Appendix B.4

Borehole Logging Survey Residential Well Walker Road

July 11, 2025

RETTEW

We answer to you.

3020 Columbia Avenue, Lancaster, PA 17603 ● Phone: (800) 738-8395
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Engineers

Environmental Consultants

Surveyors

Landscape Architects

Safety Consultants

July 11, 2025

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

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

Dear Brad:

On June 24 and 27, 2025, RETTEW completed a geophysical borehole logging 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, and to determine which specific features or zones might be producing light non-aqueous phase liquid (LNAPL) petroleum. To accomplish these objectives, RETTEW conducted Optical Televiewer, Acoustic Televiewer, Mechanical Caliper, Fluid Temperature, Fluid Conductivity, and Natural Gamma logging on June 24, and a second Optical Televiewer log using ultraviolet (UV) illumination on June 27. The procedures and geophysical techniques 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.

OPTICAL TELEVIEWER

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.

UV OPTICAL TELEVIEWER

The UV OPTV records a visible light image (as described above) along with a matching image utilizing an integrated 365 nanometer (nm) UV light source. When certain minerals or hydrocarbons are exposed to ultraviolet light, characteristic fluorescence can be observed. Benchtop testing by Energy Transfer (ET) has demonstrated that jet fuel will fluoresce bright blue under 365 nm excitation (see photo in **Appendix D**). The mineral calcite is commonly fluorescent, but not in its pure form. Traces of metals or rare earth elements can cause it to fluoresce – usually red-orange, but the element Europium and some organic compounds can cause blue fluorescence in calcite. The Lockatong Formation in which these wells were installed does not typically contain calcite in its matrix, but does have secondary calcite veins and crystals – particularly along fractures. Discrimination of calcite from LNAPL will be discussed in the results section below.

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] Walker Road-Residential Well

NOTABLE FEATURES

- The total depth of the well was measured at approximately 400.0 feet below "top of casing" (TOC).
- The height of the TOC above ground level (the "stickup") could not be accurately measured at the time of logging, due to recent excavation. This does not adversely affect the logging since depths are registered relative to the TOC. However, conversion from depths below TOC to depths below ground surface (bgs) cannot be accomplished.
- The depth to water was measured at 33.1 feet below TOC at the beginning of the survey but varied throughout logging – particularly during the UV OPTV logging since the well was pumped down to 155 feet below TOC prior to UV logging, with the water level recovering throughout the UV logging run.
- 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 35.0 feet below TOC.

- The caliper log showed a notable enlargement due to fracturing centered near 58.0, 73.0, 120.0, and 138.0 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 385.0 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 93.0, 105.0, 131.0, 173.0, 212.0, 263.0, 288.0, 333.0, 355.0, and 396.0 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.
- UV logging was completed to a depth of 200.0 feet below TOC.
- UV responses were observed starting just below the bottom of the casing (35.0 feet). These were most prevalent and strongest down to 41 feet below TOC, were scattered and weak down to 65 feet, very weak and scattered to about 152 feet, and absent from 152 to 200 feet.
- In intervals with fluorescence, there are light-colored veins and small lenses that could be calcite. However, these light-colored (in visible light) materials continue below 152.0 feet where there is no fluorescence. The fluorescence above 152 feet is uniformly blue (as opposed to the common orange color for calcite). And there is no fluorescence associated with light-colored veins and lenses below 152 feet. Therefore, the blue fluorescence can confidently be attributed to LNAPL.
- The sonde intercepted the recovering water table at a depth of 152.0 feet below TOC, where a thin layer of LNAPL can be observed.
- Given the thin LNAPL layer on the recovering water table at 152 feet, the weak and scattered fluorescence from 41 to 152 feet is likely to be petroleum product adhered to the borehole walls as the water table dropped during pre-logging pumping. The strongest and most continuous fluorescence from 37 to 41 feet is likely to represent the fractures truly bearing LNAPL petroleum in the formation.
- Planar features were recognizable on the UV optical televiewer log. The depth, strike, dip, aperture, and feature type are listed on the logs – as well as on the accompanying table.
- Planar features from the standard OPTV and UV OPTV logs are consistent.

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:

Felicia Kegel Bechtel, MSc, PG
Senior Geophysical Advisor

<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
Appendix D: UV Logging Plan

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ENCLOSURES

RETTEW

RETTEW

Rettew Field Services

Geophysical Logging Program

WELL ID

Residential Well

Logging Date: *06/24/2025*

Logging Datum: *Top of Casing*

BOC: *35.0* **DTW:** *33.1* **TD:** *400.0*

Site Name: [redacted] *Walker Road*

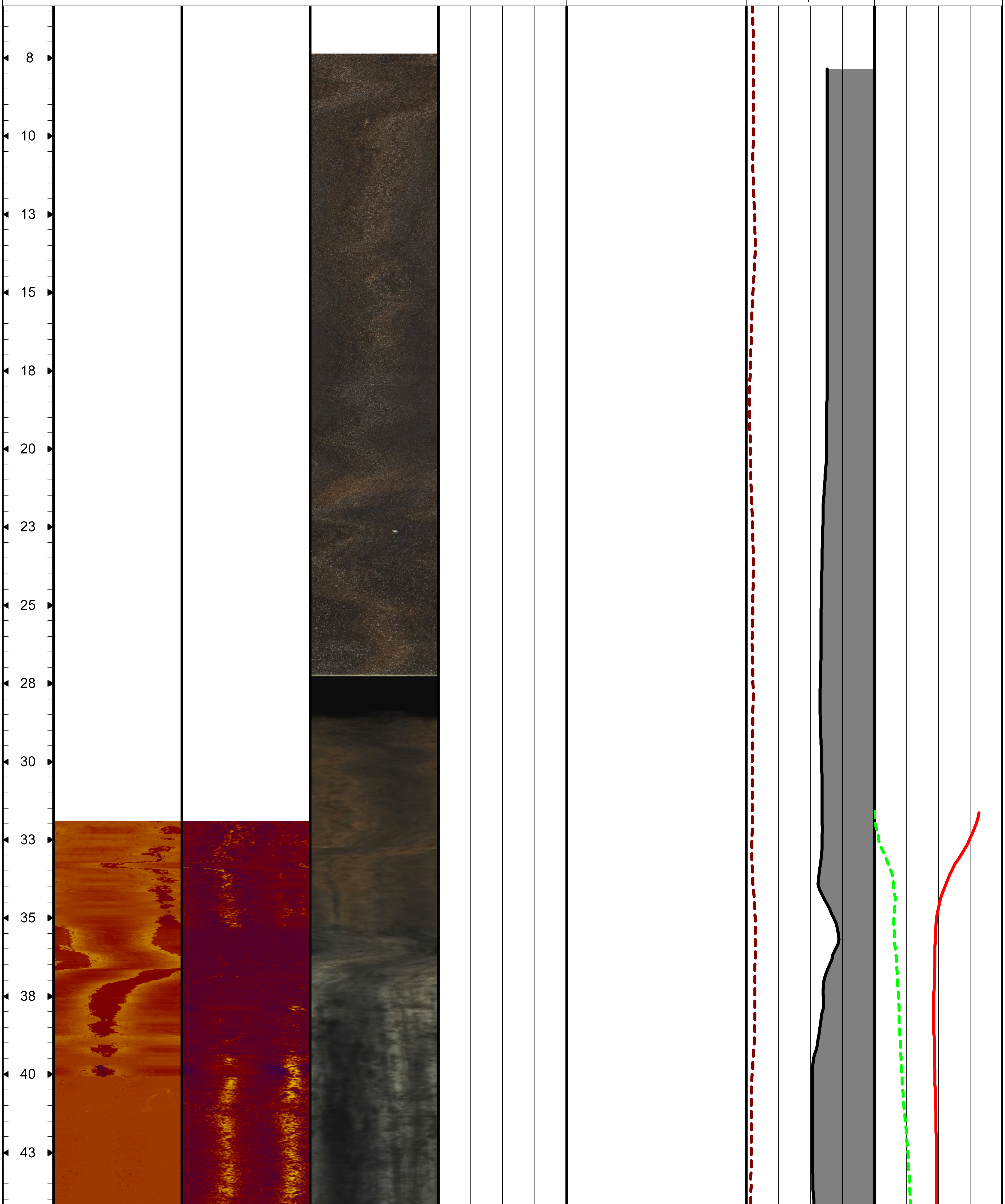
Location: *Upper Makefield Township, PA*

Client: *Sunoco Pipeline LP*

Project No.: *0963003386*

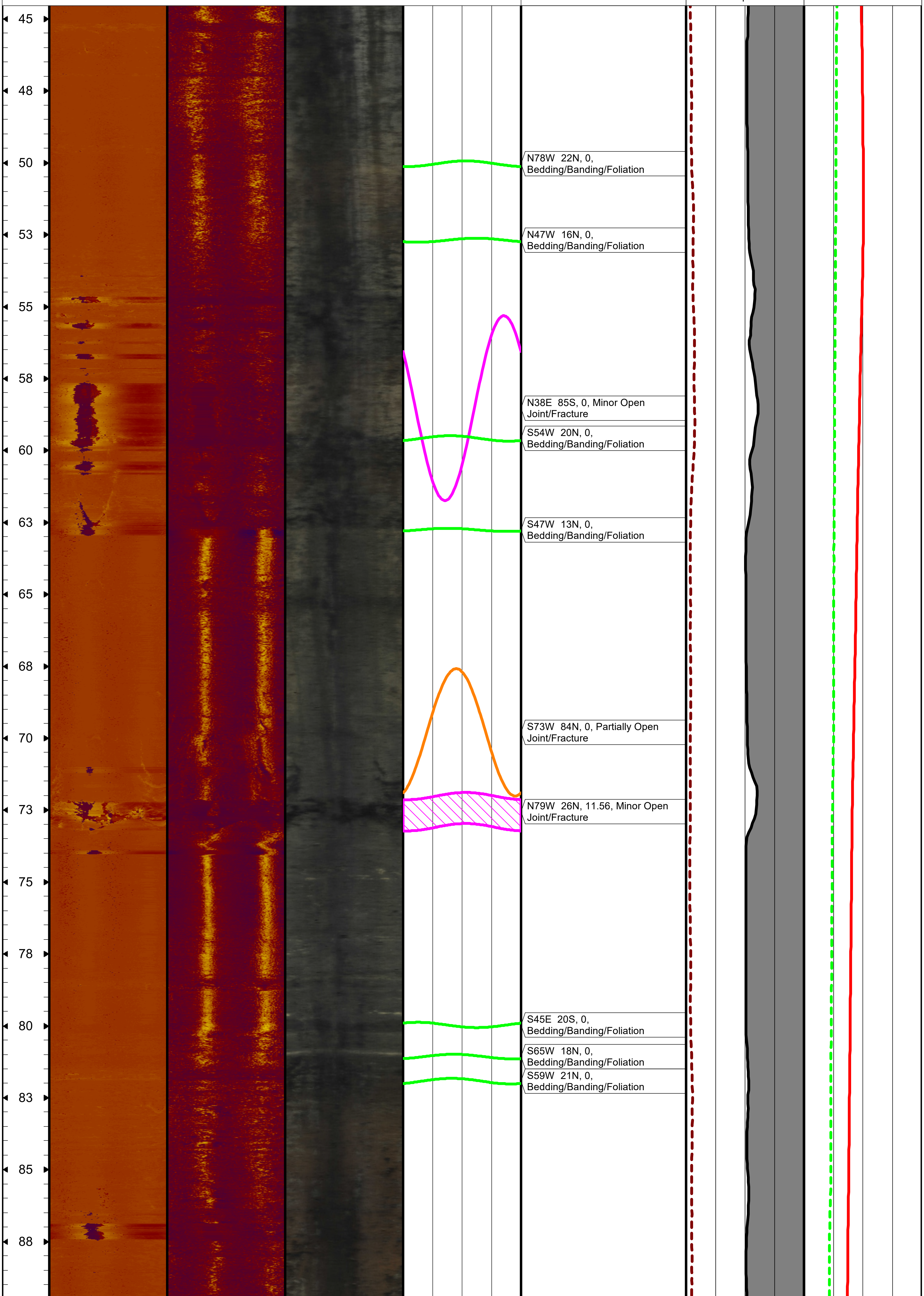
Revision Date: *07/06/2025*

Depth	Acoustic Travel Time	Acoustic Amplitude	Optical Televiewer	Televiewer Features	Feature Characteristics	Mechanical Caliper	Temp
1ft:50ft	0° 90° 180° 270° 0°	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	0 'C 40
						Natural Gamma 0 cps 2000	Cond 0 uS/cm 2000

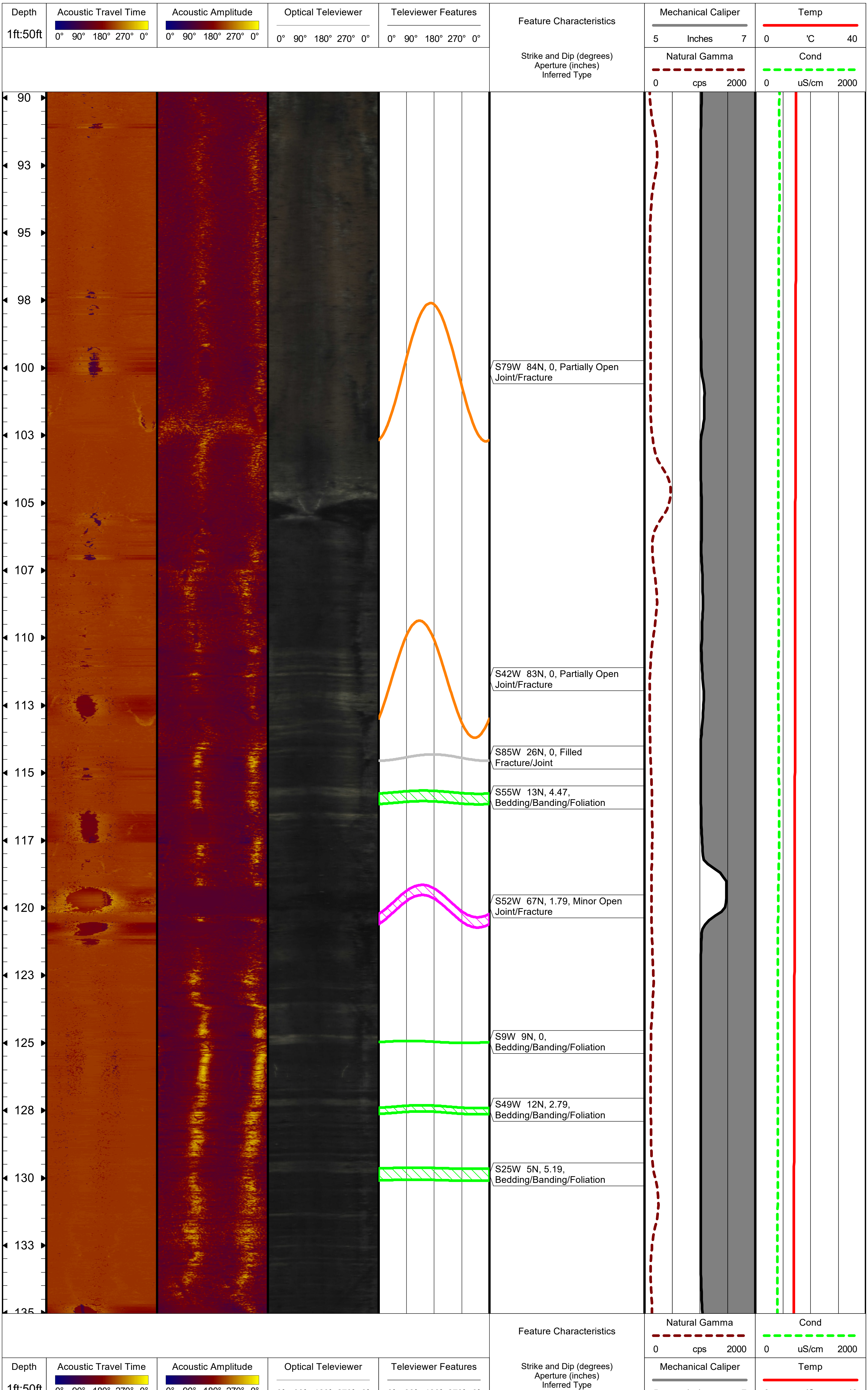


					Feature Characteristics	Natural Gamma 0 cps 2000	Cond 0 uS/cm 2000
Depth	Acoustic Travel Time	Acoustic Amplitude	Optical Televiewer	Televiewer Features	Strike and Dip (degrees) Aperture (inches) Inferred Type	Mechanical Caliper	Temp
1ft:50ft	0° 90° 180° 270° 0°	0° 90° 180° 270° 0°	0° 90° 180° 270° 0°	0° 90° 180° 270° 0°		5 Inches 7	0 'C 40

Depth	Acoustic Travel Time	Acoustic Amplitude	Optical Televiewer	Televiewer Features	Feature Characteristics	Mechanical Caliper	Temp
1ft:50ft	0° 90° 180° 270° 0°	0° 90° 180° 270° 0°	0° 90° 180° 270° 0°	0° 90° 180° 270° 0°		5 Inches 7	0 'C 40
					Strike and Dip (degrees) Aperture (inches) Inferred Type	Natural Gamma 0 cps 2000	Cond 0 uS/cm 2000



					Feature Characteristics	Natural Gamma 0 cps 2000	Cond 0 uS/cm 2000
Depth 1ft:50ft	Acoustic Travel Time 0° 90° 180° 270° 0°	Acoustic Amplitude 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 0 'C 40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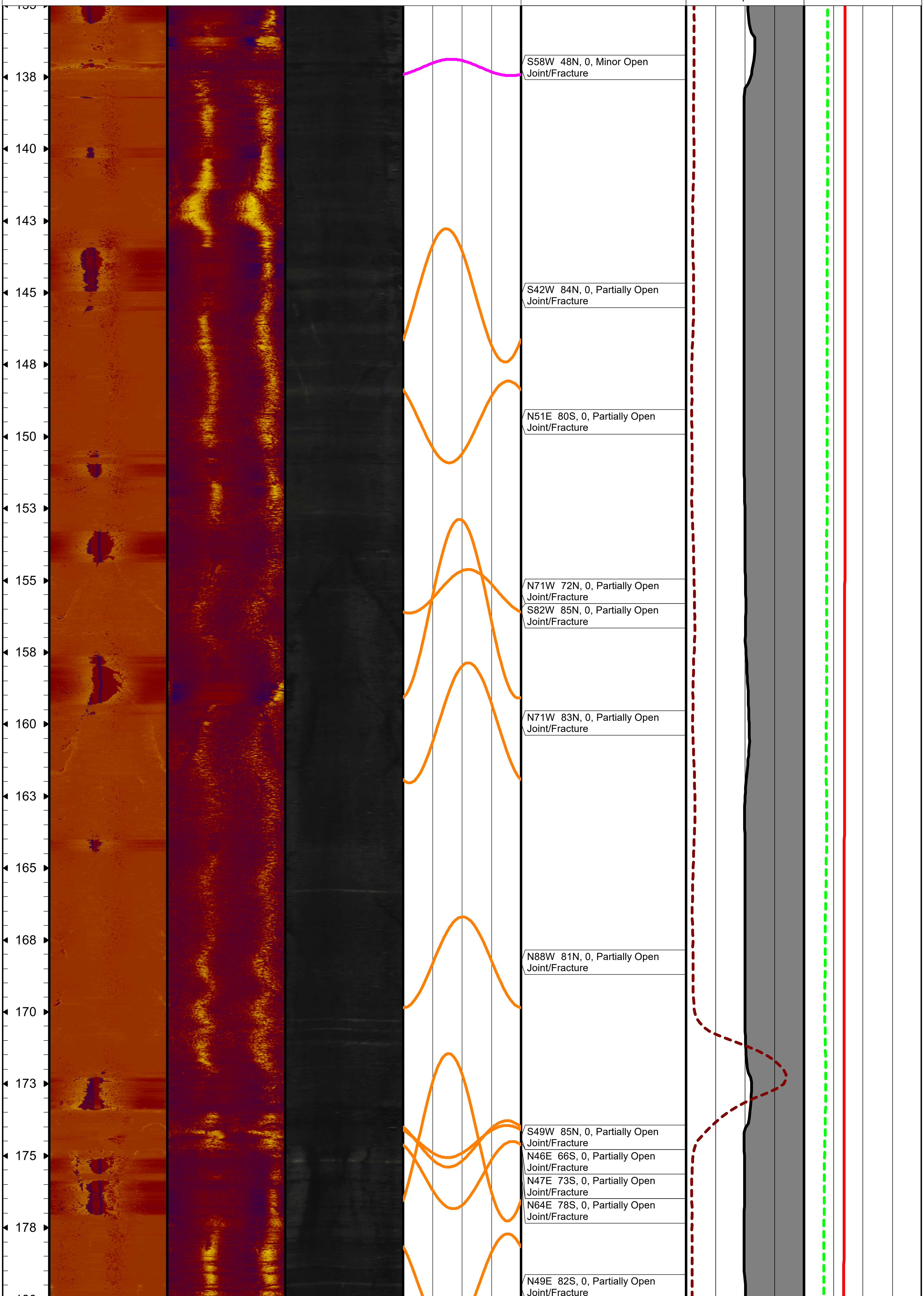
1ft:50ft
Acoustic Travel Time
0° 90° 180° 270° 0°
Acoustic Amplitude
0° 90° 180° 270° 0°
Optical Televiewer
0° 90° 180° 270° 0°
Televiewer Features
0° 90° 180° 270° 0°
Feature Characteristics
Strike and Dip (degrees)
Aperture (inches)
Inferred Type
Mechanical Caliper
5 Inches 7
Natural Gamma
0 cps 2000
Temp
0 'C 40
Cond
0 uS/cm 2000
90
93
95
98
100
103
105
107
110
113
115
117
120
123
125
128
130
133
135
S79W 84N, 0, Partially Open Joint/Fracture
S42W 83N, 0, Partially Open Joint/Fracture
S85W 26N, 0, Filled Fracture/Joint
S55W 13N, 4.47, Bedding/Banding/Foliation
S52W 67N, 1.79, Minor Open Joint/Fracture
S9W 9N, 0, Bedding/Banding/Foliation
S49W 12N, 2.79, Bedding/Banding/Foliation
S25W 5N, 5.19, Bedding/Banding/Foliation
Natural Gamma
0 cps 2000
Cond
0 uS/cm 2000
Feature Characteristics
Depth
1ft:50ft
Acoustic Travel Time
0° 90° 180° 270° 0°
Acoustic Amplitude
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
0 'C 40

Depth 1ft:50ft | Acoustic Travel Time 0° 90° 180° 270° 0° | Acoustic Amplitude 0° 90° 180° 270° 0° | Optical Televiewer 0° 90° 180° 270° 0° | Televiewer Features 0° 90° 180° 270° 0° | Feature Characteristics | Mechanical Caliper 5 Inches 7 | Temp 0 'C 40

Strike and Dip (degrees)
Aperture (inches)
Inferred Type

Natural Gamma 0 cps 2000 | Cond 0 uS/cm 2000

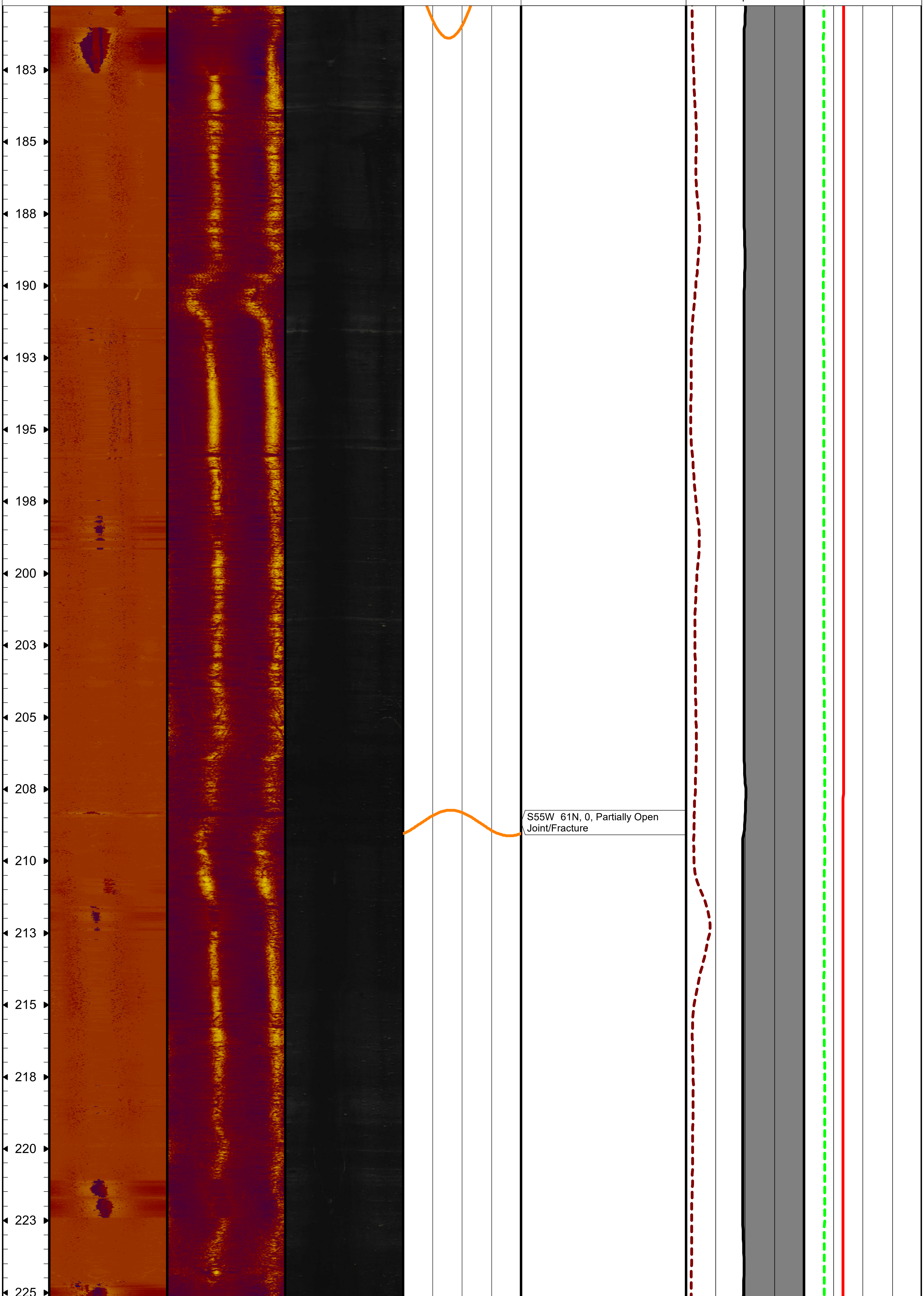


Feature Characteristics

Natural Gamma 0 cps 2000 | Cond 0 uS/cm 2000

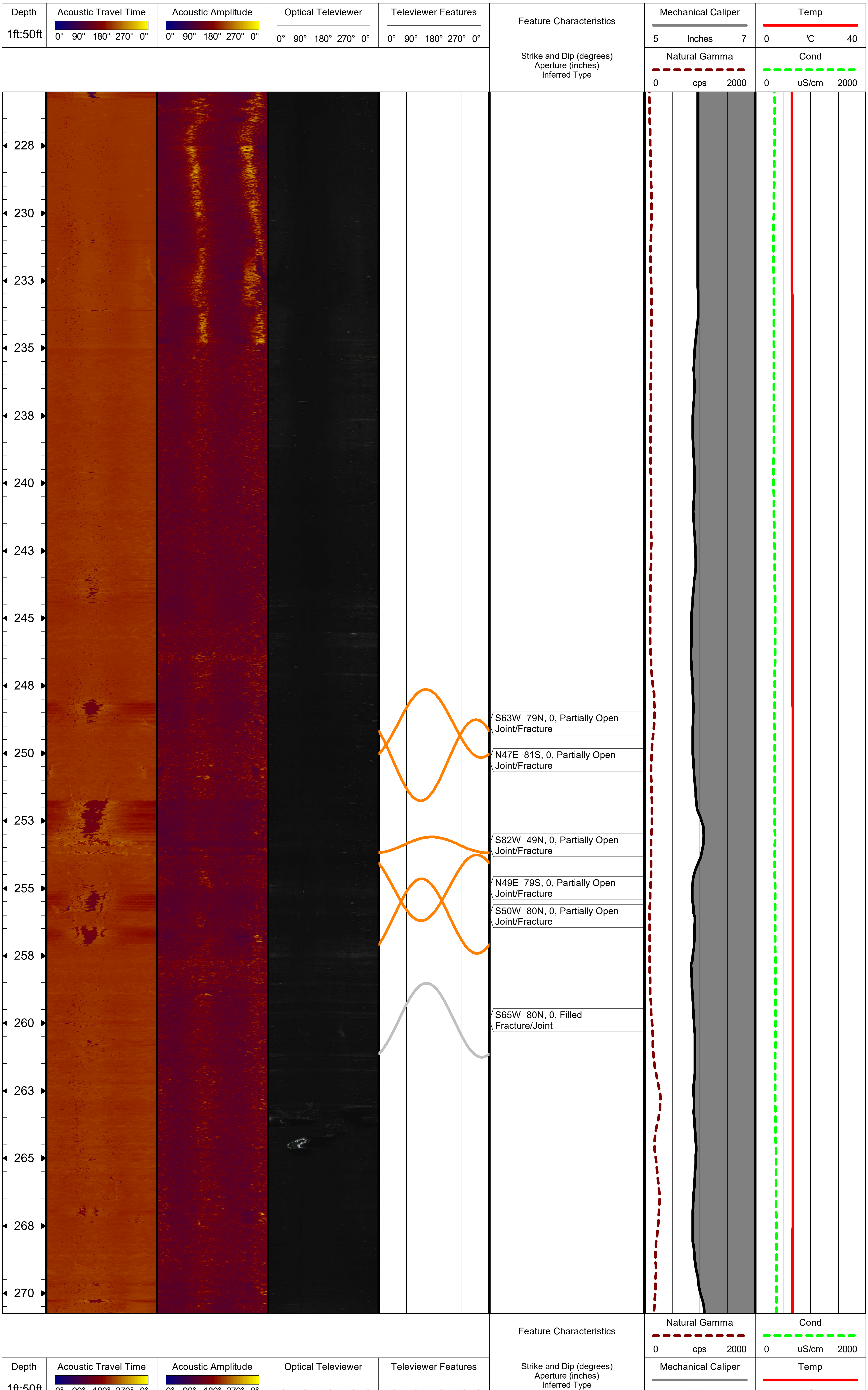
Depth 1ft:50ft | Acoustic Travel Time 0° 90° 180° 270° 0° | Acoustic Amplitude 0° 90° 180° 270° 0° | Optical Televiewer 0° 90° 180° 270° 0° | Televiewer Features 0° 90° 180° 270° 0° | Strike and Dip (degrees) Aperture (inches) Inferred Type | Mechanical Caliper 5 Inches 7 | Temp 0 'C 40

Depth	Acoustic Travel Time	Acoustic Amplitude	Optical Televiewer	Televiewer Features	Feature Characteristics	Mechanical Caliper	Temp
1ft:50ft	0° 90° 180° 270° 0°	0° 90° 180° 270° 0°	0° 90° 180° 270° 0°	0° 90° 180° 270° 0°		5 Inches 7	0 'C 40
					Strike and Dip (degrees) Aperture (inches) Inferred Type	Natural Gamma 0 cps 2000	Cond 0 uS/cm 2000



Feature Characteristics	Natural Gamma	Cond
	0 cps 2000	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:50ft	0° 90° 180° 270° 0°	0° 90° 180° 270° 0°	0° 90° 180° 270° 0°	0° 90° 180° 270° 0°		5 Inches 7	0 'C 40


Depth
1ft:50ft
Acoustic Travel Time
0° 90° 180° 270° 0°
Acoustic Amplitude
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
Temp
0 'C 40
Natural Gamma
0 cps 2000
Cond
0 uS/cm 2000
228
230
233
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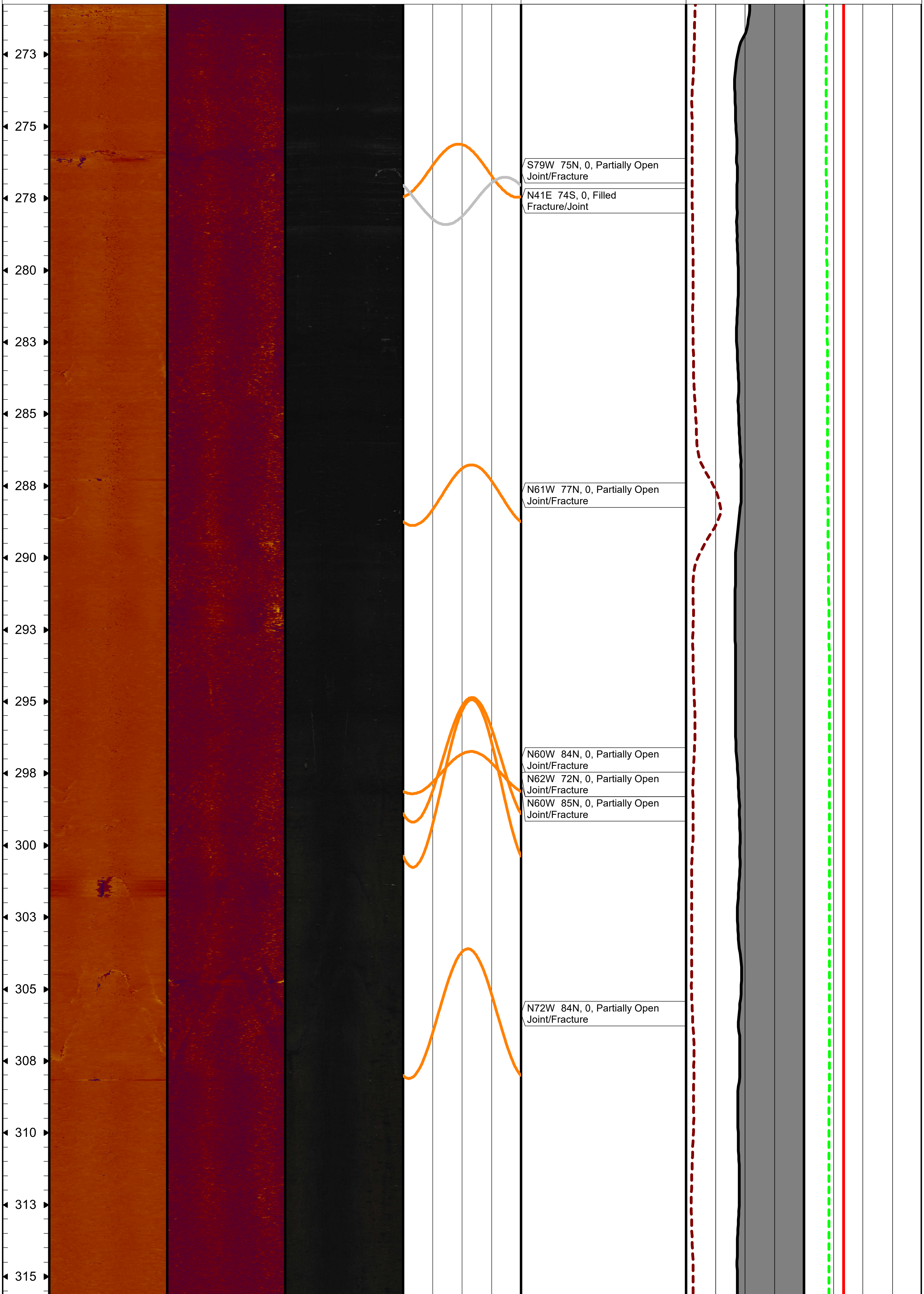
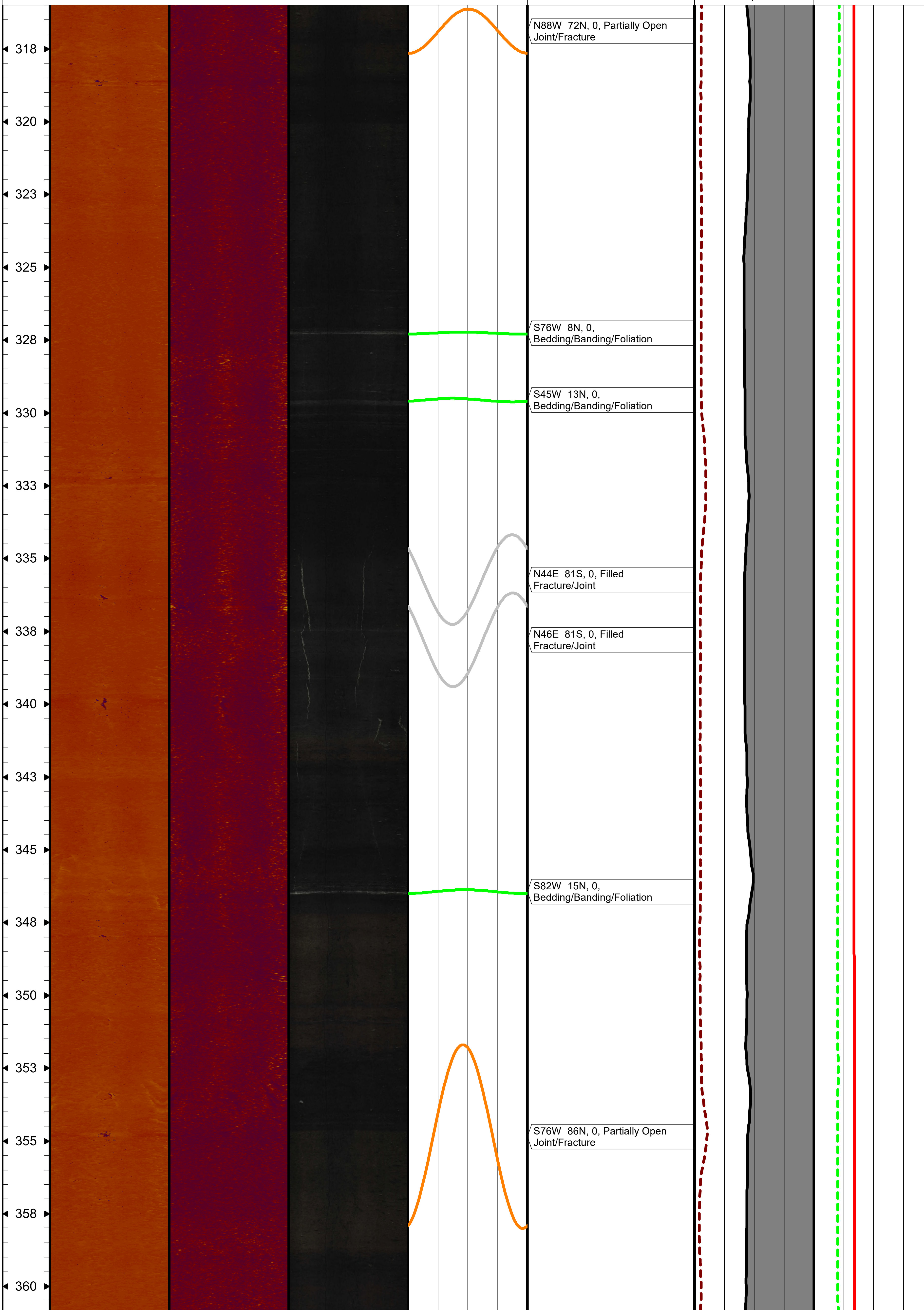
238
240
243
245
248
250
253
255
258
260
263
265
268
270
S63W 79N, 0, Partially Open Joint/Fracture
N47E 81S, 0, Partially Open Joint/Fracture
S82W 49N, 0, Partially Open Joint/Fracture
N49E 79S, 0, Partially Open Joint/Fracture
S50W 80N, 0, Partially Open Joint/Fracture
S65W 80N, 0, Filled Fracture/Joint

Depth 1ft:50ft	Acoustic Travel Time 0° 90° 180° 270° 0°	Acoustic Amplitude 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; Natural Gamma 0 cps 2000	Temp 0 'C 40; Cond 0 uS/cm 2000



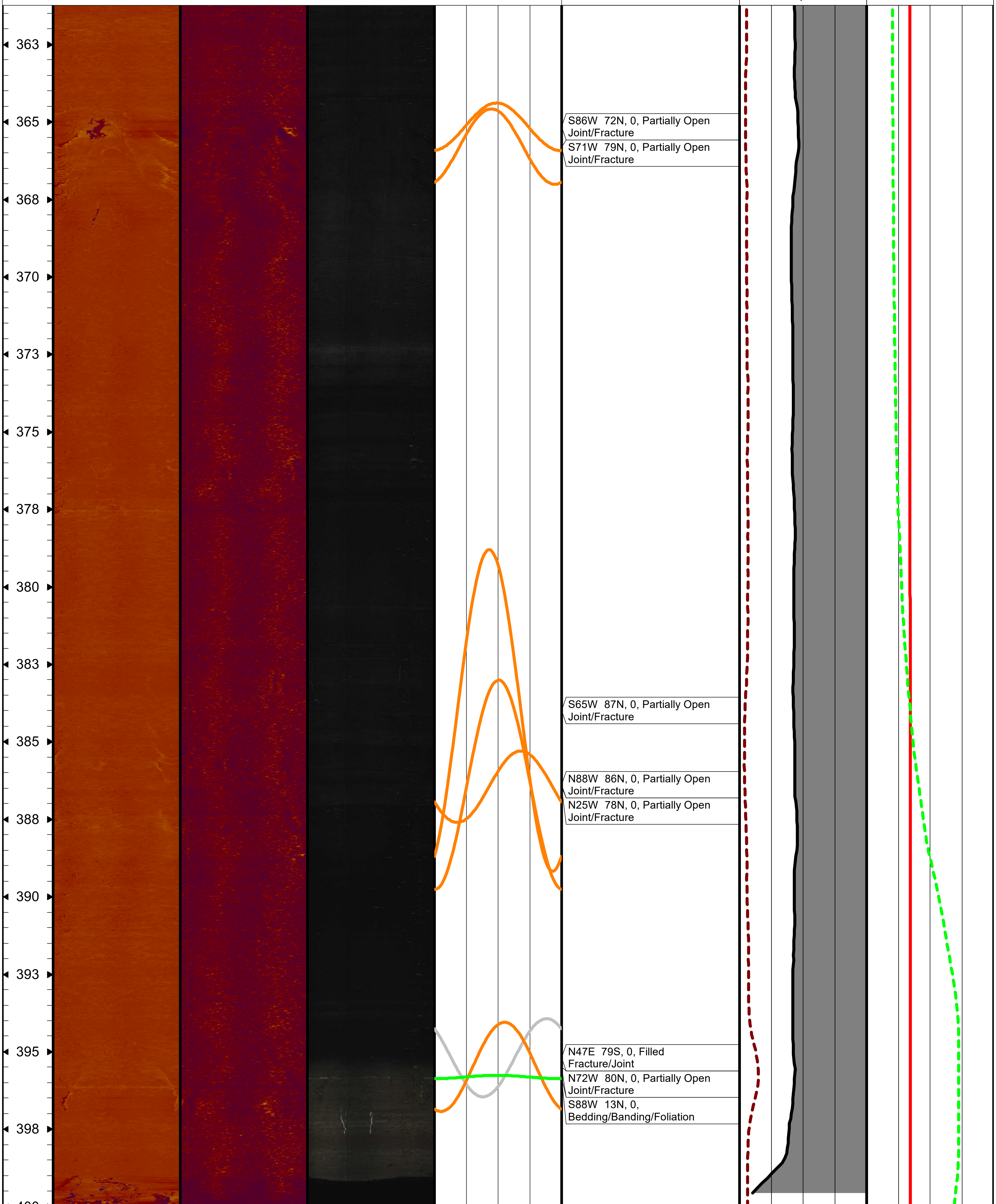
Depth 1ft:50ft	Acoustic Travel Time 0° 90° 180° 270° 0°	Acoustic Amplitude 0° 90° 180° 270° 0°	Optical Televiewer 0° 90° 180° 270° 0°	Televiewer Features 0° 90° 180° 270° 0°	Feature Characteristics: Strike and Dip (degrees), Aperture (inches), Inferred Type	Natural Gamma 0 cps 2000; Mechanical Caliper 5 Inches 7	Cond 0 uS/cm 2000; Temp 0 'C 40

Depth	Acoustic Travel Time	Acoustic Amplitude	Optical Televiewer	Televiewer Features	Feature Characteristics	Mechanical Caliper	Temp
1ft:50ft	0° 90° 180° 270° 0°	0° 90° 180° 270° 0°	0° 90° 180° 270° 0°	0° 90° 180° 270° 0°		5 Inches 7	0 'C 40
					Strike and Dip (degrees) Aperture (inches) Inferred Type	Natural Gamma 0 cps 2000	Cond 0 uS/cm 2000



Depth	Acoustic Travel Time	Acoustic Amplitude	Optical Televiewer	Televiewer Features	Feature Characteristics	Natural Gamma	Cond
						0 cps 2000	0 uS/cm 2000
1ft:50ft	0° 90° 180° 270° 0°	0° 90° 180° 270° 0°	0° 90° 180° 270° 0°	0° 90° 180° 270° 0°	Strike and Dip (degrees) Aperture (inches) Inferred Type	Mechanical Caliper 5 Inches 7	Temp 0 'C 40

Depth	Acoustic Travel Time	Acoustic Amplitude	Optical Televiewer	Televiewer Features	Feature Characteristics	Mechanical Caliper	Temp
1ft:50ft	0° 90° 180° 270° 0°	0° 90° 180° 270° 0°	0° 90° 180° 270° 0°	0° 90° 180° 270° 0°		5 Inches 7	0 'C 40
					Strike and Dip (degrees) Aperture (inches) Inferred Type	Natural Gamma 0 cps 2000	Cond 0 uS/cm 2000



					Feature Characteristics	Natural Gamma 0 cps 2000	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:50ft	0° 90° 180° 270° 0°	0° 90° 180° 270° 0°	0° 90° 180° 270° 0°	0° 90° 180° 270° 0°		5 Inches 7	0 'C 40

RETTEW SM

Rettew Field Services

Geophysical Logging Program

WELL ID

Residential Well

Logging Date: *06/27/2025*

Logging Datum: *Top of Casing*

BOC: *35.0* **DTW:** *33.1* **TD:** *400.0*

Site Name: [redacted] *Walker Road*

Location: *Upper Makefield Township, PA*

Client: *Sunoco Pipeline LP*

Project No.: *0963003386*

Revision Date: *07/06/2025*

Depth 1ft:50ft	Optical Televiewer 0° 90° 180° 270° 0°	UV Response 0° 90° 180° 270° 0°	Televiewer Features 0° 90° 180° 270° 0°	Feature Characteristics: Strike and Dip (degrees), Aperture (inches), Inferred Type

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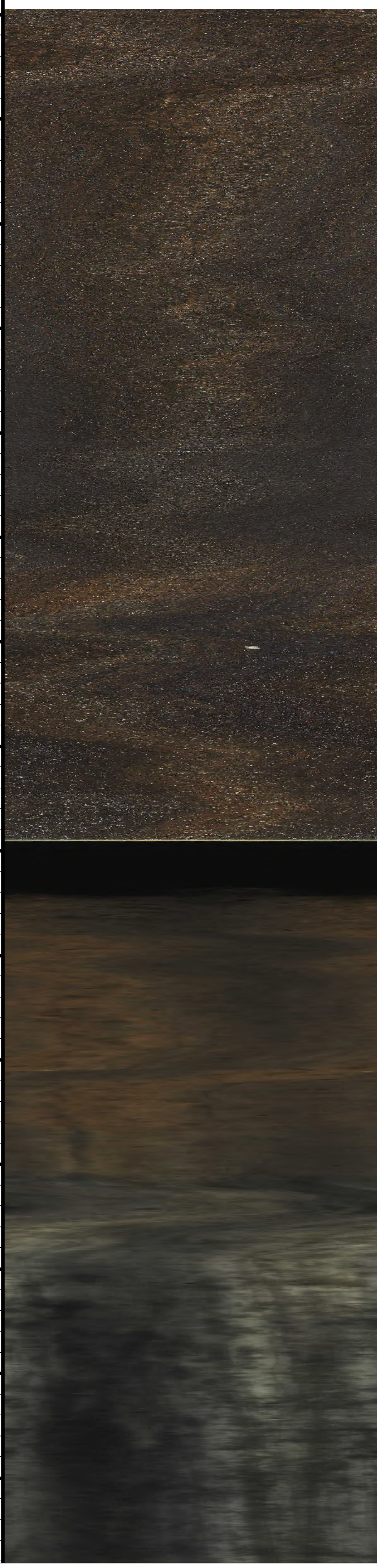
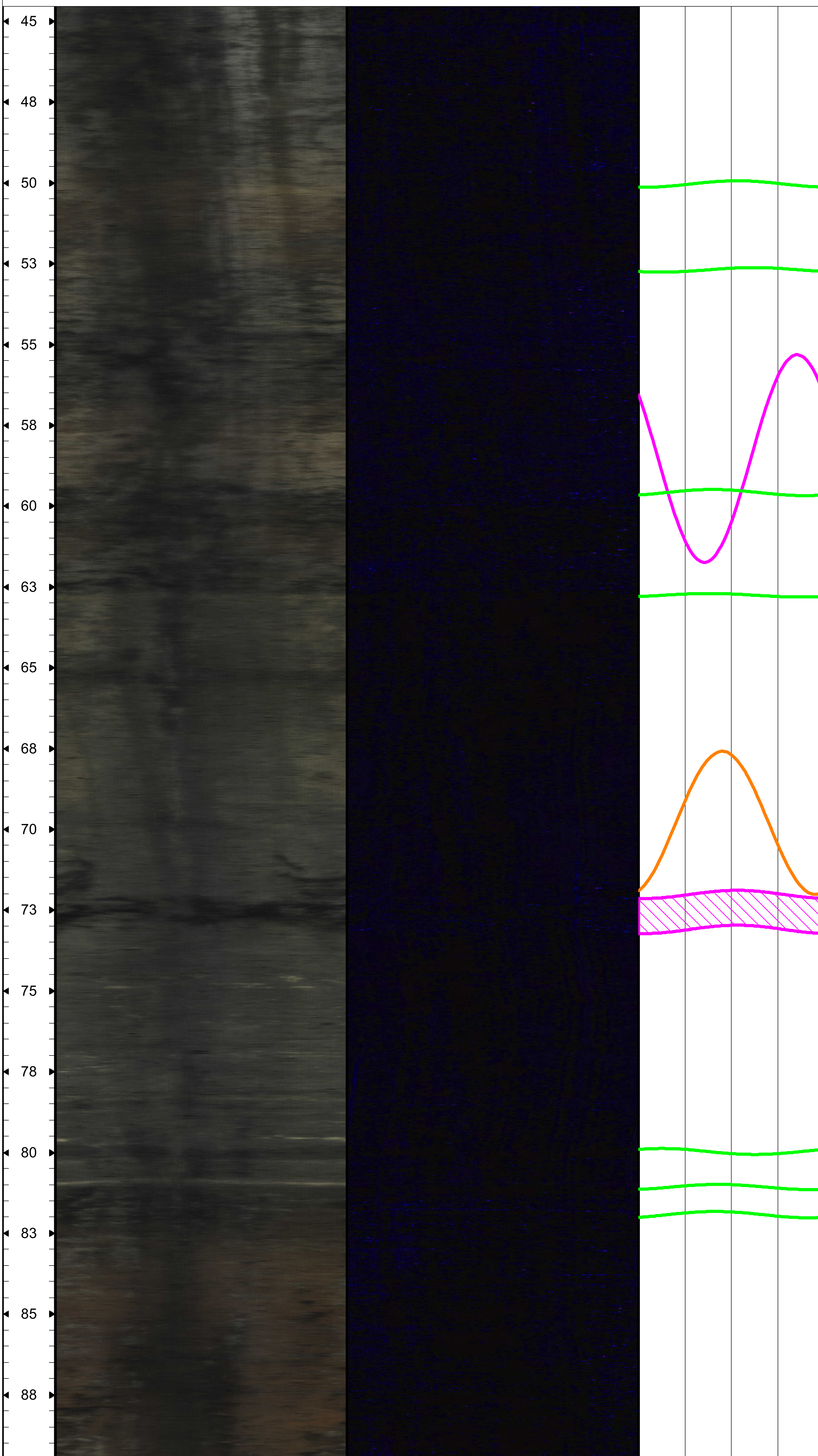


Depth 1ft:50ft	Optical Televiewer 0° 90° 180° 270° 0°	UV Response 0° 90° 180° 270° 0°	Televiewer Features 0° 90° 180° 270° 0°	Feature Characteristics: Strike and Dip (degrees), Aperture (inches), Inferred Type

Depth 1ft:50ft	Optical Televiewer 0° 90° 180° 270° 0°	UV Response 0° 90° 180° 270° 0°	Televiewer Features 0° 90° 180° 270° 0°	Feature Characteristics Strike and Dip (degrees) Aperture (inches) Inferred Type



N78W 22N, 0, Bedding/Banding/Foliation

N47W 16N, 0, Bedding/Banding/Foliation

N38E 85S, 0, Minor Open Joint/Fracture

S54W 20N, 0, Bedding/Banding/Foliation

S47W 13N, 0, Bedding/Banding/Foliation

S73W 84N, 0, Partially Open Joint/Fracture

N79W 26N, 11.56, Minor Open Joint/Fracture

S45E 20S, 0, Bedding/Banding/Foliation

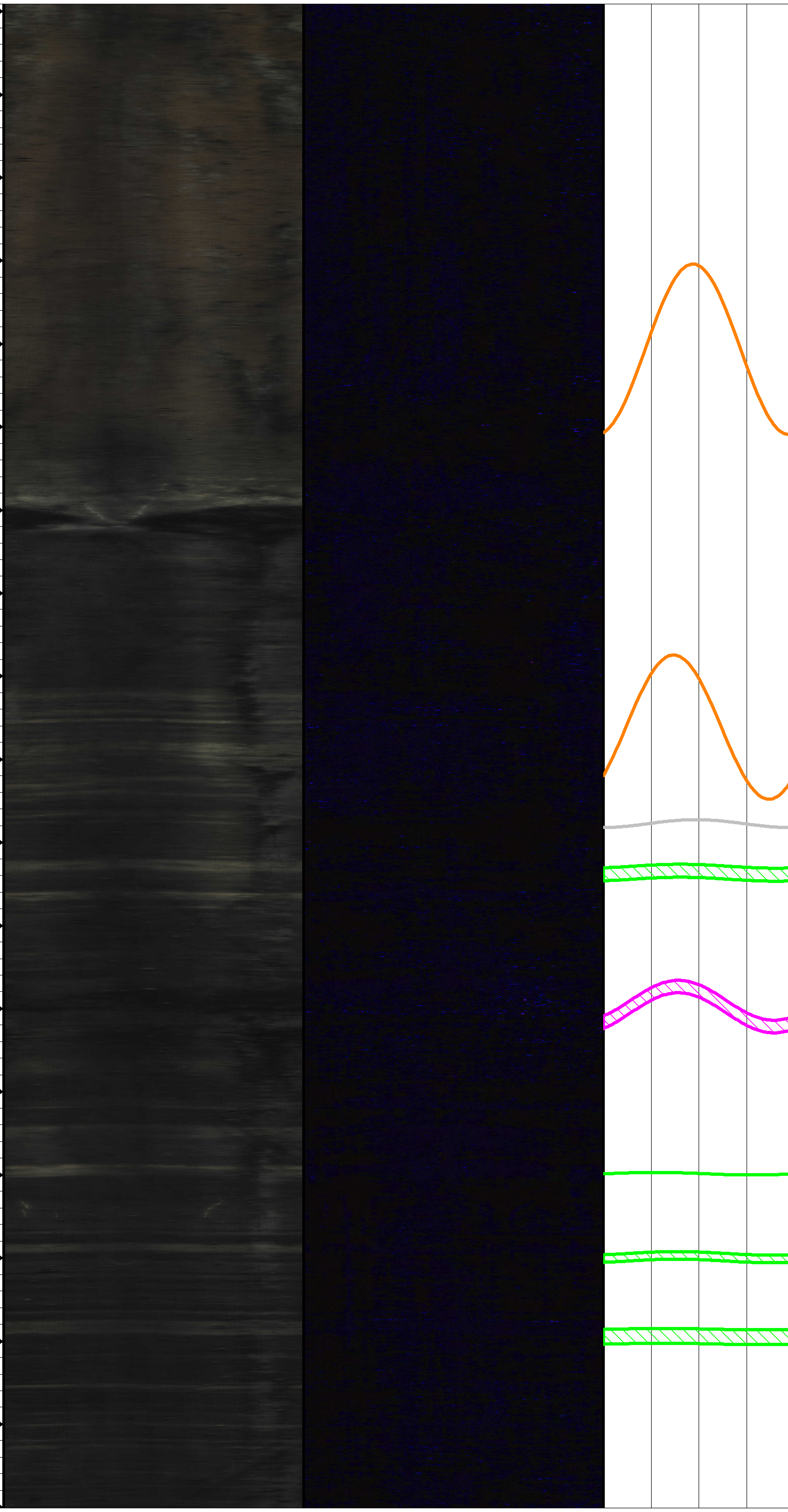
S65W 18N, 0, Bedding/Banding/Foliation

S59W 21N, 0, Bedding/Banding/Foliation

Depth 1ft:50ft	Optical Televiewer 0° 90° 180° 270° 0°	UV Response 0° 90° 180° 270° 0°	Televiewer Features 0° 90° 180° 270° 0°	Feature Characteristics Strike and Dip (degrees) Aperture (inches) Inferred Type

Depth	Optical Televiewer	UV Response	Televiewer Features	Feature Characteristics
1ft:50ft	0° 90° 180° 270° 0°	0° 90° 180° 270° 0°	0° 90° 180° 270° 0°	Strike and Dip (degrees) Aperture (inches) Inferred Type

Depth: 90, 93, 95, 98, 100, 103, 105, 107, 110, 113, 115, 117, 120, 123, 125, 128, 130, 133, 135



S79W 84N, 0, Partially Open Joint/Fracture

S42W 83N, 0, Partially Open Joint/Fracture

S85W 26N, 0, Filled Fracture/Joint

S55W 13N, 4.47, Bedding/Banding/Foliation

S52W 67N, 1.79, Minor Open Joint/Fracture

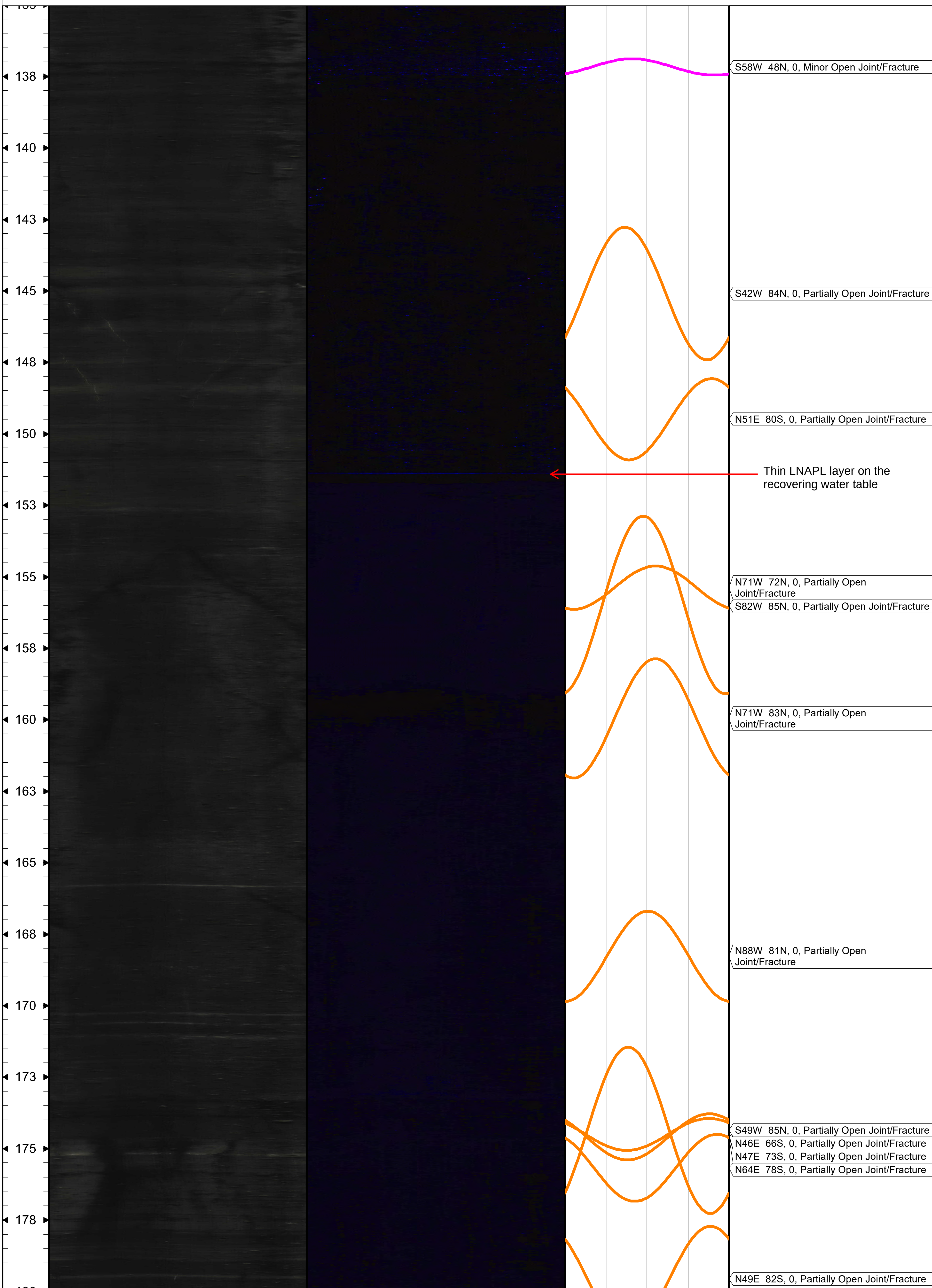
S9W 9N, 0, Bedding/Banding/Foliation

S49W 12N, 2.79, Bedding/Banding/Foliation

S25W 5N, 5.19, Bedding/Banding/Foliation

Depth	Optical Televiewer	UV Response	Televiewer Features	Feature Characteristics
1ft:50ft	0° 90° 180° 270° 0°	0° 90° 180° 270° 0°	0° 90° 180° 270° 0°	Strike and Dip (degrees) Aperture (inches) Inferred Type

Depth 1ft:50ft	Optical Televiewer 0° 90° 180° 270° 0°	UV Response 0° 90° 180° 270° 0°	Televiewer Features 0° 90° 180° 270° 0°	Feature Characteristics Strike and Dip (degrees) Aperture (inches) Inferred Type



Depth 1ft:50ft	Optical Televiewer 0° 90° 180° 270° 0°	UV Response 0° 90° 180° 270° 0°	Televiewer Features 0° 90° 180° 270° 0°	Feature Characteristics Strike and Dip (degrees) Aperture (inches) Inferred Type

Depth	Optical Televiewer	UV Response	Televiewer Features	Feature Characteristics
1ft:50ft	0° 90° 180° 270° 0°	0° 90° 180° 270° 0°	0° 90° 180° 270° 0°	Strike and Dip (degrees) Aperture (inches) Inferred Type

183
185
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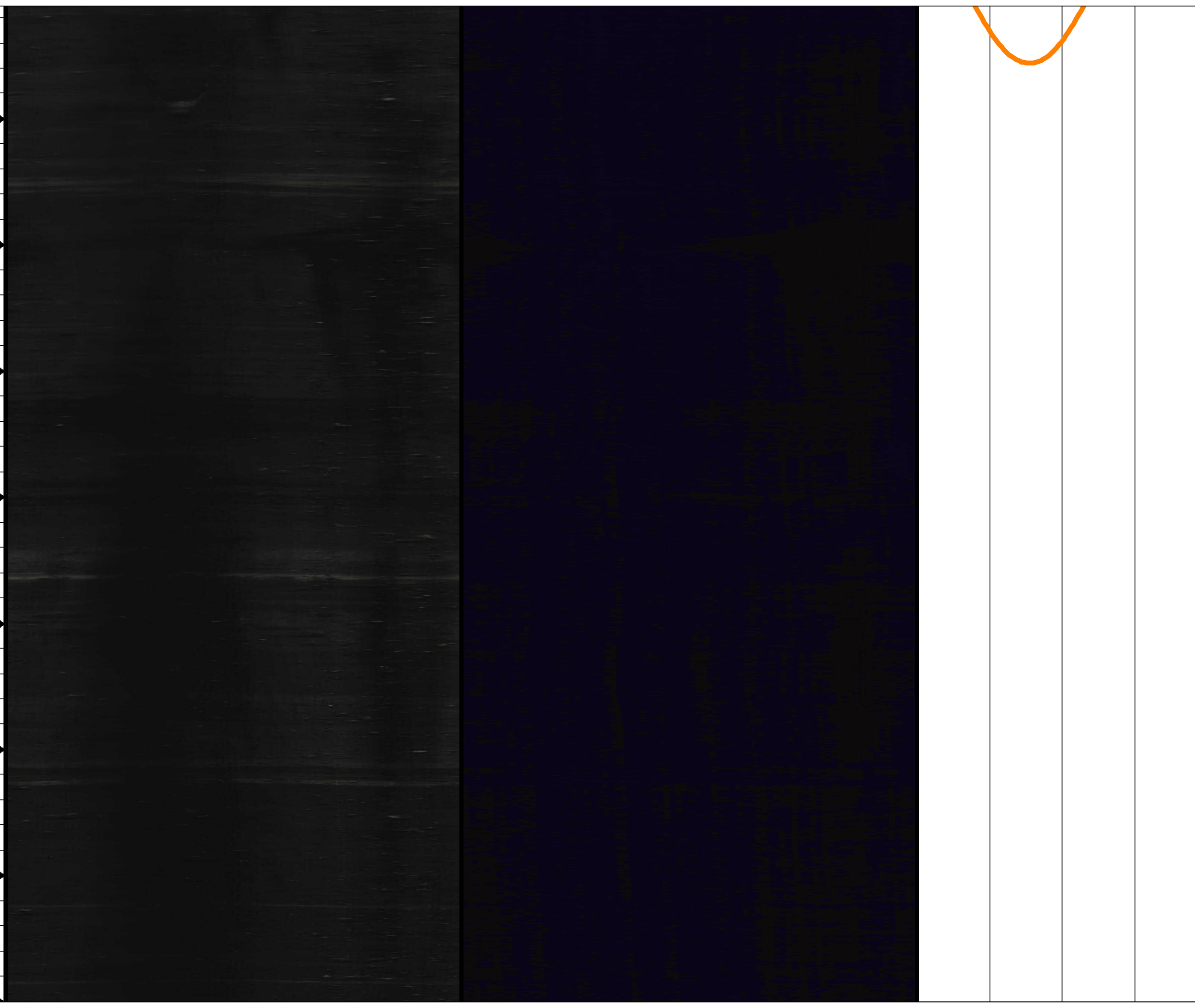
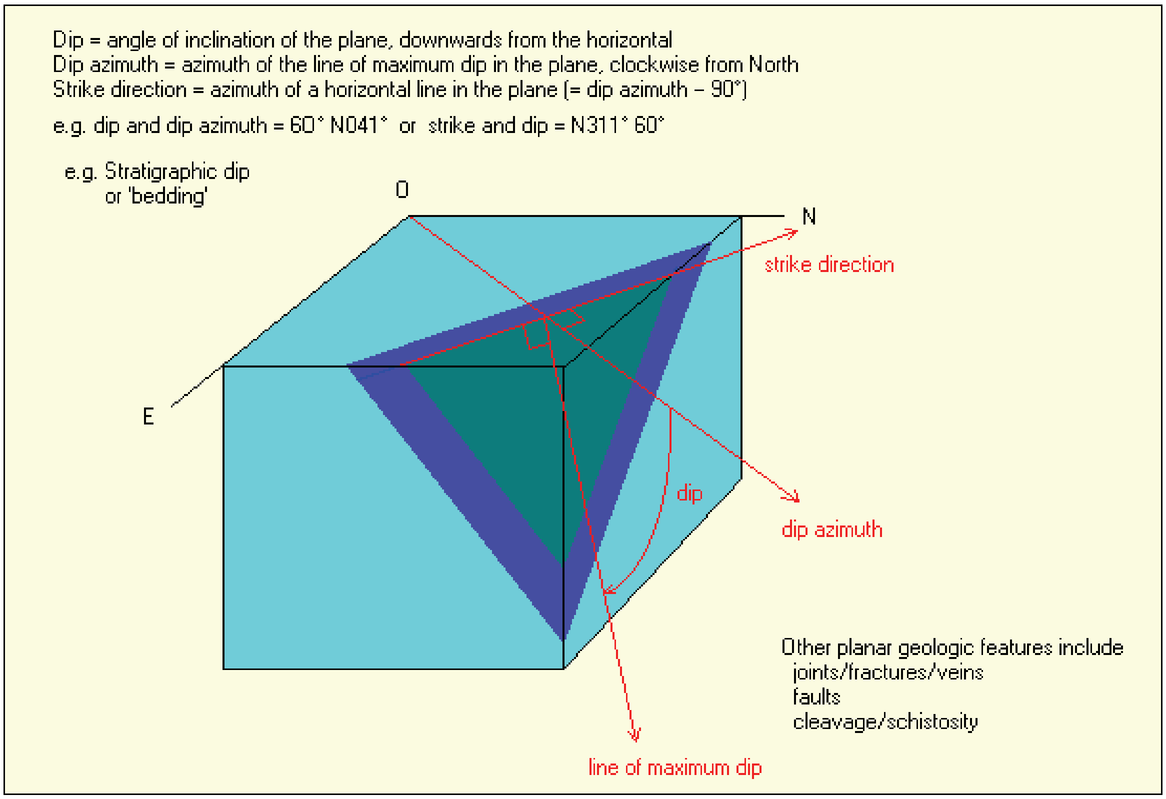


Depth	Optical Televiewer	UV Response	Televiewer Features	Feature Characteristics
1ft:50ft	0° 90° 180° 270° 0°	0° 90° 180° 270° 0°	0° 90° 180° 270° 0°	Strike and Dip (degrees) Aperture (inches) Inferred Type

APPENDIX A

Planar Feature Orientation Schematic

Planar Feature Orientation Parameters



APPENDIX B

Planar Feature Characterization Table

RETTEW

Residential Well
Planar Feature Table

RETTEW

Project No.:	0963003386	**Client:**	Sunoco Pipeline LP
Site Name:	[redacted] Walker Road	**Logging Date:**	06/24/2025
Location:	Upper Makefield Twp, PA	**Revision Date:**	07/06/2025

Depth	Aperture (in.)	Dip Azimuth (deg.)	Strike (deg.)	Dip (deg.)	Feature Type
50.0	0.0	12	N78W	22N	Bedding/Banding/Foliation
52.7	0.0	43	N47W	16N	Bedding/Banding/Foliation
58.5	0.0	128	N38E	85S	Minor Open Joint/Fracture
59.6	0.0	324	S54W	20N	Bedding/Banding/Foliation
62.8	0.0	317	S47W	13N	Bedding/Banding/Foliation
69.8	0.0	343	S73W	84N	Partially Open Joint/Fracture
72.6	11.6	11	N79W	26N	Minor Open Joint/Fracture
80.0	0.0	225	S45E	20S	Bedding/Banding/Foliation
81.1	0.0	335	S65W	18N	Bedding/Banding/Foliation
81.9	0.0	329	S59W	21N	Bedding/Banding/Foliation
100.2	0.0	349	S79W	84N	Partially Open Joint/Fracture
111.5	0.0	312	S42W	83N	Partially Open Joint/Fracture
114.4	0.0	355	S85W	26N	Filled Fracture/Joint
115.9	4.5	325	S55W	13N	Bedding/Banding/Foliation
120.0	1.8	322	S52W	67N	Minor Open Joint/Fracture
125.0	0.0	279	S9W	9N	Bedding/Banding/Foliation
127.5	2.8	319	S49W	12N	Bedding/Banding/Foliation
129.9	5.2	295	S25W	5N	Bedding/Banding/Foliation
137.2	0.0	328	S58W	48N	Minor Open Joint/Fracture
145.1	0.0	312	S42W	84N	Partially Open Joint/Fracture
149.5	0.0	141	N51E	80S	Partially Open Joint/Fracture
155.4	0.0	19	N71W	72N	Partially Open Joint/Fracture
156.0	0.0	352	S82W	85N	Partially Open Joint/Fracture
160.0	0.0	19	N71W	83N	Partially Open Joint/Fracture
168.3	0.0	2	N88W	81N	Partially Open Joint/Fracture
174.4	0.0	319	S49W	85N	Partially Open Joint/Fracture
174.5	0.0	136	N46E	66S	Partially Open Joint/Fracture
174.6	0.0	137	N47E	73S	Partially Open Joint/Fracture
175.7	0.0	154	N64E	78S	Partially Open Joint/Fracture
179.6	0.0	139	N49E	82S	Partially Open Joint/Fracture
208.7	0.0	325	S55W	61N	Partially Open Joint/Fracture
248.9	0.0	333	S63W	79N	Partially Open Joint/Fracture
250.3	0.0	137	N47E	81S	Partially Open Joint/Fracture
253.4	0.0	352	S82W	49N	Partially Open Joint/Fracture
255.0	0.0	139	N49E	79S	Partially Open Joint/Fracture
256.0	0.0	320	S50W	80N	Partially Open Joint/Fracture
259.9	0.0	335	S65W	80N	Filled Fracture/Joint
276.6	0.0	349	S79W	75N	Partially Open Joint/Fracture
277.6	0.0	131	N41E	74S	Filled Fracture/Joint
287.8	0.0	29	N61W	77N	Partially Open Joint/Fracture
297.0	0.0	30	N60W	84N	Partially Open Joint/Fracture
297.5	0.0	28	N62W	72N	Partially Open Joint/Fracture
297.9	0.0	30	N60W	85N	Partially Open Joint/Fracture
305.9	0.0	18	N72W	84N	Partially Open Joint/Fracture
316.9	0.0	2	N88W	72N	Partially Open Joint/Fracture
327.3	0.0	346	S76W	8N	Bedding/Banding/Foliation
329.6	0.0	315	S45W	13N	Bedding/Banding/Foliation
335.7	0.0	134	N44E	81S	Filled Fracture/Joint
337.8	0.0	136	N46E	81S	Filled Fracture/Joint
346.4	0.0	352	S82W	15N	Bedding/Banding/Foliation
354.9	0.0	346	S76W	86N	Partially Open Joint/Fracture
365.2	0.0	356	S86W	72N	Partially Open Joint/Fracture
365.8	0.0	341	S71W	79N	Partially Open Joint/Fracture
384.0	0.0	335	S65W	87N	Partially Open Joint/Fracture
386.4	0.0	2	N88W	86N	Partially Open Joint/Fracture
386.5	0.0	65	N25W	78N	Partially Open Joint/Fracture
395.2	0.0	137	N47E	79S	Filled Fracture/Joint
395.5	0.0	18	N72W	80N	Partially Open Joint/Fracture
395.8	0.0	358	S88W	13N	Bedding/Banding/Foliation

Residential Well
UV Planar Feature Table

RETTEW

Project No.:	**0963003386**	**Client:**	**Sunoco Pipeline LP**
Site Name:	[redacted] **Walker Road**	**Logging Date:**	**06/27/2025**
Location:	**Upper Makefield Twp, PA**	**Revision Date:**	**07/06/2025**

Depth	Aperture (in.)	Dip Azimuth (deg.)	Strike (deg.)	Dip (deg.)	Feature Type
50.0	0.0	12	N78W	22N	Bedding/Banding/Foliation
52.7	0.0	43	N47W	16N	Bedding/Banding/Foliation
58.5	0.0	128	N38E	85S	Minor Open Joint/Fracture
59.6	0.0	324	S54W	20N	Bedding/Banding/Foliation
62.8	0.0	317	S47W	13N	Bedding/Banding/Foliation
69.8	0.0	343	S73W	84N	Partially Open Joint/Fracture
72.6	11.6	11	N79W	26N	Minor Open Joint/Fracture
80.0	0.0	225	S45E	20S	Bedding/Banding/Foliation
81.1	0.0	335	S65W	18N	Bedding/Banding/Foliation
81.9	0.0	329	S59W	21N	Bedding/Banding/Foliation
100.2	0.0	349	S79W	84N	Partially Open Joint/Fracture
111.5	0.0	312	S42W	83N	Partially Open Joint/Fracture
114.4	0.0	355	S85W	26N	Filled Fracture/Joint
115.9	4.5	325	S55W	13N	Bedding/Banding/Foliation
120.0	1.8	322	S52W	67N	Minor Open Joint/Fracture
125.0	0.0	279	S9W	9N	Bedding/Banding/Foliation
127.5	2.8	319	S49W	12N	Bedding/Banding/Foliation
129.9	5.2	295	S25W	5N	Bedding/Banding/Foliation
137.2	0.0	328	S58W	48N	Minor Open Joint/Fracture
145.1	0.0	312	S42W	84N	Partially Open Joint/Fracture
149.5	0.0	141	N51E	80S	Partially Open Joint/Fracture
155.4	0.0	19	N71W	72N	Partially Open Joint/Fracture
156.0	0.0	352	S82W	85N	Partially Open Joint/Fracture
160.0	0.0	19	N71W	83N	Partially Open Joint/Fracture
168.3	0.0	2	N88W	81N	Partially Open Joint/Fracture
174.4	0.0	319	S49W	85N	Partially Open Joint/Fracture
174.5	0.0	136	N46E	66S	Partially Open Joint/Fracture
174.6	0.0	137	N47E	73S	Partially Open Joint/Fracture
175.7	0.0	154	N64E	78S	Partially Open Joint/Fracture
179.6	0.0	139	N49E	82S	Partially Open Joint/Fracture

APPENDIX C

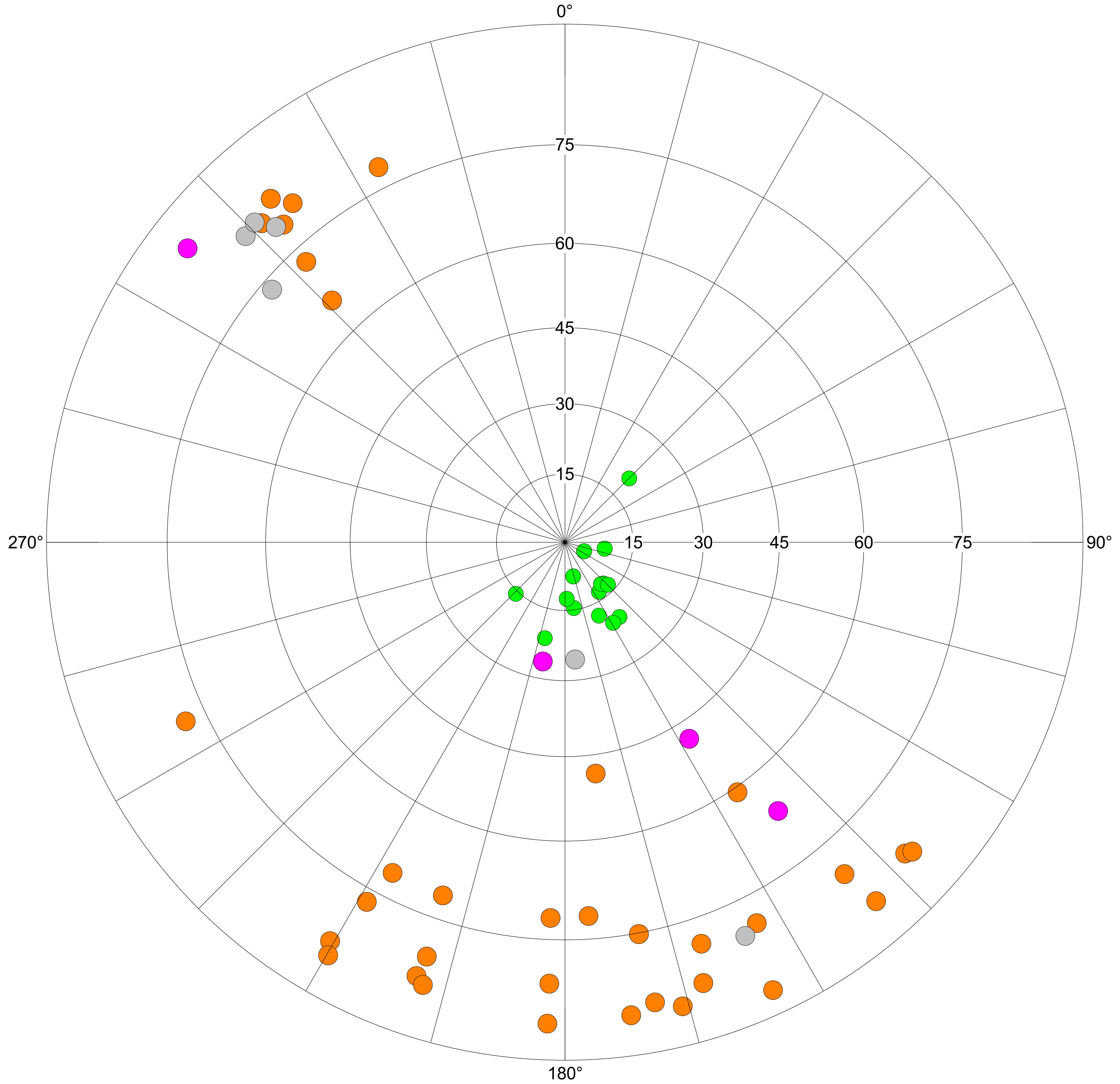
Planar Feature Wulff Plot

RETTEW	Rettew Field Services Geophysical Logging Program	WELL ID *Residential Well*	Logging Date: *06/24/2025* Logging Datum: *Top of Casing* BOC: *35.0* DTW: *33.1* TD: *400.0*

Site Name: [redacted] *Walker Road*
Location: *Upper Makefield Township, PA*
Client: *Sunoco Pipeline LP*
Project No.: *0963003386*
Revision Date: *07/06/2025*

Polar Projection- Dip

Wulff Plot - LH - Type
Depth: 0.00 [ft] to 400.00 [ft]



	Counts	Dip[deg]	Azi[deg]
Mean	59	68.80	341.03
● (green)	15	11.30	331.35
● (magenta)	4	57.77	324.83
● (orange)	34	82.99	346.62
● (gray)	6	85.96	139.37

Polar Projection- Dip

APPENDIX D

UV Logging Plan

RETTEW

We answer to you.

3020 Columbia Avenue, Lancaster, PA 17603● Phone: (800) 738-8395
E-mail: rettew@rettew.com ● Website: rettew.com

In an effort to determine which specific product-bearing fractures might be producing jet fuel into the recovery well at 108 Spencer Road, RETTEW will log the well using an Advanced Logic Technology (ALT) QL40-OBI2G-UV Optical Televiewer (OPTV) with ultraviolet (UV) imaging capabilities (see **Figure 1**). The UV OPTV records simultaneous visible light and 365 nm UV continuous, oriented, and scaled borehole images with 1,800 pixels per 360° rotation. The tool will be driven and recorded by a pickup truck-mounted Mount Sopris winch and digital logging system.

Figure 1: UV OPTV Sonde, photo courtesy of ALT.

Prior to logging, the former domestic well will be pumped by Groundwater and Environmental Services (GES) to induce drawdown, creating a cone-of-depression around the well to draw-in jet fuel light non-aqueous phase liquid (LNAPL). During drawdown, the logging system and tool will be set-up and readied so that a downward logging run can begin as soon as the pump is pulled. Pumped water will be directed to a container provided by Energy Transfer (ET). A drawdown of nearly the full depth of the well is desirable (if possible) to ensure inward flow at any fractures. Inward flow from fractures that contain LNAPL should produce UV staining from the fracture downward that ought to persist even if recovery brings the water level above the LNAPL-producing feature (due to adsorption of LNAPL onto the rock wall of the bore).

Nearby domestic supply wells located on Spencer Road will be monitored during the drilling activities outlined in the plan. Liquid level data will be recorded for each domestic well monitored. An interface probe will be used to record liquid level data at a frequency to be determined at each of the domestic wells at various locations on Spencer Road. In addition, water may be collected from various domestic well locations on Spencer Road on a routine basis with a bailer for visual inspection. However, it should be noted that due to spacers and/ or wire guards existing in certain domestic wells, a bailer may not be deployed for visual inspection.

Figure 2: Jet A fuel floating on water illuminated by 365 nm UV flashlight. Photo courtesy of Bill Barth (ET).

Once the pump is pulled, the tool will be run-in to just above the base of casing at a rate of 15 feet per minute, where logging will commence and proceed to a depth of 300 feet at a rate of 5 feet per minute.

Benchtop testing by ET has demonstrated that jet fuel will fluoresce bright blue under 365 nm excitation (see **Figure 2**).

The UV OPTV log will be processed in WellCAD to produce matching visible light and UV scaled and oriented digital images. Although this well has already been OPTV-logged and fracture depths and orientations identified, fractures will again be catalogued and plotted for the UV OPTV log.

As the tool is retrieved, the cable will be decontaminated at the wellhead (as for the previous logging), and the tool will be decontaminated resting on sawhorses with a sheet of plastic beneath. The small volume of decontamination water will be added to the pumped water container.

Containerization and disposal of produced water will follow the Waste Management Plan dated February 26, 2025. Traffic control will follow the Traffic Control Plan dated March 13, 2025.