RETTEW

We answer to you.

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Engineers

Environmental Consultants

Surveyors

Landscape Architects

Safety Consultants

March 6, 2025

Mr. Bradford L. Fish
Sunoco Pipeline LP
100 Green Street
Marcus Hook, PA 19061

RE: Borehole Logging Survey
Residential Well
[redacted]
Upper Makefield Township, PA
RETTEW Project No. 0963003386

Dear Mr. Fish,

On February 17 and 18, 2025, RETTEW completed a geophysical borehole survey at the above-referenced site. The purpose of the survey was to locate and characterize fractures and potential water-bearing zones intersecting the above-referenced residential well. To accomplish these objectives, RETTEW conducted Optical Televiewer, Acoustic Televiewer, Mechanical Caliper, Fluid Temperature, Fluid Conductivity, and Natural Gamma. The procedures and geophysical technics utilized are briefly described in the sections below. A summary of the notable features identified is presented in the "Logging Results" section.

LOGGING EQUIPMENT

RETTEW conducts borehole geophysics and televiewer logging using a Mt. Sopris MX Series winch and SCOUT Pro data acquisition system. This unit records digital data for on-site log playback, reproduction, and field interpretation, as well as post-processing and report presentation. The systems are driven by field PCs running software supplied by the manufacturer for data acquisition, log replay, probe control, probe calibration, and logging environment compensation.

DECONTAMINATION PROCEDURE

Prior to RETTEW's mobilization to the site, the winch cable and sondes scheduled for use are decontaminated, to ensure the quality of sampling by preventing cross-contamination. The procedure described below was implemented both before and after logging. The equipment used for decontamination is listed below.

- Distilled water
- Seventh Generation solution (mixed with distilled water)
- Stiff-bristle brush
- Manual pump spray bottle
- Heavy duty paper towels
- 5-gallon bucket with lid.

The procedure used for decontamination is listed below.

1. A decontamination area is designated and set-up.

2. Proper personal protective equipment is donned (i.e., nitrile gloves, safety glasses).
3. Sondes are removed from their containers and placed in the decontamination area.
4. Mixed detergent solution is applied to each sonde with a manual pump spray bottle.
5. Sondes are manually wiped down with a paper towel or scrubbed with a stiff bristle brush, depending on the amount of mud or dirt on the sonde.
6. Sondes are rinsed with distilled water and dried with a paper towel.
7. Discarded water is captured in a 5-gallon bucket, which is sealed for proper disposal and not allowed to infiltrate the soil.
8. If a sonde is still visibly contaminated, the process is repeated as necessary.
9. Decontamination of the winch cable is performed during the first deployment of a sonde down a borehole, and on the last retrieval of a sonde, for each borehole.
10. Mixed detergent solution is sprayed on paper towels, and the cable is wiped down on its initial deployment down a borehole.
11. Paper towels are monitored for cleanliness and replaced as necessary.
12. Cable decontamination process is repeated on the final recovery of a sonde, for each borehole.

LOGGING PARAMETERS AND METHODOLOGY

Geophysical well logging in general involves lowering sondes in a borehole and recording parameters that are related to the properties of the adjacent soil or rock, the fluids in the borehole or formation, and/or construction details of the well. There are many tools and techniques that have been developed to provide specific information in different environments and constructions of drilled holes. The data collected can define the nature and extent of geologic formations and formation fluids and can be used to provide correlation between holes.

The sondes used for this survey are described below. Note that RETTEW personnel test them for proper function and recalibrate periodically, as necessary. This is essential to the proper acquisition of downhole data and the ability to relate the data from one borehole to another.

<u>OPTICAL TELEVIEWER</u>

The borehole optical televiewer (OPTV) provides a high-resolution digital optical scan of the interior of a borehole using visible wavelength light. From the accurately scaled, continuous image it is possible to identify the depth and character of features such as fractures, bedding planes, veins, solution openings, etc. It is possible to calculate the strike, dip, and aperture of planar features. The OPTV operates by using a high-resolution color downhole camera, which views a reflection of the borehole walls in a hyperbolic correction mirror. At successive depth increments of 0.5 mm, rings of pixels corresponding to circular scans of the borehole wall are acquired from the probe and stacked into a continuous image. The image is rectangular – representing the interior of a cylinder that has been sliced open and rolled out flat. The image is oriented to north, based on data from three magnetometers and accelerometers in the sonde. Note that the use of magnetometers for orientation leads to image distortion in steel-cased holes, and within several feet of the base of steel casing in open holes. All OPTV sondes require an open borehole, or one filled with a clear fluid.

ACOUSTIC TELEVIEWER

The high-resolution acoustic televiewer (HRAT) provides a scan or image of the interior of the borehole that is created not by reflected visible wavelength light, but by reflected ultrasound. Since ultrasonic pulses are used, it is possible to record both the amplitude and travel time of each pulse and construct two separate images. The amplitude log is analogous to a visual scan, while the travel time data are affected primarily by the local diameter of the borehole (i.e., the larger the bore, the later the arrival of the reflected pulse), and therefore can supplement or replace a caliper log. The main advantage of the HRAT probe is that it can be used in larger boreholes than optical tools, and in holes with turbid or particle-loaded fluids that would be opaque to optical methods.

The HRAT operates by using a fixed acoustic transducer and a rotating acoustic mirror capable of focusing on the borehole wall at any distance from the probe diameter upwards. The acoustic transducer is focused based on the borehole diameter, and impedance-matched to the borehole fluid, to provide optimum image resolution and reflected amplitude. Mirror rotation speed (i.e., circumferential resolution), sampling rate (i.e., depth resolution), signal gain (i.e., amplitude image contrast), and recording time gate (i.e., travel time image contrast) are all variable and under operator control to provide the best image possible under borehole-specific conditions.

Planar features intersecting a cylindrical borehole appear sinusoidal on the flattened cylindrical image. The azimuth of the peak/trough of the sinusoid, and the amplitude of the sinusoid, can be measured and used to calculate the strike and dip (see **Appendix A**) of such features. Based on their visual character, planar features on the HRAT (and OPTV- see above) logs are categorized on the log sheets as various types of geologic interface (fractures, bedding planes, foliation, etc.). Once sinusoids are fit to the structures, they are corrected for borehole tilt, corrected for declination using NOAA's "Estimated Value of Magnetic Declination" online calculator for each well location, and are listed in the Planar Features Characterization Table (**Appendix B**) and plotted on a Wulff stereonet in **Appendix C**.

Tables listing the depth, aperture, strike, dip, and type of feature are included for each well. Based on their visual character, planar features are categorized as various types of geologic interface (fractures, bedding planes, foliation, etc.). Feature apertures are listed in tenths of an inch. An aperture of zero for an open fracture simply means that while it appears to be a continuous open feature, the opening is smaller than the line thickness on the log (~0.019 inches).

Please note that feature measurements present within five feet of the bottom of a steel casing may be distorted due to metallic interference with the internal magnetometer. Note also that it has been the experience of RETTEW that the aperture of a feature is not always a strong indicator of its water-producing potential. Thin, discrete features sometimes produce as much or more water than wide, open fractures or fracture zones.

MECHANICAL CALIPER

Caliper measurements represent the average diameter of the borehole, or well, at a given depth. The caliper tool collects and transmits the data from three spring-loaded arms as the tool is lifted upwards through the borehole. The caliper tool is used to locate solution openings or fractures (where the borehole is typically enlarged due either to the presence of natural openings, or to plucking of broken rock by the drill bit), and to determine the length of casing intervals (as evident from small changes in casing diameter, or the small enlargements at threaded junctions, or narrowing due to the bead at welded junctions).
Caliper logs are collected by calibrating the downhole tool with a measuring template, lowering the tool

to the base of the well, remotely opening the arms, and then logging the open borehole and casing diameter in an upward direction. Caliper logs are acquired with a logging speed of no more than 12 feet per minute (fpm).

FLUID TEMPERATURE

Fluid temperature logs provide the temperature of the air or fluid in a borehole as a function of depth. Temperature logs can indicate where water is entering or leaving a borehole – and thereby disturbing the normal geothermal gradient. Deviations, offsets, or changes in the slope of the temperature log can be used to locate zones of water movement within the borehole. Temperature logs must be run in wells that have been allowed to fully equilibrate to the local geothermal gradient following any prior drilling, construction, pumping, or sampling. During a temperature survey, data accuracy is ensured by maintaining a downward logging speed of approximately 10 fpm. This provides an adequate time buffer to allow sensors to respond to minor temperature changes.

FLUID CONDUCTIVITY

Fluid conductivity logs provide a continuous measurement of the electrical conductivity of the borehole fluid- i.e., zero in air or hydrocarbons, greater than zero in water. In water, electrical conductivity is mostly a function of electrolytic content. Water with very low dissolved solid concentrations will yield low fluid conductivity, while water containing a high level of dissolved solids will be proportionally more conductive. Fluid conductivity logs often deflect where water-producing features are transmitting water into or out of the well (since the well water may have a differing electrolytic chemistry than the formation water). The fluid conductivity log is usually collected simultaneously with the temperature log – since for both, data from a fully equilibrated water column is required.

NATURAL GAMMA

Gamma logs are one of the most widely used geophysical logs in groundwater applications. They are used primarily to identify changes in lithology – specifically, the relative amounts of clay in various sedimentary units.

A gamma log provides a record of the total natural gamma radiation detected within a given energy range. In water-bearing rocks and sediments that are not contaminated by artificial radioisotopes, the most significant naturally occurring, gamma-emitting radioisotopes are potassium-40 and the daughter products of the uranium and thorium decay series. If gamma-emitting artificial radioisotopes have been introduced by humans into the groundwater system, they will also produce part of the radiation measured.

The amplitude of gamma-log deflections is affected by any borehole condition that alters the density of the material through which gamma photons must pass, or the length of the travel path. The bedding of a gamma-emitting formation must be thick to obtain a quantitative value, since the detector will be affected by the radiation from the formation as the tool approaches and passes the bed. Although increases in borehole diameter, or the presence of steel casing, will decrease the recorded gamma count, it is possible to collect usable information in both cased and open portions of the borehole using the gamma sonde. The presence of potassium-rich (and therefore gamma-emitting) bentonite clay commonly used in well construction will generally produce high gamma count peaks on a natural gamma log. RETTEW has natural gamma detectors on many sondes, and comparison of the multiple gamma logs collected for any given well logging program are used to ensure that the depths of differing logs are not erroneously shifted. Therefore, the gamma log presented for any well may have been collected simultaneously with any of the other logs from the same well.

LOGGING RESULTS

The logging results for the well are presented on the enclosed digital logs and tables are briefly summarized below.

Note that since analysis of borehole geophysical logs can be quite subjective, and the level of detail is dependent upon the specific goals of the geologist, the analysis below by RETTEW covers the major features of each log – as well as some possibly minor features – to serve as examples (or guides) for further interpretation by geologists familiar with the site, local geology, and/or project goals. In general, logs may display deviations (i.e., "spikes" where the parameter deviates from, and then returns to, "background" level), offsets (changes in background level), or slope changes. Any of these could be considered significant in certain situations, or when compared to correlating features at the same depth on other logs.

[redacted]-Residential Well

NOTABLE FEATURES

- The total depth of the well was measured at approximately 460.0 feet below "top of casing" (TOC).
- TOC was measured as 0.85 feet above ground level.
- The depth to water was measured at 52.4 feet below TOC at the beginning of the survey but varied over the two days.
- The diameter of the casing at the surface was measured to be nominally 6 inches, and the bottom of the casing was located at approximately 28.4 feet below TOC.
- The caliper log showed a notable enlargement due to fracturing centered near 108.0 feet below TOC and multiple smaller enlargements due to partially open fractures throughout the well.
- The fluid conductivity was consistent throughout most of the well but exhibited a notable increase from 440.0 feet below TOC through the bottom of the borehole.
- The fluid temperature was consistent throughout the borehole.
- The natural gamma log had notable increased response at 176.0, 198.0, 276.0, and 453.0 feet below TOC.
- Planar features were recognizable on the acoustic and optical televiewer logs. The depth, strike, dip, aperture, and feature type are listed on the logs – as well as on the accompanying table.

LIMITATIONS

The survey described above was completed using standard and/or routinely accepted practices of the geophysical industry, and the equipment employed represents, in RETTEW's professional opinion, the best available technology. RETTEW does not accept responsibility for survey limitations due to inherent technological limitations or unforeseen site-specific conditions. We will notify you of such limitations or conditions when they are identifiable.

We have enjoyed and appreciated this opportunity to have worked with you. If you have any questions, please do not hesitate to contact the undersigned.

Sincerely,

Robert J. Krause, PG
Senior Geophysicist

Quality Assurance/Control:

Matthew T. Bruckner, PG
Regional Director

<u>Enclosures</u>
Residential Well – Geophysical Logs and Planar Features
Appendix A: Planar Feature Orientation Schematic
Appendix B: Planar Feature Table
Appendix C: Wulff Plot

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ENCLOSURES

RETTEW	**Rettew Field Services** **Geophysical Logging Program**	**WELL ID** *Residential Well*	**Logging Date:** *02/18/2025* **Logging Datum:** *Top of Casing* **BOC:** *28.4* **DTW:** *52.4* **TD:** *460.0*

Site Name: [redacted]

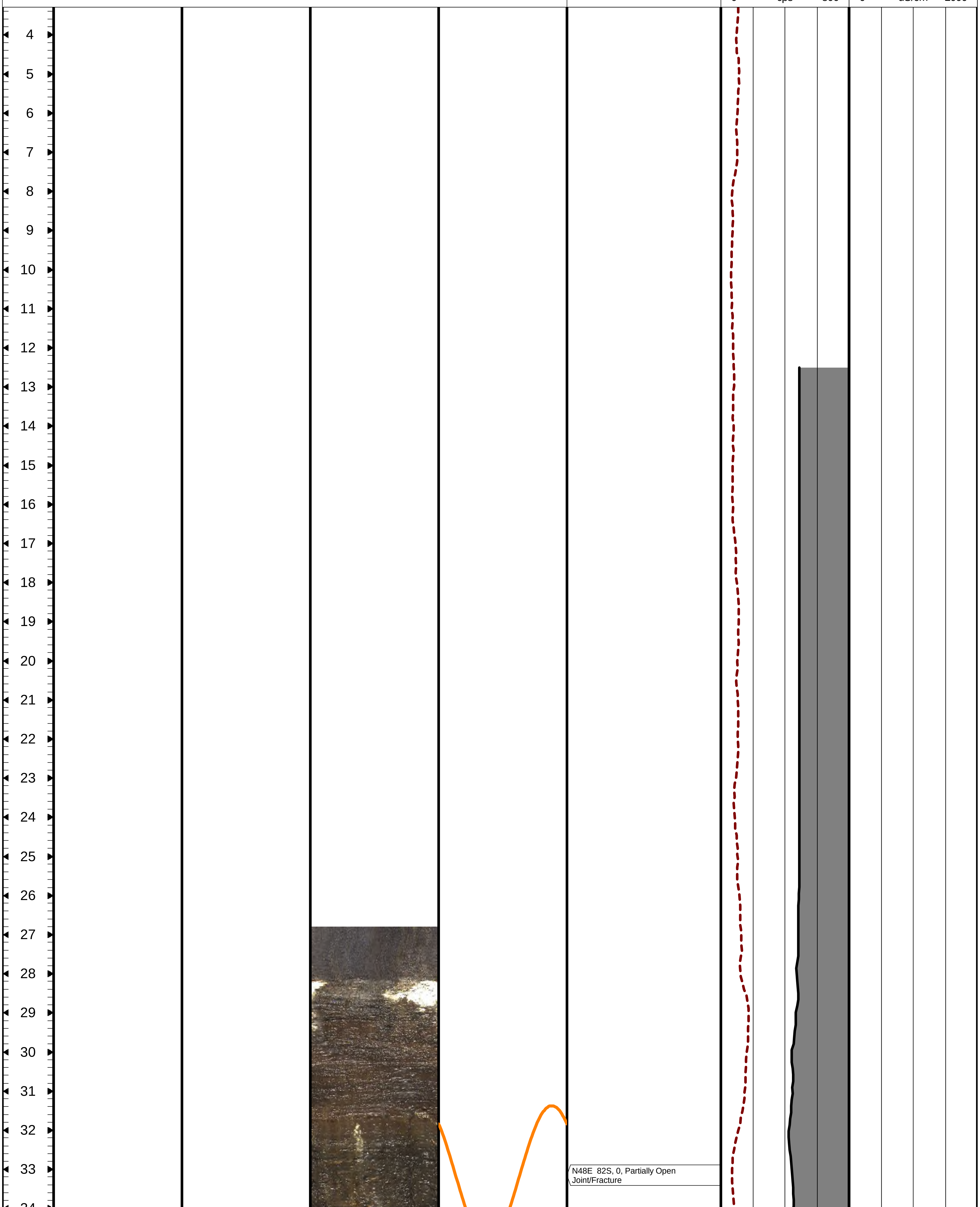
Location: *Upper Makefield Township*
Washington Crossing, PA

Client: *Sunoco Pipeline LP*

Project No.: *0963003386*

Revision Date: *02/20/2025*

Depth	Acoustic Travel Time	Acoustic Amplitude	Optical Televiewer	Televiewer Features	Feature Characteristics	Mechanical Caliper	Temp
1ft:40ft	20 us 120 0° 90° 180° 270° 0°	-2000 15000 0° 90° 180° 270° 0°	0° 90° 180° 270° 0°	0° 90° 180° 270° 0°	Strike and Dip (degrees) Aperture (inches) Inferred Type	5 Inches 7	5 'C 15
						GR 0 cps 800	Cond 0 uS/cm 2000



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Depth	Acoustic Travel Time	Acoustic Amplitude	Optical Televiewer	Televiewer Features	Feature Characteristics	Mechanical Caliper	Temp
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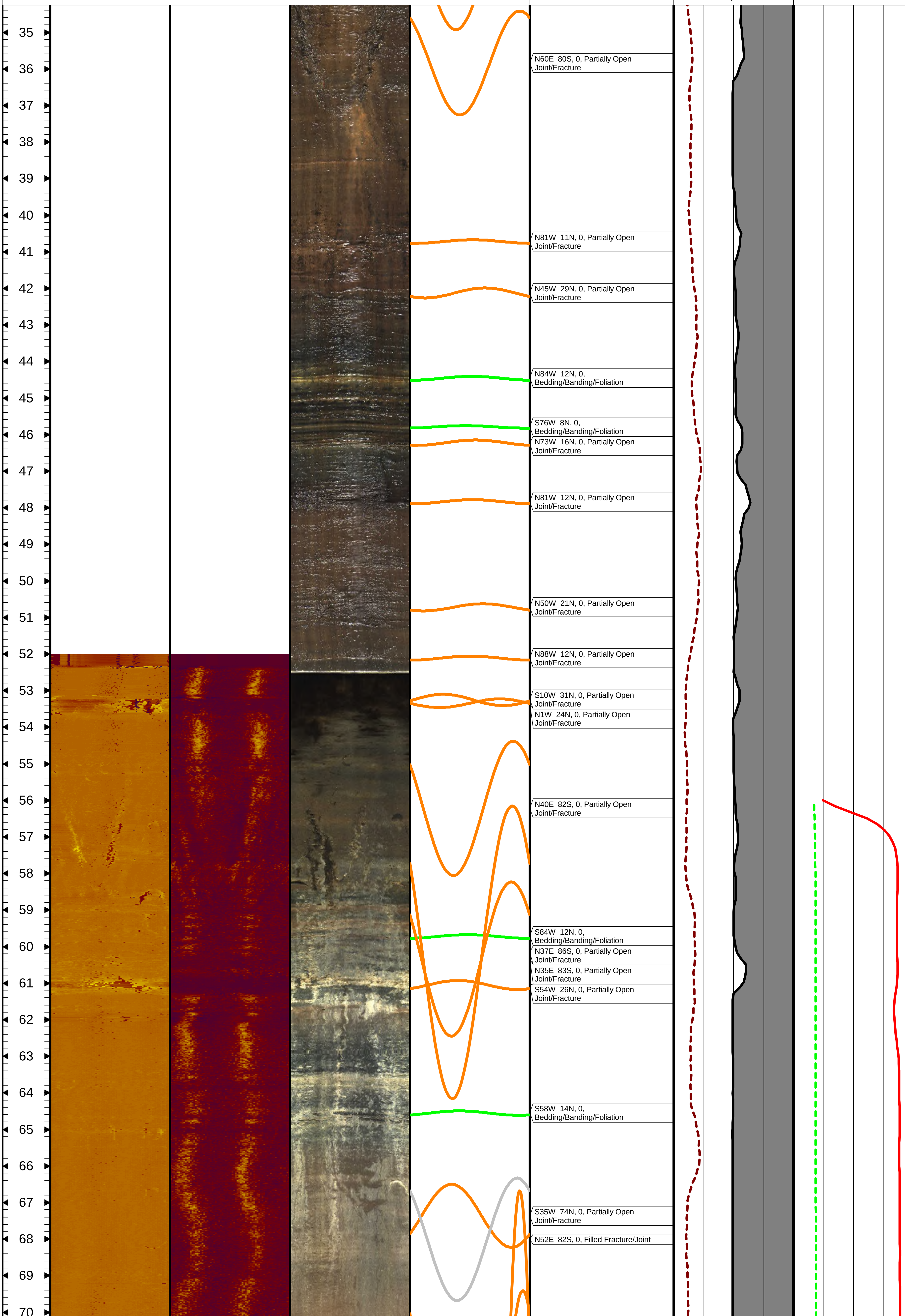

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Depth	Acoustic Travel Time	Acoustic Amplitude	Optical Televiewer	Televiewer Features	Feature Characteristics	Mechanical Caliper	Temp
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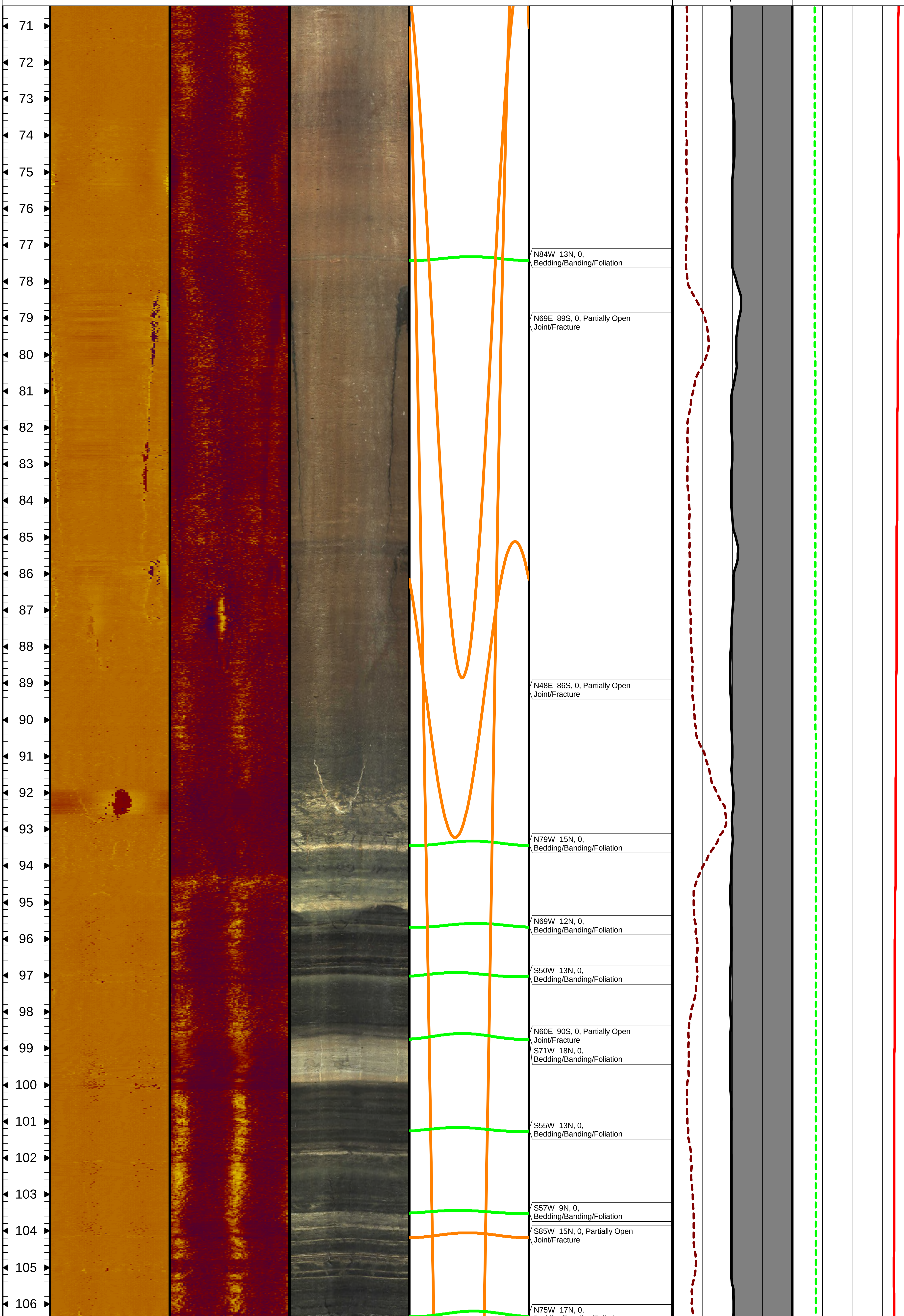

					Feature Characteristics	GR 0 cps 800	Cond 0 uS/cm 2000
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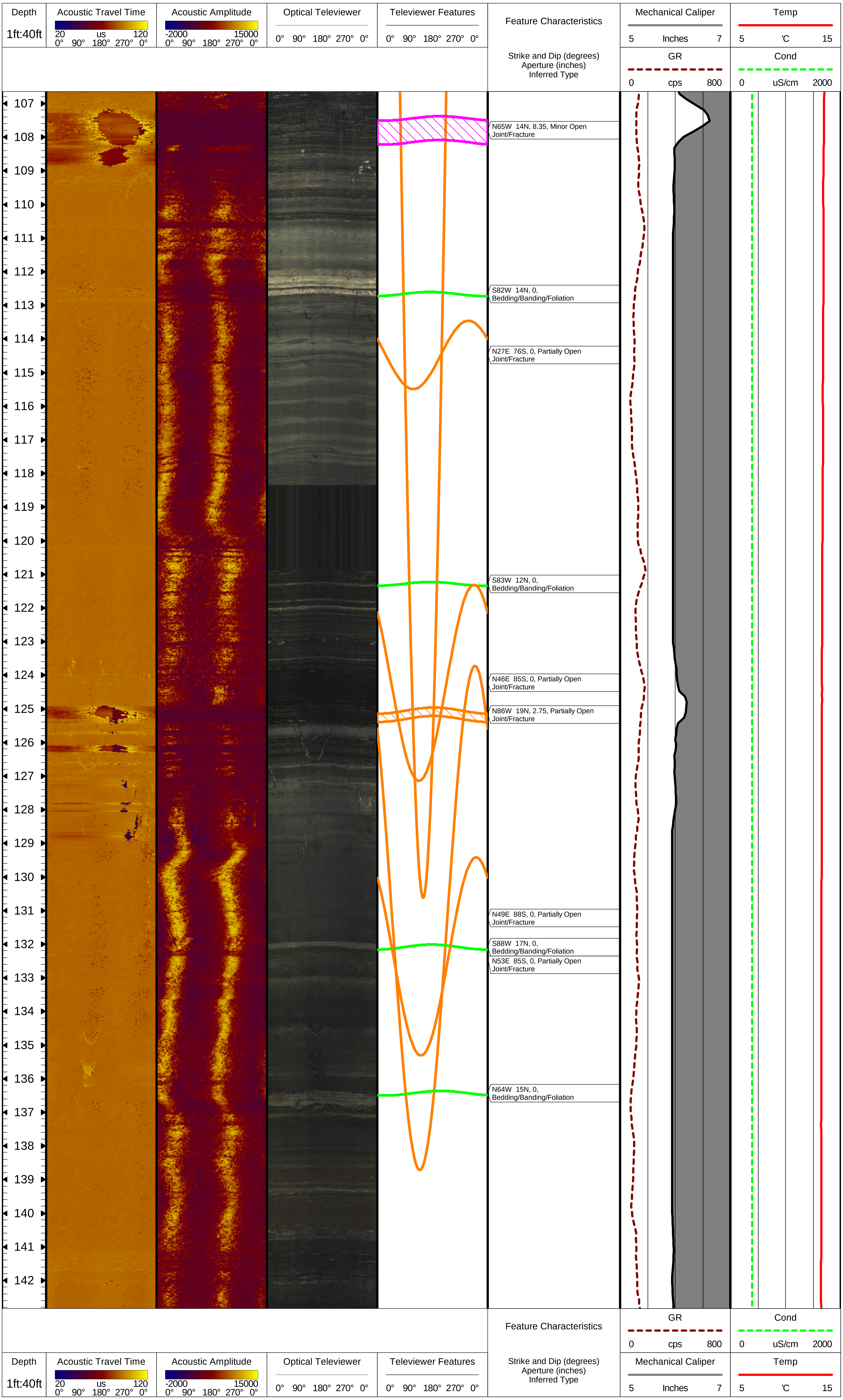
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N65W 14N, 8.35, Minor Open Joint/Fracture
S82W 14N, 0, Bedding/Banding/Foliation
N27E 76S, 0, Partially Open Joint/Fracture
S83W 12N, 0, Bedding/Banding/Foliation
N46E 85S, 0, Partially Open Joint/Fracture
N86W 19N, 2.75, Partially Open Joint/Fracture
N49E 88S, 0, Partially Open Joint/Fracture
S88W 17N, 0, Bedding/Banding/Foliation
N53E 85S, 0, Partially Open Joint/Fracture
N64W 15N, 0, Bedding/Banding/Foliation
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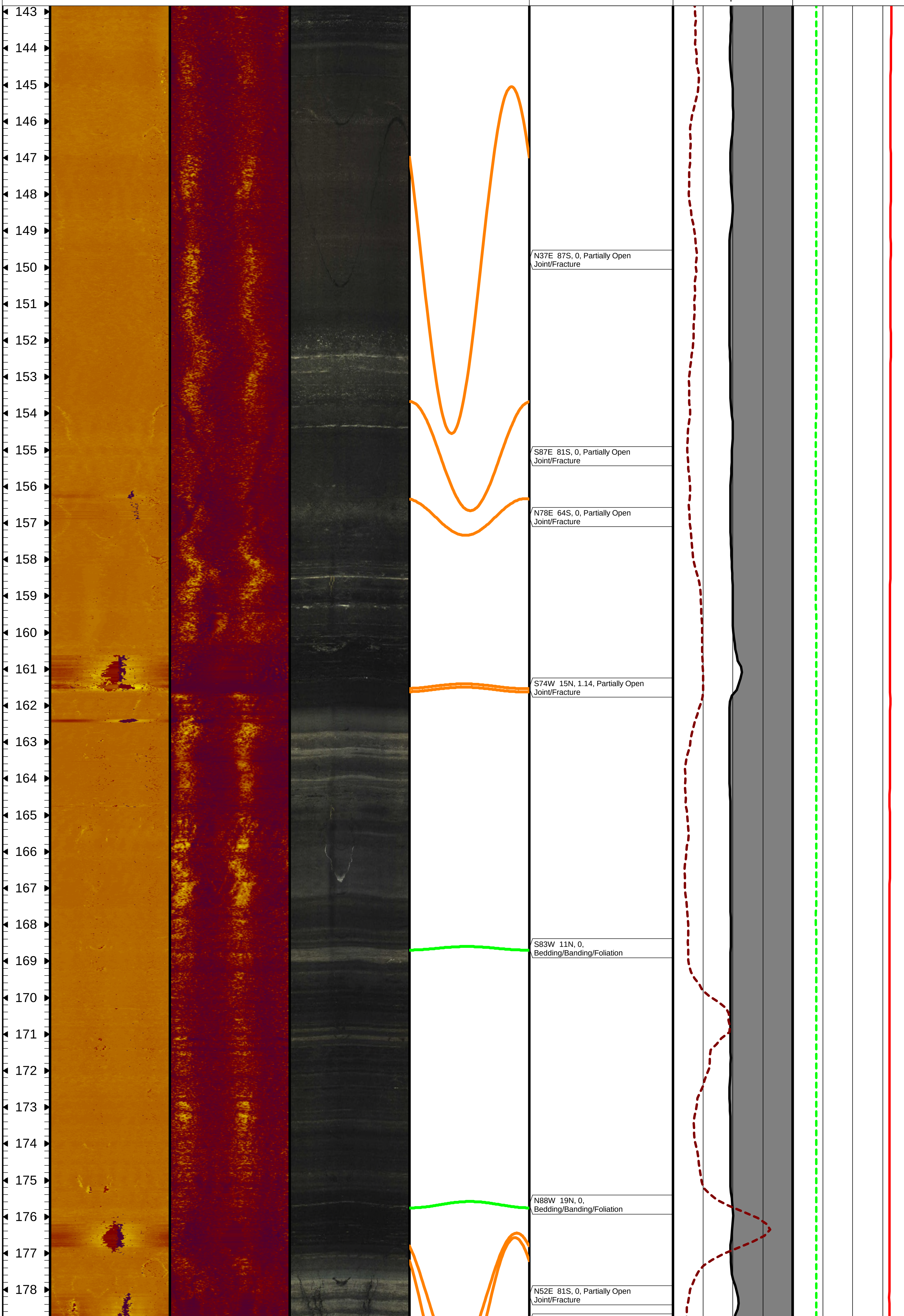
						GR 0 cps 800	Cond 0 uS/cm 2000



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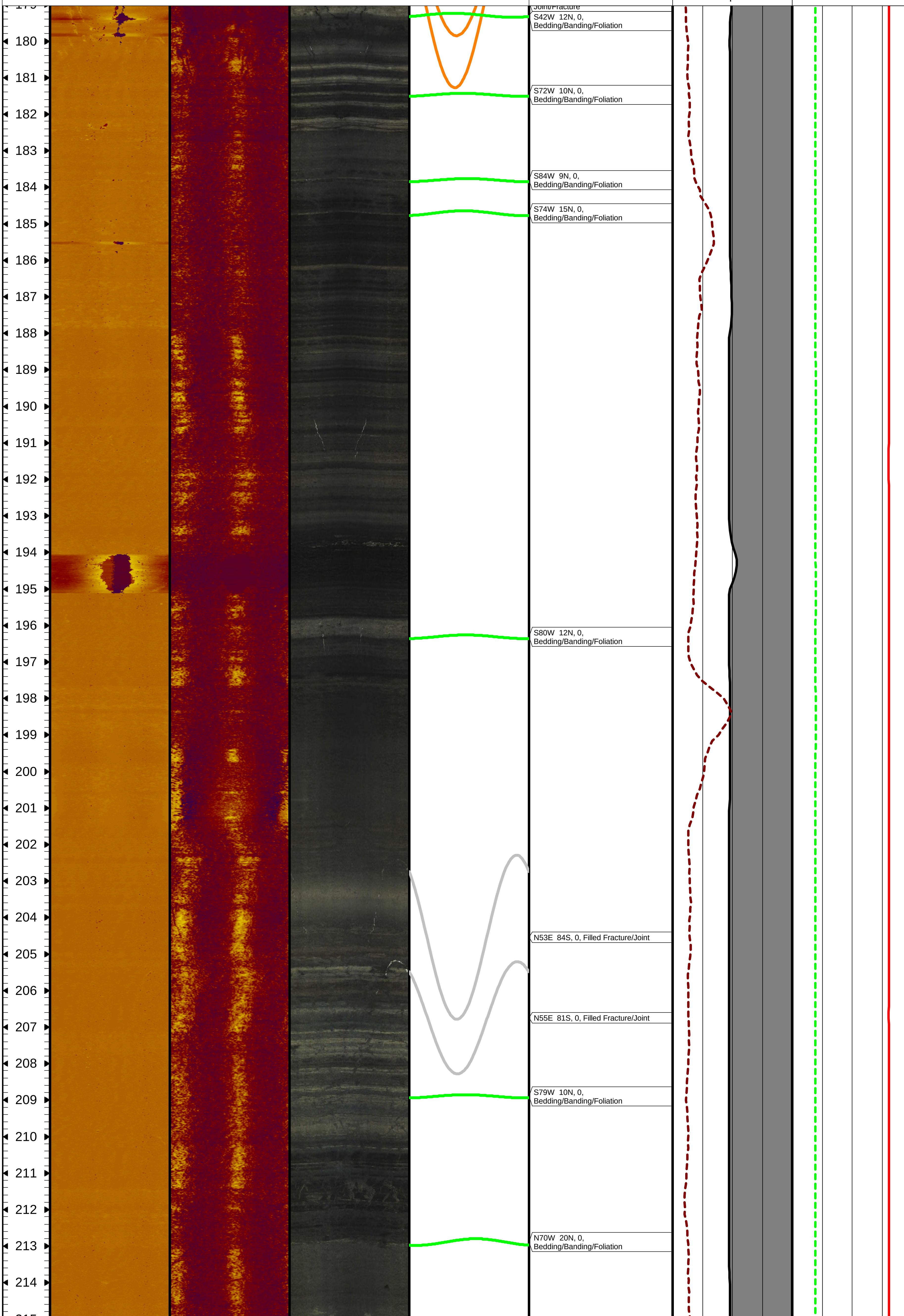

					Feature Characteristics	GR 0 cps 800	Cond 0 uS/cm 2000
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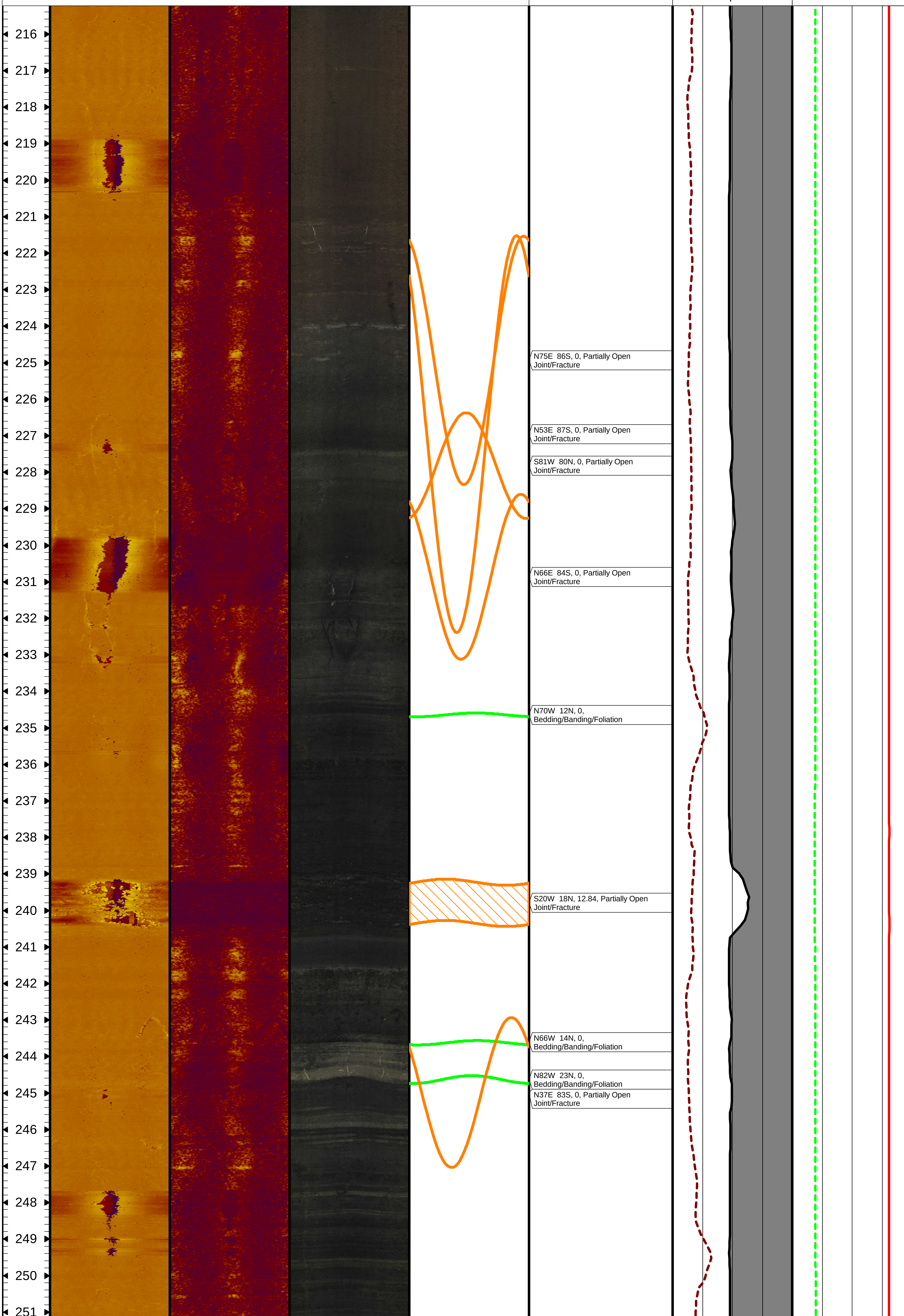
						GR 0 cps 800	Cond 0 uS/cm 2000



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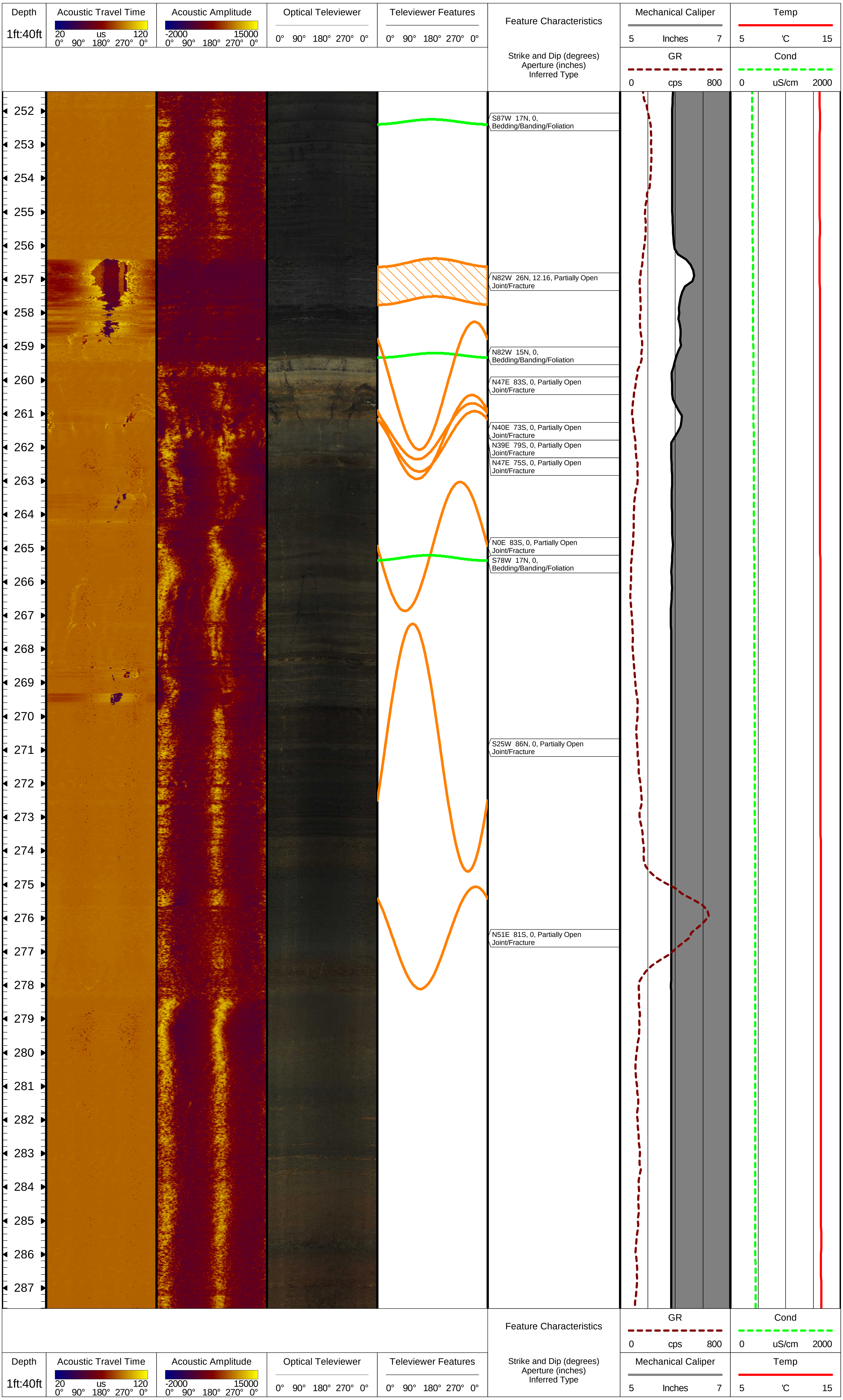

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S87W 17N, 0, Bedding/Banding/Foliation
N82W 26N, 12.16, Partially Open Joint/Fracture
N82W 15N, 0, Bedding/Banding/Foliation
N47E 83S, 0, Partially Open Joint/Fracture
N40E 73S, 0, Partially Open Joint/Fracture
N39E 79S, 0, Partially Open Joint/Fracture
N47E 75S, 0, Partially Open Joint/Fracture
N0E 83S, 0, Partially Open Joint/Fracture
S78W 17N, 0, Bedding/Banding/Foliation
S25W 86N, 0, Partially Open Joint/Fracture
N51E 81S, 0, Partially Open Joint/Fracture
Feature Characteristics
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0 uS/cm 2000
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Acoustic Travel Time
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Acoustic Amplitude
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Televiewer Features
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Strike and Dip (degrees)
Aperture (inches)
Inferred Type
Mechanical Caliper
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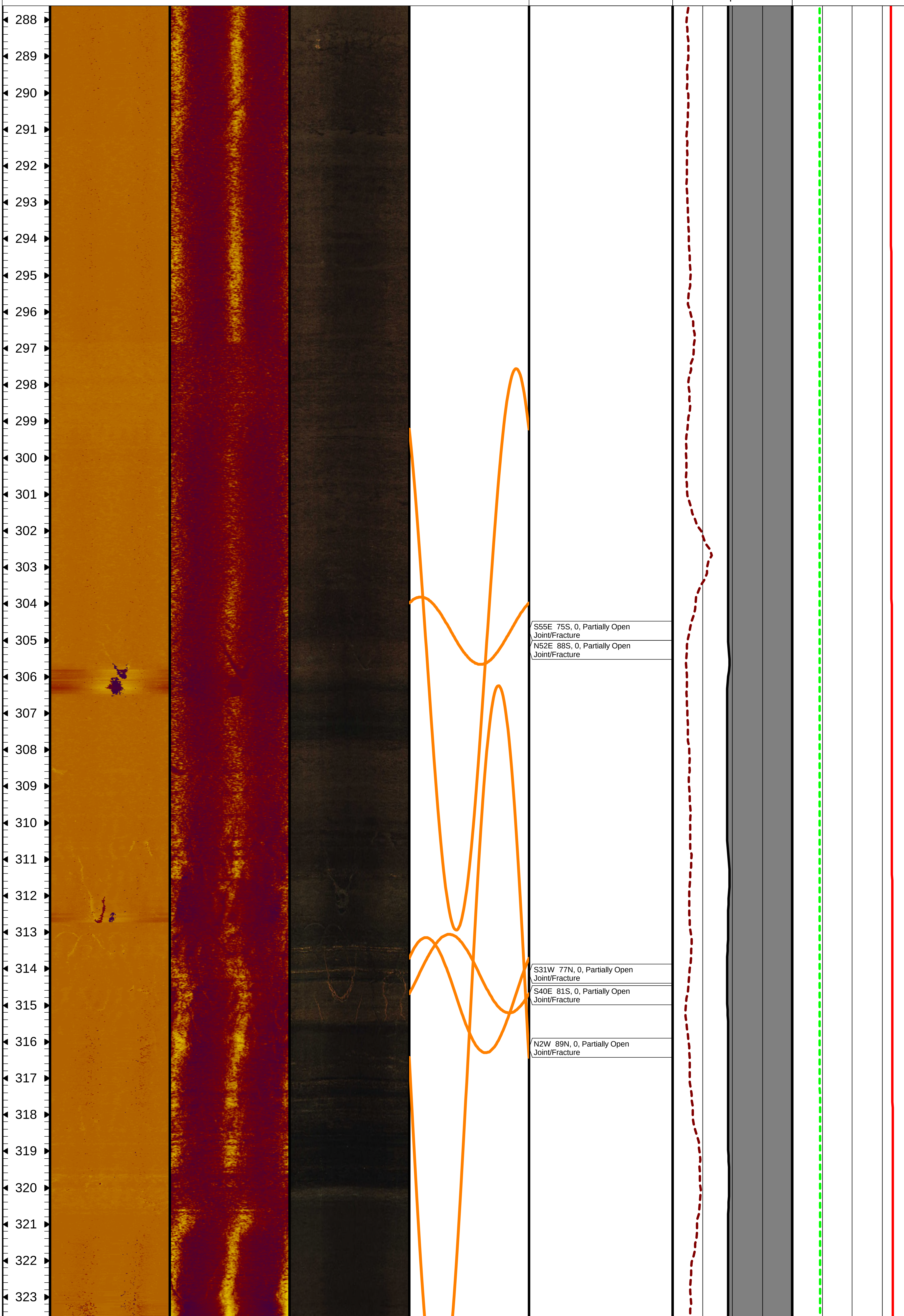
Depth	Acoustic Travel Time	Acoustic Amplitude	Optical Televiewer	Televiewer Features	Feature Characteristics	Mechanical Caliper	Temp
1ft:40ft	20 us 120 0° 90° 180° 270° 0°	-2000 15000 0° 90° 180° 270° 0°	0° 90° 180° 270° 0°	0° 90° 180° 270° 0°	Strike and Dip (degrees) Aperture (inches) Inferred Type	5 Inches 7 GR 0 cps 800	5 'C 15 Cond 0 uS/cm 2000



Depth	Acoustic Travel Time	Acoustic Amplitude	Optical Televiewer	Televiewer Features	Feature Characteristics	GR / Mechanical Caliper	Cond / Temp
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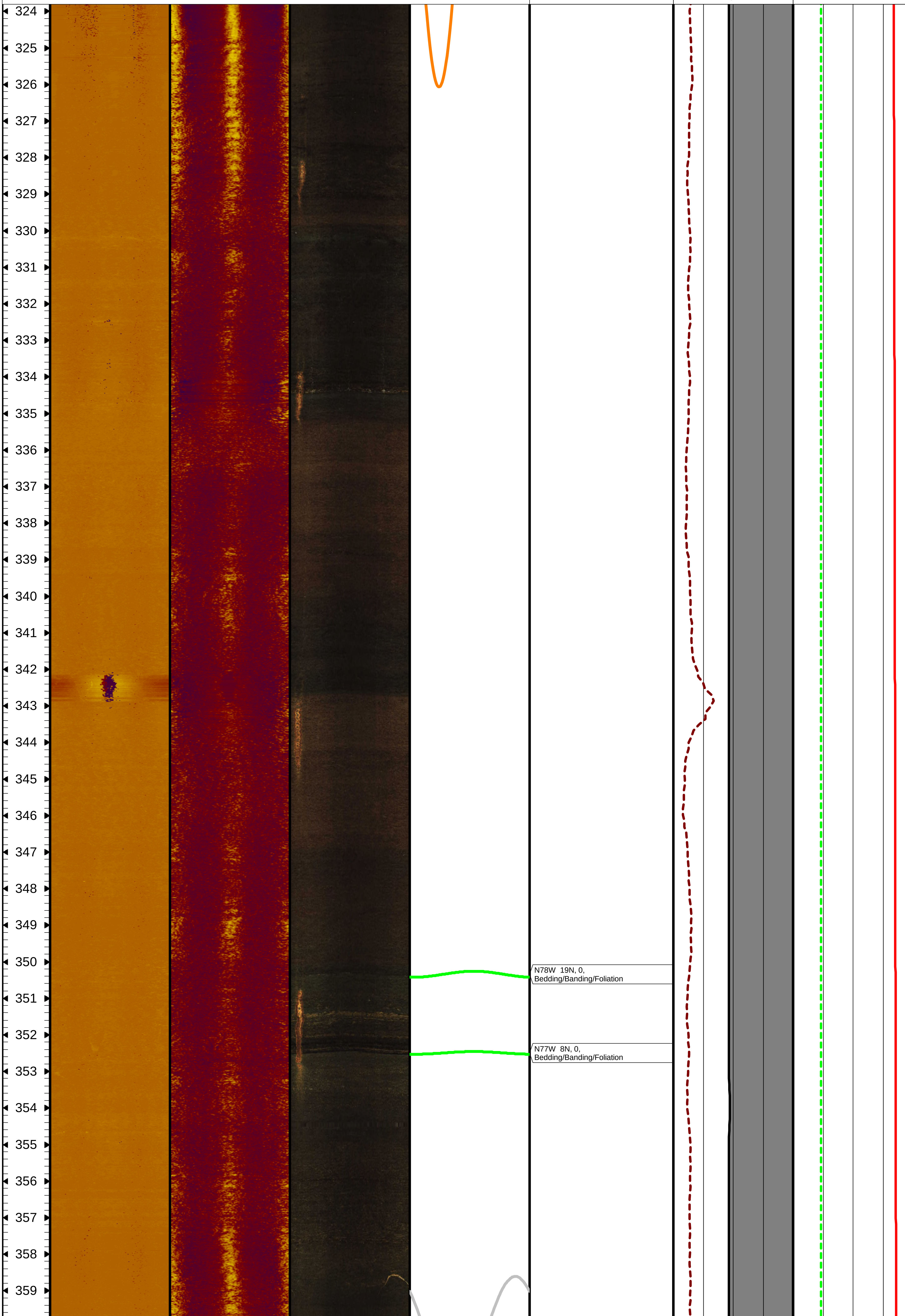
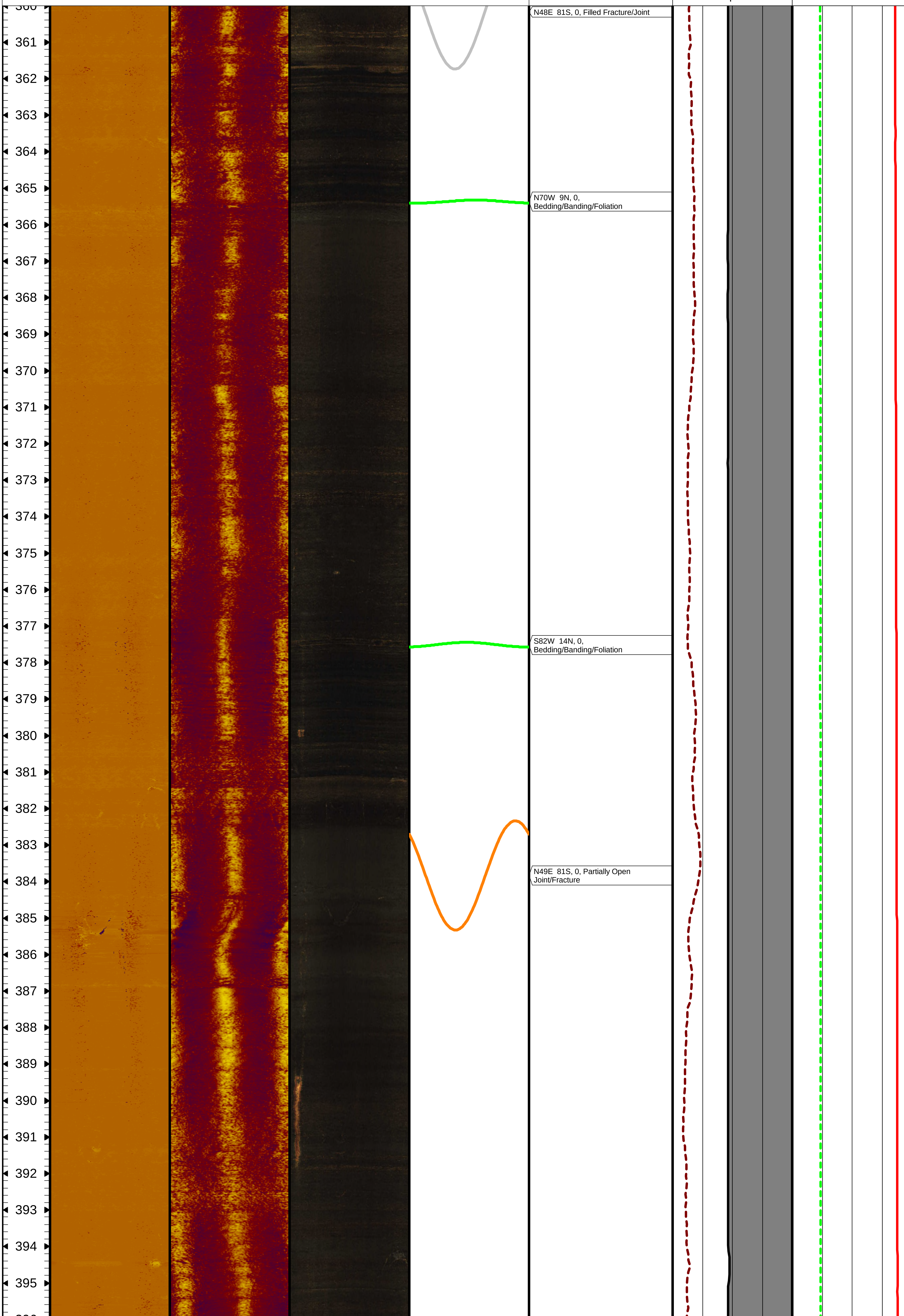
Depth	Acoustic Travel Time	Acoustic Amplitude	Optical Televiewer	Televiewer Features	Feature Characteristics	Mechanical Caliper	Temp
1ft:40ft	20 us 120 0° 90° 180° 270° 0°	-2000 15000 0° 90° 180° 270° 0°	0° 90° 180° 270° 0°	0° 90° 180° 270° 0°	Strike and Dip (degrees) Aperture (inches) Inferred Type	5 Inches 7 GR 0 cps 800	5 'C 15 Cond 0 uS/cm 2000



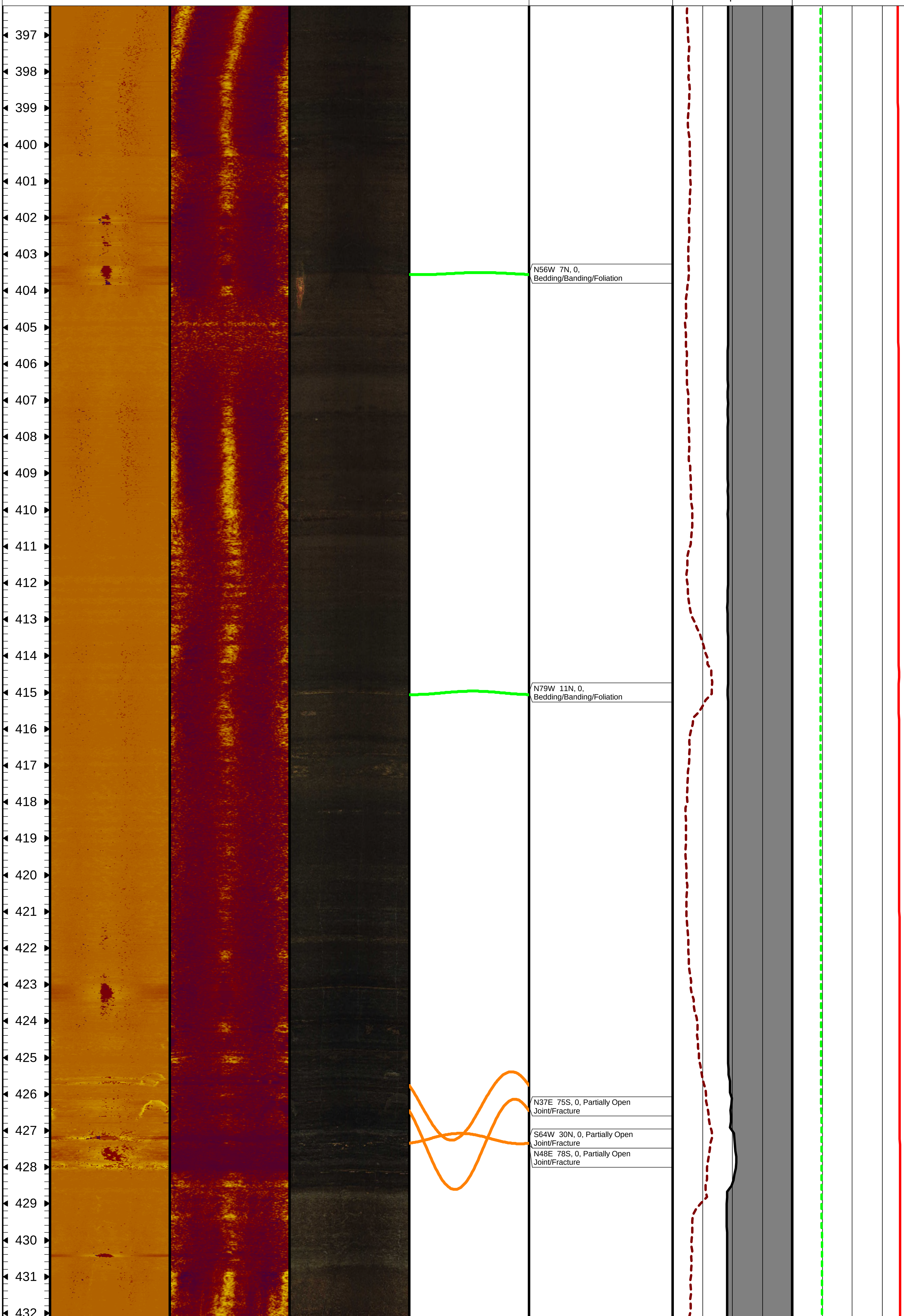
Depth	Acoustic Travel Time	Acoustic Amplitude	Optical Televiewer	Televiewer Features	Feature Characteristics	Mechanical Caliper	Temp
1ft:40ft	20 us 120 0° 90° 180° 270° 0°	-2000 15000 0° 90° 180° 270° 0°	0° 90° 180° 270° 0°	0° 90° 180° 270° 0°	Strike and Dip (degrees) Aperture (inches) Inferred Type	GR 0 cps 800 5 Inches 7	Cond 0 uS/cm 2000 5 'C 15

Depth	Acoustic Travel Time	Acoustic Amplitude	Optical Televiewer	Televiewer Features	Feature Characteristics	Mechanical Caliper	Temp
1ft:40ft	20 us 120 0° 90° 180° 270° 0°	-2000 15000 0° 90° 180° 270° 0°	0° 90° 180° 270° 0°	0° 90° 180° 270° 0°	Strike and Dip (degrees) Aperture (inches) Inferred Type	5 Inches 7	5 'C 15
						GR 0 cps 800	Cond 0 uS/cm 2000

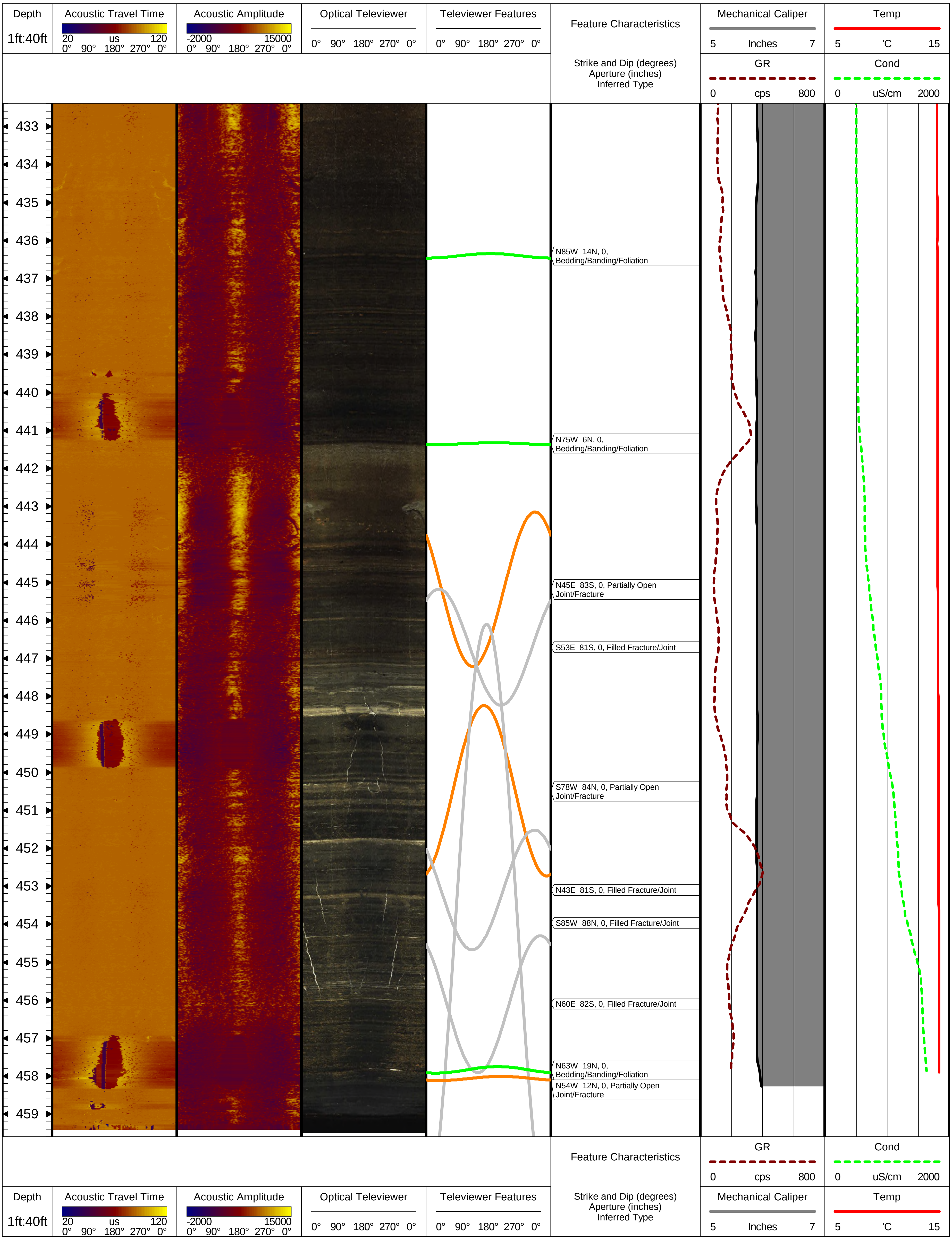


					Feature Characteristics	GR 0 cps 800	Cond 0 uS/cm 2000
Depth	Acoustic Travel Time	Acoustic Amplitude	Optical Televiewer	Televiewer Features	Strike and Dip (degrees) Aperture (inches) Inferred Type	Mechanical Caliper	Temp
1ft:40ft	20 us 120 0° 90° 180° 270° 0°	-2000 15000 0° 90° 180° 270° 0°	0° 90° 180° 270° 0°	0° 90° 180° 270° 0°		5 Inches 7	5 'C 15

Depth	Acoustic Travel Time	Acoustic Amplitude	Optical Televiewer	Televiewer Features	Feature Characteristics	Mechanical Caliper	Temp
1ft:40ft	20 us 120 0° 90° 180° 270° 0°	-2000 15000 0° 90° 180° 270° 0°	0° 90° 180° 270° 0°	0° 90° 180° 270° 0°		5 Inches 7	5 'C 15
					Strike and Dip (degrees) Aperture (inches) Inferred Type	GR 0 cps 800	Cond 0 uS/cm 2000



					Feature Characteristics	GR 0 cps 800	Cond 0 uS/cm 2000
Depth 1ft:40ft	Acoustic Travel Time 20 us 120 0° 90° 180° 270° 0°	Acoustic Amplitude -2000 15000 0° 90° 180° 270° 0°	Optical Televiewer 0° 90° 180° 270° 0°	Televiewer Features 0° 90° 180° 270° 0°	Strike and Dip (degrees) Aperture (inches) Inferred Type	Mechanical Caliper 5 Inches 7	Temp 5 'C 15



Depth
1ft:40ft
Acoustic Travel Time
20 us 120
0° 90° 180° 270° 0°
Acoustic Amplitude
-2000 15000
0° 90° 180° 270° 0°
Optical Televiewer
0° 90° 180° 270° 0°
Televiewer Features
0° 90° 180° 270° 0°
Feature Characteristics
Strike and Dip (degrees)
Aperture (inches)
Inferred Type
Mechanical Caliper
5 Inches 7
GR
0 cps 800
Temp
5 'C 15
Cond
0 uS/cm 2000
433
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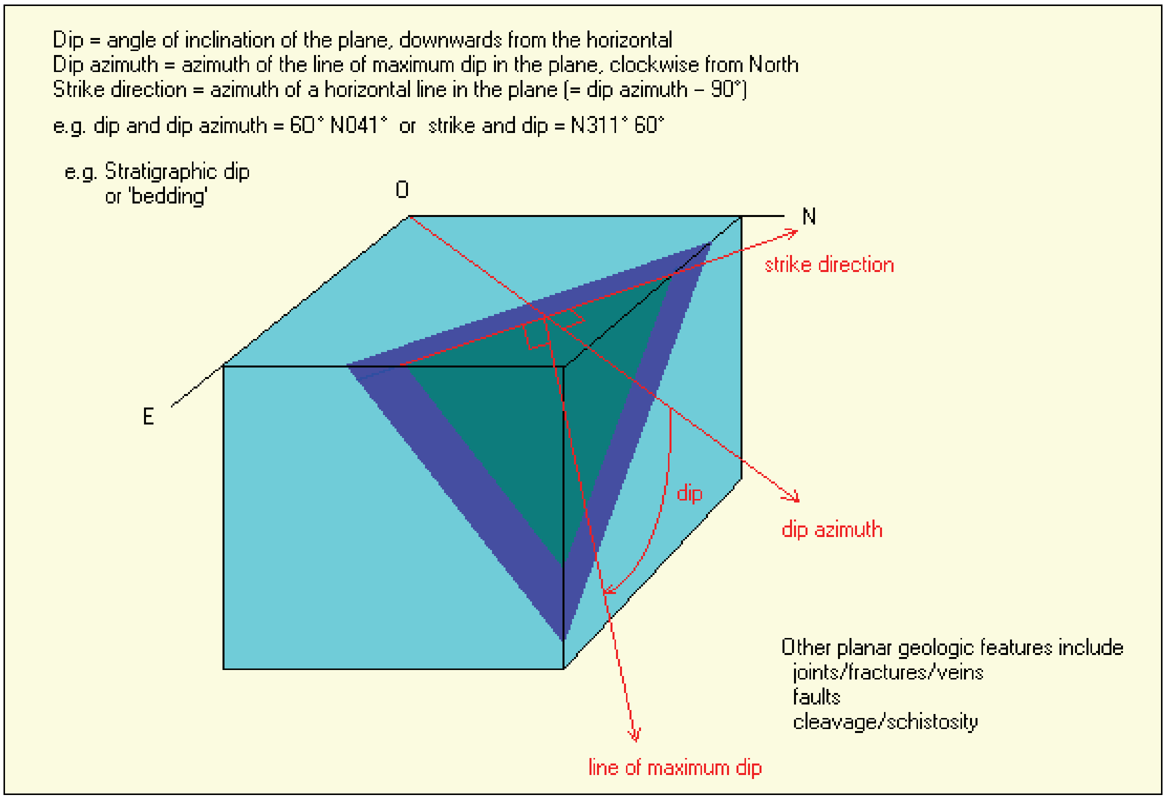
459
N85W 14N, 0, Bedding/Banding/Foliation
N75W 6N, 0, Bedding/Banding/Foliation
N45E 83S, 0, Partially Open Joint/Fracture
S53E 81S, 0, Filled Fracture/Joint
S78W 84N, 0, Partially Open Joint/Fracture
N43E 81S, 0, Filled Fracture/Joint
S85W 88N, 0, Filled Fracture/Joint
N60E 82S, 0, Filled Fracture/Joint
N63W 19N, 0, Bedding/Banding/Foliation
N54W 12N, 0, Partially Open Joint/Fracture
Feature Characteristics
GR
0 cps 800
Cond
0 uS/cm 2000
Depth
1ft:40ft
Acoustic Travel Time
20 us 120
0° 90° 180° 270° 0°
Acoustic Amplitude
-2000 15000
0° 90° 180° 270° 0°
Optical Televiewer
0° 90° 180° 270° 0°
Televiewer Features
0° 90° 180° 270° 0°
Strike and Dip (degrees)
Aperture (inches)
Inferred Type
Mechanical Caliper
5 Inches 7
Temp
5 'C 15

APPENDIX A

Planar Feature Orientation Schematic

Planar Feature Orientation Parameters



APPENDIX B

Planar Feature Characterization Table

Residential Well
Planar Feature Table

RETTEW

Project No.:	0963003386	**Client:**	Sunoco Pipeline LP
Site Name:	[redacted]	**Logging Date:**	02/18/2025
Location:	Upper Makefield Twp, PA	**Revision Date:**	02/21/2025

Depth	Aperture (in.)	Dip Azimuth (deg.)	Strike (deg.)	Dip (deg.)	Feature Type
33.2	0.0	138	N48E	82S	Partially Open Joint/Fracture
35.8	0.0	150	N60E	80S	Partially Open Joint/Fracture
40.7	0.0	9	N81W	11N	Partially Open Joint/Fracture
42.1	0.0	45	N45W	29N	Partially Open Joint/Fracture
44.5	0.0	6	N84W	12N	Bedding/Banding/Foliation
45.8	0.0	346	S76W	8N	Bedding/Banding/Foliation
46.2	0.0	17	N73W	16N	Partially Open Joint/Fracture
47.8	0.0	9	N81W	12N	Partially Open Joint/Fracture
50.7	0.0	40	N50W	21N	Partially Open Joint/Fracture
52.1	0.0	2	N88W	12N	Partially Open Joint/Fracture
53.3	0.0	280	S10W	31N	Partially Open Joint/Fracture
53.4	0.0	89	N1W	24N	Partially Open Joint/Fracture
56.2	0.0	130	N40E	82S	Partially Open Joint/Fracture
59.7	0.0	354	S84W	12N	Bedding/Banding/Foliation
60.2	0.0	127	N37E	86S	Partially Open Joint/Fracture
60.4	0.0	125	N35E	83S	Partially Open Joint/Fracture
61.1	0.0	324	S54W	26N	Partially Open Joint/Fracture
64.6	0.0	328	S58W	14N	Bedding/Banding/Foliation
67.4	0.0	305	S35W	74N	Partially Open Joint/Fracture
68.0	0.0	142	N52E	82S	Filled Fracture/Joint
77.4	0.0	6	N84W	13N	Bedding/Banding/Foliation
79.1	0.0	159	N69E	89S	Partially Open Joint/Fracture
89.2	0.0	138	N48E	86S	Partially Open Joint/Fracture
93.4	0.0	11	N79W	15N	Bedding/Banding/Foliation
95.6	0.0	21	N69W	12N	Bedding/Banding/Foliation
97.0	0.0	320	S50W	13N	Bedding/Banding/Foliation
98.7	0.0	150	N60E	90S	Partially Open Joint/Fracture
98.7	0.0	341	S71W	18N	Bedding/Banding/Foliation
101.2	0.0	325	S55W	13N	Bedding/Banding/Foliation
103.5	0.0	327	S57W	9N	Bedding/Banding/Foliation
104.1	0.0	355	S85W	15N	Partially Open Joint/Fracture
106.3	0.0	15	N75W	17N	Bedding/Banding/Foliation
107.8	8.4	25	N65W	14N	Minor Open Joint/Fracture
112.7	0.0	352	S82W	14N	Bedding/Banding/Foliation
114.5	0.0	117	N27E	76S	Partially Open Joint/Fracture
121.3	0.0	353	S83W	12N	Bedding/Banding/Foliation
124.2	0.0	136	N46E	85S	Partially Open Joint/Fracture
125.2	2.8	4	N86W	19N	Partially Open Joint/Fracture
131.2	0.0	139	N49E	88S	Partially Open Joint/Fracture
132.1	0.0	358	S88W	17N	Bedding/Banding/Foliation
132.4	0.0	143	N53E	85S	Partially Open Joint/Fracture
136.4	0.0	26	N64W	15N	Bedding/Banding/Foliation
149.8	0.0	127	N37E	87S	Partially Open Joint/Fracture
155.2	0.0	183	S87E	81S	Partially Open Joint/Fracture
156.8	0.0	168	N78E	64S	Partially Open Joint/Fracture
161.5	1.1	344	S74W	15N	Partially Open Joint/Fracture
168.7	0.0	353	S83W	11N	Bedding/Banding/Foliation
175.7	0.0	2	N88W	19N	Bedding/Banding/Foliation
178.2	0.0	142	N52E	81S	Partially Open Joint/Fracture
178.9	0.0	137	N47E	84S	Partially Open Joint/Fracture
179.3	0.0	312	S42W	12N	Bedding/Banding/Foliation
181.5	0.0	342	S72W	10N	Bedding/Banding/Foliation
183.8	0.0	354	S84W	9N	Bedding/Banding/Foliation
184.7	0.0	344	S74W	15N	Bedding/Banding/Foliation
196.3	0.0	350	S80W	12N	Bedding/Banding/Foliation
204.5	0.0	143	N53E	84S	Filled Fracture/Joint
206.8	0.0	145	N55E	81S	Filled Fracture/Joint
208.9	0.0	349	S79W	10N	Bedding/Banding/Foliation
212.9	0.0	20	N70W	20N	Bedding/Banding/Foliation

Residential Well
Planar Feature Table

RETTEW

Project No.: 0963003386
Client: Sunoco Pipeline LP
Site Name: [redacted]
Logging Date: 02/18/2025
Location: Upper Makefield Twp, PA
Revision Date: 02/21/2025

Depth	Aperture (in.)	Dip Azimuth (deg.)	Strike (deg.)	Dip (deg.)	Feature Type
224.9	0.0	165	N75E	86S	Partially Open Joint/Fracture
227.0	0.0	143	N53E	87S	Partially Open Joint/Fracture
227.8	0.0	351	S81W	80N	Partially Open Joint/Fracture
230.9	0.0	156	N66E	84S	Partially Open Joint/Fracture
234.7	0.0	20	N70W	12N	Bedding/Banding/Foliation
239.8	12.8	290	S20W	18N	Partially Open Joint/Fracture
243.6	0.0	24	N66W	14N	Bedding/Banding/Foliation
244.6	0.0	8	N82W	23N	Bedding/Banding/Foliation
245.0	0.0	127	N37E	83S	Partially Open Joint/Fracture
252.3	0.0	357	S87W	17N	Bedding/Banding/Foliation
257.1	12.2	8	N82W	26N	Partially Open Joint/Fracture
259.3	0.0	8	N82W	15N	Bedding/Banding/Foliation
260.2	0.0	137	N47E	83S	Partially Open Joint/Fracture
261.5	0.0	130	N40E	73S	Partially Open Joint/Fracture
261.7	0.0	129	N39E	79S	Partially Open Joint/Fracture
261.8	0.0	137	N47E	75S	Partially Open Joint/Fracture
265.0	0.0	90	N0E	83S	Partially Open Joint/Fracture
265.3	0.0	348	S78W	17N	Bedding/Banding/Foliation
270.9	0.0	295	S25W	86N	Partially Open Joint/Fracture
276.6	0.0	141	N51E	81S	Partially Open Joint/Fracture
304.7	0.0	215	S55E	75S	Partially Open Joint/Fracture
305.3	0.0	142	N52E	88S	Partially Open Joint/Fracture
314.1	0.0	301	S31W	77N	Partially Open Joint/Fracture
314.7	0.0	230	S40E	81S	Partially Open Joint/Fracture
316.2	0.0	88	N2W	89N	Partially Open Joint/Fracture
350.4	0.0	12	N78W	19N	Bedding/Banding/Foliation
352.5	0.0	13	N77W	8N	Bedding/Banding/Foliation
360.2	0.0	138	N48E	81S	Filled Fracture/Joint
365.4	0.0	20	N70W	9N	Bedding/Banding/Foliation
377.5	0.0	352	S82W	14N	Bedding/Banding/Foliation
383.8	0.0	139	N49E	81S	Partially Open Joint/Fracture
403.5	0.0	34	N56W	7N	Bedding/Banding/Foliation
415.0	0.0	11	N79W	11N	Bedding/Banding/Foliation
426.3	0.0	127	N37E	75S	Partially Open Joint/Fracture
427.2	0.0	334	S64W	30N	Partially Open Joint/Fracture
427.4	0.0	138	N48E	78S	Partially Open Joint/Fracture
436.4	0.0	5	N85W	14N	Bedding/Banding/Foliation
441.4	0.0	15	N75W	6N	Bedding/Banding/Foliation
445.2	0.0	135	N45E	83S	Partially Open Joint/Fracture
446.7	0.0	217	S53E	81S	Filled Fracture/Joint
450.5	0.0	348	S78W	84N	Partially Open Joint/Fracture
453.1	0.0	133	N43E	81S	Filled Fracture/Joint
454.0	0.0	355	S85W	88N	Filled Fracture/Joint
456.1	0.0	150	N60E	82S	Filled Fracture/Joint
457.8	0.0	27	N63W	19N	Bedding/Banding/Foliation
458.1	0.0	36	N54W	12N	Partially Open Joint/Fracture

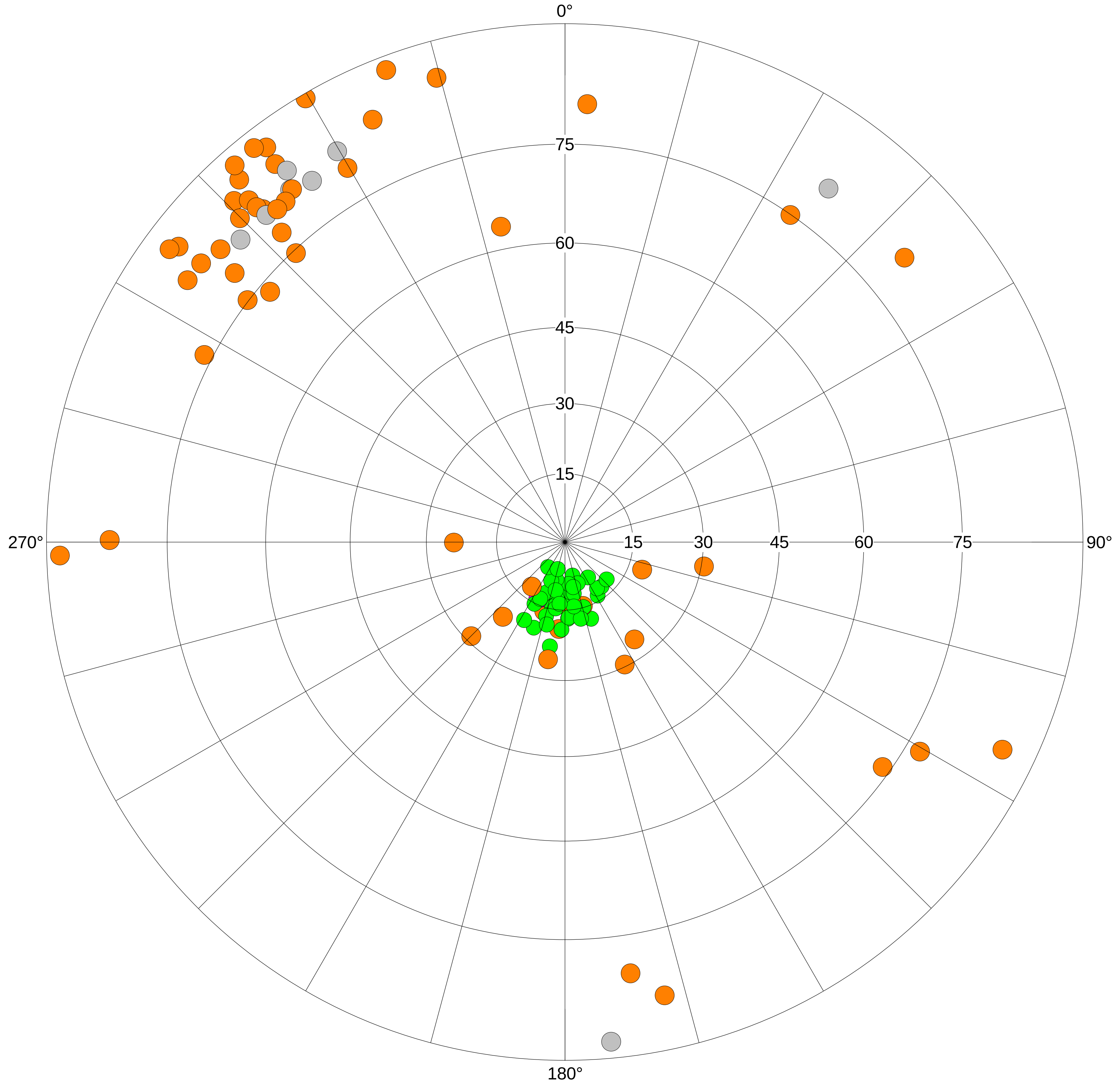
APPENDIX C

Planar Feature Wulff Plot

RETTEW	Rettew Field Services Wulff Plot - LH - Type	WELL ID *Residential Well*	Logging Date: *02/18/2025* Logging Datum: *Top of Casing* BOC: *28.4* DTW: *52.4* TD: *460.0*

Site Name:	[redacted]	**Client:**	*Sunoco Pipeline LP*
Location:	*Upper Makefield Township* *Washington Crossing, PA*	**Project No.:**	*0963003386*
		Revision Date:	*02/25/2025*

Wulff Plot - LH - Type
Depth: 3.30 [ft] to 460.00 [ft]



	Counts	Dip[deg]	Azi[deg]
Mean	105	21.71	344.26
(orange)	56	88.05	138.37
(green)	40	12.73	359.91
(gray)	8	82.53	149.16
(magenta)	1	13.85	25.00