FLORENCE COPPER

**FLORENCE COPPER INC.**
1575 W. Hunt Highway, Florence, Arizona 85132 USA
florencecopper.com

September 28, 2020

David Albright
Manager, Groundwater Protection Section
USEPA Region 9 (WTR-4-2)
75 Hawthorne Street
San Francisco, CA 94105

**Re: Transmittal of Quarterly Temperature Logging Summary, Q3 2020**
**Production Test Facility Westbay Wells: WB-01, WB-02, WB-03, and WB-04**
**Florence Copper Project, Florence Arizona**

Dear Mr. Albright:

Florence Copper Inc. herewith transmits the enclosed Technical Memorandum, *Quarterly Temperature Logging Summary, Q3 2020, Production Test Facility Westbay Wells: WB-01, WB-02, WB-03, and WB-04, Florence Copper Project, Florence Arizona.*

Please contact me at 520-316-3710 if you require any additional information.

Sincerely,
Florence Copper Inc.

Brent Berg
General Manager

cc: Nancy Rumrill, U.S. Environmental Protection Agency

Enclosure

FLORENCE COPPER

**FLORENCE COPPER INC.**
1575 W. Hunt Highway, Florence, Arizona 85132 USA
florencecopper.com

**TECHNICAL MEMORANDUM**

TO: David Albright
USEPA Region 9

FROM: Brent Berg
Florence Copper

DATE: September 28, 2020

SUBJECT: Quarterly Temperature Logging Summary, Q3 2020
Production Test Facility Westbay Wells: WB-01, WB-02, WB-03, and WB-04
Florence Copper Inc., Florence, Arizona

## Introduction

This Technical Memorandum presents the results of temperature logging for Production Test Facility (PTF) Westbay wells WB-01, WB-02, WB-03, and WB-04 during September 2020 for Florence Copper Inc. (Florence Copper) in Florence, Arizona. Westbay wells WB-01, WB-02, WB-03, and WB-04 are located within the Underground Injection Control (UIC) Permitted Area of Review for UIC Permit R9UIC-AZ3-FY11-1 and were completed as Class III multi-level monitoring wells for the PTF (Figure 1).

Florence Copper contracted Southwest Exploration Services, LLC to perform temperature logging to verify the absence of fluid movement through vertical channels adjacent to the well, in accordance with the 25 July 2019 UIC Permit Minor Modification.

## Wells Logged

Florence Copper completed temperature logging of Westbay wells WB-01, WB-02, WB-03, and WB-04. Temperature runs were completed at least 4 hours apart after the wells had been shut in for 24 hours. The temperature logs were performed as listed in the following table.

| Well ID | Temperature Log Date | Temperature Log Run 1 Time | Temperature Log Run 2 Time |
|---|---|---|---|
| WB-01 | 9/3/2020 | 8:09 AM | 12:09 PM |
| WB-02 | 9/3/2020 | 7:14 AM | 11:14 AM |
| WB-03 | 9/3/2020 | 6:22 AM | 10:22 AM |
| WB-04 | 9/3/2020 | 5:15 AM | 9:15 AM |

As-built diagrams of the Westbay wells are provided in Appendix A and the temperature logs are provided in Appendix B. Daily average flow rates for the injection and recovery wells, and daily average water level elevations for the recovery and observation wells, are provided in Appendix C for the day temperature logs were conducted.

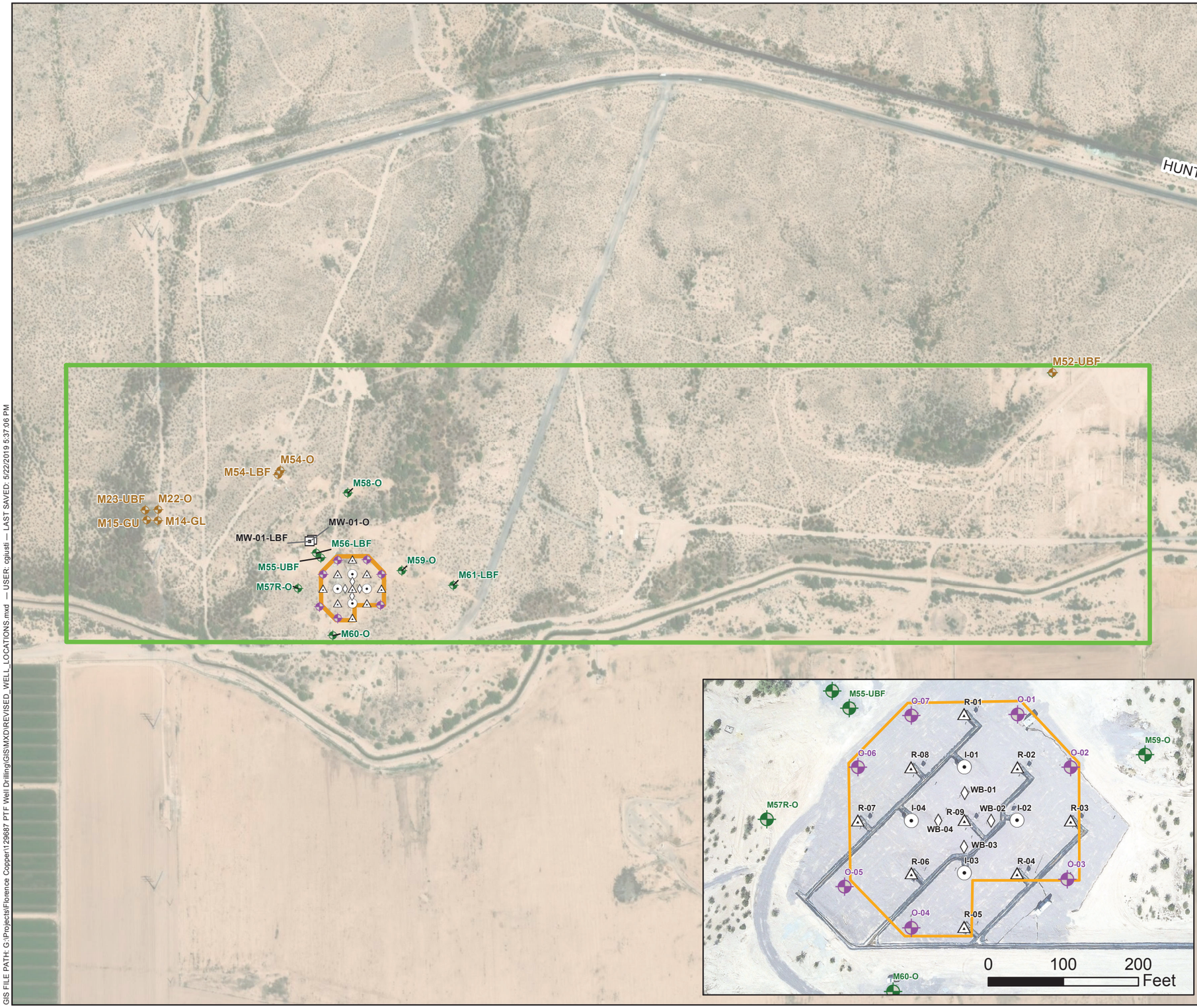
**Findings**

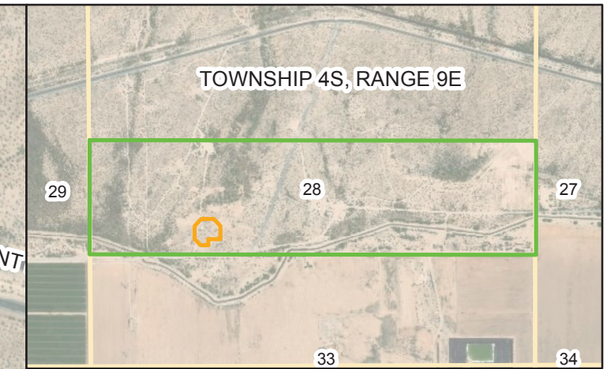
The temperature logging results for Westbay wells WB-01, WB-02, WB-03, and WB-04 show no anomalies that would indicate that there is flow behind the well casings. The temperature logs for each logging event reflect similar instrument readings for both the initial and secondary runs, resulting in parallel temperature traces on each of the log records for the entirety of the well.

Enclosures:

Figure 1 – Well Locations
Appendix A – Westbay Well As-Built Diagrams
Appendix B – Q3 2020 Temperature Logs
Appendix C – Daily Average Flow Rates and Water Level Elevations

**FIGURE**




0 1,000 2,000 Feet

**LEGEND**

- INJECTION WELL
- RECOVERY WELL
- WESTBAY WELL
- OPERATIONAL WELL
- OBSERVATION WELL
- SUPPLEMENTAL MONITORING WELL
- POINY-OF-COMPLIANCE WELL
- STATE LAND LEASE
- PTF WELLFIELD

**NOTES**

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE
2. AERIAL IMAGERY SOURCE: ESRI

N

0 500 1,000
SCALE IN FEET

HALEY ALDRICH

FLORENCE COPPER PROJECT
FLORENCE, ARIZONA

WELL LOCATIONS

FLORENCE COPPER

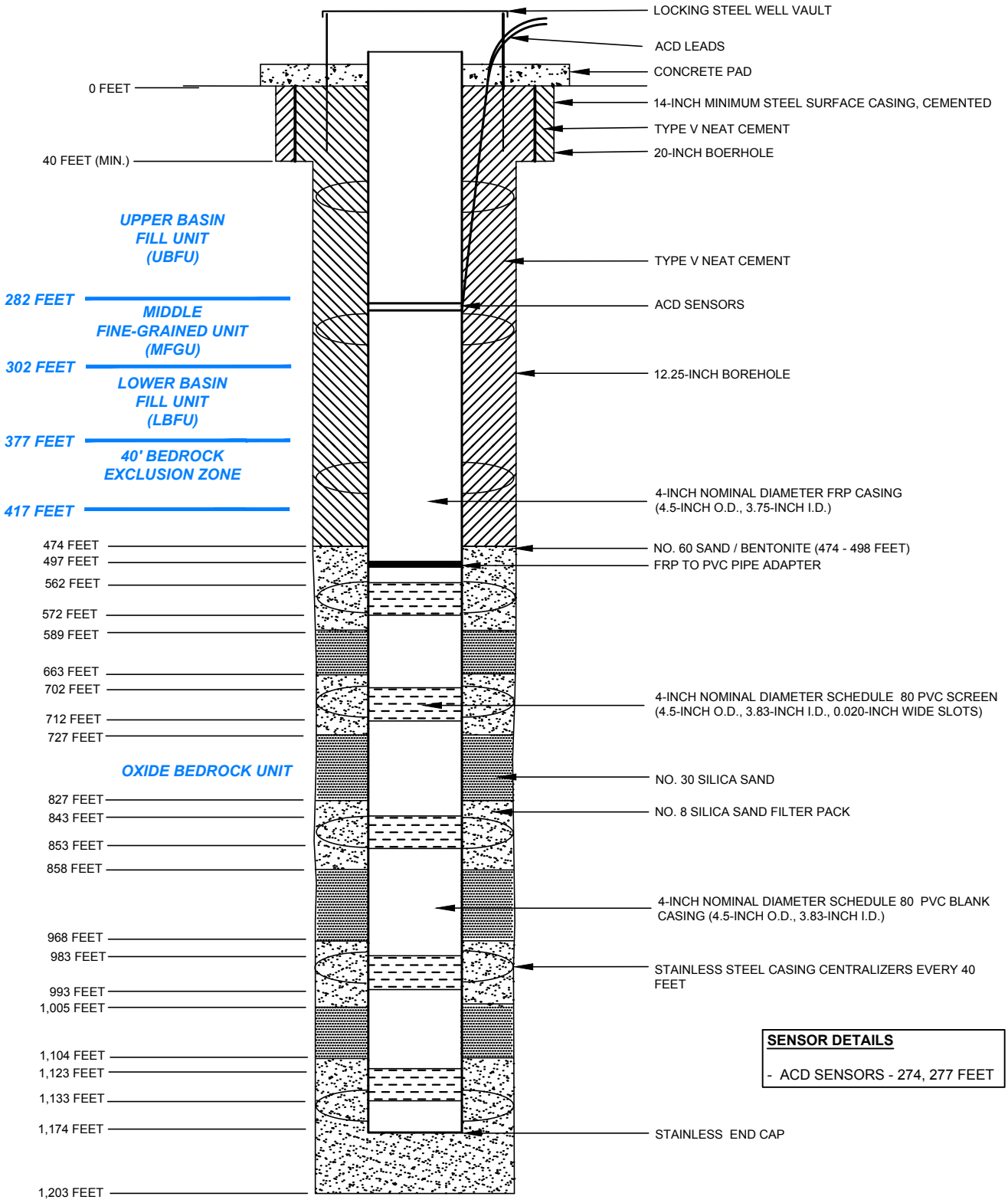
JUNE 2020

FIGURE 1

GIS FILE PATH: G:\Projects\Florence Copper\129687 PTF Well Drilling\GIS\MXD\REVISED_WELL_LOCATIONS.mxd — USER: cgiusti — LAST SAVED: 5/22/2019 5:37:06 PM

# APPENDIX A

## Westbay Well As-Built Diagrams




**SENSOR DETAILS**

- ACD SENSORS - 274, 277 FEET

**NOTES**

1. WELL REGISTRATION NO.: 55-227226
2. CADASTRAL LOCATION: D(4-9) 28 CAC
3. MEASURING POINT ELEVATION: 1479.34 FEET AMSL
4. I.D. = INSIDE DIAMETER
5. O.D. = OUTSIDE DIAMETER
6. PVC = POLYVINYL CHLORIDE
7. FRP = FIBERGLASS REINFORCED PLASTIC
8. ACD = ANNULAR CONDUCTIVITY DEVICE
9. DOWNHOLE EQUIPMENT INSTALLED BY WESTBAY INSTRUMENTS

HALEY ALDRICH

PRODUCTION TEST FACILITY
FLORENCE COPPER, INC.
FLORENCE, ARIZONA

WB-01 WESTBAY WELL
AS-BUILT DIAGRAM

FLORENCE COPPER INC.

SCALE: NOT TO SCALE
SEPTEMBER 2018

FIGURE 2

MOBINI, GITA Printed: 8/31/2018 2:54 PM Layout: WB-01
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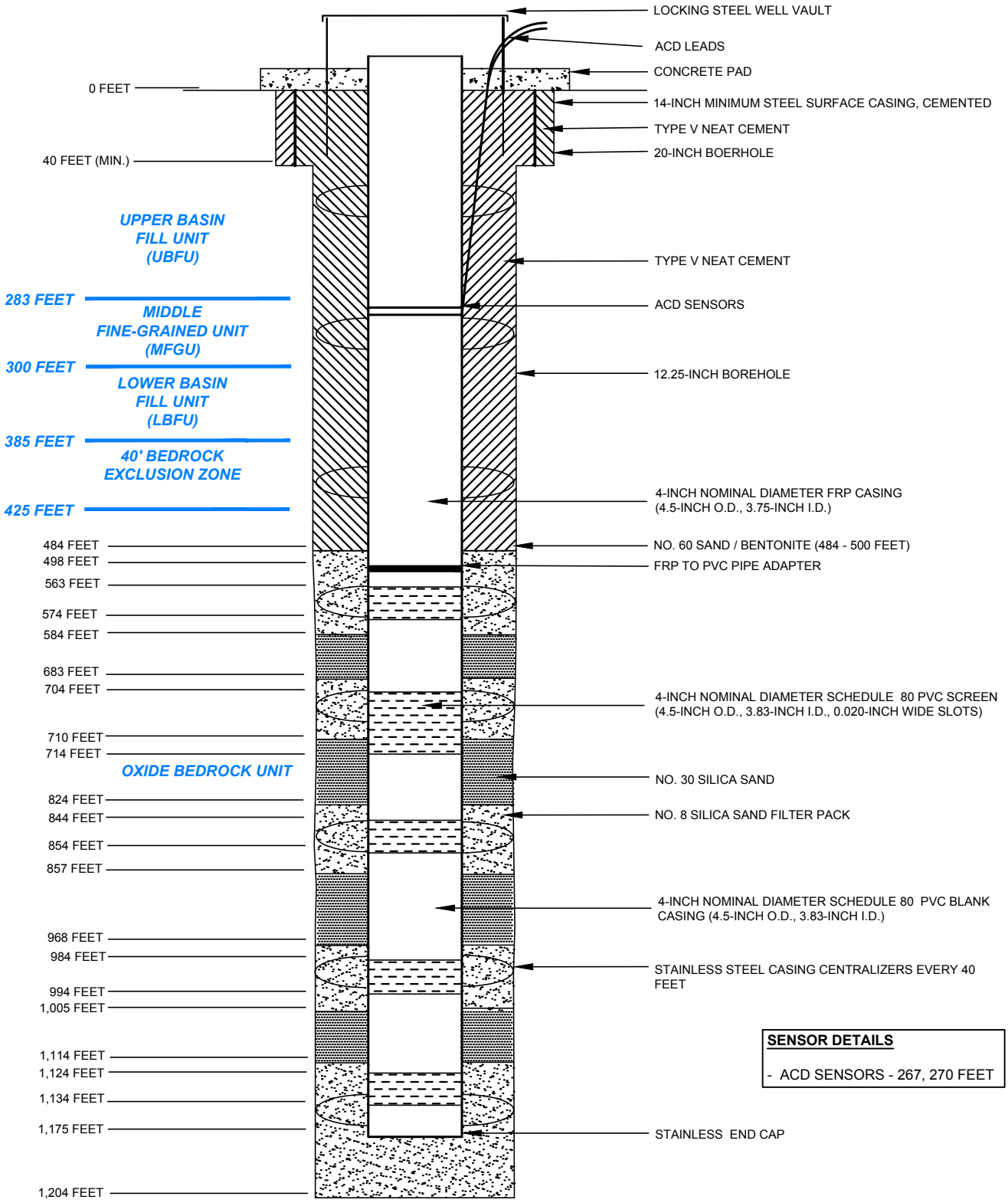



**NOTES**

1. WELL REGISTRATION NO.: 55-227227
2. CADASTRAL LOCATION: D(4-9) 28 CAC
3. MEASURING POINT ELEVATION: 1478.75 FEET AMSL
4. I.D. = INSIDE DIAMETER
5. O.D. = OUTSIDE DIAMETER
6. PVC = POLYVINYL CHLORIDE
7. FRP = FIBERGLASS REINFORCED PLASTIC
8. ACD = ANNULAR CONDUCTIVITY DEVICE
9. DOWNHOLE EQUIPMENT INSTALLED BY WESTBAY INSTRUMENTS

HALEY ALDRICH

PRODUCTION TEST FACILITY
FLORENCE COPPER, INC.
FLORENCE, ARIZONA

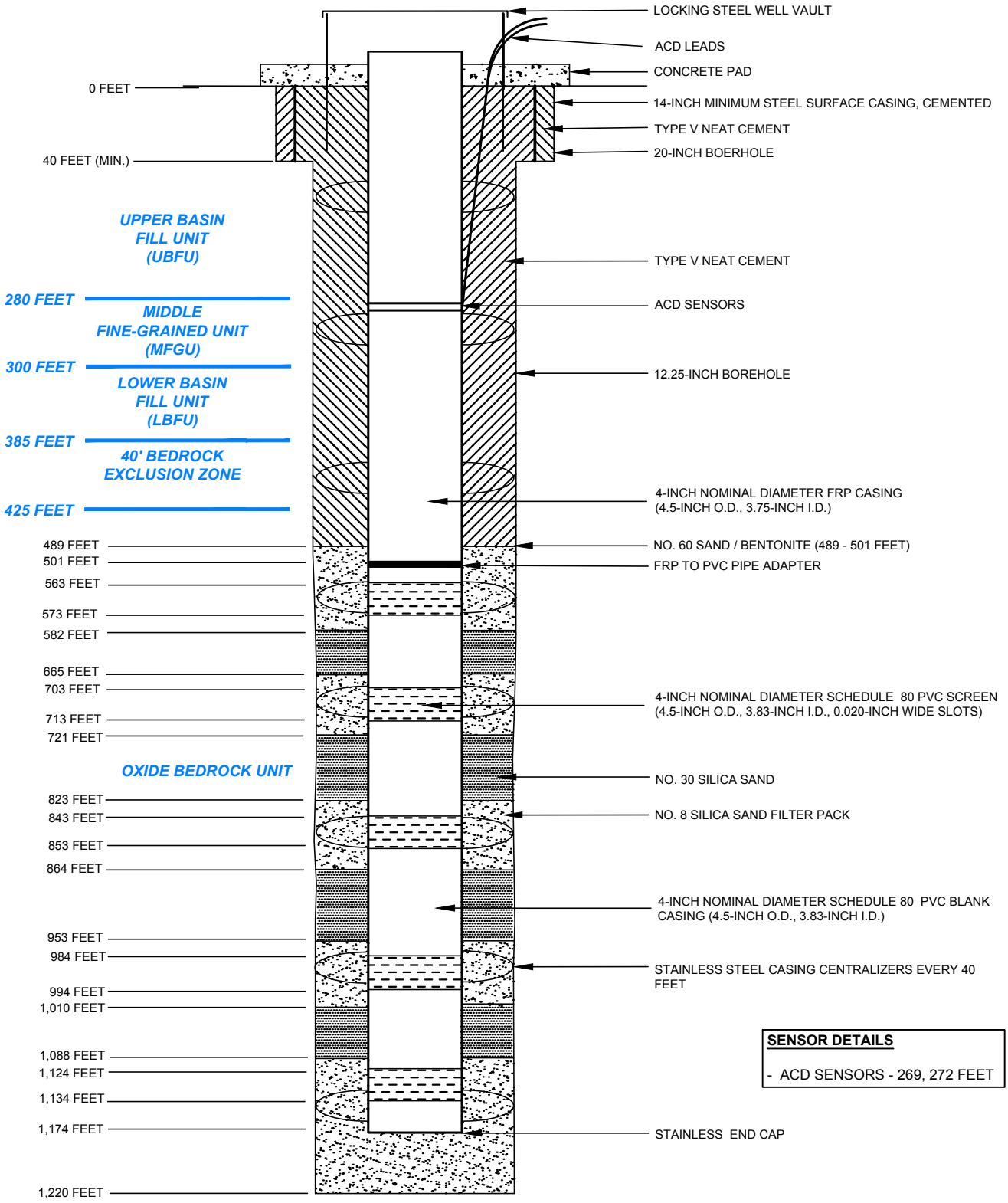
WB-02 WESTBAY WELL
AS-BUILT DIAGRAM

FLORENCE COPPER INC.

SCALE: NOT TO SCALE
SEPTEMBER 2018

FIGURE 2

MOBINI, GITA Printed: 8/31/2018 2:54 PM Layout: WB-02
E:\PROJECTS\FLORENCE COPPER\CAD\AS-BUILTS\WESTBAY WELLS\129687_011_WB WELLS_AS-BUILT.DWG




**NOTES**

1. WELL REGISTRATION NO.: 55-227228
2. CADASTRAL LOCATION: D(4-9) 28 CAC
3. MEASURING POINT ELEVATION: 1478.99 FEET AMSL
4. I.D. = INSIDE DIAMETER
5. O.D. = OUTSIDE DIAMETER
6. PVC = POLYVINYL CHLORIDE
7. FRP = FIBERGLASS REINFORCED PLASTIC
8. ACD = ANNULAR CONDUCTIVITY DEVICE
9. DOWNHOLE EQUIPMENT INSTALLED BY WESTBAY INSTRUMENTS

HALEY ALDRICH

PRODUCTION TEST FACILITY
FLORENCE COPPER, INC.
FLORENCE, ARIZONA

WB-03 WESTBAY WELL
AS-BUILT DIAGRAM

FLORENCE COPPER INC.

SCALE: NOT TO SCALE
SEPTEMBER 2018

FIGURE 2

MOBINI, GITA Printed: 8/31/2018 2:54 PM Layout: WB-03
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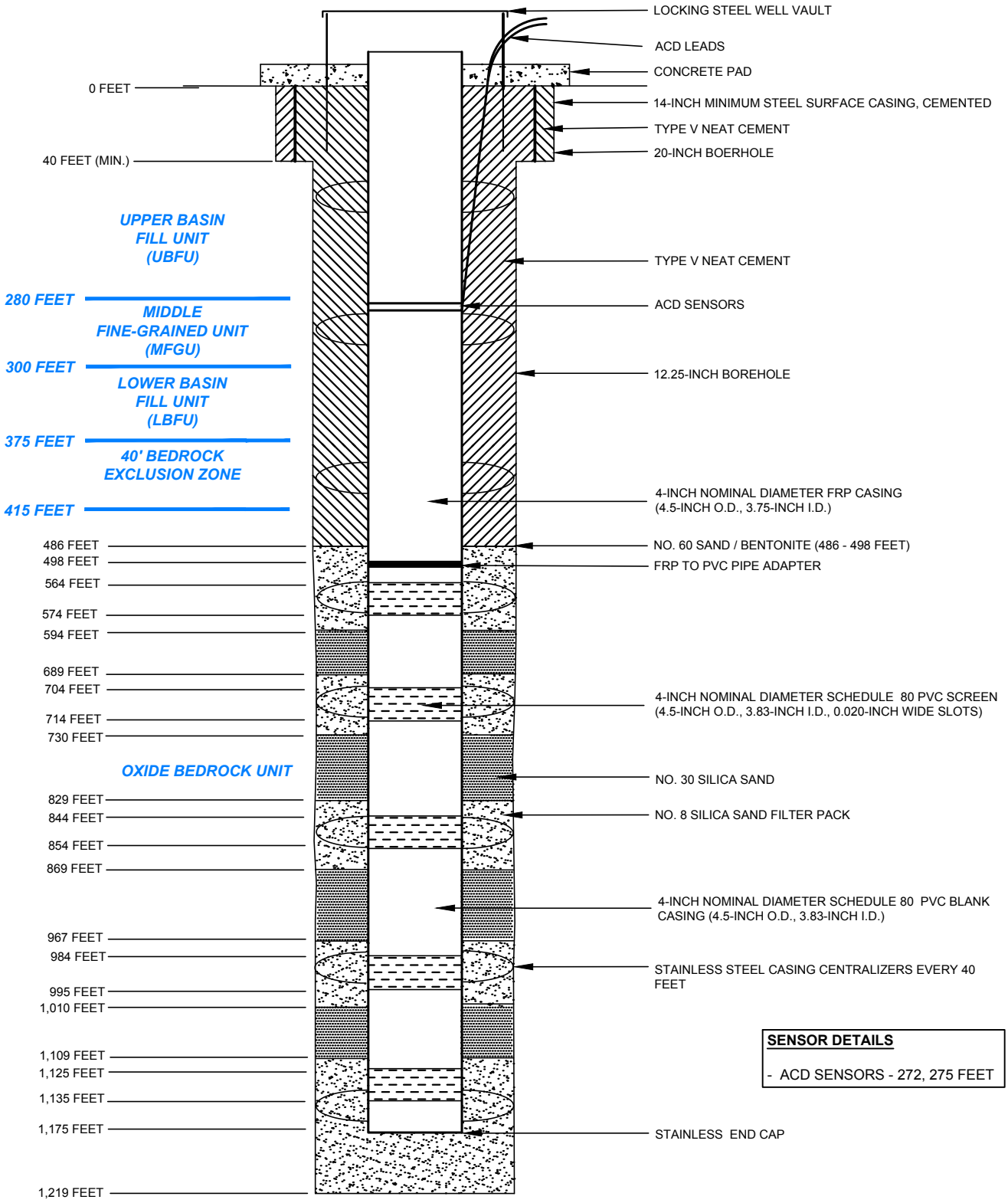


**NOTES**

1. WELL REGISTRATION NO.: 55-227229
2. CADASTRAL LOCATION: D(4-9) 28 CAC
3. MEASURING POINT ELEVATION: 1479.79 FEET AMSL
4. I.D. = INSIDE DIAMETER
5. O.D. = OUTSIDE DIAMETER
6. PVC = POLYVINYL CHLORIDE
7. FRP = FIBERGLASS REINFORCED PLASTIC
8. ACD = ANNULAR CONDUCTIVITY DEVICE
9. DOWNHOLE EQUIPMENT INSTALLED BY WESTBAY INSTRUMENTS

HALEY ALDRICH

PRODUCTION TEST FACILITY
FLORENCE COPPER, INC.
FLORENCE, ARIZONA

WB-04 WESTBAY WELL
AS-BUILT DIAGRAM

FLORENCE COPPER INC.

SCALE: NOT TO SCALE
SEPTEMBER 2018

FIGURE 2

MOBINI, GITA Printed: 8/31/2018 2:54 PM Layout: WB-04
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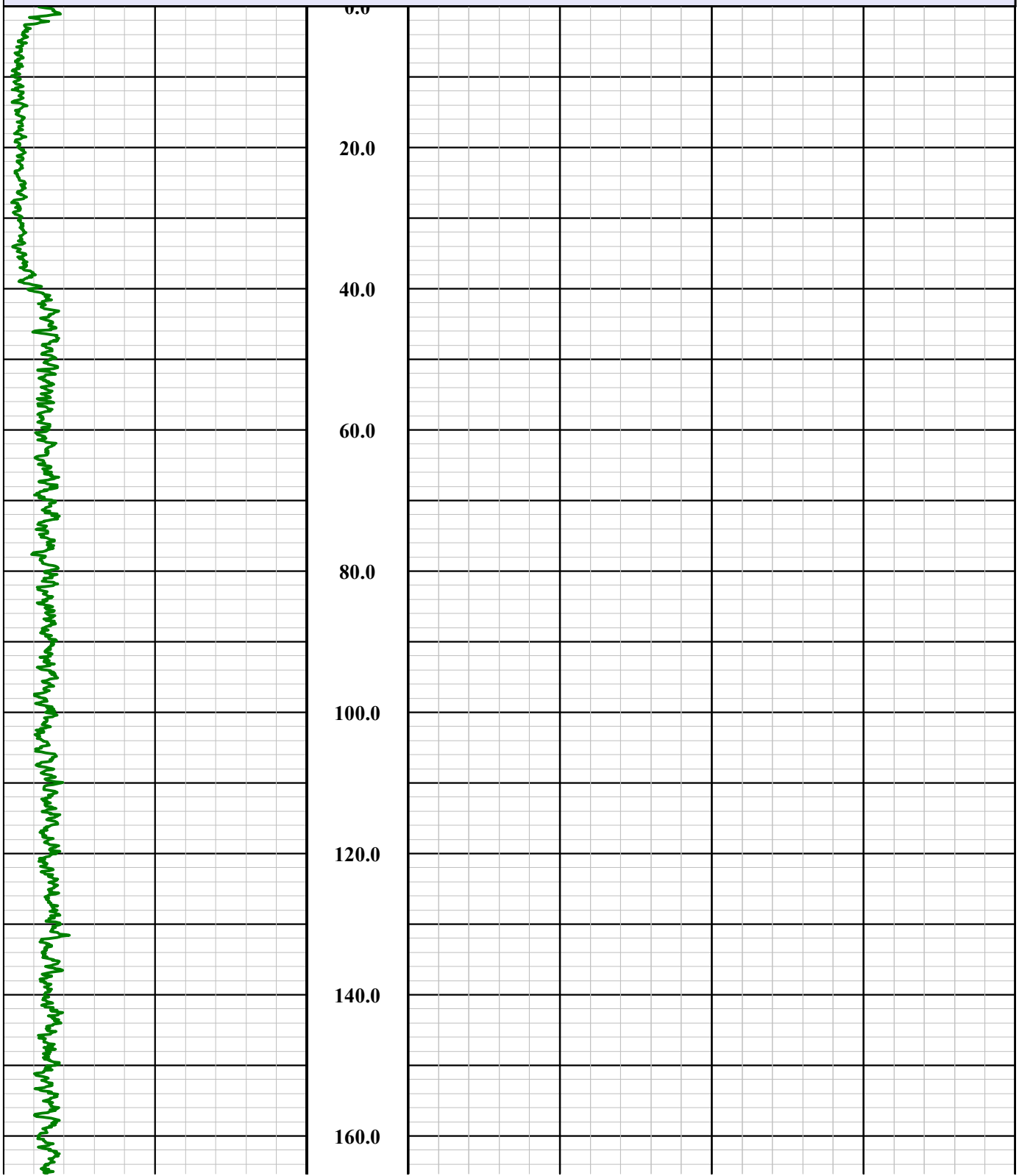
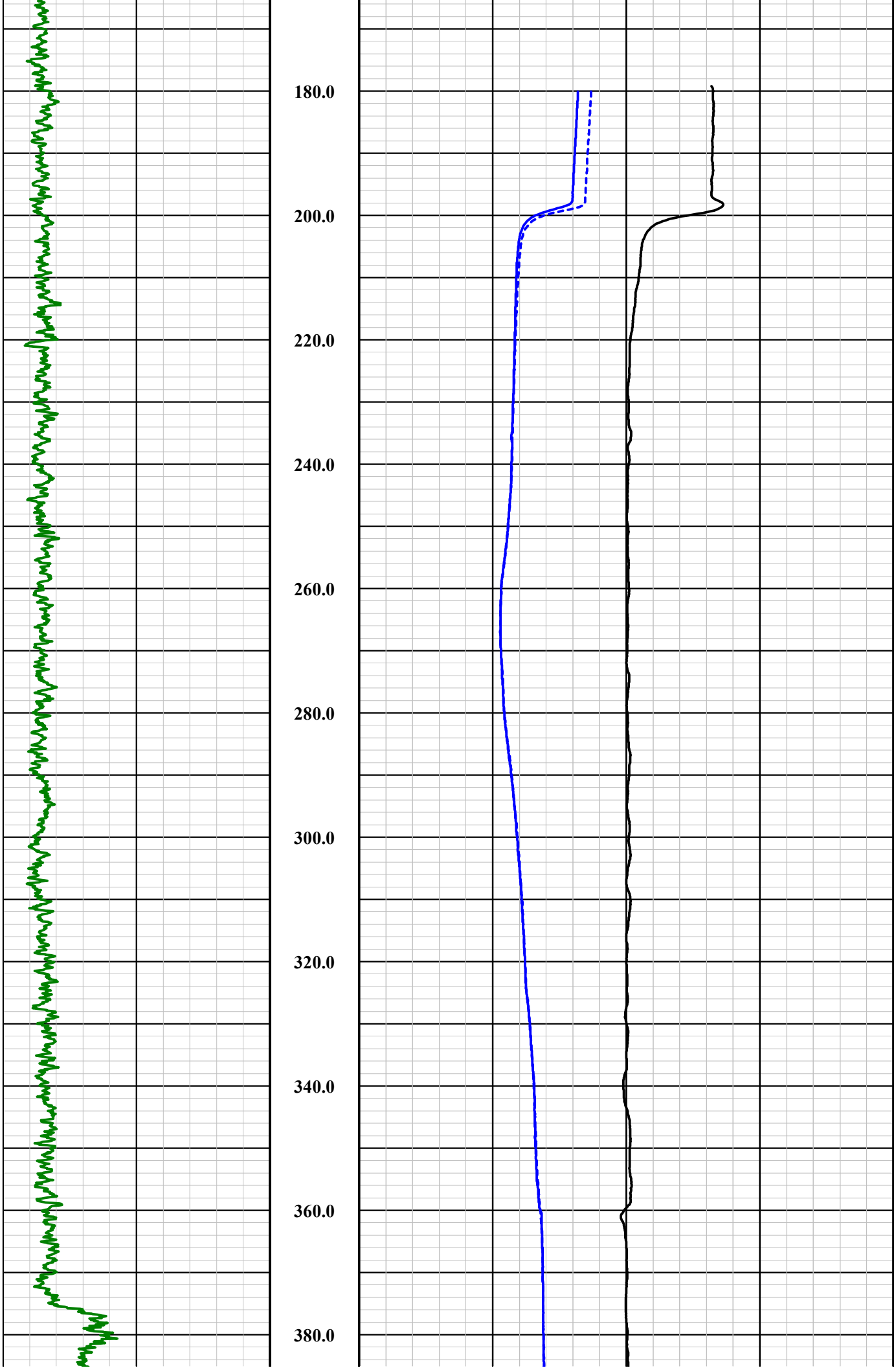
# APPENDIX B

## Q3 2020 Temperature Logs

| Hole Information | Depth | Temperature (8:09 AM) | | |
|---|---|---|---|---|
| | 1in:20ft | 60 | Deg F | 100 |
| Well Name: WB-01 | | Temperature (12:09 PM) | | |
| Survey Date: 09-03-20 | | 60 | Deg F | 100 |
| Elevation: 1478.56 Ft | | Differential Temperature | | |
| Northing (NAD83): 746167.49 | | -3 | Deg F | 3 |
| Easting (NAD83): 847695.07 | | | | |
| Shut In Time: 24 Hours 0 Min | | | | |
| Base of Lowermost USDW: 302 Ft | | | | |
| Nat. Gamma | | | | |
| 0 API 400 | | | | |

## WB-01 Temperature Evaluation

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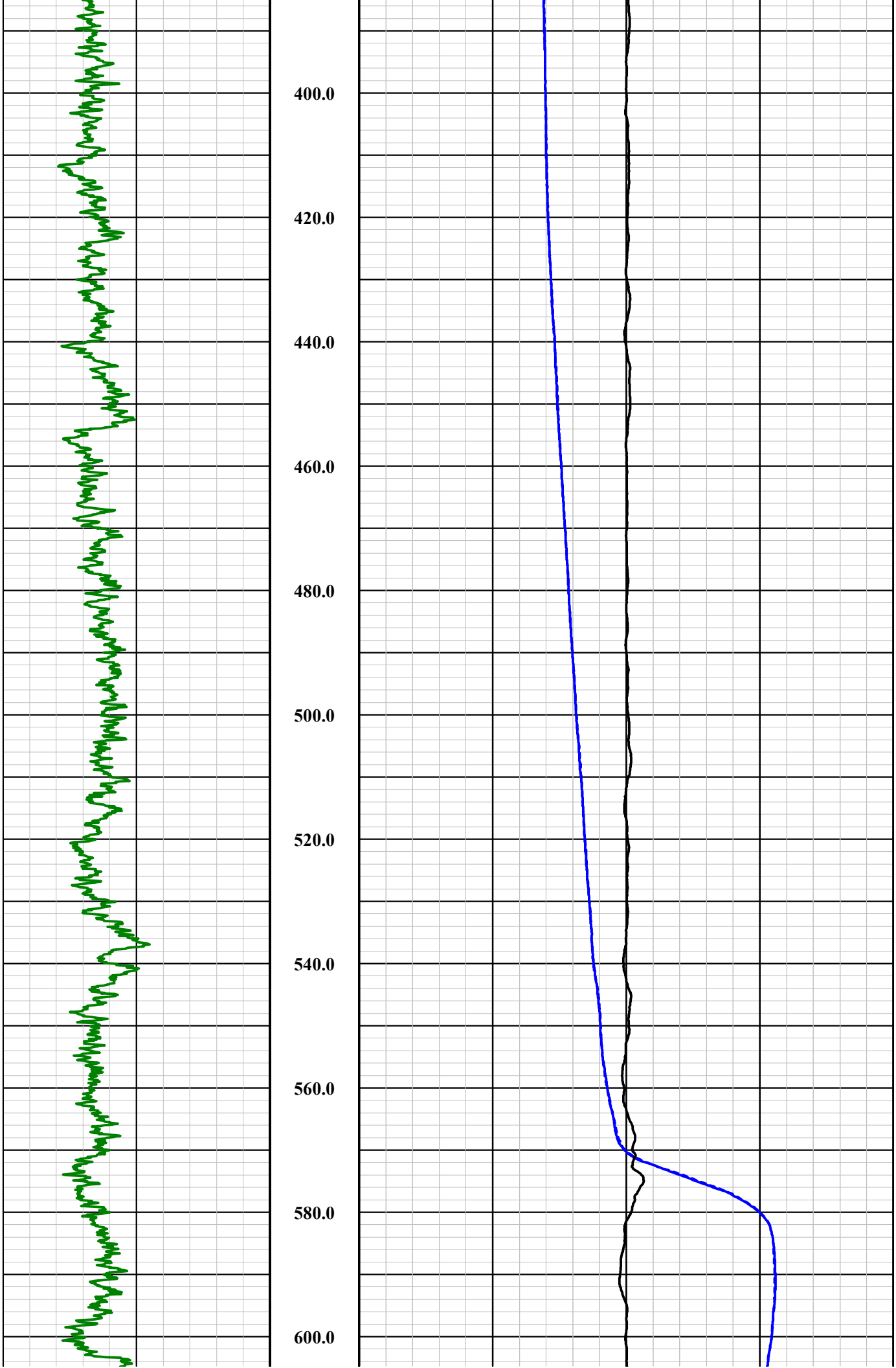
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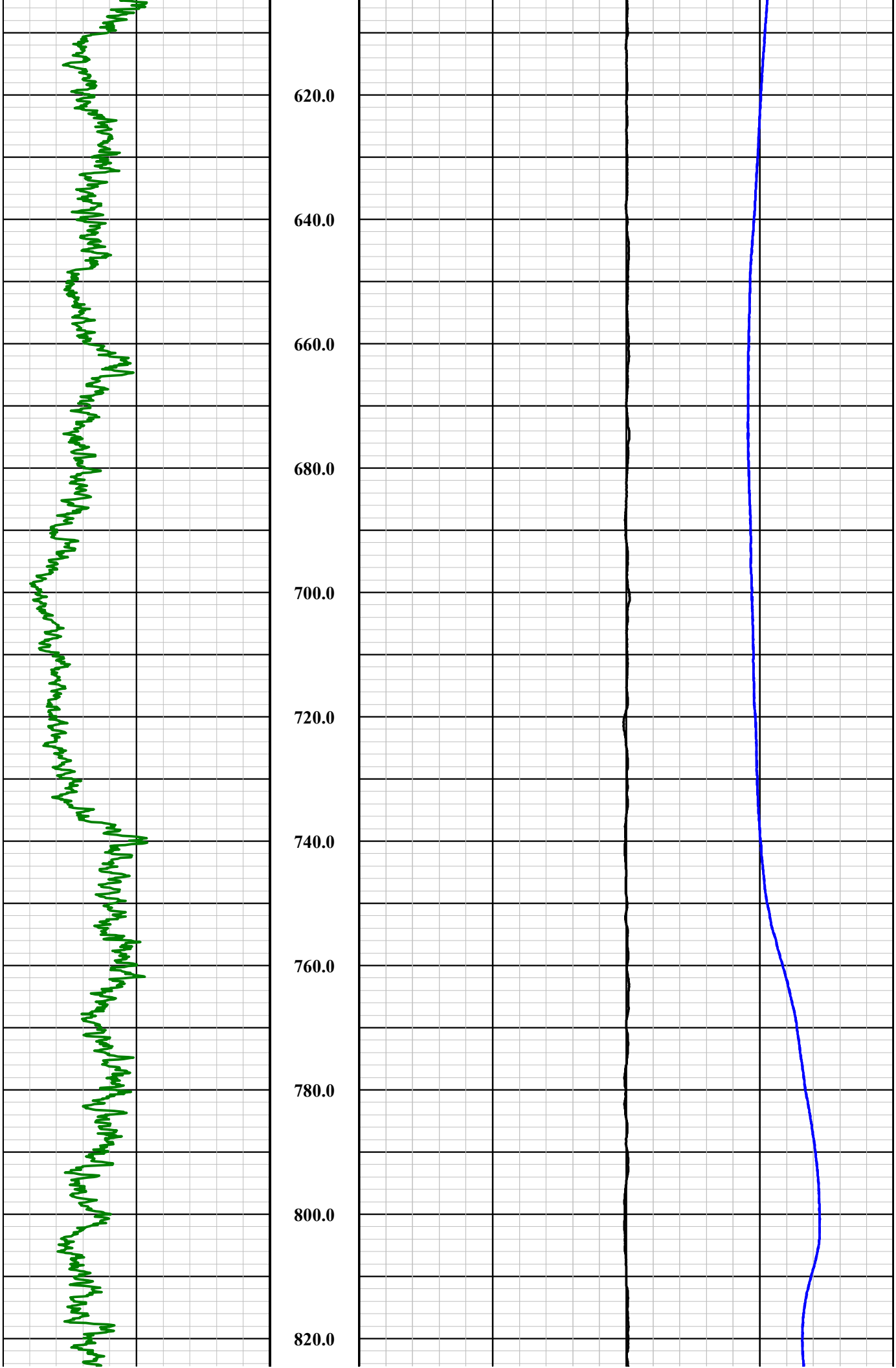
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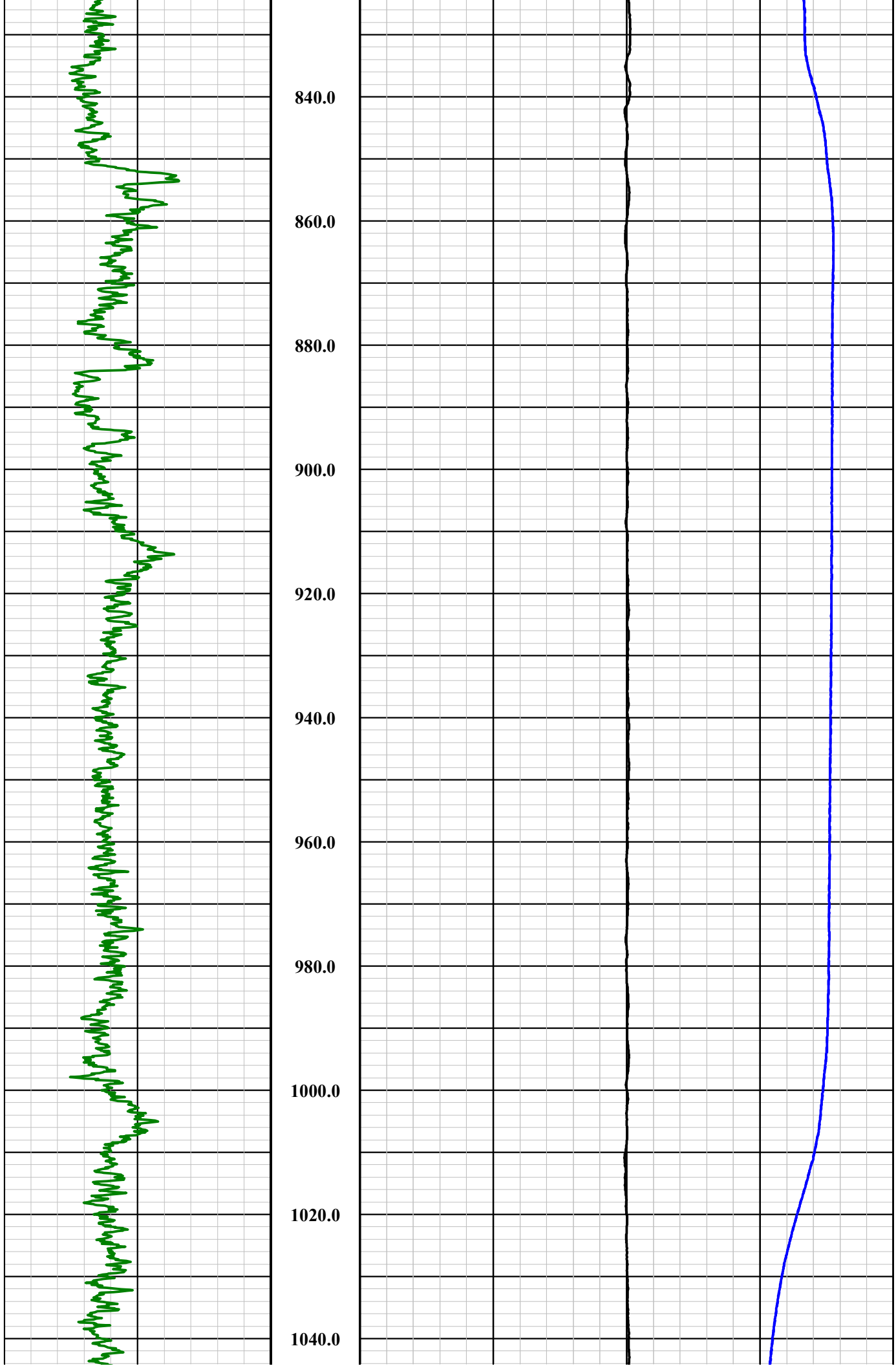
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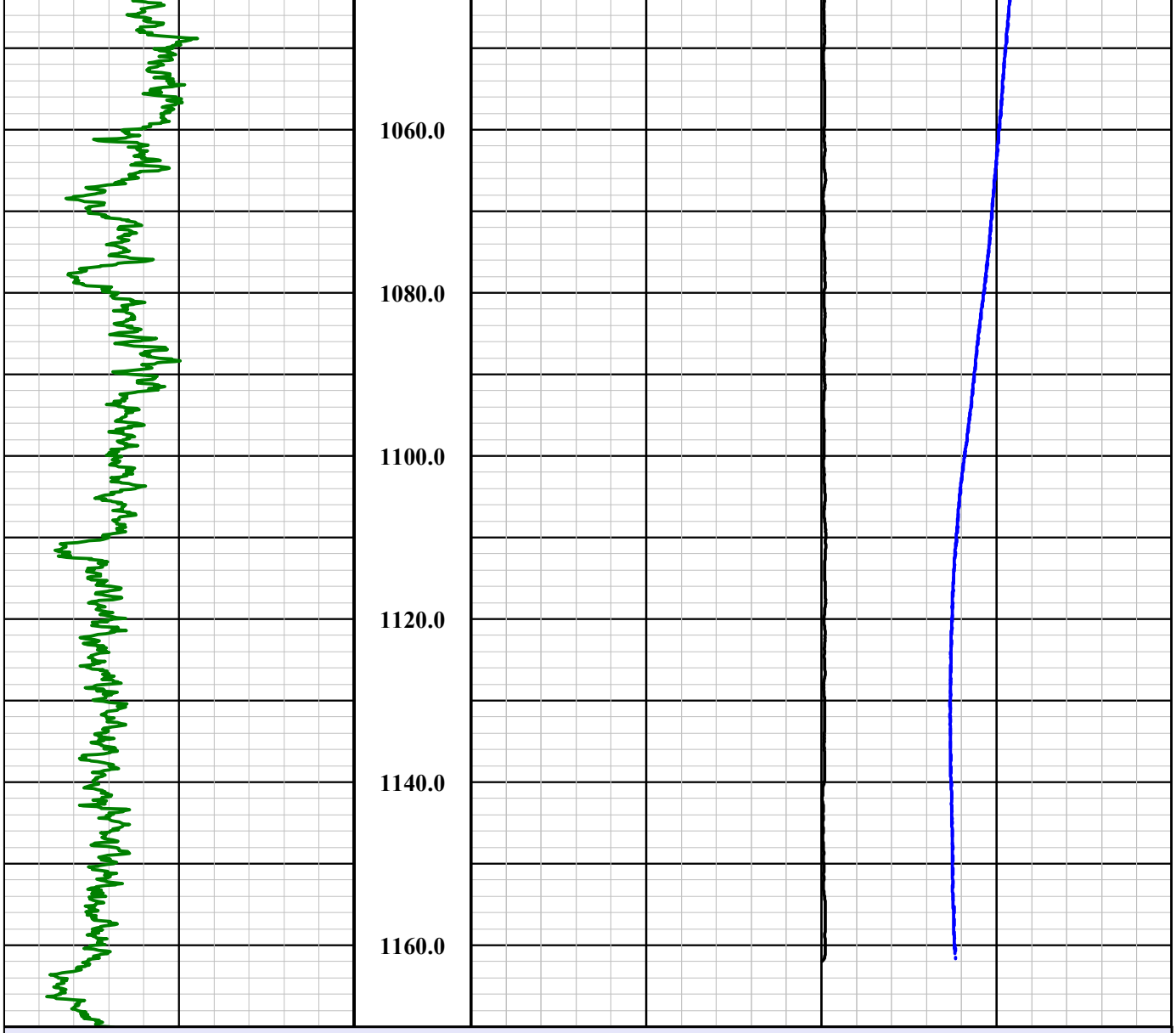



## WB-01 Temperature Evaluation

0 API 400

**Nat. Gamma**

**Base of Lowermost USDW: 302 Ft**
**Shut In Time: 24 Hours 0 Min**
**Easting (NAD83): 847695.07**
**Northing (NAD83): 746167.49**
**Elevation: 1478.56 Ft**
**Survey Date: 09-03-20**
**Well Name: WB-01**

-3 Deg F 3

**Differential Temperature**

60 Deg F 100

**Temperature (12:09 PM)**

**Hole Information**

1in:20ft

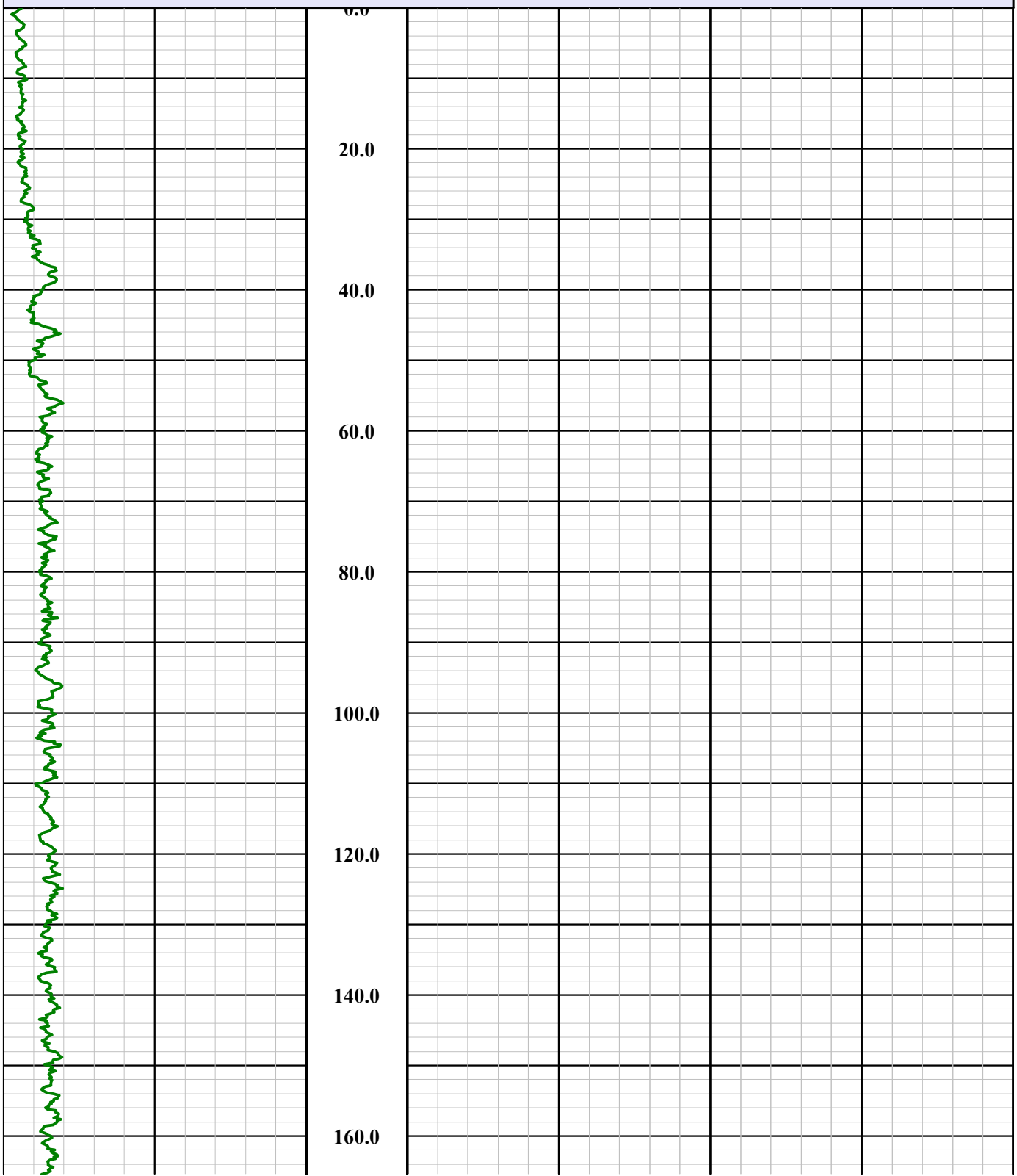
**Depth**

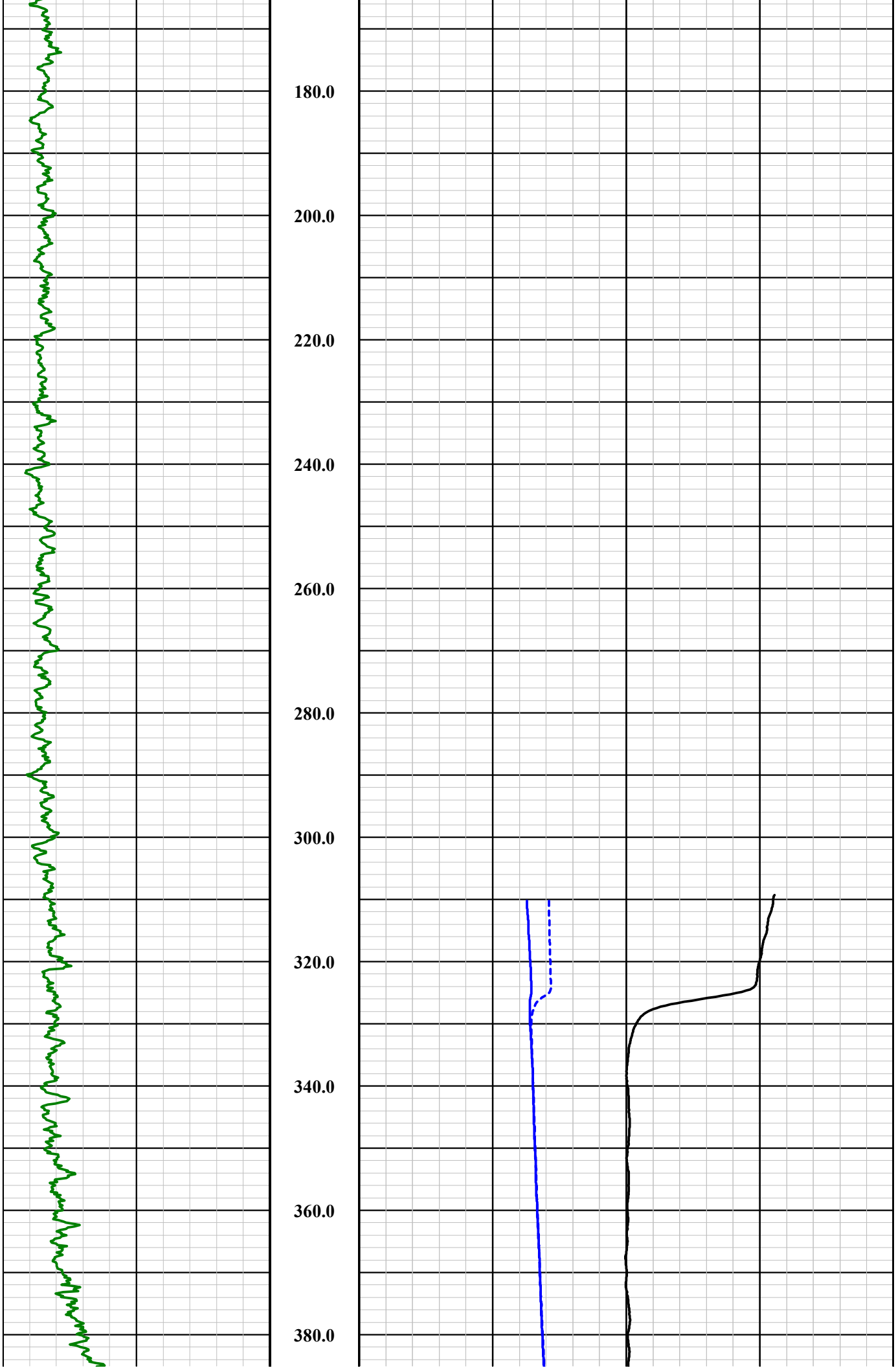
60 Deg F 100

**Temperature (8:09 AM)**

| Hole Information | Depth 1in:20ft | Temperature (7:14 AM) | | |
|---|---|---|---|---|
| | | 60 | Deg F | 100 |
| Well Name: WB-02 | | Temperature (11:14 AM) | | |
| Survey Date: 09-03-20 | | 60 | Deg F | 100 |
| Elevation: 1478.27 Ft | | Differential Temperature | | |
| Northing (NAD83): 746131.32 | | -3 | Deg F | 3 |
| Easting (NAD83): 847730.23 | | | | |
| Shut In Time: 24 Hours 0 Min | | | | |
| Base of Lowermost USDW: 300 Ft | | | | |
| Nat. Gamma | | | | |
| 0 API 400 | | | | |

## WB-02 Temperature Evaluation

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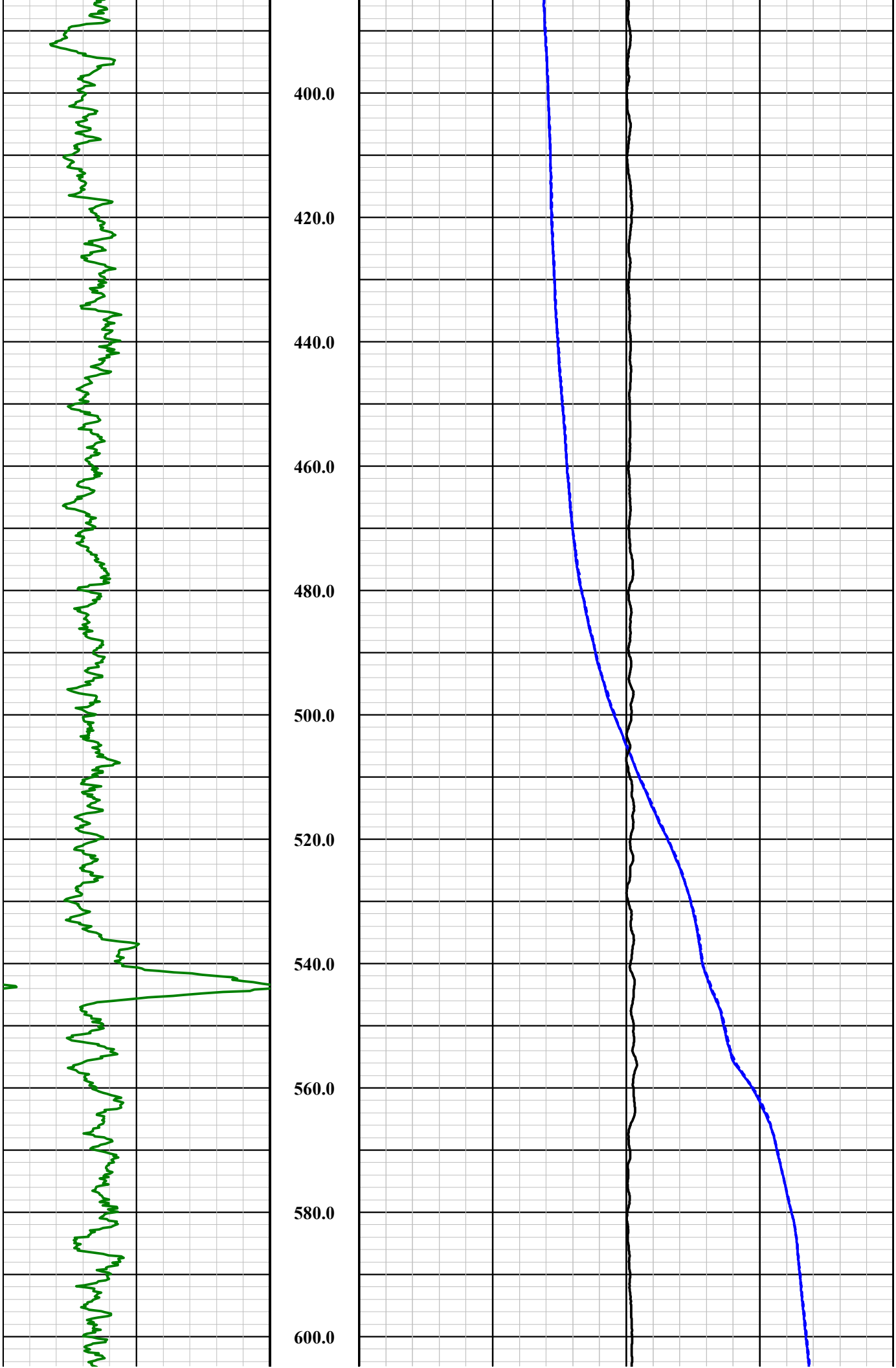
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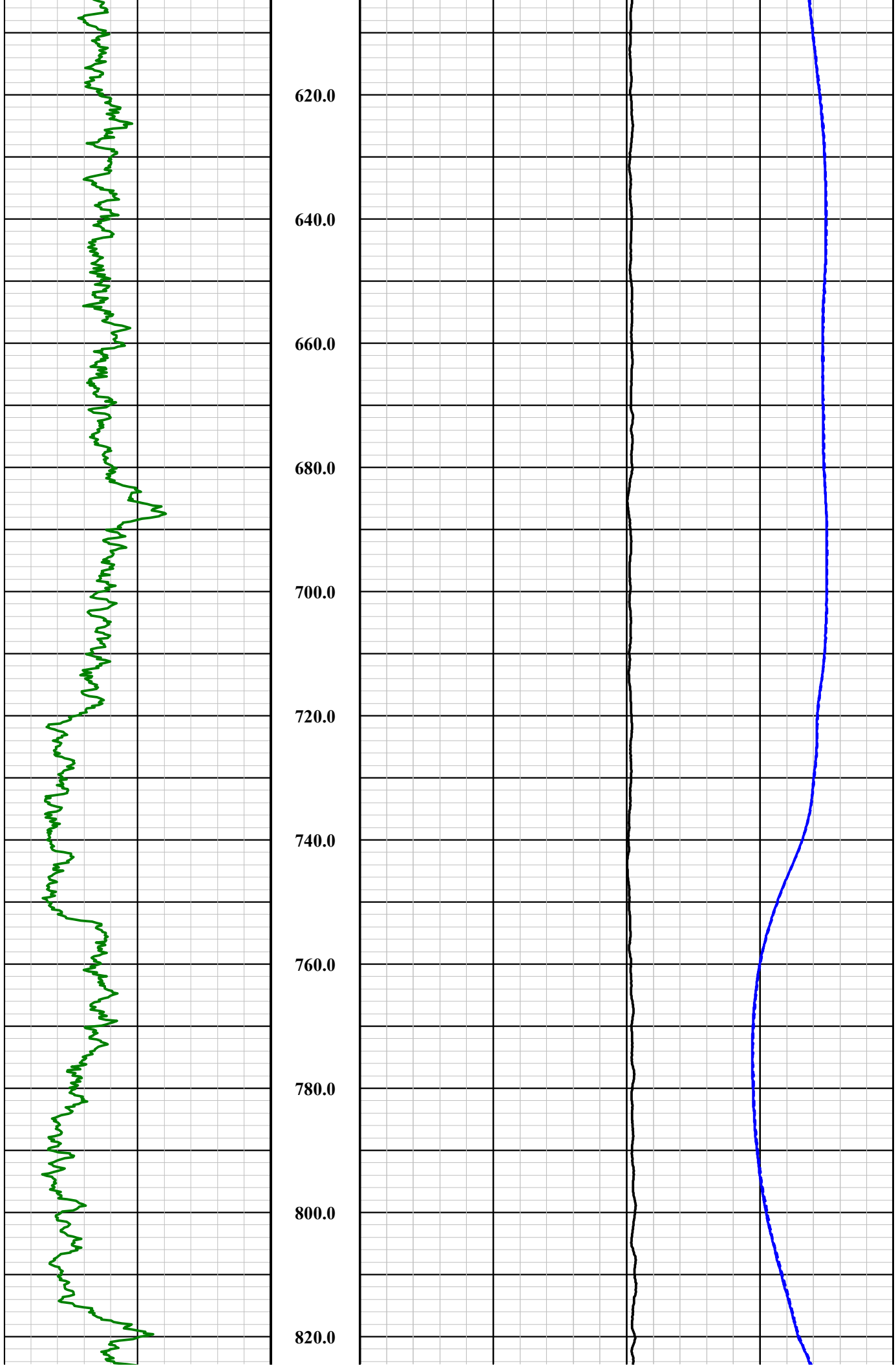
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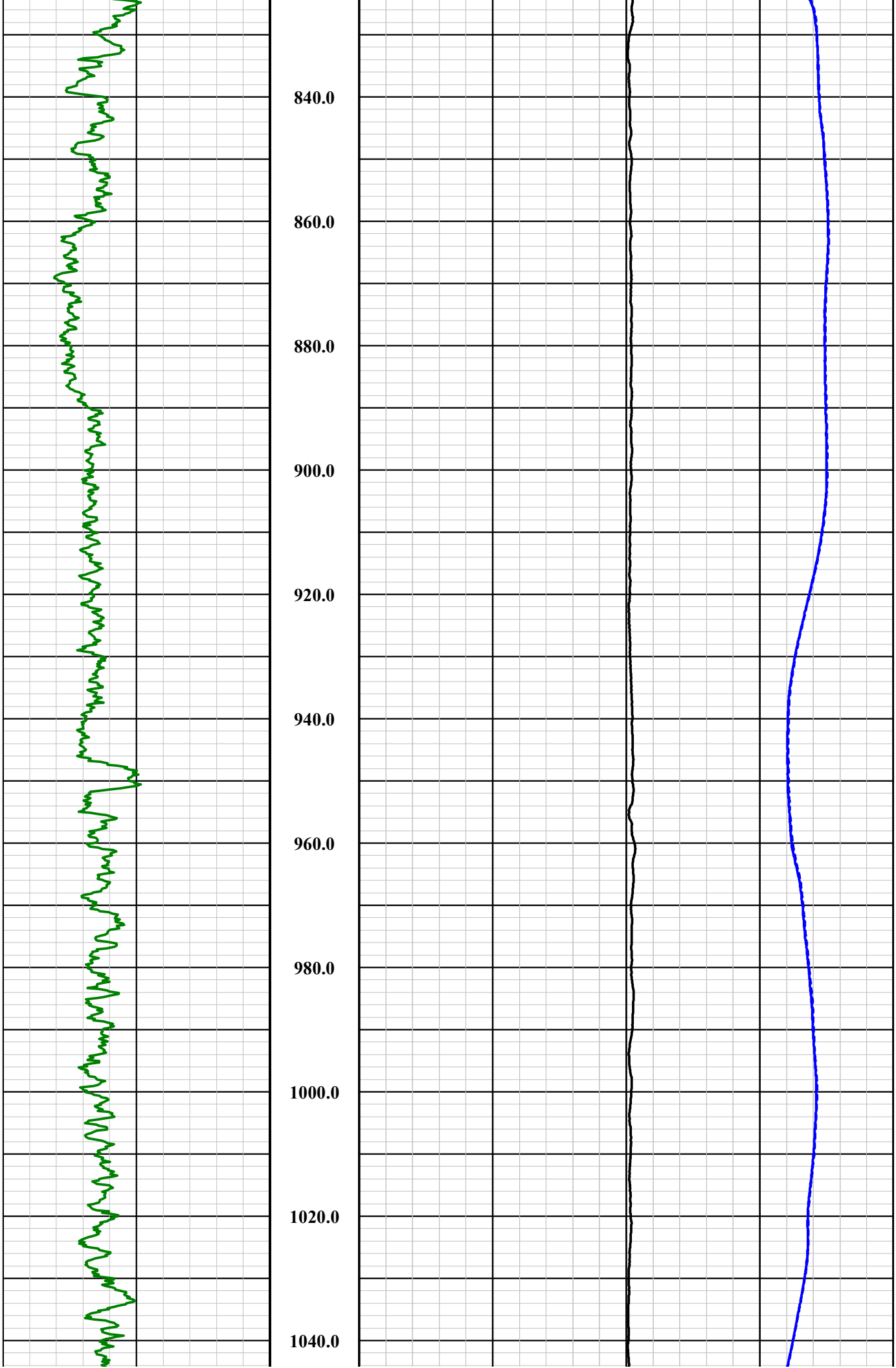
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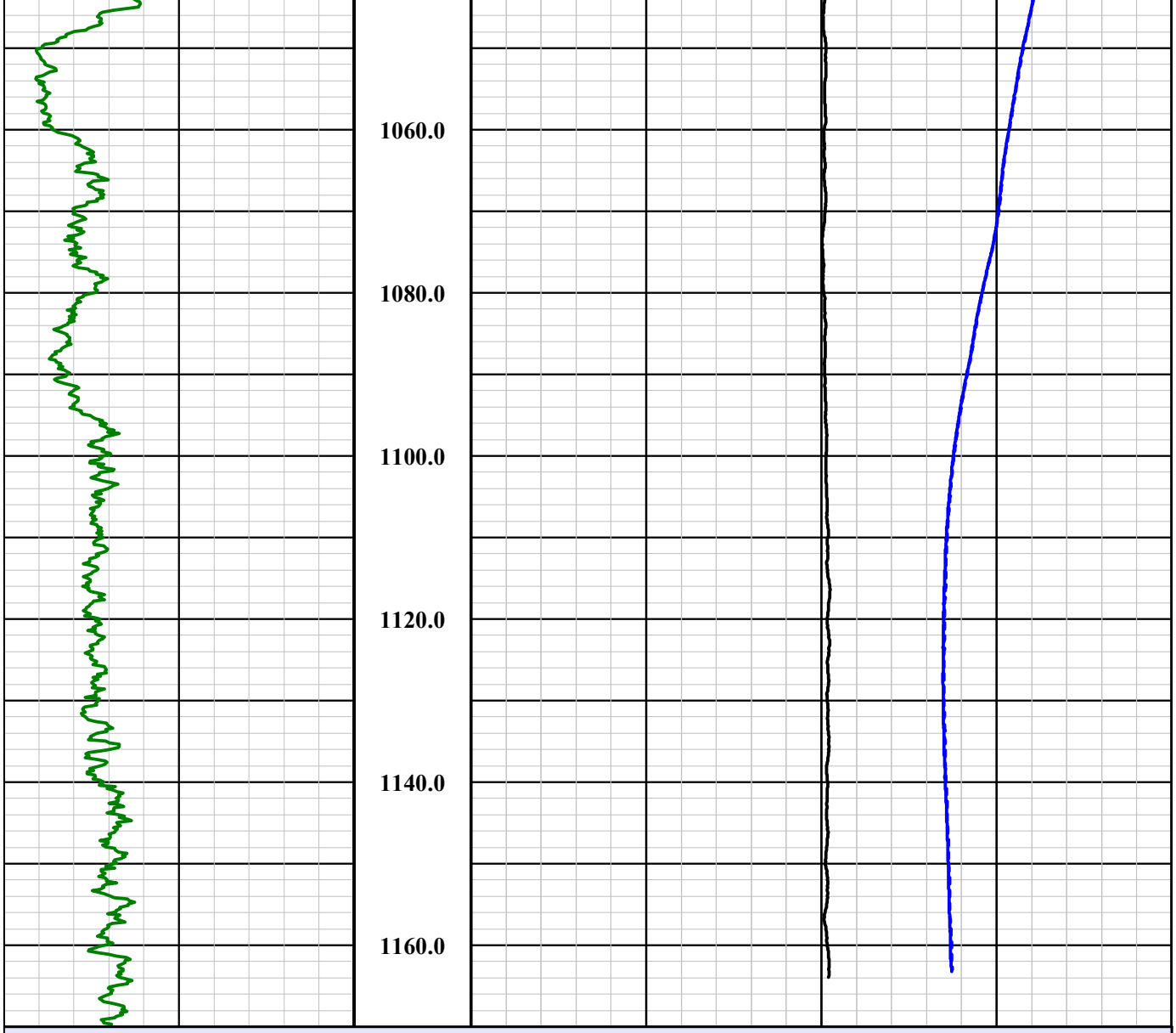
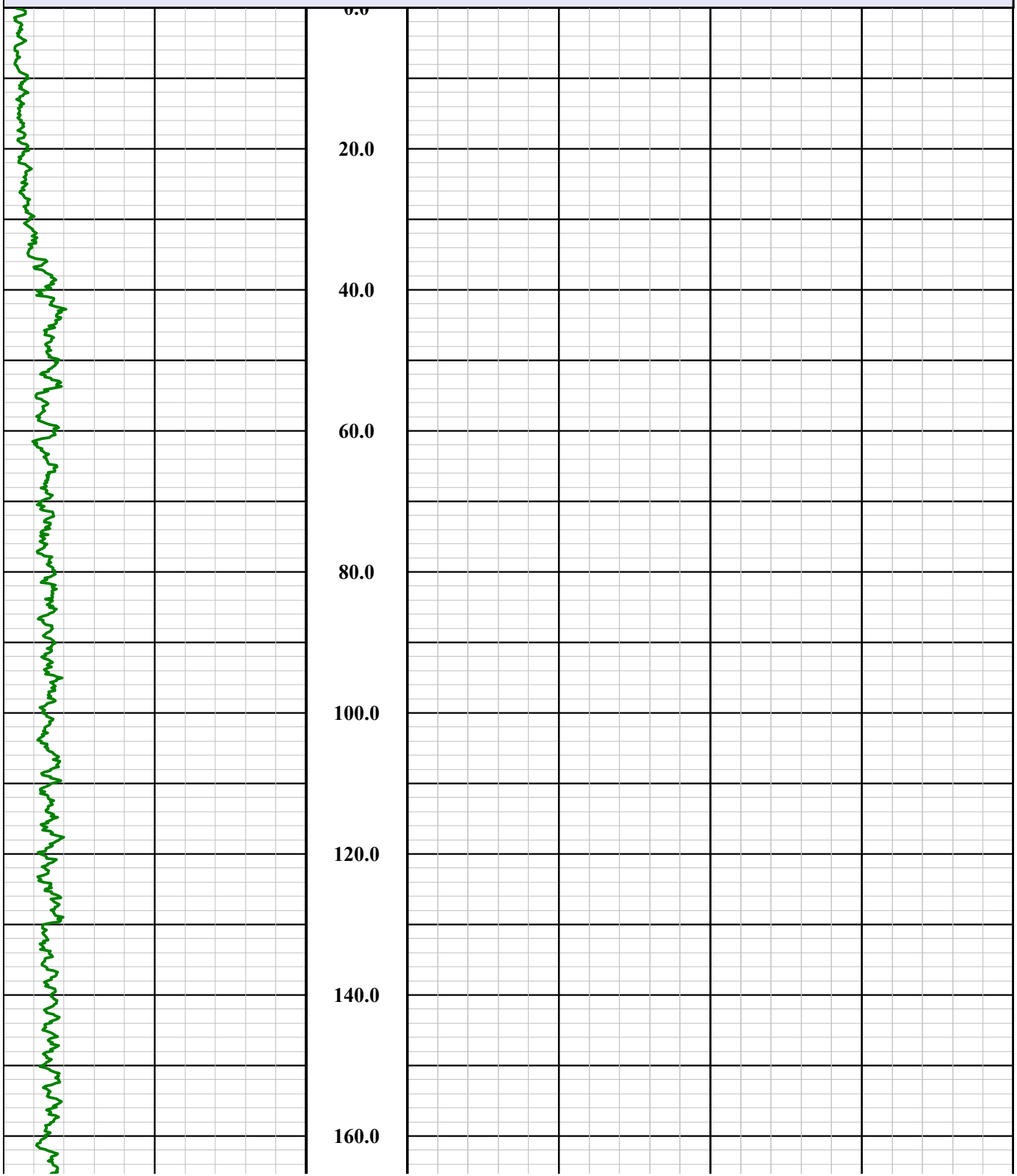


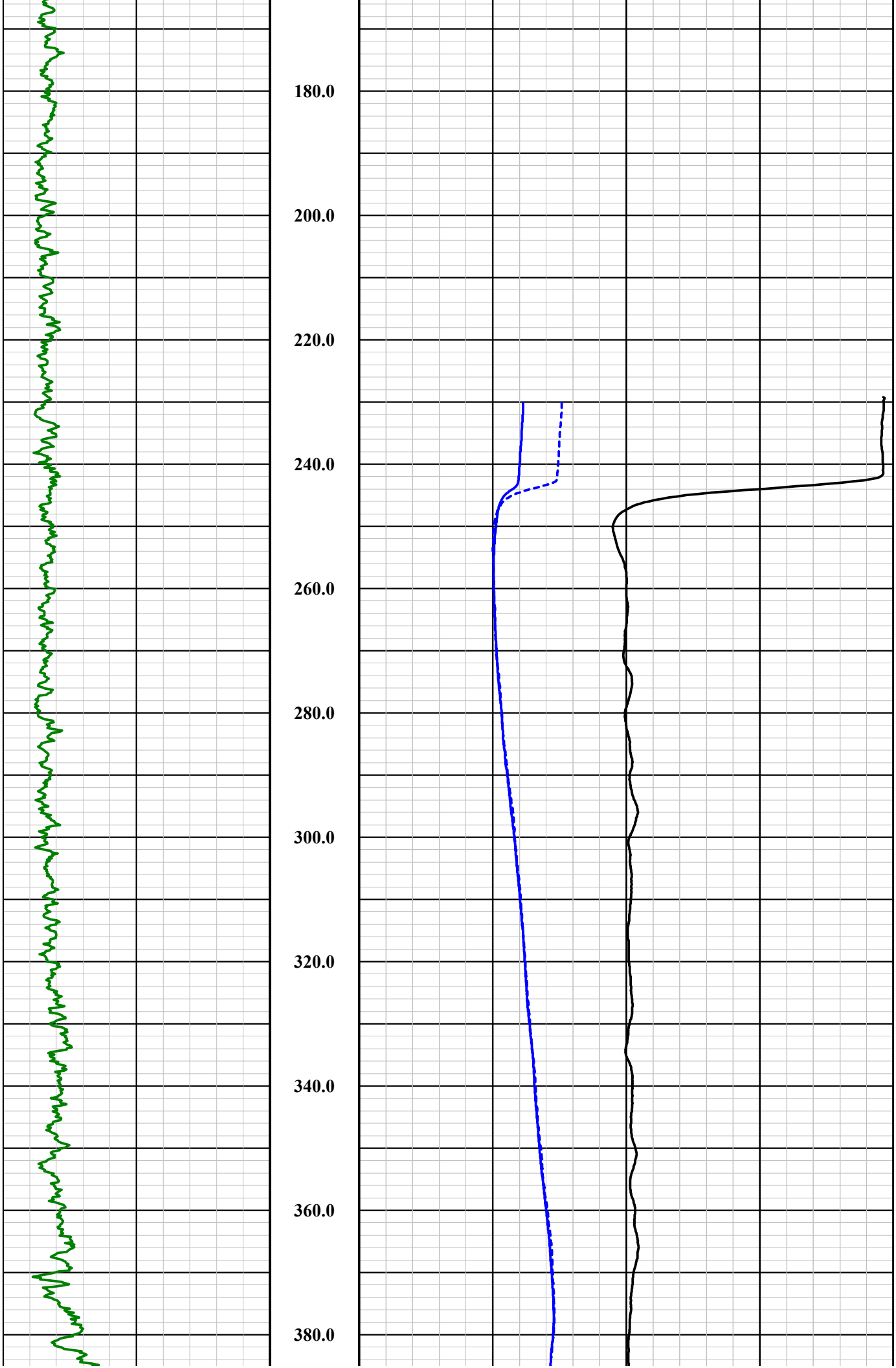

## WB-02 Temperature Evaluation

| | | |
|---|---|---|
| 0 API 400<br>**Nat. Gamma** | | |
| **Base of Lowermost USDW: 300 Ft**<br>**Shut In Time: 24 Hours 0 Min**<br>**Easting (NAD83): 847730.23**<br>**Northing (NAD83): 746131.32**<br>**Elevation: 1478.27 Ft**<br>**Survey Date: 09-03-20**<br>**Well Name: WB-02** | | -3 Deg F 3<br>**Differential Temperature**<br>60 Deg F 100<br>**Temperature (11:14 AM)** |
| **Hole Information** | 1in:20ft<br>**Depth** | 60 Deg F 100<br>**Temperature (7:14 AM)** |

| Hole Information | Depth | Temperature (6:22 AM) | | |
|---|---|---|---|---|
| | 1in:20ft | 60 | Deg F | 100 |
| Well Name: WB-03 | | Temperature (10:22 AM) | | |
| Survey Date: 09-03-20 | | 60 | Deg F | 100 |
| Elevation: 1478.18 Ft | | Differential Temperature | | |
| Northing (NAD83): 746096.49 | | -3 | Deg F | 3 |
| Easting (NAD83): 847694.07 | | | | |
| Shut In Time: 24 Hours 0 Min | | | | |
| Base of Lowermost USDW: 300 Ft | | | | |
| Nat. Gamma | | | | |
| 0 API 400 | | | | |

## WB-03 Temperature Evaluation

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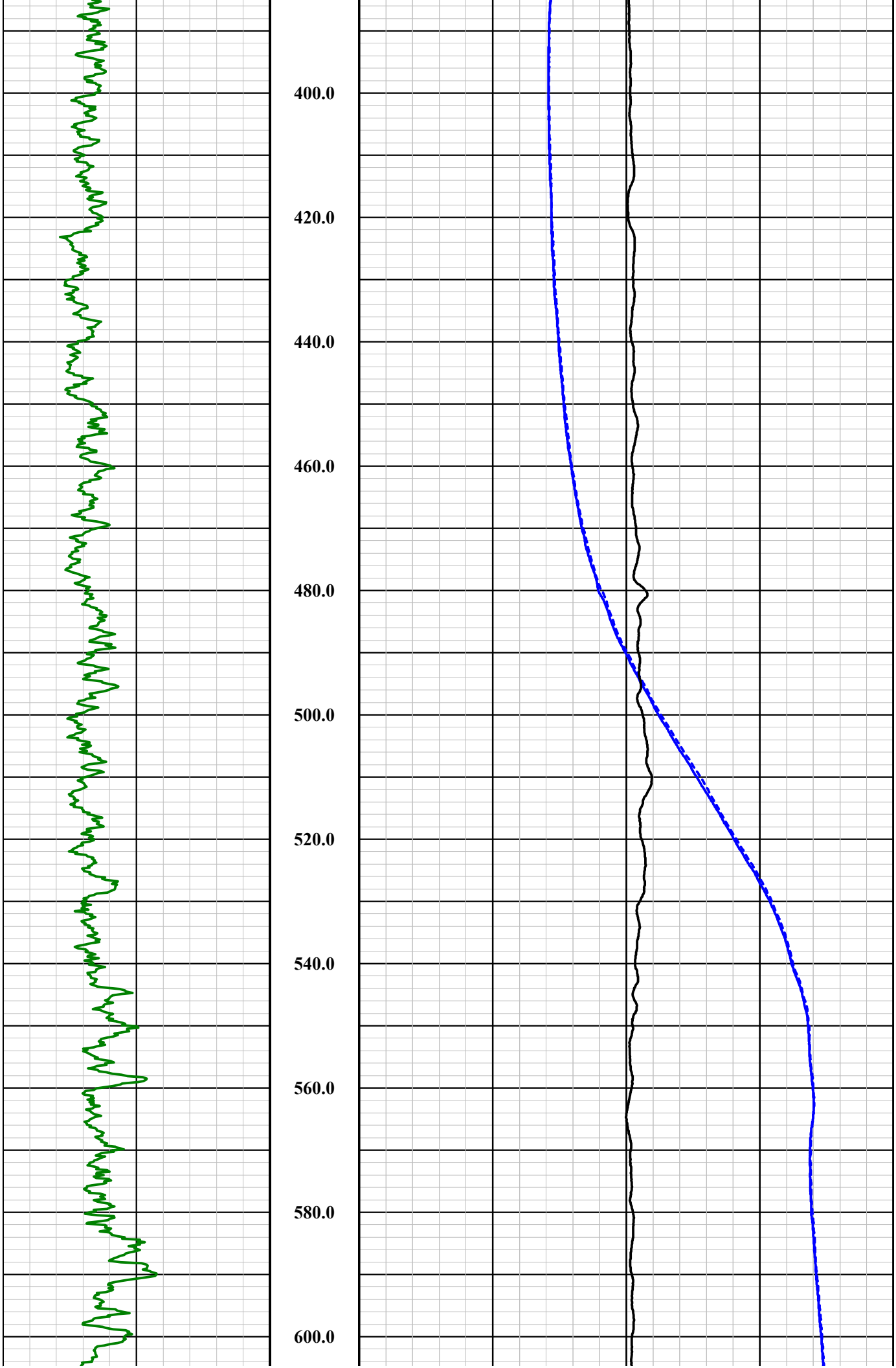
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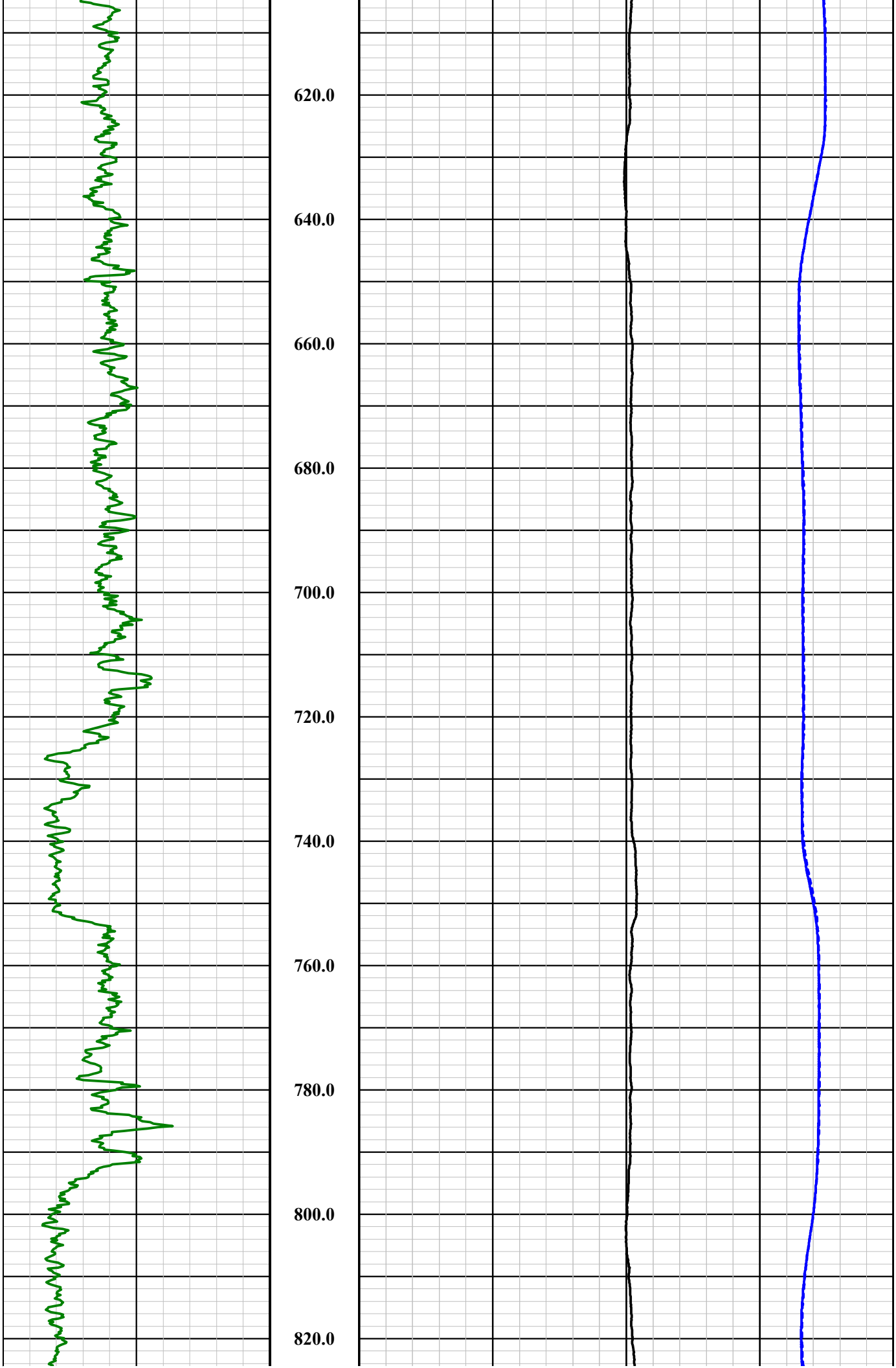
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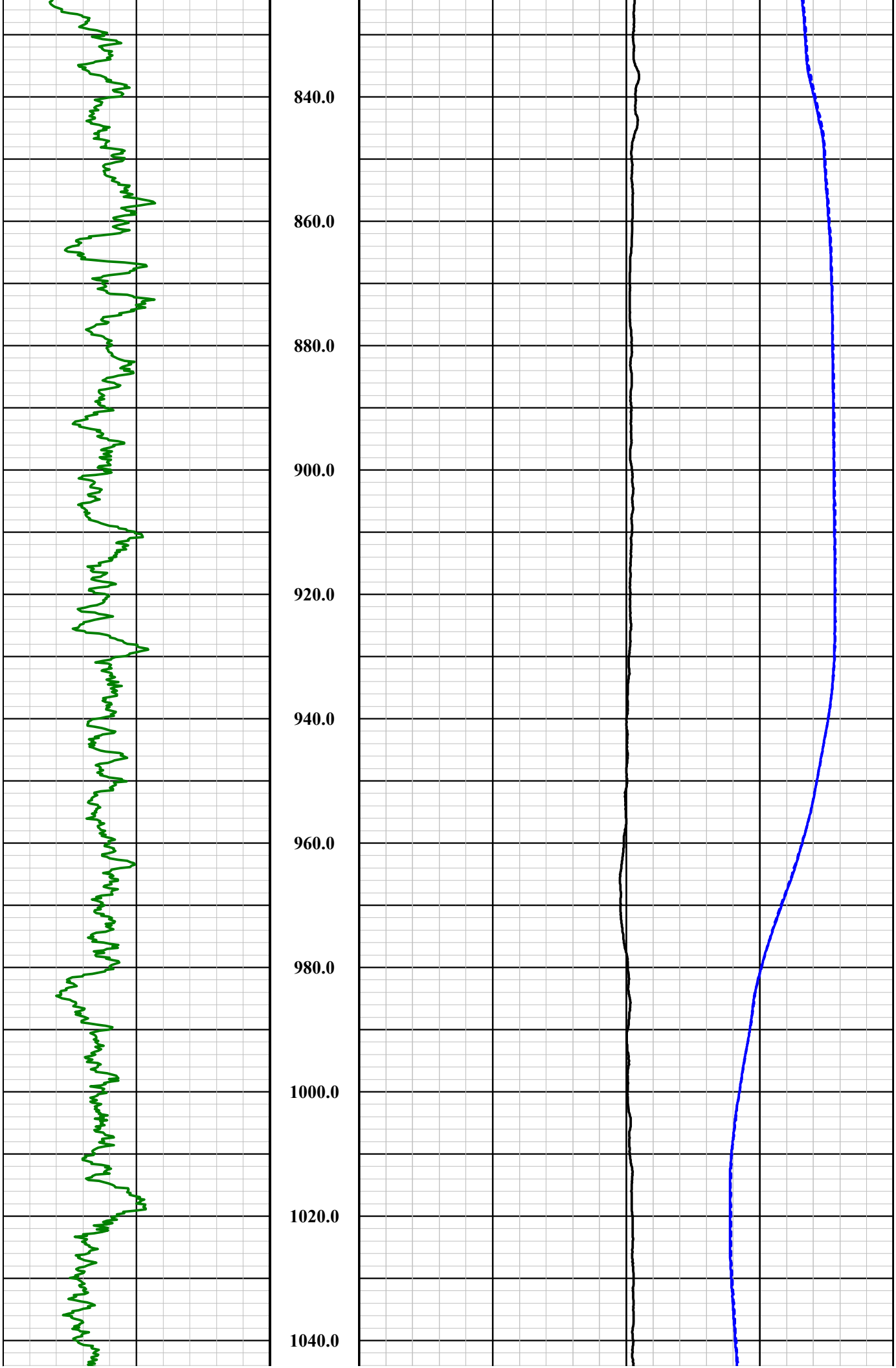
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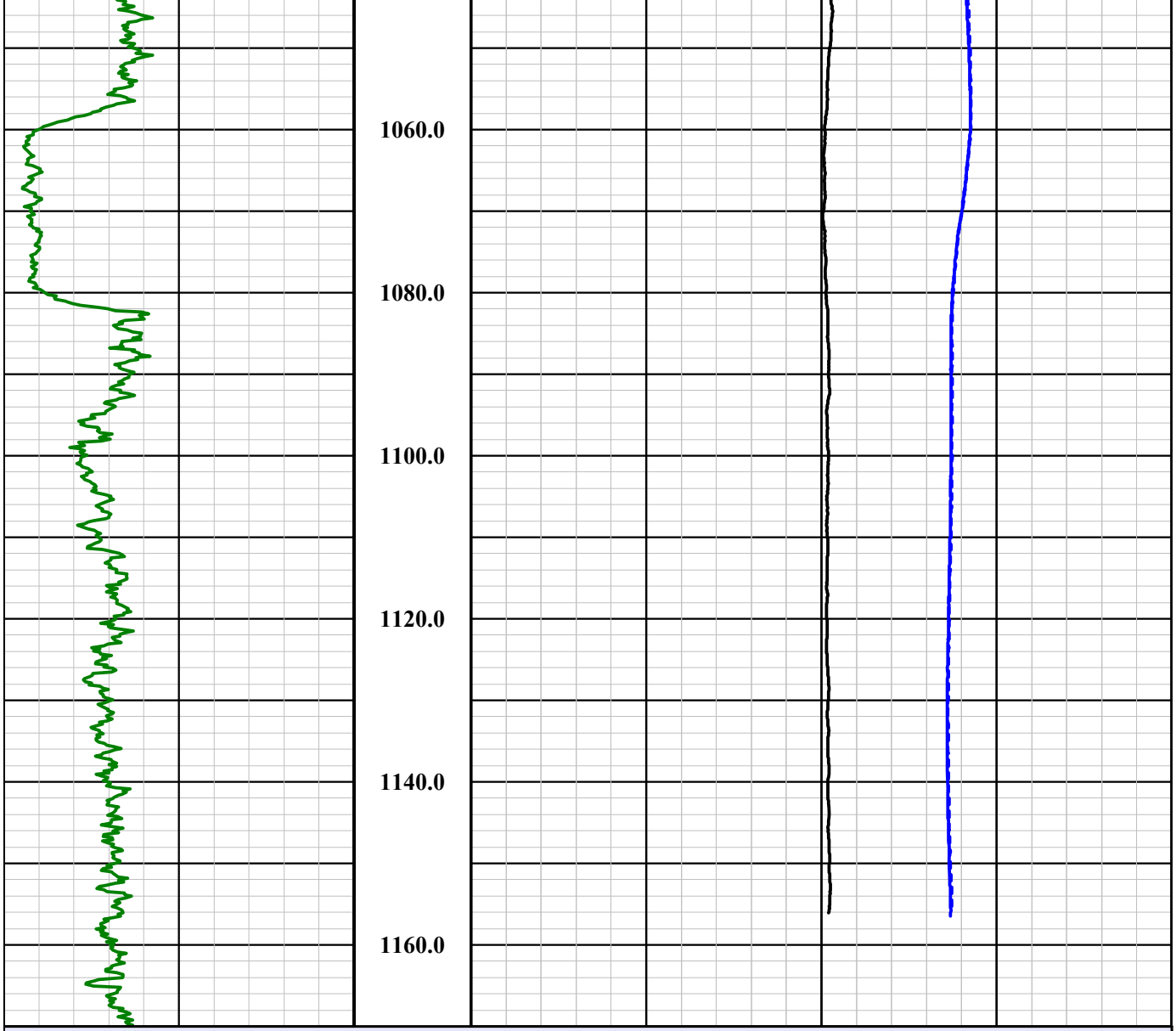



## WB-03 Temperature Evaluation

0 API 400

**Nat. Gamma**

**Base of Lowermost USDW: 300 Ft**
**Shut In Time: 24 Hours 0 Min**
**Easting (NAD83): 847694.07**
**Northing (NAD83): 746096.49**
**Elevation: 1478.18 Ft**
**Survey Date: 09-03-20**
**Well Name: WB-03**

-3 Deg F 3

**Differential Temperature**

60 Deg F 100

**Temperature (10:22 AM)**

**Hole Information**

1in:20ft

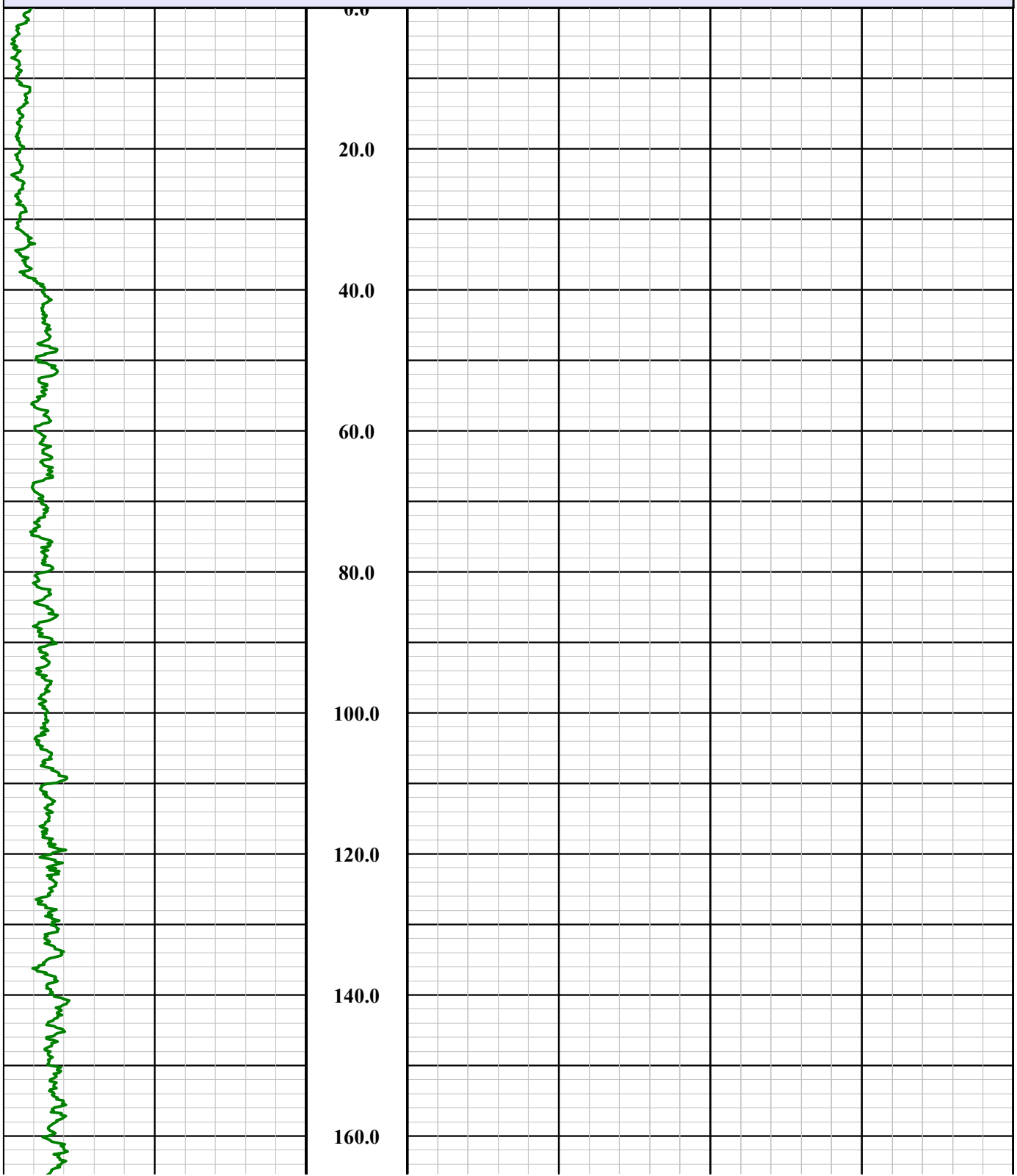
**Depth**

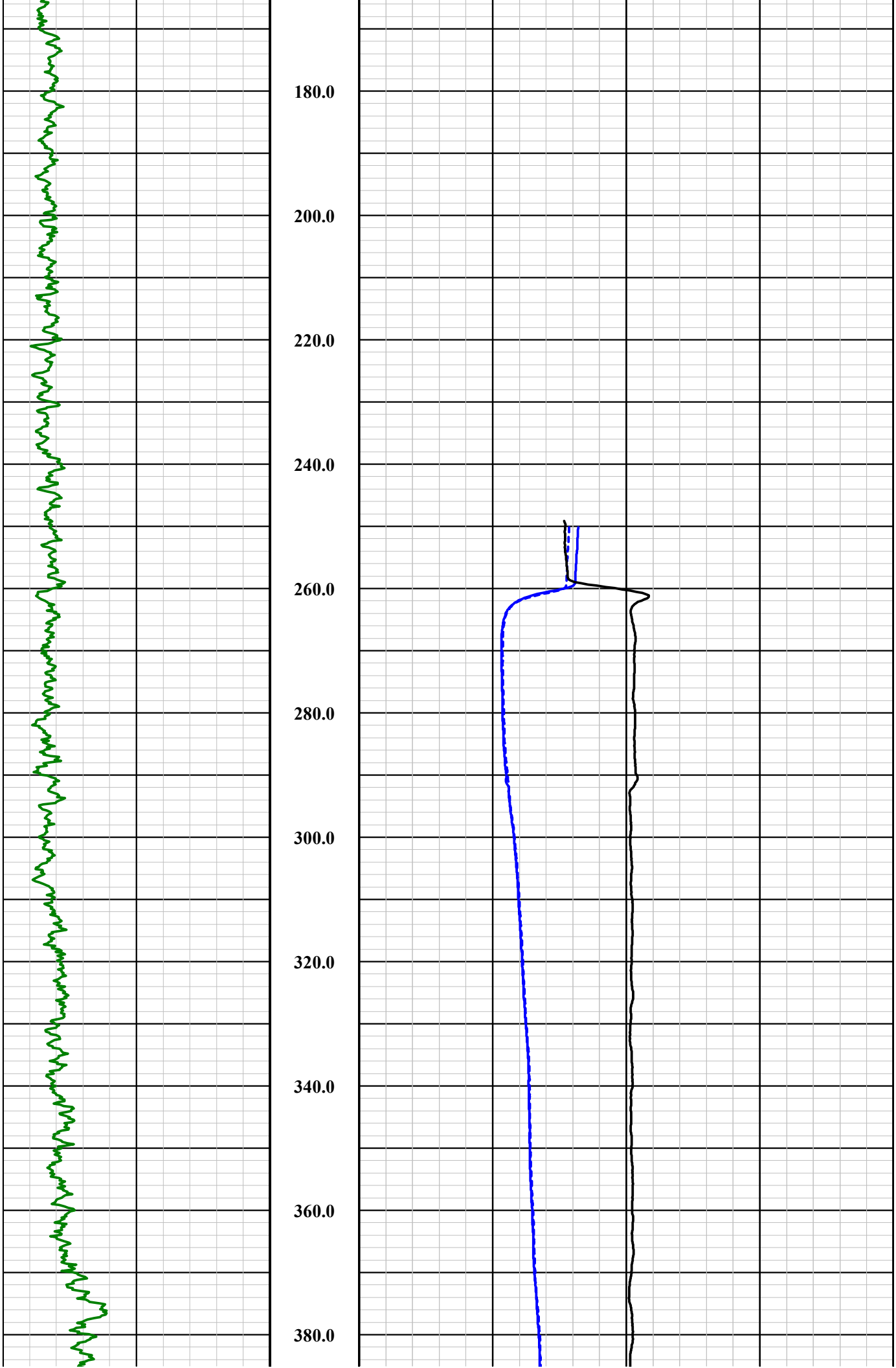
60 Deg F 100

**Temperature (6:22 AM)**

| Hole Information | Depth | Temperature (5:15 AM) | | |
|---|---|---|---|---|
| | 1in:20ft | 60 | Deg F | 100 |
| Well Name: WB-04 | | Temperature (9:15 AM) | | |
| Survey Date: 09-03-20 | | 60 | Deg F | 100 |
| Elevation: 1478.17 Ft | | Differential Temperature | | |
| Northing (NAD83): 746131.41 | | -3 | Deg F | 3 |
| Easting (NAD83): 847659.81 | | | | |
| Shut In Time: 24 Hours 0 Min | | | | |
| Base of Lowermost USDW: 300 Ft | | | | |
| Nat. Gamma | | | | |
| 0 API 400 | | | | |

## WB-04 Temperature Evaluation

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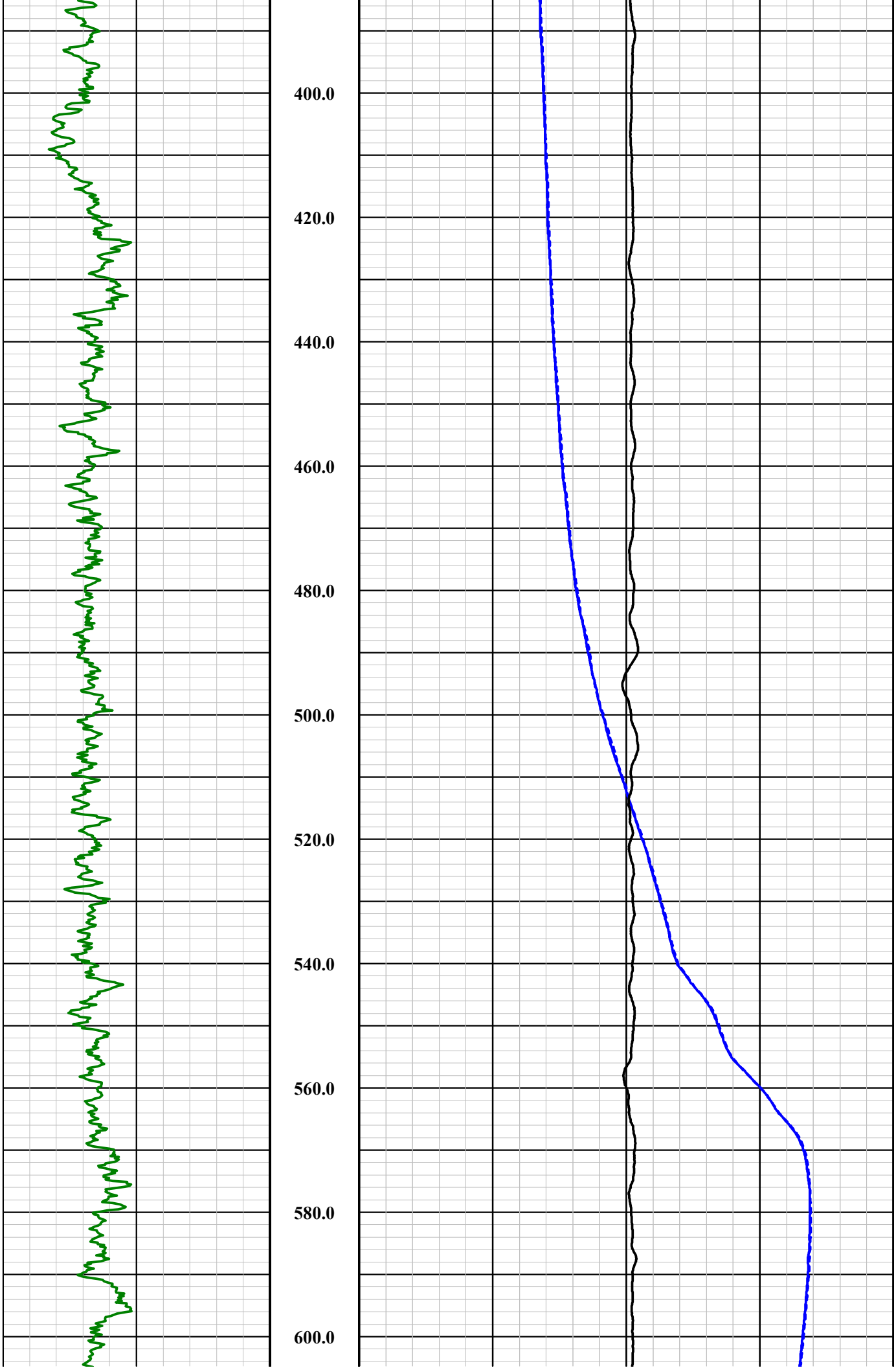
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520.0
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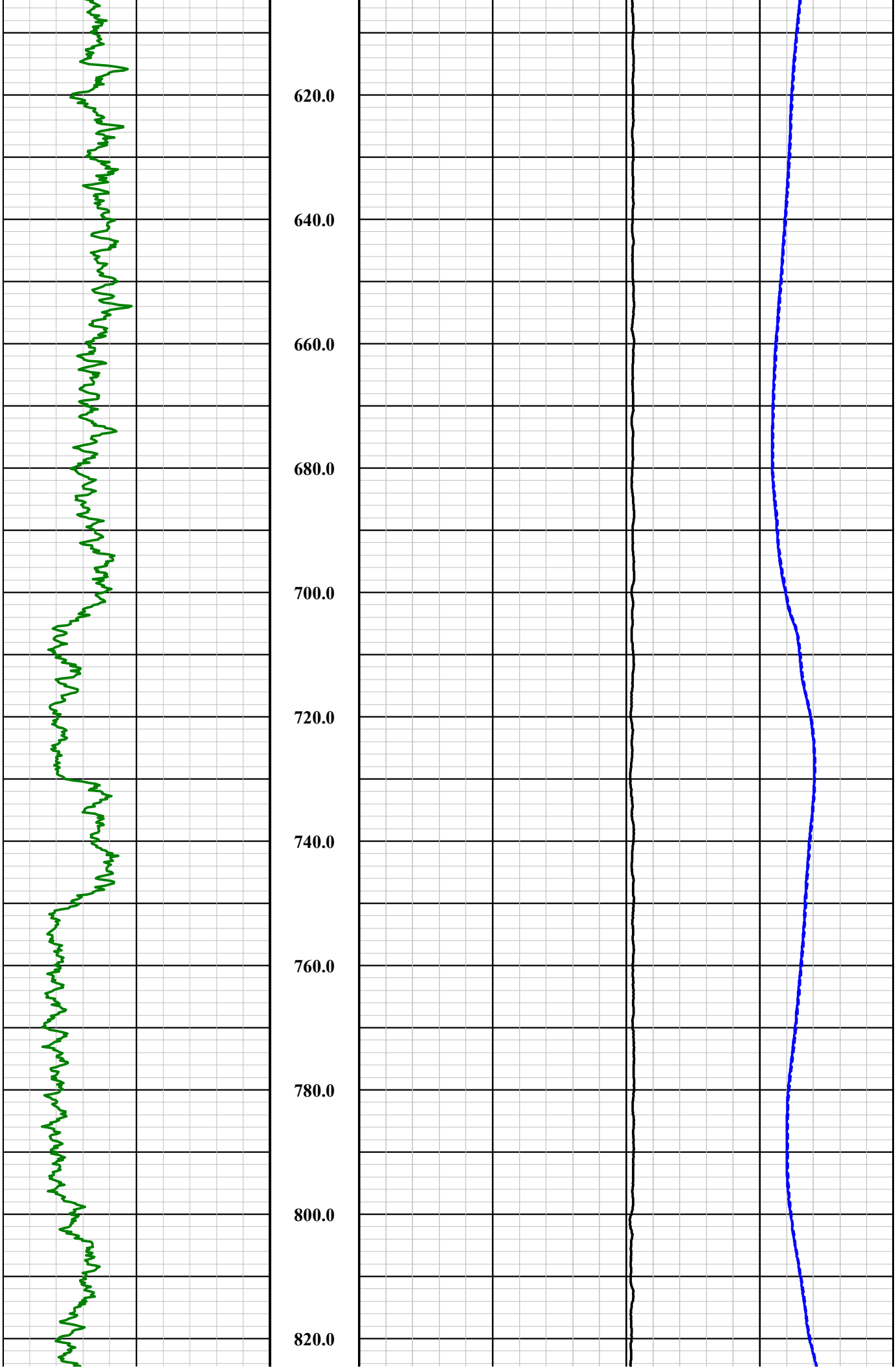
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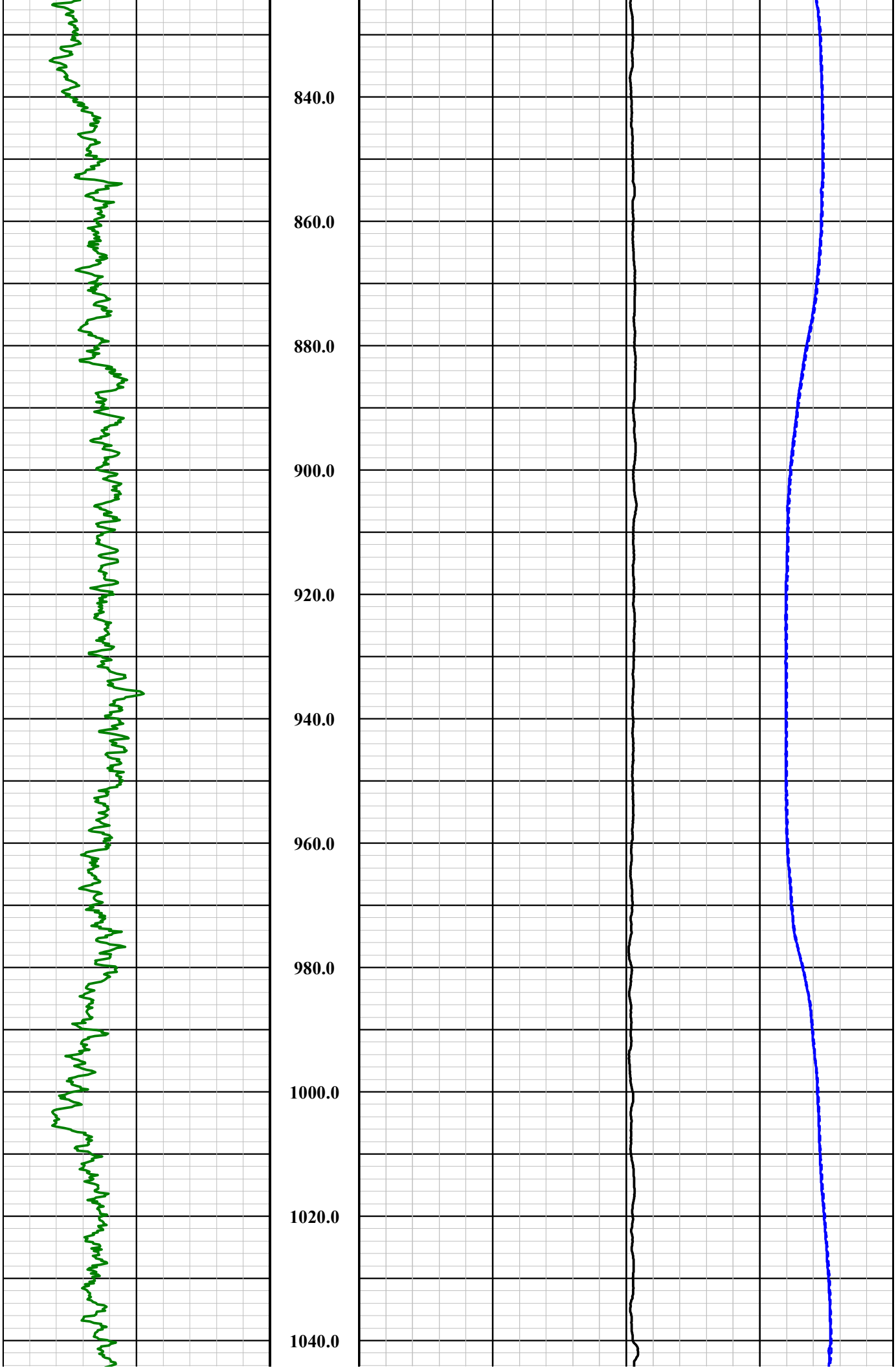
800.0
820.0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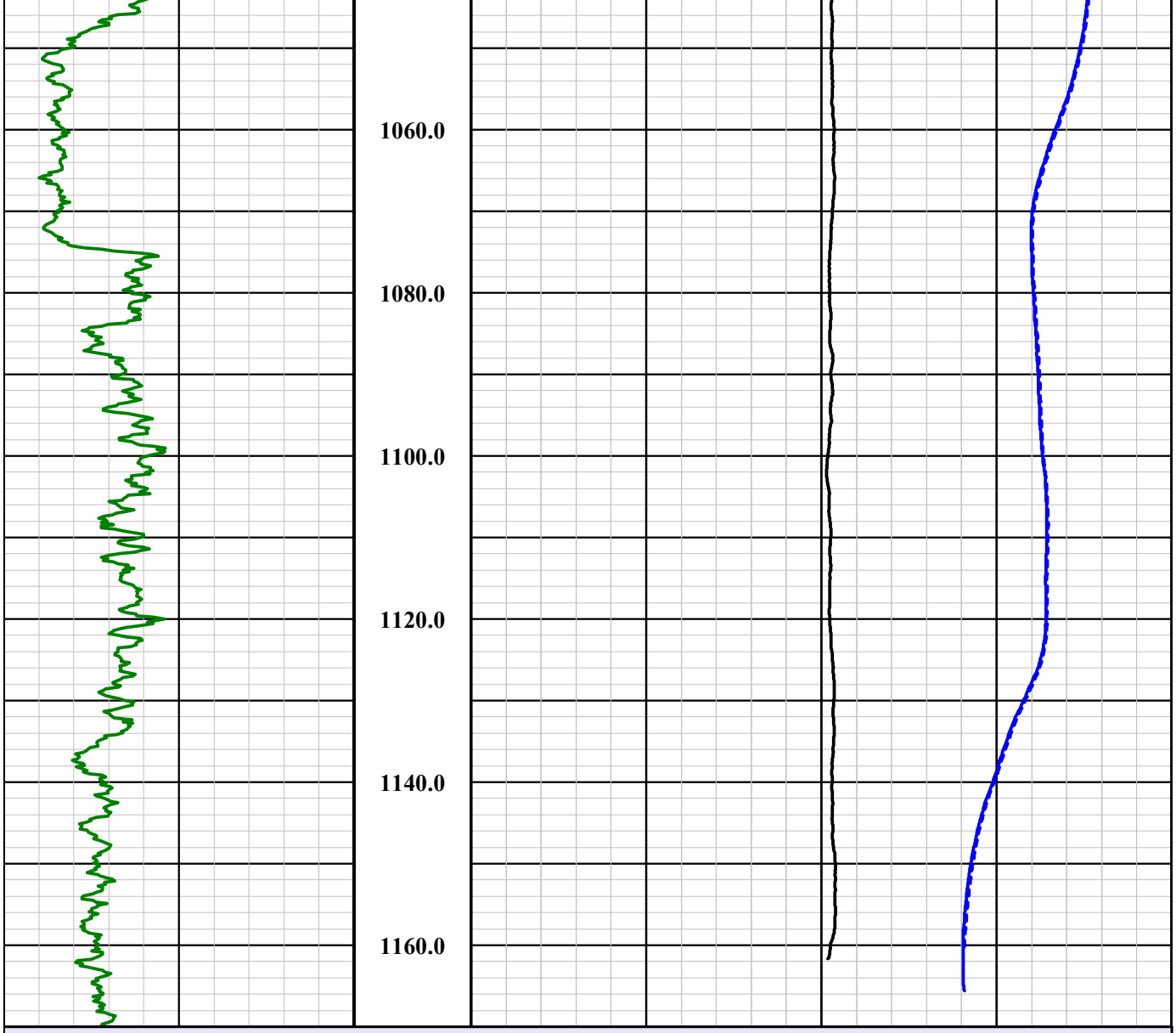


## WB-04 Temperature Evaluation

| | | |
|---|---|---|
| 0 API 400<br>**Nat. Gamma** | | |
| **Base of Lowermost USDW: 300 Ft**<br>**Shut In Time: 24 Hours 0 Min**<br>**Easting (NAD83): 847659.81**<br>**Northing (NAD83): 746131.41**<br>**Elevation: 1478.17 Ft**<br>**Survey Date: 09-03-20**<br>**Well Name: WB-04** | | -3 Deg F 3<br>**Differential Temperature**<br>60 Deg F 100<br>**Temperature (9:15 AM)** |
| **Hole Information** | 1in:20ft<br>**Depth** | 60 Deg F 100<br>**Temperature (5:15 AM)** |

# APPENDIX C

## Daily Average Flow Rates and Water Level Elevations

**APPENDIX C-1**
**DAILY AVERAGE FLOW RATES FOR INJECTION**
**AND RECOVERY WELLS DURING TEMPREATURE LOGGING**
FLORENCE COPPER, INC.
FLORENCE, ARIZONA

| Date | Daily Average Flow Rate in Gallons per Minute | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | I-01 | I-02 | I-03 | I-04 | R-01 | R-02 | R-03 | R-04* | R-05 | R-06 | R-07 | R-08 | R-09 |
| 9/3/2020 | 55.14 | 50.00 | 50.00 | 50.07 | 12.99 | 22.01 | 27.01 | 0.00 | 25.00 | 25.00 | 15.07 | 25.00 | 80.14 |

*R-04 down for maintenance

**APPENDIX C-2**
**DAILY AVERAGE WATER LEVEL ELEVATIONS**
**DURING TEMPREATURE LOGGING**
FLORENCE COPPER, INC.
FLORENCE, ARIZONA

| Date | Daily Average Water Level Elevation in Feet Above mean Sea Level | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | R-01 | O-01 | O-07 | R-02 | O-01 | O-02 | R-03 | O-02 | O-03 | R-04* | O-03 | R-05 | O-04 | R-06 | O-04 | O-05 | R-07 | O-05 | O-06 | R-08 | O-06 | O-07 | R-09 |
| 9/3/2020 | 1220.33 | 1243.10 | 1237.18 | 1183.98 | 1243.10 | 1237.87 | 1080.04 | 1237.87 | 1240.60 | | 1240.60 | 1133.18 | 1237.90 | 1112.63 | 1237.90 | 1238.98 | 1234.44 | 1238.98 | 1239.54 | 1212.61 | 1239.54 | 1237.18 | 1164.63 |

*R-04 down for maintenance