
ORGANIC CARBON, Total		**Method: SM5310 C**					**Analyst: DSD**
Total Organic Carbon	ND	1.00	NA		mg/L		6/20/2013 4:40 PM

REI Consultants, Inc. - Analytical Report

WO#: 1306J70

Date Reported: 6/27/2013

Client:	CORE ENVIRONMENTAL SERVICES INC	**Collection Date:**	6/18/2013 1:15:00 PM
Project:	HALL DRILLING	**Date Received:**	6/18/2013
Lab ID:	1306J70-03A	**Matrix:**	Liquid
Client Sample ID:	MW-3	**Site ID:**	ELLENBORO, WV

Analysis	Result	PQL	MCL	Qual	Units	PrepDate	Date Analyzed
METALS BY ICP		**Method: E200.7**				**E200.2**	**Analyst: LF**
Barium	0.351	0.100	NA		mg/L	6/19/2013 10:05 AM	6/19/2013 6:04 PM
Iron	0.721	0.100	NA		mg/L	6/19/2013 10:05 AM	6/19/2013 6:04 PM
Manganese	ND	0.100	NA		mg/L	6/19/2013 10:05 AM	6/19/2013 6:04 PM
Sodium	39.1	10.0	NA		mg/L	6/19/2013 10:05 AM	6/19/2013 6:07 PM
SEMI-VOLATILE RANGE ORGANICS		**Method: SW8015C**				**SW3510B**	**Analyst: CL**
TPH (Diesel Range)	ND	0.13	NA		mg/L	6/20/2013 1:00 PM	6/21/2013 6:15 AM
TPH (Oil Range)	ND	0.31	NA		mg/L	6/20/2013 1:00 PM	6/21/2013 6:15 AM
Surr: o-Terphenyl	122	28.3-152	NA		%REC	6/20/2013 1:00 PM	6/21/2013 6:15 AM
VOLATILE RANGE ORGANICS		**Method: SW8015C**					**Analyst: CB**
TPH (Gasoline Range)	ND	0.500	NA		mg/L	6/21/2013 1:39 PM	6/26/2013 10:54 PM
Surr: 2,5-Dibromotoluene	86.5	37.2-152	NA		%REC	6/21/2013 1:39 PM	6/26/2013 10:54 PM
VOLATILE ORGANIC COMPOUNDS		**Method: SW8021B**					**Analyst: CB**
Benzene	ND	1.00	NA		µg/L	6/21/2013 1:39 PM	6/26/2013 10:54 PM
Toluene	ND	1.00	NA		µg/L	6/21/2013 1:39 PM	6/26/2013 10:54 PM
Ethylbenzene	ND	1.00	NA		µg/L	6/21/2013 1:39 PM	6/26/2013 10:54 PM
m,p-Xylene	ND	2.00	NA		µg/L	6/21/2013 1:39 PM	6/26/2013 10:54 PM
o-Xylene	ND	1.00	NA		µg/L	6/21/2013 1:39 PM	6/26/2013 10:54 PM
Surr: 1,1,1-Trifluorotoluene	95.9	63.4-131	NA		%REC	6/21/2013 1:39 PM	6/26/2013 10:54 PM
ANIONS by ION CHROMATOGRAPHY		**Method: E300.0**					**Analyst: CF**
Bromide	ND	0.10	NA		mg/L		6/19/2013 3:12 PM
Chloride	2.49	1.00	NA		mg/L		6/19/2013 3:12 PM
Sulfate	ND	5.00	NA		mg/L		6/19/2013 3:12 PM
TOTAL DISSOLVED SOLIDS		**Method: SM2540 C**					**Analyst: SF**
Total Dissolved Solids	152	10	NA		mg/L		6/19/2013 4:11 PM
TOTAL SUSPENDED SOLIDS		**Method: SM2540 D**					**Analyst: SF**
Total Suspended Solids	6.0	5.0	NA		mg/L		6/19/2013 4:08 PM
ORGANIC CARBON, Total		**Method: SM5310 C**					**Analyst: DSD**
Total Organic Carbon	ND	1.00	NA		mg/L		6/20/2013 4:40 PM

REI Consultants, Inc. - Analytical Report

WO#: 1306J70

Date Reported: 6/27/2013

Client:	CORE ENVIRONMENTAL SERVICES INC	**Collection Date:**	6/18/2013 12:00:00 AM
Project:	HALL DRILLING	**Date Received:**	6/18/2013
Lab ID:	1306J70-04A	**Matrix:**	Trip Blank
Client Sample ID:	TRIP BLANK	**Site ID:**	ELLENBORO, WV

Analysis	Result	PQL	MCL	Qual	Units	PrepDate	Date Analyzed
VOLATILE ORGANIC COMPOUNDS		**Method: SW8021B**					**Analyst: CB**
Benzene	ND	1.00	NA		µg/L	6/21/2013 1:39 PM	6/26/2013 9:23 PM
Toluene	ND	1.00	NA		µg/L	6/21/2013 1:39 PM	6/26/2013 9:23 PM
Ethylbenzene	ND	1.00	NA		µg/L	6/21/2013 1:39 PM	6/26/2013 9:23 PM
m,p-Xylene	ND	2.00	NA		µg/L	6/21/2013 1:39 PM	6/26/2013 9:23 PM
o-Xylene	ND	1.00	NA		µg/L	6/21/2013 1:39 PM	6/26/2013 9:23 PM
Surr: 1,1,1-Trifluorotoluene	98.1	63.4-131	NA		%REC	6/21/2013 1:39 PM	6/26/2013 9:23 PM

CHAIN OF CUSTODY RECORD

REIC
Research Environmental & Industrial Consultants, Inc.

MAIN LABORATORY & CORPORATE HEADQUARTERS:
P.O. Box 286 • 225 Industrial Park Rd, Beaver WV 25813
800-999-0105 • 304-255-2500 • www.reclabs.com

MID-OHIO VALLEY Service Center	SHENANDOAH Service Center	ROANOKE Service Center	MORGANTOWN Service Center
101 17th Street, Ashland, KY 41101, 606-393-5027	1557 Commerce Rd., Ste 201, Verona, VA 24482, 540-248-0183	3029-C Peters Creek Rd, Roanoke, VA 24019, 540-777-1276	16 Commerce Drive, Westover, WV 26501, 304 241 5861

Client: CORE Environmental/
Contact Person: John Nock
PO #
Phone: 304[illegible]
QUOTE #
Fax: 304[illegible]
Email: jnock@ core-env.com
Address: 4 Brookstone Plaza City: Morgantown State: WV Zip: 26508
Billing Address (if different): Same
Site ID & State: Elkview, WV Project ID: Hall Drilling City State Zip
Sampler: [illegible]

SAMPLE LOG & ANALYSIS REQUEST

TURNAROUND TIME
✓ NORMAL — RUSH TURNAROUND: 5 DAY 3 DAY 2 DAY 1 DAY
*Rush work needs prior laboratory approval and will be at additional charges

ANALYSIS & METHOD REQUESTED:
- Chloride, Sodium
- Barium, Iron, Manganese
- Bromide
- Sulfate
- TOC
- TDS, TSS
- [illegible]
- TPH (GRO, DRO, ORO)

SAMPLE ID	No. & Type of Containers	Sampling Date/Time	Matrix	Sample Type	Analyses
MW-1	[illegible]	6-17-13 1120	Water	Grab	X X X X X X X X
MW-2	↓	1245	↓	↓	↓
MW-3	↓	1315	↓	↓	↓
Trip Blank (BC)					

WATER PRESERVATIVE CODE:
0 None
1 Hydrochloric Acid
2 Nitric Acid
3 Sulfuric Acid
4 Sodium Thiosulfate
5 Sodium Hydroxide
6 Zinc Acetate
7 EDTA
8 Ascorbic Acid

COMMENTS:

All analytical requests are subject to REIC's Standard Terms and Conditions.

Temperature at arrival: 4 °C ICED: Y X N

Relinquished	Date/Time
[signature]	6-18-13 1353
[signature]	6/18/13 1153

FAX RESULTS — EMAIL RESULTS ✓

Received

Office of Oil and Gas
WV Dept. of Environmental Protection

www.ammara.com

Monitoring Wells

REI Consultants, Inc.
PO Box 286
Beaver, WV 25813
TEL: 304.255.2500
Website: www.reiclabs.com

improving the environment, one client at a time...

3029-C Peters Creek Road
Roanoke, VA 24019
TEL: 540.777.1276

101 17th Street
Ashland, KY 41101
TEL: 606.393.5027

1537 Commerce Road, Suite 201
Verona, VA 24482
TEL: 540.777.1276

16 Commerce Drive
Westover, WV 26501
TEL: 304.241.5861

Thursday, June 27, 2013

John Nock
CORE ENVIRONMENTAL SERVICES INC
4 BROOKSTONE PLAZA
MORGANTOWN, WV 26508

TEL: (304) 292-2673
FAX:

RE: HALL DRILLING
Work Order #: 1306J70

Dear John Nock:

REI Consultants, Inc. received 4 sample(s) on 6/18/2013 for the analyses presented in the following report.

Sincerely,

Jimmy Suttle
Project Manager

REI Consultants, Inc. - Case Narrative

WO#: 1306J70

Date Reported: 6/27/2013

Client: CORE ENVIRONMENTAL SERVICES INC

Project: HALL DRILLING

The analytical results presented in this report were produced using documented laboratory SOPs that incorporate appropriate quality control procedures as described in the applicable methods. Verification of required sample preservation (as required) is recorded on associated laboratory logs. Any deviation from compliance or method modification is identified within the body of this report by a qualifier footnote which is defined at the bottom of this page.

All sample results for solid samples are reported on an "as-received" wet weight basis unless otherwise noted.

Results reported for sums of individual parameters, such as TTHM and HAA5, may vary slightly from the sum of the individual parameter results, due to rounding of individual results, as required by EPA.

The test results in this report meet all NELAP (and/or VELAP) requirements for parameters except as noted in this report.

DEFINITIONS:
MCL: Maximum Contaminant Level
MDL: Method Detection Limit; The lowest concentration of analyte that can be detected by the method in the applicable matrix.
Mg/Kg or mg/L: Units of part per million (PPM) - milligram per Kilogram (weight/weight) or milligram per Liter (weight/volume).
NA: Not Applicable
ND: Not Detected at the PQL or MDL
PQL: Practical Quantitation Limit; The lowest verified limit to which data is quantified without qualifications. Analyte concentrations below PQL are reported either as ND or as a number with a "J" qualifier.
Qual: Qualifier that applies to the analyte reported.
TIC: Tentatively Identified Compound, Estimated Concentration
Ug/Kg or ug/L: Units of part per billion (PPB) - microgram per kilogram (weight/weight) or microgram per liter (weight/volume).

QUALIFIERS:
X: Reported value exceeds required MCL
B: Analyte detected in the associated Method Blank at a concentration > 1/2 the PQL
E: Analyte concentration reported that exceeds the upper calibration standard. Greater uncertainty is associated with this result and data should be consider estimated.
H: Holding time for preparation or analysis has been exceeded.
J: Analyte concentration is reported, and is less than the PQL and greater than or equal to the MDL. The result reported is an estimate.
S: % REC (% recovery) exceeds control limits

CERTIFICATIONS:
Beaver, WV: WVDHHR 00412CM, WVDEP 060, VADCLS 00281, KYDEP 90039, TNDEQ TN02926, NCDWQ 486, PADEP 68-00839, VADCLS (VELAP) 460148
Bioassay (Beaver, WV): WVDEP 060, VADCLS(VELAP) 460149, PADEP 68-00839
Roanoke, VA: VADCLS(VELAP) 460150
Verona, VA: VADCLS(VELAP) 460151
Ashland, KY: KYDEP 00094

REI Consultants, Inc. - Analytical Report

WO#: 1306J70

Date Reported: 6/27/2013

Client:	CORE ENVIRONMENTAL SERVICES INC	**Collection Date:**	6/18/2013 12:20:00 PM
Project:	HALL DRILLING	**Date Received:**	6/19/2013
Lab ID:	1306J70-01A	**Matrix:**	Liquid
Client Sample ID:	MW-1	**Site ID:**	ELLENBORO, WV

Analysis	Result	PQL	MCL	Qual	Units	PrepDate	Date Analyzed
METALS BY ICP		**Method: E200.7**			**E200.2**		**Analyst: LF**
Barium	0.233	0.100	NA		mg/L	6/19/2013 10:05 AM	6/19/2013 5:51 PM
Iron	11.4	0.100	NA		mg/L	6/19/2013 10:05 AM	6/19/2013 5:51 PM
Manganese	0.344	0.100	NA		mg/L	6/19/2013 10:05 AM	6/19/2013 5:51 PM
Sodium	58.1	10.0	NA		mg/L	6/19/2013 10:05 AM	6/19/2013 5:54 PM
SEMI-VOLATILE RANGE ORGANICS		**Method: SW8015C**			**SW3510B**		**Analyst: CL**
TPH (Diesel Range)	ND	0.13	NA		mg/L	6/20/2013 1:00 PM	6/21/2013 5:10 AM
TPH (Oil Range)	ND	0.31	NA		mg/L	6/20/2013 1:00 PM	6/21/2013 5:10 AM
Surr: o-Terphenyl	113	28.3-152	NA		%REC	6/20/2013 1:00 PM	6/21/2013 5:10 AM
VOLATILE RANGE ORGANICS		**Method: SW8015C**					**Analyst: CB**
TPH (Gasoline Range)	ND	0.500	NA		mg/L	6/21/2013 1:39 PM	6/28/2013 9:53 PM
Surr: 2,5-Dibromotoluene	74.8	37.2-152	NA		%REC	6/21/2013 1:39 PM	6/28/2013 9:53 PM
VOLATILE ORGANIC COMPOUNDS		**Method: SW8021B**					**Analyst: CB**
Benzene	ND	1.00	NA		µg/L	6/21/2013 1:39 PM	6/28/2013 9:53 PM
Toluene	ND	1.00	NA		µg/L	6/21/2013 1:39 PM	6/28/2013 9:53 PM
Ethylbenzene	ND	1.00	NA		µg/L	6/21/2013 1:39 PM	6/28/2013 9:53 PM
m,p-Xylene	ND	2.00	NA		µg/L	6/21/2013 1:39 PM	6/28/2013 9:53 PM
o-Xylene	ND	1.00	NA		µg/L	6/21/2013 1:39 PM	6/28/2013 9:53 PM
Surr: 1,1,1-Trifluorotoluene	95.1	63.4-131	NA		%REC	6/21/2013 1:39 PM	6/28/2013 9:53 PM
ANIONS by ION CHROMATOGRAPHY		**Method: E300.0**					**Analyst: CF**
Bromide	ND	0.10	NA		mg/L		6/19/2013 2:34 PM
Chloride	3.03	1.00	NA		mg/L		6/19/2013 2:34 PM
Sulfate	ND	5.00	NA		mg/L		6/19/2013 2:34 PM
TOTAL DISSOLVED SOLIDS		**Method: SM2540 C**					**Analyst: SF**
Total Dissolved Solids	175	10	NA		mg/L		6/19/2013 4:11 PM
TOTAL SUSPENDED SOLIDS		**Method: SM2540 D**					**Analyst: SF**
Total Suspended Solids	66.0	10.0	NA		mg/L		6/19/2013 4:08 PM
ORGANIC CARBON, Total		**Method: SM5310 C**					**Analyst: DSD**
Total Organic Carbon	1.71	1.00	NA		mg/L		6/20/2013 4:40 PM

REI Consultants, Inc. - Analytical Report

WO#: 1306J70

Date Reported: 6/27/2013

Client:	CORE ENVIRONMENTAL SERVICES INC	**Collection Date:**	6/18/2013 12:45:00 PM
Project:	HALL DRILLING	**Date Received:**	6/18/2013
Lab ID:	1306J70-02A	**Matrix:**	Liquid
Client Sample ID:	MW-2	**Site ID:**	ELLENBORO, WV

Analysis	Result	PQL	MCL	Qual	Units	PrepDate	Date Analyzed
METALS BY ICP		**Method: E200.7**				**E200.2**	**Analyst: LF**
Barium	0.147	0.100	NA		mg/L	6/19/2013 10:05 AM	6/19/2013 5:58 PM
Iron	3.07	0.100	NA		mg/L	6/19/2013 10:05 AM	6/19/2013 5:58 PM
Manganese	ND	0.100	NA		mg/L	6/19/2013 10:05 AM	6/19/2013 5:58 PM
Sodium	91.1	10.0	NA		mg/L	6/19/2013 10:05 AM	6/19/2013 6:01 PM
SEMI-VOLATILE RANGE ORGANICS		**Method: SW8015C**				**SW3510B**	**Analyst: CL**
TPH (Diesel Range)	ND	0.12	NA		mg/L	6/20/2013 1:00 PM	6/21/2013 5:43 AM
TPH (Oil Range)	ND	0.31	NA		mg/L	6/20/2013 1:00 PM	6/21/2013 5:43 AM
Surr: o-Terphenyl	124	28.3-152	NA		%REC	6/20/2013 1:00 PM	6/21/2013 5:43 AM
VOLATILE RANGE ORGANICS		**Method: SW8015C**					**Analyst: CB**
TPH (Gasoline Range)	ND	0.500	NA		mg/L	6/21/2013 1:39 PM	6/26/2013 10:23 PM
Surr: 2,5-Dibromotoluene	79.3	37.2-152	NA		%REC	6/21/2013 1:39 PM	6/26/2013 10:23 PM
VOLATILE ORGANIC COMPOUNDS		**Method: SW8021B**					**Analyst: CB**
Benzene	ND	1.00	NA		µg/L	6/21/2013 1:39 PM	6/26/2013 10:23 PM
Toluene	ND	1.00	NA		µg/L	6/21/2013 1:39 PM	6/26/2013 10:23 PM
Ethylbenzene	ND	1.00	NA		µg/L	6/21/2013 1:39 PM	6/26/2013 10:23 PM
m,p-Xylene	ND	2.00	NA		µg/L	6/21/2013 1:39 PM	6/26/2013 10:23 PM
o-Xylene	ND	1.00	NA		µg/L	6/21/2013 1:39 PM	6/26/2013 10:23 PM
Surr: 1,1,1-Trifluorotoluene	94.0	63.4-131	NA		%REC	6/21/2013 1:39 PM	6/26/2013 10:23 PM
ANIONS by ION CHROMATOGRAPHY		**Method: E300.0**					**Analyst: CF**
Bromide	ND	0.10	NA		mg/L		6/19/2013 2:53 PM
Chloride	ND	1.00	NA		mg/L		6/19/2013 2:53 PM
Sulfate	ND	5.00	NA		mg/L		6/19/2013 2:53 PM
TOTAL DISSOLVED SOLIDS		**Method: SM2540 C**					**Analyst: SF**
Total Dissolved Solids	252	10	NA		mg/L		6/19/2013 4:11 PM
TOTAL SUSPENDED SOLIDS		**Method: SM2540 D**					**Analyst: SF**
Total Suspended Solids	70.0	10.0	NA		mg/L		6/19/2013 4:08 PM
ORGANIC CARBON, Total		**Method: SM5310 C**					**Analyst: DSD**
Total Organic Carbon	ND	1.00	NA		mg/L		6/20/2013 4:40 PM

REI Consultants, Inc. - Analytical Report

WO#: 1306J70

Date Reported: 6/27/2013

Client:	CORE ENVIRONMENTAL SERVICES INC	**Collection Date:**	6/18/2013 1:15:00 PM
Project:	HALL DRILLING	**Date Received:**	6/18/2013
Lab ID:	1306J70-03A	**Matrix:**	Liquid
Client Sample ID:	MW-3	**Site ID:**	ELLENBORO, WV

Analysis	Result	PQL	MCL	Qual	Units	PrepDate	Date Analyzed
METALS BY ICP		**Method: E200.7**				**E200.2**	**Analyst: LF**
Barium	0.351	0.100	NA		mg/L	6/19/2013 10:05 AM	6/19/2013 6:04 PM
Iron	0.721	0.100	NA		mg/L	6/19/2013 10:05 AM	6/19/2013 6:04 PM
Manganese	ND	0.100	NA		mg/L	6/19/2013 10:05 AM	6/19/2013 6:04 PM
Sodium	39.1	10.0	NA		mg/L	6/19/2013 10:05 AM	6/19/2013 6:07 PM
SEMI-VOLATILE RANGE ORGANICS		**Method: SW8015C**				**SW3510B**	**Analyst: CL**
TPH (Diesel Range)	ND	0.13	NA		mg/L	6/20/2013 1:00 PM	6/21/2013 6:15 AM
TPH (Oil Range)	ND	0.31	NA		mg/L	6/20/2013 1:00 PM	6/21/2013 6:15 AM
Surr: o-Terphenyl	122	26.3-152	NA		%REC	6/20/2013 1:00 PM	6/21/2013 6:15 AM
VOLATILE RANGE ORGANICS		**Method: SW8015C**					**Analyst: CB**
TPH (Gasoline Range)	ND	0.500	NA		mg/L	6/21/2013 1:39 PM	6/26/2013 10:54 PM
Surr: 2,5-Dibromotoluene	86.5	37.2-152	NA		%REC	6/21/2013 1:39 PM	6/26/2013 10:54 PM
VOLATILE ORGANIC COMPOUNDS		**Method: SW8021B**					**Analyst: CB**
Benzene	ND	1.00	NA		µg/L	6/21/2013 1:39 PM	6/26/2013 10:54 PM
Toluene	ND	1.00	NA		µg/L	6/21/2013 1:39 PM	6/26/2013 10:54 PM
Ethylbenzene	ND	1.00	NA		µg/L	6/21/2013 1:39 PM	6/26/2013 10:54 PM
m,p-Xylene	ND	2.00	NA		µg/L	6/21/2013 1:39 PM	6/26/2013 10:54 PM
o-Xylene	ND	1.00	NA		µg/L	6/21/2013 1:39 PM	6/26/2013 10:54 PM
Surr: 1,1,1-Trifluorotoluene	95.9	83.4-131	NA		%REC	6/21/2013 1:39 PM	6/26/2013 10:54 PM
ANIONS by ION CHROMATOGRAPHY		**Method: E300.0**					**Analyst: CF**
Bromide	ND	0.10	NA		mg/L		6/19/2013 3:12 PM
Chloride	2.49	1.00	NA		mg/L		6/19/2013 3:12 PM
Sulfate	ND	5.00	NA		mg/L		6/19/2013 3:12 PM
TOTAL DISSOLVED SOLIDS		**Method: SM2540 C**					**Analyst: SF**
Total Dissolved Solids	152	10	NA		mg/L		6/19/2013 4:11 PM
TOTAL SUSPENDED SOLIDS		**Method: SM2540 D**					**Analyst: SF**
Total Suspended Solids	6.0	5.0	NA		mg/L		6/19/2013 4:06 PM
ORGANIC CARBON, Total		**Method: SM5310 C**					**Analyst: DSD**
Total Organic Carbon	ND	1.00	NA		mg/L		6/20/2013 4:40 PM

REI Consultants, Inc. - Analytical Report

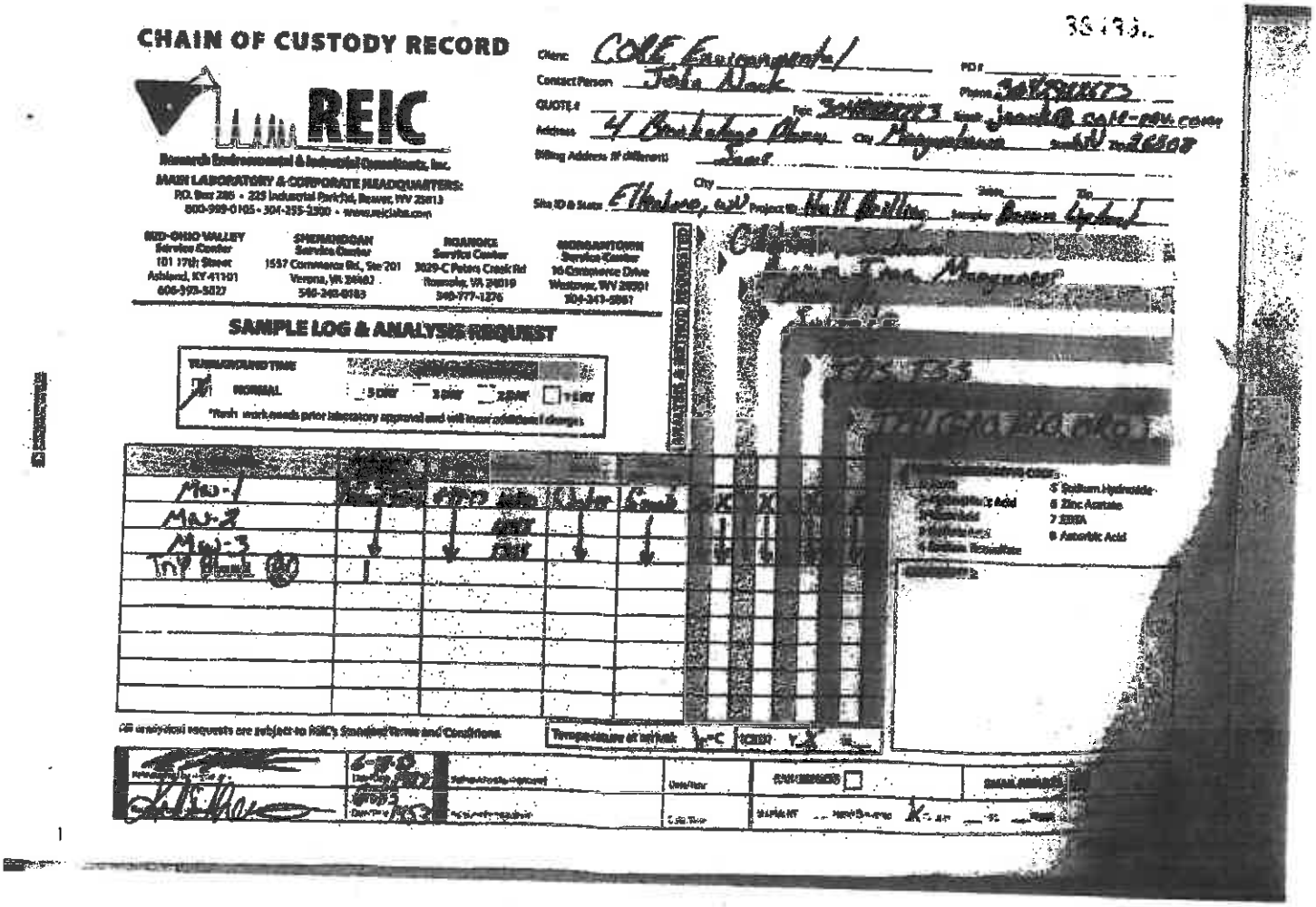
WO#: 1306J70

Date Reported: 6/27/2013

Client:	CORE ENVIRONMENTAL SERVICES INC	**Collection Date:**	6/18/2013 12:00:00 AM
Project:	HALL DRILLING	**Date Received:**	6/18/2013
Lab ID:	1306J70-04A	**Matrix:**	Trip Blank
Client Sample ID:	TRIP BLANK	**Site ID:**	ELLENBORO, WV

Analysis	Result	PQL	MCL	Qual	Units	PrepDate	Date Analyzed
VOLATILE ORGANIC COMPOUNDS		**Method: SW8021B**					**Analyst: CB**
Benzene	ND	1.00	NA		µg/L	6/21/2013 1:39 PM	6/26/2013 9:23 PM
Toluene	ND	1.00	NA		µg/L	6/21/2013 1:39 PM	6/26/2013 9:23 PM
Ethylbenzene	ND	1.00	NA		µg/L	6/21/2013 1:39 PM	6/26/2013 9:23 PM
m,p-Xylene	ND	2.00	NA		µg/L	6/21/2013 1:39 PM	6/26/2013 9:23 PM
o-Xylene	ND	1.00	NA		µg/L	6/21/2013 1:39 PM	6/26/2013 9:23 PM
Surr: 1,1,1-Trifluorotoluene	98.1	63.4-131	NA		%REC	6/21/2013 1:39 PM	6/26/2013 9:23 PM

DBPix Evaluation



CHAIN OF CUSTODY RECORD

REIC

Research Environmental & Industrial Consultants, Inc.

MAIN LABORATORY & CORPORATE HEADQUARTERS:
P.O. Box 286 • 225 Industrial Park Rd, Beaver, WV 25813
800-989-0105 • 304-255-2500 • www.reiclabs.com

MID-OHIO VALLEY Service Center
101 17th Street
Ashland, KY 41101
606-393-5027

SHENANDOAH Service Center
1537 Commerce Rd., Ste 201
Verona, VA 24482
540-248-0183

ROANOKE Service Center
3029-C Peters Creek Rd
Roanoke, VA 24019
540-777-1276

MORGANTOWN Service Center
16 Commerce Drive
Westover, WV 26501
304-241-8961

Client: COLE Environmental
Contact Person: Jack Mack
QUOTE #
Address: 4 Blackridge Plaza
Billing Address (if different)
City: Bridgeport
State: WV
Zip: 26330
Site ID & State: Elkview, WV
Project ID: Hall Drilling
Sampler: Brian Upshaw

SAMPLE LOG & ANALYSIS REQUEST

TURNAROUND TIME
NORMAL
*Rush work needs prior laboratory approval and will incur additional charges.

MW-1										
MW-2										
MW-3										
Trip Blank (2)										

5 Sodium Hydroxide
6 Zinc Acetate
7 EDTA
8 Ascorbic Acid

All analytical requests are subject to REIC's Standard Terms and Conditions.

Temperature of cooler: °C

www.reiclabs.com

west virginia department of environmental protection

Office of Oil and Gas
601 57th Street SE
Charleston, WV 25304
(304) 926-0450
(304) 926-0452 fax

Earl Ray Tomblin, Governor
Randy C. Huffman, Cabinet Secretary
www.dep.wv.gov

UIC Permit

HALL DRILLING, LLC
P O BOX 249
ELLENBORO, WV 26346-

Dear Applicant:

Enclosed you will find Underground Injection Control Permit Number UIC2D0859909 dated June 07, 2013. Be advised that the duration of the permit is for a period of five (5) years.

Also be advised that all conditions established by UIC Permit Number UIC2D0859909 either expressly or incorporated by reference, must be strictly adhered to. All monitoring forms shall be submitted to the Office of Oil and Gas in the manner and frequency prescribed. The monitoring forms will be compared with the scope of permitted activity to verify compliance.

Please review the permit carefully and be aware of all permit conditions. Compliance of all permit conditions will be strictly enforced.

The operation of this injection well facility in general, including maintenance of all related surface equipment, shall be conducted so as to preclude any unlawful discharge of waste materials into the surface or ground waters of the state.

If permit should expire before a determination is made regarding re-issuance of a new permit company/operator may continue injection activities under current conditions required within expired permit during permit renewal process.

James Martin
Chief,
Office of Oil and Gas

Enclosures as stated

UIC PERMIT NO. UIC2D0859909
WELL NO. Tech Service Center #3H

UNDERGROUND INJECTION CONTROL PERMIT
FOR
DEPARTMENT OF ENVIRONMENTAL PROTECTION,
OFFICE OF OIL AND GAS AND DIVISION OF WATER AND WASTE MANAGEMENT
FOR
CLASS II COMMERCIAL DISPOSAL WELL

This document consists of the Underground Injection Control (UIC) Permit required by the Department of Environmental Protection, Office of Oil and Gas, and Division of Water and Waste Management. The permittee is allowed to engage in underground injection in accordance with the terms and conditions of this permit based upon an approved UIC Permit.

The Underground Injection Control Permit No. **UIC2D0859909** consists of Forms WW-3A and WW-3B and the terms and conditions below:

1. The underground injection activity authorized by this permit shall not allow the movement of fluid, as per (47CSR13-2.26), containing any contaminant into any subsurface area other than that which is specified and may not cause a violation of any primary drinking water regulation promulgated under 40 CFR Chapter 1, Part 141 or any water quality standard promulgated by the Department of Environmental Protection.

2. This permit is issued in accordance with the provisions of Article 11 and 12, Chapter 22 of the Code of West Virginia and the Legislative Rule 47CSR13.

3. All reports required by this permit shall be submitted to the Office of Oil and Gas with the exception to paragraph 4 below.

4. The following activities require the immediate cessation of facility operations and prompt notification of the Director of Water and Waste Management (47CSR13-13.6.d and 47CSR13-13.12.1.6).

   a) Any monitoring or other information which indicates that any contaminant has caused or may cause an endangerment to an underground source of drinking water;

   b) Any non-compliance with a permit condition or any malfunction of the injection system which may cause fluid migration into or between underground sources of drinking water; and

   c) Any non-compliance which may endanger health and environment.

5. This permit is for authorization of injection of only fluids as defined for Class II wells in 47CSR13-4.2. The fluids to be injected shall only be from those sources listed in the permit application. Additional sources of fluids may be approved upon written request by the permittee.

6. The permit must satisfy the requirements of the Office of Oil and Gas regarding any corrective action needed on all known wells penetrating the injection zone within the area of review.

7. Any production well within a ¼ mile radius of disposal well# 47-85-09909 which does not have cemented production casing shall be plugged immediately upon becoming inactive. Any temporarily inactive well shall be monitored at a frequency and by a method prescribed by the Office of Oil and Gas upon notice by the permittee of such activity. Any well shut-in more than one (1) week shall be considered inactive.

8. The area of review is designated as a 1 / 4 mile radius around the injection well.

9. This permit approves the Oriskany formation for injection from 6,480' to 6,491'.

10. The maximum wellhead injection pressure shall be established at 2,520 PSI based on a Step-Rate test conducted on February 6, 2013.

11. The permittee shall provide for security at the injection facility to guard against illegal or unauthorized dumping and injection at the injection facility. The facility, including well(s), pump house, tanks, and impoundments, shall be fenced and monitored on a 24 hour basis.

12. The permittee shall monitor the 2 7/8" X 4 1/2" and 4 1/2" X 7" casing annuli with pressure sensitive devices or with such a method as approved or required by the Office of Oil and Gas to allow early detection on any leaks from the injection zone or casing. The results of such monitoring shall be reported on Form WR-40.

13. Authorization to inject is contingent upon submission and approval of the Office of Oil and Gas Form WR-37 for each well. Construction modifications from the proposed work plan (O&G Form WW-3) and mechanical integrity will be evaluated at this time. Operational conditions will be finalized at this time. Upon approval of Form WR-37, conditions established on this form are incorporated by reference as conditions of this permit. FORM WR-37 SHALL BE SUBMITTED WITHIN 30 DAYS OF THE EFFECTIVE DATE OF THE UIC PERMIT. A mechanical integrity test must be performed at least once every five years per 35CSR4-7.7.b.

14. If a mechanical integrity test should fail, the permittee shall cease operation/injection and shut-in the well immediately until repaired or permanently plugged and abandoned per regulation. The well must be repaired or permanently plugged within 90 days of the failure date. If repaired, the well must be re-tested making sure to submit a WR-37 Form to the Office of Oil and Gas. The Office of Oil and Gas should be notified 24 hours in advance of the re-test date to witness said test.

15. A well head pressure gauge shall be installed and maintained on the injection tubing / casing to facilitate inspection and ensure compliance of maximum injection pressures as approved on Oil and Gas Form WR-37. A daily reading of the injection pressure shall be taken and reported monthly on Form WR-40 to the Office of Oil and Gas.

16. The permittee shall sample and analyze injection fluids upon request by the Office of Oil and Gas at a frequency not to exceed twice a year. Analyses shall cover all parameters listed on Attachment A of this permit. Results of all analyses shall be submitted to the Office of Oil and Gas. Permittee shall submit a letter of explanation for any parameter which exceeds the ranges on Attachment A.

17. All injection lines shall be inspected, maintained, operated and monitored to allow early detection of any leakage and so that the occurrence of leaks will be minimized. Pipelines connection UIC well and tank battery shall be tested for tightness at least once every five years.

18. All above-ground storage tanks on location shall have secondary containment per regulation to protect against leaks.

19. Permittee shall monitor existing impoundment for releases following groundwater monitoring plan proposed within UIC application. Wells shall be constructed per regulation and monitored for those parameters stated within plan submitted. Injection shall not begin until background samples are taken for groundwater per plan submitted. All water well monitoring shall be reported to the Office of Oil and Gas on a semi-annual basis.

21. Impoundment(s) on location shall be inspected at least once a week recording integrity. An inspection shall be conducted within 24 hours of a significant rain event, meaning rainfall of two (2) inches or more within a 6 hour period. If an inspection discloses a potential hazard the permittee shall notify the Office of Oil and Gas of the findings. Permittee shall maintain at least a two (2) foot freeboard within impoundment(s).

20. Permittee shall immediately cease injection if any monitoring results indicate contamination of a freshwater aquifer. The permittee shall make every reasonable effort to identify, remove, or mitigate the source of such contamination. Within (30) days the permitte shall submit to the Office of Oil and Gas a groundwater remediation plan.

21. All solids/sludge removed from impoundment shall be disposed of properly taking to an approved landfill.

22. The permittee shall fulfill the requirements of the Office of Oil and Gas regarding maintaining financial responsibility and resources to close, plug, and abandon permitted wells. An additional five-thousand dollar performance bond shall be maintained on permitted UIC well #85-09909.

23. The herein-described activity is to be extended, modified, added to, made, enlarged, acquired, constructed or installed, and operated, used and maintained strictly in accordance with the terms and conditions of this permit; with the information submitted with the Permit Application No. **UIC2D0859909** with the plan of maintenance and method of operation thereof submitted with such application(s); and with any applicable rules and regulations promulgated by the Department of Environmental Protection.

24. This permit is issued in accordance with the provisions of Article 11 and 12, Chapter 22, of the Code of West Virginia and Legislative Rule 47CSR13.

25. Failure to comply with the terms and conditions of this permit, with the plans and specifications submitted with the Permit Application No. **UIC2D0859909** and with the plan of maintenance and method of operation thereof submitted with such application(s) shall constitute grounds for the revocation or suspension of this permit and for the invocation of all the enforcement procedures set forth in Article 11 and 12, Chapter 22, of the Code of West Virginia and Legislative Rule 47CSR13.

26. The operation of this injection well facility in general, including maintenance of all unrelated surface equipment, shall be conducted so as to preclude any unlawful discharge of waste materials into the surface or ground waters of this State.

27. The permittee must satisfy the requirement of the Office of Oil and Gas for plugging and abandonment of permitted injection wells in such a manner as to ensure that no fluid movement occurs either from the injection zone into an underground source of drinking water or from one underground source of drinking water to another.

28. Permittee shall implement a manifesting system to record all loads hauled to the facility making sure to document the source of the waste fluid and hauler identification. The Office of Oil and Gas shall approve the instrument, prior to the transportation of any fluids.

29. Permittee must ensure that a monthly composite / representative fluid sample is taken from water brought to the facility to be injected into disposal well API#85-09909 from each operator and associated wells testing for pH, Iron, Manganese, Chlorides, Sodium, Sulfate, TDS, TOC, and Barium. Each sample must list the formation(s) that the water originated from. Test results must be submitted to the Office of Oil and Gas.

ATTACHMENT A

Injection Fluid Analyses Parameters

Parameter	Ranges
PH	>2 – 10
TDS	0 - 265,000 mg/l
TSS	0 - 1000 mg/l
Aluminum	0 - 10 mg/l
Arsenic	0 – 10 mg
Barium	0 – 1500 mg/l
Cadmium	0 – 2 mg/l
Chromium	0 – 1 mg/l
Iron	0 – 1000 mg/l
Lead	0 – 7.5 mg/l
Magnesium	0 – 5000 mg/l
Manganese	0 – 15 mg/l
Potassium	0 – 5000 mg/l
Sodium	0 – 110,000 mg/l
Zinc	0 – 15 mg/l
Surfactants	0 – 10 mg/l
TKN	0 – 25 mg/l
Oil and Grease	0 – 100 mg/l
TOC	0 – 10,000 mg/l
COD	0 – 30,000 mg/l
Acidity	0 – 500 mg/l
Chloride	0 – 250,000 mg/l
Sulfate	0 – 500 mg/l
Cyanide	0 – 1 mg/l
Phenols	0 – 10 mg/l
Calcium	0 – 60,000 mg/l
BNA – Extractables	Trace
Purgeable Aromatics	Trace
Purgeable Halocarbons	Trace
PCBs	<MDL or 50 ppm
TPHs (ORO, DRO, GRO)	
NORM	

CORE
ENVIRONMENTAL SERVICES, INC
Consulting • Operation & Maintenance • Risk Assessment • Engineering

April 25, 2013

Hall Drilling, LLC
981 E. Washington, Ave.
Ellenboro, WV 26346

Attention: Susan Baldwin

Subject: **Environmental Services Proposal**
Groundwater Monitoring Well Installation and Development
UIC Well #3
Ellenboro, Ritchie County, West Virginia

Dear Ms. Baldwin,

On behalf of CORE Environmental Services, Inc. (CORE), we are pleased to provide this proposal and cost estimate for environmental services associated with the above referenced project. We appreciate the opportunity and look forward to assisting Hall Drilling, LLC (Hall Drilling) with this project.

Scope of Work

The proposed scope of work includes the following tasks:

Purpose: The purpose of the proposed scope of work is to satisfy the water quality monitoring requirements (section IV) of the West Virginia Department of Environmental Protection (WVDEP) guidance document, "Design and Construction Standards for Centralized Pits", as referenced in the WVDEP guidance, dated December 23, 2011 (attached).

Pre-Mobilization and HASP Preparation: Prior to mobilization to the site to initiate intrusive work, CORE will develop a site specific Health and Safety Plan (HASP) to address safety concerns and potential on-site hazards related to the proposed work scope. The HASP will be prepared in accordance to applicable Occupational Safety and Health Administrations (OHSA) guidelines, and provides emergency contact information and procedures to be followed in the event of an emergency.

At least 48 hours prior to commencing intrusive work, CORE will contact West Virginia's Miss Utility system and will provide the project-specific information needed for performance of the required utility mark-out. The mark-out service will identify subsurface utilities along the property frontage and the locations of known service laterals extending onto private property (if applicable). Miss utility does not identify private, on-site utility

4 Brockstone Plaza
Morgantown, WV 26508
(304) 292-CORE (2673)
Fax (304) 292-2773

Corporate Office
4068 Mt. Royal Blvd., Suite 225
Allison Park, PA 15101-2951
(412) 487-6000
Fax (412) 487-9785
www.core-env.com

130 George Street, Suite H
Beckley, WV 25801
(681) 238-5235
Fax (681) 238-5239

locations.

Groundwater Monitoring Well Installation and Development: CORE will retain Chatfield Drilling, Inc. (Chatfield) and provide supervision during the installation of three shallow water table monitoring wells (MW-1 through MW-3) at the approximate locations indicated in Hall Drillings UIC Impoundment and Groundwater Monitoring Plan, which establishes required construction details for the centralized impoundment pit. The monitoring wells will be situated hydraulically downgradient of the impoundment pit, in order to allow for detection of potential groundwater contamination from the contents of the pit. Estimated costs are based on the well locations being accessible with a truck mounted drill rig (track rig not required).

A CORE Field Technician will supervise the installation of the monitoring wells, provide site safety oversight and monitor the work area breathing zone with a calibrated photoionization detector (PID). CORE field personnel will keep in regular contact with the CORE Project Manager and provide details of the well installation activities as the work progresses.

CORE will supervise the installation of three 4-inch diameter monitoring wells to a sufficient depth to allow a standing water column which will accommodate the collection of groundwater samples from within the completed well casings. Costs included here are based on completion of the wells to 80 feet below ground surface (bgs), however the wells will be advanced to sufficient depth based on site conditions and the associated cost adjusted accordingly if greater depth is required.

Each well will be constructed with approximately 30 feet of 0.01 inch slotted PVC well screen and approximately 50 feet of solid 4-inch PVC riser, depending on site conditions. A clean sand filter pack will extend five feet above the screened interval in each well boring. The monitoring wells will be completed at the surface with high-visibility, lockable, protective steel casings, which will extend approximately four feet above surface grade. Drill cuttings generated during the monitoring well installation will be dispersed onsite at locations that will not affect the immediate work areas. Upon completion of the monitoring well installations, Chatfield personnel will develop each well by removing sediment-laden groundwater until minimal turbidity is achieved. Groundwater recovered during well development will be dispersed onsite at locations that will not affect the immediate work areas.

Following completion of the proposed field work, CORE will provide well construction documentation to Hall Drilling. Within five business days of receipt of documentation from the drilling contractor, CORE will provide an AutoCAD map showing approximate well locations, well construction logs, and a written summary of completion details.

Please note this proposal does not include costs for sampling the wells once completed. That proposal will be

prepared following completion of the wells and will be based on actual construction details of the wells (depth to water, depth to bottom, etc.)

Cost Estimate

A detailed cost estimate is included on the following pages. Below is a breakdown of the estimated costs to perform each task of the above scope of work.

Pre-Mobilization and HASP Preparation	$ 480
Groundwater Monitoring Well Installation and Development	$ 22,003
Total Cost:	**$ 22,483**

Schedule and Compensation

CORE will initiate the proposed scope of work within 48 hours of receipt of the signed proposal. Invoices will be submitted to Hall Drilling on a monthly basis. Payment will be due as stated in the attached Continuing Services Agreement (CSA).

CORE appreciates this opportunity to provide you with our services and looks forward to working with you on this project. If this proposal meets with your acceptance, please return a copy with an authorized signature on the line below and a signed copy of the enclosed CSA by email to trebar@core-env.com or fax to (304) 292-2773.

If you have any questions regarding this proposal or the associated costs please contact me at (304) 266-7207.

Sincerely,

CORE Environmental Services, Inc.

Thomas M. Rebar, LRS
Senior Consultant

Enclosure: Detailed Cost Estimate

I authorize the work scope to be performed as described above (Hall Drilling Environmental Services Proposal, April 25, 2013) and in accordance with the CSA between CORE and Hall Drilling.

Signature

Date

UIC Impoundment and Groundwater Monitoring Plan
Hall Drilling Underground Injection Center, Ellenboro, West Virginia

Purpose

Monitoring and periodic routine investigative procedures will be performed on the impoundment area of the Hall Drilling Underground Injection Center by visual observations and by monitoring wells located down gradient from the impoundment site to ensure prompt notification of the migration of disposal fluids temporarily retained in the pond. The monitor wells will be designed to meet specifications as required by applicable laws, permits and regulations, and the Region 3 United States Environmental Protection Agency guidelines. Pertinent data will be reviewed regularly by qualified operators and forwarded to the agencies as required. Monitoring and testing will be designed to provide data regarding impoundment integrity and safe operation.

Design of the Monitoring Network

Monitoring Sites

Two to three monitoring well locations will be identified along the eastern slope of the impoundment area based upon the practicalities of installation and monitoring as well as the ability to detect contaminate releases in time to remediate before the substance enters groundwater wells in the area. The monitoring wells will be within the leased area of the Tech Service Center and will not require additional security measures to be installed. Data will be collected from sources such as drilling information, core samples, hydrological tests and/or geophysical logs to assist in determining the location distance from the impoundment and the sampling formation thickness, pressure, lithology and hydrologic properties. The zone for sampling will be selected for adequate transmissivity and formation pressure.

Well Installation

As the monitoring field is in the design phase, specific details regarding the construction, specific materials, drilling methods and well development are not available at this time. Construction of the monitoring field will begin after proper approval by the appropriate agencies. The monitoring wells will be constructed and developed based on the West Virginia Rules 47CST59 and Title 47 Series 60. The vertical depths and types of wells will be determined by the first permanent aquifer zone and the potential contaminants properties. Mechanical integrity of the wells will be maintained at all times to ensure proper sampling. Copies of all work reports and logs will be collected and the information dispersed to the DEP upon completion.

Design of Sampling and Analysis Plan

Control strategies will be developed based upon the properties of disposal fluid. A potential contaminant list will be based upon an analysis of a sample of disposal fluid and testing designed to detect these elements and compounds. The disposal fluid analysis includes tests for pH, chloride levels, sodium, TDS, TSS, arsenic, aluminum, barium, cadmium, chromium, iron, lead, manganese, MBAS, sulfate, BTEX, TPHs and

NORM. A sample of in-situ groundwater will also be analyzed to determine pre-existing levels of these chemicals. A baseline of sampling constituents is being created and the MCL will be determined in accordance to current EPA standards. A Quality Assurance Project Plan (QAPP) will be designed to ensure proper testing procedures are followed in accordance to EPA approved analytical methods.

Monitoring Plan

A baseline for groundwater quality will be established in the first year. A schedule for sampling the monitor wells will be created after an analysis of the groundwater formation to ensure the prompt detection of disposal fluid migration. Anticipated sampling schedule for the monitoring wells will be quarterly pursuant to USEPA regulations at 146.13(d)(2) unless analysis of data contraindicates. The schedule of sampling will be determined and submitted to the DEP when completed.

If a monitor well fails required continuous monitoring or periodic testing standards, the well will be retested. After investigation into the cause for the failure, action may consist of notifying appropriate authorities, and taking remedial action for repairing the problem.

Plugging and Abandonment Plan

A component in the design of the monitoring field plan will be the plugging and abandonment of the monitor wells. The operator of the Tech Service Center will maintain financial responsibility and resources necessary to close, plug and abandon the monitoring wells consistent with 40 CFR 146.10.

Pace Analytical Services, Inc.
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

April 22, 2013

Ms. Tenley Miller
Reliance Laboratories, Inc.
2044 Meadowbrook Road
P.O. Box 4657
Bridgeport, WV 26330

RE: Project: 193161-2013-W
Pace Project No.: 3091141

Dear Ms. Miller:
Enclosed are the analytical results for sample(s) received by the laboratory on April 05, 2013. The results relate only to the samples included in this report. Results reported herein conform to the most current TNI standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Jacquelyn Collins

jacquelyn.collins@pacelabs.com
Project Manager

Enclosures

Received
Office of Oil & Gas

MAY - 6 2013

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

CERTIFICATIONS

Project: 193161-2013-W
Pace Project No.: 3091141

Pennsylvania Certification IDs
1638 Roseytown Rd Suites 2,3&4 Greensburg, PA 15601
ACLASS DOD-ELAP Accreditation #: ADE-1544
Alabama Certification #: 41590
Arizona Certification #: AZ0734
Arkansas Certification
California/TNI Certification #: 04222CA
Colorado Certification
Connecticut Certification #: PH-0694
Delaware Certification
Florida/TNI Certification #: E87683
Guam/PADEP Certification
Hawaii/PADEP Certification
Idaho Certification
Illinois/PADEP Certification
Indiana/PADEP Certification
Iowa Certification #: 391
Kansas/TNI Certification #: E-10358
Kentucky Certification #: 90133
Louisiana/TNI Certification #: LA050002
Louisiana/TNI Certification #: 4086
Maine Certification #: PA0091
Maryland Certification #: 308
Massachusetts Certification #: M-PA1457
Michigan/PADEP Certification
Missouri Certification #: 235
Montana Certification #: Cert 0082
Nevada Certification
New Hampshire/TNI Certification #: 2976
New Jersey/TNI Certification #: PA 051
New Mexico Certification
New York/TNI Certification #: 10888
North Carolina Certification #: 42706
Oregon/TNI Certification #: PA200002
Pennsylvania/TNI Certification #: 65-00282
Puerto Rico Certification #: PA01457
South Dakota Certification
Tennessee Certification #: TN2867
Texas/TNI Certification #: T104704188
Utah/TNI Certification #: ANTE
Virgin Island/PADEP Certification
Virginia/VELAP Certification #: 460198
Washington Certification #: C868
West Virginia Certification #: 143
Wisconsin/PADEP Certification
Wyoming Certification #: 8TMS-Q

Pace Analytical Services, Inc.
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

SAMPLE SUMMARY

Project: 193161-2013-W
Pace Project No.: 3091141

Lab ID	Sample ID	Matrix	Date Collected	Date Received
3091141001	193161-2013-W	Water	03/20/13 11:00	04/05/13 09:50

Pace Analytical Services, Inc.
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Greensburg, PA 15601
(724)850-5600

SAMPLE ANALYTE COUNT

Project: 193161-2013-W
Pace Project No.: 3091141

Lab ID	Sample ID	Method	Analysts	Analytes Reported
3091141001	193161-2013-W	EPA 901.1m	AEH	3
		EPA 903.1	SLA	1
		EPA 904.0	MAW	1

Pace Analytical Services, Inc.
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

PROJECT NARRATIVE

Project: 193161-2013-W
Pace Project No.: 3091141

Method: EPA 901.1m
Description: 901.1 Gamma Spec
Client: Reliance Laboratories, Inc.
Date: April 22, 2013

General Information:
1 sample was analyzed for EPA 901.1m. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

Pace Analytical Services, Inc.
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

PROJECT NARRATIVE

Project: 193161-2013-W
Pace Project No.: 3091141

Method: EPA 903.1
Description: 903.1 Radium 226
Client: Reliance Laboratories, Inc.
Date: April 22, 2013

General Information:
1 sample was analyzed for EPA 903.1. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

Pace Analytical Services, Inc.
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

PROJECT NARRATIVE

Project: 193161-2013-W
Pace Project No.: 3091141

Method: EPA 904.0
Description: 904.0 Radium 228
Client: Reliance Laboratories, Inc.
Date: April 22, 2013

General Information:
1 sample was analyzed for EPA 904.0. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

This data package has been reviewed for quality and completeness and is approved for release.

Pace Analytical Services, Inc.
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

ANALYTICAL RESULTS

Project: 193161-2013-W
Pace Project No.: 3091141

Sample: 193161-2013-W Lab ID: 3091141001 Collected: 03/20/13 11:00 Received: 04/05/13 09:50 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC)	Units	Analyzed	CAS No.	Qual
Bismuth-212	EPA 901.1m	83.371 ± 84.636 (137.400)	pCi/L	04/17/13 10:47	14913-49-6	
Bismuth-214	EPA 901.1m	1028.800 ± 115.510 (98.510)	pCi/L	04/17/13 10:47	14733-03-0	
Lead-212	EPA 901.1m	36.868 ± 13.393 (20.640)	pCi/L	04/17/13 10:47	15092-94-1	
Lead-214	EPA 901.1m	1109.200 ± 125.840 (98.710)	pCi/L	04/17/13 10:47	15067-28-4	
Potassium-40	EPA 901.1m	691.290 ± 143.810 (97.250)	pCi/L	04/17/13 10:47	13966-00-2	
Thallium-208	EPA 901.1m	10.318 ± 7.396 (11.800)	pCi/L	04/17/13 10:47	14913-50-9	
Thorium-234	EPA 901.1m	732.160 ± 168.320 (1183.000)	pCi/L	04/17/13 10:47	15065-10-8	
Uranium-235	EPA 901.1m	15.991 ± 25.647 (119.200)	pCi/L	04/17/13 10:47	15117-96-1	
Radium-226	EPA 903.1	3,864 ± 388 (0.782)	pCi/L	04/18/13 13:29	13982-63-3	
Radium-228	EPA 904.0	284 ± 51.6 (5.94)	pCi/L	04/16/13 14:21	15262-20-1	

Received
Office of Oil & Gas

MAY - 6 2013

Date: 04/22/2013 01:28 PM

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

QUALITY CONTROL DATA

Project: 193161-2013-W
Pace Project No.: 3091141

QC Batch: RADC/16340 Analysis Method: EPA 903.1
QC Batch Method: EPA 903.1 Analysis Description: 903.1 Radium-226
Associated Lab Samples: 3091141001

METHOD BLANK: 535470 Matrix: Water
Associated Lab Samples: 3091141001

Parameter	Act ± Unc (MDC)	Units	Analyzed	Qualifiers
Radium-226	0.114 ± 0.315 (0.611)	pCi/L	04/18/13 12:34	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

QUALITY CONTROL DATA

Project: 193161-2013-W
Pace Project No.: 3091141

QC Batch: RADC/15399
QC Batch Method: EPA 901.1m
Analysis Method: EPA 901.1m
Analysis Description: 901.1 Gamma Spec
Associated Lab Samples: 3091141001

METHOD BLANK: 557176
Matrix: Water
Associated Lab Samples: 3091141001

Parameter	Act ± Unc (MDC)	Units	Analyzed	Qualifiers
Bismuth-212	-33.624 ± 65.785 (126.100)	pCi/L	04/16/13 08:49	
Bismuth-214	7.023 ± 31.883 (58.690)	pCi/L	04/16/13 08:49	
Lead-212	2.590 ± 7.791 (14.500)	pCi/L	04/16/13 08:49	
Lead-214	0.188 ± 0.175 (16.590)	pCi/L	04/16/13 08:49	
Potassium-40	-73.763 ± 2950.500 (132.600)	pCi/L	04/16/13 08:49	
Thallium-208	1.275 ± 4.833 (8.784)	pCi/L	04/16/13 08:49	
Thorium-234	31.283 ± 459.030 (816.700)	pCi/L	04/16/13 08:49	
Uranium-235	42.213 ± 44.333 (42.030)	pCi/L	04/16/13 08:49	

Pace Analytical Services, Inc.
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

QUALITY CONTROL DATA

Project: 193161-2013-W
Pace Project No.: 3091141

QC Batch: RADC/15344 Analysis Method: EPA 904.0
QC Batch Method: EPA 904.0 Analysis Description: 904.0 Radium 228
Associated Lab Samples: 3091141001

METHOD BLANK: 565474 Matrix: Water
Associated Lab Samples: 3091141001

Parameter	Act ± Unc (MDC)	Units	Analyzed	Qualifiers
Radium-228	0.172 ± 0.356 (0.797)	pCi/L	04/18/13 11:40	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

QUALIFIERS

Project: 193161-2013-W
Pace Project No.: 3091141

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to changes in sample preparation, dilution of the sample aliquot, or moisture content.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PRL - Pace Reporting Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine (8270 listed analyte) decomposes to Azobenzene.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Act - Activity

Unc - Uncertainty

(MDC) - Minimum Detectable Concentration

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

85-09909

RELIANCE LABORATORIES, INC.

ENVIRONMENTAL ANALYSTS AND CONSULTANTS

BRIDGEPORT, WV www.RelianceLabs.net MARTINSBURG, WV

Certifications: WV Department of Health #: 00364, 00433 | WV Department of Environmental Protection #: 136, 161
MD Department of Environment #: 336, 337 | US Environmental Protection Agency #: WV00042, WV00001

WILLOW LAND SURVEYING
P.O. BOX 17

Thursday, March 28, 2013

PENNSBORO, WV 26415-

Lab Number: 193107-2013-DW **Sample ID:** TECH SERVICE - BLOVIR

Parameter	Value	Units	Method	Date/Time Analyzed	Analyst	MRL	MCL
Analyte Group: Inorganics							
E. coli (Chromogenic)	ABSENT		SM9223B	3/19/2013	14:46 C.Parker		
Total Coliform (Chromogenic)	ABSENT		SM9223B	3/19/2013	14:46 C.Parker		
pH	8.81	S.U.	SM4500H+B	3/26/2013	11:26 A.Tenisary		
Total Alkalinity	233	mg/l	SM2320B	3/26/2013	11:26 A.Tenisary	2	
Total Chloride	52.5	mg/l	EPA 300.0	3/21/2013	3:51 M.Coffman	0.15	[250]
Total Dissolved Solids	406	mg/l	SM 2540C	3/25/2013	11:45 C.Tomaro	10	[500]
Total Organic Carbon	0.55	mg/l	SM5310C	3/12/2013	10:14 M.Coffman	0.1	
Total Surfactant	ND	mg/l	SM5540C	3/20/2013	15:09 K.Davis	0.2	[0.5]
Turbidity	3.36	N.T.U.	EPA 180.1	3/20/2013	16:37 K.Davis	0.22	
Total Aluminum	0.04	mg/l	EPA 200.7	3/25/2013	10:14 T.Hanshaw	0.04	[0.05]
Total Barium	0.10	mg/l	EPA 200.7	3/25/2013	10:14 T.Hanshaw	0.05	2.0
Total Iron	0.01	mg/l	EPA 200.7	3/25/2013	10:14 T.Hanshaw	0.01	[0.3]
Total Manganese	ND	mg/l	EPA 200.7	3/25/2013	10:14 T.Hanshaw	0.01	[0.05]

Remarks:

Date Sample Collected: 3/19/2013 8:45
Sample Submitted By: T.SUMMERS
Date Sample Received: 3/19/2013 12:59
ND = Not Detected at the MDL or MRL.
MDL - Minimum Detectable Limit
MRL - Minimum Reporting Limit
MCL - Maximum Contaminant Level, USEPA Regulated
[MCL] = Maximum Contaminant Level, Non-Regulated

"Method Codes" STANDARD METHODS 20TH ED; US EPA METHODS FOR THE CHEMICAL ANALYSIS OF WATER AND WASTES, Rev. 83; US EPA METHODS FOR THE DETERMINATION OF METALS IN ENVIRONMENTAL SAMPLES, May 1994; TEST METHODS FOR EVALUATING SOLID WASTE, SW-846, 3rd ED; USEPA Manual for Certification of Laboratories Analyzing Drinking Water, 4th ED, in accordance with EPA Regulations, all reports, including raw data and quality control data, are maintained by the laboratory for a minimum of 5 years.

NOTE: This sample meets standards set for Total Coliform and E. Coli by the State of West Virginia, 64-3-10, Code of State Regulations, adopted July 1, 2002 by the Bureau For Public Health. Sample analyzed by Certified Laboratory #00364CM and #00433BL.

NOTE: ND or Not Detected indicates that the analytical value obtained is below the minimum reportable limit (MRL) which is equivalent to the lowest standard utilized in preparation of the method calibration curve.

RL1001

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EMAIL: RELIANCELABS@WVDSL.NET | WEB: WWW.RELIANCELABS.NET

RELIANCE LABORATORIES, INC.

ENVIRONMENTAL ANALYSTS AND CONSULTANTS

BRIDGEPORT, WV www.RelianceLabs.net MARTINSBURG, WV

Certifications: WV Department of Health #: 00364, 00453 | WV Department of Environmental Protection #: 168, 181
MD Department of Environment #: 338, 357 | US Environmental Protection Agency #: WV00042, WV00901

WILLOW LAND SURVEYING
P.O. BOX 17

Thursday, March 28, 2013

PENNSBORO, WV 26415-

Lab Number: 193108-2013-DW **Sample ID:** TECH SERVICE - SLAWSON

Parameter	Value	Units	Method	Date/Time Analyzed	Analyst	MRL	MCL
Analyte Group: Inorganics							
E. coli (Chromogenic)	ABSENT		SM9223B	3/19/2013 14:48	C.Parker		
Total Coliform (Chromogenic)	ABSENT		SM9223B	3/19/2013 14:48	C.Parker		
pH	7.99	S.U.	SM4500H+B	3/26/2013 11:31	A.Tonkery		
Total Alkalinity	111	mg/l	SM2320B	3/26/2013 11:31	A.Tonkery		
Total Chloride	1.12	mg/l	EPA 300.0	3/21/2013 4:22	M.Coffman	0.15	[250]
Total Dissolved Solids	140	mg/l	SM 2540C	3/26/2013 11:45	C.Tomaro	10	[500]
Total Organic Carbon	0.72	mg/l	SM5310C	3/21/2013 10:14	M.Coffman	0.1	
Total Surfactant	ND	mg/l	SM5540C	3/20/2013 16:00	K.Davis	0.2	[0.5]
Turbidity	3.10	N.T.U.	EPA 180.1	3/20/2013 16:37	K.Davis	0.22	
Total Aluminum	ND	mg/l	EPA 200.7	3/25/2013 10:20	T.Hanshaw	0.04	[0.05]
Total Barium	0.71	mg/l	EPA 200.7	3/25/2013 10:20	T.Hanshaw	0.06	2.0
Total Iron	0.25	mg/l	EPA 200.7	3/25/2013 10:20	T.Hanshaw	0.01	[0.3]
Total Manganese	0.06	mg/l	EPA 200.7	3/25/2013 10:20	T.Hanshaw	0.01	[0.05]

Remarks:

Date Sample Collected: 3/19/2013 13:55
Sample Submitted By: T.Slawson
Date Sample Received: 3/19/2013 19:29
ND = Not Detected at the MDL or MRL.
MDL - Minimum Detectable Limit
MRL - Minimum Reporting Limit
MCL - Maximum Contaminant Level, USEPA Regulated
[MCL] = Maximum Contaminant Level, Non-Regulated

Method Code: STANDARD METHODS 18TH ED; US EPA METHODS FOR THE CHEMICAL ANALYSIS OF WATER AND WASTES, Rev. ED; US EPA METHODS FOR THE DETERMINATION OF METALS IN ENVIRONMENTAL SAMPLES, May 1994; TEST METHODS FOR EVALUATING SOLID WASTE, SW-846, 3rd ED; USEPA Manual for Certification of Laboratories Analyzing Drinking Water, 5th ED. In accordance with EPA Regulations, all reports, including raw data and quality control data, are maintained by the laboratory for a minimum of 5 years.
NOTE: This sample meets standards set for Total Coliform and E. Coli by the State of West Virginia, 64-3-10, Code of State Regulations, adopted July 1, 2002 by the Bureau For Public Health. Sample analyzed by Certified Laboratory #00364CH and #00453M.
NOTE: ND or Not Detected indicates that the analytes value obtained is below the minimum reportable limit (MRL) which is equivalent to the lowest standard utilized in preparation of the method calibration curve

RLI.001

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ENVIRONMENTAL ANALYSTS AND CONSULTANTS

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Certifications: WV Department of Health #: 00854, 00433 | WV Department of Environmental Protection #: 155, 181
MD Department of Environment #: 336, 337 | US Environmental Protection Agency #: WV00042, WV00901

WILLOW LAND SURVEYING
P.O. BOX 17

PENNSBORO, WV 26415-

Thursday, March 28, 2013

Lab Number: 193109-2013-DW **Sample ID:** TECH SERVICE - REED

Parameter	Value	Units	Method	Date/Time Analyzed	Analyst	MRL	MCL
Analyte Group: Inorganics							
E. coli (Chromogenic)	ABSENT		[illegible]	3/19/2013	14:48 C.Parker		
Total Coliform (Chromogenic)	PRESENT		SM9223B	3/19/2013	14:48 C.Parker		
pH	8.21	S.U.	SM4500H+B	3/26/2013	11:34 A.Tonkery		
Total Alkalinity	241	mg/l	SM2320B	3/26/2013	11:34 A.Tonkery	2	
Total Chloride	7.88	mg/l	EPA 300.0	3/21/2013	4:53 M.Coffman	0.15	[250]
Total Dissolved Solids	302	mg/l	SM 2540C	3/25/2013	11:45 C.Tenaro	10	[500]
Total Organic Carbon	1.27	mg/l	SM5310C	3/21/2013	10:14 M.Coffman	0.1	
Total Surfactant	ND	mg/l	SM5540C	3/20/2013	18:09 K.Davis	0.2	[0.5]
Turbidity	1.10	N.T.U.	EPA 180.1	3/20/2013	18:37 K.Davis	0.22	
Total Aluminum	ND	mg/l	EPA 200.7	3/25/2013	10:23 T.Henshaw	0.04	[0.05]
Total Barium	1.55	mg/l	EPA 200.7	3/25/2013	10:23 T.Henshaw	0.05	2.0
Total Iron	0.29	mg/l	EPA 200.7	3/25/2013	10:23 T.Henshaw	0.01	[0.3]
Total Manganese	0.04	mg/l	EPA 200.7	3/25/2013	10:23 T.Henshaw	0.01	[0.05]

Remarks:

Date Sample Collected: 3/13/2013 10:20
Sample Submitted By: T.SURNAME
Date Sample Received: 3/18/2013 12:53
ND = Not Detected at the MDL or MRL
MDL - Minimum Detectable Limit
MRL - Minimum Reporting Limit
MCL - Maximum Contaminant Level, USEPA Regulated
[MCL] = Maximum Contaminant Level, Non-Regulated

*Method Codes: STANDARD METHODS 19TH ED; US EPA METHODS FOR THE CHEMICAL ANALYSIS OF WATER AND WASTES, Rev. ED; US EPA METHODS FOR THE DETERMINATION OF METALS IN ENVIRONMENTAL SAMPLES, May 1994; TEST METHODS FOR EVALUATING SOLID WASTE, SW-846, 3rd ED; USEPA Manual for Certification of Laboratories Analyzing Drinking Water, 4th ED. In accordance with EPA Regulations, all reports, including raw data and quality control data, are maintained by the laboratory for a minimum of 5 years.

NOTE: This sample does not meet standards set for Total Coliform and E Coli by the State of West Virginia, 64-3-10, Code of State Regulations, adopted July 1, 2002 by the Bureau For Public Health. Sample Analyzed by Certified Laboratory #00854(C) and #00444

NOTE: ND or Not Detected indicates that the analytical value obtained is below the minimum reportable limit (MRL) which is equivalent to the lowest standard utilized in preparation of the method calibration curve

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RIDGEFIELD BUSINESS CENTER | 35 CRIMSON CIRCLE | MARTINSBURG, WV 25403 | VOICE: 304-596-2064 | FAX: 304-596-2065
EMAIL: RELIANCELABS@WVDSL.NET | WEB: WWW.RELIANCELABS.NET

RELIANCE LABORATORIES, INC. - CHAIN OF CUSTODY RECORD

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POST OFFICE BOX 4657
BRIDGEPORT, WV 26330
TEL. (304) 842-5285 • FAX (304) 842-5351
E-MAIL. reliancelabs@wvdsl.net
INTERNET www.RelianceLabs.net

☐ RIDGEFIELD BUSINESS CENTER
25 CRIMSON CIRCLE
MARTINSBURG, WV 25403
TEL. (304) 596-2084 • FAX (304) 596-2086

*CLIENT NAME Hall Drilling

*ADDRESS

CUSTOMER # C06443 *TEL.# FAX #

*SAMPLER (S) J. Stricker E-MAIL

See Attached

SHEET NO. OF

LABORATORY #	*DATE	*TIME	GRAB	COMP	MATRIX W, DW, S, O, M	TEMP. ≤ 4°C Yes No	# OF CONTAIN.	HNO3	H2SO4	HCL	NaOH	BAC-T	NO PRES.	*PROJECT/REMARKS
193161	3/20/13	11:00			W	13.1c	6	1		2			3	Tech Service Center 3H

SAMPLES DO ✓ DO NOT ____ MEET USEPA GUIDELINES FOR HOLDING TIMES
SAMPLES DO ✓ DO NOT ____ MEET USEPA GUIDELINES FOR CHEMICAL PRESERVATIVES
SAMPLES DO ✓ DO NOT ____ MEET USEPA GUIDELINES FOR SAMPLE CONTAINERS
SAMPLES ARE ____ ARE NOT ____ FOR REGULATORY COMPLIANCE PURPOSES

*RELINQUISHED BY:	*DATE/TIME	*RECEIVED BY:
PRINT: Jack Stricker	DATE: 3/20/13	PRINT: A. Shrock
SIGN: Jack Stricker	TIME: 14:25	SIGN:
*RELINQUISHED BY:	*DATE/TIME	*RECEIVED BY:
PRINT:	DATE:	PRINT:
SIGN:	TIME:	SIGN:
*RELINQUISHED BY:	*DATE/TIME	*RECEIVED BY:
PRINT:	DATE:	PRINT:
SIGN:	TIME:	SIGN:
*COURIER:	*DATE/TIME	*RECEIVED BY:
TRACKING #	DATE:	PRINT:
	TIME:	SIGN:

REMARKS:

PWS#

COPY

WEATHER/TEMPERATURE:

☐ *RUSH STATUS* (INITIAL ACCEPTANCE _____)

*** ADDITIONAL LABORATORY FEES MAY APPLY***

EXTENT OF LIABILITY

SHOULD RELIANCE LABORATORIES, INC. BE AT FAULT AND ANY DISPUTE ARISE REGARDING ANALYTICAL DATA GENERATED BY THE LABORATORY, THE EXTENT OF THE LIABILITY TO RELIANCE WILL BE A DUPLICATE ANALYSIS OF THAT SAMPLE (PROVIDING ADEQUATE SAMPLE REMAINS) OR A REFUND OF THE ANALYTICAL FEE. IN NO EVENT WILL RELIANCE LABORATORIES BE LIABLE FOR DAMAGES INCLUDING BUT NOT LIMITED TO DIRECT, INDIRECT OR CONSEQUENTIAL DAMAGES ARISING FROM SUCH DISPUTE.

NOTE: TYPICAL SAMPLE TURN AROUND FOR ROUTINE SAMPLES IS 8 TO 10 WORKING DAYS. THIS IS NOT A GUARANTEE THAT SAMPLES WILL BE COMPLETED IN THIS TIME FRAME, HOWEVER, NON-ROUTINE SAMPLES MAY REQUIRE ADDITIONAL TIME.

ORIGINAL CHAIN OF CUSTODY DOCUMENT MUST BE EXECUTED IN INK

WHITE - LABORATORY YELLOW - CLIENT

RELIANCE LABORATORIES, INC.

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Certifications: WV Department of Health #: 00954, 00433 | WV Department of Environmental Protection #: 155, 181
MD Department of Environment #: 336, 337 | US Environmental Protection Agency #: WV00042, WV00901

HALL DRILLING
981 E. WASHINGTON AVE.

Wednesday, April 10, 2013

ELLENBORO, WV 26346-

Lab Number: 193161-2013-W **Sample ID:** TECH SERVICE CENTER 3H

Parameter	Value	Units	Method	Date/Time Analyzed	Analyst	MDL	MCL
Analyte Group: Inorganics							
Total Lead	ND	mg/l	EPA 200.7	3/25/2013	11:08 T.Hanshaw	0.005	
pH	# 6.09	S.U.	SM4500H+B	3/27/2013	13:32 K.Davis		
Total Iron	113	mg/l	EPA 200.7	3/25/2013	11:08 T.Hanshaw	0.004	
Total Chloride	78976	mg/l	SM 4500CLB	3/27/2013	9:15 K.Davis	2.52	
Total Surfactant	12.8	mg/l	SM5540C	3/20/2013	15:00 K.Davis	0.02	
Total Aluminum	0.85	mg/l	EPA 200.7	3/25/2013	11:08 T.Hanshaw	0.009	
Total Dissolved Solids	127568	mg/l	SM 2540C	3/26/2013	10:15 C.Tomaro	10	
Total Suspended Solids	778	mg/l	SM2540D	3/26/2013	10:15 C.Tomaro	4	
Total Cadmium	ND	mg/l	EPA 200.7	3/25/2013	11:08 T.Hanshaw	0.002	
Total Chromium	ND	mg/l	EPA 200.7	3/25/2013	11:08 T.Hanshaw	0.006	
Total Barium	533	mg/l	EPA 200.7	3/25/2013	11:08 T.Hanshaw	0.003	
Total Manganese	6.87	mg/l	EPA 200.7	3/25/2013	11:08 T.Hanshaw	0.007	
Total Arsenic	0.78	mg/l	EPA 200.7	3/25/2013	11:08 T.Hanshaw	0.007	
Total Sodium	26900	mg/l	EPA 200.7	3/25/2013	11:08 T.Hanshaw	0.011	
Total Sulfate	250	mg/l	D516-02	3/22/2013	10:00 K.Davis	0.59	

Remarks:

Date Sample Collected: 3/20/2013 11:00
Sample Submitted By: J.STRICKLER
Date Sample Received: 3/20/2013 14:25
ND = Not Detected at the MDL or MRL.
MDL - Minimum Detectable Limit
MCL - Maximum Contaminant Level, USEPA Regulated
MRL - Minimum Reporting Limit
[MCL] = Maximum Contaminant Level, Non-Regulated

*Method Codes: STANDARD METHODS 19TH ED; US EPA METHODS FOR THE CHEMICAL ANALYSIS OF WATER AND WASTES, Rev. 83; US EPA METHODS FOR THE DETERMINATION OF METALS IN ENVIRONMENTAL SAMPLES, May 1994; TEST METHODS FOR EVALUATING SOLID WASTE, SW-846, 3rd ED; USEPA Manual for Certification Laboratories Analyzing Drinking Water, 5th ED, In accordance with EPA Regulations, all reports, including raw data and quality control data, are maintained by the laboratory for a minimum of 5 yrs.
NOTE: #Holding time exceeded for this analysis.

Received
Office of Oil & Gas
MAY - 6 2013
WV Dept. of Environmental Protection

RLL001

RELIANCE LABORATORIES, INC.

ENVIRONMENTAL ANALYSTS AND CONSULTANTS

BRIDGEPORT, WV www.RelianceLabs.net MARTINSBURG, WV

Certifications: WV Department of Health #: 00354, 00433 | WV Department of Environmental Protection #: 158, 181
MD Department of Environment #: 336, 337 | US Environmental Protection Agency #: WV00042, WV00901

HALL DRILLING
981 E. WASHINGTON AVE.

Wednesday, April 10, 2013

ELLENBORO, WV 26346-

Lab Number: 193161-2013-W **Sample ID:** TECH SERVICE CENTER 3H

Parameter	Value	Units	Method	Date/Time Analyzed	Analyst	MDL	MCL
Analyte Group: Total Petroleum Hydrocarbons							
TPH - DRO	ND	mg/l	8015B/3535	3/26/2013	11:24 M.Coffman	1	
TPH - ORO	20.9	mg/l	8015B/3535	3/26/2013	11:24 M.Coffman	1	
o-Terphenyl (Surrogate)	81.3	%	8015B	3/26/2013	11:24 M.Coffman		
Benzene	0.1421	mg/l	8021B/5030	3/25/2013	13:56 M.Coffman	0.0007	
Ethylbenzene	0.0297	mg/l	8021B/5030	3/25/2013	13:56 M.Coffman	0.0014	
Toluene	0.3129	mg/l	8021B/5030	3/25/2013	13:56 M.Coffman	0.002	
TPH - GRO	23.7	mg/l	8015B/5030	3/25/2013	11:54 M.Coffman	0.12	
Xylene	0.4075	mg/l	8021B/5030	3/25/2013	13:56 M.Coffman	0.003	
4-Bromochlorobenzene (Surrogate)	99.1	%	8021B/8015B	3/25/2013	13:56 M.Coffman		

Remarks:

Date Sample Collected: 3/20/2013 11:00
Sample Submitted By: J.STRICKLER
Date Sample Received: 3/20/2013 14:25
ND = Not Detected at the MDL or MRL
MDL - Minimum Detectable Limit
MRL - Minimum Reporting Limit
[MCL] - Maximum Contaminant Level, USEPA Regulated
[MCL] = Maximum Contaminant Level, Non-Regulated

Received
Office of Oil & Gas
MAY – 6 2013

*Method Code: STANDARD METHODS 19TH ED; US EPA METHODS FOR THE CHEMICAL ANALYSIS OF WATER AND WASTES, Rev. 83; US EPA METHODS FOR THE DETERMINATION OF METALS IN ENVIRONMENTAL SAMPLES, May 1994; TEST METHODS FOR EVALUATING SOLID WASTE, SW-846, 3rd ED; USEPA Manual for Certification of Laboratories Analyzing Drinking Water, 5th ED. In accordance with EPA Regulations, all reports, including raw data and quality control data, are maintained by the laboratory for a minimum of 5 years.
NOTE: #-Holding time exceeded for this analysis.

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