Heather A. Roberts
4360 W. Roy Furman Highway
Waynesburg, PA 15370
Phone: 724.627.2112
Fax: 724.627.2141
hroberts@cpg.com

December 22, 2015

Mr. Tom Bass
Environmental Resources Program Manager
West Virginia Department of Environmental Protection
Office of Oil and Gas
601 57th Street, S.E.
Charleston, West Virginia 25304-2345

RE: Completed UIC Permit Renewal Application
Columbia Gas Transmission, LLC
Permit Number UIC2D0871977
Martin Yard Roane Well #99

Dear Mr. Bass:

Columbia Gas Transmission LLC (Columbia) is submitting the enclosed renewal application package for the Martin Yard Underground Injection Control (UIC) well located near Cotton, Roane County, West Virginia. Roane Well #99, API Well Number 47-087-01977, is covered by Permit Number UIC2D0871977.

The signed original and one copy of the renewal application are enclosed. One electronic copy is also included in the package. The application package includes the application Checklist, Sections 1 through 16, Appendices A through K and all required attachments (Area of Review Maps, laboratory analytical reports for drinking water wells, laboratory analytical reports for the fluids to be injected, etc.). In addition, a check payable to the agency in the amount of $550.00 comprising the $500 permit renewal application fee and the $50 Groundwater Protection Plan fee for an existing facility is enclosed.

For Section 7 – Area of Review (AOR), Columbia has included two (2) topographic maps showing the water wells in use documented by conducting a house-to-house survey. Two out of the three homes within the ¼- mile AOR that were sampled as part of the previous renewal were sampled again as part of this renewal. After two attempts, samples were not able to be collected from the Burke residence (third home). In an attempt to provide additional sampling data, a fourth residence located near the ¼ mile AOR boundary was sampled, and the results are provided.

There are three (3) oil and gas wells inside the AOR, one that is active, and two that are abandoned. The only forms or documentation that appear to exist for the active well are old company drilling or

completion reports, which have been included in the application. This active well appears to date from approximately 1921 and there are not any associated WR-35 and/or WR-38 agency forms to provide. There was, however, enough information to complete the Appendix C requirements for this well. At this time, it is unknown if the information exists, or can be obtained, to provide all the information required by Appendix C for the two abandoned wells. These wells have been shown on the AOR map, and what information that is available for them has been included in Appendix C. If Columbia is able to obtain the information needed to complete Appendix C for the two abandoned wells located within the ¼-mile AOR, it will be submitted as an addendum to this renewal application.

For Section 9 – Operating Requirements/Data requires the wells by API Number to be served by the injection well to be listed on Appendix G. Appendix G has been marked as Not Applicable because the fluids being disposed of at the Martin Yard are not associated with production wells or natural gas production. Instead, the fluids being injected are those associated with gathering, storage and transmission operations. A description of these fluids, and the stations they are associated with, have been included as Attachments 9-1 and 9-2, respectively, in the permit renewal application.

If you have any questions or require more information regarding this renewal application, please do not hesitate to contact me at (724) 627-2112.

Sincerely,

Heather A Roberts

Heather A. Roberts
Environmental Compliance Manager

HAR/dwb

Enclosures

c:
Charleston File

UIC PERMIT NUMBER UIC2D0871977
RENEWAL APPLICATION
ROANE WELL #99

CK 13303
550.00

Columbia Gas Transmission, LLC

Prepared for:

Columbia Gas Transmission, LLC
1700 MacCorkle Avenue, SE
P.O. Box 1273
Charleston, West Virginia 25325-1273

Prepared by:

Potesta & Associates, Inc.
7012 MacCorkle Avenue SE
Charleston, West Virginia 25304
Phone: (304) 342-1400 Fax: (304) 343-9031
E-Mail: potesta@potesta.com

Project No. 0101-06-0552

December 22, 2015

POTESTA

TABLE OF CONTENTS

Checklist

(4/25)

CHECKLIST FOR FILING A UIC PERMIT APPLICATION

Please utilize this checklist to ensure you have prepared, completed, and enclosed all required documentation and payment to ensure a timely review of your submittal.

Operator	Columbia Gas Transmission, LLC		
Existing UIC Permit ID Number	UIC2D0871977	UIC Well API Number	47-087-01977

Office of Oil and Gas Office Use Only	
Permit Reviewer	
Date Received	
Administratively Complete Date	
Approved Date	
Permit Issued	

Please check the fees and payment included.

Fees		Payment Type	
UIC Permit Fee: $500	✓	Check	✓
Groundwater Protection Plan (GPP) Fee: $50.00	✓	Electronic	
		Other	

Please check the items completed and enclosed.

- ✓ Checklist
- ✓ UIC-1
  - ✓ Section 1 – Facility Information
  - ✓ Section 2 – Operator Information
  - ✓ Section 3 – Application Information
  - ✓ Section 4 – Applicant/Activity Request and Type
  - ✓ Section 5 – Brief description of the Nature of the Business
  - ✓ CERTIFICATION
- ✓ Section 6 – Construction
  - ✓ Appendix A Injection Well Form
  - ✓ Appendix B Storage Tank Inventory
- ✓ Section 7 – Area of Review
  - ✓ Appendix C Wells Within the Area of Review

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DEC 23 2015
WV Department of
Environmental Protection

dep

- [x] Appendix D Public Service District Affidavit
- [x] Appendix E Water Sources
- [x] Appendix F Area Permit Wells
- [x] Section 8 – Geological Data on Injection and Confining Zones
- [x] Section 9 – Operating Requirements / Data
  - [x] Appendix G Wells Serviced by Injection Well
- [x] Section 10 – Monitoring
- [x] Section 11 – Groundwater Protection Plan (GPP)
  - [x] Appendix H Groundwater Protection Plan (GPP)
- [x] Section 12 – Plugging and Abandonment
- [x] Section 13 – Additional Bonding
- [x] Section 14 – Financial Responsibility
  - [x] Appendix I Financial Responsibility
- [x] Section 15 – Site Security Plan
  - [x] Appendix J Site Security for Commercial Wells
- [x] Section 16 – Additional Information
  - [x] Appendix K Other Permit Approvals

NOTE: For all 2D wells an additional bond in the amount of $5,000 is required.

Reviewed by (Print Name): Robert M. Kitchell - Vice President Operations

Reviewed by (Sign): Robert M. Kitchell

Date Reviewed: 12/17/15

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UIC-1

UIC PERMIT NUMBER UIC2D0871977
RENEWAL APPLICATION
ROANE WELL #99
COLUMBIA GAS TRANSMISSION, LLC.

UIC-1

Columbia Gas Transmission, LLC is submitting the following information in this part of the renewal application.

SECTION 1
FACILITY INFORMATION

SECTION 2
OPERATOR INFORMATION

SECTION 3
APPLICANT INFORMATION

SECTION 4
APPLICANT/ACTIVITY REQUEST AND TYPE

SECTION 5
BRIEF DESCRIPTION OF THE NATURE OF THE BUSINESS

CERTIFICATION

UIC-1
(4/25)

WEST VIRGINIA DEPARTMENT OF
ENVIRONMENTAL PROTECTION
OFFICE OF OIL AND GAS
601 57th Street, SE
Charleston, WV 25304
(304) 926-0450
www.dep.wv.gov/oil-and-gas

UNDERGROUND INJECTION CONTROL (UIC) PERMIT APPLICATION

UIC PERMIT ID # UIC2D0871977 API # 47-087-01977 WELL # Roane Well #99

Section I. Facility Information

Facility Name: Martin Yard Roane Well #99

Address: 1700 MacCorkle Avenue SE, 4th Floor

City: North of Cotton State: WV Zip: 25045

County: Roane

Location description:

Well is located in the Walton District of Roane County in the Lefthand Fork watershed in the Clio Quadrangle at an elevation of 664.58'

Location of well(s) or approximate center of field/project in UTM NAD 83 (meters):

Northing: 4268073.610 Easting: 468649.707

Environmental Contact Information:

Name: Heather A. Roberts Title: Environmental Compliance Manager

Phone: 724-627-2112 Email: hroberts@cpg.com

Section 2. Operator Information

Operator Name: Columbia Gas Transmission, LLC

Operator ID: 307032

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DEC 23 2015
WV Department of
Environmental Protection

Address: 1700 MacCorkle Avenue SE, 4th Floor

City: Charleston State: WV Zip: 25314

County: Kanawha

Contact Name: Randy Jones Contact Title: Roustabout B

Contact Phone: 304-548-1618 Contact Email: rljones@cpg.com

Promoting a healthy environment.

Section 3. Applicant Information

Ownership Status: ■ PRIVATE ☐ PUBLIC ☐ FEDERAL ☐ STATE
☐ OTHER (explain):

SIC code: ■ 1311 (2D, 2H, 2R) ☐ 1479 (3S) ☐ OTHER (explain):

Section 4. Applicant / Activity Request and Type:

A. Apply for a new UIC Permit: ☐ 2D ☐ 2H ☐ 2R ☐ 3S
B. Reissue existing UIC Permit: ■ 2D ☐ 2H ☐ 2R ☐ 3S
C. Modify existing UIC Permit: ☐ 2D ☐ 2H ☐ 2R ☐ 3S
(Submit only documentation pertaining to the modification request)

2D COMMERCIAL FACILITY: ☐ YES ■ NO

Section 5. Briefly describe the nature of business and the activities to be conducted:

To dispose of fresh water, salt water and other fluids associated with natural gas gathering, storage and transmission operations.

Certification

CERTIFICATION

All permit applications must be signed by 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 [1]duly authorized representative in accordance with 47CSR13-13.11.b.

A. Name and title of person applying for permit:

Print Name: Robert M. Kitchell

Print Title: Vice President Operations

B. Signature and Date.

I certify under 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.

Signature: Robert M Kitchell

Date: 12/17/15

[1] A person is a duly authorized representative if:

The authorization is made in writing by a person described in subdivision 47CSR13-13.11.a.

The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility or activity, such as the position of the plant manager, operator of a well or a well field, superintendent, or position of equivalent responsibility.

The written authorization is submitted to the Director.

Section 6
Construction

POTESTA & ASSOCIATES, INC.
ENGINEERS AND ENVIRONMENTAL CONSULTANTS
7012 MacCorkle Ave. SE, Charleston, WV 25304
TEL: (304) 342-1400 FAX: (304) 343-9031
E-Mail Address: potesta@potesta.com

Project
COLUMBIA GAS TRANSMISSION, LLC
MARTIN YARD

Scale 1"=1000'
Date 12/09/2015
Dwg. No.
FIGURE 1

UIC PERMIT NUMBER UIC2D0871977
RENEWAL APPLICATION
ROANE WELL #99
COLUMBIA GAS TRANSMISSION, LLC.

SECTION 6
CONSTRUCTION

Provided is the Site Plan from the SPCC Plan that was developed for the Martin Yard. Since this Site Plan it not to scale, an aerial photograph with an associated scale has been provided to supplement the Site Plan. A detailed well schematic of the injection well is included following the Site Plan and associated aerial photograph.

Appendix A, the completed Injection Well Form is attached, as is Appendix B, the completed Storage Tank Inventory Form which lists the aboveground storage tanks (ASTs) present at the Martin Yard.

May 2016 Revisions

Item 1.a. – The UIC well is located outside the security fence. However, the well is contained within a permanent building at the facility, which is kept locked when not in use, and when no personnel are present at the facility. The Site Map from the facility SPCC Plan that was submitted as part of the renewal application has been revised to reflect this, and is included as part of this response.

Item 1.b. – The well construction schematic has been revised to include the additional details and is included as part of this response.

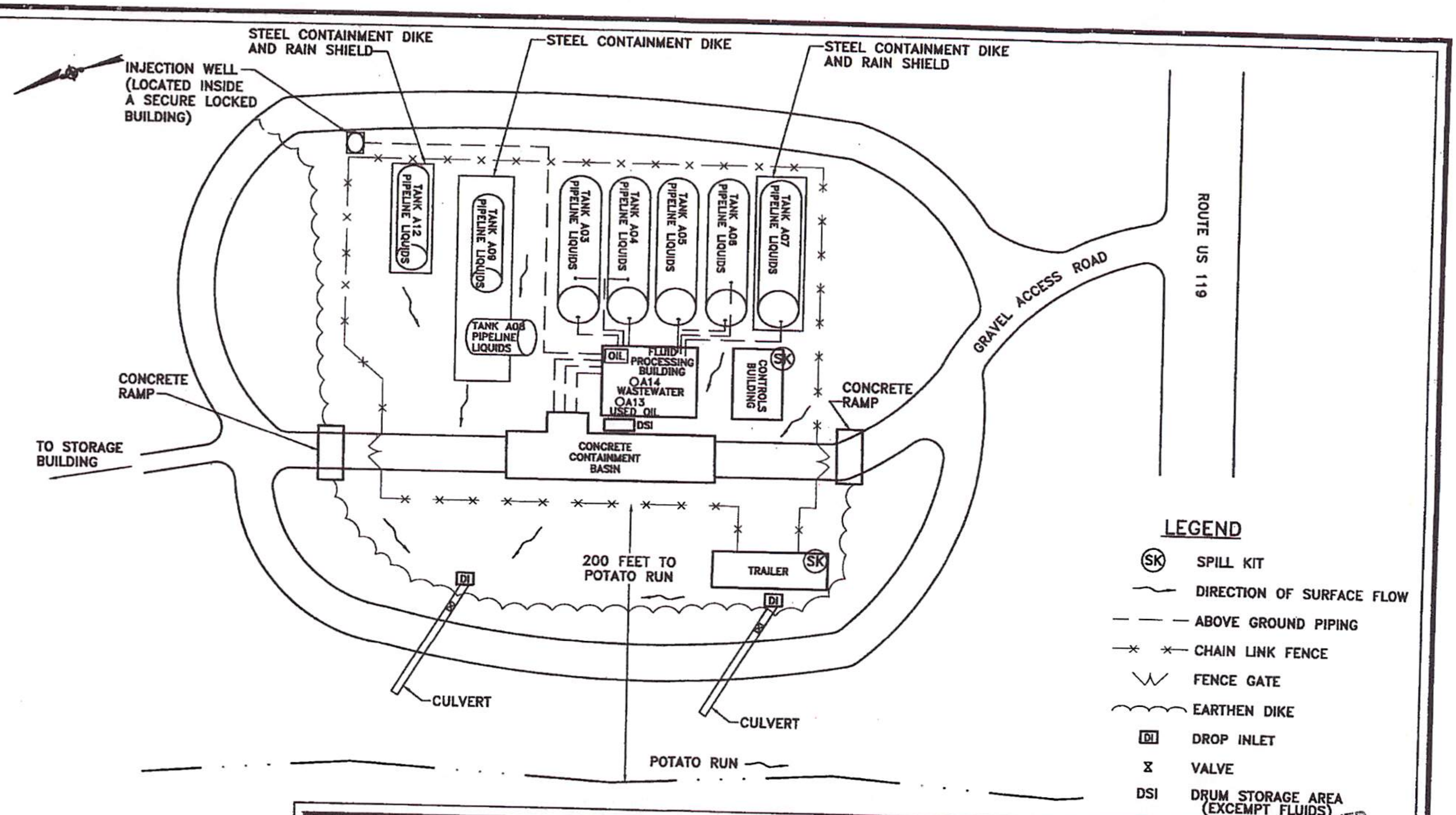
Item 1.c. – Columbia understands the maximum allowable injection pressure in the permit is 1425 psi. The 1200 psi used in the renewal application is a calculated value that satisfies the requirements in the WVDEP UIC Permit Application Package, Section 9 - Operating Requirements/Data, Item 1, "Injection activities shall not initiate new or propagate existing fractures in the injection and confining zones". The calculations used to derive the 1200 psi maximum surface pressure, which ensures that Columbia's injection operations do not induce or propagate hydraulic fractures in the Rhinestreet Shale, are shown below. Appendix A, Item 8 was completed to reflect the maximum proposed injection pressure.

Maximum surface injection pressure calculations:

ISIP from 2002 fracture stimulation:	1708 psig
Flush fluid density:	8.33 ppg
Top perforation (TVD):	4620 ft
Hydrostatic pressure of flush:	0.052 (8.33) (4620) = 2001 psi
Bottom-hole fracture pressure:	1708 + 2001 = 3709 psig

Max injection fluid density:	1.2 SG (10.0 ppg) * Oriskany brine
Max surface injection pressure:	3709 – [(0.052) (10) (4620)] = 1306 psig
With 100 psi safety factor:	1306 – 100 = 1206 psig (round down to 1200 psig)

Item 1.d. – The WV Department of Mines Well Drilling Record from 1972 is being submitted as part of the response to this item. Also being submitted is a Well Work History Summary, a Columbia Gas Well Log for work that was performed in 1989, detailed Well Work Reports from 1992 through 2016, and WVDEP Forms W-37 for permitted well work performed in 2001-02 and 2010.



POTESTA

Potesta & Associates, Inc.
ENGINEERS AND ENVIRONMENTAL CONSULTANTS
7012 MacCorkle Ave. SE, Charleston, WV 25304
TEL: (304) 342-1400 FAX: (304) 343-9031
E-Mail Address: potesta@potesta.com

Project	SPCC SITE PLAN MARTIN YARD UIC DISPOSAL WELL COLUMBIA GAS TRANSMISSION
Scale NOT TO SCALE	FIGURE 1
Date MAY 2016	

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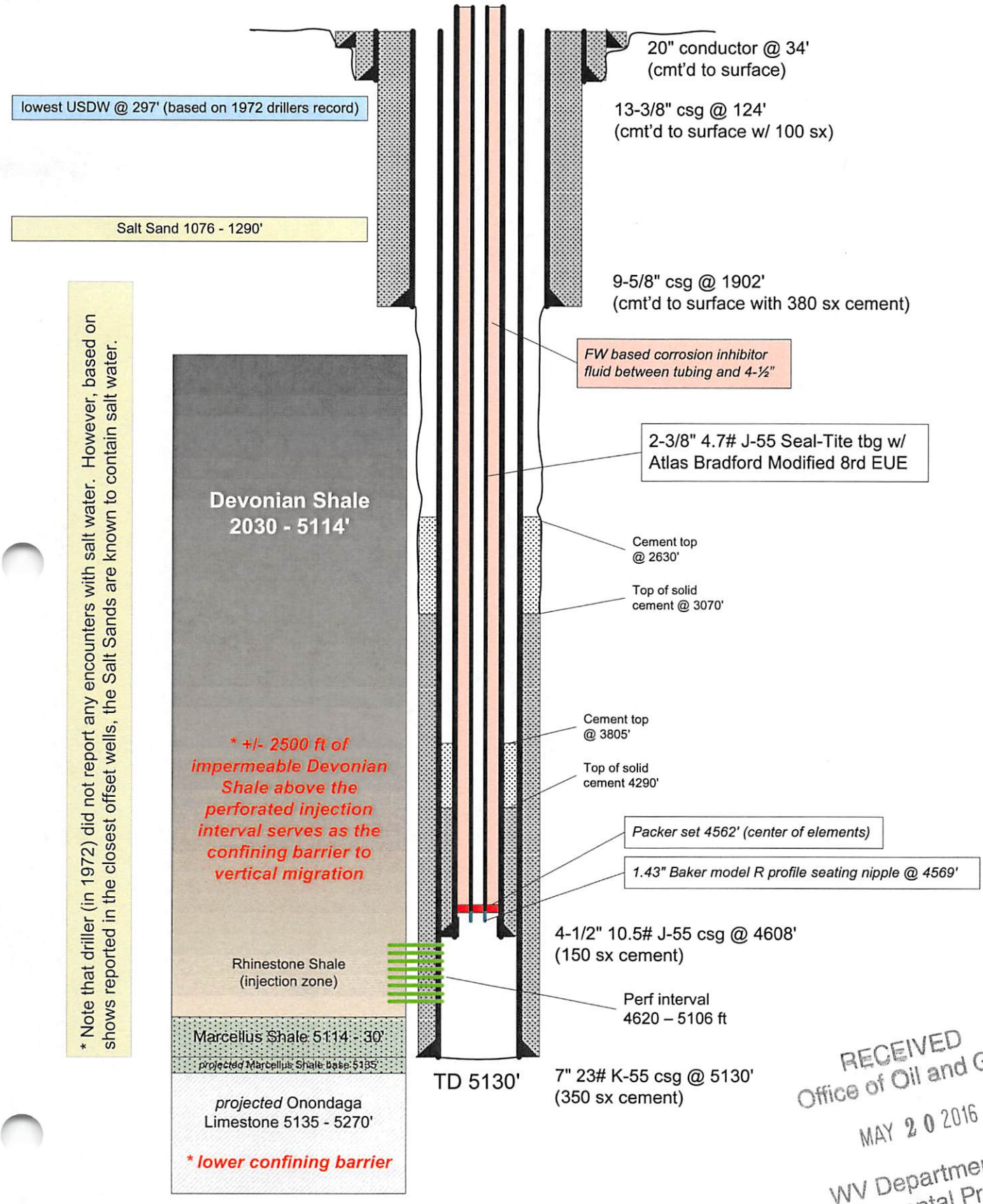
JUN 20 2016
WV Department of Environmental Protection

PROJECT #: 06-0552 FILENAME: 06-0552-000J-02

XREF Files: IMAGE Files: martinyard.bmp
File: 06-0552 - COLUMBIA HQ\PH 000J\06-0552-000J-02.dwg
Plot Date/Time: ...y 11, 2016 - 8:34am
Plotted By: Mbounkoff

Columbia Gas Transmission, LLC **ROANE W-99 Wellbore Schematic** (as of 5/18/16)

** not to scale **



Form OG-10

STATE OF WEST VIRGINIA
DEPARTMENT OF MINES
OIL AND GAS WELLS DIVISION

WELL RECORD

Rotary ☑
Spudder ☐
Cable Tools ☐
Storage ☐

Quadrangle Clendenin
Permit No. Roa-1977
Oil or Gas Well Disposal (KIND)

Company Columbia Gas Transmission Corporation
Address Charleston, West Virginia
Farm Columbia Gas Transm Corp. Acres 322
Location (waters)
Well No. W-99 Elev.
District Walton County Roane
The surface of tract is owned in fee by
Address
Mineral rights are owned by
Address
Drilling commenced November 24, 1972
Drilling completed December 3, 1972
Date Shot From To
With
Open Flow /10ths Water in Inch
/10ths Merc. in Inch
Volume Cu. Ft.
Rock Pressure lbs. hrs.
Oil bbls., 1st 24 hrs.
WELL ACIDIZED (DETAILS)
WELL FRACTURED (DETAILS)

Casing and Tubing	Used in Drilling	Left in Well	Packers
Size			
16 13"	114'	114'	Kind of Packer
13 9"	1918'	1918'	
10 7"	5258'	5258'	Size of
8¼			
6⅝			Depth set
5 3/16			
4½			
3			Perf. top
2			Perf. bottom
Liners Used			Perf. top
			Perf. bottom

Attach copy of cementing record.
CASING CEMENTED 7" SIZE 5258 No. Ft. 11-30-72 Date
Amount of cement used (bags) 350
Name of Service Co. Dowell
COAL WAS ENCOUNTERED AT FEET INCHES
FEET INCHES FEET INCHES
FEET INCHES FEET INCHES

RESULT AFTER TREATMENT (Initial open Flow or bbls.)
ROCK PRESSURE AFTER TREATMENT HOURS
Fresh Water 297 Feet Salt Water Feet
Producing Sand Shale Depth 5130

Formation	Color	Hard or Soft	Top	Bottom	Oil, Gas or Water	Depth	Remarks
Sand			0	20			
Sand & Gravel			20	25			
Sand			25	311			Water 297
Shale			311	367			
Sand			367	480			
Sandy Shale			480	498			
Shale			498	502			
Sand			502	599			
Sandy Shale			599	630			
Sand			630	678			
Sandy Sand			678	693			
Sand			693	723			
Sandy Shale			723	778			
Sand			778	836			
Sandy Sand			836	852			
Sand			852	923			
Sandy Shale			923	990			
Sand			990	1140			
Shale			1140	1159			
Sand			1159	1296			
Sand			1296	1390			
Sand			1390	1430			
Shale			1430	1440			
Sand			1440	1580			
Shale			1580	1640			
Sand			1640	1709			
Shale			1709	5130			
Total Depth				5130			

(over)

Roane W-99 Well Work History

1972	Well was drilled.
1989	Ran tubing on packer inside the 7" csg. Performed WHX. MIT passed. ** no record of WV DEP well work permit*
1992	MIT on 7" csg failed. Pulled tbg/pkr. Leak detected @ 4098' but no record of any repairs to 7" csg. Re-ran tbg/pkr – pkr set @ 3887'. MIT passed. ** no WV DEP well work permit required*
1997	MIT failed. Pulled tbg/pkr. Re-ran tbg and new pkr – found holes in 3 jts of tubing (not ran) – pkr set @ 3756'. MIT passed. Left 500 psig on tbg/csg annulus. ** no WV DEP well work permit required*
2001-02	MIT failed. Pulled tbg/pkr. Ran MVRT. Ran 4595' of new 4-1/2" csg and cmt'd. WHX. Ran SBT. Drilled plugs/cmt to 4850'. Ran new tbg/pkr – pkr set @ 4583'. Poor injection rate. Performed CTCO – no improvement. Pulled tbg/pkr. Cleaned/drilled to 5106'. Spotted acid and re-perfed 4620 – 5106'. Re-ran tbg/pkr – pkr set @ 4583'. MIT passed. Still poor injection. Pulled tbg/pkr. Fracture stimulated. Re-run tbg/pkr – pkr set @ _____ ft. MIT passed. Left 500 psig on tbg/csg annulus. ** WV DEP well work permit obtained – J Amos submitted WR-35 Dec 2007.*
2004	Lost annular pressure. Attempted to csg pressure test – failed. Installed tbg plug and tested tbg – good test. Attempted csg pressure test – failed. Pulled tbg/pkr. Ran VRT. Backed off and replaced top 2141' of 4-1/2" csg. Set BP and pressure tested – good. Re-ran tbg and redressed pkr – pkr set @ 4588'. MIT passed. ** no WV DEP well work permit required*
2005	Lost annular pressure. Set tbg plug and pressure tested tbg – good. Pressure tested tbg/csg annulus – leaking into tbg. Pulled tbg/pkr. Ran MVRT. Could not locate tbg leak. Ran new tbg/pkr. MIT passed. Left 500 psig on tbg/csg annulus. ** no WV DEP well work permit required*
2007	Lost annular pressure. Re-pressurized annulus and it held. MIT passed. Placed well back in service. 7 days later lost annular pressure. Pulled tbg/pkr. Re-dressed pkr. Re-ran tbg/pkr. MIT failed. Leak in tbg or on-off tool above pkr – could not discriminate. Pulled tbg/pkr. Ran new Seal Tite tbg and new pkr – pkr set @ 4589'. MIT passed. Left 500 psig on tbg/csg annulus.

** no WV DEP well work permit required*

2010 Lost annular pressure. Re-pressurized annulus but would not hold. Pulled tbg/pkr. Ran HRVRT. Ran rental tbg and pkr – set and pressure tested csg – good test. Re-ran Seal Tite tbg (replaced connection seals) and new pkr – pkr set @ 4586'. MIT passed. Left 980 psig on annulus.
** no WV DEP well work permit required*

2015 Lost annular pressure. Re-pressurized annulus and observed wellhead fitting leak. Replaced fitting. MIT passed. Left 900 psig on annulus. Placed well back in service per Office O&G approval. 9 days later annular pressure dropped to 620 psig. Replaced other suspect wellhead fittings and removed/cleaned wellhead packing. MIT passed. Left 800 psig on annulus. Placed well back in service per Office O&G approval. 12 days later annulus pressure dropped to 300 psig. Pulled tbg/pkr. Replaced tbg connection seals. Re-ran tbg and new pkr. WHX. MIT passed. Placed well back in service per Office O&G approval. 22 days later lost annular pressure. Discovered thread leak at base of tbg head. Welded tbg head to 4-1/2" csg. Per instructions from Office O&G, re-pressured annulus to 1740 psig to monitor for a few days – well not approved to be placed back in service. 2 days later pressure dropped to 980 psig. Per Office of O&G, released annular pressure to 0 psig, resumed injections, and monitored annulus for pressure buildup – no pressure increase. MIT passed. Per Office O&G, new operating practice is to leave annular pressure at 0 psig and monitor for pressure increase while well in service. Office O&G approved resuming injections.
** no WV DEP well work permit required*

FORM 832, ED. 4 CSD
(REV. 1-82)

WELL NO. W-99
PERMIT NO. 47-089-1777
FIELD Disposal Well W-99
PROD. ☐ STOR. ☒

WELL LOG

NOTICE

It is a part of the contract between:

COLUMBIA GAS TRANSMISSION CORPORATION
COMPANY

AND

Shull Well Service (1989 Reconditioning for Disposal Re-permitting)
DRILLING CONTRACTOR

That this record must be accurately kept and filled out in full, and approved by the Division Manager, before any contract is fulfilled.

SUBMITTED BY:

W.H. Foraker Sr. Storage Engineer/Drilling & Field Liaison
FOR DRILLING CONTRACTOR

APPROVED BY:

DIVISION MANAGER

Well No. W-99 Permit No. 47-087-1977
U.I.C. 2D 0871977

Budget No. 5944 Work Order No. 1670

Farm Columbia Gas Trans. Lease No. Deed 2399 Fee Int.

Division Southwest Region Acres 322

County Roane State WV

~~Township~~/District Walton

Sect-Lot
Map Sq. _____ Map No. _____

Quad. 15' ☐ 7½' ☐ _____

Latitude _____ ft. N S of ____ ° ' "

Longitude _____ ft. E W of ____ ° ' "

On waters of Lefthand Crk. of Big Sandy Crk.

Coal Owner _____

Coal Operator Not Operated

Surface Owner Columbia Gas Transmission Corp

New Lease ☑ Old Lease ☐

Location Made by _____ Date _____

Notebook _____ Page _____

Elevation 664.58' Indicate Method Spirit level

Field _____ Prod ☐ Stg ☑

Classification Fluid disposal well

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Office of Oil and Gas
MAY 20 2016
WV Department of
Environmental Protection

Contractor Shull Well Service

Address P.O. Box 1072, Clarksburg WV 26301

Telephone (304) 622-0141

Contractor's Representative _____

Address _____

Telephone _____

Company Representative W H Foraker

Address P.O. Box 1273 Charleston WV 25325

Telephone 357-2000

Workover
Rig ~~Road~~ Started May 24 19 89

Workover
Drilling Started May ~~25~~ 30 19 89

Workover
Drilling Completed June 15 19 89

Well Shut In _____ 19 ____

Drill Deeper Started _____ 19 ____

Drill Deeper Completed _____ 19 ____

Plugging Started _____ 19 ____

Plugging Completed _____ 19 ____

WELL PROGNOSIS

WELL NO. W-99 ELEV. 664.58'

ESTIMATED TOTAL DEPTH 5130 FEET

TARGET FORMATION Marcellus Shale

ESTIMATED CASING

SIZE (O.D.)	GRADE	WT.	SETTING DEPTH
20"	H-40	94#	34'
13 3/8"	H-40	48#	124'
9 5/8"	H-40	32#	1902'
7"	N-80	23#	5130'
2 3/8"	J-55	4.7#	4241'

ESTIMATE FORMATIONS TOPS

TOP	BTM.	FORMATION INCL. COAL, WATER OIL AND GAS

SAVE SAMPLES TO	SAVE SAMPLES FROM	SAMPLE INSTRUCTIONS

LOGS TO BE RUN:

SPECIAL TEST, MUD PROGRAM, ETC.

Work String

INDIVIDUAL ☐ CASING ☑ TUBING JOINT MEASUREMENT

SIZE	WEIGHT	MFR.	GRADE	THD.	COUPLING
2 3/8"	4.7#		J55	8rd	EUE

1. 31	38	32	62	32	35	32	27
⓶ ~~31~~	~~39~~ →	⊗ ~~31~~	~~40~~ →	31	55	31	82
3. 32	49	32	35	31	52	29	45
4. 31	77	31	60	30	57	31	45
5. 31	35	30	28	⊗ 32 ~~32~~	~~28~~ →	32	40
6. 32	77	32	42	32	28	30	—
7. 31	65	31	50	32	70	32	05
8. 32	15	30	20	32	15	32	45
⑨ ~~31~~	~~38~~	32	43	31	50	31	47
10. 32	45	32	75	31	40	31	14
11. [illegible]	22	32	38	32	60	32	22
12. 32	75	31	43	32	38	32	18
13. 31	95	29	74	32	32	31	55
⑭ 31	~~26~~ →	30	06	31	60	32	25
15. 31	47	31	45	⊗ ~~31~~	~~25~~ →	31	52
16. 32	31	31	30	32	30	32	—
17. 32	36	31	40	31	75	31	50
18. 32	32	31	45	30	50	30	10
19. 31	24	⊗ ~~31~~	~~32~~ →	32	55	31	35
20. 31	56	32	40	31	58	31	55
TOTAL 637	14	TOTAL 630	48	TOTAL 637	53	TOTAL 630	72

Mixed String includes 3983' used tubing transferred from Terra Alta Transfer No Jun 036 & 1228' New EW Tubing McJunkin Appalachian ⊗ New

Total 5211'

ALL MEASUREMENTS ☑ LESS ☐ WITH THREADS

INDIVIDUAL ☐ CASING ☑ TUBING JOINT MEASUREMENT

SIZE	WEIGHT	MFR.	GRADE	THD.	COUPLING
2 3/8"	4.7#		J55	8rd	EUE

1. 30	65	32	58	32	20	⊗ 31	~~47~~
2. 31	35	31	55	31	80	⊗ 30	~~66~~ →
3. 31	20	30	10	32	05	⊗ 31	~~30~~ →
4. 32	35	31	—	32	85	⊗ 31	~~30~~ →
5. 31	52	29	28	31	55	⊗ 31	~~32~~ →
6. 31	50	30	64	32	25	⊗ 31	~~23~~ →
7. 32	60	31	82	⊗ ~~31~~	~~38~~ →	⊗ 31	~~30~~ →
8. 31	35	31	20	⊗ ~~31~~	~~30~~ →	⊗ 31	~~33~~ →
9. 30	43	31	40	32	04	⊗ 31	~~30~~ →
10. 31	95	29	72	31	30	⊗ 31	~~30~~ →
11. 31	40	31	95	30	74	⊗ 31	~~32~~ →
12. 31	95	32	60	32	14	⊗ 31	~~37~~ →
13. 32	28	32	05	⊗ ~~32~~	~~67~~ →	⊗ 31	~~30~~ →
14. 32	15	31	55	⊗ ~~31~~	~~33~~ →	⊗ 31	~~34~~ →
15. 31	55	32	22	⊗ 31	~~29~~ →	⊗ 31	~~33~~ →
16. 32	90	31	40	⊗ 31	~~30~~ →	⊗ 31	~~34~~ →
17. 31	90	31	90	⊗ 31	~~25~~ →	⊗ 31	~~30~~ →
18. 32	30	32	75	⊗ 31	~~25~~ →	⊗ 31	~~30~~ →
19. 32	30	31	20	⊗ 31	~~29~~ →	⊗ 30	~~80~~ →
20. 31	50	30	25	⊗ 31	~~31~~ →	⊗ 31	~~20~~ →
TOTAL 635	13	TOTAL 627	16	TOTAL 633	31	TOTAL ~~622~~	~~48~~

625 15

Total pipe on location 5181.93' threads off (29.07' threads ·)

On pipe racks @ Martin Yard 4305.67'

Ran in well

⊗ New left on Rack

ALL MEASUREMENTS ☑ LESS ☐ WITH THREADS

INDIVIDUAL ☐ CASING ☑ TUBING JOINT MEASUREMENT

	SIZE	WEIGHT	MFR.	GRADE	THD.	COUPLING
	2 3/8	4.7 #		J-55	8rd	EUE
1.	31 ~~26~~					
2.	31 ~~34~~					
3.	31 ~~33~~					
4.	31 ~~38~~					
5.						
6.						
7.						
8.						
9.						
10.						
11.						
12.						
13.						
14.						
15.						
16.						
17.						
18.						
19.						
20.						
TOTAL 125	31	TOTAL	TOTAL		TOTAL	

ALL MEASUREMENTS ☑ LESS ☐ WITH THREADS

30

INDIVIDUAL ☐ CASING ☐ TUBING JOINT MEASUREMENT

	SIZE	WEIGHT	MFR.	GRADE	THD.	COUPLING
1.						
2.						
3.						
4.						
5.						
6.						
7.						
8.						
9.						
10.						
11.						
12.						
13.						
14.						
15.						
16.						
17.						
18.						
19.						
20.						
TOTAL		TOTAL	TOTAL		TOTAL	

ALL MEASUREMENTS ☐ LESS ☐ WITH THREADS

31

New Tubing Ran in Hole

INDIVIDUAL ☐ CASING ☑ TUBING JOINT MEASUREMENT

SIZE	WEIGHT	MFR.	GRADE (EW)	THD.	COUPLING
2 3/8	4.7#	Lone Star	J-55	8rd	EUE

Tailpipe 1.	31	38	31	30	31	29	31	34
Packer 2.	5	12	31	33	31	28	31	31
On-off Tool	1	32	31	16	31	38	31	28
4.	31	27	31	33	31	31	30	64
5.	30	72	31	37	31	30	31	34
6.	31	29	31	31	31	30	31	31
7.	30	22	31	29	31	31	31	28
8.	31	34	31	27	31	35	31	30
9.	31	31	31	20	31	29	31	29
10.	31	31	31	31	31	30	31	20
11.	31	28	31	24	31	32	31	28
12.	30	72	30	70	31	29	31	29
13.	31	41	30	72	31	32	30	70
14.	31	25	31	31	31	30	31	30
15.	31	36	31	30	31	20	31	31
16.	31	31	30	62	31	28	31	33
17.	30	81	31	28	31	33	31	26
18.	30	52	31	26	31	36	31	35
19.	31	23	30	66	31	26	31	29
20.	30	75	31	30	31	27	31	30
TOTAL	565	92	TOTAL 623	26	TOTAL 626	04	TOTAL 624	70

Ran 4240.73' tubing, packer & pieces
Includes 3318.7' from Acjunkin Appalachian
& 907.64' from previous new pipe shipment

ALL MEASUREMENTS ☑ LESS ☐ WITH THREADS

INDIVIDUAL ☐ CASING ☑ ~~TUBING~~ JOINT MEASUREMENT

SIZE	WEIGHT	MFR.	GRADE	THD.	COUPLING
2 3/8"	4.7#	Lone Star	J-55	8rd	EUE

1.	31	36	27	00	31	25	31	33
2.	31	34	32	43	31	29	31	34
3.	31	32	32	86	31	31	31	30
4.	31	30	32	34	31	41	31	30
5.	31	28	32	33	30	66	30	80
6.	32	42	32	38	31	30	31	30
7.	31	68	32	15	31	30	31	26
8.	32	30	28	75	31	32	31	34
9.	31	10	31	39	31	23	31	33
10.	31	35	31	30	31	30		
11.	32	88	31	36	31	33	Left on Rack @ Martin Yard Included in Tally Pg 28-30	
12.	32	24	31	40	31	30		
13.	32	90	31	32	31	30		
14.	31	12	31	25	31	32		
15.	31	40	31	38	31	37		
16.	30	97	31	30	31	30		
17.	32	30	31	35	31	37		
18.	32	90	31	29	6	10		
19.	32	27	31	30				
20.	32	42	31	35				
TOTAL	636	85	TOTAL 626	23	TOTAL 537	73	TOTAL 281	30

Packer set @ 4206.31' 4240.73' 4522.63'

ALL MEASUREMENTS ☑ LESS ☐ WITH THREADS

4238.03

WATER WELL INFORMATION

Was a Water Well Drilled? ☐Yes ☐No

Total Depth _____ Ft.

Hole Diameter _____ In.

Size of Pipe run in Well _____ In.

Was Water Well Abandoned upon Completion of Gas Well? ☐Yes ☐No

Distance Water Well from Gas Well _____ Ft.

N

W . E Estimate direction of Water Well (X) as to Gas Well (·)

S

REMARKS

89 Recondition (Ran tubing on packer for injection - Installed new wellhead components - Tested to renew disposal permit)

5/24/89 Moved in Schlumberger. Ran 7" gauge ring to ~~4227~~ 4127'. Hung in hole temporarily, Retrieved gauge ring, Preparing location.

5/25 Preparing location —

5/30 Moved in and Rigged up Shull Well Service.

REMARKS

5/31 Unloaded Tubing, Removed wellhead fittings Rigged up 7" lift nipple. Pulled 95,000 #'s on 7"; Releasing casing slips. ~~Set~~ set 75,000#'s on csg slips Removed & Replaced 9⅝ x 7" casing head.

6/1 Made up a 7"x2" stripping head, Ran 6⅛" tooth bit, 7" casing scraper & 2⅜" 4.7# EUE Tubing. In hole to 4127'. Circulated Drip Gas out of Hole. Repaired Tristate Mud Pump.

6/2 Cleaned 7" Casing with bit & casing scraper from 4127'. Encountered tight spot @ 4345'; Getting some metal back. Pulling tubing to check bit.

6/5 Finished tripping tubing out of hole. Inspected 6⅛" bit & casing scraper (outside teeth on bit chipped). Ran in hole with bit, casing scraper & 2⅜" tubing to 4345'. Cleaned hole to 4474' encountered tight spot @ 4447'.

6/6 Cleaned hole from 4474'-4818' with bit & casing scraper. Encountered

REMARKS

tight places @ 4520', 4541', 4612', 4620', 4671', 4723'.

6/7 Cleaned hole from 4818'-4899'. Set down @ 4899' w/ 6000#'s, losing circulation. Tripped out of hole with tubing, casing scraper & 6⅛" bit. Encountered tight spots @ 4869' & 4873'.

6/9 Rigged up Schlumberger, Ran gauge ring & junk basket in 7" casing to 4249'. Set & tested blanking plug. Began running in hole w/ 2⅜" tubing, Baker Model A-3 lockset packer & on/off sealing connector.

6/9 Ran 2⅜" tubing & Baker Model A-3 lockset packer to 4190'; Pressure tested 2⅜" tubing & 7"x2⅜" annulus to 2000 psig unsuccessfully. To Re-run w/ new 2⅜" tubing & Retest 7" & 2⅜" annulus above packer.

48

REMARKS

6/12 Released on/off tool @ 5190'. Pulled 2⅜" tubing. Inspected & redressed on/off tool & ran back in hole w/ new tubing to 2560'.

6/13 Ran on/off tool & new 2⅜" 4.7 #/ft J-55 tubing to 4190', Stinging into packer assembly. Released packer & reset @ 4206'. Tested tubing to 2000 psi for 30 min. (Tested O.K.). Tested casing to 2,000 psi for 30 min. (Tested O.K.). Swabbed tubing to 4100'.

6/14 Moved in & Rigged up Willis Slick line service. Ran in hole w/ wireline & retrieving tool to 4209'. Pulled equalization prong. Ran back in hole sheared off fish; Last retrieving tool spring. Fished spring out of hole. Ran in hole with retrieving tool jarring on blanking plug.

6/15 Retrieved Baker 1.81" blanking plug.

49

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Office of Oil and Gas
MAY 20 2016
WV Department of Environmental Protection

Set it in the on-off tool on surface - Kevin - Baker man tested it!

REMARKS

plug w/ slickline retrieving tool. Rigged down equipment well complete

REMARKS

Retired 9 5/8" x 7" csg head

◉ Active Fields
○ Inactive Fields

Field Name
Ripley
Roane
Rockport
Terra Alta
Terra Alta South
Victory A
Victory B
Wayne
Weaver
Wellington

Well
00099

Or Type Well #
00099

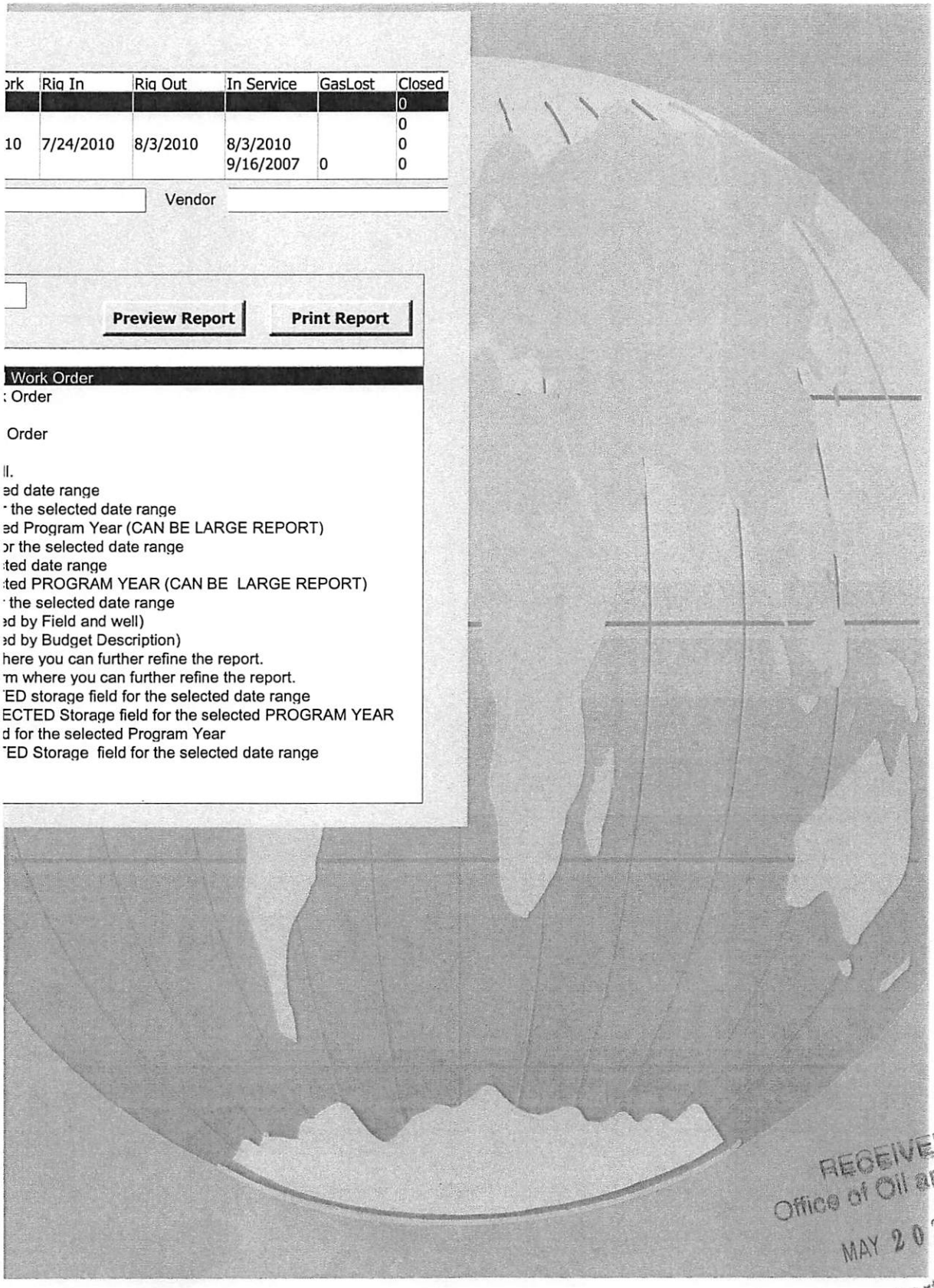
Well Level Work Orders

WO	Year	Budget Type	Budget	Spent	Start Wo
-1518	2015	O&M Field Investig Work	$0.00		
46027	2015	Roane W99 (Martin Yard)	$100,000.00	$59,316.17	
40737	2010	2010 Martin Yard Disposal Well W-9	$133,000.00	$52,713.62	7/24/20
37827	2007	Martin Yard Disposal Well W-99	$168,000.00	$87,851.79	

Defaults: Date: Field Super Rig Contr:

Start Date: 4/25/2016
End Date: 5/9/2016
Budget Type:
Program Year:

Level	Type	Date Specific	Report Name
Work Order	Detailed	No	Work Order Summary - detailed report for currently selected
Work Order	Detailed	No	Operations Summary Report for the currently selected Work
Work Order	Detailed	No	Detailed Operations for the currently selected Work Order
Work Order	Detailed	No	Daily Costs - Detailed Costs for the currently celected Work
Work Order	Detailed	No	Daily Costs sorted and totaled by VENDOR
Well	Detailed	No	Detailed Operations for the entire history of the selected wel
System	Detailed	Yes	Daily Costs for ALL Work Orders in ALL fields for the selecte
System	Detailed	Yes	Daily Costs for SELECTED BUDGET TYPE in ALL fields for
System	Detailed	Program Year	Daily Costs for ALL Work Orders in ALL fields for the selecte
System	Detailed	Yes	Daily Details for SELECTED BUDGET TYPE in ALL fields fo
System	Detailed	Yes	Daily Details for ALL Work Orders in ALL fields for the selec
System	Detailed	Program Year	Daily Details for ALL Work Orders in ALL fields for the selec
System	Detailed	Yes	Gas Lost Daily Details for ALL Work Orders in ALL fields for
System	Summary	Program Year	Program Summary for SELECTED PROGRAM YEAR (sorte
System	Summary	Program Year	Program Summary for SELECTED PROGRAM YEAR (sorte
System	Detailed	On SubForm	VENDOR Payments - Opens the Vendor Payments Form wl
System	Detailed	On SubForm	VENDOR UNPAID Tickets - Opens the Unpaid Vendors For
Field	Detailed	Yes	Daily Costs for ALL Work Orders for CURRENTLY SELECT
Field	Detailed	Program Year	Daily Details for ALL Work Orders in the CURRENTLY SELI
Field	Detailed	Program Year	Daily Costs for ALL Work Orders in SELECTED storage fiel
Field	Detailed	Yes	Daily Details for ALL Work Orders in CURRENTLY SELECT



ork	Rig In	Rig Out	In Service	GasLost	Closed
					0
					0
10	7/24/2010	8/3/2010	8/3/2010		0
			9/16/2007	0	0

Vendor

Preview Report Print Report

Work Order
: Order

Order

ll.
ed date range
the selected date range
ed Program Year (CAN BE LARGE REPORT)
or the selected date range
ted date range
ted PROGRAM YEAR (CAN BE LARGE REPORT)
the selected date range
ed by Field and well)
ed by Budget Description)
here you can further refine the report.
m where you can further refine the report.
ED storage field for the selected date range
ECTED Storage field for the selected PROGRAM YEAR
d for the selected Program Year
ED Storage field for the selected date range

Columbia Gas Transmission
A NiSource Company

RR 2 Box 138
Sandyville, WV 25275

December 13, 2007

Kay Holtsclaw
WV DEP – Office of Oil & Gas
601 57th Street, SE
Charleston, WV 25304-2345

Ms. Holtsclaw,

As per your request during a recent telephone conversation, please find enclosed completed form WR-35, Well Operator's Report of Well Work, for 2001-02 work performed on Columbia's well Roane W-99, UIC permit #UIC2D871977, API permit 47-087-01977. The well work permit was issued 12/4/2001.

Note that I could not find a copy of, or any record, that Columbia had previously submitted a completed form WR-35 for this work. The enclosed report was prepared based on detailed and accurate records.

If questions arise, feel free to call.

Regards,

Jim Amos
Columbia Gas Transmission
Office: 304.373.2412
Cell: 304.483.0073

WR-35
Rev (5-01)

DATE: 12/13/2007
API #: 47- 087 – 01977

State of West Virginia
Department of Environmental Protection
Office of Oil and Gas

Well Operator's Report of Well Work

Farm name: Columbia Gas Transmission Operator Well No.: W-99 (UIC Permit #UIC2D871977)

LOCATION: Elevation: 660.7 Quadrangle: Clio

District: Walton County: Roane
Latitude: 8,300 Feet South of 38 Deg. 35 Min. 00 Sec.
Longitude 7,650 Feet West of 81 Deg. 20 Min. 00 Sec.

Company: Columbia Gas Transmission Corp

	Casing & Tubing	Used in drilling	Left in well	Cement fill up Cu. Ft.
Address: 1700 MacCorkle Ave SE	4-1/2"	4608 ft	4608 ft	150 sx
Charleston, WV 25325-1273	2-3/8" tbg	4588 ft	4588 ft	NA
Agent: Paul Amick	The 4-1/2" casing was installed 4/4/01. Tubing pulled and new tubing ran/set on packer at 4588 ft. All other existing casing left in well.			
Inspector: Mike Lewis / Homer Daugherty				
Date Permit Issued: 12/4/01				
Date Well Work Commenced: 12/11/01				
Date Well Work Completed: 2/13/02				
Verbal Plugging:				
Date Permission granted on:				
Rotary X Cable Rig				
Total Depth (feet): 5130				
Fresh Water Depth (ft.): not applicable				
Salt Water Depth (ft.): not applicable				
Is coal being mined in area (N/Y)? no				
Coal Depths (ft.):				

OPEN FLOW DATA

Producing formation Rhinestreet and Marcellus Shale Pay zone depth (ft) 4620 - 5106
Gas: Initial open flow not applicable MCF/d Oil: Initial open flow not applicable Bbl/d
Final open flow not applicable MCF/d Final open flow not applicable Bbl/d
Time of open flow between initial and final tests not applicable Hours
Static rock Pressure 0 psig (surface pressure) after 72 Hours

Second Producing formation not applicable Pay zone depth (ft) not applicable
Gas: Initial open flow _____ MCF/d Oil: Initial open flow _____ Bbl/d
Final open flow _____ MCF/d Final open flow _____ Bbl/d
Time of open flow between initial and final tests _____ Hours
Static rock Pressure _____ psig (surface pressure) after _____ Hours

NOTE: ON BACK OF THIS FORM PUT THE FOLLOWING: 1). DETAILS OF PERFORATED INTERVALS, FRACTURING OR STIMULATING, PHYSICAL CHANGE, ETC. 2). THE WELL LOG WHICH IS A SYSTEMATIC DETAILED GEOLOGICAL RECORD OF ALL FORMATIONS, INCLUDING COAL ENCOUNTERED BY THE WELLBORE.

Signed: James E. Amos
By: James E. Amos – Senior Storage Engineer – Columbia Gas Transmission Corp
Date: 12/13/07

Roane W-99 UIC well

This is an existing permitted UIC. Below is a summary of work performed.

1) Pulled tubing and packer.
2) Ran pipe inspection log inside 7" casing indicating corrosion below 3780 ft.
3) Installed new string of 4-1/2" casing.
4) Ran GR-Neut and cement bond log.
5) Drilled 4-1/2" shoe.
6) Ran new tubing on packer – set at 4583 ft.
7) Performed MIT on 2-3/8" tubing x 4-1/2" casing annulus – test OK.
8) Performed coil tubing cleanout.
9) Pull 2-3/8" tubing and packer.
10) Cleaned well to 5106 ft.
11) Spotted acid and perforated 4-1/2" casing as follows:
    4620 – 4890 ft (88 shots)
    4936 – 5056 ft (45 shots)
    5056 – 5106 ft (17 shots)
12) Re-ran 2-3/8" tubing on packer – set @ 4588 ft.
13) Performed MIT on 2-3/8" tubing x 4-1/2" casing annulus – test OK – witnessed by Mike Lewis.
14) Pulled tubing and packer.
15) Fracture stimulated with:
    1. 984 bbls fluid
    2. 23,200 lbs sand
    3. ATR: 48 bpm
    4. ATP: 2800 psig
16) Re-ran 2-3/8" tubing on packer – set @ 4588 ft.
17) Performed MIT on 2-3/8" tubing x 4-1/2" casing annulus – test OK – witnessed by Homer Daugherty 2/4/2002.

* Note that no earthen pit was utilized. Workover treatment fluids recovered via steel tanks and transported to LAD in Wheeling, WV for disposal/processing.

Office of Oil and Gas
1356 Hansford Street
Charleston, WV 25301
Phone: (304) 558-6075
Phone: (304) 558-6076
Fax: (304) 558-6047

West Virginia Department of Environmental Protection

Bob Wise,
Governor

Michael O. Callaghan
Secretary

December 04, 2001

WELL WORK PERMIT

Fracture

This permit, API Well Number: 47-8701977, issued to COLUMBIA GAS TRANSMISSION CORP., is evidence of permission granted to perform the specified well work at the location described on the attached pages and located on the attached plat, subject to the provisions of Chapter 22 of the West Virginia Code of 1931, as amended, and all rules and regulations promulgated thereunder,and to all conditions and provisions outlined in the pages attached hereto. Notification shall be given by the operator to the Oil and Gas Inspector at least 24 hours prior to the construction of roads, locations, and/or pits for any permitted work. In addition, the well operator shall notify the same inspector 24 hours before any actual well work is commenced and prior to running and cementing casing. Spills or emergency discharges must be promptly reported by the operator to 1-800-654-3312 and to the Oil and Gas inspector.

Please be advised that form WR-35, well operators report of well work, is to be submitted to this office within 90 days of completion of drilling, as should form WR-34 Discharge Monitoring Report within 30 days of discharge of pits, if applicable.

Failure to abide by all statutory and regulatory provisions governing all duties and operations hereunder may result in suspension or revocation of this permit and, in addition, may results in civil and/or criminal penalties being imposed upon the operators.

This permit will expire in two (2) years from the issue date.

If there are any questions, please feel free to contact me or Mr. Al Blankenship at 304-558-6342.

James Martin
Interim Chief,
Office of Oil and Gas

Operator's Well No: W-99
Farm Name: COLUMBIA GAS TRANS.
API Well Number: 47-8701977
Permit Type: Fracture
Date Issued: 12/04/2001

WR-37
REV. 5/01

Date: 8/10/2007 * should be year 2010

Operator's Well Number W-99 UIC 2D0871977

	State	County	Permit
API Well No.:	47-	087	- 01977

STATE OF WEST VIRGINIA
DEPARTMENT OF ENVIRONMENT-OFFICE OF OIL AND GAS
PRE-OPERATION CERTIFICATE
FOR LIQUID INJECTION OR WASTE DISPOSAL WELL

WELL OPERATOR Columbia Gas Transmission
Address 1700 MacCorkle Ave., SE
Charleston, WV 25314

DESIGNATED AGENT Paul Amick
Address 1700 MacCorkle Ave., SE
Charleston, WV 25314

GEOLOGICAL TARGET FORMATION Devonian Shale Depth 2,400 feet(top) to 5,095 feet(bottom)

Virgin reservoir pressure in target formation None psig

Source of information on virgin reservoir pressure:

Perforation intervals 4,650' - 5,095' Open-hole intervals None

MAXIMUM PERMITTED INJECTION OPERATIONS

Well head injection pressure: 1,102 psig Bottom hole pressure: 2,618 psig

Volume per hour: 40 bbls

DETAILED IDENTIFICATION OF MATERIALS TO BE INJECTED

Liquids to be injected for oil recovery: N/A

Wastes to be disposed of: See attachment 1

Additives (Slurry mediums, inhibitors, solvents, oxidizers, deoxidizers, etc.)

Corrosion inhibitors CRW9058 and X-Cide 102W

SPECIFICATIONS FOR CATHODIC PROTECTION AND OTHER CORROSION CONTROL

Insulated flange protection

ADDITIONAL DRILLING AS PART OF THE CONVERSION (Complete form WR-35)

DETAILS ON NEW CASING AND TUBING PROGRAM AS PART OF THE CONVERSION (To be completed below unless the new casing and tubing program is described on a form WR-35, submitted in connection with the permit to which this form WR-37 relates.)

CASING OR TUBING TYPE	SIZE	GRADE	WEIGHT PER FT.	NEW	USED	FOOTAGE USED IN DRILLING	FOOTAGE LEFT IN WELL	CEMENT USED	PACKERS (KIND, SIZE, DEPTH SET)
CONDUCTOR	20"	H-40	94ppf	x		34'	34'	surface	
FRESH WATER	13-3/8"	H-40	48ppf	x		124'	124'	surface	Baker A3
COAL	9-5/8"	H-40	32ppf	x		1,902'	1,902'	surface	4-1/2" x 2-3/8"
INTERMEDIATE	7"	N-80	23ppf	x		5,130'	5,130	cmt to 2,948'	4,583'
PRODUCTION	4-1/2"	J-55	10.5ppf	x		4,608'	4,608'	150 sx	
TUBING	2-3/8"	J-55	4.7ppf	x		4,583'	4,583'		
LINERS									

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Office of Oil and Gas
MAY 20 2010
WV Department of
Environmental Protection

WR37

MECHANICAL INTEGRITY TEST

Test Method: Pulled and re-dressed Baker A3 Lok-set packer and on/off tool. Re-ran packer and PVC lined 2-3/8" J-55 4.7 ppf EUE tubing with Atlas Bradford modified connections. (See attachment 2). RU BJ services. Pressurized 4-1/2" x 2-3/8" annulus to 1,744 psig (required test pressure 1,653 psig) and held for 27 minutes. (See attachment 3)

The undersigned certifies that the test was performed on July 30, 20___ and demonstrated mechanical integrity of the well. The test was witnessed by _____ representing the Office of Oil and Gas.

John V McCallister
Well Operator

8/10/2010
Date

THIS WELL IS AUTHORIZED FOR INJECTION.

Signed _____ UIC PROGRAM DIRECTOR

Date 8/13/10

[NOTE: That the mechanical integrity of this well must be demonstrated again within ninety (90) days of five years from this date in order for injection to continue. Please notify the state inspector 24 hours in advance of the test].

Columbia Gas Transmission
Well Operator
By: John V. McCallister
Its Sr. Storage Engineer

Appendix A
Injection Well Form

(4/25)

APPENDIX A
Injection Well Form

1) GEOLOGIC TARGET FORMATION Devonian Shale

Depth 2030 Feet (top) 5095 Feet (bottom) perfs 4620 - 5106 ft

2) Estimated Depth of Completed Well, (or actual depth of existing well): 5130 Feet

3) Approximate water strata depths: Fresh 297 Feet Salt none rpt'd Feet

4) Approximate coal seam depths: none reported by driller

5) Is coal being mined in the area? Yes ☐ No ☑

6) Virgin reservoir pressure in target formation unknown psig Source

7) Estimated reservoir fracture pressure 3700 psig (BHFP)

8) MAXIMUM PROPOSED INJECTION OPERATIONS:

Injection rate (bbl/hour)	40
Injection volume (bbl/day)	960
Injection pressure (psig)	1200
Bottom hole pressure (psig)	3600

9) DETAILED IDENTIFICATION OF MATERIALS TO BE INJECTED, INCLUDING ADDITIVES:

Fresh water, salt water and other fluids associated with natural gas gathering, storage and transmission operations. No chemical additives such as corrosion inhibitors are used.

Temperature of injected fluid: (°F) Ambient

10) FILTERS (IF ANY)

None

11) SPECIFICATIONS FOR CATHODIC PROTECTION AND OTHER CORROSION CONTROL

Insulated flange protection

APPENDIX A (cont.)

12. Casing and Tubing Program

TYPE	Size	New or Used	Grade	Weight per ft. (lb/ft)	FOOTAGE: For Drilling	INTERVALS: Left in Well	CEMENT: Fill-up (Cu. Ft.)
Conductor	20"	New	H-40	94	34'	34'	34' to surface
Fresh Water	13-3/8"	New	H-40	48	124'	124'	100 sx
Coal							
Intermediate 1	9-5/8"	New	H-40	32	1902'	1902'	380 sx
Intermediate 2	7"	New	N-80	23	5130'	5130'	350 sx
Production	4-1/2"	New	J-55	10.5	4608'	4608'	150 sx
Tubing	2 3/8"	New	J-55	4.7	4569'	4569'	packer
Liners							

TYPE	Wellbore Diameter	Casing Size	Wall Thickness	Burst Pressure	Cement Type	Cement Yield (cu. ft./sk)	Cement to Surface ? (Y or N)
Conductor	unknown	20"	0.438"	1530	unknown	unknown	Y
Fresh Water	17-1/2"	13-3/8"	0.330"	1730	Class A	1.18	Y
Coal							
Intermediate 1	12-1/4"	9-5/8"	0.312	2270	Poz / A	1.26 / 1.18	Y
Intermediate 2	8-3/4"	7"	0.317	6340	Class A	1.18	N
Production	6.25"	4-1/2"	0.224	4790	Class A	1.18	N
Tubing	4.052"	2-3/8"	0.19	7700	N/A	N/A	N/A
Liners							

PACKERS	Packer #1	Packer #2	Packer #3	Packer #4
Kind:	Baker Model 45A3 Lok-Set			
Sizes:	2-3/8" x 4-1/2"			
Depths Set:	4562'			

* Note that 8.34 ppg packer inhibitor fluid pumped in 2-3/8" x 4-1/2" annulus above packer. MIT performed 8/13/15, and authorization for injection issued 8/24/15, per Pre-Operations Certificate. Annular pressure released after MIT and monitored by Columbia personnel while in operation.

Appendix B
Storage Tank Inventory

(4/25)

APPENDIX B
Storage Tank Inventory

API #	Tank ID	Tank Location (UTM NAD 83 Meters)		Installation Date	Tank Age (Months)	Construction Material (Steel, plastic, etc.)	Capacity (gallons)	Type of Fluid Stored	Volume of Fluid Stored (gallons)	Tank Type Single/Double Wall
		Northing	Easting							
47-087-1977	A03	4268060.77	468653.09	1992	286	Steel	10080	Pipeline Liq	10080	Double walled
47-087-1977	A04	4268060.77	468653.09	1992	286	Steel	10080	Pipeline Liq	10080	Double walled
47-087-1977	A05	4268060.77	468653.09	1992	286	Steel	8400	Pipeline Liq	8400	Double walled
47-087-1977	A06	4268060.77	468653.09	1992	286	Steel	8400	Pipeline Liq	8400	Double walled
47-087-1977	A07	4268060.77	468653.09	1998	214	Steel	10000	Pipeline Liq	10000	Single walled
47-087-1977	Oil/Water Sep	4268060.77	468653.09	UNK	UNK	Steel	500	Oil/Water	500	Single walled
47-087-1977	A09	4268060.77	468653.09	1998	214	Steel	8820	Pipeline Liq	8820	Single walled
47-087-1977	A12	4268060.77	468653.09	1998	214	Steel	8000	Pipeline Liq	8000	Single walled
47-087-1977	A13	4268060.77	468653.09	2001	178	Steel	600	Lube Oil, Used	600	Single walled
47-087-1977	A14	4268060.77	468653.09	2001	178	Steel	600	Oil/Water	600	Single walled

Section 7
Area of Review

UIC PERMIT NUMBER UIC2D0871977
RENEWAL APPLICATION
ROANE WELL #99
COLUMBIA GAS TRANSMISSION, LLC.

SECTION 7
AREA OF REVIEW

Provided are three (3) Topographical Maps, all of which show the ¼-mile AOR and the 1-mile radius around Roane Well #99. The topo map identified as Figure 1 has been provided to show water wells used for drinking or agricultural purposes outside the ¼-mile AOR radius, but within the 1-mile radius from the injection well. The topo map identified as Figure 2 has been used to show wells used for drinking or agricultural purposes within the AOR.

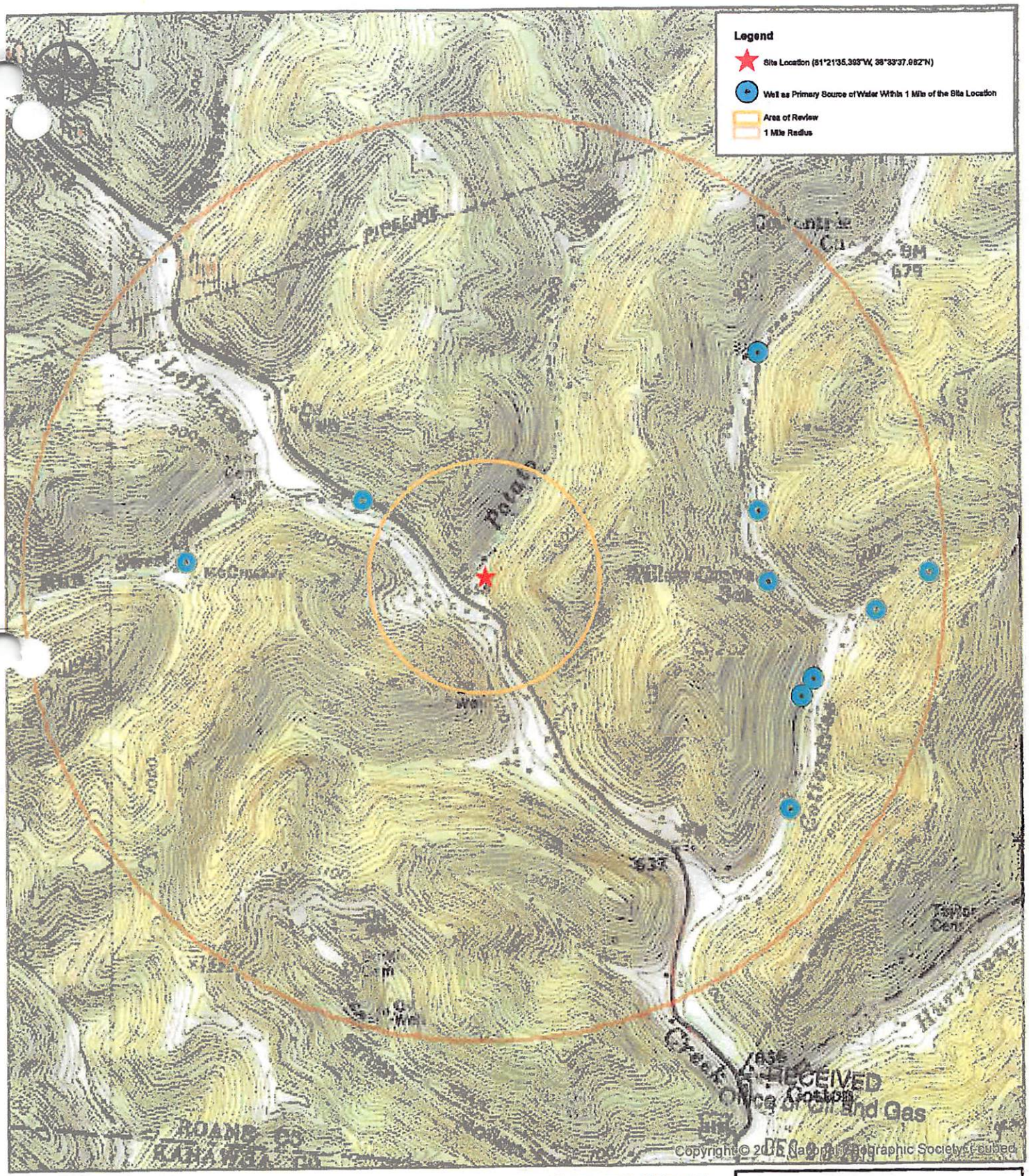
The third topo map shows the locations for oil and gas wells located within the ¼-mile AOR, as well as those outside the AOR, but within 1-mile radius from the injection well. In summary, within one mile of W-99, there are four plugged wells, four active wells (not including W-99), 29 abandoned wells, and one well of unknown status. Within 1/4 mile of W-99, there is one active well (API Number 47-087-02332) and two abandoned wells (API Numbers 47-087-30858 and 47-087-30972. A spreadsheet behind the topo map contains information regarding permit numbers, API numbers and distances to the injection well. In general, geologic tops are provided for wells within one mile of W-99 where records exist with the West Virginia Geologic and Economic Survey. As a disclaimer, the information provided is for known wells that have been recorded in databases with the WVGES and WVDEP. With that said, there is limited geologic information for the Devonian shale (W-99 Injection Horizon).

The only forms or documentation that appear to exist for the active well are old company drilling or completion reports, which have been included in the application. This active well appears to date from around 1921 so there are not any associated WR-35 and/or WR-38 agency forms to provide. There was however, enough information to complete the Appendix C requirements for this well. At this time, it is unknown if the information exists, or can be obtained, to provide all the information required by Appendix C for the two abandoned wells. Information available for the abandoned wells has been included in Appendix C.

Mr. Randy Lowe, Sanitarian for the Roane County Health Department was contacted and questioned concerning publically recorded drinking water wells within a 1-mile radius of the injection well. Mr. Lowe was unable to provide any information regarding whether or not wells existed within this radius. He suggested contacting the West Virginia Department of Health and Human Resources in an attempt to obtain this information. The state agency was not able to supply any additional information. The local Public Service District (PSD), Walton PSD was contacted to determine if there were any publically recorded drinking water sources within the 1-mile radius. Appendix D has been completed, signed and notarized confirming none exist.

Based on the field survey made during the previous renewal, and confirmed by an additional survey conducted as part of this renewal, there are three residences within the AOR which use well water for drinking or agricultural purposes. Samples were collected from two of the three water wells within the AOR, as was done during the previous renewal. The Burke residence is within the AOR, and samples were collected from that residence during the previous renewal application. However, during the first attempt to sample the well at the Burke residence, field personnel were informed by the occupants that the entire household was ill, and that they did not wish to have anyone enter their home at that time. The following week, another attempt was made to collect samples at this location, but no one answered the door at the residence. A third sample was collected at a residence very close to, if not touching, the AOR. The results from the analyses conducted by a laboratory certified for reporting purposes by the West Virginia DEP are included as Appendix E. Complete copies of the lab reports are included following Appendix E.

This renewal application is for a single injection well, rather than an area permit consisting of more than one well. Appendix F has been included, but marked as Not Applicable for this reason.



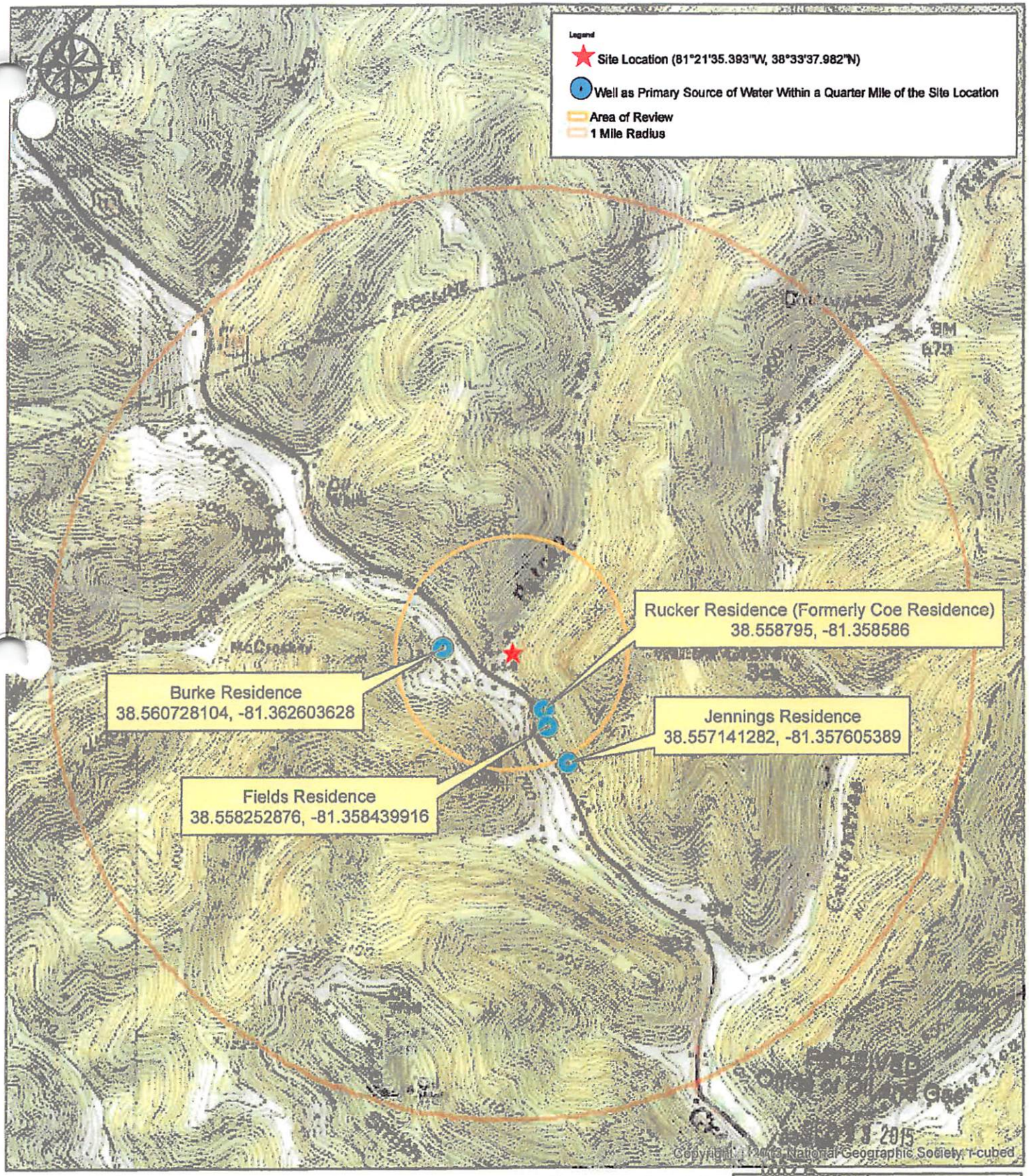
0 720 1,440 2,880 Feet

POTESTA
ENGINEERS AND ENVIRONMENTAL CONSULTANTS

DATE: DECEMBER 2015
PROJECT NO: 06-0552-000J
SCALE: 1" = 1,440'

Figure 1
Columbia Gas Transmission
Martin Yard Permitting Map
Clio Quadrangle
Roane County, West Virginia

G:\Projects\2006\06_0552_000J\MapDocuments
12_11_2015\06_0552_000J_FIG_1_1MiWells.mxd



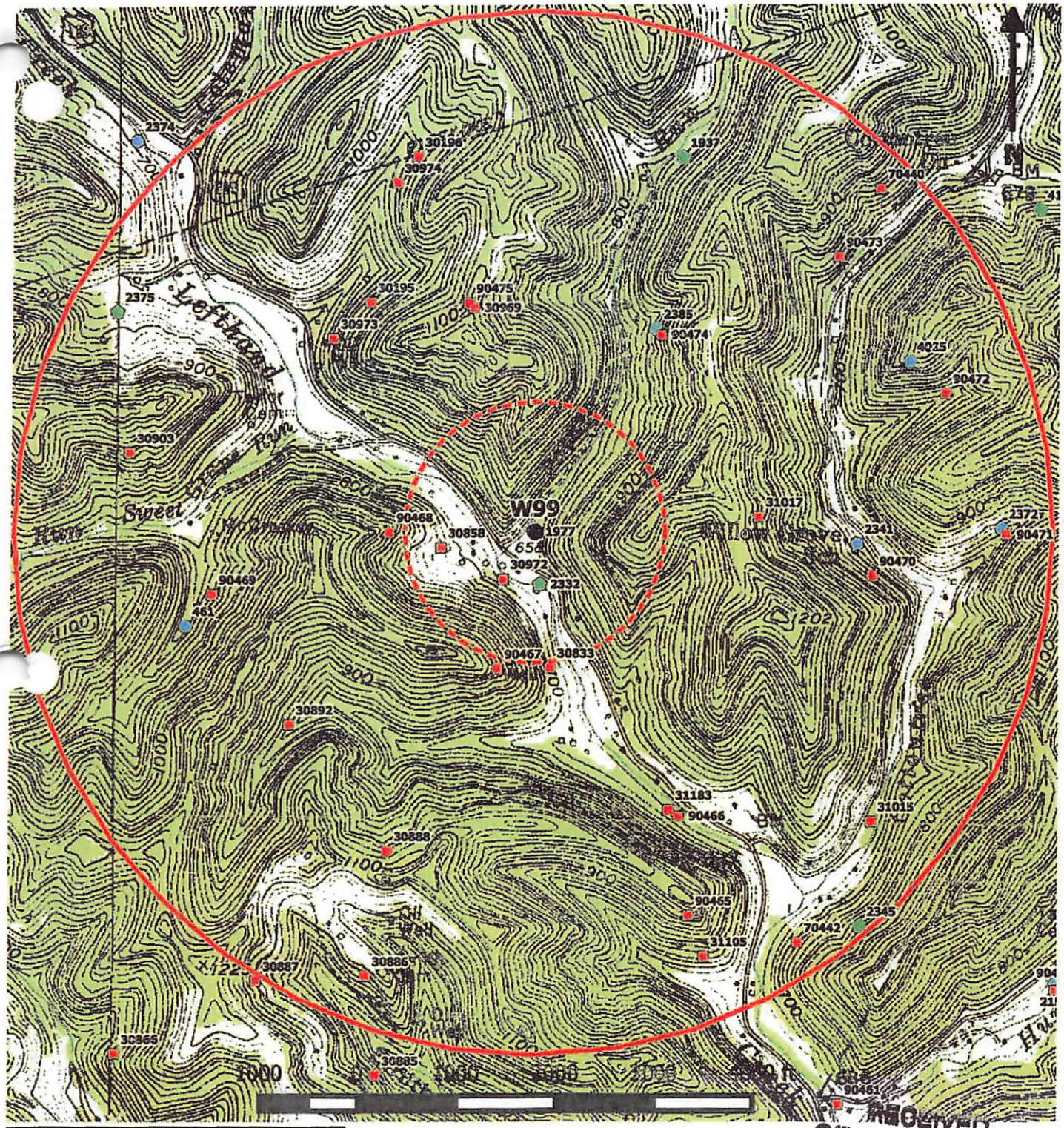
0 720 1,440 2,880 Feet

POTESTA
ENGINEERS AND ENVIRONMENTAL CONSULTANTS

DATE: DECEMBER 2015
PROJECT NO: 06-0552-000J
SCALE: 1" = 1,440'

Figure 2
Columbia Gas Transmission
Martin Yard 1 Mile Water Well Map
Clio Quadrangle
Roane County, West Virginia

G:\Projects\2006\06_0552_000J\MapDocuments
\12_11_2015\06_0552_000J_FIG_1_QuarterMIWells.mxd



NOTE: Well Labels Are Designated By WVGES Permit Numbers.

DATA SOURCE: WVGES & WVDEP

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Department of Environmental Protection

Columbia Pipeline Group

Roane County W-99 UIC Location

USGS 7.5 Minute Topo
Known Well Locations and Classification

Author: SSH / LAS	Scale:	Date: 12/18/2015

FROM	TO (WELL PERMIT#)	TO (WELL API#)	DISTANCE(FT)
W-99	2332	47-087-02332	530.840
W-99	30972	47-087-30972	571.366
W-99	30858	47-087-30858	963.959
W-99	30833	47-087-30833	1382.719
W-99	90467	47-087-90467	1428.871
W-99	90468	47-087-90468	1479.167
W-99	31017	47-087-31017	2276.678
W-99	30969	47-087-30969	2357.915
W-99	90474	47-087-90474	2370.114
W-99	2385	47-087-02385	2391.115
W-99	90475	47-087-90475	2419.197
W-99	30973	47-087-30973	2839.868
W-99	30195	47-087-30195	2873.921
W-99	31183	47-087-31183	3118.420
W-99	30892	47-087-30892	3159.068
W-99	90466	47-087-90466	3219.792
W-99	2341	47-087-02341	3276.519
W-99	90469	47-087-90469	3336.804
W-99	90470	47-087-90470	3459.629
W-99	30888	47-087-30888	3544.956
W-99	461	47-087-00461	3666.249
W-99	30974	47-087-30974	3815.571
W-99	30196	47-087-30196	3992.411
W-99	1937	47-087-01937	4077.363
W-99	90473	47-087-90473	4146.807
W-99	90465	47-087-90465	4176.528
W-99	4025	47-087-04025	4182.756
W-99	30903	47-087-30903	4195.538
W-99	90472	47-087-90472	4407.816
W-99	31015	47-087-31015	4497.988
W-99	31105	47-087-31105	4620.297
W-99	2372	47-087-02372	4754.009
W-99	30886	47-087-30886	4796.683
W-99	2375	47-087-02375	4801.157
W-99	90471	47-087-90471	4806.457
W-99	70440	47-087-70440	4927.317
W-99	70442	47-087-70442	4929.866
W-99	2345	47-087-02345	5174.043

FORM U-37-C.N.-6-39

Roane 2385

UNITED FUEL GAS COMPANY
COMPANY

SERIAL WELL NO. 232 LEASE NO. MAP SQUARE 26-73

RECORD OF WELL NO. on the	Casing and Tubing: Size	Weight	Used in Drilling	Left in Well	Test Before Shot
L. T. Smith farm of Acres					15/10 of Water in 6-5/8. inch
in Walton District	10"		900		/10 of Merc. in inch
Roane County	8¼"		683		Volume 1,494 M Cu. ft.
State of: West Virginia	6 5/8		1593		TEST AFTER SHOT
Field:					/10 of Water in inch
Rig Commenced 193					/10 of Merc. in inch
Rig Completed 193					Volume Cu. ft.
Drilling Commenced Jan 7 1910					Hours After Shot
Drilling Completed Feb. 17 1910					Rock Pressure
Drilling to cost per foot					Date Shot
Contractor is: Carnahan Drilling Co.					Size of Torpedo

Address:

Driller's Name

SHUT IN

Date 2-17-10

in. Tubing or Casing

Size of Packer

Kind of Packer

1st Perf. Set from

2nd Perf. Set from

Oil Flowed bbls. 1st 24 hrs.

Oil Pumped bbls. 1st 24 hrs.

Well abandoned and

Plugged 193

Elevation: 795 B

DRILLER'S RECORD

FORMATION	TOP	BOTTOM	THICKNESS	REMARKS
Slate		100		Hole Full Water 1180
Sand	100	145		
Red Slate	145	195		Gas at 1153
Sand	195	220		
Slate	220	255		Well retubed Dec. 27-1911 4" re-
Red Slate	255	285		claimed and 3" used.
Sand	285	320		
Slate	320	335		Gas from 1636-1638
Sand	335	420		
Slate	420	490		
Sand	490	505		
Slate	505	520		
Sand	520	645		
Slate	645	670		
Lime	670	695		
Sand	695	725		

LAT - 38.56611
Long - -81.35596

Mapped

ERIAL WELL NO. 232 LEASE NO. MAP SQUARE 76-73

Book 2385 Page 2. Well # 800232

DRILLER'S RECORD

FORMATION	TOP	BOTTOM	THICKNESS	REMARKS
Slate	725	740		
Sand	740	785		
Slate	785	790		
Sand	790	830		
Slate & Shells	830	1115		
Lime	1115	1155		
Slate	1155	1160		
Sand	1160	1450		
Slate	1450	1457		
Sand	1457	1465		
Lime	1465	1482		
Red Slate	1482	1485		
Lime	1485	1496		
Red Slate	1496	1505		
Maxton Sand	1505	1520		
Pencil Slate	1520	1590		
Little Lime	1590	1565		
Penoil Cave	1565	1567		
White Lime	1567	1576		
Penoil Cave	1576	1587		
Big Lime	1587			
Total Depth		1653		
DRILLED DEEPER - Sep. 28	1911			
Orig. T. Depth		1653		Drilled thru Big Injun
Big Injun	1653	1762		Test 22/10 W 6 5/8" (1,809 M)
Total Depth		1762		

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Environmental Protection

Form U.G. ... *Roane 2332*

UNITED FUEL GAS COMPANY

INCORPORATED

Well No. 1219 Lease No. 14509 Map Square 76-73

RECORD OF WELL No. 1 on the C. Canterbury et al. Farm of 11 Acres in Walton District Roane County Clendenin Field, State of W. Va.

Rig Commenced	19
Rig Completed	19
Drilling Commenced	February 18 1921
Drilling Completed	March 26 1921
Drilling to cost	per foot

Contractor is: M. C. Kifer
Address: Charleston, W.-Va.

Drillers' Names A. L. Baighle
M. J. Strothers

Elevation 650'

CASING AND TUBING

Size	Used in Drilling	Left in Well
16		
13		
10	198	
8¼	514	
6⅝	1372'11	1372'11"
5 3/16		
4¾		
4		
3	1611'11	1611'11"
2		

TEST BEFORE SHOT

.... of Water in .... inch
14 10ths of Merc. in 3 inch
Volume *1,700,000* Cu. ft.

TEST AFTER SHOT

.... of Water in .... inch
10ths .... of Merc. in .... inch
Volume .... Cu. ft.
Rock pressure *450#*

Date Shot ....
Size of Torpedo ....
Oil Flowed .... bbls. 1st 24 hrs.
Oil Pumped .... bbls. 1st 24 hrs.

SHUT IN

Date Mar. 30, 1921
3 inch Tubing or Casing
Size of Packer 3 x 6 5/8
Kind of Packer *Wall* Anchor *204' from Bottom*
1st Perf. Set 19' from bottom
2nd Perf. Set 42' from bottom
3rd " " 112' " "

Well abandoned and Plugged .... 19....

DRILLERS RECORD

Formation	Top	Bottom	Thickness	Remarks
Conductor			16	Water 370
Sand & Gravel	16	100	84	1000
Slate	100	120	20	1585
Sand	120	150	30	Gas 1471-1474
Lime	150	180	30	1561
Sand	180	205	25	1580-1585
Slate	205	225	20	
Lime	225	250	25	S.L. 1360 1474 1561 1604
Sand	250	281	31	
Coal	281	285	4	
Slate	285	310	25	
Blue Mud	310	350	40	
Sand	350	370	20	
Slate	370	410	40	
Sand	410	440	30	
Slate	440	465	25	
Sand	465	485	20	
Blue Mud	485	500	15	
Sand Lime	500	540	40	
Slate	540	580	40	
Black Lime	580	630	50	
Slate	630	680	50	
Sand	680	700	20	
Slate	700	760	60	
1st Salt Sand	760	800	40	
Slate Break	800	850	50	
Lime	850	870	20	
Slate	870	890	20	
Sand	890	916	26	
Slate Shells	916	960	46	
Sand	960	1127	167	
Slate	1127	1132	5	
Lime	1132	1160	28	
Maxon	1160	1286	126	
Little Lime	1286	1321	35	
Slate	1321	1330	9	
Lime	1330	1337	7	
Pencil	1337	1345	8	
Big Lime	1345	1552	207	
Break	1373	1375	2	
Lime (Black)	1375	1418	43	
Break	1418	1420	2	
Lime (Grey)	1420	1449	29	
Slate Break	1449	1451	2	
Lime	1451	1471	20	
Big Injun	1552	1585	33	
Slate	1585	1604	19	
Total Depth		1604		

Hole not reduced acct of big lime being broken up ~~and gas~~

And gas was found in big lime before suitable formation was found to reduce hole

Approved C.C. Doty

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LAT - 38.55894
Long - 81.3...

Appendix C
Wells Within the Area of Review

(4/25)

APPENDIX C

Wells within the Area of Review

API #	Well Type	Well Status (Active, Abandoned, Shut-in, Plugged)	Northing (UTM NAD 83 Meters)	Easting (UTM NAD 83 Meters)	Penetrate Injection Zone (Y or N)	Penetrate Confining Zone (Y or N)	Total Vertical Depth	Surface Elevation
47-087-02332	Natural Gas	Active	4267913.856	468627.68	N	N	1604'	650'
47-087-30858		Abandoned	4268038.4	468348.8				
47-087-30972		Abandoned	4267941.1	468541.6				

Attach as many copies as necessary and include page numbers as appropriate.

Appendix D
Public Service District
Affidavit

(4/25)

APPENDIX D

Public Service District Affidavit

Underground Injection Control Permit applicants must identify all publically recorded drinking water sources within a one (1) mile radius of the proposed injection well facility. If no drinking water sources are present within this radius a written affidavit shall be supplied by the local Public Service District (PSD) as ample verification.

"I certify under penalty of law that (state name of business)
Columbia Gas Transmission, LLC

has verified with the public service district (state name of PSD)
Walton PSD - Roane County, WV - Lloyd Naylor, PSD Board Chairman

that there are no such publically recorded sources.

Lloyd Naylor
(Signature of Authorized Representative)

Sworn and subscribed to before me this 30th day of November, 20 15.
Angela Dever, my commission expires January 3, 2023

(Notary Signature)
Angela Dever.

Official Seal
Notary Public, State Of West Virginia
Angela Dever
42 Sycamore Ridge
Walton WV 25286
My commission expires January 3, 2023

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WV Department of
Environmental Protection

Appendix E
Water Sources

(4/25)

APPENDIX E
Water Sources

Operator: Columbia Gas Transmission, LLC Year 2015 UIC Permit # UIC2D0871977

		Source # 1	Source # 2	Source # 3	Source #
Water Source Name		Jennings Residence	Fields Residence	Rucker Residence	
Northing		4267696.52	4267819.38	426788.384	
Easting		468840.65	468768.60	468757.452	
Parameter	Units				
TPH - GRO	mg/L	ND, <0.033	ND, <0.033	ND, <0.033	
TPH - DRO	mg/L	1	ND, <0.023	ND, <0.023	
TPH - ORO	mg/L	ND, <0.026	ND, <0.026	ND, <0.026	
BTEX	mg/L	ND, <0.00026	ND, <0.00026	ND, <0.00026	
Chloride	mg/L	25	3.5	2.1	
Sodium	mg/L	19	58	50	
Total Dissolved Solids (TDS)	mg/L	110	320	280	
Aluminum	mg/L	0.048	0.0088	0.030	
Arsenic	mg/L	ND, <0.00070	0.0016	<0.00070	
Barium	mg/L	0.034	0.31	0.057	
Iron	mg/L	0.061	0.015	0.030	
Manganese	mg/L	0.00064	0.0022	<0.00020	
pH	SU	6.80	6.84	7.30	
Calcium	mg/L	19	60	41	
Sulfate	mg/L	6.3	9.7	24	
MBAS	mg/L	ND, <0.0050	ND, <0.0050	ND, <0.0050	
Dissolved Methane	mg/L	0.0017	ND, <0.00034	ND, <0.00034	
Dissolved Ethane	mg/L	ND, <0.00023	ND, <0.00023	ND, <0.00023	
Dissolved Butane	mg/L	ND, <0.00035	ND, <0.00035	ND, <0.00035	
Dissolved Propane	mg/L	ND, <0.00022	ND, <0.00022	ND, <0.00022	
Bacteria (Total Coliforms)	#/100mL	ND, <10	ND, <10	ND, <10	

ALS Environmental

30-Nov-2015

Doug Bowe
Potesta & Associates
7012 MacCorkle Avenue, SE
Charleston, WV 25304

Re: **Columbia Martin Yard Renewal Sampling** Work Order: **1511948**

Dear Doug,

ALS Environmental received 3 samples on 17-Nov-2015 through 18-Nov-2015 for the analyses presented in the following report.

The analytical data provided relates directly to the samples received by ALS Environmental and for only the analyses requested.

Sample results are compliant with NELAP standard requirements and QC results achieved laboratory specifications. Any exceptions are noted in the Case Narrative, or noted with qualifiers in the report or QC batch information. Should this laboratory report need to be reproduced, it should be reproduced in full unless written approval has been obtained from ALS Environmental. Samples will be disposed in 30 days unless storage arrangements are made.

The total number of pages in this report is 26.

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

Sincerely,

Rebecca Kiser

Electronically approved by: Rebecca Kiser

Rebecca Kiser
Project Manager

NELAP ACCREDITED LABORATORY

Certificate No: WV: 355

Report of Laboratory Analysis

ALS Group USA, Corp

Date: 30-Nov-15

Client: Potesta & Associates
Project: Columbia Martin Yard Renewal Sampling
Work Order: 1511948

Work Order Sample Summary

Lab Samp ID	Client Sample ID	Matrix	Tag Number	Collection Date	Date Received	Hold
1511948-01	Jennings Residence Grab	Water		11/17/2015 10:05	11/17/2015 15:34	☐
1511948-01	Jennings Residence Grab	Water		11/17/2015 10:05	11/18/2015 09:30	☐
1511948-02	Fields Residence Grab	Water		11/17/2015 10:45	11/17/2015 15:34	☐
1511948-02	Fields Residence Grab	Water		11/17/2015 10:45	11/18/2015 09:30	☐
1511948-03	Trip Blank	Water		11/17/2015	11/18/2015 09:30	☐

ALS Group USA, Corp

Date: 30-Nov-15

Client:	Potesta & Associates
Project:	Columbia Martin Yard Renewal Sampling
Work Order:	1511948

Case Narrative

ALS Environmental
1740 Union Carbide Dr.
South Charleston, WV 25303

The following parameters were received and analyzed for WO# 1511948 at the ALS South Charleston facility under WVDEP Attachment I, Certificate No. 385:

pH - SM4500H B11
Coliform, Total (MF) - SM9222 B-97

Surfactants & Dissolved Gases were analyzed at the ALS Middletown facility under WVDEP Attachment I, Certificate No. 343.

Per 40CFR Part 136 Table II Sample Handling Guidelines:

The holding time associated with the following parameters is defined as not to exceed 15 minutes:

Hydrogen Ion (pH)

Results for analyses conducted in the laboratory, for the above noted parameters, shall be considered non-compliant.

Batch R176402, Method PH_4500WV_W, Sample 1511948-01F: Sample was analyzed outside of the holding time at the request of the client. Results should be considered estimated.

Batch R176402, Method PH_4500WV_W, Sample 1511948-02F: Sample was analyzed outside of the holding time at the request of the client. Results should be considered estimated.

Batch 79127, Method ICP_200.8WV_W, Sample 1511948-01G: Analyte concentration (X) detected in the bracketing continuing calibration blank where the MDL< X <PQL As

Batch 79127, Method ICP_200.8WV_W, Sample 1511948-02G: Analyte concentration (X) detected in the bracketing continuing calibration blank where the MDL< X <PQL As

ALS Group USA, Corp

Date: 30-Nov-15

Client:	Potesta & Associates
Project:	Columbia Martin Yard Renewal Sampling
WorkOrder:	1511948

QUALIFIERS, ACRONYMS, UNITS

Qualifier	Description
*	Value exceeds Regulatory Limit
a	Not accredited
B	Analyte detected in the associated Method Blank above the Reporting Limit
E	Value above quantitation range
H	Analyzed outside of Holding Time
J	Analyte is present at an estimated concentration between the MDL and Report Limit
n	Not offered for accreditation
ND	Not Detected at the Reporting Limit
O	Sample amount is > 4 times amount spiked
P	Dual Column results percent difference > 40%
R	RPD above laboratory control limit
S	Spike Recovery outside laboratory control limits
U	Analyzed but not detected above the MDL
X	Analyte was detected in the Method Blank between the MDL and PQL, sample results may exhibit background or reagent contamination at the observed level.

Acronym	Description
DUP	Method Duplicate
LCS	Laboratory Control Sample
LCSD	Laboratory Control Sample Duplicate
LOD	Limit of Detection (see MDL)
LOQ	Limit of Quantitation (see PQL)
MBLK	Method Blank
MDL	Method Detection Limit
MS	Matrix Spike
MSD	Matrix Spike Duplicate
PQL	Practical Quantitation Limit
RPD	Relative Percent Difference
TDL	Target Detection Limit
TNTC	Too Numerous To Count
A	APHA Standard Methods
D	ASTM
E	EPA
SW	SW-846 Update III

Units Reported	Description
µg/L	Micrograms per Liter
cfu/100ml	Colony Forming Units per 100 Milliliters
mg MBAS/L	Milligrams Methylene Blue Active Substances per Liter
mg/L	Milligrams per Liter
s.u.	Standard Units

ALS Group USA, Corp

Date: *30-Nov-15*

Client: Potesta & Associates
Project: Columbia Martin Yard Renewal Sampling
Sample ID: Jennings Residence Grab
Collection Date: 11/17/2015 10:05 AM

Work Order: 1511948
Lab ID: 1511948-01
Matrix: WATER

Analyses	Result	Qual	MDL	Report Limit	Units	Dilution Factor	Date Analyzed
DIESEL RANGE ORGANICS BY GC-FID			Method:SW8015C		Prep: SW3511 / 11/23/15		Analyst: IT
DRO (C10-C28)	1.0		0.023	0.10	mg/L	1	11/24/2015 11:01
ORO (C28-C40)	U		0.026	0.10	mg/L	1	11/24/2015 11:01
Surr: 4-Terphenyl-d14	*92.5*			*31-176*	*%REC*	1	11/24/2015 11:01
GASOLINE RANGE ORGANICS BY GC-FID			Method:SW8015D				Analyst: IT
GRO (C8-C10)	U		33	200	µg/L	1	11/19/2015 16:02
Surr: Toluene-d8	*109*			*70-130*	*%REC*	1	11/19/2015 16:02
METALS BY ICP-MS			Method:E200.8		Prep: E200.8 / 11/19/15		Analyst: ML
Aluminum	0.048		0.0011	0.010	mg/L	1	11/22/2015 19:10
Arsenic	U	X	0.00070	0.0050	mg/L	1	11/19/2015 23:11
Barium	0.034		0.00020	0.0050	mg/L	1	11/19/2015 23:11
Calcium	19		0.38	0.50	mg/L	1	11/19/2015 23:11
Iron	0.061	J	0.010	0.030	mg/L	1	11/19/2015 23:11
Manganese	0.00064	J	0.00020	0.0050	mg/L	1	11/19/2015 23:11
Sodium	19		0.051	0.20	mg/L	1	11/19/2015 23:11
TOTAL COLIFORM, MF			Method:A9222 B-97				Analyst: ARC
Total Coliform, MF	*<10*		10	10	cfu/100ml	1	11/17/2015 16:43
PH (LABORATORY)			Method:A4500-H B-11				Analyst: ARC
pH (laboratory)	6.75	H	0.020	0.0200	s.u.	1	11/17/2015 16:11
GASES IN WATER			Method:RSK-175				Analyst: ALS
Butane	U		0.35	4.3	µg/L	1	11/23/2015 07:58
Ethane	U		0.23	3.3	µg/L	1	11/23/2015 07:58
Methane	1.7		0.34	1.5	µg/L	1	11/23/2015 07:58
Propane	U		0.22	3.2	µg/L	1	11/23/2015 07:58
VOLATILE ORGANIC COMPOUNDS			Method:E624				Analyst: LSY
Benzene	U		0.25	1.0	µg/L	1	11/24/2015 05:00
Ethylbenzene	U		0.22	1.0	µg/L	1	11/24/2015 05:00
m,p-Xylene	U		0.40	2.0	µg/L	1	11/24/2015 05:00
o-Xylene	U		0.21	1.0	µg/L	1	11/24/2015 05:00
Toluene	U		0.20	1.0	µg/L	1	11/24/2015 05:00
Xylenes, Total	U		0.62	3.0	µg/L	1	11/24/2015 05:00
Surr: 1,2-Dichloroethane-d4	*103*			*75-120*	*%REC*	1	11/24/2015 05:00
Surr: 4-Bromofluorobenzene	*89.8*			*80-110*	*%REC*	1	11/24/2015 05:00
Surr: Dibromofluoromethane	*103*			*85-115*	*%REC*	1	11/24/2015 05:00
Surr: Toluene-d8	*95.4*			*85-110*	*%REC*	1	11/24/2015 05:00

Note: See Qualifiers page for a list of qualifiers and their definitions.

ALS Group USA, Corp

Date: *30-Nov-15*

Client: Potesta & Associates
Project: Columbia Martin Yard Renewal Sampling
Sample ID: Jennings Residence Grab
Collection Date: 11/17/2015 10:05 AM

Work Order: 1511948
Lab ID: 1511948-01
Matrix: WATER

Analyses	Result	Qual	MDL	Report Limit	Units	Dilution Factor	Date Analyzed
ANIONS BY ION CHROMATOGRAPHY			Method:E300.0				Analyst: EE
Chloride	25		0.29	2.0	mg/L	2	11/24/2015 16:38
Sulfate	6.3		0.28	2.0	mg/L	2	11/24/2015 16:38
ANIONIC SURFACTANTS AS MBAS			Method:A5540C				Analyst: ALS
Anionic Surfactants as MBAS	U		0.0050	0.025	mg MBAS/L	1	11/19/2015 04:10
TOTAL DISSOLVED SOLIDS			Method:A2540 C-97		Prep: FILTER / 11/19/15		Analyst: YM
Total Dissolved Solids	110		7.6	10	mg/L	1	11/19/2015 12:05

Note: See Qualifiers page for a list of qualifiers and their definitions.

ALS Group USA, Corp

Date: *30-Nov-15*

Client: Potesta & Associates
Project: Columbia Martin Yard Renewal Sampling
Sample ID: Fields Residence Grab
Collection Date: 11/17/2015 10:45 AM

Work Order: 1511948
Lab ID: 1511948-02
Matrix: WATER

Analyses	Result	Qual	MDL	Report Limit	Units	Dilution Factor	Date Analyzed
DIESEL RANGE ORGANICS BY GC-FID			Method:SW8015C		Prep: SW3511 / 11/23/15		Analyst: IT
DRO (C10-C28)	U		0.023	0.10	mg/L	1	11/24/2015 11:32
ORO (C28-C40)	U		0.026	0.10	mg/L	1	11/24/2015 11:32
Surr: 4-Terphenyl-d14	*71.0*			*31-176*	*%REC*	1	11/24/2015 11:32
GASOLINE RANGE ORGANICS BY GC-FID			Method:SW8015D				Analyst: IT
GRO (C8-C10)	U		33	200	µg/L	1	11/19/2015 16:27
Surr: Toluene-d8	*111*			*70-130*	*%REC*	1	11/19/2015 16:27
METALS BY ICP-MS			Method:E200.8		Prep: E200.8 / 11/19/15		Analyst: ML
Aluminum	0.0088	J	0.0011	0.010	mg/L	1	11/19/2015 23:30
Arsenic	0.0016	JX	0.00070	0.0050	mg/L	1	11/19/2015 23:30
Barium	0.31		0.00020	0.0050	mg/L	1	11/19/2015 23:30
Calcium	60		0.38	0.50	mg/L	1	11/19/2015 23:30
Iron	0.015	J	0.010	0.080	mg/L	1	11/19/2015 23:30
Manganese	0.0022	J	0.00020	0.0050	mg/L	1	11/19/2015 23:30
Sodium	58		0.051	0.20	mg/L	1	11/19/2015 23:30
TOTAL COLIFORM, MF			Method:A9222 B-97				Analyst: ARC
Total Coliform, MF	*<10*		10	10	cfu/100ml	1	11/17/2015 16:43
PH (LABORATORY)			Method:A4500-H B-11				Analyst: ARC
pH (laboratory)	6.97	H	0.020	0.0200	s.u.	1	11/17/2015 16:11
GASES IN WATER			Method:RSK-175				Analyst: ALS
Butane	U		0.35	4.3	µg/L	1	11/23/2015 08:17
Ethane	U		0.23	3.3	µg/L	1	11/23/2015 08:17
Methane	U		0.34	1.5	µg/L	1	11/23/2015 08:17
Propane	U		0.22	3.2	µg/L	1	11/23/2015 08:17
VOLATILE ORGANIC COMPOUNDS			Method:E624				Analyst: LSY
Benzene	U		0.25	1.0	µg/L	1	11/24/2015 05:25
Ethylbenzene	U		0.22	1.0	µg/L	1	11/24/2015 05:25
m,p-Xylene	U		0.40	2.0	µg/L	1	11/24/2015 05:25
o-Xylene	U		0.21	1.0	µg/L	1	11/24/2015 05:25
Toluene	U		0.20	1.0	µg/L	1	11/24/2015 05:25
Xylenes, Total	U		0.62	3.0	µg/L	1	11/24/2015 05:25
Surr: 1,2-Dichloroethane-d4	*102*			*75-120*	*%REC*	1	11/24/2015 05:25
Surr: 4-Bromofluorobenzene	*89.6*			*80-110*	*%REC*	1	11/24/2015 05:25
Surr: Dibromofluoromethane	*101*			*85-115*	*%REC*	1	11/24/2015 05:25
Surr: Toluene-d8	*98.3*			*85-110*	*%REC*	1	11/24/2015 05:25

Note: See Qualifiers page for a list of qualifiers and their definitions.

ALS Group USA, Corp

Date: *30-Nov-15*

Client: Potesta & Associates
Project: Columbia Martin Yard Renewal Sampling
Sample ID: Fields Residence Grab
Collection Date: 11/17/2015 10:45 AM

Work Order: 1511948
Lab ID: 1511948-02
Matrix: WATER

Analyses	Result	Qual	MDL	Report Limit	Units	Dilution Factor	Date Analyzed
ANIONS BY ION CHROMATOGRAPHY			Method:E300.0				Analyst: EE
Chloride	3.5		0.14	1.0	mg/L	1	11/24/2015 16:58
Sulfate	9.7		0.14	1.0	mg/L	1	11/24/2015 16:58
ANIONIC SURFACTANTS AS MBAS			Method:A5540C				Analyst: ALS
Anionic Surfactants as MBAS	U		0.0050	0.025	mg MBAS/L	1	11/19/2015 04:10
TOTAL DISSOLVED SOLIDS			Method:A2540 C-97		Prep: FILTER / 11/18/15		Analyst: YM
Total Dissolved Solids	320		7.6	10	mg/L	1	11/18/2015 12:05

Note: See Qualifiers page for a list of qualifiers and their definitions.

ALS Group USA, Corp

Date: *30-Nov-15*

Client: Potesta & Associates
Project: Columbia Martin Yard Renewal Sampling
Sample ID: Trip Blank
Collection Date: 11/17/2015

Work Order: 1511948
Lab ID: 1511948-03
Matrix: WATER

Analyses	Result	Qual	MDL	Report Limit	Units	Dilution Factor	Date Analyzed
VOLATILE ORGANIC COMPOUNDS		Method:E624					Analyst: LSY
Benzene	U		0.25	1.0	µg/L	1	11/24/2015 04:34
Ethylbenzene	U		0.22	1.0	µg/L	1	11/24/2015 04:34
m,p-Xylene	U		0.40	2.0	µg/L	1	11/24/2015 04:34
o-Xylene	U		0.21	1.0	µg/L	1	11/24/2015 04:34
Toluene	U		0.20	1.0	µg/L	1	11/24/2015 04:34
Xylenes, Total	U		0.62	3.0	µg/L	1	11/24/2015 04:34
Surr: 1,2-Dichloroethane-d4	*102*			*75-120*	*%REC*	1	11/24/2015 04:34
Surr: 4-Bromofluorobenzene	*91.4*			*80-110*	*%REC*	1	11/24/2015 04:34
Surr: Dibromofluoromethane	*100*			*85-115*	*%REC*	1	11/24/2015 04:34
Surr: Toluene-d8	*99.4*			*85-110*	*%REC*	1	11/24/2015 04:34

Note: See Qualifiers page for a list of qualifiers and their definitions.

ALS Group USA, Corp

Client: Potesta & Associates
Work Order: 1511948
Project: Columbia Martin Yard Renewal Sampling

Date: 30-Nov-15

QC BATCH REPORT

Batch ID: 79332 Instrument ID GC8 Method: SW8015C

MBLK Sample ID: DBLKW1-79332-79332 Units: mg/L Analysis Date: 11/24/2015 08:17 AM
Client ID: Run ID: GC8_151124B SeqNo: 3587015 Prep Date: 11/23/2015 DF: 1

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
DRO (C10-C28)	U	0.023	0.10								
ORO (C28-C40)	U	0.026	0.10								
Surr: 4-Terphenyl-d14	*0.1121*	0	0	*0.1143*	0	*98.1*	*31-176*	0			

LCS Sample ID: DLCSW1-79332-79332 Units: mg/L Analysis Date: 11/24/2015 10:00 AM
Client ID: Run ID: GC8_151124B SeqNo: 3587016 Prep Date: 11/23/2015 DF: 1

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
DRO (C10-C28)	7.85	0.023	0.10	11.43	0	68.7	35-95	0			
ORO (C28-C40)	5.72	0.026	0.10	11.43	0	50.1	44-77	0			
Surr: 4-Terphenyl-d14	*0.1148*	0	0	*0.1143*	0	*100*	*31-176*	0			

MS Sample ID: 1511948-01E MS Units: mg/L Analysis Date: 11/24/2015 10:30 AM
Client ID: Jennings Residence Grab Run ID: GC8_151124B SeqNo: 3587017 Prep Date: 11/23/2015 DF: 1

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
DRO (C10-C28)	8.472	0.023	0.10	11.43	1.032	65.1	29-96	0			
ORO (C28-C40)	6.474	0.026	0.10	11.43	0	56.6	41-84	0			
Surr: 4-Terphenyl-d14	*0.1107*	0	0	*0.1143*	0	*96.9*	*31-176*	0			

DUP Sample ID: 1511948-02E DUP Units: mg/L Analysis Date: 11/24/2015 12:02 PM
Client ID: Fields Residence Grab Run ID: GC8_151124B SeqNo: 3587020 Prep Date: 11/23/2015 DF: 1

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
DRO (C10-C28)	U	0.023	0.10	0	0	0		0	0	30	
ORO (C28-C40)	U	0.026	0.10	0	0	0		0	0	30	
Surr: 4-Terphenyl-d14	*0.09358*	0	0	*0.1143*	0	*81.9*	*31-176*	0.08112	*14.3*	*30*	

The following samples were analyzed in this batch: 1511948-01E 1511948-02E

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: Potesta & Associates
Work Order: 1511948
Project: Columbia Martin Yard Renewal Sampling

QC BATCH REPORT

Batch ID: R176649 Instrument ID GC9 Method: SW8015D

MBLK Sample ID: GBLKW1-151119-R176649 Units:µg/L Analysis Date: 11/19/2015 03:37 PM
Client ID: Run ID: GC9_151119A SeqNo:3578574 Prep Date: DF: 1

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
GRO (C6-C10)	U	33	200								
Surr: Toluene-d8	*114.7*	0	0	*100*	0	*115*	*70-130*	0			

LCS Sample ID: GLCSW1-151119-R176649 Units:µg/L Analysis Date: 11/19/2015 03:12 PM
Client ID: Run ID: GC9_151119A SeqNo:3578570 Prep Date: DF: 1

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
GRO (C6-C10)	10420	33	200	10000	0	104	70-130	0			
Surr: Toluene-d8	*105*	0	0	*100*	0	*105*	*70-130*	0			

MS Sample ID: 1511948-01C MS Units:µg/L Analysis Date: 11/19/2015 05:20 PM
Client ID: Jennings Residence Grab Run ID: GC9_151119A SeqNo:3578579 Prep Date: DF: 1

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
GRO (C6-C10)	7810	33	200	10000	0	78.1	70-130	0			
Surr: Toluene-d8	*102.2*	0	0	*100*	0	*102*	*70-130*	0			

MSD Sample ID: 1511948-01C MSD Units:µg/L Analysis Date: 11/19/2015 05:45 PM
Client ID: Jennings Residence Grab Run ID: GC9_151119A SeqNo:3578580 Prep Date: DF: 1

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
GRO (C6-C10)	7509	33	200	10000	0	75.1	70-130	7810	3.94	30	
Surr: Toluene-d8	*102.4*	0	0	*100*	0	*102*	*70-130*	102.2	*0.244*	*30*	

The following samples were analyzed in this batch: 1511948-01C 1511948-02C

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: Potesta & Associates
Work Order: 1511948
Project: Columbia Martin Yard Renewal Sampling

QC BATCH REPORT

Batch ID: 79127 Instrument ID ICPMS1 Method: E200.8

MBLK Sample ID: MBLK-79127-79127 Units: mg/L Analysis Date: 11/19/2015 08:21 PM
Client ID: Run ID: ICPMS1_151119A SeqNo: 3578832 Prep Date: 11/19/2015 DF: 1

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Aluminum	U	0.0011	0.010								
Arsenic	0.0009771	0.0007	0.0050								J
Barium	U	0.0002	0.0050								
Calcium	U	0.38	0.50								
Iron	U	0.01	0.080								
Manganese	U	0.0002	0.0050								
Sodium	U	0.051	0.20								

LCS Sample ID: LCS-79127-79127 Units: mg/L Analysis Date: 11/19/2015 08:28 PM
Client ID: Run ID: ICPMS1_151119A SeqNo: 3578833 Prep Date: 11/19/2015 DF: 1

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Aluminum	0.1022	0.0011	0.010	0.1	0	102	85-115	0			
Arsenic	0.09772	0.0007	0.0050	0.1	0	97.7	85-115	0			
Barium	0.09876	0.0002	0.0050	0.1	0	98.8	85-115	0			
Calcium	10.03	0.38	0.50	10	0	100	85-115	0			
Iron	10.15	0.01	0.080	10	0	102	85-115	0			
Manganese	0.1002	0.0002	0.0050	0.1	0	100	85-115	0			
Sodium	10.25	0.051	0.20	10	0	102	85-115	0			

MS Sample ID: 1511948-01GMS Units: mg/L Analysis Date: 11/19/2015 11:17 PM
Client ID: Jennings Residence Grab Run ID: ICPMS1_151119A SeqNo: 3578858 Prep Date: 11/19/2015 DF: 1

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Arsenic	0.1023	0.0007	0.0050	0.1	0.0003482	102	70-130	0			
Barium	0.1343	0.0002	0.0050	0.1	0.03438	99.9	70-130	0			
Calcium	29.98	0.38	0.50	10	19.31	107	70-130	0			
Iron	9.84	0.01	0.080	10	0.06148	98.8	70-130	0			
Manganese	0.09888	0.0002	0.0050	0.1	0.0008418	98.2	70-130	0			
Sodium	28.57	0.051	0.20	10	18.51	101	70-130	0			

MS Sample ID: 1511948-02GMS Units: mg/L Analysis Date: 11/19/2015 11:36 PM
Client ID: Fields Residence Grab Run ID: ICPMS1_151119A SeqNo: 3578861 Prep Date: 11/19/2015 DF: 1

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Arsenic	0.1009	0.0007	0.0050	0.1	0.001584	99.3	70-130	0			
Barium	0.413	0.0002	0.0050	0.1	0.3076	105	70-130	0			
Calcium	71.34	0.38	0.50	10	60.23	111	70-130	0			
Iron	9.911	0.01	0.080	10	0.01528	99	70-130	0			
Manganese	0.1013	0.0002	0.0050	0.1	0.002232	99.1	70-130	0			
Sodium	69.21	0.051	0.20	10	57.81	114	70-130	0			

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: Potesta & Associates
Work Order: 1511948
Project: Columbia Martin Yard Renewal Sampling

QC BATCH REPORT

Batch ID: 79127 Instrument ID ICPMS1 Method: E200.8

MS Sample ID: 1511948-01GMS Units: mg/L Analysis Date: 11/22/2015 07:17 PM
Client ID: Jennings Residence Grab Run ID: ICPMS1_151121A SeqNo: 3583292 Prep Date: 11/19/2015 DF: 1

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Aluminum	0.1564	0.0011	0.010	0.1	0.04807	108	70-130	0			

MS Sample ID: 1511948-02GMS Units: mg/L Analysis Date: 11/22/2015 07:29 PM
Client ID: Fields Residence Grab Run ID: ICPMS1_151121A SeqNo: 3583299 Prep Date: 11/19/2015 DF: 1

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Aluminum	0.1023	0.0011	0.010	0.1	0	102	70-130	0			

MSD Sample ID: 1511948-01GMSD Units: mg/L Analysis Date: 11/19/2015 11:24 PM
Client ID: Jennings Residence Grab Run ID: ICPMS1_151119A SeqNo: 3578859 Prep Date: 11/19/2015 DF: 1

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Arsenic	0.09948	0.0007	0.0050	0.1	0.0003482	99.1	70-130	0.1023	2.8	20	
Barium	0.1371	0.0002	0.0050	0.1	0.03438	103	70-130	0.1343	2.06	20	
Calcium	30.51	0.38	0.50	10	19.31	112	70-130	29.98	1.75	20	
Iron	10.1	0.01	0.080	10	0.06148	100	70-130	9.94	1.6	20	
Manganese	0.1017	0.0002	0.0050	0.1	0.0006418	101	70-130	0.09888	2.81	20	
Sodium	29.26	0.051	0.20	10	18.51	108	70-130	28.57	2.39	20	

MSD Sample ID: 1511948-02GMSD Units: mg/L Analysis Date: 11/19/2015 11:43 PM
Client ID: Fields Residence Grab Run ID: ICPMS1_151119A SeqNo: 3578882 Prep Date: 11/19/2015 DF: 1

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Arsenic	0.1012	0.0007	0.0050	0.1	0.001584	99.6	70-130	0.1009	0.297	20	
Barium	0.4167	0.0002	0.0050	0.1	0.3076	109	70-130	0.413	0.892	20	
Calcium	72.48	0.38	0.50	10	60.23	122	70-130	71.34	1.59	20	O
Iron	9.992	0.01	0.080	10	0.01528	99.8	70-130	9.911	0.814	20	
Manganese	0.1026	0.0002	0.0050	0.1	0.002232	100	70-130	0.1013	1.28	20	
Sodium	70.21	0.051	0.20	10	57.81	124	70-130	69.21	1.43	20	O

MSD Sample ID: 1511948-01GMSD Units: mg/L Analysis Date: 11/22/2015 07:23 PM
Client ID: Jennings Residence Grab Run ID: ICPMS1_151121A SeqNo: 3583296 Prep Date: 11/19/2015 DF: 1

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Aluminum	0.1596	0.0011	0.010	0.1	0.04807	112	70-130	0.1564	2.03	20	

MSD Sample ID: 1511948-02GMSD Units: mg/L Analysis Date: 11/22/2015 07:36 PM
Client ID: Fields Residence Grab Run ID: ICPMS1_151121A SeqNo: 3583304 Prep Date: 11/19/2015 DF: 1

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Aluminum	0.1207	0.0011	0.010	0.1	0	121	70-130	0.1023	16.6	20	

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client:	Potesta & Associates
Work Order:	1511948
Project:	Columbia Martin Yard Renewal Sampling

QC BATCH REPORT

Batch ID: 79127 Instrument ID ICPMS1 Method: E200.8

The following samples were analyzed in this batch: 1511948-01G 1511948-02G

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: Potesta & Associates
Work Order: 1511948
Project: Columbia Martin Yard Renewal Sampling

QC BATCH REPORT

Batch ID: R176883B Instrument ID VMS9 Method: E624

MBLK Sample ID: VBLKW2-151123-R176883B Units: µg/L Analysis Date: 11/24/2015 02:50 AM
Client ID: Run ID: VMS9_151123A SeqNo: 3586407 Prep Date: DF: 1

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Benzene	U	0.25	1.0								
Ethylbenzene	U	0.22	1.0								
m,p-Xylene	U	0.4	2.0								
o-Xylene	U	0.21	1.0								
Toluene	U	0.2	1.0								
Xylenes, Total	U	0.62	3.0								
Surr: 1,2-Dichloroethane-d4	*19.89*	0	0	*20*	0	*99.4*	*75-120*	0			
Surr: 4-Bromofluorobenzene	*18.22*	0	0	*20*	0	*91.1*	*80-110*	0			
Surr: Dibromofluoromethane	*19.35*	0	0	*20*	0	*96.8*	*85-115*	0			
Surr: Toluene-d8	*19.5*	0	0	*20*	0	*97.5*	*85-110*	0			

LCS Sample ID: VLCSW1-151123-R176883B Units: µg/L Analysis Date: 11/24/2015 01:07 AM
Client ID: Run ID: VMS9_151123A SeqNo: 3586406 Prep Date: DF: 1

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Benzene	19.56	0.25	1.0	20	0	97.8	85-125	0			
Ethylbenzene	21.39	0.22	1.0	20	0	107	85-125	0			
m,p-Xylene	39.92	0.4	2.0	40	0	99.8	75-130	0			
o-Xylene	21.43	0.21	1.0	20	0	107	80-125	0			
Toluene	20.45	0.2	1.0	20	0	102	85-125	0			
Xylenes, Total	61.35	0.62	3.0	60	0	102	80-126	0			
Surr: 1,2-Dichloroethane-d4	*18.92*	0	0	*20*	0	*94.6*	*75-120*	0			
Surr: 4-Bromofluorobenzene	*20.96*	0	0	*20*	0	*105*	*80-110*	0			
Surr: Dibromofluoromethane	*18.88*	0	0	*20*	0	*94.4*	*85-115*	0			
Surr: Toluene-d8	*20.3*	0	0	*20*	0	*102*	*85-110*	0			

MS Sample ID: 15111054-01A MS Units: µg/L Analysis Date: 11/24/2015 11:27 AM
Client ID: Run ID: VMS9_151123A SeqNo: 3586678 Prep Date: DF: 20

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Benzene	439.4	5	20	400	0	110	85-125	0			
Ethylbenzene	463.8	4.4	20	400	0	116	85-125	0			
m,p-Xylene	848.8	8.1	40	800	0	106	75-130	0			
o-Xylene	458.8	4.2	20	400	0	115	80-125	0			
Toluene	446.8	3.9	20	400	0	112	85-125	0			
Xylenes, Total	1308	12	60	1200	0	109	80-126	0			
Surr: 1,2-Dichloroethane-d4	*392.4*	0	0	*400*	0	*98.1*	*75-120*	0			
Surr: 4-Bromofluorobenzene	*417.8*	0	0	*400*	0	*104*	*80-110*	0			
Surr: Dibromofluoromethane	*399*	0	0	*400*	0	*99.8*	*85-115*	0			
Surr: Toluene-d8	*405*	0	0	*400*	0	*101*	*85-110*	0			

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: Potesta & Associates
Work Order: 1511948
Project: Columbia Martin Yard Renewal Sampling

QC BATCH REPORT

Batch ID: **R176883B** Instrument ID **VMS9** Method: **E624**

MSD Sample ID: **15111054-01A MSD** Units: **µg/L** Analysis Date: **11/24/2015 11:53 AM**
Client ID: Run ID: **VMS9_151123A** SeqNo: **3588679** Prep Date: DF: **20**

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Benzene	436.6	5	20	400	0	109	85-125	439.4	0.639	30	
Ethylbenzene	466.2	4.4	20	400	0	117	85-125	463.8	0.516	30	
m,p-Xylene	860.2	8.1	40	800	0	108	75-130	848.8	1.33	30	
o-Xylene	464	4.2	20	400	0	116	80-125	458.8	1.13	30	
Toluene	452.4	3.9	20	400	0	113	85-125	446.8	1.25	30	
Xylenes, Total	1324	12	60	1200	0	110	80-126	1308	1.26	30	
Surr: 1,2-Dichloroethane-d4	*389*	0	0	*400*	0	*97.2*	*75-120*	392.4	*0.87*	*30*	
Surr: 4-Bromofluorobenzene	*407.8*	0	0	*400*	0	*102*	*80-110*	417.8	*2.42*	*30*	
Surr: Dibromofluoromethane	*388.8*	0	0	*400*	0	*97.2*	*85-115*	399	*2.59*	*30*	
Surr: Toluene-d8	*403.6*	0	0	*400*	0	*101*	*85-110*	405	*0.346*	*30*	

The following samples were analyzed in this batch: 1511948-01D 1511948-02D 1511948-03A

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: Potesta & Associates
Work Order: 1511948
Project: Columbia Martin Yard Renewal Sampling

QC BATCH REPORT

Batch ID: 79095 Instrument ID TDS Method: A2540 C-97

MBLK Sample ID: MBLK-79095-79095 Units: mg/L Analysis Date: 11/19/2015 12:05 PM
Client ID: Run ID: TDS_151119A SeqNo: 3576607 Prep Date: 11/19/2015 DF: 1

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Total Dissolved Solids	U	7.6	10								

LCS Sample ID: LCS-79095-79095 Units: mg/L Analysis Date: 11/19/2015 12:05 PM
Client ID: Run ID: TDS_151119A SeqNo: 3576606 Prep Date: 11/19/2015 DF: 1

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Total Dissolved Solids	477	7.6	10	495	0	96.4	80-120	0			

DUP Sample ID: 1511910-09E DUP Units: mg/L Analysis Date: 11/19/2015 12:05 PM
Client ID: Run ID: TDS_151119A SeqNo: 3576582 Prep Date: 11/19/2015 DF: 1

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Total Dissolved Solids	440	7.6	10	0	0	0	0-0	449	2.02	10	

DUP Sample ID: 1511960-02A DUP Units: mg/L Analysis Date: 11/19/2015 12:05 PM
Client ID: Run ID: TDS_151119A SeqNo: 3576602 Prep Date: 11/19/2015 DF: 1

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Total Dissolved Solids	1702	7.6	10	0	0	0	0-0	1660	2.5	10	

The following samples were analyzed in this batch: 1511948-01F 1511948-02F

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: Potesta & Associates
Work Order: 1511948
Project: Columbia Martin Yard Renewal Sampling

QC BATCH REPORT

Batch ID: R177066 Instrument ID IC4 Method: E300.0

MBLK Sample ID: CCB/MBLK-R177066 Units: mg/L Analysis Date: 11/24/2015 02:09 PM
Client ID: Run ID: IC4_151124A SeqNo: 3590384 Prep Date: DF: 1

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chloride	U	0.14	1.0								
Sulfate	0.3057	0.14	1.0								J

LCS Sample ID: MLCCV/LCS-R177066 Units: mg/L Analysis Date: 11/24/2015 06:19 PM
Client ID: Run ID: IC4_151124A SeqNo: 3590407 Prep Date: DF: 1

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chloride	9.078	0.14	1.0	10	0	90.8	90-110	0			
Sulfate	10.03	0.14	1.0	10	0	100	90-110	0			

MS Sample ID: 15111321-01A MS Units: mg/L Analysis Date: 11/24/2015 03:17 PM
Client ID: Run ID: IC4_151124A SeqNo: 3590388 Prep Date: DF: 2

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chloride	19.51	0.29	2.0	20	2.127	86.9	80-120	0			
Sulfate	28.91	0.28	2.0	20	8.86	100	80-120	0			

MSD Sample ID: 15111321-01A MSD Units: mg/L Analysis Date: 11/24/2015 03:37 PM
Client ID: Run ID: IC4_151124A SeqNo: 3590389 Prep Date: DF: 2

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chloride	19.5	0.29	2.0	20	2.127	86.9	80-120	19.51	0.0841	20	
Sulfate	29	0.28	2.0	20	8.86	101	80-120	28.91	0.318	20	

The following samples were analyzed in this batch: 1511948-01F 1511948-02F

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: Potesta & Associates
Work Order: 1511948
Project: Columbia Martin Yard Renewal Sampling

QC BATCH REPORT

Batch ID: **R177191** Instrument ID **SUB** Method: **A5540C**

MBLK Sample ID: **MB-R177191-R177191** Units: **mg MBAS/L** Analysis Date: **11/19/2015 04:10 AM**
Client ID: Run ID: **SUB_151119B** SeqNo: **3593875** Prep Date: DF: **1**

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Anionic Surfactants as MBAS	U	0.005	0.025								

The following samples were analyzed in this batch: 1511948-01A 1511948-02A

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

151194P Page 1 of 1

POTESTA

CHAIN OF CUSTODY RECORD

CHARLESTON OFFICE
7012 MacCorkle Avenue, SE
Charleston, WV 25304
Phone: (304) 342-1400
Fax: (304) 343-9031

MORGANTOWN OFFICE
125 Lakeview Drive
Morgantown, WV 26508
Phone: (304) 225-2245
Fax: (304) 225-2246

WINCHESTER OFFICE
15 South Braddock Street
Winchester, VA 22601
Phone: (504) 450-0180
Fax: (540) 450-0182

CAMBRIDGE OFFICE
841 Steubenville Avenue
Cambridge, OH 43725
Phone: (740) 432-6555
Fax: (740) 432-6554

CLIENT/SAMPLING SITE: Columbia Martin Yard Renewal Sampling

PROJECT NO.: 0101-06-0552-000J

DATE: 17-Nov-15

DELIVERABLE: ☐ Email ☐ Hard Copy ☐ EDD (Excel) ☐ Other:

LAB USED: ALS Environmental HOW SHIPPED: Delivered to lab

CONTACT PERSON(S): Douglas Bowe

OFFICE LOCATION(S): Charleston

EMAIL(S): dwbowe@potesta.com

SAMPLER(S): Megan Bucklew, Lee Moreland

SAMPLE LOG AND ANALYSIS REQUESTED

PRESERVATIVE CODES
0 No Preservative
1 Hydrochloric Acid
2 Nitric Acid
3 Sulfuric Acid
4 Sodium Thiosulfate
5 Sodium Hydroxide
6 Zinc Acetate
7 EDTA
See Notes Section

TURNAROUND TIME
☒ Regular
☐ Rush (Indicate Date Needed)

NOTES:
- Sample(s) maintained at 4°C unless otherwise noted.
- Analyze all solid samples for % solids unless otherwise noted.

SAMPLE ID	NO. & TYPE OF CONTAINERS (Note Preservative Code)	DATE	TIME	MATRIX	COMP/GRAB	ANALYSIS REQUESTED and METHOD	Analytical parameters as per attachment	REMARKS
Jennings Residence	Two 500 ml (0), one 250 ml (2)	11/17/15	1005	Water	Grab		X	Jennings Residence
	One 100 ml (4), Two 40ml (0)	11/17/15	1005	Water	Grab		X	Field pH = 6.80 SU
	Eight 40 ml (1)	11/17/15	1005	Water	Grab		X	Trip Blanks - Two 40 ml (1)
Fields Residence	Two 500 ml (0), one 250 ml (2)	11/17/15	1045	Water	Grab		X	Fields Residence
	One 100 ml (4), Two 40ml (0)	11/17/15	1045	Water	Grab		X	Field pH = 6.84 SU
	Eight 40 ml (1)	11/17/15	1045	Water	Grab		X	Trip Blanks - Two 40 ml (1)

RELINQUISHED BY: (SIGNATURE)	DATE/TIME	RECEIVED BY: (SIGNATURE)
Megan Bucklew	11/17/15 ~~1600~~ 1534	[signature]
[signature]	11/17/15 1700	[signature] 11/18/15 0930

COMMENTS: AISHN <6.07

RECEIVED
Office of Oil and Gas
WV Department of Environmental Protection

Electronic Copy (Rev. 3/20/15)

ALS Group USA, Corp

Sample Receipt Checklist

Client Name: POTESTA | Date/Time Received: 17-Nov-15 15:34

Work Order: 1511948 | Received by: JAS

Checklist completed by Janet Smith (eSignature) 17-Nov-15 (Date) | Reviewed by: Rebecca Kiser (eSignature) 19-Nov-15 (Date)

Matrices: Water

Carrier name: Client

Shipping container/cooler in good condition?	Yes ☑	No ☐	Not Present ☐
Custody seals intact on shipping container/cooler?	Yes ☐	No ☐	Not Present ☑
Custody seals intact on sample bottles?	Yes ☐	No ☐	Not Present ☑
Chain of custody present?	Yes ☑	No ☐	
Chain of custody signed when relinquished and received?	Yes ☑	No ☐	
Chain of custody agrees with sample labels?	Yes ☑	No ☐	
Samples in proper container/bottle?	Yes ☑	No ☐	
Sample containers intact?	Yes ☑	No ☐	
Sufficient sample volume for indicated test?	Yes ☑	No ☐	
All samples received within holding time?	Yes ☐	No ☑	
Container/Temp Blank temperature in compliance?	Yes ☑	No ☐	
Sample(s) received on ice?	Yes ☑	No ☐	
Temperature(s)/Thermometer(s):	<6C	IR	
Cooler(s)/Kit(s):			
Date/Time sample(s) sent to storage:			
Water - VOA vials have zero headspace?	Yes ☑	No ☐	No VOA vials submitted ☐
Water - pH acceptable upon receipt?	Yes ☑	No ☐	N/A ☐
pH adjusted?	Yes ☐	No ☑	N/A ☐
pH adjusted by:			

Login Notes: pH received out of holding time. Holland <6.0 c

Client Contacted: | Date Contacted: | Person Contacted:

Contacted By: | Regarding:

Comments:

CorrectiveAction:

ALS Environmental

30-Nov-2015

Doug Bowe
Potesta & Associates
7012 MacCorkle Avenue, SE
Charleston, WV 25304

Re: **Columbia Martin Yard Renewal Sampling** Work Order: **15111024**

Dear Doug,

ALS Environmental received 2 samples on 18-Nov-2015 through 19-Nov-2015 for the analyses presented in the following report.

The analytical data provided relates directly to the samples received by ALS Environmental and for only the analyses requested.

Sample results are compliant with NELAP standard requirements and QC results achieved laboratory specifications. Any exceptions are noted in the Case Narrative, or noted with qualifiers in the report or QC batch information. Should this laboratory report need to be reproduced, it should be reproduced in full unless written approval has been obtained from ALS Environmental. Samples will be disposed in 30 days unless storage arrangements are made.

The total number of pages in this report is 24.

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

Sincerely,

Rebecca Kiser

Electronically approved by: Rebecca Kiser

Rebecca Kiser
Project Manager

NELAP ACCREDITED LABORATORY

Certificate No: WV: 355

ADDRESS 3352 128th Avenue Holland, Michigan 49424-9263 | PHONE (616) 399 6070 | FAX (616) 399-6185

ALS Group USA, Corp

Date: 30-Nov-15

Client: Potesta & Associates
Project: Columbia Martin Yard Renewal Sampling
Work Order: 15111024

Work Order Sample Summary

Lab Samp ID	Client Sample ID	Matrix	Tag Number	Collection Date	Date Received	Hold
15111024-01	Rucker Residence Grab	Water		11/18/2015 09:30	11/18/2015	☐
15111024-01	Rucker Residence Grab	Water		11/18/2015 09:30	11/18/2015 14:20	☐
15111024-01	Rucker Residence Grab	Water		11/18/2015 09:30	11/19/2015 09:30	☐
15111024-02	Trip Blank	Water		11/18/2015	11/19/2015 09:30	☐

ALS Group USA, Corp *Date: 30-Nov-15*

Client:	Potesta & Associates
Project:	Columbia Martin Yard Renewal Sampling
Work Order:	15111024

Case Narrative

ALS Environmental
1740 Union Carbide Dr.
South Charleston, WV 25303

The following parameters were received and analyzed for WO# 15111024 at the ALS South Charleston facility under WVDEP Attachment I, Certificate No. 385:

pH - SM4500H B11

Surfactants & Dissolved Gases were analyzed at the ALS Middletown facility under WVDEP Attachment I, Certificate No. 343.

Per 40CFR Part 136 Table II Sample Handling Guidelines:

The holding time associated with the following parameters is defined as not to exceed 15 minutes:

Hydrogen Ion (pH)

Results for analyses conducted in the laboratory, for the above noted parameters, shall be considered non-compliant.

Batch R176540, Method PH_4500WV_W, Sample 15111024-01F: Sample was analyzed outside of the holding time at the request of the client. Results should be considered estimated.

Batch R177213, Method IC_300.0_WW, Sample 15111024-01F MS: The matrix spike recovery was outside of the control limit. However, the matrix spike duplicate recovery and the RPD between the MS and MSD were in control. No qualification is required for this analyte: Sulfate

ALS Group USA, Corp Date: 30-Nov-15

Client:	Potesta & Associates
Project:	Columbia Martin Yard Renewal Sampling
WorkOrder:	15111024

QUALIFIERS, ACRONYMS, UNITS

Qualifier	Description
*	Value exceeds Regulatory Limit
a	Not accredited
B	Analyte detected in the associated Method Blank above the Reporting Limit
E	Value above quantitation range
H	Analyzed outside of Holding Time
J	Analyte is present at an estimated concentration between the MDL and Report Limit
n	Not offered for accreditation
ND	Not Detected at the Reporting Limit
O	Sample amount is > 4 times amount spiked
P	Dual Column results percent difference > 40%
R	RPD above laboratory control limit
S	Spike Recovery outside laboratory control limits
U	Analyzed but not detected above the MDL
X	Analyte was detected in the Method Blank between the MDL and PQL, sample results may exhibit background or reagent contamination at the observed level.

Acronym	Description
DUP	Method Duplicate
LCS	Laboratory Control Sample
LCSD	Laboratory Control Sample Duplicate
LOD	Limit of Detection (see MDL)
LOQ	Limit of Quantitation (see PQL)
MBLK	Method Blank
MDL	Method Detection Limit
MS	Matrix Spike
MSD	Matrix Spike Duplicate
PQL	Practical Quantitation Limit
RPD	Relative Percent Difference
TDL	Target Detection Limit
TNTC	Too Numerous To Count
A	APHA Standard Methods
D	ASTM
E	EPA
SW	SW-846 Update III

Units Reported	Description
µg/L	Micrograms per Liter
cfu/100ml	Colony Forming Units per 100 Milliliters
mg MBAS/L	Milligrams Methylene Blue Active Substances per Liter
mg/L	Milligrams per Liter
s.u.	Standard Units

ALS Group USA, Corp

Date: *30-Nov-15*

Client: Potesta & Associates
Project: Columbia Martin Yard Renewal Sampling
Sample ID: Rucker Residence Grab
Collection Date: 11/18/2015 09:30 AM

Work Order: 15111024
Lab ID: 15111024-01
Matrix: WATER

Analyses	Result	Qual	MDL	Report Limit	Units	Dilution Factor	Date Analyzed
DIESEL RANGE ORGANICS BY GC-FID			Method:SW8015C		Prep: SW3511 / 11/23/15		Analyst: IT
DRO (C10-C28)	U		0.023	0.10	mg/L	1	11/24/2015 14:01
ORO (C28-C40)	U		0.026	0.10	mg/L	1	11/24/2015 14:01
Surr: 4-Terphenyl-d14	*90.0*			*31-176*	*%REC*	1	11/24/2015 14:01
GASOLINE RANGE ORGANICS BY GC-FID			Method:SW8015D				Analyst: IT
GRO (C6-C10)	U		33	200	µg/L	1	11/20/2015 22:47
Surr: Toluene-d8	*112*			*70-130*	*%REC*	1	11/20/2015 22:47
METALS BY ICP-MS			Method:E200.8		Prep: E200.8 / 11/21/15		Analyst: RH
Aluminum	0.030		0.0011	0.010	mg/L	1	11/23/2015 12:18
Arsenic	U		0.00070	0.0050	mg/L	1	11/23/2015 12:18
Barium	0.057		0.00020	0.0050	mg/L	1	11/23/2015 12:18
Calcium	41		0.38	0.50	mg/L	1	11/23/2015 12:18
Iron	0.030	J	0.010	0.080	mg/L	1	11/23/2015 12:18
Manganese	U		0.00020	0.0050	mg/L	1	11/23/2015 12:18
Sodium	50		0.051	0.20	mg/L	1	11/23/2015 12:18
TOTAL COLIFORM, MF			Method:A9222 B-97				Analyst: ARC
Total Coliform, MF	U		10	10	cfu/100ml	1	11/18/2015 16:44
PH (LABORATORY)			Method:A4500-H B-11				Analyst: MLH
pH (laboratory)	7.56	H	0.020	0.0200	s.u.	1	11/18/2015 16:14
GASES IN WATER			Method:RSK-175				Analyst: ALS
Butane	U		0.35	4.3	µg/L	1	11/20/2015 10:59
Ethane	U		0.23	3.3	µg/L	1	11/20/2015 10:59
Methane	U		0.34	1.5	µg/L	1	11/20/2015 10:59
Propane	U		0.22	3.2	µg/L	1	11/20/2015 10:59
VOLATILE ORGANIC COMPOUNDS			Method:E624				Analyst: LSY
Benzene	U		0.25	1.0	µg/L	1	11/25/2015 18:13
Ethylbenzene	U		0.22	1.0	µg/L	1	11/25/2015 18:13
m,p-Xylene	U		0.40	2.0	µg/L	1	11/25/2015 18:13
o-Xylene	U		0.21	1.0	µg/L	1	11/25/2015 18:13
Toluene	U		0.20	1.0	µg/L	1	11/25/2015 18:13
Xylenes, Total	U		0.62	3.0	µg/L	1	11/25/2015 18:13
Surr: 1,2-Dichloroethane-d4	*94.7*			*75-120*	*%REC*	1	11/25/2015 18:13
Surr: 4-Bromofluorobenzene	*97.4*			*80-110*	*%REC*	1	11/25/2015 18:13
Surr: Dibromofluoromethane	*95.0*			*85-115*	*%REC*	1	11/25/2015 18:13
Surr: Toluene-d8	*92.4*			*85-110*	*%REC*	1	11/25/2015 18:13

Note: See Qualifiers page for a list of qualifiers and their definitions.

ALS Group USA, Corp

Date: *30-Nov-15*

Client: Potesta & Associates
Project: Columbia Martin Yard Renewal Sampling
Sample ID: Rucker Residence Grab
Collection Date: 11/18/2015 09:30 AM

Work Order: 15111024
Lab ID: 15111024-01
Matrix: WATER

Analyses	Result	Qual	MDL	Report Limit	Units	Dilution Factor	Date Analyzed
ANIONS BY ION CHROMATOGRAPHY			Method:E300.0				Analyst: EE
Chloride	2.1		0.14	1.0	mg/L	1	11/24/2015 17:39
Sulfate	24		0.28	2.0	mg/L	2	11/29/2015 21:17
ANIONIC SURFACTANTS AS MBAS			Method:A5540C				Analyst: ALS
Anionic Surfactants as MBAS	U		0.0050	0.025	mg MBAS/L	1	11/20/2015 03:20
TOTAL DISSOLVED SOLIDS			Method:A2540 C-97		Prep: FILTER / 11/23/15		Analyst: STP
Total Dissolved Solids	280		7.6	10	mg/L	1	11/23/2015 13:08

Note: See Qualifiers page for a list of qualifiers and their definitions.

ALS Group USA, Corp

Date: *30-Nov-15*

Client: Potesta & Associates
Project: Columbia Martin Yard Renewal Sampling
Sample ID: Trip Blank
Collection Date: 11/18/2015

Work Order: 15111024
Lab ID: 15111024-02
Matrix: WATER

Analyses	Result	Qual	MDL	Report Limit	Units	Dilution Factor	Date Analyzed
VOLATILE ORGANIC COMPOUNDS		Method:E624					Analyst: LSY
Benzene	U		0.25	1.0	µg/L	1	11/25/2015 17:49
Ethylbenzene	U		0.22	1.0	µg/L	1	11/25/2015 17:49
m,p-Xylene	U		0.40	2.0	µg/L	1	11/25/2015 17:49
o-Xylene	U		0.21	1.0	µg/L	1	11/25/2015 17:49
Toluene	U		0.20	1.0	µg/L	1	11/25/2015 17:49
Xylenes, Total	U		0.62	3.0	µg/L	1	11/25/2015 17:49
Surr: 1,2-Dichloroethane-d4	*95.7*			*75-120*	*%REC*	1	11/25/2015 17:49
Surr: 4-Bromofluorobenzene	*96.3*			*80-110*	*%REC*	1	11/25/2015 17:49
Surr: Dibromofluoromethane	*93.0*			*85-115*	*%REC*	1	11/25/2015 17:49
Surr: Toluene-d8	*94.2*			*85-110*	*%REC*	1	11/25/2015 17:49

Note: See Qualifiers page for a list of qualifiers and their definitions.

ALS Group USA, Corp

Client: Potesta & Associates
Work Order: 15111024
Project: Columbia Martin Yard Renewal Sampling

Date: 30-Nov-15

QC BATCH REPORT

Batch ID: 79332 Instrument ID GC8 Method: SW8015C

MBLK Sample ID: DBLKW1-79332-79332 Units: mg/L Analysis Date: 11/24/2015 09:17 AM
Client ID: Run ID: GC8_151124B SeqNo: 3587015 Prep Date: 11/23/2015 DF: 1

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
DRO (C10-C28)	U	0.023	0.10								
ORO (C28-C40)	U	0.026	0.10								
Surr: 4-Terphenyl-d14	*0.1121*	0	0	*0.1143*	0	*98.1*	*31-176*	0			

LCS Sample ID: DLCSW1-79332-79332 Units: mg/L Analysis Date: 11/24/2015 10:00 AM
Client ID: Run ID: GC8_151124B SeqNo: 3587016 Prep Date: 11/23/2015 DF: 1

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
DRO (C10-C28)	7.85	0.023	0.10	11.43	0	68.7	35-95	0			
ORO (C28-C40)	5.72	0.026	0.10	11.43	0	50.1	44-77	0			
Surr: 4-Terphenyl-d14	*0.1148*	0	0	*0.1143*	0	*100*	*31-176*	0			

MS Sample ID: 1511948-01E MS Units: mg/L Analysis Date: 11/24/2015 10:30 AM
Client ID: Run ID: GC8_151124B SeqNo: 3587017 Prep Date: 11/23/2015 DF: 1

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
DRO (C10-C28)	8.472	0.023	0.10	11.43	1.032	65.1	29-96	0			
ORO (C28-C40)	6.474	0.026	0.10	11.43	0	56.6	41-84	0			
Surr: 4-Terphenyl-d14	*0.1107*	0	0	*0.1143*	0	*96.9*	*31-176*	0			

DUP Sample ID: 1511948-02E DUP Units: mg/L Analysis Date: 11/24/2015 12:02 PM
Client ID: Run ID: GC8_151124B SeqNo: 3587020 Prep Date: 11/23/2015 DF: 1

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
DRO (C10-C28)	U	0.023	0.10	0	0	0		0	0	30	
ORO (C28-C40)	U	0.026	0.10	0	0	0		0	0	30	
Surr: 4-Terphenyl-d14	*0.09358*	0	0	*0.1143*	0	*81.9*	*31-176*	0.08112		30	

The following samples were analyzed in this batch: 15111024-01E

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: Potesta & Associates
Work Order: 15111024
Project: Columbia Martin Yard Renewal Sampling

QC BATCH REPORT

Batch ID: R176699 Instrument ID GC9 Method: SW8015D

MBLK Sample ID: GBLKW1-151120-R176699 Units: µg/L Analysis Date: 11/20/2015 10:22 PM
Client ID: Run ID: GC9_151120A SeqNo: 3582242 Prep Date: DF: 1

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
GRO (C6-C10)	U	33	200								
Surr: Toluene-d8	*112.2*	0	0	*100*	0	*112*	*70-130*	0			

LCS Sample ID: GLCSW1-151120-R176699 Units: µg/L Analysis Date: 11/20/2015 09:57 PM
Client ID: Run ID: GC9_151120A SeqNo: 3582239 Prep Date: DF: 1

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
GRO (C6-C10)	9604	33	200	10000	0	96	70-130	0			
Surr: Toluene-d8	*107.5*	0	0	*100*	0	*108*	*70-130*	0			

MS Sample ID: 15111217-01A MS Units: µg/L Analysis Date: 11/21/2015 01:16 AM
Client ID: Run ID: GC9_151120A SeqNo: 3582248 Prep Date: DF: 1

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
GRO (C6-C10)	11200	33	200	10000	1563	96.4	70-130	0			
Surr: Toluene-d8	*104.9*	0	0	*100*	0	*105*	*70-130*	0			

MSD Sample ID: 15111217-01A MSD Units: µg/L Analysis Date: 11/21/2015 01:40 AM
Client ID: Run ID: GC9_151120A SeqNo: 3582249 Prep Date: DF: 1

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
GRO (C6-C10)	11020	33	200	10000	1563	94.6	70-130	11200	1.61	30	
Surr: Toluene-d8	*106.8*	0	0	*100*	0	*107*	*70-130*	104.9	*1.85*	*30*	

The following samples were analyzed in this batch: 15111024-01C

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: Potesta & Associates
Work Order: 15111024
Project: Columbia Martin Yard Renewal Sampling

QC BATCH REPORT

Batch ID: 79252 Instrument ID ICPMS2 Method: E200.8

MBLK Sample ID: MBLK-79252-79252 Units: mg/L Analysis Date: 11/23/2015 11:32 AM
Client ID: Run ID: ICPMS2_151123A SeqNo: 3583337 Prep Date: 11/21/2015 DF: 1

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Aluminum	U	0.0011	0.010								
Arsenic	U	0.0007	0.0050								
Barium	U	0.0002	0.0050								
Calcium	U	0.38	0.50								
Iron	U	0.01	0.080								
Manganese	U	0.0002	0.0050								
Sodium	U	0.051	0.20								

LCS Sample ID: LCS-79252-79252 Units: mg/L Analysis Date: 11/23/2015 11:38 AM
Client ID: Run ID: ICPMS2_151123A SeqNo: 3583338 Prep Date: 11/21/2015 DF: 1

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Aluminum	0.09206	0.0011	0.010	0.1	0	92.1	85-115	0			
Arsenic	0.09186	0.0007	0.0050	0.1	0	91.9	85-115	0			
Barium	0.09097	0.0002	0.0050	0.1	0	91	85-115	0			
Calcium	9.269	0.38	0.50	10	0	92.7	85-115	0			
Iron	9.485	0.01	0.080	10	0	94.8	85-115	0			
Manganese	0.09027	0.0002	0.0050	0.1	0	90.3	85-115	0			
Sodium	9.353	0.051	0.20	10	0	93.5	85-115	0			

MS Sample ID: 15111251-01BMS Units: mg/L Analysis Date: 11/23/2015 11:48 AM
Client ID: Run ID: ICPMS2_151123A SeqNo: 3583343 Prep Date: 11/21/2015 DF: 1

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Aluminum	1.409	0.0011	0.010	0.1	1.421	-12	70-130	0			SO
Arsenic	0.1535	0.0007	0.0050	0.1	0.0628	90.7	70-130	0			
Barium	0.4444	0.0002	0.0050	0.1	0.3807	83.7	70-130	0			
Calcium	244.3	0.38	0.50	10	245.1	-8	70-130	0			SEO
Iron	9.422	0.01	0.080	10	0.6763	87.5	70-130				
Manganese	4.107	0.0002	0.0050	0.1	4.161	-54	70-130				SEO
Sodium	197.6	0.051	0.20	10	205.8	-82	70-130	0			SEO

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: Potesta & Associates
Work Order: 15111024
Project: Columbia Martin Yard Renewal Sampling

QC BATCH REPORT

Batch ID: 79252 Instrument ID **ICPMS2** Method: **E200.8**

MS Sample ID: **15111042-04AMS** Units: **mg/L** Analysis Date: **11/23/2015 12:03 PM**
Client ID: Run ID: **ICPMS2_151123A** SeqNo: **3583349** Prep Date: **11/21/2015** DF: **1**

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Aluminum	0.1233	0.0011	0.010	0.1	0.02058	103	70-130	0			
Arsenic	0.09172	0.0007	0.0050	0.1	0.0007318	91	70-130	0			
Barium	0.1176	0.0002	0.0050	0.1	0.02463	93	70-130	0			
Calcium	22.59	0.38	0.50	10	13.34	92.5	70-130	0			
Iron	9.222	0.01	0.080	10	0.07434	91.5	70-130	0			
Manganese	0.09838	0.0002	0.0050	0.1	0.006628	91.8	70-130	0			
Sodium	13	0.051	0.20	10	4.097	89	70-130	0			

MSD Sample ID: **15111251-01BMSD** Units: **mg/L** Analysis Date: **11/23/2015 11:53 AM**
Client ID: Run ID: **ICPMS2_151123A** SeqNo: **3583345** Prep Date: **11/21/2015** DF: **1**

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Aluminum	1.417	0.0011	0.010	0.1	1.421	-4	70-130	1.409	0.566	20	SO
Arsenic	0.1542	0.0007	0.0050	0.1	0.0628	91.4	70-130	0.1535	0.455	20	
Barium	0.4499	0.0002	0.0050	0.1	0.3807	89.2	70-130	0.4444	1.23	20	
Calcium	245.8	0.38	0.50	10	245.1	7	70-130	244.3	0.612	20	SEO
Iron	9.517	0.01	0.080	10	0.6763	88.4	70-130	9.422	1	20	
Manganese	4.104	0.0002	0.0050	0.1	4.161	-57	70-130	4.107	0.0731	20	SEO
Sodium	197.9	0.051	0.20	10	205.8	-79	70-130	197.8	0.152	20	SEO

MSD Sample ID: **15111042-04AMSD** Units: **mg/L** Analysis Date: **11/23/2015 12:08 PM**
Client ID: Run ID: **ICPMS2_151123A** SeqNo: **3583351** Prep Date: **11/21/2015** DF: **1**

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Aluminum	0.126	0.0011	0.010	0.1	0.02058	105	70-130	0.1233	2.17	20	
Arsenic	0.09139	0.0007	0.0050	0.1	0.0007318	90.7	70-130	0.09172	0.36	20	
Barium	0.1163	0.0002	0.0050	0.1	0.02463	91.7	70-130	0.1176	1.11	20	
Calcium	22.28	0.38	0.50	10	13.34	89.4	70-130	22.59	1.38	20	
Iron	9.172	0.01	0.080	10	0.07434	91	70-130	9.222	0.544	20	
Manganese	0.09721	0.0002	0.0050	0.1	0.006628	90.6	70-130	0.09838	1.2	20	
Sodium	12.88	0.051	0.20	10	4.097	87.8	70-130	13	0.922	20	

The following samples were analyzed in this batch: 15111024-01G

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: Potesta & Associates
Work Order: 15111024
Project: Columbia Martin Yard Renewal Sampling

QC BATCH REPORT

Batch ID: **R176540** Instrument ID **WETCHEM** Method: **A4500-H B-11**

LCS Sample ID: **LCS-R176540-R176540** Units: **s.u.** Analysis Date: **11/18/2015 04:14 PM**
Client ID: Run ID: **WETCHEM_151118W** SeqNo: **3575288** Prep Date: DF: **1**

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
pH (laboratory)	3.98	0.02	0.020	4	0	99.5	90-110	0			

DUP Sample ID: **15111024-01F DUP** Units: **s.u.** Analysis Date: **11/18/2015 04:14 PM**
Client ID: **Rucker Residence Grab** Run ID: **WETCHEM_151118W** SeqNo: **3575292** Prep Date: DF: **1**

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
pH (laboratory)	7.58	0.02	0.020	0	0	0		7.56	0.264	20	H

The following samples were analyzed in this batch: 15111024-01F

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: Potesta & Associates
Work Order: 15111024
Project: Columbia Martin Yard Renewal Sampling

QC BATCH REPORT

Batch ID: R176602 Instrument ID WETCHEM Method: A9222 B-97

MBLK Sample ID: MB-R176602-R176602 Units: cfu/100ml Analysis Date: 11/18/2015 04:44 PM
Client ID: Run ID: WETCHEM_151118Z SeqNo: 3577214 Prep Date: DF: 1

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Total Coliform, MF	U	10	10								

MBLK Sample ID: MB-R176602-R176602 Units: cfu/100ml Analysis Date: 11/18/2015 04:44 PM
Client ID: Run ID: WETCHEM_151118Z SeqNo: 3577218 Prep Date: DF: 1

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Total Coliform, MF	U	10	10								

DUP Sample ID: 15111024-01H DUP Units: cfu/100ml Analysis Date: 11/18/2015 04:44 PM
Client ID: Rucker Residence Grab Run ID: WETCHEM_151118Z SeqNo: 3577217 Prep Date: DF: 1

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Total Coliform, MF	13	10	10	0	0	0		6	73.7	20	R

The following samples were analyzed in this batch: 15111024-01H

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: Potesta & Associates
Work Order: 15111024
Project: Columbia Martin Yard Renewal Sampling

QC BATCH REPORT

Batch ID: R177184 Instrument ID SUB Method: RSK-175

MBLK Sample ID: MB-R177184-R177184 Units:µg/L Analysis Date: 11/20/2015 06:30 AM
Client ID: Run ID: SUB_151120G SeqNo:3593728 Prep Date: DF: 1

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Butane	U	0.35	4.3								
Ethane	U	0.23	3.3								
Methane	U	0.34	1.5								
Propane	U	0.22	3.2								

The following samples were analyzed in this batch: 15111024-01B

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: Potesta & Associates
Work Order: 15111024
Project: Columbia Martin Yard Renewal Sampling

QC BATCH REPORT

Batch ID: **R177013B** Instrument ID **VMS8** Method: **E624**

MBLK Sample ID: **VBLKW1-151125-R177013B** Units: µg/L Analysis Date: **11/25/2015 12:25 PM**
Client ID: Run ID: **VMS8_151125A** SeqNo: **3591243** Prep Date: DF: **1**

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Benzene	U	0.25	1.0								
Ethylbenzene	U	0.22	1.0								
m,p-Xylene	U	0.4	2.0								
o-Xylene	U	0.21	1.0								
Toluene	U	0.2	1.0								
Xylenes, Total	U	0.62	3.0								
Surr: 1,2-Dichloroethane-d4	*19.45*	0	0	*20*	0	*97.2*	*75-120*	0			
Surr: 4-Bromofluorobenzene	*19.76*	0	0	*20*	0	*98.8*	*80-110*	0			
Surr: Dibromofluoromethane	*20.17*	0	0	*20*	0	*101*	*85-115*	0			
Surr: Toluene-d8	*18.5*	0	0	*20*	0	*92.5*	*85-110*	0			

LCS Sample ID: **VLCSW1-151125-R177013B** Units: µg/L Analysis Date: **11/25/2015 10:47 AM**
Client ID: Run ID: **VMS8_151125A** SeqNo: **3591241** Prep Date: DF: **1**

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Benzene	23.57	0.25	1.0	20	0	118	85-125	0			
Ethylbenzene	21.56	0.22	1.0	20	0	108	85-125	0			
m,p-Xylene	45.26	0.4	2.0	40	0	113	75-130	0			
o-Xylene	21.55	0.21	1.0	20	0	108	80-125	0			
Toluene	21.73	0.2	1.0	20	0	109	85-125	0			
Xylenes, Total	66.81	0.62	3.0	60	0	111	80-126	0			
Surr: 1,2-Dichloroethane-d4	*18.82*	0	0	*20*	0	*94.1*	*75-120*	0			
Surr: 4-Bromofluorobenzene	*20.77*	0	0	*20*	0	*104*	*80-110*	0			
Surr: Dibromofluoromethane	*20.28*	0	0	*20*	0	*101*	*85-115*	0			
Surr: Toluene-d8	*19.11*	0	0	*20*	0	*95.6*	*85-110*	0			

MS Sample ID: **15111107-19D MS** Units: µg/L Analysis Date: **11/25/2015 09:05 PM**
Client ID: Run ID: **VMS8_151125A** SeqNo: **3591247** Prep Date: DF: **10**

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Benzene	295.7	2.5	10	200	46.27	125	85-125				
Ethylbenzene	205.9	2.2	10	200	0	103	85-125	0			
m,p-Xylene	436	4	20	400	0	109	75-130	0			
o-Xylene	204.5	2.1	10	200	0	102	80-125	0			
Toluene	219.7	2	10	200	0	110	85-125	0			
Xylenes, Total	640.5	6.2	30	600	0	107	80-126	0			
Surr: 1,2-Dichloroethane-d4	*194.1*	0	0	*200*	0	*97*	*75-120*	0			
Surr: 4-Bromofluorobenzene	*208.4*	0	0	*200*	0	*104*	*80-110*	0			
Surr: Dibromofluoromethane	*199*	0	0	*200*	0	*99.5*	*85-115*	0			
Surr: Toluene-d8	*188.5*	0	0	*200*	0	*94.2*	*85-110*	0			

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: Potesta & Associates
Work Order: 15111024
Project: Columbia Martin Yard Renewal Sampling

QC BATCH REPORT

Batch ID: R177013B Instrument ID VMS8 Method: E624

MSD	Sample ID: 15111107-19D MSD				Units: µg/L			Analysis Date: 11/25/2015 09:29 PM			
Client ID:	Run ID: VMS8_151125A				SeqNo: 3591248			Prep Date:		DF: 10	
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Benzene	281.7	2.5	10	200	46.27	118	85-125	295.7	4.85	30	
Ethylbenzene	205.5	2.2	10	200	0	103	85-125	205.9	0.194	30	
m,p-Xylene	425.8	4	20	400	0	106	75-130	438	2.37	30	
o-Xylene	200.5	2.1	10	200	0	100	80-125	204.5	1.98	30	
Toluene	210.6	2	10	200	0	105	85-125	219.7	4.23	30	
Xylenes, Total	626.3	6.2	30	600	0	104	80-126	640.5	2.24	30	
Surr: 1,2-Dichloroethane-d4	*188.3*	0	0	*200*	0	*94.2*	*75-120*	194.1	*3.03*	*30*	
Surr: 4-Bromofluorobenzene	*205.3*	0	0	*200*	0	*103*	*80-110*	208.4	*1.5*	*30*	
Surr: Dibromofluoromethane	*194.9*	0	0	*200*	0	*97.4*	*85-115*	199	*2.08*	*30*	
Surr: Toluene-d8	*189.2*	0	0	*200*	0	*94.6*	*85-110*	188.5	*0.371*	*30*	

The following samples were analyzed in this batch: 15111024-01D 15111024-02A

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: Potesta & Associates
Work Order: 15111024
Project: Columbia Martin Yard Renewal Sampling

QC BATCH REPORT

Batch ID: **79245** Instrument ID **TDS** Method: **A2540 C-97**

MBLK Sample ID: **MBLK-79245-79245** Units: **mg/L** Analysis Date: **11/23/2015 01:08 PM**
Client ID: Run ID: **TDS_151123A** SeqNo: **3583429** Prep Date: **11/23/2015** DF: **1**

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Total Dissolved Solids	U	7.6	10								

LCS Sample ID: **LCS-79245-79245** Units: **mg/L** Analysis Date: **11/23/2015 01:08 PM**
Client ID: Run ID: **TDS_151123A** SeqNo: **3583428** Prep Date: **11/23/2015** DF: **1**

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Total Dissolved Solids	485	7.6	10	495	0	98	80-120	0			

DUP Sample ID: **15111194-01E DUP** Units: **mg/L** Analysis Date: **11/23/2015 01:08 PM**
Client ID: Run ID: **TDS_151123A** SeqNo: **3583396** Prep Date: **11/23/2015** DF: **1**

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Total Dissolved Solids	1573	7.6	10	0	0	0	0-0	1573	0	10	

DUP Sample ID: **1511985-02A DUP** Units: **mg/L** Analysis Date: **11/23/2015 01:08 PM**
Client ID: Run ID: **TDS_151123A** SeqNo: **3583410** Prep Date: **11/23/2015** DF: **1**

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Total Dissolved Solids	623	7.6	10	0	0	0	0-0	611	1.94	10	

The following samples were analyzed in this batch: 15111024-01F

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: Potesta & Associates
Work Order: 15111024
Project: Columbia Martin Yard Renewal Sampling

QC BATCH REPORT

Batch ID: **R177066** Instrument ID **IC4** Method: **E300.0**

MBLK Sample ID: **CCB/MBLK-R177066** Units: **mg/L** Analysis Date: **11/24/2015 02:08 PM**
Client ID: Run ID: **IC4_151124A** SeqNo: **3590384** Prep Date: DF: **1**

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chloride	U	0.14	1.0								

LCS Sample ID: **MLCCV/LCS-R177066** Units: **mg/L** Analysis Date: **11/24/2015 08:19 PM**
Client ID: Run ID: **IC4_151124A** SeqNo: **3590407** Prep Date: DF: **1**

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chloride	9.078	0.14	1.0	10	0	90.8	90-110	0			

MS Sample ID: **15111321-01A MS** Units: **mg/L** Analysis Date: **11/24/2015 03:17 PM**
Client ID: Run ID: **IC4_151124A** SeqNo: **3590388** Prep Date: DF: **2**

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chloride	19.51	0.29	2.0	20	2.127	86.9	80-120	0			

MSD Sample ID: **15111321-01A MSD** Units: **mg/L** Analysis Date: **11/24/2015 03:37 PM**
Client ID: Run ID: **IC4_151124A** SeqNo: **3590389** Prep Date: DF: **2**

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chloride	19.5	0.29	2.0	20	2.127	86.9	80-120			20	

The following samples were analyzed in this batch: 15111024-01F

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: Potesta & Associates
Work Order: 15111024
Project: Columbia Martin Yard Renewal Sampling

QC BATCH REPORT

Batch ID: **R177190** Instrument ID **SUB** Method: **A5540C**

MBLK	Sample ID: **MB-R177190-R177190**				Units: **mg MBAS/L**		Analysis Date: **11/20/2015 03:20 AM**			
Client ID:	Run ID: **SUB_151120H**			SeqNo: **3593858**	Prep Date:		DF: **1**			
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Anionic Surfactants as MBAS	U	0.005	0.025								

The following samples were analyzed in this batch: 15111024-01A

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: Potesta & Associates
Work Order: 15111024
Project: Columbia Martin Yard Renewal Sampling

QC BATCH REPORT

Batch ID: **R177213** Instrument ID **IC4** Method: **E300.0**

MBLK Sample ID: **CCB/MBLK-R177213** Units: **mg/L** Analysis Date: **11/29/2015 08:14 PM**
Client ID: Run ID: **IC4_151129A** SeqNo: **3594714** Prep Date: DF: **1**

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Sulfate	U	0.14	1.0								

LCS Sample ID: **LCS-R177213** Units: **mg/L** Analysis Date: **11/29/2015 08:34 PM**
Client ID: Run ID: **IC4_151129A** SeqNo: **3594716** Prep Date: DF: **1**

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Sulfate	9.731	0.14	1.0	10	0	97.3	90-110	0			

MS Sample ID: **15111024-01F MS** Units: **mg/L** Analysis Date: **11/29/2015 09:37 PM**
Client ID: **Rucker Residence Grab** Run ID: **IC4_151129A** SeqNo: **3594720** Prep Date: DF: **2**

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Sulfate	31.48	0.28	2.0	10	23.52	79.6	80-120	0			S

MSD Sample ID: **15111024-01F MSD** Units: **mg/L** Analysis Date: **11/29/2015 09:58 PM**
Client ID: **Rucker Residence Grab** Run ID: **IC4_151129A** SeqNo: **3594722** Prep Date: DF: **2**

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Sulfate	32.65	0.28	2.0	10	23.52	91.3	80-120	31.48	3.65	20	

The following samples were analyzed in this batch: 15111024-01F

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

15111024 Page 1 of 1

POTESTA

CHAIN OF CUSTODY RECORD

CHARLESTON OFFICE
7012 MacCorkle Avenue, SE
Charleston, WV 25304
Phone: (304) 342-1400
Fax: (304) 343-9031

MORGANTOWN OFFICE
125 Lakeview Drive
Morgantown, WV 26508
Phone: (304) 225-2245
Fax: (304) 225-2246

WINCHESTER OFFICE
15 South Braddock Street
Winchester, VA 22601
Phone: (504) 450-0180
Fax: (540) 450-0182

CAMBRIDGE OFFICE
841 Steubenville Avenue
Cambridge, OH 43725
Phone: (740) 432-6555
Fax: (740) 432-6554

CLIENT/SAMPLING SITE: Columbia Martin Yard Renewal Sampling

PROJECT NO.: 0101-06-0552-000J DATE: 18-Nov-15

DELIVERABLE: ☐ Email ☐ Hard Copy ☐ EDD (Excel) ☐ Other:

LAB USED: ALS Environmental HOW SHIPPED: Delivered to lab

CONTACT PERSON(S): Douglas Bowe

OFFICE LOCATION(S): Charleston

EMAIL(S): dwbowe@potesta.com

SAMPLER(S): Megan Buckalew, Lee Moreland

SAMPLE LOG AND ANALYSIS REQUESTED

PRESERVATIVE CODES
0 No Preservative
1 Hydrochloric Acid
2 Nitric Acid
3 Sulfuric Acid
4 Sodium Thiosulfate
5 Sodium Hydroxide
6 Zinc Acetate
7 EDTA
See Notes Section

TURNAROUND TIME
☒ Regular
☐ Rush (Indicate Date Needed)

NOTES:
- Sample(s) maintained at 4°C unless otherwise noted.
- **Analyze all solid samples for % solids unless otherwise noted.**

SAMPLE ID	NO. & TYPE OF CONTAINERS (Note Preservative Code)	DATE	TIME	MATRIX	COMP/GRAB	ANALYSIS REQUESTED and METHOD	Analytical parameters as per attachment								REMARKS
Rucker Residence	Two 500 ml (0), one 250 ml (2)	11/18/15	0930	Water	Grab		X								Rucker Residence
	One 100 ml (4), Two 40ml (0)	11/18/15	0930	Water	Grab		X								Field pH = 7.30 SU
	Eight 40 ml (1)	11/18/15	0930	Water	Grab		X								Trip Blanks - Two 40 ml (1)

RELINQUISHED BY: (SIGNATURE)	DATE/TIME	RECEIVED BY: (SIGNATURE)
Megan Buckalew	11/18/15 1420	[signature]
[signature]	11/18/15 1705	FED EX
FED EX	11/19/15 0930	[signature]

COMMENTS: Original results to Heather Roberts of Columbia Pipeline Group. Email address hroberts@cpg.com

Copy of results to Doug Bowe at POTESTA

Lab Use Only: Temp (°C) 2.6 Cooling Method (Circle One): Ice

ALSHN <6.0

RECEIVED Office of Oil and Gas DEC 08 2015 WV Department of Environmental Protection

ALS Group USA, Corp

Sample Receipt Checklist

Client Name: **POTESTA**

Work Order: **15111024**

Date/Time Received: **18-Nov-15 14:20**

Received by: **JAS**

Checklist completed by Janet Smith (eSignature) 18-Nov-15 (Date)

Reviewed by: Rebecca Kiser (eSignature) 19-Nov-15 (Date)

Matrices: Water

Carrier name: Client

Shipping container/cooler in good condition?	Yes ☑	No ☐	Not Present ☐
Custody seals intact on shipping container/cooler?	Yes ☐	No ☐	Not Present ☑
Custody seals intact on sample bottles?	Yes ☐	No ☐	Not Present ☑
Chain of custody present?	Yes ☑	No ☐	
Chain of custody signed when relinquished and received?	Yes ☑	No ☐	
Chain of custody agrees with sample labels?	Yes ☑	No ☐	
Samples in proper container/bottle?	Yes ☑	No ☐	
Sample containers intact?	Yes ☑	No ☐	
Sufficient sample volume for indicated test?	Yes ☑	No ☐	
All samples received within holding time?	Yes ☐	No ☑	
Container/Temp Blank temperature in compliance?	Yes ☑	No ☐	
Sample(s) received on ice?	Yes ☑	No ☐	
Temperature(s)/Thermometer(s):	<6C	IR	
Cooler(s)/Kit(s):			
Date/Time sample(s) sent to storage:			
Water - VOA vials have zero headspace?	Yes ☑	No ☐	No VOA vials submitted ☐
Water - pH acceptable upon receipt?	Yes ☑	No ☐	N/A ☐
pH adjusted?	Yes ☐	No ☑	N/A ☐
pH adjusted by:			

Login Notes: Sample received out of holding time for pH. Holland <6.0 c

RECEIVED
Office of Oil and Gas
DEC 23 2015
WV Department of
Environmental Protection

Client Contacted:

Date Contacted:

Person Contacted:

Contacted By:

Regarding:

Comments:

CorrectiveAction:

Appendix F
Area Permit Wells

APPENDIX F

Area Permit Wells

API #	Well Type (Injection, Production, Observation, Monitoring)	Well Status (Active, Abandoned, Shut-in, Plugged)	Northing (UTM NAD 83 Meters)	Easting (UTM NAD 83 Meters)
Not Applicable				
Not an Area Permit				

Make as many copies as necessary and include page numbers as appropriate.

Section 8
Geological Data on Injection and Confining Zones

UIC PERMIT NUMBER UIC2D0871977
RENEWAL APPLICATION
ROANE WELL #99
COLUMBIA GAS TRANSMISSION, LLC.

SECTION 8
GEOLOGICAL DATA ON THE INJECTION AND CONFINING ZONE

Included is a detailed investigation of subsurface features in the vicinity of the injection well.

May 2016 Revisions

General - Columbia's existing W-99 disposal well is located in Walton District, Roane County, West Virginia and is found on the USGS 7.5 minute Clio, WV topographical map. The disposal well was drilled under API Permit Number 47-087-1977 and reached a logger's total depth of 5130 feet on December 3, 1972. Injection zone is the lower Devonian Shale that encompasses the Rhinestreet shale, an unconventional reservoir with minimal-to-nearly zero porosity and permeability.

Research of company and WVGES files document that there are no historic Devonian Shale wells (Huron, Rhinestreet or Marcellus) within a one-mile radius of disposal well W-99. Eight active Devonian Shale wells are present within a one- to two-mile radius of W-99 that reported gas production as recent as 2014. An additional 13 active Devonian Shale wells are present within an expanded two- to three-mile radius of W-99 that reported gas production as recent as 2014. Columbia Geology found no evidence of fluid encroachment in the Devonian Shale in any of the 21 active Shale gas wells within a three-mile radius of disposal well W-99.

Item 2.a. – The existing lower Devonian Shale (encompassing the Rhinestreet shale) injection zone is composed of alternating layers of shale, limey shale and tight siltstone as determined by the examination of 13 area wells with Devonian Shale electric logs and gamma ray curves. The formation is noted for its high(er) API unit content, "hotter" gamma ray curve signature, kerogen-rich content and increased values of total organic content (TOC). Microscopic examination of Rhinestreet shale drill cuttings reveals a dark gray-to-dark brown shale-to-silty shale formation.

Disposal well W-99 has a Devonian Rhinestreet shale thickness of 204 feet (4576 feet to 4780 feet).

The Rhinestreet shale serves as its own reservoir and hydrocarbon source. Naturally occurring micro and macro fractures within sections of the lower Devonian Shale, including the Rhinestreet, tightly hold its gas reserves. Examination of Shale wells with density logs within the three-mile radius from W-99 document very low primary porosity in a range of 0% to 2.5%.

Permeability of the Rhinestreet shale in disposal well W-99 can neither be determined nor documented due to the absence of Rhinestreet cores, core analyses or core reports from any wells within the three-mile radius from disposal well W-99. In lieu of core data, a reasonable average value for Rhinestreet shale permeability in the area of interest is projected at 0.05mD (or less).

Item 2.b. - The Devonian Shale that was deposited on top of the Rhinestreet shale and extends vertically to the Berea sand or its depositional horizon (when no Berea sand is present) is the existing confining interval. It has effectively sealed the disposal fluids in the lower Devonian Shale and Rhinestreet shale for nearly one-half century. The thickness of the Devonian Shale confining interval in well W-99 is 2558 feet.

The Devonian Shale overlying the Rhinestreet shale that extends vertically up to the Berea sand has naturally occurring micro and macro fractures within its sections. Examination of Shale wells with density logs within the three-mile radius from W-99 document very low primary porosity in a range of 0% to 2.5%. Permeability of the Devonian Shale confining interval in disposal well W-99 can neither be determined nor documented due to the absence of Devonian Shale cores, core analyses or core reports from any wells within the three-mile radius from disposal well W-99. In lieu of core data, a reasonable average value for Devonian Shale confining interval in the area of interest is projected at 0.05mD (or less).

Item 2.c. - An isopach map of the Devonian Rhinestreet shale injection zone is attached. The map was based upon the correlation of 13 Devonian Shale electric logs from wells within a three-mile radius from disposal well W-99. Average thickness of the Rhinestreet shale from these wells is 200 feet.

Item 2.d. - A structure map on top of the Devonian Rhinestreet shale injection zone is attached. The map was based upon the correlation of 13 Devonian Shale electric logs from wells within a three-mile radius from disposal well W-99. Also shown on the structure map are the locations of the structural axes of the Arches Fork anticline and Robinson syncline that pass through the area of interest. No data regarding subsurface faults in the immediate area surrounding disposal well W-99 was found. Regarding lineaments that may or may not be present in the local area of interest, Columbia interprets lineaments as surface features identified by the examination of aerial and satellite imagery. As such, no lineament maps (WVGES or others) document depth of subsurface extension. Lineament maps, therefore, are of speculative value only as to whether lineaments have any influence on the Devonian Rhinestreet shale deep injection zone in well W-99.

Item 2.e. - An isopach map of the Devonian Shale confining interval (top of the Rhinestreet shale to the top of the Berea sand) is attached. Average thickness of the confining interval from 13 wells (with Shale electric logs) within a three mile radius of disposal well W-99 is 2366 feet.

Item 2.f. - A structure map on top of the Devonian Shale confining interval (top of the Berea sand) is attached. Data points were provided by the electric logs from 21 wells (plus W-99).

within the three-mile radius area centered on W-99 that penetrated the Berea sand or Berea horizon (base of the Sunbury/Coffee shale).

Item 2.g. - A correlated and marked paper copy of the McCullough GR/D/DT electric log dated December 3, 1972 from Columbia's Roane W-99 disposal well is attached. Cement bond logs are also included in this response.

Item 2.h. – Disclaimer: Note that the fluid migration model presented below is overly simplified and lacks scientific support due to limited availability of reservoir formation data.

Assumptions:

- Approximately 880,000 bbls (4,940,833 cu ft) of total fluid injected to-date.
- Injected fluids exit wellbore and enters injection zone through perforations. Injected fluid volumes and rates are evenly distributed across entire perforation interval (486 ft) and migrate outward through the injection zone in a uniform radial pattern.
- Vertical fluid migration is limited to the height of the perforation interval.
- Injection zone is assumed homogeneous with uniform permeability and porosity.
- Average porosity of injection zone assumed to be 1.25% (based on electric log data).

Calculations:

$TFI = \text{porosity } (\pi) (\text{radius})^2 (\text{height})$

where:	TFI:	total fluid injected (cu ft)
	porosity:	injection zone average porosity
	radius:	radial extent of injected fluid migration (ft)
	height:	perforation interval height (ft)

solving for radius

$\text{radius} = [(TFI) / (\text{porosity})(\pi)(\text{height})]^{0.5}$

substituting

$= [(4{,}940{,}833) / (0.0125) (\pi) (486)]^{0.5}$

$= 509 \text{ feet}$

Model Summary:

Based on the disclaimer and assumptions outlined above, injected fluid has migrated a distance of 509 feet from wellbore, and extended vertically no shallower than a depth of 4620 feet and no deeper than a depth of 5106 feet.

Item 2.i. – Periodic inspections and past performance of facility piping, pumps, valves, fittings, well tubing, and well casing (i.e. those in contact with the injection fluid) reveal no evidence of abnormal metal loss indicative of a highly corrosive or erosive environment. Furthermore, there is no evidence that the injected fluid has adversely affected the mineral or mechanical characteristics of the injection formation.

The pH of 5.11 Standard Units (SU) reported for the fluids being injected is only slightly acidic. This is the result of only one sample, and not necessarily representative of all injection fluids. As part of the previous renewal application submitted in 2011, a pH of 5.92 was measured in the fluids being injected. The majority of fluids being injected are brine and basement water which do not contain any acids from frac jobs or other processes. As the agency is aware, Columbia utilizes higher grade tubing than what is typically used at similar facilities. The higher grade tubing should provide additional protection from the effects of the slightly acidic water.

W-99 has been operated as a fluid disposal well problem-free, incident-free and subsurface contamination-free by Columbia Gas Transmission for 43 years (since 1973). Subsurface confinement of disposal fluids by well W-99 is demonstrated by over four decades of trouble-free operation.

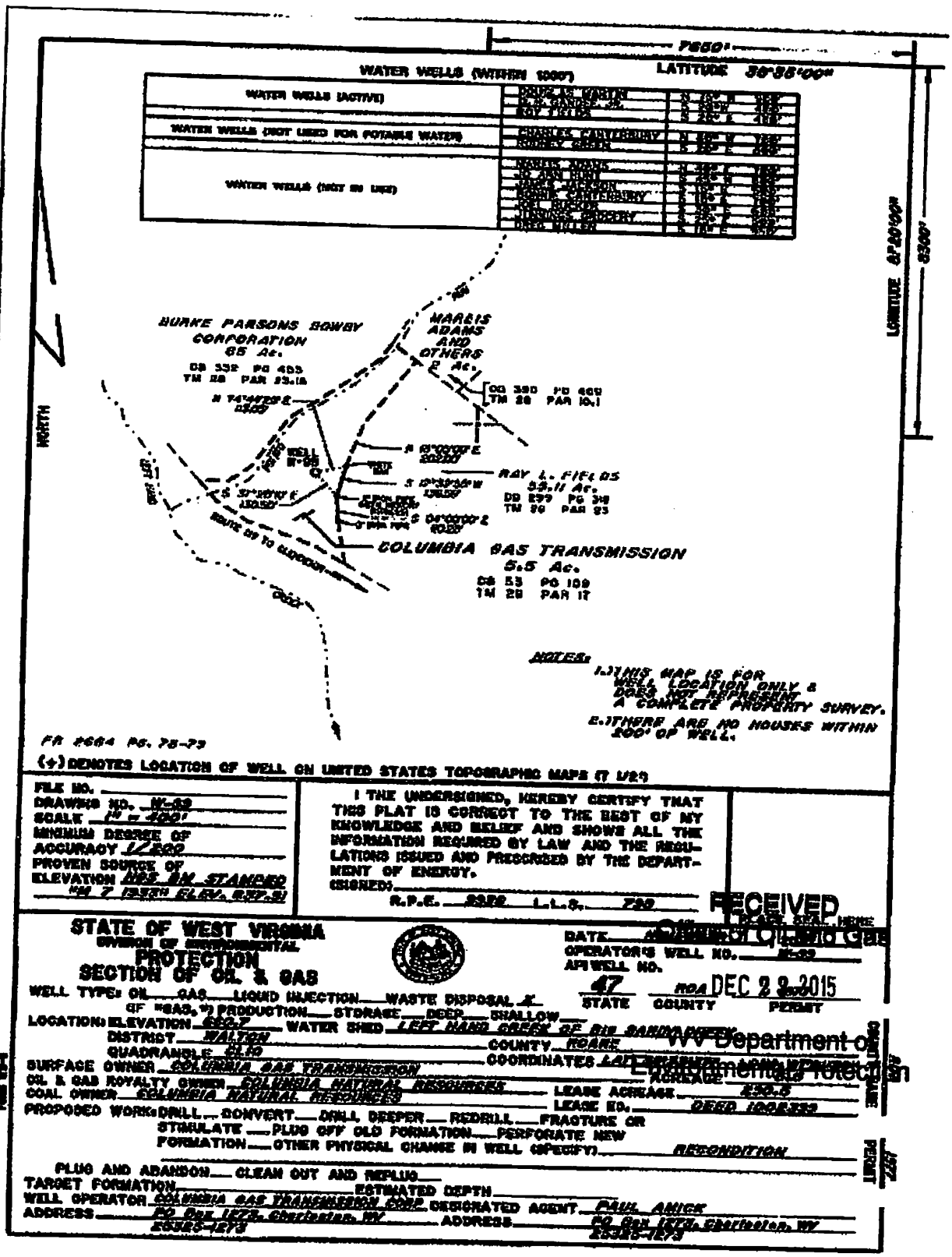


FIGURE 1 - SURVEY PLAT

Office of Oil and Gas

DEC 23 2015

WV Department of Environmental Protection

Columbia Pipeline Group

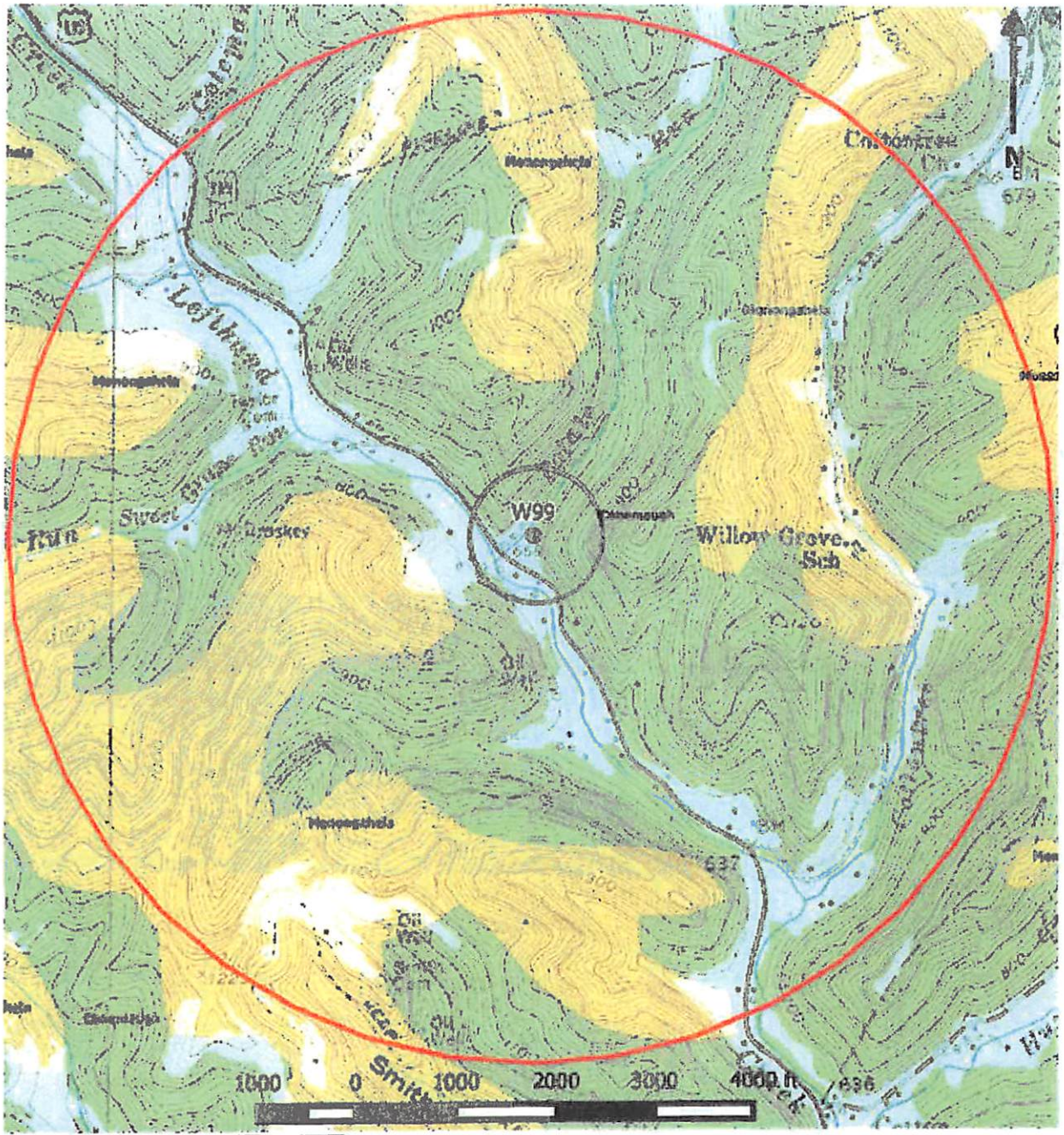
USGS 7.5 Minute Topo

Author: SSH / LAS	Scale:	Date: 12/16/2015

Legend

- CPG ROANE W99 UIC WELL

FIGURE 2 - Topo Map



Legend

- CPG ROANE W99 UIC WELL

WVGES GEOLOGY POLYGONS

PENNSYLVANIAN GROUPS
Conemaugh
Monongahela

ROANE W99 1 MILE RADIUS

FIGURE 3 - Surface Geology

WVGES GEOLOGIC POLYGONS SOURCE:
West Virginia Geologic And Economic Survey

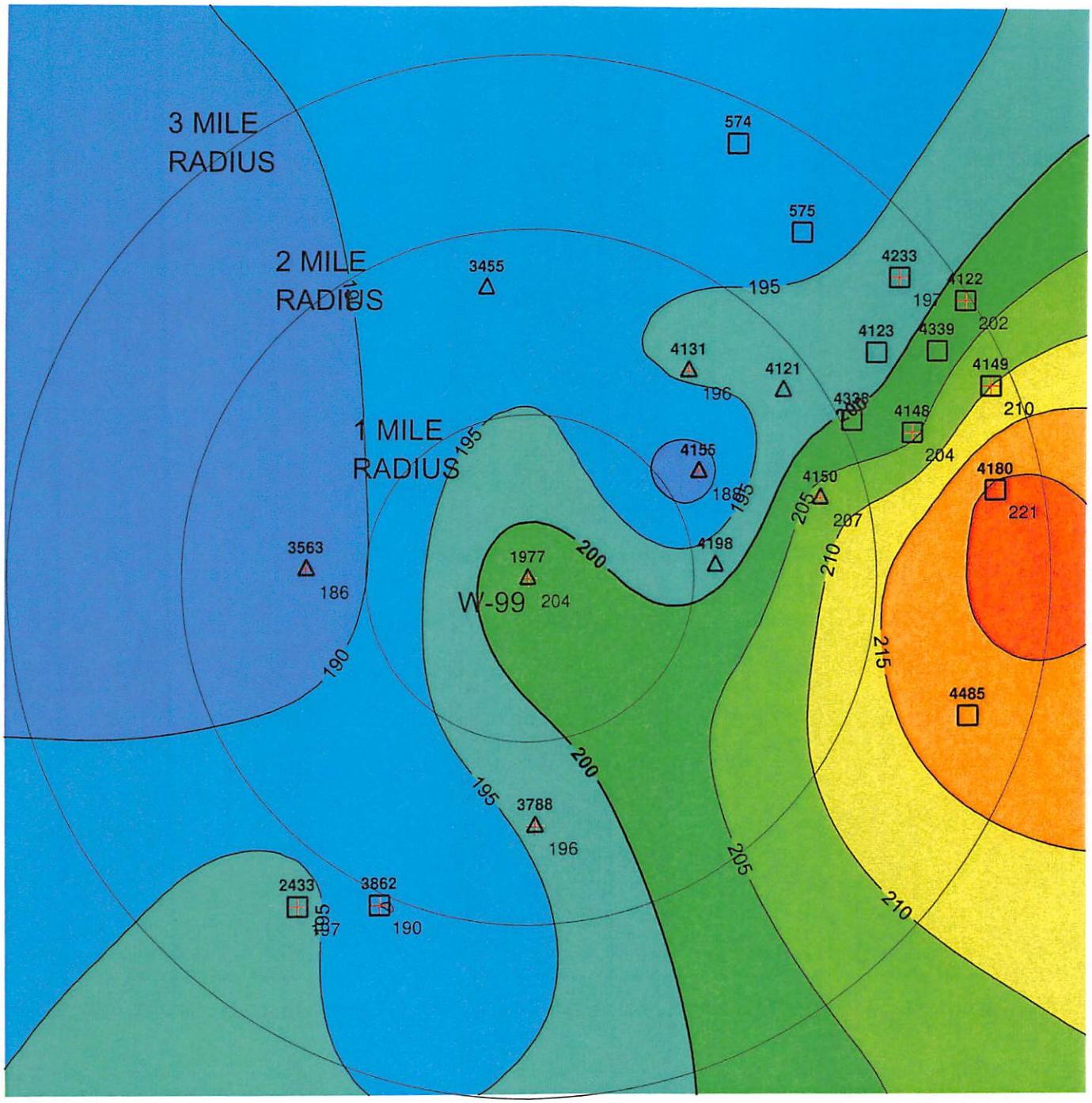
http://gis.dep.wv.gov/data/vector/geology.zip

Columbia Pipeline Group

Roane County W-99 UIC Well

USGS 7.5 Minute Topo and Geologic Groups

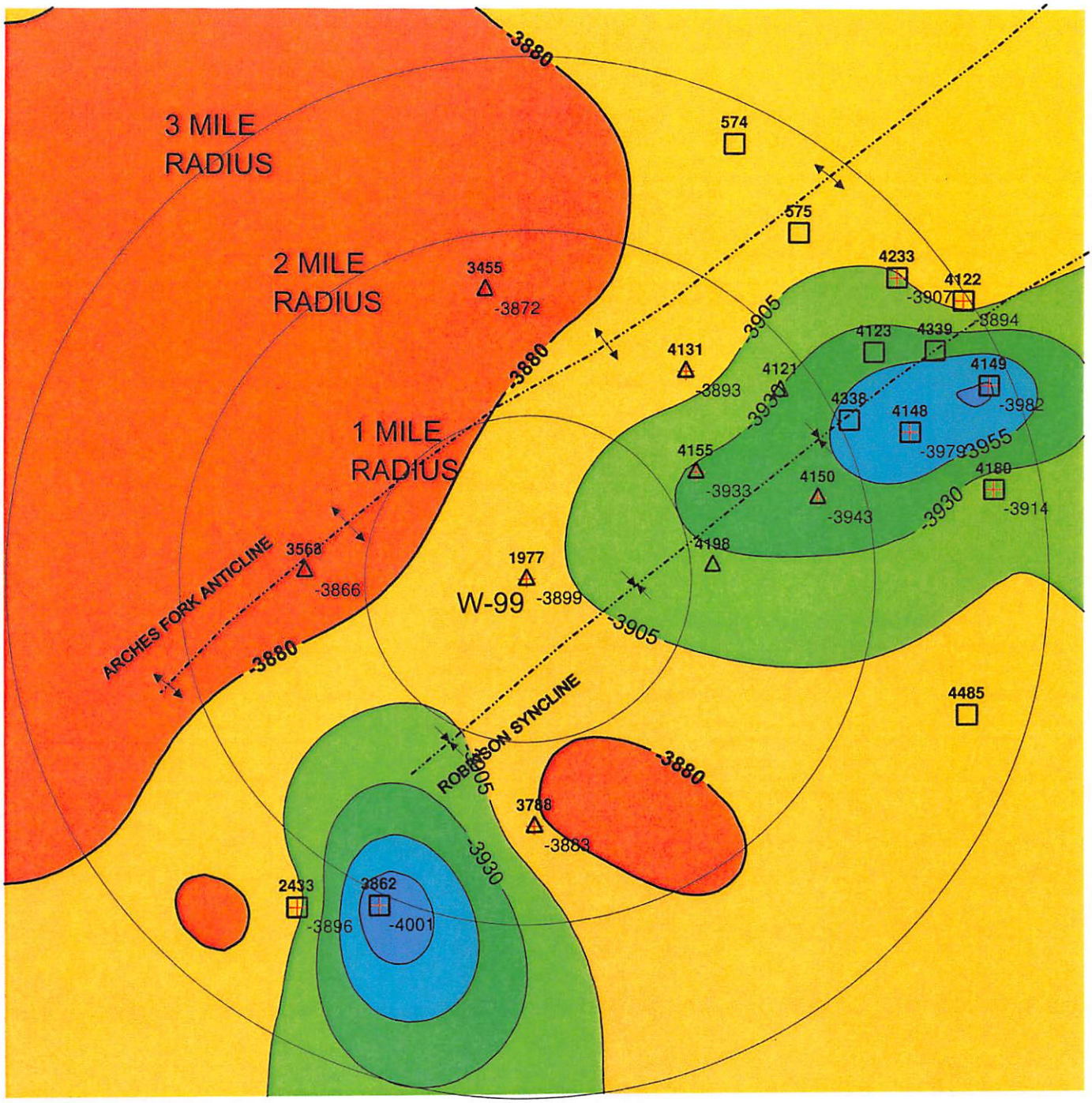
12 16 2015



Columbia Pipeline Group

Roane County Disposal Well W-99
Isopach Map of Devonian Rhinestreet Shale
Contour Interval: 5 feet

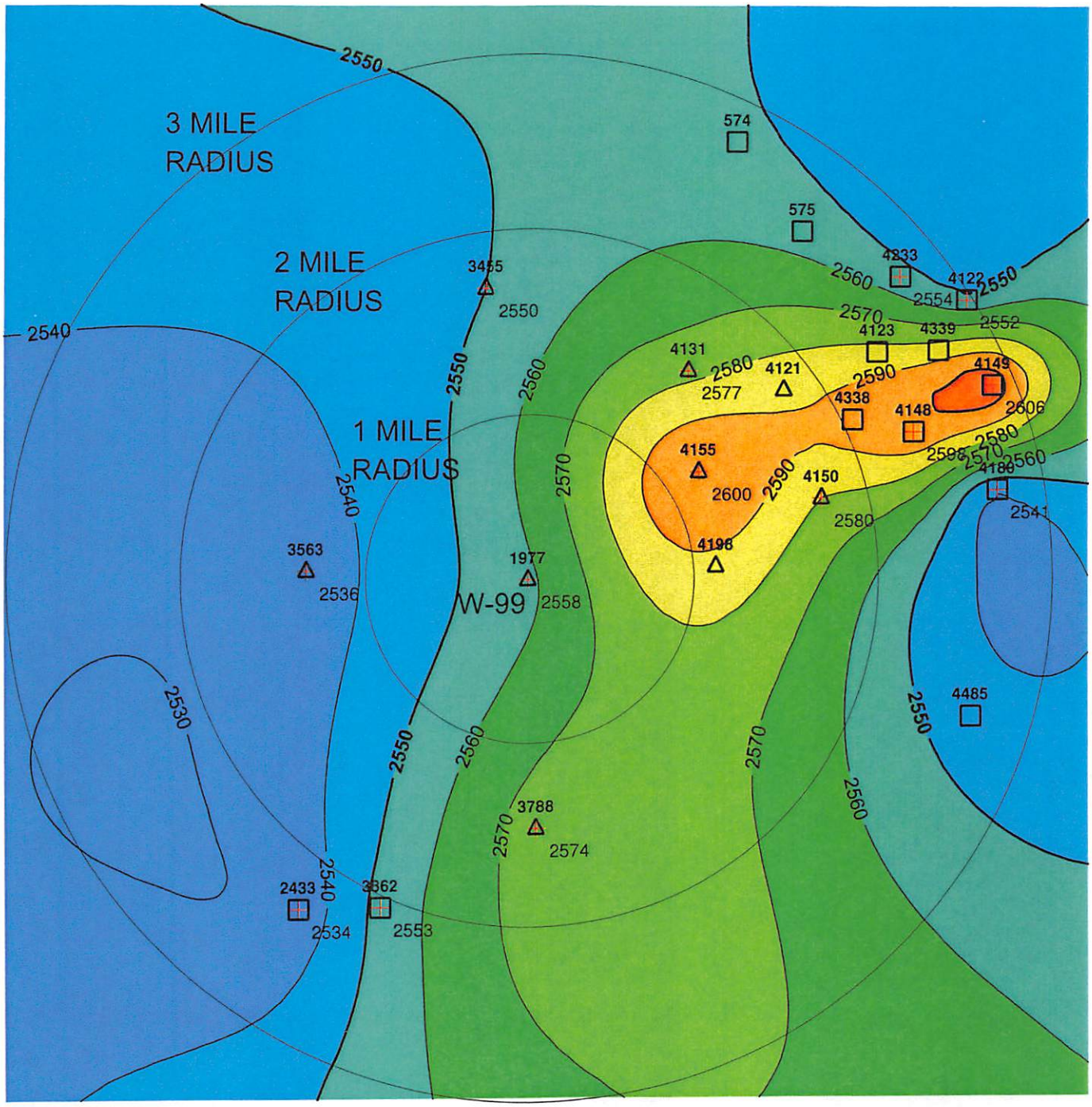
Author:		Date:
SSH & LAS		13 May, 2016



Columbia Pipeline Group

Roane County Disposal Well W-99
Structure Map - Top of Rhinestreet Shale
Contour Interval: 25 feet

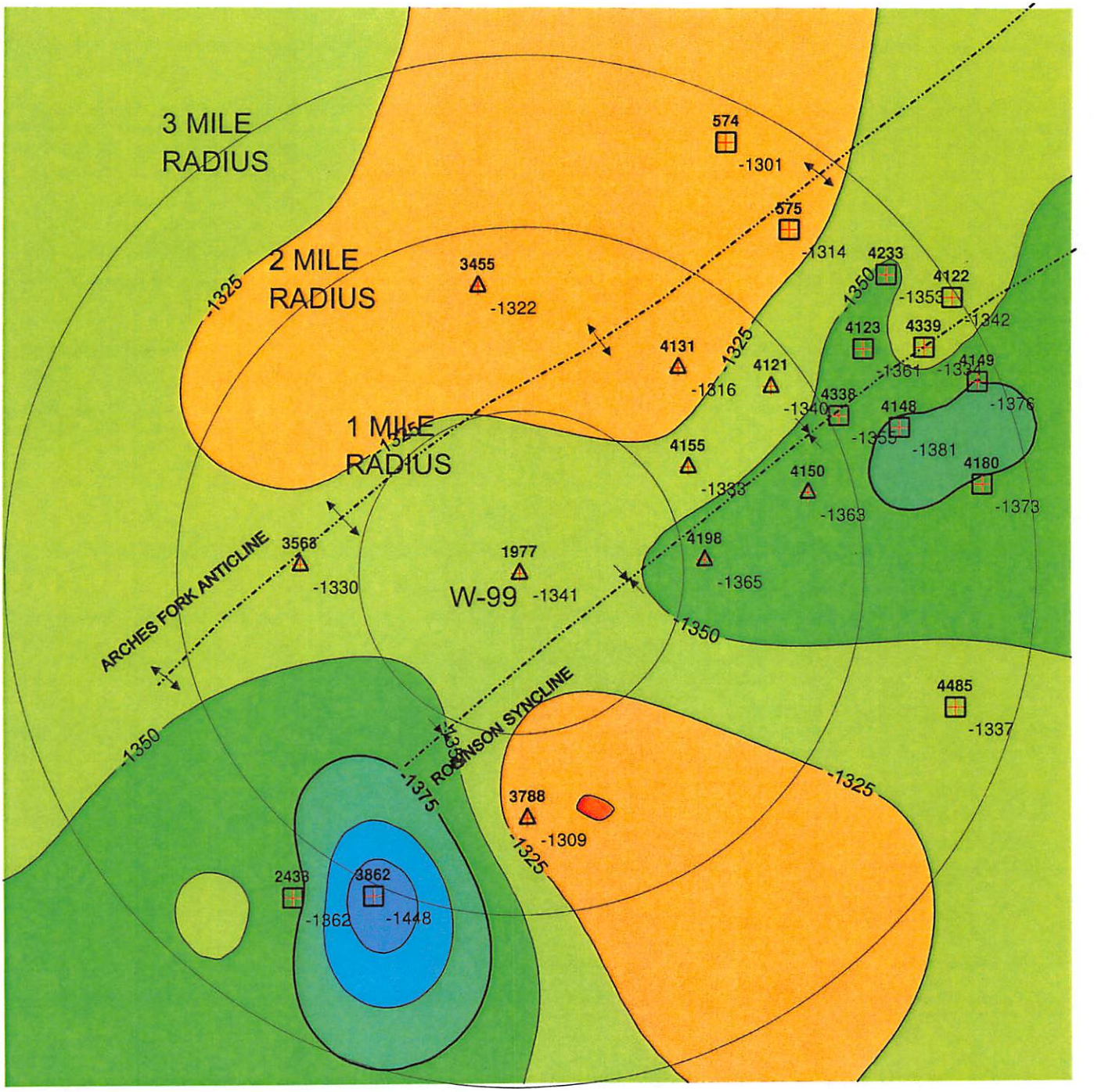
Author:		Date:
SSH & LAS		13 May, 2016



Columbia Pipeline Group

Roane County Disposal Well W-99
Isopach Map of Confining Interval
(Top Berea Sand to Top of Rhinestreet Shale)
Contour Interval: 10 feet

Author:		Date:
SSH & LAS		13 May, 2016



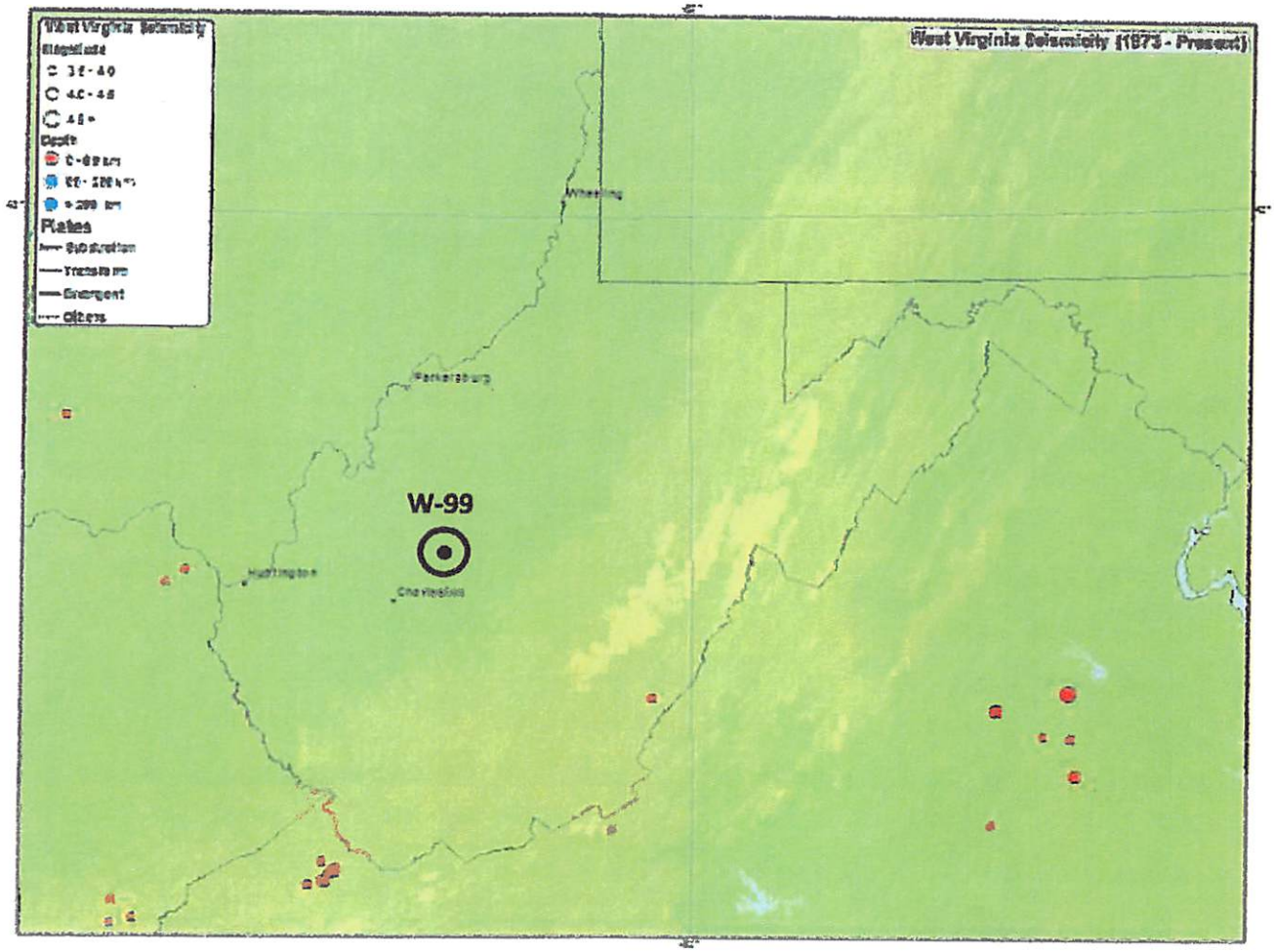
Columbia Pipeline Group

Roane County Disposal Well W-99
Structure Map on Top of Confining Interval
(Top of Berea Sand)
Contour Interval: 25 feet

Author:		Date:
SSH & LAS		13 May 2016

West Virginia (Per U.S.G.S.)

Seismicity Map - 1973 to March 2012



Roane W-99 disposal well operated from 1973 to the present.

FIGURE 7 - Seismic Activity Map

GR-D-MECH, CALIPER & DIFF. TEMP. LOG

FILE NO.
GR-D-67541
C-67541
DT-67541

W-99

COMPANY: COLUMBIA GAS TRANSMISSION CORP.
WELL: W-99 DISPOSAL
FIELD: Walton DISTRICT
COUNTY: ROANE (1977) STATE: WEST VIRGINIA
LOCATION: LEFT HAND FORK OF BIG SANDY CRK.
OTHER SERVICES:

FILE COPY

SEC. TWP. RGE.

ELEVATIONS: KB 676.58' DF GL 664.58'

PERMANENT DATUM	GL ELEV. 664.58'		
LOG MEASURED FROM	KB		
DRILLING MEASURED FROM	KB		
DATE	12-3-72		
RUN NO.	ONE	TWO	THREE
TYPE LOG	GR-D-MECH.	CALIPER	DIFF. TEMP.
DEPTH-DRILLER	5130'		
DEPTH-LOGGER	5129.5'		
BTM. LOGGED INTERVAL	5128'	5129'	5129'
TOP LOGGED INTERVAL	50'	1800'	1900'
TYPE FLUID IN HOLE	DRY		
SALINITY, PPM CL.			
DENSITY LB./GAL.			
LEVEL			
MAX. REC. TEMP. DEG. F.	90°		
OPR. RIG TIME	5-1/2 HRS.		
RECORDED BY	HARLESS		
WITNESSED BY	MR. FRIEND		

BORE HOLE RECORD				CASING RECORD			
RUN NO.	BIT	FROM	TO	SIZE	WGT.	FROM	TO
				20"		0	34'
				13-3/8"		0	124'
	8-3/4"	1902	5130'	9-5/8"		0	1902'

FOLD HERE

THIS HEADING AND LOG CONFORMS TO API RECOMMENDED STANDARD PRACTICE RP33 (?)

EQUIPMENT DATA

	GR	CALIPER	DIFF TEMP
RUN NO.	ONE	TWO	THREE
TOOL MODEL NO.	GD-3.5-C		DT-1.375-G
DIAM.	3.5"	1.75"	1.375"
DETECT. MODEL NO.	113		
TYPE	SCINT		
LENGTH	3"	5'	4'

	DENSITY
RUN NO.	ONE
LOG TYPE	DENSITY
TOOL MODEL NO.	GD-3.5-C
DIAM.	3.5"
DETECT. MODEL NO.	431
TYPE	SCINT
LENGTH	1"
SOURCE MODEL NO.	CS-137
SERIAL NO.	008
SPACING	10"
TYPE	GR
STRENGTH	

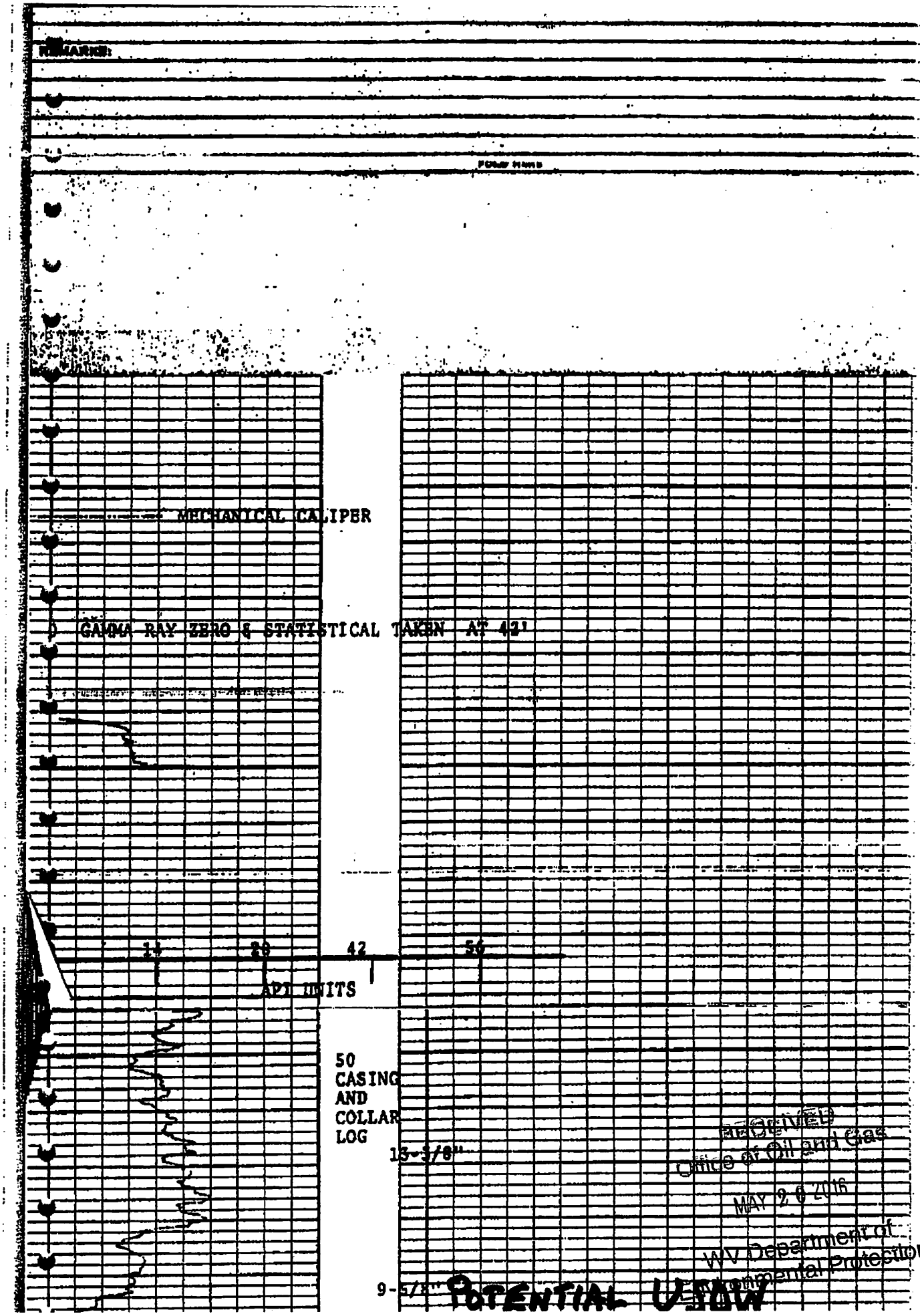
GENERAL

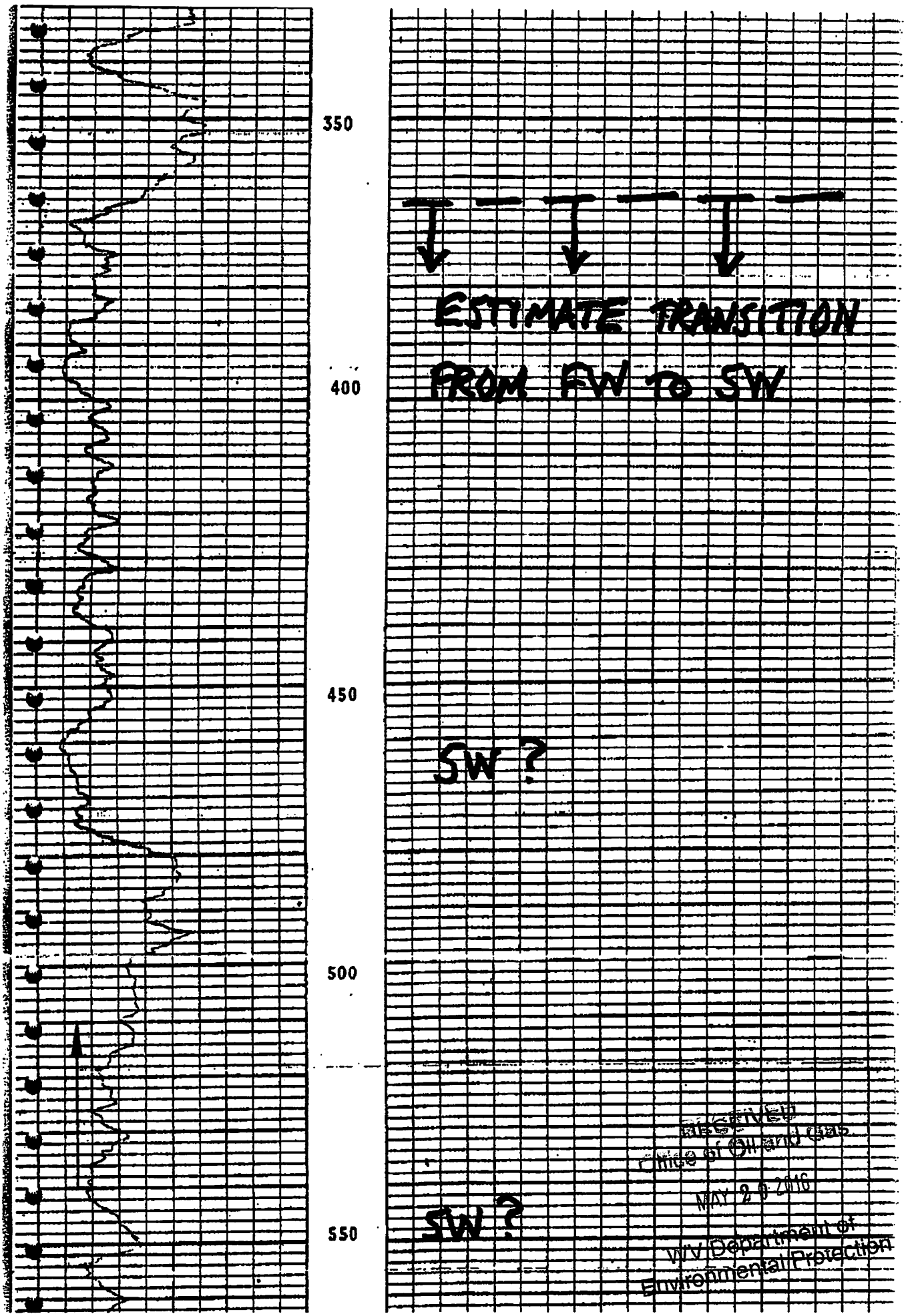
HOIST TRUCK NO.	1930		
INST. TRUCK NO.	1930		
TOOL SERIAL NO.			
LOG TICKET NO.	21169		

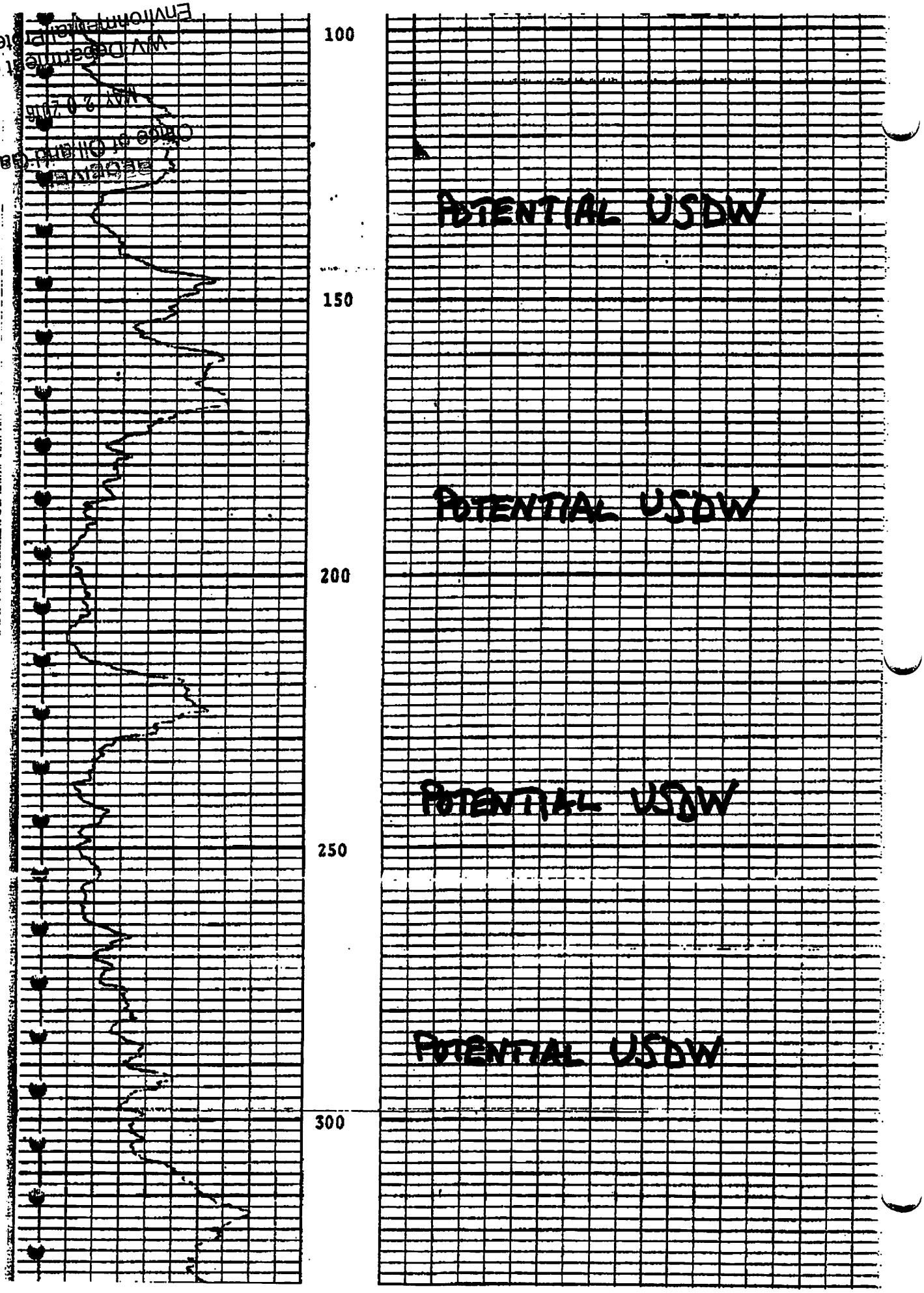
LOGGING DATA

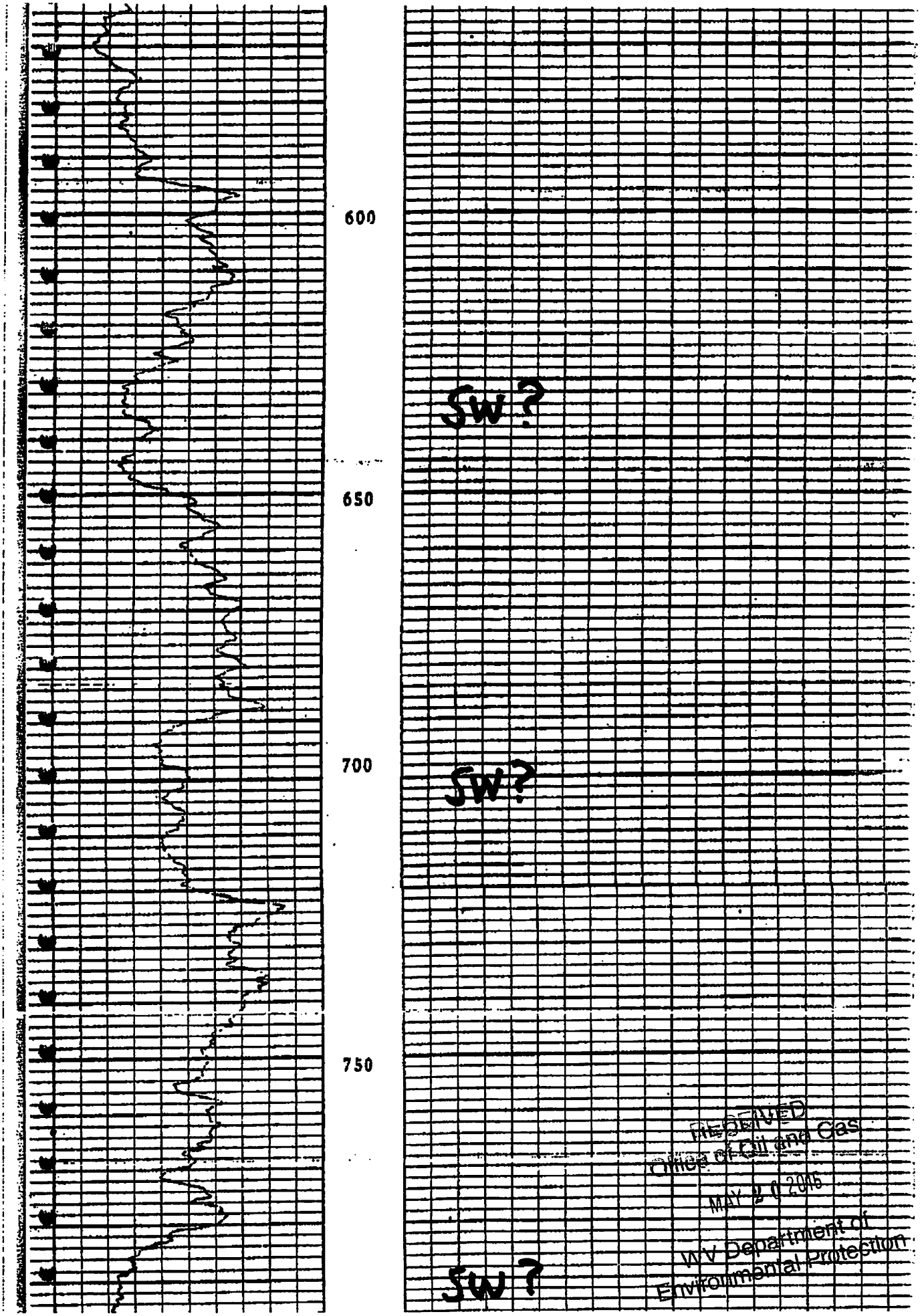
GENERAL				GAMMA RAY				DENSITY		
RUN NO.	DEPTHS FROM	TO	SPEED FT./MIN.	T.C. SEC.	SENS. SETTINGS	ZERO DIV. L. or R.	API GR. UNITS PER LOG DIV.	T.C. SEC.	SENS. SETTINGS	ZERO DIV. L. or R.
1	5128	50	30	5	G-600 D-160 R-2A		3.5	3	G-600 D-100 R-7A	
2	5129	1800	50							
3	1900	5129	50							

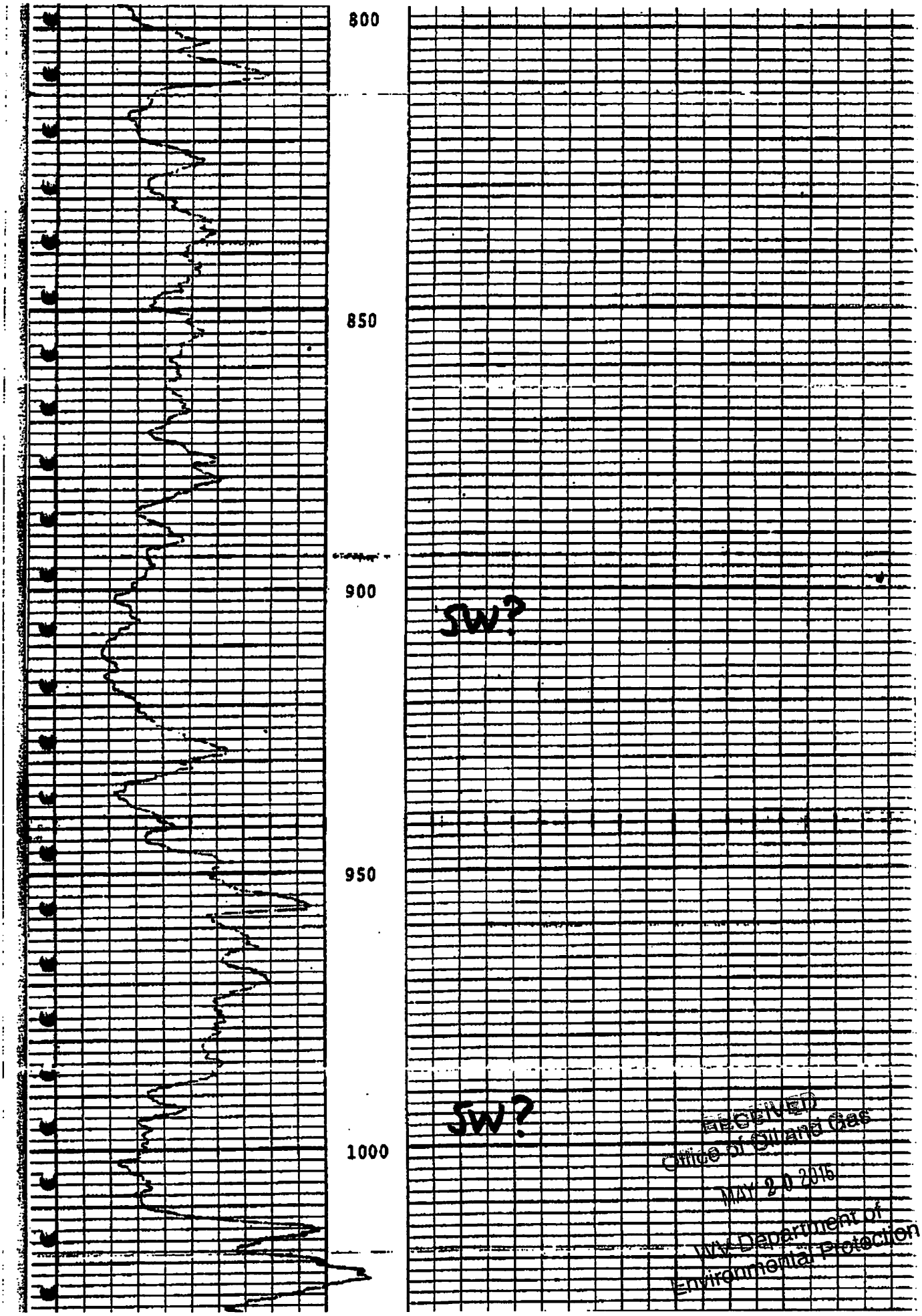
REFERENCE LITERATURE:

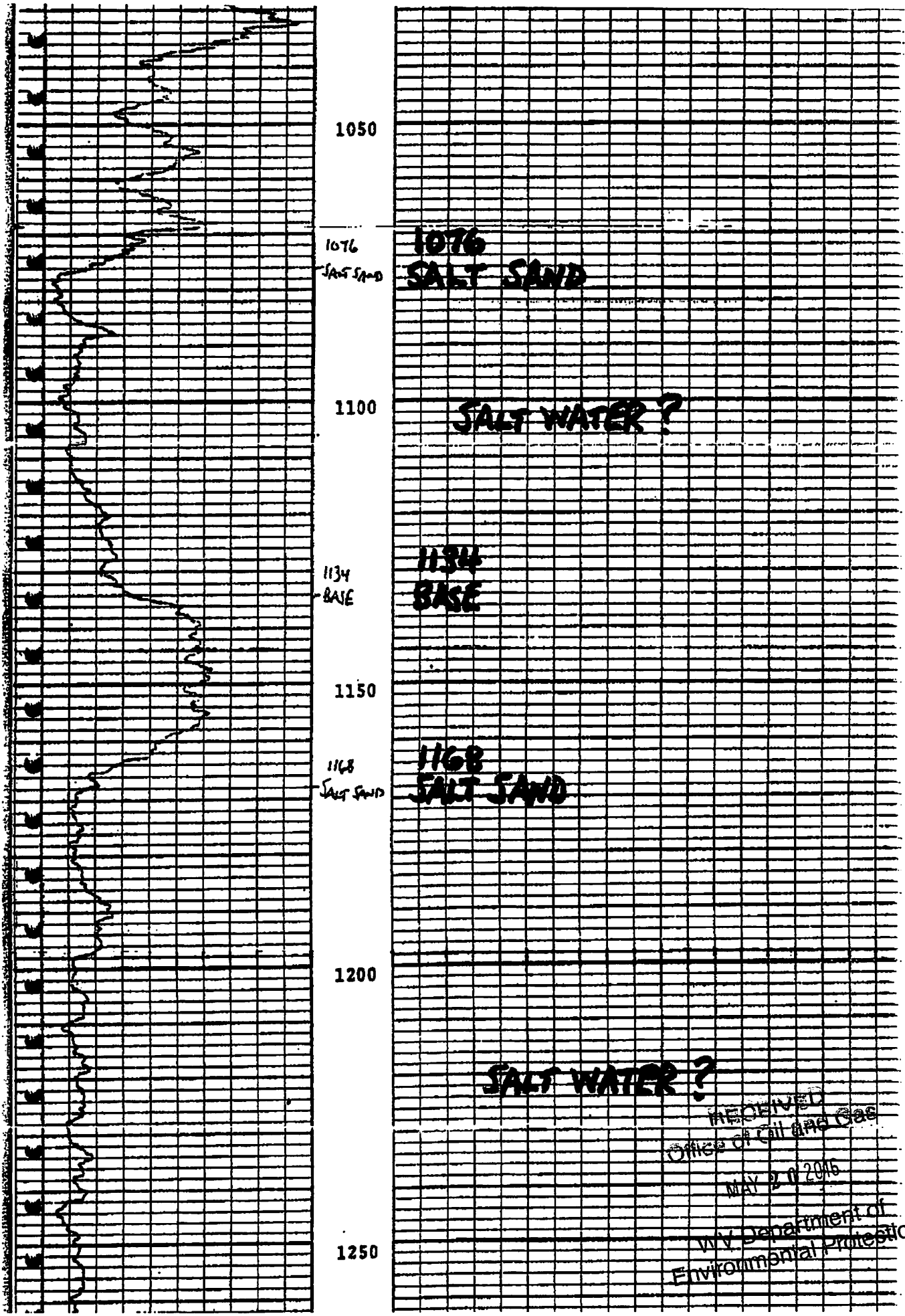


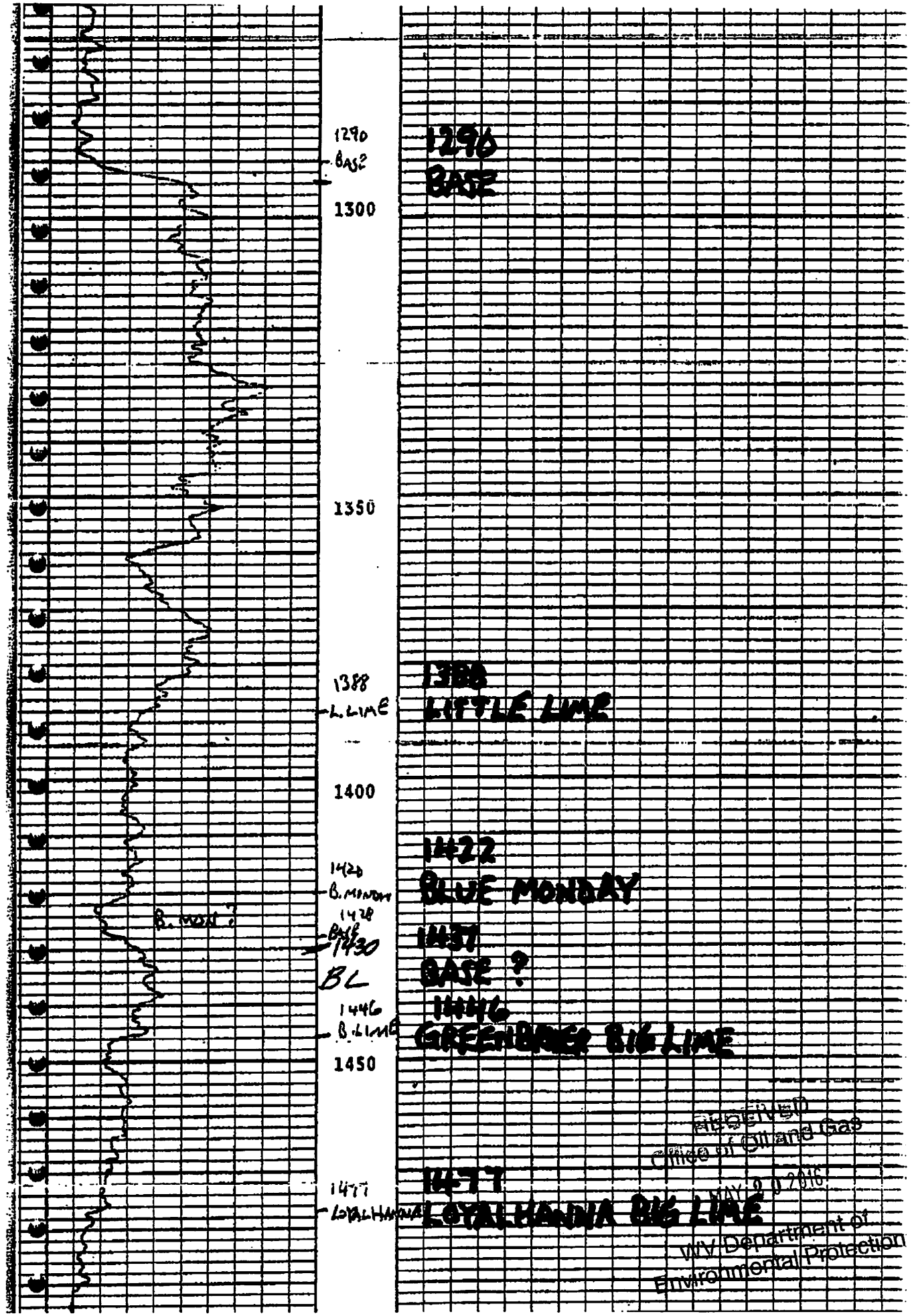


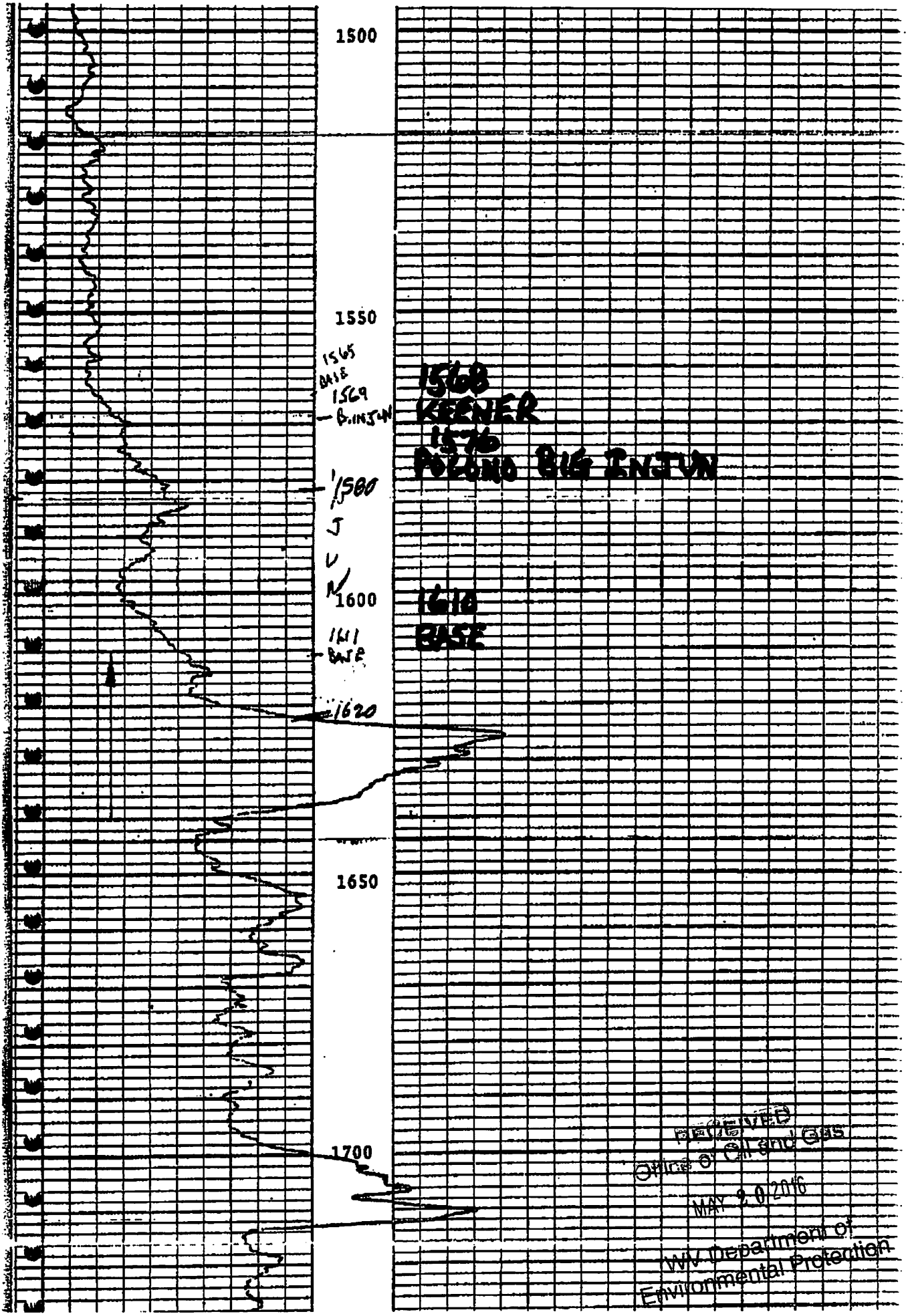

100
150
200
250
300
POTENTIAL USDW
POTENTIAL USDW
POTENTIAL USDW
POTENTIAL USDW

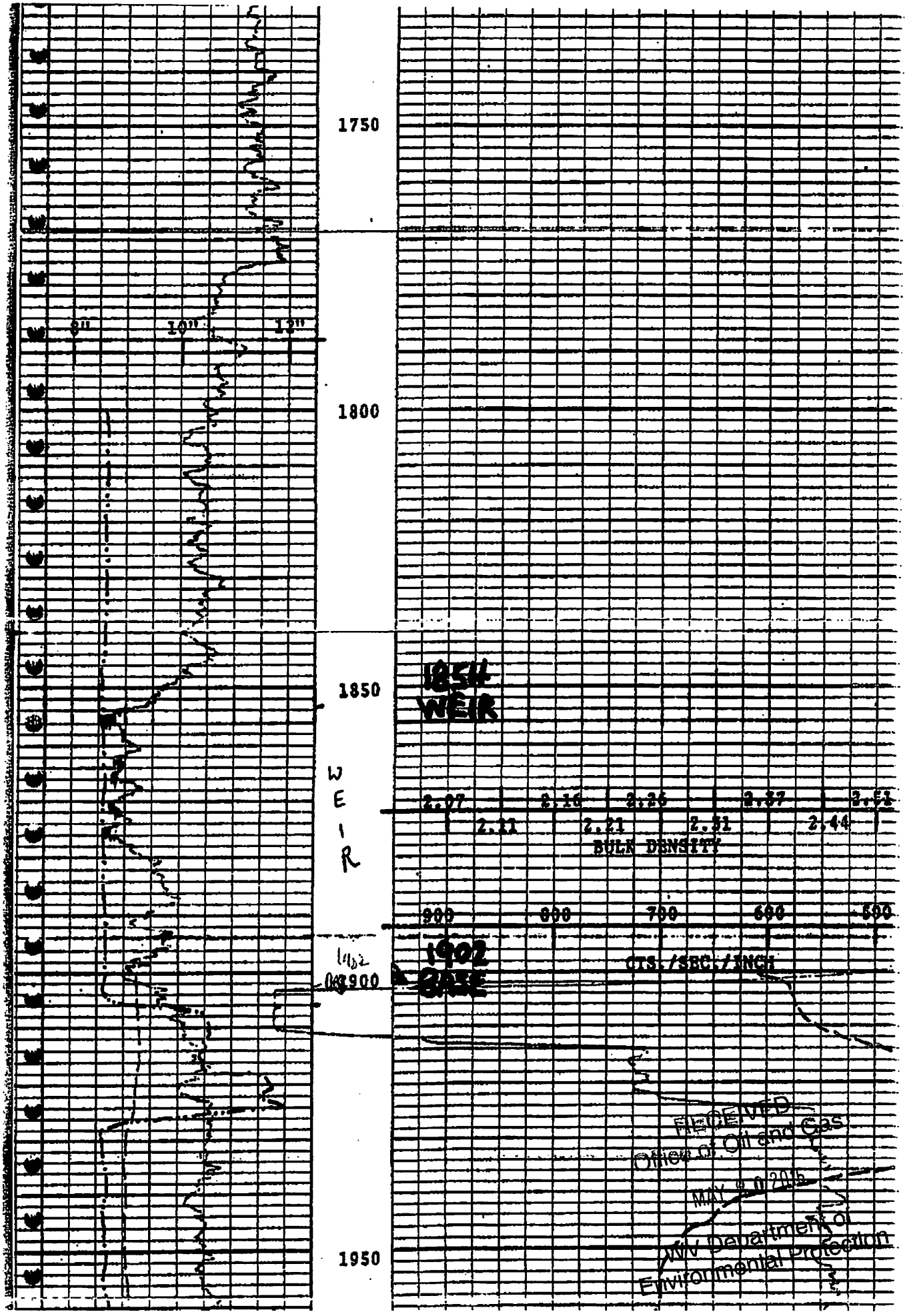


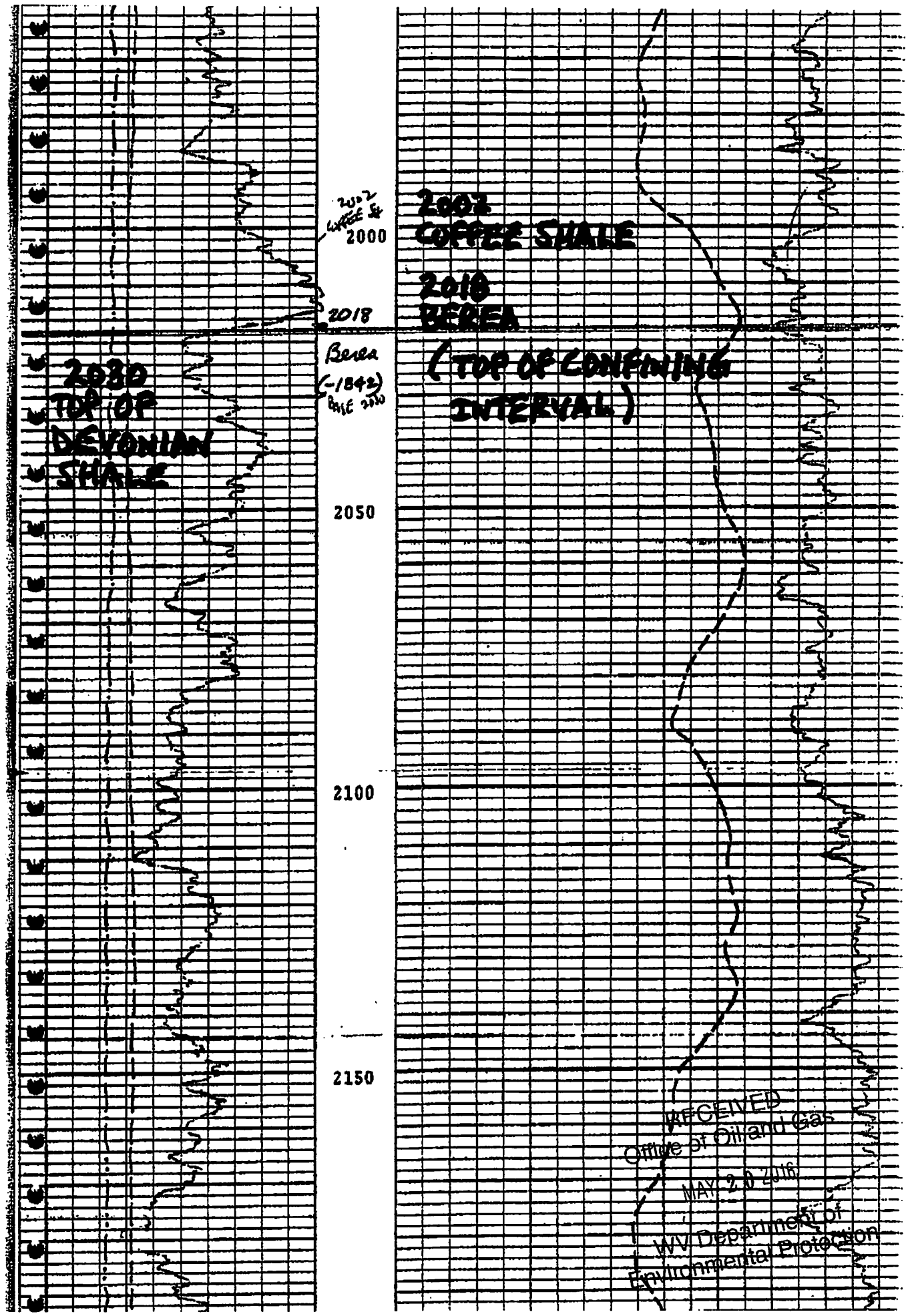


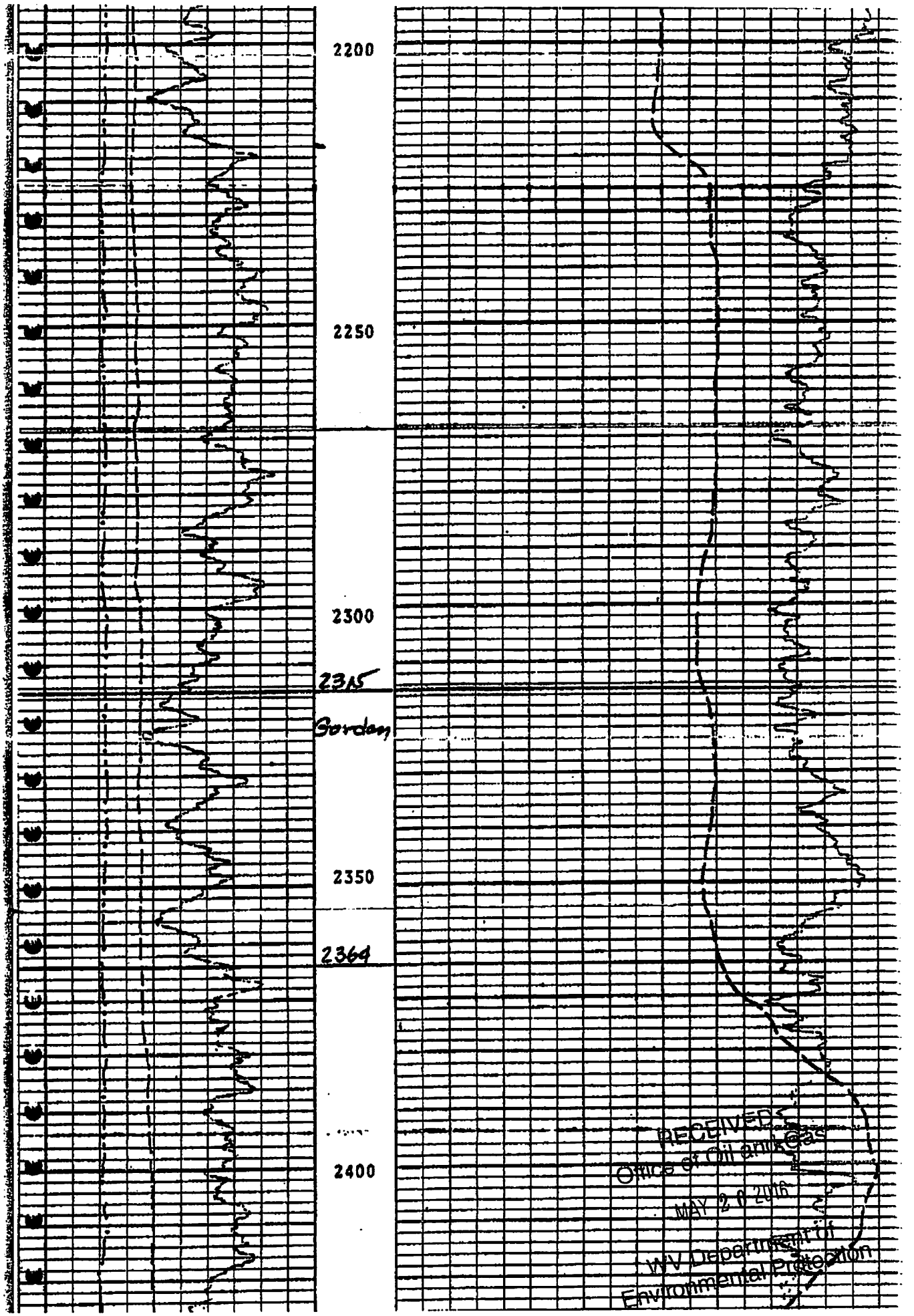


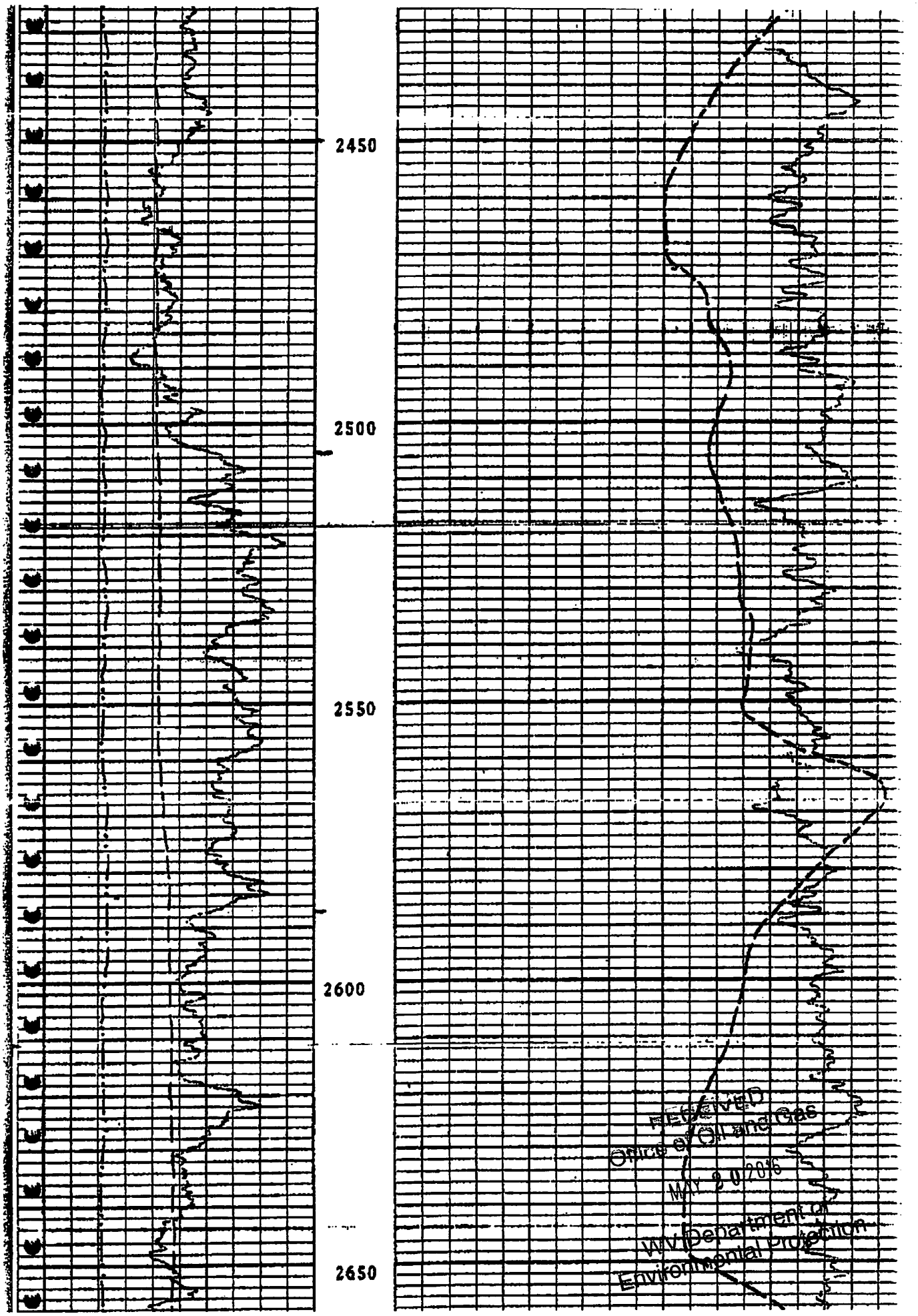


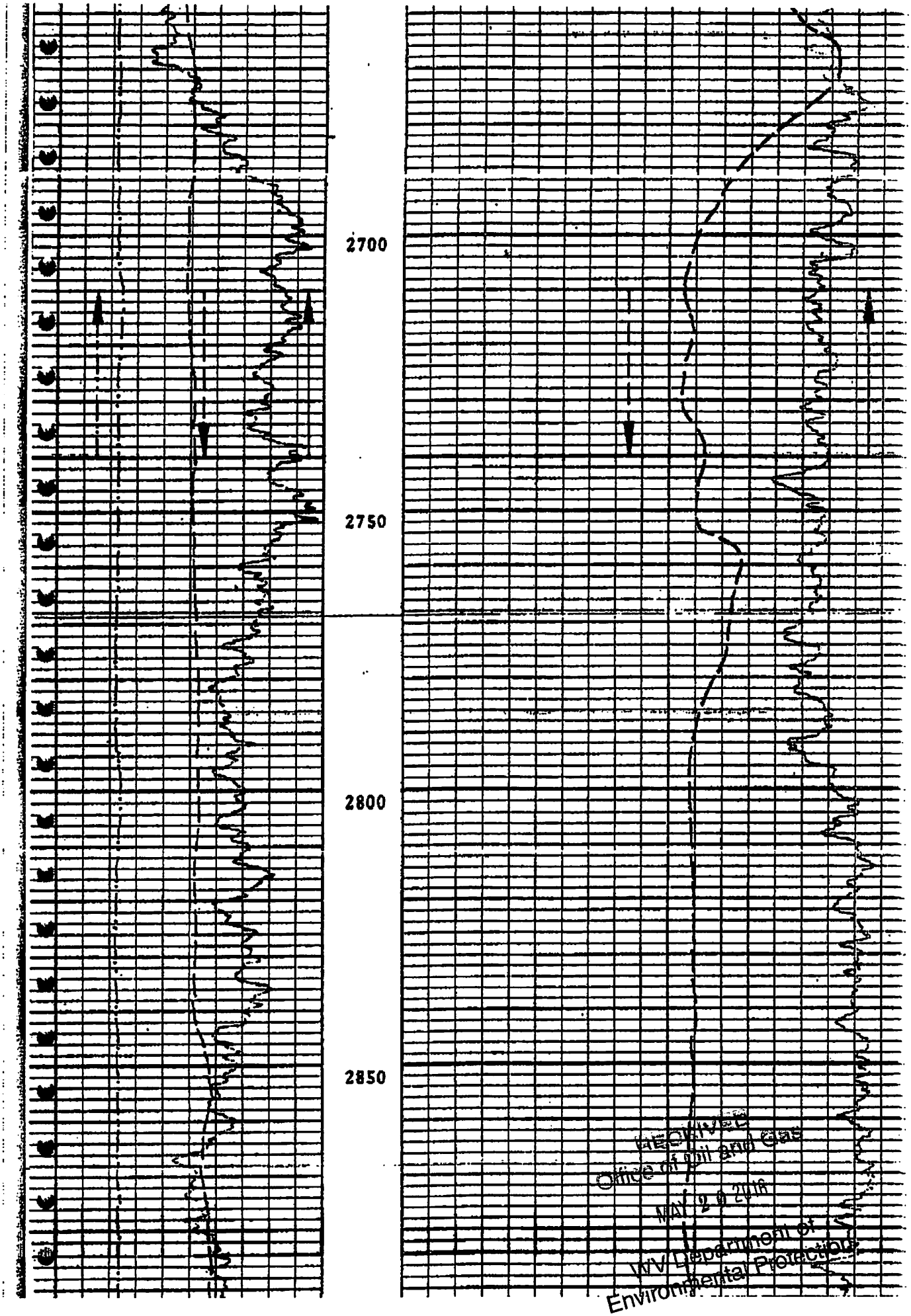


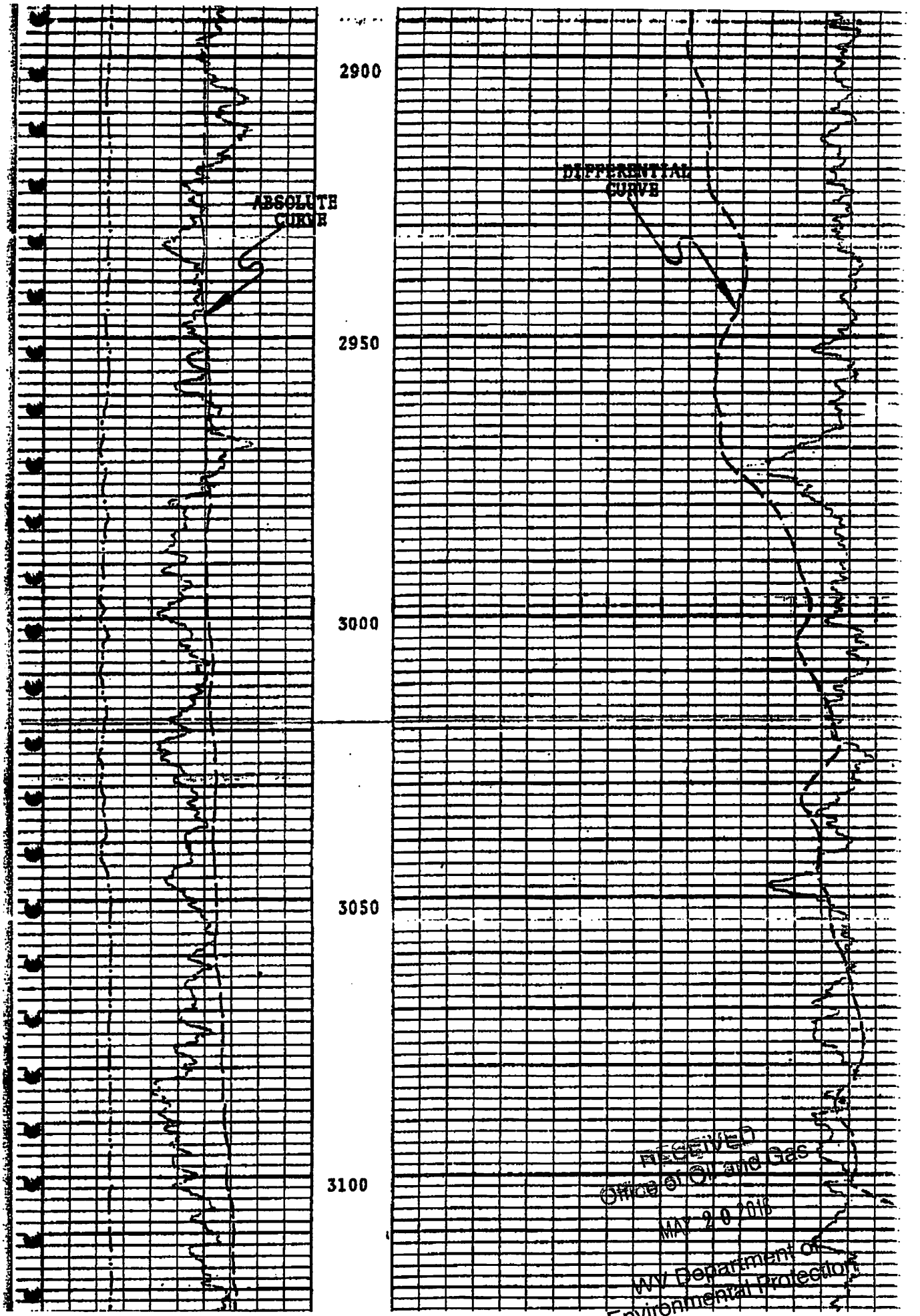

1750
1800
1850
1950
8"
10"
12"
WEIR
WEIR
2.07
2.11
2.16
2.21
2.26
2.31
2.37
2.44
3.53
BULK DENSITY
900
800
700
600
500
CTS./SEC./INCH
1852
1900
1902
RECEIVED
Office of Oil and Gas
MAY 10 2013
WV Department of
Environmental Protection

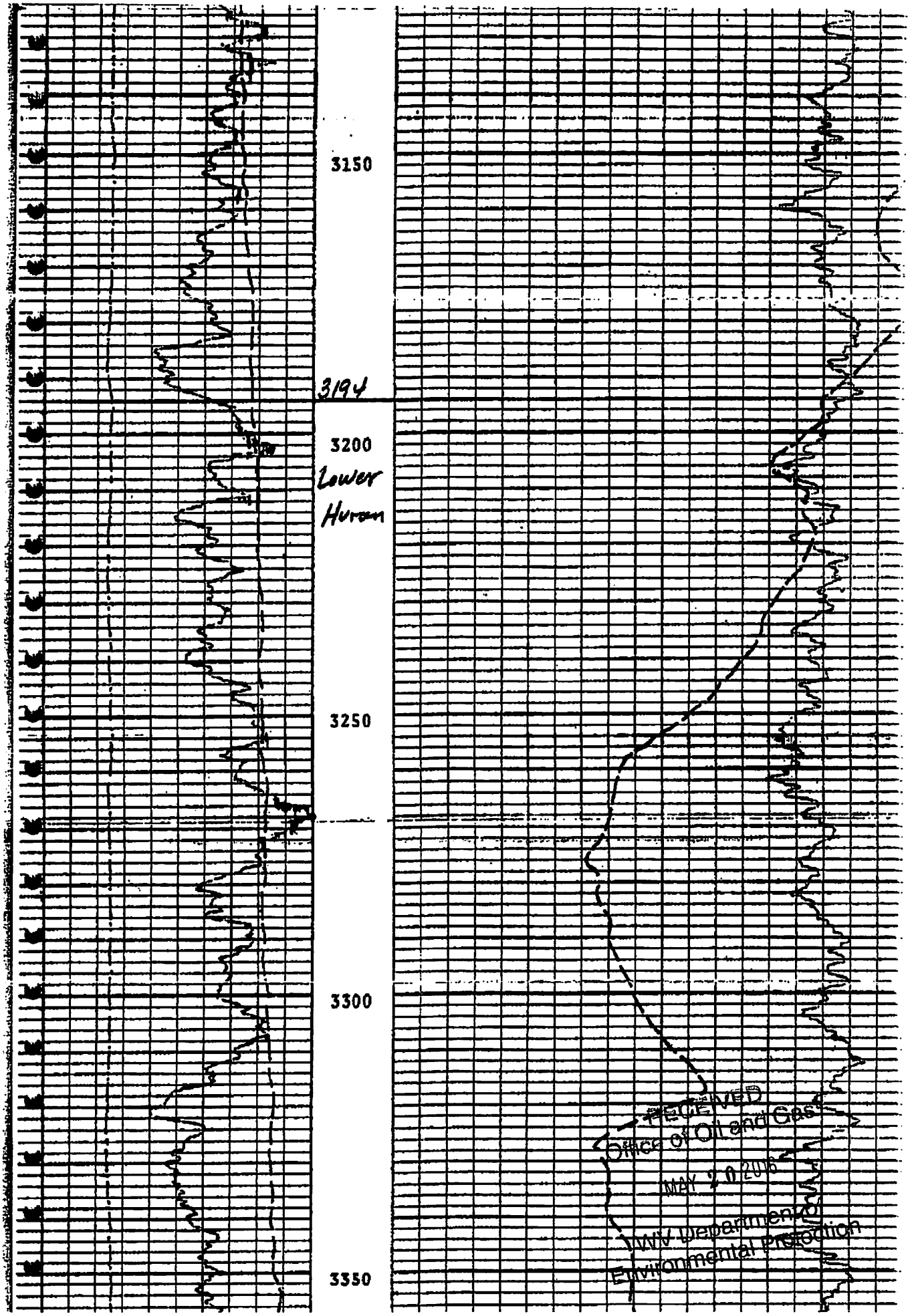


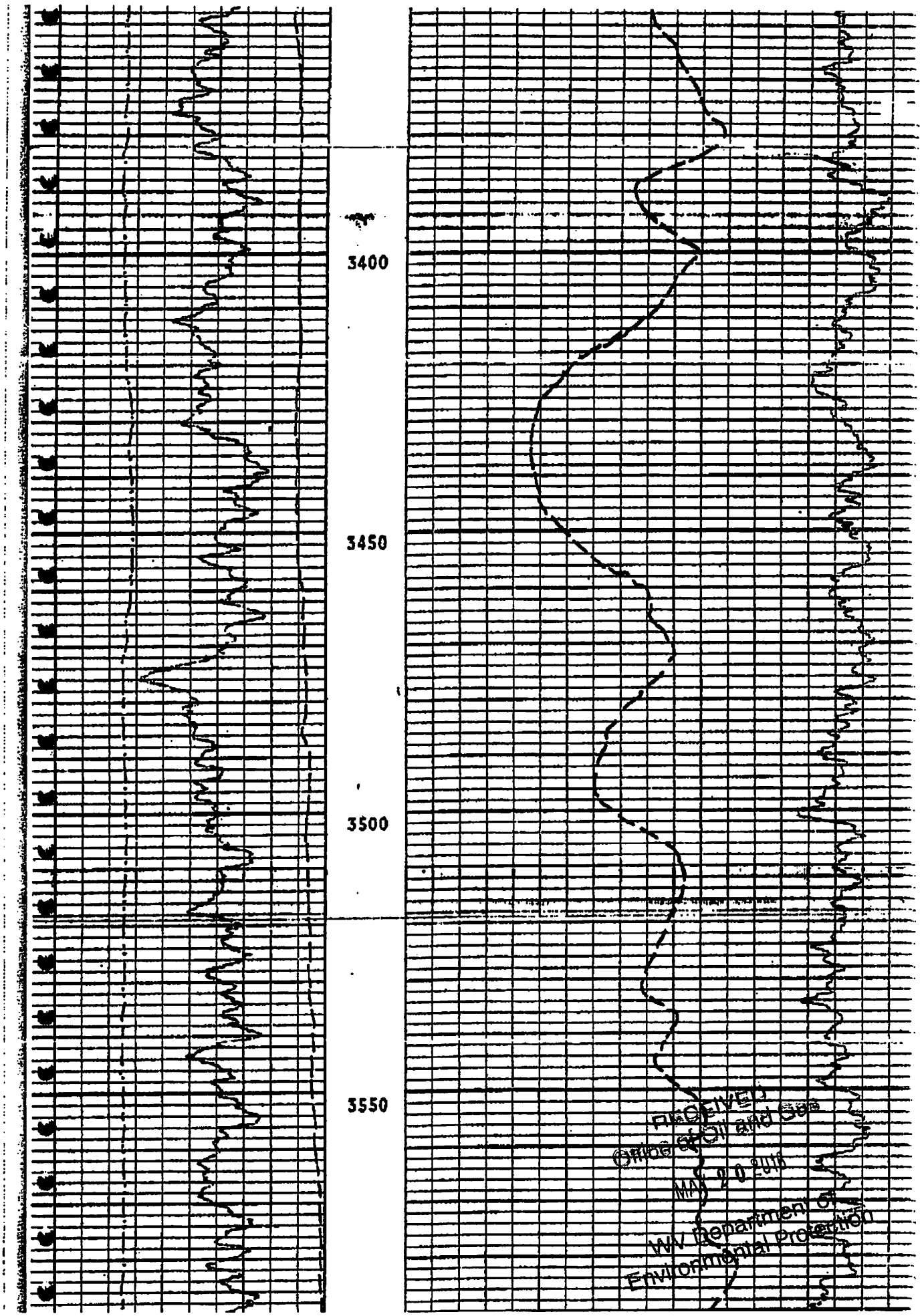








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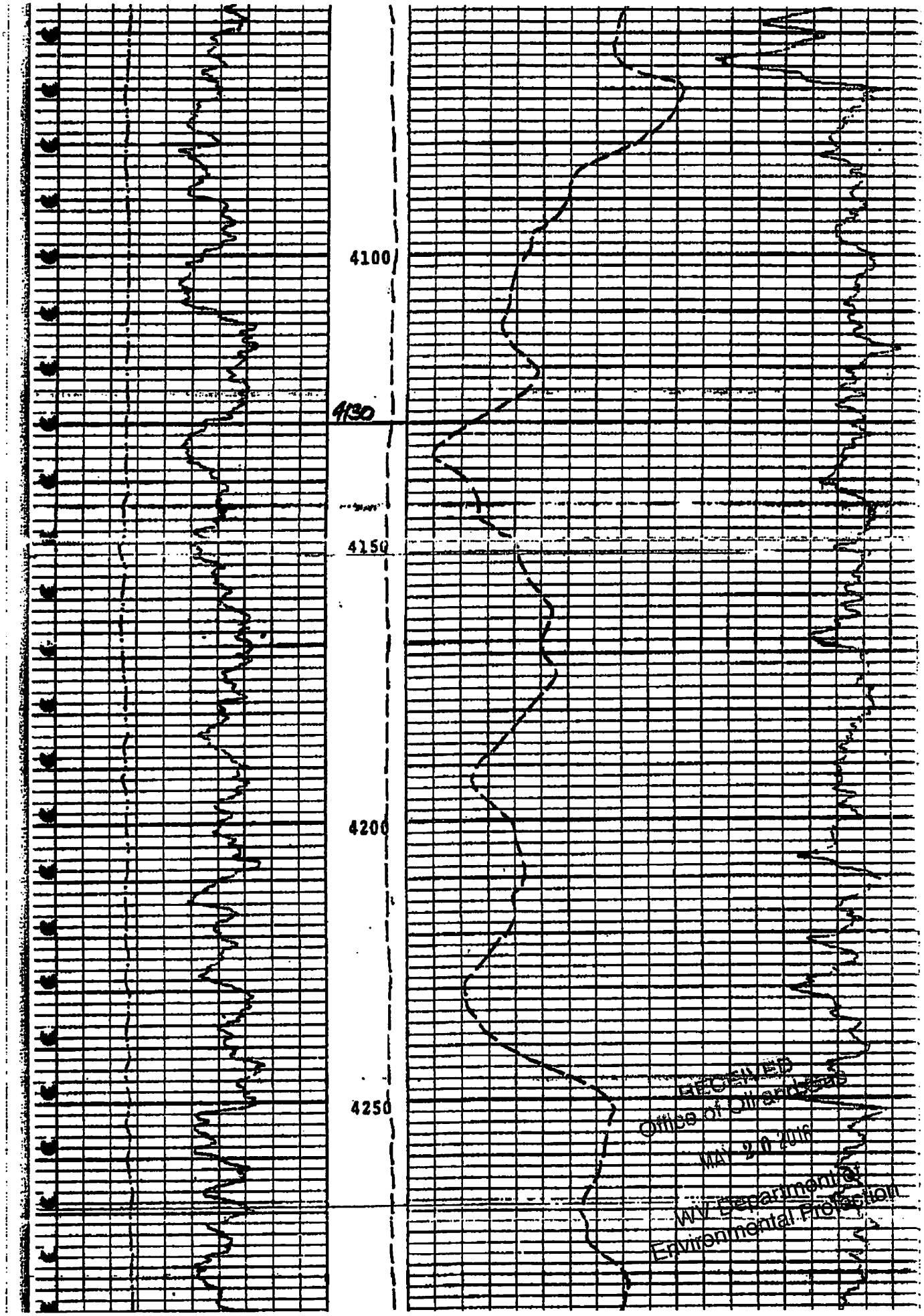
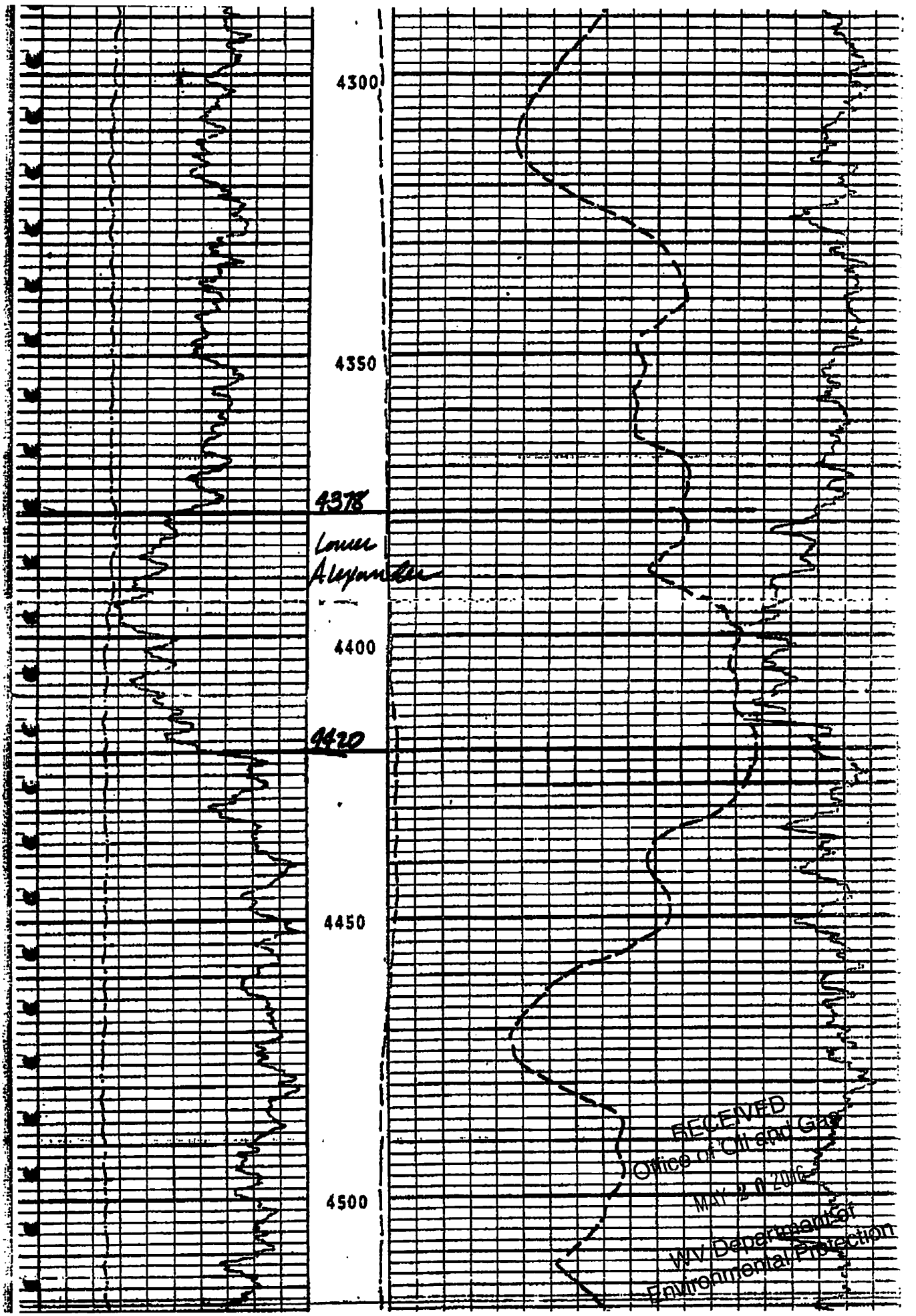
MAY 20 2016
WV Department of
Environmental Protection

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4350
4378
Lower Alexander
4400
4420
4450
4500
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MAY 2 1 2018
WV Department of
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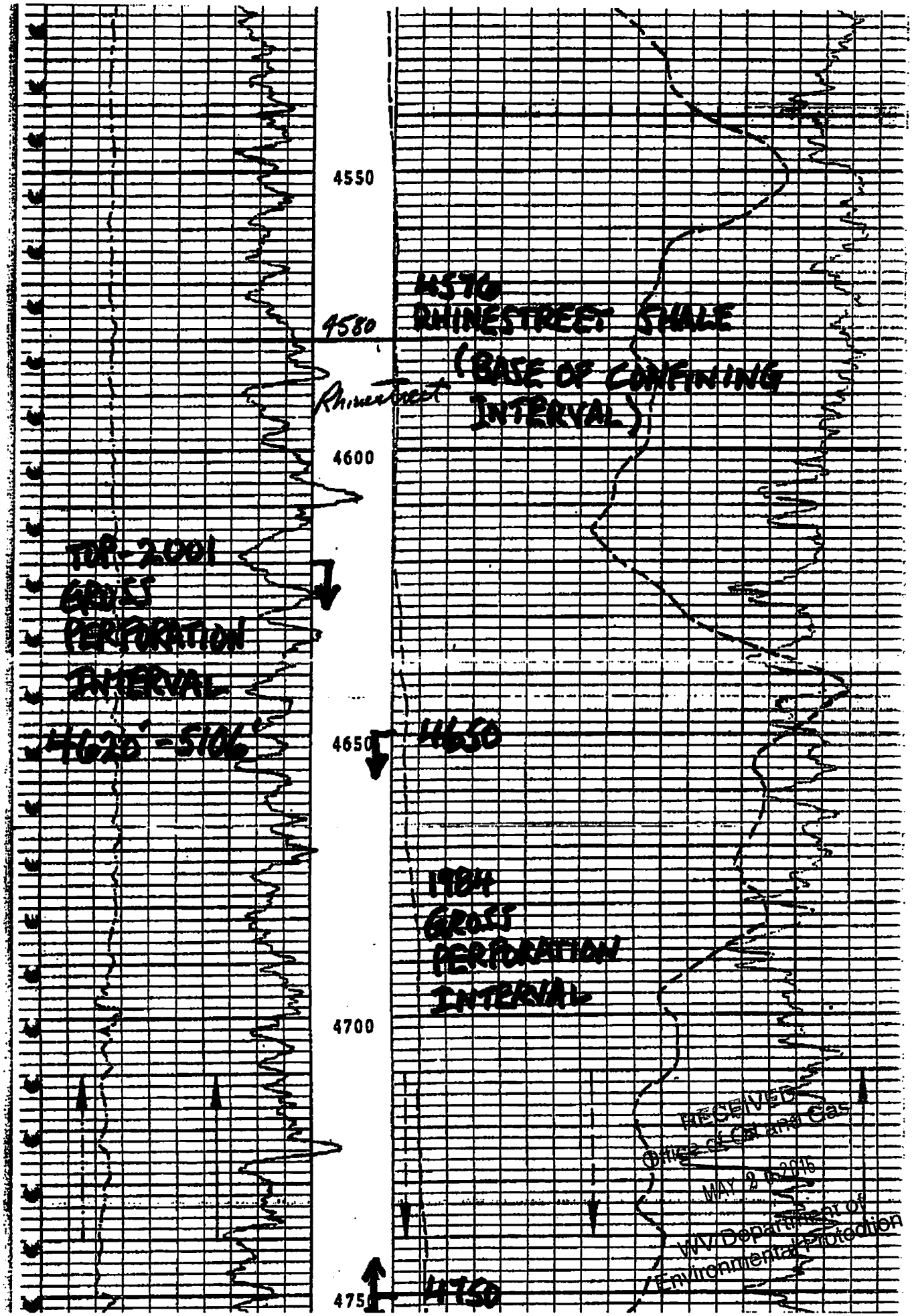
4550
4580
4576
RHINESTREET SHALE
(BASE OF CONFINING
INTERVAL)
Rhinestreet
4600
TOP-2001
GROSS
PERFORATION
INTERVAL
4620'-5106'
4650
4650
1984
GROSS
PERFORATION
INTERVAL
4700
4750
4750
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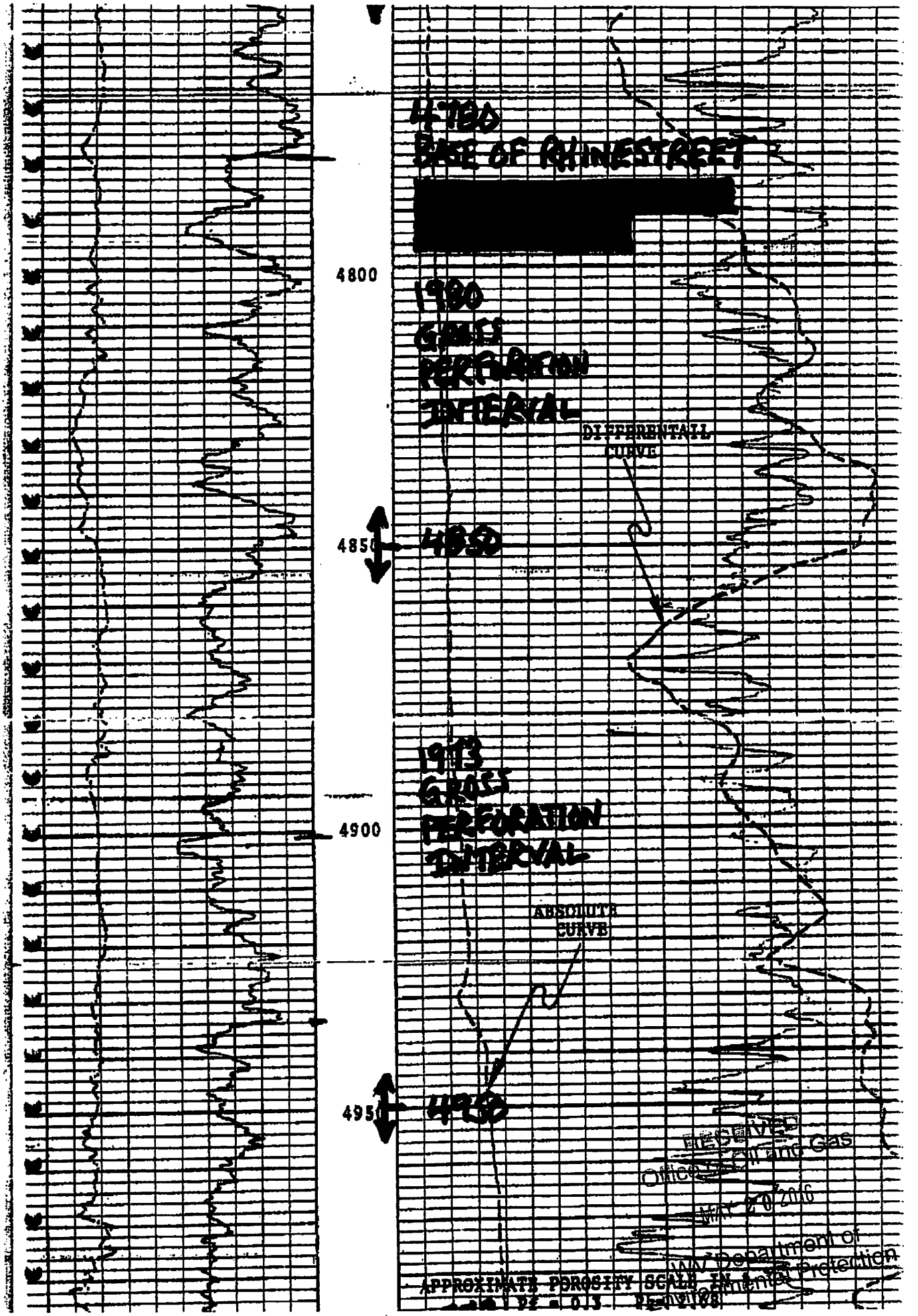
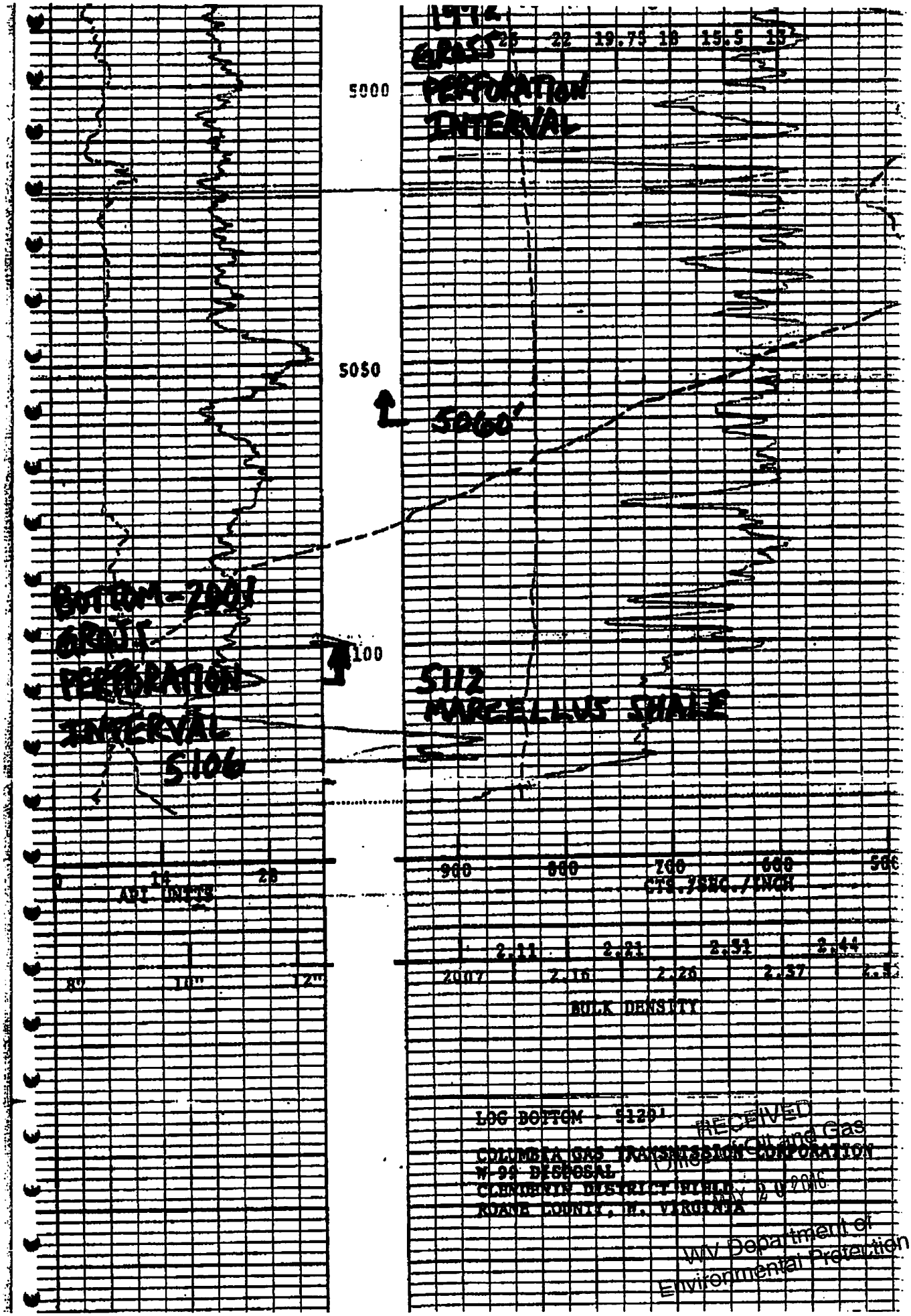
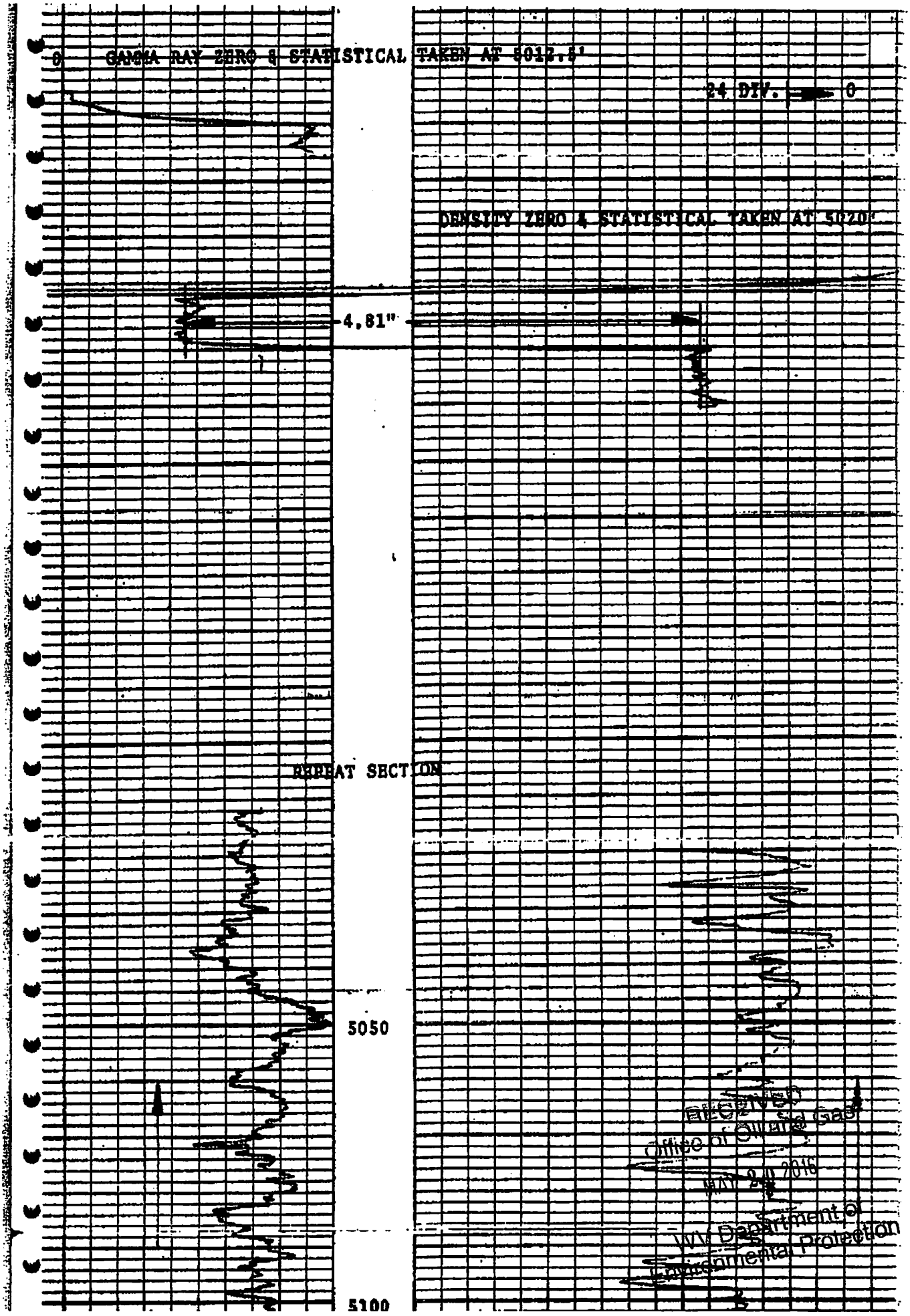
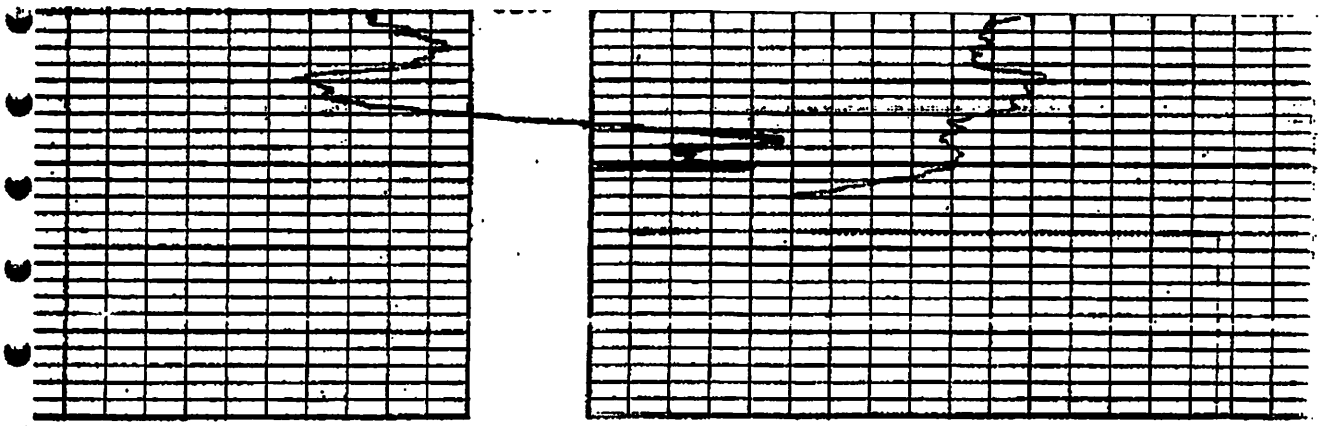
MAY 0 6 2016
WV Department of
Environmental Protection









Printed with PreView™

Weatherford

RoaneW-99_GR-D-MECH-CAL-DT_12031972

McCullough

SONIC SEISMOGRAM LOG

NO. 57575

FILE COPY

COMPANY COLUMBIA GAS TRANSMISSION CORPORATION

WELL W-99 DISPOSAL

FIELD Valley DISTRICT

COUNTY ROANE - 1977 STATE W. VIRGINIA

LOCATION: M.S. 76-73

LEFT LAND FORK OF BIG SANDY CREEK

SEC. TWP. RGE.

OTHER SERVICES:

ELEVATIONS: KB 676.58' DF. GL 664.58'

GL ELEV. 664.58'

KB

D FROM

	12-13-72
	ONE
	BOND CEMENT
	5130'
	5171'
INTERVAL	5068'
RVAL	1900'
LE	WATER
CL	
AL	
	FULL
DEG. F.	
	2-1/2 HRS.
	MILKY
	MR. FRIED

THIS HEARING AND LOG CONFORMS TO API RECOMMENDED STANDARD PRACTICE RP-43 (5)

POLE RISE

LOGGING AND EQUIPMENT DATA (BOND CEMENT LOG)

TOOL MODEL NO.		SQUEEZE NO. 2	SQUEEZE NO. 3
DIAMETER	1.75"		
LENGTH	15'		
CEMENTING DATA			
	1	2	
DATE RECORDED	12-13-72		
TIME STARTED			
TIME FINISHED			
LOGGED INTERVAL	5068' - 1900'		
LOGGED CEMENT TOP			
DATE AND HOUR SET	12-4-72		
SETTING TIME (HRS)			
TYPE CEMENT			
SACKS USED			
PREceding FLUID			
% ADDITIVE			
% RETARDER			
SLURRY WT.			
BREAKDOWN PRESS.			
SURFACE MAX. PRESS.			

ORE HOLE RECORD

FROM	TO
1902	5130

CASING RECORD

SIZE	WT.	FROM	TO
20"		0	34
13-3/8"		0	124
9-5/8"		0	1902
7"		0	5130

GAMMA RAY				NEUTRON			
RUN NO.				LOG TYPE			
TOOL MODEL NO.				TOOL MODEL NO.			
DIAM.				DIAM.			
DETECT. MODEL NO.				DETECT. MODEL NO.			
TYPE				TYPE			
LENGTH				LENGTH			
DIST. TO N. SOURCE				SOURCE MODEL NO.			
				SERIAL NO.			
				SPACING			
				TYPE			
				STRENGTH			

GENERAL			
HOIST TRUCK NO.	1842		
INST. TRUCK NO.	1842		
TOOL SERIAL NO.			
LOG TICKET NO.			

LOGGING DATA

GENER.		NEUTRON		
RUN NO.	DEPTH FROM	GENL. SECONDS	ZERO DIV.	API N. UNIT PER

1/16/02

KLH,

Larry Friend is the expert on W-99. Perf 100 ft of shale, dispose + when full, perf the next upper 100 ft.

EMR

REMARKS:

FORMATION BOND CURVE

AMPLITUDE INCREASE

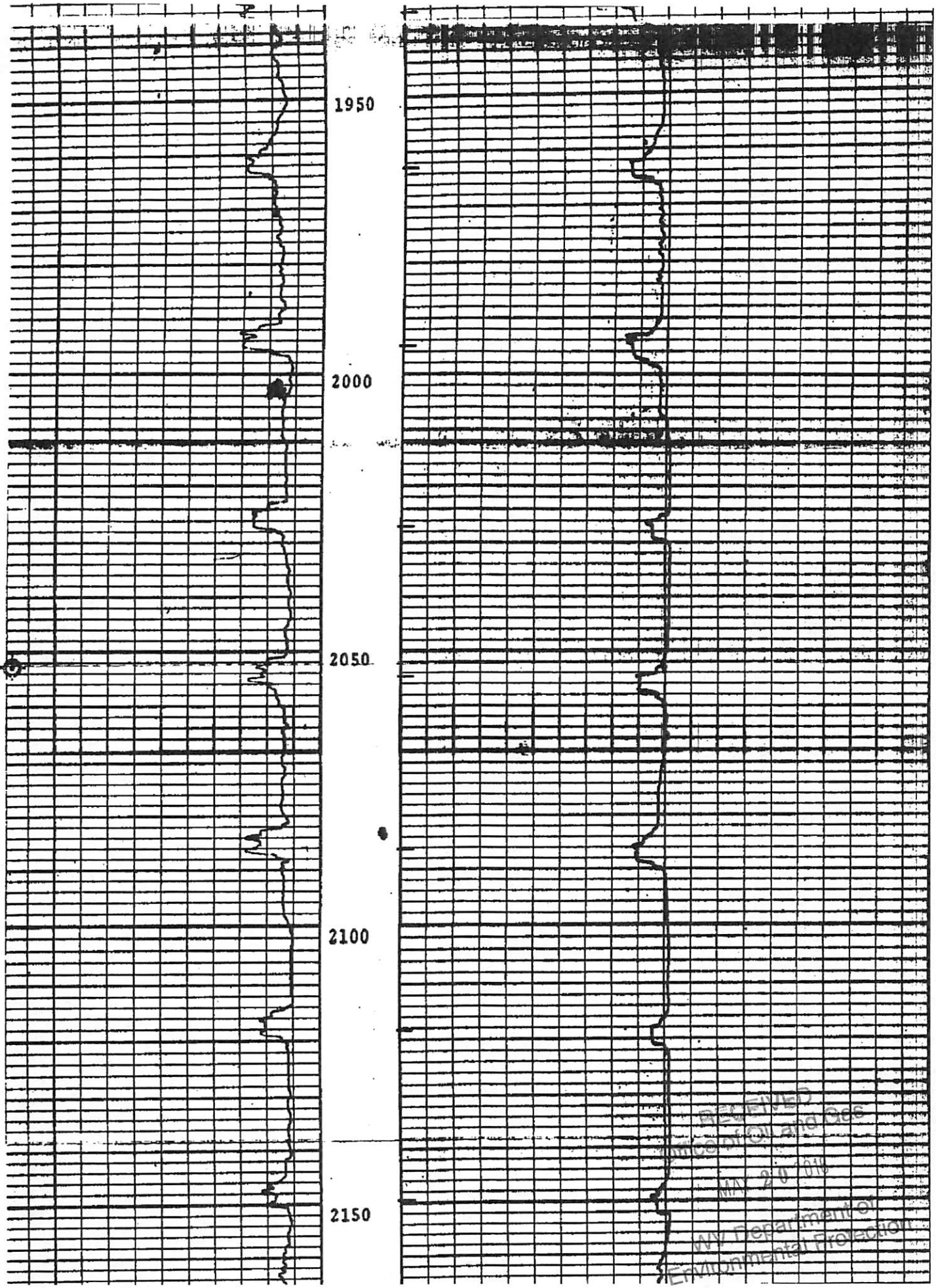
BOND CEMENT CURVE

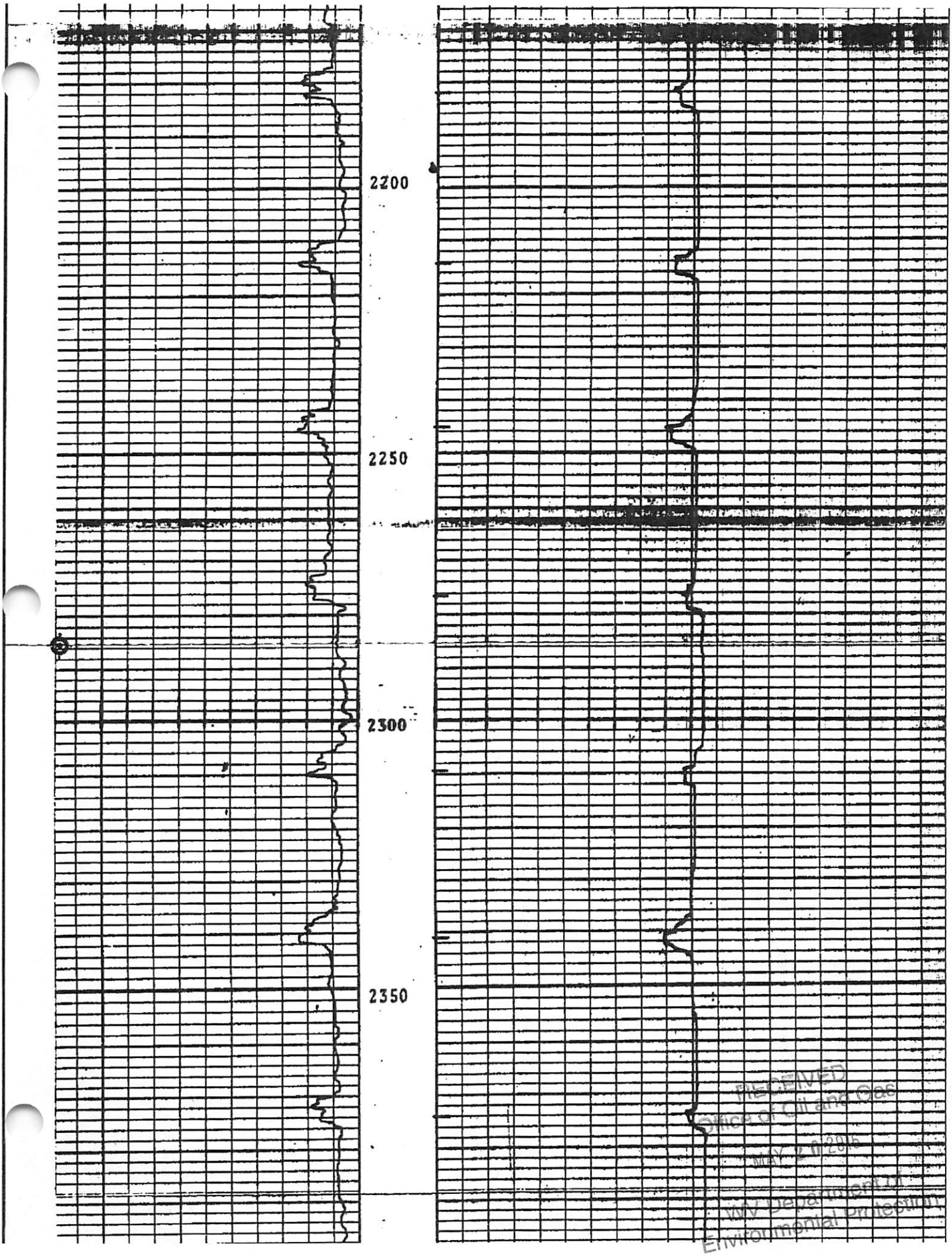
100 50 0 BOND

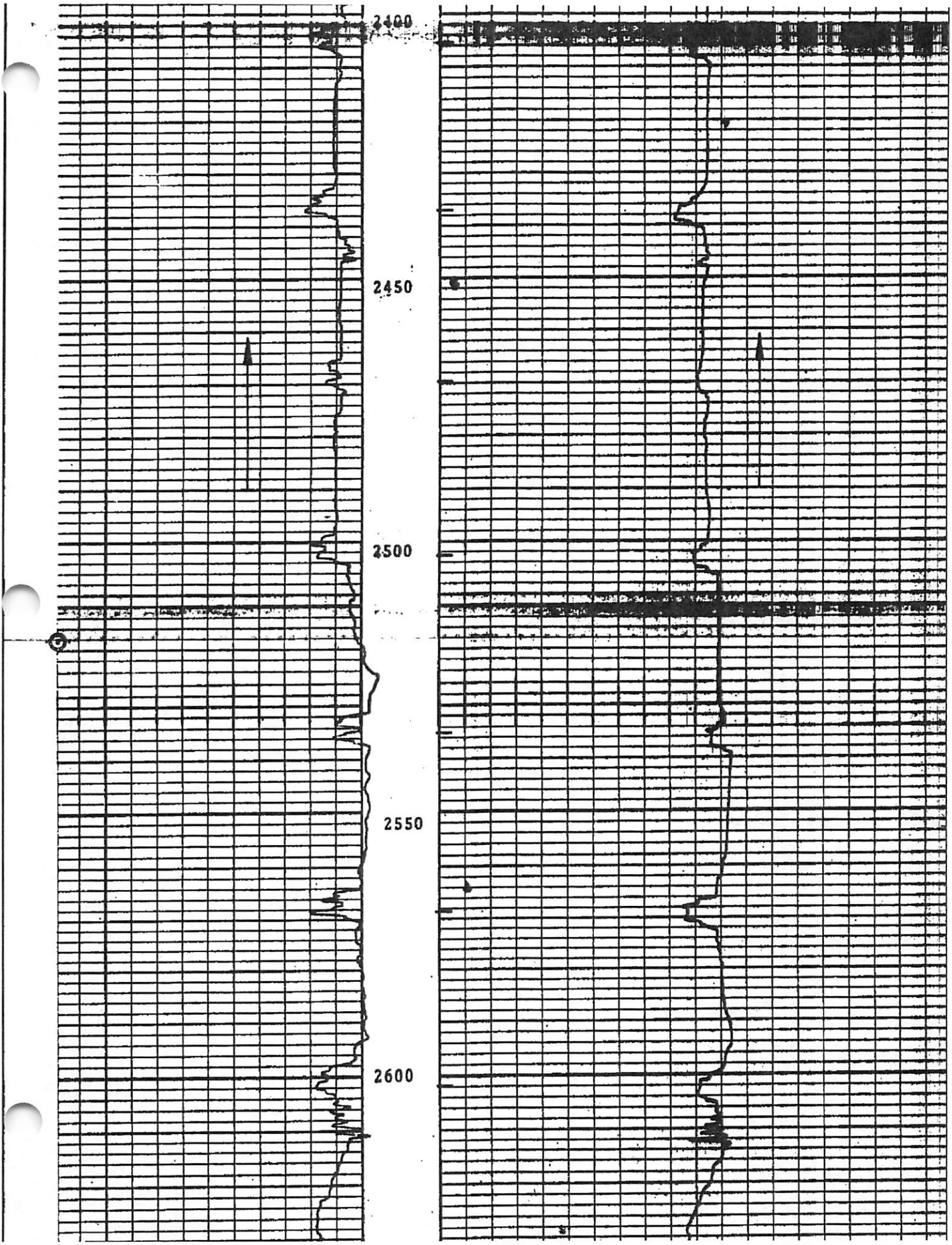
1900

CASING AND COLLAR LOG

7"



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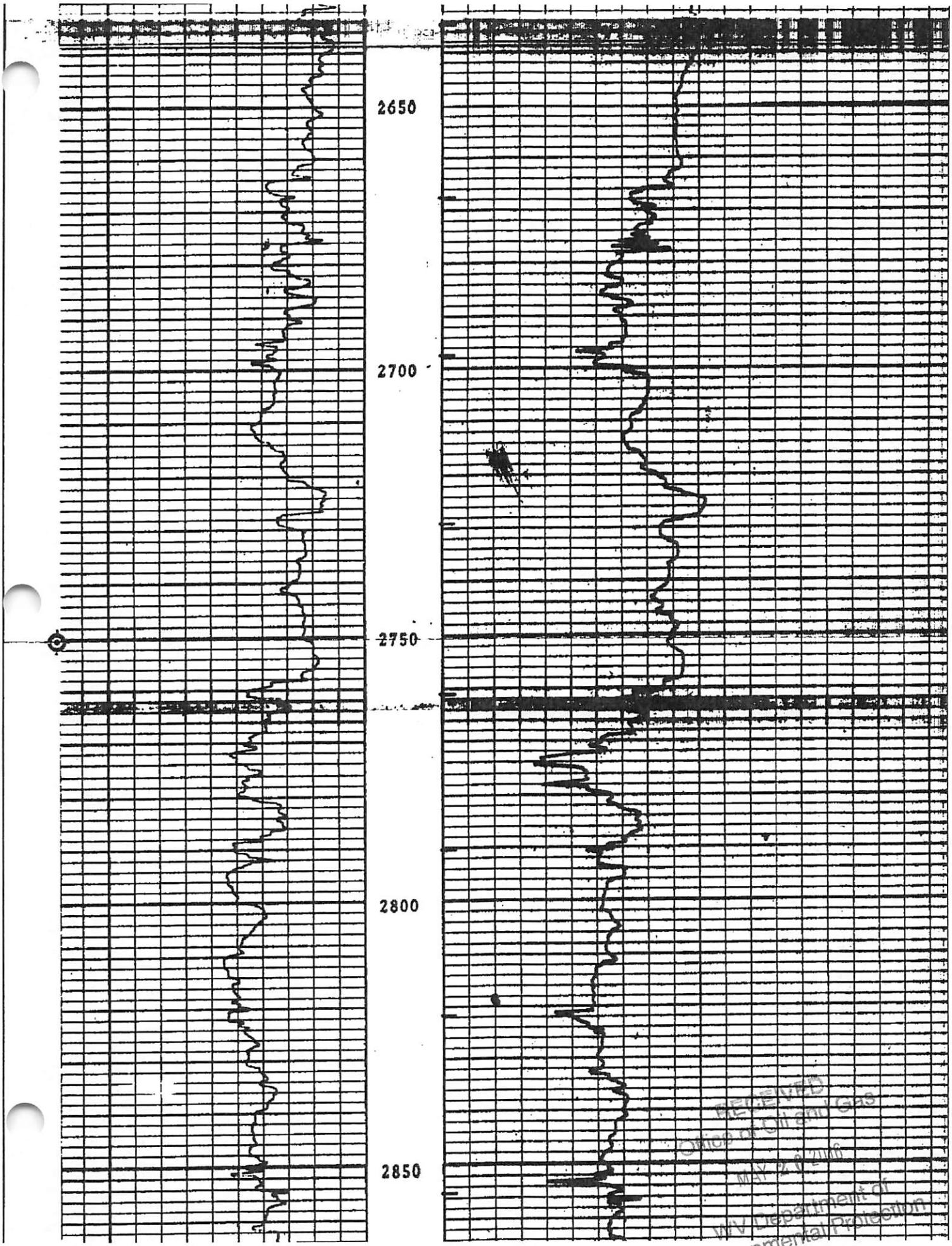
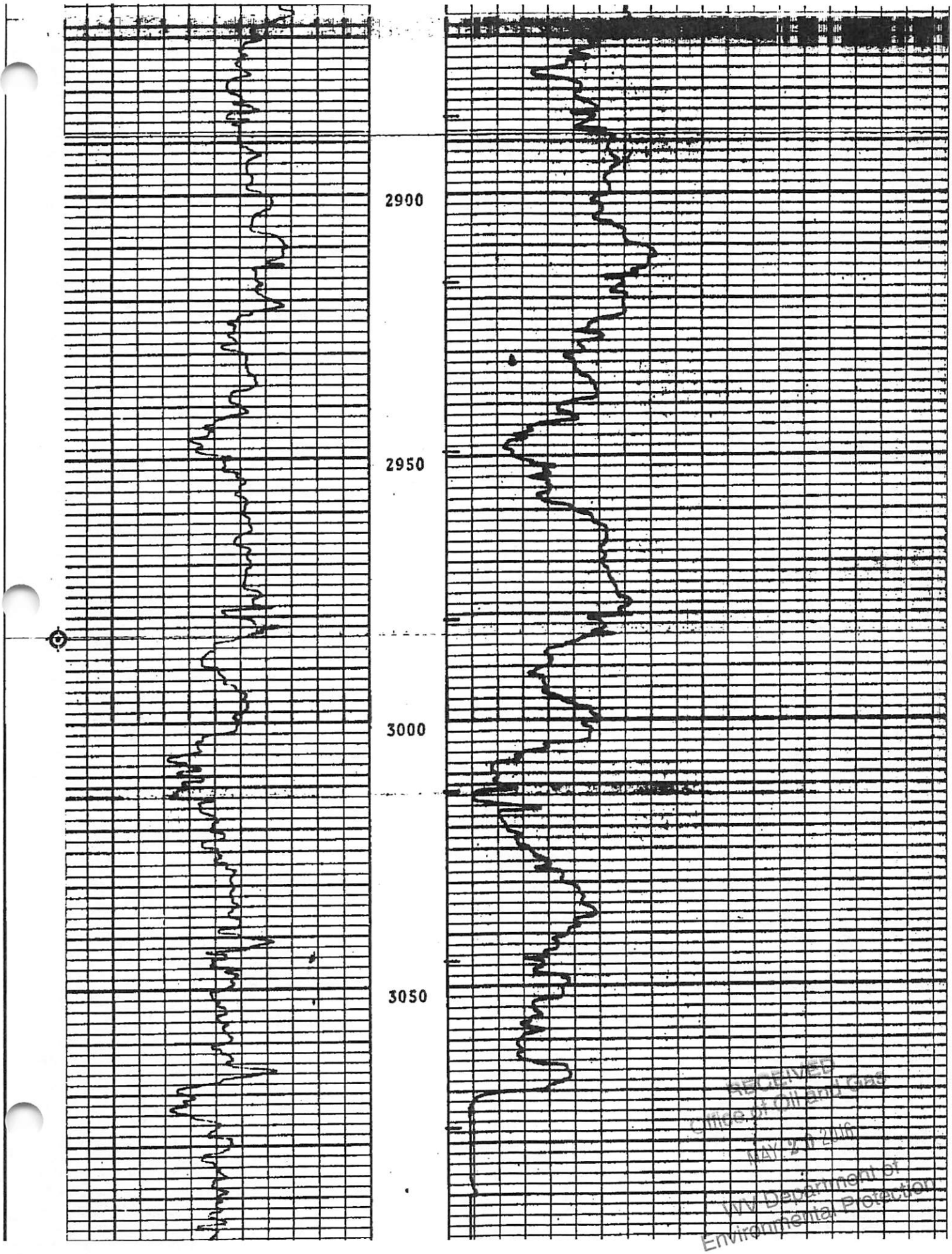
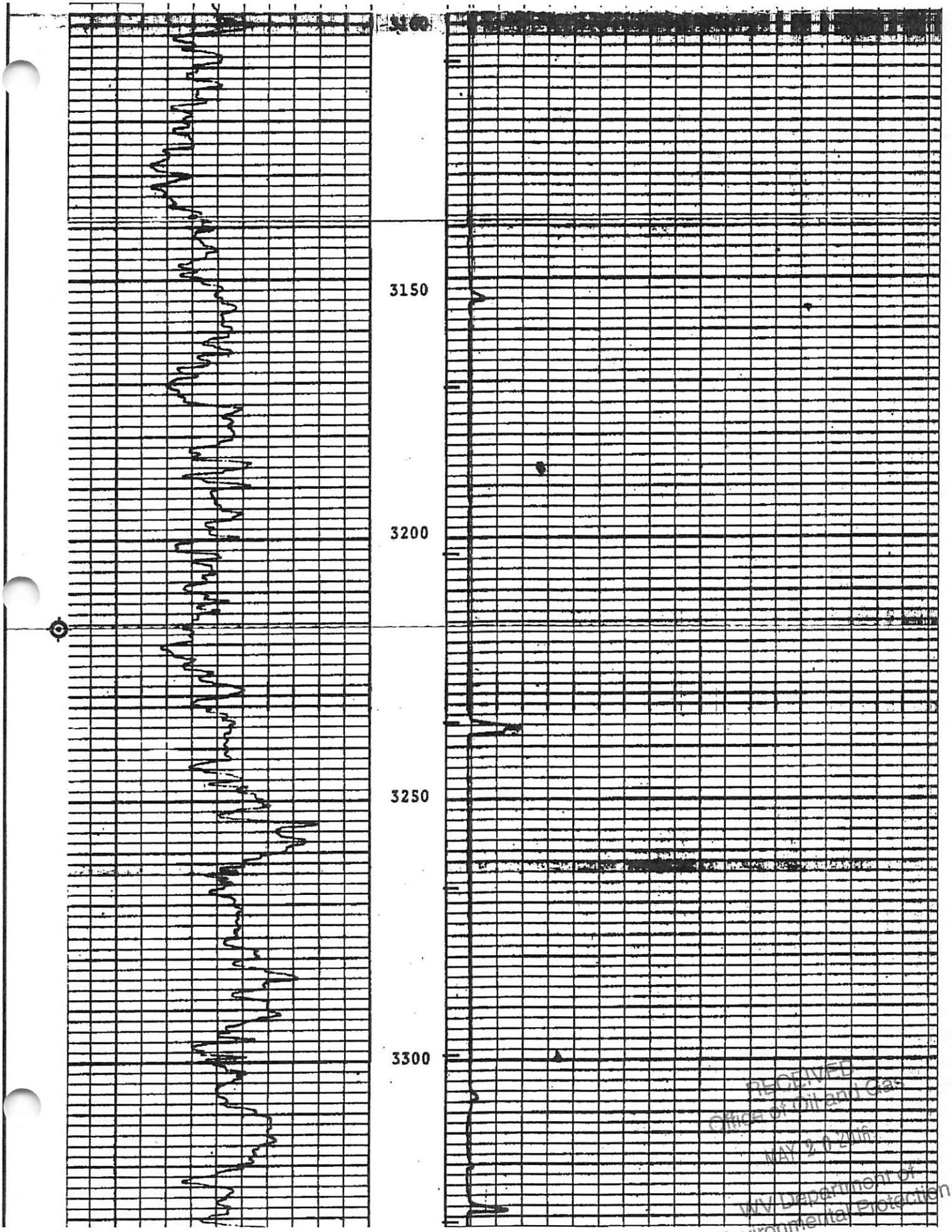
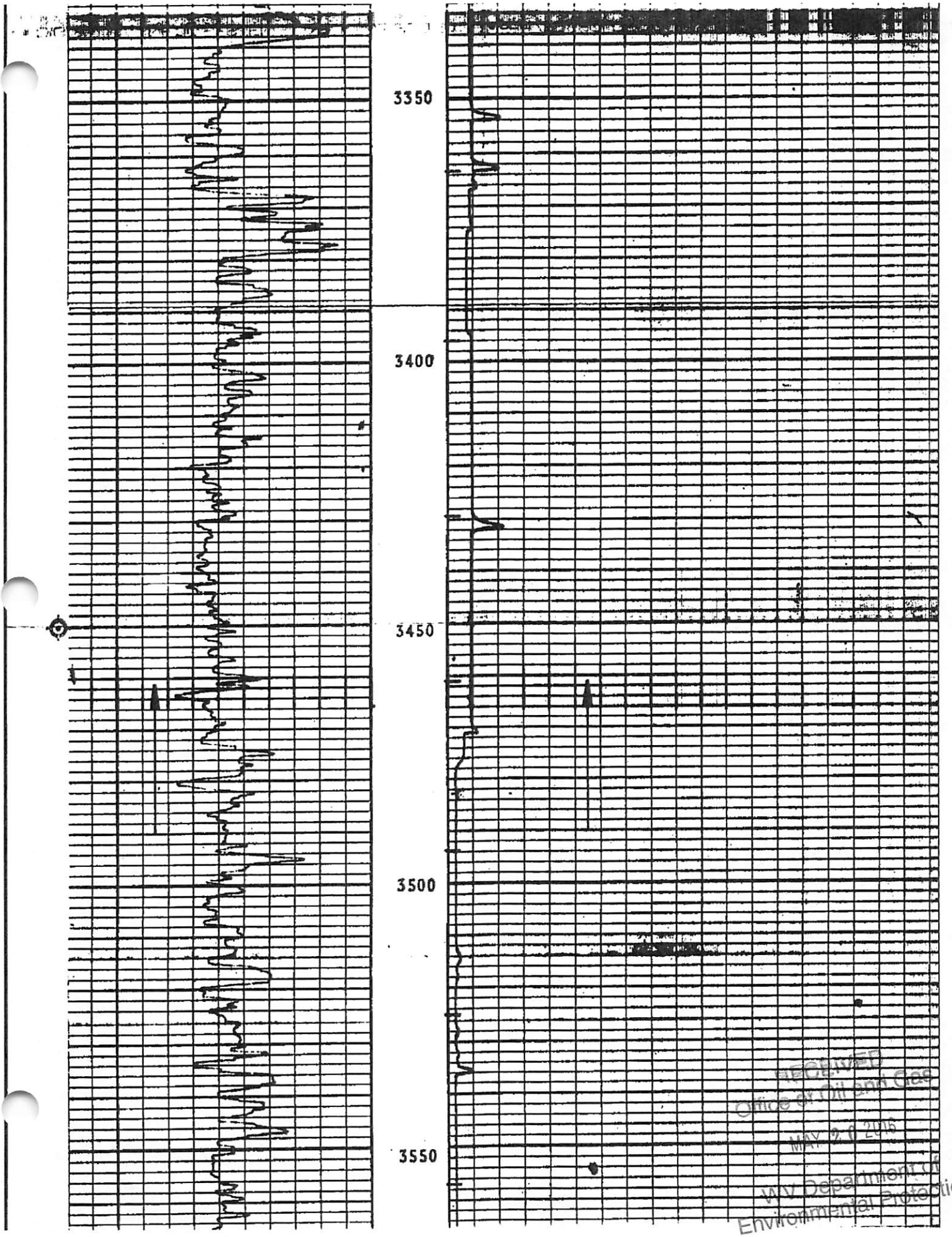
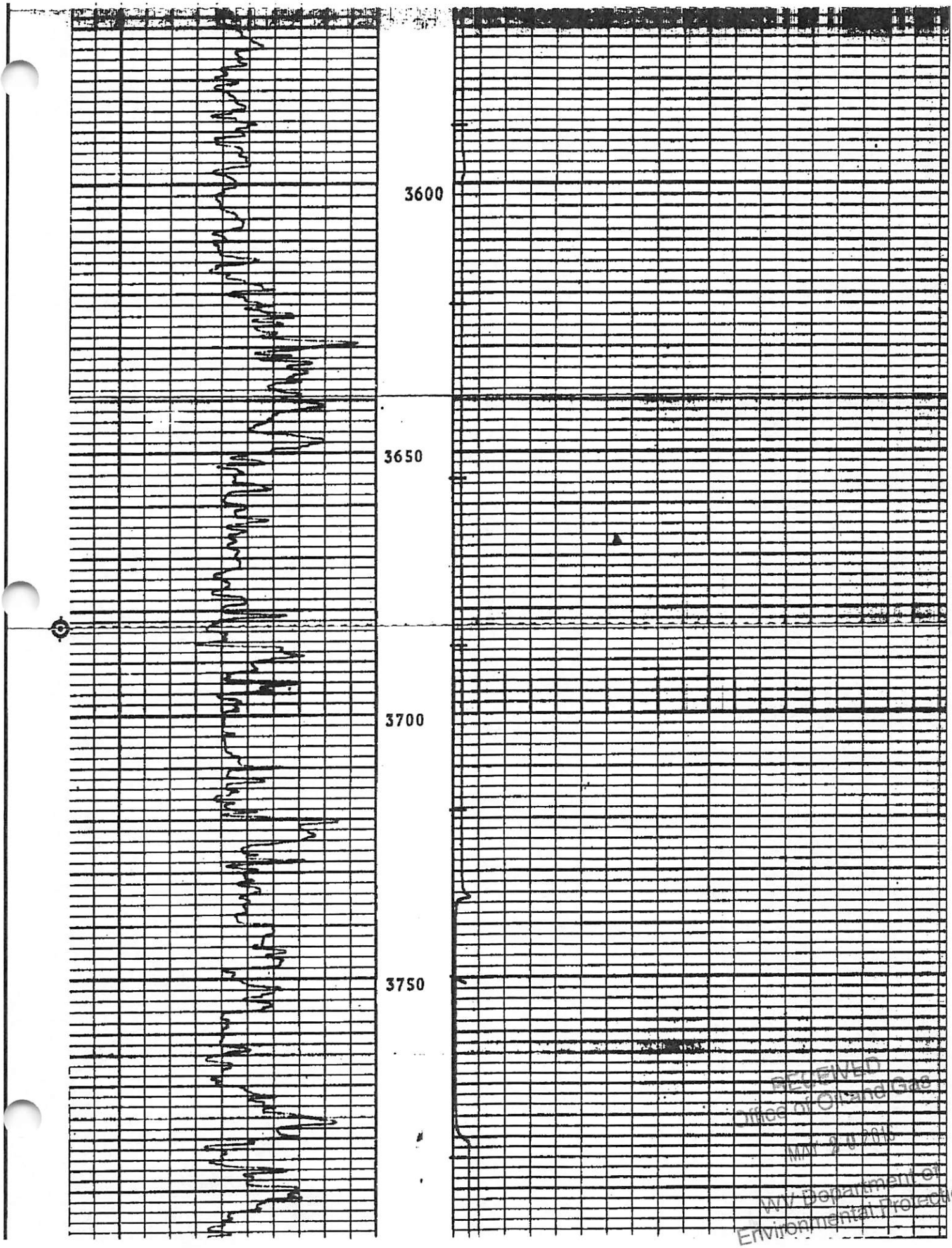
2450
2500
2550
2600

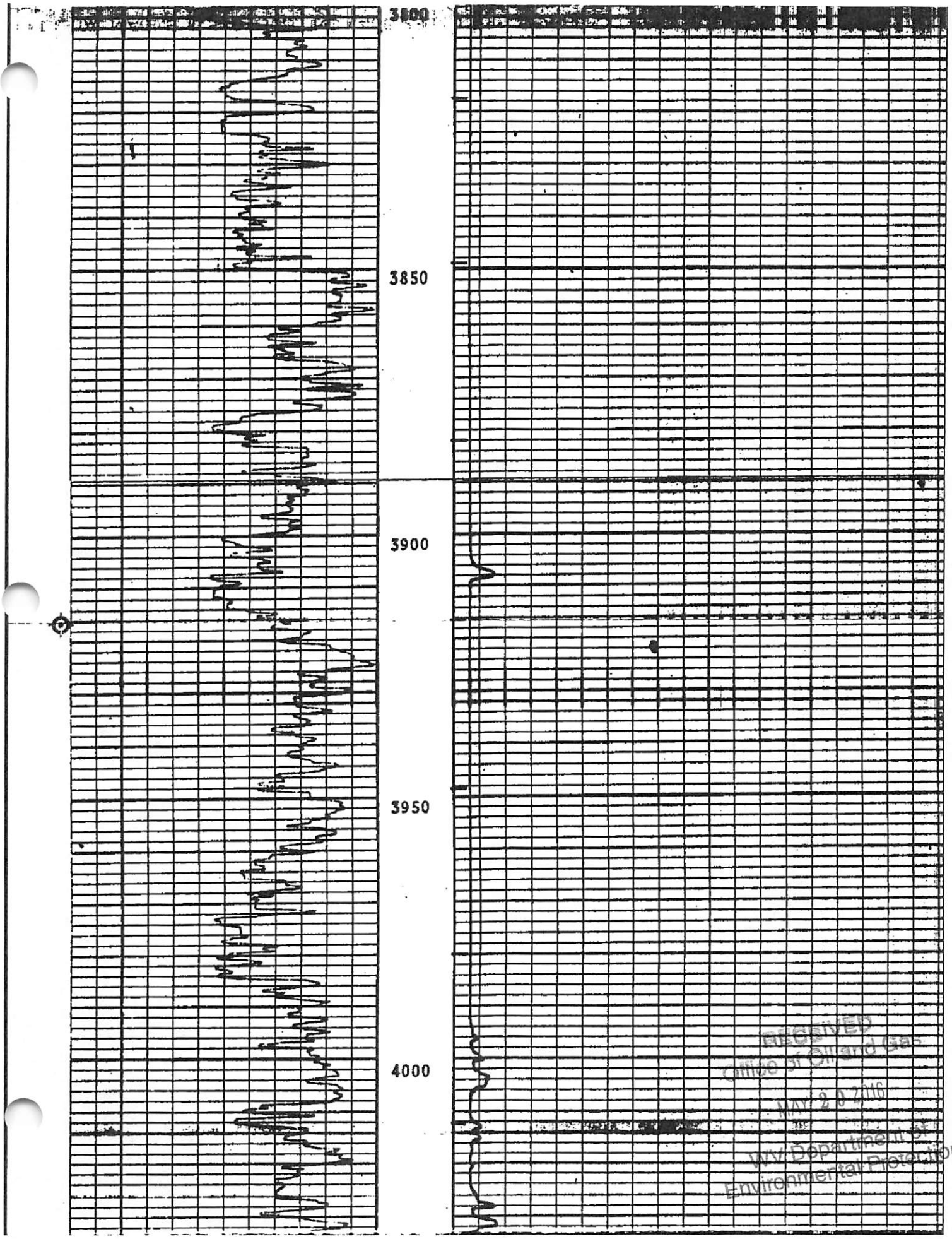


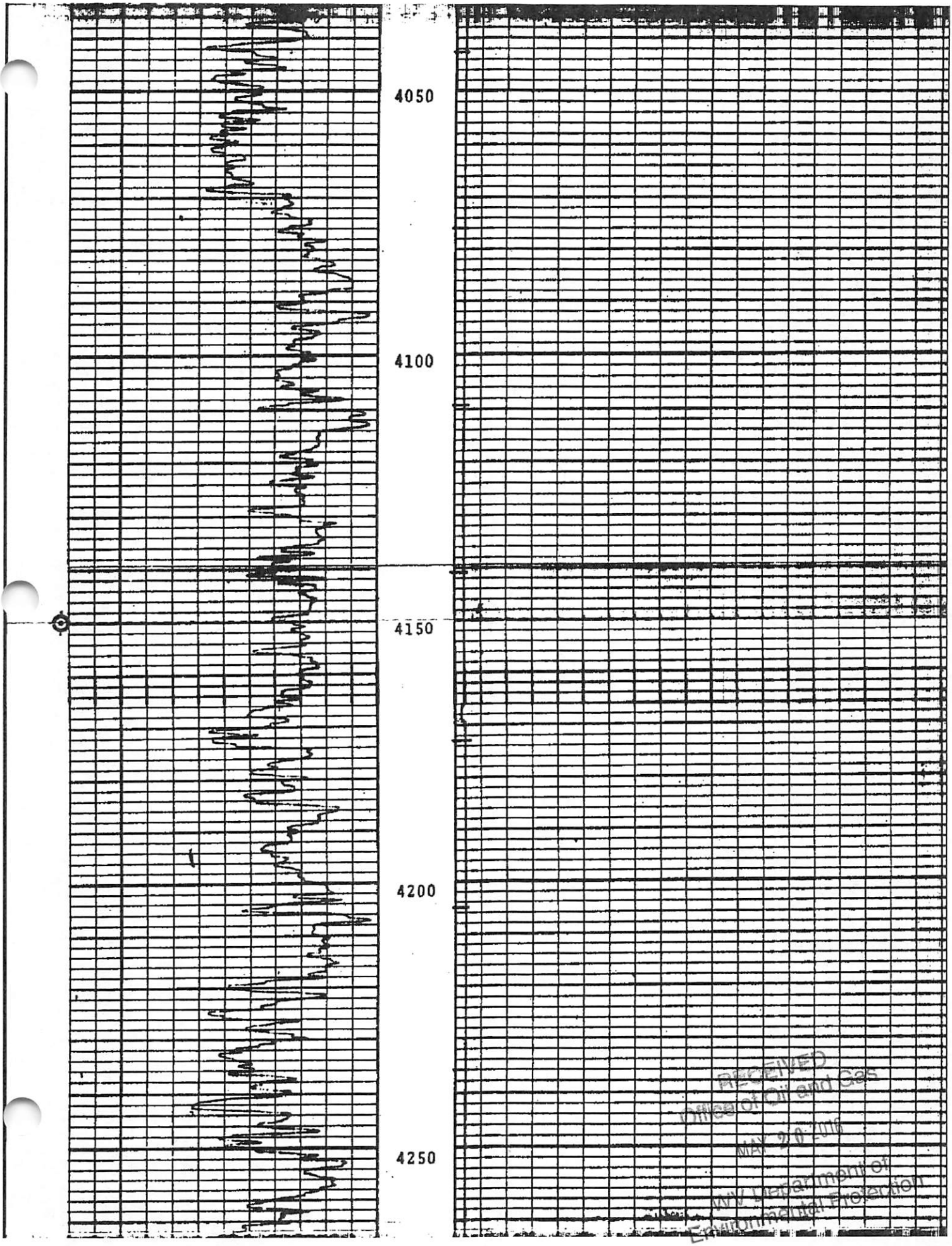


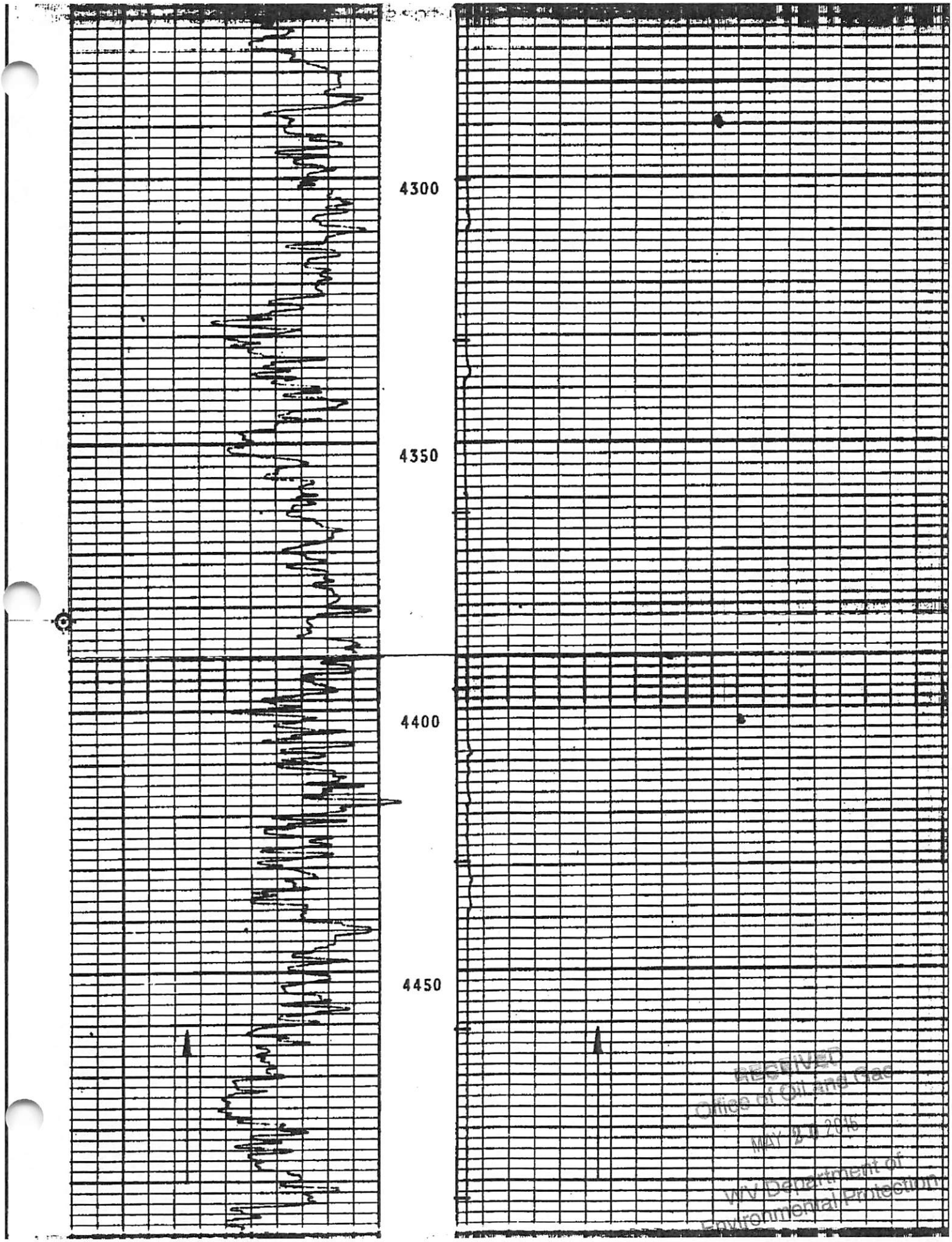


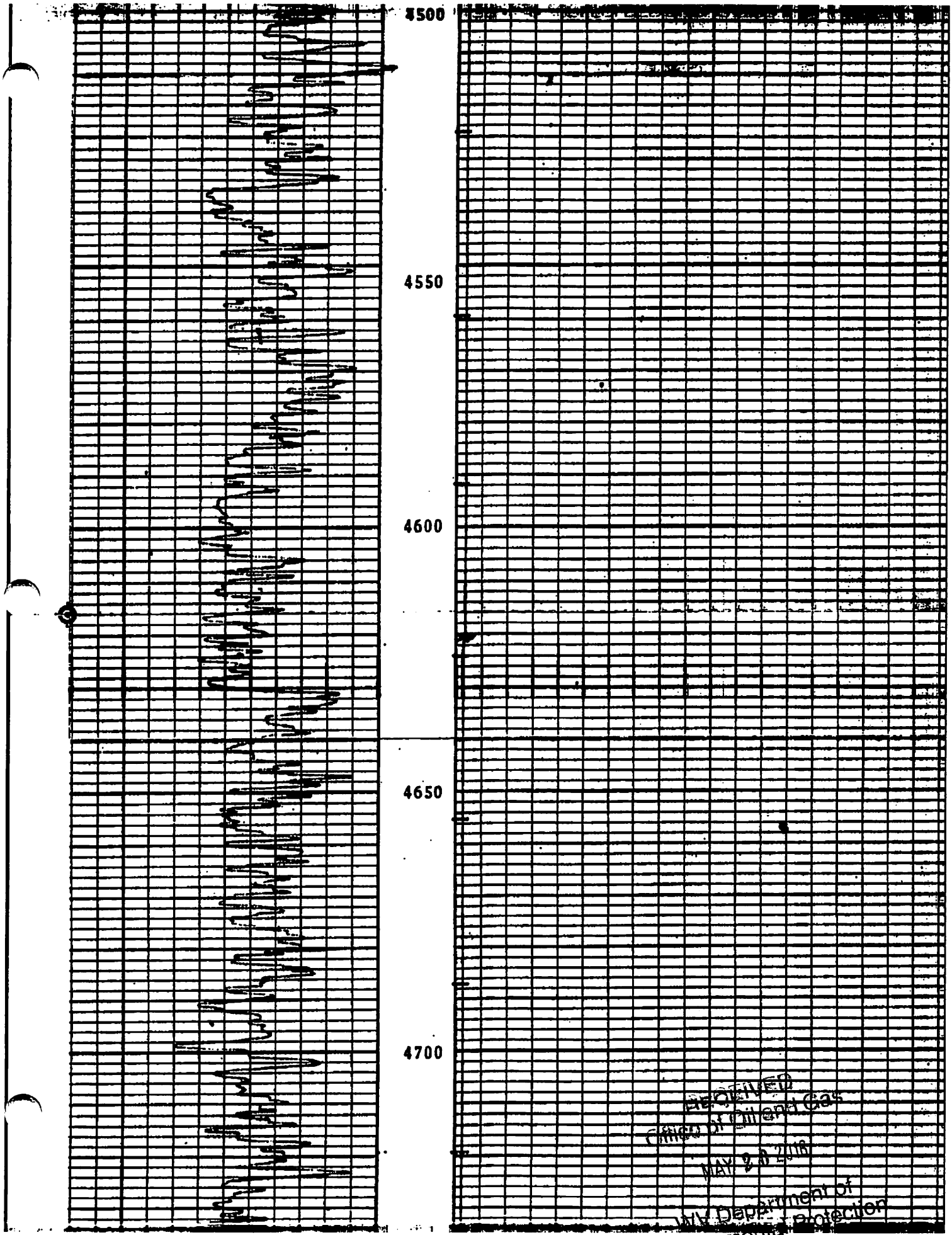


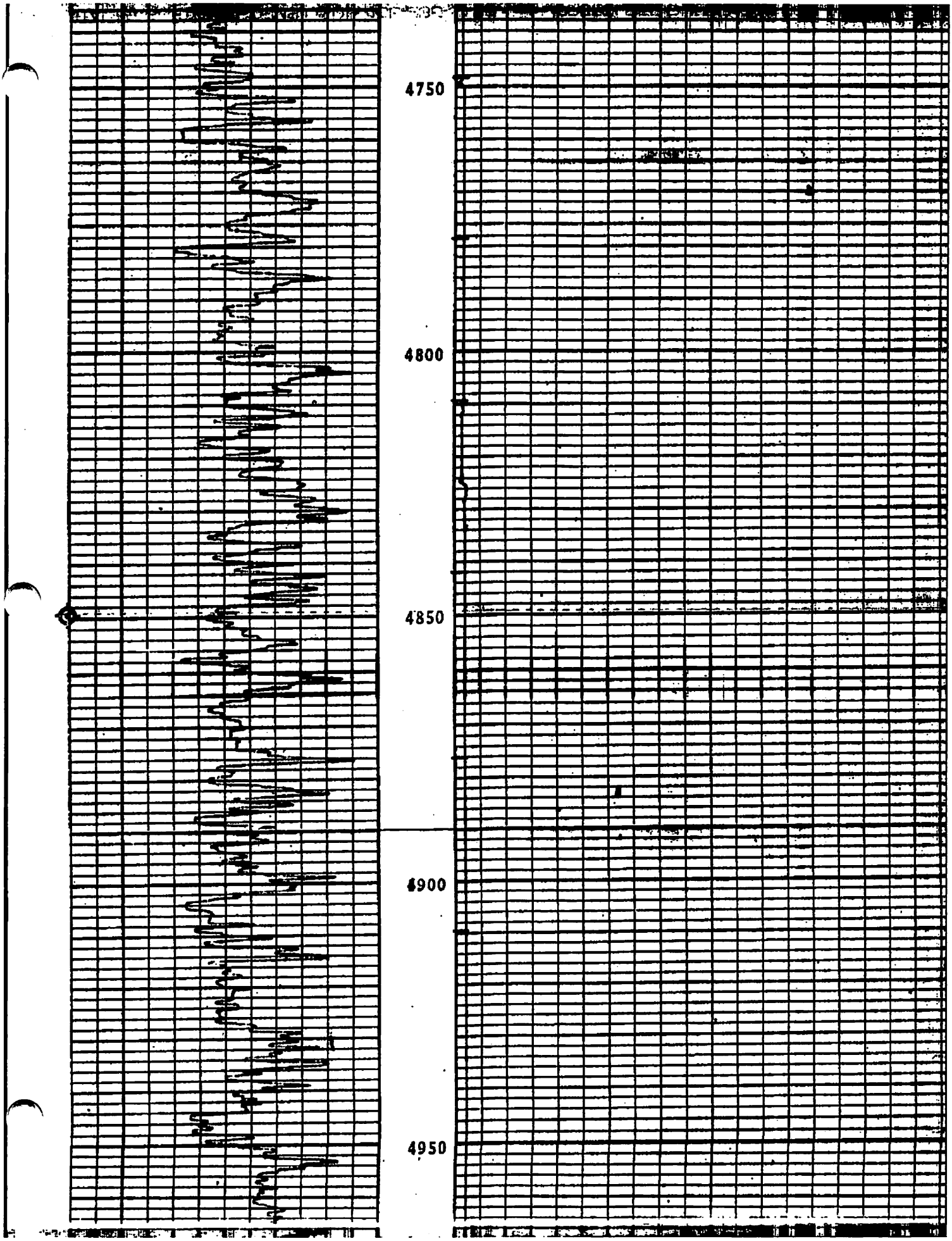








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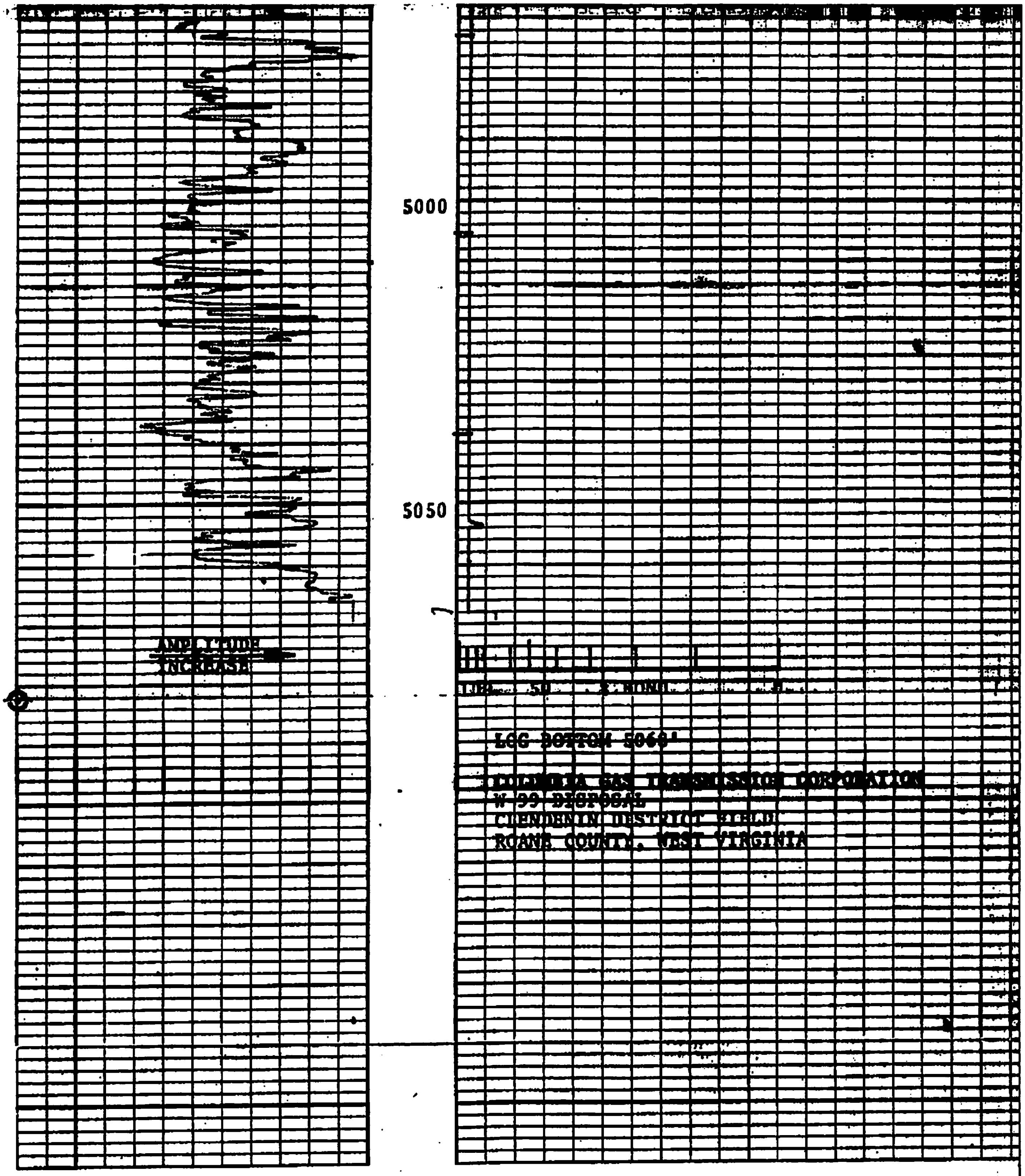
4800
4850
4900
4950


5000
5050
AMPLITUDE INCREASE
LOG BOTTOM 5060'
COLUMBIA GAS TRANSMISSION CORPORATION
W 99 DISPOSAL
CLENDENIN DISTRICT FIELD
ROANE COUNTY, WEST VIRGINIA

BAKER HUGHES

Baker Atlas

Segmented Bond Log Gamma Ray

File No:	9958T
API No:	47-087-1977
Company	COLUMBIA GAS TRANSMISSION
Well	W-99
Field	ROANE
County	ROANE
State	WEST VIRGINIA

Location

SEC	TWP	RGE

Permanent Datum	Ground Level	Elevation	
Log Measured From	K.G	3 ft	Above P.D. 665 ft
Drill Measured From	NA		

Other Services

GAMMA RAY
NEUTRON

Elevations

KB NA
DF NA
GL 665 ft

Date	5-APRIL-01
Run	ONE
Service Order	361070
Depth Driller	5130 ft
Depth Logger	4594 ft
Bottom Logged Interval	4560 ft
Top Logged Interval	3500 ft
Time Started	1230
Time Finished	1530
Operator Rig Time	3 HRS.
Type of Fluid in Hole	WATER
Fluid Density	NA
Salinity	NA
Fluid Level	2400 ft
Logged Cement Top	3804 ft
Wellhead Pressure	0 psi
Maximum Hole Deviation	NA
Nominal Logging Speed	20 fpm
Maximum Recorded Temperature	NA
Reference Log	GAMMA RAY NEUTRON
Reference Log Date	5-APRIL-01
Equipment No. / Location	4112 / BUCKHANNON
Recorded By	R.JOHNSON
Witnessed By	DOUG MOSS

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.

Borehole Record

Bit Size	From	To
0 in	0 ft	0 ft
0 in	0 ft	0 ft
0 in	0 ft	0 ft
0 in	0 ft	0 ft

Casing Record

Size	Weight	Grade	From	To
13.375 in	48 lbm/ft		0 ft	114 ft
9.625 in	32 lbm/ft		0 ft	1918 ft
7 in	23 lbm/ft		0 ft	5258 ft
4.5 in	10.5 lbm/ft	J-55	0 ft	4607 ft

Remarks

CREW: S.LARSON, M.WOOD

THANK YOU FOR CHOOSING BAKER ATLAS.
THE SBT LOG WAS CORRELATED TO THE GAMMA RAY NEUTRON LOG RAN ON 17-MAY-97.
THE 4 1/2" CASING WAS PULLED AND THE PACKER WAS REPLACED AND RERAN TO 4607'.

Equipment Data

Run	Trip	Tool	Series Number	Serial Number	Position
1	1	GR	1309XA	46775	CENTRALIZED
1	1	PCM	1633EA	113813	CENTRALIZED
1	1	SBT	1424XA	172735	CENTRALIZED
1	1	SBT	1424PA	173892	CENTRALIZED
0	0				

NORMALIZATION PASS

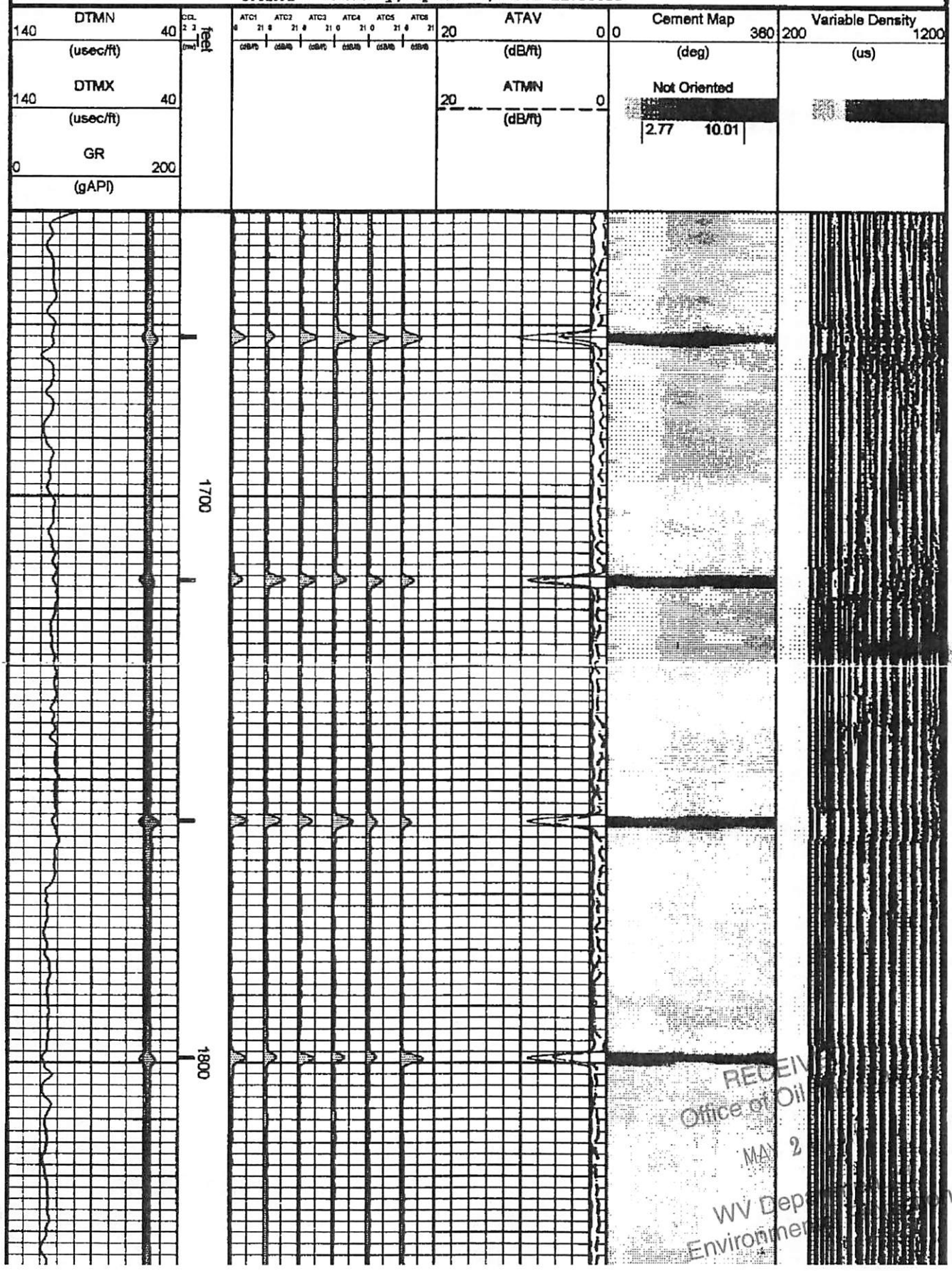
SBT NORMALIZATION RESULTS

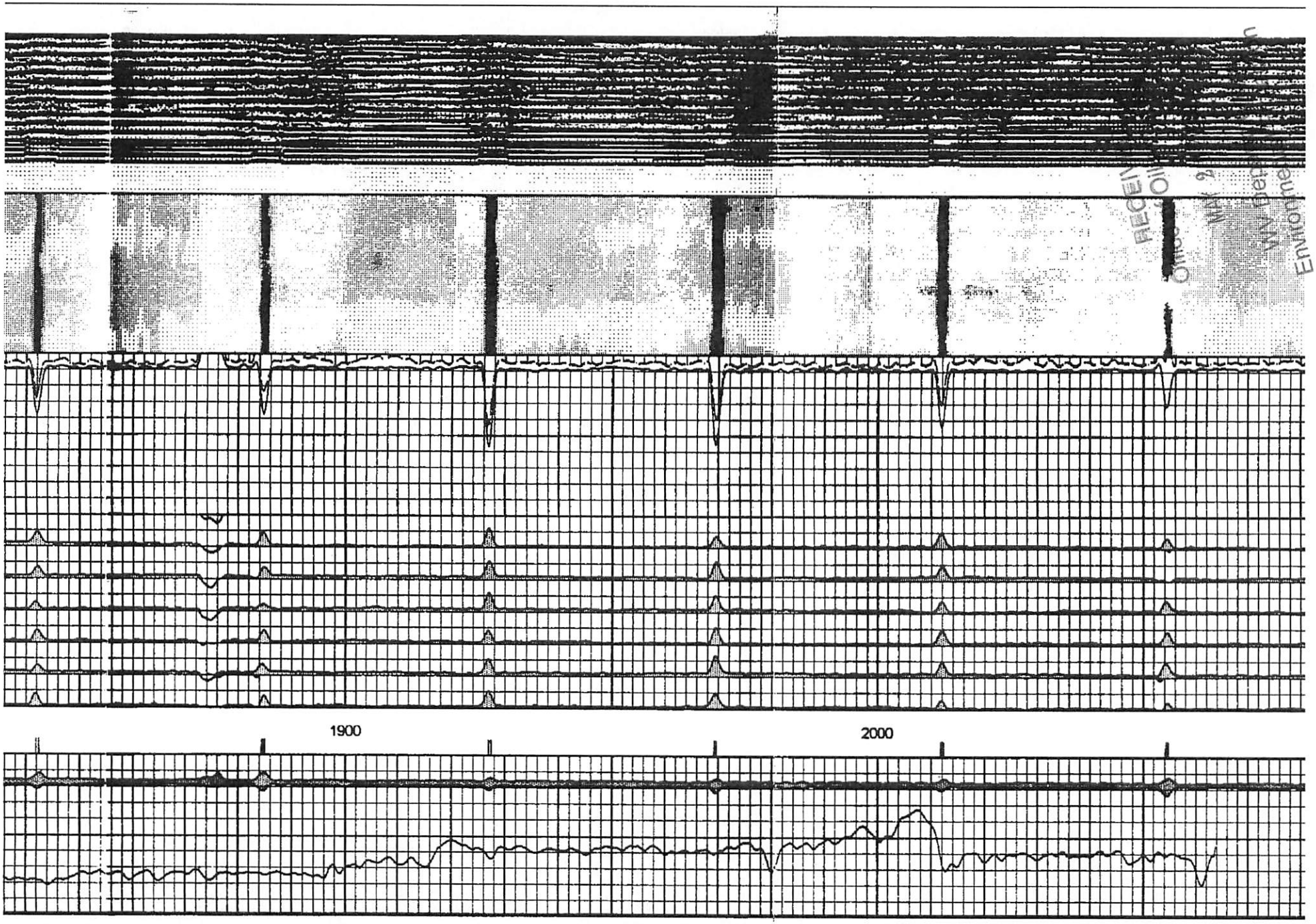
CURVE	PARAMETER	VALUE	UNITS	TOP	BOTTOM	COMMENT
ATC1	seg1 cnormf1	0.000	db/ft	1649.434	2100.000	
ATC2	seg2 cnormf2	0.000	db/ft	1649.434	2100.000	
ATC3	seg3 cnormf3	0.000	db/ft	1649.434	2100.000	
ATC4	seg4 cnormf4	0.000	db/ft	1649.434	2100.000	
ATC5	seg5 cnormf5	0.000	db/ft	1649.434	2100.000	
ATC6	seg6 cnormf6	0.000	db/ft	1649.434	2100.000	
ATC1	seg1 dnormf1	0.453	db/ft	1649.434	2100.000	Good Confidence
ATC2	seg2 dnormf2	-0.325	db/ft	1649.434	2100.000	Good Confidence
ATC3	seg3 dnormf3	0.194	db/ft	1649.434	2100.000	Good Confidence
ATC4	seg4 dnormf4	-0.221	db/ft	1649.434	2100.000	Good Confidence
ATC5	seg5 dnormf5	-0.586	db/ft	1649.434	2100.000	Good Confidence
ATC6	seg6 dnormf6	0.485	db/ft	1649.434	2100.000	Good Confidence

SBT PROCESSING

MEASUREMENT TYPE	PARAMETER	VALUE	UNITS	TOP	BOTTOM
CN	Bit Size	7.875	inches	1649.434	2100.000
cemr	casing od	4.500	inches	1649.434	2100.000
CN	Casing Thickness	0.275	inches	1649.434	2100.000
cemr	casing wt	10.500	lbm/ft	1649.434	2100.000
CN	Casing/Cement Correction	No		1649.434	2100.000
CN	CN Chism	No		1649.434	2100.000
cemr	compress	1500.000	psi	1649.434	2100.000
atc	dbspread	4.844	dB/ft	1649.434	2100.000
amp	fpamp	90.632	mv	1649.434	2100.000
amp	fpattn	0.351	dB/ft	1649.434	2100.000
CN	Matrix	Limestone		1649.434	2100.000
CN	Salinity	0.000	ppm	1649.434	2100.000
atc	spacing	0.619	feet	1649.434	2100.000

Company Name : COLUMBIA GAS TRANSMISSION
Well Name : W-99
File Name : C:\Welldata\998BT\Norm.xtf
Mode : PlotMgr 4.4.017
Interval : 1650.00 - 2100.00 feet
Created : Thursday, April 05, 2001 11:53:53

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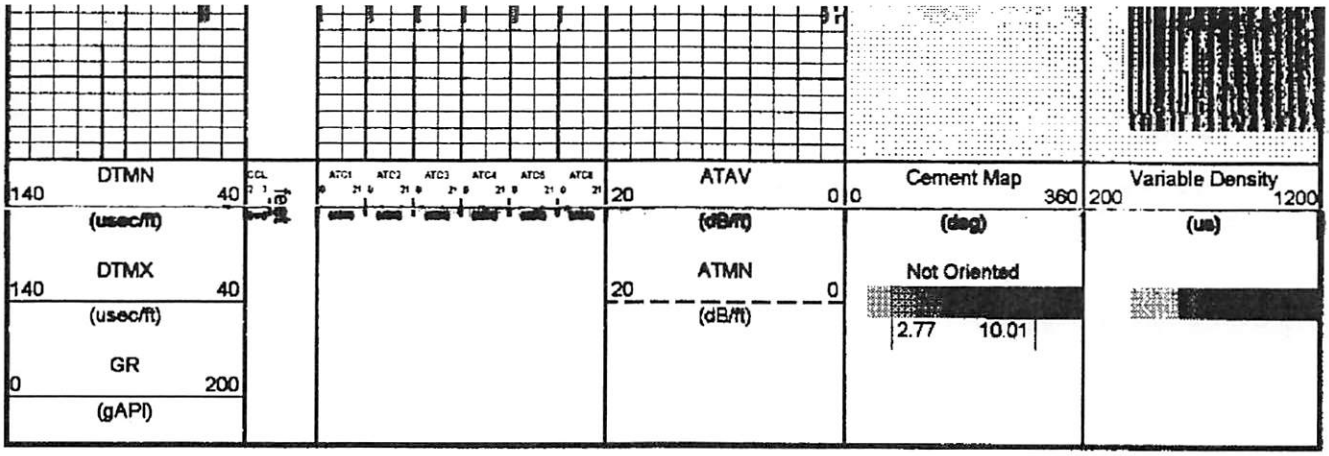
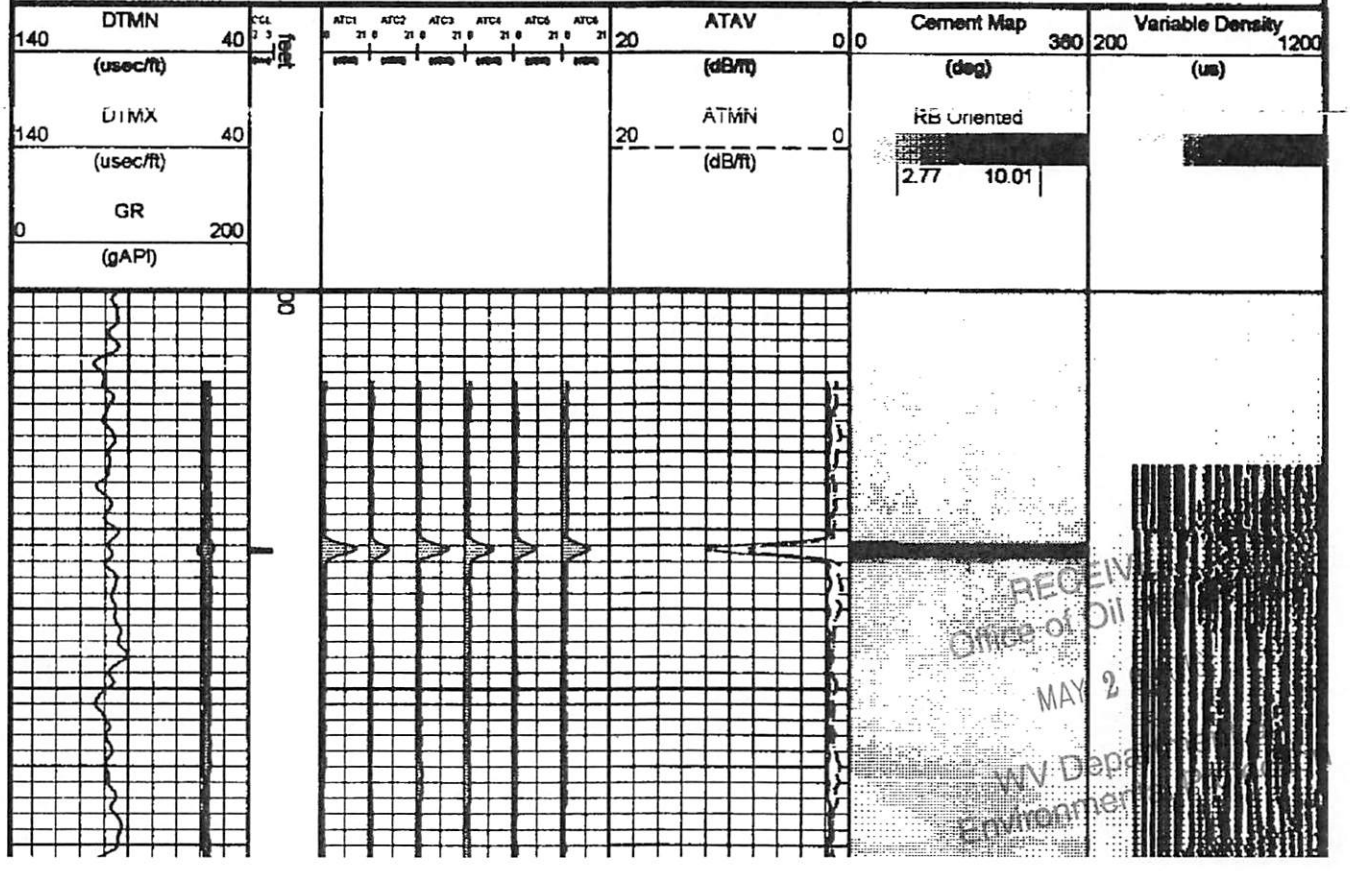
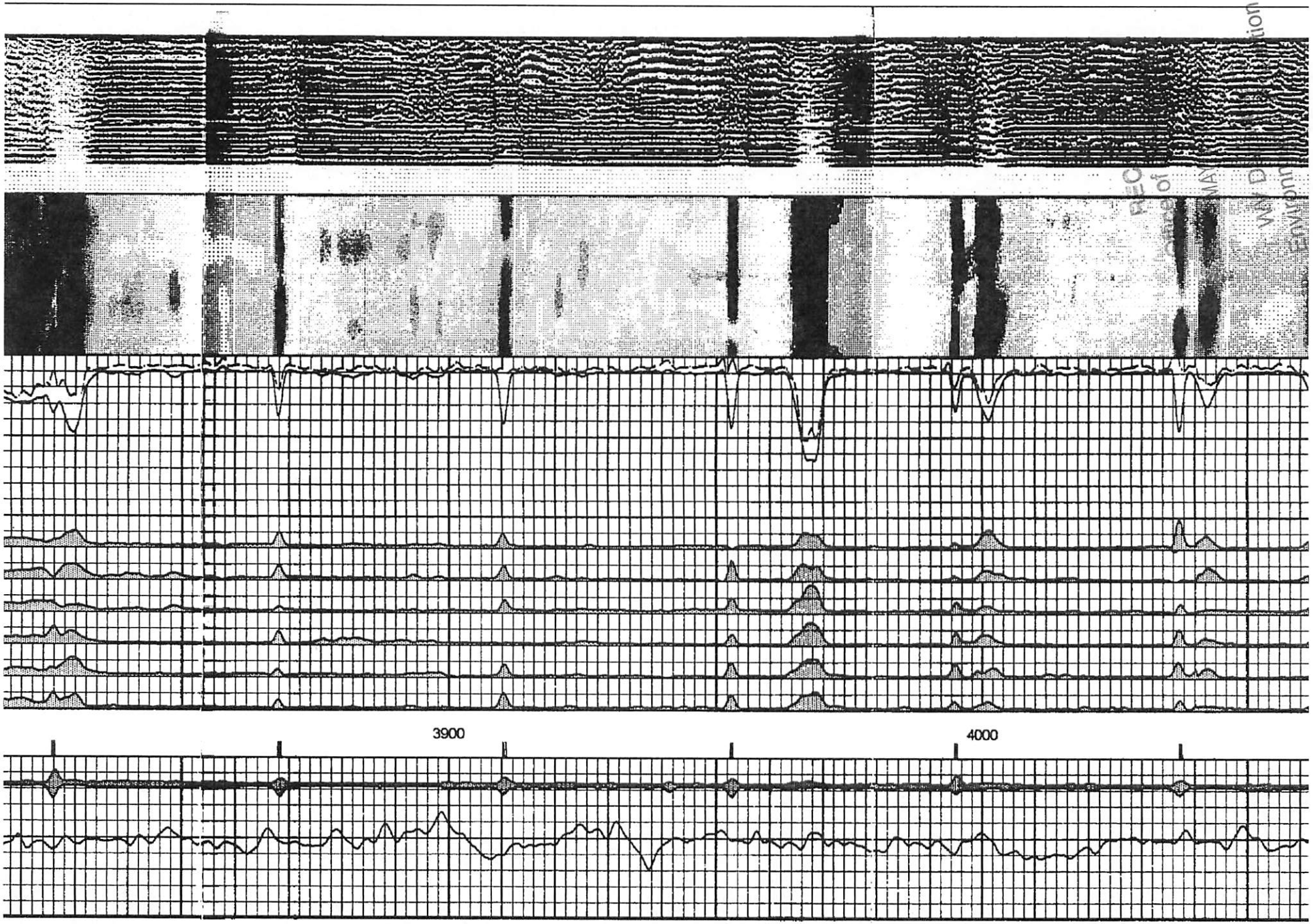


MAIN LOG 5"/100'

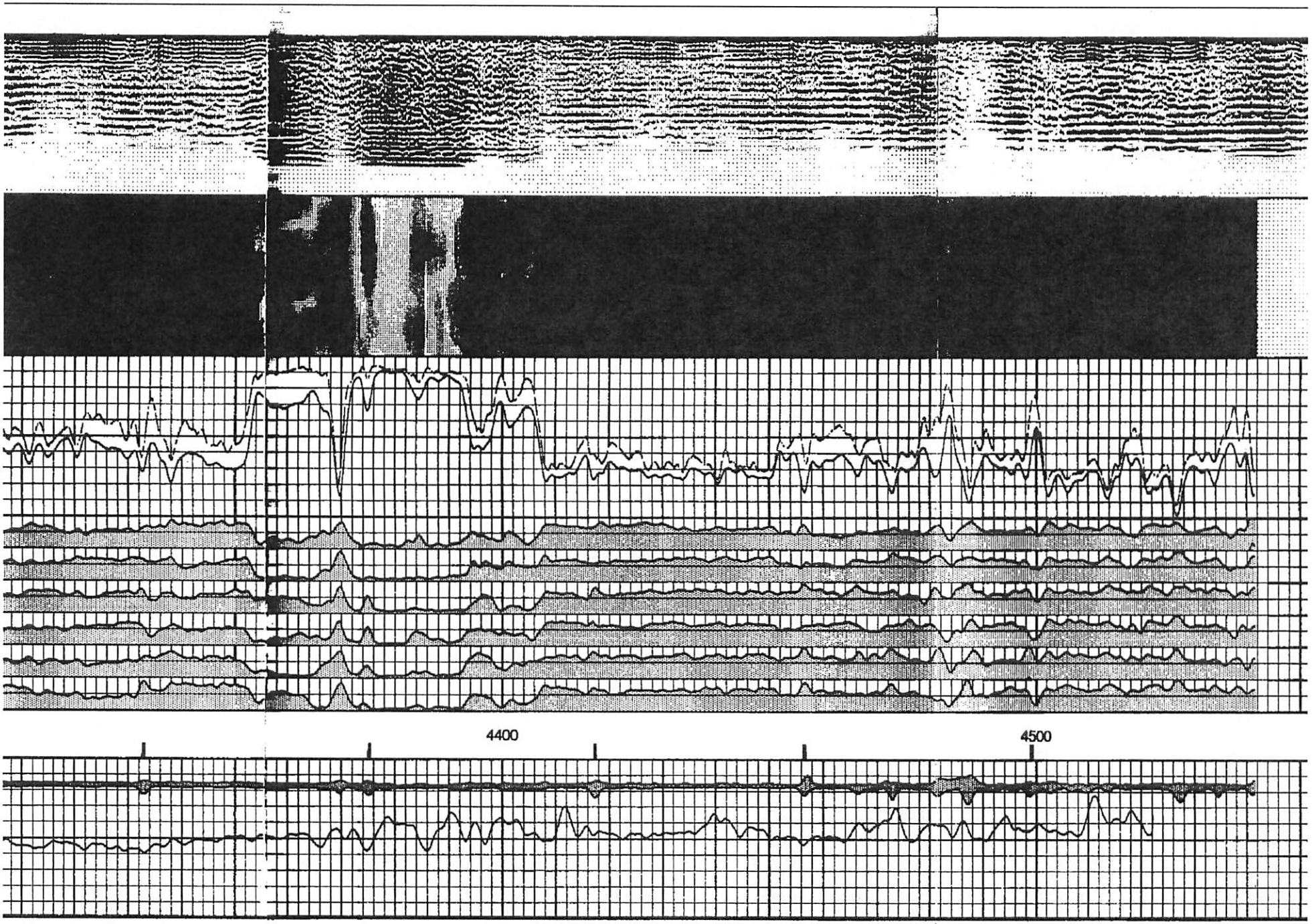
System : CASE Acquisition, v4.5.001
Program : Logpad OCX, v4.4.021

Company Name : COLUMBIA GAS TRANSMISSION
Well Name : W-99
File Name : C:\Welldata\99SBT\Sbtmain.xtf
Mode : PlotMgr 4.4.017
Interval : 3500.00 - 4590.00 feet
Created : Thursday, April 05, 2001 15:41:36




3900
4000

4100
4200
4300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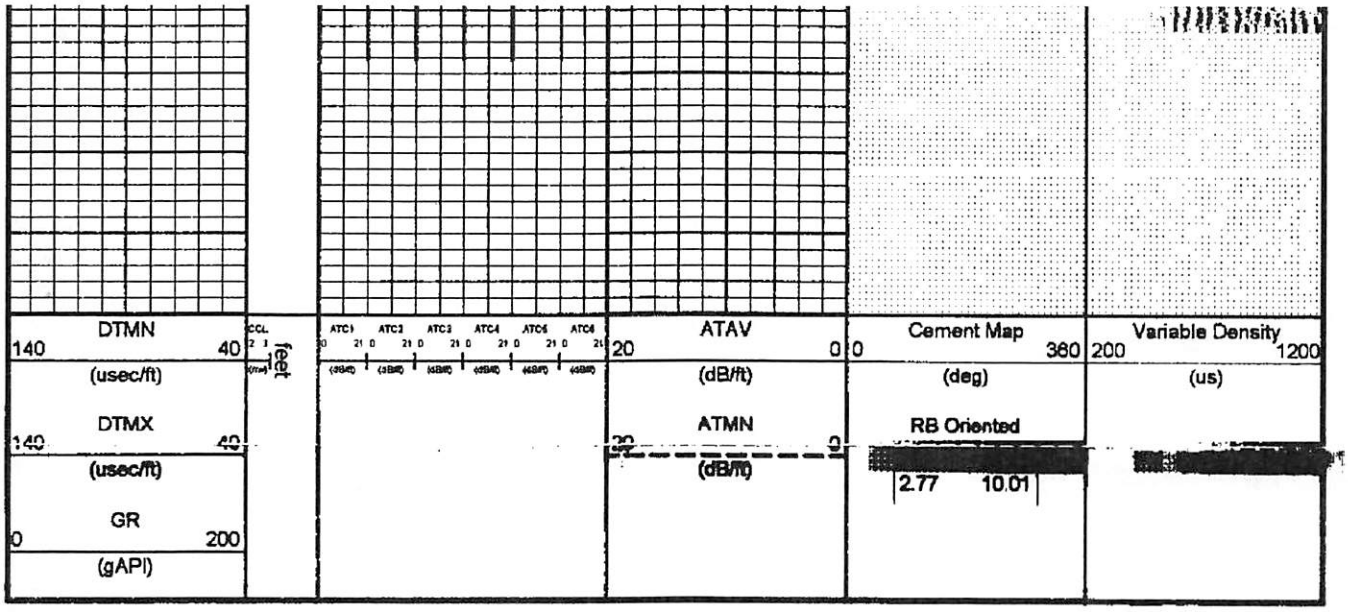
4500



REPEAT SECTION

SBT NORMALIZATION RESULTS

CURVE	PARAMETER	VALUE	UNITS	TOP	BOTTOM	COMMENT
ATC1	seg1 cnormf1	0.453	db/ft	4299.473	4541.973	
ATC2	seg2 cnormf2	-0.325	db/ft	4299.473	4541.973	
ATC3	seg3 cnormf3	0.194	db/ft	4299.473	4541.973	
ATC4	seg4 cnormf4	-0.221	db/ft	4299.473	4541.973	
ATC5	seg5 cnormf5	-0.586	db/ft	4299.473	4541.973	
ATC6	seg6 cnormf6	0.485	db/ft	4299.473	4541.973	
ATC1	seg1 dnormf1	0.276	db/ft	4299.473	4541.973	Good Confidence
ATC2	seg2 dnormf2	-0.294	db/ft	4299.473	4541.973	Good Confidence
ATC3	seg3 dnormf3	0.529	db/ft	4299.473	4541.973	Good Confidence
ATC4	seg4 dnormf4	-0.308	db/ft	4299.473	4541.973	Good Confidence
ATC5	seg5 dnormf5	-0.631	db/ft	4299.473	4541.973	Good Confidence
ATC6	seg6 dnormf6	0.428	db/ft	4299.473	4541.973	Good Confidence

SBT PROCESSING

MEASUREMENT TYPE	PARAMETER	VALUE	UNITS	TOP	BOTTOM
CN	Bit Size	7.875	inches	4299.473	4541.973
cemr	casing od	4.500	inches	4299.473	4542.000
CN	Casing Thickness	0.227	inches	4299.473	4541.973
cemr	casing wt	10.500	lbm/ft	4299.473	4542.000

CN	Casing/Cement Correction	No		4299.473	4541.973
CN	CN Chism	No		4299.473	4541.973
cemr	compress	1500.000	psi	4299.473	4542.000
atc	dbspread	4.844	dB/ft	4299.473	4542.000
amp	fpamp	90.632	mv	4299.473	4542.000
amp	fpattn	0.351	dB/ft	4299.473	4542.000
CN	Matrix	Limestone		4299.473	4541.973
CN	Salinity	0.000	ppm	4299.473	4541.973
atc	spacing	0.619	feet	4299.473	4542.000

System : CASE Acquisition, v4.5.001

Company Name : COLUMBIA GAS TRANSMISSION

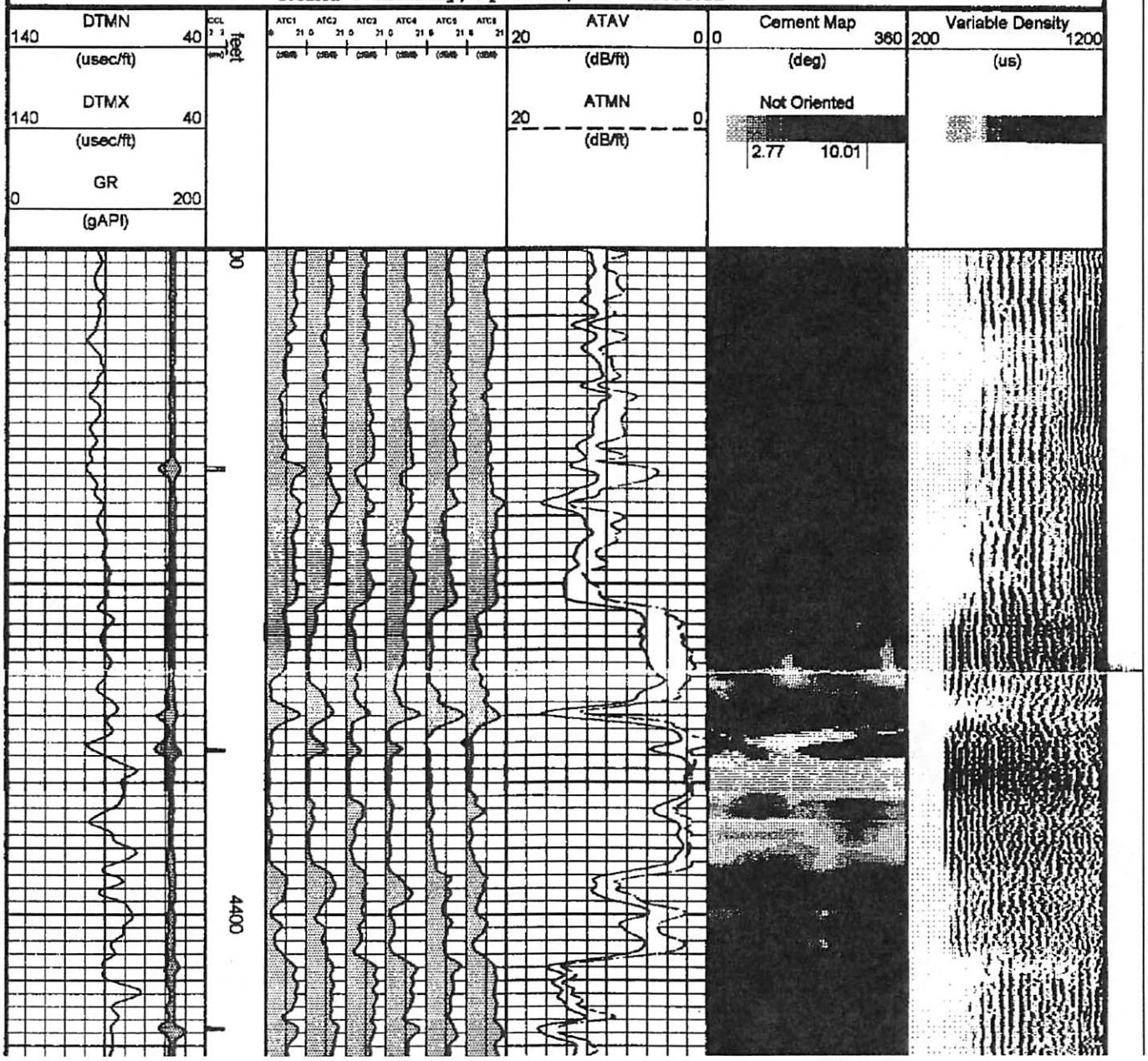
Well Name : W-99

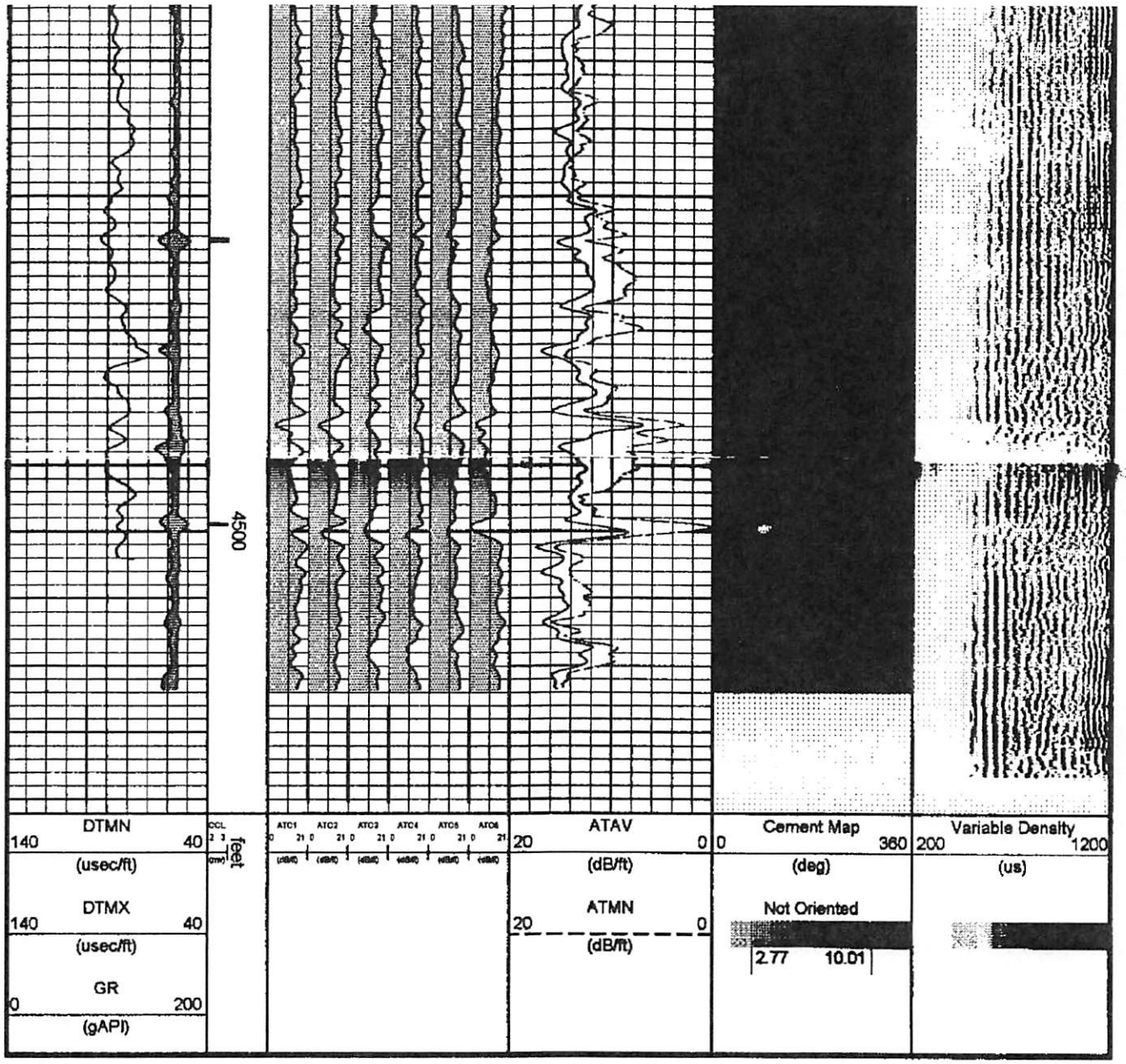
File Name : C:\Welldata\99SBT\Sbtrpt.xtf

Mode : PlotMgr 4.4.017

Interval : 4300.00 - 4542.00 feet

Created : Thursday, April 05, 2001 13:04:52





GAMMA RAY

Calibration File: C:\CASE\CALVER\GR\4677504.cal

CALIBRATION SUMMARY

DATE/TIME PERFORMED: Mon Apr 02 09:30:49 2001 **TOOL SERIES:** 1309XA **ASSET:** 46775 **SEQ:** 04

Calibrator #	Background [cps]	Calibrator On [cps]	Multiplicative	Background [api]	Calibrator On [api]	Differential [api]
S2K DA-564	56.69	277.03	0.681	38.59	188.59	150.00

Verification File: C:\CASE\CALVER\GR\4677504.VP

PRIMARY LOG VERIFICATION

DATE/TIME PERFORMED: Mon Apr 02 09:35:05 2001 **TOOL SERIES:** 1309XA **ASSET:** 46775 **SEQ:** 04

Calibrator #	Background [cps]	Calibrator On [cps]	Multiplicative	Background [api]	Calibrator On [api]	Differential [api]

S2K DA-564	55.78	276.48	0.681	37.97	188.21	150.24

RB

Calibration File: C:\CASE\CALVER\RB\17273503.cal

CALIBRATION SUMMARY

DATE/TIME PERFORMED: Mon Mar 26 16:27:19 2001 **TOOL SERIES:** 1424XA **ASSET:** 172735 **SEQ:** 03

	X-Att [raw]	Y-Att [raw]	RB [deg]	X-Max [deg]	Y-Max [deg]	OFFSET [deg]
PAD 2	358.00	-164.00	2.44			
PAD 3	60.00	-400.20	60.00	383.46	-405.19	21.00

PAD

Verification File: C:\CASE\CALVER\PAD\17273505.VK

DATE/TIME PERFORMED: Thu Apr 05 12:51:27 2001 **TOOL SERIES:** 1424XA **ASSET:** 172735 **SEQ:** 05

	Pad 1	Pad 2	Pad 3	Pad 4	Pad 5	Pad 6
Noise Level	176.05	236.15	159.65	114.07	165.85	116.93
PAD Sensitivity	233.80	228.80	105.50	116.00	164.50	103.40

BAKER HUGHES

Baker Atlas

CASE

Company	COLUMBIA GAS TRANSMISSION
Well	W-99
Field	ROANE
County	ROANE **State** WEST VIRGINIA

File No: 99SBT

API No: 47-087-1977

Location

SEC **TWP** **RGE**

Elevations

KB NA
DF NA
GL 665 ft

Section 9
Operating Requirements/Data

UIC PERMIT NUMBER UIC2D0871977
RENEWAL APPLICATION
ROANE WELL #99
COLUMBIA GAS TRANSMISSION, LLC.

SECTION 9
OPERATING REQUIREMENTS/DATA

Columbia Gas Transmission is providing the following information:

- Average Volume of Fluid Injected (bbl/day): 73
- Maximum Volume of Fluid Injected (bbl/day): 960
- Average Injection Pressure (psig): 520
- Maximum Injection Pressure (psig): 1200

The lists of fluids to be injected and the facilities where these fluids are generated are included in this section as Attachments 9-1 and 9-2, respectively. No disposal fluids are associated with well work or production; therefore, Appendix G has been marked as Not Applicable.

The laboratory report of the physical and chemical characteristics of the injection fluids is included in this section as Attachment 9-3.

Columbia stopped using additives in the injection fluid approximately three years ago.

Fresh water-based corrosion inhibited fluid installed in the 2⅜-inch tubing by 4½-inch casing annulus above the packer.

In the event of a well integrity failure, injections will cease and the cause of the failure will be investigated, resolved and a mechanical integrity test (MIT) performed. The MIT will be witnessed and approved by the West Virginia Department of Environmental Protection - Office of Oil and Gas prior to resuming injections. If integrity of well cannot be restored, the well will be plugged and abandoned per West Virginia code. Future fluids will be disposed at an approved commercial facility.

May 2016 Revisions

Item 3.a. – The instructions for Section 9 indicate that proposed operating data be provided, including the maximum injection pressure. The instructions state that the data may be obtained through a service company, pressure test results, well treatment data, etc. As indicated by the response to Item 1.c, the 1200 psi maximum injection pressure used in the renewal application is a calculated value which ensures that Columbia's injection operations do not induce or propagate hydraulic fractures in the Rhinestreet Shale. An instantaneous shut-in pressure (ISIP) from a 2002 fracture stimulation is the basis for this calculation.

Item 3.b. - The fluid placed in the 2⅜-inch by 4½-inch annulus consists of fresh water as a base fluid, with the additive Packer Inhibitor manufactured by Clearwater Engineered Chemistry. Packer Inhibitor is a corrosion inhibitor, composed of 7-13% Acetic Acid, 40-70% Methanol, and 15-40% Ammonium bisulfite. The fluid serves to protect steel tubulars from corrosion. The MSDS for this additive has been included.

Item 3.c. - The following list of hydraulic barriers, well construction elements, and monitoring practices that serve to isolate and protect USDW zones from the deeper injection fluids is being submitted as the facility Failure Migration Prevention Plan:

- Lowest USDW is +/- 4000 feet above the injection zone. The ability for fluid to vertically migrate through multiple impermeable zones (beyond the confines of the wellbore) is extremely unlikely.

- The 2⅜-inch tubing by 4½-inch casing annulus pressure, above the packer, is monitored at the surface. The annulus pressure has 0 psig pressure when the well is in operational mode. If pressure (above 0 psig) is observed, the well is taken out of service, WVDEP notified, the issue diagnosed, and integrity restored.

- The integrity of the 4½-inch casing is periodically inspected using Magnetic Flux Leakage electric logs. Dates ran: 5/19/2004, 8/19/2005 and 7/27/2010.

- Casing Potential Profile electric log ran 9/6/2005 to test for the presence of stray electrical current down-hole.

- GR-Neutron electric logs are periodically run to detect fluid movement behind pipe. Dates ran: 5/14/1997, 4/5/2001 and 9/6/2005.

- The length and quality of cement sheath behind the 4½-inch casing serves as an annular barrier to prevent vertical fluid migration. An evaluation of the Baker Atlas Segmented Bond Log ran 4/5/2001 indicates:
  - 485 feet of marginally bonded cement 3805 to 4290 feet, and
  - 252 feet of high-quality bonded cement 4290 to 4542 feet (bottom logged interval).

  And, because the bottom logged depth of 4542 feet is 66 feet above the depth of the casing shoe (at 4608 feet), it's reasonable to expect there is an additional +/- 66 feet of good cement. Total length of cement behind the 4½-inch casing: 803 feet.

- The length and quality of cement sheath behind the 7-inch casing serves as an annular barrier to prevent vertical fluid migration. Based on the 12/13/1972 McCullough Services cement bond log, there is at minimum 1998 feet (3070 – 5068 feet) of quality cement sheath behind

the 7-inch casing. And, because the bottom logged depth of 5068 feet is 62 feet above the depth of the casing shoe (at 5130 feet), it is reasonable to expect there is an additional +/- 62 feet of good cement. Total length of cement behind the 7-inch casing: 2060 feet.

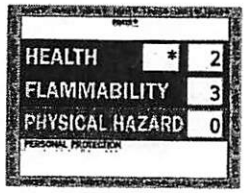
- The 9⅝-inch surface/intermediate casing is cemented to surface per records. The USDW zone at 297 feet is behind the 9⅝-inch casing and the cement sheath provides hydraulic isolation.

Item 3.d. – If the well becomes inoperable for any reason, Columbia will transport the fluids to an approved, commercial disposal site for disposal in accordance with applicable regulations. In addition, for temporary measures, there are two 8,000-gallon ASTs at the facility which are typically kept empty which may be used for short-term storage on an emergency basis.

CLEARWATER™
Engineered Chemistry®

Material Safety Data Sheet

PACKER INHIBITOR

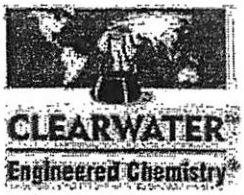


1. Product and Company Identification

Material name	**PACKER INHIBITOR**
Patent Number	Not available
Revision date	February-09-2011
Version No.	3
CAS #	Mixture
Product use	Corrosion Inhibitor
Manufacturer information	Clearwater™ International L.L.C. 100 Leetsdale Industrial Drive Leetsdale, PA 15056 US CHEMTREC 1-800-424-9300/703-527-3887
Emergency	CHEMTREC 1-800-424-9300/703-527-3887
Supplier information	Clearwater™ International L.L.C. 100 Leetsdale Industrial Drive Leetsdale, PA 15056 US
Supplier emergency telephone number(s)	CHEMTREC 1-800-424-9300/703-527-3887

2. Hazards Identification

Emergency overview	Will be easily ignited by heat, spark or flames. Irritating to respiratory system. Prolonged exposure may cause chronic effects.
OSHA regulatory status	This product is considered hazardous under 29 CFR 1910.1200 (Hazard Communication).
Potential health effects	
Routes of exposure	Inhalation. Skin contact. Ingestion. Eye contact.
Eyes	This product causes eye burns. Risk of serious damage to eyes. Do not get this material in contact with eyes.
Skin	Causes skin burns. Do not get this material in contact with skin.
Inhalation	Causes burns. Prolonged inhalation may be harmful. Irritating to respiratory system. Do not breathe dust/fume/gas/mist/vapors/spray.
Ingestion	Ingestion may produce burns to the lips, oral cavity, upper airway, esophagus and possibly the digestive tract. May cause delayed lung damage. Do not ingest. Components of the product may be absorbed into the body by ingestion.
Target organs	Eyes. Gastrointestinal tract. Lungs. Respiratory system. Skin.
Chronic effects	Shortness of breath. May cause delayed lung damage.
Signs and symptoms	Discomfort in the chest. Shortness of breath. Cough.
Potential environmental effects	Components of this product are hazardous to aquatic life. May cause long-term adverse effects in the environment.



3. Composition / Information on Ingredients

Components	CAS #	Percent
Acetic Acid	64-19-7	7 - 13
Methanol	67-56-1	40 - 70
Ammonium bisulfite	10192-30-0	15 - 40

4. First Aid Measures

First aid procedures

Eye contact — Immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention if irritation develops or persists.

Skin contact — Wash off with soap and water. Get medical attention if irritation develops or persists.

Inhalation — If breathing is difficult, remove to fresh air and keep at rest in a position comfortable for breathing. Get medical attention immediately.

Ingestion — If swallowed, seek medical advice immediately and show this container or label. Do not induce vomiting without medical advice.

Notes to physician — In case of shortness of breath, give oxygen. Keep victim warm. Symptoms may be delayed.

General advice — In case of shortness of breath, give oxygen. Keep victim warm. Call a physician if symptoms develop or persist. Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves.

5. Fire Fighting Measures

Flammable properties — Flammable by OSHA criteria. Containers may explode when heated. Runoff to sewer may cause fire or explosion hazard.

Extinguishing media

Suitable extinguishing media — Water. Foam. Dry chemical. Carbon dioxide (CO2).

Unsuitable extinguishing media — Do not use a solid water stream as it may scatter and spread fire.

Protection of firefighters

Specific hazards arising from the chemical — Fire may produce irritating, corrosive and/or toxic gases.

Protective equipment and precautions for firefighters — In the event of fire and/or explosion do not breathe fumes. Wear full protective clothing, including helmet, self-contained positive pressure or pressure demand breathing apparatus, protective clothing and face mask. If tank, rail car or tank truck is involved in a fire, ISOLATE for 800 meters (1/2 mile) in all directions; also consider initial evacuation for 800 meters (1/2 mile) in all directions. ALWAYS stay away from tanks engulfed in flame. Fight fire from maximum distance or use unmanned hose holders or monitor nozzles. Withdraw immediately in case of rising sound from venting safety devices or any discoloration of tanks due to fire. Move containers from fire area if you can do it without risk. For massive fire, use unmanned hose holders or monitor nozzles; if this is impossible, withdraw from area and let fire burn. Use water spray to cool unopened containers. Cool containers with flooding quantities of water until well after fire is out.

6. Accidental Release Measures

Personal precautions

Ensure adequate ventilation. Keep people away from and upwind of spill/leak. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. Ventilate closed spaces before entering. Keep unnecessary personnel away. Stay upwind. Keep out of low areas.

Environmental precautions

Prevent further leakage or spillage if safe to do so. Do not contaminate water.

Methods for containment

Eliminate all ignition sources (no smoking, flares, sparks, or flames in immediate area). Stop the flow of material, if this is without risk. Dike the spilled material, where this is possible. Use water spray to reduce vapors or divert vapor cloud drift. Prevent entry into waterways, sewers, basements or confined areas.

Methods for cleaning up

Should not be released into the environment.

Large Spills: Dike far ahead of liquid spill for later disposal. Use a non-combustible material like vermiculite, sand or earth to soak up the product and place into a container for later disposal. After removal flush contaminated area thoroughly with water.

Small Spills: Wipe up with absorbent material (e.g. cloth, fleece). Clean contaminated surface thoroughly.

Never return spills in original containers for re-use.

7. Handling and Storage

Handling

Do not handle or store near an open flame, heat or other sources of ignition. Use only with adequate ventilation. Wash thoroughly after handling. Avoid prolonged exposure.

Storage

Prevent electrostatic charge build-up by using common bonding and grounding techniques. Store in a closed container away from incompatible materials.

8. Exposure Controls / Personal Protection

Exposure limits

ACGIH

Components	CAS #	TWA	STEL	Ceiling
Methanol	67-56-1	200 ppm	250 ppm	Not established
Acetic Acid	64-19-7	10 ppm	15 ppm	Not established

OSHA

Components	CAS #	TWA	STEL	Ceiling
Methanol	67-56-1	200 ppm	Not established	Not established
Acetic Acid	64-19-7	10 ppm	Not established	Not established

Engineering controls

Ensure adequate ventilation, especially in confined areas.

Personal protective equipment

Eye / face protection

Do not get this material in contact with eyes. Wear chemical goggles. Face-shield.

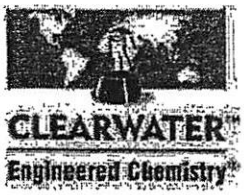
Skin protection	Do not get this material in contact with skin. Do not get this material on clothing. Wear chemical protective equipment that is specifically recommended by the manufacturer. It may provide little or no thermal protection. Use chemical splash goggles and face shield (ANSI Z87.1 or approved equivalent). Protective gloves.Impervious gloves. Structural firefighters protective clothing provides limited protection in fire situations ONLY; it is not effective in spill situations.
Respiratory protection	Wear positive pressure self-contained breathing apparatus (SCBA). When workers are facing concentrations above the exposure limit they must use appropriate certified respirators.
General hygeine considerations	Do not get this material in contact with eyes. Do not get this material in contact with skin. Do not get this material on clothing. When using do not eat or drink. Keep away from food and drink. Handle in accordance with good industrial hygiene and safety practice.

9. Physical & Chemical Properties

Appearance	Liquid.
Color	yellow - amber
Odor	Not assigned.
Odor threshold	Not available
Physical state	Liquid.
Form	Liquid.
pH	5 - 8
Melting point	-29.2 °F (-34.15 °C) estimated
Freezing point	Not available
Boiling point	129.2 °F (54.44 °C) estimated
Flash point	80 °F (26.7 °C)
Evaporation rate	Not available
Flammability	Not available.
Flammability limits in air, upper, % by volume	Not available
Flammability limits in air, lower, % by volume	Not available
Vapor pressure	Not available
Vapor density	Not available
Specific gravity	0.97 - 1
Relative density	0.9849 g/cm3 estimated
Solubility (water)	Not available
Partition coefficient (n-octanol/water)	Not available
Auto-ignition temperature	390.2 °F (199 °C) estimated
Decomposition temperature	Not available
VOC	42.8 % estimated

10. Chemical Stability & Reactivity Information

Chemical stability	Risk of ignition. Stable at normal conditions.



Conditions to avoid	Heat, flames and sparks.
Incompatible materials	Peroxides. Strong oxidizing agents. Strong acids. Caustics.
Hazardous decomposition products	Irritants. Toxic gas. May include oxides of nitrogen. May include oxides of phosphorus.
Possibility of hazardous reactions	Hazardous polymerization does not occur.

11. Toxicological Information

Acute effects

Acute LD50: 10386 mg/kg estimated, Rat, Oral
Acute LD50: 11503 mg/kg estimated, Rat, Dermal
Acute LC50: 35 mg/l/4h estimated, Rat, Inhalation
Causes burns.

Component analysis - LD50

Toxicology Data - Selected LD50s and LC50s

Acetic Acid	64-19-7	Inhalation LC50 Rat: 11.4 mg/L/1H; Oral LD50 Rat:3310 mg/kg; Dermal LD50 Rabbit:1060 mg/kg
Methanol	67-56-1	Inhalation LC50 Rat: 83.2 mg/L/4H; Inhalation LC50 Rat:64000 ppm/4H; Oral LD50 Rat:5628 mg/kg; Dermal LD50 Rabbit:15800 mg/kg

Local effects Irritating to respiratory system.

Chronic effects Hazardous by OSHA criteria. Prolonged or repeated exposure may cause lung injury. Prolonged exposure may cause chronic effects.

Carcinogenicity Not expected to be hazardous by OSHA criteria.

Neurological effects Not expected to be hazardous by OSHA criteria.

12. Ecological Information

Ecotoxicity LC50 1273 mg/L estimated, Fish, 96.00 Hours,

Ecotoxicity - Freshwater Fish Species Data

Acetic Acid	64-19-7	96 Hr LC50 Pimephales promelas: 88 mg/L [static]; 96 Hr LC50 Lepomis macrochirus 75 mg/L
Methanol	67-56-1	96 Hr LC50 Pimephales promelas: 28100 mg/L [flow-through]; 96 Hr LC50 Oncorhynchus mykiss: 13200 mg/L

Ecotoxicity - Microtox Data

Acetic Acid	64-19-7	5 min EC50 Photobacterium phosphoreum: 8.8 mg/L; 15 min EC50 Photobacterium phosphoreum: 8.8 mg/L; 25 min EC50 Photobacterium phosphoreum: 8.8 mg/L
Methanol	67-56-1	5 min EC50 Photobacterium phosphoreum: 43000 mg/L; 15 min EC50 Photobacteriur phosphoreum: 40000 mg/L; 25 min EC50 Photobacterium phosphoreum: 39000 mg/l

Ecotoxicity - Water Flea Data

Acetic Acid	64-19-7	24 Hr EC50 Daphnia magna: 95 mg/L

Environmental effects Harmful to aquatic life.

Ecotoxicity - Freshwater Fish Species Data

Acetic Acid	64-19-7	96 Hr LC50 Pimephales promelas: 88 mg/L [static]; 96 Hr LC50 Lepomis macrochirus 75 mg/L
Methanol	67-56-1	96 Hr LC50 Pimephales promelas: 28100 mg/L [flow-through]; 96 Hr LC50 Oncorhynchus mykiss: 13200 mg/L

Ecotoxicity - Microtox Data

Acetic Acid	64-19-7	5 min EC50 Photobacterium phosphoreum: 8.8 mg/L; 15 min EC50 Photobacterium phosphoreum: 8.8 mg/L; 25 min EC50 Photobacterium phosphoreum: 8.8 mg/L
Methanol	67-56-1	5 min EC50 Photobacterium phosphoreum: 43000 mg/L; 15 min EC50 Photobacteriur phosphoreum: 40000 mg/L; 25 min EC50 Photobacterium phosphoreum: 39000 mg/l

Ecotoxicity - Water Flea Data

Acetic Acid	64-19-7	24 Hr EC50 Daphnia magna: 95 mg/L

13. Disposal Considerations

Waste codes D001: Waste Flammable material with a flash point <140 F

U.S. - RCRA (Resource Conservation & Recovery Act) - U Series Wastes - Acutely Toxic Wastes & Other Hazardous Characteristics

Methanol	67-56-1	waste number U154 (Ignitable waste)

Disposal instructions Dispose of this material and its container at hazardous or special waste collection point. Do not allow this material to drain into sewers/water supplies. If discarded, this product is considered a RCRA ignitable waste, D001. Incinerate the material under controlled conditions in an approved incinerator. Do not incinerate sealed containers. Dispose in accordance with all applicable regulations.

14. Transport Information

Department of Transportation (DOT) Requirements

Basic shipping requirements:	
Proper shipping name	Flammable liquids, n.o.s. (Methanol)
Hazard class	3
UN number	UN1993
Packing group	III
Additional information:	
Packaging non bulk	202
Packaging bulk	242
ERG number	128

Department of Transportation (DOT) Requirements

Bulk

Basic shipping requirements:	
Proper shipping name	Flammable liquids, n.o.s. (Methanol)
Hazard class	3
UN number	UN1993
Packing group	III
Additional information:	
Packaging non bulk	202
Packaging bulk	242
ERG number	128

Canadian Transportation of Dangerous Goods (TDG) Requirements

Basic shipping requirements:	
Proper shipping name	FLAMMABLE LIQUID, TOXIC, N.O.S. (Methanol)
Hazard class	3
Subsidiary hazard class	6.1
UN number	UN1992
Packing group	III
Additional information:	
Special provisions	16
ERG number	128

IMDG

Basic shipping requirements:	
Proper shipping name	FLAMMABLE LIQUID, TOXIC, N.O.S. (Methanol)
Hazard class	3
Subsidiary hazard class	6.1
UN number	1992
Packing group	III

IATA

Basic shipping requirements:	
Proper shipping name	Flammable liquid, n.o.s. (Methanol)
Hazard class	3
UN number	1993
Packing group	III

15. Regulatory Information

Labelling

Contains Acetic Acid, Ammonium bisulfite, Methanol

US federal regulations This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

FEMA (Flavor and Extract Manufacturers Association) - FEMA Numbers

Acetic Acid	64-19-7	2006

U.S. - CERCLA/SARA - Section 313 - Emission Reporting

Methanol	67-56-1	1.0 % de minimis concentration

U.S. - FDA - Direct Food Additives

Methanol	67-56-1	21 CFR 173.250

U.S. - FDA - Food Additives Generally Recognized as Safe (GRAS)

Acetic Acid	64-19-7	21 CFR 184.1005

Occupational Safety and Health Administration (OSHA)

29 CFR 1910.1200 hazardous chemical	Yes

CERCLA (Superfund) reportable quantity

Methanol: 5000.0000
Ammonium bisulfite: 5000.0000
Acetic Acid: 5000.0000

Superfund Amendments and Reauthorization Act of 1986 (SARA)

Hazard categories	Immediate Hazard - Yes Delayed Hazard - Yes Fire Hazard - Yes Pressure Hazard - No Reactivity Hazard - No
Section 302 extremely hazardous substance	No
Section 311 hazardous chemical	Yes

Inventory status

Country(s) or region	Inventory name	On inventory (yes/no)*
Australia	Australian Inventory of Chemical Substances (AICS)	No
Canada	Domestic Substances List (DSL)	No
Canada	Non-Domestic Substances List (NDSL)	No
China	Inventory of Existing Chemical Substances in China (IECSC)	No
Europe	European Inventory of New and Existing Chemicals (EINECS)	No
Europe	European List of Notified Chemical Substances (ELINCS)	No
Japan	Inventory of Existing and New Chemical Substances (ENCS)	No
Korea	Existing Chemicals List (ECL)	No
New Zealand	New Zealand Inventory	No
Philippines	Philippine Inventory of Chemicals and Chemical Substances (PICCS)	No
United States & Puerto Rico	Toxic Substances Control Act (TSCA) Inventory	No

A "Yes" indicates that all components of this product comply with the inventory requirements administered by the governing country(s)

International regulations

Canada - WHMIS - Ingredient Disclosure List

Acetic Acid	64-19-7	1 %
Ammonium bisulfite	10192-30-0	1 %
Methanol	67-56-1	1 %

State regulations This product does not contain a chemical known to the State of California to cause cancer, birth defects or other reproductive harm.

U.S. - Massachusetts - Right To Know List

Acetic Acid	64-19-7	Present
Ammonium bisulfite	10192-30-0	Present
Methanol	67-56-1	Present

U.S. - Minnesota - Hazardous Substance List

Acetic Acid	64-19-7	Present
Methanol	67-56-1	Skin

U.S. - New Jersey - Right to Know Hazardous Substance List

Acetic Acid	64-19-7	sn 0004
Ammonium bisulfite	10192-30-0	sn 0090
Methanol	67-56-1	sn 1222

U.S. - Pennsylvania - RTK (Right to Know) List

Acetic Acid	64-19-7	Environmental hazard
Ammonium bisulfite	10192-30-0	Environmental hazard
Methanol	67-56-1	Environmental hazard

U.S. - Rhode Island - Hazardous Substance List

Acetic Acid	64-19-7	Toxic; Flammable
Methanol	67-56-1	Toxic; Flammable

U.S. - Texas - Effects Screening Levels - Long Term

Acetic Acid	64-19-7	10 ppb ESL; 25 µg/m3 ESL
Methanol	67-56-1	200 ppb ESL; 262 µg/m3 ESL

U.S. - Texas - Effects Screening Levels - Short Term

Acetic Acid	64-19-7	100 ppb ESL; 250 µg/m3 ESL
Methanol	67-56-1	2000 ppb ESL; 2620 µg/m3 ESL

16. Other Information

HMIS® ratings
Health: 2*
Flammability: 3
Physical hazard: 0

NFPA ratings
Health: 2
Flammability: 3
Instability: 0

Prepared by
Amanda L. Ruston
4420 South Flores Road
Elmendorf, Texas 78112
210-626-0850

Disclaimer
THIS PRODUCT'S HEALTH AND SAFETY INFORMATION IS PROVIDED TO ASSIST OUR CUSTOMERS IN ASSESSING COMPLIANCE WITH HEALTH, SAFETY AND ENVIRONMENTAL REGULATIONS. THE INFORMATION CONTAINED HEREIN IS BASED ON DATA AVAILABLE TO US, AND IS BELIEVED TO BE ACCURATE, ALTHOUGH NO GUARANTEE OR WARRANTY IS PROVIDED OR IMPLIED BY THE COMPANY IN THIS RESPECT. SINCE THE USE OF THIS PRODUCT IS WITHIN THE EXCLUSIVE CONTROL OF THE USER, IT IS THE USER'S RESPONSIBILITY TO DETERMINE THE CONDITIONS OF SAFE USE. SUCH CONDITIONS MUST COMPLY WITH ALL GOVERNMENTAL REGULATIONS.

Issue date
February-09-2011

MSDS sections updated
Product and Company Identification: Alternate Trade Names
Other Information: MSDS footer disclaimer

Appendix G
Wells Serviced by Injection Well

APPENDIX G

Wells Serviced by Injection Wells

API #	Operator	Producing Formation
Not Applicable		

Make as many copies as necessary and include page numbers as appropriate.

SECTION 9
OPERATING REQUIREMENTS/DATA

ATTACHMENT 9-1

Potential Underground Injection Control (UIC)
Associated with Gathering, Storage and Transmission Operations

Fluid Identification

Group 2 – Field Gathering/Storage Generated

Separator Condensate Water
Brine Water
Hydrostatic Test Water (existing wells/pipes)

Group 3 – Gathering/Storage Associated Gas Plant/Compressor Station Wastewater

Basement Water
Stormwater (including equipment pad and remediation)
Cleaning/Washdown Water
Air Compressor Condensate Water

SECTION 9
OPERATING REQUIREMENTS/DATA

ATTACHMENT 9-2

Columbia Gas Transmission, LLC
West Virginia Compressor Station Summary

Storage/Gathering Associated With Compressor Stations

Compressor Station	County, State
Horse Creek	Boone, WV
Ripley	Jackson, WV
Buff Lick	Kanawha, WV
Cobb	Kanawha, WV
Coco	Kanawha, WV
Hunt	Kanawha, WV
Walgrove	Kanawha, WV
Hubball	Lincoln, WV
Grant	Mingo, WV
Terra Alta	Preston, WV
Nye	Putnam, WV
Glady	Randolph
Kenova	Wayne, WV
Rockport	Wood, WV
Huff Creek	Wyoming, WV
Walbridge	Lawrence, KY
Inez	Martin, KY
Boldman	Pike, KY

Combined Storage/Gathering/Transmission Associated With Compressor Stations

Compressor Station	County, State
Hardy County	Hardy, WV
Lanham	Kanawha, WV
Adaline	Marshall, WV

SECTION 9
OPERATING REQUIREMENTS/DATA

ATTACHMENT 9-3

Chemical and Physical Characteristics of Injection Fluid
ALS Environmental Laboratory Report

Columbia Gas Transmission, LLC
UIC 2D0871977
Walton District, Roane County, WV
Class II Injectate Analyses
2015

ALS Environmental

16-Dec-2015

Doug Bowe
Potesta & Associates
7012 MacCorkle Avenue, SE
Charleston, WV 25304

Re: **Columbia Martin Yard Renewal Sampling** Work Order: **15111192**

Dear Doug,

ALS Environmental received 2 samples on 20-Nov-2015 11:15 AM for the analyses presented in the following report.

The analytical data provided relates directly to the samples received by ALS Environmental and for only the analyses requested.

Sample results are compliant with NELAP standard requirements and QC results achieved laboratory specifications. Any exceptions are noted in the Case Narrative, or noted with qualifiers in the report or QC batch information. Should this laboratory report need to be reproduced, it should be reproduced in full unless written approval has been obtained from ALS Environmental. Samples will be disposed in 30 days unless storage arrangements are made.

The total number of pages in this report is 41.

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

Sincerely,

Rebecca Kiser

Electronically approved by: Rebecca Kiser

Rebecca Kiser
Project Manager

NELAP ACCREDITED LABORATORY
Certificate No: WV: 355

Report of Laboratory Analysis

ALS Group USA, Corp

Date: 16-Dec-15

Client: Potesta & Associates
Project: Columbia Martin Yard Renewal Sampling
Work Order: 15111192

Work Order Sample Summary

Lab Samp ID	Client Sample ID	Matrix	Tag Number	Collection Date	Date Received	Hold
15111192-01	Martin Yard UIC Grab	Water		11/20/2015 10:20	11/20/2015 11:15	☐
15111192-01	Martin Yard UIC Grab	Water		11/20/2015 10:20	11/21/2015 10:30	☐
15111192-02	Trip Blank	Water		11/20/2015	11/21/2015 10:30	☐

ALS Group USA, Corp

Date: 16-Dec-15

Client:	Potesta & Associates
Project:	Columbia Martin Yard Renewal Sampling
Work Order:	15111192

Case Narrative

ALS Environmental
1740 Union Carbide Dr.
South Charleston, WV 25303

The following parameters were received and analyzed for WO# 15111192 at the ALS South Charleston facility under WVDEP Attachment I, Certificate No. 385:

pH - SM4500H B11
Coliform, Total (MF) - SM9222 B-97

Surfactants (MBAS) and Dissolved Gases were analyzed at the ALS Middletown facility under WVDEP Attachment I, Certifiate No. 343.

RadChem was analyzed at Pace Analytical (see attached report).

Per 40CFR Part 136 Table II Sample Handling Guidelines:

The holding time associated with the following parameters is defined as not to exceed 15 minutes:

Hydrogen Ion (pH)

Results for analyses conducted in the laboratory, for the above noted parameters, shall be considered non-compliant.

Batch R176679, Method PH_4500WV_W, Sample 15111192-01E: Sample was analyzed outside of the holding time at the request of the client. Results should be considered estimated.

ALS Group USA, Corp

Date: 16-Dec-15

Client:	Potesta & Associates
Project:	Columbia Martin Yard Renewal Sampling
WorkOrder:	15111192

QUALIFIERS, ACRONYMS, UNITS

Qualifier	Description
*	Value exceeds Regulatory Limit
a	Not accredited
B	Analyte detected in the associated Method Blank above the Reporting Limit
E	Value above quantitation range
H	Analyzed outside of Holding Time
J	Analyte is present at an estimated concentration between the MDL and Report Limit
n	Not offered for accreditation
ND	Not Detected at the Reporting Limit
O	Sample amount is > 4 times amount spiked
P	Dual Column results percent difference > 40%
R	RPD above laboratory control limit
S	Spike Recovery outside laboratory control limits
U	Analyzed but not detected above the MDL
X	Analyte was detected in the Method Blank between the MDL and PQL, sample results may exhibit background or reagent contamination at the observed level.

Acronym	Description
DUP	Method Duplicate
LCS	Laboratory Control Sample
LCSD	Laboratory Control Sample Duplicate
LOD	Limit of Detection (see MDL)
LOQ	Limit of Quantitation (see PQL)
MBLK	Method Blank
MDL	Method Detection Limit
MS	Matrix Spike
MSD	Matrix Spike Duplicate
PQL	Practical Quantitation Limit
RPD	Relative Percent Difference
TDL	Target Detection Limit
TNTC	Too Numerous To Count
A	APHA Standard Methods
D	ASTM
E	EPA
SW	SW-846 Update III

Units Reported	Description
µg/L	Micrograms per Liter
as noted	
cfu/100ml	Colony Forming Units per 100 Milliliters
mg MBAS/L	Milligrams Methylene Blue Active Substances per Liter
mg/L	Milligrams per Liter
none	
s.u.	Standard Units

ALS Group USA, Corp

Date: *16-Dec-15*

Client: Potesta & Associates
Project: Columbia Martin Yard Renewal Sampling
Sample ID: Martin Yard UIC Grab
Collection Date: 11/20/2015 10:20 AM

Work Order: 15111192
Lab ID: 15111192-01
Matrix: WATER

Analyses	Result	Qual	MDL	Report Limit	Units	Dilution Factor	Date Analyzed
DIESEL RANGE ORGANICS BY GC-FID			Method:SW8015C		Prep: SW3511 / 11/23/15		Analyst: IT
DRO (C10-C28)	45		0.23	1.0	mg/L	10	11/24/2015 13:32
ORO (C28-C40)	37		0.26	1.0	mg/L	10	11/24/2015 13:32
Surr: 4-Terphenyl-d14	*140*			*31-176*	*%REC*	10	11/24/2015 13:32
GASOLINE RANGE ORGANICS BY GC-FID			Method:SW8015D				Analyst: IT
GRO (C6-C10)	86,000		330	2,000	µg/L	10	11/24/2015 14:19
Surr: Toluene-d8	*103*			*70-130*	*%REC*	10	11/24/2015 14:19
METALS BY ICP-MS			Method:E200.8		Prep: E200.8 / 11/23/15		Analyst: RH
Aluminum	0.85		0.011	0.10	mg/L	10	11/25/2015 03:02
Arsenic	0.21		0.0070	0.050	mg/L	10	11/25/2015 03:02
Barium	0.24		0.0020	0.050	mg/L	10	11/25/2015 03:02
Calcium	220		3.8	5.0	mg/L	10	11/25/2015 03:02
Iron	23		0.10	0.80	mg/L	10	11/25/2015 03:02
Manganese	0.33		0.0020	0.050	mg/L	10	11/25/2015 03:02
Sodium	730		0.51	2.0	mg/L	10	11/25/2015 03:02
TOTAL COLIFORM, MF			Method:A9222 B-97				Analyst: ARC
Total Coliform, MF	*<10*		10	10	cfu/100ml	1	11/20/2015 15:43
PH (LABORATORY)			Method:A4500-H B-11				Analyst: ARC
pH (laboratory)	5.11	H	0.020	0.0200	s.u.	1	11/20/2015 13:25
GASES IN WATER			Method:RSK-175				Analyst: ALS
Butane	90		0.35	4.3	µg/L	1	11/23/2015 08:31
Ethane	120		0.23	3.3	µg/L	1	11/23/2015 08:31
Methane	750		0.34	1.5	µg/L	1	11/23/2015 08:31
Propane	110		0.22	3.2	µg/L	1	11/23/2015 08:31
SUBCONTRACTED ANALYSES			Method:SUBCONTRACT				Analyst: PACE
Subcontracted Analyses	See attached		0		as noted	1	12/11/2015
VOLATILE ORGANIC COMPOUNDS			Method:E624				Analyst: BG
Benzene	4,700		25	100	µg/L	100	11/25/2015 18:22
Ethylbenzene	460		22	100	µg/L	100	11/25/2015 18:22
m,p-Xylene	2,300		40	200	µg/L	100	11/25/2015 18:22
o-Xylene	900		21	100	µg/L	100	11/25/2015 18:22
Toluene	4,900		20	100	µg/L	100	11/25/2015 18:22
Xylenes, Total	3,200		62	300	µg/L	100	11/25/2015 18:22
Surr: 1,2-Dichloroethane-d4	*102*			*75-120*	*%REC*	100	11/25/2015 18:22
Surr: 4-Bromofluorobenzene	*99.5*			*80-110*	*%REC*	100	11/25/2015 18:22

Note: See Qualifiers page for a list of qualifiers and their definitions.

ALS Group USA, Corp

Date: *16-Dec-15*

Client: Potesta & Associates
Project: Columbia Martin Yard Renewal Sampling
Sample ID: Martin Yard UIC Grab
Collection Date: 11/20/2015 10:20 AM

Work Order: 15111192
Lab ID: 15111192-01
Matrix: WATER

Analyses	Result	Qual	MDL	Report Limit	Units	Dilution Factor	Date Analyzed
Surr: Dibromofluoromethane	*96.0*			*85-115*	*%REC*	100	11/25/2015 18:22
Surr: Toluene-d8	*99.4*			*85-110*	*%REC*	100	11/25/2015 18:22
ANIONS BY ION CHROMATOGRAPHY			Method:E300.0				Analyst: ED
Chloride	1,500		29	200	mg/L	200	11/30/2015 18:51
Sulfate	22		0.70	5.0	mg/L	5	11/30/2015 17:49
ANIONIC SURFACTANTS AS MBAS			Method:A5540C				Analyst: ALS
Anionic Surfactants as MBAS	0.46		0.010	0.050	mg MBAS/L	1	11/21/2015 10:40
SPECIFIC GRAVITY			Method:D5057-90				Analyst: KF
Specific Gravity	1.01		0		none	1	11/25/2015 15:00
TOTAL DISSOLVED SOLIDS			Method:A2540 C-97		Prep: FILTER / 11/25/15		Analyst: STP
Total Dissolved Solids	3,000		30	40	mg/L	1	11/25/2015 13:42
ORGANIC CARBON, TOTAL			Method:A5310C-00				Analyst: JJG
Organic Carbon, Total	3,900		33	250	mg/L	500	11/25/2015 14:00
TOTAL SUSPENDED SOLIDS			Method:A2540 D-97		Prep: FILTER / 11/24/15		Analyst: STP
Total Suspended Solids	210		3.5	6.0	mg/L	1	11/24/2015 16:47

Note: See Qualifiers page for a list of qualifiers and their definitions.

ALS Group USA, Corp

Date: *16-Dec-15*

Client: Potesta & Associates
Project: Columbia Martin Yard Renewal Sampling
Sample ID: Trip Blank
Collection Date: 11/20/2015

Work Order: 15111192
Lab ID: 15111192-02
Matrix: WATER

Analyses	Result	Qual	MDL	Report Limit	Units	Dilution Factor	Date Analyzed
VOLATILE ORGANIC COMPOUNDS		Method:E624					Analyst: BG
Benzene	U		0.25	1.0	µg/L	1	11/25/2015 17:56
Ethylbenzene	U		0.22	1.0	µg/L	1	11/25/2015 17:56
m,p-Xylene	U		0.40	2.0	µg/L	1	11/25/2015 17:56
o-Xylene	U		0.21	1.0	µg/L	1	11/25/2015 17:56
Toluene	U		0.20	1.0	µg/L	1	11/25/2015 17:56
Xylenes, Total	U		0.62	3.0	µg/L	1	11/25/2015 17:56
Surr: 1,2-Dichloroethane-d4	*101*			*75-120*	*%REC*	1	11/25/2015 17:56
Surr: 4-Bromofluorobenzene	*96.8*			*80-110*	*%REC*	1	11/25/2015 17:56
Surr: Dibromofluoromethane	*97.1*			*85-115*	*%REC*	1	11/25/2015 17:56
Surr: Toluene-d8	*97.9*			*85-110*	*%REC*	1	11/25/2015 17:56

Note: See Qualifiers page for a list of qualifiers and their definitions.

ALS Group USA, Corp

Date: 16-Dec-15

Client: Potesta & Associates
Work Order: 15111192
Project: Columbia Martin Yard Renewal Sampling

QC BATCH REPORT

Batch ID: 79332 Instrument ID GC8 Method: SW8015C

MBLK Sample ID: DBLKW1-79332-79332 Units: mg/L Analysis Date: 11/24/2015 09:17 AM
Client ID: Run ID: GC8_151124B SeqNo: 3587015 Prep Date: 11/23/2015 DF: 1

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
DRO (C10-C28)	U	0.023	0.10								
ORO (C28-C40)	U	0.026	0.10								
Surr: 4-Terphenyl-d14	*0.1121*	0	0	*0.1143*	0	*98.1*	*31-176*	0			

LCS Sample ID: DLCSW1-79332-79332 Units: mg/L Analysis Date: 11/24/2015 10:00 AM
Client ID: Run ID: GC8_151124B SeqNo: 3587016 Prep Date: 11/23/2015 DF: 1

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
DRO (C10-C28)	7.85	0.023	0.10	11.43	0	68.7	35-95	0			
ORO (C28-C40)	5.72	0.026	0.10	11.43	0	50.1	44-77	0			
Surr: 4-Terphenyl-d14	*0.1148*	0	0	*0.1143*	0	*100*	*31-176*	0			

MS Sample ID: 1511948-01E MS Units: mg/L Analysis Date: 11/24/2015 10:30 AM
Client ID: Run ID: GC8_151124B SeqNo: 3587017 Prep Date: 11/23/2015 DF: 1

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
DRO (C10-C28)	8.472	0.023	0.10	11.43	1.032	65.1	29-96	0			
ORO (C28-C40)	6.474	0.026	0.10	11.43	0	56.6	41-84	0			
Surr: 4-Terphenyl-d14	*0.1107*	0	0	*0.1143*	0	*96.9*	*31-176*	0			

DUP Sample ID: 1511948-02E DUP Units: mg/L Analysis Date: 11/24/2015 12:02 PM
Client ID: Run ID: GC8_151124B SeqNo: 3587020 Prep Date: 11/23/2015 DF: 1

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
DRO (C10-C28)	U	0.023	0.10	0	0	0		0	0	30	
ORO (C28-C40)	U	0.026	0.10	0	0	0		0	0	30	
Surr: 4-Terphenyl-d14	*0.09358*	0	0	*0.1143*	0	*81.9*	*31-176*	0.08112	*14.3*	*30*	

The following samples were analyzed in this batch: 15111192-01B

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: Potesta & Associates
Work Order: 15111192
Project: Columbia Martin Yard Renewal Sampling

QC BATCH REPORT

Batch ID: R176974 Instrument ID GC9 Method: SW8015D

MBLK Sample ID: GBLKW1-151124-R176974 Units: µg/L Analysis Date: 11/24/2015 10:47 AM
Client ID: Run ID: GC9_151124A SeqNo: 3587296 Prep Date: DF: 1

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
GRO (C6-C10)	U	33	200								
Surr: Toluene-d8	*116*	0	0	*100*	0	*116*	*70-130*	0			

LCS Sample ID: GLCSW1-151124-R176974 Units: µg/L Analysis Date: 11/24/2015 10:22 AM
Client ID: Run ID: GC9_151124A SeqNo: 3587293 Prep Date: DF: 1

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
GRO (C6-C10)	9989	33	200	10000	0	99.9	70-130	0			
Surr: Toluene-d8	*107.5*	0	0	*100*	0	*107*	*70-130*	0			

MS Sample ID: 15111268-07A MS Units: µg/L Analysis Date: 11/24/2015 02:44 PM
Client ID: Run ID: GC9_151124A SeqNo: 3587323 Prep Date: DF: 1

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
GRO (C6-C10)	9802	33	200	10000	0	98	70-130	0			
Surr: Toluene-d8	*104*	0	0	*100*	0	*104*	*70-130*	0			

.D Sample ID: 15111268-07A MSD Units: µg/L Analysis Date: 11/24/2015 03:09 PM
Client ID: Run ID: GC9_151124A SeqNo: 3587327 Prep Date: DF: 1

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
GRO (C6-C10)	9772	33	200	10000	0	97.7	70-130	9802	0.302	30	
Surr: Toluene-d8	*106.5*	0	0	*100*	0	*106*	*70-130*	104	*2.38*	*30*	

The following samples were analyzed in this batch: 15111192-01A

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: Potesta & Associates
Work Order: 15111192
Project: Columbia Martin Yard Renewal Sampling

QC BATCH REPORT

Batch ID: 79291 Instrument ID ICPMS2 Method: E200.8

MBLK Sample ID: MBLK-79290-79291 Units: mg/L Analysis Date: 11/24/2015 12:11 AM
Client ID: Run ID: ICPMS2_151123A SeqNo: 3585015 Prep Date: 11/23/2015 DF: 1

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Aluminum	0.001495	0.0011	0.010								J
Arsenic	U	0.0007	0.0050								
Barium	U	0.0002	0.0050								
Calcium	U	0.38	0.50								
Iron	U	0.01	0.080								
Manganese	U	0.0002	0.0050								

MBLK Sample ID: MBLK-79291-79291 Units: mg/L Analysis Date: 11/24/2015 12:21 AM
Client ID: Run ID: ICPMS2_151123A SeqNo: 3585017 Prep Date: 11/23/2015 DF: 1

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Aluminum	U	0.0011	0.010								
Arsenic	U	0.0007	0.0050								
Barium	U	0.0002	0.0050								
Calcium	U	0.38	0.50								
Iron	U	0.01	0.080								
nganese	U	0.0002	0.0050								
ium	0.06846	0.051	0.20								J

LCS Sample ID: LCS-79290-79291 Units: mg/L Analysis Date: 11/24/2015 12:16 AM
Client ID: Run ID: ICPMS2_151123A SeqNo: 3585016 Prep Date: 11/23/2015 DF: 1

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Aluminum	0.08906	0.0011	0.010	0.1	0	89.1	85-115	0			
Arsenic	0.08997	0.0007	0.0050	0.1	0	90	85-115	0			
Barium	0.08896	0.0002	0.0050	0.1	0	89	85-115	0			
Calcium	9.429	0.38	0.50	10	0	94.3	85-115	0			
Iron	9.329	0.01	0.080	10	0	93.3	85-115	0			
Manganese	0.08988	0.0002	0.0050	0.1	0	89.9	85-115	0			

LCS Sample ID: LCS-79291-79291 Units: mg/L Analysis Date: 11/24/2015 12:27 AM
Client ID: Run ID: ICPMS2_151123A SeqNo: 3585018 Prep Date: 11/23/2015 DF: 1

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Aluminum	0.08887	0.0011	0.010	0.1	0	88.9	85-115	0			
Arsenic	0.08968	0.0007	0.0050	0.1	0	89.7	85-115	0			
Barium	0.08886	0.0002	0.0050	0.1	0	88.9	85-115	0			
Calcium	9.342	0.38	0.50	10	0	93.4	85-115	0			
Iron	9.34	0.01	0.080	10	0	93.4	85-115	0			
Manganese	0.08929	0.0002	0.0050	0.1	0	89.3	85-115	0			
um	9.268	0.051	0.20	10	0	92.7	85-115	0			

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: Potesta & Associates
Work Order: 15111192
Project: Columbia Martin Yard Renewal Sampling

QC BATCH REPORT

Batch ID: 79291 Instrument ID ICPMS2 Method: E200.8

MS Sample ID: 15111172-01AMS Units: mg/L Analysis Date: 11/24/2015 01:19 AM
Client ID: Run ID: ICPMS2_151123A SeqNo: 3585028 Prep Date: 11/23/2015 DF: 1

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Aluminum	26.37	0.0011	0.010	0.1	27.73	-1360	70-130	0			SEO
Arsenic	0.09573	0.0007	0.0050	0.1	0.004774	91	70-130	0			
Barium	0.0959	0.0002	0.0050	0.1	0.004432	91.5	70-130	0			
Calcium	31.11	0.38	0.50	10	23.58	75.3	70-130	0			
Iron	31.43	0.01	0.080	10	23.84	75.9	70-130	0			
Manganese	0.198	0.0002	0.0050	0.1	0.1022	95.8	70-130	0			

MS Sample ID: 15111175-01AMS Units: mg/L Analysis Date: 11/24/2015 01:56 AM
Client ID: Run ID: ICPMS2_151123A SeqNo: 3585035 Prep Date: 11/23/2015 DF: 1

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Aluminum	0.1229	0.0011	0.010	0.1	0.03562	87.3	70-130	0			
Arsenic	0.116	0.0007	0.0050	0.1	0.02672	89.3	70-130	0			
Barium	0.1999	0.0002	0.0050	0.1	0.1071	92.8	70-130	0			
Calcium	60.57	0.38	0.50	10	52.37	82	70-130	0			O
Iron	9.71	0.01	0.080	10	0.6624	90.5	70-130	0			
ganese	0.1158	0.0002	0.0050	0.1	0.02455	91.2	70-130	0			
ium	61.33	0.051	0.20	10	53.38	79.5	70-130	0			O

MS Sample ID: 15111172-01AMS Units: mg/L Analysis Date: 11/25/2015 02:51 AM
Client ID: Run ID: ICPMS2_151124A SeqNo: 3588279 Prep Date: 11/23/2015 DF: 10

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Sodium	1259	0.51	2.0	10	1316	-570	70-130	0			SO

MSD Sample ID: 15111172-01AMSD Units: mg/L Analysis Date: 11/24/2015 01:25 AM
Client ID: Run ID: ICPMS2_151123A SeqNo: 3585029 Prep Date: 11/23/2015 DF: 1

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Aluminum	26.42	0.0011	0.010	0.1	27.73	-1310	70-130	26.37	0.189	20	SEO
Arsenic	0.09372	0.0007	0.0050	0.1	0.004774	88.9	70-130	0.09573	2.12	20	
Barium	0.09401	0.0002	0.0050	0.1	0.004432	89.6	70-130	0.0959	2.09	20	
Calcium	30.99	0.38	0.50	10	23.58	74.1	70-130	31.11	0.386	20	
Iron	31.67	0.01	0.080	10	23.84	78.3	70-130	31.43	0.761	20	
Manganese	0.1954	0.0002	0.0050	0.1	0.1022	93.2	70-130	0.198	1.32	20	

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: Potesta & Associates
Work Order: 15111192
Project: Columbia Martin Yard Renewal Sampling

QC BATCH REPORT

Batch ID: 79291 Instrument ID ICPMS2 Method: E200.8

MSD	Sample ID: 15111175-01AMSD				Units: mg/L			Analysis Date: 11/24/2015 02:02 AM			
Client ID:	Run ID: ICPMS2_151123A				SeqNo: 3585036			Prep Date: 11/23/2015		DF: 1	
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Aluminum	0.1238	0.0011	0.010	0.1	0.03562	88.2	70-130	0.1229	0.73	20	
Arsenic	0.1173	0.0007	0.0050	0.1	0.02672	90.6	70-130	0.116	1.11	20	
Barium	0.2001	0.0002	0.0050	0.1	0.1071	93	70-130	0.1999	0.1	20	
Calcium	59.39	0.38	0.50	10	52.37	70.2	70-130	60.57	1.97	20	O
Iron	9.887	0.01	0.080	10	0.6624	92.2	70-130	9.71	1.81	20	
Manganese	0.1203	0.0002	0.0050	0.1	0.02455	95.8	70-130	0.1158	3.81	20	
Sodium	60.2	0.051	0.20	10	53.38	68.2	70-130	61.33	1.86	20	SO

MSD	Sample ID: 15111172-01AMSD				Units: mg/L			Analysis Date: 11/25/2015 02:56 AM			
Client ID:	Run ID: ICPMS2_151124A				SeqNo: 3588281			Prep Date: 11/23/2015		DF: 10	
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Sodium	1270	0.51	2.0	10	1316	-460	70-130	1259	0.87	20	SO

The following samples were analyzed in this batch: 15111192-01G

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: Potesta & Associates
Work Order: 15111192
Project: Columbia Martin Yard Renewal Sampling

QC BATCH REPORT

Batch ID: R176679 Instrument ID **WETCHEM** Method: **A4500-H B-11**

LCS Sample ID: **LCS-R176679-R176679** Units: **s.u.** Analysis Date: **11/20/2015 01:25 PM**
Client ID: Run ID: **WETCHEM_151120A** SeqNo: **3579493** Prep Date: DF: **1**

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
pH (laboratory)	4.01	0.02	0.020	4	0	100	90-110	0			

DUP Sample ID: **15111192-01E DUP** Units: **s.u.** Analysis Date: **11/20/2015 01:25 PM**
Client ID: **Martin Yard UIC Grab** Run ID: **WETCHEM_151120A** SeqNo: **3579495** Prep Date: DF: **1**

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
pH (laboratory)	5.17	0.02	0.020	0	0	0		5.11	1.17	20	H

The following samples were analyzed in this batch: 15111192-01E

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: Potesta & Associates
Work Order: 15111192
Project: Columbia Martin Yard Renewal Sampling

QC BATCH REPORT

Batch ID: R176747 Instrument ID WETCHEM Method: A9222 B-97

MBLK	Sample ID: MB-R176747-R176747				Units: cfu/100ml			Analysis Date: 11/20/2015 03:43 PM			
Client ID:	Run ID: WETCHEM_151120I				SeqNo: 3581087			Prep Date:		DF: 1	
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Total Coliform, MF	U	10	10								

MBLK	Sample ID: MBLK2-R176747				Units: cfu/100ml			Analysis Date: 11/20/2015 03:43 PM			
Client ID:	Run ID: WETCHEM_151120I				SeqNo: 3581091			Prep Date:		DF: 1	
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Total Coliform, MF	U	10	10								

DUP	Sample ID: 15111192-01I DUP				Units: cfu/100ml			Analysis Date: 11/20/2015 03:43 PM			
Client ID: Martin Yard UIC Grab	Run ID: WETCHEM_151120I				SeqNo: 3581090			Prep Date:		DF: 1	
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Total Coliform, MF	U	10	10	0	0	0		0	0	20	

The following samples were analyzed in this batch: 15111192-01I

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: Potesta & Associates
Work Order: 15111192
Project: Columbia Martin Yard Renewal Sampling

QC BATCH REPORT

Batch ID: R177180 Instrument ID SUB Method: RSK-175

MBLK Sample ID: MB-R177180-R177180 Units: µg/L Analysis Date: 11/23/2015 07:14 AM
Client ID: Run ID: SUB_151123B SeqNo: 3593568 Prep Date: DF: 1

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Butane	U	0.35	0								
Carbon dioxide	U	2	2.0								
Ethane	U	0.23	0.72								
Ethene	U	0.4	0.69								
Hydrogen	U	0	0								
Methane	U	0.34	0.38								
Nitrogen	U	0.1	0.10								
Oxygen	U	0.1	0.10								
Propane	U	0.22	1.0								

The following samples were analyzed in this batch: 15111192-01H

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: Potesta & Associates
Work Order: 15111192
Project: Columbia Martin Yard Renewal Sampling

QC BATCH REPORT

Batch ID: R177043b Instrument ID VMS5 Method: E624

MBLK Sample ID: VBLKW1-151125-R177043b Units: µg/L Analysis Date: 11/25/2015 02:52 PM
Client ID: Run ID: VMS5_151125A SeqNo: 3591279 Prep Date: DF: 1

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Benzene	U	0.25	1.0								
Ethylbenzene	U	0.22	1.0								
m,p-Xylene	U	0.4	2.0								
o-Xylene	U	0.21	1.0								
Toluene	U	0.2	1.0								
Xylenes, Total	U	0.62	3.0								
Surr: 1,2-Dichloroethane-d4	*20.24*	0	0	*20*	0	*101*	*75-120*	0			
Surr: 4-Bromofluorobenzene	*19.7*	0	0	*20*	0	*98.5*	*80-110*	0			
Surr: Dibromofluoromethane	*19.67*	0	0	*20*	0	*98.4*	*85-115*	0			
Surr: Toluene-d8	*19.51*	0	0	*20*	0	*97.6*	*85-110*	0			

LCS Sample ID: VLCSW1-151125-R177043b Units: µg/L Analysis Date: 11/25/2015 01:34 PM
Client ID: Run ID: VMS5_151125A SeqNo: 3591278 Prep Date: DF: 1

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Benzene	21.23	0.25	1.0	20	0	106	85-125	0			
Ethylbenzene	20.09	0.22	1.0	20	0	100	85-125	0			
m,p-Xylene	40.21	0.4	2.0	40	0	101	75-130	0			
o-Xylene	19.5	0.21	1.0	20	0	97.5	80-125	0			
Toluene	20.66	0.2	1.0	20	0	103	85-125	0			
Xylenes, Total	59.71	0.62	3.0	60	0	99.5	80-126	0			
Surr: 1,2-Dichloroethane-d4	*19.98*	0	0	*20*	0	*99.9*	*75-120*	0			
Surr: 4-Bromofluorobenzene	*20.07*	0	0	*20*	0	*100*	*80-110*	0			
Surr: Dibromofluoromethane	*20.22*	0	0	*20*	0	*101*	*85-115*	0			
Surr: Toluene-d8	*19.9*	0	0	*20*	0	*99.5*	*85-110*	0			

MS Sample ID: 15111192-01C MS Units: µg/L Analysis Date: 11/25/2015 11:08 PM
Client ID: Martin Yard UIC Grab Run ID: VMS5_151125A SeqNo: 3591282 Prep Date: DF: 100

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Benzene	6514	25	100	2000	4726	89.4	85-125	0			
Ethylbenzene	2314	22	100	2000	462	92.6	85-125	0			
m,p-Xylene	5991	40	200	4000	2301	92.2	75-130	0			
o-Xylene	2678	21	100	2000	904	88.7	80-125	0			
Toluene	6574	20	100	2000	4870	85.2	85-125	0			
Xylenes, Total	8669	62	300	6000	3205	91.1	80-126	0			
Surr: 1,2-Dichloroethane-d4	*2015*	0	0	*2000*	0	*101*	*75-120*	0			
Surr: 4-Bromofluorobenzene	*2054*	0	0	*2000*	0	*103*	*80-110*	0			
Surr: Dibromofluoromethane	*1968*	0	0	*2000*	0	*98.4*	*85-115*	0			
Surr: Toluene-d8	*1958*	0	0	*2000*	0	*97.9*	*85-110*	0			

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: Potesta & Associates
Work Order: 15111192
Project: Columbia Martin Yard Renewal Sampling

QC BATCH REPORT

Batch ID: **R177043b** Instrument ID **VMS5** Method: **E624**

MSD Sample ID: **15111192-01C MSD** Units: **µg/L** Analysis Date: **11/25/2015 11:34 PM**
Client ID: **Martin Yard UIC Grab** Run ID: **VMS5_151125A** SeqNo: **3591283** Prep Date: DF: **100**

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Benzene	6903	25	100	2000	4726	109	85-125	6514	5.8	30	
Ethylbenzene	2495	22	100	2000	462	102	85-125	2314	7.53	30	
m,p-Xylene	6423	40	200	4000	2301	103	75-130	5991	6.96	30	
o-Xylene	2892	21	100	2000	904	99.4	80-125	2678	7.68	30	
Toluene	6930	20	100	2000	4870	103	85-125	6574	5.27	30	
Xylenes, Total	9315	62	300	6000	3205	102	80-126	8669	7.18	30	
Surr: 1,2-Dichloroethane-d4	*2036*	0	0	*2000*	0	*102*	*75-120*	2015	*1.04*	*30*	
Surr: 4-Bromofluorobenzene	*2033*	0	0	*2000*	0	*102*	*80-110*	2054	*1.03*	*30*	
Surr: Dibromofluoromethane	*2007*	0	0	*2000*	0	*100*	*85-115*	1968	*1.96*	*30*	
Surr: Toluene-d8	*2006*	0	0	*2000*	0	*100*	*85-110*	1958	*2.42*	*30*	

The following samples were analyzed in this batch: 15111192-01C 15111192-02A

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: Potesta & Associates
Work Order: 15111192
Project: Columbia Martin Yard Renewal Sampling

QC BATCH REPORT

Batch ID: 79417 Instrument ID TSS Method: A2540 D-97

MBLK Sample ID: MBLK-79417-79417 Units: mg/L Analysis Date: 11/24/2015 04:47 PM
Client ID: Run ID: TSS_151124A SeqNo: 3588707 Prep Date: 11/24/2015 DF: 1

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Total Suspended Solids	U	1.4	2.4								

LCS Sample ID: LCS-79417-79417 Units: mg/L Analysis Date: 11/24/2015 04:47 PM
Client ID: Run ID: TSS_151124A SeqNo: 3588703 Prep Date: 11/24/2015 DF: 1

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Total Suspended Solids	91	3.5	6.0	100	0	91	80-115	0			

DUP Sample ID: 1511034-20A DUP Units: mg/L Analysis Date: 11/24/2015 04:47 PM
Client ID: Run ID: TSS_151124A SeqNo: 3588669 Prep Date: 11/24/2015 DF: 1

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Total Suspended Solids	142	7	12	0	0	0	0-0	144	1.4	10	

DUP Sample ID: 1511034-21A DUP Units: mg/L Analysis Date: 11/24/2015 04:47 PM
Client ID: Run ID: TSS_151124A SeqNo: 3588672 Prep Date: 11/24/2015 DF: 1

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Total Suspended Solids	128	7	12	0	0	0	0-0	130	1.55	10	

The following samples were analyzed in this batch: 15111192-01E

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: Potesta & Associates
Work Order: 15111192
Project: Columbia Martin Yard Renewal Sampling

QC BATCH REPORT

Batch ID: 79432 Instrument ID TDS Method: A2540 C-97

MBLK Sample ID: MBLK-79432-79432 Units: mg/L Analysis Date: 11/25/2015 01:42 PM
Client ID: Run ID: TDS_151125C SeqNo: 3589939 Prep Date: 11/25/2015 DF: 1

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Total Dissolved Solids	U	7.6	10								

LCS Sample ID: LCS-79432-79432 Units: mg/L Analysis Date: 11/25/2015 01:42 PM
Client ID: Run ID: TDS_151125C SeqNo: 3589938 Prep Date: 11/25/2015 DF: 1

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Total Dissolved Solids	491	7.6	10	495	0	99.2	80-120	0			

DUP Sample ID: 15111370-01A DUP Units: mg/L Analysis Date: 11/25/2015 01:42 PM
Client ID: Run ID: TDS_151125C SeqNo: 3589911 Prep Date: 11/25/2015 DF: 1

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Total Dissolved Solids	3568	15	20	0	0	0	0-0	3582	0.392	10	

DUP Sample ID: 15111412-01C DUP Units: mg/L Analysis Date: 11/25/2015 01:42 PM
Client ID: Run ID: TDS_151125C SeqNo: 3589923 Prep Date: 11/25/2015 DF: 1

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Total Dissolved Solids	1790	15	20	0	0	0	0-0	1804	0.779	10	

The following samples were analyzed in this batch: 15111192-01E

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: Potesta & Associates
Work Order: 15111192
Project: Columbia Martin Yard Renewal Sampling

QC BATCH REPORT

Batch ID: R177141B **Instrument ID** TOC3 **Method:** A5310C-00

MBLK Sample ID: MBLK-R177141B Units: mg/L Analysis Date: 11/25/2015 02:00 PM
Client ID: Run ID: TOC3_151125A SeqNo: 3592282 Prep Date: DF: 1

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Organic Carbon, Total	U	0.066	0.50								

LCS Sample ID: LCS-R177141B Units: mg/L Analysis Date: 11/25/2015 02:00 PM
Client ID: Run ID: TOC3_151125A SeqNo: 3592283 Prep Date: DF: 1

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Organic Carbon, Total	5.077	0.066	0.50	5	0	102	91-110	0			

MS Sample ID: 15111109-01C MS Units: mg/L Analysis Date: 11/25/2015 02:00 PM
Client ID: Run ID: TOC3_151125A SeqNo: 3592258 Prep Date: DF: 2

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Organic Carbon, Total	1.974	0.13	1.0	10	0.261	17.1	87-120	0			S

MSD Sample ID: 15111109-01C MSD Units: mg/L Analysis Date: 11/25/2015 02:00 PM
Client ID: Run ID: TOC3_151125A SeqNo: 3592259 Prep Date: DF: 2

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Organic Carbon, Total	1.932	0.13	1.0	10	0.261	16.7	87-120	1.974	2.15	5	S

The following samples were analyzed in this batch: 15111192-01D

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

QC BATCH REPORT

Client: Potesta & Associates
Work Order: 15111192
Project: Columbia Martin Yard Renewal Sampling

Batch ID: R177189 **Instrument ID** SUB **Method:** A5540C

Analysis Date: 11/21/2015 10:40 AM

MBLK	Sample ID: MB-R177189-R177189	Units: mg MBAS/L		DF: 1
Client ID:	Run ID: SUB_151121B	SeqNo: 3593834	Prep Date:	

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Anionic Surfactants as MBAS	U	0.005	0.025								

The following samples were analyzed in this batch: 15111192-01F

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: Potesta & Associates
Work Order: 15111192
Project: Columbia Martin Yard Renewal Sampling

QC BATCH REPORT

Batch ID: R177279 Instrument ID IC4 Method: E300.0

MBLK Sample ID: CCB/MBLK-R177279 Units: mg/L Analysis Date: 11/30/2015 08:40 AM
Client ID: Run ID: IC4_151130A SeqNo: 3595911 Prep Date: DF: 1

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chloride	U	0.14	1.0								
Sulfate	U	0.14	1.0								

LCS Sample ID: LCS-R177279 Units: mg/L Analysis Date: 11/30/2015 09:01 AM
Client ID: Run ID: IC4_151130A SeqNo: 3595912 Prep Date: DF: 1

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chloride	9.226	0.14	1.0	10	0	92.3	90-110	0			
Sulfate	10.01	0.14	1.0	10	0	100	90-110	0			

MS Sample ID: 15111296-01A MS Units: mg/L Analysis Date: 11/30/2015 02:09 PM
Client ID: Run ID: IC4_151130A SeqNo: 3595920 Prep Date: DF: 4

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chloride	22.32	0.58	4.0	10	13.2	91.2	80-120	0			
Sulfate	57.06	0.56	4.0	10	47.8	92.6	80-120	0			O

MSD Sample ID: 15111296-01A MSD Units: mg/L Analysis Date: 11/30/2015 02:30 PM
Client ID: Run ID: IC4_151130A SeqNo: 3595921 Prep Date: DF: 4

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chloride	22.59	0.58	4.0	10	13.2	93.9	80-120	22.32	1.22	20	
Sulfate	57.17	0.56	4.0	10	47.8	93.7	80-120	57.06	0.188	20	O

The following samples were analyzed in this batch: 15111192-01E

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

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

December 11, 2015

Ms. Rebecca Kiser
ALS Environmental
1740 Union Carbide Drive
Charleston, WV 25303

RE: Project: 15111192
Pace Project No.: 30166255

Dear Ms. Kiser:
Enclosed are the analytical results for sample(s) received by the laboratory on November 24, 2015. The results relate only to the samples included in this report. Results reported herein conform to the most current TNI standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

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

Sincerely,

Carin A. Ferris

Carin Ferris
carin.ferris@pacelabs.com
Project Manager

Enclosures

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

CERTIFICATIONS

Project: 15111192
Pace Project No.: 30166255

Pennsylvania Certification IDs
Georgia Certification #: C040
1638 Roseytown Rd Suites 2,3&4, Greensburg, PA 15601
L-A-B DOD-ELAP Accreditation #: L2417
Alabama Certification #: 41590
Arizona Certification #: AZ0734
Arkansas Certification
California Certification #: 04222CA
Colorado Certification
Connecticut Certification #: PH-0694
Delaware Certification
Florida/TNI Certification #: E87683
Georgia Certification #: C040
Guam Certification
Hawaii Certification
Idaho Certification
Illinois Certification
Indiana Certification
Iowa Certification #: 391
Kansas/TNI Certification #: E-10358
Kentucky Certification #: 90133
Louisiana DHH/TNI Certification #: LA140008
Louisiana DEQ/TNI Certification #: 4086
Maine Certification #: PA00091
Maryland Certification #: 308
Massachusetts Certification #: M-PA1457
Michigan/PADEP Certification
Missouri Certification #: 235
Montana Certification #: Cert 0082
Nebraska Certification #: NE-05-20-14
Nevada Certification #: PA014572015-1
New Hampshire/TNI Certification #: 2976
New Jersey/TNI Certification #: PA 051
New Mexico Certification #: PA01457
New York/TNI Certification #: 10888
North Carolina Certification #: 42706
North Dakota Certification #: R-190
Oregon/TNI Certification #: PA200002
Pennsylvania/TNI Certification #: 65-00282
Puerto Rico Certification #: PA01457
Rhode Island Certification #: 65-00282
South Dakota Certification
Tennessee Certification #: TN2867
Texas/TNI Certification #: T104704188-14-8
Utah/TNI Certification #: PA014572015-5
USDA Soil Permit #: P330-14-00213
Vermont Dept. of Health: ID# VT-0282
Virgin Island/PADEP Certification
Virginia/VELAP Certification #: 460198
Washington Certification #: C868
West Virginia DEP Certification #: 143
West Virginia DHHR Certification #: 9964C
Wisconsin Certification
Wyoming Certification #: 8TMS-L

REPORT OF LABORATORY ANALYSIS

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

SAMPLE SUMMARY

Project: 15111192
Pace Project No.: 30166255

Lab ID	Sample ID	Matrix	Date Collected	Date Received
30166255001	15111192-01J	Water	11/20/15 10:20	11/24/15 09:35

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Greensburg, PA 15601
(724)850-5600

SAMPLE ANALYTE COUNT

Project: 15111192
Pace Project No.: 30166255

Lab ID	Sample ID	Method	Analysts	Analytes Reported
30166255001	15111192-01J	EPA 900.0	NEG	2
		EPA 903.1	WRR	1
		EPA 904.0	JLW	1

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

PROJECT NARRATIVE

Project: 15111192
Pace Project No.: 30166255

Method: EPA 900.0
Description: 900.0 Gross Alpha/Beta
Client: ALS Life Sciences Division | Environmental
Date: December 11, 2015

General Information:
1 sample was analyzed for EPA 900.0. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

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

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

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

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

Additional Comments:

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

PROJECT NARRATIVE

Project: 15111192
Pace Project No.: 30166255

Method: EPA 903.1
Description: 903.1 Radium 226
Client: ALS Life Sciences Division | Environmental
Date: December 11, 2015

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

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

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

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

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

Additional Comments:

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Greensburg, PA 15601
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PROJECT NARRATIVE

Project: 15111192
Pace Project No.: 30166255

Method: EPA 904.0
Description: 904.0 Radium 228
Client: ALS Life Sciences Division | Environmental
Date: December 11, 2015

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

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

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

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

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

Additional Comments:

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

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

ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: 15111192
Pace Project No.: 30166255

Sample: 15111192-01J Lab ID: 30166255001 Collected: 11/20/15 10:20 Received: 11/24/15 09:35 Matrix: Water
PWS: Site ID: Sample Type:

Comments: • Sample Acceptance Policy Waiver on file from the client.

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Gross Alpha	EPA 900.0	25.6 ± 9.51 (13.0) C:NA T:NA	pCi/L	12/09/15 21:21	12587-46-1	
Gross Beta	EPA 900.0	82.2 ± 15.6 (4.59) C:NA T:NA	pCi/L	12/09/15 21:21	12587-47-2	
Radium-226	EPA 903.1	17.6 ± 3.84 (0.426) C:NA T:88%	pCi/L	12/10/15 11:36	13982-63-3	
Radium-228	EPA 904.0	7.00 ± 1.56 (1.05) C:79% T:52%	pCi/L	12/09/15 15:00	15262-20-1	

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Greensburg, PA 15601
(724)850-5600

QUALITY CONTROL - RADIOCHEMISTRY

Project: 15111192
Pace Project No.: 30166255

QC Batch: RADC/27060
QC Batch Method: EPA 903.1
Analysis Method: EPA 903.1
Analysis Description: 903.1 Radium-226
Associated Lab Samples: 30166255001

METHOD BLANK: 991457
Matrix: Water
Associated Lab Samples: 30166255001

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-226	0.178 ± 0.271 (0.160) C:NA T:105%	pCi/L	12/10/15 11:02	

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

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Greensburg, PA 15601
(724)850-5600

QUALITY CONTROL - RADIOCHEMISTRY

Project: 15111192
Pace Project No.: 30166255

QC Batch: RADC/27071
QC Batch Method: EPA 904.0
Associated Lab Samples: 30166255001

Analysis Method: EPA 904.0
Analysis Description: 904.0 Radium 228

METHOD BLANK: 991468
Associated Lab Samples: 30166255001

Matrix: Water

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-228	0.315 ± 0.304 (0.623) C:85% T:81%	pCi/L	12/09/15 15:05	

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

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Greensburg, PA 15601
(724)850-5600

QUALITY CONTROL - RADIOCHEMISTRY

Project: 15111192
Pace Project No.: 30166255

QC Batch: RADC/27127
QC Batch Method: EPA 900.0
Analysis Method: EPA 900.0
Analysis Description: 900.0 Gross Alpha/Beta
Associated Lab Samples: 30166255001

METHOD BLANK: 993253
Matrix: Water
Associated Lab Samples: 30166255001

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Gross Alpha	-0.058 ± 0.174 (0.523) C:NA T:NA	pCi/L	12/09/15 21:24	
Gross Beta	0.465 ± 0.520 (1.07) C:NA T:NA	pCi/L	12/09/15 21:24	

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

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Greensburg, PA 15601
(724)850-5600

QUALIFIERS

Project: 15111192
Pace Project No.: 30166255

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.
ND - Not Detected at or above adjusted reporting limit.
J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.
MDL - Adjusted Method Detection Limit.
PQL - Practical Quantitation Limit.
RL - Reporting Limit.
S - Surrogate
1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.
Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.
LCS(D) - Laboratory Control Sample (Duplicate)
MS(D) - Matrix Spike (Duplicate)
DUP - Sample Duplicate
RPD - Relative Percent Difference
NC - Not Calculable.
SG - Silica Gel - Clean-Up
U - Indicates the compound was analyzed for, but not detected.
N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.
Act - Activity
Unc - Uncertainty: SDWA = 1.96 sigma count uncertainty, all other matrices = Expanded Uncertainty (95% confidence interval). Gamma Spec = Expanded Uncertainty (95.4% Confidence Interval)
(MDC) - Minimum Detectable Concentration
Trac - Tracer Recovery (%)
Carr - Carrier Recovery (%)
Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.
TNI - The NELAC Institute.

Subcontractor:
Pace Analytical Services, Inc.
1638 Roseytown Rd
Suites 2,3 & 4
Greensburg, PA 15601

TEL: (724) 850-5600
FAX:
Acct #:

CHAIN-OF-CUSTODY RECORD

Page 1 of 1

Date: 20-Nov-15
COC ID: 6100
Due D 11-Dec-15

Salesperson: Paul Painter

Customer Information		Project Information		Parameter/Method Request for Analysis	
Purchase Order		Project Name	15111192	A	Subcontracted Analyses (SUBCONTRACT)
Work Order		Project Number		B	
Company Name	ALS Group USA, Corp	Bill To Company	ALS Group USA, Corp	C	
Send Report To	Rebecca Kiser	Inv Attn	Accounts Payable	D	
Address	3352 128th Avenue	Address	3352 128th Avenue	E	
				F	30166255
City/State/Zip	Holland, Michigan 49424-9263	City/State/Zip	Holland, Michigan 49424-9263	G	
Phone	(616) 399-6070	Phone	(616) 399-6070	H	
Fax	(616) 399-6185	Fax	(616) 399-6185	I	
eMail Address	rebecca.kiser@alsglobal.com	eMail CC		J	

ALS Sample ID	Client Sample ID	Matrix	Collection Date 24hr	Bottle	A	B	C	D	E	F	G	H	I	J
15111192-01J	Martin Yard UIC Grab	Water	20/Nov/2015 10:20	(4) 1LPHNO3	X									

Comments: South Charleston. Please analyze for Gross Alpha/Beta and RA-226/228.

RECEIVED
Office of Oil and Gas
DEC 28 2015
WV Department of
Environmental Protection

Relinquished by:	Date/Time	Received by:	Date/Time	Cooler IDs	Report/QC Level
Janet Smith	11/23/15 1700	To Fed Ex	11/23/15 1700		Std
Relinquished by:	Date/Time	Received by: [signature] Pace	11/24/15 0935		

NW

30166255

Sample Condition Upon Receipt

Pace Analytical

Client Name: ALS

Project #

Courier: ☑ Fed Ex ☐ UPS ☐ USPS ☐ Client ☐ Commercial ☐ Pace Other

Tracking #: 7750 3571 0158

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

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

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

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

Date and Initials of person examining contents: ARM 11/24/15

Temp should be above freezing to 6°C

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

Client Notification/ Resolution:

Person Contacted: ___ Date/Time: ___

Field Data Required? Y / N

Comments/ Resolution:

RECEIVED
Office of Oil and Gas
DEC 28 2015
WV Department of
Environmental Protection

Project Manager Review: [signature] Date: 11/24/15

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

Pace Analytical

Project Number: 30166255

Client Name: AES

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

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Office of Oil and Gas
DEC 8 8 2015
WV Department of
Environmental Protection

SCURF Back (C016-4 15May2012).xls

1511172

Pa 1 of 1

POTESTA

CHAIN OF CUSTODY RECORD

CHARLESTON OFFICE
7012 MacCorkle Avenue, SE
Charleston, WV 25304
Phone: (304) 342-1400
Fax: (304) 343-9031

MORGANTOWN OFFICE
125 Lakeview Drive
Morgantown, WV 26508
Phone: (304) 225-2245
Fax: (304) 225-2246

WINCHESTER OFFICE
15 South Braddock Street
Winchester, VA 22601
Phone: (504) 450-0180
Fax: (540) 450-0182

CAMBRIDGE OFFICE
841 Steubenville Avenue
Cambridge, OH 43725
Phone: (740) 432-6555
Fax: (740) 432-6554

CLIENT/SAMPLING SITE: Columbia Martin Yard Renewal Sampling

LAB USED: ALS Environmental HOW SHIPPED: Delivered to lab

CONTACT PERSON(S): Douglas Bowe

PROJECT NO.: 0101-06-0552-0001 DATE: 20-Nov-15

OFFICE LOCATION(S): Charleston

DELIVERABLE: ☐ Email ☐ Hard Copy ☐ EDD (Excel) ☐ Other:

EMAIL(S): dwbowe@potesta.com

SAMPLER(S): Megan Buckalew, Lee Moreland - Leah Crothers

SAMPLE LOG AND ANALYSIS REQUESTED

PRESERVATIVE CODES
0 No Preservative
1 Hydrochloric Acid
2 Nitric Acid
3 Sulfuric Acid
4 Sodium Thiosulfate
5 Sodium Hydroxide
6 Zinc Acetate
7 EDTA
See Notes Section

TURNAROUND TIME
☒ Regular
☐ Rush (Indicate Date Needed) _____

SAMPLE ID	NO. & TYPE OF CONTAINERS (Note Preservative Code)	DATE	TIME	MATRIX	COMP/ GRAB	ANALYSIS REQUESTED and METHOD	Analytical parameters as per attachment							NOTES:
Martin Yard UIC	One 500 ml (0), One 250 ml (2)	11/20/15	1020	Water	Grab		X							• Sample(s) maintained at 4°C unless otherwise noted.
	One 100 ml (4), Two 40ml (0)	11/20/15	1020	Water	Grab		X							• Analyze all solid samples for % solids unless otherwise noted.
	Eight 40 ml (1)	11/20/15	1020	Water	Grab		X							REMARKS
	Four 1000 ml (2)	11/20/15	1020	Water	Grab		X							UIC Well
	One 1000 ml (0)	11/20/15	1020	Water	Grab		X							Field pH = 4.98 SU
														Trip Blanks - Two 40 ml (1)

RELINQUISHED BY: (SIGNATURE)	DATE/TIME	RECEIVED BY: (SIGNATURE)
Megan Buckalew	11/20/15 1115	
RELINQUISHED BY: (SIGNATURE)	DATE/TIME	RECEIVED BY: (SIGNATURE)
	11/20/15 1700	FED EX
RELINQUISHED BY: (SIGNATURE)	DATE/TIME	RECEIVED BY: (SIGNATURE)
FED EX	11/21/15 1039	

COMMENTS: Original results and invoice to Heather Roberts of Columbia pipeline Group. Email address hroberts@cpg.com Phone 714-937-2111

Copy of results to Doug Bowe at POTESTA

ALSHN <6.0°C

RECEIVED
DEC 28 2015
West Virginia Department of Environmental Protection
Office of Oil and Gas

Electronic Copy (Rev. 3/20/15)

ALS Group USA, Corp

Sample Receipt Checklist

Client Name: POTESTA
Date/Time Received: 20-Nov-15 11:15
Work Order: 15111192
Received by: JAS

Checklist completed by Janet Smith eSignature 20-Nov-15 Date
Reviewed by: Rebecca Kerr eSignature 20-Nov-15 Date

Matrices: Water
Carrier name: Client

Shipping container/cooler in good condition?	Yes ☑	No ☐	Not Present ☐
Custody seals intact on shipping container/cooler?	Yes ☐	No ☐	Not Present ☑
Custody seals intact on sample bottles?	Yes ☐	No ☐	Not Present ☑
Chain of custody present?	Yes ☑	No ☐	
Chain of custody signed when relinquished and received?	Yes ☑	No ☐	
Chain of custody agrees with sample labels?	Yes ☐	No ☑	
Samples in proper container/bottle?	Yes ☑	No ☐	
Sample containers intact?	Yes ☑	No ☐	
Sufficient sample volume for indicated test?	Yes ☑	No ☐	
All samples received within holding time?	Yes ☐	No ☑	
Container/Temp Blank temperature in compliance?	Yes ☑	No ☐	
Sample(s) received on ice?	Yes ☑	No ☐	
Temperature(s)/Thermometer(s):	<6C	IR	
Cooler(s)/Kit(s):			
Date/Time sample(s) sent to storage:			
Water - VOA vials have zero headspace?	Yes ☑	No ☐	No VOA vials submitted ☐
Water - pH acceptable upon receipt?	Yes ☐	No ☑	N/A ☐
pH adjusted?	Yes ☑	No ☐	N/A ☐
pH adjusted by:	JAS		

Login Notes: Sample container for TOC was not supplied to client at time of bottle request. Split of extra sample volume provided by client made for analysis. Holland <6.0 c

RECEIVED
Office of Oil and Gas
DEC 29 2015
WV Department of
Environmental Protection

Client Contacted: Date Contacted: Person Contacted:
Contacted By: Regarding:

Comments:

CorrectiveAction:

Section 10
Monitoring

UIC PERMIT NUMBER UIC2D0871977
RENEWAL APPLICATION
ROANE WELL #99
COLUMBIA GAS TRANSMISSION, LLC.

SECTION 10
MONITORING

Columbia Gas Transmission, LLC has implemented the following monitoring and recordkeeping procedures to account for the liquids injected into the well in addition to the source of all fluids on site.

- A Columbia employee responsible for transferring liquids from off site to the injection well is required to complete a manifest detailing the following:

  - The type(s) of liquid
  - The amount of each if more than one type is involved
  - Point of origin of the liquids and
  - Where the liquids are being transported

  A copy of the manifest is kept at the appropriate facility office. An example of the manifest showing the information documented is included in this section as Attachment 1.

- In addition to the manifest for each liquid transfer, personnel at the Martin Yard keep a monthly log of the liquids that are transported to the injection facility and that documents the site from which the liquids were transferred. This monthly log also documents injection activities at the facility and provides the following information associated with the injection activity:

  - Date
  - Carrier
  - Fluid Type
  - Total amount of barrels of liquid injected into the well
  - Initials of Pumper

  An example of this log is included in this section as Attachment 2.

- On a monthly basis, Columbia submits a Report for Waste Disposal Wells (WR-40B) form to the West Virginia Department of Environmental Protection detailing injection activity at the facility. An example of this form is included in this section as Attachment 3.

May 2016 Revisions

Item 4.a. – The information recorded on the facility WR-40 form submitted to the agency is obtained from gallon/barrels processed from non-hazardous manifests submitted by tank truck drivers from the various compressor stations this facility serves. Pressures are recorded from digital readout displays which are connected to pressure sensors/transmitters installed in process piping. These data are manually recorded daily, used to complete the WR-40 report in paper format, which is then submitted electronically to the agency. An operator is present at the facility during all processes and functions associated with the injection of fluids, including unloading of trucks, tank to tank fluid transfers and processing of the fluids before they are injected.

Someone is present during all injection and fluid transfer activities. All pipeline associated with the UIC is located within the footprint shown on the SPCC Site Plan drawing in Section 6. Therefore, the pipeline is easily monitored by personnel when the UIC system is operating.

SECTION 10
MONITORING

ATTACHMENT 10-1

NON-HAZARDOUS WASTE MANIFEST

1. Generator ID Number | 2. Page 1 of | 3. Emergency Response Phone | 4. Waste Tracking Number

GENERATOR

5. Generator's Name and Mailing Address

Generator's Site Address (if different than mailing address)

Generator's Phone:

6. Transporter 1 Company Name — U.S. EPA ID Number

7. Transporter 2 Company Name — U.S. EPA ID Number

8. Designated Facility Name and Site Address — U.S. EPA ID Number

Facility's Phone:

	9. Waste Shipping Name and Description	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	
1.						
2.						
3.						
4.						

13. Special Handling Instructions and Additional Information

14. **GENERATOR'S/OFFEROR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations.

Generator's/Offeror's Printed/Typed Name — Signature — Month Day Year

INT'L

15. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:

Transporter Signature (for exports only): Date leaving U.S.:

TRANSPORTER

16. Transporter Acknowledgment of Receipt of Materials

Transporter 1 Printed/Typed Name — Signature — Month Day Year

Transporter 2 Printed/Typed Name — Signature — Month Day Year

DESIGNATED FACILITY

17. Discrepancy

17a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection

17b. Alternate Facility (or Generator) — Manifest Reference Number: — U.S. EPA ID Number

Facility's Phone:

17c. Signature of Alternate Facility (or Generator) — Month Day Year

18. Designated Facility Owner or Operator: Certification of receipt of materials covered by the manifest except as noted in Item 17a

Printed/Typed Name — Signature — Month Day Year

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169-BLS-C 5 11979 (Rev. 9/09)

DESIGNATED FACILITY'S COPY

SECTION 10
MONITORING

ATTACHMENT 10-2

NOVEMBER 2015

MARTIN YARD DISPOSAL UNIT

DATE	CARRIER	FLUID TYPE	#BBL	PUMPER
11-2-15	JR PAYNE	RIPLEY - WATER	60	RJ
11-2-15	TIM HUFFMAN	GUNT - WATER	60	RJ
11-2-15	PORTER	LINE-5 DEEP	25	RJ
11-3-15	JR PAYNE	POCKET - WATER	60	RJ
11-5-15	JR PAYNE	POCKET - WATER	60	RJ
11-12-15	Keith	KENOVA - Water	115	KC
11-13-15	Keith	Horse Creek - Water	60	KC
11-13-15	Keith	Nye - Water	60	KC
11-17-15	BIRD	POCKET - WATER	60	RJ
11-19-15	Tim HUFFMAN	COCO - WATER	60	RJ
11-20-15	TIM HUFFMAN	COCO - WATER	60	RJ
11-30-15	Huffman	Coco - Water	60	KC

SECTION 10
MONITORING

ATTACHMENT 10-3

WR-40 B

STATE OF WEST VIRGINIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
REPORT FOR WASTE DISPOSAL WELLS

MONTH /YEAR (MM/YYYY): 11/2015
WELL NO. W-99
API NO. 47- 089 - 01977
PERMIT NO. UIC-2D0871977

OPERATOR NAME: Columbia Gas Transmission

********MAXIMUM PERMITTED INJECTION PRESSURE 1,103 PSIG.********

DAY	OPERATING HOURS	ANNULUS PRESSURES (PSIG)		MAXIMUM DAILY INJECTION PRESSURE (PSIG)	SHUT IN PRESSURE (PSIG)	VOLUME IN BBLS AND/OR MCF. 875,852		RATE IN GALLONS PER MINUTE	
		TUBING	OTHER			DAILY	ACCUMULATED	MAXIMUM	MINIMUM
1	0	0	3			0	875852	0	0
2	3	0	3	0	0	120	875972	28	28
3	2	0	3	525	0	60	876032	28	28
4	0	0	3	515	0	0	876032	0	0
5	2	0	3	0	0	60	876092	28	28
6	0	0	3	520	0	0	876092	0	0
7	0	0	3	0	0	0	876092	0	0
8	0	0	3	0	0	0	876092	0	0
9	0	0	3	0	0	0	876092	0	0
10	0	0	3	0	0	0	876092	0	0
11	0	0	3	0	0	0	876092	0	0
12	3	0	3	0	0	0	876092	0	0
13	3	0	3	525	0	115	876207	28	28
14	0	0	3	520	0	120	876327	28	28
15	0	0	3	0	0	0	876327	0	0
16	0	0	3	0	0	0	876327	0	0
17	2	0	3	0	0	0	876327	0	0
18	0	0	3	515	0	60	876387	28	28
19	2	0	3	0	0	0	876387	0	0
20	2	0	3	529	0	60	876447	28	28
21	0	0	3	514	0	60	876507	28	28
22	0	0	3	0	0	0	876507	0	0
23	0	0	3	0	0	0	876507	0	0
24	0	0	3	0	0	0	876507	0	0
25	0	0	3	0	0	0	876507	0	0
26	0	0	3	0	0	0	876507	0	0
27	0	0	3	0	0	0	876507	0	0
28	0	0	3	0	0	0	876507	0	0
29	0	0	3	0	0	0	876507	0	0
30	2	0	3	0	0	0	876507	0	0
31	0	0	0	520	0	60	876567	28	28
TOTALS	21	0	3	529	0	715	876,567	28	28

I HEREBY CERTIFY THAT THE INFORMATION ON THIS REPORT IS TRUE AND CORRECT. BY: Randy Jones \ Kathy Cottrell
TITLE: Pipeliner

Section 11
Groundwater Protection Plan

UIC PERMIT NUMBER UIC2D0871977
RENEWAL APPLICATION
ROANE WELL #99
COLUMBIA GAS TRANSMISSION, LLC.

SECTION 11
GROUNDWATER PROTECTION PLAN (GPP)

Attached is Appendix H, the completed and signed GPP for the facility. Also included in Section 11 is the site-specific Spill Prevention Control and Countermeasures (SPCC) Plan that was developed for and has been implemented at the Martin Yard.

Appendix H
Groundwater Protection Plan

APPENDIX H

GROUNDWATER PROTECTION PLAN

Facility Name: Martin Yard Roane Well #99

County: Roane

Facility Location:

Postal Service Address:	Not Applicable.		
Latitude :	38° 33' 37.982" North	Longitude:	-81° 21' 35.393" West

Contact Information:

Person:	Dennis Scheuvront - Operations Team leader
Phone Number:	(304) 548-1615
E-mail Address:	dscheuvront@cpg.com

Date: December 1, 2015

1. A list of all operations that may contaminate the groundwater.

The ASTs listed in Section 6, Appendix B as well as associated piping, valves and pumps have the potential to contaminate groundwater. The transfer of fluids to be injected from trucks carrying these fluids is another potential source of contamination.

2. A description of procedures and facilities used to protect groundwater quality from the list of potential contaminant sources above.

ASTs are provided with secondary containment. Columbia has developed and implemented a Spill Prevention, Control and Countermeasures Plan (SPCC Plan) for this facility which provides details of these procedures and measures. A copy of the facility SPCC Plan has been included as part of this renewal application, and is located following the GPP.

3. List procedures to be used when designing and adding new equipment or operations.

New equipment and operations will be designed, operated and maintained in a manner in compliance with 47 C.S.R.58. In addition, appropriate literature concerning 47 C.S.R.58 (such as the West Virginia Manufacturer's Association Groundwater Protection Plan Guidance Document) will be consulted for practices protective of groundwater. It is Columbia's policy not to install equipment that causes uncontrolled releases to the environment that would have the potential to contaminate groundwater. Before new equipment is operational, facility personnel are trained on the specific operation and maintenance necessary to minimize releases.

4. Summarize all activities at your facility that are already regulated for groundwater protection.

The Martin Yard is currently permitted through the UIC Program of the Office of Oil and Gas. UIC Permit Number UIC2D0871977 and the activities authorized by this permit coverage require the implementation of a GPP for the facility.

5. Discuss any existing groundwater quality data for your facility or an adjacent property.

Currently the groundwater is not monitored at this facility, and no groundwater monitoring data are available. Samples of groundwater have been collected at those residences with the 1/4 mile AOR who use well or spring water for drinking and/or agricultural purposes and are included with this renewal application.

6. Provide a statement that no waste material will be used for deicing or fill material on the property unless allowed by another rule.

In accordance with §4.11.6. of 47 CSR 58, no wastes will be used for deicing, fills, or for any other purpose, unless specifically allowed by applicable regulations.

7. Describe the groundwater protection instruction and training to be provided to the employees. Job procedures shall provide direction on how to prevent groundwater contamination.

Employee training in groundwater protection is provided through instruction on SPCC, WVPDES, and other programs. Columbia provides a full range of training for environmental protection, including groundwater, which is described specifically in Columbia Policies & Procedures. Training will be conducted on at least an annual basis and will be refreshed as soon as practical if the plan undergoes substantial revision or in the event of a spill or release incident that indicates the need for additional training.

4. Summarize all activities at your facility that are already regulated for groundwater protection.

The Martin Yard is currently permitted through the UIC Program of the Office of Oil and Gas. UIC Permit Number UIC2D0871977 and the activities authorized by this permit coverage require the implementation of a GPP for the facility.

5. Discuss any existing groundwater quality data for your facility or an adjacent property.

Currently the groundwater is not monitored at this facility, and no groundwater monitoring data are available. Samples of groundwater have been collected at those residences with the 1/4 mile AOR who use well or spring water for drinking and/or agricultural purposes and are included with this renewal application.

6. Provide a statement that no waste material will be used for deicing or fill material on the property unless allowed by another rule.

In accordance with §4.11.6. of 47 CSR 58, no wastes will be used for deicing, fills, or for any other purpose, unless specifically allowed by applicable regulations.

7. Describe the groundwater protection instruction and training to be provided to the employees. Job procedures shall provide direction on how to prevent groundwater contamination.

Employee training in groundwater protection is provided through instruction on SPCC, WVPDES, and other programs. Columbia provides a full range of training for environmental protection, including groundwater, which is described specifically in Columbia Policies & Procedures. Training will be conducted on at least an annual basis and will be refreshed as soon as practical if the plan undergoes substantial revision or in the event of a spill or release incident that indicates the need for additional training.

8. Include provisions for inspections of all GPP elements and equipment. Inspections must be made quarterly at a minimum.

Inspections are conducted on a quarterly basis and are intended to ensure that all the elements and equipment specified in this plan are in place, properly functioning and appropriately managed. Records of inspections are kept on site and are recorded on appropriate forms.

Signature: _____

Date: 12/17/15

SPILL PREVENTION, CONTROL AND COUNTERMEASURE PLAN (SPCC)

Columbia Gas Transmission Corporation
Martin Yard UIC Disposal Well

Prepared for:

Columbia Gas Transmission Corporation
Martin Yard UIC Disposal Well
US Route 119
Clendenin, West Virginia 25045
Phone: (304) 548-1674

Prepared by:

Potesta & Associates, Inc.
7012 MacCorkle Avenue, SE
Charleston, West Virginia 25304
Phone: (304) 342-1400 Fax: (304) 343-9031
E-mail: potesta@potesta.com

Project No. 0101- 06-0564-008

April 30, 2007

POTESTA

EMERGENCY NOTIFICATION
(40 CFR 112.7(a)(3)(vi))

The following will be notified, as appropriate, in the event of a reportable spill:

Columbia Monitoring Center	**(800) 835-7191 or (304) 357-2008**
National Emergency Response Center	**(800) 424-8802**
Roane County Emergency Planning Commission	**(304) 927-6277**
Fire and Other Emergency Services	**911**
West Virginia Emergency Response Commission (SERC)	**(800) 642-3074**

Facility Coordinator: Dennis Scheuvront,
Office Phone: (304) 548-1615
Cell (304) 550-7608

Alternate Coordinator: Timothy N. Spence, HSE Coordinator
Office Phone: (304) 722-8668
Home Phone: (304) [illegible]
Mobile Phone: (304) 926-4713

Plan reviewed - No changes
recertified 2/28/12
Patrick D Croghan
HSE Coordinator III

Reviewed:
Tim Spence 01/22/13 No change
Tim Spence 12/18/15

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SPILL RESPONSE PROCEDURES
(40 CFR 112.7(a)(3)(iv))

Even though the primary purpose of this plan is to plan and implement an operation so that a spill will not occur, accidents do and will happen. Therefore, appropriate equipment and personnel will be available to respond to a spill. The following lists the persons to be notified of a spill, where applicable, cleanup contractors who can be utilized, and the location of cleanup supplies.

All spills will be reported to the Station Team Leader and/or senior supervisor immediately. A summary of response actions is listed below.

Facility personnel will:

1. Summon assistance; call 911 for fire, ambulance or emergency help or the facility office, if needed.

2. Extinguish all ignition sources and suspend operation as necessary.

3. Notify the Facility Team Leader and all potentially affected persons.

4. Assist in stopping the release, containment and control.

5. Call the Columbia Gas Transmission Corporation (Columbia) Monitoring Center at (800) 835-7191 or (304) 357-2008; however, if Environmental Health & Safety is not available (call is not returned in 30 minutes), and the spill has impacted surface waters, the National Response Center (NRC) should be contacted directly: ***NATIONAL RESPONSE CENTER*** (800) 424-8802. If the NRC is contacted, care should be taken to record all information given/requested along with the assigned, "incident" number. A followup call should be made to the Columbia Monitoring Center.

6. Arrange for outside response contractors as needed.

7. Secure the facility from non-contributing persons (e.g., visitors and media).

8. Escort government inspectors who may visit the site.

9. Supervise the cleanup and repair efforts until completion.

10. Keep good notes, take pictures, and record times, dates, people and places.

11. Determine cause(s) and initiate corrective and/or preventative actions as appropriate.

12. Assist Environmental Health & Safety with the preparation of reports to government agencies, as required by federal, state and local agencies.

CONTRACTORS (40 CFR 112.7(a)(3)(vi))

~~Federal Regulations 49 CFR Part 192-192.615 – Emergency Plans, requires Columbia to establish written procedures for emergencies. These plans are located in facilities manned for four (4) hours or more per day. Section II A – Emergency telephone listing contains contractor information that, depending upon the nature and severity of the emergency situation, are available to assist with remedial response activities.~~

Depending on the nature and severity of the emergency situation, outside contractors are available to assist with remedial response activities. A list of emergency response contractors, as well as local contractors and their telephone numbers follows:

Emergency Response Contractors:

Environmental Quality Services (EQ) (800) 839-3975

PROFESSIONAL ENGINEER'S CERTIFICATION
(40 CFR 112.3(d))

In accordance with 40 CRF Part 112.3 (d), I certify that my agent or I have examined this facility, and being familiar with the provision of 40 CFR 112, I do hereby certify that this SPCC Plan has been prepared in accordance with good engineering practice, including consideration of applicable industry standards, and in accordance with 40 CFR 112 requirements. I attest to the best of my knowledge that this Plan is adequate for this facility contingent upon the successful implementation of the following measures:

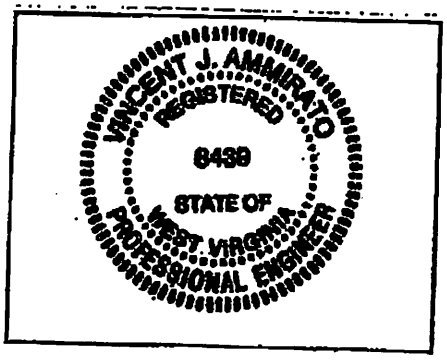
Signature: Vincent J Amm

Printed Name: Vincent Ammirato

Date: 6-1-07

Registration Number: 8439

State of Registration: West Virginia



MANAGEMENT COMMITMENT (40 CFR 112.7)

I hereby declare that I have examined and am familiar with this Plan and that it has the full approval of Columbia Gas Transmission management at a level of authority necessary to commit the resources for implementation.

Signature: Buddy Childers **Date:** 5-14-07

Name: Buddy Childers **Title:** Team Leader

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TABLE OF CONTENTS

APPENDICES

SPILL PREVENTION, CONTROL AND COUNTERMEASURE PLAN (SPCC)

Columbia Gas Transmission Corporation
Martin Yard UIC Disposal Well

1.0 INTRODUCTION

1.1 Purpose (40 CFR 112.4(a))

Spill Prevention, Control and Countermeasures (SPCC) plans for this facility are prepared and implemented as required by United States Environmental Protection Agency (USEPA) regulations contained in Title 40 Code of Federal Regulations, Part 112. As a non-transportation related facility, it is subject to SPCC regulations if the capacity of the total aboveground storage capacity exceeds 1,320 gallons (for containers of 55 gallons and greater); or the underground storage capacity exceeds 42,000 gallons; and if, due to its location, the facility could reasonably be expected to discharge oil into or upon the navigable water of the United States.

The SPCC plan is not required to be filed with USEPA, but a copy is available for on-site review by the regional administrator during normal working hours. The Plan is to be maintained on-site if the facility is manned four hours a day or more, it may be maintained off-site if the facility is manned less than four hours a day. Spill information must be submitted to the USEPA Region III regional administrator and the State agency as specified in 40 CFR § 112.4 if either of the following occurs:

1. The facility discharges more than 1,000 US gallons of oil in a single event, or
2. The facility discharges more than 42 US gallons of oil in each of two discharges within any 12-month period.
3. Violates applicable water quality standards, or
4. Causes a film or sheen upon or discoloration of the surface of the water or adjoining shorelines or causes a sludge or emulsion to be deposited beneath the surface of the water or upon adjoining shorelines.

Columbia Gas Transmission Corporation (Columbia) understands the risks and liabilities associated with the storage and use of oil. To address these risks and liabilities, Columbia implements a spill prevention and management program at all of our qualifying facilities. Spill prevention is primarily accomplished through planning and responsible operation of properly designed facilities. Good housekeeping, equipment maintenance, adherence to operating procedures and effective personnel training are integral aspects of the spill prevention and management program.

This Spill Prevention, Control and Countermeasure (SPCC) Plan (the Plan) provides guidelines for planning to prevent spills and response should one occur.

1.2 Facility Information

This SPCC Plan has been developed for Martin Yard UIC Disposal Well (Martin Yard), which is owned and operated by Columbia. Martin Yard is an onshore, non-production facility and meets the requirements of Subpart A and Subpart B, Part 112 of the Code of Federal Regulation (CFR). The general facility information is summarized below:

Name of Facility: Martin Yard UIC Disposal Well

Address:
US Route 119
Clendenin, West Virginia 25045
Roane County
Telephone: (304) 548-1674

Name of Owner and Operator:
Columbia Gas Transmission Corporation
1700 MacCorkle Avenue
Charleston, West Virginia 25314
Telephone: (304) 357-2000

Supervisor: (Person in charge of oil spill prevention.) (40 CFR 112.7(e)(10)(ii))

Buddy Childers, Team Leader
PO Box 529
Clendenin, West Virginia 25045
Roane County
Telephone: (304) 548-1647

Service Area: Kanawha and Roane County and Surrounding Area

Maintenance/Location of SPCC Plan: (40 CFR 112.3(e))

The original copy of this plan shall be maintained at the Martin Yard.

1.3 Amendment/Revision (40 CFR 112.5)

So that this Plan can serve as an effective guide during an actual spill, this Plan will be kept current. At a minimum, this Plan will be reviewed and amended as appropriate every five years (40 CFR 112.5(b)). All Plan reviews will entail an evaluation of the past effectiveness of the Plan at preventing and responding to spills and will evaluate whether more effective prevention and control technology is available (40 CFR 112.5(b)). This Plan will be amended within six months of a change in facility design, construction, operations or maintenance. Changes made

not materially affect the facility's potential for a discharge (such as telephone numbers and contact names) will be made by the Columbia EH&S personnel. A professional engineer must certify any technical amendments to the Plan that affect a facility's potential for a discharge.

All records of amendments and revisions are recorded in the work management system. The record will include a summary of the driver for the change and any material modifications.

1.4 Description of Facility Operations

The Martin Yard UIC Disposal Well provides for the separation of wastewater and oil and disposal by underground injection of wastewater. The primary oil based products handled at this facility include pipeline liquids, which in most instances contain hydrocarbons, recovered from the natural gas stream.

The accompanying drawing in Appendix A shows the adjacent roadways and vehicle access, buildings on-site, major waterways, the predicted drainage direction and major oil storage/handling facilities.

1.4.1 Summary of Facility Major Oil Storage Including Exempt Containers (40 CFR 112.7(a))

A summary of major oil storage and exempt containers located at this facility, along with specific spill prevention and control measures and tank management requirements applicable to each container is found in Appendix B.

2.0 SPILL PREVENTION PLAN

This portion of the Plan addresses facility evaluation and spill prevention activities that are required during facility operations.

2.1 Spill History

Columbia maintains a spill database to record spills through the Monitoring Center. Spill database records are kept in the Charleston headquarters and are available for review.

2.2 Drainage Pathways and Distance to Navigable Water (40 CFR 112.7(b)).

Depending on the spill event, oils may be present that could potentially impact surface waters if not properly contained and controlled. Appendix B summarizes these potential sources based on a worst-case discharge scenario.

- ***Additional information can be found on the facility diagram.***
- ***All tanks are constructed of material that is compatible with the material stored and the conditions of storage, such as pressure and temperature (40 CFR 112.7(c)(2)(i).***
- ***May include aboveground oil containing piping.***

2.3 Containment and Control (40 CFR 112.7(c))

The facility construction and equipment setup is designed with appropriate containment and/or diversionary structures or equipment to prevent discharged oils from reaching navigable water or adjoining shoreline. This section details measures typically used to provide containment and control for potential spill sources.

2.3.1 Demonstration of Practicability (40 CFR 112.7(c; d))

Columbia has determined that the use of containment and diversion structures or readily available equipment to prevent discharged oil from reaching navigable waters is generally practical and effective. However, it is possible that because of site and/or operating conditions (e.g., emergency response to a blowout or failure of a temporary storage system, etc.), adequate containment and control measures are not practicable. If such a condition arises, the commitment of manpower, equipment and materials is authorized to include, but not limited to, all available Columbia personnel, equipment and materials found throughout this facility. This commitment also includes the use of any and all contracted resources as listed in this Plan.

For spill planning, containment and diversionary systems, Columbia considers both environmental and safety concerns. The location of all pertinent or potential bodies of water has also been carefully considered. A facility diagram is included with this SPCC Plan as Appendix A.

2.3.2 Secondary Containment Structures (40 CFR 112.7(c))

Double wall construction, concrete dikes, and steel dikes provide secondary containment for aboveground tanks, as well as the building in which they are contained.

These methods of secondary containment are identified within Appendix B.

2.4 Aboveground Storage Container Inspections and Records (40 CFR 112.7(e))

Facility inspection and monitoring is a vital part of Columbia's spill prevention program. Through frequent site evaluations, unsafe conditions and inoperable parts can be identified and remedied prior to initiating operational activities. Any sign of deterioration or leakage shall be immediately investigated, reported and entered into the work management system for prompt corrective action. The Inspection and Monitoring Program shall entail:

1. AST Tank Inspection – Columbia Procedure 120.006.002

An electronic record of the formal inspections will be maintained in the work management system.

2.5 Personnel Training (40 CFR 112.7(f))

This facility maintains a training program, Plateau Course NIEHS0108, on spill prevention and response procedures. This SPCC Plan is reviewed once each calendar year with facility personnel. In addition, personnel are instructed in the proper operation and maintenance of equipment to prevent the discharges of oil/hydrocarbons, pollution control laws, rules, and regulations. Equipment failures and other potential operational problems impacting spill prevention are discussed, as needed, with personnel at monthly safety meetings. The facility supervisor, as listed in Section 1.2 of this Plan, has been designated accountable for spill prevention and training at this facility.

Facility personnel have also been instructed in the following spill prevention and countermeasures:

1. To avoid overfill, no tank or compartment is to be filled without checking reserves prior to commencing the filling operation.

2. No pump operations are to continue unless attended constantly.

3. Warning signs are displayed at appropriate locations to remind personnel to check line disconnection before vehicle departure.

4. Training has been held on oil spill prevention and containment.

5. Instructions and telephone numbers regarding the reporting of spill to the company spill response hot line have been publicized and posted. In the event of a spill, the person who discovers the spill will immediately call (800) 835-7191 or (304) 357-2008.

6. Instructions and company policies relating to oil spill prevention and countermeasures are reviewed annually.

7. An electronic record of all personnel who have completed spill training is maintained in the Plateau database.

2.6 Security (40 CFR 112.7(g))

1. The facility is surrounded by a secured steel fence to prevent unauthorized entry into the yard. All buildings and fence gates are normally locked during non-operating hours.

2. Any valve that could permit outflow of a tank's content will be securely sealed closed when in non-operating or non-standby status.

3. All electronic controls are located within the control building. The control building is locked when the facility is unattended.

4. All loading/unloading connections of oil pipelines will be capped or blank-flanged if not in service or on standby status of an extended time.

5. Lighting is commensurate with the facility and in consideration with the discovery of spills at night and the prevention of spill occurring through acts of vandalism through the illumination of offices, engine rooms and tank areas.

2.7 Facility Transfer Operations (40 CFR 112.7(h))

All facility transfer operations will be conducted under controlled conditions utilizing both company and/or contracted personnel. All handlers will be competent in the performance of their responsibilities, properly trained and follow all safety and environmental regulations, policies and procedures. In the event of a spill, operations will be terminated, the spill contained and immediately reported to the facility supervisors. Internal and external notifications will be conducted in accordance with this plan. (See Spill Response Procedures.)

2.7.1 Loading/Unloading Containment or Diversionary Systems (40 CFR 112.7(h)(1))

Permanent secondary containment at the loading and unloading area is provided at this facility, with sufficient storage to hold 3,423 gallons of material. Transport delivery personnel manually gauge the tank prior to beginning product transfer to verify that the tank has sufficient freeboard to accept the delivery quantity. Trained personnel are present during transfer operations to respond immediately to a release. Spillage that may occur due to a release and path has been identified in Section 2.2. Loading and unloading operations may occur infrequently at various locations within the facility where secondary containment is not provided. At these transfer points, emergency spill cleanup material will be immediately available and oil containment material such as oil booms or other appropriate material will be deployed as necessary to prevent a spill from reaching water when these transfers are being preformed(see Appendix A).

2.7.2 Premature Vehicular Departure Warning Systems (40 CFR 112.7(h)(2))

Signs are provided at/around tank loading/unloading areas to advise truck drivers and tank operators to ensure that lines are disconnected and not leaking prior to transportation, ensure operations are manned during tank loading/unloading and to advise of the in-house spill reporting hot-line number.

2.7.3 Loading/Unloading Operations Pre and Post Inspections (40 CFR 112.7(h)(3))

The lowermost drain and all outlets on a tank truck are to be inspected for leakage prior to filling and departure. Any leakage detected is to be immediately securely contained and the facility supervisor notified immediately to ensure prompt corrective action is taken.

2.8 Brittle Fracture (40 CFR 112.7(i))

Not applicable, there are no field-constructed aboveground containers at this site.

3. If used for pressurized flow-back operations, containers are adequately vented and properly baffled to prevent fluid discharge.

2.12 Secondary Containment (40 CFR 112.8(c)(2))

As a minimum, secondary means of containment has been provided for the largest container plus 10 percent freeboard to allow for precipitation. Section 2.3.2 of this Plan provides specific details on secondary containment structures for each container at this facility. Secondary containment at this facility is provided by double wall construction or containers are located inside a concrete or steel dike. All facility containment areas have been determined to consist of walls and floors, which are sufficiently impervious to contain spilled oil until cleanup can occur. Future installed tanks will be provide with either sufficient secondary containment for the largest container and freeboard for precipitation from a 25-year, 24-hour storm event or protection from precipitation (rain shield, located within a building, etc.).

2.13 Secondary Containment Drainage (40 CFR 112.8(c)(3))

Drainage from diked areas is:

1. Retained by a normally sealed closed bypass valve.

2. Retained rainwater is inspected prior to discharge in accordance with Paragraph 2.11 of this Plan.

3. The bypass valve is closed, sealed and only opened as needed.

2.14 Buried Metallic Storage Containers (40 CFR 112.8(c)(4))

Completely buried metallic storage tanks are protected from corrosion by coatings and/or cathodic protection. Underground storage containers will be inspected for cathodic protection following External Corrosion Control Plan 70.01.01. Inspection frequencies and test procedures for leak testing are provided in Columbia Procedure 120.07.01.

2.15 Partially Buried Metallic Storage Containers (40 CFR 112.8(c)(5))

This facility does not have any partially buried metallic storage containers as regulated under 40 CFR 112.

2.16 Integrity Testing (40 CFR 112.8(c)(6))

In addition to the visual inspection conducted in accordance with Section 2.5 of this Plan, Aboveground containers are to be inspected for shell integrity on a regular basis. Inspection frequencies, and test procedures used are provided in Columbia Procedure 120.005.002.

2.17 Internal Heating Coils (40 CFR 112.8(c)(7))

There are no tanks with internal heating coils at this facility.

2.18 Tank Fail-Safe Engineering (40 CFR 112.8(c)(8))

All bulk storage containers are designed in accordance with good engineering practices to avoid discharge through the incorporation of at least one of the following:

1.	High liquid level alarms with an audible or visual signal at a constantly attended operation:	
2.	Automatic high liquid level pump cutoff or inlet shutoff devices:	X
3.	A direct signal between the tank gauges and pumping station:	
4.	A fast response system to detect oil level of each storage tank: *(A person must be present to monitor gauges and/or liquid levels and the overall filling of bulk containers.)*	X

Section 1.4.1, Appendix B, of this Plan provides specific details for each container. Container liquid level sensing devices, if installed, are tested using Columbia Procedure 20.612.005 to insure proper operation.

2.19 Plant Effluent Discharges (40 CFR 112.8(c)(9))

This facility does not have on-site effluent treatment facilities.

2.20 Equipment Leaks (40 CFR 112.8(c)(10)

When oil leaks occur, including seams, gaskets, piping pumps, valves, rivets and bolts, they shall be promptly cleaned up removing any accumulation of oil in the diked area.

2.21 Mobile Tanks (40 CFR 112.8(c)(11)

Mobile or portable oil storage tanks at this facility are positioned to prevent spilled oil from reaching navigable waters. These tanks are positioned within secondary containment and located where they will not be subject to periodic flooding.

2.22 Transfer Piping Corrosion Protection (40 CFR 112.8(d)(1))

Buried piping installed on or after August 16, 2002 was installed with a protective wrapper and/or coating installed and cathodically protected. If a section of buried line is exposed it shall be carefully inspected for deterioration and corrective action shall be taken if any corrosion

damage is present. The corrosion protection system shall be installed and maintained in accordance with Columbia's External Corrosion Control Plan 70.01.01.

2.23 Container Connection Points (40 CFR 112.8(d)(2))

Where tank loading/unloading lines are not equipped with quick disconnects, a bucket or absorbent material is placed under the line to catch any product that might drip from the pipe during loading/unloading operations.

Cap or blank-flange the terminal connection at the transfer point and mark it as to origin when piping is not in service or is in standby service for an extended period of time.

2.24 Transfer Piping Design (40 CFR 112.8(d)(3))

Pipe supports are properly designed to minimize abrasion and corrosion and allow for expansion and contraction.

2.25 Transfer Piping Inspection (40 CFR 112.8(d)(4))

Aboveground piping shall be regularly inspected. See Section 2.4 of this Plan for appropriate inspection frequencies and test procedures.

Buried piping is integrity and leak tested at the time of installation modification, construction, relocation or replacement. Testing is in accordance with the appropriate industrial code, such as ANSI, that was used for its design.

2.26 Aboveground Piping Warnings System (40 CFR 112.8(d)(5))

All vehicles entering the facility are warned to avoid damaging aboveground piping by one of the following methods:

Verbally:	X
By posted signs:	
Both verbally and by posted signs:	

3.0 RECORDS

3.1 Company Forms Database

The approved electronic work management system, Maximo, is used to record and store SPCC records.

Prior to the electronic work management and data capture system, the following forms were used to document work performed:

- SPCC Review Log
- SPCC Review/Revision History Log
- Weekly Drum/Storage Area Inspection Checklist

~~4.0 FACILITY RESPONSE PLANS (40 CFR 112.20)~~

The owner of this regulated facility is not required to submit a response plan in accordance with 40 CFR 112.20. This SPCC Plan includes the signed certification form ("Certification of the Applicability of the Substantial Harm Criteria") contained in Appendix C to Part 112 of the regulation.

5.0 EMERGENCY/CONTINGENCY PLAN

The primary emphasis of this Plan is to implement preventative spill measures and to effectively respond should one occur. However, even with proper planning, a "reportable" spill may occur. This section outlines the appropriate response measures to be followed to address such a spill.

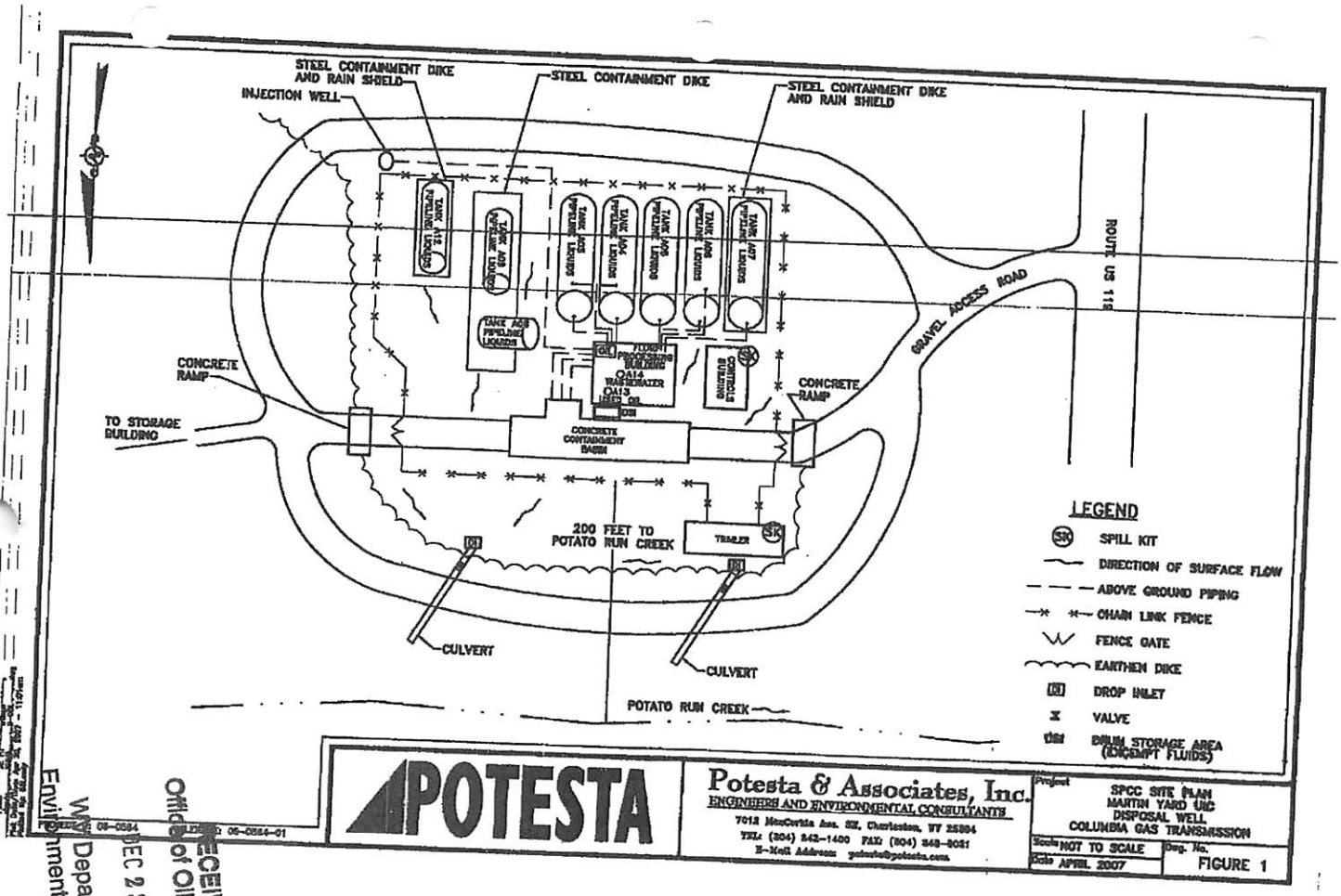
In summary, should a spill occur, the responsible facility person should:

1. Take immediate measures to stop the source (as safe conditions permit);
2. Notify appropriate authorities (Columbia and regulatory), if necessary; and
3. Assist as needed with cleanup operations.

5.1 Facility Equipment

Adequate spill response equipment shall be maintained at the facility. See Appendix A (facility diagram) for facility locations of emergency spill kits and other spill response equipment for additional resource availability in Columbia.

APPENDIX A



POTESTA

Potesta & Associates, Inc.
ENGINEERS AND ENVIRONMENTAL CONSULTANTS
7012 MacCorkle Ave. SE, Charleston, WV 25304
TEL: (304) 342-1400 FAX: (304) 342-0031
E-Mail Address: potesta@potesta.com

Project: SPCC SITE PLAN
MARTIN YARD UIC
DISPOSAL WELL
COLUMBIA GAS TRANSMISSION

Scale: NOT TO SCALE
Date: APRIL 2007

Dwg. No.
FIGURE 1

APPENDIX B

APPENDIX B

Maximo Equip #	Container #	Type	Construction	Install Date	Contents	Exempt from SPCC?	Maximum Capacity (Gallons)	Secondary Containment		Tankcars Pathways/Releases to Water			Details
								Type	Capacity	Type of Failure	Rate of Flow	Direction	
	A07	AST	Steel	1992	Pipeline Liquids (New Tank)	Included for SPCC	10,080	Double Walled Construction	Double wall construction provides inherent secondary containment.	Tank Failure	Instantaneous	North with potential impact to Potato Run Creek located 300 feet north.	• Tank liquid level is monitored on a regular basis. • Secondary containment provided by double wall construction. • Automatic high liquid level shut-off of inlet valve provides overfill protection. • Tank primarily accepts raw pipeline fluids, water and hydrocarbon mix. • Tank transfer operations are manual and observed by trained personnel for overfill protection.
	A04	AST	Steel	1992	Pipeline Liquids (New Tank)	Included for SPCC	10,080	Double Walled Construction	Double wall construction provides inherent secondary containment.	Tank Failure	Instantaneous	North with potential impact to Potato Run Creek located 300 feet north.	• Tank liquid level is monitored on a regular basis. • Secondary containment provided by double wall construction. • Automatic high liquid level shut-off of inlet valve provides overfill protection. • Tank primary accepts raw pipeline fluids, water and hydrocarbon mix. • Tank transfer operations are manual and observed by trained personnel for overfill protection.
	A05	AST	Steel	1992	Pipeline Liquids (Hydrocarbon Tank)	Included for SPCC	8,400	Double Walled Construction	Double wall construction provides inherent secondary containment.	Tank Failure	Instantaneous	North with potential impact to Potato Run Creek located 300 feet north.	• Tank liquid level is monitored on a regular basis. • Secondary containment provided by double walled construction. • Automatic high liquid level shut off of inlet valve provides overfill protection. • Tank primarily stores separated hydrocarbon portion of pipeline liquid. • Tank transfer operations are manual and observed by trained personnel for overfill protection.
	A06	AST	Steel	1992	Pipeline Liquids (Hydrocarbon Tank)	Included for SPCC	8,400	Double Walled Construction	Double wall construction provides inherent secondary containment.	Tank Failure	Instantaneous	North with potential impact to Potato Run Creek located 300 feet north.	• Tank liquid level is monitored on a regular basis. • Secondary containment provided by double walled construction. • Automatic high liquid level shut off of inlet valve provides overfill protection. • Tank primarily stores separated hydrocarbon portion of pipeline liquid. • Tank transfer operations are manual and observed by trained personnel for overfill protection.

APPENDIX B

Maximo Equip #	Container #	Type	Construction	Install Date	Contents	Exempt from SPCC?	Maximum Capacity (Gallons)	Secondary Containment: Type	Secondary Containment: Capacity	Drainage Pathway/Distance to Water: Type of Failure	Rate of Flow	Direction	Details
	A07	AST	Steel	1998	Pipeline Liquids (Injection Tank)	Included for SPCC	10,000	Steel Dike	30' X 10' X 5' X 7.48 gal/ft³ = 11,220 gallons or 112% (11,220/10,000) containment	Tank Failure	Instantaneous	North with potential impact to Potato Run Creek located 300 feet north.	• Tank liquid level is monitored on a regular basis. • Secondary containment provided by steel dike with rain shield. • Automatic high liquid level shut off of inlet valve provides overfill protection. • Tank primarily stores separated hydrocarbon portion of pipeline liquid. • Tank transfer operations are manned and observed by trained personnel for overfill protection.
	A08	AST	Steel	1998	Pipeline Liquids (Injection Tank)	Included for SPCC	8,820	Steel Dike	36' X 16' X 3' X 7.48 gal/ft³ = 12,925 gallons or 146% (12,925/8,820) containment	Tank Failure	Instantaneous	North with potential impact to Potato Run Creek located 300 feet north.	• Tank liquid level is monitored on a regular basis. • Tank is used to store raw pipeline liquids. • Secondary containment provided by steel dike common with Tank A09. • Tank transfer operations are manned and observed by trained personnel for overfill protection.
	A09	AST	Steel	1998	Pipeline Liquids (Trash Tank)	Included for SPCC	8,820	Steel Dike	36' X 16' X 3.17' X 7.48 gal/ft³ = 13,657 gallons or 154% (13,657/8,820) containment	Tank Failure	Instantaneous	North with potential impact to Potato Run Creek located 300 feet north.	• Tank liquid level is monitored on a regular basis. • Tank is used to store raw pipeline liquids. • Secondary containment provided by steel dike common with Tank A08. • Tank transfer operations are manned and observed by trained personnel for overfill protection.
	A12	AST	Steel	Unknown	Pipeline Liquids	Included for SPCC	8,000	Steel Dike	10.84' X 27.5' X 4' X 7.48 gal/ft³ = 8,919 gallons or 111% (8,919/8,000) containment	Tank Failure	Undetermined	North with potential impact to Potato Run Creek located 300 feet north.	• Tank liquid level is monitored on a regular basis. • Secondary containment provided by steel dike with rain shield. • Tank transfer operations are manned and observed by trained personnel for overfill protection.
	A13	AST	Steel	2001	Used Oil	Included for SPCC	600	Concrete Dike	31.66' X 11.25' X 0.25' X 7.48 gal/ft³ = 666 gallons or 111% (666/600) containment	Tank Failure	Undetermined	North with potential impact to Potato Run Creek located 300 feet north.	• Secondary containment provided by a concrete floor with curbing inside fluid handling building. • Receives used oil from oil/water separator. • Tank transfer operations are manned and observed by trained personnel for overfill protection.
	A14	AST	Steel	2001	Waste Water with Residual Oil	Included for SPCC	600	Concrete Dike	31.66' X 11.25' X 0.25' X 7.48 gal/ft³ = 666 gallons or 111% (666/600) containment	Tank Failure	Undetermined	North with potential impact to Potato Run Creek located 300 feet north.	• Secondary containment provided by a concrete floor with curbing inside fluid handling building. • Receives waste water from oil/water separator. • Tank transfer operations are manned and observed by trained personnel for overfill protection.

APPENDIX B

Machine Equip #	Container #	Type	Construction	Install Date	Contents	Exempt from SPCC?	Maximum Capacity (Gallons)	Secondary Containment		Drainage Pathways/Distance to Water			Details
								Type	Capacity	Type of Failure	Rate of Flow	Direction	
	Oil/Water Separator	AST	Steel	Unknown	Waste Water and Oil	Included for SPCC	500 (est.)	Concrete Dike	31.66' X 11.25' X 0.25' X 7.48 gal/ft³ = 666 gallons or 133% (666/500) containment	Tank Failure	Instantaneous	North with potential impact to Potato Run Creek located 300 feet north.	• Secondary containment provided by a concrete floor with curbing inside fluid handling building. • Receives raw pipeline liquids containing water and hydrocarbons. • Tank transfer operations are manned and observed by trained personnel for overfill protection.

APPENDIX C

APPENDIX C
CERTIFICATION OF THE APPLICABILITY OF SUBSTANTIAL HARM CRITERIA (40 CFR 112.20(e))

Facility Name: Martin Yard UIC Disposal Well
Facility Address: US Route 119, Clendenin, West Virginia 25045

1. Does the facility transfer oil over water to or from vessels and does the facility have a total oil storage capacity greater than or equal to 42,000 gallons?
YES _____ NO X

2. Does the facility have a total oil storage capacity greater than or equal to 1 million gallons and does the facility lack secondary containment that is sufficiently large to contain the capacity of the largest aboveground oil storage tank plus sufficient freeboard to allow for precipitation within any aboveground oil storage tank area?
YES _____ NO X

3. Does the facility have a total oil storage capacity greater than or equal to 1 million gallons and is the facility located at a distance (as calculated using the appropriate formula in Attachment C-III of 40 CFR 112.20 or a comparable formula) such that a discharge from the facility could cause injury to fish and wildlife sensitive environments?
YES _____ NO X

4. Does the facility have a total oil storage capacity greater than or equal to 1 million gallons and is the facility located at a distance (as calculated using the appropriate formula in Attachment C-III to the appendix of 40 CFR 112.20 or a comparable formula) such that a discharge from the facility would shut down a public water intake?
YES _____ NO X

5. Does the facility have a total oil storage capacity greater than or equal to 1 million gallons and has the facility experienced a reportable oil spill in an amount greater than or equal to 10,000 gallons within the last 5 years?
YES _____ NO X

CERTIFICATION

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document, and that based on my inquiry of those individuals responsible for obtaining this information, I believe that the submitted information is true, accurate, and complete.

Signature: Buddy Childers
Name: Buddy Childers
Title: Team Leader
Date: 5-14-07.

SPCC PLAN REVIEW

Name	Date	I have completed a review and evaluation of the SPCC Plan for MARTIN YARD WIC DISPOSAL WELL and will (will not)* amend the Plan as a result. *Please check one box below.		
		Will	Will Not	Comments
PATRICK CROGHAN	2/28/12		X	NO CHANGES
TIM SPENCE	1/29/13		X	NO CHANGES
TIM SPENCE	12/18/15		X	ADMIN. CHANGES

Section 12
Plugging and Abandonment

UIC PERMIT NUMBER UIC2D0871977
RENEWAL APPLICATION
ROANE WELL #99
COLUMBIA GAS TRANSMISSION, LLC.

SECTION 12
PLUGGING AND ABANDONMENT

Attached is a proposed plugging and abandonment plan, including a wellbore schematic that shows existing conditions, and a wellbore schematic reflecting the proposed plugging and abandonment of the well.

Roane W-99 (injection)
Proposed Plug and Abandonment Plan

General

API Number:	47 – 087 - 01977
UIC Permit Number:	UIC2D0871977
Operator:	Columbia Gas Transmission, LLC
Surface Owner:	Columbia Gas Transmission, LLC
GL Elevation:	661 ft

Casing/Tubing

20" conductor set @ 34 ft	(cemented to surface)
13-3/8" csg set @ 124 ft	(cemented to surface)
9-5/8" csg set @ 1902 ft	(cemented to surface)
7" 23# K-55 csg set @ 5130 ft	(cemented w/ 350 sx – cement top at 2940 ft per CBL)
4-1/2" 10.5# J-55 csg set @ 4608 ft	(cemented w/ 150 sx – cement top at 4290 ft per CBL)

2-3/8" tbg ran to 4569 ft set on a packer @ 4562 ft

Formations (electric log)

Fresh water show @ 297'

Salt Sand	1076 – 1134 ft	*(potential for salt water)*
Salt Sand	1168 – 1290 ft	*(potential for salt water)*
Greenbrier Big Lime	1446 – 1477 ft	
Loyalhanna Big Lime	1477 – 1565 ft	*(potential for hydrocarbon)*
Pocono Big Injun	1569 – 1611 ft	*(potential for hydrocarbon)*
Weir Sand	1854 – 1902 ft	*(potential for hydrocarbon)*
Berea	2018 – 2030 ft	*(potential for hydrocarbon)*
Top of Devonian Shale	2030 ft	
Lower Huron	3194 – 4130 ft	*(potential for hydrocarbon)*
Lower Alexander	4378 – 4420 ft	
Rhinestreet	4580 – 4901 ft	* *injection zone*
Base of Devonian Shale	5114 ft	
Marcellus Shale	5114 – 5130 ft	*(potential for hydrocarbon)*
TD	5130 ft	

Perforations

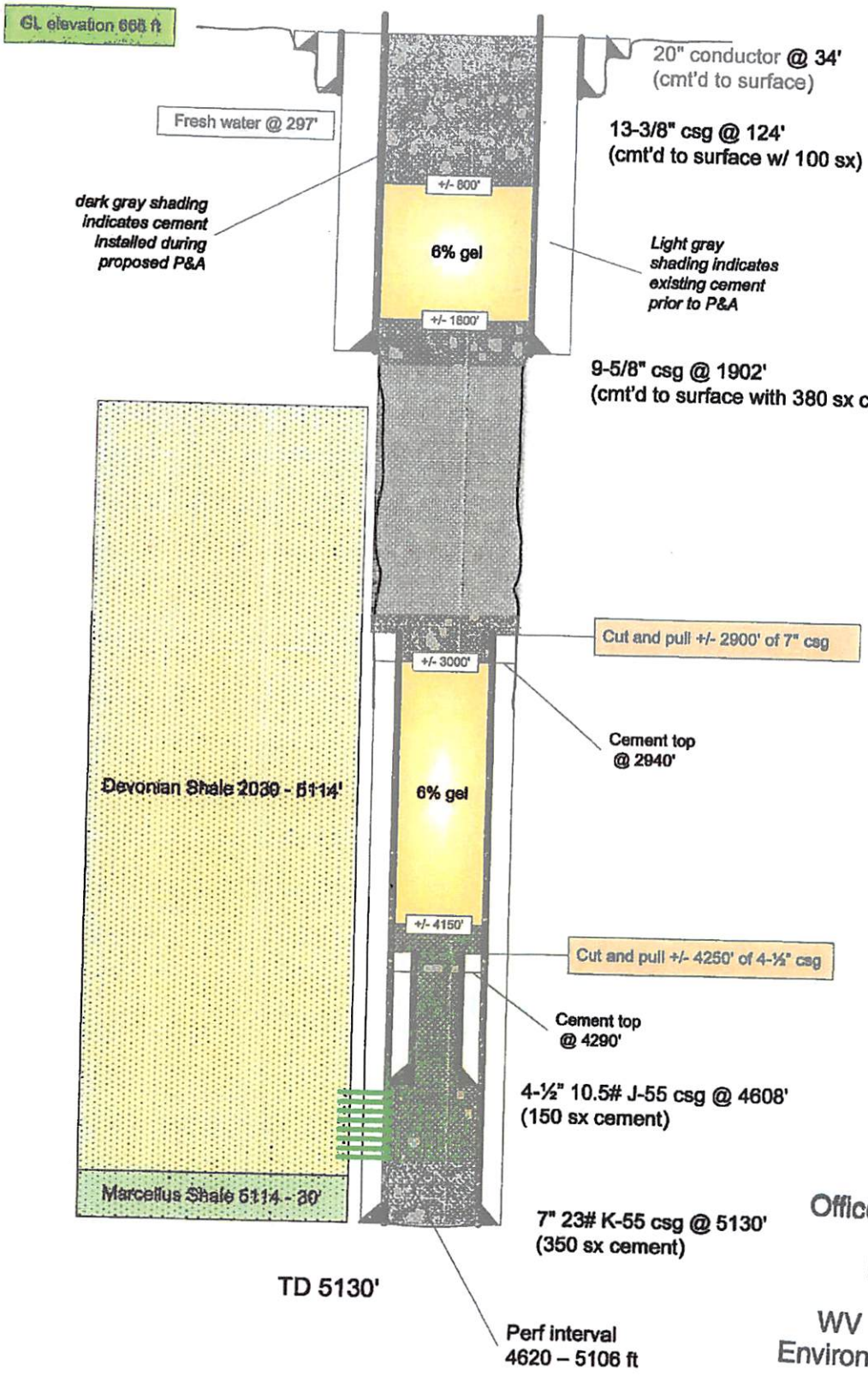
4620 – 5106 ft (7" casing) * *injection interval*

P&A Procedure

** Refer to prior and proposed post P&A wellbore schematic*

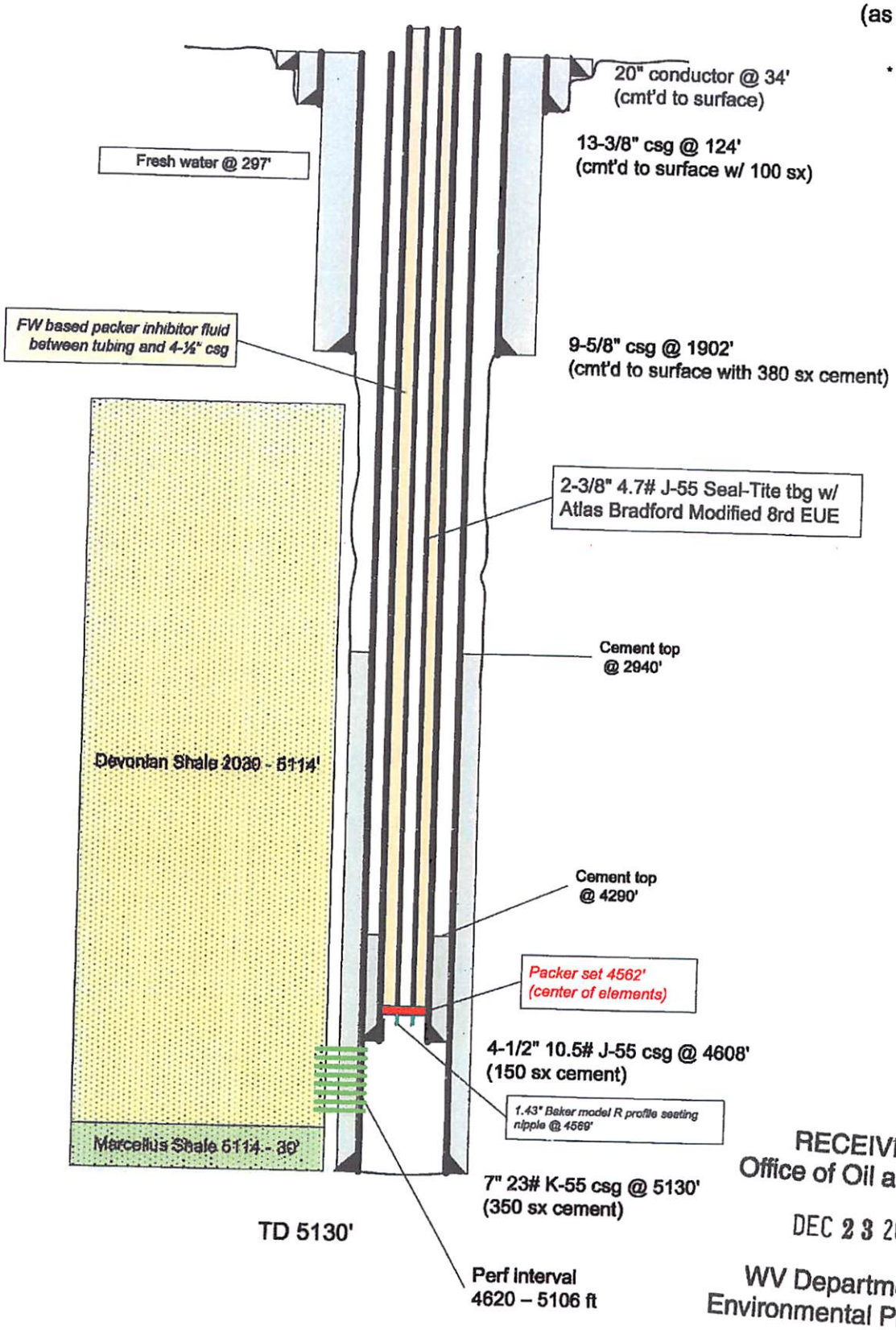
1. Kill well.
2. Pull tubing and packer.
3. Clean to TD.
4. Install cement plug from TD to 4350 ft.
5. WOC and tag top of cement plug.
6. Cut/back-off and pull 4250 ft of 4-1/2" casing.
7. Install cement plug from 4150 to 4350 ft.
8. Spot 6% gel from 3000 to 4150 ft.
9. Cut and pull 2900 ft of 7" casing.
10. Install cement plug from 1800 to 3000 ft.
11. Spot 6% gel from 800 to 1800 ft.
12. Install cement plug from surface to 800 ft.
13. Install permanent monument.

ROANE W-99
(proposed P&A)



ROANE W-99
(as of 12/17/15)

** not to scale **



Section 13
Additional Bonding

UIC PERMIT NUMBER UIC2D0871977
RENEWAL APPLICATION
ROANE WELL #99
COLUMBIA GAS TRANSMISSION, LLC.

SECTION 13
ADDITIONAL BONDING

Columbia has a $50,000 Blanket Performance Bond to cover all wells located in West Virginia.

As required, Columbia also has the separate, additional bond for the operation of a Class 2D well. The following information is being provided concerning the additional bond:

- Surety Bond in the amount of $5,000 from Travelers Casualty and Surety Company;
- Instrument Number 800223-08;
- Issued March 21, 2011;
- Effective May 2, 2011

Section 14
Financial Responsibility

UIC PERMIT NUMBER UIC2D0871977
RENEWAL APPLICATION
ROANE WELL #99
COLUMBIA GAS TRANSMISSION, LLC.

SECTION 14
FINANCIAL RESPONSIBILITY

Appendix I has been completed, signed and included as evidence of financial responsibility and resources to close, plug or abandon the well in a manner prescribed by the Director.

RECEIVED
Office of Oil and Gas

DEC 23 2015

WV Department of
Environmental Protection

Appendix I
Financial Responsibility

(4/25)

APPENDIX I

Requirement for Financial Responsibility to Plug/Abandon an Injection Well

To: WV Department of Environmental Protection
Office of Oil and Gas
601 57th Street, SE
Charleston, West Virginia 25304-2345
ATTN: Underground Injection Control Program

From: Columbia Gas Transmission, LLC
1700 MacCorkle Avenue SE
4th Floor
Charleston, WV 25314

Date: 12/17/15

Subject: Underground Injection Control (UIC) Permit Application
UIC2D0871977
Requirement for Financial Responsibility

I, Robert M. Kitchell, verify in accordance with 47CSR13-13.7.g., that I will maintain financial responsibility and resources to close, plug, and abandon underground injection wells(s) in a manner prescribed by the Chief of the Office of Oil and Gas.

RECEIVED
Office of Oil and Gas
DEC 23 2015
WV Department of
Environmental Protection

Name: Robert M. Kitchell - Vice President Operations

Signature: Robert M. Kitchell

Date: 12/17/15

Section 15
Site Security Plan

UIC PERMIT NUMBER UIC2D0871977
RENEWAL APPLICATION
ROANE WELL #99
COLUMBIA GAS TRANSMISSION, LLC.

SECTION 15
SITE SECURITY PLAN

The facility is fully enclosed by a chain link fence and the entrance gate is locked at all times when no personnel are present at the site.

The disposal well is located inside a building that is locked when no personnel are present at the site.

All ASTs are either double-walled or within secondary containment fields.

The facility has adequate lighting from dusk to dawn.

Since the Martin Yard facility is not a commercial facility, the attached Appendix J has been marked as not applicable.

Appendix J
Site Security for Commercial Wells

APPENDIX J

Site Security for Commercial Facilities

Provide a detailed description of the method(s) utilized at the facility to restrict or prohibit illegal dumping of unauthorized waste or vandalism at the facility.

1. Complete enclosure of all wells, holding tank/pits and manifold assemblies within a chain link or other suitable fencing; and

2. Require that all gates and other entry points be locked when the facility is unattended; or

3. Providing tamper-proof seals for the master valve on each well (a "lock-out" or chain & padlock system would be more secure; however, these devices could create a potential safety hazard if the well needed to be quickly shut in due to an emergency); and

4. Installing locking caps on all valves and connections on holding tanks, unloading racks, and headers.

Not Applicable.

Section 16
Additional Information

UIC PERMIT NUMBER UIC2D0871977
RENEWAL APPLICATION
ROANE WELL #99
COLUMBIA GAS TRANSMISSION, LLC.

SECTION 16
ADDITIONAL INFORMATION

All permits or construction approvals received or applied for associated with the facility have been shown in the attached Appendix K.

May 2016 Revisions

Item 5.a. - The two culverts shown are to control runoff water during rain events. The culverts do not discharge treated or untreated industrial process water. While the water is monitored for visible oil sheens prior to release to the stream, the water is nothing more than surface water runoff. Natural Gas Transmission and Storage, under SIC Code 4922, are exempt from the stormwater permitting requirements under the NPDES program. Therefore, no NPDES permit should be required for this facility.

Item 5.b. – Columbia is currently investigating air permitting issues and will address this item as necessary upon completion of the evaluation.

Item 5.c. - None of the ASTs at the facility are registered with the State of West Virginia. These ASTs are exempt from registration because they are covered under the Natural Gas Pipeline Safety Act of 1968. Representatives of the Division of Water and Waste Management are currently evaluating the ASTs present at the facility to confirm if the agency agrees the tanks are exempt, or if they will have to be registered.

UIC PERMIT NUMBER UIC2D0871977
RENEWAL APPLICATION
ROANE WELL #99
COLUMBIA GAS TRANSMISSION, LLC.

SECTION 16
ADDITIONAL INFORMATION

All permits or construction approvals received or applied for associated with the facility have been shown in the attached Appendix K.

Appendix K
Other Permit Approvals

APPENDIX K

Identify permit or construction approvals received or applied for under the following programs:

Permit/approvals	ID Number
Hazardous Waste Management Program under RCRA	
NPDES Program	
Prevention of Significant Deterioration (PSD)	
Nonattainment Program	
Dredge or Fill	
NPDES/NPDES – Stormwater	
WVDEP – Office of Waste Management (OWM) – Solid Waste Facility	
WVDEP – OWM – RCRA (Hazardous Waste TSD or Transporter)	
WVDEP – OWM – UST	
CERCLA – Superfund	
WV Voluntary Remediation – Brownfields	
FIFRA – Federal Insecticide, Fungicide and Rodenticide Act	
Well Head Protection Program (WHPP)	
Underground Injection Control (UIC)	UIC2D0871977
Toxic Substances Control Act (TSCA)	
Best Management Plans	
Management of Used Oil	
Other Relevant Permits (Specify):	