MONTGOMERY
& ASSOCIATES
Water Resource Consultants

REPORT

July 3, 2020

Summary of Results for 2020 Site Investigations at the Skunk Camp Storage Facility Site

Prepared for:

RESOLUTION
COPPER

1550 East Prince Road, Tucson, AZ 85719
elmontgomery.com

July 3, 2020

Summary of Results for 2020 Site Investigations at the Skunk Camp Tailings Storage Facility Site

Prepared for:

Resolution Copper

102 Magma Heights Blvd., Superior, Arizona 85173

Prepared by:

Montgomery & Associates

1550 E. Prince Road, Tucson, Arizona

Contents

1 INTRODUCTION 1
1.1 Objectives 1
1.2 Location 1
1.3 Hydrogeologic Conditions 3
1.4 Project Planning and Coordination 3
1.5 Contractors 4
1.6 Permits 5
1.6.1 Notices of Intent to Drill 5
1.6.2 AZPDES De Minimis Discharge Authorization 5
2 GEOPHYSICAL SURVEYS AND EVALUATION OF RANCH WELLS 6
2.1 Seismic and Electrical Resistivity Surveys 6
2.2 Evaluation of Existing Wells 8
2.2.1 55-622471 Evaluation 8
2.2.2 Stock Well Evaluation 11
3 INSTALLATION OF HYDROGEOLOGIC TEST WELLS 12
3.1 Monitoring of Drilling Conditions 12
3.2 Monitoring of Lithologic Conditions 12
3.3 Borehole Geophysical Logging 12
3.4 Monitoring of Groundwater Conditions 13
3.5 Well Construction Materials 13
3.6 Well Development 13
4 WELL DRILLING, CONSTRUCTION, AND EQUIPPING 15
4.1 Wellhead Completion 15
4.2 Well Completion Reports 15
4.3 Wellhead Survey 15
4.4 Well RC20-2 17
4.4.1 Drilling Operations 17
4.4.2 Lithologic Conditions 18
4.4.3 Borehole Geophysical Logging 18
4.4.4 Well Construction 19
4.4.5 Well Development 20

Contents – continued

4.5 Well RC20-2A 20
- 4.5.1 Drilling Operations 20
- 4.5.2 Lithologic Conditions 20
- 4.5.3 Borehole Geophysical Logging 21
- 4.5.4 Well Construction 22
- 4.5.5 Well Development 22

4.6 Well RC20-2B 22
- 4.6.1 Drilling Operations 23
- 4.6.2 Lithologic Conditions 23
- 4.6.3 Borehole Geophysical Logging 24
- 4.6.4 Well Construction 24
- 4.6.5 Well Development 25

4.7 Well RC20-2C 25
- 4.7.1 Drilling Operations 26
- 4.7.2 Lithologic Conditions 27
- 4.7.3 Borehole Geophysical Logging 27
- 4.7.4 Well Construction 27
- 4.7.5 Well Development 27

4.8 Well RC20-2D 27
- 4.8.1 Drilling Operations 28
- 4.8.2 Lithologic Conditions 29
- 4.8.3 Borehole Geophysical Logging 29
- 4.8.4 Well Construction 30
- 4.8.5 Well Development 30

4.9 Well RC20-18 30
- 4.9.1 Drilling Operations 31
- 4.9.2 Lithologic Conditions 31
- 4.9.3 Borehole Geophysical Logging 31
- 4.9.4 Well Construction 31
- 4.9.5 Well Development 32

4.10 Well RC20-18A 32
- 4.10.1 Drilling Operations 32
- 4.10.2 Lithologic Conditions 32
- 4.10.3 Borehole Geophysical Logging 32
- 4.10.4 Well Construction 32
- 4.10.5 Well Development 33

Contents – continued

5 AQUIFER TESTING **34**
5.1 Introduction **34**
5.2 Aquifer Testing Objectives **36**
5.3 Field Methods and Procedures **36**
5.3.1 Pumping Tests 36
5.3.2 Injection Tests 38
5.4 Analytical Methods **38**
5.4.1 Pumping Tests 38
5.4.2 Injection Tests 41
5.5 Results of Aquifer Testing **41**
5.5.1 Pumping Tests 41
5.5.2 Injection Tests 56
5.6 Summary **67**
5.6.1 Pumping Tests 67
5.6.2 Injection Tests 67
5.7 Discussion **68**
5.7.1 Dripping Spring Fault 69
5.7.2 Hydraulic Connectivity of Geologic Units 69
6 REFERENCES **70**
7 ACRONYMS & ABBREVIATIONS **72**

Tables

Table 4-1. Well Construction Details for 2020 Hydrogeologic Investigations Wells 16
Table 5-1. Summary of Aquifer Tests 34
Table 5-2. Constant-rate Pumping Test Wells and Characteristics 42
Table 5-3. Constant-head Injection Test Wells and Characteristics 56
Table 5-4. Summary of Constant-rate Pumping Test Results 67
Table 5-5. Summary of Constant-head Injection Test Results 68

Figures

Figure 1-1. Geologic Map and Well Locations Skunk Camp Site 2
Figure 2-1. Geophysical Survey Lines 7
Figure 2-2. Schematic Diagram of Construction for Irrigation Well 55-622471 10
Figure 5-1. Locations of Aquifer Tests 35
Figure 5-2. Well 55-205266 Pumping Test Location Map 43
Figure 5-3. RC20-2 Pumping Test Location Map 45
Figure 5-4. Schematic Cross Section of RC20-2 Pumping Test 46
Figure 5-5. RC20-2A Pumping Test Location Map 48
Figure 5-6. Schematic Cross Section of RC20-2A Pumping Test 49
Figure 5-7. RC20-2D Pumping Test Location Map 51
Figure 5-8. Schematic Cross Section of RC20-2D Pumping Test (7-Day) 52
Figure 5-9. Stage and drinker discharge at Big Springs during RC20-2D 7-day pumping test 55
Figure 5-10. RC20-2C Injection Test Location Map 57
Figure 5-11. Schematic Cross Section of RC20-2C Injection Test 58
Figure 5-12. Injection Test at RC20-2C 60
Figure 5-13. RC20-2C Injection Test Observation Wells 61
Figure 5-14. RC20-18A Injection Test Location Map 62
Figure 5-15. Schematic Cross Section of RC20-18A Injection Test 63
Figure 5-16. Injection Test at RC20-18A 65
Figure 5-17. RC20-18A Injection Test Observation Wells 66

Appendices

Appendix A Daily Reports of Drilling Program
Appendix B Geophysical Survey Report
Appendix C ADWR Imaged Records for Selected Wells
Appendix D Driller Bit Run Sheets
Appendix E Lithologic Logs for Hydrogeologic Test Wells
Appendix F Schematic Diagrams of Well Construction
Appendix G Geophysical Logs for Hydrogeologic Test Wells
Appendix H Driller Reports for Hydrogeologic Test Wells
Appendix I Well Survey Results
Appendix J Aquifer Testing Results Summary Tables
Appendix K Pumping Test Hydrographs, Field Parameters, and Analytical Solutions

1 INTRODUCTION

The proposed Resolution Mine and Tailings Storage Facility (TSF) at several alternative locations, including Skunk Camp, was described and evaluated in a Draft Environmental Impact Statement (DEIS) published by the Tonto National Forest (the Forest) on August 9, 2019. Numerous comments were received from reviewing agencies and members of the public. In response to comments, and to further the National Environmental Policy Act (NEPA) analysis, the Forest requested additional analysis of the proposed Skunk Camp TSF. In response, site specific data was collected at the Skunk Camp TSF between late 2018 and through 2019. Additional data was collected between January and May 2020 and Montgomery & Associates (M&A) has prepared this report summarizing results of hydrogeologic investigations at the Skunk Camp site to inform Water Working Group Action Item WR30 (Submittal of Skunk Camp Conceptual and Predictive Modeling Results).

1.1 Objectives

The primary objectives of this phase of work at the Skunk Camp site included collection of data that are critical for seepage collection design, and confirmation of modeling parameters.
The investigations included: assessing the geology, wells, and springs in the area; conducting geophysical investigations to estimate thickness and saturation of alluvial deposits in the vicinity of and downstream from the main embankment of the proposed Skunk Camp TSF; installing and testing five hydrogeologic test wells; and evaluating two existing ranch wells.

1.2 Location

The investigations were conducted south-southeast and downgradient from the proposed Skunk Camp TSF in Sections 11, 14, 23, and 24, T. 3 S., R. 14 E., and Section 29, T. 3 S., R. 15 E. in Gila County, Arizona. A geologic map showing locations of investigation sites is shown on Figure 1-1.

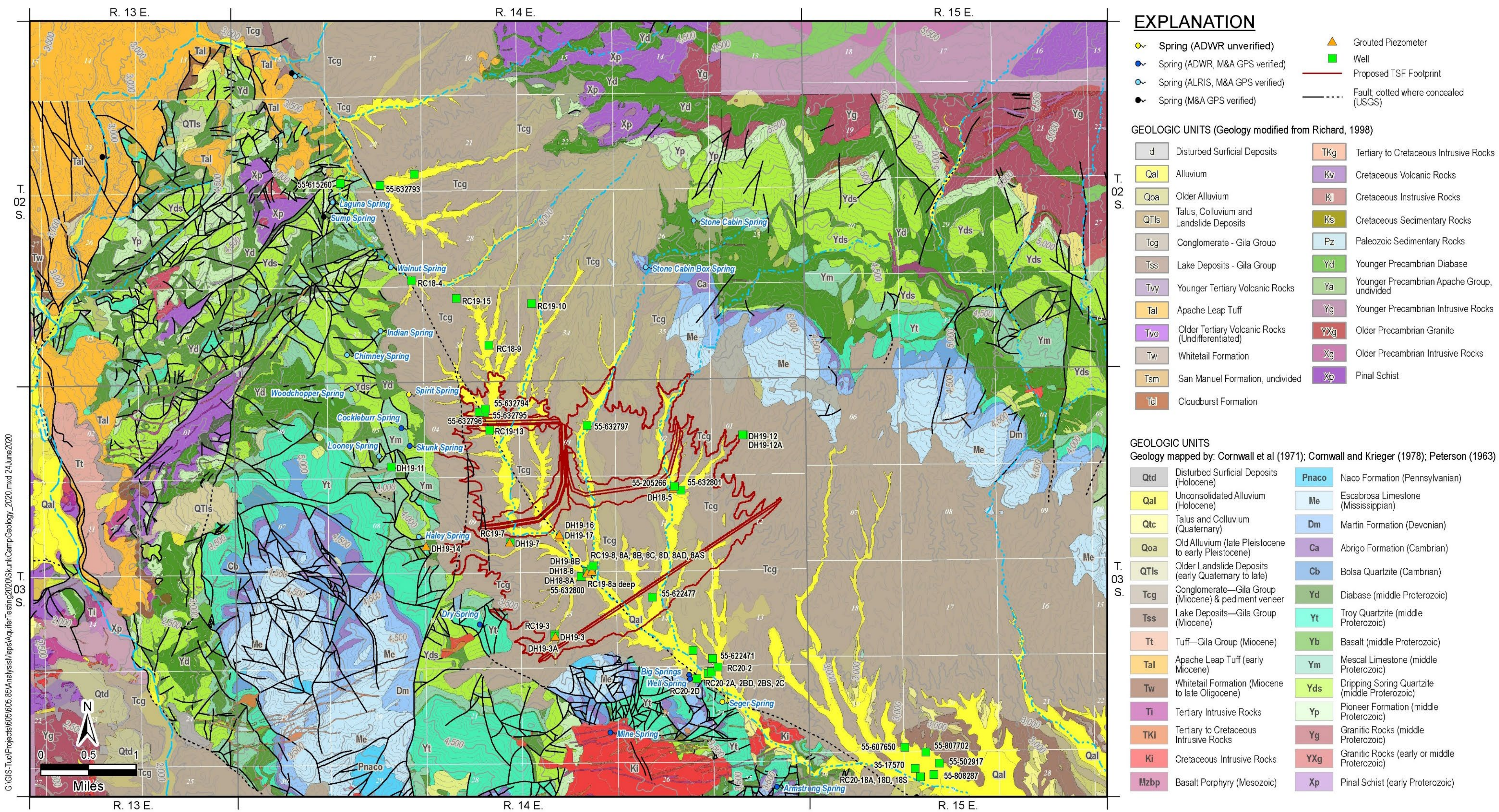


Figure 1-1. Geologic Map and Well Locations Skunk Camp Site

1.3 Hydrogeologic Conditions

The geology of the Skunk Camp area was mapped by Cornwall and others (1971) and Cornwall and Krieger (1978). Within the study area, geologic units range in age from Holocene alluvium in active stream channels to older Precambrian schist basement rocks in the surrounding mountains. Within the area of current investigations, the principal geologic units include Quaternary alluvium in active stream channels and on low-lying terraces (Qal); older alluvium (Qoa); Gila conglomerate and pediment veneer (Tcg); Gila sandstone and lake deposits (Tss); Cretaceous intrusive rocks (Ki); Paleozoic sedimentary units including Pennsylvanian Naco formation (Pnaco), Mississippian Escabrosa Limestone (Me), Devonian Martin Formation (Dm), Cambrian Abrigo Formation (Ca), and Cambrian Bolsa Quartzite (Cb); and younger Precambrian units including diabase (Yd), Troy Quartzite (Yt), basalt (Yb), Mescal Limestone (Ym), Dripping Spring Quartzite (Yds), and Pioneer Formation (Yp) (Cornwall and others, 1971; Cornwall and Krieger, 1978) (Figure 1-1).

The rocks in the Dripping Spring Mountains west of Dripping Spring Wash are complexly faulted. The central part of the Dripping Spring Mountains to the west of the proposed TSF footprint comprises a graben bounded by north-south trending faults. The eastern Ransome fault, and a splay to the east, extend into the Tcg in the western portion of the footprint (Cornwall and others, 1971) (Figure 1-1.). A steeply dipping normal fault, herein named the Dripping Spring fault, with the east side down-dropped relative to the west side, bounds the western side of Dripping Spring Valley and historic data suggests approximately 2,900 feet of displacement in the northern part of the valley and more than 1,470 feet south of the toe of the TSF footprint in the vicinity of the ranch irrigation well (Cornwall and others, 1971).

In 2018 and 2019, 13 hydrogeological investigation wells were installed and tested in the area adjacent to the proposed TSF. Site investigations were documented by KCB Consultants Ltd. (2019) and M&A (2019). Additional investigations conducted in 2020 primarily involved Qal, Tcg, Tss, and Cb in the area south and downstream from previous investigations (Figure 1-1.).

1.4 Project Planning and Coordination

M&A coordinated and contracted with geophysical surveyors who provided surface and borehole geophysical logging services. Electrical resistivity and shallow seismic surveys were conducted to target locations for the hydrogeologic test wells at Site 2, and along the toe of the proposed Skunk Camp TSF.

Hydrogeologic test wells were drilled in accordance with technical specifications prepared by M&A and RC. RC coordinated and contracted with the drilling contractor. Daily drilling reports were prepared by drilling contractor personnel and were submitted to RC and M&A for review.

M&A coordinated and contracted with the pump contractor who provided services to inspect, remove, install test pump equipment, and assist with testing of the wells.

M&A provided daily summaries of progress of field activities during drilling and testing operations. Daily reports of drilling program progress are provided in Appendix A.

1.5 Contractors

DalMolin Excavating Inc. (DalMolin), a construction company based in Globe, Arizona provided support for clearing drill pads, transporting and storing water, and preparing and maintaining roads during field operations. Jonovich Companies, Inc., an industrial general contractor also based in Globe, handled investigation-derived fluid transportation and disposal.

Seismic and electrical resistivity surveys were conducted by hydroGEOPHYSICS, Inc. (HGI), Tucson, Arizona. Results of the surveys were reported by HGI and are included as Appendix B.

The hydrogeologic test wells were drilled and constructed by National EWP (National), Gilbert, Arizona. The RC20-2 (2 through 2D) and RC20-18 (18 and 18A) series wells were installed during the period February 20 through March 16, 2020, using a Schramm T685WS top-head drive rotary drill rig. Conventional air and mud rotary methods were used to drill the surface boreholes. The production boreholes were drilled using the dual-wall air reverse circulation and dual-wall air-assisted flooded-reverse circulation methods. For the upper part of the boreholes, a Symmetrix casing advancement system was used to stabilize the borehole through unconsolidated to poorly consolidated materials.

Southwest Exploration Services, LLC (SWE), Gilbert, Arizona, provided borehole geophysical logging services at selected well locations when the boreholes were drilled to total depth or after the wells were completed.

Cascade Drilling, LP (Cascade), Peoria, Arizona, provided pump services for testing newly installed hydrogeologic test wells from March through May 2020.

1.6 Permits

1.6.1 Notices of Intent to Drill

National obtained drill cards from the Arizona Department of Water Resources (ADWR) on behalf of RC. National filed Notice of Intent to Drill forms using the electronic filing system. In accordance with the permits, National filed well completion reports with ADWR following installation of the wells.

1.6.2 AZPDES De Minimis Discharge Authorization

M&A amended the Project-wide De Minimis Discharge Authorization (AZDM74824) under the Arizona Pollutant Discharge Elimination System to include testing and periodic sampling of the Skunk Camp wells included in this phase of work.

2 GEOPHYSICAL SURVEYS AND EVALUATION OF RANCH WELLS

The 2020 Skunk Camp field investigations described below are located mostly downstream from the proposed TSF footprint and are shown on Figure 1-1. .

2.1 Seismic and Electrical Resistivity Surveys

HGI conducted surface geophysical surveys at Skunk Camp to assess depth to top of Tcg, saturation of Qal, location of the Dripping Spring fault, and to estimate geotechnical properties of the Tcg in the area south of the proposed TSF. The surveys were conducted during the period January 28-31, 2020. The investigations included electrical resistivity, P-wave refraction, and multi-channel analysis of surface waves (MASW) along two lines, one near the ranch irrigation well (Line 1), and the other near the toe of the proposed TSF (Line 2). The lines of survey are shown on Figure 2-1. .

The P-wave refraction method is used to estimate depth to bedrock and bedrock structure; MASW is used to determine ground strength and load-bearing capacity; and electrical resistivity is used to characterize rock and sediment properties and their pore fluids (HGI, 2020; Appendix B).

Results of the resistivity surveys were modeled as two layers with a resistive upper alluvium layer overlying a more conductive lower conglomerate layer. The seismic profiles indicate a low P-wave velocity upper alluvial layer overlying a higher velocity lower conglomerate layer (Figures 9 and 10, HGI, 2020). Line 1 shows considerable variability to a simple two-layer system, whereas Line 2 shows less variability.

The results suggest that the Qal within Dripping Spring Wash along Line 1 is about 75 feet thick in the zone from 750 to 1,000 feet along the line of survey. A conductive zone in the upper layer is indicated between 0 and 375 feet along the line of survey. This is interpreted as a zone of increased near-surface moisture in the vicinity of Big Springs (Figure 1-1.). Also, two conductive zones are indicated between 1,000 and 1,450 feet and 1,550 and 1,650 feet along the line of survey. These are interpreted as zones of perched water or saturation in the alluvium, or alternatively, zones with more silt and clay in the alluvium (Figure 9, HGI, 2020). Results of the Line 1 survey were used to select locations for the hydrogeologic test wells in the vicinity of Site 2. M&A interpreted the feature in the zone from 375 and 500 feet along the line of survey as the Dripping Spring fault based on drilling at RC20-2D (Figure 1-1.).

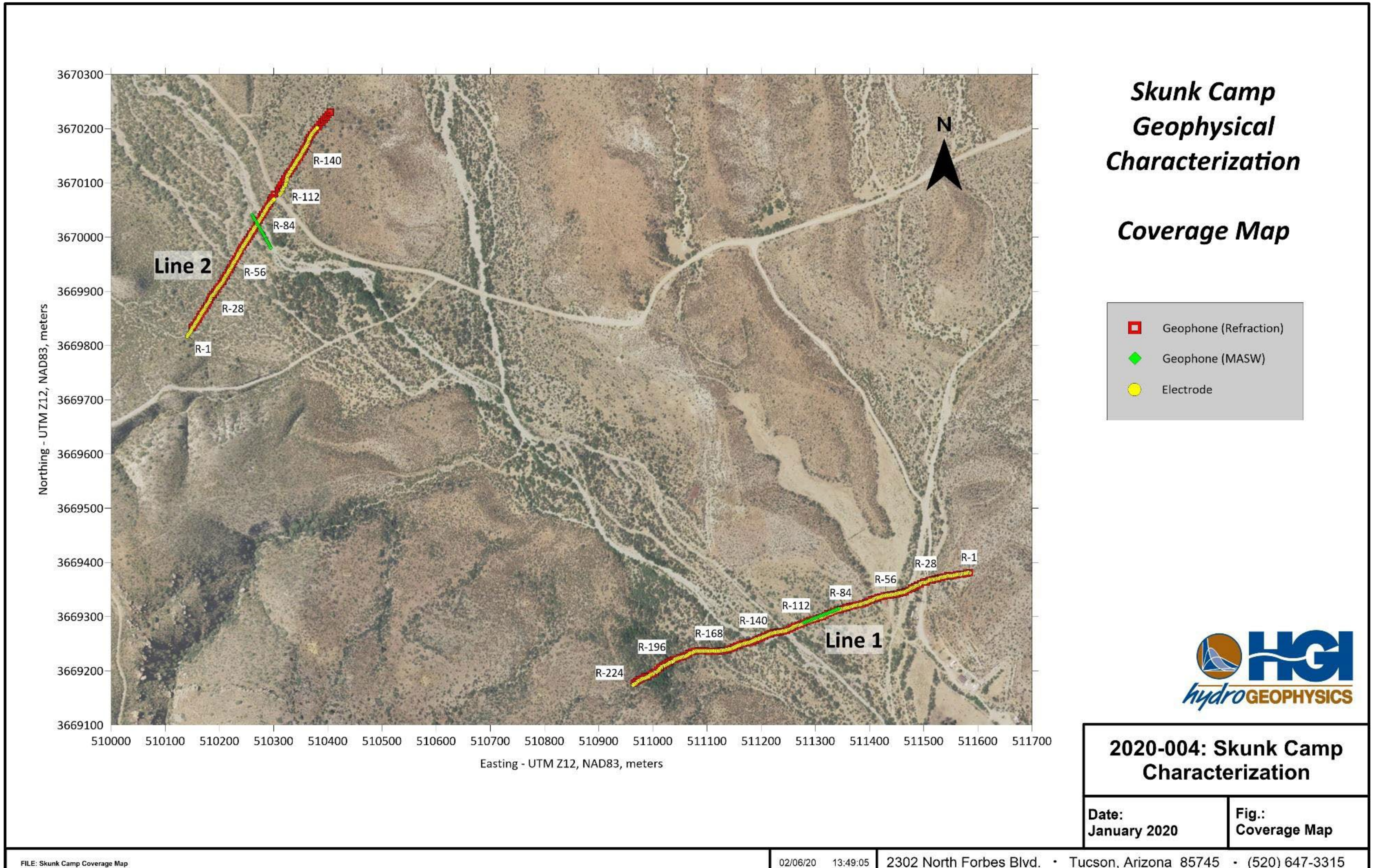


Figure 2-1. Geophysical Survey Lines

The results suggest that the Qal within Dripping Spring Wash along Line 2 is about 50 to 80 feet thick in the zone from 250 to 900 feet along the line of survey. A less resistive zone in the upper layer was indicated in the zone from 300 and 600 feet along the line of survey. This is interpreted to be a zone of increased moisture in the upper 40 feet (Figure10, HGI, 2020).

2.2 Evaluation of Existing Wells

Two existing wells were evaluated for suitability for testing and/or monitoring purposes. The wells include an irrigation well (D-3-14)24bbb (55-622471), and a stock well (D-3-14)14bdb (55-622477). Activities conducted at these wells are described in the following sections. The ADWR imaged records for the wells are provided in Appendix C.

2.2.1 55-622471 Evaluation

The ADWR record for irrigation well 55-622471 indicates that the well was drilled to a depth of 1,475 feet in 1962. Reportedly the well was completed with 16-inch diameter steel casing to 615 feet with perforations from 260 to 600 feet below land surface (bls). The contact between the Qal and Tcg was interpreted to be at 60 feet bls based on the driller's log, and the maximum pump capacity was reported to be 1,200 gallons per minute (gpm) (Appendix C). Examination of the well was recommended to determine the feasibility of testing the well to determine aquifer parameters of the Tcg at the site. The site was visited on January 20, 2020 to inspect the well condition and the installed infrastructure. The well was equipped with a non-functional line shaft turbine pump. A photograph showing irrigation well 55-622471 during the preliminary inspection is shown below.

Photograph 2-1. Irrigation Well 55-622471, January 20, 2020

Cascade mobilized to the well on February 16, 2020 to remove the installed pump. After the pump was removed, SWE conducted a well video survey on February 22, 2020. The video showed that many sections of the well casing were degraded and corroded, and a substantial portion of the perforations were heavily encrusted. Below the cased depth of 615 feet, the well bore was open to 1,418 bls with fill material below that depth. In addition to the well video, SWE obtained caliper, natural gamma ray, temperature, and fluid resistivity logs, as well as electric logs (e-logs) and sonic logs. A schematic diagram of construction for irrigation well 55-622471 was prepared based on ADWR records and information obtained from the geophysical logs, and is shown on Figure 2-2. .

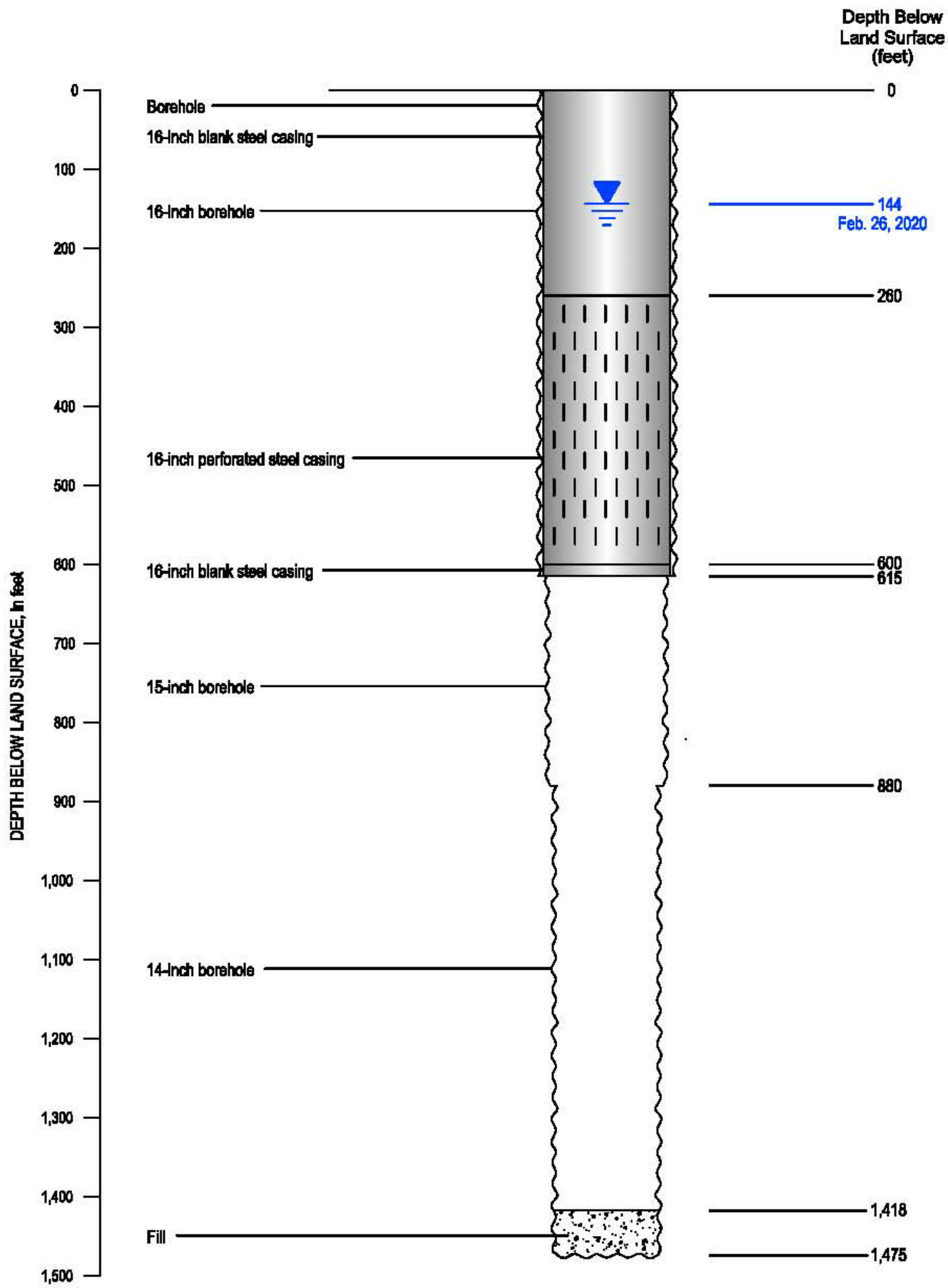


Figure 2-2. Schematic Diagram of Construction for Irrigation Well 55-622471

Following the preliminary inspection, a water level of 151 feet bls was measured. A temporary test pump was installed on February 24, 2020, and a short step discharge test was conducted on February 26, 2020 to determine pumping capacity and well efficiency. Results of the step discharge test indicated poor well efficiency that may be improved with rehabilitation of the screened interval. Additional information regarding the step discharge test, including procedure, methods, and results, will be provided in a separate technical memorandum.

Rehabilitation of irrigation well 55-622471 was conducted by Cascade during the period April 28 to May 4, 2020. Rehabilitation operations included brushing the well screen, applying acid treatment to the well screen using a surge block, airlifting the water column to purge the well of development materials, and bailing development debris from the bottom of the borehole. All development fluids were contained on site in portable storage tanks for later disposal by Jonovich.

2.2.2 Stock Well Evaluation

Limited information for the stock well 55-622477 is available with ADWR. The record indicates that the well was completed to a depth of 900 feet with a maximum pump capacity of 6 gpm. The property lessee reported that the well was obstructed by a rock at depth of 100 to 200 feet, and that an attempt was made to remove the obstruction. On February 7, 2020, SWE conducted a borehole video survey of the well. Debris and fill were observed at a depth of approximately 129 feet bls.

3 INSTALLATION OF HYDROGEOLOGIC TEST WELLS

3.1 Monitoring of Drilling Conditions

During drilling of the hydrogeologic test wells, drill penetration rate was monitored by National by recording start and stop time for 20-foot drill rods. In addition to drill penetration rate, National monitored rotational torque, and zones of variable or increasing torque were noted as a potential indicator of fracturing. Copies of available technical data sheets (bit run sheets) recorded by National are included in Appendix D.

During drilling, water was added as needed to maintain circulation and remove drill cuttings. The water was sourced from hydrogeologic investigation well RC18-9, located approximately 4 miles northwest of Line 1 within the preliminary TSF footprint (M&A, 2019).

3.2 Monitoring of Lithologic Conditions

During drilling of the Tcg and bedrock wells, drill cuttings samples were collected for 10-foot composite intervals. For the Qal and dual completion wells, samples were collected for 5-foot composite intervals. Samples were placed in labeled bags and stored on site.

Lithologic descriptions of the bagged samples were prepared by M&A hydrogeologists. Representative splits for each sample were placed in plastic chip trays and are on file at M&A's Tucson office. Bulk cutting samples were bagged and provided to RC in accordance with their sampling plan. Detailed lithologic descriptions for each well based on drilling samples are provided in Appendix E. Depths to contacts for principal hydrogeologic units were refined using sample descriptions in combination with borehole geophysical logs. Summary geologic units encountered at each well are shown on the well schematics provided in Appendix F, Figures F-1 through F-7.

3.3 Borehole Geophysical Logging

In most cases, borehole geophysical logging was conducted after the borehole was drilled to total depth; at wells RC20-2C, RC20-18, and RC20-18A, geophysical logs were not obtained either because the well was drilled entirely with the Symmetrix casing advancement method or because the well was co-located with another well where logging had been conducted. The SWE standard borehole geophysical logging suite generally included: natural gamma ray, caliper, fluid resistivity, temperature, e-logs (single point resistance, focused resistivity, and spontaneous potential), and sonic logs. At most locations acoustic and/or optical borehole imaging (ABI / OBI) logs were obtained. SWE provided preliminary field data and final results in digital format to M&A and RC staff. Final borehole geophysical logs are provided in Appendix G.

3.4 Monitoring of Groundwater Conditions

When the dual-wall air reverse circulation method was used, it was possible to monitor for the presence of groundwater and to determine approximately where groundwater inflow zones were encountered. Observations of groundwater production rates were made after drilling each 20-foot drill rod starting at depths where groundwater presence was anticipated. After drilling to the end of a drill rod, injection water was cut off from the airstream, and air circulation was continued for a minimum of 10 to 15 minutes. Once stabilized, the sustained discharge from the borehole was measured using the time required to fill a calibrated container or storage tank.

3.5 Well Construction Materials

Well construction materials were procured by National on behalf of RC. One of four types of wells was constructed depending upon purpose for the well. These included RC20-2 and RC20-2A, completed in the Tcg; RC20-2C and RC20-18A, completed in the Qal; RC20-2B and RC20-18, with dual completions in the Tcg and Qal; and RC20-2D, completed in Paleozoic bedrock. For all wells, surface casing consisted of 20 feet of 10-1/2-inch diameter blank low carbon steel. Production casing for wells RC20-2, RC20-2A, and RC20-2D consisted of 4-inch diameter Schedule 40 blank and slotted PVC with 0.020-inch slots and 8-12 silica sand filter pack. Production casing for wells RC20-2C and RC20-18A consisted of 4-inch diameter Schedule 80 blank and slotted PVC with 0.040-inch slots and 6-9 silica sand filter pack. Production casing for wells RC20-2B and RC20-18 consisted of two strings of 2-inch diameter Schedule 40 blank and slotted PVC with 0.020-inch slots and 8-12 silica sand filter pack. Annular seals were composed of 3/8-inch bentonite chips and/or cement-bentonite slurry.

Grouted-in vibrating-wire piezometers (VWPs) were installed in the borehole annulus of upper Tcg at wells RC20-2 and RC20-2A. The installation depths of the VWPs were selected to measure vertical gradients between the piezometers and slotted intervals at these sites. The VWPs were Geokon Model 4500S Standard Piezometers with pressure ratings selected based on the anticipated depths of installation. During well construction, the VWPs were strapped to blank sections of the 4-inch PVC casing. Following installation of the filter pack and bentonite seal, the VWPs were grouted-in using a cement-bentonite mixture consisting of the following ratio by weight: 2.5 parts water: 1 part cement: 0.3 part bentonite. The VWPs were connected to Geokon LC-2 single-channel dataloggers for transducer communication and data retrieval.

3.6 Well Development

Following casing installation at RC20-2, RC20-2A, RC20-2B(D), RC20-18(D) and RC20-2D, the wells were developed by airlift surging and pumping to remove fine particles from the aquifer and filter pack immediately around the well screen in order to increase permeability and decrease the resistance to flow of water into the well. Wells RC20-2B(S) and RC20-18(S), both completed in upper Tcg, did not have adequate water present during construction to be developed using this method. Wells RC20-2C and RC20-18A, both completed in Qal, were dry and therefore not developed.

M&A measured discharge rates and discharge water quality parameters during well development operations. The water quality parameters were measured using a Myron L® Ultrameter II and Hach 2100Q turbidimeter, and included temperature, pH, and specific electrical conductance. Suspended sediment content was periodically measured with an Imhoff cone. Development was conducted until water quality parameters stabilized and discharge water was sediment-free.

4 WELL DRILLING, CONSTRUCTION, AND EQUIPPING

Seven additional hydrogeologic test wells were drilled in 2020 in support of data collection for the Skunk Camp TSF. The wells were completed in Qal, Tcg, Tss, and Paleozoic bedrock units.

Wells RC20-2 and RC20-2A were drilled and completed in Tcg. Well RC20-2D was drilled as a bedrock well installed in Cb in the vicinity of the Dripping Spring fault. Wells RC20-2B and RC20-18 were drilled as dual completion (two wells completed at different depths in the same borehole) to observe hydraulic responses in Qal and upper Tcg during injection tests at wells RC20-2C and RC20-18A, respectively. Schematic diagrams for the wells are given in Appendix F, Figures F-1 through F-7.

Well drilling operations began with a 17-1/2-inch diameter surface borehole advanced to approximately 20 feet bls using conventional mud rotary drilling methods. Following drilling of the surface borehole, 10-1/2-inch diameter blank steel surface casing was centered in the borehole and cemented in place. Drilling of the well resumed after the surface casing cement had cured for a minimum of six hours.

4.1 Wellhead Completion

The wells were secured with a surface completion consisting of a welded extension of the 10-1/2-inch diameter steel surface casing to approximately 3 feet above land surface. The casing extension was cemented in place and surrounded by a concrete pad approximately 4-feet square and 6 inches thick. Each well vault was secured with a locking cap and padlock.

4.2 Well Completion Reports

Well driller reports for each well were submitted to ADWR by National after review by M&A. Copies of the well driller reports are included in Appendix H.

4.3 Wellhead Survey

A wellhead coordinate survey was conducted by Environmental Field Services LLC, Oracle, Arizona. Results of the wellhead survey are provided in Appendix I. Survey results are summarized in Table 4-1.

Table 4-1. Well Construction Details for 2020 Hydrogeologic Investigations Wells

				….BOREHOLE….		…………CASING AND CONSTRUCTION…………						……SURVEY COORDINATES (AZSPC, feet)[c]……			
WELL IDENTIFIER	CADASTRAL	ADWR WELL REGISTRATION NUMBER 55-	DATE COMPLETED	BOREHOLE DIAMETER (inches)	BOREHOLE DEPTH (feet, bls)[a]	DIAMETER (inches)	DEPTH (feet, bls)	PERFORATED INTERVAL (feet, bls)	SAND PACK INTERVAL (feet, bls)	HYDROGEOLOGIC UNIT(S) AT THE PERFORATED INTERVAL	GROUTED VIBRATING-WIRE PIEZOMETER DEPTH[b] (feet)	NORTHING (feet)	EASTING (feet)	SURVEYED ELEVATION[d] (feet, amsl)[e]	LAND SURFACE ELEVATION (feet, amsl)
RC20-2 (Tcg #1)	(D-3-14)14ddd	923921	2/25/2020	17-1/2 9-5/8 7-3/4 7-1/2	0 - 20 20 - 50 50 - 450 450 - 601	10.5 4	0 - 20 0 - 600	--- 270 - 600	--- 256 - 601	Gila Conglomerate (Tcg)	180	788964.07	1017770.65	3009.35	3006.33
RC20-2A (Tcg #2)	(D-3-14)23aaa	923957	3/2/2020	17-1/2 9-5/8 7-3/4 7-1/2	0 - 20 20 - 70 70 - 480 480 - 600	10.5 4	0 - 20 0 - 599	--- 268 - 599	--- 255 - 600	Gila Conglomerate (Tcg)	165	788153.59	1017536.57	2988.58	2985.72
RC20-2BD RC20-2BS (DC #1)	(D-3-14)23aaa	923971	3/4/2020	17-1/2 9-5/8 7-3/4	0 - 20 20 - 92 92 - 156	10 2	0 - 20 0 - 155	--- 115 - 155	--- 97 - 156	Gila Conglomerate (Tcg)	---	788241.55	1017692.97	2989.43	2986.77
						2	0 - 90	40 - 90	30 - 87	Quaternary Alluvium (Qal)	---				
RC20-2C (Qal #1)	(D-3-14)23aaa	923972	3/5/2020	17-1/2 9-5/8	0 - 20 20 - 70	10.5 4	0 - 20 0 - 69	--- 29 - 69	--- 27 - 70	Quaternary Alluvium (Qal)	---	788211.35	1017709.18	2988.57	2985.76
RC20-2D (Bedrock)	(D-3-14)23aab	923982	3/9/2020	17-1/2 9-5/8 7-3/4	0 - 20 20 - 50 50 - 155	10.5 4	0 - 20 0 - 139	--- 99 - 139	--- 77 - 140	Bolsa Quartzite (Cb), Dripping Spring Fault	---	787845.69	1016931.56	2993.99	2991.11
RC20-18D RC20-18S (DC #3)	(D-3-15)29bca	924012	3/14/2020	17-1/2 9-5/8 7-3/4	0 - 20 20 - 99 92 - 130	10 2	0 - 20 0 - 130	--- 105 - 130	--- 105 - 131	Gila Conglomerate (Tcg)	---	782415.59	1029273.38	2706.24	2703.76
						2	0 - 91	40 - 91	31 - 91	Quaternary Alluvium (Qal)	---				
RC20-18A (Qal #3)	(D-3-15)29bca	924013	3/16/2020	17-1/2 9-5/8	0 - 20 20 - 92	10.5 4	0 - 20 0 - 92	--- 52 - 91	--- 41 - 92	Quaternary Alluvium (Qal)	---	782435.64	1029251.62	2706.69	2704.15

[a] bls = below land surface
[b] grouted-in piezometers attached to 4-inch well casing
[c] Arizona State Plane Coordinates NAD83 U.S. feet
[d] Survey point at the center of the well vault with the lid closed; surveyed by Environmental Field Services LLC, Oracle, AZ
[e] amsl = above mean sea level
--- = none

MONTGOMERY & ASSOCIATES

4.4 Well RC20-2

Well RC20-2 was drilled, constructed, and developed during the period February 20 – 25, 2020. Location of the well is shown on Figure 1-1. A schematic diagram of construction is provided on Figure F-1. A photograph of the drill site is shown below.

Photograph 4-1. Drill Site Layout for RC20-2

4.4.1 Drilling Operations

At RC20-2, the production interval of the borehole was drilled using the dual-wall air reverse circulation, Symmetrix casing advancement, and air-assisted flooded reverse methods. Airlift water production began at a depth of 180 feet bls with a rate of 0.6 gpm and increased to 133 gpm at total depth of 601 feet bls. The drilling method was changed to air-assisted flooded reverse at a depth of 450 feet bls.

Depths, drilling methods, and bit types used during drilling are summarized below:

Depth Interval (feet bls)	Drilling Method	Bit Type	Borehole Diameter (inches)
0 – 20	conventional mud rotary (surface)	tricone	17-1/2
20 – 50	dual-wall, air reverse circulation with Symmetrix	hammer	9-5/8
50 - 450	dual-wall, air reverse circulation	hammer	7-3/4
450 – 601	dual-wall, flooded reverse circulation	tricone	7-1/2

4.4.2 Lithologic Conditions

Detailed lithologic descriptions for drill cuttings samples for RC20-2 are given in Appendix E; Table E-1. Hydrogeologic units encountered at RC20-2 included Qal and Tcg. Weathered Tcg occurred in the depth interval from 20-34 feet bls; competent Tcg occurred from a depth of 34 feet bls to the bottom of the borehole at 601 feet bls. A log of lithologic units encountered at RC20-2 is shown on Figure F-1.

4.4.3 Borehole Geophysical Logging

A summary of geophysical logs obtained and depth intervals for each log are summarized below:

Logging Tool	Depth Interval(s) (feet bls)
Caliper	0 – 598
Natural Gamma Ray	0 – 594
Temperature	150 – 600
Fluid Resistivity	150 – 600
E-Log	150 – 599
Optical Televiewer	45 – 597
Acoustic Televiewer	150 – 597
Sonic	150 – 597
Borehole Magnetic Resonance	20 – 592

Final borehole geophysical logs for RC20-2 are provided in Appendix G.

4.4.3.1 Interpretation of Borehole Geophysical Logs

OBI: The OBI log coverage begins within Tcg at a depth of 45.4 feet bls. The formation is predominantly clast-supported conglomerate with angular to subrounded clasts ranging in size from small pebbles to small boulders. Bedding is generally thick or massive, with lesser thin fine-grained beds. Units appear to be alluvial fan or debris flow deposits, and many sections of the log show fining-upward sequences. A minor fracture was observed at 105.5-105.8 feet bls (Appendix G-1-1). In combination with the ABI and sonic and logs (Appendix G-1-2 and G-1-3, respectively) minor fractures are interpreted at 180-180.7 feet bls, 353.7-354.7 feet bls, 386.7-388 feet bls, and 531.5-532 feet bls.

Sonic: The sonic log coverage begins at a depth of 150.4 feet bls. The log shows distinctive bedding features that align with bedding observed in the OBI and ABI logs (Appendix G-1-1 and G-1-2). Weaker zones within the Tcg are indicated by zones of lower density. The sonic log indicates three distinct zones that include 1) a low-density zone from water level at 150.4 feet bls to 205 feet bls; 2) a moderate-density zone from 205-320 feet bls; and 3) a high-density zone from 320-597.8 feet bls (Appendix G-1-3).

Natural gamma ray: The natural gamma ray log (Appendix G-1-4) coverage begins at land surface and along with the lithologic log (Appendix E-1) shows four zones:

- 0 - 20 feet bls-low gamma ray activity, 20-40 API units; interpreted as Qal and surface casing
- 20 - 36 feet bls-increased activity, 40-60 API units; interpreted as weathered Tcg
- 36 - 58 feet bls-increased activity, 60-80 API units; transition to more competent Tcg
- 58 - 594 feet bls-relatively uniform activity, 50-120 API units

A decreasing baseline shift in the natural gamma log was noted at water level at 150.4 feet bls, and on all logs where groundwater was encountered. The natural gamma log showed the best definition of Qal, and weathered and competent Tcg in the upper part of the borehole (Appendix G-1-4).

E-log: The e-log coverage begins at a depth of about 185 feet bls. The logs show relatively low resistivity from 200-385 feet bls, and higher, more variable resistivity from 385-597 feet bls (Appendix G-1-5).

4.4.4 Well Construction

Well construction details for RC20-2 are provided in Table 4-1 and on Figure F-1. The well was constructed with a slotted interval from 270 to 600 feet bls, and filter pack interval from 256 to 601 feet bls in Tcg. An annular grouted-in VWP was installed at a depth of 180 feet bls in Tcg between the water level and open interval to measure the vertical gradient within the Tcg at the well site.

4.4.5 Well Development

Following casing installation, RC20-2 was developed by airlift pumping for approximately four hours on February 24 – 25, 2020. Depth to pre-pumping water level was 150.5 feet bls. In order to reduce the risk of well collapse due to differential pressure across the PVC casing, the bottom of the airline was limited to a maximum depth of 300 feet. Discharge ranged from 27 to 50 gpm, with an average rate of 35 gpm and estimated total purge volume of 12,000 gallons.

Additional development of the slotted interval was conducted by Cascade on April 3 and 4, 2020 using a surge block and bailer. Depth to water level prior to the start of development was 153.8 feet bls. Bailing produced minimal silt and fine sand and the water level returned to approximately 154.1 feet bls at the end of development.

4.5 Well RC20-2A

Well RC20-2A was drilled, constructed, and developed during the period February 25 – March 2, 2020. Location of the well is shown on Figure 1-1. A schematic diagram of construction is shown on Figure F-2.

4.5.1 Drilling Operations

At RC20-2A, the production interval of the borehole was drilled using the dual-wall air reverse circulation, Symmetrix casing advancement, and air-assisted flooded reverse methods. Airlift water production measurements began at a depth of 180 feet bls with a rate of 0.1 gpm and increased to 133 gpm at total depth of 600 feet bls. The drilling method was changed to air-assisted flooded reverse at a depth of 460 feet bls.

Depths, drilling methods, and bit types used during drilling are summarized below:

Depth Interval (feet bls)	Drilling Method	Bit Type	Borehole Diameter (inches)
0 – 20	conventional mud rotary (surface)	tricone	17-1/2
20 – 62	dual-wall, air reverse circulation with Symmetrix	hammer	9-5/8
62 - 460	dual-wall, air reverse circulation	hammer	7-3/4
460 – 600	dual-wall, flooded reverse circulation	tricone	7-1/2

4.5.2 Lithologic Conditions

Detailed lithologic description for drill cuttings samples for well RC20-2A are given in Appendix E; Table E-2. Hydrogeologic units encountered at RC20-2A included Qal and Tcg.

Tcg was encountered at 62 feet bls. A log of lithologic units encountered at RC20-2A is shown on Figure F-2.

4.5.3 Borehole Geophysical Logging

A summary of geophysical logs obtained and depth intervals for each log are summarized below:

Logging Tool	Depth Interval(s) (feet bls)
Caliper	67 – 597
Natural Gamma Ray	2 – 593
Temperature	135 – 600
Fluid Resistivity	135 – 600
E-Log	170 – 598
Optical Televiewer	67 – 598
Acoustic Televiewer	132 – 597
Sonic	135 – 598
Borehole Magnetic Resonance	71 – 585

Final borehole geophysical logs for RC20-2A are provided in Appendix G.

4.5.3.1 Interpretation of Borehole Geophysical Logs

OBI: The OBI log coverage begins within Tcg at a depth of 67.2 feet bls. The Tcg is very similar to RC20-2 described previously in Section 4.4.3.1; however, no evidence of fracturing was observed at RC20-2A (Appendix G-2-1).

Sonic: The sonic log coverage begins at a depth of 134.5 feet bls. The log shows distinctive bedding features that align with bedding observed in the OBI and ABI logs (Appendix G-2-1 and G-2-2). The sonic log indicates three distinct zones that include 1) a low-density zone from water level at 134.5 feet bls to 232 feet bls; 2) a moderate-density zone from 232-334 feet bls; and 3) a high-density zone from 334-598 feet bls (Appendix G-2-3).

Natural gamma ray: The natural gamma ray log (Appendix G-2-4) coverage begins at land surface and along with the lithologic log (Appendix E-2) shows four zones:

- 0 - 19 feet bls-low gamma ray activity, 20-40 API units; interpreted as Qal and surface casing
- 19 - 62 feet bls-increased activity, 40-80 API units; interpreted as Qal
- 62 - 67 feet bls-increased activity, 60-80 API units; weathered Tcg
- 67 - 594 feet bls-relatively uniform activity, 50-120 API units

E-log: The e-log coverage begins at a depth of about 170 feet bls. The logs show relatively low resistivity from about 200-515 feet bls, and higher, more variable resistivity from 515-596 feet bls (Appendix G-2-5).

4.5.4 Well Construction

Well construction details for RC20-2A are provided in Table 4-1 and on Figure F-2. The well was constructed with a slotted interval from 268 to 599 feet bls, and a filter pack interval from 255 to 600 feet bls in the Tcg. An annular grouted-in VWP was installed at 165 feet bls in the Tcg between water level and the open interval of the well to measure vertical gradients in the Tcg.

4.5.5 Well Development

Following casing installation, the production interval at well RC20-2A was developed by airlift pumping for 4 hours on March 1 – 2, 2020. Depth to pre-pumping water level was 131.5 feet bls. As with development at RC20-2, the bottom of the airline was limited to a maximum depth of 280 feet in order to reduce the risk of well collapse due to differential pressure across the PVC casing. Discharge ranged from 36 to 45 gpm during development, with an average rate of 40 gpm and estimated total purge volume of 10,000 gallons.

Additional development of the slotted interval was conducted by Cascade on April 6, 2020 using a surge block and bailer. Depth to water level prior to the start of development was 135.5 feet bls. Bailing produced minimal silt and fine sand and the water level returned to approximately 139.1 feet bls immediately after development.

4.6 Well RC20-2B

Well RC20-2B was drilled and constructed during the period March 2 – 4, 2020. Location of the well is shown on Figure 1-1. . A schematic diagram of construction is provided on Figure F-3. A photograph of the drill site is shown below.

Photograph 4-2. Drill site layout for well RC20-2B

4.6.1 Drilling Operations

RC20-2B was installed as a dual completion well with one slotted interval in the Qal and one slotted interval in the upper Tcg. The production interval of the borehole was drilled using dual-wall air reverse circulation and Symmetrix casing advancement methods.

Depths, drilling methods, and bit types used during drilling are summarized below:

Depth Interval (feet bls)	Drilling Method	Bit Type	Borehole Diameter (inches)
0 – 20	conventional mud rotary (surface)	tricone	17-1/2
20 – 92	dual-wall, air reverse circulation with Symmetrix	hammer	9-5/8
92 - 156	dual-wall, air reverse circulation	hammer	7-3/4

4.6.2 Lithologic Conditions

Detailed lithologic description for drill cuttings samples for well RC20-2B are given in Appendix E; Table E-3. Hydrogeologic units encountered at RC20-2B included Qal and Tcg.

Tcg was encountered at 87 feet bls. A summary log of lithologic units encountered at RC20-2B is shown on Figure F-3.

4.6.3 Borehole Geophysical Logging

A summary of geophysical logs obtained and depth intervals for each log are summarized below:

Logging Tool	Depth Interval(s) (feet bls)
Caliper	90 – 154
Natural Gamma Ray	2 – 149
Temperature	113 – 155
Fluid Resistivity	113 – 155
Optical Televiewer	90.5 – 154.2

Final borehole geophysical logs for RC20-2B are provided in Appendix G.

4.6.3.1 Interpretation of Borehole Geophysical Logs

OBI: The OBI log coverage begins within Tcg at a depth of 90.5 feet bls. Below water level at 113.1 feet bls, the quality of the log is poor. The Tcg is very similar to RC20-2 described previously in Section 4.4.3.1; however, no obvious evidence of fracturing was observed at RC20-2B (Appendix G-3-1).

Natural gamma ray: The natural gamma ray log (Appendix G-3-2) coverage begins at land surface and along with the lithologic log (Appendix E-3) shows four zones:

- 0 - 19 feet bls-low gamma ray activity, 20-25 API units; interpreted as Qal and surface casing
- 19 - 68 feet bls-increased activity, 40-60 API units; interpreted as Qal
- 68 - 89 feet bls-decreased activity, 30-50 API units; interpreted as Qal
- 89 - 113 feet bls-increased activity, 60-100 API units; interpreted as unsaturated Tcg
- 113 - 149 feet bls-decreased activity, 40-60 API units; interpreted as Tcg

4.6.4 Well Construction

Well construction details for RC20-2B are provided in Table 4-1 and on Figure F-3. The well was constructed with two completions one in lower Qal and the other in upper Tcg. During well construction, water level was monitored for two hours and appeared to stabilize at approximately 116 feet bls. The Tcg completion has a slotted interval from 115 to 155 feet bls, and a filter pack interval from 97 to 156 feet bls. The Qal completion has a slotted interval from 40 to 90 feet bls and a filter pack interval from 30 to 87 feet bls. These intervals were selected to provide observations wells for the Qal and upper Tcg during injection testing at Qal well RC20-2C which is located on the same drill pad.

4.6.5 Well Development

At the time of well construction, there was inadequate water in the Qal completion to develop the well with airlift pumping. The production interval of the Tcg completion was developed by airlift pumping using a 1-inch airline for 2 hours on March 4, 2020.

Water level monitoring conducted at RC20-2B between March 7 and May 7, 2020 suggested that the Tcg completion may be underdeveloped and showed a large difference in water level between the Qal and Tcg completions of approximately 30 feet. As a result, M&A manually developed both completions using a swab and bailer on May 8, 2020. Approximately 15 gallons were removed from the Qal completion and 25 gallons from the Tcg completion. A small amount of silt was removed from both completions, and no drilling additives were observed. The Qal completion recovered quickly, indicating a strong hydraulic connection with the Qal aquifer. The Tcg completion water level did not immediately recover, suggesting poor hydraulic connectivity with the surrounding Tcg aquifer.

4.7 Well RC20-2C

Well RC20-2C was drilled and constructed on March 5, 2020. Location of the well is shown on Figure 1-1. A schematic diagram of construction is provided on Figure F-4. A photograph of the drill site is shown below.

Photograph 4-3. Drill site layout for well RC20-2C

4.7.1 Drilling Operations

At RC20-2C, the production interval of the borehole was drilled using the dual-wall air reverse circulation method. Symmetrix casing was used to stabilize the borehole during drilling and then subsequently was removed during well construction. Groundwater was not encountered during drilling of the well.

Depths, drilling methods, and bit types used during drilling are summarized below:

Depth Interval (feet bls)	Drilling Method	Bit Type	Borehole Diameter (inches)
0 – 20	conventional mud rotary (surface)	tricone	17-1/2
20 – 70	dual-wall, air reverse circulation with Symmetrix	hammer	9-5/8

4.7.2 Lithologic Conditions

Detailed lithologic description for drill cuttings samples for well RC20-2C are given in Appendix E; Table E-4. RC20-2C was completed entirely in Qal, as shown on Figure F-4.

4.7.3 Borehole Geophysical Logging

The standard geophysical logs were not collected at RC20-2C because it is co-located with RC20-2B where additional logs were obtained.

4.7.4 Well Construction

Well construction details for RC20-2C are provided in Table 4-1 and on Figure F-4. The well was constructed with a slotted interval from 29 to 69 feet bls, and a filter pack interval from 27 to 70 feet bls. This interval was selected for injection testing within the Qal. The well is co-located with dual completion well RC20-2B.

4.7.5 Well Development

The well was dry at the time of completion and was not formally developed.

4.8 Well RC20-2D

Well RC20-2D was drilled, constructed, and developed during the period March 5 – 10, 2020. Location of the well is shown on Figure 1-1. A schematic diagram of construction is provided on Figure F-5. A photograph of the drill site is shown below.

Photograph 4-4. Drill site for well RC20-2D

4.8.1 Drilling Operations

At RC20-2D, the production interval of the borehole was drilled using the dual-wall air reverse circulation and Symmetrix casing advancement methods. The quartzite bedrock was highly fractured and unstable beginning at a depth of about 85 feet bls, and continuing to the final drilling advancement of 155 feet bls. The highly fractured bedrock and drilling difficulty encountered between 85 and 155 feet bls indicated the approximate depth of the Dripping Spring fault.

Airlift water production measurements began at a depth of 95 feet bls with a rate of 2.9 gpm and increased to 12 gpm by a depth of 115 feet bls. Further attempts to measure water production were suspended below 115 feet due to borehole instability. The lower 15 feet of the borehole between 140 and 155 feet bls collapsed prior to well construction.

Depths, drilling methods, and bit types used during drilling are summarized below:

Depth Interval (feet bls)	Drilling Method	Bit Type	Borehole Diameter (inches)
0 – 20	conventional mud rotary (surface)	tricone	17-1/2
20 – 50	dual-wall, air reverse circulation with Symmetrix	hammer	9-5/8
50 – 155	dual-wall, air-reverse circulation	hammer	7-3/4

4.8.2 Lithologic Conditions

Detailed lithologic description for drill cuttings samples for well RC20-2D are given in Appendix E; Table E-5. Hydrogeologic units encountered at RC20-2D included Qal and Cb. The Cb was encountered at a depth of 34 feet bls. Beginning at a depth of 85 feet bls and extending to total depth of 155 feet bls, evidence of fracturing was noted including intervals of lost circulation and an increase in size of the drill cuttings (up to 4 inches). A summary log of lithologic units encountered at RC20-2D is shown on Figure F-5.

4.8.3 Borehole Geophysical Logging

An attempt was made to obtain geophysical logs at RC20-2D; however, the caliper log showed large washouts below the Symmetrix casing, and additional logs could not be obtained safely. A summary of geophysical logs obtained and depth intervals for each log are summarized below:

Logging Tool	Depth Interval(s) (feet bls)
Caliper	55 – 138
Natural Gamma Ray	0 – 134
Temperature	60 – 141
Fluid Resistivity	71 – 140

Final borehole geophysical logs for RC20-2D are provided in Appendix G.

4.8.3.1 Interpretation of Borehole Geophysical Logs

Due to unstable borehole conditions, only logs on the combination tool were obtained (Appendix G-5-1). The caliper log shows numerous washouts larger than the 17-inch maximum diameter of the caliper tool. The natural gamma ray log shows an increasing shift at a depth of 18 feet bls, a decreasing shift at 34 feet bls where the Qal/Cb contact was noted during drilling; an increasing shift in the interval below the Symmetrix casing and water level, followed by a decreasing shift at water level at about 72 feet bls; a relatively uniform trend from 72 to 100 feet bls; and finally an increasing and more variable trend from 100 to 134 feet bls.

4.8.4 Well Construction

Well construction details for RC20-2D are provided in Table 4-1 and on Figure F-5. The well was constructed with a slotted interval from 99 to 139 feet bls, and a filter pack interval from 77 to 140 feet bls in Cb. This interval was selected to test the Dripping Spring fault zone and whether pumping the well has any hydraulic effect on springs in the vicinity of the well.

4.8.5 Well Development

Following casing installation, the production interval at well RC20-2D was developed with airlift pumping for about 3.5 hours on March 10, 2020.

4.9 Well RC20-18

Well RC20-18 was drilled and constructed during the period March 10 – 14, 2020. Location of the well is shown on Figure 1-1. A schematic diagram of construction is provided on Figure F-6. A photograph of the drill site is shown below.

Photograph 4-5. Drill site for well RC20-18

4.9.1 Drilling Operations

RC20-18 was installed as a dual completion well with one slotted interval in the Qal and one slotted interval in the upper Tcg. The production interval of the borehole was drilled using the dual-wall air reverse circulation and Symmetrix casing advancement methods.

Depths, drilling methods, and bit types used during drilling are summarized below:

Depth Interval (feet bls)	Drilling Method	Bit Type	Borehole Diameter (inches)
0 – 20	conventional mud rotary (surface)	tricone	17-1/2
20 – 92	dual-wall, air reverse circulation with Symmetrix	hammer	9-5/8
92 - 156	dual-wall, air reverse circulation	hammer	7-3/4

4.9.2 Lithologic Conditions

Detailed lithologic description for drill cuttings samples for well RC20-18 are given in Appendix E; Table E-6. Hydrogeologic units encountered at RC20-18 included Qal and Tss. The Tss was encountered at a depth of approximately 94 feet bls. A summary of lithologic units encountered at RC20-18 is shown on Figure F-6.

4.9.3 Borehole Geophysical Logging

The standard geophysical logs were not collected at RC20-18 because only a small portion of the hole was exposed below the Symmetrix casing.

4.9.4 Well Construction

Well construction details for RC20-18 are provided in Table 4-1 and on Figure F-6. The well was constructed with two completions one in the Qal and the other in the Tss. The Tss completion has a slotted interval from 110 to 130 feet bls, and a filter pack interval from 105 to 130 feet bls. The Qal completion has a slotted interval from 41 to 91 feet bls and a filter pack interval from 31 to 94 feet bls. These intervals were selected to provide observations wells for the Qal and upper Tss during injection testing at Qal well RC20-18A, which is located on the same drill pad.

4.9.5 Well Development

At the time of well construction, there was inadequate water in the Qal completion to develop the well with airlift pumping. The production interval of the Tcg completion was developed by airlift pumping using a 1-inch airline for 2 hours on March 14, 2020.

4.10 Well RC20-18A

Well RC20-18A was drilled and constructed on March 15 – 16, 2020. Location of the well is approximately 20 feet northwest from RC20-18, as shown on Figure 1-1. A schematic diagram of construction is shown on Figure F-7.

4.10.1 Drilling Operations

At RC20-18A, the production interval of the borehole was drilled using the dual-wall air reverse circulation method. Symmetrix casing was used to temporarily stabilize the borehole during drilling and then subsequently removed during well construction. Groundwater was not encountered during drilling of the well.

Depths, drilling methods, and bit types used during drilling are summarized below:

Depth Interval (feet bls)	Drilling Method	Bit Type	Borehole Diameter (inches)
0 – 20	conventional mud rotary (surface)	tricone	17-1/2
20 – 92	dual-wall, air reverse circulation with Symmetrix	hammer	9-5/8

4.10.2 Lithologic Conditions

Detailed lithologic description for drill cuttings samples for well RC20-18A are given in Appendix E; Table E-7. RC20-18A was completely solely in the Qal, as shown on Figure F-7.

4.10.3 Borehole Geophysical Logging

Geophysical logs were not collected at RC20-18A because drilling was completed within Symmetrix casing.

4.10.4 Well Construction

Well construction details for RC20-18A are provided in Table 4-1 and on Figure F-7. The well was constructed with a slotted interval from 52 to 92 feet bls, and a filter pack interval from

39 to 70 feet bls. This interval was selected for injection testing of the Qal in the lower part of Dripping Spring Valley. The well is co-located with dual completion well RC20-18.

4.10.5 Well Development

The well was dry at the time of construction and was not developed.

5 AQUIFER TESTING

5.1 Introduction

M&A provided professional hydrogeologic services to conduct aquifer testing at the Skunk Camp investigation area in Pinal and Gila Counties, Arizona. The aquifer tests were carried out between March and May 2020 in order to gather additional information about the hydraulic properties of geologic units in the area of the proposed Skunk Camp TSF.

Five constant-rate pumping tests were conducted at four wells. The tests lasted between 5 hours and 7 days, with pumping rates that varied from 2.7 to 105 gallons per minute (gpm). Three of the wells were completed in Gila conglomerate (Tcg) and a fourth well was completed in the Dripping Spring fault. Two tests were conducted in the fourth well to evaluate water level responses at observation wells and confirm hydraulic estimates of the fault.

Two constant-head injection tests were conducted in wells completed in Quaternary alluvium (Qal). Prior to testing the wells were dry; therefore, injection tests were conducted rather than conventional pumping tests. The tests lasted between 3 and 3.5 hours and consumed approximately 8,000 to 10,000 gallons of water. During testing, water level responses in nearby observation wells were monitored in order to evaluate the degree of hydraulic connectivity between the Qal and Tcg aquifers.

Testing activities are summarized in Table 5-1. A map showing the locations of test wells is presented on Figure 5-1.

Table 5-1. Summary of Aquifer Tests

Test Type	Number of Wells Tested	Testing Period	Durations	Rates (gpm)	Hydrogeologic Units Tested
Constant-rate Pumping	4 [a]	3/27/20 – 5/19/20	5 hrs – 7 days	2.7 – 105 (pumping)	Gila Conglomerate (Tcg), Dripping Spring fault
Constant-head Injection	2	4/2/20 – 4/7/20	3 – 3.5 hrs	9.9 – 62.8 (injection)	Quaternary Alluvium (Qal)

[a] two constant-rate pumping tests were conducted at well RC20-2D

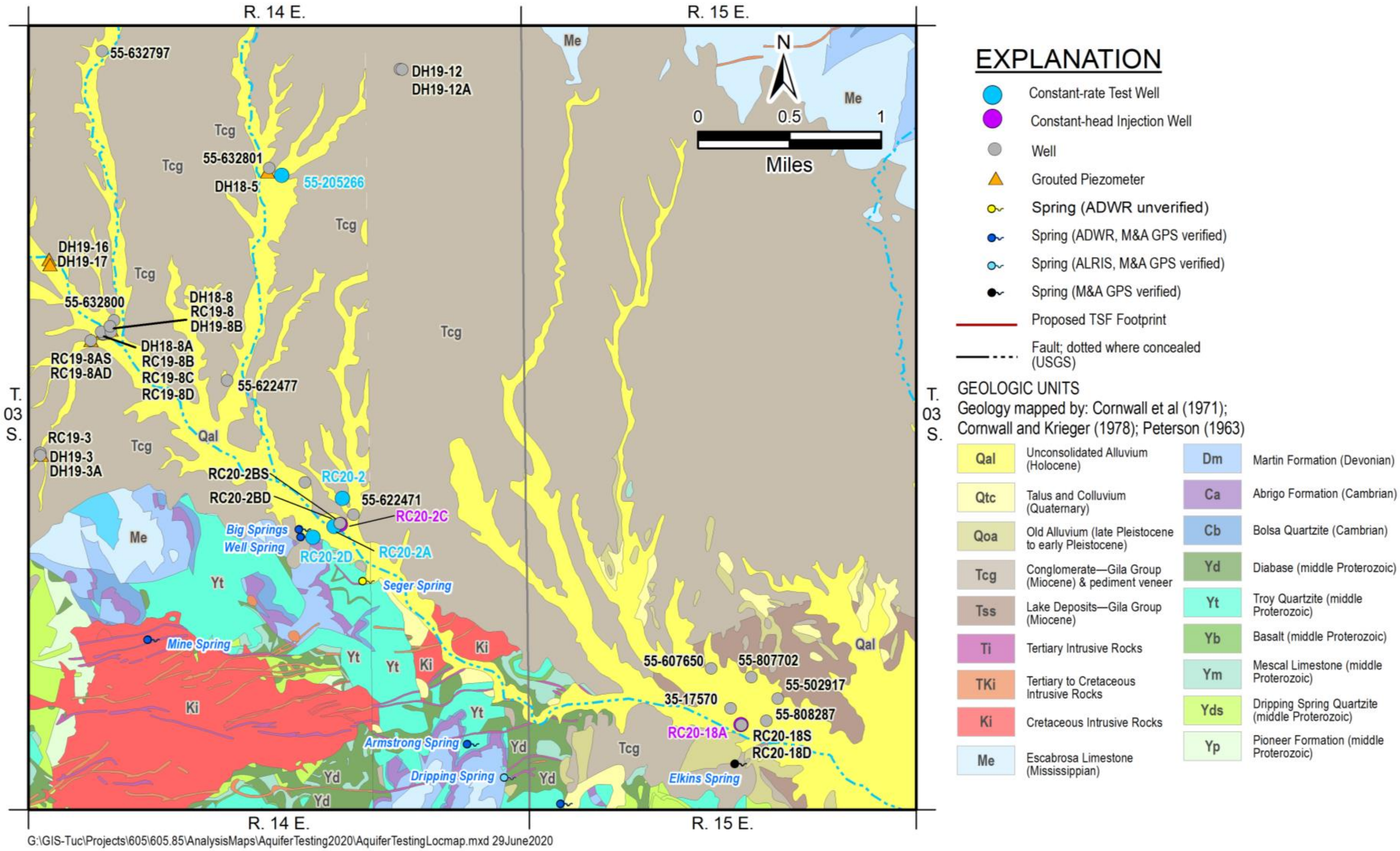


Figure 5-1. Locations of Aquifer Tests

Note: Close-up maps for individual tests included in descriptions of individual tests in the following sections.

The remainder of this section provides descriptions of field methods and procedures, analytical methods, and the results of aquifer testing at Skunk Camp. Supplemental information and tabulated results may be found in Appendices J and K, as outlined below:

- Appendix J: Tabulated results of pumping tests and injection tests
- Appendix K: Hydrographs, field parameters, and analytical solutions for pumping tests

5.2 Aquifer Testing Objectives

Aquifer testing was conducted to characterize the hydrogeology of groundwater systems downgradient of the proposed Skunk Camp TSF. The objectives included developing estimates of aquifer hydraulic parameters for the Gila conglomerate (Tcg) and Quaternary Alluvium (Qal) aquifers, including aquifer transmissivity, hydraulic conductivity, and storage. Additional objectives included evaluating the degree of hydraulic connectivity between the Tcg and Qal aquifers, as wells as between the Dripping Spring fault and surrounding hydrogeologic units based on water levels responses at observation wells during testing.

5.3 Field Methods and Procedures

Field methods and procedures implemented for the pumping and injection tests are described below.

5.3.1 Pumping Tests

Pumping tests were conducted at ranch well 55-205266 and at recently completed hydrogeologic investigation wells RC20-2, RC20-2A, and RC20-2D. At the ranch well, pumping was carried out using the existing pump and a gasoline-powered generator. A temporary discharge assembly was connected to the wellhead that consisted of 1-inch diameter steel pipe and included a gate valve and 1-inch GPI digital flowmeter. Manual flow measurements were calculated using a stopwatch and five-gallon bucket and used to calibrate the flowmeter.

Pumping tests at hydrogeologic investigation wells were carried out using temporary submersible pumps that were installed and operated by Cascade Drilling (Cascade). Discharge assemblies were attached to riser columns at the wellhead and included 2-inch to 4-inch steel pipes and 3-inch rubber hosing. The assemblies were equipped with a magnetic or impeller flowmeter, a pressure gauge, a gate valve to adjust flow rate, and a hose bib for obtaining water samples. Pumping rates and discharge line pressures were regularly monitored and recorded during testing. In order to avoid recirculation of discharged water to the pumped well, approximately 2,000 feet of lay flat hose was attached to the ends of the assemblies and directed down Dripping Spring Wash. For the two RC20-2D tests, the lay flat hose was connected to a 6-inch diameter pipeline that continued more than 3,000 feet further down the wash.

Photograph 5-1. RC20-2D constant-rate pumping test (60-hour)

Pre-tests were conducted prior to constant-rate pumping tests at most wells. Pre-tests consisted of pumping for approximately 10 to 30 minutes in order check the electrical wiring of the pump, assess the operation of discharge assembly components, estimate the sustainable well yield, and adjust the gate valve to the proper setting for the start of the constant-rate test.

Field water quality parameters of pumped water were measured using Myron L Ultrameter II instruments, and included pH, electrical conductivity (EC), and temperature. Turbidity was measured using a Hach 2100Q turbidity meter.

During pumping periods and subsequent water level recoveries, water pressures in pumped wells and observation wells were recorded using non-vented In-Situ Level TROLL integrated dataloggers/pressure transducers (Level TROLLs). In pumped wells, the Level TROLLs were installed at depths below anticipated water level drawdowns and programmed to record pressures at 1-minute intervals. Additional water level measurements were collected manually with water level meters and used to confirm Level TROLL readings. In observation wells located near pumped wells, Level TROLLs were installed below water level and programmed to record pressures at one to ten-minute intervals.

Barometric pressure was recorded with In-Situ BaroTROLLs installed in vaults of pumped wells and surrounding observation wells. BaroTROLLs recorded barometric pressure at 1-minute intervals during testing activities. Following completion of the tests, barometric pressure data were used to distinguish water level stresses due to pumping from stresses caused by changes in atmospheric pressure in selected observation wells.

5.3.2 Injection Tests

Injection tests were conducted at wells RC20-2C and RC20-18A in order to estimate aquifer parameters for Qal in the Skunk Camp study area. Due to unsaturated conditions at the well sites, injection tests were conducted rather than conventional pumping tests.

The injection tests were carried out using a Multiquip QP2TH water pump located within 30 feet of the wellheads at ground surface. Water was pumped from Baker storage tanks through horizontal steel discharge pipe assemblies and directed into the wells. During the tests, additional water was transferred to the Baker tanks from water trucks and secondary storage tanks located on the well pads. The discharge assemblies included gate valves that were used to control injection rates, and magnetic flowmeters used to measure flow. Two-inch steel drop pipe was installed in the wells to convey pumped water vertically down the wells, where it was discharged within five feet of well bottom. During the tests, water levels were manually measured using water level meters at one-minute intervals.

5.4 Analytical Methods

Analytical methods applied to pumping test and injection test data are described below.

5.4.1 Pumping Tests

Analytical solutions were developed for the constant-rate pumping tests using the commercially available aquifer test software AQTESOLV (HydroSOLVE, 2012). The following considerations informed the interpretation of tests and development of analytical solutions:

- Geological conceptual model—including effective porosity of the porous media, locations of major fault features, degree of fracturing in geophysical logs, and hydraulically confined or unconfined conditions
- Inner boundary conditions—well bore storage effects, well bore skin, and potential lateral extent of fracture systems
- Outer boundary conditions—potential no-flow boundaries and constant-head boundaries
- Characteristic flow regimes—presence of radial or sub-radial flow conditions, and prevailing flow dimensions throughout the test

In addition, analytical methods included the use of diagnostic flow interpretation based on derivative analysis. Flow diagnostics and analytical solutions implemented in the analysis of the pumping tests are detailed below.

5.4.1.1 Analytical Diagnostics

Workflow for development of a conceptual model for testing activities included reviewing local-scale geologic setting, well construction details, observations from well drilling and lithologic descriptions, and borehole geophysical logs. Data processing of pumping tests routinely included construction of hydrographs showing linear-linear, log-linear, and log-log time versus water level axes for pumped well and observation well data.

After data processing, further development of the conceptual model for analysis of testing results included preparation of diagnostic flow plots and derivative analysis using the aquifer testing analysis software program AQTESOLV. Diagnostic flow and derivative analysis plots included analysis of radial flow conditions for identifying infinite acting radial flow (IARF) behavior and wellbore storage. The pressure derivative method was used to delineate early, intermediate, and late-time curves related to various well and aquifer types and flow geometries. Derivative data was processed in AQTESOLV according to methods described by Spane and Wurstner (1993) and Bourdet and others (1983 and 1989).

5.4.1.2 Analytical Solution Methods

Pumping test data was analyzed using the software AQTESOLV and analytical solutions were developed for pumping tests in confined and unconfined aquifers. For tests with diagnostic periods of IARF, the Cooper-Jacob (1946) semi-log straight-line solution was implemented for analysis of drawdown data from the pumped well. This solution involved fitting a straight line through drawdown data as a function of log time. For selected tests, the slope of this line was substituted into the Moench solution (1997) to estimate aquifer parameters. The Moench solution accounts for partially penetrating wells, wellbore storage, and skin effects. For tests of the Dripping Spring fault, the Cooper-Jacob solution was substituted into the Barker solution (1988) to evaluate the characteristic flow regime of the fault. The Barker method implements a generalized radial flow model that allows for n-dimensional flow in confined and fractured aquifers, which can be useful for informing the conceptual model regarding hydraulic constraints of the pumped system.

Analytical solutions used for estimating aquifer parameters for each pumping test are described in Section 5.5.1 and included in Appendix J, Table J-1. A summary of analytical methods used for analysis of the tests is included in the table below.

ANALYTICAL SOLUTION METHODS USED FOR ANALYSIS OF AQUIFER TESTS
Barker, J.A., 1988. A generalized radial flow model for hydraulic tests in fractured rock, Water Resources Research, vol. 24, no. 10, pp. 1796-1804.
Cooper, H.H., Jr. and Jacob, C.E., 1946. A generalized graphical method for evaluating formation constants and summarizing well-field history, American Geophysical Union Transactions, vol. 27, pp. 526-534.
Moench, A.F., 1997, Flow to a well of finite diameter in a homogeneous, anisotropic water-table aquifer: Water Resources Research, vol. 33, no. 6, pp. 1397-1407.

Using the most applicable analytical method, estimates of aquifer parameters were derived for aquifer transmissivity, hydraulic conductivity, and storativity. Transmissivity (T) is the product of hydraulic conductivity (K) multiplied by aquifer thickness (b) and is defined as the rate of groundwater flow through a vertical column of aquifer that is 1 foot wide, extending through the full saturated thickness of the aquifer, under a unit hydraulic gradient (Lohman, 1972). In this report, transmissivity is expressed in cubic feet per day per foot width of aquifer ($ft^3/d/ft$, which simplifies to ft^2/d) or cubic meters per day per meter width of aquifer ($m^3/d/m$, which simplifies to m^2/d). Hydraulic conductivity is the quotient of transmissivity divided by aquifer thickness and is defined as the rate of flow of groundwater through a square foot of aquifer under a unit hydraulic gradient (Lohman, 1972). In this report, hydraulic conductivity is expressed in feet per day (ft/d) or centimeters per second (cm/s).

For multiple well tests that include observation wells completed in the same aquifer as the pumped well, storativity (S) can also be estimated. Storativity is the volume of water that an aquifer releases or takes into storage per unit surface area of the aquifer per unit change in head (Lohman, 1972) and is dimensionless. Storativity is defined as:

$$S = S_y + S_s b$$

where S_y is specific yield, S_s is specific storage, and b is aquifer thickness. In an unconfined aquifer, storativity is essentially equal to specific yield. Morris and Johnson (1967) report specific yields ranging from about 0.05 for clayey materials to over 0.30 for fine to coarse sandy materials. In a confined aquifer, storativity is equal to specific storage (Ss) multiplied by aquifer thickness (b). Batu (1998) shows representative S_s values of materials in units of feet^{-1} ranging from less than 10^{-6} for unfractured rock to 10^{-5} for dense sands. Loose, sandy materials are reported to be in the range of 10^{-4}. Further discussion on storativity, specific yield, and specific storage, can be found in Bear (1979) and M&A (2019).

5.4.2 Injection Tests

The constant-head injection tests were analyzed to estimate saturated hydraulic conductivity, K_{sat}, for tested intervals at wells RC20-2C and RC20-18A. Data were analyzed using both Glover (1953) and Nasberg-Terletskata (Nasberg, 1951; Terletskata, 1954) analytical solutions for flow from a constant-head borehole permeameter in the vadose zone. The Glover and Nasberg-Terletskata solutions compute K_{sat} based on stabilized injection rate, constant head established for the test (length of wetted borehole), and borehole radius. Both analytical solutions are valid for tests where the constant-head is located within the perforated interval and assume homogeneous conditions of the sediment intervals tested.

Results for Glover and Nasberg-Terletskata solutions for the injection tests at RC20-2C and RC20-18A are given in Appendix J, Table J-2 and provide estimations of K_{sat} for the sediment intervals tested. The K_{sat} values derived from the Glover and Nasberg-Terletskata solutions are composite hydraulic conductivities that combine vertical and horizontal components of flow. Neither solution accounts for the effects of capillary flow (unsaturated flow at the edges of the primary saturated flow field); however, the K_{sat} of the Qal tested is sufficiently large that the effects of capillary flow are considered insignificant once a steady injection rate and constant-head have been established.

5.5 Results of Aquifer Testing

The results of the aquifer tests are presented in the following sections. The locations of the pumping and injection tests are shown on Figure 5-1. . Tabulated results are included in Appendix J, Tables J-1 and J-2.

5.5.1 Pumping Tests

Constant-rate pumping tests were carried out at four wells between March 27 and May 19, 2020. The tests included a short-duration test at well 55-205266, and four longer duration tests at wells

RC20-2, RC20-2A, and RC20-2D. Water level responses were monitored at nearby observation wells during the four longer duration tests.

Table 5-2 summarizes pumping durations, pumping rates, observation wells, and water levels observed during the tests.

Table 5-2. Constant-rate Pumping Test Wells and Characteristics

Pumping Test Well	Pumping Duration	Pumping Rate (gpm)	Observation Well(s)	Pre-Test Water Level (ft bls)	Maximum Water Level Drawdown (ft)
55-205266	5 hrs	2.7	-	159.84	29.8
RC20-2	1 day	70	55-622471	151.50	38.2
RC20-2A	1 day	70	55-622471, RC20-2B(S), RC20-2B(D)	133.34	67.1
RC20-2D [1]	60 hrs	105	55-622471, RC20-2B(S), RC20-2(D)	71.91	22.8
	7 days	105	RC20-2A, 55-622471, RC20-2B(S), RC20-2(D)	76.24	36.2

[1] Two pumping tests were conducted RC20-2D—the first lasted 60 hours and the second lasted 7 days

The remainder of Section 5.4.1 provides detailed descriptions of test data, analysis, and results for each of the constant-rate pumping tests. Hydrographs and AQTESOLV plots for pumping tests are shown in Appendix K.

5.5.1.1 Well 55-205266

A short-duration, single-well pumping test was conducted at well 55-205266 on March 27, 2020. The test lasted five hours and was conducted at a constant pumping rate of 2.7 gpm. Figure 5-2 shows a close-up map of the well location within the eastern portion of the proposed TSF footprint.

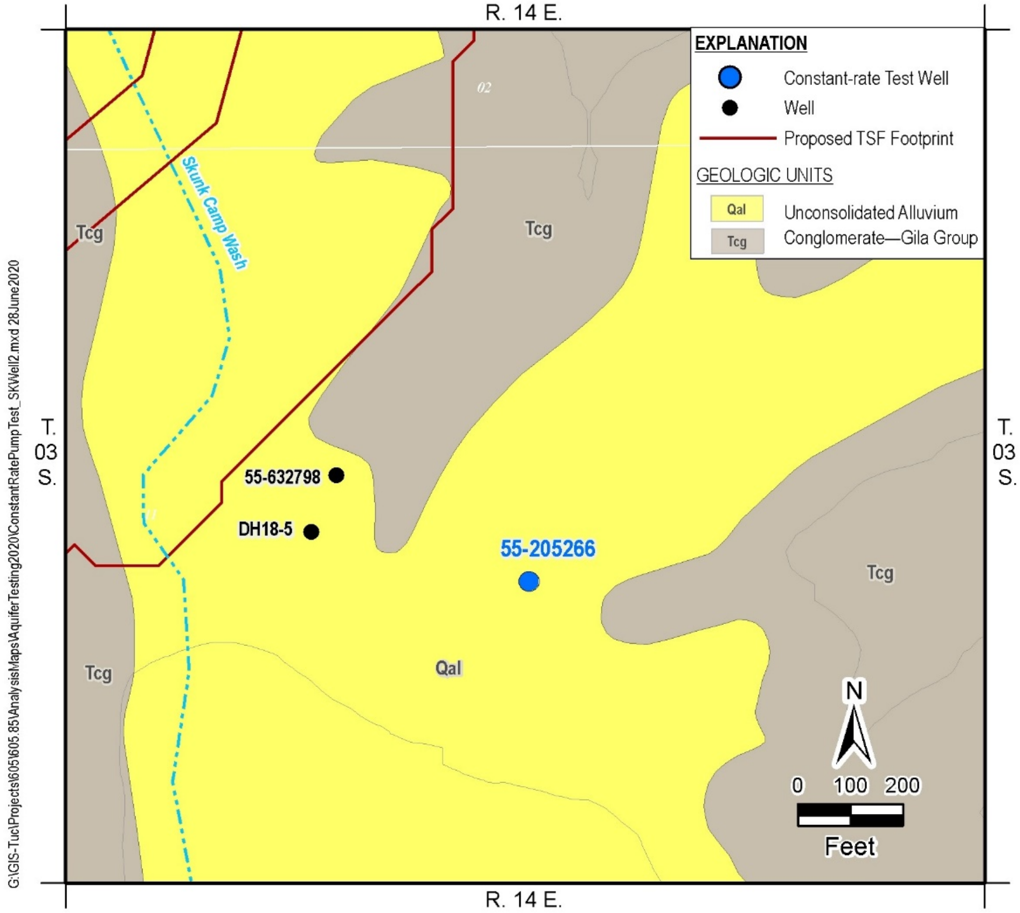


Figure 5-2. Well 55-205266 Pumping Test Location Map

Based on ADWR records, well 55-205266 is completed with 6-inch diameter steel casing to 230 feet with perforations from 205 to 225 feet bls. The well location and depth suggest that the well is completed in Tcg. Prior to the start of pumping, water level in the well was measured at 160.31 feet bls. The aquifer saturated thickness was assumed to be 70 feet, equal to distance between static water level and the well bottom.

A hydrograph for well 55-205266 during the period of testing is included in Appendix K. At the end of the test, drawdown was 29.8 feet—equal to a well specific capacity of approximately 0.1 gpm/ft (Appendix J, Table J-1).

Field water quality parameters collected from pumped water during the test are shown in Appendix K. Average values for measured parameters included: pH of 7.25; specific electrical conductance of 594 µS/cm; and temperature of 74.2 ºF.

An analytical solution was developed for the test using the Cooper and Jacob (1946) straight-line method for approximating the Theis (1935) equation, and is shown in Appendix K. The straight-line solution was matched to displacement data for the period between 20 and 100 minutes after the start of pumping, when the slope of derivative data was most indicative of Infinite Acting Radial Flow (IARF) conditions. Around 100 minutes after the start of pumping, a change in slope of displacement data suggests that water level drawdown around the well may have encountered a low-conductivity boundary. As a result, the solution was developed for data prior to the boundary.

The results of the Cooper-Jacob analysis suggest that aquifer transmissivity is on the order of 10.5 ft^2/d. Based on the estimated transmissivity and assumed aquifer thickness, hydraulic conductivity is computed to be on the order of 5.3-05 cm/s. Results for the 55-205266 pumping test are summarized in Appendix J, Table J-1.

5.5.1.2 Well RC20-2

A constant-rate pumping test was conducted at RC20-2 from April 8 – 9, 2020. The test lasted 24 hours and was conducted at a constant rate of 70 gpm. During the test, water level response was monitored at well 55-622471. A close-up map showing the locations of pumped well RC20-2 and observation well 55-622471 is presented on Figure 5-3.

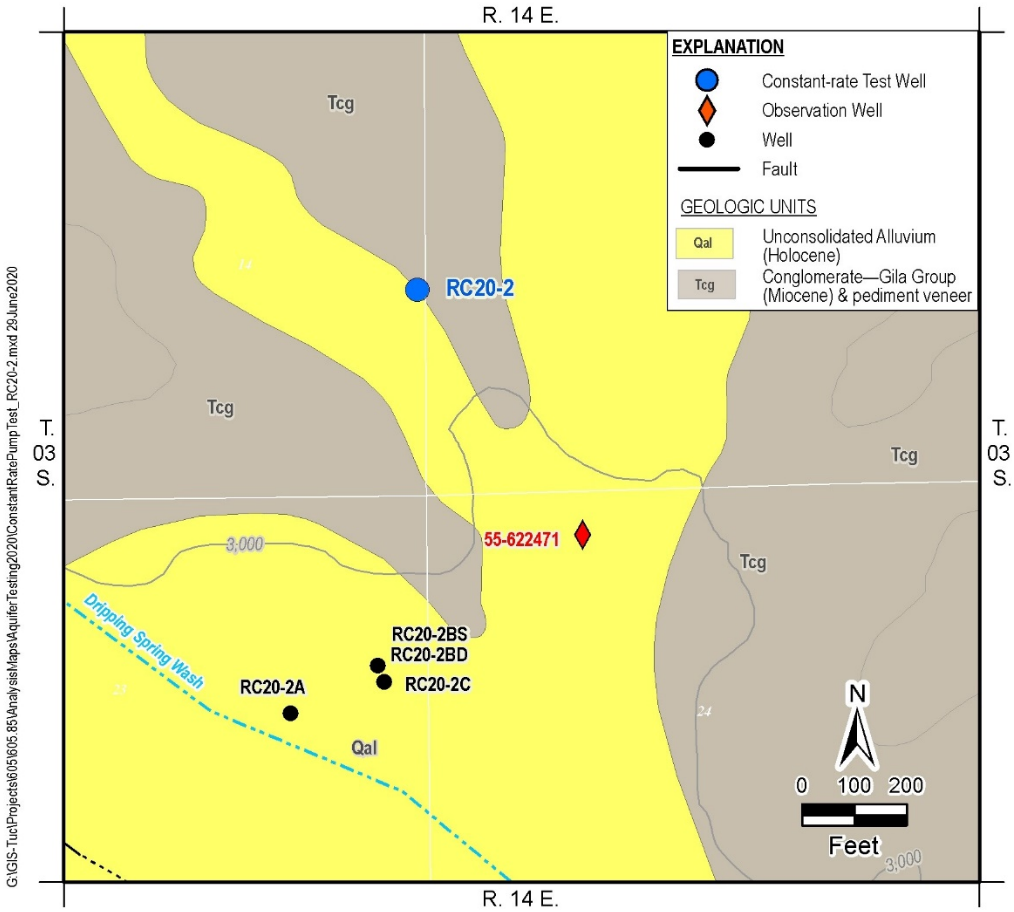


Figure 5-3. RC20-2 Pumping Test Location Map

The total depth of RC20-2 is 600 feet with a slotted interval from 270 to 600 feet bls completed in Tcg (Figure F-1). Prior to the start of pumping, water level in the well was measured at 151.50 feet bls. Observation well 55-622471 is cased to 615 feet, with a perforated interval from 260 to 600 feet bls, and an open bore extending from 615 to 1,418 feet bls (Figure 2-2). Review of the ADWR drilling log suggests that the well is completed in Tcg and total depth drilled was 1,475 feet. Prior to the start of pumping, water level in 55-266271 was approximately 140.2 feet bls. Based on the pre-pumping water level at RC20-2 and total depth drilled at 55-622471, the aquifer saturated thickness at RC20-2 was estimated to be approximately 1,340 feet.

The horizontal distance from the pumped well RC20-2 to observation well 55-622471, the depths of slotted and open intervals, and water levels in the wells prior to the start of pumping are shown on Figure 5-4.

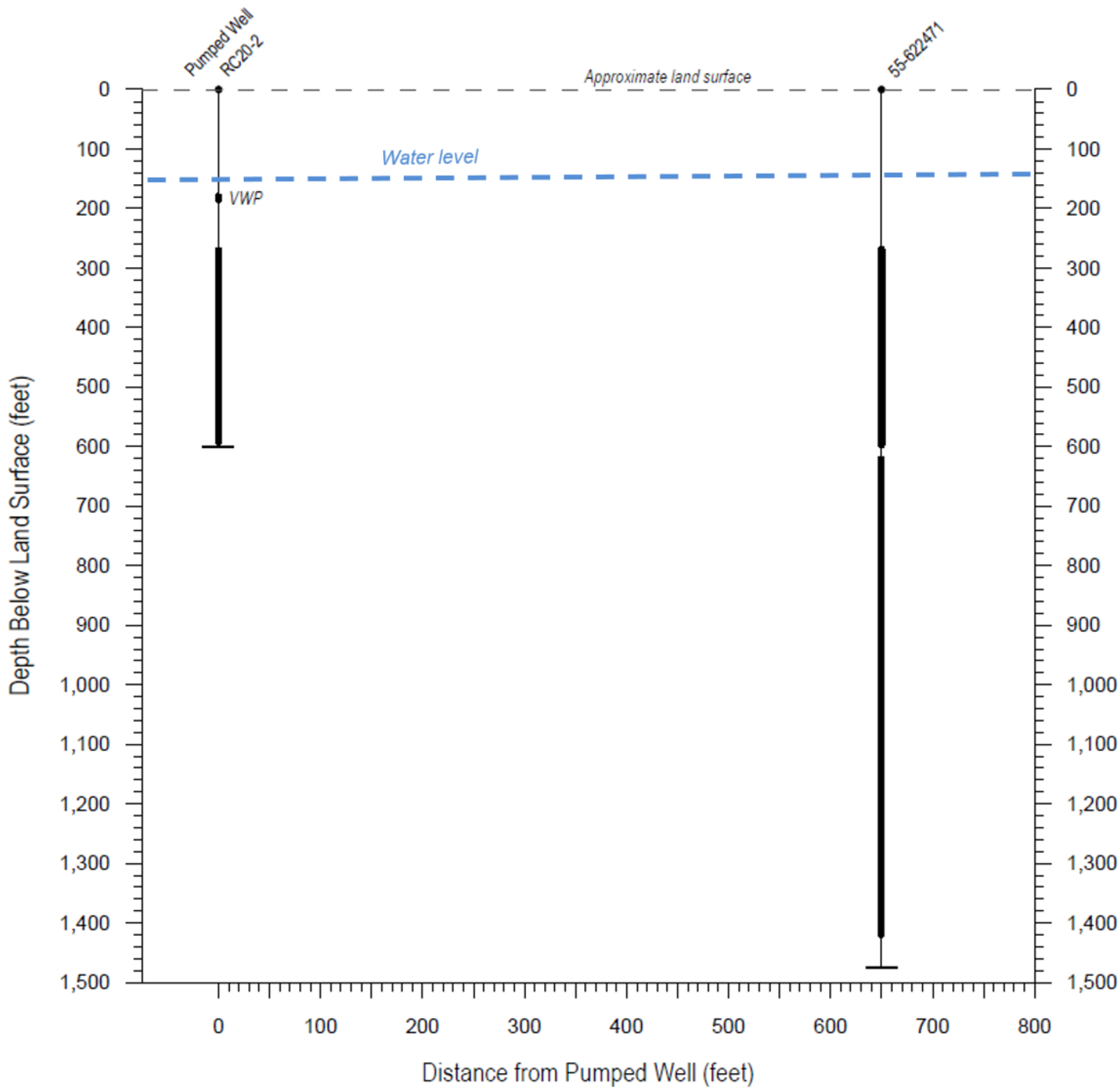


Figure 5-4. Schematic Cross Section of RC20-2 Pumping Test

Note: Well slotted intervals denoted with bold lines; VWPs denoted with points.

Hydrographs for RC20-2 and 55-622471 are included in Appendix K. At the end of the test, water level drawdown was 38.2 feet at the pumped well, with a well specific capacity was approximately 1.8 gpm/ft (Appendix J, Table J-1). Water level drawdown at observation well 55-622471 was approximately 3.8 feet at the end of the test and required several days to recover to pre-pumping levels.

Field water quality parameters collected from pumped water during the test are shown in Appendix K. On average, groundwater pH was 7.29 and specific electrical conductance was 629 µS/cm. Groundwater temperature varied between 72.7 ºF during the day and 71.2 ºF at night.

An analytical solution for the test is included in Appendix K. The analytical solution matches drawdown and derivative data for pumped well RC20-2 and observation well 55-622471, and is based on the Moench (1997) equation for water level response to pumping in an unconfined aquifer with possible anisotropy, wellbore skin, and partial well penetration.

The type curve analysis of measured composite data for the pumped and observation wells provides the following estimates for aquifer parameters: transmissivity of 837 ft^2/d; K_z/K_r of 0.2; wellbore skin of -3.9 feet (increased permeability around the wellbore); storativity of 2.3E-04; and specific yield of 0.08. Based on the estimated transmissivity and assumed aquifer thickness, hydraulic conductivity is computed to be on the order of 2.2E-04 cm/s. Results for the RC20-2 pumping test are summarized in Appendix J, Table J-1.

5.5.1.3 Well RC20-2A

A constant-rate pumping test was conducted at RC20-2A from April 15 – 16, 2020. The test lasted 24 hours and was conducted at a constant pumping rate of 70 gpm. During the test, water level responses were monitored at well 55-622471, and at the shallow (S) and deep (D) completions of well RC20-2B. Nearby well RC20-2C was dry during the test and was not monitored. Figure 5-5 shows a close-up map of the locations of pumped well RC20-2A and observation wells 55-622471, RC20-2B(S), and RC20-2B(D).

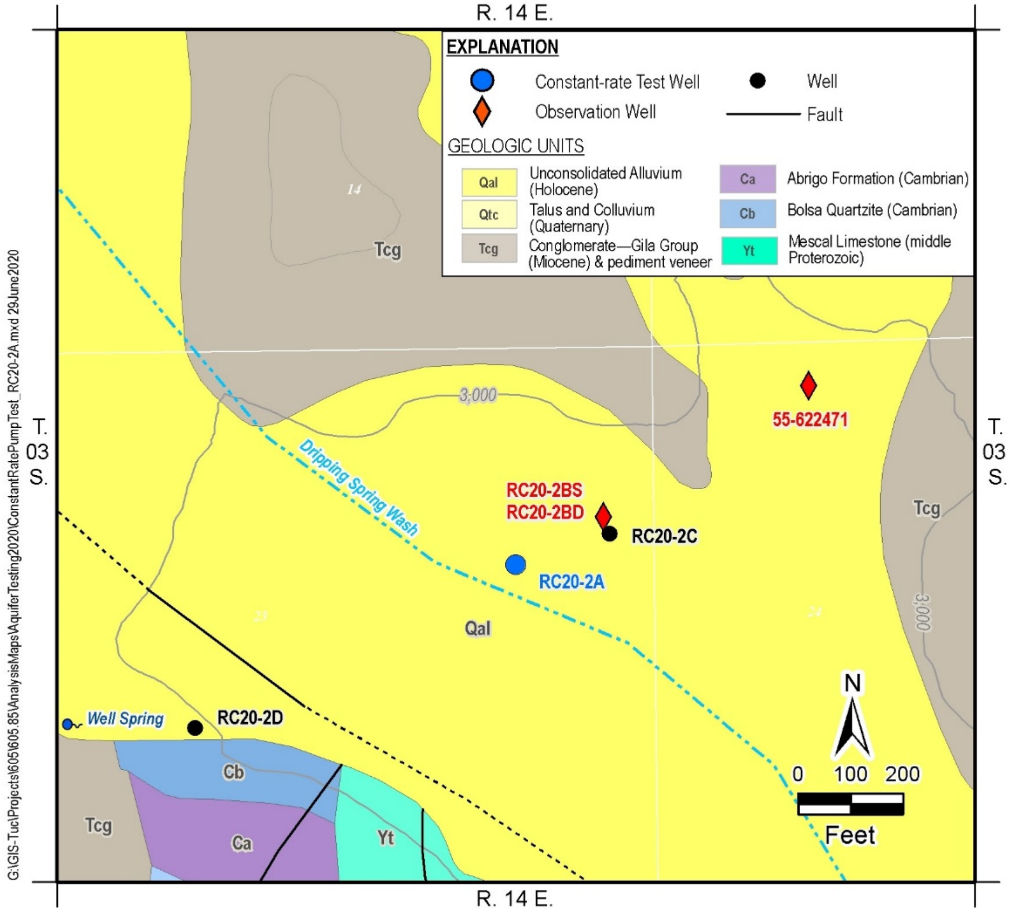


Figure 5-5. RC20-2A Pumping Test Location Map

The total depth of RC20-2A is 599 feet with a slotted interval from 268 to 599 feet bls completed in Tcg (Figure F-2). Prior to the start of pumping, the water level in the well was measured at 133.34 feet bls. Observation well 55-622471 is cased to 615 feet, with a perforated interval from 260 to 600 feet bls, and an open bore from 615 to 1,418 feet bls (Figure 2-2). Review of the ADWR drilling log indicates that the well is completed in Tcg, and prior to the start of pumping the water level in 55-622471 was approximately 140.4 feet bls. Based on the pre-pumping water level at RC20-2A and total depth drilled at 55-622471, the aquifer saturated thickness at RC20-2A was assumed to be approximately 1,340 feet.

Observation well RC20-2B has two completions—a shallow well that is slotted from 40 to 90 feet bls and completed in Qal, and a deeper well that is slotted from 115 to 155 feet bls and completed in the upper zone of Tcg (Figure F-3). Prior to the start of pumping, water levels in the shallow and deep completions were 69.95 and 110.08 feet bls, respectively. The difference in water levels of approximately 40 feet indicates that RC20-2B(S) is completed in a perched aquifer and the water level at RC20-2B(D) approximates the piezometric surface of the regional

Tcg system. RC20-2B(S) is the only hydrogeologic investigation well at Skunk Camp where a perched aquifer has been encountered in Qal.

The horizontal distances from pumped well RC20-2A to observation wells 55-622471 and RC20-2B(S,D), the depths of slotted and open intervals, and water levels in the wells prior to the start of pumping are shown on Figure 5-6.

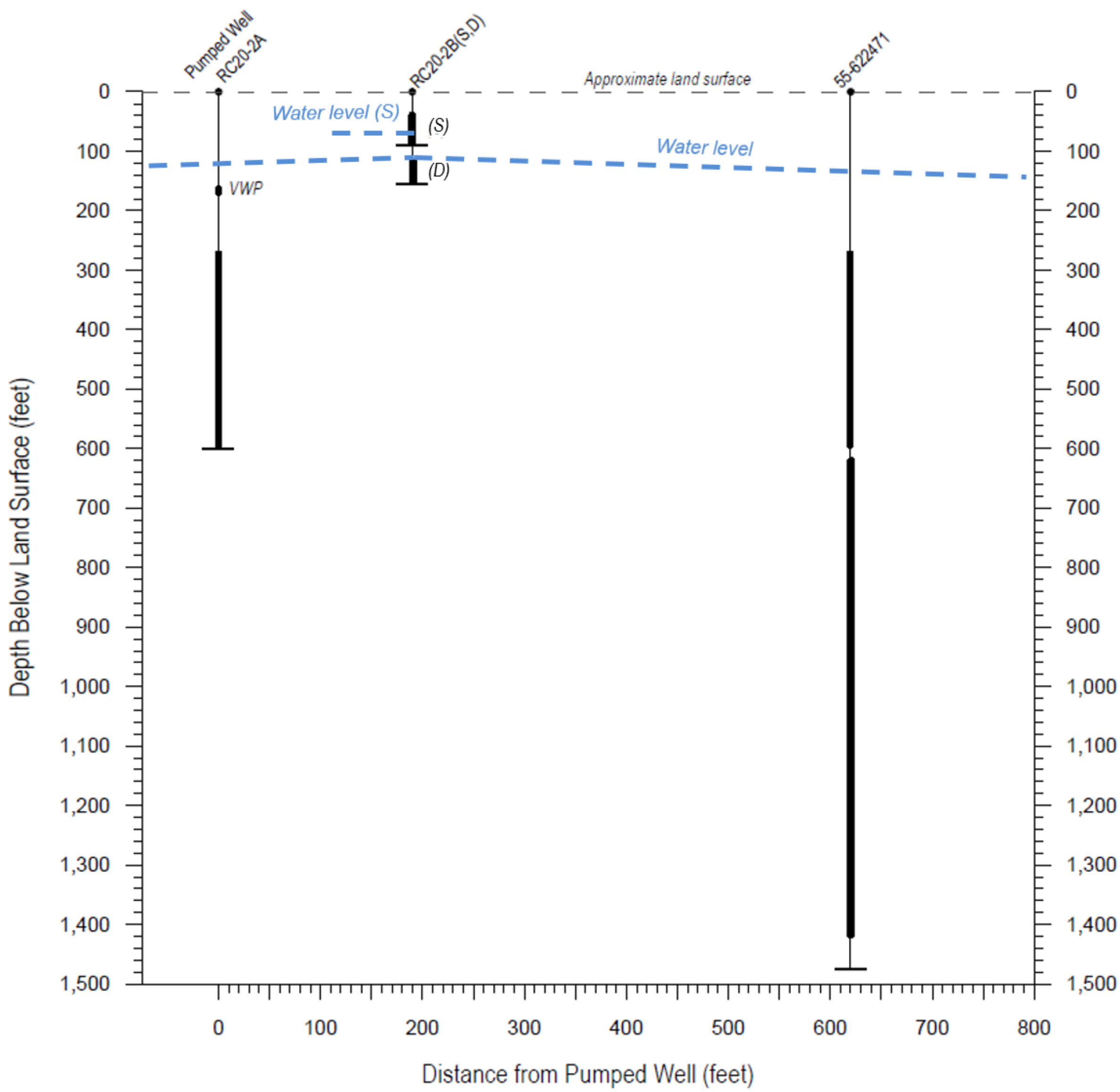


Figure 5-6. Schematic Cross Section of RC20-2A Pumping Test

Note: Well slotted and open intervals denoted with bold lines; VWPs denoted with points.

Hydrographs for RC20-2A, RC20-2B(S), RC20-2B(D), and 55-622471 are included in Appendix K. At the end of the test, drawdown at pumped well RC20-2A was 67.1 feet, and at observation well 55-622471 was 4.8 feet. At observation well RC20-2B(S), completed in Qal, the water level showed no response to pumping once corrected for changes in barometric pressure; this suggests that a degree of hydraulic confinement exists between the Tcg aquifer and the perched Qal aquifer at the well site. At observation well RC20-2B(D), completed in Tcg, the water level showed approximately 0.9 feet of drawdown that did not immediately recover following the end of pumping.

Field water quality parameters collected from pumped water during the test are shown in Appendix K. On average, groundwater pH was 7.31 and specific electrical conductance was 550 µS/cm. Groundwater temperature varied between 72.9 ºF during the day and 71.4 ºF at night.

An analytical solution for the test is included in Appendix K. The analytical solution matches drawdown and derivative data for pumped well RC20-2A and observation well 55-622471, and is based on the Moench (1997) equation for water level response to pumping in an unconfined aquifer with anisotropy, wellbore skin, and partial well penetration.

The type curve analysis of measured composite data for the pumped and observation wells provides the following estimates for aquifer parameters: transmissivity of 567 ft^2/d; K_z/K_r of 0.2; wellbore skin of -3.15 feet (increased permeability around the wellbore); storativity of 2.5E-04; and specific yield of 0.08. Based on the estimated transmissivity and assumed aquifer thickness, hydraulic conductivity is computed to be on the order of 1.5E-04 cm/s. Results for the RC20-2A pumping test are summarized in Appendix J, Table J-1.

5.5.1.4 Well RC20-2D

Two constant-rate pumping tests were conducted at RC20-2D. The first test was conducted April 19 – 22, 2020 and lasted 60 hours. The second test was conducted May 12 – 19, 2020 and lasted 7 days. The pumping rate for both tests was 105 gpm.

During the 60-hour test, water level responses were monitored at the shallow (S) and deep (D) completions of well RC20-2B, and at well 55-622471. During the 7-day test, water level responses were also monitored at the shallow and deep completions of well RC20-2B and 55-622471, as well as RC20-2A. Additional water level and discharge monitoring was conducted at Big Springs in order to detect potential impacts from pumping activities. Well RC20-2C, located adjacent to RC20-2B, was dry during both tests and was not monitored.

Figure 5-7 shows the locations of pumped well RC20-2D, observation wells RC20-2A, RC20-2B(S), RC20-2B(D), and 55-622471, and Big Springs.

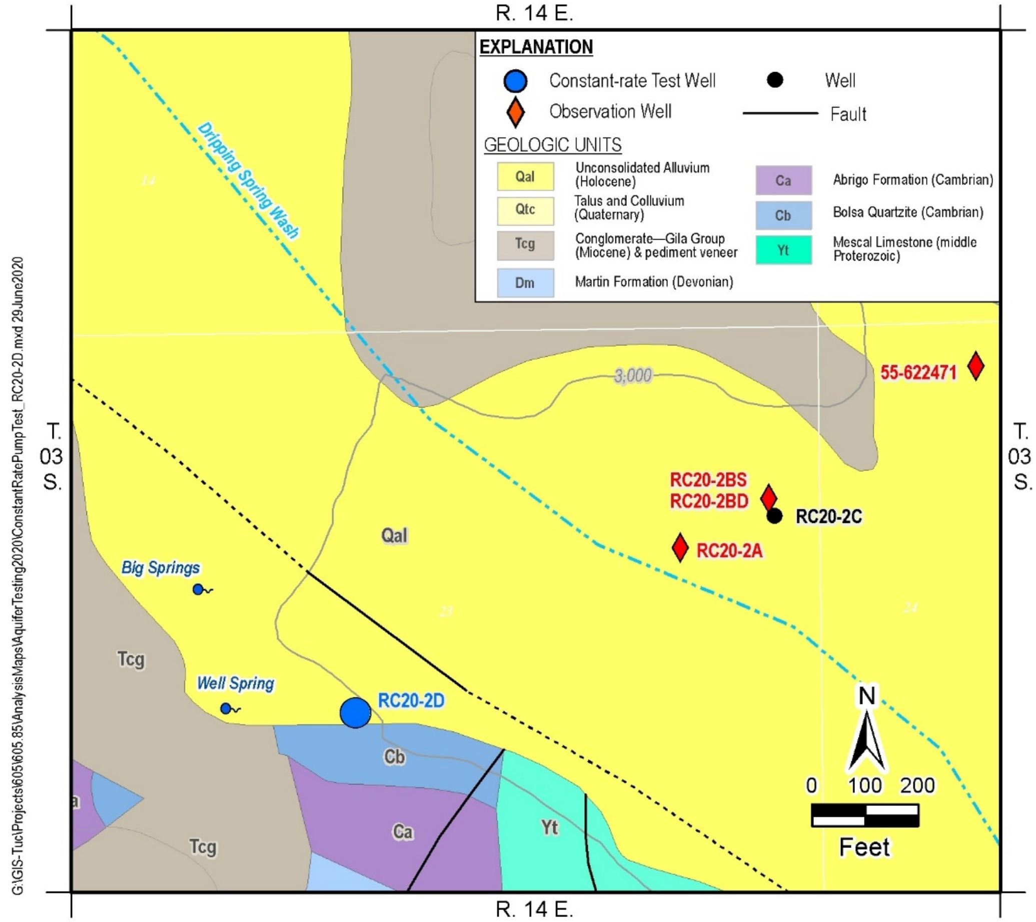


Figure 5-7. RC20-2D Pumping Test Location Map

The total depth of RC20-2D is 139 feet with a slotted interval from 99 to 139 feet bls completed in the Dripping Spring fault within Bolsa Quartzite (Cb) (Section 4.8 and Figure F-5). The saturated thickness of the Dripping Spring fault is estimated to be 70 feet based the thickness of faulted material encountered during drilling. Prior to the start of the 60-hour and 7-day tests, the water level in RC20-2D was measured at 71.91 and 76.24 feet bls, respectively.

The total depth of observation well RC20-2A is 599 feet with a slotted interval from 268 to 599 feet bls completed in Tcg (Figure F-2). RC20-2A was not monitored during the 60-hour test, but was monitored during the 7-day test. Prior to the start of the 7-day test the water level in the well was approximately 132.7 feet bls.

Observation well RC20-2B has two completions—a shallow well that is slotted from 40 to 90 feet bls and completed in Qal, and a deeper well that is slotted from 115 to 155 feet bls and completed in the upper zone of Tcg (Figure F-3). Prior to the start of the 60-hour test, water levels in the shallow and deep completions were 70.0 and 110.9 feet bls, respectively. Prior to the start of the 7-day test, water levels in the shallow and deep completions were 70.0 and 116.3 feet bls, respectively.

Observation well 55-622471 is cased to 615 feet with a perforated interval from 260 to 600 feet bls, and an open bore from 615 to 1,418 feet bls (Figure 2-2). The perforated and open intervals are completed in Tcg. Prior to the start of the 60-hour and 7-day tests, the water level in 55-622471 was approximately 140.88 and 140.06 feet bls, respectively.

The horizontal distances from pumped well RC20-2D to the observation wells, the depths of slotted and open intervals, and water level depths prior to the start of the 7-day test are shown on Figure 5-8.

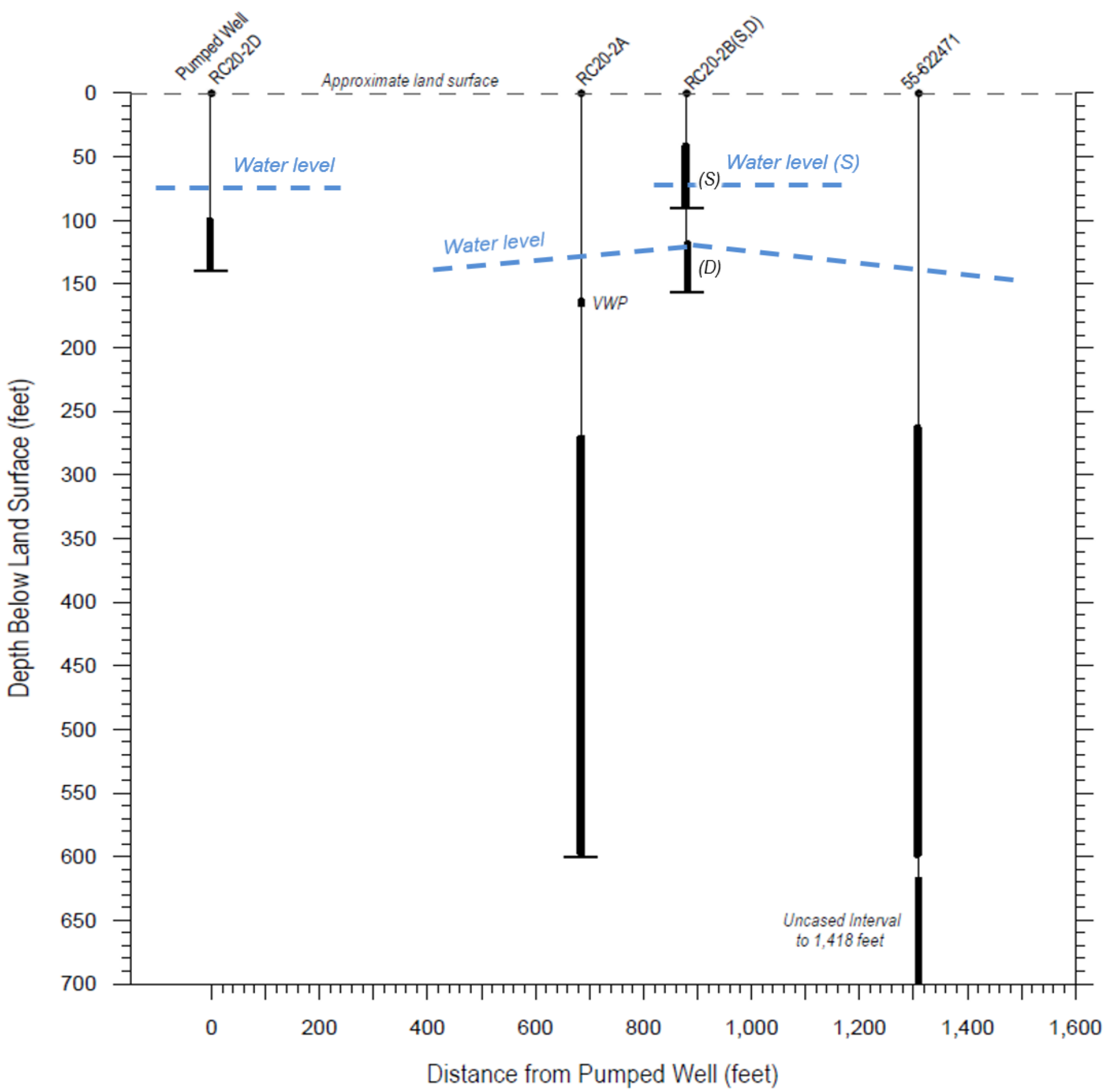


Figure 5-8. Schematic Cross Section of RC20-2D Pumping Test (7-Day)

Note: Well slotted and open intervals denoted with bold lines; VWPs denoted with points.

Hydrographs for RC20-2D, RC20-2A, RC20-2B(S), RC20-2B(D), and 55-622471 for the 60-hour and 7-day pumping tests are included in Appendix K.

At the end of the 60-hour test, water level drawdown at pumped well RC20-2D was 22.8 feet, with a well specific capacity of approximately 4.6 gpm/ft. The hydrograph for RC20-2B(S), completed in Qal, shows no water level response during the 60-hour test. In addition, the hydrographs for wells RC-2B(D) and 55-62271, both completed in Tcg, show no clear responses to pumping during the 60-hour test.

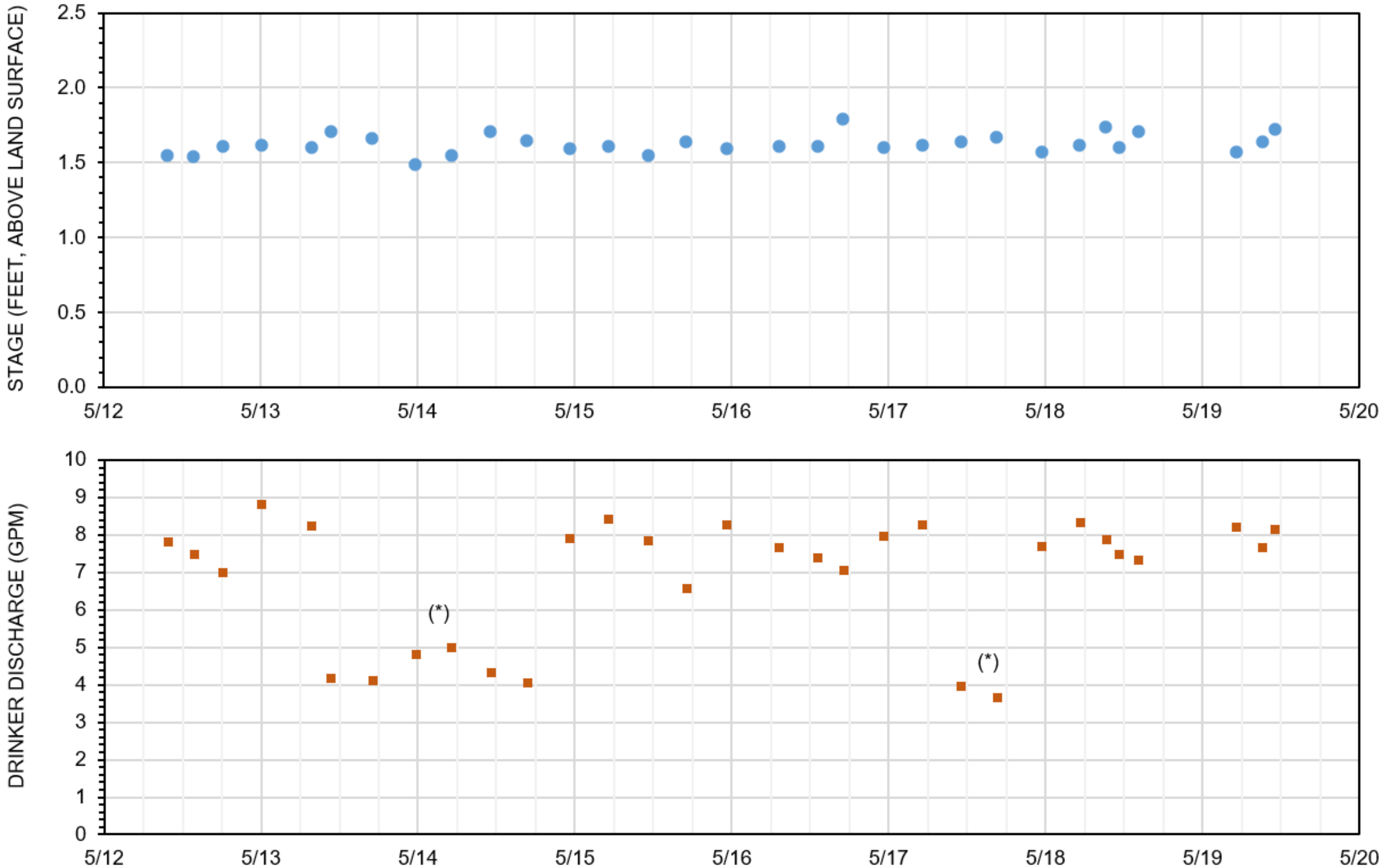
At the end of the 7-day test, water level drawdown at pumped well RC20-2D was 36.2 feet with a well specific capacity of approximately 2.9 gpm/ft; the relatively lower specific capacity observed during the 7-day compared to the 60-hour test is likely attributable to a longer pumping period and lower pre-pumping water level than the 60-hour test. The hydrograph for RC20-2B(S), completed in Qal, shows drawdown that begins shortly after the start of pumping, and continues after the end of pumping. The onset of drawdown observed after the start of pumping may be related to depressurization of the alluvial aquifer system due to pumping at RC20-2D—conditions that had not yet been reached during the 60-hour test. The hydrograph for RC20-2B(D), completed in Tcg, shows no clear response to pumping during the 7-day test. The hydrograph for RC20-2A, completed in Tcg, shows no response to pumping during the 7-day test, and maintains an average water level depth of approximately 132.8 feet bls. The hydrograph for well 55-62271, completed in Tcg, shows an unclear response to pumping during the 7-day test, as the water level is relatively stable during the pumping period, but falls approximately 0.3 foot in the 11 days following the end of pumping. For both RC20-2A and 55-62271, a sinusoidal, diurnal pattern is observed in water level data that is related to tidal effects, and changes in barometric pressure have relatively little effect on the water level, which may be indicative of confined or semi-confined aquifer conditions.

Big Springs was monitored during the tests in order to identify potential impacts to spring flow. A dam near the springhead retains water and provides the opportunity to measure changes in stage, and a portion of spring discharge behind the dam is captured by a pipeline leading to a nearby ranch, with several drinker pipes connecting to the main line between the spring and ranch. During pumping, manual measurements of the spring stage and discharge at a downstream drinker were collected every four hours. In addition, ranch use of spring water during testing was investigated and documented. Manual measurements collected during the 7-day constant-rate test are shown on Figure 5-9. No clearly identifiable impacts from pumping in stage or discharge at Big Springs are noted.

Field water quality parameters collected from pumped water during the tests are shown in Appendix K. Using data from both tests, average groundwater pH was 7.21 and average specific electrical conductance was 515 µS/cm. Groundwater temperature ranged from 72.3 ºF during the day to 69.8 ºF at night.

Analytical solutions for the tests are included in Appendix K. Solutions were developed with Cooper and Jacob (1946) and Barker (1998) methods for both tests. Using the Cooper-Jacob approach, straight lines were matched to late-time water level displacement data at the pumped well, for periods corresponding to IARF conditions—approximately the last 10 hours of pumping for the 60-hour test, and last 2.5 days of pumping for the 7-day test. The Cooper-Jacob estimates of transmissivity for the 60-hour and 7-day tests were 152 and 135 ft^2/day, respectively. Based on the estimated transmissivities and assumed thickness of the fault, hydraulic conductivities for the 60-hour and 7-day tests are estimated to be on the order of 7.6E-04 and 6.8E-04 cm/s, respectively.

The Cooper-Jacob hydraulic conductivity results were incorporated into the Barker solution for confined and fractured aquifers to evaluate additional fault characteristics, including the generalized flow dimensions of the two tests. For the 60-hour test, matching the slope of both displacement and derivative data in late-time indicated that the characteristic generalized flow dimension was approximately 0.7; for the 7-day test, the generalized flow dimension was approximately 1.2. According to Barker (1998), a flow dimension of n=2 indicates radial flow, and a flow dimension of n=1 indicates one-dimensional flow from a plane. The results from the two tests suggest that water level displacement in the well from pumping was similar to one-dimensional flow from a plane, which is consistent with a conceptual model for flow through a fault, where the hydraulic conductivity of the fault is greater than the conductivity of surrounding material.



(*) Rancher turned on pump for cattle tank on 5/13 - 5/14, and 5/17

Figure 5-9. Stage and drinker discharge at Big Springs during RC20-2D 7-day pumping test

5.5.2 Injection Tests

Two constant-head injection tests were conducted at wells RC20-2C and RC20-18A in order to obtain additional aquifer parameters for Qal in the Skunk Camp site investigation area. Due to unsaturated conditions encountered within Qal at the well locations, injection tests were conducted rather than conventional pumping tests. The objectives of the tests were to estimate the saturated hydraulic conductivity (K_{sat}) of the Qal, and to observe the degree of hydraulic connectivity that exists between Qal and Tcg by monitoring water levels in nearby wells. Descriptions of the injection tests and results are provided below.

Table 5-3 summarizes injection durations, number of steps, injection rates, and observation wells for the tests.

Table 5-3. Constant-head Injection Test Wells and Characteristics

Injection Test Well	Injection Duration	Number of Steps	Injection Rates (gpm)	Observation Wells	Hydrogeologic Unit Tested
RC20-2C	3 hrs	3	39.7 – 62.8	RC20-2B(S), RC20-2B(D)	Quaternary Alluvium (Qal)
RC20-18A	3.5 hrs	3	9.9 – 49.0	RC20-18(S), RC20-18(D)	Quaternary Alluvium (Qal)

The remainder of Section 5.5.2 provides detailed descriptions of test data, analysis, and results for each of the constant-head injection tests.

5.5.2.1 Well RC20-2C

A constant-head injection test was conducted at RC20-2C on April 2, 2020. The test lasted 3 hours and involved three 60-minute steps at steady injection rates of 39.7, 49.9, and 62.8 gpm. During the injection test, water levels were monitored in the shallow (S) and deep (D) completions of RC20-2B, located approximately 34 feet northwest of RC20-2C. A close-up map showing the locations of test well RC20-2C, and observation wells RC20-2B(S) and RC20-2B(D) is presented on Figure 5-10 below.

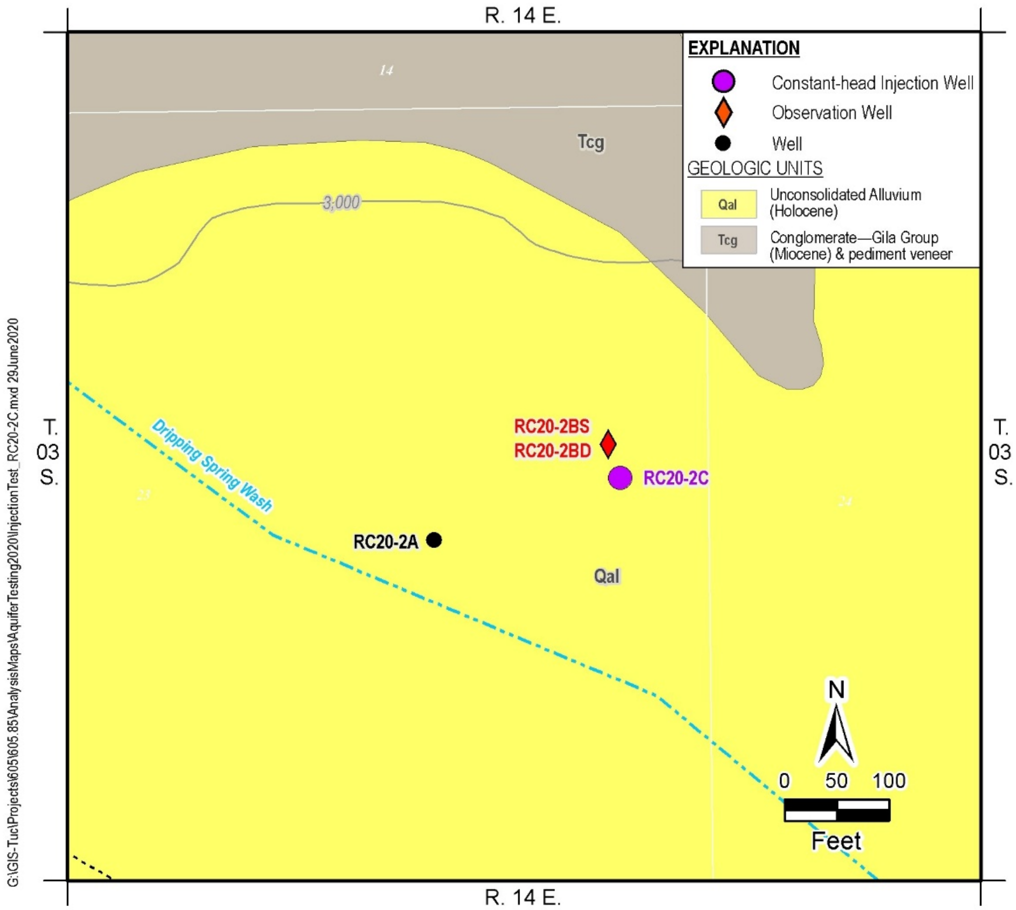


Figure 5-10. RC20-2C Injection Test Location Map

The total depth of RC20-2C is 69 feet with a slotted interval that extends from 29 to 69 feet bls and is completed in Qal (Figure F-4). Prior to the start of the injection test, the well was dry. Observation well RC20-2B has two completions—a shallow well that is slotted from 40 to 90 feet bls and completed mostly in Qal, and a deeper well that is slotted from 115 to 155 feet bls and completed in the upper zone of Tcg (Figure F-3). During drilling, Tcg was encountered at approximately 87 feet bls. Prior to the start of the injection test, water levels in the shallow and deep completions were measured at 70.03 and 105.18 feet bls, respectively.

The horizontal distance from injection well RC20-2C to observation wells RC20-2B(S,D), the depths of slotted intervals, the Tcg contact depth at RC20-2B(S,D), and water levels at RC20-2B(S) and RC20-2B(D) prior to the start of the test are shown on Figure 5-11.

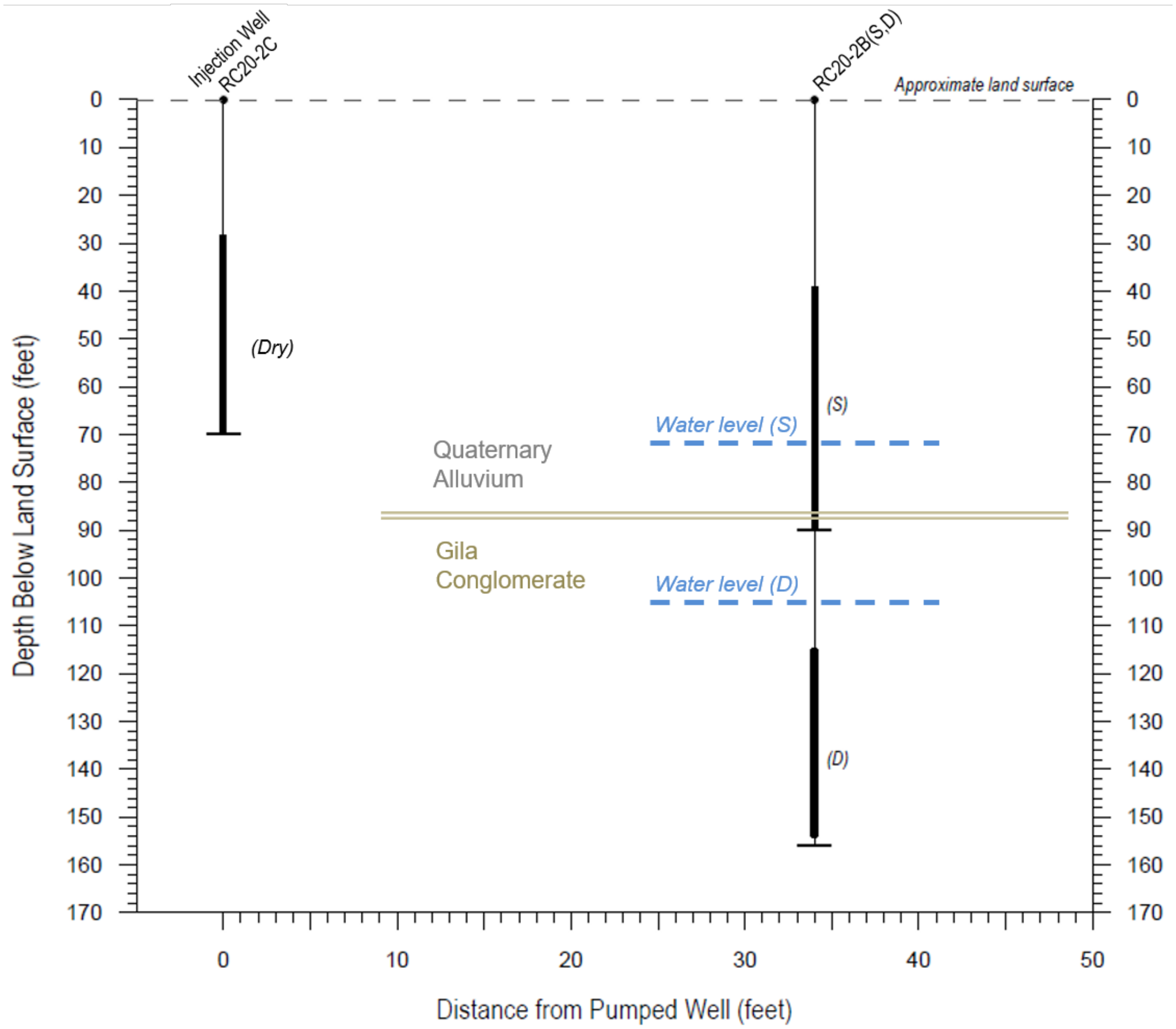


Figure 5-11. Schematic Cross Section of RC20-2C Injection Test

Note: Well slotted intervals denoted with bold lines.

The test began at 1300 hours on April 2, 2020. Water was injected into RC20-2C while the rise in water level in the well was monitored. After the first 23 minutes of the test, the water level and injection rate stabilized. For the next 36 minutes of the first hour, the water level was maintained at an average head of 22.6 feet above well bottom [with a standard deviation (σ) of 0.02 feet] and the injection rate was maintained steady at an average of 39.7 gpm (σ = 0.16 gpm).

Following completion of the first step, the injection rate was increased at 1400 hrs. After approximately 38 minutes, the water level and injection rate stabilized and were maintained at an average head of 31.0 feet above well bottom (σ = 0.09 feet) and average injection rate of 49.9 gpm (σ = 0.16 gpm) for an additional 21 minutes.

The injection rate was increased for the third step at 1500 hrs. After approximately 45 minutes, the water level and injection rate stabilized and were maintained for an additional 15 minutes at an average head of 39.2 feet above well bottom (σ = 0.11 feet) and average injection rate of 62.8 gpm (σ = 0.2 gpm), until the test was terminated at 1630 hrs. During the test, injection rates and head measurements were recorded at one-minute intervals and are shown on Figure 5-12.

Test data were analyzed using both Glover (1953) and Nasberg-Terletskata (Nasberg, 1951; Terletskata, 1954) analytical solutions for flow from a constant-head borehole permeameter in the vadose zone. The results indicate that estimated saturated hydraulic conductivity (K_{sat}) for Qal at the well location varied from approximately 2.3E-03 to 5.4E-03 cm/s (7 to 15 ft/d). The highest estimated K_{sat} was recorded during the first step with an average constant head of 22.6 feet above well bottom. Results for the RC20-2C injection test are presented in Appendix J, Table J-2.

Water level responses in the Qal and Tcg aquifers were monitored at wells RC20-2B(S) and RC20-2B(D), respectively (Figure 5-13). At well RC20-2B(S), water level began rising approximately 60 minutes after the start of the test. The delay between the test start and water level response at RC20-2B(S) is likely related to both the lower injection rate applied during first step (39.9 gpm) and the time required to saturate the alluvium located between RC20-2C and RC20-2B(S). At the end of the three-hour test, the water level at RC20-2B(S) reached a maximum displacement from its pre-injection level of approximately 0.35 feet. Upon test completion, the water level began falling and approached pre-injection levels approximately 32 hours later.

The water level at RC20-2B(D) showed no apparent response to the injection test at RC20-2C (Figure 5-13). In addition, barometric pressure is observed to have little effect on water level.

Interpretation of the RC20-2B(S) hydrograph suggests that the Qal aquifer is transmissive and continuous at the well site. The lack of water level response at RC20-2B(D) suggests that one or more confining layers may exist in upper Tcg at this location.

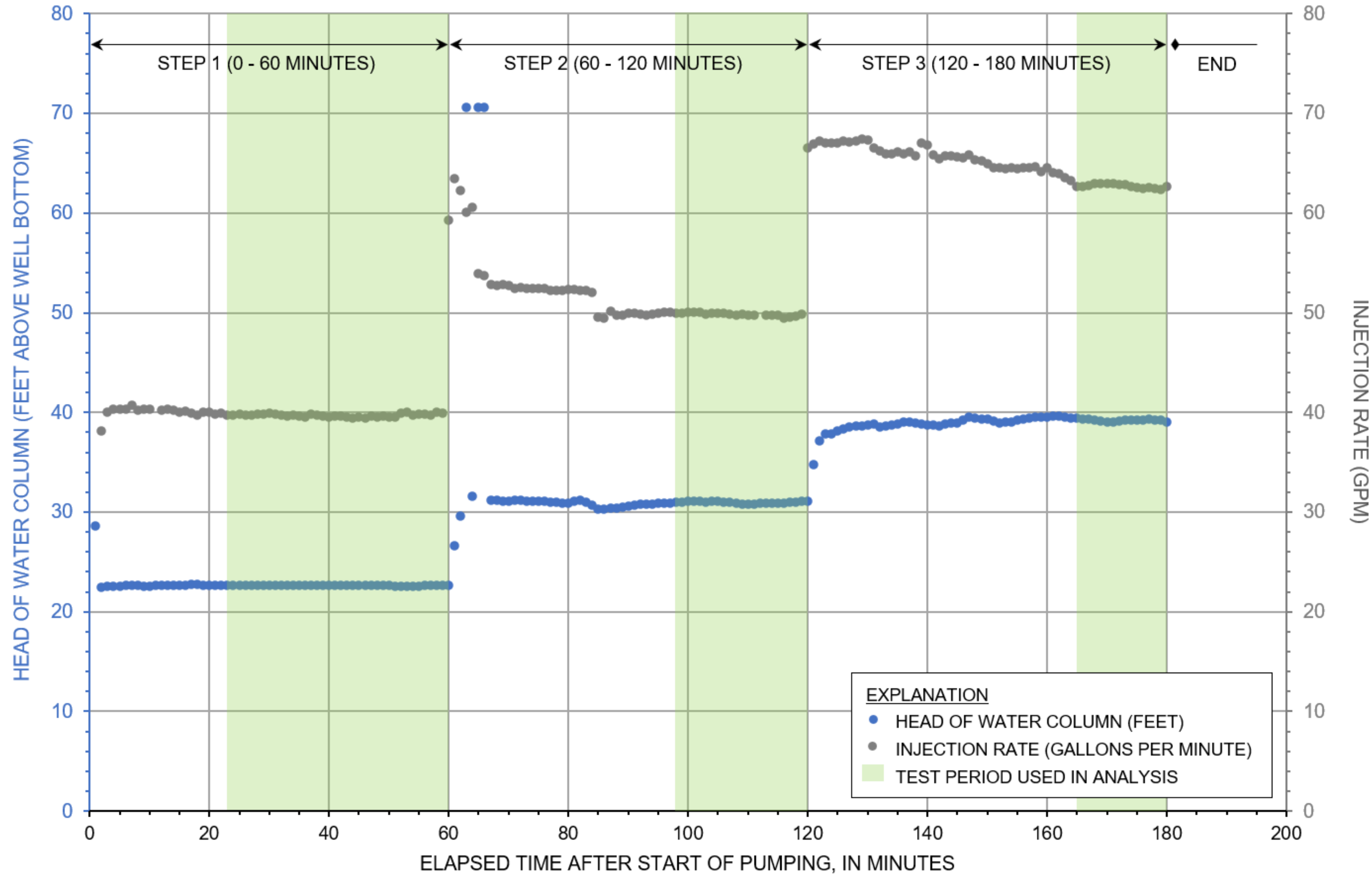
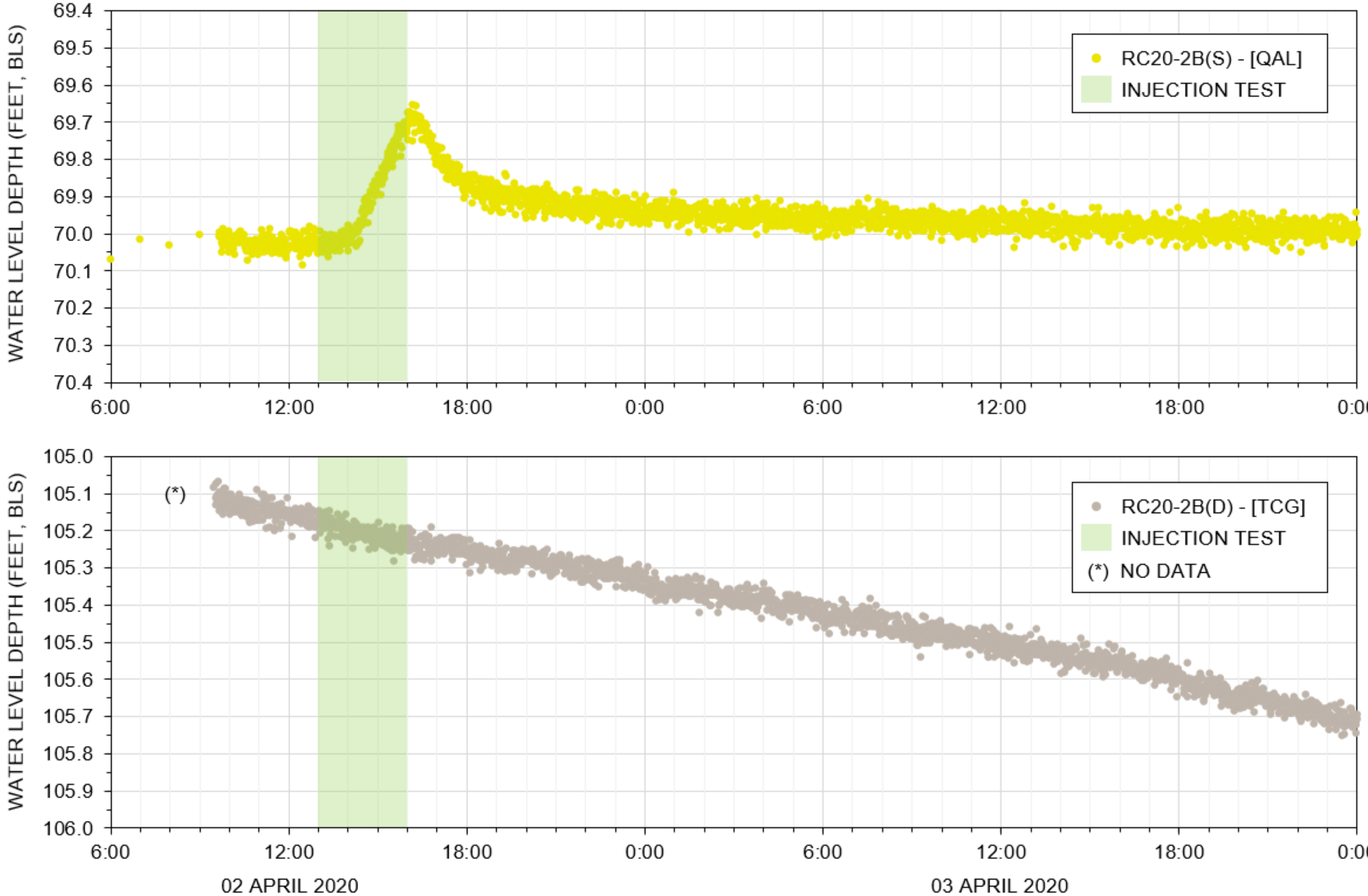


Figure 5-12. Injection Test at RC20-2C



Note: RC20-2B(S) water level data corrected for changes in barometric pressure

Figure 5-13. RC20-2C Injection Test Observation Wells

5.5.2.2 Well RC20-18A

A constant-head injection test was conducted at RC20-18A on April 7, 2020. The test lasted 3.5 hours and involved two 60-minute steps at steady injection rates of 9.9 and 39.7 gpm, and one 90-minute step at a steady injection rate of 49 gpm. During the test, water levels were monitored in the shallow (S) and deep (D) completions of well RC20-18(S,D), located approximately 30 feet southeast of RC20-18A. A close-up map showing the locations of test well RC20-18A and RC20-18(S,D) is presented on Figure 5-14 below.

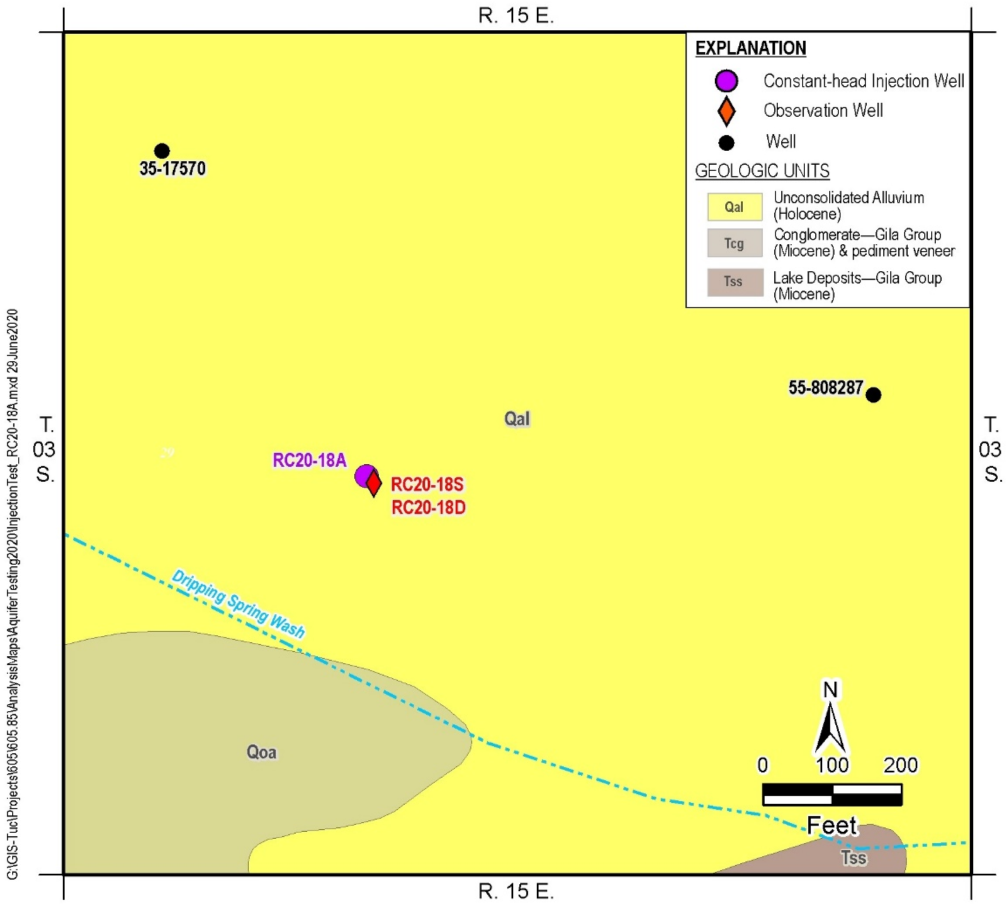
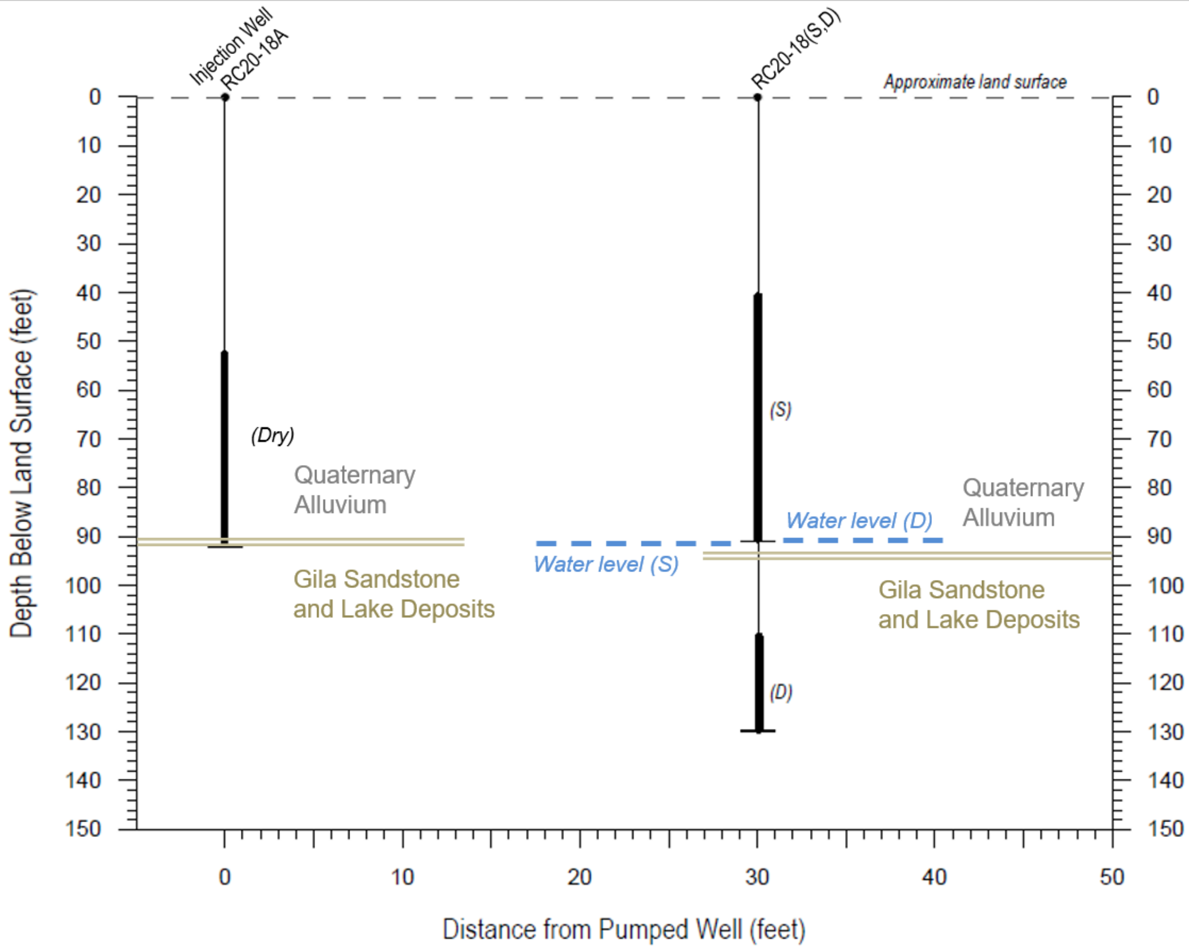


Figure 5-14. RC20-18A Injection Test Location Map

The total depth of RC20-18A is 92 feet with a slotted interval from 52 to 92 feet bls completed mostly in Qal (Figure F-7). During drilling, Gila sandstone and lake deposits (Tss) was encountered at approximately 91 feet bls. Prior to the start of the injection test, the well was dry.

Observation well RC20-18 has two completions—a shallow well that is slotted from 41 to 91 feet bls and completed in Qal, and a deeper well that is slotted from 110 to 130 feet bls and completed in the upper zone of Tss (Figure F-6). During drilling, Tss was encountered at approximately 94 feet bls. Prior to the start of the injection test, water levels in the shallow and deep completions were 89.77 and 88.80 feet bls, respectively.

The horizontal distance from injection well RC20-18A to observation well RC20-18(S,D), the depths of slotted intervals, the depths of Tss contacts, and water levels in RC20-18(S,D) prior to the start of the test are shown on Figure 5-15.



Note: Well slotted intervals denoted with bold lines.

Figure 5-15. Schematic Cross Section of RC20-18A Injection Test

The test began at 1230 hours on April 7, 2020. Water was injected into RC20-18A while the rise in water level in the well was monitored. After the first 26 minutes of the test, water level and injection rate stabilized. For the remaining 34 minutes of the first hour, the water level was maintained at an average head of 20.8 feet above well bottom [with a standard deviation (σ) of 0.01 feet] and the injection rate was maintained steady at an average of 9.9 gpm (σ = 0.12 gpm).

Following completion of the first step, the injection rate was increased at 1330 hrs. After approximately 44 minutes, the water level and injection rate stabilized and were maintained at an average head of 30.1 feet above well bottom (σ = 0.08 feet) and average injection rate of 39.7 gpm (σ = 0.08 gpm) for an additional 16 minutes.

The injection rate was increased for the third step at 1430 hrs. After approximately 60 minutes, the water level and injection rate stabilized and were maintained for an additional 30 minutes at an average head of 38.9 feet above well bottom (σ = 0.20 feet) and average injection rate of 49.0 gpm (σ = 0.19 gpm), until the test was terminated at 1600 hrs. During the test, injection rates and head measurements were recorded at one-minute intervals and are shown on Figure 5-16.

Test data were analyzed using both Glover (1953) and Nasberg-Terletskata (Nasberg, 1951; Terletskata, 1954) analytical solutions for flow from a constant-head borehole permeameter in the vadose zone. The results indicate that estimated K_{sat} for Qal at the well location varied from approximately 1.1E-03 to 3.2E-03 cm/s (3 to 9 ft/d). The highest estimated K_{sat} was recorded during the second step with an average constant head of 30.1 feet above well bottom. Results for the RC20-2C injection test are presented in Appendix J, Table J-2.

Water level responses in the Qal and Tss aquifers were monitored at wells RC20-18(S) and RC20-18(D), respectively (Figure 5-17). At well RC20-18(S), water level began rising at the start of the test, reaching a maximum displacement of 0.48 feet. Approximately 30 minutes after test completion, the water level began falling and was 0.1 feet above pre-injection levels approximately 32 hours later.

The water level at RC20-18(D) showed no apparent response to the injection test at RC20-18A (Figure 5-17); however, water level data did show responses to changes in barometric pressure, which were removed from the hydrograph on Figure 5-17.

Interpretation of the RC20-18(S) hydrograph suggests that the Qal aquifer is transmissive and continuous at the well site. The response to nearby injection in the Qal aquifer, resulting in a water level displacement of 0.48 feet, is similar to the displacement of 0.35 feet observed in Qal at RC20-2B(S). The lack of water level response at RC20-18(D) suggests that water injected at RC20-18A did not have a significant effect on hydraulic pressures in upper Tss at the well site, and that the degree of hydraulic connectivity between Qal and Tss may be poor at this location.

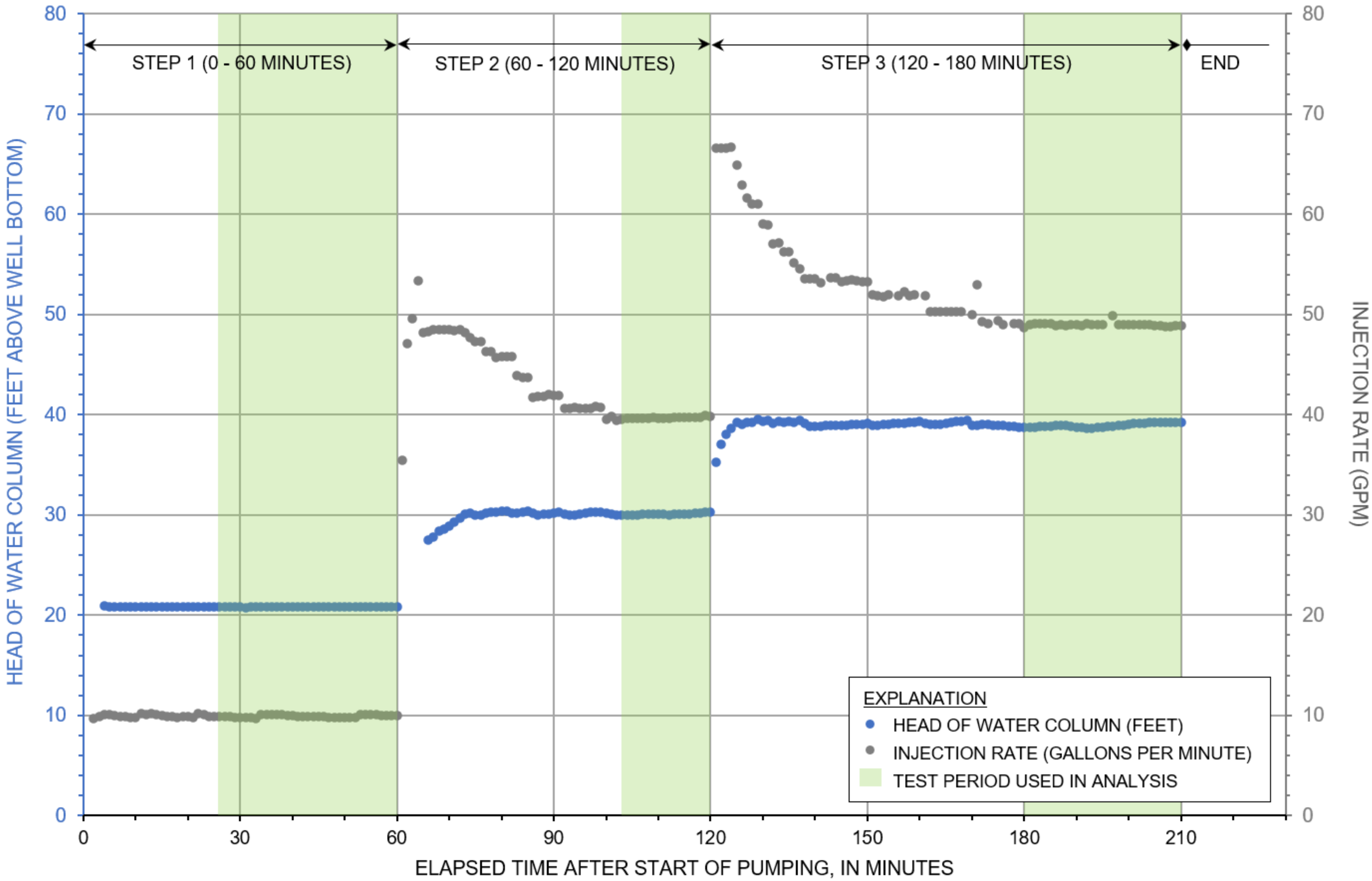
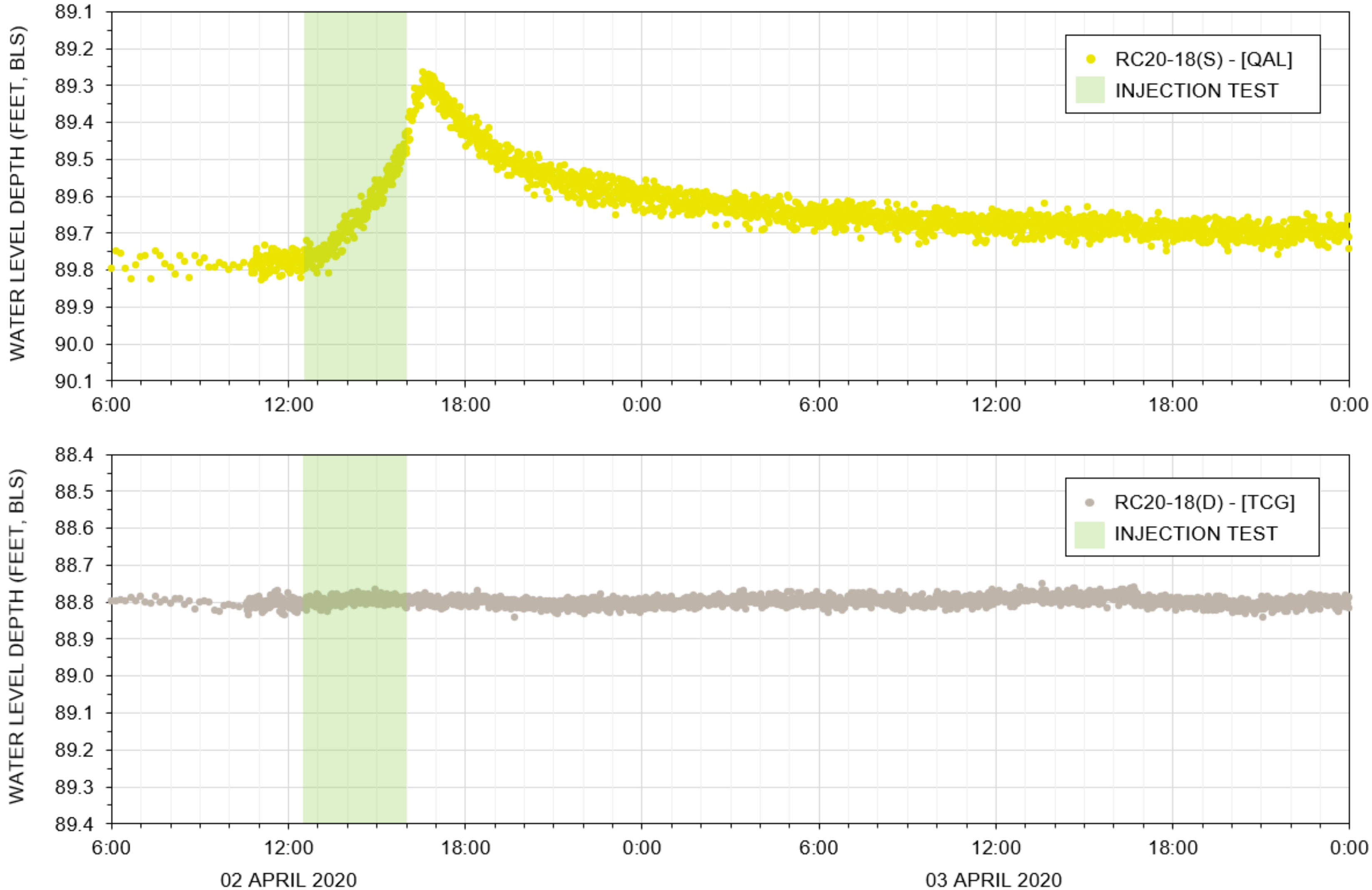


Figure 5-16. Injection Test at RC20-18A

MONTGOMERY & ASSOCIATES



Note: RC20-18(S) and RC20-18(D) water level data corrected for changes in barometric pressure

Figure 5-17. RC20-18A Injection Test Observation Wells

5.6 Summary

5.6.1 Pumping Tests

Results for constant-rate pumping tests are presented in Appendix J, Table J-1 and summarized in Table 5-4 below. AQTESOLV plots of the analytical solutions are included in Appendix K.

Table 5-4. Summary of Constant-rate Pumping Test Results

Well ID	Hydrogeologic Unit Tested	Analytical Method(s)	Transmissivity T, (ft^2/d) [a]	Hydraulic Conductivity (cm/s) [a]	Storage Parameters [b,c]
55-205266	Gila Conglomerate (Tcg)	Cooper-Jacob (1946)	10.5	5.3E-05	-
RC20-2	Gila Conglomerate (Tcg)	Moench (1997)	837	2.2E-04	S = 2.3E-04 S_y = 0.08
RC20-2A	Gila Conglomerate (Tcg)	Moench (1997)	567	1.5E-04	S = 2.5E-04 S_y = 0.08
RC20-2D (60-hr) RC20-2D (7-day)	Dripping Spring Fault	Cooper-Jacob (1946), Barker (1988)	152 135	7.6E-04 6.8E-04	- -

[a] metric and imperial unit conversions of T and K values are included in Appendix J, Table J-1
[b] S = elastic storage coefficient
[c] Storage parameters not considered reliable estimates for single-well tests (55-205266 and RC20-2D)

5.6.2 Injection Tests

Results for constant-head injection tests are summarized in Table 5-5 below. Detailed results are included in Appendix J, Table J-2.

Table 5-5. Summary of Constant-head Injection Test Results

Well ID	Hydrogeologic Unit Tested	Step	Steady Injection Rate (gpm)	Avg. Constant-head (feet above well bottom)	Analytical Method [1,2]	Estimated Saturated Hydraulic Conductivity, K_{sat}	
						(ft/d)	(cm/s)
RC20-2C	Quaternary Alluvium (Qal)	1	39.7	22.6	Glover	11	3.9E-03
					Nasberg-Terletskata	15	5.4E-03
		2	49.9	31.0	Glover	8	2.8E-03
					Nasberg-Terletskata	11	3.8E-03
		3	62.8	39.2	Glover	7	2.3E-03
					Nasberg-Terletskata	9	3.1E-03
RC20-18A	Quaternary Alluvium (Qal)	1	9.9	20.8	Glover	3	1.1E-03
					Nasberg-Terletskata	5	1.6E-03
		2	39.7	30.1	Glover	7	2.3E-03
					Nasberg-Terletskata	9	3.2E-03
		3	49.0	38.9	Glover	5	1.8E-03
					Nasberg-Terletskata	7	2.5E-03

[1] Glover, R.E. (1953)
[2] Terletskata, N. M. (1954)

5.7 Discussion

The results of 2020 site investigations downstream of the proposed Skunk Camp TSF generally confirm findings from previous investigations, and provide additional empirical support for the conceptual and groundwater numerical models. Pumping tests conducted in the Gila Conglomerate (Tcg) exhibited hydraulic conductivities in the range of 5.3E-05 to 2.2E-04 cm/s, which on average, occur on the same order of magnitude as wells tested in the vicinity of the proposed TSF footprint (M&A, 2019).

In addition, injection tests conducted in Quaternary Alluvium (Qal) yielded results similar to previous findings. Altogether, three injection tests have been conducted at the Skunk Camp site since 2019, resulting in estimated saturated hydraulic conductivities in the range of 1.1E-03 to 1.3E-02 cm/s.

Findings for pumping tests conducted at the Dripping Spring fault, and observations of hydraulic connectivity between geologic units during pumping and injection tests are discussed below.

5.7.1 Dripping Spring Fault

During drilling of well RC20-2D to the south of the proposed TSF footprint (Figure 1-1), the Dripping Spring fault was encountered from approximately 85 feet bls. The well was completed in the fault, and two pumping tests were conducted lasting between 60 hours and 7 days.

The pumping tests of the Dripping Spring fault demonstrated that the hydraulic conductivity at the well location is on the order of 7E-04 cm/s. Compared to tests conducted in Tcg and Qal, the hydraulic conductivity of the fault was approximately five times higher than the hydraulic conductivity of Tcg and one-fourth the hydraulic conductivity of Qal.

General radial flow analysis with the Barker (1988) method suggested that flow to the well was sub-radial and approximated linear (n=1) flow. This result is consistent with flow through a confined fault system.

5.7.2 Hydraulic Connectivity of Geologic Units

During most pumping and injection tests, water level responses in nearby observation wells were monitored in order to evaluate the degree of hydraulic connectivity between the Qal and Tcg aquifers, and Dripping Spring fault.

For the pumping test at RC20-2A, completed in Tcg, the water level at RC20-2B(S) indicated no response from the perched aquifer identified in the Qal, located approximately 190 feet away (Appendix K and Figure 5-6); however, drawdown was observed in wells RC20-2B(D) and 55-622471, which are both completed in Tcg.

During pumping at RC20-2D, no response was observed in any of the Tcg wells. Drawdown coinciding with the start of pumping was observed in the alluvium [RC20-2B(S)], suggesting that water in the alluvium may be in connection with the fault system.

During the two injection tests in the Qal, no response was observed in underlying Tcg or Tss, indicating that the Qal and Tcg/Tss may not be well connected downstream from the TSF footprint. This is different from observations within the TSF footprint; during the injection test at RC19-8C water levels in the Tcg responded to injection. This suggests that the extent of connectivity between the Tcg and Qal varies spatially, potentially with less connectivity further downstream.

6 REFERENCES

Barker, J.A., 1988. A generalized radial flow model for hydraulic tests in fractured rock, Water Resources Research, vol. 24, no. 10, pp. 1796-1804.

Batu, V., 1998, Aquifer hydraulics: a comprehensive guide to hydrogeologic data analysis: John Wiley & Sons, New York, 727 p.

Bear, J., 1979, Hydraulics of Groundwater: McGraw-Hill, New York, 569 p.

Bourdet, D.J., Ayoub, J.A., and Pirard, Y.M., 1989, Use of pressure derivative in well-test interpretation: SPE Formation Evaluation, June 1989, pp. 293-302.

Cooper, H.H., Jr. and Jacob, C.E., 1946. A generalized graphical method for evaluating formation constants and summarizing well-field history, American Geophysical Union Transactions, vol. 27, pp. 526-534.

Cornwall, H.R., Banks, N.G., and Phillips, C.H., 1971, Geologic map of the Sonora quadrangle, Pinal and Gila Counties, Arizona: United States Geological Survey, Geologic Quadrangle Map GQ-1021, 1:24,000.

Cornwall, H.R., and Krieger, M.H., 1978, Geologic map of the El Capitan Mountain quadrangle, Gila and Pinal Counties, Arizona: United States Geological Survey, Geologic Quadrangle Map GQ-1442, 1:24,000.

Glover, R.E., 1953, Flow from a test-hole located above ground-water level in theory and problems of water percolation: United States Bureau of Reclamation Engineering Monograph No. 8, pp. 69-71.

HydroSOLVE, Inc., 2012, AQTESOLV for Windows 95/98/NT/2000/XP/Vista: HydroSOLVE, Inc., Reston, Virginia, version 4.51.002 – Professional.

KCB Consultants Ltd, 2019, Resolution Copper Mining LLC, Resolution Copper Project, Skunk Camp Site Investigation Rev. 0: Report prepared for Resolution Copper, November 2019.

Lohman, S.W., 1972, Ground-water hydraulics: U.S. Geological Survey Professional Paper 708, 70 p.

Moench, A.F., 1997, Flow to a well of finite diameter in a homogeneous, anisotropic water-table aquifer: Water Resources Research, vol. 33, no. 6, pp. 1397-1407.

Montgomery & Associates, 2019, Aquifer testing results for Skunk Camp hydrogeologic investigation, Pinal and Gila Counties, Arizona: Report prepared for Resolution Copper, November 7, 2019.

Morris, D.A. and A.I. Johnson, 1967, Summary of hydrologic and physical properties of rock and soil materials as analyzed by the Hydrologic Laboratory of the U.S. Geological Survey: U.S. Geological Survey Water-Supply Paper 1839-D, 42 p.

Nasberg, V.M., 1951, The problem of flow in an unsaturated soil for injection under pressure: Ixvestja Akademia Nauk. SSR Odt Tekh Nauk, No. 9.

Spane, F.A., Jr., and S.K. Wurstner, 1993. DERIV: A computer program for calculating pressure derivatives for use in hydraulic test analysis, Ground Water, vol. 31, no. 5, pp. 814-822.

Terletskata, N. M., 1954, Determination of permeability in dry soils: Hydroelectric Waterworks No. 2, Moscow, U.S.S.R., February 1954.

Theis, C.V., 1935. The relationship between the lowering of the piezometric surface and the rate and duration of discharge of a well using ground-water storage, American Geophysical Union.

7 ACRONYMS & ABBREVIATIONS

ABI................acoustic borehole imaging
ADWR ....Arizona Department of Water Resources
AZPDES ....Arizona Pollutant Discharge Elimination System
b.....................aquifer thickness
bls..................below land surface
cm/s...............centimeters per second
e-log ....electric log
EC ....electrical conductivity
ºF ....degrees Fahrenheit
ft/d.................feet per day
ft^2/d................square feet per day
gpm ....gallons per minute
gpm/ft............gallons per minute per foot
HGI ....hydroGEOPHYSICS, Inc.
hrs..................hours
IARF ....infinite-acting radial flow
K....................hydraulic conductivity
KCB ....Klohn Crippen Berger Ltd.
K_{sat}.................saturated hydraulic conductivity
K_z/K_r..............ratio of vertical to radial hydraulic conductivity
MASW ....multi-channel analysis of surface waves
m^2/d...............square meters per day
n.....................total porosity
n_e ....effective porosity
OBI................optical borehole imaging
pH..................potential hydrogen
RC ....Resolution Copper
S ....storativity; also, elastic storage coefficient
S_s ....specific storage
SWE ....Southwest Exploration Services, LLC
S_y...................specific yield
T ....transmissivity
TSF................tailings storage facility
µS/cm ....micro-Siemens per centimeter
VWP..............vibrating wire piezometer

Appendix A

Daily Reports of Drilling Program

Drilling Daily Report

Date	M&A Personnel	Hours on Site	Well ID	Hole Size/Type	Drilling Depth: Shift Start (feet bls)	Drilling Depth: Shift End (feet bls)	Hydrologic Data: Water Depth (feet bls)	Hydrologic Data: Airlift Production (gpm)	Geology	Safety Meeting	Activities Summary
20-Feb-20 [Day]	C. Gregory, M. Mellott	9.25 (0900-1815)	RC20-2 [Tcg #1]	17.5" bore with 10.5" surface casing	0	20	N/A	N/A	Quaternary Alluvium (silty sand with gravel)	NEWP lead: Received site induction, reviewed CRMs and shut-off switches, and discussed communication protocols between M&A staff and drillers	NEWP rig and equipment inspections in the morning. Began drilling with 17.5" tricone in the afternoon and completed 20 feet. Surface casing will be installed and cemented-in during night shift before proceeding with drilling.
20-Feb-2020 [Night]	L. Wersan	12 (18:00 - 06:00)	RC20-2 [Tcg #1]	17.5" bore with 10.5" surface casing	20	20	N/A	N/A	Quaternary Alluvium (silty sand with gravel)	NEWP lead: Received site induction, reviewed CRMs, discussed Symmetrix casing system and hammer assembly procedures, discussed sampling protocol.	Advanced 10.5" surface casing to 19.5'. Made up 9 5/8" hammer BHA and Symmetrix casing assembly. Cemented surface casing in place. Rigged up cyclone and kelly hose assembly for pneumatic hammer drilling. Advanced BHA and Symmetrix casing inside surface casing.
21-Feb-20 [Day]	C. Gregory, M. Mellott	12 (06:10 - 18:15)	RC20-2 [Tcg #1]	7.75" Hammer	20	100	N/A	N/A	Gila Conglomerate; starts ~20 feet bls, likley weathered; firms at 34 feet bls.	NEWP lead: Review CRMs and drilling plan; reminder to be mindful of backhoe and vehicle movement.	Resumed drilling with 9-5/8" hammer and 9.5" Symmetrix casing and from 20' bls at 08:05 hrs. Advance to 50'. At 11:00 hrs drill tooling replaced and address issue with fuel nozzle. NEWP conducts maintenance on rig and modifies rod lifter. Drilling resumes from 50' at 15:50 hrs, and advances to 100' at end of shift.
21-Feb-20 [Night]	L. Wersan	12.5 (18:00-06:30)	RC20-2 [Tcg #1]	7.75" Hammer	100	300	Approx. 160	18	17.8	NEWP lead: Review CRMs and emergency shutoffs; Review sampling procedures; LO/TO procedures	Drill ahead from 100' to 120'; Replace hydraulic line on rod handler at 22:00. Resume drilling from 120' to 260'; water encountered between 160' and 180'. At 04:50 shut down to repair a washout forming underneath the cyclone. Resume drilling from 260' at 05:10. Drilling advanced to 300' at end of shift.
22-Feb-20 [Day]	C. Gregory, M. Mellott	12.25 (06:00 - 18:15)	RC20-2 [Tcg #1]	7.75" Hammer	300	450	~160	48 - 75	Gila Conglomerate	M&A lead with SwExp: be mindful of overhead wireline, vehicle impacts, and platform height. Rain will make surfaces more slippery than usual.	Resumed drilling with 7.75" hammer from 300' bls at 06:40 hrs. Advance to 450'. At 12:42 hrs Tcg becomes harder and hammer waters out. Trip-out hammer and replace with 7.5" tricone. Trip-in tricone; bit is plugged. Trip back out until end of day shift.
22-Feb-20 [Night]	L. Wersan	12.5 (18:00-06:30)	RC20-2 [Tcg #1]	7.75" Tricone	450	600	Approx. 160	75-133	Gila Conglomerate	NEWP lead: Review JSA for tripping rods and safety procedures for rod handler. Discuss rain and vehicle safety on wet surfaces.	Unplug tricone bit, trip back to bottom; repair rod handler during trip. Resume drilling at 22:10. Drilled ahead with tricone bit to TD at 601.65' bgs at 05:47.
23-Feb-20 [Day]	M. Mellott	12.25 (06:00 - 18:15)	RC20-2 [Tcg #1]	7.5" Tricone	601	601	151.98	133	Gila Conglomerate	NEWP lead through CRMs and site induction for E. Beam and D. Alp from SwExp.	Drilling finished to TD upon arrival on site. Turned off injection and allowed flow value to settle to get flow and water quality parameters. NEWP tripped out and removed tooling. NEWP installed 50 feet of blank 6" PVC casing for Geophysical logging. Escorted E. Beam and D. Alp from SwExp onsite. SwExp conducted Combo log, E log, and sonic log. Optical borehole imaging is ongoing with ABI still to come later this evening.
23-Feb-20 [Night]	L. Wersan	12 (18:00	RC20-2 [Tcg #1]	9.5" symmetrix to 45' BLS 7.75" Hammer 45' to 450' 7.5" Tricone to 601' TD	---	---	---	---	Gila Conglomerate	NEWP lead: Review casing handling and tripping procedures. Discuss VWP install protocol and cable safety.	[Construction]: Wireline logging completed at 20:40; SWExp off-site at 21:00. NEWP pulled the 6" temporary PVC casing, then tripped in and tagged bottom with tremie pipe at 601.5' bls-- no significant slumping downhole. NEWP began tripping in the PVC production casing (blank PVC to 270' bgs, slotted to 600' bgs) at 01:00. At 03:10 a VWP was installed at 180' bls. The production casing was hung at 600.37' at 03:50. NEWP is currently trickling silica sand filter pack with the tremie pipe.

MONTGOMERY & ASSOCIATES

Drilling Daily Report

Date	M&A Personnel	Hours on Site	Well ID	Hole Size/Type	Drilling Depth: Shift Start (feet bls)	Drilling Depth: Shift End (feet bls)	Hydrologic Data: Water Depth (feet bls)	Hydrologic Data: Airlift Production (gpm)	Geology	Safety Meeting	Activities Summary
24-Feb-20 [Day]	M.Mellott, C. Gregory	12.25 (06:00 - 18:15)	RC20-2 [Tcg #1]	9.5" symmetrix to 45' BLS 7.75" Hammer 45' to 450' 7.75" Tricone to 601' TD	---	---	---	---	Gila Conglomerate	NEWP led. Reviewed CRMs and specifically addressed moving equipment and falling objects as these risks pertained to today's tasks	[Construction]: Continued night shift annular filling with silica sand from 520' bls to 258' (10' above screened interval). Used 128 bags (50 lb.) of silica sand. Fine choke sand filled to 255' (one 50 lb. bag) followed by 3 bags of 3/8" bentonite-chip hole plug. 2.5 parts water: 1 part cement: 0.3 part bentonite mixture grout emplaced to 60 feet bls (40 bags cement, 47 lb each; 10 bags bentonite gel, 50 lb each). 45 feet of symmetrix casing was removed by NEWP. Grouting continued to 10 feet bls (16 bags cement, 4 bags gel).
24-Feb-20 [Night]	L. Wersan	12 (18:00 - 06:00)	RC20-2 [Tcg #1]	9.5" symmetrix to 45' bls 7.75" hammer to 450' bls 7.75" tricone to 601' bls (TD)	---	---	---	---	Gila Conglomerate	NEWP lead: Review airlift testing procedure and safety protocol. Discuss whip-check placement and hammer unions.	Following installation of cement in the upper 10' of the annulus, NEWP tripped AQ pipe to 240' bls to begin airlift development. The well was developed with pumping for 2 hrs to remove drilling water and fines and to lower the hydrostatic pressure around the well. The well was then air-lifted for approximately one hour at 270', 290' and 300' depths. Development activities finalized at 05:55 hrs and NEWP prepared to demobilize from site.
25-Feb-20 [Day]	C. Gregory, M. Mellott	4.75 (08:15 - 13:00)	RC20-2 [Tcg #1]	9.5" symmetrix to 45' bls 7.75" hammer to 450' bls 7.75" tricone to 601' bls (TD)	---	---	---	---	Gila Conglomerate	---	NEWP spent the day mobilizing to RC20-2a. An immersion training was conducted by RC with NEWP staff around midday.
			Ranch Irrigation Well	16" cased well	---	---	144.35' bmp	---	Gila Conglomerate	M&A lead: Take 5 conducted with Cascade to review set-up procedures and hazards for pumping test.	M&A on-site at 8:15 hrs. RC electricians arrive at 8:45 hrs. Following electrical hook-up of the pump, a pre-test was conducted to check pumping equipment from 10:00 - 10:10 hrs; water level was allowed to recover until 11:00 hrs. After review of pre-test data, the discharge assembly flow valve was set at 50 gpm and the pumping test was schedule for 11:30 hrs. Between 11:25 11:45 hrs, Cascade could not get the generator to run and was troubleshooting the issue. United Rentals indicated that the error code was related to carbon buildup and would have to be fixed by a mechanic. At 13:00 hrs, Cascade and M&A mobilized off-site. A mechanic from United will arrive at 06:30 hrs tomorrow morning to fix the issue, and the pumping test will begin tomorrow morning.
25-Feb-20 [Night]	L. Wersan	8.75 (09:30 - 06:15)	RC20-2A [Tcg #2]	17.5" bore with 10.5" surface casing	0	20	---	---	Quaternary Alluvium (silty sand with gravel)	NEWP lead: Reviewed lifting and BHA assembly procedures, discussed Kelly hose/ mud system safety and angles of approach. Discussed logging station placement with HME nearby and built segregation berms.	[DRILLING]: NEWP began drilling with 17.5" tricone at 22:25. Drilled to 20' bls and installed surface casing to 19.5' bls due to minor slumping downhole. Rigged up to drill ahead with Symmetrix casing hammer assembly and cement casing in place. Cementing will be completed during day shift before drilling ahead with 9 5/8" Symmetrix casing hammer.
	M. Mellott	12.5 (06:00 - 18:30)	RC20-2A [Tcg #2]	17.5" bore with 10.5" surface casing to 20', 7.75" air hammer to 70'	20	70	---	---	Quaternary Alluvium, Gila Conglomerate	NEWP re-brief and site induction for new drill pad: reviewed emergency shut offs, proper PPE, and CRMs. M&A conducted Take 5 with Cascade before beginning Ranch Irrigation Well pumping test.	[DRILLING]: NEWP cemented surface casing. Continued drilling with pilot hammer bit and symmetrix casing to depth of 70' bls. At approximately 62' bls a firm horizon was encountered that is believed to be contact with Gila Conglomerate (Tcg) and supported by drill chips. Tripped out pilot hammer bit and installed new tooling with 7.75" air hammer bit.

Drilling Daily Report

Date	M&A Personnel	Hours on Site	Well ID	Hole Size/Type	Drilling Depth: Shift Start (feet bls)	Drilling Depth: Shift End (feet bls)	Hydrologic Data: Water Depth (feet bls)	Hydrologic Data: Airlift Production (gpm)	Geology	Safety Meeting	Activities Summary
26-Feb-20 [Day]	C. Gregory	12.5 (06:00 - 18:30)	Ranch Irrigation Well	16" cased well	---	---	144.4' bmp	---	Gila Conglomerate	M&A completes Take 5 and reviews days tasks and hazards.	[TESTING]: United Rentals arrives at site in the morning and resolves carbon build-up issue. Upon starting the generator, a new regen error appears that requires maintenance in Phoenix. Upon deliberating with RC, the decision is made to use the 36kW generator on-site at Morty's. Pumping test started at 1130 hrs included: 2-hr step at 40 gpm; 1.5-hr step at 70 gpm; 1-hr step at 100 gpm; 1-hr step at 150 gpm; and 1-hr step at ~175 gpm (valve all the way open). Minor recirculation observed in WL drawdown data after 3 hrs. Total drawdown after 6.5 hrs of pumping and finishing the test at 175 gpm was 142 ft (WL = 286.4 ft bmp). A chart showing water level drawdown and a more complete assessment of the test will be shared tomorrow in a separate email.
26-Feb-20 [Night]	C.Pratt	12 (18:00 - 06:00)	RC20-2A [Tcg #2]	17.5" bore with 10.5" surface casing, 7.75" air hammer	70	460	---	66	Gila Conglomerate	NEWP lead: Received site induction, reviewed CRMs, discussed sampling protocol and communication when approacing cyclone.	[DRILLING]: Resumed drilling with 7.75" air hammer bit from 70 feet bls. Injection was shut off after each 20' section to test for water production. Water was first encountered at ~180' bls with flow steadily increasing with depth. NEWP continued drilling to 460' bls by end of night shift.
27-Feb-20 [Day]	M. Mellott	12 (06:00-18:00)	RC20-2A [Tcg #2]	17.5" bore with 10.5" surface casing to 20', 7.75" Air hammer to 480', 7.5" tricone to 535'	460	535	---	109	Gila Conglomerate	NEWP lead covering CRMs and specific hazards related to tripping in/out.	[DRILLING]: Continued drilling with 7.75" air hammer to 480'. Tripped out tooling and replaced bit with 7.5" tricone. Tripped back in an continued drilling to a depth of 535'. After adding an additional rod NEWP encountered an issue with rig's fan motor and shut off rig at 14:30. NEWP filled permit to perform maintenance on rig. After receiving approval, fan motor was removed to assess. A new part for the motor was ordered and is expected to arrive tomorrow in the early afternoon. [TESTING]: Resolution electricians on site to disconnect generator from pump/control panel at Ranch Irrigation Well. Cascade removed temporary pump and discharge assembly. Generator was picked up by N. Speaks of M&A for Skunk Camp well sampling.
27-Feb-20 [Night]	C. Pratt	0	RC20-2A [Tcg #2]	17.5" bore with 10.5" surface casing, 7.75" air hammer	535	535	---	---	---	---	[DRILLING]: Drill rig down for maintenance on fan motor.
28-Feb-20 [Day]	M. Mellott	7.5 (09:30-17:00)	RC20-2 [Tcg #1]	Monitor Well	---	---	---	---	---	Reviewed safety hazards associated with BMR tool with SwExp before logging	[LOGGING]: Escorted SwExp on site to complete BMR log of RC20-2. SwExp completed log and removed tool by 1420 and were off-site by 1430. RC supplied American Lock was installed on well vault.
			RC20-2A [Tcg #2]	17.5" bore with 10.5" surface casing to 20', 7.75" Air hammer to 480', 7.5" tricone to 535'	535	535	---	---	---	NEWP followed LOTO procedures for rig maintenance.	[DRILLING]: Replacement part for fan motor arrived at 1645 today. NEWP technician was working on replacement of the part at shift change. Drilling is anticipated to resume by 1900 tonight.
28-Feb-20 [Night]	C. Pratt	11 (18:45-06:00)	RC20-2A [Tcg #2]	17.5" bore with 10.5" surface casing to 20', 7.75" Air hammer to 480', 7.5" tricone to 600'	535	600	137.5	120	Gila Conglomerate	NEWP lead covering CRMs and specific hazards related to tripping in/out.	[DRILLING]: Drill rig down for maintenance on fan motor and hydraulics. NEWP resumed drilling from 535' bls at 00:20 with 7.75" tricone bit. Boring TD'd at 600' bls. Air lift testing at 600' bls produced 120 gpm. Crew tripped out for geophysical logging. SWExp arrived on site at 05:35.

MONTGOMERY & ASSOCIATES

Drilling Daily Report

Date	M&A Personnel	Hours on Site	Well ID	Hole Size/Type	Drilling Depth		Hydrologic Data		Geology	Safety Meeting	Activities Summary
					Shift Start (feet bls)	Shift End (feet bls)	Water Depth (feet bls)	Airlift Production (gpm)			
29-Feb-20 [Day]	M. Mellott	12 (06:00-18:00)	RC20-2A [Tcg #2]	17.5" bore with 10.5" surface casing to 20', 7.75" Air hammer to 480', 7.5" tricone to 535'	600	600	132.0	---	Gila Conglomerate	Conducted take 5 with SwExp prior to geophysical logs and covered hazards specific to handling logging tools.	[LOGGING]: SwExp came on site today and conducted combo log, E-log, sonic log, OBI, ABI, and BMR logs. Geophysical logs were used to determine VWP install depth and well casing intervals. Night shift will begin installing 4" PVC casing.
29-Feb-20 [Night]	C. Pratt	12 (18:00-06:00)	RC20-2A [Tcg #2]	17.5" bore with 10.5" surface casing to 20', 7.75" Air hammer to 480', 7.5" tricone to 600'	600	600	---	---	Gila Conglomerate	NEWP lead covering heavy lifting and ladder safety	[CONSTRUCTION]: NEWP installed 4" slotted PVC from 599' to 268' bls. Blank PVC was installed from 268' to 0' bls. A VWP was installed at 165' bls. Silica sand tremeied in to 259' bls. Fine choke sand was emplaced to 255' bls.
1-Mar-20 [Day]	M. Mellott	12 (06:00-18:00)	RC20-2A [Tcg #2]	17.5" bore with 10.5" surface casing to 20', 7.75" Air hammer to 480', 7.5" tricone to 535'	600	600	130.2	---	Gila Conglomerate	NEWP lead covering hazards associated with construction, specifically when removing symmetrix casing.	[CONSTRUCTION]: NEWP emplaced 4 bags of 3/8" bentonite chips to approximately 245' bls. After allowing an hour for chips to hydrate, a 200 gallon batch of cement-bentonite grout was piped downhole. Symmetrix casing required significant force to move, raising concerns of hole stability and potential slumping around the casing shoe. In response, NEWP removed single 20' sections of symmetrix casing and added half batches (100 gallons) of grout between lifts. Grout was added to within 5' of land surface before allowing to cure.
1-Mar-20 [Night]	C. Pratt	9 (18:00-03:00)	RC20-2A [Tcg #2]	17.5" bore with 10.5" surface casing to 20', 7.75" air hammer to 480', 7.5" tricone to 600'	600	600	139.1	46	0' - ~62': Qal ~62' - 600': Tcg	NEWP lead covering working near pressurized lines.	[DEVELOPMENT]: NEWP airlifted water from 240' bls for two hours. Water was subsequently airlifted from 260' and 280' bls respectively for an hour each.Water quality parameters were measured every half hour. Flow measurements were taken at the start of airlifting and then once per interval. NEWP is mobing to next site.
2-Mar-20 [Day]	C. Gregory	7.75 (10:30-18:15)	RC20-2B [DC #1]	17.5" bore with 10.5" surface casing to 20'	0	20	---	---	0' - 20': Qal	NEWP lead: site induction of safety hazards and e-stops on rig and auxiliary equipment. Take 5 completed prior to start of drilling.	[DRILLING]: Following mobilization and rig inspection, surface drilling began at 13:15 hrs. Drilling was conducted using conventional mud rotary and a 17.5" tricone drilling bit. M&A staff collected lith samples according to specifications indicated in the RCM technical memorandum. Surface drilling reached a final depth of 20 ft bls at 15:10 hrs. NEWP conditioned the borehole for approximately one hour before installing 20 ft of 10.5" surface casing to a total depth of 20 ft bls.
2-Mar-20 [Night]	C. Pratt	12 (18:00-06:00)	RC20-2B [DC #1]	17.5" bore with 10.5" surface casing to 19.5', 9.5" Symmetrix to 67' bls'	20	67	---	---	0' - 67': Qal	NEWP lead covering working at heights and fall arrest gear.	[DRILLING]: NEWP cemented the 10.5" surface casing in place. While waiting for cement to cure, NEWP continued to make adjustments to the pad. Drilling resumed from 20' to 67' bls with a 7.75" hammer bit. Symmetrix casing was installed to 67' bls.
3-Mar-20 [Day]	C. Gregory	12.5 (06:00-18:30)	RC20-2B [DC #1]	17.5" bore with 10.5" surface casing to 19.5', 9.5" Symmetrix to 92', 7.75" air hammer to 156'	67	156 [TD]	~116	<0.1	0' - 87' (approx.): Qal 87' - 155': Tcg	NEWP lead: review slips, trips, and falls in working area; review operations plan.	[DRILLING]: Open-hole drilling resumes from 67' bls with air hammer. At 77' bls, bottom of borehole begins to cave-in. Air hammer is tripped-out and replaced with Symmetrix system. Drilling is advanced to 87' bls, where Qal/Tcg contact is encountered. Symmetrix casing is advanced to 92' bls, and drilling resumes open-hole with the air hammer to final depth of 156' bls. Following extended airlift test that yielded < 0.1 gpm, NEWP breaks drilling rod string and water level recovery is monitored up to ~116' bls, where it appears to stabilize. SwExp will be notified to come to site this evening.

Drilling Daily Report

Date	M&A Personnel	Hours on Site	Well ID	Hole Size/Type	Drilling Depth		Hydrologic Data		Geology	Safety Meeting	Activities Summary
					Shift Start (feet bls)	Shift End (feet bls)	Water Depth (feet bls)	Airlift Production (gpm)			
3-Mar-20 [Night]	C. Pratt	12 (18:00-06:00)	RC20-2B [DC #1]	17.5" bore with 10.5" surface casing to 19.5', 9.5" Symmetrix to 92', 7.75" air hammer to 156'	156 [TD]	156 [TD]	113.5	---	0' - ~87': Qal ~87' - 156': Tcg	NEWP lead covering working at heights and fall arrest gear.	[DRILLING]: TD was called at 156' bls. M&A monitored rising water level in the boring. SWExp arrived on site and conducted geophysical logs with the combo and OBI tool. [CONSTRUCTION]: For the lower well, 40' of 2" slotted schedule 40 PVC pipe was installed followed by 115' of 2" blank schedule 40 PVC. For the upper well, 50' of 2" slotted schedule 40 PVC pipe was installed followed by 40' of 2" blank PVC. Coarse silica sand was installe from 156' to 97' bls by the end of day shift.
4-Mar-20 [Day]	C. Gregory	12 (06:00-18:00)	RC20-2B [DC #1]	17.5" bore with 10.5" surface casing to 19.5', 9.5" Symmetrix to 92', 7.75" air hammer to 156'	156 [TD]	156 [TD]	113.5	---	0' - ~87': Qal ~87' - 156': Tcg	NEWP lead: review hazards during well construction and plan for annulus materials and depths.	[CONSTRUCTION]: Well construction continued with the installation of annular materials that included: bentonite plug from 97' to 87' bls; coarse sand from 87' to 30' bls; bentonite plug from 30' to 20'; neat cement from 20' to surface. Both bentonite plug seals were hydrated with water, and the neat cement was allowed to cure prior to the beginning of development activities. A brief, 2-3 hr development of the lower well will be conducted at the start of night shift prior to the drilling rig mobing ~35 ft away to begin drilling at RC20-2C.
4-Mar-20 [Night]	C. Pratt	12 (18:00-06:00)	RC20-2B [DC #1] RC20-2C [Qal #1]	17.5" bore with 10.5" surface casing to 19.5', 9.5" Symmetrix to 92', 7.75" air hammer to 156'	156	156	---	---	0' - ~87': Qal ~87' - 156': Tcg	NEWP lead covering working around pressurized lines and moving equipment.	[DEVELOPMENT]: 1" pipe was tripped into 147' bls in the lower well at RC20-2B. After attaching the air compressor to directly to the 1" pipe, the well was developed for ~30 minutes. The well was then developed from 127' bls for ~30 minutes. [DRILLING]: Following development, NEWP mobilized to RC20-2C with drilling anticipated to begin at 0600.
5-Mar-20 [Day]	C. Gregory	12 (06:00-18:00)	RC20-2C [Qal #1]	17.5" bore with 10.5" surface casing to 20', 9.5" Symmetrix to 70'	0	70	---	---	0' - 70': Qal	NEWP lead: review internal JSAs and risks with day shift tasks. Watch for slips, trips, and falls around mud near mixing tank.	[DRILLING]: Surface drilling was completed to 20' bls, and 10.5" surface casing was installed and cemented in the morning. In the afternoon, drilling resumed with the 9.5" Symmetrix casing advance to a depth of 70' bls (TD). Well construction activities will begin during night shift. [SAMPLES]: RC staff was on-site from approximately 11:00 - 11:30 hrs and picked-up RC20-2B samples.
5-Mar-20 [Night]	C. Pratt	4 (18:00-22:00)	RC20-2C [Qal #1]	17.5" bore with 10.5" surface casing to 20', 9.5" Symmetrix casing to 70'	70 [TD]	70 [TD]	---	---	0' - 70': Qal	NEWP lead covering tripping out large diameter pipe.	[CONSTRUCTION]: 40 ft of 4" schedule 40 PVC screen was installed from 70' to 30' bls, followed by 30 feet of schedule 40 PVC blank from 30' bls to ground surface. The crew finished installing annual material at 22:00 hrs and prepared to mob to the next site.
6-Mar-20 [Day]	C. Gregory	3.5 (13:30-17:00)	RC20-2D [Bedrock Well]	17.5" bore with 10.5" surface casing to 20'	0	20	---	---	0' - 20': Qal	NEWP lead: provide site induction of safety hazards at new site to M&A staff; review parking outside of drill pad and hazards around logging station.	[DRILLING]: M&A arrived on site for the start of surface drilling at 13:30 hrs. Following a site induction and preparation of drilling string, surface drilling began and was completed to a depth of 20' bls. 20 feet of 10.5" surface casing was installed and cement was poured around the casing by the end of day shift.

Drilling Daily Report

Date	M&A Personnel	Hours on Site	Well ID	Hole Size/Type	Drilling Depth: Shift Start (feet bls)	Drilling Depth: Shift End (feet bls)	Hydrologic Data: Water Depth (feet bls)	Hydrologic Data: Airlift Production (gpm)	Geology	Safety Meeting	Activities Summary
6-Mar-20 [Night]	L. Wersan	12 (18:00-06:00)	RC20-2D (Bedrock Well)	17.5" bore with 10.5" surface casing to 20', 9.5" Symmetrix to 50'	20	50	---	---	0'-34': Qal 34'-50': Cb	NEWP lead covering lifting operations, Symmetrix casing use, mobile equipment, and exclusion zones	[DRILLING]: NEWP rigged up to drill ahead with the Symmetrix casing hammer while the surface casing cement cured. Once the cement had set, drilling resumed from 20' bls with the Symmetrix casing advance to 50' bls. Drilling will continue during the day shift with the 7.5" hammer BHA.
7-Mar-20 [Day]	N. Speaks	12 (05:45-18:15)	RC20-2D (Bedrock Well)	17.5" bore with 10.5" surface casing to 20', 9.5" Symmetrix to 56', 7.5" hammer to 150'	50	155	70.0	12 gpm @ 110 ft bls	0'-34': Qal 34'-155': Cb	NEWP lead: review internal JSAs. Watch for slips, trips, and falls around mud near mixing tank.	[DRILLING]: Drilling continued from 50' with 7.5" hammer BHA. Rock began fracturing at 130', bit was advanced to 155' with some lost returns. Line became clogged with large chips and needed to be cleaned out. Hammer eventually changed out for tricone bit to try and advance hole. Material continued to fall in during hole clean-out after bit changeover. Project management chose to TD hole early.
7-Mar-20 [Night]	L. Wersan	3.5 (18:00-21:30)	RC20-2D (Bedrock Well)	17.5" bore with 10.5" surface casing to 20', 9.5" Symmetrix to 56', 7.75" air hammer to 155'	155	155	70.0	12 gpm @ 110 ft bls	0'-34': Qal 34'-155': Cb	NEWP lead: Review tripping procedures and lifting operations, discuss hand placement and body positioning	[DRILLING]: Hole TD called at 155' bls due to borehole instability issues. After tripping to bottom at the start of the shift NEWP tagged TD at 143' bls due to slumping in the borehole. NEWP tripped out all pipe and tooling and installed temporary 6" PVC casing to 57' bls while waiting for SW Exp to arrive onsite at 08:00.
8-Mar-20 [Day]	N. Speaks	11 (07:15-18:15)	RC20-2D (Bedrock Well)	17.5" bore with 10.5" surface casing to 20', 9.5" Symmetrix to 56', 7.75" air hammer to 155'	155	155	70.0	12 gpm @ 110 ft bls	0'-34': Qal 34'-155': Cb	NEWP lead: review internal JSAs. Watch for pinch points, heavy lifting, manual handling, objects falling from heights.	[CONSTRUCTION]: SWExp arrived on site and conducted geophysical logs with the combo tool; due to hole stability, SWExp did not want to put any more tools downhole. NEWP installed 4" slotted PVC from 139' to 99' bls. Blank PVC was installed from 99' to 0' bls. Silica sand tremied in to 77' bls and bentonite plug from 77' to 56' bls. Due to wash outs, more material was used than expected.
8-Mar-20 [Night]	L. Wersan	12.25 (18:00-06:15)	RC20-2D (Bedrock Well)	17.5" bore with 10.5" surface casing to 20', 9.5" Symmetrix to 56', 7.75" air hammer to 155'	140	140	72.2	14.5	0'-34': Qal 34'-155': Cb	NEWP lead: review high pressure hoses, hammer unions, and angles of approach. Review lifting procedures and exclusion zones for non-essential personnel.	[CONSTRUCTION]: NEWP mixed and pumped cement/bentonite grout mixture to surface. After waiting for grout to cure, NEWP rigged up and tripped in for well development; first development airlift started at 03:50. [DEVELOPMENT]: NEWP tripped in AQ pipe to 97' bls and developed the screened borehole section. The borehole was developed for 1/2 hour increments at 97', 117', and 137' bls while NEWP began mobilizing to next site. Final development will continue from 137' bls to top of screen interval during day shift.
9-Mar-20 [Day]	N. Speaks	11 (05:55-18:20)	RC20-2D (Bedrock Well)	17.5" bore with 10.5" surface casing to 20', 9.5" Symmetrix to 56', 7.75" air hammer to 155'	140	140	72.1	12 gpm @ 110 ft bls	0'-34': Qal 34'-155': Cb	NEWP lead: review Airlifting JSAs. Watch for pinch points, manual handling, slips trips and falls, backhoe operation, property/equiptet damage, objects falling from heights.	[DEVELOPMENT]: Well development continued from 137' bls to 97' bls in 20 ft intervals. Development continued until sand content was neglable, ~45 minutes per zone. [SAMPLES]: RC staff was on-site from approximately 1245 - 1315 hrs and picked-up RC20-2D samples. [MOBILIZATION]: NEWP mobilized to Brady property with drilling on DC#3 anticipated to begin on 3-10-20 around 0900 hrs.

MONTGOMERY & ASSOCIATES

Drilling Daily Report

Date	M&A Personnel	Hours on Site	Well ID	Hole Size/Type	Drilling Depth: Shift Start (feet bls)	Drilling Depth: Shift End (feet bls)	Hydrologic Data: Water Depth (feet bls)	Hydrologic Data: Airlift Production (gpm)	Geology	Safety Meeting	Activities Summary
10-Mar-20 [Day]	N. Speaks	10 (08:00-18:00)	RC20-18 (DC#3)	17.5" bore with 10.5" surface casing to 20'	0	20	---	---	0'-20': Qal	NEWP lead: review JSA on rotary mixing operations. Watch slips trips and falls, pinchpoints, rotating pipe, working at heights, falling/dropping tools, improper lifting techniques, strains.	[DRILLING]: Following rig inspection, surface drilling began at 12:05 hrs. Drilling was conducted using conventional mud rotary and a 17.5" tricone drilling bit. M&A staff collected lith samples according to specifications indicated in the RCM technical memorandum. Surface drilling reached a final depth of 20 ft bls at ~14:00 hrs. NEWP conditioned the borehole for ~one hour before installing 20 ft of 10.5" surface casing to a total depth of 20 ft bls.
11-Mar-20 [Day]	N. Speaks	5 (06:00-11:00)	RC20-18 (DC#3)	17.5" bore with 10.5", surface casing to 20', 7.75" air hammer to 55'	20	55	---	---	0'-20': Qal	NEWP lead: review JSA on Symmetrix add and removal. Watch slips trips and falls, slick roads, crush points, struck by or pinned.	[DRILLING]: NEWP began work at began preparations for drilling at sunrise. Drilling resumed from 20' to 55' bls with a 7.75" hammer bit. Symmetrix casing was installed to 50' bls.
		1 (11:35-12:40)	RC20-2B, C, D	1 (11:35-12:40)	---	---	---	---	---	---	Collected gps coordinates at RC20-2B, C & D. Examined baker tank layout and tank cleanliness at RC20-2C.
11-Mar-20 [Day]	L. Wersan	9 (09:00-18:00)	RC20-18 (DC#3)	17.5" bore with 10.5", surface casing to 20', 9 5/8" Symmetrix casing to 82'	55	82	67.44	---	0'-52': Qal 52'-82': Tcg (?)	NEWP lead: review lifting procedures, changing downhole tooling, and exclusion zones. Review pressurized line safety and hand/body placement.	[DRILLING]: NEWP drilled ahead with 9 5/8" Symmetrix casing hammer to 56' bls, switching over to the 7.75" air hammer after encountering competent rock at 52' bls. Drilling proceeded from 56' and encountered a zone of borehole instability from 70'-76' bls. Symmetrix casing was advanced past the unstable zone to 82' bls before drilling was halted at the end of shift. Tomorrow morning NEWP will continue drilling from 82' bls to TD with the 7.75" air hammer.
12-Mar-20 [Day]	L. Wersan	11.75 (06:00-17:45)	RC20-18 (DC#3)	17.5" bore with 10.5", surface casing to 20', 9 5/8" Symmetrix casing to 99', 7.75" air hammer to 130'	82	130	89.4	16 gpm	0'-94': Qal 94'-130': Tcg	NEWP lead: Review well construction and PVC trip JSAs, Review sampling procedures and personnel/vehicle movement on wet pad	[DRILLING]: NEWP drilled ahead with 7.75" air hammer from 82'-85' bls. Continued borehole instability necessitated switching back to 9 5/8" Symmetrix casing hammer. Symmetrix casing advanced to 99'; Competent Tcg was encountered at 94' bls. NEWP drilled ahead from 99' to TD at 130' with 7.75" air hammer. [CONSTRUCTION]: PVC was installed for the Tcg completion to 130' bls, with a screened interval from 130' to 110' bls. #8-12 Silica sand was installed to 105' bls, followed by a bentonite seal from 105' to 94' bls. Tomorrow NEWP will install the alluvium completion to 94' bls and finish well construction.
13-Mar-20 [Day]	L. Wersan	11.25 (06:00-17:15)	RC20-18 (DC#3)	17.5" bore with 10.5", surface casing to 20', 9 5/8" Symmetrix casing to 99', 7.75" air hammer to 130'	130	130	89.06	n/a	0'-94': Qal 94'-130': Tcg	NEWP lead: Review lightning alert procedures and vehicle movement on wet roads/pad. Discuss increased likelihood of S/T/F when adding well materials in wet conditions.	[CONSTRUCTION]: Alluvium PVC completion was installed to 91' bls with a screened interval from 91' to 41' bls. Silica sand was installed from 91' to 31' bls, then the well was completed to surface with 3/8" bentonite hole plug. After a red alert for lightning NEWP rigged up for development of the Tcg completion, which will begin at the start of operations tomorrow.
14-Mar-20 [Day]	M. Mellott	12 (06:00-18:00)	RC20-18 (DC#3)	17.5" bore with 10.5", surface casing to 20', 9 5/8" Symmetrix casing to 99', 7.75" air hammer to 130'	130	130	---	1.3	0'-94': Qal 94'-130': Tcg	NEWP lead: Review hazards associated with airlift testing and moving of rig.	[DEVELOPMENT]: Well development airlift was conducted at 120' bls. Development continued until turbidity and sand content stabilized (3 hours). NEWP tripped out piping and sealed well. Rig was then moved to begin drilling RC20-18A on the same pad.

Drilling Daily Report

Date	M&A Personnel	Hours on Site	Well ID	Hole Size/Type	Drilling Depth		Hydrologic Data		Geology	Safety Meeting	Activities Summary
					Shift Start (feet bls)	Shift End (feet bls)	Water Depth (feet bls)	Airlift Production (gpm)			
			RC20-18A (Qal #3)	17.5" bore with 10.5" surface casing to 20'	0	20	---	---	0-20': Qal	NEWP conducted Take 5 prior to moving rig and drilling surface	[DRILLING]: NEWP drilled 17.5" bore with mud tricone to 20' bls. 10.5" surface casing was installed and cemented by shift end. Drilling will continue tomorrow to a TD of 95' bls.
15-Mar-20 [Day]	M. Mellott	12 (06:00-18:00)	RC20-18A	17.5" bore with 10.5", surface casing to 20', 9 5/8" Symmetrix casing to 92'	20	92	84.15	<0.1	0-91': Qal 91-92': Tcg	NEWP lead: Reviewed safety hazards associated with drilling, specifically overhead hazards	[DRILLING]: Driling continued from 20' using symmetrix casing and pilot hammer bit. At ~91' a relatively competent horizon was noted by drillers. Drill chips of sandy matrix supported that the Qal/Tcg contact had been encountered. NEWP continued drilling an additional foot below the contact to a TD of 92' then tripped out. Airlift tests were conducted at 80' and 92' bls. Neither test showed significant water production. [CONSTRUCTION]: NEWP emplaced 40' of 4" slotted-screen PVC and 54' of 4" blank PVC. Silica sand was added while removing symmetrix casing. Top of sand tagged at 74' bls at the end of shift. Annular filling is anticipated to conclude tomorrow morning.
16-Mar-20 [Day]	M. Mellott	7 (06:00-13:00)	RC20-18A	17.5" bore with 10.5", surface casing to 20', 9 5/8" Symmetrix casing to 92'	92	92	89.9	---	0-91': Qal 91-92': Tcg	NEWP lead: Reviewed safety hazards associated with construction and breaking down drill rig.	[CONSTRUCTION]: NEWP continued filling annulus with silica sand to 41' bls. Two feet of fine choke sand was emplaced followed by 3/8" bentonite chips. Bentonite chips were emplaced to 17' bls with water trickled downhole to hydrate. Due to lack of chips, bentonite grout was filled to surface after allowing chips to hydrate for 2 hours. NEWP will be flushing the shallow hole of RC20-18 and RC20-18A with 500 and 1000 gallons of water, respectively. NEWP is currently breaking down the rig and anticipates being able to demobilize by tomorrow evening.

Appendix B

Geophysical Survey Report

RPT-2020-004, Revision 0

GEOPHYSICAL CHARACTERIZATION OF THE SKUNK CAMP SITE, RESOLUTION MINE, ARIZONA

N. Crook
M. McNeill
J. Strohmeyer

hydroGEOPHYSICS
2302 N. Forbes Blvd, Tucson, AZ 85745 USA

Date Published
February 2020

Prepared for Montgomery & Associates / Resolution Copper Mine

TABLE OF CONTENTS

1.0 INTRODUCTION 1
1.1 PROJECT DESCRIPTION 1
1.2 SITE LOCATION 1
1.3 OBJECTIVE OF INVESTIGATION 1
1.4 SCOPE OF INVESTIGATION 1

2.0 GEOPHYSICAL THEORY 5
2.1 ELECTRICAL RESISTIVITY 5
2.2 P-WAVE SEISMIC REFRACTION 6
2.3 MULTI-CHANNEL ANALYSIS OF SURFACE WAVES (MASW) 7

3.0 METHODOLOGY 9
3.1 SURVEY AREA AND LOGISTICS 9
3.1.1 Resistivity Data Acquisition 9
3.1.2 Seismic Refraction Data Acquisition 9
3.1.3 MASW Data Acquisition 10
3.2 EQUIPMENT 10
3.2.1 Resistivity Equipment 10
3.2.2 Seismic Equipment 11
3.2.3 GPS 11
3.3 QUALITY CONTROL 11
3.4 DATA PROCESSING 11
3.4.1 Resistivity Data Processing 11
3.4.1.1 2D Resistivity Modeling 12
3.4.2 Seismic Refraction Data Processing 12
3.4.2.1 Seismic Refraction Modeling 13
3.4.3 MASW Processing 14

4.0 RESULTS & SUMMARY 15
4.1 ELECTRICAL RESISTIVITY AND SEISMIC REFRACTION RESULTS 15
4.2 MASW RESULTS 20
4.3 SUMMARY 23

5.0 REFERENCES 24

Figure 1. General Location Map. 3
Figure 2. Detailed Coverage Map. 4
Figure 3. Possible Arrays for Use in Electrical Resistivity Characterization. 5
Figure 4. Ray Travel for Seismic Refraction Surveying. 7
Figure 5. Example of Surface Wave Dispersion Produced During MASW Survey. 8
Figure 6. Example Shot Record Showing First Break Picks. 13
Figure 7. Example of Layer Assignments. 13
Figure 8. Example Dispersion Curve. 14
Figure 9. Line 1 Electrical Resistivity and Seismic Refraction Inverse Model Results. 18
Figure 10. Line 2 Electrical Resistivity and Seismic Refraction Inverse Model Results. 19
Figure 11. Line 1 MASW Results. 21
Figure 12. Line 2 MASW Results. 22

Table 1. Electrical Resistivity Survey Details. 9
Table 2. Seismic Refraction Survey Details. 10
Table 3. MASW Survey Details. 10
Table 4. Summary of MASW Results. 20

1.0 INTRODUCTION

1.1 PROJECT DESCRIPTION

In January 2020, hydroGEOPHYSICS, Inc. (HGI), under contract to Montgomery & Associates (M&A), performed a geophysical survey to investigate the subsurface at a proposed Tailings Storage Facility (TSF) at the Skunk Camp Site, near Kearny, Arizona. In 2018, HGI completed a similar geophysical survey to the northeast of the current deployment, with a focus on assessing the depth to bedrock, estimating the rippability of the Gila conglomerate bedrock, and identifying and locating a fault.

1.2 SITE LOCATION

The Skunk Camp Site is located in central Arizona within Pinal and Gila County, approximately 10 miles north of Kearny, Arizona. Figure 1 shows the general location of the geophysical survey.

1.3 OBJECTIVE OF INVESTIGATION

The objective of the overall geophysical survey was to:

- Assess thickness and variability of alluvial deposits within the potential TSF footprint.
- Estimate the rippability of the underlying Gila conglomerate bedrock.
- Provide V_s30 measurements of the alluvial sediments and bedrock.
- Characterize the saturation within the alluvial deposits.

1.4 SCOPE OF INVESTIGATION

Three geophysical methods were employed and co-analyzed to characterize the survey area: electrical resistivity, P-wave refraction, and multi-channel analysis of surface waves (MASW).

The P-wave refraction method is well suited to determining depth to bedrock and bedrock structure, based on the contrast in seismic velocity between unconsolidated alluvial and bedrock materials. Due to the dependence of seismic velocity on the elasticity and density of the material through which the energy is passing, seismic refraction surveys provide a measure of material strengths and can consequently be used as an aid in assessing rippability and rock quality.

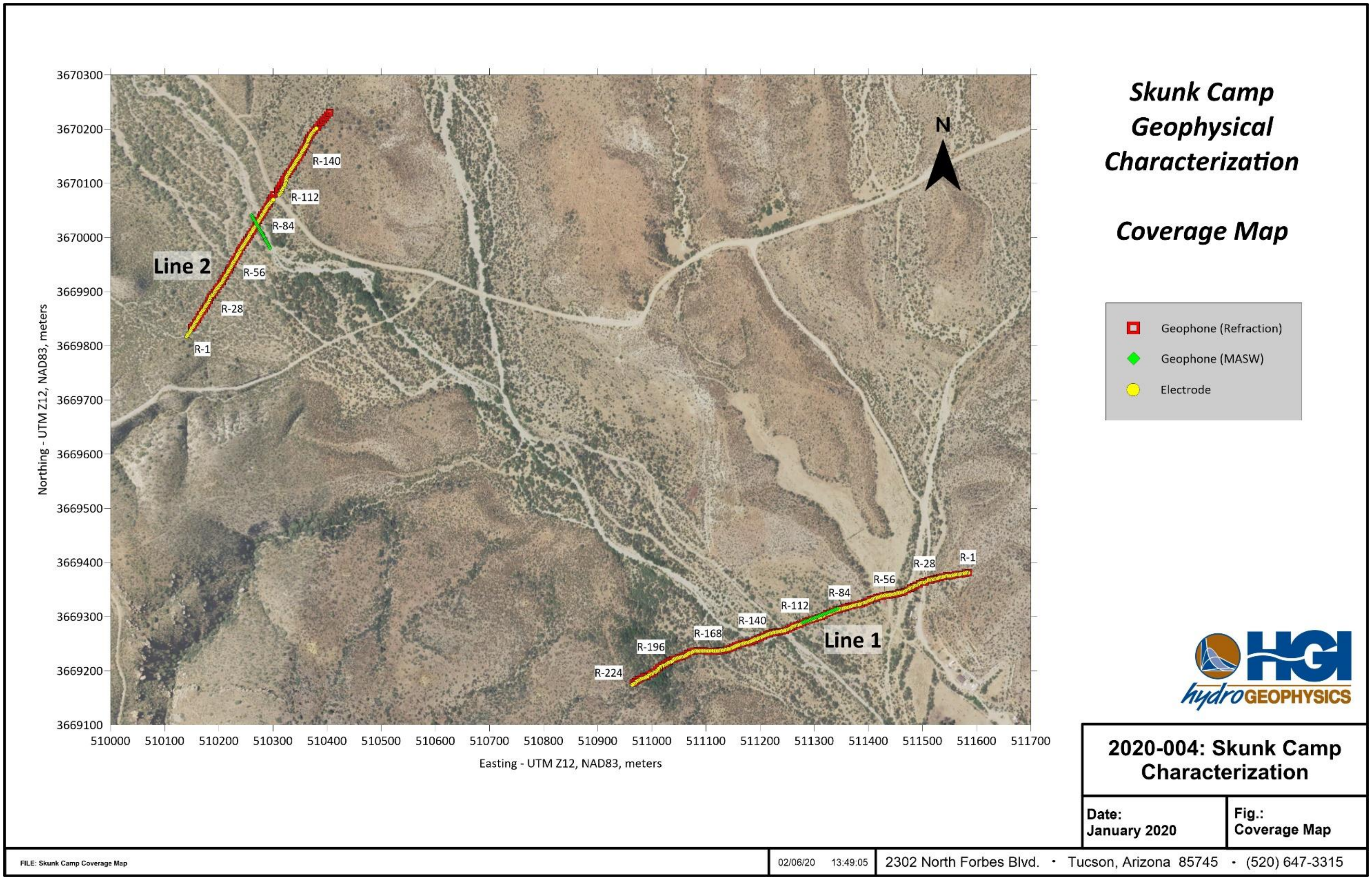
MASW first measures seismic surface waves generated from various types of seismic sources — such as a sledge hammer — analyzes the propagation velocities of those surface waves, and then finally deduces shear-wave velocity (V_s) variations below the surveyed area. Shear-wave velocity

(V_s) is one of the elastic constants and closely related to Young's modulus. Under most circumstances, V_s is a direct indicator of the ground strength (stiffness) and therefore commonly used to derive load-bearing capacity.

In general, electrical resistivity is the science of measuring the electrical properties of the subsurface, with the goal of using those properties to help characterize structure and properties of rocks and sediments and their pore fluids. Electrical resistivity, for example, can be used to remotely observe changes in hydrogeological properties, saturation within sediments, or extend "ground truth" information about geological/geotechnical structures and properties based on borehole data. Electrical resistivity surveys are most reliable as a first-order target recognition tool. In this mode, sufficient background data are required to distinguish the entirety of the target and confirm the extent of its edges. A target cannot be identified if the variations in properties of the background material are similar in contrast and scale to those associated with the target.

Figure 1. General Location Map.

Figure 2. Detailed Coverage Map.



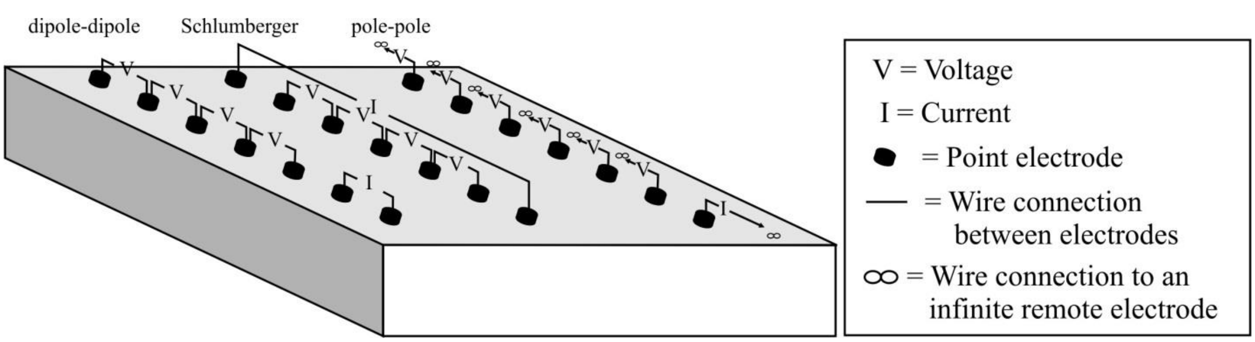
2.0 GEOPHYSICAL THEORY

2.1 ELECTRICAL RESISTIVITY

Electrical resistivity is a volumetric property that describes the resistance of electrical current flow within a medium (Rucker et al., 2011; Telford et al., 1990). Direct electrical current is propagated in rocks and minerals by electronic or electrolytic means. Electronic conduction occurs in minerals where free electrons are available, such as the electrical current flow through metal. Electrolytic conduction, on the other hand, relies on the dissociation of ionic species within a pore space. With electrolytic conduction, the movement of electrons varies with the mobility, concentration, and the degree of dissociation of the ions.

Mechanistically, the resistivity method uses electric current (I) that is transmitted into the earth through one pair of electrodes (transmitting dipole) that are in contact with the soil. The resultant voltage potential (V) is then measured across another pair of electrodes (receiving dipole). Numerous electrodes can be deployed along a transect (which may be anywhere from feet to miles in length), or within a grid. Figure 3 shows examples of electrode layouts for surveying. The figure shows transects with a variety of array types (dipole-dipole, Schlumberger, pole-pole). A complete set of measurements occurs when each electrode (or adjacent electrode pair) passes current, while all other adjacent electrode pairs are utilized for voltage measurements. Modern equipment automatically switches the transmitting and receiving electrode pairs through a single multi-core cable connection. Rucker et al. (2009) describe in more detail the methodology for efficiently conducting an electrical resistivity survey.

Figure 3. Possible Arrays for Use in Electrical Resistivity Characterization.



The modern application of the resistivity method uses numerical modeling and inversion theory to estimate the electrical resistivity distribution of the subsurface given the known quantities of electrical current, measured voltage, and electrode positions. A common resistivity inverse method incorporated in commercially available codes is the regularized least squares optimization method (Sasaki, 1989; Loke, et al., 2003). The objective function within the optimization aims to minimize the difference between measured and modeled potentials (subject to certain constraints, such as the type and degree of spatial smoothing or regularization) and the optimization is conducted iteratively due to the nonlinear nature of the model that describes the potential distribution. The relationship between the subsurface resistivity (ρ) and the measured voltage is given by the following equation (from Dey and Morrison, 1979):

$$-\nabla \cdot \left[\frac{1}{\rho(x,y,z)} \nabla V(x,y,z) \right] = \left(\frac{I}{U} \right) \delta(x-x_s)\delta(y-y_s)\delta(z-z_s) \qquad (1)$$

where I is the current applied over an elemental volume U specified at a point (x_s, y_s, z_s) by the Dirac delta function.

Equation (1) is solved many times over the volume of the earth by iteratively updating the resistivity model values using either the L_2-norm smoothness-constrained least squares method, which aims to minimize the square of the misfit between the measured and modeled data (de Groot-Hedlin & Constable, 1990; Ellis & Oldenburg, 1994):

$$\left(J_i^T J_i + \lambda_i W^T W \right) \Delta r_i = J_i^T g_i - \lambda_i W^T W r_{i-1} \qquad (2)$$

or the L_1-norm that minimizes the sum of the absolute value of the misfit:

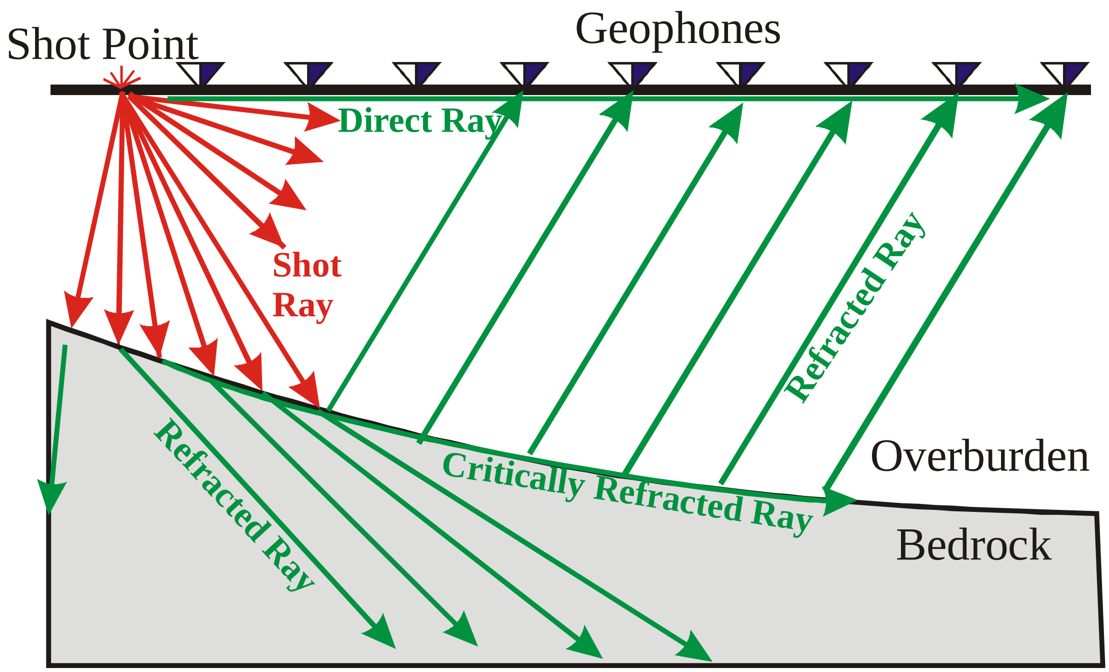
$$\left(J_i^T R_d J_i + \lambda_i W^T R_m W \right) \Delta r_i = J_i^T R_d g_i - \lambda_i W^T R_m W r_{i-1} \qquad (1)$$

where g is the data misfit vector containing the difference between the measured and modeled data, J is the Jacobian matrix of partial derivatives, W is a roughness filter, R_d and R_m are the weighting matrices to equate model misfit and model roughness, Δr_i is the change in model parameters for the i^{th} iteration, r_i is the model parameters for the previous iteration, and λ_i = the damping factor.

2.2 P-WAVE SEISMIC REFRACTION

The P-wave seismic refraction method is based on the measurement of the travel time of seismic compressional waves refracted at the interfaces between subsurface layers of different velocity. Figure 4 shows an example of the seismic refraction method. Seismic energy is provided by a source ('shot') located on the surface. For shallow applications, the shot normally comprises a hammer and plate, weight drop, or small explosive charge (blank shotgun cartridge). Energy radiates out from the shot point, either traveling directly through the upper layer (direct arrivals), or traveling down to and then laterally along higher velocity layers (refracted arrivals) before returning to the surface. The refracted energy is detected on the surface using a linear array (or spread) of geophones spaced at regular intervals. Beyond a certain distance from the shot point, known as the cross-over distance, the refracted signal is observed as a first-arrival signal at the geophones (arriving before the direct arrival). Observation of the travel times of the direct and refracted signals provides information on the depth profile of the refractor.

Figure 4. Ray Travel for Seismic Refraction Surveying.



Data are recorded on a seismograph and later downloaded to a computer for analysis of the first-arrival times to the geophones from each shot position. Travel-time versus distance graphs are then constructed and velocities calculated for the overburden and refractor layers through analysis of the direct arrival and T-minus graph gradients. Depth profiles for each refractor are produced by an analytical procedure based on consideration of shot and receiver geometry and the measured travel-times and calculated velocities. The final output comprises a depth profile of the refractor layer and a velocity model of the subsurface.

The primary applications of seismic refraction are for determining depth to bedrock and bedrock structure. Due to the dependence of seismic velocity on the elasticity and density of the material through which the energy is passing, seismic refraction surveys provide a measure of material strengths and can consequently be used as an aid in assessing rippability and rock quality. The technique has been successfully applied to mapping depth to base of backfilled quarries, depth of landfills, thickness of overburden, voids, and the topography of groundwater.

2.3 MULTI-CHANNEL ANALYSIS OF SURFACE WAVES (MASW)

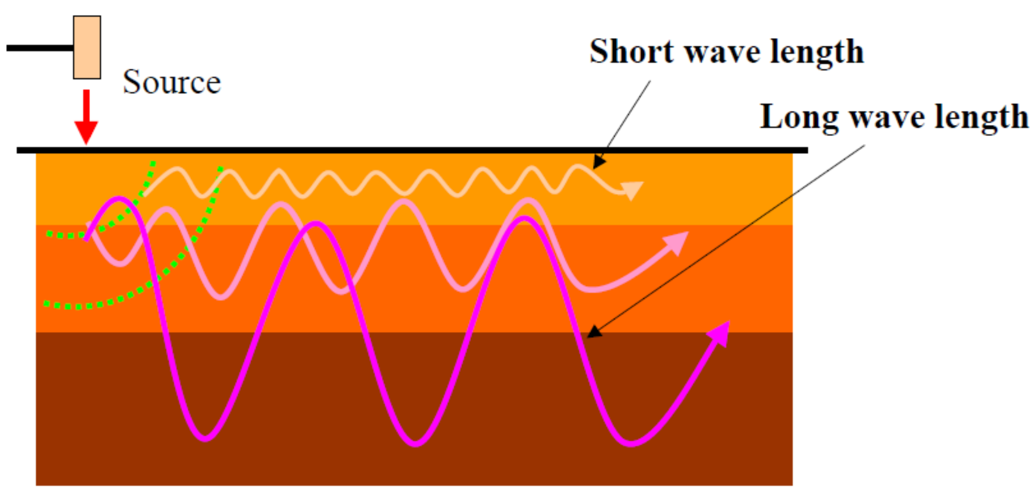
Dispersion, or change in phase velocity with frequency, is the fundamental property utilized in surface-wave seismic methods. Phase velocity of surface-wave is sensitive to the shear wave velocity (Vs); phase velocity of surface-wave is typically 90-95% that of the shear wave velocity.

Surface wave dispersion can be significant in the presence of velocity layering, which is common in the near-surface environment. There are other types of surface waves, or waves that travel along a surface, but in this application we are concerned with the Rayleigh wave, which is also called "ground roll" since the Rayleigh wave is the dominant component of ground roll.

"Active source" surface-wave surveying means that seismic energy is intentionally generated at a specific location relative to the geophone spread and recording begins when the source energy is imparted into the ground. This is in contrast to "passive source" surveying, also called "microtremor" surveying or "refraction microtremor" (or the commercial term "ReMi") surveying, where there is no time break and motion from ambient energy (generated by cultural noise, wind, wave motion, etc. at various, and usually unknown, locations relative to the geophone spread) is recorded.

Surface-wave energy decays exponentially with depth beneath the surface. Longer wavelength (that is, longer-period and lower-frequency) surface waves travel deeper and thus contain more information about deeper velocity structure (Figure 5). Shorter wavelength (that is, shorter-period and higher-frequency) surface waves travel shallower and thus contain more information about shallower velocity structure. In this context, by their nature and proximity to the geophone spread, it can be said that higher-frequency active source surface waves resolve the shallower velocity structure and lower-frequency passive source surface waves resolve the deeper velocity structure.

Figure 5. Example of Surface Wave Dispersion Produced During MASW Survey.



MASW surveys are conducted using the same source and seismograph equipment as the more common P-wave seismic refraction surveys, requiring only a change to lower frequency geophones (typically 4.5Hz). They are much easier to conduct than shear wave surveys, and benefit from increasing source power efficiency (for each sledgehammer blow 67% of the energy produced is in the form of surface-waves, 26% shear waves, and 7% P-waves) and consequently improved signal-to-noise ratio. The technique works best in soft rock geology conditions with minimal or constant topography change across the spread.

Shear wave velocity is one of the elastic constants and is closely related to Young's modulus. Under most circumstances, shear wave velocity is a direct indicator of the ground strength (stiffness) and therefore can be used to derive load-bearing capacity.

3.0 METHODOLOGY

3.1 SURVEY AREA AND LOGISTICS

The multi-method geophysical survey was conducted on January 28 through 31, 2020. Figure 2 shows a detailed overview of the coverage for this deployment.

3.1.1 Resistivity Data Acquisition

Two lines of electrical resistivity data were acquired with survey parameters as detailed in Table 1. Geophysical cables with approximately 10 feet (3 meters) spaced stainless steel electrodes were used along with a modified Wenner array for acquisition of the electrical resistivity data.

Table 1. Electrical Resistivity Survey Details.

Line Name	Direction of Collection	Electrode Spacing	Line Length
Line 1	Northeast to Southwest	~10 feet (3 meters)	~2,195 feet (669 meters)
Line 2	Southwest to Northeast	~10 feet (3 meters)	~1,625 feet (459 meters)

3.1.2 Seismic Refraction Data Acquisition

Two lines of seismic P-wave refraction data were acquired with survey parameters as detailed in Table 2. The seismic lines were co-located with the electrical resistivity lines to allow for a combined method analysis. 14-Hz geophone placement was every 20 feet, shot point spacing was approximately 120 feet located at the midpoint of geophone positions along the spread, with off-end shots at between 40 and 80 feet beyond the first and last geophones along each survey line, where accessible. The seismic source consisted of a UTV hitch mounted elastic wave generator with an approximately 90 pound (lb) (40 kilogram) weight drop (PEG-40), with a 16 lb sledgehammer used as a stand-in for locations where access constraints limited use of the UTV-mounted source. The Geodes were controlled from a laptop in order to view each shot to ensure acceptable data quality, and record and process the data. Additional shots with the source forming a new "stack" of data were added until the desired data quality was achieved. The shot record (seismogram) was also saved to the computer and stored for subsequent processing. A real-time noise monitor showing all geophones was carefully scrutinized during shots to ensure that noise levels were at a minimum for each shot. This included watching for breaks in wind noise, construction and other traffic, and other sources of noise.

Table 2. Seismic Refraction Survey Details.

Line Name	Direction of Collection	Geophone Spacing	Line Length
Line 1	Northeast to Southwest	20 feet	2,220 feet
Line 2	Southwest to Northeast	20 feet	1,580 feet

3.1.3 MASW Data Acquisition

Two lines of MASW data were acquired with survey parameters as detailed in Table 3. The MASW lines were located in the vicinity of the electrical resistivity and seismic refraction survey lines in order to provide V_s30 measurements of the alluvial sediments and bedrock in these locations. 4.5-Hz geophone placement was every 10 feet, with a shot point offset 60 feet from the end geophones being used for the survey lines (a number off-end shot point distances, or offsets, were tested to determine the optimum offset to use). The seismic source consisted of a UTV hitch mounted elastic wave generator with an approximately 90 lb (40 kilogram) weight drop (PEG-40), with a 16 lb sledgehammer used as a stand-in for locations where access constraints limited use of the UTV-mounted source. The Geodes were controlled from a laptop in order to view each shot to ensure acceptable data quality, and record and process the data. Additional shots with the source forming a new “stack” of data were added until the desired data quality was achieved. The shot record (seismogram) was also saved to the computer and stored for subsequent processing. A real-time noise monitor showing all geophones was carefully scrutinized during shots to ensure that noise levels were at a minimum for each shot. This included watching for breaks in wind noise, construction and other traffic, and other sources of noise.

Table 3. MASW Survey Details.

Line Name	Direction of Collection	Geophone Spacing	Line Length
Line 1	Northeast to Southwest	10 feet	230 feet
Line 2	Northwest to Southeast	10 feet	230 feet

3.2 EQUIPMENT

3.2.1 Resistivity Equipment

Data were collected using a Supersting™ R8 multichannel electrical resistivity system (Advanced Geosciences, Inc. (AGI), Texas) and associated cables, stainless steel electrodes, and battery power supply. The Supersting™ R8 meter is commonly used in surface geophysical projects and has proven itself to be reliable for long-term, continuous acquisition.

3.2.2 Seismic Equipment

Two Geode Ultra-Light Exploration 24–Channel Seismographs (Geometrics, Inc., San Jose, California) were used for seismic P-wave refraction and MASW surveying, providing a total of 48-channels. 14-Hz geophones were placed every 20 feet for the refraction survey and 4.5-Hz geophones were placed every 10 feet for the MASW survey, and the seismic source consisted of either the PEG-40 or a 16 lb sledgehammer.

3.2.3 GPS

Positional data were acquired via a Leica survey grade GPS; these data were used by the HGI field crew to record the location and elevation of electrodes and geophones for use in the subsequent modeling.

3.3 QUALITY CONTROL

Data were given a preliminary assessment for quality control (QC) in the field to assure quality of data before progressing the surveys. Following onsite QC, all data were transferred to the HGI server for storage and detailed data processing and analysis. Data quality was inspected and checked for consistency, and data files were saved to designated folders on the server. Records of survey configuration, location, equipment used, environmental conditions, proximal infrastructure or other obstacles, and any other useful information were recorded during data acquisition and were saved to the HGI Tucson server.

3.4 DATA PROCESSING

3.4.1 Resistivity Data Processing

The geophysical data for the resistivity survey, including measured voltage, current, measurement (repeat) error, and electrode position, were recorded digitally with the AGI SuperSting R8 resistivity meter. Quality control, both in-field and in-office, was performed throughout the survey to ensure data quality passed accepted standards. Data were assessed and data removal was performed based on degree of noise/other erroneous data. During data removal, those data that appeared to be extremely noisy and fell outside the normal range of accepted conditions were manually removed within an initial Excel spreadsheet analysis. Examples of conditions that would cause data to be removed include, negative or very low voltages, high-calculated apparent resistivity, extremely low current, and high repeat measurement error. No resistivity data values were manipulated or changed, such as with smoothing routines or box filters; noisy data were only removed from the general population. The edited dataset was then formatted for input to the 2D inverse modeling software.

3.4.1.1 2D Resistivity Modeling

RES2DINVx64 software (Geotomo, Inc.) was used for inverting individual lines in two dimensions. RES2DINV is a commercial resistivity inversion software package available to the public from www.geotomosoft.com. The inversion process followed a set of stages that utilized consistent inversion parameters to maintain consistency between each model. Inversion parameters were chosen to maximize the likelihood of convergence. Convergence of the inversion was judged whether the model achieved an RMS of less than 5% within three to five iterations. Inversion parameter choices included the starting model, the inversion routine (robust or smooth), the constraint defining the value of smoothing and various routine halting criteria that automatically determined when an inversion was complete. Qualified in-house inversion experts subjected each profile to a final review.

The inverted data were output from RES2DINVx64 and were gridded and color contoured in Surfer (Golden Software, Inc.). Where relevant and recorded, field observations such as roads, fences or other features were plotted on the resistivity section to assist in data analysis.

3.4.2 Seismic Refraction Data Processing

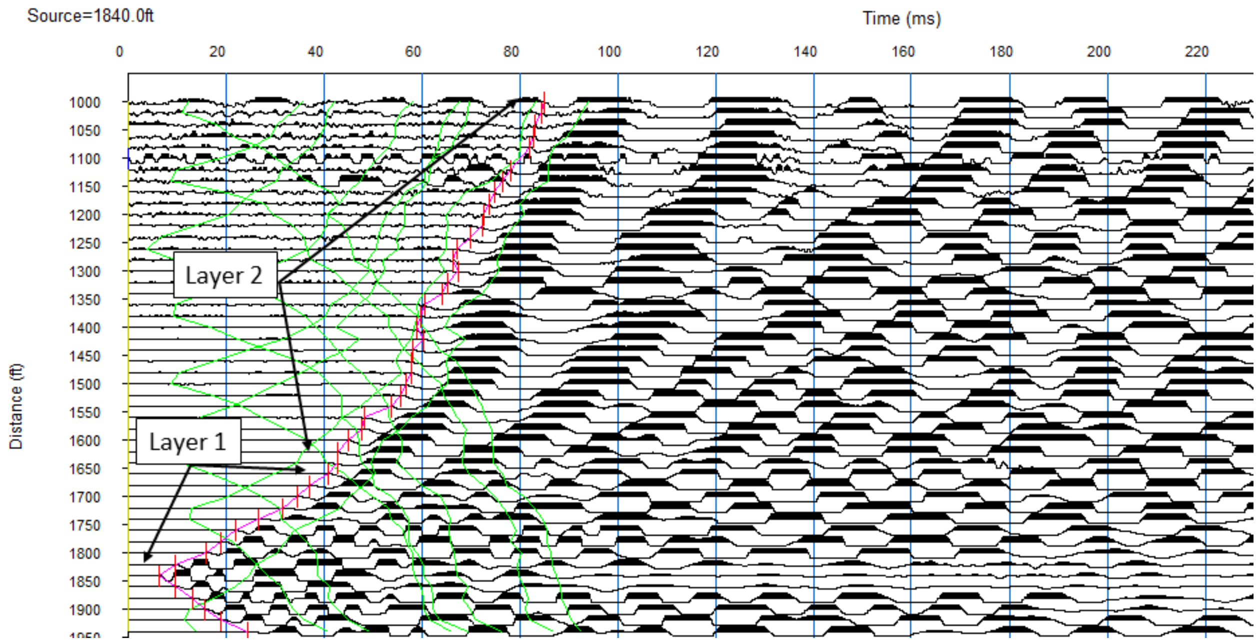
Data processing for the seismic refraction method consisted primarily of accounting for energy source and geophone locations, making adjustments for topographic changes along the geophone array profiles, and determining the first arrival times at the geophones. The final step was to determine subsurface acoustic properties using two different processing methods: refraction analysis, and tomographic inversion. The software incorporated all of the features necessary for accurate representation of subsurface properties, including the first break pick, inversion, and plotting.

Input Data: The geometry was created to define the relationship between the field file and channel numbers, and the source and receiver station numbers. Records marked in the Observer’s logs as needing to be omitted were edited from the data. At this stage and within the software, edits and corrections were made to account for any errors made in the field.

First Arrival Selection: The first step for data processing was to pick the time for first arrival of energy at the geophone from each of the shot records, also known as first break picking. Each geophone had a separate first break pick for each shot. The first break picking was conducted interactively within the Seisimager's software called Pickwin.

Figure 6 shows an example shot record. The x-axis is time in milliseconds and the y-axis is distance between geophones. The first break picks of energy arriving at the geophones are annotated as red marks below. There is an automatic picking option that is used initially in the software and then each trace in each shot record is manually reviewed and adjusted. In the example there are two distinct velocity slopes in arrivals representing the two layers as illustrated. The first slope, which is much steeper, indicates a slower velocity alluvium layer. The other layer is the refracted energy as it returns from a second and higher velocity layer. The second higher velocity layer may be either a more consolidated alluvium or weathered bedrock.

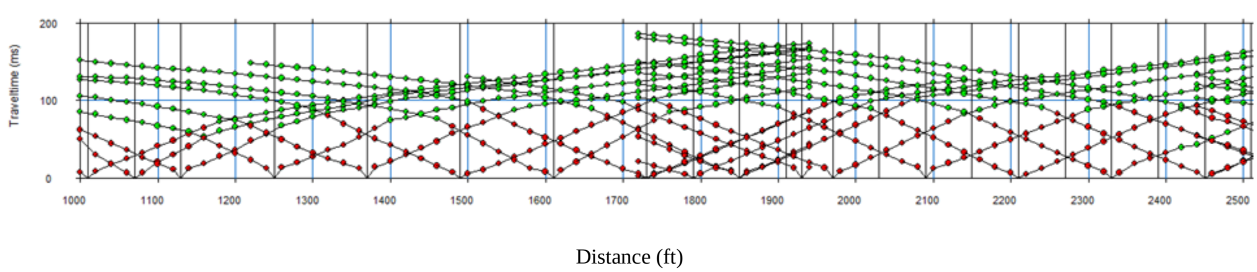
Figure 6. Example Shot Record Showing First Break Picks.



3.4.2.1 Seismic Refraction Modeling

Layer Assignment: Once the first breaks were assigned for all of the seismic lines, the next step in the process was layer assignment, where the user chose the slopes that best fit the two-layer or three-layer model. **Error! Reference source not found.** shows an example of layer assignments chosen using SeisImager's software called Plotrefa. The x-axis now shows distance and the y-axis shows the time in milliseconds. The red circles represent a Layer 1 and the green circles represent a Layer 2.

Figure 7. Example of Layer Assignments.



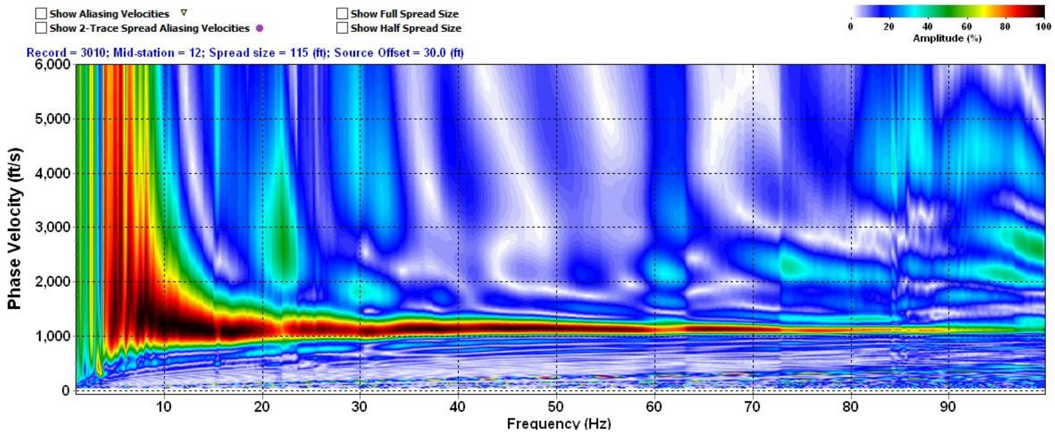
Refraction Analysis: Upon completion of the first break picks and the layer assignments, the refraction analysis was completed using the Seisimager software. Refraction analysis was completed for both lines using the time-term inversion modeling assuming a two or three-layer model. An initial model was used for geometry verification. The refraction program compared the predicted pick times with the actual pick times producing numerous statistical displays used for finding and correcting shot/patch position errors. A two or three-layer depth model was created using algorithms based on the generalized reciprocal method. This method assumes that layer velocity is constant and that the layer extends throughout the modeled section. For flat-layered geology this method is reliable and accurate, but tends to poorly represent variable horizontal velocity material and complex topographic changes within the layer.

Tomographic Inversion: Tomographic velocity inversion was completed using the Seisimager software. This method starts with an initial velocity model (generated manually or by the above mentioned time-term inversion and iteratively traces rays through the numerical model) with the goal of minimizing the root-mean squared (RMS) error between the observed and calculated travel times. Tomographic inversion is generally best suited for situations where velocity contrasts are known to be more gradational than discrete. In cases where strong horizontal velocity variations are known to exist, and in extreme topography, processing can lead to erroneous results with time-term least squares and delay-time inversion, depending on the severity of variations. Thus, tomographic inversion was chosen for the profiles here. The final output of the inversion modeling is a profile (X and Z dimensions) of acoustic velocity beneath each geophone spread. Generally, tomographic inversion requires a larger quantity and higher quality of data to produce viable results.

3.4.3 MASW Processing

The data processing flow for the MASW used the SurfSeis (Kansas Geological Survey, Lawrence, Kansas) MASW processing software. The processing sequence included: encoding the field geometry, generating dispersion images (example shown in Figure 8), extracting dispersion curves, and inversion of the dispersion curves using a gradient-based iterative approach, with the goal of minimizing the RMS error between the observed and calculated velocity curves. Convergence of the inversion was judged whether the model achieved an RMS of less than 5% within five to seven iterations.

Figure 8. Example Dispersion Curve.



4.0 RESULTS & SUMMARY

4.1 ELECTRICAL RESISTIVITY AND SEISMIC REFRACTION RESULTS

The inverse model results are provided as two-dimensional (2D) profiles in the following section. For the electrical resistivity model results, electrically conductive (low resistivity) subsurface regions are represented by cool hues (purple to blue) and electrically resistive regions are represented by warm hues (yellow to brown). In the seismic model results, low P-wave velocity is represented by cool hues (purple to blue) and high P-wave velocity is represented by warm hues (yellow to red). The same color scale is used for the Line 1 and Line 2 electrical resistivity profiles, while a different color scale is used for the two seismic refraction profiles due to a different range of velocities found in the modeled results.

Figure 9 shows the coincident electrical resistivity and P-wave refraction model results for survey Line 1. The electrical resistivity profile presents a general two-layer structure; with a resistive upper layer likely representing the alluvium, overlying a more conductive layer likely representing the Gila Conglomerate bedrock unit (upper profile in Figure 9). This interpretation correlates well with the seismic model results (lower profile in Figure 9); with the alluvium layer presenting as a low P-wave velocity upper layer, with a sharp increase in P-wave velocity corresponding to the bedrock interface indicated by the electrical resistivity model results. Drilling logs from the ranch irrigation well, located near the survey line at approximately 1,725 feet along the profile, contains some general lithologic descriptions which are displayed on the profiles. At this location, the 9,000 feet per second (feet/sec) contour intersects at the noted interface between "sand and gravel" and "clay and rock" at 60 feet below ground surface (bgs). The 9,000 feet/sec contour has been highlighted in both profiles with a white dashed line, potentially representing the bedrock interface.

Several locations along the resistivity profile vary slightly from the general two-layer structure interpretation, with a number of notable regions of increased conductivity within the upper generally resistive layer. Between approximately 0 and 375 feet along the profile, a conductive zone is observed in the vicinity of the location of Big Springs, with several highly conductive near-surface regions, likely representing an area of increased moisture in the near-surface. At approximately 700 feet along the profile, a highly conductive anomaly is noted that is most likely a result of interference due to a buried metallic pipeline that is transporting water to the nearby ranch. This anomaly creates neighboring extreme high and low resistive artifacts in the model results, in addition to a vertical conductive zone extending to the bottom of the model profile. Two conductive regions between approximately 1,000 and 1,450 feet, and 1,550 and 1,650 feet along the profile are potentially a response to increase moisture content of the alluvium, a perched water layer or saturated zone for example. Alternatively, these two regions could represent an increase in the fine grained content of the alluvium, silts and clay for example. A resistive layer, directly below the conductive region between approximately 1,000 and 1,450 feet along the profile, ends abruptly at approximately 1,400 feet along the line. The increase in conductivity observed beyond approximately 1,400 feet along the profile could be a response to moisture movement away from the overlying perched water layer. The resistive layer may represent more competent or cemented alluvium or alternatively a coarser grained region of the alluvium. A decrease in resistivity value near the end of the profile may again be due to increased moisture in the alluvium as a smaller drainage was noted at about 2000 feet along the line, or an increased percentage of clays in the alluvium.

In the lower, more conductive layer a sharp transition is observed at approximately 900 feet along the line, where in the western portion the layer is slightly more resistive (tan and olive hues) in comparison to the eastern portion (blue hues). It is possible that this represents a transition from the conglomerate unit into volcanic units that are noted in geologic maps in the western side of this survey area. This transition could also indicate the location of the fault associated with the Dripping Springs Wash. Another transition in this lower layer is hinted at the beginning of the profile, where an increase in resistivity occurs around the edge of the model. This could again indicate a change in lithology, potentially bounded by a fault feature, to a more resistive bedrock unit and the geological map does indicate a number of volcanic units in this area. However, based on the proximity to the edge of the model, where the resolution is much reduced, this could also be a modeling artifact.

The seismic refraction profile interpretation would suggest that the alluvium is approximately 50 feet in thickness at a distance between approximately 0 and 350 feet along the line. There appears to be a small incised channel type structure between approximately 400 and 500 feet along the profile, where the alluvium increases in thickness to approximately 75 feet. The alluvium then decreases in thickness to approximately 50 feet in thickness until approximately 725 feet along the profile. Above approximately 725 feet the alluvium increases in thickness to approximately 70 to 75 feet, across the wash areas located between 750 and 1,700 feet along the profile. After this point, the alluvium layer gradually decreases in thickness to approximately 25 feet at the end of the profile.

The lower layer appears fairly homogeneous in the seismic model results, with P-wave velocities between approximately 8,500 and 10,500 feet/sec, which correlates well with the Gila Conglomerate bedrock interpretation. This would indicate that the majority of the bedrock layer would be classified as marginal to non-rippable material based on the Caterpillar Handbook for a D9 tractor. We do not observe any significant lateral decreases in P-wave velocity that may be indicative of a fault or fracture zone across the P-wave refraction model results.

Figure 10 displays the model results for the coincident electrical resistivity and P-wave refraction model results for Line 2. Again, the electrical resistivity profile presents a general two-layer structure (in this case presenting a simpler model result as compared to Line 1); with a resistive upper layer, likely representing the alluvium, overlying a more conductive layer likely representing the Gila Conglomerate bedrock unit (upper profile in Figure 10). Similar to the Line 1 model results, this interpretation correlates well with the seismic model results (lower profile in Figure 10); with the alluvium layer presenting as a low velocity upper layer, with a sharp increase in P-wave velocity corresponding to the bedrock interface indicated by the electrical resistivity model results.

The upper, more resistive layer is observed to be fairly homogeneous in this survey line, primarily showing as red and brown hues in the profile. There is a region of slightly decreased resistivity in the near-surface noted between approximately 350 and 730 feet along the profile, showing as olive and tan hues. This could be a response to increased moisture content in the subsurface, potentially relating to preferential pathways based on the location beneath the wash areas. The upper resistive layer displays a gradual decrease in thickness toward the northeast end of the profile. The lower, more conductive layer is also observed to be fairly homogeneous, and is also more conductive than the lower layer of survey Line 1, potentially indicating a change in the conglomerate to the south. We do observe a subtle transition at approximately 700 feet along the profile in this lower layer, with slightly more resistive values to the southwest. This could be a response to the fault associated with the Dripping Springs Wash, however it is subtle and may simply reflect a variation in composition of the Gila Conglomerate.

The seismic refraction interpretation would suggest that the alluvium is approximately 50 feet thick at the beginning of the profile. The alluvium then gradually increases in thickness, to approximately 80 feet at approximately 400 feet along the line. Above approximately 400 feet, the alluvium layer gradually decreases in thickness, to approximately 15 to 30 feet at the end of the profile. For the Line 2 profiles, the 7,000 feet/sec and 5,400 feet/sec contours have been highlighted, with a white and gray dashed line respectively. The 7,000 feet/sec contour is likely more representative of the bedrock interface, while the 5,400 feet/sec contour potentially indicates the start of a transitional interface with more weathered bedrock materials found between the two.

The lower layer appears fairly homogeneous in the seismic model results, with P-wave velocities between approximately 6,500 and 7,500 feet/sec which correlates well with the Gila Conglomerate bedrock interpretation, although these velocities are lower than in the Line 1 model results. This would indicate that the majority of the bedrock layer in this location would be classified as rippable to marginal material based on the Caterpillar Handbook for a D9 tractor. There is a region of decreased velocities observed at the northeast end of the profile, where the alluvium layer begins to thin. This could be an area of increased weathering within the conglomerate unit.

Figure 9. Line 1 Electrical Resistivity and Seismic Refraction Inverse Model Results.

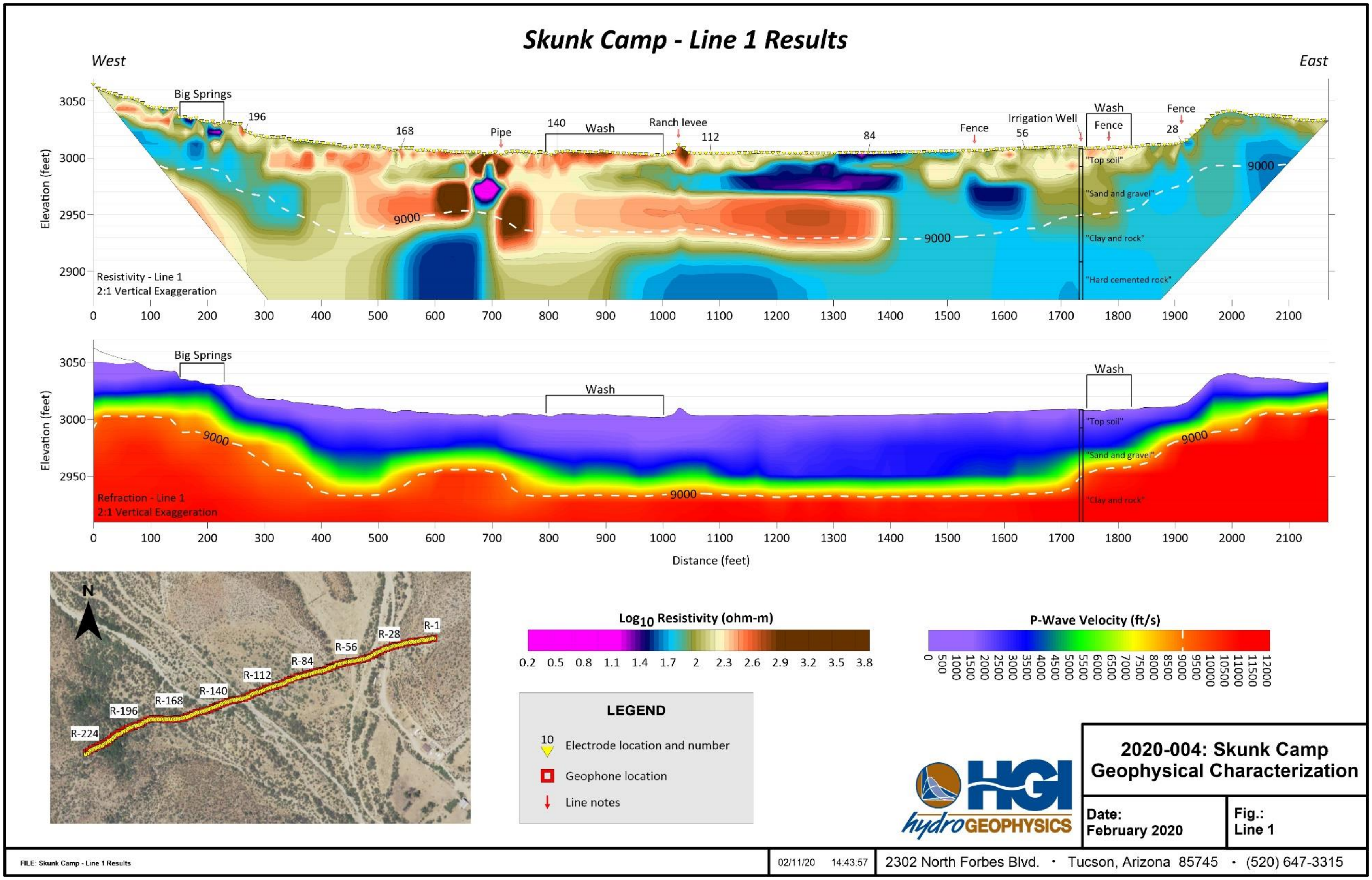
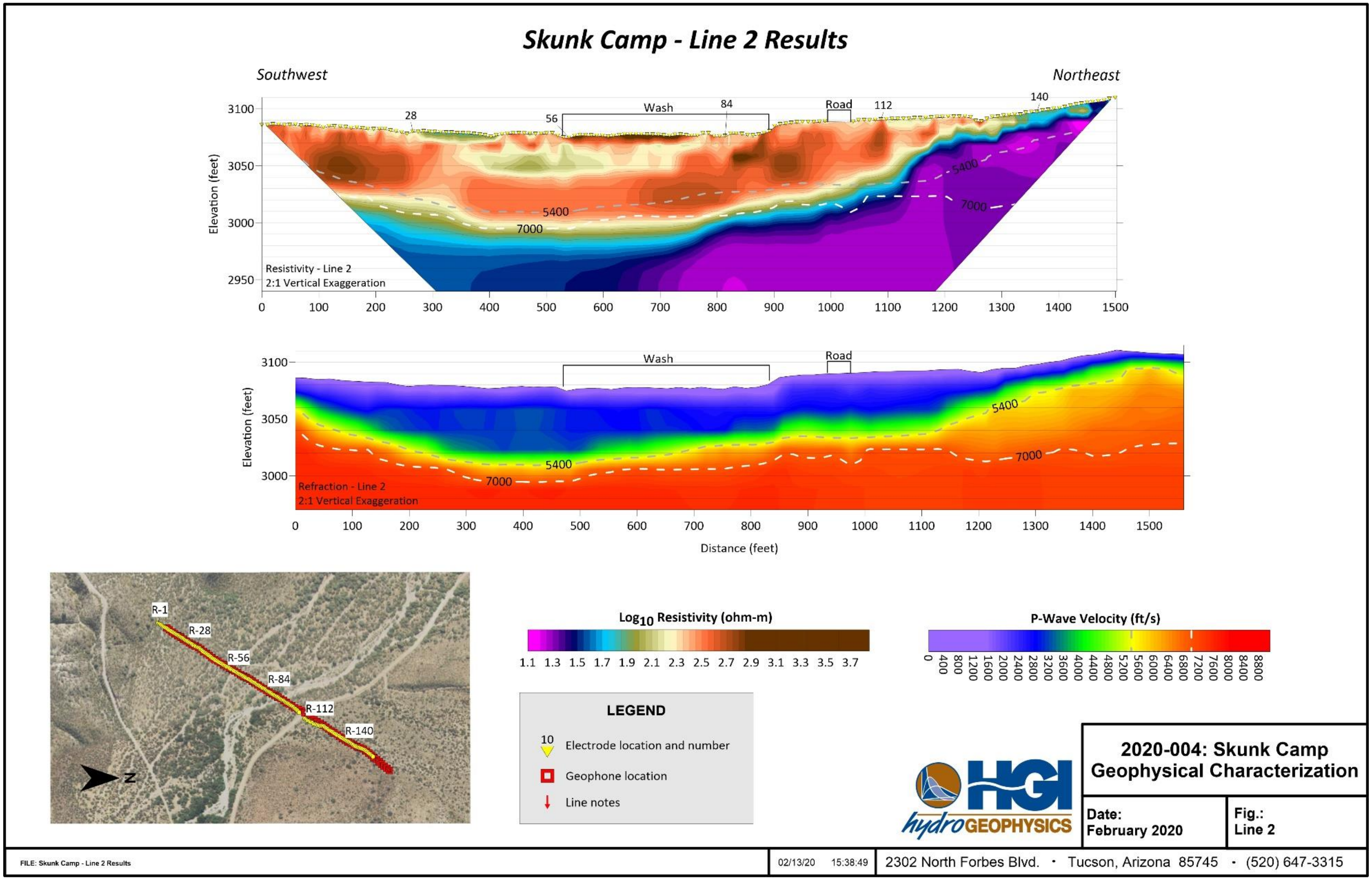


Figure 10. Line 2 Electrical Resistivity and Seismic Refraction Inverse Model Results.



4.2 MASW RESULTS

The 1D soundings of shear-wave velocity for the profiles collected along Lines 1 and 2 are displayed in Figures 11 and 12 respectively. In general, both profiles display a gradual increase in shear-wave velocity with depth. The Line 1 profile displays several low velocity layers in the upper 30 feet, where we observed a slight decrease in shear-wave velocity compared to the surrounding model layers. In addition, both profiles display a low velocity layer at depth, between approximately 65 and 85 feet bgs in the Line 1 profile and approximately 75 and 95 bgs in the Line 2 profile. The V_s30 values and Seismic Site Classification are detailed in Table 1 for both profiles.

Table 4. Summary of MASW Results.

Line Name	V_s30 (feet/sec)	Soil Classification	Soil Type
Line 1	1,084	D	Soft Soil
Line 2	1,266	C	Stiff Soil

Figure 11. Line 1 MASW Results.

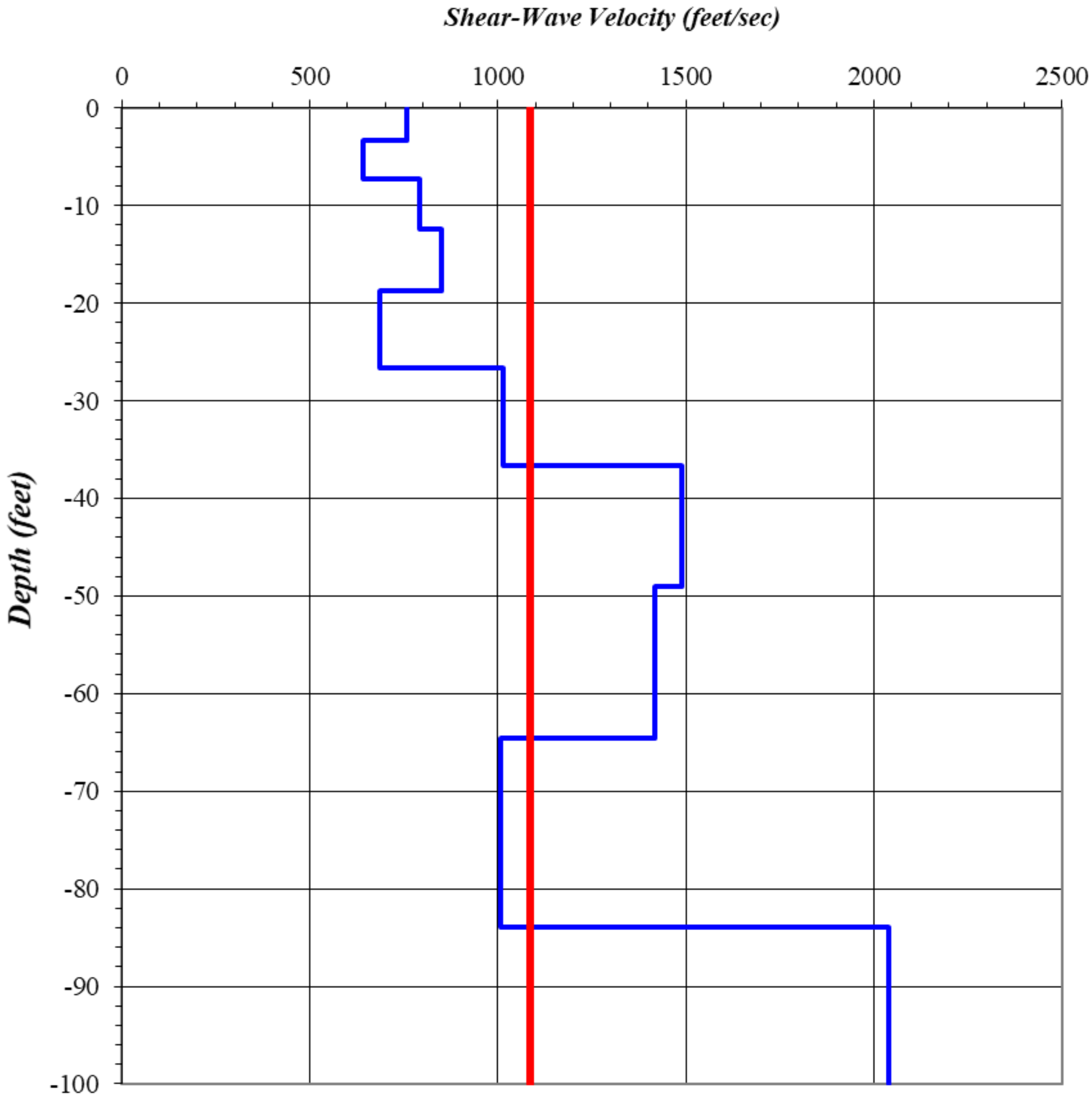
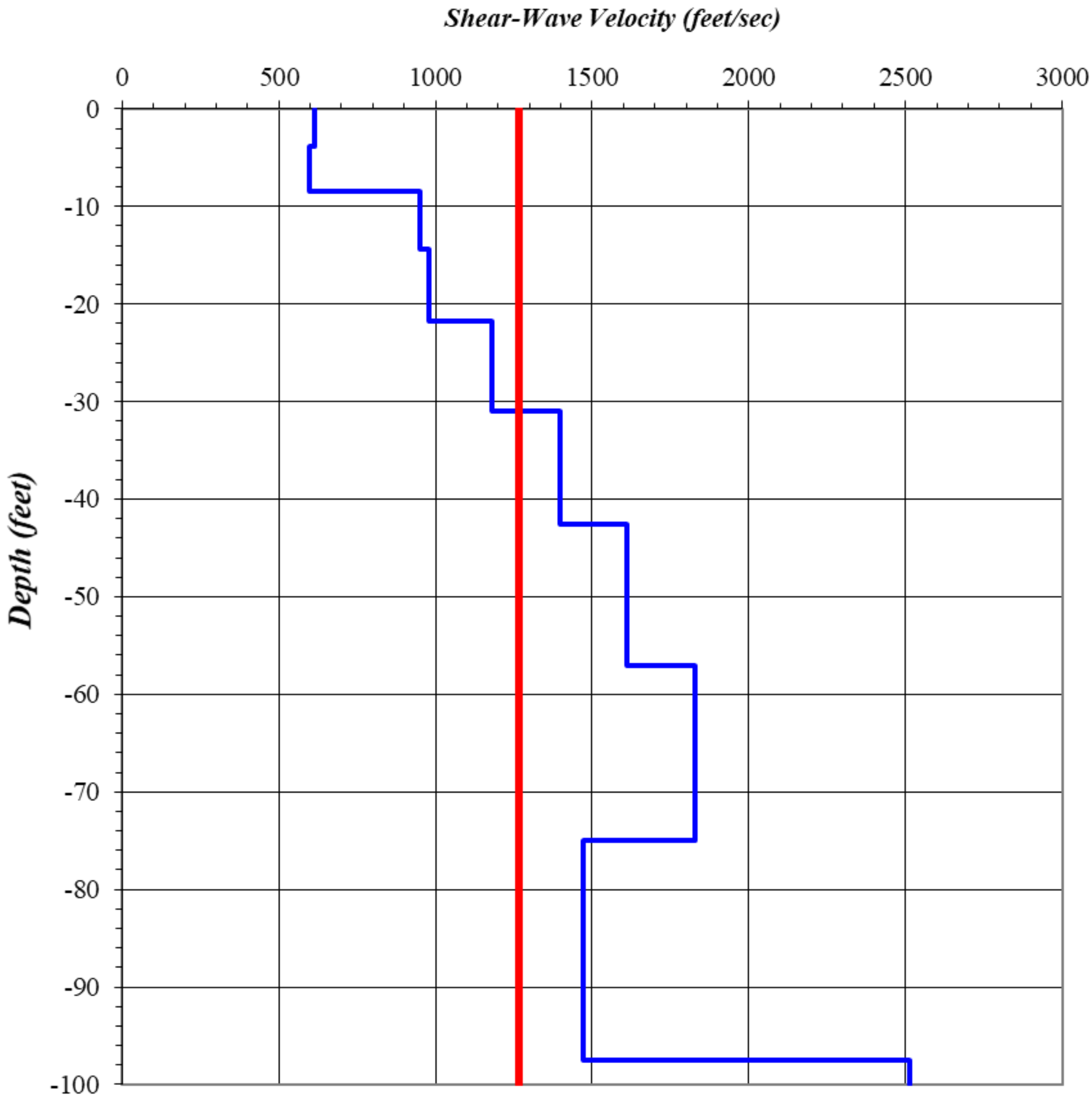


Figure 12. Line 2 MASW Results.



4.3 SUMMARY

Two survey lines of coincident electrical resistivity, seismic refraction, and MASW data were collected at the Skunk Camp Site, near Kearny, Arizona. The purpose of the survey was to investigate the subsurface at a proposed Tailings Storage Facility (TSF), with the following objectives in mind:

- Assess thickness and variability of alluvial deposits within the potential TSF footprint.
- Estimate the rippability of the underlying Gila conglomerate bedrock.
- Provide V_s30 measurements of the alluvial sediments and bedrock.
- Characterize the saturation within the alluvial deposits

In general, the modeled profiles display a two-layered structure likely representing the upper alluvium layer and the underlying Gila Conglomerate or volcanic bedrock units. Alluvial deposits range in thickness from approximately 25 to 75 feet in Line 1 and 15 to 80 feet in Line 2. P-wave velocities in the modeled profiles tend to estimate the rippability of the conglomerate layer as marginal to non-rippable in Line 1, and rippable to marginal in Line 2. Several regions of potential saturation are identified in the Line 1 results, while in Line 2 the alluvial deposits appear to be more resistive and likely composed of mostly unsaturated materials. The MASW results indicate a V_s30 shear wave velocity of 1,084 feet/sec (soil class D, or “soft soil) for Line 1 and 1,266 feet/sec (soil class C, or “stiff soil”) for Line 2.

5.0 REFERENCES

Caterpillar Inc., 2000, Handbook of Ripping (12th Edition), Caterpillar Inc., Peoria, IL.

deGroot-Hedlin, C., and S.C. Constable, 1990, Occam's inversion to generate smooth, two-dimensional models from magnetotelluric data: Geophysics 55, 1613– 1624.

Dey, A., and H.F. Morrison, 1979, Resistivity modeling for arbitrarily shaped three-dimensional structures: Geophysics, 44, 753-780.

Ellis, R.G., and D.W. Oldenburg, 1994, Applied geophysical inversion: Geophysical Journal International, 116, 5-11.

Loke, M.H., I. Acworth, and T. Dahlin, 2003, A comparison of smooth and blocky inversion methods in 2D electrical imaging surveys: Exploration Geophysics, 34, 182-187.

Rucker, D.F., Levitt, M.T., Greenwood, W.J., 2009. Three-dimensional electrical resistivity model of a nuclear waste disposal site. Journal of Applied Geophysics 69, 150-164.

Rucker, D.F., G.E. Noonan, and W.J. Greenwood, 2011. Electrical resistivity in support of geologic mapping along the Panama Canal. Engineering Geology 117(1-2):121-133.

Sasaki, Y., 1989, Two-dimensional joint inversion of magnetotelluric and dipole-dipole resistivity data: Geophysics, 54, 254-262.

Telford, W. M., Geldart, L. P., and Sherriff, R. E., 1990, Applied Geophysics (2nd Edition), Cambridge University Press.

Appendix C

ADWR Imaged Records for Selected Wells

Arizona Department of Water Resources
Water Management Support Section
PO Box 458 • Phoenix, Arizona 85001-0458
(602) 771-8500 • (800) 352-8488
www.azwater.gov

D(3-14-14)BOB

REQUEST TO CHANGE WELL INFORMATION

- Review instructions prior to completing form in black or blue ink.
- You must include with your Notice:
  - ▶ check or money order for any required fee(s)
- Authority for fee AAG. R12-15-151(B)(4)(a), ARS. §45-113(B)

** PLEASE PRINT CLEARLY **

RECEIVED
DEC 24 2007
HRO MGMT

FILE NUMBER

WELL REGISTRATION NUMBER
55 - 622477

SECTION 1. REGISTRY INFORMATION

Well Owner

FULL NAME OF COMPANY, ORGANIZATION, OR INDIVIDUAL	Susan Carol Bolich
MAILING ADDRESS	29315 North 144th Street
CITY / STATE / ZIP CODE	Scottsdale, AZ 85262
CONTACT PERSON NAME AND TITLE	Susan Carol Bolich
TELEPHONE NUMBER	(602) 803-7899
FAX	

Location of Well

WELL LOCATION ADDRESS (IF ANY)

TOWNSHIP (N/S)	RANGE (E/W)	SECTION	160 ACRE	40 ACRE	10 ACRE
3 S	14 E	14	NW ¼	SE ¼	NW ¼

LATITUDE Degrees	Minutes	Seconds	LONGITUDE Degrees	Minutes	Seconds
°	'	"N	°	'	"N

METHOD OF LATITUDE/LONGITUDE (CHECK ONE)
□ USGS Quad Map □ Conventional Survey □ *GPS: Hand-Held □ *GPS: Survey-Grade

* IF GPS WAS USED, GEOGRAPHIC COORDINATE DATUM (CHECK ONE)
□ NAD 83 □ Other (please specify):

COUNTY ASSESSOR'S PARCEL ID NUMBER BOOK	MAP	PARCEL	COUNTY WHERE WELL IS LOCATED
			Gila County

Type of Request (CHECK ONE)

□ Change of Well Drilling Contractor *(Fill out Section 2)*
✓ Change of Well Ownership *(Fill out Section 3)*
□ Change of Well Information (location, use, etc.) *(Fill out Section 4)*

SECTION 2. REQUEST TO CHANGE WELL DRILLING CONTRACTOR ($10 Fee Required) $10 FEE

- If drilling or abandoning a well, the Department must receive this request and issue authorization to the new drilling firm prior to the commencement of well drilling or abandonment.

Current Well Drilling Contractor		New Well Drilling Contractor	
FULL NAME OF COMPANY, ORGANIZATION, OR INDIVIDUAL		NAME OF COMPANY, ORGANIZATION, OR INDIVIDUAL	
DWR LICENSE NUMBER		DWR LICENSE NUMBER	ROC LICENSE CATEGORY
TELEPHONE NUMBER	FAX	TELEPHONE NUMBER	FAX

SECTION 3. STATEMENT OF CHANGE OF WELL OWNERSHIP ($10 Fee Required) $10 FEE

- If this change pertains to more than one well and the names are the same, only one $10 fee is required.

	Previous Well Owner	New Well Owner
FULL NAME OF COMPANY, ORGANIZATION, OR INDIVIDUAL	Susan Carol Bolich	Rick Larry Jodsaas
MAILING ADDRESS	29315 North 144th Street	HC 2 Box 2360
CITY / STATE / ZIP CODE	Scottsdale, AZ 85262	Winkelman, AZ 85292
CONTACT PERSON NAME AND TITLE	Susan Carol Bolich	Rick Larry Jodsaas
TELEPHONE NUMBER	(602) 803-7899	(602) 402-6382
FAX		

SECTION 4. CHANGE OF WELL INFORMATION (No Fee Required) NO FEE

NOTE: Applies only to wells that have already been drilled. For proposed wells, an amended Notice of Intent to Drill a Well must be filed.
EXPLAIN

I HEREBY CERTIFY that the above statements are true to the best of my knowledge and belief.

TYPE OR PRINT NAME AND TITLE	SIGNATURE OF WELL OWNER	DATE
Susan C Bolich	Susan C. Bolich	11/27/07

Arizona Department of Water Resources
Water Management Support Section
PO Box 458 • Phoenix, Arizona 85001-0458
(602) 771-8500 • (800) 352-8488
www.azwater.gov

REQUEST TO CHANGE WELL INFORMATION

RECEIVED
DEC 24 2007
INFO MGMT

- Review instructions prior to completing form in black or blue ink.
- You must include with your Notice:
  - ▶ check or money order for any required fee(s)
- Authority for fee AAG. R12-15-151(B)(4)(a), ARS. §45-113(B)

** PLEASE PRINT CLEARLY **

FILE NUMBER

WELL REGISTRATION NUMBER **55 - 622478**

SECTION 1. REGISTRY INFORMATION

Well Owner

FULL NAME OF COMPANY, ORGANIZATION, OR INDIVIDUAL: Susan Carol Bolich

MAILING ADDRESS: 29315 North 144th Street

CITY / STATE / ZIP CODE: Scottsdale, AZ 85262

CONTACT PERSON NAME AND TITLE: Susan Carol Bolich

TELEPHONE NUMBER: (602) 803-7899
FAX:

Location of Well

WELL LOCATION ADDRESS (IF ANY):

TOWNSHIP (N/S)	RANGE (E/W)	SECTION	160 ACRE	40 ACRE	10 ACRE
3 S	15 E	18	SE ¼	NE ¼	NE ¼

LATITUDE Degrees °	Minutes '	Seconds "N	LONGITUDE Degrees °	Minutes '	Seconds "N

METHOD OF LATITUDE/LONGITUDE (CHECK ONE): □ USGS Quad Map □ Conventional Survey □ *GPS: Hand-Held □ *GPS: Survey-Grade

* IF GPS WAS USED, GEOGRAPHIC COORDINATE DATUM (CHECK ONE): □ NAD 83 □ Other (please specify):

COUNTY ASSESSOR'S PARCEL ID NUMBER: BOOK / MAP / PARCEL

COUNTY WHERE WELL IS LOCATED: Gila County

Type of Request (CHECK ONE)

□ Change of Well Drilling Contractor *(Fill out Section 2)* ✓ Change of Well Ownership *(Fill out Section 3)* □ Change of Well Information (location, use, etc.) *(Fill out Section 4)*

SECTION 2. REQUEST TO CHANGE WELL DRILLING CONTRACTOR ($10 Fee Required) $10 FEE

- If drilling or abandoning a well, the Department must receive this request and issue authorization to the new drilling firm prior to the commencement of well drilling or abandonment.

Current Well Drilling Contractor

FULL NAME OF COMPANY, ORGANIZATION, OR INDIVIDUAL:

DWR LICENSE NUMBER:

TELEPHONE NUMBER: FAX:

New Well Drilling Contractor

NAME OF COMPANY, ORGANIZATION, OR INDIVIDUAL:

DWR LICENSE NUMBER: ROC LICENSE CATEGORY:

TELEPHONE NUMBER: FAX:

SECTION 3. STATEMENT OF CHANGE OF WELL OWNERSHIP ($10 Fee Required) $10 FEE

- If this change pertains to more than one well and the names are the same, only one $10 fee is required.

	Previous Well Owner	New Well Owner
FULL NAME OF COMPANY, ORGANIZATION, OR INDIVIDUAL	Susan Carol Bolich	Rick Larry Jodsaas
MAILING ADDRESS	29315 North 144th Street	HC 2 Box 2360
CITY / STATE / ZIP CODE	Scottsdale, AZ 85262	Winkelman, AZ 85292
CONTACT PERSON NAME AND TITLE	Susan Carol Bolich	Rick Larry Jodsaas
TELEPHONE NUMBER	(602) 803-7899	(602) 402-6382
FAX		

SECTION 4. CHANGE OF WELL INFORMATION (No Fee Required) NO FEE

NOTE: Applies only to wells that have already been drilled. For proposed wells, an amended Notice of Intent to Drill a Well must be filed.

EXPLAIN

I HEREBY CERTIFY that the above statements are true to the best of my knowledge and belief.

TYPE OR PRINT NAME AND TITLE: Susan C. Bolich

SIGNATURE OF WELL OWNER: Susan C Bolich

DATE: 11/27/07

Arizona Department of Water Resources
Water Management Support Section
PO Box 458 • Phoenix, Arizona 85001-0458
(602) 771-8500 • (800) 352-8488
www.azwater.gov

REQUEST TO CHANGE WELL INFORMATION

RECEIVED

DEC 24 2007

INFO MGMT

FILE NUMBER

WELL REGISTRATION NUMBER
55 - 622479

- Review instructions prior to completing form in black or blue ink.
- You must include with your Notice:
  - check or money order for any required fee(s)
- Authority for fee AAG. R12-15-151(B)(4)(a), ARS. §45-113(B)

** PLEASE PRINT CLEARLY **

SECTION 1. REGISTRY INFORMATION

Well Owner

FULL NAME OF COMPANY, ORGANIZATION, OR INDIVIDUAL	Susan Carol Bolich
MAILING ADDRESS	29315 North 144th Street
CITY / STATE / ZIP CODE	Scottsdale, AZ 85262
CONTACT PERSON NAME AND TITLE	Susan Carol Bolich
TELEPHONE NUMBER	(602) 803-7899
FAX	

Location of Well

WELL LOCATION ADDRESS (IF ANY)

TOWNSHIP (N/S)	RANGE (E/W)	SECTION	160 ACRE	40 ACRE	10 ACRE
3 S	15 E	8	NE ¼	SE ¼	SE ¼

LATITUDE			LONGITUDE		
° Degrees	' Minutes	"N Seconds	° Degrees	' Minutes	"N Seconds

METHOD OF LATITUDE/LONGITUDE (CHECK ONE)
- ☐ USGS Quad Map
- ☐ Conventional Survey
- ☐ *GPS Hand-Held
- ☐ *GPS: Survey-Grade

* IF GPS WAS USED, GEOGRAPHIC COORDINATE DATUM (CHECK ONE)
- ☐ NAD 83
- ☐ Other (please specify):

COUNTY ASSESSOR'S PARCEL ID NUMBER BOOK	MAP	PARCEL	COUNTY WHERE WELL IS LOCATED
			Gila County

Type of Request (CHECK ONE)

- ☐ Change of Well Drilling Contractor *(Fill out Section 2)*
- ✓ Change of Well Ownership *(Fill out Section 3)*
- ☐ Change of Well Information (location, use, etc.) *(Fill out Section 4)*

SECTION 2. REQUEST TO CHANGE WELL DRILLING CONTRACTOR ($10 Fee Required) $10 FEE

- If drilling or abandoning a well, the Department must receive this request and issue authorization to the new drilling firm prior to the commencement of well drilling or abandonment.

Current Well Drilling Contractor

FULL NAME OF COMPANY, ORGANIZATION, OR INDIVIDUAL	
DWR LICENSE NUMBER	
TELEPHONE NUMBER	
FAX	

New Well Drilling Contractor

NAME OF COMPANY, ORGANIZATION, OR INDIVIDUAL	
DWR LICENSE NUMBER	
ROC LICENSE CATEGORY	
TELEPHONE NUMBER	
FAX	

SECTION 3. STATEMENT OF CHANGE OF WELL OWNERSHIP ($10 Fee Required) $10 FEE

- If this change pertains to more than one well and the names are the same, only one $10 fee is required.

	Previous Well Owner	New Well Owner
FULL NAME OF COMPANY, ORGANIZATION, OR INDIVIDUAL	Susan Carol Bolich	Rick Larry Jodsaas
MAILING ADDRESS	29315 North 144th Street	HC 2 Box 2360
CITY / STATE / ZIP CODE	Scottsdale, AZ 85262	Winkelman, AZ 85284
CONTACT PERSON NAME AND TITLE	Susan Carol Bolich	Rick Larry Jodsaas
TELEPHONE NUMBER	(602) 803-7899	(602) 402-6382
FAX		

SECTION 4. CHANGE OF WELL INFORMATION (No Fee Required) NO FEE

NOTE: Applies only to wells that have already been drilled. For proposed wells, an amended Notice of Intent to Drill a Well must be filed.

EXPLAIN

I HEREBY CERTIFY that the above statements are true to the best of my knowledge and belief.

TYPE OR PRINT NAME AND TITLE	SIGNATURE OF WELL OWNER	DATE
Susan C Bolich	Susan C Bolich	11/27/07

Arizona Department of Water Resources
Water Management Support Section
PO Box 458 • Phoenix, Arizona 85001-0458
(602) 771-8500 • (800) 352-8488
www.azwater.gov

REQUEST TO CHANGE WELL INFORMATION

DEC 24 2007

- Review instructions prior to completing form in black or blue ink.
- You must include with your Notice:
  - ▶ check or money order for any required fee(s)
- Authority for fee AAG. R12-15-151(B)(4)(a), ARS. §45-113(B)

** PLEASE PRINT CLEARLY **

FILE NUMBER

WELL REGISTRATION NUMBER
55 - 622471

SECTION 1. REGISTRY INFORMATION

Well Owner

FULL NAME OF COMPANY, ORGANIZATION, OR INDIVIDUAL
Susan Carol Bolich

MAILING ADDRESS
29315 North 144th Street

CITY / STATE / ZIP CODE
Scottsdale, AZ 85262

CONTACT PERSON NAME AND TITLE
Susan Carol Bolich

TELEPHONE NUMBER	FAX
(602) 803-7899	

Location of Well

WELL LOCATION ADDRESS (IF ANY)

TOWNSHIP (N/S)	RANGE (E/W)	SECTION	160 ACRE	40 ACRE	10 ACRE
35	14 E	24	NW ¼	NW ¼	NW ¼

LATITUDE			LONGITUDE		
°	'	"N	°	'	"N
Degrees	Minutes	Seconds	Degrees	Minutes	Seconds

METHOD OF LATITUDE/LONGITUDE (CHECK ONE)
□ USGS Quad Map □ Conventional Survey □ *GPS: Hand-Held □ *GPS: Survey-Grade

* IF GPS WAS USED, GEOGRAPHIC COORDINATE DATUM (CHECK ONE)
□ NAD 83 □ Other (please specify):

COUNTY ASSESSOR'S PARCEL ID NUMBER			COUNTY WHERE WELL IS LOCATED
BOOK	MAP	PARCEL	
			Gila County

Type of Request (CHECK ONE)

□ Change of Well Drilling Contractor *(Fill out Section 2)*
✓ Change of Well Ownership *(Fill out Section 3)*
□ Change of Well Information (location, use, etc.) *(Fill out Section 4)*

SECTION 2. REQUEST TO CHANGE WELL DRILLING CONTRACTOR ($10 Fee Required) $10 FEE

- If drilling or abandoning a well, the Department must receive this request and issue authorization to the new drilling firm prior to the commencement of well drilling or abandonment.

Current Well Drilling Contractor		New Well Drilling Contractor	
FULL NAME OF COMPANY, ORGANIZATION, OR INDIVIDUAL		NAME OF COMPANY, ORGANIZATION, OR INDIVIDUAL	
DWR LICENSE NUMBER		DWR LICENSE NUMBER	ROC LICENSE CATEGORY
TELEPHONE NUMBER	FAX	TELEPHONE NUMBER	FAX

SECTION 3. STATEMENT OF CHANGE OF WELL OWNERSHIP ($10 Fee Required) $10 FEE

- If this change pertains to more than one well and the names are the same, only one $10 fee is required.

Previous Well Owner		New Well Owner	
FULL NAME OF COMPANY, ORGANIZATION, OR INDIVIDUAL Susan Carol Bolich		FULL NAME OF COMPANY, ORGANIZATION, OR INDIVIDUAL Rick Larry Jodsaas	
MAILING ADDRESS 29315 North 144th Street		MAILING ADDRESS HC 2 Box 2360	
CITY / STATE / ZIP CODE Scottsdale, AZ 85262		CITY / STATE / ZIP CODE Winkelman, AZ 85292	
CONTACT PERSON NAME AND TITLE Susan Carol Bolich		CONTACT PERSON NAME AND TITLE Rick Larry Jodsaas	
TELEPHONE NUMBER (602) 803-7899	FAX	TELEPHONE NUMBER (602) 402-6382	FAX

SECTION 4. CHANGE OF WELL INFORMATION (No Fee Required) NO FEE

NOTE: Applies only to wells that have already been drilled. For proposed wells, an amended Notice of Intent to Drill a Well must be filed.
EXPLAIN

I HEREBY CERTIFY that the above statements are true to the best of my knowledge and belief.

TYPE OR PRINT NAME AND TITLE	SIGNATURE OF WELL OWNER	DATE
Susan C Bolich	Susan C Bolich	11/27/07

Gila County, AZ
Linda Haught Ortega, Recorder
12/05/2007
04:19PM
Doc Code: WD

Doc Id: 2007-019848
Receipt #: 61158
Rec Fee: 15.00

PIONEER TITLE AGENCY RECORDING

2007-019848
Page: 1 of 5
12/05/2007 04:19P
15.00

Gila County, AZ WD

Recorded at the request of,
and when recorded return to:
William J. Simon
Tiffany & Bosco, P.A.
2525 E. Camelback Road, Third Floor
Phoenix, AZ 85016-9240

SPECIAL WARRANTY DEED

For good and valuable consideration, the receipt of which is hereby acknowledged, **SUSAN CAROL BOLICH**, an unmarried woman ("Grantor"), does hereby transfer, assign and convey to **RICK L. JODSAAS**, an unmarried man ("Grantee"), and his successors and assigns forever, all of Grantor's right, title and interest in and to that certain real property located in Gila and Pinal Counties, State of Arizona, which is legally described in Exhibit A attached hereto and made a part hereof, including any rights to minerals, surface water and wells, subject to: taxes, assessments, reservations in patents, easements, right of way, encumbrances, liens, covenants, conditions and restrictions as may appear of record; any and all conditions, easements, encroachments, rights of way or restrictions which a physical inspection, or accurate ALTA survey of the property would reveal; and any applicable zoning and use laws and regulations of any municipality, county, state or federal government or agency effecting the property.

Grantor hereby warrants the title to the property against all acts of Grantor and no others, subject to the matters set forth above.

DATED Nov. 2, 2007.

DEC 24 2007

GRANTOR:

Susan C Bolich
Susan Carol Bolich

STATE OF ARIZONA)
) ss.
County of Maricopa)

The foregoing Special Warranty Deed was acknowledged before me this 2nd day of November, 2007, by **Susan Carol Bolich**.

Jessica A. Lopez
Notary Public

My commission expires:
9/5/2011

OFFICIAL SEAL
JESSICA A. LOPEZ
NOTARY PUBLIC - State of Arizona
MARICOPA COUNTY
My Comm. Expires Sept. 5, 2011

Exhibit A is attached.

334123

EXHIBIT A TO SPECIAL WARRANY DEED

(Legal Description of Real Property)

DEC 24 2007

Exhibit A

PARCEL NO. 1

The Southeast quarter of the Southeast quarter of Section 11, Township 3 South, Range 14 East of the Gila and Salt River Base and Meridian, Gila County, Arizona;

EXCEPTING therefrom all coal, oil, gas and other mineral deposits, as reserved in instrument recorded as Docket 365, Page 822.

PARCEL NO. 2

The South half of the Southwest quarter of Section 11, Township 3 South, Range 14 East of the Gila and Salt River Base and Meridian, Gila County, Arizona;

EXCEPTING therefrom 1/16th interest in all coal, oil, gas and other mineral deposits, as reserved in instrument recorded as Docket 314, Page 211.

PARCEL NO. 3

The Northwest quarter of the Southeast quarter of Section 12, Township 3 South, Range 14 East of the Gila and Salt River Base and Meridian, Gila County, Arizona ;

EXCEPTING therefrom all coal, oil, gas and other mineral deposits as reserved in instrument recorded as Docket 365, Page 822.

PARCEL NO. 4

The West half of the Southwest quarter of Section 13, Township 3 South, Range 14 East of the Gila and Salt River Base and Meridian, Gila County, Arizona;

EXCEPTING therefrom all coal, oil, gas and other mineral deposits, as reserved in instrument recorded as Docket 365, Page 822.

PARCEL NO. 5

The Southwest quarter of the Southeast quarter; the Northwest quarter of the Southeast quarter; the East half of the Southeast quarter; the Southeast quarter of the Northwest quarter; the Southwest quarter of the Northwest quarter and the Northeast quarter of the Southwest quarter of Section 14, Township 3 South, Range 14 East of the Gila and Salt River Base and Meridian, Gila County, Arizona.

EXCEPTING therefrom all coal, oil, gas and other mineral deposits, as reserved in instrument recorded as Docket 365, Page 822.

PARCEL NO. 6

The North half of the Northwest quarter of Section 14, Township 3 South, Range 14 East of the Gila and Salt River Base and Meridian, Gila County, Arizona;

EXCEPTING therefrom 1/16th interest in all coal, oil, gas and other mineral deposits, as reserved in instrument recorded as Docket 367, Page 108;

EXCEPTING therefrom 15/16 interest in all coal, oil, gas and other mineral deposits, as reserved in instrument recorded as Docket 365, Page 822.

PARCEL NO. 7

The Northeast quarter of the Northeast quarter of Section 15, Township 3 South, Range 14 East of the Gila and Salt River Base and Meridian, Gila County, Arizona;

EXCEPTING therefrom all coal, oil, gas and other mineral deposits, as reserved in instrument recorded as Docket 251, Page 60.

PARCEL NO. 8

The Southeast quarter of the Northeast quarter of Section 23, Township 3 South, Range 14 East of the Gila and Salt River Base and Meridian, Gila County, Arizona;

EXCEPTING therefrom 1/16th interest in all coal, oil, gas and other mineral deposits as reserved in instrument recorded as Docket 344, Page 966.

EXCEPTING therefrom 15/16 interest in all coal, oil, gas and other mineral deposits, as reserved in instrument recorded as Docket 365, Page 822.

PARCEL NO. 9

The North half of the Northeast quarter of Section 23, Township 3 South, Range 14 East of the Gila and Salt River Base and Meridian, Gila County, Arizona.

EXCEPTING therefrom all coal, oil, gas and other mineral deposits, as reserved in instrument recorded as Docket 365, Page 822.

PARCEL NO. 10

The East half of the Northwest quarter and the Southwest quarter of the Northwest quarter of Section 24, Township 3 South, Range 14 East of the Gila and Salt River Base and Meridian, Gila County, Arizona;

EXCEPTING therefrom all coal, oil, gas and other mineral deposits, as reserved in instrument recorded as Docket 137, Page 63.

PARCEL NO. 11

The Northwest quarter of the Northwest quarter of Section 24, Township 3 South, Range 14 East of the Gila and Salt River Base and Meridian, Gila County, Arizona.

PARCEL NO. 12

The Southwest quarter of the Southeast quarter of Section 29, Township 2 South, Range 15 East of the Gila and Salt River Base and Meridian, Gila County, Arizona.

EXCEPTING therefrom all coal, oil, gas and other mineral deposits, as reserved in instrument recorded as Docket 365, Page 822.

PARCEL NO. 13

The South half of the Southeast quarter of the Northwest quarter and the North half of the Northeast quarter of the Southwest quarter of Section 30, Township 2 South, Range 15 East of the Gila and Salt River Base and Meridian, Gila County, Arizona;

EXCEPTING therefrom all coal, oil, gas and other mineral deposits, as reserved in instrument recorded as Docket 137, Page 65.

PARCEL NO. 14

The Southeast quarter of the Southwest quarter and the South half of the Southeast quarter of Section 31, Township 2 South, Range 15 East of the Gila and Salt River Base and Meridian, Gila County, Arizona;

EXCEPTING therefrom all coal, oil, gas and other mineral deposits, as reserved in instrument recorded as Docket 365, Page 822.

PARCEL NO. 15

The Northeast quarter of the Northwest quarter; the Northwest quarter of the Northeast quarter; and the Southeast quarter of the Northeast quarter of Section 8, Township 3 South, Range 15 East of the Gila and Salt River Base and Meridian, Gila County, Arizona.

EXCEPTING therefrom all coal, oil, gas and other mineral deposits, as reserved in instrument recorded as Docket 365, Page 822.

PARCEL NO. 16

All that portion of Lots 1, 2 and 5 of Section 23, Township 3 South, Range 14 East of the Gila and Salt River Base and Meridian, Pinal County, Arizona, lying Westerly of the Easterly boundary line of Pinal County;

EXCEPT any portion lying within Iron King, Hoosier Bay, Copper King, Copper Depot and Copper Depot 2 Lode Mining Claims as shown on Mineral Survey No. 2447 in Riverside Mining District;

EXCEPT 1/16th of all gas, oil, metals and mineral rights as set forth in ARS 37-231, Subsection C, as reserved in the Patent from the State of Arizona recorded January 09, 1969 as Docket 557, Page 306;

EXCEPTING therefrom all coal, oil, gas and other mineral deposits together with reasonable access for the purpose of exploring for or developing same, as reserved in deed recorded as Docket 759, Page 209.

TIFFANY & BOSCO
P.A.
THIRD FLOOR CAMELBACK ESPLANADE II
2525 EAST CAMELBACK ROAD
PHOENIX, ARIZONA 85016-9240
TELEPHONE: (602) 255-6000
FACSIMILE: (602) 255-0103
general@tblaw.com
www.tblaw.com

WILLIAM J. SIMON
ATTORNEY AT LAW
DIRECT LINE: (602) 255-6004
wjs@tblaw.com

December 21, 2007

Arizona Department of Water Resources
Attention: Water Management Support Section
P.O. Box 33589
Phoenix, AZ 85067

Re: Previous Well Owner: Susan Carol Bolich
New Well Owner: Rick Larry Jodsaas

Dear Sir or Madam:

Enclosed are the following documents:

1. 4 signed original Requests to Change Well Information;

2. Check in the amount of $10.00 as fee.

Please process this Request and have a copy of the conformed documents mailed to me at the above address when complete.

Very truly yours,

TIFFANY & BOSCO, P.A.

William J. Simon

William J. Simon

WJS/jal

Enclosures

cc: Rick L. Jodsaas w/o enclosures
13489-001/357489

Printed: 12/24/2007 11:25:30 AM

Store 0010
Sale Receipt #
12/24/2007
Page 1

Arizona Department of Water Resources

3550 N Central Ave
Phoenix AZ 85012

TIFFANY & BOSCO

2525 EAST CAMELBACK ROAD
PHOENIX,AZ 85016
602-255-6000

Date: 12/24/2007
Cashier: WRLXS
Type: Mail

DCS/INV#	DESCRIPTION		ATTR	SIZE	QTY	PRICE	EXT PRICE
F 78	4439-12	CHANGE OF WELL OWNERSHIP	15238		1	10.00	10.00
				1 Unit(s)		Subtotal:	10.00
						RECEIPT TOTAL:	**10.00**
						Tendered:	10.00

Check #: 10.00 # 28654

various

We Appreciate Your Business!

Arizona Department of Water Resources
Groundwater Management Support Section
P.O. Box 458 • Phoenix, Arizona 85001-0458
(602) 417-2470 • (800) 352-8488
www.water.az.gov

D(3-14)14 B DD

Request to Change Well Information

RECEIVED
MAY 12 2004
Information Management

- Review instructions prior to completing form in black or blue ink.
- You must include with your Notice:
  - check or money order for any required fee(s)
- Authority for fee: A.A.C. R12-15-151(B)(4)(a), A.R.S. § 45-113(B)

** PLEASE PRINT CLEARLY **

FILE NUMBER

WELL REGISTRATION NUMBER
55 - 622477

SECTION 1. REGISTRY INFORMATION

Well Owner

FULL NAME OF COMPANY, ORGANIZATION, OR INDIVIDUAL
Richard Seger

MAILING ADDRESS
HCR Box 2360 Dripping Springs Rd.

CITY / STATE / ZIP CODE
Winkelman, AZ 85242

CONTACT PERSON NAME AND TITLE
Richard Seger, Owner

TELEPHONE NUMBER	FAX
928-719-1374	

Location of Well

WELL LOCATION ADDRESS (IF ANY)

TOWNSHIP (N/S)	RANGE (E/W)	SECTION	160 ACRE	40 ACRE	10 ACRE
35	14E	14	NW ¼	SE ¼	NW ¼

LATITUDE			LONGITUDE		
° Degrees	' Minutes	"N Seconds	° Degrees	' Minutes	"W Seconds

COUNTY ASSESSOR'S PARCEL ID NUMBER

BOOK	MAP	PARCEL

COUNTY WHERE WELL IS LOCATED
Gila County

Type of Request (CHECK ONE)

- ☐ Change of Well Drilling Contractor *(Fill out Section 2)*
- ☒ Change of Well Ownership *(Fill out Section 3)*
- ☐ Change of Well Information (location, use, etc.) *(Fill out Section 4)*

SECTION 2. REQUEST TO CHANGE WELL DRILLING CONTRACTOR ($10 Fee Required)

$10 FEE

- If drilling or abandoning a well, the Department must receive this request and issue authorization to the new drilling firm prior to the commencement of well drilling or abandonment.

Current Well Drilling Contractor

FULL NAME OF COMPANY, ORGANIZATION, OR INDIVIDUAL

DWR LICENSE NUMBER

ENTERED MAY 14 2004

TELEPHONE NUMBER	FAX

New Well Drilling Contractor

FULL NAME OF COMPANY, ORGANIZATION, OR INDIVIDUAL

DWR LICENSE NUMBER	ROC LICENSE CATEGORY

TELEPHONE NUMBER	FAX

SECTION 3. STATEMENT OF CHANGE OF WELL OWNERSHIP ($10 Fee Required)

$10 FEE

- If this change pertains to more than one well and the names are the same, only one $10 fee is required.

Previous Well Owner

FULL NAME OF COMPANY, ORGANIZATION, OR INDIVIDUAL
Richard Seger

MAILING ADDRESS
HCE Box 2360 Dripping Springs Rd.

CITY / STATE / ZIP CODE
Winkelman, AZ 85242

CONTACT PERSON NAME AND TITLE
Richard Seger, Owner

TELEPHONE NUMBER	FAX
928-719-1374	

New Well Owner

FULL NAME OF COMPANY, ORGANIZATION, OR INDIVIDUAL
Susan Carol Bolich

MAILING ADDRESS
HCR Box 2360 Dripping Springs Rd.

CITY / STATE / ZIP CODE
Winkelman, AZ 85242

CONTACT PERSON NAME AND TITLE
Susan Bolich, Owner

TELEPHONE NUMBER	FAX
928-719-1374	

SECTION 4. CHANGE OF WELL INFORMATION (No Fee Required)

NO FEE

NOTE: Applies only to wells that have already been drilled. For proposed wells, an amended Notice of Intent to Drill a Well must be filed.

EXPLAIN

Susan C Bolich
Roy C. Seger

I HEREBY CERTIFY that the above statements are true to the best of my knowledge and belief.

TYPE OR PRINT NAME AND TITLE	SIGNATURE OF WELL OWNER	DATE
	Richard J. Seger	

Arizona Department of Water Resources
Groundwater Management Support Section
P.O. Box 458 • Phoenix, Arizona 85001-0458
(602) 417-2470 • (800) 352-8488
www.water.az.gov

D(3-14)14 B DD

Request to Change Well Information

RECEIVED
MAY 12 2004
Information Management

FILE NUMBER	
WELL REGISTRATION NUMBER	55 - 622477

- Review instructions prior to completing form in black or blue ink.
- You must include with your Notice:
  - check or money order for any required fee(s)
- Authority for fee: A.A.C. R12-15-151(B)(4)(a), A.R.S. § 45-113(B)

** PLEASE PRINT CLEARLY **

SECTION 1. REGISTRY INFORMATION

Well Owner

FULL NAME OF COMPANY, ORGANIZATION, OR INDIVIDUAL	Richard Seger
MAILING ADDRESS	HCR Box 2360 Dripping Springs Rd.
CITY / STATE / ZIP CODE	Winkelman, AZ 85242
CONTACT PERSON NAME AND TITLE	Richard Seger, Owner
TELEPHONE NUMBER	928-719-1374
FAX	

Location of Well

WELL LOCATION ADDRESS (IF ANY)

TOWNSHIP (N/S)	RANGE (E/W)	SECTION	160 ACRE	40 ACRE	10 ACRE
35	14E	14	NW ¼	SE ¼	NW ¼

LATITUDE Degrees	Minutes	Seconds N	LONGITUDE Degrees	Minutes	Seconds W

COUNTY ASSESSOR'S PARCEL ID NUMBER

BOOK	MAP	PARCEL

COUNTY WHERE WELL IS LOCATED: Gila County

Type of Request (CHECK ONE)

- ☐ Change of Well Drilling Contractor *(Fill out Section 2)*
- ☒ Change of Well Ownership *(Fill out Section 3)*
- ☐ Change of Well Information (location, use, etc.) *(Fill out Section 4)*

SECTION 2. REQUEST TO CHANGE WELL DRILLING CONTRACTOR ($10 Fee Required)

$10 FEE

- If drilling or abandoning a well, the Department must receive this request and issue authorization to the new drilling firm prior to the commencement of well drilling or abandonment.

Current Well Drilling Contractor	New Well Drilling Contractor
FULL NAME OF COMPANY, ORGANIZATION, OR INDIVIDUAL:	FULL NAME OF COMPANY, ORGANIZATION, OR INDIVIDUAL:
DWR LICENSE NUMBER:	DWR LICENSE NUMBER: / ROC LICENSE CATEGORY:
TELEPHONE NUMBER: / FAX:	TELEPHONE NUMBER: / FAX:

SECTION 3. STATEMENT OF CHANGE OF WELL OWNERSHIP ($10 Fee Required)

$10 FEE

- If this change pertains to more than one well and the names are the same, only one $10 fee is required.

	Previous Well Owner	New Well Owner
FULL NAME OF COMPANY, ORGANIZATION, OR INDIVIDUAL	Richard Seger	Susan Carol Bolich
MAILING ADDRESS	HCE Box 2360 Dripping Springs Rd.	HCR Box 2360 Dripping Springs Rd.
CITY / STATE / ZIP CODE	Winkelman, AZ 85242	Winkelman, AZ 85242
CONTACT PERSON NAME AND TITLE		

ORIGINAL DOCUMENT IS PRINTED ON CHEMICAL REACTIVE PAPER & HAS A MICROPRINTED BORDER

235303643

First American Title Insurance Agency, Inc.
P.O. Box 843
Globe, AZ 85502
(928) 425-4481

FIRST AMERICAN

PR. 4000
Ofc. 4235

Bank of America -
Global Client Svcs 333 S. Beaudry Avenue
Los Angeles CA 90017-1466

1233

Date 04/30/2004

FILE NO. 235-4116667

PAY **********$40.00********** DOLLARS $******40.00

Escrow Trust Account

[redacted]

Re:

TO THE ORDER OF
Arizona Department of Water Resources Groundwater Management Support
P O Box 458
Phoenix, AZ 85001-0458

Brown.

DEPARTMENT OF WATER RESOURCES
99 EAST VIRGINIA AVENUE
PHOENIX, ARIZONA 85004

RECEIVED JUN 12 1982 DEPT OF WATER RESOURCES

REGISTRATION OF EXISTING WELLS

READ INSTRUCTIONS ON BACK OF THIS FORM BEFORE COMPLETING

PRINT OR TYPE — FILE IN DUPLICATE

u8

FOR OFFICE USE ONLY

REGISTRATION NO. 55- 622477
FILE NO. D(3-14)14bdb
FILED JUN 12 1982 (DATE) AT 9 am (TIME)
INA
AMA

REGISTRATION FEE (CHECK ONE)

EXEMPT WELL (NO CHARGE) ☒
NON-EXEMPT WELL – $10.00 ☐

1. Name of Registrant:
Brown Land and Cattle Co.
Box 2784 (Address) Globe (City) AZ (State) 85501 (Zip)

2. File and/or Control Number under previous groundwater law:
(File Number) 35- (Control Number)

3. a. The well is located within the NW ¼ SE ¼ NW ¼, Section 14, of Township 3 ~~N~~/S Range 14 E/~~W~~, G & SRB & M, in the County of Gila.
b. If in a subdivision: Name of subdivision ____, Lot No. ____, Address ____.

4. The principal use(s) of water (Examples: irrigation - stockwater - domestic - municipal - industrial)

5. If for irrigation use, number of acres irrigated from well —.

6. Owner of land on which well is located. If same as Item 1, check this box ☒

(Address) (City) (State) (Zip)

7. Well data (If data not available, write N/A)
a. Depth of Well 900 feet
b. Diameter of casing 10 inches
c. Depth of casing 900 feet
d. Type of casing steel.
e. Maximum pump capacity 6 gallons per minute.
f. Depth to water 90 feet below land surface.
g. Date well completed (Month) (Day) — (Year).

8. The place(s) of use of water. If same as Item 3, check this box ☒
____ ¼ ____ ¼ ____ ¼, Section ____ Township ____ Range ____
____ ¼ ____ ¼ ____ ¼, Section ____ Township ____ Range ____

Attach additional sheet if necessary.

9. DATE 6-14-82 SIGNATURE OF REGISTRANT Ted Brown

MICROFILMED

INSTRUCTIONS FOR COMPLETING REGISTRATION FORM

General Instructions

1. A person who owns an "Existing Well" shall register the well, pursuant to A.R.S. 45-593, by filing this form **in duplicate** with the Department of Water Resources not later than midnight June 14, 1982. The form must be completed and signed. Failure to do so will constitute a violation of A.R.S. 45-593, and may subject the well owner to injunction and/or civil penalties, pursuant to A.R.S. Title 45, Article 12.

2. An "Existing Well" means, (1) a well which was drilled on or before June 12, 1980 and which is not abandoned or sealed, or (2) a well which was not completed on or before June 12, 1980, but for which a Notice of Intention to Drill was on file with the Arizona Water Commission on or before June 12, 1980.

3. No registration fee is required for Exempt Wells. A $10.00 registration fee must accompany registration forms for all Non-Exempt Wells.

4. An "Exempt Well" means a well having a pump with a maximum capacity of not more than 35 gallons per minute which is used to withdraw groundwater. An Exempt Well may include the non-commercial irrigation of not more than 1 acre of land.

5. A "Non-Exempt Well" means a well that is not an "Exempt Well".

INSTRUCTIONS FOR REGISTRATION QUESTIONS

1. The Registrant must be the owner of the well and may be an individual, public or private corporation, company, partnership, firm, association, society, estate, trust, any other private organization or enterprise, the United States, any state, territory or country or a governmental entity, political subdivision or municipal corporation organized under or subject to the constitution and laws of this State.

2. If you own an existing irrigation well drilled at any time, or any other type of well drilled on or after June 20, 1968, you should have an assigned control and/or file number. Write these numbers in item 2. If you do not know the number, please explain the reason on the form or on an attached sheet.

3. a. Fill in the Section, Township and Range in all cases if it is available.
   b. If the well is in a subdivision and you have this information, give the subdivision name, Lot Number, and Address.

4. Show all purposes for which the water is used.

5. If the well is used for irrigation, give the number of acres irrigated in 1980 from the well.

6. If the owner of the land is an individual, give the last name, first name, middle initial. If the owner of the land is a corporation, partnership, firm, etc., fill in the appropriate title.

7. Complete the section on Well Data with the most accurate information available to you. If the data is not available, write N/A in the blanks.

8. Give the legal description of the place of use of the water. If place of use is in a subdivision and legal description is not available, give the subdivision name, Lot Number and/or address on the blank line.

9. The person in whose name a well is registered shall notify the Department of any change in ownership and shall keep all information on the registration record current and accurate. A form entitled "Change of Well Information/Ownership" is available for this purpose. A blank form will be furnished with the returned duplicate copy of the registration form.

OK

DEPARTMENT OF WATER RESOURCES
99 East Virginia Avenue
Suite 100
Phoenix, Arizona 85004

CHANGE OF WELL INFORMATION

Registration No. 622477

I request the following information be changed in Well File Number D(3-14)14 bdb

Date ____________, 19____ ____________
Signature of Well Owner

STATEMENT OF CHANGE OF WELL OWNERSHIP

I, Verl Brown, state that I am (no longer) the

(~~new~~) owner of the well described below:

Township 3S Range 14E Section 14, SE ¼ NW ¼ ____ ¼

Registration #55-____________ File No. ____________

Verl Brown - Lorena Brown	Richard J or Nancy Seger
Previous Owner	New Owner
Rt. 1 Box 409	HCR Box 2360
Address	Address
Duncan, Arizona 85534	Winkelman AZ 85292
City State Zip	City State Zip

NOTE: ARS §45-593 requires that the Department be notified of change of well ownership and that the well owner is required to keep the Department's Well Registration records current and accurate. Well data and ownership changes must be submitted within 30 days after changes take place.

NOTE: SAVE THIS FORM TO REPORT FUTURE CHANGES IN OWNERSHIP OR WELL DATA SUCH AS PUMP CAPACITY, ETC.

ENTERED JUL 11 1988

DWR-55-51-12/83

RECEIVED
6 2004
Information Management

Susan Carol Bolich
Victory Cross Ranch
HC 2 Box 2360
Winkelman, AZ 85292

8-2-04

AZ Dept of Water Resources
Information Management
PO Box 458
Phoenix, AZ 85001

To whom it may concern,

As of May 1, 2004, I am the new owner of Victory Cross Ranch (HC 2 Box 2360 Dripping Springs Rd, Winkelman, AZ 85292). The paperwork for registering the water rights has been processed and apparently is in my name. I am requesting a copy of this current registration with my name on the paperwork as the current owner, so that I may have the proper ownership on file.

Also please note that the wrong zip code was typed in (by the title company or whomever filled the application out) on the 'Request to Change Well Information' Form for the following registration numbers:
55-622471 (I've included a copy of this one with the wrong info highlighted for your review)
55-622477
55-622478
55-622479
Do we also have numbers ending in 72, 73, 74, 75, 76? Could it still be in Seger's name? Please let me know.

Please check that the correct zip code is reflected on all paperwork, and if it is not correct on the ownership that you are sending me, please update it before sending it so that I have the correct information on my paperwork.

If you have any questions you may contact me at 928-719-1374.

Thank you,

Susan C Bolich

Susan Carol Bolich

ENTERED AUG 1 3 2004

Arizona Department of Water Resources
Groundwater Management Support Section
P.O. Box 458 • Phoenix, Arizona 85001-0458
(602) 417-2470 • (800) 352-8488
www.water.az.gov

Request to Change Well Information

- Review instructions prior to completing form in black or blue ink.
- You must include with your Notice:
  - check or money order for any required fee(s)
- Authority for fee: A.A.C. R12-15-151(B)(4)(a), A.R.S. § 45-113(B)

FILE NUMBER

WELL REGISTRATION NUMBER
55 - 622471

** PLEASE PRINT CLEARLY **

SECTION 1. REGISTRY INFORMATION

Well Owner

FULL NAME OF COMPANY, ORGANIZATION, OR INDIVIDUAL
Richard Seger

MAILING ADDRESS
HCR Box 2360 Dripping Springs Rd.

CITY / STATE / ZIP CODE
Winkelman, AZ 85242 ← should be 85292

CONTACT PERSON NAME AND TITLE
Richard Seger, Owner

TELEPHONE NUMBER	FAX
928-719-1374	

Location of Well

WELL LOCATION ADDRESS (IF ANY)

TOWNSHIP (N/S)	RANGE (E/W)	SECTION	160 ACRE	40 ACRE	10 ACRE
3S	14E	24	NW ¼	NW ¼	NW ¼

LATITUDE: ° Degrees ' Minutes " Seconds N
LONGITUDE: ° Degrees ' Minutes " Seconds W

COUNTY ASSESSOR'S PARCEL ID NUMBER

BOOK	MAP	PARCEL

COUNTY WHERE WELL IS LOCATED
Gila County

Type of Request (CHECK ONE)

☐ Change of Well Drilling Contractor *(Fill out Section 2)*
☒ Change of Well Ownership *(Fill out Section 3)*
☐ Change of Well Information (location, use, etc.) *(Fill out Section 4)*

SECTION 2. REQUEST TO CHANGE WELL DRILLING CONTRACTOR ($10 Fee Required)

$10 FEE

- If drilling or abandoning a well, the Department must receive this request and issue authorization to the new drilling firm prior to the commencement of well drilling or abandonment.

Current Well Drilling Contractor
FULL NAME OF COMPANY, ORGANIZATION, OR INDIVIDUAL
DWR LICENSE NUMBER
TELEPHONE NUMBER | FAX

New Well Drilling Contractor
FULL NAME OF COMPANY, ORGANIZATION, OR INDIVIDUAL
DWR LICENSE NUMBER | ROC LICENSE CATEGORY
TELEPHONE NUMBER | FAX

SECTION 3. STATEMENT OF CHANGE OF WELL OWNERSHIP ($10 Fee Required)

$10 FEE

- If this change pertains to more than one well and the names are the same, only one $10 fee is required.

	Previous Well Owner	New Well Owner
FULL NAME OF COMPANY, ORGANIZATION, OR INDIVIDUAL	Richard Seger	Susan Carol Bolich
MAILING ADDRESS	HCE Box 2360 Dripping Springs Rd.	HCR Box 2360 Dripping Springs Rd.
CITY / STATE / ZIP CODE	Winkelman, AZ 85242 ← 85292	Winkelman, AZ 85242 ← 85292
CONTACT PERSON NAME AND TITLE	Richard Seger, Owner	Susan Bolich, Owner
TELEPHONE NUMBER	928-719-1374	928-719-1374
FAX		

SECTION 4. CHANGE OF WELL INFORMATION (No Fee Required)

NO FEE

NOTE: Applies only to wells that have already been drilled. For proposed wells, an amended Notice of Intent to Drill a Well must be filed.

EXPLAIN

ENTERED AUG 13 2004

I HEREBY CERTIFY that the above statements are true to the best of my knowledge and belief.

TYPE OR PRINT NAME AND TITLE | SIGNATURE OF WELL OWNER | DATE

Victory Cross Ranch
HC 2 Box 2360
Winkelman, AZ 85292

AZ Dept of Water Resources
Information Management
PO Box 458
Phoenix, AZ 85001

85001-0458

Arizona Department of Water Resources
Groundwater Management Support Section
P.O. Box 458 • Phoenix, Arizona 85001-0458
(602) 417-2470 • (800) 352-8488
www.water.az.gov

D(3-14) 24 BBB

Request to Change Well Information

RECEIVED
MAY 12 2004
Information Management

FILE NUMBER	
WELL REGISTRATION NUMBER	55- 622471

- Review instructions prior to completing form in black or blue ink.
- You must include with your Notice:
  - check or money order for any required fee(s)
- Authority for fee: A.A.C. R12-15-151(B)(4)(a), A.R.S. § 45-113(B)

** PLEASE PRINT CLEARLY **

SECTION 1. REGISTRY INFORMATION

Well Owner

FULL NAME OF COMPANY, ORGANIZATION, OR INDIVIDUAL	Richard Seger
MAILING ADDRESS	HCR Box 2360 Dripping Springs Rd.
CITY / STATE / ZIP CODE	Winkelman, AZ 85242
CONTACT PERSON NAME AND TITLE	Richard Seger, Owner
TELEPHONE NUMBER	928-719-1374
FAX	

Location of Well

WELL LOCATION ADDRESS (IF ANY):

TOWNSHIP (N/S)	RANGE (E/W)	SECTION	160 ACRE	40 ACRE	10 ACRE
3S	14E	24	NW ¼	NW ¼	NW ¼

LATITUDE Degrees °	Minutes '	Seconds "N	LONGITUDE Degrees °	Minutes '	Seconds "W

COUNTY ASSESSOR'S PARCEL ID NUMBER

BOOK	MAP	PARCEL

COUNTY WHERE WELL IS LOCATED: Gila County

Type of Request (CHECK ONE)

☐ Change of Well Drilling Contractor *(Fill out Section 2)*
☒ Change of Well Ownership *(Fill out Section 3)*
☐ Change of Well Information (location, use, etc.) *(Fill out Section 4)*

SECTION 2. REQUEST TO CHANGE WELL DRILLING CONTRACTOR ($10 Fee Required)

$10 FEE

- If drilling or abandoning a well, the Department must receive this request and issue authorization to the new drilling firm prior to the commencement of well drilling or abandonment.

Current Well Drilling Contractor		New Well Drilling Contractor	
FULL NAME OF COMPANY, ORGANIZATION, OR INDIVIDUAL		FULL NAME OF COMPANY, ORGANIZATION, OR INDIVIDUAL	
DWR LICENSE NUMBER		DWR LICENSE NUMBER	ROC LICENSE CATEGORY
TELEPHONE NUMBER	FAX	TELEPHONE NUMBER	FAX

ENTERED MAY 14 2004

SECTION 3. STATEMENT OF CHANGE OF WELL OWNERSHIP ($10 Fee Required)

$10 FEE

- If this change pertains to more than one well and the names are the same, only one $10 fee is required.

	Previous Well Owner	New Well Owner
FULL NAME OF COMPANY, ORGANIZATION, OR INDIVIDUAL	Richard Seger	Susan Carol Bolich
MAILING ADDRESS	HCE Box 2360 Dripping Springs Rd.	HCR Box 2360 Dripping Springs Rd.
CITY / STATE / ZIP CODE	Winkelman, AZ 85242	Winkelman, AZ 85242
CONTACT PERSON NAME AND TITLE	Richard Seger, Owner	Susan Bolich, Owner
TELEPHONE NUMBER	928-719-1374	928-719-1374
FAX		

SECTION 4. CHANGE OF WELL INFORMATION (No Fee Required)

NO FEE

NOTE: Applies only to wells that have already been drilled. For proposed wells, an amended Notice of Intent to Drill a Well must be filed.

EXPLAIN

Susan C Bolich
Ray C. Seger

I HEREBY CERTIFY that the above statements are true to the best of my knowledge and belief.

TYPE OR PRINT NAME AND TITLE	SIGNATURE OF WELL OWNER	DATE
	Richard J. Seger	

DWR 55-71A (REVISED 03/20/03) Page 1 of 1

D(3-14) 24 BBB

Arizona Department of Water Resources
Groundwater Management Support Section
P.O. Box 458 • Phoenix, Arizona 85001-0458
(602) 417-2470 • (800) 352-8488
www.water.az.gov

Request to Change Well Information

RECEIVED
MAY 12 2004
Information Management

FILE NUMBER

WELL REGISTRATION NUMBER
55- 622471

- Review instructions prior to completing form in black or blue ink.
- You must include with your Notice:
  - check or money order for any required fee(s)
- Authority for fee: A.A.C. R12-15-151(B)(4)(a), A.R.S. § 45-113(B)

** PLEASE PRINT CLEARLY **

SECTION 1. REGISTRY INFORMATION

Well Owner

FULL NAME OF COMPANY, ORGANIZATION, OR INDIVIDUAL: Richard Seger

MAILING ADDRESS: HCR Box 2360 Dripping Springs Rd.

CITY / STATE / ZIP CODE: Winkelman, AZ 85242

Location of Well

WELL LOCATION ADDRESS (IF ANY):

TOWNSHIP (N/S)	RANGE (E/W)	SECTION	160 ACRE	40 ACRE	10 ACRE
3S	14E	24	NW ¼	NW ¼	NW ¼

LATITUDE ° ' " Degrees Minutes

LONGITUDE "W seconds

ORIGINAL DOCUMENT IS PRINTED ON CHEMICAL REACTIVE PAPER & HAS A MICROPRINTED BORDER

First American Title Insurance Agency, Inc.
P.O. Box 843
Globe, AZ 85502
(928) 425-4481

FIRST AMERICA

PR 4000
Ofc. 4235

Bank of America -
Global Client Svcs 333 S. Beaudry Avenue
Los Angeles CA 90017-1466

1233

235303643

FILE NO. 235-4116667

Date 04/30/2004

PAY **********$40.00********** DOLLARS $******40.00

Re:

Escrow Trust Account

[redacted]

TO THE ORDER OF
Arizona Department of Water Resources Groundwater Management Support
P O Box 458
Phoenix, AZ 85001-0458

[redacted]

SECTION 3. STATEMENT OF CHANGE OF WELL OWNERSHIP ($10 Fee Required)

$10 FEE

- If this change pertains to more than one well and the names are the same, only one $10 fee is required.

	Previous Well Owner	New Well Owner
FULL NAME OF COMPANY, ORGANIZATION, OR INDIVIDUAL	Richard Seger	Susan Carol Bolich
MAILING ADDRESS	HCE Box 2360 Dripping Springs Rd.	HCR Box 2360 Dripping Springs Rd.
CITY / STATE / ZIP CODE	Winkelman, AZ 85242	Winkelman, AZ 85242
CONTACT PERSON NAME AND TITLE	Richard Seger, Owner	Susan Bolich, Owner
TELEPHONE NUMBER	928-719-1374	928-719-1374
FAX		

SECTION 4. CHANGE OF WELL INFORMATION (No Fee Required)

NO FEE

NOTE: Applies only to wells that have already been drilled. For proposed wells, an amended Notice of Intent to Drill a Well must be filed.

EXPLAIN

Susan C Bolich

Ray C. Seger

I HEREBY CERTIFY that the above statements are true to the best of my knowledge and belief.

TYPE OR PRINT NAME AND TITLE

SIGNATURE OF WELL OWNER: Richard J. Seger

DATE

DEPARTMENT OF WATER RESOURCES
99 EAST VIRGINIA AVENUE
PHOENIX, ARIZONA 85004

RECEIVED JUN 12 1982 DEP'T OF WATER RESOURCES

REGISTRATION OF EXISTING WELLS

READ INSTRUCTIONS ON BACK OF THIS FORM BEFORE COMPLETING
PRINT OR TYPE — FILE IN DUPLICATE

U8

FOR OFFICE USE ONLY
REGISTRATION NO. 55- 622471
FILE NO. D(3-14)24 BBB
FILED JUN 12 1982 (DATE) AT 9am (TIME)
INA
AMA

REGISTRATION FEE (CHECK ONE)
EXEMPT WELL (NO CHARGE) ☐
NON-EXEMPT WELL — $10.00 ☒

1. Name of Registrant:
BROWN LAND AND CATTLE
BOX 2784 (Address) GLOBE (City) ARIZ. (State) 85501 (Zip)

2. File and/or Control Number under previous groundwater law: NA – THIS LAND PURCHASED FROM THELMA HAGEN IN SEPTEMBER 1974 (File Number) 35- (Control Number)

3. a. The well is located within the NW ¼ NW ¼ NW ¼, Section 24, of Township 3 S. N/S Range 14E. E/W, G & SRB & M, in the County of GILA.
b. If in a subdivision: Name of subdivision ____, Lot No. ____, Address ____.

4. The principal use(s) of water (Examples: irrigation - stockwater - domestic - municipal - industrial)
IRRIGATION – DOMESTIC.

5. If for irrigation use, number of acres irrigated from well 70.

6. Owner of land on which well is located. If same as Item 1, check this box ☒
(Address) (City) (State) (Zip)

7. Well data (If data not available, write N/A)
a. Depth of Well 1400 feet
b. Diameter of casing 20 inches
c. Depth of casing 1400 feet
d. Type of casing Stovepipe.
e. Maximum pump capacity 1200 gallons per minute.
f. Depth to water 150 feet below land surface.
g. Date well completed NA (Month) (Day) (Year).

8. The place(s) of use of water. If same as Item 3, check this box ☐.
__ ¼ SE ¼ SE ¼, Section 14 Township 3S Range 14E
__ ¼ NE ¼ NE ¼, Section 23 Township 3 S. Range 14E
NW¼ NW¼ SECTION 24 T. 3S R. 14E
Attach additional sheet if necessary.

9. DATE 6-12-82 SIGNATURE OF REGISTRANT Verl Brown

MICROFILMED

INSTRUCTIONS FOR COMPLETING REGISTRATION FORM

General Instructions

1. A person who owns an "Existing Well" shall register the well, pursuant to A.R.S. 45-593, by filing this form **in duplicate** with the Department of Water Resources not later than midnight June 14, 1982. The form must be completed and signed. Failure to do so will constitute a violation of A.R.S. 45-593, and may subject the well owner to injunction and/or civil penalties, pursuant to A.R.S. Title 45, Article 12.

2. An "Existing Well" means, (1) a well which was drilled on or before June 12, 1980 and which is not abandoned or sealed, or (2) a well which was not completed on or before June 12, 1980, but for which a Notice of Intention to Drill was on file with the Arizona Water Commission on or before June 12, 1980.

3. No registration fee is required for Exempt Wells. A $10.00 registration fee must accompany registration forms for all Non-Exempt Wells.

4. An "Exempt Well" means a well having a pump with a maximum capacity of not more than 35 gallons per minute which is used to withdraw groundwater. An Exempt Well may include the non-commercial irrigation of not more than 1 acre of land.

5. A "Non-Exempt Well" means a well that is not an "Exempt Well".

INSTRUCTIONS FOR REGISTRATION QUESTIONS

1. The Registrant must be the owner of the well and may be an individual, public or private corporation, company, partnership, firm, association, society, estate, trust, any other private organization or enterprise, the United States, any state, territory or country or a governmental entity, political subdivision or municipal corporation organized under or subject to the constitution and laws of this State.

2. If you own an existing irrigation well drilled at any time, or any other type of well drilled on or after June 20, 1968, you should have an assigned control and/or file number. Write these numbers in item 2. If you do not know the number, please explain the reason on the form or on an attached sheet.

3. a. Fill in the Section, Township and Range in all cases if it is available.
   b. If the well is in a subdivision and you have this information, give the subdivision name, Lot Number, and Address.

4. Show all purposes for which the water is used.

5. If the well is used for irrigation, give the number of acres irrigated in 1980 from the well.

6. If the owner of the land is an individual, give the last name, first name, middle initial. If the owner of the land is a corporation, partnership, firm, etc., fill in the appropriate title.

7. Complete the section on Well Data with the most accurate information available to you. If the data is not available, write N/A in the blanks.

8. Give the legal description of the place of use of the water. If place of use is in a subdivision and legal description is not available, give the subdivision name, Lot Number and/or address on the blank line.

9. The person in whose name a well is registered shall notify the Department of any change in ownership and shall keep all information on the registration record current and accurate. A form entitled "Change of Well Information/Ownership" is available for this purpose. A blank form will be furnished with the returned duplicate copy of the registration form.

OK

DEPARTMENT OF WATER RESOURCES
99 East Virginia Avenue
Suite 100
Phoenix, Arizona 85004

CHANGE OF WELL INFORMATION

Registration No. 622471

I request the following information be changed in Well File Number D(3-14)24bbb

Date ____________, 19____ ____________
Signature of Well Owner

STATEMENT OF CHANGE OF WELL OWNERSHIP

I, Verl Brown, state that I am (no longer) the ~~(new)~~ owner of the well described below:

Township 3S Range 14E Section 24, NW ¼ NW ¼ ____ ¼

Registration #55-____________ File No. ____________

Verl Brown - Lorena Brown
Previous Owner

Rt. 1 Box 409
Address

Duncan, Arizona 85534
City State Zip

Richard J or Nancy Segla
New Owner

HCR Box 2360
Address

Winkelman AZ 85292
City State Zip

NOTE: ARS §45-593 requires that the Department be notified of change of well ownership and that the well owner is required to keep the Department's Well Registration records current and accurate. Well data and ownership changes must be submitted within 30 days after changes take place.

NOTE: SAVE THIS FORM TO REPORT FUTURE CHANGES IN OWNERSHIP OR WELL DATA SUCH AS PUMP CAPACITY, ETC.

ENTERED JUL 11 1988

DWR-55-51-12/83

BROWN LAND & CATTLE CO.
BOX 2784
GLOBE AZ 85501

STATE OF ARIZONA
DEPARTMENT OF WATER RESOURCES
WATER RIGHTS ADMINISTRATION
99 EAST VIRGINIA
PHOENIX, ARIZONA 85004

MICROFILMED

RECEIPT

KIND ENTRY	FILE REFERENCE NO.
55	622471
	THRU
55	

ACCOUNT NO. FUND SOURCE	AGENCY	CHAPTER	DIV.	INT. ACCT.	ITEM DESCRIPTION	RATE	$ AMOUNT
					Filing Fee for Registration of	10.00	10.00
					Existing Wells	WAITER	PAYMENT
						GUESTS	1
						CHK NO	1495
					File No. D(3-14)24 bbb	55-I	10.00
						TAX	0.00
						TOTL	10.00
						GEN.CHEK	10.00
						# 2924 A	15:33

9/30/82 jc

Check # 1495

TOTAL $ 10.00

LAND DEPARTMENT
WATER DIVISION
STATE OF ARIZONA

REPORT OF WELL DRILLER

This report should be prepared by the driller in all detail and filed with the State Land Commissioner following completion of the well.

1. OWNER Thelma W. Hagun
   Name
   Box 150 Globe, Ariz
   Address
2. Lessee or Operator
   Name
   Address
3. DRILLER Weber Well Drilling Co.
   Name
   P. O. Box 5354, Phoenix 10, Arizona
   Address
4. Location of well: Twp. 3S Rge. 14E Section 24 NW ¼ NW ¼ NW ¼
   10-acre sudivision
5. Intention to Drill File No. D(3-14) 24 666 Permit No.

DESCRIPTION OF WELL

6. Total depth of hole 1475 ft.
7. Type of casing O. D.
8. Diameter and length of casing 16 in. from 0 to 615, in. from to , in. from to
9. Method of sealing at reduction points
10. Perforated from 260 to 600, from to , from to , from to
11. Size of cuts 1/4 x 4 Number of cuts per foot 6
12. If screen was installed: Length ft. Diam in. Type
13. Method of construction drilled
    drilled, dug, driven, bored, jetted, etc.
14. Date started 10/11/61
    Month Day Year
15. Date completed 3/14/62
    Month Day Year
16. Depth of water 160 ft.
    If flowing well, so state.
17. Describe point from which depth measurements were made, and give sea-level elevation if available
    surface
18. If flowing well, state method of flow regulation

622471

19. REMARKS:

DO NOT WRITE IN THIS SPACE
OFFICE RECORD

Received 5-3-63 by D
Filed 5-3-63 by D
File No. D(3-14) 24 666

(Well Log to Appear on Reverse Side)

WO FORM G-301
REV. 4-27-53

LOG OF WELL

Indicate depth at which water was first encountered, and the depth and thickness of water bearing beds. If water is artesian, indicate depth at which encountered, and depth to which it rose in well.

FROM (FEET)	TO (FEET)	DESCRIPTION OF FORMATION MATERIAL
0	16	top soil
16	60	sand and gravel
60	100	clay and rock
100	160	hard cemented rock
160	190	cemnted rock and clay
190	310	hard cemented conglomerate
310	1185	conglomerate
1185	1300	clay and gravel with some quartz.
1300	1410	clay and gravel with some conglomerate
1410	1445	hard sandstone
1445	1475	conglomerate

9518

I hereby certify that this well was drilled by me (or under my supervision), and that each and all of the statements herein contained are true to the best of my knowledge and belief.

Driller Weber Well Drilling Co.
Name

P.O. Box 5354 Phx
Address

Date 4-30-63

MONTGOMERY & ASSOCIATES

Appendix D

Driller Bit Run Sheets

National Exploratory Drilling

Bit Run Sheet

Date: 02/21/2020
Client: Rio tinto
Hole/Well No.: TCG #1
Location:
Serial No.: 191272

Job #: 402.0360
Depth in:
Depth Out:
Total hrs:
Bit diam.: 7 3/4

	Depth		Time		Elasped Time	Total Hours	Weight on Bit	RPM	Torque	GPM	Comments	
	From	To	Start	Stop								
	40	60	16:40	16:50	:10	:10					No water	
	60	80	17:00	17:15	:15	:25					no water	
	80	100	17:25	17:40	:15	:40					no water	
JC	100	120	19:38	21:56	.14	.54					Stop 19:36 no water Start 2145	No water
	120	140	2340	2354	.14	1.08					No water	
	140	160	0011	0023	.12	1.20					No water	F
	160	180	0043	0055	.12	1.32					Trace of water	
	180	200	0130	0143	.13	1.45					Trace of water	
	200	220	0205	0216	.11	1.56				7	Water	F
	220	240	0243	0381	.12	2.08					Stop To Prime Bean Pump	
	240	260	0355	0407	.12	2.20				18		
	260	280	0512	0526	.14	2.34						F
	280	306	0552	0604	.12	2.46				40		
	300	320	06:40	06:53	.13	2.59						
	320	340	07:16	07:30	.14	3.13						F
	340	360	07:46	08:03	.17	3.30				40		
	360	380	08:21	08:41	.20	3.50						
	380	400	9:05	09:35	:30	4:20				60		F
	400	420	9:53	10:23	:30	4:50						
	420	440	10:39	11:25	:46	5:36				60		
	440	450	11:42	12:42	1.00	6.36				75		

***National* Exploratory Drilling**

Bit Run Sheet

Date:	2/22/20	Job #:	402-0360
Client:	Riotinto	Depth in:	20'/450'
Hole/Well No.:	TCG#1	Depth Out:	450'
Location:	Skunk Camp	Total hrs:	6.36 /
Serial No.:	191272 / OK537G	Bit diam.:	7 3/4" / 7½"

Depth		Time		Elasped	Total	Weight				
From	To	Start	Stop	Time	Hours	on Bit	RPM	Torque	GPM	Comments
JC 450	470	2209	2343	1.34	1.34	22K	20-25	1000 ~~[illegible]~~	100	Hard Gila Quartz mix
470	490	0010	0050	.40	2.14	16K	20-25	950		
490	510	0110	0146	.36	2.50	16K	30	900		
510	530	0207	0232	.25	3.15	16K	25-30	1000		
530	550	0255	0323	.28	3.43	16K	25-30	1000	~~100+~~	118GPM
550	570	0344	0410	.26	4.09	16K	25-30	950		
570	590	0436	0512	.36	4.45	16-20K	25-30	900	133	
590	600	0533	0548	.15	5.00	17K	30	900		

Bit Run Sheet

Date: 2-25-20
Client: Resolution
Hole/Well No.: ~~[illegible]~~ RC20-2A
Location: SKUNK CAMP
Serial No.: 191272

Job #: 0360
Depth in: 70'
Depth Out: 460'
Total hrs: 11:23
Bit diam.: 17½ / 7¾

Depth From	Depth To	Time Start	Time Stop	Elasped Time	Total Hours 6.36	Weight on Bit	RPM	Torque	GPM	Comments	
70	80	1925	19.30	.05	6.41			900	NA		
80	100	1945	1955	.10	6.51			900	NA		
100	120	2013	2025	.12	7.03			850	NA		F
120	140	2043	2057	.14	7.17			850	NA		
140	160	2114	2126	.12	7.29			900	NA		
160	180	2142	2154	.12	7.41			800	Trace		F
180	200	2226	2239	.13	7.54			900			
200	220	2303	2317	.14	8.08			900			
220	240	2335	2350	.15	8.23			900			
240	260	0004	0016	.12	8.35			900	20		
260	280	0037	0048	.11	8.46			900	20		F
280	300	0120	0135	.15	9.01			1000	26		
300	320	0154	0208	.14	9.15			950			
320	340	0226	0239	.13	9.28			1000			
340	360	0306	0314	.14	9.42			1000	33		F
360	380	0330	0344	.14	9.56			1000	~~33~~		
380	400	0354	0408	.14	10.10			1000	46		
400	420	0422	0439	.17	10.27			1000	50		
420	440	0451	~~[illegible]~~ 0510	.19	10.46			950	60		
440	460	0521	0558	.37	11.23			1000			

National Exploratory Drilling

Bit Run Sheet

Date: 2.27.26
Client: Resolution
Hole/Well No.: RC-20 2A
Location: Sicuak Camp
Serial No.: 191272 / 71016

Job #: 402.0360
Depth in: 70' / 480
Depth Out: 480 / 600
Total hrs: 25:04 /
Bit diam.: 7 3/4 / 7 1/2
12.22 hrs / 8-35 hrs

Depth		Time		Elasped	11:23 Total	Weight					
From	To	Start	Stop	Time	Hours	on Bit	RPM	Torque	GPM	Comments	
460	480	6:33	7:32	:59	12:22	200	20	1000		Flooded out / Tripped 4 TC	~~155 PSI~~
480	495	10:55	11:23	:38	5:38	700	45	1200			-155 PSI
495	515	11:50	12:28	:38	6:16	700	45	1200			-163 PSI
515	535	12:52	13:36	:44	7:00	700	45	1200			-180 PSI
535	555	~~13:51~~ 0021	0041	.20	7.20	700	45	1200			-195 PSI
555	575	0058	0126	.28	7.48	700	35	1200			199 PSI
575	595	0140	0213	.33	8.21	800	35-40	1300			-210 PSI
595	602	0227	0241	.14	8.35	800	35-40	1250	120		-210 PSI

National Exploratory Drilling

Bit Run Sheet

Date:	03/02/20	Job #:	0360
Client:	Riotinto	Depth in:	
Hole/Well No.:	RC20-2B	Depth Out:	
Location:	Skunk Camp	Total hrs:	
Serial No.:		Bit diam.:	

Depth		Time		Elapsed	Total	Weight				
From	To	Start	Stop	Time	Hours	on Bit	RPM	Torque	GPM	Comments
67	75	1000	1020	:20						
75	90									
80	95	1600	1607	:07		0-50	10-20	900		
95	115	16:15	1633	:18		0-50	20	" "	Ø	10 airlift
115	135	1650	1720	:30		" "	25	" "	TR	20 min airlift
135	150	17:48	18:17	:29		" "	25	" "		

Appendix E

Lithologic Logs for Hydrogeologic Test Wells

DRAFT

E-1. LITHOLOGIC DESCRIPTIONS FOR DRILL CUTTINGS FROM MONITOR WELL RC20-2 [*55-923921*] SKUNK CAMP GILA COUNTY, ARIZONA

DRILLING COMPANY: National EWP	LOGGED BY: M. Mellott; N. Speaks
DEPTH DRILLED / LAND SURFACE ELEVATION: 601.0 feet / 3006.33 feet msl	DATE DRILLED: Feb. 20 - 23, 2020
CADASTRAL / AZ STATE PLANE NAD83 : (D-3-14)14ddd / 788964.07 N / 1017770.65 E	

DEPTH INTERVAL (feet)	FORMATION	GENERAL DESCRIPTION	SECONDARY FEATURES	COMMENTS
QUATERNARY ALLUVIUM (Qal)				
0 - 10	**Qal**	silty gravelly sand; brown [7.5YR4/4]; non-lithified; subangular to subrounded, very fine to very coarse sand 40%, very fine to medium gravel 35%, silt with trace clay 25%; gravel fraction: 70% quartz and granitoid, 30% dark lithic fragments including diabase; well graded; non cohesive; reaction to acid: none		conventional mud rotary; subangular to subrounded granules up to 1/3-inch
10 - 20	**Qal**	silty gravelly sand; brown [7.5YR4/4]; non-lithified; subangular to subrounded, very fine to very coarse sand 60%, very fine to medium gravel 15%, silt with trace clay 25%; gravel fraction: 70% quartz and granitoid, 30% dark lithic fragments including diabase; well graded; non cohesive; reaction to acid: none		subangular to subrounded granules up to 1/3-inch
GILA CONGLOMERATE (Tcg)				
20 - 30	**Tcg**	clast-supported conglomerate; brown [10YR4/3]; very weakly to weakly lithified; 50% clayey silty sand matrix; 50% clasts of quartzite with some iron oxidation, some granitoid, diabase; reaction to acid: weak to moderate	weathered	reverse circulation hammer with Symmetrix; angular to subangular chips up to 1-1/3-inches
30 - 40	**Tcg**	clast-supported conglomerate; brown [10YR4/3]; very weakly to weakly lithified; 60% clayey silty sand matrix; 40% clasts of quartzite with some iron oxidation, some granitoid, diabase; reaction to acid: weak to moderate		Gila Conglomerate: hard boundary encountered at 34 feet; angular to subangular chips up to 1-1/4-inches
40 - 50	**Tcg**	clast-supported conglomerate; brown [10YR4/3]; weakly to moderately lithified; 60% clayey silty sand matrix; 40% clasts of quartzite with some iron oxidation, some granitoid, diabase; reaction to acid: weak to moderate		angular to subangular chips up to 1-1/2-inches
50 - 60	**Tcg**	clast-supported conglomerate; brown [10YR4/3]; weakly to moderately lithified; 55% clayey silty sand matrix; 45% clasts of quartzite with some iron oxidation, some granitoid, diabase; televiewer log shows fining upwards sequences of clast to matrix supported conglomerate; reaction to acid: weak to moderate		reverse circulation hammer; angular to subangular chips up to 1-inch

MONTGOMERY & ASSOCIATES

DRAFT

E-1. LITHOLOGIC DESCRIPTIONS FOR
DRILL CUTTINGS FROM MONITOR WELL RC20-2 [*55-923921*]
SKUNK CAMP
GILA COUNTY, ARIZONA

DEPTH INTERVAL (feet)	FORMATION	GENERAL DESCRIPTION	SECONDARY FEATURES	COMMENTS
60 - 70	**Tcg**	clast-supported conglomerate; brown [10YR4/3]; weakly to moderately lithified; 50% clayey silty sand matrix; 50% clasts of quartzite with some iron oxidation, granitoid, some diabase, dark lithic fragments; reaction to acid: weak to moderate		angular to subangular chips up to 1-inch
70 - 80	**Tcg**	clast-supported conglomerate; brown [10YR4/3]; weakly to moderately lithified; 55% silty sand matrix; 45% clasts of quartzite with some iron oxidation, granitoid, some diabase, dark lithic fragments; reaction to acid: weak to moderate		angular to subangular chips up to 1-inch
80 - 90	**Tcg**	clast-supported conglomerate; brown [10YR4/3]; weakly to moderately lithified; 55% clasts of quartzite with some iron oxidation, granitoid, some diabase, dark lithic fragments, 45% silty sand matrix; televiewer log shows fining upwards sequences of clast to matrix supported conglomerate; reaction to acid: weak to moderate		angular to subangular chips up to 2/3-inch
90 - 100	**Tcg**	clast-supported conglomerate; brown [10YR4/3]; weakly to moderately lithified; 60% clayey silty sand matrix; 40% clasts of quartzite with some iron oxidation, granitoid, some diabase, dark lithic fragments; televiewer log shows fining upwards sequences of clast to matrix supported conglomerate; reaction to acid: weak to moderate		angular to subangular chips up to 1/2-inch
100 - 110	**Tcg**	clast-supported conglomerate; grayish brown [10YR5/2]; weakly to moderately lithified; 55% clayey silty sand matrix; 45% clasts of quartzite with some iron oxidation, granitoid, some diabase, dark lithic fragments; televiewer log shows fining upwards sequences of clast to matrix supported conglomerate; reaction to acid: weak to moderate		angular to subangular chips up to 1-1/4-inch
110 - 120	**Tcg**	clast-supported conglomerate; grayish brown [10YR5/2]; weakly to moderately lithified; 55% clayey silty sand matrix; 45% clasts of quartzite with some iron oxidation, granitoid, some diabase, dark lithic fragments; reaction to acid: weak to moderate		angular to subangular chips up to 2/3-inch

DRAFT

E-1. LITHOLOGIC DESCRIPTIONS FOR DRILL CUTTINGS FROM MONITOR WELL RC20-2 [*55-923921*] SKUNK CAMP GILA COUNTY, ARIZONA

DEPTH INTERVAL (feet)	FORMATION	GENERAL DESCRIPTION	SECONDARY FEATURES	COMMENTS
120 - 130	**Tcg**	clast-supported conglomerate; grayish brown [10YR5/2]; weakly to moderately lithified; 60% clayey silty sand matrix; 40% clasts of quartzite with some iron oxidation, granitoid, some diabase, dark lithic fragments; televiewer log shows fining upwards sequences of clast to matrix supported conglomerate; reaction to acid: weak to moderate		angular to subangular chips up to 1/2-inch
130 - 140	**Tcg**	clast-supported conglomerate; grayish brown [10YR5/2]; weakly to moderately lithified; 60% silty sand matrix; 40% clasts of quartzite with some iron oxidation, granitoid, trace dark lithic fragments, diabase; televiewer log shows fining upwards sequences of clast to matrix supported conglomerate; reaction to acid: weak to moderate		angular to subangular chips up to 1/2-inch
140 - 150	**Tcg**	clast-supported conglomerate; grayish brown [10YR5/2]; weakly to moderately lithified; 55% silty sand matrix; 45% clasts of quartzite with some iron oxidation, granitoid, some dark lithic fragments, diabase; televiewer log shows fining upwards sequences of clast to matrix supported conglomerate; reaction to acid: weak to moderate		angular to subangular chips up to 1/2-inch
150 - 160	**Tcg**	clast-supported conglomerate; grayish brown [10YR5/2]; weakly to moderately lithified; 55% silty sand matrix; 45% clasts of quartzite with some iron oxidation, granitoid, some dark lithic fragments, diabase; televiewer log shows fining upwards sequences of clast to matrix supported conglomerate; reaction to acid: weak to moderate		angular to subangular chips up to 1/2-inch
160 - 170	**Tcg**	clast-supported conglomerate; grayish brown [10YR5/2]; weakly to moderately lithified; 75% silty sand matrix; 25% clasts of quartzite with some iron oxidation, granitoid, some diabase, trace dark lithic fragments; televiewer log shows fining upwards sequences of clast to matrix supported conglomerate; reaction to acid: weak to moderate		angular to subangular chips up to 2/3-inch
170 - 180	**Tcg**	clast-supported conglomerate; grayish brown [10YR5/2]; weakly to moderately lithified; 55% silty sand matrix; 45% clasts of quartzite with some iron oxidation, granitoid, some dark lithic fragments, trace diabase; reaction to acid: weak to moderate		angular to subangular chips up to 3/4-inch

DRAFT

E-1. LITHOLOGIC DESCRIPTIONS FOR
DRILL CUTTINGS FROM MONITOR WELL RC20-2 [*55-923921*]
SKUNK CAMP
GILA COUNTY, ARIZONA

DEPTH INTERVAL (feet)	FORMATION	GENERAL DESCRIPTION	SECONDARY FEATURES	COMMENTS
180 - 190	**Tcg**	clast-supported conglomerate; grayish brown [10YR5/2]; weakly to moderately lithified; 55% clasts of quartzite with some iron oxidation, granitoid, trace dark lithic fragments, 45% silty sand matrix; televiewer log shows fining upwards sequences of clast to matrix supported conglomerate; reaction to acid: weak to moderate		angular to subangular chips up to 1-inch
190 - 200	**Tcg**	clast-supported conglomerate; grayish brown [10YR5/2]; weakly to moderately lithified; 65% silty sand matrix; 35% clasts of quartzite with some iron oxidation, granitoid with some iron oxidation, some diabase, dark lithic fragments; televiewer log shows fining upwards sequences of clast to matrix supported conglomerate; reaction to acid: weak to moderate		angular to subangular chips up to 3/4-inch
200 - 210	**Tcg**	clast-supported conglomerate; grayish brown [10YR5/2]; weakly to moderately lithified; 55% clasts of quartzite with iron oxidation, granitoid with some iron oxidation and epidote alteration, some diabase, trace dark lithic fragments, 45% silty sand matrix; reaction to acid: weak to moderate		angular to subangular chips up to 1-inch
210 - 220	**Tcg**	clast-supported conglomerate; grayish brown [10YR5/2]; weakly to moderately lithified; 80% silty sand matrix; 20% clasts of quartzite with some iron oxidation, granitoid with some iron oxidation and epidote alteration, some diabase, dark lithic fragments; televiewer log shows fining upwards sequences of clast to matrix supported conglomerate; reaction to acid: weak to moderate		angular to subangular chips up to 1/2-inch
220 - 230	**Tcg**	clast-supported conglomerate; grayish brown [10YR5/2]; weakly to moderately lithified; 70% silty sand matrix; 30% clasts of quartzite with some iron oxidation, granitoid with some epidote alteration, some diabase, trace dark lithic fragments; reaction to acid: weak to moderate		angular to subangular chips up to 1/4-inch
230 - 240	**Tcg**	clast-supported conglomerate; grayish brown [10YR5/2]; weakly to moderately lithified; 55% silty sand matrix; 45% clasts of quartzite with some iron oxidation and epidote alteration, granitoid with some iron oxidation and epidote alteration, trace diabase, dark lithic fragments; reaction to acid: weak to moderate		angular to subangular chips up to 3/4-inch

DRAFT

E-1. LITHOLOGIC DESCRIPTIONS FOR
DRILL CUTTINGS FROM MONITOR WELL RC20-2 [*55-923921*]
SKUNK CAMP
GILA COUNTY, ARIZONA

DEPTH INTERVAL (feet)	FORMATION	GENERAL DESCRIPTION	SECONDARY FEATURES	COMMENTS
240 - 250	**Tcg**	clast-supported conglomerate; grayish brown [10YR5/2]; weakly to moderately lithified; 50% silty sand matrix; 50% clasts of quartzite with some iron oxidation, granitoid with some epidote alteration, trace diabase, dark lithic fragments; televiewer log shows fining upwards sequences of clast to matrix supported conglomerate; reaction to acid: weak to moderate		angular to subangular chips up to 3/4-inch
250 - 260	**Tcg**	clast-supported conglomerate; grayish brown [10YR5/2]; weakly to moderately lithified; 65% silty sand matrix; 40% clasts of quartzite with some iron oxidation and epidote alteration, granitoid with some epidote alteration, some diabase, dark lithic fragments; reaction to acid: weak to moderate		angular to subangular chips up to 1-inch
260 - 270	**Tcg**	clast-supported conglomerate; grayish brown [10YR5/2]; weakly to moderately lithified; 50% silty sand matrix; 50% clasts of quartzite with some iron oxidation, granitoid, diabase, some dark lithic fragments; televiewer log shows fining upwards sequences of clast to matrix supported conglomerate; reaction to acid: weak to moderate		angular to subangular chips up to 2/3-inch
270 - 280	**Tcg**	clast-supported conglomerate; grayish brown [10YR5/2]; weakly to moderately lithified; 70% silty sand matrix; 30% clasts of quartzite with some iron oxidation and epidote alteration, granitoid, some diabase, dark lithic fragments; reaction to acid: weak to moderate		angular to subangular chips up to 1/2-inch
280 - 290	**Tcg**	clast-supported conglomerate; grayish brown [10YR5/2]; weakly to moderately lithified; 70% silty sand matrix; 30% clasts of quartzite with some iron oxidation and epidote alteration, granitoid, some dark lithic fragments, trace diabase; reaction to acid: weak to moderate		angular to subangular chips up to 1/2-inch
290 - 300	**Tcg**	clast-supported conglomerate; grayish brown [10YR5/2]; weakly to moderately lithified; 65% silty sand matrix; 35% clasts of quartzite with some iron oxidation and epidote alteration, granitoid, some dark lithic fragments; reaction to acid: weak to moderate		subangular angular to subangular chips up to 1-inch

DRAFT

E-1. LITHOLOGIC DESCRIPTIONS FOR
DRILL CUTTINGS FROM MONITOR WELL RC20-2 [*55-923921*]
SKUNK CAMP
GILA COUNTY, ARIZONA

DEPTH INTERVAL (feet)	FORMATION	GENERAL DESCRIPTION	SECONDARY FEATURES	COMMENTS
300 - 310	**Tcg**	clast-supported conglomerate; grayish brown [10YR5/2]; weakly to moderately lithified; 50% silty sand matrix; 50% clasts of quartzite with some iron oxidation and epidote alteration, granitoid with some iron oxidation and trace epidote alteration, some diabase, trace dark lithic fragments; televiewer log shows fining upwards sequences of clast to matrix supported conglomerate; reaction to acid: weak to moderate		subangular angular to subangular chips up to 1-inch
310 - 320	**Tcg**	clast-supported conglomerate; grayish brown [10YR5/2]; weakly to moderately lithified; 55% silty sand matrix; 45% clasts of quartzite with some iron oxidation, granitoid, some dark lithic fragments; reaction to acid: weak to moderate		subangular angular to subangular chips up to 1/2-inch
320 - 330	**Tcg**	clast-supported conglomerate; grayish brown [10YR5/2]; weakly to moderately lithified; 50% silty sand matrix, 50% clasts of quartzite with some iron oxidation and trace epidote alteration, granitoid with trace iron oxidation, some dark lithic fragments; reaction to acid: weak to moderate		subangular angular to subangular chips up to 2/3-inch
330 - 340	**Tcg**	clast-supported conglomerate; grayish brown [10YR5/2]; weakly to moderately lithified; 85% clasts of quartzite with some iron oxidation and trace epidote alteration, granitoid with trace iron oxidation and epidote alteration, some dark lithic fragments, diabase, 20% silty sand matrix; reaction to acid: weak to moderate		angular to subangular chips up to 1-inch
340 - 350	**Tcg**	clast-supported conglomerate; grayish brown [10YR5/2]; weakly to moderately lithified; 55% clasts of quartzite with some iron oxidation, granitoid, some dark lithic fragments, 45% silty sand matrix; televiewer log shows fining upwards sequences of clast to matrix supported conglomerate; reaction to acid: weak to moderate		angular to subangular chips up to 3/4-inch
350 - 360	**Tcg**	clast-supported conglomerate; grayish brown [10YR5/2]; weakly to moderately lithified; 55% clasts of quartzite with some iron oxidation and trace epidote alteration, granitoid with trace iron oxidation, some dark lithic fragments, trace diabase, 45% silty sand matrix; reaction to acid: weak to moderate		angular to subangular chips up to 3/4-inch

DRAFT

E-1. LITHOLOGIC DESCRIPTIONS FOR
DRILL CUTTINGS FROM MONITOR WELL RC20-2 [*55-923921*]
SKUNK CAMP
GILA COUNTY, ARIZONA

DEPTH INTERVAL (feet)	FORMATION	GENERAL DESCRIPTION	SECONDARY FEATURES	COMMENTS
360 - 370	**Tcg**	clast-supported conglomerate; grayish brown [10YR5/2]; weakly to moderately lithified; 65% clasts of quartzite with some iron oxidation and trace epidote alteration, granitoid with trace epidote alteration and iron oxidation, some dark lithic fragments, 35% silty sand matrix; televiewer log shows fining upwards sequences of clast to matrix supported conglomerate; reaction to acid: weak to moderate		angular to subangular chips up to 2/3-inch
370 - 380	**Tcg**	clast-supported conglomerate; grayish brown [10YR5/2]; weakly to moderately lithified; 55% clasts of quartzite with some iron oxidation and trace epidote alteration, granitoid with trace epidote alteration, some dark lithic fragments, diabase, 45% silty sand matrix; televiewer log shows fining upwards sequences of clast to matrix supported conglomerate; reaction to acid: weak to moderate		angular to subangular chips up to 1/2-inch
380 - 390	**Tcg**	clast-supported conglomerate; grayish brown [10YR5/2]; weakly to moderately lithified; 50% clasts of quartzite with some iron oxidation and trace epidote alteration, granitoid with trace iron oxidation and epidote alteration, dark lithic fragments, some diabase, 50% silty sand matrix; televiewer log shows fining upwards sequences of clast to matrix supported conglomerate; reaction to acid: weak to moderate		angular to subangular chips up to 1/3-inch
390 - 400	**Tcg**	clast-supported conglomerate; grayish brown [10YR5/2]; weakly to moderately lithified; 85% clasts of quartzite with some iron oxidation and trace epidote alteration, granitoid with trace iron oxidation and epidote alteration, dark lithic fragments, some diabase, 15% silty sand matrix; televiewer log shows fining upwards sequences of clast to matrix supported conglomerate; reaction to acid: weak to moderate		angular to subangular chips up to 1/3-inch
400 - 410	**Tcg**	clast-supported conglomerate; grayish brown [10YR5/2]; weakly to moderately lithified; 75% clasts of quartzite with some iron oxidation and trace epidote alteration, granitoid with trace iron oxidation and epidote alteration, some dark lithic fragments, diabase, 25% silty sand matrix; televiewer log shows fining upwards sequences of clast to matrix supported conglomerate; reaction to acid: weak to moderate		angular to subangular chips up to 1/2-inch

DRAFT

E-1. LITHOLOGIC DESCRIPTIONS FOR
DRILL CUTTINGS FROM MONITOR WELL RC20-2 [*55-923921*]
SKUNK CAMP
GILA COUNTY, ARIZONA

DEPTH INTERVAL (feet)	FORMATION	GENERAL DESCRIPTION	SECONDARY FEATURES	COMMENTS
410 - 420	**Tcg**	clast-supported conglomerate; grayish brown [10YR5/2]; weakly to moderately lithified; 80% clasts of quartzite with some iron oxidation and trace epidote alteration, granitoid with trace iron oxidation and epidote alteration, some dark lithic fragments, diabase, 20% silty sand matrix; televiewer log shows fining upwards sequences of clast to matrix supported conglomerate; reaction to acid: weak to moderate		angular to subangular chips up to 1/2-inch
420 - 430	**Tcg**	clast-supported conglomerate; grayish brown [10YR5/2]; weakly to moderately lithified; 65% clasts of quartzite with some iron oxidation and trace epidote alteration, granitoid with trace iron oxidation and epidote alteration, some dark lithic fragments, diabase with trace iron alteration, 35% silty sand matrix; televiewer log shows fining upwards sequences of clast to matrix supported conglomerate; reaction to acid: weak to moderate		angular to subangular chips up to 1/2-inch
430 - 440	**Tcg**	clast-supported conglomerate; grayish brown [10YR5/2]; weakly to moderately lithified; 70% clasts of quartzite with some iron oxidation and trace epidote alteration, granitoid with trace epidote alteration, some diabase, dark lithic fragments, 30% silty sand matrix; televiewer log shows fining upwards sequences of clast to matrix supported conglomerate; reaction to acid: weak to moderate		angular to subangular chips up to 1/3-inch
440 - 450	**Tcg**	clast-supported conglomerate; grayish brown [10YR5/2], red [5R4/6]; weakly to moderately lithified; 75% clasts of quartzite with some iron oxidation and trace epidote alteration, granitoid with trace epidote alteration and iron oxidation, some dark lithic fragments, diabase with trace iron alteration, 25% silty sand matrix; televiewer log shows fining upwards sequences of clast to matrix supported conglomerate; reaction to acid: weak to moderate		hammer bit watered out at approximately 450 feet; angular to subangular chips up to 2/3-inch

DRAFT

E-1. LITHOLOGIC DESCRIPTIONS FOR
DRILL CUTTINGS FROM MONITOR WELL RC20-2 [*55-923921*]
SKUNK CAMP
GILA COUNTY, ARIZONA

DEPTH INTERVAL (feet)	FORMATION	GENERAL DESCRIPTION	SECONDARY FEATURES	COMMENTS
450 - 460	**Tcg**	clast-supported conglomerate; grayish brown [10YR5/2], red [5R4/6]; weakly to moderately lithified; 70% silty sand matrix, 30% clasts of quartzite with some iron oxidation and trace epidote alteration, granitoid with trace iron oxidation and epidote alteration, some diabase, dark lithic fragments; televiewer log shows fining upwards sequences of clast to matrix supported conglomerate; reaction to acid: weak to moderate		angular to subangular chips up to 1/3-inch
460 - 470	**Tcg**	matrix-supported conglomerate; grayish brown [10YR5/2]; weakly to moderately lithified; 95% silty sand matrix, 5% clasts of quartzite with some iron oxidation and trace epidote alteration, granitoid with trace iron oxidation, some dark lithic fragments, diabase; televiewer log shows fining upwards sequences of clast to matrix supported conglomerate; reaction to acid: weak to moderate		slower drilling with new bit; angular to subangular chips up to 1/4-inch
470 - 480	**Tcg**	matrix-supported conglomerate; grayish brown [10YR5/2]; weakly to moderately lithified; 85% silty sand matrix, 15% clasts of quartzite with some iron oxidation and trace epidote alteration, granitoid with trace iron oxidation, some dark lithic fragments, diabase; televiewer log shows fining upwards sequences of clast to matrix supported conglomerate; reaction to acid: weak to moderate		reverse circulation tricone; angular to subangular chips up to 1/2-inch
480 - 490	**Tcg**	matrix-supported conglomerate; grayish brown [10YR5/2]; weakly to moderately lithified; 90% silty sand matrix, 10% clasts of quartzite with some iron oxidation and trace epidote alteration, granitoid with trace iron oxidation, some dark lithic fragments, diabase; televiewer log shows fining upwards sequences of clast to matrix supported conglomerate; reaction to acid: weak to moderate		angular to subangular chips up to 1/2-inch
490 - 500	**Tcg**	matrix-supported conglomerate; grayish brown [10YR5/2]; weakly to moderately lithified; 90% silty sand matrix, 10% clasts of quartzite with some iron oxidation, granitoid with trace iron oxidation, some dark lithic fragments, diabase; televiewer log shows fining upwards sequences of clast to matrix supported conglomerate; reaction to acid: weak to moderate		angular to subangular chips up to 1/3-inch

DRAFT

E-1. LITHOLOGIC DESCRIPTIONS FOR DRILL CUTTINGS FROM MONITOR WELL RC20-2 [*55-923921*] SKUNK CAMP GILA COUNTY, ARIZONA

DEPTH INTERVAL (feet)	FORMATION	GENERAL DESCRIPTION	SECONDARY FEATURES	COMMENTS
500 - 510	**Tcg**	matrix-supported conglomerate; grayish brown [10YR5/2]; weakly to moderately lithified; 85% silty sand matrix, 15% clasts of quartzite with some iron oxidation and trace epidote alteration, granitoid with trace iron oxidation, some dark lithic fragments, trace diabase; reaction to acid: weak to moderate		angular to subangular chips up to 1/2-inch
510 - 520	**Tcg**	clast-supported conglomerate; grayish brown [10YR5/2]; weakly to moderately lithified; 75% silty sand matrix, 25% clasts of quartzite with some iron oxidation and trace epidote alteration, granitoid with trace iron oxidation and epidote alteration, some diabase with trace iron oxidation, dark lithic fragments; televiewer log shows fining upwards sequences of clast to matrix supported conglomerate; reaction to acid: weak to moderate		angular to subangular chips up to 1/3-inch
520 - 530	**Tcg**	matrix-supported conglomerate; grayish brown [10YR5/2]; weakly to moderately lithified; 85% silty sand matrix, 15% clasts of quartzite with some iron oxidation and trace epidote alteration, granitoid with trace iron oxidation and epidote alteration, some dark lithic fragments, diabase; televiewer log shows fining upwards sequences of clast to matrix supported conglomerate; reaction to acid: weak to moderate		angular to subangular chips up to 1/2-inch
530 - 540	**Tcg**	matrix-supported conglomerate; grayish brown [10YR5/2]; weakly to moderately lithified; 85% silty sand matrix, 15% clasts of quartzite with some iron oxidation and trace epidote alteration, granitoid with trace iron oxidation, some dark lithic fragments; televiewer log shows fining upwards sequences of clast to matrix supported conglomerate; reaction to acid: weak to moderate		angular to subangular chips up to 1/2-inch
540 - 550	**Tcg**	clast-supported conglomerate; grayish brown [10YR5/2]; weakly to moderately lithified; 75% silty sand matrix, 25% clasts of quartzite with some iron oxidation, granitoid with trace iron oxidation, some dark lithic fragments, diabase; televiewer log shows fining upwards sequences of clast to matrix supported conglomerate; reaction to acid: weak to moderate		angular to subangular chips up to 1/2-inch

DRAFT

E-1. LITHOLOGIC DESCRIPTIONS FOR
DRILL CUTTINGS FROM MONITOR WELL RC20-2 [*55-923921*]
SKUNK CAMP
GILA COUNTY, ARIZONA

DEPTH INTERVAL (feet)	FORMATION	GENERAL DESCRIPTION	SECONDARY FEATURES	COMMENTS
550 - 560	**Tcg**	matrix-supported conglomerate; grayish brown [10YR5/2]; weakly to moderately lithified; 85% silty sand matrix, 15% clasts of quartzite with some iron oxidation, granitoid with trace iron oxidation, some diabase with iron oxidation, dark lithic fragments; televiewer log shows fining upwards sequences of clast to matrix supported conglomerate; reaction to acid: weak to moderate		angular to subangular chips up to 1/2-inch
560 - 570	**Tcg**	clast-supported conglomerate; grayish brown [10YR5/2]; weakly to moderately lithified; 75% silty sand matrix, 25% clasts of quartzite with some iron oxidation and trace epidote alteration, granitoid with trace iron oxidation, some dark lithic fragments, diabase; televiewer log shows fining upwards sequences of clast to matrix supported conglomerate; reaction to acid: weak to moderate		angular to subangular chips up to 1/2-inch
570 - 580	**Tcg**	matrix-supported conglomerate; grayish brown [10YR5/2]; weakly to moderately lithified; 85% silty sand matrix, 15% clasts of quartzite with some iron oxidation, granitoid with trace iron oxidation, some dark lithic fragments, trace diabase; televiewer log shows fining upwards sequences of clast to matrix supported conglomerate; reaction to acid: weak to moderate		angular to subangular chips up to 1/2-inch
580 - 590	**Tcg**	matrix-supported conglomerate; grayish brown [10YR5/2]; weakly to moderately lithified; 90% silty sand matrix, 10% clasts of quartzite with some iron oxidation and trace epidote alteration, granitoid, trace dark lithic fragments, diabase; reaction to acid: weak to moderate		angular to subangular chips up to 1/3-inch
590 - 601	**Tcg**	matrix-supported conglomerate; grayish brown [10YR5/2]; weakly to moderately lithified; 85% silty sand matrix, 15% clasts of quartzite with some iron oxidation and trace epidote alteration, granitoid, trace dark lithic fragments, diabase; reaction to acid: weak to moderate		angular to subangular chips up to 1/3-inch

DRAFT

E-2. LITHOLOGIC DESCRIPTIONS FOR DRILL CUTTINGS FROM MONITOR WELL RC20-2A [*55-923957*] SKUNK CAMP GILA COUNTY, ARIZONA

DRILLING COMPANY: National EWP	LOGGED BY: M. Mellott; N. Speaks
DEPTH DRILLED / LAND SURFACE ELEVATION: 600.0 feet / 2985.72 feet msl	DATE DRILLED: Feb. 20 - Mar. 1, 2020
CADASTRAL / AZ STATE PLANE NAD83 : (D-3-14)23aaa / 788153.59 N / 1017536.57 E	

DEPTH INTERVAL (feet)	FORMATION	GENERAL DESCRIPTION	SECONDARY FEATURES	COMMENTS
QUATERNARY ALLUVIUM (Qal)				
0 - 10	**Qal**	silty gravelly sand; brown [7.5YR5/2]; non-lithified to weakly lithified; subangular to subrounded, very fine to very coarse sand 60%, silt with trace clay 20%, very fine to fine gravel 20%; gravel fraction: quartzite, diabase, granitoids with epidote or magnetite; well graded; non cohesive; reaction to acid: weak to moderate		conventional mud rotary; angular chips up to 1/4-inch
10 - 20	**Qal**	silty gravelly sand; brown [7.5YR4/4]; non-lithified to weakly lithified; subangular to subrounded, very fine to very coarse sand 60%, silt with trace clay 20%, very fine to fine gravel 20%; gravel fraction: quartzite, diabase, granitoids with epidote or magnetite; well graded; non cohesive; reaction to acid: weak to moderate		angular to subangular chips up to 1/3-inch
20 - 30	**Qal**	clayey silty sandy gravel; dark yellowish brown [10YR4/4]; non-lithified to weakly lithified; very fine to very coarse gravel 50%, subangular to subrounded, very fine to very coarse sand 30%, clayey silt 20%; gravel fraction: quartzite, trace diabase, granitoids with epidote; well graded; weakly cohesive; reaction to acid: weak to moderate		reverse circulation hammer with Symmetrix; angular to subangular chips up to 2-inches; cement chips
30 - 40	**Qal**	gravelly sand; dark yellowish brown [10YR4/4]; non-lithified to weakly lithified; subangular to subrounded, very fine to very coarse sand 50%, very fine to very coarse gravel 40%, clayey silt 10%; gravel fraction: quartzite, trace granitoids with epidote, quartz; well graded; weakly cohesive; reaction to acid: weak to moderate		angular to subangular chips up to 1/4-inch; cement chips
40 - 50	**Qal**	sandy gravel; dark grayish brown [10Y4/2]; non-lithified to weakly lithified; very fine to very coarse gravel 70%, subangular to subrounded, very fine to very coarse sand 25%, clayey silt 5%; gravel fraction: quartzite, trace granitoids, diabase; well graded; weakly cohesive; reaction to acid: weak to moderate		subangular chips up to 2-inches

DRAFT
E-2. LITHOLOGIC DESCRIPTIONS FOR
DRILL CUTTINGS FROM MONITOR WELL RC20-2A [*55-923957*]
SKUNK CAMP
GILA COUNTY, ARIZONA

DEPTH INTERVAL (feet)	FORMATION	GENERAL DESCRIPTION	SECONDARY FEATURES	COMMENTS
50 - 60	**Qal**	sandy gravel; dark grayish brown [10YR4/2]; non-lithified to weakly lithified; very fine to very coarse gravel 60%, subangular to subrounded, very fine to very coarse sand 35%, clayey silt 5%; gravel fraction: quartzite, trace granitoids, diabase; well graded; weakly cohesive; reaction to acid: weak to moderate		reverse circulation hammer; subangular to subrounded chips up to 2-inches
GILA CONGLOMERATE (Tcg)				
60 - 70	**Tcg**	clast-supported conglomerate; olive brown [2.5Y4/3]; weakly to moderately lithified; 55% clayey sand matrix, 45% clasts of quartzite, trace quartz, granitoids, diabase; reaction to acid: weak to moderate		Gila Conglomerate contact at 62 feet; angular to subrounded chips up to 2-inches
70 - 80	**Tcg**	clast-supported conglomerate; dark grayish brown [10YR4/2]; very weakly to weakly lithified; 60% clayey sand matrix, 40% clasts of quartzite, trace quartz, granitoid, limestone, dark lithic fragments, diabase healed calcite veins in limestone, subangular chips; reaction to acid: none to moderate		reverse circulation hammer; angular to subangular chips up to 3-inches
80 - 90	**Tcg**	clast-supported conglomerate; dark grayish brown [10YR4/2]; very weakly to weakly lithified; 55% clayey sand matrix, 45% clasts of quartzite, some quartz, granitoid; reaction to acid: none to weak		angular to sub-rounded chips up to 1-inch
90 - 100	**Tcg**	clast-supported conglomerate; dark grayish brown [10YR4/2]; very weakly to weakly lithified; 60% clasts of quartzite with some iron oxidation, trace diabase, quartz, granitoid; 40% clayey sand matrix; reaction to acid: none to weak		angular to sub-rounded chips up to 1-1/2-inches
100 - 110	**Tcg**	clast-supported conglomerate; dark grayish brown [10YR4/2]; very weakly to weakly lithified; 60% clayey sand matrix, 40% clasts of quartzite with some iron oxidation, some diabase, trace quartz, granitoid with epidote; reaction to acid: none to weak		angular to subrounded chips up to 1-1/4-inches
110 - 120	**Tcg**	clast-supported conglomerate; dark grayish brown [10YR4/2]; very weakly to weakly lithified; 60% clasts of quartzite with some iron oxidation, trace diabase, quartz, granitoid with epidote; 40% silty sand matrix; reaction to acid: none to weak		angular to subangular chips up 1-1/4-inch

DRAFT

E-2. LITHOLOGIC DESCRIPTIONS FOR
DRILL CUTTINGS FROM MONITOR WELL RC20-2A [*55-923957*]
SKUNK CAMP
GILA COUNTY, ARIZONA

DEPTH INTERVAL (feet)	FORMATION	GENERAL DESCRIPTION	SECONDARY FEATURES	COMMENTS
120 - 130	**Tcg**	clast-supported conglomerate; dark grayish brown [10YR4/2]; very weakly to weakly lithified; 55% clasts of quartzite with some iron oxidation, trace diabase, quartz, granitoid with trace epidote; 45% silty sand matrix; reaction to acid: none to weak		angular to subangular chips up to 1-inch
130 - 140	**Tcg**	clast-supported conglomerate; grayish brown [10YR5/2]; very weakly to weakly lithified; 55% clayey sand matrix, 45% clasts of quartzite with some iron oxidation, some quartz, granitoid with trace epidote; reaction to acid: none to weak		angular to subangular chips up to 1-inch
140 - 150	**Tcg**	clast-supported conglomerate; grayish brown [10YR5/2]; very weakly to weakly lithified; 60% clayey sand matrix, 40% clasts of quartzite with some iron oxidation, some quartz, granitoid with trace epidote, diabase; reaction to acid: none to weak		angular to subangular chips up to 3/4-inch
150 - 160	**Tcg**	clast-supported conglomerate; grayish brown [10YR5/2]; very weakly to weakly lithified; 60% clasts of quartzite with some iron oxidation, some quartz, granitoid with trace epidote, diabase; 40% clayey sand matrix; reaction to acid: none to weak		angular to subangular chips up to 3/4-inch
160 - 170	**Tcg**	clast-supported conglomerate; grayish brown [10YR5/2]; very weakly to weakly lithified; 55% clasts of quartzite with some iron oxidation, trace diabase, quartz, granitoid with trace epidote, some dark lithic fragments; 45% silty sand matrix; reaction to acid: none to weak		angular to subangular chips up to 3/4-inch
170 - 180	**Tcg**	clast-supported conglomerate; grayish brown [10YR5/2]; very weakly to weakly lithified; 70% clasts of quartzite with some iron oxidation, trace diabase, quartz, granitoid with trace epidote, some dark lithic fragments; 30% silty sand matrix; reaction to acid: none to weak		angular to subangular chips up to 1-inch
180 - 190	**Tcg**	clast-supported conglomerate; grayish brown [10YR5/2]; very weakly to weakly lithified; 60% clayey sand matrix, 40% clasts of quartzite with some iron oxidation, some quartz, granitoid with trace epidote, some dark lithic fragments, trace diabase; reaction to acid: none to weak		angular to subangular chips up to 1-1/2-inches

DRAFT

E-2. LITHOLOGIC DESCRIPTIONS FOR
DRILL CUTTINGS FROM MONITOR WELL RC20-2A [*55-923957*]
SKUNK CAMP
GILA COUNTY, ARIZONA

DEPTH INTERVAL (feet)	FORMATION	GENERAL DESCRIPTION	SECONDARY FEATURES	COMMENTS
190 - 200	**Tcg**	clast-supported conglomerate; brown [10YR4/3]; very weakly to weakly lithified; 60% silty sand matrix, 40% clasts of quartzite with some iron oxidation, some quartz, granitoid with trace epidote, some dark lithic fragments, trace diabase; reaction to acid: none to weak		angular to subangular chips up to 1/3-inch
200 - 210	**Tcg**	clast-supported conglomerate; brown [10YR4/3]; very weakly to weakly lithified; 60% clasts of quartzite with some iron oxidation, some diabase, quartz, granitoid with trace epidote, some dark lithic fragments; 30% silty sand matrix; reaction to acid: none to weak		angular to subangular chips up to 3/4-inch
210 - 220	**Tcg**	clast-supported conglomerate; brown [10YR4/3]; weakly to moderately lithified; 60% clasts of quartzite with some iron oxidation, some diabase, quartz, granitoid, some dark lithic fragments; 30% silty sand matrix; reaction to acid: none to weak		angular to subangular chips up to 1-inch
220 - 230	**Tcg**	clast-supported conglomerate; brown [10YR4/3]; very weakly to weakly lithified; 55% silty sand matrix, 45% clasts of quartzite with some iron oxidation, some quartz, granitoid, diabase, some dark lithic fragments; reaction to acid: none to weak		angular to subangular chips up to 3/4-inch
230 - 240	**Tcg**	clast-supported conglomerate; brown [10YR4/3]; weakly to moderately lithified; 55% silty sand matrix, 45% clasts of quartzite with some iron oxidation, some quartz, granitoid, diabase, some dark lithic fragments; reaction to acid: none to weak		angular to subangular chips up to 3/4-inch
240 - 250	**Tcg**	clast-supported conglomerate; brown [10YR4/3]; very weakly to weakly lithified; 60% clasts of quartzite with some iron oxidation, some diabase, quartz, granitoid with trace epidote, some dark lithic fragments; 40% silty sand matrix; reaction to acid: none to weak		angular to subangular chips up to 1-1/2-inches
250 - 260	**Tcg**	clast-supported conglomerate; brown [10YR4/3]; very weakly to weakly lithified; 55% clasts of quartzite with some iron oxidation, some diabase, quartz, granitoid, some dark lithic fragments; 45% silty sand matrix; reaction to acid: none to weak		angular to subangular chips up to 1-inch

DRAFT

E-2. LITHOLOGIC DESCRIPTIONS FOR
DRILL CUTTINGS FROM MONITOR WELL RC20-2A [*55-923957*]
SKUNK CAMP
GILA COUNTY, ARIZONA

DEPTH INTERVAL (feet)	FORMATION	GENERAL DESCRIPTION	SECONDARY FEATURES	COMMENTS
260 - 270	**Tcg**	clast-supported conglomerate; brown [10YR4/3]; very weakly to weakly lithified; 55% silty sand matrix, 45% clasts of quartzite with some iron oxidation, some quartz, granitoid, diabase; reaction to acid: none to weak		angular to subangular chips up to 3/4-inch
270 - 280	**Tcg**	clast-supported conglomerate; brown [10YR4/3]; very weakly to weakly lithified; 55% silty sand matrix, 45% clasts of quartzite with some iron oxidation, some quartz, granitoid with trace epidote, some dark lithic fragments; reaction to acid: none to weak		angular to subangular chips up to 3/4-inch
280 - 290	**Tcg**	clast-supported conglomerate; brown [10YR4/3]; very weakly to weakly lithified; 65% clasts of quartzite with some iron oxidation, some diabase, quartz, granitoid with trace epidote; 45% silty sand matrix; reaction to acid: none to weak		angular to subangular chips up to 2/3-inch
290 - 300	**Tcg**	clast-supported conglomerate; brown [10YR4/3]; very weakly to weakly lithified; 65% clasts of quartzite with some iron oxidation, some diabase, quartz, granitoid; 45% silty sand matrix; reaction to acid: none to weak		subangular chips
300 - 310	**Tcg**	clast-supported conglomerate; brown [10YR4/3]; weakly to moderately lithified; 65% clasts of quartzite with some iron oxidation, some diabase, quartz, granitoid with trace epidote; 45% silty sand matrix; reaction to acid: none to weak		subangular chips
310 - 320	**Tcg**	clast-supported conglomerate; brown [10YR5/3]; very weakly to weakly lithified; 60% clasts of quartzite with some iron oxidation, some diabase, dark lithic fragments, quartz, granitoid with trace epidote; 40% silty sand matrix; reaction to acid: none to weak		angular to subangular chips up to 2/3-inch
320 - 330	**Tcg**	clast-supported conglomerate; brown [10YR5/3]; very weakly to weakly lithified; 60% clasts of quartzite with some iron oxidation, some diabase, quartz, granitoid with trace epidote; epidote fragments; 40% silty sand matrix; reaction to acid: none to weak		angular to subangular chips up to 2/3-inch

DRAFT

E-2. LITHOLOGIC DESCRIPTIONS FOR DRILL CUTTINGS FROM MONITOR WELL RC20-2A [*55-923957*] SKUNK CAMP GILA COUNTY, ARIZONA

DEPTH INTERVAL (feet)	FORMATION	GENERAL DESCRIPTION	SECONDARY FEATURES	COMMENTS
330 - 340	**Tcg**	clast-supported conglomerate; brown [10YR5/3]; very weakly to weakly lithified; 60% clasts of quartzite with trace iron oxidation, some quartz, granitoid, diabase, some dark lithic fragments, epidote fragments; 40% silty sand matrix; reaction to acid: none to weak		subangular chips
340 - 350	**Tcg**	clast-supported conglomerate; brown [10YR5/3]; very weakly to weakly lithified; 50% silty sand matrix, 50% clasts of quartzite with trace iron oxidation, some quartz, granitoid, diabase, some dark lithic fragments, epidote fragments; reaction to acid: none to weak		subangular chips
350 - 360	**Tcg**	clast-supported conglomerate; brown [10YR5/3]; very weakly to weakly lithified; 50% silty sand matrix, 50% clasts of quartzite with trace iron oxidation, some quartz, granitoid, diabase, some dark lithic fragments, epidote fragments; reaction to acid: none to weak		subangular chips
360 - 370	**Tcg**	clast-supported conglomerate; brown [10YR5/3]; very weakly to weakly lithified; 50% silty sand matrix, 50% clasts of quartzite with trace iron oxidation, some quartz, granitoid, diabase, some dark lithic fragments, epidote fragments; reaction to acid: none to weak		subangular chips
370 - 380	**Tcg**	clast-supported conglomerate; brown [10YR5/3]; very weakly to weakly lithified; 60% clasts of quartzite with trace iron oxidation, some quartz, granitoid with trace epidote, diabase, some dark lithic fragments, epidote fragments; 40% silty sand matrix; reaction to acid: none to weak		subangular chips
380 - 390	**Tcg**	clast-supported conglomerate; brown [10YR5/3]; very weakly to weakly lithified; 60% clasts of quartzite with trace iron oxidation, some quartz, granitoid with trace epidote, diabase, some dark lithic fragments, epidote fragments; 40% silty sand matrix; reaction to acid: none to weak		subangular chips
390 - 400	**Tcg**	clast-supported conglomerate; brown [10YR5/3]; very weakly to weakly lithified; 60% clasts of quartzite with trace iron oxidation, some quartz, granitoid with trace epidote, diabase, some dark lithic fragments, epidote fragments; 40% silty sand matrix; reaction to acid: none to weak		subangular chips

DRAFT

E-2. LITHOLOGIC DESCRIPTIONS FOR
DRILL CUTTINGS FROM MONITOR WELL RC20-2A [*55-923957*]
SKUNK CAMP
GILA COUNTY, ARIZONA

DEPTH INTERVAL (feet)	FORMATION	GENERAL DESCRIPTION	SECONDARY FEATURES	COMMENTS
400 - 410	**Tcg**	clast-supported conglomerate; brown [10YR5/3]; very weakly to weakly lithified; 60% clasts of quartzite with trace iron oxidation, some quartz, granitoid with trace epidote, diabase, some dark lithic fragments, epidote fragments; 40% silty sand matrix; reaction to acid: none to weak		subangular chips up to 2/3-inch
410 - 420	**Tcg**	clast-supported conglomerate; brown [10YR5/3]; very weakly to weakly lithified; 60% clasts of quartzite with trace iron oxidation, some quartz, granitoid with trace epidote, diabase, some dark lithic fragments, epidote fragments; 40% silty sand matrix; reaction to acid: none to weak		subangular chips up to 1-inch
420 - 430	**Tcg**	clast-supported conglomerate; brown [10YR5/3]; very weakly to weakly lithified; 60% clasts of quartzite with trace iron oxidation, some quartz, granitoid with trace epidote, diabase, some dark lithic fragments, epidote fragments; 40% silty sand matrix; reaction to acid: none to weak		subangular chips up to 3/4-inch
430 - 440	**Tcg**	clast-supported conglomerate; brown [10YR5/3]; weakly to moderately lithified; 60% clasts of quartzite with trace iron oxidation, some quartz, granitoid with trace epidote, diabase, some dark lithic fragments, epidote fragments; 40% silty sand matrix; reaction to acid: none to weak		subangular chips up to 1/2-inch
440 - 450	**Tcg**	clast-supported conglomerate; brown [10YR5/3]; weakly to moderately lithified; 60% clasts of quartzite with trace iron oxidation, some quartz, granitoid with trace epidote, diabase, some dark lithic fragments, epidote fragments; 40% silty sand matrix; reaction to acid: none to weak		subangular chips up to 1/2-inch
450 - 460	**Tcg**	clast-supported conglomerate; brown [10YR5/3]; weakly to moderately lithified; 55% clasts of quartzite with trace iron oxidation, some quartz, granitoid with trace epidote, diabase, some dark lithic fragments; 45% silty sand matrix; reaction to acid: none to weak		subangular chips up to 3/4-inch
460 - 470	**Tcg**	clast-supported conglomerate; brown [10YR5/3]; weakly to moderately lithified; 55% clasts of quartzite with trace iron oxidation, some quartz, granitoid with trace epidote, diabase, some dark lithic fragments; 45% silty sand matrix; reaction to acid: none to weak		subangular chips up to 1/2-inch

DRAFT

E-2. LITHOLOGIC DESCRIPTIONS FOR
DRILL CUTTINGS FROM MONITOR WELL RC20-2A [*55-923957*]
SKUNK CAMP
GILA COUNTY, ARIZONA

DEPTH INTERVAL (feet)	FORMATION	GENERAL DESCRIPTION	SECONDARY FEATURES	COMMENTS
470 - 480	**Tcg**	clast-supported conglomerate; brown [10YR5/3]; weakly to moderately lithified; 65% silty sand matrix, 35% clasts of quartzite with trace iron oxidation, quartz, granitoid with trace epidote and magnetite, diabase, some dark lithic fragments; reaction to acid: none to weak		subangular chips finer than previous interval
480 - 490	**Tcg**	clast-supported conglomerate; grayish brown [10YR5/2]; weakly to moderately lithified; 65% silty sand matrix, 35% clasts of quartzite with trace iron oxidation, quartz, granitoid with trace epidote and magnetite, diabase, some dark lithic fragments; reaction to acid: weak to strong	carbonate cementation	reverse circulation tricone; subangular chips up to 2/3-inch
490 - 500	**Tcg**	clast-supported conglomerate; olive brown [2.5Y4/3]; weakly to moderately lithified; 65% silty sand matrix, 35% clasts of quartzite with trace iron oxidation, quartz, granitoid with trace epidote and magnetite, diabase, some dark lithic fragments; reaction to acid: weak to strong	carbonate cementation	subangular chips up to 3/4-inch
500 - 510	**Tcg**	clast-supported conglomerate; olive brown [2.5Y4/3]; weakly to moderately lithified; 50% clasts of quartzite with some iron oxidation, quartz, granitoid with epidote, some iron oxidation and trace magnetite, diabase, some dark lithic fragments; 50% silty sand matrix; reaction to acid: weak to strong	carbonate cementation	subangular to subrounded chips
510 - 520	**Tcg**	clast-supported conglomerate; olive brown [2.5Y4/3]; weakly to moderately lithified; 50% clasts of quartzite with some with iron oxidation, quartz, granitoid with epidote, some iron oxidation and trace magnetite, diabase, some dark lithic fragments; 50% silty sand matrix; reaction to acid: weak to strong	carbonate cementation	subangular to subrounded chips
520 - 530	**Tcg**	clast-supported conglomerate; olive brown [2.5Y4/3]; weakly to moderately lithified; 50% clasts of quartzite with some with iron oxidation, quartz, granitoid with epidote, some iron oxidation and trace magnetite, diabase, some dark lithic fragments; 50% silty sand matrix; reaction to acid: weak to strong	carbonate cementation	subangular to subrounded chips

DRAFT

E-2. LITHOLOGIC DESCRIPTIONS FOR
DRILL CUTTINGS FROM MONITOR WELL RC20-2A [*55-923957*]
SKUNK CAMP
GILA COUNTY, ARIZONA

DEPTH INTERVAL (feet)	FORMATION	GENERAL DESCRIPTION	SECONDARY FEATURES	COMMENTS
530 - 540	**Tcg**	clast-supported conglomerate; light brownish gray [10YR6/2]; weakly to moderately lithified; 50% clasts of quartzite with some with iron oxidation, quartz, granitoid with epidote, some iron oxidation and trace magnetite, diabase, some dark lithic fragments; 50% silty sand matrix; reaction to acid: very weak to weak	carbonate cementation	subangular to subrounded chips
540 - 550	**Tcg**	clast-supported conglomerate; light brownish gray [10YR6/2]; weakly to moderately lithified; 50% clasts of quartzite with some with iron oxidation, quartz, granitoid with epidote, some iron oxidation and trace magnetite, diabase, some dark lithic fragments; 50% silty sand matrix; reaction to acid: very weak to weak	carbonate cementation	subangular to subrounded chips
550 - 560	**Tcg**	clast-supported conglomerate; grayish brown [10YR5/2]; weakly to moderately lithified; 60% clasts of quartzite with some with iron oxidation, quartz, granitoid with epidote, some iron oxidation and trace magnetite, diabase, some dark lithic fragments; 40% silty sand matrix; reaction to acid: none to weak		subangular to subrounded chips
560 - 570	**Tcg**	clast-supported conglomerate; grayish brown [10YR5/2]; weakly to moderately lithified; 60% clasts of quartzite with some with iron oxidation, quartz, granitoid with epidote, some iron oxidation and trace magnetite, diabase, some dark lithic fragments; 40% silty sand matrix; reaction to acid: none to weak		subangular to subrounded chips
570 - 580	**Tcg**	clast-supported conglomerate; grayish brown [10YR5/2]; weakly to moderately lithified; 60% clasts of quartzite with some with iron oxidation, quartz, granitoid with epidote, some iron oxidation and trace magnetite, diabase, some dark lithic fragments; 40% silty sand matrix; reaction to acid: none to weak		subangular to subrounded chips
580 - 590	**Tcg**	clast-supported conglomerate; grayish brown [10YR5/2]; weakly to moderately lithified; 60% clasts of quartzite with some with iron oxidation, quartz, granitoid with epidote, some iron oxidation and trace magnetite, diabase, some dark lithic fragments; 40% silty sand matrix; reaction to acid: none to weak		subangular to subrounded chips

DRAFT

E-2. LITHOLOGIC DESCRIPTIONS FOR
DRILL CUTTINGS FROM MONITOR WELL RC20-2A [*55-923957*]
SKUNK CAMP
GILA COUNTY, ARIZONA

DEPTH INTERVAL (feet)	FORMATION	GENERAL DESCRIPTION	SECONDARY FEATURES	COMMENTS
590 - 600	**Tcg**	clast-supported conglomerate; grayish brown [10YR5/2]; weakly to moderately lithified; 60% clasts of quartzite with some with iron oxidation, quartz, granitoid with epidote, some iron oxidation and trace magnetite, diabase, some dark lithic fragments; 40% silty sand matrix; reaction to acid: none to weak		subangular to subrounded chips

DRAFT

E-3. LITHOLOGIC DESCRIPTIONS FOR DRILL CUTTINGS FROM MONITOR WELL RC20-2B [*55-923971*] SKUNK CAMP GILA COUNTY, ARIZONA

DRILLING COMPANY: National EWP	LOGGED BY: C. Gregory; C. Pratt; N. Speaks
DEPTH DRILLED / LAND SURFACE ELEVATION: 156.0 feet / 2986.77 feet msl	DATE DRILLED: Mar. 2-3, 2020
CADASTRAL / AZ STATE PLANE NAD83 : (D-3-14)23aaa / 788241.55 N / 1017692.97 E	

DEPTH INTERVAL (feet)	FORMATION	GENERAL DESCRIPTION	SECONDARY FEATURES	COMMENTS
ALLUVIUM (Qal)				
0 - 5	**Qal**	clayey silty sand; light gray [7.5YR7/1]; non-lithified to very weakly lithified; angular to rounded, very fine to very coarse sand 75%, clayey silt 24%, very fine to fine gravel 1%; gravel fraction: 50% quartz and granitoids, 50% dark fragments and volcanics including diabase, quartzite, very fine-grained dark lithic fragments, epidot; reaction to acid: very weak		conventional mud rotary; subangular to subrounded gravel up to 1/4-inch
5 - 10	**Qal**	gravelly sand; pinkish gray [7.5YR7/2]; non-lithified to very weakly lithified; angular to rounded, very fine to very coarse sand 70%, very fine to fine gravel 20%, silty clay 10%, gravel fraction: 50% quartz and granitoids, 50% dark fragments and volcanics including diabase, quartzite, very fine-grained dark lithic fragments, epidot; reaction to acid: very weak		subangular to subrounded gravel up to 1/4-inch
10 - 15	**Qal**	gravelly sand; light brown [7.5YR6/3]; non-lithified to very weakly lithified; angular to rounded, very fine to very coarse sand 70%, very fine to fine gravel 20%, silty clay 10%; gravel fraction: 50% quartz and granitoids, 50% dark fragments and volcanics including diabase, quartzite, very fine-grained dark lithic fragments, epidot; reaction to acid: very weak		reverse circulation hammer with Symmetrix; subangular to subrounded gravel up to 1/4-inch
15 - 20	**Qal**	gravelly sand; light brown [7.5YR6/4]; non-lithified to very weakly lithified; angular to rounded, very fine to very coarse sand 65%, very fine to fine gravel 25%, silty clay 10%; gravel fraction: 50% quartz and granitoids, 50% dark fragments and volcanics including diabase, quartzite, very fine-grained dark lithic fragments, epidot; reaction to acid: very weak		subangular to subrounded gravel up to 1/4-inch
20 - 25	**Qal**	sandy silty clay; brown [7.5YR5/3]; non-lithified to very weakly lithified; silty clay 78%, angular to rounded, very fine to very coarse sand 20%, very fine to fine gravel 2%; gravel fraction: 90% granitoids and quartz, 15% quartzite; well graded; cohesive; reaction to acid: weak		angular to subrounded chips up to 1/4-inch

DRAFT

E-3. LITHOLOGIC DESCRIPTIONS FOR
DRILL CUTTINGS FROM MONITOR WELL RC20-2B [*55-923971*]
SKUNK CAMP
GILA COUNTY, ARIZONA

DEPTH INTERVAL (feet)	FORMATION	GENERAL DESCRIPTION	SECONDARY FEATURES	COMMENTS
25 - 30	**Qal**	silty clay; brown [7.5YR5/4]; non-lithified to very weakly lithified; silty clay 89%, angular to rounded, very fine to very coarse sand 10%, very fine to fine gravel 1%; gravel fraction: 80% granitoids, 20% quartzite; gap-graded; cohesive; reaction to acid: weak		angular to subrounded chips up to 1/3-inch
30 - 35	**Qal**	silty clay; brown [7.5YR5/4]; non-lithified; silty clay 89%, angular to rounded, very fine to very coarse sand 10%, very fine to fine gravel 1%; gravel fraction: 50% granitoids, 50% quartzite; well graded; cohesive; reaction to acid: weak		subangular to subrounded chips up to 1/2-inch
35 - 40	**Qal**	clayey silty gravelly sand; brown [7.5YR5/4]; non-lithified to very weakly lithified; very fine to medium gravel 60%, angular to subrounded, very fine to very coarse sand 25%, clayey silt 15%; gravel fraction: 70% quartzite, 25% granitoids and quartz, 5% diabase; well graded; weakly cohesive; reaction to acid: weak		subangular to subrounded chips up to 1-inch
40 - 45	**Qal**	gravelly sand; pinkish gray [7.5YR6/2]; non-lithified to very weakly lithified; angular to subrounded, fine to very coarse sand 45%, very fine to medium gravel 35%, silt 20%; gravel fraction: 50% quartzite, 50% granitoids and quartz; well graded; non cohesive; reaction to acid: weak		angular to subrounded chips up to 1-1/2-inches
45 - 50	**Qal**	sandy gravel; pinkish gray [7.5YR6/2]; non-lithified to very weakly lithified; very fine to medium gravel 60%, angular to subrounded, very fine to very coarse sand 30%, silt 10%; gravel fraction: 50% quartzite, 50% granitoids and quartz; well graded; non cohesive; reaction to acid: weak to moderate		angular to subrounded chips up to 1-1/4-inches
50 - 55	**Qal**	sandy gravel; pinkish gray [7.5YR6/2]; non-lithified to very weakly lithified; very fine to medium gravel 65%, angular to subrounded, very fine to very coarse sand 30%, silt 5%; gravel fraction: 50% quartzite, 50% granitoids and quartz; well graded; non cohesive; reaction to acid: weak		angular to subrounded chips up to 1-1/4-inches
55 - 60	**Qal**	sandy gravel; pinkish gray [7.5YR6/2]; non-lithified to very weakly lithified; very fine to medium gravel 60%, angular to subrounded, very fine to very coarse sand 35%, silt 5%; gravel fraction: 50% quartzite, 50% granitoids and quart; well graded; non cohesive; reaction to acid: weak		angular to subrounded chips up to 1-1/4-inches

DRAFT

E-3. LITHOLOGIC DESCRIPTIONS FOR
DRILL CUTTINGS FROM MONITOR WELL RC20-2B [*55-923971*]
SKUNK CAMP
GILA COUNTY, ARIZONA

DEPTH INTERVAL (feet)	FORMATION	GENERAL DESCRIPTION	SECONDARY FEATURES	COMMENTS
60 - 65	**Qal**	sandy gravel; pinkish gray [7.5YR6/2]; weakly to moderately lithified; very fine to medium gravel 70%, angular to subrounded, very fine to very coarse sand 20%, silt 10%, trace clay; gravel fraction: 50% quartzite, 50% granitoids and quartz; well graded; non cohesive; reaction to acid: weak		angular to subrounded chips up to 1-inch
65 - 70	**Qal**	sandy gravel; pinkish gray [7.5YR6/2]; non-lithified; very fine to medium gravel 70%, angular to rounded, very fine to very coarse sand 20%, silt 10%; gravel fraction: 50% quartz and granitoids, 50% dark fragments and volcanics including quartzite, diabase, very fine-grained dark lithic fragments, some epi; reaction to acid: weak		angular to subrounded chips up to 1-1/2-inches
70 - 75	**Qal**	silty gravelly sand; pinkish gray [7.5YR6/2]; non-lithified; subangular to rounded, very fine to very coarse sand 45%, very fine to coarse gravel 35%, silt 20%; gravel fraction: 50% quartz and granitoids, 50% dark fragments and volcanics including quartzite, diabase, very fine-grained dark lithic fragments, some; reaction to acid: weak		angular to subrounded chips up to 1-inch
75 - 80	**Qal**	silty sandy gravel; pinkish white [7.5YR8/2]; non-lithified; very fine to coarse gravel 55%, angular to round, very fine to very coarse sand 30%, silt 15%; gravel fraction: 50% quartz and granitoids, 50% dark fragments and volcanics including quartzite, diabase, very fine-grained dark lithic fragments, some epido; reaction to acid: weak to moderate		angular to subrounded chips up to 1-1/4-inches
80 - 85	**Qal**	silty sandy gravel; pinkish white [7.5YR8/2]; non-lithified; very fine to coarse gravel 50%, angular to round, very fine to very coarse sand 25%, silt 25%; gravel fraction: 50% quartz and granitoids, 50% dark fragments and volcanics including quartzite, diabase, very fine-grained dark lithic fragments, some epido; reaction to acid: weak to moderate		angular to subrounded chips up to 1-inch
85 - 90	**Qal**	silty sandy gravel; very pale brown [10YR7/3]; weakly lithified; very fine to coarse gravel 60%, angular to round, very fine to very coarse sand 25%, silt 15%; gravel fraction: 50% quartzite, 50% granitoids with trace epidote alteration, diabase; well graded; non cohesive; reaction to acid: weak		Gila Conglomerate contact at 87 feet; angular to subrounded chips up to 1-1/2-inches

DRAFT

E-3. LITHOLOGIC DESCRIPTIONS FOR DRILL CUTTINGS FROM MONITOR WELL RC20-2B [*55-923971*] SKUNK CAMP GILA COUNTY, ARIZONA

DEPTH INTERVAL (feet)	FORMATION	GENERAL DESCRIPTION	SECONDARY FEATURES	COMMENTS
GILA CONGLOMERATE (Tcg)				
90 - 95	**Tcg**	clast-supported conglomerate; very pale brown [10YR7/3]; weakly lithified; 50% silty sand matrix, 50% clasts of quartzite, quartz, diabase, limestone, some granitoids with trace epidote alteration; reaction to acid: weak		reverse circulation hammer; angular to subrounded chips up to 1-3/4-inches
95 - 100	**Tcg**	clast-supported conglomerate; very pale brown [10YR7/3]; weakly lithified; 65% silty sand matrix, 35% clasts of quartzite, quartz, diabase, limestone, some granitoids with trace epidote alteration; televiewer log shows fining upwards sequence; reaction to acid: weak		angular to subrounded chips up to 1-1/4-inches
100 - 105	**Tcg**	clast-supported conglomerate; very pale brown [10YR7/3]; weakly lithified; 50% silty sand matrix, 50% clasts of quartzite, quartz with some iron oxide, diabase, limestone, some granitoids with epidote alteration; televiewer log shows fining upwards sequence; reaction to acid: moderate		angular to subangular chips up to 1/3-inch
105 - 110	**Tcg**	clast-supported conglomerate; very pale brown [10YR7/3]; weakly lithified; 50% silty sand matrix, 50% clasts of quartzite, quartz, diabase, limestone, some granitoids with epidote alteration; televiewer log shows fining upwards sequence; reaction to acid: moderate		angular to subangular chips up to 1/2-inch
110 - 115	**Tcg**	clast-supported conglomerate; very pale brown [10YR7/3]; weakly to moderately lithified; 50% silty sand matrix, 50% clasts of quartzite, quartz with some iron oxide, diabase, limestone, some granitoids with trace epidote alteration; televiewer log shows fining upwards sequence; reaction to acid: moderate		angular to subangular chips up to 1/3-inch
115 - 120	**Tcg**	clast-supported conglomerate; very pale brown [10YR7/3]; weakly to moderately lithified; 50% silty sand matrix, 50% clasts of quartzite, quartz with some iron oxidation, diabase, limestone, some granitoids with trace epidote alteration, trace very fine-grained dark lithic fragments; reaction to acid: moderate		angular to subangular chips up to 3/4-inch

DRAFT

E-3. LITHOLOGIC DESCRIPTIONS FOR
DRILL CUTTINGS FROM MONITOR WELL RC20-2B [*55-923971*]
SKUNK CAMP
GILA COUNTY, ARIZONA

DEPTH INTERVAL (feet)	FORMATION	GENERAL DESCRIPTION	SECONDARY FEATURES	COMMENTS
120 - 125	**Tcg**	clast-supported conglomerate; very pale brown [10YR7/3]; weakly to moderately lithified; 50% silty sand matrix, 50% clasts of quartzite, quartz with iron oxidation, diabase, some limestone, granitoids with trace epidote alteration, very fine-grained dark lithic fragments; reaction to acid: weak to moderate		angular to subangular chips up to 3/4-inch
125 - 130	**Tcg**	clast-supported conglomerate; very pale brown [10YR7/3]; weakly to moderately lithified; 50% silty sand matrix, 50% clasts of quartzite, quartz with some iron oxidation, diabase, limestone, some granitoids with trace epidote alteration, trace very fine-grained dark lithic fragments; reaction to acid: weak to moderate		angular to subangular chips up to 1/2-inch
130 - 135	**Tcg**	clast-supported conglomerate; very pale brown [10YR7/3]; weakly to moderately lithified; 50% silty sand matrix, 50% clasts of quartzite, quartz with some iron oxidation, diabase, some limestone and granitoids with trace epidote alteration; televiewer log shows fining upwards sequence; reaction to acid: weak to moderate		angular to subangular chips up to 3/4-inch
135 - 140	**Tcg**	clast-supported conglomerate; very pale brown [10YR7/3]; weakly to moderately lithified; 50% silty sand matrix, 50% clasts of quartzite, quartz with some iron oxidation, diabase, limestone and some granitoids with trace epidote alteration; reaction to acid: moderate		angular to subangular chips up to 1-inch
140 - 145	**Tcg**	clast-supported conglomerate; very pale brown [10YR7/3]; weakly to moderately lithified; 50% silty sand matrix, 50% clasts of quartzite, quartz with some iron oxidation, diabase, limestone and some granitoids with epidote alteration; reaction to acid: moderate		angular to subangular chips up to 3/4-inch
145 - 150	**Tcg**	clast-supported conglomerate; very pale brown [10YR7/3]; weakly to moderately lithified; 50% silty sand matrix, 50% clasts of quartzite, quartz with some iron oxidation, diabase, some limestone and granitoids with trace epidote alteration; reaction to acid: weak		angular to subangular chips up to 1-1/4-inches

DRAFT

E-3. LITHOLOGIC DESCRIPTIONS FOR
DRILL CUTTINGS FROM MONITOR WELL RC20-2B [*55-923971*]
SKUNK CAMP
GILA COUNTY, ARIZONA

DEPTH INTERVAL (feet)	FORMATION	GENERAL DESCRIPTION	SECONDARY FEATURES	COMMENTS
150 - 155	**Tcg**	clast-supported conglomerate; very pale brown [10YR7/3]; weakly to moderately lithified; 50% silty sand matrix, 50% clasts of quartzite, quartz with iron oxidation, diabase, some limestone, granitoids with trace epidote alteration; reaction to acid: weak		angular to subangular chips up to 2-inches

DRAFT

E-4. LITHOLOGIC DESCRIPTIONS FOR DRILL CUTTINGS FROM MONITOR WELL RC20-2C [*55-923972*] SKUNK CAMP GILA COUNTY, ARIZONA

DRILLING COMPANY: National EWP	LOGGED BY: C. Gregory; N. Speaks
DEPTH DRILLED / LAND SURFACE ELEVATION: 70.0 feet / 2985.76 feet msl	DATE DRILLED: Mar. 5, 2020
CADASTRAL / AZ STATE PLANE NAD83 : (D-3-14)23aaa / 788211.35 N / 1017709.18 E	

DEPTH INTERVAL (feet)	FORMATION	GENERAL DESCRIPTION	SECONDARY FEATURES	COMMENTS
QUATERNARY ALLUVIUM (Qal)				
0 - 5	**Qal**	silty sand; light brownish gray [10YR6/2]; non-lithified; angular to subrounded, very fine to coarse sand 84%, silt with trace clay 15%, very fine to fine gravel 1%; gravel fraction: 50% quartz and granitoids, 50% dark fragments and volcanics, diabase, quartzite, limestone, very fine-grained dark lithic fragmen; reaction to acid: moderate		conventional mud rotary; angular to subangular chips up to 1/4-inch
5 - 10	**Qal**	silty sand; light brownish gray [10YR6/2]; non-lithified; angular to subrounded, very fine to coarse sand 84%, silt with trace clay 15%, very fine to fine gravel 1%; gravel fraction: 50% quartz and granitoids, 50% dark fragments and volcanics, diabase, quartzite, limestone, very fine-grained dark lithic fragmen; reaction to acid: moderate		angular to subangular chips up to 1/4-inch
10 - 15	**Qal**	clayey silty sand; light yellowish brown [10YR6/4]; non-lithified; angular to subrounded, very fine to coarse sand 70%, clayey silt 20%, very fine to fine gravel 10%; gravel fraction: 50% quartz and granitoids, 50% dark fragments and volcanics, diabase, quartzite, limestone, very fine-grained dark lithic fragment, trace; reaction to acid: moderate		angular to subangular chips up to 1/4-inch
15 - 20	**Qal**	clayey silty gravelly sand; light yellowish brown [10YR6/4]; non-lithified; angular to subrounded, very fine to coarse sand 60%, very fine to medium gravel 30%, clayey silt 10%; gravel fraction: 50% quartz and granitoids, 50% dark fragments and volcanics, diabase, quartzite, limestone, very fine-grained dark lithic fragment, tra; reaction to acid: moderate		angular to subangular chips up to 1/3-inch
20 - 25	**Qal**	clayey silty gravelly sand; light yellowish brown [10YR6/4]; non-lithified; angular to subangular, very fine to coarse sand 50%, very fine to fine gravel 25%, clayey silt 25%; gravel fraction: 50% quartz and granitoids, 50% dark fragments and volcanics, diabase, quartzite, limestone, trace epidote staining; well sorted; weakly co; reaction to acid: moderate		reverse circulation hammer with Symmetrix; angular to subangular chips up to 1/3-inch

DRAFT

E-4. LITHOLOGIC DESCRIPTIONS FOR DRILL CUTTINGS FROM MONITOR WELL RC20-2C [*55-923972*] SKUNK CAMP GILA COUNTY, ARIZONA

DEPTH INTERVAL (feet)	FORMATION	GENERAL DESCRIPTION	SECONDARY FEATURES	COMMENTS
25 - 30	**Qal**	clayey silty gravelly sand; light yellowish brown [10YR6/4]; non-lithified; angular to subangular, very fine to coarse sand 45%, very fine to fine gravel 30%, clayey silt 25%; gravel fraction: 50% quartz and granitoids, 49% dark fragments and volcanics, diabase, quartzite, 1% limestone; well sorted; weakly cohesive; reaction to acid: moderate		angular to subangular chips up to 1/3-inch
30 - 35	**Qal**	clayey silty sandy gravel; brown [7.5YR5/4]; non-lithified; very fine to very coarse gravel 55%, angular to subangular, very fine to very coarse sand 25%, clayey silt 20%; gravel fraction: 50% granitoids, 49% volcanics quartzite, diabase, 1% limestone; well sorted; weakly cohesive; reaction to acid: moderate to strong		angular to subangular chips up to 1/3-inch
35 - 40	**Qal**	clayey silty sandy gravel; brown [7.5YR5/4]; non-lithified; very fine to very coarse gravel 55%, angular to subrounded, very fine to very coarse sand 25%, clayey silt 20%; gravel fraction: 50% granitoids, 49% volcanics quartzite, diabase, 1% limestone; well sorted; weakly cohesive; reaction to acid: moderate to strong		subangular to subrounded chips up to 2-3/4-inches
40 - 45	**Qal**	sandy gravel; light yellowish brown [10YR6/4]; non-lithified; very fine to very coarse gravel 50%, angular to subangular, very fine to very coarse sand 40%, silt 10%; gravel fraction: 50% granitoids, 50% volcanics quartzite, diabase, limestone; well sorted; non cohesive; reaction to acid: weak to moderate		subangular to subrounded chips up to 2-inches
45 - 50	**Qal**	sandy gravel; light gray [10YR7/2]; non-lithified; very fine to very coarse gravel 50%, angular to subrounded, very fine to very coarse sand 40%, silt 10%; gravel fraction: 50% granitoids, 50% volcanics quartzite, diabase, limestone; well sorted; non cohesive; reaction to acid: weak		subangular to subrounded chips up to 2-inches
50 - 55	**Qal**	sandy gravel; light yellowish brown [10YR6/4]; non-lithified to weakly lithified; very fine to very coarse gravel 55%, angular to subangular, very fine to very coarse sand 40%, silt 5%; gravel fraction: 50% granitoids, 50% volcanics quartzite, diabase, minor limestone, trace epidote; well sorted; non cohesive; reaction to acid: weak		subangular to subrounded chips up to 1-3/4-inches

DRAFT

E-4. LITHOLOGIC DESCRIPTIONS FOR
DRILL CUTTINGS FROM MONITOR WELL RC20-2C [*55-923972*]
SKUNK CAMP
GILA COUNTY, ARIZONA

DEPTH INTERVAL (feet)	FORMATION	GENERAL DESCRIPTION	SECONDARY FEATURES	COMMENTS
55 - 60	**Qal**	sandy gravel; brown [10YR5/3]; non-lithified; very fine to very coarse gravel 60%, angular to subangular, very fine to very coarse sand 40%; gravel fraction: 50% granitoids, 50% volcanics quartzite, diabase, minor limestone; well sorted; non cohesive; reaction to acid: weak to moderate		subangular to subrounded chips up to 1-1/3-inches
60 - 65	**Qal**	sandy gravel; light yellowish brown [10YR6/4]; non-lithified to weakly lithified; very fine to very coarse gravel 65%, angular to subangular, very fine to very coarse sand 30%; silt 5%; gravel fraction: 50% granitoids, 50% volcanics quartzite, diabase, minor limestone; well sorted; non cohesive; reaction to acid: none to moderate		subangular to subrounded chips up to 1-1/3-inches
65 - 70	**Qal**	sandy gravel; brown [10YR5/3]; non-lithified; very fine to very coarse gravel 65%, angular to subangular, very fine to very coarse sand 30%; silt with trace clay 5%; gravel fraction: 50% granitoids, 50% volcanics quartzite, diabase, minor limestone; well sorted; non cohesive; reaction to acid: none to weak		subangular to subrounded chips up to 1-1/3-inches

MONTGOMERY & ASSOCIATES

DRAFT

E-5. LITHOLOGIC DESCRIPTIONS FOR DRILL CUTTINGS FROM MONITOR WELL RC20-2D [*55-923982*] SKUNK CAMP GILA COUNTY, ARIZONA

DRILLING COMPANY: National EWP	LOGGED BY: L. Wersan; N. Speaks
DEPTH DRILLED / LAND SURFACE ELEVATION: 155.0 feet / 2991.11 feet msl	DATE DRILLED: Mar. 6 - 8, 2020
CADASTRAL / AZ STATE PLANE NAD83 : (D-3-14)23aab / 787845.69 N / 1016931.56 E	

DEPTH INTERVAL (feet)	FORMATION	GENERAL DESCRIPTION	SECONDARY FEATURES	COMMENTS
ALLUVIUM (Qal)				
0 - 10	**Qal**	silty gravelly sand; brown [7.5YR4/2]; non-lithified; subangular to angular, very fine to very coarse sand 45%, very fine to medium gravel 30%, silt 25%; gravel fraction: 70% volcanics, diabase with minor magnetite, quartzite, very fine-grained dark lithic fragments, 30% quartz, granitoids, trace limestone; reaction to acid: none to weak		conventional mud rotary; subangular to subrounded chips up to 1/4-inch
10 - 20	**Qal**	gravelly sand; brown [7.5YR4/2]; non-lithified; subangular to angular, very fine to very coarse sand 50%, very fine to medium gravel 40%, silt 10%; gravel fraction: 70% volcanics, diabase with trace magnetite, quartzite, very fine-grained dark lithic fragment; 30% quartz, granitoids, trace limestone; reaction to acid: none to weak		subangular to subrounded chips up to 3/4-inch
20 - 30	**Qal**	sandy gravel; brown [7.5YR4/3], brown [10YR5/3]; non-lithified; very fine to medium gravel 60%, subangular to angular, very fine to very coarse sand 30%, silt 10%; gravel fraction: 75% volcanics, diabase with trace magnetite, quartzite, 25% granitoids, quartz, trace limestone; well graded; non cohesive; reaction to acid: none to strong		reverse circulation hammer with Symmetrix; subangular to angular chips up to 1-1/4-inches
BOLSA QUARTZITE (Cb)				
30 - 40	**Cb**	quartzite; light gray [10YR7/1], brown [10YR5/3], very dark gray [N3]; non-lithified to moderately lithified; 60% fine to medium grained, granular texture quartzite; 40% sandy gravel (gravel 50%, subangular to angular, very fine to coarse sand 30%, silt 20%; gravel fraction: 65% volcanics, diabase, 20% quartzite, 10% granitoids, 5% limestone; well graded; non coh; reaction to acid: none to strong		Bolsa Quartzite contact at 34 feet; subangular to angular chips up to 1-1/2-inches
40 - 50	**Cb**	quartzite; light gray [10R7/1], dark reddish brown [2.5YR3/4], pale yellow [5Y8/4]; well lithified; fine to medium grained, granular texture, ferruginous quartzite; trace pale yellow siltstone; very trace kaolinite; reaction to acid: none	some iron oxidation on fracture surfaces	angular to subangular chips up to 1-inch

DRAFT

E-5. LITHOLOGIC DESCRIPTIONS FOR
DRILL CUTTINGS FROM MONITOR WELL RC20-2D [*55-923982*]
SKUNK CAMP
GILA COUNTY, ARIZONA

DEPTH INTERVAL (feet)	FORMATION	GENERAL DESCRIPTION	SECONDARY FEATURES	COMMENTS
50 - 60	**Cb**	quartzite; light gray [10R7/1], red [2.5YR4/6], dark reddish gray [2.5YR3/1]; well lithified; fine to medium grained, granular texture, ferruginous quartzite; reaction to acid: none	some iron oxidation on fracture surfaces	reverse circulation hammer; angular to subangular chips up to 1-1/2-inches
60 - 70	**Cb**	quartzite; light gray [10R7/1], reddish yellow [7.5YR6/6], dark gray [2.5Y4/1]; well to very well lithified; 95% fine to medium grained, granular texture, ferruginous quartzite; 5% very fine-grained dark gray lithics; reaction to acid: none	some iron oxidation on fracture surfaces	angular chips up to 1/2-inch; very fine grained dark layer around 65 to 67 feet
70 - 80	**Cb**	quartzite; light gray [10R7/1], reddish yellow [7.5YR6/6], reddish brown [2.5YR5/3]; well to very well lithified; fine to coarse grained, granular texture, ferruginous quartzite; trace very fine-grained dark lithic fragments, siltstone, kaolinite; reaction to acid: none	some iron oxidation on fracture surfaces	angular chips up to 1-1/2-inches
80 - 90	**Cb**	quartzite; light gray [10R7/1], dark reddish gray [2.5YR3/1], dark gray [2.5Y4/1]; well to very well lithified; fine to coarse grained, granular texture, ferruginous quartzite; trace kaolinite; bedding; reaction to acid: none	some iron oxidation on fracture surfaces	driller indicated fracturing between 85 and 95 feet; angular chips up to 1-inch
90 - 100	**Cb**	quartzite; light gray [10R7/1], reddish brown [2.5YR5/3], dark gray [2.5Y4/1]; well to very well lithified; fine to coarse grained, granular texture, ferruginous quartzite; trace kaolinite; bedding; reaction to acid: none	minor iron oxidation on fracture surfaces	driller indicated fracturing between 85 and 95 feet; angular chips up to 1-inch
100 - 110	**Cb**	quartzite; light gray [10R7/1], reddish brown [2.5YR5/3], dark reddish gray [2.5YR3/1]; well to very well lithified; fine to coarse grained, granular texture, ferruginous quartzite; trace kaolinite; bedding; reaction to acid: none to very weak	some iron oxidation on fracture surfaces	no sample returns from 104 to 112 feet; angular chips up to 1-1/2-inches
110 - 120	**Cb**	quartzite; light gray [10R7/1], dark reddish gray [2.5YR3/1], pale yellow [5Y8/4]; well to very well lithified; 99% fine to coarse grained, granular texture, ferruginous quartzite; 1% pale yellow siltstone; trace kaolinite; bedding; reaction to acid: none to very weak	some iron oxidation on fracture surfaces	angular to subangular chips up to 1/2-inch
120 - 130	**Cb**	quartzite; light gray [10R7/1], dark reddish gray [2.5YR3/1], reddish brown [2.5YR5/3]; well to very well lithified; fine to coarse grained, granular texture, ferruginous quartzite; trace pale yellow siltstone; bedding; reaction to acid: none	some iron oxidation on fracture surfaces	angular chips commonly up to 1-1/2-inches; chips up to 2 to 4-inches near end of interval

DRAFT

E-5. LITHOLOGIC DESCRIPTIONS FOR DRILL CUTTINGS FROM MONITOR WELL RC20-2D [*55-923982*] SKUNK CAMP GILA COUNTY, ARIZONA

DEPTH INTERVAL (feet)	FORMATION	GENERAL DESCRIPTION	SECONDARY FEATURES	COMMENTS
130 - 140	**Cb**	quartzite; light gray [10R7/1], dark reddish gray [2.5YR3/1], reddish brown [2.5YR5/3]; well to very well lithified; 99% fine to coarse grained, granular texture, ferruginous quartzite; 1% pale yellow siltstone; trace kaolinite; bedding; reaction to acid: none	some iron oxidation on fracture surfaces	no circulation around 135 feet; angular chips up to 3-inches
140 - 150	**Cb**	quartzite; light gray [10R7/1], dark reddish gray [2.5YR3/1], reddish brown [2.5YR5/3]; well to very well lithified; 99% fine to coarse grained, granular texture, ferruginous quartzite; 1% pale yellow siltstone; trace kaolinite; bedding; reaction to acid: none	some iron oxidation on fracture surfaces	angular chips up to 1-1/2-inches; chips up to 2 to 3-inches around end of interval
150 - 155	**Cb**	quartzite; no sample; lost circulation		no circulation from 150 to 155 feet; hole total depth at 155 feet due to borehole instability

DRAFT

E-6. LITHOLOGIC DESCRIPTIONS FOR DRILL CUTTINGS FROM MONITOR WELL RC20-18 [*55-924012*] SKUNK CAMP GILA COUNTY, ARIZONA

DRILLING COMPANY: National EWP	LOGGED BY: L. Wersan; M. Mellott; N. Speaks
DEPTH DRILLED / LAND SURFACE ELEVATION: 130.0 feet / 2703.76 feet msl	DATE DRILLED: Mar. 10-12, 2020
CADASTRAL / AZ STATE PLANE NAD83 : (D-3-15)29bca / 782415.59 N / 1029273.38 E	

DEPTH INTERVAL (feet)	FORMATION	GENERAL DESCRIPTION	SECONDARY FEATURES	COMMENTS
ALLUVIUM (Qal)				
0 - 5	**Qal**	gravelly sand; dark gray [7.5YR4/1]; non-lithified to very weakly lithified; angular to subrounded, very fine to very coarse sand 65%, very fine to fine gravel 30%, silt 5%; gravel fraction: 50% quartzite, 30% diabase and dark volcanics, 20% granitoids; well graded; non cohesive; reaction to acid: very weak to weak		conventional mud rotary; subangular to subrounded chips up to 1/3-inch
5 - 10	**Qal**	gravelly sand; dark gray [7.5YR4/1]; non-lithified to very weakly lithified; angular to subrounded, very fine to very coarse sand 70%, very fine to fine gravel 20%, silt 10%; gravel fraction: 50% quartzite, 30% diabase and dark volcanics, 20% granitoids; well graded; non cohesive; reaction to acid: weak to moderate		subangular to subrounded chips up to 1/3-inch
10 - 15	**Qal**	gravelly sand; dark grayish brown [10Y4/2]; non-lithified to very weakly lithified; angular to subrounded, very fine to very coarse sand 60%, very fine to fine gravel 30%, silt 10%; gravel fraction: 50% quartzite, 30% diabase and dark volcanics, 20% granitoids; well graded; non cohesive; reaction to acid: weak to moderate		subangular to subrounded chips up to 1/3-inch
15 - 20	**Qal**	gravelly sand; dark grayish brown [10Y4/2]; non-lithified to very weakly lithified; angular to subrounded, very fine to very coarse sand 60%, very fine to fine gravel 30%, silt 10%; gravel fraction: 50% quartzite, 30% diabase and dark volcanics, 20% granitoids; well graded; non cohesive; reaction to acid: weak to moderate		subangular to subrounded chips up to 1/3-inch
20 - 25	**Qal**	sandy gravel; dark grayish brown [10Y4/2]; very weakly to weakly lithified; very fine gravel to coarse gravel 50%, angular to subrounded, very fine to very coarse sand 40%, silt 10%; gravel fraction: 45% quartzite, 45% diabase and dark volcanics, 10% granitoids; well graded; non cohesive; reaction to acid: weak to moderate		reverse circulation hammer with Symmetrix; subangular to subrounded chips up to 1-inch

DRAFT

E-6. LITHOLOGIC DESCRIPTIONS FOR DRILL CUTTINGS FROM MONITOR WELL RC20-18 [*55-924012*] SKUNK CAMP GILA COUNTY, ARIZONA

DEPTH INTERVAL (feet)	FORMATION	GENERAL DESCRIPTION	SECONDARY FEATURES	COMMENTS
25 - 30	**Qal**	gravelly sand; dark grayish brown [10Y4/2]; non-lithified to very weakly lithified; angular to subrounded, very fine to very coarse sand 70%, very fine to coarse gravel 25%, silt 5%; gravel fraction: 45% quartzite, 45% diabase and dark volcanics, 10% granitoids; well graded; non cohesive; reaction to acid: weak to moderate		subangular to subrounded chips up to 1/4-inch
30 - 35	**Qal**	sandy gravel; dark grayish brown [10Y4/2]; non-lithified to very weakly lithified; very fine to coarse gravel 60%, angular to subrounded, very fine to very coarse sand 35%, silt 5%; gravel fraction: 45% quartzite, 45% diabase and dark volcanics, 10% granitoids; well graded; non cohesive; reaction to acid: weak to moderate		subangular to subrounded chips up to 1-inch
35 - 40	**Qal**	sandy gravel; dark grayish brown [10Y4/2]; non-lithified to very weakly lithified; very fine to coarse gravel 50%, angular to subrounded, very fine to very coarse sand 40%, silt 10%; gravel fraction: 45% quartzite, 45% diabase and dark volcanics, 10% granitoids; well graded; non cohesive; reaction to acid: weak to moderate		subangular to subrounded chips up to 1-inch
40 - 45	**Qal**	silty gravelly sand; dark grayish brown [10Y4/2]; non-lithified to very weakly lithified; angular to subrounded, very fine to very coarse sand 70%, very fine to fine gravel 15%, silt 15%; gravel fraction: 45% quartzite, 45% diabase and dark volcanics, 10% granitoids; well graded; non cohesive; reaction to acid: weak to moderate		subangular to subrounded chips up to 1/4-inch
45 - 50	**Qal**	silty gravelly sand; dark grayish brown [10Y4/2]; non-lithified to very weakly lithified; angular to subrounded, very fine to very coarse sand 70%, very fine to fine gravel 15%, silt 15%; gravel fraction: 45% quartzite, 45% diabase and dark volcanics, 10% granitoids; well graded; non cohesive; reaction to acid: weak to moderate		subangular to subrounded chips up to 1/4-inch
50 - 55	**Qal**	sandy gravel; brown [10YR4/3]; very weakly to weakly lithified; very fine to coarse gravel 50%, angular to subrounded, very fine to very coarse sand 40%, silt 10%; gravel fraction: 80% quartzite, 20% diabase and dark volcanics; well graded; non cohesive; reaction to acid: weak to moderate		subangular to subrounded chips up to 1-inch

DRAFT

E-6. LITHOLOGIC DESCRIPTIONS FOR DRILL CUTTINGS FROM MONITOR WELL RC20-18 [*55-924012*] SKUNK CAMP GILA COUNTY, ARIZONA

DEPTH INTERVAL (feet)	FORMATION	GENERAL DESCRIPTION	SECONDARY FEATURES	COMMENTS
55 - 60	**Qal**	sandy gravel; brown [10YR4/3]; very weakly to weakly lithified; very fine to coarse gravel 50%, angular to subrounded, very fine to very coarse sand 40%, silt 10%; gravel fraction: 80% quartzite, 20% diabase and dark volcanics; well graded; non cohesive; reaction to acid: weak to moderate		subangular to subrounded chips up to 1-inch
60 - 65	**Qal**	silty sandy gravel; brown [10YR4/3]; very weakly to weakly lithified; very fine to coarse gravel 60%, angular to subrounded, very fine to very coarse sand 20%, silt 20%; gravel fraction: 80% quartzite, 20% diabase and dark volcanics; well graded; non cohesive; reaction to acid: very weak to weak		subangular to subrounded chips up to 1-inch
65 - 70	**Qal**	silty sandy gravel; brown [10YR4/3]; weakly to moderately lithified; very fine to coarse gravel 60%, angular to subrounded, very fine to very coarse sand 20%, silt 20%; gravel fraction: 80% quartzite, 20% diabase and dark volcanics; well graded; non cohesive; reaction to acid: weak to moderate		subangular to subrounded chips up to 1-inch
70 - 75	**Qal**	silty sandy gravel; brown [10YR4/3]; weakly to moderately lithified; very fine to coarse gravel 40%, angular to subrounded, very fine to very coarse sand 30%, silt 30%; gravel fraction: 80% quartzite, 20% diabase and dark volcanics; well graded; non cohesive; reaction to acid: weak to moderate		subangular to subrounded chips up to 1-inch
75 - 80	**Qal**	silty sandy gravel; brown [10YR4/3]; weakly to moderately lithified; very fine to coarse gravel 70%, very fine to very coarse sand 15%, silt 15%; gravel fraction: 80% quartzite, 20% diabase and dark volcanics; well graded; non cohesive; reaction to acid: weak to moderate		subangular to subrounded chips up to 1-inch
80 - 85	**Qal**	silty sandy gravel; brown [10YR4/3]; weakly to moderately lithified; very fine to coarse gravel 70%, angular to subrounded, very fine to very coarse sand 15%, silt 15%; gravel fraction: 80% quartzite, 20% diabase and dark volcanics; well graded; non cohesive; reaction to acid: weak to moderate		subangular to subrounded chips up to 1-inch

DRAFT

E-6. LITHOLOGIC DESCRIPTIONS FOR DRILL CUTTINGS FROM MONITOR WELL RC20-18 [*55-924012*] SKUNK CAMP GILA COUNTY, ARIZONA

DEPTH INTERVAL (feet)	FORMATION	GENERAL DESCRIPTION	SECONDARY FEATURES	COMMENTS
85 - 90	**Qal**	sandy gravel; brown [10YR4/3]; weakly to moderately lithified; very fine to coarse gravel 55%, angular to subrounded, very fine to very coarse sand 40%, silt 5%; gravel fraction: 60% quartzite, 20% diabase and dark volcanics, 20% granitoids and quartz; well graded; non cohesive; reaction to acid: weak to moderate		subangular to subrounded chips up to 1-inch
90 - 95	**Qal**	sandy gravel; brown [10YR5/3]; weakly to moderately lithified; very fine to coarse gravel 80%, angular to subrounded, very fine to very coarse sand 15%, silt 5%; gravel fraction: 40% quartzite, 40% diabase and dark volcanics, 10% granitoids and quartz, 10% consolidated silty sand; well graded; non cohesive; reaction to acid: weak to moderate		Gila Conglomerate contact at 94 feet; subangular to subrounded chips up to 1-1/2-inches
TERTIARY SANDSTONE (Tss)				
95 - 100	**Tss**	lithic sandstone with gravel; brown [7.5YR4/3]; weakly to well lithified; 80% silty sand matrix, 20% clasts of quartzite, granitoids, diabase; reaction to acid: moderate to strong		reverse circulation hammer; subangular to subrounded chips up to 1-1/2-inches
100 - 105	**Tss**	lithic sandstone; brown [7.5YR4/3]; weakly lithified; 95% silty sand matrix, 5% clasts of diabase, quartzite, granitoids; reaction to acid: moderate		subangular to subrounded chips up to 1-inch
105 - 110	**Tss**	lithic sandstone; brown [7.5YR4/3]; weakly lithified; 98% silty sand matrix, 2% clasts of quartzite, diabase, granitoids; reaction to acid: weak to moderate		subangular to subrounded chips up to 1-1/2-inches
110 - 115	**Tss**	lithic sandstone; brown [7.5YR4/3]; weakly lithified; 95% silty sand matrix, 5% clasts of diabase, quartzite, granitoids; reaction to acid: weak		subangular to subrounded chips up to 1-1/2-inches
115 - 120	**Tss**	lithic sandstone; brown [7.5YR4/3]; weakly lithified; 95% silty sand matrix, 5% clasts of diabase, quartzite, granitoids; reaction to acid: weak		subangular to subrounded chips up to 1-inch
120 - 125	**Tss**	lithic sandstone; brown [7.5YR4/3]; weakly to moderately lithified; 95% silty sand matrix, 5% clasts of diabase, quartzite, granitoids; reaction to acid: moderate		subangular to subrounded chips up to 1-inch
125 - 130	**Tss**	lithic sandstone; brown [7.5YR4/3]; weakly to moderately lithified; 95% silty sand matrix, 5% clasts of quartzite, diabase, granitoids; reaction to acid: weak		subangular to subrounded chips up to 1-1/2-inches

DRAFT

E-7. LITHOLOGIC DESCRIPTIONS FOR DRILL CUTTINGS FROM MONITOR WELL RC20-18A [*55-924013*] SKUNK CAMP GILA COUNTY, ARIZONA

DRILLING COMPANY: National EWP	LOGGED BY: M. Mellott; N. Speaks
DEPTH DRILLED / LAND SURFACE ELEVATION: 92.0 feet / 2704.15 feet msl	DATE DRILLED: Mar. 14-15, 2020
CADASTRAL / AZ STATE PLANE NAD83 : (D-3-15)29bca / 782435.64 N / 1029251.62 E	

DEPTH INTERVAL (feet)	FORMATION	GENERAL DESCRIPTION	SECONDARY FEATURES	COMMENTS
ALLUVIUM (Qal)				
0 - 5	**Qal**	sand; brown [10YR4/3]; non-lithified to very weakly lithified; subangular to subrounded, very fine to very coarse sand 80%, very fine to fine gravel 10%, silt 10%; gravel fraction: 80% quartzite, 15% granitoids, 5% diabase, trace limestone; well graded; non cohesive; reaction to acid: weak to moderate		conventional mud rotary; subangular to subrounded chips up to 1/5-inch
5 - 10	**Qal**	sand; brown [10YR4/3]; non-lithified to very weakly lithified; subangular to subrounded, very fine to very coarse sand 80%, very fine to fine gravel 10%, silt 10%; gravel fraction: 80% quartzite, 15% granitoids, 5% diabase, trace limestone; well graded; non cohesive; reaction to acid: weak to moderate		subangular to subrounded chips up to 1/5-inch
10 - 15	**Qal**	clayey silty sand; brown [10YR4/3]; non-lithified to very weakly lithified; subangular to subrounded, very fine to very coarse sand 55%, clayey silt 40%, very fine to fine gravel 5%; gravel fraction: 80% quartzite, 15% granitoids, 5% diabase, trace limestone; well graded; weakly cohesive; reaction to acid: weak to moderate		subangular to subrounded chips up to 1/5-inch
15 - 20	**Qal**	gravelly clayey silty sand; brown [10YR4/3]; non-lithified to very weakly lithified; subangular to subrounded, very fine to very coarse sand 50%, clayey silt 30%, very fine to fine gravel 20%; gravel fraction: 80% quartzite, 15% granitoids, 5% diabase, trace limestone; well graded; weakly cohesive; reaction to acid: weak to moderate		subangular to subrounded chips up to 1/5-inch
20 - 25	**Qal**	silty gravelly sand; brown [10YR4/3]; non-lithified to very weakly lithified; subangular to subrounded, very fine to very coarse sand 50%, very fine to coarse gravel 30%, silt 20%; gravel fraction: 60% quartzite, 20% diabase, 10% granitoids, 10% limestone; well graded; non cohesive; reaction to acid: weak to moderate		reverse circulation hammer with Symmetrix; subangular to subrounded chips up to 1-1/2-inches

DRAFT

E-7. LITHOLOGIC DESCRIPTIONS FOR
DRILL CUTTINGS FROM MONITOR WELL RC20-18A [*55-924013*]
SKUNK CAMP
GILA COUNTY, ARIZONA

DEPTH INTERVAL (feet)	FORMATION	GENERAL DESCRIPTION	SECONDARY FEATURES	COMMENTS
25 - 30	**Qal**	sandy gravel; brown [10YR4/3]; non-lithified to very weakly lithified; very fine to coarse gravel 60%, subangular to subrounded, very fine to very coarse sand 30%, silt 10%; gravel fraction: 60% quartzite, 20% diabase, 10% granitoids, 10% limestone; well graded; non cohesive; reaction to acid: weak to moderate		subangular to subrounded chips up to 1-1/2-inches
30 - 35	**Qal**	sandy gravel; brown [10YR4/3]; non-lithified to very weakly lithified; very fine to coarse gravel 55%, subangular to subrounded, very fine to very coarse sand 40%, silt 5%; gravel fraction: 80% quartzite, 10% diabase, 10% granitoids, trace limestone; well graded; non cohesive; reaction to acid: weak to moderate		subangular to subrounded chips up to 1-inches
35 - 40	**Qal**	sandy gravel; brown [10YR5/3]; non-lithified to very weakly lithified; very fine to coarse gravel 80%, subangular to subrounded, very fine to very coarse sand 15%, silt 5%; gravel fraction: 60% quartzite, 15% limestone, 15% granitoids, 10% diabase and other dark lithics; well graded; non cohesive; reaction to acid: weak to moderate		subangular to subrounded chips up to 1-1/2-inches
40 - 45	**Qal**	silty sandy gravel; brown [10YR4/3]; non-lithified to very weakly lithified; very fine to coarse gravel 50%, subangular to subrounded, very fine to very coarse sand 30%, silt 20%; gravel fraction: 70% quartzite, 20% diabase, 10% granitoids, trace limestone; well graded; non cohesive; reaction to acid: weak to moderate		subangular to subrounded chips up to 1-1/2-inches
45 - 50	**Qal**	silty sandy gravel; brown [10YR4/3]; non-lithified to very weakly lithified; very fine to coarse gravel 50%, subangular to subrounded, very fine to very coarse sand 30%, silt 20%; gravel fraction: 70% quartzite, 20% diabase, 10% granitoids, trace limestone; well graded; non cohesive; reaction to acid: weak to moderate		subangular to subrounded chips up to 1-1/2-inches
50 - 55	**Qal**	gravel; brown [10YR4/3]; non-lithified to very weakly lithified; very fine to coarse gravel 80%, subangular to subrounded, very fine to very coarse sand 10%, silt 10%; gravel fraction: 70% quartzite, 20% diabase, 10% granitoids, trace limestone; well graded; non cohesive; reaction to acid: weak to moderate		subangular to subrounded chips up to 1-1/2-inches

DRAFT

E-7. LITHOLOGIC DESCRIPTIONS FOR
DRILL CUTTINGS FROM MONITOR WELL RC20-18A [*55-924013*]
SKUNK CAMP
GILA COUNTY, ARIZONA

DEPTH INTERVAL (feet)	FORMATION	GENERAL DESCRIPTION	SECONDARY FEATURES	COMMENTS
55 - 60	**Qal**	silty sandy gravel; brown [10YR4/3]; very weakly to weakly lithified; very fine to coarse gravel 50%, subangular to subrounded, very fine to very coarse sand 30%, silt 20%; gravel fraction: 70% quartzite, 20% diabase, 10% granitoids, trace limestone; well graded; non cohesive; reaction to acid: weak to moderate		subangular to subrounded chips up to 1-1/2-inches
60 - 65	**Qal**	silty sandy gravel; brown [10YR4/3]; very weakly to weakly lithified; very fine to very coarse gravel 50%, subangular to subrounded, very fine to very coarse sand 30%, silt 20%; gravel fraction: 70% quartzite, 20% diabase, 10% granitoids, trace limestone; well graded; non cohesive; reaction to acid: weak to moderate		subangular to subrounded chips up to 2-inches
65 - 70	**Qal**	silty sandy gravel; brown [10YR4/3]; very weakly to weakly lithified; very fine to very coarse gravel 60%, subangular to subrounded, very fine to very coarse sand 25%, silt 15% ; gravel fraction: 70% quartzite, 20% granitoids, 10% diabase and other dark lithics; well graded; non cohesive; reaction to acid: weak to moderate		subangular to subrounded chips up to 2-1/2-inches
70 - 75	**Qal**	silty sandy gravel; brown [10YR4/3]; very weakly to weakly lithified; very fine to very coarse gravel 60%, subangular to subrounded, very fine to very coarse sand 25%, silt 15%; gravel fraction: 70% quartzite, 20% granitoids, 10% diabase and other dark lithics; well graded; non cohesive; reaction to acid: weak to moderate		subangular to subrounded chips up to 2-1/2-inches
75 - 80	**Qal**	silty sandy gravel; brown [10YR4/3]; very weakly to weakly lithified; very fine to very coarse gravel 50%, subangular to subrounded, very fine to very coarse sand 30%, silt 20%; gravel fraction: 60% quartzite, 30% diabase, 10% quartz and granitoids; well graded; non cohesive; reaction to acid: weak to moderate		subangular to subrounded chips up to 1-1/2-inches
80 - 85	**Qal**	silty sandy gravel; brown [10YR4/3]; very weakly to weakly lithified; very fine to very coarse gravel 50%, subangular to subrounded, very fine to very coarse sand 30%, silt 20%; gravel fraction: 60% quartzite, 30% diabase, 10% quartz and granitoids; well graded; non cohesive; reaction to acid: weak to moderate		subangular to subrounded chips up to 1-1/2-inches

DRAFT

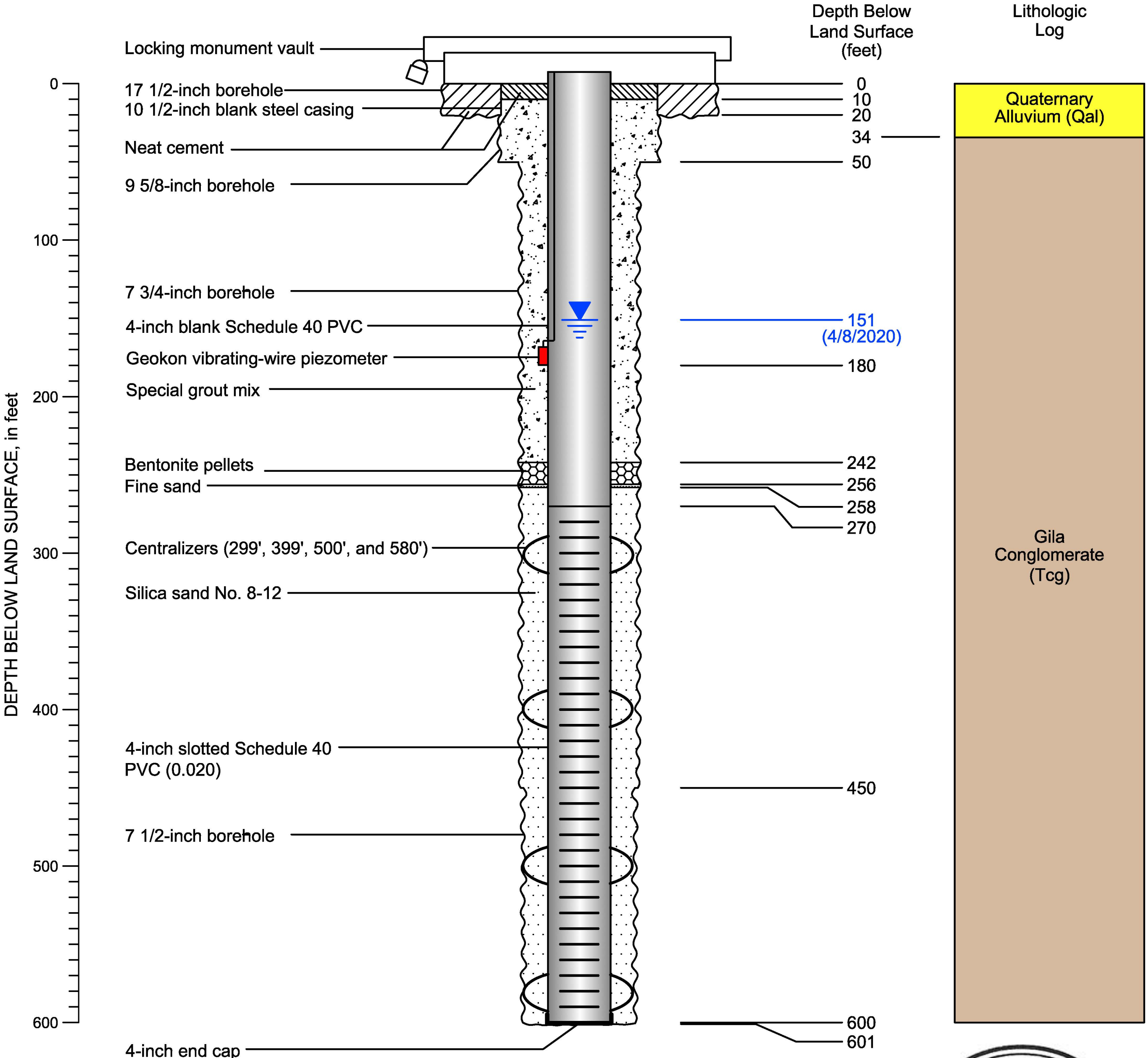
E-7. LITHOLOGIC DESCRIPTIONS FOR
DRILL CUTTINGS FROM MONITOR WELL RC20-18A [*55-924013*]
SKUNK CAMP
GILA COUNTY, ARIZONA

DEPTH INTERVAL (feet)	FORMATION	GENERAL DESCRIPTION	SECONDARY FEATURES	COMMENTS
85 - 90	**Qal**	sandy gravel; brown [10YR4/3]; very weakly to weakly lithified; very fine to very coarse gravel 50%, subangular to subrounded, very fine to very coarse sand 40%, silt 10%; gravel fraction: 60% quartzite, 30% diabase, 10% quartz and granitoids; well graded; non cohesive; reaction to acid: weak to moderate		subangular to subrounded chips up to 1-1/2-inches
90 - 92	**Qal**	silty sandy gravel; brown [10YR4/3]; weakly to moderately lithified; very fine to very coarse gravel 60%, subangular to subrounded, very fine to very coarse sand 20%, silt 20%; gravel fraction: 60% quartzite, 20% diabase, 10% quartz and granitoids; well graded; non cohesive; reaction to acid: weak to moderate		Gila Conglomerate contact at 91 feet; subangular to subrounded chips up to 1-1/2-inches

MONTGOMERY
& ASSOCIATES

Appendix F

Schematic Diagrams of Well Construction



CLIENT: Resolution Copper	
PROJECT: Skunk Camp	
VERSION: 01July2020	
ADWR No. 55-923921	

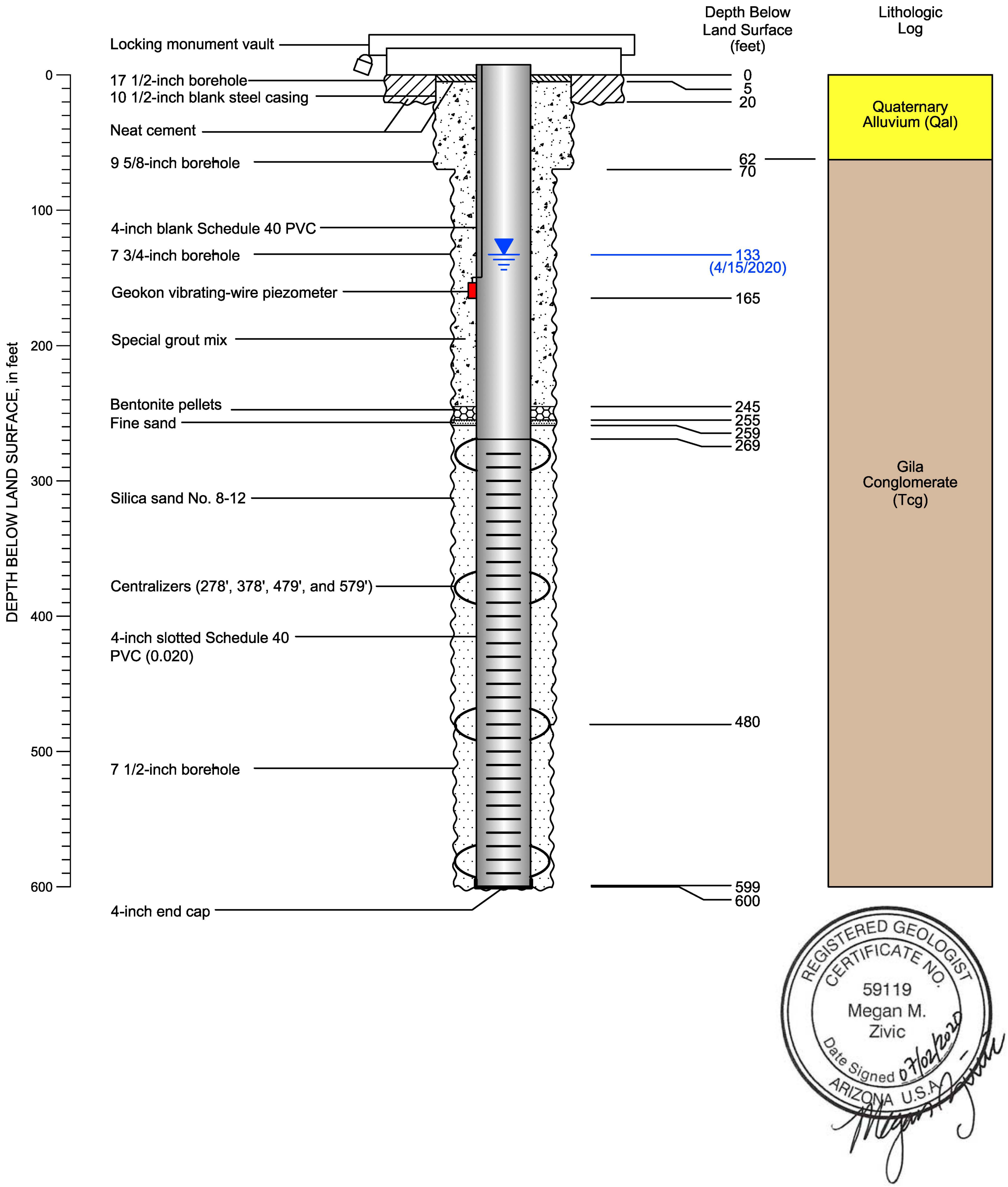
SCHEMATIC DIAGRAM OF CONSTRUCTION FOR WELL RC20-2 (Tcg #1)

DRAFT

MONTGOMERY & ASSOCIATES
Water Resource Consultants

FIGURE F-1

Drafting\605\WellSchematics_2020\RC20-2_ws\01July2020



CLIENT: Resolution Copper	
PROJECT: Skunk Camp	
VERSION: 25June2020	
ADWR No. 55-923957	

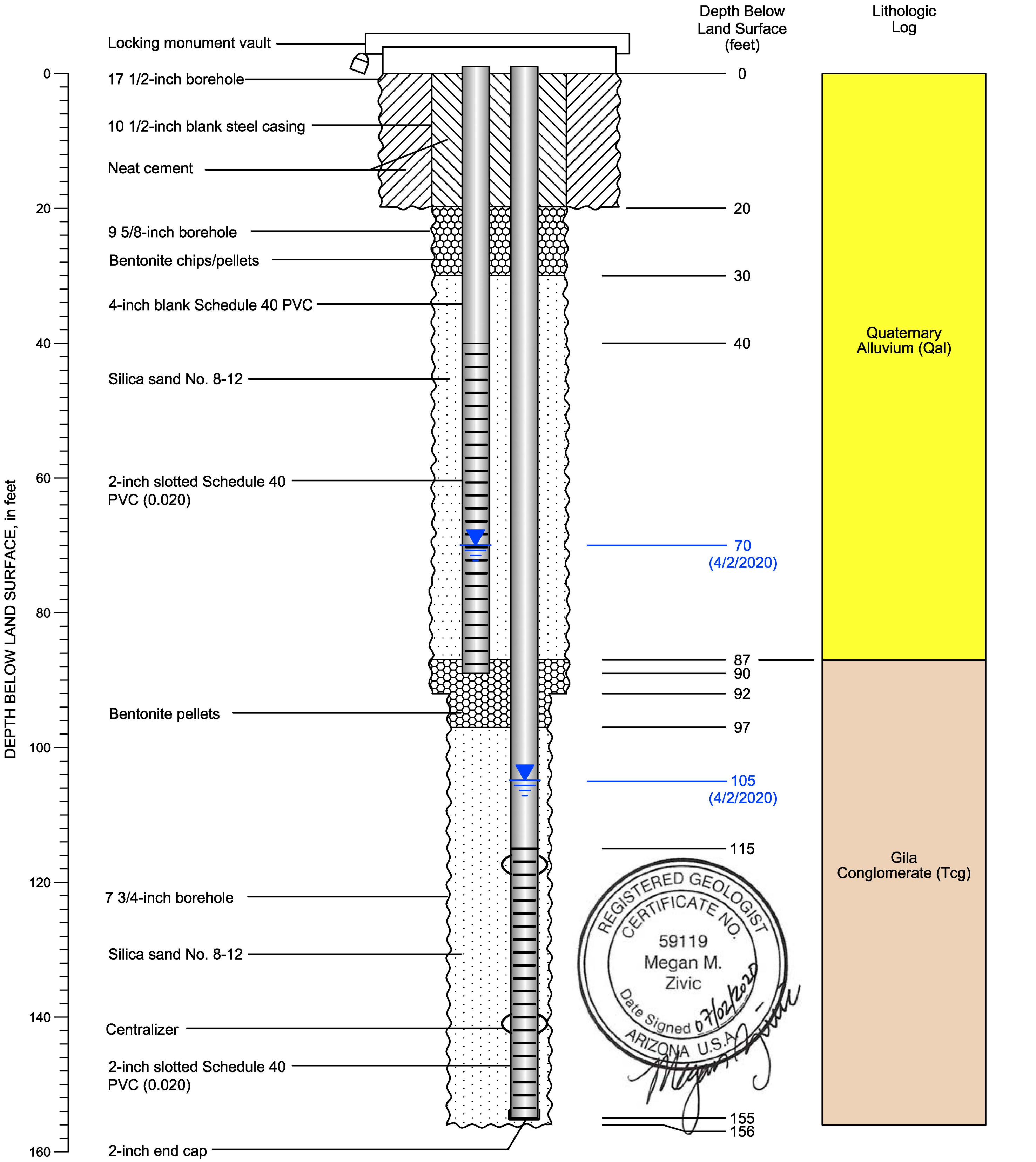
SCHEMATIC DIAGRAM OF CONSTRUCTION FOR WELL RC20-2A (Tcg #2)

DRAFT

MONTGOMERY & ASSOCIATES
Water Resource Consultants

FIGURE F-2

Drafting\605\WellSchematics_2020\RC20-2A_Well\25June2020



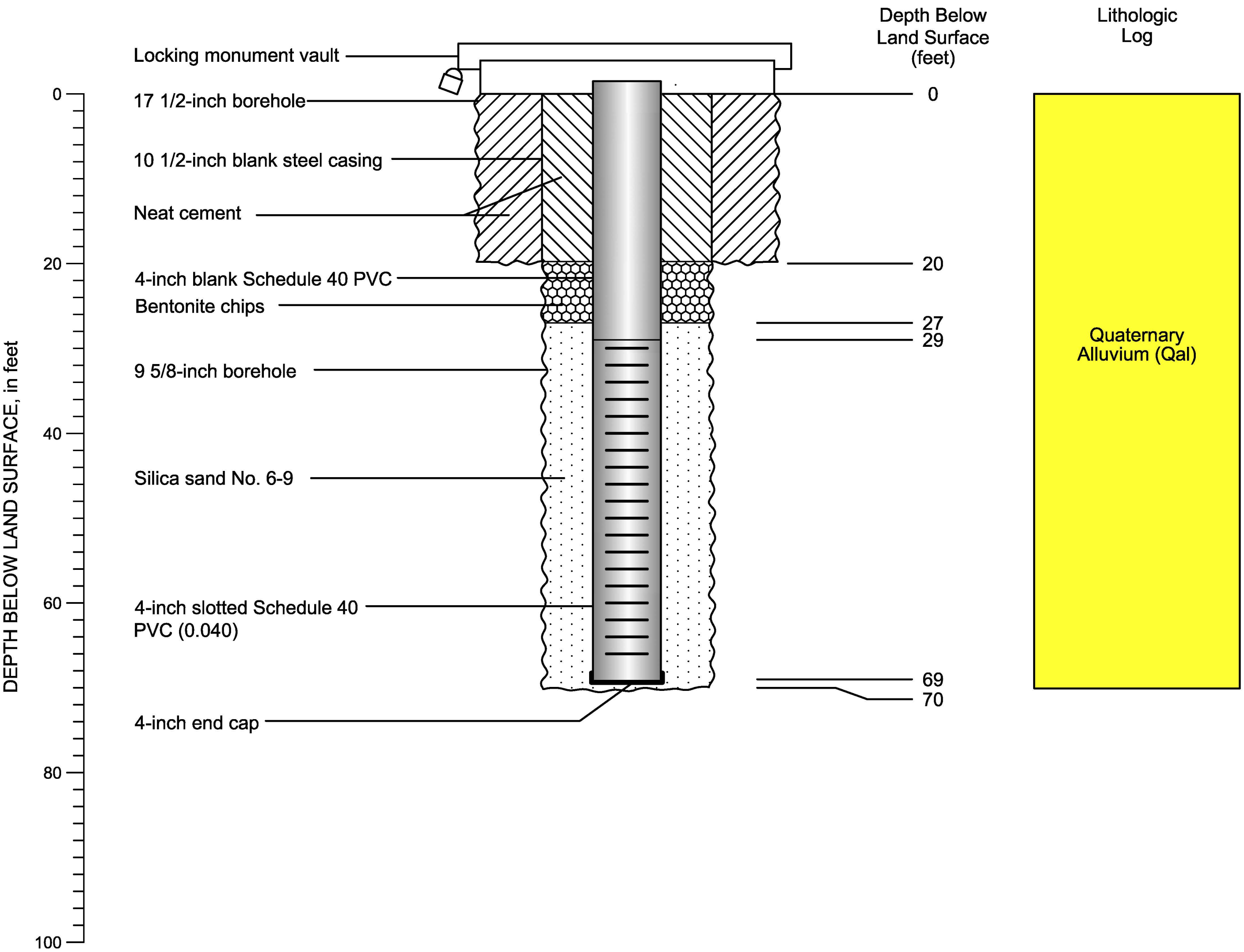
CLIENT: Resolution Copper	
PROJECT: Skunk Camp	
VERSION: 25June2020	
ADWR No. 55-923971	

SCHEMATIC DIAGRAM OF CONSTRUCTION FOR WELL RC20-2B (DC #1)

DRAFT

MONTGOMERY & ASSOCIATES
Water Resource Consultants

FIGURE F-3



REGISTERED GEOLOGIST
CERTIFICATE NO.
59119
Megan M.
Zivic
Date Signed 07/02/2020
ARIZONA U.S.A.

CLIENT: Resolution Copper

PROJECT: Skunk Camp

VERSION: 25June2020

ADWR No. 55-923972

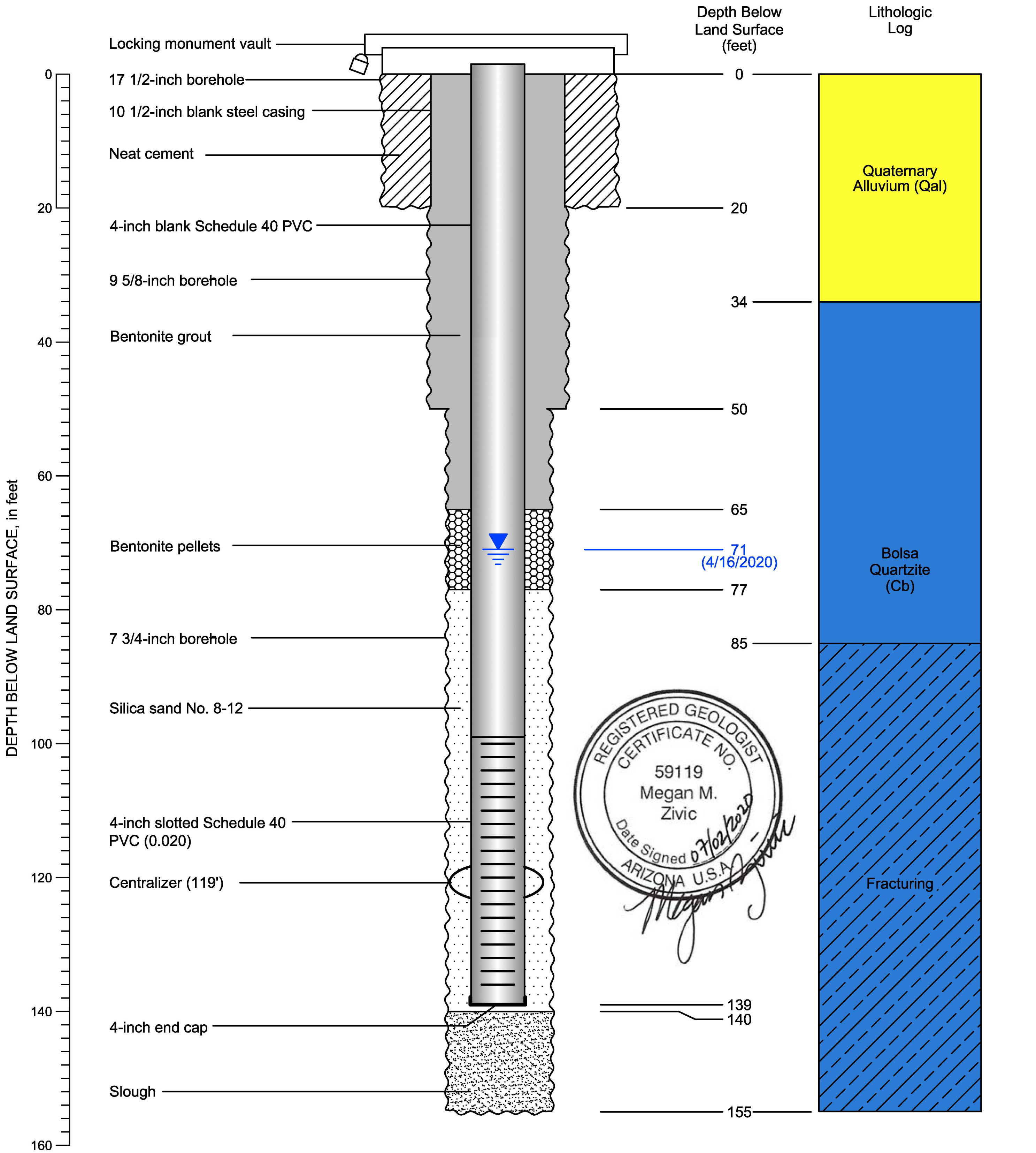
DRAFT

SCHEMATIC DIAGRAM OF CONSTRUCTION FOR WELL RC20-2C (Qal #1)

MONTGOMERY & ASSOCIATES
Water Resource Consultants

FIGURE F-4

Drafting\605\WellSchematics_2020\R20-2C\25June2020



CLIENT: Resolution Copper

PROJECT: Skunk Camp

VERSION: 25June2020

ADWR No. 55-923982

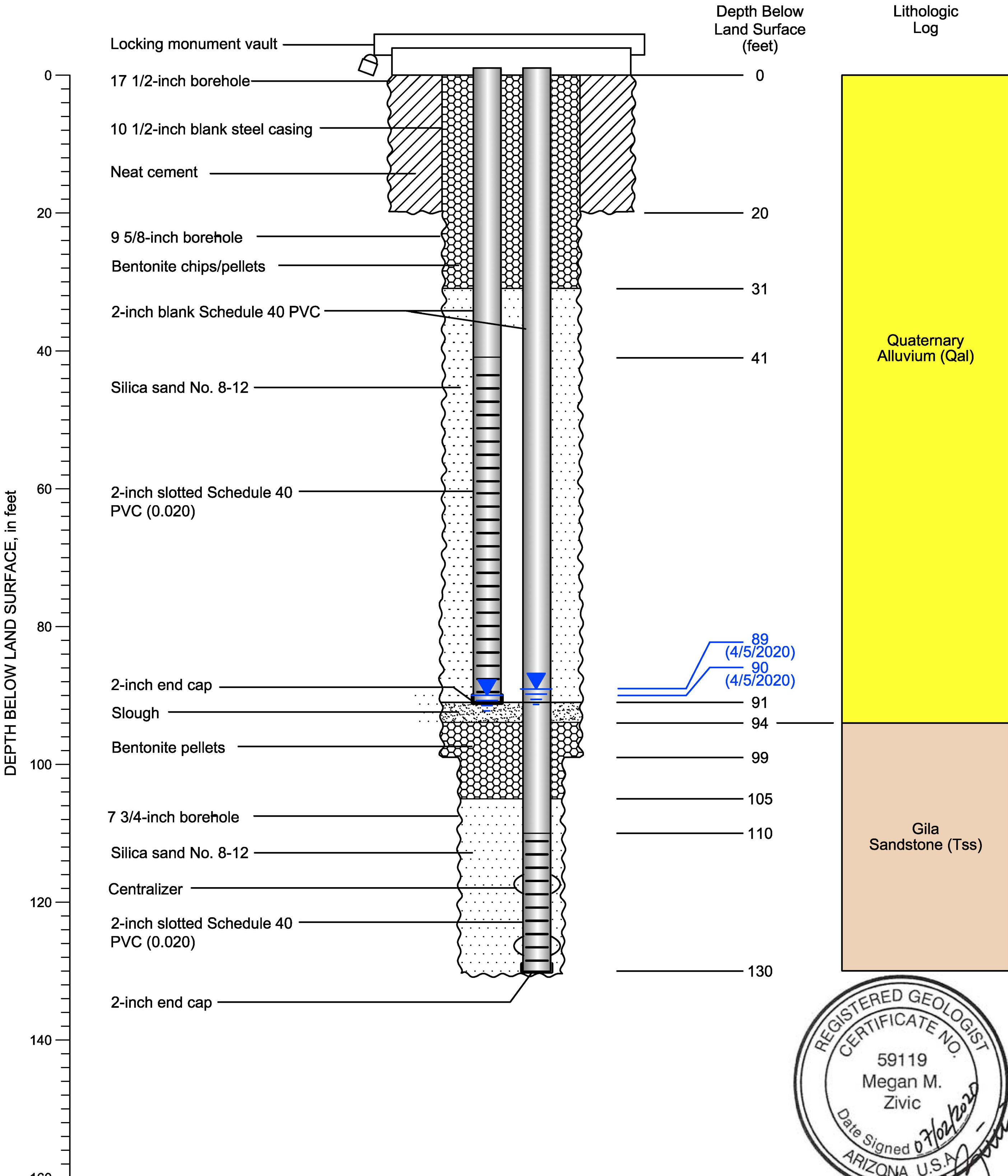
DRAFT

SCHEMATIC DIAGRAM OF CONSTRUCTION FOR WELL RC20-2D (BEDROCK)

MONTGOMERY & ASSOCIATES
Water Resource Consultants

FIGURE F-5

Drafting\605\WellSchematics_2020\RC20-2D_Bedrock\25June2020



REGISTERED GEOLOGIST CERTIFICATE NO. 59119 Megan M. Zivic
Date Signed 07/02/2020
ARIZONA U.S.A.

CLIENT: Resolution Copper
PROJECT: Skunk Camp
VERSION: 25June2020
ADWR No. 55-924012

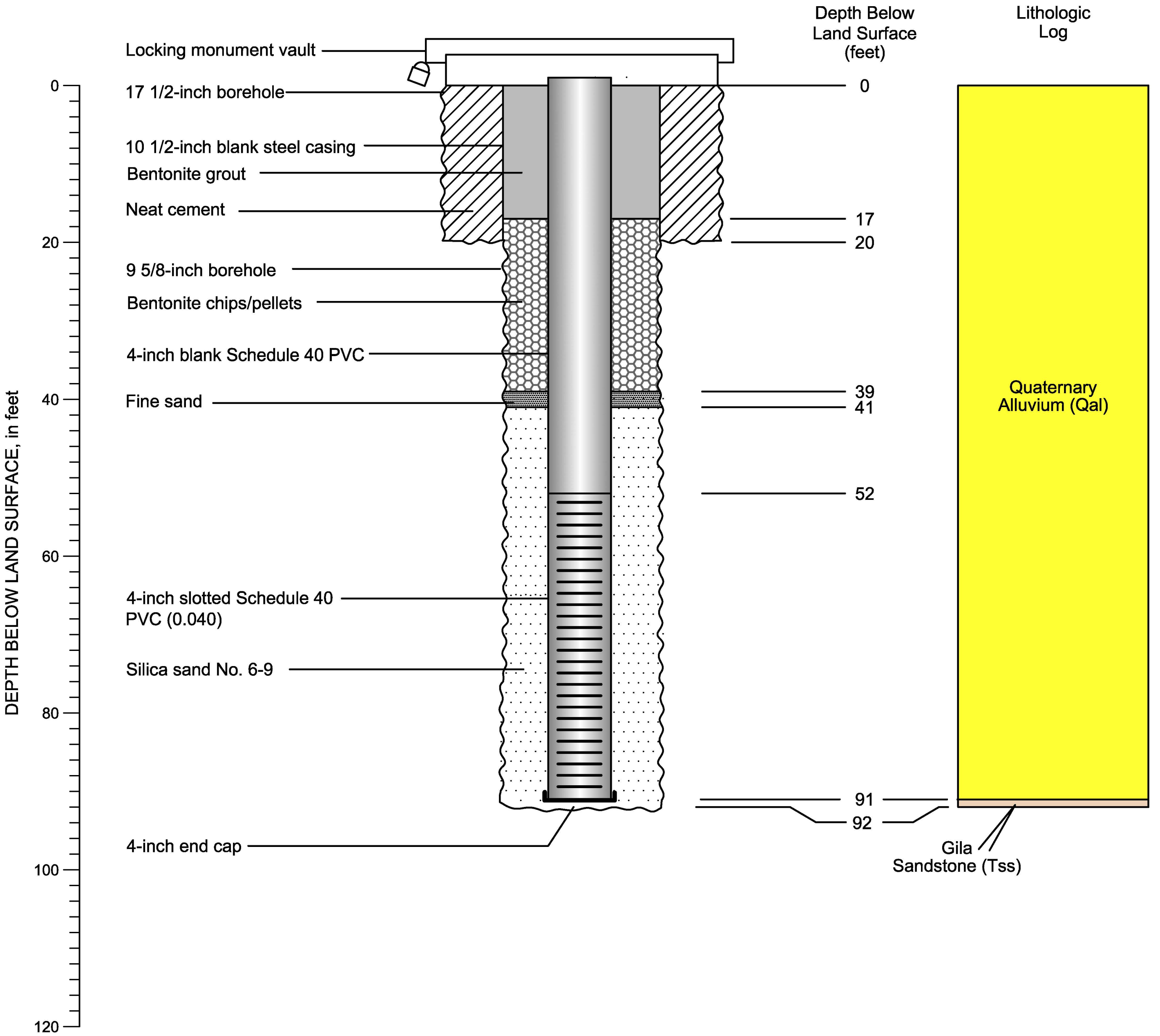
DRAFT

SCHEMATIC DIAGRAM OF CONSTRUCTION FOR WELL RC20-18 (DC #3)

MONTGOMERY & ASSOCIATES
Water Resource Consultants

FIGURE F-6

Drafting\605\WellSchematics_2020\RC20-18\25June2020



REGISTERED GEOLOGIST CERTIFICATE NO. 59119 Megan M. Zivic Date Signed 07/02/2020 ARIZONA U.S.A.

CLIENT: Resolution Copper	
PROJECT: Skunk Camp	
VERSION: 01July2020	
ADWR No. 55-924013	

DRAFT

SCHEMATIC DIAGRAM OF CONSTRUCTION FOR WELL RC20-18A (Qal #3)

MONTGOMERY & ASSOCIATES Water Resource Consultants

FIGURE F-7

Drafting\605\WellSchematics_2020\RC20-18A\01July2020

MONTGOMERY & ASSOCIATES

Appendix G

Geophysical Logs for Hydrogeologic Test Wells

Southwest Exploration Services, LLC
borehole geophysics & video services

COMPANY	RESOLUTION COPPER MINING		
WELL ID	RC20-2		
FIELD	SKUNK CAMP		
COUNTY	GILA	STATE	ARIZONA

TYPE OF LOGS: OPTICAL TELEVIEWER
MORE: GAMMA - CALIPER

LOCATION

SEC TWP RGE

OTHER SERVICES
TEMP / FLUID RES
ACOUSTIC TELEVIEWER
SONIC
E-LOG

PERMANENT DATUM		ELEVATION	K.B.
LOG MEAS. FROM	GROUND LEVEL	ABOVE PERM. DATUM	D.F.
DRILLING MEAS. FROM	GROUND LEVEL		G.L.

DATE	02-23-20	TYPE FLUID IN HOLE	FORMATION WATER
RUN No	4	MUD WEIGHT	N/A
TYPE LOG	OPTICAL TELEVIEWER	VISCOSITY	N/A
DEPTH-DRILLER	600.0 FT	LEVEL	~150 FT
DEPTH-LOGGER	599.9 FT	MAX. REC. TEMP.	21.5 Deg C
BTM LOGGED INTERVAL	598 FT	IMAGE ORIENTED TO:	MAGNETIC NORTH
TOP LOGGED INTERVAL	45.0 FT	SAMPLE INTERVAL	0.035 FT
DRILLER / RIG#	NATIONAL DRILLING	LOGGING TRUCK	TRUCK #310
RECORDED BY / Logging Eng.	E. BEAM / D. ALP	TOOL STRING/SN	ALT QL OBI40 2G SN 170106
WITNESSED BY	NATIONAL DRILLING	LOG TIME:ON SITE/OFF SITE	1:30 PM

RUN	BOREHOLE RECORD			CASING RECORD			
NO.	BIT	FROM	TO	SIZE	WGT.	FROM	TO
1	? IN	SURFACE	40 FT	8.62 IN	STEEL	SURFACE	40 FT
2	7 7/8 IN	40 FT	TOTAL DEPTH	6 IN	PVC	SURFACE	50 FT
3							

COMMENTS:

.

Tool Summary:

Date	02-23-20	**Date**	02-23-20	**Date**	02-23-20
Run No.	1	**Run No.**	2	**Run No.**	3
Tool Model	MSI COMBO TOOL	**Tool Model**	ALT QL E-LOG	**Tool Model**	ALT 4 RX SONIC
Tool SN	4953	**Tool SN**	6380	**Tool SN**	4572
From	SURFACE	**From**	100.0 FT	**From**	140.0 FT
To	599.9 FT	**To**	599.4 FT	**To**	599.9 FT
Recorded By	D. ALP	**Recorded By**	D. ALP	**Recorded By**	D. ALP
Truck No	310	**Truck No**	310	**Truck No**	310
Operation Check	02-23-20	**Operation Check**	02-20-20	**Operation Check**	02-20-20
Calibration Check	02-21-20	**Calibration Check**	02-20-20	**Calibration Check**	N/A
Time Logged	2:00 PM	**Time Logged**	3:00 PM	**Time Logged**	3:30 PM

Date	02-23-20	**Date**	02-23-20	**Date**	
Run No.	4	**Run No.**	5	**Run No.**	6
Tool Model	ALT QL OBI40 2G	**Tool Model**	ALT QL ABI40 2G	**Tool Model**	
Tool SN	170106	**Tool SN**	143003	**Tool SN**	
From	45.0 FT	**From**	145.0 FT	**From**	
To	598.0 FT	**To**	598.0 FT	**To**	
Recorded By	D. ALP	**Recorded By**	D. ALP	**Recorded By**	
Truck No	310	**Truck No**	310	**Truck No**	
Operation Check	02-20-20	**Operation Check**	02-20-20	**Operation Check**	
Calibration Check	N/A	**Calibration Check**	N/A	**Calibration Check**	
Time Logged	4:30 PM	**Time Logged**	7:00 PM	**Time Logged**	

Additional Comments:

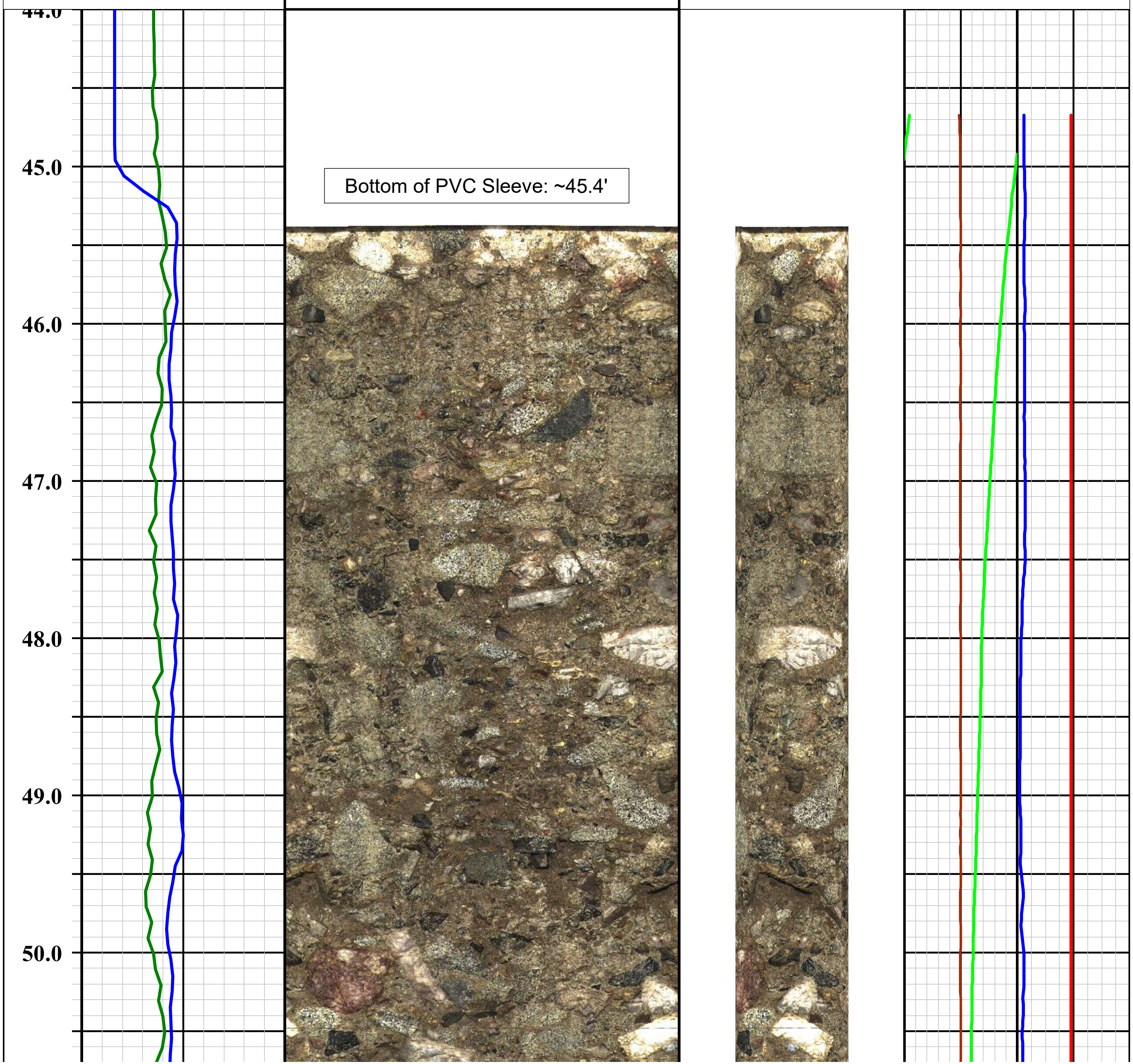
Caliper Arms Used: 9" **Calibration Points:** 6" & 12"

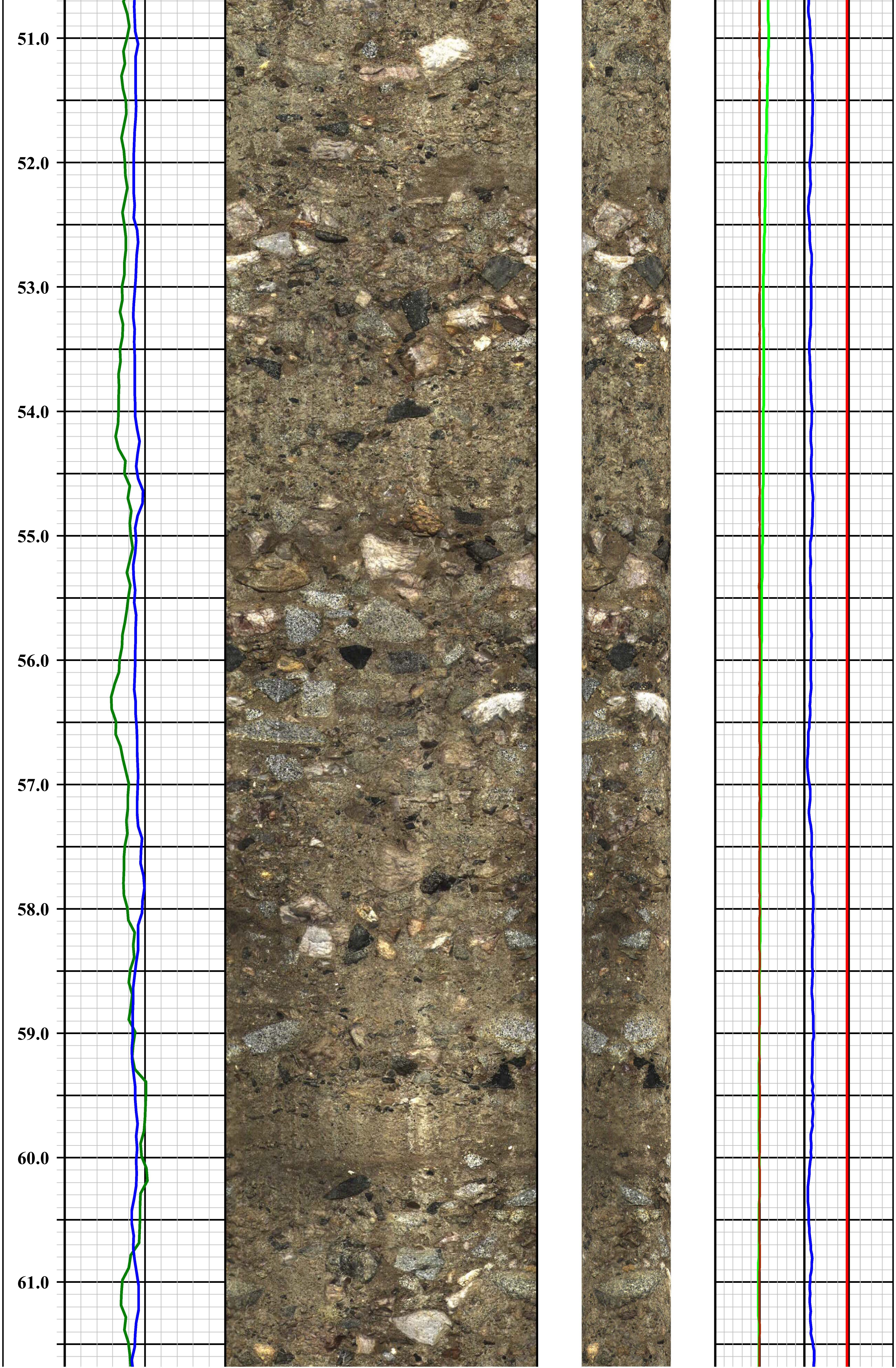
E-Log Calibration Range: 1 - 10,000 OHM-M **Calibration Points:** 1 & 10,000 OHM-M

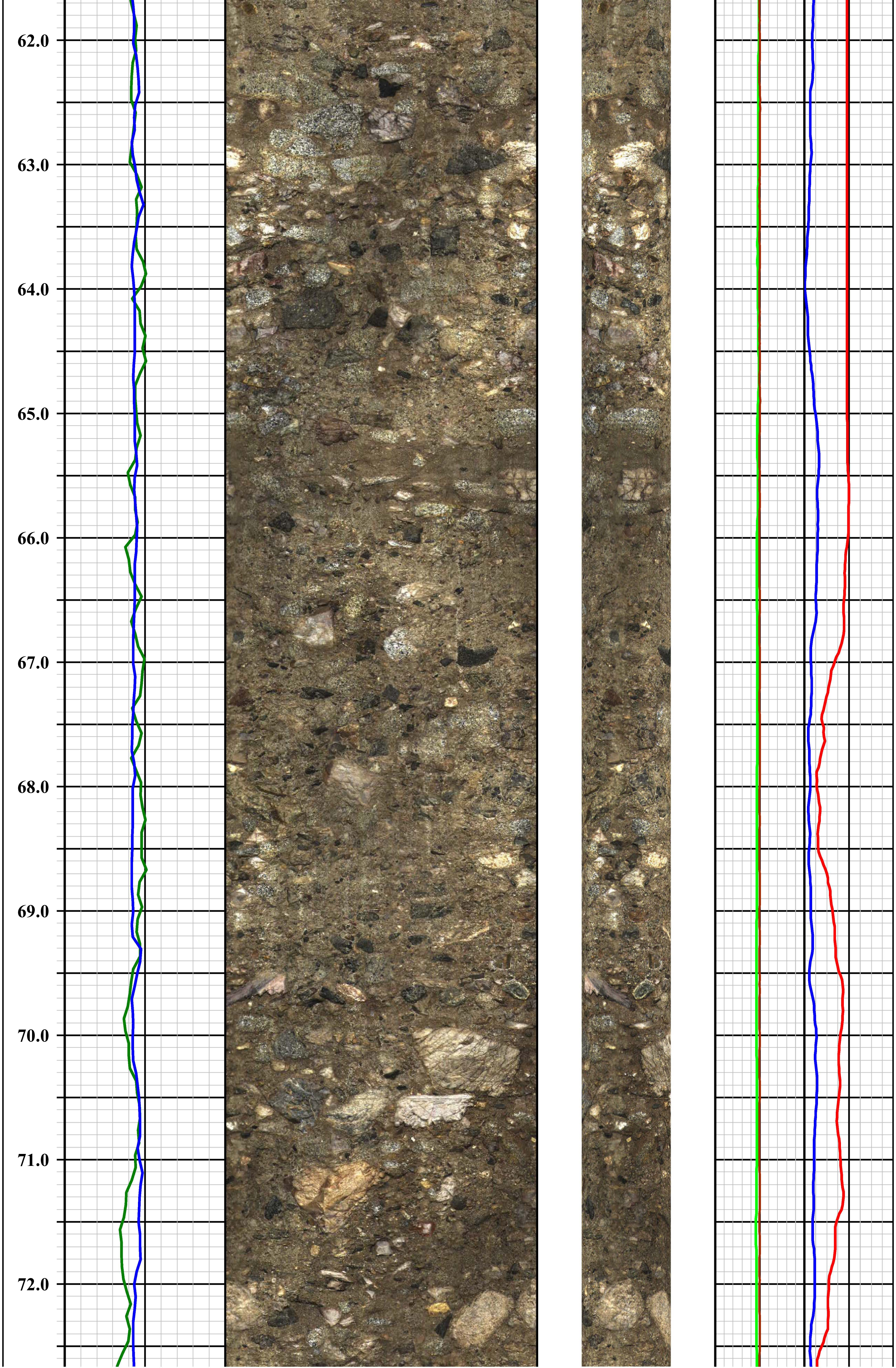
Disclaimer:

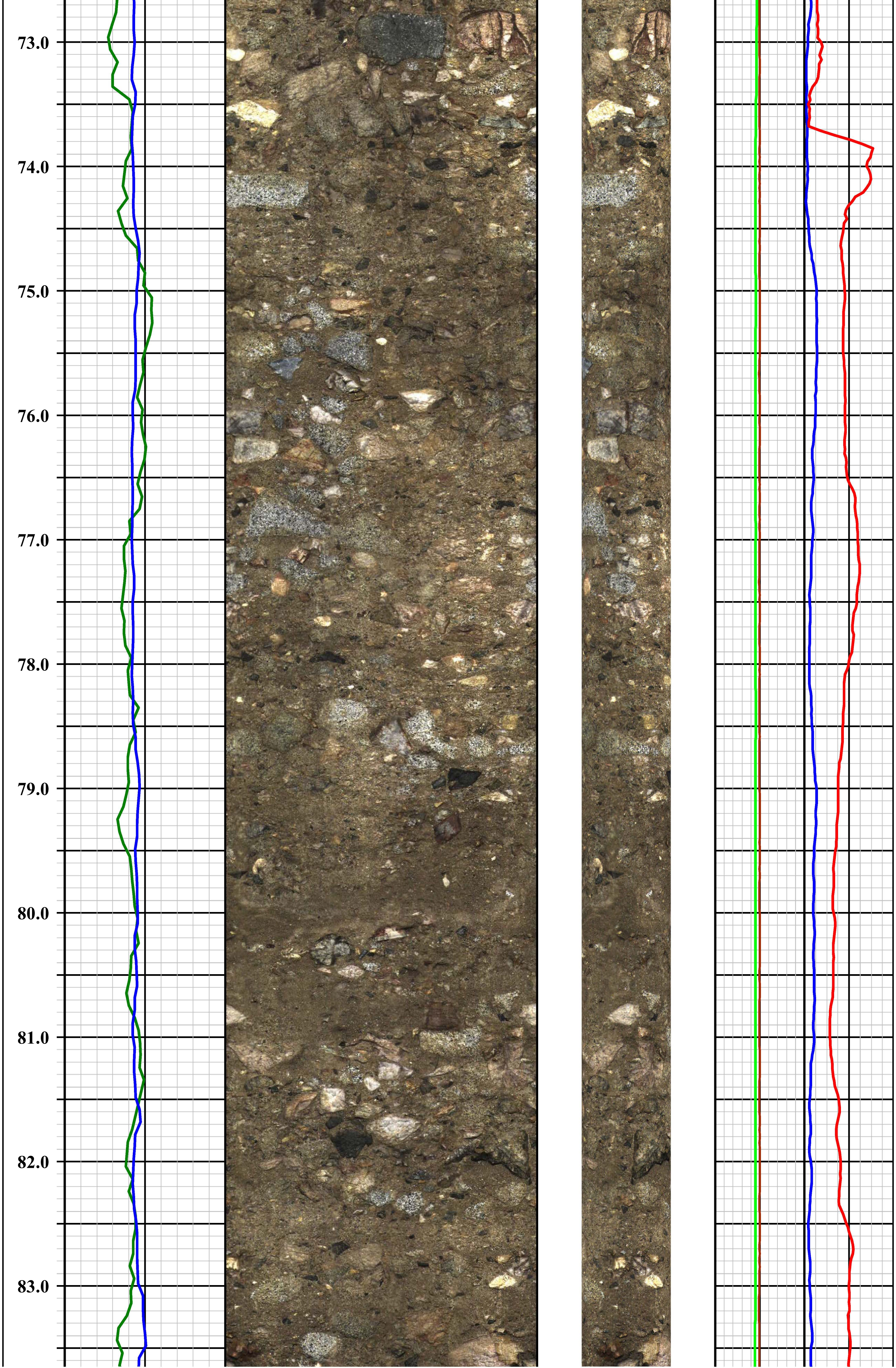
All interpretations of log data are opinions based on inferences from electrical or other measurements. We do not guarantee the accuracy or correctness of any interpretations or recommendations and shall not be liable or responsible for any loss, costs, damages, or expenses incurred or sustained by anyone resulting from any interpretation made by any of our employees or agents. These interpretations are also subject to our general terms and conditions set out in our current Service Invoice.

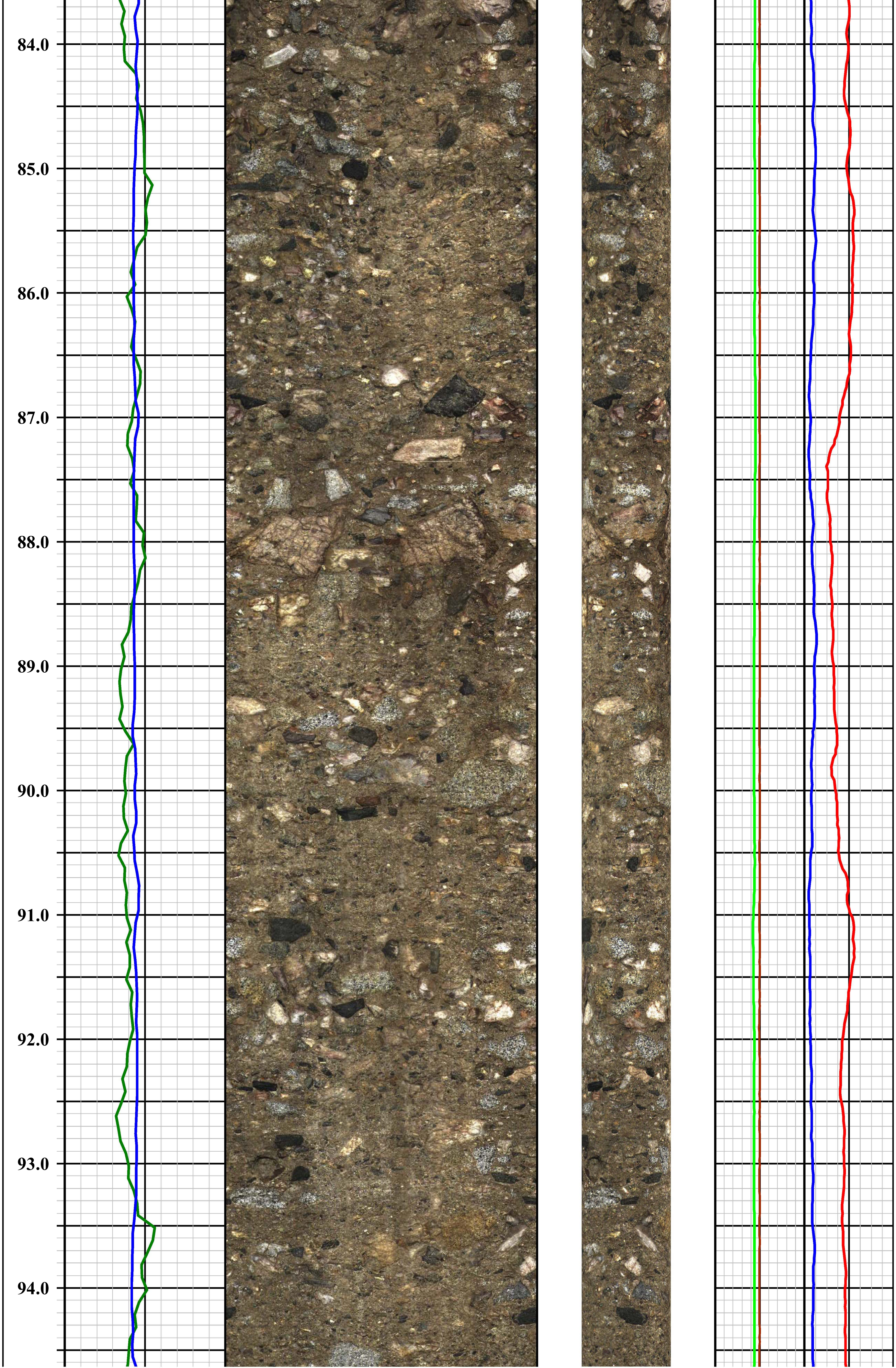
Depth 1in:1ft	Skunk Camp RC20-2 OBI40 2G Summary ~45.4' - ~597.4'				
	Nat. Gamma 0 API 200	Image-NM Oriented Mag North 0° 90° 180° 270° 0°	3-D View -0°	Mag Field 40 uT 60	Tilt 0 Deg 8
	3-Arm Caliper 5 Inches 12			Gravity 0.8 g 1.2	Azi-Edited 0 360
		Image_45.4'-64.4' Non Oriented, Rot'd by 25.2 Deg 0° 90° 180° 270° 0°			

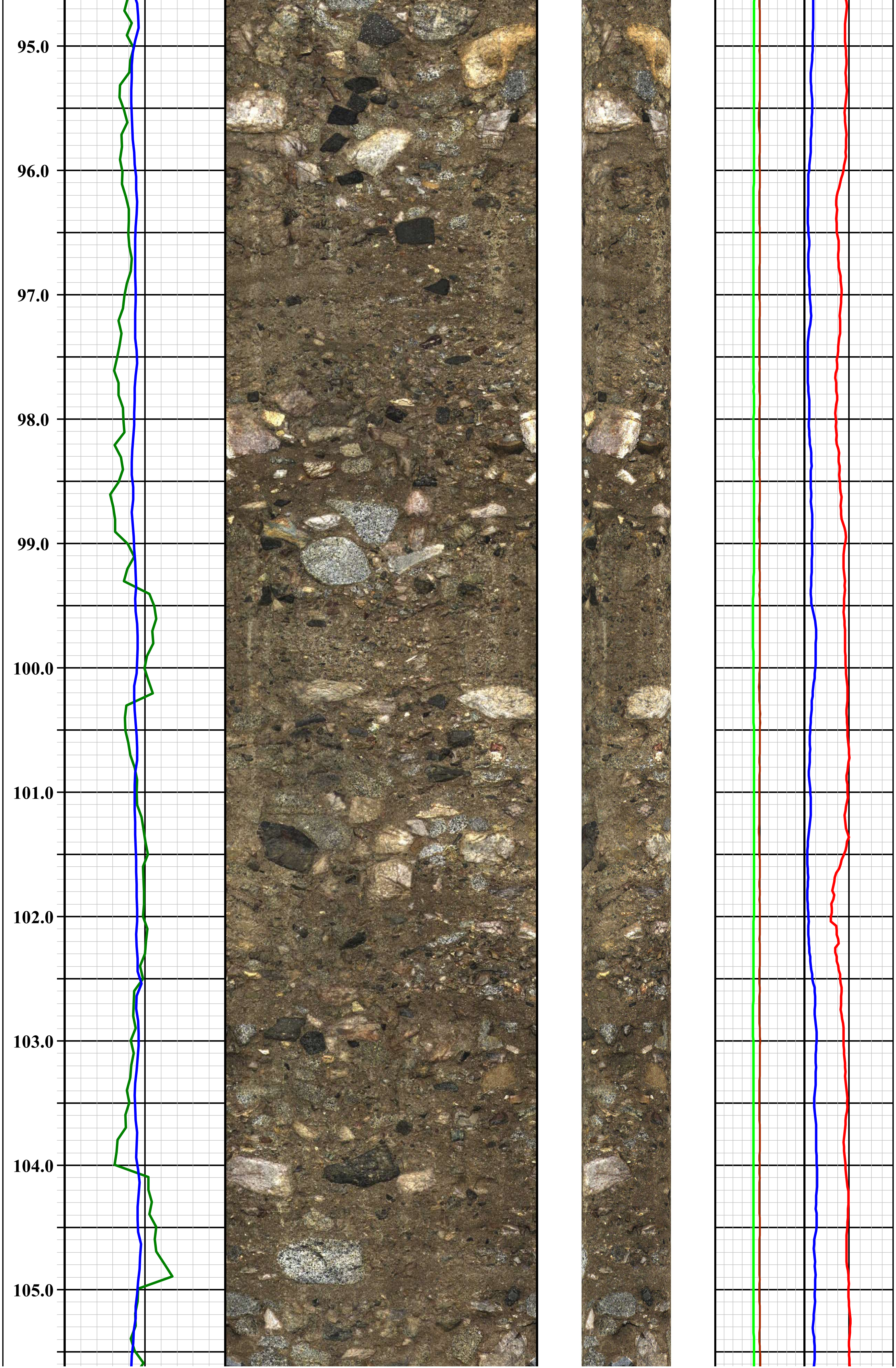


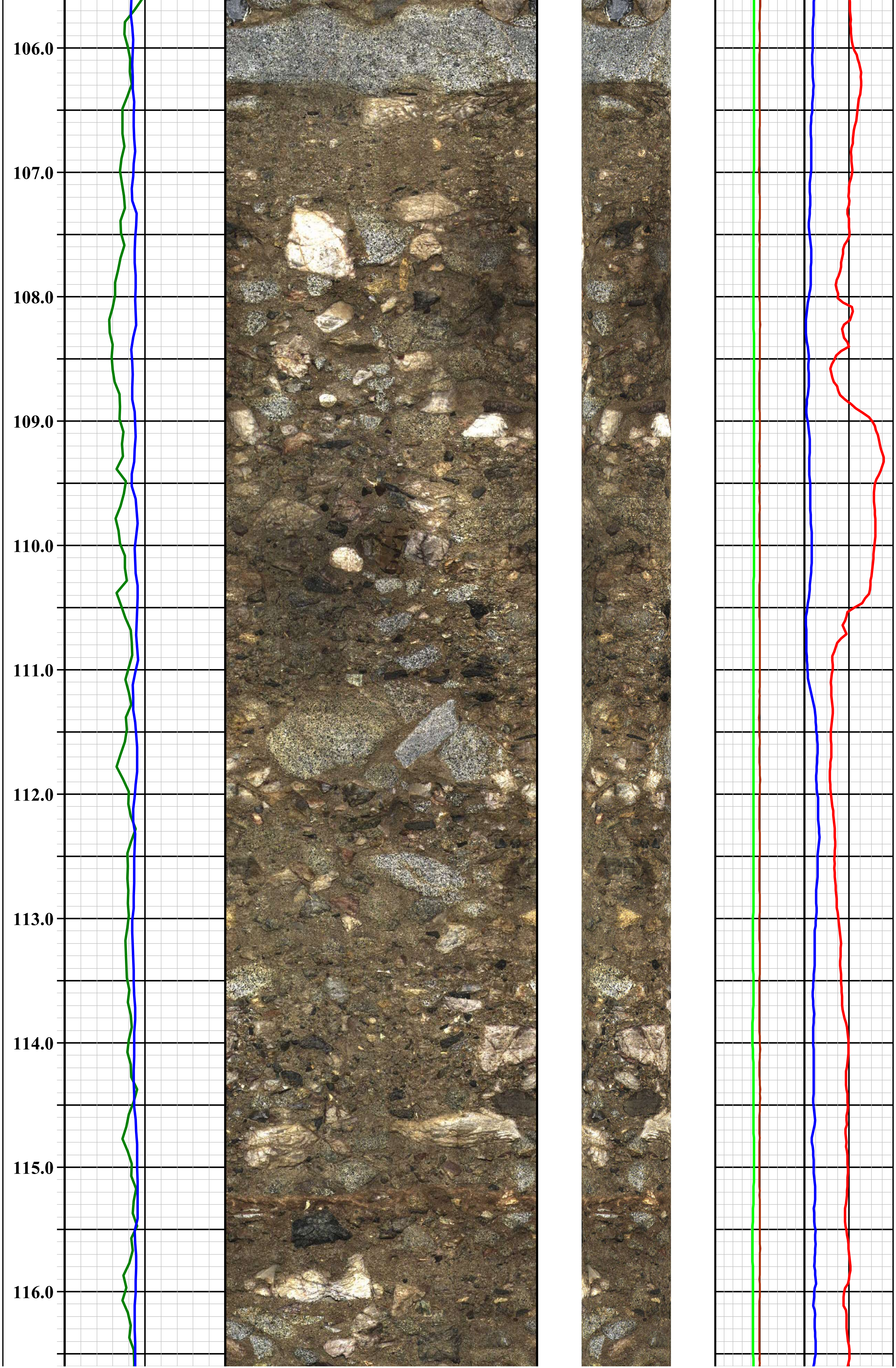

51.0
52.0
53.0
54.0
55.0
56.0
57.0
58.0
59.0
60.0
61.0

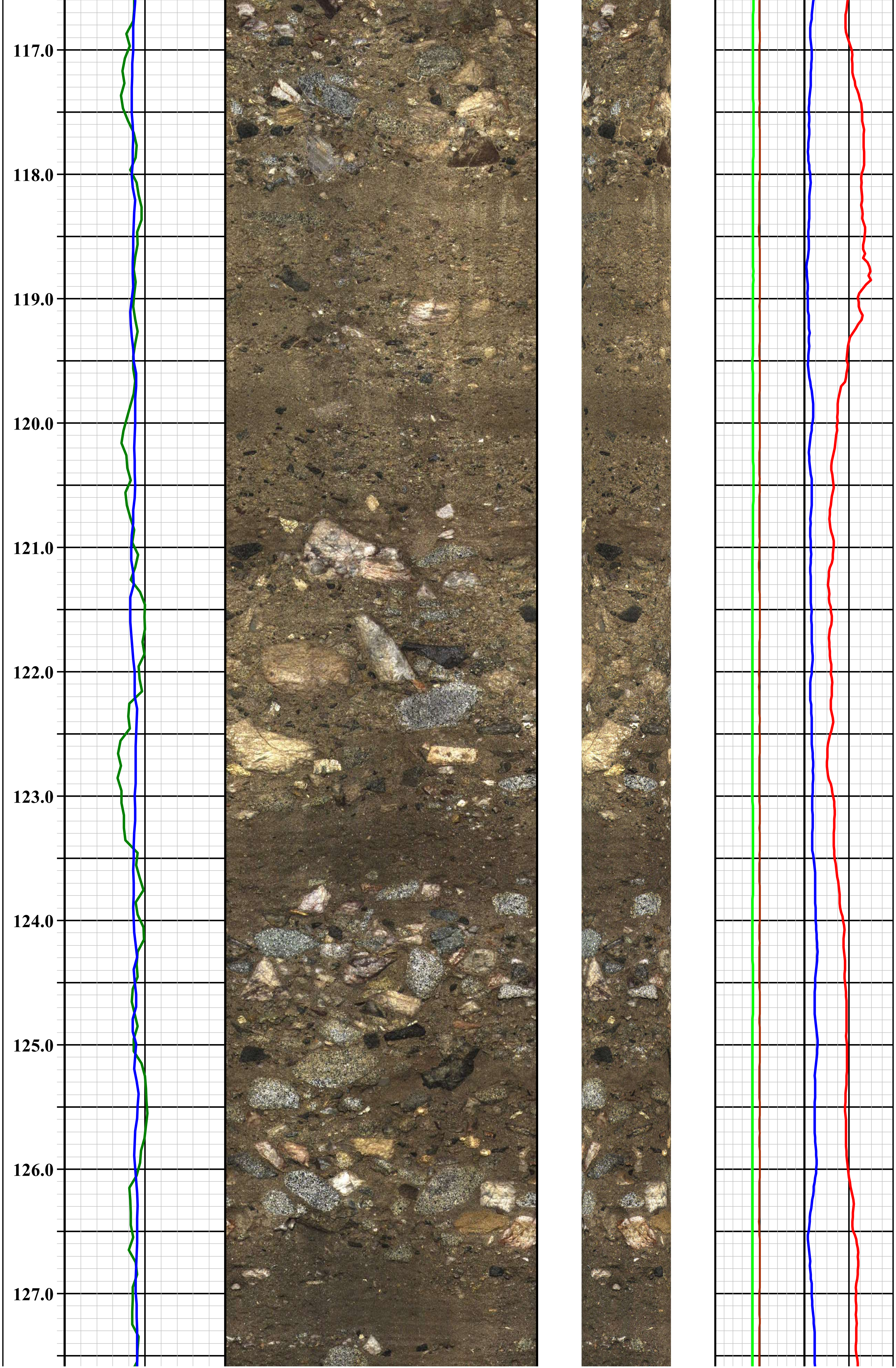

62.0
63.0
64.0
65.0
66.0
67.0
68.0
69.0
70.0
71.0
72.0

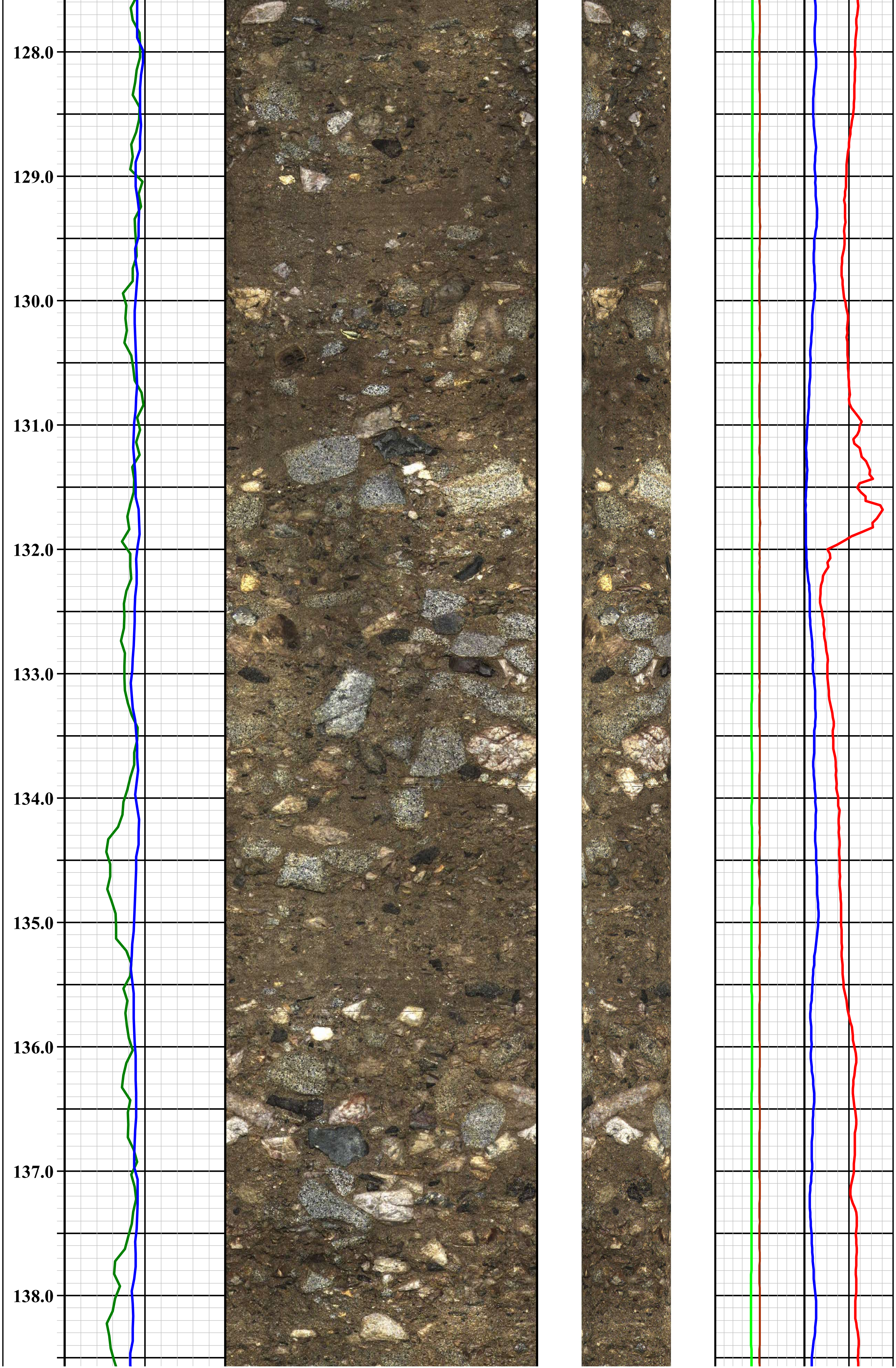

73.0
74.0
75.0
76.0
77.0
78.0
79.0
80.0
81.0
82.0
83.0

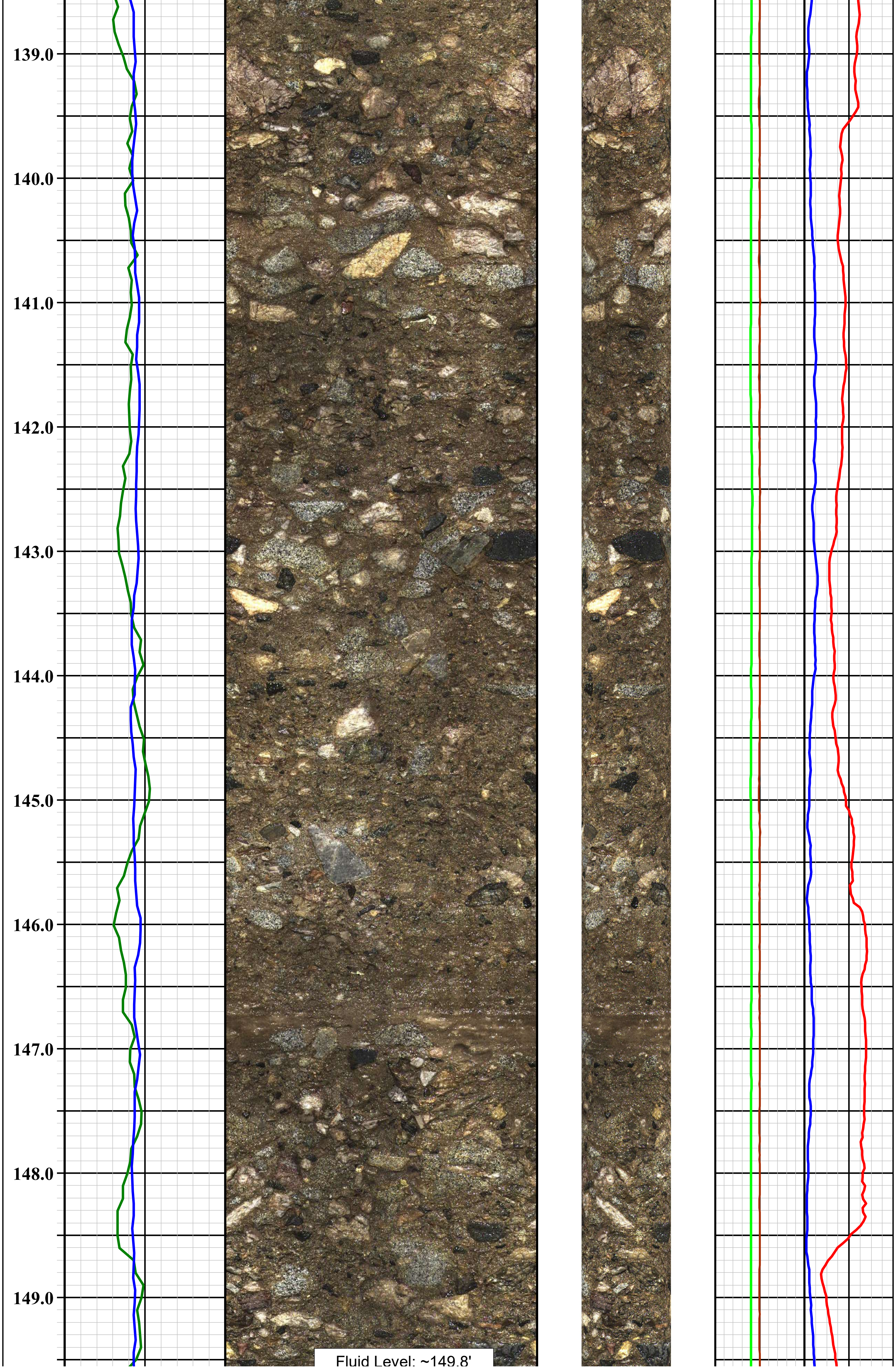

84.0
85.0
86.0
87.0
88.0
89.0
90.0
91.0
92.0
93.0
94.0

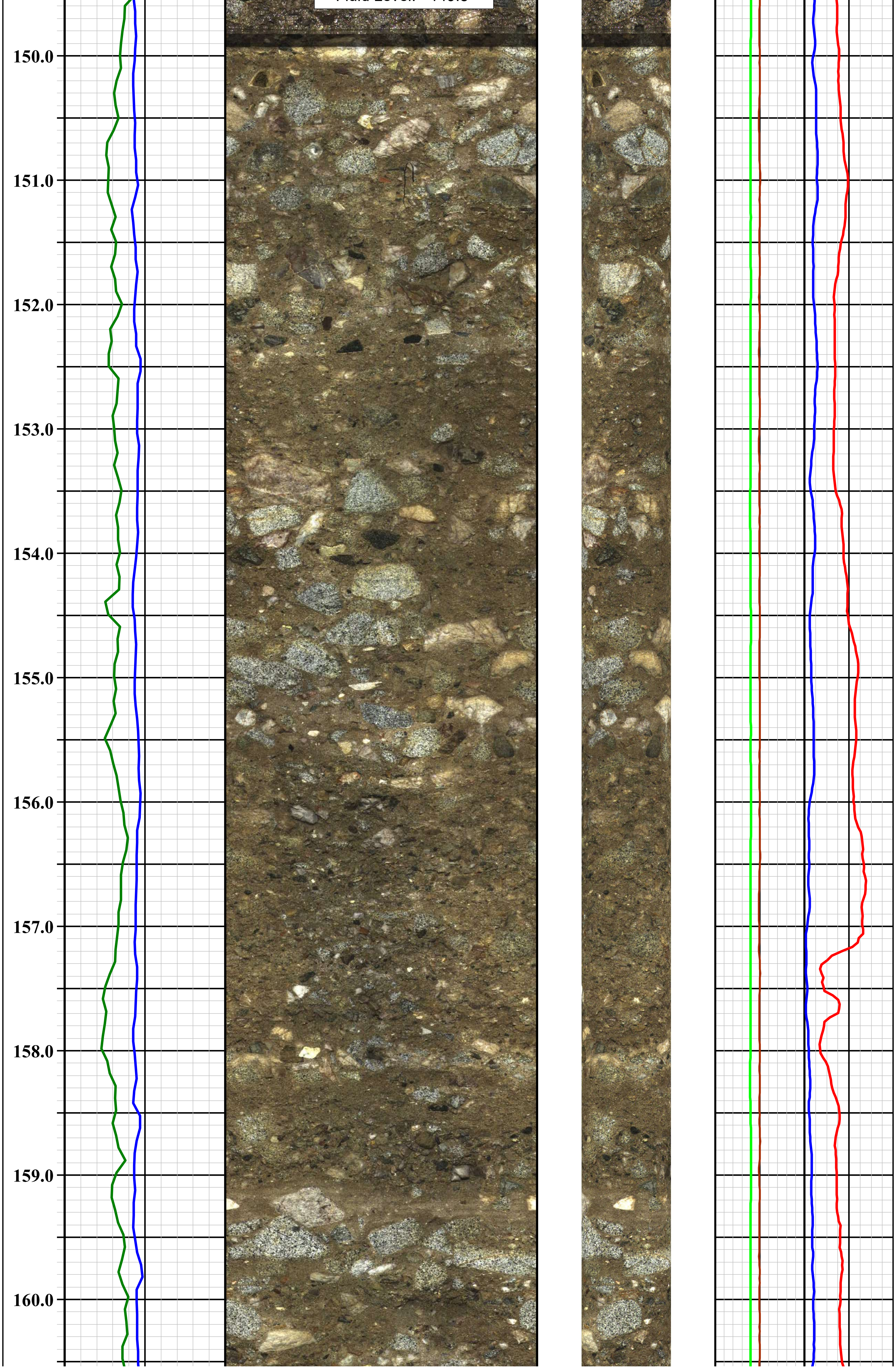

95.0
96.0
97.0
98.0
99.0
100.0
101.0
102.0
103.0
104.0
105.0

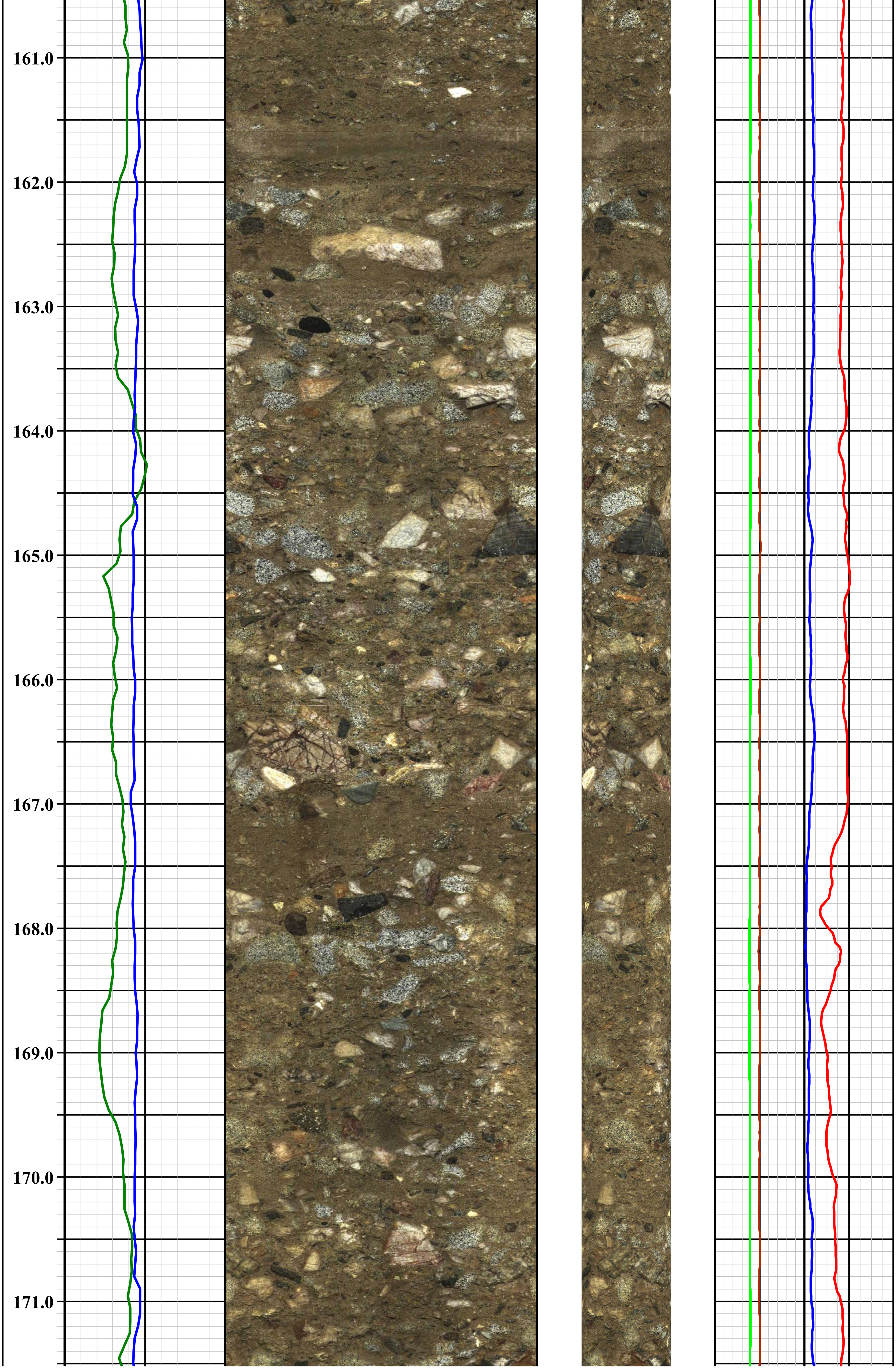

106.0
107.0
108.0
109.0
110.0
111.0
112.0
113.0
114.0
115.0
116.0

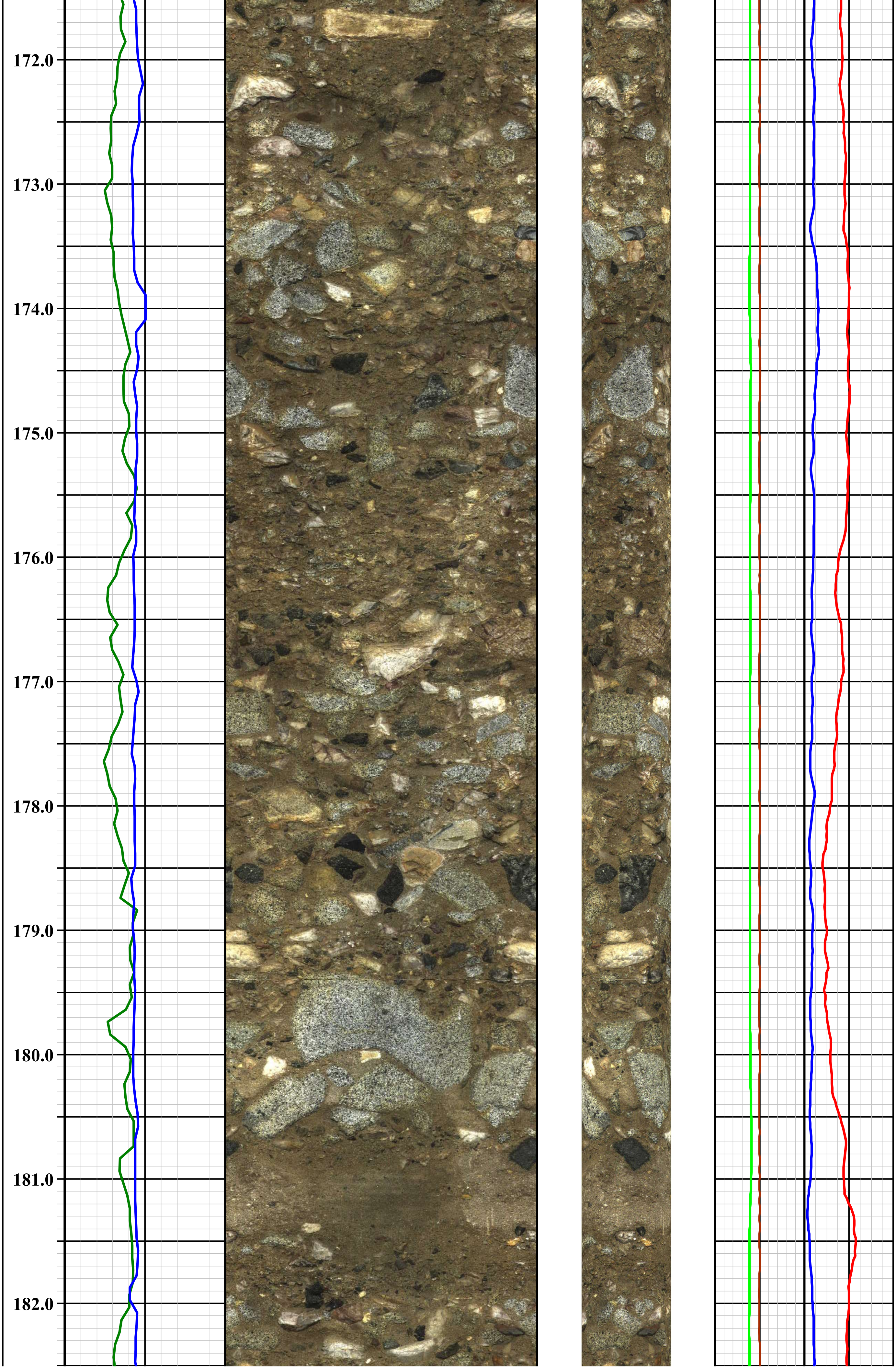

117.0
118.0
119.0
120.0
121.0
122.0
123.0
124.0
125.0
126.0
127.0

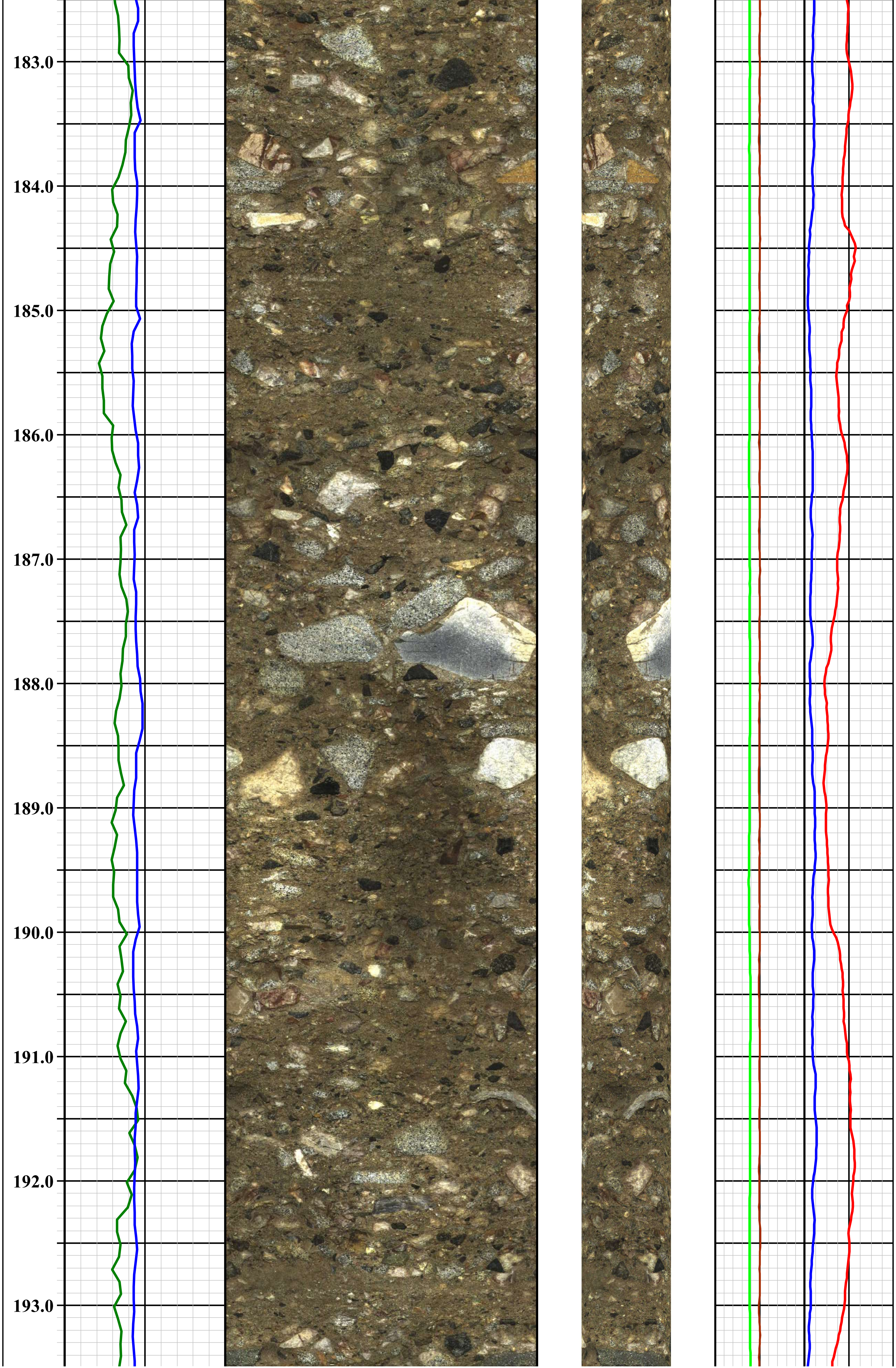

128.0
129.0
130.0
131.0
132.0
133.0
134.0
135.0
136.0
137.0
138.0

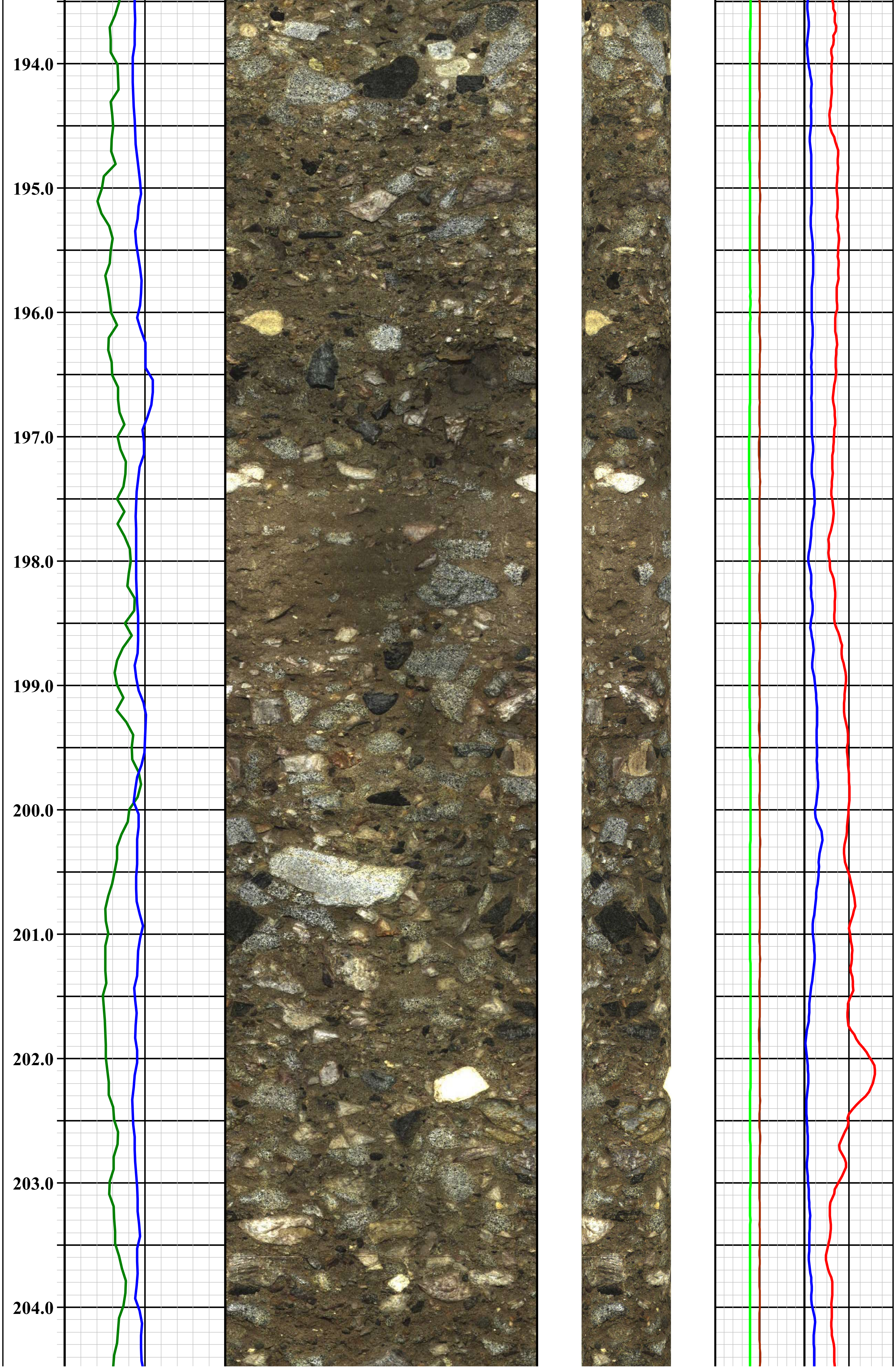

139.0
140.0
141.0
142.0
143.0
144.0
145.0
146.0
147.0
148.0
149.0
Fluid Level: ~149.8'


150.0
151.0
152.0
153.0
154.0
155.0
156.0
157.0
158.0
159.0
160.0

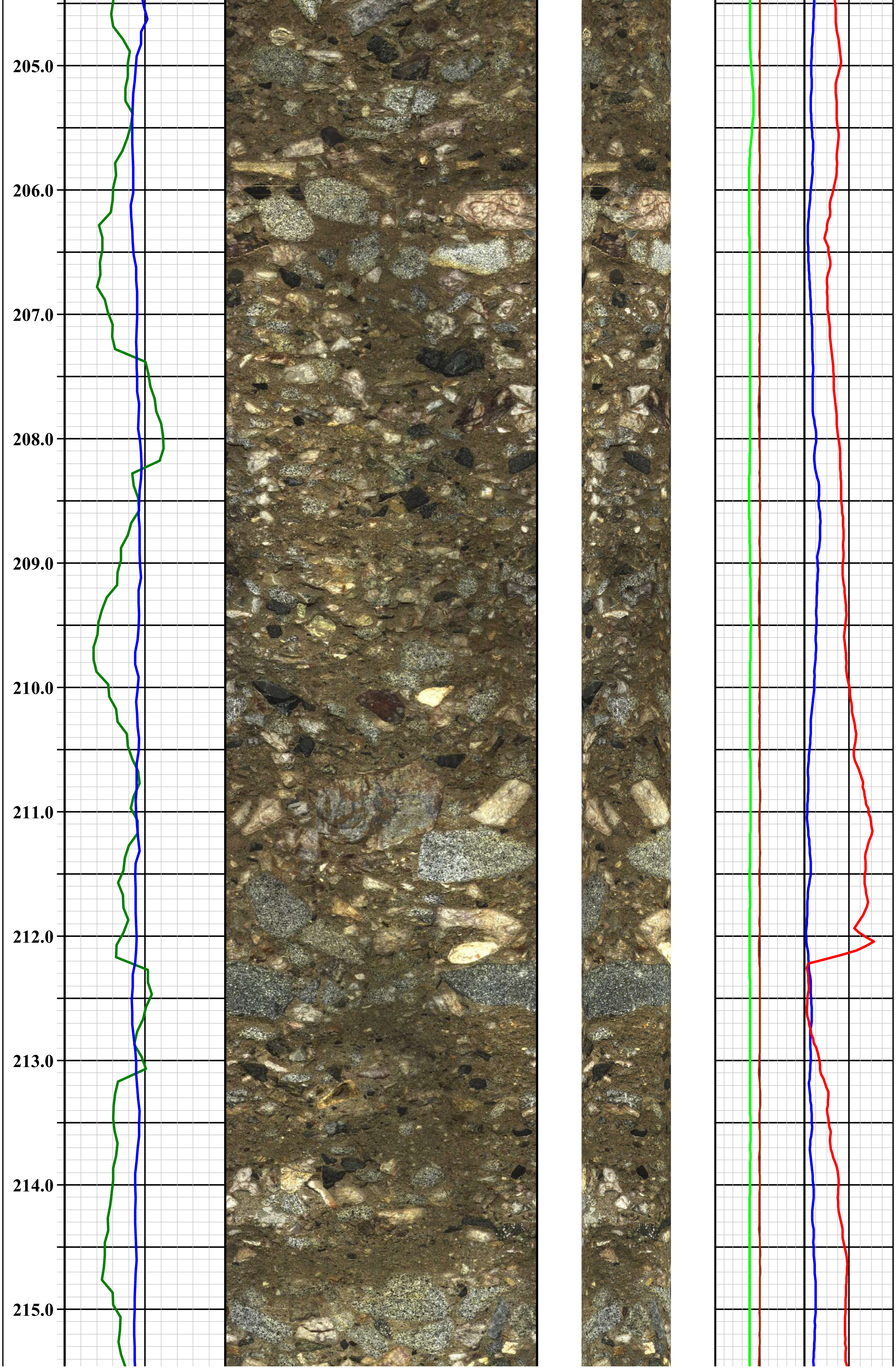

161.0
162.0
163.0
164.0
165.0
166.0
167.0
168.0
169.0
170.0
171.0

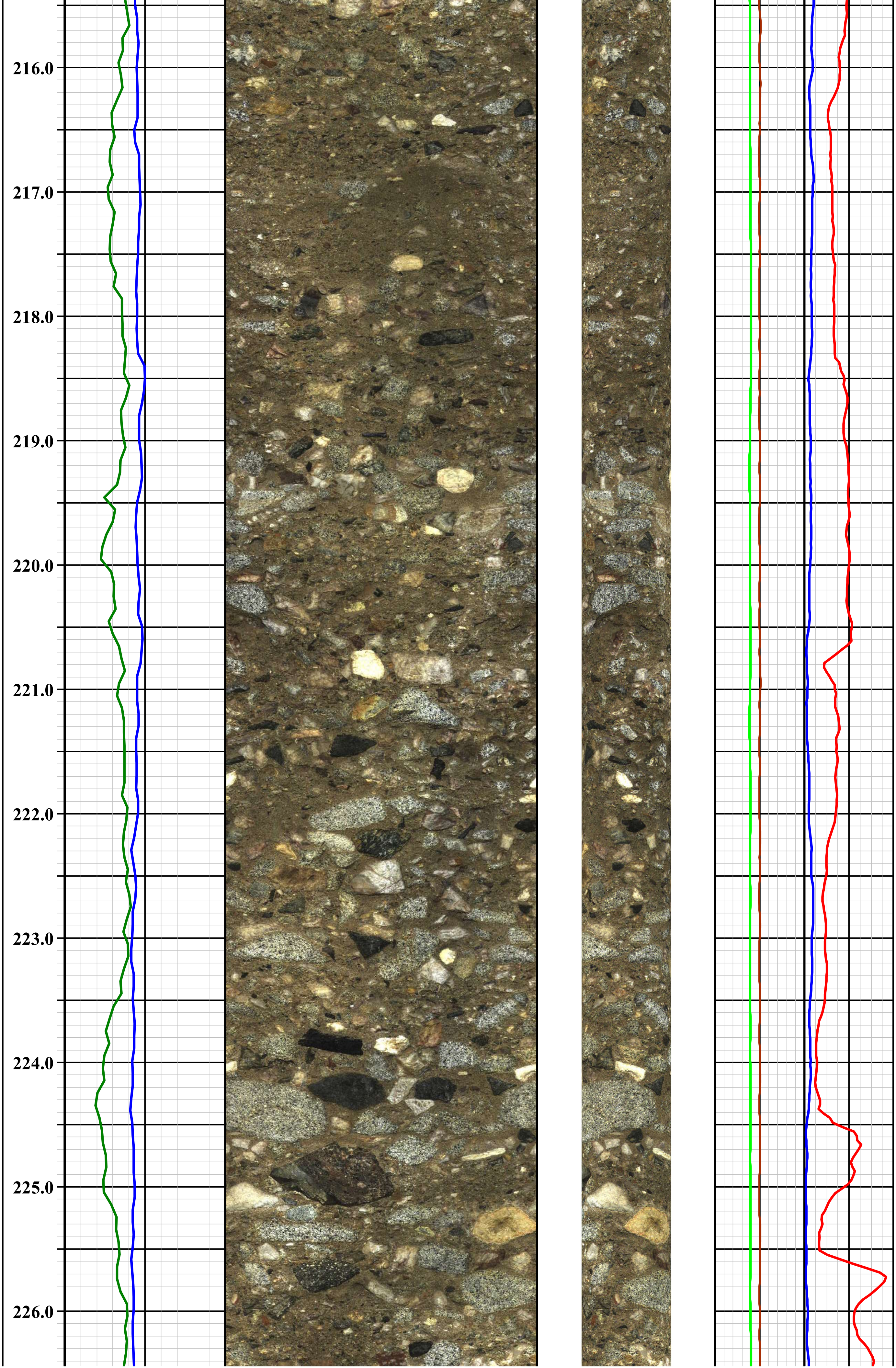

172.0
173.0
174.0
175.0
176.0
177.0
178.0
179.0
180.0
181.0
182.0

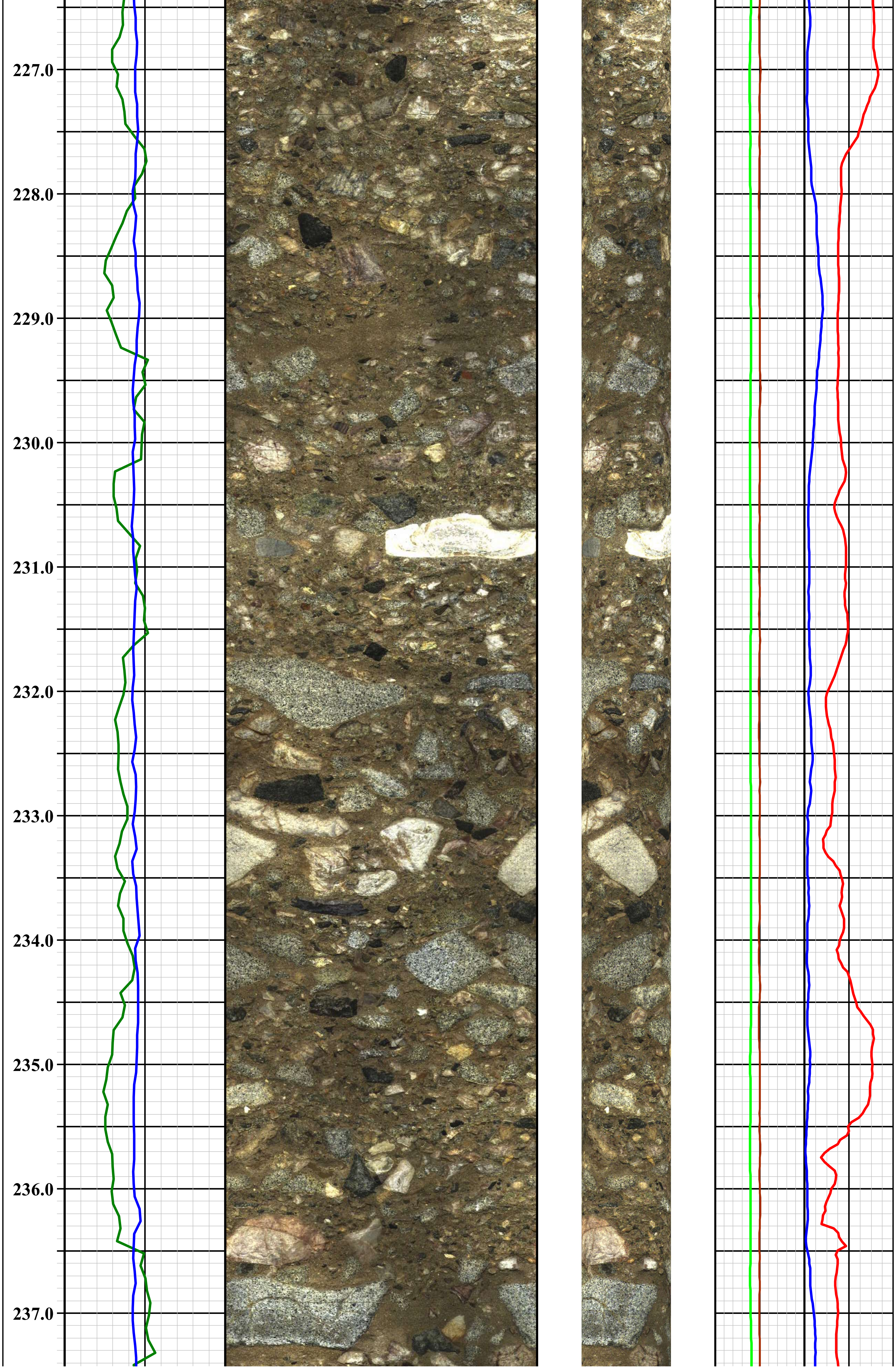

183.0
184.0
185.0
186.0
187.0
188.0
189.0
190.0
191.0
192.0
193.0

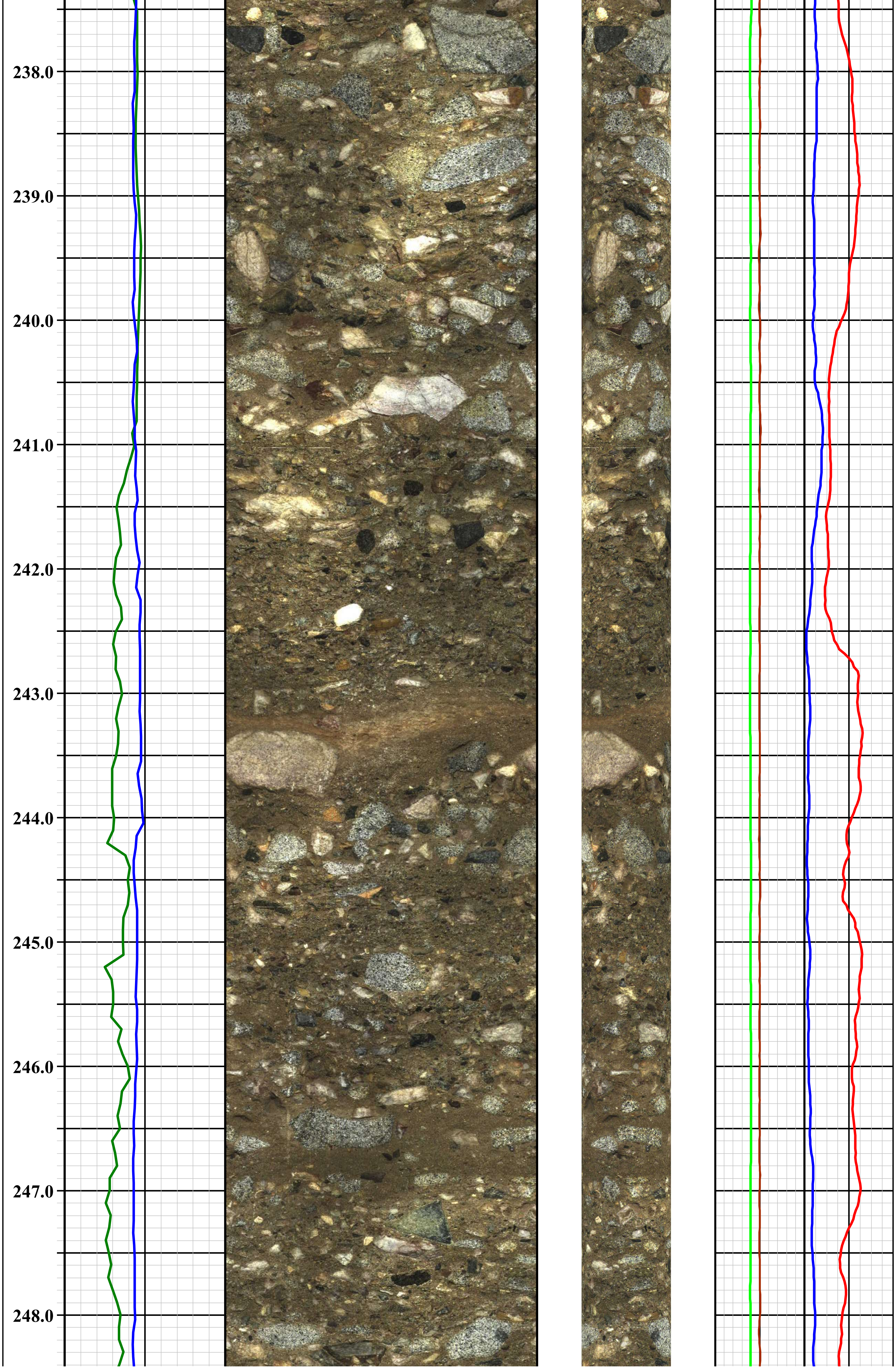


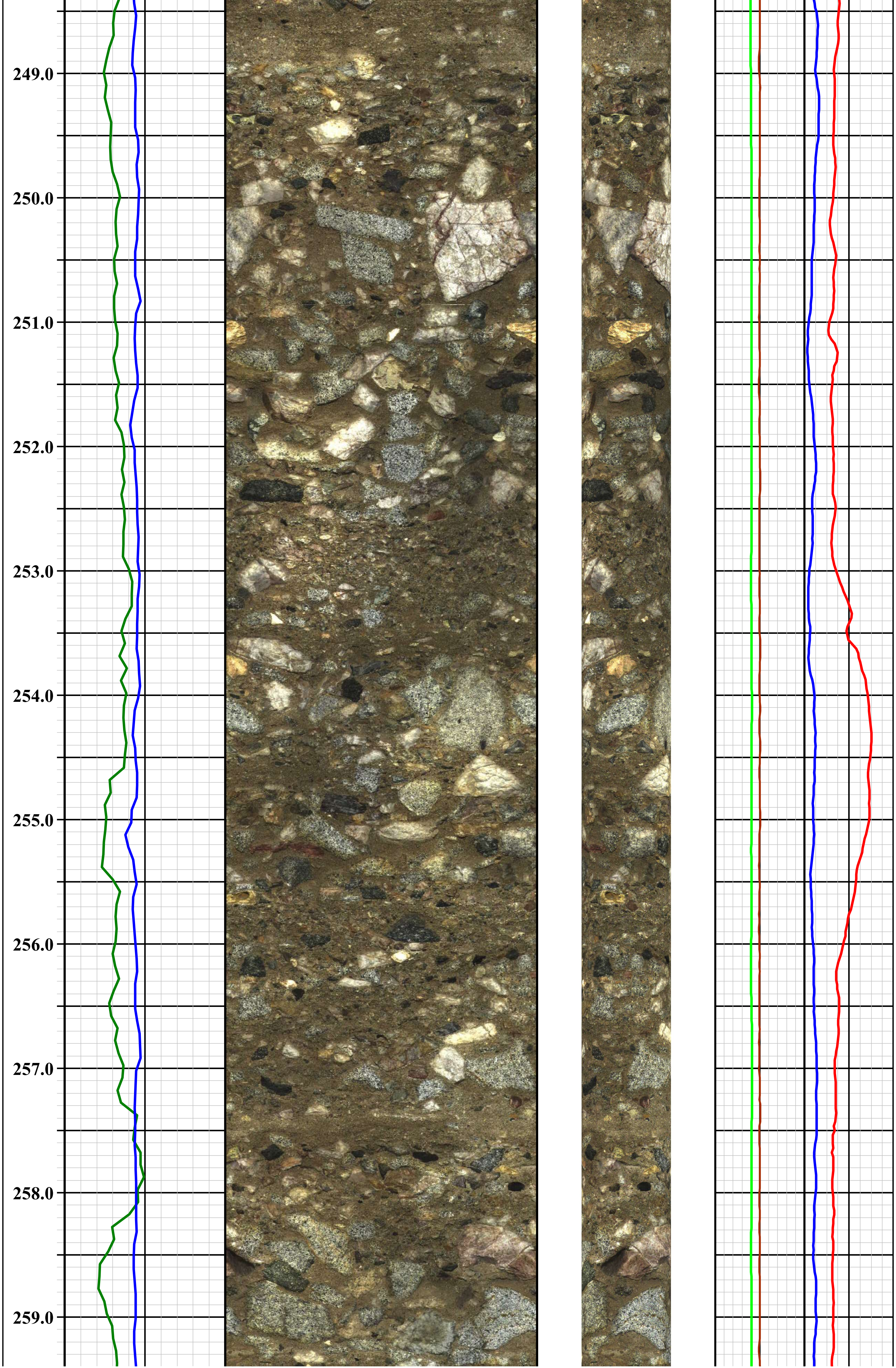
194.0
195.0
196.0
197.0
198.0
199.0
200.0
201.0
202.0
203.0
204.0

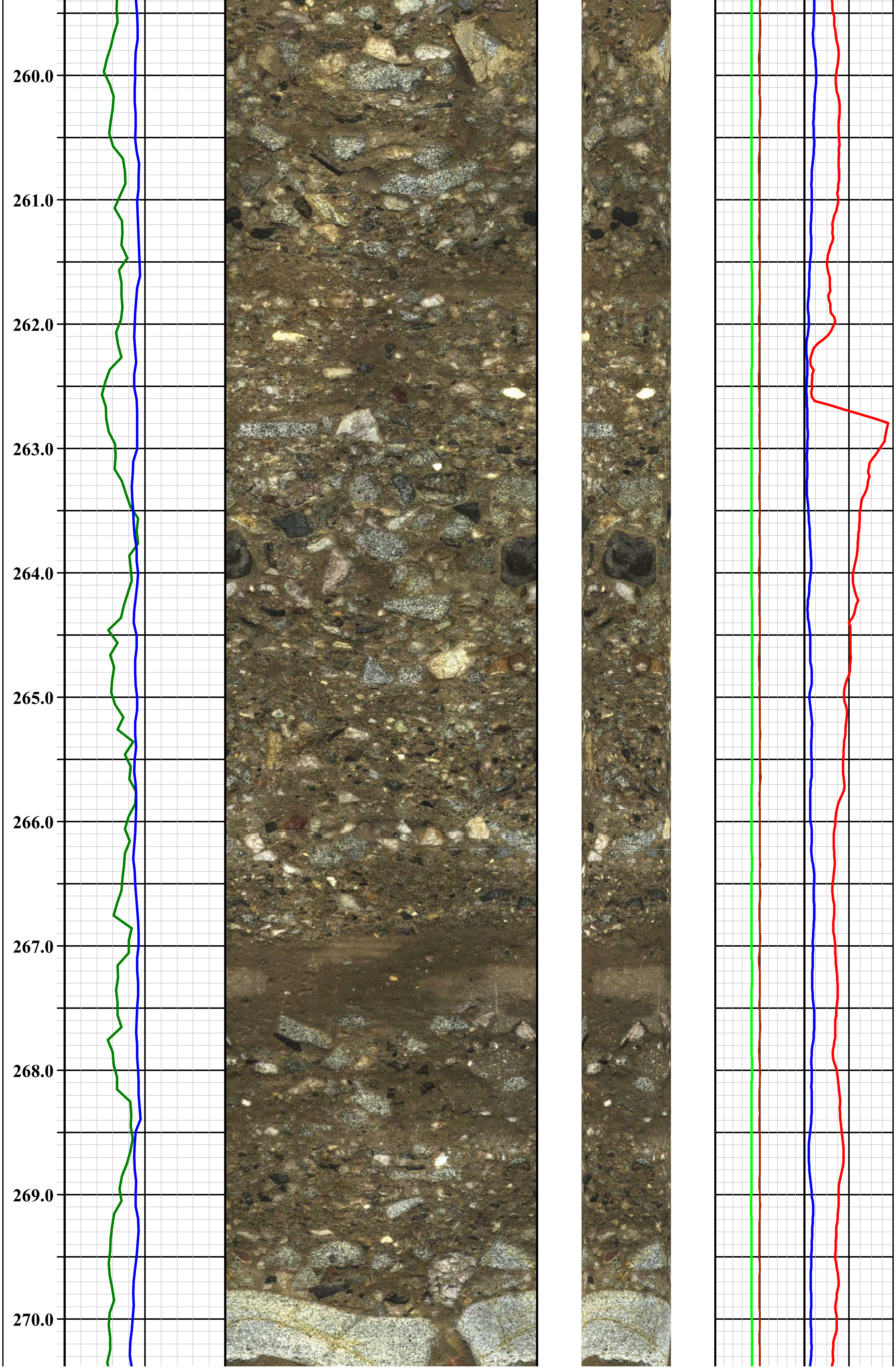

205.0
206.0
207.0
208.0
209.0
210.0
211.0
212.0
213.0
214.0
215.0

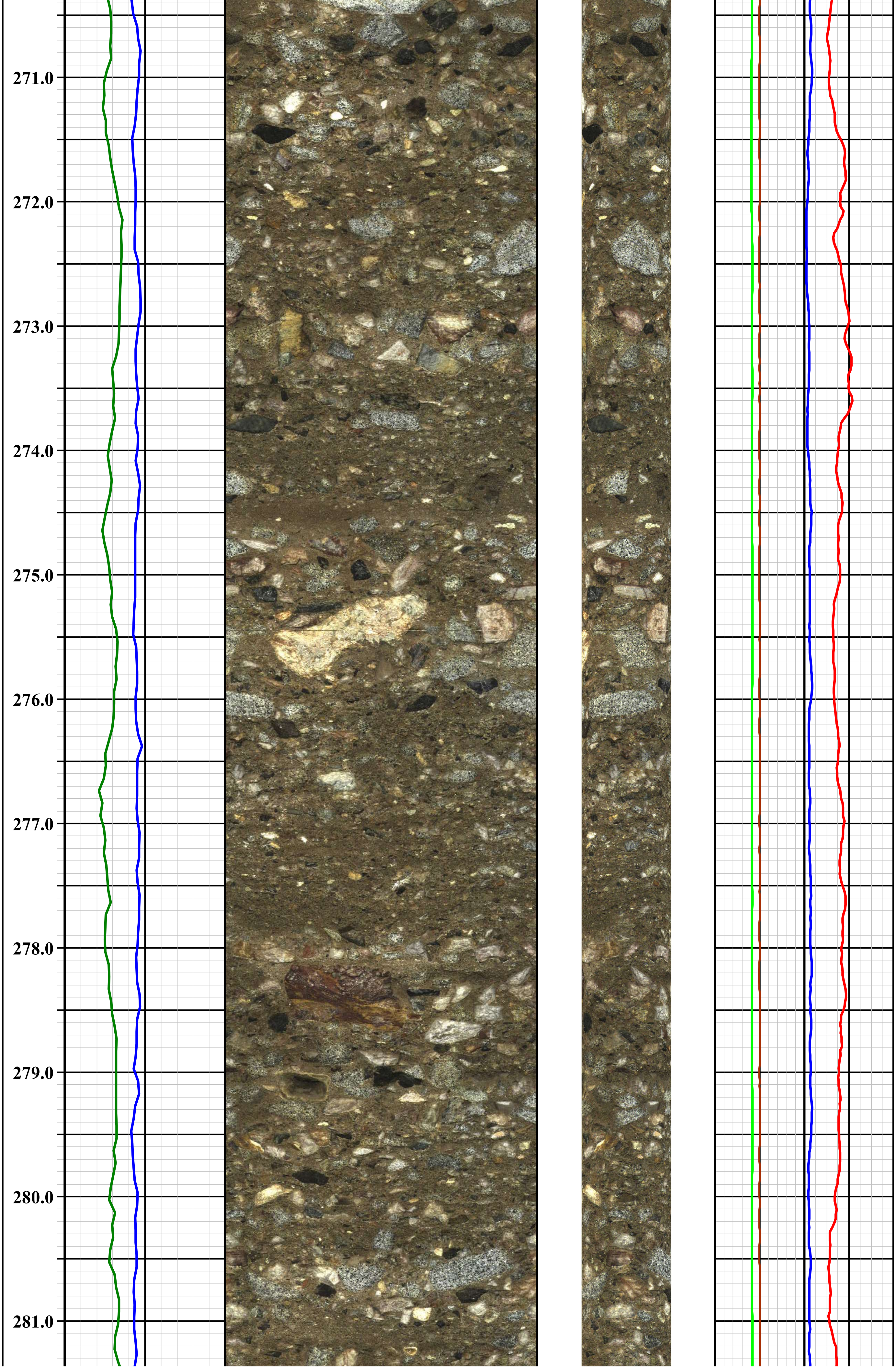

216.0
217.0
218.0
219.0
220.0
221.0
222.0
223.0
224.0
225.0
226.0

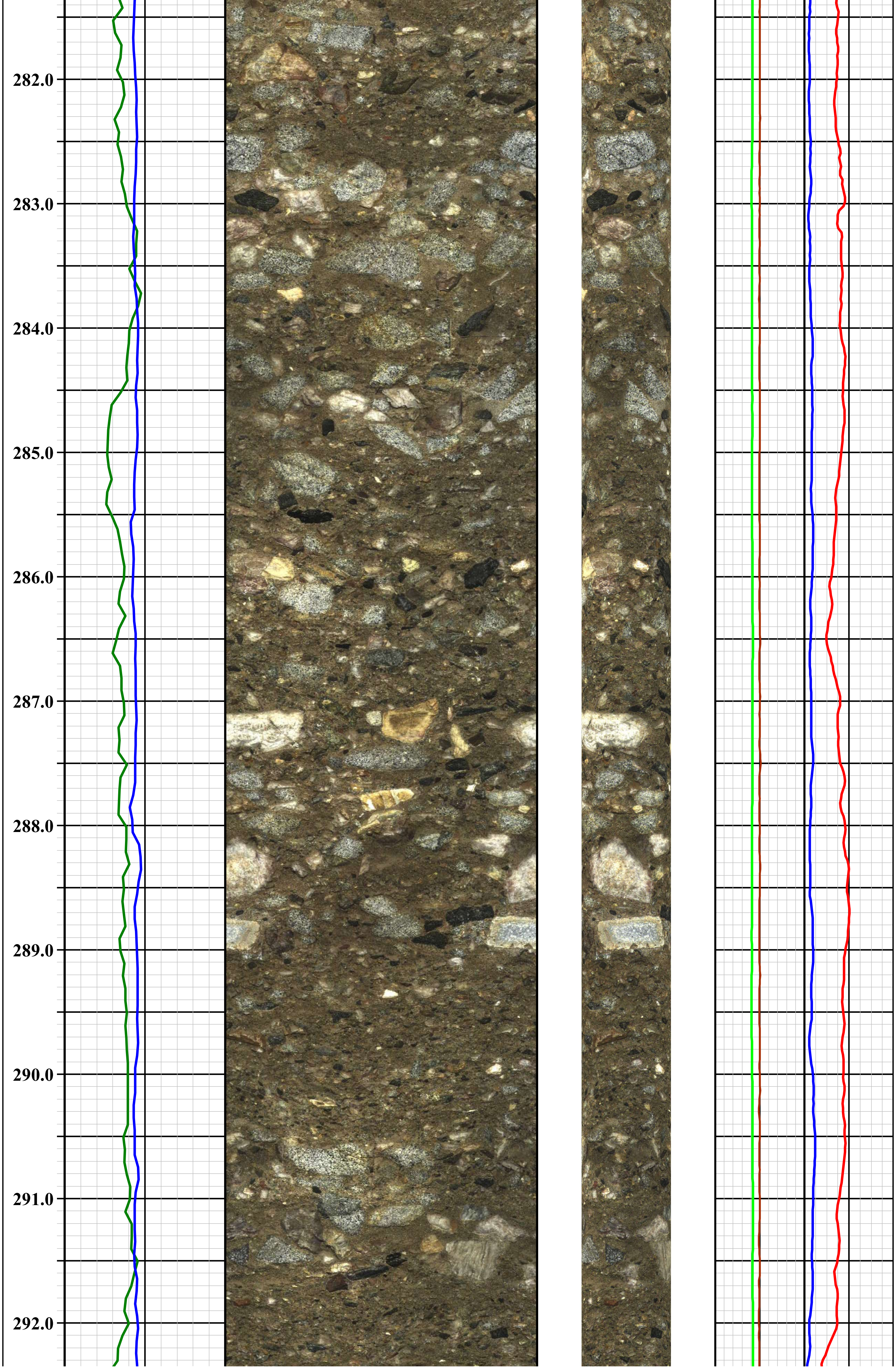

227.0
228.0
229.0
230.0
231.0
232.0
233.0
234.0
235.0
236.0
237.0

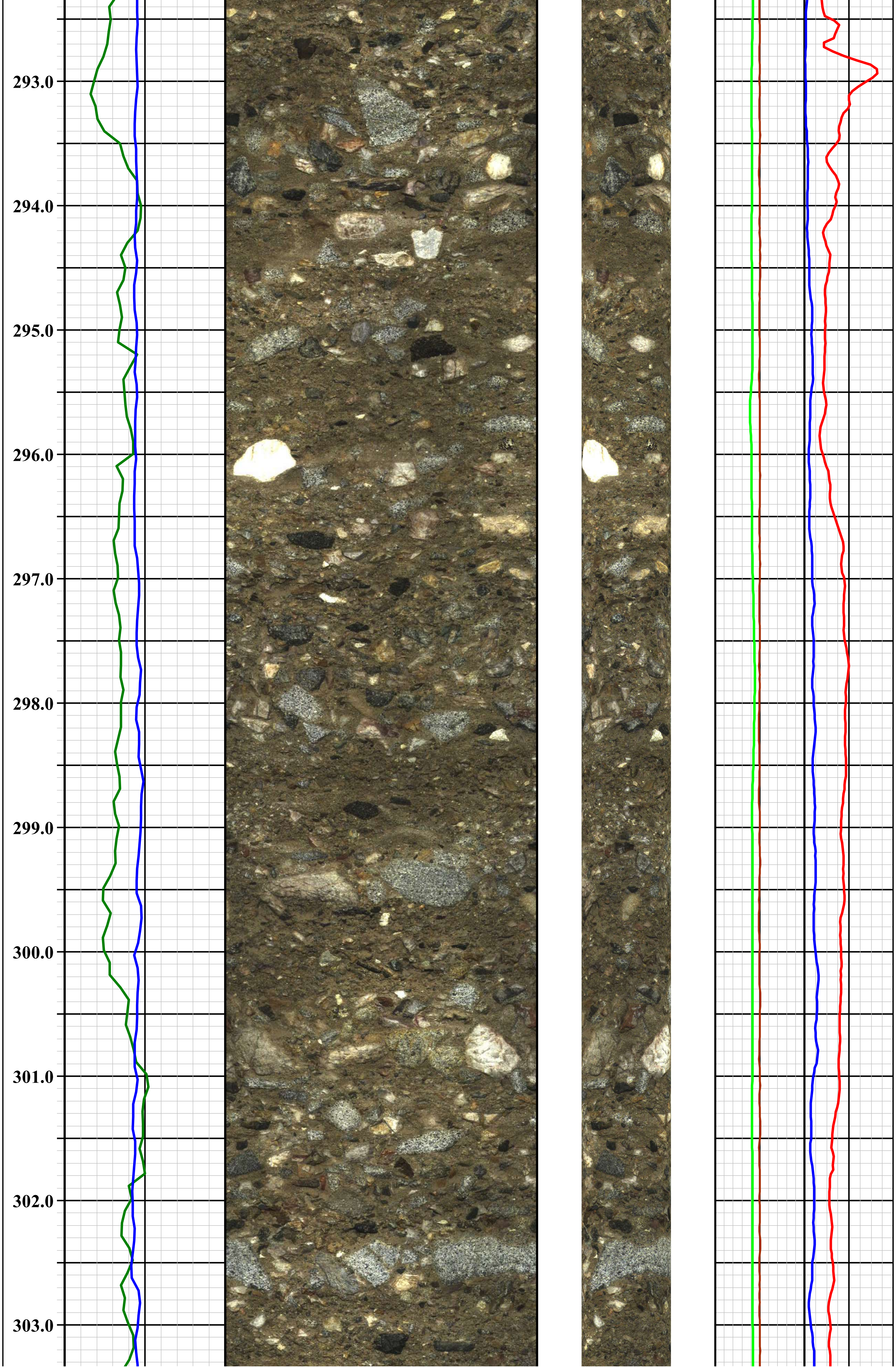

238.0
239.0
240.0
241.0
242.0
243.0
244.0
245.0
246.0
247.0
248.0

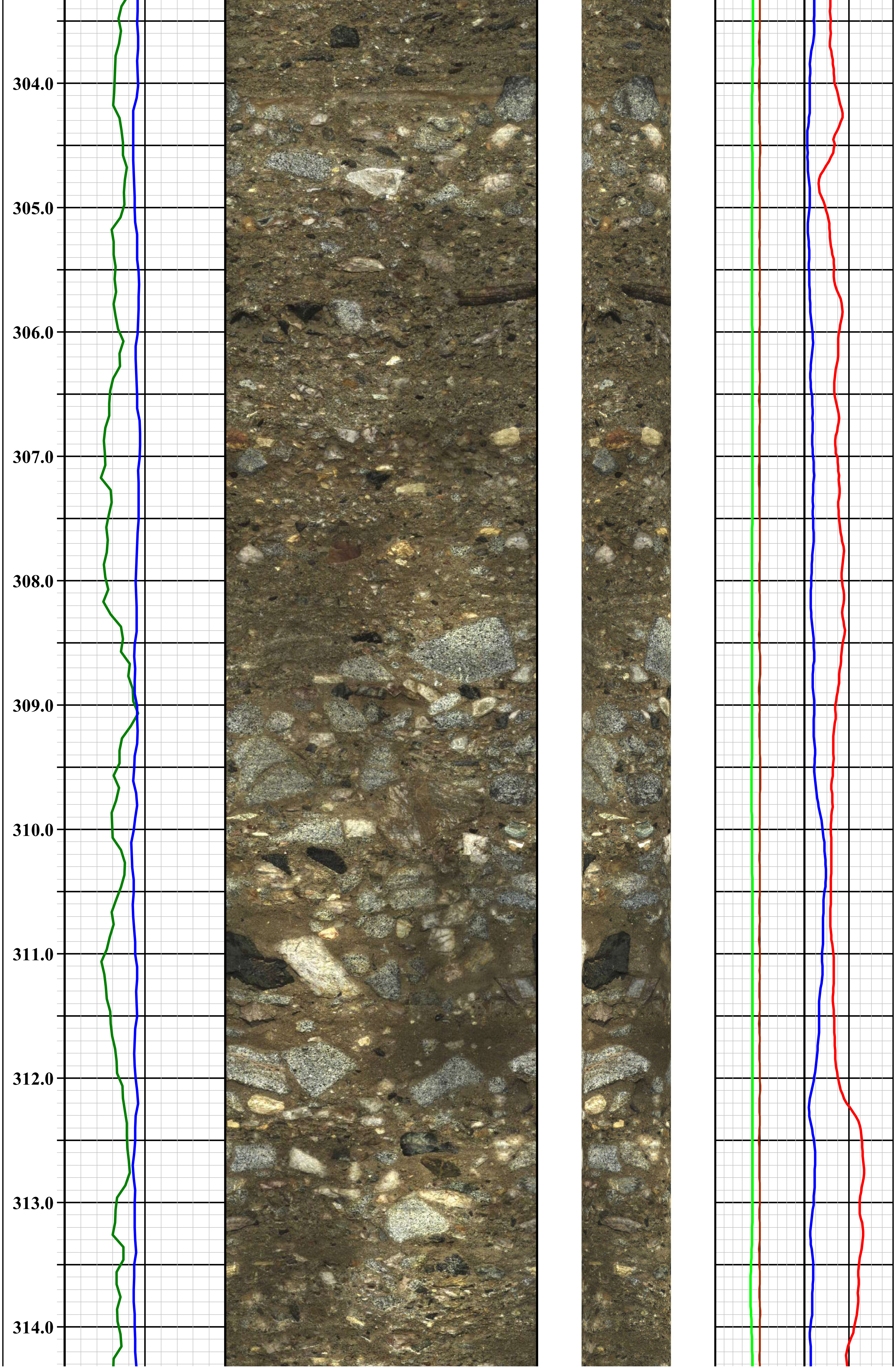

249.0
250.0
251.0
252.0
253.0
254.0
255.0
256.0
257.0
258.0
259.0

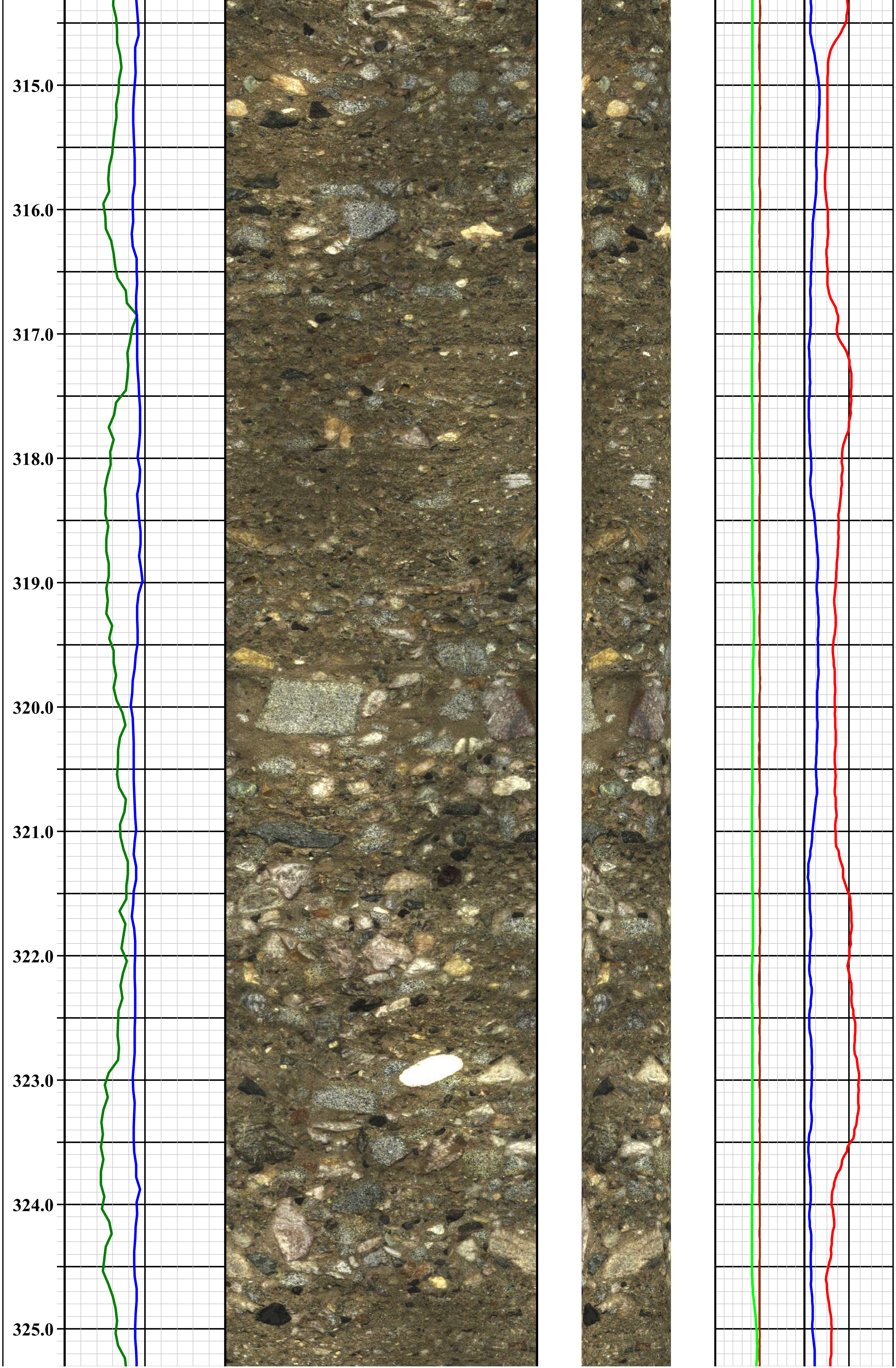

260.0
261.0
262.0
263.0
264.0
265.0
266.0
267.0
268.0
269.0
270.0

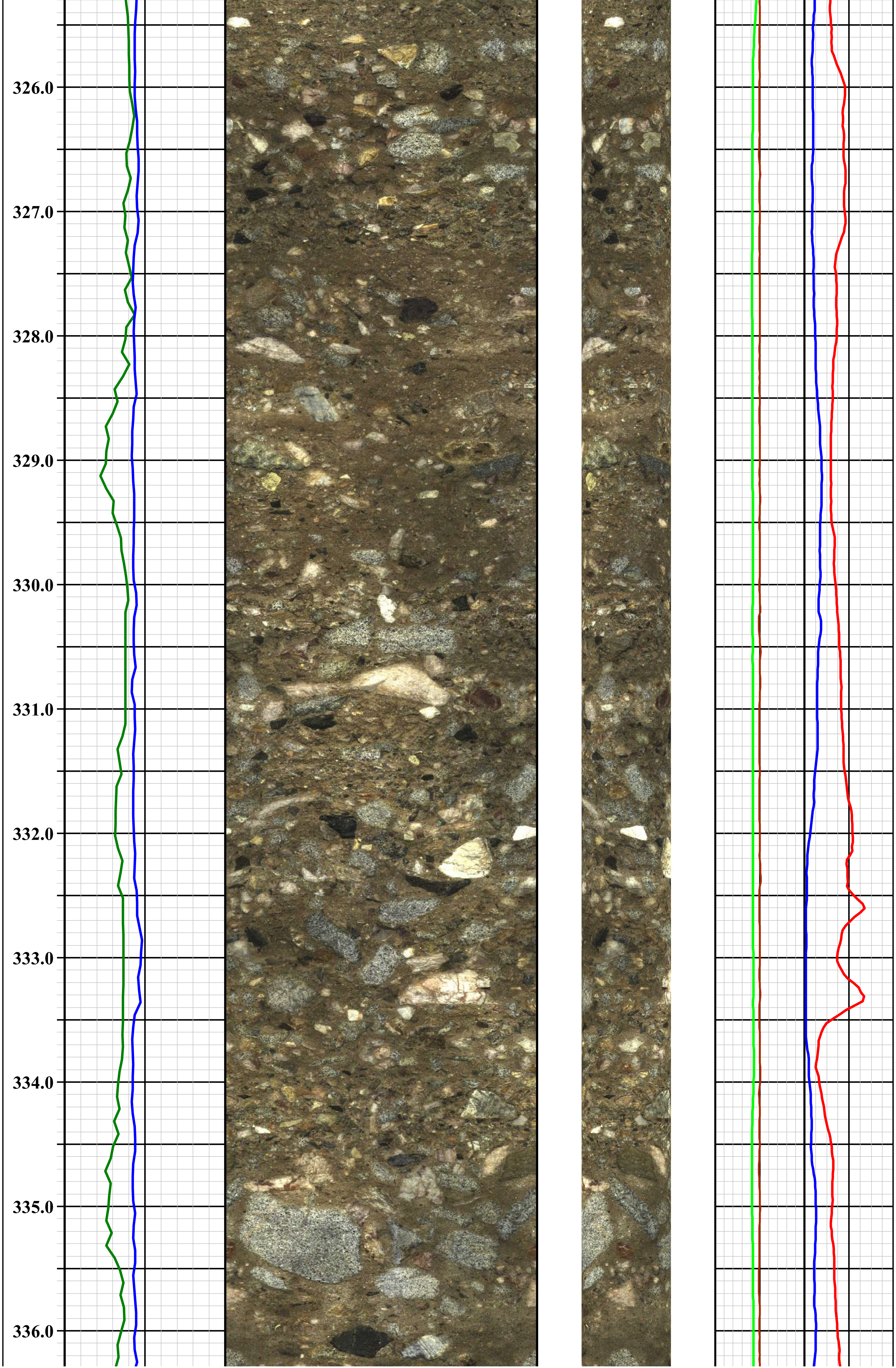

271.0
272.0
273.0
274.0
275.0
276.0
277.0
278.0
279.0
280.0
281.0

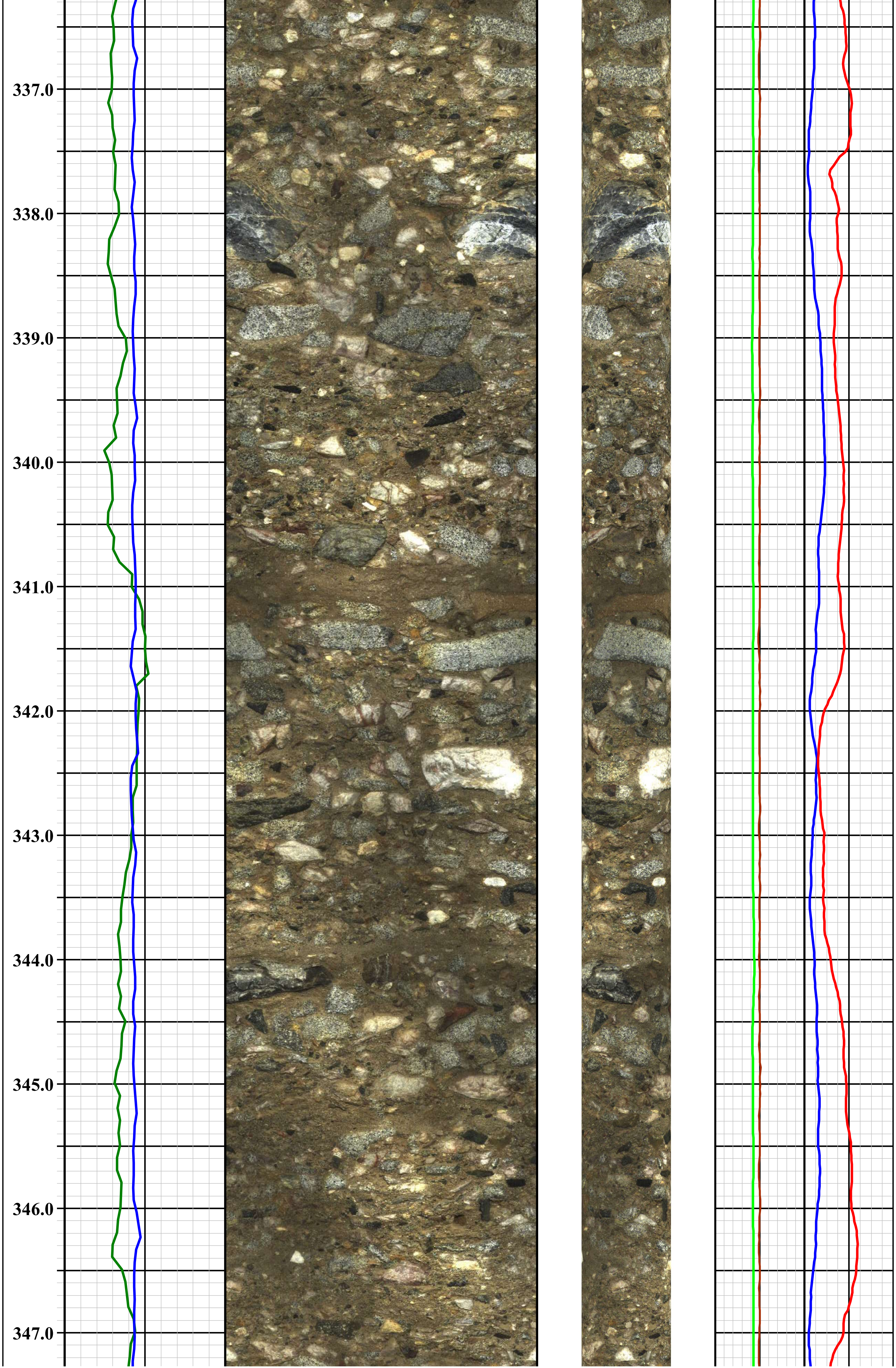

282.0
283.0
284.0
285.0
286.0
287.0
288.0
289.0
290.0
291.0
292.0

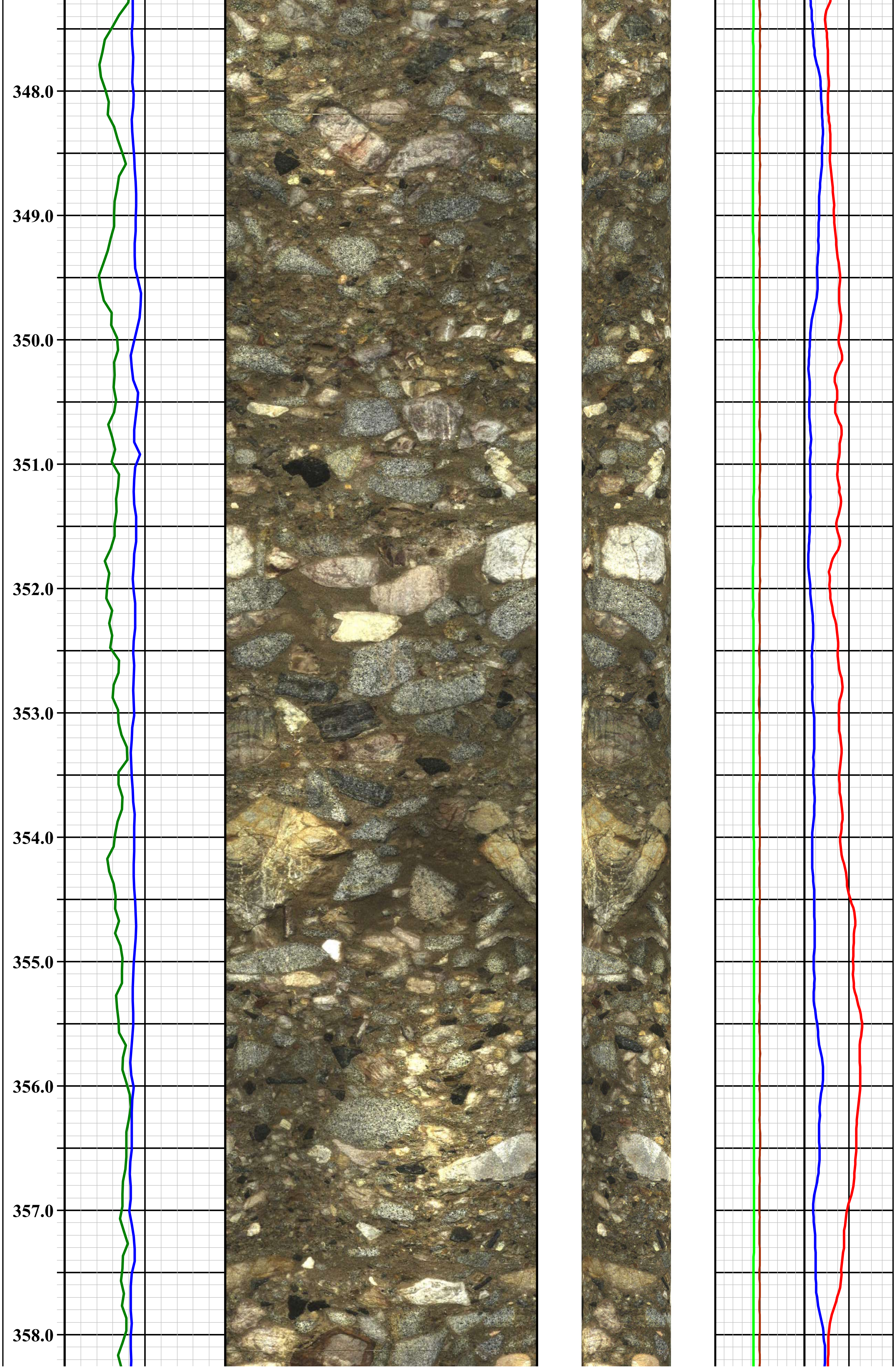

293.0
294.0
295.0
296.0
297.0
298.0
299.0
300.0
301.0
302.0
303.0


304.0
305.0
306.0
307.0
308.0
309.0
310.0
311.0
312.0
313.0
314.0

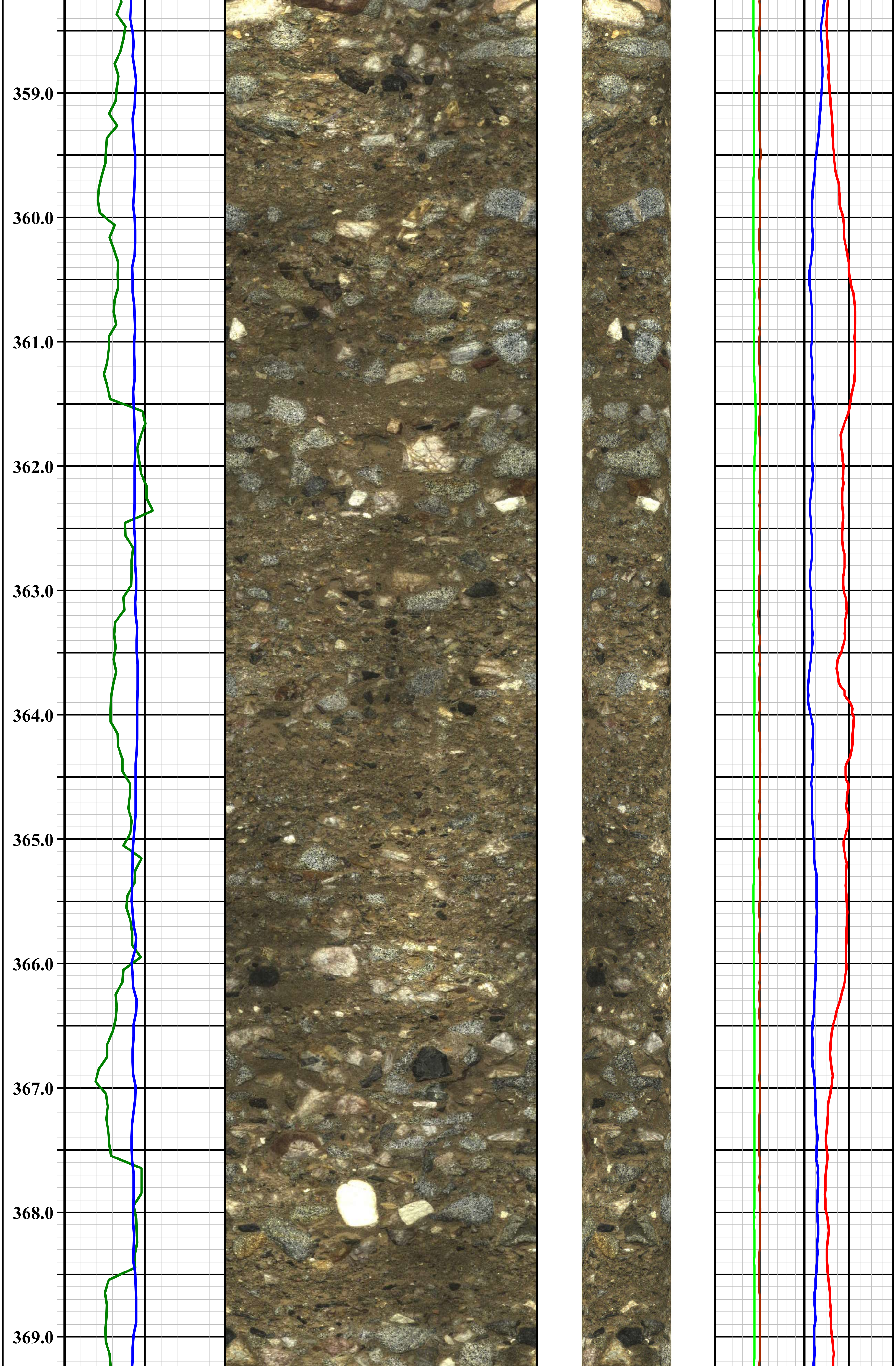

315.0
316.0
317.0
318.0
319.0
320.0
321.0
322.0
323.0
324.0
325.0

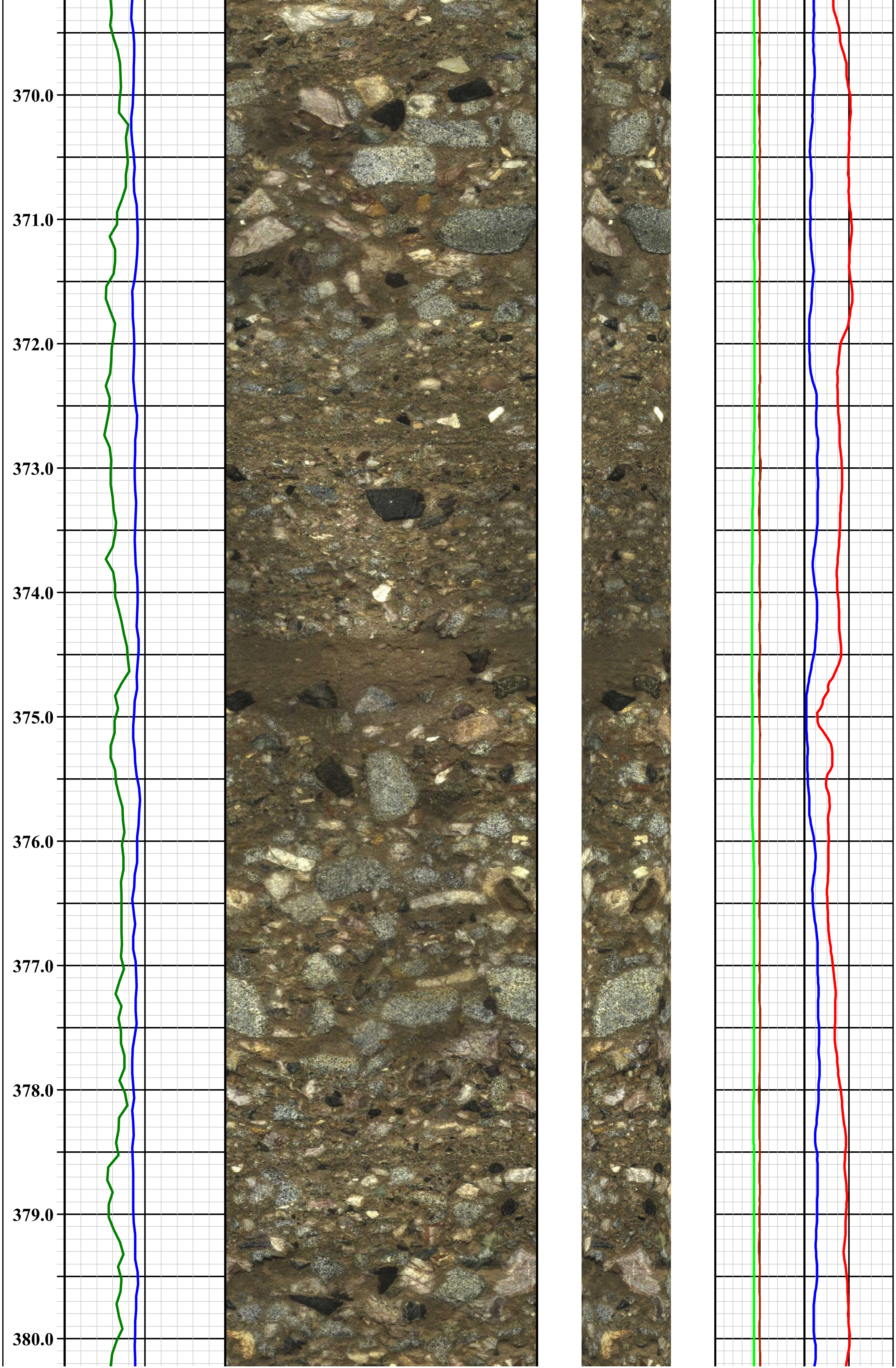

326.0
327.0
328.0
329.0
330.0
331.0
332.0
333.0
334.0
335.0
336.0

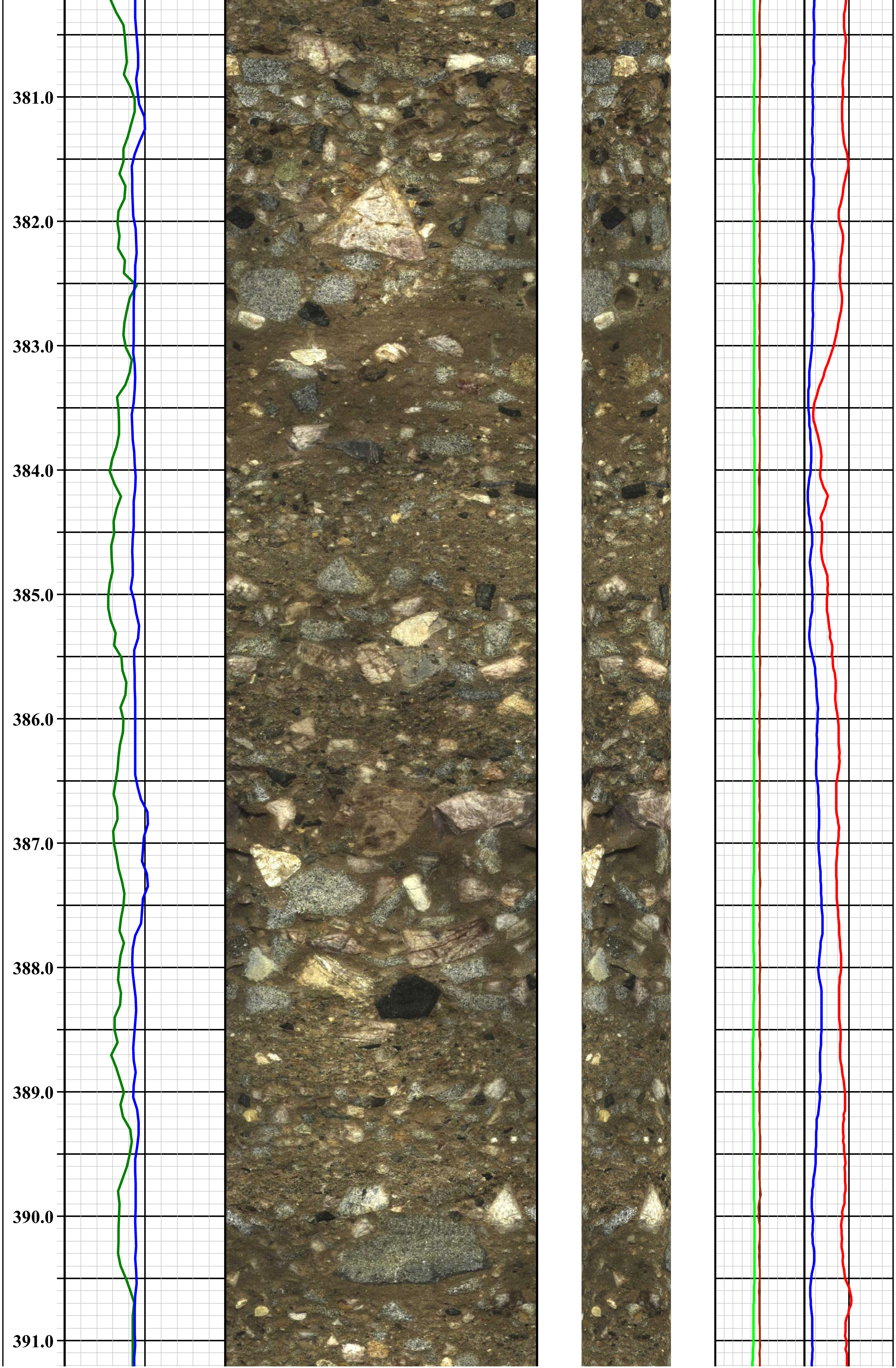

337.0
338.0
339.0
340.0
341.0
342.0
343.0
344.0
345.0
346.0
347.0

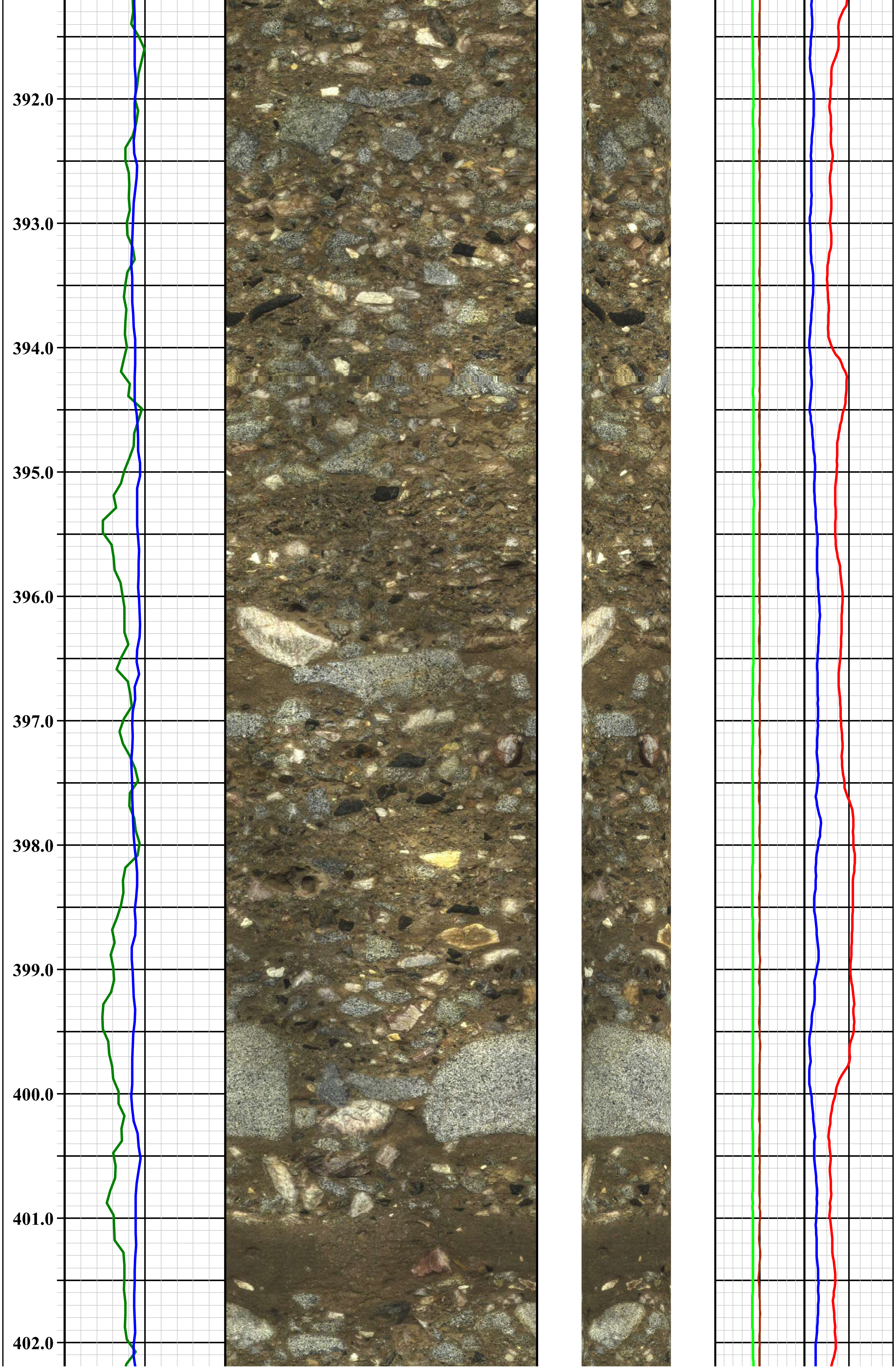


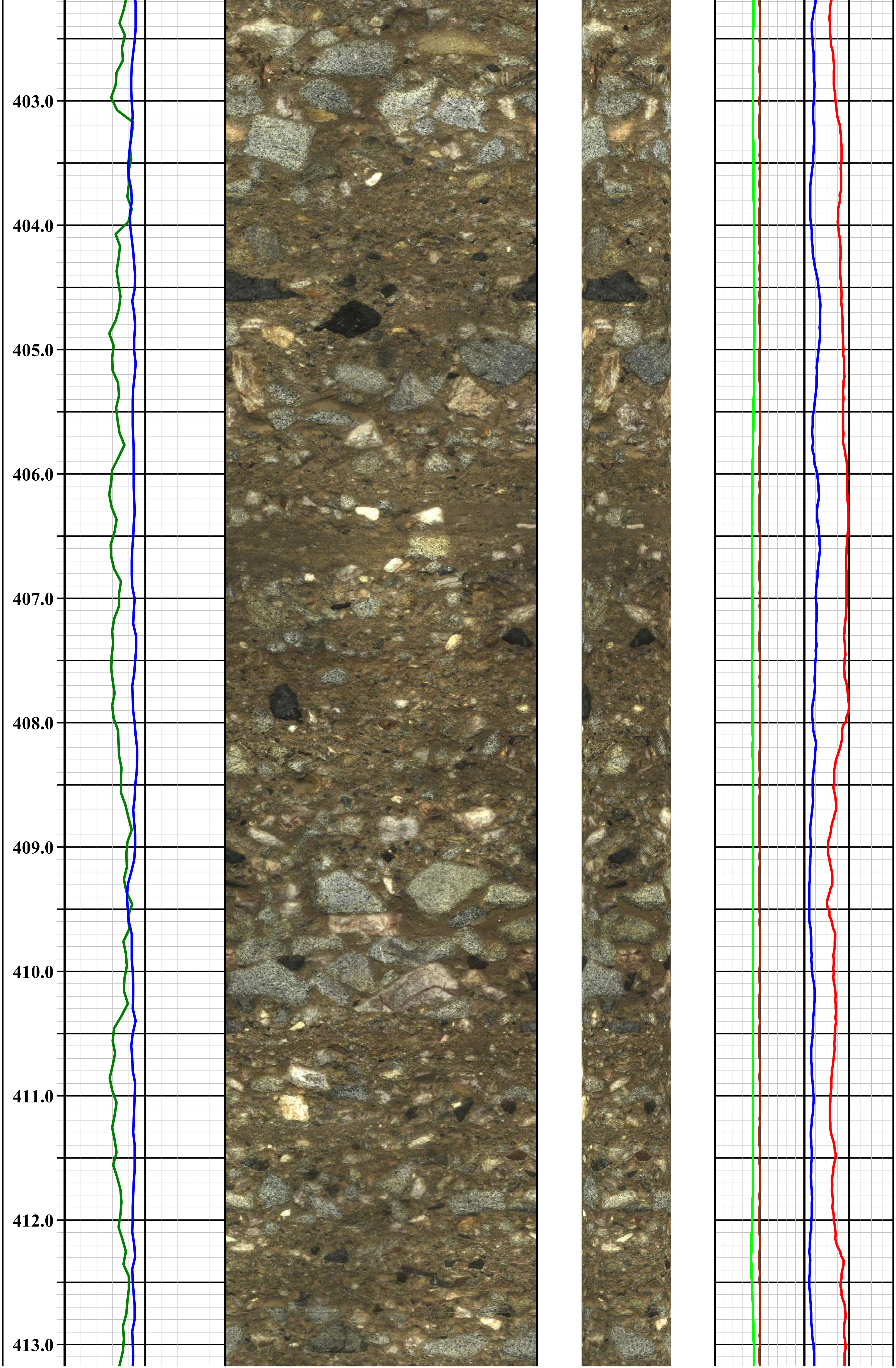
348.0
349.0
350.0
351.0
352.0
353.0
354.0
355.0
356.0
357.0
358.0

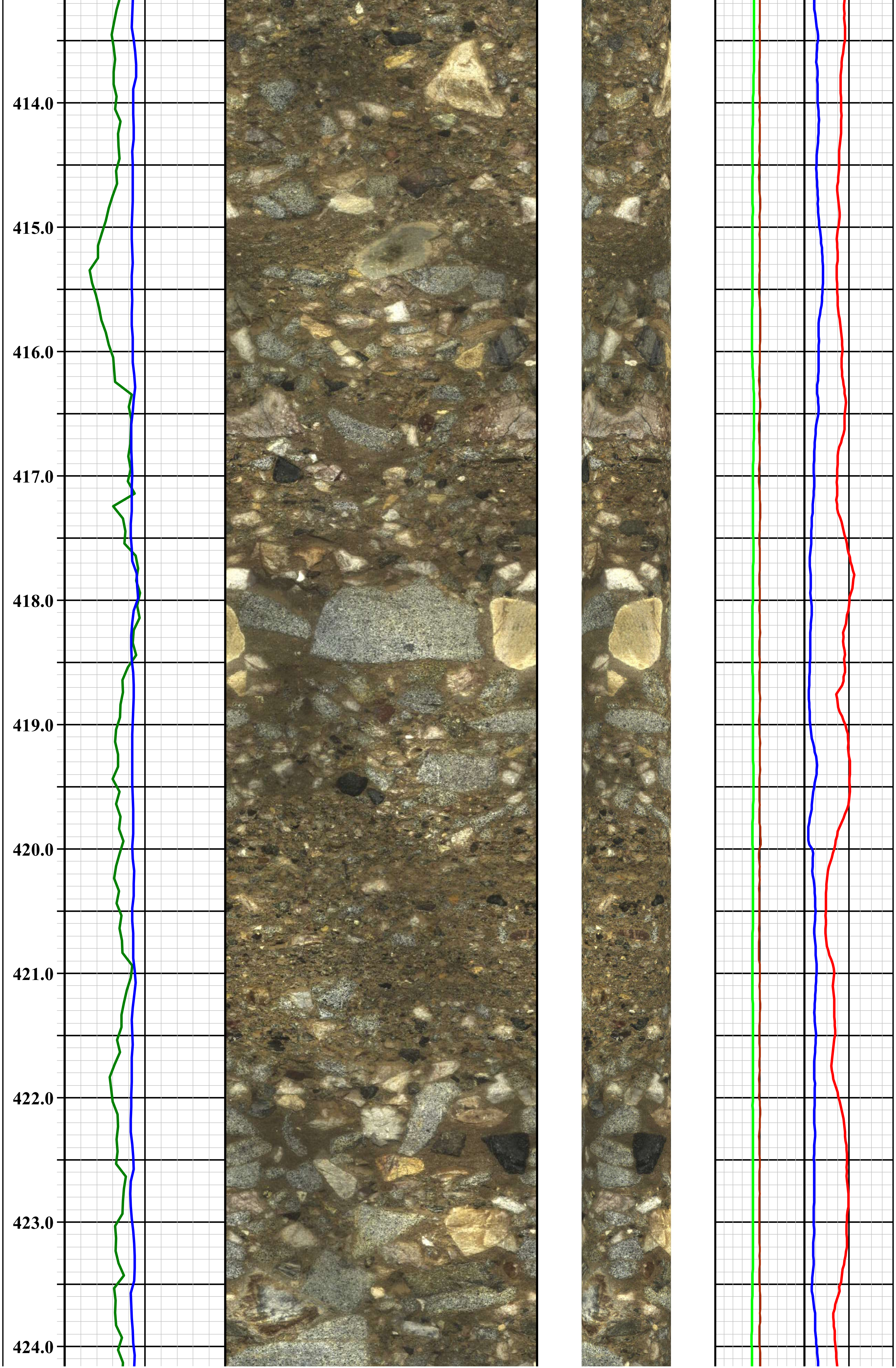

359.0
360.0
361.0
362.0
363.0
364.0
365.0
366.0
367.0
368.0
369.0

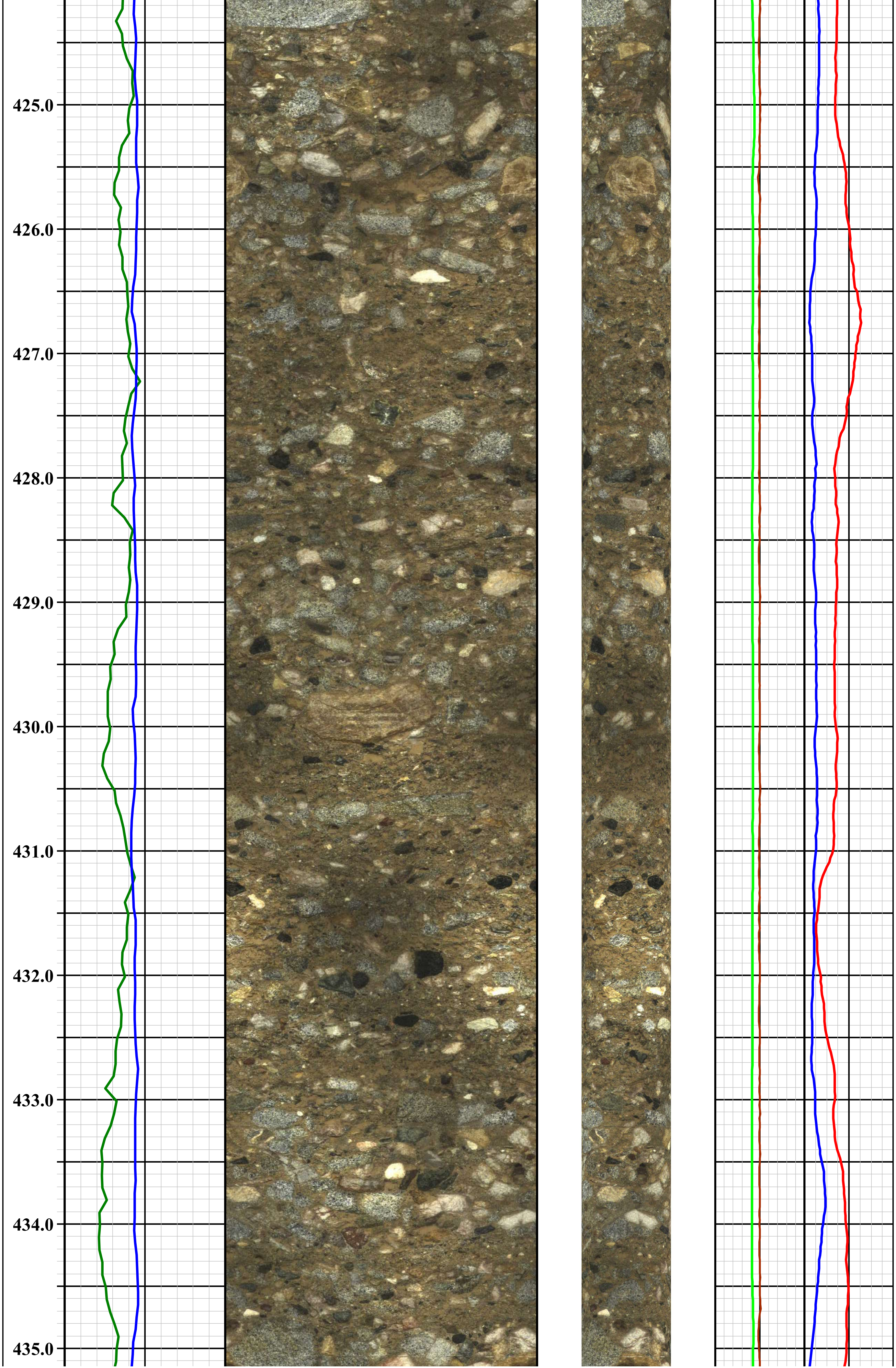

370.0
371.0
372.0
373.0
374.0
375.0
376.0
377.0
378.0
379.0
380.0

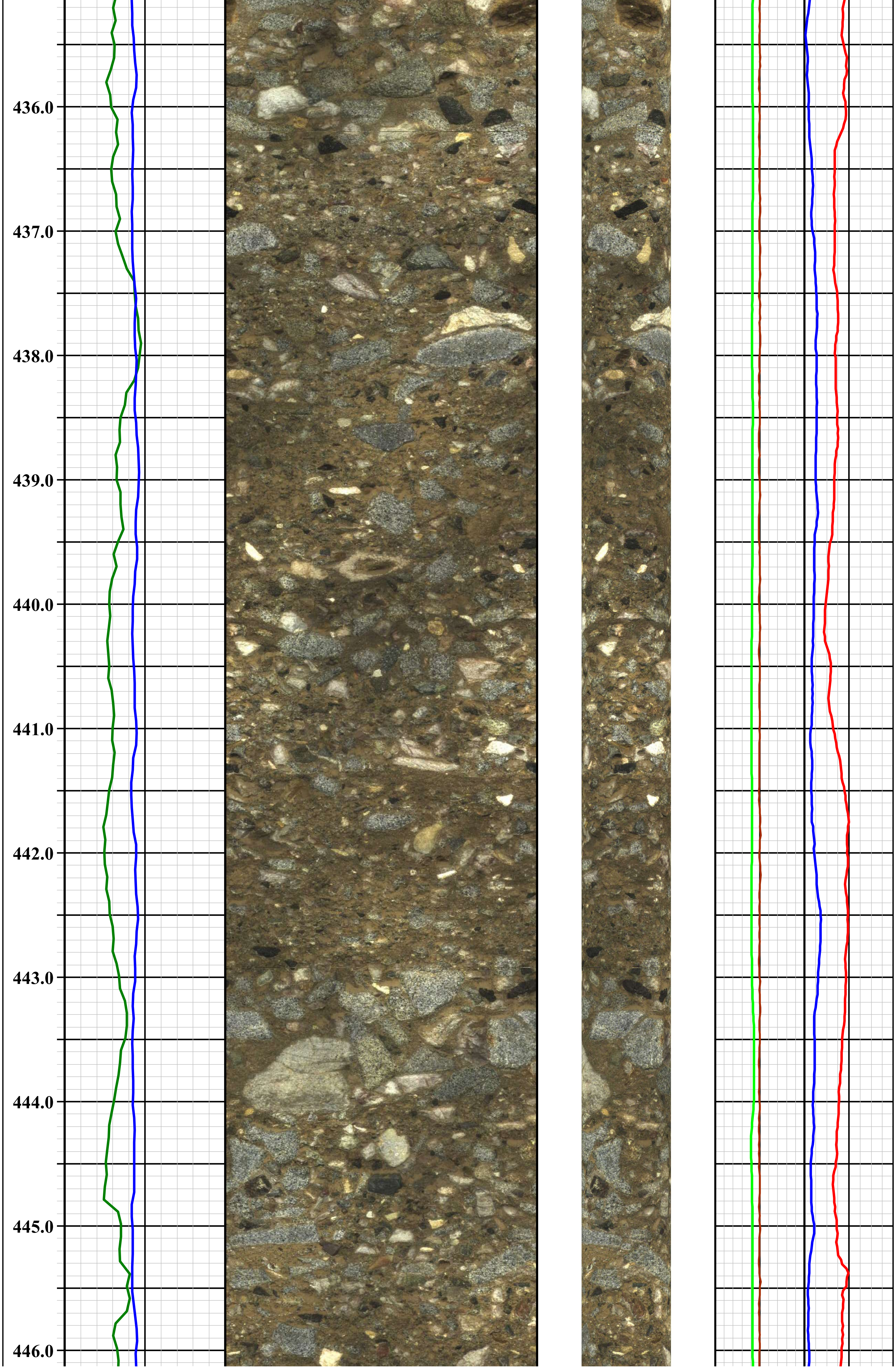

381.0
382.0
383.0
384.0
385.0
386.0
387.0
388.0
389.0
390.0
391.0

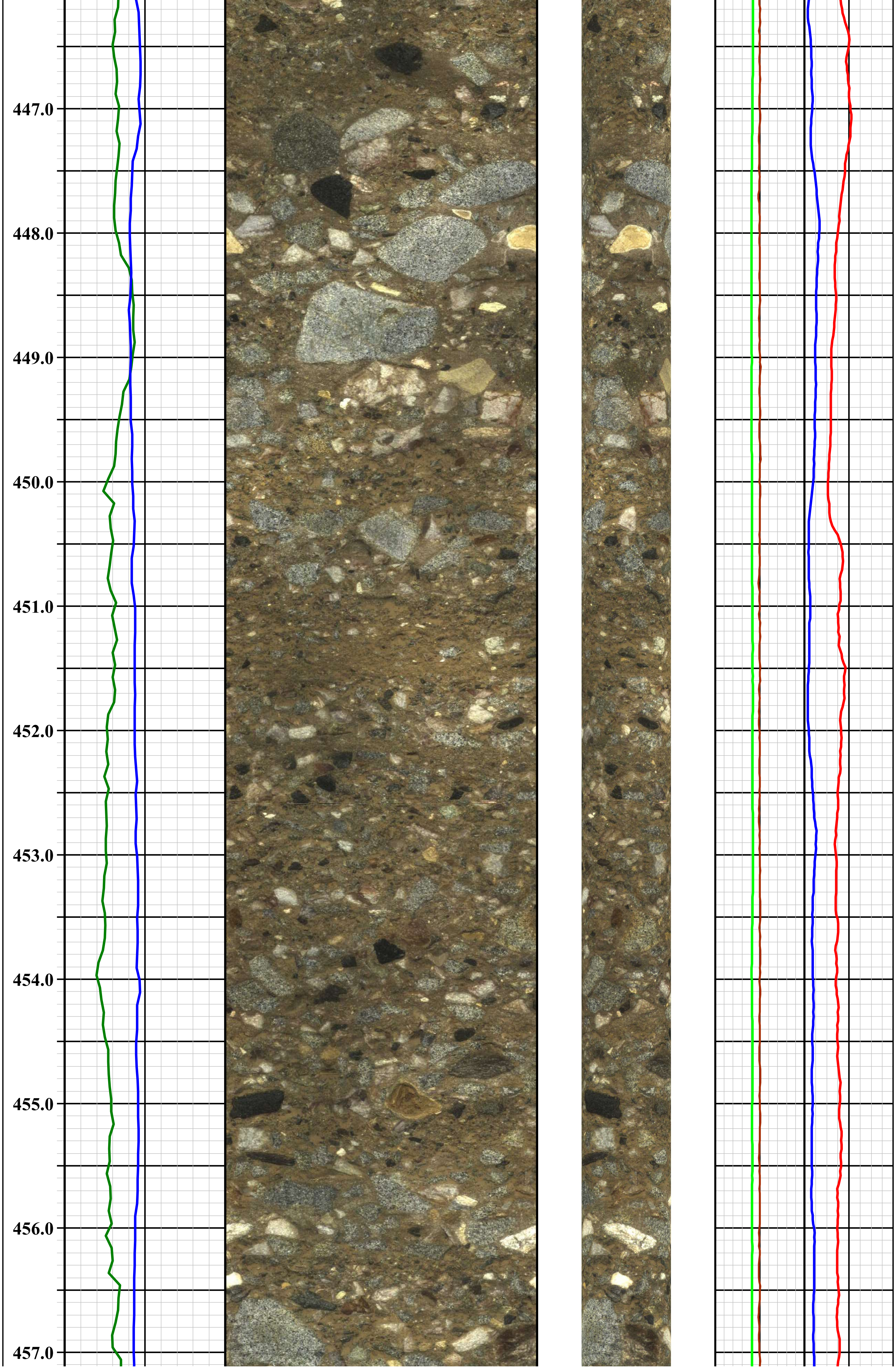

392.0
393.0
394.0
395.0
396.0
397.0
398.0
399.0
400.0
401.0
402.0

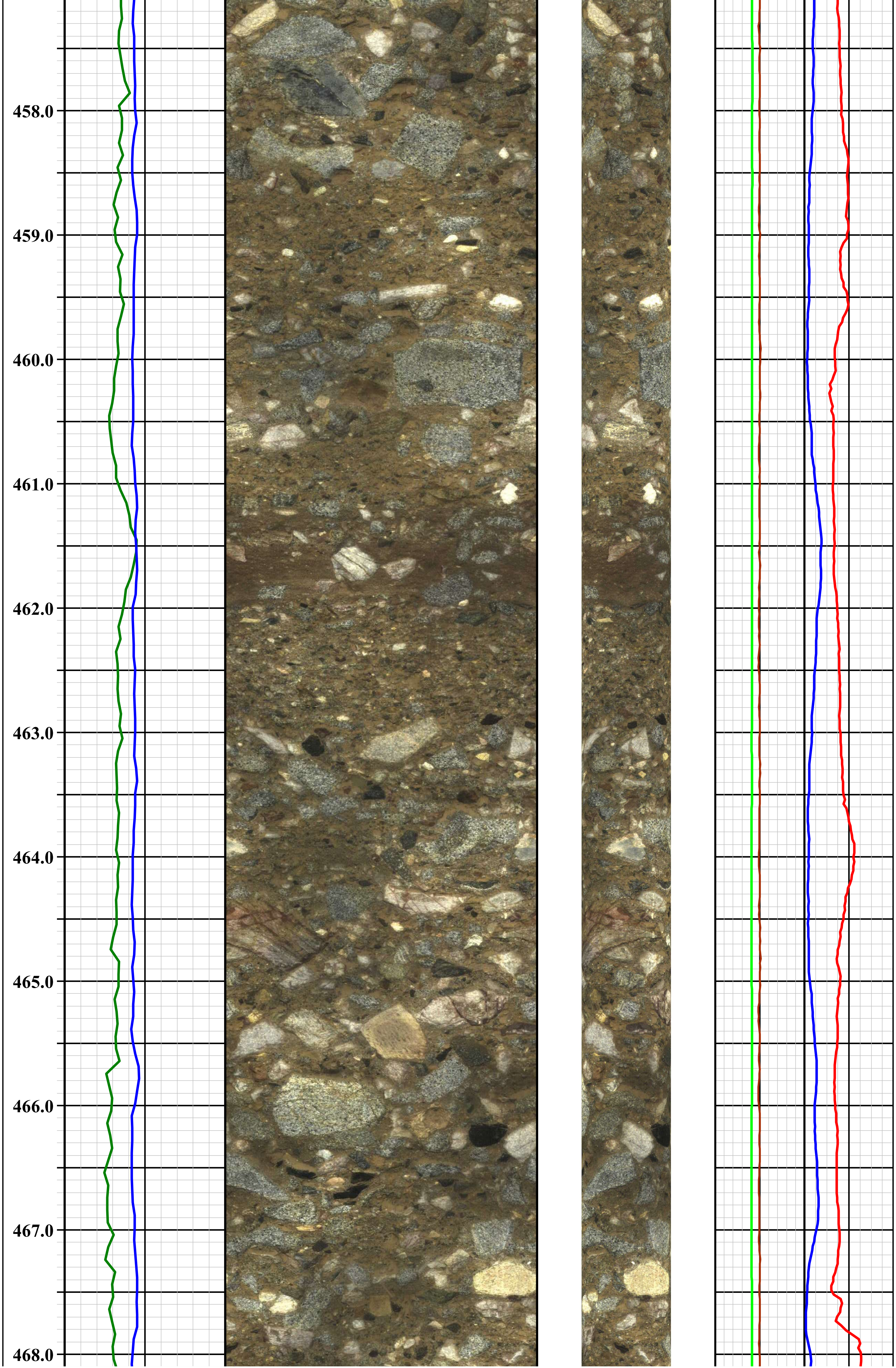

403.0
404.0
405.0
406.0
407.0
408.0
409.0
410.0
411.0
412.0
413.0

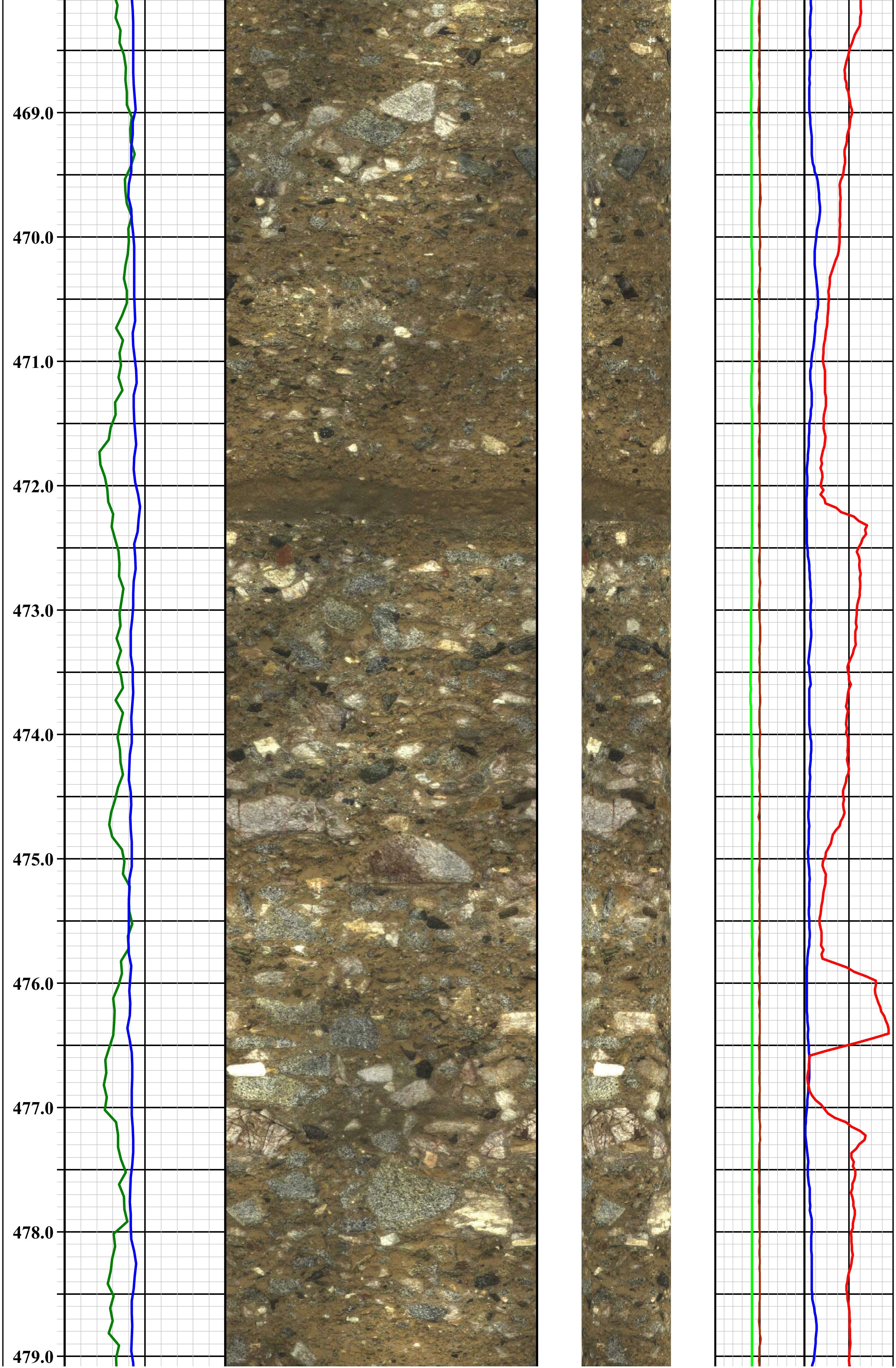

414.0
415.0
416.0
417.0
418.0
419.0
420.0
421.0
422.0
423.0
424.0

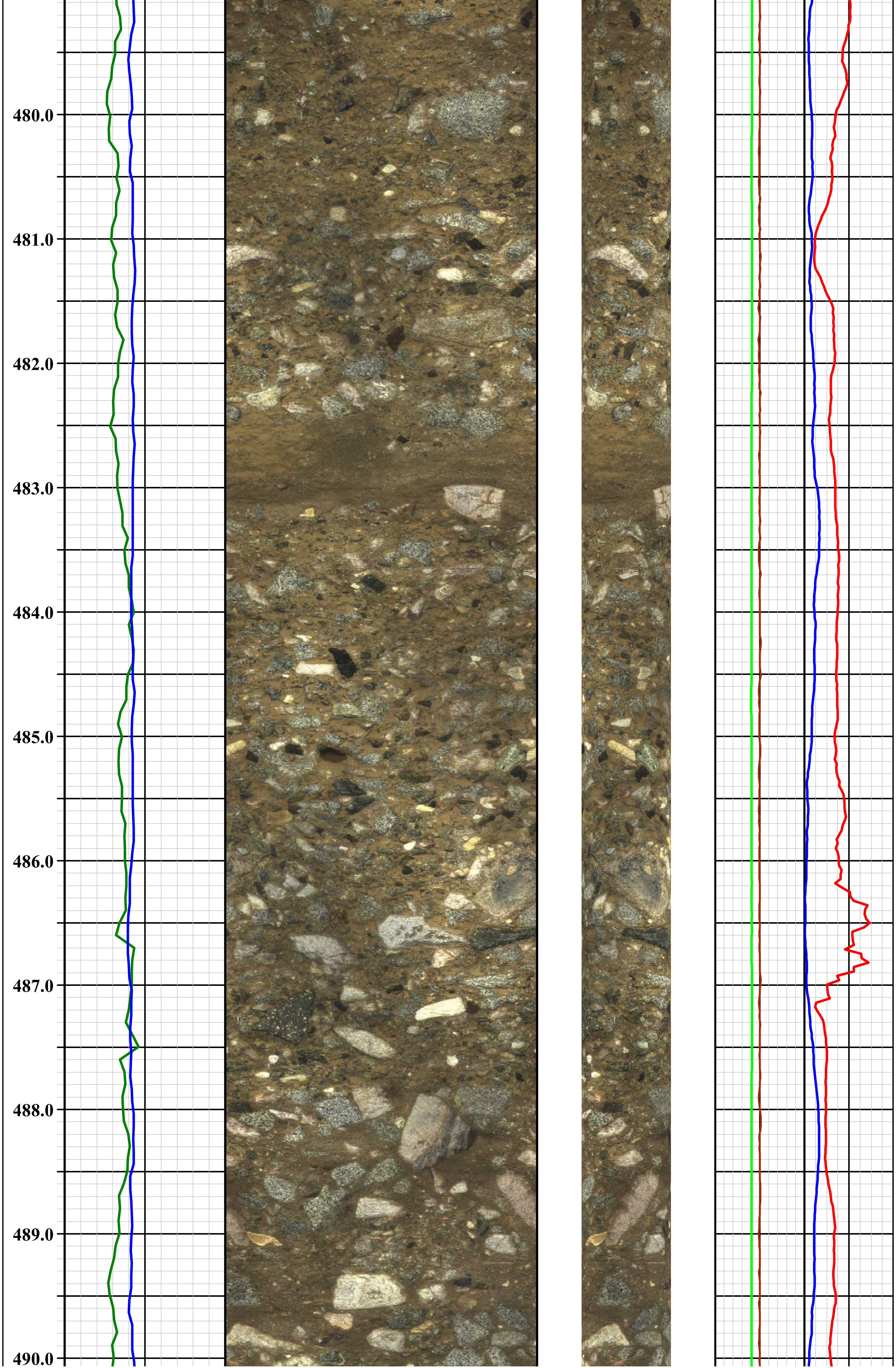

425.0
426.0
427.0
428.0
429.0
430.0
431.0
432.0
433.0
434.0
435.0

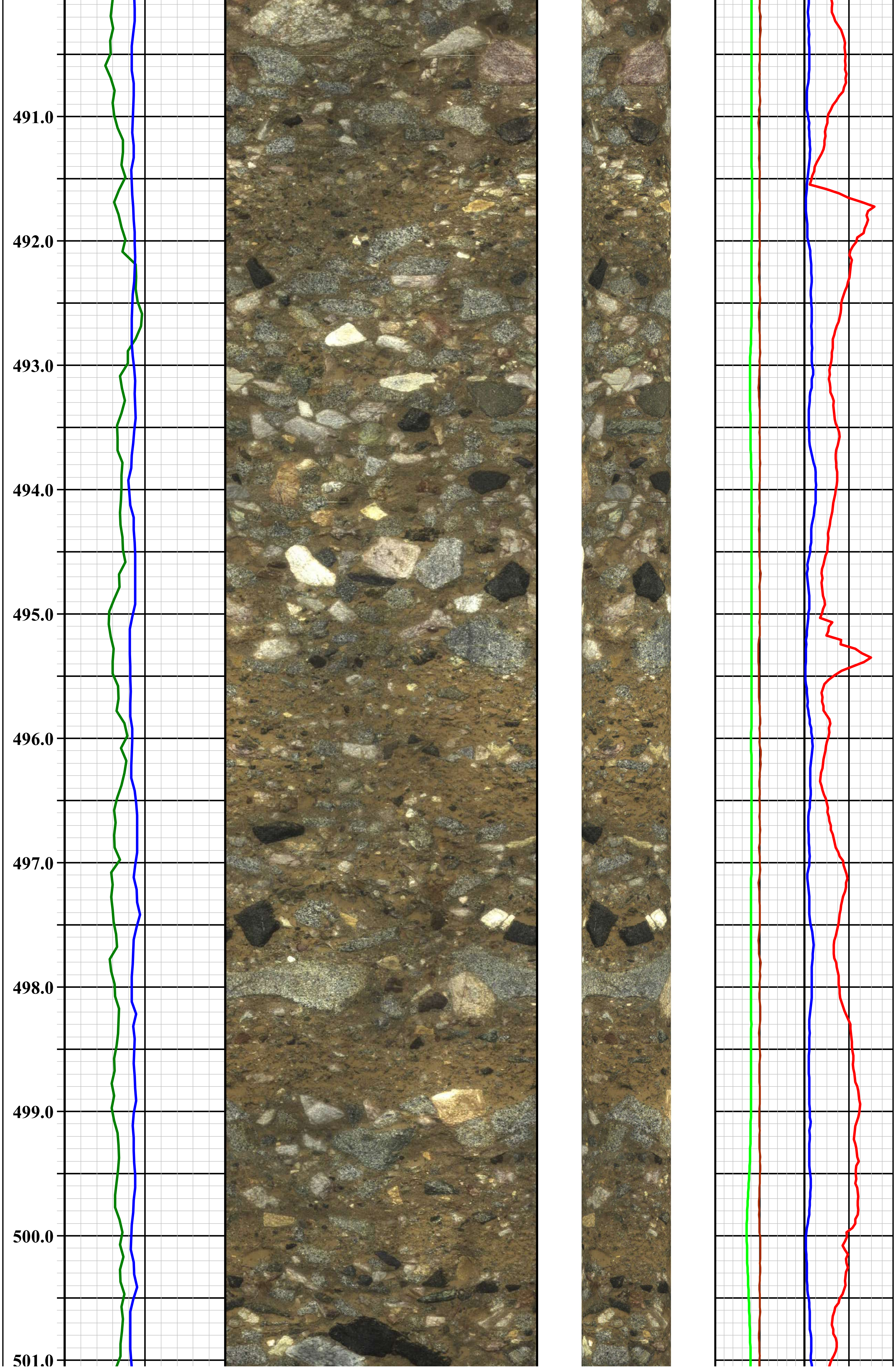

436.0
437.0
438.0
439.0
440.0
441.0
442.0
443.0
444.0
445.0
446.0

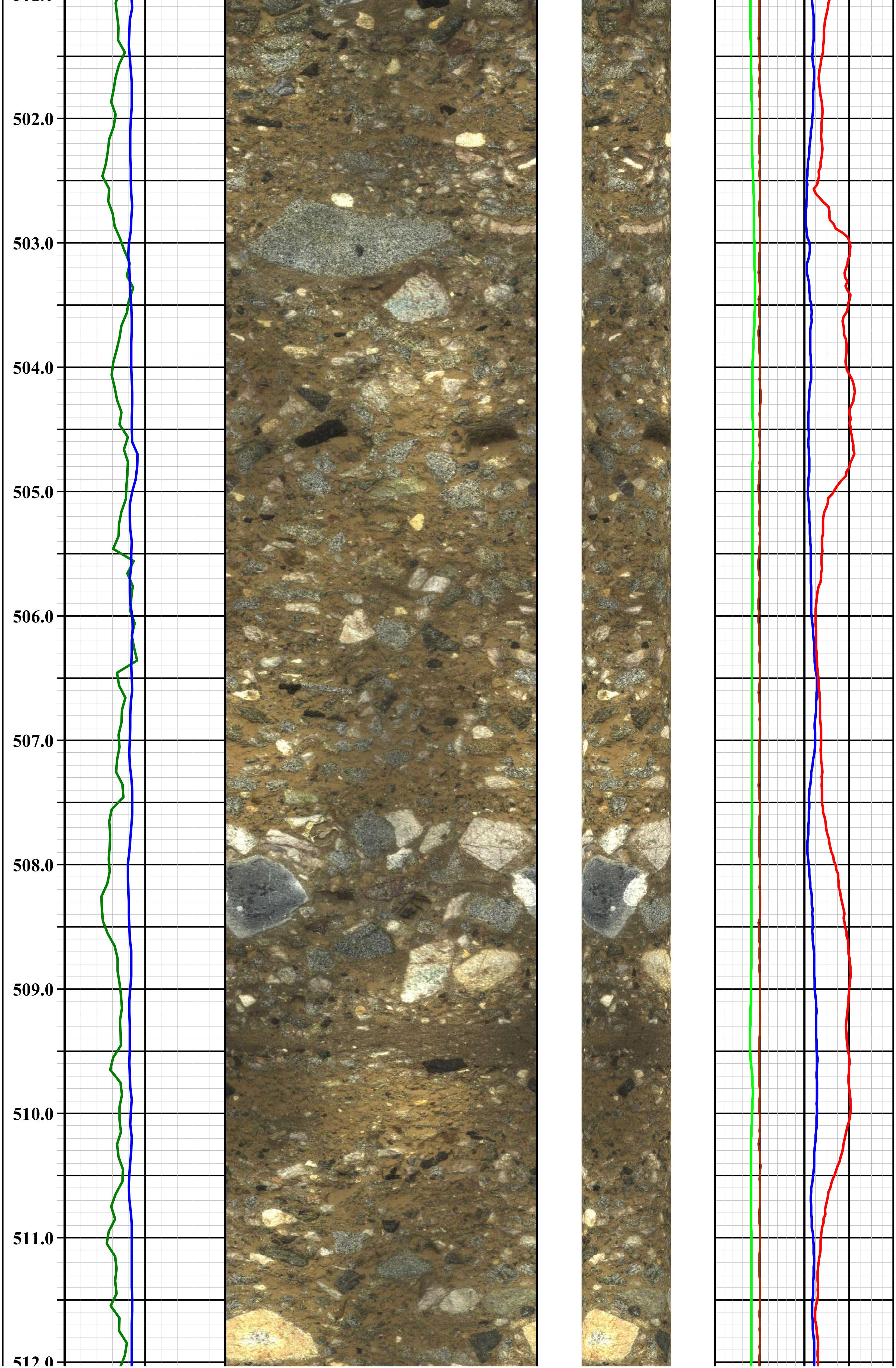

447.0
448.0
449.0
450.0
451.0
452.0
453.0
454.0
455.0
456.0
457.0


458.0
459.0
460.0
461.0
462.0
463.0
464.0
465.0
466.0
467.0
468.0

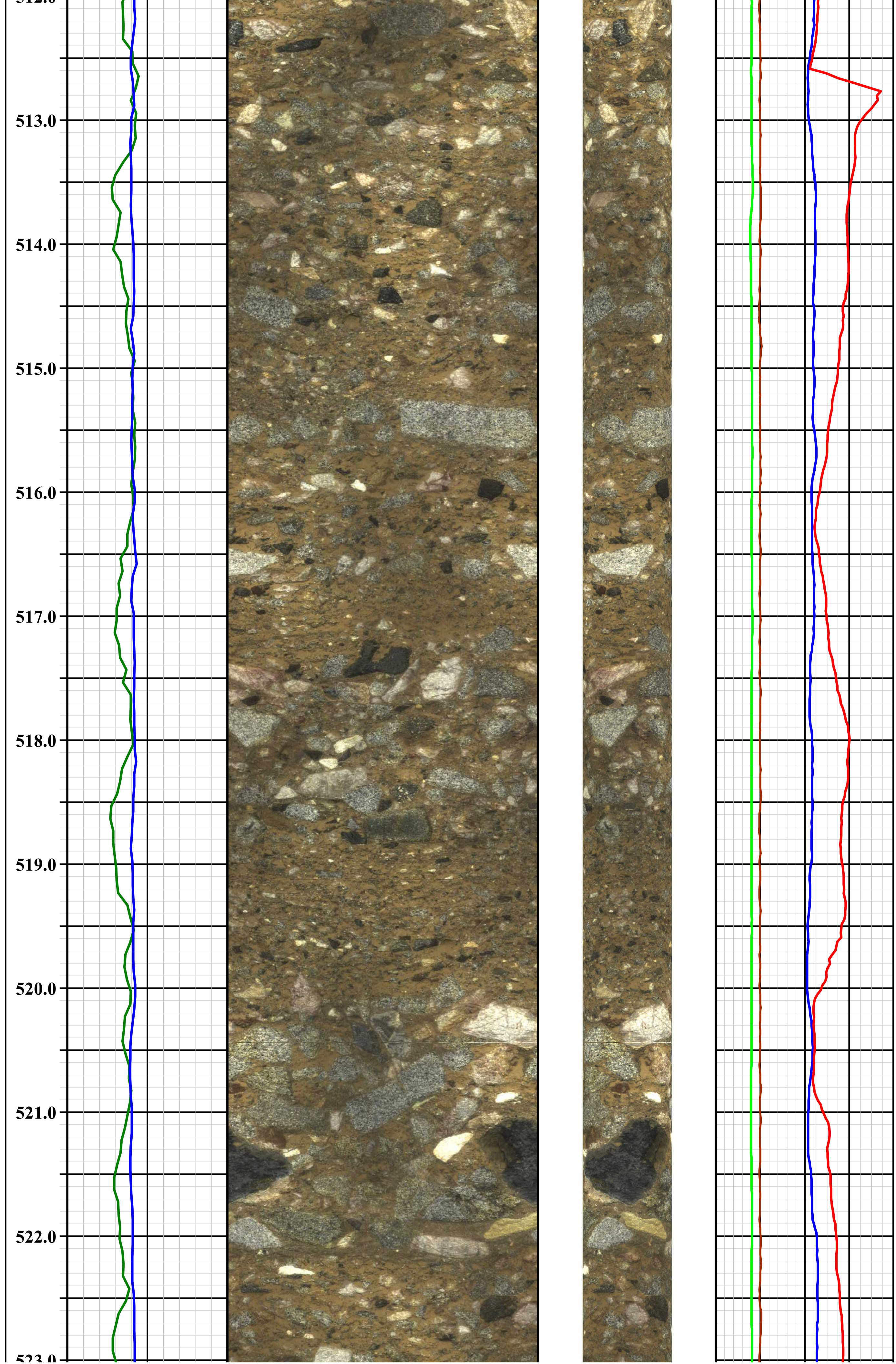

469.0
470.0
471.0
472.0
473.0
474.0
475.0
476.0
477.0
478.0
479.0


480.0
481.0
482.0
483.0
484.0
485.0
486.0
487.0
488.0
489.0
490.0

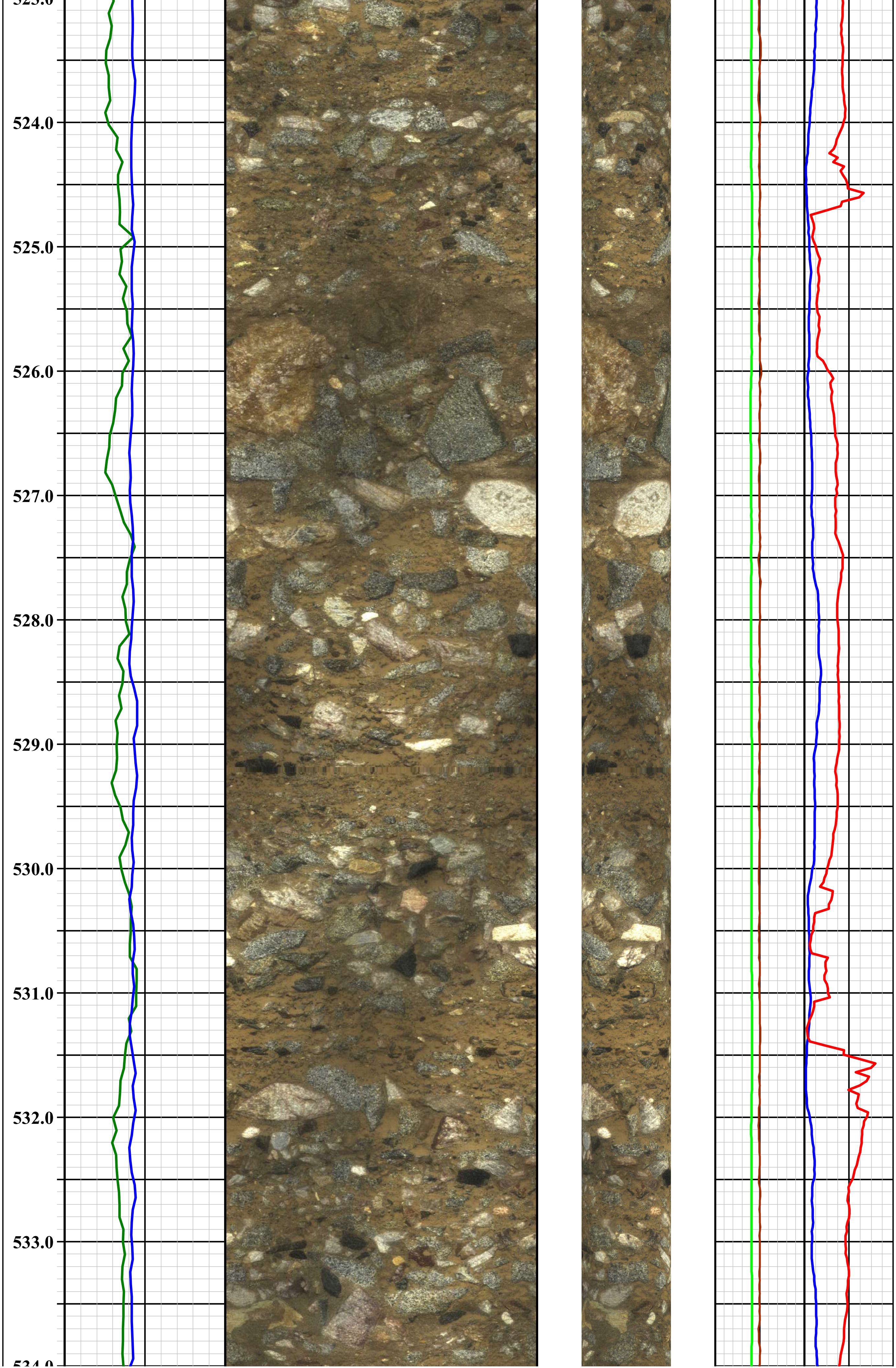

491.0
492.0
493.0
494.0
495.0
496.0
497.0
498.0
499.0
500.0
501.0

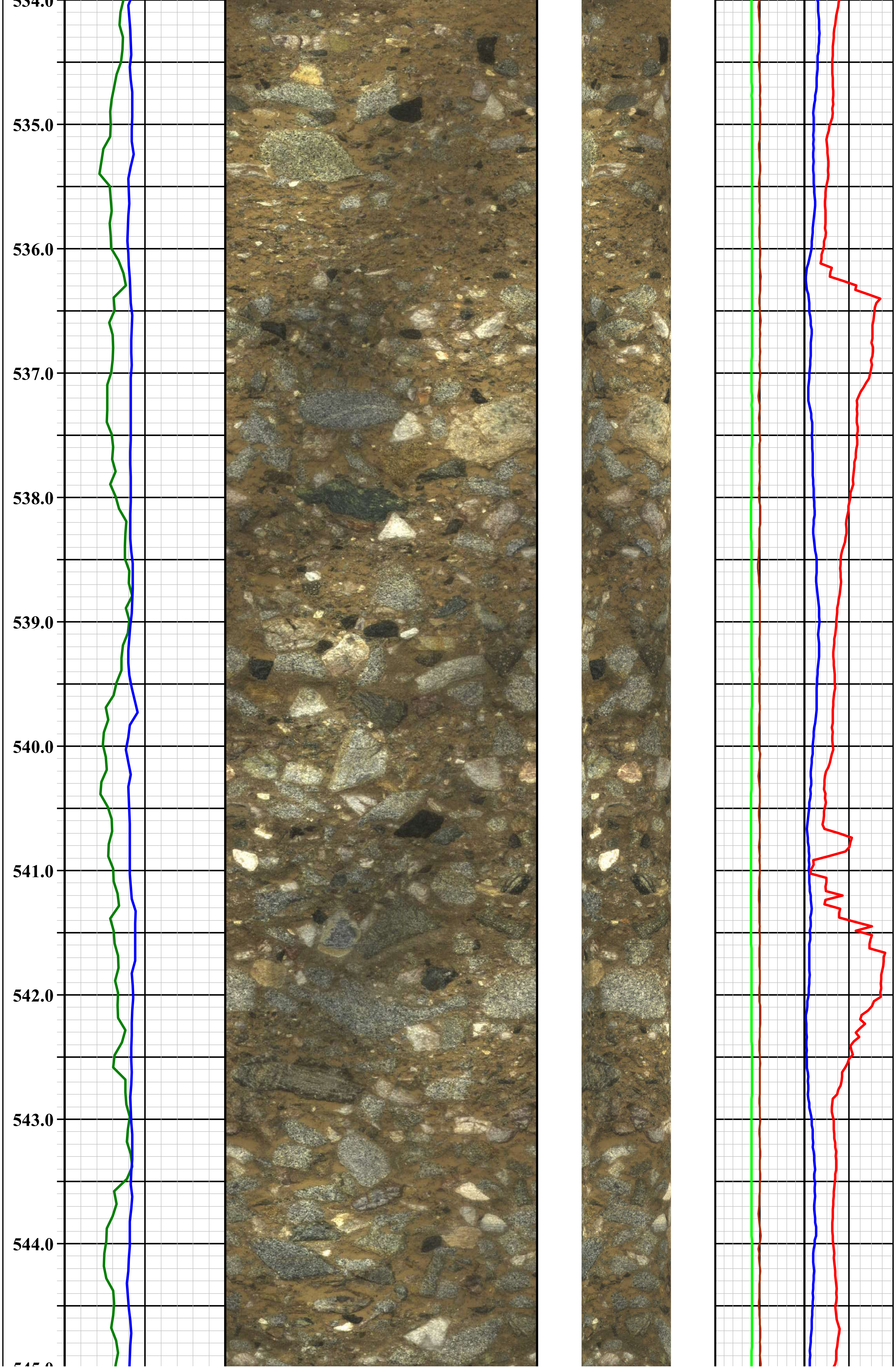


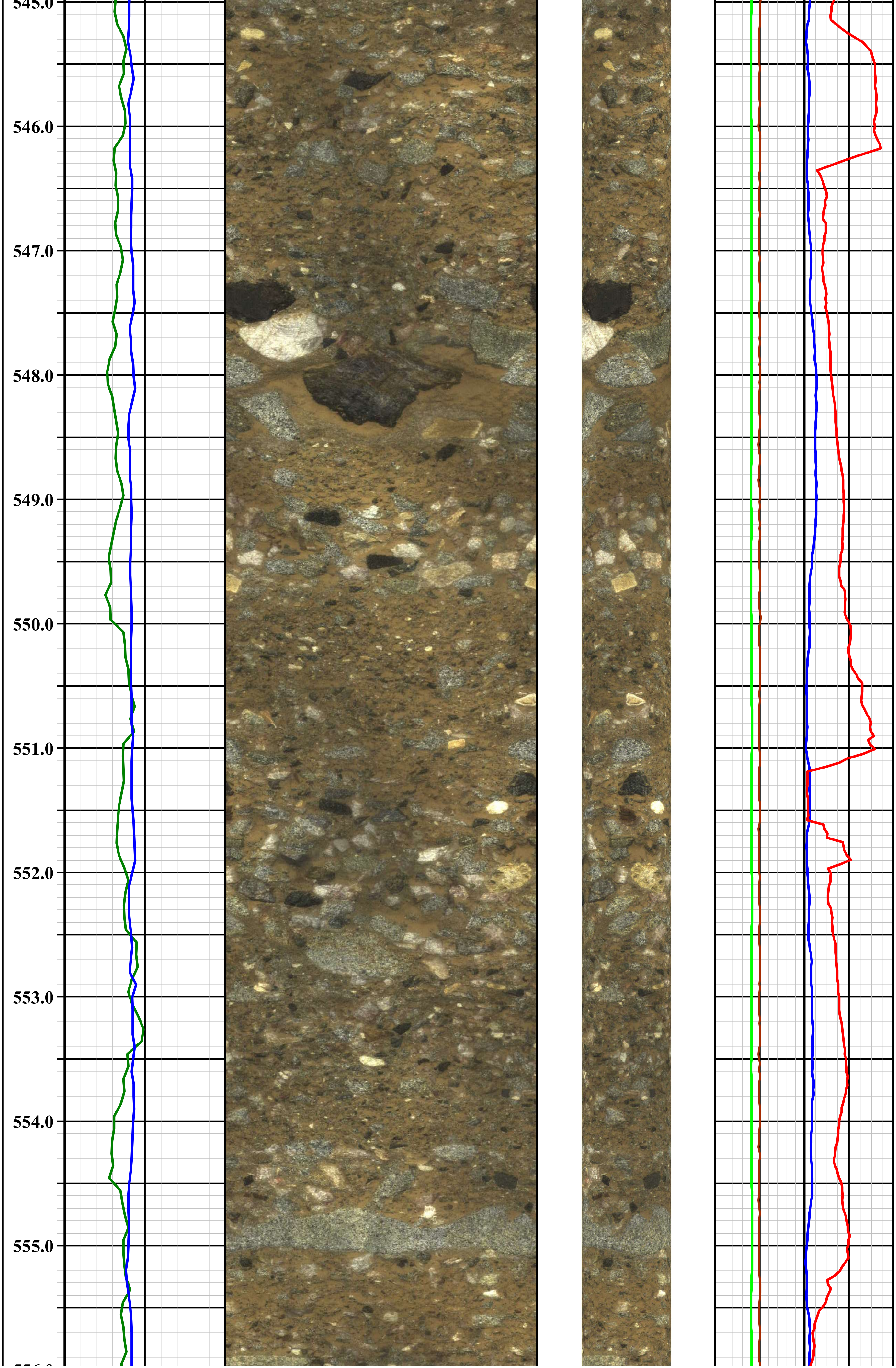
502.0
503.0
504.0
505.0
506.0
507.0
508.0
509.0
510.0
511.0
512.0

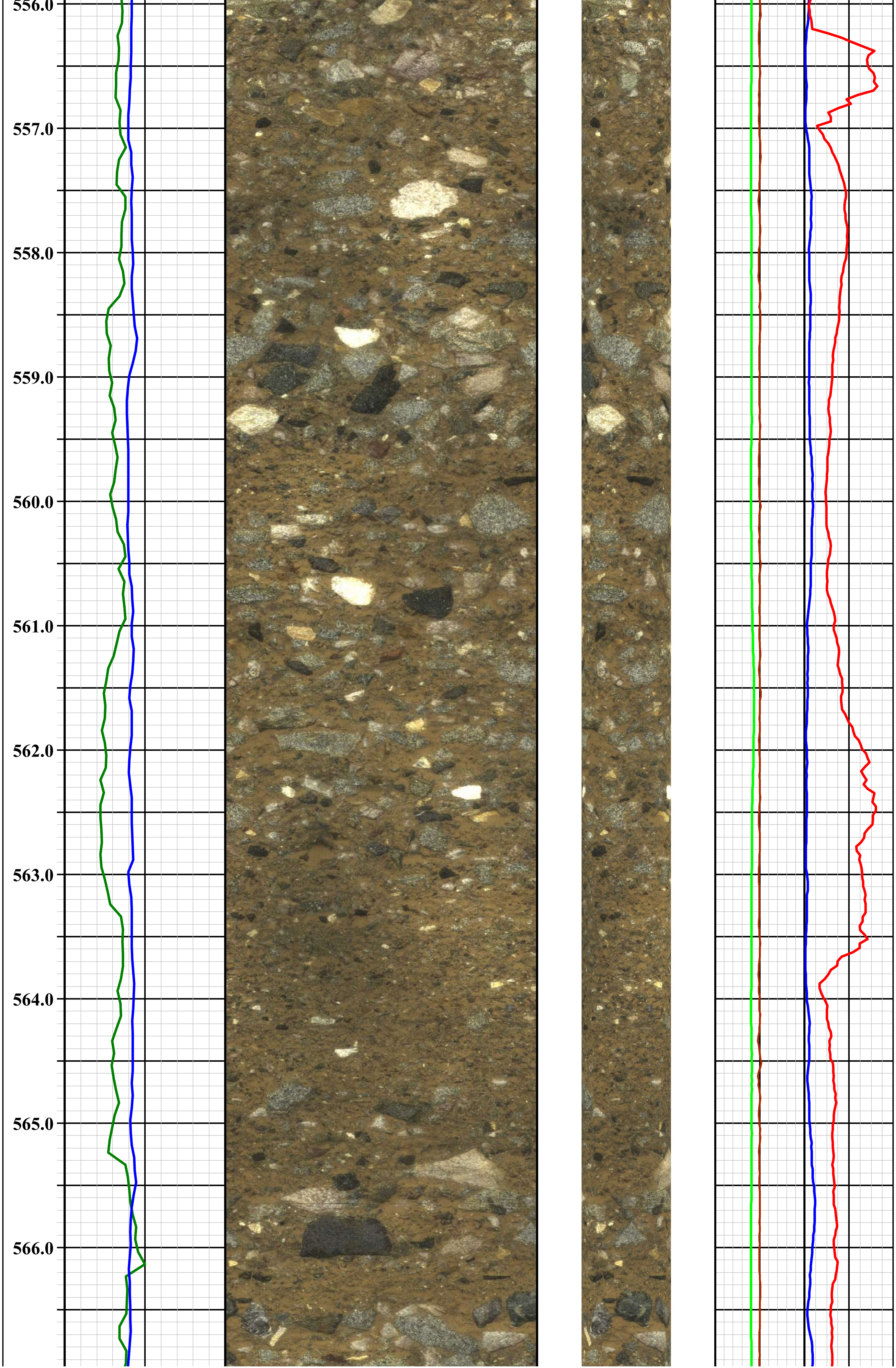


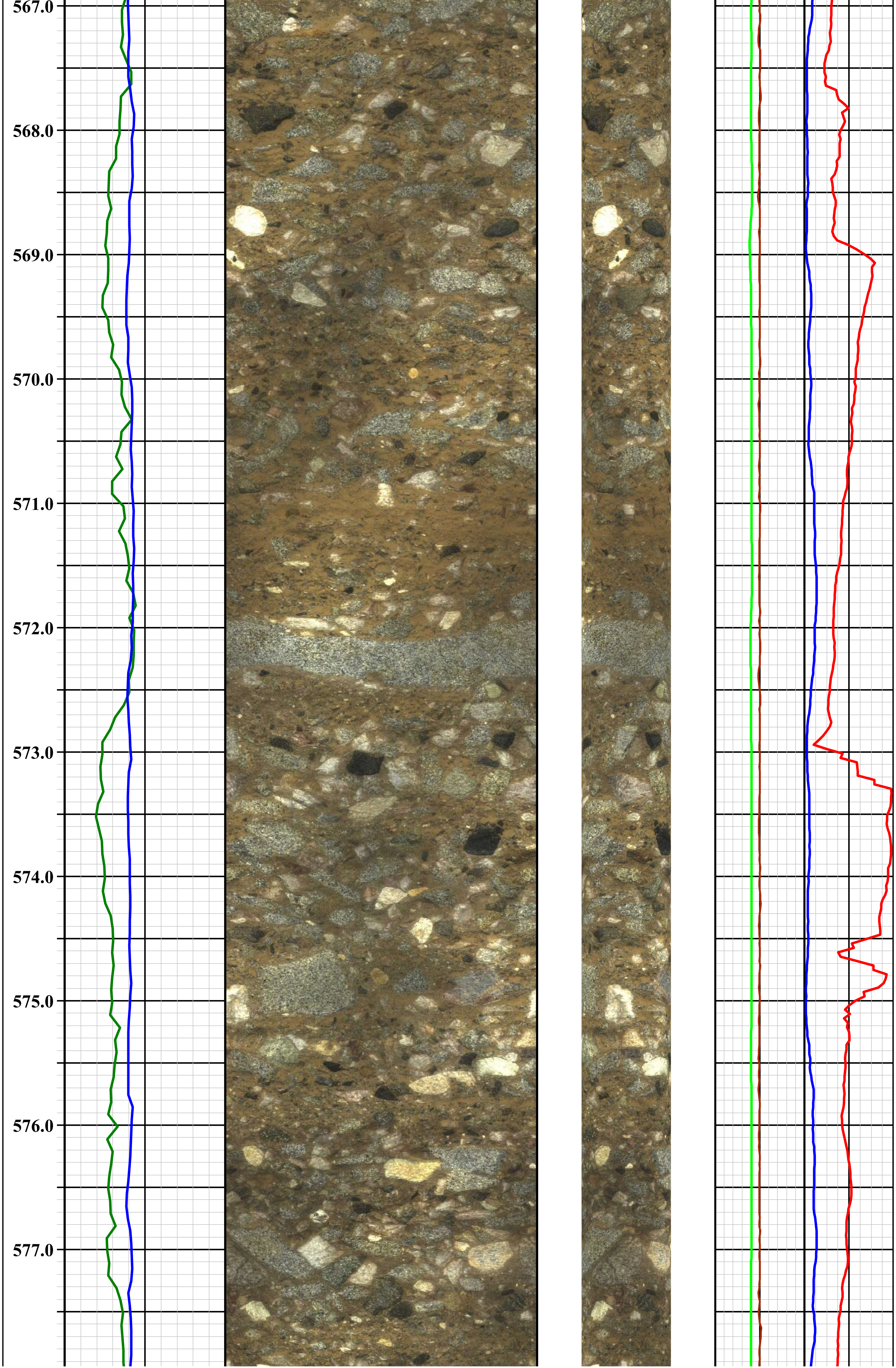
513.0
514.0
515.0
516.0
517.0
518.0
519.0
520.0
521.0
522.0

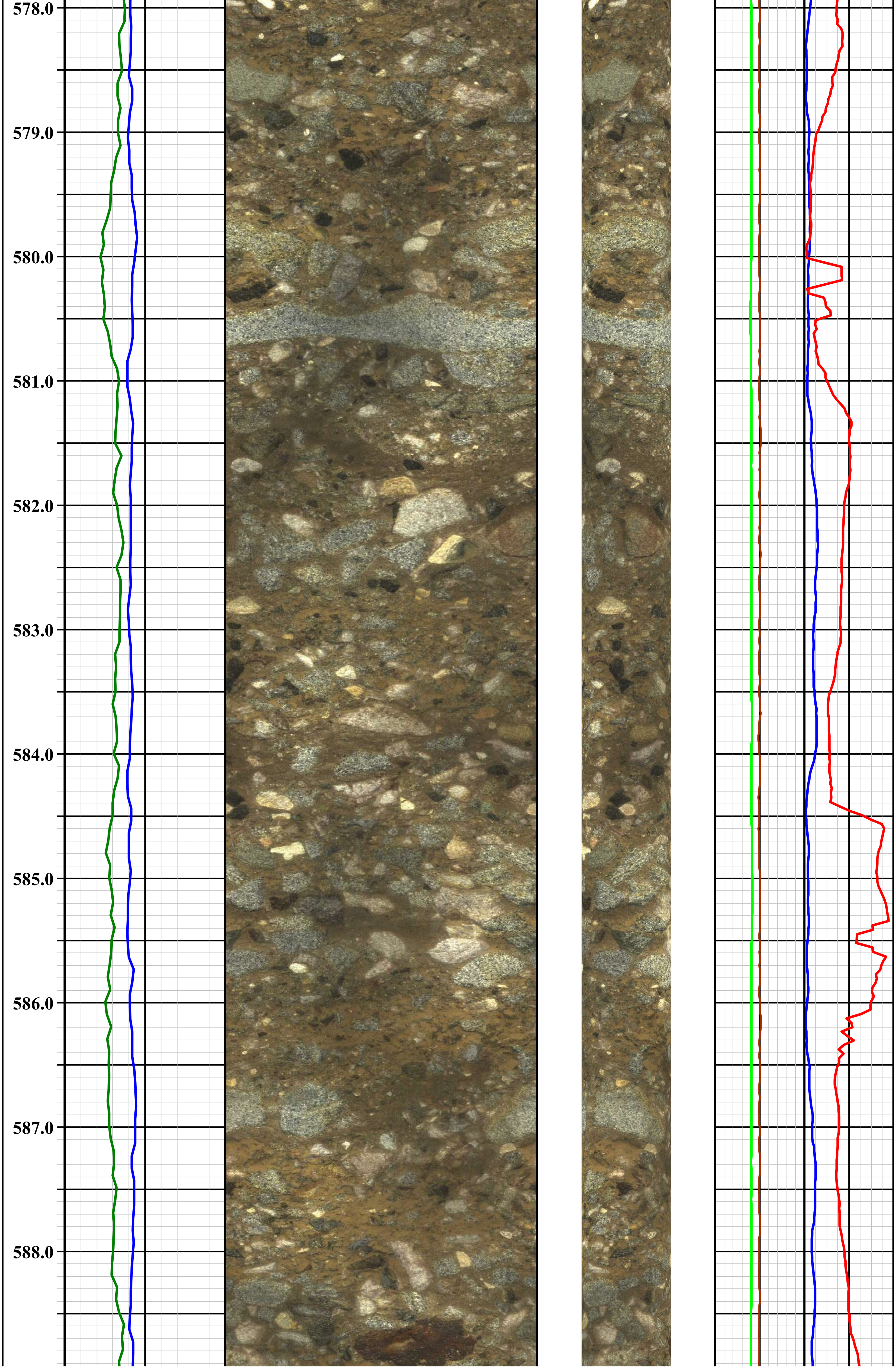

524.0
525.0
526.0
527.0
528.0
529.0
530.0
531.0
532.0
533.0

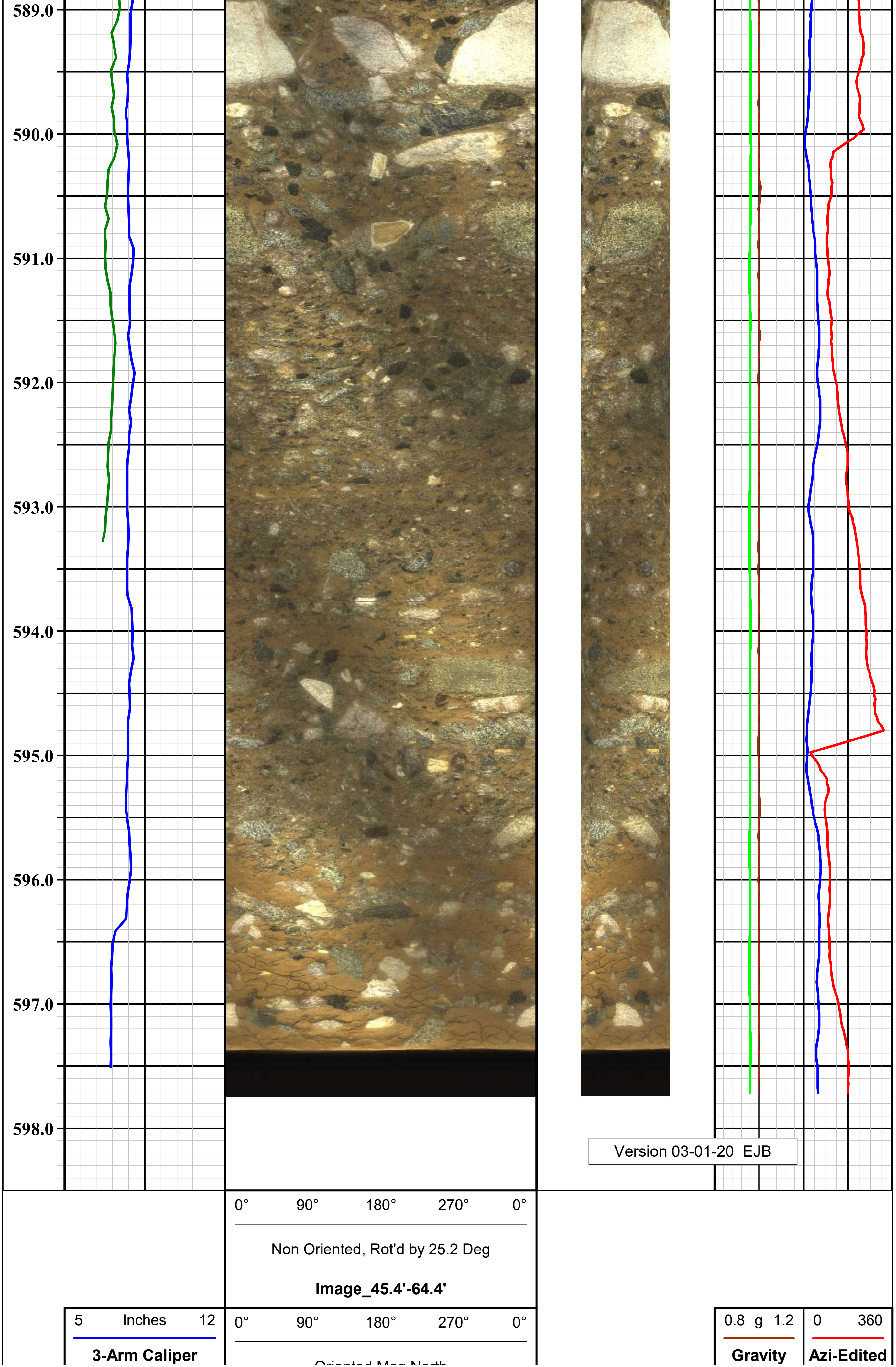

535.0
536.0
537.0
538.0
539.0
540.0
541.0
542.0
543.0
544.0


545.0
546.0
547.0
548.0
549.0
550.0
551.0
552.0
553.0
554.0
555.0


556.0
557.0
558.0
559.0
560.0
561.0
562.0
563.0
564.0
565.0
566.0


567.0
568.0
569.0
570.0
571.0
572.0
573.0
574.0
575.0
576.0
577.0


578.0
579.0
580.0
581.0
582.0
583.0
584.0
585.0
586.0
587.0
588.0

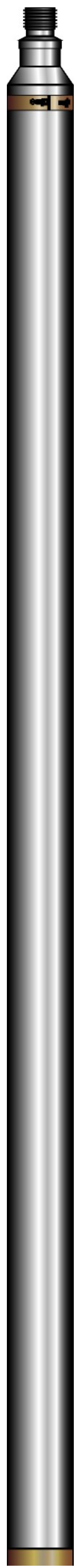

589.0
590.0
591.0
592.0
593.0
594.0
595.0
596.0
597.0
598.0
Version 03-01-20 EJB
0° 90° 180° 270° 0°
Non Oriented, Rot'd by 25.2 Deg
Image_45.4'-64.4'
5 Inches 12
3-Arm Caliper
0° 90° 180° 270° 0°
0.8 g 1.2
Gravity
0 360
Azi-Edited

	0 API 200	Oriented Mag North	-0°	40 uT 60	0 Deg 8
	Nat. Gamma	Image-NM	3-D View	Mag Field	Tilt
1in:1ft Depth	Skunk Camp RC20-2 OBI40 2G Summary ~45.4' - ~597.4'				

QL OBI-40 2G Optical Borehole Imager

Probe Top = Depth Ref.

Tool SN: 145010, 152511 & 170106



Four Conductor MSI Probe Top

APS Probe Orientation Sensor
3-Axis Magnetometer
3-Axis Accellerometer

Probe Length = 1.66 m or 5.46 ft

Probe Weight = 5.3 kg or 11.7 lbs

Distance from Optical Image Window to Orientation Sensor = 0.9 m or 3 ft

Inclination Accuracy = +/- 0.5 deg
Azimuth Accuracy = +/- 1.0 deg

Temperature Range: 0 - 70 Deg C (32 - 158 Deg F)
Pressure Range: 0 - 200 bar (0 - 2900 psi)

External Bow Spring Centralizers

Operates in dry or clear water conditions.

1.6" or 40 mm Diameter

MSI Gamma-Caliper-Temperature-Fluid Resistivity SN 4953

Probe Top = Depth Ref.

Probe Length = 2.59 m or 8.5 ft
Probe Weight = 6.80 kg or 15.0 lbs

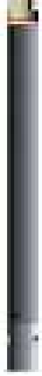
Natural Gamma and Caliper can only be collected logging up hole.

Fluid Temperature/Resistivity can only be collected logging down hole.

Temperature Rating: 70 Deg C (158 Deg F)
Presure Rating: 200 bar (2900 psi)

Distance from tool top: 2.20 m (86.5 in)

Available Arm Sizes: 3", 9", and 15"



TFR (Temperature/Fluid Resistivity) = 0.39 m (15.5 in)

1.375" or 34.9 mm Diameter

Southwest Exploration Services, LLC
borehole geophysics & video services

Company	RESOLUTION COPPER MINING
Well	RC20-2
Field	SKUNK CAMP
County	GILA
State	ARIZONA

Final **Optical Televiewer Summary**

Southwest Exploration Services, LLC
borehole geophysics & video services

COMPANY	RESOLUTION COPPER MINING
WELL ID	RC20-2
FIELD	SKUNK CAMP
COUNTY	GILA
STATE	ARIZONA

TYPE OF LOGS: ACOUSTIC TELEVIEWER
MORE: CALIPER

OTHER SERVICES: OPTICAL TELEVIEWER, GAMMA, TEMP / FLUID RES, SONIC, E-LOG

LOCATION

SEC TWP RGE

PERMANENT DATUM		ELEVATION	K.B.
LOG MEAS. FROM	GROUND LEVEL	ABOVE PERM. DATUM	D.F.
DRILLING MEAS. FROM	GROUND LEVEL		G.L.

DATE	02-23-20	TYPE FLUID IN HOLE	FORMATION WATER
RUN No	5	MUD WEIGHT	N/A
TYPE LOG	ACOUSTIC TELEVIEWER	VISCOSITY	N/A
DEPTH-DRILLER	600.0 FT	LEVEL	~150 FT
DEPTH-LOGGER	599.9 FT	MAX. REC. TEMP.	21.5 Deg C
BTM LOGGED INTERVAL	598.0 FT	IMAGE ORIENTED TO:	MAGNETIC NORTH
TOP LOGGED INTERVAL	149.0 FT	SAMPLE INTERVAL	0.010 FT
DRILLER / RIG#	NATIONAL DRILLING	LOGGING TRUCK	TRUCK #310
RECORDED BY / Logging Eng.	E. BEAM / D. ALP	TOOL STRING/SN	ALT QL ABI40 2G SN 143003
WITNESSED BY	NATIONAL DRILLING	LOG TIME:ON SITE/OFF SITE	1:30 PM

RUN	BOREHOLE RECORD			CASING RECORD			
NO.	BIT	FROM	TO	SIZE	WGT.	FROM	TO
1	? IN	SURFACE	40 FT	8.62 IN	STEEL	SURFACE	40 FT
2	7 7/8 IN	40 FT	TOTAL DEPTH	6 IN	PVC	SURFACE	50 FT
3							

COMMENTS:

Tool Summary:

Date	02-23-20	**Date**	02-23-20	**Date**	02-23-20
Run No.	1	**Run No.**	2	**Run No.**	3
Tool Model	MSI COMBO TOOL	**Tool Model**	ALT QL E-LOG	**Tool Model**	ALT 4 RX SONIC
Tool SN	4953	**Tool SN**	6380	**Tool SN**	4572
From	SURFACE	**From**	100.0 FT	**From**	140.0 FT
To	599.9 FT	**To**	599.4 FT	**To**	599.9 FT
Recorded By	D. ALP	**Recorded By**	D. ALP	**Recorded By**	D. ALP
Truck No	310	**Truck No**	310	**Truck No**	310
Operation Check	02-23-20	**Operation Check**	02-20-20	**Operation Check**	02-20-20
Calibration Check	02-21-20	**Calibration Check**	02-20-20	**Calibration Check**	N/A
Time Logged	2:00 PM	**Time Logged**	3:00 PM	**Time Logged**	3:30 PM

Date	02-23-20	**Date**	02-23-20	**Date**	
Run No.	4	**Run No.**	5	**Run No.**	6
Tool Model	ALT QL OBI40 2G	**Tool Model**	ALT QL ABI40 2G	**Tool Model**	
Tool SN	170106	**Tool SN**	143003	**Tool SN**	
From	45.0 FT	**From**	145.0 FT	**From**	
To	598.0 FT	**To**	598.0 FT	**To**	
Recorded By	D. ALP	**Recorded By**	D. ALP	**Recorded By**	
Truck No	310	**Truck No**	310	**Truck No**	
Operation Check	02-20-20	**Operation Check**	02-20-20	**Operation Check**	
Calibration Check	N/A	**Calibration Check**	N/A	**Calibration Check**	
Time Logged	4:30 PM	**Time Logged**	7:00 PM	**Time Logged**	

Additional Comments:

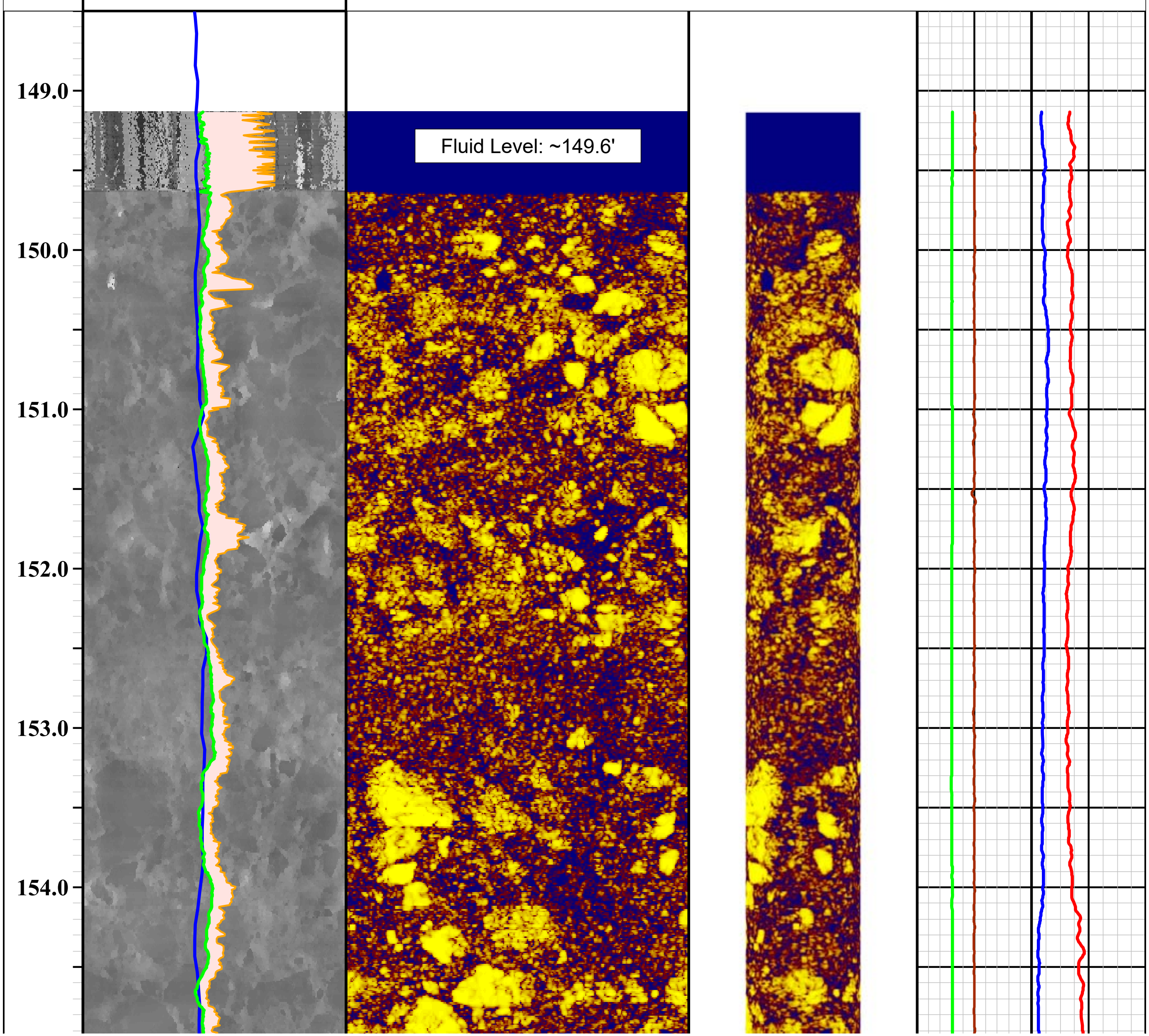
Caliper Arms Used: 9" **Calibration Points:** 6" & 12"

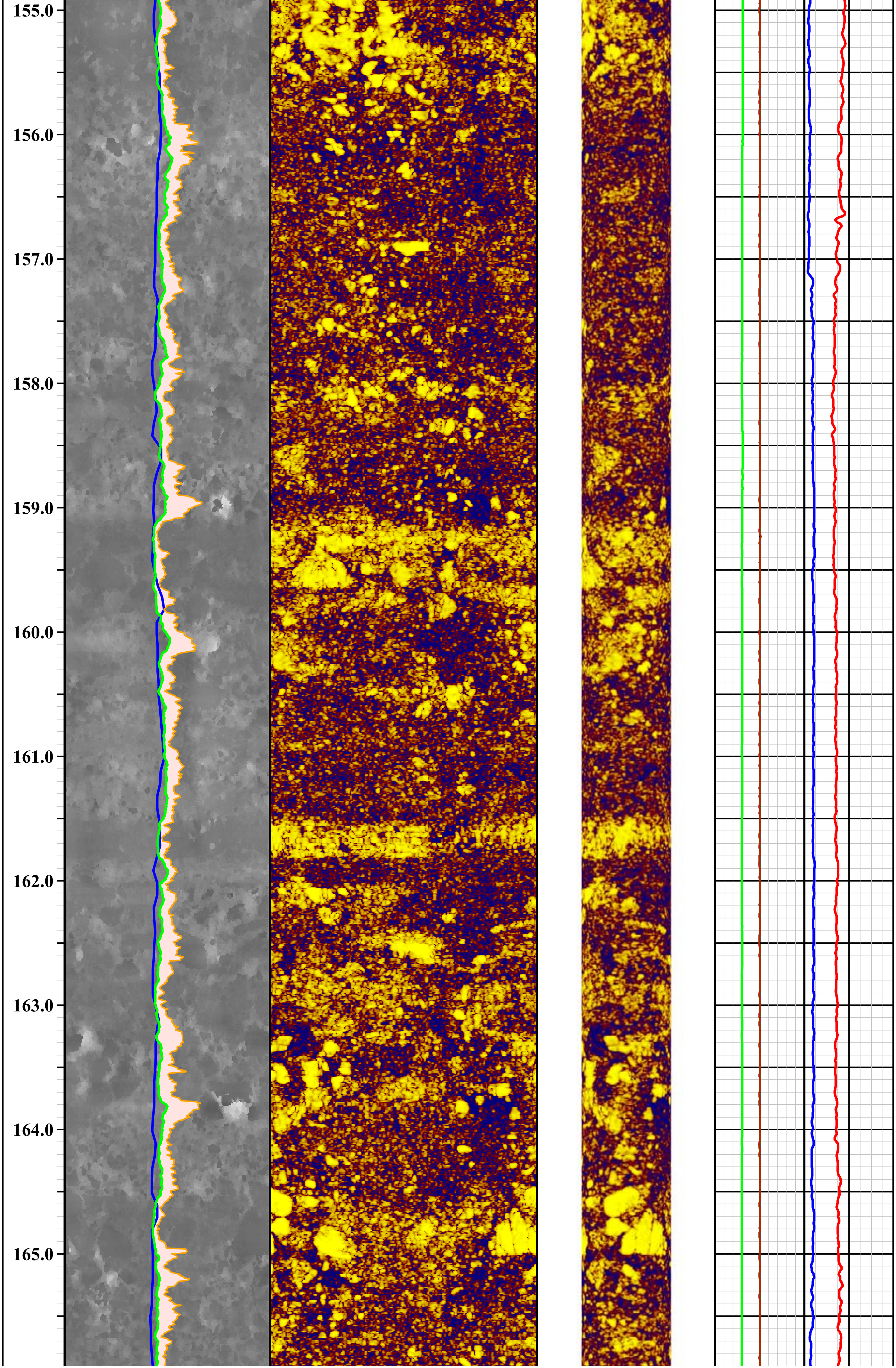
E-Log Calibration Range: 1 - 10,000 OHM-M **Calibration Points:** 1 & 10,000 OHM-M

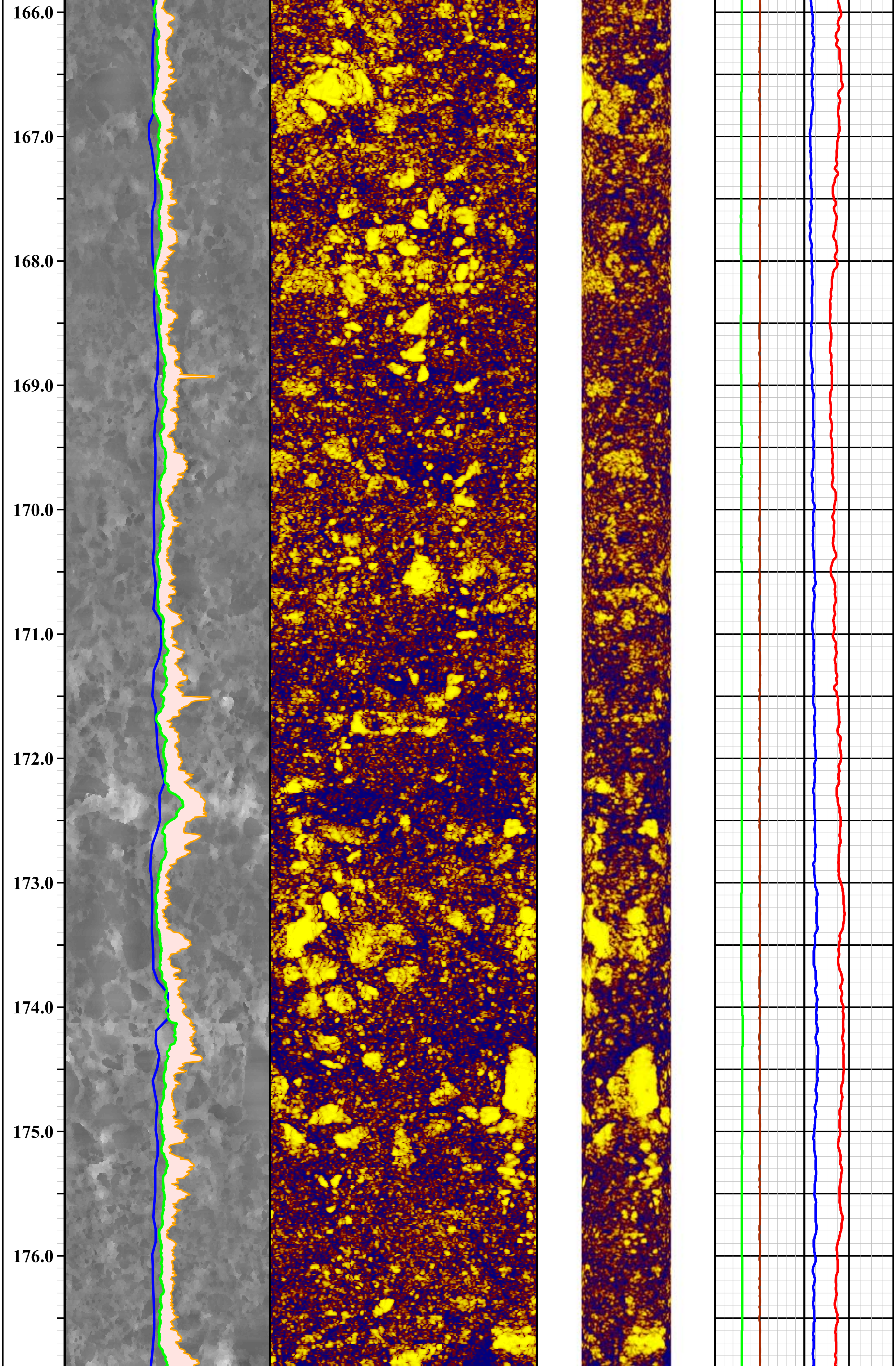
Disclaimer:

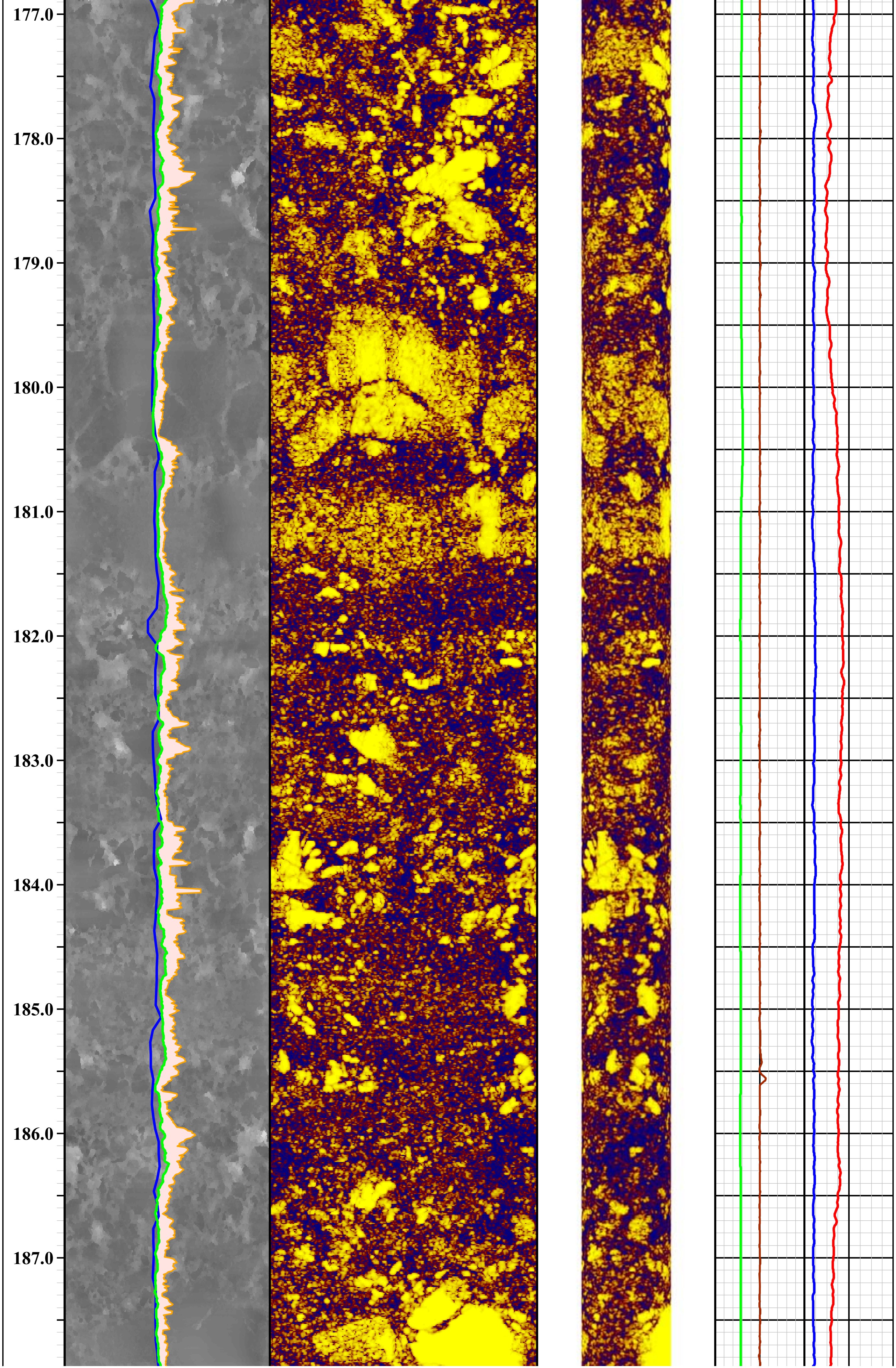
All interpretations of log data are opinions based on inferences from electrical or other measurements. We do not guarantee the accuracy or correctness of any interpretations or recommendations and shall not be liable or responsible for any loss, costs, damages, or expenses incurred or sustained by anyone resulting from any interpretation made by any of our employees or agents. These interpretations are also subject to our general terms and conditions set out in our current Service Invoice.

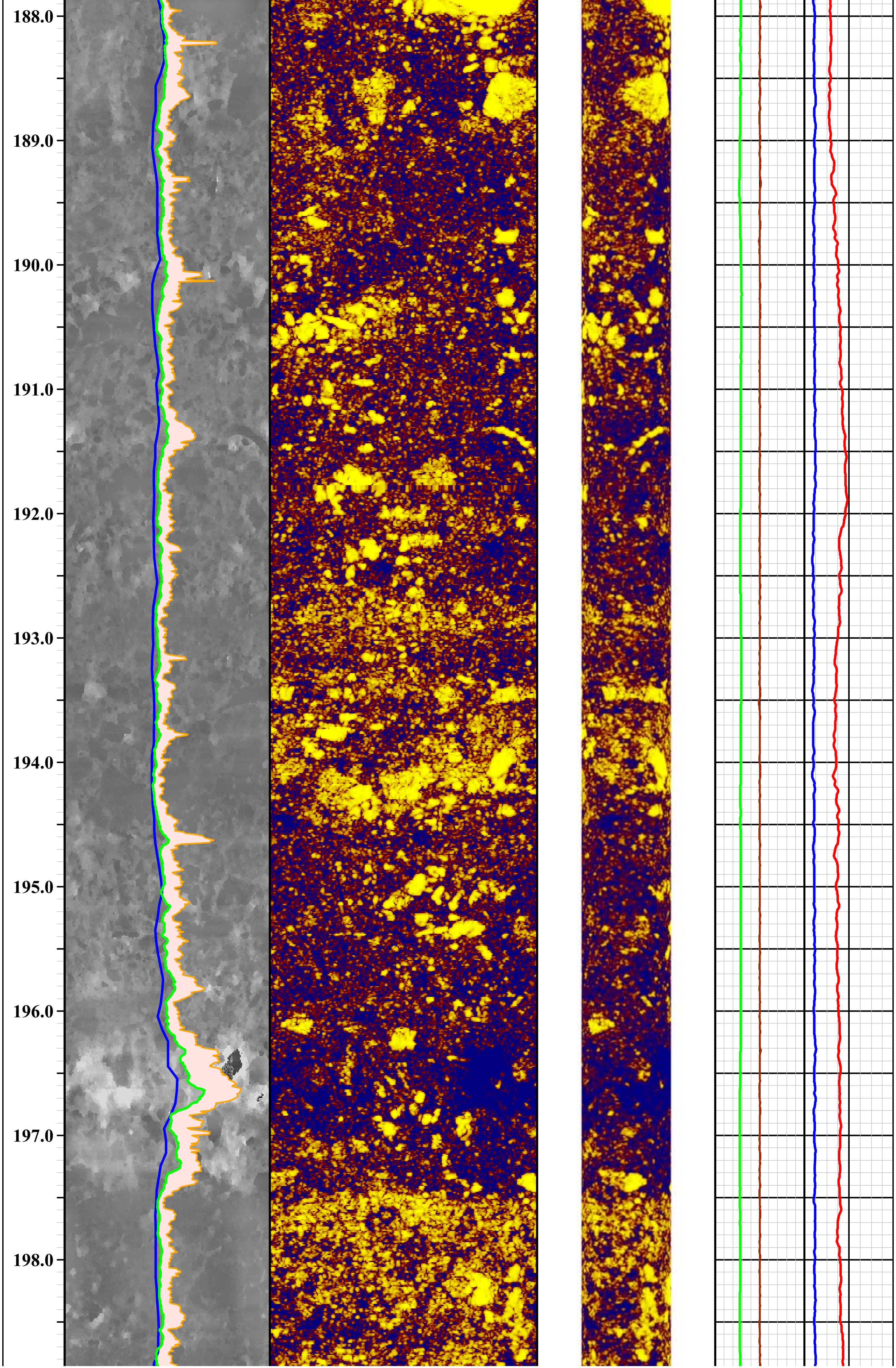
Depth 1in:1ft	Skunk Camp RC20-2 ABI40 2G Summary ~149.6' - ~597.2'				
	Centralized TT Oriented Mag North 0° 90° 180° 270° 0°	**Amplitude-NM** Oriented Mag North 0° 90° 180° 270° 0°	**3-D View** -0°	**Mag Field** 40 uT 60	**Tilt** 0 Deg 8
	3-Arm Caliper 5 Inches 12	**Amplitude-Static** Oriented Mag North 0° 90° 180° 270° 0°		**Gravity** 0.8 g 1.2	**Azimuth** 0 360
	Max-Acoustic Caliper 5 Inches 12	**ARI** 0 3000			
	Ave-Acoustic Caliper 5 Inches 12				
	Enlargements				



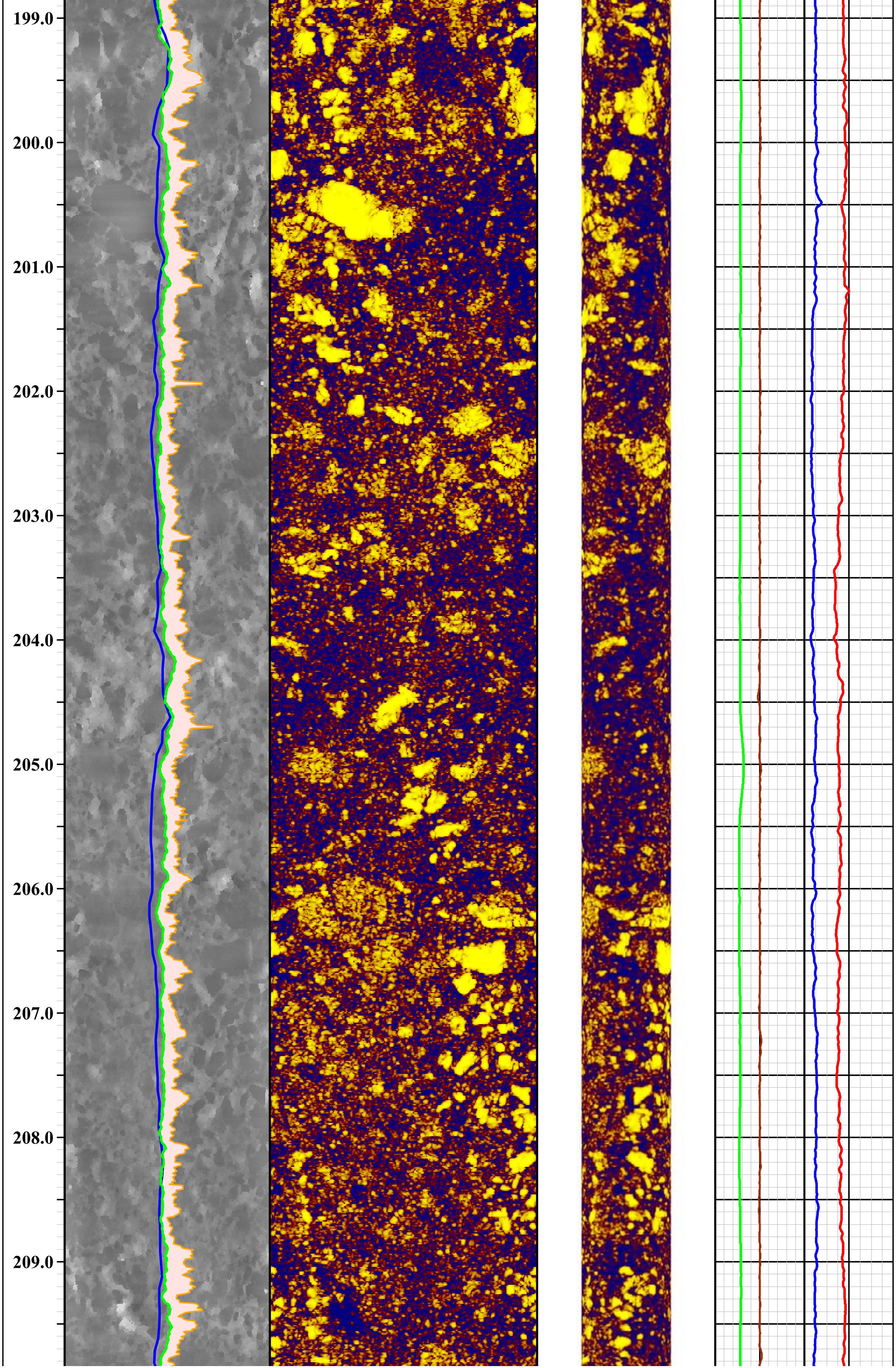

155.0
156.0
157.0
158.0
159.0
160.0
161.0
162.0
163.0
164.0
165.0

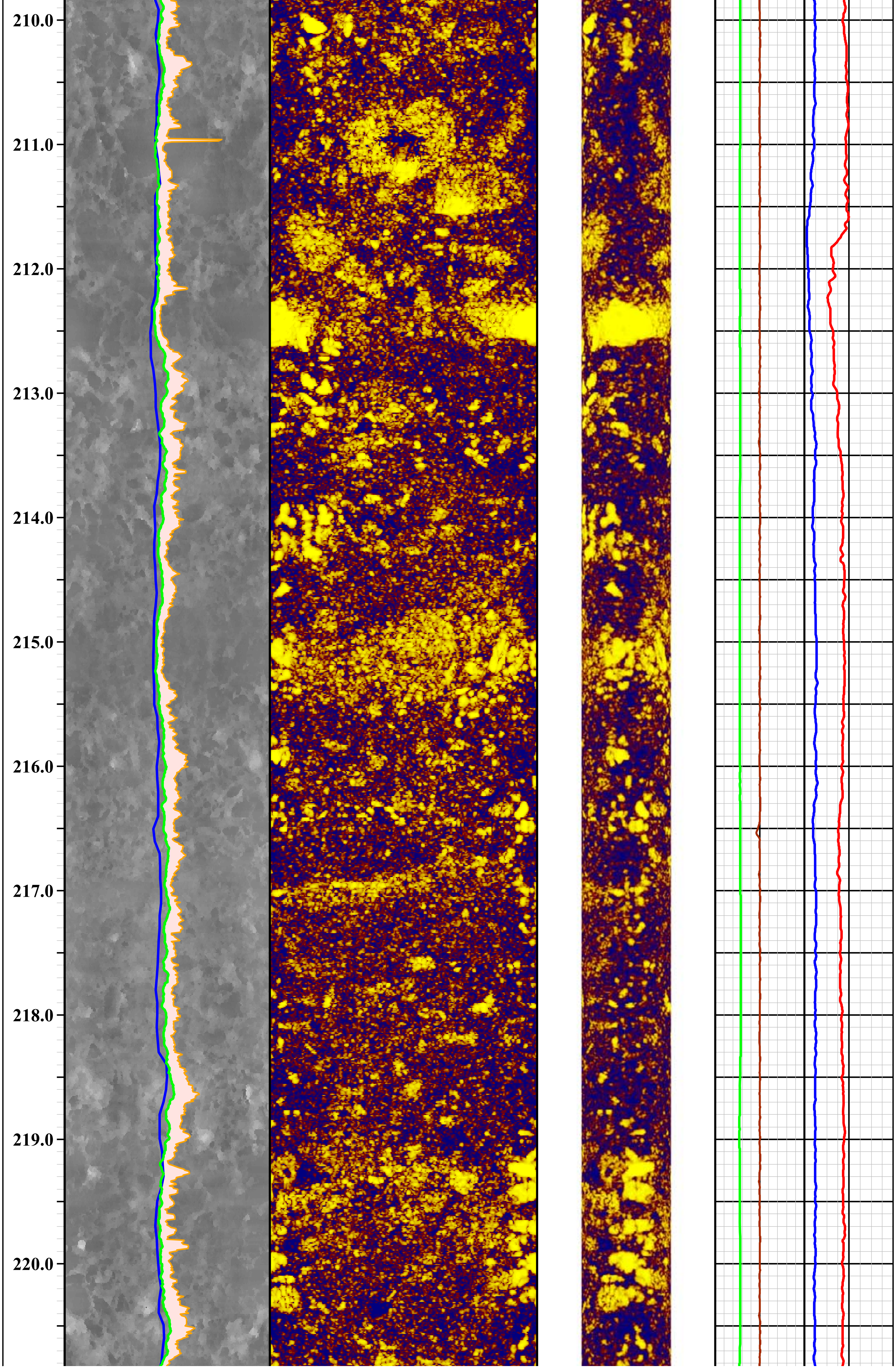

166.0
167.0
168.0
169.0
170.0
171.0
172.0
173.0
174.0
175.0
176.0

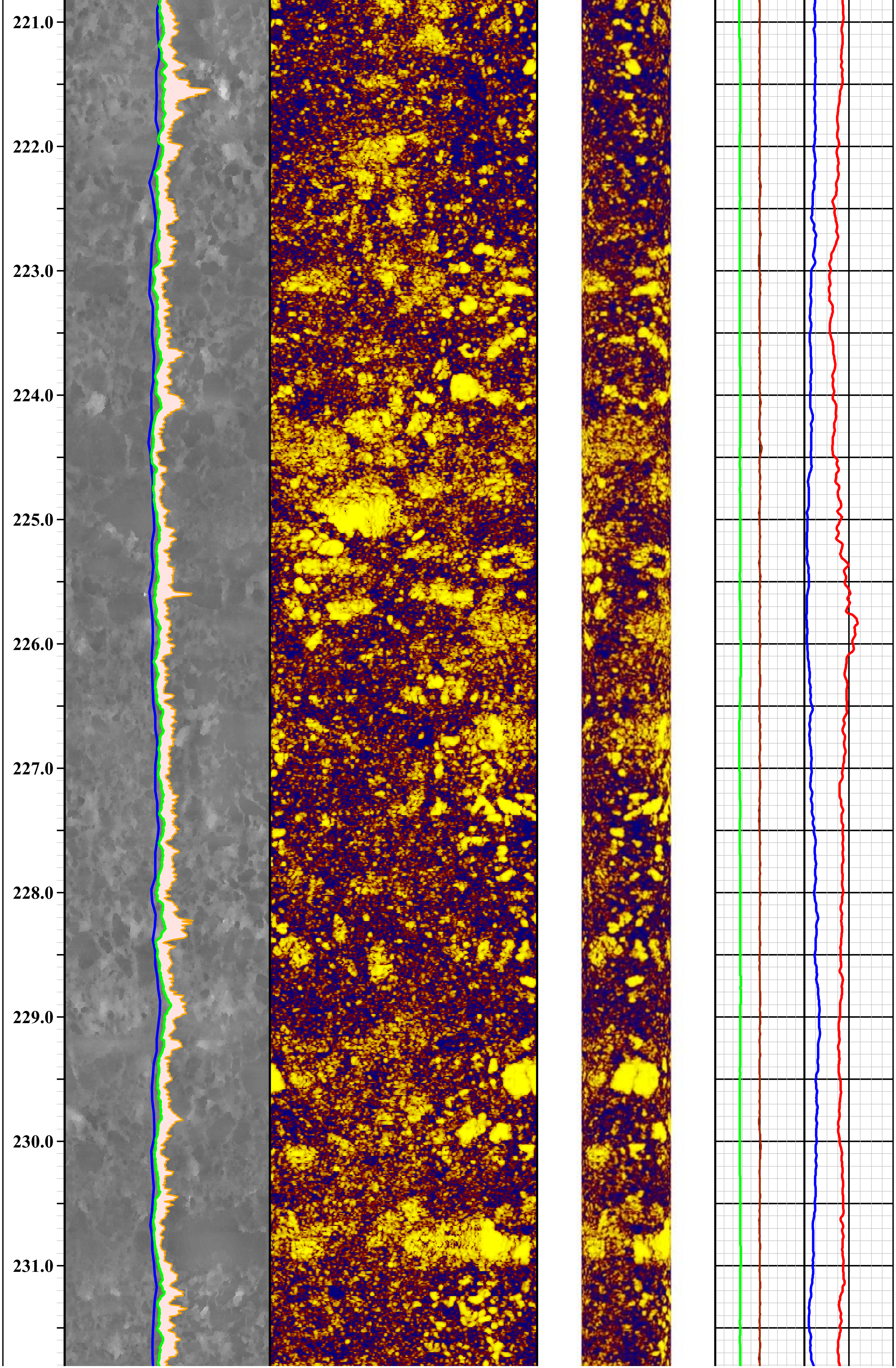

177.0
178.0
179.0
180.0
181.0
182.0
183.0
184.0
185.0
186.0
187.0

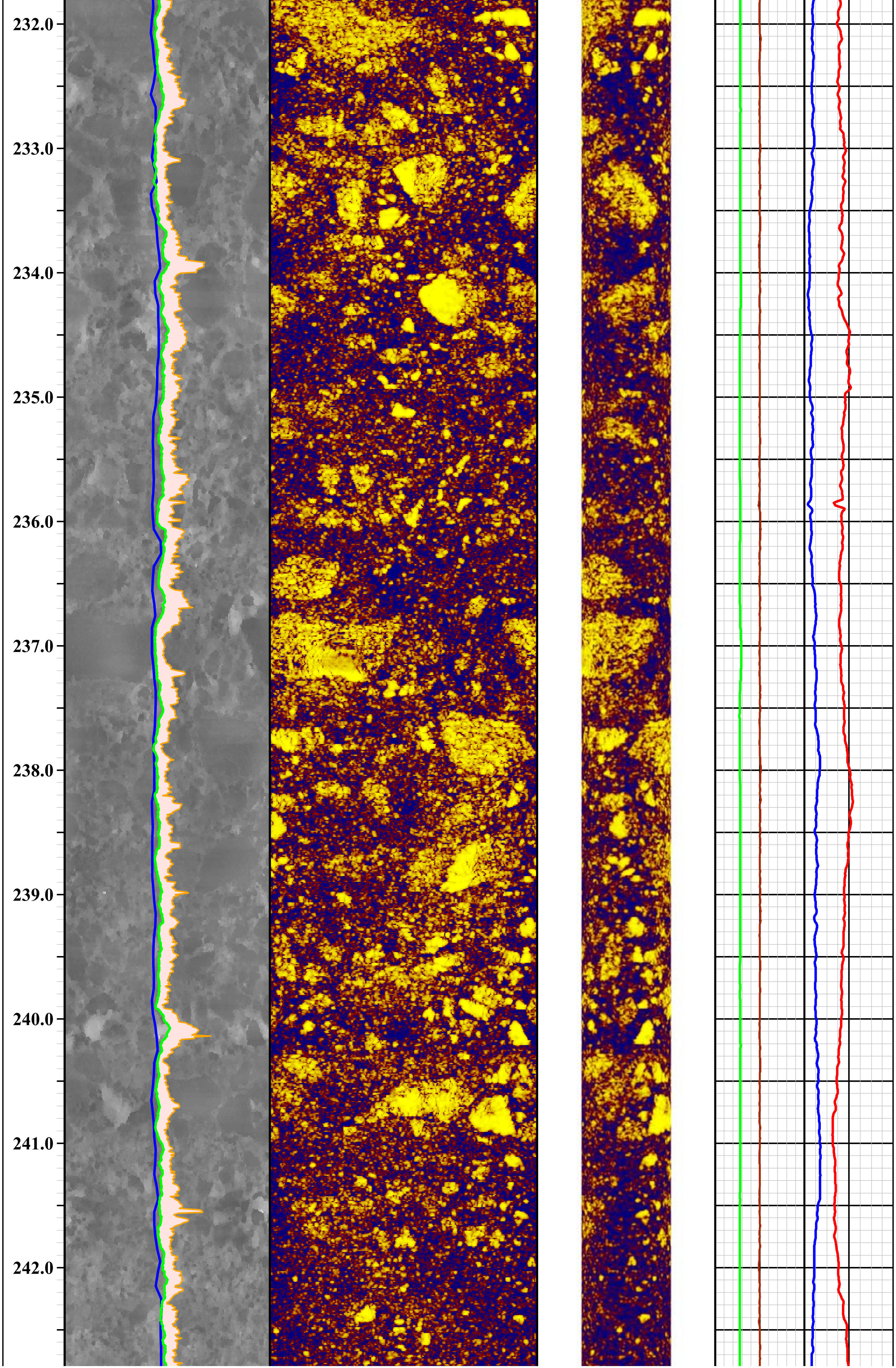


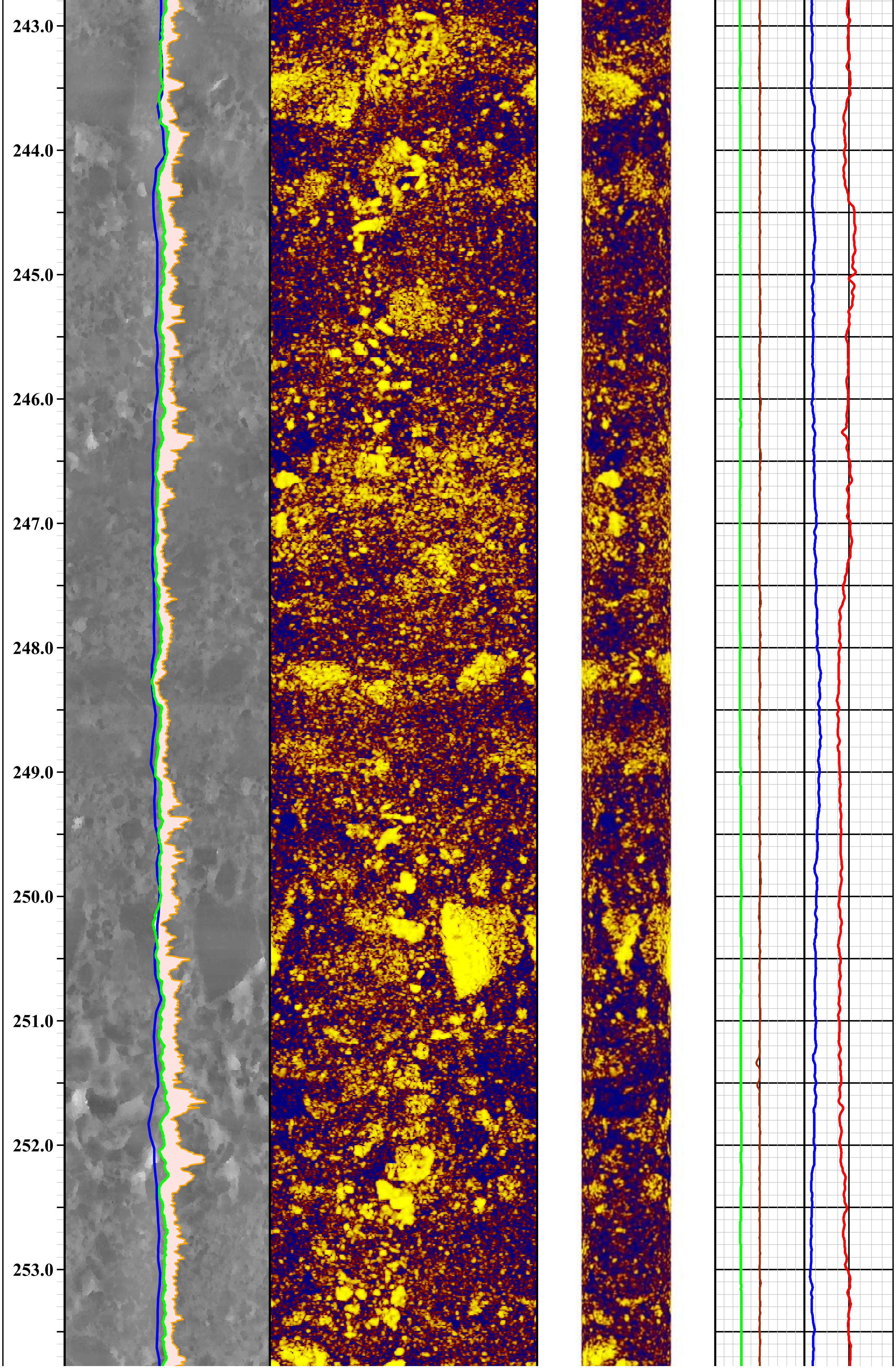
188.0
189.0
190.0
191.0
192.0
193.0
194.0
195.0
196.0
197.0
198.0

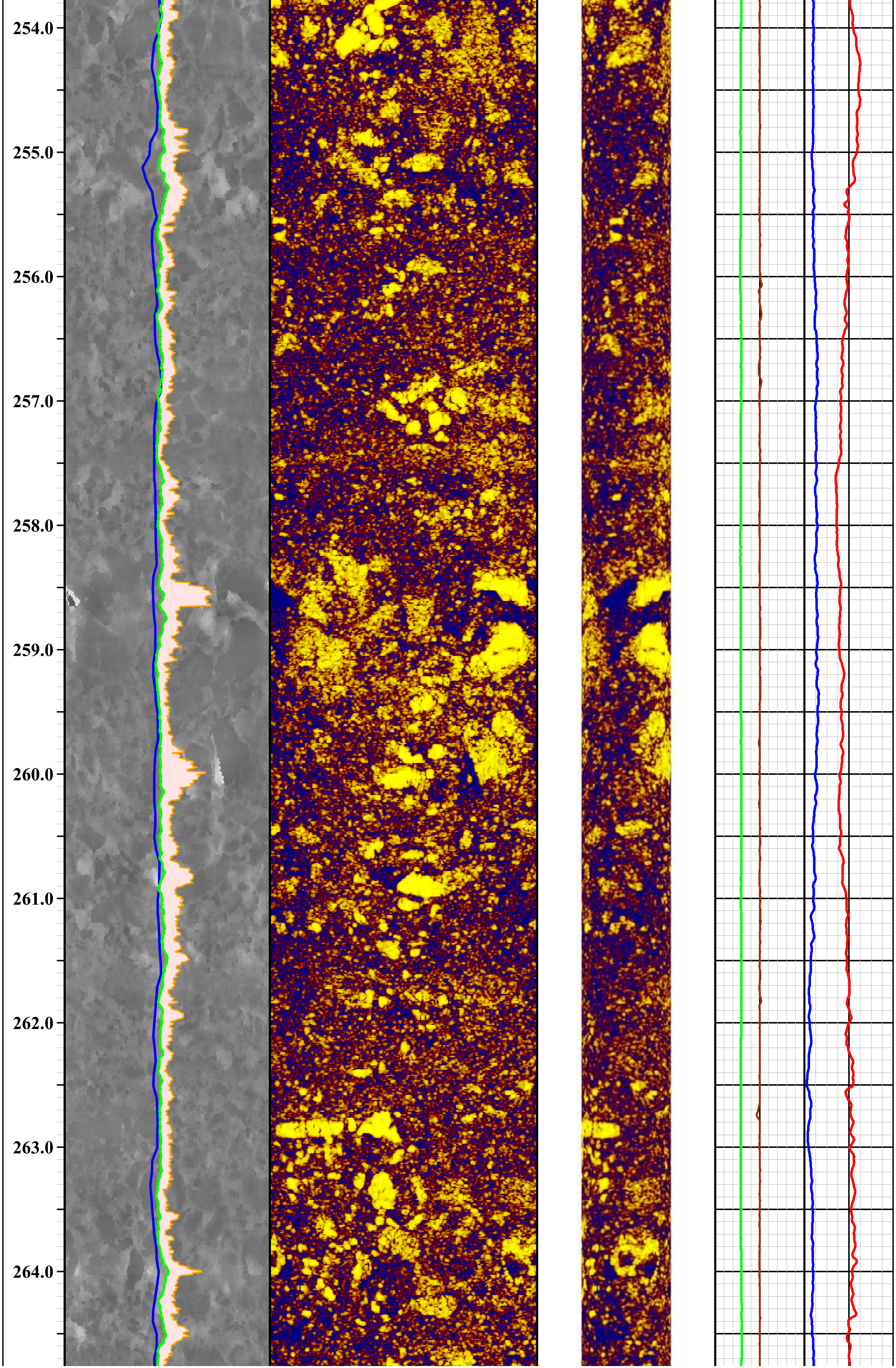

199.0
200.0
201.0
202.0
203.0
204.0
205.0
206.0
207.0
208.0
209.0

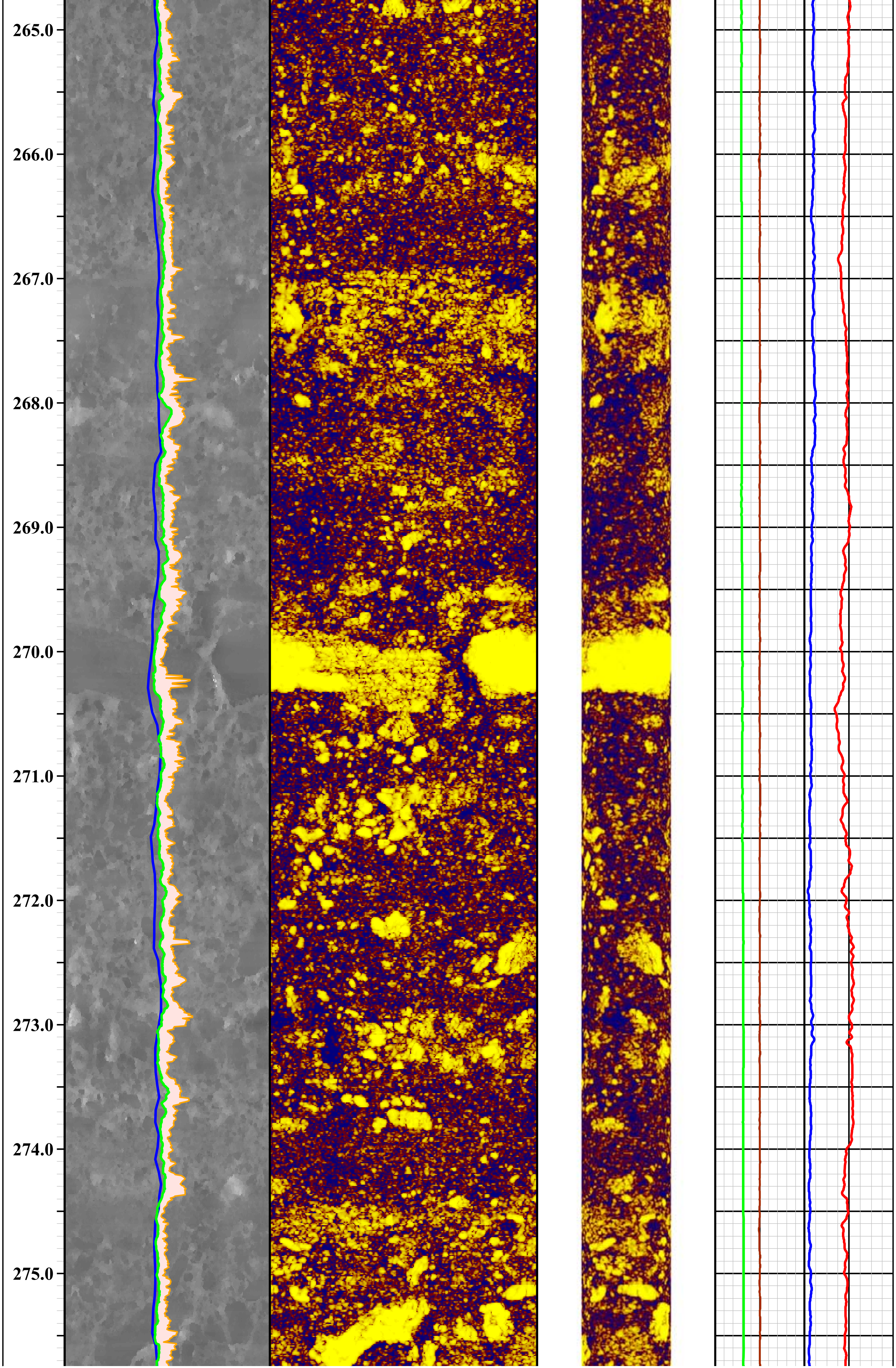

210.0
211.0
212.0
213.0
214.0
215.0
216.0
217.0
218.0
219.0
220.0

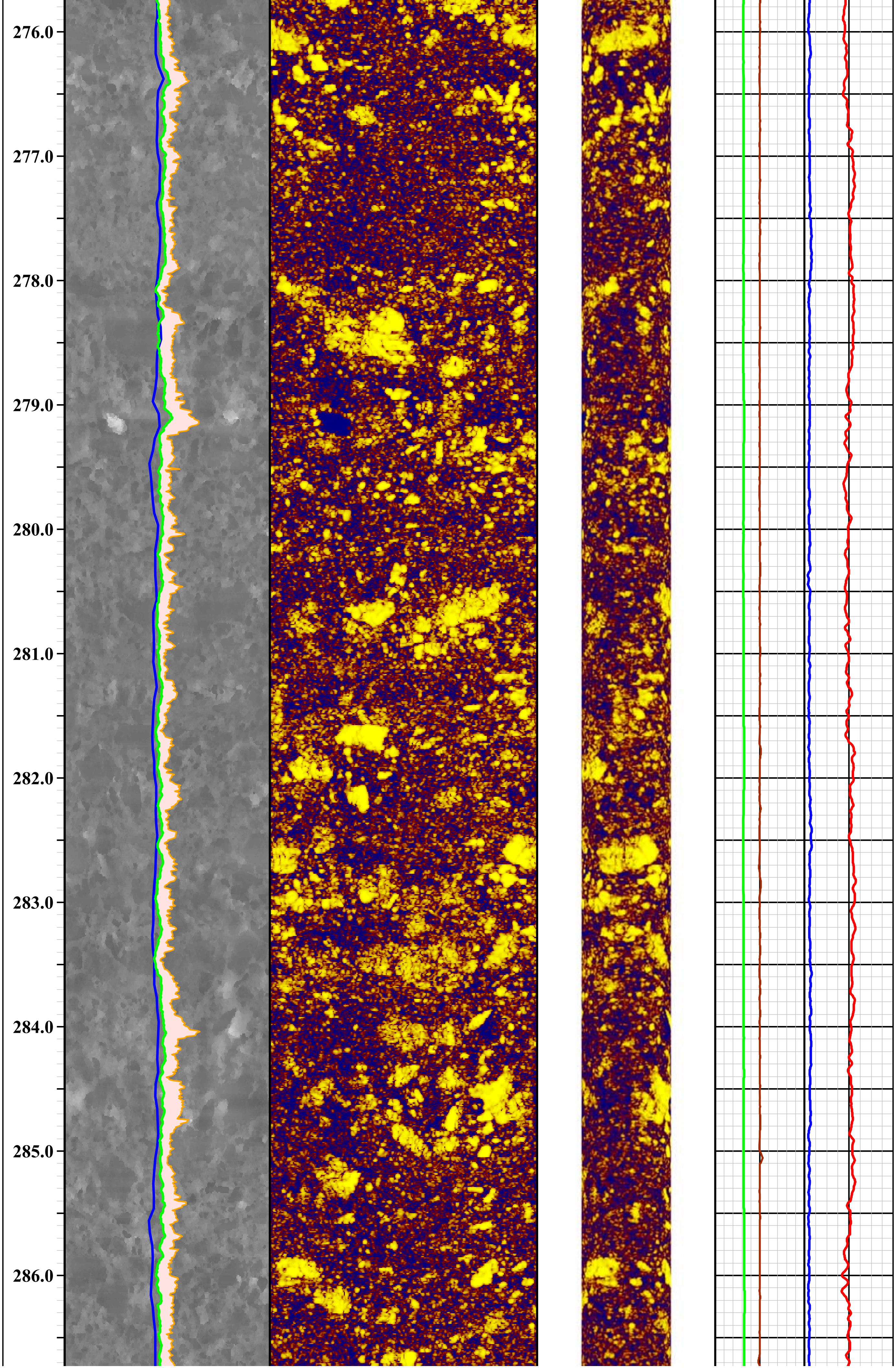

221.0
222.0
223.0
224.0
225.0
226.0
227.0
228.0
229.0
230.0
231.0

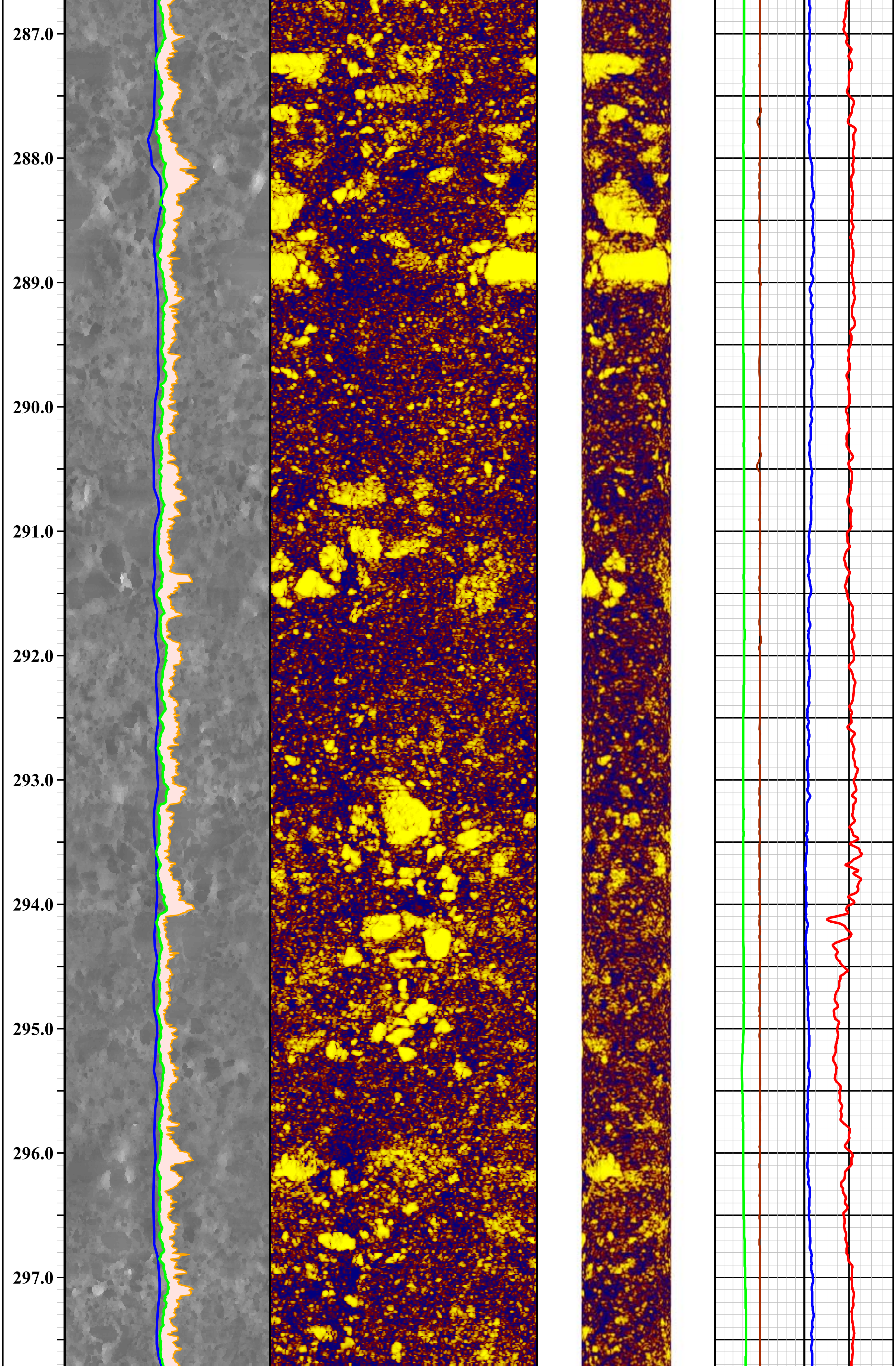

232.0
233.0
234.0
235.0
236.0
237.0
238.0
239.0
240.0
241.0
242.0

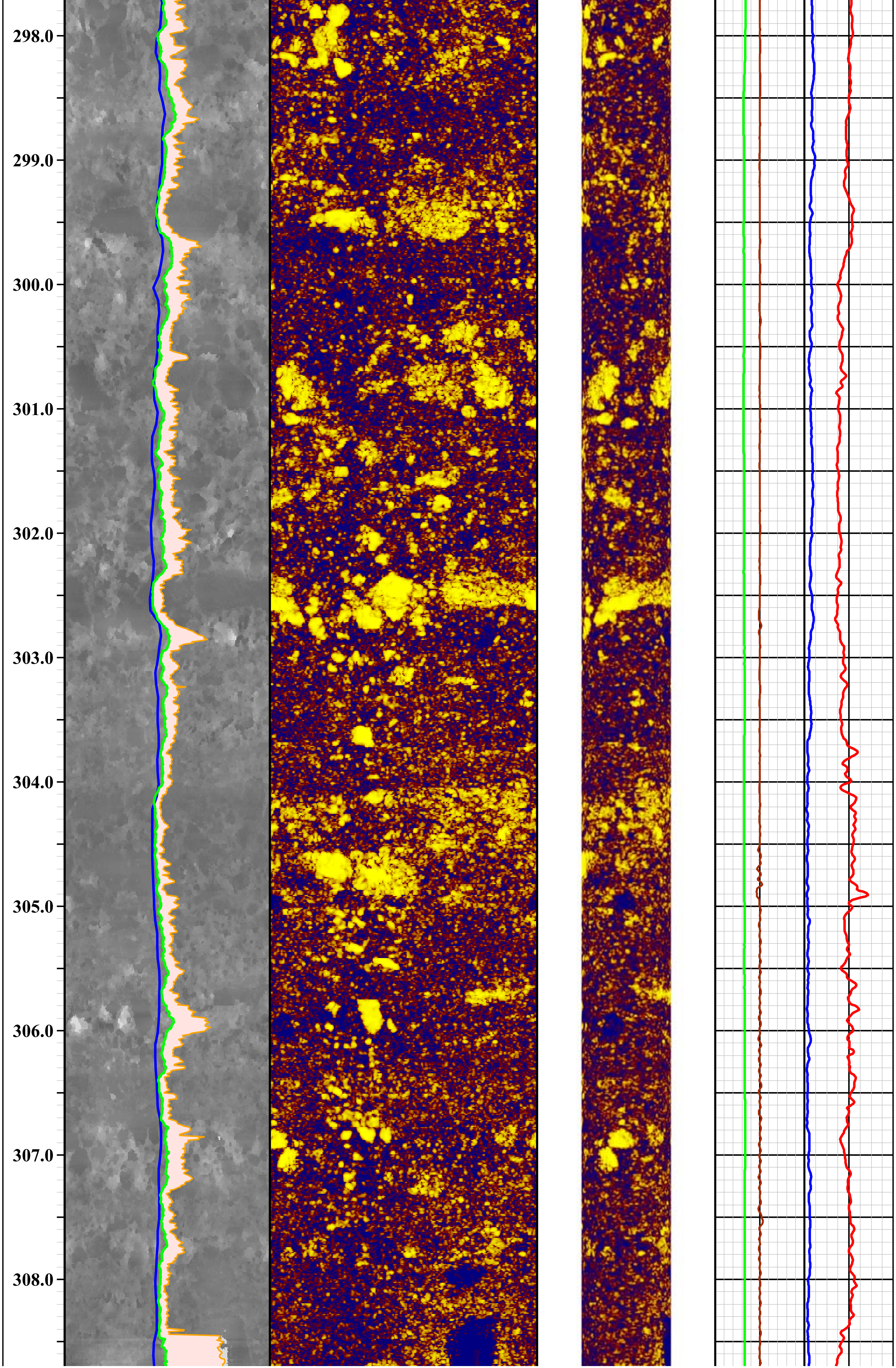

243.0
244.0
245.0
246.0
247.0
248.0
249.0
250.0
251.0
252.0
253.0


254.0
255.0
256.0
257.0
258.0
259.0
260.0
261.0
262.0
263.0
264.0

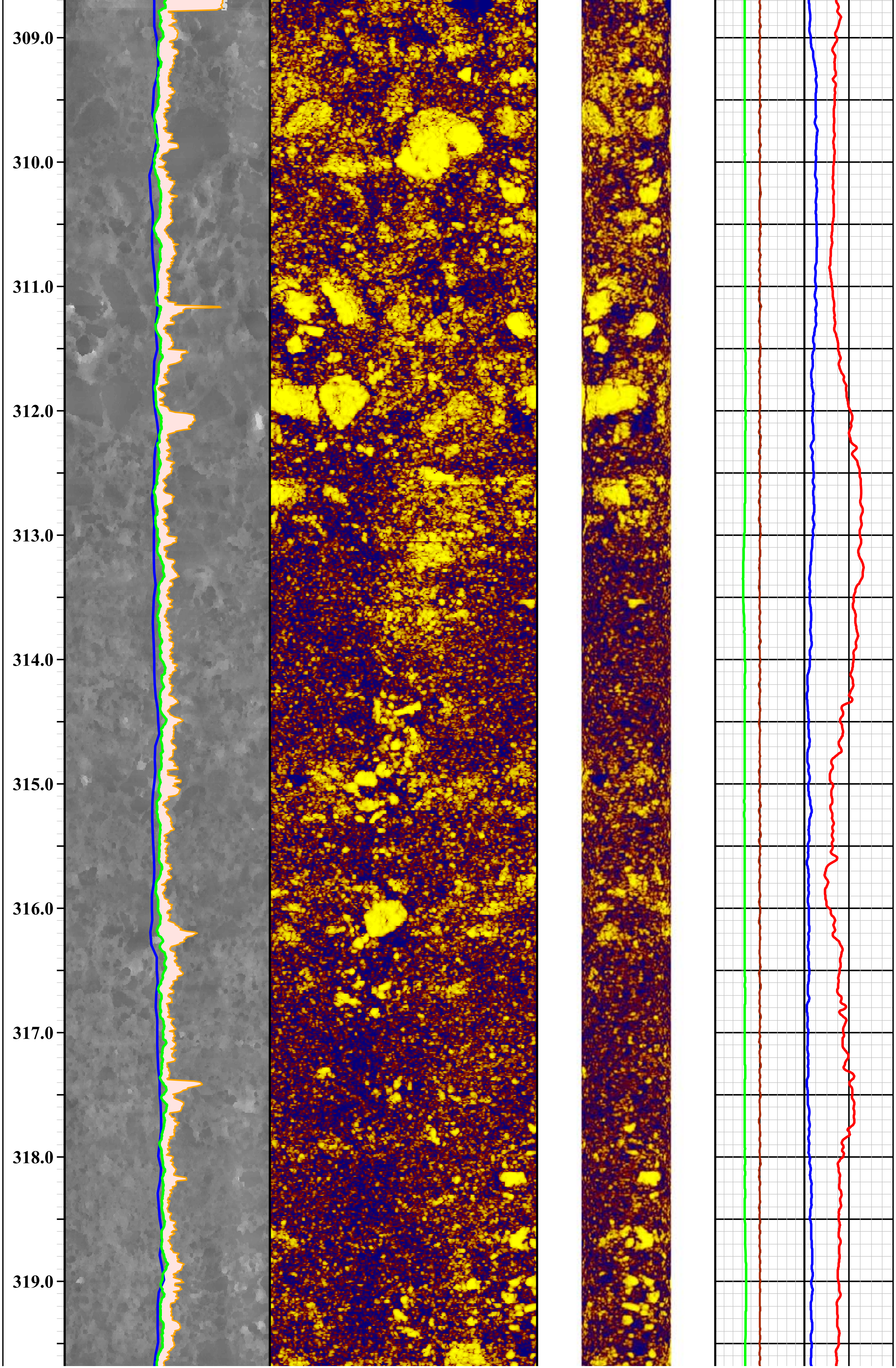

265.0
266.0
267.0
268.0
269.0
270.0
271.0
272.0
273.0
274.0
275.0

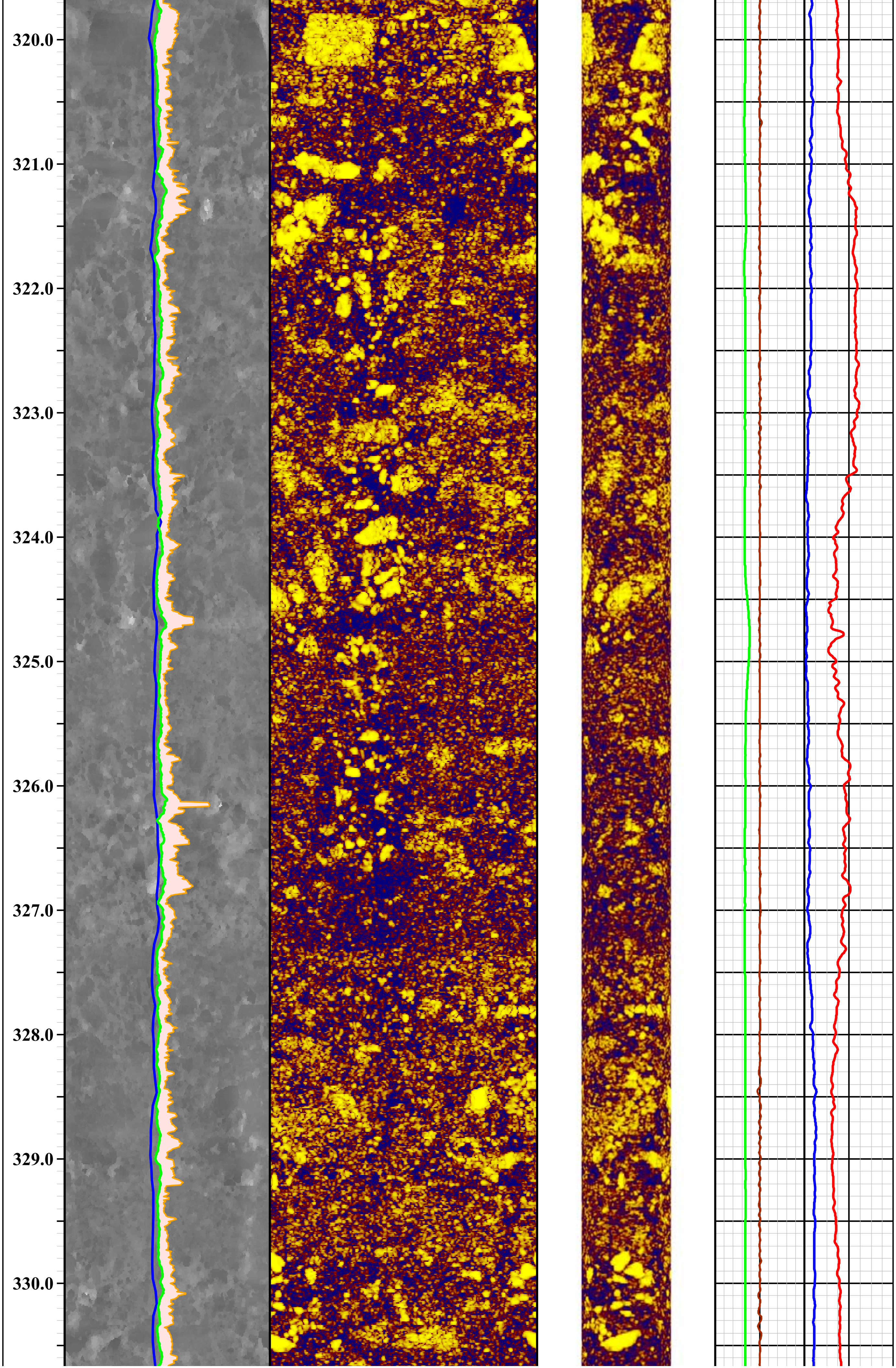

276.0
277.0
278.0
279.0
280.0
281.0
282.0
283.0
284.0
285.0
286.0

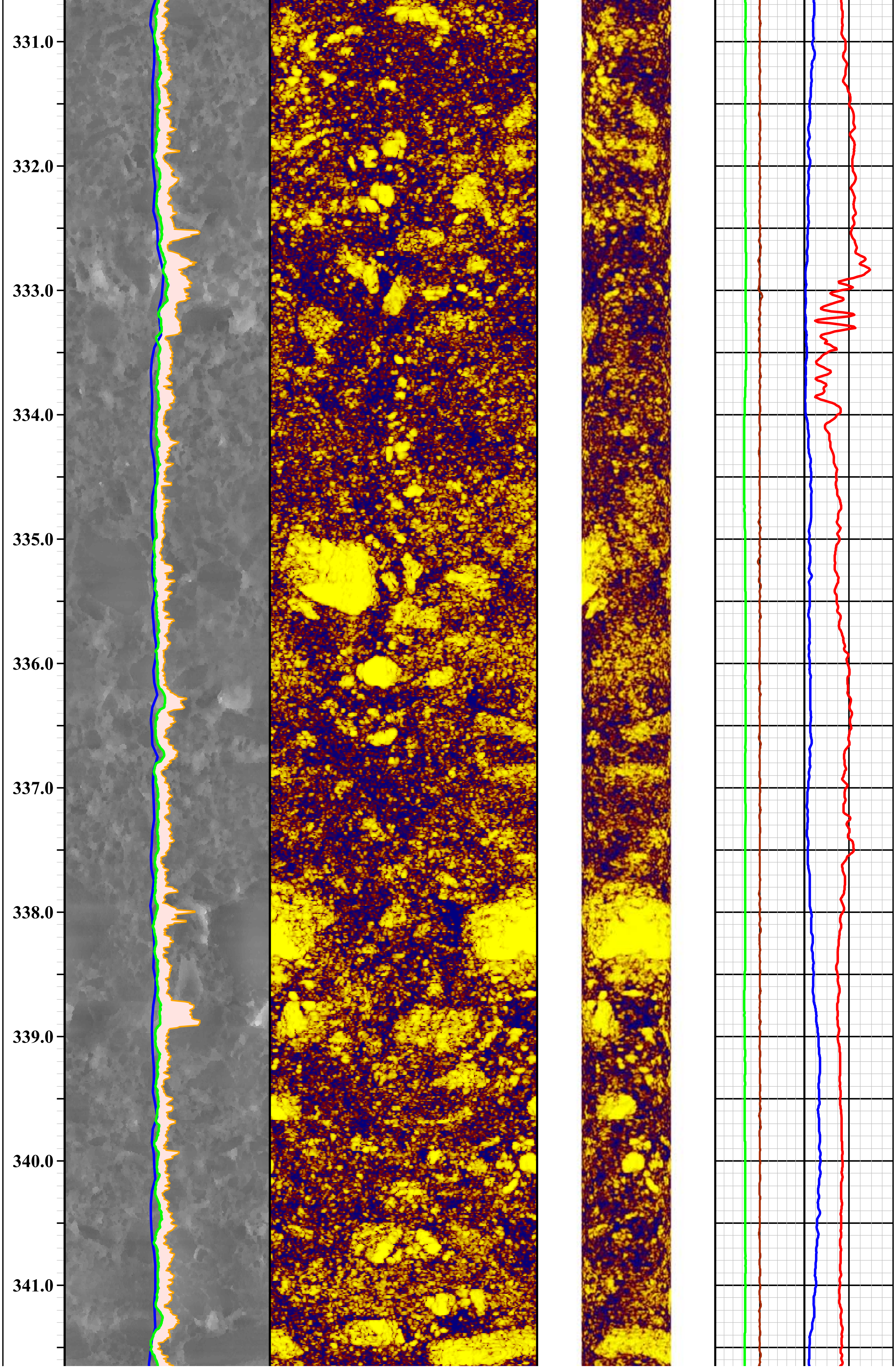

287.0
288.0
289.0
290.0
291.0
292.0
293.0
294.0
295.0
296.0
297.0

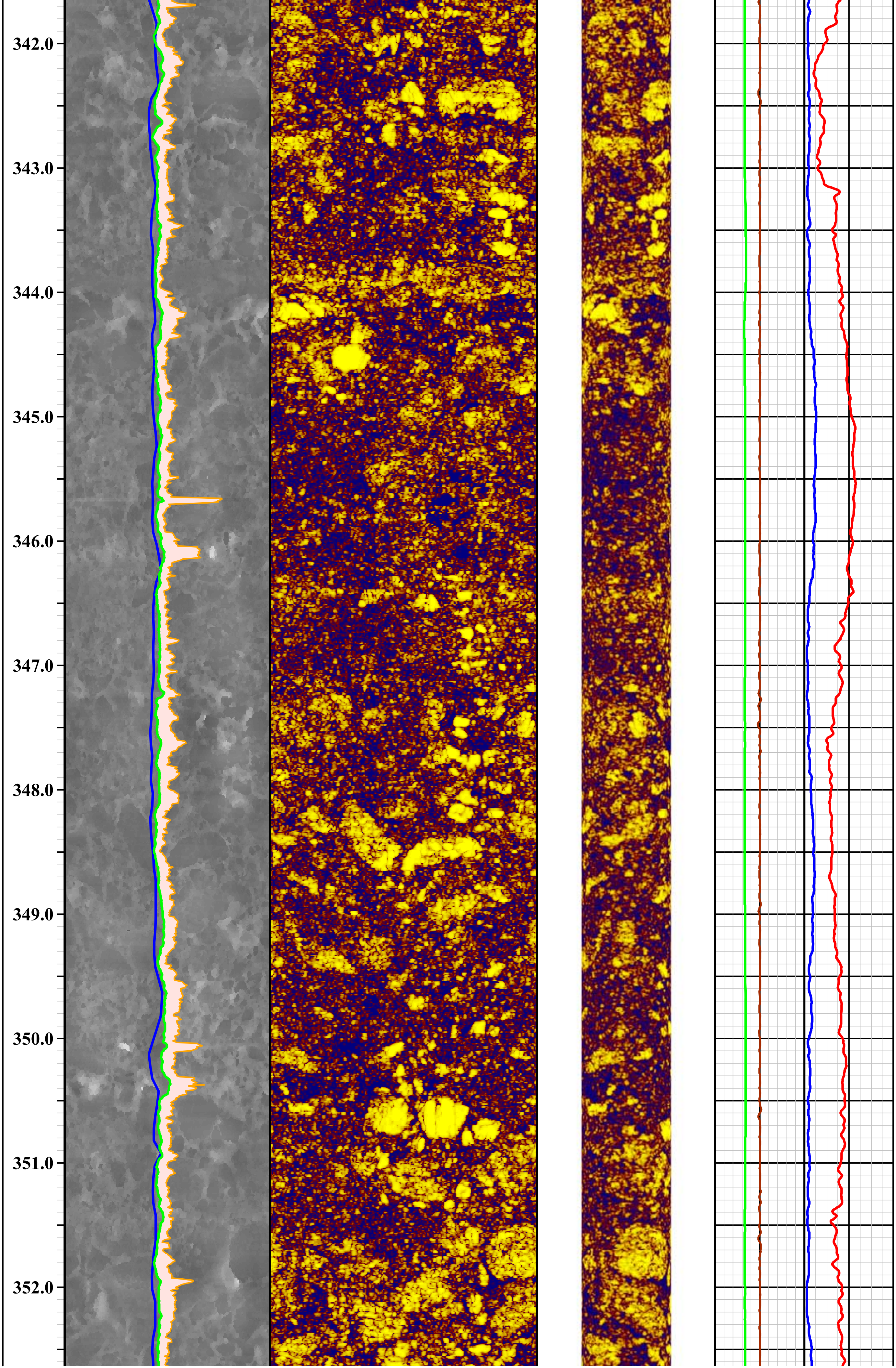


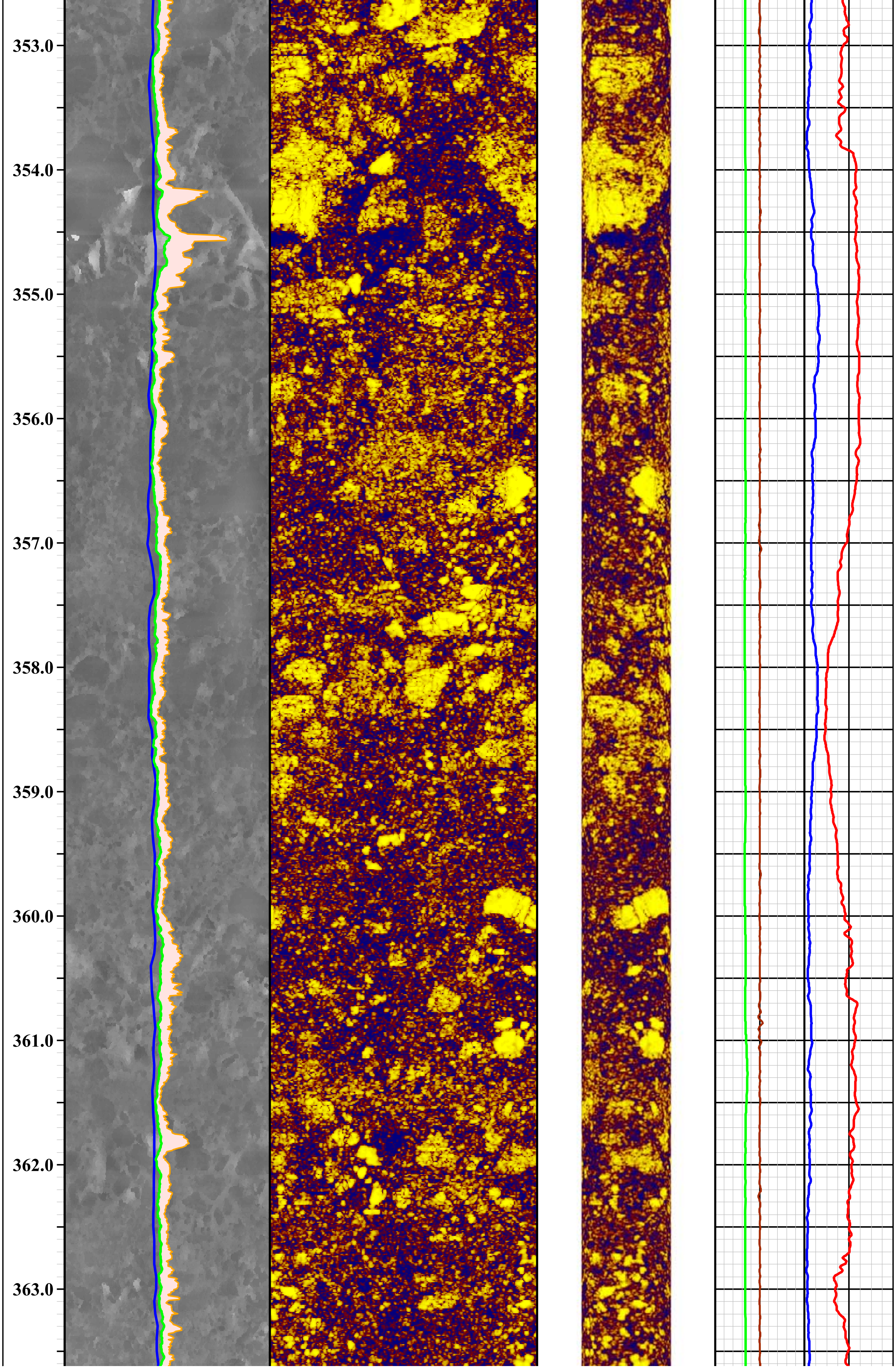
298.0
299.0
300.0
301.0
302.0
303.0
304.0
305.0
306.0
307.0
308.0

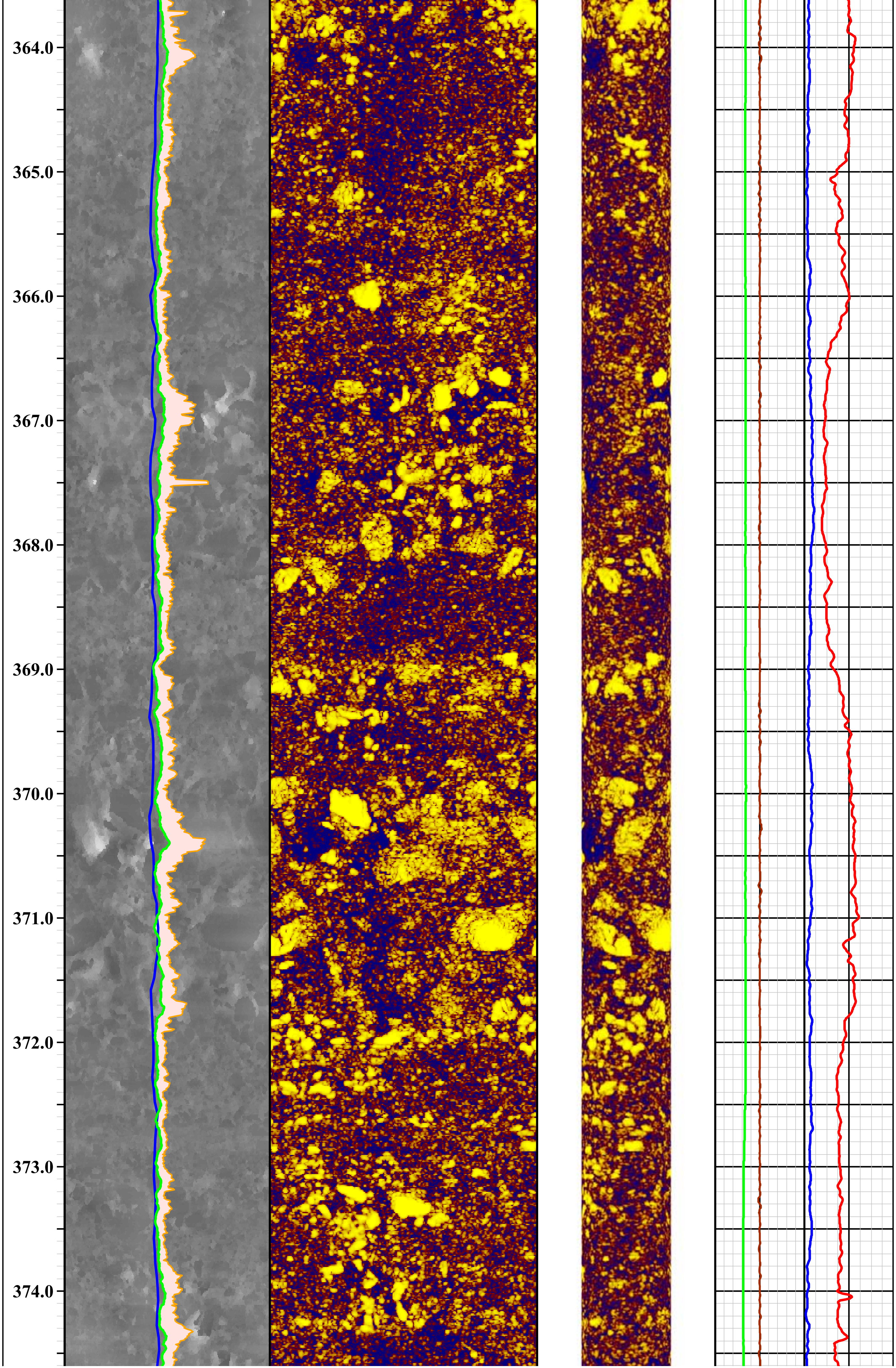

309.0
310.0
311.0
312.0
313.0
314.0
315.0
316.0
317.0
318.0
319.0

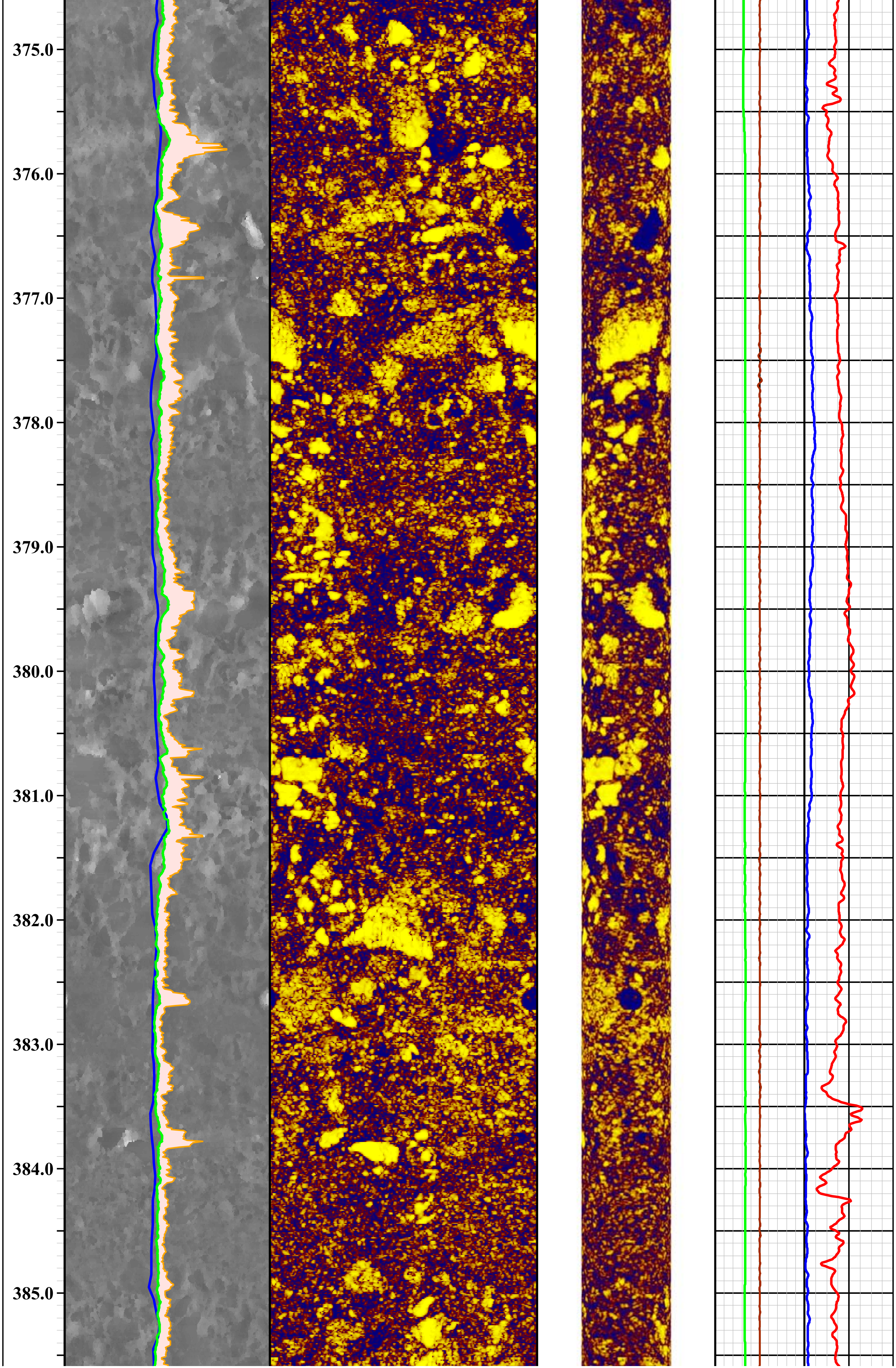

320.0
321.0
322.0
323.0
324.0
325.0
326.0
327.0
328.0
329.0
330.0

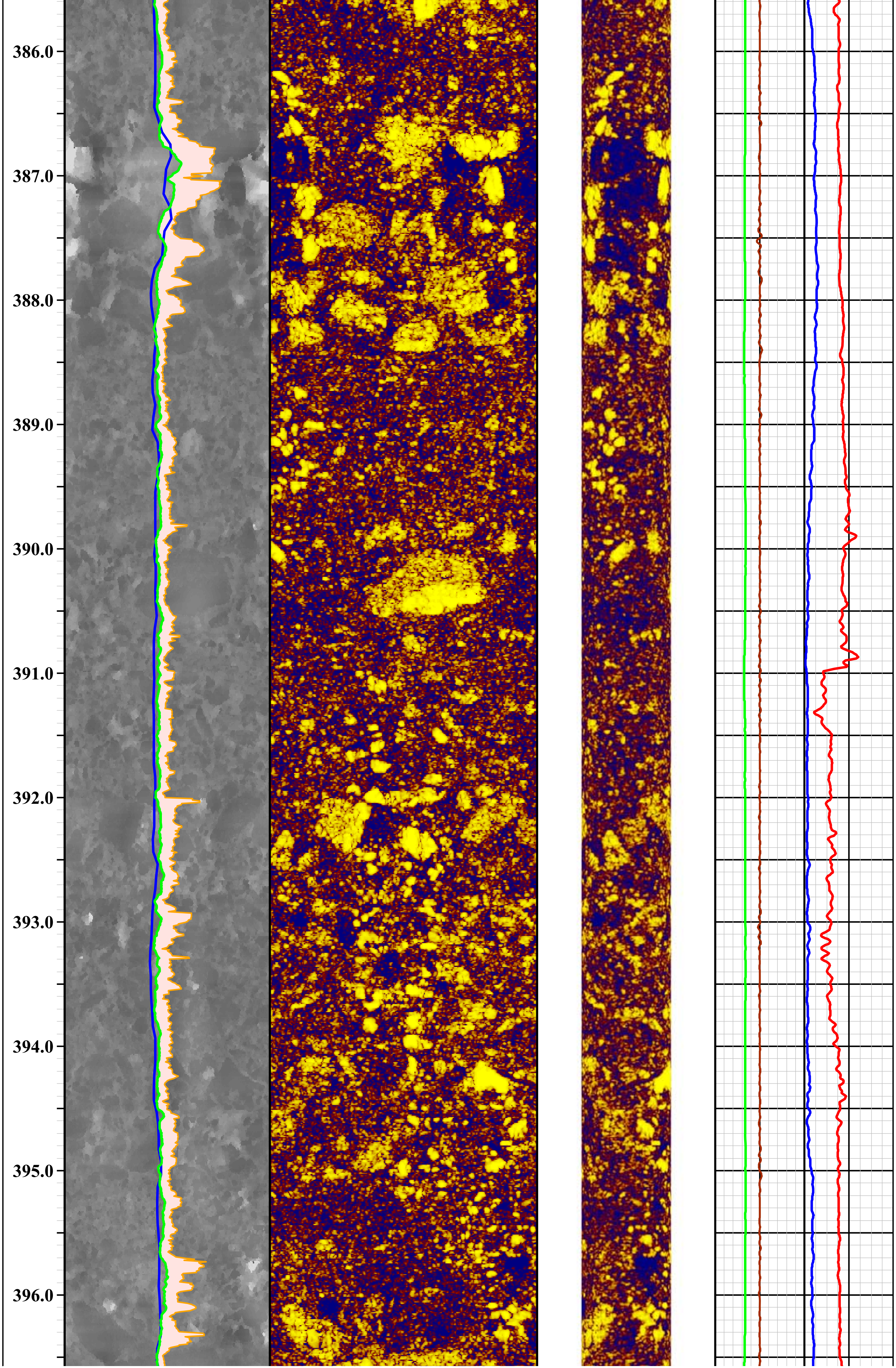

331.0
332.0
333.0
334.0
335.0
336.0
337.0
338.0
339.0
340.0
341.0

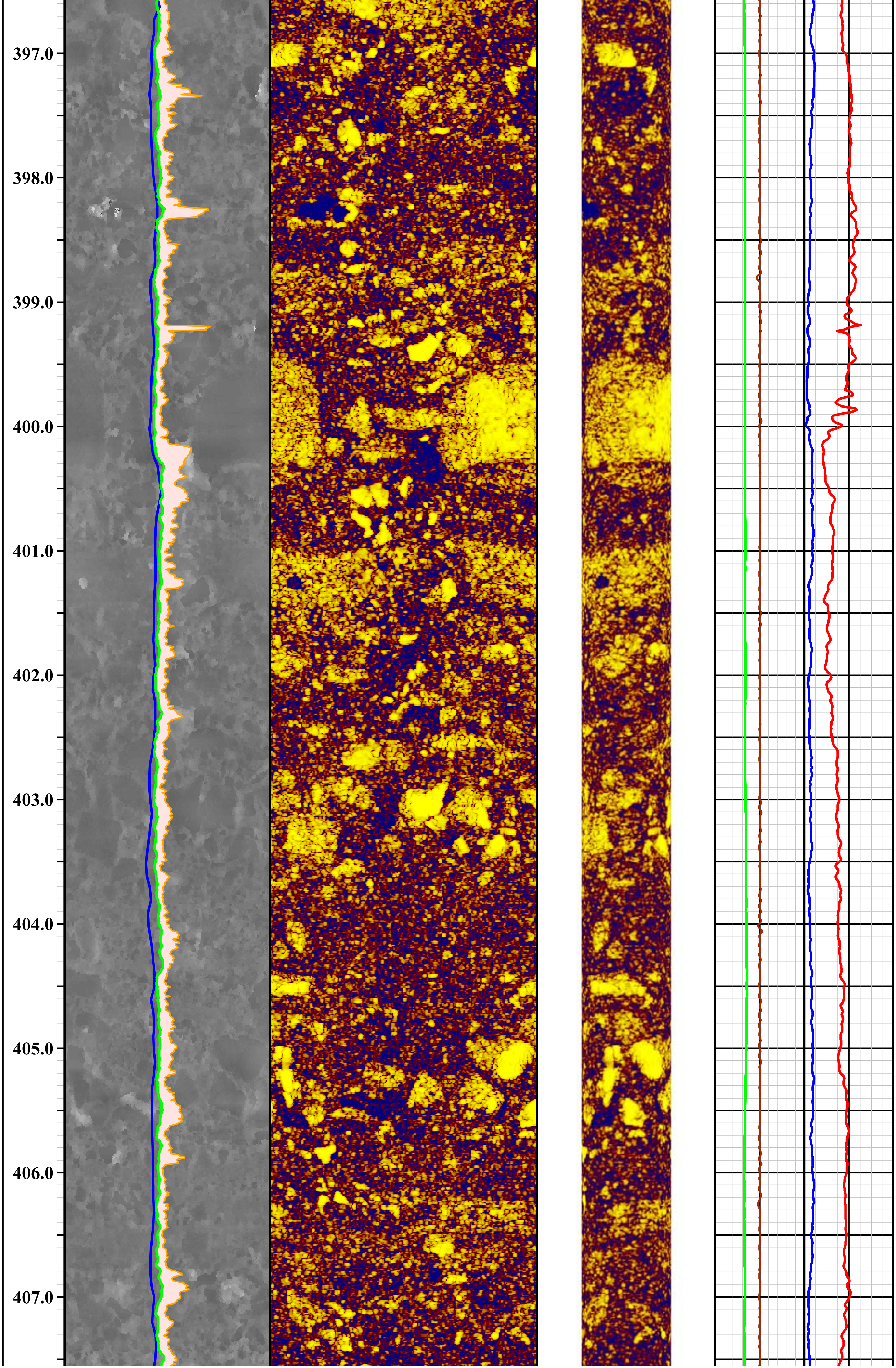

342.0
343.0
344.0
345.0
346.0
347.0
348.0
349.0
350.0
351.0
352.0

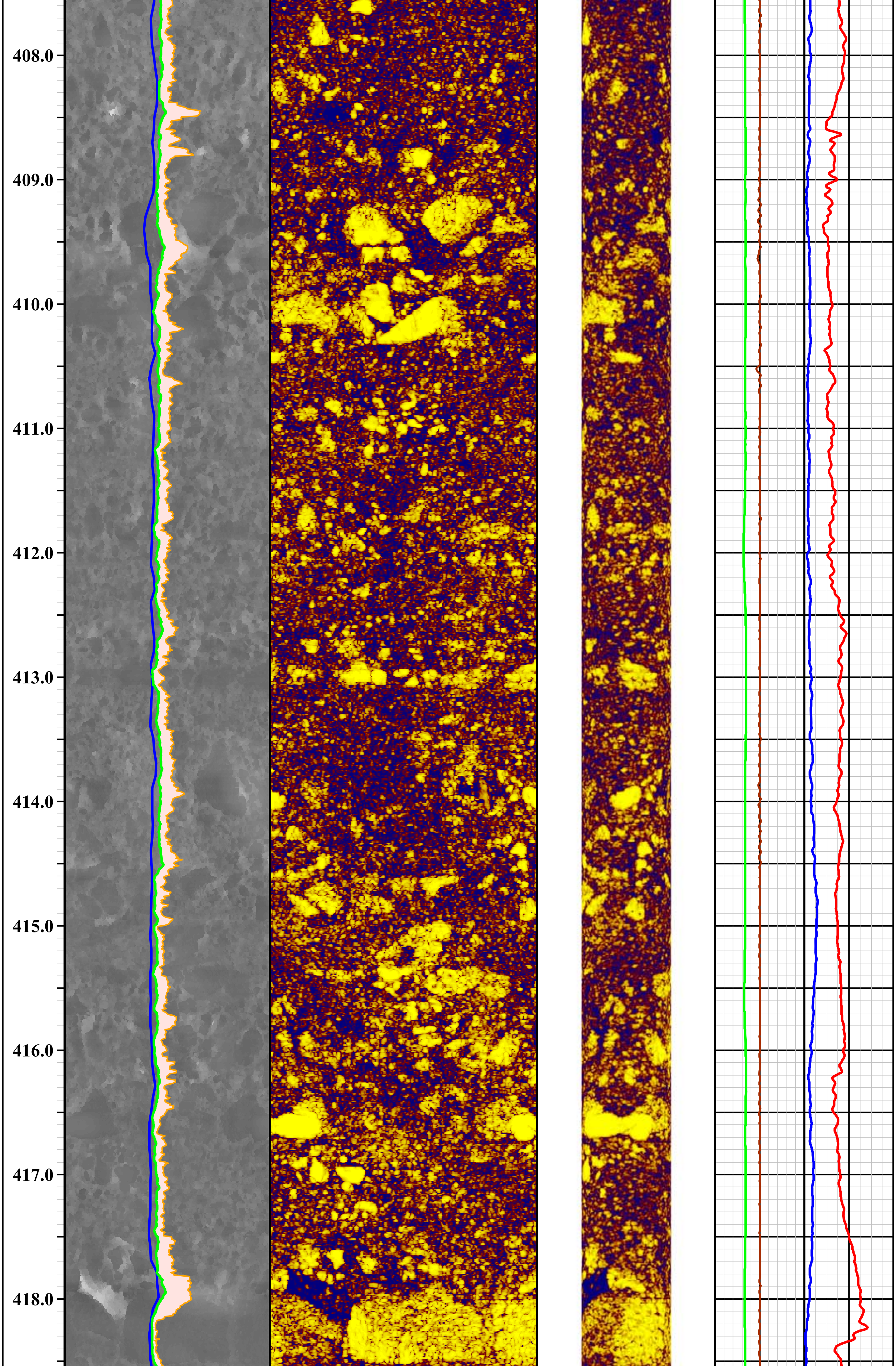

353.0
354.0
355.0
356.0
357.0
358.0
359.0
360.0
361.0
362.0
363.0

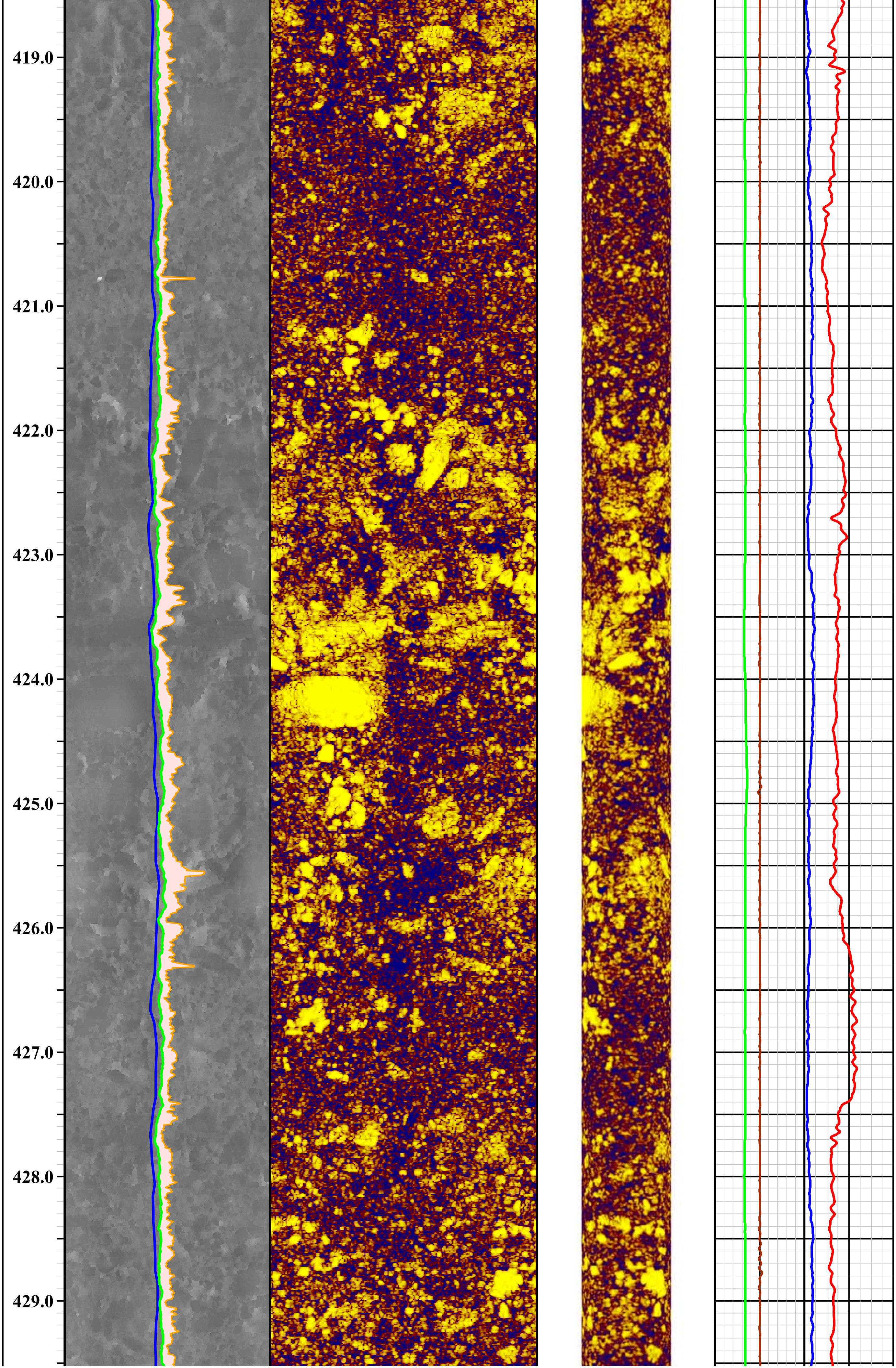

364.0
365.0
366.0
367.0
368.0
369.0
370.0
371.0
372.0
373.0
374.0

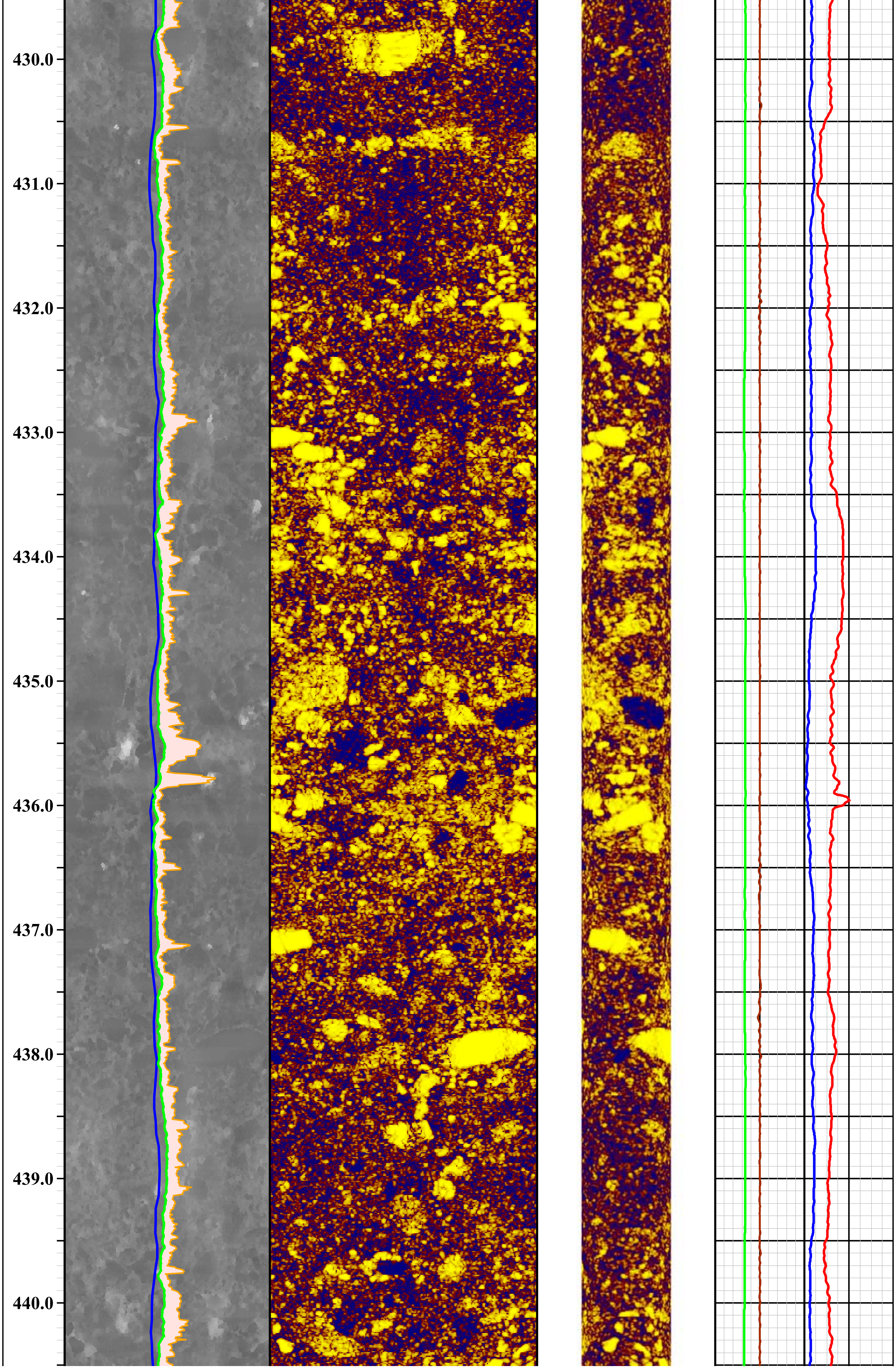

375.0
376.0
377.0
378.0
379.0
380.0
381.0
382.0
383.0
384.0
385.0

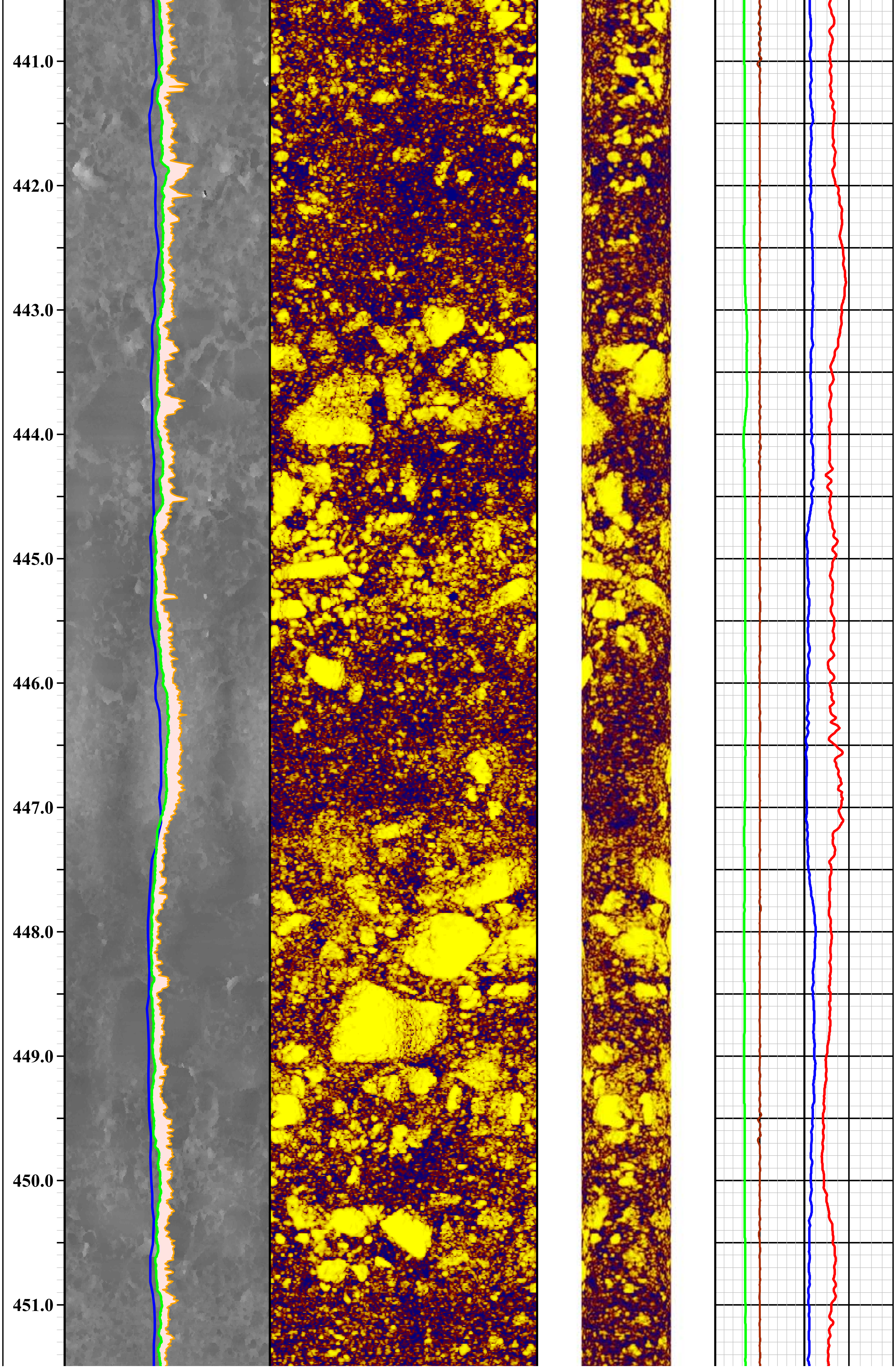

386.0
387.0
388.0
389.0
390.0
391.0
392.0
393.0
394.0
395.0
396.0

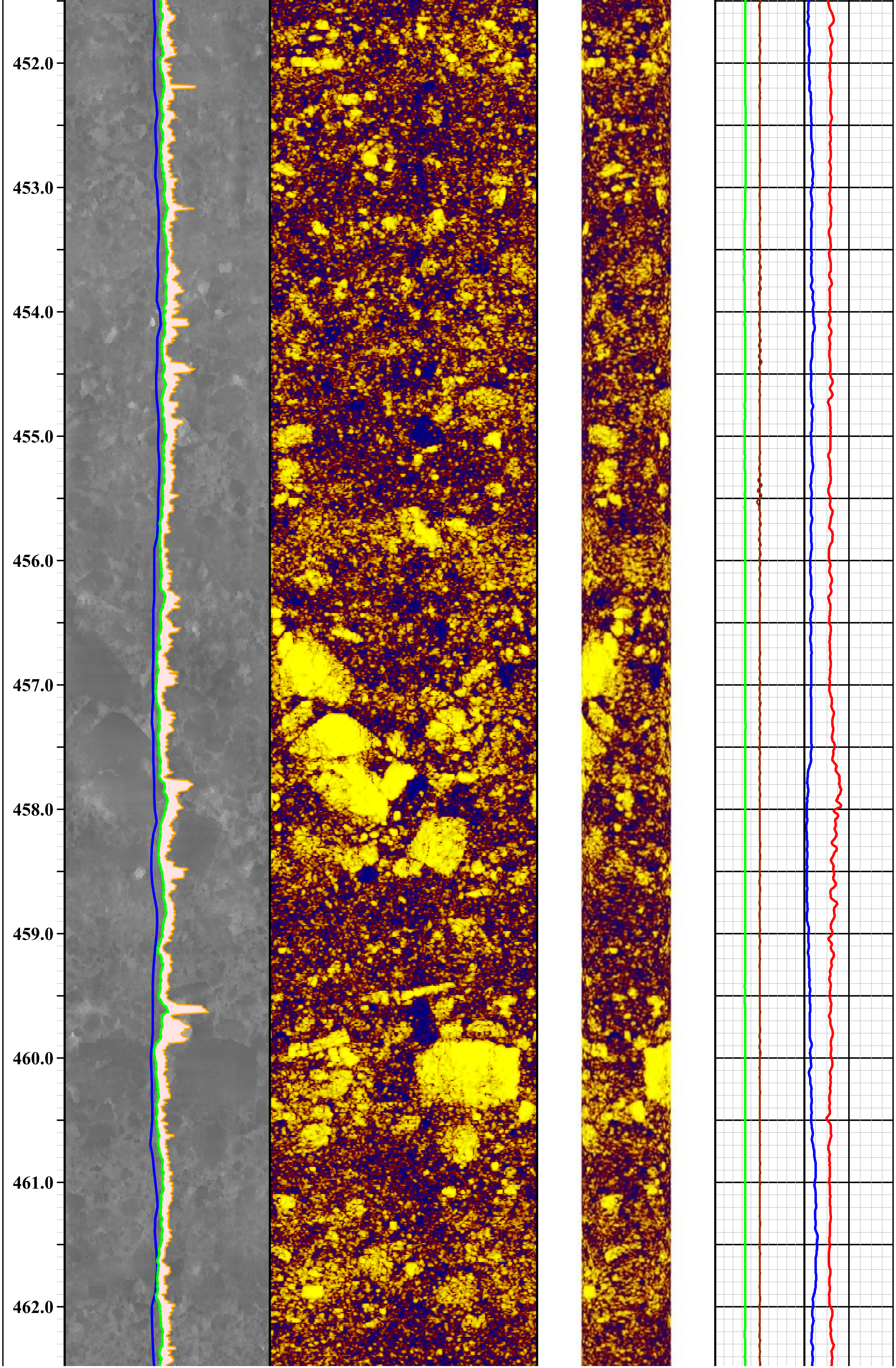

397.0
398.0
399.0
400.0
401.0
402.0
403.0
404.0
405.0
406.0
407.0

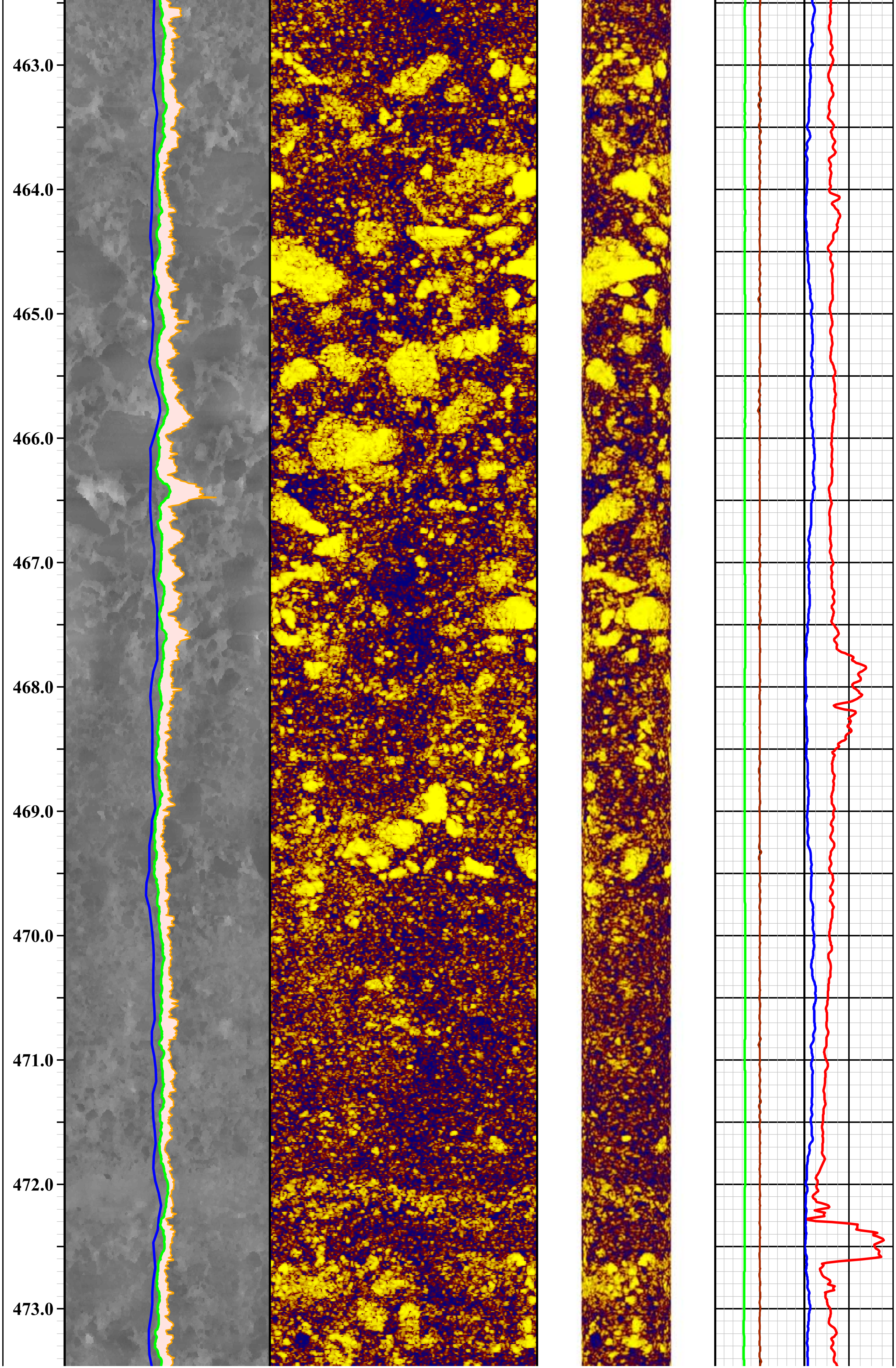

408.0
409.0
410.0
411.0
412.0
413.0
414.0
415.0
416.0
417.0
418.0

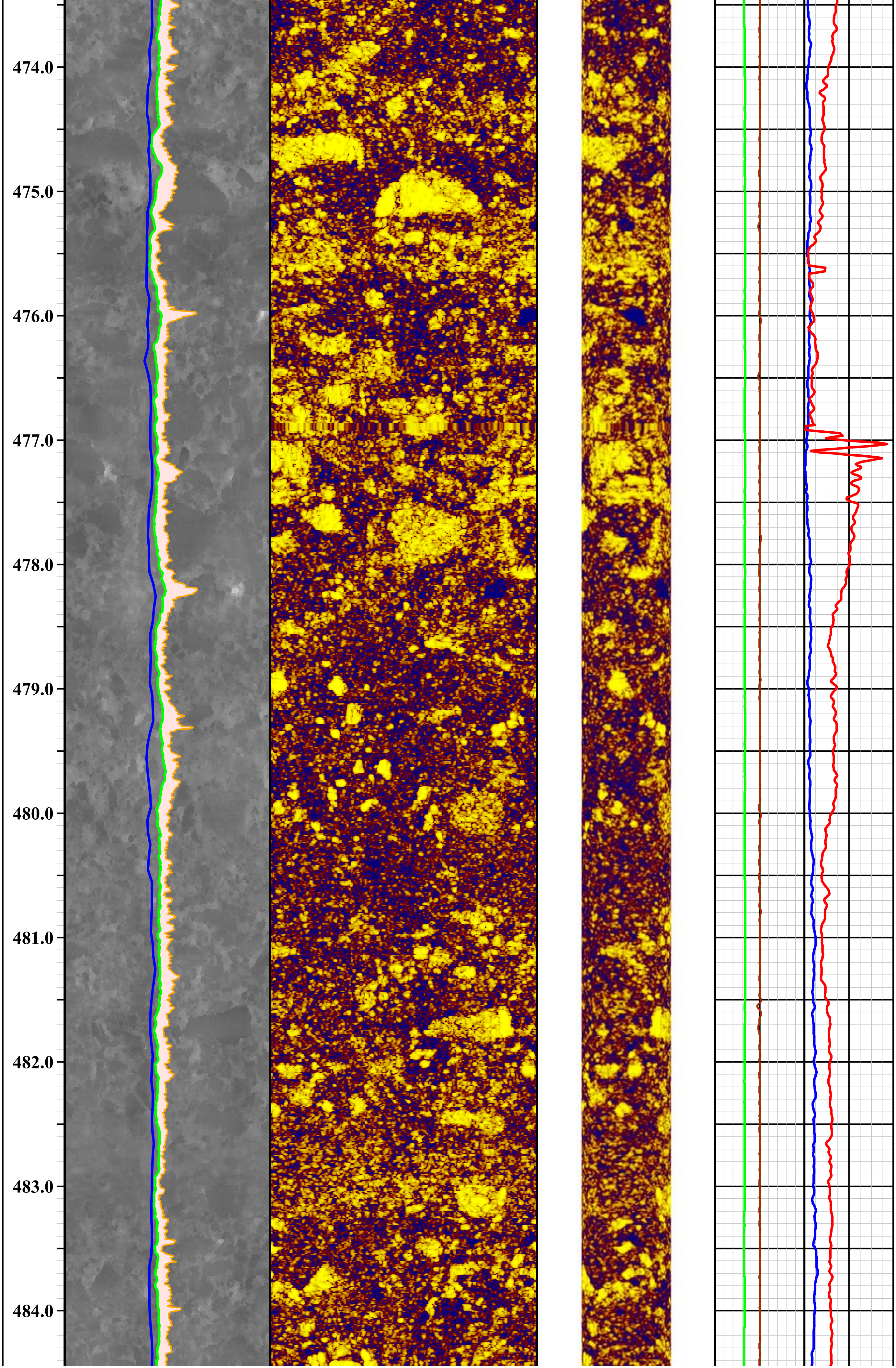

419.0
420.0
421.0
422.0
423.0
424.0
425.0
426.0
427.0
428.0
429.0

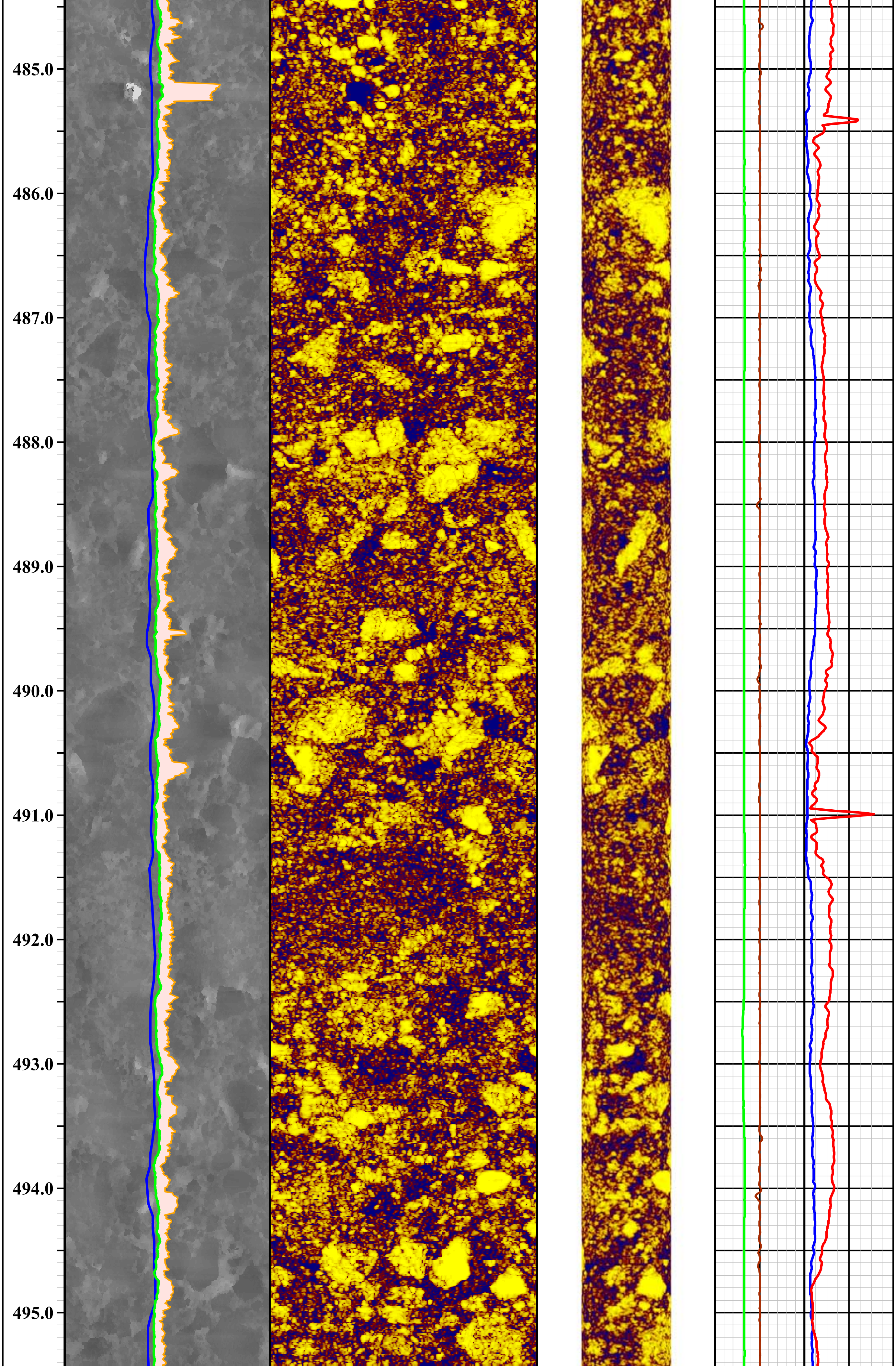

430.0
431.0
432.0
433.0
434.0
435.0
436.0
437.0
438.0
439.0
440.0

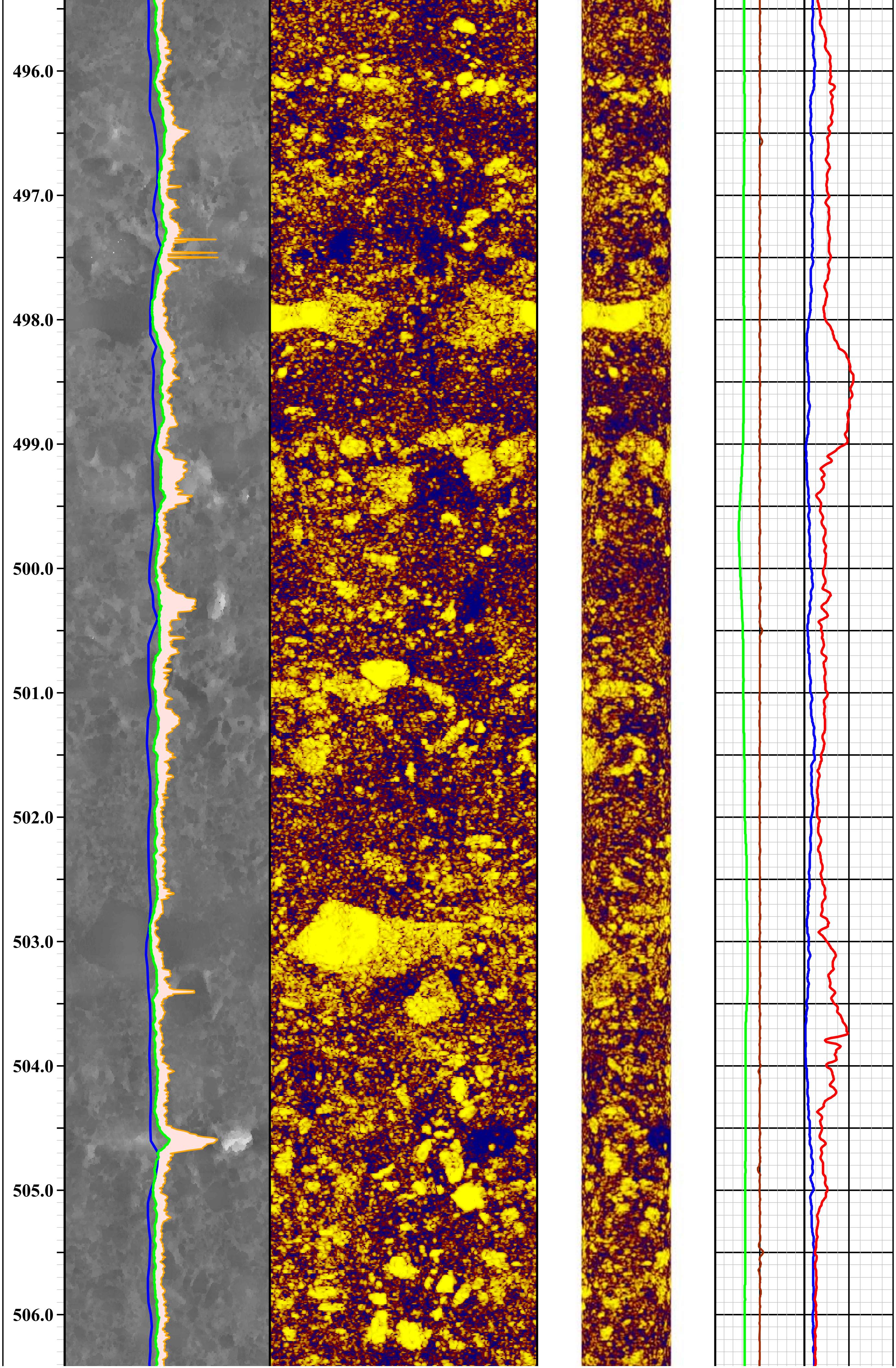

441.0
442.0
443.0
444.0
445.0
446.0
447.0
448.0
449.0
450.0
451.0


452.0
453.0
454.0
455.0
456.0
457.0
458.0
459.0
460.0
461.0
462.0

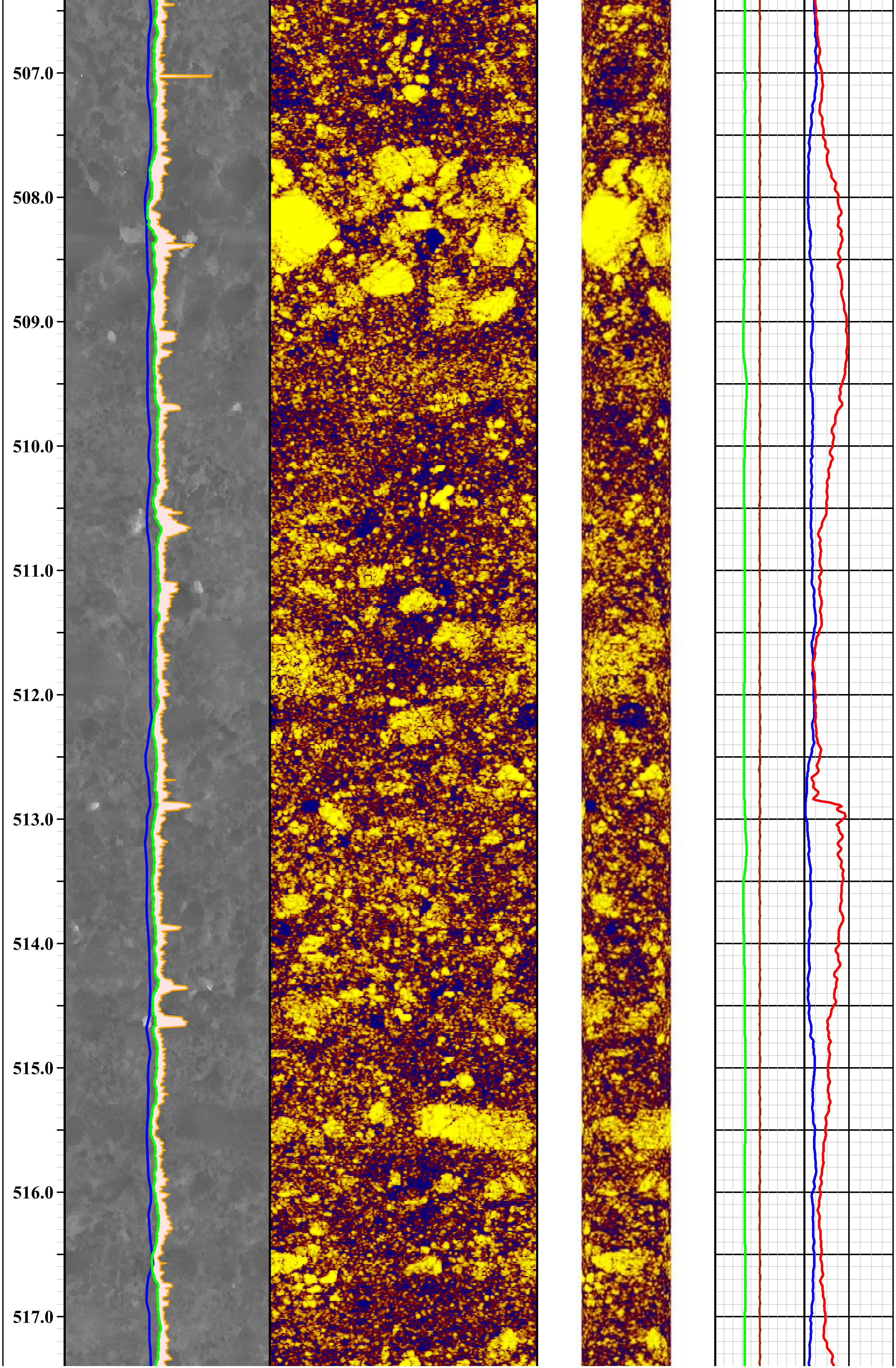

463.0
464.0
465.0
466.0
467.0
468.0
469.0
470.0
471.0
472.0
473.0

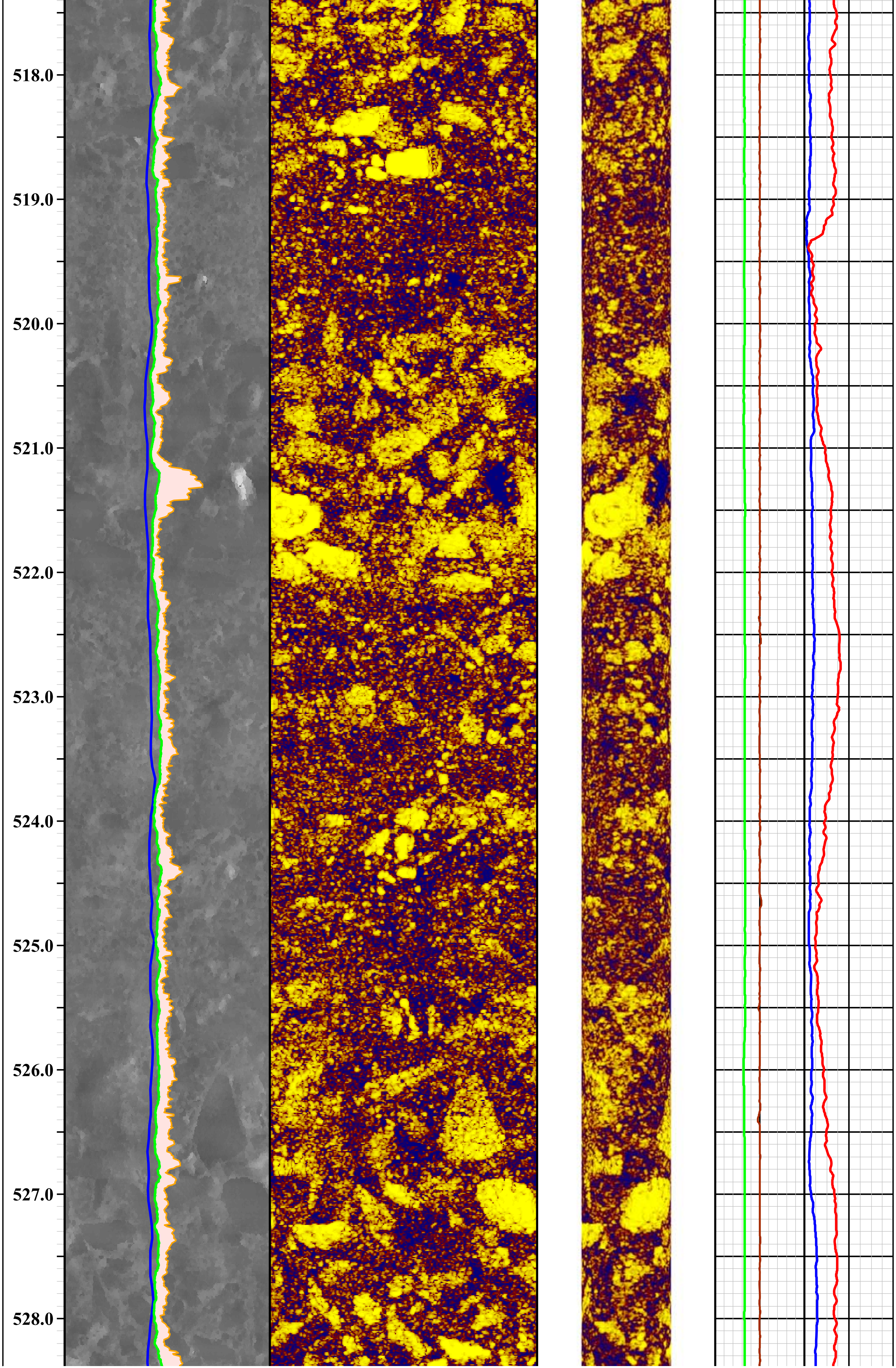

474.0
475.0
476.0
477.0
478.0
479.0
480.0
481.0
482.0
483.0
484.0

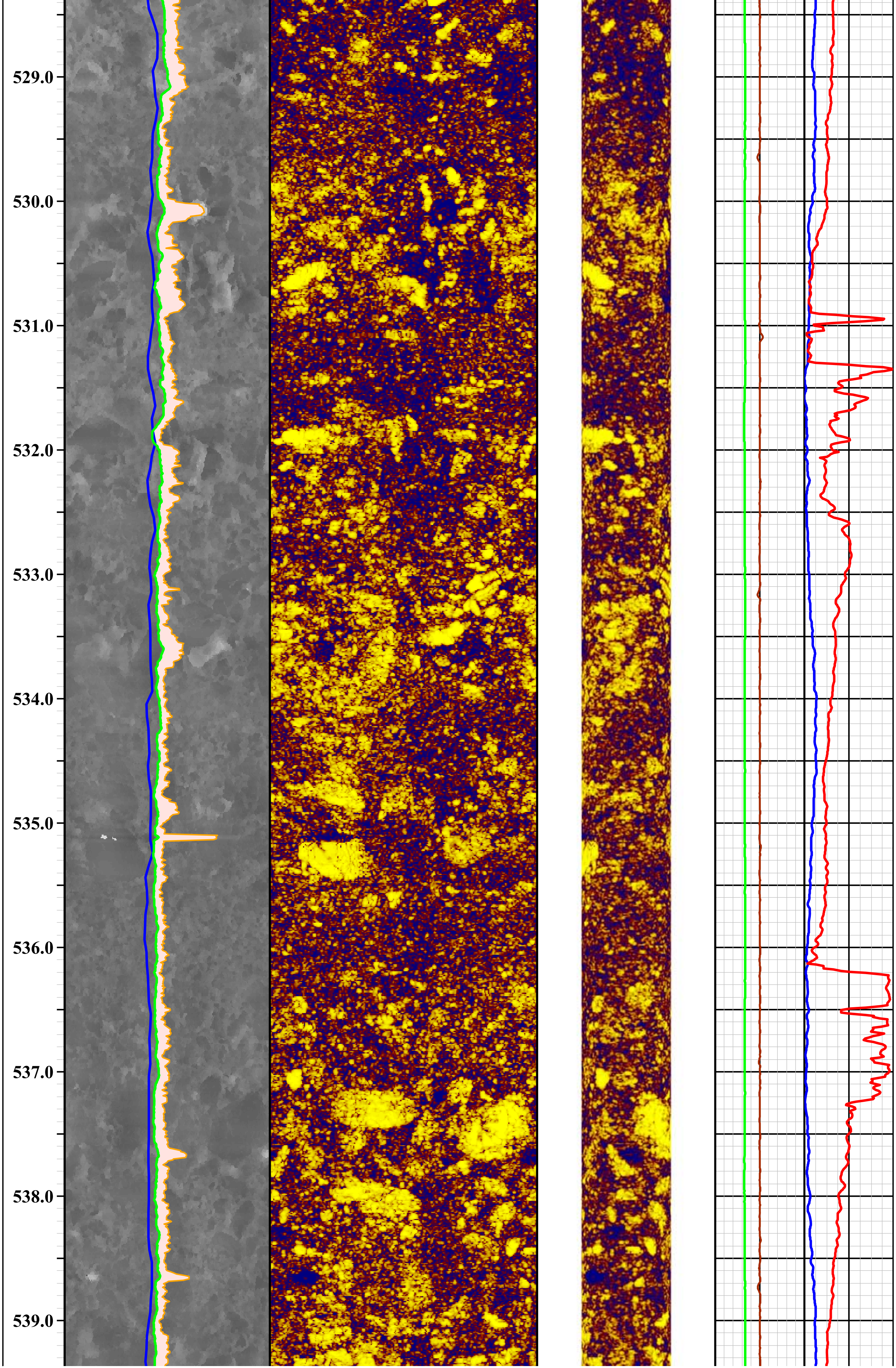

485.0
486.0
487.0
488.0
489.0
490.0
491.0
492.0
493.0
494.0
495.0

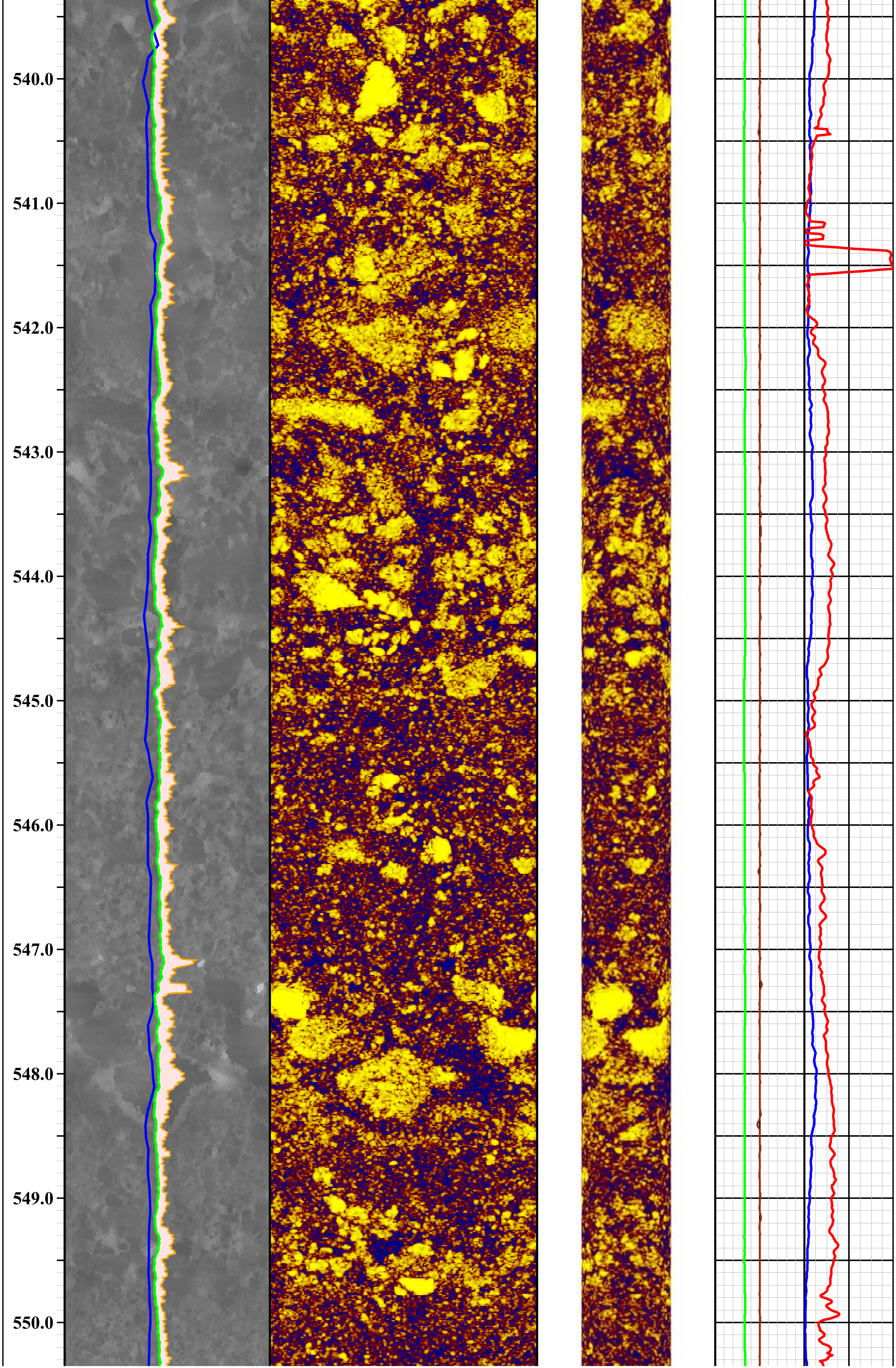


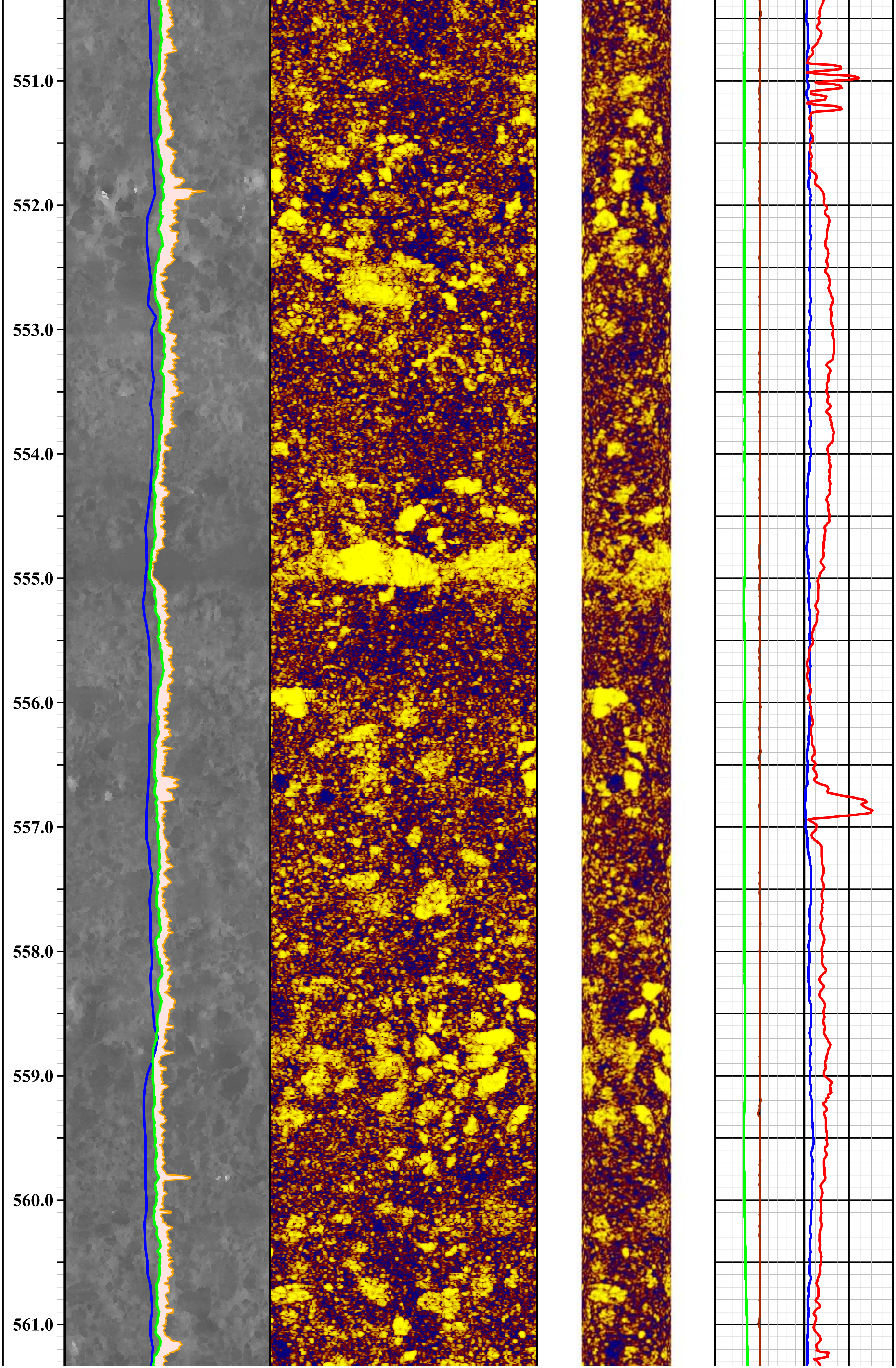
496.0
497.0
498.0
499.0
500.0
501.0
502.0
503.0
504.0
505.0
506.0

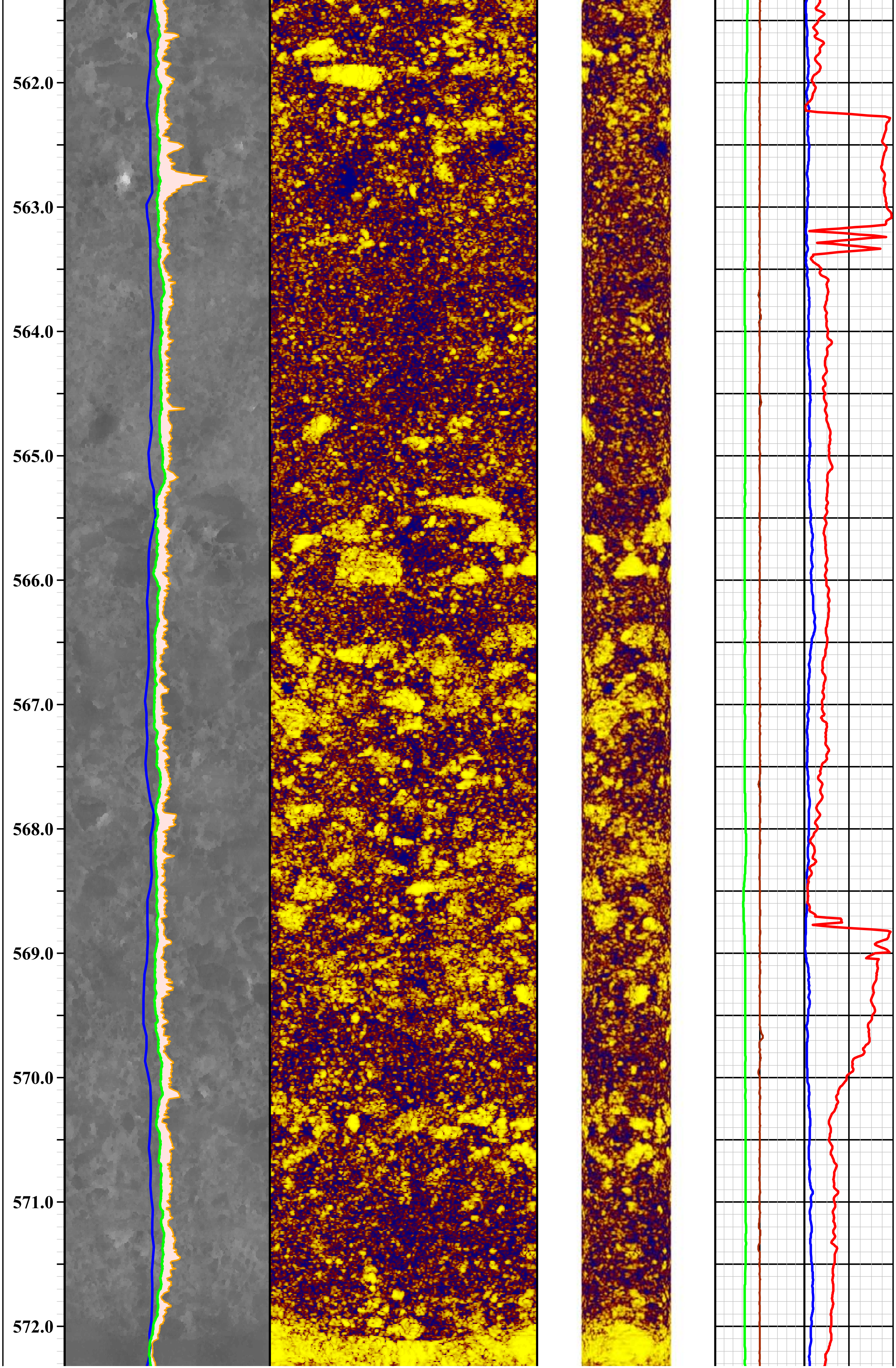

507.0
508.0
509.0
510.0
511.0
512.0
513.0
514.0
515.0
516.0
517.0

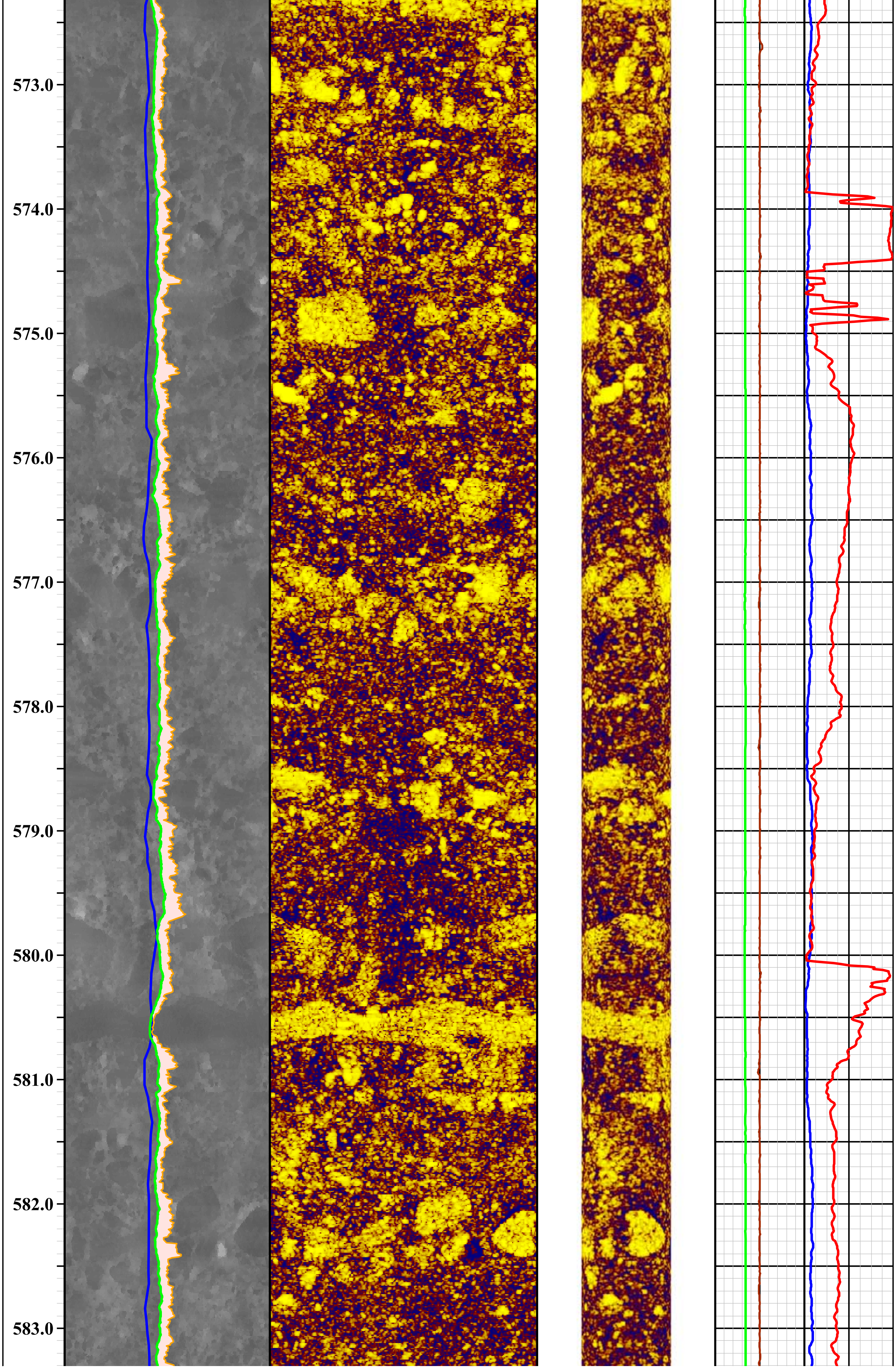

518.0
519.0
520.0
521.0
522.0
523.0
524.0
525.0
526.0
527.0
528.0

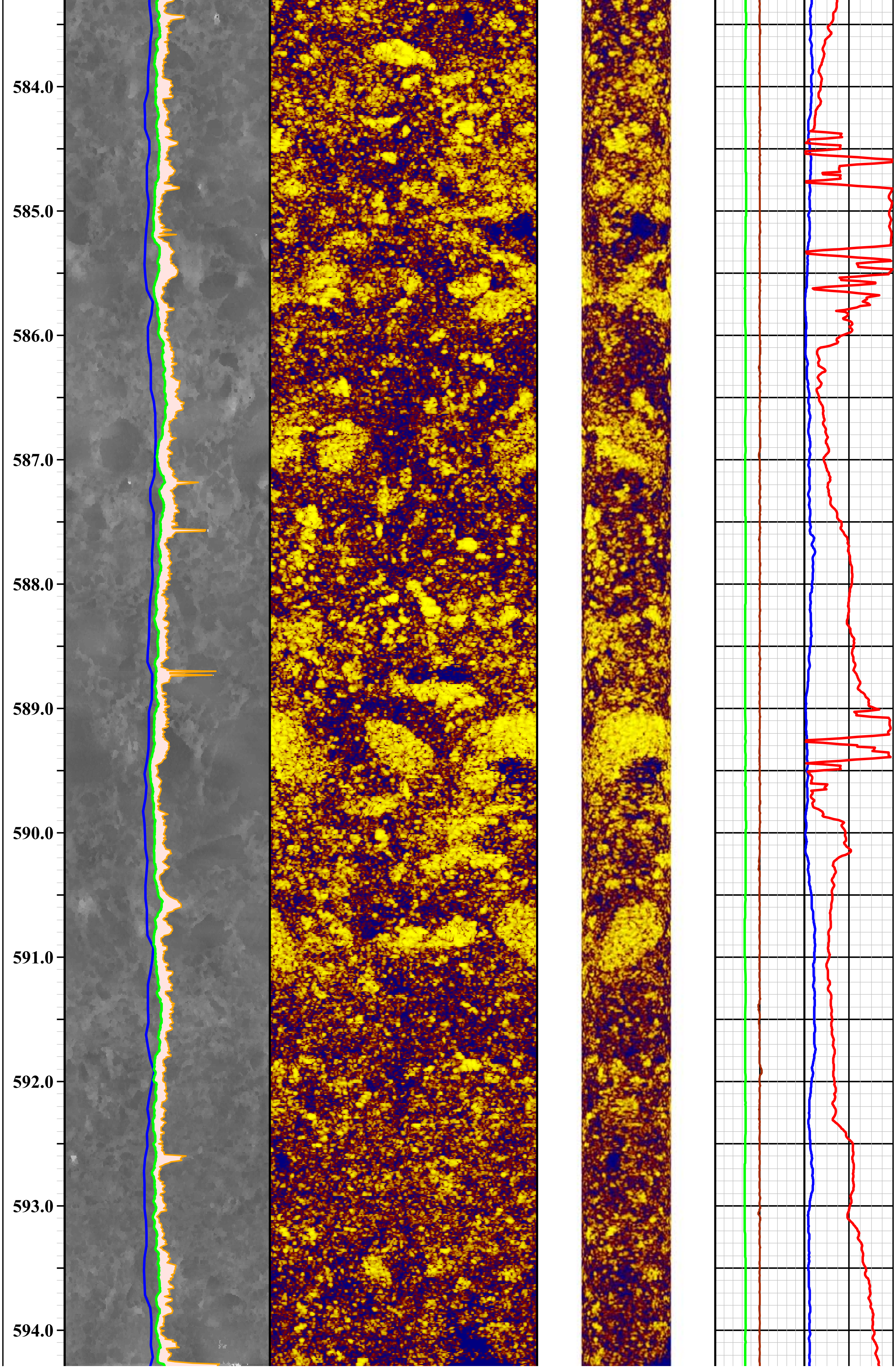

529.0
530.0
531.0
532.0
533.0
534.0
535.0
536.0
537.0
538.0
539.0

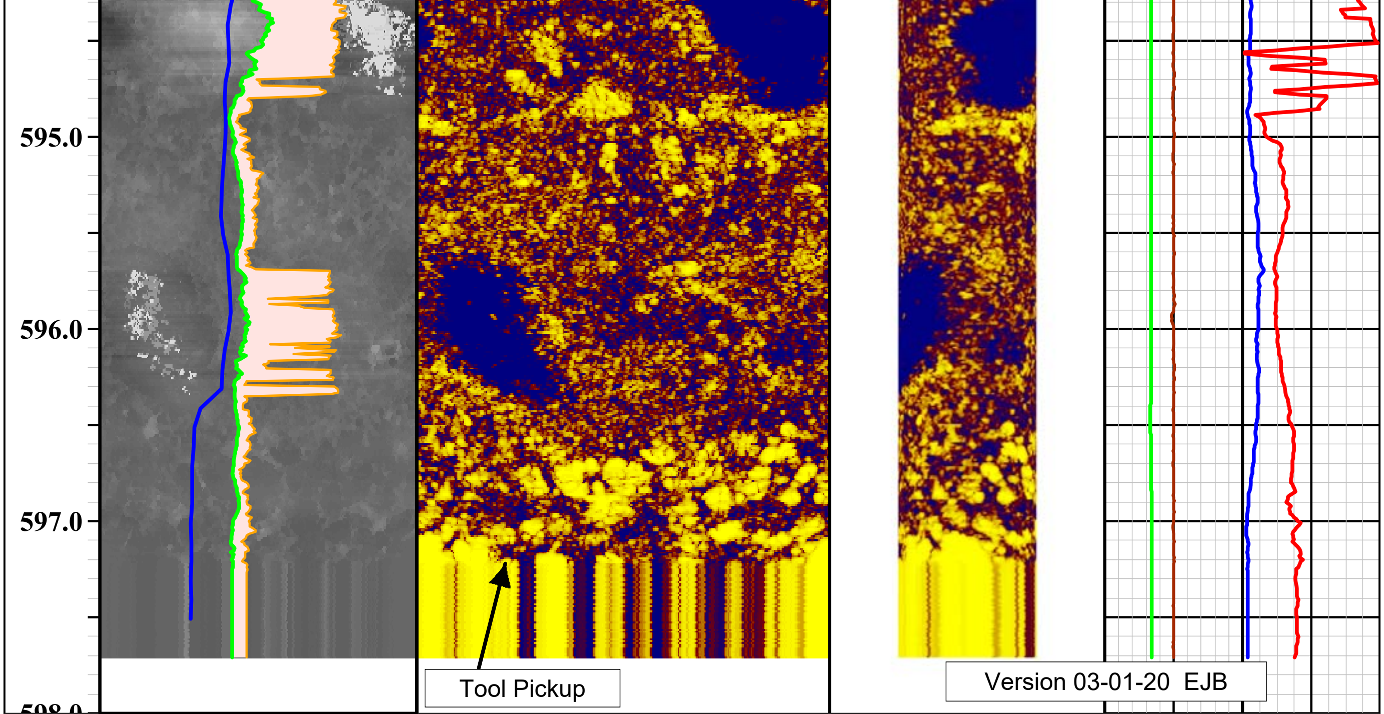

540.0
541.0
542.0
543.0
544.0
545.0
546.0
547.0
548.0
549.0
550.0


551.0
552.0
553.0
554.0
555.0
556.0
557.0
558.0
559.0
560.0
561.0


562.0
563.0
564.0
565.0
566.0
567.0
568.0
569.0
570.0
571.0
572.0


573.0
574.0
575.0
576.0
577.0
578.0
579.0
580.0
581.0
582.0
583.0


584.0
585.0
586.0
587.0
588.0
589.0
590.0
591.0
592.0
593.0
594.0



Enlargements
5 Inches 12
Ave-Acoustic Caliper
5 Inches 12
Max-Acoustic Caliper
5 Inches 12
3-Arm Caliper
0° 90° 180° 270° 0°
Oriented Mag North
Centralized TT

0 3000
ARI
0° 90° 180° 270° 0°
Oriented Mag North
Amplitude-Static
0° 90° 180° 270° 0°
Oriented Mag North
Amplitude-NM

-0°
3-D View

0.8 g 1.2
Gravity
40 uT 60
Mag Field

0 360
Azimuth
0 Deg 8
Tilt

1in:1ft
Depth

Skunk Camp RC20-2 ABI40 2G Summary ~149.6' - ~597.2'

QL ABI-40 Acoustic Borehole Imager

Probe Top = Depth Ref.

Tool SN: 113403 & 984701

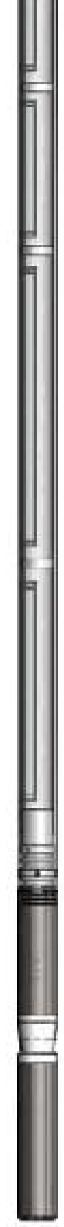
Single Conductor MSI Probe Top

APS Probe Orientation Sensor
3-Axis Magnetometer
3-Axis Accellerometer

Probe Length = 1.72 m or 5.63 ft

Probe Weight = 6.7 kg or 14.7 lbs

Distance from Acoustic Image Window to Orientation Sensor = 1.2 m or 4 ft



Inclination Accuracy = +/- 0.5 deg
Azimuth Accuracy = +/- 1.0 deg

Beam Width = 3 mm

Frequency = 1.2 MHz

Temperature Range: 0 - 70 Deg C (32 - 158 Deg F)
Pressure Range: 0 - 200 bar (0 - 2900 psi)

Run Centralized with External Bow Spring Centralizers

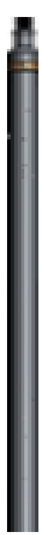
Can only be logged in fluid filled holes

ABI Imaging Window

1.6" or 40 mm Diameter

MSI Gamma-Caliper-Temperature-Fluid Resistivity SN 4953

Probe Top = Depth Ref.



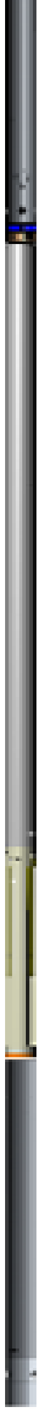
Single Conductor MSI Probe Top

Probe Length = 2.59 m or 8.5 ft
Probe Weight = 6.80 kg or 15.0 lbs

Natural Gamma and Caliper can only be collected logging up hole.

Fluid Temperature/Resistivity can only be collected logging down hole.

Temperature Rating: 70 Deg C (158 Deg F)
Presure Rating: 200 bar (2900 psi)



Natural Gamma Ray = 0.76 m (29.75 in)

3-Arm Caliper = 1.44 m (56.75 in)

Distance from tool top: 2.20 m (86.5 in)

Available Arm Sizes: 3", 9", and 15"

TFR (Temperature/Fluid Resistivity) = 0.39 m (15.5 in)

1.375" or 34.9 mm Diameter

Southwest Exploration Services, LLC borehole geophysics & video services	Company	RESOLUTION COPPER MINING
	Well	RC20-2
	Field	SKUNK CAMP
	County	GILA
	State	ARIZONA

Final — **Acoustic Televiewer Summary**

Southwest Exploration Services, LLC
borehole geophysics & video services

COMPANY	RESOLUTION COPPER MINING
WELL ID	RC20-2
FIELD	SKUNK CAMP
COUNTY	GILA
STATE	ARIZONA

TYPE OF LOGS: 4 RX SONIC
MORE: GAMMA - CALIPER

LOCATION

SEC TWP RGE

OTHER SERVICES
OPTICAL TELEVIEWER
ACOUSTIC TELEVIEWER
TEMP / FLUID RES.
E-LOG

PERMANENT DATUM		ELEVATION	K.B.
LOG MEAS. FROM	GROUND LEVEL	ABOVE PERM. DATUM	D.F.
DRILLING MEAS. FROM	GROUND LEVEL		G.L.

DATE	02-23-20	TYPE FLUID IN HOLE	FORMATION WATER
RUN No	3	MUD WEIGHT	N/A
TYPE LOG	SONIC-GAMMA-CALIPER	VISCOSITY	N/A
DEPTH-DRILLER	600.0 FT	LEVEL	~150 FT
DEPTH-LOGGER	599.9 FT	MAX. REC. TEMP.	21.5 Deg C
BTM LOGGED INTERVAL	599.9 FT	IMAGE ORIENTED TO:	N/A
TOP LOGGED INTERVAL	140.0 FT	SAMPLE INTERVAL	0.25 FT
DRILLER / RIG#	NATIONAL DRILLING	LOGGING TRUCK	TRUCK #310
RECORDED BY / Logging Eng.	E. BEAM / D. ALP	TOOL STRING/SN	ALT 4 RX SONIC SN 4572
WITNESSED BY	NATIONAL DRILLING	LOG TIME:ON SITE/OFF SITE	1:30 PM

RUN	BOREHOLE RECORD			CASING RECORD			
NO.	BIT	FROM	TO	SIZE	WGT.	FROM	TO
1	? IN	SURFACE	40 FT	8.62 IN	STEEL	SURFACE	40 FT
2	7 7/8 IN	40 FT	TOTAL DEPTH	6 IN	PVC	SURFACE	50 FT
3							

COMMENTS:

.

Tool Summary:

Date	02-23-20	**Date**	02-23-20	**Date**	02-23-20
Run No.	1	**Run No.**	2	**Run No.**	3
Tool Model	MSI COMBO TOOL	**Tool Model**	ALT QL E-LOG	**Tool Model**	ALT 4 RX SONIC
Tool SN	4953	**Tool SN**	6380	**Tool SN**	4572
From	SURFACE	**From**	100.0 FT	**From**	140.0 FT
To	599.9 FT	**To**	599.4 FT	**To**	599.9 FT
Recorded By	D. ALP	**Recorded By**	D. ALP	**Recorded By**	D. ALP
Truck No	310	**Truck No**	310	**Truck No**	310
Operation Check	02-23-20	**Operation Check**	02-20-20	**Operation Check**	02-20-20
Calibration Check	02-21-20	**Calibration Check**	02-20-20	**Calibration Check**	N/A
Time Logged	2:00 PM	**Time Logged**	3:00 PM	**Time Logged**	3:30 PM

Date	02-23-20	**Date**	02-23-20	**Date**	
Run No.	4	**Run No.**	5	**Run No.**	6
Tool Model	ALT QL OBI40 2G	**Tool Model**	ALT QL ABI40 2G	**Tool Model**	
Tool SN	170106	**Tool SN**	143003	**Tool SN**	
From	45.0 FT	**From**	145.0 FT	**From**	
To	598.0 FT	**To**	598.0 FT	**To**	
Recorded By	D. ALP	**Recorded By**	D. ALP	**Recorded By**	
Truck No	310	**Truck No**	310	**Truck No**	
Operation Check	02-20-20	**Operation Check**	02-20-20	**Operation Check**	
Calibration Check	N/A	**Calibration Check**	N/A	**Calibration Check**	
Time Logged	4:30 PM	**Time Logged**	7:00 PM	**Time Logged**	

Additional Comments:

Caliper Arms Used: 9" **Calibration Points:** 6" & 12"

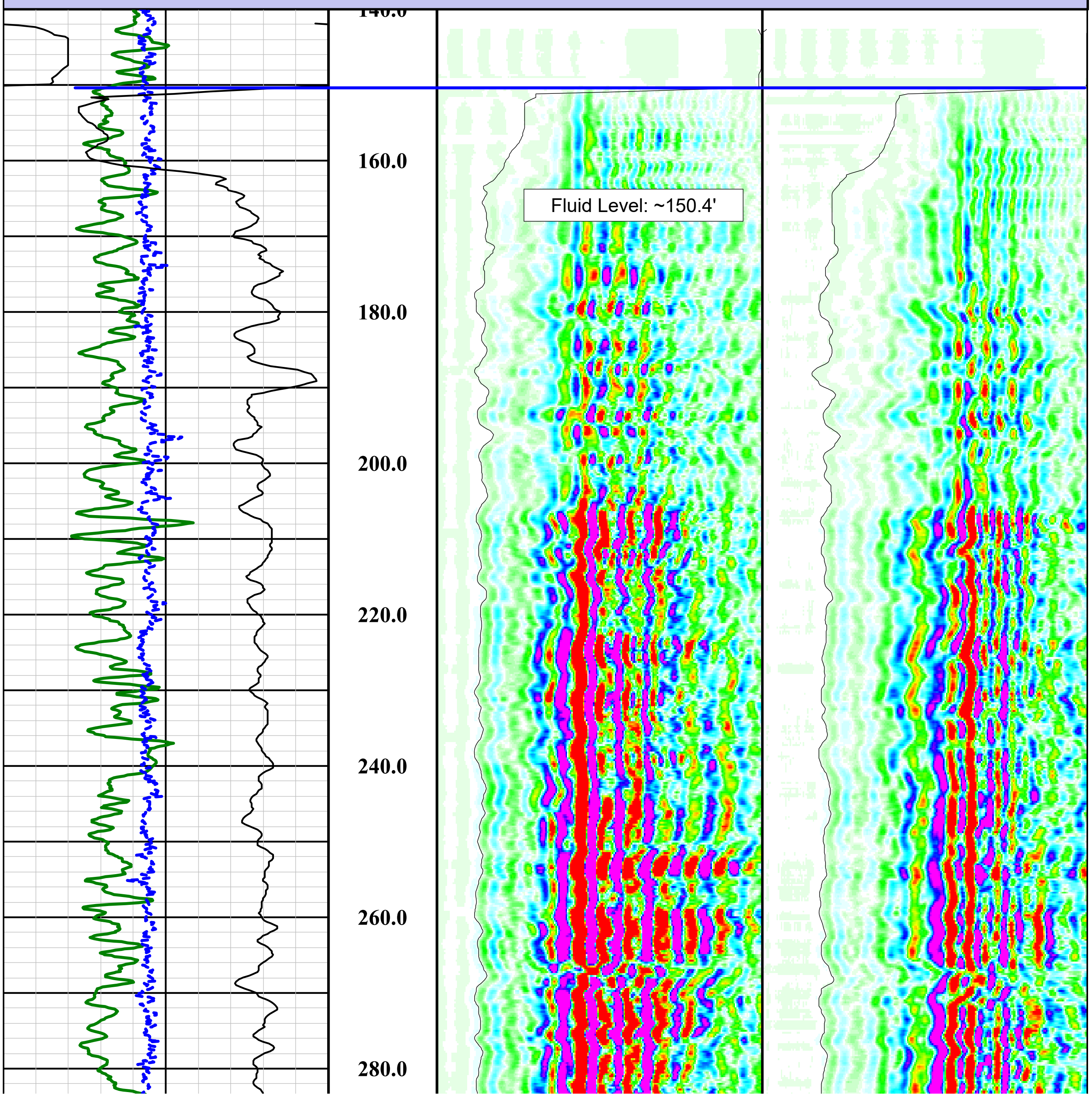
E-Log Calibration Range: 1 - 10,000 OHM-M **Calibration Points:** 1 & 10,000 OHM-M

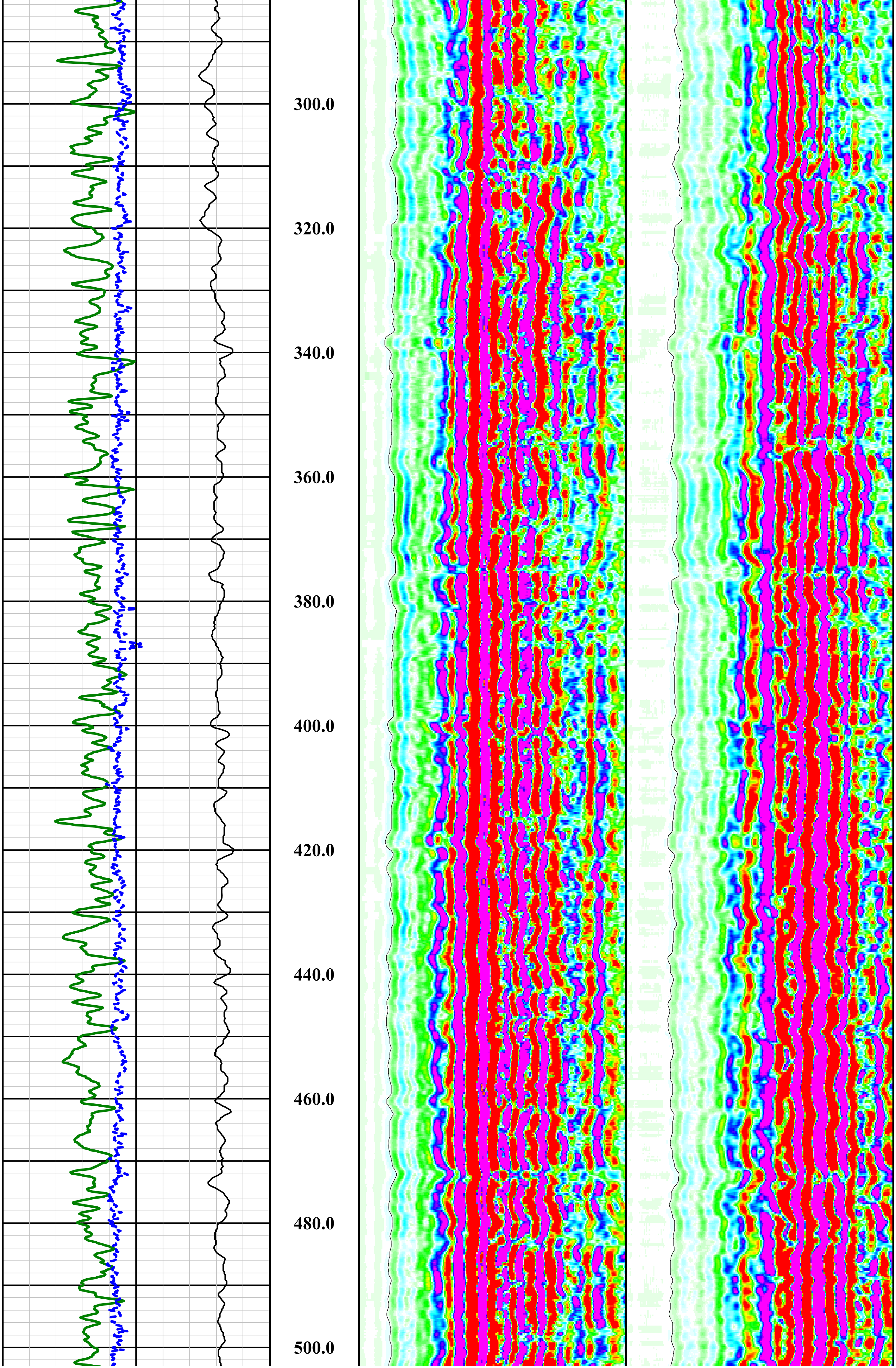
Disclaimer:

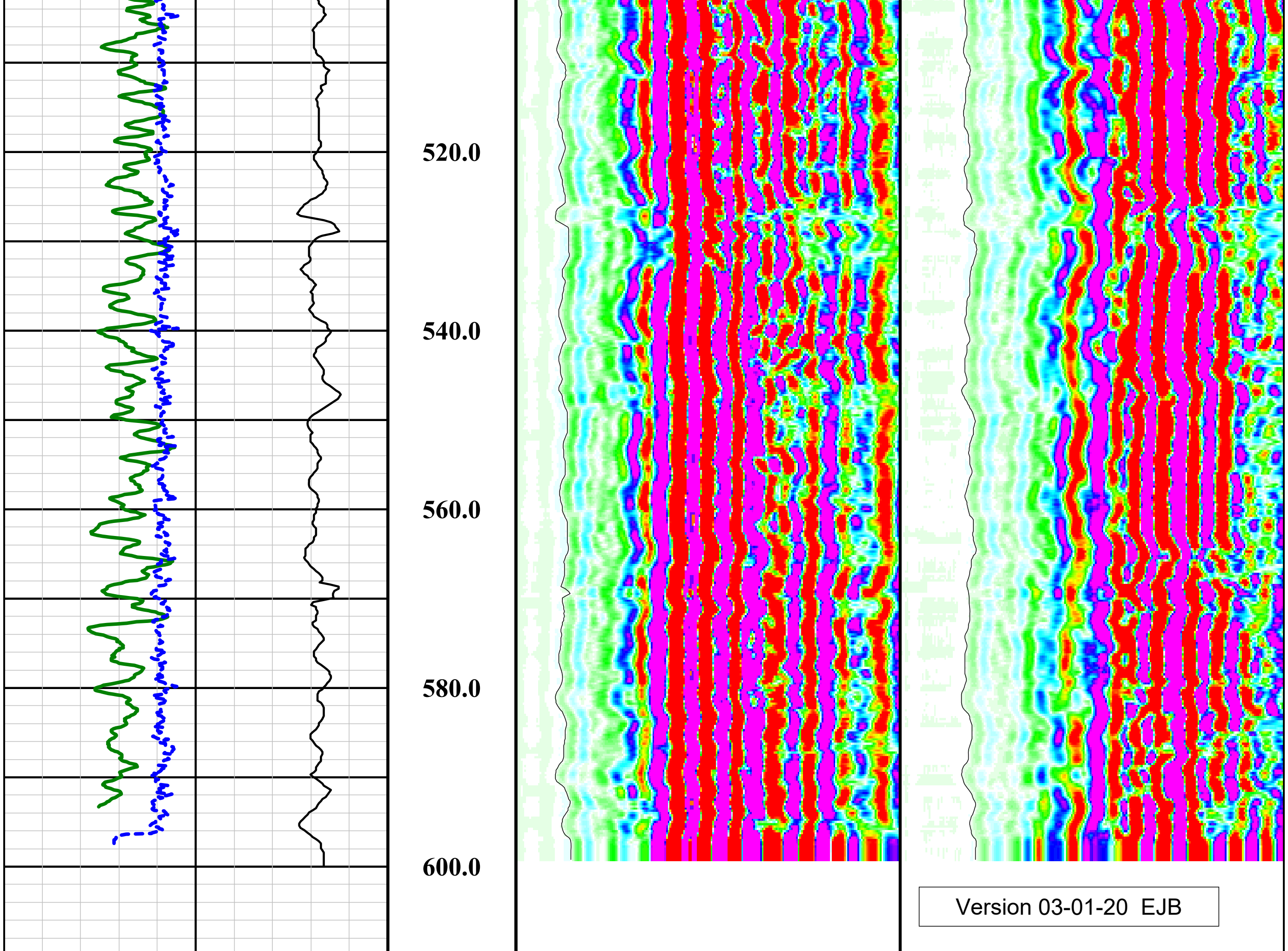
All interpretations of log data are opinions based on inferences from electrical or other measurements. We do not guarantee the accuracy or correctness of any interpretations or recommendations and shall not be liable or responsible for any loss, costs, damages, or expenses incurred or sustained by anyone resulting from any interpretation made by any of our employees or agents. These interpretations are also subject to our general terms and conditions set out in our current Service Invoice.

Nat. Gamma 0 API 200	Depth 1in:20ft	RX1 - VDL 100 uSec 1000	RX2 - VDL 100 uSec 1000
3-Arm Caliper 5 Inches 12		RX1 - Travel Time 100 uSec 1000	RX2 - Travel Time 100 uSec 1000
Delta T 240 uSec/ft 40			

Skunk Camp RC20-2 4 RX Sonic Summary ~150.4' - ~596.5'




300.0
320.0
340.0
360.0
380.0
400.0
420.0
440.0
460.0
480.0
500.0



Skunk Camp RC20-2 4 RX Sonic Summary ~150.4' - ~596.5'

240 uSec/ft 40 **Delta T**			
5 Inches 12 **3-Arm Caliper**		100 uSec 1000 **RX1 - Travel Time**	100 uSec 1000 **RX2 - Travel Time**
0 API 200 **Nat. Gamma**	1in:20ft **Depth**	100 uSec 1000 **RX1 - VDL**	100 uSec 1000 **RX2 - VDL**

FWS50 4 RX Full Waveform Sonic Tool SN 4572

Probe Top = Depth Ref.

Probe Length = 2.78 m or 9.13 ft
Probe Weight = ~18.0 kg or 39.6 lbs

Sensors: Ceramic Piezoelectric in Polyurethane potting

Transmitter Frequency: ~20 kHz resonant frequency

Rx - Rx Spacing: 0.2 m (7.9 in)

Typically ran centralized with external bow spring centralizers.

Can only be collected in fluid.

Temperature Rating: 70 Deg C (158 Deg F)
Presure Rating: 200 bar (2900 psi)

Rx-4 Tx - Rx4 Spacing = 1.2 m (47.2 in)

Rx-3 Tx - Rx3 Spacing = 1.0 m (39.4 in)

Rx-2 Tx - Rx2 Spacing = 0.8 m (31.5 in)

Rx-1 Tx - Rx1 Spacing = 0.6 m (23.6 in)

Acoustic Isolater

Tx = Acoustic Transmitter

0.235 m or 9.25 in. - End of tool to center of Tx

1.97" or 50 mm Diameter

MSI Gamma-Caliper-Temperature-Fluid Resistivity SN 4953

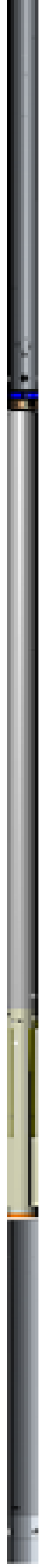
Probe Top = Depth Ref.

Single Conductor MSI Probe Top

Probe Length = 2.59 m or 8.5 ft
Probe Weight = 6.80 kg or 15.0 lbs

Natural Gamma and Caliper can only be collected logging up hole.

Fluid Temperature/Resistivity can only be collected logging down hole.



Temperature Rating: 70 Deg C (158 Deg F)

Presure Rating: 200 bar (2900 psi)

Natural Gamma Ray = 0.76 m (29.75 in)

3-Arm Caliper = 1.44 m (56.75 in)

Distance from tool top: 2.20 m (86.5 in)

Available Arm Sizes: 3", 9", and 15"

TFR (Temperature/Fluid Resistivity) = 0.39 m (15.5 in)

1.375" or 34.9 mm Diameter

Southwest Exploration Services, LLC
borehole geophysics & video services

Company	RESOLUTION COPPER MINING
Well	RC20-2
Field	SKUNK CAMP
County	GILA
State	ARIZONA

Final **4 RX Full Waveform Sonic Summary**

Southwest Exploration Services, LLC
borehole geophysics & video services

COMPANY	RESOLUTION COPPER MINING
WELL ID	RC20-2
FIELD	SKUNK CAMP
COUNTY	GILA
STATE	ARIZONA
TYPE OF LOGS:	**GAMMA - CALIPER**
MORE:	**TEMP / FLUID RES.**
LOCATION	
OTHER SERVICES	OPTICAL TELEVIEWER ACOUSTIC TELEVIEWER SONIC E-LOG
SEC	
TWP	
RGE	

PERMANENT DATUM		ELEVATION	K.B.
LOG MEAS. FROM	GROUND LEVEL	ABOVE PERM. DATUM	D.F.
DRILLING MEAS. FROM	GROUND LEVEL		G.L.
DATE	02-23-20	TYPE FLUID IN HOLE	FORMATION WATER
RUN No	1	MUD WEIGHT	N/A
TYPE LOG	GAMMA-CALIPER-TFR	VISCOSITY	N/A
DEPTH-DRILLER	600.0 FT	LEVEL	~150 FT
DEPTH-LOGGER	599.9 FT	MAX. REC. TEMP.	21.5 Deg C
BTM LOGGED INTERVAL	599.9 FT	IMAGE ORIENTED TO:	N/A
TOP LOGGED INTERVAL	SURFACE	SAMPLE INTERVAL	0.1 FT
DRILLER / RIG#	NATIONAL DRILLING	LOGGING TRUCK	TRUCK #310
RECORDED BY / Logging Eng.	E. BEAM / D. ALP	TOOL STRING/SN	MSI COMBO TOOL SN 4953
WITNESSED BY	NATIONAL DRILLING	LOG TIME:ON SITE/OFF SITE	1:30 PM

RUN	BOREHOLE RECORD			CASING RECORD			
NO.	BIT	FROM	TO	SIZE	WGT.	FROM	TO
1	? IN	SURFACE	40 FT	8.62 IN	STEEL	SURFACE	40 FT
2	7 7/8 IN	40 FT	TOTAL DEPTH	6 IN	PVC	SURFACE	50 FT
3							

COMMENTS:

Tool Summary:

Date	02-23-20	**Date**	02-23-20	**Date**	02-23-20
Run No.	1	**Run No.**	2	**Run No.**	3
Tool Model	MSI COMBO TOOL	**Tool Model**	ALT QL E-LOG	**Tool Model**	ALT 4 RX SONIC
Tool SN	4953	**Tool SN**	6380	**Tool SN**	4572
From	SURFACE	**From**	100.0 FT	**From**	140.0 FT
To	599.9 FT	**To**	599.4 FT	**To**	599.9 FT
Recorded By	D. ALP	**Recorded By**	D. ALP	**Recorded By**	D. ALP
Truck No	310	**Truck No**	310	**Truck No**	310
Operation Check	02-23-20	**Operation Check**	02-20-20	**Operation Check**	02-20-20
Calibration Check	02-21-20	**Calibration Check**	02-20-20	**Calibration Check**	N/A
Time Logged	2:00 PM	**Time Logged**	3:00 PM	**Time Logged**	3:30 PM

Date	02-23-20	**Date**	02-23-20	**Date**	
Run No.	4	**Run No.**	5	**Run No.**	6
Tool Model	ALT QL OBI40 2G	**Tool Model**	ALT QL ABI40 2G	**Tool Model**	
Tool SN	170106	**Tool SN**	143003	**Tool SN**	
From	45.0 FT	**From**	145.0 FT	**From**	
To	598.0 FT	**To**	598.0 FT	**To**	
Recorded By	D. ALP	**Recorded By**	D. ALP	**Recorded By**	
Truck No	310	**Truck No**	310	**Truck No**	
Operation Check	02-20-20	**Operation Check**	02-20-20	**Operation Check**	
Calibration Check	N/A	**Calibration Check**	N/A	**Calibration Check**	
Time Logged	4:30 PM	**Time Logged**	7:00 PM	**Time Logged**	

Additional Comments:

Caliper Arms Used: 9" **Calibration Points:** 6" & 12"

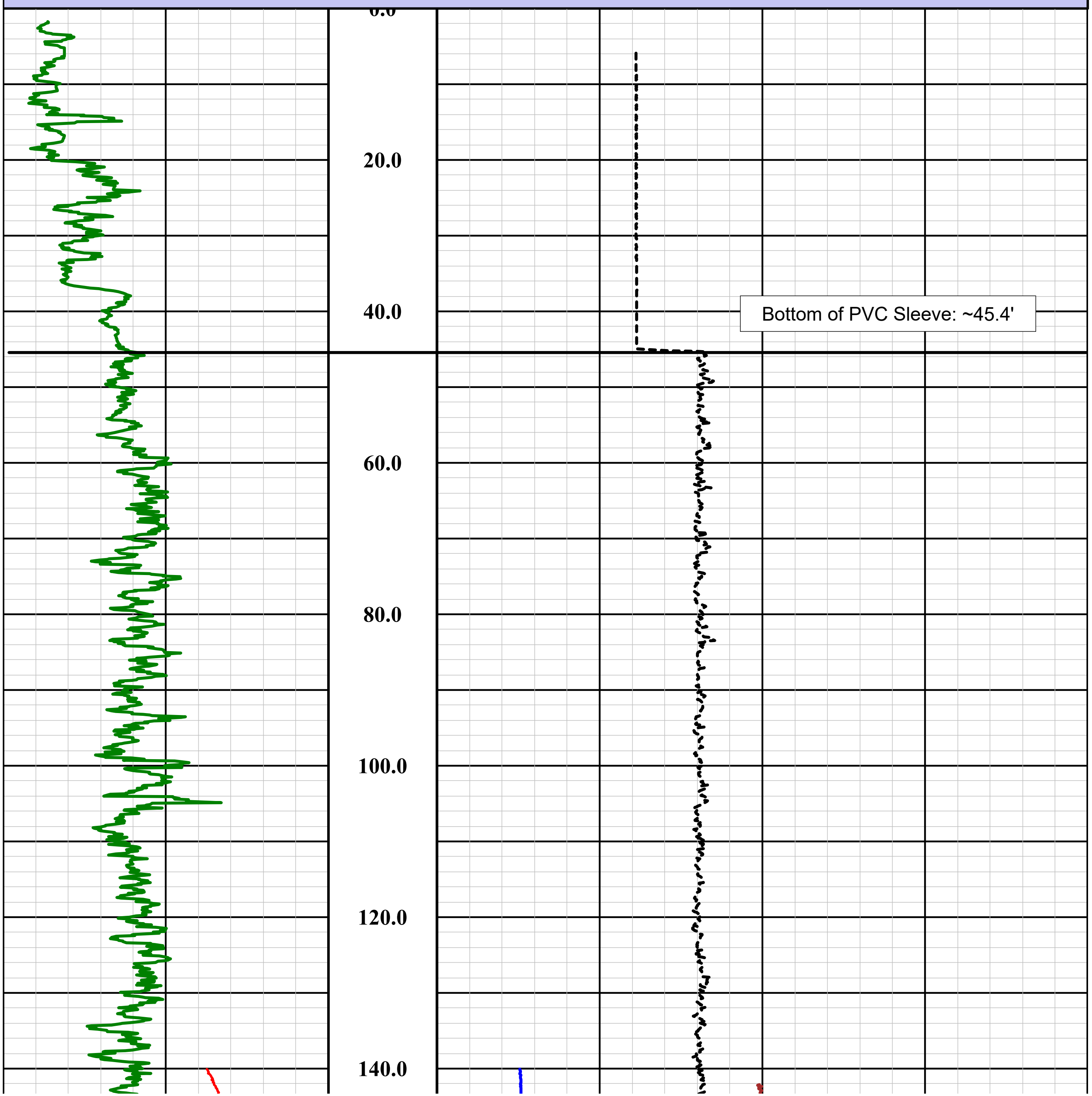
E-Log Calibration Range: 1 - 10,000 OHM-M **Calibration Points:** 1 & 10,000 OHM-M

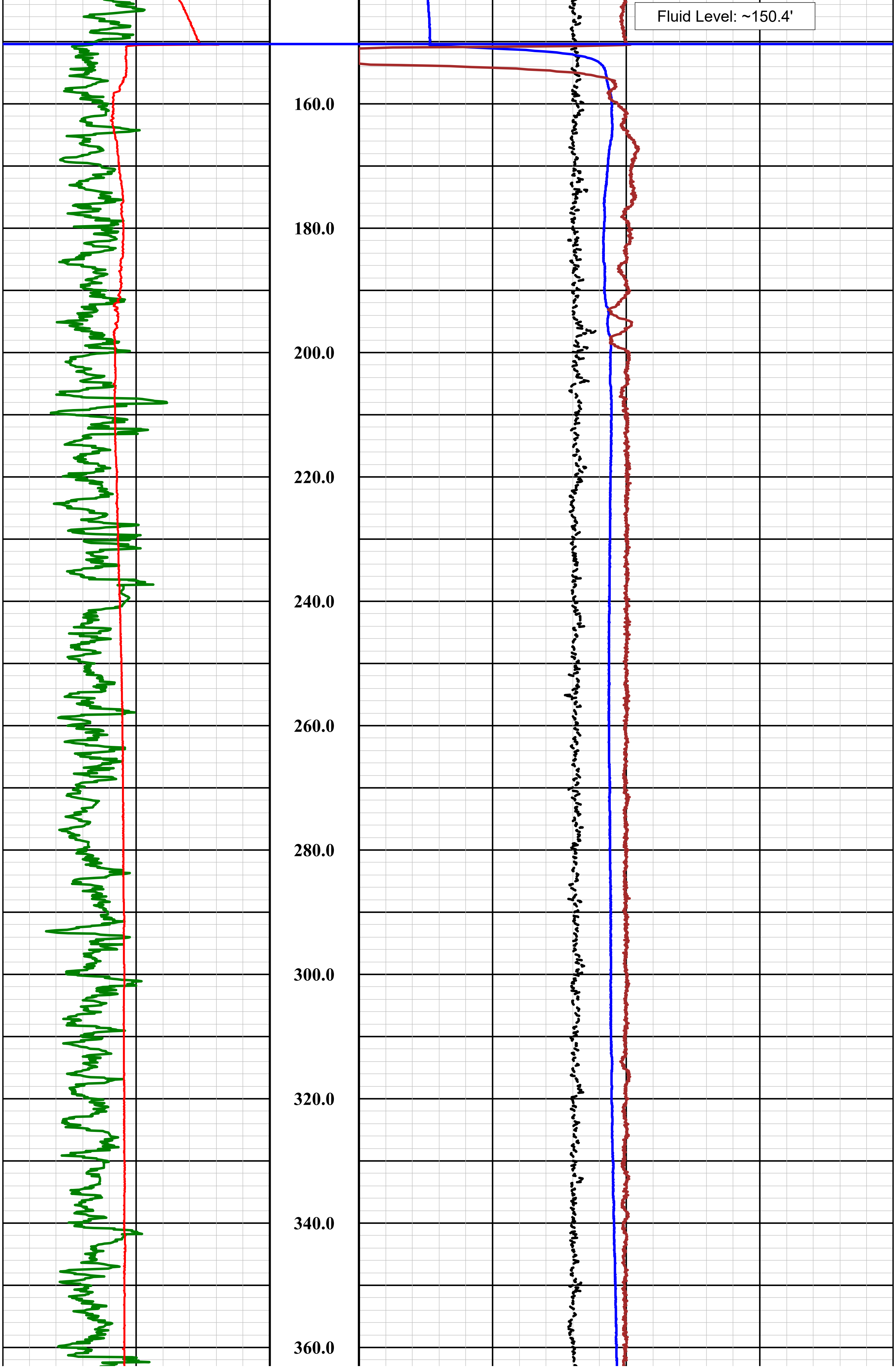
Disclaimer:

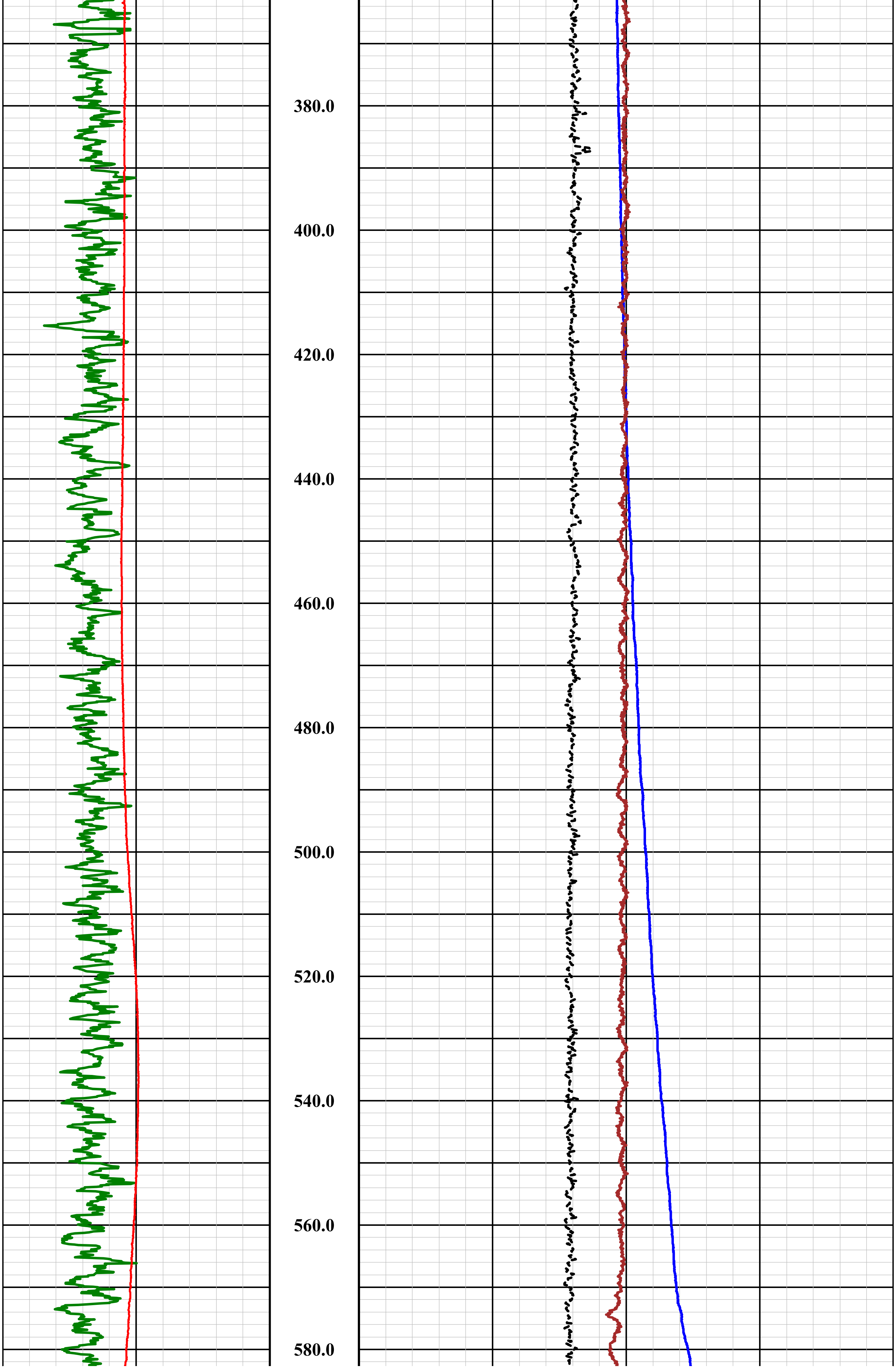
All interpretations of log data are opinions based on inferences from electrical or other measurements. We do not guarantee the accuracy or correctness of any interpretations or recommendations and shall not be liable or responsible for any loss, costs, damages, or expenses incurred or sustained by anyone resulting from any interpretation made by any of our employees or agents. These interpretations are also subject to our general terms and conditions set out in our current Service Invoice.

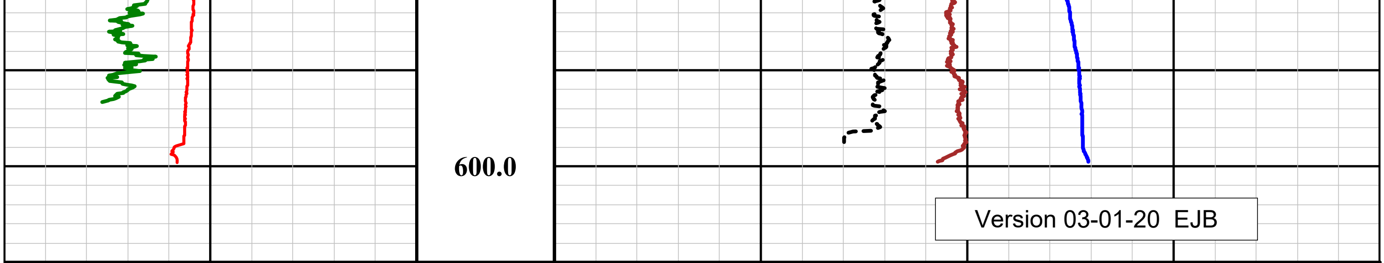
Nat. Gamma	Depth	3-Arm Caliper
0 API 200	1in:20ft	0 Inches 20
Fluid Resistivity		Temperature
0 Ohm-m 40		15 Deg C 25
		2-Ft Diff. Temp.
		-1 Deg C 1

Skunk Camp RC20-2 GCT Summary Surface - ~599.6'




Fluid Level: ~150.4'
160.0
180.0
200.0
220.0
240.0
260.0
280.0
300.0
320.0
340.0
360.0


380.0
400.0
420.0
440.0
460.0
480.0
500.0
520.0
540.0
560.0
580.0

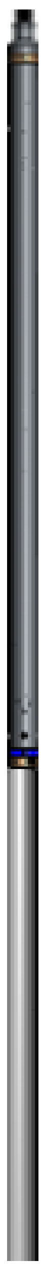


Skunk Camp RC20-2 GCT Summary Surface - ~599.6'

		-1 Deg C 1 — 2-Ft Diff. Temp.
0 Ohm-m 40 — Fluid Resistivity		15 Deg C 25 — Temperature
0 API 200 — Nat. Gamma	1in:20ft — Depth	0 Inches 20 — 3-Arm Caliper

MSI Gamma-Caliper-Temperature-Fluid Resistivity SN 4953

Probe Top = Depth Ref.



Single Conductor MSI Probe Top

Probe Length = 2.59 m or 8.5 ft
Probe Weight = 6.80 kg or 15.0 lbs

Natural Gamma and Caliper can only be collected logging up hole.

Fluid Temperature/Resistivity can only be collected logging down hole.

Temperature Rating: 70 Deg C (158 Deg F)
Presure Rating: 200 bar (2900 psi)

Natural Gamma Ray = 0.76 m (29.75 in)

3-Arm Caliper = 1.44 m (56.75 in)

Distance from tool top: 2.20 m (86.5 in)

Available Arm Sizes: 3", 9", and 15"

TFR (Temperature/Fluid Resistivity) = 0.39 m (15.5 in)

1.375" or 34.9 mm Diameter

Southwest Exploration Services, LLC
borehole geophysics & video services

Company	RESOLUTION COPPER MINING
Well	RC20-2
Field	SKUNK CAMP
County	GILA
State	ARIZONA

Final GCT Summary

Southwest Exploration Services, LLC
borehole geophysics & video services

COMPANY	RESOLUTION COPPER MINING
WELL ID	RC20-2
FIELD	SKUNK CAMP
COUNTY	GILA
STATE	ARIZONA

TYPE OF LOGS: E-LOG - GAMMA
MORE:

LOCATION

SEC TWP RGE

OTHER SERVICES
OPTICAL TELEVIEWER
ACOUSTIC TELEVIEWER
SONIC
CALIPER
TEMP / FLUID RES.

PERMANENT DATUM		ELEVATION	K.B.
LOG MEAS. FROM	GROUND LEVEL	ABOVE PERM. DATUM	D.F.
DRILLING MEAS. FROM	GROUND LEVEL		G.L.

DATE	02-23-20	TYPE FLUID IN HOLE	FORMATION WATER
RUN No	1	MUD WEIGHT	N/A
TYPE LOG	E-LOG - GAMMA	VISCOSITY	N/A
DEPTH-DRILLER	600.0 FT	LEVEL	~150 FT
DEPTH-LOGGER	599.9 FT	MAX. REC. TEMP.	21.5 Deg C
BTM LOGGED INTERVAL	599.4 FT	IMAGE ORIENTED TO:	N/A
TOP LOGGED INTERVAL	100.0 FT	SAMPLE INTERVAL	0.2 FT
DRILLER / RIG#	NATIONAL DRILLING	LOGGING TRUCK	TRUCK #310
RECORDED BY / Logging Eng.	E. BEAM / D. ALP	TOOL STRING/SN	ALT QL E-LOG SN 6380
WITNESSED BY	NATIONAL DRILLING	LOG TIME:ON SITE/OFF SITE	1:30 PM

RUN	BOREHOLE RECORD			CASING RECORD			
NO.	BIT	FROM	TO	SIZE	WGT.	FROM	TO
1	? IN	SURFACE	40 FT	8.62 IN	STEEL	SURFACE	40 FT
2	7 7/8 IN	40 FT	TOTAL DEPTH	6 IN	PVC	SURFACE	50 FT
3							

COMMENTS:

.

Tool Summary:

Date	02-23-20	**Date**	02-23-20	**Date**	02-23-20
Run No.	1	**Run No.**	2	**Run No.**	3
Tool Model	MSI COMBO TOOL	**Tool Model**	ALT QL E-LOG	**Tool Model**	ALT 4 RX SONIC
Tool SN	4953	**Tool SN**	6380	**Tool SN**	4572
From	SURFACE	**From**	100.0 FT	**From**	140.0 FT
To	599.9 FT	**To**	599.4 FT	**To**	599.9 FT
Recorded By	D. ALP	**Recorded By**	D. ALP	**Recorded By**	D. ALP
Truck No	310	**Truck No**	310	**Truck No**	310
Operation Check	02-23-20	**Operation Check**	02-20-20	**Operation Check**	02-20-20
Calibration Check	02-21-20	**Calibration Check**	02-20-20	**Calibration Check**	N/A
Time Logged	2:00 PM	**Time Logged**	3:00 PM	**Time Logged**	3:30 PM

Date	02-23-20	**Date**	02-23-20	**Date**	
Run No.	4	**Run No.**	5	**Run No.**	6
Tool Model	ALT QL OBI40 2G	**Tool Model**	ALT QL ABI40 2G	**Tool Model**	
Tool SN	170106	**Tool SN**	143003	**Tool SN**	
From	45.0 FT	**From**	145.0 FT	**From**	
To	598.0 FT	**To**	598.0 FT	**To**	
Recorded By	D. ALP	**Recorded By**	D. ALP	**Recorded By**	
Truck No	310	**Truck No**	310	**Truck No**	
Operation Check	02-20-20	**Operation Check**	02-20-20	**Operation Check**	
Calibration Check	N/A	**Calibration Check**	N/A	**Calibration Check**	
Time Logged	4:30 PM	**Time Logged**	7:00 PM	**Time Logged**	

Additional Comments:

Caliper Arms Used: 9" **Calibration Points:** 6" & 12"

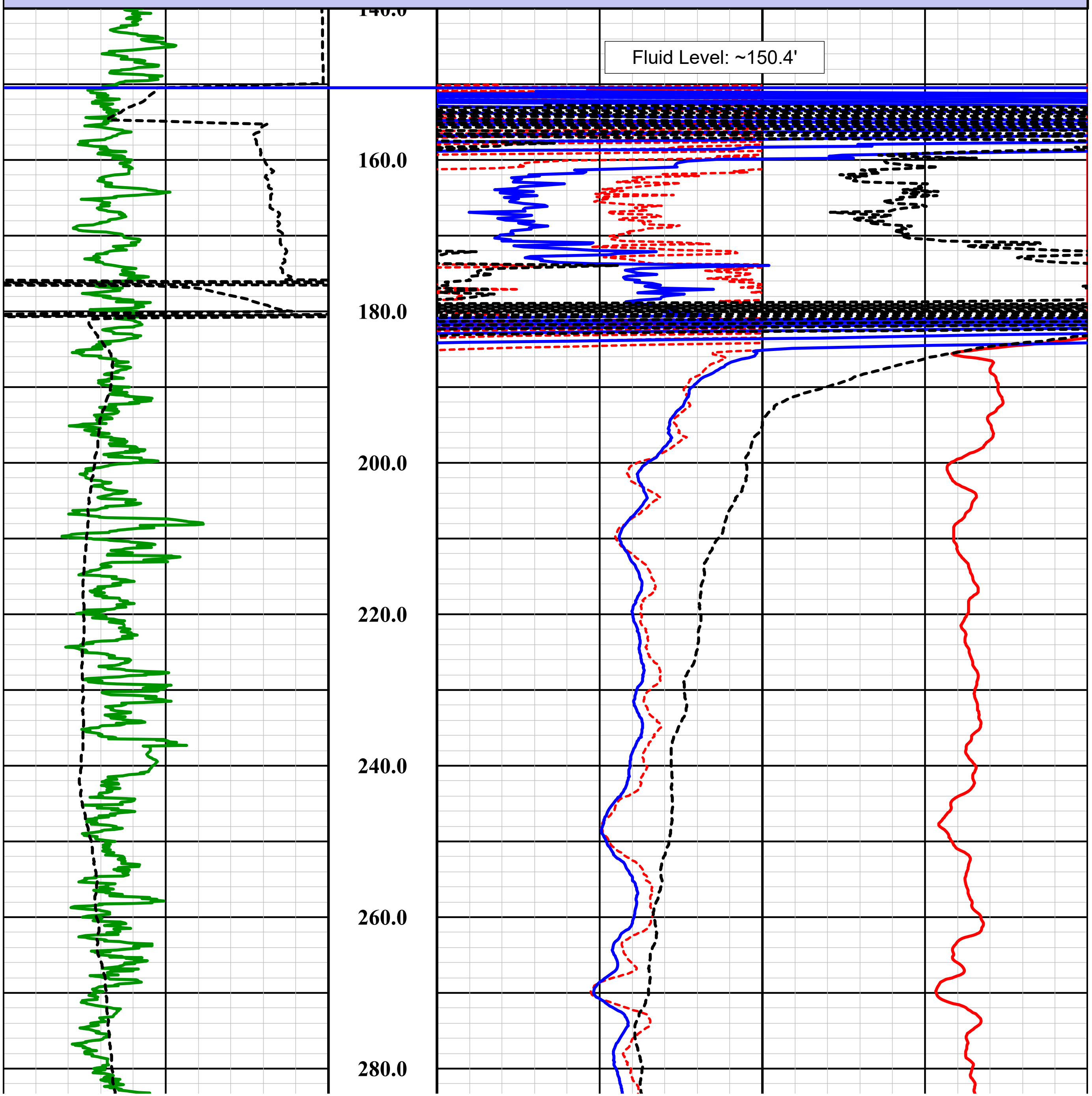
E-Log Calibration Range: 1 - 10,000 OHM-M **Calibration Points:** 1 & 10,000 OHM-M

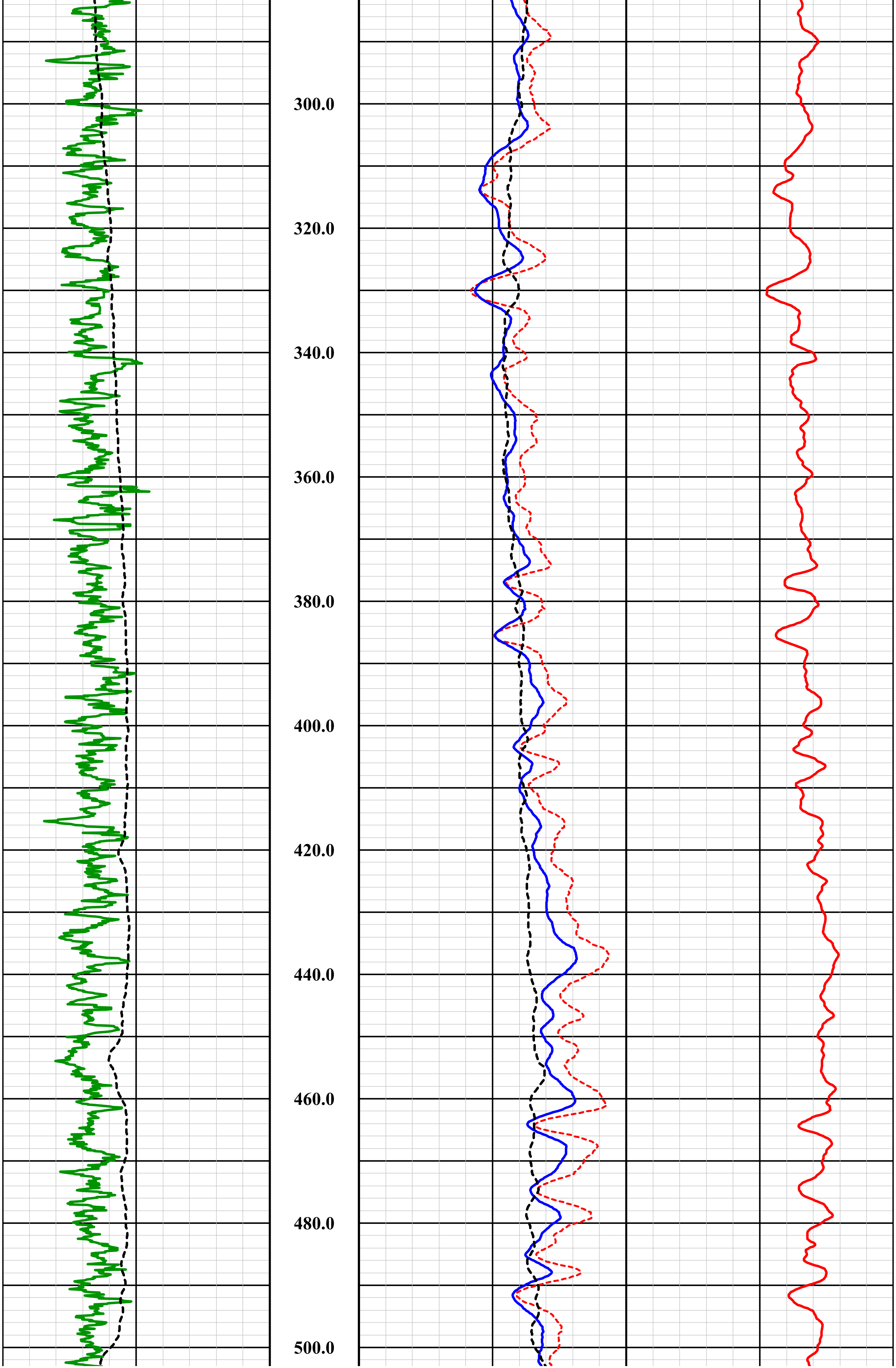
Disclaimer:

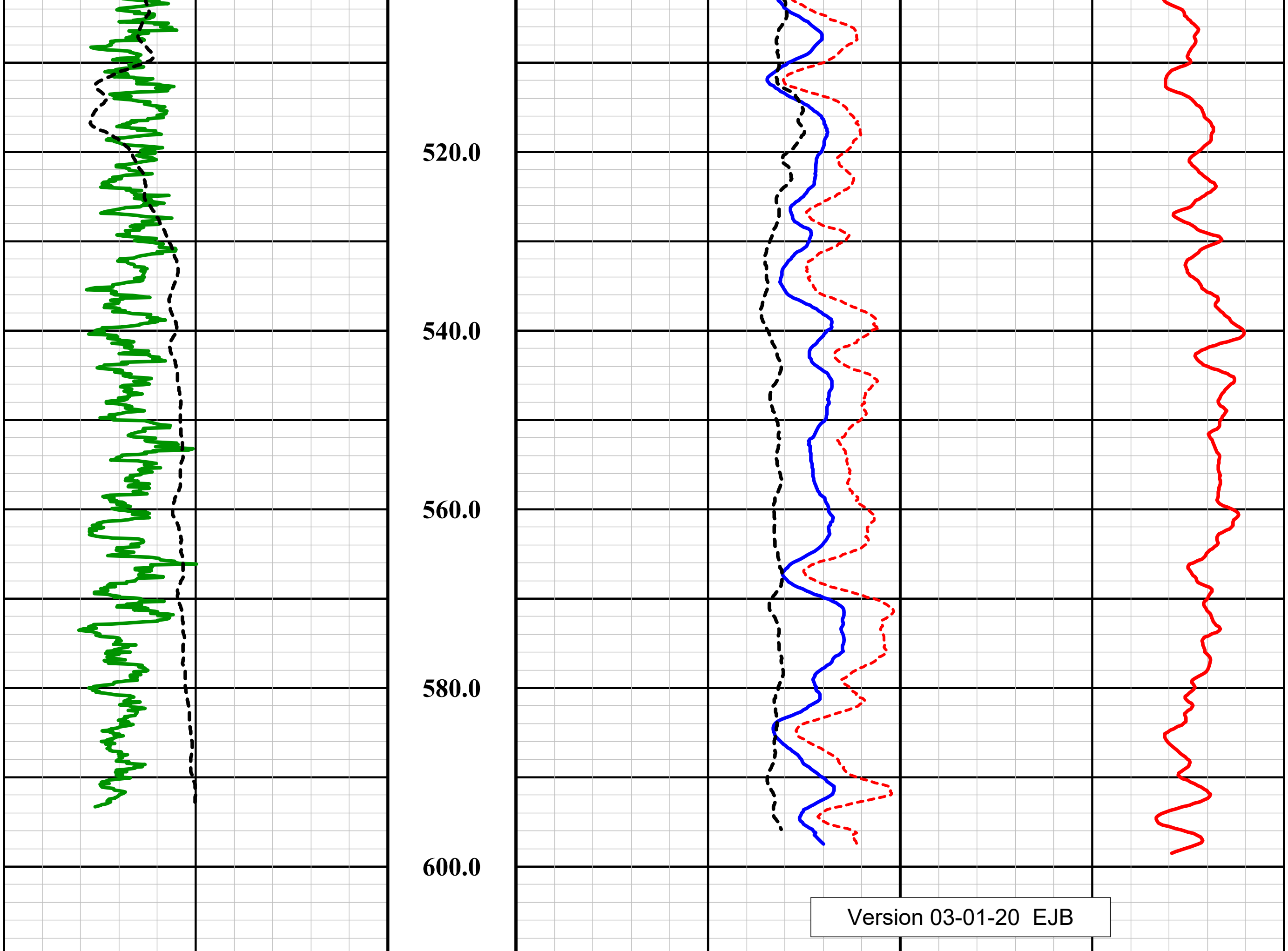
All interpretations of log data are opinions based on inferences from electrical or other measurements. We do not guarantee the accuracy or correctness of any interpretations or recommendations and shall not be liable or responsible for any loss, costs, damages, or expenses incurred or sustained by anyone resulting from any interpretation made by any of our employees or agents. These interpretations are also subject to our general terms and conditions set out in our current Service Invoice.

Nat. Gamma	Depth	8" NRes	SPR
0 API 200	1in:20ft	0 Ohm-m 100	30 Ohms 130
SP		16" NRes	
0 mV 400		0 Ohm-m 200	
		64" NRes	
		0 Ohm-m 200	

Skunk Camp RC20-2 E-Log Summary ~150.4' - ~598.7'




300.0
320.0
340.0
360.0
380.0
400.0
420.0
440.0
460.0
480.0
500.0



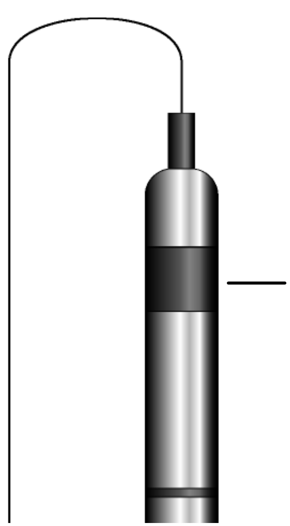
Skunk Camp RC20-2 E-Log Summary ~150.4' - ~598.7'

Nat. Gamma	0 API 200	solid green
SP	0 mV 400	dashed black
Depth	1in:20ft	
8" NRes	0 Ohm-m 100	dashed red
SPR	30 Ohms 130	solid red
16" NRes	0 Ohm-m 200	solid blue
64" NRes	0 Ohm-m 200	dashed black

ALT QL E-Log Tool

Probe Top = Depth Ref.

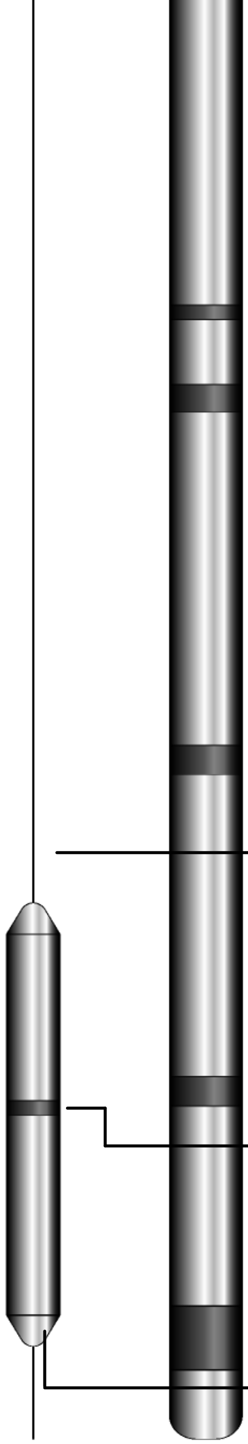
Tool SN: 6355 & 6380



Bridle connects to wireline cablehead: Wireline armor is the B Electrode.

64" Normal Resistivity Electrode/Spontaneous Potential Electrode (M Electrode)

Probe Length = 1.89 m or 6.2 ft



Bridle Length = 7.88 m or 25.86 ft

Probe Weight = 8.8 kg or 19.4 lbs

Can only be collected in fluid
May be stacked with other QL tools

Operating Temperature: 80 Deg C (176 Deg F)
Presure Rating: 200 bar (2900 psi)

32" Normal Resistivity Electrode (M Electrode)

Electrode Measuring Points (from bottom of probe)
- Spontaneous Potential (SP): 1.689 m or 5.54 ft
- 8" Normal Resistivity (8" NRes): 0.164 m or 0.54 ft
- 16" Normal Resistivity (16" NRes): 0.266 m or 0.87 ft
- 32" Normal Resistivity (32" NRes): 0.469 m or 1.54 ft
- 64" Normal Resistivity (64" NRes): 0.875 m or 2.87 ft
- Single Point Resistance (SPR): 0.063 m or 0.21 ft

16" Normal Resistivity Electrode (M Electrode)

Isolation Bridle

8" Normal Resistivity Electrode (M Electrode)

Bridle Electrode (N Electrode)

Current Electrode/Single Point Resistance Electrode (A Electrode)

Four Conductor MSI Probe Top

1.63" or 40 mm Diameter (41.4 mm with neoprene heat shrink and electrical tape)

MSI Gamma-Caliper-Temperature-Fluid Resistivity SN 4953

Probe Top = Depth Ref.

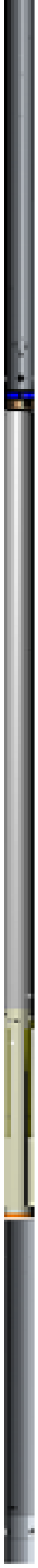
Single Conductor MSI Probe Top

Probe Length = 2.59 m or 8.5 ft
Probe Weight = 6.80 kg or 15.0 lbs

Natural Gamma and Caliper can only be collected logging up hole.

Fluid Temperature/Resistivity can only be collected logging down hole.

Temperature Rating: 70 Deg C (158 Deg F)
Presure Rating: 200 bar (2900 psi)



Natural Gamma Ray = 0.76 m (29.75 in)

3-Arm Caliper = 1.44 m (56.75 in)

Distance from tool top: 2.20 m (86.5 in)

Available Arm Sizes: 3", 9", and 15"

TFR (Temperature/Fluid Resistivity) = 0.39 m (15.5 in)

1.375" or 34.9 mm Diameter

Southwest Exploration Services, LLC
borehole geophysics & video services

Company	RESOLUTION COPPER MINING
Well	RC20-2
Field	SKUNK CAMP
County	GILA
State	ARIZONA

Final **E-Log Summary**

Southwest Exploration Services, LLC
borehole geophysics & video services

COMPANY	RESOLUTION COPPER MINING		
WELL ID	RC20-2A		
FIELD	SKUNK CAMP		
COUNTY	GILA	STATE	ARIZONA

TYPE OF LOGS: OPTICAL TELEVIEWER
MORE: GAMMA - CALIPER

OTHER SERVICES
TEMP / FLUID RES.
ACOUSTIC TELEVIEWER
SONIC
E-LOG

LOCATION

SEC	TWP	RGE

PERMANENT DATUM		ELEVATION	K.B.
LOG MEAS. FROM	GROUND LEVEL	ABOVE PERM. DATUM	D.F.
DRILLING MEAS. FROM	GROUND LEVEL		G.L.
DATE	02-29-20	TYPE FLUID IN HOLE	FORMATION WATER
RUN No	4	MUD WEIGHT	N/A
TYPE LOG	OPTICAL TELEVIEWER	VISCOSITY	N/A
DEPTH-DRILLER	602.0 FT	LEVEL	~134 FT
DEPTH-LOGGER	599.9 FT	MAX. REC. TEMP.	21.8 Deg C
BTM LOGGED INTERVAL	598.0 FT	IMAGE ORIENTED TO:	MAGNETIC NORTH
TOP LOGGED INTERVAL	60.0 FT	SAMPLE INTERVAL	0.035 FT
DRILLER / RIG#	NATIONAL DRILLING	LOGGING TRUCK	TRUCK #310
RECORDED BY / Logging Eng.	E. BEAM / D. ALP	TOOL STRING/SN	ALT QL OBI40 2G SN 152511
WITNESSED BY	NATIONAL DRILLING	LOG TIME:ON SITE/OFF SITE	5:30 AM

RUN	BOREHOLE RECORD			CASING RECORD			
NO.	BIT	FROM	TO	SIZE	WGT.	FROM	TO
1	? IN	SURFACE	70 FT	8.62 IN	STEEL	SURFACE	70 FT
2	7 3/4 IN	70 FT	480 FT				
3	7 1/4 IN TRI	480 FT	TOTAL DEPTH				

COMMENTS:

Tool Summary:

Date	02-29-20	Date	02-29-20	Date	02-29-20
Run No.	1	Run No.	2	Run No.	3
Tool Model	MSI COMBO TOOL	Tool Model	ALT QL E-LOG	Tool Model	ALT 4 RX SONIC
Tool SN	4953	Tool SN	6380	Tool SN	4572
From	SURFACE	From	SURFACE	From	120.0 FT
To	599.7 FT	To	599.0 FT	To	599.6 FT
Recorded By	D. ALP	Recorded By	D. ALP	Recorded By	D. ALP
Truck No	310	Truck No	310	Truck No	310
Operation Check	02-23-20	Operation Check	02-20-20	Operation Check	02-20-20
Calibration Check	02-21-20	Calibration Check	02-20-20	Calibration Check	N/A
Time Logged	6:15 AM	Time Logged	7:10 AM	Time Logged	7:45 AM

Date	02-23-20	Date	02-23-20	Date	
Run No.	4	Run No.	5	Run No.	6
Tool Model	ALT QL OBI40 2G	Tool Model	ALT QL ABI40 2G	Tool Model	
Tool SN	152511	Tool SN	192302	Tool SN	
From	60.0 FT	From	130.0 FT	From	
To	599.0 FT	To	599.0 FT	To	
Recorded By	D. ALP	Recorded By	D. ALP	Recorded By	
Truck No	310	Truck No	310	Truck No	
Operation Check	02-20-20	Operation Check	02-20-20	Operation Check	
Calibration Check	N/A	Calibration Check	N/A	Calibration Check	
Time Logged	8:45 AM	Time Logged	7:00 PM	Time Logged	

Additional Comments:

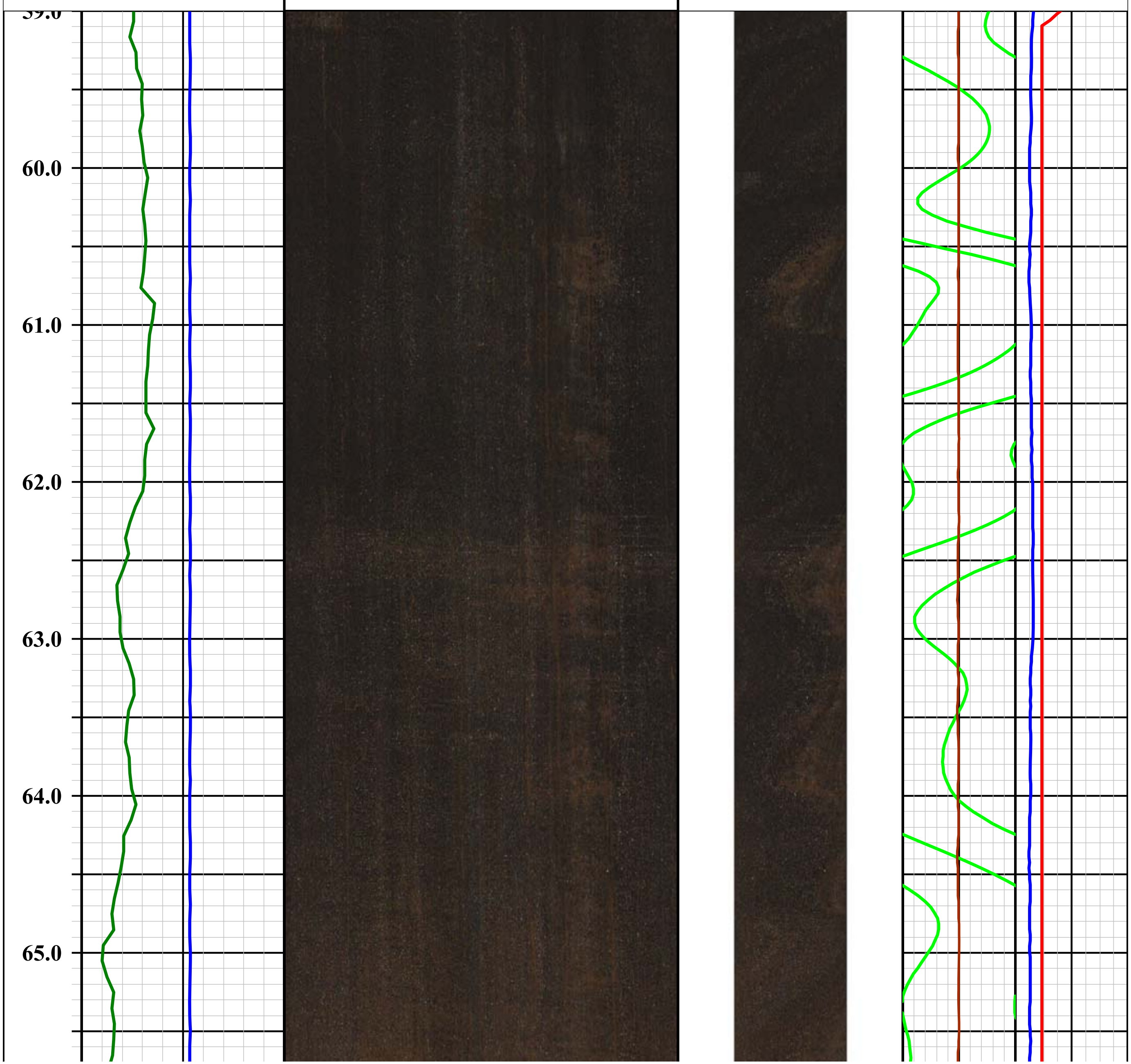
Caliper Arms Used: 9" **Calibration Points:** 6" & 12"

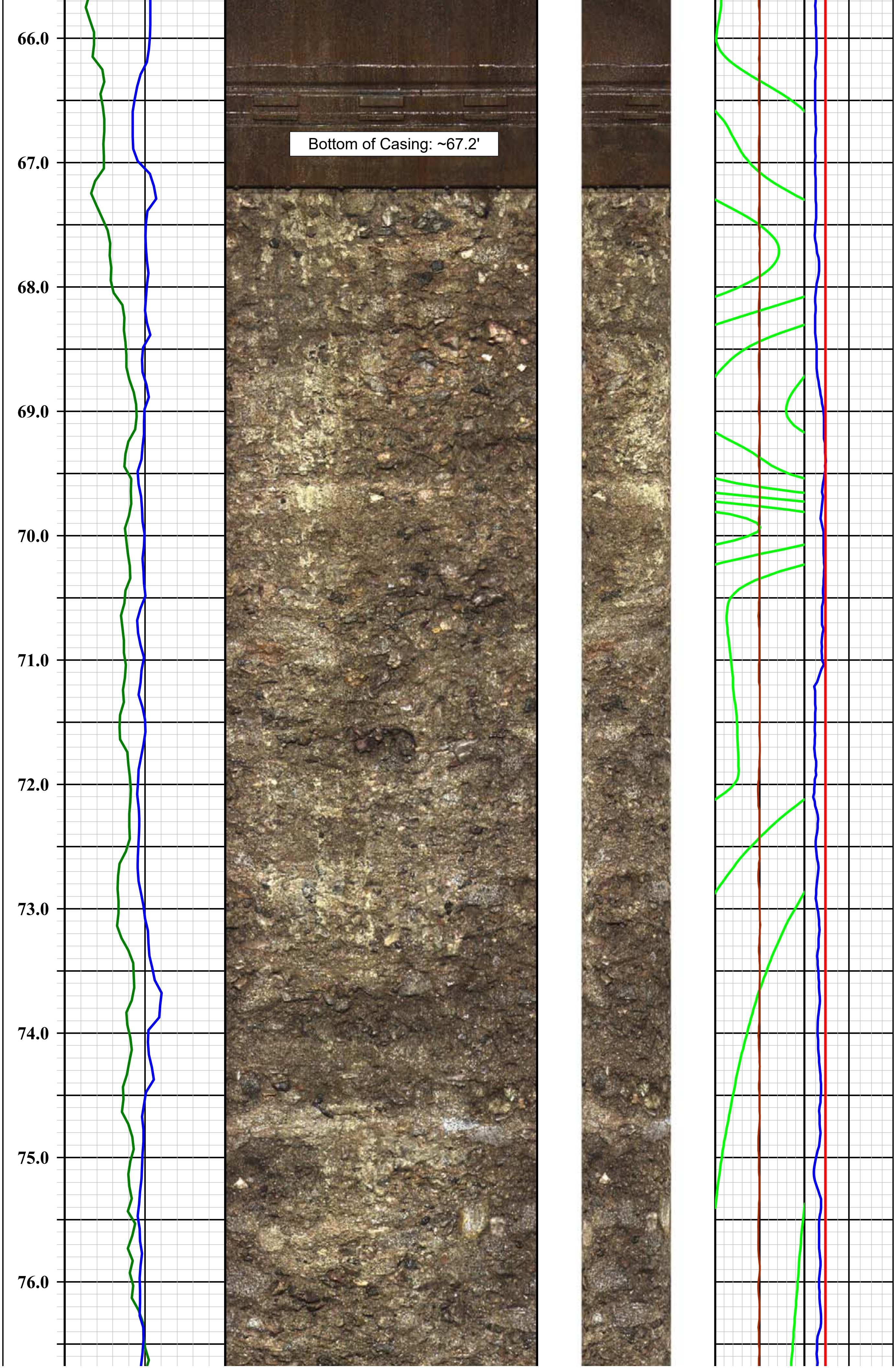
E-Log Calibration Range: 1 - 10,000 OHM-M **Calibration Points:** 1 & 10,000 OHM-M

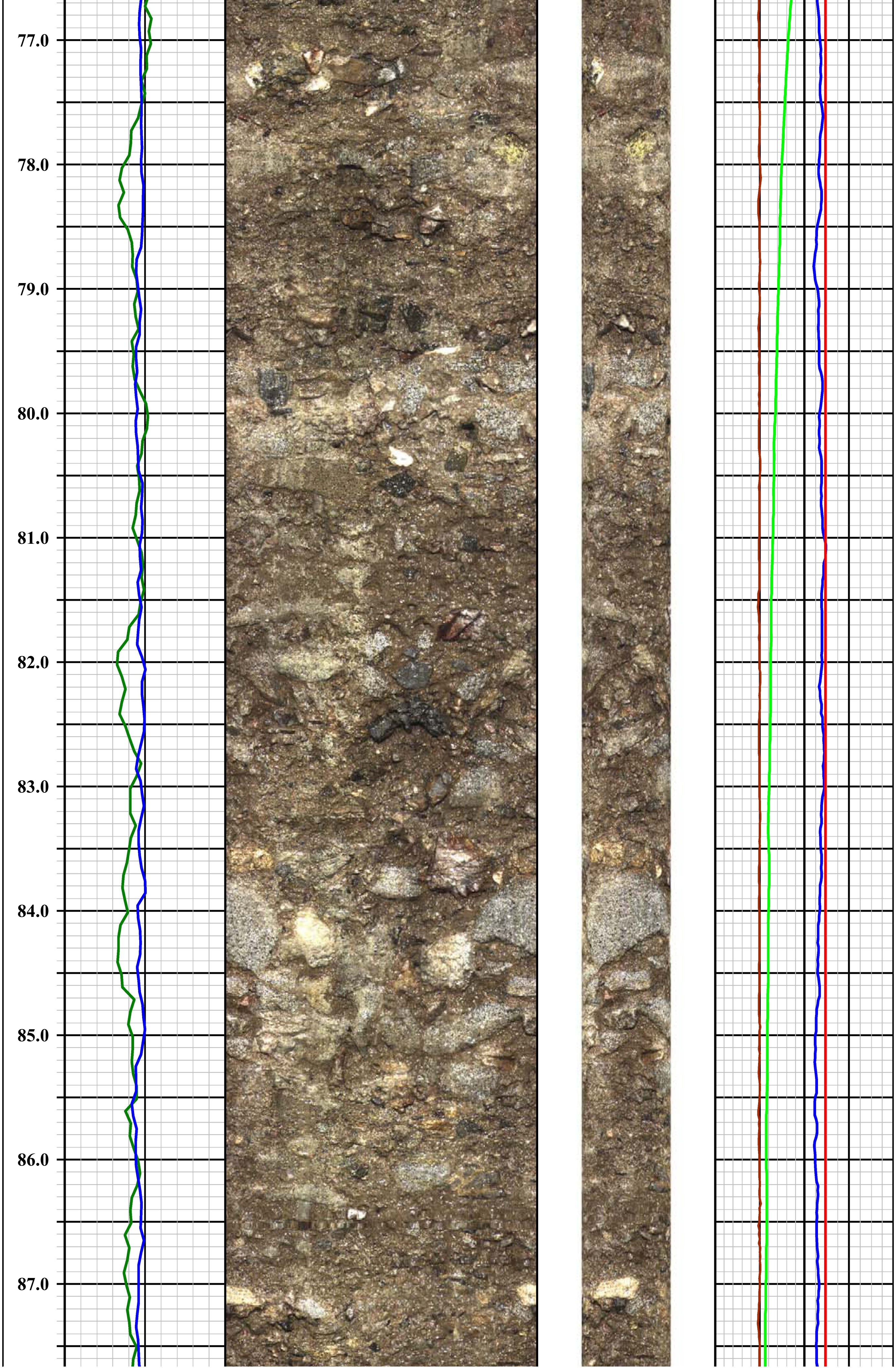
Disclaimer:

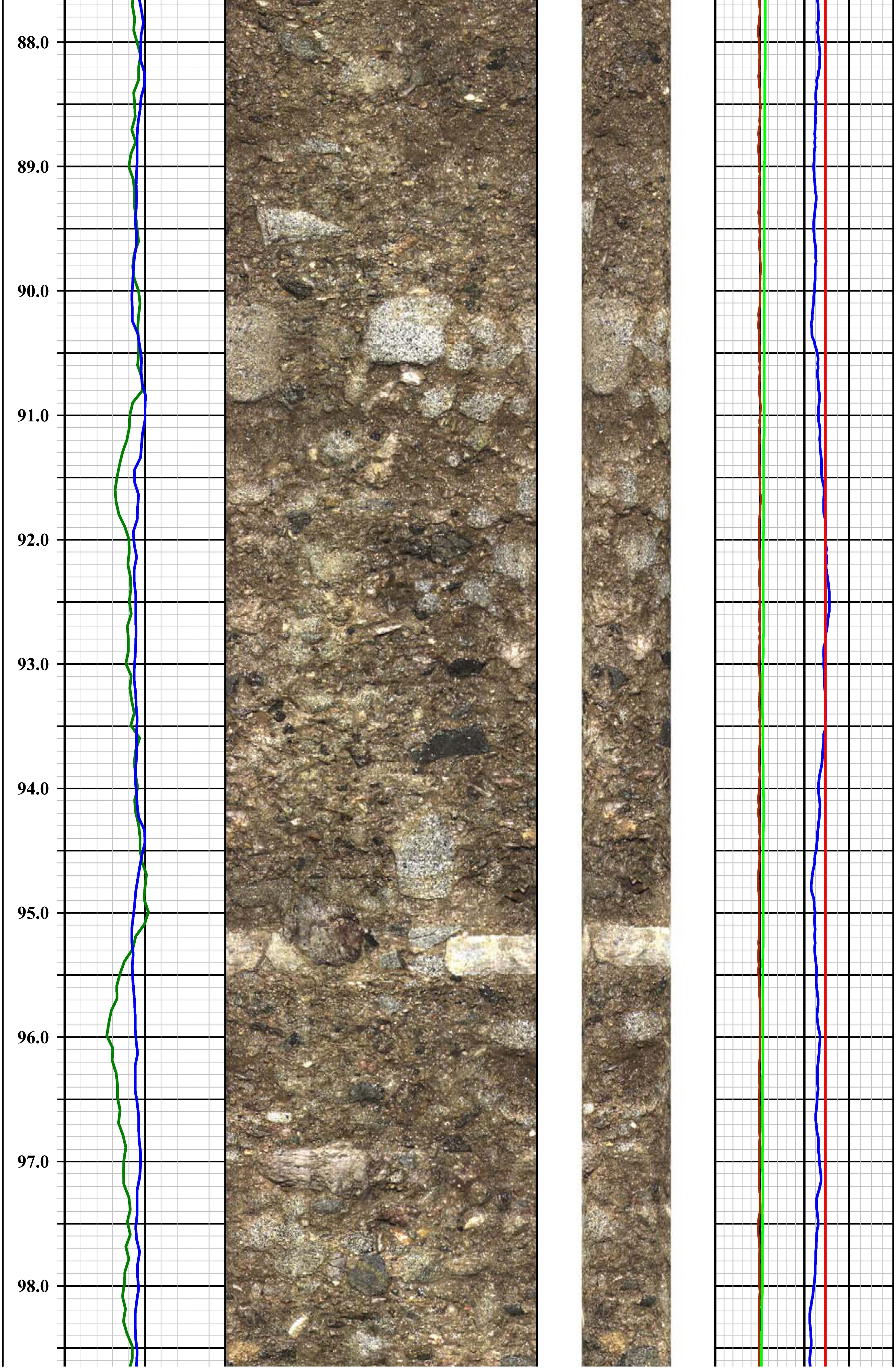
All interpretations of log data are opinions based on inferences from electrical or other measurements. We do not guarantee the accuracy or correctness of any interpretations or recommendations and shall not be liable or responsible for any loss, costs, damages, or expenses incurred or sustained by anyone resulting from any interpretation made by any of our employees or agents. These interpretations are also subject to our general terms and conditions set out in our current Service Invoice.

Depth 1in:1ft	Skunk Camp RC20-2A OBI40 2G Summary ~67.2' - ~597.7'			
	Nat. Gamma 0 API 200 / **3-Arm Caliper** 5 Inches 12	**Image-NM** Oriented Mag North 0° 90° 180° 270° 0° / **Image_59.0'-104.8'** Non Oriented, Rot'd by 160.4 Deg 0° 90° 180° 270° 0°	**3-D View** -0°	**Mag Field** 40 uT 60 / **Gravity** 0.8 g 1.2 / **Tilt** 0 Deg 8 / **Azi-Edited** 0 360

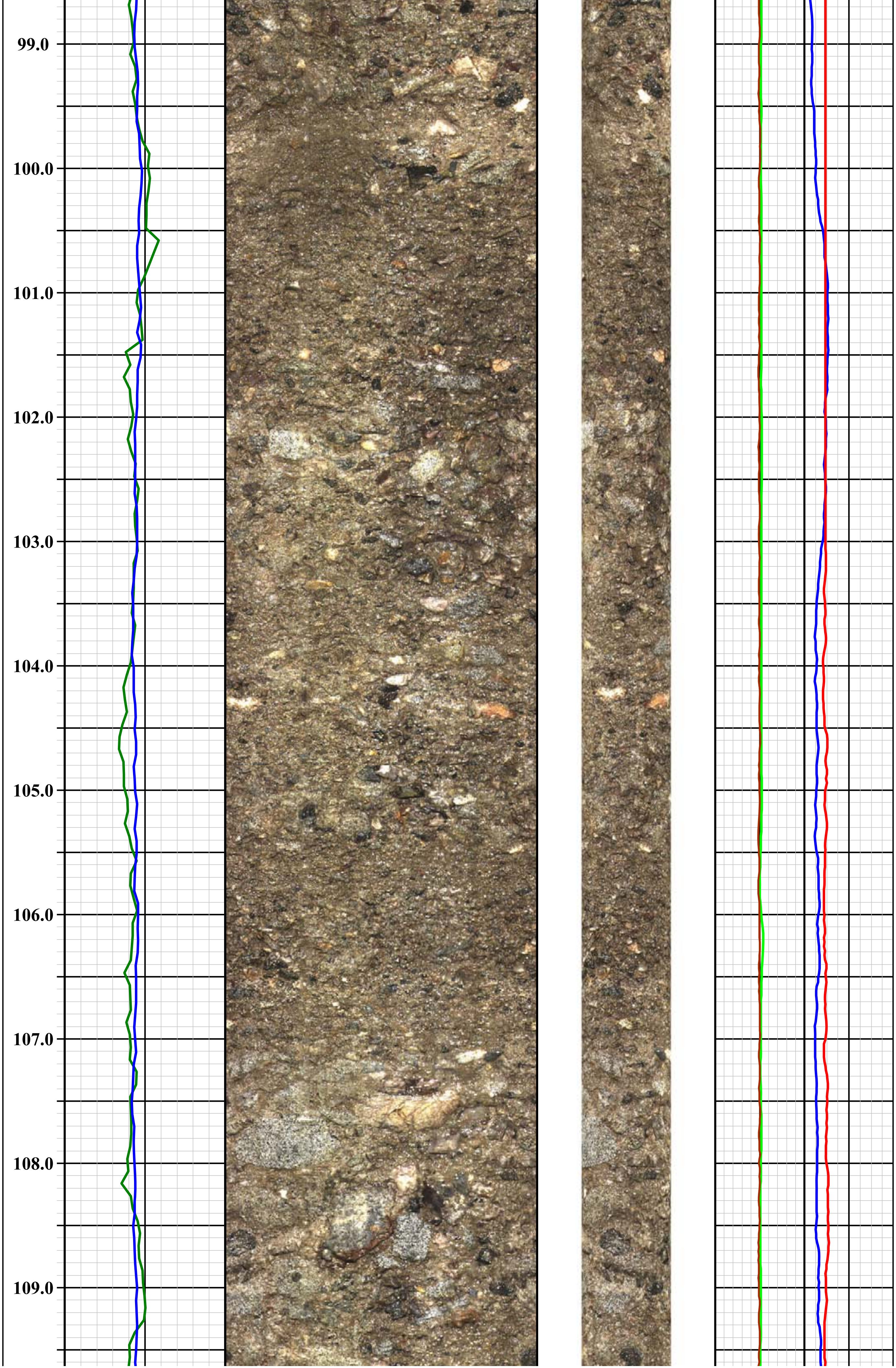


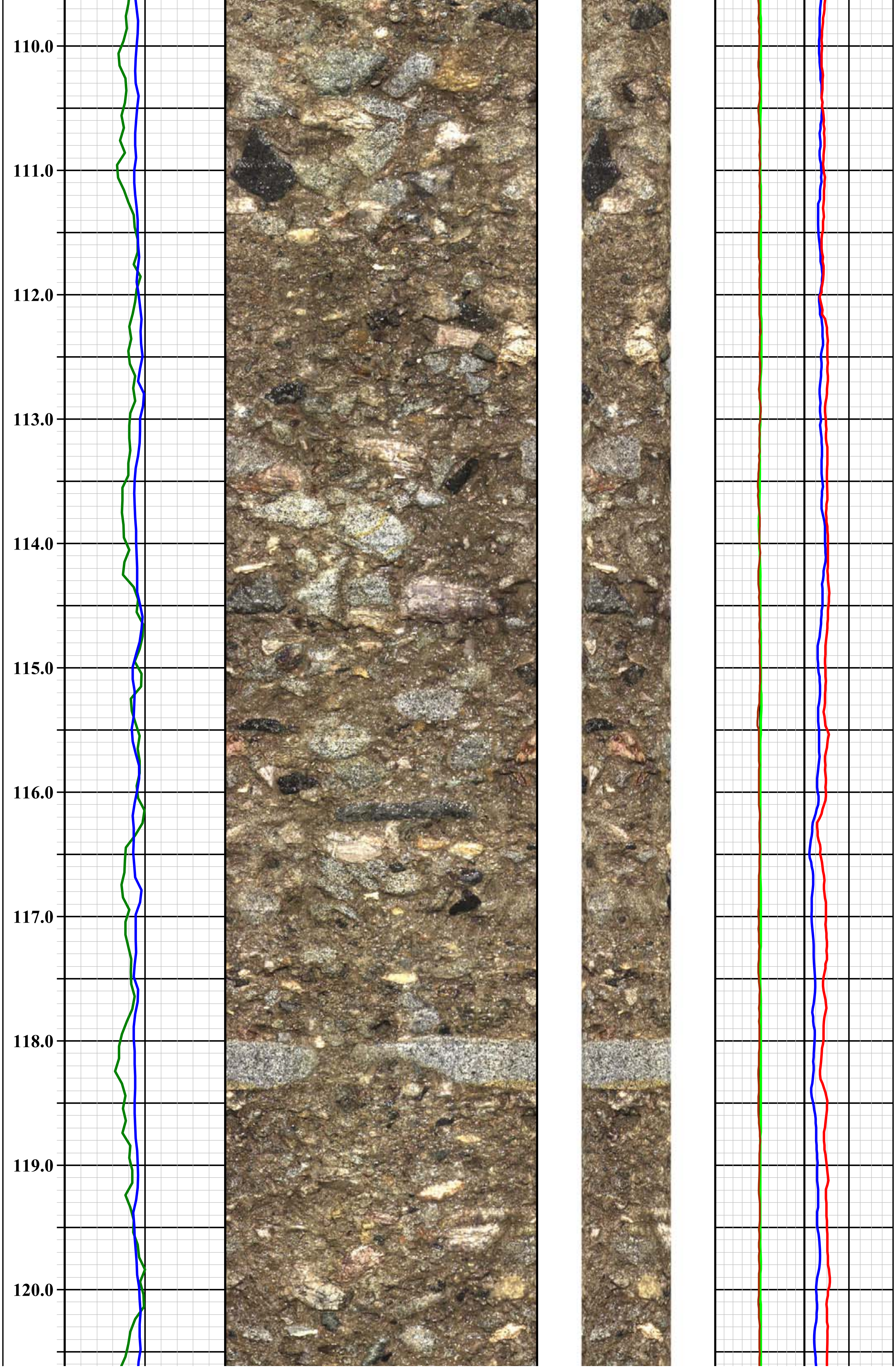

66.0
67.0
68.0
69.0
70.0
71.0
72.0
73.0
74.0
75.0
76.0
Bottom of Casing: ~67.2'

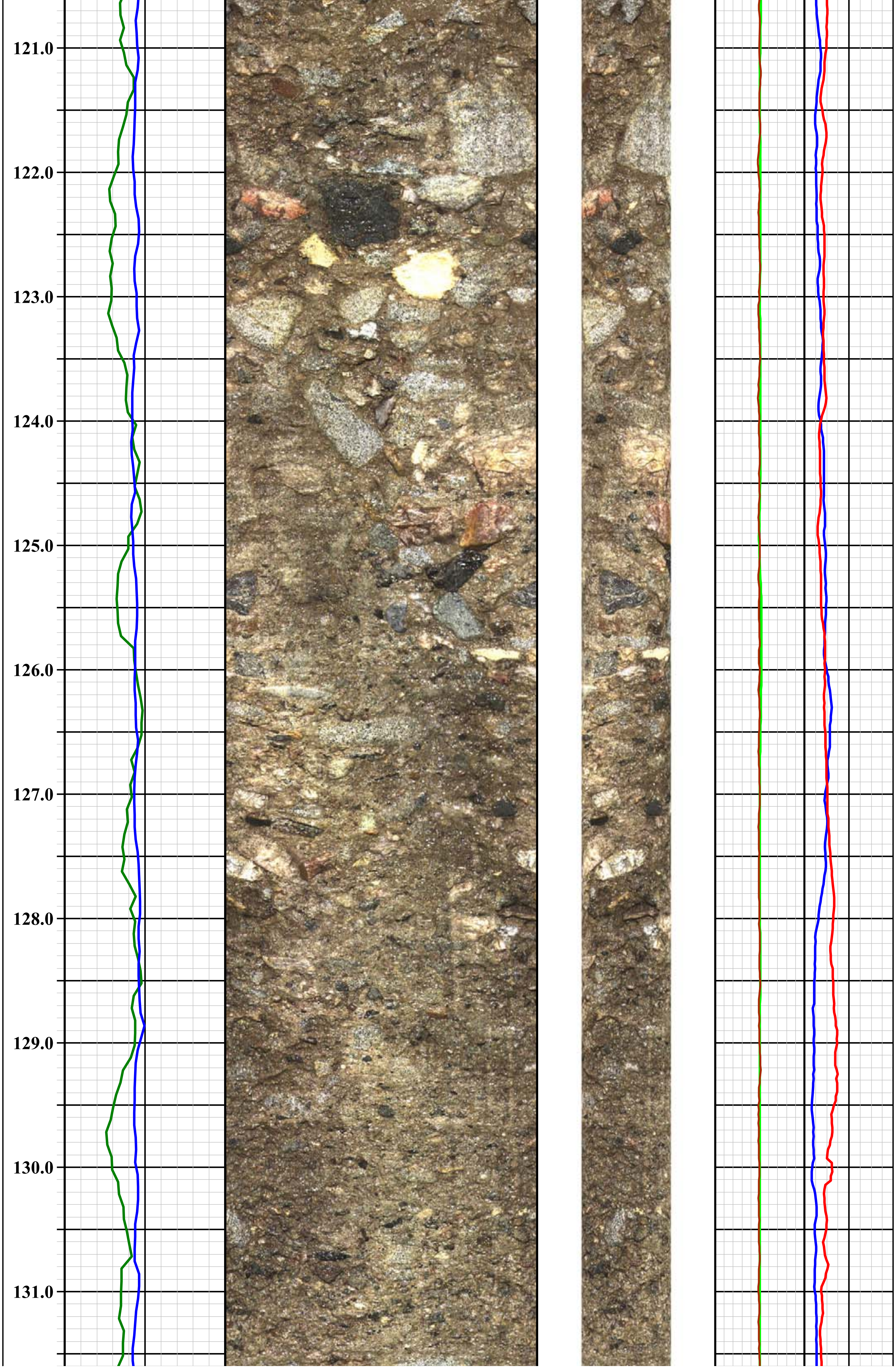

77.0
78.0
79.0
80.0
81.0
82.0
83.0
84.0
85.0
86.0
87.0

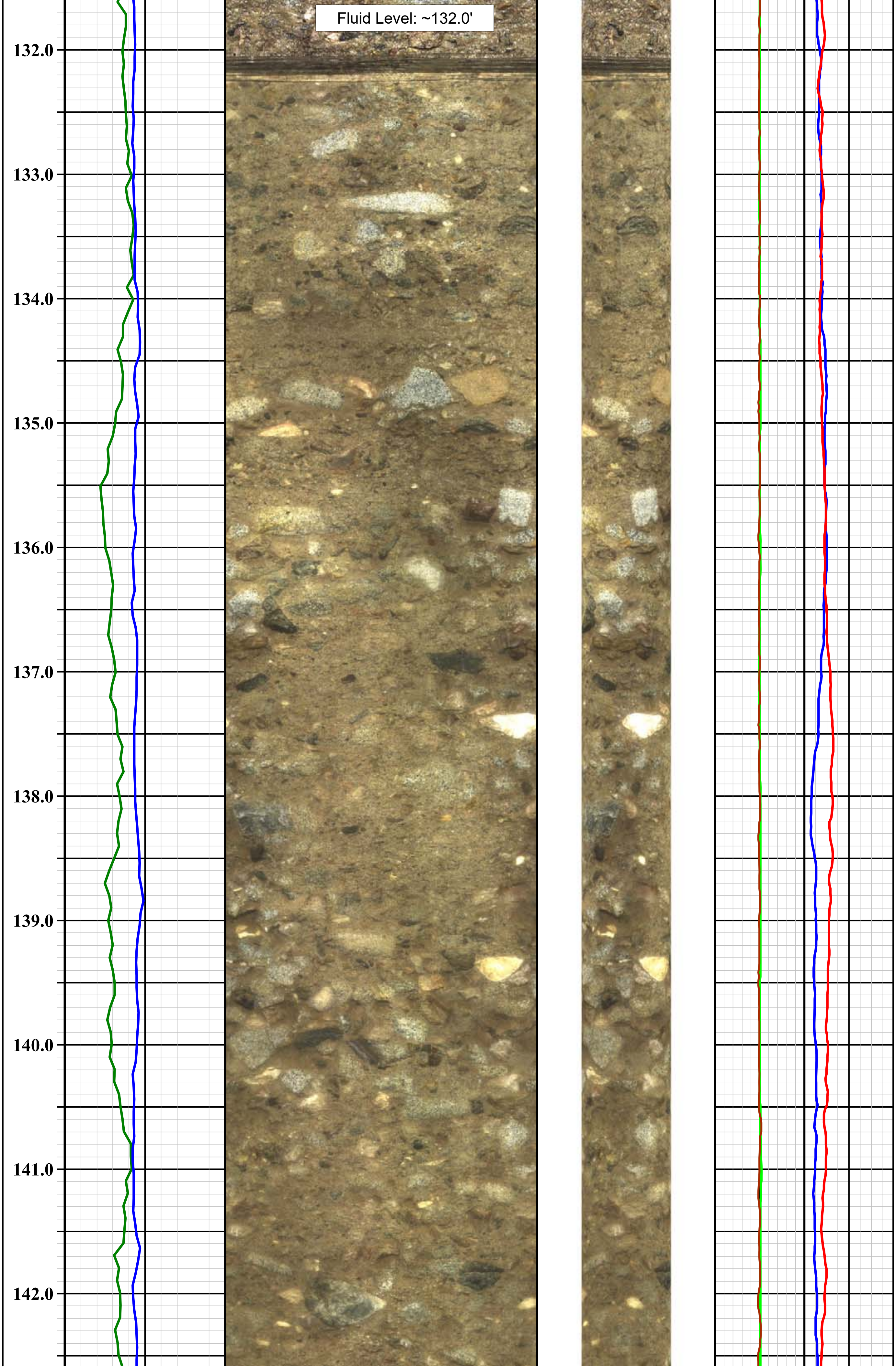


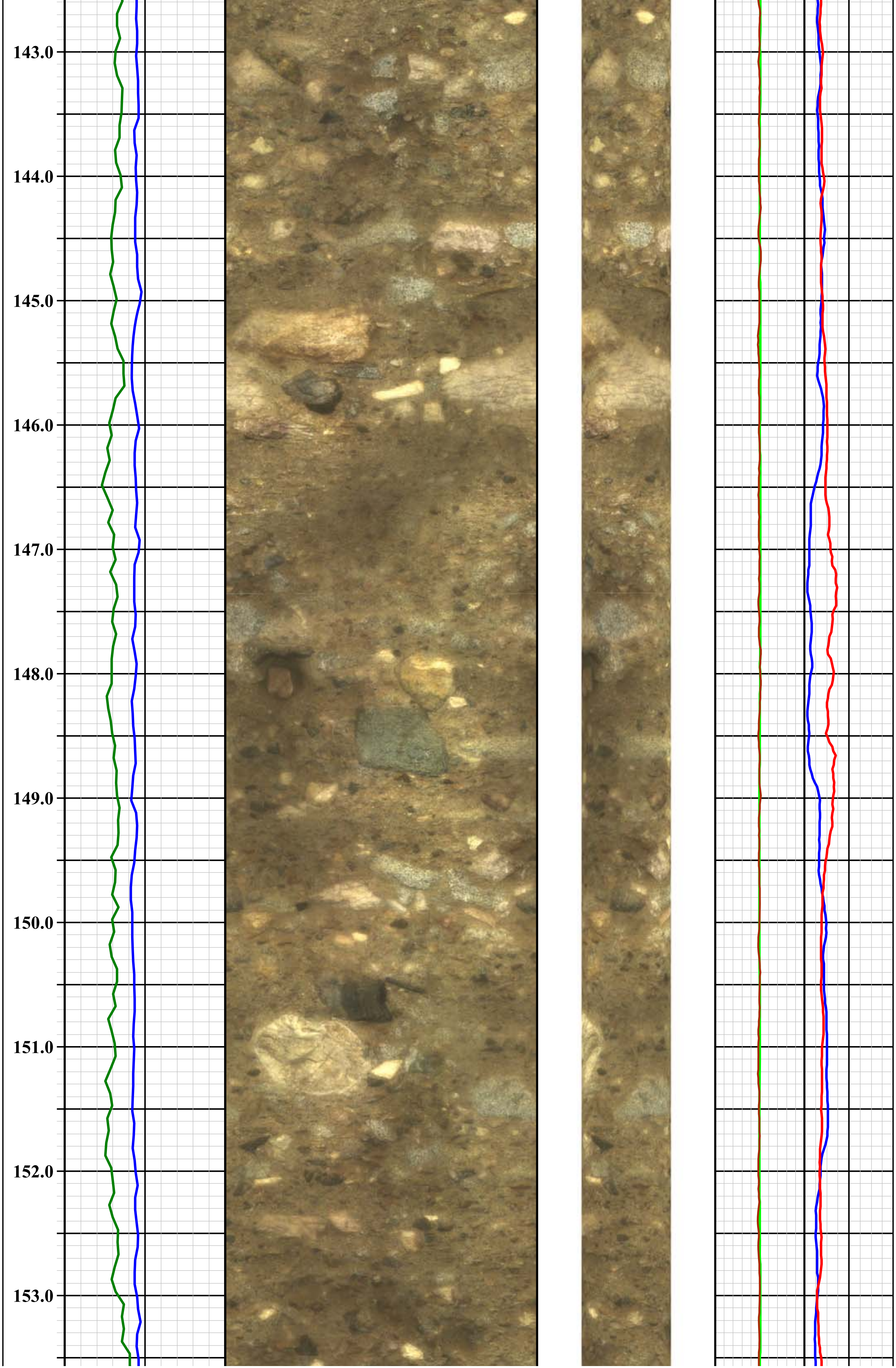
88.0
89.0
90.0
91.0
92.0
93.0
94.0
95.0
96.0
97.0
98.0

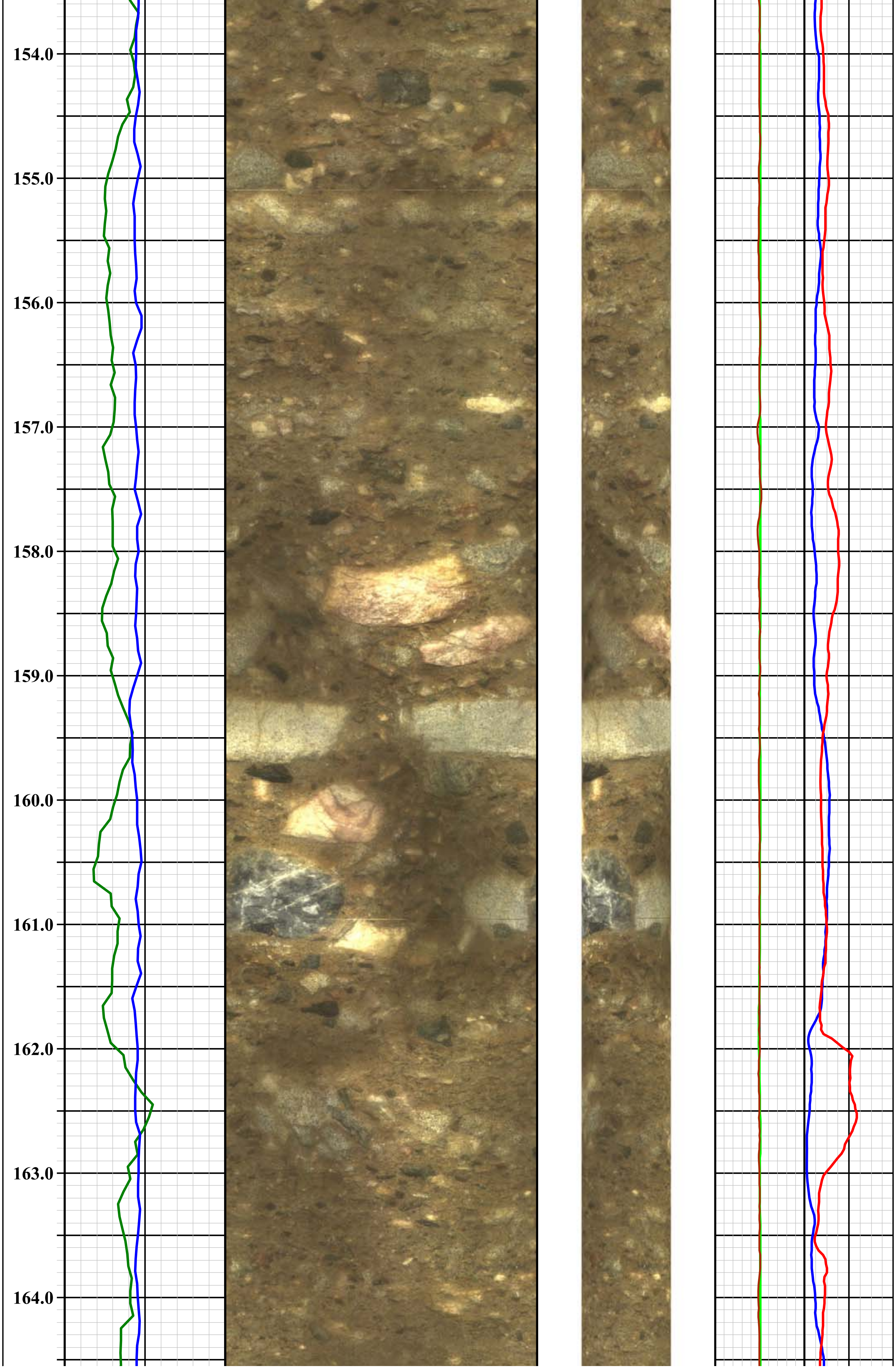

99.0
100.0
101.0
102.0
103.0
104.0
105.0
106.0
107.0
108.0
109.0

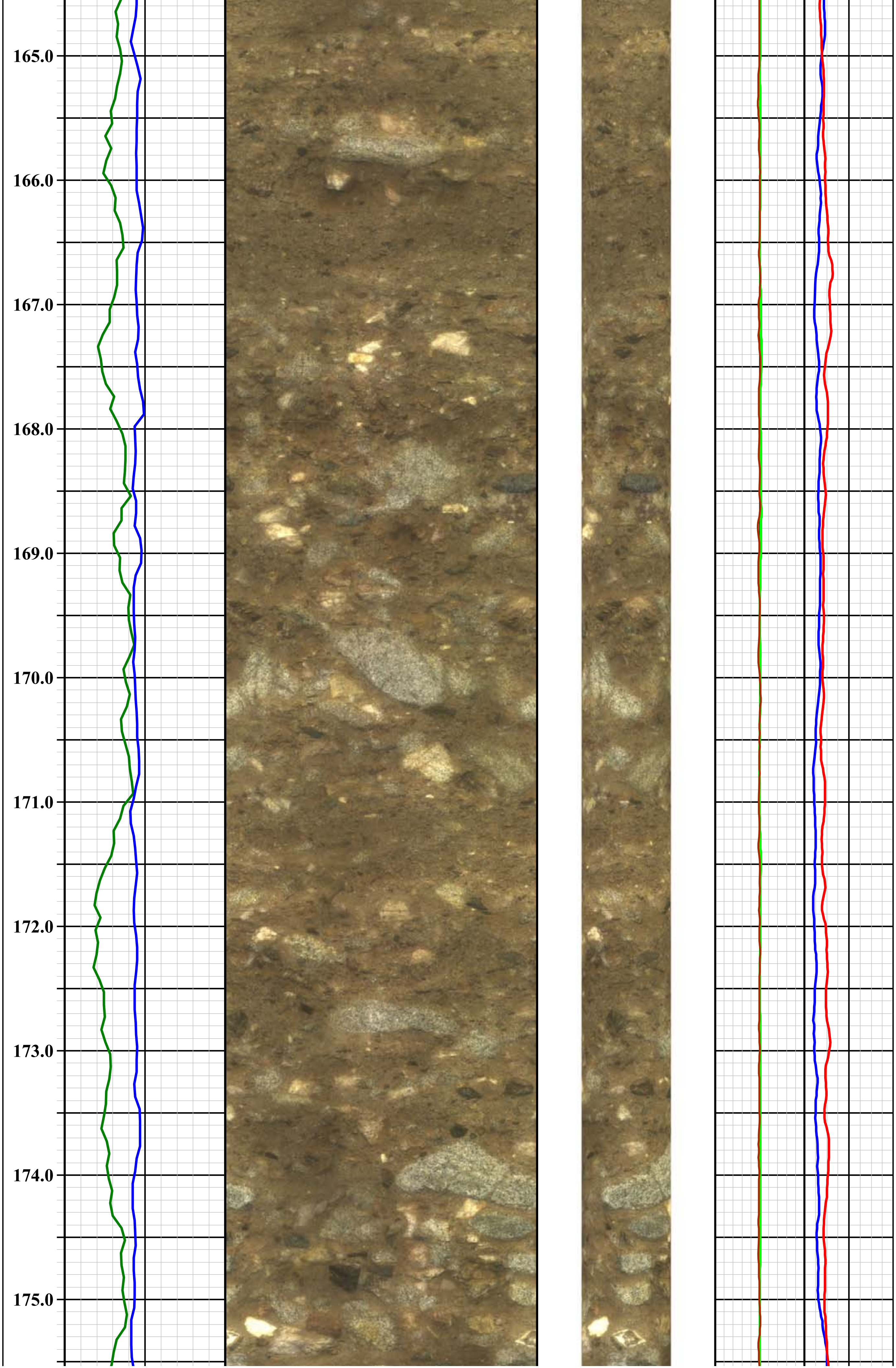

110.0
111.0
112.0
113.0
114.0
115.0
116.0
117.0
118.0
119.0
120.0

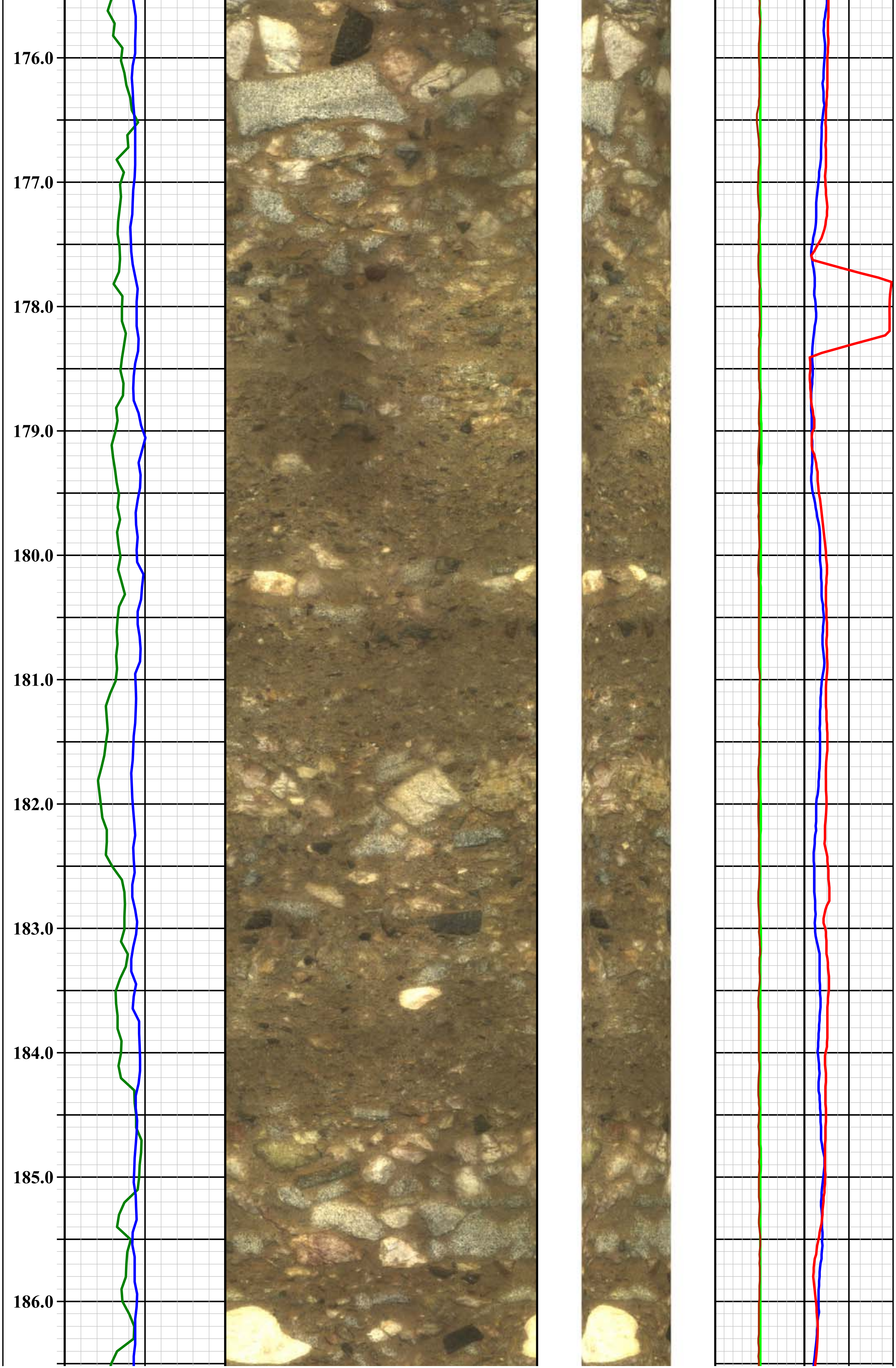

121.0
122.0
123.0
124.0
125.0
126.0
127.0
128.0
129.0
130.0
131.0

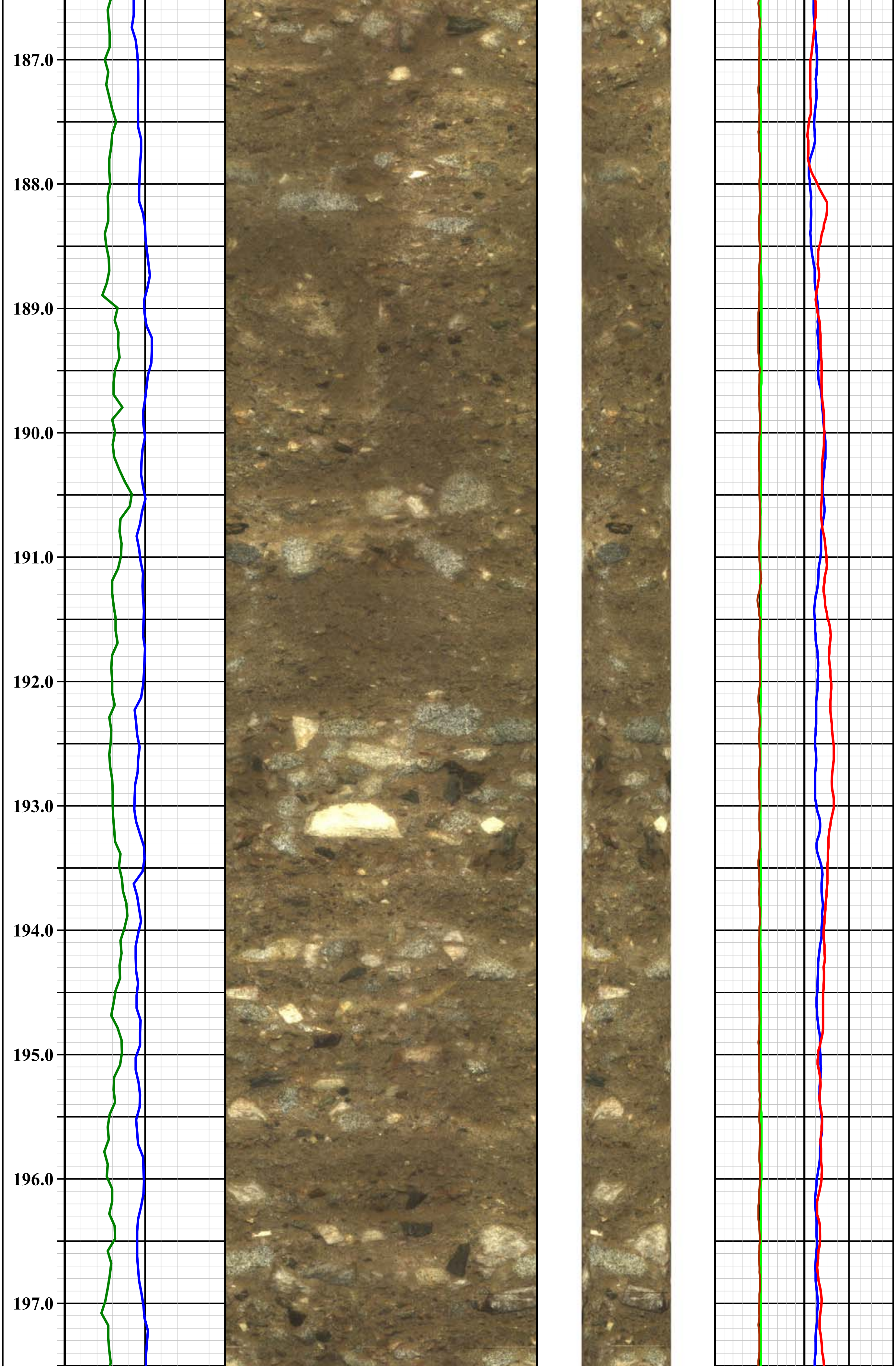

Fluid Level: ~132.0'
132.0
133.0
134.0
135.0
136.0
137.0
138.0
139.0
140.0
141.0
142.0

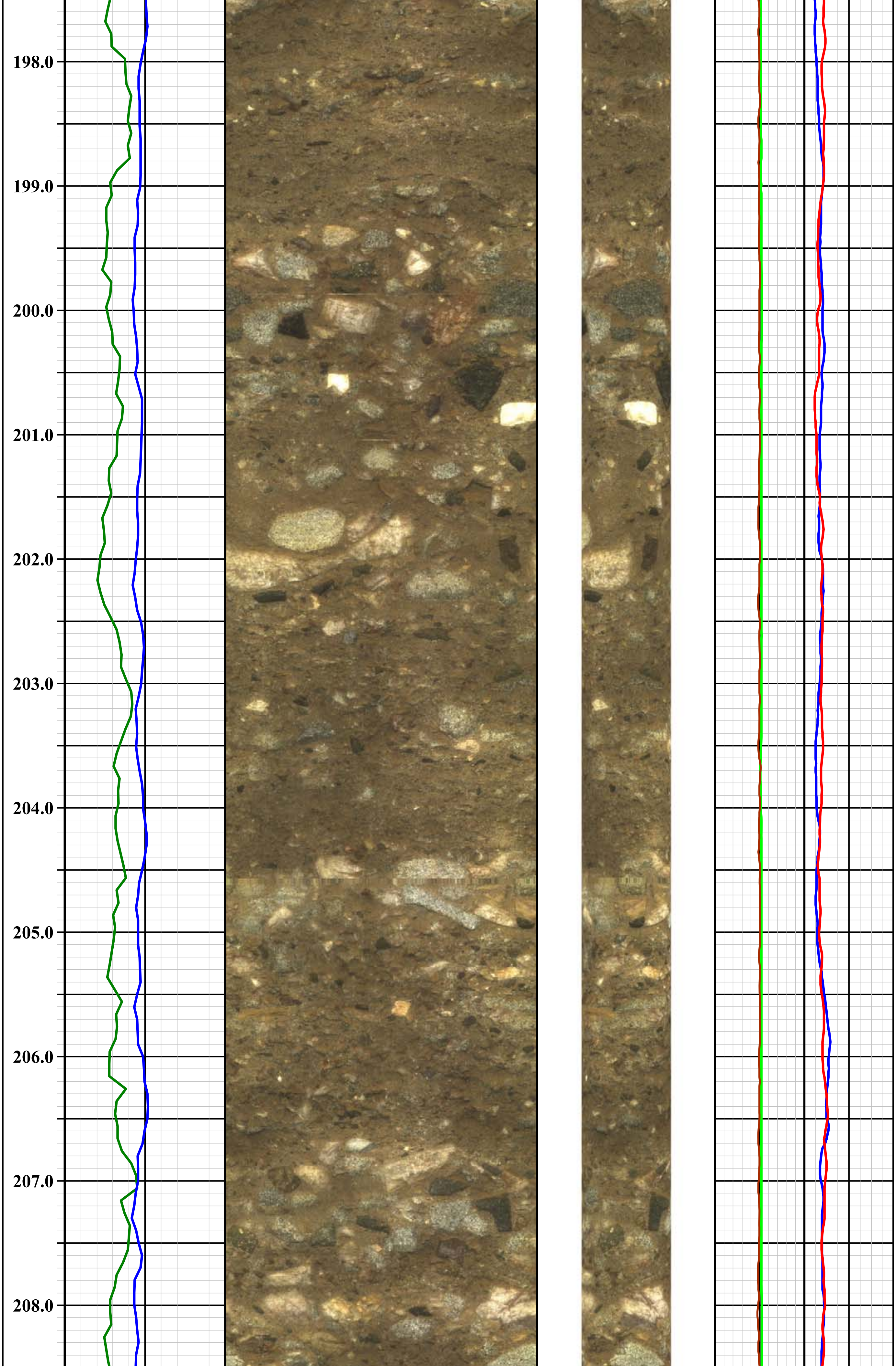

143.0
144.0
145.0
146.0
147.0
148.0
149.0
150.0
151.0
152.0
153.0

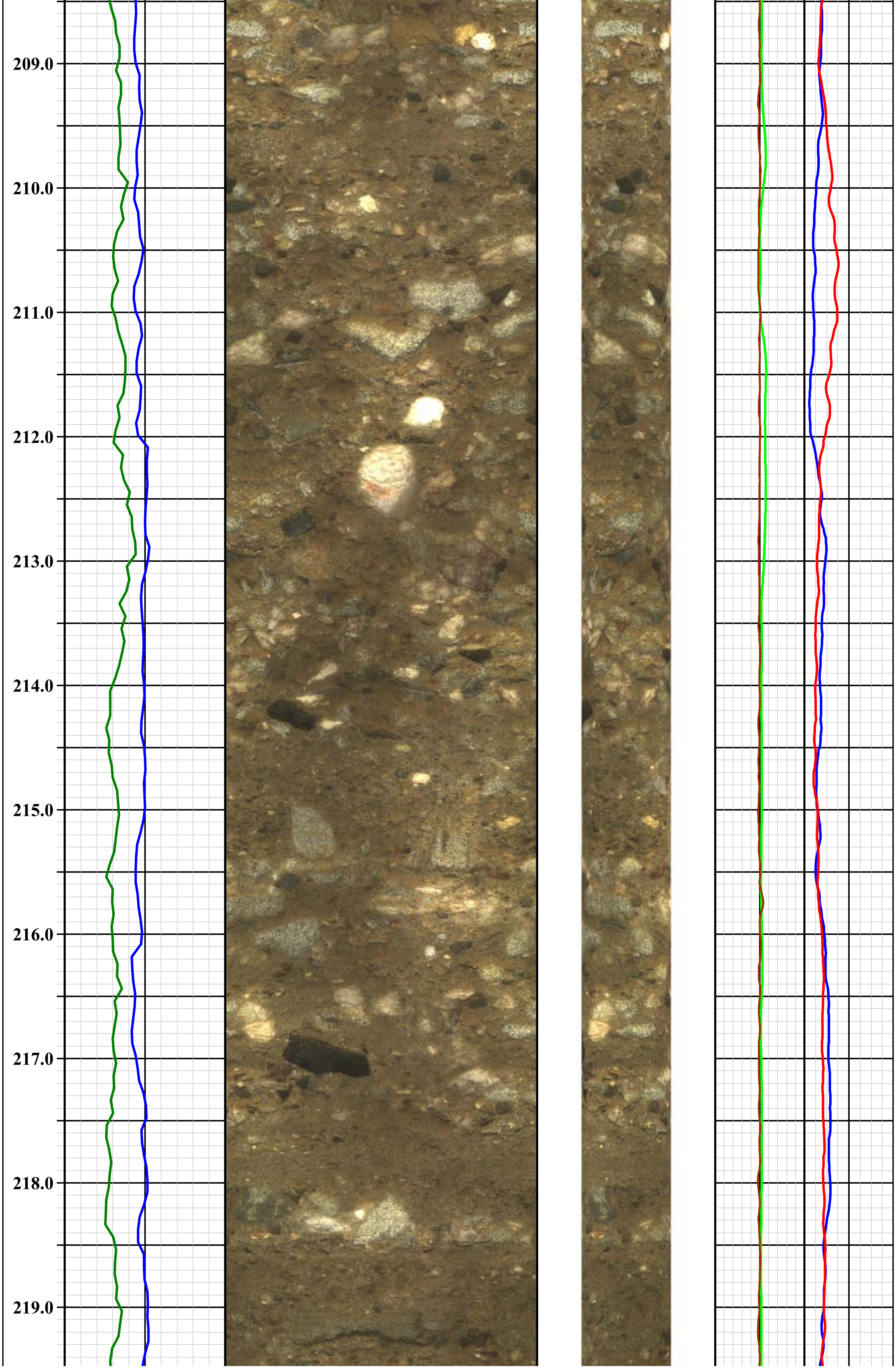

154.0
155.0
156.0
157.0
158.0
159.0
160.0
161.0
162.0
163.0
164.0

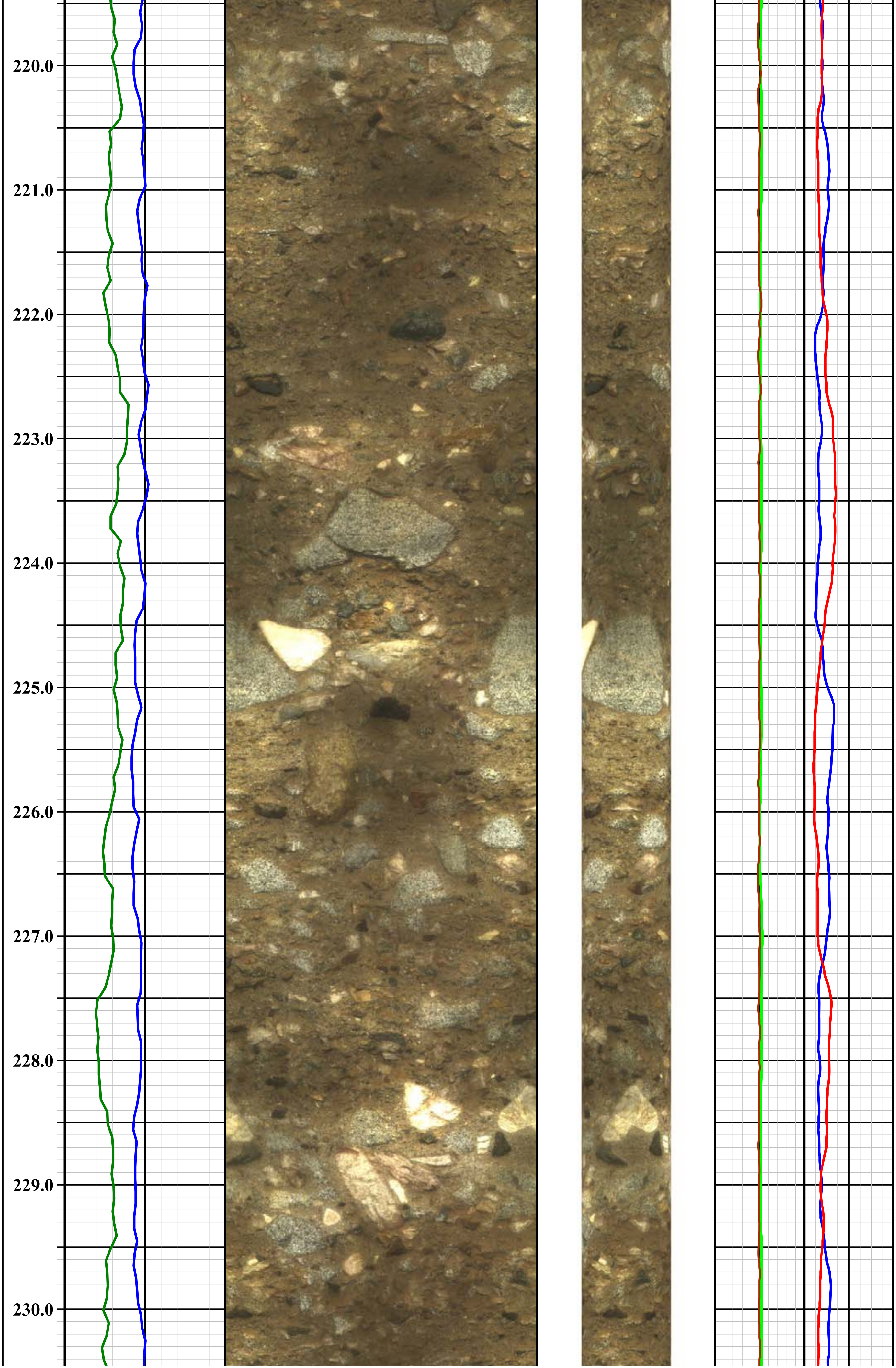

165.0
166.0
167.0
168.0
169.0
170.0
171.0
172.0
173.0
174.0
175.0

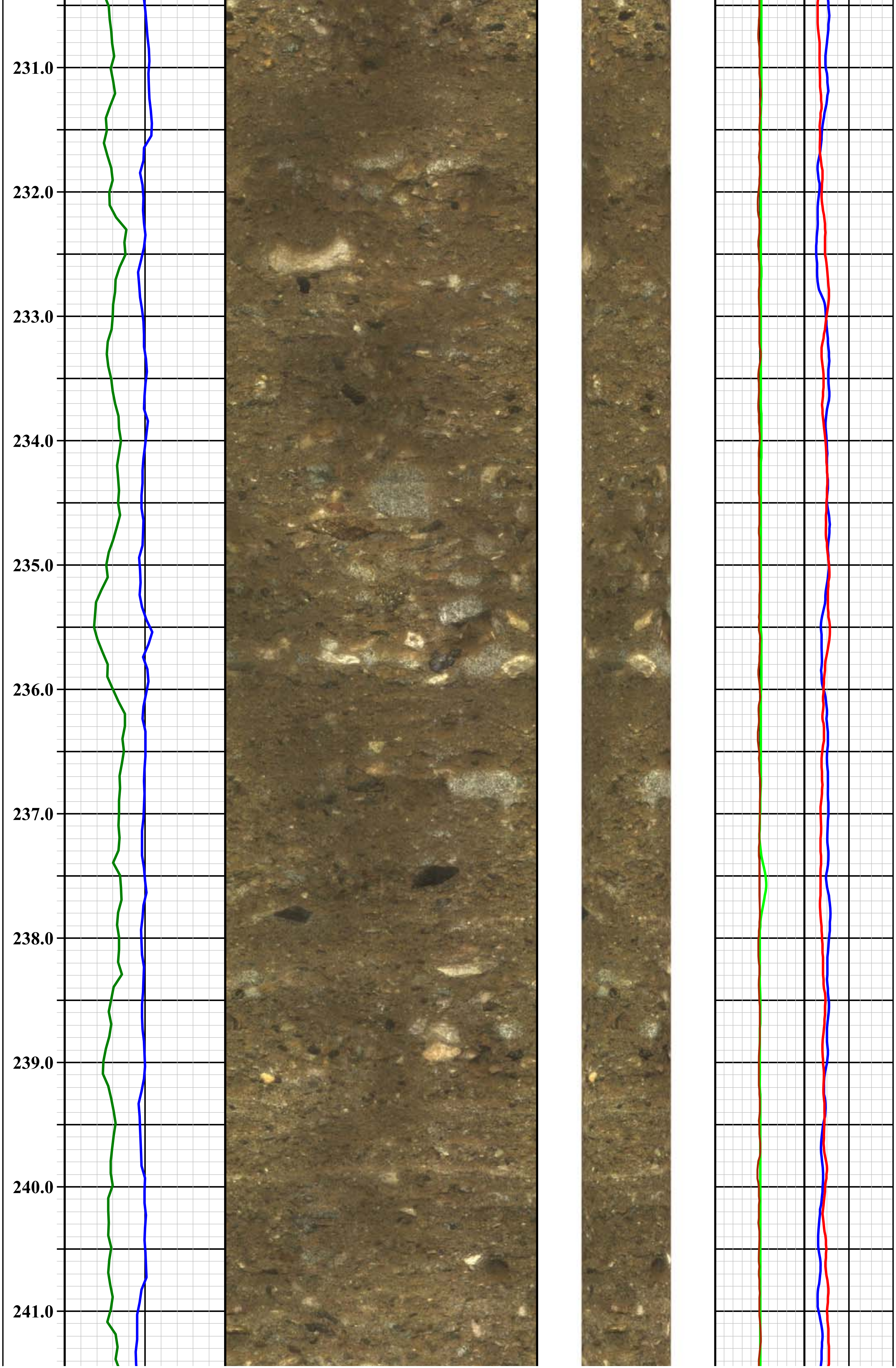

176.0
177.0
178.0
179.0
180.0
181.0
182.0
183.0
184.0
185.0
186.0

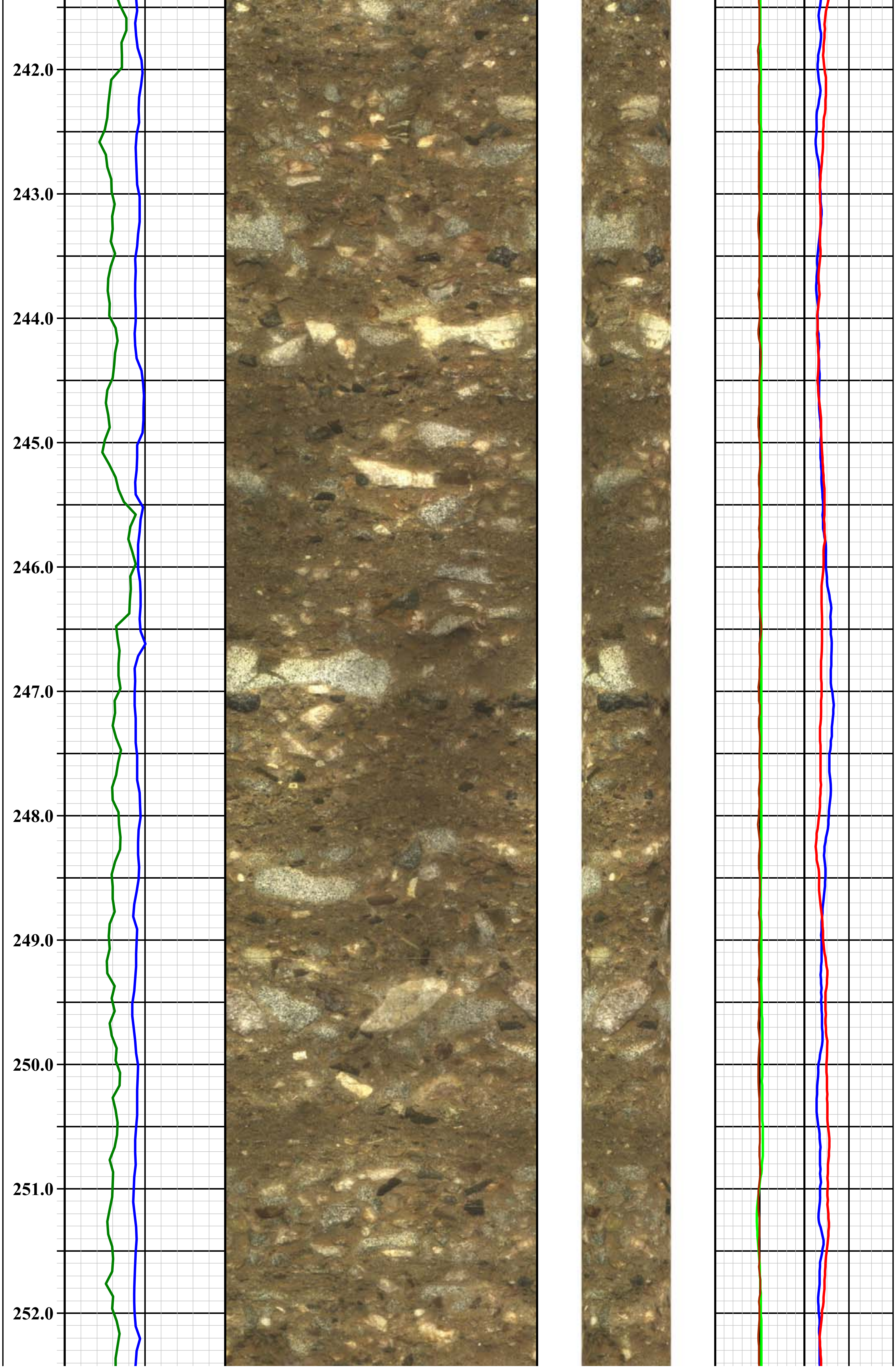

187.0
188.0
189.0
190.0
191.0
192.0
193.0
194.0
195.0
196.0
197.0

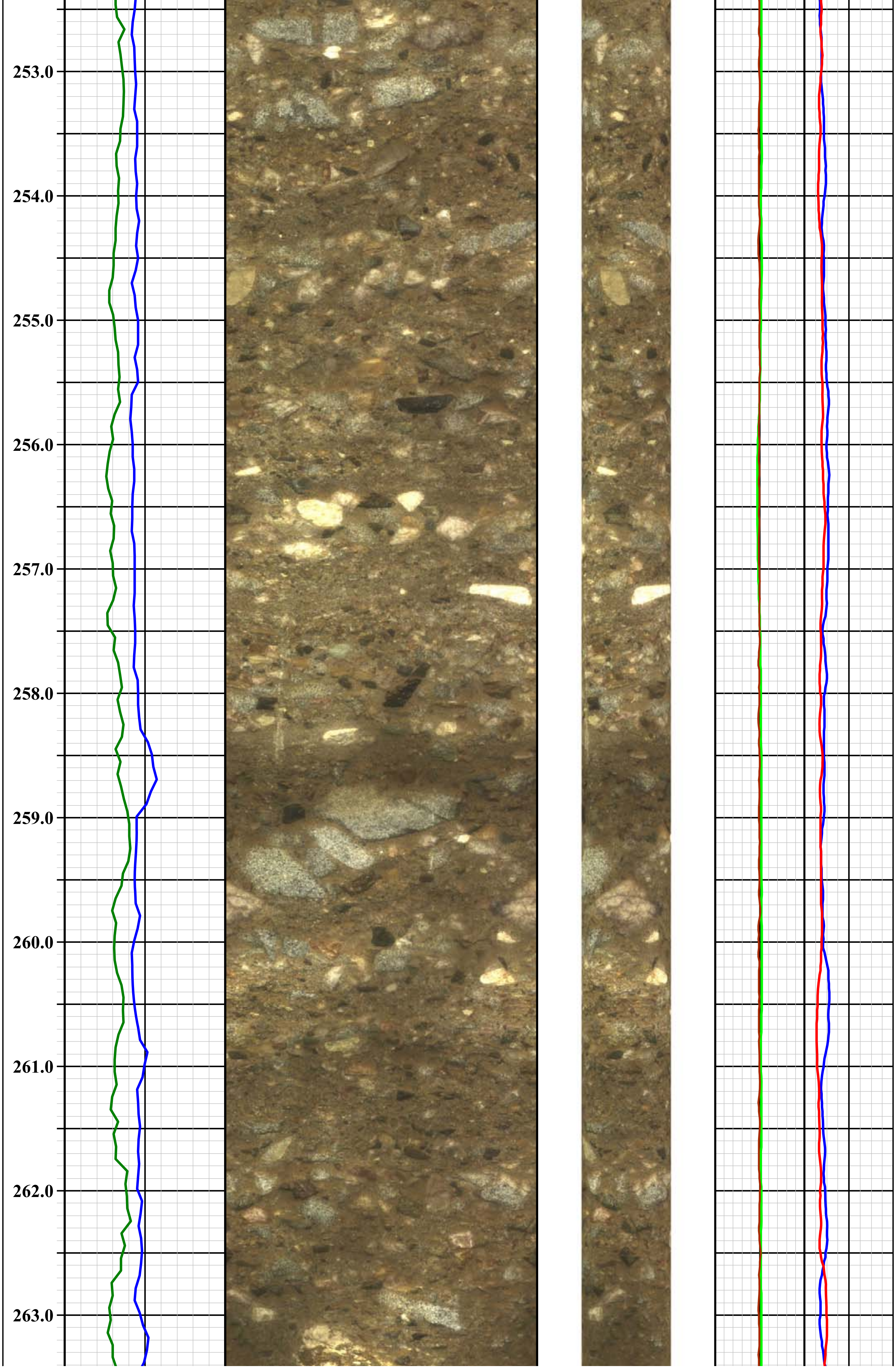

198.0
199.0
200.0
201.0
202.0
203.0
204.0
205.0
206.0
207.0
208.0

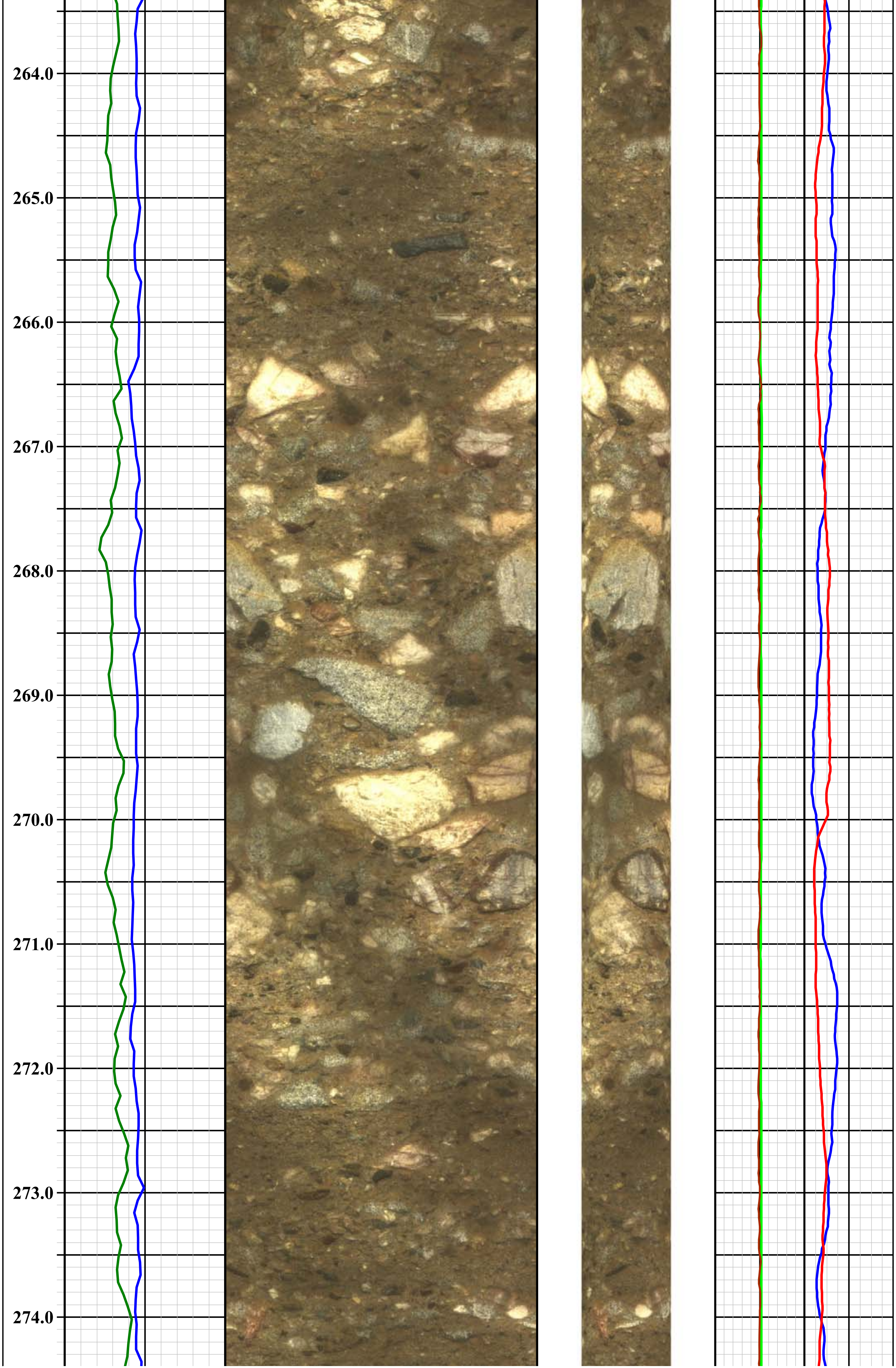

209.0
210.0
211.0
212.0
213.0
214.0
215.0
216.0
217.0
218.0
219.0

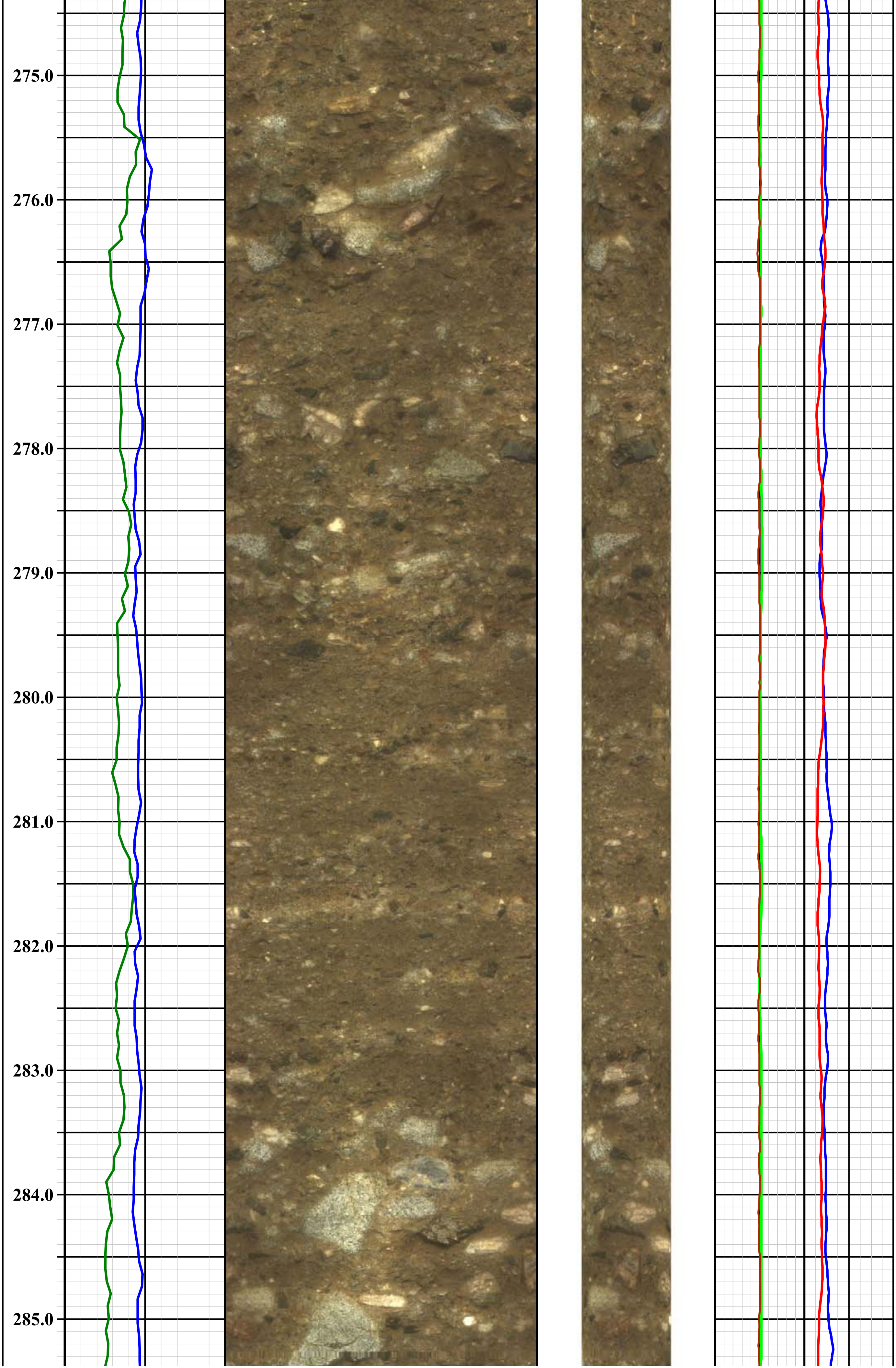

220.0
221.0
222.0
223.0
224.0
225.0
226.0
227.0
228.0
229.0
230.0

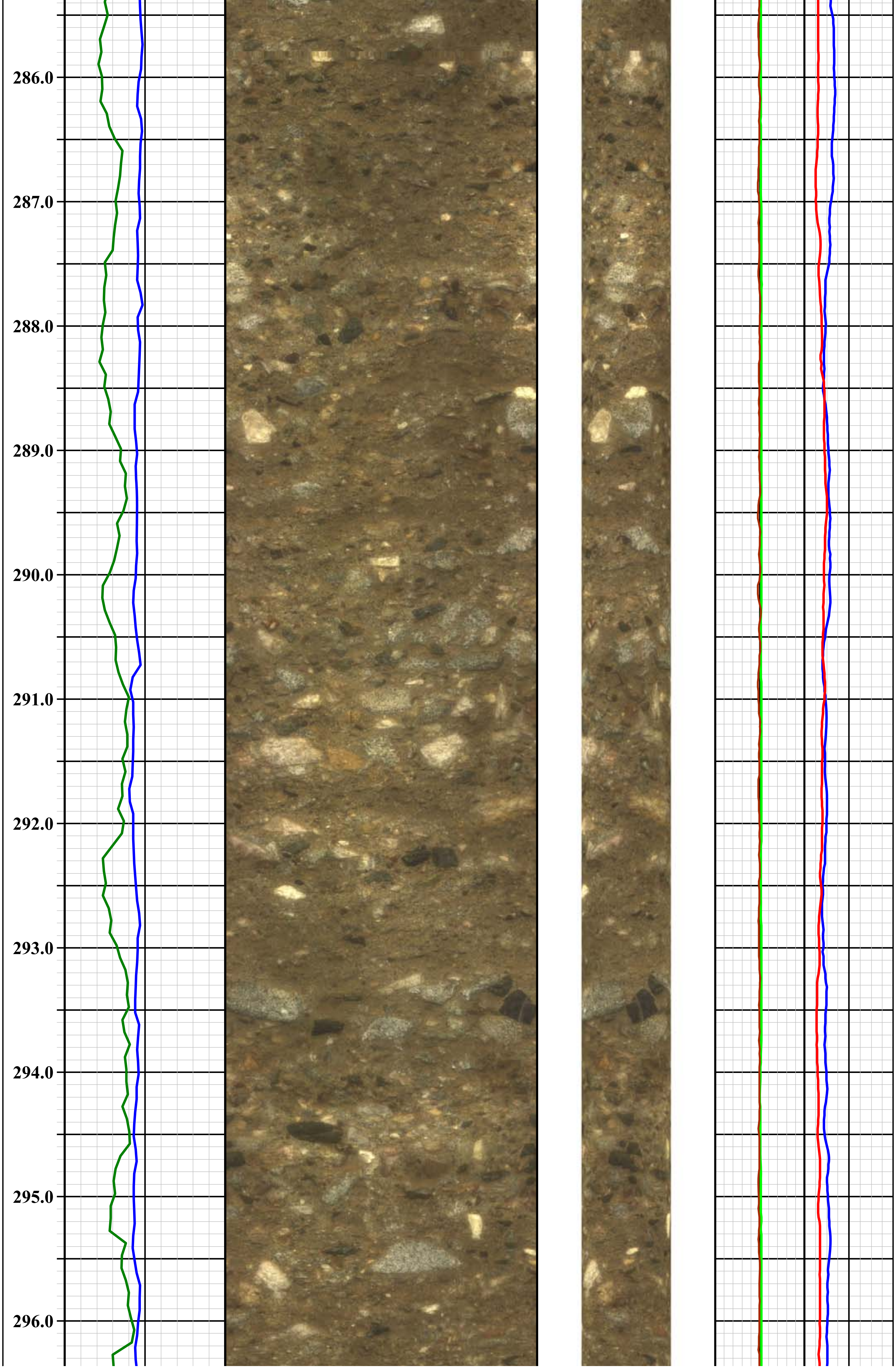

231.0
232.0
233.0
234.0
235.0
236.0
237.0
238.0
239.0
240.0
241.0

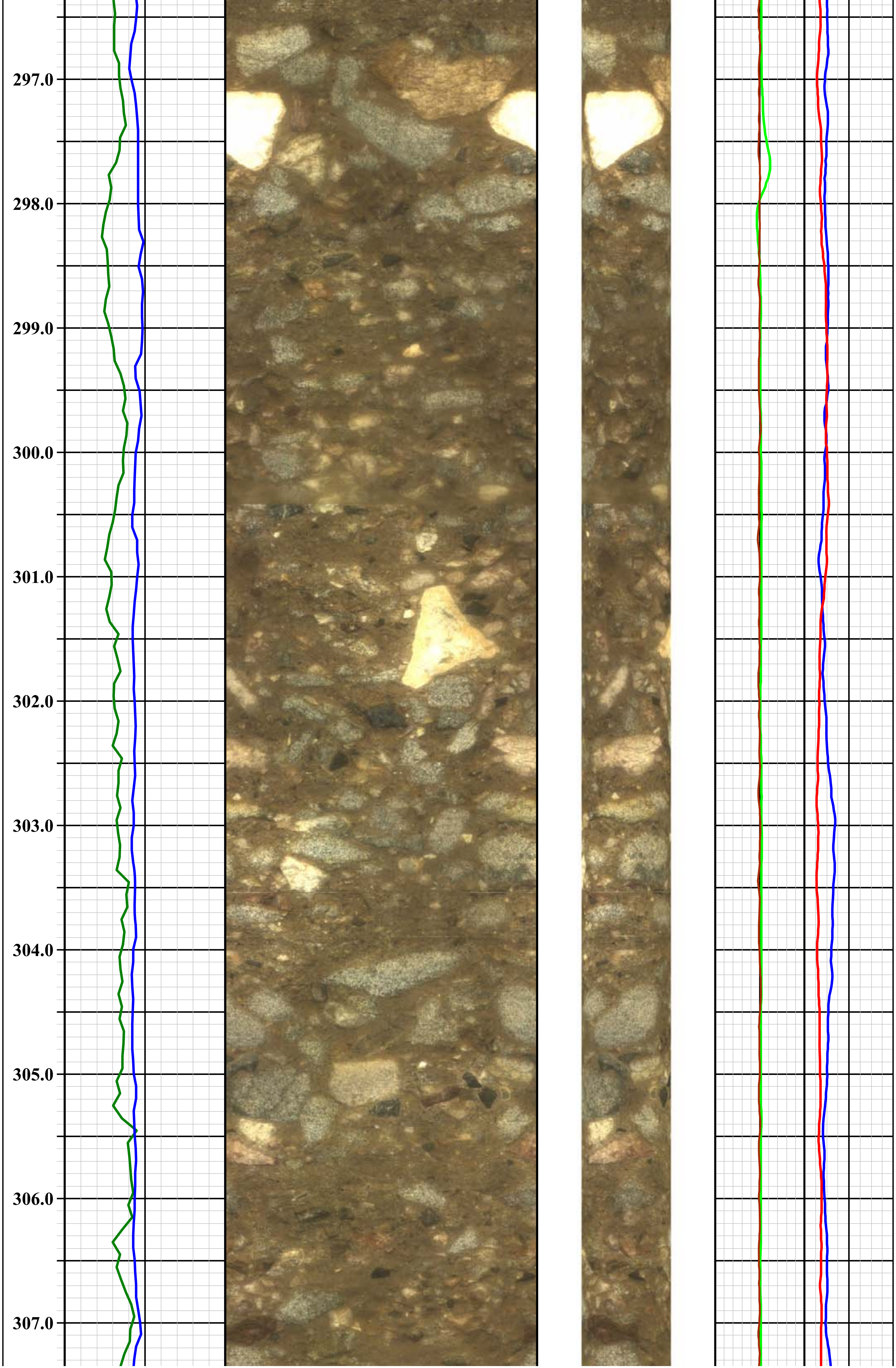

242.0
243.0
244.0
245.0
246.0
247.0
248.0
249.0
250.0
251.0
252.0

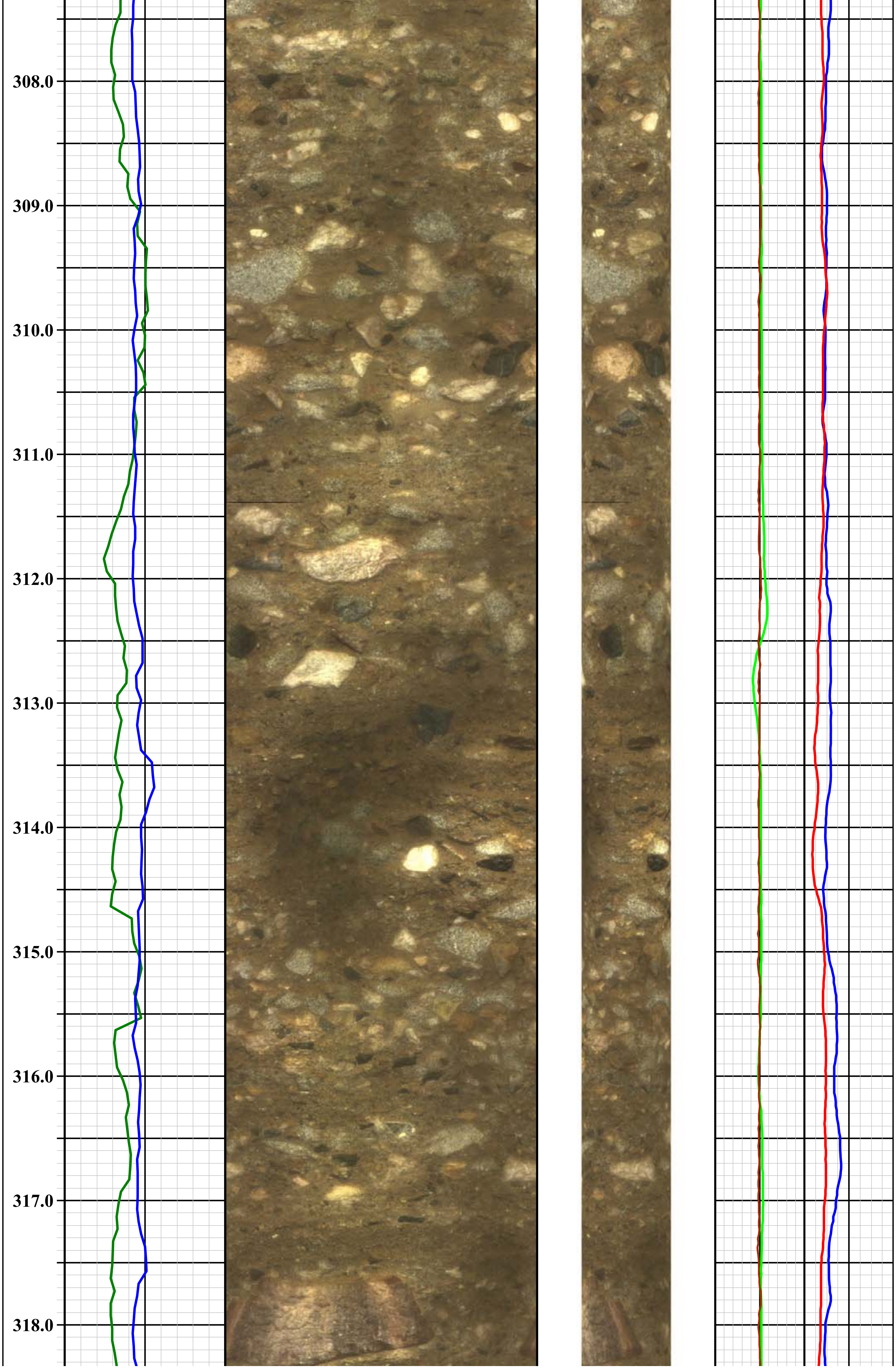

253.0
254.0
255.0
256.0
257.0
258.0
259.0
260.0
261.0
262.0
263.0

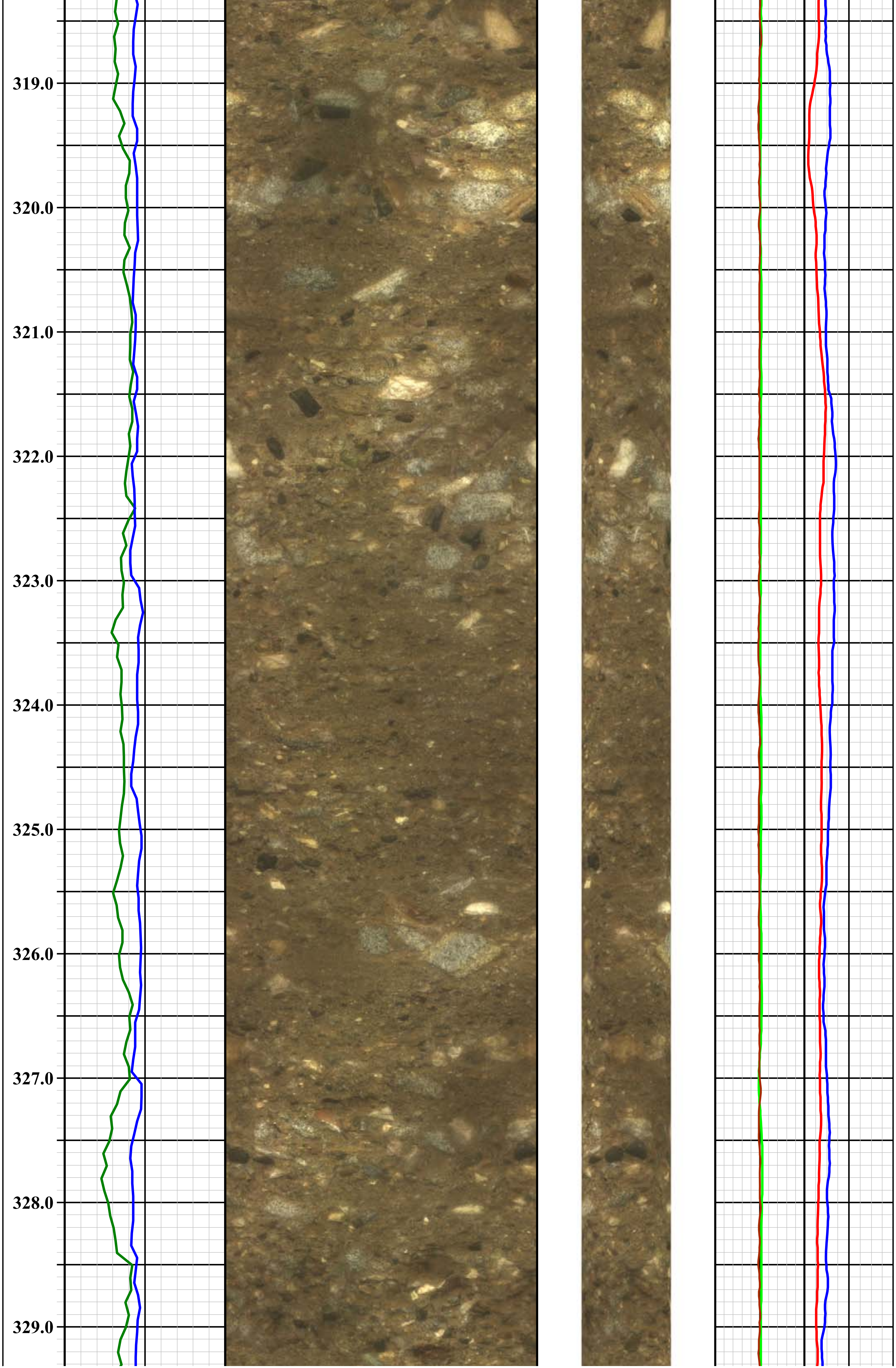

264.0
265.0
266.0
267.0
268.0
269.0
270.0
271.0
272.0
273.0
274.0

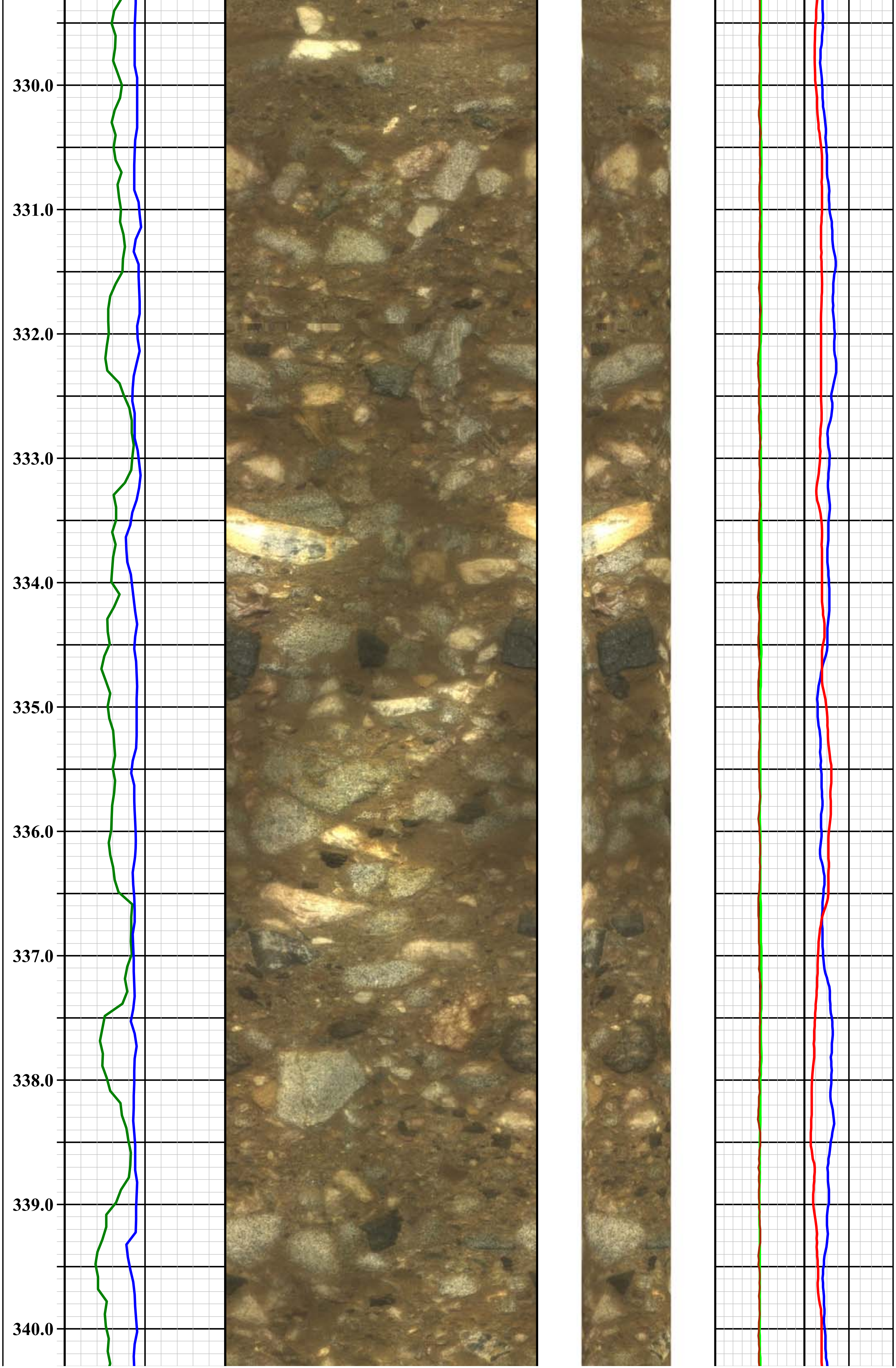

275.0
276.0
277.0
278.0
279.0
280.0
281.0
282.0
283.0
284.0
285.0


286.0
287.0
288.0
289.0
290.0
291.0
292.0
293.0
294.0
295.0
296.0

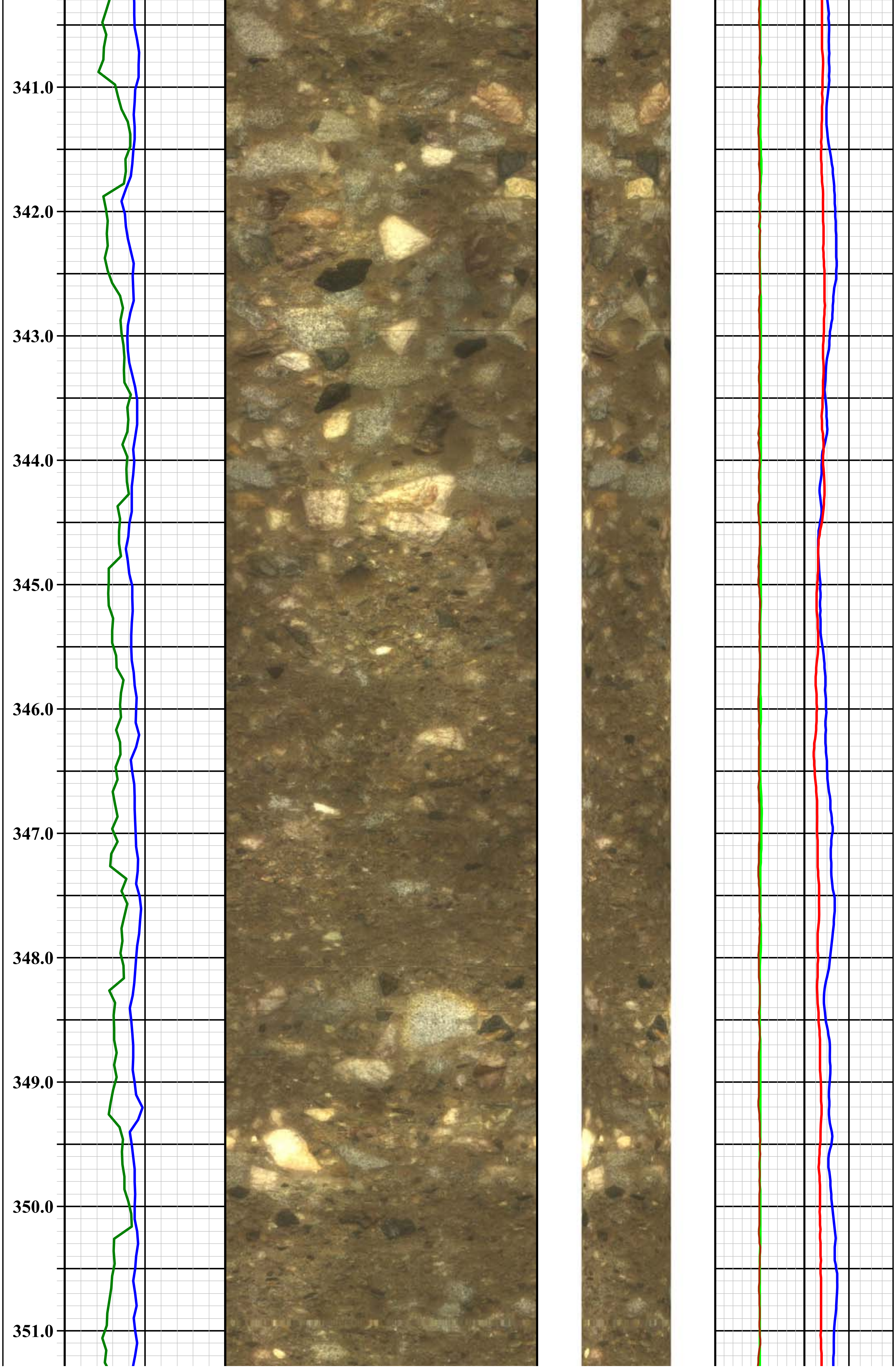

297.0
298.0
299.0
300.0
301.0
302.0
303.0
304.0
305.0
306.0
307.0

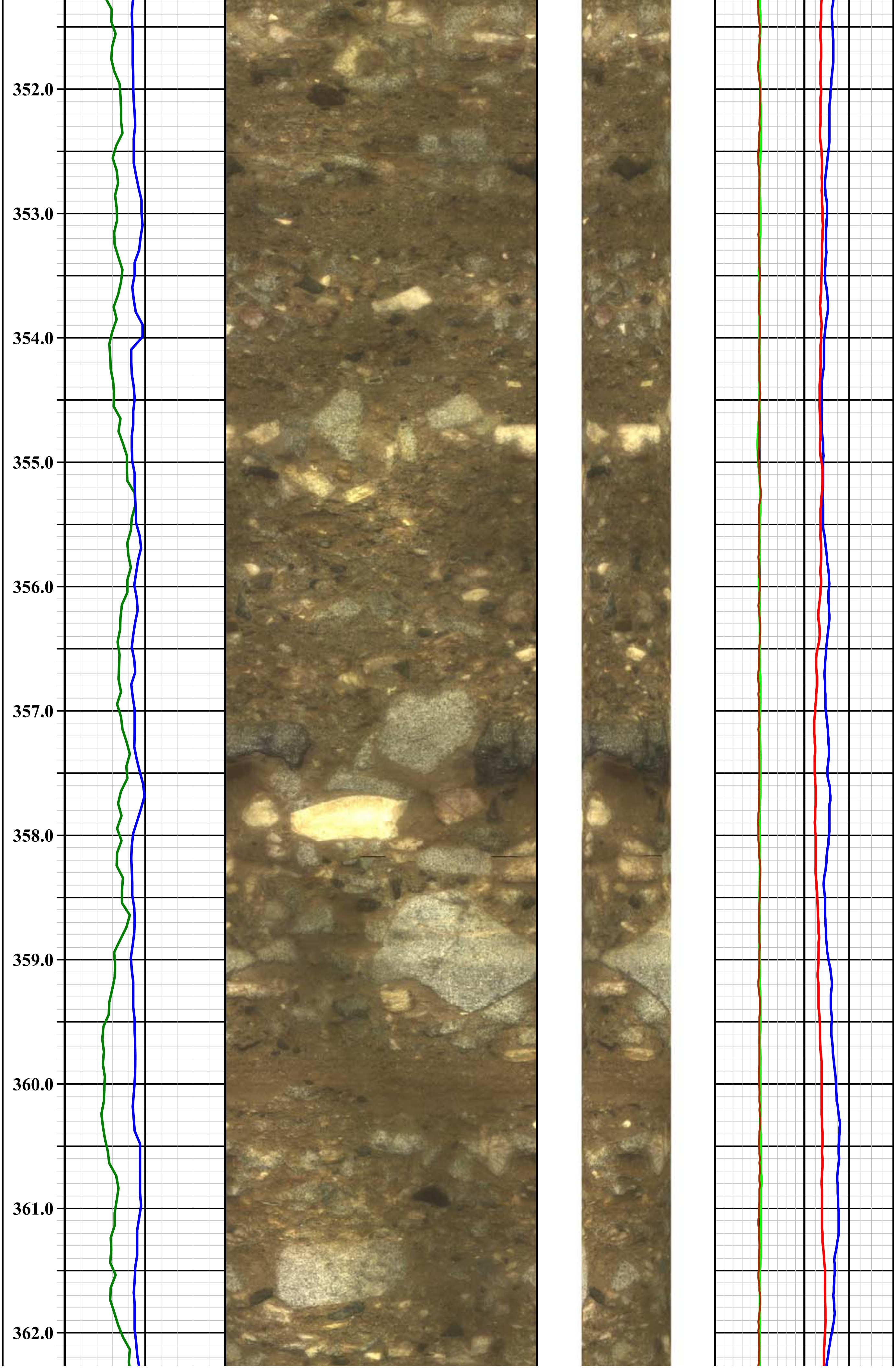

308.0
309.0
310.0
311.0
312.0
313.0
314.0
315.0
316.0
317.0
318.0

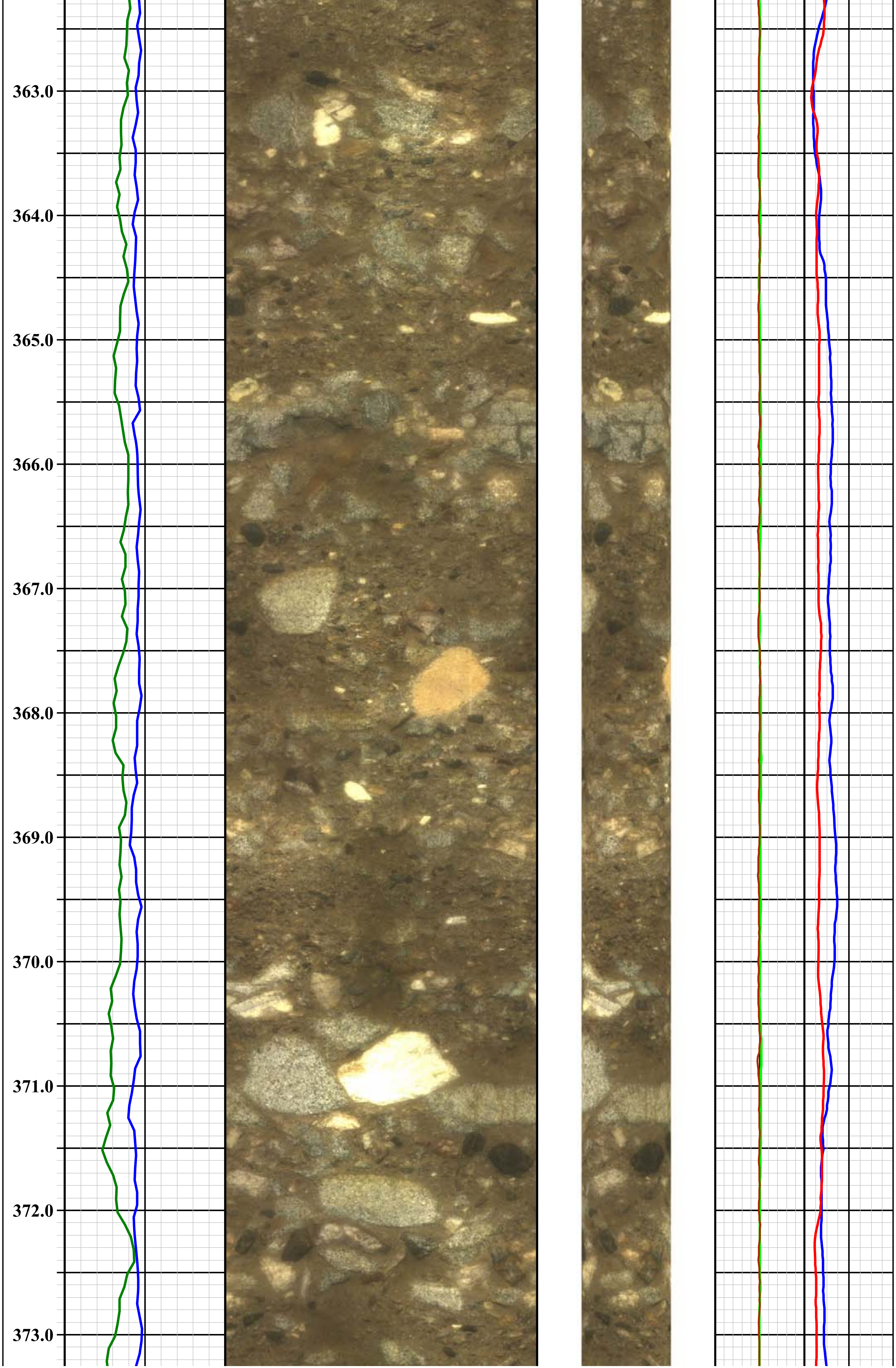

319.0
320.0
321.0
322.0
323.0
324.0
325.0
326.0
327.0
328.0
329.0

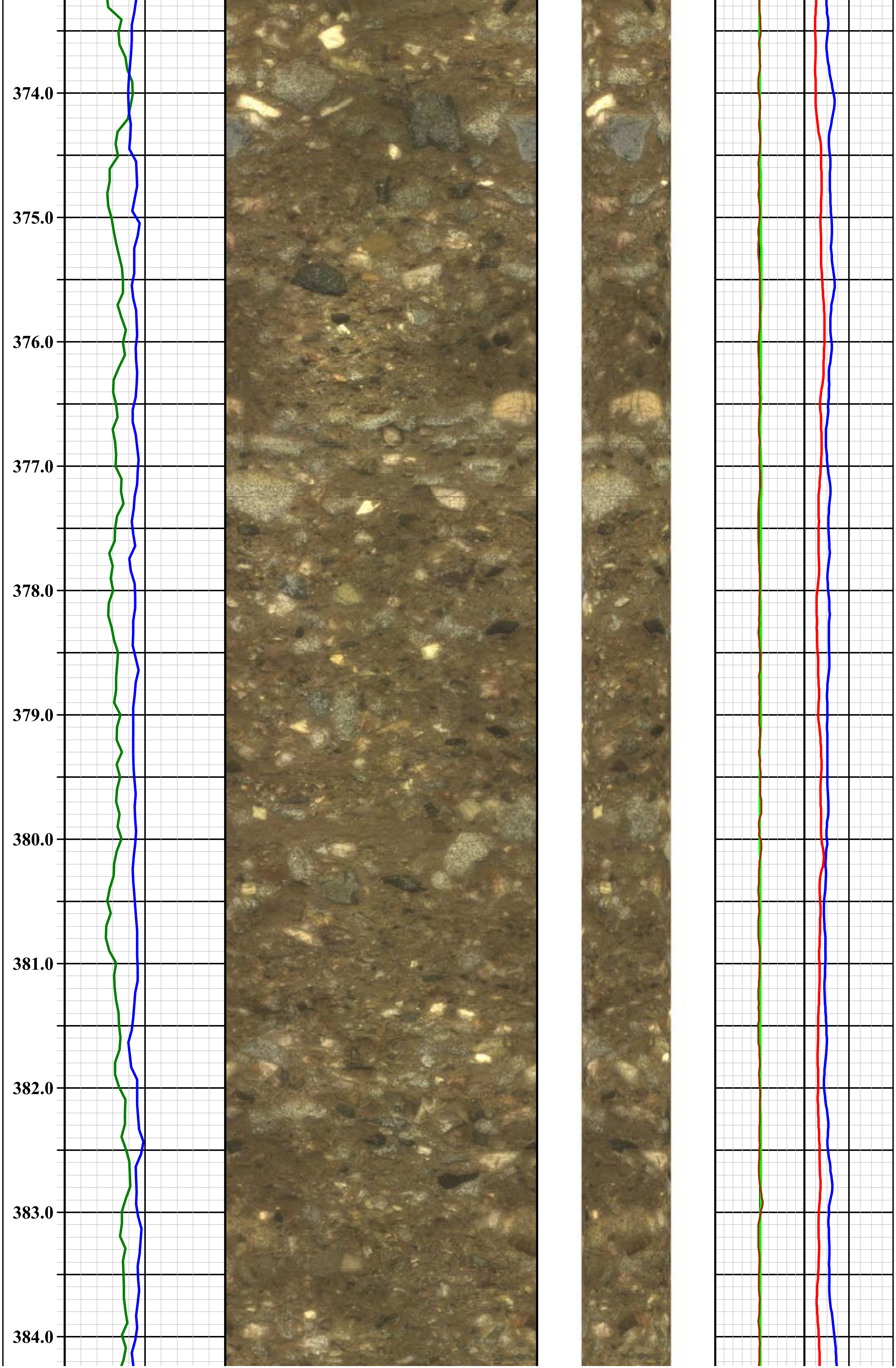


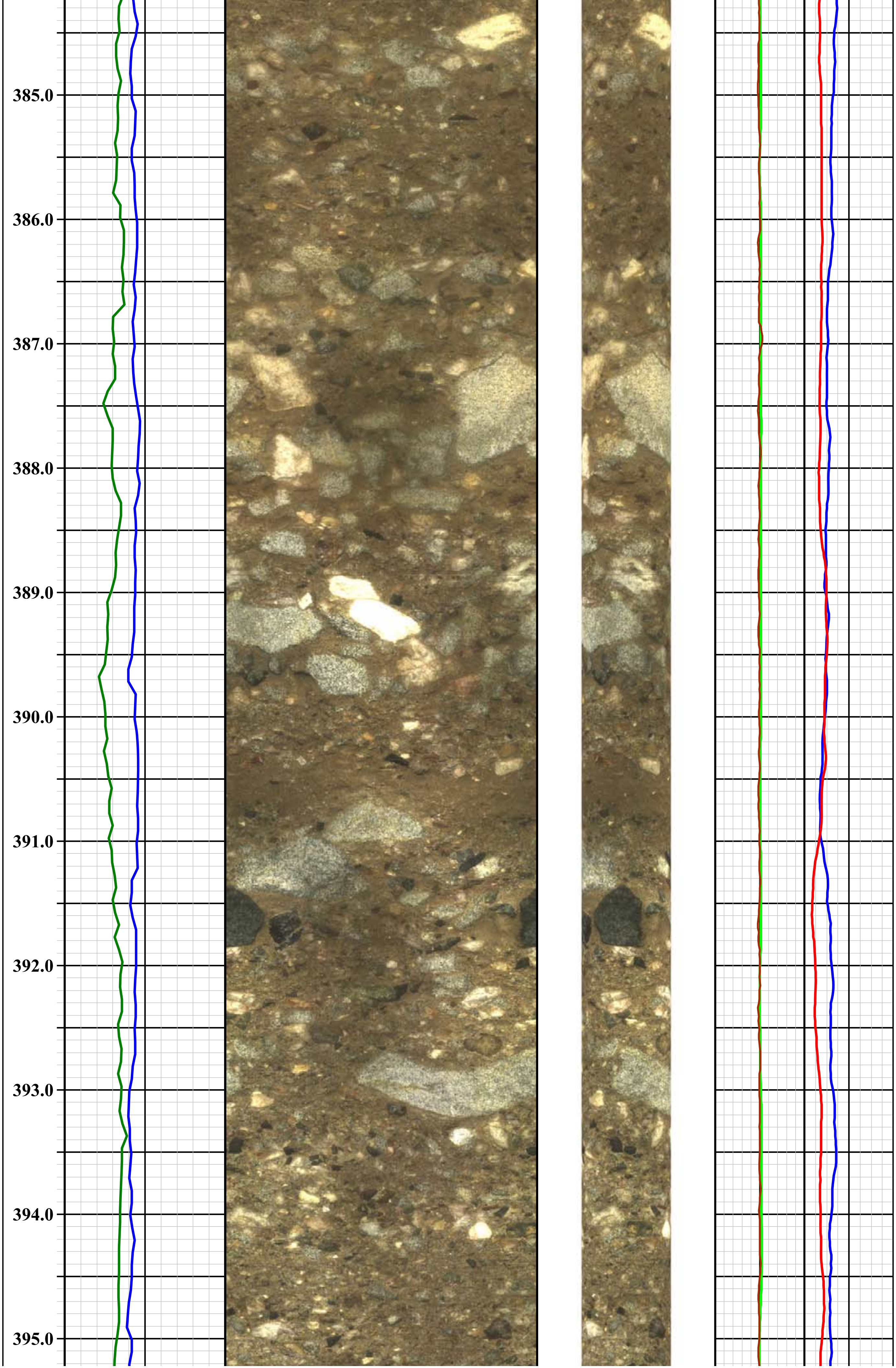
330.0
331.0
332.0
333.0
334.0
335.0
336.0
337.0
338.0
339.0
340.0

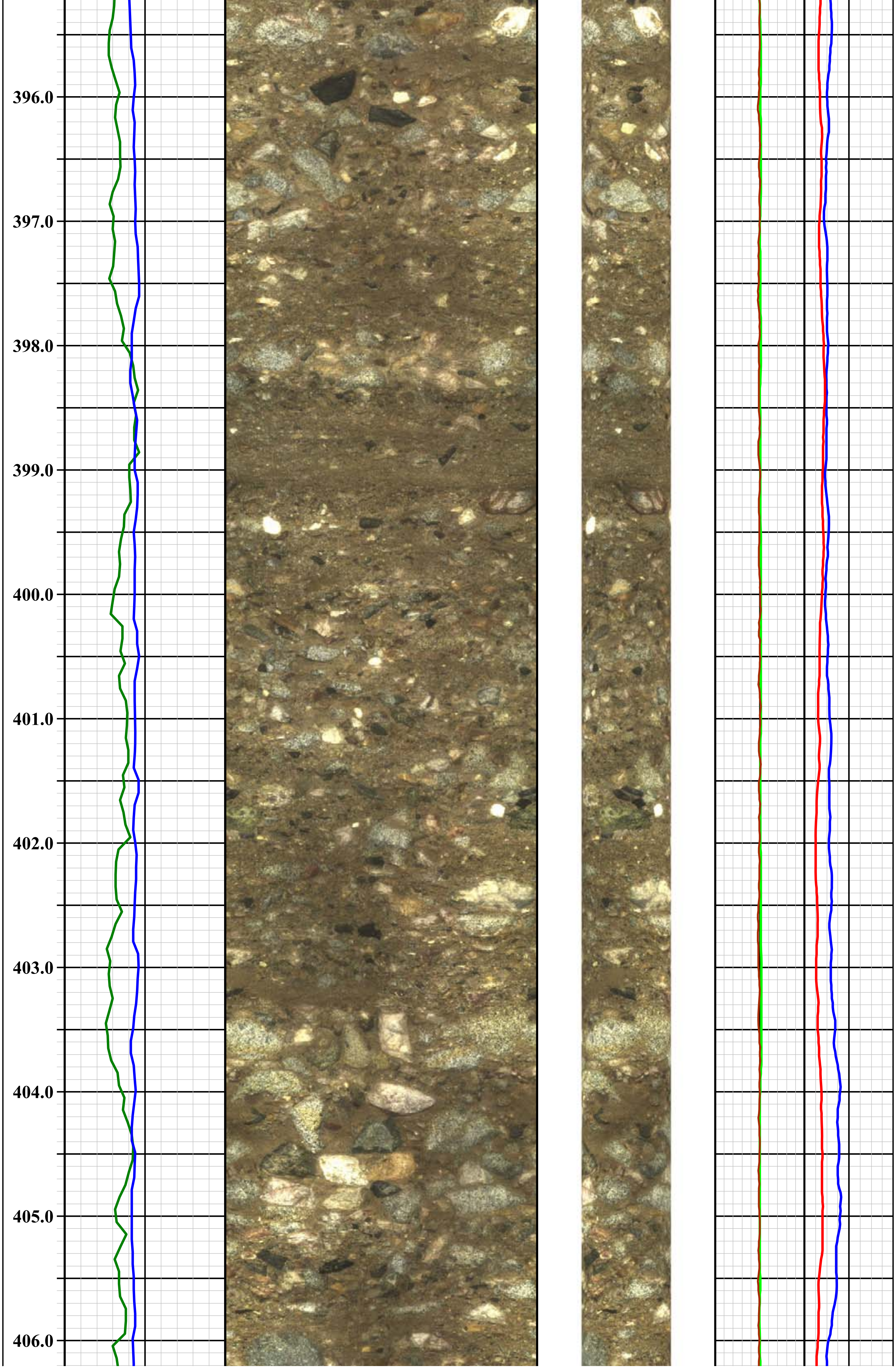

341.0
342.0
343.0
344.0
345.0
346.0
347.0
348.0
349.0
350.0
351.0

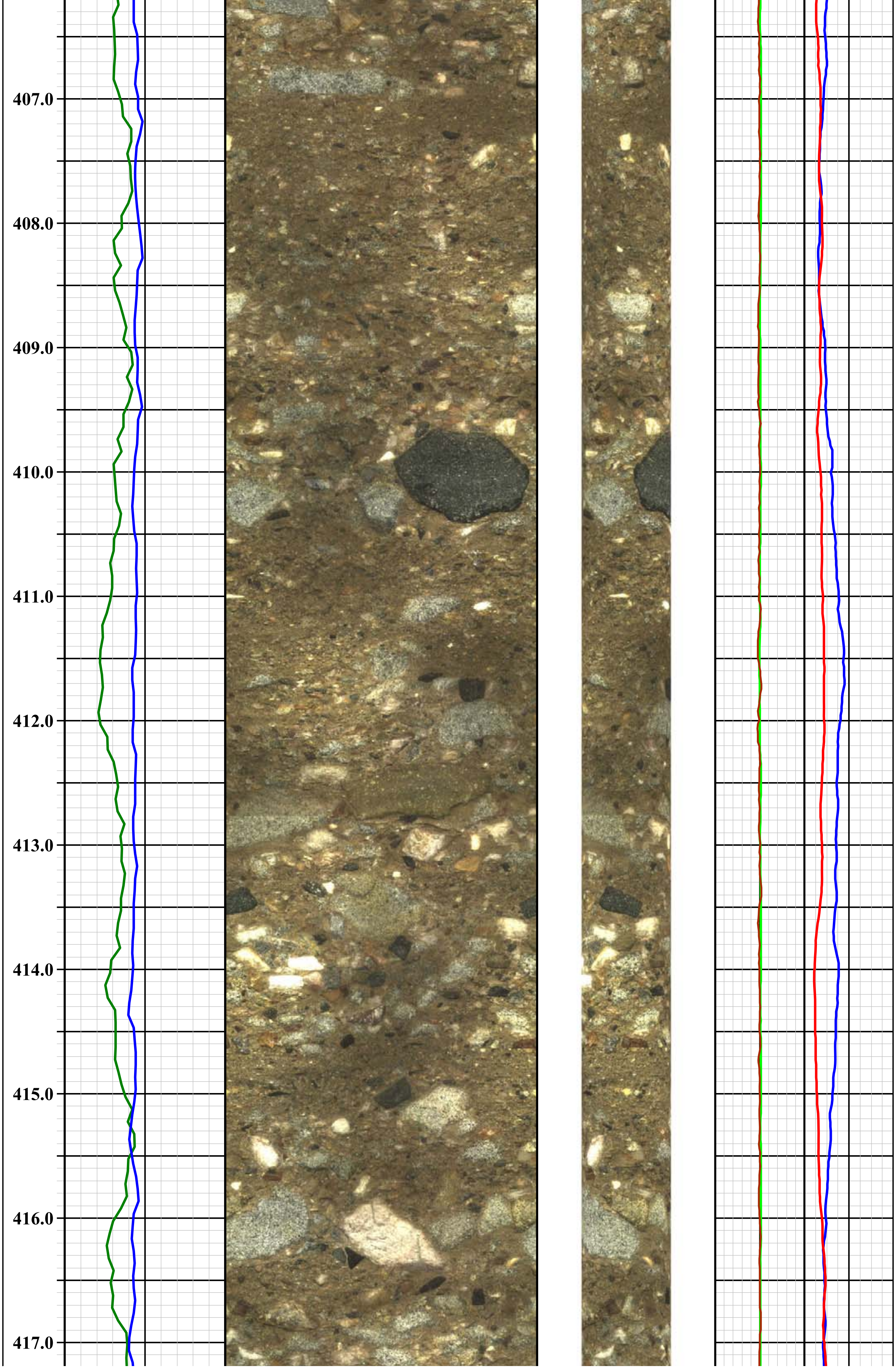

352.0
353.0
354.0
355.0
356.0
357.0
358.0
359.0
360.0
361.0
362.0

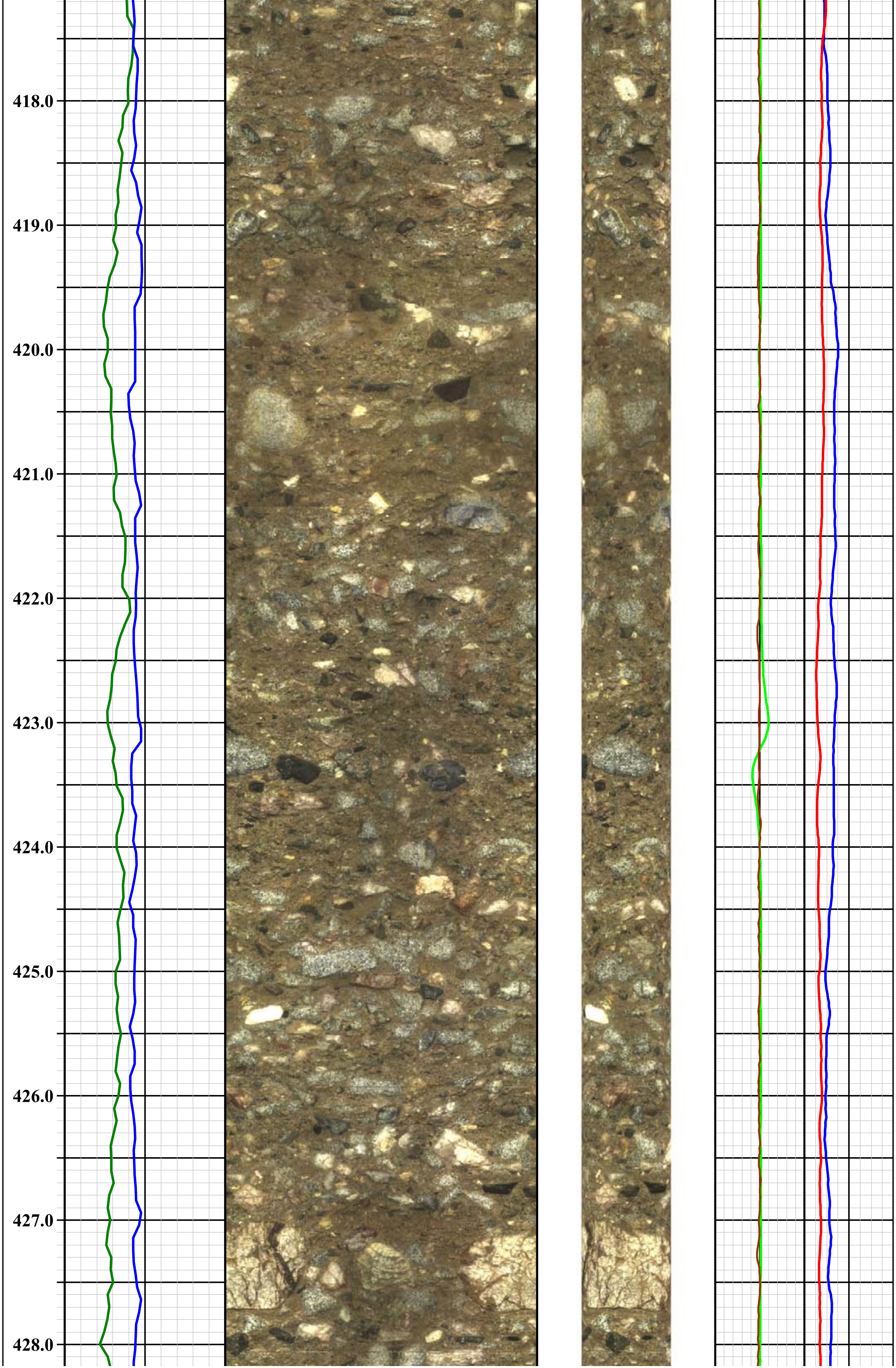

363.0
364.0
365.0
366.0
367.0
368.0
369.0
370.0
371.0
372.0
373.0

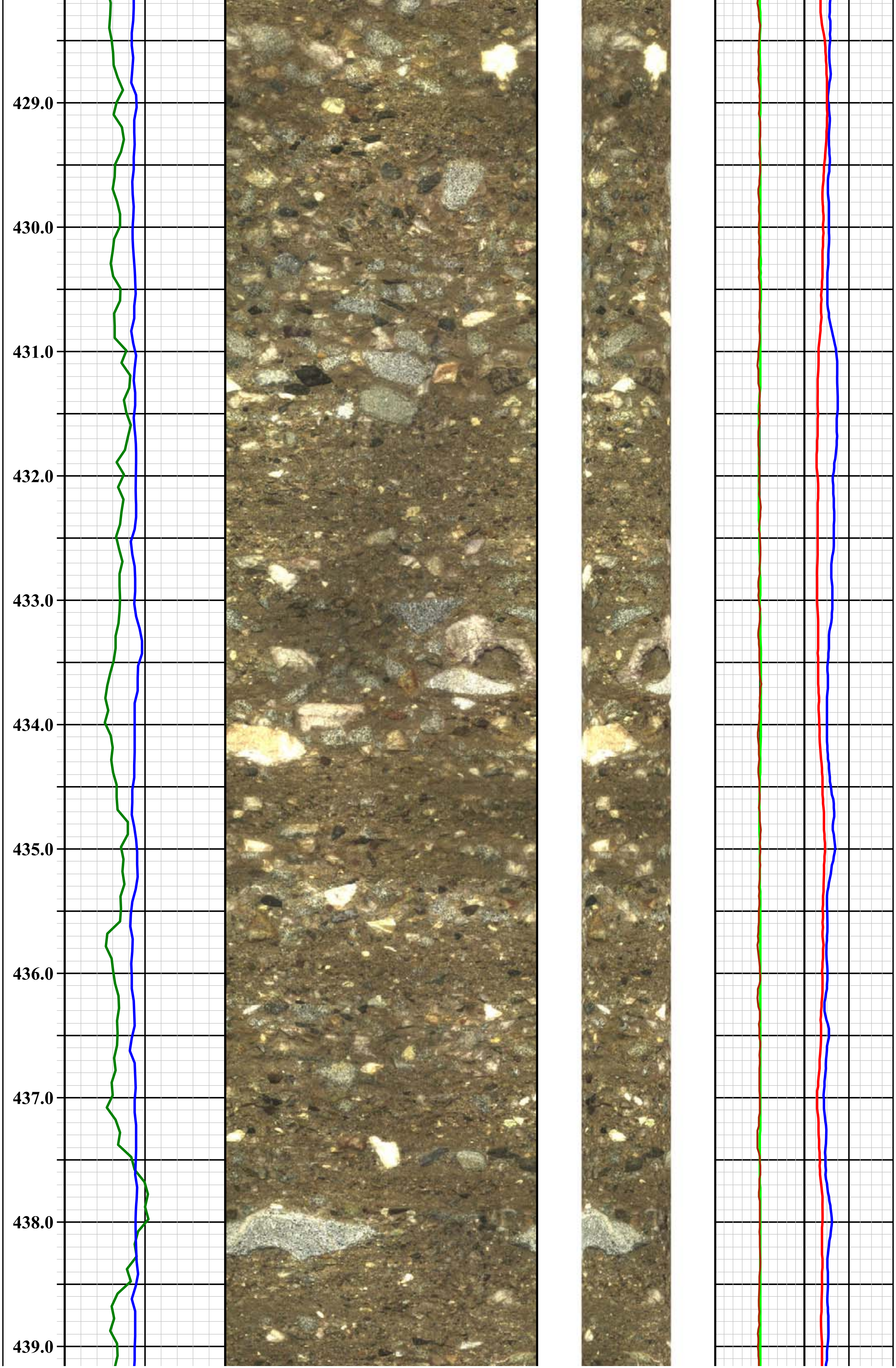

374.0
375.0
376.0
377.0
378.0
379.0
380.0
381.0
382.0
383.0
384.0


385.0
386.0
387.0
388.0
389.0
390.0
391.0
392.0
393.0
394.0
395.0

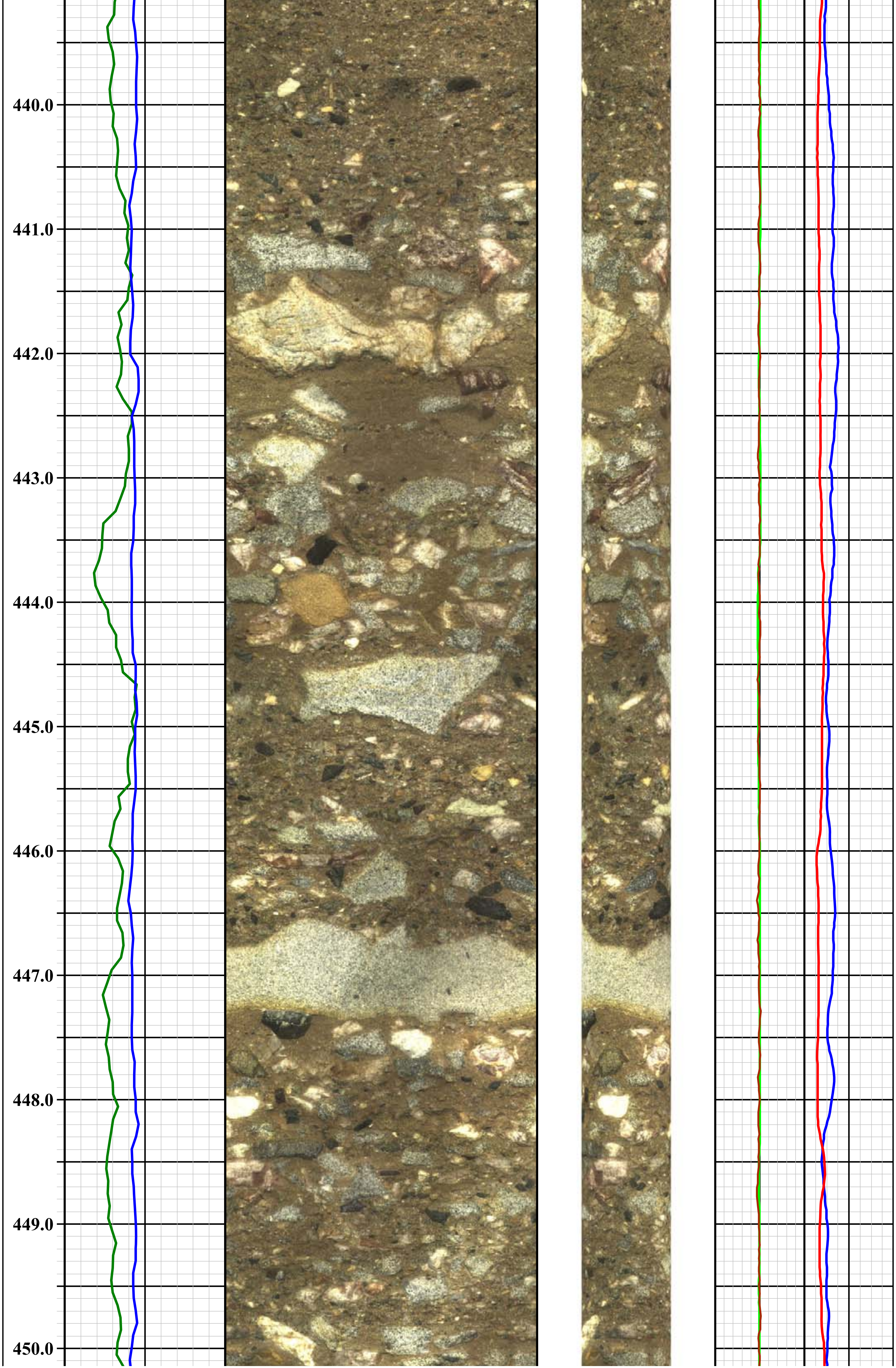

396.0
397.0
398.0
399.0
400.0
401.0
402.0
403.0
404.0
405.0
406.0


407.0
408.0
409.0
410.0
411.0
412.0
413.0
414.0
415.0
416.0
417.0

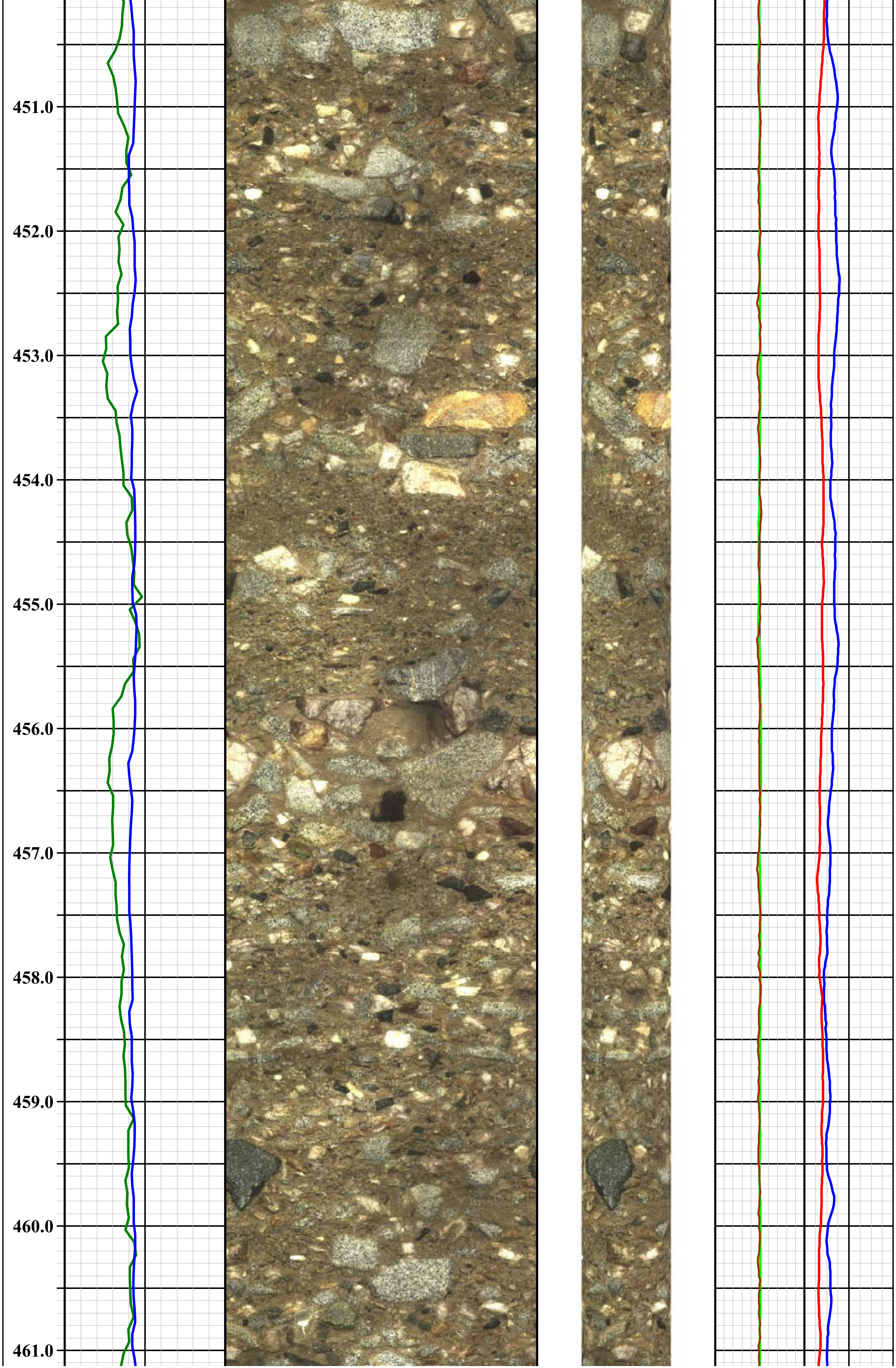

418.0
419.0
420.0
421.0
422.0
423.0
424.0
425.0
426.0
427.0
428.0

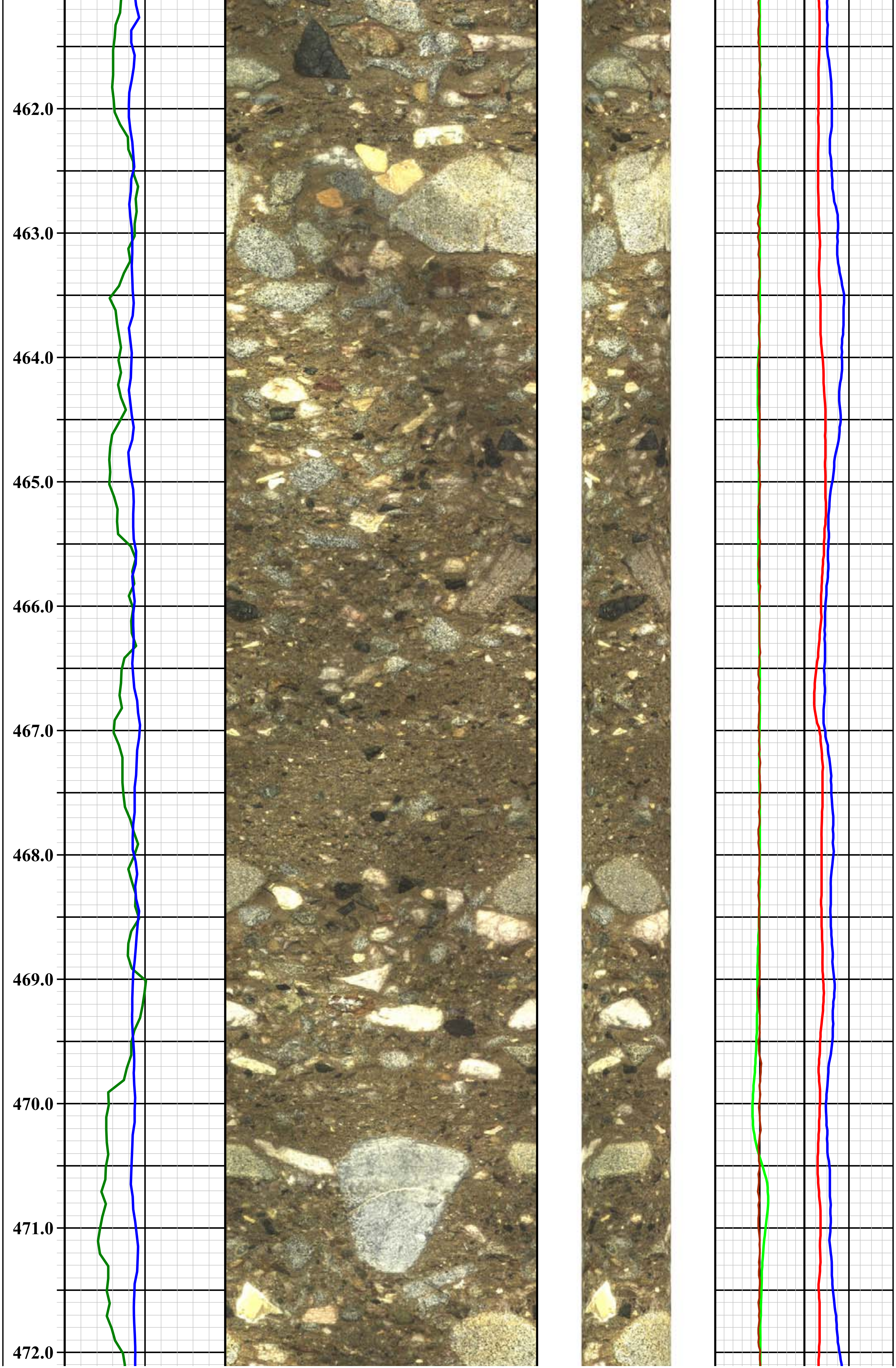


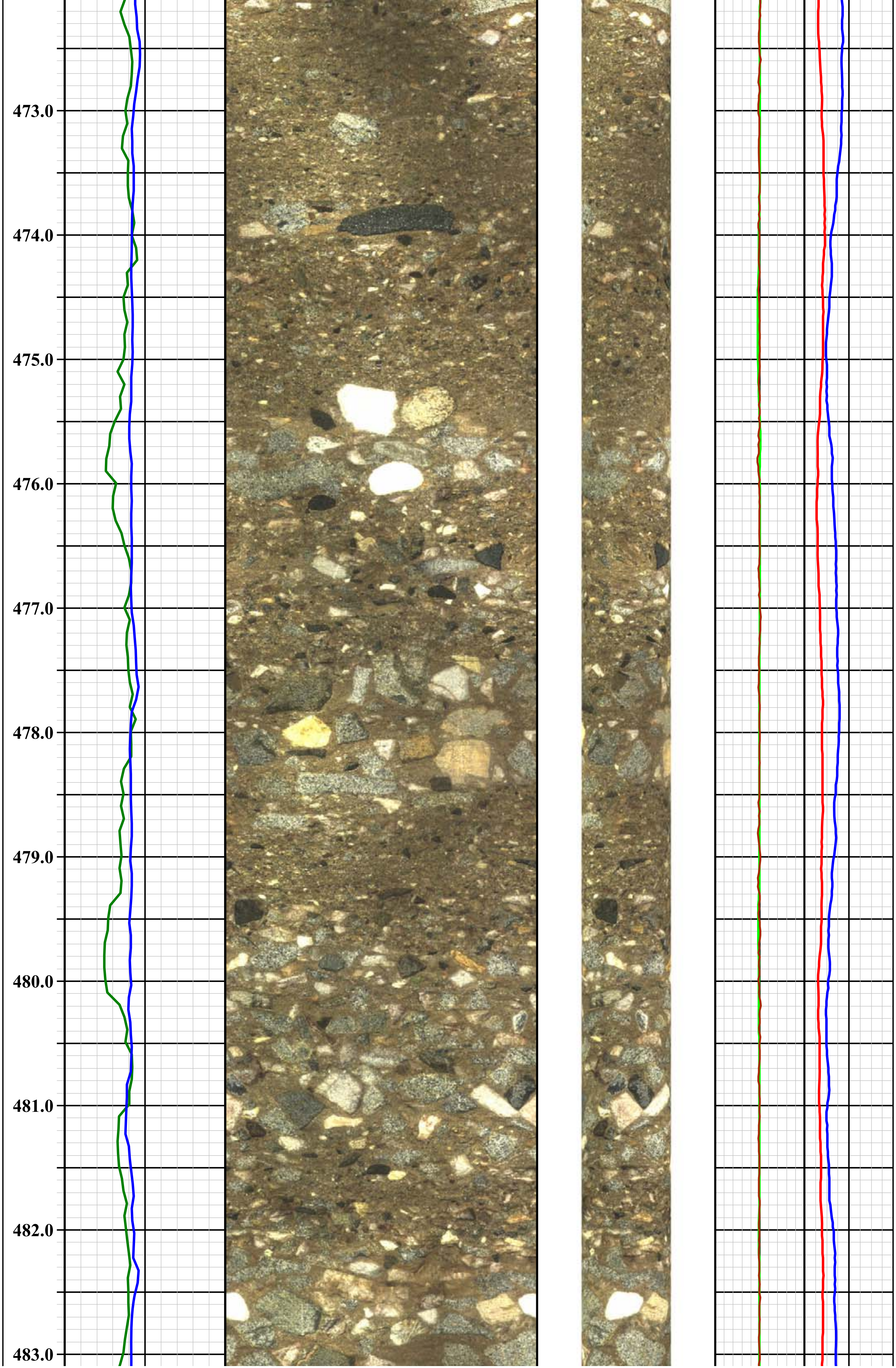
429.0
430.0
431.0
432.0
433.0
434.0
435.0
436.0
437.0
438.0
439.0

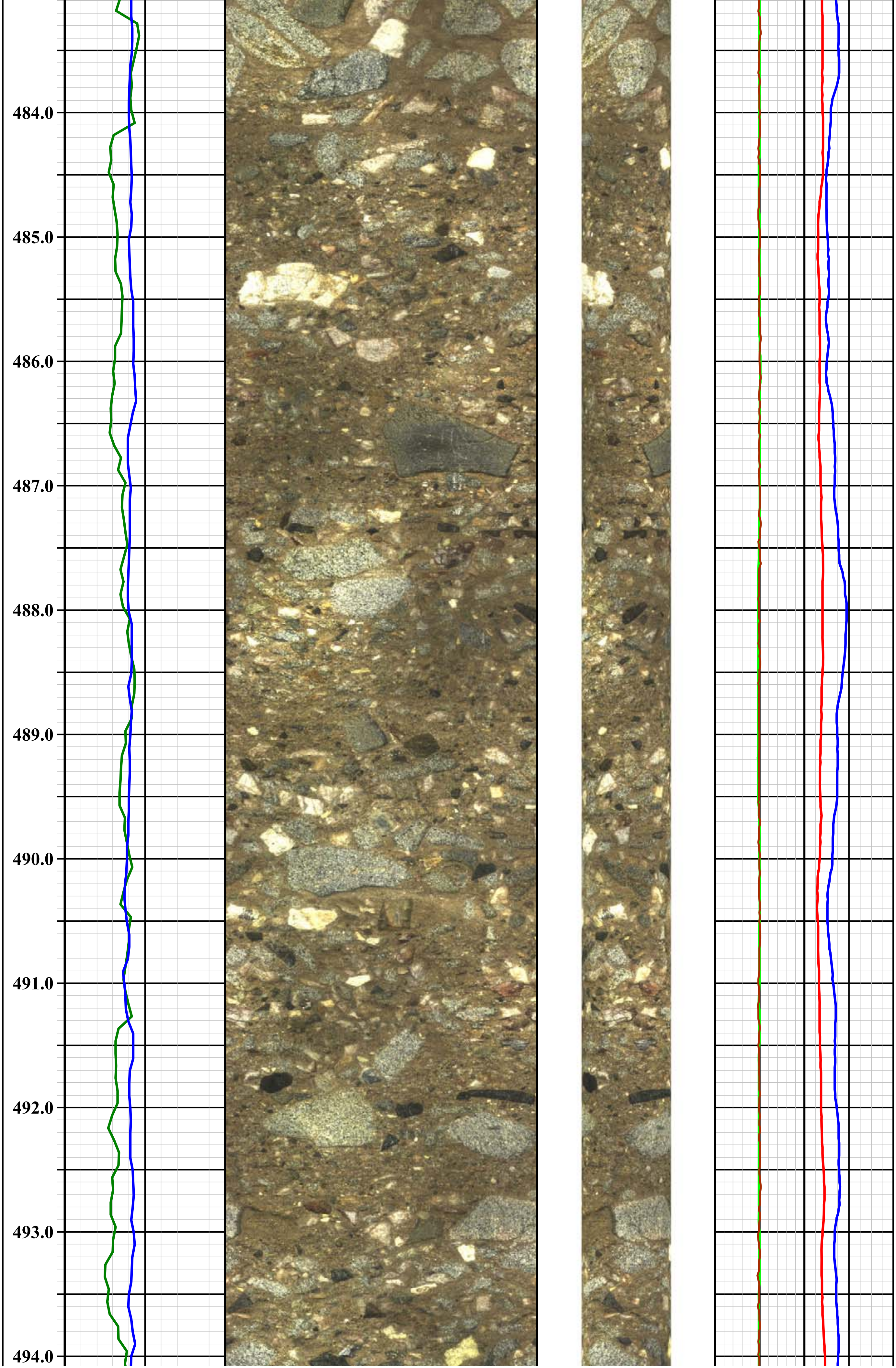


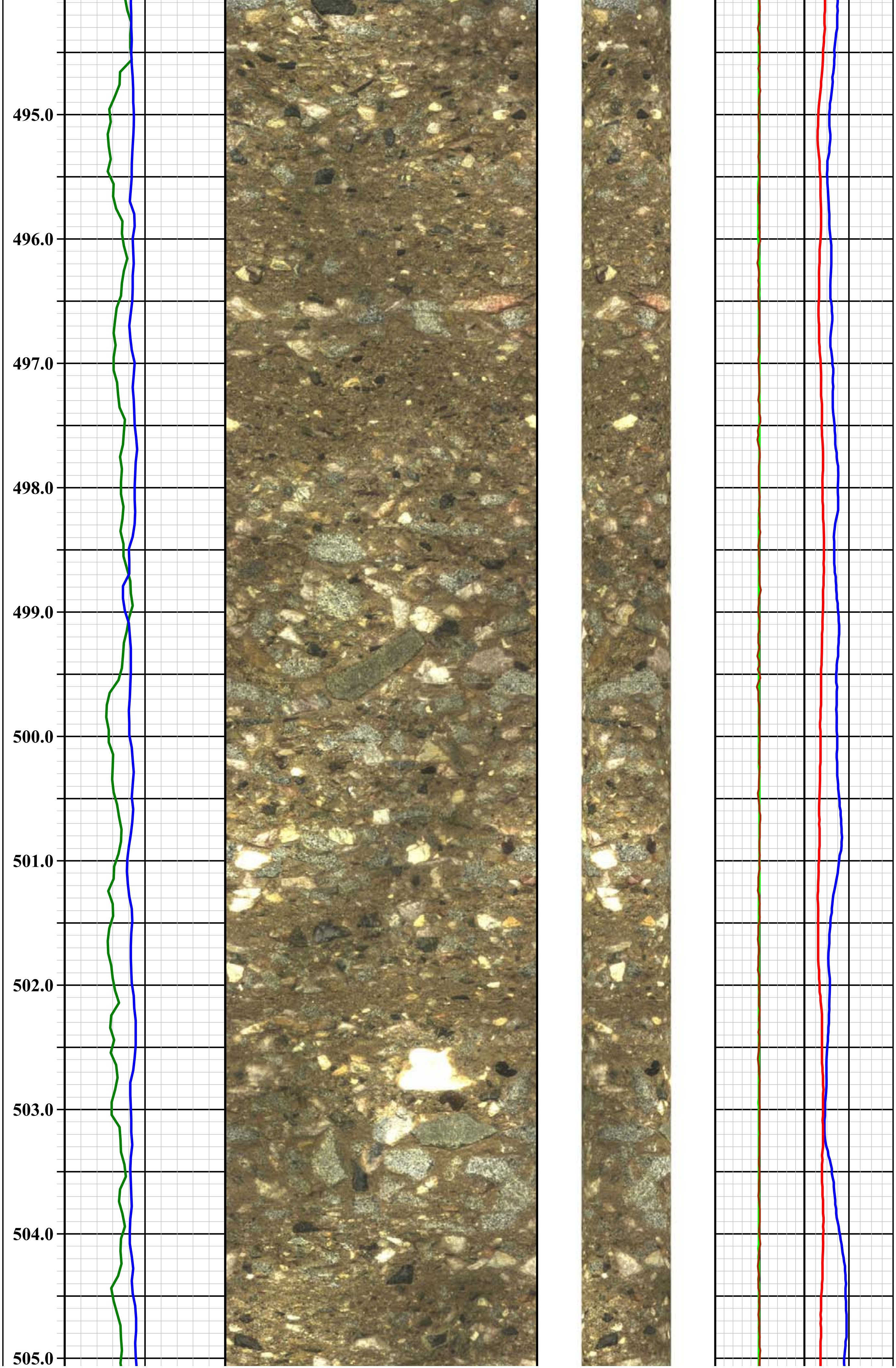
440.0
441.0
442.0
443.0
444.0
445.0
446.0
447.0
448.0
449.0
450.0

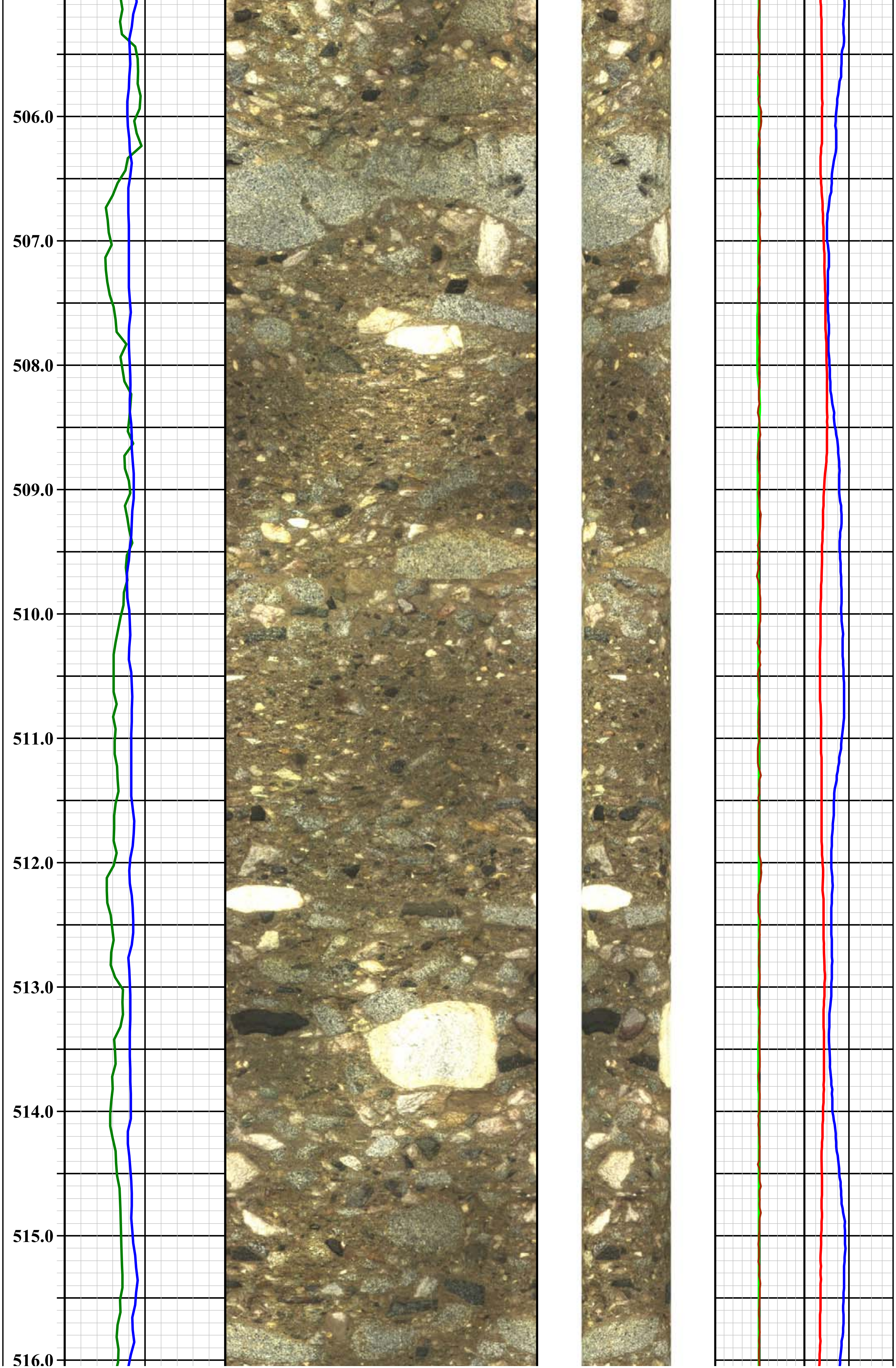

451.0
452.0
453.0
454.0
455.0
456.0
457.0
458.0
459.0
460.0
461.0

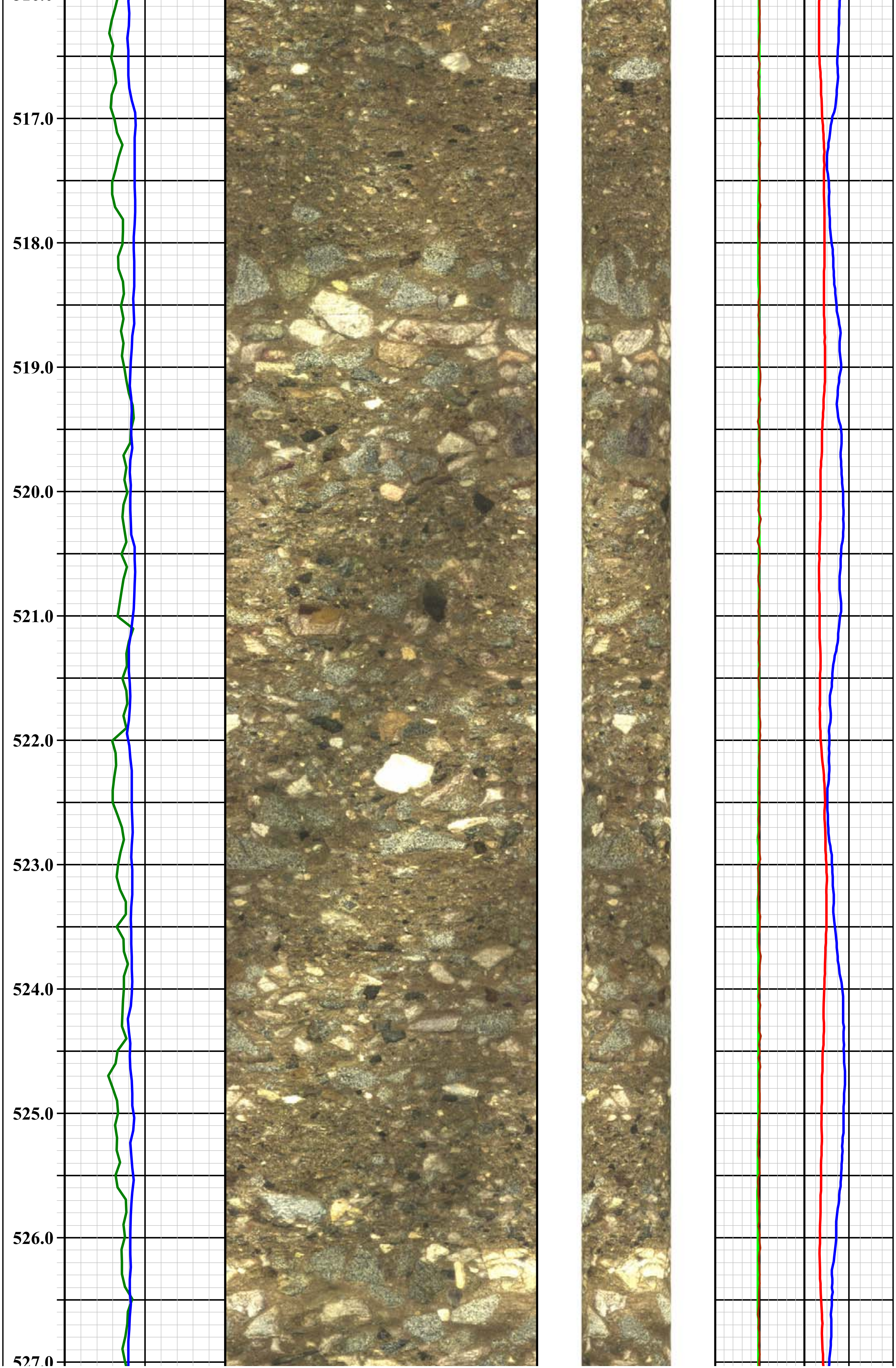

462.0
463.0
464.0
465.0
466.0
467.0
468.0
469.0
470.0
471.0
472.0

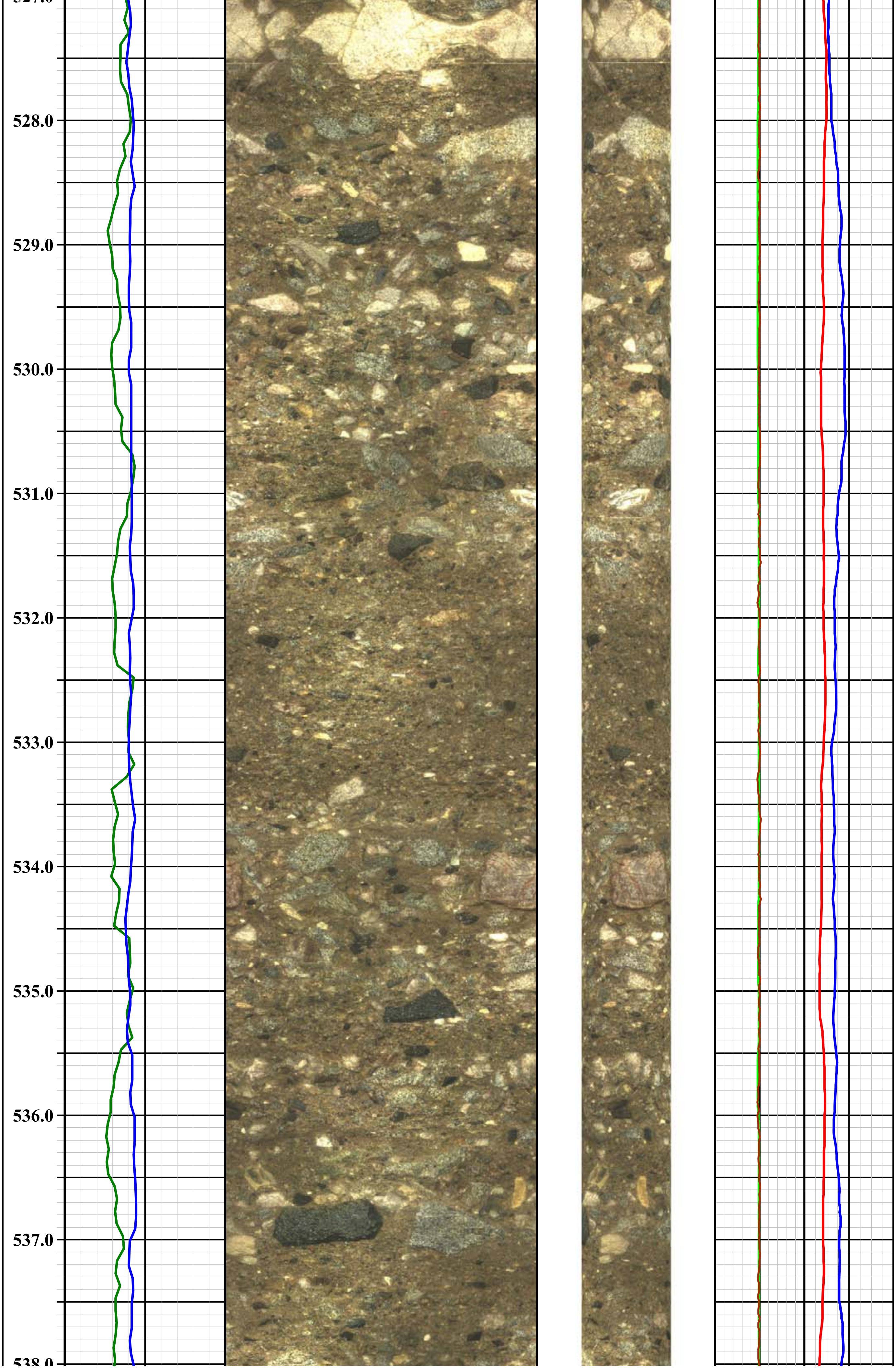

473.0
474.0
475.0
476.0
477.0
478.0
479.0
480.0
481.0
482.0
483.0

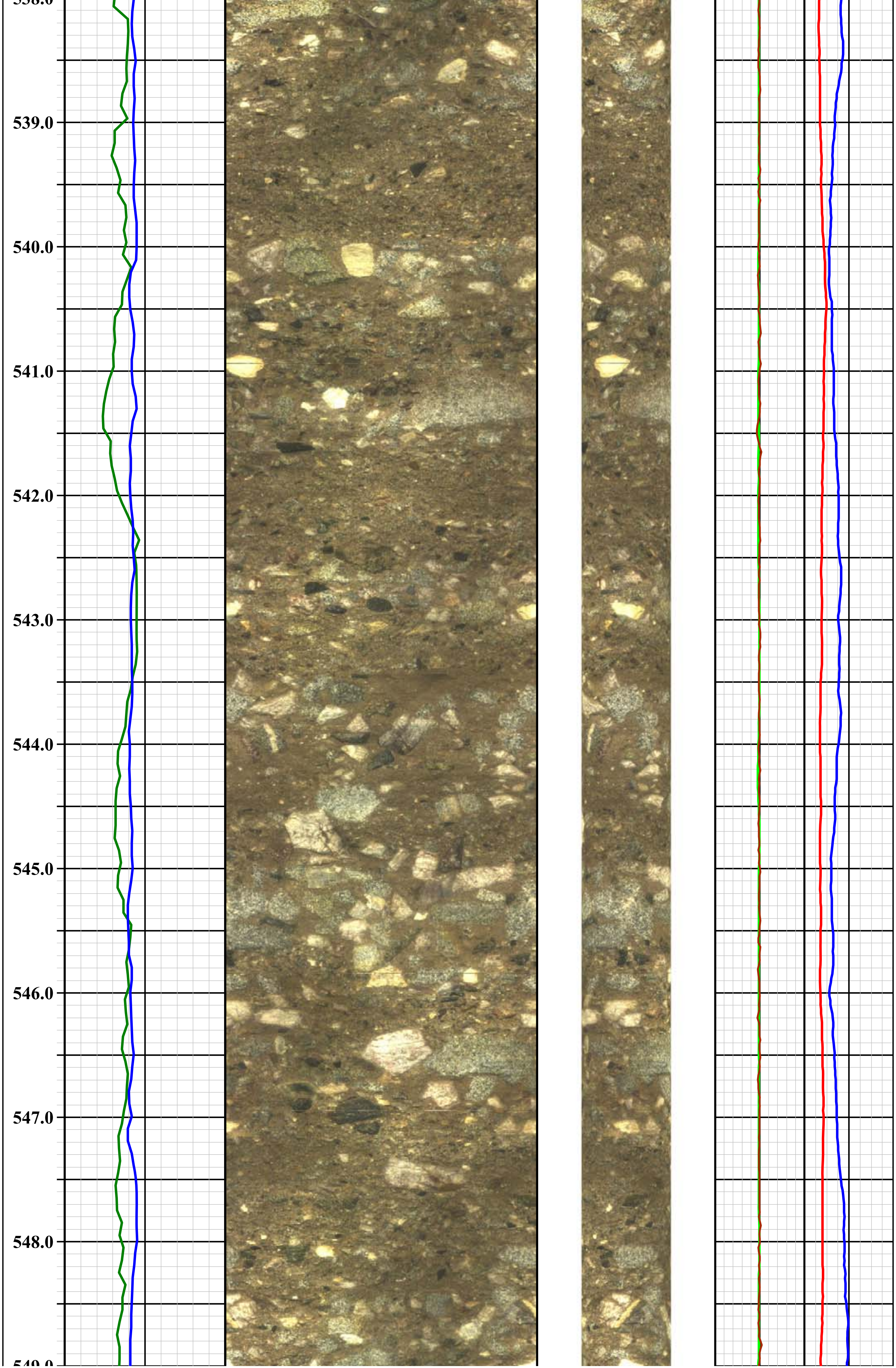

484.0
485.0
486.0
487.0
488.0
489.0
490.0
491.0
492.0
493.0
494.0

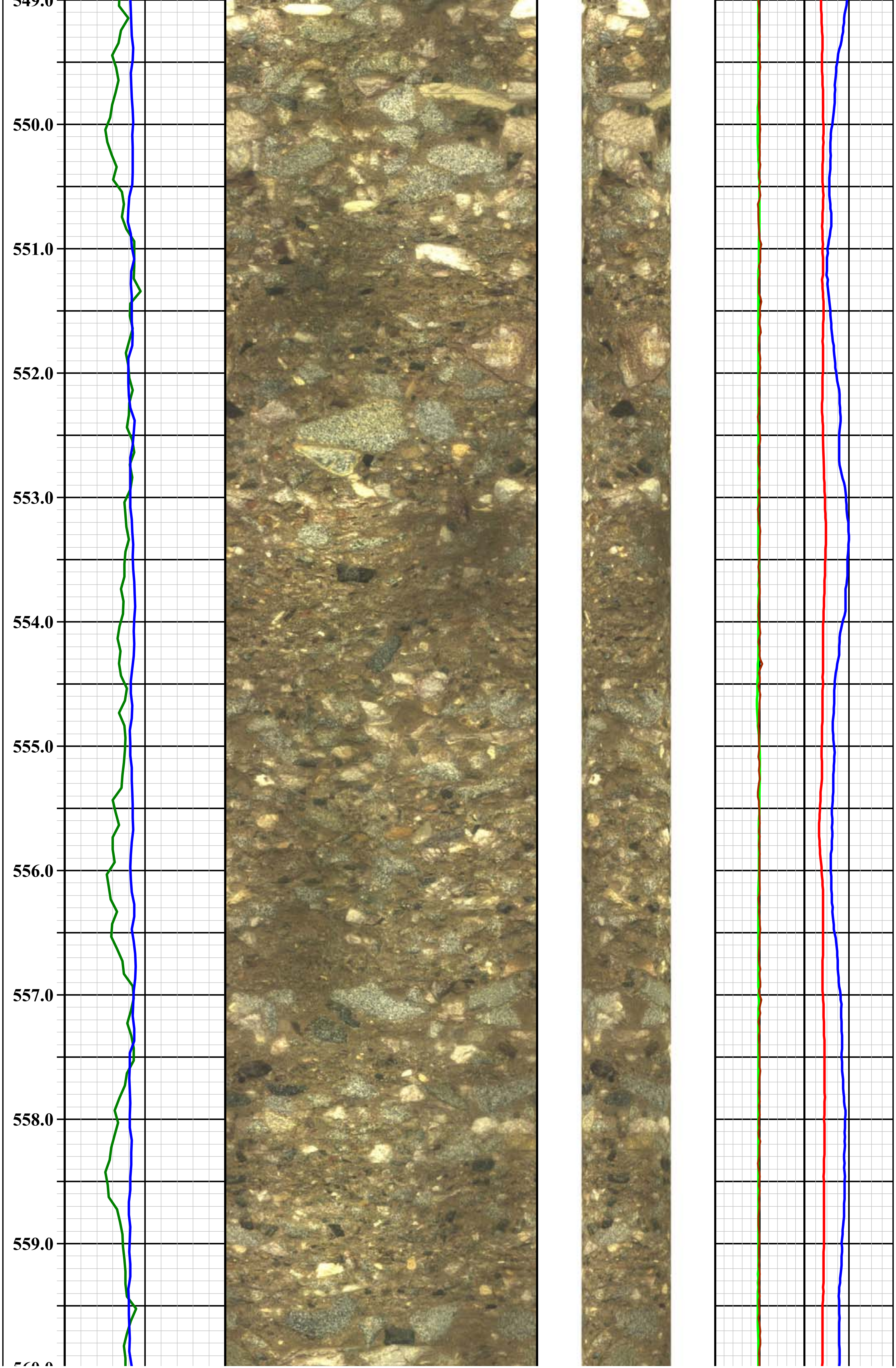

495.0
496.0
497.0
498.0
499.0
500.0
501.0
502.0
503.0
504.0
505.0

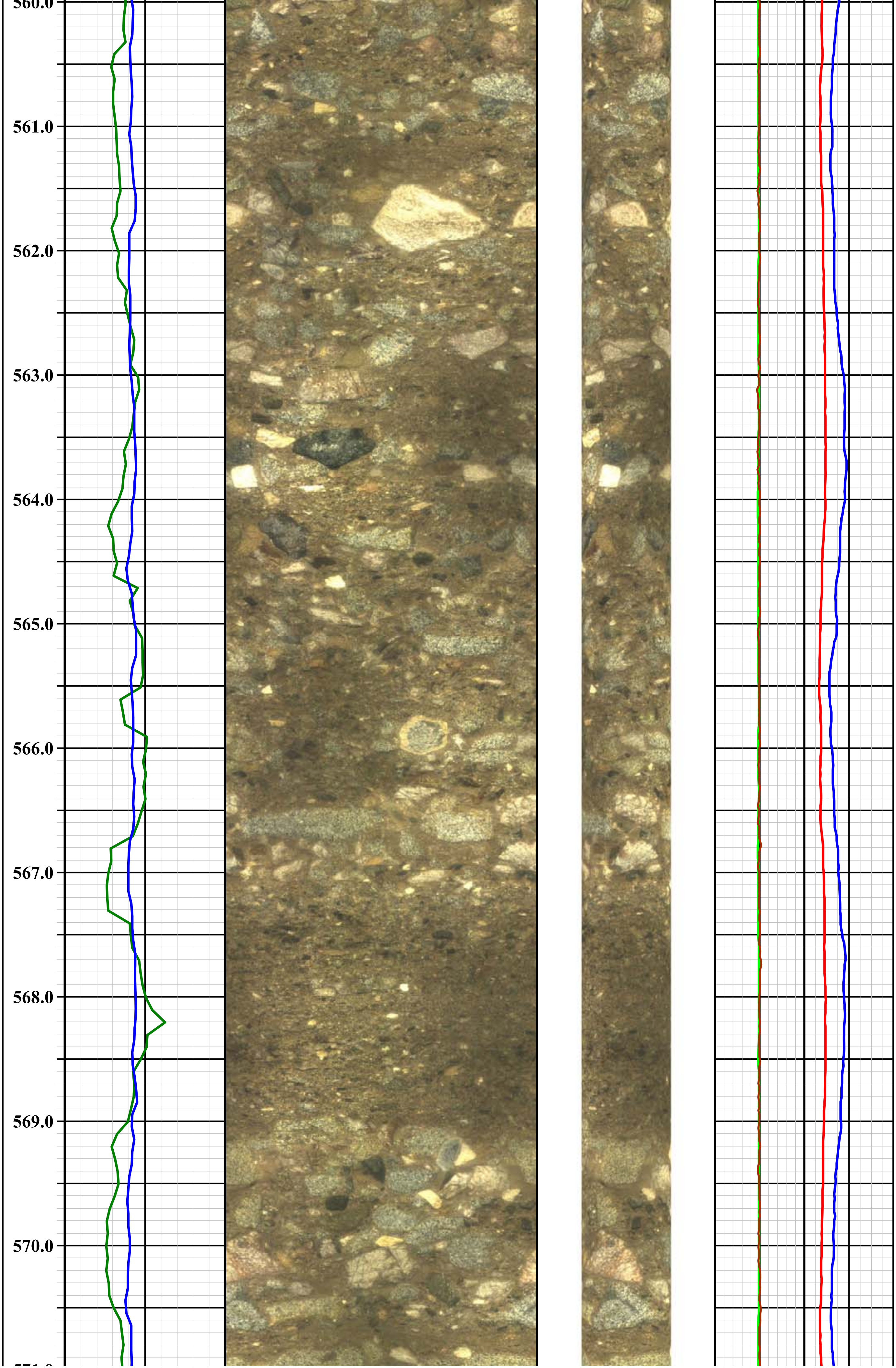

506.0
507.0
508.0
509.0
510.0
511.0
512.0
513.0
514.0
515.0
516.0

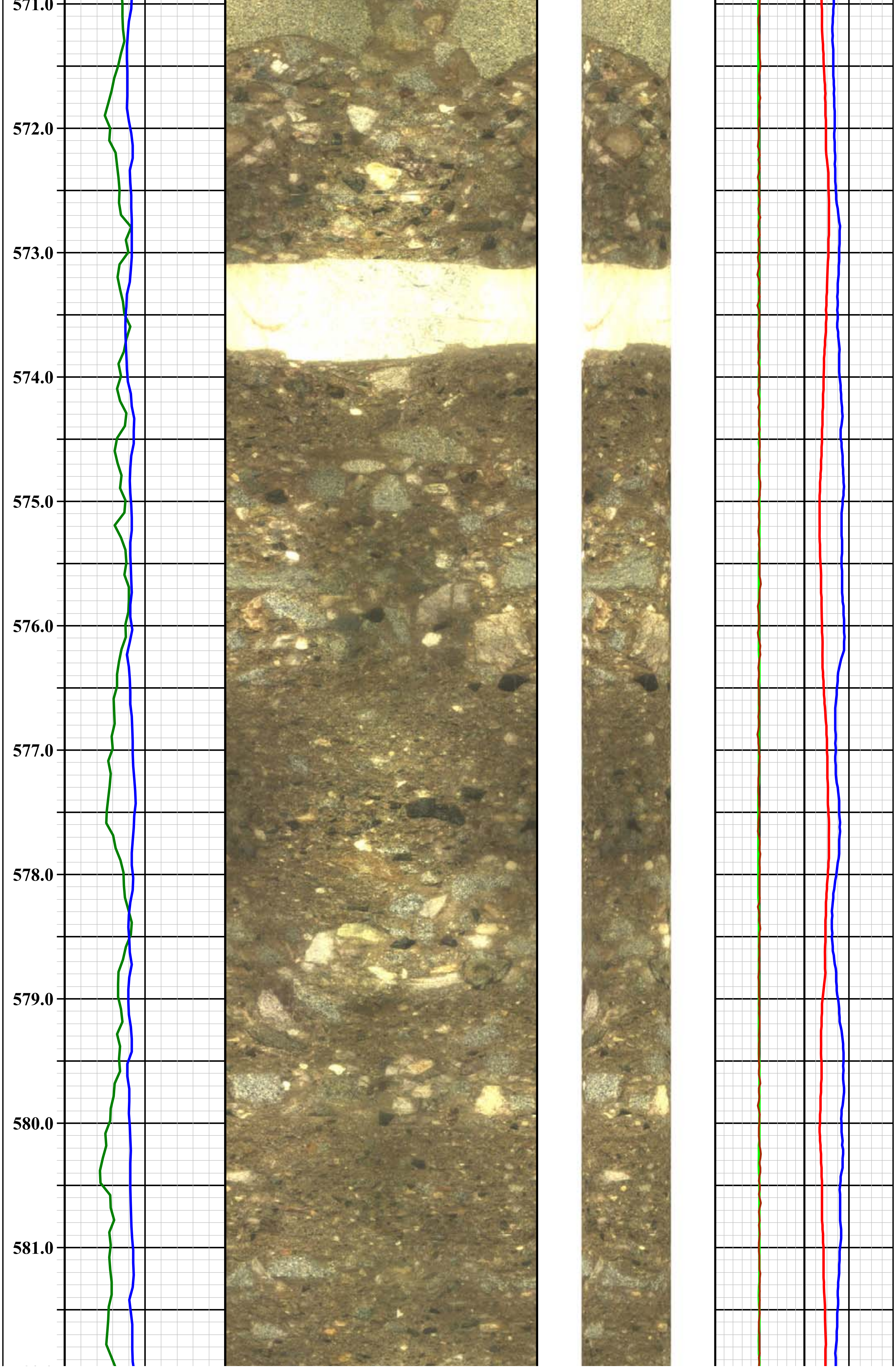

517.0
518.0
519.0
520.0
521.0
522.0
523.0
524.0
525.0
526.0
527.0


528.0
529.0
530.0
531.0
532.0
533.0
534.0
535.0
536.0
537.0
538.0

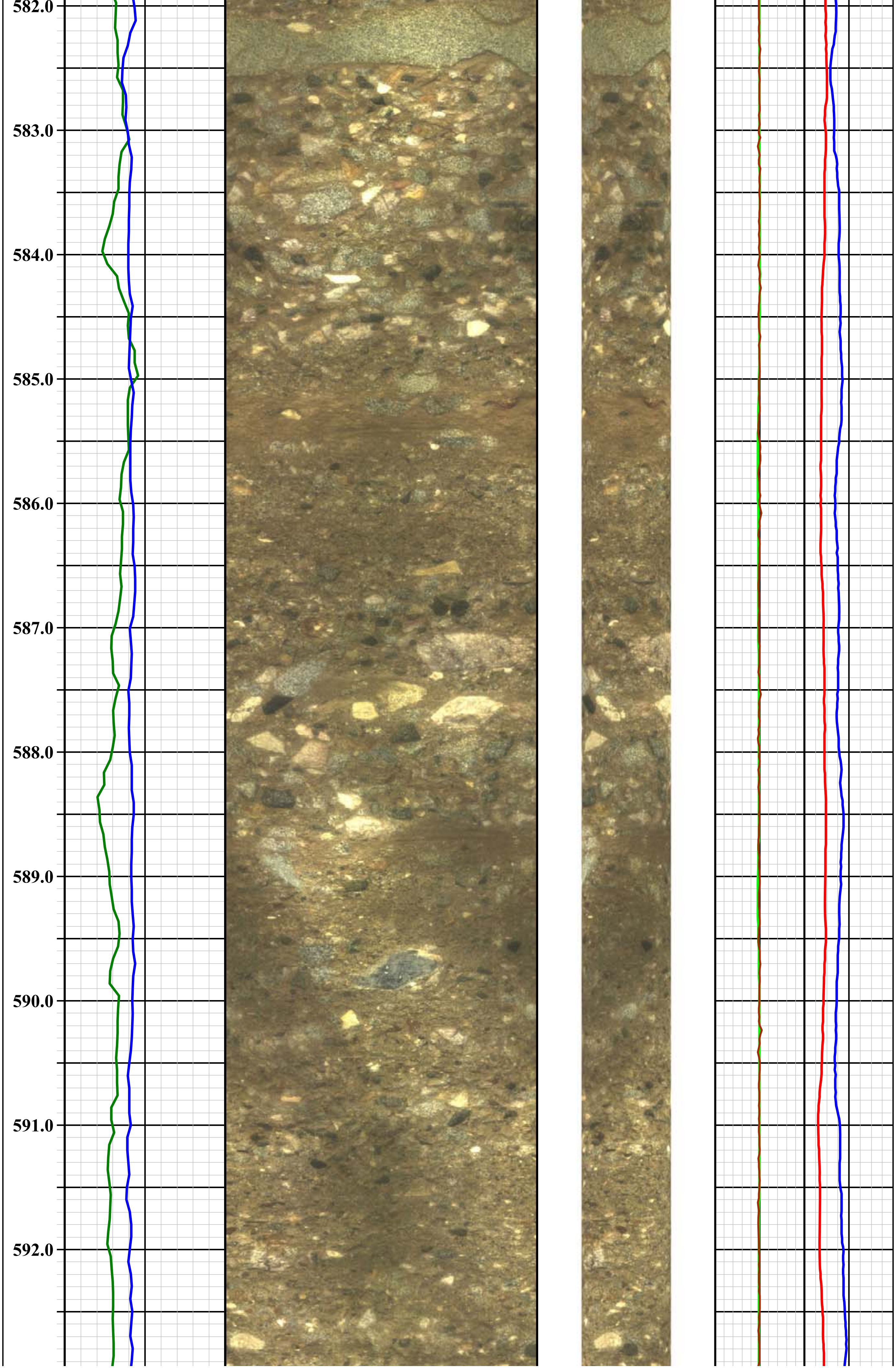

539.0
540.0
541.0
542.0
543.0
544.0
545.0
546.0
547.0
548.0

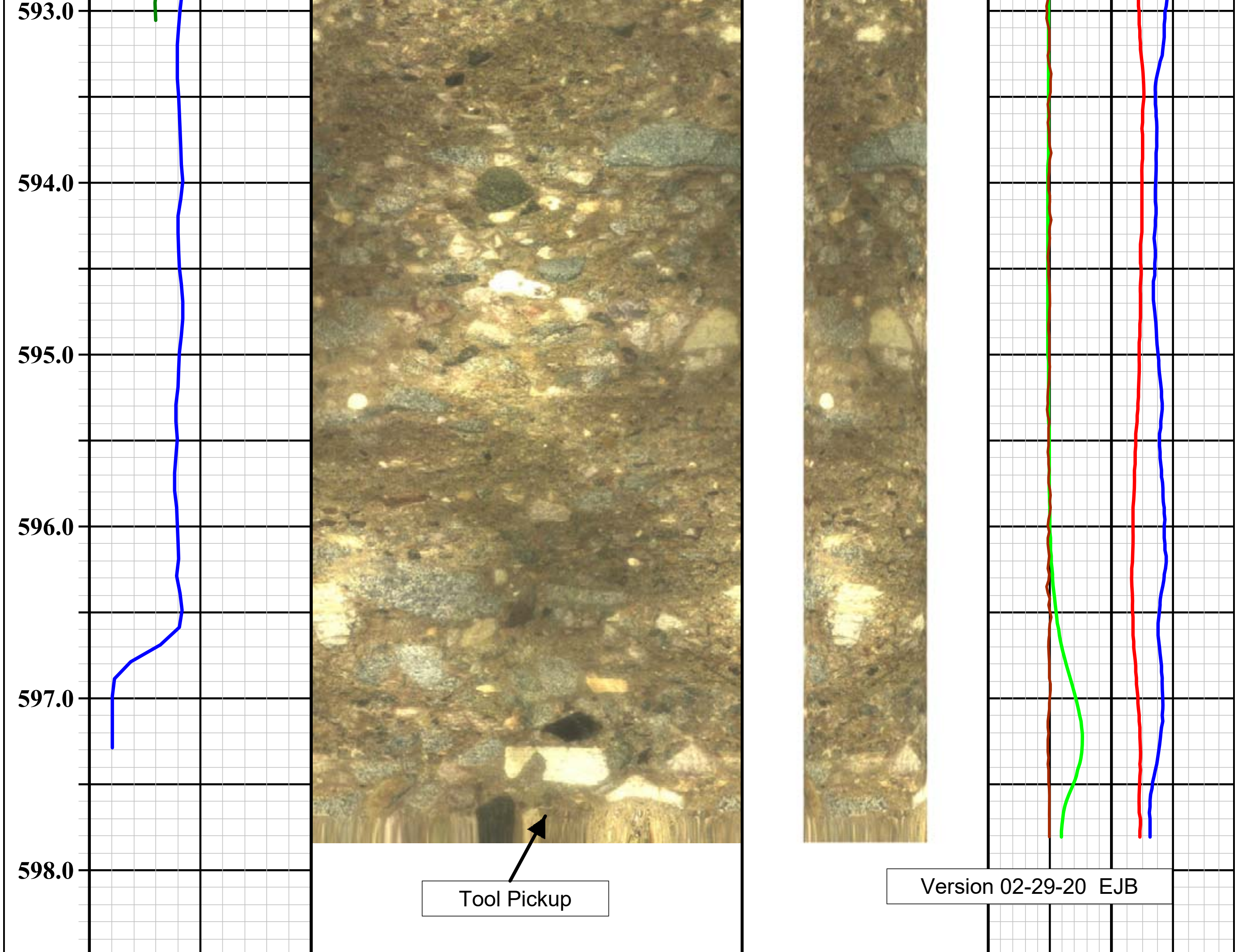

549.0
550.0
551.0
552.0
553.0
554.0
555.0
556.0
557.0
558.0
559.0
560.0


560.0
561.0
562.0
563.0
564.0
565.0
566.0
567.0
568.0
569.0
570.0


571.0
572.0
573.0
574.0
575.0
576.0
577.0
578.0
579.0
580.0
581.0

582.0
583.0
584.0
585.0
586.0
587.0
588.0
589.0
590.0
591.0
592.0





	0° 90° 180° 270° 0° Non Oriented, Rot'd by 160.4 Deg **Image_59.0'-104.8'**			
5 Inches 12 **3-Arm Caliper**	0° 90° 180° 270° 0° Oriented Mag North **Image-NM**		0.8 g 1.2 **Gravity**	0 360 **Azi-Edited**
0 API 200 **Nat. Gamma**		-0° **3-D View**	40 uT 60 **Mag Field**	0 Deg 8 **Tilt**

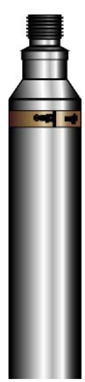
1in:1ft
Depth

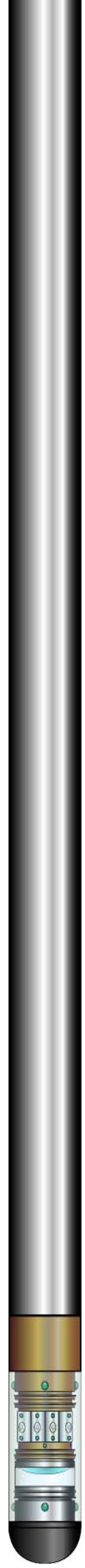
Skunk Camp RC20-2A OBI40 2G Summary ~67.2' - ~597.7'

QL OBI-40 2G Optical Borehole Imager

Probe Top = Depth Ref.

Tool SN: 145010, 152511 & 170106





Probe Length = 1.66 m or 5.46 ft

Probe Weight = 5.3 kg or 11.7 lbs

Distance from Optical Image Window to Orientation Sensor = 0.9 m or 3 ft

Inclination Accuracy = +/- 0.5 deg
Azimuth Accuracy = +/- 1.0 deg

Temperature Range: 0 - 70 Deg C (32 - 158 Deg F)
Pressure Range: 0 - 200 bar (0 - 2900 psi)

External Bow Spring Centralizers

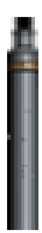
Operates in dry or clear water conditions.

OBI Imaging Window

1.6" or 40 mm Diameter

MSI Gamma-Caliper-Temperature-Fluid Resistivity SN 4953

Probe Top = Depth Ref.



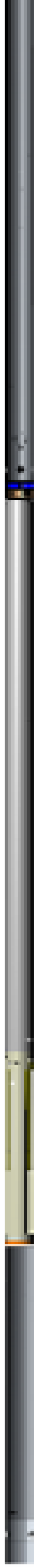
Single Conductor MSI Probe Top

Probe Length = 2.59 m or 8.5 ft
Probe Weight = 6.80 kg or 15.0 lbs

Natural Gamma and Caliper can only be collected logging up hole.

Fluid Temperature/Resistivity can only be collected logging down hole.

Temperature Rating: 70 Deg C (158 Deg F)
Presure Rating: 200 bar (2900 psi)



Natural Gamma Ray = 0.76 m (29.75 in)

3-Arm Caliper = 1.44 m (56.75 in)

Distance from tool top: 2.20 m (86.5 in)

Available Arm Sizes: 3", 9", and 15"

TFR (Temperature/Fluid Resistivity) = 0.39 m (15.5 in)

1.375" or 34.9 mm Diameter

Southwest Exploration Services, LLC
borehole geophysics & video services

Company	RESOLUTION COPPER MINING
Well	RC20-2A
Field	SKUNK CAMP
County	GILA
State	ARIZONA

Final **Optical Televiewer Summary**

Southwest Exploration Services, LLC

borehole geophysics & video services

COMPANY	RESOLUTION COPPER MINING
WELL ID	RC20-2A
FIELD	SKUNK CAMP
COUNTY	GILA
STATE	ARIZONA

TYPE OF LOGS: ACOUSTIC TELEVIEWER

MORE: CALIPER

LOCATION

SEC TWP RGE

OTHER SERVICES
OPTICAL TELEVIEWER
GAMMA
TEMP / FLUID RES
SONIC
E-LOG

PERMANENT DATUM		ELEVATION	K.B.
LOG MEAS. FROM	GROUND LEVEL	ABOVE PERM. DATUM	D.F.
DRILLING MEAS. FROM	GROUND LEVEL		G.L.

DATE	02-29-20	TYPE FLUID IN HOLE	FORMATION WATER
RUN No	5	MUD WEIGHT	N/A
TYPE LOG	ACOUSTIC TELEVIEWER	VISCOSITY	N/A
DEPTH-DRILLER	602.0 FT	LEVEL	~134 FT
DEPTH-LOGGER	599.9 FT	MAX. REC. TEMP.	21.8 Deg C
BTM LOGGED INTERVAL	599.0 FT	IMAGE ORIENTED TO:	MAGNETIC NORTH
TOP LOGGED INTERVAL	130.0 FT	SAMPLE INTERVAL	0.010 FT
DRILLER / RIG#	NATIONAL DRILLING	LOGGING TRUCK	TRUCK #310
RECORDED BY / Logging Eng.	E. BEAM / D. ALP	TOOL STRING/SN	ALT QL ABI40 2G SN 192302
WITNESSED BY	NATIONAL DRILLING	LOG TIME:ON SITE/OFF SITE	5:30 AM

RUN	BOREHOLE RECORD			CASING RECORD			
NO.	BIT	FROM	TO	SIZE	WGT.	FROM	TO
1	? IN	SURFACE	70 FT	8.62 IN	STEEL	SURFACE	70 FT
2	7 3/4 IN	70 FT	480 FT				
3	7 1/4 IN TRI	480 FT	TOTAL DEPTH				

COMMENTS:

.

Tool Summary:

Date	02-29-20	**Date**	02-29-20	**Date**	02-29-20
Run No.	1	**Run No.**	2	**Run No.**	3
Tool Model	MSI COMBO TOOL	**Tool Model**	ALT QL E-LOG	**Tool Model**	ALT 4 RX SONIC
Tool SN	4953	**Tool SN**	6380	**Tool SN**	4572
From	SURFACE	**From**	SURFACE	**From**	120.0 FT
To	599.7 FT	**To**	599.0 FT	**To**	599.6 FT
Recorded By	D. ALP	**Recorded By**	D. ALP	**Recorded By**	D. ALP
Truck No	310	**Truck No**	310	**Truck No**	310
Operation Check	02-23-20	**Operation Check**	02-20-20	**Operation Check**	02-20-20
Calibration Check	02-21-20	**Calibration Check**	02-20-20	**Calibration Check**	N/A
Time Logged	6:15 AM	**Time Logged**	7:10 AM	**Time Logged**	7:45 AM

Date	02-23-20	**Date**	02-23-20	**Date**	
Run No.	4	**Run No.**	5	**Run No.**	6
Tool Model	ALT QL OBI40 2G	**Tool Model**	ALT QL ABI40 2G	**Tool Model**	
Tool SN	152511	**Tool SN**	192302	**Tool SN**	
From	60.0 FT	**From**	130.0 FT	**From**	
To	599.0 FT	**To**	599.0 FT	**To**	
Recorded By	D. ALP	**Recorded By**	D. ALP	**Recorded By**	
Truck No	310	**Truck No**	310	**Truck No**	
Operation Check	02-20-20	**Operation Check**	02-20-20	**Operation Check**	
Calibration Check	N/A	**Calibration Check**	N/A	**Calibration Check**	
Time Logged	8:45 AM	**Time Logged**	7:00 PM	**Time Logged**	

Additional Comments:

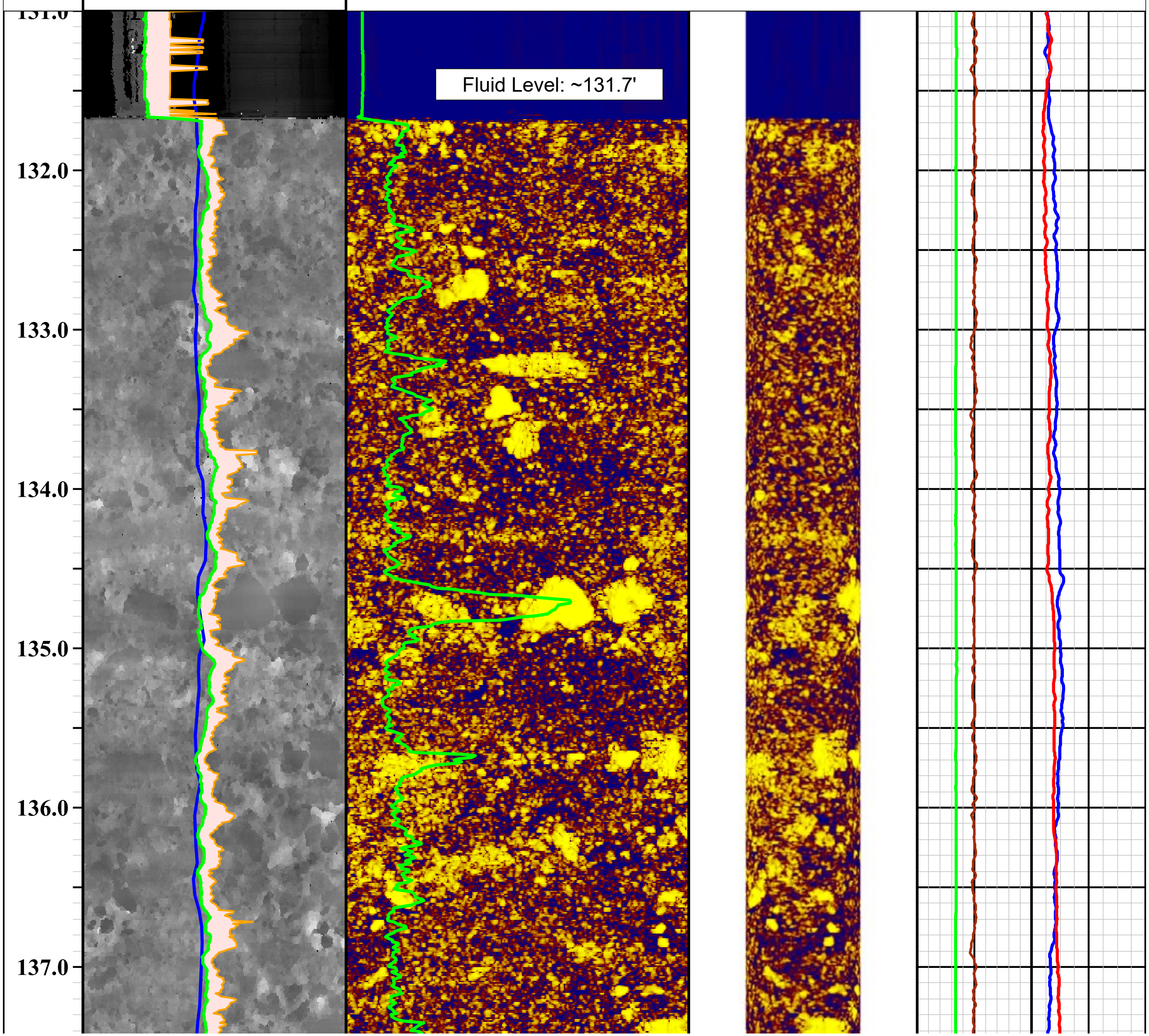
Caliper Arms Used: 9" **Calibration Points:** 6" & 12"

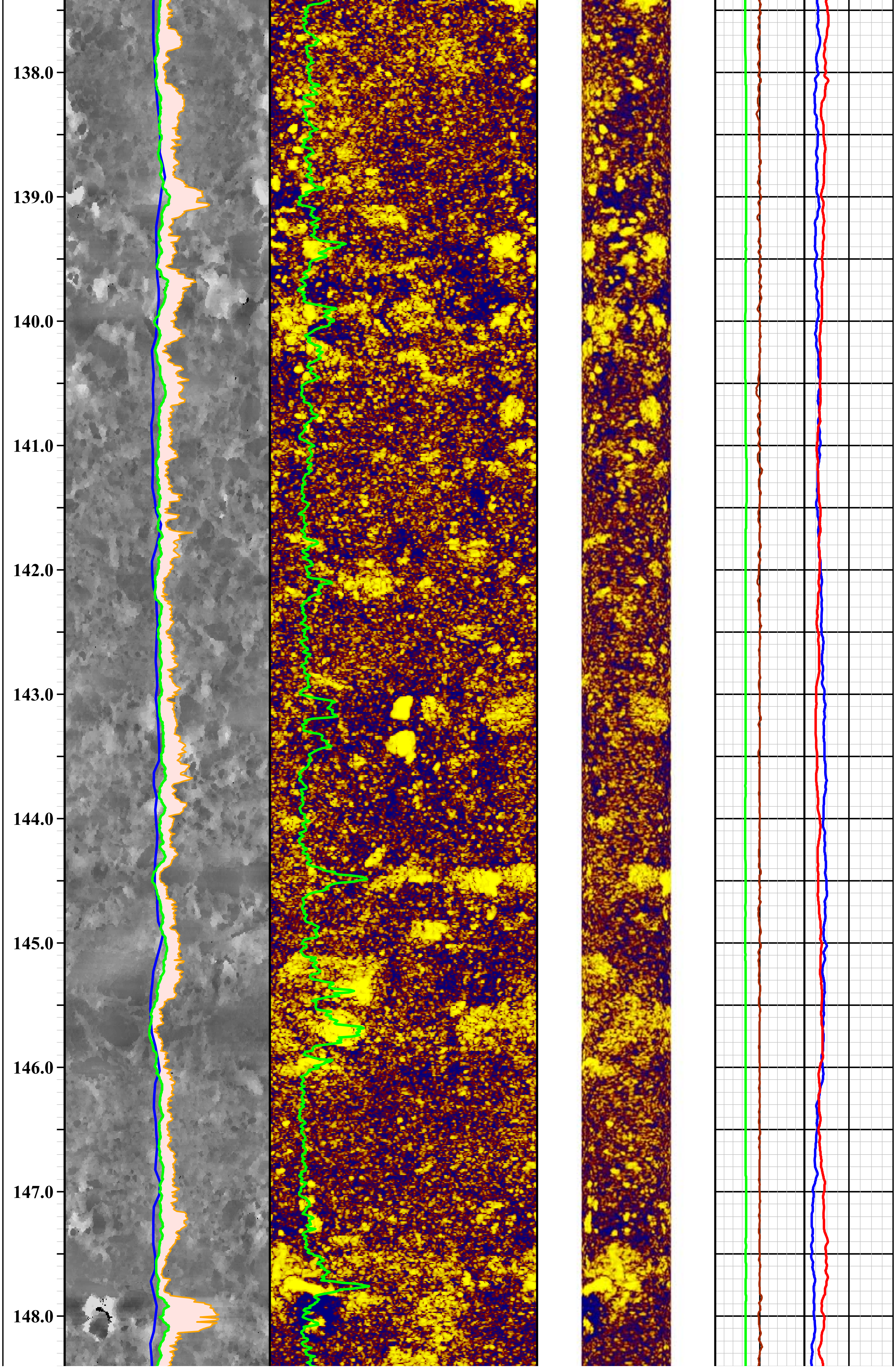
E-Log Calibration Range: 1 - 10,000 OHM-M **Calibration Points:** 1 & 10,000 OHM-M

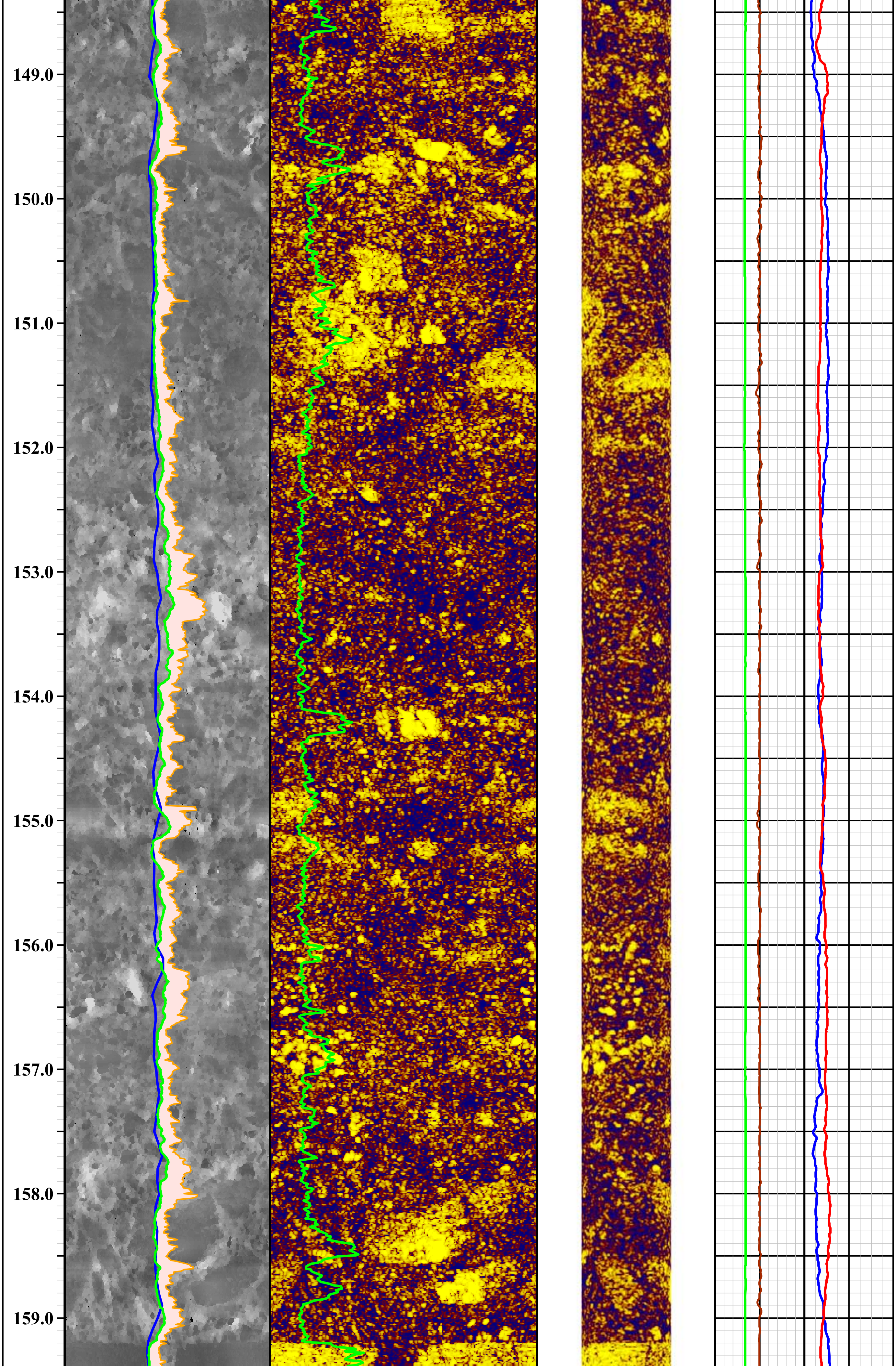
Disclaimer:

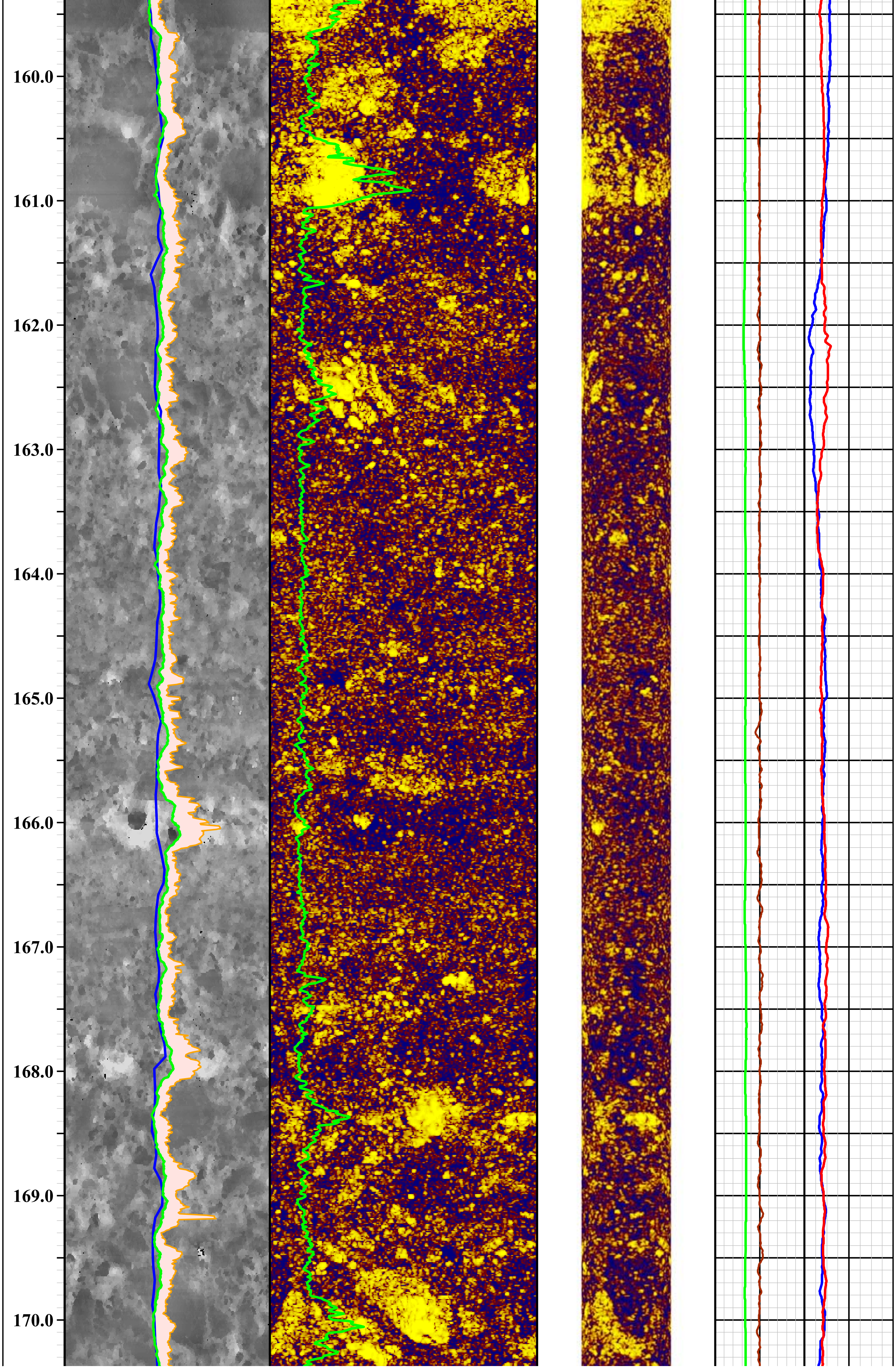
All interpretations of log data are opinions based on inferences from electrical or other measurements. We do not guarantee the accuracy or correctness of any interpretations or recommendations and shall not be liable or responsible for any loss, costs, damages, or expenses incurred or sustained by anyone resulting from any interpretation made by any of our employees or agents. These interpretations are also subject to our general terms and conditions set out in our current Service Invoice.

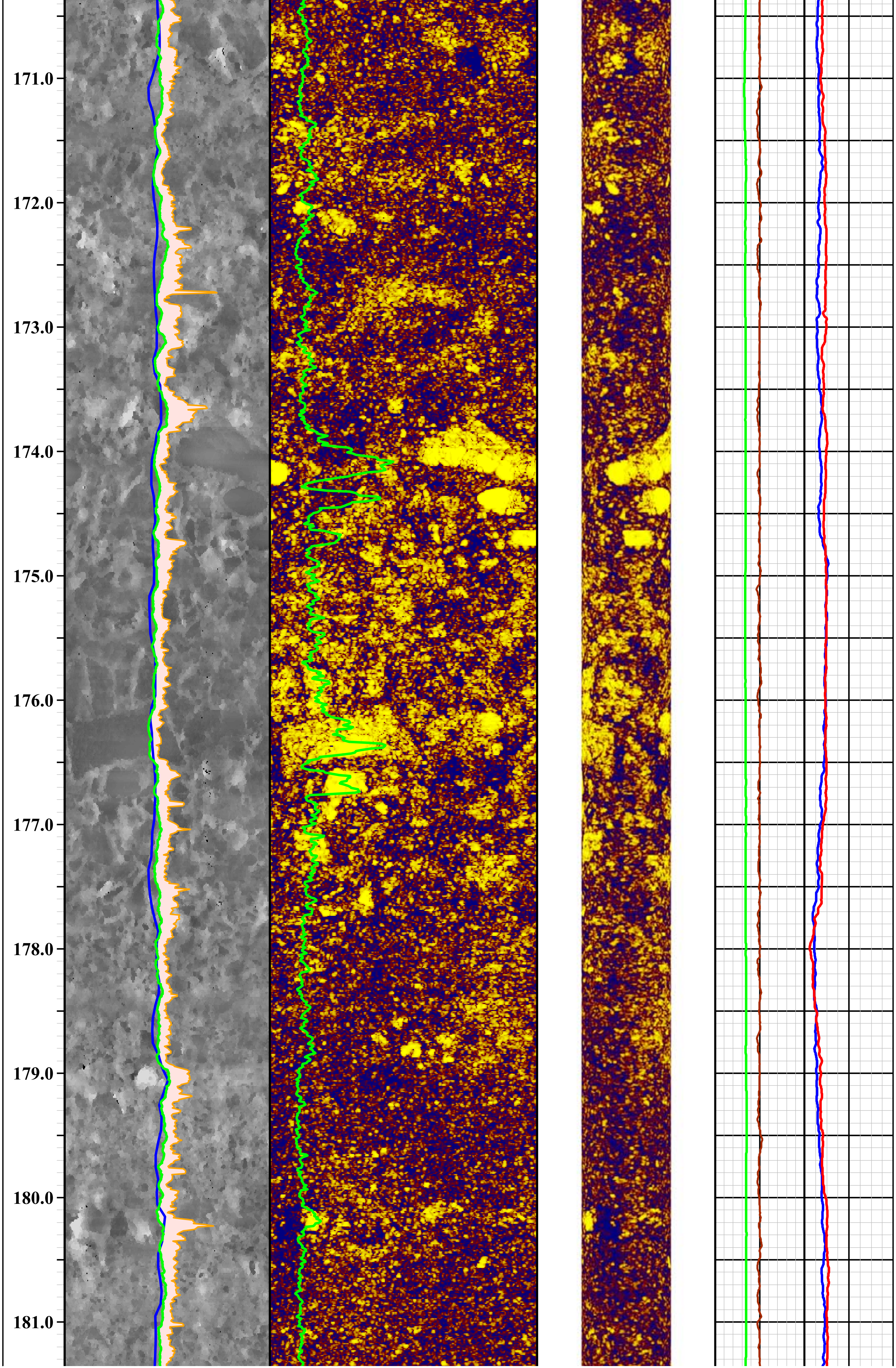
Depth 1in:1ft	Skunk Camp RC20-2A ABI40 2G Summary ~131.7' - ~597.4'			
	Centralized TT Oriented Mag North 0° 90° 180° 270° 0°	**Amplitude-NM** Oriented Mag North 0° 90° 180° 270° 0°	**3-D View** -0°	**Mag Field** 40 uT 60 / **Tilt** 0 Deg 8
	3-Arm Caliper 5 Inches 12	**Amplitude-Static** Oriented Mag North 0° 90° 180° 270° 0°		**Gravity** 0.8 g 1.2 / **Azimuth** 0 360
	Max-Acoustic Caliper 5 Inches 12	**ARI** 0 2200		
	Ave-Acoustic Caliper 5 Inches 12			
	Enlargements			

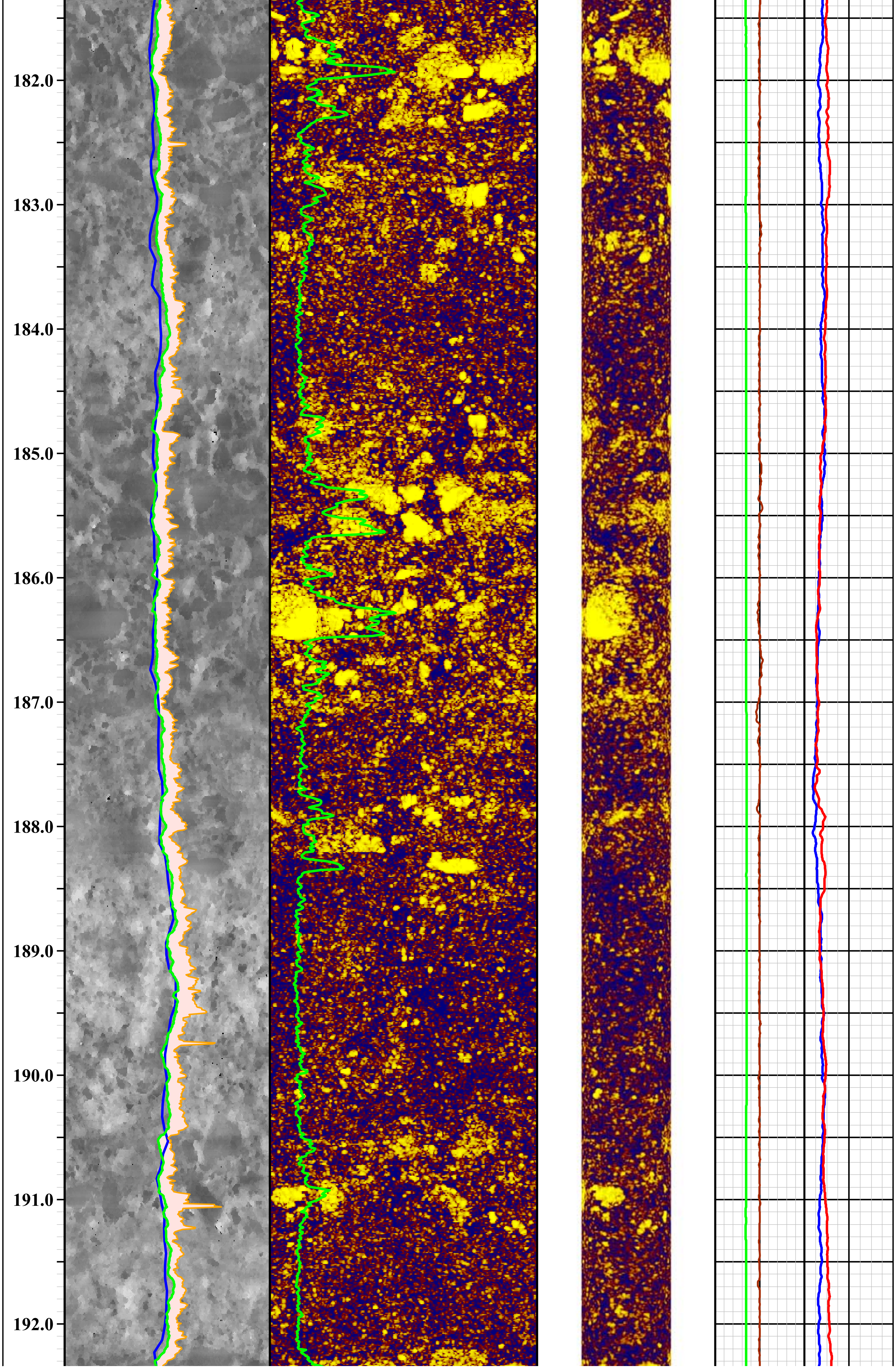


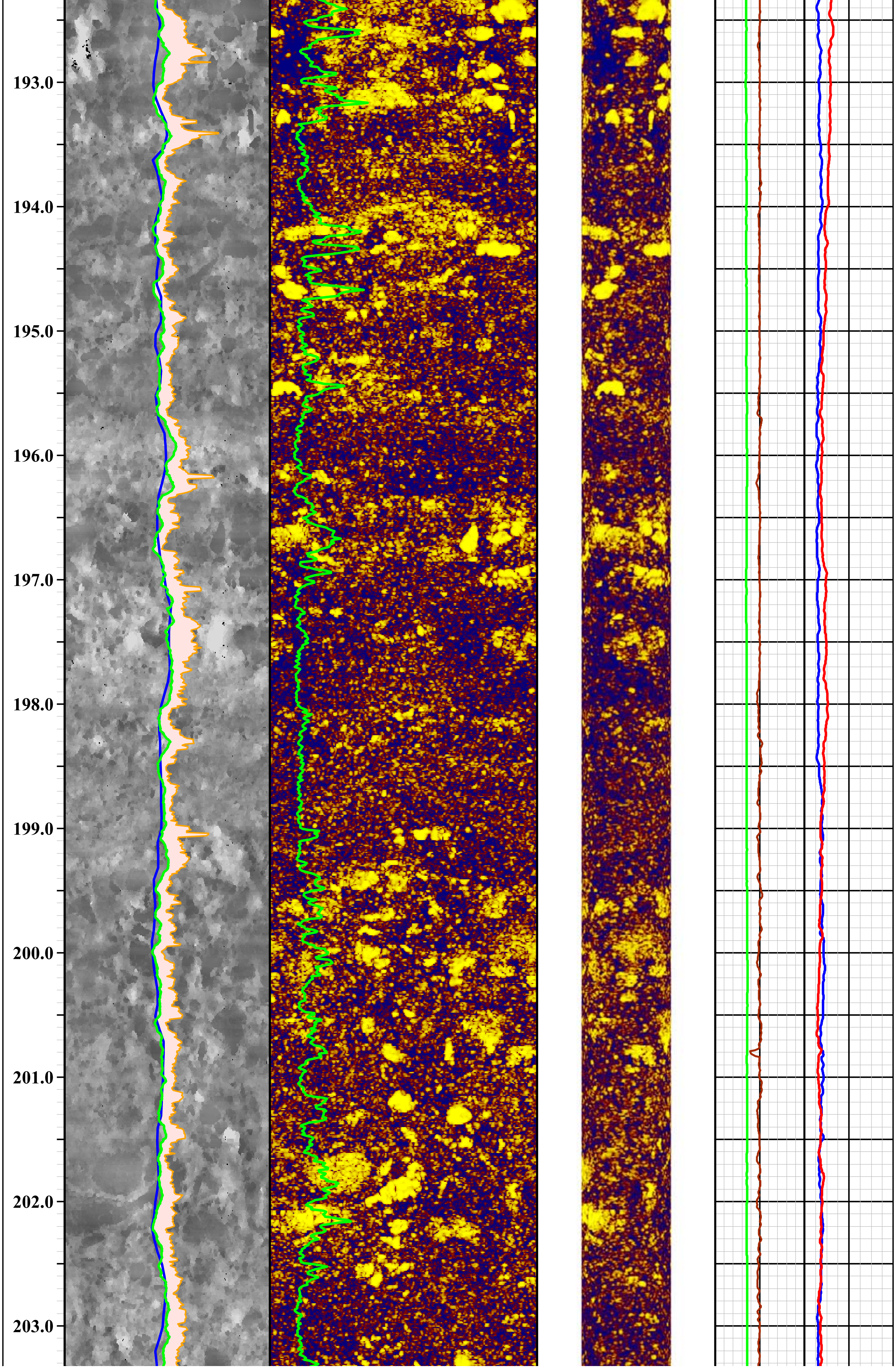

138.0
139.0
140.0
141.0
142.0
143.0
144.0
145.0
146.0
147.0
148.0

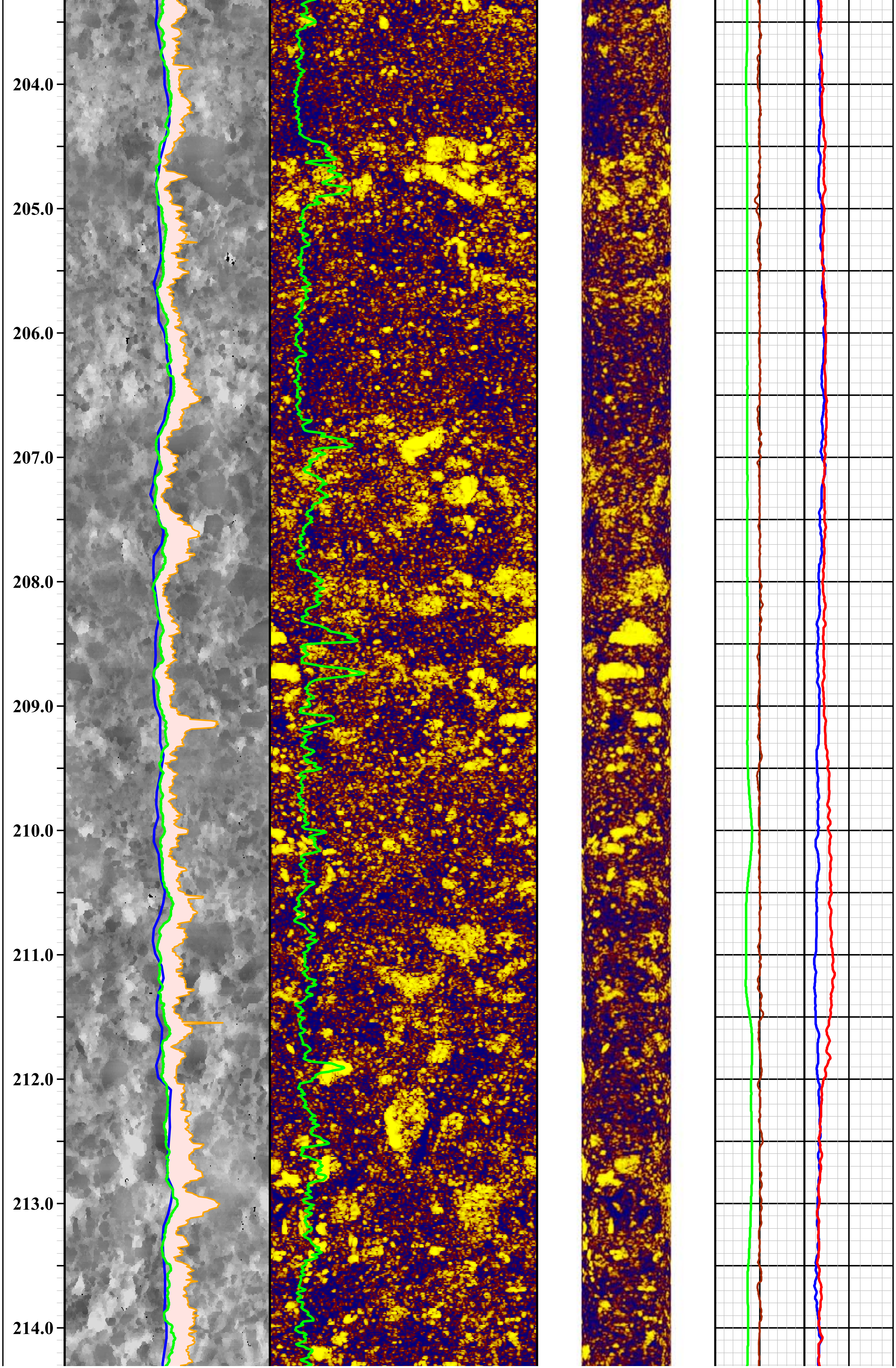

149.0
150.0
151.0
152.0
153.0
154.0
155.0
156.0
157.0
158.0
159.0

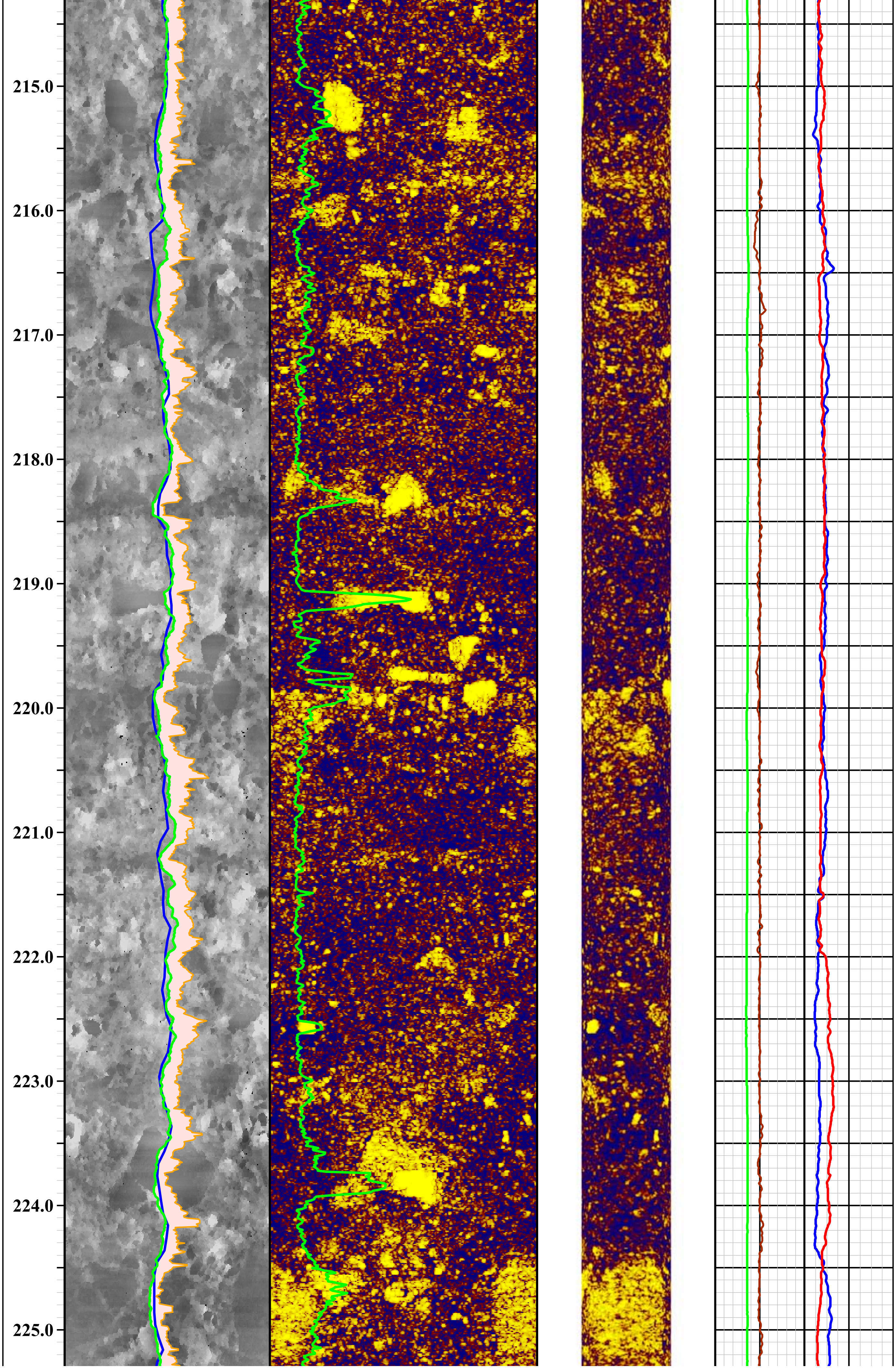

160.0
161.0
162.0
163.0
164.0
165.0
166.0
167.0
168.0
169.0
170.0

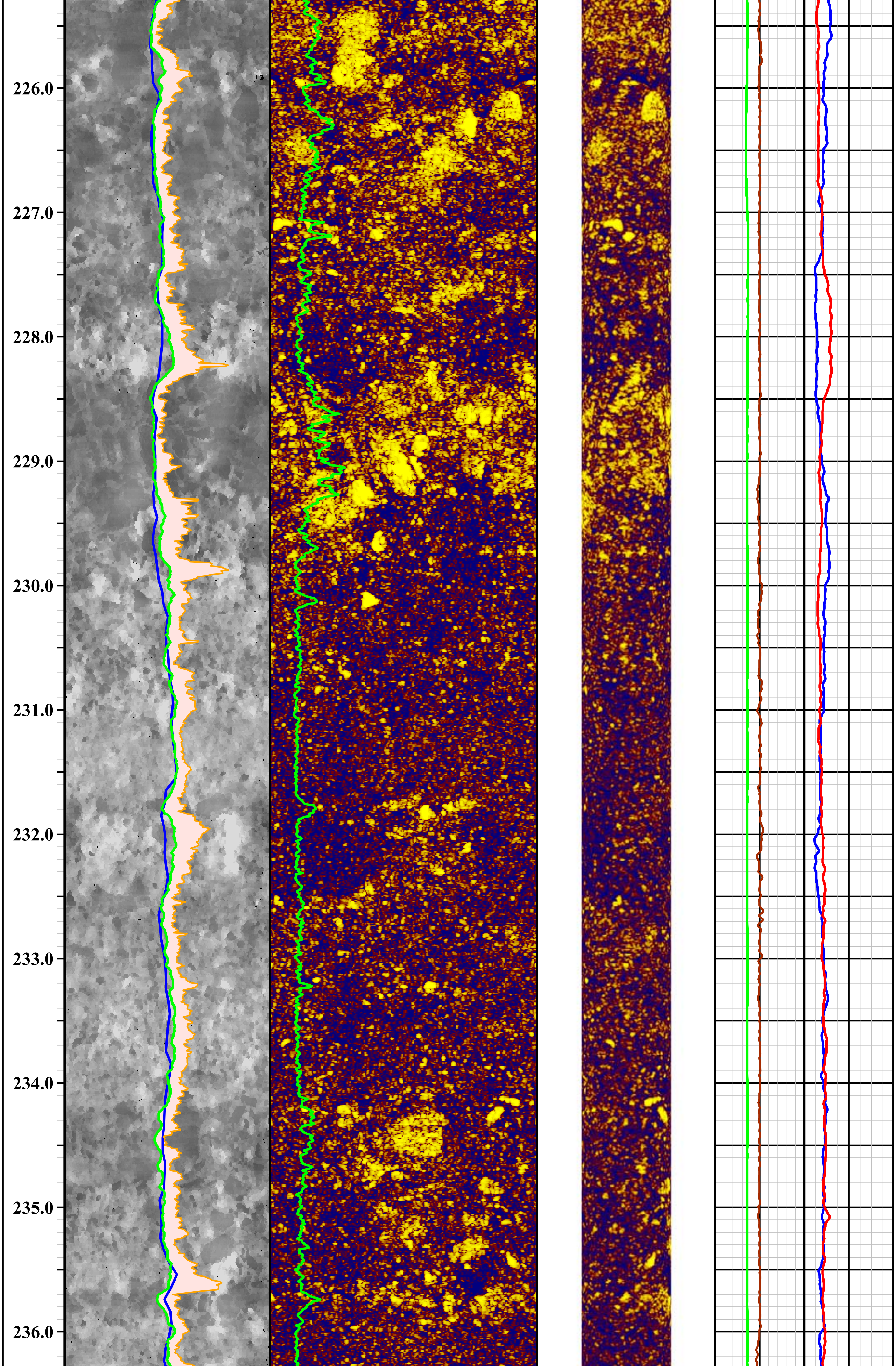

171.0
172.0
173.0
174.0
175.0
176.0
177.0
178.0
179.0
180.0
181.0

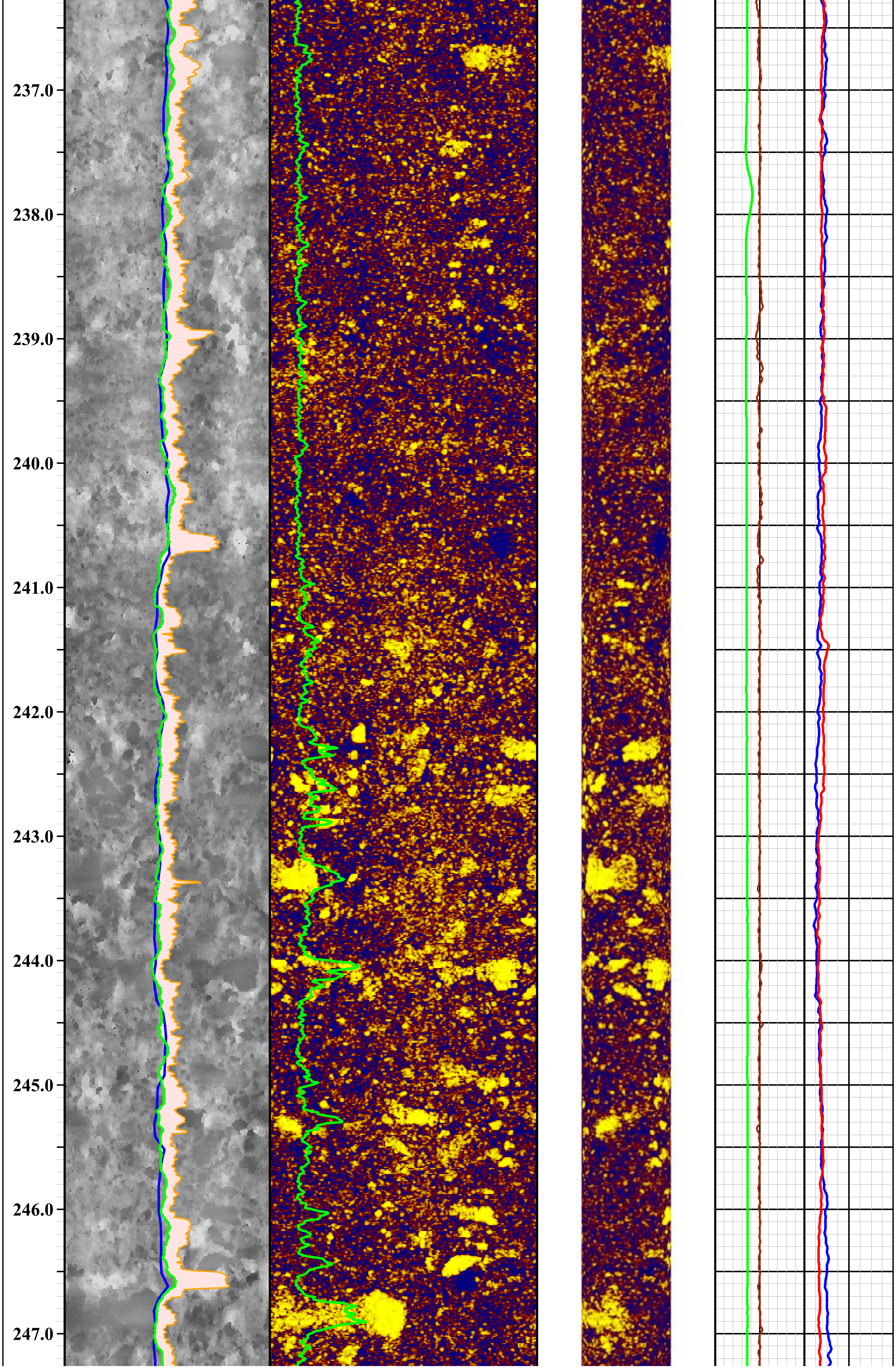

182.0
183.0
184.0
185.0
186.0
187.0
188.0
189.0
190.0
191.0
192.0

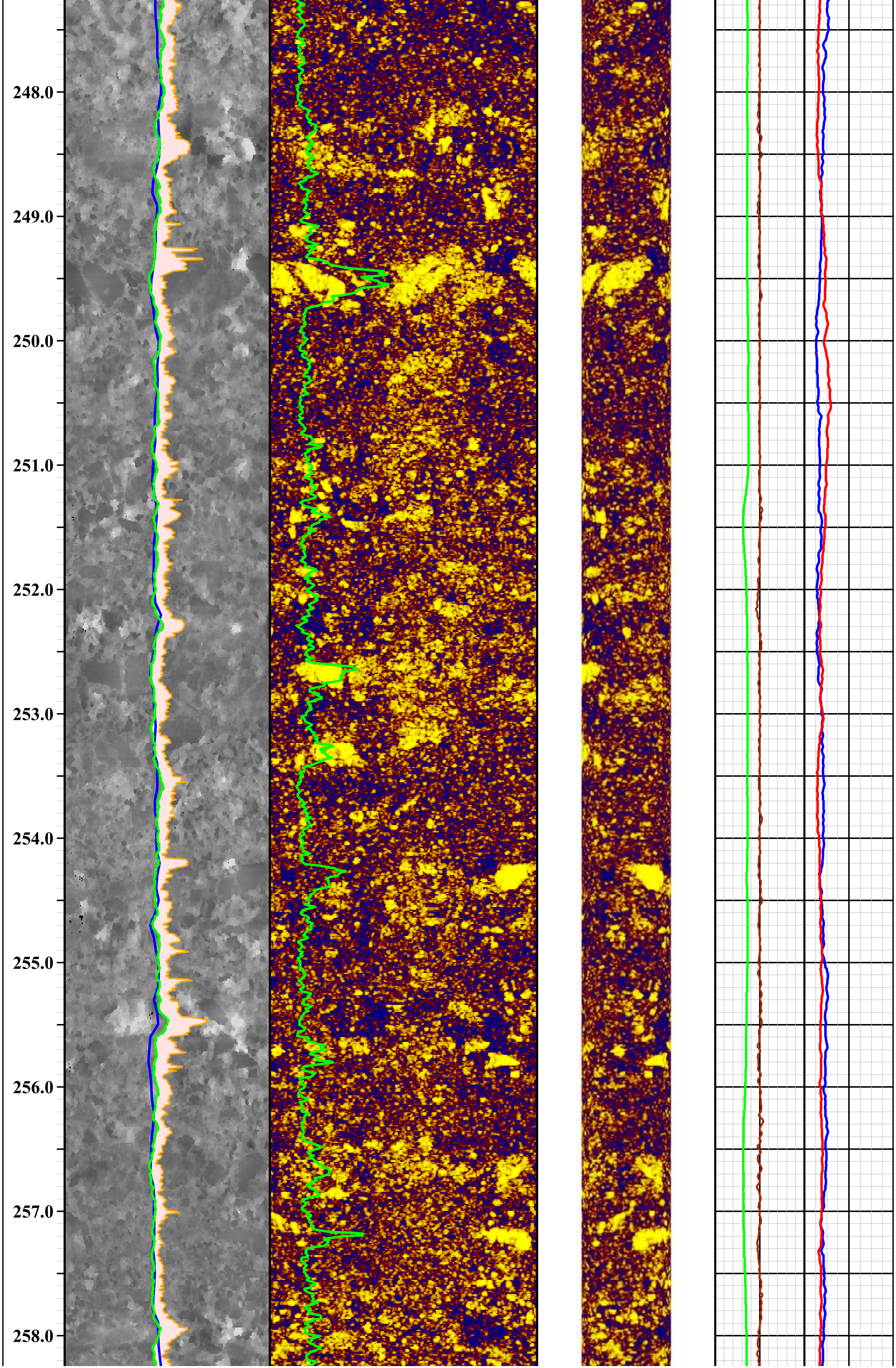

193.0
194.0
195.0
196.0
197.0
198.0
199.0
200.0
201.0
202.0
203.0

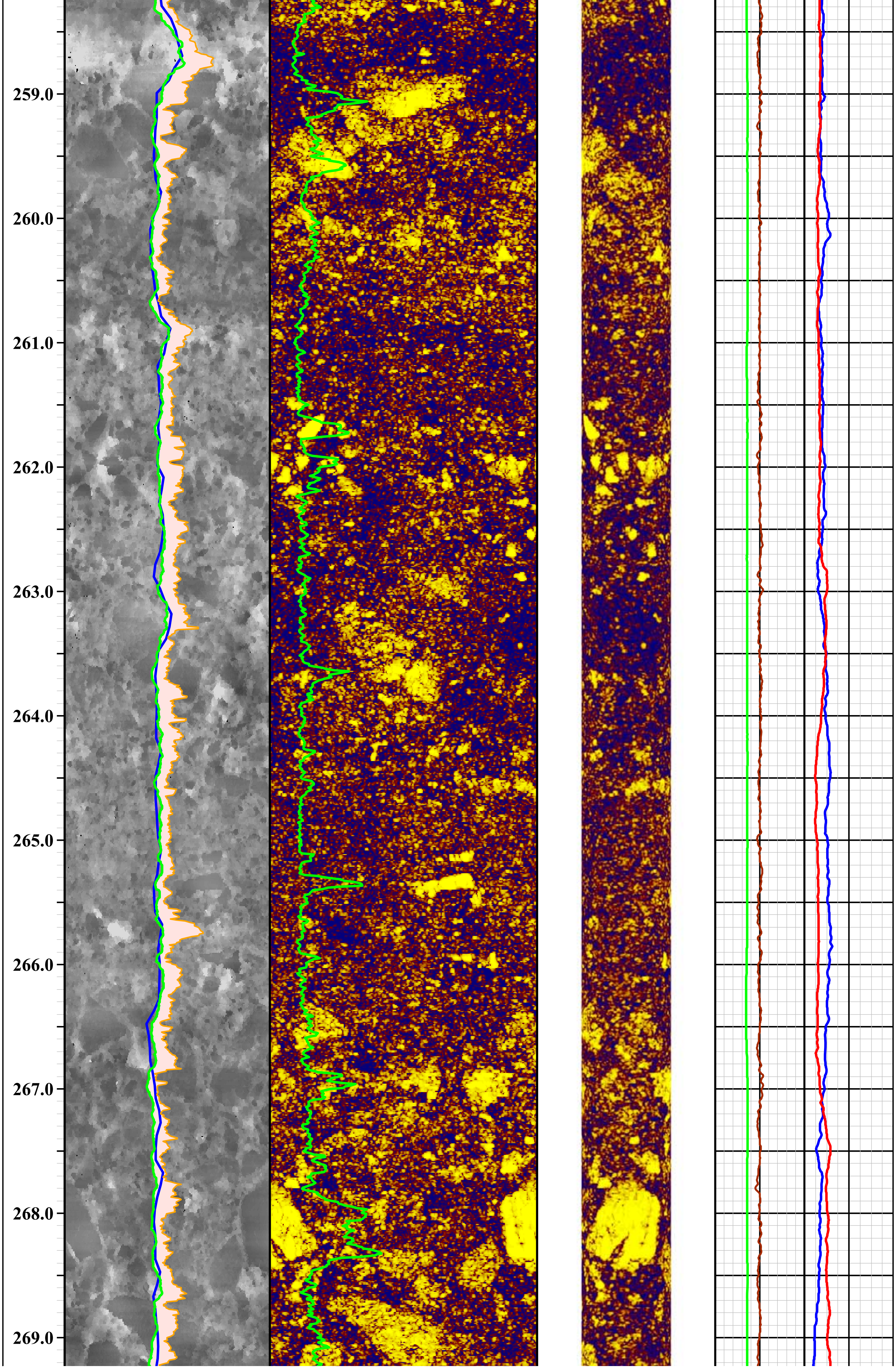

204.0
205.0
206.0
207.0
208.0
209.0
210.0
211.0
212.0
213.0
214.0

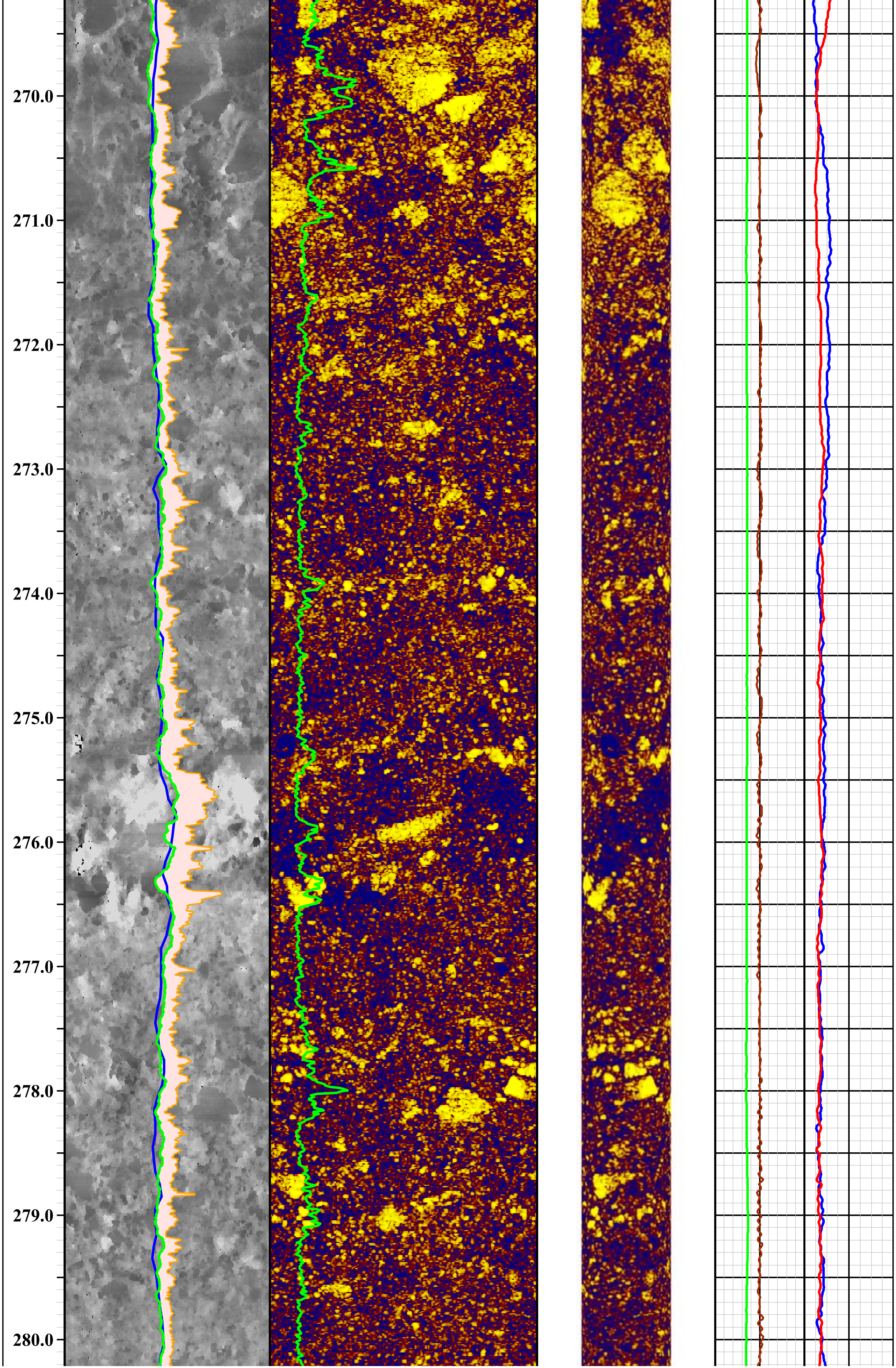

215.0
216.0
217.0
218.0
219.0
220.0
221.0
222.0
223.0
224.0
225.0

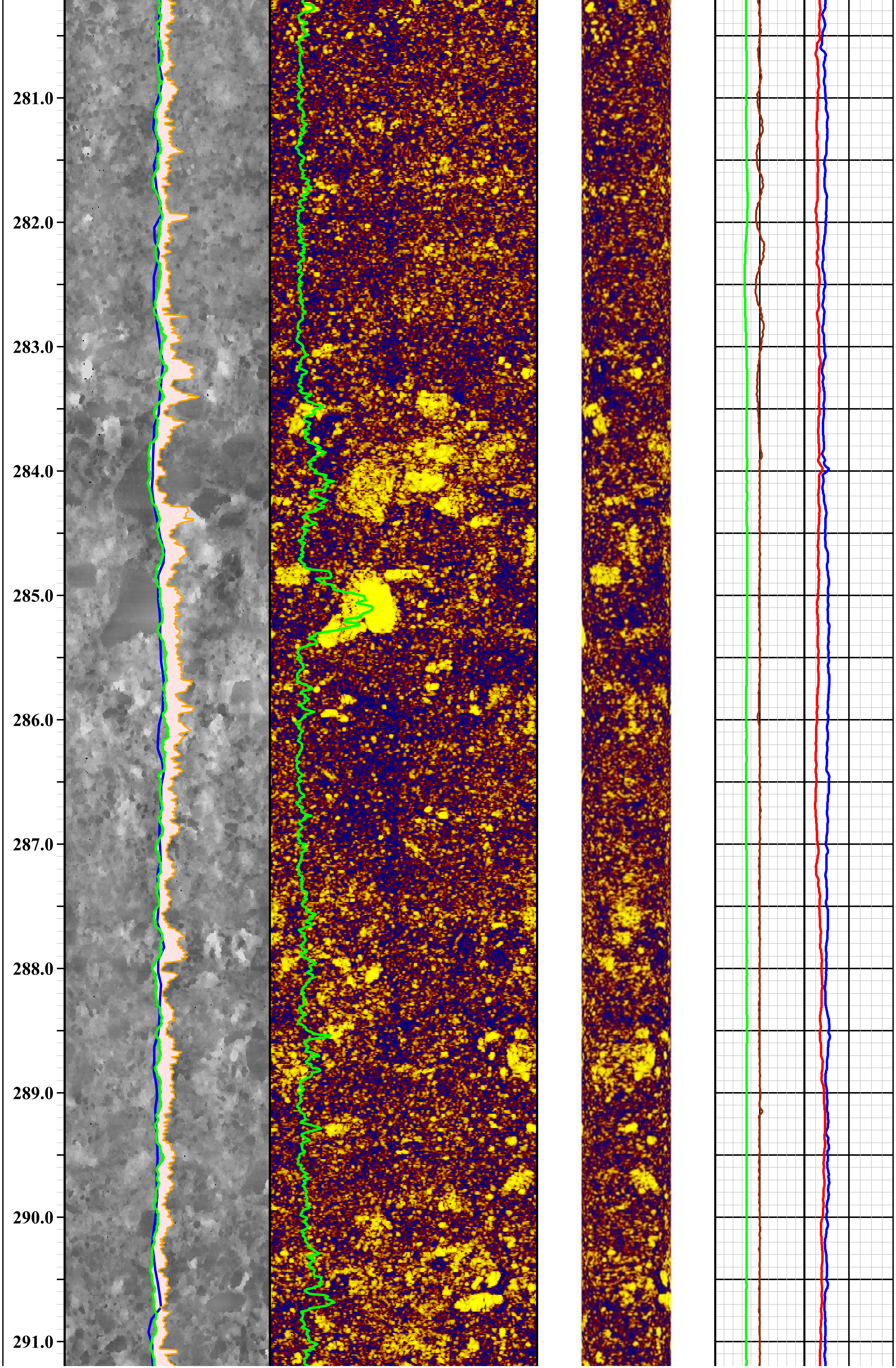

226.0
227.0
228.0
229.0
230.0
231.0
232.0
233.0
234.0
235.0
236.0

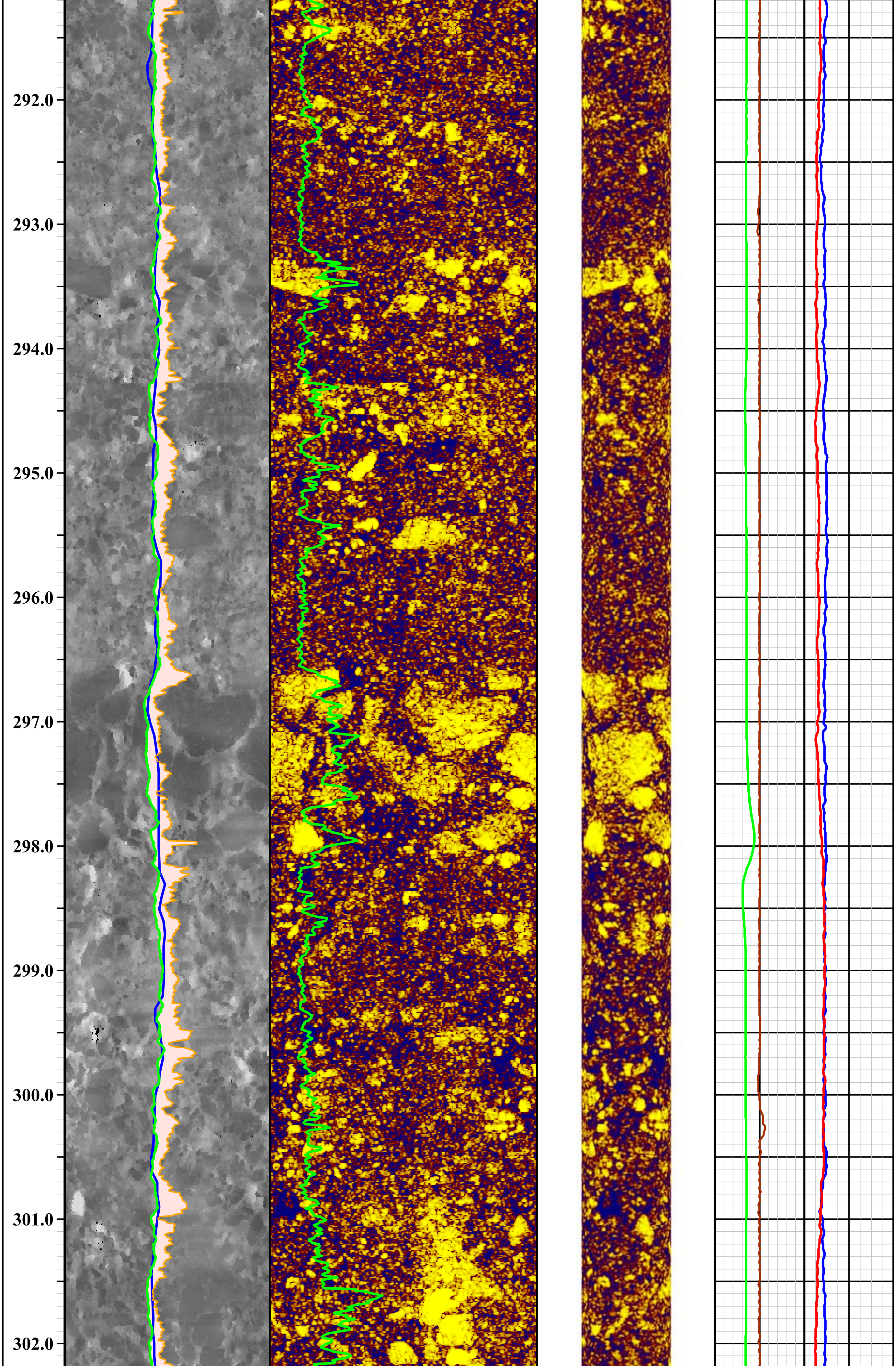

237.0
238.0
239.0
240.0
241.0
242.0
243.0
244.0
245.0
246.0
247.0

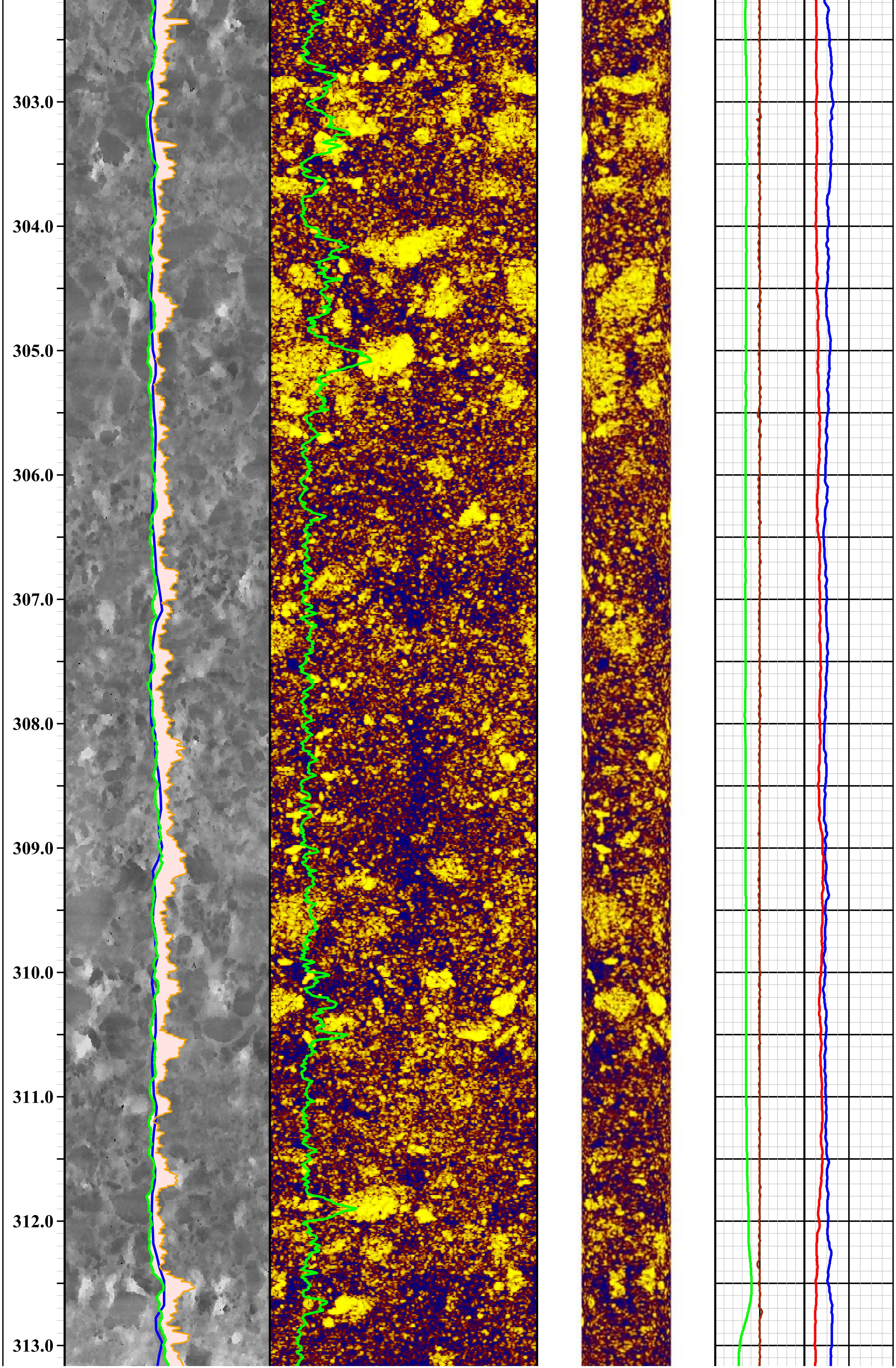

248.0
249.0
250.0
251.0
252.0
253.0
254.0
255.0
256.0
257.0
258.0

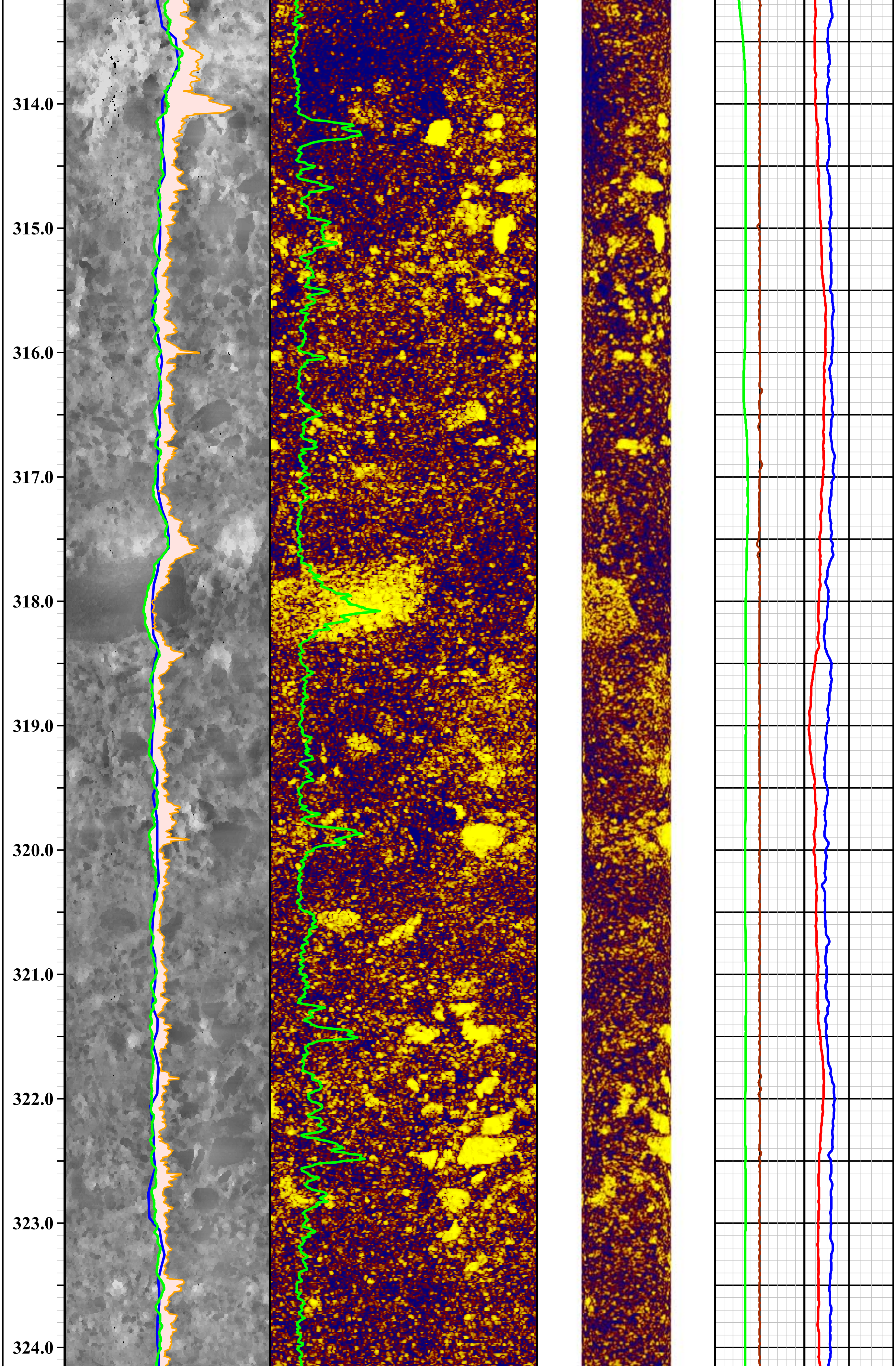

259.0
260.0
261.0
262.0
263.0
264.0
265.0
266.0
267.0
268.0
269.0

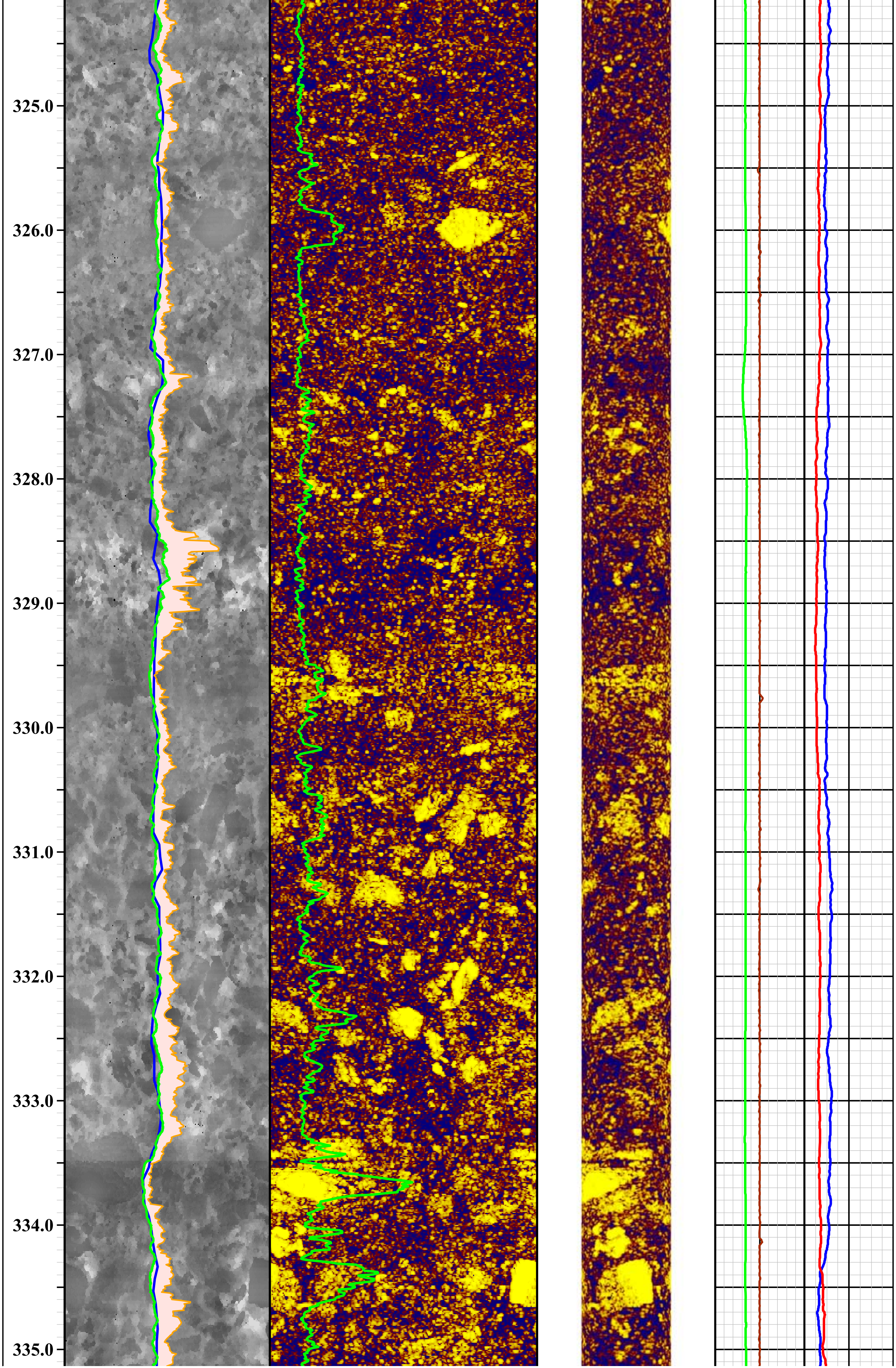

270.0
271.0
272.0
273.0
274.0
275.0
276.0
277.0
278.0
279.0
280.0

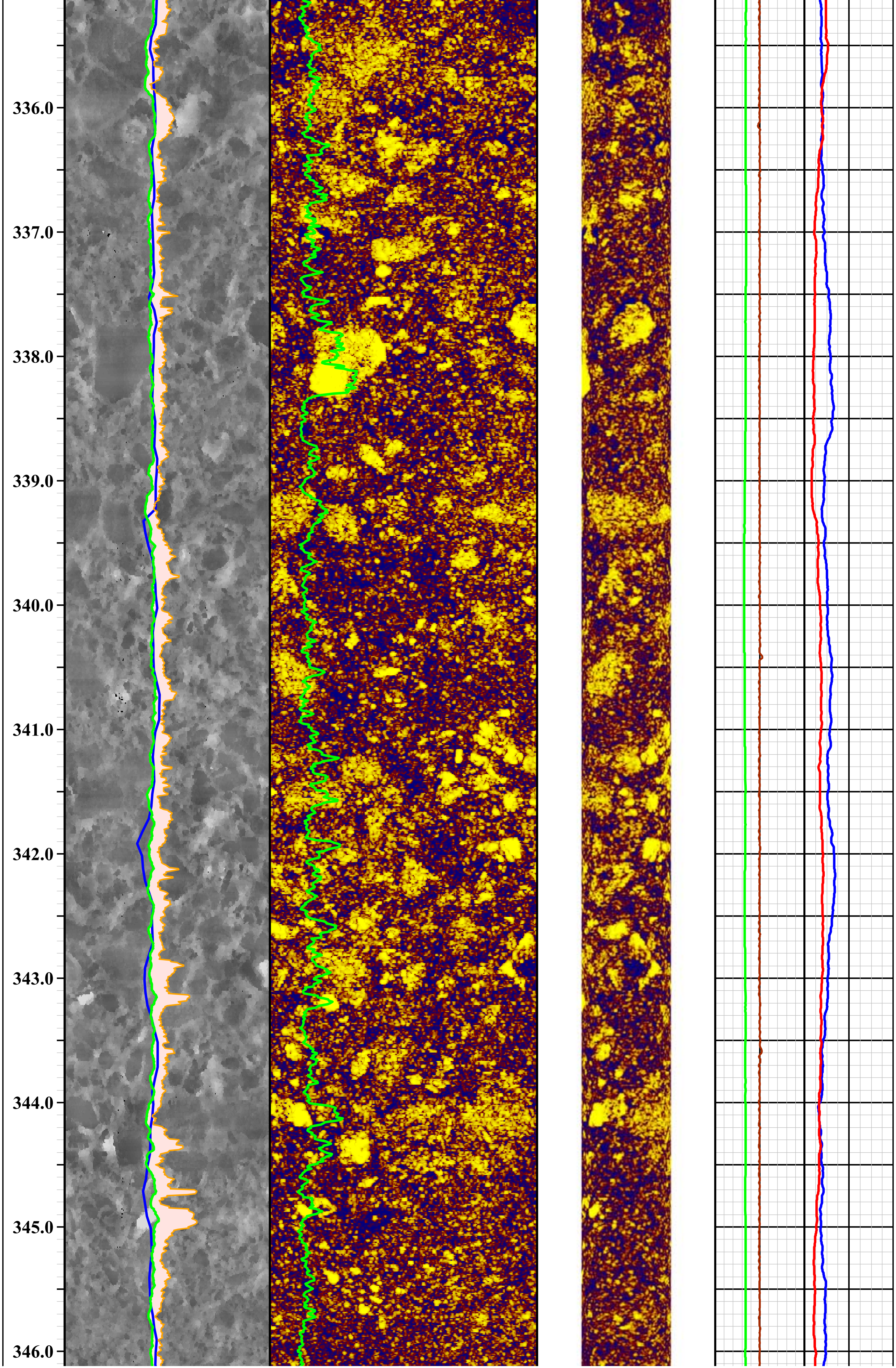

281.0
282.0
283.0
284.0
285.0
286.0
287.0
288.0
289.0
290.0
291.0

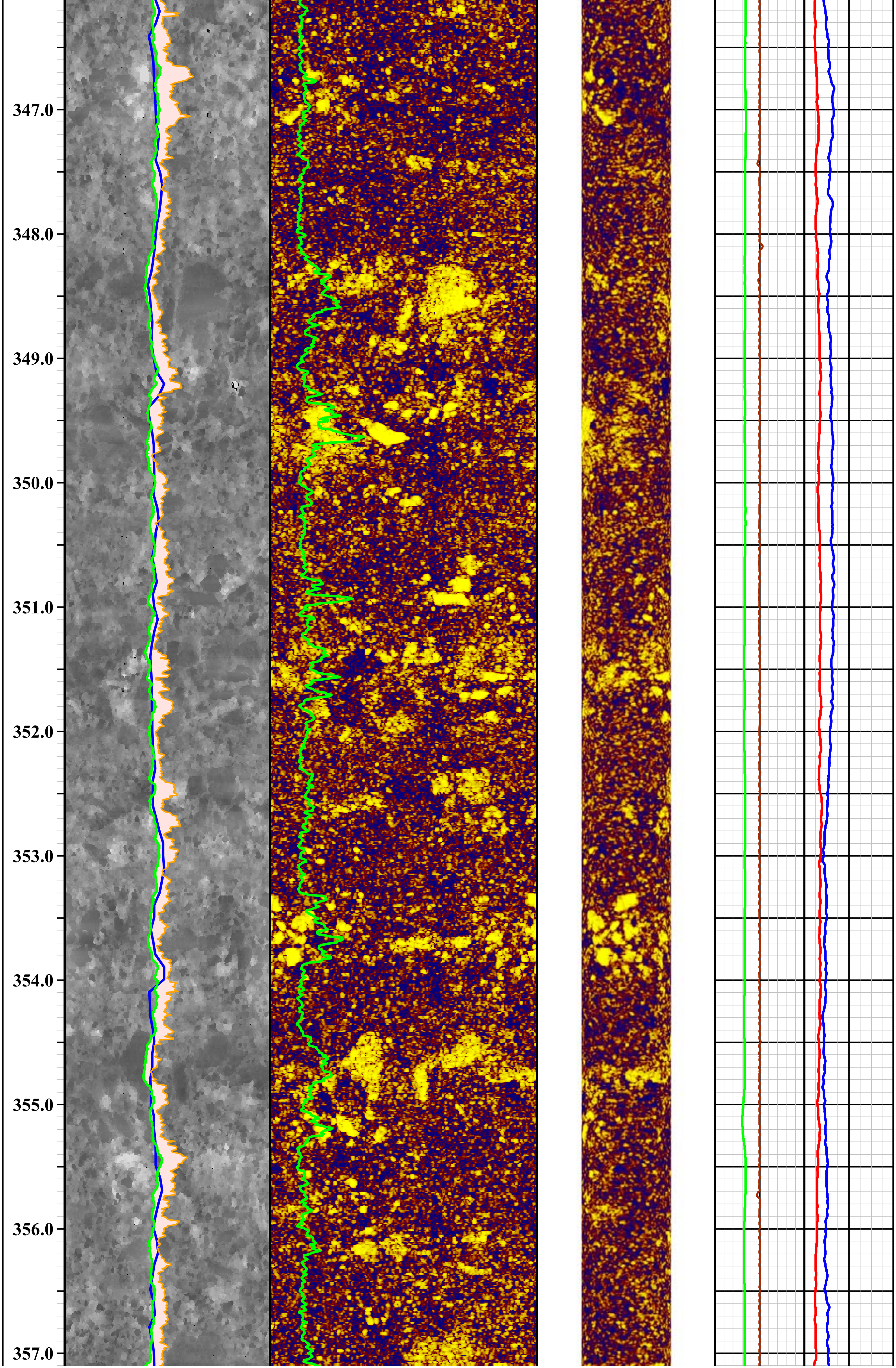

292.0
293.0
294.0
295.0
296.0
297.0
298.0
299.0
300.0
301.0
302.0

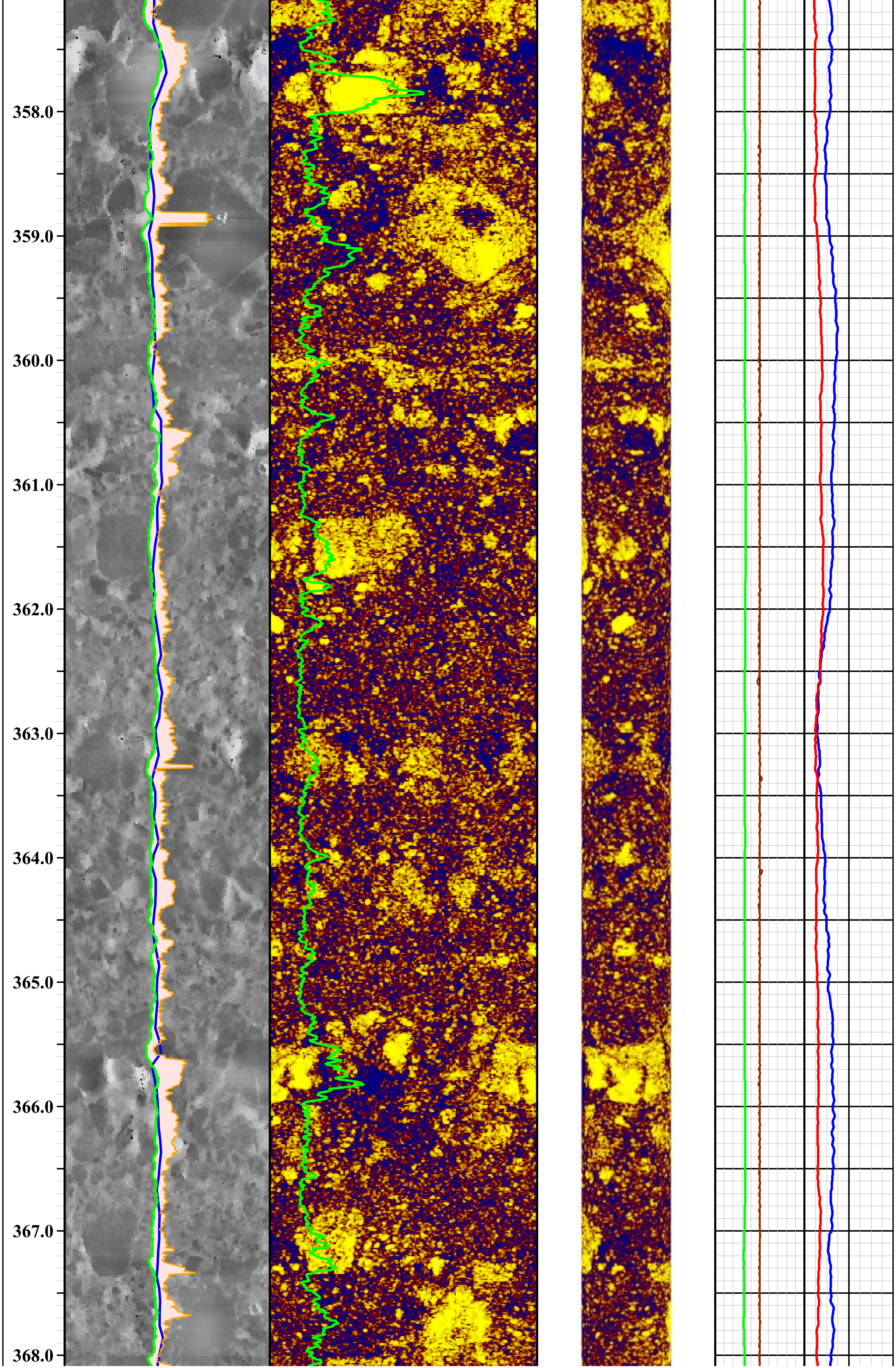

303.0
304.0
305.0
306.0
307.0
308.0
309.0
310.0
311.0
312.0
313.0

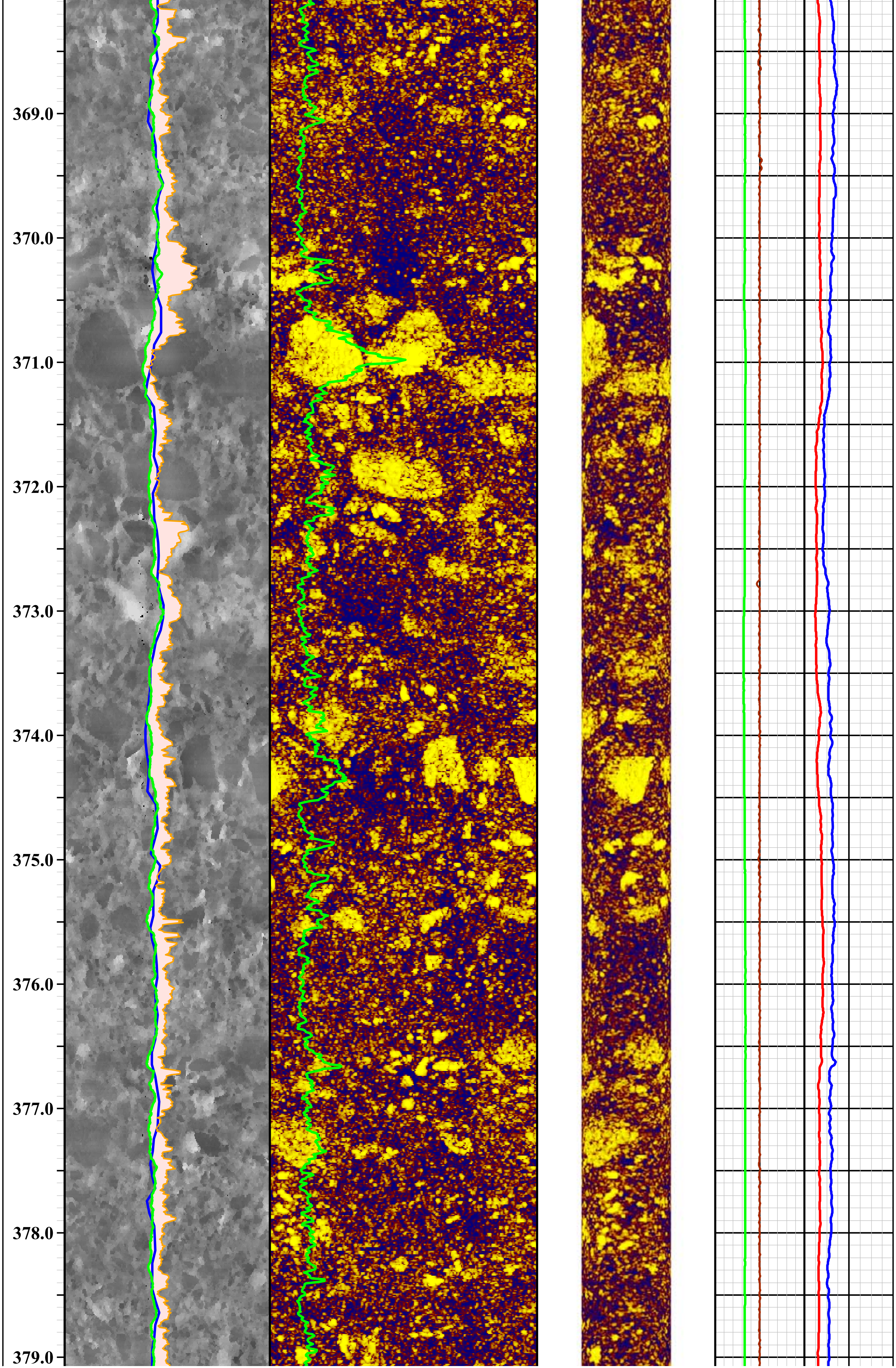

314.0
315.0
316.0
317.0
318.0
319.0
320.0
321.0
322.0
323.0
324.0

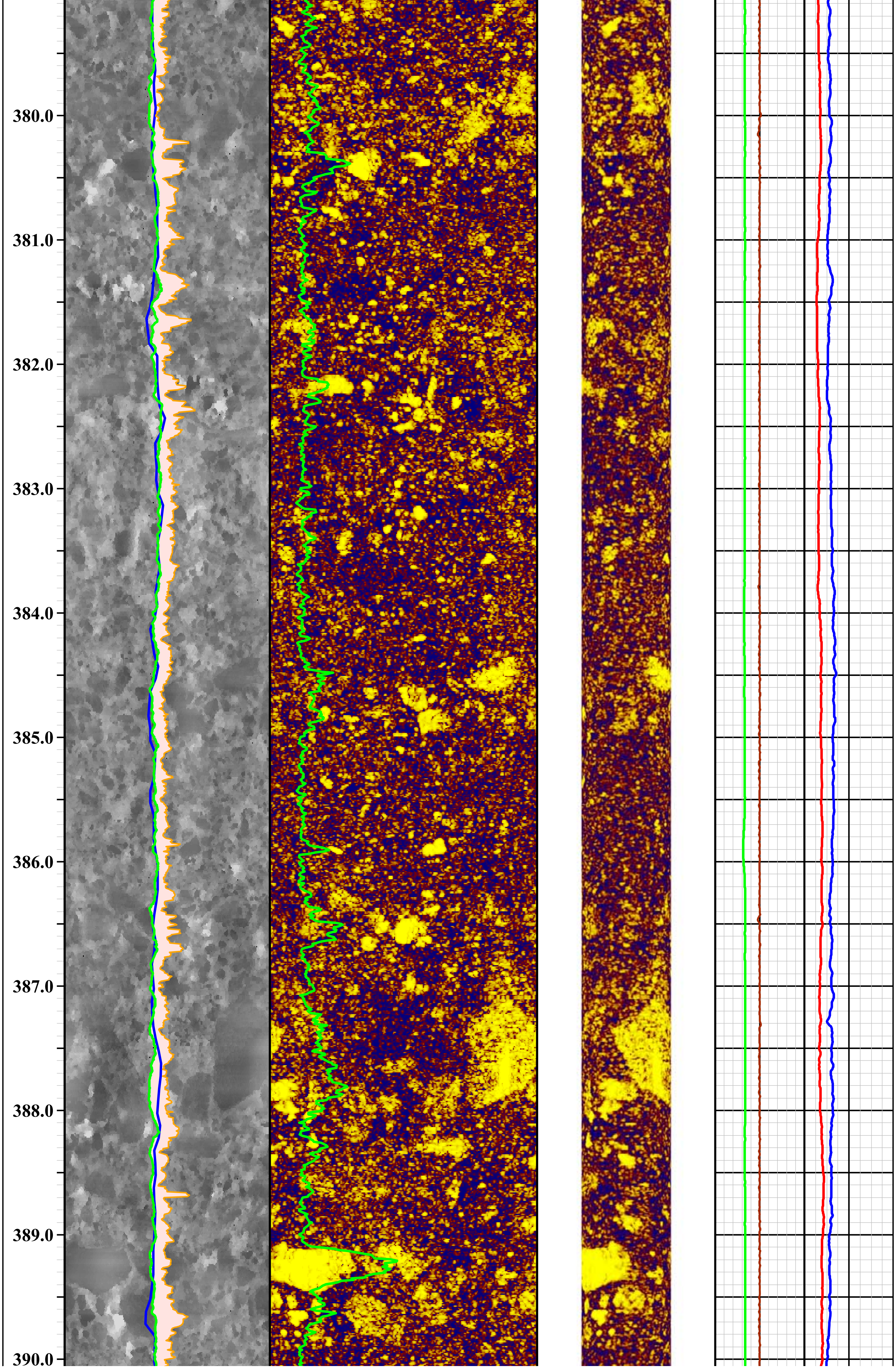

325.0
326.0
327.0
328.0
329.0
330.0
331.0
332.0
333.0
334.0
335.0


336.0
337.0
338.0
339.0
340.0
341.0
342.0
343.0
344.0
345.0
346.0

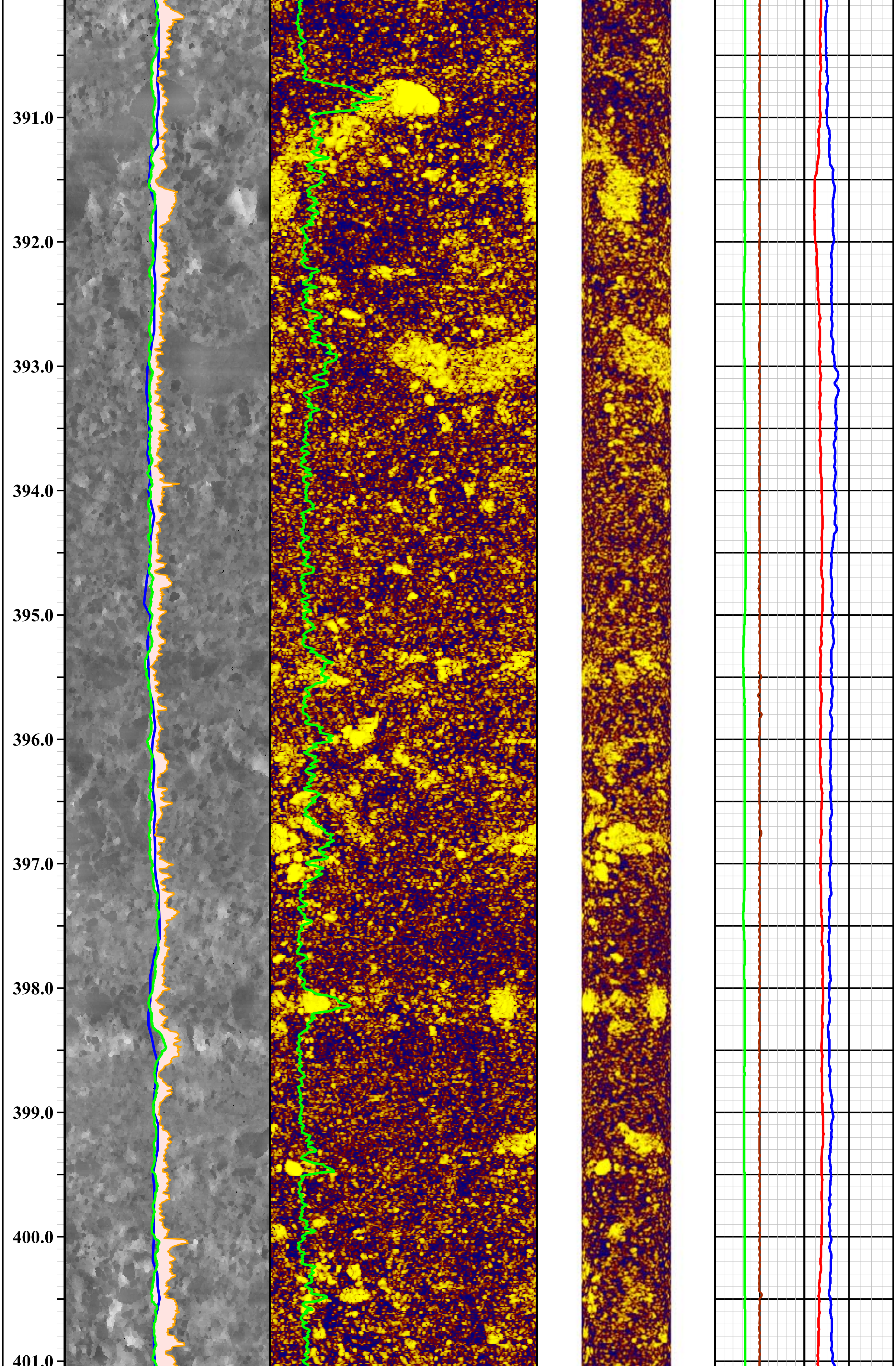

347.0
348.0
349.0
350.0
351.0
352.0
353.0
354.0
355.0
356.0
357.0

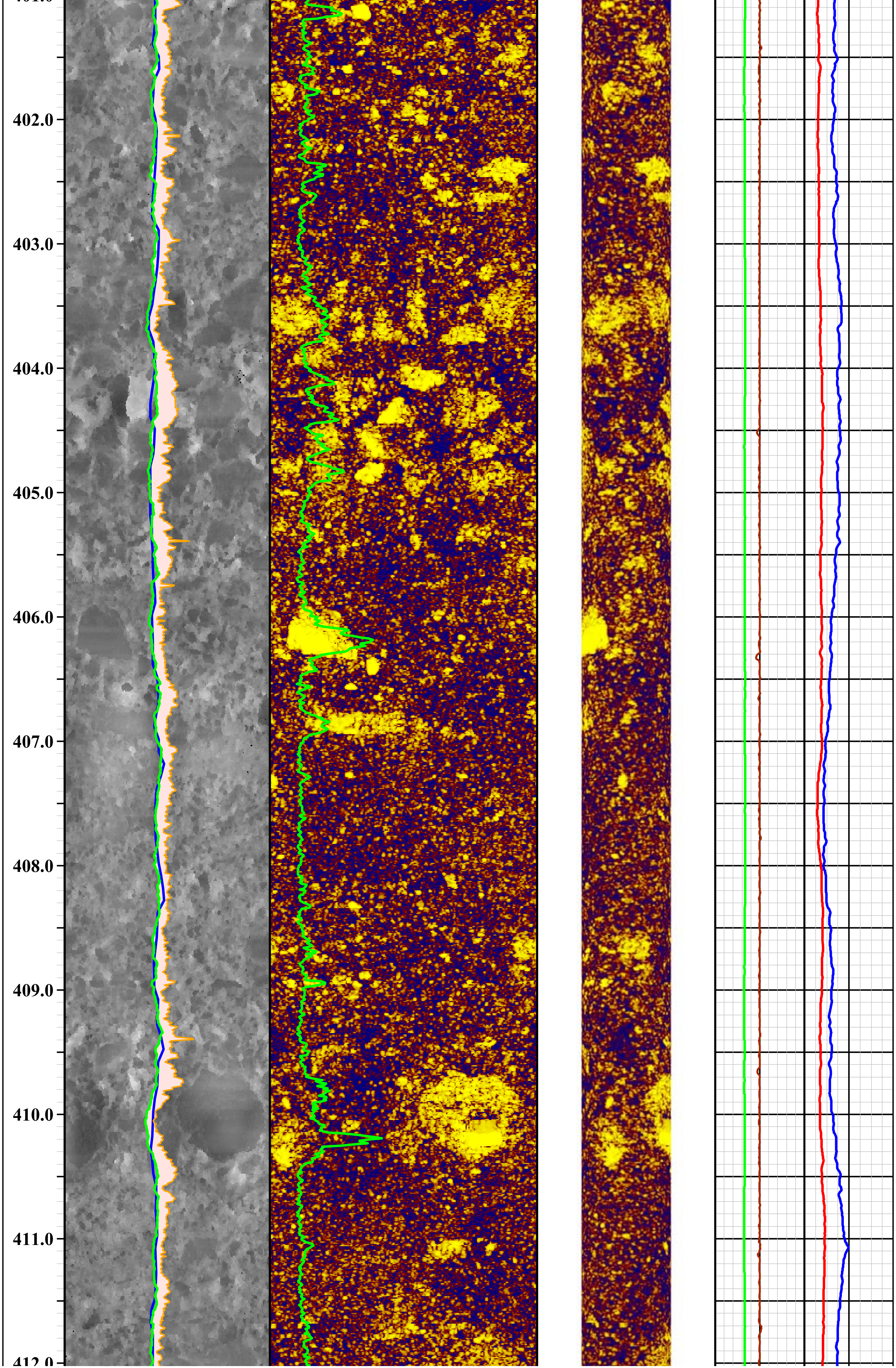

358.0
359.0
360.0
361.0
362.0
363.0
364.0
365.0
366.0
367.0
368.0

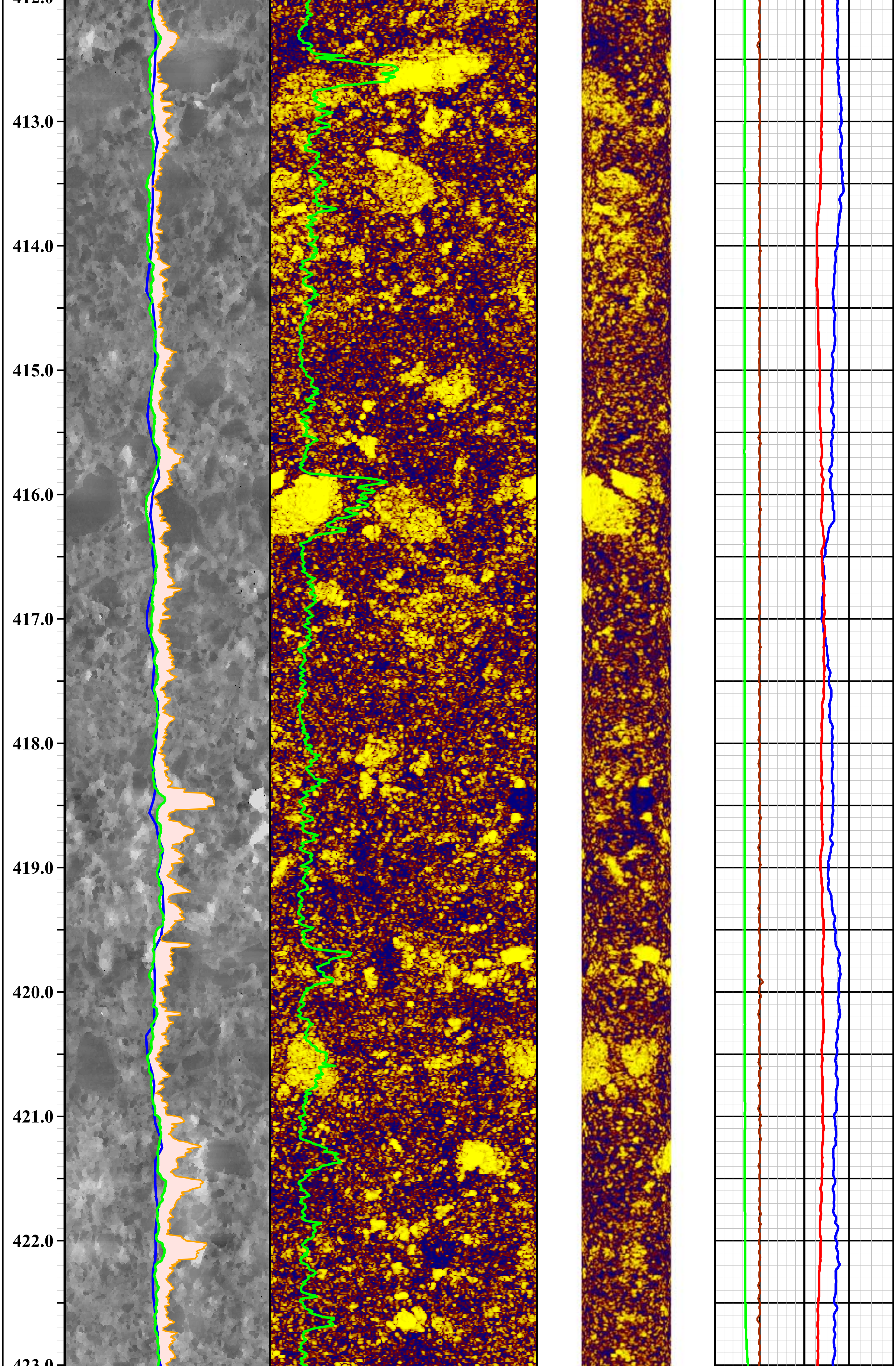

369.0
370.0
371.0
372.0
373.0
374.0
375.0
376.0
377.0
378.0
379.0

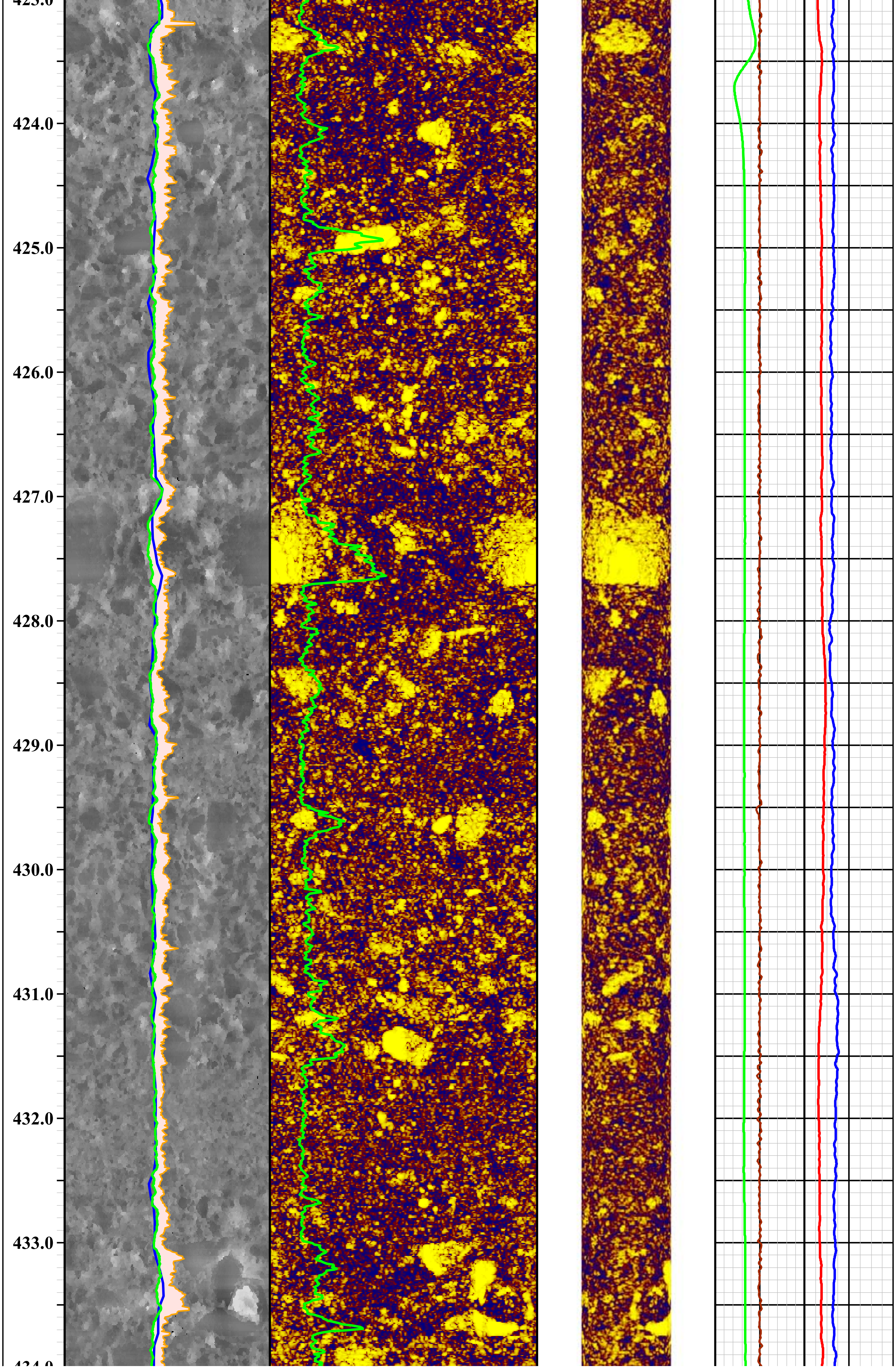


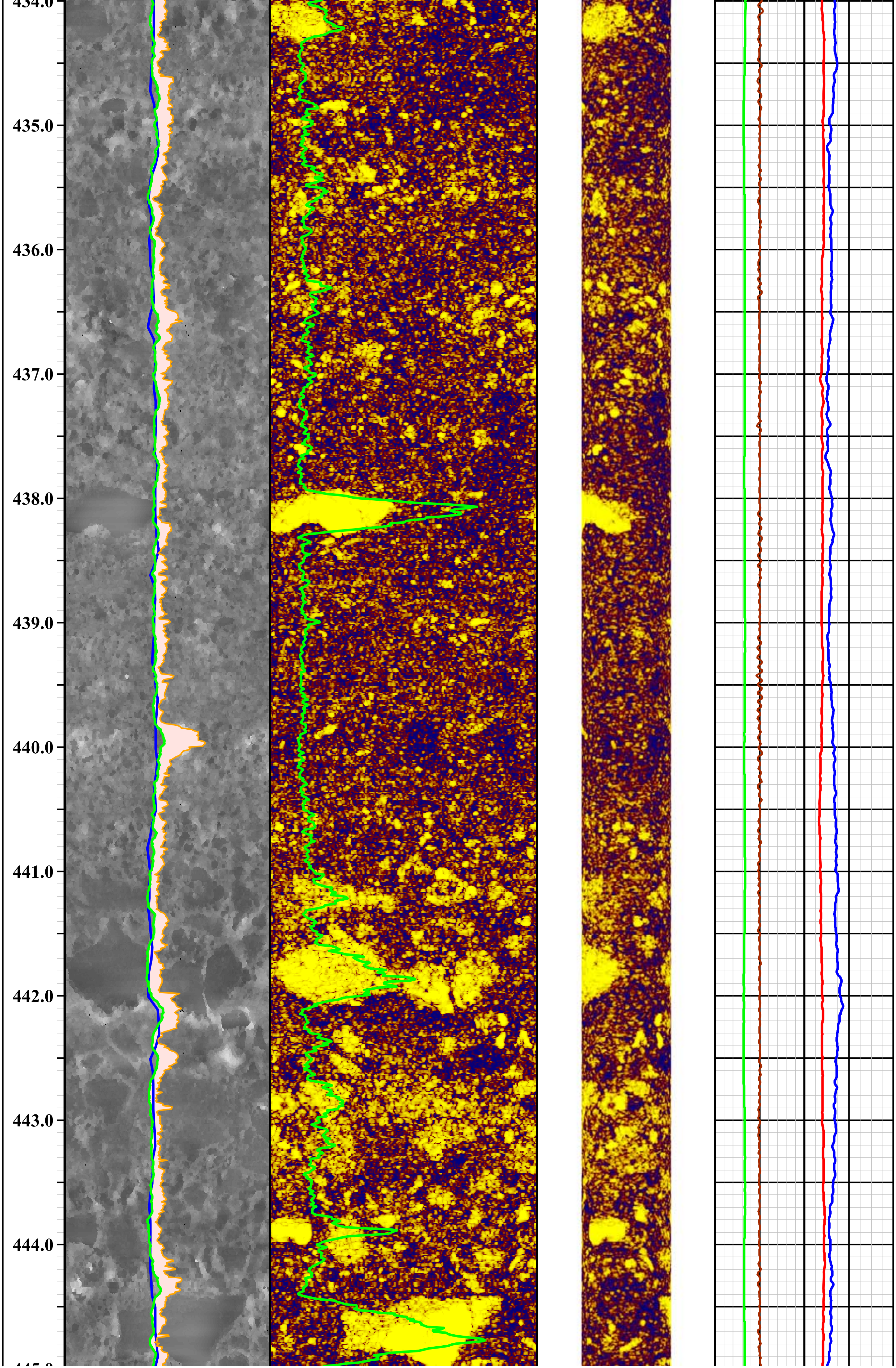
380.0
381.0
382.0
383.0
384.0
385.0
386.0
387.0
388.0
389.0
390.0


391.0
392.0
393.0
394.0
395.0
396.0
397.0
398.0
399.0
400.0
401.0

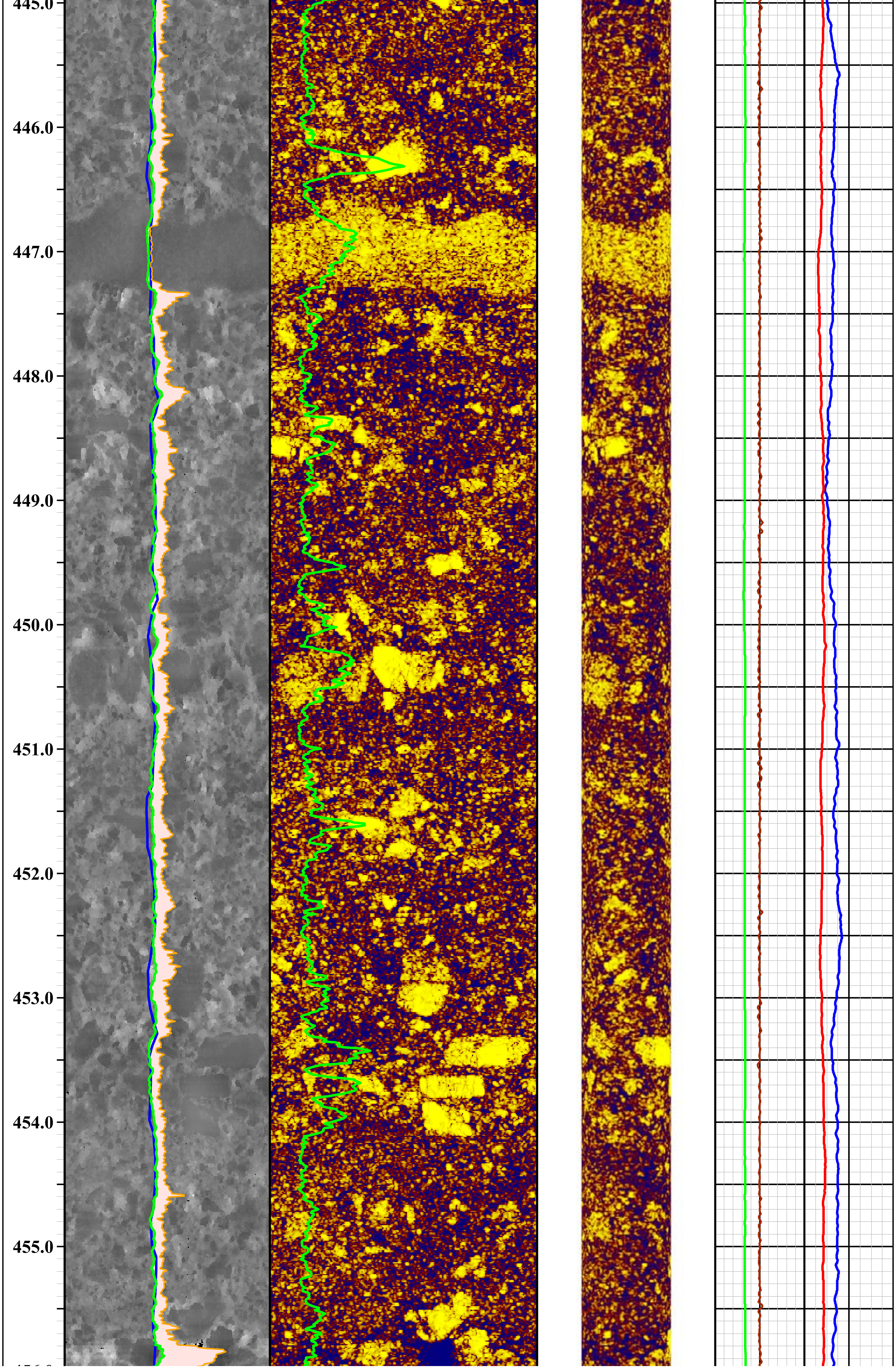

402.0
403.0
404.0
405.0
406.0
407.0
408.0
409.0
410.0
411.0


413.0
414.0
415.0
416.0
417.0
418.0
419.0
420.0
421.0
422.0
423.0

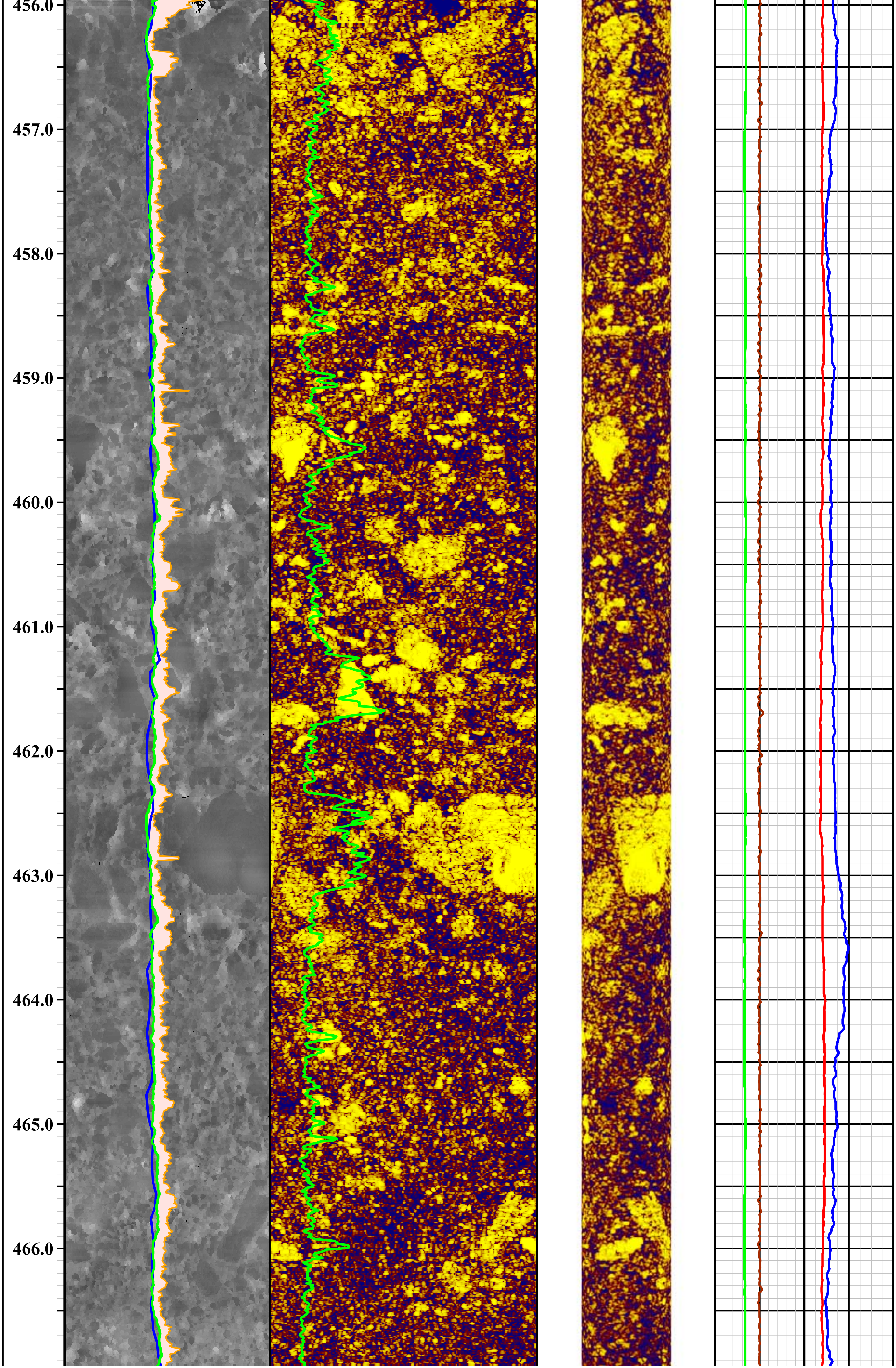

424.0
425.0
426.0
427.0
428.0
429.0
430.0
431.0
432.0
433.0



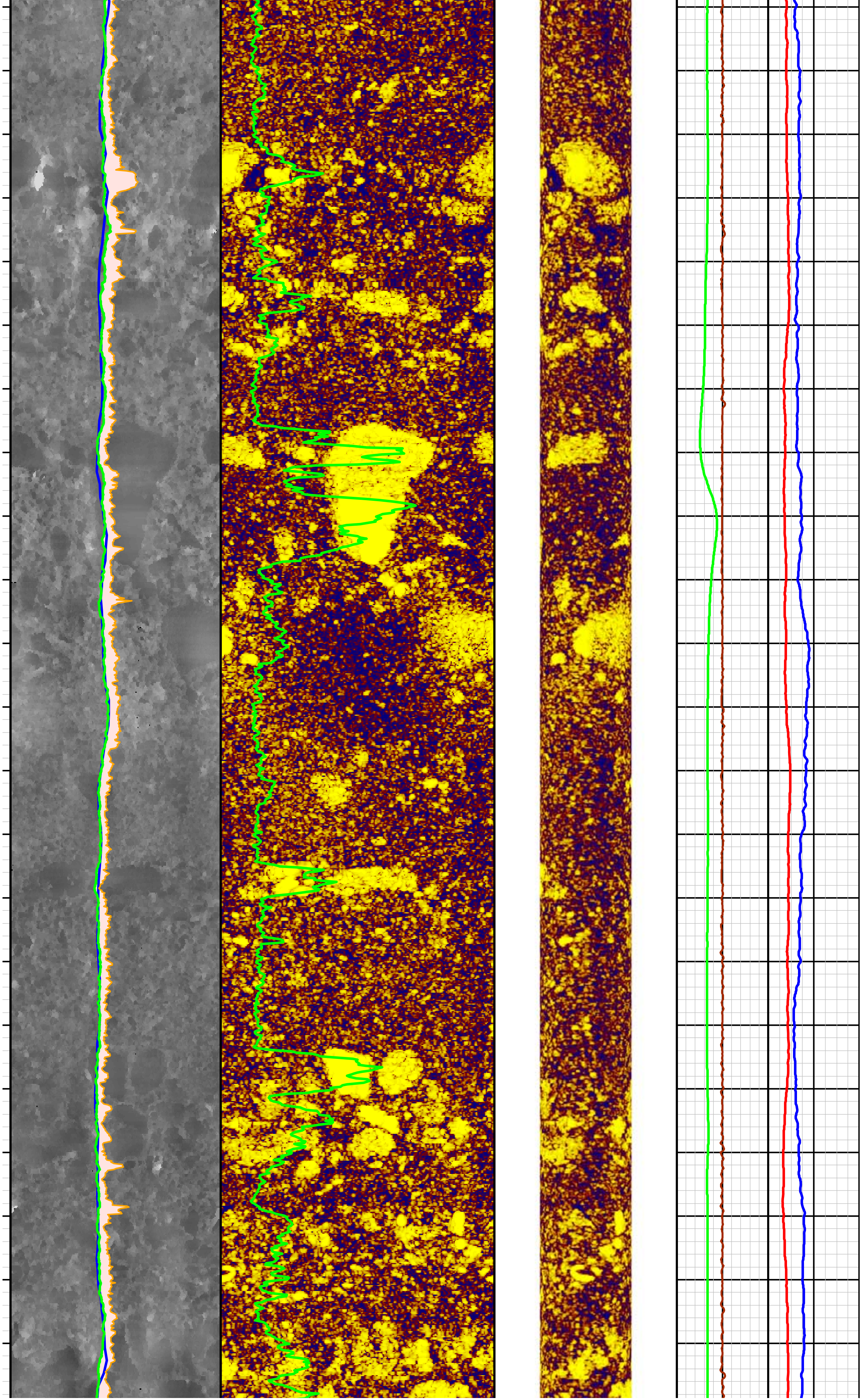
435.0
436.0
437.0
438.0
439.0
440.0
441.0
442.0
443.0
444.0

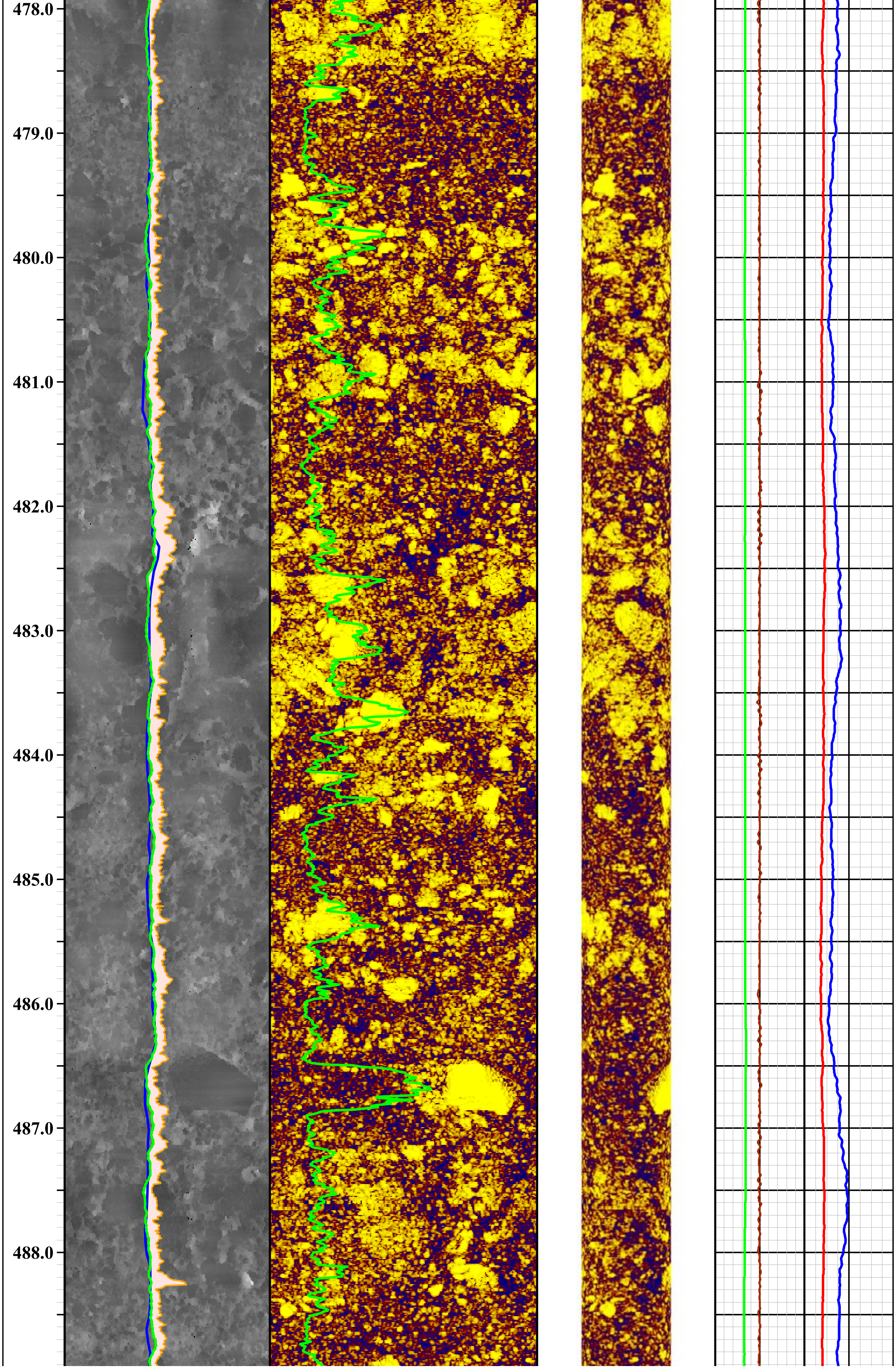


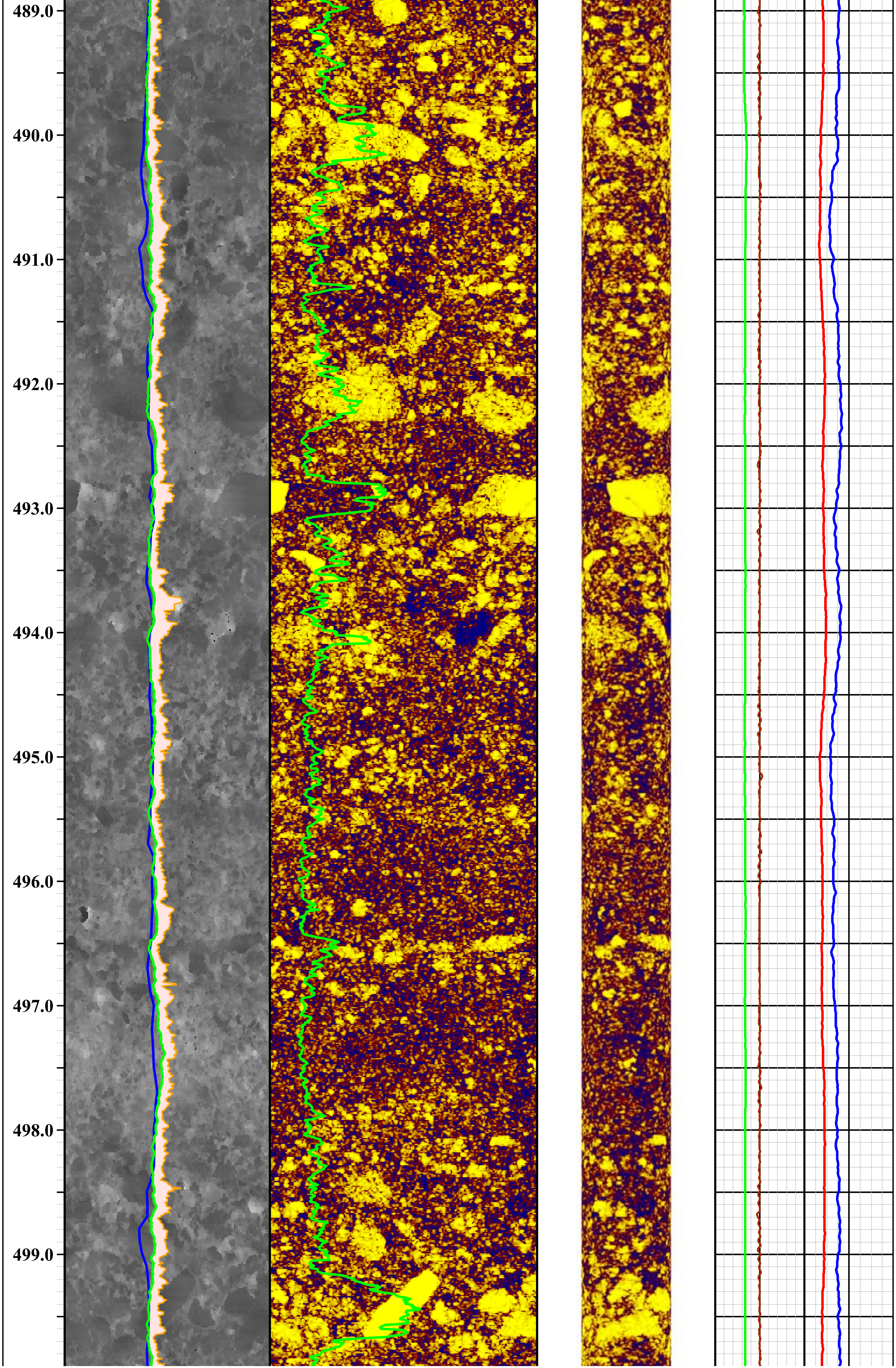
445.0
446.0
447.0
448.0
449.0
450.0
451.0
452.0
453.0
454.0
455.0
456.0

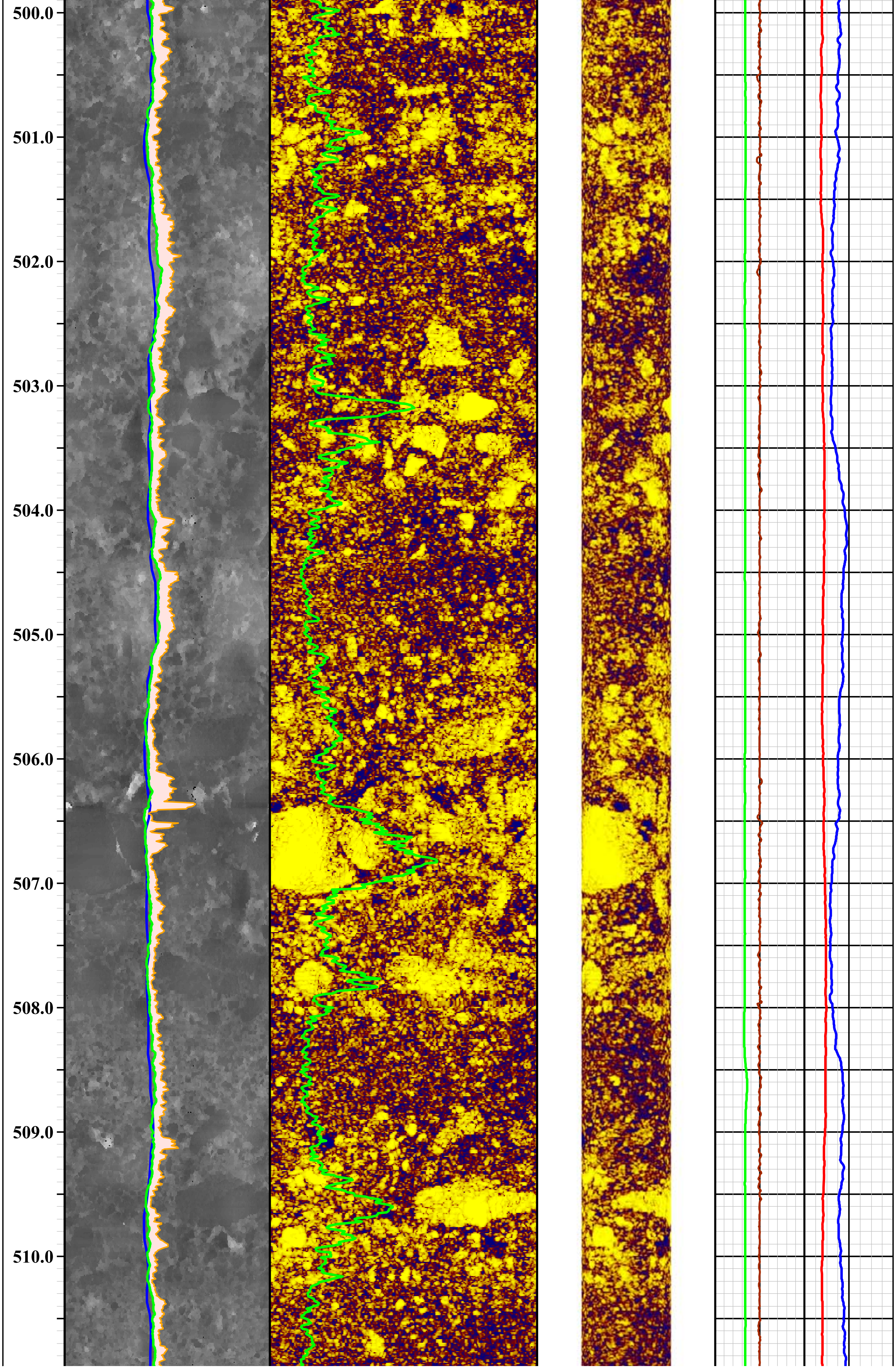

456.0
457.0
458.0
459.0
460.0
461.0
462.0
463.0
464.0
465.0
466.0

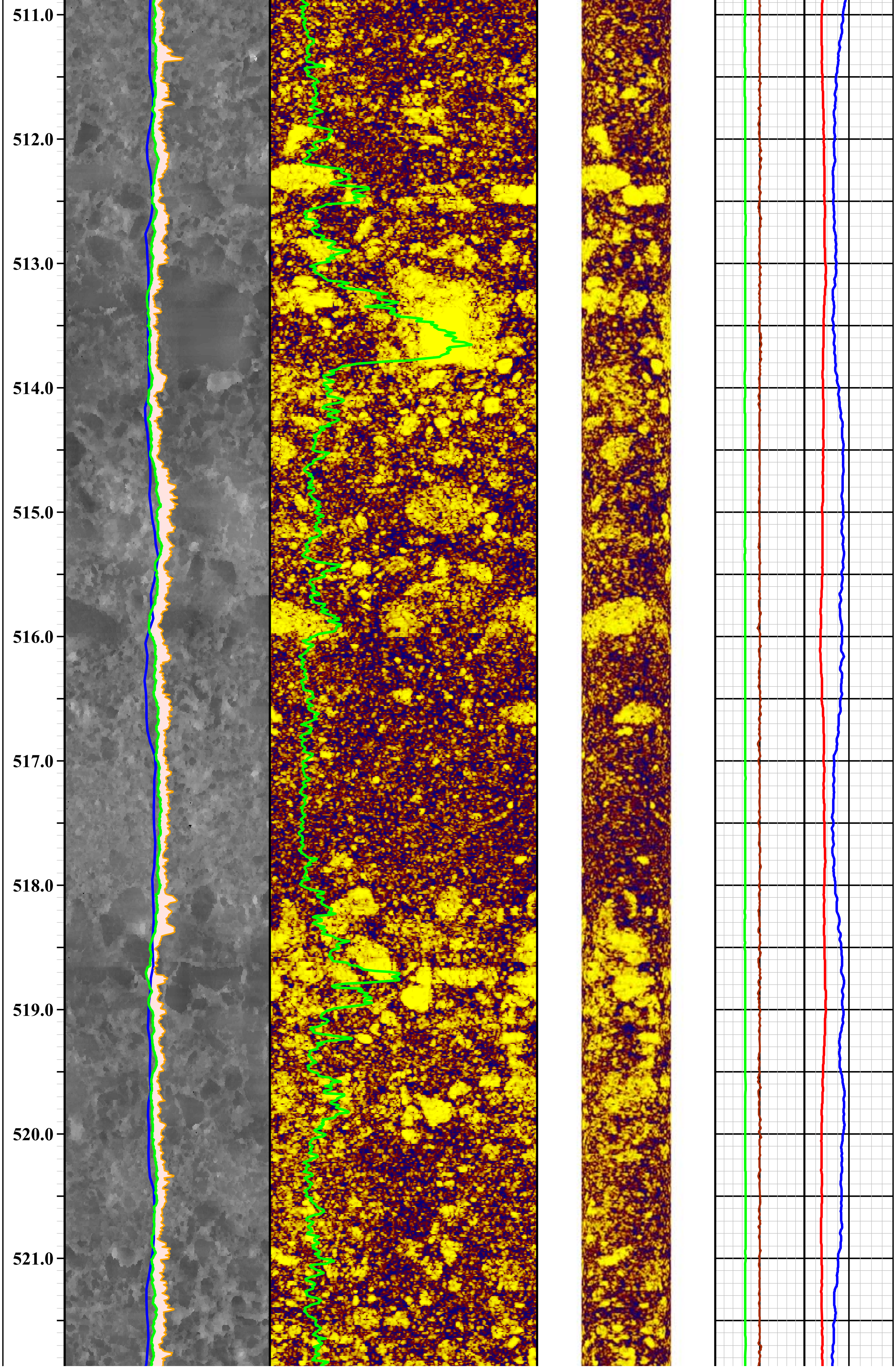
467.0
468.0
469.0
470.0
471.0
472.0
473.0
474.0
475.0
476.0
477.0

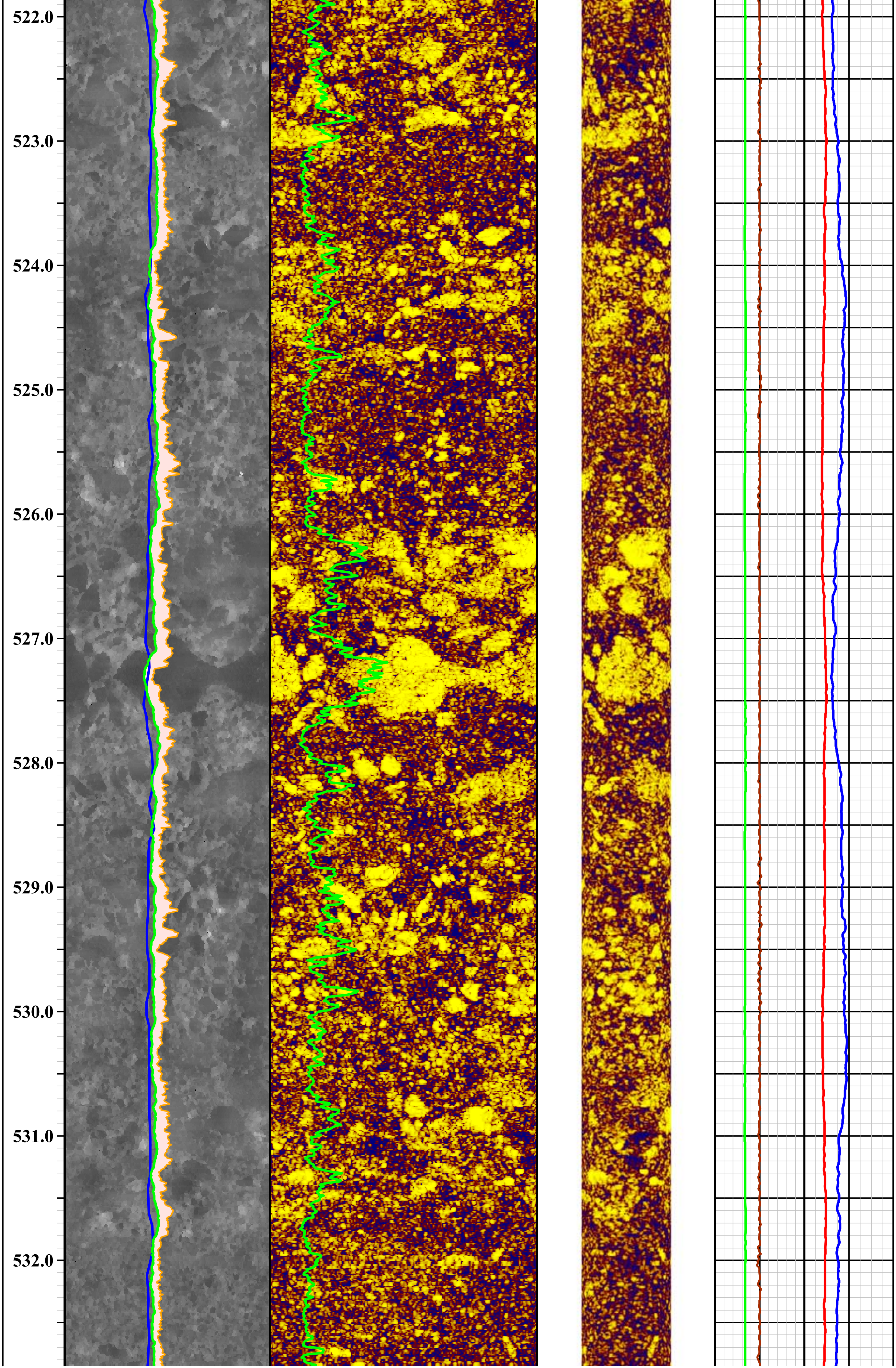


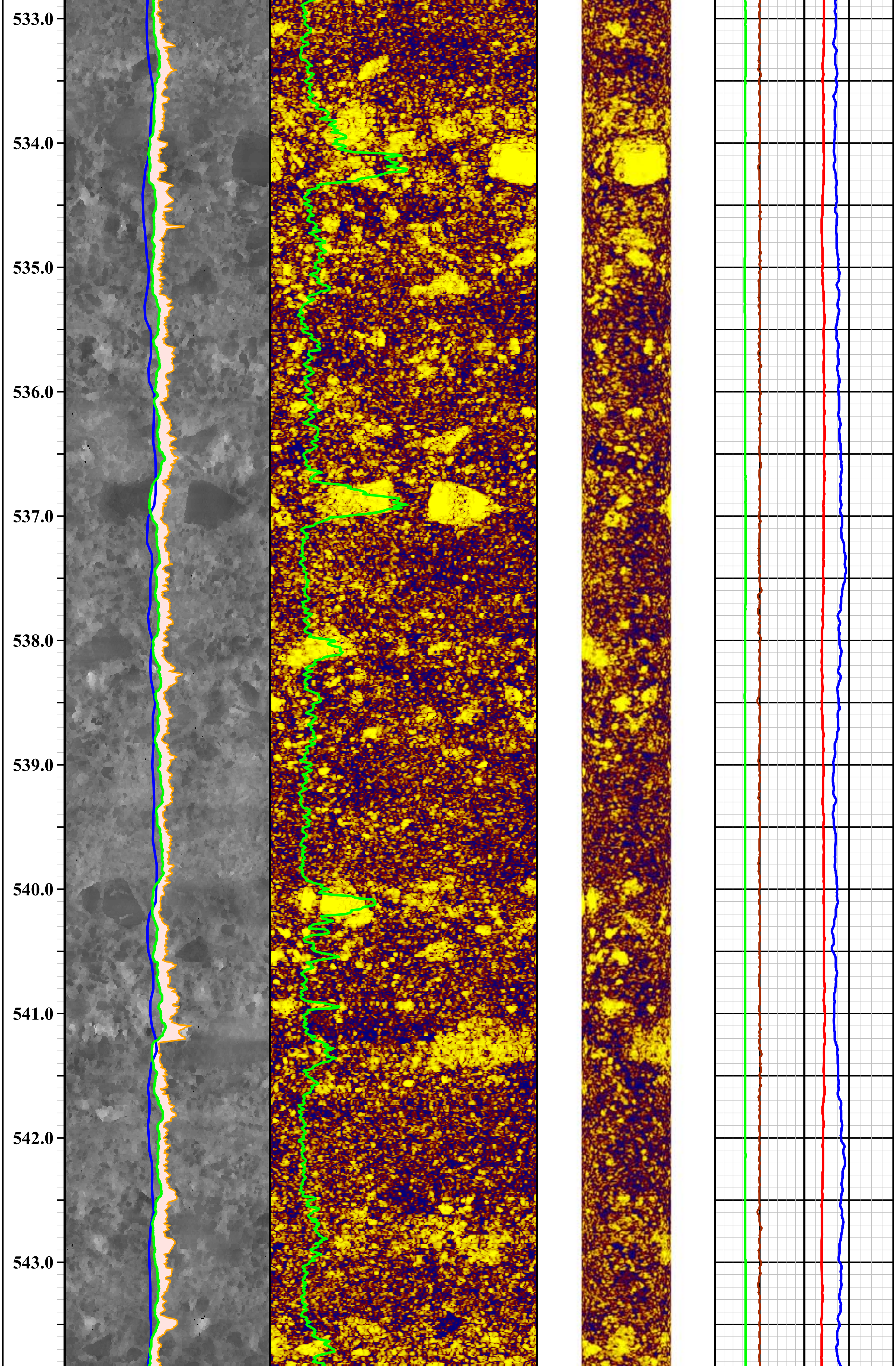

478.0
479.0
480.0
481.0
482.0
483.0
484.0
485.0
486.0
487.0
488.0

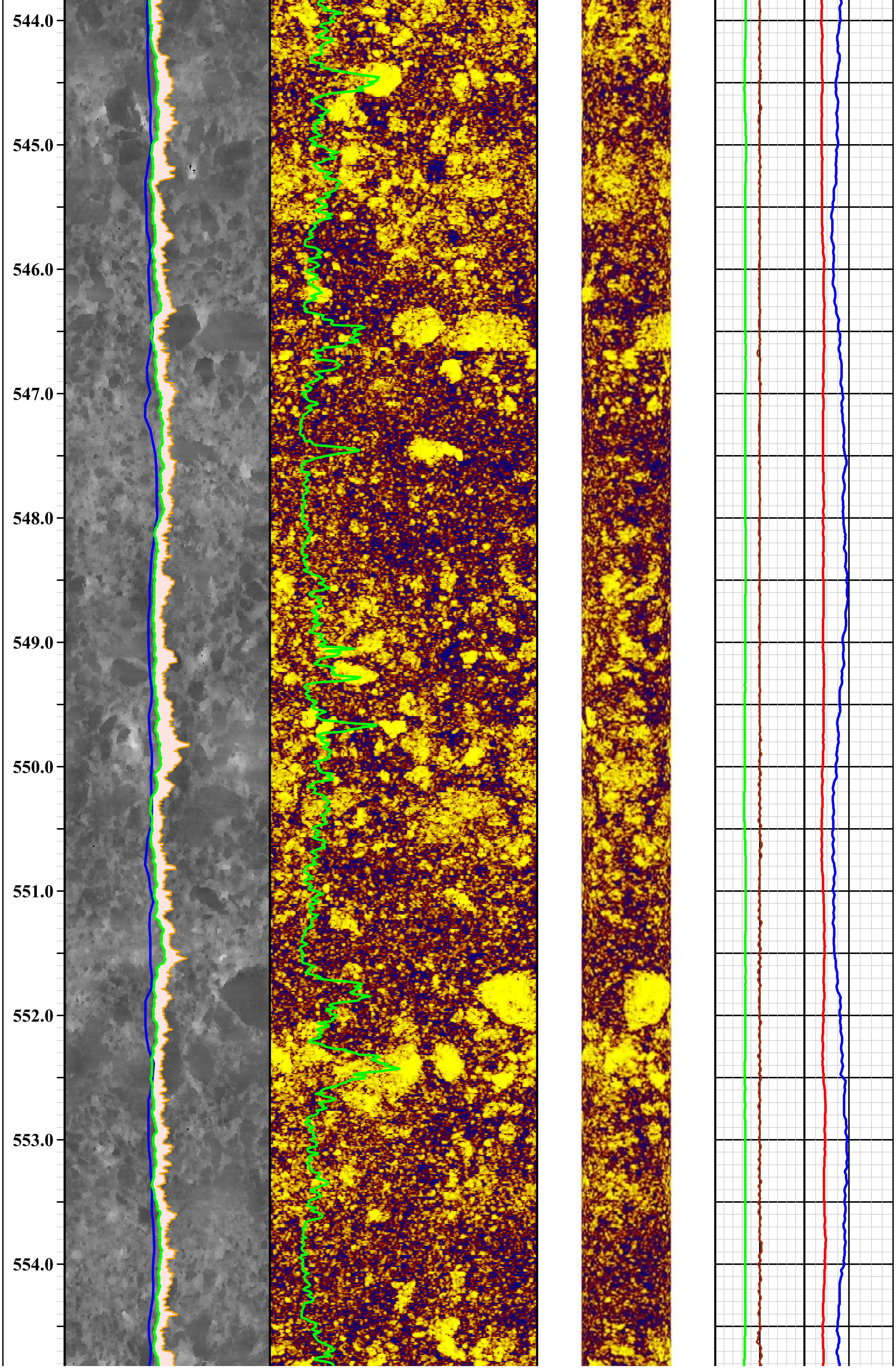

489.0
490.0
491.0
492.0
493.0
494.0
495.0
496.0
497.0
498.0
499.0

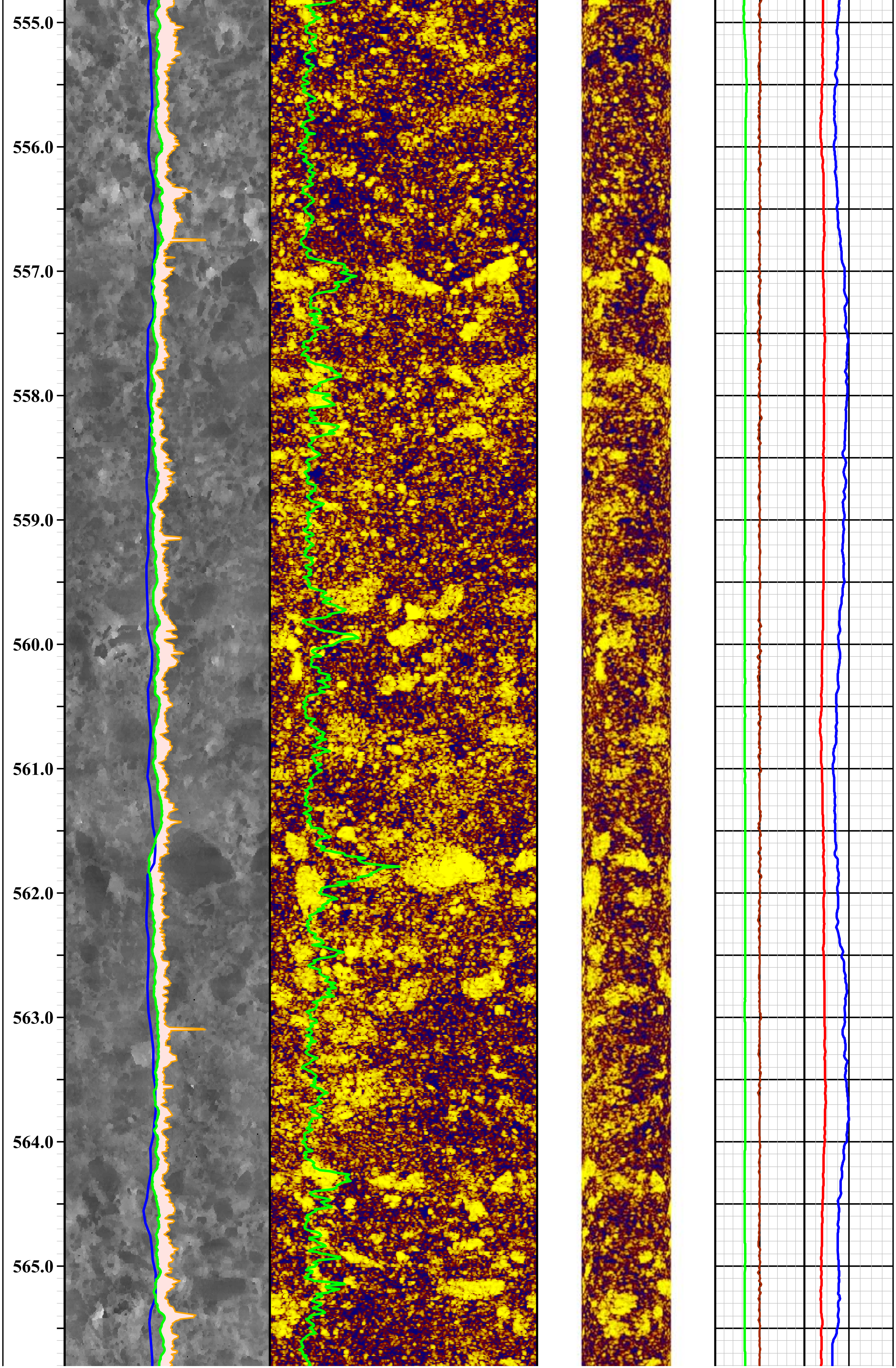

500.0
501.0
502.0
503.0
504.0
505.0
506.0
507.0
508.0
509.0
510.0

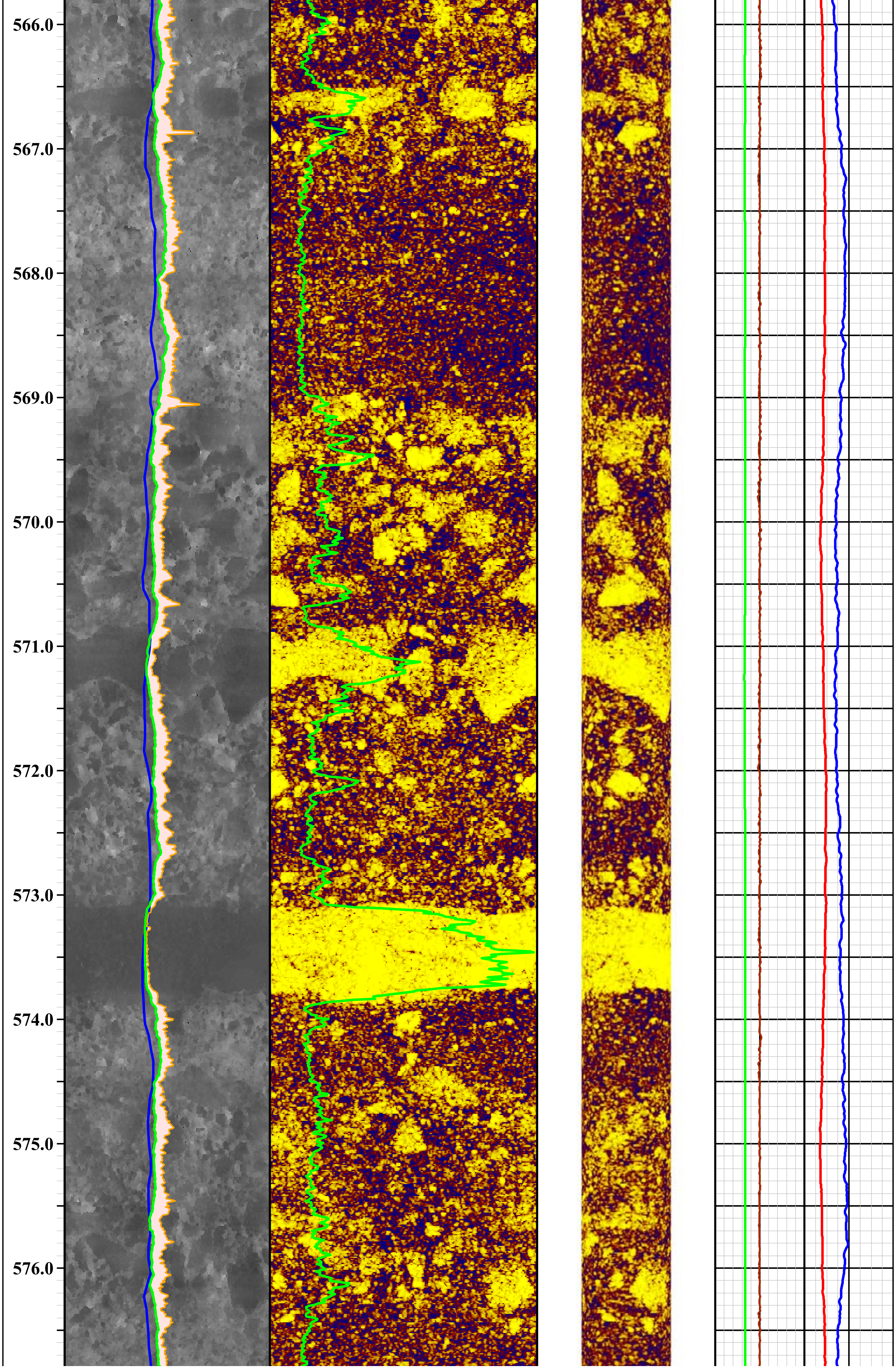

511.0
512.0
513.0
514.0
515.0
516.0
517.0
518.0
519.0
520.0
521.0

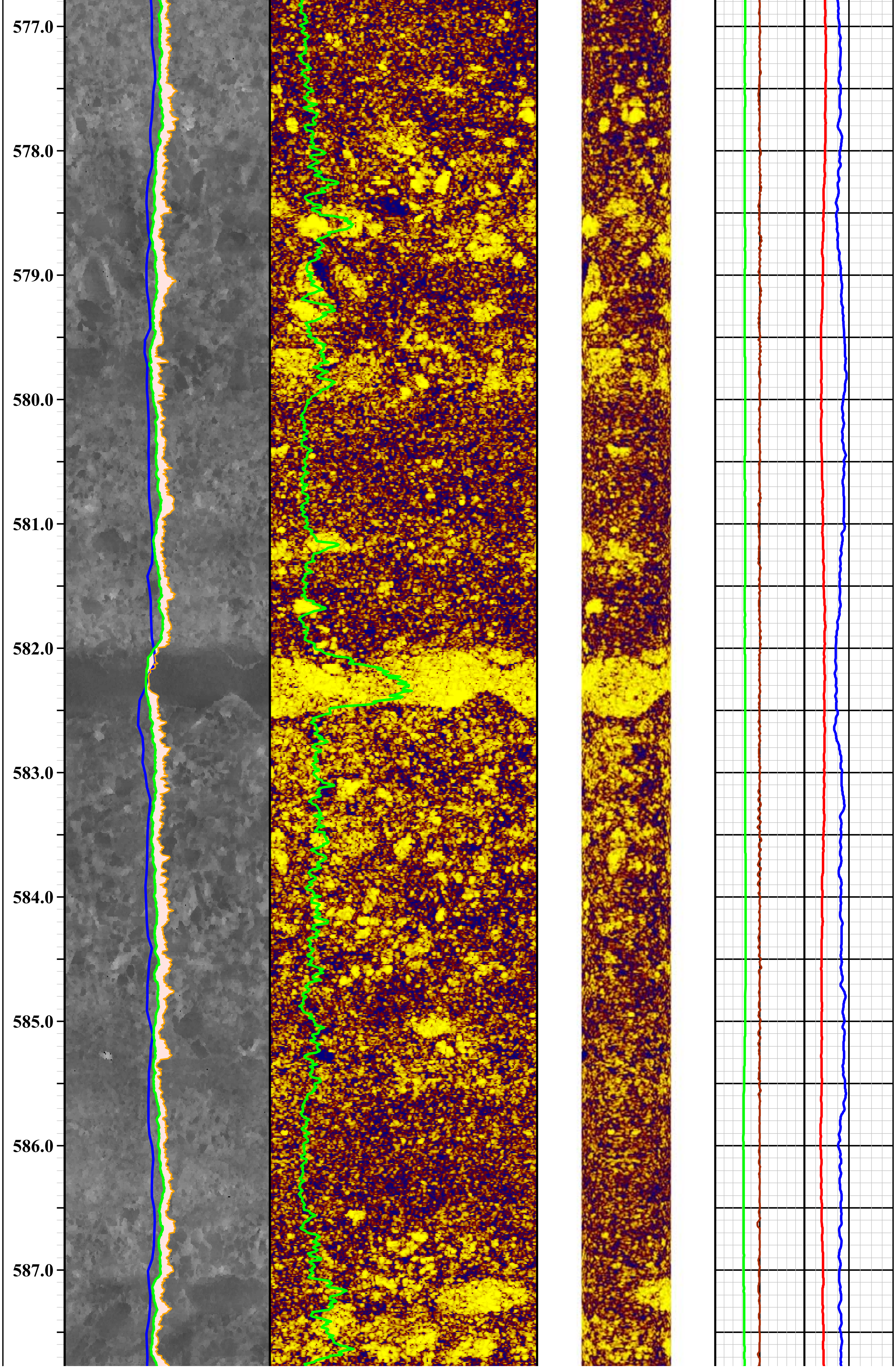

522.0
523.0
524.0
525.0
526.0
527.0
528.0
529.0
530.0
531.0
532.0

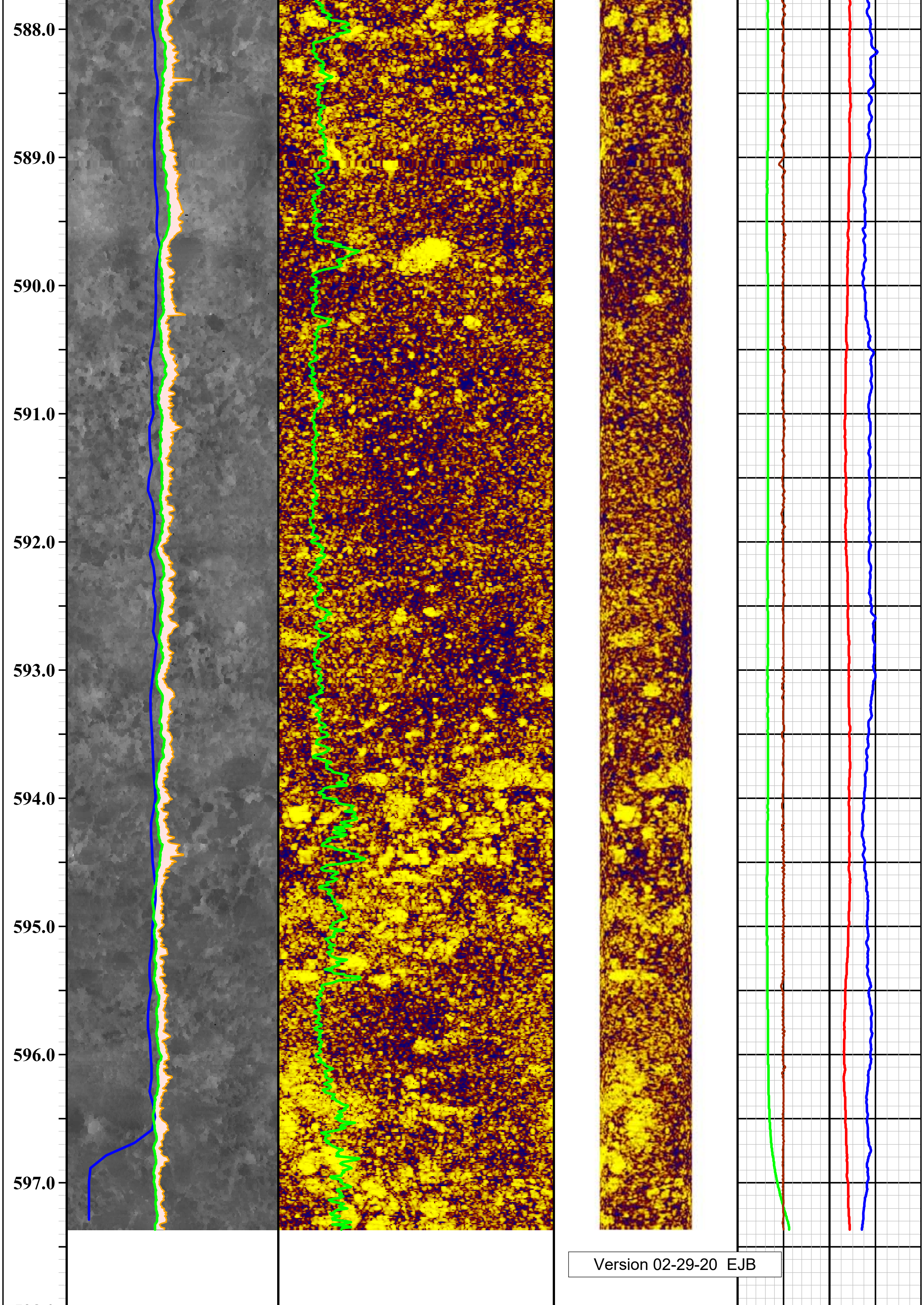

533.0
534.0
535.0
536.0
537.0
538.0
539.0
540.0
541.0
542.0
543.0


544.0
545.0
546.0
547.0
548.0
549.0
550.0
551.0
552.0
553.0
554.0


555.0
556.0
557.0
558.0
559.0
560.0
561.0
562.0
563.0
564.0
565.0


566.0
567.0
568.0
569.0
570.0
571.0
572.0
573.0
574.0
575.0
576.0


577.0
578.0
579.0
580.0
581.0
582.0
583.0
584.0
585.0
586.0
587.0



Enlargements

5 Inches 12

Ave-Acoustic Caliper

0 2200

	5 Inches 12 Max-Acoustic Caliper 5 Inches 12 3-Arm Caliper 0° 90° 180° 270° 0° Oriented Mag North Centralized TT	ARI 0° 90° 180° 270° 0° Oriented Mag North Amplitude-Static 0° 90° 180° 270° 0° Oriented Mag North Amplitude-NM	-0° 3-D View	0.8 g 1.2 Gravity 40 uT 60 Mag Field	0 360 Azimuth 0 Deg 8 Tilt
1in:1ft Depth	Skunk Camp RC20-2A ABI40 2G Summary ~131.7' - ~597.4'				

QL ABI-40 2G Acoustic Borehole Imager

Probe Top = Depth Ref.

Tool SN: 143003, 143009 & 192302

Four Conductor MSI Probe Top

APS Probe Orientation Sensor
3-Axis Magnetometer
3-Axis Accellerometer

Probe Length = 1.62 m or 5.25 ft

Probe Weight = 6.7 kg or 14.7 lbs

Distance from Acoustic Image Window to Orientation Sensor = 0.92 m or 3 ft

Inclination Accuracy = +/- 0.5 deg
Azimuth Accuracy = +/- 1.2 deg

Beam Width = 1.5 mm

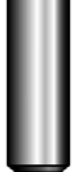
Frequency = 1.2 MHz

Temperature Range: 0 - 70 Deg C (32 - 158 Deg F)
Pressure Range: 0 - 200 bar (0 - 2900 psi)

Run Centralized with External Bow Spring Centralizers

Can only be logged in fluid filled holes

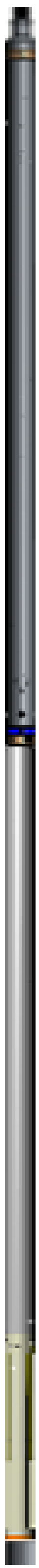
ABI Imaging Window



1.6" or 40 mm Diameter

MSI Gamma-Caliper-Temperature-Fluid Resistivity SN 4953

Probe Top = Depth Ref.



Single Conductor MSI Probe Top

Probe Length = 2.59 m or 8.5 ft
Probe Weight = 6.80 kg or 15.0 lbs

Natural Gamma and Caliper can only be collected logging up hole.

Fluid Temperature/Resistivity can only be collected logging down hole.

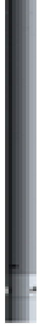
Temperature Rating: 70 Deg C (158 Deg F)
Presure Rating: 200 bar (2900 psi)

Natural Gamma Ray = 0.76 m (29.75 in)

3-Arm Caliper = 1.44 m (56.75 in)

Distance from tool top: 2.20 m (86.5 in)

Available Arm Sizes: 3", 9", and 15"



TFR (Temperature/Fluid Resistivity) = 0.39 m (15.5 in)

1.375" or 34.9 mm Diameter

Southwest Exploration Services, LLC borehole geophysics & video services	Company	RESOLUTION COPPER MINING
	Well	RC20-2A
	Field	SKUNK CAMP
	County	GILA
	State	ARIZONA

Final Acoustic Televiewer Summary

Southwest Exploration Services, LLC
borehole geophysics & video services

COMPANY	RESOLUTION COPPER MINING		
WELL ID	RC20-2A		
FIELD	SKUNK CAMP		
COUNTY	GILA	STATE	ARIZONA

TYPE OF LOGS: 4 RX SONIC
MORE: GAMMA - CALIPER

LOCATION

SEC TWP RGE

OTHER SERVICES
OPTICAL TELEVIEWER
ACOUSTIC TELEVIEWER
TEMP / FLUID RES
E-LOG

PERMANENT DATUM		ELEVATION	K.B.
LOG MEAS. FROM	GROUND LEVEL	ABOVE PERM. DATUM	D.F.
DRILLING MEAS. FROM	GROUND LEVEL		G.L.

DATE	02-29-20	TYPE FLUID IN HOLE	FORMATION WATER
RUN No	3	MUD WEIGHT	N/A
TYPE LOG	SONIC-GAMMA-CALIPER	VISCOSITY	N/A
DEPTH-DRILLER	602.0 FT	LEVEL	~134 FT
DEPTH-LOGGER	599.9 FT	MAX. REC. TEMP.	21.8 Deg C
BTM LOGGED INTERVAL	599.9 FT	IMAGE ORIENTED TO:	N/A
TOP LOGGED INTERVAL	120.0 FT	SAMPLE INTERVAL	0.25 FT
DRILLER / RIG#	NATIONAL DRILLING	LOGGING TRUCK	TRUCK #310
RECORDED BY / Logging Eng.	E. BEAM / D. ALP	TOOL STRING/SN	ALT 4 RX SONIC SN 4572
WITNESSED BY	NATIONAL DRILLING	LOG TIME:ON SITE/OFF SITE	5:30 AM

RUN	BOREHOLE RECORD			CASING RECORD			
NO.	BIT	FROM	TO	SIZE	WGT.	FROM	TO
1	? IN	SURFACE	70 FT	8.62 IN	STEEL	SURFACE	70 FT
2	7 3/4 IN	70 FT	480 FT				
3	7 1/4 IN TRI	480 FT	TOTAL DEPTH				

COMMENTS:

.

Tool Summary:

Date	02-29-20	**Date**	02-29-20	**Date**	02-29-20
Run No.	1	**Run No.**	2	**Run No.**	3
Tool Model	MSI COMBO TOOL	**Tool Model**	ALT QL E-LOG	**Tool Model**	ALT 4 RX SONIC
Tool SN	4953	**Tool SN**	6380	**Tool SN**	4572
From	SURFACE	**From**	SURFACE	**From**	120.0 FT
To	599.7 FT	**To**	599.0 FT	**To**	599.6 FT
Recorded By	D. ALP	**Recorded By**	D. ALP	**Recorded By**	D. ALP
Truck No	310	**Truck No**	310	**Truck No**	310
Operation Check	02-23-20	**Operation Check**	02-20-20	**Operation Check**	02-20-20
Calibration Check	02-21-20	**Calibration Check**	02-20-20	**Calibration Check**	N/A
Time Logged	6:15 AM	**Time Logged**	7:10 AM	**Time Logged**	7:45 AM

Date	02-23-20	**Date**	02-23-20	**Date**	
Run No.	4	**Run No.**	5	**Run No.**	6
Tool Model	ALT QL OBI40 2G	**Tool Model**	ALT QL ABI40 2G	**Tool Model**	
Tool SN	152511	**Tool SN**	192302	**Tool SN**	
From	60.0 FT	**From**	130.0 FT	**From**	
To	599.0 FT	**To**	599.0 FT	**To**	
Recorded By	D. ALP	**Recorded By**	D. ALP	**Recorded By**	
Truck No	310	**Truck No**	310	**Truck No**	
Operation Check	02-20-20	**Operation Check**	02-20-20	**Operation Check**	
Calibration Check	N/A	**Calibration Check**	N/A	**Calibration Check**	
Time Logged	8:45 AM	**Time Logged**	7:00 PM	**Time Logged**	

Additional Comments:

Caliper Arms Used: 9" **Calibration Points:** 6" & 12"

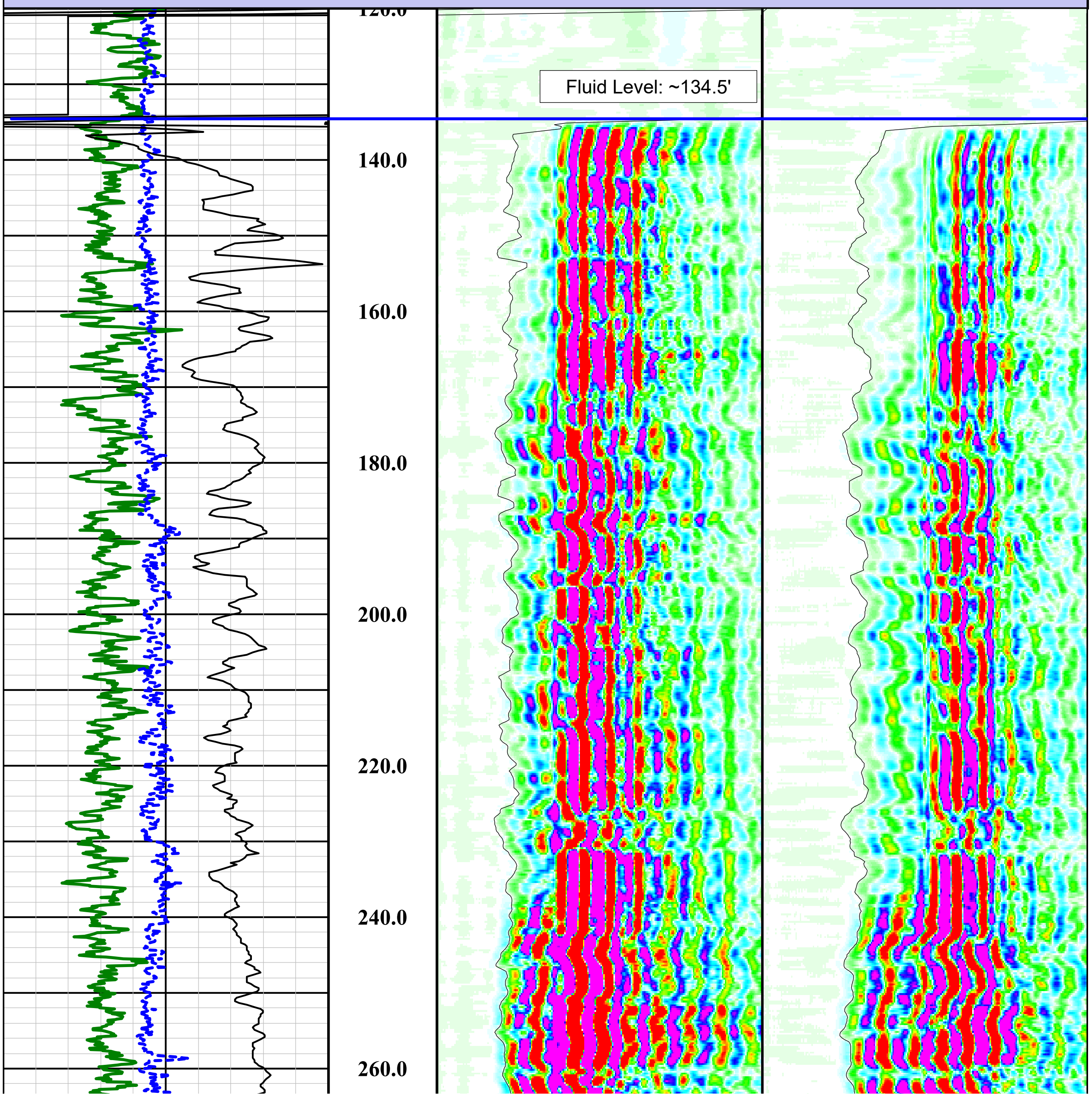
E-Log Calibration Range: 1 - 10,000 OHM-M **Calibration Points:** 1 & 10,000 OHM-M

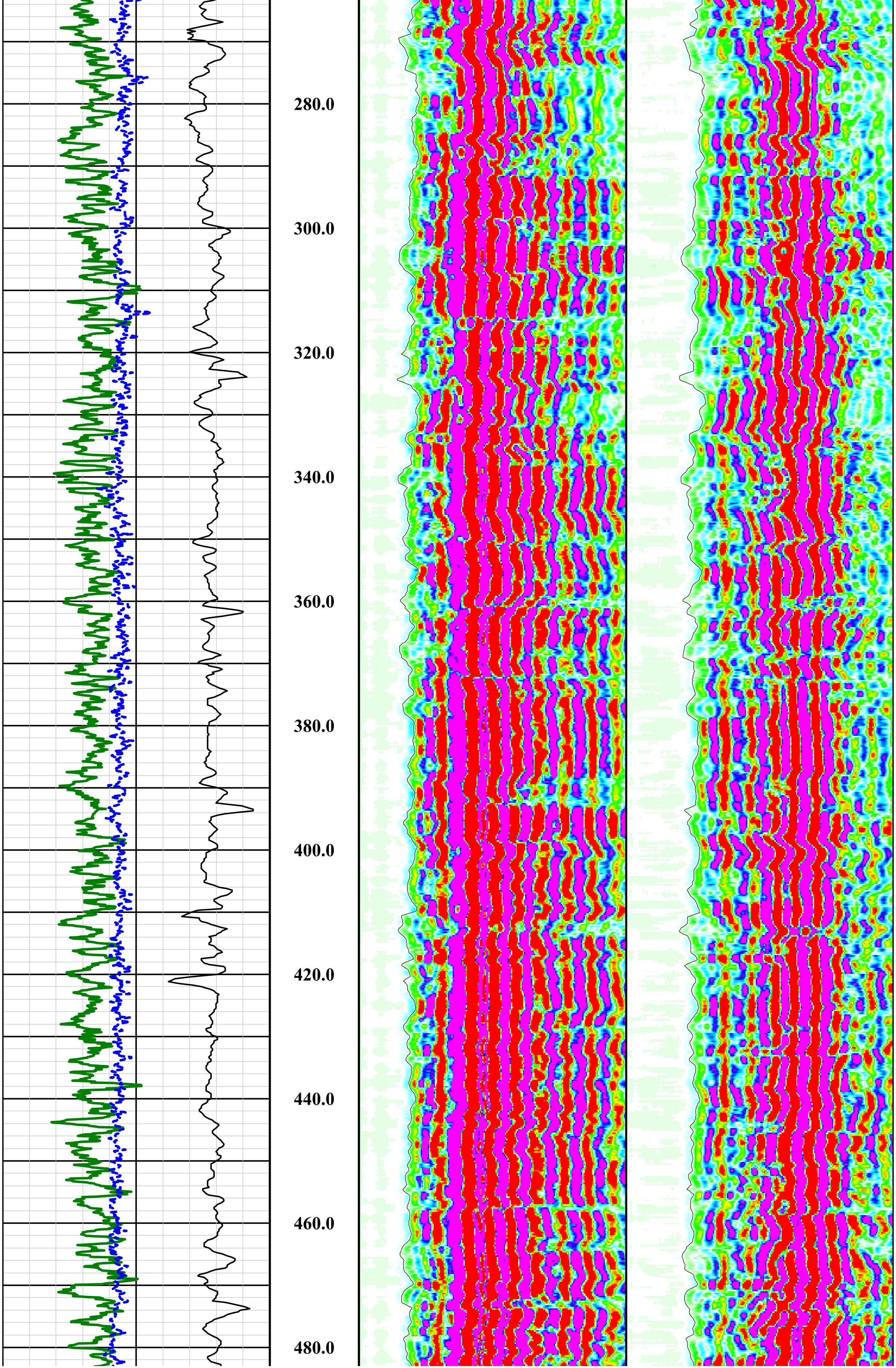
Disclaimer:

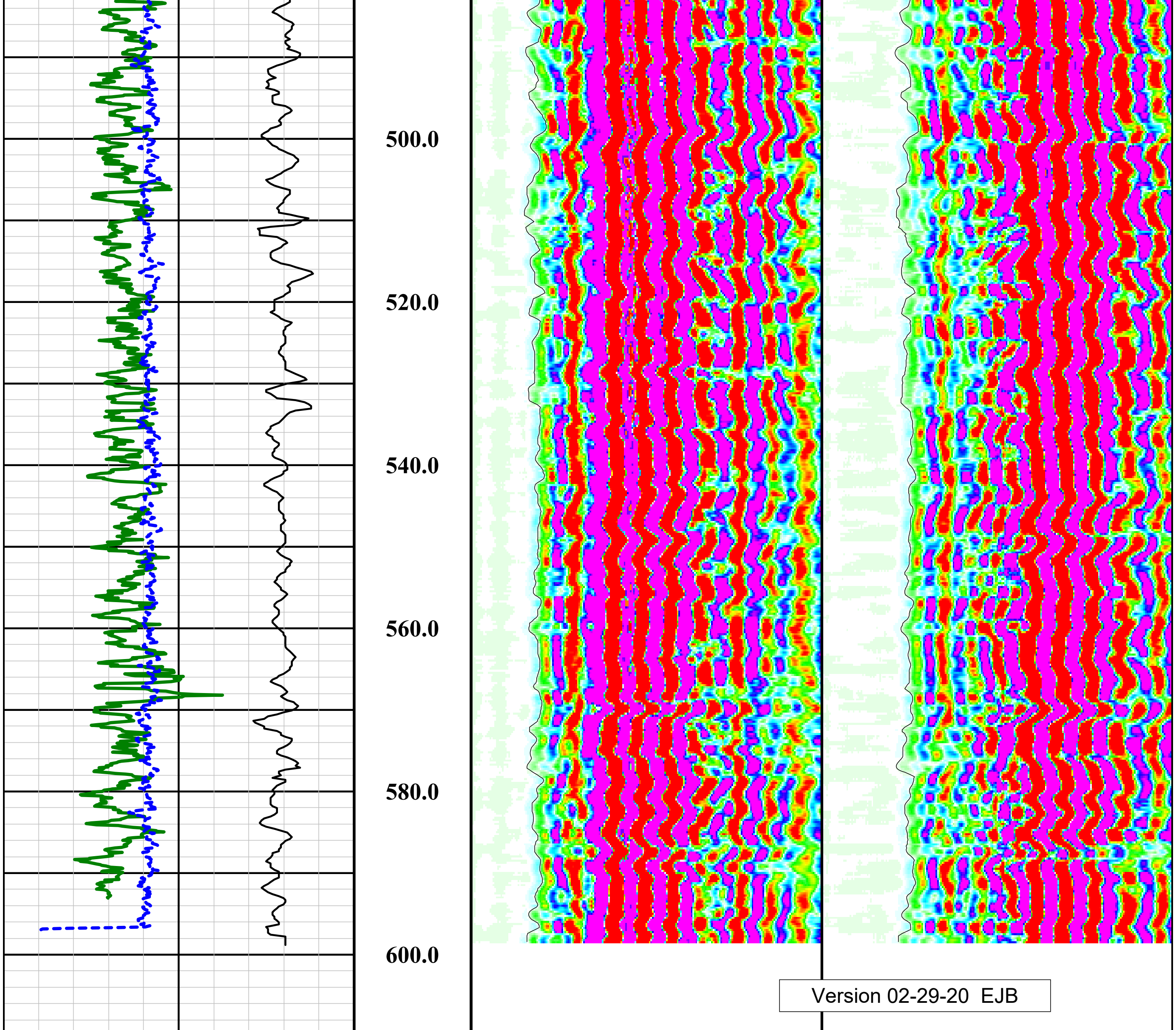
All interpretations of log data are opinions based on inferences from electrical or other measurements. We do not guarantee the accuracy or correctness of any interpretations or recommendations and shall not be liable or responsible for any loss, costs, damages, or expenses incurred or sustained by anyone resulting from any interpretation made by any of our employees or agents. These interpretations are also subject to our general terms and conditions set out in our current Service Invoice.

Nat. Gamma 0 API 200	Depth 1in:20ft	RX1 - VDL 100 uSec 1000	RX2 - VDL 100 uSec 1000
3-Arm Caliper 5 Inches 12		RX1 - Travel Time 100 uSec 1000	RX2 - Travel Time 100 uSec 1000
Delta T 240 uSec/ft 40			

Skunk Camp RC20-2A 4 RX Sonic Summary ~134.5' - ~598.4'




280.0
300.0
320.0
340.0
360.0
380.0
400.0
420.0
440.0
460.0
480.0



Skunk Camp RC20-2A 4 RX Sonic Summary ~134.5' - ~598.4'

240 uSec/ft 40	Delta T
5 Inches 12	3-Arm Caliper
0 API 200	Nat. Gamma
1in:20ft	Depth
100 uSec 1000	RX1 - Travel Time
100 uSec 1000	RX1 - VDL
100 uSec 1000	RX2 - Travel Time
100 uSec 1000	RX2 - VDL

FWS50 4 RX Full Waveform Sonic Tool SN 4572

Probe Top = Depth Ref.

Probe Length = 2.78 m or 9.13 ft

Probe Weight = ~18.0 kg or 39.6 lbs

Sensors: Ceramic Piezoelectric in Polyurethane potting

Transmitter Frequency: ~20 kHz resonant frequency

Rx - Rx Spacing: 0.2 m (7.9 in)

Typically ran centralized with external bow spring centralizers.

Can only be collected in fluid.

Temperature Rating: 70 Deg C (158 Deg F)
Presure Rating: 200 bar (2900 psi)

Rx-4 Tx - Rx4 Spacing = 1.2 m (47.2 in)

Rx-3 Tx - Rx3 Spacing = 1.0 m (39.4 in)

Rx-2 Tx - Rx2 Spacing = 0.8 m (31.5 in)

Rx-1 Tx - Rx1 Spacing = 0.6 m (23.6 in)

Acoustic Isolater

Tx = Acoustic Transmitter

0.235 m or 9.25 in. - End of tool to center of Tx

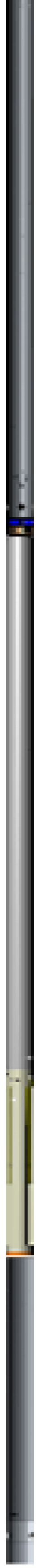
1.97" or 50 mm Diameter

MSI Gamma-Caliper-Temperature-Fluid Resistivity SN 4953

Probe Top = Depth Ref.

Single Conductor MSI Probe Top

Probe Length = 2.59 m or 8.5 ft
Probe Weight = 6.80 kg or 15.0 lbs



Probe Weight = 6.80 kg or 15.0 lbs

Natural Gamma and Caliper can only be collected logging up hole.

Fluid Temperature/Resistivity can only be collected logging down hole.

Temperature Rating: 70 Deg C (158 Deg F)
Presure Rating: 200 bar (2900 psi)

Natural Gamma Ray = 0.76 m (29.75 in)

3-Arm Caliper = 1.44 m (56.75 in)

Distance from tool top: 2.20 m (86.5 in)

Available Arm Sizes: 3", 9", and 15"

TFR (Temperature/Fluid Resistivity) = 0.39 m (15.5 in)

1.375" or 34.9 mm Diameter

Southwest Exploration Services, LLC
borehole geophysics & video services

Company	RESOLUTION COPPER MINING
Well	RC20-2A
Field	SKUNK CAMP
County	GILA
State	ARIZONA

Final	**4 RX Full Waveform Sonic Summary**

Southwest Exploration Services, LLC
borehole geophysics & video services

COMPANY	RESOLUTION COPPER MINING
WELL ID	RC20-2A
FIELD	SKUNK CAMP
COUNTY	GILA
STATE	ARIZONA

TYPE OF LOGS: GAMMA - CALIPER
MORE: TEMP / FLUID RES.

OTHER SERVICES
OPTICAL TELEVIEWER
ACOUSTIC TELEVIEWER
SONIC
E-LOG

LOCATION

SEC TWP RGE

PERMANENT DATUM		ELEVATION	K.B.
LOG MEAS. FROM	GROUND LEVEL	ABOVE PERM. DATUM	D.F.
DRILLING MEAS. FROM	GROUND LEVEL		G.L.

DATE	02-29-20	TYPE FLUID IN HOLE	FORMATION WATER
RUN No	1	MUD WEIGHT	N/A
TYPE LOG	GAMMA-CALIPER-TFR	VISCOSITY	N/A
DEPTH-DRILLER	602.0 FT	LEVEL	~134 FT
DEPTH-LOGGER	599.9 FT	MAX. REC. TEMP.	21.8 Deg C
BTM LOGGED INTERVAL	599.9 FT	IMAGE ORIENTED TO:	N/A
TOP LOGGED INTERVAL	SURFACE	SAMPLE INTERVAL	0.1 FT
DRILLER / RIG#	NATIONAL DRILLING	LOGGING TRUCK	TRUCK #310
RECORDED BY / Logging Eng.	E. BEAM / D. ALP	TOOL STRING/SN	MSI COMBO TOOL SN 4953
WITNESSED BY	NATIONAL DRILLING	LOG TIME:ON SITE/OFF SITE	5:30 AM

RUN	BOREHOLE RECORD			CASING RECORD			
NO.	BIT	FROM	TO	SIZE	WGT.	FROM	TO
1	? IN	SURFACE	70 FT	8.62 IN	STEEL	SURFACE	70 FT
2	7 3/4 IN	70 FT	480 FT				
3	7 1/4 IN TRI	480 FT	TOTAL DEPTH				

COMMENTS:

Tool Summary:

Date	02-29-20	**Date**	02-29-20	**Date**	02-29-20
Run No.	1	**Run No.**	2	**Run No.**	3
Tool Model	MSI COMBO TOOL	**Tool Model**	ALT QL E-LOG	**Tool Model**	ALT 4 RX SONIC
Tool SN	4953	**Tool SN**	6380	**Tool SN**	4572
From	SURFACE	**From**	SURFACE	**From**	120.0 FT
To	599.7 FT	**To**	599.0 FT	**To**	599.6 FT
Recorded By	D. ALP	**Recorded By**	D. ALP	**Recorded By**	D. ALP
Truck No	310	**Truck No**	310	**Truck No**	310
Operation Check	02-23-20	**Operation Check**	02-20-20	**Operation Check**	02-20-20
Calibration Check	02-21-20	**Calibration Check**	02-20-20	**Calibration Check**	N/A
Time Logged	6:15 AM	**Time Logged**	7:10 AM	**Time Logged**	7:45 AM

Date	02-23-20	**Date**	02-23-20	**Date**	
Run No.	4	**Run No.**	5	**Run No.**	6
Tool Model	ALT QL OBI40 2G	**Tool Model**	ALT QL ABI40 2G	**Tool Model**	
Tool SN	152511	**Tool SN**	192302	**Tool SN**	
From	60.0 FT	**From**	130.0 FT	**From**	
To	599.0 FT	**To**	599.0 FT	**To**	
Recorded By	D. ALP	**Recorded By**	D. ALP	**Recorded By**	
Truck No	310	**Truck No**	310	**Truck No**	
Operation Check	02-20-20	**Operation Check**	02-20-20	**Operation Check**	
Calibration Check	N/A	**Calibration Check**	N/A	**Calibration Check**	
Time Logged	8:45 AM	**Time Logged**	7:00 PM	**Time Logged**	

Additional Comments:

Caliper Arms Used: 9" **Calibration Points:** 6" & 12"

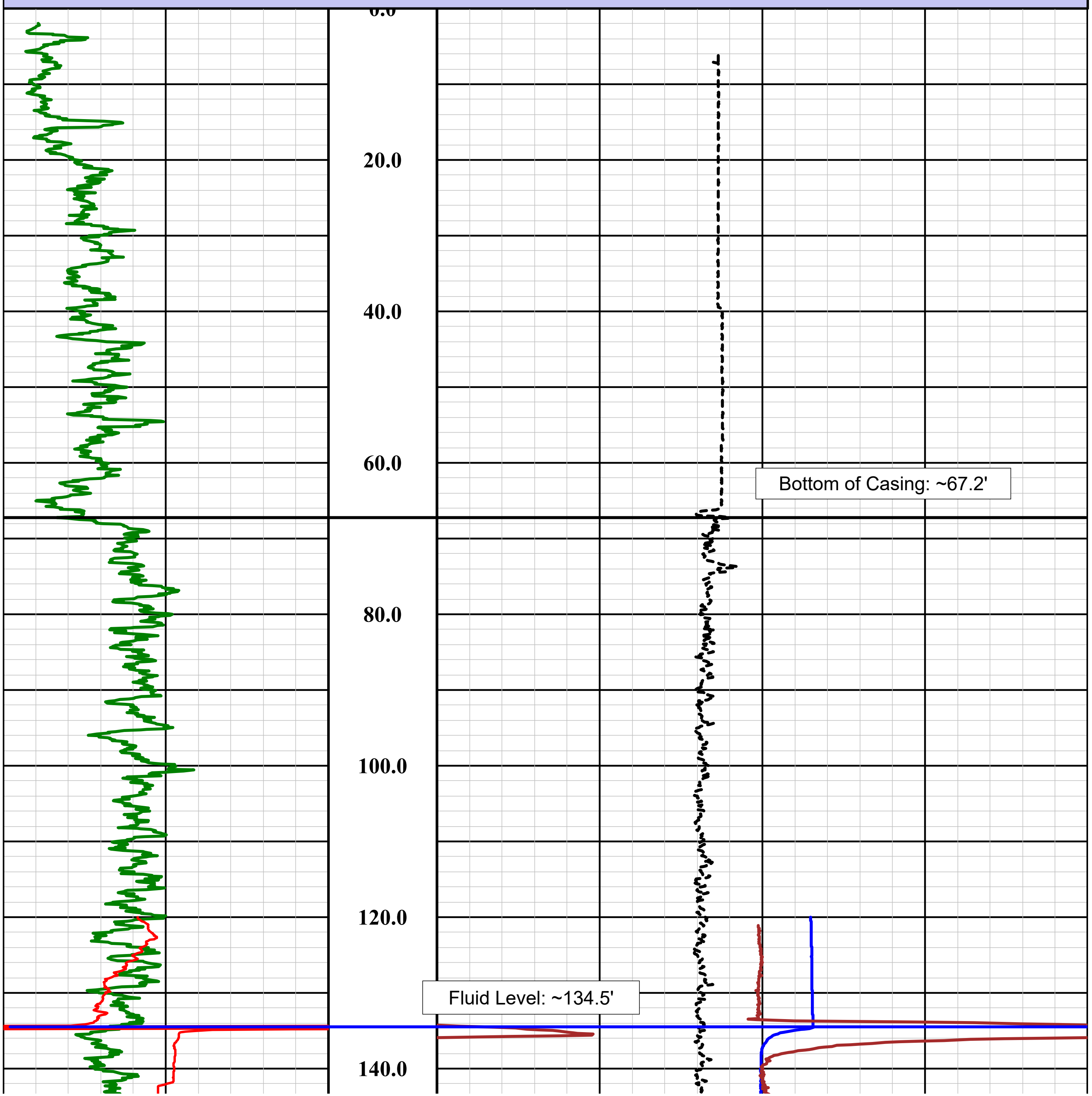
E-Log Calibration Range: 1 - 10,000 OHM-M **Calibration Points:** 1 & 10,000 OHM-M

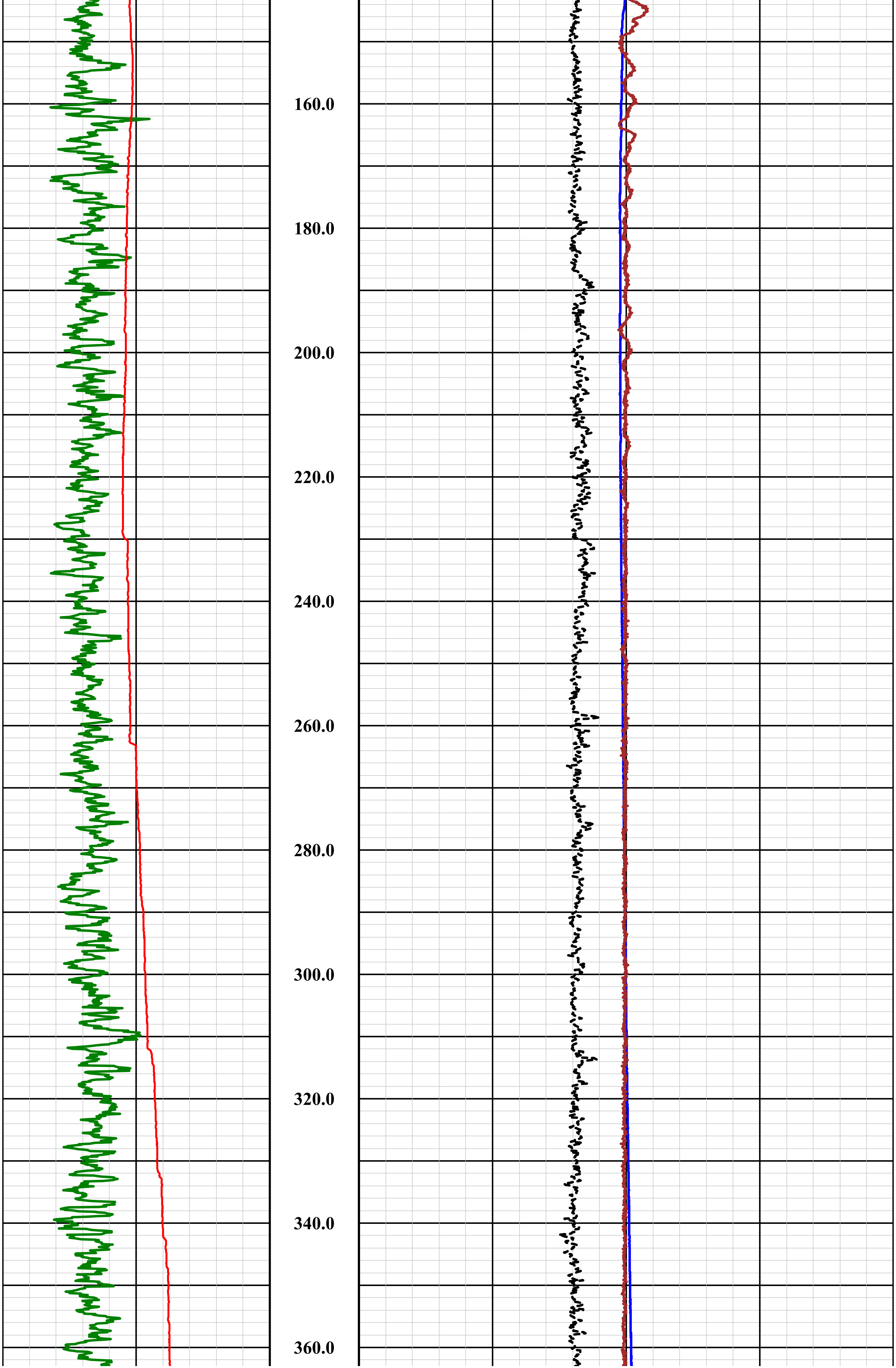
Disclaimer:

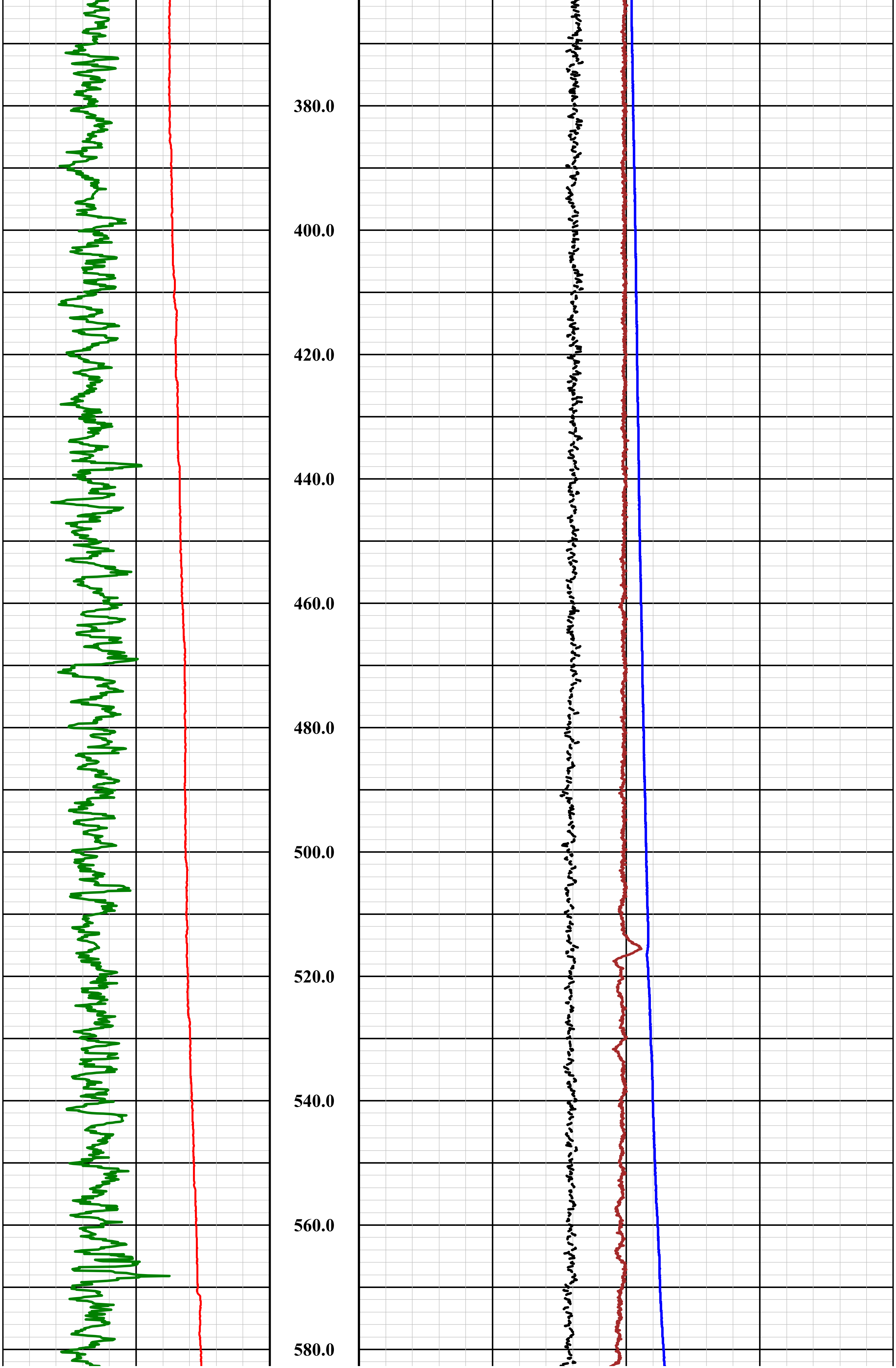
All interpretations of log data are opinions based on inferences from electrical or other measurements. We do not guarantee the accuracy or correctness of any interpretations or recommendations and shall not be liable or responsible for any loss, costs, damages, or expenses incurred or sustained by anyone resulting from any interpretation made by any of our employees or agents. These interpretations are also subject to our general terms and conditions set out in our current Service Invoice.

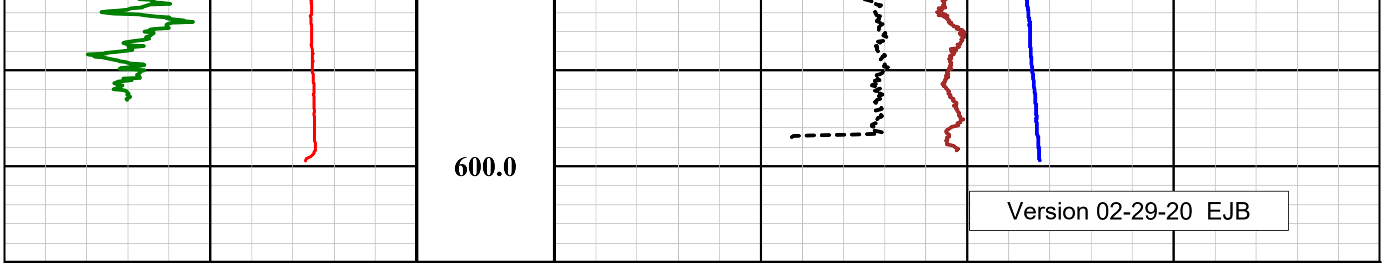
Nat. Gamma 0 API 200	Depth 1in:20ft	3-Arm Caliper 0 Inches 20
Fluid Resistivity 10 Ohm-m 30		Temperature 10 Deg C 30
		2-Ft Diff. Temp. -1 Deg C 1

Skunk Camp RC20-2A GCT Summary Surface - ~599.5'




160.0
180.0
200.0
220.0
240.0
260.0
280.0
300.0
320.0
340.0
360.0


380.0
400.0
420.0
440.0
460.0
480.0
500.0
520.0
540.0
560.0
580.0

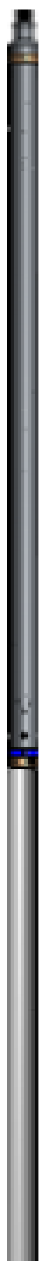


Skunk Camp RC20-2A GCT Summary Surface - ~599.5'

2-Ft Diff. Temp.	-1	Deg C	1
Fluid Resistivity	10	Ohm-m	30
Temperature	10	Deg C	30
Nat. Gamma	0	API	200
Depth		1in:20ft	
3-Arm Caliper	0	Inches	20

MSI Gamma-Caliper-Temperature-Fluid Resistivity SN 4953

Probe Top = Depth Ref.



Single Conductor MSI Probe Top

Probe Length = 2.59 m or 8.5 ft
Probe Weight = 6.80 kg or 15.0 lbs

Natural Gamma and Caliper can only be collected logging up hole.

Fluid Temperature/Resistivity can only be collected logging down hole.

Temperature Rating: 70 Deg C (158 Deg F)
Presure Rating: 200 bar (2900 psi)

Natural Gamma Ray = 0.76 m (29.75 in)

3-Arm Caliper = 1.44 m (56.75 in)

Distance from tool top: 2.20 m (86.5 in)

Available Arm Sizes: 3", 9", and 15"

TFR (Temperature/Fluid Resistivity) = 0.39 m (15.5 in)

1.375" or 34.9 mm Diameter

Southwest Exploration Services, LLC borehole geophysics & video services	Company	RESOLUTION COPPER MINING
	Well	RC20-2A
	Field	SKUNK CAMP
	County	GILA
	State	ARIZONA

Final **GCT Summary**

Southwest Exploration Services, LLC

borehole geophysics & video services

COMPANY	RESOLUTION COPPER MINING		
WELL ID	RC20-2A		
FIELD	SKUNK CAMP		
COUNTY	GILA	STATE	ARIZONA

TYPE OF LOGS: E-LOG - GAMMA

MORE: TEMP / FLUID RES.

OTHER SERVICES: OPTICAL TELEVIEWER, ACOUSTIC TELEVIEWER, SONIC, CALIPER, TEMP / FLUID RES

LOCATION

SEC TWP RGE

PERMANENT DATUM		ELEVATION	K.B.
LOG MEAS. FROM	GROUND LEVEL	ABOVE PERM. DATUM	D.F.
DRILLING MEAS. FROM	GROUND LEVEL		G.L.
DATE	02-29-20	TYPE FLUID IN HOLE	FORMATION WATER
RUN No	2	MUD WEIGHT	N/A
TYPE LOG	E-LOG - GAMMA	VISCOSITY	N/A
DEPTH-DRILLER	602.0 FT	LEVEL	~134 FT
DEPTH-LOGGER	599.9 FT	MAX. REC. TEMP.	21.8 Deg C
BTM LOGGED INTERVAL	599.9 FT	IMAGE ORIENTED TO:	N/A
TOP LOGGED INTERVAL	SURFACE	SAMPLE INTERVAL	0.2 FT
DRILLER / RIG#	NATIONAL DRILLING	LOGGING TRUCK	TRUCK #310
RECORDED BY / Logging Eng.	E. BEAM / D. ALP	TOOL STRING/SN	ALT QL E-LOG SN 6380
WITNESSED BY	NATIONAL DRILLING	LOG TIME:ON SITE/OFF SITE	5:30 AM

RUN	BOREHOLE RECORD			CASING RECORD			
NO.	BIT	FROM	TO	SIZE	WGT.	FROM	TO
1	? IN	SURFACE	70 FT	8.62 IN	STEEL	SURFACE	70 FT
2	7 3/4 IN	70 FT	480 FT				
3	7 1/4 IN TRI	480 FT	TOTAL DEPTH				

COMMENTS:

Tool Summary:

Date	02-29-20	**Date**	02-29-20	**Date**	02-29-20
Run No.	1	**Run No.**	2	**Run No.**	3
Tool Model	MSI COMBO TOOL	**Tool Model**	ALT QL E-LOG	**Tool Model**	ALT 4 RX SONIC
Tool SN	4953	**Tool SN**	6380	**Tool SN**	4572
From	SURFACE	**From**	SURFACE	**From**	120.0 FT
To	599.7 FT	**To**	599.0 FT	**To**	599.6 FT
Recorded By	D. ALP	**Recorded By**	D. ALP	**Recorded By**	D. ALP
Truck No	310	**Truck No**	310	**Truck No**	310
Operation Check	02-23-20	**Operation Check**	02-20-20	**Operation Check**	02-20-20
Calibration Check	02-21-20	**Calibration Check**	02-20-20	**Calibration Check**	N/A
Time Logged	6:15 AM	**Time Logged**	7:10 AM	**Time Logged**	7:45 AM

Date	02-23-20	**Date**	02-23-20	**Date**	
Run No.	4	**Run No.**	5	**Run No.**	6
Tool Model	ALT QL OBI40 2G	**Tool Model**	ALT QL ABI40 2G	**Tool Model**	
Tool SN	152511	**Tool SN**	192302	**Tool SN**	
From	60.0 FT	**From**	130.0 FT	**From**	
To	599.0 FT	**To**	599.0 FT	**To**	
Recorded By	D. ALP	**Recorded By**	D. ALP	**Recorded By**	
Truck No	310	**Truck No**	310	**Truck No**	
Operation Check	02-20-20	**Operation Check**	02-20-20	**Operation Check**	
Calibration Check	N/A	**Calibration Check**	N/A	**Calibration Check**	
Time Logged	8:45 AM	**Time Logged**	7:00 PM	**Time Logged**	

Additional Comments:

Caliper Arms Used: 9" **Calibration Points:** 6" & 12"

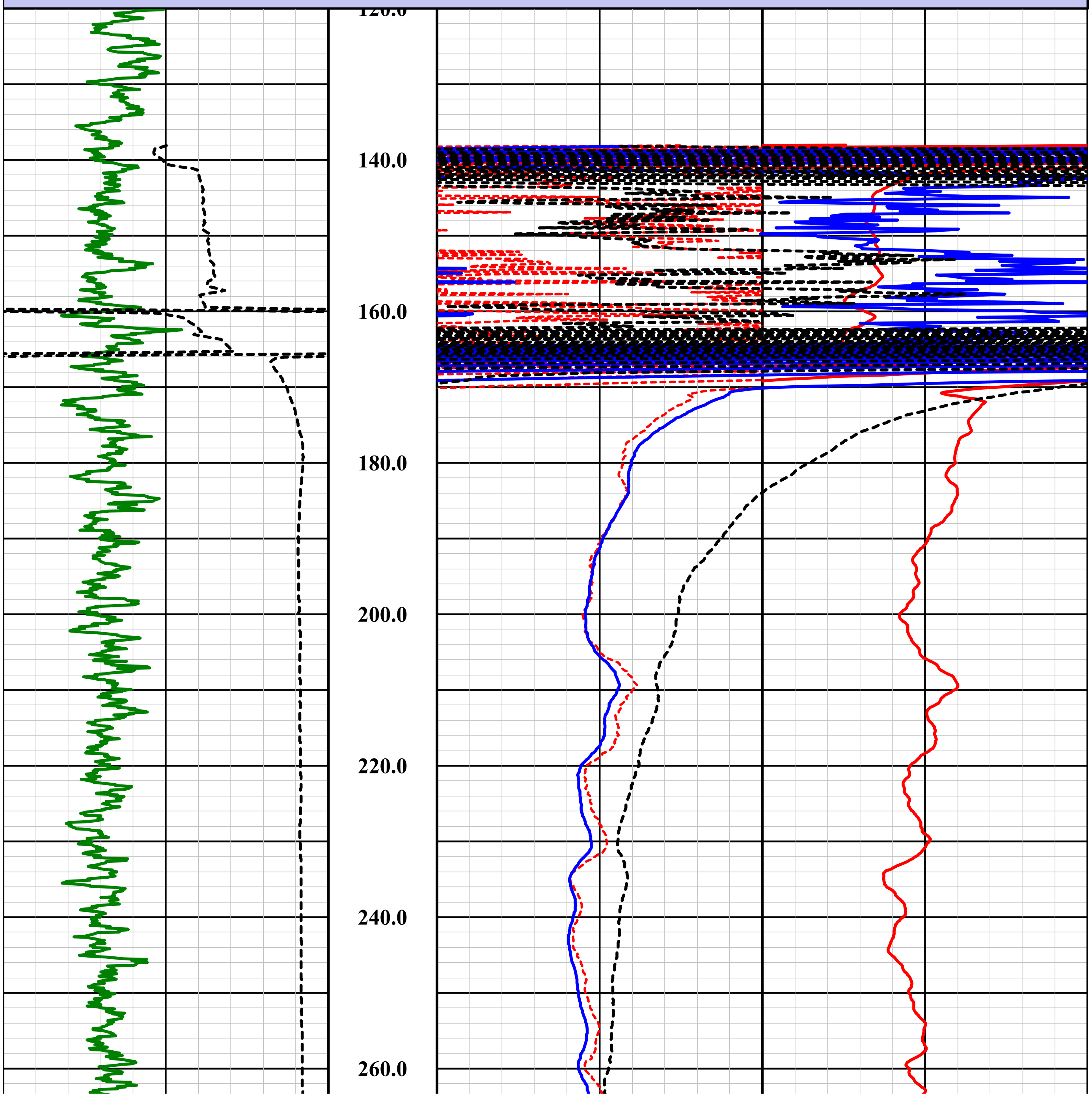
E-Log Calibration Range: 1 - 10,000 OHM-M **Calibration Points:** 1 & 10,000 OHM-M

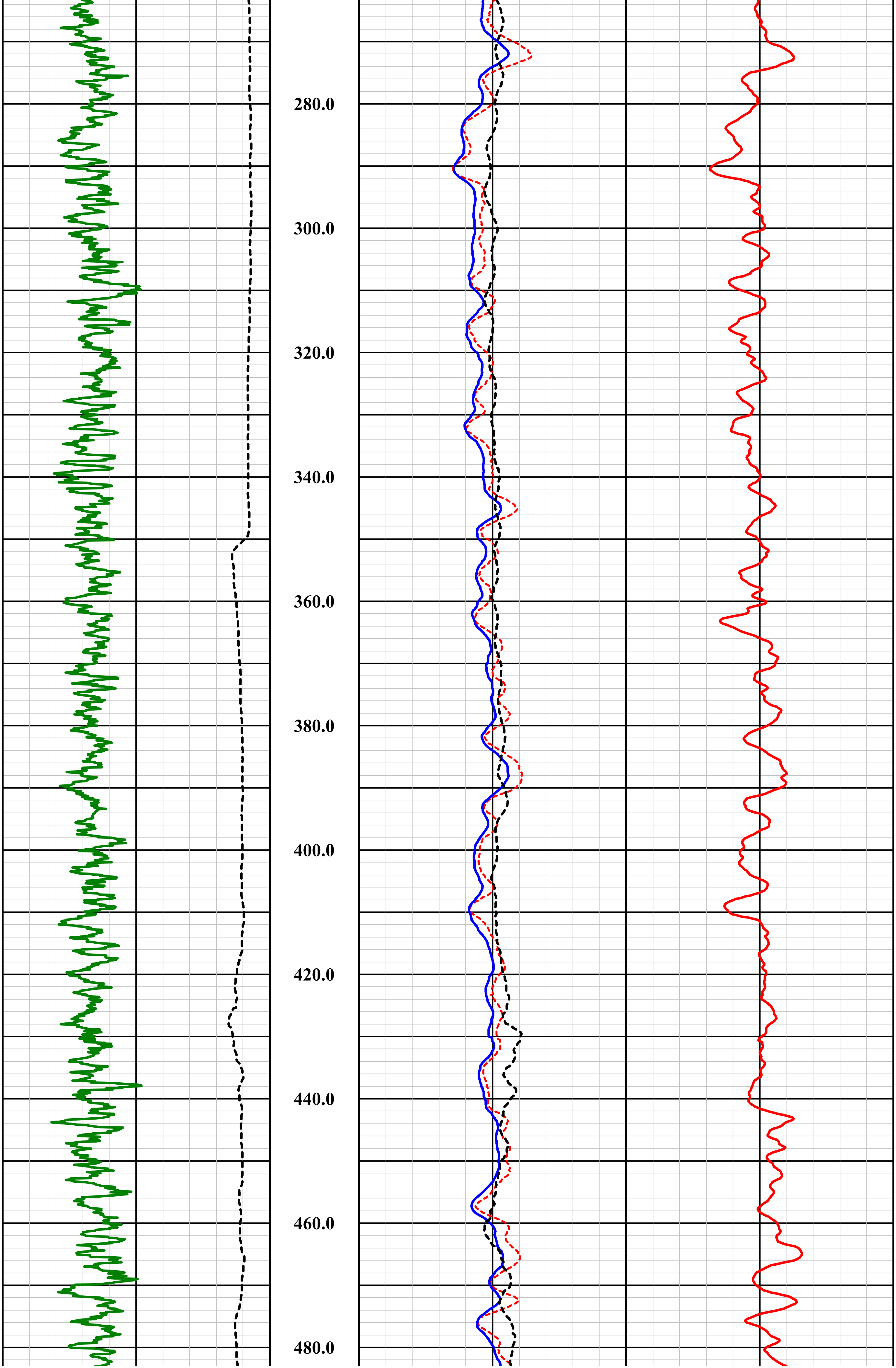
Disclaimer:

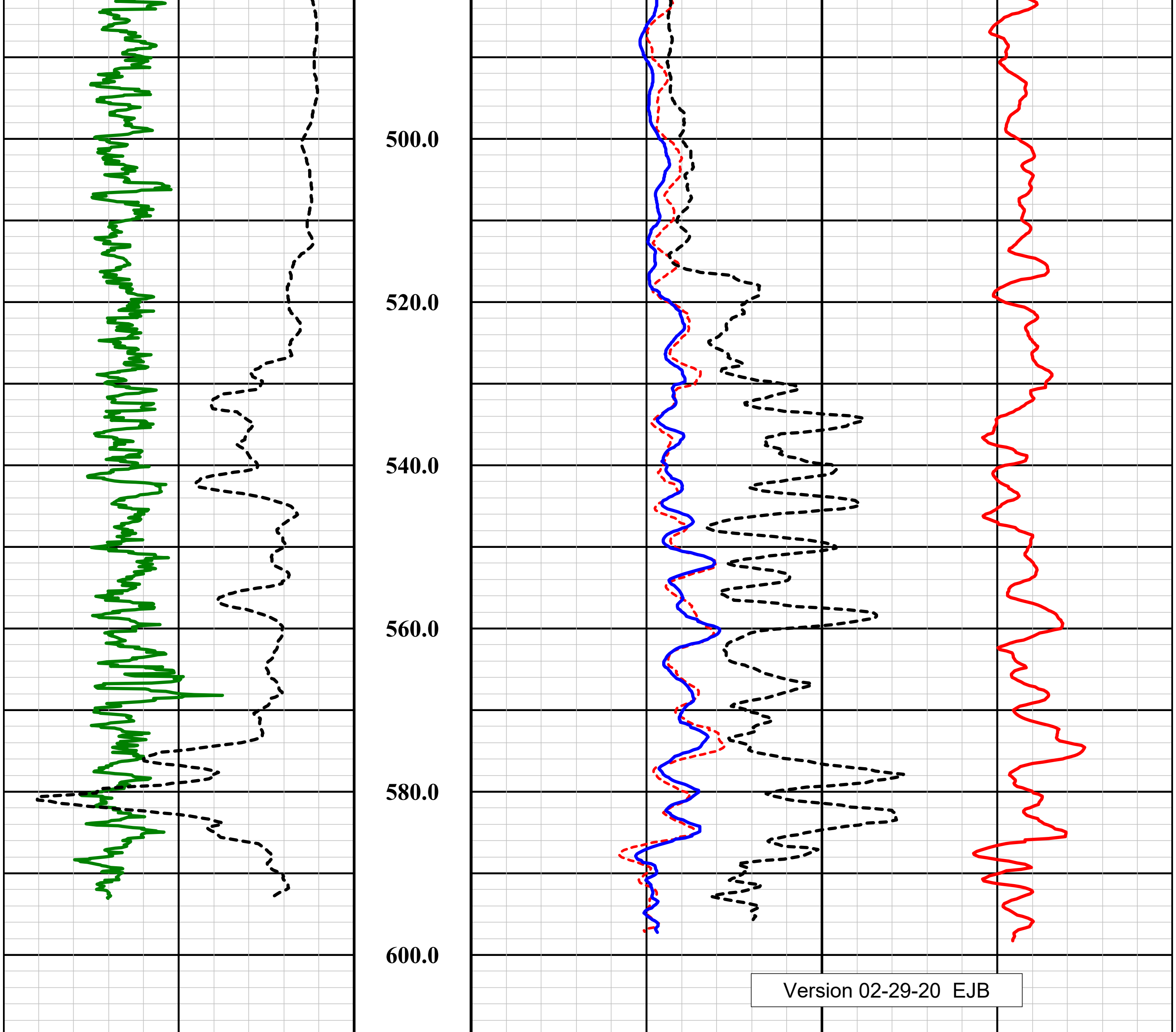
All interpretations of log data are opinions based on inferences from electrical or other measurements. We do not guarantee the accuracy or correctness of any interpretations or recommendations and shall not be liable or responsible for any loss, costs, damages, or expenses incurred or sustained by anyone resulting from any interpretation made by any of our employees or agents. These interpretations are also subject to our general terms and conditions set out in our current Service Invoice.

Nat. Gamma	Depth	8" NRes	SPR
0 API 200	1in:20ft	0 Ohm-m 100	60 Ohms 120
SP		16" NRes	
-600 mV 300		0 Ohm-m 200	
		64" NRes	
		0 Ohm-m 200	

Skunk Camp RC20-2A E-Log Summary ~137.8' - ~598.3'




280.0
300.0
320.0
340.0
360.0
380.0
400.0
420.0
440.0
460.0
480.0



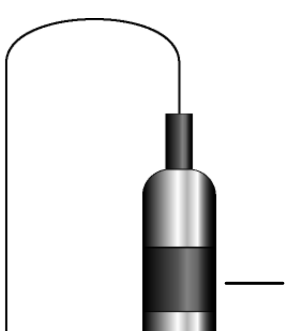
Skunk Camp RC20-2A E-Log Summary ~137.8' - ~598.3'

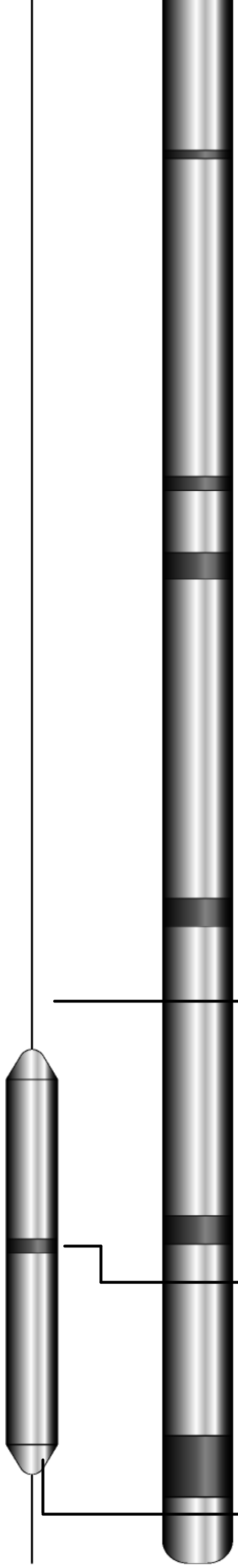
Nat. Gamma	SP	Depth	8" NRes	SPR	16" NRes	64" NRes
0 API 200	-600 mV 300	1in:20ft	0 Ohm-m 100	60 Ohms 120	0 Ohm-m 200	0 Ohm-m 200

ALT QL E-Log Tool

Probe Top = Depth Ref.

Tool SN: 6355 & 6380





Probe Length = 1.89 m or 6.2 ft
Bridle Length = 7.88 m or 25.86 ft

Probe Weight = 8.8 kg or 19.4 lbs

Can only be collected in fluid
May be stacked with other QL tools

Operating Temperature: 80 Deg C (176 Deg F)
Presure Rating: 200 bar (2900 psi)

32" Normal Resistivity Electrode (M Electrode)

Electrode Measuring Points (from bottom of probe)
- Spontaneous Potential (SP): 1.689 m or 5.54 ft
- 8" Normal Resistivity (8" NRes): 0.164 m or 0.54 ft
- 16" Normal Resistivity (16" NRes): 0.266 m or 0.87 ft
- 32" Normal Resistivity (32" NRes): 0.469 m or 1.54 ft
- 64" Normal Resistivity (64" NRes): 0.875 m or 2.87 ft
- Single Point Resistance (SPR): 0.063 m or 0.21 ft

16" Normal Resistivity Electrode (M Electrode)

Isolation Bridle

8" Normal Resistivity Electrode (M Electrode)

Bridle Electrode (N Electrode)

Current Electrode/Single Point Resistance Electrode (A Electrode)

Four Conductor MSI Probe Top

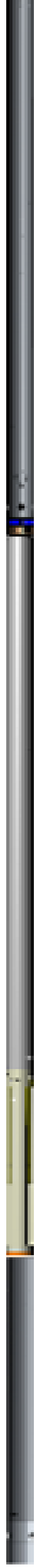
1.63" or 40 mm Diameter (41.4 mm with neoprene heat shrink and electrical tape)

MSI Gamma-Caliper-Temperature-Fluid Resistivity SN 4953

Probe Top = Depth Ref.

Single Conductor MSI Probe Top

Probe Length = 2.59 m or 8.5 ft
Probe Weight = 6.80 kg or 15.0 lbs



Probe Weight = 6.80 kg or 15.0 lbs

Natural Gamma and Caliper can only be collected logging up hole.

Fluid Temperature/Resistivity can only be collected logging down hole.

Temperature Rating: 70 Deg C (158 Deg F)
Presure Rating: 200 bar (2900 psi)

Natural Gamma Ray = 0.76 m (29.75 in)

3-Arm Caliper = 1.44 m (56.75 in)

Distance from tool top: 2.20 m (86.5 in)

Available Arm Sizes: 3", 9", and 15"

TFR (Temperature/Fluid Resistivity) = 0.39 m (15.5 in)

1.375" or 34.9 mm Diameter

Final	**E-Log Summary**

Southwest Exploration Services, LLC

borehole geophysics & video services

COMPANY	RESOLUTION COPPER MINING
WELL ID	RC20-2B
FIELD	SKUNK CAMP
COUNTY	GILA
STATE	ARIZONA

TYPE OF LOGS: OPTICAL TELEVIEWER

MORE: GAMMA - CALIPER

OTHER SERVICES
TEMP / FLUID RES

LOCATION

SEC TWP RGE

PERMANENT DATUM		ELEVATION	K.B.
LOG MEAS. FROM	GROUND LEVEL	ABOVE PERM. DATUM	D.F.
DRILLING MEAS. FROM	GROUND LEVEL		G.L.

DATE	03-03-20	TYPE FLUID IN HOLE	FORMATION WATER
RUN No	2	MUD WEIGHT	N/A
TYPE LOG	OPTICAL TELEVIEWER	VISCOSITY	N/A
DEPTH-DRILLER	156.0 FT	LEVEL	~113.5 FT
DEPTH-LOGGER	155.7 FT	MAX. REC. TEMP.	21.2 Deg C
BTM LOGGED INTERVAL	154.0 FT	IMAGE ORIENTED TO:	MAGNETIC NORTH
TOP LOGGED INTERVAL	85.0 FT	SAMPLE INTERVAL	0.035 FT
DRILLER / RIG#	NATIONAL DRILLING	LOGGING TRUCK	TRUCK #310
RECORDED BY / Logging Eng.	E. BEAM / T. GODSEY	TOOL STRING/SN	ALT QL OBI40 2G SN 170106
WITNESSED BY	NATIONAL DRILLING	LOG TIME:ON SITE/OFF SITE	10:00 PM

RUN	BOREHOLE RECORD			CASING RECORD			
NO.	BIT	FROM	TO	SIZE	WGT.	FROM	TO
1	? IN	SURFACE	20 FT	10 IN	STEEL	SURFACE	20 FT
2	9 7/8 IN	20 FT	90 FT	9 IN	STEEL	SURFACE	90 FT
3	7 3/4 IN	90 FT	TOTAL DEPTH				

COMMENTS:

.

Tool Summary:

Date	03-03-20	**Date**	03-03-20	**Date**	03-03-20
Run No.	1	**Run No.**	2	**Run No.**	2
Tool Model	2CAA-F	**Tool Model**	QL GAMMA	**Tool Model**	ALT QL OBI40 2G
Tool SN	2299	**Tool SN**	6517	**Tool SN**	170106
From	SURFACE	**From**	SURFACE	**From**	85.0 FT
To	155.7 FT	**To**	154.0 FT	**To**	154.0 FT
Recorded By	E. BEAM	**Recorded By**	E. BEAM	**Recorded By**	E. BEAM
Truck No	310	**Truck No**	310	**Truck No**	310
Operation Check	03-03-20	**Operation Check**	03-03-20	**Operation Check**	03-03-20
Calibration Check	03-03-20	**Calibration Check**	N/A	**Calibration Check**	N/A
Time Logged	11:00 PM	**Time Logged**	11:30 PM	**Time Logged**	11:30 PM

Date		**Date**		**Date**	
Run No.	4	**Run No.**	5	**Run No.**	6
Tool Model		**Tool Model**		**Tool Model**	
Tool SN		**Tool SN**		**Tool SN**	
From		**From**		**From**	
To		**To**		**To**	
Recorded By		**Recorded By**		**Recorded By**	
Truck No		**Truck No**		**Truck No**	
Operation Check		**Operation Check**		**Operation Check**	
Calibration Check		**Calibration Check**		**Calibration Check**	
Time Logged		**Time Logged**		**Time Logged**	

Additional Comments:

Caliper Arms Used: 9" **Calibration Points:** 4" & 10"

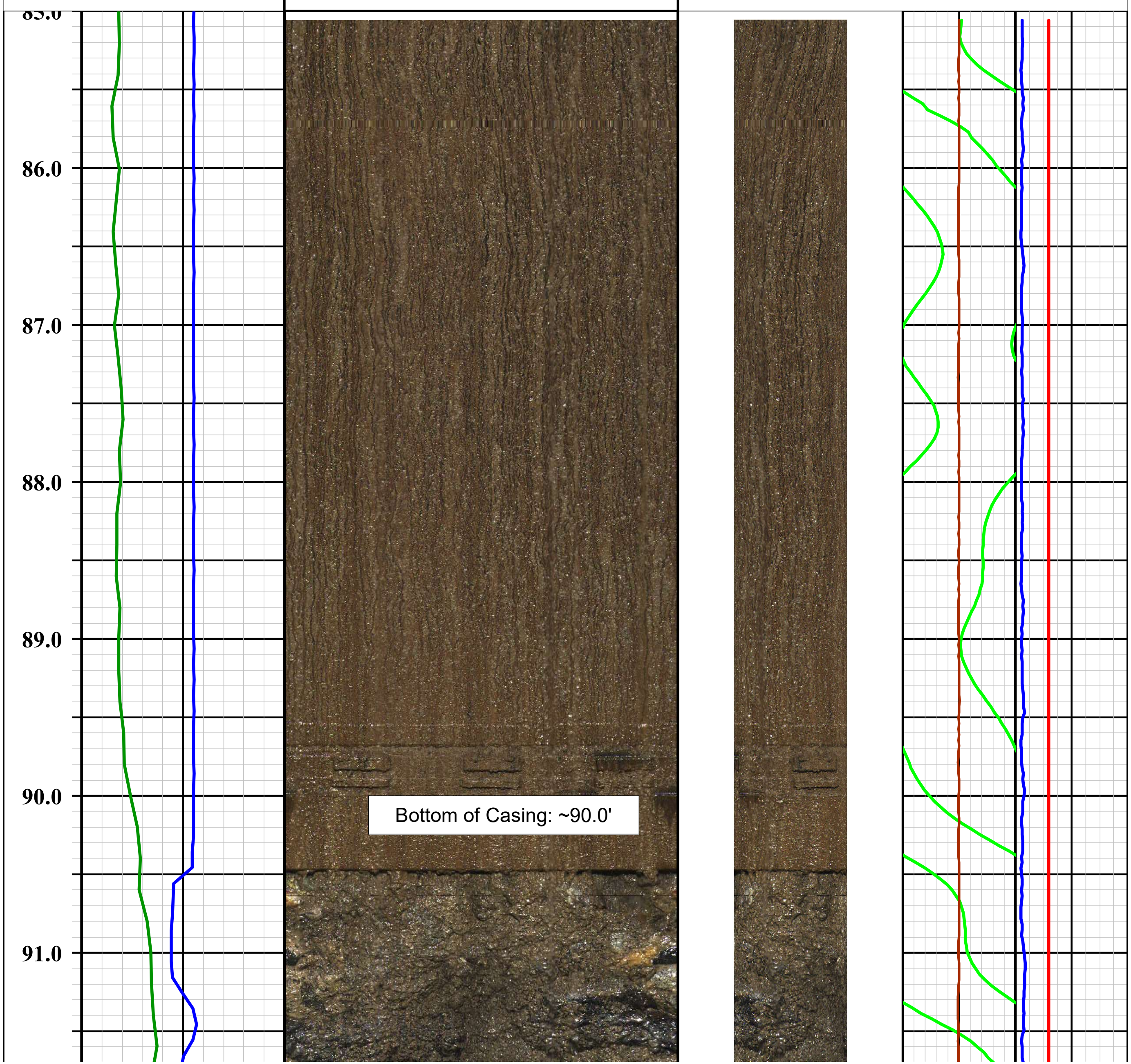
E-Log Calibration Range: N/A **Calibration Points:** N/A

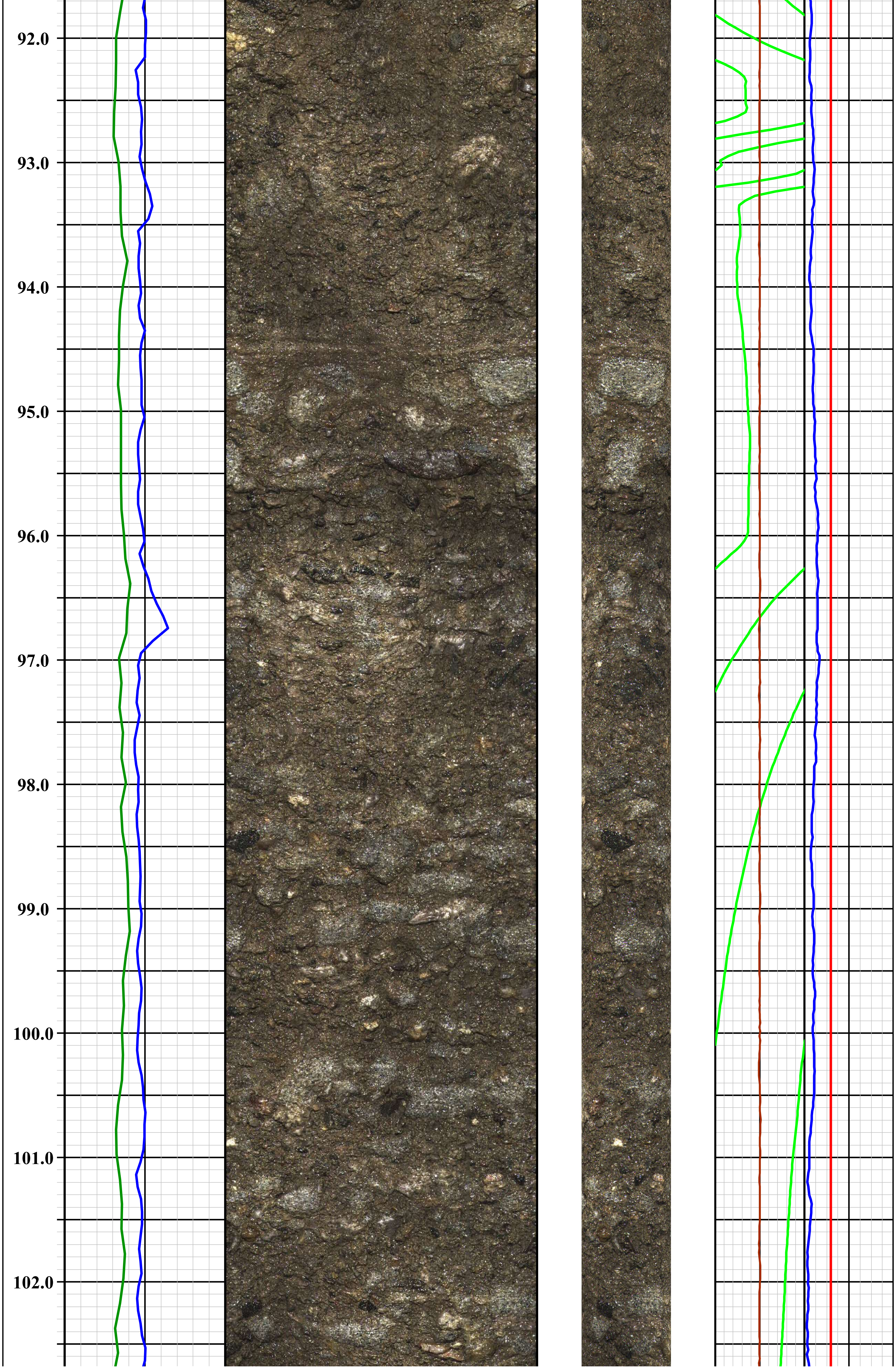
Disclaimer:

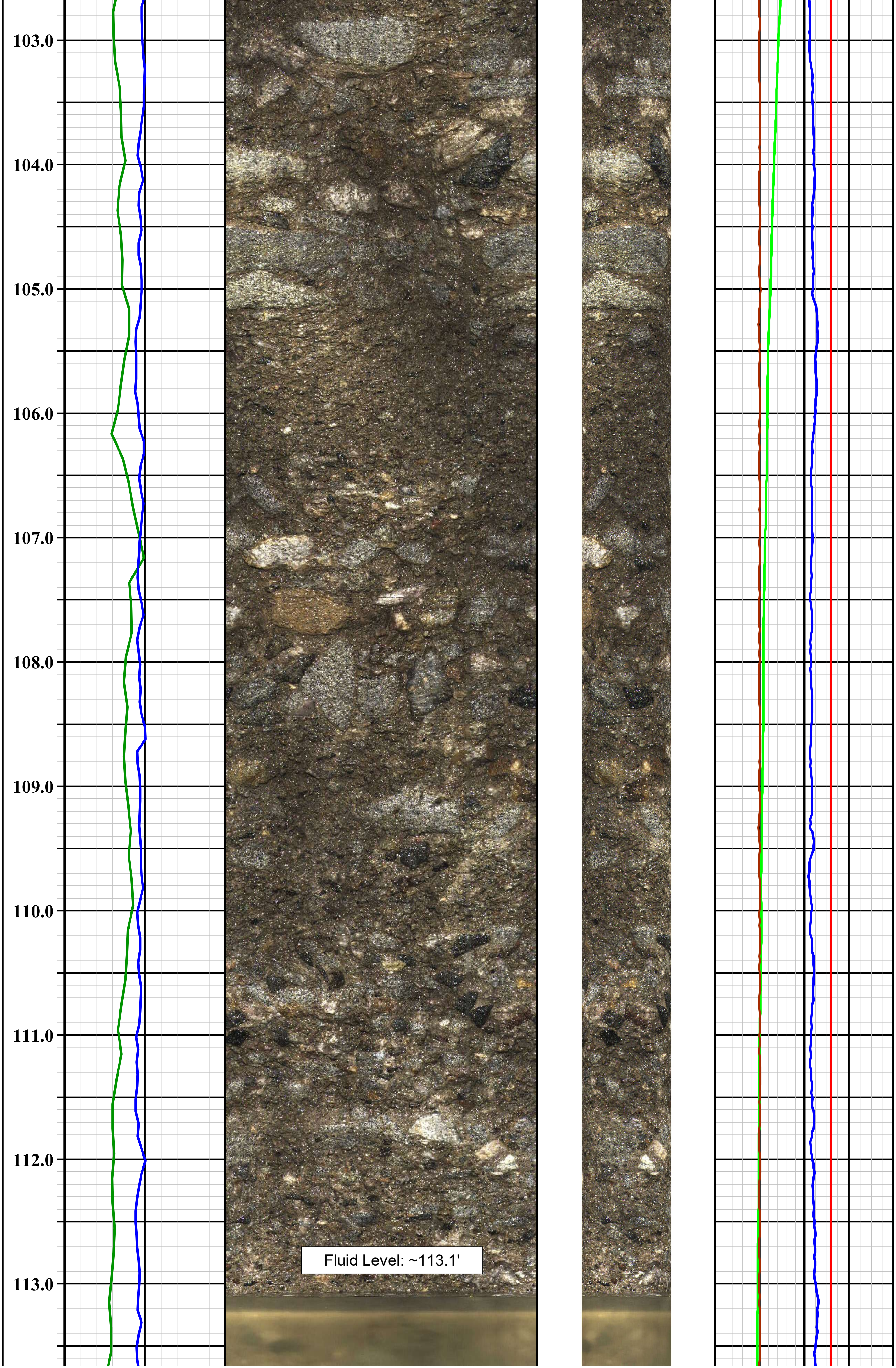
All interpretations of log data are opinions based on inferences from electrical or other measurements. We do not guarantee the accuracy or correctness of any interpretations or recommendations and shall not be liable or responsible for any loss, costs, damages, or expenses incurred or sustained by anyone resulting from any interpretation made by any of our employees or agents. These interpretations are also subject to our general terms and conditions set out in our current Service Invoice.

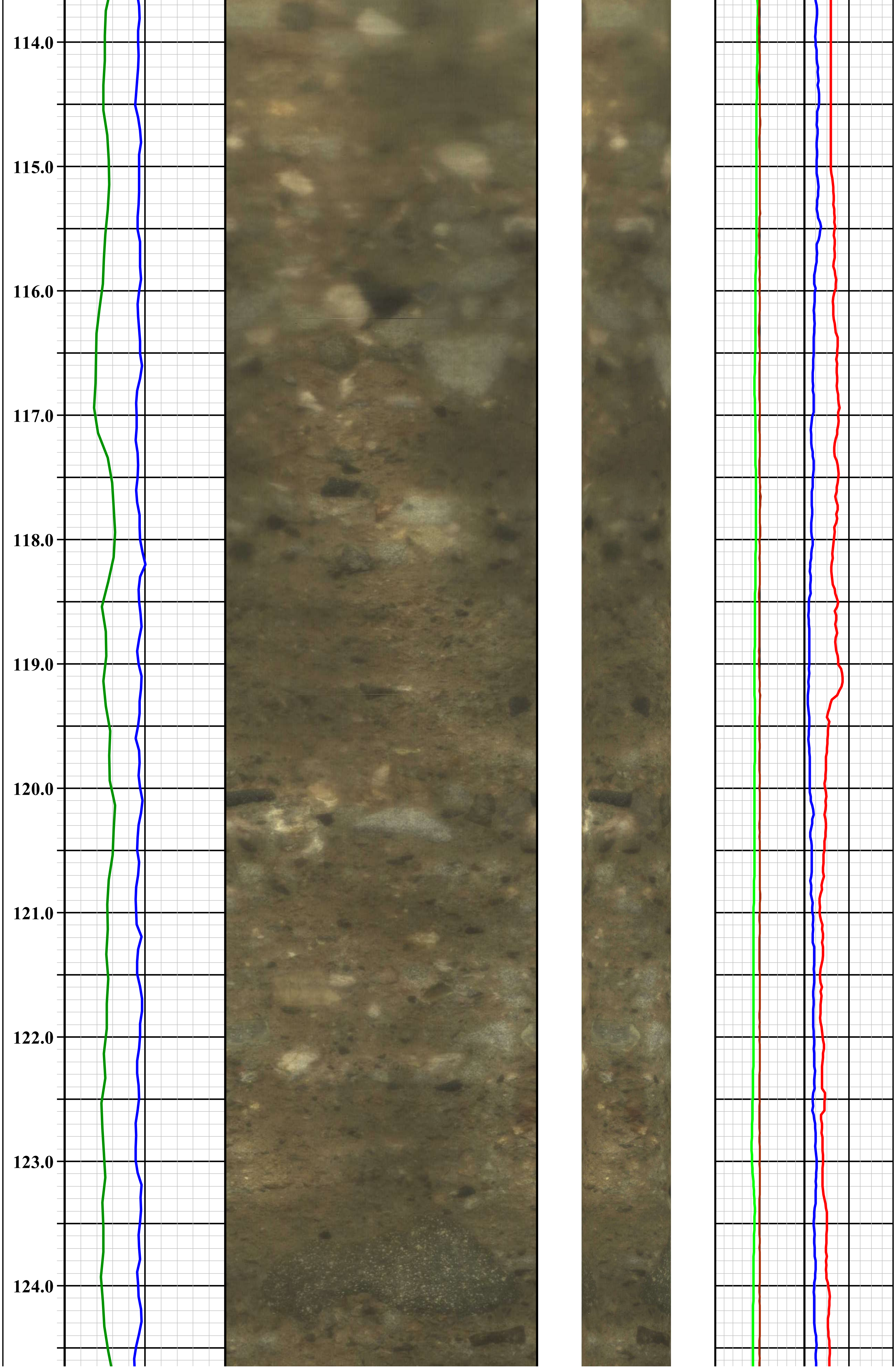
Skunk Camp RC20-2B OBI40 2G Summary ~90.0' - ~154.3'

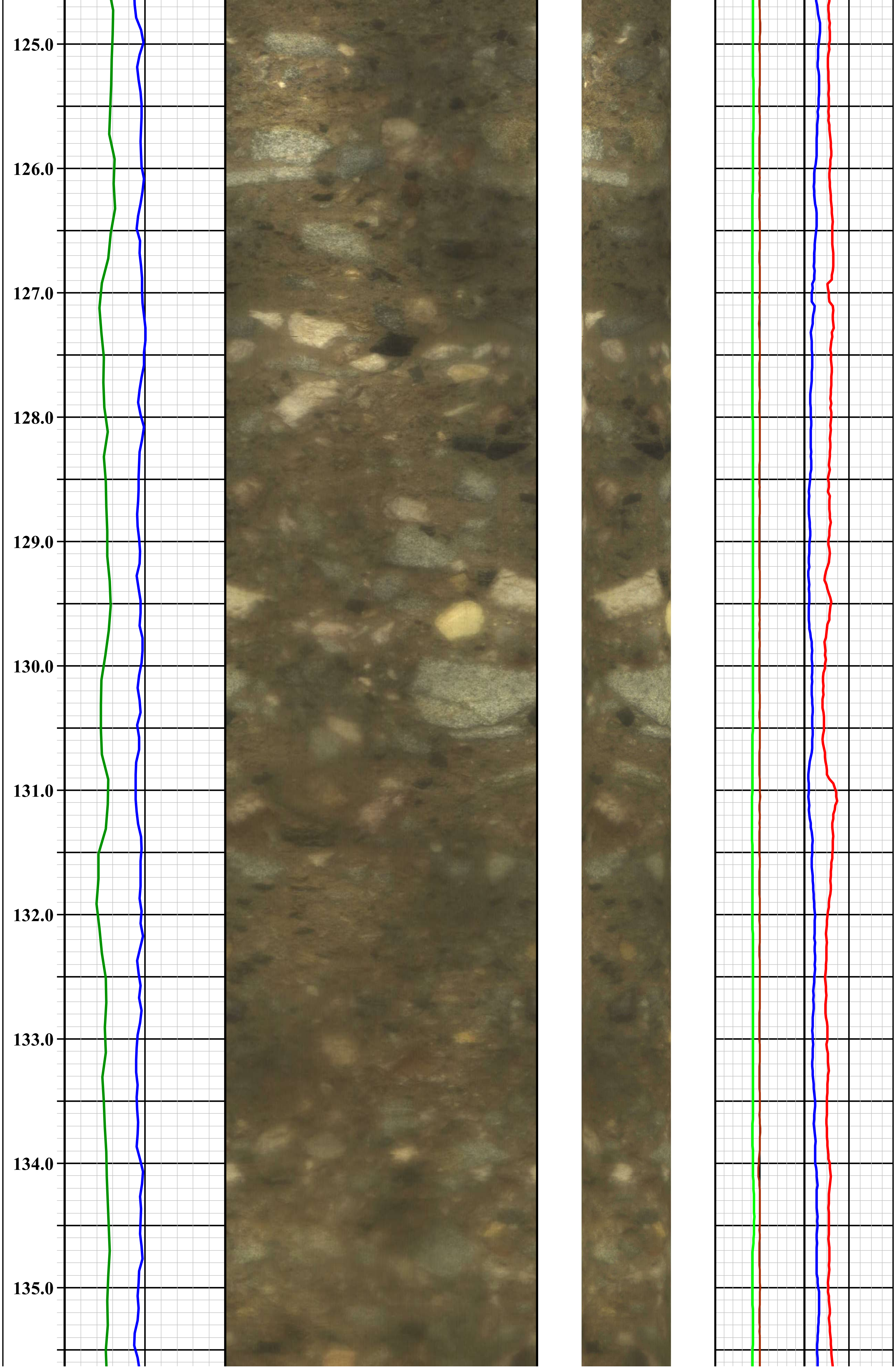
Depth 1in:1ft	Nat. Gamma (0 API 200) / 3-Arm Caliper (5 Inches 12)	Image-NM: Oriented Mag North (0° 90° 180° 270° 0°) / Image_90.0'-113.0': Non Oriented, Rot'd by 133.6 Deg (0° 90° 180° 270° 0°)	3-D View (-0°)	Mag Field (40 uT 60) / Gravity (0.8 g 1.2)	Tilt (0 Deg 8) / Azi-Edited (0 360)

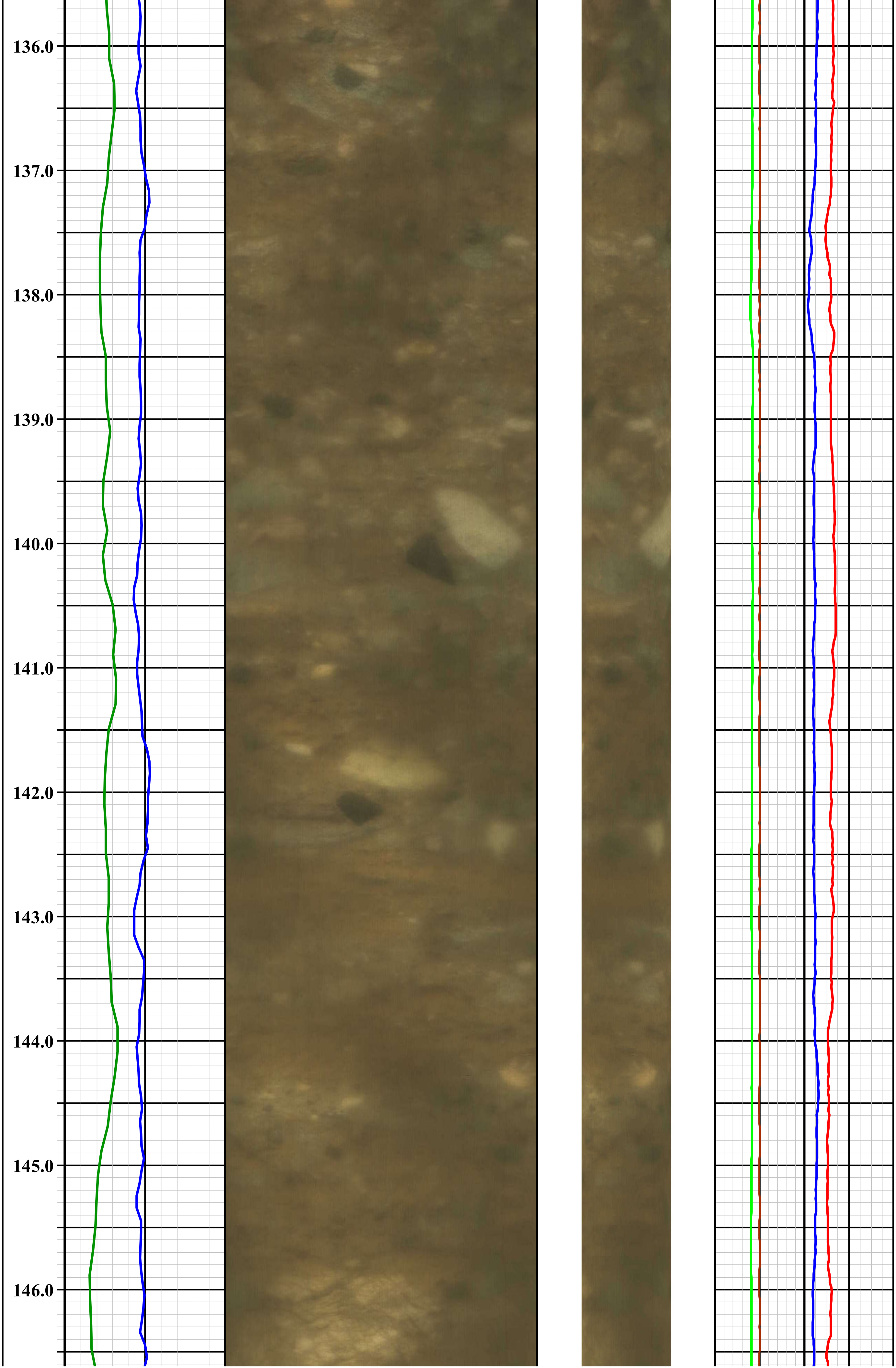


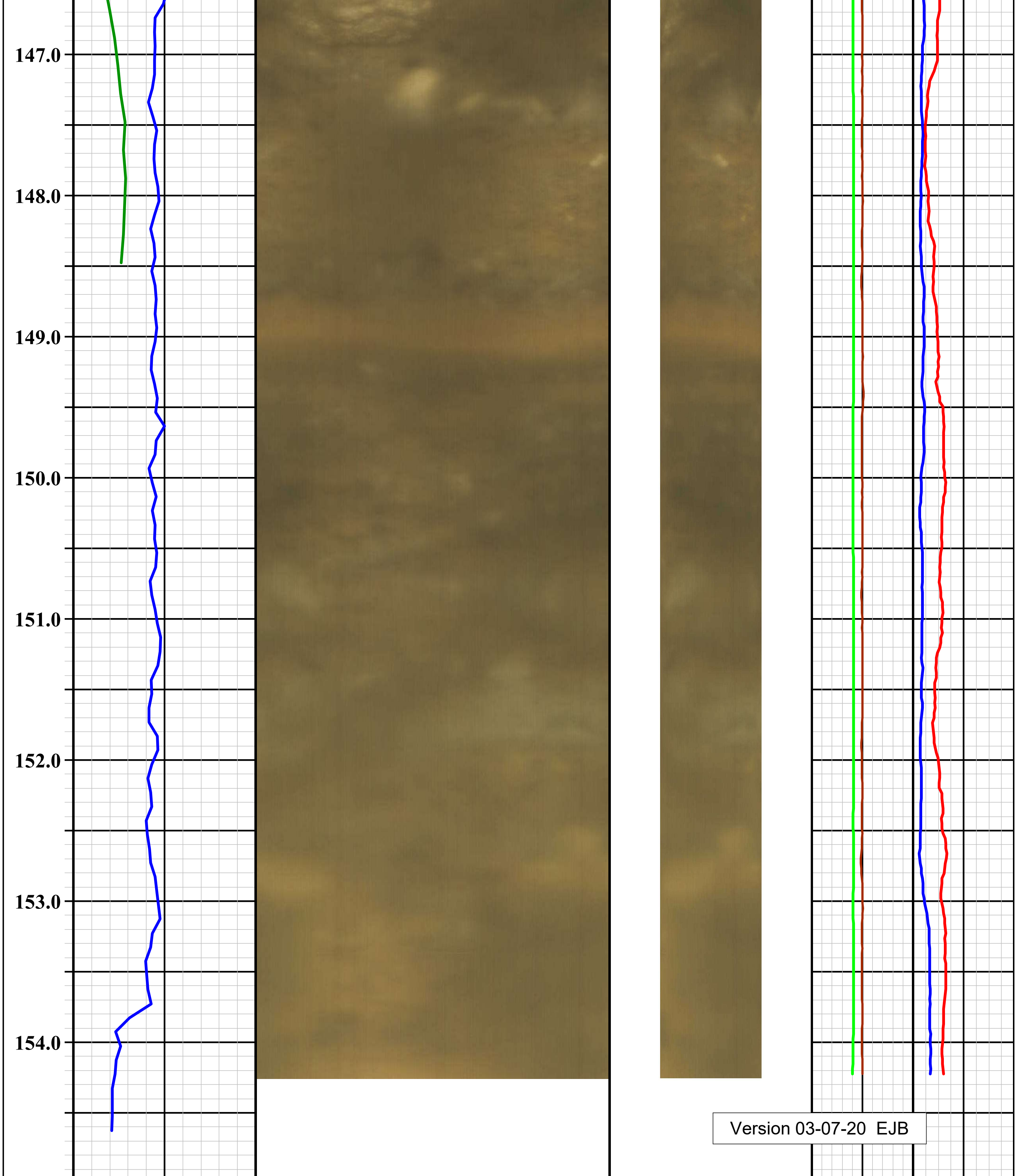

92.0
93.0
94.0
95.0
96.0
97.0
98.0
99.0
100.0
101.0
102.0


103.0
104.0
105.0
106.0
107.0
108.0
109.0
110.0
111.0
112.0
113.0
Fluid Level: ~113.1'


114.0
115.0
116.0
117.0
118.0
119.0
120.0
121.0
122.0
123.0
124.0


125.0
126.0
127.0
128.0
129.0
130.0
131.0
132.0
133.0
134.0
135.0


136.0
137.0
138.0
139.0
140.0
141.0
142.0
143.0
144.0
145.0
146.0



0° 90° 180° 270° 0°

Non Oriented, Rot'd by 133.6 Deg

Image_90.0'-113.0'

3-Arm Caliper (5 Inches 12)	Image-NM (0° 90° 180° 270° 0°)	3-D View	Gravity (0.8 g 1.2)	Azi-Edited (0 360)
Nat. Gamma (0 API 200)	Oriented Mag North	3-D View (-0°)	Mag Field (40 uT 60)	Tilt (0 Deg 8)

1in:1ft

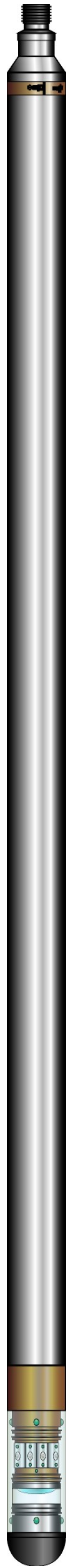
Depth

Skunk Camp RC20-2B OBI40 2G Summary ~90.0' - ~154.3'

QL OBI-40 2G Optical Borehole Imager

Probe Top = Depth Ref.

Tool SN: 145010, 152511 & 170106



APS Probe Orientation Sensor
3-Axis Magnetometer
3-Axis Accellerometer

Probe Length = 1.66 m or 5.46 ft

Probe Weight = 5.3 kg or 11.7 lbs

Distance from Optical Image Window to Orientation Sensor = 0.9 m or 3 ft

Inclination Accuracy = +/- 0.5 deg
Azimuth Accuracy = +/- 1.0 deg

Temperature Range: 0 - 70 Deg C (32 - 158 Deg F)
Pressure Range: 0 - 200 bar (0 - 2900 psi)

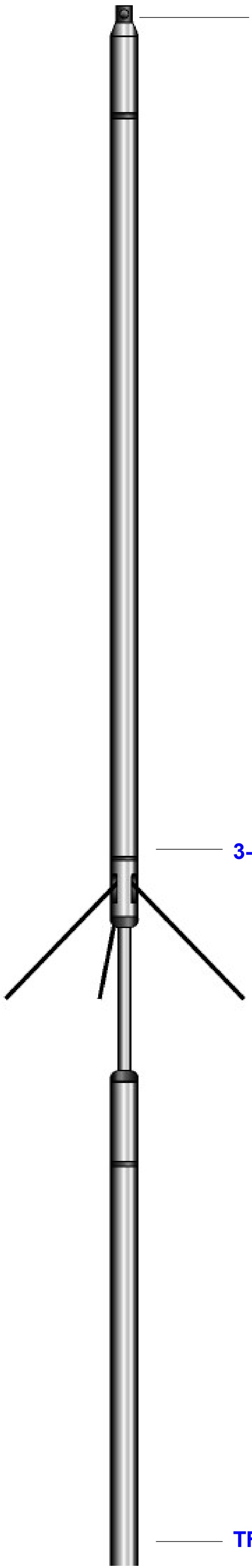
External Bow Spring Centralizers

Operates in dry or clear water conditions.

1.6" or 40 mm Diameter

MSI 2CAA Caliper-Temperature-Fluid Resistivity

Probe Top = Depth Ref.



Single Conductor MSI Probe Top

Probe Length = 1.95 m or 6.4 ft
Probe Weight = 11.70 kg or 25.79 lbs

Caliper can only be collected logging up hole.

Fluid Temperature/Resistivity can only be collected logging down hole.

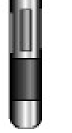
Temperature Rating: 70 Deg C (158 Deg F)
Presure Rating: 200 bar (2900 psi)

3-Arm Caliper = 1.44 m (56.75 in)

Distance from tool top: 2.20 m (86.5 in)

Available Arm Sizes: 3", 9", and 15"

TFR (Temperature/Fluid Resistivity) = 0.39 m (15.5 in)

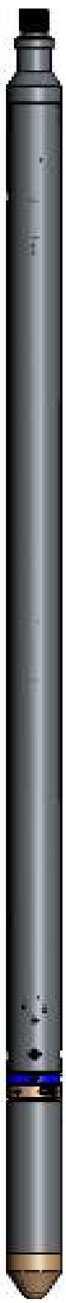


1.60" or 41.0 mm Diameter

QL40 Natural Gamma Ray

Probe Top = Depth Ref.

Tool SN: 5613, 5979, 6161, 6292, 6517 & 6587



Probe Length = 1.07 m or 3.61 ft
Probe Weight = 4.67 kg or 10.3 lbs

Temperature Rating: 70 Deg C (158 Deg F)

Pressure Rating: 200 bar (2900 psi)

1.63 in or 40.0 mm Diameter

Company	RESOLUTION COPPER MINING

Southwest Exploration Services, LLC
borehole geophysics & video services

Well	RC20-2B
Field	SKUNK CAMP
County	GILA
State	ARIZONA

Final Optical Televiewer Summary

Southwest Exploration Services, LLC
borehole geophysics & video services

COMPANY	RESOLUTION COPPER MINING		
WELL ID	RC20-2B		
FIELD	SKUNK CAMP		
COUNTY	GILA	STATE	ARIZONA

TYPE OF LOGS: GAMMA - CALIPER
MORE: TEMP / FLUID RES.

OTHER SERVICES
OPTICAL TELEVIEWER

LOCATION

SEC TWP RGE

PERMANENT DATUM		ELEVATION	K.B.
LOG MEAS. FROM	GROUND LEVEL	ABOVE PERM. DATUM	D.F.
DRILLING MEAS. FROM	GROUND LEVEL		G.L.

DATE	03-03-20	TYPE FLUID IN HOLE	FORMATION WATER
RUN No	1	MUD WEIGHT	N/A
TYPE LOG	GAMMA-CALIPER-TFR	VISCOSITY	N/A
DEPTH-DRILLER	156.0 FT	LEVEL	~113.5 FT
DEPTH-LOGGER	155.7 FT	MAX. REC. TEMP.	21.2 Deg C
BTM LOGGED INTERVAL	155.7 FT	IMAGE ORIENTED TO:	N/A
TOP LOGGED INTERVAL	SURFACE	SAMPLE INTERVAL	0.1 FT
DRILLER / RIG#	NATIONAL DRILLING	LOGGING TRUCK	TRUCK #310
RECORDED BY / Logging Eng.	E. BEAM / T. GODSEY	TOOL STRING/SN	MSI 2CAA-F SN 2299
WITNESSED BY	NATIONAL DRILLING	LOG TIME:ON SITE/OFF SITE	10:00 PM

RUN	BOREHOLE RECORD			CASING RECORD			
NO.	BIT	FROM	TO	SIZE	WGT.	FROM	TO
1	? IN	SURFACE	20 FT	10 IN	STEEL	SURFACE	20 FT
2	9 7/8 IN	20 FT	90 FT	9 IN	STEEL	SURFACE	90 FT
3	7 3/4 IN	90 FT	TOTAL DEPTH				

COMMENTS:

.

Tool Summary:

Date	03-03-20	**Date**	03-03-20	**Date**	03-03-20
Run No.	1	**Run No.**	2	**Run No.**	2
Tool Model	2CAA-F	**Tool Model**	QL GAMMA	**Tool Model**	ALT QL OBI40 2G
Tool SN	2299	**Tool SN**	6517	**Tool SN**	170106
From	SURFACE	**From**	SURFACE	**From**	85.0 FT
To	155.7 FT	**To**	154.0 FT	**To**	154.0 FT
Recorded By	E. BEAM	**Recorded By**	E. BEAM	**Recorded By**	E. BEAM
Truck No	310	**Truck No**	310	**Truck No**	310
Operation Check	03-03-20	**Operation Check**	03-03-20	**Operation Check**	03-03-20
Calibration Check	03-03-20	**Calibration Check**	N/A	**Calibration Check**	N/A
Time Logged	11:00 PM	**Time Logged**	11:30 PM	**Time Logged**	11:30 PM

Date		**Date**		**Date**	
Run No.	4	**Run No.**	5	**Run No.**	6
Tool Model		**Tool Model**		**Tool Model**	
Tool SN		**Tool SN**		**Tool SN**	
From		**From**		**From**	
To		**To**		**To**	
Recorded By		**Recorded By**		**Recorded By**	
Truck No		**Truck No**		**Truck No**	
Operation Check		**Operation Check**		**Operation Check**	
Calibration Check		**Calibration Check**		**Calibration Check**	
Time Logged		**Time Logged**		**Time Logged**	

Additional Comments:

Caliper Arms Used: 9" **Calibration Points:** 4" & 10"

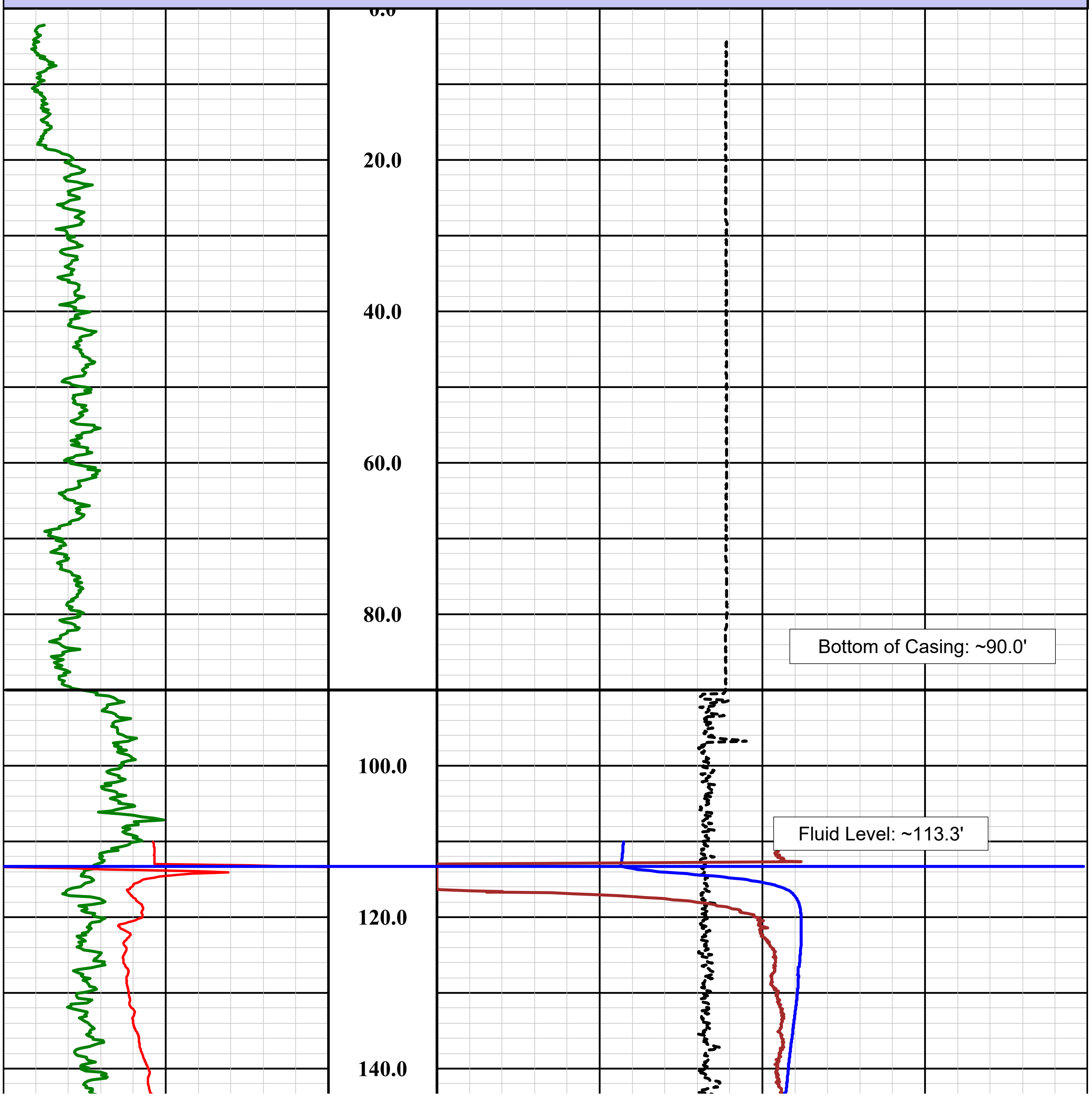
E-Log Calibration Range: N/A **Calibration Points:** N/A

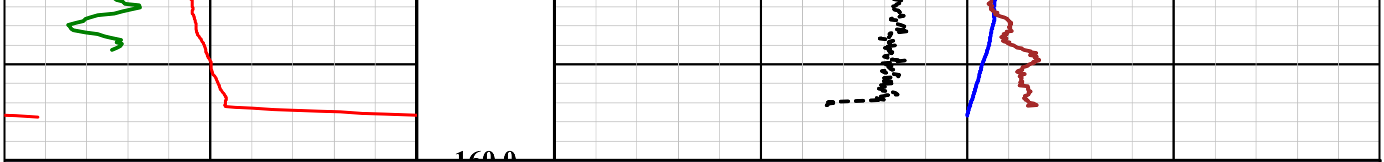
Disclaimer:

All interpretations of log data are opinions based on inferences from electrical or other measurements. We do not guarantee the accuracy or correctness of any interpretations or recommendations and shall not be liable or responsible for any loss, costs, damages, or expenses incurred or sustained by anyone resulting from any interpretation made by any of our employees or agents. These interpretations are also subject to our general terms and conditions set out in our current Service Invoice.

Nat. Gamma	Depth	3-Arm Caliper
0 API 200	1in:20ft	0 Inches 20
Fluid Resistivity		Temperature
10 Ohm-m 30		10 Deg C 30
		2-Ft Diff. Temp.
		-1 Deg C 1

Skunk Camp RC20-2B GCT Summary Surface - ~155.7'



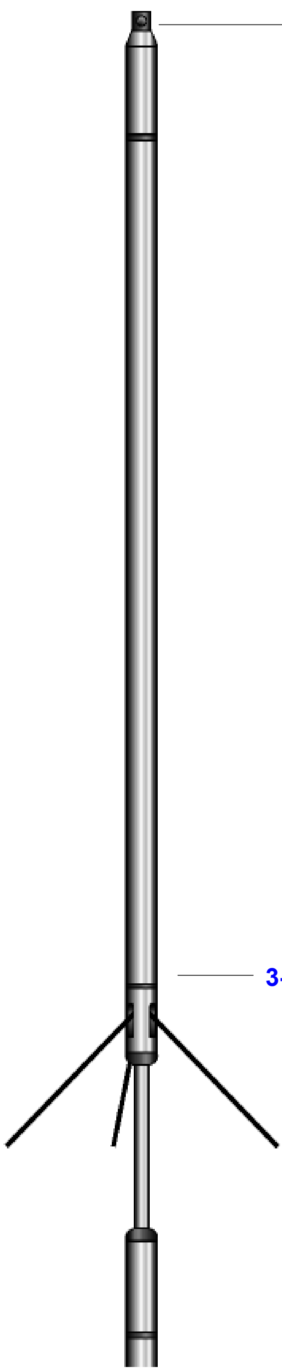


Skunk Camp RC20-2B GCT Summary Surface - ~155.7'

2-Ft Diff. Temp.	-1	Deg C	1
Fluid Resistivity	10	Ohm-m	30
Temperature	10	Deg C	30
Nat. Gamma	0	API	200
Depth		1in:20ft	
3-Arm Caliper	0	Inches	20

MSI 2CAA Caliper-Temperature-Fluid Resistivity

Probe Top = Depth Ref.



Single Conductor MSI Probe Top

Probe Length = 1.95 m or 6.4 ft
Probe Weight = 11.70 kg or 25.79 lbs

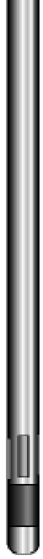
Caliper can only be collected logging up hole.

Fluid Temperature/Resistivity can only be collected logging down hole.

Temperature Rating: 70 Deg C (158 Deg F)
Presure Rating: 200 bar (2900 psi)

3-Arm Caliper = 1.44 m (56.75 in)

Distance from tool top: 2.20 m (86.5 in)



Available Arm Sizes: 3", 9", and 15"

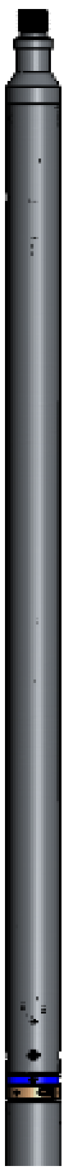
TFR (Temperature/Fluid Resistivity) = 0.39 m (15.5 in)

1.60" or 41.0 mm Diameter

QL40 Natural Gamma Ray

Probe Top = Depth Ref.

Tool SN: 5613, 5979, 6161, 6292, 6517 & 6587

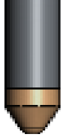


Four Conductor MSI Probe Top

Probe Length = 1.07 m or 3.61 ft
Probe Weight = 4.67 kg or 10.3 lbs

Temperature Rating: 70 Deg C (158 Deg F)

Pressure Rating: 200 bar (2900 psi)



1.63 in or 40.0 mm Diameter

Southwest Exploration Services, LLC borehole geophysics & video services	Company	RESOLUTION COPPER MINING
	Well	RC20-2B
	Field	SKUNK CAMP
	County	GILA
	State	ARIZONA

Final GCT Summary

Southwest Exploration Services, LLC
borehole geophysics & video services

COMPANY	RESOLUTION COPPER MINING		
WELL ID	RC20-2D		
FIELD	SKUNK CAMP		
COUNTY	GILA	STATE	ARIZONA

TYPE OF LOGS: GAMMA - CALIPER
MORE: TEMP / FLUID RES

LOCATION

OTHER SERVICES N/A

SEC TWP RGE

PERMANENT DATUM		ELEVATION	K.B.
LOG MEAS. FROM	GROUND LEVEL	ABOVE PERM. DATUM	D.F.
DRILLING MEAS. FROM	GROUND LEVEL		G.L.

DATE	3-8-2020	TYPE FLUID IN HOLE	MUD
RUN No	1	MUD WEIGHT	N/A
TYPE LOG	GAMMA - CALIPER - FTC	VISCOSITY	N/A
DEPTH-DRILLER	143 FT	LEVEL	~71 FT
DEPTH-LOGGER	138 FT	MAX. REC. TEMP.	15.4 Deg C
BTM LOGGED INTERVAL	138 FT	IMAGE ORIENTED TO:	N/A
TOP LOGGED INTERVAL	SURFACE	SAMPLE INTERVAL	0.2 FT
DRILLER / RIG#	NATIONAL	LOGGING TRUCK	TRUCK #800
RECORDED BY / Logging Eng.	J. QUINONES	TOOL STRING/SN	MSI COMBO TOOL SN 4009
WITNESSED BY	NICOLE - M & A	LOG TIME:ON SITE/OFF SITE	8:15 AM

RUN	BOREHOLE RECORD			CASING RECORD			
NO.	BIT	FROM	TO	SIZE	WGT.	FROM	TO
1	? IN	SURFACE	30 FT	10.5 IN	STEEL	SURFACE	30 FT
2	9 7/8 IN	30 FT	55 FT	9 IN	STEEL	SURFACE	55 FT
3	7 3/7 IN	55 FT	TOTAL DEPTH				

COMMENTS:

Tool Summary:

Date	3-7-2020	**Date**		**Date**	
Run No.	1	**Run No.**	2	**Run No.**	3
Tool Model	MSI COMBO TOOL	**Tool Model**		**Tool Model**	
Tool SN	4009	**Tool SN**		**Tool SN**	
From	SURFACE	**From**		**From**	
To	138 FT	**To**		**To**	
Recorded By	J.QUINONES	**Recorded By**		**Recorded By**	
Truck No	900	**Truck No**		**Truck No**	
Operation Check	3-7-2020	**Operation Check**		**Operation Check**	
Calibration Check	3-7-2020	**Calibration Check**		**Calibration Check**	
Time Logged	8:45 AM	**Time Logged**		**Time Logged**	

Date		**Date**		**Date**	
Run No.	4	**Run No.**	5	**Run No.**	6
Tool Model		**Tool Model**		**Tool Model**	
Tool SN		**Tool SN**		**Tool SN**	
From		**From**		**From**	
To		**To**		**To**	
Recorded By		**Recorded By**		**Recorded By**	
Truck No		**Truck No**		**Truck No**	
Operation Check		**Operation Check**		**Operation Check**	
Calibration Check		**Calibration Check**		**Calibration Check**	
Time Logged		**Time Logged**		**Time Logged**	

Additional Comments:

Caliper Arms Used: 9" **Calibration Points:** 6" & 12"

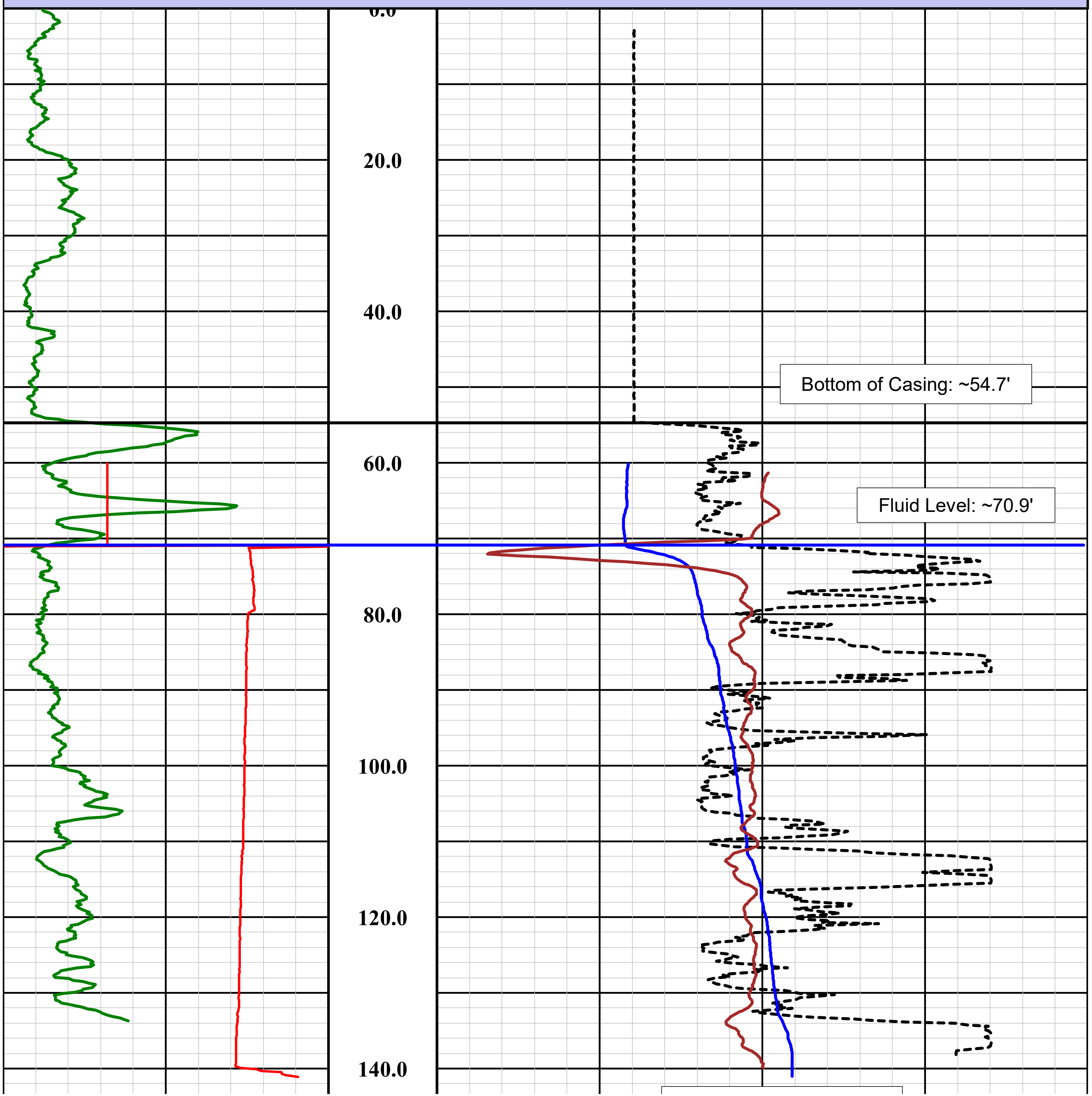
E-Log Calibration Range: N/A **Calibration Points:** N/A

Disclaimer:

All interpretations of log data are opinions based on inferences from electrical or other measurements. We do not guarantee the accuracy or correctness of any interpretations or recommendations and shall not be liable or responsible for any loss, costs, damages, or expenses incurred or sustained by anyone resulting from any interpretation made by any of our employees or agents. These interpretations are also subject to our general terms and conditions set out in our current Service Invoice.

Nat. Gamma 0 API 200	Depth 1in:20ft	3-Arm Caliper 0 Inches 20
Fluid Resistivity 15 Ohm-m 35		Temperature 10 Deg C 20
		2-Ft Diff. Temp. -1 Deg C 1

Skunk Camp RC20-2D GCT Summary Surface - ~140.9'



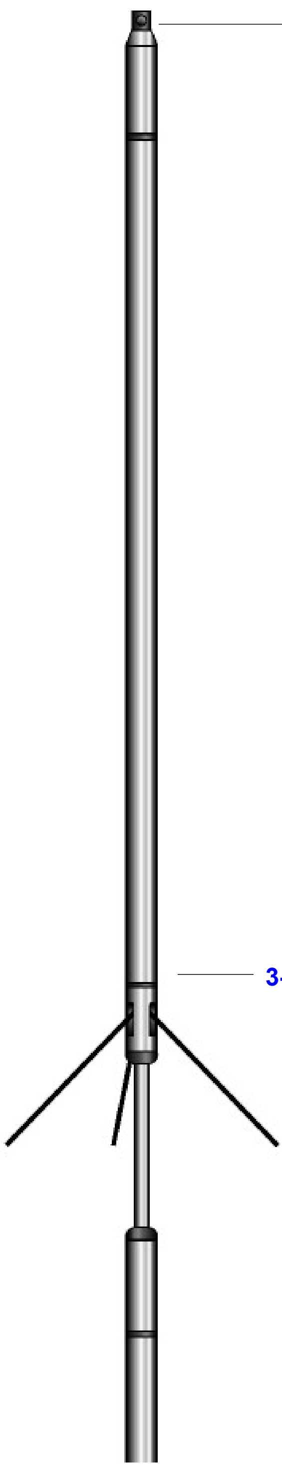
Version 03-18-20 EJB

Skunk Camp RC20-2D GCT Summary Surface - ~140.9'

		-1 Deg C 1 **2-Ft Diff. Temp.**
15 Ohm-m 35 **Fluid Resistivity**		10 Deg C 20 **Temperature**
0 API 200 **Nat. Gamma**	1in:20ft **Depth**	0 Inches 20 **3-Arm Caliper**

MSI 2CAA Caliper-Temperature-Fluid Resistivity

Probe Top = Depth Ref.



Single Conductor MSI Probe Top

Probe Length = 1.95 m or 6.4 ft
Probe Weight = 11.70 kg or 25.79 lbs

Caliper can only be collected logging up hole.

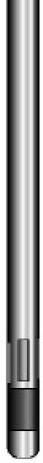
Fluid Temperature/Resistivity can only be collected logging down hole.

Temperature Rating: 70 Deg C (158 Deg F)
Presure Rating: 200 bar (2900 psi)

3-Arm Caliper = 1.44 m (56.75 in)

Distance from tool top: 2.20 m (86.5 in)

Available Arm Sizes: 3", 9", and 15"



TFR (Temperature/Fluid Resistivity) = 0.39 m (15.5 in)

1.60" or 41.0 mm Diameter

Southwest Exploration Services, LLC
borehole geophysics & video services

Company	RESOLUTION COPPER MINING
Well	RC20-2D
Field	SKUNK CAMP
County	GILA
State	ARIZONA

Final GCT Summary

MONTGOMERY
& ASSOCIATES

Appendix H

Driller Reports for Hydrogeologic Test Wells

ARIZONA DEPARTMENT OF WATER RESOURCES

Phoenix, Arizona 85007

DRILLING CARD

THIS AUTHORIZATION SHALL BE IN POSSESSION OF THE DRILLER DURING ALL DRILLING OPERATIONS

WELL REGISTRATION NO: **55-923921**

AUTHORIZED DRILLER: **NATIONAL EWP, INC.** LICENSE NO: **823**

NOTICE OF INTENT TO **DRILL A ENV - MONITOR WELL** HAS BEEN FILED WITH THE DEPARTMENT BY:

WELL OWNER: **RESOLUTION COPPER MINING LLC**

ADDRESS: **102 MAGMA HEIGHTS, SUPERIOR, AZ, 85173**

THE WELL(S) IS/ARE TO BE LOCATED IN THE:

SE 1/4 of the **SE** 1/4 of the **SE** 1/4 Section **14** Township **03 S** Range **14 E**

NO. OF WELLS IN THIS PROJECT: **1** ASSESSOR'S PARCEL NO: **102-35-003**

THIS AUTHORIZATION EXPIRES AT MIDNIGHT ON THE DAY OF **2/17/2021**

THE DRILLER MUST FILE A WELL DRILLER REPORT AND WELL LOG WITHIN 30 DAYS OF COMPLETION OF DRILLING

This drilling or abandonment authority was granted based upon the certifications made by the above-named Driller in the notice of intent to drill or abandon. Those certifications, along with any variances granted, are listed below. By drilling or abandoning the well pursuant to this authorization, the above-named driller acknowledges the accuracy of the driller certifications. If the certifications are in error this authorization is invalid and driller must contact the Department of Water Resource's NOI Section in writing at the addres above to correct.

Variance(s) Granted To Driller: **None**

Certification(s) Made By Driller:

- ☑ By checking this box, I certify that I have all necessary Registrar of Contractor (ROC) licenses in all necessary license categories for this drilling or abandonment project and that those licenses are current.
- ☑ By checking this box, I certify that I have been authorized by the above-named well owner to submit this Notice of Intent on the well owner's behalf.
- ☑ By checking this box, I certify that the information above is complete and correct, and that the well shall be drilled or abandoned in compliance with all pertinent statutes and rules, including any special standards that may be required to protect the aquifer or other water sources.
- ☑ By checking this box, I certify that this NOI application is not an application to replace, deepen, or modify an existing well.
- ☑ By checking this box, I understand that the Authorization to drill this well DOES NOT constitute or guarantee an approval to use the well for the purpose of withdrawing groundwater for transportation to an Active Management Area (AMA) pursuant to A.R.S. § 45-552, 45-553, 45-554 or 45-555(A) without official prior approval from the Department.

Arizona Department of Water Resources
Groundwater Permitting and Wells
PO Box 36020 • Phoenix, Arizona 85067-6020
(602) 771-8527 • 602-771-8500
www.azwater.gov

Well Driller Report and Well Log

THIS REPORT MUST BE FILED WITHIN 30 DAYS OF COMPLETING THE WELL. PURSUANT TO ARIZONA REVISED STATUTE 45-600 AND A.A.C. RULE R12-15-808.

WELL DRILLER LOGS AND REPORTS CAN ALSO BE DONE ONLINE AT:
http://www.azwater.gov/eForms/Forms/DL/DWR_DL.aspx

FILE NUMBER	D(3-14) 14 DDD
WELL REGISTRATION NUMBER	55 - 923921
PERMIT NUMBER (IF ISSUED)	

SECTION 1. DRILLING AUTHORIZATION

Drilling Firm

Mail To:

NAME: NATIONAL EWP, INC.	DWR LICENSE NUMBER: 823
ADDRESS: 1200 W. SAN PEDRO ST.	TELEPHONE NUMBER: 480-684-0065
CITY / STATE / ZIP: GILBERT, AZ, 85233	FAX:

SECTION 2. REGISTRY INFORMATION

Well Owner

FULL NAME OF COMPANY, ORGANIZATION, OR INDIVIDUAL: RESOLUTION COPPER MINING LLC

MAILING ADDRESS: 102 MAGMA HEIGHTS

CITY / STATE / ZIP: SUPERIOR, AZ, 85173

CONTACT PERSON NAME AND TITLE: Greg Ghidotti

TELEPHONE NUMBER: 520 689-3391 FAX:

WELL NAME (e.g., MW-1, PZ-3, lot 25 Well, Smith Well, etc.): RC20-2 (TCG#1)

COUNTY	ASSESSOR'S PARCEL ID NUMBER (MOST RECENT) BOOK	MAP	PARCEL
GILA	102	35	003

Location of Well

WELL LOCATION ADDRESS (IF ANY): Skunk camp

TOWNSHIP (N/S)	RANGE (E/W)	SECTION	160 ACRE	40 ACRE	10 ACRE
3S	14E	14	SE 1/4	SE 1/4	SE 1/4

LATITUDE DEGREES	MINUTES	SECONDS	LONGITUDE DEGREES	MINUTES	SECONDS
33 °	09 '	52.2 "N	-110 °	52 '	41.6 "W

METHOD OF LATITUDE/LONGITUDE (CHECK ONE): [X] *GPS: Hand-Held [ ] *GPS: Survey-Grade [ ] TOPO

*LATITUDE/LONGITUDE DATUM, GPS (CHECK ONE): [X] NAD83 [ ] NAD27 [ ] WGS84 [ ] Other

METHOD OF ELEVATION (CHECK ONE): [X] *GPS: Hand-Held [ ] *GPS: Survey-Grade [ ] TOPO

LAND SURFACE ELEVATION AT WELL: ELEVATION 3026 Feet Above Sea Level

*ELEVATION DATUM (CHECK ONE): [X] NAVD88 [ ] NGVD29 [ ] OTHER

SECTION 3. WELL CONSTRUCTION DETAILS

Drilling Method

CHECK ONE

- [ ] Air Rotary
- [ ] Bored or Augered
- [ ] Cable Tool
- [ ] Dual Rotary
- [ ] Mud Rotary
- [X] Reverse Circulation
- [ ] Driven
- [ ] Jetted
- [ ] Air Percussion / Odex Tubing
- [ ] Other (please specify)

Method of Well Development

CHECK ONE

- [X] Airlift
- [ ] Bail
- [ ] Surge Block
- [ ] Surge Pump
- [ ] Other (please specify)

Method of Sealing at Reduction Points

CHECK ONE

- [ ] None
- [ ] Packed
- [ ] Swedged
- [ ] Welded
- [X] Other (please specify) Cement

Condition of Well

CHECK ONE

- [X] Capped
- [ ] Pump Installed
- [ ] Abandoned
- [ ] **Not Drilled**

Construction Dates

DATE WELL CONSTRUCTION STARTED: 2.20.2020

DATE WELL CONSTRUCTION COMPLETED: 2.24.2020

I state that this notice is filed in compliance with A.R.S. § 45-596 and is complete and correct to the best of my knowledge and belief.

SIGNATURE OF QUALIFYING PARTY: [signature] DATE: 05/28/2020

Well Driller Report and Well Log

WELL REGISTRATION NUMBER
55 - 923921

SECTION 4. WELL CONSTRUCTION DESIGN (AS BUILD) (attach additional page if needed)

Depth

DEPTH OF BORING	DEPTH OF COMPLETED WELL
600 Feet Below Land Surface	600 Feet Below Land Surface

Water Level Information

STATIC WATER LEVEL	DATE MEASURED	TIME MEASURED	IF FLOWING WELL, METHOD OF FLOW REGULATION
151.1 Feet Below Land Surface	03.04.2020	12:45	☐ Valve ☐ Other:

Borehole			Installed Casing													
DEPTH FROM SURFACE			DEPTH FROM SURFACE			MATERIAL TYPE (X)				PERFORATION TYPE (X)						
FROM (feet)	TO (feet)	BOREHOLE DIAMETER (inches)	FROM (feet)	TO (feet)	OUTER (inches)	STEEL	PVC	ABS	IF OTHER TYPE, DESCRIBE	BLANK OR NONE	WIRE WRAP	SHUTTER SCREEN	MILLS KNIFE	SLOTTED	IF OTHER TYPE, DESCRIBE	SLOT SIZE (inches)
0	20	17.5	+3	20	10.625	x				x						
20	40	10	+2	330	4.5		x		sch.40	x						
40	450	7.75	330	600	4.5		x		sch.40					x	Horizontal	.020
450	600	7.5														

Installed Annular Material

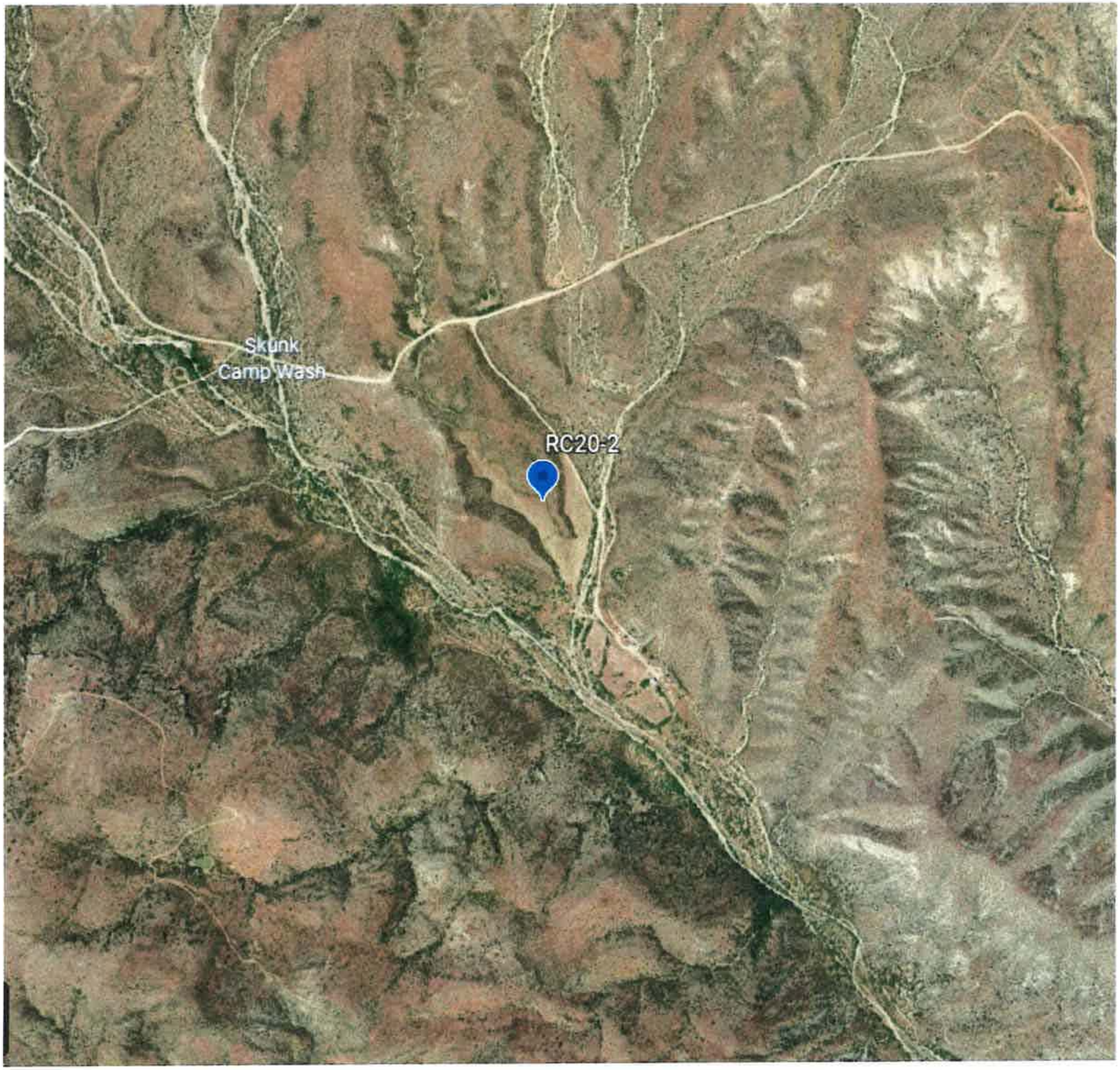
DEPTH FROM SURFACE		ANNULAR MATERIAL TYPE (X)				BENTONITE				FILTER PACK		
FROM (feet)	TO (feet)	NONE	CONCRETE	NEAT CEMENT OR CEMENT GROUT	CEMENT-BENTONITE GROUT	GROUT	CHIPS	PELLETS	IF OTHER TYPE OF ANNULAR MATERIAL, DESCRIBE	SAND	GRAVEL	SIZE
0	242			x								
242	256						x					.375
256	257									x		#60
257	600									x		8 x 12

Well Driller Report and Well Log

WELL REGISTRATION NUMBER
55 - 923921

SECTION 5. GEOLOGIC LOG OF WELL

DEPTH FROM SURFACE FROM (feet)	DEPTH FROM SURFACE TO (feet)	**Description** Describe material, grain size, color, etc.	Check (X) every interval where water was encountered (if known)
0	34	Quaternary Alluvium	
34	600	Gila Conglomerate	x


Skunk
Camp Wash
RC20-2

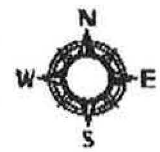
Well Driller Report and Well Log

WELL REGISTRATION NUMBER
55 - 923921

SECTION 6. WELL SITE PLAN

NAME OF WELL OWNER	COUNTY ASSESSOR'S PARCEL ID NUMBER (MOST RECENT)		
	BOOK	MAP	PARCEL
RESOLUTION COPPER MINING LLC	102	35	003

- Required for all wells, please draw the following: (1) the boundaries of property on which the well was located; (2) the well location; (3) the locations of all septic tank systems and sewer systems on the property or within 100 feet of the well location, even if on neighboring properties; and (4) any permanent structures on the property that may aid in locating the well.
- Please indicate the distance between the well location and any septic tank system or sewer system.



1" = ______ ft

See Attached

REAL ESTATE PURCHASE CONTRACT AND ESCROW INSTRUCTIONS

BY THIS REAL ESTATE PURCHASE CONTRACT AND ESCROW INSTRUCTIONS (the "Agreement"), the parties hereto declare, covenant and agree as follows:

ARTICLE I
DEFINITIONS

The following terms are defined as set forth herein for purposes of this Agreement and shall be given such meanings wherever appearing in this Agreement unless the context requires otherwise:

Seller: Rick L. Jodsaas
2360 E. Dripping Springs Road
Winkelman, AZ 85192

Purchaser: Resolution Copper Mining LLC
102 Magma Heights
Box 1944
Superior, AZ 85173

Escrow Agent: Cathy Hansen
Commercial Escrow Officer
Stewart Title & Trust of Tucson
3939 E. Broadway Blvd.
Tucson, AZ 85711

Agreement Date: December ____, 2019

Property: The Property consists of the following real property and real property rights and personal property, to wit:

(1) That certain real property, including without limitation all surface and appurtenant mineral rights, in Pinal and Gila Counties, Arizona, as described in Exhibit A attached hereto.

(2) State of Arizona Grazing Lease Number 05-094729 (the "ASLD Grazing Lease").

(3) Bureau of Land Management Grazing Allotment 04503 Victory Cross (the "BLM Grazing Lease")

(4) All water rights appurtenant to or associated with the property specified in paragraphs (1), (2), and (3) above.

to by the Purchaser, Purchaser shall, within such thirty (30) day period, notify Seller in writing of such fact. If Purchaser does not either accept the condition of the Commitment or object to the condition of the Commitment within said thirty (30) day period, Purchaser shall be deemed to have waived its right to object to such objections at the time of purchasing the Property and such exceptions shall be deemed to be acceptable to Purchaser.

(b) Seller shall, within ten (10) calendar days of receipt of said objection notice, clear the title of the defects from objections so specified. If the results of such preliminary title report show that Seller does not have marketable title to the Property reasonably acceptable to the Purchaser as shown in Purchaser's written notice, and if Seller fails to clear the title of such defects as so objected, Purchaser shall have the right by notice to terminate this Agreement at which time Escrow Agent shall refund the Earnest Payment, and any accrued interest, to Purchaser and this Agreement shall terminate with no further obligations on the part of either Party. Nothing contained in this Paragraph 3.2 shall restrict Purchaser's right to terminate this Agreement for any reason subject to all other terms, specifically Paragraph 2.2, of this Agreement during the Contingency Period.

3.3 Delivery of Survey. Within thirty (30) calendar days after the Effective Date of this Agreement, Purchaser shall commission an ALTA survey of the Property from a registered surveyor acceptable to Purchaser and Escrow Agent. Purchaser shall have ten (10) calendar days from the receipt of the Survey to provide written disapproval, which disapproval shall set forth with specificity the reason(s) for Purchaser's objection(s) to the item(s) shown on the Survey. If no written disapproval is sent by Purchaser, the Survey shall be deemed approved. If Purchaser disapproves of any matter contained in the Survey, Seller shall cooperate fully with Purchaser to resolve the item(s) to which objection has been made. Should Seller, within ten (10) days after receiving notice of the objection, fail to correct or cure any such deficiency as identified in writing by Purchaser, Purchaser may (a) elect to waive this condition precedent and to close this transaction; or (b) cancel and terminate this Agreement subject to all other terms, specifically Paragraph 2.2, of this Agreement. Prior to Closing, Purchaser may adjust the legal description in the General Warranty Deed provided in Exhibit D to conform to the results of the ALTA survey of the Property.

3.4 Purchaser's Access to the Property and Information. From and after the Effective Date, Purchaser and its agents shall have the right to enter upon the Property during normal business hours to conduct surveys, hydrological, topographical, traffic, feasibility and engineering studies and reports, to conduct tests, borings and analyses of the soils and water, to investigate the availability and quality of access, utilities, water and sewage disposal to the Property, and to otherwise inspect the general condition of the Property, the cost of which shall be borne exclusively by Buyer. Buyer hereby agrees to indemnify and hold Seller harmless from any and all liabilities or obligations, including reasonable attorney's fees, incurred as a result of such entrance of Buyer or its agents upon the Property, except as may be due to the acts of Seller, and to return the property to

8.10 Brokers and Expenses. Seller and Purchaser each represent and warrants to the other that it has not dealt with any real estate broker, agent or salesperson in connection with this transaction to whom a commission may be owed other than Walter Lane of Headquarters West representing the Purchaser ("Purchaser's Broker"). Purchaser represents and warrants that it will indemnify and hold Seller harmless from and against any claims of commissions or any other sums owed to Purchaser's Broker resulting from any actions taken or costs incurred by Purchaser's Broker related to this Agreement, including reasonable attorney's fees incurred by Seller. Purchaser agrees to pay a brokerage commission to Purchaser's Broker pursuant to a separate agreement between Broker and Purchaser's Broker. Each party shall indemnify, defend and hold harmless the other on account of any sales commission, brokerage commission or finder's fee, arising or brought by any third party (other than Purchaser's Broker) who has dealt or claims to have dealt with such indemnity party pertaining to the Property.

IN WITNESS WHEREOF, the parties have duly executed this Agreement as of the day and year first above written.

Approved as to Form
RCML Legal
6 December 2019
Hugh Thatcher, Sr Corp Counsel

PURCHASER:
Resolution Copper Mining, LLC

By: Resolution Copper Company, as Manager and not on its own behalf

Andrew Lye
Vice President

Date: December 6, 2019

SELLER:
Rick L. Jodsaas

Rick L. Jodsaas
Print Name

December 17th, 2019
Date

RECEIVED AND ACCEPTED this _____ day of December, 2019:

TITLE COMPANY:

By______________________________

EXHIBIT A

The Property consists of the following parcels of real property and leasehold interests granted by the State of Arizona and the Bureau of Land Management:

Grazing Leases:

State of Arizona Grazing Lease Number 05-094729

Bureau of Land Management Grazing Allotment 04503 Victory Cross

Private Property:

A. Gila County Parcels

PARCEL NO. 1
The Southeast quarter of the Southeast quarter of Section 11, Township 3 South, Range 14 East of the Gila and Salt River Base and Meridian, Gila County, Arizona;

EXCEPTING therefrom all coal, oil, gas and other mineral deposits, as reserved in instrument recorded as Docket 365, Page 822.

PARCEL NO. 2
The South half of the Southwest quarter of Section 11, Township 3 South, Range 14 East of the Gila and Salt River Base and Meridian, Gila County, Arizona;

EXCEPTING therefrom 1/16th interest in all coal, oil, gas and other mineral deposits, as reserved in instrument recorded as Docket 314, Page 211.

PARCEL NO. 3
The Northwest quarter of the Southeast quarter of Section 12, Township 3 South, Range 14 East of the Gila and Salt River Base and Meridian, Gila County, Arizona;

EXCEPTING therefrom all coal, oil, gas and other mineral deposits as reserved in instrument recorded as Docket 365, Page 822.

PARCEL NO. 4
The West half of the Southwest quarter of Section 13, Township 3 South, Range 14 East of the Gila and Salt River Base and Meridian, Gila County, Arizona;

EXCEPTING therefrom all coal, oil, gas and other mineral deposits, as reserved in instrument recorded as Docket 365, Page 822.

PARCEL NO. 5

The Southwest quarter of the Southeast quarter; the Northwest quarter of the Southeast quarter; the East half of the Southeast quarter; the Southeast quarter of the Northwest quarter; the Southwest quarter of the Northwest quarter and the Northeast quarter of the Southwest quarter of Section 14, Township 3 South, Range 14 East of the Gila and Salt River Base and Meridian, Gila County, Arizona.

EXCEPTING therefrom all coal, oil, gas and other mineral deposits, as reserved in instrument recorded as Docket 365, Page 822.

PARCEL NO. 6

The North half of the Northwest quarter of Section 14, Township 3 South, Range 14 East of the Gila and Salt River Base and Meridian, Gila County, Arizona;

EXCEPTING therefrom 1/16th interest in all coal, oil, gas and other mineral deposits, as reserved in instrument recorded as Docket 367, Page 108;

EXCEPTING therefrom 15/16 interest in all coal, oil, gas and other mineral deposits, as reserved in instrument recorded as Docket 365, Page 822.

PARCEL NO. 7

The Northeast quarter of the Northeast quarter of Section 15, Township 3 South, Range 14 East of the Gila and Salt River Base and Meridian, Gila County, Arizona;

EXCEPTING therefrom all coal, oil, gas and other mineral deposits, as reserved in instrument recorded as Docket 251, Page 60.

PARCEL NO. 8

The Southeast quarter of the Northeast quarter of Section 23, Township 3 South, Range 14 East of the Gila and Salt River Base and Meridian, Gila County, Arizona;

EXCEPTING therefrom 1/16th interest in all coal, oil, gas and other mineral deposits as reserved in instrument recorded as Docket 344, Page 966.

EXCEPTING therefrom 15/16 interest in all coal, oil, gas and other mineral deposits, as reserved in instrument recorded as Docket 365, Page 822.

PARCEL NO. 9

The North half of the Northeast quarter of Section 23, Township 3 South, Range 14 East of the Gila and Salt River Base and Meridian, Gila County, Arizona.

EXCEPTING therefrom all coal, oil, gas and other mineral deposits, as reserved in instrument recorded as Docket 365, Page 822.

PARCEL NO. 10

The East half of the Northwest quarter and the Southwest quarter of the Northwest quarter of Section 24, Township 3 South, Range 14 East of the Gila and Salt River Base and Meridian, Gila County, Arizona;

EXCEPTING therefrom all coal, oil, gas and other mineral deposits, as reserved in instrument recorded as Docket 137, Page 63.

PARCEL NO. 11

The Northwest quarter of the Northwest quarter of Section 24, Township 3 South, Range 14 East of the Gila and Salt River Base and Meridian, Gila County, Arizona.

PARCEL NO. 12

The Southwest quarter of the Southeast quarter of Section 29, Township 2 South, Range 15 East of the Gila and Salt River Base and Meridian, Gila County, Arizona.

EXCEPTING therefrom all coal, oil, gas and other mineral deposits, as reserved in instrument recorded as Docket 365, Page 822.

PARCEL NO. 13

The South half of the Southeast quarter of the Northwest quarter and the North half of the Northeast quarter of the Southwest quarter of Section 30, Township 2 South, Range 15 East of the Gila and Salt River Base and Meridian, Gila County, Arizona;

EXCEPTING therefrom all coal, oil, gas and other mineral deposits, as reserved in instrument recorded as Docket 137, Page 65.

PARCEL NO. 14

The Southeast quarter of the Southwest quarter and the South half of the Southeast quarter of Section 31, Township 2 South, Range 15 East of the Gila and Salt River Base and Meridian, Gila County, Arizona;

EXCEPTING therefrom all coal, oil, gas and other mineral deposits, as reserved in instrument recorded as Docket 365, Page 822.

PARCEL NO. 15

The Northeast quarter of the Northwest quarter; the Northwest quarter of the Northeast quarter; and the Southeast quarter of the Northeast quarter of Section 8, Township 3 South, Range 15 East of the Gila and Salt River Base and Meridian, Gila County, Arizona.

EXCEPTING therefrom all coal, oil, gas and other mineral deposits, as reserved in instrument recorded as Docket 365, Page 822.

B. Pinal County Parcel

PARCEL NO. 16

All that portion of Lots 1, 2 and 5 of Section 23, Township 3 South, Range 14 East of the Gila and Salt River Base and Meridian, Pinal County, Arizona, lying Westerly of the Easterly boundary line of Pinal County;

EXCEPT any portion lying within Iron King, Hoosier Bay, Copper King, Copper Depot and Copper Depot 2 Lode Mining Claims as shown on Mineral Survey No. 2447 in Riverside Mining District;

EXCEPT 1/16th of all gas, oil, metals and mineral rights as set forth in ARS 37-231, Subsection C, as reserved in the Patent from the State of Arizona recorded January 09, 1969 as Docket 557, Page 306;

EXCEPTING therefrom all coal, oil, gas and other mineral deposits together with reasonable access for the purpose of exploring for or developing same, as reserved in deed recorded as Docket 759, Page 209.

EXHIBIT B
Lease Agreement

EXHIBIT C
Memorandum of Right of First Refusal

EXHIBIT D
General Warranty Deed

Rio Tinto

One Gateway
426 N. 44th Street, Suite 320
Phoenix AZ 85008
USA
M : +1 (520) 827-0694

Arizona Department of Water Resources
Groundwater Permitting and Wells Section
P.O. Box 36020
Phoenix, Arizona 85067-6020

1110 W. Washington St., Suite 310
Phoenix, AZ 85007-2952

February 14, 2020

Re: Resolution Copper Mining, LLC; Notice of Intent to Drill

To whom it may concern,

Resolution Copper Mining, LLC (RCML) submits the attached Notice of Intent to Drill. The subject property on which the drilling will occur is in escrow to be purchased by RCML. Under section 3.4 of the purchase agreement, attached here for reference, RCML has the right to enter the subject property and conduct drilling. Accordingly, RCML signs and submits the NOI under this authority.

Any questions specific to the status of our rights during the due diligence period may be directed to myself at (520) 827-0694.

The attached purchase agreement contains confidential information. Please do not include it as part of the Department's imaged records.

Sincerely,

Karlene Martorana

Karlene Martorana, Corporate Counsel
Resolution Copper Mining, LLC

ARIZONA DEPARTMENT OF WATER RESOURCES

Phoenix, Arizona 85007

DRILLING CARD

THIS AUTHORIZATION SHALL BE IN POSSESSION OF THE DRILLER DURING ALL DRILLING OPERATIONS

WELL REGISTRATION NO: **55-923957**

AUTHORIZED DRILLER: **NATIONAL EWP, INC.** LICENSE NO: **823**

NOTICE OF INTENT TO **DRILL A ENV - MONITOR WELL** HAS BEEN FILED WITH THE DEPARTMENT BY:

WELL OWNER: **RESOLUTION COPPER MINING LLC**

ADDRESS: **102 MAGMA HEIGHTS, SUPERIOR, AZ, 85173**

THE WELL(S) IS/ARE TO BE LOCATED IN THE:

NE 1/4 of the **NE** 1/4 of the **NE** 1/4 Section **23** Township **03 S** Range **14 E**

NO. OF WELLS IN THIS PROJECT: **1** ASSESSOR'S PARCEL NO: **102-35-011**

THIS AUTHORIZATION EXPIRES AT MIDNIGHT ON THE DAY OF **2/24/2021**

THE DRILLER MUST FILE A WELL DRILLER REPORT AND WELL LOG WITHIN 30 DAYS OF COMPLETION OF DRILLING

This drilling or abandonment authority was granted based upon the certifications made by the above-named Driller in the notice of intent to drill or abandon. Those certifications, along with any variances granted, are listed below. By drilling or abandoning the well pursuant to this authorization, the above-named driller acknowledges the accuracy of the driller certifications. If the certifications are in error this authorization is invalid and driller must contact the Department of Water Resource's NOI Section in writing at the addres above to correct.

Variance(s) Granted To Driller: **None**

Certification(s) Made By Driller:

- ☑ By checking this box, I certify that I have all necessary Registrar of Contractor (ROC) licenses in all necessary license categories for this drilling or abandonment project and that those licenses are current.
- ☑ By checking this box, I certify that I have been authorized by the above-named well owner to submit this Notice of Intent on the well owner's behalf.
- ☑ By checking this box, I certify that the information above is complete and correct, and that the well shall be drilled or abandoned in compliance with all pertinent statutes and rules, including any special standards that may be required to protect the aquifer or other water sources.
- ☑ By checking this box, I certify that this NOI application is not an application to replace, deepen, or modify an existing well.
- ☑ By checking this box, I understand that the Authorization to drill this well DOES NOT constitute or guarantee an approval to use the well for the purpose of withdrawing groundwater for transportation to an Active Management Area (AMA) pursuant to A.R.S. § 45-552, 45-553, 45-554 or 45-555(A) without official prior approval from the Department.

Arizona Department of Water Resources
Groundwater Permitting and Wells
PO Box 36020 • Phoenix, Arizona 85067-6020
(602) 771-8527 • 602-771-8500
www.azwater.gov

Well Driller Report and Well Log

THIS REPORT MUST BE FILED WITHIN 30 DAYS OF COMPLETING THE WELL. PURSUANT TO ARIZONA REVISED STATUTE 45-600 AND A.A.C. RULE R12-15-808.

FILE NUMBER: D(3-14) 23 AAA
WELL REGISTRATION NUMBER: 55 - 923957
PERMIT NUMBER (IF ISSUED):

WELL DRILLER LOGS AND REPORTS CAN ALSO BE DONE ONLINE AT:
http://www.azwater.gov/eForms/Forms/DL/DWR_DL.aspx

SECTION 1. DRILLING AUTHORIZATION

Drilling Firm

Mail To:

NAME: NATIONAL EWP, INC.	DWR LICENSE NUMBER: 823
ADDRESS: 1200 W. SAN PEDRO ST	TELEPHONE NUMBER: 480-684-0065
CITY / STATE / ZIP: GILBERT, AZ, 85233	FAX:

SECTION 2. REGISTRY INFORMATION

Well Owner

FULL NAME OF COMPANY, ORGANIZATION, OR INDIVIDUAL: RESOLUTION COPPER MINING LLC
MAILING ADDRESS: 102 MAGMA HEIGHTS
CITY / STATE / ZIP: SUPERIOR, AZ, 85173
CONTACT PERSON NAME AND TITLE: Greg Ghidotti
TELEPHONE NUMBER: 520 689-3391
FAX:
WELL NAME (e.g., MW-1, PZ-3, lot 25 Well, Smith Well, etc.): RC20-2A (TCG-2)

COUNTY	ASSESSOR'S PARCEL ID NUMBER (MOST RECENT) BOOK	MAP	PARCEL
GILA	102	35	011

Location of Well

WELL LOCATION ADDRESS (IF ANY): Skunk Camp

TOWNSHIP (N/S)	RANGE (E/W)	SECTION	160 ACRE	40 ACRE	10 ACRE
3S	14E	23	NE 1/4	NE 1/4	NE 1/4

LATITUDE DEGREES	MINUTES	SECONDS	LONGITUDE DEGREES	MINUTES	SECONDS
33 °	09 '	44.2 "N	-110 °	52 '	44.5 "W

METHOD OF LATITUDE/LONGITUDE (CHECK ONE): ☒ *GPS: Hand-Held ☐ *GPS: Survey-Grade ☐ TOPO

*LATITUDE/LONGITUDE DATUM, GPS (CHECK ONE): ☒ NAD83 ☐ NAD27 ☐ WGS84 ☐ Other

METHOD OF ELEVATION (CHECK ONE): ☒ *GPS: Hand-Held ☐ *GPS: Survey-Grade ☐ TOPO

LAND SURFACE ELEVATION AT WELL: ELEVATION 2996 Feet Above Sea Level

*ELEVATION DATUM (CHECK ONE): ☒ NAVD88 ☐ NGVD29 ☐ OTHER

SECTION 3. WELL CONSTRUCTION DETAILS

Drilling Method

CHECK ONE
- ☐ Air Rotary
- ☐ Bored or Augered
- ☐ Cable Tool
- ☐ Dual Rotary
- ☐ Mud Rotary
- ☒ Reverse Circulation
- ☐ Driven
- ☐ Jetted
- ☐ Air Percussion / Odex Tubing
- ☐ Other (please specify)

Method of Well Development

CHECK ONE
- ☒ Airlift
- ☐ Bail
- ☐ Surge Block
- ☐ Surge Pump
- ☐ Other (please specify)

Condition of Well

CHECK ONE
- ☒ Capped
- ☐ Pump Installed
- ☐ Abandoned
- ☐ **Not Drilled**

Method of Sealing at Reduction Points

CHECK ONE
- ☐ None
- ☐ Packed
- ☐ Swedged
- ☐ Welded
- ☒ Other (please specify) cement

Construction Dates

DATE WELL CONSTRUCTION STARTED: 02.26.2020
DATE WELL CONSTRUCTION COMPLETED: 03.01.2020

I state that this notice is filed in compliance with A.R.S. § 45-596 and is complete and correct to the best of my knowledge and belief.

SIGNATURE OF QUALIFYING PARTY:
DATE: 05/28/2020

Well Driller Report and Well Log

WELL REGISTRATION NUMBER
55 - 923957

SECTION 4. WELL CONSTRUCTION DESIGN (AS BUILD) (attach additional page if needed)

Depth

DEPTH OF BORING	DEPTH OF COMPLETED WELL
600 Feet Below Land Surface	599.5 Feet Below Land Surface

Water Level Information

STATIC WATER LEVEL	DATE MEASURED	TIME MEASURED	IF FLOWING WELL, METHOD OF FLOW REGULATION
132 Feet Below Land Surface	03.04.2020	12:00	☐ Valve ☐ Other:

Borehole

DEPTH FROM SURFACE FROM (feet)	DEPTH FROM SURFACE TO (feet)	BOREHOLE DIAMETER (inches)
0	20	12.75
20	70	10
70	480	7.75
480	600	7.5

Installed Casing

DEPTH FROM SURFACE FROM (feet)	DEPTH FROM SURFACE TO (feet)	OUTER (inches)	MATERIAL TYPE (X) STEEL	PVC	ABS	IF OTHER TYPE, DESCRIBE	PERFORATION TYPE (X) BLANK OR NONE	WIRE WRAP	SHUTTER SCREEN	MILLS KNIFE	SLOTTED	IF OTHER TYPE, DESCRIBE	SLOT SIZE (inches)
+3	20	10.625	x				x						
+2	268	4.5		x			x						
268	599.5	4.5		x							x	Horizontal	.020

Installed Annular Material

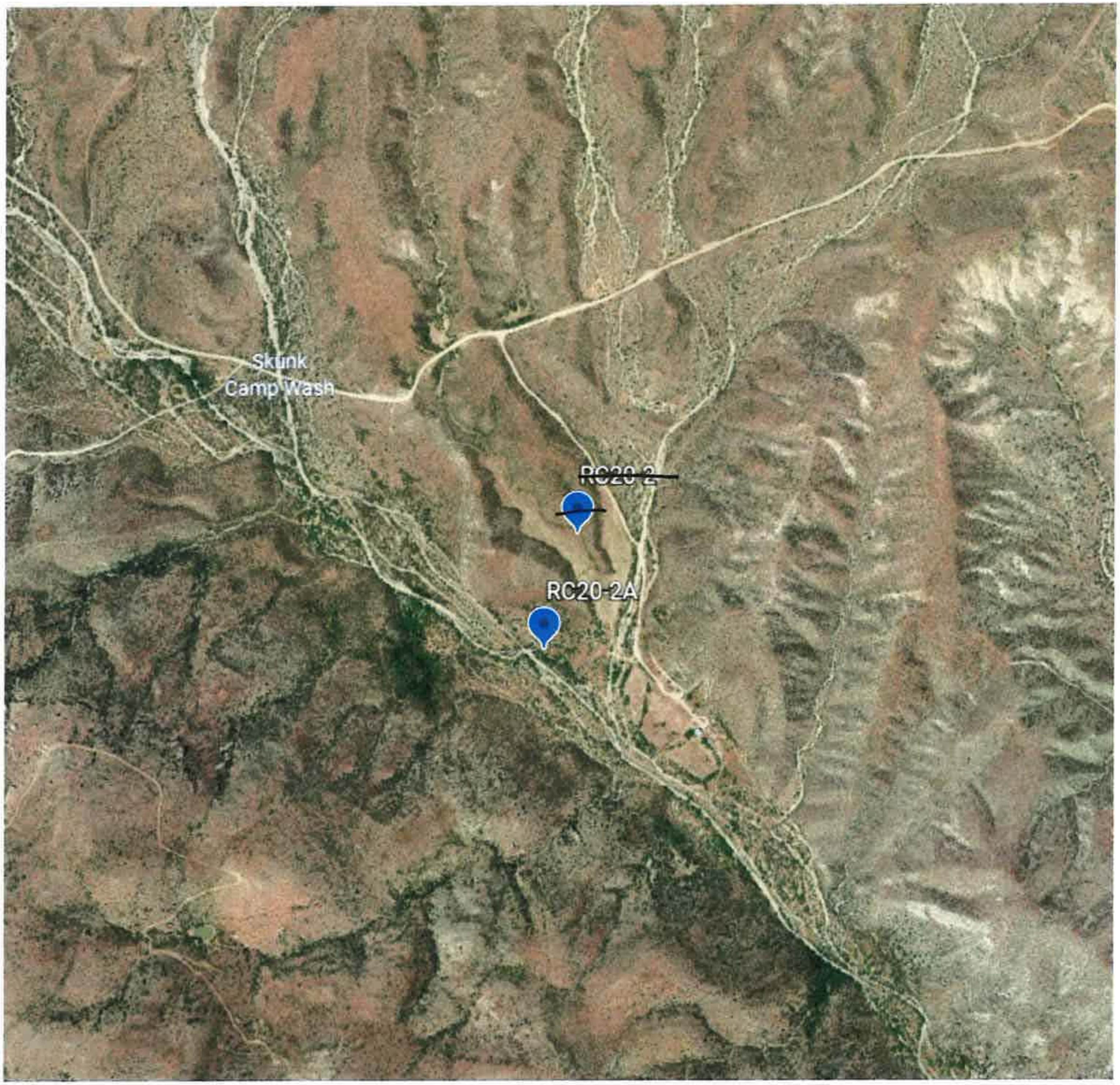
DEPTH FROM SURFACE FROM (feet)	DEPTH FROM SURFACE TO (feet)	ANNULAR MATERIAL TYPE (X) NONE	CONCRETE	NEAT CEMENT OR CEMENT GROUT	CEMENT-BENTONITE GROUT	BENTONITE GROUT	BENTONITE CHIPS	BENTONITE PELLETS	IF OTHER TYPE OF ANNULAR MATERIAL, DESCRIBE	FILTER PACK SAND	GRAVEL	SIZE
0	245			x								
245	255						x					.375
255	257									x		#60
257	600									x		8 x 12

Well Driller Report and Well Log

WELL REGISTRATION NUMBER
55 - 923957

SECTION 5. GEOLOGIC LOG OF WELL

DEPTH FROM SURFACE FROM (feet)	DEPTH FROM SURFACE TO (feet)	**Description** Describe material, grain size, color, etc.	Check (X) every interval where water was encountered (if known)
0	62	Quanternary Alluvium	
62	600	Gila Conglomerate	x


Skunk Camp Wash
~~RC20-2~~
RC20-2A

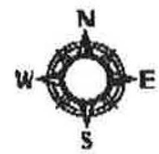
Well Driller Report and Well Log

WELL REGISTRATION NUMBER
55 - 923957

SECTION 6. WELL SITE PLAN

NAME OF WELL OWNER	COUNTY ASSESSOR'S PARCEL ID NUMBER (MOST RECENT)		
	BOOK	MAP	PARCEL
RESOLUTION COPPER MINING LLC	102	35	011

- Required for all wells, please draw the following: (1) the boundaries of property on which the well was located; (2) the well location; (3) the locations of all septic tank systems and sewer systems on the property or within 100 feet of the well location, even if on neighboring properties; and (4) any permanent structures on the property that may aid in locating the well.
- Please indicate the distance between the well location and any septic tank system or sewer system.



1" = ______ ft

REAL ESTATE PURCHASE CONTRACT AND ESCROW INSTRUCTIONS

BY THIS REAL ESTATE PURCHASE CONTRACT AND ESCROW INSTRUCTIONS (the "Agreement"), the parties hereto declare, covenant and agree as follows:

ARTICLE I
DEFINITIONS

The following terms are defined as set forth herein for purposes of this Agreement and shall be given such meanings wherever appearing in this Agreement unless the context requires otherwise:

Seller: Rick L. Jodsaas
2360 E. Dripping Springs Road
Winkelman, AZ 85192

Purchaser: Resolution Copper Mining LLC
102 Magma Heights
Box 1944
Superior, AZ 85173

Escrow Agent: Cathy Hansen
Commercial Escrow Officer
Stewart Title & Trust of Tucson
3939 E. Broadway Blvd.
Tucson, AZ 85711

Agreement Date: December ____, 2019

Property: The Property consists of the following real property and real property rights and personal property, to wit:

(1) That certain real property, including without limitation all surface and appurtenant mineral rights, in Pinal and Gila Counties, Arizona, as described in Exhibit A attached hereto.

(2) State of Arizona Grazing Lease Number 05-094729 (the "ASLD Grazing Lease").

(3) Bureau of Land Management Grazing Allotment 04503 Victory Cross (the "BLM Grazing Lease")

(4) All water rights appurtenant to or associated with the property specified in paragraphs (1), (2), and (3) above.

to by the Purchaser, Purchaser shall, within such thirty (30) day period, notify Seller in writing of such fact. If Purchaser does not either accept the condition of the Commitment or object to the condition of the Commitment within said thirty (30) day period, Purchaser shall be deemed to have waived its right to object to such objections at the time of purchasing the Property and such exceptions shall be deemed to be acceptable to Purchaser.

(b) Seller shall, within ten (10) calendar days of receipt of said objection notice, clear the title of the defects from objections so specified. If the results of such preliminary title report show that Seller does not have marketable title to the Property reasonably acceptable to the Purchaser as shown in Purchaser's written notice, and if Seller fails to clear the title of such defects as so objected, Purchaser shall have the right by notice to terminate this Agreement at which time Escrow Agent shall refund the Earnest Payment, and any accrued interest, to Purchaser and this Agreement shall terminate with no further obligations on the part of either Party. Nothing contained in this Paragraph 3.2 shall restrict Purchaser's right to terminate this Agreement for any reason subject to all other terms, specifically Paragraph 2.2, of this Agreement during the Contingency Period.

3.3 Delivery of Survey. Within thirty (30) calendar days after the Effective Date of this Agreement, Purchaser shall commission an ALTA survey of the Property from a registered surveyor acceptable to Purchaser and Escrow Agent. Purchaser shall have ten (10) calendar days from the receipt of the Survey to provide written disapproval, which disapproval shall set forth with specificity the reason(s) for Purchaser's objection(s) to the item(s) shown on the Survey. If no written disapproval is sent by Purchaser, the Survey shall be deemed approved. If Purchaser disapproves of any matter contained in the Survey, Seller shall cooperate fully with Purchaser to resolve the item(s) to which objection has been made. Should Seller, within ten (10) days after receiving notice of the objection, fail to correct or cure any such deficiency as identified in writing by Purchaser, Purchaser may (a) elect to waive this condition precedent and to close this transaction; or (b) cancel and terminate this Agreement subject to all other terms, specifically Paragraph 2.2, of this Agreement. Prior to Closing, Purchaser may adjust the legal description in the General Warranty Deed provided in Exhibit D to conform to the results of the ALTA survey of the Property.

3.4 Purchaser's Access to the Property and Information. From and after the Effective Date, Purchaser and its agents shall have the right to enter upon the Property during normal business hours to conduct surveys, hydrological, topographical, traffic, feasibility and engineering studies and reports, to conduct tests, borings and analyses of the soils and water, to investigate the availability and quality of access, utilities, water and sewage disposal to the Property, and to otherwise inspect the general condition of the Property, the cost of which shall be borne exclusively by Buyer. Buyer hereby agrees to indemnify and hold Seller harmless from any and all liabilities or obligations, including reasonable attorney's fees, incurred as a result of such entrance of Buyer or its agents upon the Property, except as may be due to the acts of Seller, and to return the property to

8.10 Brokers and Expenses. Seller and Purchaser each represent and warrants to the other that it has not dealt with any real estate broker, agent or salesperson in connection with this transaction to whom a commission may be owed other than Walter Lane of Headquarters West representing the Purchaser ("Purchaser's Broker"). Purchaser represents and warrants that it will indemnify and hold Seller harmless from and against any claims of commissions or any other sums owed to Purchaser's Broker resulting from any actions taken or costs incurred by Purchaser's Broker related to this Agreement, including reasonable attorney's fees incurred by Seller. Purchaser agrees to pay a brokerage commission to Purchaser's Broker pursuant to a separate agreement between Broker and Purchaser's Broker. Each party shall indemnify, defend and hold harmless the other on account of any sales commission, brokerage commission or finder's fee, arising or brought by any third party (other than Purchaser's Broker) who has dealt or claims to have dealt with such indemnity party pertaining to the Property.

IN WITNESS WHEREOF, the parties have duly executed this Agreement as of the day and year first above written.

Approved as to Form
RCML Legal
6 December 2019
Hugh Thatcher, Sr Corp Counsel

PURCHASER:
Resolution Copper Mining, LLC

By: Resolution Copper Company, as Manager and not on its own behalf

____
Andrew Lye
Vice President

Date: December 6, 2019

SELLER:
Rick L. Jodsaas

____

Rick L. Jodsaas
Print Name

December 17th, 2019
Date

RECEIVED AND ACCEPTED this ______
day of December, 2019:

TITLE COMPANY:

By________________________________

EXHIBIT A

The Property consists of the following parcels of real property and leasehold interests granted by the State of Arizona and the Bureau of Land Management:

Grazing Leases:

State of Arizona Grazing Lease Number 05-094729

Bureau of Land Management Grazing Allotment 04503 Victory Cross

Private Property:

A. Gila County Parcels

PARCEL NO. 1
The Southeast quarter of the Southeast quarter of Section 11, Township 3 South, Range 14 East of the Gila and Salt River Base and Meridian, Gila County, Arizona;

EXCEPTING therefrom all coal, oil, gas and other mineral deposits, as reserved in instrument recorded as Docket 365, Page 822.

PARCEL NO. 2
The South half of the Southwest quarter of Section 11, Township 3 South, Range 14 East of the Gila and Salt River Base and Meridian, Gila County, Arizona;

EXCEPTING therefrom 1/16th interest in all coal, oil, gas and other mineral deposits, as reserved in instrument recorded as Docket 314, Page 211.

PARCEL NO. 3
The Northwest quarter of the Southeast quarter of Section 12, Township 3 South, Range 14 East of the Gila and Salt River Base and Meridian, Gila County, Arizona;

EXCEPTING therefrom all coal, oil, gas and other mineral deposits as reserved in instrument recorded as Docket 365, Page 822.

PARCEL NO. 4
The West half of the Southwest quarter of Section 13, Township 3 South, Range 14 East of the Gila and Salt River Base and Meridian, Gila County, Arizona;

EXCEPTING therefrom all coal, oil, gas and other mineral deposits, as reserved in instrument recorded as Docket 365, Page 822.

PARCEL NO. 5

The Southwest quarter of the Southeast quarter; the Northwest quarter of the Southeast quarter; the East half of the Southeast quarter; the Southeast quarter of the Northwest quarter; the Southwest quarter of the Northwest quarter and the Northeast quarter of the Southwest quarter of Section 14, Township 3 South, Range 14 East of the Gila and Salt River Base and Meridian, Gila County, Arizona.

EXCEPTING therefrom all coal, oil, gas and other mineral deposits, as reserved in instrument recorded as Docket 365, Page 822.

PARCEL NO. 6

The North half of the Northwest quarter of Section 14, Township 3 South, Range 14 East of the Gila and Salt River Base and Meridian, Gila County, Arizona;

EXCEPTING therefrom 1/16th interest in all coal, oil, gas and other mineral deposits, as reserved in instrument recorded as Docket 367, Page 108;

EXCEPTING therefrom 15/16 interest in all coal, oil, gas and other mineral deposits, as reserved in instrument recorded as Docket 365, Page 822.

PARCEL NO. 7

The Northeast quarter of the Northeast quarter of Section 15, Township 3 South, Range 14 East of the Gila and Salt River Base and Meridian, Gila County, Arizona;

EXCEPTING therefrom all coal, oil, gas and other mineral deposits, as reserved in instrument recorded as Docket 251, Page 60.

PARCEL NO. 8

The Southeast quarter of the Northeast quarter of Section 23, Township 3 South, Range 14 East of the Gila and Salt River Base and Meridian, Gila County, Arizona;

EXCEPTING therefrom 1/16th interest in all coal, oil, gas and other mineral deposits as reserved in instrument recorded as Docket 344, Page 966.

EXCEPTING therefrom 15/16 interest in all coal, oil, gas and other mineral deposits, as reserved in instrument recorded as Docket 365, Page 822.

PARCEL NO. 9

The North half of the Northeast quarter of Section 23, Township 3 South, Range 14 East of the Gila and Salt River Base and Meridian, Gila County, Arizona.

EXCEPTING therefrom all coal, oil, gas and other mineral deposits, as reserved in instrument recorded as Docket 365, Page 822.

PARCEL NO. 10

The East half of the Northwest quarter and the Southwest quarter of the Northwest quarter of Section 24, Township 3 South, Range 14 East of the Gila and Salt River Base and Meridian, Gila County, Arizona;

EXCEPTING therefrom all coal, oil, gas and other mineral deposits, as reserved in instrument recorded as Docket 137, Page 63.

PARCEL NO. 11

The Northwest quarter of the Northwest quarter of Section 24, Township 3 South, Range 14 East of the Gila and Salt River Base and Meridian, Gila County, Arizona.

PARCEL NO. 12

The Southwest quarter of the Southeast quarter of Section 29, Township 2 South, Range 15 East of the Gila and Salt River Base and Meridian, Gila County, Arizona.

EXCEPTING therefrom all coal, oil, gas and other mineral deposits, as reserved in instrument recorded as Docket 365, Page 822.

PARCEL NO. 13

The South half of the Southeast quarter of the Northwest quarter and the North half of the Northeast quarter of the Southwest quarter of Section 30, Township 2 South, Range 15 East of the Gila and Salt River Base and Meridian, Gila County, Arizona;

EXCEPTING therefrom all coal, oil, gas and other mineral deposits, as reserved in instrument recorded as Docket 137, Page 65.

PARCEL NO. 14

The Southeast quarter of the Southwest quarter and the South half of the Southeast quarter of Section 31, Township 2 South, Range 15 East of the Gila and Salt River Base and Meridian, Gila County, Arizona;

EXCEPTING therefrom all coal, oil, gas and other mineral deposits, as reserved in instrument recorded as Docket 365, Page 822.

PARCEL NO. 15

The Northeast quarter of the Northwest quarter; the Northwest quarter of the Northeast quarter; and the Southeast quarter of the Northeast quarter of Section 8, Township 3 South, Range 15 East of the Gila and Salt River Base and Meridian, Gila County, Arizona.

EXCEPTING therefrom all coal, oil, gas and other mineral deposits, as reserved in instrument recorded as Docket 365, Page 822.

B. Pinal County Parcel

PARCEL NO. 16
All that portion of Lots 1, 2 and 5 of Section 23, Township 3 South, Range 14 East of the Gila and Salt River Base and Meridian, Pinal County, Arizona, lying Westerly of the Easterly boundary line of Pinal County;

EXCEPT any portion lying within Iron King, Hoosier Bay, Copper King, Copper Depot and Copper Depot 2 Lode Mining Claims as shown on Mineral Survey No. 2447 in Riverside Mining District;

EXCEPT 1/16th of all gas, oil, metals and mineral rights as set forth in ARS 37-231, Subsection C, as reserved in the Patent from the State of Arizona recorded January 09, 1969 as Docket 557, Page 306;

EXCEPTING therefrom all coal, oil, gas and other mineral deposits together with reasonable access for the purpose of exploring for or developing same, as reserved in deed recorded as Docket 759, Page 209.

EXHIBIT B
Lease Agreement

EXHIBIT C
Memorandum of Right of First Refusal

EXHIBIT D
General Warranty Deed

RioTinto

One Gateway
426 N. 44th Street, Suite 320
Phoenix AZ 85008
USA
M : +1 (520) 827-0694

Arizona Department of Water Resources
Groundwater Permitting and Wells Section
P.O. Box 36020
Phoenix, Arizona 85067-6020

1110 W. Washington St., Suite 310
Phoenix, AZ 85007-2952

February 14, 2020

Re: Resolution Copper Mining, LLC; Notice of Intent to Drill

To whom it may concern,

Resolution Copper Mining, LLC (RCML) submits the attached Notice of Intent to Drill. The subject property on which the drilling will occur is in escrow to be purchased by RCML. Under section 3.4 of the purchase agreement, attached here for reference, RCML has the right to enter the subject property and conduct drilling. Accordingly, RCML signs and submits the NOI under this authority.

Any questions specific to the status of our rights during the due diligence period may be directed to myself at (520) 827-0694.

The attached purchase agreement contains confidential information. Please do not include it as part of the Department's imaged records.

Sincerely,

Karlene Martorana

Karlene Martorana, Corporate Counsel
Resolution Copper Mining, LLC

ARIZONA DEPARTMENT OF WATER RESOURCES

Phoenix, Arizona 85007

DRILLING CARD

THIS AUTHORIZATION SHALL BE IN POSSESSION OF THE DRILLER DURING ALL DRILLING OPERATIONS

WELL REGISTRATION NO: **55-923971**

AUTHORIZED DRILLER: **NATIONAL EWP, INC.** LICENSE NO: **823**

NOTICE OF INTENT TO **DRILL A ENV - MONITOR WELL** HAS BEEN FILED WITH THE DEPARTMENT BY:

WELL OWNER: **RESOLUTION COPPER MINING LLC**

ADDRESS: **102 MAGMA HEIGHTS, SUPERIOR, AZ, 85173**

THE WELL(S) IS/ARE TO BE LOCATED IN THE:

NE 1/4 of the **NE** 1/4 of the **NE** 1/4 Section **23** Township **03 S** Range **14 E**

NO. OF WELLS IN THIS PROJECT: **1** ASSESSOR'S PARCEL NO: **102-35-011**

THIS AUTHORIZATION EXPIRES AT MIDNIGHT ON THE DAY OF **2/28/2021**

THE DRILLER MUST FILE A WELL DRILLER REPORT AND WELL LOG WITHIN 30 DAYS OF COMPLETION OF DRILLING

This drilling or abandonment authority was granted based upon the certifications made by the above-named Driller in the notice of intent to drill or abandon. Those certifications, along with any variances granted, are listed below. By drilling or abandoning the well pursuant to this authorization, the above-named driller acknowledges the accuracy of the driller certifications. If the certifications are in error this authorization is invalid and driller must contact the Department of Water Resource's NOI Section in writing at the address above to correct.

Variance(s) Granted To Driller: **None**

Certification(s) Made By Driller:

☑ By checking this box, I certify that I have all necessary Registrar of Contractor (ROC) licenses in all necessary license categories for this drilling or abandonment project and that those licenses are current.

☑ By checking this box, I certify that I have been authorized by the above-named well owner to submit this Notice of Intent on the well owner's behalf.

☑ By checking this box, I certify that the information above is complete and correct, and that the well shall be drilled or abandoned in compliance with all pertinent statutes and rules, including any special standards that may be required to protect the aquifer or other water sources.

☑ By checking this box, I certify that this NOI application is not an application to replace, deepen, or modify an existing well.

☑ By checking this box, I understand that the Authorization to drill this well DOES NOT constitute or guarantee an approval to use the well for the purpose of withdrawing groundwater for transportation to an Active Management Area (AMA) pursuant to A.R.S. § 45-552, 45-553, 45-554 or 45-555(A) without official prior approval from the Department.

Arizona Department of Water Resources
Groundwater Permitting and Wells
PO Box 36020 • Phoenix, Arizona 85067-6020
(602) 771-8527 • 602-771-8500
www.azwater.gov

Well Driller Report and Well Log

THIS REPORT MUST BE FILED WITHIN 30 DAYS OF COMPLETING THE WELL PURSUANT TO ARIZONA REVISED STATUTE 45-600 AND A.A.C. RULE R12-15-808.

WELL DRILLER LOGS AND REPORTS CAN ALSO BE DONE ONLINE AT:
http://www.azwater.gov/eForms/Forms/DL/DWR_DL.aspx

FILE NUMBER: **D(3-14) 23 AAA**
WELL REGISTRATION NUMBER: **55 - 923971**
PERMIT NUMBER (IF ISSUED):

SECTION 1. DRILLING AUTHORIZATION

Drilling Firm

Mail To:

NAME: NATIONAL EWP, INC.	DWR LICENSE NUMBER: 823
ADDRESS: 1200 W. SAN PEDRO ST.	TELEPHONE NUMBER: 480-684-0065
CITY / STATE / ZIP: GILBERT, AZ, 85233	FAX:

SECTION 2. REGISTRY INFORMATION

Well Owner

FULL NAME OF COMPANY, ORGANIZATION, OR INDIVIDUAL: RESOLUTION COPPER MINING LLC
MAILING ADDRESS: 102 MAGMA HEIGHTS
CITY / STATE / ZIP: SUPERIOR, AZ, 85173
CONTACT PERSON NAME AND TITLE: Greg Ghidotti
TELEPHONE NUMBER: 520 689-3391
FAX:
WELL NAME (e.g., MW-1, PZ-3, lot 25 Well, Smith Well, etc.): RC20-2B (DC#1)

COUNTY	ASSESSOR'S PARCEL ID NUMBER (MOST RECENT) BOOK	MAP	PARCEL
GILA	102	35	011

Location of Well

WELL LOCATION ADDRESS (IF ANY): Skunk Camp

TOWNSHIP (N/S)	RANGE (E/W)	SECTION	160 ACRE	40 ACRE	10 ACRE
3S	14E	23	NE 1/4	NE 1/4	NE 1/4

LATITUDE DEGREES	MINUTES	SECONDS	LONGITUDE DEGREES	MINUTES	SECONDS
33°	09'	45.0" N	-110°	52'	44.7" W

METHOD OF LATITUDE/LONGITUDE (CHECK ONE): [X] *GPS: Hand-Held [ ] *GPS: Survey-Grade [ ] TOPO

*LATITUDE/LONGITUDE DATUM, GPS (CHECK ONE): [X] NAD83 [ ] NAD27 [ ] WGS84 [ ] Other

METHOD OF ELEVATION (CHECK ONE): [X] *GPS: Hand-Held [ ] *GPS: Survey-Grade [ ] TOPO

LAND SURFACE ELEVATION AT WELL: ELEVATION 2998 Feet Above Sea Level

*ELEVATION DATUM (CHECK ONE): [X] NAVD88 [ ] NGVD29 [ ] OTHER

SECTION 3. WELL CONSTRUCTION DETAILS

Drilling Method

CHECK ONE
- [ ] Air Rotary
- [ ] Bored or Augered
- [ ] Cable Tool
- [ ] Dual Rotary
- [ ] Mud Rotary
- [X] Reverse Circulation
- [ ] Driven
- [ ] Jetted
- [ ] Air Percussion / Odex Tubing
- [ ] Other (please specify)

Method of Well Development

CHECK ONE
- [X] Airlift
- [ ] Bail
- [ ] Surge Block
- [ ] Surge Pump
- [ ] Other (please specify)

Condition of Well

CHECK ONE
- [X] Capped
- [ ] Pump Installed
- [ ] Abandoned
- [ ] **Not Drilled**

Method of Sealing at Reduction Points

CHECK ONE
- [ ] None
- [ ] Packed
- [ ] Swedged
- [ ] Welded
- [X] Other (please specify) Neat Cement

Construction Dates

DATE WELL CONSTRUCTION STARTED: 03.02.2020
DATE WELL CONSTRUCTION COMPLETED: 03.03.2020

I state that this notice is filed in compliance with A.R.S. § 45-596 and is complete and correct to the best of my knowledge and belief.

SIGNATURE OF QUALIFYING PARTY:
DATE: 05/28/2020

Well Driller Report and Well Log

WELL REGISTRATION NUMBER
55 - 923971

SECTION 4. WELL CONSTRUCTION DESIGN (AS BUILD) (attach additional page if needed)

Depth

DEPTH OF BORING	DEPTH OF COMPLETED WELL
156 Feet Below Land Surface	155 Feet Below Land Surface

Water Level Information

STATIC WATER LEVEL	DATE MEASURED	TIME MEASURED	IF FLOWING WELL, METHOD OF FLOW REGULATION
127 Feet Below Land Surface	03.04.20	23:50	☐ Valve ☐ Other:

Borehole			Installed Casing													
DEPTH FROM SURFACE			DEPTH FROM SURFACE			MATERIAL TYPE (X)				PERFORATION TYPE (X)						
FROM (feet)	TO (feet)	BOREHOLE DIAMETER (inches)	FROM (feet)	TO (feet)	OUTER (inches)	STEEL	PVC	ABS	IF OTHER TYPE, DESCRIBE	BLANK OR NONE	WIRE WRAP	SHUTTER SCREEN	MILLS KNIFE	SLOTTED	IF OTHER TYPE, DESCRIBE	SLOT SIZE (inches)
0	20	17.5	0	20	10.625	x				x						
20	92	10	+2	115	2.375		x			x						
92	156	7.75	115	155	2.375		x							x		.020
			+2	50	2.375		x			x						
			50	90	2.375		x							x		.020

Installed Annular Material

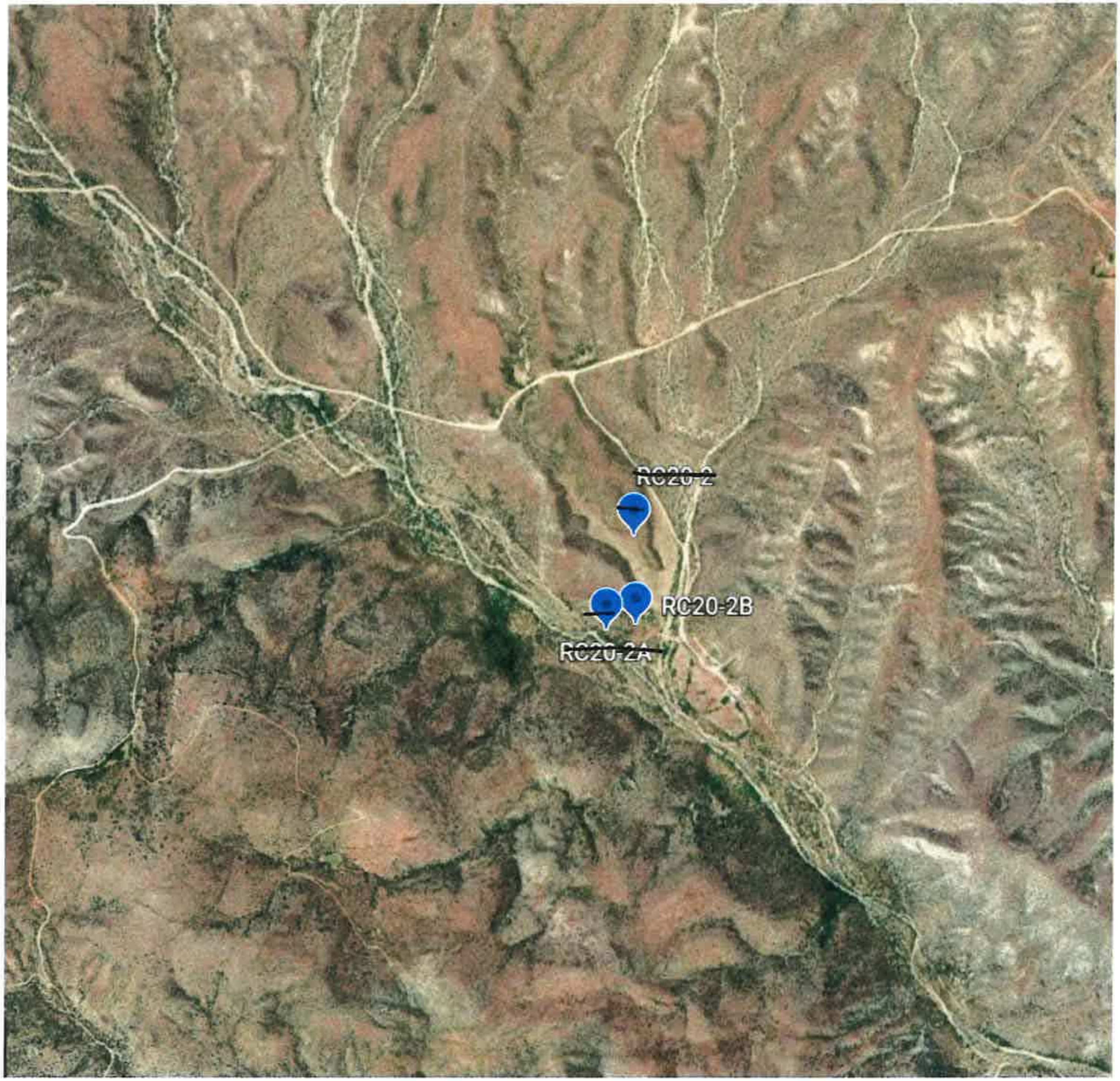
DEPTH FROM SURFACE		ANNULAR MATERIAL TYPE (X)								FILTER PACK		
						BENTONITE						
FROM (feet)	TO (feet)	NONE	CONCRETE	NEAT CEMENT OR CEMENT GROUT	CEMENT-BENTONITE GROUT	GROUT	CHIPS	PELLETS	IF OTHER TYPE OF ANNULAR MATERIAL, DESCRIBE	SAND	GRAVEL	SIZE
0	20			x								
20	30						x					3/8
30	87									x		8x12
87	97						x					
97	156									x		8x12

Well Driller Report and Well Log

WELL REGISTRATION NUMBER
55 - 923971

SECTION 5. GEOLOGIC LOG OF WELL

DEPTH FROM SURFACE FROM (feet)	DEPTH FROM SURFACE TO (feet)	Description Describe material, grain size, color, etc.	Check (X) every interval where water was encountered (if known)
0	90	Quanternary Alluvium	
90	156	Gila Conglomerate	x


~~RC20-2~~
RC20-2B
~~RC20-2A~~

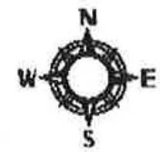
Well Driller Report and Well Log

WELL REGISTRATION NUMBER
55 - 923971

SECTION 6. WELL SITE PLAN

NAME OF WELL OWNER	COUNTY ASSESSOR'S PARCEL ID NUMBER (MOST RECENT) BOOK	MAP	PARCEL
RESOLUTION COPPER MINING LLC	102	35	011

- Required for all wells, please draw the following: (1) the boundaries of property on which the well was located; (2) the well location; (3) the locations of all septic tank systems and sewer systems on the property or within 100 feet of the well location, even if on neighboring properties; and (4) any permanent structures on the property that may aid in locating the well.
- Please indicate the distance between the well location and any septic tank system or sewer system.



1" = ______ ft

See Attached

RioTinto

One Gateway
426 N. 44th Street, Suite 320
Phoenix AZ 85008
USA
M : +1 (520) 827-0694

Arizona Department of Water Resources
Groundwater Permitting and Wells Section
P.O. Box 36020
Phoenix, Arizona 85067-6020

1110 W. Washington St., Suite 310
Phoenix, AZ 85007-2952

February 14, 2020

Re: Resolution Copper Mining, LLC; Notice of Intent to Drill

To whom it may concern,

Resolution Copper Mining, LLC (RCML) submits the attached Notice of Intent to Drill. The subject property on which the drilling will occur is in escrow to be purchased by RCML. Under section 3.4 of the purchase agreement, attached here for reference, RCML has the right to enter the subject property and conduct drilling. Accordingly, RCML signs and submits the NOI under this authority.

Any questions specific to the status of our rights during the due diligence period may be directed to myself at (520) 827-0694.

The attached purchase agreement contains confidential information. Please do not include it as part of the Department's imaged records.

Sincerely,

Karlene Martorana

Karlene Martorana, Corporate Counsel
Resolution Copper Mining, LLC

REAL ESTATE PURCHASE CONTRACT AND ESCROW INSTRUCTIONS

BY THIS REAL ESTATE PURCHASE CONTRACT AND ESCROW INSTRUCTIONS (the "Agreement"), the parties hereto declare, covenant and agree as follows:

ARTICLE I
DEFINITIONS

The following terms are defined as set forth herein for purposes of this Agreement and shall be given such meanings wherever appearing in this Agreement unless the context requires otherwise:

Seller: Rick L. Jodsaas
2360 E. Dripping Springs Road
Winkelman, AZ 85192

Purchaser: Resolution Copper Mining LLC
102 Magma Heights
Box 1944
Superior, AZ 85173

Escrow Agent: Cathy Hansen
Commercial Escrow Officer
Stewart Title & Trust of Tucson
3939 E. Broadway Blvd.
Tucson, AZ 85711

Agreement Date: December ____, 2019

Property: The Property consists of the following real property and real property rights and personal property, to wit:

(1) That certain real property, including without limitation all surface and appurtenant mineral rights, in Pinal and Gila Counties, Arizona, as described in Exhibit A attached hereto.

(2) State of Arizona Grazing Lease Number 05-094729 (the "ASLD Grazing Lease").

(3) Bureau of Land Management Grazing Allotment 04503 Victory Cross (the "BLM Grazing Lease")

(4) All water rights appurtenant to or associated with the property specified in paragraphs (1), (2), and (3) above.

to by the Purchaser, Purchaser shall, within such thirty (30) day period, notify Seller in writing of such fact. If Purchaser does not either accept the condition of the Commitment or object to the condition of the Commitment within said thirty (30) day period, Purchaser shall be deemed to have waived its right to object to such objections at the time of purchasing the Property and such exceptions shall be deemed to be acceptable to Purchaser.

(b) Seller shall, within ten (10) calendar days of receipt of said objection notice, clear the title of the defects from objections so specified. If the results of such preliminary title report show that Seller does not have marketable title to the Property reasonably acceptable to the Purchaser as shown in Purchaser's written notice, and if Seller fails to clear the title of such defects as so objected, Purchaser shall have the right by notice to terminate this Agreement at which time Escrow Agent shall refund the Earnest Payment, and any accrued interest, to Purchaser and this Agreement shall terminate with no further obligations on the part of either Party. Nothing contained in this Paragraph 3.2 shall restrict Purchaser's right to terminate this Agreement for any reason subject to all other terms, specifically Paragraph 2.2, of this Agreement during the Contingency Period.

3.3 Delivery of Survey. Within thirty (30) calendar days after the Effective Date of this Agreement, Purchaser shall commission an ALTA survey of the Property from a registered surveyor acceptable to Purchaser and Escrow Agent. Purchaser shall have ten (10) calendar days from the receipt of the Survey to provide written disapproval, which disapproval shall set forth with specificity the reason(s) for Purchaser's objection(s) to the item(s) shown on the Survey. If no written disapproval is sent by Purchaser, the Survey shall be deemed approved. If Purchaser disapproves of any matter contained in the Survey, Seller shall cooperate fully with Purchaser to resolve the item(s) to which objection has been made. Should Seller, within ten (10) days after receiving notice of the objection, fail to correct or cure any such deficiency as identified in writing by Purchaser, Purchaser may (a) elect to waive this condition precedent and to close this transaction; or (b) cancel and terminate this Agreement subject to all other terms, specifically Paragraph 2.2, of this Agreement. Prior to Closing, Purchaser may adjust the legal description in the General Warranty Deed provided in Exhibit D to conform to the results of the ALTA survey of the Property.

3.4 Purchaser's Access to the Property and Information. From and after the Effective Date, Purchaser and its agents shall have the right to enter upon the Property during normal business hours to conduct surveys, hydrological, topographical, traffic, feasibility and engineering studies and reports, to conduct tests, borings and analyses of the soils and water, to investigate the availability and quality of access, utilities, water and sewage disposal to the Property, and to otherwise inspect the general condition of the Property, the cost of which shall be borne exclusively by Buyer. Buyer hereby agrees to indemnify and hold Seller harmless from any and all liabilities or obligations, including reasonable attorney's fees, incurred as a result of such entrance of Buyer or its agents upon the Property, except as may be due to the acts of Seller, and to return the property to

8.10 Brokers and Expenses. Seller and Purchaser each represent and warrants to the other that it has not dealt with any real estate broker, agent or salesperson in connection with this transaction to whom a commission may be owed other than Walter Lane of Headquarters West representing the Purchaser ("Purchaser's Broker"). Purchaser represents and warrants that it will indemnify and hold Seller harmless from and against any claims of commissions or any other sums owed to Purchaser's Broker resulting from any actions taken or costs incurred by Purchaser's Broker related to this Agreement, including reasonable attorney's fees incurred by Seller. Purchaser agrees to pay a brokerage commission to Purchaser's Broker pursuant to a separate agreement between Broker and Purchaser's Broker. Each party shall indemnify, defend and hold harmless the other on account of any sales commission, brokerage commission or finder's fee, arising or brought by any third party (other than Purchaser's Broker) who has dealt or claims to have dealt with such indemnity party pertaining to the Property.

IN WITNESS WHEREOF, the parties have duly executed this Agreement as of the day and year first above written.

Approved as to Form
RCML Legal
6 December 2019
Hugh Thatcher, Sr Corp Counsel

PURCHASER:
Resolution Copper Mining, LLC

By: Resolution Copper Company, as Manager and not on its own behalf

Andrew Lye
Vice President

Date: December 6, 2019

SELLER:
Rick L. Jodsaas

Rick L. Jodsaas
Print Name

December 17th, 2019
Date

RECEIVED AND ACCEPTED this ______
day of December, 2019:

TITLE COMPANY:

By________________________________

EXHIBIT A

The Property consists of the following parcels of real property and leasehold interests granted by the State of Arizona and the Bureau of Land Management:

Grazing Leases:

State of Arizona Grazing Lease Number 05-094729

Bureau of Land Management Grazing Allotment 04503 Victory Cross

Private Property:

A. Gila County Parcels

PARCEL NO. 1
The Southeast quarter of the Southeast quarter of Section 11, Township 3 South, Range 14 East of the Gila and Salt River Base and Meridian, Gila County, Arizona;

EXCEPTING therefrom all coal, oil, gas and other mineral deposits, as reserved in instrument recorded as Docket 365, Page 822.

PARCEL NO. 2
The South half of the Southwest quarter of Section 11, Township 3 South, Range 14 East of the Gila and Salt River Base and Meridian, Gila County, Arizona;

EXCEPTING therefrom $1/16^{th}$ interest in all coal, oil, gas and other mineral deposits, as reserved in instrument recorded as Docket 314, Page 211.

PARCEL NO. 3
The Northwest quarter of the Southeast quarter of Section 12, Township 3 South, Range 14 East of the Gila and Salt River Base and Meridian, Gila County, Arizona;

EXCEPTING therefrom all coal, oil, gas and other mineral deposits as reserved in instrument recorded as Docket 365, Page 822.

PARCEL NO. 4
The West half of the Southwest quarter of Section 13, Township 3 South, Range 14 East of the Gila and Salt River Base and Meridian, Gila County, Arizona;

EXCEPTING therefrom all coal, oil, gas and other mineral deposits, as reserved in instrument recorded as Docket 365, Page 822.

PARCEL NO. 5

The Southwest quarter of the Southeast quarter; the Northwest quarter of the Southeast quarter; the East half of the Southeast quarter; the Southeast quarter of the Northwest quarter; the Southwest quarter of the Northwest quarter and the Northeast quarter of the Southwest quarter of Section 14, Township 3 South, Range 14 East of the Gila and Salt River Base and Meridian, Gila County, Arizona.

EXCEPTING therefrom all coal, oil, gas and other mineral deposits, as reserved in instrument recorded as Docket 365, Page 822.

PARCEL NO. 6

The North half of the Northwest quarter of Section 14, Township 3 South, Range 14 East of the Gila and Salt River Base and Meridian, Gila County, Arizona;

EXCEPTING therefrom 1/16th interest in all coal, oil, gas and other mineral deposits, as reserved in instrument recorded as Docket 367, Page 108;

EXCEPTING therefrom 15/16 interest in all coal, oil, gas and other mineral deposits, as reserved in instrument recorded as Docket 365, Page 822.

PARCEL NO. 7

The Northeast quarter of the Northeast quarter of Section 15, Township 3 South, Range 14 East of the Gila and Salt River Base and Meridian, Gila County, Arizona;

EXCEPTING therefrom all coal, oil, gas and other mineral deposits, as reserved in instrument recorded as Docket 251, Page 60.

PARCEL NO. 8

The Southeast quarter of the Northeast quarter of Section 23, Township 3 South, Range 14 East of the Gila and Salt River Base and Meridian, Gila County, Arizona;

EXCEPTING therefrom 1/16th interest in all coal, oil, gas and other mineral deposits as reserved in instrument recorded as Docket 344, Page 966.

EXCEPTING therefrom 15/16 interest in all coal, oil, gas and other mineral deposits, as reserved in instrument recorded as Docket 365, Page 822.

PARCEL NO. 9

The North half of the Northeast quarter of Section 23, Township 3 South, Range 14 East of the Gila and Salt River Base and Meridian, Gila County, Arizona.

EXCEPTING therefrom all coal, oil, gas and other mineral deposits, as reserved in instrument recorded as Docket 365, Page 822.

PARCEL NO. 10

The East half of the Northwest quarter and the Southwest quarter of the Northwest quarter of Section 24, Township 3 South, Range 14 East of the Gila and Salt River Base and Meridian, Gila County, Arizona;

EXCEPTING therefrom all coal, oil, gas and other mineral deposits, as reserved in instrument recorded as Docket 137, Page 63.

PARCEL NO. 11

The Northwest quarter of the Northwest quarter of Section 24, Township 3 South, Range 14 East of the Gila and Salt River Base and Meridian, Gila County, Arizona.

PARCEL NO. 12

The Southwest quarter of the Southeast quarter of Section 29, Township 2 South, Range 15 East of the Gila and Salt River Base and Meridian, Gila County, Arizona.

EXCEPTING therefrom all coal, oil, gas and other mineral deposits, as reserved in instrument recorded as Docket 365, Page 822.

PARCEL NO. 13

The South half of the Southeast quarter of the Northwest quarter and the North half of the Northeast quarter of the Southwest quarter of Section 30, Township 2 South, Range 15 East of the Gila and Salt River Base and Meridian, Gila County, Arizona;

EXCEPTING therefrom all coal, oil, gas and other mineral deposits, as reserved in instrument recorded as Docket 137, Page 65.

PARCEL NO. 14

The Southeast quarter of the Southwest quarter and the South half of the Southeast quarter of Section 31, Township 2 South, Range 15 East of the Gila and Salt River Base and Meridian, Gila County, Arizona;

EXCEPTING therefrom all coal, oil, gas and other mineral deposits, as reserved in instrument recorded as Docket 365, Page 822.

PARCEL NO. 15

The Northeast quarter of the Northwest quarter; the Northwest quarter of the Northeast quarter; and the Southeast quarter of the Northeast quarter of Section 8, Township 3 South, Range 15 East of the Gila and Salt River Base and Meridian, Gila County, Arizona.

EXCEPTING therefrom all coal, oil, gas and other mineral deposits, as reserved in instrument recorded as Docket 365, Page 822.

B. Pinal County Parcel

PARCEL NO. 16
All that portion of Lots 1, 2 and 5 of Section 23, Township 3 South, Range 14 East of the Gila and Salt River Base and Meridian, Pinal County, Arizona, lying Westerly of the Easterly boundary line of Pinal County;

EXCEPT any portion lying within Iron King, Hoosier Bay, Copper King, Copper Depot and Copper Depot 2 Lode Mining Claims as shown on Mineral Survey No. 2447 in Riverside Mining District;

EXCEPT 1/16th of all gas, oil, metals and mineral rights as set forth in ARS 37-231, Subsection C, as reserved in the Patent from the State of Arizona recorded January 09, 1969 as Docket 557, Page 306;

EXCEPTING therefrom all coal, oil, gas and other mineral deposits together with reasonable access for the purpose of exploring for or developing same, as reserved in deed recorded as Docket 759, Page 209.

EXHIBIT B
Lease Agreement

EXHIBIT C
Memorandum of Right of First Refusal

EXHIBIT D
General Warranty Deed

ARIZONA DEPARTMENT OF WATER RESOURCES

Phoenix, Arizona 85007

DRILLING CARD

THIS AUTHORIZATION SHALL BE IN POSSESSION OF THE DRILLER DURING ALL DRILLING OPERATIONS

WELL REGISTRATION NO: **55-923972**

AUTHORIZED DRILLER: **NATIONAL EWP, INC.** LICENSE NO: **823**

NOTICE OF INTENT TO **DRILL A ENV - MONITOR WELL** HAS BEEN FILED WITH THE DEPARTMENT BY:

WELL OWNER: **RESOLUTION COPPER MINING LLC**

ADDRESS: **102 MAGMA HEIGHTS, SUPERIOR, AZ, 85173**

THE WELL(S) IS/ARE TO BE LOCATED IN THE:

NE 1/4 of the **NE** 1/4 of the **NE** 1/4 Section **23** Township **03 S** Range **14 E**

NO. OF WELLS IN THIS PROJECT: **1** ASSESSOR'S PARCEL NO: **102-35-011**

THIS AUTHORIZATION EXPIRES AT MIDNIGHT ON THE DAY OF **2/28/2021**

THE DRILLER MUST FILE A WELL DRILLER REPORT AND WELL LOG WITHIN 30 DAYS OF COMPLETION OF DRILLING

This drilling or abandonment authority was granted based upon the certifications made by the above-named Driller in the notice of intent to drill or abandon. Those certifications, along with any variances granted, are listed below. By drilling or abandoning the well pursuant to this authorization, the above-named driller acknowledges the accuracy of the driller certifications. If the certifications are in error this authorization is invalid and driller must contact the Department of Water Resource's NOI Section in writing at the addres above to correct.

Variance(s) Granted To Driller: **None**

Certification(s) Made By Driller:

- ☑ By checking this box, I certify that I have all necessary Registrar of Contractor (ROC) licenses in all necessary license categories for this drilling or abandonment project and that those licenses are current.
- ☑ By checking this box, I certify that I have been authorized by the above-named well owner to submit this Notice of Intent on the well owner's behalf.
- ☑ By checking this box, I certify that the information above is complete and correct, and that the well shall be drilled or abandoned in compliance with all pertinent statutes and rules, including any special standards that may be required to protect the aquifer or other water sources.
- ☑ By checking this box, I certify that this NOI application is not an application to replace, deepen, or modify an existing well.
- ☑ By checking this box, I understand that the Authorization to drill this well DOES NOT constitute or guarantee an approval to use the well for the purpose of withdrawing groundwater for transportation to an Active Management Area (AMA) pursuant to A.R.S. § 45-552, 45-553, 45-554 or 45-555(A) without official prior approval from the Department.

Arizona Department of Water Resources
Groundwater Permitting and Wells
PO Box 36020 • Phoenix, Arizona 85067-6020
(602) 771-8527 • 602-771-8500
www.azwater.gov

Well Driller Report and Well Log

THIS REPORT MUST BE FILED WITHIN 30 DAYS OF COMPLETING THE WELL. PURSUANT TO ARIZONA REVISED STATUTE 45-600 AND A.A.C. RULE R12-15-808.

WELL DRILLER LOGS AND REPORTS CAN ALSO BE DONE ONLINE AT:
http://www.azwater.gov/eForms/Forms/DL/DWR_DL.aspx

FILE NUMBER: D(3-14) 23 AAA
WELL REGISTRATION NUMBER: 55 - 923972
PERMIT NUMBER (IF ISSUED):

SECTION 1. DRILLING AUTHORIZATION

Drilling Firm

Mail To:

NAME: NATIONAL EWP, INC.	DWR LICENSE NUMBER: 823
ADDRESS: 1200 W. SAN PEDRO ST	TELEPHONE NUMBER: 480-684-0065
CITY / STATE / ZIP: GILBERT, AZ, 85233	FAX:

SECTION 2. REGISTRY INFORMATION

Well Owner

FULL NAME OF COMPANY, ORGANIZATION, OR INDIVIDUAL: RESOLUTION COPPER MINING LLC

MAILING ADDRESS: 102 MAGMA HEIGHTS

CITY / STATE / ZIP: SUPERIOR, AZ, 85173

CONTACT PERSON NAME AND TITLE: Greg Ghidotti

TELEPHONE NUMBER: 520 689-3391 | FAX:

WELL NAME (e.g., MW 1, PZ-3, lot 25 Well, Smith Well, etc): RC20-2C (Qal #1)

COUNTY	ASSESSOR'S PARCEL ID NUMBER (MOST RECENT) BOOK	MAP	PARCEL
GILA	102	35	011

Location of Well

WELL LOCATION ADDRESS (IF ANY): Skunk Camp

TOWNSHIP (N/S)	RANGE (E/W)	SECTION	160 ACRE	40 ACRE	10 ACRE
3S	14E	23	NE 1/4	NE 1/4	NE 1/4

LATITUDE DEGREES	MINUTES	SECONDS	LONGITUDE DEGREES	MINUTES	SECONDS
33 °	09 '	44.8 "N	-110 °	52 '	42.6 "W

METHOD OF LATITUDE/LONGITUDE (CHECK ONE): [x] *GPS: Hand-Held [ ] *GPS: Survey-Grade [ ] TOPO

*LATITUDE/LONGITUDE DATUM, GPS (CHECK ONE): [x] NAD83 [ ] NAD27 [ ] WGS84 [ ] Other

METHOD OF ELEVATION (CHECK ONE): [x] *GPS: Hand-Held [ ] *GPS: Survey-Grade [ ] TOPO

LAND SURFACE ELEVATION AT WELL: ELEVATION 2996 Feet Above Sea Level

*ELEVATION DATUM (CHECK ONE): [x] NAVD88 [ ] NGVD29 [ ] OTHER

SECTION 3. WELL CONSTRUCTION DETAILS

Drilling Method

CHECK ONE
- [ ] Air Rotary
- [ ] Bored or Augered
- [ ] Cable Tool
- [ ] Dual Rotary
- [ ] Mud Rotary
- [x] Reverse Circulation
- [ ] Driven
- [ ] Jetted
- [ ] Air Percussion / Odex Tubing
- [ ] Other (please specify)

Method of Well Development

CHECK ONE
- [x] Airlift
- [ ] Bail
- [ ] Surge Block
- [ ] Surge Pump
- [ ] Other (please specify)

Method of Sealing at Reduction Points

CHECK ONE
- [ ] None
- [ ] Packed
- [ ] Swedged
- [ ] Welded
- [x] Other (please specify) Neat Cement

Condition of Well

CHECK ONE
- [x] Capped
- [ ] Abandoned
- [ ] Pump Installed
- [ ] **Not Drilled**

Construction Dates

DATE WELL CONSTRUCTION STARTED: 03.05.2020

DATE WELL CONSTRUCTION COMPLETED: 03.05.2020

I state that this notice is filed in compliance with A.R.S. § 45-596 and is complete and correct to the best of my knowledge and belief.

SIGNATURE OF QUALIFYING PARTY	DATE
[signature]	05/28/2020

Well Driller Report and Well Log

WELL REGISTRATION NUMBER
55 - 923972

SECTION 4. WELL CONSTRUCTION DESIGN (AS BUILD) (attach additional page if needed)

Depth

DEPTH OF BORING	DEPTH OF COMPLETED WELL
70 Feet Below Land Surface	69 Feet Below Land Surface

Water Level Information

STATIC WATER LEVEL	DATE MEASURED	TIME MEASURED	IF FLOWING WELL, METHOD OF FLOW REGULATION
N/A Feet Below Land Surface	03.07.2020	1030	☐ Valve ☐ Other:

Borehole / **Installed Casing**

Borehole DEPTH FROM SURFACE FROM (feet)	TO (feet)	BOREHOLE DIAMETER (inches)	Casing DEPTH FROM SURFACE FROM (feet)	TO (feet)	OUTER (inches)	MATERIAL TYPE (X) STEEL	PVC	ABS	IF OTHER TYPE, DESCRIBE	PERFORATION TYPE (X) BLANK OR NONE	WIRE WRAP	SHUTTER SCREEN	MILLS KNIFE	SLOTTED	IF OTHER TYPE, DESCRIBE	SLOT SIZE (inches)
0	20	17.5	0	20	10.625	x				x						
20	70	10	+2	29	4.5		x			x						
			29	69	4.5		x							x		.040

Installed Annular Material

DEPTH FROM SURFACE FROM (feet)	TO (feet)	ANNULAR MATERIAL TYPE (X) NONE	CONCRETE	NEAT CEMENT OR CEMENT GROUT	CEMENT-BENTONITE GROUT	BENTONITE GROUT	BENTONITE CHIPS	BENTONITE PELLETS	IF OTHER TYPE OF ANNULAR MATERIAL, DESCRIBE	FILTER PACK SAND	GRAVEL	SIZE
0	20			x								
20	27						x					
27	70									x		6x9

Well Driller Report and Well Log

WELL REGISTRATION NUMBER
55 - 923972

SECTION 8. GEOLOGIC LOG OF WELL

DEPTH FROM SURFACE FROM (feet)	DEPTH FROM SURFACE TO (feet)	**Description** Describe material, grain size, color, etc.	Check (X) every interval where water was encountered (if known)
0	70	Quaternary Alluvium	

Well Driller Report and Well Log

WELL REGISTRATION NUMBER
55 - 923972

SECTION 6. WELL SITE PLAN

NAME OF WELL OWNER	COUNTY ASSESSOR'S PARCEL ID NUMBER (MOST RECENT)		
	BOOK	MAP	PARCEL
RESOLUTION COPPER MINING LLC	102	35	011

- Required for all wells, please draw the following: (1) the boundaries of property on which the well was located; (2) the well location; (3) the locations of all septic tank systems and sewer systems on the property or within 100 feet of the well location, even if on neighboring properties; and (4) any permanent structures on the property that may aid in locating the well.
- Please indicate the distance between the well location and any septic tank system or sewer system.

N
W E
S

1" = ______ ft

See Attached


Skunk
Camp Wash
~~RC20-2~~
~~RC20-2B~~
RC20-2C
~~RC20-2A~~

REAL ESTATE PURCHASE CONTRACT AND ESCROW INSTRUCTIONS

BY THIS REAL ESTATE PURCHASE CONTRACT AND ESCROW INSTRUCTIONS (the "Agreement"), the parties hereto declare, covenant and agree as follows:

ARTICLE I
DEFINITIONS

The following terms are defined as set forth herein for purposes of this Agreement and shall be given such meanings wherever appearing in this Agreement unless the context requires otherwise:

Seller: Rick L. Jodsaas
2360 E. Dripping Springs Road
Winkelman, AZ 85192

Purchaser: Resolution Copper Mining LLC
102 Magma Heights
Box 1944
Superior, AZ 85173

Escrow Agent: Cathy Hansen
Commercial Escrow Officer
Stewart Title & Trust of Tucson
3939 E. Broadway Blvd.
Tucson, AZ 85711

Agreement Date: December ____, 2019

Property: The Property consists of the following real property and real property rights and personal property, to wit:

(1) That certain real property, including without limitation all surface and appurtenant mineral rights, in Pinal and Gila Counties, Arizona, as described in Exhibit A attached hereto.

(2) State of Arizona Grazing Lease Number 05-094729 (the "ASLD Grazing Lease").

(3) Bureau of Land Management Grazing Allotment 04503 Victory Cross (the "BLM Grazing Lease")

(4) All water rights appurtenant to or associated with the property specified in paragraphs (1), (2), and (3) above.

to by the Purchaser, Purchaser shall, within such thirty (30) day period, notify Seller in writing of such fact. If Purchaser does not either accept the condition of the Commitment or object to the condition of the Commitment within said thirty (30) day period, Purchaser shall be deemed to have waived its right to object to such objections at the time of purchasing the Property and such exceptions shall be deemed to be acceptable to Purchaser.

(b) Seller shall, within ten (10) calendar days of receipt of said objection notice, clear the title of the defects from objections so specified. If the results of such preliminary title report show that Seller does not have marketable title to the Property reasonably acceptable to the Purchaser as shown in Purchaser's written notice, and if Seller fails to clear the title of such defects as so objected, Purchaser shall have the right by notice to terminate this Agreement at which time Escrow Agent shall refund the Earnest Payment, and any accrued interest, to Purchaser and this Agreement shall terminate with no further obligations on the part of either Party. Nothing contained in this Paragraph 3.2 shall restrict Purchaser's right to terminate this Agreement for any reason subject to all other terms, specifically Paragraph 2.2, of this Agreement during the Contingency Period.

3.3 Delivery of Survey. Within thirty (30) calendar days after the Effective Date of this Agreement, Purchaser shall commission an ALTA survey of the Property from a registered surveyor acceptable to Purchaser and Escrow Agent. Purchaser shall have ten (10) calendar days from the receipt of the Survey to provide written disapproval, which disapproval shall set forth with specificity the reason(s) for Purchaser's objection(s) to the item(s) shown on the Survey. If no written disapproval is sent by Purchaser, the Survey shall be deemed approved. If Purchaser disapproves of any matter contained in the Survey, Seller shall cooperate fully with Purchaser to resolve the item(s) to which objection has been made. Should Seller, within ten (10) days after receiving notice of the objection, fail to correct or cure any such deficiency as identified in writing by Purchaser, Purchaser may (a) elect to waive this condition precedent and to close this transaction; or (b) cancel and terminate this Agreement subject to all other terms, specifically Paragraph 2.2, of this Agreement. Prior to Closing, Purchaser may adjust the legal description in the General Warranty Deed provided in Exhibit D to conform to the results of the ALTA survey of the Property.

3.4 Purchaser's Access to the Property and Information. From and after the Effective Date, Purchaser and its agents shall have the right to enter upon the Property during normal business hours to conduct surveys, hydrological, topographical, traffic, feasibility and engineering studies and reports, to conduct tests, borings and analyses of the soils and water, to investigate the availability and quality of access, utilities, water and sewage disposal to the Property, and to otherwise inspect the general condition of the Property, the cost of which shall be borne exclusively by Buyer. Buyer hereby agrees to indemnify and hold Seller harmless from any and all liabilities or obligations, including reasonable attorney's fees, incurred as a result of such entrance of Buyer or its agents upon the Property, except as may be due to the acts of Seller, and to return the property to

8.10 Brokers and Expenses. Seller and Purchaser each represent and warrants to the other that it has not dealt with any real estate broker, agent or salesperson in connection with this transaction to whom a commission may be owed other than Walter Lane of Headquarters West representing the Purchaser ("Purchaser's Broker"). Purchaser represents and warrants that it will indemnify and hold Seller harmless from and against any claims of commissions or any other sums owed to Purchaser's Broker resulting from any actions taken or costs incurred by Purchaser's Broker related to this Agreement, including reasonable attorney's fees incurred by Seller. Purchaser agrees to pay a brokerage commission to Purchaser's Broker pursuant to a separate agreement between Broker and Purchaser's Broker. Each party shall indemnify, defend and hold harmless the other on account of any sales commission, brokerage commission or finder's fee, arising or brought by any third party (other than Purchaser's Broker) who has dealt or claims to have dealt with such indemnity party pertaining to the Property.

IN WITNESS WHEREOF, the parties have duly executed this Agreement as of the day and year first above written.

Approved as to Form
RCML Legal
6 December 2019
Hugh Thatcher, Sr Corp Counsel

PURCHASER:
Resolution Copper Mining, LLC

By: Resolution Copper Company, as Manager and not on its own behalf

Andrew Lye
Vice President

Date: DECEMBER 6, 2019

SELLER:
Rick L. Jodsaas

Rick L. Jodsaas
Print Name

December 17th, 2019
Date

RECEIVED AND ACCEPTED this _____
day of December, 2019:

TITLE COMPANY:

By________________________________

EXHIBIT A

The Property consists of the following parcels of real property and leasehold interests granted by the State of Arizona and the Bureau of Land Management:

Grazing Leases:

State of Arizona Grazing Lease Number 05-094729

Bureau of Land Management Grazing Allotment 04503 Victory Cross

Private Property:

A. Gila County Parcels

PARCEL NO. 1
The Southeast quarter of the Southeast quarter of Section 11, Township 3 South, Range 14 East of the Gila and Salt River Base and Meridian, Gila County, Arizona;

EXCEPTING therefrom all coal, oil, gas and other mineral deposits, as reserved in instrument recorded as Docket 365, Page 822.

PARCEL NO. 2
The South half of the Southwest quarter of Section 11, Township 3 South, Range 14 East of the Gila and Salt River Base and Meridian, Gila County, Arizona;

EXCEPTING therefrom 1/16th interest in all coal, oil, gas and other mineral deposits, as reserved in instrument recorded as Docket 314, Page 211.

PARCEL NO. 3
The Northwest quarter of the Southeast quarter of Section 12, Township 3 South, Range 14 East of the Gila and Salt River Base and Meridian, Gila County, Arizona;

EXCEPTING therefrom all coal, oil, gas and other mineral deposits as reserved in instrument recorded as Docket 365, Page 822.

PARCEL NO. 4
The West half of the Southwest quarter of Section 13, Township 3 South, Range 14 East of the Gila and Salt River Base and Meridian, Gila County, Arizona;

EXCEPTING therefrom all coal, oil, gas and other mineral deposits, as reserved in instrument recorded as Docket 365, Page 822.

PARCEL NO. 5

The Southwest quarter of the Southeast quarter; the Northwest quarter of the Southeast quarter; the East half of the Southeast quarter; the Southeast quarter of the Northwest quarter; the Southwest quarter of the Northwest quarter and the Northeast quarter of the Southwest quarter of Section 14, Township 3 South, Range 14 East of the Gila and Salt River Base and Meridian, Gila County, Arizona.

EXCEPTING therefrom all coal, oil, gas and other mineral deposits, as reserved in instrument recorded as Docket 365, Page 822.

PARCEL NO. 6

The North half of the Northwest quarter of Section 14, Township 3 South, Range 14 East of the Gila and Salt River Base and Meridian, Gila County, Arizona;

EXCEPTING therefrom 1/16th interest in all coal, oil, gas and other mineral deposits, as reserved in instrument recorded as Docket 367, Page 108;

EXCEPTING therefrom 15/16 interest in all coal, oil, gas and other mineral deposits, as reserved in instrument recorded as Docket 365, Page 822.

PARCEL NO. 7

The Northeast quarter of the Northeast quarter of Section 15, Township 3 South, Range 14 East of the Gila and Salt River Base and Meridian, Gila County, Arizona;

EXCEPTING therefrom all coal, oil, gas and other mineral deposits, as reserved in instrument recorded as Docket 251, Page 60.

PARCEL NO. 8

The Southeast quarter of the Northeast quarter of Section 23, Township 3 South, Range 14 East of the Gila and Salt River Base and Meridian, Gila County, Arizona;

EXCEPTING therefrom 1/16th interest in all coal, oil, gas and other mineral deposits as reserved in instrument recorded as Docket 344, Page 966.

EXCEPTING therefrom 15/16 interest in all coal, oil, gas and other mineral deposits, as reserved in instrument recorded as Docket 365, Page 822.

PARCEL NO. 9

The North half of the Northeast quarter of Section 23, Township 3 South, Range 14 East of the Gila and Salt River Base and Meridian, Gila County, Arizona.

EXCEPTING therefrom all coal, oil, gas and other mineral deposits, as reserved in instrument recorded as Docket 365, Page 822.

PARCEL NO. 10

The East half of the Northwest quarter and the Southwest quarter of the Northwest quarter of Section 24, Township 3 South, Range 14 East of the Gila and Salt River Base and Meridian, Gila County, Arizona;

EXCEPTING therefrom all coal, oil, gas and other mineral deposits, as reserved in instrument recorded as Docket 137, Page 63.

PARCEL NO. 11

The Northwest quarter of the Northwest quarter of Section 24, Township 3 South, Range 14 East of the Gila and Salt River Base and Meridian, Gila County, Arizona.

PARCEL NO. 12

The Southwest quarter of the Southeast quarter of Section 29, Township 2 South, Range 15 East of the Gila and Salt River Base and Meridian, Gila County, Arizona.

EXCEPTING therefrom all coal, oil, gas and other mineral deposits, as reserved in instrument recorded as Docket 365, Page 822.

PARCEL NO. 13

The South half of the Southeast quarter of the Northwest quarter and the North half of the Northeast quarter of the Southwest quarter of Section 30, Township 2 South, Range 15 East of the Gila and Salt River Base and Meridian, Gila County, Arizona;

EXCEPTING therefrom all coal, oil, gas and other mineral deposits, as reserved in instrument recorded as Docket 137, Page 65.

PARCEL NO. 14

The Southeast quarter of the Southwest quarter and the South half of the Southeast quarter of Section 31, Township 2 South, Range 15 East of the Gila and Salt River Base and Meridian, Gila County, Arizona;

EXCEPTING therefrom all coal, oil, gas and other mineral deposits, as reserved in instrument recorded as Docket 365, Page 822.

PARCEL NO. 15

The Northeast quarter of the Northwest quarter; the Northwest quarter of the Northeast quarter; and the Southeast quarter of the Northeast quarter of Section 8, Township 3 South, Range 15 East of the Gila and Salt River Base and Meridian, Gila County, Arizona.

EXCEPTING therefrom all coal, oil, gas and other mineral deposits, as reserved in instrument recorded as Docket 365, Page 822.

B. Pinal County Parcel

PARCEL NO. 16

All that portion of Lots 1, 2 and 5 of Section 23, Township 3 South, Range 14 East of the Gila and Salt River Base and Meridian, Pinal County, Arizona, lying Westerly of the Easterly boundary line of Pinal County;

EXCEPT any portion lying within Iron King, Hoosier Bay, Copper King, Copper Depot and Copper Depot 2 Lode Mining Claims as shown on Mineral Survey No. 2447 in Riverside Mining District;

EXCEPT 1/16th of all gas, oil, metals and mineral rights as set forth in ARS 37-231, Subsection C, as reserved in the Patent from the State of Arizona recorded January 09, 1969 as Docket 557, Page 306;

EXCEPTING therefrom all coal, oil, gas and other mineral deposits together with reasonable access for the purpose of exploring for or developing same, as reserved in deed recorded as Docket 759, Page 209.

EXHIBIT B
Lease Agreement

EXHIBIT C
Memorandum of Right of First Refusal

EXHIBIT D
General Warranty Deed

Rio Tinto

One Gateway
426 N. 44th Street, Suite 320
Phoenix AZ 85008
USA
M : +1 (520) 827-0694

Arizona Department of Water Resources
Groundwater Permitting and Wells Section
P.O. Box 36020
Phoenix, Arizona 85067-6020

1110 W. Washington St., Suite 310
Phoenix, AZ 85007-2952

February 14, 2020

Re: Resolution Copper Mining, LLC; Notice of Intent to Drill

To whom it may concern,

Resolution Copper Mining, LLC (RCML) submits the attached Notice of Intent to Drill. The subject property on which the drilling will occur is in escrow to be purchased by RCML. Under section 3.4 of the purchase agreement, attached here for reference, RCML has the right to enter the subject property and conduct drilling. Accordingly, RCML signs and submits the NOI under this authority.

Any questions specific to the status of our rights during the due diligence period may be directed to myself at (520) 827-0694.

The attached purchase agreement contains confidential information. Please do not include it as part of the Department's imaged records.

Sincerely,

Karlene Martorana

Karlene Martorana, Corporate Counsel
Resolution Copper Mining, LLC

ARIZONA DEPARTMENT OF WATER RESOURCES

Phoenix, Arizona 85007

DRILLING CARD

THIS AUTHORIZATION SHALL BE IN POSSESSION OF THE DRILLER DURING ALL DRILLING OPERATIONS

WELL REGISTRATION NO: **55-923982**

AUTHORIZED DRILLER: **NATIONAL EWP, INC.** LICENSE NO: **823**

NOTICE OF INTENT TO **DRILL A ENV - MONITOR WELL** HAS BEEN FILED WITH THE DEPARTMENT BY:

WELL OWNER: **RESOLUTION COPPER MINING LLC**

ADDRESS: **102 MAGMA HEIGHTS, SUPERIOR, AZ, 85173**

THE WELL(S) IS/ARE TO BE LOCATED IN THE:

NW 1/4 of the **NE** 1/4 of the **NE** 1/4 Section **23** Township **03 S** Range **14 E**

NO. OF WELLS IN THIS PROJECT: **1** ASSESSOR'S PARCEL NO: **102-35-007**

THIS AUTHORIZATION EXPIRES AT MIDNIGHT ON THE DAY OF **3/4/2021**

THE DRILLER MUST FILE A WELL DRILLER REPORT AND WELL LOG WITHIN 30 DAYS OF COMPLETION OF DRILLING

This drilling or abandonment authority was granted based upon the certifications made by the above-named Driller in the notice of intent to drill or abandon. Those certifications, along with any variances granted, are listed below. By drilling or abandoning the well pursuant to this authorization, the above-named driller acknowledges the accuracy of the driller certifications. If the certifications are in error, this authorization is invalid and driller must contact the Department of Water Resource's NOI Section in writing at the addres above to correct.

Variance(s) Granted To Driller: **None**

Certification(s) Made By Driller:

- ☑ By checking this box, I certify that I have all necessary Registrar of Contractor (ROC) licenses in all necessary license categories for this drilling or abandonment project and that those licenses are current.
- ☑ By checking this box, I certify that I have been authorized by the above-named well owner to submit this Notice of Intent on the well owner's behalf.
- ☑ By checking this box, I certify that the information above is complete and correct, and that the well shall be drilled or abandoned in compliance with all pertinent statutes and rules, including any special standards that may be required to protect the aquifer or other water sources.
- ☑ By checking this box, I certify that this NOI application is not an application to replace, deepen, or modify an existing well.
- ☑ By checking this box, I understand that the Authorization to drill this well DOES NOT constitute or guarantee an approval to use the well for the purpose of withdrawing groundwater for transportation to an Active Management Area (AMA) pursuant to A.R.S. § 45-552, 45-553, 45-554 or 45-555(A) without official prior approval from the Department.

Arizona Department of Water Resources
Groundwater Permitting and Wells
PO Box 36020 • Phoenix, Arizona 85067-6020
(602) 771-8527 • 602-771-8500
www.azwater.gov

Well Driller Report and Well Log

THIS REPORT MUST BE FILED WITHIN 30 DAYS OF COMPLETING THE WELL. PURSUANT TO ARIZONA REVISED STATUTE 45-600 AND A.A.C. RULE R12-15-808.

FILE NUMBER	**D(3-14) 23 AAB**
WELL REGISTRATION NUMBER	**55 - 923982**
PERMIT NUMBER (IF ISSUED)	

WELL DRILLER LOGS AND REPORTS CAN ALSO BE DONE ONLINE AT:
http://www.azwater.gov/eForms/Forms/DL/DWR_DL.aspx

SECTION 1. DRILLING AUTHORIZATION

Drilling Firm

Mail To:

NAME: NATIONAL EWP, INC.	DWR LICENSE NUMBER: 823
ADDRESS: 1200 W. SAN PEDRO ST.	TELEPHONE NUMBER: 480-684-0065
CITY / STATE / ZIP: GILBERT, AZ, 85233	FAX:

SECTION 2. REGISTRY INFORMATION

Well Owner

FULL NAME OF COMPANY, ORGANIZATION, OR INDIVIDUAL: RESOLUTION COPPER MINING LLC

MAILING ADDRESS: 102 MAGMA HEIGHTS

CITY / STATE / ZIP: SUPERIOR, AZ, 85173

CONTACT PERSON NAME AND TITLE: Greg Ghidotti

TELEPHONE NUMBER: 520 689-3391

FAX:

WELL NAME (e.g., MW-1, PZ-3, lot 25 Well, Smith Well, etc.): RC20-2D (Bedrock)

COUNTY	BOOK	MAP	PARCEL
GILA	102	35	007

(ASSESSOR'S PARCEL ID NUMBER (MOST RECENT))

Location of Well

WELL LOCATION ADDRESS (IF ANY):

TOWNSHIP (N/S)	RANGE (E/W)	SECTION	160 ACRE	40 ACRE	10 ACRE
3S	14E	23	NE 1/4	NE 1/4	NW 1/4

LATITUDE			LONGITUDE		
33 ° DEGREES	09 ' MINUTES	41.3 "N SECONDS	-110 ° DEGREES	52 ' MINUTES	51.6 "W SECONDS

METHOD OF LATITUDE/LONGITUDE (CHECK ONE): [X] *GPS: Hand-Held [ ] *GPS: Survey-Grade [ ] TOPO

*LATITUDE/LONGITUDE DATUM, GPS (CHECK ONE): [X] NAD83 [ ] NAD27 [ ] WGS84 [ ] Other ______

METHOD OF ELEVATION (CHECK ONE): [X] *GPS: Hand-Held [ ] *GPS: Survey-Grade [ ] TOPO

LAND SURFACE ELEVATION AT WELL
ELEVATION 3018 Feet Above Sea Level

*ELEVATION DATUM (CHECK ONE): [X] NAVD88 [ ] NGVD29 [ ] OTHER ______

SECTION 3. WELL CONSTRUCTION DETAILS

Drilling Method

CHECK ONE

- [ ] Air Rotary
- [ ] Bored or Augered
- [ ] Cable Tool
- [ ] Dual Rotary
- [ ] Mud Rotary
- [X] Reverse Circulation
- [ ] Driven
- [ ] Jetted
- [ ] Air Percussion / Odex Tubing
- [ ] Other (please specify)

Method of Well Development

CHECK ONE

- [X] Airlift
- [ ] Bail
- [ ] Surge Block
- [ ] Surge Pump
- [ ] Other (please specify)

Method of Sealing at Reduction Points

CHECK ONE

- [ ] None
- [ ] Packed
- [ ] Swedged
- [ ] Welded
- [X] Other (please specify) Neat Cement

Condition of Well

CHECK ONE

- [X] Capped
- [ ] Abandoned
- [ ] Pump Installed
- [ ] **Not Drilled**

Construction Dates

DATE WELL CONSTRUCTION STARTED: 03.06.2020

DATE WELL CONSTRUCTION COMPLETED: 03.08.2020

I state that this notice is filed in compliance with A.R.S. § 45-596 and is complete and correct to the best of my knowledge and belief.

SIGNATURE OF QUALIFYING PARTY: [signature]

DATE: 05/28/2020

Well Driller Report and Well Log

WELL REGISTRATION NUMBER
55 - 923982

SECTION 4. WELL CONSTRUCTION DESIGN (AS BUILD) (attach additional page if needed)

Depth

DEPTH OF BORING	DEPTH OF COMPLETED WELL
155 Feet Below Land Surface	139 Feet Below Land Surface

Water Level Information

STATIC WATER LEVEL	DATE MEASURED	TIME MEASURED	IF FLOWING WELL, METHOD OF FLOW REGULATION
74.8 Feet Below Land Surface	03.08.2020	13:50	☐ Valve ☐ Other:

Borehole			Installed Casing													
DEPTH FROM SURFACE			DEPTH FROM SURFACE			MATERIAL TYPE (X)				PERFORATION TYPE (X)						
FROM (feet)	TO (feet)	BOREHOLE DIAMETER (inches)	FROM (feet)	TO (feet)	OUTER (inches)	STEEL	PVC	ABS	IF OTHER TYPE, DESCRIBE	BLANK OR NONE	WIRE WRAP	SHUTTER SCREEN	MILLS KNIFE	SLOTTED	IF OTHER TYPE, DESCRIBE	SLOT SIZE (inches)
0	20	17.5	0	20	10.625	x				x						
20	56	10	+2	99	4.5		x			x						
56	155	7.75	99	139	4.5		x							x		.020

Installed Annular Material

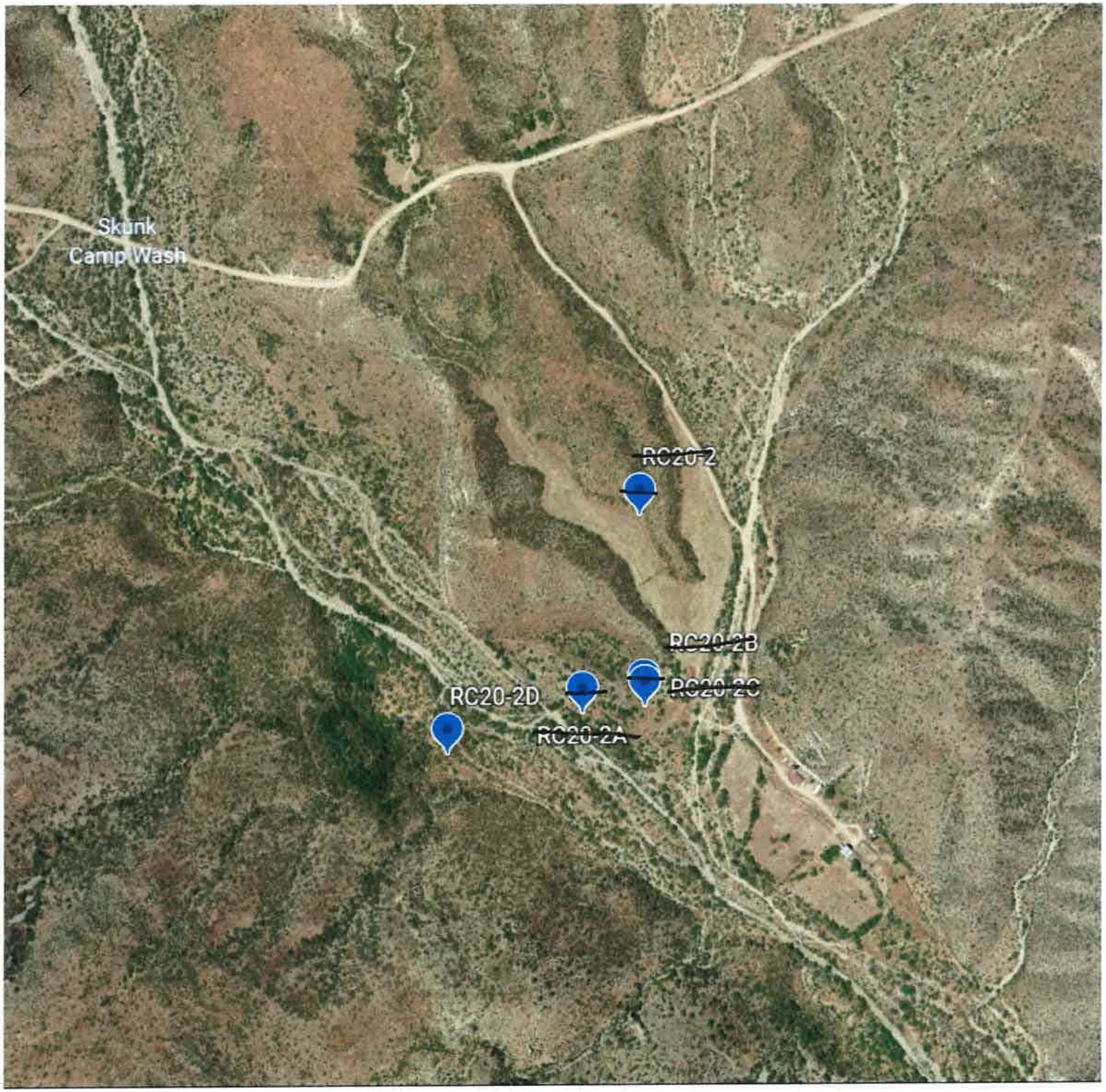
DEPTH FROM SURFACE		ANNULAR MATERIAL TYPE (X)				BENTONITE				FILTER PACK		
FROM (feet)	TO (feet)	NONE	CONCRETE	NEAT CEMENT OR CEMENT GROUT	CEMENT-BENTONITE GROUT	GROUT	CHIPS	PELLETS	IF OTHER TYPE OF ANNULAR MATERIAL, DESCRIBE	SAND	GRAVEL	SIZE
0	20			x								
20	65				x							
65	77						x					3/8
77	140									x		8x12
140	155	x							Native			

Well Driller Report and Well Log

WELL REGISTRATION NUMBER
55 - 923982

SECTION 5. GEOLOGIC LOG OF WELL

DEPTH FROM SURFACE FROM (feet)	TO (feet)	Description Describe material, grain size, color, etc.	Check (X) every interval where water was encountered (if known)
0	34	Quaternary Alluvium	
34	155	Bolsa Quartzite	x


Skunk
Camp Wash
~~RC20-2~~
~~RC20-2B~~
~~RC20-2C~~
RC20-2D
~~RC20-2A~~

Well Driller Report and Well Log

WELL REGISTRATION NUMBER
55 - 923982

SECTION 6. WELL SITE PLAN

NAME OF WELL OWNER	COUNTY ASSESSOR'S PARCEL ID NUMBER (MOST RECENT)		
	BOOK	MAP	PARCEL
RESOLUTION COPPER MINING LLC	102	35	007

- Required for all wells, please draw the following: (1) the boundaries of property on which the well was located; (2) the well location; (3) the locations of all septic tank systems and sewer systems on the property or within 100 feet of the well location, even if on neighboring properties; and (4) any permanent structures on the property that may aid in locating the well.
- Please indicate the distance between the well location and any septic tank system or sewer system.

N
W E
S

1" = ______ ft

See Attached

Rio Tinto

One Gateway
426 N. 44th Street, Suite 320
Phoenix AZ 85008
USA
M : +1 (520) 827-0694

Arizona Department of Water Resources
Groundwater Permitting and Wells Section
P.O. Box 36020
Phoenix, Arizona 85067-6020

1110 W. Washington St., Suite 310
Phoenix, AZ 85007-2952

February 14, 2020

Re: Resolution Copper Mining, LLC; Notice of Intent to Drill

To whom it may concern,

Resolution Copper Mining, LLC (RCML) submits the attached Notice of Intent to Drill. The subject property on which the drilling will occur is in escrow to be purchased by RCML. Under section 3.4 of the purchase agreement, attached here for reference, RCML has the right to enter the subject property and conduct drilling. Accordingly, RCML signs and submits the NOI under this authority.

Any questions specific to the status of our rights during the due diligence period may be directed to myself at (520) 827-0694.

The attached purchase agreement contains confidential information. Please do not include it as part of the Department's imaged records.

Sincerely,

Karlene Martorana

Karlene Martorana, Corporate Counsel
Resolution Copper Mining, LLC

REAL ESTATE PURCHASE CONTRACT AND ESCROW INSTRUCTIONS

BY THIS REAL ESTATE PURCHASE CONTRACT AND ESCROW INSTRUCTIONS (the "Agreement"), the parties hereto declare, covenant and agree as follows:

ARTICLE I
DEFINITIONS

The following terms are defined as set forth herein for purposes of this Agreement and shall be given such meanings wherever appearing in this Agreement unless the context requires otherwise:

Seller: Rick L. Jodsaas
2360 E. Dripping Springs Road
Winkelman, AZ 85192

Purchaser: Resolution Copper Mining LLC
102 Magma Heights
Box 1944
Superior, AZ 85173

Escrow Agent: Cathy Hansen
Commercial Escrow Officer
Stewart Title & Trust of Tucson
3939 E. Broadway Blvd.
Tucson, AZ 85711

Agreement Date: December ____, 2019

Property: The Property consists of the following real property and real property rights and personal property, to wit:

(1) That certain real property, including without limitation all surface and appurtenant mineral rights, in Pinal and Gila Counties, Arizona, as described in Exhibit A attached hereto.

(2) State of Arizona Grazing Lease Number 05-094729 (the "ASLD Grazing Lease").

(3) Bureau of Land Management Grazing Allotment 04503 Victory Cross (the "BLM Grazing Lease")

(4) All water rights appurtenant to or associated with the property specified in paragraphs (1), (2), and (3) above.

to by the Purchaser, Purchaser shall, within such thirty (30) day period, notify Seller in writing of such fact. If Purchaser does not either accept the condition of the Commitment or object to the condition of the Commitment within said thirty (30) day period, Purchaser shall be deemed to have waived its right to object to such objections at the time of purchasing the Property and such exceptions shall be deemed to be acceptable to Purchaser.

(b) Seller shall, within ten (10) calendar days of receipt of said objection notice, clear the title of the defects from objections so specified. If the results of such preliminary title report show that Seller does not have marketable title to the Property reasonably acceptable to the Purchaser as shown in Purchaser's written notice, and if Seller fails to clear the title of such defects as so objected, Purchaser shall have the right by notice to terminate this Agreement at which time Escrow Agent shall refund the Earnest Payment, and any accrued interest, to Purchaser and this Agreement shall terminate with no further obligations on the part of either Party. Nothing contained in this Paragraph 3.2 shall restrict Purchaser's right to terminate this Agreement for any reason subject to all other terms, specifically Paragraph 2.2, of this Agreement during the Contingency Period.

3.3 Delivery of Survey. Within thirty (30) calendar days after the Effective Date of this Agreement, Purchaser shall commission an ALTA survey of the Property from a registered surveyor acceptable to Purchaser and Escrow Agent. Purchaser shall have ten (10) calendar days from the receipt of the Survey to provide written disapproval, which disapproval shall set forth with specificity the reason(s) for Purchaser's objection(s) to the item(s) shown on the Survey. If no written disapproval is sent by Purchaser, the Survey shall be deemed approved. If Purchaser disapproves of any matter contained in the Survey, Seller shall cooperate fully with Purchaser to resolve the item(s) to which objection has been made. Should Seller, within ten (10) days after receiving notice of the objection, fail to correct or cure any such deficiency as identified in writing by Purchaser, Purchaser may (a) elect to waive this condition precedent and to close this transaction; or (b) cancel and terminate this Agreement subject to all other terms, specifically Paragraph 2.2, of this Agreement. Prior to Closing, Purchaser may adjust the legal description in the General Warranty Deed provided in Exhibit D to conform to the results of the ALTA survey of the Property.

3.4 Purchaser's Access to the Property and Information. From and after the Effective Date, Purchaser and its agents shall have the right to enter upon the Property during normal business hours to conduct surveys, hydrological, topographical, traffic, feasibility and engineering studies and reports, to conduct tests, borings and analyses of the soils and water, to investigate the availability and quality of access, utilities, water and sewage disposal to the Property, and to otherwise inspect the general condition of the Property, the cost of which shall be borne exclusively by Buyer. Buyer hereby agrees to indemnify and hold Seller harmless from any and all liabilities or obligations, including reasonable attorney's fees, incurred as a result of such entrance of Buyer or its agents upon the Property, except as may be due to the acts of Seller, and to return the property to

8.10 Brokers and Expenses. Seller and Purchaser each represent and warrants to the other that it has not dealt with any real estate broker, agent or salesperson in connection with this transaction to whom a commission may be owed other than Walter Lane of Headquarters West representing the Purchaser ("Purchaser's Broker"). Purchaser represents and warrants that it will indemnify and hold Seller harmless from and against any claims of commissions or any other sums owed to Purchaser's Broker resulting from any actions taken or costs incurred by Purchaser's Broker related to this Agreement, including reasonable attorney's fees incurred by Seller. Purchaser agrees to pay a brokerage commission to Purchaser's Broker pursuant to a separate agreement between Broker and Purchaser's Broker. Each party shall indemnify, defend and hold harmless the other on account of any sales commission, brokerage commission or finder's fee, arising or brought by any third party (other than Purchaser's Broker) who has dealt or claims to have dealt with such indemnity party pertaining to the Property.

IN WITNESS WHEREOF, the parties have duly executed this Agreement as of the day and year first above written.

Approved as to Form
RCML Legal
6 December 2019
Hugh Thatcher, Sr Corp Counsel

PURCHASER:
Resolution Copper Mining, LLC

By: Resolution Copper Company, as Manager and not on its own behalf

Andrew Lye
Vice President

Date: December 6, 2019.

SELLER:
Rick L. Jodsaas

Rick L. Jodsaas
Print Name

December 17th, 2019
Date

RECEIVED AND ACCEPTED this _____
day of December, 2019:

TITLE COMPANY:

By_______________________________

EXHIBIT A

The Property consists of the following parcels of real property and leasehold interests granted by the State of Arizona and the Bureau of Land Management:

Grazing Leases:

State of Arizona Grazing Lease Number 05-094729

Bureau of Land Management Grazing Allotment 04503 Victory Cross

Private Property:

A. Gila County Parcels

PARCEL NO. 1
The Southeast quarter of the Southeast quarter of Section 11, Township 3 South, Range 14 East of the Gila and Salt River Base and Meridian, Gila County, Arizona;

EXCEPTING therefrom all coal, oil, gas and other mineral deposits, as reserved in instrument recorded as Docket 365, Page 822.

PARCEL NO. 2
The South half of the Southwest quarter of Section 11, Township 3 South, Range 14 East of the Gila and Salt River Base and Meridian, Gila County, Arizona;

EXCEPTING therefrom $1/16^{th}$ interest in all coal, oil, gas and other mineral deposits, as reserved in instrument recorded as Docket 314, Page 211.

PARCEL NO. 3
The Northwest quarter of the Southeast quarter of Section 12, Township 3 South, Range 14 East of the Gila and Salt River Base and Meridian, Gila County, Arizona;

EXCEPTING therefrom all coal, oil, gas and other mineral deposits as reserved in instrument recorded as Docket 365, Page 822.

PARCEL NO. 4
The West half of the Southwest quarter of Section 13, Township 3 South, Range 14 East of the Gila and Salt River Base and Meridian, Gila County, Arizona;

EXCEPTING therefrom all coal, oil, gas and other mineral deposits, as reserved in instrument recorded as Docket 365, Page 822.

PARCEL NO. 5

The Southwest quarter of the Southeast quarter; the Northwest quarter of the Southeast quarter; the East half of the Southeast quarter; the Southeast quarter of the Northwest quarter; the Southwest quarter of the Northwest quarter and the Northeast quarter of the Southwest quarter of Section 14, Township 3 South, Range 14 East of the Gila and Salt River Base and Meridian, Gila County, Arizona.

EXCEPTING therefrom all coal, oil, gas and other mineral deposits, as reserved in instrument recorded as Docket 365, Page 822.

PARCEL NO. 6

The North half of the Northwest quarter of Section 14, Township 3 South, Range 14 East of the Gila and Salt River Base and Meridian, Gila County, Arizona;

EXCEPTING therefrom 1/16th interest in all coal, oil, gas and other mineral deposits, as reserved in instrument recorded as Docket 367, Page 108;

EXCEPTING therefrom 15/16 interest in all coal, oil, gas and other mineral deposits, as reserved in instrument recorded as Docket 365, Page 822.

PARCEL NO. 7

The Northeast quarter of the Northeast quarter of Section 15, Township 3 South, Range 14 East of the Gila and Salt River Base and Meridian, Gila County, Arizona;

EXCEPTING therefrom all coal, oil, gas and other mineral deposits, as reserved in instrument recorded as Docket 251, Page 60.

PARCEL NO. 8

The Southeast quarter of the Northeast quarter of Section 23, Township 3 South, Range 14 East of the Gila and Salt River Base and Meridian, Gila County, Arizona;

EXCEPTING therefrom 1/16th interest in all coal, oil, gas and other mineral deposits as reserved in instrument recorded as Docket 344, Page 966.

EXCEPTING therefrom 15/16 interest in all coal, oil, gas and other mineral deposits, as reserved in instrument recorded as Docket 365, Page 822.

PARCEL NO. 9

The North half of the Northeast quarter of Section 23, Township 3 South, Range 14 East of the Gila and Salt River Base and Meridian, Gila County, Arizona.

EXCEPTING therefrom all coal, oil, gas and other mineral deposits, as reserved in instrument recorded as Docket 365, Page 822.

PARCEL NO. 10

The East half of the Northwest quarter and the Southwest quarter of the Northwest quarter of Section 24, Township 3 South, Range 14 East of the Gila and Salt River Base and Meridian, Gila County, Arizona;

EXCEPTING therefrom all coal, oil, gas and other mineral deposits, as reserved in instrument recorded as Docket 137, Page 63.

PARCEL NO. 11

The Northwest quarter of the Northwest quarter of Section 24, Township 3 South, Range 14 East of the Gila and Salt River Base and Meridian, Gila County, Arizona.

PARCEL NO. 12

The Southwest quarter of the Southeast quarter of Section 29, Township 2 South, Range 15 East of the Gila and Salt River Base and Meridian, Gila County, Arizona.

EXCEPTING therefrom all coal, oil, gas and other mineral deposits, as reserved in instrument recorded as Docket 365, Page 822.

PARCEL NO. 13

The South half of the Southeast quarter of the Northwest quarter and the North half of the Northeast quarter of the Southwest quarter of Section 30, Township 2 South, Range 15 East of the Gila and Salt River Base and Meridian, Gila County, Arizona;

EXCEPTING therefrom all coal, oil, gas and other mineral deposits, as reserved in instrument recorded as Docket 137, Page 65.

PARCEL NO. 14

The Southeast quarter of the Southwest quarter and the South half of the Southeast quarter of Section 31, Township 2 South, Range 15 East of the Gila and Salt River Base and Meridian, Gila County, Arizona;

EXCEPTING therefrom all coal, oil, gas and other mineral deposits, as reserved in instrument recorded as Docket 365, Page 822.

PARCEL NO. 15

The Northeast quarter of the Northwest quarter; the Northwest quarter of the Northeast quarter; and the Southeast quarter of the Northeast quarter of Section 8, Township 3 South, Range 15 East of the Gila and Salt River Base and Meridian, Gila County, Arizona.

EXCEPTING therefrom all coal, oil, gas and other mineral deposits, as reserved in instrument recorded as Docket 365, Page 822.

B. Pinal County Parcel

PARCEL NO. 16

All that portion of Lots 1, 2 and 5 of Section 23, Township 3 South, Range 14 East of the Gila and Salt River Base and Meridian, Pinal County, Arizona, lying Westerly of the Easterly boundary line of Pinal County;

EXCEPT any portion lying within Iron King, Hoosier Bay, Copper King, Copper Depot and Copper Depot 2 Lode Mining Claims as shown on Mineral Survey No. 2447 in Riverside Mining District;

EXCEPT 1/16th of all gas, oil, metals and mineral rights as set forth in ARS 37-231, Subsection C, as reserved in the Patent from the State of Arizona recorded January 09, 1969 as Docket 557, Page 306;

EXCEPTING therefrom all coal, oil, gas and other mineral deposits together with reasonable access for the purpose of exploring for or developing same, as reserved in deed recorded as Docket 759, Page 209.

EXHIBIT B
Lease Agreement

EXHIBIT C
Memorandum of Right of First Refusal

EXHIBIT D
General Warranty Deed

Arizona Department of Water Resources
Groundwater Permitting and Wells
PO Box 36020 • Phoenix, Arizona 85067-6020
(602) 771-8527 • 602-771-8500
www.azwater.gov

Well Driller Report and Well Log

THIS REPORT MUST BE FILED WITHIN 30 DAYS OF COMPLETING THE WELL. PURSUANT TO ARIZONA REVISED STATUTE 45-600 AND A.A.C. RULE R12-15-808.

WELL DRILLER LOGS AND REPORTS CAN ALSO BE DONE ONLINE AT:
http://www.azwater.gov/eForms/Forms/DL/DWR_DL.aspx

FILE NUMBER	D(3-15) 29 BCA
WELL REGISTRATION NUMBER	55 - 924012
PERMIT NUMBER (IF ISSUED)	

SECTION 1. DRILLING AUTHORIZATION

Drilling Firm (Mail To:)

NAME: NATIONAL EWP, INC.	DWR LICENSE NUMBER: 823
ADDRESS: 1200 W. SAN PEDRO ST.	TELEPHONE NUMBER: 480-684-0065
CITY / STATE / ZIP: GILBERT, AZ, 85233	FAX:

SECTION 2. REGISTRY INFORMATION

Well Owner

FULL NAME OF COMPANY, ORGANIZATION, OR INDIVIDUAL	RESOLUTION COPPER MINING LLC
MAILING ADDRESS	102 MAGMA HEIGHTS
CITY / STATE / ZIP	SUPERIOR, AZ, 85173
CONTACT PERSON NAME AND TITLE	Greg Ghidotti
TELEPHONE NUMBER	520 689-3391
FAX	
WELL NAME (e.g., MW-1, PZ-3, lot 25 Well, Smith Well, etc.)	RC20-18

COUNTY	ASSESSOR'S PARCEL ID NUMBER (MOST RECENT) BOOK	MAP	PARCEL
GILA	102	36	016A

Location of Well

WELL LOCATION ADDRESS (IF ANY): Dripping Springs

TOWNSHIP (N/S)	RANGE (E/W)	SECTION	160 ACRE	40 ACRE	10 ACRE
03S	15E	29	NW 1/4	SW 1/4	NE 1/4

LATITUDE DEGREES	MINUTES	SECONDS	LONGITUDE DEGREES	MINUTES	SECONDS
33 °	08 '	46.46 " N	110 °	50 '	27.28 " W

METHOD OF LATITUDE/LONGITUDE (CHECK ONE): ☒ *GPS: Hand-Held ☐ *GPS: Survey-Grade ☐ TOPO

*LATITUDE/LONGITUDE DATUM, GPS (CHECK ONE): ☒ NAD83 ☐ NAD27 ☐ WGS84 ☐ Other

METHOD OF ELEVATION (CHECK ONE): ☒ *GPS: Hand-Held ☐ *GPS: Survey-Grade ☐ TOPO

LAND SURFACE ELEVATION AT WELL: ELEVATION 2725 Feet Above Sea Level

*ELEVATION DATUM (CHECK ONE): ☒ NAVD88 ☐ NGVD29 ☐ OTHER

SECTION 3. WELL CONSTRUCTION DETAILS

Drilling Method (CHECK ONE)

- ☐ Air Rotary
- ☐ Bored or Augered
- ☐ Cable Tool
- ☐ Dual Rotary
- ☐ Mud Rotary
- ☒ Reverse Circulation
- ☐ Driven
- ☐ Jetted
- ☐ Air Percussion / Odex Tubing
- ☐ Other (please specify)

Method of Well Development (CHECK ONE)

- ☒ Airlift
- ☐ Bail
- ☐ Surge Block
- ☐ Surge Pump
- ☐ Other (please specify)

Method of Sealing at Reduction Points (CHECK ONE)

- ☐ None
- ☐ Packed
- ☐ Swedged
- ☐ Welded
- ☒ Other (please specify) Cement

Condition of Well (CHECK ONE)

- ☒ Capped
- ☐ Pump Installed
- ☐ Abandoned
- ☐ **Not Drilled**

Construction Dates

DATE WELL CONSTRUCTION STARTED: 3/10/2020

DATE WELL CONSTRUCTION COMPLETED: 3/14/2020

I state that this notice is filed in compliance with A.R.S. § 45-596 and is complete and correct to the best of my knowledge and belief.

SIGNATURE OF QUALIFYING PARTY	DATE
(signature)	06/25/2020

Well Driller Report and Well Log

WELL REGISTRATION NUMBER
55 - 924012

SECTION 4. WELL CONSTRUCTION DESIGN (AS BUILD) (attach additional page if needed)

Depth

DEPTH OF BORING	DEPTH OF COMPLETED WELL
130.8 Feet Below Land Surface	130 Feet Below Land Surface

Water Level Information

STATIC WATER LEVEL	DATE MEASURED	TIME MEASURED	IF FLOWING WELL, METHOD OF FLOW REGULATION
120 Feet Below Land Surface	3/14/2020	11:00	☐ Valve ☐ Other:

Borehole			Installed Casing													
DEPTH FROM SURFACE			DEPTH FROM SURFACE			MATERIAL TYPE (X)				PERFORATION TYPE (X)						
FROM (feet)	TO (feet)	BOREHOLE DIAMETER (inches)	FROM (feet)	TO (feet)	OUTER (inches)	STEEL	PVC	ABS	IF OTHER TYPE, DESCRIBE	BLANK OR NONE	WIRE WRAP	SHUTTER SCREEN	MILLS KNIFE	SLOTTED	IF OTHER TYPE, DESCRIBE	SLOT SIZE (inches)
0	20	17.5	+2	20	10.625	x				x						
20	99	9 5/8	+1	110	2.375		x			x						
99	130	7 3/4	110	130	2.375		x							x		0.020
			+1	41	2.375		x			x						
			41	91	2.375		x							x		0.020

Installed Annular Material

DEPTH FROM SURFACE		ANNULAR MATERIAL TYPE (X)				BENTONITE				FILTER PACK		
FROM (feet)	TO (feet)	NONE	CONCRETE	NEAT CEMENT OR CEMENT GROUT	CEMENT-BENTONITE GROUT	GROUT	CHIPS	PELLETS	IF OTHER TYPE OF ANNULAR MATERIAL, DESCRIBE	SAND	GRAVEL	SIZE
0	20			x								
20	31						x					
31	91									x		8x12
91	94								Native			
94	105						x					
105	130.8									x		8x12

Well Driller Report and Well Log

WELL REGISTRATION NUMBER
55 - 924012

SECTION 5. GEOLOGIC LOG OF WELL

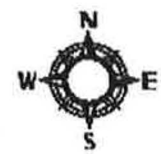
DEPTH FROM SURFACE FROM (feet)	TO (feet)	Description Describe material, grain size, color, etc.	Check (X) every interval where water was encountered (if known)
0	94	Quaternary Alluvium	
94	130.8	Gila Conglomerate	x

Well Driller Report and Well Log

WELL REGISTRATION NUMBER
55 - 924012

SECTION 6. WELL SITE PLAN			
NAME OF WELL OWNER	COUNTY ASSESSOR'S PARCEL ID NUMBER (MOST RECENT)		
	BOOK	MAP	PARCEL
RESOLUTION COPPER MINING LLC	102	36	016A

- Required for all wells, please draw the following: (1) the boundaries of property on which the well was located; (2) the well location; (3) the locations of all septic tank systems and sewer systems on the property or within 100 feet of the well location, even if on neighboring properties; and (4) any permanent structures on the property that may aid in locating the well.
- Please indicate the distance between the well location and any septic tank system or sewer system.



1" = ______ ft

Arizona Department of Water Resources
Groundwater Permitting and Wells
PO Box 36020 • Phoenix, Arizona 85067-6020
(602) 771-8527 • 602-771-8500
www.azwater.gov

Well Driller Report and Well Log

THIS REPORT MUST BE FILED WITHIN 30 DAYS OF COMPLETING THE WELL.
PURSUANT TO ARIZONA REVISED STATUTE 45-600 AND A.A.C. RULE R12-15-808.

WELL DRILLER LOGS AND REPORTS CAN ALSO BE DONE ONLINE AT:
http://www.azwater.gov/eForms/Forms/DL/DWR_DL.aspx

FILE NUMBER: D(3-15) 29 BCA
WELL REGISTRATION NUMBER: 55 - 924013
PERMIT NUMBER (IF ISSUED):

SECTION 1. DRILLING AUTHORIZATION

Drilling Firm

Mail To:

NAME: NATIONAL EWP, INC.	DWR LICENSE NUMBER: 823
ADDRESS: 1200 W. SAN PEDRO ST.	TELEPHONE NUMBER: 480-684-0065
CITY / STATE / ZIP: GILBERT, AZ, 85233	FAX:

SECTION 2. REGISTRY INFORMATION

Well Owner

FULL NAME OF COMPANY, ORGANIZATION, OR INDIVIDUAL: RESOLUTION COPPER MINING LLC

MAILING ADDRESS: 102 MAGMA HEIGHTS

CITY / STATE / ZIP: SUPERIOR, AZ, 85173

CONTACT PERSON NAME AND TITLE: Greg Ghidotti

TELEPHONE NUMBER: 520 689-3391
FAX:

WELL NAME (e.g., MW-1, PZ-3, lot 25 Well, Smith Well, etc.): RC20-18A

COUNTY	BOOK	MAP	PARCEL
GILA	102	35	016A

ASSESSOR'S PARCEL ID NUMBER (MOST RECENT)

Location of Well

WELL LOCATION ADDRESS (IF ANY): Dripping Springs

TOWNSHIP (N/S)	RANGE (E/W)	SECTION	160 ACRE	40 ACRE	10 ACRE
03S	15E	29	NW 1/4	SW 1/4	NE 1/4

LATITUDE DEGREES	MINUTES	SECONDS	LONGITUDE DEGREES	MINUTES	SECONDS
33 °	08 '	46.37 " N	110 °	50 '	27.16 " W

METHOD OF LATITUDE/LONGITUDE (CHECK ONE)
☒ *GPS: Hand-Held ☐ *GPS: Survey-Grade ☐ TOPO

*LATITUDE/LONGITUDE DATUM, GPS (CHECK ONE)
☒ NAD83 ☐ NAD27 ☐ WGS84 ☐ Other

METHOD OF ELEVATION (CHECK ONE)
☒ *GPS: Hand-Held ☐ *GPS: Survey-Grade ☐ TOPO

LAND SURFACE ELEVATION AT WELL
ELEVATION 2725 Feet Above Sea Level

*ELEVATION DATUM (CHECK ONE)
☒ NAVD88 ☐ NGVD29 ☐ OTHER

SECTION 3. WELL CONSTRUCTION DETAILS

Drilling Method

CHECK ONE
- ☐ Air Rotary
- ☐ Bored or Augered
- ☐ Cable Tool
- ☐ Dual Rotary
- ☐ Mud Rotary
- ☒ Reverse Circulation
- ☐ Driven
- ☐ Jetted
- ☐ Air Percussion / Odex Tubing
- ☐ Other (please specify)

Method of Well Development

CHECK ONE
- ☐ Airlift
- ☐ Bail
- ☐ Surge Block
- ☐ Surge Pump
- ☒ Other (please specify) Dry

Method of Sealing at Reduction Points

CHECK ONE
- ☐ None
- ☐ Packed
- ☐ Swedged
- ☐ Welded
- ☒ Other (please specify) Cement

Condition of Well

CHECK ONE
- ☒ Capped
- ☐ Pump Installed
- ☐ Abandoned
- ☐ **Not Drilled**

Construction Dates

DATE WELL CONSTRUCTION STARTED: 3-15-2020

DATE WELL CONSTRUCTION COMPLETED: 3-16-2020

I state that this notice is filed in compliance with A.R.S. § 45-596 and is complete and correct to the best of my knowledge and belief.

SIGNATURE OF QUALIFYING PARTY	DATE
[signature]	06/25/2020

Well Driller Report and Well Log

WELL REGISTRATION NUMBER
55 - 924013

SECTION 4. WELL CONSTRUCTION DESIGN (AS BUILD) (attach additional page if needed)

Depth

DEPTH OF BORING	DEPTH OF COMPLETED WELL
92 Feet Below Land Surface	91 Feet Below Land Surface

Water Level Information

STATIC WATER LEVEL	DATE MEASURED	TIME MEASURED	IF FLOWING WELL, METHOD OF FLOW REGULATION
88.9 Feet Below Land Surface	3.16.2020	08:40	☐ Valve ☐ Other:

Borehole			Installed Casing													
DEPTH FROM SURFACE			DEPTH FROM SURFACE			MATERIAL TYPE (X)				PERFORATION TYPE (X)						
FROM (feet)	TO (feet)	BOREHOLE DIAMETER (inches)	FROM (feet)	TO (feet)	OUTER (inches)	STEEL	PVC	ABS	IF OTHER TYPE, DESCRIBE	BLANK OR NONE	WIRE WRAP	SHUTTER SCREEN	MILLS KNIFE	SLOTTED	IF OTHER TYPE, DESCRIBE	SLOT SIZE (inches)
0	20	17.5	0	20	10.625	x				x						
20	92	9 5/8	+1.5	52	4.5		x			x						
			52	91	4.5		x							x		0.404

Installed Annular Material

DEPTH FROM SURFACE		ANNULAR MATERIAL TYPE (X)				BENTONITE				FILTER PACK		
FROM (feet)	TO (feet)	NONE	CONCRETE	NEAT CEMENT OR CEMENT GROUT	CEMENT-BENTONITE GROUT	GROUT	CHIPS	PELLETS	IF OTHER TYPE OF ANNULAR MATERIAL, DESCRIBE	SAND	GRAVEL	SIZE
0	20			x								
20	39						x					3/8
39	41									x		#60
41	92									x		6x9

Well Driller Report and Well Log

WELL REGISTRATION NUMBER
55 - 924013

SECTION 5. GEOLOGIC LOG OF WELL

DEPTH FROM SURFACE FROM (feet)	TO (feet)	**Description** Describe material, grain size, color, etc.	Check (X) every interval where water was encountered (if known)
0	91	Quaternary Alluvium	
91	92	Gila Conglomerate	

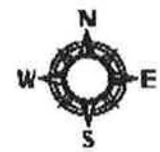
Well Driller Report and Well Log

WELL REGISTRATION NUMBER
55 - 924013

SECTION 6. WELL SITE PLAN

NAME OF WELL OWNER	COUNTY ASSESSOR'S PARCEL ID NUMBER (MOST RECENT)		
	BOOK	MAP	PARCEL
RESOLUTION COPPER MINING LLC	102	35	016A

- Required for all wells, please draw the following: (1) the boundaries of property on which the well was located; (2) the well location; (3) the locations of all septic tank systems and sewer systems on the property or within 100 feet of the well location, even if on neighboring properties; and (4) any permanent structures on the property that may aid in locating the well.
- Please indicate the distance between the well location and any septic tank system or sewer system.



1" = ______ ft

Appendix I

Well Survey Results

Resolution Copper Skunk Camp Monitor Well Survey Report

06/16/2020

T. Robert Breen Owner/RLS

On June 11th and 15th, 2020 Environmental Field Services LLC (EFS) was contracted to survey recently constructed monitor wells in the Dripping Springs/Skunk Camp area.

On this project EFS employed a Trimble R8 Mod2 survey grade GPS and TSC3 data collector along with a 2-man survey crew.

Each one of the well locations was surveyed in for specific positions and they are as follows:
Top of lid – M LID
top of pad – PAD
top of monument – M
top of casing pipe – TOP CASE

Additionally, all stated elevations within this report were adjusted to the closest NGS benchmark (DU0279) to ensure elevation consistency throughout the project.

Lastly, it bears mentioning that on several of the drill sites we had issue in getting accurate X, Y, and Z information on 1 or 2 of the 4 above referenced survey points as a result of the topographical relief within the area preventing us from receiving adequate radio transmission from our base station. This was discussed with resolution Copper's third-party consultant utilizing the data and the offer was made to add additional benchmarks in those areas in order to achieve better radio and to resurvey those locations and we were instructed that it would not be necessary.

T. ROBERT BREEN OWNER/RLS

COORDINATE SYSTEM:

SYSTEM: US State Pplane 1983

ZONE: Arizona Central 0202

DATUM: NAD 1983 (CON US) (MOS)

GEOID MODEL: G09 US

UNITS: International Feet

well location coordinates and photos

Label	EASTING	NORTHING	Raw Elevation	Adjusted Elevation
RC20-2 PAD	1017768.016	788965.194	3018.455	**3006.328**
RC20-2 TOP CASE	1017770.65	788964.07	3020.041	**3007.914**
RC20-2 M	1017770.259	788963.922	3021.472	**3009.345**
RC20-2 M LID	1017770.714	788964.005	3021.498	**3009.371**

Label	EASTING	NORTHING	Raw Elevation	Adjusted Elevation
RC20-2A PAD	1017534.07	788152.103	2997.85	**2985.723**
RC20-2A M	1017536.548	788153.651	3000.711	**2988.584**
RC20-2A TOP CASE	1017536.572	788153.585	2998.246	**2986.119**
RC20-2A M LID	1017536.544	788153.158	3000.728	**2988.601**

Label	EASTING	NORTHING	Raw Elevation	Adjusted Elevation
RC20-2B PAD	1017691.137	788243.065	2998.893	**2986.766**
RC20-2B M	1017692.972	788241.547	3001.56	**2989.433**
RC20-2BD TOP CASE	1017693.311	788241.754	3000.196	**2988.069**
RC20-2BS TOP CASE	1017693.434	788241.717	3000.22	**2988.093**
RC20-2B M-LID	1017693.395	788241.928	3001.527	**2989.4**

Label	EASTING	NORTHING	Raw Elevation	Adjusted Elevation
RC20-2C PAD	1017711.338	788210.219	2997.886	**2985.759**
RC20-2C M	1017709.281	788211.16	3000.7	**2988.573**
RC20-2C CASE	1017709.184	788211.353	2999.271	**2987.144**
RC20-2C M LID	1017709.409	788211.668	3000.701	**2988.574**

Label	EASTING	NORTHING	Raw Elevation	Adjusted Elevation
RC20-2D PAD	1016928.791	787845.365	3003.241	**2991.114**
RC20-2D M	1016931.502	787845.398	3006.112	**2993.985**
RC20-2D TOP CASE	1016931.56	787845.692	3005.143	**2993.016**
RC20-2D M LID	1016931.569	787845.646	3006.135	**2994.008**

Label	EASTING	NORTHING	Raw Elevation	Adjusted Elevation
RC20-18A PAD	1029254.112	782436.621	2716.279	**2704.152**
RC20-18A M	1029252.169	782435.883	2718.817	**2706.69**
RC20-18A CASE	1029251.617	782435.635	2717.198	**2705.071**
RC20-18A M LID	1029251.989	782435.867	2718.848	**2706.721**

Label	EASTING	NORTHING	Raw Elevation	Adjusted Elevation
RC20-18 PAD	1029274.092	782413.338	2715.884	**2703.757**
RC20-18 M	1029273.382	782415.589	2718.384	**2706.240**
RC20-18S CASE	1029273.651	782416.007	2717.375	**2705.248**
RC20-18D CASE	1029273.434	782416.069	2717.349	**2705.222**
RC20-18 M LID	1029273.354	782416.316	2718.351	**2706.250**

Label	EASTING	NORTHING	Raw Elevation	Adjusted Elevation
RANCH STOCK WELL PAD	1014448.298	792356.113	3156.628	**3144.501**
RANCH STOCK WELL TOP CASE	1014455.425	792360.486	3157.195	**3145.068**

Label	EASTING	NORTHING	Raw Elevation	Adjusted Elevation
RANCH IRRIG. WELL PAD	1018104.379	788405.282	3007.121	**2994.994**
RANCH IRRIG. WELL TOP CASE	1018106.810	788400.427	3007.170	**2995.043**

Label	EASTING	NORTHING	Raw Elevation	Adjusted Elevation
RANCH SLUICE RANCH	1016734.705	789401.341	3026.557	**3014.43**
RANCH SLUICE RANCH PAD	1016731.553	789399.12	3026.453	**3014.326**

NOTE: THE RANCH SLUICE PAD WAS TAKEN AT THE NORTHWEST CORNER OF PAD AND THE RANCH SLUICE POINT WAS AT THE DEPTH TO WATER ACCESS POINT.

Label	EASTING	NORTHING	Raw Elevation	Adjusted Elevation
RC20-2 PAD	1017768.016	788965.194	3018.455	**3006.328**
RC20-2 TOP CASE	1017770.65	788964.07	3020.041	**3007.914**
RC20-2 M	1017770.259	788963.922	3021.472	**3009.345**
RC20-2 M LID	1017770.714	788964.005	3021.498	**3009.371**

Label	EASTING	NORTHING	Raw Elevation	Adjusted Elevation
RC20-2C PAD	1017711.338	788210.219	2997.886	**2985.759**
RC20-2C M	1017709.281	788211.16	3000.7	**2988.573**
RC20-2C CASE	1017709.184	788211.353	2999.271	**2987.144**
RC20-2C M LID	1017709.409	788211.668	3000.701	**2988.574**

Label	EASTING	NORTHING	Raw Elevation	Adjusted Elevation
RC20-2B PAD	1017691.137	788243.065	2998.893	**2986.766**
RC20-2B M	1017692.972	788241.547	3001.56	**2989.433**
RC20-2BD	1017693.311	788241.754	3000.196	**2988.069**
RC20-2BS	1017693.434	788241.717	3000.22	**2988.093**
RC20-2B	1017693.395	788241.928	3001.527	**2989.4**

Label	EASTING	NORTHING	Raw Elevation	Adjusted Elevation
RC20-2A PAD	1017534.07	788152.103	2997.85	**2985.723**
RC20-2A M	1017536.548	788153.651	3000.711	**2988.584**
RC20-2A TOP CASE	1017536.572	788153.585	2998.246	**2986.119**
RC20-2A M LID	1017536.544	788153.158	3000.728	**2988.601**

Label	EASTING	NORTHING	Raw Elevation	Adjusted Elevation
RC20-2D PAD	1016928.791	787845.365	3003.241	**2991.114**
RC20-2D M	1016931.502	787845.398	3006.112	**2993.985**
RC20-2D TOP CASE	1016931.56	787845.692	3005.143	**2993.016**
RC20-2D M LID	1016931.569	787845.646	3006.135	**2994.008**

Label	EASTING	NORTHING	Raw Elevation	Adjusted Elevation
RC20-18 PAD	1029274.092	782413.338	2715.884	**2703.757**
RC20-18 M	1029273.382	782415.589	2718.384	**2706.24**
RC20-18S CASE	1029273.651	782416.007	2717.375	**2705.248**
RC20-18D CASE	1029273.434	782416.069	2717.349	**2705.222**
RC20-18 M LID	1029273.354	782416.316	2718.351	**2706.25**

Label	EASTING	NORTHING	Raw Elevation	Adjusted Elevation
RC20-18A PAD	1029254.112	782436.621	2716.279	**2704.152**
RC20-18A M	1029252.169	782435.883	2718.817	**2706.69**
RC20-18A CASE	1029251.617	782435.635	2717.198	**2705.071**
RC20-18A M LID	1029251.989	782435.867	2718.848	**2706.721**

Label	EASTING	NORTHING	Raw Elevation	Adjusted Elevation
RANCH STOCK WELL PAD	1014448.298	792356.113	3156.628	**3144.501**
RANCH STOCK WELL TOP CASE	1014455.425	792360.486	3157.195	**3145.068**

Label	EASTING	NORTHING	Raw Elevation	Adjusted Elevation
RANCH IRRIG. WELL PAD	1018104.379	788405.282	3007.121	**2994.994**
RANCH IRRIG. WELL TOP CASE	1018106.81	788400.427	3007.17	**2995.043**

Label	EASTING	NORTHING	Raw Elevation	Adjusted Elevation
RANCH SLUICE RANCH	1016734.705	789401.341	3026.557	**3014.43**
RANCH SLUICE RANCH PAD	1016731.553	789399.12	3026.453	**3014.326**

WOLLEY 1935 (EFS)	969129.186	743812.06	3184.127	**3172**
NGS reference benchmark DU2052 - Wolley			**3172**	

Survey data is in Arizona State plane central, NAD 1983, international feet

MONTGOMERY & ASSOCIATES

Appendix J

Aquifer Testing Results Summary Tables

TABLE J-1. CONSTANT-RATE PUMPING TEST RESULTS - 2020 SITE INVESTIGATIONS

SKUNK CAMP INVESTIGATION AREA
PINAL AND GILA COUNTIES, ARIZONA

													HYDRAULIC PARAMETERS						
													TRANSMISSIVITY, T		HYDRAULIC CONDUCTIVITY, K [d]				
PUMPED WELL	TEST START (dd-mm-yy hh:mm)	TEST END (dd-mm-yy hh:mm)	PUMPING DURATION	OBSERVATION WELLS	PUMPING RATE (gpm) [a]	PRE-PUMPING WATER LEVEL DEPTH (ft bls) [b]	MAXIMUM WATER LEVEL DRAWDOWN (ft)	SPECIFIC CAPACITY (gpm/ft) [c]	HYDROGEOLOGIC UNIT TESTED	WELL CONSTRUCTION AND AQUIFER TYPE	SATURATED THICKNESS OF UNIT(S) TESTED	ANALYTICAL METHOD(S)	TEST TYPE	(ft^2/d)	(m^2/d)	(ft/d)	(cm/s)	ELASTIC STORAGE COEFFICIENT, S [e]	SPECIFIC YIELD, Sy [e]	Ratio Kz / Kr
55-205266	27-Mar-20 12:15	27-Mar-20 17:15	5 hrs	-	2.7	160.31	29.8	0.1	Gila Conglomerate (Tcg)	Unconfined, Partially penetrating	70	Cooper-Jacob (1946)	Single Well, Constant-rate Pumping	10.5	1.0	1.5E-01	5.3E-05	-	-	1
RC20-2	08-Apr-20 15:00	09-Apr-20 15:00	24 hrs	55-622471	70	151.50	38.2	1.8	Gila Conglomerate (Tcg)	Semi-confined, Partially penetrating	1320	Moench (1997)	Multiple Wells, Constant-rate Pumping	837	78	6.3E-01	2.2E-04	2.3E-04	0.08	0.2
RC20-2A	15-Apr-20 11:00	16-Apr-20 11:00	24 hrs	55-622471, RC20-2B (S,D)	70	133.34	67.1	1.0	Gila Conglomerate (Tcg)	Semi-confined, Partially penetrating	1340	Moench (1997)	Multiple Wells, Constant-rate Pumping	567	53	4.2E-01	1.5E-04	2.5E-04	0.08	0.2
RC20-2D	19-Apr-20 12:00	22-Apr-20 00:00	60 hrs	RC20-2B (S,D), 55-622471	105	71.91	22.8	4.6	Dripping Spring Fault	Confined	70	Cooper-Jacob (1946), Barker (1988)	Multiple Wells, Constant-rate Pumping	152	14	2.2E+00	7.6E-04	-	-	1
	12-May-20 10:00	19-May-20 10:00	7 days	RC20-2A, RC20-2B(S,D), 55-622471	105	76.24	36.2	2.9	Dripping Spring Fault	Confined	70	Cooper-Jacob (1946), Barker (1988)	Multiple Wells, Constant-rate Pumping	135	13	1.9E+00	6.8E-04	-	-	1

Note:
[a] gallons per minute
[b] feet below land surface
[c] gallons per minute per foot of drawdown
[d] Calculated by dividing transmissivity by saturated thickness of tested unit; hydraulic conductivity is equivalent to radial hydraulic conductivity (K_r) when K_z/K_r is less than one
[e] Storage parameters estimates not considered reliable for single-well tests

TABLE J-2. CONSTANT-HEAD INJECTION TEST RESULTS - 2020 SITE INVESTIGATIONS

SKUNK CAMP INVESTIGATION AREA
PINAL AND GILA COUNTIES, ARIZONA

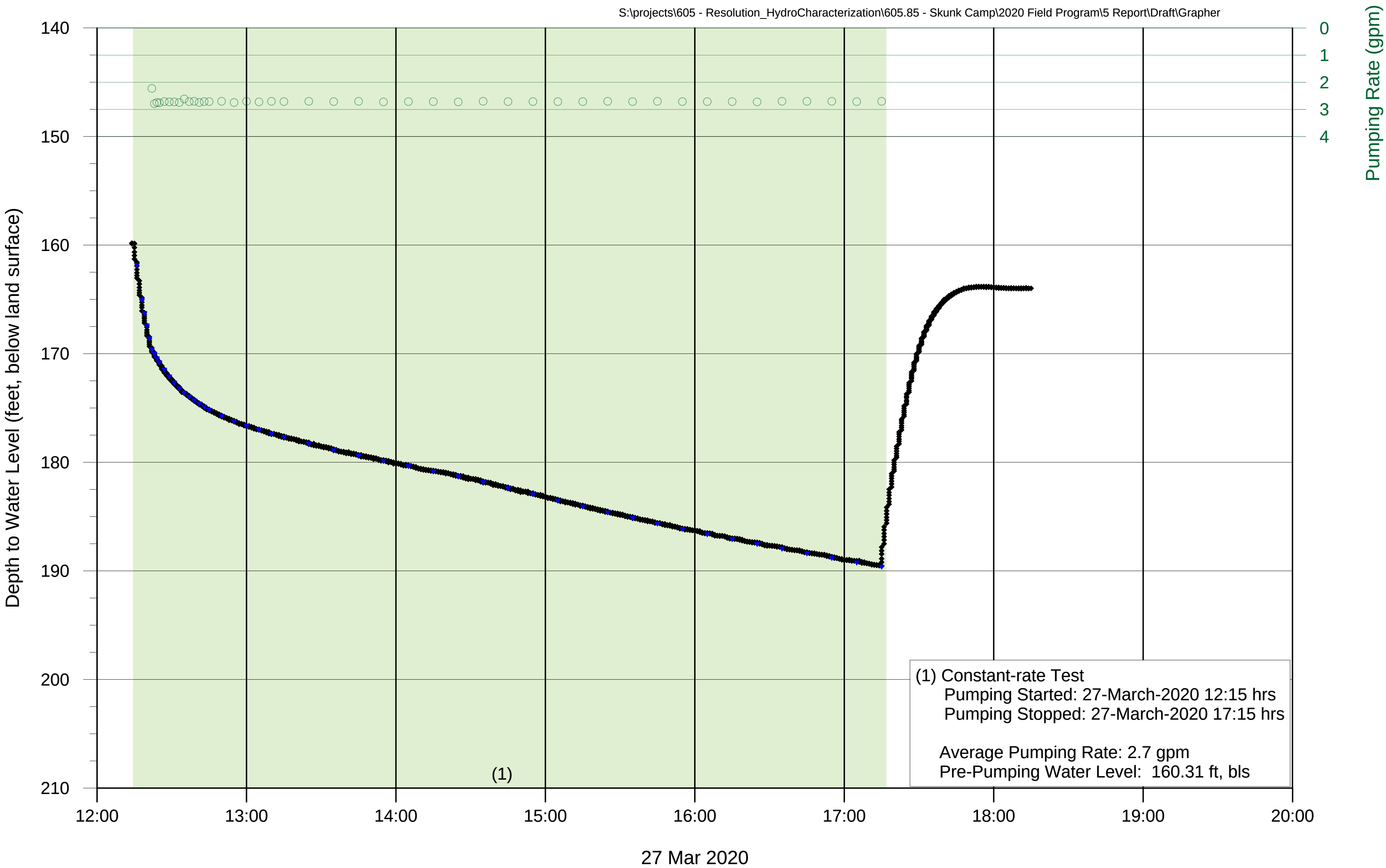
WELL ID	TEST TYPE	START (dd-mm-yy hh:mm)	END (dd-mm-yy hh:mm)	INJECTION DURATION (minutes)	STEADY INJECTION RATE (gpm)	TEST PERIOD USED FOR ANALYSIS	TOTAL WELL DEPTH (ft bls)	PRE-TEST WATER LEVEL (ft bls)	AVERAGE CONSTANT-HEAD (ft above well bottom)	HYDROGEOLOGIC UNIT TESTED	WELL CONSTRUCTION AND AQUIFER TYPE	SATURATED HYDRAULIC CONDUCTIVITY [a]: GLOVER (1953) K_{sat} (ft/d)	GLOVER (1953) K_{sat} (cm/s)	NASBERG-TERLETSKATA (1954) K_{sat} (ft/d)	NASBERG-TERLETSKATA (1954) K_{sat} (cm/s)
RC20-2C	Constant-head Injection	02-Apr-20 13:00	02-Apr-20 14:00	60	39.7	13:23 - 13:59	69	-- (dry)	22.6	Quaternary Alluvium (Qal)	Partially Penetrating; Vadose Zone	11	3.9E-03	15	5.4E-03
		02-Apr-20 14:00	02-Apr-20 15:00	60	49.9	14:38 - 14:59	69	-- (dry)	31.0			8	2.8E-03	11	3.8E-03
		02-Apr-20 15:00	02-Apr-20 16:00	60	62.8	15:45 - 16:00	69	-- (dry)	39.2			7	2.3E-03	9	3.1E-03
RC20-18A	Constant-head Injection	07-Apr-20 12:30	07-Apr-20 13:30	60	9.9	12:56 - 13:30	92	-- (dry)	20.8	Quaternary Alluvium (Qal)	Fully Penetrating; Vadose Zone	3	1.1E-03	5	1.6E-03
		07-Apr-20 13:30	07-Apr-20 14:30	60	39.7	14:14 - 14:30	92	-- (dry)	30.1			7	2.3E-03	9	3.2E-03
		07-Apr-20 14:30	07-Apr-20 16:00	90	49.0	15:30 - 16:00	92	-- (dry)	38.9			5	1.8E-03	7	2.5E-03

Note:
[a] Composite of vertical and radial flow components

Appendix K

Pumping Test Hydrographs, Field Parameters, and Analytical Solutions

55-205266



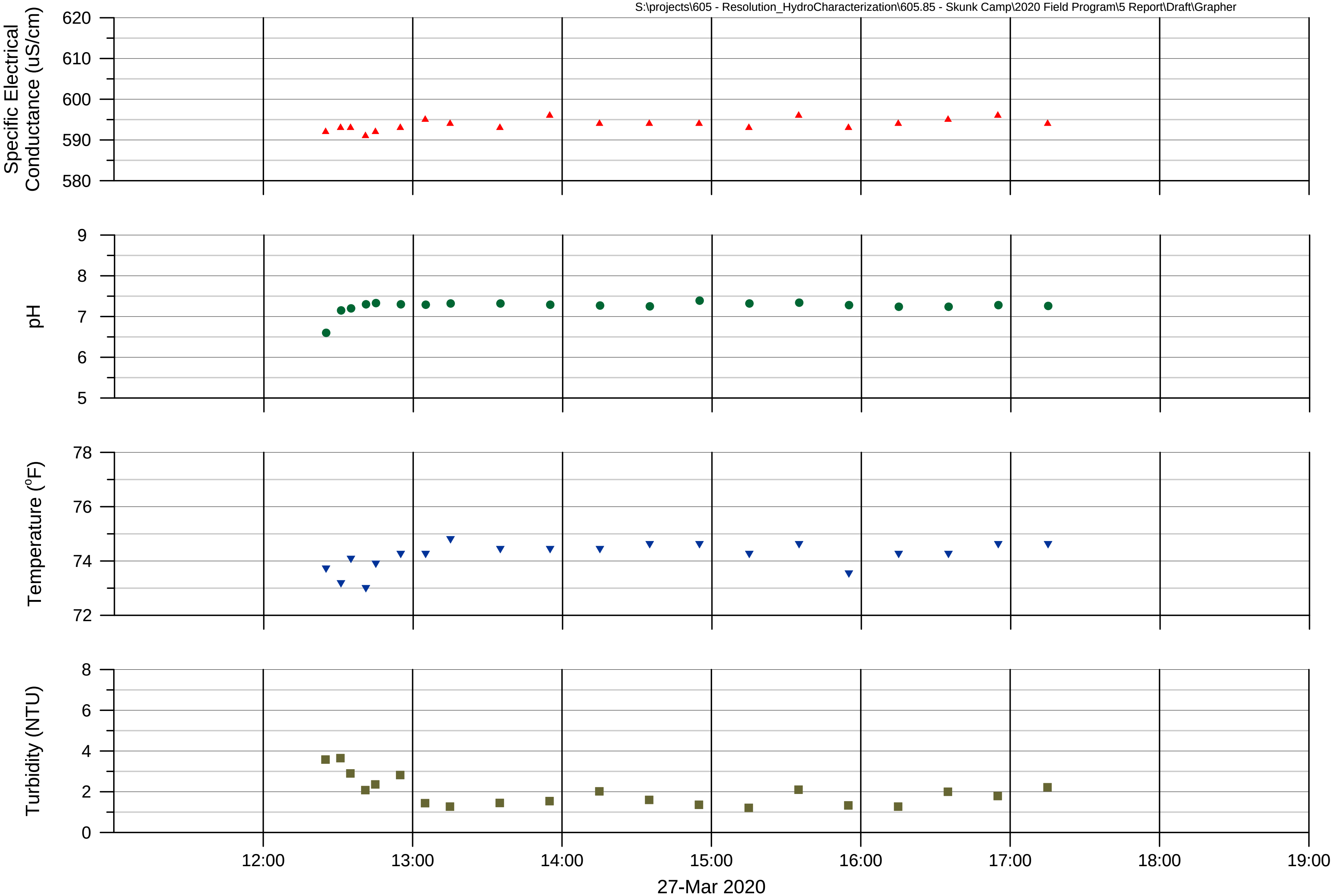
EXPLANATION

- ▼ Water Level (manual)
- ◆ Water Level (transducer)
- ○ Pumping Rate (instantaneous)

HYDROGRAPH FOR PUMPED WELL 55-205266 DURING CONSTANT-RATE PUMPING TEST

Client: Resolution Copper
Project: Skunk Camp Aquifer Testing
Location: Pinal and Gila Counties, AZ

MONTGOMERY & ASSOCIATES



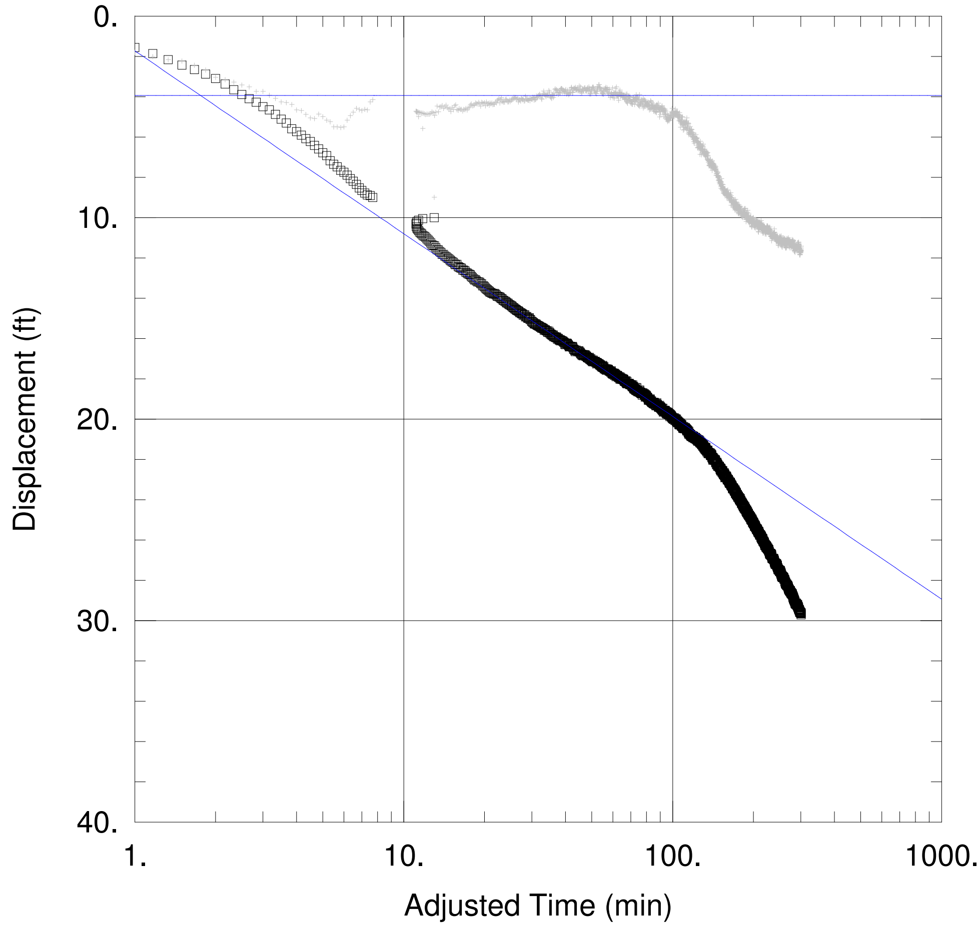
EXPLANATION
- Specific Elec. Conductance
- pH
- Temperature
- Turbidity

NOTE
Water quality parameters collected using discharge water at the wellhead

FIELD MEASUREMENTS OF SPECIFIC ELECTRICAL CONDUCTANCE, pH, TEMPERATURE, AND TURBIDITY DURING PUMPING AT WELL 55-205266

Client: Resolution Copper
Project: Skunk Camp Aquifer Testing
Location: Pinal County, Arizona

MONTGOMERY & ASSOCIATES



55-205266 CONSTANT-RATE PUMPING TEST

Data Set: S:\...\55-205266_CJ.aqt
Date: 06/29/20 Time: 07:25:03

PROJECT INFORMATION

Company: Montgomery & Associates
Client: Resolution Copper
Project: 605.8514
Location: Skunk Camp
Test Well: 55-205266
Test Date: 27 Mar 2020

AQUIFER DATA

Saturated Thickness: 69.66 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
55-205266	1016028	798261

Observation Wells

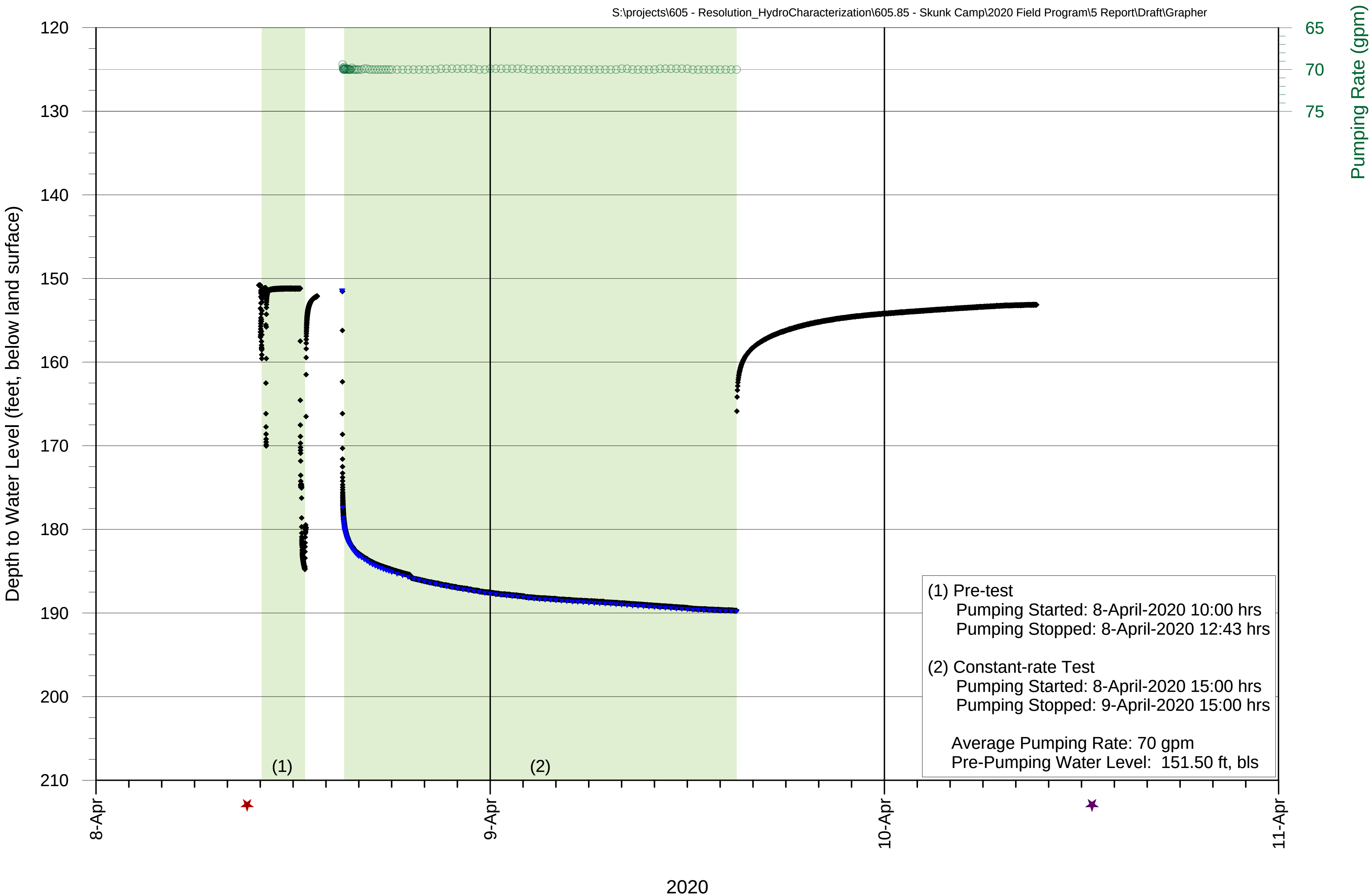
Well Name	X (ft)	Y (ft)
□ 55-205266	1016028	798261

SOLUTION

Aquifer Model: Confined Solution Method: Cooper-Jacob

T = 10.5 ft^2/day S = 0.097

RC20-2



EXPLANATION

- Water Level (manual)
- Pumping Rate (instantaneous)

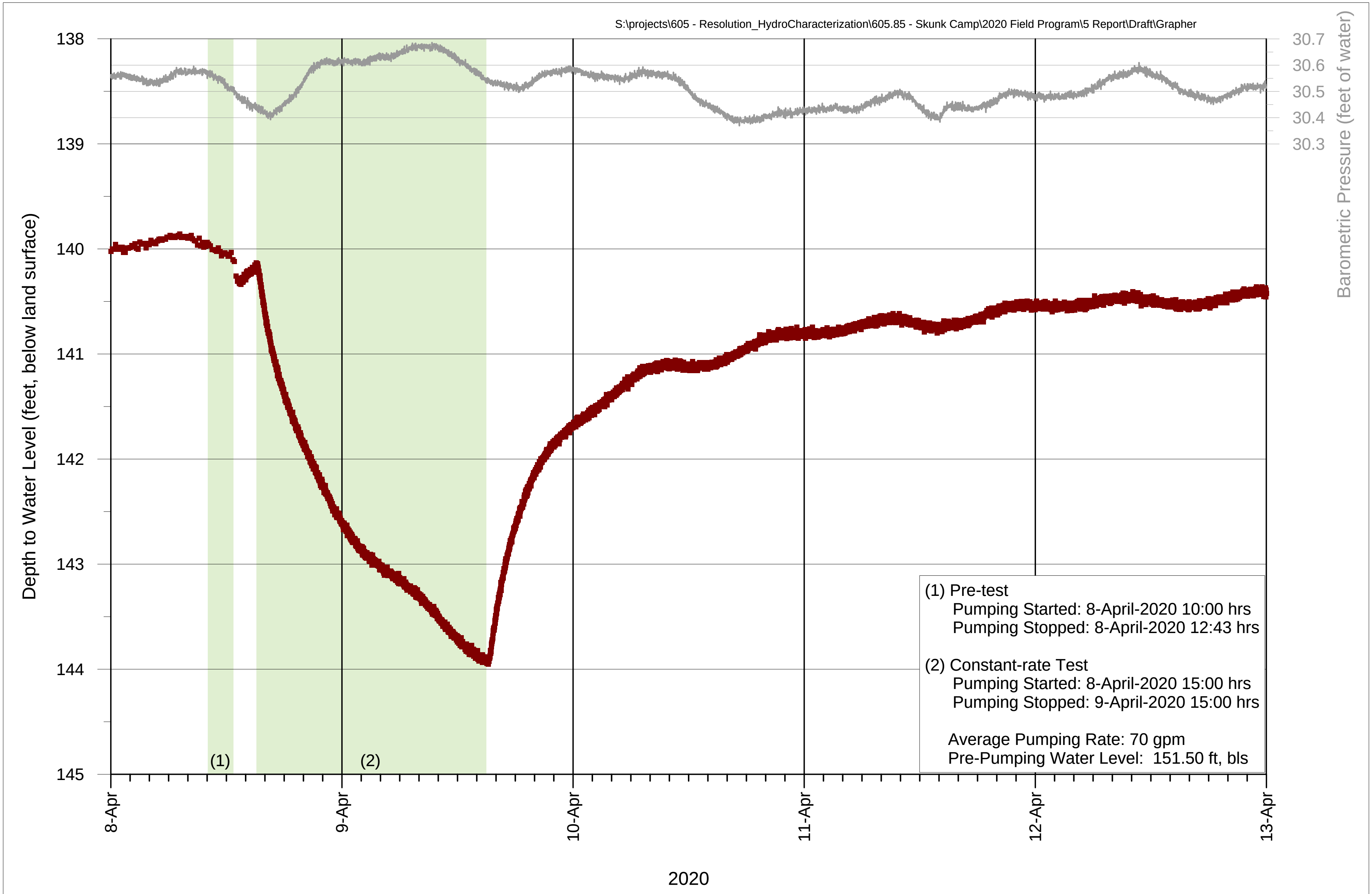
Data Gaps

- Pump Installed - No transducer installed
- Pump Removal - transducer removed

HYDROGRAPH FOR PUMPED WELL RC20-2 DURING PRE AND CONSTANT-RATE PUMPING TESTS

Client: Resolution Copper
Project: Skunk Camp Aquifer Testing
Location: Pinal and Gila Counties, AZ

MONTGOMERY & ASSOCIATES



EXPLANATION

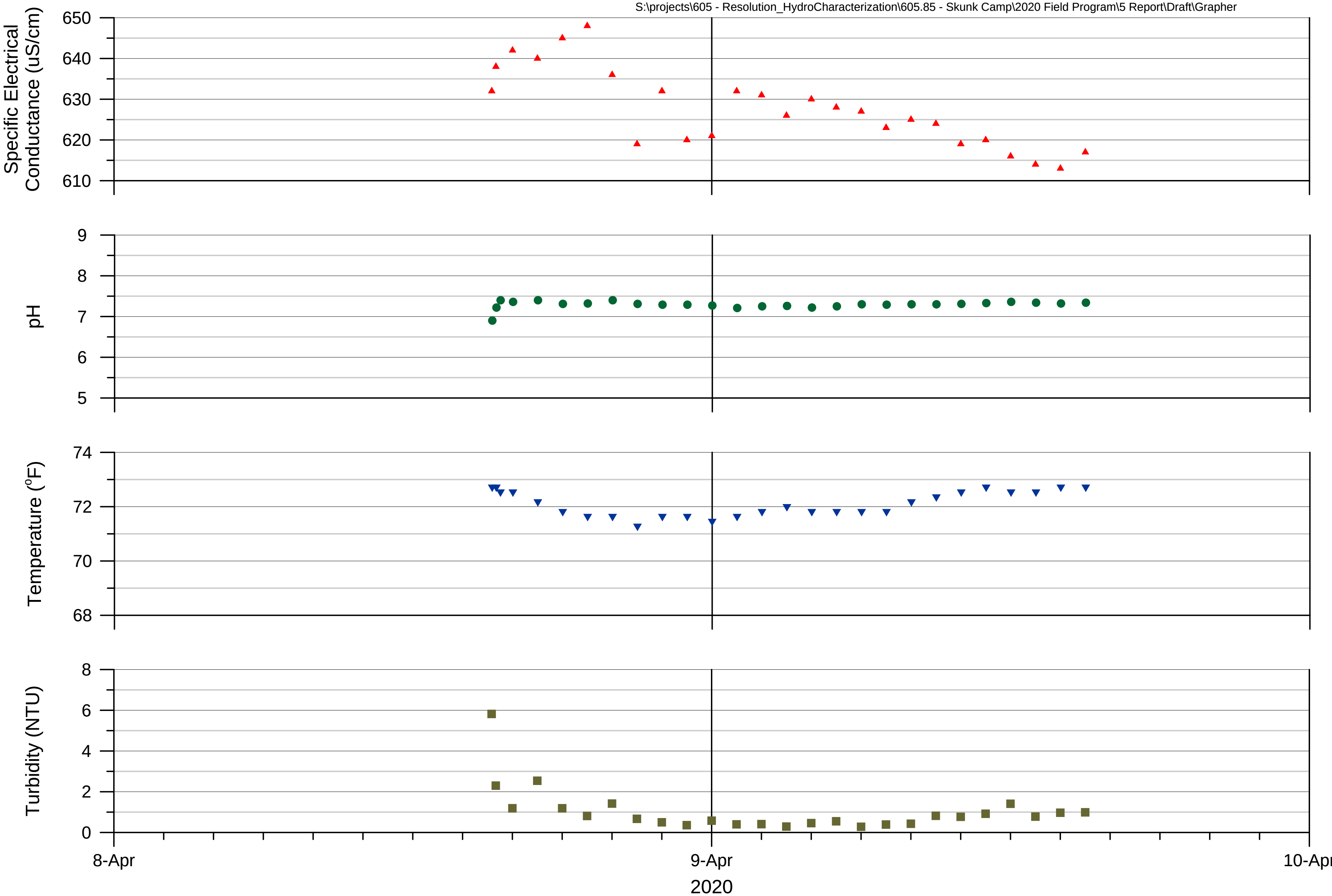
■ 55-622471

— Barometric Pressure

HYDROGRAPH FOR OBSERVATION WELL 55-622471 DURING RC20-2 PUMPING TEST

Client: Resolution Copper
Project: Skunk Camp Aquifer Testing
Location: Pinal and Gila Counties, AZ

MONTGOMERY & ASSOCIATES



EXPLANATION

- Specific Elec. Conductance
- pH
- Temperature
- Turbidity

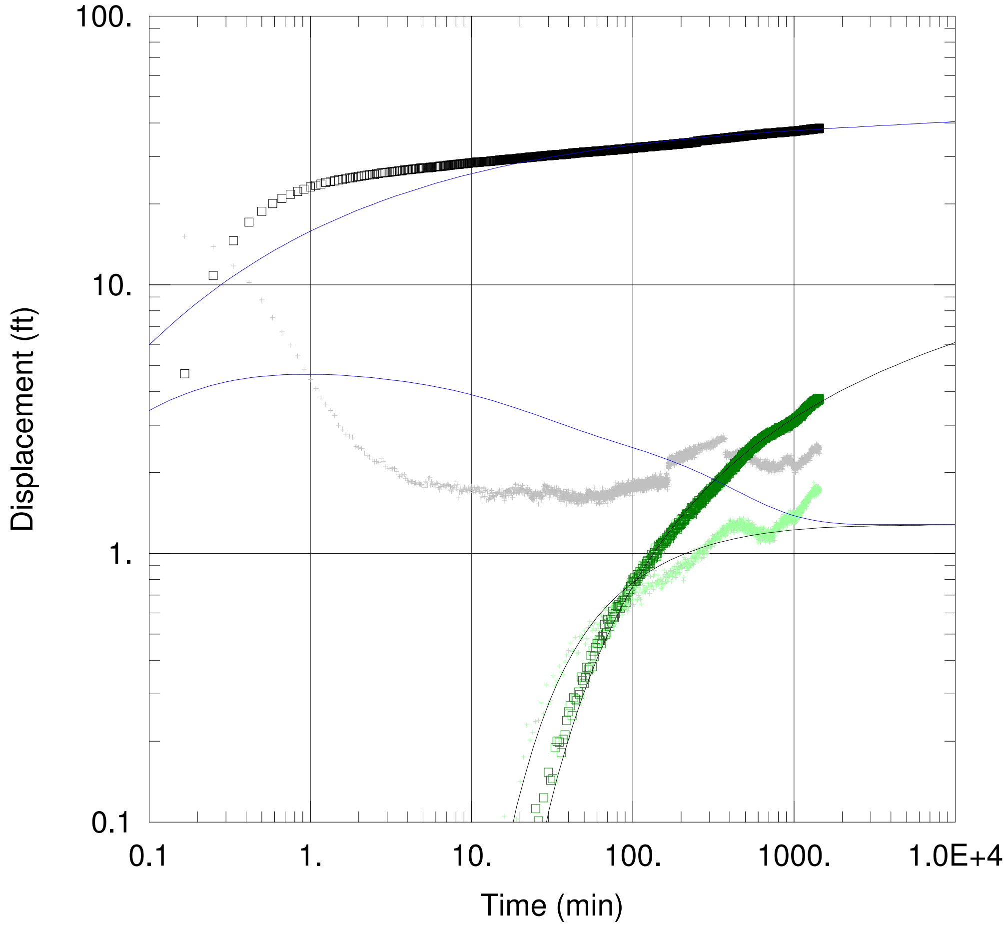
NOTE

Water quality parameters collected using discharge water at the wellhead

FIELD MEASUREMENTS OF SPECIFIC ELECTRICAL CONDUCTANCE, pH, TEMPERATURE, AND TURBIDITY DURING PUMPING AT WELL RC20-2

Client: Resolution Copper
Project: Skunk Camp Aquifer Testing
Location: Pinal County, Arizona

MONTGOMERY & ASSOCIATES



RC20-2 CONSTANT-RATE PUMPING TEST

Data Set: S:\...\RC20-2_55-622471_Moench.aqt
Date: 06/25/20 Time: 12:18:37

PROJECT INFORMATION

Company: Montgomery & Associates
Client: Resolution Copper
Project: 605.8514
Location: Skunk Camp
Test Well: RC20-2
Test Date: 8 - 9 Apr 2020

AQUIFER DATA

Saturated Thickness: 1320. ft Anisotropy Ratio (Kz/Kr): 0.2

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
RC20-2	1017777	788951

Observation Wells

Well Name	X (ft)	Y (ft)
□ RC20-2	1017777	788951
□ 55-622471	1018107	788387

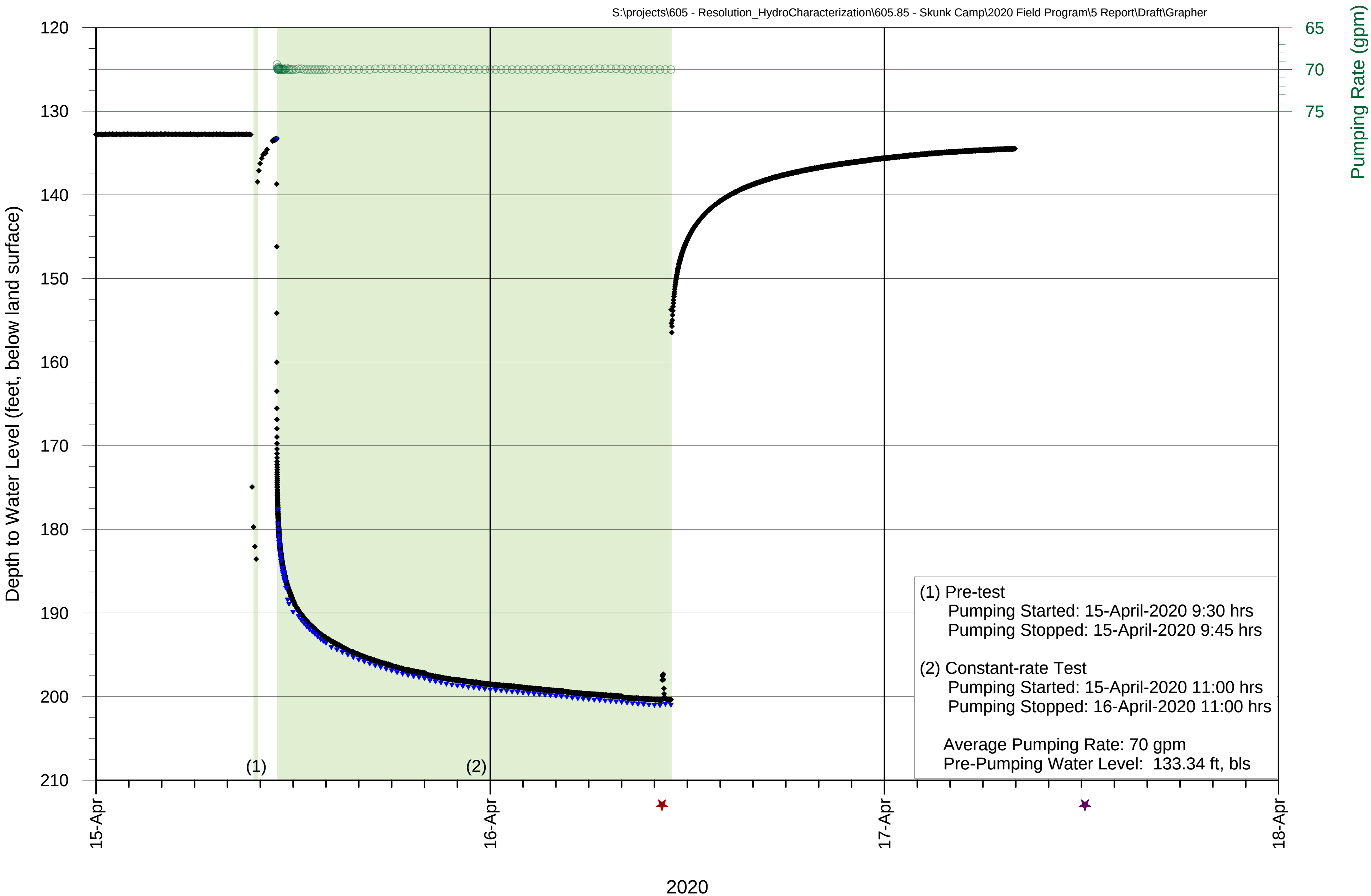
SOLUTION

Aquifer Model: Unconfined Solution Method: Moench

T = 837. ft^2/day
Sy = 0.08
Sw = -3.9
r(c) = 0.1667 ft

S = 0.00023
Kz/Kr = 0.2
r(w) = 0.3125 ft
alpha = 1.0E-10 min^{-1}

RC20-2A



EXPLANATION

- Water Level (manual)
- Water Level (transducer)
- Pumping Rate (instantaneous)

Variable-frequency drive temporarily decreased from 58 to 55 hz at 1029 hrs due to overheating

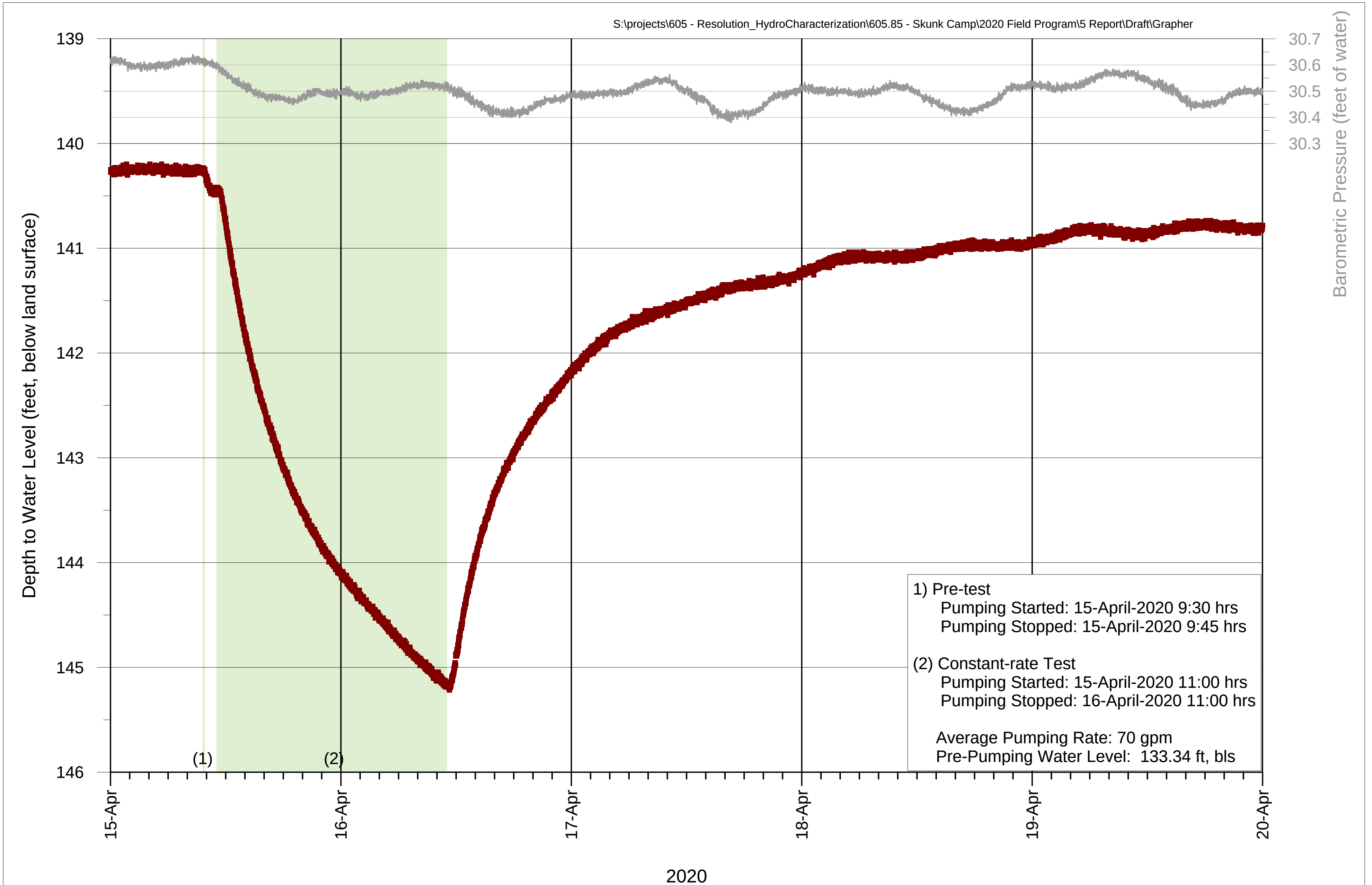
Data Gap

Transducer removed

HYDROGRAPH FOR PUMPED WELL RC20-2A DURING PRE AND CONSTANT-RATE PUMPING TEST

Client: Resolution Copper
Project: Skunk Camp Aquifer Testing
Location: Pinal and Gila Counties, AZ

MONTGOMERY & ASSOCIATES



EXPLANATION

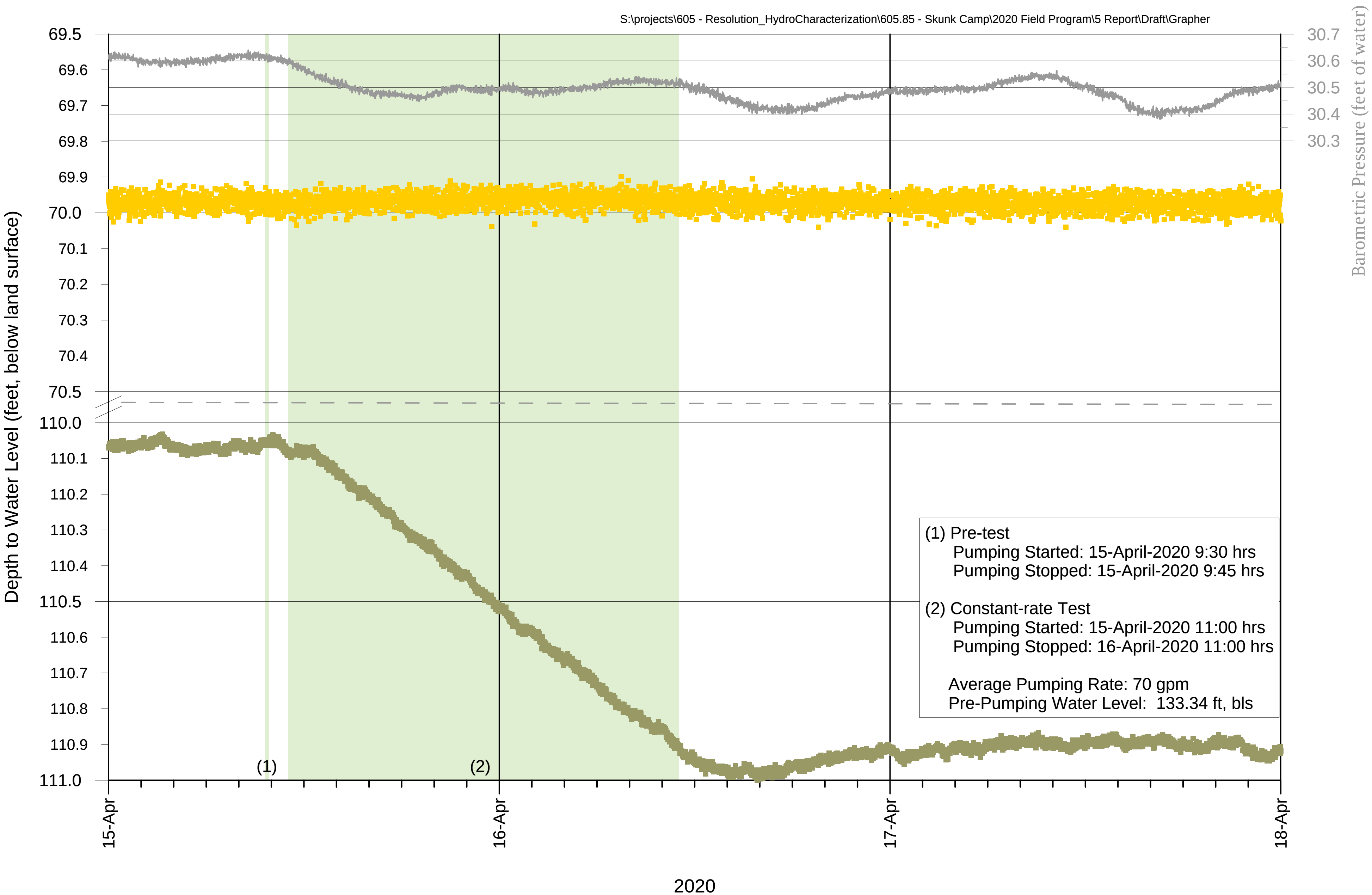
■ 55-622471

— Barometric Pressure

HYDROGRAPH FOR OBSERVATION WELL 55-622471
DURING RC20-2A PUMPING TEST

Client: Resolution Copper
Project: Skunk Camp Aquifer Testing
Location: Pinal and Gila Counties, AZ

MONTGOMERY
& ASSOCIATES



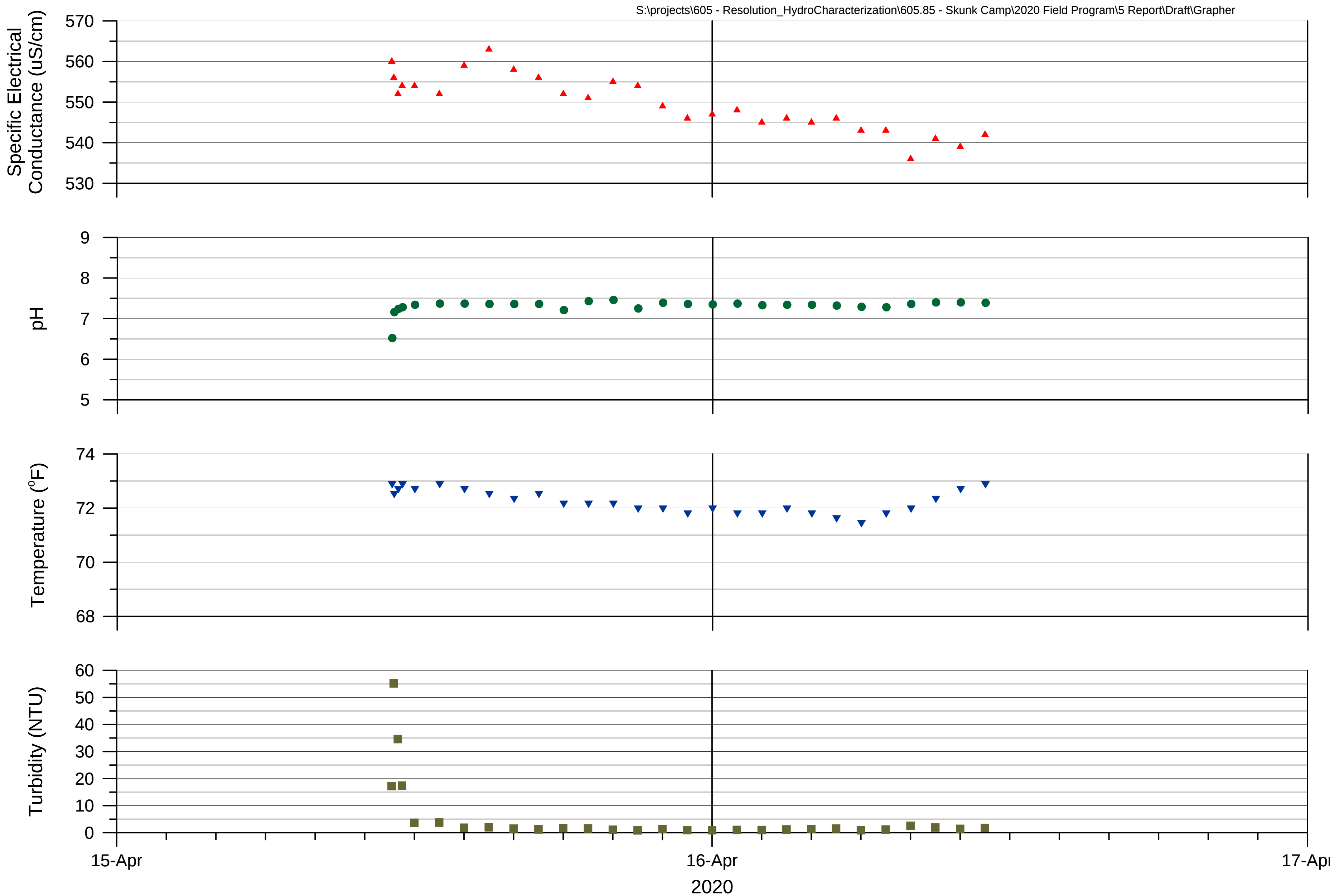
EXPLANATION
- RC20-2B(S)
- RC20-2B(D)
- Barometric Pressure

NOTE
RC20-2B(S) transducer data was corrected for changes in barometric pressure

HYDROGRAPH FOR OBSERVATION WELLS RC20-2B(S), AND RC20-2B(D) DURING RC20-2A PUMPING TEST

Client: Resolution Copper
Project: Skunk Camp Aquifer Testing
Location: Pinal and Gila Counties, AZ

MONTGOMERY & ASSOCIATES



EXPLANATION

- Specific Elec. Conductance
- pH
- Temperature
- Turbidity

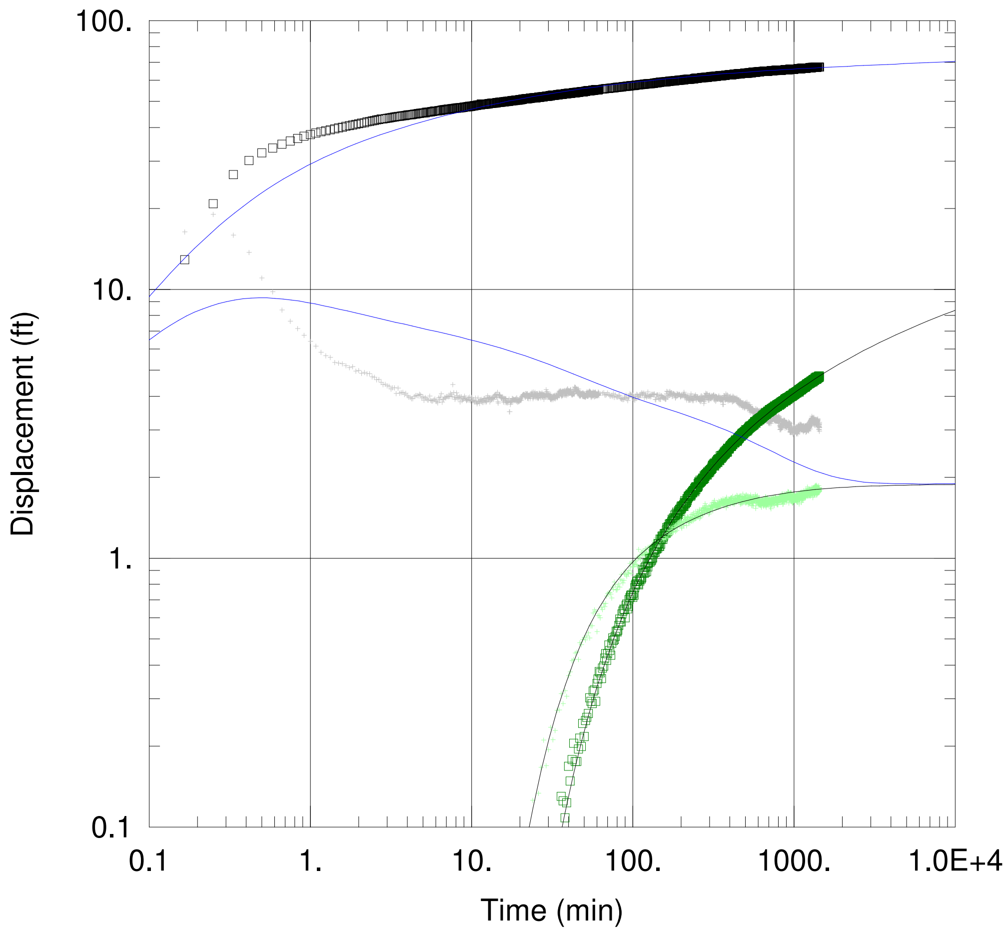
NOTE

Water quality parameters collected using discharge water at the wellhead

FIELD MEASUREMENTS OF SPECIFIC ELECTRICAL CONDUCTANCE, pH, TEMPERATURE, AND TURBIDITY DURING PUMPING AT WELL RC20-2A

Client: Resolution Copper
Project: Skunk Camp Aquifer Testing
Location: Pinal County, Arizona

MONTGOMERY & ASSOCIATES



RC20-2A CONSTANT-RATE PUMPING TEST

Data Set: S:\...\RC20-2A_55-622471_Moench.aqt
Date: 06/25/20 Time: 12:28:37

PROJECT INFORMATION

Company: Montgomery & Associates
Client: Resolution Copper
Project: 605.8514
Location: Skunk Camp
Test Well: RC20-2A
Test Date: 15 - 16 Apr 2020

AQUIFER DATA

Saturated Thickness: 1340. ft
Anisotropy Ratio (Kz/Kr): 0.2

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
RC20-2A	1017535	788141

Observation Wells

Well Name	X (ft)	Y (ft)
□ RC20-2A	1017535	788141
□ Jodsaas Irrigation Well	1018107	788387

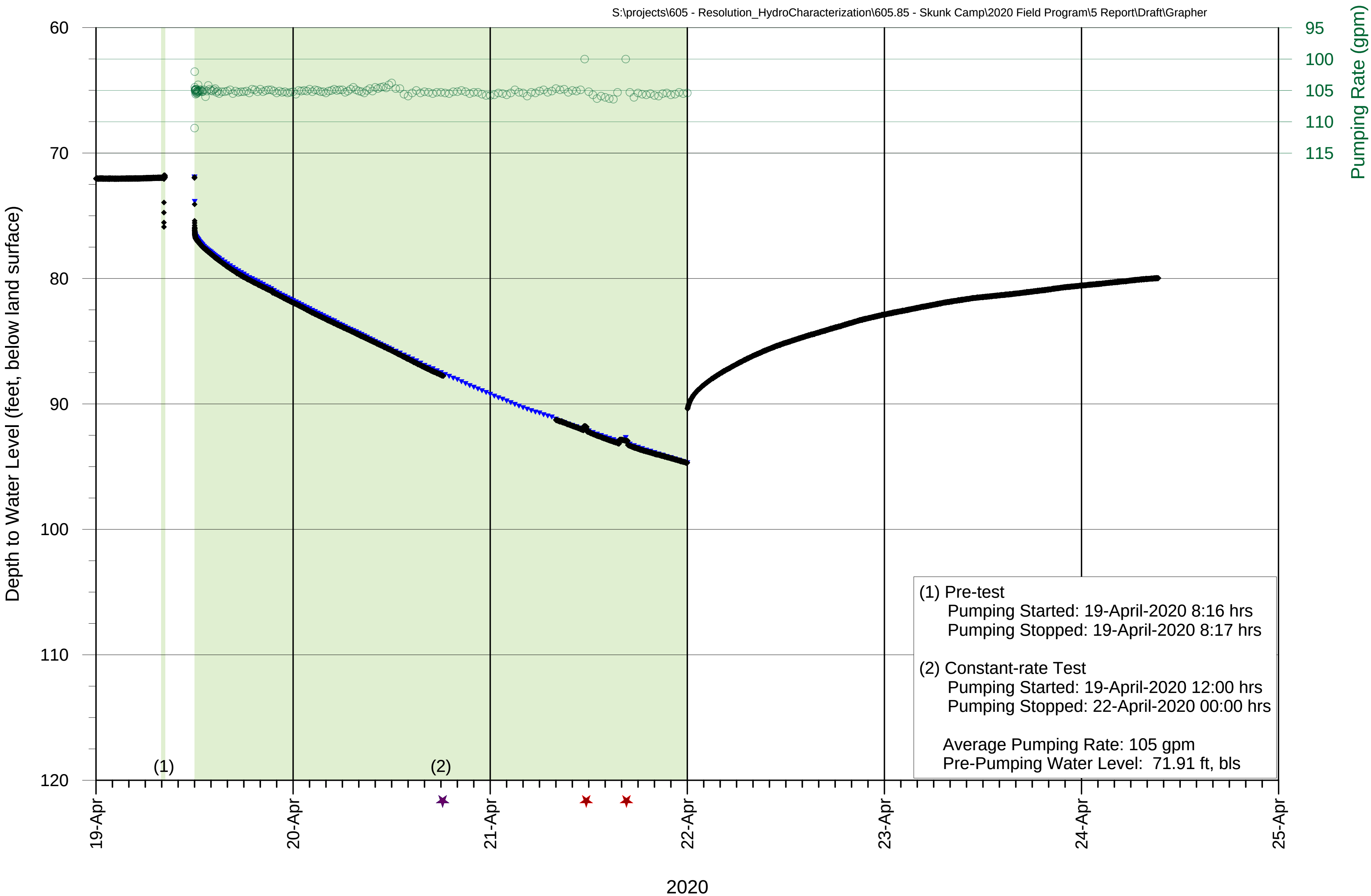
SOLUTION

Aquifer Model: Unconfined
Solution Method: Moench

T = 567.3 ft^2/day
Sy = 0.08
Sw = -3.15
r(c) = 0.1667 ft

S = 0.00025
Kz/Kr = 0.2
r(w) = 0.3125 ft
alpha = 1.0E-10 min^{-1}

RC20-2D [60-hour test]



EXPLANATION

- ▼ Water Level (manual)
- ◆ Water Level (transducer)
- ○ Pumping Rate (instantaneous)

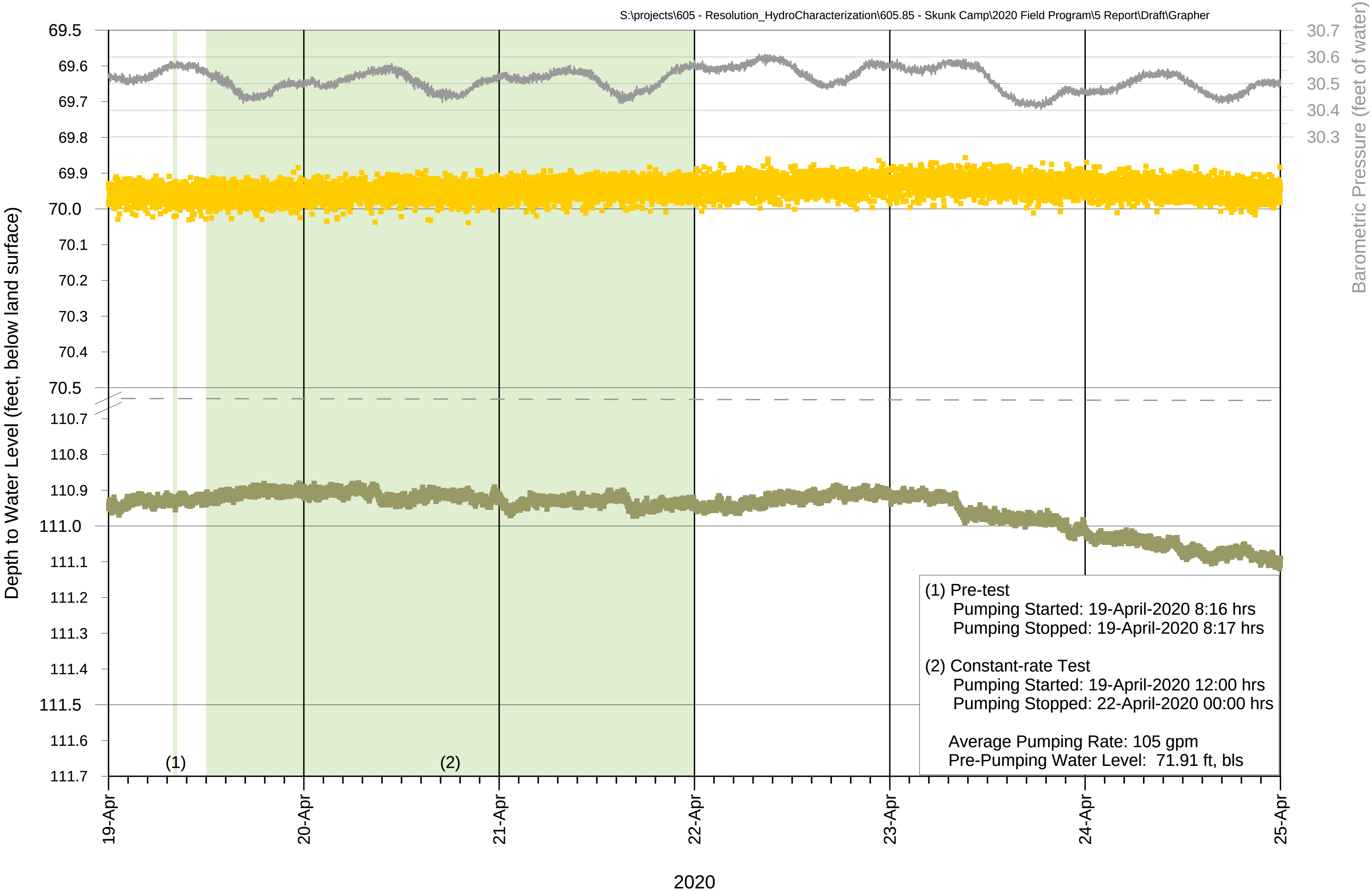
★ LevelTroll disconnected due to generator power surge; backup LevelTroll installed at 0800 hrs on 4/21/20

★ Variable-frequency drive temporarily decreased from 58 to 55 hz at 1123 hrs and 1543 hrs due to overheating

HYDROGRAPH FOR PUMPED WELL RC20-2D DURING PRE AND 60-HOUR CONSTANT-RATE PUMPING TESTS

Client: Resolution Copper
Project: Skunk Camp Aquifer Testing
Location: Pinal and Gila Counties, AZ

MONTGOMERY & ASSOCIATES



EXPLANATION

- RC20-2B(S)
- RC20-2B(D)
- Barometric Pressure

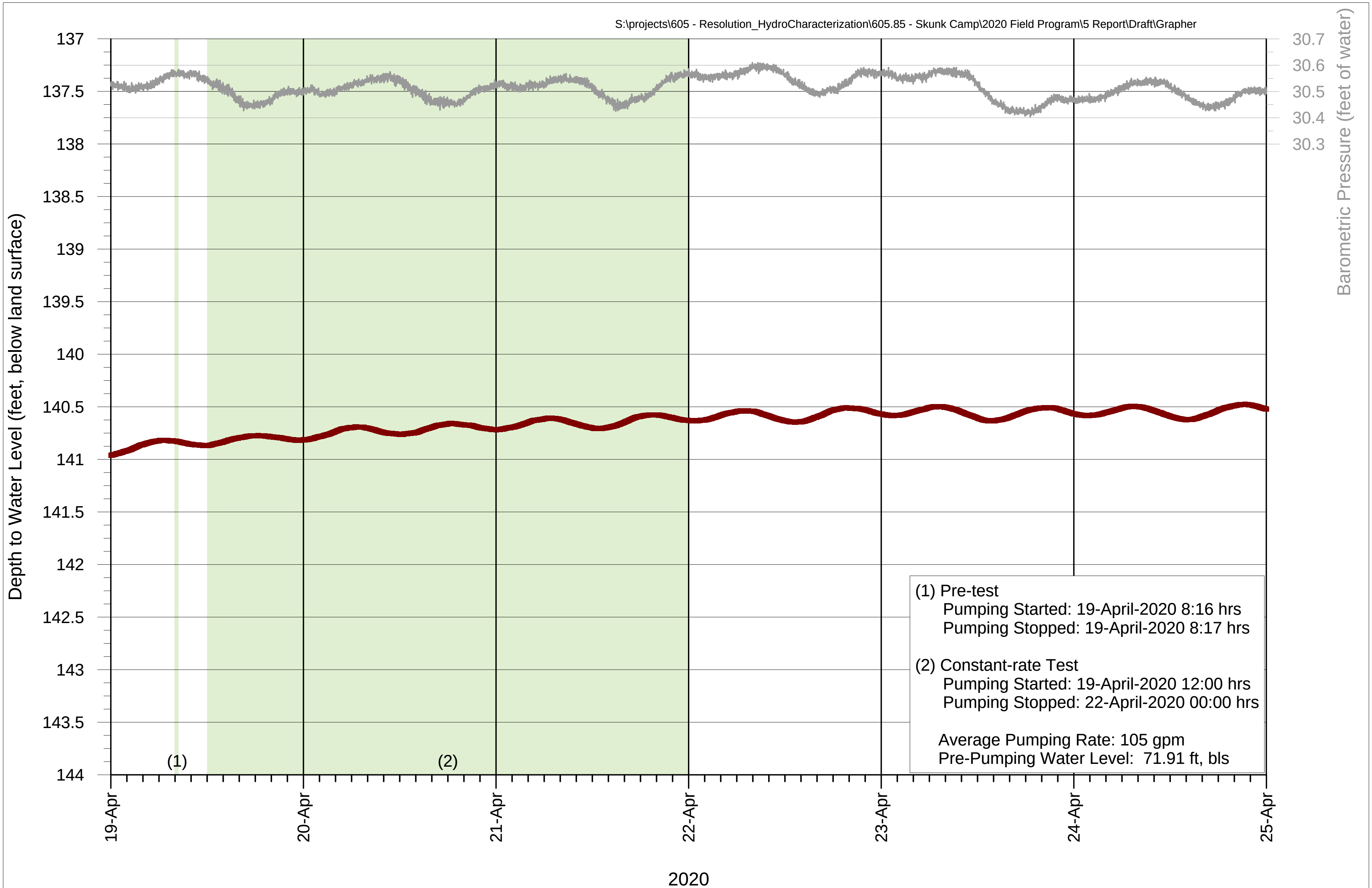
NOTE

RC20-2B(S) transducer data was corrected for changes in barometric pressure

HYDROGRAPH FOR OBSERVATION WELLS RC20-2B(S) AND RC20-2B(D) DURING RC20-2D 60-HOUR PUMPING TEST

Client: Resolution Copper
Project: Skunk Camp Aquifer Testing
Location: Pinal and Gila Counties, AZ

MONTGOMERY & ASSOCIATES



EXPLANATION

■ 55-622471

— Barometric Pressure

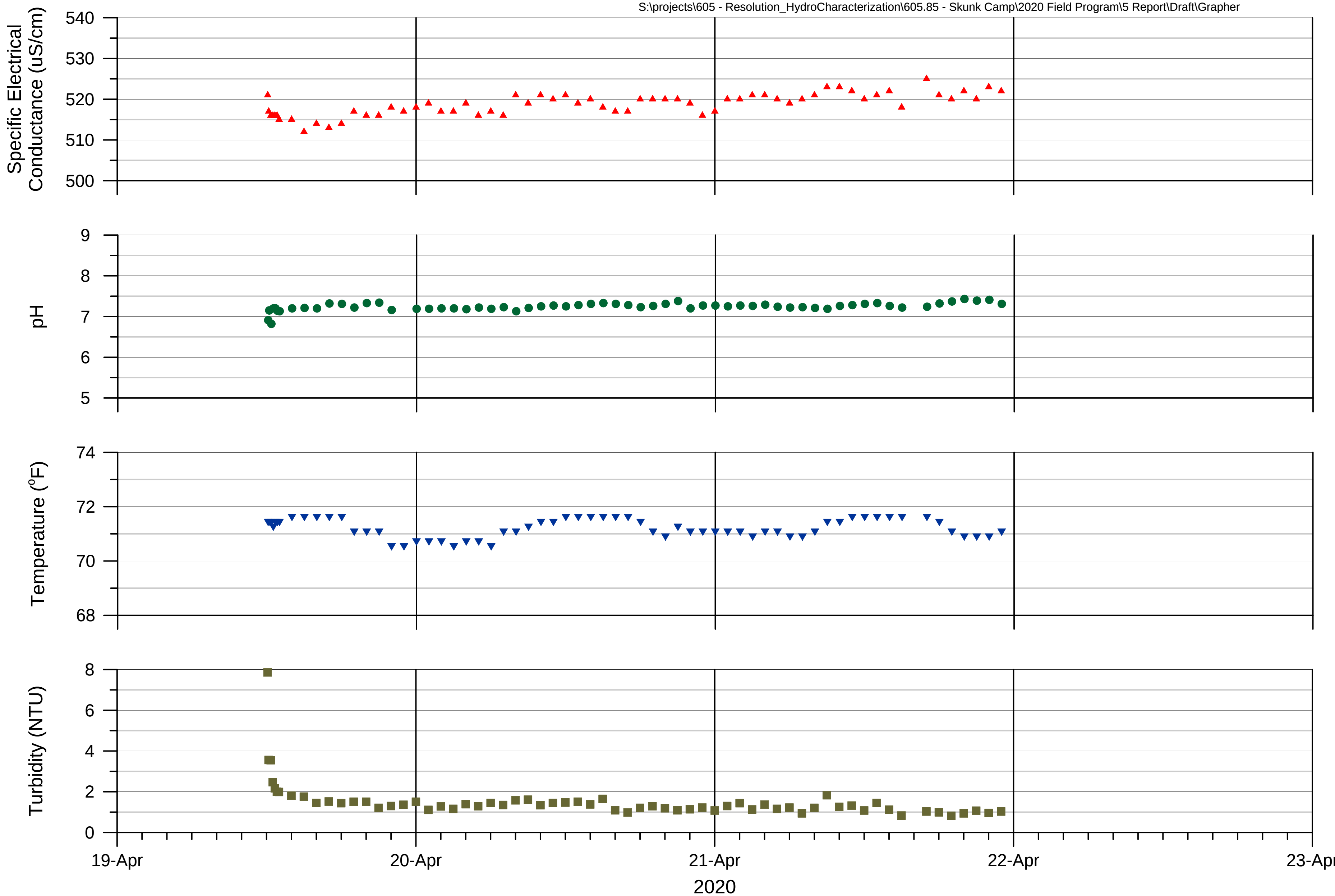
NOTE

Diurnal signal observed in transducer data is related to tidal effects

HYDROGRAPH FOR OBSERVATION WELL 55-622471
DURING RC20-2D 60-HOUR PUMPING TEST

Client: Resolution Copper
Project: Skunk Camp Aquifer Testing
Location: Pinal and Gila Counties, AZ

MONTGOMERY & ASSOCIATES



EXPLANATION

- ▲ Specific Elec. Conductance
- ● pH
- ▼ Temperature
- ■ Turbidity

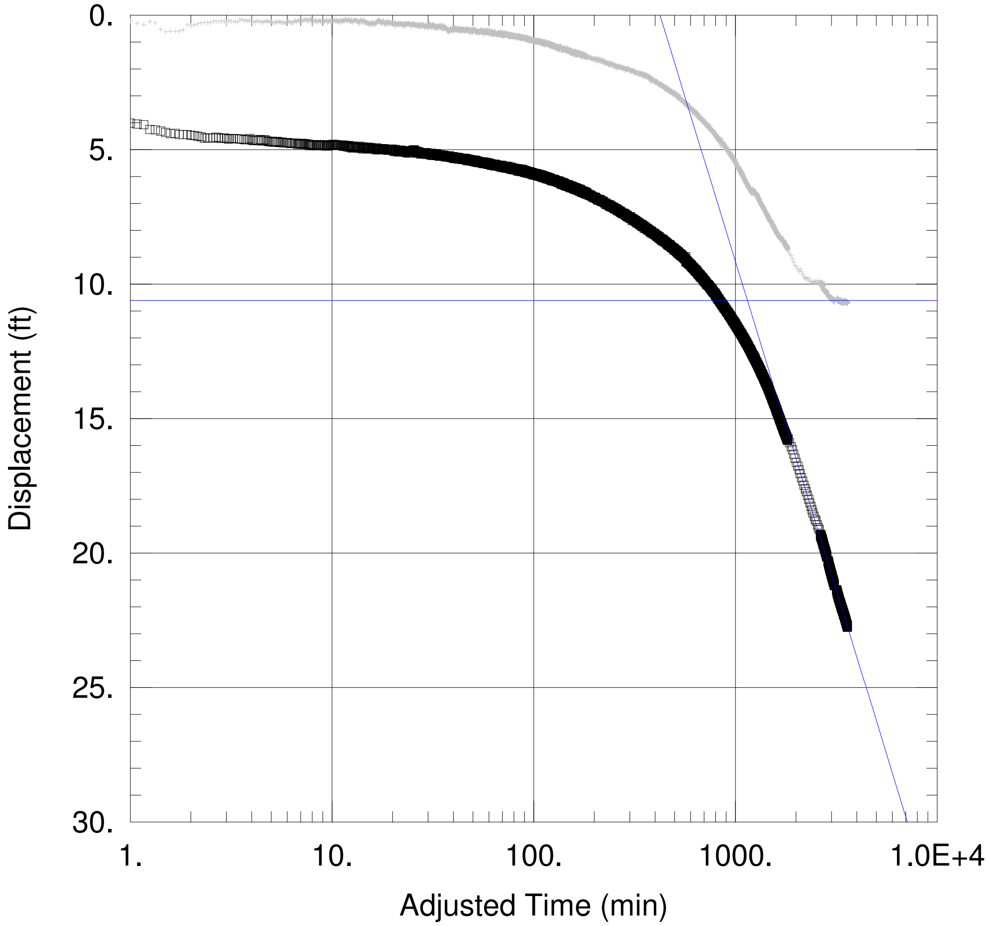
NOTE

Water quality parameters collected using discharge water at the wellhead

FIELD MEASUREMENTS OF SPECIFIC ELECTRICAL CONDUCTANCE, pH, TEMPERATURE, AND TURBIDITY DURING PUMPING AT WELL RC20-2D (60-HR TEST)

Client: Resolution Copper
Project: Skunk Camp Aquifer Testing
Location: Pinal County, Arizona

MONTGOMERY & ASSOCIATES



RC20-2D CONSTANT-RATE PUMPING TEST [60 HRS]

Data Set: S:\...\RC20-2D_60-hr_CJ.aqt
Date: 06/29/20 Time: 07:30:32

PROJECT INFORMATION

Company: Montgomery & Associates
Client: Resolution Copper
Project: 605.8514
Location: Skunk Camp
Test Well: RC20-2D
Test Date: 19 - 22 Apr 2020

AQUIFER DATA

Saturated Thickness: 70. ft Anisotropy Ratio (Kz/Kr): 1.0E-6

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
RC20-2D	1016923	787830

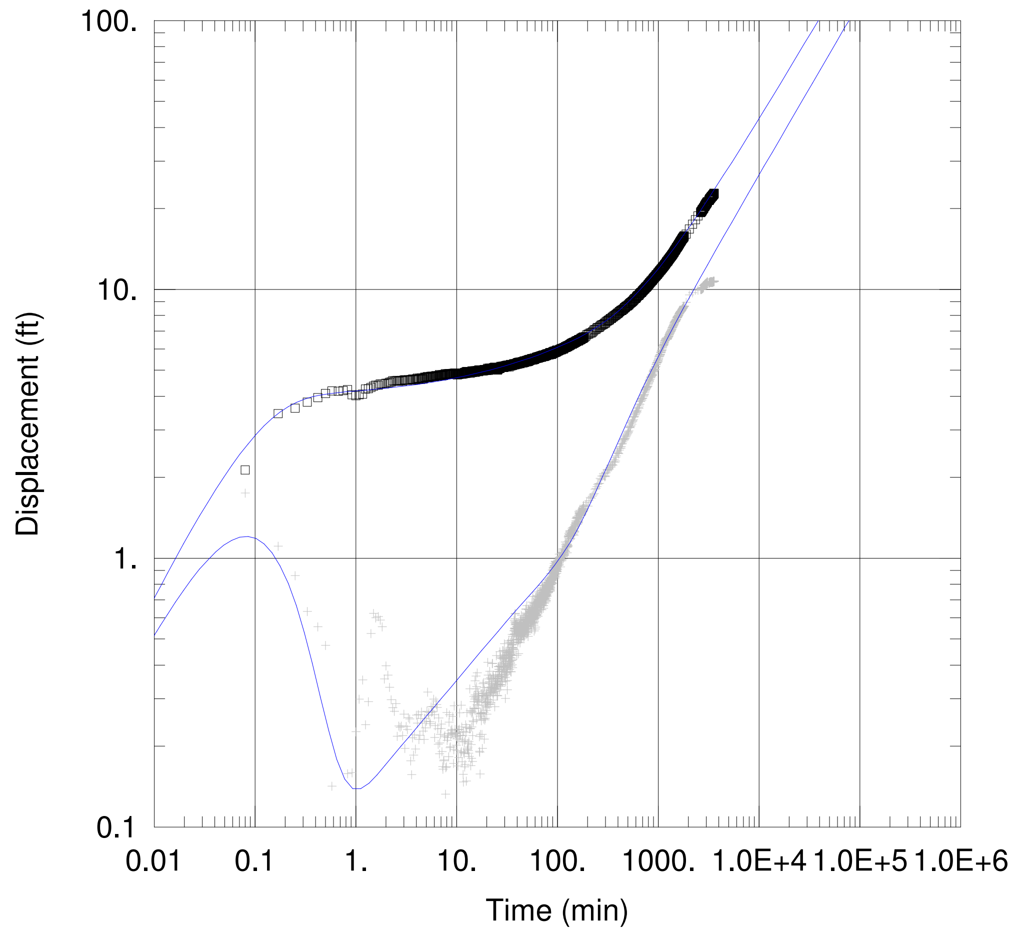
Observation Wells

Well Name	X (ft)	Y (ft)
□ RC20-2D	1016923	787830

SOLUTION

Aquifer Model: Confined Solution Method: Cooper-Jacob

T = 151.5 ft^2/day S = 0.1



RC20-2D CONSTANT-RATE PUMPING TEST [60 HRS]

Data Set: S:\...\RC20-2D_60-hr_Barker.aqt
Date: 07/02/20 Time: 09:57:20

PROJECT INFORMATION

Company: Montgomery & Associates
Client: Resolution Copper
Project: 605.8514
Location: Skunk Camp
Test Well: RC20-2D
Test Date: 19 - 22 Apr 2020

AQUIFER DATA

Saturated Thickness: 70. ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
RC20-2D	1016923	787830

Observation Wells

Well Name	X (ft)	Y (ft)
□ RC20-2D	1016923	787830

SOLUTION

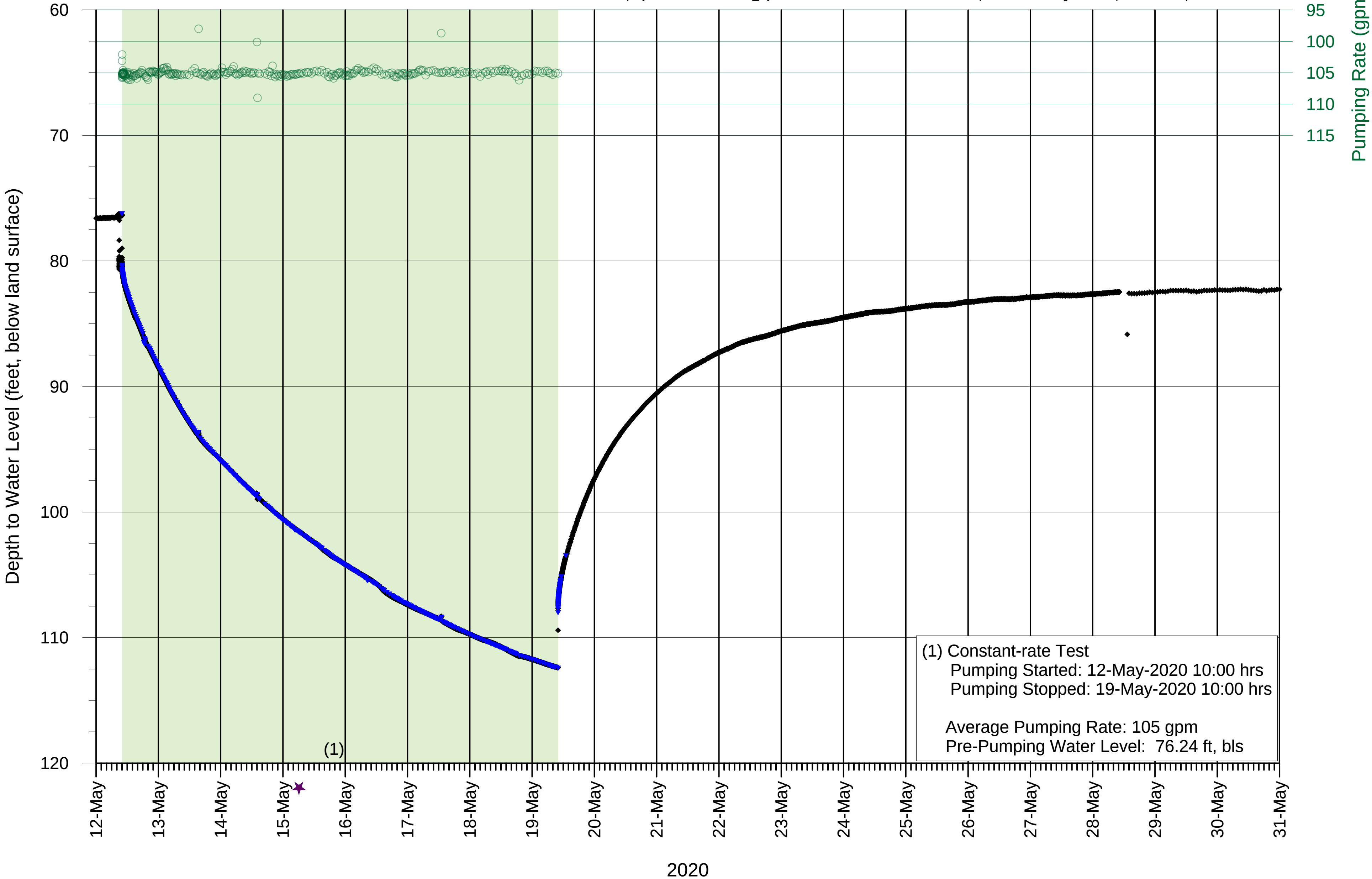
Aquifer Model: Fractured

Solution Method: Barker

K = 0.00076 cm/sec
K' = 1.5E-5 cm/sec
n = 0.7
Sf = 0.5
r(w) = 1. ft

Ss = 4.0E-6
Ss' = 0.01 ft^{-1}
b = 70. ft
Sw = -0.18
r(c) = 0.1667 ft

RC20-2D [7-day test]

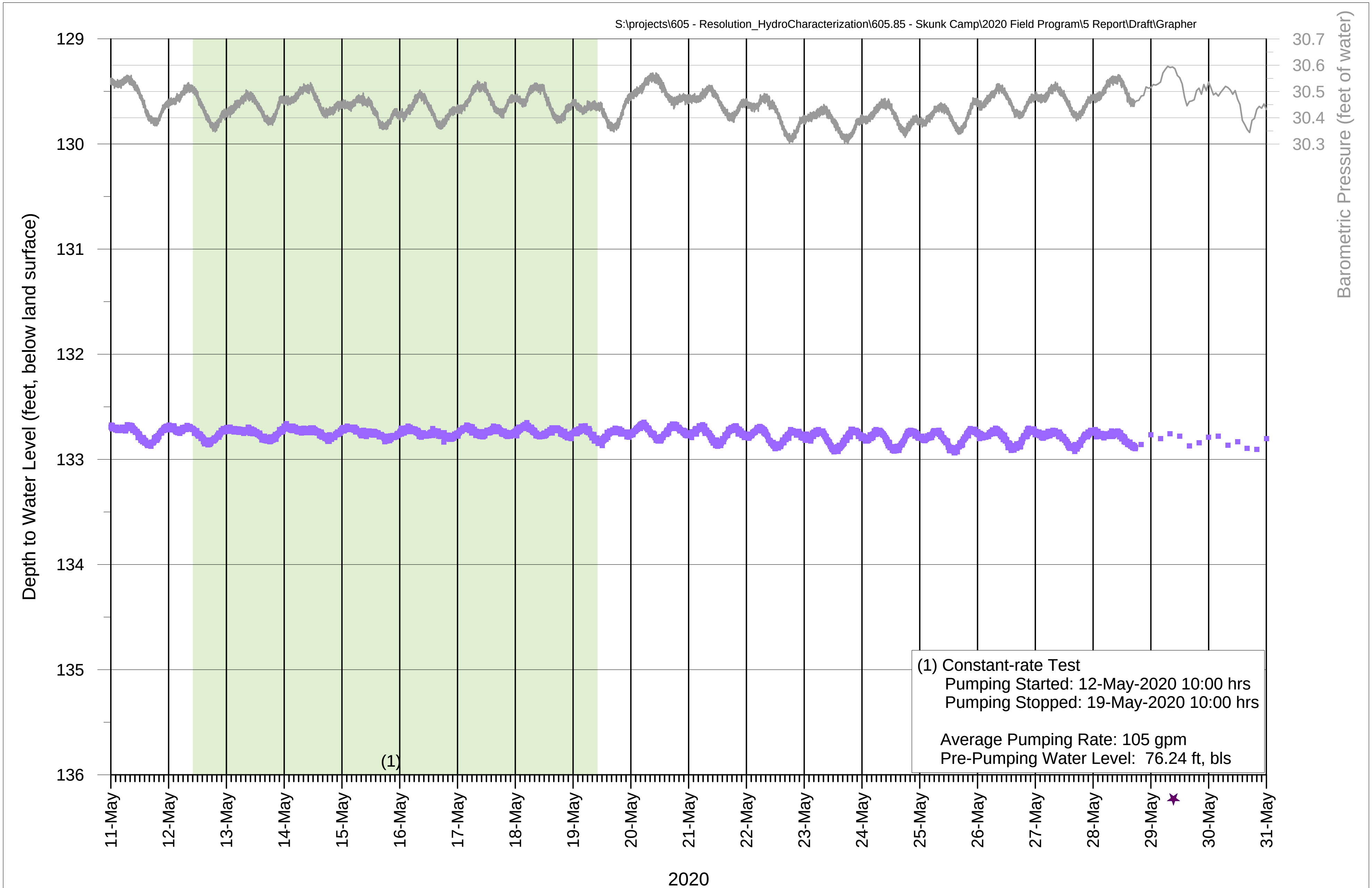


EXPLANATION
- ▼ Water Level (manual)
- ○ Pumping Rate (instantaneous)
- ✶ Pumping rate affected by temporary kink in discharge line

HYDROGRAPH FOR PUMPED WELL RC20-2D DURING PRE AND 7-DAY CONSTANT-RATE PUMPING TEST

Client: Resolution Copper
Project: Skunk Camp Aquifer Testing
Location: Pinal and Gila Counties, AZ

MONTGOMERY & ASSOCIATES



EXPLANATION

■ RC20-2A

— Barometric Pressure

✶ Transducer and barometer reprogrammed to 4-hour interval

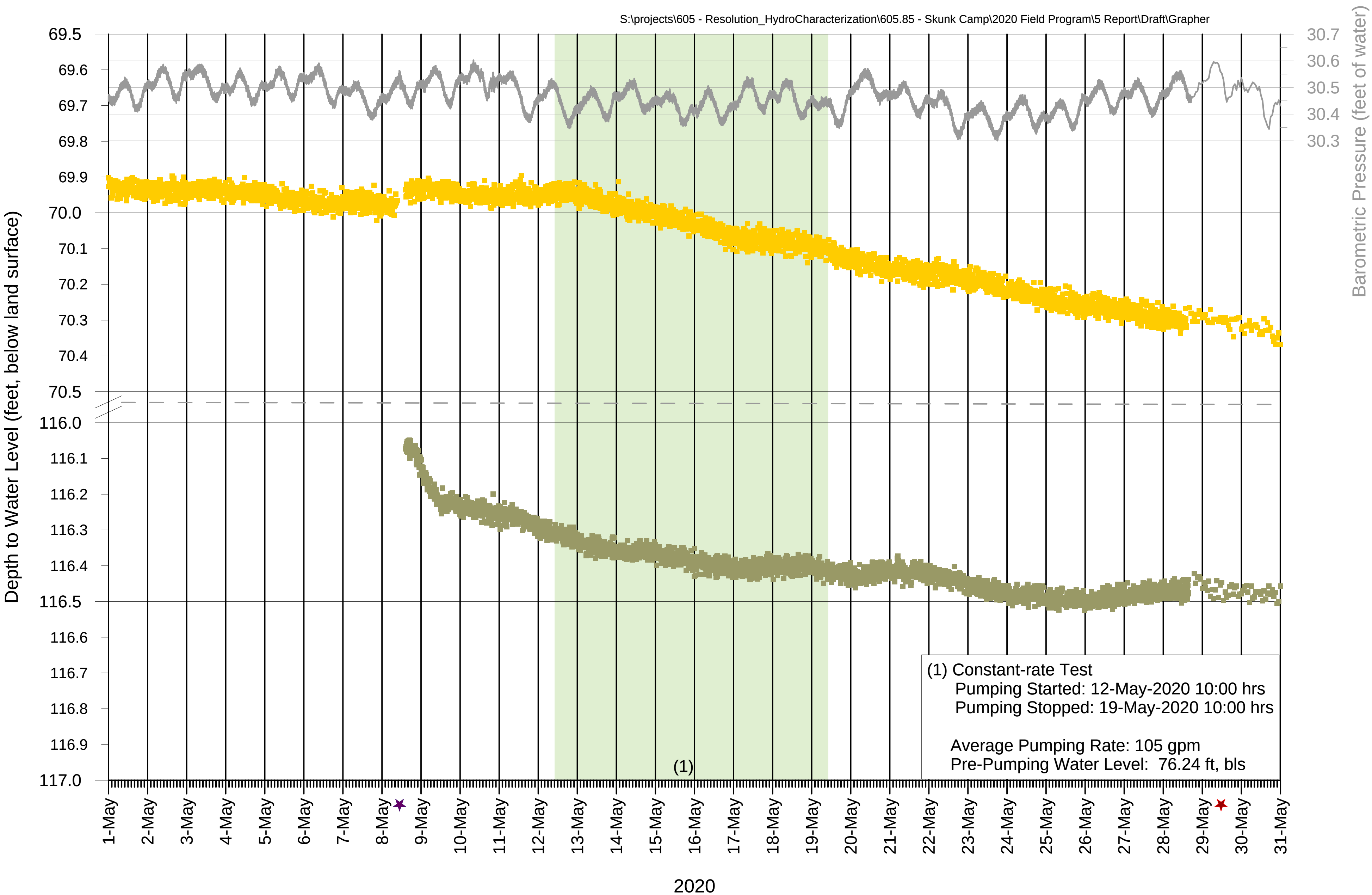
NOTE

Diurnal signal observed in transducer data is related to tidal effects

HYDROGRAPH FOR OBSERVATION WELL RC20-2A DURING RC20-2D 7-DAY PUMPING TEST

Client: Resolution Copper
Project: Skunk Camp Aquifer Testing
Location: Pinal and Gila Counties, AZ

MONTGOMERY & ASSOCIATES



EXPLANATION

- RC20-2B(S)
- RC20-2B(D)
- Barometric Pressure

✶ Development conducted in RC20-2B(S) and (D); water level in RC20-2B(D) approximately 108.8 feet bls during the week prior to development

✶ Transducer and barometer reprogrammed to 4-hour interval

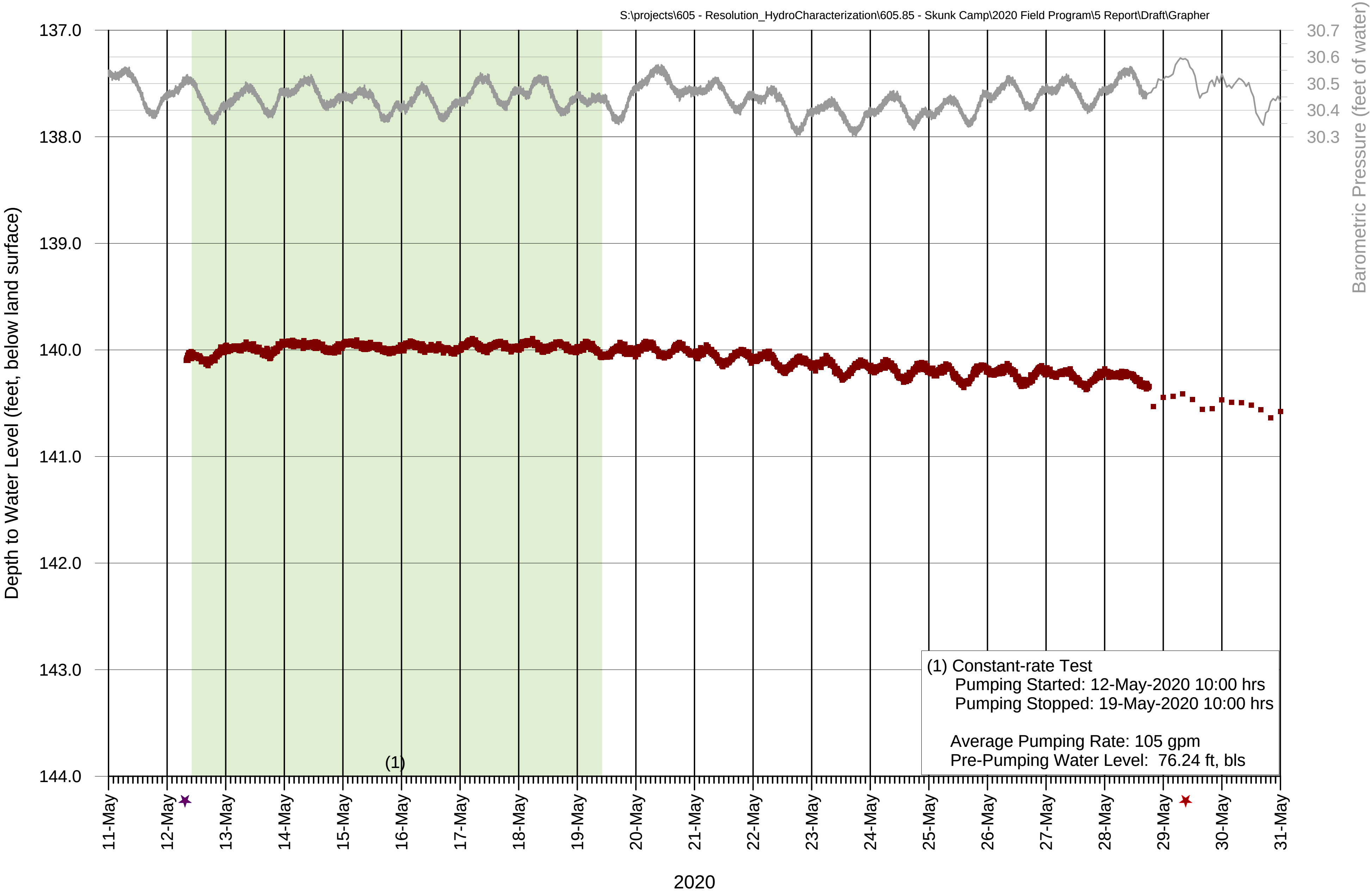
NOTE

RC20-2B(S) transducer data was corrected for changes in barometric pressure

HYDROGRAPH FOR OBSERVATION WELLS RC20-2B(S) AND RC20-2D(D) DURING RC20-2D 7-DAY PUMPING TEST

Client: Resolution Copper
Project: Skunk Camp Aquifer Testing
Location: Pinal and Gila Counties, AZ

MONTGOMERY & ASSOCIATES



EXPLANATION

■ 55-622471

— Barometric Pressure

DATA GAP

✶ Transducer re-installed following rehabilitation of well

NOTE

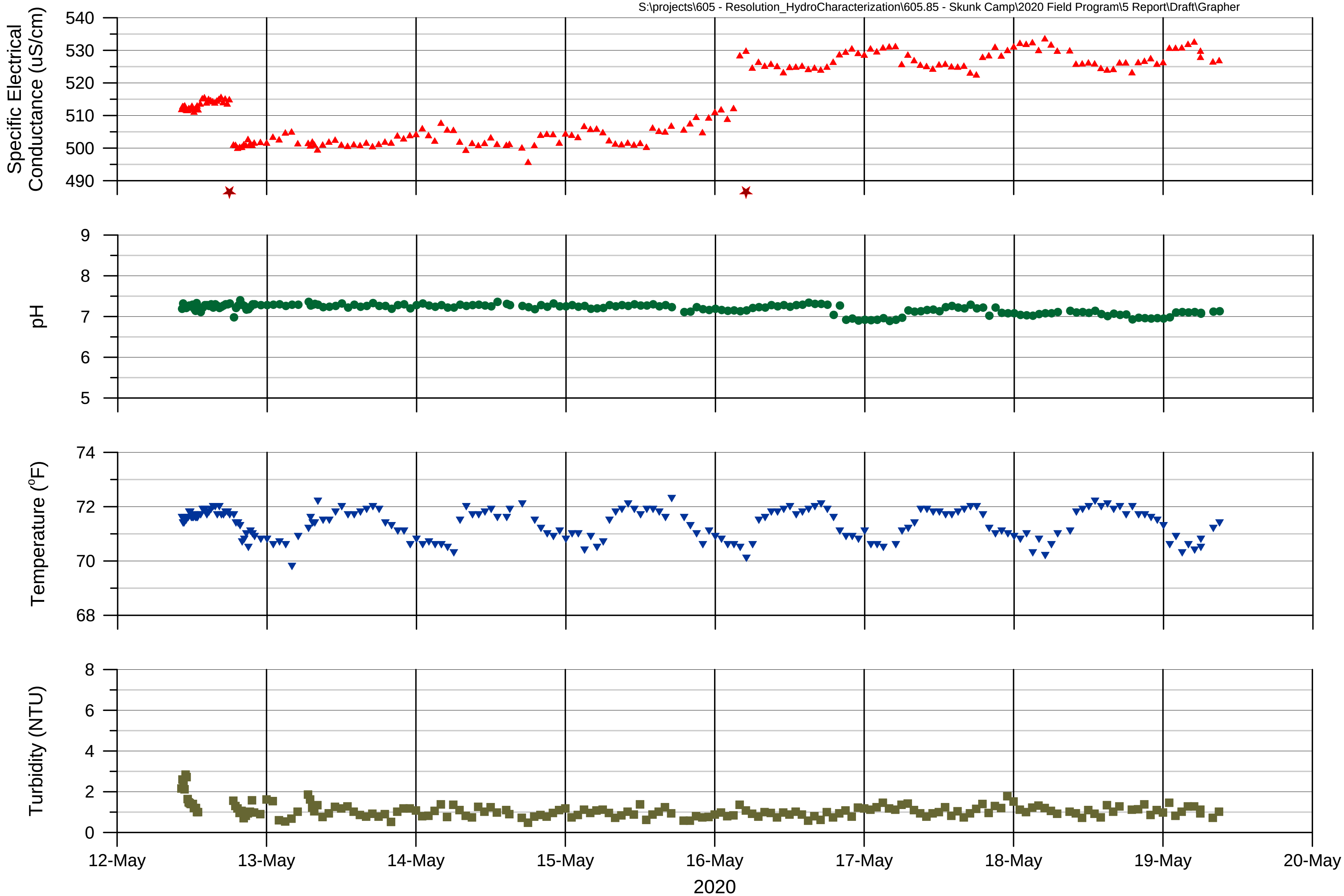
✶ Transducer and barometer reprogrammed to 4-hour interval

Diurnal signal observed in transducer data is related to tidal effects

HYDROGRAPH FOR OBSERVATION WELL 55-622471
DURING RC20-2D 7-DAY PUMPING TEST

Client: Resolution Copper
Project: Skunk Camp Aquifer Testing
Location: Pinal and Gila Counties, AZ

MONTGOMERY & ASSOCIATES



EXPLANATION

- Specific Elec. Conductance
- pH
- Temperature
- Turbidity

✶ Replaced Myron L Ultrameter II field instrument

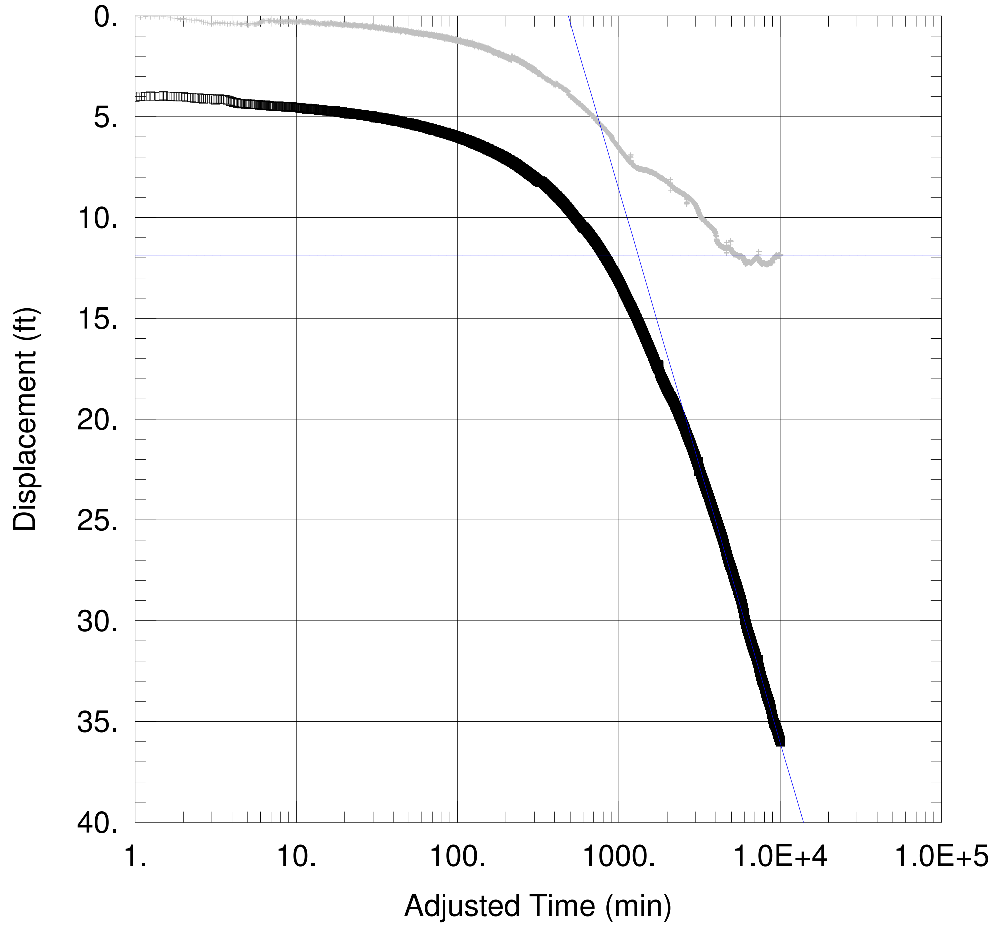
NOTE

Water quality parameters collected using discharge water at the wellhead

FIELD MEASUREMENTS OF SPECIFIC ELECTRICAL CONDUCTANCE, pH, TEMPERATURE, AND TURBIDITY DURING PUMPING AT WELL RC20-2D (7-DAY TEST)

Client: Resolution Copper
Project: Skunk Camp Aquifer Testing
Location: Pinal County, Arizona

MONTGOMERY & ASSOCIATES



RC20-2D CONSTANT-RATE PUMPING TEST [7 DAYS]

Data Set: S:\...\RC20-2D_7-day_CJ.aqt
Date: 06/29/20 Time: 07:34:18

PROJECT INFORMATION

Company: Montgomery & Associates
Client: Resolution Copper
Project: 605.8514
Location: Skunk Camp
Test Well: RC20-2D
Test Date: 12 - 19 May 2020

AQUIFER DATA

Saturated Thickness: 70. ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
RC20-2D	1016923	787830

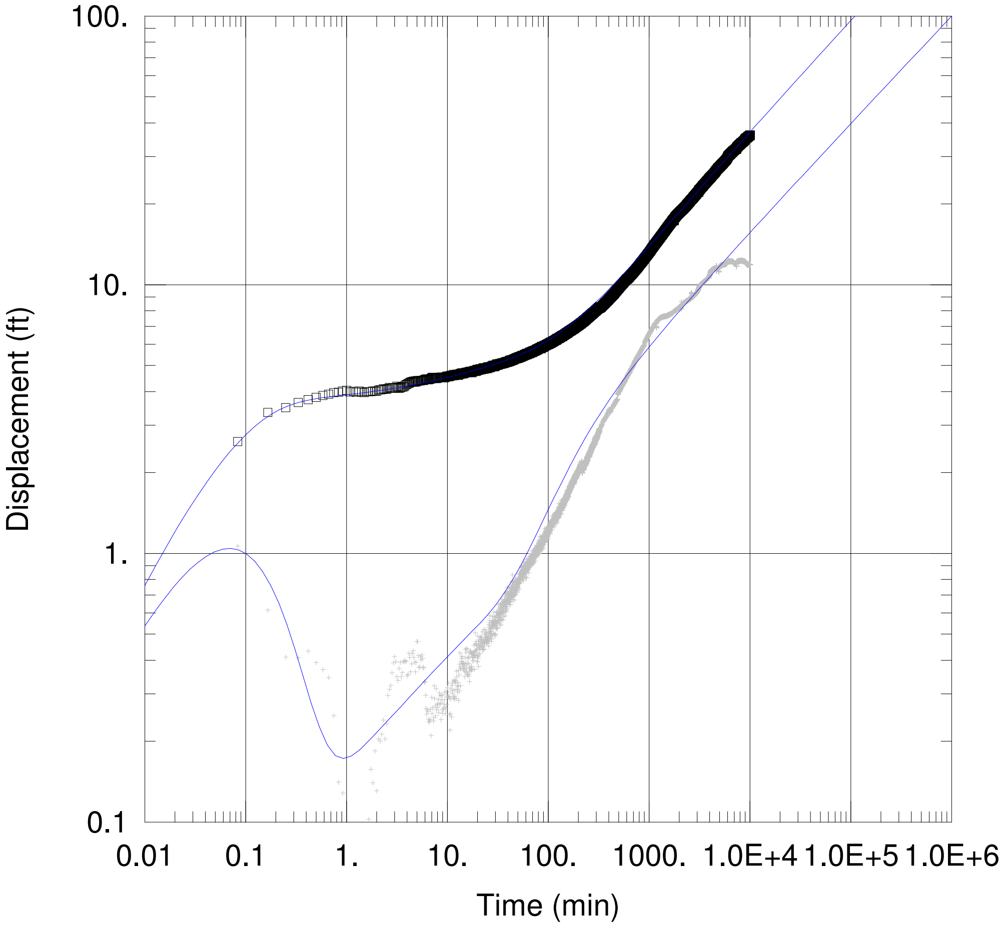
Observation Wells

Well Name	X (ft)	Y (ft)
□ RC20-2D	1016923	787830

SOLUTION

Aquifer Model: Confined Solution Method: Cooper-Jacob

T = 135. ft^2/day S = 0.1



RC20-2D CONSTANT-RATE PUMPING TEST [7 DAYS]

Data Set: S:\...\RC20-2D_7-day_Barker.aqt
Date: 06/29/20 Time: 07:39:17

PROJECT INFORMATION

Company: Montgomery & Associates
Client: Resolution Copper
Project: 605.8514
Location: Skunk Camp
Test Well: RC20-2D
Test Date: 12 - 19 May 2020

AQUIFER DATA

Saturated Thickness: 70. ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
RC20-2D	1016923	787830

Observation Wells

Well Name	X (ft)	Y (ft)
□ RC20-2D	1016923	787830

SOLUTION

Aquifer Model: Fractured Solution Method: Barker

K = 0.00068 cm/sec
K' = 0.0002 cm/sec
n = 1.2
Sf = 0.5
r(w) = 1. ft

Ss = 2.5E-5
Ss' = 0.017 ft^{-1}
b = 70. ft
Sw = -0.6
r(c) = 0.1667 ft