Columbia Gas®

October 22, 2024

Mr. Kevin Rowsey
UIC Program Lead, Mid-Atlantic Region
United States Environmental Protection Agency
Four Penn Center
1600 JFK Boulevard
Philadelphia, Pennsylvania 19103-2029

RE: RENEWAL REQUEST
UIC Class IID Injection Well
Permit Number PAS2D041BBEA
Blackhawk Storage Field, Beaver County, Pennsylvania

Dear Mr. Rowsey:

Columbia Gas of Pennsylvania, Inc. is submitting the attached application for renewal of our Underground Injection Control (UIC) permit associated with the Blackhawk Storage Field's John Galey C-5 Well. The Blackhawk Storage Field, used for the disposal of fluids produced in association with oil and gas production operations, is located in Beaver Falls, Beaver County, Pennsylvania.

In review of the Plugging and Abandonment Plan, Columbia Gas of Pennsylvania, Inc. obtained an estimate to complete plugging and abandonment activities for the Blackhawk C-5 Injection Well. It was determined that costs to properly abandon the well had increased. As a result, the Surety Bond increased from $75,000 to $352,000. The Surety bond Rider showing this increase has been included within the permit renewal application.

Please accept this letter and accompanying information as our request to renew Permit Number PAS2D041BBEA. The facility remains unchanged since the last permit renewal. If you have any questions or require additional information, please do not hesitate to contact me at (219) 895-0695 or our consultant, Ms. Christina Moore of Potesta & Associates, Inc., at (304) 342-1400.

Sincerely,

COLUMBIA GAS OF PENNSYLVANIA, INC.

Paul Frohnapple
Environmental Coordinator

PF:CCM/rlh

OMB No. 2040-0042 Approval Expires 4/30/2022

United States Environmental Protection Agency

Underground Injection Control
Permit Application for a Class II Well

(Collected under the authority of the Safe Drinking Water Act. Sections 1421, 1422, and 40 CFR Part 144)

For Official Use Only

Date Received

Permit Number

Read Attached Instructions Before Starting

I. Owner Name, Address, Phone Number and/or Email

Columbia Gas of Pennsylvania, Inc.
Southpoint Industrial Park
501 Technology Drive
Cannonsburg, PA 15317
(724) 416-6327

II. Operator Name, Address, Phone Number and/or Email

Same as owner

III. Commercial Facility

- [X] Yes
- [ ] No

IV. Ownership

- [X] Private
- [ ] Federal
- [ ] State/Tribal/ Municipal

V. Permit Action Requested

- [ ] New Permit
- [X] Permit Renewal
- [ ] Modification
- [ ] Add Well to Area Permit
- [ ] Other

VI. SIC Code(s)

4922

VII. Indian Country

- [ ] Yes
- [X] No

VIII. Type of Permit (For multiple wells, use additional page(s) to provide the information requested for each additional well)

- [X] A. Individual
- [ ] B. Area

Number of Wells: 1

Well Field and/or Project Names: Blackhawk Storage Field / John Galey C-5 Well

IX. Class and Type of Well (see reverse)

A. Class	B. Type (enter code(s))	C. If type code is "X," explain.
II	D	

X. Well Status

- [x] A. Operating
- [ ] B. Conversion
- [ ] C. Proposed

Date Injection Started:

Date Well Constructed:

XI. Well Information

API Number: 37-017-2-0027

Permit (or EPA ID) Number: PAS2D041BBEA

Full Well Name: John Galey C-5

XII. Location of Well or, for Multiple Wells, Approximate Center of Field or Project

Locate well in two directions from nearest lines of quarter section and drilling unit

Surface Location

____ 1/4 of ____ 1/4 of Section ____ Township ____ Range ____

____ ft. from (N/S) ____ Line of quarter section

____ ft. from (E/W) ____ Line of quarter section.

Latitude: 40.7555996

Longitude: -80.443845

XIII. Attachments

In addition to this form, complete Attachments A-U (as appropriate for the specific well class) on separate sheets. Submit complete information, as required in the instructions and list all attachments, maps or other figures, by the applicable letter.

XIV. Certification

I certify under the penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibliity of fine and imprisonment. (Ref. 40 CFR § 144.32)

Name and Official Title *(Please Type or Print)*	Signature	Date Signed
Brian Scutta-Director, System Operations PA/MD	Brian Scutta	October 14, 2024

Underground Injection Control – Permit Application for a Class II Well
Columbia Gas of Pennsylvania, Inc; Blackhawk Storage Field, John Galey C-5 Well
USEPA Permit No. PAS3D052BBEA

Section XIII. Attachments

Attachment A. Maps and Area of Review

Item I. Well Location

The Blackhawk Storage Field, used for the disposal of fluids produced in association with oil and gas production operations, is located in Beaver Falls, Beaver County Pennsylvania. The Latitude of the well is 40.755996 and Longitude is -80.443845.

Item II. Area of Review Size Determination

Columbia Gas of Pennsylvania proposes a one-quarter mile fixed radius as the Area of Review (AOR) around the well. The Blackhawk Field was converted into a gas storage field in 1970 due to the field's ability to confine natural gas. The produced fluid being injected is the fluid within this gas storage field that Columbia Gas of Pennsylvania produces during gas production out of the field. Therefore, the produced fluid is simply being returned to the confined storage field.

Item III. Maps

Topographic Map - Location

A topographic map showing location of the injection well is attached.

Topographic Map – 1 Mile Radius

A topographic map extending one-mile beyond the facility is attached. There are no identified surface water intakes or discharge structures within the one-mile radius of the injection well.

Topographic Map – ¼ Mile AOR

A topographic map showing the well location with a ¼ radius boundary identified is attached. Additional injection wells, abandoned wells or water wells were not identified within the AOR. Springs or streams were not identified within the AOR. There is no presence of mines or quarries within the AOR. Residences, schools or hospitals are not present within the AOR. An access road for the well is present within the AOR and identified on the attached map.

Item IV. Area of Review (AOR) Wells and Corrective Action Plan (CAP)

This section is not applicable.

Item V. Landowner Information

A list of the property owners and addresses within the ¼ mile AOR is attached.

Underground Injection Control – Permit Application for a Class II Well
Columbia Gas of Pennsylvania, Inc; Blackhawk Storage Field, John Galey C-5 Well
USEPA Permit No. PAS3D052BBEA

Attachment B. Geological and Geophysical Information

Item I. Geological Data

The Geological Statement prepared by Columbia Gas for the 2015 permit renewal application is attached. This information is applicable to the 2024 permit renewal application.

Item II. Formation Testing Plan

Columbia Gas of Pennsylvania conducts a mechanical integrity test (MIT) once every five years. This test consists of a pressure test to make sure the casing, tubing and packer in the well do not leak and a fluid movement test to make sure that movement of fluid does not occur outside of the injection zone. Columbia Gas of Pennsylvania also monitors injection pressure, annular pressure, flow rate and cumulative volume on a continuous basis and reports this data to the USEPA on an annual basis.

Attachment C. Well Construction/Conversion Information

Item I. Well Schematic Diagram

The original well schematic diagram for construction is not available as this well was originally constructed circa 1970. A generalized well schematic is attached. Well schematic diagrams have also been subsequently developed and are attached within the routine monitoring reports and the plugging and abandonment plan.

Item II. Well Construction or Conversion Procedures

Not applicable. The well was originally constructed circa 1970. The well was originally permitted for use as injection well in March 1985. Permit reissuances have occurred March 1995, March 2005 and March 2015.

Attachment D. Injection Operation and Monitoring Program

Columbia Gas of Pennsylvania conducts a MIT once every five years. This test consists of a pressure test to make sure the casing, tubing and packer in the well do not leak and a fluid movement test to make sure that movement of fluid does not occur outside of the injection zone. Columbia Gas of Pennsylvania also monitors injection pressure, annular pressure, flow rate and cumulative volume on a continuous basis and reports this data to the USEPA on an annual basis. The following reports and data are attached:

- July 2020 HR Vertilog inspection Report
- July 2020 Baker Hughes Gamma Ray Log, Neutron Log and Differential Temperature Log
- July 2020 Baker Hughes Cement Evaluation

- December 2019 Mechanical Integrity Test Results

Columbia Gas of Pennsylvania also submits annual reports related to pressure and volume and laboratory analytical data for the injectate. The 2020 through 2023 Injection Well Monitoring Reports and the 2023 laboratory data are attached.

Operating Data Information:

Average and Maximum daily rate and volume of fluids to be injected: Pursuant to the current UIC permit, Injection volume shall not exceed 21,000 barrels per month. A barrel consists of 42 gallons. Based on the 2023 Annual Monitoring Report, 924 barrels were injected April 2023. The injection well was "shut in" during the months of January 2023 through March 2023 and May 2023 through December 2023 with no fluids being injected. The 2022 Annual Monitoring Report shows 582 barrels were injected in January 2022 and 256 barrels injected in March 2022. The well was "shut in" for the remaining months of 2022.

Average and Maximum injection pressure:

Based on the 2022 and 2023 Annual Monitoring Reports, the average and maximum injection pressure is approximately 400 psi. The maximum surface injection pressure included in prior permit requirements is 1,831 psi. This pressure was calculated based on an injection fluid specific gravity of 1.20 and a fracture gradient of 0.90 psi/ft.

Source of Injection Fluids (including field and formation names):

Brine water produced from gas production activity of the Blackhawk Field will be injected into the Oriskany Sandstone Formation located at the subsurface interval between approximately 4822 feet and 4884 feet.

Proposed annual fluid:

Not applicable

Analysis of the chemical and physical characteristics of the injection fluid:

See attached 2023 Lab Report

Attachment E. Plugging and Abandonment Plan

The Plugging and Abandonment Plan has been entered into EPA Form 7520-19 and is attached.

Underground Injection Control – Permit Application for a Class II Well
Columbia Gas of Pennsylvania, Inc; Blackhawk Storage Field, John Galey C-5 Well
USEPA Permit No. PAS3D052BBEA

Attachment F. Financial Assurance

Columbia Gas of Pennsylvania previously submitted a Performance Bond as evidence of its financial responsibility in compliance with the USEPA's underground injection control requirements. The original performance bond was obtained in the amount of $50,000. This bond was subsequently revised to $75,000 with the last permit renewal. In preparation for the 2025 UIC permit renewal application, Columbia Gas of Pennsylvania obtained an estimate from a third party consultant (Campos) to complete plugging and abandonment activities at the Blackhawk C-5 Injection Well. As a result of the recent estimate, Columbia Gas of Pennsylvania increased the Surety Bond to $352,000 to cover 2024 estimated plugging and abandonment costs. The Surety Bond Rider for Bond No. 8000221-108 showing increase to $352,000 is attached.

Attachment G. Site Security and Manifest Requirements

Not applicable.

Attachment H. Aquifer Exemptions

Not applicable.

Attachment I. Existing Environmental Permits

The Blackhawk Storage Field, John Galey C-5 Well is currently permitted under USEPA Permit No. PAS2D041BBEA. This UIC permit expires in March 2025. Columbia Gas of Pennsylvania is requesting renewal of the UIC permit through this submission.

Attachment J. Description of Business

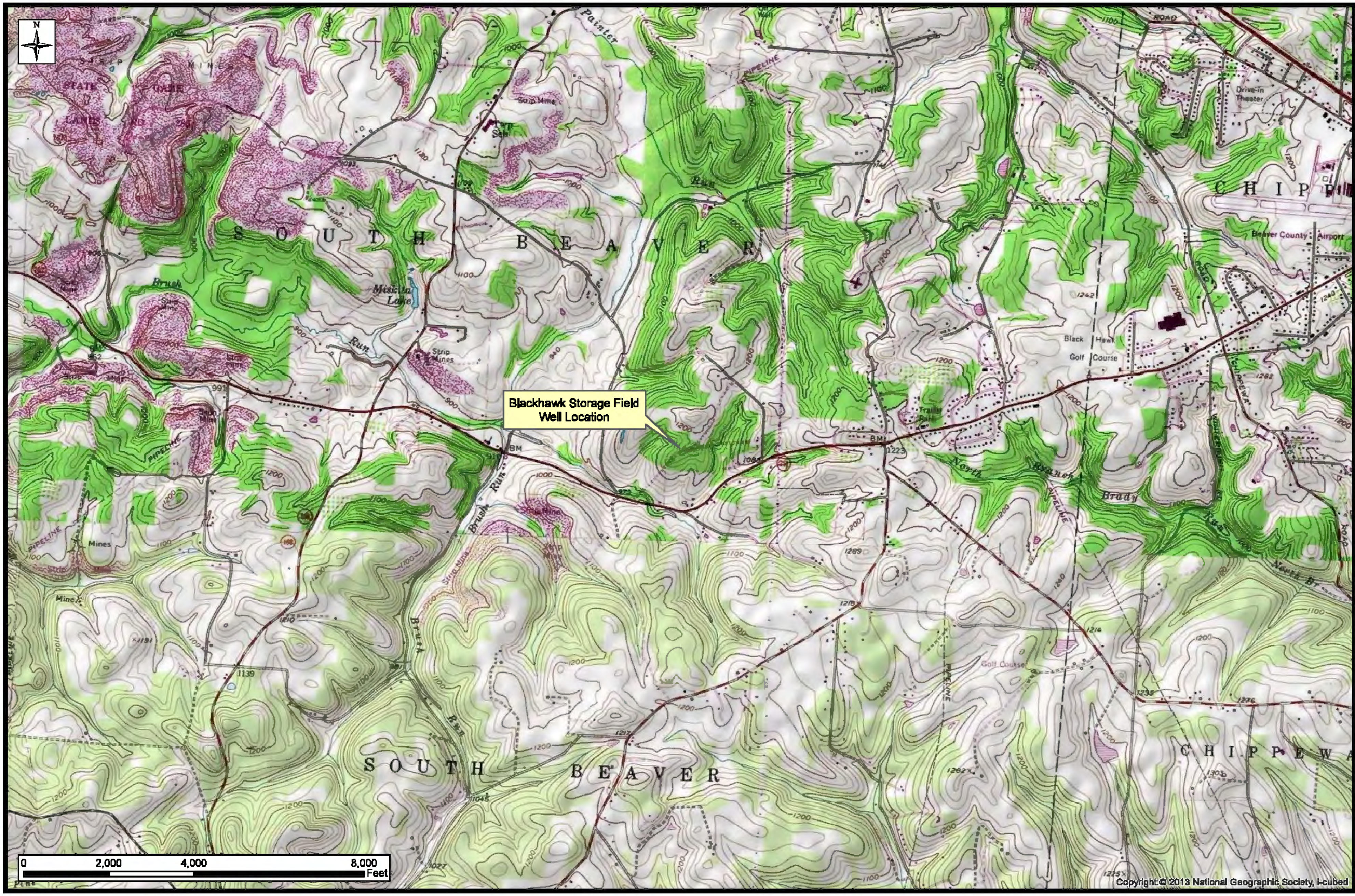
Columbia Gas of Pennsylvania is one of Pennsylvania's leading energy companies. Headquartered in Canonsburg, Columbia Gas of Pennsylvania provides natural gas service to residential, commercial and industrial customers throughout Pennsylvania's greater York, state college and Western Pennsylvania service territories. Columbia Gas of Pennsylvania owns and operates the Blackhawk underground storage facility in Beaver County, Pennsylvania. Blackhawk operates as a peak shaving facility, typically only withdrawing on days of extreme customer demand. Columbia Gas of Pennsylvania operates the Blackhawk John Galey C-5 Well to accept fluids being produced from the Blackhawk storage field.

Attachment K. Additional Project Information

Not applicable.

ATTACHMENT A

Maps and Area of Review



SCALE: 1" = 2,000'	DRAWN: CH
DATE: 08/02/2024	CHECKED:
PN: 23-0335.000	APPROVED:

POTESTA

Potesta & Associates, Inc.
ENGINEERS AND ENVIRONMENTAL CONSULTANTS
7012 MacCorkle Avenue, S.E.
Charleston, WV 25304
Office: (304) 342-1400 Fax: (304) 343-9031
E-mail: potesta@potesta.com

801 E. 86th Avenue
Merrillville, Indiana 46410

MAPPING FOR VISUAL REPRESENTATION ONLY

Blackhawk Storage Field
Well Location Map
Beaver County, Pennsylvania
For Informational Purposes Only

FIGURE 1

MAPPING FOR VISUAL REFERENCE ONLY

Blacksburg Storage Field
One Mile Radius Well Location Map
Beaver County, Pennsylvania
For Informational Purposes Only

POTESTA

501 E. 86th Avenue
Merrillville, Indiana 46410

Potesta & Associates, Inc.
ENVIRONMENTAL CONSULTANTS
7012 MacCorkle Avenue, S.E.
Charleston, WV 25304
Office: (304) 342-1400 Fax: (304) 343-9031
E-mail: potesta@potesta.com

SCALE: 1" = 1,100'	DRAWN: CH
DATE: 08/02/2024	CHECKED:
PN: 23-033.000	APPROVED:

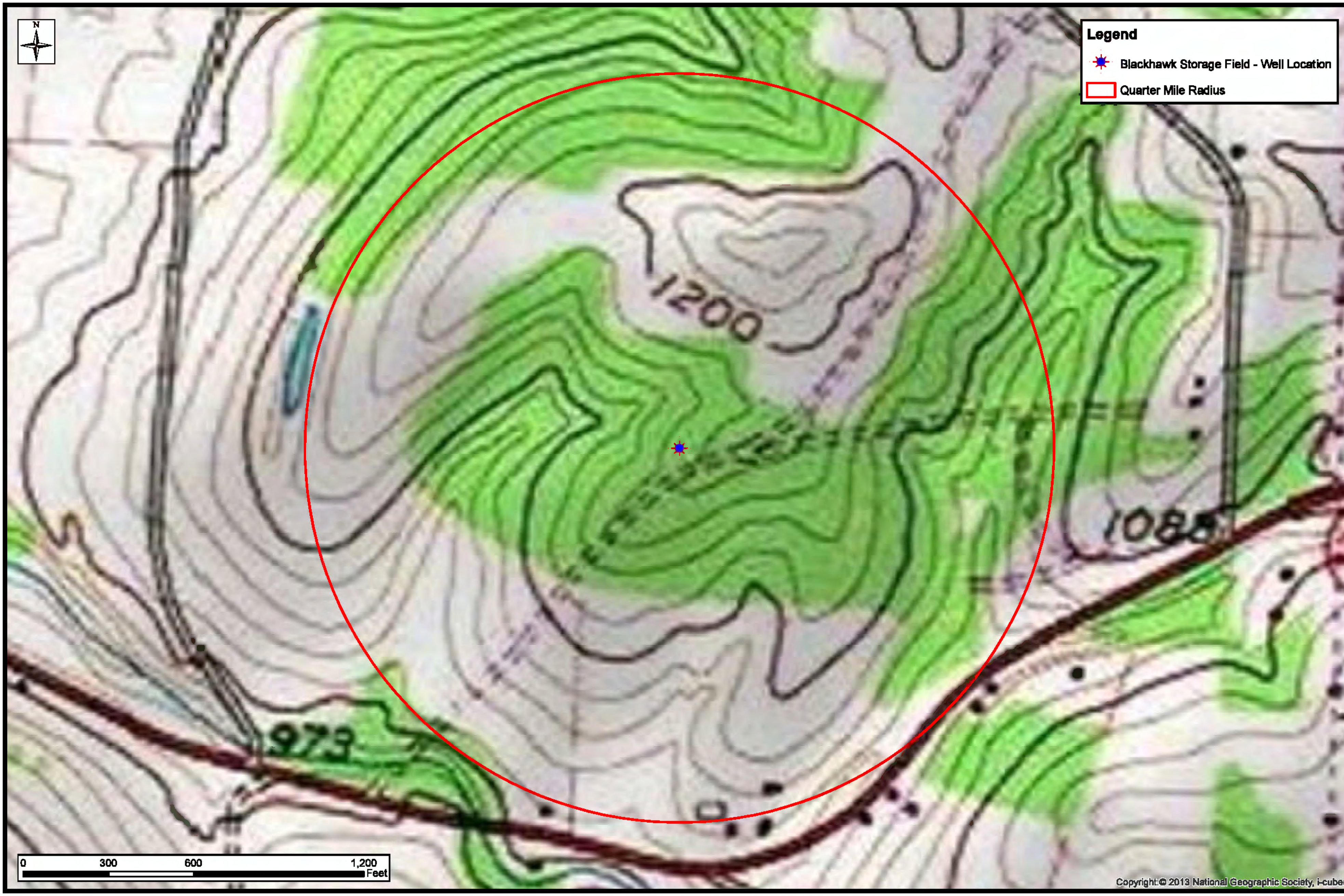
FIGURE 3

Legend

Blacknawk Storage Field - Well Location

One Mile Radius

0 1,100 2,200 4,400 Feet



SCALE: 1" = 300'
DATE: 08/02/2024
PN: 23-0335.000
DRAWN: CH
CHECKED:
APPROVED:

Potesta & Associates, Inc.
ENGINEERS AND ENVIRONMENTAL CONSULTANTS
7012 MacCorkle Avenue, S.E.
Charleston, WV 25304
Office: (304) 342-1400 Fax: (304)-343-9031
E-mail: potesta@potesta.com

POTESTA

NIPSCO
801 E. 86th Avenue
Merriville, Indiana 46410

MAPPING FOR VISUAL REPRESENTATION ONLY

Blackhawk Storage Field
Quarter Mile Radius Well Location Map
Beaver County, Pennsylvania

For Informational Purposes Only

FIGURE 2

Columbia Gas of Pennsylvania, Inc.
Blackhawk Storage Field, John Galey C-5 Well
UIC Permit Renewal Section XIII, Item V. Landowner Information
Property Owners within 1/4 Mile Radius

Parcel Owner		Owner Address			Property Location	Description
77-131-0134.P01 PULLMAN,RONALD V	WILLOWBROOK MANOR	943 BLACKHAWK RD	BEAVER FALLS PA	15010	00000 SHERMAN ROAD	PAR#2 SMITH PL#1
77-131-0129.000 LONG, COURTNEY		135 RENN LANE	BEAVER FALLS PA	15010	00135 RENN LN	64.9 AC HS GR OB BN
77-131-0142.000 PULLMAN,RONALD V		943 BLACKHAWK RD	BEAVER FALLS PA	15106	00943 BLACKHAWK RD	1.82 AC SPENCE-PULLMAN
77-131-0122.000 SPENCE,WALLACE C &	BETTY JOANN ETAL	127 LAPEER DRIVE	BEAVER FALLS PA	15010	00000 BLACKHAWK ROAD	50.11 AC SPENCE-PULLMAN PL
77-131-0143.004 DILLAN,MARK J & BONNIE L		148 FEITS LANE	BEAVER FALLS PA	15010	00148 FEITS LN	LOT 2 BLACKHAWK PL#1 HSE
77-131-0146.000 LAMBRIGHT,KETTIE L TRUSTEE		224 FEITS LANE	BEAVER FALLS PA	15010	00224 FEITS LN	112 AC MATHENY TRUST PL HS GR BN OBS
77-131-0145.000 JORDON,BRUCE A & KAREN L		193 FEITS LANE	BEAVER FALLS PA	15010	00193 FEITS LN	1.07 AC HS OB
77-131-0136.006 GUSSENHOFEN,CARL M		1022 BLACKHAWK ROAD	BEAVER FALLS PA	15010	01022 BLACKHAWK RD	12.25 AC HS GR BN
77-131-0136.000 CHAKEY,GEORGE J III		1005 BLACKHAWK ROAD	BEAVER FALLS PA	15010	00000 BLACKHAWK RD	1.377 AC BLDG
77-131-0136.004 GREINER MICHAEL DAVID,&	NICOLE	169 GRANGE ROAD	ALIQUIPPA PA	15001	00000 SHERMAN ROAD	10.4547 AC OB
77-131-0139.000 COLLINS,BRANDON H.		989 BLACKHAWK ROAD	BEAVER FALLS PA	15010	00989 BLACKHAWK RD	1.0 AC HSE GAR
77-131-0140.000 KAHLE,DANIEL E & ROBIN ANN		985 BLACKHAWK ROAD	BEAVER FALLS PA	15010	00985 BLACKHAWK RD	1.38 AC HS GR OB IMP
77-131-0141.001 COOK,CHRISTINE		119 CLAY DRIVE	DARLINGTON PA	16115	00000 BLACKHAWK ROAD	0.26 AC
77-131-0141.000 COOK,CHRISTINE F &	NOCERA,TERENCE	119 CLAY DRIVE	DARLINGTON PA	16115	00973 BLACKHAWK RD	2.26 AC HSE
77-131-0134.P02 PULLMAN,RONALD V	C/O PULLMAN FINANCIAL CORP	943 BLACKHAWK RD	BEAVER FALLS PA	15010	00000 BLACKHAWK ROAD	2.502 AC SMITH PL#2
77-131-0143.002 COLUMBIA GAS OF	PENNSYLVAN IA, INC	P 0 BOX 1273	CHARLESTON WV	25325	00115 FEITS LN	2.86 AC BLDGS
77-131-0146.002 LAMBRIGHT,KETTIE L TRUSTEE		224 FEITS LANE	BEAVER FALLS PA	15010	00192 FEITS LN	PAR 2 KIMMEL PL#1 MH GR
77-131-0136.005 WORST,MARJORIE ANN	IRRECOVABLE TRUST	118 SHERMAN ROAD	BEAVER FALLS PA	15010	00118 SHERMAN RD	51.07 AC HS GR BN
77-131-0136.003 GETTEMY,DAVID A III &	ANDERSON-GETTEMY,ALLISON	1045 BLACKHAWK ROAD	BEAVER FALLS PA	15010	01045 BLACKHAWK RD	3.25 AC HS GR
77-131-0135.000 MINNITTE,LAURA		109 SHERMAN ROAD	BEAVER FALLS PA	15010	00109 SHERMAN RD	1.98 AC HS OB
77-131-0136.007 CHAKEY,GEORGE J III		1005 BLACKHAWK ROAD	BEAVER FALLS PA	15010	00000 BLACKHAWK ROAD	1.526 AC
77-131-0137.000 CHAKEY,GEORGE J III		1005 BLACKHAWK ROAD	BEAVER FALLS PA	15010	01005 BLACKHAWK RD	1.38 AC HS
77-131-0158.000 RIDIN' DIRTY,LLC		443 WOODLAWN RD	SEWICKLEY PA	15143	01091 BLACKHAWK RD	107.3 AC MH GR OB
77-131-0157.000 KREBS,RICHARD A & LENORA M		1053 BLACKHAWK RD	BEAVER FALLS PA	15010	01053 BLACKHAWK RD	3.977 AC HS GR BN
77-131-0136.001 JENKINS,WILLIAM & LEONA E	ETAL % BARBARA JENKINS	191 TWIN POND VIEW DR	CAPON BRIDGE WV	26711	01046 BLACKHAWK RD	11.124 AC MH GR
77-131-0156.000 BARKER, RAYMOND & PATRICIA		1054 BLACKHAWK ROAD	BEAVER FALLS PA	15010	01054 BLACKHAWK RD	2.80 AC FITZGERALD-BARKR PL HS GR
77-131-0155.000 FITZGERALD,JAMES B &	LORI A	190 MARTIN ROAD	DARLINGTON PA	16115	00000 BLACKHAWK ROAD	94.08 AC FITZGERALD PL
77-131-0154.000 FITZGERALD,JAMES B &	LORI A	190 MARTIN ROAD	DARLINGTON PA	16115	00061 MARTIN RD	1.50 AC GR OB
77-131-0153.000 FITZGERALD,JAMES B &	LORI A	190 MARTIN ROAD	DARLINGTON PA	16115	00190 MARTIN RD	1.0 AC HS OB
77-131-0150.002 CHEN,CAROLYN C		210 MARTIN ROAD	DARLINGTON PA	16115	00210 MARTIN RD	LOT 1 SHUSTER PL#1 HS
77-131-0146.001 BUBB,MADYSON S &	TRELLA, DAVID M	194 FEIT LANE	BEAVER FALLS PA	15010	00194 FEITS LN	PAR 1 KIMLEL PL#1 HS GR
77-131-0144.000 LAMBRIGHT,KETTIE L TRUSTEE		224 FEITS LANE	BEAVER FALLS PA	15010	00000 T-402 OFF	34.0 AC
77-131-0116.000 GALLAGHER,CORY J &	KARLYN M	197 GEORGETOWN ROAD	BEAVER FALLS PA	15010	00197 GEORGETOWN RD	36.099 AC HS
77-131-0116.002 CAMESI,BREANNA R&	MCFARLAND, BENJAMIN M	171 GEORGETOWN ROAD	BEAVER FALLS PA	15010	00171 GEORGETOWN RD	10.625 AC HS GR
77-131-0116.000 CARNEY,JAMES P & MARY P		159 GEORGETOWN ROAD	BEAVER FALLS PA	15010	00159 GEORGETOWN RD	8.307 AC HS GRS OB
77-131-0119.000 GIRTING,KEITH E & JANET M		165 GEORGETOWN ROAD	BEAVER FALLS PA	15010	00165 GEORGETOWN RD	1.28 AC HS GR IMP
77-131-0116.001 SEELEY,MICHAEL ALLEN &	TATUM M	213 GEORGETOWN ROAD	BEAVER FALLS PA	15010	00213 GEORGETOWN RD	0.6 AC HS GR
77-131-0117.P00 RILEY, DANIEL C &	JENNIFER M	208 GEORGETOWN ROAD	BEAVER FALLS PA	15010	00206 GEORGETOWN RD	38.7 AC HS GR
77-131-0115.000 ANTHONY, JAMES L & STACY L		208 GEORGETOWN ROAD	BEAVER FALLS PA	15010	00208 GEORGETOWN RD	LOT 2 DAVIS & GRIMM SUB
77-131-0120.000 WHY-FERRIGNO,MARY E &	FERRIGNO,JOSEPH A JR	152 GEORGETOWN ROAD	BEAVER FALLS PA	15010	00000 GEORGETOWN ROAD	1.0 AC
77-003-0107.000 147 GEORGETOWN RD LLC		147 GEORGETOWN ROAD	BEAVER FALLS PA	15010	00147 GEORGETOWN RD	PTLOT 8 LOT 9 MCKENNA PL
77-003-0106.000 SCOTT,ROBERT ALLEN JR		141 GEORGETOWN RD	BEAVER FALLS PA	15010	00141 GEORGETOWN RD	LOTS 6 7 PTLOT 8 MCKENNA
77-003-0104.000 DOLL, CHARLES		133 GEORGETOWN ROAD	BEAVER FALLS PA	15010	00133 GEORGETOWN RD	LOT 5 MCKENNA PL HS GRS
77-003-0103.000 CHARLES & TRACY DOLL	REVOCABLE TRUST	133 GEORGETOWN ROAD	BEAVER FALLS PA	15010	00129 GEORGETOWN RD	PTLOT 3 LOT 4 MCKENNA PL
77-003-0101.000 MADDEN,MEGHAN E		121 GEORGETOWN ROAD	BEAVER FALLS PA	15010	00121 GEORGETOWN RD	LOT 1 MADDEN PL HS GR OB
77-003-0100.000 THE KEVIN ARBOGAST	MEDICAID ASSET PROT IRR TR	115 GEORGETOWN ROAD	BEAVER FALLS PA	15010	00115 GEORGETOWN RD	LOT 1 MCKENNA PL HSE GAR
77-003-0200.000 WHY-FERRIGNO,MARY E &	FERRIGNO,JOSEPH A JR	152 GEORGETOWN ROAD	BEAVER FALLS PA	15010	00152 GEORGETOWN RD	1.0 AC PTLOT HS GRS
77-003-0202.000 MAY,CLARENCE L & PAULA D	C/O PAULA D STANLEY	144 GEORGETOWN ROAD	BEAVER FALLS PA	15010	00144 GEORGETOWN RD	0.46 AC MH GR
77-003-0300.005 HALAHAN,DAVID C &	SHERRIE W	138 GEORGETOWN ROAD	BEAVER FALLS PA	15010	00138 GEORGETOWN RD	0.46 AC HS GR OB
77-003-0300.002 MIRANDA,MATTHEW D		134 GEORGETOWN ROAD	BEAVER FALLS PA	15010	00134 GEORGETOWN RD	0.46 AC HS GR
77-003-0300.003 PISANO,LEAH N &	ANTHONY J	130 GEORGETOWN ROAD	BEAVER FALLS PA	15010	00130 GEORGETOWN RD	0.46 AC HS GR OBS
77-003-0300.004 WAHL, TIMOTHY S, SR. &	CATHLEEN A	116 GEORGETOWN ROAD	BEAVER FALLS PA	15010	00128 GEORGETOWN RD	0.46 AC MH
77-003-0400.000 DIFRISCHIA,JOSEPH M &	MARY E	122 GEORGETOWN ROAD	BEAVER FALLS PA	15010	00122 GEORGETOWN RD	0.5 AC HS GR
77-003-0300.036 WAHL,CATHLEEN A		116 GEORGETOWN ROAD	BEAVER FALLS PA	15010	00116 GEORGETOWN RD	0.71 AC HS BN IMP
77-131-0122.006 PENCE,RALPH L		873 BLACKHAWK ROAD	BEAVER FALLS PA	15010	00873 BLACKHAWK RD	1.3283 AC HS GR
77-131-0122.001 WAGURAK,JORDAN A		865 BLACKHAWK ROAD	BEAVER FALLS PA	15010	00865 BLACKHAWK RD	1.93 AC HSE GAR
77-131-0122.002 MCCANN,CHRISTOPHER M &	JANET L	849 BLACKHAWK ROAD	BEAVER FALLS PA	15010	00849 BLACKHAWK RD	0.74 AC HS IMP
77-131-0122.004 STRATI,JOSEPH A &	CHRISTINA L	108 OLD BLACKHAWK ROAD	BEAVER FALLS PA	15010	00000 OLD BLACKHAWK ROAD	0.92 AC
77-131-0122.003 STRATI,JOSEPH A &	CHRISTINA L	108 OLD BLACKHAWK ROAD	BEAVER FALLS PA	15010	00108 OLD BLACKHAWK RD	0.84 AC HS GR

Columbia Gas of Pennsylvania, Inc.
Blackhawk Storage Field, John Galey C-5 Well
UIC Permit Renewal Section XIII, Item V. Landowner Information
Property Owners within 1/4 Mile Radius

Parcel Owner		Owner Address			Property Location	Description
77-131-0123.000 DIAMOND,DANIEL A &	SANDRA G	120 OLD BLACKHAWK ROAD	BEAVER FALLS PA	15010	00120 OLD BLACKHAWK RD	2.445 AC HS GR OB
77-131-0125.P00 CROUD,JULIANNA		135 RENN LANE	BEAVER FALLS PA	15010	00000 OLD BLACKHAWK ROAD	4.45 AC
77-131-0108.000 MCCARTER,JON W & BEVERLY		206 ACHORTOWN ROAD	BEAVER FALLS PA	15010	00000 ACHORTOWN ROAD	2.70 AC MCCARTER PL#1
77-003-0701.000 DINSMORE, CRAIG & ERICA		101 OLD BLACKHAWK ROAD	BEAVER FALLS PA	15010	00000 OLD BLACKHAWK ROAD	4.447 AC
77-003-0700.000 DINSMORE, CRAIG & ERICA		101 OLD BLACKHAWK ROAD	BEAVER FALLS PA	15010	00101 OLD BLACKHAWK RD	3.93 AC HS GR
77-003-0700.001 SOUTH BEAVER TOWNSHIP		805 BLACKHAWK ROAD	BEAVER FALLS PA	15010	00817 BLACKHAWK RD	LOT 1 MILLER PL#1 BLDG
77-002-0230.000 SOUTH BEAVER TOWNSHIP		805 BLACKHAWK ROAD	BEAVER FALLS PA	15010	00805 BLACKHAWK RD	1.3 AC BLDG
77-003-0500.000 CHRIST PRESBYTERIAN CHURCH	C/O L R MATTERN	RD#1	BEAVER FALLS PA	15010	00828 BLACKHAWK RD	3.738 AC CHURCH IMP
77-003-0501.000 BRADSHAW,RONALD M &	JANET M	810 BLACKHAWK ROAD	BEAVER FALLS PA	15010	00810 BLACKHAWK RD	PAR-A BRADSHAW PL REV HS
77-003-0300.035 D & Z PROPERTY, LLC		4 KELLY DRIVE	BEAVER FALLS PA	15010	00000 BLACKHAWK ROAD	LOT 35 SCHUTTE PL
77-003-0305.000 D & Z PROPERTY, LLC		4 KELLY DRIVE	BEAVER FALLS PA	15010	00000 BLACKHAWK ROAD	0.6 AC
77-003-0300.001 D & Z PROPERTY, LLC		4 KELLY DRIVE	BEAVER FALLS PA	15010	00000 BLACKHAWK ROAD	1.00 AC BRDSHW PL GRS
77-003-0503.000 D & Z PROPERTY, LLC		4 KELLY DRIVE	BEAVER FALLS PA	15010	00812 BLACKHAWK ROAD	0.54 AC HSE GARS
77-003-0502.000 BURNSWORTH,KEVIN &	RUTH ANN	117 BRADSHAW STREET	BEAVER FALLS PA	15010	00117 BRADSHAW ST	0.5 AC HS GR
77-003-0800.000 SANDERS,ALBERTA ANN		802 BLACKHAWK ROAD	BEAVER FALLS PA	15010	00802 BLACKHAWK RD	0.789 AC HS IMP
77-003-0300.038 GENZLER, SUSAN &	JOHN FREDERICK	116 BRADSHAW STREET	BEAVER FALLS PA	15010	00000 BRADSHAW STREET	0.1 AC
77-003-0300.040 D & Z PROPERTY, LLC		4 KELLY DRIVE	BEAVER FALLS PA	15010	00000 BLACKHAWK ROAD	0.26 AC
77-003-0300.037 D & Z PROPERTY, LLC		4 KELLY DRIVE	BEAVER FALLS PA	15010	00000 BLACKHAWK ROAD	LOT 12 3,OAC UNR SCHUTTE
77-003-0203.000 MAY,PAULA D	C/O PAULA D STANLEY	144 GEORGETOWN ROAD	BEAVER FALLS PA	15010	00000 GEORGETOWN ROAD	PTLT10 & LT11 SCHUTTE PL
77-003-0300.024 BACISIN, LACEY L &	NICHOLAS A	142 GEORGETOWN ROAD	BEAVER FALLS PA	15010	00142 GEORGETOWN RD	LOT 24 SCHUTTE PL MH GR
77-003-0304.000 WARDEN,STEVEN M TRUSTEE		141 PINE STREET	BEAVER FALLS PA	15010	00124 GEORGETOWN RD	1.28 AC HS OB
77-003-0300.039 D & Z PROPERTY, LLC		4 KELLY DRIVE	BEAVER FALLS PA	15010	00000 BLACKHAWK ROAD	LOT 23 SCHUTTE PL UNREC
77-003-0300.021 D & Z PROPERTY, LLC		4 KELLY DRIVE	BEAVER FALLS PA	15010	00000 BLACKHAWK ROAD OFF	LOTS21 22 27 UNR SCHUTTE
77-003-0300.018 D & Z PROPERTY, LLC		4 KELLY DRIVE	BEAVER FALLS PA	15010	00000 BLACKHAWK ROAD	LOTS 18 19 20 28 UNR
77-003-0300.007 HOVANEC, KIMBERLY S		118 BRADSHAW STREET	BEAVER FALLS PA	15010	00118 BRADSHAW ST	0.46 AC
77-003-0300.030 GENZLER, SUSAN &	JOHN FREDERICK	116 BRADSHAW STREET	BEAVER FALLS PA	15010	00116 BRADSHAW ST	LOT 30 SCHUTTE PL MH GR
77-003-0801.000 CHIOTTI,DAVID L &	JULIE ANN	800 BLACKHAWK ROAD	BEAVER FALLS PA	15010	00800 BLACKHAWK RD	0.9 AC HS GR OB
77-131-0147.014 PRICE,MICHAEL R &	MARJORIE ROSE	PO BOX 59	DARLINGTON PA	16115	00211 CORDAK DR	LOT 14 CORDAK PL2
77-131-0147.013 COFFMAN, NICHOLAS JAY		213 CORDAK DRIVE	DARLINGTON PA	16115	00213 CORDAK DR	LOT 13 CORDAK PL HS BN
77-131-0147.015 PRICE,MICHAEL R &	MARJORIE ROSE	PO BOX 59	DARLINGTON PA	16115	00209 CORDAK DR	LOT 15 CORDAK PL2 MH OB
77-131-0147.016 PRICE,MICHAEL R &	MARJORIE R	207 CORDAK DRIVE	DARLINGTON PA	16115	00207 CORDAK DR	LOT 16 CORDAK PL2 HS OB
77-131-0147.017 PRICE,MICHAEL R &	MARJORIE R	207 CORDAK DRIVE	DARLINGTON PA	16115	00205 CORDAK DR	LOT 17 CORDAK PL2
77-131-0147.P20 HAFERA,JEFFREY A		163 CORDAK DRIVE	DARLINGTON PA	16115	00163 CORDAK DR	LOTS 18 19 20 21 CORDAK

ATTACHMENT B

Geological Data

Columbia Gas of Pennsylvania, Inc.
Blackhawk Storage Field, John Galey C-5 Well
UIC Permit Renewal Attachment B, Item I

GEOLOGICAL STATEMENT

The Blackhawk storage field located in South Beaver Township, Beaver County, PA, utilizes the Devonian Oriskany sand for underground gas storage operations. The field is both structurally and stratigraphically controlled. The Oriskany is described as a white to light gray, fine to medium-grained, subrounded to rounded calcareous sand. The top of the Oriskany is found at an average depth of 4639 feet in the storage field. With a gross thickness of approximately 51 feet, the uppermost three to six foot (3' - 6') porous and permeable section of the Oriskany sand provides the storage reservoir. Core analysis from a Blackhawk storage well indicates an average Oriskany sand porosity of approximately 7.5% with average horizontal and vertical permeability of 35 millidarcy (md) and 25 md respectively. A +/- 350,000,000 year effective vertical seal of the Blackhawk Oriskany sand was provided by an average of 205' of dense, hard, massive, crypto-crystalline carbonate formations (Huntersville Chert and Onondaga limestone) immediately overlying the Oriskany sand. Those dense carbonate formations serve as impermeable confining cap-rock for the Oriskany gas reservoir. An additional approximate 31' thick impermeable carbonate layer (Tully limestone) is present approximately 158' above the top of the Onondaga limestone. Blackhawk disposal well C-5 has two strings of cemented steel casing that isolate, protect and separate shallow sources of fresh water from reinjected Oriskany salt water produced by Blackhawk storage wells. These casings are: 8-5/8" casing set at 1157' (cemented back to the surface with 525 sacks) and 5-1/2" casing set at 4788.8' (cemented back to the surface with 2000 sacks).

The sole purpose of Blackhawk disposal well C-5 is to return Oriskany salt water produced and recovered by Blackhawk storage wells to the Oriskany formation. No drilling fluid waste, fract (flow-back) water or salt water collected from non-Blackhawk wells has or will be injected into the Blackhawk disposal well C-5.

GENERAL

There are minimal Blackhawk storage field data in our storage files or located in our archives. A reference to a geological report dated August 1976 by W.D. Bagnall was discovered but no such report has been located. According to a Pennsylvania Geological Survey publication, the Blackhawk field was discovered in 1935, and the gas producing horizon was the Devonian Oriskany sand. The field was converted to underground gas storage in 1970.

STRATIGRAPHY

The following average values were determined from an analysis of eight existing Blackhawk storage and storage related wells:

Average depth to the top of the Oriskany sand is 4639'

Average gross thickness of the Oriskany sand (based on two wells) is 51'. The Oriskany reservoir (porosity or pay) was found at the top of the sand. Estimated Oriskany reservoir thickness is 3' to 6'.

There are three dense, hard, massive, crypto-crystalline carbonate formations above the Oriskany sand that serve as impermeable confining cap-rock:

1. Immediately overlying the Oriskany storage zone is the Huntersville Chert. Its average thickness is 181'.
2. Overlying the Huntersville Chert is the Onondaga limestone. Its average thickness is 13'.
3. Lying approximately 158' above the top of the Onondaga limestone and separated by shale and siltstone, the Tully limestone has an average thickness of 31'.

Average gross thickness of continuous carbonate above the Oriskany sand (Onondaga + Huntersville Chert) is 205'

Average gross interval from the top of the Tully limestone to the top of the Oriskany sand is 362'.

Dense carbonates deposited above the Oriskany sand provided an effective +/- 350,000,000 geologic seal that allowed the accumulation and confinement of natural gas in the Oriskany sand reservoir at Blackhawk.

ORISKANY STRUCTURE

Average subsea top of the Oriskany sand in eight Blackhawk wells is -3620'. Subsea top of the Oriskany sand ranges from -3615' to -3633' in the C-5 disposal well (18' of structural relief). A finalized September 1983 evaluation by W.H. Foraker states (from the Bagnall report): "The Blackhawk reservoir is described as a small, elongate, doubly-plunging anticline in a southeastwards regional dip. The maximum closure is reported to be 35' and structural closure is limited to 20'." The Blackhawk storage field is both structurally and stratigraphically controlled.

ORISKANY LITHOLOGY AND DESCRIPTION

From "The Atlas of Major Appalachian Gas Plays," WVGES, Pub. V-25, 1996, the following lithology description of the Oriskany sand in the general area of interest is quoted: "The Oriskany is a white to light gray, fine to medium-grained, subrounded to rounded, calcareous sand. Quartz is the main cement in the upper pay zone, whereas the abundance of calcite cement increases downward as porosity decreases." The Atlas also states: "Incomplete cementation by quartz and calcite has resulted in higher porosity and permeability."

The following statements regarding Oriskany reservoir parameters were found on page 8 of the 1983 Foraker evaluation: "A core analysis report by Halliburton Services on (Blackhawk) Well No. C-1 dated June 10, 1969 reports porosity values of approximately 7.5%, a horizontal permeability of approximately 35 md and a vertical permeability value of approximately 25 md for the top three feet of pay. The horizontal and vertical permeability values decrease significantly to 12 md and less below the top three feet of pay."

BLACKHAWK ORISKANY SAND DISPOSAL WELL C-5

Blackhawk storage well C-5 (F-14079) is located in South Beaver Township, Beaver County, Pennsylvania. State permit number BEA-27-R was assigned to the well. Original TD was reported at 4909' with a final PB-TD at 4840'.

Driller tops reported in Blackhawk well C-5 were Onondaga from 4618' to 4635' (17'), Huntersville Chert from 4635' to 4822' (187') and Oriskany sand from 4822' to 4884'.

Casing was reported as follows:

8-5/8" (24#/ft) set at 1157' and cemented to the surface with 525 sacks

5-1/2" (17#/ft J-55) set at 4897.1' and cemented to the surface with 2000 sacks

2-3/8" (4.6#/ft J-55) set at 4788.8' (uncemented)

Oriskany sand perforations (20 shots or 4 spf) were reported from 4825' to 4830'.

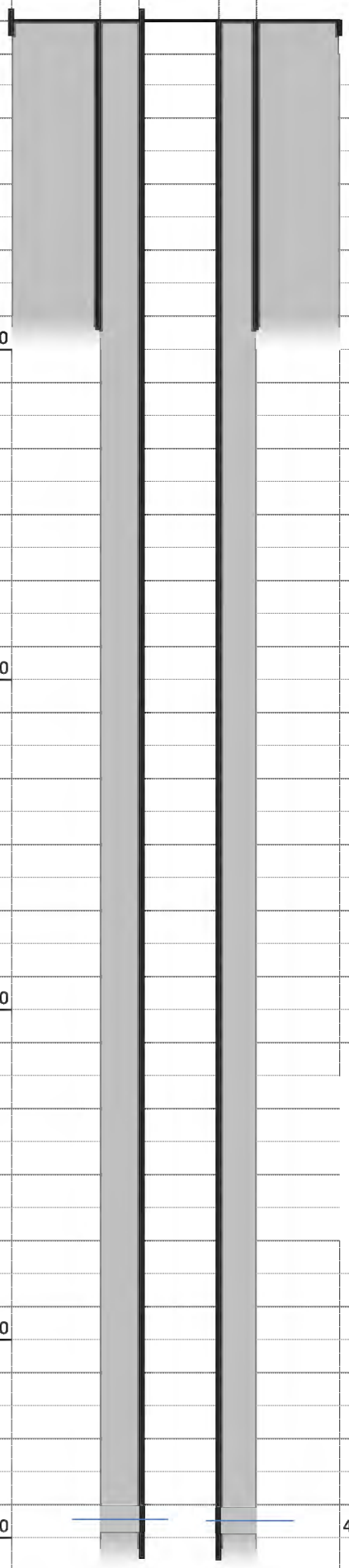
ATTACHMENT C

Well Schematic Diagram

C-5 Wellbore Schematic:

For assistance in accessing this document, contact R3_UIC_Mailbox@epa.gov

Well	**Blackhawk C-5 (saltwater disposal well)**			Scale: 1 cell row height = 100 feet
Latitude (ref)	40.75602			
Longitude (ref)	-80.443838			
Location	Corrected using Goog Maps			
Elevation	1184.06			
Reference	GL	log ref GL		
Surface Casing				
Hole Diameter	9.625	log		
Depth	1157	1164	1000	
Casing Diameter	8.625			
Casing Weight per foot	24			
Casing Grade	J-55			
Intmd Casing				
Hole Diameter			2000	
Depth				
Casing Diameter				
Casing Weight				
Casing Grade				
Casing Threads				
Cement Sacks				
Calculated TOC*min				
Calculated TOC*max				
Production Casing			3000	
Hole Diameter	7.875			
Depth	4895			
Casing Diameter	5.5	4677		
Casing Weight	17			
Casing Grade	J-55			
			4000	
Perforations				
Top				
Bottom				
shots per foot				
Other			4600	4spf perforations '
Tubing				DTD 4909



ATTACHMENT D

Injection Operation and Monitoring Program

Baker Hughes Company
180 Childers Run Crossing
Buckhannon, West Virginia 26201

Manager: Francisco "Frank" Fossati
Tel. (304) 472 – 2465
Analysis Manager: Luis Liscano
Tel. 713 879 1324

Table of Contents

Executive Summary

On July 29, 2020, Baker Hughes Company Wireline Services, operating from Buckhannon, WV completed a HR Vertilog magnetic flux leakage (MFL) casing inspection survey on the NiSource Blackhawk C-5.

A total of 148 individual joints of casing were identified during the inspection survey. Within this report, the term “casing” is intended to mean the downhole tubulars which are the subject of the survey, and which may include well casings, liners or production tubing.

A total of 0 metal loss features exceeding the 20% reporting threshold were identified during the HR Vertilog survey. Of the 0 total metal loss features, 0 were identified as internal features, and 0 were identified as external features.

A total of 0 metal loss features exhibited predicted depths exceeding 80% of wall thickness. The maximum depth among all metal loss features was 0%. Any metal loss features of 80% or greater body wall loss will have a 0 PSI burst pressure rating and should be considered to have possible total or near total body wall penetration.

A total of 0 metal loss features exhibited ERF values exceeding 1.0. The maximum ERF among all metal loss features was 0.000.

This Final Report is intended to serve as an overall summary of the inspection results. The accompanying InSight Data CD contains a comprehensive Feature List which represents the complete findings of the HR Vertilog casing survey.

Evaluation Comments:

8.95 ft	Hardware - External Csg Head Response
1164.37 ft	Hardware - Bottom Of External 8-5/8" Csg.
3832.19 ft	Hardware - Probable DV Tool / Stage Collar.
3983.28 ft	Hardware - Cement Basket

There was no reportable identified metal loss feature, which exceeds the 20% metal loss cutoff.

This log is tied in to the Baker Hughes GRNT log dated 07/29/2020.

1. Job Information

Baker Hughes Company Wireline Services completed a HR Vertilog casing inspection survey on the NiSource C-5 on July 29, 2020. The job parameters are summarized in the following well, service and equipment data tables.

1.1. Well Data

The following well data and casing records were provided by representatives of NiSource.

Table 1. Well Data

Well Identification					
Company	NiSource				
Well	C-5				
Field	Blackhawk				
County/Parish	Beaver				
State/Province	Pennsylvania	**Country**	USA		
API Number	37-017-2-0027	**Location**	N/A		
Section	N/A	**Township**	S. Beaver	**Range**	N/A
Elevations					
Kelly Bushing	0.00 feet				
Drilling Floor	0.00 feet				
Ground/Sea Floor	0.00 feet				
Permanent Datum Is	G.L.	**Permanent Datum Elevation**	1184.06 feet		
Log Measured From	G.L	**Height Above Datum**	0.00 feet		
Drilling Measured From	N/A	**Height Above Datum**	0.00 feet		
Borehole Information					
Fluid	Brine	**Wellhead Pressure**	0 psi	**Well Depth**	4909.00 feet
Casing Record					
Size	**Weight**	**Grade**	**From**	**To**	**Length**
5.500 in	17.0 lb/ft	J55	0.00 ft	4895.00 ft	4895.00 ft
8.625 in	24.0 lb/ft	J55	0.00 ft	1157.00 ft	1157.00 ft

1.2. Service Data

The Baker Hughes Company Wireline Services field services are summarized in the table below.

Table 2. Service Data

Service Information	
Job Date	July 29, 2020
Service Order	169779
Recorded By	J. Moczygemba
Witnessed By	D. Reynolds
Service Location	Buckhannon, WV
Service Unit Number	9717
Logging Information	
Service	HRVRT
Bottom Logged Interval	4800.00 feet
Top Logged Interval	0.00 feet
Additional Services	GRNT, SBT
Remarks:	

1.3. Pressure Calculations

The following information was provided by NiSource for use in pressure calculations.

Pressure Calculations:	
Burst Pressure Calculation	ASME B31G
Interaction Criteria	RP0102 - Fixed BW Ratio 6.0T x 6.0T

1.4. Equipment Data

The following Baker Hughes Company Wireline Services equipment assets were utilized in the performance of the inspection services.

Table 3. Equipment Data

Equipment Data	
Tool Series Number	5-1/2 Inch HRVRT 48 FL + 48 DIS Tool
Electronics Series Number	MuxDB
Interface Panel Series Number	4921
Calibration Reference Number	
Acquisition Software	Microvision 32-bit 7.6.1.4
Analysis Software	Insight 2.7.1.20180409.1

2. Casing Configuration

2.1. Casing Segments

For the purpose of this report, a casing "segment" refers to an interval of casing with consistent physical properties and operating parameters. The concept of casing segments is used within the context of this report to define casing intervals for the purpose of pressure-based analysis, including burst strength analysis and pressure ratio calculations.

Casing segments with consistent nominal wall thickness (T), external diameter (D), maximum allowable operating pressure (MAOP), internal design pressure (P_i), and specified minimum yield strength (SMYS) are defined as "major" casing segments.

MFL inspection technology alone does not conclusively identify or quantify the parameters which define a major casing segment. It is therefore the responsibility of the well operator to provide the appropriate casing specifications in advance of the survey for the purpose of pressure-based analysis and reporting.

The high-resolution MFL technology employed for this survey may, under certain conditions, provide data which indicates a casing parameter that differs from the operator's reported values. Such discrepancies, typically in the form of a suspected weight or grade variation, will be brought to the attention of the operator by designating these intervals as "minor" casing segments. A minor segment is therefore identified by the analyst as a subset of the major casing segment reported by the well operator.

If the casing weight or grade of a minor segment can be reliably ascertained by the analyst, it will be noted in the inspection database. However, only the major segment parameters provided and/or approved by the operator will be used for the purpose of pressure-based analysis and reporting. If the well operator subsequently determines to re-specify a minor casing segment for any reason, it then becomes, by definition, a major segment, and the data over this interval must be re-interpreted accordingly.

Major casing segments will be identified and indexed numerically (i.e. 1, 2, 3) by increasing depth, while minor segments will be identified with respect to the major segment in which they occur (i.e. 1.1, 1.2, 2.1).

The major and minor casing segments identified in the course of this survey are summarized in the Casing Segment Report (on the accompanying CD).

2.2. External Casings

Any interval of casing positioned coaxially and external to the primary casing undergoing inspection is considered to be an "external casing" for the purpose of this report. External casings do not directly affect the pressure-based analysis in the primary casing, so the presence of one or more external casings has no bearing on the determination of major or minor casing segments, as described above.

External casings can, however, directly affect metal loss feature sizing by altering magnetic interactions within the primary casing. Consequently, all external casing intervals must be identified and compensated for in the course of data analysis.

The start and end positions of all external casings and major/minor casing segments shall be reported as the logging depth whenever these positions can be reliably determined directly from the inspection data. In the absence of sufficient log data, all casing positions will be analyzed and reported according to the casing data provided by the well operator.

The external casings identified during this survey are summarized in the External Casing Report (on the accompanying CD).

3. Feature List

Casing "features" are defined as all of the downhole casing components and anomalies identified during the inspection survey.

Features include components related to the physical construction of the well, such as collars, perforations, centralizers, repairs, and downhole hardware. Features also include individual casing anomalies, such as metal loss features, mill-related anomalies, and deformations.

The "Feature List" is simply a comprehensive list of all individual casing features identified during the survey, organized by their position within the well. The position of any feature is always reported as the logging depth to the mid-point, or centerline, of each feature.

The Feature Summary (Table 4, below) lists the casing features identified during the survey, summarized by category.

Table 4: Feature Summary

Occurrences	Description
148	Casing Joints
147	Collars
19	Casing Hardware
0	Perforated Intervals
0	Repair Intervals
0	Metal Loss Features
0	Mill-Related Anomalies
0	Deformation Features

The Feature List (on the accompanying CD) contains a complete listing of the features identified during the inspection survey, and serves as the database for all of the individual summaries, reports, and figures contained in this Final Report.

4. Casing Components

The category of “casing components” represents three types of downhole hardware features which contribute to the physical make-up and functionality of the well, and two types of casing anomalies which do not fit within the conventional definition of metal loss features, as described in Section 5.

Casing components associated with downhole hardware include various mechanical features which routinely form part of the well construction, such as collars, centralizers, perforations, mandrels and repairs. The casing joints themselves are analyzed separately, and are therefore not identified as casing “components” for the purpose of this report.

Casing components also include two types of features associated with casing anomalies which fall outside of the conventional metal loss feature definition. These features are mill-related anomalies, which result from the casing manufacturing process, and collar anomalies, which are features associated specifically with the casing collar connections.

The five types of casing components identified by the survey are described and summarized in the sections below.

4.1. Hardware

Casing hardware is determined to mean any physical downhole hardware, other than the casing joints themselves, which comprise the downhole well casing below the log “zero” point, which is typically identified as the top of the master valve or casing flange. Wellhead components above the log zero point are not considered part of the casing or casing components for the purpose of this report.

Casing hardware includes components that serve to connect the casing joints together (e.g., collars), components affixed to the outside of casing (e.g., centralizers, scratchers, clamps), and any class of downhole tools or components which make-up integral to the casing (e.g., mandrels, DV tools, float collars, casing shoes, safety valves, casing packers).

Many casing hardware components represent a significant addition of ferromagnetic material, which adversely affects the tool’s magnetic interactions with the casing body. As a result, metal loss anomalies in the casing body which may occur in association with hardware, for example corrosion under a centralizer, are not identified or sized as part of the standard analysis.

The Hardware Summary (Table 5, below) serves to summarize the casing hardware identified during the survey by type.

Table 5: Hardware Summary

Occurrences	Description
147	Collars
15	Centralizers
0	Scratchers
0	Clamps
0	Gas Lift Mandrels
1	DV Tools
0	Girth Welds
0	Casing Shoes
0	Casing Packers
0	Safety Valves
3	Other

The Feature List (on the accompanying CD) contains a comprehensive listing of individual casing hardware components identified during the survey.

4.2. Perforations

Perforations are intervals of the well casing in which perforations, slotted liners or other means of communication with the formation are located. Analysis of the survey data will serve to identify the beginning and end of the perforated intervals, but no attempt is made to ascertain perforation shot type, density, or phasing.

Metal loss anomalies which may occur within the perforated intervals are not identified or sized as part of the standard analysis.

The Perforated Interval Summary (Table 6, below) provides a summary of the perforated intervals identified during the survey.

Table 6: Perforated Interval Summary

Occurrences	Description
0	Perforated Intervals
0	Slotted Liners

The Feature List (on the accompanying CD) contains a comprehensive listing of individual perforated intervals identified during the survey, including their start point, end point, and total length.

4.3. Repair Intervals

Repair intervals are segments of the well that contain existing casing repairs at the time of the survey, such as an internal casing patch, or other form of repair sleeve.

Any metal loss anomalies which may occur within repair intervals are not identified or sized as part of the standard analysis.

The Repair Interval Summary (Table 7, below) provides a summary of the repairs identified during the survey.

Table 7: Repair Interval Summary

Occurrences	Description
0	Repair Intervals

The Feature List (on the accompanying CD) contains a comprehensive listing of individual existing repair intervals identified during the survey.

4.4. Mill-related Anomalies

Mill-related anomalies are features in the casing body or weld metal resulting from the manufacturing process. Mill-related anomalies may be identified, but not sized, as part of the standard analysis.

Mill-related anomalies are classified in two general categories:

i. *Manufacturing Anomalies: manufacturing anomalies are features of the manufacturing process which occur in the casing body, such as laminations, inclusions, or scabs.*

ii. *Seam Weld Anomalies: Seam weld anomalies are features of the manufacturing process which occur in the casing seam weld (if present), such as incomplete fusion or lack of penetration.*

The Mill-related Anomalies Summary (Table 8, below) serves to summarize the mill-related anomalies, organized by type.

Table 8: Mill-related Anomalies Summary

Occurrences	Description
0	Manufacturing Anomalies
0	Seam Weld Anomalies
0	**Total**

The Feature List (on the accompanying CD) contains a comprehensive listing of the mill-related anomalies identified during the survey.

4.5. Collar Anomalies

For the purpose of this report, casing “collars” are defined to include any means of mechanically coupling individual joints of casing together in a well. Collars include conventional casing connection methods utilizing a short external collar, as well as all types of “flush” joint connections, where both the male and female threads are integral to the casing.

Collars are employed to connect two joints of casing together, or to connect one end of a joint of casing to an integral downhole tool, mandrel, or other casing component. Any girth weld occurring below the master valve or casing flange is considered to be a collar, within this report.

The HR Vertilog survey may detect two types of anomalies associated with the collars:

i. *Collar Anomalies: Metal loss anomalies occurring within the casing body, either under the collar in the case of an external collar, or within the threaded connection interval in the case of a flush joint collar.*

ii. *Make-up Anomalies: Any MFL collar signature that deviates in one or more material respects (e.g. signature length, amplitude, form) from the typical collar response in the well. For example, a collar signature with an atypically long “gap” between casing ends may indicate cross-threading, insufficient make-up torque, or improper seating, all of which may be a possible sources of collar leaks.*

Collar length is determined according to the length of the MFL signature, which typically exceeds the physical dimensions of the collar connection. Since collars contain threads and other complex metal gain/loss profiles, the capacity of MFL technology to detect and size metal loss features in the casing body may be diminished or eliminated within the collar, depending on the collar type.

Accordingly, collar anomalies may be identified, but are not sized, as part of the standard analysis. If collar anomaly size is provided, the performance specification for anomaly sizing does not apply.

Collar anomalies identified during the survey are included in the Collar Anomaly Summary (Table 9, below), which serves to summarize these features by type.

Table 9: Collar Anomalies Summary

Occurrences	Description
0	Collar Anomalies
0	Make-up Anomalies
147	Total Collars

The Feature List (on the accompanying CD) contains a comprehensive listing of the collar anomalies and make-up anomalies identified during the survey.

5. Metal Loss Features

Metal loss features are defined as anomalies in the casing body in which metal has been removed, typically as a result of corrosion or mechanical damage, such as gouging.

Metal loss features detected during the survey are summarized in this report by the following methods:

i. *Surface location: according to the surface of origin, either internal or external*
ii. *Depth-based: according to the depth of penetration*
iii. *Pressure-based: according to the effect on remaining strength of the casing*
iv. *Feature type: according to a classification based on length, width, and wall thickness*
v. *Joint summary: according to the most severe features identified per individual casing joint*

5.1. Surface Location

The metal loss features detected during the survey are summarized according to their surface location, either internal or external, in the Surface Location Summary (Table 10, below).

Table 10: Surface Location Summary

Occurrences	Description
0	Internal Metal Loss Features
0	External Metal Loss Features
0	**Total**

The distribution of metal loss features according to their surface location is illustrated in a series of Surface-Based Histograms (Attachment 5.1). Three histograms are presented:

- Surface location: all metal loss features
- Surface location: internal metal loss features
- Surface location: external metal loss features

The vertical axis of each histogram corresponds to the log depth, and the horizontal axis corresponds to the number of occurrences. Each horizontal bar in the histogram represents the total number of occurrences within a 45.00 foot interval of the well.

5.2. Depth-Based Analysis

The metal loss features identified during the survey are summarized according to their depth of penetration (DOP) in the Metal Loss Depth-Based Summary (Table 11, below).

The individual metal loss features are summarized in the three columns on the left of the table according to their depth range and surface location. All individual metal loss features identified during the survey are represented in this section of the summary.

In the right hand column of the table, the maximum depth of any metal loss feature within individual joints of casing is summarized. Where more than one metal loss feature is contained in a joint, only the

feature with the maximum depth of penetration is reported, so that each joint of casing appears in the table only once.

Table 11: Metal Loss Depth-Based Summary

Metal Loss Features			Metal Loss Depth	Number of Joints
Internal	External	Total		
N/A	N/A	N/A	**0% ≤ d < 20%**	148
0	0	0	**20% ≤ d < 30%**	0
0	0	0	**30% ≤ d < 40%**	0
0	0	0	**40% ≤ d < 50%**	0
0	0	0	**50% ≤ d < 60%**	0
0	0	0	**60% ≤ d < 70%**	0
0	0	0	**70% ≤ d < 80%**	0
0	0	0	**80% ≤ d**	0
0	**0**	**0**	**Total**	**148**

5.2.1. Maximum Depth

The distribution of metal loss features within the well according to their maximum depth of penetration is illustrated in a series of Maximum Depth Histograms (Attachment 5.2.1). Three histograms are presented:

- Maximum depth: all metal loss features
- Maximum depth: internal metal loss features
- Maximum depth: external metal loss features

The vertical axis of each histogram corresponds to the HR Vertilog Log depth, and the horizontal axis corresponds to the number of occurrences. Each horizontal bar in the histogram represents the total number of occurrences within a 45.00 foot interval of the well.

5.2.2. Depth Range

The distribution of metal loss features within the well according to their depth range is illustrated in a series of Depth Range Histograms (Attachment 5.2.2). Four histograms are presented:

- All metal loss features (all reported depths)
- **Metal loss features with 20% ≤ depth < 50%**
- **Metal loss features with 50% ≤ depth < 80%**
- **Metal loss features with depth ≥ 80%**

The vertical axis of each histogram corresponds to the HR Vertilog Log depth, and the horizontal axis corresponds to the number of occurrences. Each horizontal bar in the histogram represents the total number of occurrences within a 45.00 foot interval of the well.

5.2.3. Severity List and Feature Location Sheets

The Depth-Based Severity Report (Attachment 5.2.3) lists the 5 most severe metal loss features detected during the survey, according to their depth of penetration.

In order to help facilitate the location and recovery of these features in the field, the Depth-Based Severity Report includes a Feature Location Sheet for each feature listed.

The Feature Location Sheets includes a description of each feature, and a schematic diagram that indicates a) the feature with respect to casing joint number and depth in the well b) the feature location within the specified casing joint, and c) the joint location with respect to adjacent joints.

5.3. Pressure-Based Analysis

Pressure-sentenced ratios are non-dimensional terms which help operators assess the severity of metal loss features detected during the survey.

This report determines the Estimated Repair Factor (ERF) on the basis of operating pressures and metal loss feature assessment methods selected by the operator, and identified in Section 1.2 of this report. The ERF is calculated as follows;

$$ERF = P/P_{safe}$$

Where; P = MAOP, MOP, or other Operator selected pressure value, and

P_{safe} = the safe operating pressure as calculated by the metal loss features assessment method selected by the Operator (e.g. B31G, Modified B31G, Effective Area)

The ERF Summary is presented in Table 12, below.

Table 12: ERF Summary

Occurrences	ERF Values	Number of Joints
0	Metal loss features with ERF < 0.6	148
0	**Metal loss features with 0.6 ≤ ERF < 0.8**	0
0	**Metal loss features with 0.8 ≤ ERF < 0.90**	0
0	**Metal loss features with 0.9 ≤ ERF < 1.0**	0
0	**Metal loss features with ERF ≥ 1.0**	0
0	**Total**	**148**

5.3.1. Pressure-Sentenced Plot

The pressure-sentenced plot graphically displays all metal loss features within each major segment on the basis of feature length (x-axis) and depth (y-axis). The reference line on the

plot corresponds to an ERF equal to 1.0. Metal loss features with a calculated ERF *greater than* 1.0 plot *above* the reference line.

This report contains one pressure-sentenced plot for each major pipeline segment defined by the operator. The value for pipeline external diameter, D, is assumed to be constant throughout each major segment.

Pressure-Sentenced Plots are presented in Attachment 5.3.1.

5.3.2. Pressure-Based Histograms

The distribution of metal loss features within the well, according to their effect on remaining strength, is illustrated in a series of Pressure-Based Histograms (Attachment 5.3.2). Four histograms are presented:

- All metal loss features
- Metal loss features with ERF $<$ 0.8
- **Metal loss features with 0.8 $\leq$ ERF $<$ 1.0**
- **Metal loss features with ERF $\geq$ 1.0**

The vertical axis of each histogram corresponds to the HR Vertilog log depth, and the horizontal axis corresponds to the number of occurrences. Each horizontal bar in the histogram represents the total number of occurrences within a 45.00 foot interval of the well.

5.3.3. Severity List and Feature Location Sheets

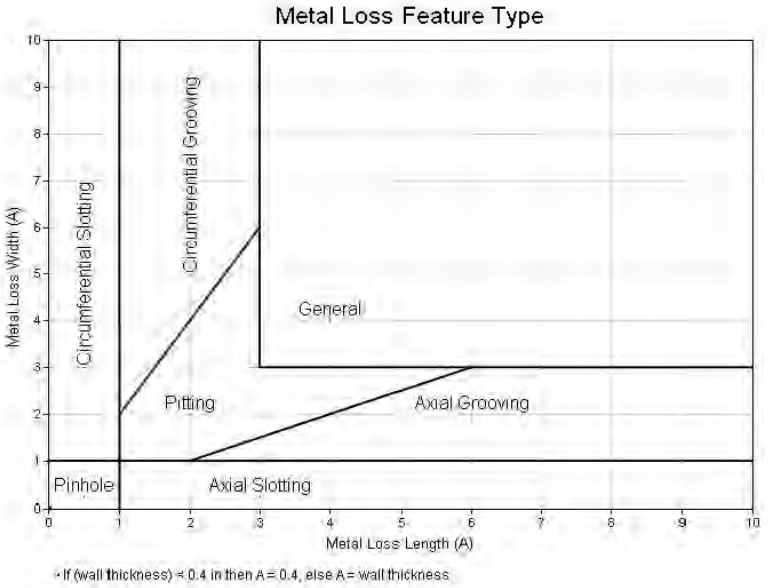
The Pressure-Based Severity Report (Attachment 5.3.3) lists the 5 most severe metal loss features detected during the survey according to their Estimated Repair Factor (ERF).

In order to help facilitate the location and recovery of these features in the field, the Pressure-Based Severity Report includes a Feature Location Sheet for each feature listed.

The Feature Location Sheets includes a description of each feature, and a schematic diagram that indicates: a) the feature with respect to casing joint number and depth in the well; b) the feature location within the specified casing joint, and; c) the joint location with respect to adjacent joints.

5.4. Feature Type

Feature type is a classification system that serves to group metal loss features within one of seven geometric categories. Feature Type classifies features according to their estimated length and width as a function of casing body wall thickness (“t”), as illustrated in the graphic, below.



Metal Loss Feature Type graphic adapted from the Pipeline Operators Forum [POF] Metal Loss Definitions

The Feature Type Summary (Table 13 below) serves to summarize all metal loss features identified during the survey according to type.

Table 13: Feature Type Summary

Feature Type	Occurrences		
	Internal	External	Total
Pinholes	0	0	0
Pits	0	0	0
General	0	0	0
Axial Grooving	0	0	0
Axial Slotting	0	0	0
Circumferential Grooving	0	0	0
Circumferential Slotting	0	0	0
Total	**0**	**0**	**0**

The distribution of metal loss by feature type is graphically illustrated in the Feature Type Plot (Attachment 5.4).

5.5. Joint Summary

The Joint Summary represents a comprehensive list of the individual joints of casing in the well. By convention, joint numbering starts from the surface, or top logged interval, and increments with increasing well depth.

The Joint Summary uniquely identifies each joint by joint number, start/end depth, length, casing weight and grade. The mid-point, or centerline, of the uphole and downhole collars serves to identify the start and end point of a casing joint.

The Joint Summary additionally describes the condition of each joint in terms of the maximum metal loss feature DOP. The individual feature number associated with the maximum DOP is also indicated.

A Joint Classification is assigned to each joint per the well operators' convention based on maximum DOP per joint.

The Joint Classification (Table 14, below) serves to summarize the casing joints by maximum metal loss feature DOP.

Table 14: Joint Classification

Occurrences	Description
148	**Class 1 (0% - 20%)**
0	**Class 2 (20% - 40%)**
0	**Class 3 (40% - 60%)**
0	**Class 4 (60% - 100%)**
148	**Total**

The Joint Summary Report (on the accompanying CD) contains a comprehensive listing of the casing joints identified during the survey.

6. System Qualification and Quality Control

6.1. System Qualification

The HR Vertilog system used to acquire and analyze the magnetic flux leakage casing inspection data and generate this report is a part of Baker Hughes Company Pipe Evaluation Services. Baker Hughes Company is a recognized industry leader in the field of downhole casing inspection technology, and provides MFL casing inspection services utilizing the Vertilog, Digital Vertilog, MicroVertilog and HR Vertilog series tools on a global basis.

The personnel and equipment used to perform this HR Vertilog inspection survey have been qualified according to the Vertilog Tools Operations (WS-CHL-1004-Q) – Qualification Assessment. Well log Data Analysts have been qualified to perform according to the B *Geoscience Magnetic Flux Leakage Certification Policy* (OPS-GLB-En-104271).

The complete HR Vertilog performance specifications are contained in the *HR Vertilog Performance Specification* (document PS 501).

6.2. Best Efforts

All opinions, interpretations, and analysis provided in this report or in connection with this survey are provided to the well operators on a “best efforts” basis. It remains as the sole responsibility of the well operator to use the information contained in this report to draw their own conclusions regarding the condition of the casing, and to undertake appropriate actions to ensure the wells ongoing safety, casing integrity and fitness for purpose.

In the course of analyzing the survey data and producing this report, Baker Hughes Company Wireline Services Data Analysts have provided the well operator with interpretations based on their experience and judgment, but always within the limits of the inspection technologies employed, and the downhole operating conditions encountered. Since all MFL interpretations and analyses are opinions based on inferences from electrical, magnetic, and other indirect measurements, the accuracy or completeness of any interpretation is not, and cannot be, guaranteed.

6.3. Analysis Quality Control

The data in this report was processed in accordance with written work instruction *InSight HR Vertilog Analysis* (document WI 501), the purpose of which is to ensure the ongoing consistency, integrity, and quality control over the HR Vertilog analysis process.

6.4. Continuous Process Improvement

The InSight™ HR Vertilog analysis software incorporates various technologies to identify and size metal loss features, including a system of supervised learning that relies on known input from large-scale calibration defect sets, magnetic FEA, and recovered casing defects.

Consequently, InSight™ has the capacity to integrate inspection data with recovered metal loss feature dimensions obtained from reliable sources. Such data may include properly identified and procured feature rubbings, dimensioned sketches, scaled photos, laser scans, x-ray, or casing samples.

We invite you to participate in our Continuous Process Improvement program by contacting one of the Baker Hughes Company Wireline Services representatives listed below. Data from your recovered casing will be used to help expand the understanding of MFL- defect interactions, improve analysis processes, and optimize feature-sizing capabilities.

Rodney L. Foster
Geoscience MGR – Cased Hole
Baker Hughes Company
930 South West Street
Olney, Illinois 62450
(618) 392 - 3300
Rodney.foster2@bakerhughes.com

List of Attachments

Attachment

Casing Segment Report

NiSource
Blackhawk
C-5

Identifier	Start Log Position	Stop Log Position	Diameter	Wall Thickness	Weight	Type	Grade	SMYS	MAOP	Design Factor
	ft	ft	in	in	lb/ft			ksi	psi	
1	8.07	4807.28	5.500	0.304	17.0	Seamless	API J55	55	2450	1.00

Inspection Date: 07-29-2020
Report Date: 07-31-2020

External Casings

NiSource

Blackhawk

C-5

Start Log Position	Stop Log Position	Diameter	Wall Thickness	Weight
ft	ft	in	in	lb/ft
8.07	1164.40	8.625	0.264	24.0

Inspection Date: 07-29-2020

Report Date: 07-31-2020

Log Depth	Dist UHC	Joint Length	Identifier	Class	Description	Surface Indication	Length	Width	Depth	Dim Class	P Safe B31G	ERF B31G	P Safe Effective Area	ERF Effective Area	NWT	Comment
ft	ft	ft					in	in	%		psi		psi		in	
8.07	0.00	21.92	C-1	Appurtenance	Flange										0.304	
8.07	0.00	21.92		Begin External Casing											0.304	
8.95	0.89	21.92	H-1-1	Hardware	External Csg Head Response										0.304	
29.98	0.00	33.10	C-2	Collar											0.304	
63.09	0.00	32.93	C-3	Collar											0.304	
96.01	0.00	32.00	C-4	Collar											0.304	
96.85	0.84	32.00	H-4-1	Hardware	Centralizer										0.304	
128.01	0.00	32.21	C-5	Collar											0.304	
160.22	0.00	32.84	C-6	Collar											0.304	
193.06	0.00	33.40	C-7	Collar											0.304	
226.46	0.00	32.45	C-8	Collar											0.304	
258.91	0.00	31.73	C-9	Collar											0.304	
290.64	0.00	33.02	C-10	Collar											0.304	
323.66	0.00	33.69	C-11	Collar											0.304	
357.35	0.00	32.83	C-12	Collar											0.304	
390.19	0.00	32.96	C-13	Collar											0.304	
423.14	0.00	33.79	C-14	Collar											0.304	
456.93	0.00	32.48	C-15	Collar											0.304	
489.41	0.00	33.66	C-16	Collar											0.304	
523.07	0.00	31.29	C-17	Collar											0.304	
554.36	0.00	32.95	C-18	Collar											0.304	
587.31	0.00	32.76	C-19	Collar											0.304	
588.89	1.58	32.76	H-19-1	Hardware	Centralizer										0.304	
620.07	0.00	32.50	C-20	Collar											0.304	
652.57	0.00	33.11	C-21	Collar											0.304	
685.69	0.00	33.54	C-22	Collar											0.304	
719.23	0.00	33.45	C-23	Collar											0.304	
752.68	0.00	31.94	C-24	Collar											0.304	
784.62	0.00	33.65	C-25	Collar											0.304	
818.27	0.00	33.41	C-26	Collar											0.304	
851.68	0.00	32.35	C-27	Collar											0.304	
884.02	0.00	33.11	C-28	Collar											0.304	
917.13	0.00	32.50	C-29	Collar											0.304	
949.63	0.00	32.45	C-30	Collar											0.304	
982.08	0.00	33.17	C-31	Collar											0.304	
1015.24	0.00	31.50	C-32	Collar											0.304	
1016.84	1.59	31.50	H-32-1	Hardware	Centralizer										0.304	
1046.74	0.00	31.75	C-33	Collar											0.304	
1078.49	0.00	32.54	C-34	Collar											0.304	
1111.03	0.00	32.50	C-35	Collar											0.304	
1143.54	0.00	32.45	C-36	Collar											0.304	
1164.37	20.83	32.45	H-36-1	Hardware	Bottom Of External Casing										0.304	Bottom Of External 8-5/8" Csg.
1164.40	20.86	32.45		End External Casing											0.304	
1175.98	0.00	33.07	C-37	Collar											0.304	
1209.05	0.00	32.50	C-38	Collar											0.304	
1241.55	0.00	32.45	C-39	Collar											0.304	
1274.00	0.00	32.04	C-40	Collar											0.304	
1306.04	0.00	31.25	C-41	Collar											0.304	
1337.29	0.00	31.17	C-42	Collar											0.304	
1368.46	0.00	33.76	C-43	Collar											0.304	
1402.23	0.00	32.07	C-44	Collar											0.304	
1434.30	0.00	32.40	C-45	Collar											0.304	
1436.06	1.76	32.40	H-45-1	Hardware	Centralizer										0.304	
1466.69	0.00	32.92	C-46	Collar											0.304	
1499.62	0.00	32.80	C-47	Collar											0.304	
1532.42	0.00	31.76	C-48	Collar											0.304	
1564.18	0.00	31.88	C-49	Collar											0.304	
1596.06	0.00	33.12	C-50	Collar											0.304	
1629.18	0.00	32.41	C-51	Collar											0.304	

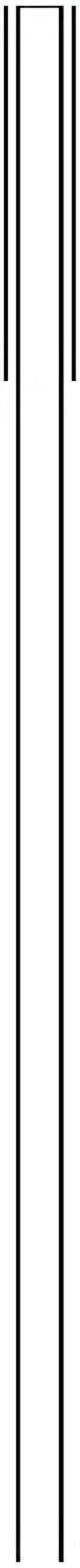
Log Depth	Dist UHC	Joint Length	Identifier	Class	Description	Surface Indication	Length	Width	Depth	Dim Class	P Safe B31G	ERF B31G	P Safe Effective Area	ERF Effective Area	NWT	Comment
ft	ft	ft					in	in	%		psi		psi		in	
1661.59	0.00	32.42	C-52	Collar											0.304	
1694.01	0.00	33.20	C-53	Collar											0.304	
1727.21	0.00	31.52	C-54	Collar											0.304	
1758.74	0.00	31.63	C-55	Collar											0.304	
1790.36	0.00	32.09	C-56	Collar											0.304	
1822.46	0.00	31.47	C-57	Collar											0.304	
1853.93	0.00	33.07	C-58	Collar											0.304	
1855.50	1.57	33.07	H-58-1	Hardware	Centralizer										0.304	
1886.99	0.00	32.21	C-59	Collar											0.304	
1919.20	0.00	33.46	C-60	Collar											0.304	
1952.66	0.00	32.47	C-61	Collar											0.304	
1985.14	0.00	33.92	C-62	Collar											0.304	
2019.05	0.00	33.33	C-63	Collar											0.304	
2052.39	0.00	31.34	C-64	Collar											0.304	
2083.72	0.00	33.50	C-65	Collar											0.304	
2117.22	0.00	33.87	C-66	Collar											0.304	
2151.09	0.00	33.22	C-67	Collar											0.304	
2184.31	0.00	32.17	C-68	Collar											0.304	
2216.49	0.00	32.14	C-69	Collar											0.304	
2248.63	0.00	33.35	C-70	Collar											0.304	
2281.98	0.00	33.11	C-71	Collar											0.304	
2283.66	1.68	33.11	H-71-1	Hardware	Centralizer										0.304	
2315.09	0.00	32.44	C-72	Collar											0.304	
2347.53	0.00	32.99	C-73	Collar											0.304	
2380.52	0.00	34.34	C-74	Collar											0.304	
2414.86	0.00	33.03	C-75	Collar											0.304	
2447.89	0.00	33.57	C-76	Collar											0.304	
2481.46	0.00	32.45	C-77	Collar											0.304	
2513.91	0.00	31.70	C-78	Collar											0.304	
2545.61	0.00	31.76	C-79	Collar											0.304	
2577.37	0.00	32.04	C-80	Collar											0.304	
2609.41	0.00	31.65	C-81	Collar											0.304	
2641.06	0.00	33.50	C-82	Collar											0.304	
2674.56	0.00	33.82	C-83	Collar											0.304	
2708.38	0.00	33.35	C-84	Collar											0.304	
2710.07	1.69	33.35	H-84-1	Hardware	Centralizer										0.304	
2741.73	0.00	31.15	C-85	Collar											0.304	
2772.88	0.00	32.12	C-86	Collar											0.304	
2804.99	0.00	32.98	C-87	Collar											0.304	
2837.97	0.00	32.01	C-88	Collar											0.304	
2869.99	0.00	33.53	C-89	Collar											0.304	
2903.51	0.00	32.44	C-90	Collar											0.304	
2935.96	0.00	33.37	C-91	Collar											0.304	
2969.32	0.00	33.32	C-92	Collar											0.304	
3002.64	0.00	30.40	C-93	Collar											0.304	
3033.04	0.00	31.84	C-94	Collar											0.304	
3064.88	0.00	28.72	C-95	Collar											0.304	
3093.61	0.00	32.19	C-96	Collar											0.304	
3125.80	0.00	30.43	C-97	Collar											0.304	
3127.49	1.69	30.43	H-97-1	Hardware	Centralizer										0.304	
3156.23	0.00	28.90	C-98	Collar											0.304	
3185.14	0.00	29.95	C-99	Collar											0.304	
3215.09	0.00	25.85	C-100	Collar											0.304	
3240.94	0.00	32.73	C-101	Collar											0.304	
3273.67	0.00	33.76	C-102	Collar											0.304	
3307.43	0.00	33.47	C-103	Collar											0.304	
3340.90	0.00	32.83	C-104	Collar											0.304	
3373.73	0.00	32.86	C-105	Collar											0.304	
3406.59	0.00	33.19	C-106	Collar											0.304	

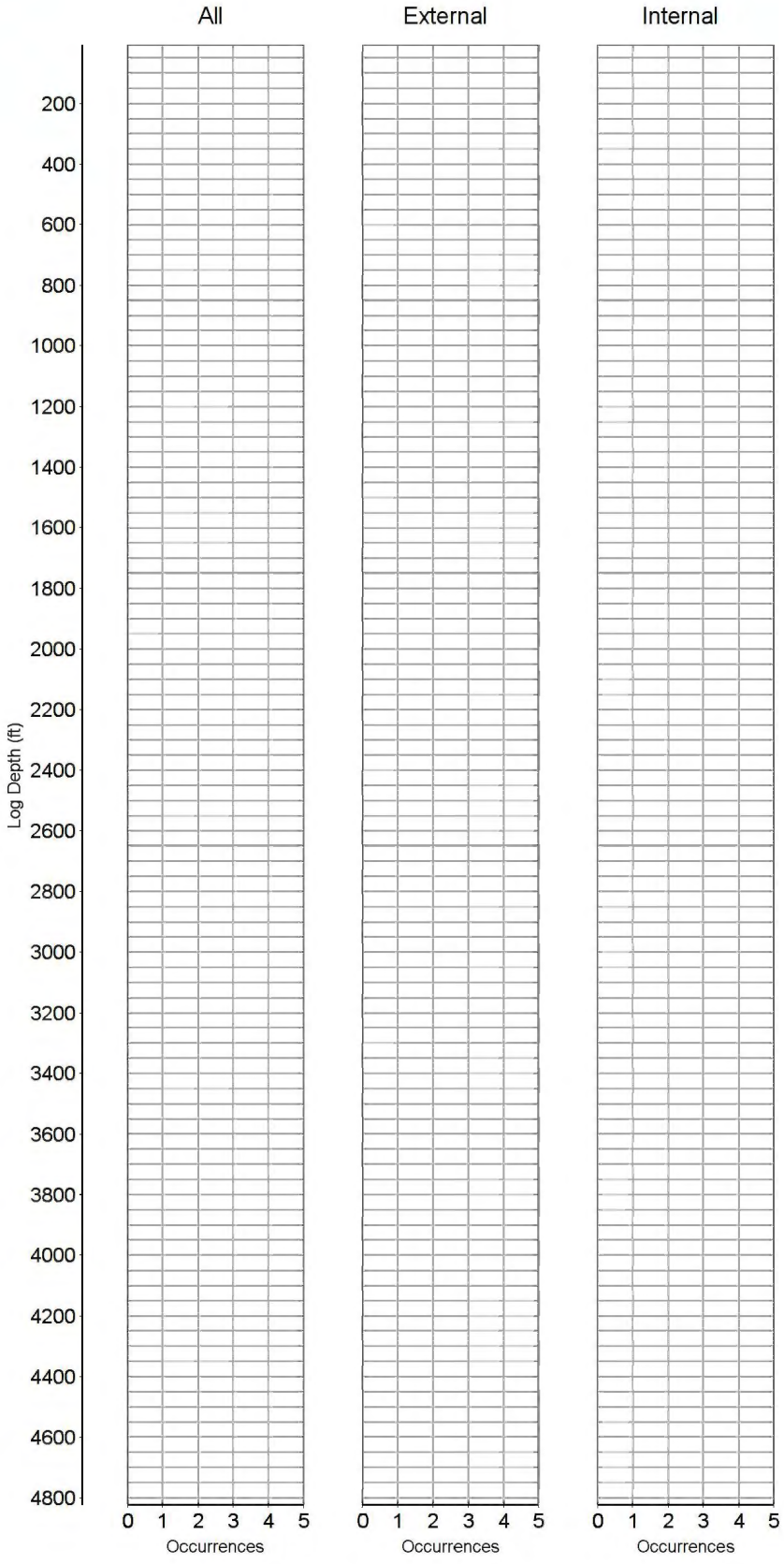
Log Depth	Dist UHC	Joint Length	Identifier	Class	Description	Surface Indication	Length	Width	Depth	Dim Class	P Safe B31G	ERF B31G	P Safe Effective Area	ERF Effective Area	NWT	Comment
ft	ft	ft					in	in	%		psi		psi		in	
3439.79	0.00	32.63	C-107	Collar											0.304	
3472.41	0.00	32.65	C-108	Collar											0.304	
3505.06	0.00	32.07	C-109	Collar											0.304	
3537.13	0.00	31.80	C-110	Collar											0.304	
3568.45	31.31	31.80	H-110-1	Hardware	Centralizer										0.304	
3568.93	0.00	33.80	C-111	Collar											0.304	
3602.73	0.00	33.86	C-112	Collar											0.304	
3636.59	0.00	32.85	C-113	Collar											0.304	
3669.43	0.00	33.92	C-114	Collar											0.304	
3703.36	0.00	32.75	C-115	Collar											0.304	
3736.11	0.00	32.49	C-116	Collar											0.304	
3768.60	0.00	29.43	C-117	Collar											0.304	
3798.04	0.00	35.29	C-118	Collar											0.304	
3832.19	34.16	35.29	H-118-1	Hardware	DV Tool										0.304	Probable DV Tool / Stage Collar.
3833.32	0.00	32.78	C-119	Collar											0.304	
3866.10	0.00	31.69	C-120	Collar											0.304	
3897.79	0.00	32.37	C-121	Collar											0.304	
3929.60	31.81	32.37	H-121-1	Hardware	Centralizer										0.304	
3930.16	0.00	32.59	C-122	Collar											0.304	
3962.74	0.00	33.38	C-123	Collar											0.304	
3983.28	20.53	33.38	H-123-1	Hardware	Cement Basket										0.304	
3996.13	0.00	30.70	C-124	Collar											0.304	
4026.83	0.00	32.87	C-125	Collar											0.304	
4059.71	0.00	33.79	C-126	Collar											0.304	
4093.04	33.33	33.79	H-126-1	Hardware	Centralizer										0.304	
4093.50	0.00	31.86	C-127	Collar											0.304	
4125.36	0.00	33.06	C-128	Collar											0.304	
4158.42	0.00	33.23	C-129	Collar											0.304	
4191.65	0.00	32.07	C-130	Collar											0.304	
4223.24	31.59	32.07	H-130-1	Hardware	Centralizer										0.304	
4223.73	0.00	32.40	C-131	Collar											0.304	
4256.12	0.00	32.82	C-132	Collar											0.304	
4288.95	0.00	33.63	C-133	Collar											0.304	
4322.58	0.00	33.11	C-134	Collar											0.304	
4355.69	0.00	34.05	C-135	Collar											0.304	
4389.74	0.00	33.44	C-136	Collar											0.304	
4423.18	0.00	30.95	C-137	Collar											0.304	
4454.13	0.00	32.24	C-138	Collar											0.304	
4454.53	0.40	32.24	H-138-1	Hardware	Centralizer										0.304	
4486.37	0.00	32.48	C-139	Collar											0.304	
4518.85	0.00	33.70	C-140	Collar											0.304	
4552.55	0.00	33.47	C-141	Collar											0.304	
4586.02	0.00	31.94	C-142	Collar											0.304	
4617.96	0.00	31.50	C-143	Collar											0.304	
4649.46	0.00	33.00	C-144	Collar											0.304	
4682.06	32.60	33.00	H-144-1	Hardware	Centralizer										0.304	
4682.46	0.00	33.52	C-145	Collar											0.304	
4715.98	0.00	33.97	C-146	Collar											0.304	
4749.96	0.00	34.05	C-147	Collar											0.304	
4783.79	33.84	34.05	H-147-1	Hardware	Centralizer										0.304	
4784.01	0.00	23.27	C-148	Collar											0.304	
4807.28			C-149	Interpretation Boundary												

Attachment 5.1 - Surface Based Histograms

Baker Hughes

Company: NiSource
Field: Blackhawk
Well: C-5
Inspection Date: 07-29-2020
Report Date: 07-31-2020

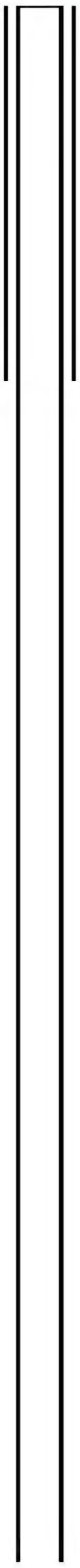


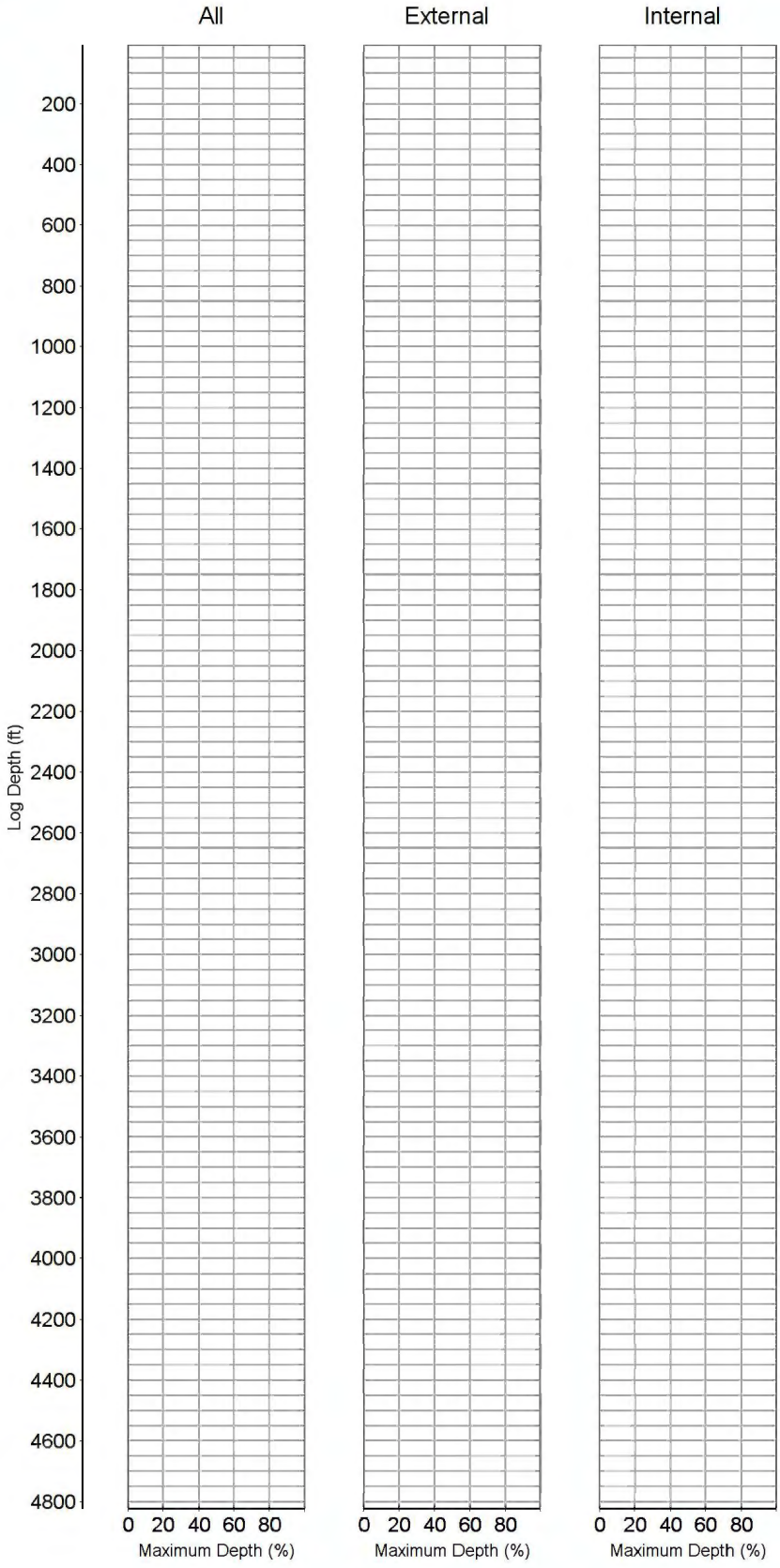


Attachment 5.2.1 - Maximum Depth Histograms

Baker Hughes

Company: NiSource
Field: Blackhawk
Well: C-5
Inspection Date: 07-29-2020
Report Date: 07-31-2020

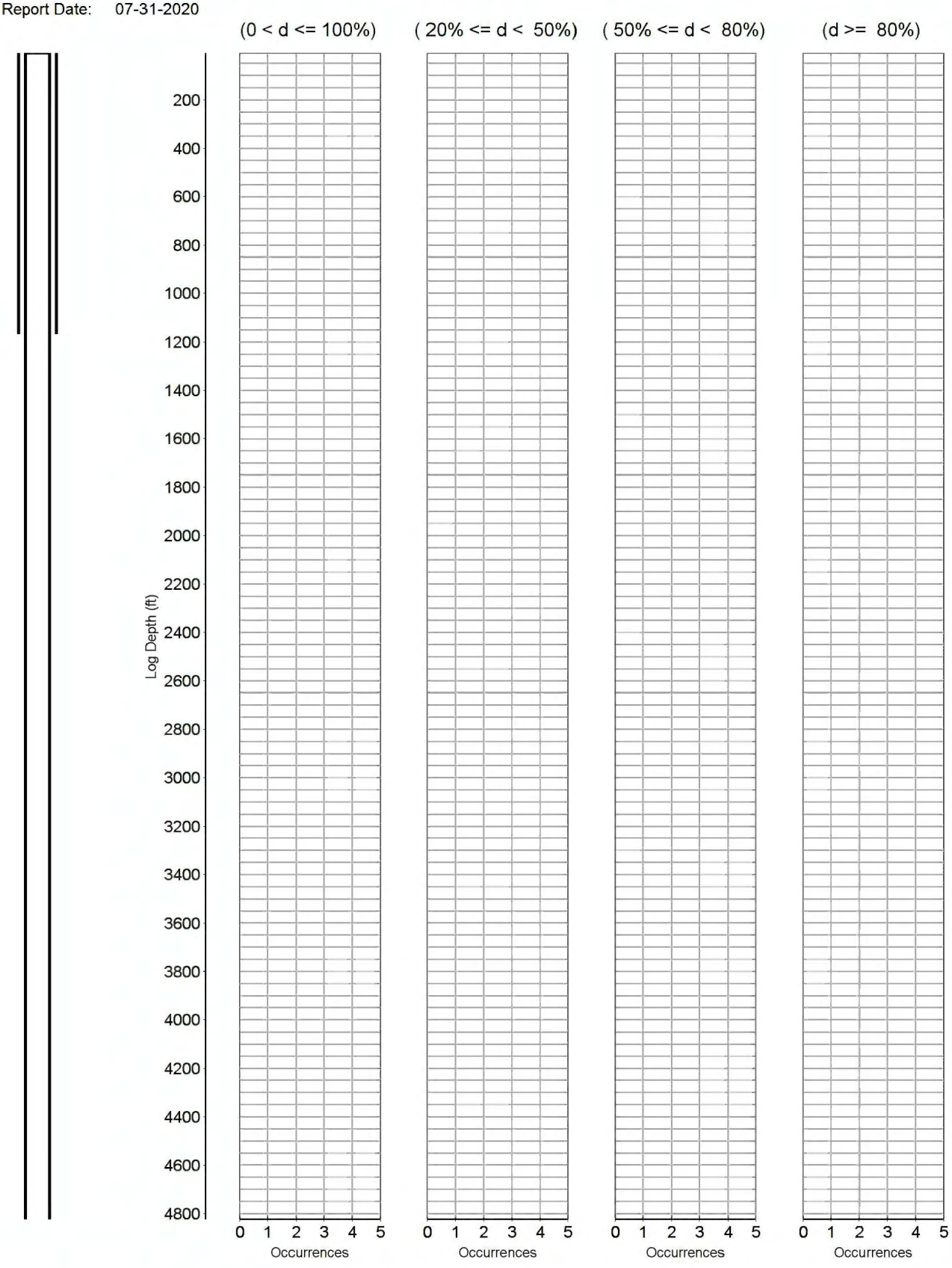




Attachment 5.2.2 - Depth Range

Baker Hughes

Company: NiSource
Field: Blackhawk
Well: C-5
Inspection Date: 07-29-2020
Report Date: 07-31-2020

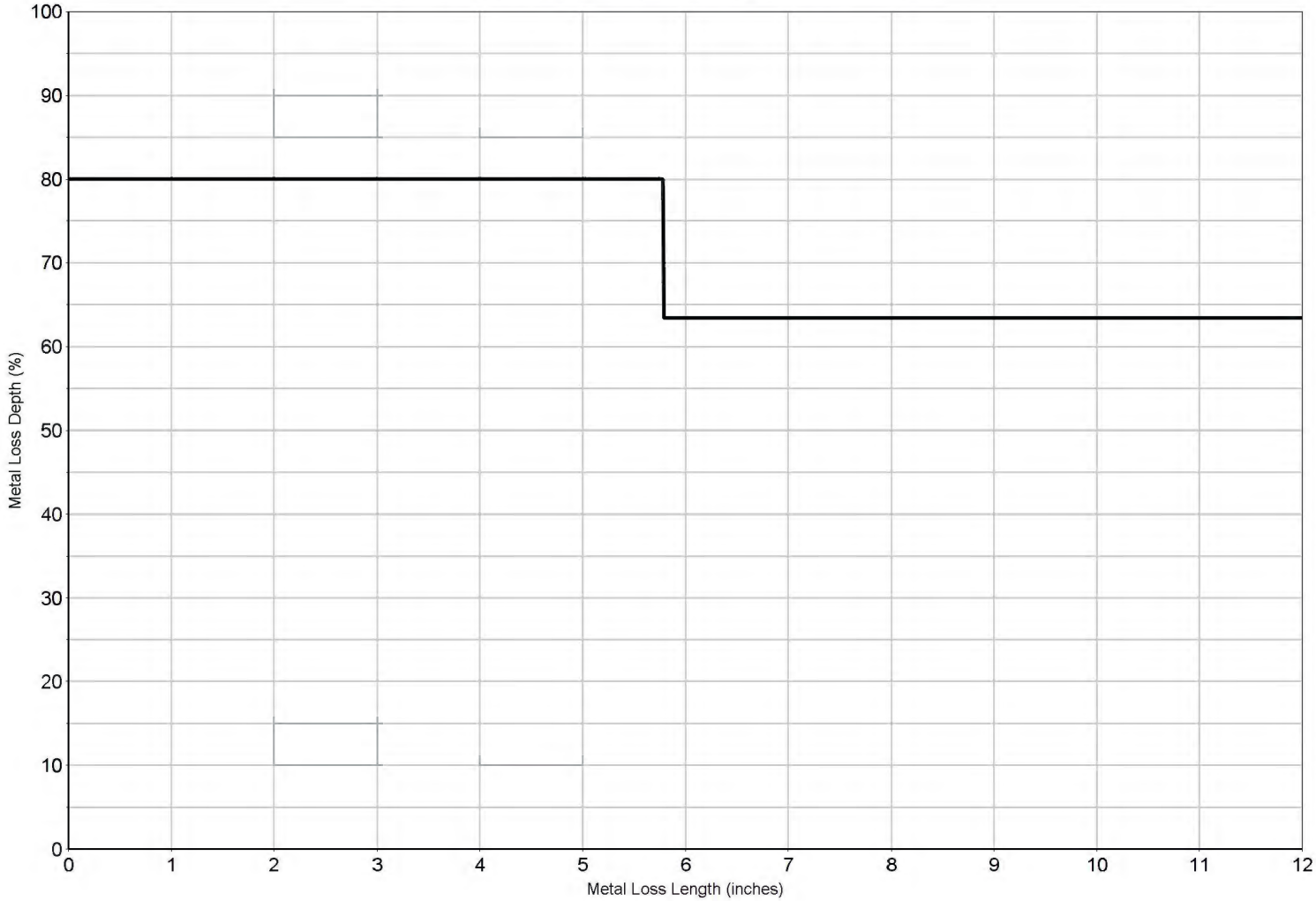


Attachment 5.3.1 - Pressure Sentenced Plot

Baker Hughes

Company:	NiSource
Field:	Blackhawk
Well:	C-5
Inspection Date:	07-29-2020
Report Date:	07-31-2020

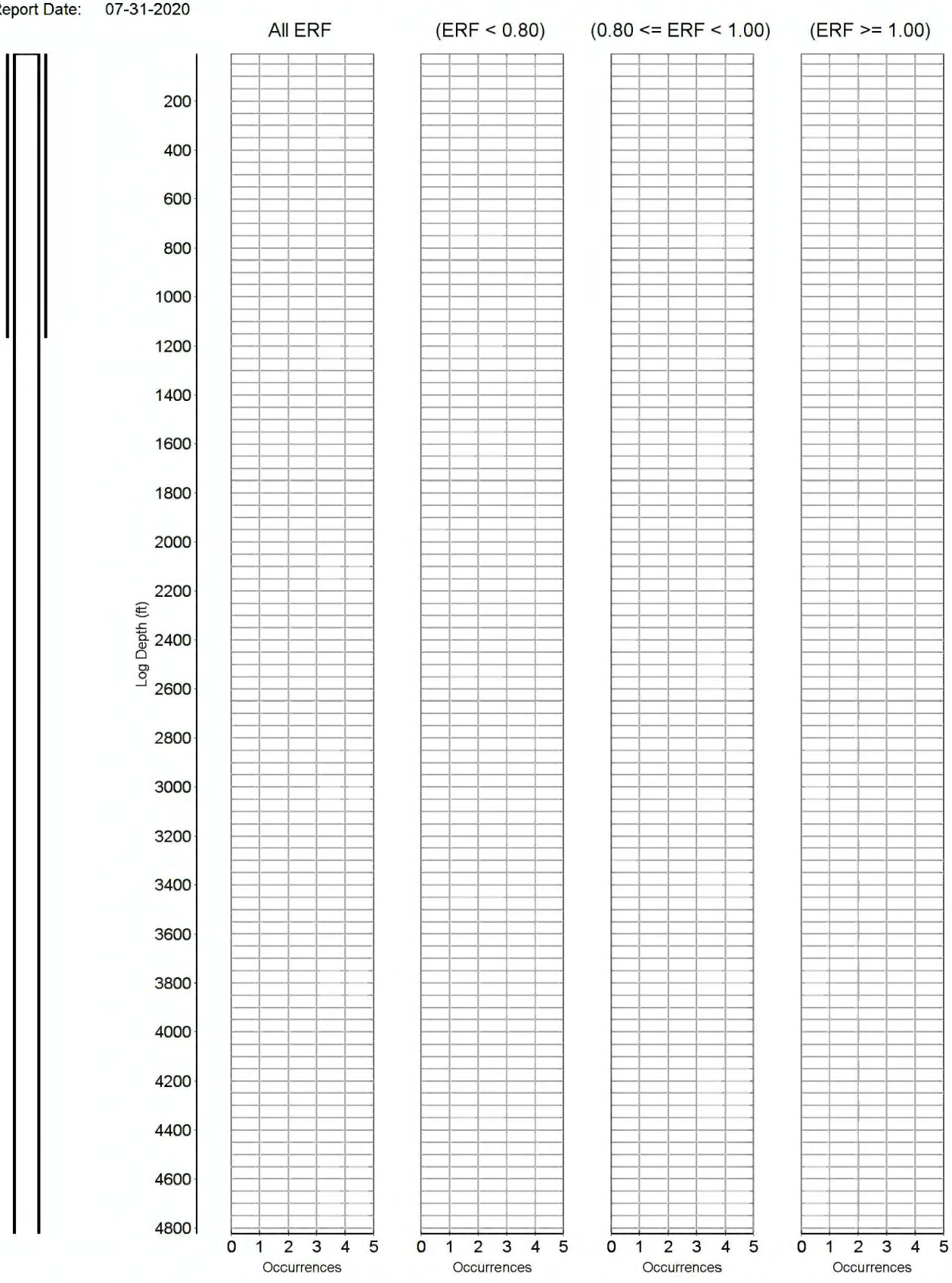
Diameter: 5.500 in, Wall Thickness: 0.304 in, SMYS: 55.0 ksi



Attachment 5.3.2 - Pressure Based Histograms

Baker Hughes

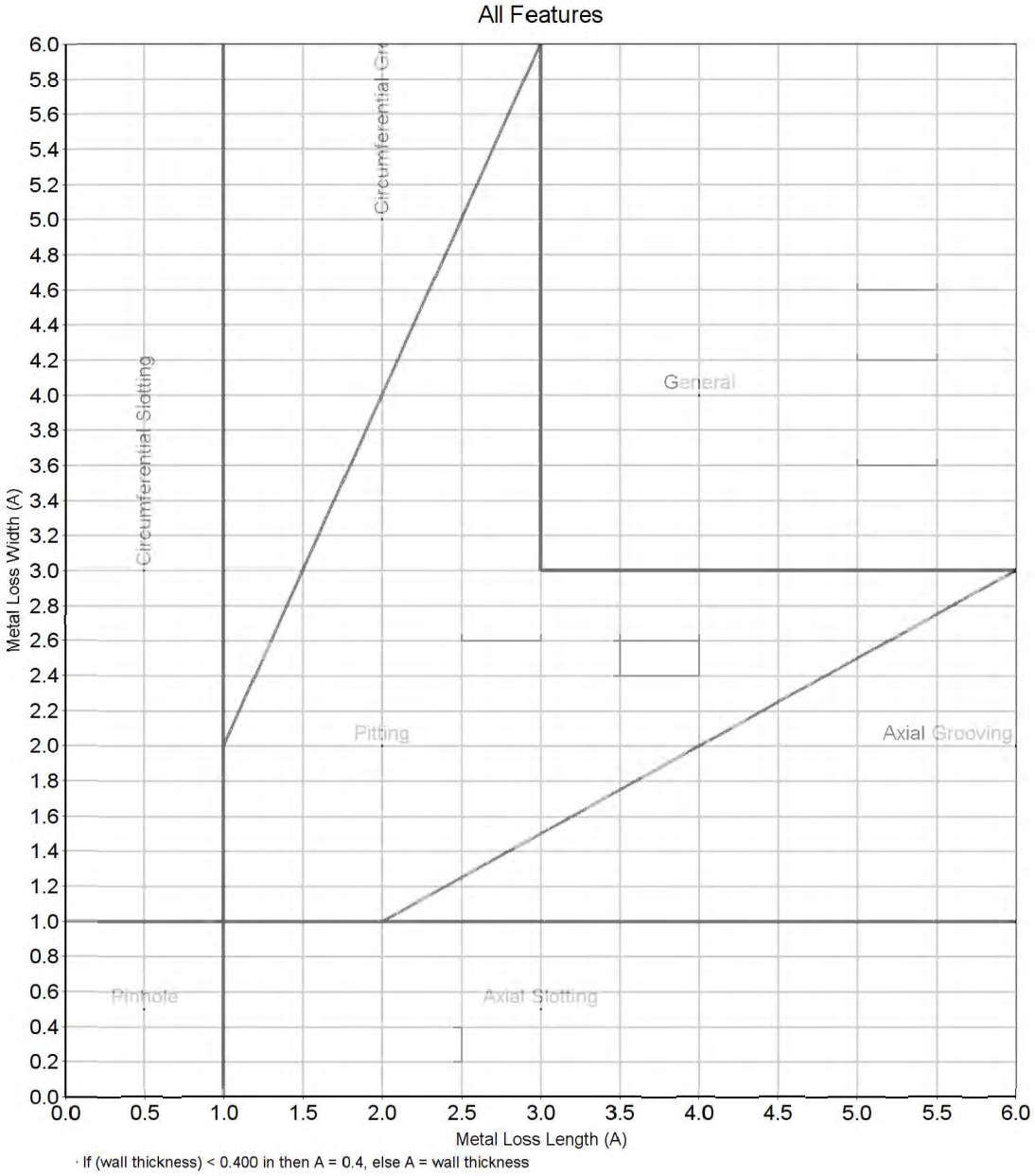
Company: NiSource
Field: Blackhawk
Well: C-5
Inspection Date: 07-29-2020
Report Date: 07-31-2020



Attachment 5.4 - Feature Type Plot

Baker Hughes

Company: NiSource
Field: Blackhawk
Well: C-5
Inspection Date: 07-29-2020
Report Date: 07-31-2020



· If (wall thickness) < 0.400 in then A = 0.4, else A = wall thickness

NiSource
Blackhawk
C-5

Identifier	Start Log Depth	Joint Length	Diameter	Wall Thickness	Weight	Max ML Depth	Max ML Position	Min Burst Pressure	Joint Depth Class
	ft	ft	in	in	lb/ft	%	ft	psi	
JT-1	8.07	21.92	5.500	0.304	17.0	0			1
JT-2	29.98	33.10	5.500	0.304	17.0	0			1
JT-3	63.09	32.93	5.500	0.304	17.0	0			1
JT-4	96.01	32.00	5.500	0.304	17.0	0			1
JT-5	128.01	32.21	5.500	0.304	17.0	0			1
JT-6	160.22	32.84	5.500	0.304	17.0	0			1
JT-7	193.06	33.40	5.500	0.304	17.0	0			1
JT-8	226.46	32.45	5.500	0.304	17.0	0			1
JT-9	258.91	31.73	5.500	0.304	17.0	0			1
JT-10	290.64	33.02	5.500	0.304	17.0	0			1
JT-11	323.66	33.69	5.500	0.304	17.0	0			1
JT-12	357.35	32.83	5.500	0.304	17.0	0			1
JT-13	390.19	32.96	5.500	0.304	17.0	0			1
JT-14	423.14	33.79	5.500	0.304	17.0	0			1
JT-15	456.93	32.48	5.500	0.304	17.0	0			1
JT-16	489.41	33.66	5.500	0.304	17.0	0			1
JT-17	523.07	31.29	5.500	0.304	17.0	0			1
JT-18	554.36	32.95	5.500	0.304	17.0	0			1
JT-19	587.31	32.76	5.500	0.304	17.0	0			1
JT-20	620.07	32.50	5.500	0.304	17.0	0			1
JT-21	652.57	33.11	5.500	0.304	17.0	0			1
JT-22	685.69	33.54	5.500	0.304	17.0	0			1
JT-23	719.23	33.45	5.500	0.304	17.0	0			1
JT-24	752.68	31.94	5.500	0.304	17.0	0			1
JT-25	784.62	33.65	5.500	0.304	17.0	0			1
JT-26	818.27	33.41	5.500	0.304	17.0	0			1
JT-27	851.68	32.35	5.500	0.304	17.0	0			1
JT-28	884.02	33.11	5.500	0.304	17.0	0			1
JT-29	917.13	32.50	5.500	0.304	17.0	0			1
JT-30	949.63	32.45	5.500	0.304	17.0	0			1
JT-31	982.08	33.17	5.500	0.304	17.0	0			1
JT-32	1015.24	31.50	5.500	0.304	17.0	0			1
JT-33	1046.74	31.75	5.500	0.304	17.0	0			1

Identifier	Start Log Depth	Joint Length	Diameter	Wall Thickness	Weight	Max ML Depth	Max ML Position	Min Burst Pressure	Joint Depth Class
	ft	ft	in	in	lb/ft	%	ft	psi	
JT-34	1078.49	32.54	5.500	0.304	17.0	0			1
JT-35	1111.03	32.50	5.500	0.304	17.0	0			1
JT-36	1143.54	32.45	5.500	0.304	17.0	0			1
JT-37	1175.98	33.07	5.500	0.304	17.0	0			1
JT-38	1209.05	32.50	5.500	0.304	17.0	0			1
JT-39	1241.55	32.45	5.500	0.304	17.0	0			1
JT-40	1274.00	32.04	5.500	0.304	17.0	0			1
JT-41	1306.04	31.25	5.500	0.304	17.0	0			1
JT-42	1337.29	31.17	5.500	0.304	17.0	0			1
JT-43	1368.46	33.76	5.500	0.304	17.0	0			1
JT-44	1402.23	32.07	5.500	0.304	17.0	0			1
JT-45	1434.30	32.40	5.500	0.304	17.0	0			1
JT-46	1466.69	32.92	5.500	0.304	17.0	0			1
JT-47	1499.62	32.80	5.500	0.304	17.0	0			1
JT-48	1532.42	31.76	5.500	0.304	17.0	0			1
JT-49	1564.18	31.88	5.500	0.304	17.0	0			1
JT-50	1596.06	33.12	5.500	0.304	17.0	0			1
JT-51	1629.18	32.41	5.500	0.304	17.0	0			1
JT-52	1661.59	32.42	5.500	0.304	17.0	0			1
JT-53	1694.01	33.20	5.500	0.304	17.0	0			1
JT-54	1727.21	31.52	5.500	0.304	17.0	0			1
JT-55	1758.74	31.63	5.500	0.304	17.0	0			1
JT-56	1790.36	32.09	5.500	0.304	17.0	0			1
JT-57	1822.46	31.47	5.500	0.304	17.0	0			1
JT-58	1853.93	33.07	5.500	0.304	17.0	0			1
JT-59	1886.99	32.21	5.500	0.304	17.0	0			1
JT-60	1919.20	33.46	5.500	0.304	17.0	0			1
JT-61	1952.66	32.47	5.500	0.304	17.0	0			1
JT-62	1985.14	33.92	5.500	0.304	17.0	0			1
JT-63	2019.05	33.33	5.500	0.304	17.0	0			1
JT-64	2052.39	31.34	5.500	0.304	17.0	0			1
JT-65	2083.72	33.50	5.500	0.304	17.0	0			1
JT-66	2117.22	33.87	5.500	0.304	17.0	0			1

Identifier	Start Log Depth	Joint Length	Diameter	Wall Thickness	Weight	Max ML Depth	Max ML Position	Min Burst Pressure	Joint Depth Class
	ft	ft	in	in	lb/ft	%	ft	psi	
JT-67	2151.09	33.22	5.500	0.304	17.0	0			1
JT-68	2184.31	32.17	5.500	0.304	17.0	0			1
JT-69	2216.49	32.14	5.500	0.304	17.0	0			1
JT-70	2248.63	33.35	5.500	0.304	17.0	0			1
JT-71	2281.98	33.11	5.500	0.304	17.0	0			1
JT-72	2315.09	32.44	5.500	0.304	17.0	0			1
JT-73	2347.53	32.99	5.500	0.304	17.0	0			1
JT-74	2380.52	34.34	5.500	0.304	17.0	0			1
JT-75	2414.86	33.03	5.500	0.304	17.0	0			1
JT-76	2447.89	33.57	5.500	0.304	17.0	0			1
JT-77	2481.46	32.45	5.500	0.304	17.0	0			1
JT-78	2513.91	31.70	5.500	0.304	17.0	0			1
JT-79	2545.61	31.76	5.500	0.304	17.0	0			1
JT-80	2577.37	32.04	5.500	0.304	17.0	0			1
JT-81	2609.41	31.65	5.500	0.304	17.0	0			1
JT-82	2641.06	33.50	5.500	0.304	17.0	0			1
JT-83	2674.56	33.82	5.500	0.304	17.0	0			1
JT-84	2708.38	33.35	5.500	0.304	17.0	0			1
JT-85	2741.73	31.15	5.500	0.304	17.0	0			1
JT-86	2772.88	32.12	5.500	0.304	17.0	0			1
JT-87	2804.99	32.98	5.500	0.304	17.0	0			1
JT-88	2837.97	32.01	5.500	0.304	17.0	0			1
JT-89	2869.99	33.53	5.500	0.304	17.0	0			1
JT-90	2903.51	32.44	5.500	0.304	17.0	0			1
JT-91	2935.96	33.37	5.500	0.304	17.0	0			1
JT-92	2969.32	33.32	5.500	0.304	17.0	0			1
JT-93	3002.64	30.40	5.500	0.304	17.0	0			1
JT-94	3033.04	31.84	5.500	0.304	17.0	0			1
JT-95	3064.88	28.72	5.500	0.304	17.0	0			1
JT-96	3093.61	32.19	5.500	0.304	17.0	0			1
JT-97	3125.80	30.43	5.500	0.304	17.0	0			1
JT-98	3156.23	28.90	5.500	0.304	17.0	0			1
JT-99	3185.14	29.95	5.500	0.304	17.0	0			1

Identifier	Start Log Depth	Joint Length	Diameter	Wall Thickness	Weight	Max ML Depth	Max ML Position	Min Burst Pressure	Joint Depth Class
	ft	ft	in	in	lb/ft	%	ft	psi	
JT-100	3215.09	25.85	5.500	0.304	17.0	0			1
JT-101	3240.94	32.73	5.500	0.304	17.0	0			1
JT-102	3273.67	33.76	5.500	0.304	17.0	0			1
JT-103	3307.43	33.47	5.500	0.304	17.0	0			1
JT-104	3340.90	32.83	5.500	0.304	17.0	0			1
JT-105	3373.73	32.86	5.500	0.304	17.0	0			1
JT-106	3406.59	33.19	5.500	0.304	17.0	0			1
JT-107	3439.79	32.63	5.500	0.304	17.0	0			1
JT-108	3472.41	32.65	5.500	0.304	17.0	0			1
JT-109	3505.06	32.07	5.500	0.304	17.0	0			1
JT-110	3537.13	31.80	5.500	0.304	17.0	0			1
JT-111	3568.93	33.80	5.500	0.304	17.0	0			1
JT-112	3602.73	33.86	5.500	0.304	17.0	0			1
JT-113	3636.59	32.85	5.500	0.304	17.0	0			1
JT-114	3669.43	33.92	5.500	0.304	17.0	0			1
JT-115	3703.36	32.75	5.500	0.304	17.0	0			1
JT-116	3736.11	32.49	5.500	0.304	17.0	0			1
JT-117	3768.60	29.43	5.500	0.304	17.0	0			1
JT-118	3798.04	35.29	5.500	0.304	17.0	0			1
JT-119	3833.32	32.78	5.500	0.304	17.0	0			1
JT-120	3866.10	31.69	5.500	0.304	17.0	0			1
JT-121	3897.79	32.37	5.500	0.304	17.0	0			1
JT-122	3930.16	32.59	5.500	0.304	17.0	0			1
JT-123	3962.74	33.38	5.500	0.304	17.0	0			1
JT-124	3996.13	30.70	5.500	0.304	17.0	0			1
JT-125	4026.83	32.87	5.500	0.304	17.0	0			1
JT-126	4059.71	33.79	5.500	0.304	17.0	0			1
JT-127	4093.50	31.86	5.500	0.304	17.0	0			1
JT-128	4125.36	33.06	5.500	0.304	17.0	0			1
JT-129	4158.42	33.23	5.500	0.304	17.0	0			1
JT-130	4191.65	32.07	5.500	0.304	17.0	0			1
JT-131	4223.73	32.40	5.500	0.304	17.0	0			1
JT-132	4256.12	32.82	5.500	0.304	17.0	0			1

Identifier	Start Log Depth	Joint Length	Diameter	Wall Thickness	Weight	Max ML Depth	Max ML Position	Min Burst Pressure	Joint Depth Class
	ft	ft	in	in	lb/ft	%	ft	psi	
JT-133	4288.95	33.63	5.500	0.304	17.0	0			1
JT-134	4322.58	33.11	5.500	0.304	17.0	0			1
JT-135	4355.69	34.05	5.500	0.304	17.0	0			1
JT-136	4389.74	33.44	5.500	0.304	17.0	0			1
JT-137	4423.18	30.95	5.500	0.304	17.0	0			1
JT-138	4454.13	32.24	5.500	0.304	17.0	0			1
JT-139	4486.37	32.48	5.500	0.304	17.0	0			1
JT-140	4518.85	33.70	5.500	0.304	17.0	0			1
JT-141	4552.55	33.47	5.500	0.304	17.0	0			1
JT-142	4586.02	31.94	5.500	0.304	17.0	0			1
JT-143	4617.96	31.50	5.500	0.304	17.0	0			1
JT-144	4649.46	33.00	5.500	0.304	17.0	0			1
JT-145	4682.46	33.52	5.500	0.304	17.0	0			1
JT-146	4715.98	33.97	5.500	0.304	17.0	0			1
JT-147	4749.96	34.05	5.500	0.304	17.0	0			1
JT-148	4784.01	23.27	5.500	0.304	17.0	0			1

Baker Hughes

GAMMA RAY LOG
NEUTRON LOG
DIFFERENTIAL TEMPERATURE LOG

FILE NO:

API NO: 37-017-2-0027

COMPANY NiSource (Columbia Gas of Pennsylvania)
WELL C-5
FIELD Blackhawk
COUNTY Beaver STATE PA

Version: 7.0wu1+8

LOCATION:
Twp: S. Beaver

LAT 40.775839 LONG -80.444085

OTHER SERVICES
Jcgr 4.68"
HRVRT
SBT

PERMANENT DATUM G.L. ELEVATION 1184.06 FT
LOG MEASURED FROM G.L. 0 FT ABOVE P.D.
DRILL. MEAS. FROM N/A

ELEVATIONS:
KB N/A
DF N/A
GL 1184.06 FT

DATE		29-Jul-2020			
RUN	TRIP	1	1		
SERVICE ORDER		US169779			
DEPTH DRILLER		4909 FT			
DEPTH LOGGER		4827 FT			
BOTTOM LOGGED INTERVAL		4827 FT			
TOP LOGGED INTERVAL		0 FT			
TIME STARTED		12:00			
TIME FINISHED		14:45			
OPERATOR RIG TIME		2.75 Hrs			
TYPE OF FLUID IN HOLE		Brine			
FLUID DENSITY		10 LB/G			
FLUID SALINITY		N/A			
FLUID LEVEL		645 FT			
LOGGED CEMENT TOP		N/A			
WELLHEAD PRESSURE		0 PSI			
MAXIMUM HOLE DEVIATION		0 DEG			
NOMINAL LOGGING SPEED		45 F/MN			
MAX. RECORDED TEMP.		135 DEGF			
REFERENCE LOG		N/A			
REFERENCE LOG DATE		N/A			
EQUIP. NO.	LOCATION	9717	Buckhannon		
RECORDED BY		J. Moczygemba			
WITNESSED BY		Dave Reynolds			

CASING RECORD

SIZE	WEIGHT	GRADE	FROM	TO
5.5 IN	17 LB/F	J-55	0 FT	4895 FT
8.625 IN	24 LB/F	J-55	0 FT	1157 FT

BOREHOLE RECORD

BIT SIZE	FROM	TO

REMARKS

RUN 1 TRIP 1: Crew on location: J. Moczygemba, H. Raza, M. Marsh, E. Deleon
Jcgr 4.68" ran to 4823', where it sat down
Sunny day, 90 degf
OST: 90 degf
BHT: 135 degf
THT: 68 degf
Zeroed on G.L.
Fluid found at 645'
Wellhead connection: 5.5" 8rd

EQUIPMENT DATA

RUN	TRIP	TOOL	SERIES NO	SERIAL NO	POSITION
1	1	GRNT	2461NA	14576702	Free

MAIN LOG 2"/100ft Scale

ECLIPS 7.0wu1 PC-ECLIPS General Release Rel 7.0w Update 1 Wed Jul 25 15:19:34 Central Daylight Time 2018
Patches: 8

Plotted: Wed Jul 29 14:46:58 2020

PARAMETER AND FILTER SUMMARY REPORT

FILE: C:\dat1a\Nisource_Blackhawk_C-5_GRNT_US169779_072920\p310b02.prm
LOGGING MODE: DEPTH DIRECTION: DOWN
TOP DEPTH: -4.000 ft BOTTOM DEPTH: 4823.250 ft

SYMMETRIC FILTER

MEASUREMENT TYPE	PARAMETER	VALUE	UNITS	INTERVAL (ft)	
GR	FILTER ()	medium (1)		TOP	BOTTOM
TEMP	FILTER ()	medium (1)		"	"
DIELECTRIC	FILTER ()	medium (1)		"	"

CCL PROCESSING

MEASUREMENT TYPE	PARAMETER	VALUE	UNITS	INTERVAL (ft)	
CCL FLOOR	CCL FLOOR	90.00 100.00		TOP 295.500	295.500 BOTTOM
CCL BASELINE	SET CCL BASELINE			TOP	BOTTOM

CURVE DESCRIPTION REPORT

CURVE NAME	CREATION DATE	CURVE DESCRIPTION
F1:CCL	Jul 29 12:09:50 2020	CASING COLLAR LOCATOR
F1:DTEMP	Jul 29 12:09:50 2020	DIFFERENTIAL TEMPERATURE
F1:GR	Jul 29 12:09:50 2020	GAMMA RAY
F1:NEU	Jul 29 12:09:50 2020	SINGLE DETECTOR NEUTRON
F1:TEMP	Jul 29 12:09:50 2020	TEMPERATURE

CURVE MEASURE POINT OFFSET

CURVE	OFFSET (ft)	CURVE	OFFSET (ft)	CURVE	OFFSET (ft)	CURVE	OFFSET (ft)
CCL	-4.50	GR	-7.75	TEMP	-1.25		
DTEMP	-1.25	NEU	-1.25				

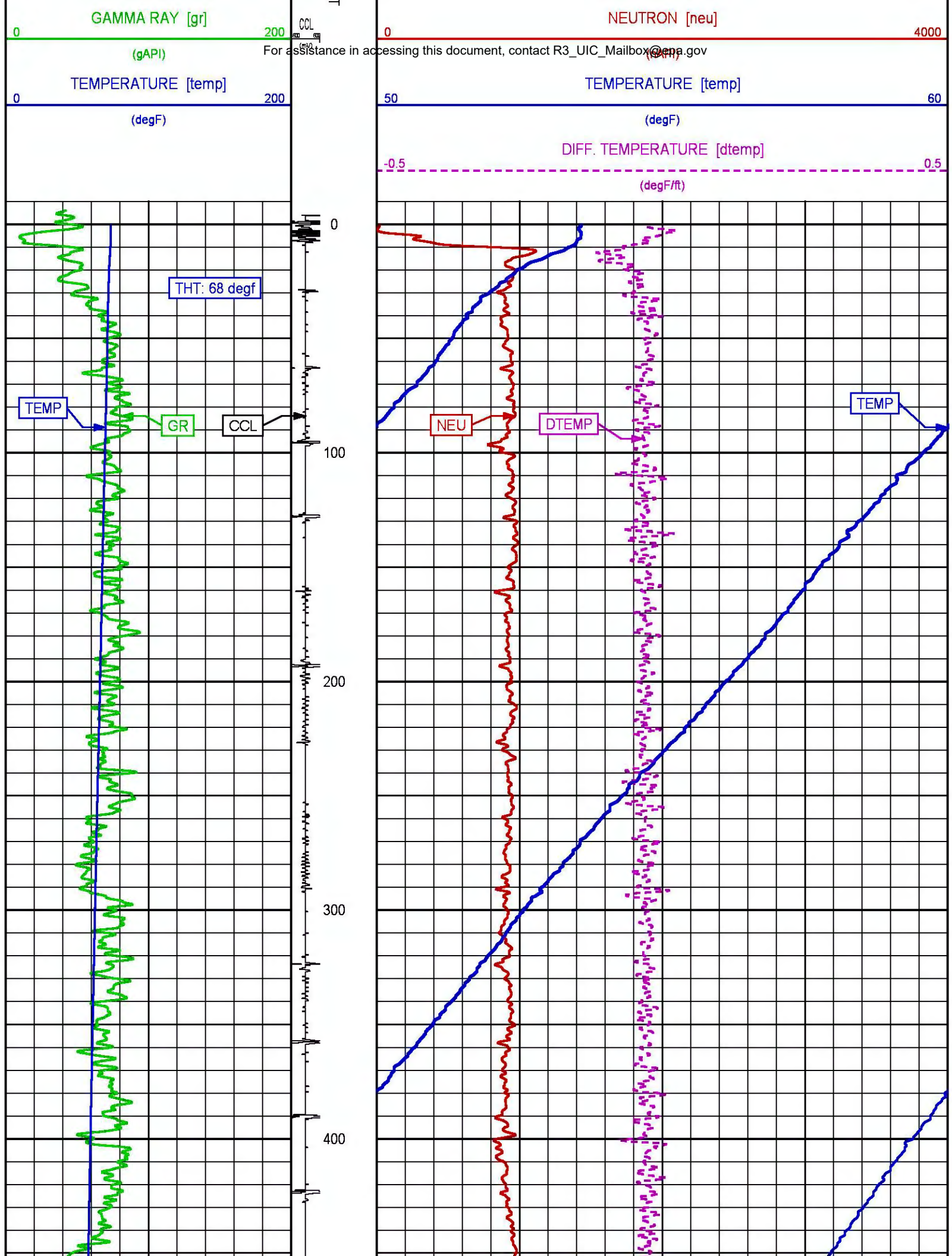
Presentation : BAKER-75650:C:\dat1a\Nisource_Blackhawk_C-5_GRNT_US169779_072920\main2.fvpdf [2"/100' Scale]
Plot Interval : -6 - 4826.5 Feet

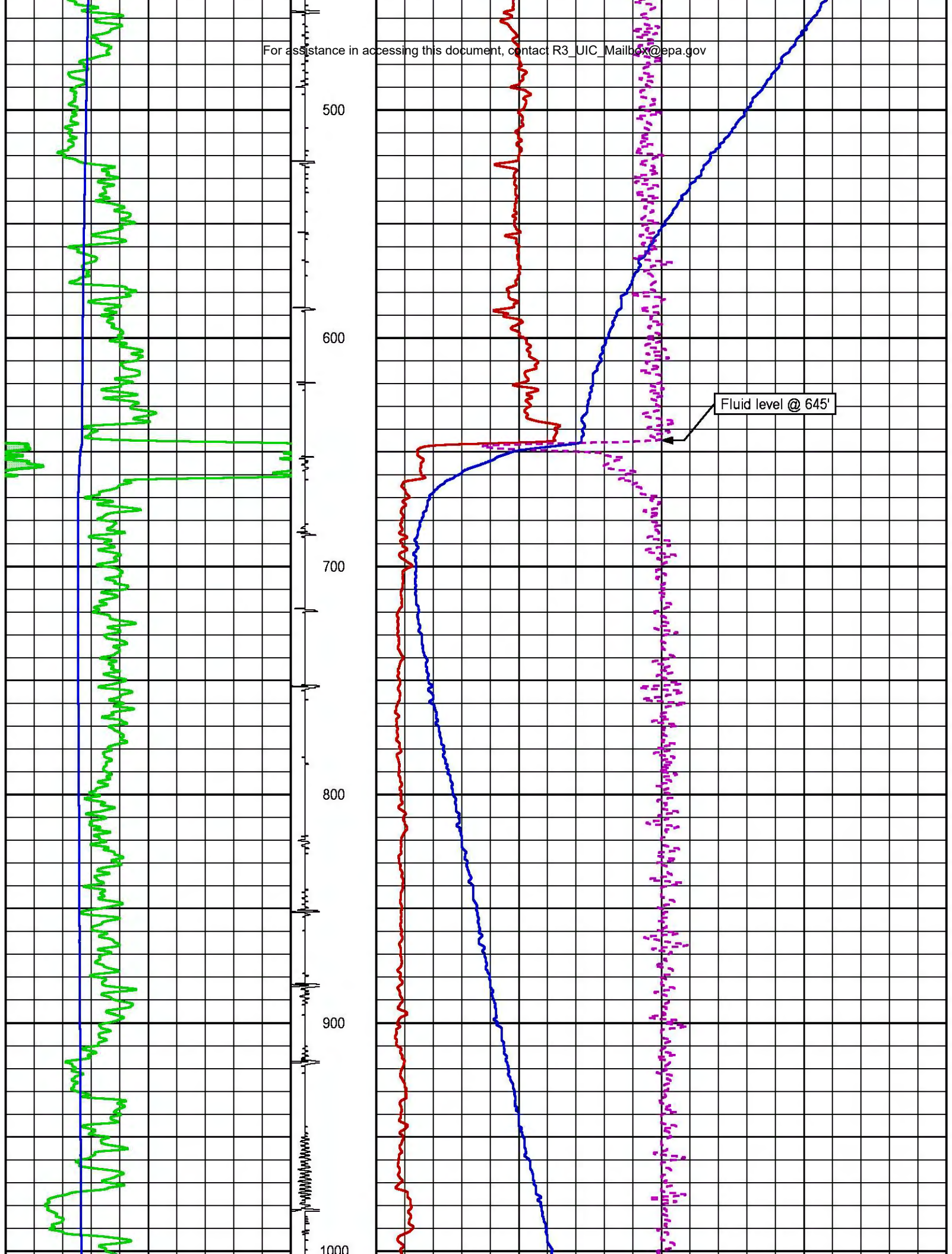
Data File 1 : F1 : BAKER-75650:C:\dat1a\Nisource_Blackhawk_C-5_GRNT_US169779_072920\main.xtf
Created On : Jul 29 12:09:50 2020
Company : NiSource
Well : C-5
Field : Blackhawk
File Interval : -6 - 4827.75 Feet
OCT : p310b

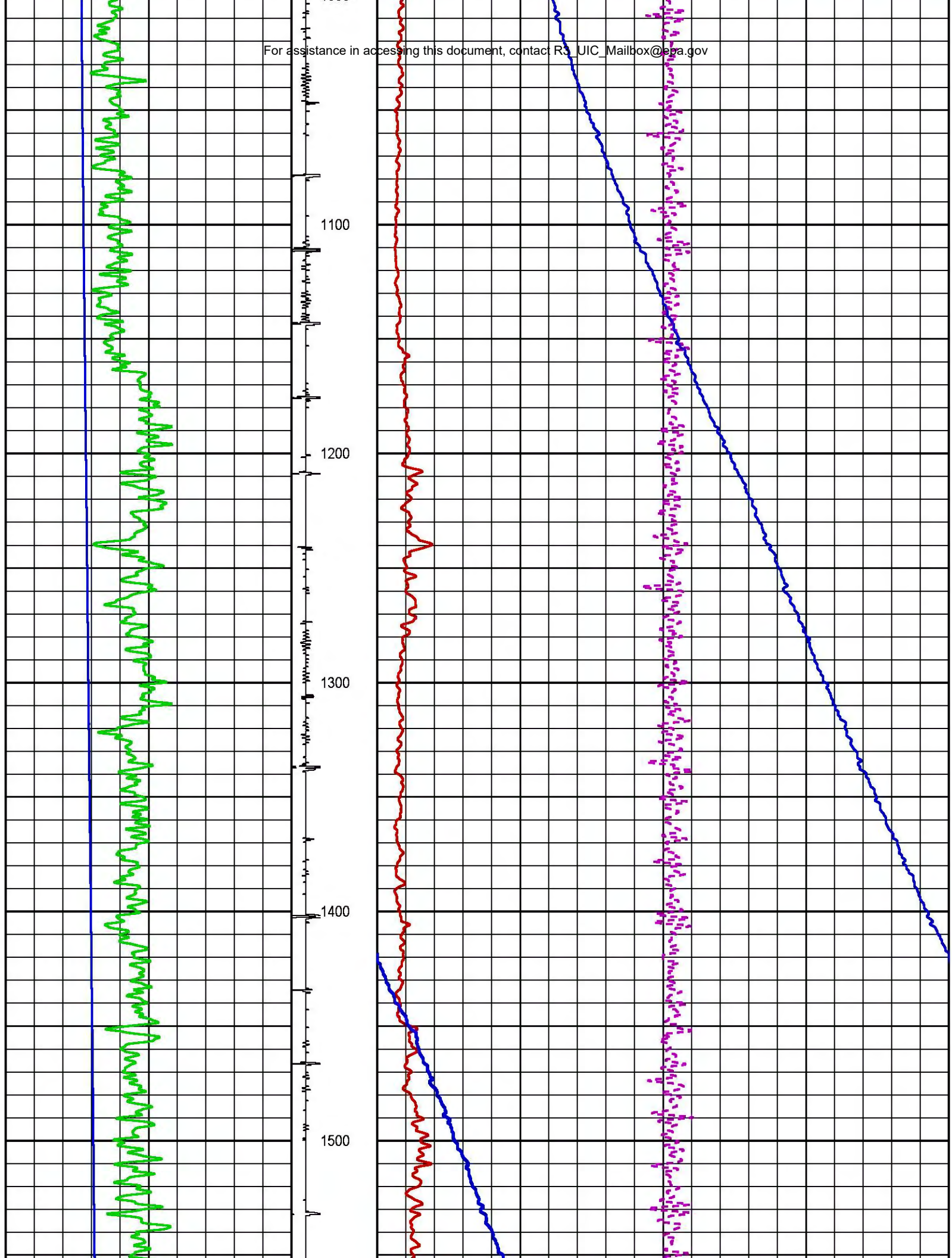
GR BACKUP

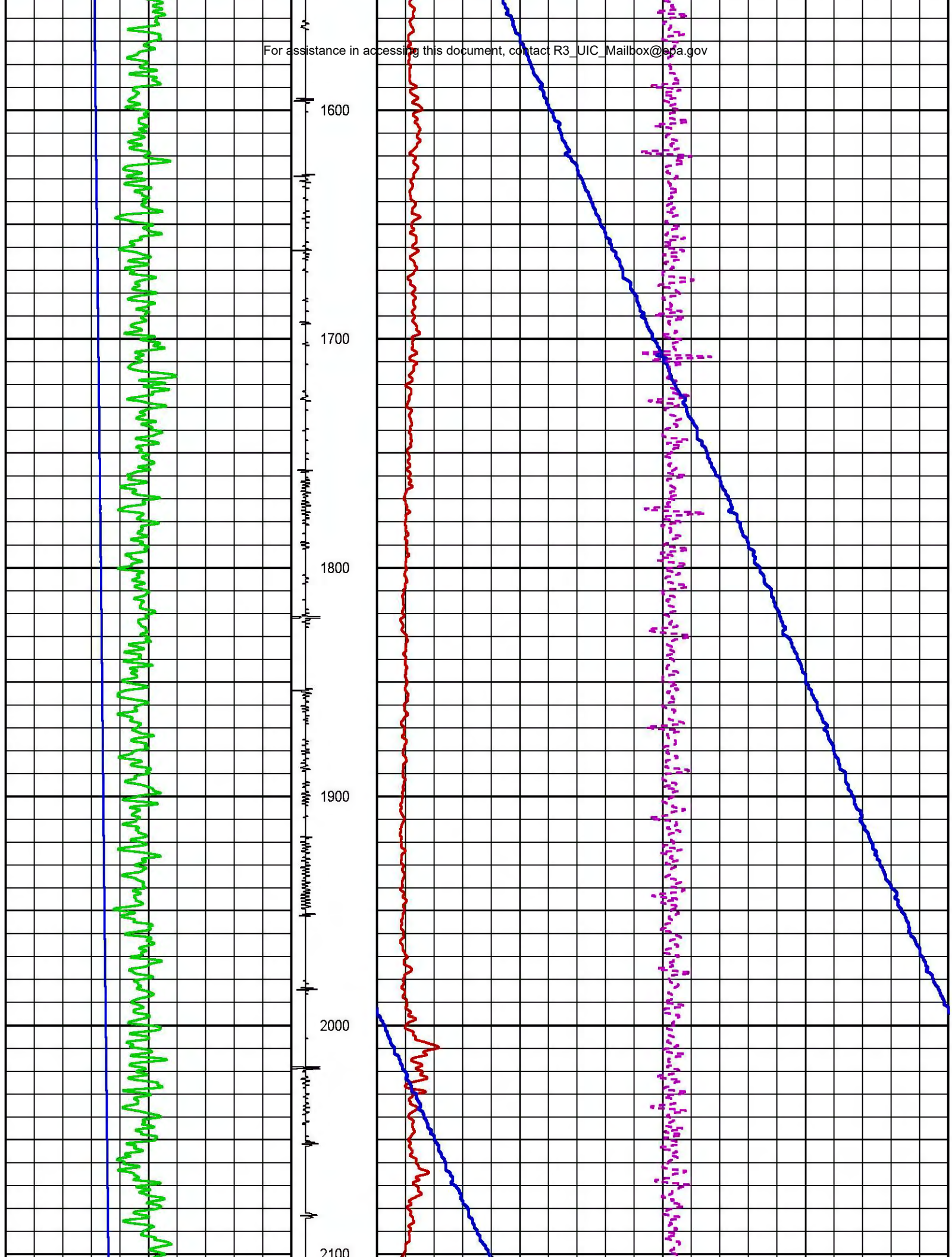
FEET

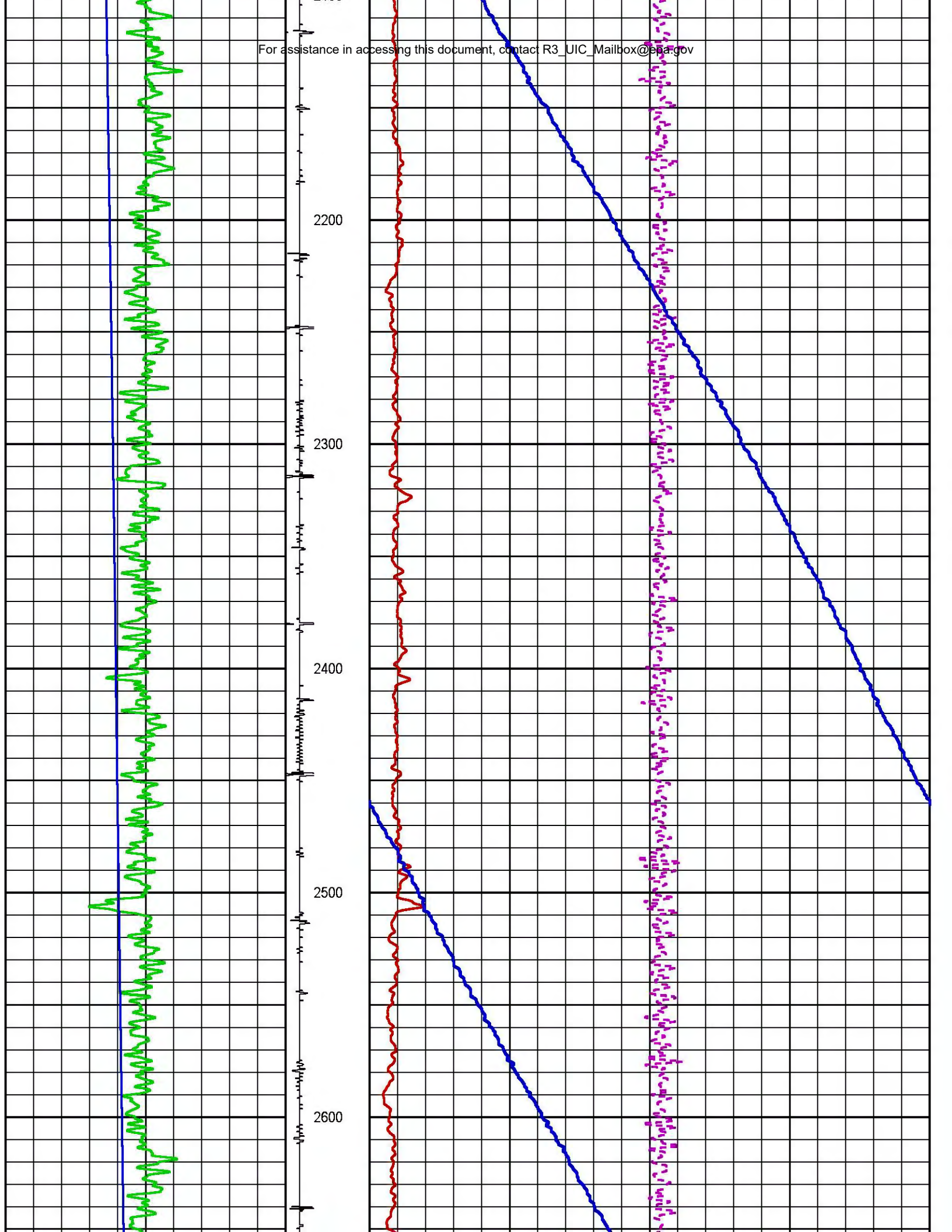
NEU BACKUP

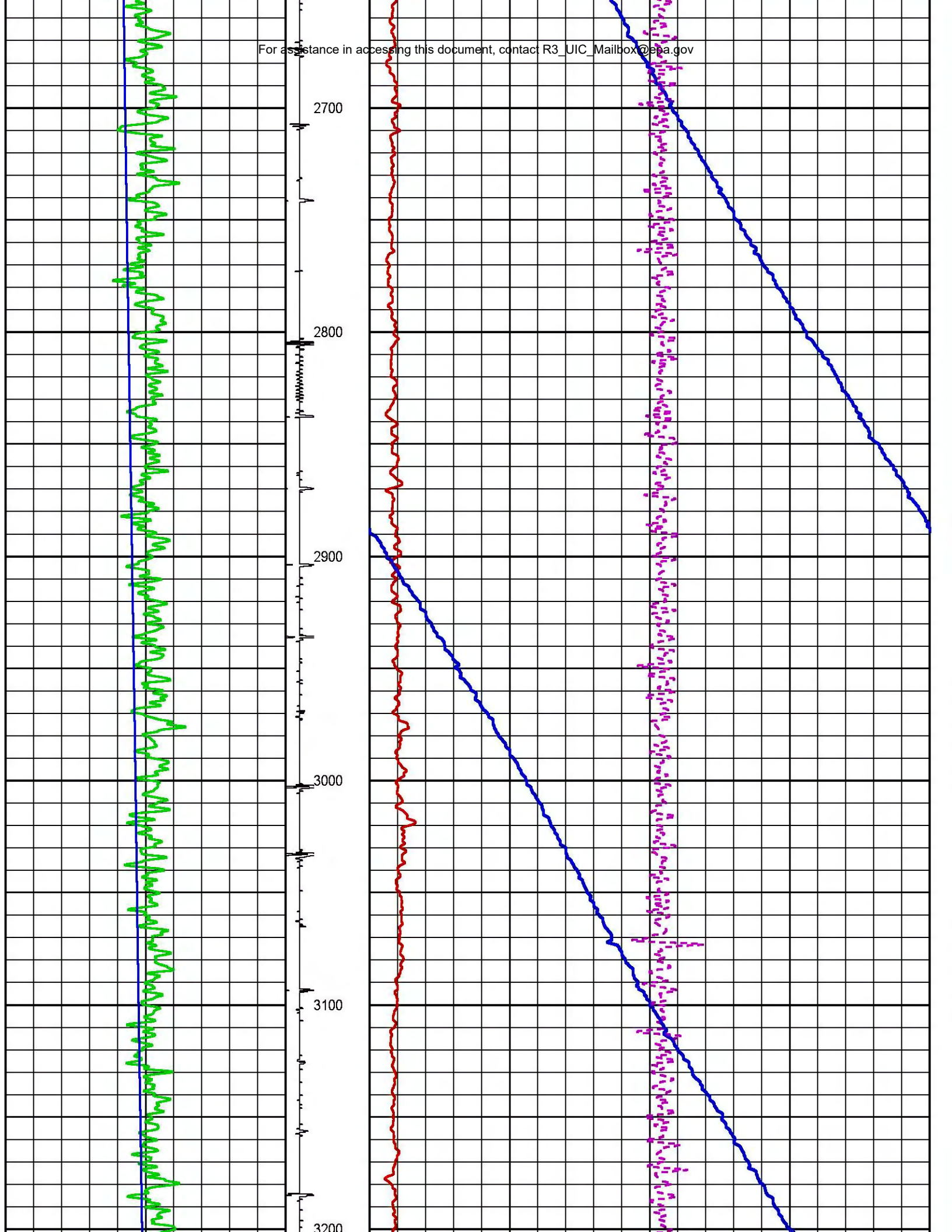


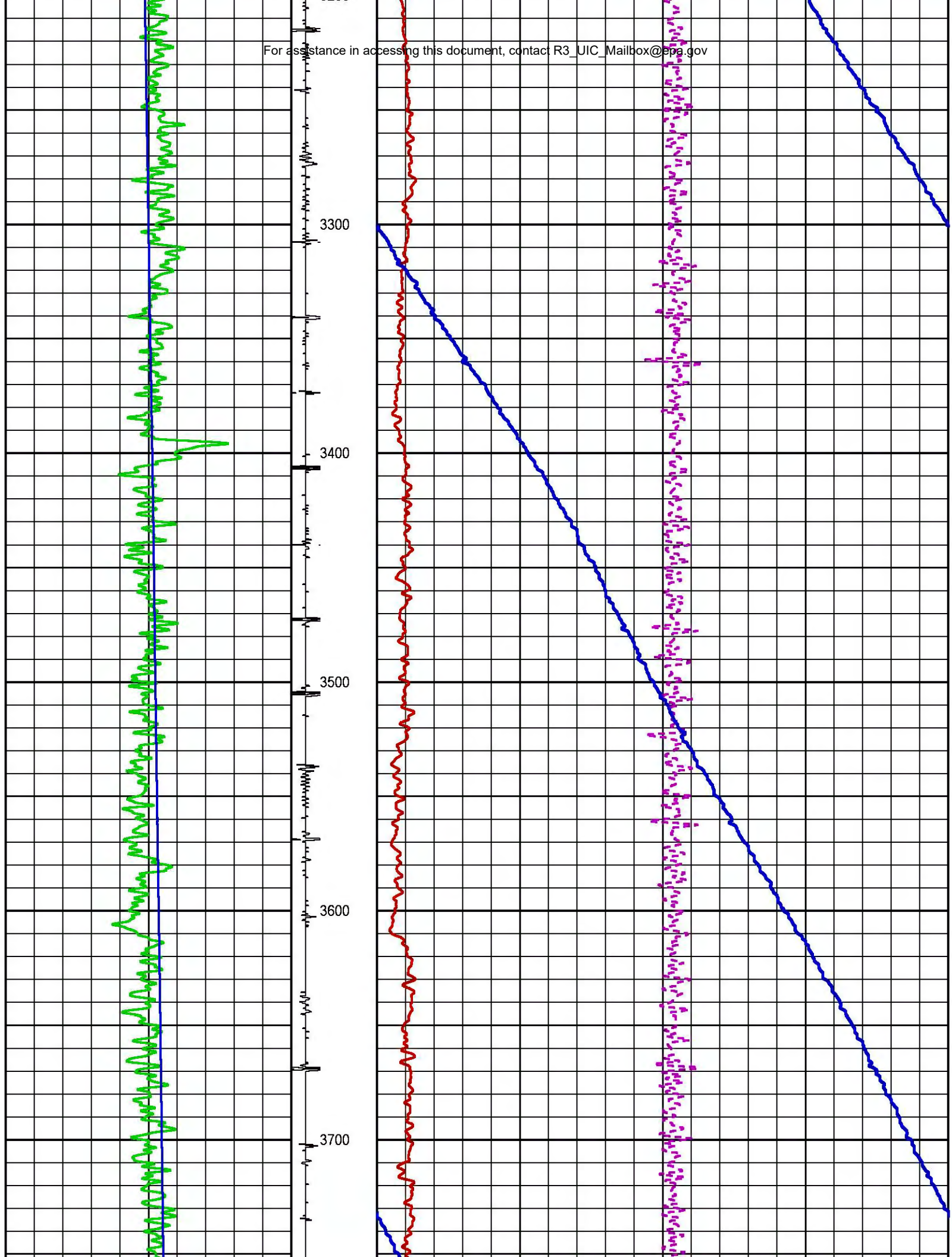


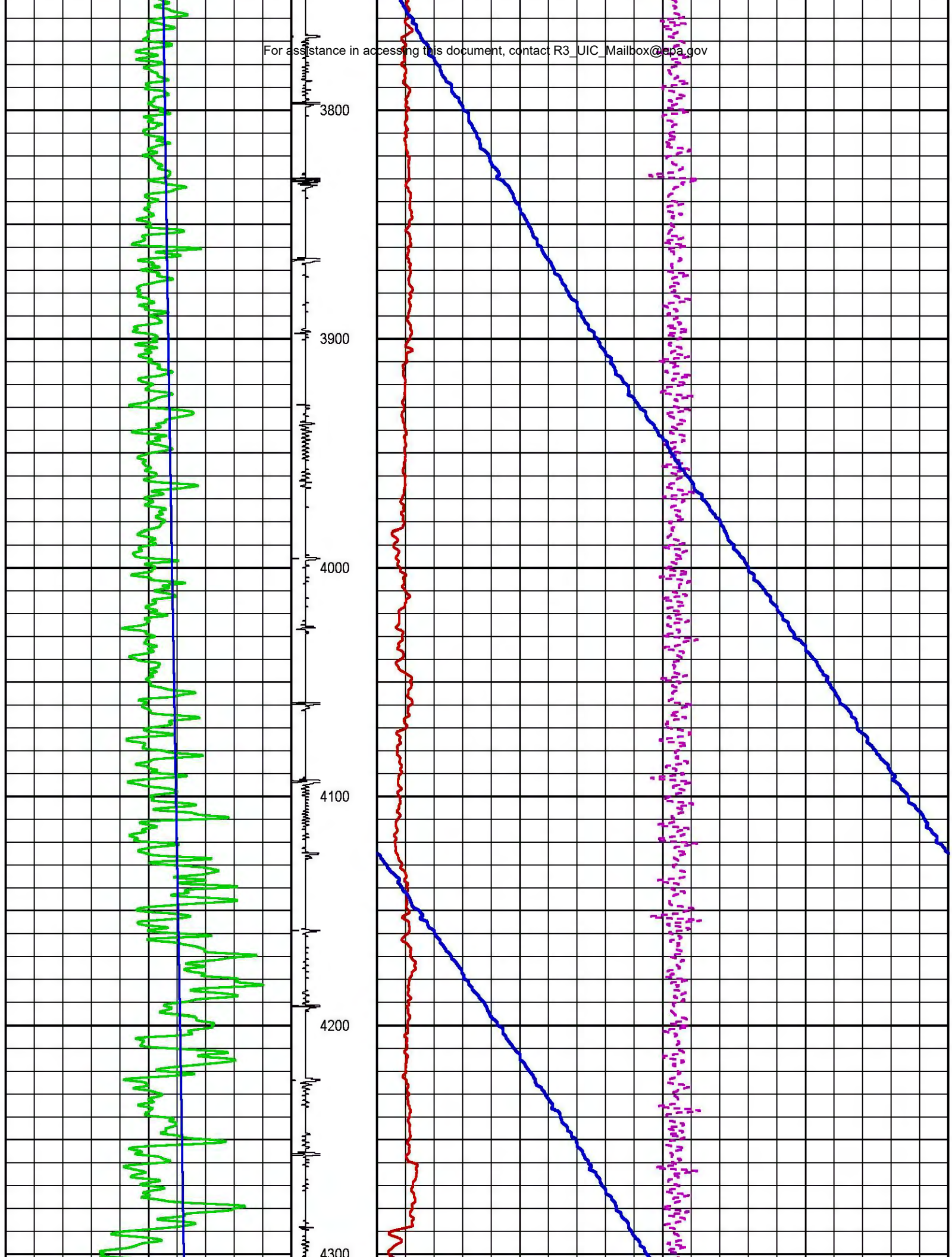


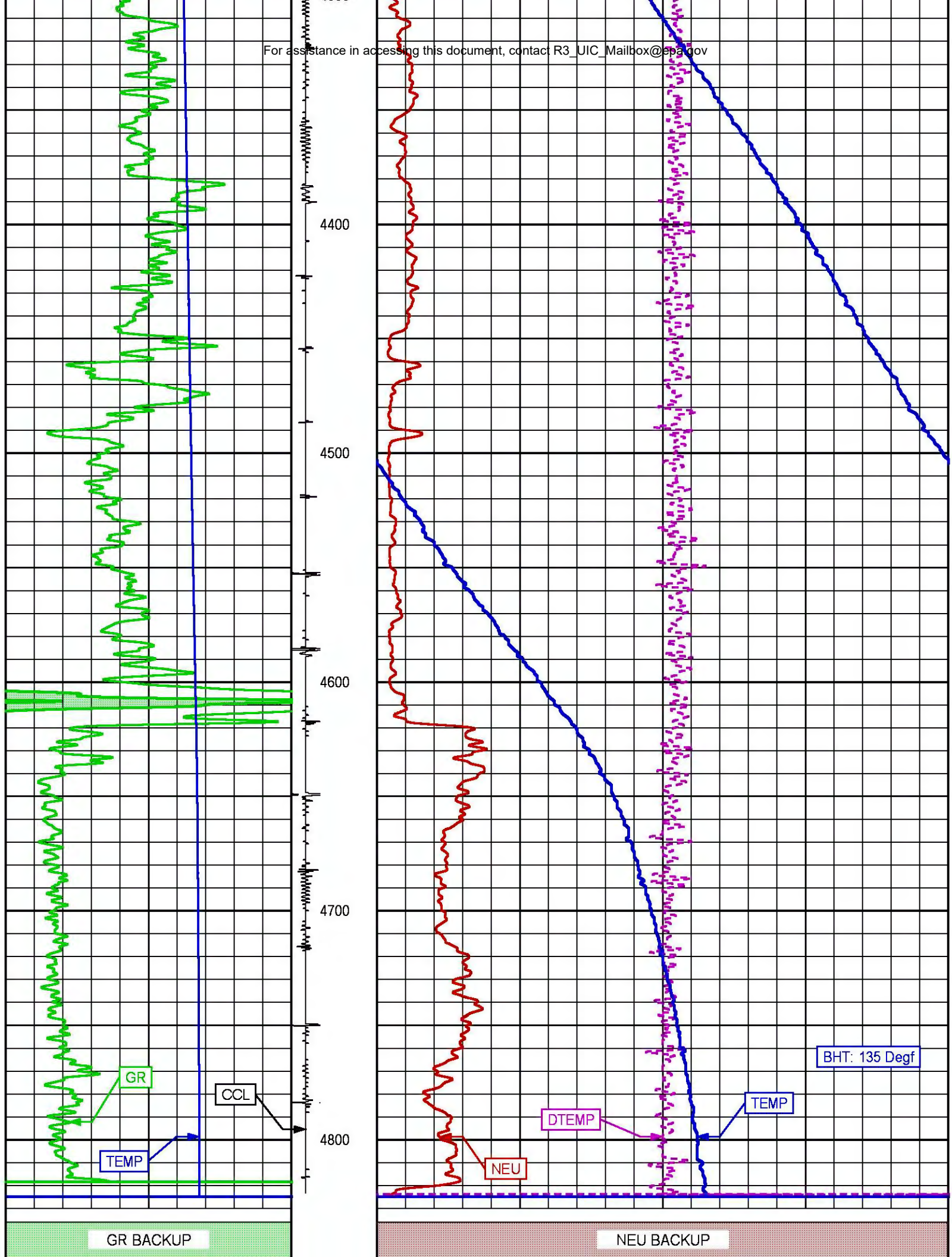


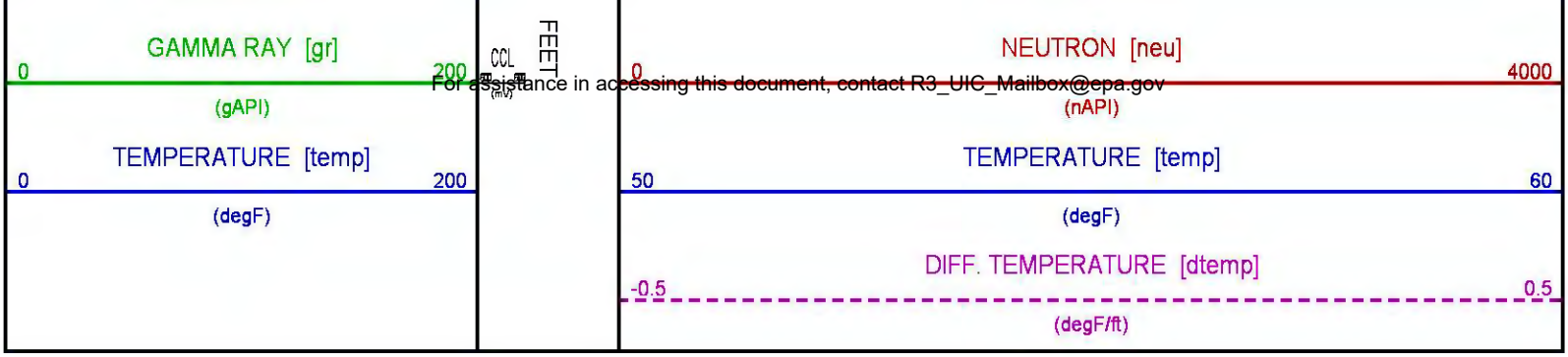












MAIN LOG 5"/100ft Scale

ECLIPS 7.0wu1 PC-ECLIPS General Release Rel 7.0w Update 1 Wed Jul 25 15:19:34 Central Daylight Time 2018
Patches: 8

Plotted: Wed Jul 29 14:24:36 2020

PARAMETER AND FILTER SUMMARY REPORT

FILE: C:\dat1a\Nisource_Blackhawk_C-5_GRNT_US169779_072920\p310b02.prm
LOGGING MODE: DEPTH DIRECTION: DOWN
TOP DEPTH: -4.000 ft BOTTOM DEPTH: 4823.250 ft

SYMMETRIC FILTER

MEASUREMENT TYPE	PARAMETER	VALUE	UNITS	INTERVAL (ft)	
GR	FILTER ()	medium (1)		TOP	BOTTOM
TEMP	FILTER ()	medium (1)		"	"
DIELECTRIC	FILTER ()	medium (1)		"	"

CCL PROCESSING

MEASUREMENT TYPE	PARAMETER	VALUE	UNITS	INTERVAL (ft)	
CCL FLOOR	CCL FLOOR	90.00 100.00		TOP 295.500	295.500 BOTTOM
CCL BASELINE	SET CCL BASELINE			TOP	BOTTOM

CURVE DESCRIPTION REPORT

CURVE NAME	CREATION DATE	CURVE DESCRIPTION
F1:CCL	Jul 29 12:09:50 2020	CASING COLLAR LOCATOR
F1:DTEMP	Jul 29 12:09:50 2020	DIFFERENTIAL TEMPERATURE
F1:GR	Jul 29 12:09:50 2020	GAMMA RAY
F1:NEU	Jul 29 12:09:50 2020	SINGLE DETECTOR NEUTRON
F1:TEMP	Jul 29 12:09:50 2020	TEMPERATURE

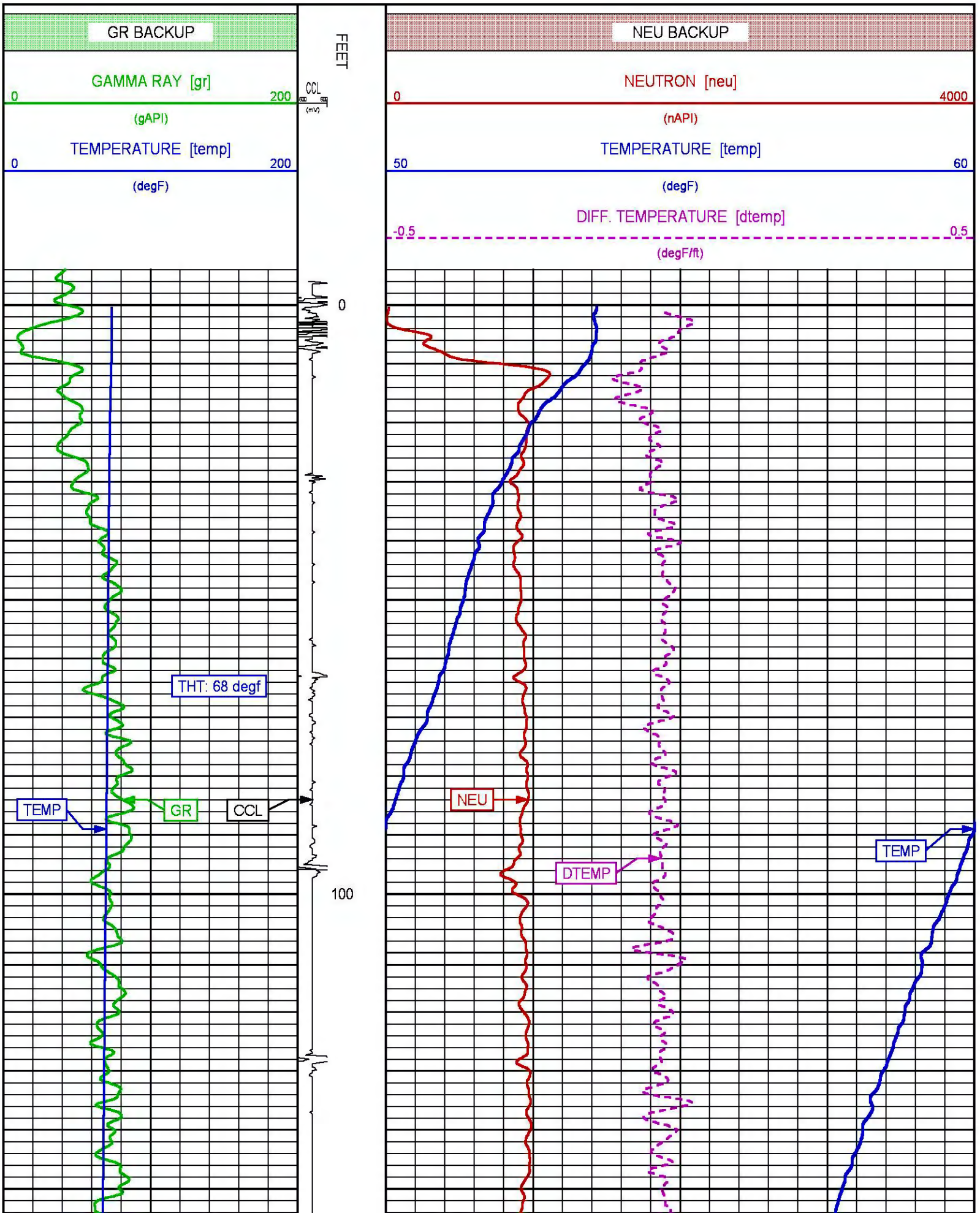
CURVE MEASURE POINT OFFSET

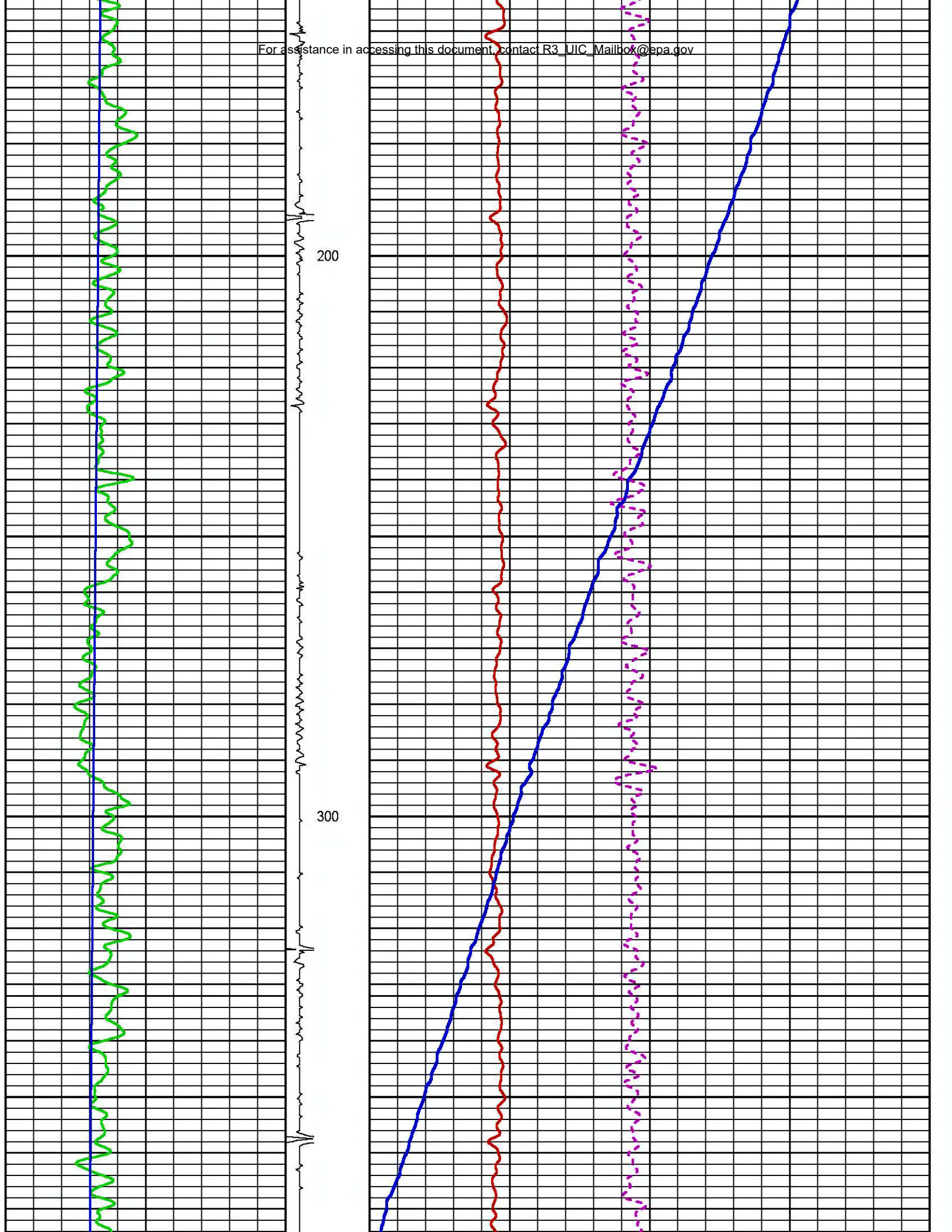
CURVE	OFFSET (ft)	CURVE	OFFSET (ft)	CURVE	OFFSET (ft)	CURVE	OFFSET (ft)
CCL	-4.50	GR	-7.75	TEMP	-1.25		
DTEMP	-1.25	NEU	-1.25				

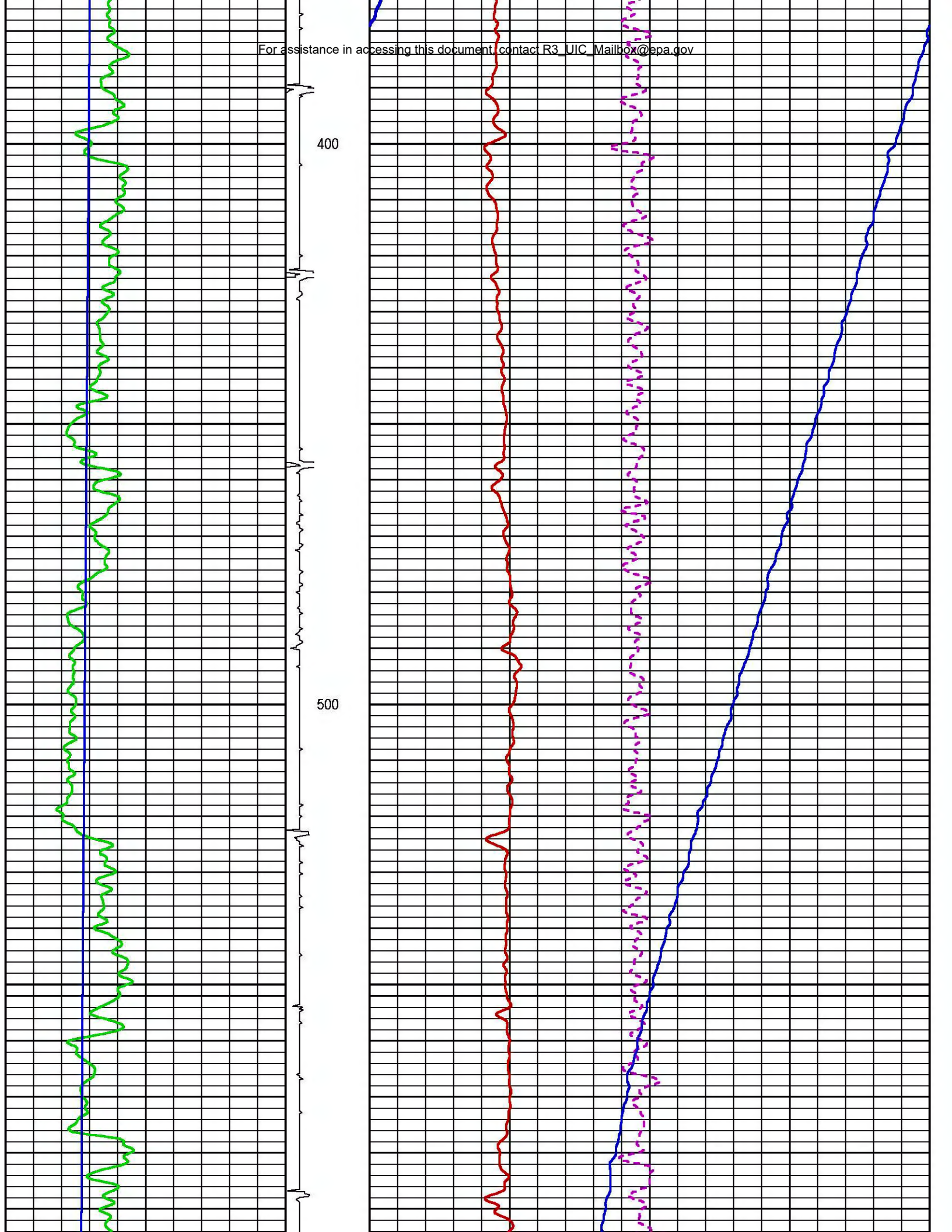
Presentation : BAKER-75650:C:\dat1a\Nisource_Blackhawk_C-5_GRNT_US169779_072920\main5.fvpdf [5"/100' Scale]
Plot Interval : -6 - 4826.5 Feet

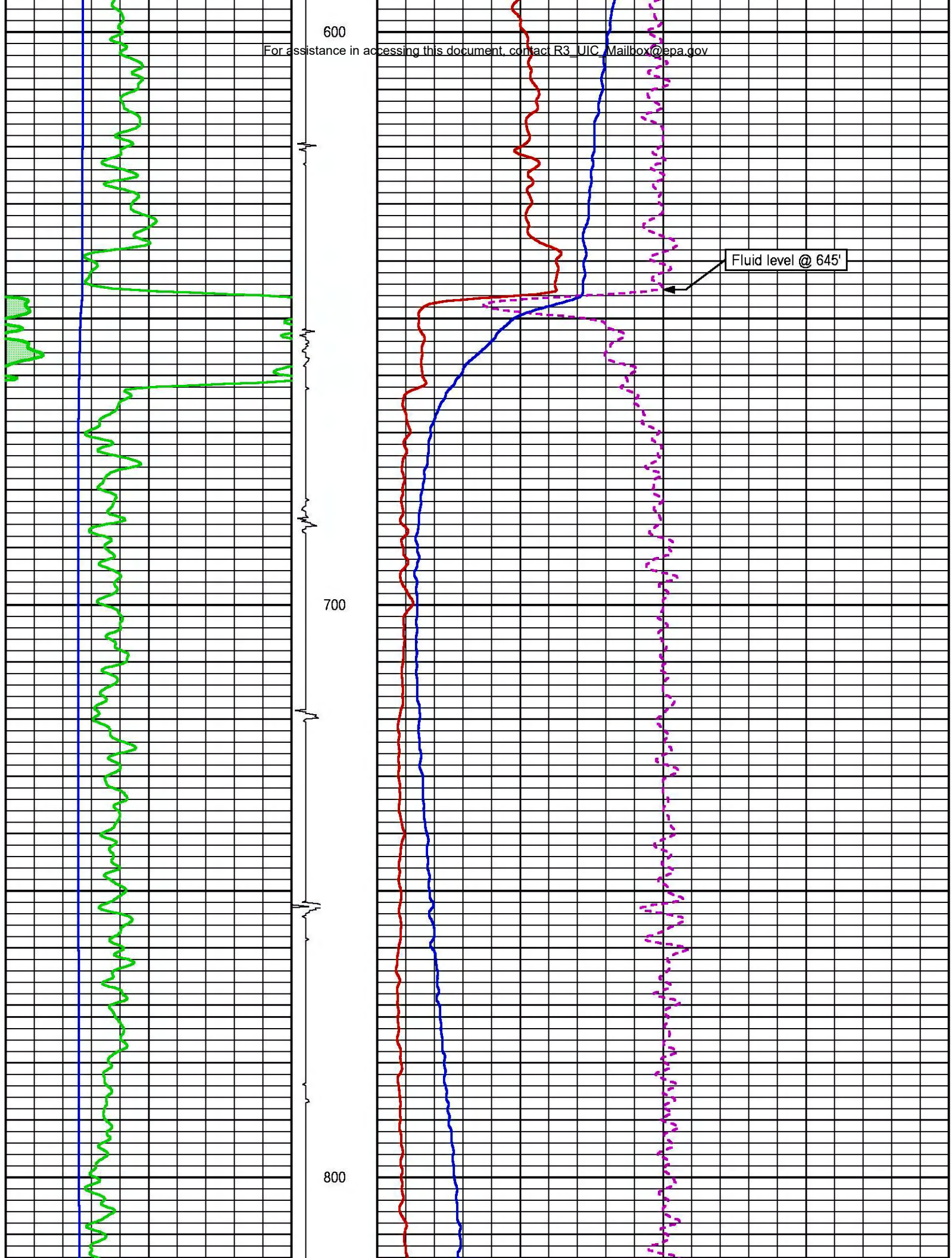
Data File 1 : F1 : BAKER-75650:C:\dat1a\Nisource_Blackhawk_C-5_GRNT_US169779_072920\main.xtf
Created On : Jul 29 12:09:50 2020
Company : NiSource

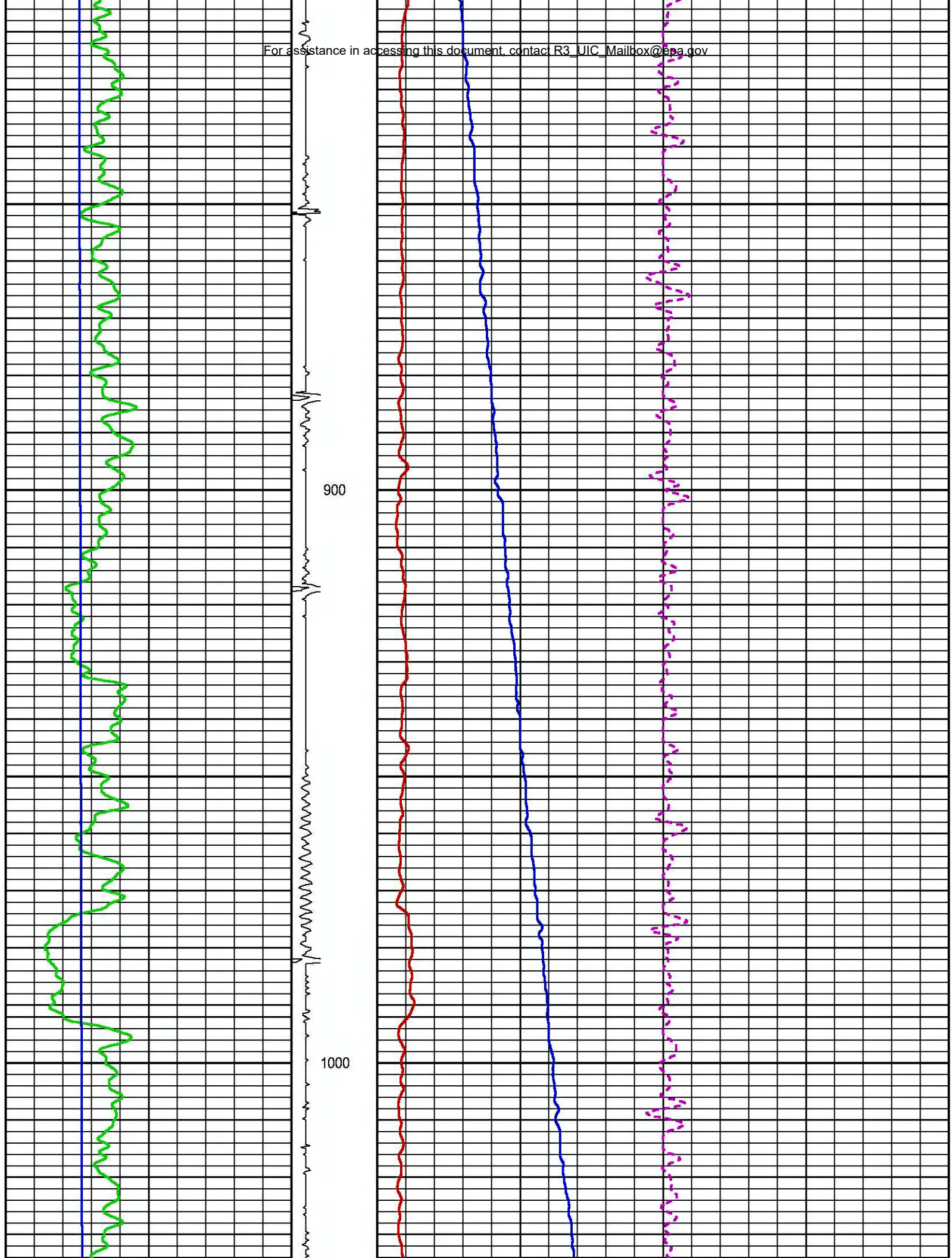
Well : C-5
Field : Blackhawk
File Interval : -6 - 4827.75 Feet
OCT : p310b

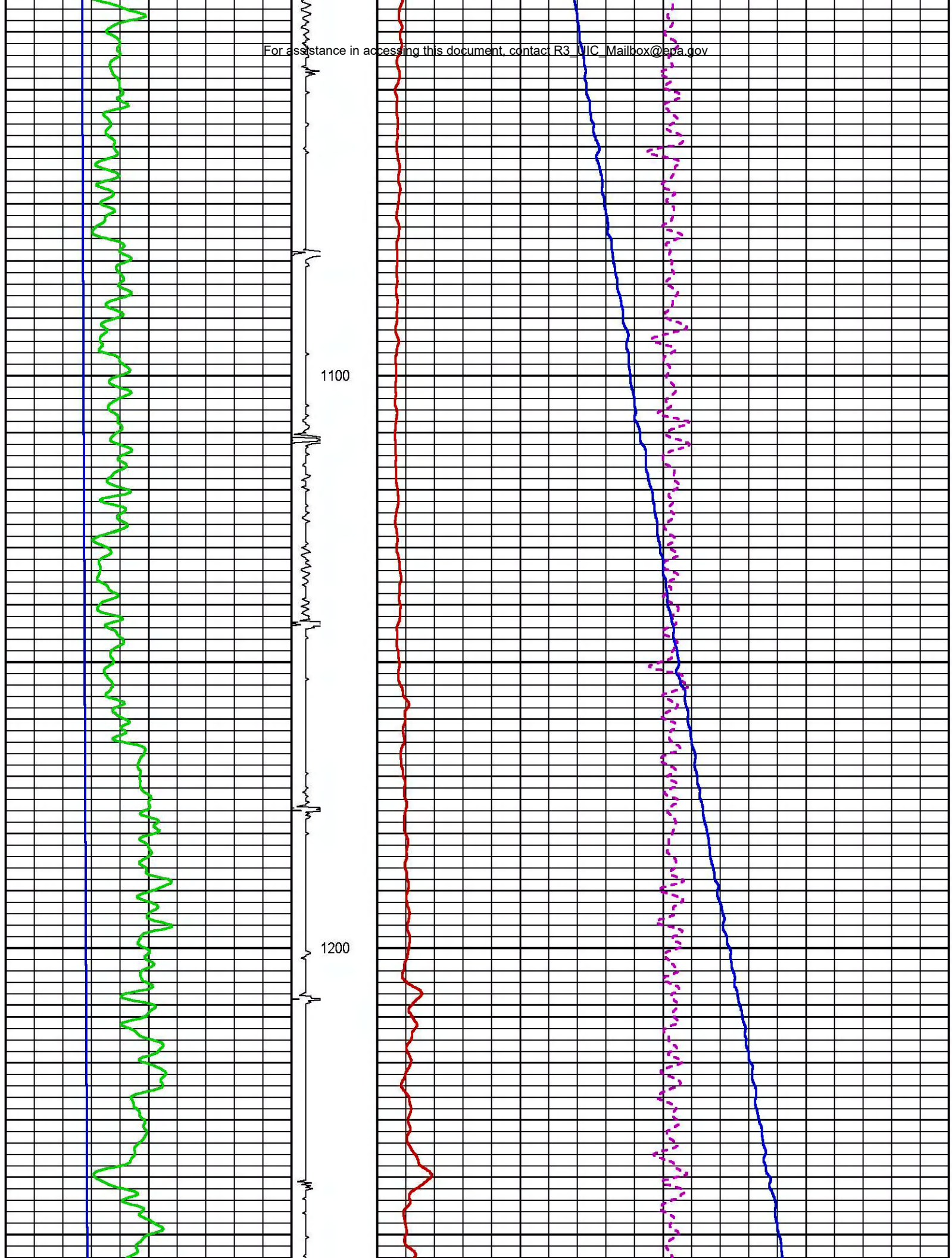


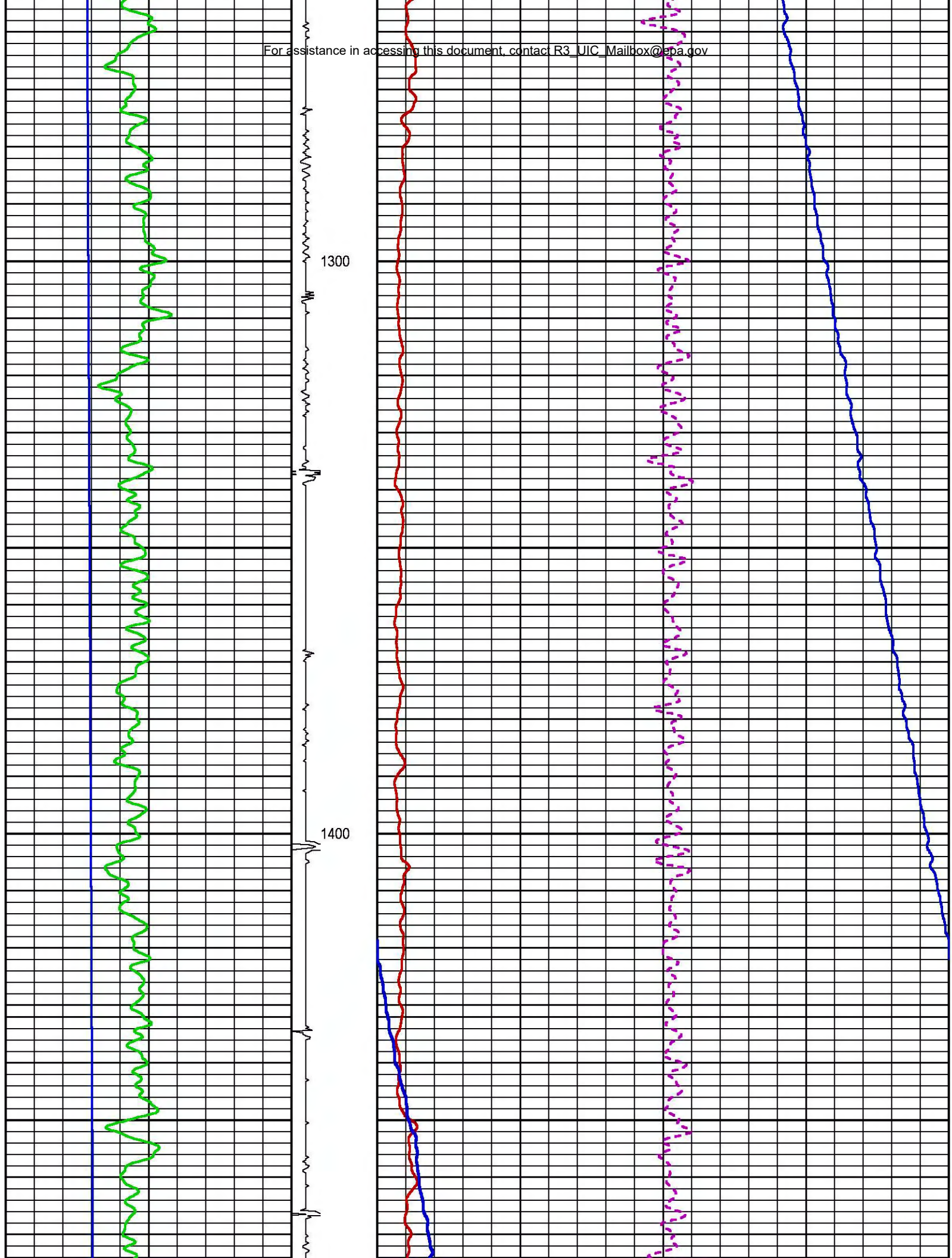


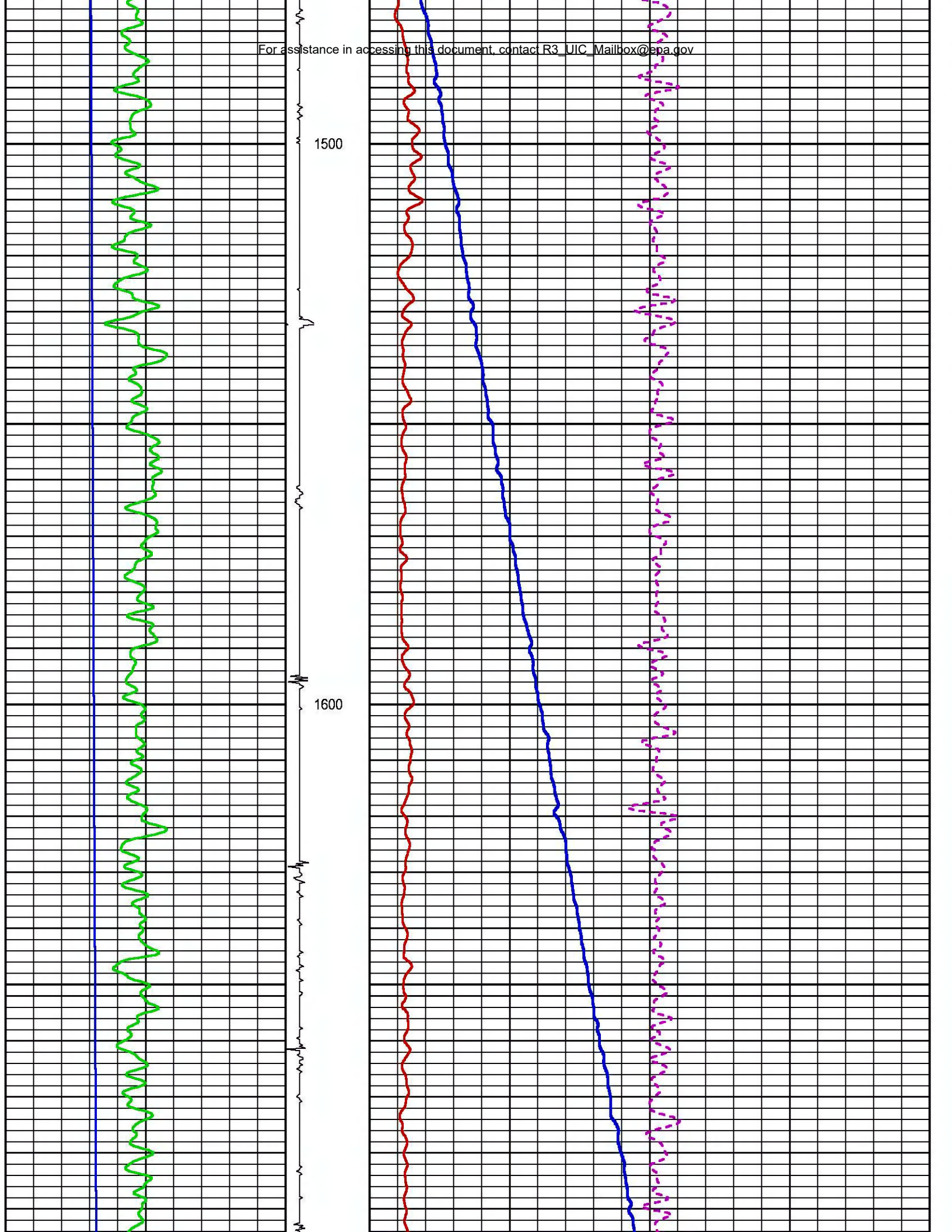


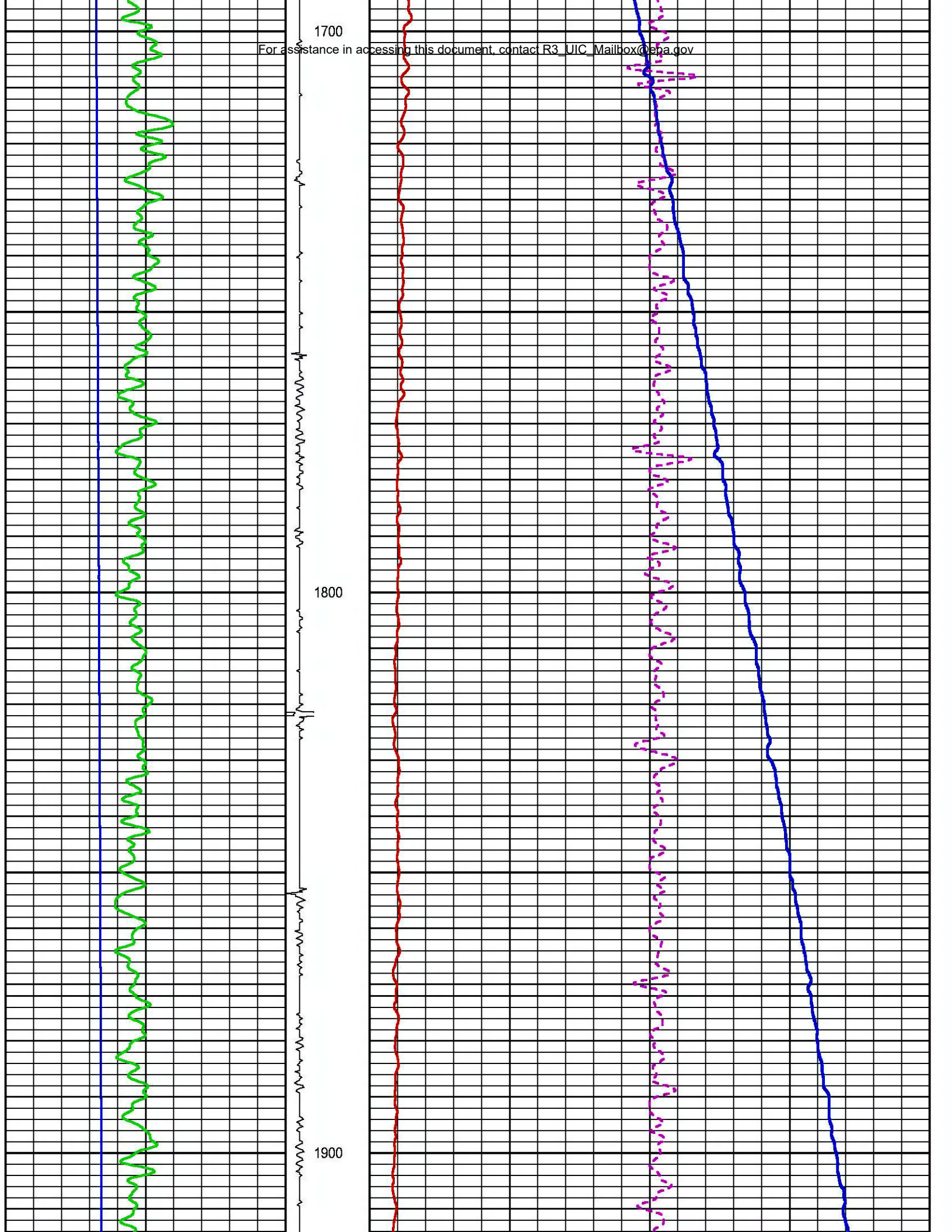


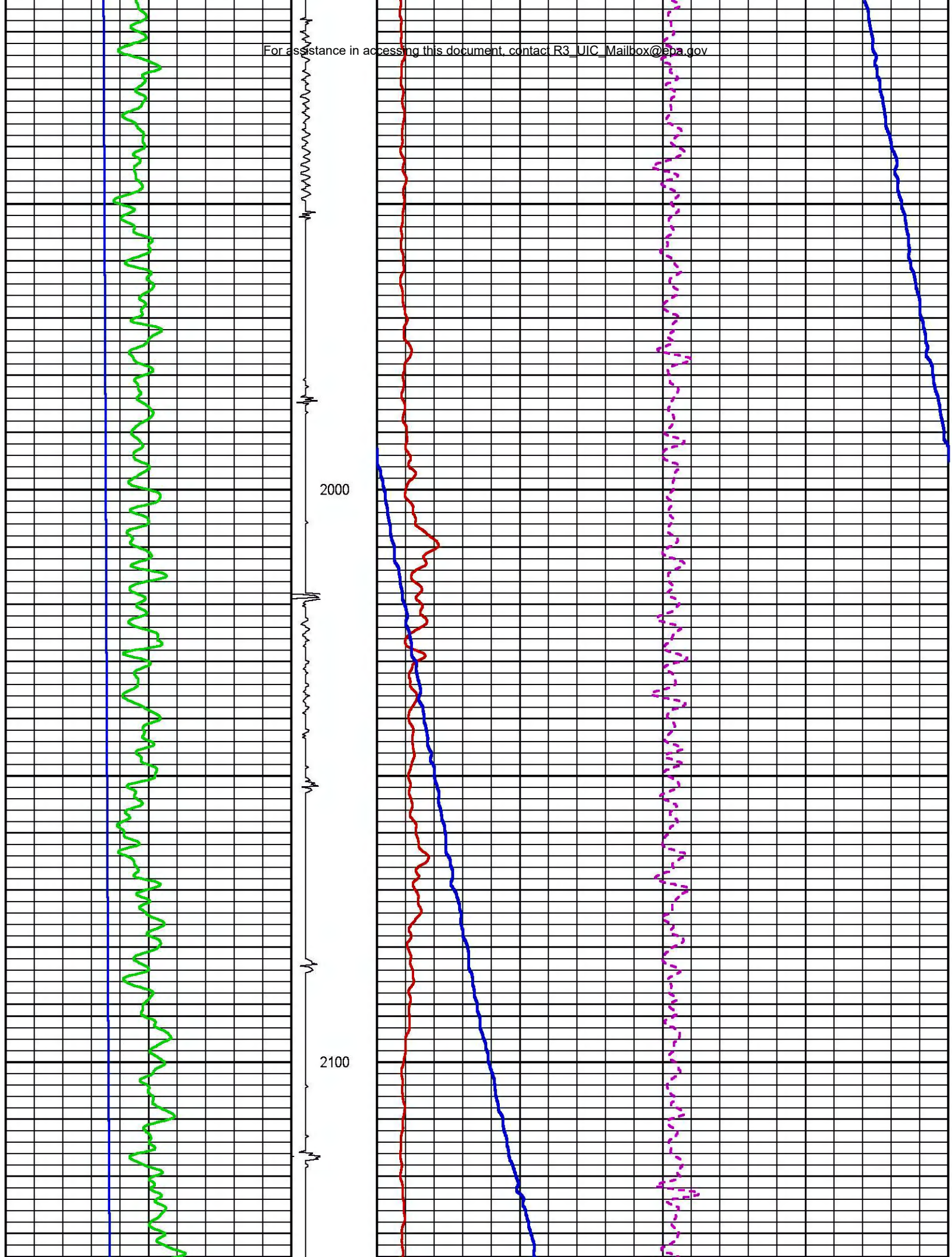


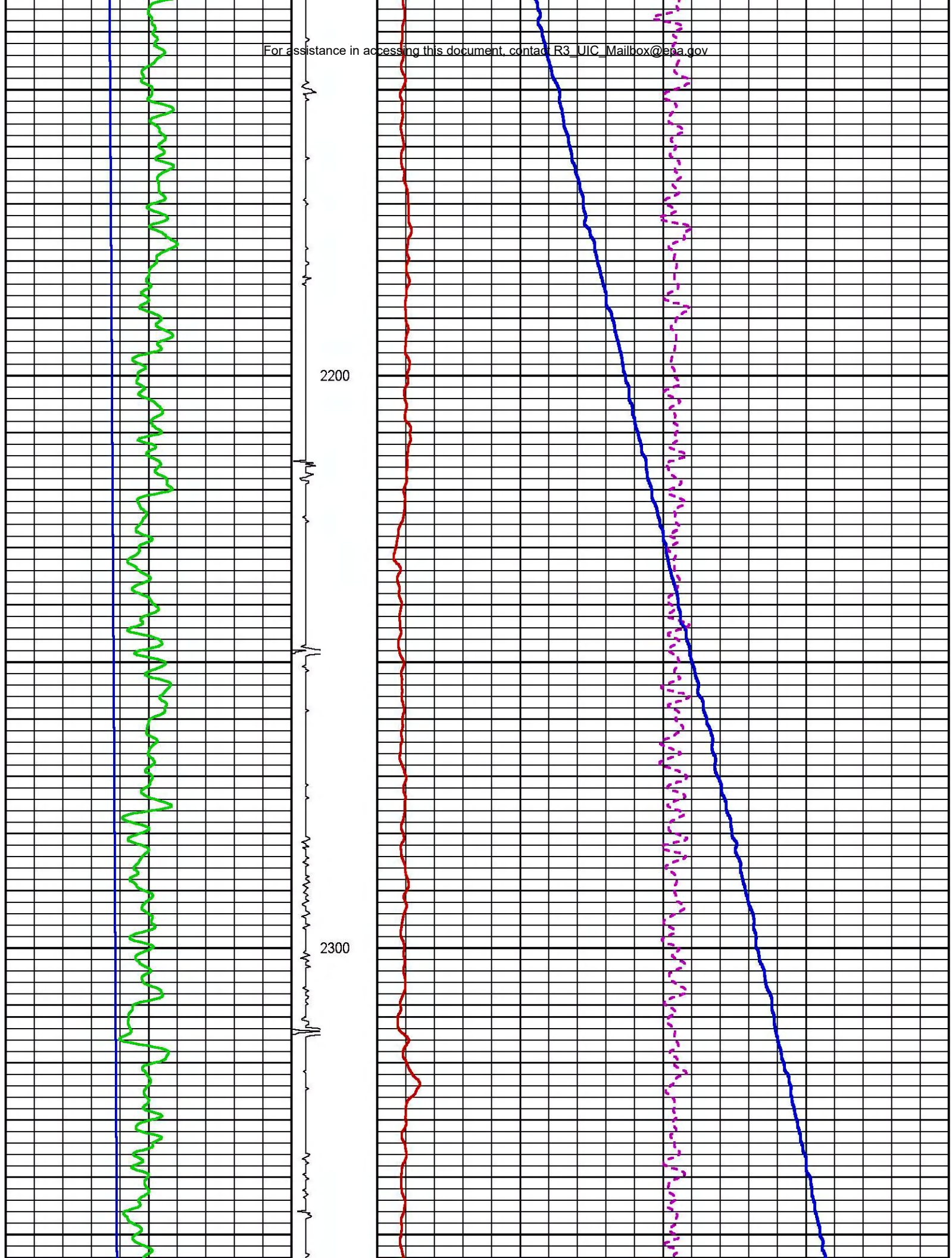


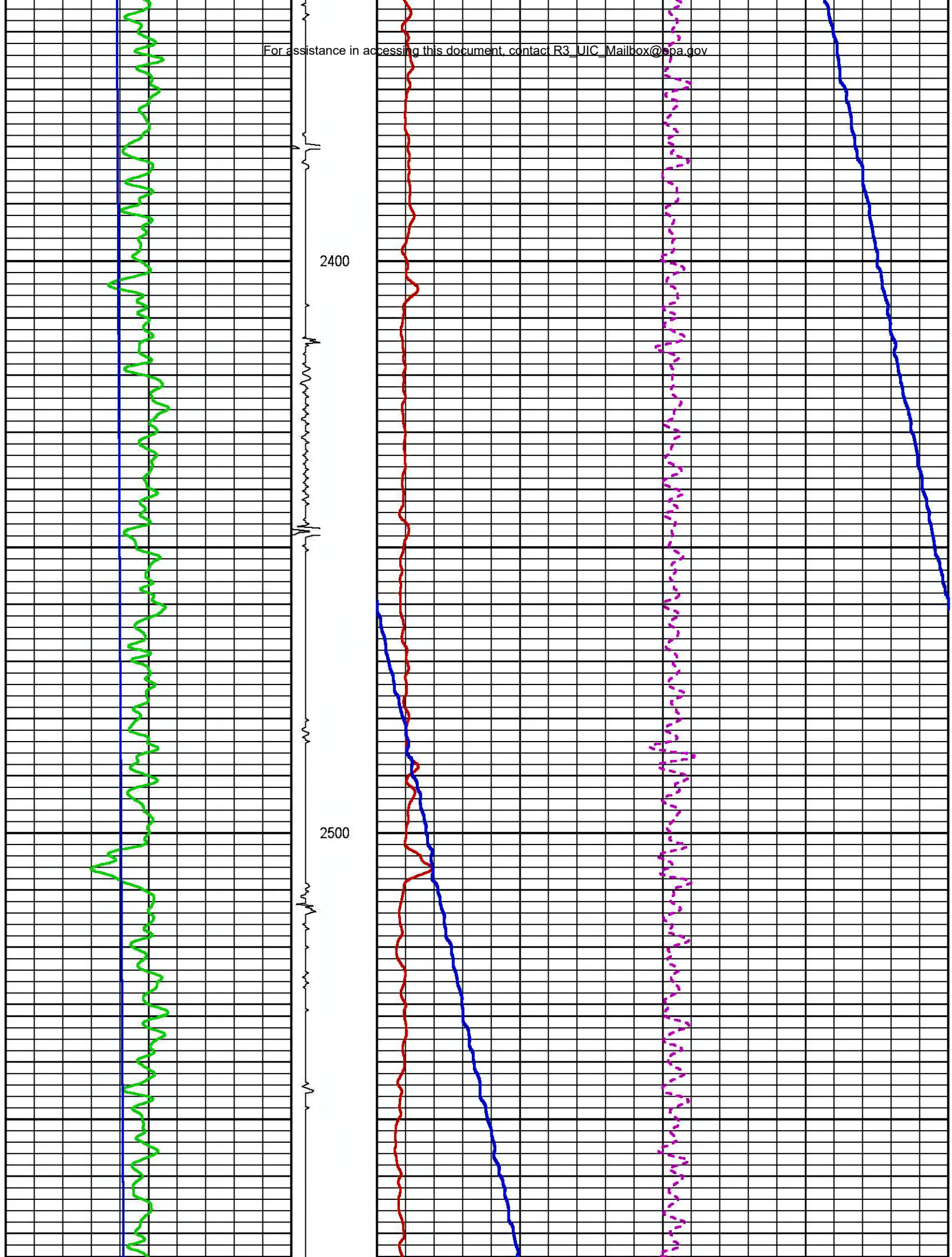


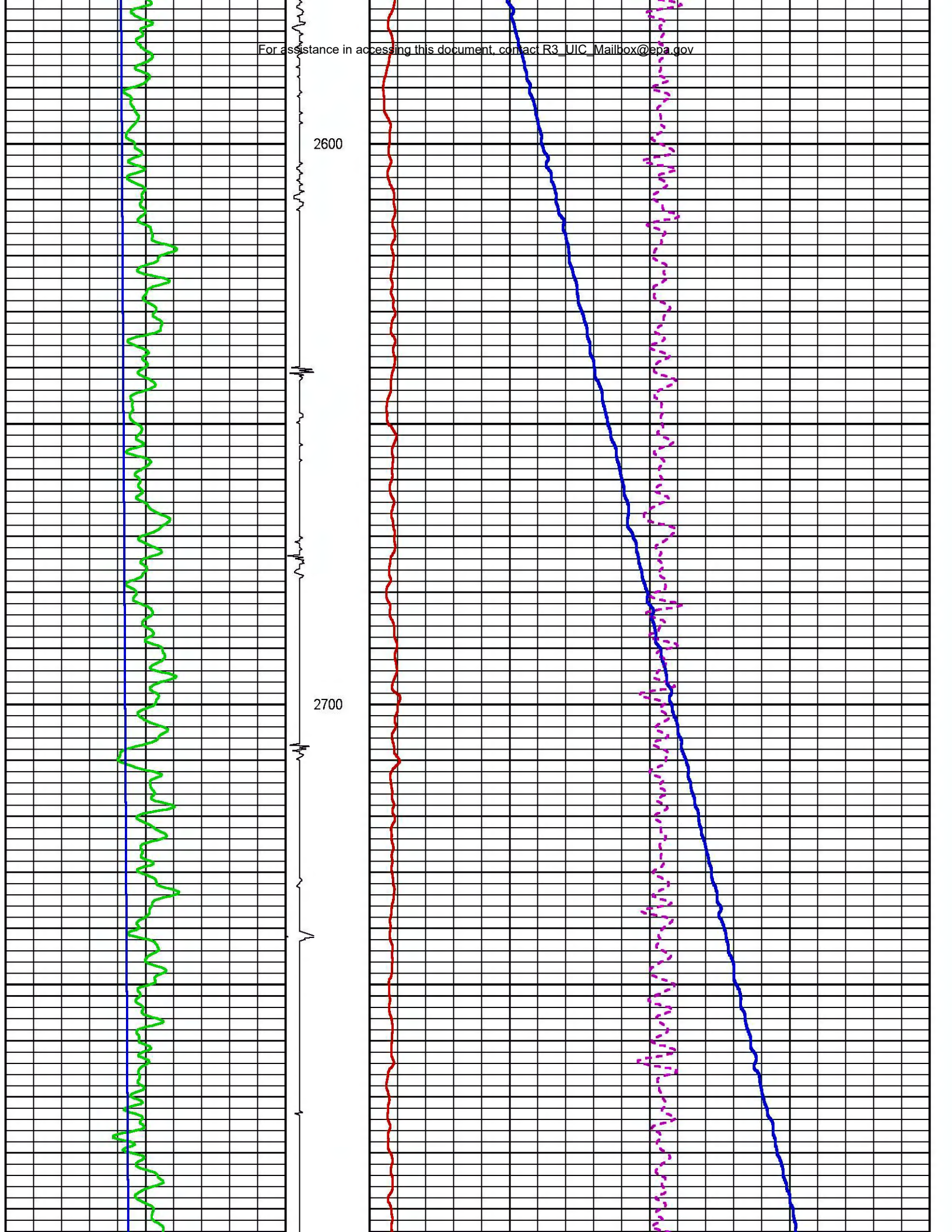


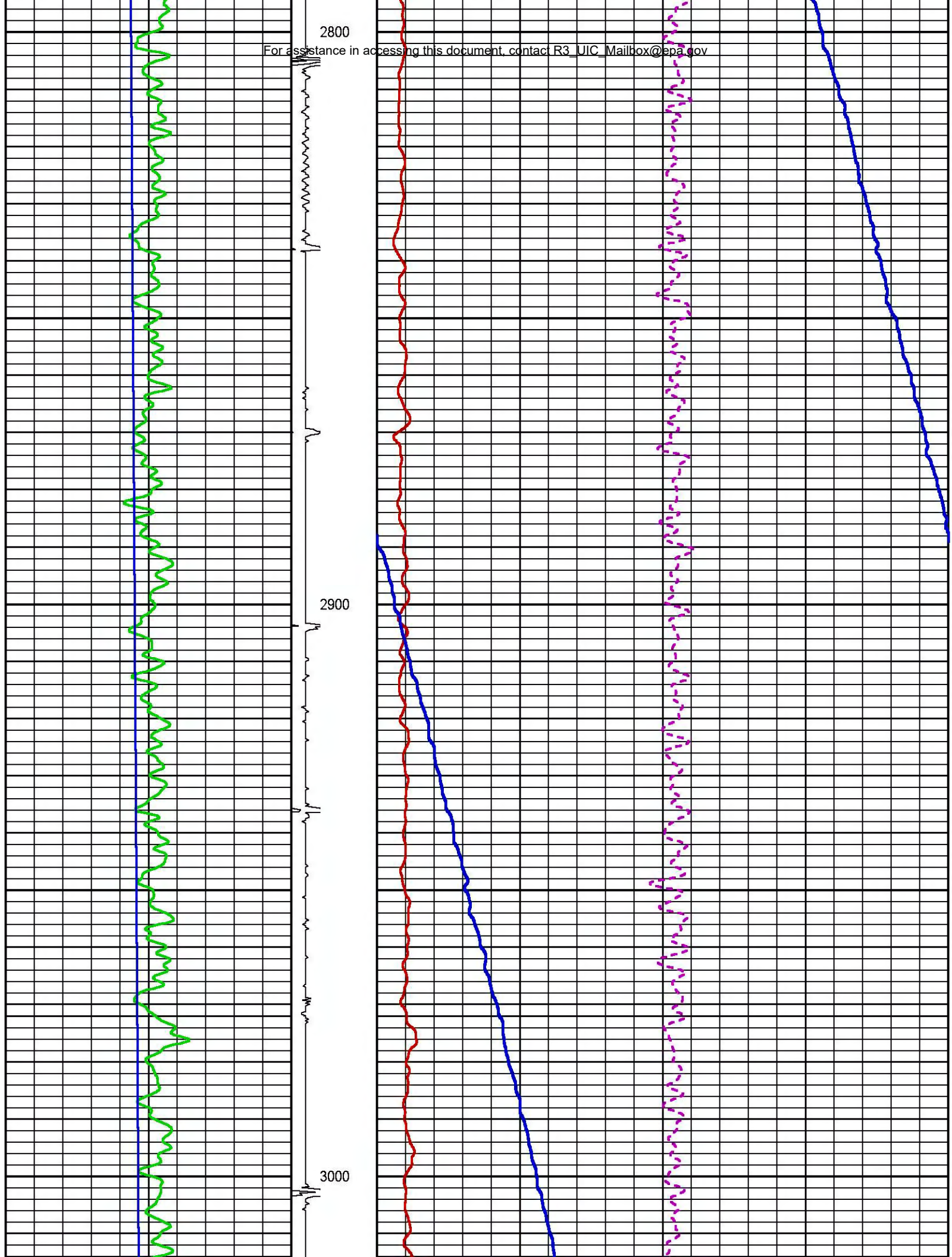


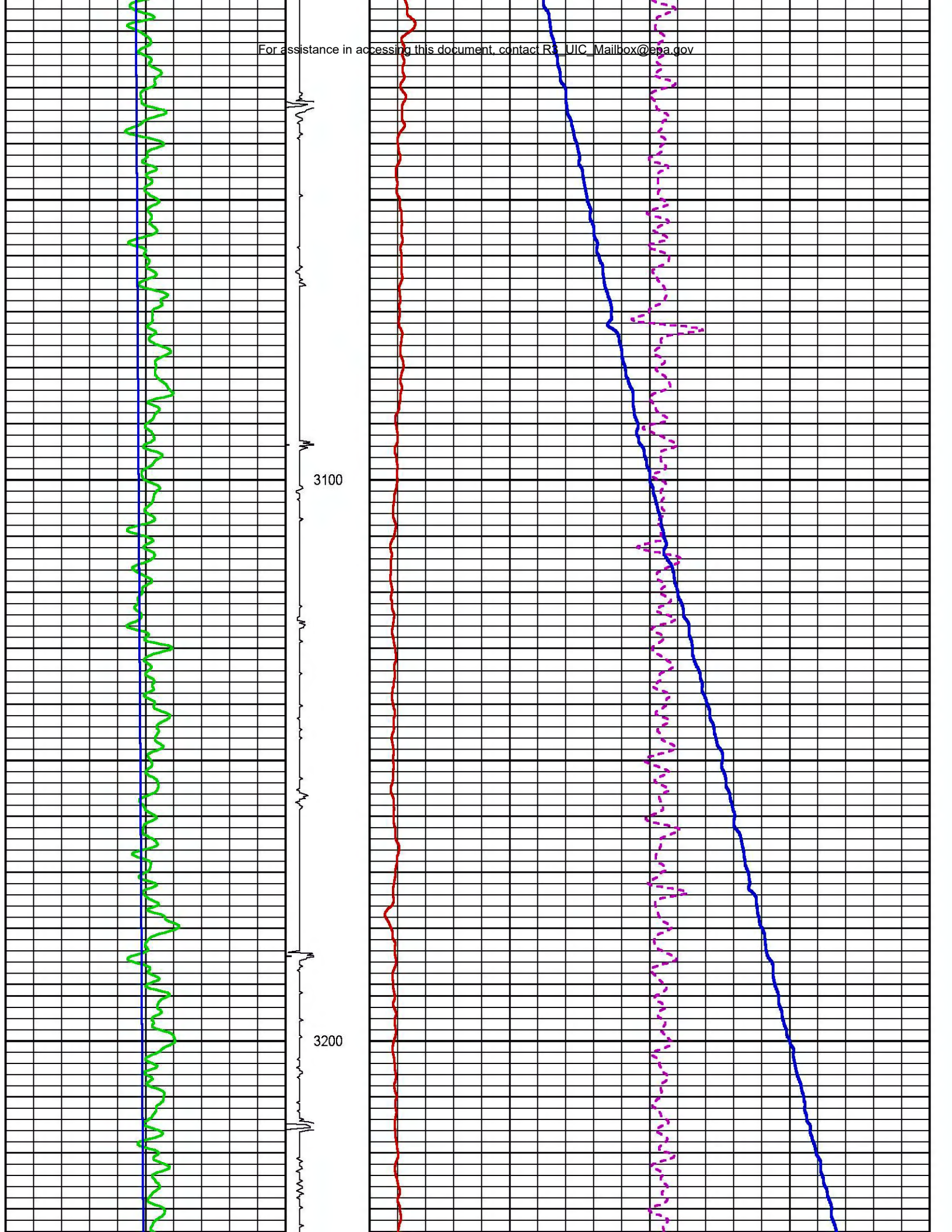


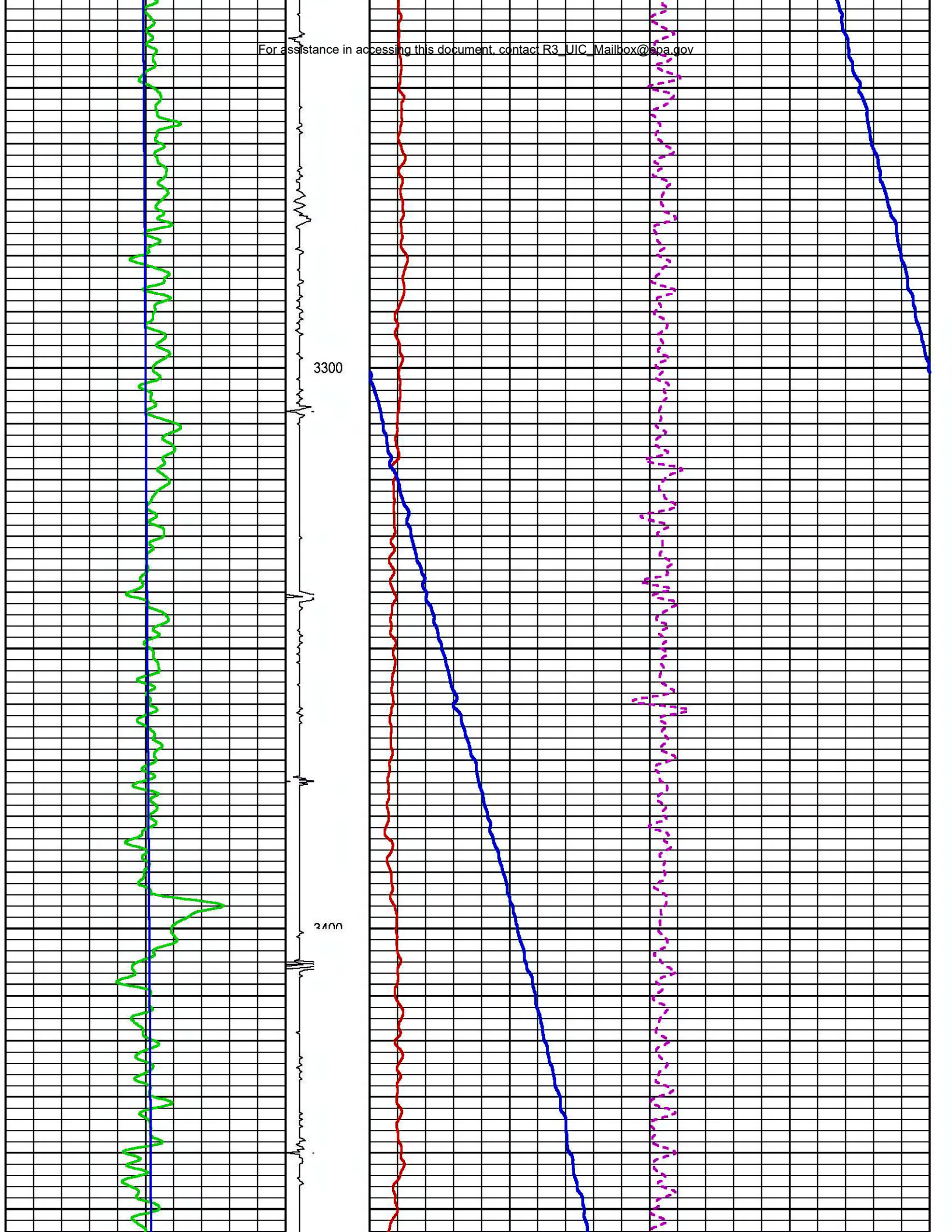


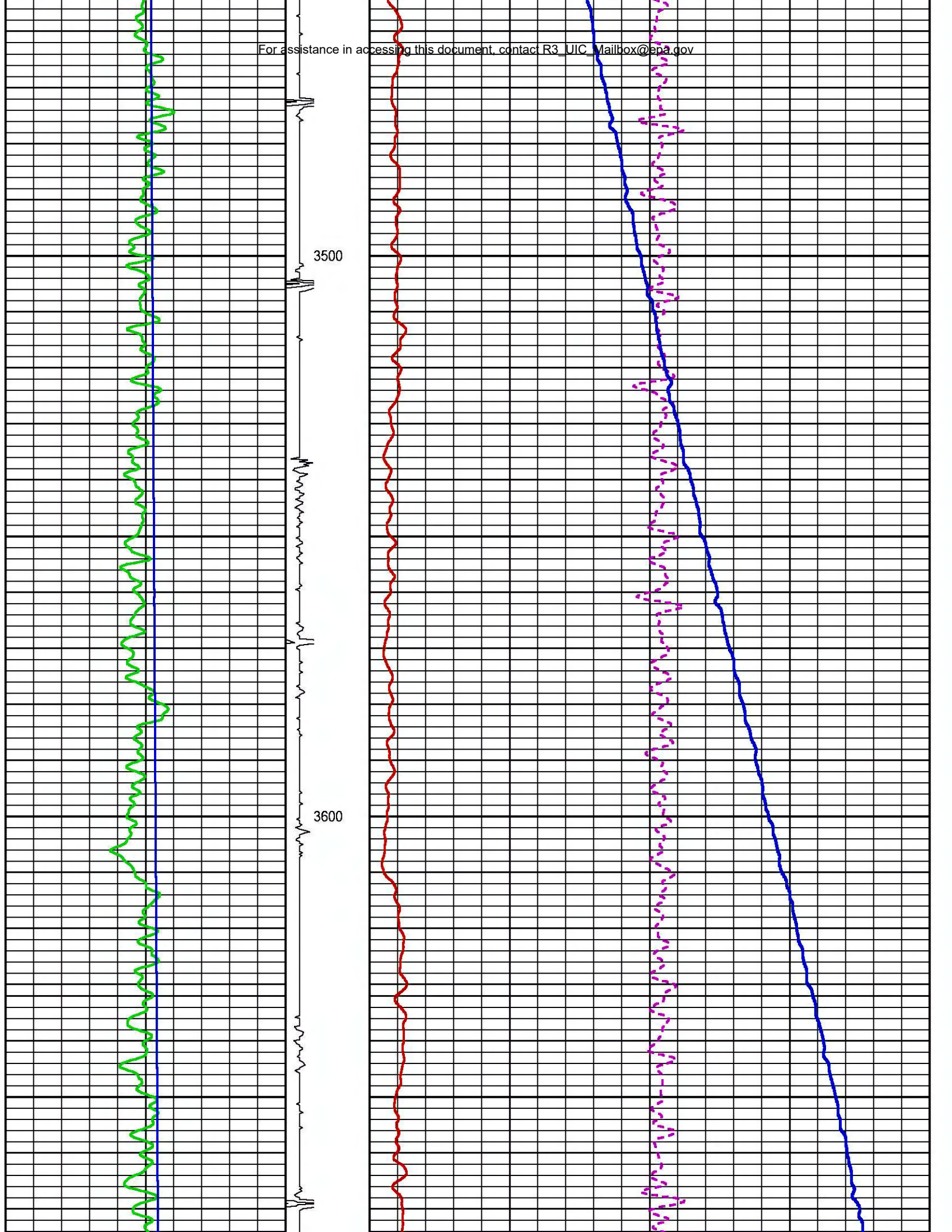


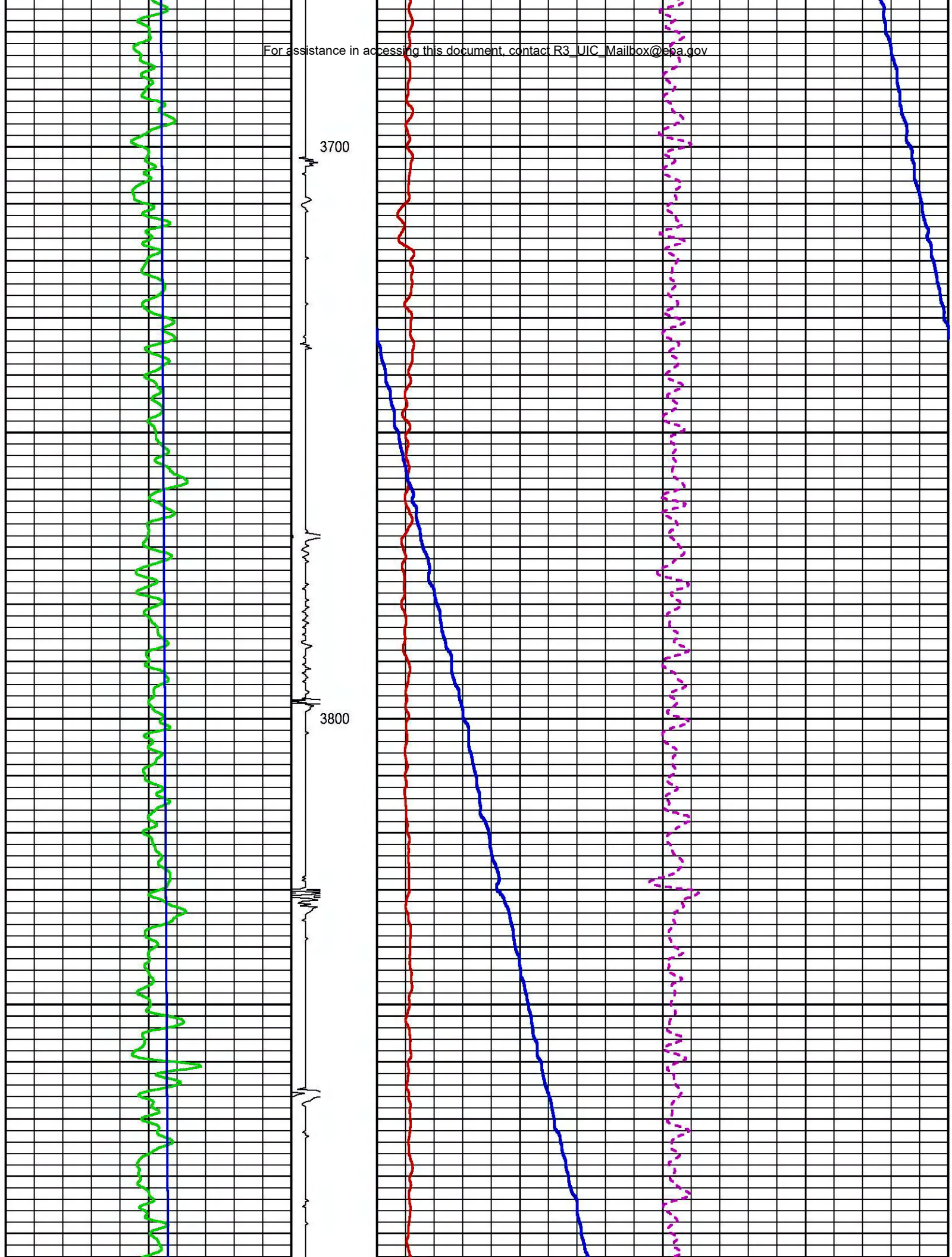


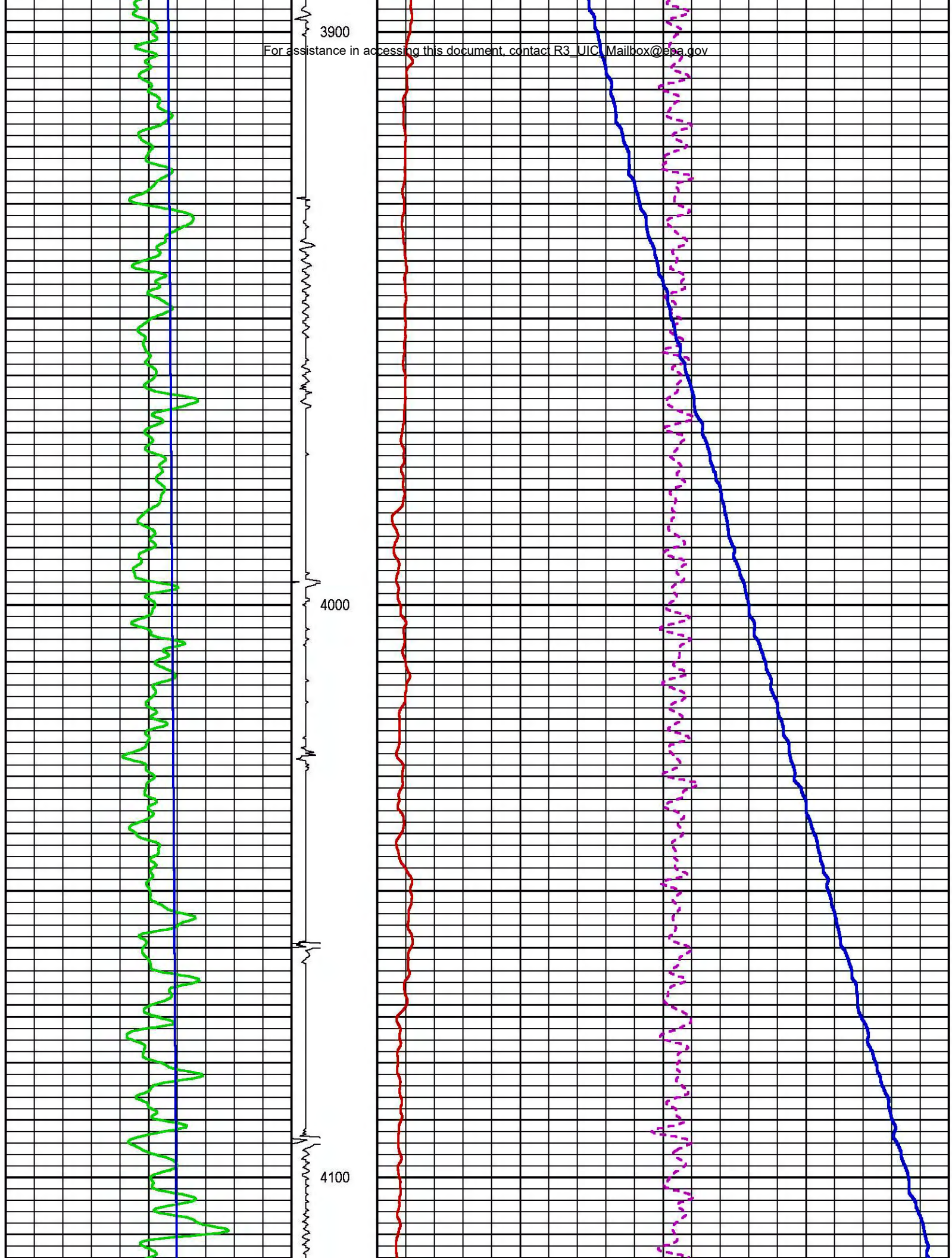


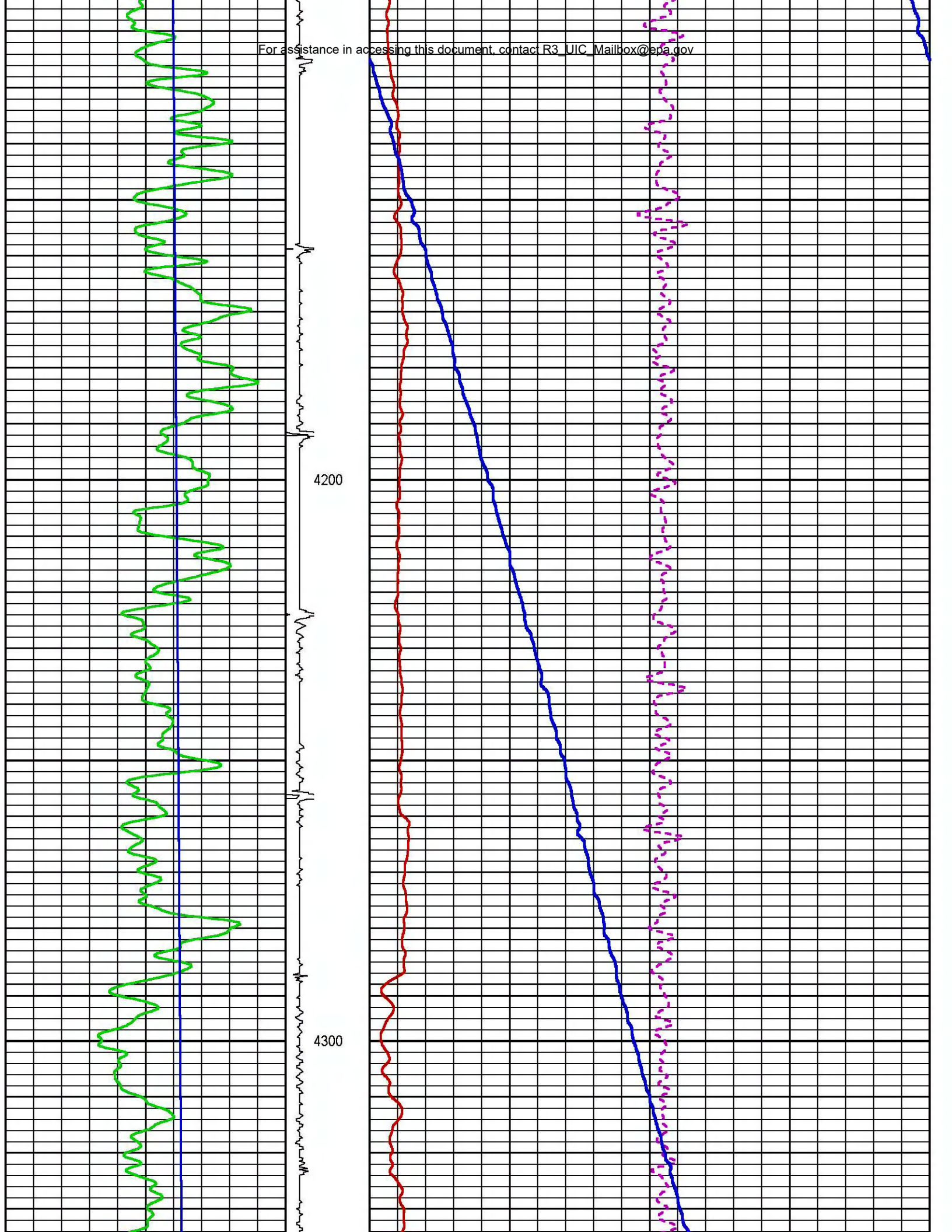


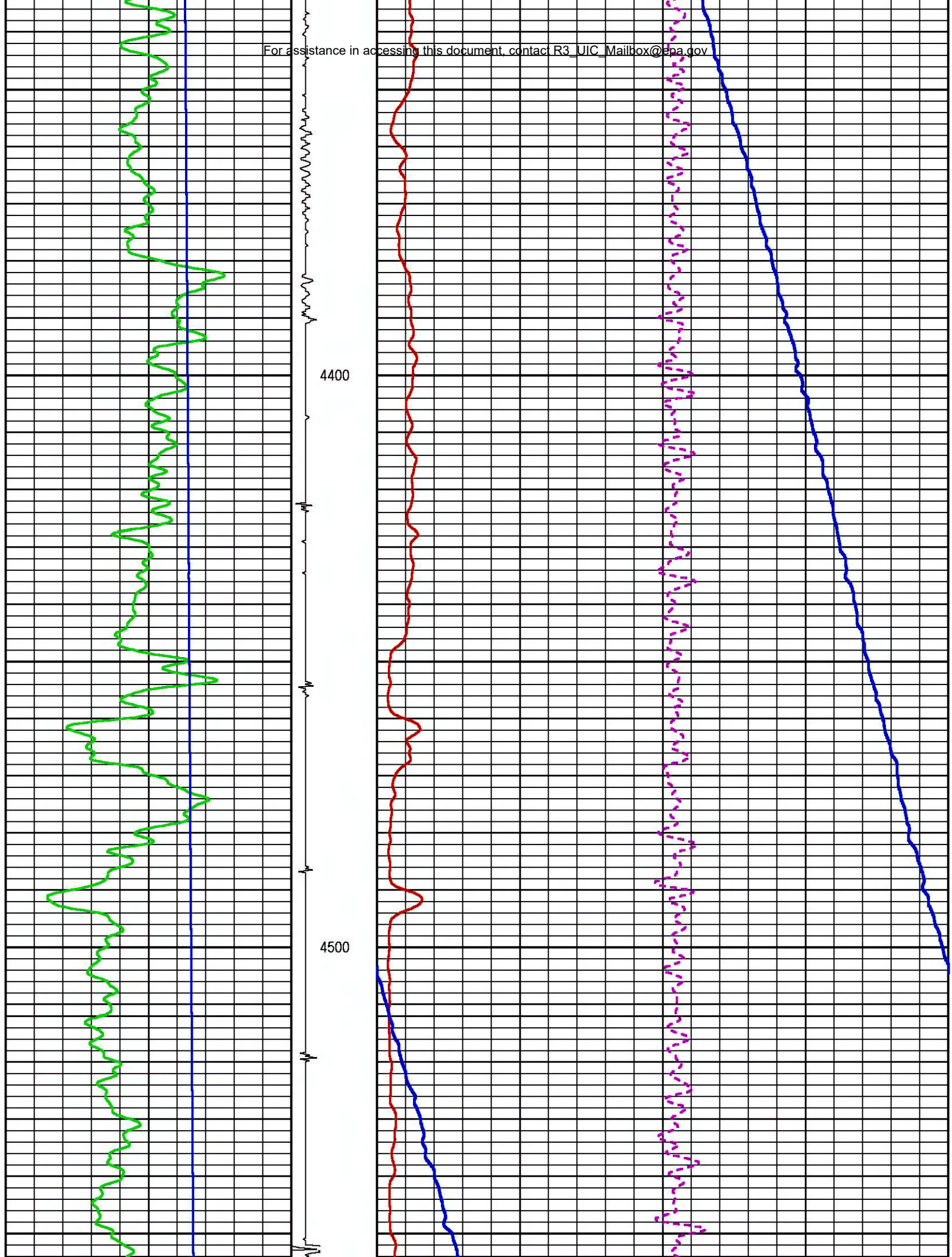


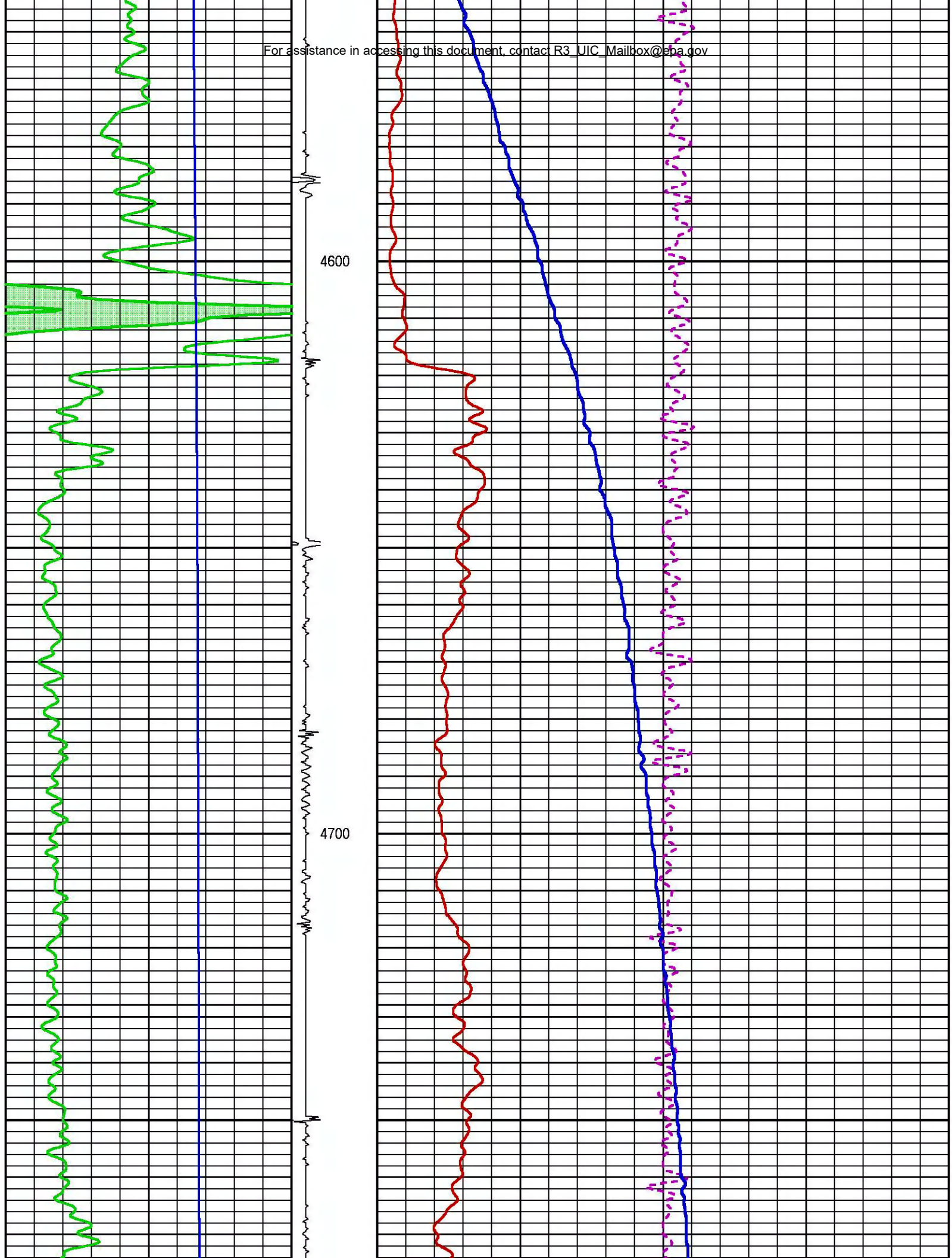


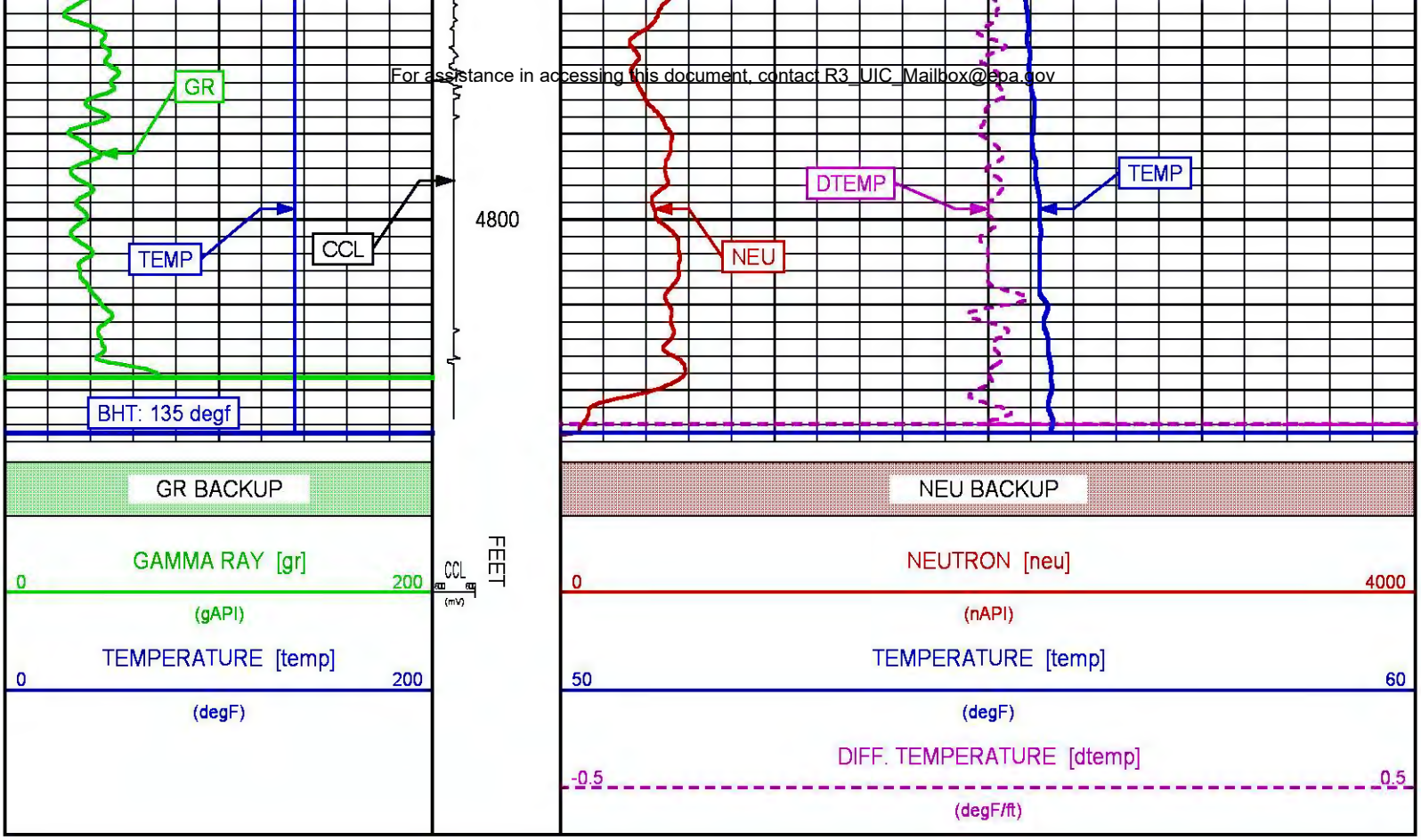












REPEAT LOG 5"/100ft Scale

ECLIPS 7.0wu1 PC-ECLIPS General Release Rel 7.0w Update 1 Wed Jul 25 15:19:34 Central Daylight Time 2018
Patches: 8

Plotted: Wed Jul 29 14:18:52 2020

PARAMETER AND FILTER SUMMARY REPORT

FILE: C:\dat1a\Nisource_Blackhawk_C-5_GRNT_US169779_072920\p310b03.prm
LOGGING MODE: DEPTH DIRECTION: UP
TOP DEPTH: 4534.750 ft BOTTOM DEPTH: 4823.000 ft

SYMMETRIC FILTER

MEASUREMENT TYPE	PARAMETER	VALUE	UNITS	INTERVAL (ft)	
GR	FILTER ()	medium (1)		TOP	BOTTOM
TEMP	FILTER ()	medium (1)		"	"
DIELECTRIC	FILTER ()	medium (1)		"	"

CCL PROCESSING

MEASUREMENT TYPE	PARAMETER	VALUE	UNITS	INTERVAL (ft)	
CCL FLOOR	CCL FLOOR	100.00		TOP	BOTTOM
CCL BASELINE	SET CCL BASELINE			"	"

CURVE DESCRIPTION REPORT

CURVE NAME	CREATION DATE	CURVE DESCRIPTION

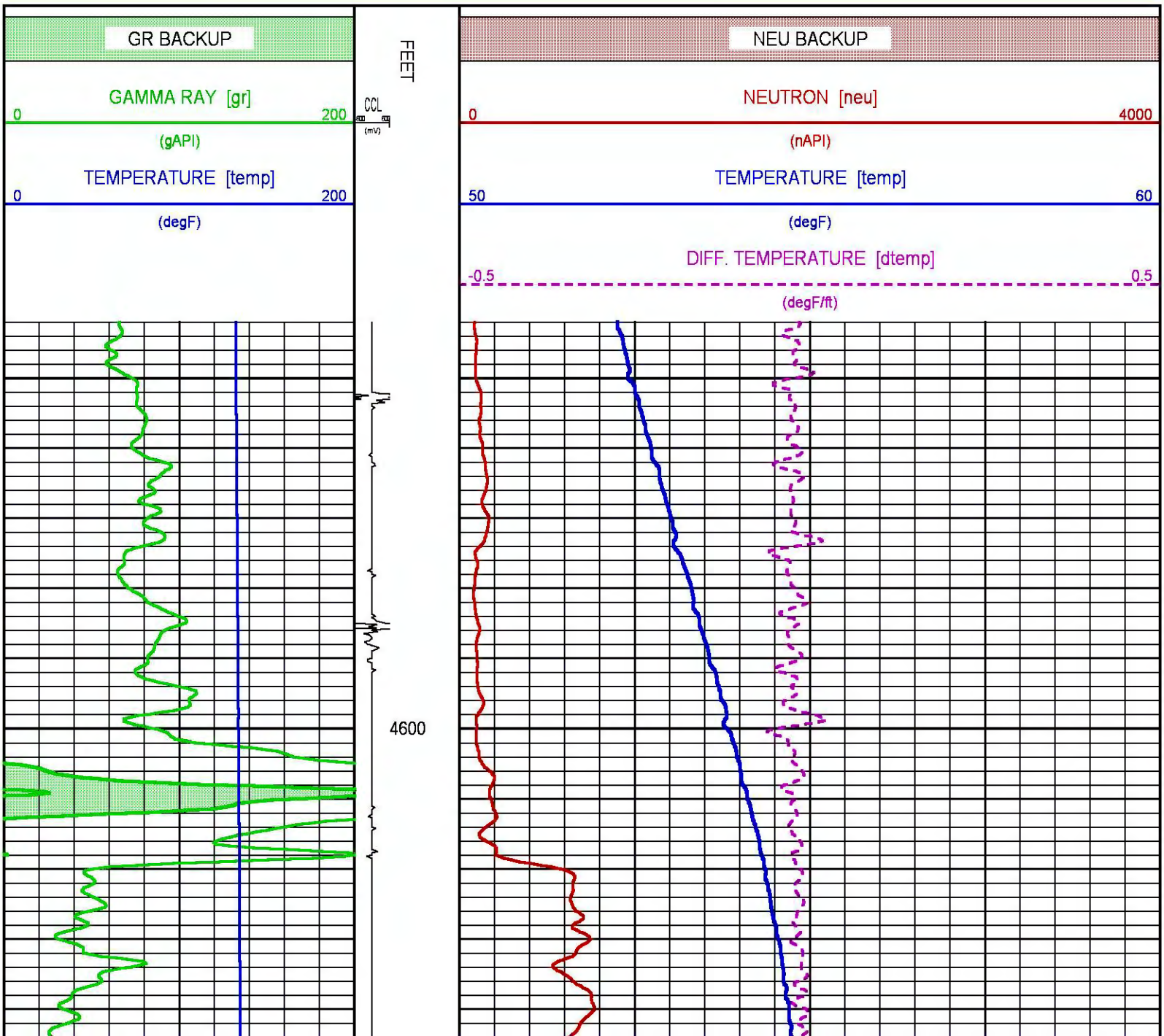
F1:CCL	Jul 29 13:50:12 2020	CASING COLLAR LOCATOR
F1:DTEMP	Jul 29 13:50:12 2020	DIFFERENTIAL TEMPERATURE
F1:GR	Jul 29 13:50:12 2020	GAMMA RAY
F1:NEU	Jul 29 13:50:12 2020	SINGLE DETECTOR NEUTRON
F1:TEMP	Jul 29 13:50:12 2020	TEMPERATURE

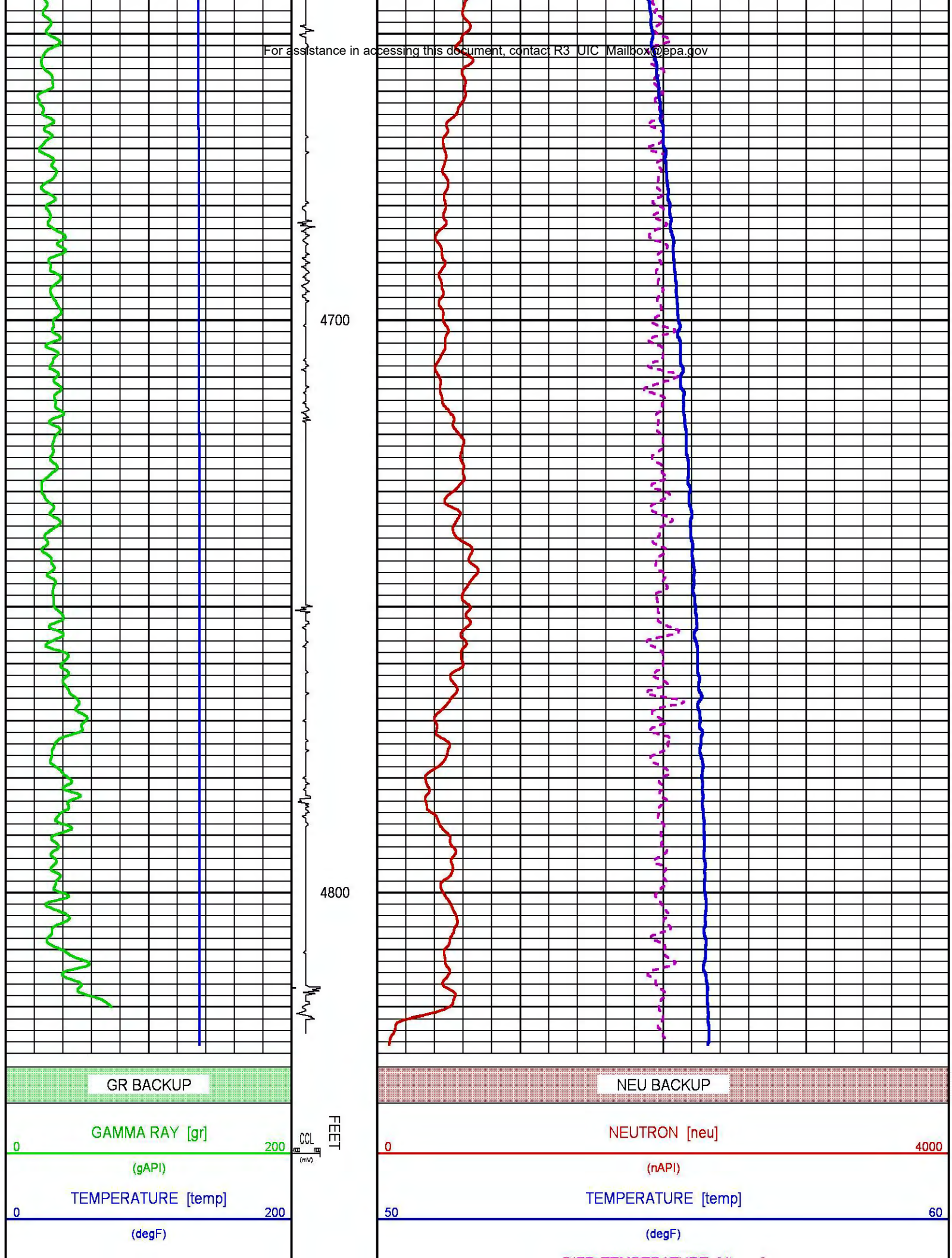
CURVE MEASURE POINT OFFSET

CURVE	OFFSET (ft)	CURVE	OFFSET (ft)	CURVE	OFFSET (ft)	CURVE	OFFSET (ft)
CCL	-4.50	GR	-7.75	TEMP	-1.25		
DTEMP	-1.25	NEU	-1.25				

Presentation : BAKER-75650:C:\dat1a\Nisource_Blackhawk_C-5_GRNT_US169779_072920\repeat.fvpdf [5"/100' Scale]
Plot Interval : 4542 - 4827.75 Feet

Data File 1 : F1 : BAKER-75650:C:\dat1a\Nisource_Blackhawk_C-5_GRNT_US169779_072920\repeat.xtf
Created On : Jul 29 13:50:12 2020
Company : NiSource
Well : C-5
Field : Blackhawk
File Interval : 4534.25 - 4829 Feet
OCT : p310b





CALIBRATION / VERIFICATION SUMMARY

Source File: C:\dat1a\Nisource_Blackhawk_C-5_GRNT_US169779_072920\p310b.tp1

GR PRIMARY CALIBRATION SUMMARY

TOOL #: 2461NA 14576702 DATE/TIME PERFORMED: Tue Jul 21 14:30:30 2020

UNIT #: 5715XA 10098208 CALB JIG #: S2K DA-565

	BACKGROUND (cts)	CALBRTR ON (cts)	CR DIFF (cts/s)	MULT	BACKGROUND (gAPI)	CALBRTR ON (gAPI)	CALBRTR (gAPI)
GR	49.42	285.24	235.8	0.784	38.77	223.77	185

GR PRIMARY VERIFICATION SUMMARY

TOOL #: 2461NA 14576702 DATE/TIME PERFORMED: Tue Jul 21 14:32:46 2020

UNIT #: 5715XA 10098208 CALB JIG #: S2K DA-565

	BACKGROUND (cts)	CALBRTR ON (cts)	CR DIFF (cts/s)	MULT	BACKGROUND (gAPI)	CALBRTR ON (gAPI)	CALBRTR (gAPI)
GR	51.40	286.40	235.0	0.787	40.46	225.46	185

NEU PRIMARY CALIBRATION SUMMARY

TOOL #: 2461NA 14576702 DATE/TIME PERFORMED: Tue Jul 21 14:40:49 2020

UNIT #: 5715XA 10098208 CALIBRATOR #: 9717 123456

	Bushing Up (cts)	Bushing Down (cts)	Mult	Bushing Up (nAPI)	Bushing Down (nAPI)	API Diff (nAPI)
NEU	539.65	2616.30	0.38	205.29	995.29	790.00

TEMP PRIMARY CALIBRATION SUMMARY

TEMP PRIMARY CALIBRATION SUMMARY

TOOL #: 2461NA 14576702

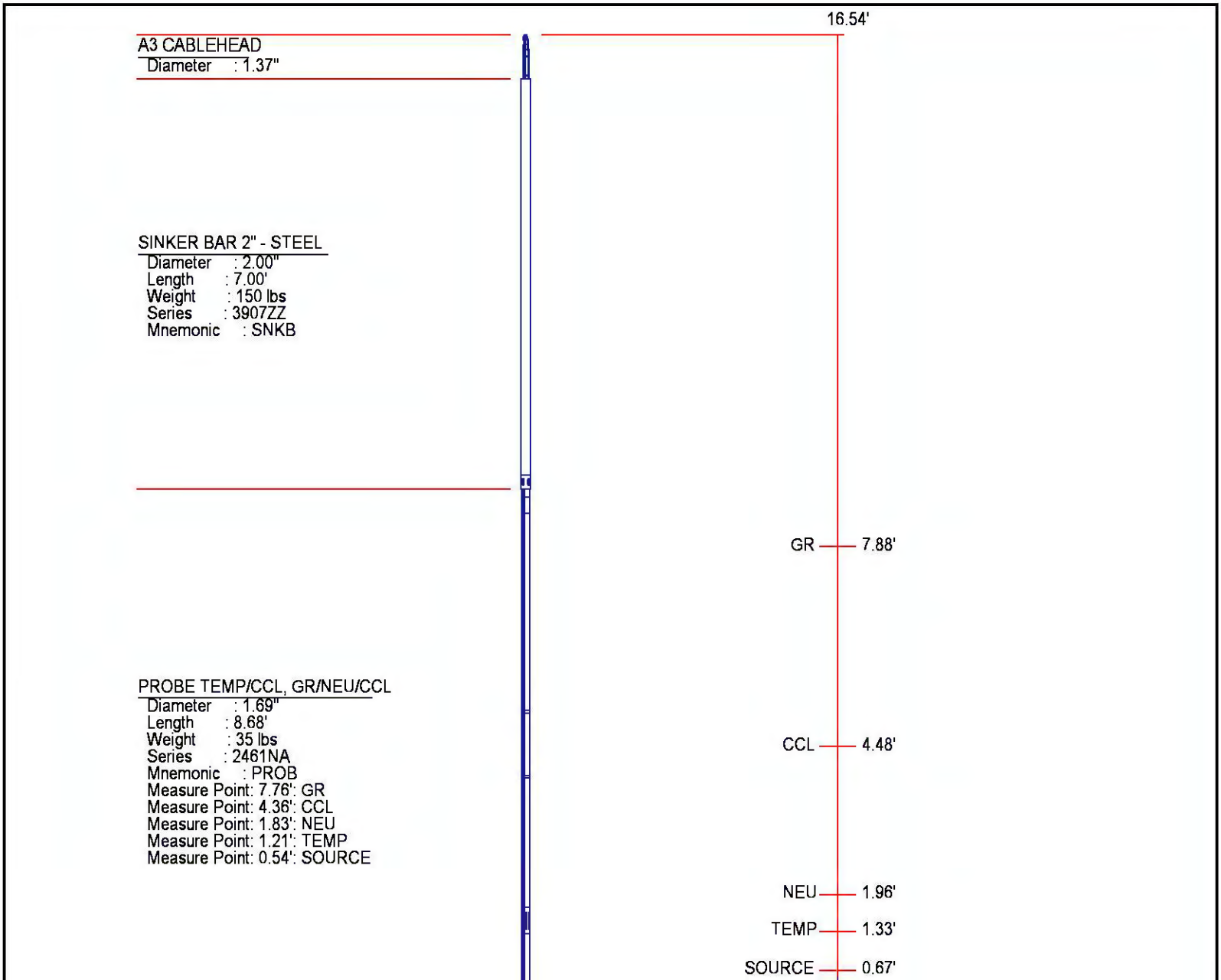
DATE/TIME PERFORMED: Tue Jul 21 14:26:10 2020

UNIT #: 5715XA 10098208

	T(0)	T(1)	T(2)	T(3)
Corr Coeff for Temp	0.000000E+00	1.000000E-01	0.000000E+00	0.000000E+00

INSTRUMENT CONFIGURATION

Source File: C:\dat1a\Nisource_Blackhawk_C-5_GRNT_US169779_072920\p310b_nisource-tdg.meta



BULL PLUG 1 11/16

0.00'

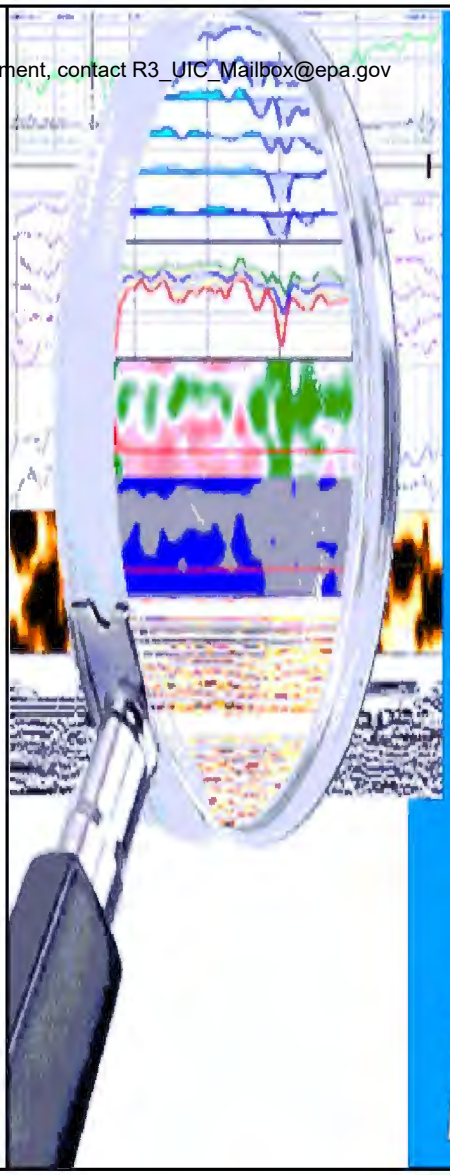
TOTAL LENGTH: 16.54'
TOTAL WEIGHT: 188 lbs
MAX DIAMETER: 0'2.00"

Baker Hughes

FOLIPS

COMPANY	NiSource (Columbia Gas of Pennsylvania)		FILE NO:
WELL	C-5		
FIELD	Blackhawk		API NO:
COUNTY	Beaver	STATE PA	37-017-2-0027
LOCATION: Twp: S. Beaver		ELEVATIONS: KB N/A DF N/A GL 1184.06 FT	7.0wu1+8
LAT 40.775839	LONG -80.444085	DATE 29-Jul-2020	

Cement Evaluation



COMPANY NiSource (Columbia Gas of Pennsylvania)

WELL C-5

FIELD Blackhawk

COUNTY Beaver STATE Pennsylvania

LOCATION:
Twp: S. Beaver
LAT 40.775839 LONG -80.444085

ELEVATIONS:
KB N/A DF N/A GL 1184.06 FT

DATE 29-Jul-2020 S.O. US169779

IN MAKING INTERPRETATIONS OF LOGS OUR EMPLOYEES WILL GIVE THE CUSTOMER THE BENEFIT OF THEIR BEST JUDGEMENT. BUT SINCE ALL INTERPRETATIONS ARE OPINIONS BASED ON INFERENCES FROM ELECTRICAL OR OTHER MEASUREMENTS, WE CANNOT, AND WE DO NOT GUARANTEE THE ACCURACY OR CORRECTNESS OF ANY INTERPRETATION. WE SHALL NOT BE LIABLE OR RESPONSIBLE FOR ANY LOSS, COST, DAMAGES, OR EXPENSES WHATSOEVER INCURRED OR SUSTAINED BY THE CUSTOMER RESULTING FROM ANY INTERPRETATION MADE BY ANY OF OUR EMPLOYEES.

COMPUTATION PARAMETERS

COMPUTATION	LOGS USED: p391b02.xtf		PROGRAM: WFM/SBTProc
	CENTER: Houston, TX	LOG ANALYST: L. Liscano.	DATE: 07/31/2020
FIELD DATA	LOCATION: Buckhannon, WV	ENGINEER: J. Moczygemba	DATE: 07/29/2020

FROM	TO	Casing OD	Weight	FPAT	FREEP	MAXATTN	MNCEMSTR	CEMSTR	
563 FT	4813 FT	5.5"	17.0 LB/	0.738	8.738	15.281	800 PSI	4000 PSI	

BOREHOLE RECORD

BIT SIZE	FROM	TO

CASING RECORD

SIZE	WEIGHT	GRADE	FROM	TO
5.5 IN	17 LB/F	J-55	0 FT	4895 FT
8.625 IN	24 LB/F	J-55	0 FT	1157 FT

REMARKS

This log is depth correlated to the Baker Hughes field SBT log from 07/29/2020
Fluid level at approx. 563 ft.
Casing: 5-1/2" x 17.0 lb/ft
Cement evaluation based on 4000 psi Compressive Strength provided by Customer

Geoscience: L. Liscano.

EQUIPMENT DATA

RUN	TRIP	TOOL	SERIES NO.	SERIAL NO.	POSITION
1	1	CCL	2330	13257703	Free
1	1	Gamma-ray	1339XA	12521913	Free
1	1	EA	1633EA	12504883	Free
1	1	Pad	1424XB	179436	Pad Device
1	1	VDL	1424PA	12524288	Free

Source File: C:\Ape_Projects\SBT_NiSource_Blackhawk_C_5\SBT_Bond_Interpretation_Rev1.txt

SBT DATA QUALITY :

1. The SBT results over the 5-1/2" 17.0 lb/ft casing indicate that the tool performed as expected and each of the tool pads were reading around the +/- 2 db/ft range.

2. The SBT data is of good quality and suitable for analysis.

3. The dtmn and dtmx curves stack closely with a total spread of less than ~4 us/ft, therefore indicating that there is no eccentricity or pad contact issues. The average reading is very close to the expected travel time of 57 us/ft for Steel.

INTERPRETATION :

1. The solid red/green/blue lines in the Channel Indicator track (min/avg/max attenuation) are the measured minimum, average and maximum attenuation recorded at each level. Average= (sum[ATCi])/6, the average of the ATC for each pad.

2. The Channel Indicator track contains the primary SBT quality checks.
   a. A narrow yellow fill between the minimum and maximum attenuation indicates a consistent measurement by all of the pads
   b. A wide yellow fill between the minimum and maximum attenuation may indicate a possible channel, spotty cement or varying cement quality.

3. The dashed red/green/blue lines in the Channel Indicator track are the modeled free pipe attenuation, minimum acceptable cement strength, and the modeled cement strength, all in dB/ft. These quality curves indicate the attenuation and consequently also represent the following:

   5.5 in casing 17.0 lb/ft

	Attenuation	Cement Strength
a. Free Pipe	0.738 dB/ft	0 Psi
b. Minimum Cement Threshold,	8.378 dB/ft	800 Psi
c. Measured Cement Strength	15.281 dB/ft	4000 Psi

4. The Apparent Cement Strength 'green/red' map has a cut-off set to twice the minimum acceptable compressive strength of 800 psi, or in this case 1600 Psi. Therefore, following the color bar from left to right:
   a. Below 800 Psi is red (free pipe) shading to white
   b. At 800 Psi the image is white, transition point between free pipe and cement
   c. Above 800 Psi white shading to green (good cement)

5. The Apparent Cement Strength 'grey/blue' map reports the presence of cement using only the SBT pad data:
   a. Blue is below the minimum acceptable cement strength (Value = 0)
   b. Grey is above the minimum acceptable cement strength (Value = 1)

GEOSCIENCE REMARKS :

This evaluation is based on a minimum compressive strength of 800 psi and a cement compressive strength of 4000 psi given by customer. The SBT Bond was run in order to evaluate the condition of bonded solids behind casing.

1. 563 Ft : Is the top of fluid level, and top of valid SBT data.

2. 563 - 3830 Ft : Free Pipe. The average attenuation curve is tracking close to the free pipe attenuation value. The VDL shows strong casing arrivals, another indication of probable poor casing to cement bond.

3. 3830 - 4560 Ft : Poor Cement Bond. The average attenuation curve is tracking on or slightly above the free pipe attenuation value 0.738 dB/ft. The VDL is showing strong to weak casing arrivals also an indication of poor cement bond to casing. The VDL formation signal can be seen indicating some casing to formation bond is probable. There were a few areas where the span between the minimum and maximum attenuation curves increased which indicates channeling / spotty cement. See an example from this condition at approx. 4175'.

4. 4560 - 4790 Ft : Poor to Partial Cement Bond. The average attenuation curve is tracking below, at and/or slightly above the minimum acceptable attenuation value for 800 Psi compressive strength cement. The VDL shows weak casing arrivals, another indication of partial casing to cement bond. The VDL formation signal can be seen indicating casing to formation bond is probable. There were a few areas where the span between the minimum and maximum attenuation curves increased which indicate channeling / spotty cement. See an example from this condition at approx. 4755' to 4785'. A short segment of free pipe is seen at approx. 4575' to 4600'; the average attenuation runs close to the free pipe threshold, VDL casing arrival becomes visible as well.

5. 4790 - 4813 Ft : Good Cement Bond. The average attenuation curve is tracking above minimum acceptable attenuation value for 800 Psi compressive strength cement, and slightly below the maximum attenuation value for 4000 Psi compressive strength cement. The VDL shows weak or missing casing arrivals, another indication good casing to cement bond. The VDL formation signal can be seen indicating casing to formation bond is probable.

Created by : Post Acquisition Tool Suite (PATS), v8.4.8611.1

Plotted by : BHI PATS Well Log Data Viewer, v8.4.8611.1

Company : NiSource

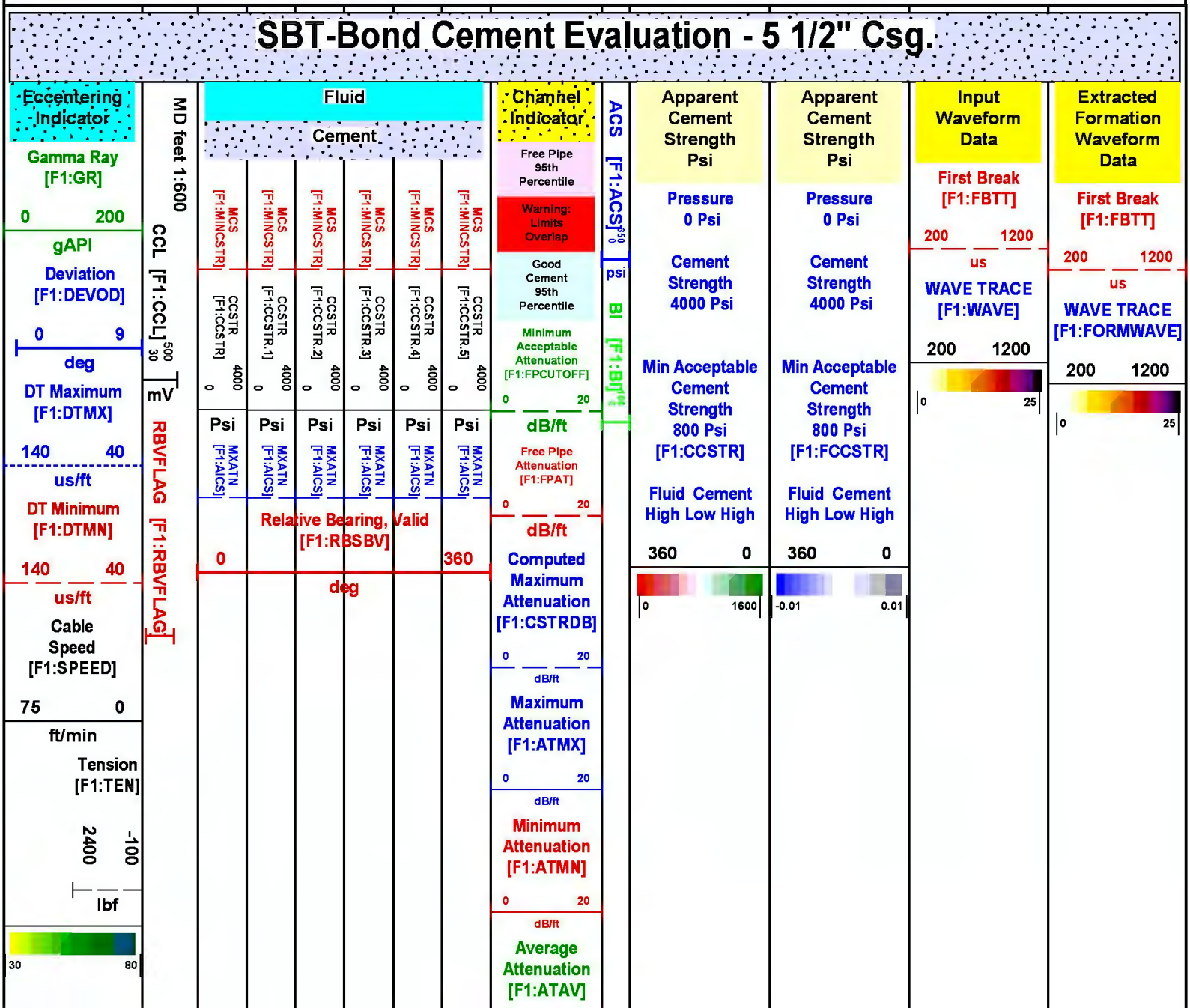
Well : C-5_SBT

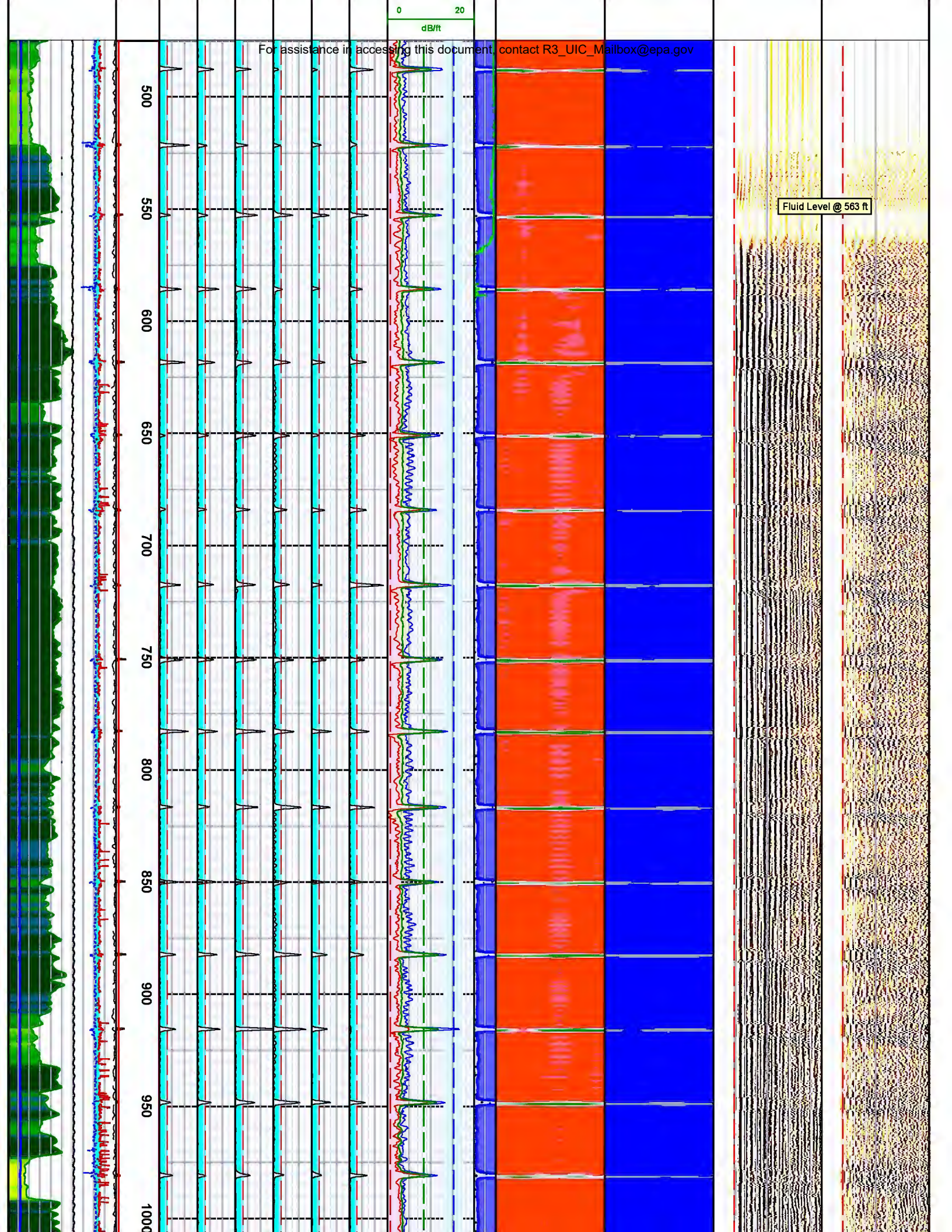
File Name : C:\Ape_Projects\SBT_NiSource_Blackhawk_C_5\BVP_D_220_GS_SBT_Case_1.xtf

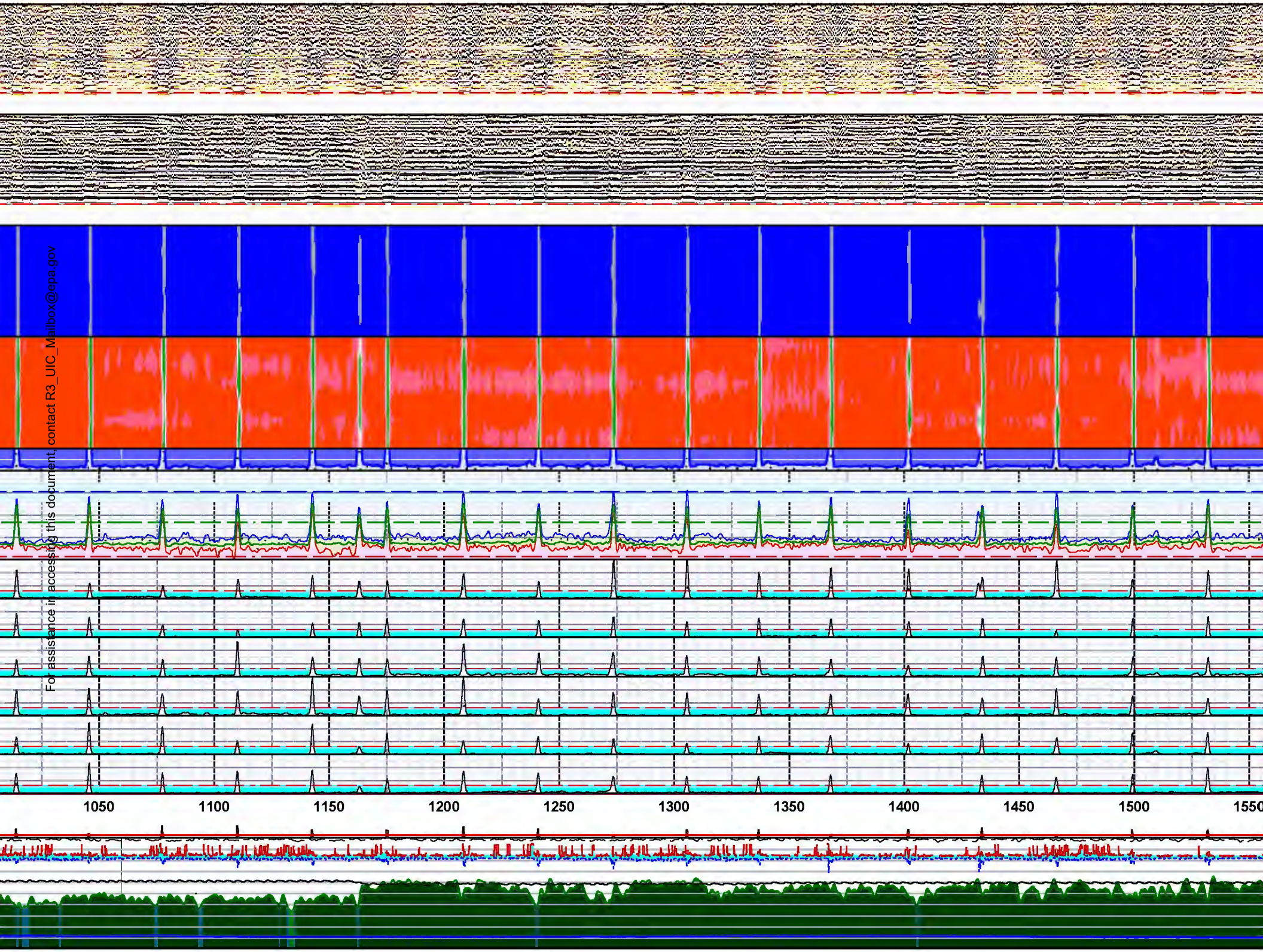
Mode : Log Viewer

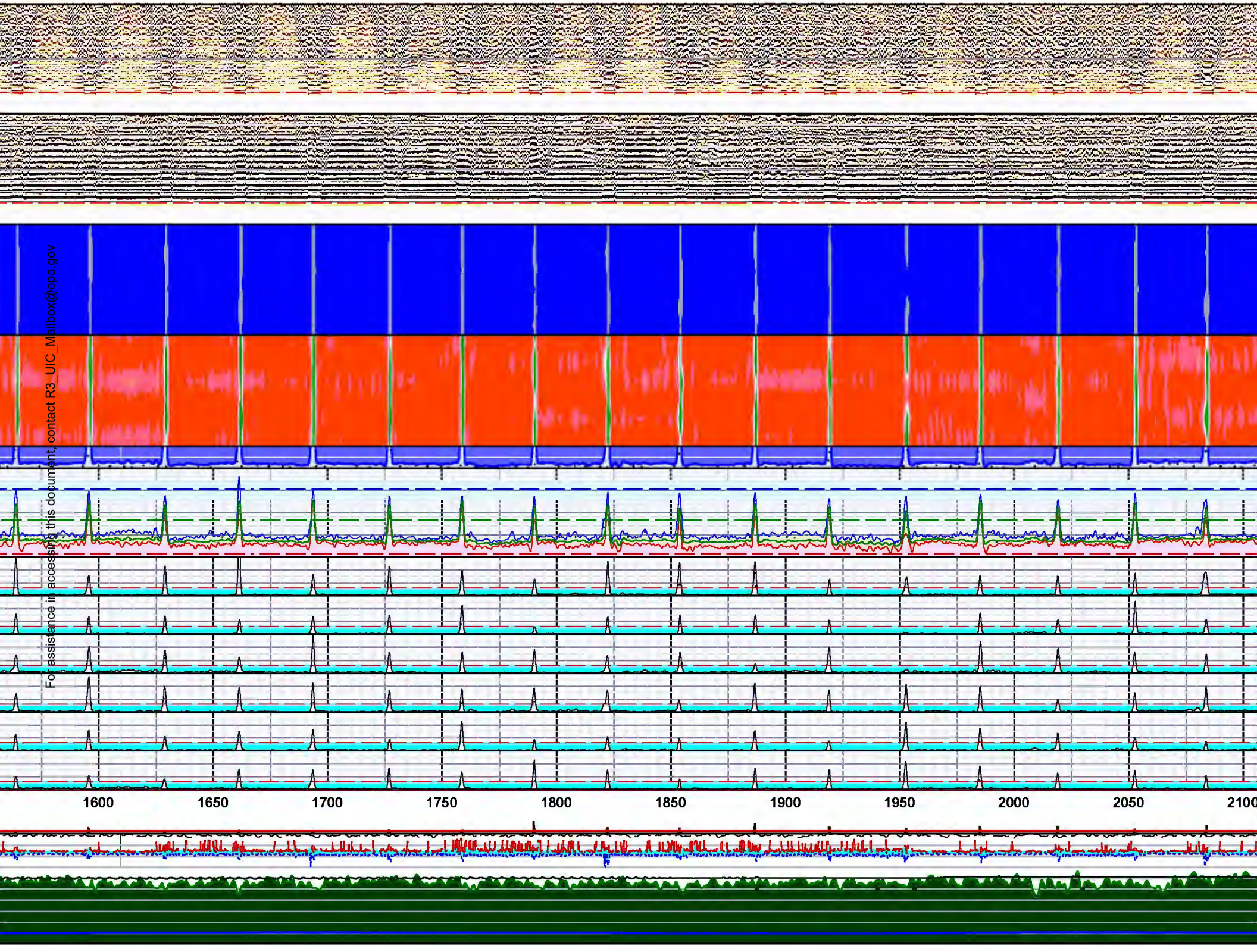
Interval : 475.00 - 4850.00 feet UP

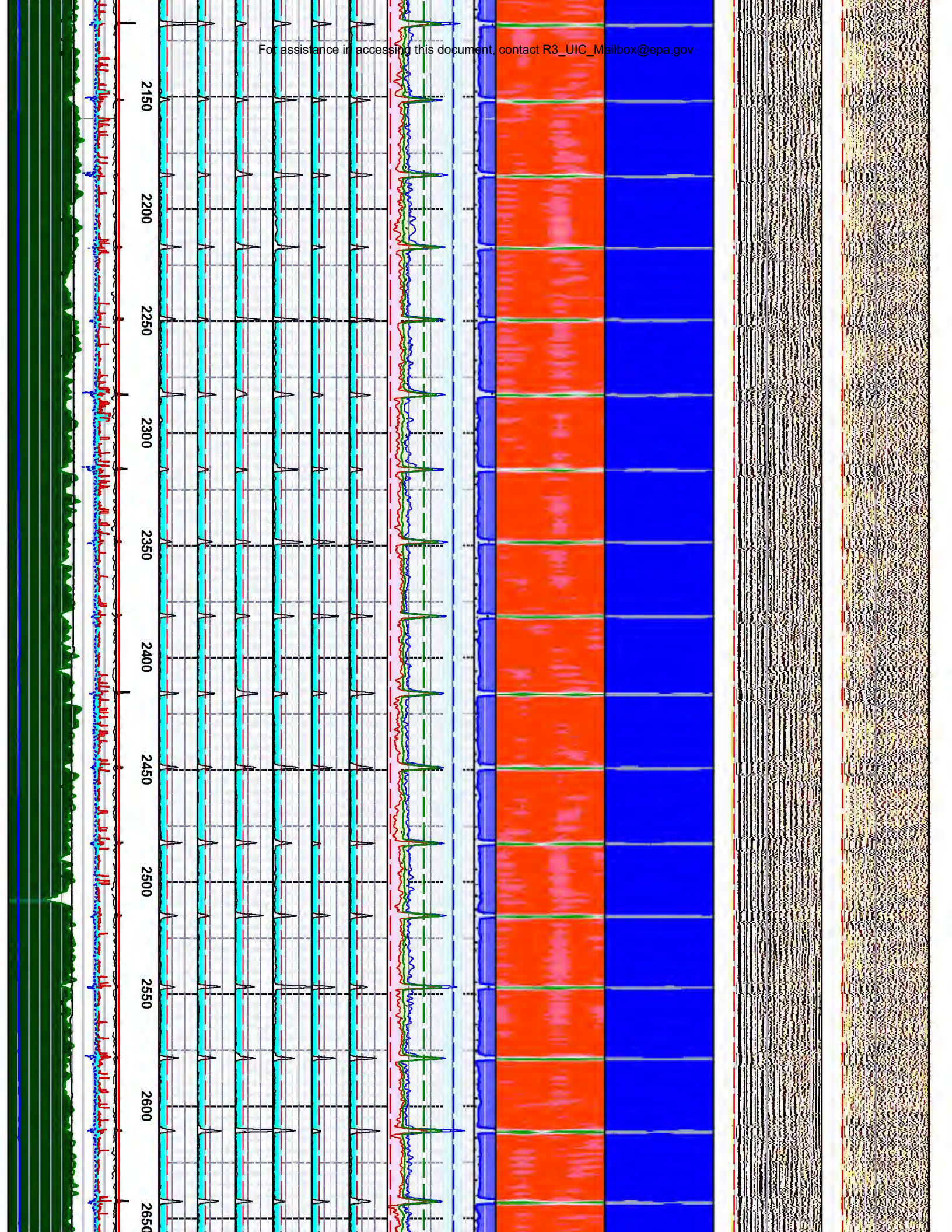
Created : 07/29/2020 8:00:03 PM

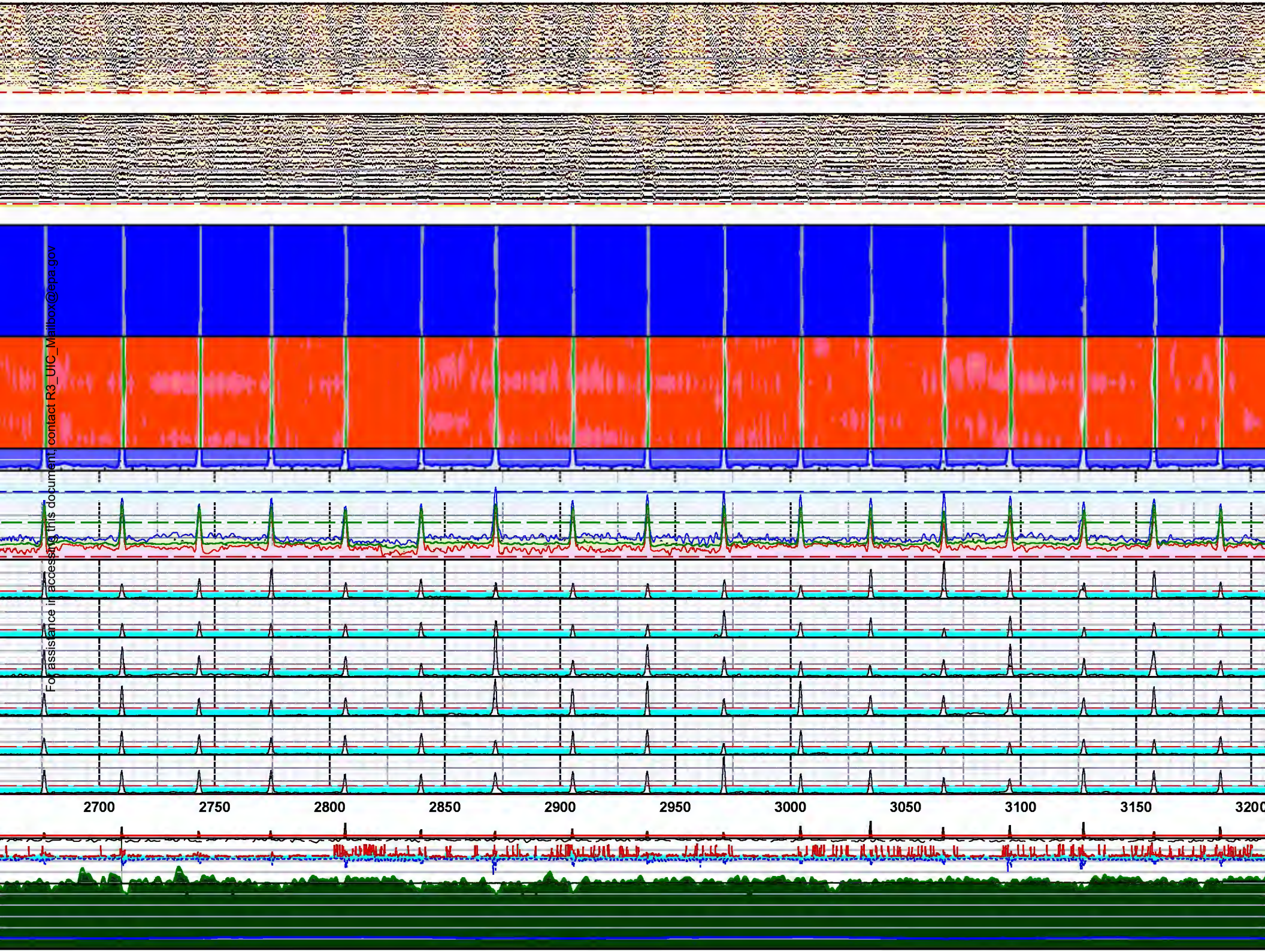


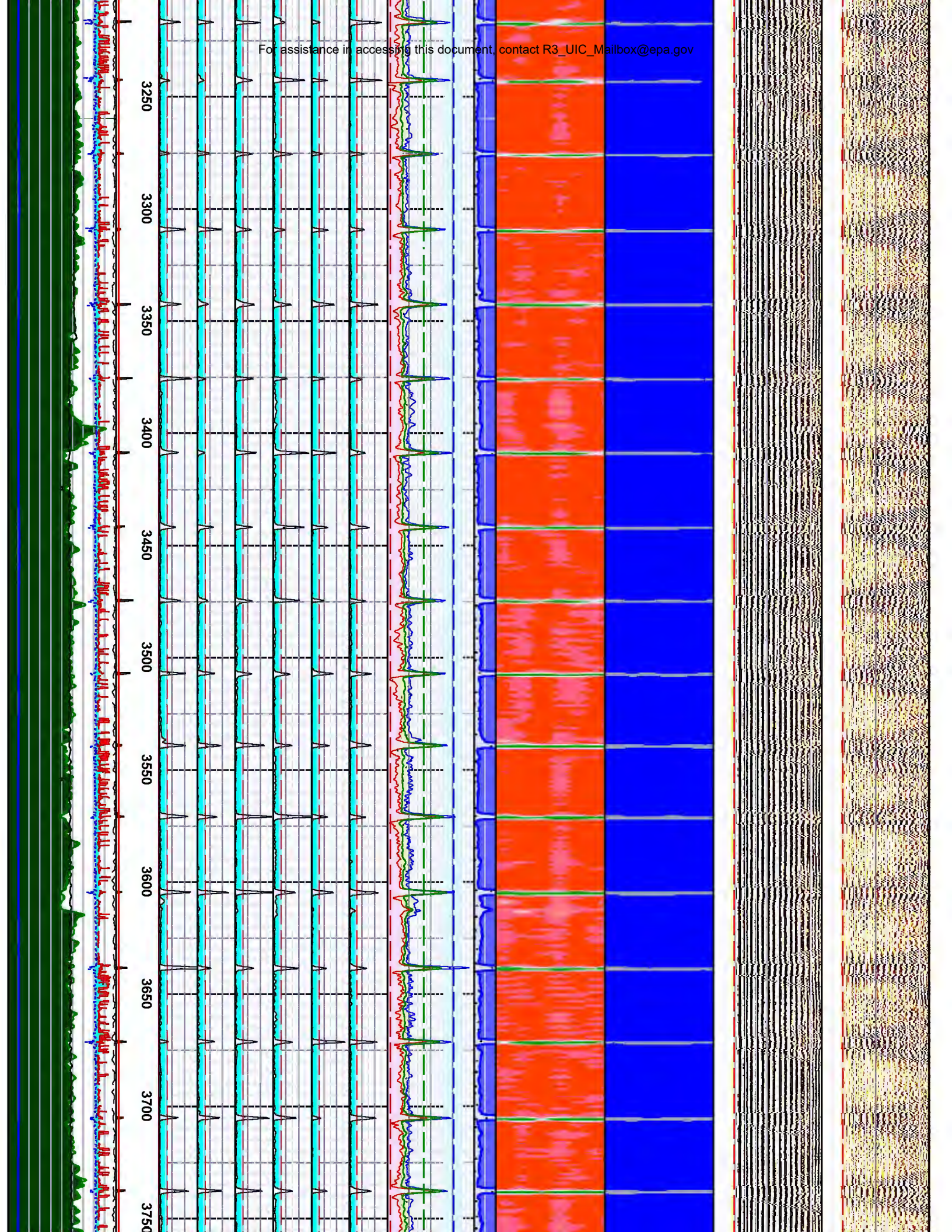


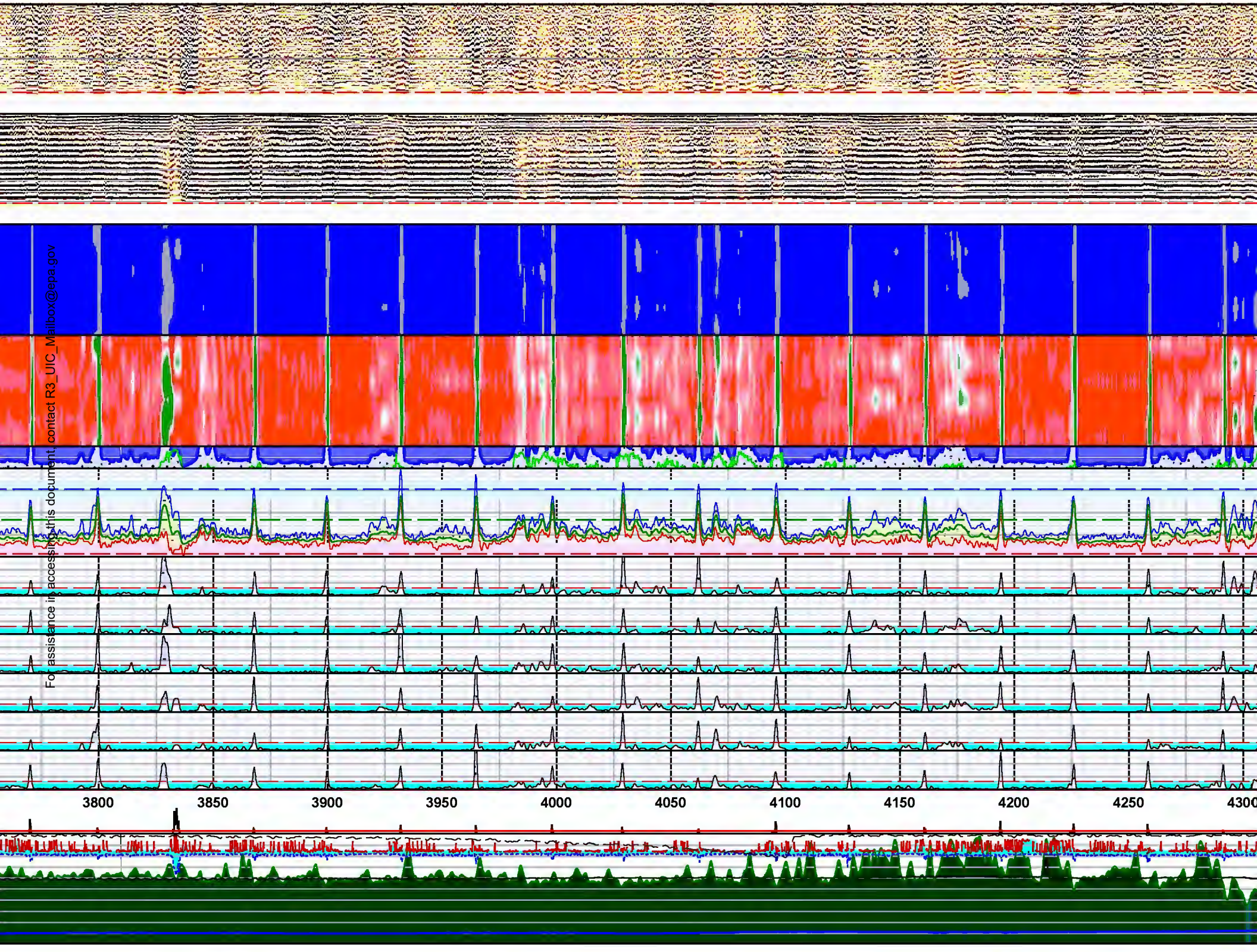




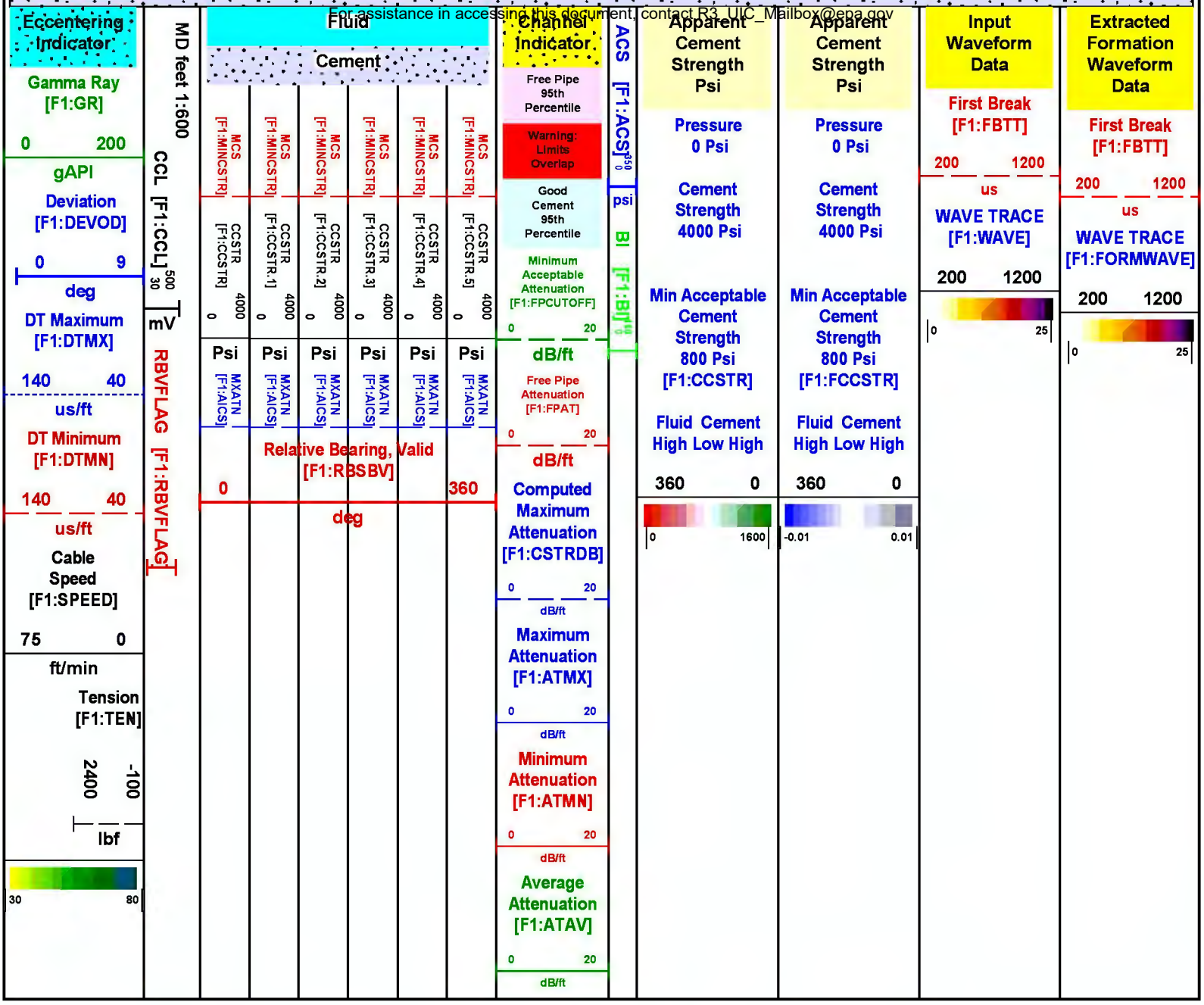








SBT-Bond Cement Evaluation - 5 1/2" Csg.



Baker Hughes

COMPANY	NiSource (Columbia Gas of Pennsylvania)
WELL	C-5
FIELD	Blackhawk
COUNTY	Beaver
STATE	Pennsylvania

FILE NO:

API NO: 37-017-2-0027

LOCATION:

Twp: S. Beaver

LAT 40.775839 LONG -80.444085

ELEVATIONS:

KB N/A
DF N/A
GL 1184.06 FT

DATE 29-Jul-2020

U.S. EPA REGION III
MECHANICAL INTEGRITY TEST RESULT
PRESSURE TEST

COMPANY NAME Columbia Gas of Pennsylvania

LEASE NAME Blackhawk Storage Field

WELL NUMBER C-5 37-007-20027R

DATE 8-12-20

ANNULUS OR TUBING STRING TESTED 5 1/2 x 2 3/8

DEPTH PACKER OR BRIDGE PLUG SET _____

TIME 10:00 **(Beginning)** **TIME** 10:30 **(END)**

RECORDING DEVICE Chart _____

INITIAL TEST PRESSURE 1520 _____

FINAL TEST PRESSURE 1420 _____

MULTIPLY THE INITIAL TEST PRESSURE BY .05 AND SUBTRACT FROM THE INITIAL TEST PRESSURE

	INITIAL TEST PRESSURE	1520
-	**INITIAL TEST PRESSURE X .05**	76
	RESULT	1444

THE WELL PASSES MECHANICAL INTEGRITY IF THE FINAL TEST PRESSURE EXCEEDS THE RESULT CALCULATED ABOVE

TEST RESULT: **PASSED** ✓ **FAILED** _____

COMMENTS: 0 psi on 2 3/8 Tubing During Test

SIGNATURE OF COMPANY REPRESENTATIVE _____

SIGNATURE OF EPA REPRESENTATIVE _____

UM *GAS FIELD & PRESSURE SERVICES*
United Measurement LLC
1461 Masonic Park Road Marietta, OH 45750
Phone: 740.236.8461 Fax: 740.373.8336
Website: unitedmeasurementllc.com

Pressure Certification

Company:	KLX	Date:	12/17/2019
Gauge Description:	10K PSI PRESSURE RECORDER	S/N:	09509

*all as found tests to indicate conditions prior to adjustment

Leaks Found	N	Friction Test	Y	American		Index Read	NA
Gauge Level	Y	Lag Adjusted	NA	Barton		Gear Ratio	NA
Zero	N	Arc Adjusted	N	Crystal		Vol/Rev	NA
Reset Zero	Y	Clock Cycle	PROG	Winters			
				TECHCAL	Y		

P1

AS FOUND

Gauge Range		10000	
Operating @		100	
Test Eq. Up	Field Eq. Up	Test Eq. Dn	Field Eq. Dn
0	100	5000	5100
10000	10200	0	100

AS LEFT

Gauge Range		10000	
Operating @		0	
Test Eq. Up	Field Eq. Up	Test Eq. Dn	Field Eq. Dn
0	0	8000	8000
5000	5000	2000	2000
10000	10000	0	0

P2

AS FOUND

Gauge Range			
Operating @			
Test Eq. Up	Field Eq. Up	Test Eq. Dn	Field Eq. Dn

AS LEFT

Gauge Range			
Operating @			
Test Eq. Up	Field Eq. Up	Test Eq. Dn	Field Eq. Dn

P3

AS FOUND

Gauge Range			
Operating @			
Test Eq. Up	Field Eq. Up	Test Eq. Dn	Field Eq. Dn

AS LEFT

Gauge Range			
Operating @			
Test Eq. Up	Field Eq. Up	Test Eq. Dn	Field Eq. Dn

RTD / TEMP TEST	Range (F):	
AS FOUND		AS LEFT
Test Equip	Field Equip	Test Equip2	Field Equip2

COMMENTS

ADJUSTED STATIC ZERO. THERE WAS BLACK OIL/SLUDGE PLUGGING THE BOURDON TUBE, WHICH WOULD NOT LET PRESSURE BUILD UP INITIALLY. UNINSTALLED AND CLEANED BOURDON TUBE, REINSTALLED. ALSO FLUSHED CUSTOMER FITTING. (1 HR ADD'L LABOR)

Technician:	DAVE MEDLEY	Calibration Complete?:	Y

*UM LLC equipment certifications on file and avialable upon request

RE: Blackhawk C-5
Rectenwald, David
to:
MPagley@nisource.com
09/30/2020 03:22 PM
Hide Details
From: "Rectenwald, David" <Rectenwald.Dave@epa.gov>
To: "MPagley@nisource.com" <MPagley@nisource.com>,

Mike,

Thank you for providing the results of the MIT test conducted on 8-12-2020. In accordance with permit PAS2D041BBEA, for disposal well C-5, you are authorized to continue operation of the permitted disposal well. We require approximately 100 psi be maintained on the casing/tubing annulus. Maintaining 1000 psi is acceptable, as long as there is a least a 100 psi differential between the tubing and casing pressures. Thanks again.

Dave

From: MPagley@nisource.com [mailto:MPagley@nisource.com]
Sent: Wednesday, September 30, 2020 9:48 AM
To: Rectenwald, David <Rectenwald.Dave@epa.gov>
Subject: Blackhawk C-5

Dave, Just checking in to make sure we're god to go n the Disposal Well C-5. Also, in the past we had 360 psi on the outside and now we put 1000 psi on it and just wanted to know if that was OK. Hope everything is well talk to you soon.

Thanks,
Michael Pagley
Columbia Gas of PA
Blackhawk Compressor Station
115 Feit Ln.
Beaver Falls, PA 15010
o. 724 843-3430
c. 412 491-7016

Form Approved OMB No. 2040-0042

EPA

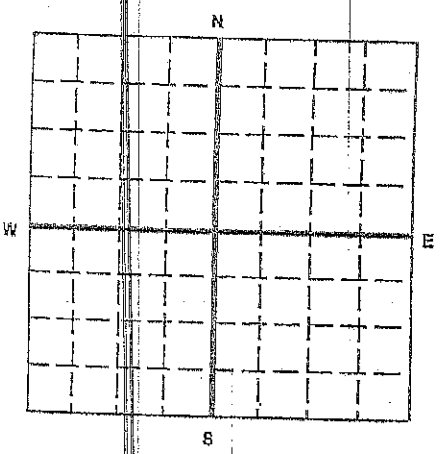
United States Environmental Protection Agency
Washington, DC 20460

ANNUAL DISPOSAL/INJECTION WELL MONITORING REPORT

Name and Address of Existing Permittee
Columbia Gas of Pennsylvania, Inc.
200 Civic Center Drive, PO Box 117
~~Columbus, OH 43216-0117~~

Name and Address of Surface Owner
Columbia Gas of Pennsylvania, Inc.
121 Champion Way Suite 100
Cannonsburg, PA 15317

Locate Well and Outline Unit on Section Plat - 640 Acres



State: PA
County: BEAVER
Permit Number: PAS2D041BBEA

Surface Location Description
____ 1/4 of ____ 1/4 of ____ 1/4 of ____ 1/4 of Section ____ Township ____ Range ____

Locate well in two directions from nearest lines of quarter section and drilling unit
Surface Location 13,000 FT SOUTH OF LATITUDE 40° 47' 30"
7,500 FT WEST OF LONGITUDE 80° 25' 00"
____ ft. frm (N/S) ____ Line of quarter section
and ____ ft. from (E/W) ____ Line of quarter section.

WELL ACTIVITY
- [X] Brine Disposal
- [ ] Enhanced Recovery
- [ ] Hydrocarbon Storage

TYPE OF PERMIT
- [ ] Individual
- [ ] Area

Number of Wells 1

Lease Name John W Galey Well Number C-5

MONTH YEAR	INJECTION PRESSURE AVERAGE PSIG	INJECTION PRESSURE MAXIMUM PSIG	TOTAL VOLUME INJECTED BBL	TOTAL VOLUME INJECTED MCF	TUBING – CASING ANNULUS PRESSURE (OPTIONAL MONITORING) MINIMUM PSIG	TUBING – CASING ANNULUS PRESSURE (OPTIONAL MONITORING) MAXIMUM PSIG
1-2020	0	0	72			
2-2020	0	0	8			
3-2020	0	0	54			
4-2020	0	0	2			
5-2020	0	0	2			
6-2020	0	SHUT IN	0			
7-2020	0	SHUT IN	0			
8-2020	0	SHUT IN	0			
9-2020	0	SHUT IN	0			
10-2020	0	SHUT IN	0			
11-2020	0	SHUT IN	0			
12-2020	0	SHUT IN	0			

Certification

I certify under the penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment. (Ref. 40 CFR 144.32)

Name and Official Title *(Please type or print)*	Signature	Date Signed

EPA Form 7520-11

OMB No. 2040-0042 Approval Expires 12/31/2018

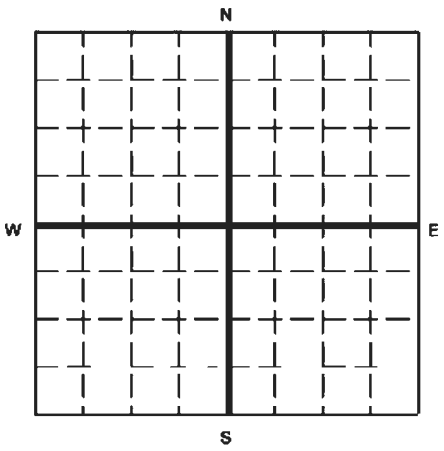
EPA

United States Environmental Protection Agency
Washington, DC 20460

ANNUAL DISPOSAL/INJECTION WELL MONITORING REPORT

Name and Address of Existing Permittee	Name and Address of Surface Owner
Columbia Gas of Pennsylvania, Inc. 121 Champion Way, Suite 100, Cannonsburg, PA 15317	Columbia Gas of Pennsylvania, Inc. 121 Champion Way, Suite 100, Cannonsburg, PA 15317

Locate Well and Outline Unit on Section Plat - 640 Acres



State	County	Permit Number
PA	Beaver	PAS2D041BBEA

Surface Location Description

____ 1/4 of 1/4 of 1/4 of ____ 1/4 of Section ____ Township Range

Locate well in two directions from nearest lines of quarter section and drilling unit

Surface Location: 13,000 ft. South of Latitude 40° 47' 30"
7,500 ft. West of Longitude 80° 25' 00"

ft. frm (N/S) ____ Line of quarter section
and ft. from (E/W) ____ Line of quarter section.

WELL ACTIVITY	TYPE OF PERMIT
✔ Brine Disposal	Individual
Enhanced Recovery	Area
Hydrocarbon Storage	Number of Wells 1

Lease Name John Galey Well Number C-5

	INJECTION PRESSURE		TOTAL VOLUME INJECTED		TUBING -- CASING ANNULUS PRESSURE (OPTIONAL MONITORING)	
MONTH YEAR	AVERAGE PSIG	MAXIMUM PSIG	BBL	MCF	MINIMUM PSIG	MAXIMUM PSIG
January-2021	400	0	582			
February-2021	0	0	0			
March-2021	400	0	286			
April-2021		Shut In	0			
May-2021		Shut In	0			
June-2021		Shut In	0			
July-2021		Shut In	0			
August-2021		Shut In	0			
September-2021		Shut In	0			
October-2021		Shut In	0			
November-2021		Shut In	0			
December-2021		Shut In	0			

Certification

I certify under the penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment. (Ref. 40 CFR 144.32)

Name and Official Title *(Please type or print)*	Signature	Date Signed
Mark Kempic, President and COO	Mark Kempic	01/30/23

Form Approved OMB No. 2040-0042

EPA

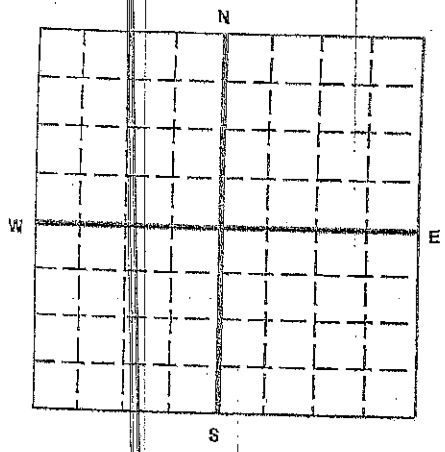
United States Environmental Protection Agency
Washington, DC 20460

ANNUAL DISPOSAL/INJECTION WELL MONITORING REPORT

Name and Address of Existing Permittee
Columbia Gas of Pennsylvania, Inc.
200 Civic Center Drive, PO Box 117
~~Columbus, OH 43216-0117~~

Name and Address of Surface Owner
Columbia Gas of Pennsylvania, Inc.
121 Champion Way Suite 100
Cannonsburg, PA 15317

Locate Well and Outline Unit on Section Plat - 640 Acres



State: PA
County: BEAVER
Permit Number: PAS2D041BBEA

Surface Location Description
____ 1/4 of ____ 1/4 of ____ 1/4 of ____ 1/4 of Section ____ Township ____ Range ____

Locate well in two directions from nearest lines of quarter section and drilling unit
Surface Location: 13,000 FT SOUTH OF LATITUDE 40° 47' 30"
7500 FT WEST OF Longitude 80° 25' 00"
____ ft. frm (N/S) ____ Line of quarter section
and ____ ft. from (E/W) ____ Line of quarter section.

WELL ACTIVITY
- [X] Brine Disposal
- [ ] Enhanced Recovery
- [ ] Hydrocarbon Storage

TYPE OF PERMIT
- [ ] Individual
- [ ] Area

Number of Wells 1

Lease Name John Galey Well Number C-5

MONTH YEAR	INJECTION PRESSURE AVERAGE PSIG	INJECTION PRESSURE MAXIMUM PSIG	TOTAL VOLUME INJECTED BBL	TOTAL VOLUME INJECTED MCF	TUBING -- CASING ANNULUS PRESSURE (OPTIONAL MONITORING) MINIMUM PSIG	TUBING -- CASING ANNULUS PRESSURE (OPTIONAL MONITORING) MAXIMUM PSIG
1-22	400	—	582	—	—	—
2-22	—	—	—	—	—	—
3-22	400	—	256	—	—	—
4-22	SHUT IN					
5-22	SHUT IN	—	—	—	—	—
6-22	SHUT IN	—	—	—	—	—
7-22	SHUT IN	—	—	—	—	—
8-22	SHUT IN	—	—	—	—	—
9-22	SHUT IN	—	—	—	—	—
10-22	SHUT IN	—	—	—	—	—
11-22	SHUT IN	—	—	—	—	—
12-22	SHUT IN	—	—	—	—	—

Certification

I certify under the penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment. (Ref. 40 CFR 144.32)

Name and Official Title *(Please type or print)*	Signature	Date Signed

EPA Form 7520-11

Form Approved OMB No. 2040-0042

EPA

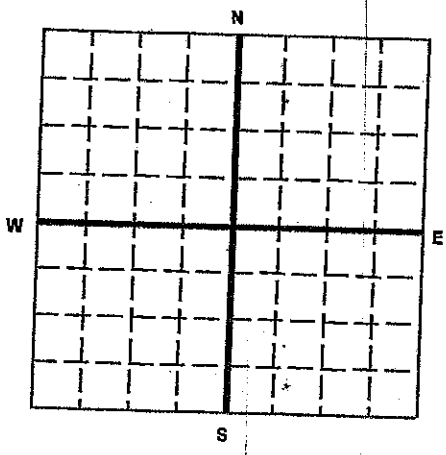
United States Environmental Protection Agency
Washington, DC 20460

ANNUAL DISPOSAL/INJECTION WELL MONITORING REPORT

Name and Address of Existing Permittee
Columbia Gas of Pennsylvania, Inc.
200 Civic Center Drive, PO Box 117
~~Columbus, OH 43216-0117~~

Name and Address of Surface Owner
Columbia Gas of Pennsylvania, Inc.
650 Washington Road, Suite 203
Pittsburgh, PA 15228

Locate Well and Outline Unit on Section Plat - 640 Acres



State: PA
County: BEAVER
Permit Number: PAS2D041BBEA

Surface Location Description
____ 1/4 of ____ 1/4 of ____ 1/4 of ____ 1/4 of Section ____ Township ____ Range ____

Locate well in two directions from nearest lines of quarter section and drilling unit
Surface Location 13,000 FT SOUTH of LATITUDE 40° 47' 30"
7500 FT WEST of Longitude 80° 25' 00"
____ ft. frm (N/S) ____ Line of quarter section
and ____ ft. from (E/W) ____ Line of quarter section.

WELL ACTIVITY
- [X] Brine Disposal
- [ ] Enhanced Recovery
- [ ] Hydrocarbon Storage

TYPE OF PERMIT
- [ ] Individual
- [ ] Area

Number of Wells 1

Lease Name John Galey Well Number C-5

MONTH YEAR	INJECTION PRESSURE AVERAGE PSIG	INJECTION PRESSURE MAXIMUM PSIG	TOTAL VOLUME INJECTED BBL	TOTAL VOLUME INJECTED MCF	TUBING -- CASING ANNULUS PRESSURE (OPTIONAL MONITORING) MINIMUM PSIG	TUBING -- CASING ANNULUS PRESSURE (OPTIONAL MONITORING) MAXIMUM PSIG
1-23	Shut in					
2-23	Shut in					
3-23	Shut in					
4-23	400		924			
5-23	Shut in					
6-23	Shut in					
7-23	Shut in					
8-23	Shut in					
9-23	Shut in					
10-23	Shut in					
11-23	Shut in					
12-23	Shut in					

Certification

I certify under the penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment. (Ref. 40 CFR 144.32)

Name and Official Title *(Please type or print)*	Signature	Date Signed

EPA Form 7520-11

2019 Ninth Avenue
PO Box 1925
Altoona, PA 16603
(814) 946-4306

NELAP: PA 07-062, VA 460212
State Certifications: MD 275, WV 364

FAIRWAY LABORATORIES
www.fairwaylaboratories.com

Columbia Gas of PA
101 Stoney Ridge Dr
Monaca, PA 15601

Project: Blackhawk Compressor Station
Project Number: 115 Fiet Lane, Beaver Falls, PA 15010
Collector: Client
Reported:

Project Manager: Vince Catalano U129523
Number of Containers: 7
01/26/23 12:29

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Sample Type	Date Sampled	Date Received
CGPA -5 Brine Sample - 1	AXA1547-01	Water	Grab	01/09/23 09:00	01/09/23 17:40

Fairway Laboratories, Inc.

Reviewed and Submitted by:

Michael P. Tyler
Laboratory Director

Fairway Labs in Altoona, PA is a NELAP (National Environmental Laboratory Accreditation Program) accredited lab, and as such, certifies that all applicable test results meet the requirements of NELAP, unless otherwise stated on the analytical report.

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

2019 Ninth Avenue
PO Box 1925
Altoona, PA 16603
(814) 946-4306

NELAP: PA 07-062, VA 460212
State Certifications: MD 275, WV 364

FAIRWAY LABORATORIES
www.fairwaylaboratories.com

Columbia Gas of PA
101 Stoney Ridge Dr
Monaca, PA 15601

Project: Blackhawk Compressor Station
Project Number: 115 Fiet Lane, Beaver Falls, PA 15010
Collector: Client
Reported:
Project Manager: Vince Catalano U129523
Number of Containers: 7
01/26/23 12:29

Client Sample ID: CGPA -5 Brine Sample - 1
Date/Time Sampled: 01/09/23 09:00

Laboratory Sample ID: AXA1547-01 (Water/Grab)

Analyte	Result	MDL	RL	Units	Date / Time Analyzed	Analytical Method	* Analyst	Note
Analyses to be performed immediately upon sampling. See Definition indicated by: #								
# Dissolved Oxygen	3.00		0.100	mg/l	01/10/23 17:26	SM 4500-O-G-16	arw	
# pH @ 21.42°C	5.79			pH Units	01/13/23 11:15	SM 4500-H-B-11	sac	
Calculated Analytes								
Hardness	77000		207	mg equiv. CaCO3/L	01/24/23 12:29	CALC	seg	
Conventional Chemistry Parameters by SM/EPA Methods								
Total Alkalinity to pH 4.5	57.9		20.0	mg CaCO3/L	01/13/23 11:15	SM 2320B-11	sac	
Chloride	182000		20000	mg/l	01/24/23 14:39	EPA 300.0/2.1	bdw	
Specific Conductance (EC)	194000		5.00	umhos/cm	01/13/23 11:15	SM 2510B-11	sac	
Total Dissolved Solids	471000		2000	mg/l	01/10/23 15:51	SM 2540C-15	ark	
Specific Gravity	1.204		0.300	-	01/10/23 11:50	SM 2710F	ark	
Sulfide	<4.00		4.00	mg/l	01/11/23 14:06	SM 4500 S2 F-11	sac	
Total Organic Carbon	<10.0		10.0	mg/l	01/18/23 14:54	SM 5310 C-14	bdw	
Metals by Prep Method EPA 200.2								
Barium	21.1		2.00	mg/l	01/24/23 12:29	EPA 200.7/4.4	seg	T
Calcium	25600		50.0	mg/l	01/24/23 12:29	EPA 200.7/4.4	seg	T
Iron	292		20.0	mg/l	01/24/23 12:29	EPA 200.7/4.4	seg	T

2019 Ninth Avenue
PO Box 1925
Altoona, PA 16603
(814) 946-4306

NELAP: PA 07-062, VA 460212
State Certifications: MD 275, WV 364

FAIRWAY LABORATORIES
www.fairwaylaboratories.com

Columbia Gas of PA
101 Stoney Ridge Dr
Monaca, PA 15601

Project: Blackhawk Compressor Station
Project Number: 115 Fiet Lane, Beaver Falls, PA 15010
Collector: Client
Reported:

Project Manager: Vince Catalano U129523
Number of Containers: 7
01/26/23 12:29

Client Sample ID: **CGPA -5 Brine Sample - 1**
Date/Time Sampled: 01/09/23 09:00

Laboratory Sample ID: **AXA1547-01 (Water/Grab)**

Analyte	Result	MDL	RL	Units	Date / Time Analyzed	Analytical Method	* Analyst	Note
Metals by Prep Method EPA 200.2								
Magnesium	3190		20.0	mg/l	01/24/23 12:29	EPA 200.7/4.4	seg	T
Manganese	3.64		2.00	mg/l	01/24/23 12:31	EPA 200.7/4.4	seg	T
Sodium	81400		100	mg/l	01/24/23 12:29	EPA 200.7/4.4	seg	T

2019 Ninth Avenue
PO Box 1925
Altoona, PA 16603
(814) 946-4306

NELAP: PA 07-062, VA 460212
State Certifications: MD 275, WV 364

FAIRWAY LABORATORIES
www.fairwaylaboratories.com

Columbia Gas of PA		Project:	Blackhawk Compressor Station
101 Stoney Ridge Dr		Project Number:	115 Fiet Lane, Beaver Falls, PA 15010
Monaca, PA 15601		Collector:	Client
Project Manager:	Vince Catalano U129523	Number of Containers:	7
			Reported: 01/26/23 12:29

Notes

T Result was over the calibration range, but within the linear dynamic range of the instrument for the noted analyte.

2019 Ninth Avenue
PO Box 1925
Altoona, PA 16603
(814) 946-4306

NELAP: PA 07-062, VA 460212
State Certifications: MD 275, WV 364

FAIRWAY LABORATORIES
www.fairwaylaboratories.com

Columbia Gas of PA		Project:	Blackhawk Compressor Station
101 Stoney Ridge Dr		Project Number:	115 Fiet Lane, Beaver Falls, PA 15010
Monaca, PA 15601		Collector:	Client
Project Manager:	Vince Catalano U129523	Number of Containers:	7
			Reported: 01/26/23 12:29

Definitions:

If surrogate values are not within the indicated range, then the results are considered to be estimated.

Reporting limits are adjusted accordingly when samples are analyzed at a dilution due to the matrix.

\+ MBAS, calculated as LAS, mol wt 348

If the solid sample weight for VOC analysis does not fall within the 3.5-6.5 gram range, the results are considered estimated values.

Unless otherwise noted, all results for solids are reported on a dry weight basis.

Samples collected by Fairway Laboratories' personnel are done so in accordance with Standard Operating Procedures established by Fairway Laboratories.

The following analyses are to be performed immediately upon sampling: pH, sulfite, chlorine residual, dissolved oxygen, filtration for ortho phosphorus, and ferrous iron. The date and time reported reflect the time the samples were analyzed at the laboratory; and should be considered as analyzed outside the EPA holding time.

^ The following analytes are to be filtered immediately upon sampling: Hexavalent Chromium. Filtration through a 0.45 micron filter within 15 minutes of sampling is required for compliance with the Clean Water Act (CWA) for reporting of hexavalent chromium to prevent interconversion of chromium species.

* **Analysis location indicator:**
D: Indicates analysis performed by Fairway Laboratories, Inc., 40 Hoover Ave., DuBois, PA 15801. PA DEP Chapter 252 certification: PA 33-00258.
E: Indicates analysis performed by Fairway Laboratories, Inc., 1920 East 38th Street, Erie, PA 16510. NELAP certification: PA 25-05907.
P: Indicates analysis performed by Fairway Laboratories, Inc., 89 Kristi Rd., Pennsdale, PA 17756. PA DEP Chapter 252 certification: PA 41-04684.
W: Indicates analysis performed by Fairway Laboratories, Inc., 1851 Golden Mile Rd., Wysox, PA 18854. NELAP certification: PA 08-05622 and NY 12127.

< Represents "less than" - indicates that the result was less than the RL, or the MDL if indicated for the parameter.

MDL Method Detection Limit - is the lowest or minimum level that provides 99% confidence level that the analyte is detected. Any reported result values that are less than the RL are considered estimated values. If Radiological results are reported, the MDC - Minimum Detectable Concentration is shown in the MDL column.

RL Reporting Limit - is the lowest or minimum level at which the analyte can be quantified.

2019 Ninth Avenue
PO Box 1925
Altoona, PA 16603
(814) 946-4306

NELAP: PA 07-062, VA 460212
State Certifications: MD 275, WV 364

FAIRWAY LABORATORIES
www.fairwaylaboratories.com

Columbia Gas of PA		Project:	Blackhawk Compressor Station
101 Stoney Ridge Dr		Project Number:	115 Fiet Lane, Beaver Falls, PA 15010
Monaca, PA 15601		Collector:	Client
Project Manager:	Vince Catalano U129523	Number of Containers:	7
			Reported: 01/26/23 12:29

Definitions Continued:

[CALC] Indicates a calculated result. Calculations use results from other analyses performed under accredited methods.

ND Non Detect. The noted analyte was not detected in the sample.

(-) Method Revision Indicator - West Virginia Samples

EPA 8270D - : Indicates that samples collected in West Virginia are analyzed by Method SW 8270E.
EPA 8260B - : Indicates that samples collected in West Virginia are analyzed by Method SW 8260D.
EPA 8015D - : Indicates that samples collected in West Virginia are analyzed by Method SW 8015C.
EPA 1010 - : Indicates that samples collected in West Virginia are analyzed by Method SW 1010B.
EPA 6010B - : Indicates that samples collected in West Virginia are analyzed by Method SW 6010D.

2019 Ninth Avenue
PO Box 1925
Altoona, PA 16603
(814) 946-4306

NELAP: PA 07-062, VA 460212
State Certifications: MD 275, WV 364

FAIRWAY LABORATORIES
www.fairwaylaboratories.com

Columbia Gas of PA		Project:	Blackhawk Compressor Station
101 Stoney Ridge Dr		Project Number:	115 Fiet Lane, Beaver Falls, PA 15010
Monaca, PA 15601		Collector:	Client
Project Manager:	Vince Catalano U129523	Number of Containers:	7
			Reported: 01/26/23 12:29

Terms & Conditions

Services provided by Fairway Laboratories Inc. are limited to the terms and conditions stated herein, unless otherwise agreed to in a formal contract.

CHAIN OF CUSTODY Fairway Laboratories Inc. ("Fairway," "us" or "we") will initiate a chain-of-custody/request for analysis upon sample receipt unless the client includes a completed form with the received sample(s). Upon request, Fairway will provide chain-of-custody forms for use.

CONFIDENTIALITY Fairway maintains confidentiality in all of our client interactions. The client's consent will be required before releasing information about the services provided.

CONTRACTS All contracts are subject to review and approval by Fairway's legal council. Each contract must be signed by a corporate officer.

PAYMENT/BILLING Unless otherwise set forth in a signed contract or purchase order, terms of payment are "NET 30 Days." The time allowed for payment shall begin based on the invoice date. A 1.5% per month service charge may be added to all unpaid balances beyond the initial 30 days. In its sole discretion, Fairway reserves the right to request payment before services and hold sample results for payment of due balances. We will not bill a third party without prior agreement among all parties acknowledging and accepting responsibility for payment.

SAMPLE COLLECTION AND SUBMISSION Clients not requesting collection services from Fairway are responsible for proper collection, preservation, packaging, and delivery of samples to the laboratory in accordance with current law and commercial practice. Fairway shall have no responsibility for sample integrity prior to the receipt of the sample(s) and/or for any inaccuracy in test or analyses results as a result of the failure of the client or any third party to maintain the integrity of samples prior to delivery to Fairway. All samples submitted must be accompanied by a completed chain of custody or similar document clearly noting the requested analyses, date/time sampled, client contact information, and trail of custody. Samples received at the laboratory after business hours are verified on the next business day. Discrepancies are documented on the Receiving Document.

SUBCONTRACTING Some analyses may require subcontracting to another laboratory. Unless the client indicates otherwise, this decision will be made by Fairway. Subcontracted work will be identified on the final report in accordance with NELAC requirements.

RETURN OF RESULTS Fairway routinely provides faxed or verbal results within 10 working days of receipt of sample(s) and a hard copy of the data results is routinely received via US Postal Service within 15 working days. At the request of the client, Fairway may offer expedited return of sample results. Surcharges may apply to rush requests. All rush requests must be pre-approved by Fairway. We reserve the right to charge an archive retrieval fee for results older than one (1) year from the date of the request. All records will be maintained by Fairway for 5 years, after which, they will be destroyed.

SAMPLE DISPOSAL Fairway will maintain samples for four (4) weeks after the sample receipt date. Fairway will dispose of samples which are not and/or do not contain hazardous wastes (as such term is defined by applicable federal or state law), unless prior arrangements have been made for long-term storage. Fairway reserves the right to charge a disposal fee for the proper disposal of samples found or suspected to contain hazardous waste. A return shipping charge will be invoiced for samples returned to the client at their request.

HAZARD COMMUNICATION The client has the responsibility to inform the laboratory of any hazardous characteristics known or suspected about the sample, and to provide information on hazard prevention and personal protection as necessary or otherwise required by applicable law.

WARRANTY AND LIMITATION OF LIABILITY For services rendered, Fairway warrants that it will apply its best scientific knowledge and judgment and to employ its best level of effort consistent with professional standards within the environmental testing industry in performing the analytical services requested by its clients. We disclaim any other warranties, expressed or implied by law. Fairway does not accept any legal responsibility for the purposes for which client uses the test results.

LITIGATION All costs associated with compliance to any subpoena for documents, for testimony in a court of law, or for any other purpose relating to work performed by Fairway Laboratories, Inc. shall be invoiced by Fairway and paid by client. These costs shall include, but are not limited to, hourly charges for the persons involved, travel, mileage, and accommodations and for any and all other expenses associated with said litigation.

Fairway Labs in Altoona, PA is a NELAP (National Environmental Laboratory Accreditation Program) accredited lab, and as such, certifies that all applicable test results meet the requirements of NELAP, unless otherwise stated on the analytical report.

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

CHAIN OF CUSTODY/ REQUEST FOR ANALYSIS

Please print. See back of COC for instructions/terms and conditions.

FAIRWAY LABORATORIES
Environmental Laboratory
2019 9th Ave.
P.O. Box 1925
Altoona, PA 16602
Phone: (814) 946-4306
Fax: (814) 946-8791

Client Page # ____ of ____

Client Name: Columbia Gas of Pennsylvania
Address: 115 Fiet Lane
Beaver Falls, PA 15010
Contact: Vince Catalano
Phone #: 724-327-5907
Fax #:
Project Name: Blackhawk Compressor Staitor
Quote/PO #:

Received on ice? Y (N)
Sample Temp:

Reportable to PADEP? Yes ☐
PWSID #

TAT: Normal ☒ Rush ☐
Rush TAT subject to pre-approval and surcharge.
Date Required: 01/09/23

LAB USE ONLY
Work Order # AXA1547
Attach #
FLI Page # 1 of 1
Tracking #

Sample Description/Location	GRAB	Composite	Composite Start Date	Composite Start Time	GRAB -or- Composite End Date	GRAB -or- Composite End Time	Matrix: Solid	Matrix: Water	Matrix: Other Brine	# of Containers	*	120.1, D1429_87, SM4500_CL_E, SM4500_H+	SM4500_O_G - Oxygen Dissolved	2340C - Total Hardness	2540C_Calcd- Total Dissolved Solids / SM4500_S2_F - Hydrogen Sulfide	SM5310C - Total Organic Carbon			Bottle Type/Comments
			Military or AM/PM required								6010B- Metals 2320B - Alkalinity, Total								
CGPA -5 Brine Sample - 1	X				1/9/23	09:00			X	6	X	X	X	X	X				5.2

AXA1547

Sampled by: (Signature) Gerald Staples

	Date	Time
Relinquished by: Gerald Staples	09/23	1245
Relinquished by:		
Relinquished by:		

	Date	Time
Received by:		
Received by: Aaron Reigh	1-9-23	1245
Received by: Aaron Reigh	1-9-23	1710
Received by:		

Remarks
* Ba, Ca, Fe, Mg, Mn, Na

CID 79 RG 9

By relinquishing my sample to Fairway Laboratories, Inc., I hereby agree to the terms and conditions printed on the reverse. White Original - FLI File Canary - FLI Copy Pink - Customer Receipt Copy

SOP FLI0601-002.A Revision 1 Date: March 16, 2021 Page of

Chain of Custody Receiving Document

Page 2 of 2 AXAIS47

Receiver: bH

Date/Time of this check: 1/9/23 18:56 Client: Columbia Gas Lab #

Received on ICE? ✓ ☐ * Sample Temperature when delivered to the Lab: 5.2°C Acceptable? ✓ ☐ * or In cool down process? ☐ *

(Not applicable for WV compliance)

Custody Seals? N Intact? N

Morning Temperature Verification <6°C (if applicable): ☐

COC/Labels on bottles agree? ✓ ☐* Correct containers for all the analysis requested? ✓ ☐ * Matrix: Water

COC #	Number and Type of BOTTLES										Comments
	Poly Non-Pres. 1L	Poly ~~H2SO4~~ NP 250ml	Poly HNO3 cZ 250 ml	Amber H2SO4 125ml	Amber Non-Pres.	Poly NaOH	VOCS (Head space?)	Other BOD bottle ☐ *	Properly Preserved ☐ *	Bacti	☐ * Internal notification completed for deviations.
Brine Sample	3	1	1	1				1	Y		

* DEVIATION PRESENT:		CLIENT CALLED:	CLIENT RESPONSE:	
⊗ No Ice	( )	YES ( )	Proceed with analysis; qualify data	( )
⊗ Not at Proper Temperature	( )	By Whom:	Will Resample	( )
⊗ Wrong Container	( )		Provided Information	( )
⊗ Missing Information:	( )	Date:	No Response; Proceed and qualified	( )
			Client Contact: Date:	

* Comments: BOD bottle and 125ml have no information/labels on them. They were in a bag with the rest of the samples

ATTACHMENT E

Plugging and Abandonment Plan

OMB No. 2040-0042 Approval Expires 12/31/2026

United States Environmental Protection Agency

EPA

WELL REWORK RECORD, PLUGGING AND ABANDONMENT PLAN, OR PLUGGING AND ABANDONMENT AFFIDAVIT

Permittee Name and Address, Phone Number and/or Email

Permit or EPA ID Number	API Number	Full Well Name

State	County

Locate well in two directions from nearest lines of quarter section and drilling unit

Surface Location

1/4 of 1/4 of Section Township Range

Latitude

Longitude

ft. from (N/S) Line of quarter section

ft. from (E/W) Line of quarter section.

Well Class	Timing of Action (pick one)	Type of Action (pick one)
Class I Class II Class III Class V	Notice Prior to Work Date Expected to Commence Report After Work Date Work Ended	Well Rework Plugging and Abandonment Conversion to a Non-Injection Well

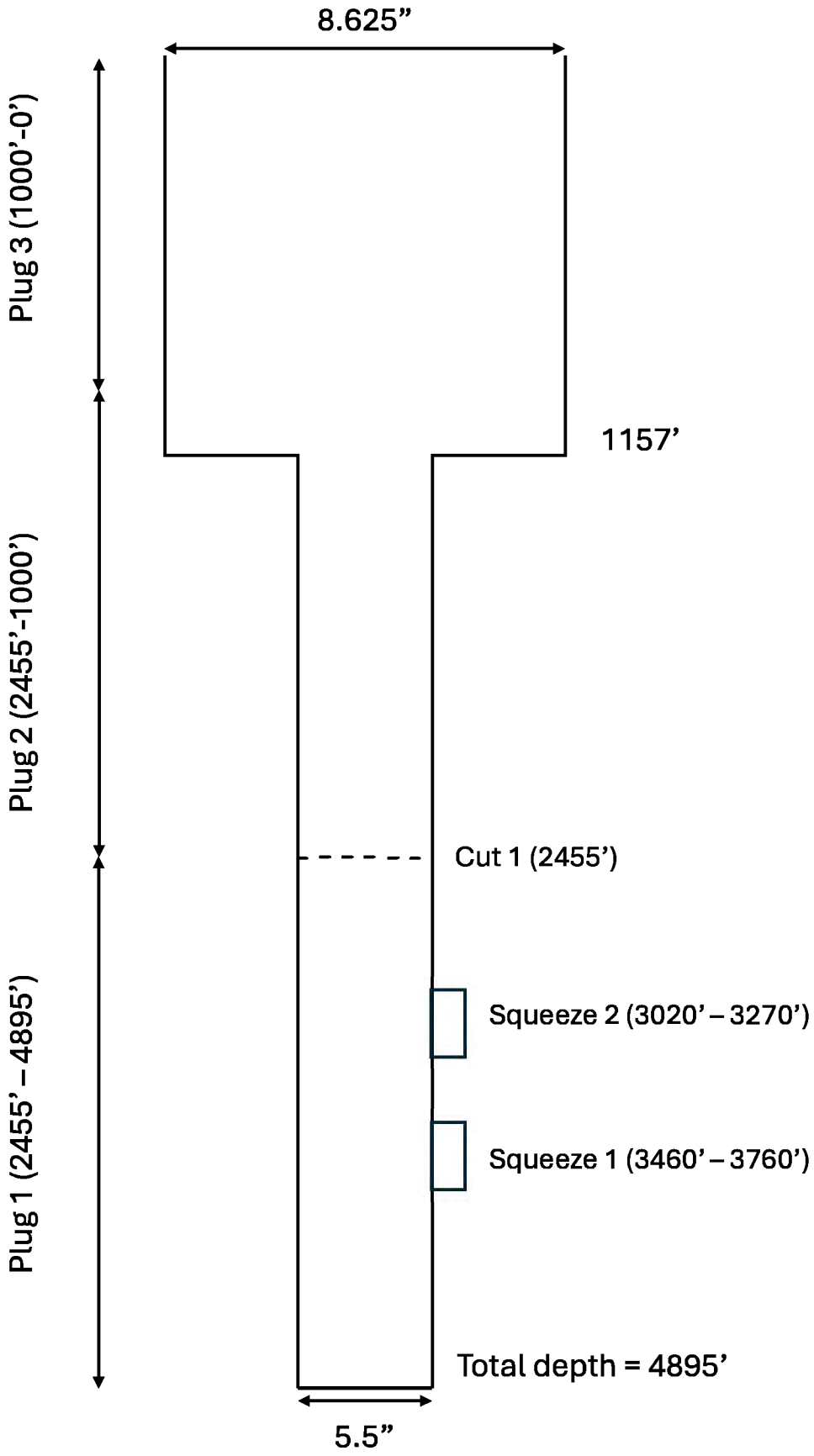
Provide a narrative description of the work planned to be performed, or that was performed. Alternatively, attach a report that meets the requirements. Use additional pages as necessary. Please see the instructions for the specific information that must be provided.

Certification

I certify under the penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment. (Ref. 40 CFR § 144.32)

Authorized Signatory and Official Title *(Please type or print)*	Signature	Date Signed
	Brian Scutta	October 14, 2024

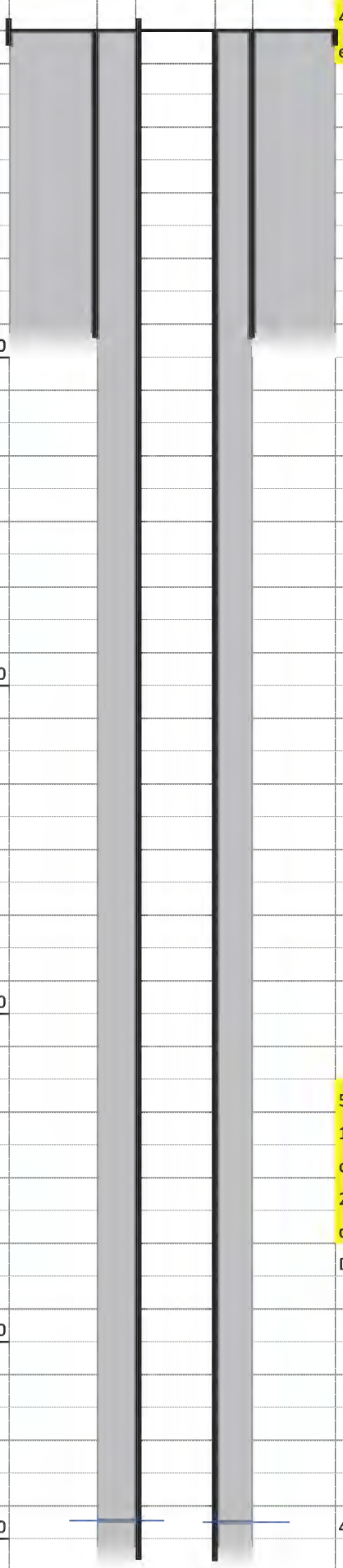
Attachment A:



C-5 Wellbore Schematic:

For assistance in accessing this document, contact R3_UIC_Mailbox@epa.gov

Well	**Blackhawk C-5 (saltwater disposal well)**			Scale: 1 cell row height = 100 feet
Permit No.	**007-20027**			4" 5000psi orbit valve, 8x5 wh National Supp
Latitude (ref)	40.75602			estimated TOC 8" = surface
Longitude (ref)	-80.443838			
Location	Corrected using Goog Maps			
Elevation	1184.06			
Reference	GL	log ref GL		
Surface Casing				
Hole Diameter	9.625	log		
Depth	1157	1164	1000	
Casing Diameter	8.625			
Casing Weight per foot	24			
Casing Grade	J-55			
Casing Threads	8rd (assumed)			
Cement Sacks	450			
Calculated TOC*min				
Calculated TOC*max	circ to surf			
	3 centralizers; float shoe			
Intmd Casing				
Hole Diameter			2000	
Depth				
Casing Diameter				
Casing Weight				
Casing Grade				
Casing Threads				
Cement Sacks				
Calculated TOC*min				
Calculated TOC*max				
Production Casing			3000	
Hole Diameter	7.875			
Depth	4895			
Casing Diameter	5.5	4677		5-1`/2" cement job:
Casing Weight	17			1st stage 500 sx, 120 sx returned, DV tool
Casing Grade	J-55			open at 1500#
Casing Threads	8rd (assumed)			2nd stage 800 sx, minimal returns
Cement Sacks	1300			closing pressure 3200#
Calculated TOC*min				DV tool at 3832'
Calculated TOC*max	circ to surf; DV tool			
	17 centralizers; float shoe&collar		4000	
Perforations				
Top				
Bottom				
shots per foot				
Other			4600	4spf perforations '
Tubing				DTD 4909



ATTACHMENT F

Financial Assurance

TRAVELERS

INCREASE RIDER

RIDER

To be attached to and form part of Bond No. **8000221-108**.

Issued on behalf of **Columbia Gas of Pennsylvania, Inc.** as Principal, and in favor of **The United States Environmental Protection Agency, Region III** as Obligee.

It is agreed that:

☐ 1. The Surety hereby gives its consent to change the Name:

from: _____

to: _____

☐ 2. The Surety hereby gives its consent to change the Address:

from: _____

to: _____

☒ 3. The Surety hereby gives its consent to change the **Bond Amount**:

from: **$75,000.00**

to: **$352,000.00**

4. This rider shall become effective as of **09/05/2024**

PROVIDED, however, that the liability of the Surety under the attached bond as changed by this Rider shall not be cumulative.

Signed, sealed and dated **09/05/2024**.

Travelers Casualty and Surety Company of America

By: _____
Jeffrey M. Wilson Attorney-in-Fact

Accepted: **The United States Environmental Protection Agency, Region III**
Obligee

By: _____

or **Columbia Gas of Pennsylvania, Inc.**
Principal

By: _____

S-4111 (8/66)

TRAVELERS

Travelers Casualty and Surety Company of America
Travelers Casualty and Surety Company
St. Paul Fire and Marine Insurance Company

POWER OF ATTORNEY

KNOW ALL MEN BY THESE PRESENTS: That Travelers Casualty and Surety Company of America, Travelers Casualty and Surety Company, and St. Paul Fire and Marine Insurance Company are corporations duly organized under the laws of the State of Connecticut (herein collectively called the "Companies"), and that the Companies do hereby make, constitute and appoint **Jeffrey M Wilson** of **BIRMINGHAM**, **Alabama**, their true and lawful Attorney(s)-in-Fact to sign, execute, seal and acknowledge any and all bonds, recognizances, conditional undertakings and other writings obligatory in the nature thereof on behalf of the Companies in their business of guaranteeing the fidelity of persons, guaranteeing the performance of contracts and executing or guaranteeing bonds and undertakings required or permitted in any actions or proceedings allowed by law

IN WITNESS WHEREOF, the Companies have caused this instrument to be signed, and their corporate seals to be hereto affixed, this **21st** day of **April, 2021.**

State of Connecticut

City of Hartford ss.

By _____
Robert L. Raney, Senior Vice President

On this the **21st** day of **April, 2021**, before me personally appeared **Robert L. Raney**, who acknowledged himself to be the Senior Vice President of each of the Companies, and that he, as such, being authorized so to do, executed the foregoing instrument for the purposes therein contained by signing on behalf of said Companies by himself as a duly authorized officer.

IN WITNESS WHEREOF, I hereunto set my hand and official seal.

My Commission expires the **30th** day of **June, 2026**

_____
Anna P. Nowik, Notary Public

This Power of Attorney is granted under and by the authority of the following resolutions adopted by the Boards of Directors of each of the Companies, which resolutions are now in full force and effect, reading as follows:

RESOLVED, that the Chairman, the President, any Vice Chairman, any Executive Vice President, any Senior Vice President, any Vice President, any Second Vice President, the Treasurer, any Assistant Treasurer, the Corporate Secretary or any Assistant Secretary may appoint Attorneys-in-Fact and Agents to act for and on behalf of the Company and may give such appointee such authority as his or her certificate of authority may prescribe to sign with the Company's name and seal with the Company's seal bonds, recognizances, contracts of indemnity, and other writings obligatory in the nature of a bond, recognizance, or conditional undertaking, and any of said officers or the Board of Directors at any time may remove any such appointee and revoke the power given him or her; and it is

FURTHER RESOLVED, that the Chairman, the President, any Vice Chairman, any Executive Vice President, any Senior Vice President or any Vice President may delegate all or any part of the foregoing authority to one or more officers or employees of this Company, provided that each such delegation is in writing and a copy thereof is filed in the office of the Secretary, and it is

FURTHER RESOLVED, that any bond, recognizance, contract of indemnity, or writing obligatory in the nature of a bond, recognizance, or conditional undertaking shall be valid and binding upon the Company when (a) signed by the President, any Vice Chairman, any Executive Vice President, any Senior Vice President or any Vice President, any Second Vice President, the Treasurer, any Assistant Treasurer, the Corporate Secretary or any Assistant Secretary and duly attested and sealed with the Company's seal by a Secretary or Assistant Secretary; or (b) duly executed (under seal, if required) by one or more Attorneys-in-Fact and Agents pursuant to the power prescribed in his or her certificate or their certificates of authority or by one or more Company officers pursuant to a written delegation of authority; and it is

FURTHER RESOLVED, that the signature of each of the following officers: President, any Executive Vice President, any Senior Vice President, any Vice President, any Assistant Vice President, any Secretary, any Assistant Secretary, and the seal of the Company may be affixed by facsimile to any Power of Attorney or to any certificate relating thereto appointing Resident Vice Presidents, Resident Assistant Secretaries or Attorneys-in-Fact for purposes only of executing and attesting bonds and undertakings and other writings obligatory in the nature thereof, and any such Power of Attorney or certificate bearing such facsimile signature or facsimile seal shall be valid and binding upon the Company and any such power so executed and certified by such facsimile signature and facsimile seal shall be valid and binding on the Company in the future with respect to any bond or understanding to which it is attached.

I, **Kevin E. Hughes**, the undersigned, Assistant Secretary of each of the Companies, do hereby certify that the above and foregoing is a true and correct copy of the Power of Attorney executed by said Companies, which remains in full force and effect.

Dated this 5th day of September 2024

_____
Kevin E. Hughes, Assistant Secretary

To verify the authenticity of this Power of Attorney, please call us at 1-800-421-3880.
Please refer to the above-named Attorney(s)-in-Fact and the details of the bond to which this Power of Attorney is attached.

REGION 3
PHILADELPHIA, PA 19103

Christina C. Moore
Senior Scientist
Potesta & Associates, Inc.
7012 MacCorkle Avenue, SE
Charleston, WV 25304

Re: Notice of Deficiency; Columbia Gas of Pennsylvania, Inc. Permit Application; PAS2D041BBEA
Underground Injection Control (UIC) Program; Class IID Injection Well John Galey C-5

Dear Ms. Moore:

On October 23, 2024, the U.S. Environmental Protection Agency (EPA) received your UIC permit renewal application for one disposal injection well (Class IID) in Beaver County, Pennsylvania.

The technical review for the application began on October 23, 2024. Critical information regarding the maps, zone of endangering influence (ZEI), underground source(s) of drinking water (USDW), plugging and abandonment plan, injection well schematic, and list of property owners around the injection well was found to be incomplete or missing. The EPA requires that Columbia Gas of Pennsylvania submit additional information to address certain deficiencies before we can continue processing the application. The deficiencies are as follows:

1. Region 3 requests that applicants submit three maps. Detailed instructions for each map are listed below:

   1a. **Topographic map showing the Area of Review (AOR) and the following items within the AOR:**
   - name and location of all production wells, injection wells, abandoned wells, dry holes, and all water wells, noting their types (public water system, domestic drinking water, stock, etc.),
   - springs and surface bodies of water,
   - mines (surface and subsurface) and quarries, and
   - other pertinent surface features, including residences, schools, hospitals, and roads.

   1b. **Topographic map that extends ¼-mile beyond the facility property boundary showing the following items there within:**

- name and location of all production wells, injection wells, abandoned wells, dry holes, and all water wells, noting their types (public water system, domestic drinking water, stock, etc.),
- springs and surface bodies of water,
- mines (surface and subsurface) and quarries, and
- other pertinent surface features, including residences, schools, hospitals, and roads.

1c. **Topographic map extending one mile beyond the facility property boundary showing:**

- project injection well(s), well pad(s) and/or project area,
- applicable AOR,
- all outcrops of injection and confining formations,
- all surface water intake and discharge structures, and
- all hazardous waste treatment, storage, or disposal facilities.

If any wells are found to be within the AOR in the above described maps, the applicant must also submit a tabulation of data and wellbore diagrams reasonably available from public records or otherwise known to the applicant on all wells within the AOR included on the map, which penetrate the proposed confining zone(s). Such information will include:

- well name, location and depth,
- well type,
- date well was drilled,
- well construction that includes casing and cement details, including demonstrated or calculated top of cement,
- cement bond logs (if available), and
- record of well completion and plugging (if applicable).

For such wells which are improperly sealed, completed, or abandoned, also submit a plan consisting of such steps or modifications as are necessary to prevent movement of fluid into USDWs.

2. EPA requests that a ZEI calculation be completed and included in the permit application to ensure the fixed radius ¼-mile AOR is adequate. For more information on how to calculate the ZEI using the modified Theis equation, refer to 40 C.F.R. 146(a).

3. The permit application does not identify any USDW. The geologic name (if known) and depth to bottom of USDW which may be affected by injection is required to be included in the permit application. The depth of the lowermost USDW needs to be provided.

4. The injection well schematic requires clearly labeled surface casing, conductor pipe, intermediate casing, long-string casing, tubing and packer, depth of the lowermost USDW, injection zone location and name, and confining zone locations and names, as applicable to this injection well. The well schematic must also include the demonstrated

or calculated top of cement for all casing and cementing components.

5. EPA form 7520-19: "Well Rework Record, Plugging and Abandonment Plan, or Plugging and Abandonment Affidavit" does not contain any information except for the signature of an authorized signatory. The form must be filled out with the appropriate information and include within it a brief narrative description of the work to be performed to meet the requirements of plugging and abandonment (as illustrated in Attachment A of the application). Also, an accompanying third party plugging estimate is required to explain the changes that were made to the financial assurance of the injection well.

6. The list of property owners around the injection well is required to extend to ½-mile beyond the injection well. The table that was provided in this permit application only lists property owners within ¼-mile radius of the well.

7. EPA Form 7520-6: "Permit Application for a Class II Well" incorrectly identifies this injection well as a commercial well. The form must be corrected in order to ensure that the appropriate requirements for the injection well are in place depending on whether this is a commercial injection well or private.

Please send the requested information to Ryan Hancharick at R3_UIC_Mailbox@epa.gov. Once the EPA has received the necessary information, we can proceed with processing the draft permit and statement of basis. Thank you for your cooperation on this matter. If you have any questions or concerns, please contact Ryan Hancharick at 215-814-3278.

Sincerely,

KAREN CRUMLISH Digitally signed by KAREN CRUMLISH
Date: 2024.12.05 13:37:35 -05'00'

Karen E. Crumlish, Chief
Drinking Water & Source Water Protection Branch

MAPPING FOR VISUAL REFERENCE ONLY

Blackhawk Storage Facility
Well Location Map
Beaver County, Pennsylvania
For Informational Purposes Only

FIGURE 1

POTESTA

801 E. 86th Avenue
Merrillville, Indiana 46410

Potesta & Associates, Inc.
ENVIRONMENTAL CONSULTANTS
7012 MacCorkle Avenue, S.E.
Charleston, WV 25304
Office: (304) 342-1400 Fax: (304) 343-9031
E-mail: potesta@potesta.com

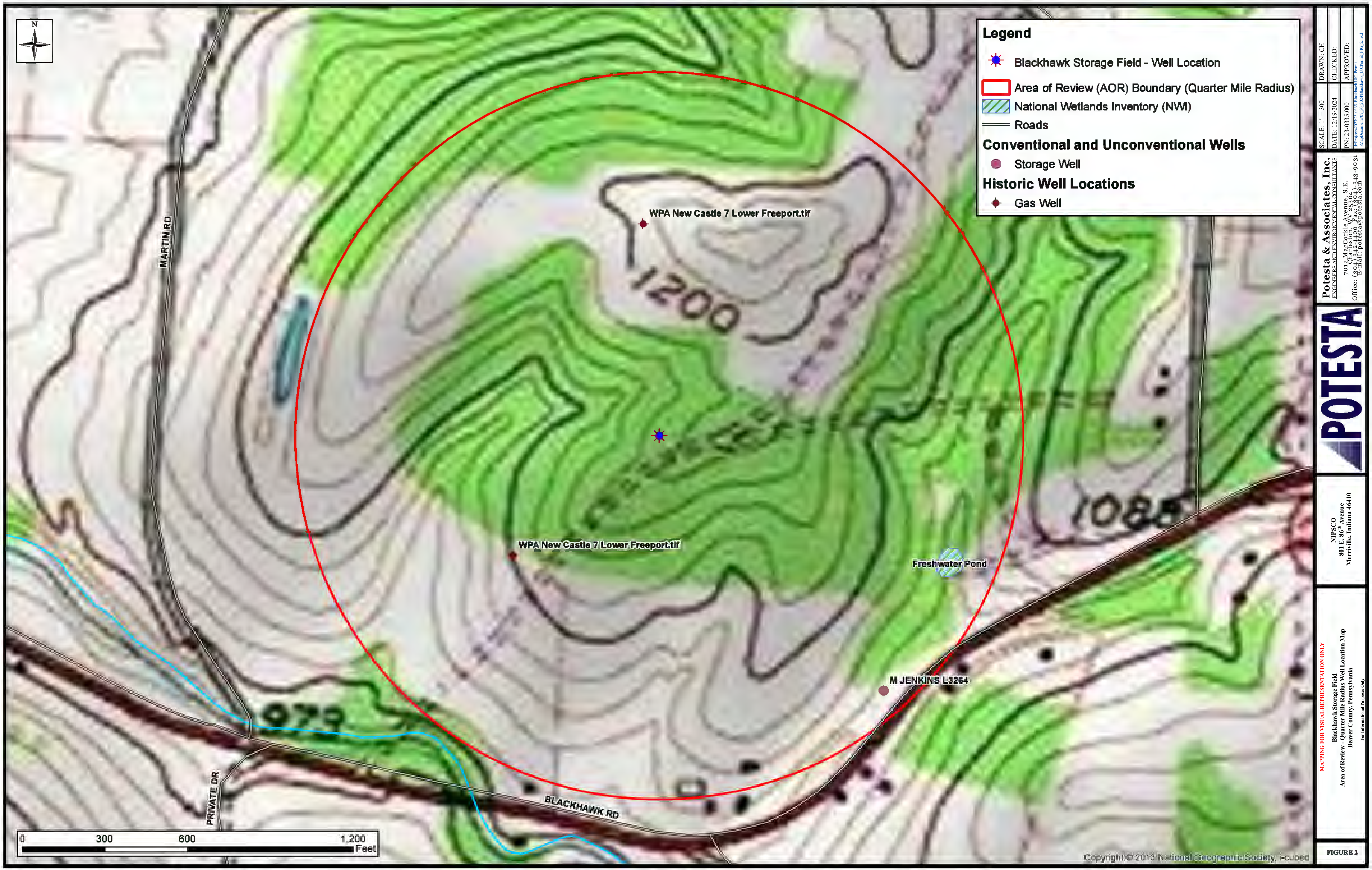
SCALE: 1" = 2,000'	DRAWN: CH
DATE: 12/19/2024	CHECKED:
Pn: 23.0335.000	APPROVED:

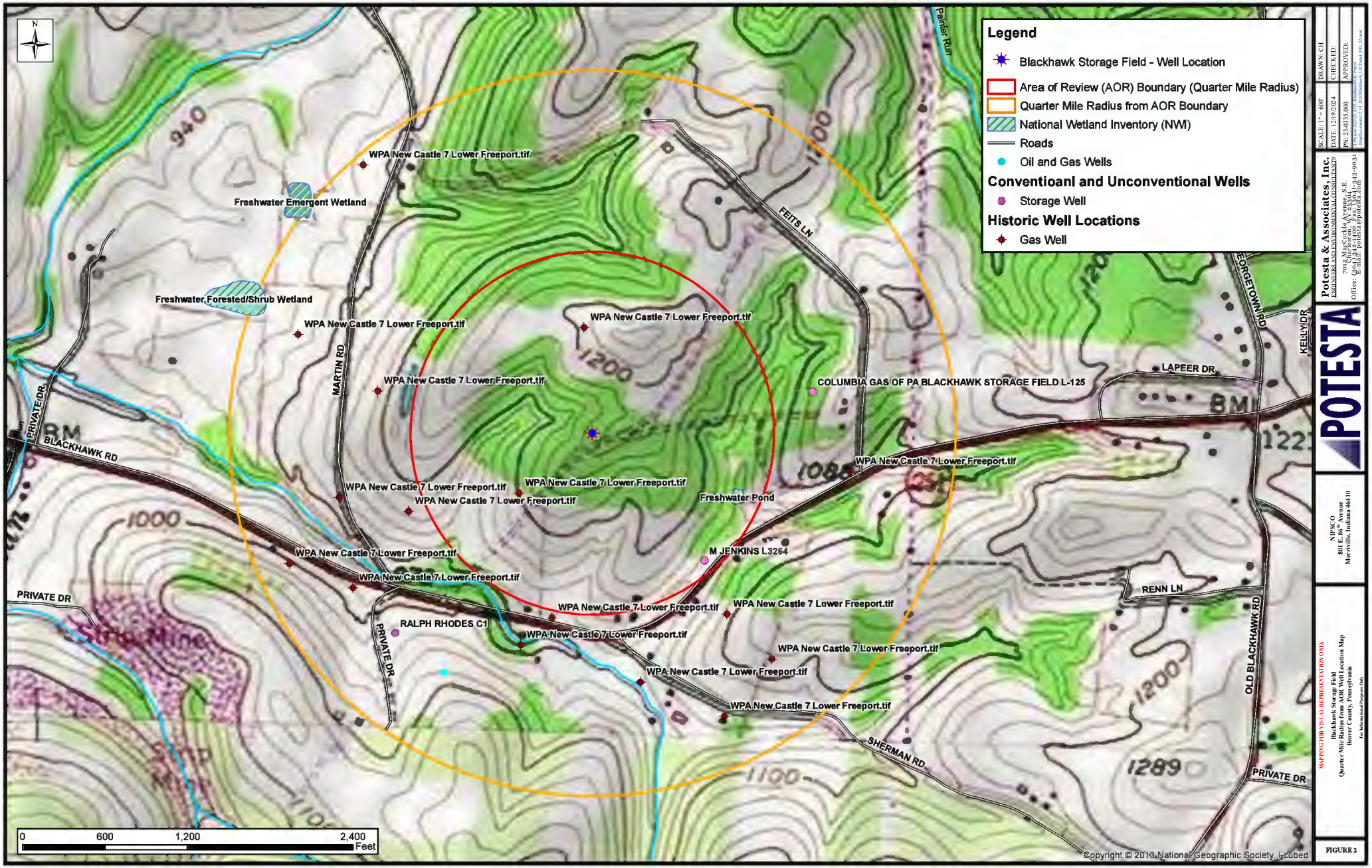
Blackhawk Storage Field
Well Location

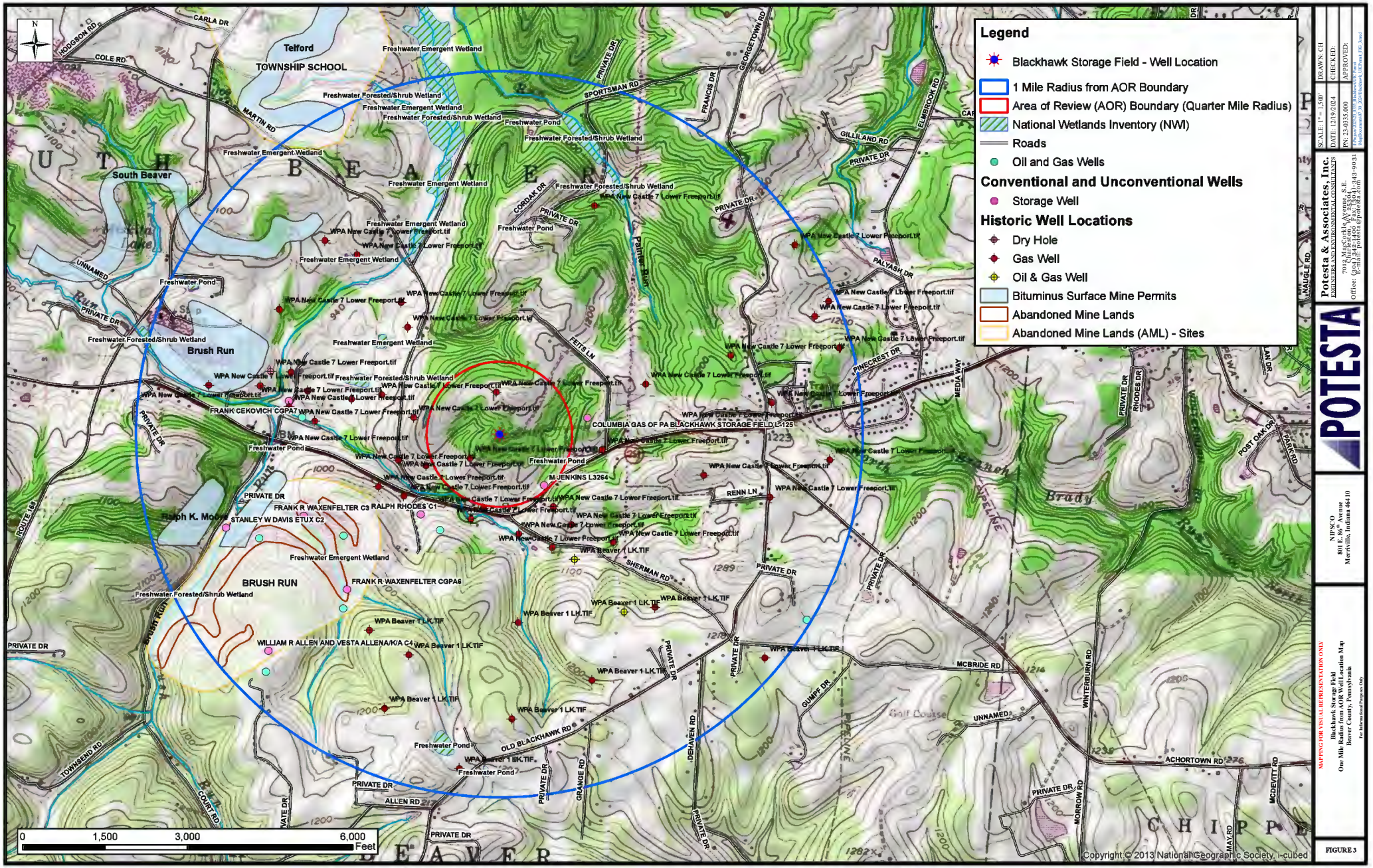
0 2,000 4,000 8,000 Feet

Copyright © 2013 National Geographic Society, i-cubed

For assistance in accessing this document, contact R3_UIC_Mailbox@epa.gov







OMB No. 2040-0042 Approval Expires 12/31/2026

United States Environmental Protection Agency

EPA

WELL REWORK RECORD, PLUGGING AND ABANDONMENT PLAN, OR PLUGGING AND ABANDONMENT AFFIDAVIT

Permittee Name and Address, Phone Number and/or Email

Columbia Gas of Pennsylvania
Soutpointe Industrial Park
501 Technology Drive
Cannonsburg, PA 15317

Permit or EPA ID Number	API Number	Full Well Name
PAS2D041BBEA	37-007-20027	John Galey C-5

State	County
Pennsylvania	Beaver

Locate well in two directions from nearest lines of quarter section and drilling unit

Surface Location

[ ] 1/4 of [ ] 1/4 of Section [ ] Township [ ] Range [ ]

[ ] ft. from (N/S) [ ] Line of quarter section

[ ] ft. from (E/W) [ ] Line of quarter section.

Latitude 40.755996

Longitude -80.443845

Well Class	Timing of Action (pick one)	Type of Action (pick one)
[ ] Class I	[✓] Notice Prior to Work	[ ] Well Rework
[✓] Class II	Date Expected to Commence	[✓] Plugging and Abandonment
[ ] Class III	[ ] Report After Work	[ ] Conversion to a Non-Injection Well
[ ] Class V	Date Work Ended	

Provide a narrative description of the work planned to be performed, or that was performed. Alternatively, attach a report that meets the requirements. Use additional pages as necessary. Please see the instructions for the specific information that must be provided.

At the point when the John Galey C-5 well is no longer used, the following Plugging and Abandonment Plan will be implemented.

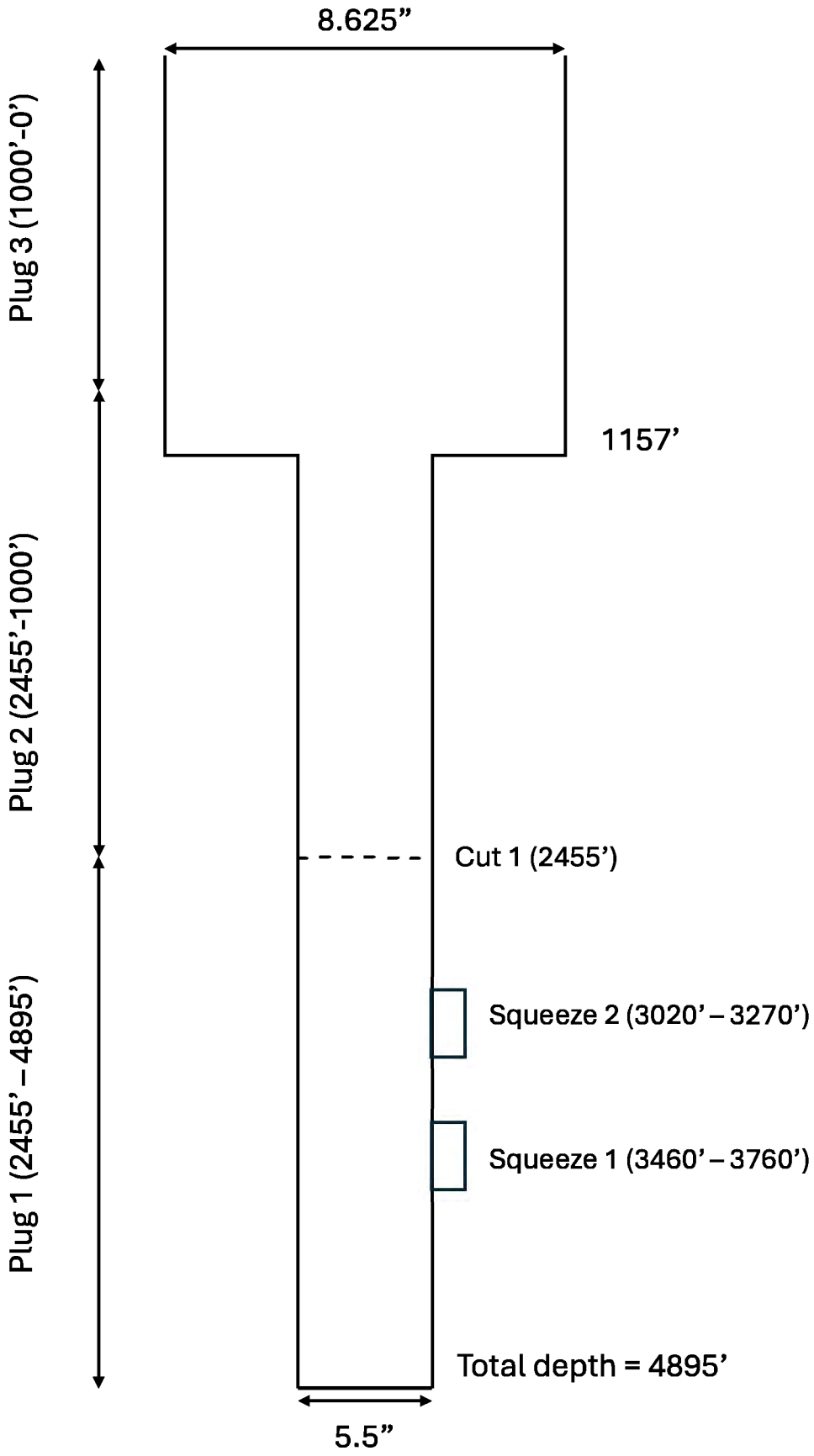
The 2.375" tubing and packer will be removed. A cut will be made to remove the upper 2455' of 5.5" production casing due to poor cement bonding. Once the upper 5.5" casing is removed, two squeezes will be placed. The first squeeze will be placed from 3460'-3760' using 65 sks of Class A common cement with a WOC of 8 hours. The second squeeze will be placed from 3020'-3270' using 75 sks of Class A common cement with a WOC of 8 hours. The first plug will then be placed in the remaining 5.5" casing from a total depth of 4895'-2455' using 270 sks of Class A common cement with a WOC of 8 hours. The second plug will be placed inside the open hole from a total depth of 2400'-1157' and inside the 8.625" casing from a total depth of 1157'-1000' using 603 sks of Class A common cement with a WOC of 8 hours. The third plug will be placed inside the 8.625" casing from a total depth of 1000' to surface.

Certification

I certify under the penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment. (Ref. 40 CFR § 144.32)

Authorized Signatory and Official Title *(Please type or print)*	Signature	Date Signed
Brian Scutta-Director, System Operations PA/MD	Brian Scutta	10/14/2024

Attachment A:



Christina C. Moore

From: Frohnapple \ Paul <pfrohnapple@nisource.com>
Sent: Monday, August 5, 2024 8:27 AM
To: Christina C. Moore
Subject: FW: Blackhawk C-5 P&A Estimate
Attachments: Blackhawk C5 schedule and summarized costs for P&A-Aug2024.xlsx

I will ask for an updated surety bond for this closure as well.

From: Griffin \ Mark \ Allen <markgriffin@nisource.com>
Sent: Monday, August 5, 2024 6:36 AM
To: Frohnapple \ Paul <pfrohnapple@nisource.com>; Catalano \ Vince \ E <vecatalano@nisource.com>
Cc: Keslar \ Timothy \ Job <TKeslar@nisource.com>; Long \ Johnnie \ C <JLong@nisource.com>
Subject: Blackhawk C-5 P&A Estimate

Hi Paul,

Attached is the P&A estimate from our storage consultant with Campos. The current estimate based of 2020 logging results is $351,666.65 without contingency and $404,396.65 with contingency. Due to the poor-to-marginal cement bonding on this well from the 2020 SBL log, it is highly likely that we will be required to remove most of the 5-1/2" due to poor cement. That requires a significant amount of rig time which we have known daily costs on with preferred venodrs. Most wells with tubing in the hole you can P&A in 3-5 days. We are estimating 10 days for this well.

As mentioned we are planning to P&A 5 wells in Indiana in 2025 with an average estimate of $350k and did P&A one well in 2022 with an actual cost of $155k. While these IN wells are shallow (<1000 ft) we have added a lot of contingency due to location (urban area) and unknown integrity (no baseline logs). Increasing depth typically just increases amt of cement; however, due to the anticipate P&A design change the amount of cement is now nearly twice what was estimated for 2015 permit.

Let me know if you need anything else.

Thanks,
Mark Griffin
Engineer, Asset & Risk Management (MRC and SG Assets)
330-716-3440

From: Frohnapple \ Paul <pfrohnapple@nisource.com>
Sent: Thursday, July 18, 2024 2:42 PM
To: Griffin \ Mark \ Allen <markgriffin@nisource.com>; Catalano \ Vince \ E <vecatalano@nisource.com>
Cc: Keslar \ Timothy \ Job <TKeslar@nisource.com>; Long \ Johnnie \ C <JLong@nisource.com>
Subject: RE: Leading a Legacy Touchpoint

Thanks Mark,

Can you please obtain an updated P&A estimate for the well, as well as an updated assurity bond to show that it will cover the P&A estimate?

		MOB Rig/RU	RU/Pull tbg	RU Fish & W/L	Cut1 (prep 2 if necessary)	Pull	Pull/Sqz1	Sqz2/Plug1	Plug2	Plug3; RD BOP RD/cut off & Steel plate					
	Day 0	**Day 1**	**Day 2**	**Day 3**	**Day 4**	**Day 5**	**Day 6**	**Day 7**	**Day 8**	**Day 9**	**Day 10**	**Total**	**Contigency Cost**	**Total with Cont**	**Pulling wt (K#)**	
Workover (Double Double)		$14,800.00	$14,800.00	$14,800.00	$14,800.00	$14,800.00	$14,800.00	$14,800.00	$14,800.00	$14,800.00	$14,800.00	$125,800.00	$22,200.00		215	Complete
DD Rig Mobe	$3,560.00										$3,560.00	$7,120.00				Complete
Wellsite Supevisor (Co Man)	$3,000.00	$3,000.00	$3,000.00	$3,000.00	$3,000.00	$3,000.00	$3,000.00	$3,000.00	$3,000.00	$3,000.00	$3,000.00	$33,000.00				J Campbell
BOP		$550.00	$550.00	$550.00	$550.00	$550.00	$550.00	$550.00	$550.00			$4,400.00				Mid5tate
Add'l Tools		$880.00	$880.00	$880.00	$880.00	$880.00	$880.00	$880.00	$880.00			$7,040.00				Mid5tate
Engineering Costs	$20,000.00	1415 sacks of Class L neat										$20,000.00				
Wireline, Cut and Fish																
Fishing Supervisor				$2,000.00	$2,000.00	$2,000.00	$2,000.00					$6,000.00	$2,000.00			Mid5tate
Super Mobe/Demobe				$2,000.00				$2,000.00				$4,000.00				Mid5tate
Tools Mobe/Demobe				$3,000.00			$3,000.00					$6,000.00				Mid5tate
FreePoint/Chem Cut				$10,910.00	$10,910.00	$3,600.00						$21,820.00	$3,600.00			Mich W/L
Internal Cutter				$3,750.00	$3,750.00								$7,500.00			Mid5tate
120 deg (3pt) caliper						$7,280.00						$7,280.00				Mich W/L
5pear Package					$3,150.00	$3,150.00						$6,300.00	$3,150.00			Mid5tate
Cement for P&A																
Cement prorata cost							$5,010.69	$22,234.95	$37,580.20	$22,861.29	$939.51	$88,626.65				Franklin/Boss/other
CBL/5BT							$7,140.00	$7,140.00	$7,140.00	$7,140.00		$14,280.00	$14,280.00			Mich W/L/baker
	Day 0	**Day 1**	**Day 2**	**Day 3**	**Day 4**	**Day 5**	**Day 6**	**Day 7**	**Day 8**	**Day 9**	**Day 10**					
Grand Total												**$351,666.65**	**$52,730.00**	**$404,396.65**		
													14.99%			
Cement sacks - for consistency assume Class L Neat							80	355	600	365	15	1415				(from Franklin)
(prorata) %							5.65%	25.09%	42.40%	25.80%	1.06%					

**(detail next tab (Cmt calcs and vols); I did not add additional contingency due to excess cement calcs already considered there)*

Vol I

	new calc	w/xs	
Sqz #1 (~3460 -3760')			
length	300		ft
hole size in 5.5" x OH avg of (in)	8.75		in
Incr Vol (ft³)	75.77865	90.93438	ft³
Incr Vol (sx)	64.2192	77.06303	SX
excess (%)	20.00%		
Sqz #2 (~9020 - 9270')			
length	250		ft
hole size in 5.5" x OH avg of (in)	9.75		in
Incr Vol (ft³)	88.37434	106.0492	ft³
Incr Vol (sx)	74.89351	89.87221	SX
excess (%)	30.00%		
plug 1b (inside remaining 5.5")			
length (ft)	2440 -		ft
hole size in 5.5")	4.892 -		in
Incr Vol (ft³)	318.49	350.33	ft³
Incr Vol (sx)	269.9032	269.90	SX
excess (%)	10.00%		
Subtotal Vol (ft³)	482.64	547.32	ft³
Subtotal Vol (bbl)	85.96	97.47	bbl
Subtotal Vol (sx)	409	487.00	SX

Vol II

	Inside 8.625" (1000-1157') new calc	w/xs	units	Inside OH (1157-3400')* new calc	w/xs	units
length (ft)	157 -		ft	1243 -		ft
hole size in 8.625")	8.097 -		in	8.75 -		in
Incr Vol (ft³)	56.14	61.75	ft³	519.06	648.82	ft³
excess (%)	10.00%			25.00%		
Subtotal Vol	575.1969	710.58	ft³			
Subtotal Vol (bbl)	102.4998	126.55	bbl			
Subtotal Vol (sx)	487.455	608	sx			

Vol III (all inside pipe)

	new calc	w/xs	units
length (ft)	1000		ft
hole size in 8.625")	8.097		in
Vol (ft³)	357.582	429.0984	ft³
Vol (bbl)	63.68965	76.42059	bbl
Vol (sx)	303.0356	364	sx
excess (%)	20.00%		

GRAND TOTAL

GT Vol (ft³)	1,415.42	1,686.99	
GT Vol (bbl)	252.08	300.45	
GT Vol (sx)	1,178.18	1404	sx
Round Out +10		1415	sx

* estimation of hole sized derived from 1 pt caliper log run in May 1970

	Adjusted Cost Franklin		Adjusted Cost Ross	
Original Total	$80,650.80		##########	
Orig w/o Mobe charges	$56,450.80		$76,863.00	
Original Cement	1355	sx	1445	sx
Addition Cement (DWS)	75		0	

Knowns & Constants

bbl	gals	ft³
1	42	5.615
0.0238095238	1	0.1337
0.1781	7.48	1

yield for L-class cement (A or B)

1.18 ft³/sx —inverse—> 0.8475 sx/ft³

15.6 ppg

5.2 gal/sx

x-sect AREA constant (ft³/ft)

pi/4/144	* d²H	(VOL)
0.005454154	* d²H	ft³

HAL red book capacity (and checked)

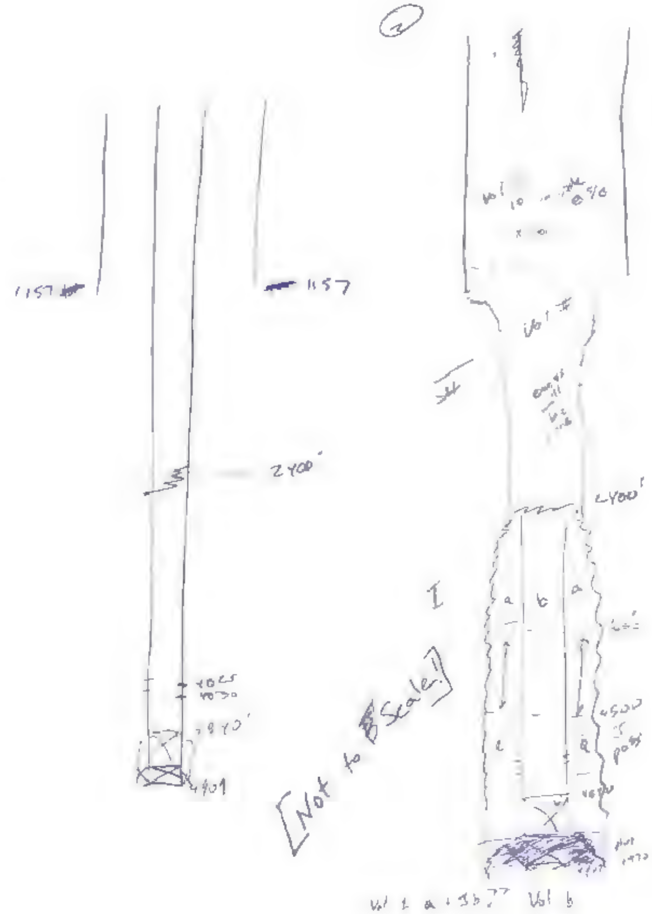
OD (in)	ID (in)	Capacity (ft³/ft)
8.625	8.097	0.3575
5.5	4.892	0.1305

perfs (depth)	4818	4822
PBD	4840	

For Estimations

(1)

OH diameter (in)	Capacity (ft³/ft)	Incre	Inc Increase
8	0.3491		
8.5	0.3941	####	12.89%
9	0.4418	####	13.67%
9.5	0.4922	####	14.45%
10	0.5454	####	15.23%
10.5	0.6015	####	16.02%
11	0.6600	####	16.80%
12	0.7854	####	35.94%
16	1.3963	####	175.00%
18	1.7671	####	106.25%
20	2.1817	####	118.75%



C-5 Wellbore Schematic:

Well	Blackhawk C-5 (saltwater disposal well)	Scale: 1 cell row height = 100 feet	
Permit No.	007-20027		4" 5000psi orbit valve, 8x5 wh National Swp
Latitude (ref)	40.75602		estimated TOC 8" = surface
Longitude (ref)	-80.443838		
Location	Corrected using Gnog Maps		
Elevation	1184.06		
Reference	GL	log ref GL	
Surface Casing			
Hole Diameter	9.625	log	
Depth	1157	1164	1000
Casing Diameter	8.625		
Casing Weight per foot	24		
Casing Grade	J-55		
Casing Threads	8rd (assumed)		
Cement Sacks	450		
Calculated TOC*min			
Calculated TOC*max	circ to surf		
	3 centralizers; float shoe		
Intmd Casing			
Hole Diameter			2000
Depth			
Casing Diameter			
Casing Weight			
Casing Grade			
Casing Threads			
Cement Sacks			
Calculated TOC*min			
Calculated TOC*max			
Production Casing			3000
Hole Diameter	7.875		
Depth	4895		
Casing Diameter	5.5	4677	
Casing Weight	17		
Casing Grade	J-55		
Casing Threads	8rd (assumed)		
Cement Sacks	1300		
Calculated TOC*min			
Calculated TOC*max	circ to surf; DV tool		
	17 centralizers; float shoe&collar		4000
Perforations			
Top			
Bottom			
shots per foot			
Other			4600
Tubing			

5-1`/2" cement job:
1st stage 500 sx, 120 sx returned, DV tool open at 1500#
2nd stage 800 sx, minimal returns
closing pressure 3200#
DV tool at 3832'

4spf perforations '

DTD 4909

BOSS CEMENTING

108 N Linn St | Olney IL 62450

ESTIMATE SHEET

Date: 8/3/2024

In Your Service Job

Customer Number:		Part II - Plug above 2400'
Customer Name: Campos /Columbia Gas		
Street:		
City:	State:	Zip:
Phone:		

Prices subject to change without notice due to unforseen circumstances, and well conditions changes.

	Permit No:		AFE:	
Well Name: Blackhawk SWD	State: PA	County Beaver	Field:	Rig:
Legal Location:		Customer Authorized Rep:		

Item No.	Description	Unit	Quantity	Unit Price	Amount	Extended
	Pump Truck Mileage	mls	500	5	$2,500.00	
	Pumping Charge (First 8 hrs) per day		1	8000	$8,000.00	
	Add. Hrs per day/per hr			800		
	Class L Cement	sks	200	26	$5,200.00	
	Calcium Chloride	sks	4	70	$280.00	
	Cement Delivery Charge	tm	4700	2	$9,400.00	
	Pickup		1	300	$300.00	
	Supervisor		1	700	$700.00	
	Perdiem/perday0/perman		4	350	$1,400.00	
	Each Day Total				$27,780.00	
	Per Day per squeeze X 3 Jobs				$83,340.00	
Equipment and People:						
				Pay This Amount		

Service Invoice: I certify that the materials and services listed were received and all services performed in a workmanlike manner.	Signature of Customer Authorized Agent:	Signature of BOSS Representative:

Plug Cmt

$83,340.00 200 sx

$2,500.00 mileage

$9,400.00 delivery

Sqz Cement

$76,437.00 1245 sx

$2,500.00 mileage

$29,557.00 delivery

Total Cost $159,777.00 1445 sx

$5,000.00 mileage

$38,957.00 delivery

Total Cost (no mobe)

$115,820.00 $80.15 /sx

$110.57 /sx (with mobe)

Columbia Gas of Pennsylvania, Inc., Blackhawk Storage Field, John Galey C-5 Well
UIC Permit Renewal Section XIII, Item V. Landowner Information
Property Owners within 1/2 Mile Radius

Parcel Owner		Owner Address			Property Location	Description
77-131-0134.P01 PULLMAN,RONALD V	WILLOWBROOK MANOR	943 BLACKHAWK RD	BEAVER FALLS PA	15010	00000 SHERMAN ROAD	PAR#2 SMITH PL#1
77-131-0129.000 LONG, COURTNEY		135 RENN LANE	BEAVER FALLS PA	15010	00135 RENN LN	84.9 AC HS GR OB BN
77-131-0142.000 PULLMAN,RONALD V		943 BLACKHAWK RD	BEAVER FALLS PA	15106	00943 BLACKHAWK RD	1.82 AC SPENCE-PULLMAN
77-131-0122.000 SPENCE,WALLACE C &	BETTY JOANN ETAL	127 LAPEER DRIVE	BEAVER FALLS PA	15010	00000 BLACKHAWK ROAD	50.11 AC SPENCE-PULLMAN PL
77-131-0143.004 DILLAN,MARK J & BONNIE L		148 FEITS LANE	BEAVER FALLS PA	15010	00148 FEITS LN	LOT 2 BLACKHAWK PL#1 HSE
77-131-0146.000 LAMBRIGHT,KETTIE L TRUSTEE		224 FEITS LANE	BEAVER FALLS PA	15010	00224 FEITS LN	112 AC MATHENY TRUST PL HS GR BN OBS
77-131-0145.000 JORDON,BRUCE A & KAREN L		193 FEITS LANE	BEAVER FALLS PA	15010	00193 FEITS LN	1.07 AC HS OB
77-131-0136.006 GUSSENHOFEN,CARL M		1022 BLACKHAWK ROAD	BEAVER FALLS PA	15010	01022 BLACKHAWK RD	12.25 AC HS GR BN
77-131-0136.000 CHAKEY,GEORGE J III		1005 BLACKHAWK ROAD	BEAVER FALLS PA	15010	00000 BLACKHAWK RD	1.377 AC BLDG
77-131-0136.004 GREINER MICHAEL DAVID,&	NICOLE	169 GRANGE ROAD	ALIQUIPPA PA	15001	00000 SHERMAN ROAD	10.4547 AC OB
77-131-0139.000 COLLINS,BRANDON H.		989 BLACKHAWK ROAD	BEAVER FALLS PA	15010	00989 BLACKHAWK RD	1.0 AC HSE GAR
77-131-0140.000 KAHLE,DANIEL E & ROBIN ANN		985 BLACKHAWK ROAD	BEAVER FALLS PA	15010	00985 BLACKHAWK RD	1.38 AC HS GR OB IMP
77-131-0141.001 COOK,CHRISTINE		119 CLAY DRIVE	DARLINGTON PA	16115	00000 BLACKHAWK ROAD	0.28 AC
77-131-0141.000 COOK,CHRISTINE F &	NOCERA,TERENCE	119 CLAY DRIVE	DARLINGTON PA	16115	00973 BLACKHAWK RD	2.28 AC HSE
77-131-0134.P02 PULLMAN,RONALD V	C/O PULLMAN FINANCIAL CORP	943 BLACKHAWK RD	BEAVER FALLS PA	15010	00000 BLACKHAWK ROAD	2.502 AC SMITH PL#2
77-131-0143.002 COLUMBIA GAS OF	PENNSYLVAN IA, INC	P 0 BOX 1273	CHARLESTON WV	25325	00115 FEITS LN	2.86 AC BLDGS
77-131-0146.002 LAMBRIGHT,KETTIE L TRUSTEE		224 FEITS LANE	BEAVER FALLS PA	15010	00192 FEITS LN	PAR 2 KIMMEL PL#1 MH GR
77-131-0136.005 WORST,MARJORIE ANN	IRRECOVABLE TRUST	118 SHERMAN ROAD	BEAVER FALLS PA	15010	00118 SHERMAN RD	51.07 AC HS GR BN
77-131-0136.003 GETTEMY,DAVID A III &	ANDERSON-GETTEMY,ALLISON	1045 BLACKHAWK ROAD	BEAVER FALLS PA	15010	01045 BLACKHAWK RD	3.25 AC HS GR
77-131-0135.000 MINNITTE,LAURA		109 SHERMAN ROAD	BEAVER FALLS PA	15010	00109 SHERMAN RD	1.98 AC HS OB
77-131-0136.007 CHAKEY,GEORGE J III		1005 BLACKHAWK ROAD	BEAVER FALLS PA	15010	00000 BLACKHAWK ROAD	1.526 AC
77-131-0137.000 CHAKEY,GEORGE J III		1005 BLACKHAWK ROAD	BEAVER FALLS PA	15010	01005 BLACKHAWK RD	1.38 AC HS
77-131-0158.000 RIDIN' DIRTY,LLC		443 WOODLAWN RD	SEWICKLEY PA	15143	01091 BLACKHAWK RD	107.3 AC MH GR OB
77-131-0157.000 KREBS,RICHARD A & LENORA M		1053 BLACKHAWK RD	BEAVER FALLS PA	15010	01053 BLACKHAWK RD	3.977 AC HS GR BN
77-131-0136.001 JENKINS,WILLIAM & LEONA E	ETAL % BARBARA JENKINS	191 TWIN POND VIEW DR	CAPON BRIDGE WV	26711	01046 BLACKHAWK RD	11.124 AC MH GR
77-131-0156.000 BARKER, RAYMOND & PATRICIA		1054 BLACKHAWK ROAD	BEAVER FALLS PA	15010	01054 BLACKHAWK RD	2.80 AC FITZGERALD-BARKR PL HS GR
77-131-0155.000 FITZGERALD,JAMES B &	LORI A	190 MARTIN ROAD	DARLINGTON PA	16115	00000 BLACKHAWK ROAD	94.06 AC FITZGERALD PL
77-131-0154.000 FITZGERALD,JAMES B &	LORI A	190 MARTIN ROAD	DARLINGTON PA	16115	00061 MARTIN RD	1.50 AC GR OB
77-131-0153.000 FITZGERALD,JAMES B &	LORI A	190 MARTIN ROAD	DARLINGTON PA	16115	00190 MARTIN RD	1.0 AC HS OB
77-131-0150.002 CHEN,CAROLYN C		210 MARTIN ROAD	DARLINGTON PA	16115	00210 MARTIN RD	LOT 1 SHUSTER PL#1 HS
77-131-0146.001 BUBB,MADYSON S &	TRELLA, DAVID M	194 FEIT LANE	BEAVER FALLS PA	15010	00194 FEITS LN	PAR 1 KIMLEL PL#1 HS GR
77-131-0144.000 LAMBRIGHT,KETTIE L TRUSTEE		224 FEITS LANE	BEAVER FALLS PA	15010	00000 T-402 OFF	34.0 AC
77-131-0116.000 GALLAGHER,CORY J &	KARLYN M	197 GEORGETOWN ROAD	BEAVER FALLS PA	15010	00197 GEORGETOWN RD	36.099 AC HS
77-131-0116.002 CAMESI,BREANNA R&	MCFARLAND, BENJAMIN M	171 GEORGETOWN ROAD	BEAVER FALLS PA	15010	00171 GEORGETOWN RD	10.625 AC HS GR
77-131-0118.000 CARNEY,JAMES P & MARY P		159 GEORGETOWN ROAD	BEAVER FALLS PA	15010	00159 GEORGETOWN RD	8.307 AC HS GRS OB
77-131-0119.000 GIRTING,KEITH E & JANET M		165 GEORGETOWN ROAD	BEAVER FALLS PA	15010	00165 GEORGETOWN RD	1.28 AC HS GR IMP
77-131-0116.001 SEELEY,MICHAEL ALLEN &	TATUM M	213 GEORGETOWN ROAD	BEAVER FALLS PA	15010	00213 GEORGETOWN RD	0.6 AC HS GR
77-131-0117.P00 RILEY, DANIEL C &	JENNIFER M	206 GEORGETOWN ROAD	BEAVER FALLS PA	15010	00206 GEORGETOWN RD	38.7 AC HS GR
77-131-0115.000 ANTHONY, JAMES L & STACY L		208 GEORGETOWN ROAD	BEAVER FALLS PA	15010	00208 GEORGETOWN RD	LOT 2 DAVIS & GRIMM SUB
77-131-0120.000 WHY-FERRIGNO,MARY E &	FERRIGNO,JOSEPH A JR	152 GEORGETOWN ROAD	BEAVER FALLS PA	15010	00000 GEORGETOWN ROAD	1.0 AC
77-003-0107.000 147 GEORGETOWN RD LLC		147 GEORGETOWN ROAD	BEAVER FALLS PA	15010	00147 GEORGETOWN RD	PTLOT 8 LOT 9 MCKENNA PL
77-003-0106.000 SCOTT,ROBERT ALLEN JR		141 GEORGETOWN RD	BEAVER FALLS PA	15010	00141 GEORGETOWN RD	LOTS 6 7 PTLOT 8 MCKENNA
77-003-0104.000 DOLL, CHARLES		133 GEORGETOWN ROAD	BEAVER FALLS PA	15010	00133 GEORGETOWN RD	LOT 5 MCKENNA PL HS GRS
77-003-0103.000 CHARLES & TRACY DOLL	REVOCABLE TRUST	133 GEORGETOWN ROAD	BEAVER FALLS PA	15010	00129 GEORGETOWN RD	PTLOT 3 LOT 4 MCKENNA PL
77-003-0101.000 MADDEN,MEGHAN E		121 GEORGETOWN ROAD	BEAVER FALLS PA	15010	00121 GEORGETOWN RD	LOT 1 MADDEN PL HS GR OB
77-003-0100.000 THE KEVIN ARBOGAST	MEDICAID ASSET PROT IRR TR	115 GEORGETOWN ROAD	BEAVER FALLS PA	15010	00115 GEORGETOWN RD	LOT 1 MCKENNA PL HSE GAR
77-003-0200.000 WHY-FERRIGNO,MARY E &	FERRIGNO,JOSEPH A JR	152 GEORGETOWN ROAD	BEAVER FALLS PA	15010	00152 GEORGETOWN RD	1.0 AC PTLOT HS GRS
77-003-0202.000 MAY,CLARENCE L & PAULA D	C/O PAULA D STANLEY	144 GEORGETOWN ROAD	BEAVER FALLS PA	15010	00144 GEORGETOWN RD	0.46 AC MH GR
77-003-0300.005 HALAHAN,DAVID C &	SHERRIE W	138 GEORGETOWN ROAD	BEAVER FALLS PA	15010	00138 GEORGETOWN RD	0.46 AC HS GR OB
77-003-0300.002 MIRANDA,MATTHEW D		134 GEORGETOWN ROAD	BEAVER FALLS PA	15010	00134 GEORGETOWN RD	0.46 AC HS GR
77-003-0300.003 PISANO,LEAH N &	ANTHONY J	130 GEORGETOWN ROAD	BEAVER FALLS PA	15010	00130 GEORGETOWN RD	0.46 AC HS GR OBS
77-003-0300.004 WAHL, TIMOTHY S, SR. &	CATHLEEN A	116 GEORGETOWN ROAD	BEAVER FALLS PA	15010	00128 GEORGETOWN RD	0.46 AC MH
77-003-0400.000 DIFRISCHIA,JOSEPH M &	MARY E	122 GEORGETOWN ROAD	BEAVER FALLS PA	15010	00122 GEORGETOWN RD	0.5 AC HS GR
77-003-0300.036 WAHL,CATHLEEN A		116 GEORGETOWN ROAD	BEAVER FALLS PA	15010	00116 GEORGETOWN RD	0.71 AC HS BN IMP
77-131-0122.006 PENCE,RALPH L		873 BLACKHAWK ROAD	BEAVER FALLS PA	15010	00873 BLACKHAWK RD	1.3263 AC HS GR
77-131-0122.001 WAGURAK,JORDAN A		865 BLACKHAWK ROAD	BEAVER FALLS PA	15010	00865 BLACKHAWK RD	1.93 AC HSE GAR
77-131-0122.002 MCCANN,CHRISTOPHER M &	JANET L	849 BLACKHAWK ROAD	BEAVER FALLS PA	15010	00849 BLACKHAWK RD	0.74 AC HS IMP
77-131-0122.004 STRATI,JOSEPH A &	CHRISTINA L	108 OLD BLACKHAWK ROAD	BEAVER FALLS PA	15010	00000 OLD BLACKHAWK ROAD	0.92 AC
77-131-0122.003 STRATI,JOSEPH A &	CHRISTINA L	108 OLD BLACKHAWK ROAD	BEAVER FALLS PA	15010	00108 OLD BLACKHAWK RD	0.84 AC HS GR
77-131-0123.000 DIAMOND,DANIEL A &	SANDRA G	120 OLD BLACKHAWK ROAD	BEAVER FALLS PA	15010	00120 OLD BLACKHAWK RD	2.445 AC HS GR OB
77-131-0125.P00 CROUD,JULIANNA		135 RENN LANE	BEAVER FALLS PA	15010	00000 OLD BLACKHAWK ROAD	4.45 AC
77-131-0108.000 MCCARTER,JON W & BEVERLY		206 ACHORTOWN ROAD	BEAVER FALLS PA	15010	00000 ACHORTOWN ROAD	2.70 AC MCCARTER PL#1
77-003-0701.000 DINSMORE, CRAIG & ERICA		101 OLD BLACKHAWK ROAD	BEAVER FALLS PA	15010	00000 OLD BLACKHAWK ROAD	4.447 AC

Columbia Gas of Pennsylvania, Inc., Blackhawk Storage Field, John Galey C-5 Well
UIC Permit Renewal Section XIII, Item V. Landowner Information
Property Owners within 1/2 Mile Radius

Parcel	Owner		Owner Address			Property Location	Description
77-003-0700.000	DINSMORE, CRAIG & ERICA		101 OLD BLACKHAWK ROAD	BEAVER FALLS PA	15010	00101 OLD BLACKHAWK RD	3.93 AC HS GR
77-003-0700.001	SOUTH BEAVER TOWNSHIP		805 BLACKHAWK ROAD	BEAVER FALLS PA	15010	00817 BLACKHAWK RD	LOT 1 MILLER PL#1 BLDG
77-002-0230.000	SOUTH BEAVER TOWNSHIP		805 BLACKHAWK ROAD	BEAVER FALLS PA	15010	00805 BLACKHAWK RD	1.3 AC BLDG
77-003-0500.000	CHRIST PRESBYTERIAN CHURCH	C/O L R MATTERN	RD#1	BEAVER FALLS PA	15010	00828 BLACKHAWK RD	3.738 AC CHURCH IMP
77-003-0501.000	BRADSHAW,RONALD M &	JANET M	810 BLACKHAWK ROAD	BEAVER FALLS PA	15010	00810 BLACKHAWK RD	PAR-A BRADSHAW PL REV HS
77-003-0300.035	D & Z PROPERTY, LLC		4 KELLY DRIVE	BEAVER FALLS PA	15010	00000 BLACKHAWK ROAD	LOT 35 SCHUTTE PL
77-003-0305.000	D & Z PROPERTY, LLC		4 KELLY DRIVE	BEAVER FALLS PA	15010	00000 BLACKHAWK ROAD	0.6 AC
77-003-0300.001	D & Z PROPERTY, LLC		4 KELLY DRIVE	BEAVER FALLS PA	15010	00000 BLACKHAWK ROAD	1.00 AC BRDSHW PL GRS
77-003-0503.000	D & Z PROPERTY, LLC		4 KELLY DRIVE	BEAVER FALLS PA	15010	00812 BLACKHAWK ROAD	0.54 AC HSE GARS
77-003-0502.000	BURNSWORTH,KEVIN &	RUTH ANN	117 BRADSHAW STREET	BEAVER FALLS PA	15010	00117 BRADSHAW ST	0.5 AC HS GR
77-003-0600.000	SANDERS,ALBERTA ANN		802 BLACKHAWK ROAD	BEAVER FALLS PA	15010	00802 BLACKHAWK RD	0.789 AC HS IMP
77-003-0300.038	GENZLER, SUSAN &	JOHN FREDERICK	116 BRADSHAW STREET	BEAVER FALLS PA	15010	00000 BRADSHAW STREET	0.1 AC
77-003-0300.040	D & Z PROPERTY, LLC		4 KELLY DRIVE	BEAVER FALLS PA	15010	00000 BLACKHAWK ROAD	0.26 AC
77-003-0300.037	D & Z PROPERTY, LLC		4 KELLY DRIVE	BEAVER FALLS PA	15010	00000 BLACKHAWK ROAD	LOT 12 3.OAC UNR SCHUTTE
77-003-0203.000	MAY,PAULA D	C/O PAULA D STANLEY	144 GEORGETOWN ROAD	BEAVER FALLS PA	15010	00000 GEORGETOWN ROAD	PTLT10 & LT11 SCHUTTE PL
77-003-0300.024	BACISIN, LACEY L &	NICHOLAS A	142 GEORGETOWN ROAD	BEAVER FALLS PA	15010	00142 GEORGETOWN RD	LOT 24 SCHUTTE PL MH GR
77-003-0304.000	WARDEN,STEVEN M TRUSTEE		141 PINE STREET	BEAVER FALLS PA	15010	00124 GEORGETOWN RD	1.28 AC HS OB
77-003-0300.039	D & Z PROPERTY, LLC		4 KELLY DRIVE	BEAVER FALLS PA	15010	00000 BLACKHAWK ROAD	LOT 23 SCHUTTE PL UNREC
77-003-0300.021	D & Z PROPERTY, LLC		4 KELLY DRIVE	BEAVER FALLS PA	15010	00000 BLACKHAWK ROAD OFF	LOTS21 22 27 UNR SCHUTTE
77-003-0300.018	D & Z PROPERTY, LLC		4 KELLY DRIVE	BEAVER FALLS PA	15010	00000 BLACKHAWK ROAD	LOTS 18 19 20 28 UNR
77-003-0300.007	HOVANEC, KIMBERLY S		118 BRADSHAW STREET	BEAVER FALLS PA	15010	00118 BRADSHAW ST	0.46 AC
77-003-0300.030	GENZLER, SUSAN &	JOHN FREDERICK	116 BRADSHAW STREET	BEAVER FALLS PA	15010	00116 BRADSHAW ST	LOT 30 SCHUTTE PL MH GR
77-003-0601.000	CHIOTTI,DAVID L &	JULIE ANN	800 BLACKHAWK ROAD	BEAVER FALLS PA	15010	00800 BLACKHAWK RD	0.9 AC HS GR OB
77-131-0147.014	PRICE,MICHAEL R &	MARJORIE ROSE	PO BOX 59	DARLINGTON PA	16115	00211 CORDAK DR	LOT 14 CORDAK PL2
77-131-0147.013	COFFMAN, NICHOLAS JAY		213 CORDAK DRIVE	DARLINGTON PA	16115	00213 CORDAK DR	LOT 13 CORDAK PL HS BN
77-131-0147.015	PRICE,MICHAEL R &	MARJORIE ROSE	PO BOX 59	DARLINGTON PA	16115	00209 CORDAK DR	LOT 15 CORDAK PL2 MH OB
77-131-0147.016	PRICE,MICHAEL R &	MARJORIE R	207 CORDAK DRIVE	DARLINGTON PA	16115	00207 CORDAK DR	LOT 16 CORDAK PL2 HS OB
77-131-0147.017	PRICE,MICHAEL R &	MARJORIE R	207 CORDAK DRIVE	DARLINGTON PA	16115	00205 CORDAK DR	LOT 17 CORDAK PL2
77-131-0147.P20	HAFERA,JEFFREY A		163 CORDAK DRIVE	DARLINGTON PA	16115	00163 CORDAK DR	LOTS 18 19 20 21 CORDAK
77-131-0150-P00	SHUSTER, SHELLEY REED		289 MARTIN ROAD	DARLINGTON PA	16115	289 MARTIN ROAD	165.872 AC SHUSTER PL#2
77-131-0160-000	IRWIN, MELANIE TODORICH		291 STATE RTE 168	DARLINGTON PA	16115	1198 BLACKHAWK ROAD	134.74 AC
77-131-0184-001	KOHLMANN, JOHN K	JOHN KURT	1181 BLACKHAWK ROAD	BEAVER FALLS PA	15010	1197 BLACKHAWK ROAD	LOT 1 GROTH SUB HSE GAR
77-131-0184-002	KOHLMANN, JOHN K	JOHN KURT	1182 BLACKHAWK ROAD	BEAVER FALLS PA	15010	1197 BLACKHAWK ROAD	PAR "A" KOHLMANN SUR GAR
77-131-0184-P00	LEMLEY, RACHEL LYNNE	JOSHUA E.	1197 BLACKHAWK ROAD	BEAVER FALLS PA	15010	1197 BLACKHAWK ROAD	23.496 AC GROTH SUB HS GR BN OB
77-131-0160-002	COX, ELMERT T & MARTHA J		1125 BLACKHAWK ROAD	BEAVER FALLS PA	15010	00000 BLACKHAWK ROAD	4.92 AC
77-131-0187-P00	BEAVER CO COON HNTR ASSN	C/O SUSAN SMITH	1681 MERCER ROAD	ELLWOOD CITY	16117	149 COURT RD	108.0 AC HS
77-131-0155-002	WEBER, COREY & MEGAN		171 MARTIN ROAD	DARLINGTON PA	16115	171 MARTIN RD	LOT 1 FITZGERALD PL
77-131-0143.000	COLUMBIA GAS OF	PENNSYLVAN IA, INC	PO BOX 117 TAX DEPT	COLUMBUS	43218	00000 BLACKHAWK RD	LOT 1 BLACKHAWK PL#1
77-131-0146.003	LAMBRIGHT,KETTIE L TRUSTEE		224 FEITS LANE	BEAVER FALLS PA	15010	00224 FEITS LN	PAR 1 MATHENY TRUST PL
77-131-0136-002	MINITER, JACK & ELISABETH		134 SHERMAN RD	BEAVER FALLS PA	15010	134 SHERMAN RD	2.38 AC HS GR OBS
77-131-0134.003	BOIVIN, R DARRYL & PAULA J		166 SHERMAN ROAD	BEAVER FALLS PA	15010	166 SHERMAN RD	LOT 1 BOIVIN SUB#1 HS
77-131-0134.000	BOIVIN, R DARRYL & PAULA J		166 SHERMAN ROAD	BEAVER FALLS PA	15010	166 SHERMAN RD	LOT 2 BOIVIN SUB#1 IMP
77-131-0133-P00	SHERMAN, JOEL K		100 MCBRIDE RD	BEAVER FALLS PA	15010	227 SHERMAN RD	109.19 AC HS BNS OBS
77-131-0152-000	ROSENBERGER JACOB & KAREN		214 MARTIN RD	DARLINGTON PA	16115	214 MARTIN RD	1.84 AC HS GR
77-131-0151-000	MARTIN, GAIL E &	PATRICIA ANN	222 MARTIN RD	DARLINGTON PA	16115	222 MARTIN RD	1.47 AC HS BARKER PL

OMB No. 2040-0042 Approval Expires 4/30/2022

United States Environmental Protection Agency

Underground Injection Control
Permit Application for a Class II Well

(Collected under the authority of the Safe Drinking Water Act. Sections 1421, 1422, and 40 CFR Part 144)

For Official Use Only

Date Received

Permit Number

Read Attached Instructions Before Starting

I. Owner Name, Address, Phone Number and/or Email

Columbia Gas of Pennsylvania, Inc.
Southpoint Industrial Park
501 Technology Drive
Cannonsburg, PA 15317
(724) 416-6327

II. Operator Name, Address, Phone Number and/or Email

Same as owner

III. Commercial Facility

- [ ] Yes
- [x] No

IV. Ownership

- [x] Private
- [ ] Federal
- [ ] State/Tribal/ Municipal

V. Permit Action Requested

- [ ] New Permit
- [x] Permit Renewal
- [ ] Modification
- [ ] Add Well to Area Permit
- [ ] Other

VI. SIC Code(s)

4922

VII. Indian Country

- [ ] Yes
- [x] No

VIII. Type of Permit (For multiple wells, use additional page(s) to provide the information requested for each additional well)

- [x] A. Individual
- [ ] B. Area

Number of Wells: 1

Well Field and/or Project Names: Blackhawk Storage Field / John Galey C-5 Well

IX. Class and Type of Well (see reverse)

A. Class	B. Type (enter code(s))	C. If type code is "X," explain.
II	D	

X. Well Status

- [x] A. Operating
- [ ] B. Conversion
- [ ] C. Proposed

Data Injection Started:

Date Well Constructed:

XI. Well Information

API Number: 37-017-2-0027

Permit (or EPA ID) Number: PAS2D041BBEA

Full Well Name: John Galey C-5

XII. Location of Well or, for Multiple Wells, Approximate Center of Field or Project

Locate well in two directions from nearest lines of quarter section and drilling unit

Surface Location

1/4 of 1/4 of Section Township Range

ft. from (N/S) Line of quarter section

ft. from (E/W) Line of quarter section.

Latitude: 40.7555996

Longitude: -80.443845

XIII. Attachments

In addition to this form, complete Attachments A-U (as appropriate for the specific well class) on separate sheets. Submit complete information, as required in the instructions and list all attachments, maps or other figures, by the applicable letter.

XIV. Certification

I certify under the penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment. (Ref. 40 CFR § 144.32)

Name and Official Title *(Please Type or Print)*	Signature	Date Signed
Brian Scutta-Director, System Operations PA/MD	Brian Scutta	October 14, 2024

INSTRUCTIONS FOR FORM 7520-6 (CLASS II WELLS)

A permit application must be completed by all owners or operators of current or proposed Class I, II, and III wells, and some Class V injection wells subject to the requirement to obtain an Underground Injection Control (UIC) permit as described at 40 CFR 144.31 and others directed by a UIC official to apply for a UIC permit. Please note that the information needs vary by well class. These instructions are specific to Class III wells; other versions are available for other well classes. Please note that this form must be signed by a responsible entity as described at 40 CFR 144.32, even if the attachments are prepared by contractors or service companies. If the application covers multiple wells, use additional pages as necessary to provide all the requested information.

I. OWNER NAME, ADDRESS, PHONE AND/OR EMAIL: Enter the name and street address, city/town, state, and ZIP code of the owner of the well, well field, or company. Also provide an email address (if available) and/or a phone number.

II. OPERATOR NAME, ADDRESS, PHONE AND/OR EMAIL: Enter the name and street address, city/town, state, and ZIP code of the operator of well or well field; also provide an email address (if available) and/or a phone number. If the operator is the same as the owner, enter "same as owner."

III. COMMERCIAL FACILITY: Check the appropriate box to indicate the type of facility. A commercial facility is a single or multiple well facility that is specifically engaged in the business of injecting waste fluids generated by third party producers that is originated off-site and transported to the facility by truck for a fee or compensation.

IV. OWNERSHIP: Check the appropriate box to indicate whether the owner of the well/facility is a private, Federal, or State/Tribal/Municipal entity.

V. TYPE OF PERMIT ACTION REQUESTED: Check "new permit" if the well has never been subject to a UIC permit (e.g., for a newly constructed or converted well). Check "permit renewal" for an application associated with extending an expiring UIC permit. Check "modification" for an application to modify an existing permit that is not expiring. Check "add well to area permit" if additional wells are to be covered under an existing UIC area permit. Check "other," if needed and describe the situation.

VI. SIC CODES: List at least one and no more than four Standard Industrial Classification (SIC) Codes that best describe the nature of the business in order of priority. A list of SIC codes is available from the U.S. Department of Labor at https://www.osha.gov/pls/imis/sicsearch.html.

VII. INDIAN COUNTRY: Check yes if the well is located in Indian country. Indian country (as defined in 18 U.S.C. 1151) includes: all land within the limits of any Indian reservation under the jurisdiction of the U.S. government; all dependent Indian communities within the borders of the U.S.; and all Indian allotments, the Indian titles to which have not been extinguished.

VIII. TYPE OF PERMIT: Check "Individual" or "Area" to indicate the type of permit requested. Individual permits cover a single injection well, while area permits may cover more than one injection well. Note that area permits are issued at the discretion of the Director and that wells covered by an area permit must: be at one contiguous site, be under the control of one entity, and may not inject hazardous waste. If an area permit is requested, enter the ***number of wells*** to be included in the permit. In the case of a project or field that crosses State lines, it may be possible to consider an area permit if EPA has jurisdiction in all affected States (each such case will be considered individually). Also provide the ***name of the well field or project.***

IX. CLASS AND TYPE OF WELL: Enter the class (as defined in 40 CFR 144.6) and type of injection well for which a permit is requested. Use the most pertinent code selected from the table below. When selecting type "X", please explain in the space provided.

TABLE OF CLASS II WELL TYPES

A	Annular Disposal Well.
D	Produced Fluid Disposal Well.
H	Hydrocarbon Storage Well (excluding natural gas).
R	Enhanced Recovery Well.
X	Other Class II Wells (not included in Type "A," "D," "H," or "R").

X. WELL STATUS: Check ***Box A, Operating*** if the well currently operates as an injection well (e.g., if a permit renewal is requested or a permit is sought for an existing rule-authorized injection well). Check ***Box B, Conversion*** for an existing well not currently being utilized for injection that is proposed to be converted to an injection well. Check ***Box C, Proposed*** for an underground injection well not yet constructed or completed. Provide relevant dates if A or B are checked.

XI. WELL INFORMATION: Enter the ***API number*** (the number assigned by the local jurisdiction (usually a State Oil and Gas Agency) using the American Petroleum Institute standard numbering system). Enter the ***Permit or EPA ID number*** assigned to the injection well by the EPA or the permitting authority. If you do not have a number (e.g., for a new well), this will be provided by EPA or the permitting authority, and you can leave the field blank. Also enter the ***Full Name of the Well*** or project.

XII. LOCATION: For individual permit applications, in the fields provided, enter the location of the well using latitude and longitude and/or the Public Land Survey System. When using latitude and longitude, use decimal degrees to five or six places after the decimal, if possible; be sure to include a negative sign for the longitude of a well in the Western Hemisphere and a

negative sign for the latitude of a well in the Southern Hemisphere. When using the Public Land Survey System, fill in the complete township, range, and section to the nearest quarter-quarter section. A township is north or south of the baseline, and a range is east or west of the principal meridian (e.g., T12N, R34W). Also include the distance, in feet, from the nearest north or south line and nearest east or west line of the quarter-section. For area permit applications, provide the latitude and longitude of the approximate center of the area.

XIII. ATTACHMENTS: Specific instructions for completing the attachments are presented on pages 3 through 6. Place the permit or EPA ID number (or, if none has been assigned, other identifying information such as an API number or the project name) in the upper right hand corner of each page of the attachments.

XIV. CERTIFICATION: All permit applications must be signed by either: a responsible corporate officer for a corporation, by a general partner for a partnership, by the proprietor of a sole proprietorship, or by a principal executive or ranking elected official for a public agency, or a duly authorized representative of that person.

PAPERWORK REDUCTION ACT NOTICE: The public reporting and recordkeeping burden for this collection of information is estimated to average 61 hours per response for a Class II well permit application. Burden means the total time, effort, or financial resource expended by persons to generate, maintain, retain, or disclose or provide information to or for a Federal Agency. This includes the time needed to review instructions; develop, acquire, install, and utilize technology and systems for the purposes of collecting, validating, and verifying information, processing and maintaining information, and disclosing and providing information; adjust the existing ways to comply with any previously applicable instructions and requirements; train personnel to be able to respond to the collection of information; search data sources; complete and review the collection of information; and, transmit or otherwise disclose the information. An agency may not conduct or sponsor, and a person is not required to respond to, a collection of information unless it displays a currently valid OMB control number. Send comments on the Agency's need for this information, the accuracy of the provided burden estimates, and any suggested methods for minimizing respondent burden, including the use of automated collection techniques to Director, Collection Strategies Division, U.S. Environmental Protection Agency (2822), 1200 Pennsylvania Ave., NW, Washington, DC 20460. Include the OMB control number in any correspondence. Do not send the completed forms to this address.

Instructions for Completing Attachments to Form 7520-6 (Class II Wells)

The Underground Injection Control (UIC) program, as promulgated under the Safe Drinking Water Act (SDWA), is designed to prevent injection activity from allowing the movement of fluid containing any contaminant into underground sources of drinking water (USDWs), if the presence of that contaminant may cause a violation of any primary drinking water regulation or may otherwise adversely affect the health of persons as found at Title 40 of the Code of Federal Regulations (40 CFR) section 144.12. Any applicant for a permit under this program shall have the burden of showing that their proposed construction, operation, maintenance, conversion, plugging, abandonment, and injection activity, does not endanger USDWs.

The attachments below have been constructed to provide applicants with clear expectations as to what information EPA needs to make a determination that an applicant's proposed activities will not endanger USDWs.

Pre-Application Coordination

Coordination between the UIC program and the permit applicant prior to submittal of the permit application is an important step for efficient and effective permitting. Early discussions will ensure that the applicant is aware of all the permit application requirements, including state specific requirements found at 40 CFR part 147. These discussions may also help the applicant plan how to invest time and resources needed to develop a comprehensive and complete permit application.

Applicants are encouraged to contact their EPA regional UIC program for a pre-application coordination meeting.

Note: If the owner or operator of *existing rule authorized Class II UIC well(s)* is required by the EPA to apply for a permit (40 CFR § 144.25), consult with EPA staff during the pre-application coordination for additional requirements that may apply.

When completing each attachment, please be sure to specify the units reported, e.g., of depth, pressure, temperature, etc.

Attachment A. Map(s) and Area of Review

Part I. Well Location(s)

For Individual Permits: If the surface location provided in the accompanying 7520-6 form does not adequately describe the well location (i.e., due to deviation, directional, or horizontal drilling), please describe the well's orientation and provide the top- and bottom-hole coordinates, as appropriate. If any monitoring wells are proposed as part of this permit application, provide coordinates for all monitoring wells.

For Area Permits (40 CFR § 144.33): Provide information similar to what is outlined above for individual permits for each well (existing or proposed) to be covered by this permit. In addition, provide a description of the proposed permitted area. At a minimum, this area should include all the proposed or existing wells known at the time of permit application submittal. For circular areas, this description should consist of a defined-radius from a singular point whose coordinates have been given. For polygonal areas, use a series of coordinates describing the vertices or corners of the area. Submit a Geographic Information System (GIS) file, if available.

Part II. Area of Review Size Determination (40 CFR § 146.6)

For All Permits. Give the method (fixed radius or equation) and, if appropriate, all calculations used to determine the size of the area of review (AOR). If you are uncertain as to which method to use, consult with your regional EPA office.

The AOR must be a minimum radius of one-fourth (1/4) mile from the well bore, including a well's lateral, or the proposed area permit boundary for area permits, unless the use of an equation is approved by the Director.

In addition, for Class II enhanced oil recovery well(s). The AOR will be at a minimum the larger of the following: one-fourth (1/4) mile radius or the distance to the nearest active producer in the production formation.

Part III. Map(s) (40 CFR §§ 144.31 & 146.24)

Submit a topographic map (or other map if a topographic map is unavailable) extending one mile beyond the facility property boundary showing:

- project injection well(s), well pad(s) and/or project area,
- applicable area of review,
- all outcrops of injection and confining formations,
- all surface water intake and discharge structures, and
- all hazardous waste treatment, storage, or disposal facilities.

Consult with your EPA regional office for the definition of the facility property boundary.

The information below does not apply to existing rule authorized Class II well(s).

Within the one-fourth (1/4) mile beyond the facility property boundary or the AOR, whichever is larger, the map will also show the:

- name and location of all production wells, injection wells, abandoned wells, dry holes, and all water wells, noting their types (public water system, domestic drinking water, stock, etc.),

- springs and surface bodies of water,
- mines (surface and subsurface) and quarries, and
- other pertinent surface features, including residences, schools, hospitals, and roads.

Only information of public record and pertinent information known to the applicant is required to be included on this map. Multiple maps may be needed to display this information clearly. If a certain feature is not present in the area covered, please state so definitively (e.g., *"There are no known outcrops of the confining formation in the mapped area."*).

Part IV, below does not apply to existing rule authorized Class II well(s).

Part IV. Area of Review Wells and Corrective Action Plans (40 CFR §§ 144.55 & 146.24)

Submit a tabulation of data and wellbore diagrams reasonably available from public records or otherwise known to the applicant on all wells within the AOR included on the map, which penetrate the proposed confining zone(s). Such information will include:

- well name, location and depth,
- well type,
- date well was drilled,
- well construction that includes casing and cement details, including demonstrated or calculated top of cement,
- cement bond logs (if available), and
- record of well completion and plugging (if applicable).

For such wells which are improperly sealed, completed, or abandoned, also submit a plan consisting of such steps or modifications as are necessary to prevent movement of fluid into USDWs.

Part V. Landowners Information (40 CFR § 144.31 and part 147)

Identify and submit a list with the names and addresses of all owners of record of land within one-fourth (1/4) mile of the facility property boundary. This requirement may be waived by the Regional Administrator if the site is in a populous area and the Regional Administrator determines that the requirement would be impracticable.

Consult with your regional EPA office, as additional state landowner notification requirements may apply (40 CFR part 147).

Attachment B. Geological and Geophysical Information

Part I. Geological Data (40 CFR § 146.24)

Provide the following information:

- geological data on all formations from the surface to the base of the injection well, identifying all USDWs and confining and injection zone(s). This data includes the lithologic description, geological name, thickness, depth, and total dissolved solids (TDS) concentrations from these formations (if known),
- source of information for the geologic data and formation TDS,
- porosity and permeability of injection formation (if available),
- geological cross-sections (if available) proximate to the injection well that includes the confining and injection zones. The cross-sections should illustrate the regional geologic setting and show the thickness and lateral continuity of the confining zone(s) through the area of review,
- within the AOR, identify known or suspected faults and fracture systems. If identified, provide proximity to the injection zone and the effect the fault/fracture system may have on the injection activities, and
- a history of seismic activity in the area and proximity to crystalline (i.e., granitic) basement.

Part II. Proposed Formation Testing Program (40 CFR § 146.22)

Provide a formation testing program to obtain data on:

- fluid pressure,
- estimated fracture pressure, and
- physical and chemical characteristics of the injection zone.

Attachment C. Well Construction/Conversion Information

Part I. Well Schematic Diagram (40 CFR § 146.24)

Provide a detailed proposed well schematic diagram that includes:

- identification of USDWs and confining and injection zones,
- casing and cementing details, including demonstrated or calculated top of cement,
- tubing and packer (if applicable),
- open hole or perforated intervals, and

- surface trace (if horizontal or deviated well).

For wells that are drilled and to be converted to an injection well, also provide the current well schematic diagram.

Part II. Well Construction or Conversion Procedures (40 CFR §§ 144.52, 146.22, & 146.24)

Provide detailed description of well construction or conversion procedures, that includes:

- proposed logs and other tests conducted during the drilling and construction of new well(s),
- proposed stimulation plan(s), if planned, and
- description of alarms and shut-down systems at the well (if applicable).

For wells that are drilled and to be converted to an injection well, also provide:

- well completion and cementing records, and
- previously run logs/tests.

Attachment D. Injection Operation and Monitoring Program (40 CFR §§ 146.23 & 146.24)

Submit the following information:

- flow diagram of fluid flow through the facility,
- contingency plan(s) to cope with well failure, so as to prevent migration of contaminating fluids into a USDW,
- drawing of the surface construction,
- locations of all monitoring devices (show on the map(s) referenced in section A.III. above), and
- description of sampling and monitoring devices to monitor the nature of the injected fluids, injection pressure, annulus pressure (if applicable), flowrate, and cumulative volume.

Hydrocarbon storage and enhanced recovery may be monitored on a field or project basis rather than on an individual well basis by manifold monitoring. If a manifold monitoring program is utilized, describe details of the monitoring program and how the program is comparable to individual well monitoring. Also, include on the map in section A.III.B, the distribution manifold applying injection fluid to all wells in the area, including location of all system monitoring locations.

Additionally, submit the following proposed operating data for each well in the individual or area permit:

- average and maximum daily rate and volume of fluids to be injected,
- average and maximum injection pressure,
- source(s) of injection fluids (including field and formation names),
- proposed annular fluid, and
- analysis of the chemical and physical characteristics of the injection fluid. At a minimum, this should include pH, specific gravity, TDS, and conductivity. Consult with the regional EPA office for additional guidance.

Attachment E. Plugging and Abandonment Plan (40 CFR §§ 144.31, 144.51 & 146.24)

Submit a plugging and abandonment (P&A) plan of the well on EPA Form 7520-19 along with a P&A diagram. The plan should include:

- type, and number of plugs to be used,
- placement of each plug including the elevation of top and bottom,
- type, grade, and quantity of cement to be used, and
- method of placement of the plugs.

Provide one or more cost estimates from an independent firm in the business of plugging and abandoning wells to conduct the work proposed in the P&A plan for EPA to contract plugging of the well. This is to ensure that EPA has adequate funding to plug the well(s) if the operator is unable to plug the well(s).

Consult with the regional EPA office for additional guidance on developing the P&A plan and cost estimate calculations.

Attachment F. Financial Assurance (40 CFR § 144.52)

Submit evidence of financial resources, such as a surety bond or financial statement, necessary for a third party to close, plug, or abandon the well in the event an owner or operator is unable to do so. The monetary amount is based on the P&A plan cost estimate provided in Attachment E.

Attachment G. Site Security and Manifest Requirements (Commercial Wells Only)

Provide a proposed site security plan. This could include fencing around the perimeter of the facility. Consult with the regional EPA office for additional guidance on manifest requirements.

Attachment H. Aquifer Exemptions (40 CFR §§ 144.7 & 146.4)

If an aquifer exemption (AE) is requested, submit the information required at 40 CFR § 144.7 and to demonstrate that the criteria found at 40 CFR § 146.4 are met. Consult with your regional EPA office for additional guidance.

Attachment I. Existing EPA Permits (40 CFR § 144.31)

Submit a listing of all permits or construction approvals received or applied for under any of the following programs:

- Hazardous Waste Management program under RCRA,
- UIC program under SDWA,
- NPDES program under CWA,
- Prevention of Significant Deterioration (PSD) program under the Clean Air Act,
- Nonattainment program under the Clean Air Act,
- National Emission Standards for Hazardous Pollutants (NESHAPS) preconstruction approval under the Clean Air Act.
- Ocean dumping permits under the Marine Protection Research and Sanctuaries Act,
- Dredge and fill permits under section 404 of CWA, and
- Other relevant environmental permits, including State permits.

Attachment J. Description of Business (40 CFR § 144.31)

Provide a brief description of the nature of the business.

Attachment K. Optional Additional Project Information (40 CFR § 144.4)

The following is a list of Federal laws that may apply prior to the issuance of permits. When any of these laws are applicable, EPA must ensure that they are followed. The optional additional information requested below will assist EPA in its analyses to satisfy these laws.

- The Wild and Scenic Rivers Act, 16 U.S.C. 1273 et seq.

  Identify any national wild and scenic river that may be impacted by the activities associated with the proposed project.

- The National Historic Preservation Act of 1966, 16 U.S.C. 470 et seq.

  Identify properties listed or eligible for listing in the National Register of Historic Places that may be affected by the activities associated with the proposed project. If previous historic and cultural resource survey(s) have been conducted, provide the results of the survey(s).

- The Endangered Species Act, 16 U.S.C. 1531 et seq.

  Identify any endangered or threatened species that may be affected by the activities associated with the proposed project. If a previous endangered or threatened species survey has been conducted, provide the results of the survey.

- The Coastal Zone Management Act, 16 U.S.C. 1451 et seq.

  Identify any coastal zones that may be affected by the activities associated with the proposed project.

Well Map ID	Well Mapped Name	PA DEP Well Name	Well Type	Well Location (Lat and Long)	Well Depth	Date Drilled	Well Construction (casing and cement details including demonstrated or calculated top of cement)	Cement Bond Logs	Record of well completion and plugging
1	WPA New Castle 7 Lower Freeport	Historic ID 7168	Gas	40.76121, -80.45007	not available	not available	not available	not available	not available
2	WPA New Castle 7 Lower Freeport	Historic ID 7170	Gas	10.75779, -80.45163	not available	not available	not available	not available	not available
3	WPA New Castle 7 Lower Freeport	Historic ID 7171	Gas	40.7581, -8044414	not available	not available	not available	not available	not available
4	WPA New Castle 7 Lower Freeport	Historic ID 7172	Gas	40.75671, -80.4495	not available	not available	not available	not available	not available
5	Columbia Gas of PA Blackhawk Storage Field L-125	Current John Galey C-5 Well - Incorrect Latitude and Longitude previously entered.							
6	WPA New Castle 7 Lower Freeport	Historic ID 7173	Gas	40.75456, -80.45042	not available	not available	not available	not available	not available
7	WPA New Castle 7 Lower Freeport	Historic ID 7176	Gas	40.75433, -80.44859	not available	not available	not available	not available	not available
8	WPA New Castle 7 Lower Freeport	Historic ID 7177	Gas	40.75476, -80.44572	not available	not available	not available	not available	not available
9	WPA New Castle 7 Lower Freeport	Historic ID 7190	Gas	40.75539, -80.43707	not available	not available	not available	not available	not available
10	WPA New Castle 7 Lower Freeport	Historic ID 7174	Gas	40.75321, -80.45167	not available	not available	not available	not available	not available
11	WPA New Castle 7 Lower Freeport	Historic ID 7175	Gas	40.75277, -80.44999	not available	not available	not available	not available	not available
12	M Jenkins L3264	M Jenkins L3264	Storage Well	40.75353, -80.440808	not available	not available	Vertical well	not available	Plugged on 7/30/1962. Permit nuber 007-00003. Operator: Manufacturers of Light & Heat Co. Operator Number OGO-5371. Original Permit Issuance Date: 3/23/1962. Permit Expiration Date: 3/23/1963. Surface elevation 1027. Primary Facility ID: 14772. Site ID 13021. Site Name: Blackhawk OG Gas Storage Reservoir. NOVs: 4 each, 2 for release of contaminating substance to a water of the commonwealth, 1 for administrative documents, one unspecified.
13	Ralph Rhodes C1	Ralph Rhodes C1	Storage Well	40.751893, -80.448847	not available	4/29/1969	Vertical well	not available	Permit number: 007-20028. Operator: Columbia Gas of PA. Operator Number: OGO-2011. Well Status: Active. Original Permit Issuance Date: 4/25/1969. Permit Expiration Date: 4/25/1970. Primary Facility ID: 14832. Surface elevation: 1035. Site ID: 13021. Site Name: Blackhawk OG Gas Storage Reservoir. NOVs: 4 each, 2 for release of contaminating substance to a water of the commonwealth, 1 for administrative documents, one
14	WPA New Castle 7 Lower Freeport	Historic ID 7178	Gas	40.75229, -80.44475	not available	not available	not available	not available	not available
15	WPA New Castle 7 Lower Freeport	Historic ID 7181	Gas	40.75247, -80.44017	not available	not available	not available	not available	not available
16	WPA New Castle 7 Lower Freeport	Historic ID 7179	Gas	40.75173, -80.44555	not available	not available	not available	not available	not available
17	WPA New Castle 7 Lower Freeport	Historic ID 7180	Gas	40.75106, -80.44238	not available	not available	not available	not available	not available
18	WPA New Castle 7 Lower Freeport	Historic ID 7183	Gas	40.7516, -80.43896	not available	not available	not available	not available	not available
19	WPA New Castle 7 Lower Freeport	Historic ID 7182	Gas	40.75043, -80.44016	not available	not available	not available	not available	not available
20	Not labeled - Blue Circle on Figure 2A	No information available - not on PA DEP Interactive Map							

Wells located within AOR

Information was obtained from the PADEP Interactive Map PA Oil and Gas Mapping

Wells summarized are located in Beaver County in the South Beaver Township

REGION 3
PHILADELPHIA, PA 19103

March 10, 2025

Ms. Christina C. Moore
Senior Scientist
Potesta & Associates, Inc.
7012 MacCorkle Avenue, SE
Charleston, West Virginia 25304

Re: Notice of Deficiency Follow Up; Columbia Gas of Pennsylvania, Inc. Permit Application; PAS2D041BBEA Underground Injection Control (UIC) Program; Class IID Injection Well John Galey C-5

Dear Ms. Moore:

EPA Region 3 UIC staff have completed their review of Columbia Gas of Pennsylvania, Inc.'s January 2, 2025 Notice of Deficiency response for the Class IID Injection Well to be located in the Blackhawk Storage Field in Beaver Falls, Beaver County, Pennsylvania.

Most of the deficiencies that this office cited in the initial Notice of Deficiency have been adequately addressed. However, critical information regarding the tabulation of wells found on the maps, the zone of endangering influence calculation, underground source(s) of drinking water (USDW), and the injection well schematic was found to be incomplete or missing. The EPA requires that Columbia Gas of Pennsylvania, Inc. submit additional information to address certain deficiencies before we can continue processing the application. The deficiencies are as follows:

1. For all wells found to be within the maps provided in response to the Notice of Deficiency, the applicant must also submit a tabulation of data and wellbore diagrams reasonably available from public records or otherwise known to the applicant on all wells within the area of review (AOR) included on the maps. Such information will include:
    - well name, location and depth,
    - well type,
    - date well was drilled,
    - well construction that includes casing and cement details, including demonstrated or calculated top of cement,
    - cement bond logs (if available), and
    - record of well completion and plugging (if applicable).

    For such wells which are improperly sealed, completed, or abandoned, also submit a

plan consisting of such steps or modifications as are necessary to prevent movement of fluid into USDWs.

2. The EPA requests that a zone of endangering influence (ZEI) calculation be completed and included in the permit application to ensure the fixed radius ¼-mile AOR is adequate. For more information on how to calculate the ZEI using the modified Theis equation, refer to 40 C.F.R. 146(a).

3. The permit application does not identify the lowermost underground source of drinking water. The geologic name (if known) and depth to bottom of USDW is required to be included in the permit application. The depth of the lowermost USDW needs to be provided. While the response to the Notice of Deficiency explains that the injection zone is separated from the lowermost USDW by an interval of approximately 4522 feet, there is not sufficient evidence provided within the permit application to show where the lowermost USDW is known to exist.

4. The injection well schematic requires clearly labeled surface casing, conductor pipe, intermediate casing, long-string casing, tubing and packer, depth of the lowermost USDW, confining zone depth and thickness, injection zone name, depth, and thickness, as applicable to this injection well. The well schematic must also include the demonstrated or calculated top of cement for all casing and cementing components. Though most of this information is found in narratives within the permit application, the EPA requests that this information be clearly labeled on the injection well schematic.

Please send the requested information to Ryan Hancharick at R3_UIC_Mailbox@epa.gov. Once the EPA has received the necessary information, we can proceed with processing the draft permit and statement of basis. Thank you for your cooperation on this matter. If you have any questions or concerns, please contact Ryan Hancharick at 215-814-3278.

Sincerely,

KAREN CRUMLISH

Digitally signed by KAREN CRUMLISH
Date: 2025.03.10 13:09:26 -04'00'

Karen E. Crumlish, Chief
Drinking Water and Source Water Protection Branch

POTESTA
Engineers and Environmental Consultants
7012 MacCorkle Avenue, SE, Charleston, WV 25304 • (304) 342-1400 • www.potesta.com

VIA EMAIL ONLY

April 14, 2025

Mr. Ryan Hancharick
Source Water & UIC Section
U.S. Environmental Protection Agency, Region III
Four Penn Center
1600 John F. Kennedy Blvd.
Philadelphia, Pennsylvania 19103

RE: Notice of Deficiency
Columbia Gas of Pennsylvania, Inc. Permit Application
PAS2D041BBEA UIC Program; Class IID Injection Well
POTESTA Project No. 0101-23-0335

Dear Mr. Hancharick:

On behalf of Columbia Gas of Pennsylvania, Inc., Blackhawk Storage Field (Blackhawk), Potesta & Associates, Inc. (POTESTA) is submitting additional information as requested within the Notice of Deficiency issued by the United States Environmental Protection Agency (USEPA) on March 10,2025 regarding the John Galey C-5 well renewal application. A discussion of the noted deficiency is presented below and the revised information, if applicable, is attached.

1. "For all wells found to be within the maps provided in response to the Notice of Deficiency, the applicant must also submit a tabulation of data and wellbore diagrams reasonably available from public records or otherwise known to the applicant on all wells within the area of review (AOR) included on the maps…."

   Information on the identified wells is not known by Columbia Gas of Pennsylvania. Therefore, online public records were reviewed to determine the availability of public information related to the wells identified within the AOR of the Blackhawk Storage Field / John Galey C-5 well. Information available within the Pennsylvania Oil and Gas Mapping on the Pennsylvania Department of Environmental Protection (PADEP) interactive mapping was summarized and attached to the January 2, 2025 Notice of Deficiency response. The tabulation of data presented with the January 2, 2025 response included information found to be publicly available. Wellbore diagrams were not located for the wells identified within the AOR.

Multiple wells identified within the AOR are noted as historical wells identified as WPA New Castle 7 Lower Freeport. Further research into these wells reveal that they are shown as abandoned wells on band drawn mapping completed circa 1934. Based on area knowledge from Columbia Gas of Pennsylvania personnel, these old wells are relatively shallow and located in the Barea formation, which is present at approximately 895 feet to 932 feet in depth. The C5 well has perforations at depths of 4825 to 4840 ft. It is not possible for the brine injections from the C5 well to migrate into a much shallower formation as the Oriskany formation has high quality cap rock which has not been penetrated by these shallow wells.

The C5 well has pressure monitoring and is set with tubing and packer to provide an additional barrier of protection. Additionally, the C5 well was recently fully assessed in 2020 including Mechanical Integrity Testing of the annulus between the tubing and production casing.

2. "EPA requests that a ZEI calculation be completed and included in the permit application to ensure the fixed radius ¼-mile AOR is adequate…."

   The Zone of Endangering Influence (ZEI) of the John Galey C-5 well has been calculated to be 897 feet (see attached calculation with assumptions). This equates to 0.17 mile radius which is lower than the fixed radius of ¼ mile that was used within the application for the area of review.

3. "The permit application does not identify the lowermost underground source of drinking water (USDW). The geologic name (if known) and depth to bottom of USDW which may be affected by injection is required to be included in the permit application…."

   The lowermost USDW in the area of the Blackhawk C5 well is within the Big Injun Sand formation located at a depth of 445 to 525 feet (as shown on the attached well schematic).

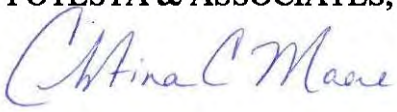
4. "The injection well schematic requires clearly labeled surface casing, conductor pipe, intermediate casing, long-string casing, tubing and packer, depth of the lowermost USDW, injection zone location and name, and confining zone locations and names, as applicable …."

   The original well schematic diagram for construction is not available as this well was originally constructed circa 1935, with redrilling completed in 1971. A well schematic diagram has been developed and is attached.

If you have any questions or require more information regarding these matters, please do not hesitate to contact me at (304) 342-1400 or Paul Frohnapple of Columbia Gas of Pennsylvania at (219) 895-0695.

Sincerely,

POTESTA & ASSOCIATES, INC.



Christina C. Moore
Senior Scientist

CCM/rlh

Attachments

c: Mr. Paul Frohnapple, via email

C5 Well at Blackhawk
ZEI Calculation

Provided by Mark Griffen, Engineer, Asset & Risk Management, NiSource

$$r = \left(\frac{2.25\ KHt}{S10^{x}} \right)^{1/2}$$

$$X = \frac{4\pi KH\left(h_w - h_{bo} \times S_p G_b\right)}{2.3Q}$$

- K - The hydraulic conductivity of the injection zone (length/time)
- H – Thickness of the injection zone (length). *According to the attached permit, Injection is limited to the Oriskany Sandstone Formation from approximately 4822 feet below ground surface to 4884 feet.*
- t – Time of injection (time)
- S – Storage coefficient (dimensionless)
- Q – Injection Rate (volume/time). *On page 10 of the attached permit, it states that the maximum volume of injection fluid is limited to 21,000 barrels per month.*
- H_{bo} – Observed original hydrostatic head of the injection zone (length) measured from the base of the lowermost USDW
- H_w – Hydrostatic head of USDW (length) measured from the base of the lowest USDW
- S_pG_b – Specific gravity of fluid in the injection zone (dimensionless).

K=10mD (The Hydraulic conductivity refers to the formation's permeability to water. The permeability testing done on BH cores showed approx.. 10 mD max. This is a conservative value as the tests appear to have been completed with gas and permeability to water would be even lower).

H=40 Ft

T=112 years (Code says expected life of injection well. Value was generated by doubling the wells current age.)

S=0.00004 estimate based on rock compressibility, porosity, and thickness

Q= -22,000 BBl/Month (max from permit) Flow

SG=1.2

Hbo- 4163 Ft calculated using the following (h= 2030 PSI / 0.433 PSI/ft =4688 ft, 4688Ft-525FT=4163 Ft)

Hw-0 FT (hydrostatic head of unconfined* USDW relative to the base of USDW would be 0 FT. This is an assumed value as we do not have native pressure data for the USDW)

Using the values presented above to calculate ZEI results in a radius of **897 FT**.

COLUMBIA GAS SYSTEM - COLUMBIA GAS TRANSMISSION CORPORATION

WELL LOG SUMMARY

WELL NO.	FARM NAME	FIELD	TOWNSHIP	COUNTY	STATE	DATE WORK STARTED		DATE WORK COMPLETED	
C-5	John Galey	Blackhawk	S. Beaver	Beaver	PA	06-Jan-03		13-Jan-03	
DATE DRILLING STARTED		DATE DRILLING COMPLETED		ELEVATION		TOTAL DEPTH		PLUGGED BACK TO	
01-May-70		03-Sep-70		1184.06'		4,909'		4,840'	

HOLE SIZE	Bit Gauge (")	9 5/8"	7 7/8"			FORMATION RECORD			
	From-To (feet)	0-1157.03'	1157.03-4909			FORMATION	TOP	BOTTOM	REMARKS
CASING & TUBING	Size (O.D.)	8 5/8"	5 1/2"	2 3/8"		big Injun			
	Weight/Foot	24#	17#	4.7#		Berea	895	932	
	Steel Grade	Sm J-55	Sm J-55	Sm J-55		Gas Sand	973	992	
	Coupling	T&C	T&C	T&C, EUE		Tully	4,460	4,468	
	Setting Depth	1157.03'	4895'	4783.75'		Onondaga	4,618	4,635	lime
	Left in Hole	1157.03'	4897.06'	4787.75'		Onondaga	4,635	4,822	chert
CEMENT RECORD	No. of Sacks	525	2000			Oriskany	4,822	4,884	salt water
	Type	50-50 Poz	50-50 Poz						
	Wt. (#/gal)	15.2	14.5			E-log depths			
	Return to surf	Yes	Yes						
	Plug down pr.	800#	1400#			original TD	4,824		1,937
	Date cemented	05-May-70	UK						
D. H. EQUIP.	Type	Float Shoe	See remarks	See remarks					
	Setting Depth	1157.03'	See remarks	See remarks					
PERF. RECORD	From-To (feet)	4,825'	4,830'						
	No. Shot Perf.	20							
	Type of Shot	0.45" jet							
	Service Co.	Schlumberger							
	Date	UK							
STIM. RECORD	Formation	Oriskany							
	From-To (feet)	4,825'	4,830'						
	Type	breakdown		fracture					
	Fluid	1000 gal. 7.5% HCl ac		20300 gal. gel water					
	Prop. Agent (#)			25,000 20-40					
	Service Co.	HES							
	Date	02-Sep-70							
		BEFORE	AFTER	BEFORE	AFTER	BEFORE	AFTER	BEFORE	AFTER
OPEN FLOW TESTS	Date		13-Aug-37		02-Sep-70	07-Jan-03	10-Jan-03		
	OF (mcfd)		1,150		full of salt wate	dead	dead		
	Duration (hr)								
	Type Gauge								
	Size Opening								
WELL-HEAD PRESS. TEST	Start Date		13-Aug-37		03-Sep-70	07-Jan-03	10-Jan-03		
	24 Hours		1870#		on vacuum	on vacuum	on vacuum		
	48 Hours		initial discovery						
	72 Hours								
LOGGING RECORD	Dist. to GL								
	Types of Logs								
	Maximum TD								
	Logging Co.								
	Date								

REMARKS	Two stage cement job: float shoe at 4897.06', DV tool at 3832.89', 33 jts.off bottom. 5 1/2" csg set 2.0' above GL
	pulled and retired 4780' 4.6# J-55 Armco seal-lock tubing, 1- 2 3/8 Armco X 2 3/8 8R sub, 1- 2 3/8 X 1.81 non-ported
	seating nipple, 08-Jan-03
	Ran 4782.3' 2 3/8" 4.7# J-55 EUE tubing, Baker L-10 on/off sealing connector (3 3/4 X 2 3/8 X 1.81 profile),
	Baker A-3 Lok-set retrievable packer (45A4), 2 3/8" re-entry guide. Packer set at 4785', overall length- 4787.75'
	Tubing set 4.0' above GL, 10-Jan-03. Mechanical integrity test performed 13-Jan-03

PREPARED BY	DATE
D. Reynolds	28-Jan-03

WELL NO.	FARM NAME	FIELD	TOWNSHIP	COUNTY	STATE	SECTOR	WELL STATUS	H2S (PPM)	
C-5	John Galey	Blackhawk	S. Beaver	Beaver	PA		active	0	

ADDTIONAL FLOW TESTS

DATE	OF (MCFD)	DURATION (hr)	TYPE GAUGE	SIZE OPENING	WHP	HOURS SI	COMMENTS

SURVEILLANCE LOGGING SUMMARY

DATE	LOGS	PBTD	LTD	FILL	CORROSION	ANNULAR FL	COMMENTS
				#VALUE!			
				#VALUE!			
				0			
				0			
				0			

SURFACE EQUIPMENT

	MAKE	TYPE	SIZE	WP	LEAKING YES	LEAKING NO	OPERABLE YES	OPERABLE NO
Tubing master (Xmas tree)	WKM	gate	2 1/16"	3/5M		X	X	
2-tubing wing (Xmas tree)	Cameron	gate	2 1/16"	3/5M		X	X	
Casing valve (tubing spool)	Cameron	gate	2 1/16"	3/5M		X	X	

	YES	NO
EXPOSED FLOW STRING		X
API WELLHEAD	X	
ATMOSPHERIC CORROSION		see remarks

REMARKS: Changed out restricted wellhead and tubing tree, retaining base, slips and primary packing assembly for re-use. Installed rebuilt 9 X 7 1/16 3M tubing spool (w/ 2- 2 1/16 studded outlets), and tubing mandrel (2 3/8 EUE 8R), and valve Installed rebuilt 7 1/16"X 2 1/16" 3M tubing bonnet, 2 1/16" 3/5 M studded cross, and 2 1/16" BHTA w/ 2 3/8 8R lift thread, and Xmas tree valves as noted above. Tested wellhead seals and wellhead. Xmas tree was pressure tested by vendor. NOTE: flange on base is corroded, but adequate for re-use.

Ran a 4 7/8" gauge ring to perfs (4825') Ran 2.88" gauge ring to 4830', perfs are open.

The Galey #1 was completed 26-Jul-37, and plugged and abandoned as F-14079 on 23-Nov-46
F-14079 was reopened for storage by ML&H as well C-5 in 1970. The well was later converted to a dedicated brine disposal well for the Blackhawk storage operation. To conform to current UIC regulations, and to monitor and test the casing/ tubing annulus, new tubing and packer were installed 10-Jan-03.

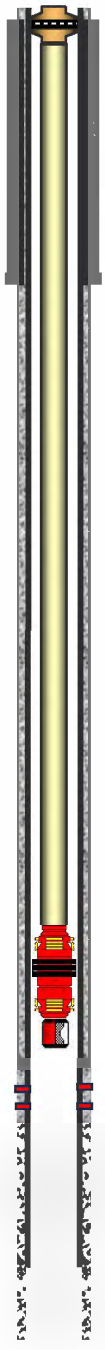
Columbia Gas of Pennsylvania
A NiSource Company

WELL #	C5	Wellbore Schematic		PERMIT: 007-20027		SINGLE PACKER
SPUD DATE	COMPLETION DATE	LAST WWO	Drawing Date	LEASE NAME	STATE	COUNTY
6/10/69	6/23/69				Pennsylvania	Beaver

SPOT LOCATION	Sec	Twn	Range	G.L.	K.B.
	NA	South Beaver		1147	n/a

CONDUCTOR SIZE & WEIGHT	SURFACE CSG SIZE & WT	PROD. CASING SIZE & WT.	PROD. TUBING SIZE & WT.		TD
	8 5/8" 24#	5 1/2" 17#	2 3/8" 4.7#		4909
CSG SET DEPTH					
1,164					

	PERFORATION INTERVALS	FORMATION	EOT	PBTD	
	4825-4830	Oriskany	NA	4840	



ITEM	DESCRIPTION	O.D.	I.D.	LENGTH	DEPTH	Formation
	KB Correction			**0.00**	**0.00**	
	-Original Cement calculations show both casing string					
	cement jobs were designed with sufficent cement					
	volume to cement to surface					
	-SBT log shows very poor bonding to free pipe above 4598'					
	Lowermost USDW from record				**300.00**	**unknown**
	Lowermost feasible USDW form GRNT log*				**525.00**	**Big Injun Sand (445-525')**
	*(This is the lowermost zone identified where freshwater is feasibly present, though it most likely contains saline)					**Barea (895-932)** Show oil 890-896'
						Gas sand 973-992
	Casing 8 5/8" 24#	**8.625**	**8.097**	**1164.00**	**1164.00**	
	Casing 5 1/2" 17#	**5.500**	**6.456**	**4895.00**	**4895.00**	
	Top of poor bonding (~25-60% cement bond)				**4598.00**	
	Tubing: 2 3/8", 4.7# EUE 8rd	**2.375**		**4788.000**	**4788.000**	
	Top of Packer	**5.500**		**5.00**	**4788.00**	
	Top of good bonding (~90-100% cement bond)				**4792.00**	
						Oriskany (4820 to TD)
	Perforations (4 SPF, 4925-4830')				**4825.00**	~5-6' of permeable sand
						makeup injection zone
	BTM 5 1/2" csg.				**4895.00**	
	Total depth				**4909.00**	