APPENDIX D

BOREHOLE GEOPHYSICS REPORTS

Borehole Geophysics Logging Report
Savage Well Site
Wells MW-31R & MW-116R
Milford, New Hampshire

Prepared for
MACTEC
December 2003

GEOPHYSICAL
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INCORPORATED

December 1, 2003

Ms. Lindi Higgins
MACTEC Engineering and Consulting, Inc.
32 Daniel Webster Highway, Suite 25
Merrimack, NH 03054

Subject: Borehole Geophysics Logging Report
Savage Well Site – Wells MW-31R & MW-116R
Milford, New Hampshire

Dear Ms. Higgins:

This report describes borehole geophysical logging performed by Geophysical Applications, Inc. at the above-noted site, to help identify and characterize hydraulically-active bedrock fractures encountered by the above-noted monitoring well.

The contracted logging suite included conventional logs (caliper, fluid temperature [FTemp], fluid resistivity [FRes], and natural gamma), acoustic televiewer (ATV), and heat-pulse flowmeter testing. Single-point resistance (SPR) and spontaneous potential (SP) logs were also obtained with the natural gamma probe, at no extra expense to MACTEC.

METHODS OF INVESTIGATION

Survey Control

All borehole logs were referenced to depths below approximate ground surface. The geophysical logging winch contains an optical depth encoder to maintain depth measurements accurate within approximately ± 0.2 feet throughout a borehole.

Borehole Geophysical Logging

A Mount Sopris model 4MXB logging winch was used with a Mount Sopris caliper/fluid-temperature/fluid-resistivity probe to obtain the first three conventional logs. These three logs were recorded at 0.1-foot depth increments, as determined by the logging winch's digital depth encoder.

Natural gamma, SPR, and SP logs were subsequently obtained with a Mount Sopris polygamma probe; these data values were also recorded at 0.1-foot depth increments.

Acoustic televiewer (ATV) data were obtained using an Advanced Logic Technologies (ALT) model ABI40 acoustic televiewer probe, with the Mount Sopris winch and an ALT model Abox electronics console. ATV data were recorded at 0.01-foot depth intervals, with 288 pixels for each 360-degree scan around the borehole wall.

Fluid temperature and fluid resistivity logs were recorded during the first logging run, using a relatively slow downward logging speed (not more than 8 feet per minute) to help identify subtle variations. A sub-assembly on the bottom of the caliper probe obtained these fluid

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measurements. Caliper logging was subsequently performed while pulling that probe upwards through the borehole at approximately 15 feet per minute.

Flowmeter data were recorded with a Mount Sopris heat-pulse flowmeter probe, at specific depths inferred from field plots of the caliper, FRes, and FTemp logs. Flowmeter data were initially recorded under ambient conditions. The same test depths were subsequently repeated while pumping at approximately 0.7 to 1.5 gallons per minute (gpm) with a Grundfos pump. The higher pumping rate was utilized at MW-116R, with a deliberately undersized flowmeter diverter, to measure water flow in that higher-yield borehole.

All geophysical log data were recorded on a laptop computer's hard drive, and copied to CD-ROM as a backup precaution.

Post-survey plot scales were adjusted to display as much detail as possible. All conventional logs and flowmeter data were merged onto one plot, to aid data correlation. Televiewer logs are presented on separate pages, at an enlarged scale, for clarity.

Equipment Decontamination Procedures

Decontamination consisted of an Alconox scrub and tap water rinse of the logging cable and probes between logging runs.

SURVEY LIMITATIONS

Measured geophysical-log depths are estimated to be accurate within ± 0.2 feet at this site, allowing for some slippage of the winches' depth-measurement wheels.

The caliper-probe arms can measure borehole diameters up to approximately 16 inches. Caliper logs can most-confidently detect fractures that cross a borehole at moderate angles, e.g. less than approximately 70 degrees from horizontal. Caliper logs may not accurately detect near-vertical fractures.

The heat-pulse flowmeter probe can measure water flow rates between 0.02 and approximately 1.2 gallons per minute (gpm). Higher flow rates may be erroneously characterized as zero flow by this probe (unless the probe is fitted with an undersized diverter, as was used at MW-116R).

Hydraulically-active fracture zones were inferred by correlating numerous geophysical logs. These interpretations are a subjective judgment based upon available data.

Acoustic televiewer probes rely on a three-component magnetometer to orient the recorded images with respect to magnetic north. These images become distorted when the magnetometers approach the bottom of steel casing, typically beginning approximately 1 to 2.5 feet below the steel. The upper portion of each unoriented televiewer image was imported into WellCAD, and manually rotated to match a feature below the magnetically distorted interval, to provide usable images throughout the entire water-filled and uncased borehole depth range. Dip orientations of televiewer-inferred features within 2.5 feet of a steel casing are therefore approximate.

Calculated down-dip compass azimuths of nearly-horizontal planar features have larger uncertainties than azimuths of steeper-dipping features.

RESULTS

Geophysical log data and generalized log interpretations are described below. Specific interpretations regarding hydraulically-active fracture depths are listed in the "comments" column on the conventional log plot.

All geophysical logs described in this report are presented in Appendix A. Summary televiewer interpretations are provided in Appendix B. These televiewer-interpretation tables are Excel spreadsheets listing observed fracture depths, down-dip compass directions for each inferred fracture (note that this is perpendicular to the fracture strike direction), fracture dip angles with respect to horizontal, and whether an inferred feature was judged to be relatively open (category 105), or less-open (category 100).

Caliper log data are presented in the left log-plot column. Caliper inflections to the right indicate borehole enlargements, for example at casing joints, or where the drill bit passed through a fracture zone.

Fluid temperature (FTemp) and fluid resistivity (FRes) logs are presented in the next conventional-log plot column. Localized inflections or changes in slope of FTemp or FRes logs typically represent water entering or exiting a borehole. Large inflections at the very bottom of a borehole may represent only accumulated sediments with temperature or electrical properties that contrast with the water column.

Heat-pulse flowmeter data are presented on the caliper panel (ambient flow measurements) and on the FTemp/FRes panel (flow measurements while pumping). Shaded boxes to the left of centerline on either panel represent downwards water flow, with the box length indicating the flow magnitude in gpm. Shaded boxes to the right of a panel's centerline represent upwards water flow. Filled circles represent depths where "zero" flow was observed (i.e., flow less than the probe's minimum detectable rate, approximately 0.02 gpm). Flowmeter test depths were selected on-site using field plots of the caliper, fluid temperature, and fluid resistivity logs. Note that the plotted flow magnitudes were normalized using the actual pumping flow rate, to help account for some water that likely bypassed the probe's flexible diverter petals.

Natural gamma, SPR, and SP logs are presented in the third conventional log-plot column. Each of these well casings was grouted a few feet into bedrock; the steel casing probably caused the slightly lower gamma values visible a few feet above the casing bottom at MW-31R.

Acoustic televiewer data are presented via two columns (ABI40 "traveltime" and "amplitude"), where each column represents a cylindrical image sliced down the north edge and laid flat on the printed page. Magnetic north is at the left edge of each column, and the plots progress through east, south, west, and back to north at the right-hand edge.

Acoustic televiewer data were evaluated using WellCAD's image-processing module, to measure fracture dip angles and down-dip azimuths. All fracture down-dip azimuths are referenced to magnetic north. Measured fracture orientations are indicated by tadpole plots, where each filled-circle indicates a fracture's dip angle from horizontal (plotted on a graph that ranges between zero and 90 degrees from left to right). Each tadpole tail points in the feature's down-dip azimuth, assuming that magnetic north is straight up on the printed page. Note that the down-dip azimuth indicated by each tadpole tail is perpendicular to the fracture's strike direction. Also note that the tadpole orientations were corrected for borehole deviation from a vertical orientation. MW-116R deviated between approximately 2 degrees (at the top of the uncased portion) to 13 degrees from

vertical (near the bottom of the hole). MW-31R deviated less than approximately 1.5 degrees from vertical throughout its uncased length.

Fractures represented on both the ATV travel-time and amplitude plots are denoted as "open" features. Fractures represented only on the ATV amplitude plots are likely to have smaller apertures (or possibly represent foliation or mineral-filled joints), and are therefore judged relatively "less open". Red tadpoles, and red sine-curve lines superimposed on the ATV plots, represent inferred "open" fractures. Black tadpoles, and black sine curves on the ATV plots, represent interpreted "less-open" features.

Televiewer interpretations are also summarized using rose diagrams, to indicate the predominant down-dip azimuth(s) of features observed in the borehole. These rose diagrams are presented with magnetic north oriented straight up on the printed page. The red rose diagram represents inferred open fractures, and the black rose diagram represents inferred less-open fractures (or possibly other planar features, e.g. foliation).

A stereoplot also summarizes the open and less-open fracture orientations inferred from the televiewer logs. Each stereoplot was prepared using an equal-angle (Schmidt) projection on the southern hemisphere, with north oriented straight up on the printed page. The pole to a horizontal feature would plot near the diagram's center, whereas a vertical feature's pole would plot at the diagram's outer edge, opposite the feature's down-dip compass direction.

Annotations on the conventional log plot describe interpreted hydraulically-active fracture depths, based on correlations between all of the available log data. Selected observations that may be of particular interest are described below.

MW-31R

This borehole's caliper log shows relatively little variation in diameter. The biggest observed enlargement was an open fracture near 134 feet deep. Note also the casing joints near 19 and 39 feet deep. The steel casing appears to be fully emplaced within the bedrock, with only a minor enlargement immediately below the casing bottom.

A distinct FRes inflection, judged to represent a hydraulically active zone, was detected near 254 feet deep.

The ambient flowtest data showed barely-measurable upward flow entering below 263 feet deep, and exiting between the casing bottom and 71 feet deep.

Inflow while pumping also originated greater than 263 feet deep, and was relatively unchanged throughout the shallower portions of the borehole.

ATV interpretations showed only two open planar features (denoted by red tadpoles and sine curves). An open feature near 134 feet deep dips steeply down toward the west-southwest, while the open feature near 150 feet deep dips moderately towards due east.

Most ATV-inferred less-open planar features dip down towards the west, northwest, and north. A smaller group of less-open features dips down towards the southeast.

The stereoplot diagram shows a cluster of less-open feature poles below and right of the diagram's center. These poles represent the planar features that dip primarily towards the west, northwest, and north, mostly at dip angles less than 40 degrees from horizontal. A smaller group of black poles near the diagram's upper left edge represents the less-open features interpreted to dip towards the southeast at approximately 80 degrees from horizontal.

MW-116R

This borehole's caliper log shows four significant enlargements, centered near 105, 200, 213, and 216 feet deep. The largest of these openings extend to approximately 9 inches in diameter.

FTemp and FRes inflections judged to represent a hydraulically active zone occurred near the casing bottom. Distinct FRes inflections judged to represent hydraulically active zones also occurred near 84 and 106 feet deep. The 106-foot FRes inflection correlates with a caliper enlargement and ATV-inferred open fractures that dip steeply towards the north-northwest.

The FRes inflection near 297 feet deep may represent a hydraulically active zone. The large FRes inflection near 298 feet deep may represent accumulated sediments at the bottom of the borehole.

Ambient flowmeter tests showed weak upward flow under ambient conditions that began greater than 294 feet deep, and increased between 222 to 240 and 208 to 222 feet deep. Some of this upward ambient flow apparently exited the borehole between 190 to 208, 171 to 190, and 150 to 171 feet deep. Ambient upward flow may also have entered between 110 and 130 feet deep, and possibly exited at the 104-foot caliper enlargement. Upward ambient flow may also have entered at a third zone, between 90 and 100 feet deep, and exited between the casing bottom and 64 feet deep.

Under pumping conditions, upward flow still originated below 294 feet deep. The largest increase in upward flow while pumping was between 208 to 222 feet deep, at one of the two biggest caliper enlargements. Upward flow while pumping increased at the next significant caliper enlargement, near 200 feet deep. Some upward water flow while pumping may have exited the borehole between 80 and 90 feet deep (i.e. at the 84-foot FRes inflection). Additional inflow while pumping may have occurred between the casing bottom and 64 feet deep.

ATV-inferred less-open features (black rose diagram) exhibited down-dip azimuths similar to MW-31R. However, the stereoplot shows that most less-open features exhibited steeper dip angles at this borehole, primarily between 30 to 80 degrees from horizontal. The less-open (black) feature poles are mostly located in the lower half of the stereoplot diagram, representing down-dip azimuths that range from west-northwest and northwest, to north and north-northeast.

More open features were detected by the MW-116R ATV log, with a wide variety of down-dip azimuths. The most common down-dip azimuths for interpreted open features are towards the southeast, east, and north-northwest.

The stereoplot diagram shows a cluster of open and less-open features in the diagram's upper left quadrant, similar to MW-31R. These poles represent features that dip towards the southeast, at 50 to 75 degrees from horizontal.

* * * * *

We appreciate this opportunity to provide geophysical services, and we welcome questions concerning this report. Please call the undersigned at 508/543-1388 if we may provide additional information that would benefit MACTEC's project.

Sincerely,

GEOPHYSICAL APPLICATIONS, INC.

M. Blackey

Mark E. Blackey
Principal and Geophysicist

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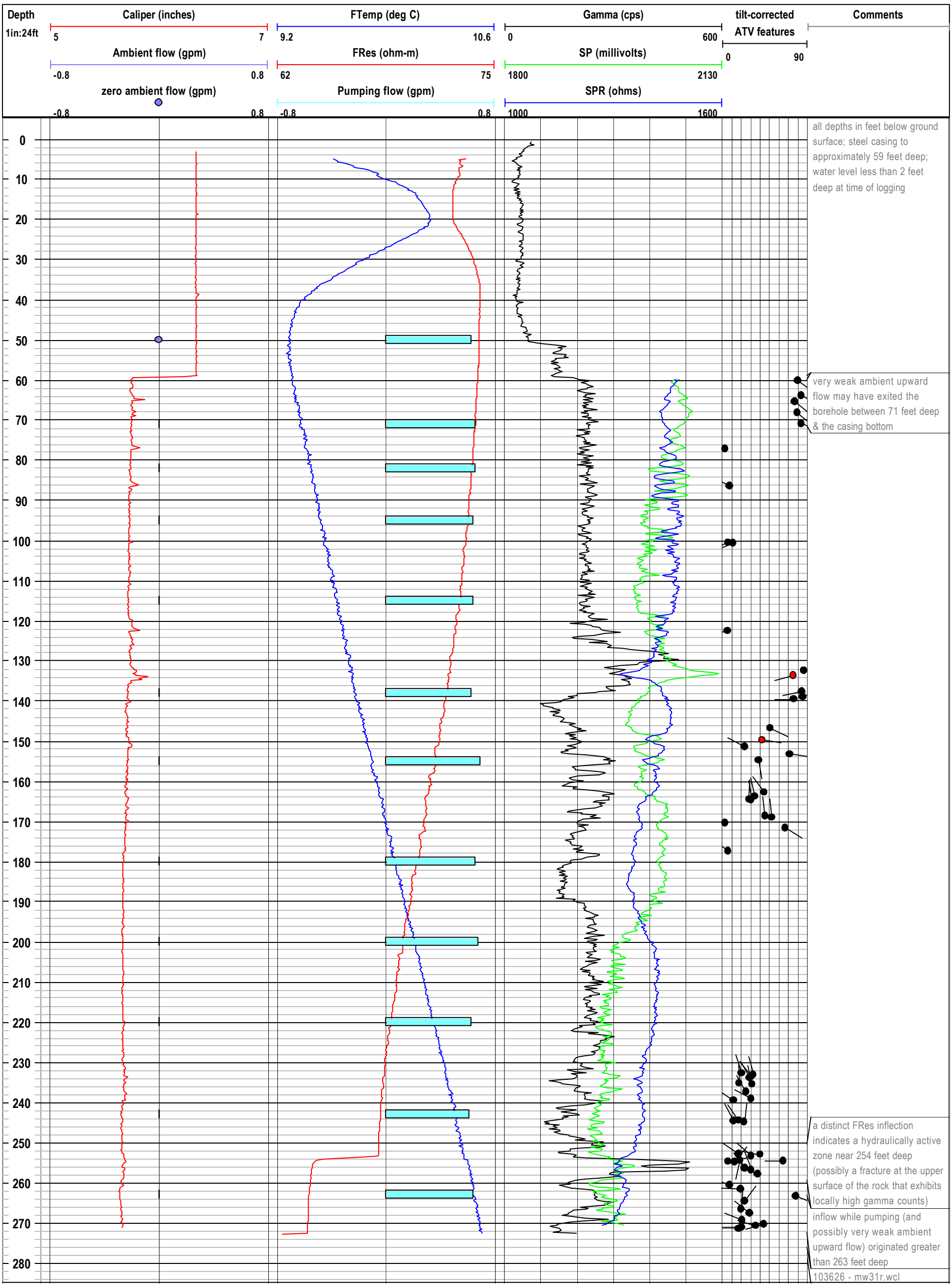
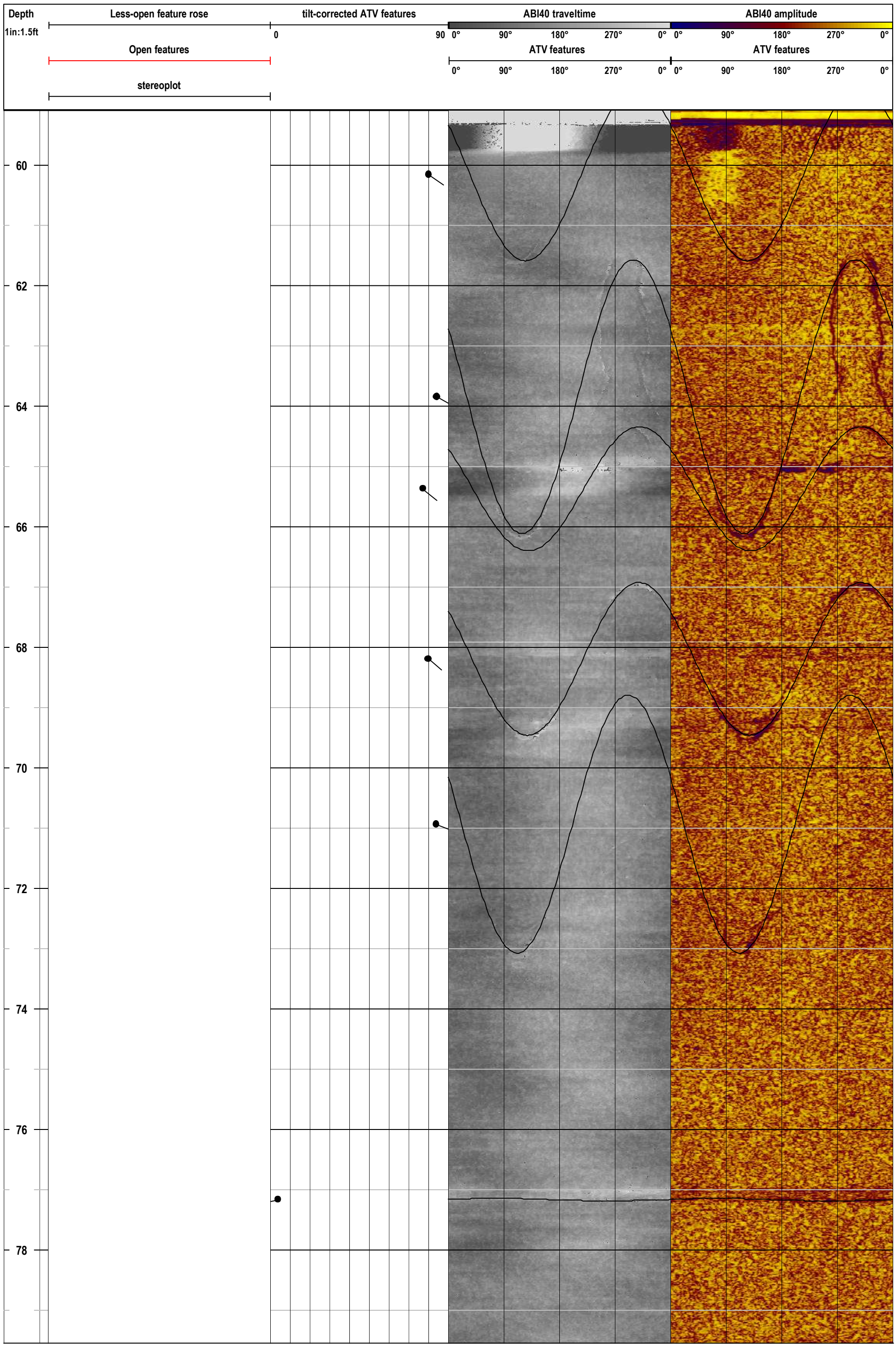
Appendix A

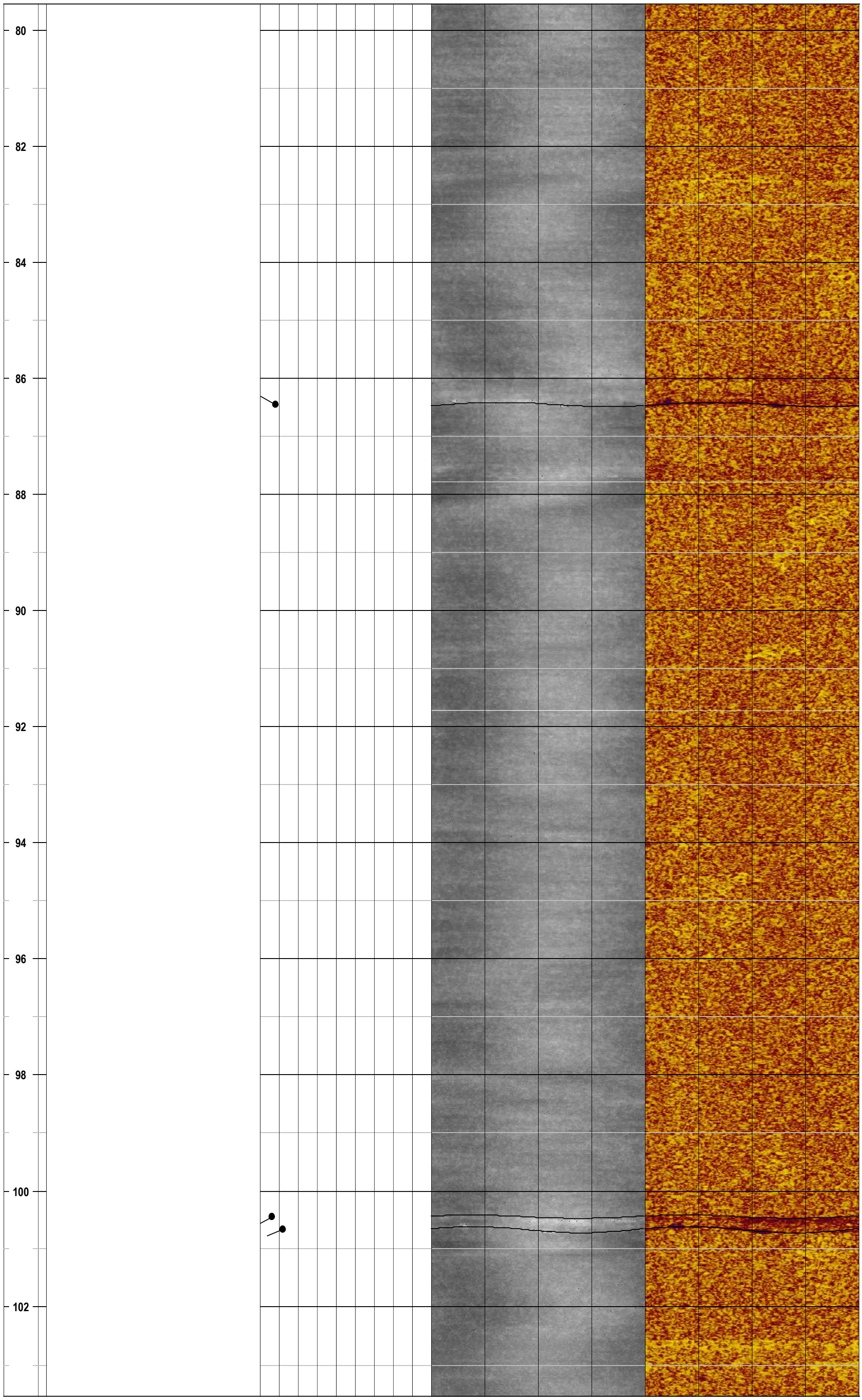
Borehole Geophysics Log Plots

Project - Well: MACTEC/Milford, NH - MW-31R conventional logs



Project - Well: MACTEC/Milford, NH - MW-31R acoustic televiewer log

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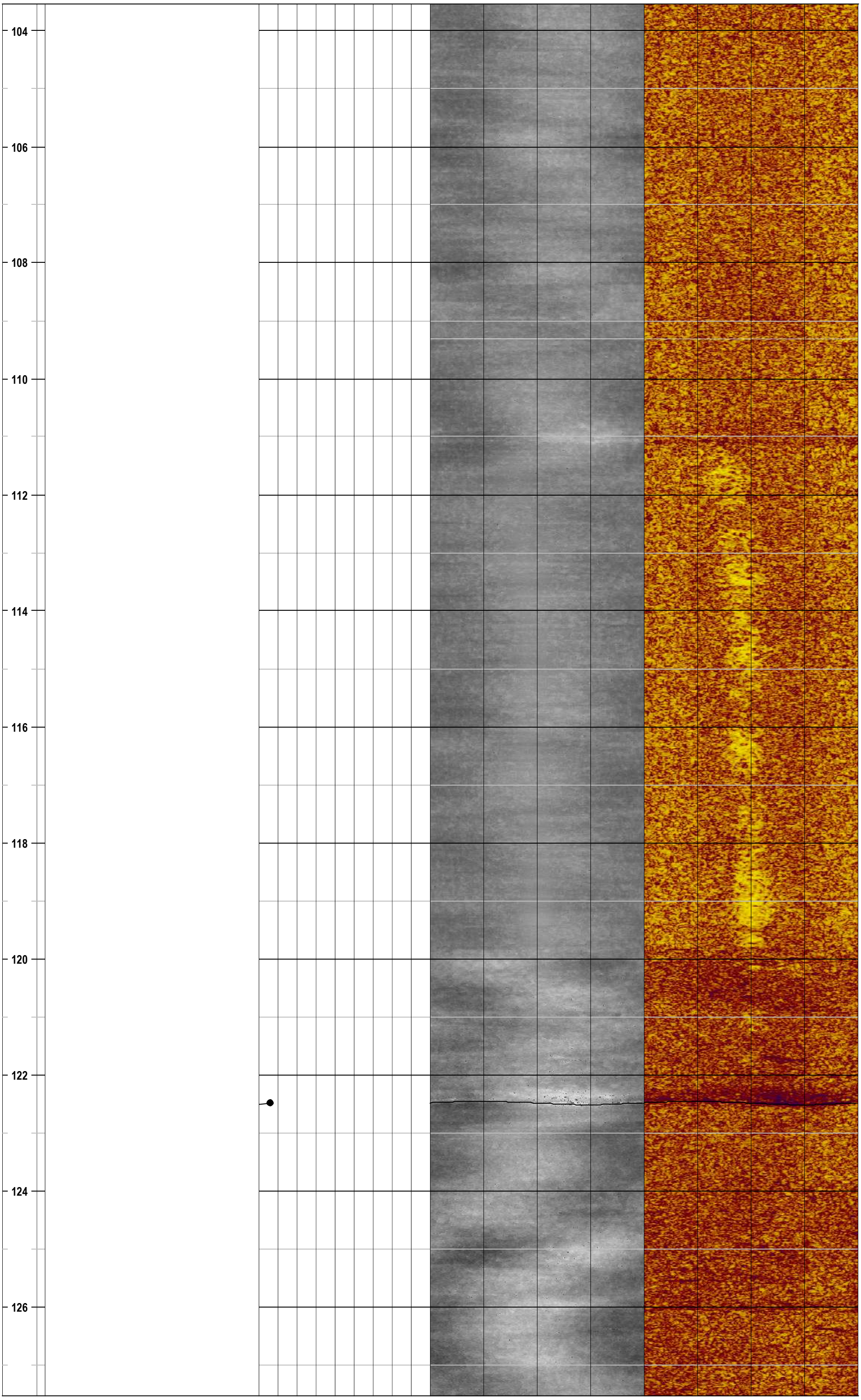
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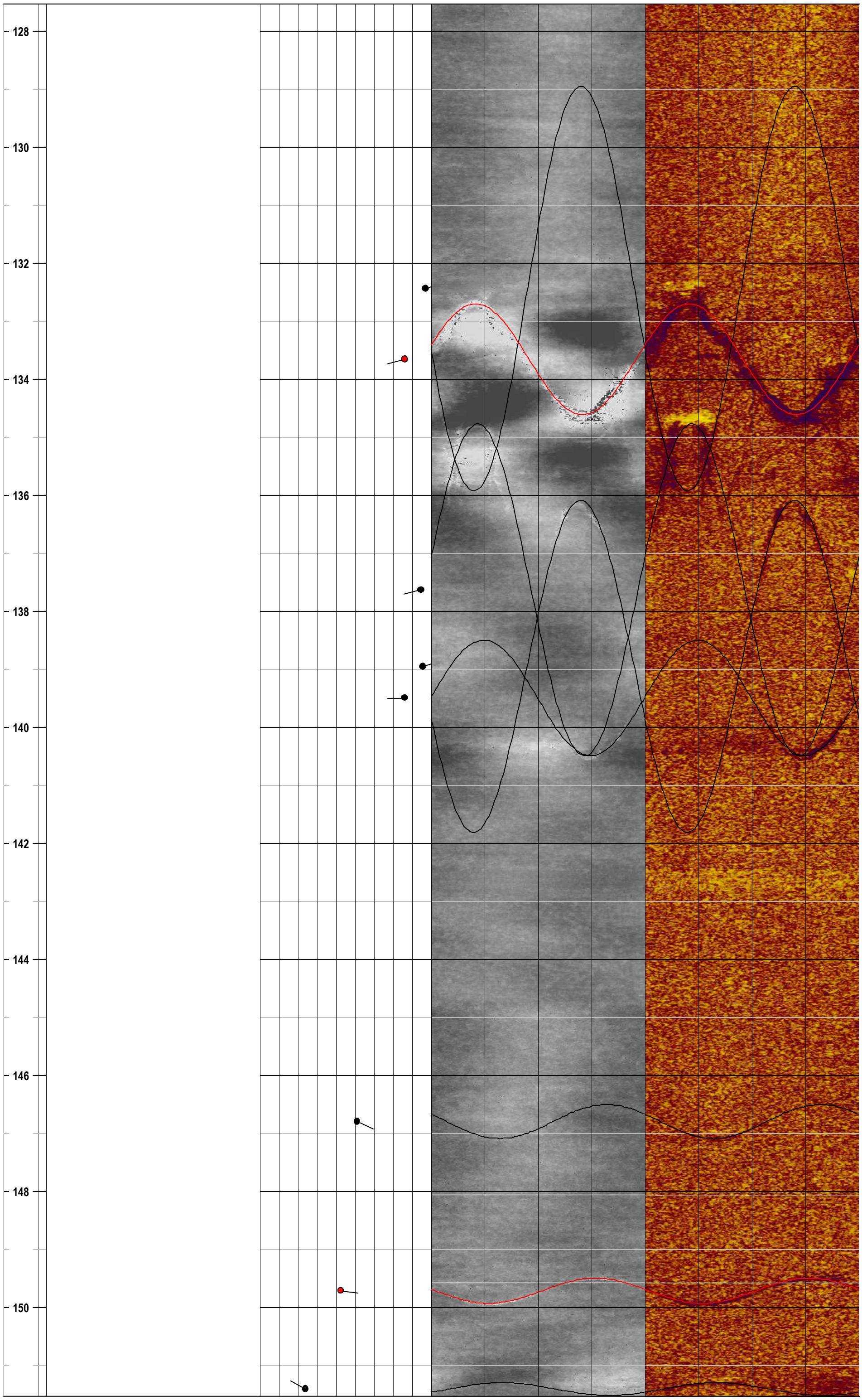
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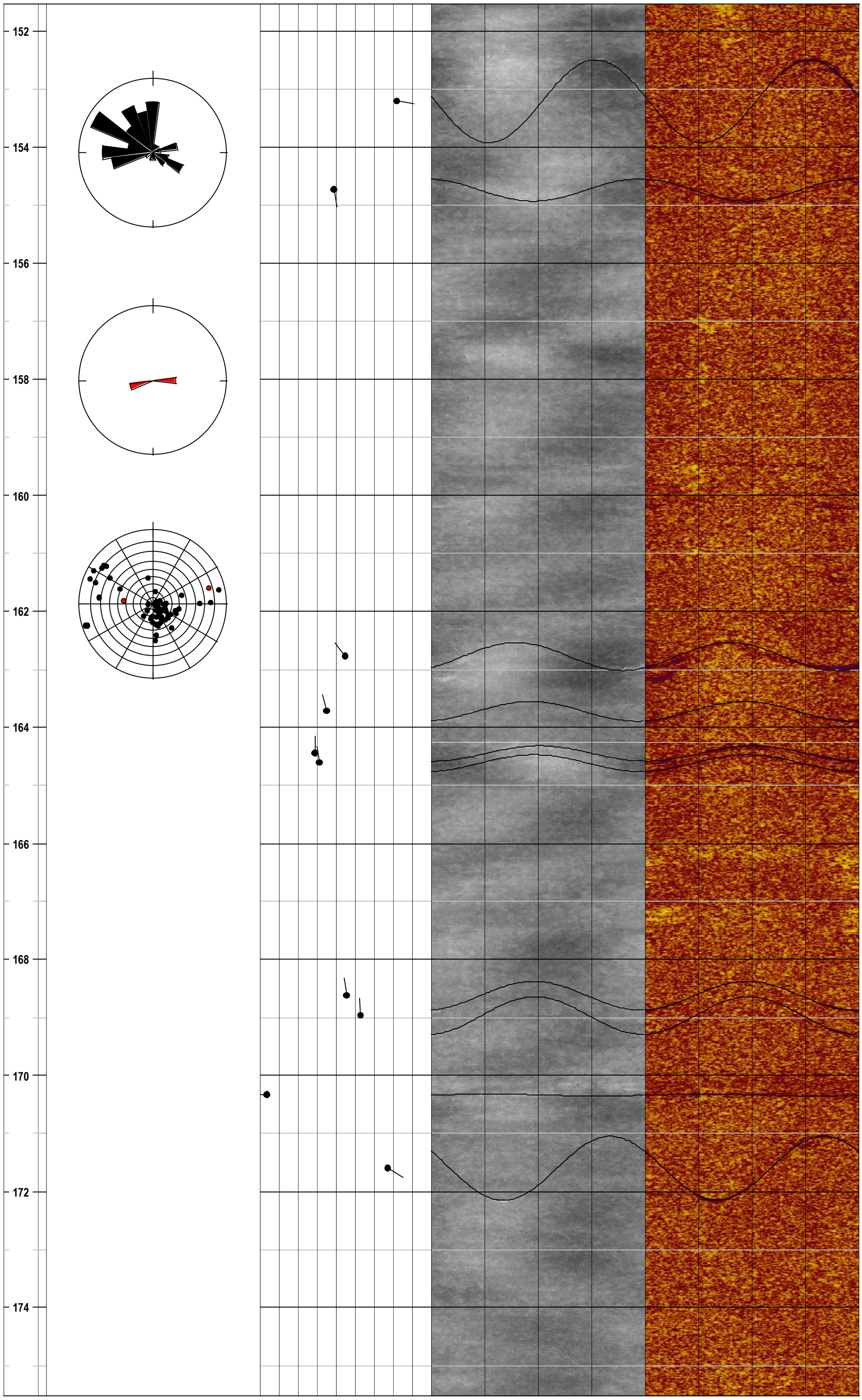
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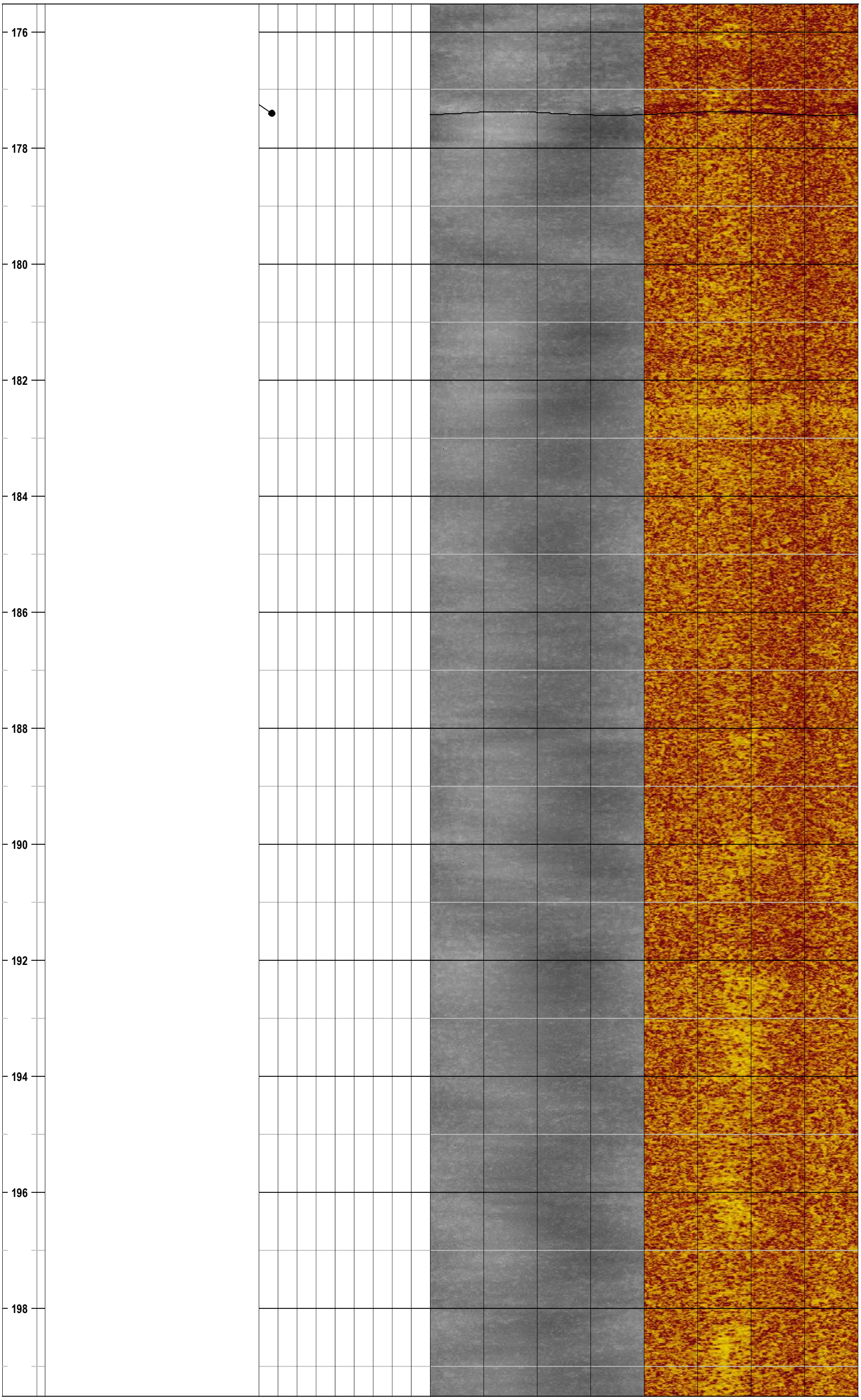
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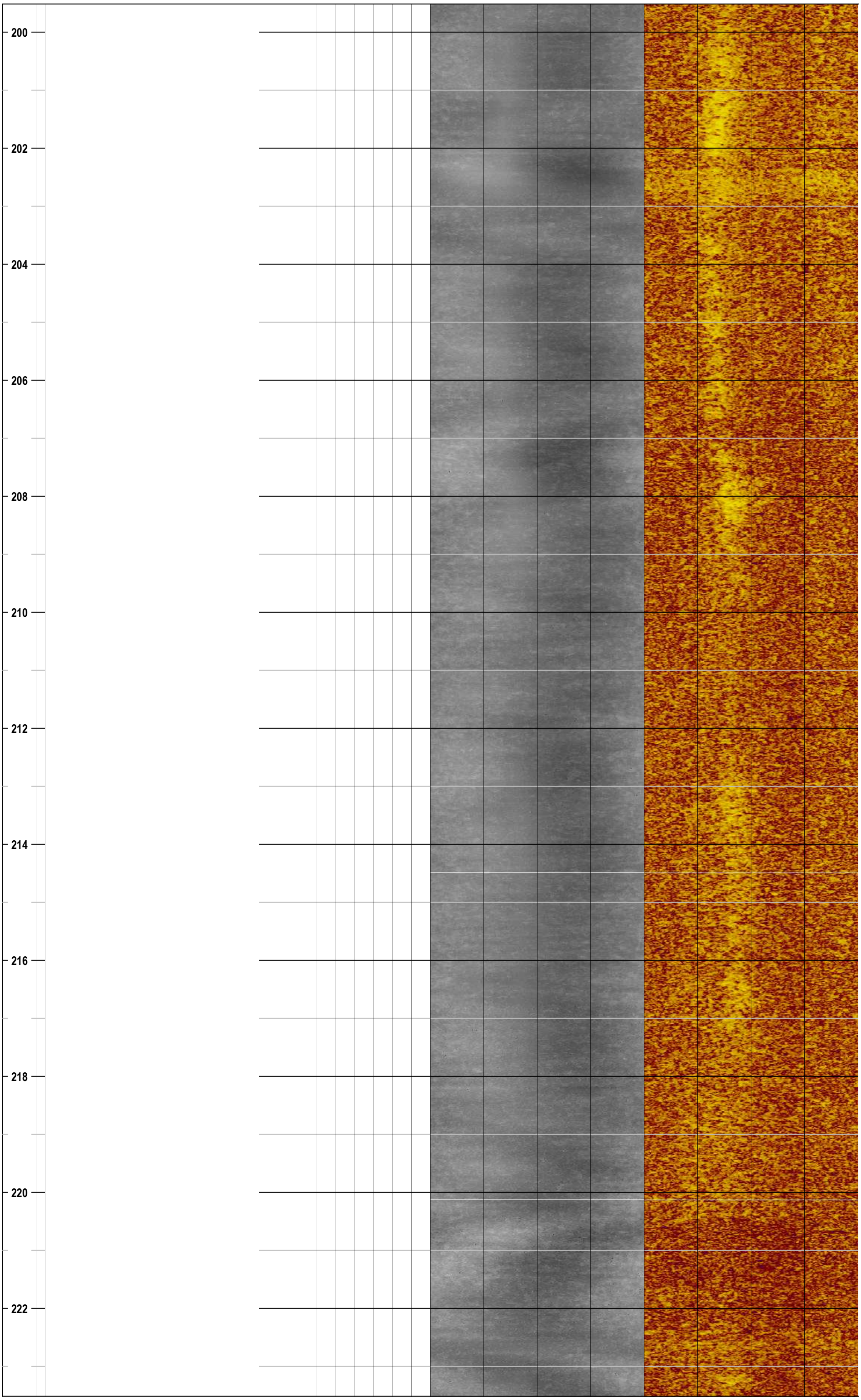
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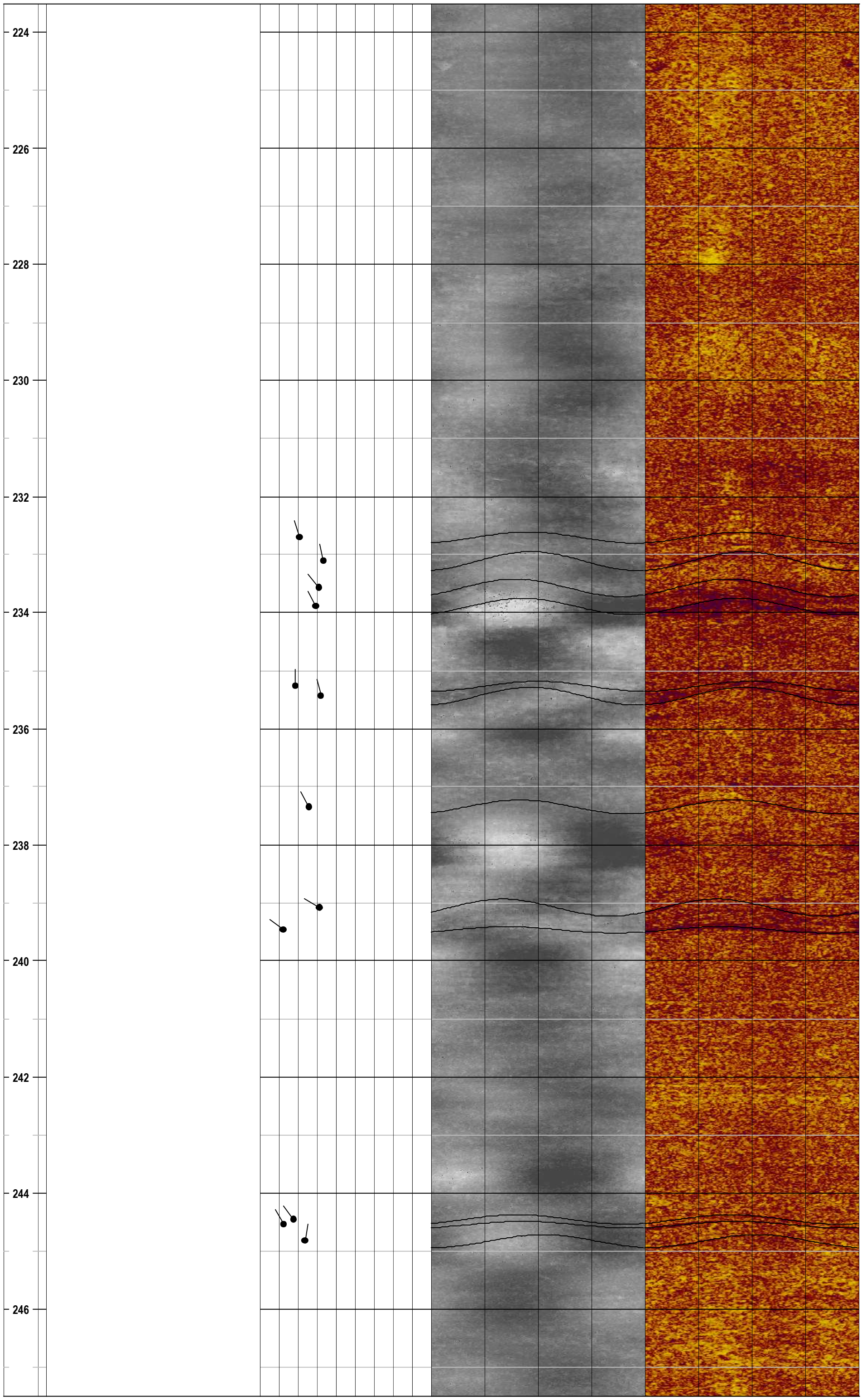
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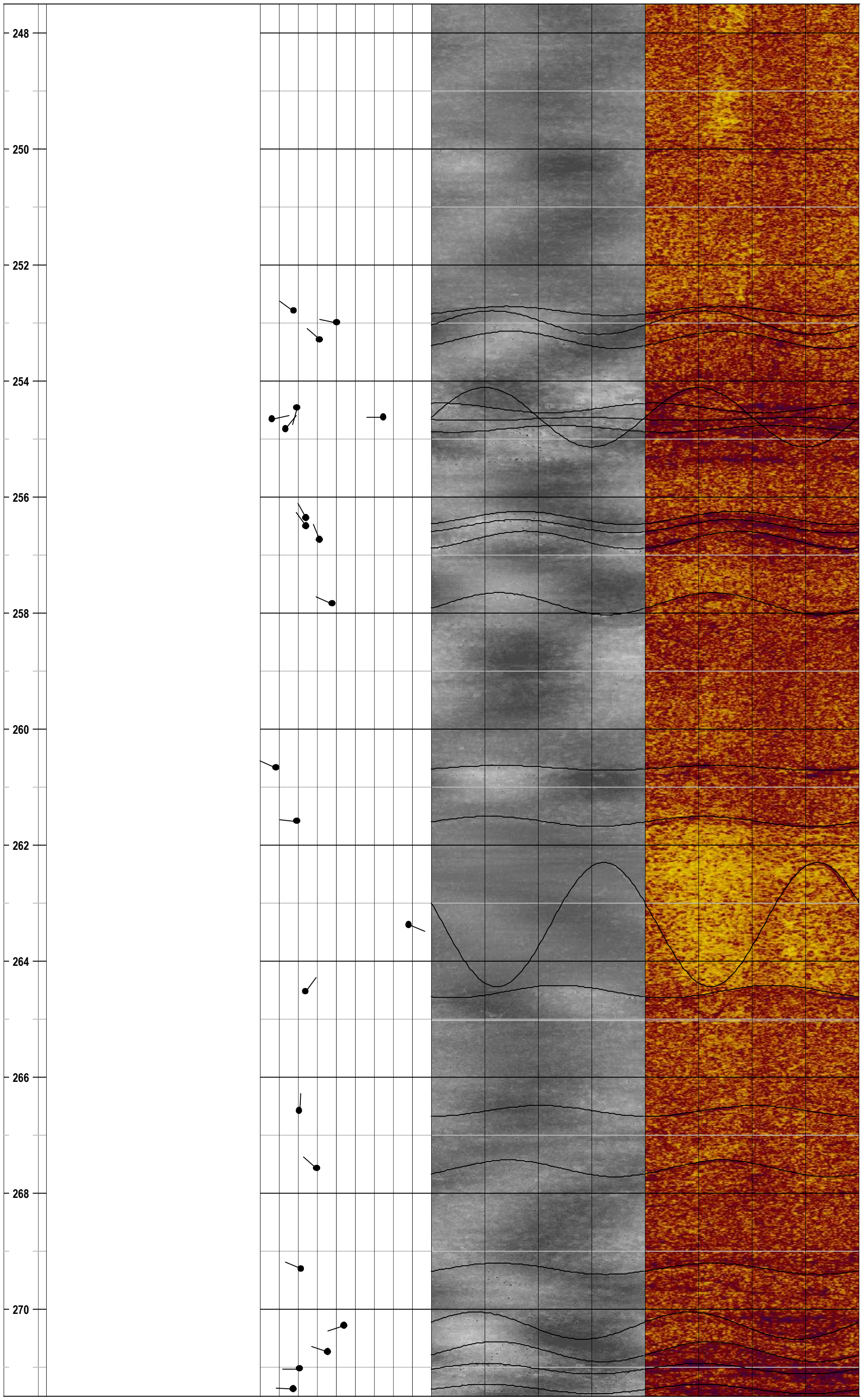
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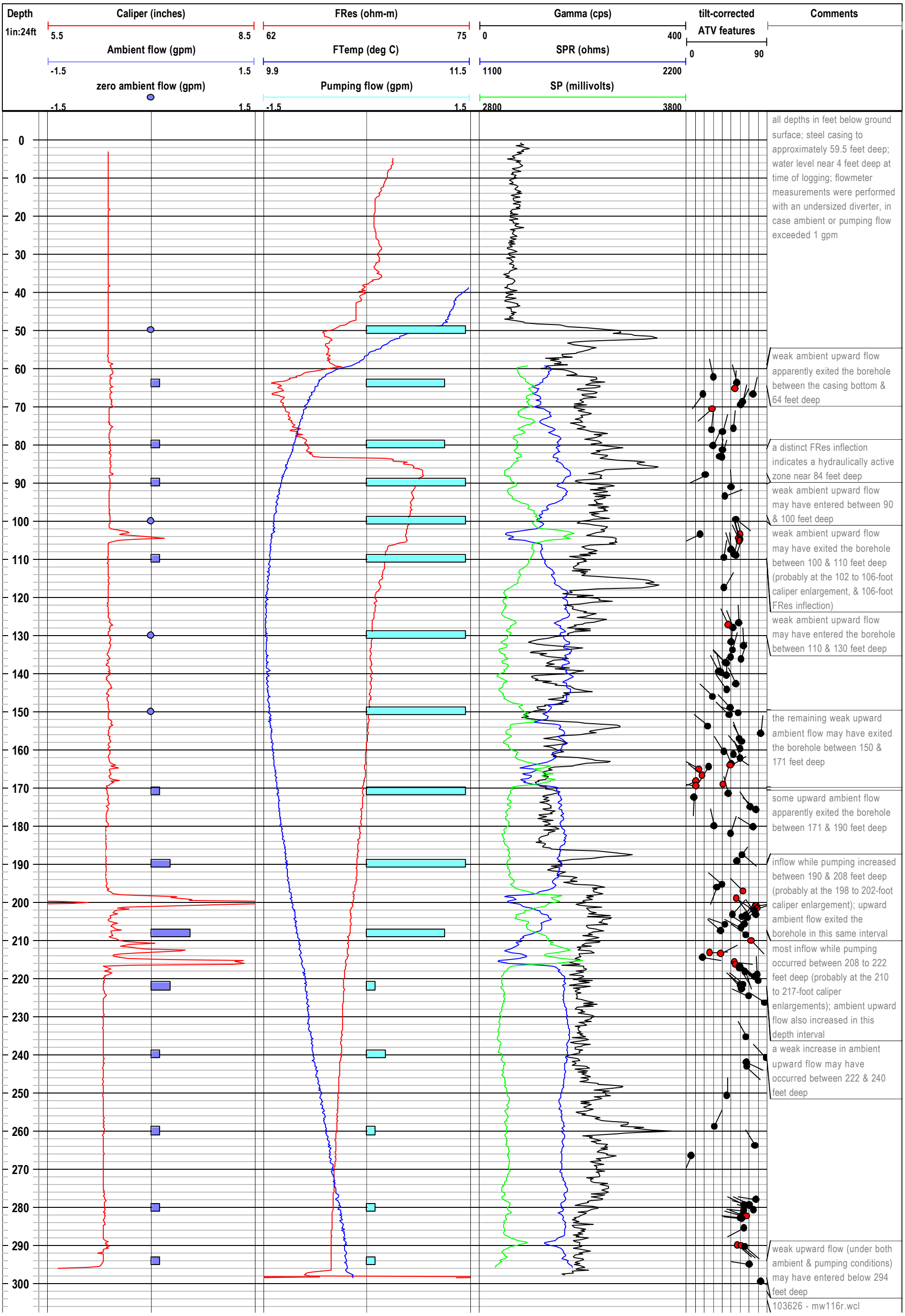
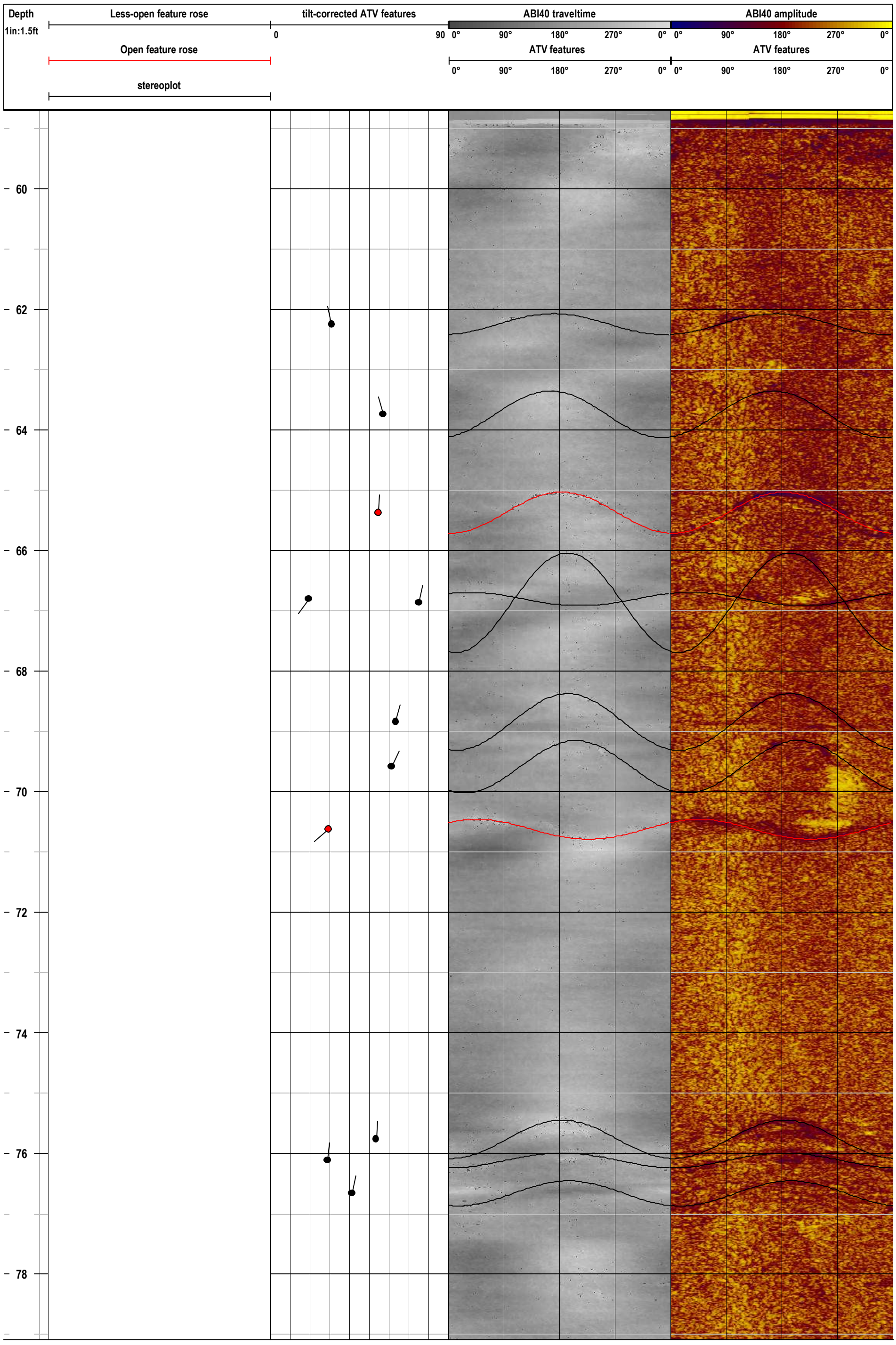
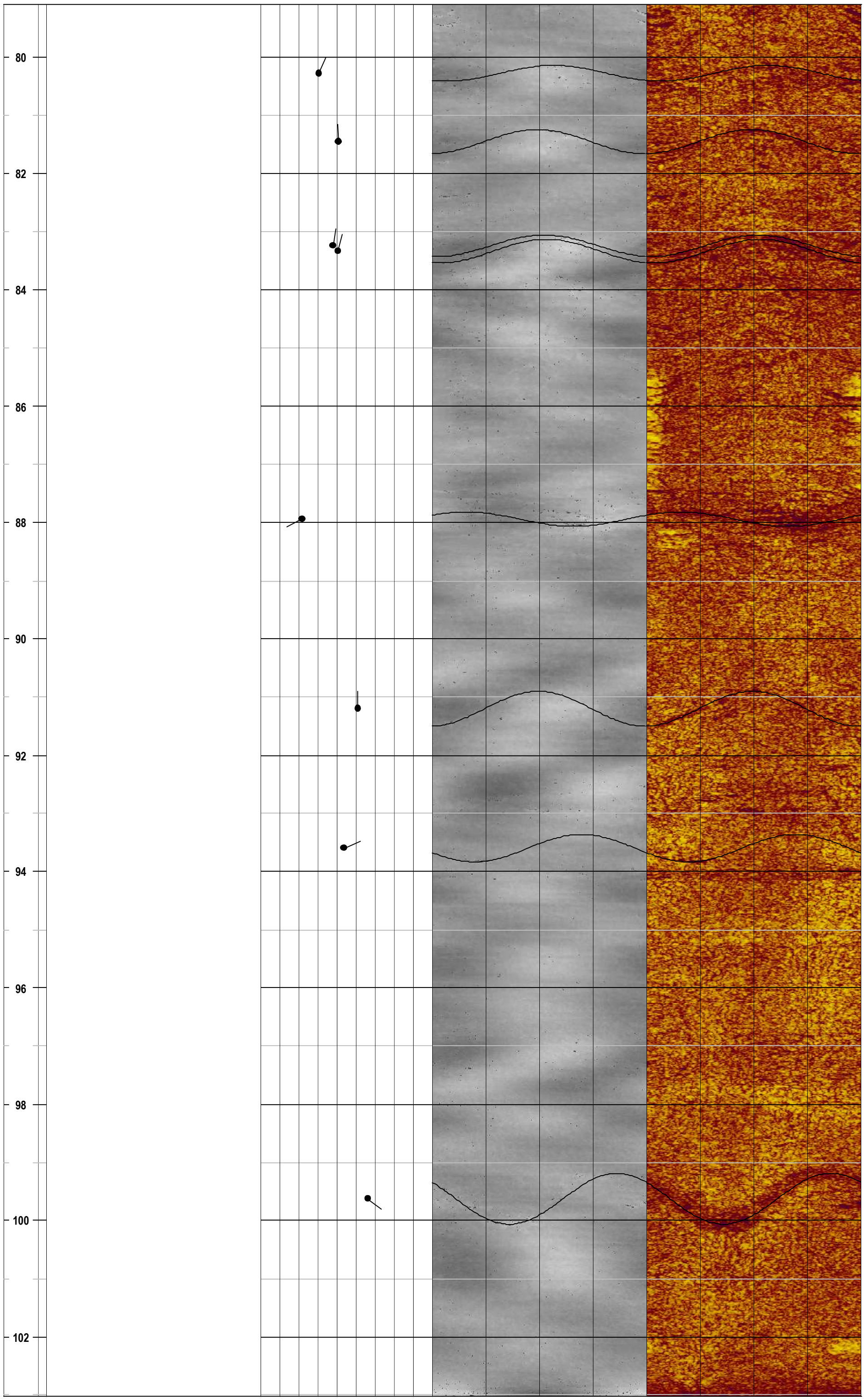
Project - Well: MACTEC/Milford, NH - MW-116R conventional logs



Project - Well: MACTEC/Milford, NH - MW-116R acoustic televiewer log

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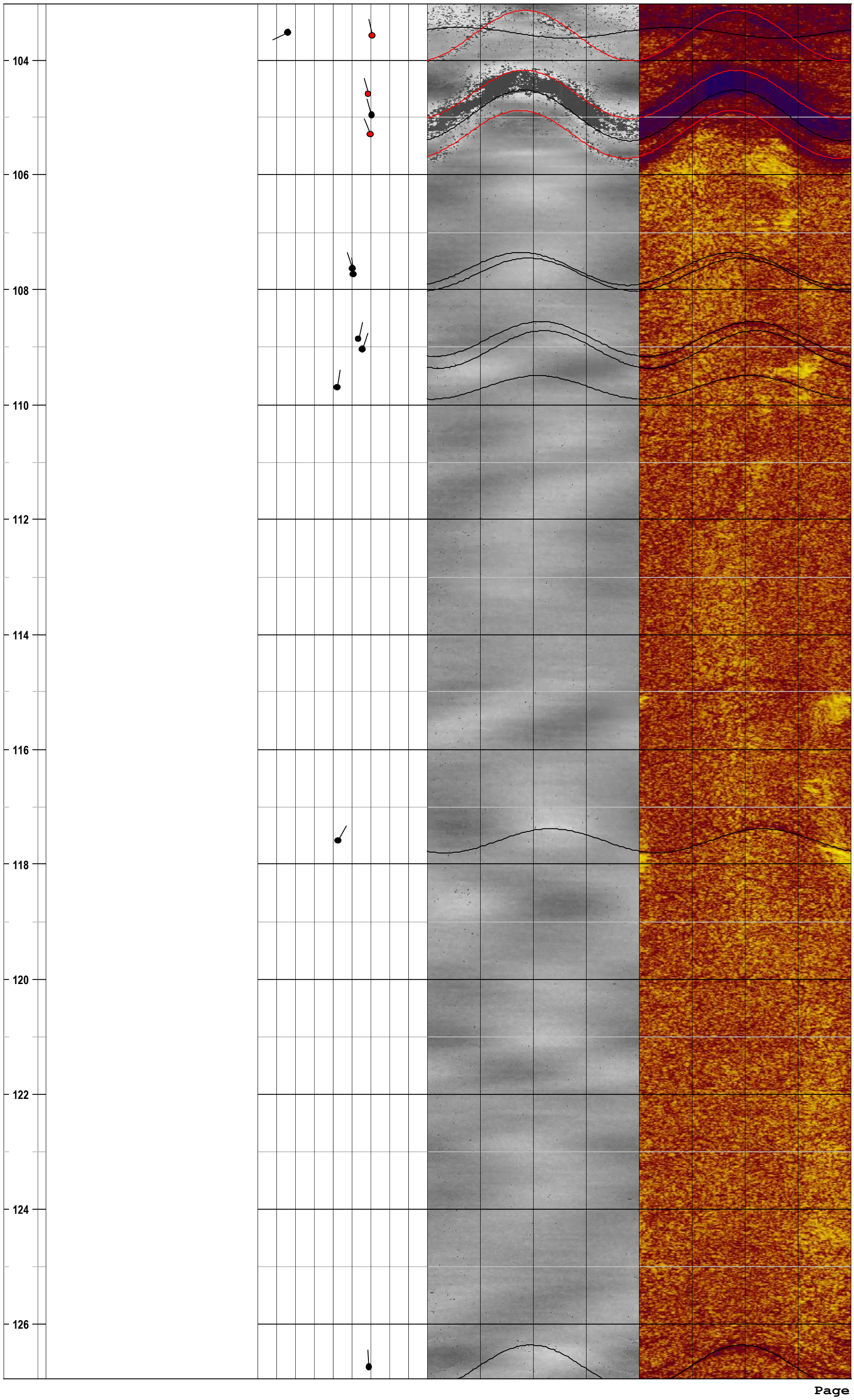
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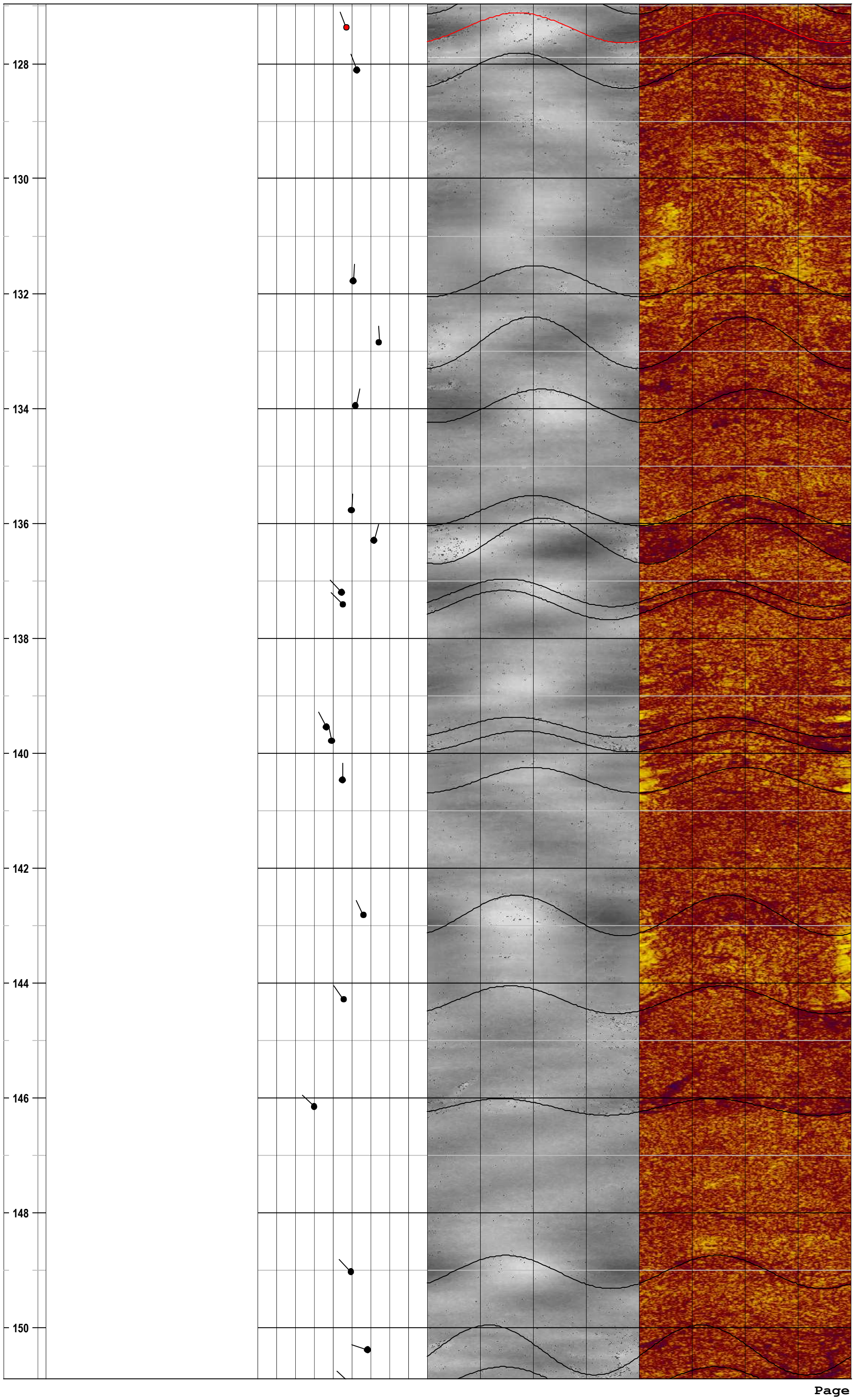
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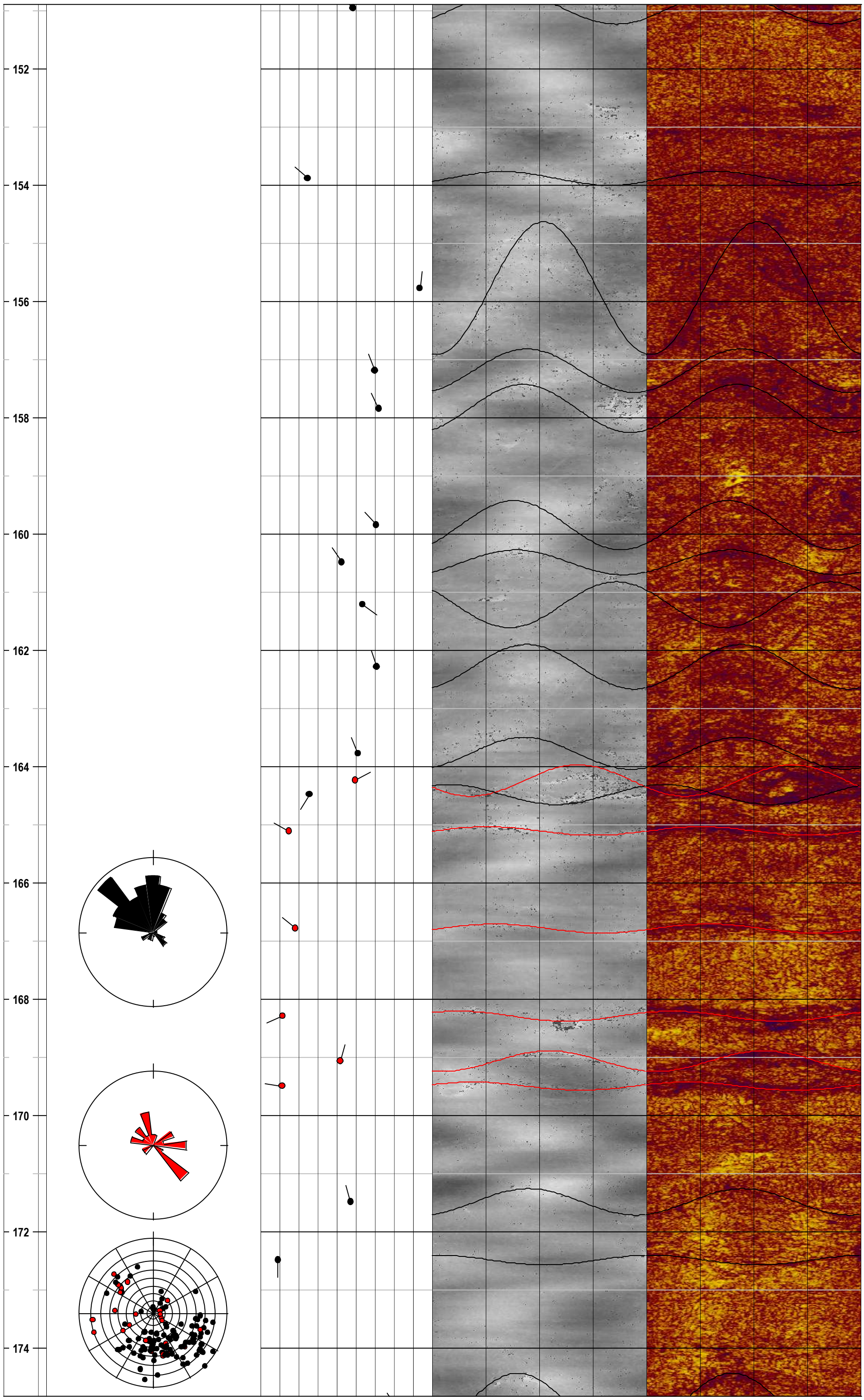
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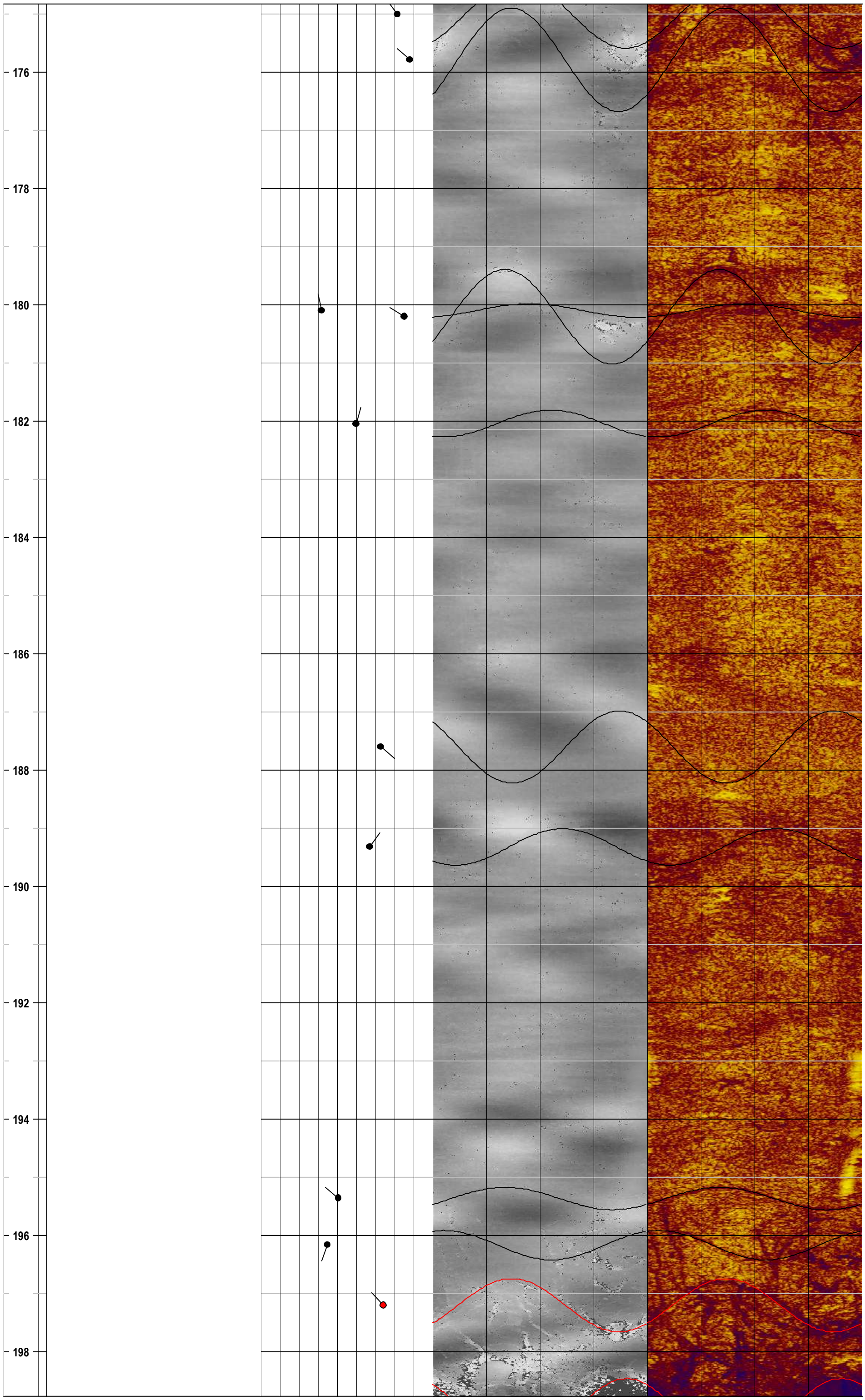
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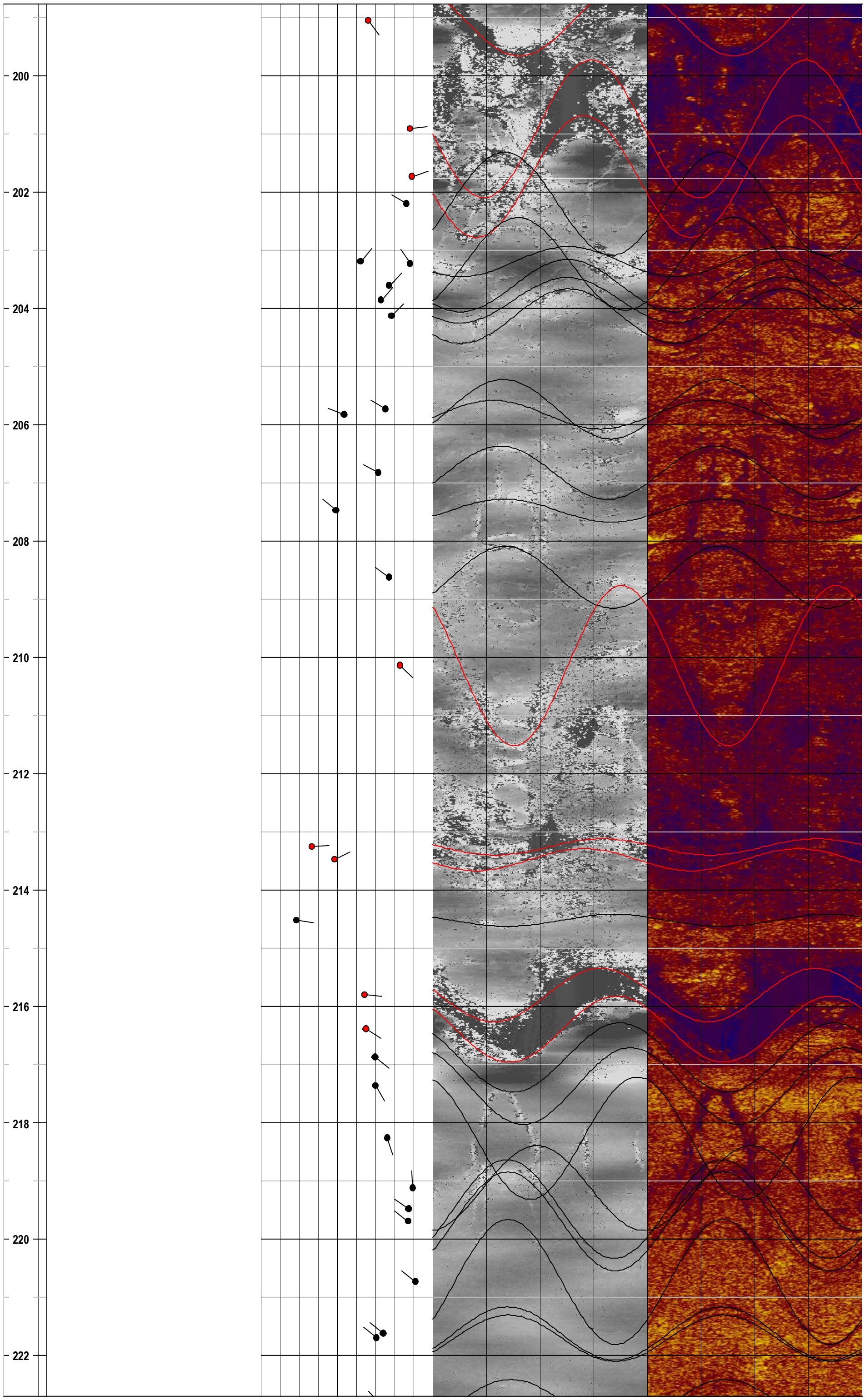
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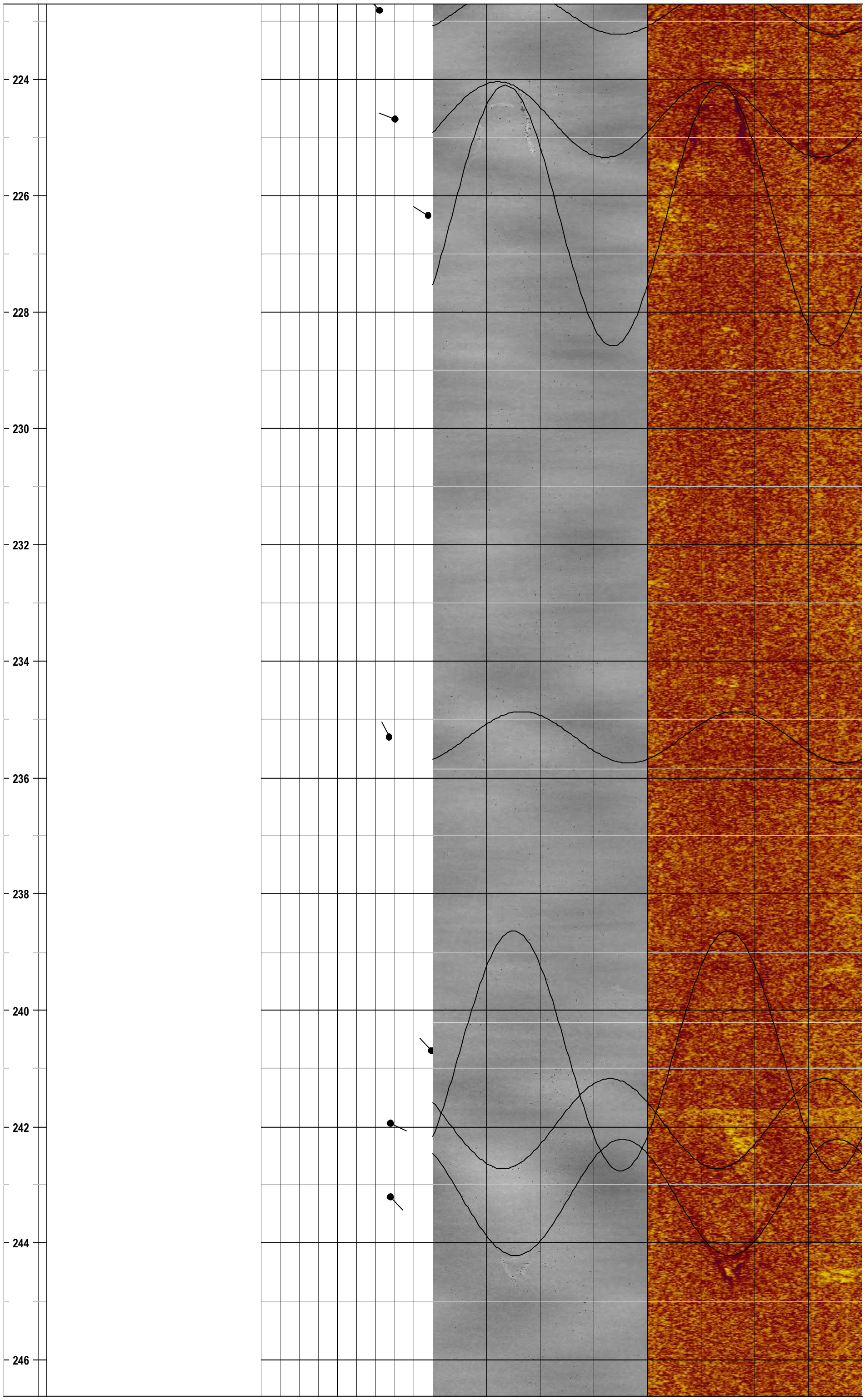
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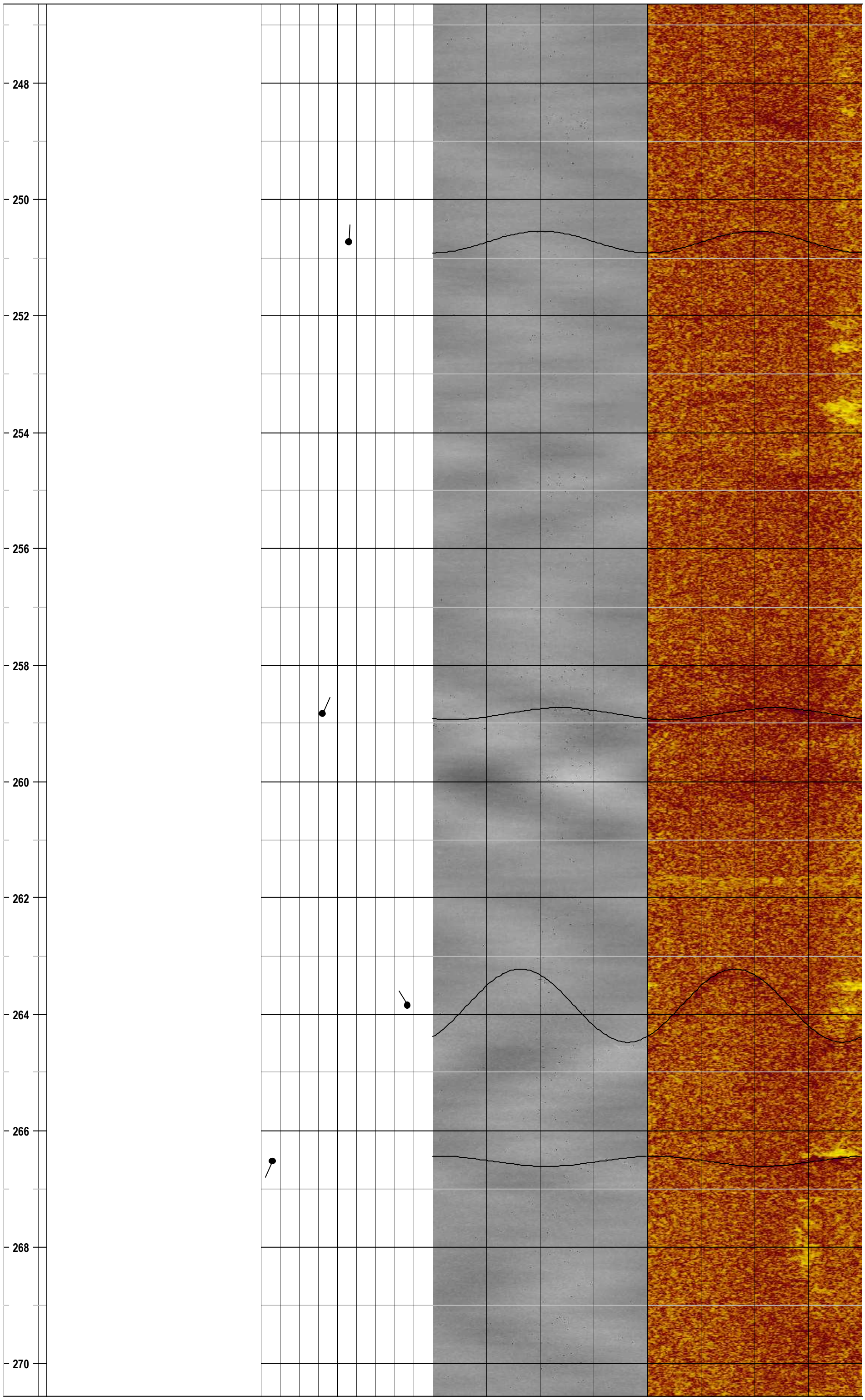
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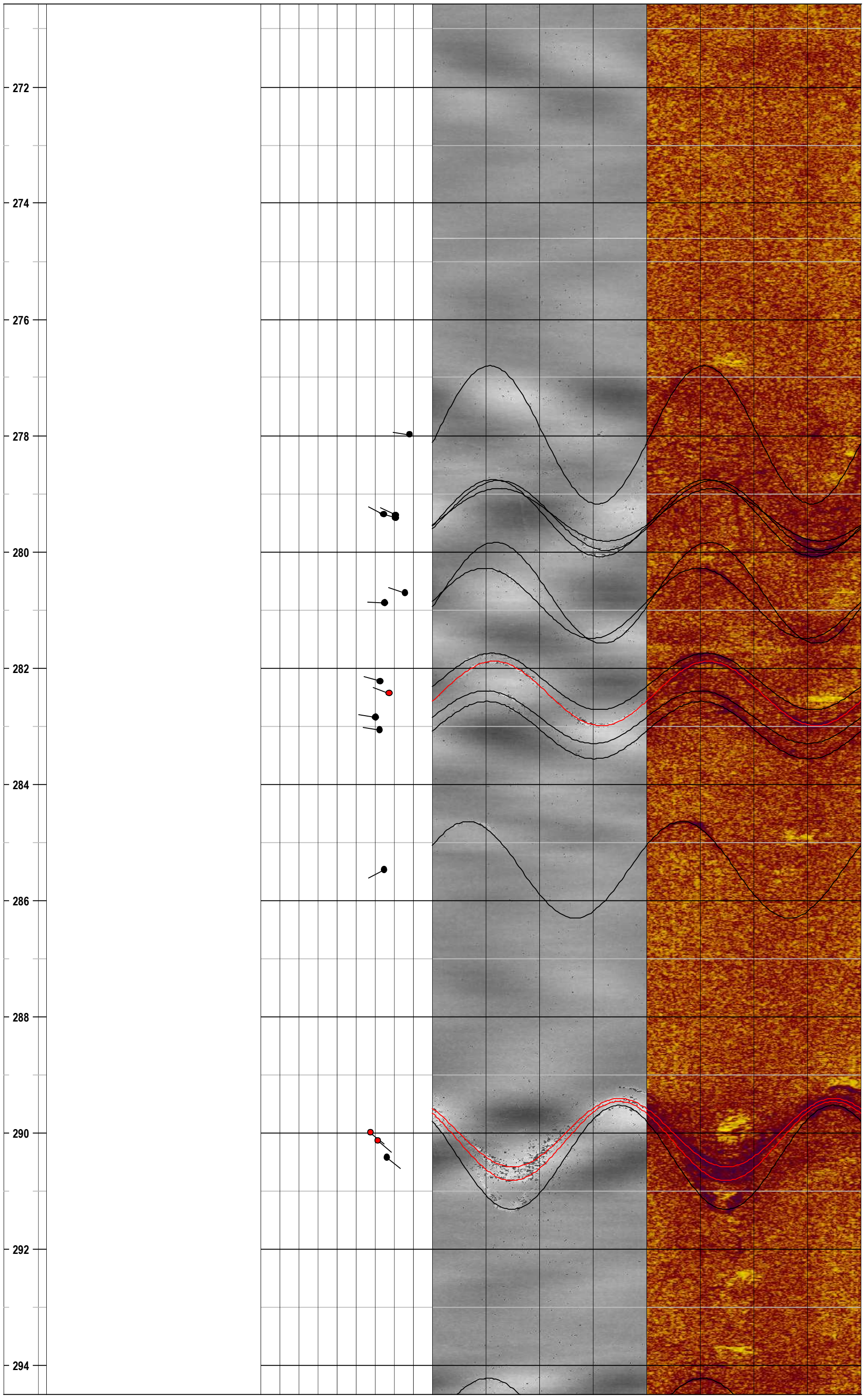
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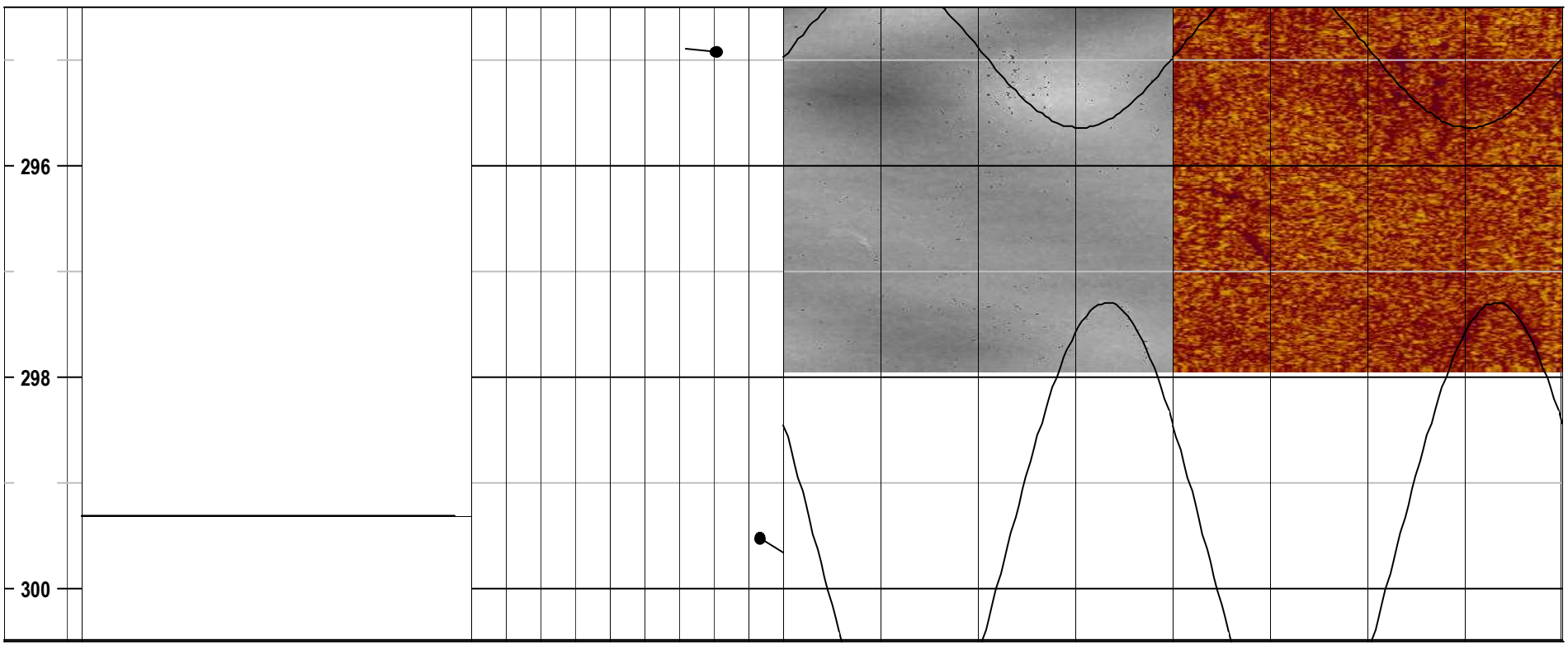
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Appendix B

Planar-feature Orientations Measured from Acoustic Televiewer Logs

Planar Feature Orientations Interpreted from the MW-31R Acoustic Televiewer Log
Savage Well Site
Milford, NH
Prepared for MACTEC
103826 - mw31ri.xls

depth (feet)	down-dip compass azimuth (degrees)	dip angle (degrees)	fracture category (open = 105 less-open = 100)
60.16	125.3	80.1	100
63.84	119.6	84.4	100
65.37	129.3	77.3	100
68.19	128.3	79.8	100
70.93	111.2	84.0	100
77.17	257.7	4.0	100
86.45	298.7	8.3	100
100.44	243.0	6.6	100
100.67	249.2	12.2	100
122.48	262.3	6.1	100
132.44	71.9	87.0	100
133.66	254.6	76.0	105
137.63	258.0	84.6	100
138.95	71.3	85.7	100
139.49	268.5	76.1	100
146.79	115.3	51.3	100
149.71	96.2	42.6	105
151.40	299.8	24.0	100
153.21	96.5	72.1	100
154.73	171.0	39.0	100
162.78	322.4	45.0	100
163.72	346.6	35.1	100
164.45	1.1	29.0	100
164.61	353.0	31.3	100
168.62	352.5	45.7	100
168.97	355.0	53.1	100
170.33	274.4	3.9	100
171.60	121.4	67.5	100
177.41	304.9	7.0	100
232.71	342.8	20.9	100
233.11	347.1	33.4	100
233.57	321.1	31.2	100
233.89	332.7	29.6	100
235.26	359.2	18.8	100
235.44	346.8	32.3	100
237.34	328.9	25.9	100
239.08	300.1	31.4	100
239.47	306.0	12.5	100
244.46	323.6	17.9	100
244.55	332.4	12.6	100
244.83	8.6	23.9	100
252.80	303.9	17.9	100
252.99	281.1	40.4	100
253.29	311.8	31.6	100
254.46	193.7	19.5	100

Note that down-dip compass azimuth is perpendicular to the strike direction.

Interpreted down-dip compass azimuths are with respect to magnetic north.

Calculated dip angles and azimuths were adjusted for borehole deviation from vertical.

Planar Feature Orientations Interpreted from the MW-31R Acoustic Televiewer Log
Savage Well Site
Milford, NH
Prepared for MACTEC
103626 - mw31ri.xls

depth (feet)	down-dip compass azimuth (degrees)	dip angle (degrees)	fracture category (open = 105 less-open = 100)
254.62	269.8	64.9	100
254.66	79.2	6.5	100
254.83	37.6	13.6	100
256.36	330.3	24.4	100
256.50	325.5	24.3	100
256.74	338.4	31.5	100
257.84	293.5	38.1	100
260.67	292.8	8.8	100
261.59	274.5	19.6	100
263.37	110.5	78.5	100
264.52	36.3	24.2	100
266.58	5.7	20.8	100
267.57	309.8	30.0	100
269.30	291.9	21.7	100
270.28	253.7	44.2	100
270.73	288.0	35.7	100
271.03	270.0	20.9	100
271.37	271.8	17.7	100

Planar Feature Orientations Interpreted from the MW-116R Acoustic Televiewer Log
Savage Well Site
Milford, NH
Prepared for MACTEC
103626 - mw116ri.xls

depth (feet)	down-dip compass azimuth (degrees)	dip angle (degrees)	fracture category (open = 105 less-open = 100)
62.24	348.1	31.1	100
63.74	346.3	57.0	100
65.37	3.0	54.8	105
66.80	216.4	19.6	100
66.86	12.5	75.1	100
68.84	13.0	63.5	100
69.58	25.4	61.4	100
70.62	230.1	29.5	105
75.76	4.7	53.6	100
76.11	5.8	29.0	100
76.86	14.4	41.5	100
80.27	23.1	30.5	100
81.45	357.9	40.9	100
83.24	8.7	38.2	100
83.33	12.4	40.8	100
87.94	242.8	22.1	100
91.20	358.3	51.1	100
93.59	67.7	43.8	100
99.62	127.0	56.4	100
103.52	244.3	16.3	100
103.58	346.9	61.0	105
104.60	345.8	58.9	105
104.96	344.4	60.6	100
105.30	338.2	59.9	105
107.63	341.4	50.8	100
107.73	353.4	51.0	100
108.86	12.3	53.7	100
109.04	18.2	55.7	100
109.70	8.1	42.5	100
117.59	29.2	42.9	100
126.75	357.2	59.3	100
127.38	337.3	47.3	105
128.12	339.0	52.7	100
131.79	2.9	51.0	100
132.85	358.8	64.6	100
133.95	13.9	52.2	100
135.78	2.4	50.0	100
136.31	16.7	61.9	100
137.21	318.0	44.6	100
137.42	314.0	45.6	100
139.55	333.5	36.8	100
139.79	347.6	39.7	100
140.47	0.3	45.3	100
142.82	334.0	56.4	100
144.30	325.8	45.9	100

Note that down-dip compass azimuth is perpendicular to the strike direction.

Interpreted down-dip compass azimuths are with respect to magnetic north.

Calculated dip angles and azimuths were adjusted for borehole deviation from vertical.

Planar Feature Orientations Interpreted from the MW-116R Acoustic Televiewer Log
Savage Well Site
Milford, NH
Prepared for MACTEC
103626 - mw116ri.xls

depth (feet)	down-dip compass azimuth (degrees)	dip angle (degrees)	fracture category (open = 105 less-open = 100)
146.16	314.7	30.2	100
149.03	318.1	49.7	100
150.39	288.1	58.5	100
150.96	314.0	48.6	100
153.88	311.0	24.9	100
155.77	6.8	83.6	100
157.19	341.1	59.9	100
157.84	335.2	62.1	100
159.85	320.2	60.8	100
160.49	326.7	42.6	100
161.21	124.1	53.6	100
162.28	340.7	61.1	100
163.77	337.9	51.1	100
164.24	59.4	49.7	105
164.48	211.6	25.7	100
165.11	298.8	15.1	105
166.79	309.8	18.4	105
168.29	246.8	11.8	105
169.06	15.9	42.0	105
169.50	279.1	11.4	105
171.49	345.2	47.4	100
172.48	182.0	9.3	100
175.01	325.8	71.6	100
175.79	313.2	78.1	100
180.10	349.6	32.0	100
180.21	303.2	75.2	100
182.04	16.8	50.0	100
187.60	129.3	63.0	100
189.32	35.0	57.1	100
195.36	311.5	40.6	100
196.17	200.4	34.9	100
197.20	316.3	64.4	105
199.06	141.4	56.5	105
200.91	83.5	78.3	105
201.73	71.6	79.4	105
202.20	302.4	76.4	100
203.20	41.3	52.3	100
203.23	324.9	78.5	100
203.61	42.4	67.5	100
203.86	41.6	63.2	100
204.13	44.1	68.4	100
205.73	302.7	65.5	100
205.82	291.6	43.8	100
206.82	297.9	61.8	100
207.47	310.5	39.4	100

Planar Feature Orientations Interpreted from the MW-116R Acoustic Televiewer Log
Savage Well Site
Milford, NH
Prepared for MACTEC
103626 - mw116ri.xls

depth (feet)	down-dip compass azimuth (degrees)	dip angle (degrees)	fracture category (open = 105 less-open = 100)
208.62	305.6	67.3	100
210.14	134.8	73.1	105
213.26	86.8	26.9	105
213.47	62.5	39.0	105
214.52	97.8	18.8	100
215.80	94.0	54.6	105
216.38	121.9	55.3	105
216.87	129.7	60.1	100
217.36	148.9	60.4	100
218.26	161.2	66.4	100
219.12	355.5	79.6	100
219.48	306.8	77.5	100
219.69	308.3	77.4	100
220.73	308.4	81.1	100
221.62	309.2	64.2	100
221.70	311.9	60.8	100
222.81	316.0	62.5	100
224.68	292.8	70.3	100
226.34	302.6	87.8	100
235.30	331.7	67.4	100
240.70	315.9	89.6	100
241.94	114.1	87.9	100
243.21	136.0	68.2	100
250.72	2.4	46.3	100
258.83	24.2	32.4	100
263.85	329.5	76.9	100
266.53	202.4	6.2	100
277.98	279.3	78.4	100
279.36	298.0	84.8	100
279.37	296.3	71.1	100
279.42	286.3	70.8	100
280.7	288.9	75.9	100
280.88	273.0	65.1	100
282.23	286.8	63.0	100
282.43	289.3	67.7	105
282.84	277.6	80.5	100
283.07	278.0	62.6	100
285.47	243.5	65.0	100
289.99	128.9	57.8	105
290.14	129.0	61.6	105
290.42	129.6	66.4	100
294.93	278.5	70.9	100
299.54	119.0	83.6	100

GEOPHYSICAL LOG RESULTS OF SEVEN BEDROCK BOREHOLES AT THE SAVAGE WELL MUNICIPAL SUPERFUND SITE IN MILFORD, NEW HAMPSHIRE

Northeast Geophysical Services
Bangor, Maine
March 2010

GEOPHYSICAL LOG RESULTS OF SEVEN BEDROCK BOREHOLES AT THE SAVAGE WELL MUNICIPAL SUPERFUND SITE IN MILFORD, NEW HAMPSHIRE

Introduction

At the request of the Weston Solutions, Inc., seven bedrock boreholes located on the Savage Well Municipal Superfund site in Milford, New Hampshire were geophysically logged. The boreholes were logged on February 15-17 and March 1-2, 2010 by Rudy Rawcliffe of NGS, Inc. The purpose of the geophysical logging was to determine the location and orientation of water-bearing fractures in the boreholes. Caliper, temperature, fluid resistivity, natural gamma, acoustic televiewer (ATV), optical televiewer (OTV) and heat pulse flowmeter measurements were collected on boreholes BR-1, BR-2, BR-3 and BR-4.

In addition to these boreholes, acoustic televiewer and optical televiewer logs were collected in boreholes MW-2R, MW-16R and MW-30.

Based primarily on the geophysical results, ten- foot zone packer samples were collected at several locations in boreholes BR-1, BR-2, BR-3 and BR-4. The boreholes were sampled from March 8 to March 16, 2010 by Mike Scully or Rudy Rawcliffe of NGS, Inc. assisted by Andrew Fuller of Weston.

Summary of Results

The geophysical log results for the seven boreholes are attached to this report (Attachments A-G). The data for BR-1, BR-2, BR-3 and BR-4 are presented on composite geophysical log plots. The composite geophysical logs show the possible locations of potential fractures in each borehole. The flowmeter results and to a lesser extent, the temperature and fluid resistivity results may provide indications of which of these potential fractures are transmissive. Tadpole plots showing the location and orientation of interpreted planar features (possible fractures) are also plotted on the composite log.

Relying primarily upon the flowmeter measurements and, to a lesser extent on the temperature, fluid resistivity and other logs, the most likely transmissive areas were selected in each borehole. The locations of these likely transmissive fractures are shown as dark black dashed circles on the caliper log of the composite log for each borehole. Other fractures that are considered to be less likely to be transmissive are shown as light gray dashed circles. It is possible that there are other transmissive fractures in the boreholes but these areas indicated on the logs were the most obvious based on the geophysics.

Also shown on the composite logs are the packer sample locations. Beside each sample location the water quality results for PCE (tetrachloroethane) and TCE (trichloroethylene) are presented.

The televiewer/caliper log plots for each borehole (including MW-2R, MW-16R and MW-30) are also attached. The interpreted results of the televiewer logs are summarized in tables for each borehole that provide the depth and calculated strike and dip of each identified feature in each borehole. A polar plot of the dip amount and dip direction of all the interpreted planar features for each borehole is also attached.

Figure 1 (on the following page) is a Rose plot of the strike and dip direction of all the interpreted planar features in the seven boreholes. This plot shows that the general strike direction in the seven boreholes is to the northeast (median 20º true) and the dip is mainly towards the northwest with a lesser number dipping southeast.

Figure 2 (page 3) is an upper hemisphere polar plot showing the dip amount and dip direction of all the interpreted planar features in the seven boreholes. This graph shows again that the planar features generally dip at a moderate angle (median 54º) towards the northwest or towards the southeast. Most of the fractures interpreted to be likely or possibly transmissive also dip towards the northwest or southeast but at a slightly steeper angle (median 66º) than the overall planar features.

Methods and Instrumentation

The boreholes were logged with a Mt Sopris Matrix digital logger. Following is a brief description of each parameter that was measured and how that information is used to locate possible bedrock fractures or to distinguish lithology.

Temperature (in degrees Centigrade [ºC]) is measured with the probe going down each hole. Generally, temperature rises smoothly with depth at a rate of about 0.5º to 1.0º C per 100 feet due to the local geothermal gradient. Areas where water may be entering or exiting the borehole are sometimes revealed on the temperature log as abrupt temperature changes or sometimes as temperature gradient changes. Other factors that can affect the temperature log besides transmissive fractures include variations in the thermal resistivity of the rock with depth along the borehole, surface climatic changes, thermal effects of drilling activity, and localized heat sources such as radionuclides in the rock or cement setting outside the casing.

Fluid resistivity measures the resistivity (in ohmmeters) of the water in the borehole. Fluid resistivity can be useful in identifying transmissive fractures because water entering the borehole through fractures sometimes has a different resistivity than the water that is already in the borehole. Unusually low fluid resistivity may indicate the presence of high ion content water.

Fluid resistivity is essentially the reciprocal of fluid conductivity in that a low resistivity value equals a high conductivity value. Because water parameters are commonly reported in conductivity units the fluid resistivity values have been converted to units of conductivity (in µS/cm) for presentation on the composite log.

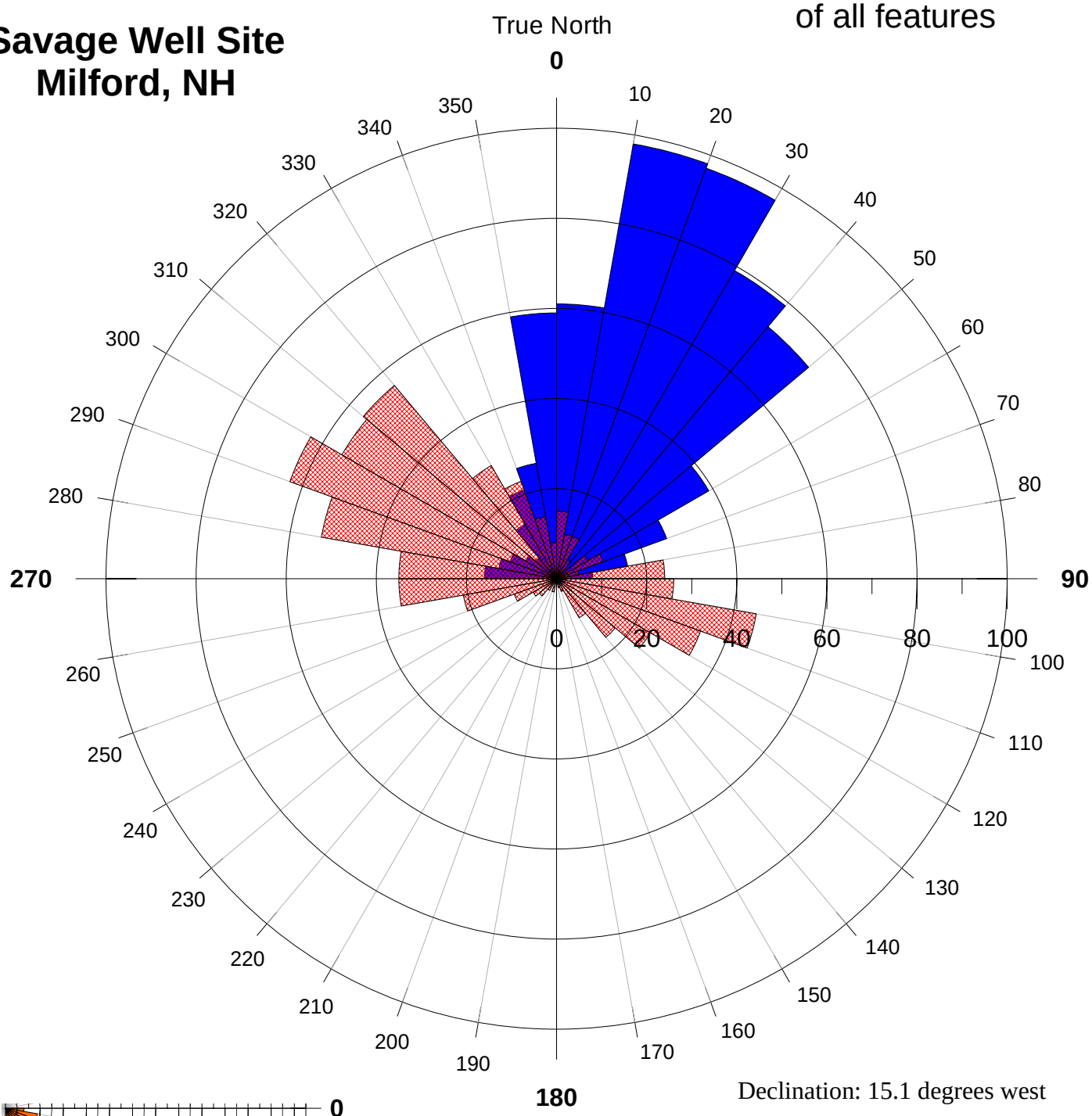
Caliper measures the borehole diameter. Fractures are often revealed on the caliper log as abrupt widenings of the borehole.

Natural gamma log measures the gamma radiation in counts per second (cps) that is being emitted from the materials located next to the tool. Natural gamma is generally used as a way to distinguish between different lithologies or soil types. This is because different materials often have different percentages of radioactive elements (mainly potassium-40 and to a lesser extent uranium-238 and thorium-232). For example, clay soil usually has a higher count rate than sand because of its higher percentage potassium. Similarly, sometimes granite can be distinguished from sandstone or limestone because granite has a higher content of feldspar or clay minerals. Bedrock fractures or fracture zones are sometimes distinguished by the gamma log because fractures often contain weathered clay minerals which can have higher amounts of potassium or uranium than the unfractured rock.

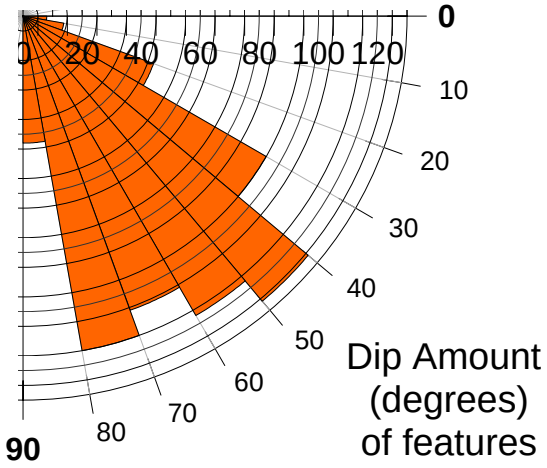
The optical televiewer (OTV) log provides a digital optical image of the borehole walls. The OTV can identify planar features such as fractures, bedding surfaces, and joints and determine the strike, dip direction and dip angle of these features.

FIGURE 1
Strike and Dip Direction of all features

Savage Well Site
Milford, NH



Declination: 15.1 degrees west



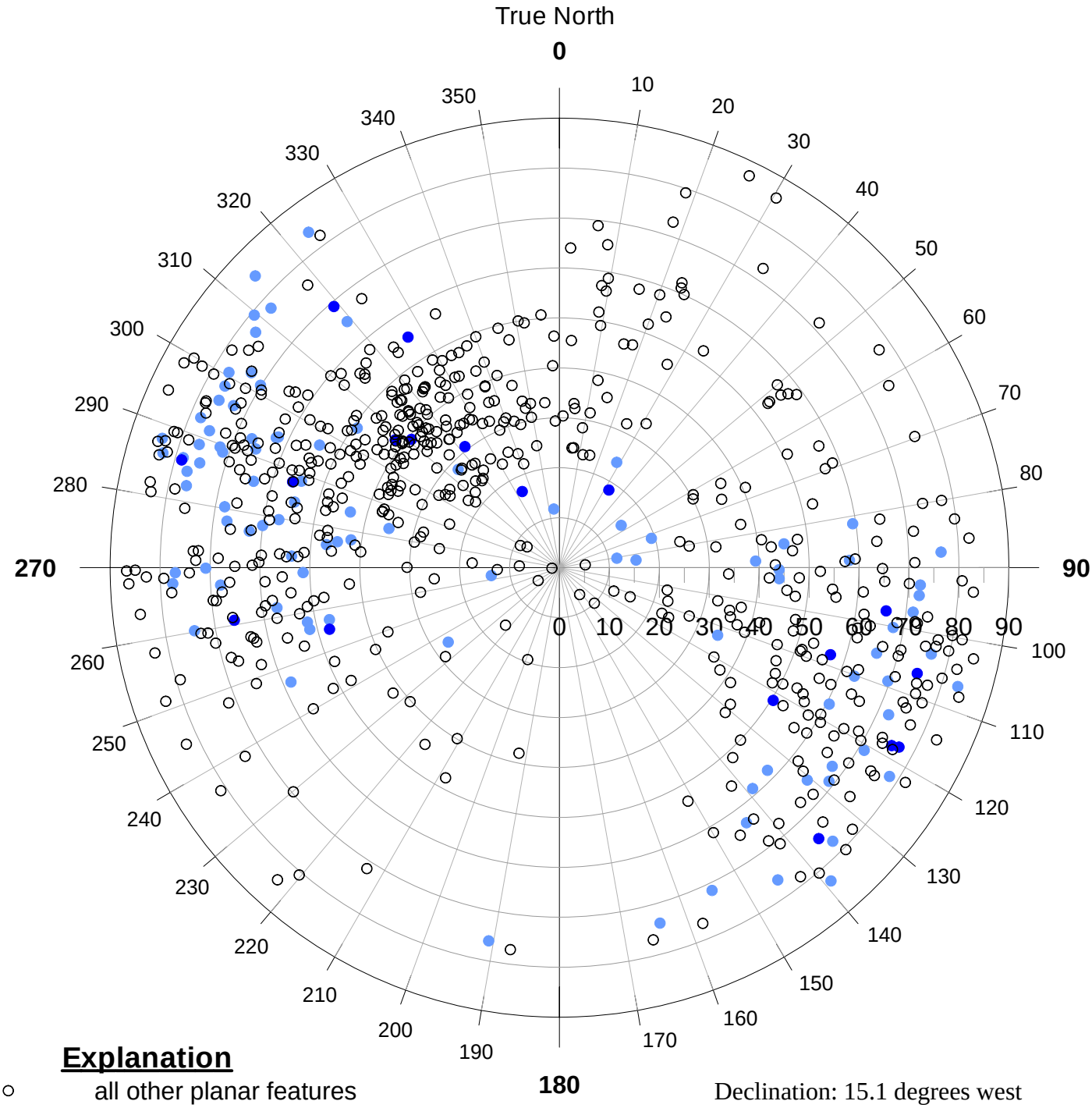
Explanation

- Dip direction of feature
- Strike of feature
- Dip Amount (Tilt)

Based on 671 measurements in 7 boreholes: BR-1, BR-2, BR-3 BR-4, MW-2R, MW-16R and MW-30

Savage Well Site
Milford, NH

FIGURE 2
Dip Amount and Dip Azimuth of planar features (upper hemisphere plot)



Explanation

- ○ all other planar features
- ● Likely water bearing
- ● Possibly water bearing

Declination: 15.1 degrees west

Based on 671 measurements in 7 boreholes: BR-1, BR-2, BR-3 BR-4, MW-2R, MW-16R and MW-30

The acoustical televiewer (ATV) log provides an acoustical image of the borehole walls. The ATV works by scanning the borehole wall with an acoustic beam that is produced by a rapidly rotating piezoelectric source. Similar to the optical televiewer, planar features such as fractures, bedding surfaces and joints can be identified with the ATV tool and the strike, dip direction and dip angle of these features can often be determined.

The optical (OTV) and acoustical (ATV) televiewer logs are somewhat duplicative in that they both can provide similar information. However, there are advantages and disadvantages to both tools. The ATV requires the borehole to be water filled and will not provide information above the water level. The OTV can work in air or water but is not effective in cloudy, turbid water whereas the ATV will work fine in cloudy water. The ATV can be better at discerning voids, cracks and fractures whereas the OTV can be better at discerning lithology. Also, sometimes water-bearing fractures are rust stained, which can be seen by the OTV.

The temperature, caliper, SPR, SP, fluid conductivity, ATV and OTV logs were examined and possible bedrock fractures were identified. This information was used to select measurement locations for the flowmeter instrument. Generally, flowmeter measurements were taken in the zone above and below locations where potential fractures might exist in the boreholes.

Flowmeter Measurements

Flowmeter measurements of the vertical water flow were made in the boreholes using a Mount Sopris Heat Pulse Flowmeter. This instrument is capable of measuring flow direction in a borehole (up or down) and has a calibrated measurement range of 1.0 to 0.03 gallons per minute (gpm).

Vertical flow in a borehole is caused when two or more transmissive fractures in the borehole are at hydraulic disequilibrium with one another. When this occurs there is a hydraulic gradient developed and water will flow toward the fracture with the lower hydraulic head. When no vertical flow is measured it can mean that there are less than two transmissive fractures in the borehole or that all the fractures in the borehole are at equilibrium with each other. Flowmeter measurements were made in each borehole under ambient conditions and then the measurements were repeated while stressing the boreholes by pumping with a small pump.

Geophysical Log Results

The geophysical data for boreholes BR-1, BR-2 BR-3 and BR-4 are presented in the attachments on a composite geophysical log. The composite log is an 11 X 17-inch summary log that contains the caliper, flowmeter, temperature, fluid resistivity and gamma data. Structural data interpreted from the televiewer logs are presented as a tadpole plot on the far right column. Fractures interpreted to be likely or possibly to be transmissive are indicated on the structure and the caliper plots.

The composite log shows possible bedrock fracture locations in each borehole. One or a combination of anomalous geophysical responses may indicate possible fractures. These include abrupt widenings in the caliper log, planar images on the ATV and OTV logs and deflections or gradient changes in the temperature log and the fluid resistivity log. The flowmeter results are also shown on this log. All of the depths on the log are referenced from the top of the casing.

Also shown on the composite logs are the packer sample locations. Beside each sample location the water quality results for PCE (tetrachloroethane) and TCE (trichloroethylene) are presented.

Televiewer & caliper log plots for each of the seven boreholes is attached. The televiewer & caliper log plot contains the OTV and ATV televiewer images along with the caliper log and the structural projection log. The ATV and OTV logs provide the strike and dip of planar features that intersect the boreholes. These planar features may be fractures, joints, or may represent cleavage or bedding planes. The results have been color-coded on the logs to provide an interpretative range of the likelihood that the associated feature signifies a transmissive fracture as follows:

- Dark blue symbol (Category 107) - multiple distinct borehole geophysical logging responses indicating borehole enlargement (aperture width) determined from caliper and televiewer measurements and evident change in the borehole fluid characteristic (temperature, oxidation, resistivity or quantified vertical flow) that provides the strongest data that the indicated bedrock feature represents a likely transmissive water-bearing fracture. In order of relative importance the flowmeter data were given the most weight in assessing the presence of transmissive fractures. Other criteria such as evidence of oxidation in the OTV log, local temperature inflections and changes in fluid resistivity were given less weight than the flowmeter.
- Light blue symbol (Category 108) - less amount of corroborating geophysical data to support that the indicated feature will transmit groundwater compared to the dark blue symbol. However, the ATV and/or OTV log shows a fairly distinct acoustic signal or wider aperture width or perhaps there is a temperature or a resistivity change that, possibly under a higher stress condition (e.g. pumping rate), vertical flow could be induced in the borehole. Less degree of confidence that the feature represents a transmissive feature.
- Black symbol (Category 100) - bedrock feature not interpreted to transmit water; more likely to represent planes of foliation, bedding planes, healed or filled fractures, or mechanical breaks in the rock matrix due to drilling advancement.

Also included in the attachments is a rose plot showing the strike and dip direction of all the interpreted planar features in each borehole and also polar plot of the same data showing the dip amount and dip direction of all the interpreted planar features in the borehole. The interpreted structural data is also presented in a table for each borehole.

Following is a summary of each borehole:

BR-1:

Total Depth (TOC):	403.5 feet
Casing Depth:	107 feet
Water Level:	7.88 feet

Borehole BR-1 has a median diameter of 6.23 inches, a median temperature of 11.31º C, a median fluid resistivity of 139 ohmmeters (which is equivalent to a temperature corrected conductivity of 102 µS/cm) and a median gamma count rate of 236 cps.

The flowmeter measurements under ambient conditions show no measurable flow in BR-1. Flowmeter measurements taken under pumping conditions in BR-1 indicate that most of the water enters the borehole at about 187 to 188 feet. Within this zone there appear to be at least four fractures with different orientations that may be transmissive. Of these the fracture thought likely to be most transmissive located at 187.3 feet. This fracture (Feature #44) strikes 57° and

dips 55° to the northwest.

The flowmeter measurements also indicate that some water enters the borehole between 260 and 284 feet. This is within a larger area of the borehole from 235 to 280 feet that the caliper shows to be relatively rough. Within this zone there are numerous relatively wide aperture fractures that may be transmissive. These can be seen on the televiewer logs where the optical shows some fractures that are rust stained (indicating possible groundwater flow).

The fluid temperature and conductivity logs for BR-1 show an abrupt change at about 340 feet with an increase in fluid conductivity and temperature. Within this area there are two distinct fractures that may be transmissive. One fracture (Feature #140) strikes 18° and dips 56° to the northwest. The second fracture (Feature #141) strikes 351° and dips 66° to the west.

Based primarily on the televiewer, fluid conductivity and temperature logs the strike and dip these possible transmissive fractures along with the other planar features for borehole BR-1 are shown in the attachments on the composite log, Figure A-1 and tabulated in Table A-1.

BR-2:

Total Depth (TOC):	404.4 feet
Casing Depth:	145 feet
Water Level:	13.47 feet

Borehole BR-2 has a median diameter of 6.29 inches, a median temperature of 11.57º C, a median fluid resistivity of 123 ohmmeters (which is equivalent to a temperature corrected conductivity of 114 µS/cm) and a median gamma count rate of 181 cps.

The flowmeter measurements under ambient conditions show no measurable flow in BR-2. Flowmeter measurements taken while pumping the borehole indicate a transmissive fracture located at 392.7 feet. This fracture (Feature #121) strikes 16° and dips steeply (79°) to the northwest.

The fluid conductivity log for BR-2 shows an increase starting at about 340 feet. The fracture considered most likely to be transmissive in this area is at 342.2 feet (Feature #95) that strikes 52° and dips 52° to the northwest.

The caliper shows borehole walls of BR-2 are quite rough in places, especially from 260 to 294 feet and the upper part of the borehole from 165 to 225 feet. Within these rough zones the flowmeter measurements and subsequent packer measurements were compromised because of likely bypass around the diverters or packers. Based on the flowmeter and fluid conductivity logs there are transmissive fractures in these zones. However, it is difficult to discern exactly which fractures are transmissive. The fractures selected as most likely to be transmissive were those that had the widest apertures on the televiewer logs and apparent rust staining on the optical logs along with changes in flow and changes in temperature or fluid conductivity.

Based primarily on the televiewer, fluid conductivity and temperature logs the strike and dip these possible transmissive fractures along with the other planar features for borehole BR-2 are shown in the attachments on the composite log, Figure B-1 and tabulated in Table B-1.

BR-3:

Total Depth (TOC):	405.4 feet
Casing Depth:	134 feet
Water Level:	14.03 feet

Borehole BR-3 has a median diameter of 6.24 inches, a median temperature of 11.11º C, a median fluid resistivity of 86 ohmmeters (which is equivalent to a temperature corrected conductivity of 167 µS/cm) and a median gamma count rate of 180 cps.

The flowmeter measurements under ambient conditions show no measurable flow in BR-3. Flowmeter measurements were then taken while pumping the borehole at about 0.5 gpm. At this pump rate water level in the borehole dropped by over sixteen feet in about an hour of pumping. This indicates that the fractures in BR-3 have low transmissivity. The flowmeter results indicate that most of the water (~0.10 gpm) enters the borehole through fractures located just below the casing between 134 and 145 feet. Within this zone there appear to be at least four or five fractures with different orientations that may be transmissive.

The flowmeter measurements indicate a small amount (0.02 gpm) of water may enter the borehole between 268 and 280 feet and even smaller amounts between 325 and 346 and 346 to 360 feet. With the exception of just below the casing the temperature and fluid conductivity logs did not show any clear deflections or gradient changes that might indicate transmissive fractures. The fractures selected as most likely to be transmissive in BR-3 were those that had the widest apertures on the televiewer logs and apparent rust staining on the optical logs. The strike and dip these possible transmissive fractures along with the other planar features for borehole BR-3 are shown in the attachments on the composite log, Figure C-1 and tabulated in Table C-1.

BR-4:

Total Depth (TOC):	424.9 feet
Casing Depth:	140 feet
Water Level:	6.99 feet

Borehole BR-4 has a median diameter of 6.23 inches, a median temperature of 10.60º C, a median fluid resistivity of 92 ohmmeters (which is equivalent to a temperature corrected conductivity of 157 µS/cm) and a median gamma count rate of 321 cps.

The flowmeter measurements under ambient conditions show no measurable flow in BR-4. Flowmeter measurements taken while pumping the borehole at about 0.4 gpm indicate two main transmissive zones in the borehole. Most of the water (0.27 gpm) enters the borehole through a fracture located at 176.9 feet. This fracture (Feature #29) strikes 32° and dips 50° to the southeast. A smaller amount of water (0.05 gpm) enters the borehole at about 282 feet. The most likely transmissive fractures at this depth is at 282.7 feet (Feature #75) that strikes 64° and dips 17° to the northwest. Another possible transmissive fracture in this area is at 281.2 feet (Feature #74) that strikes 302° and dips 18° to the northeast. The strike and dip for possible transmissive fractures along with the other planar features for borehole BR-4 are shown in the attachments on the composite log, Figure D-1 and tabulated in Table D-1.

MW-2R:

Total Depth (TOC):	165.2 feet
Casing Depth:	136 feet
Water Level:	8.13 feet

Only optical and acoustical televiewer logs were collected on borehole MW-2R. The borehole diameter estimated from the ATV travel time log is about 2.9 inches.

In general the borehole walls of MW-2R are smooth and there are few clear bedrock fractures in this borehole. There is a horizontal crack at about 140 feet that is believed to be caused by drilling. There is a possible bedrock fracture at 143.9 feet that strikes 25° and dips 62° to the

northwest. These and other features can be seen in the televiewer logs and table in Attachment E.

MW-16R:

Total Depth (TOC):	137 feet
Casing Depth:	99.5 feet
Water Level:	7.40 feet

Only optical and acoustical televiewer logs were collected on borehole MW-16R. The borehole diameter estimated from the ATV travel time log is about 2.9 inches.

In general the borehole walls of MW-16R are smooth but there are a few clear bedrock fractures in this borehole. Also seen on the televiewer logs is an apparent sample tube or tape that has been dropped into the borehole. There is a possible bedrock fracture at 118.5 feet that strikes 342° and dips 19° to the northeast. Another possible bedrock fracture is at 135 feet that strikes 351° and dips 12° to the northeast. These and other features can be seen in the televiewer logs and table in Attachment F.

MW-30:

Total Depth (TOC):	237.8 feet
Casing Depth:	161 feet
Water Level:	6.79 feet

Only optical and acoustical televiewer logs were collected on borehole MW-16R. The borehole diameter estimated from the ATV travel time log is about 5.8 inches.

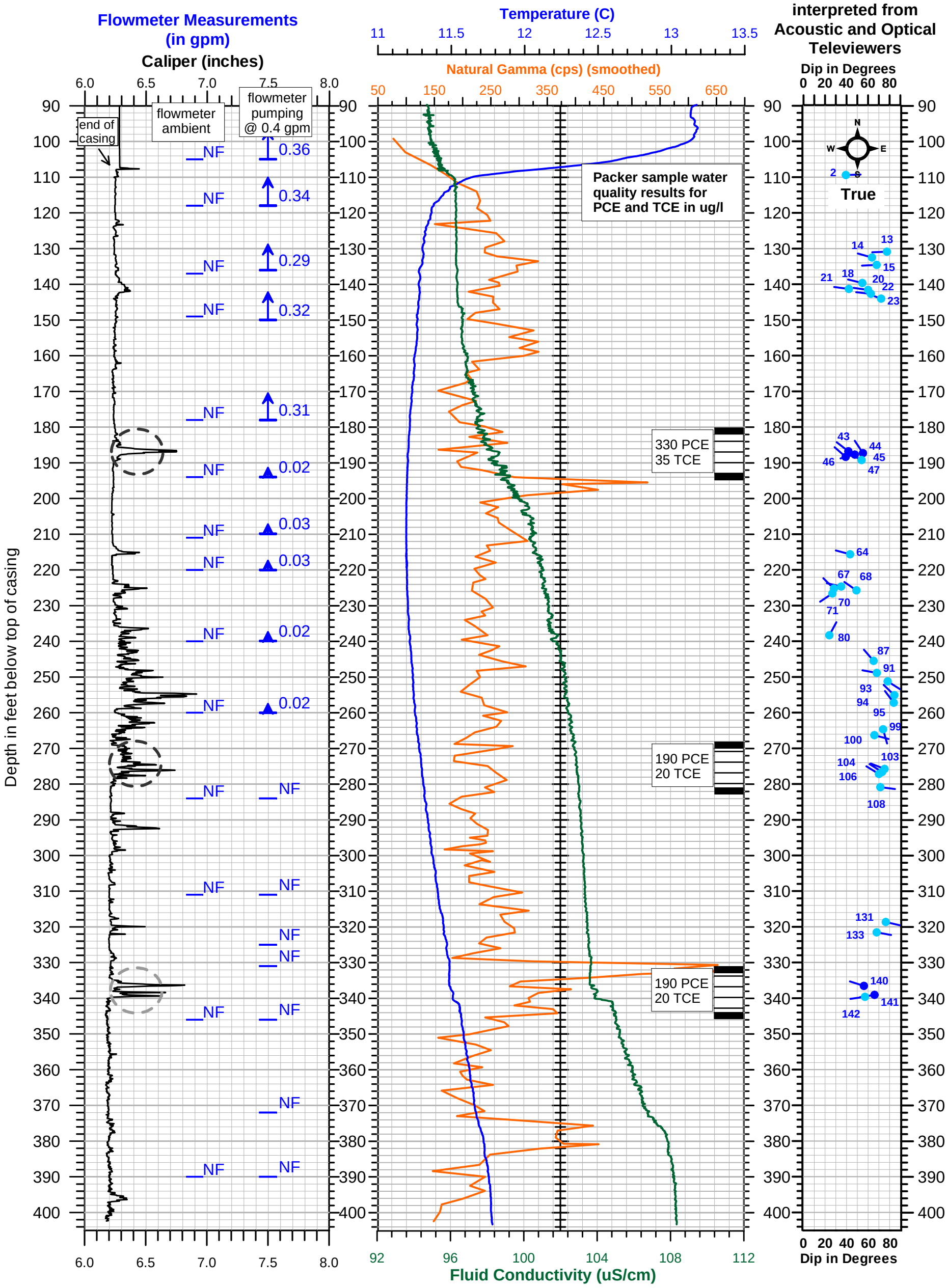
The televiewer logs show several planar features in MW-30, some of which may be transmissive fractures. Although there is no direct evidence that they are transmissive, the features picked most likely to be transmissive was based on aperture width on the acoustic log and discoloration on the optical log. These and other features can be seen in the televiewer logs and table in Attachment G.

ATTACHMENTS A-G
BOREHOLE GEOPHYSCIAL LOGS
AND TELEVIEWER LOG SUMMARIES

Northeast Geophysical Services

Borehole Geophysical Log
BR-1 - Savage Site
Milford, New Hampshire

Date logged: 2/17/10



= Likely transmissive zone

= Possible transmissive zone

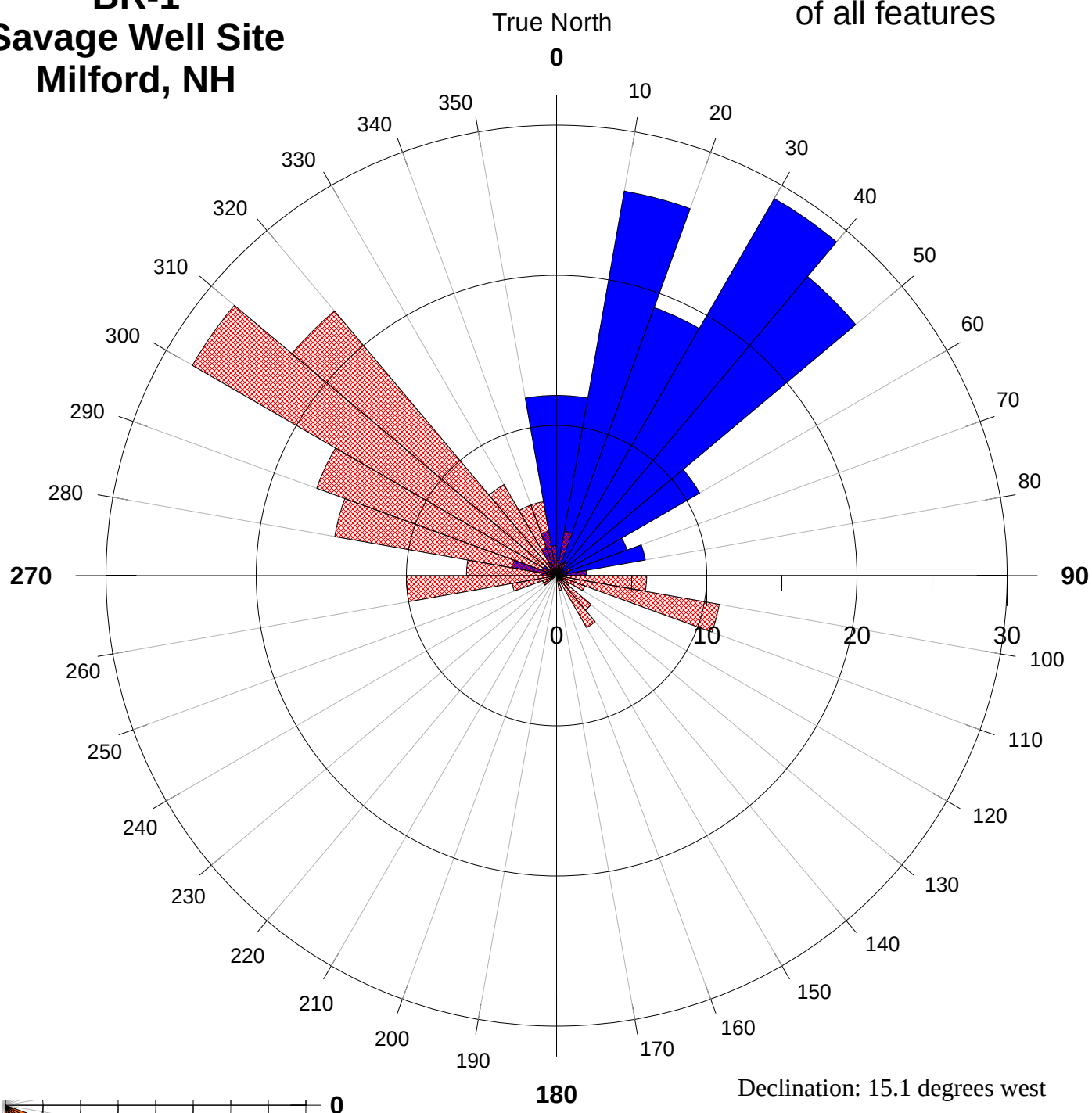
FIGURE A-1
Borehole Geophysical Log
BR-1 - Savage Site
Milford, New Hampshire

Tadpole tail indicates dip direction.
The solid tadpoles with a feature number are the ones interpreted to be likely or possibly transmissive.

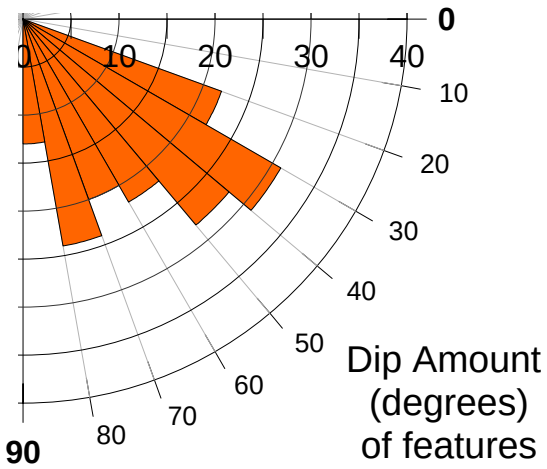
Northeast Geophysical Services

BR-1
Savage Well Site
Milford, NH

FIGURE A-2
Strike and Dip Direction of all features



Declination: 15.1 degrees west



Explanation

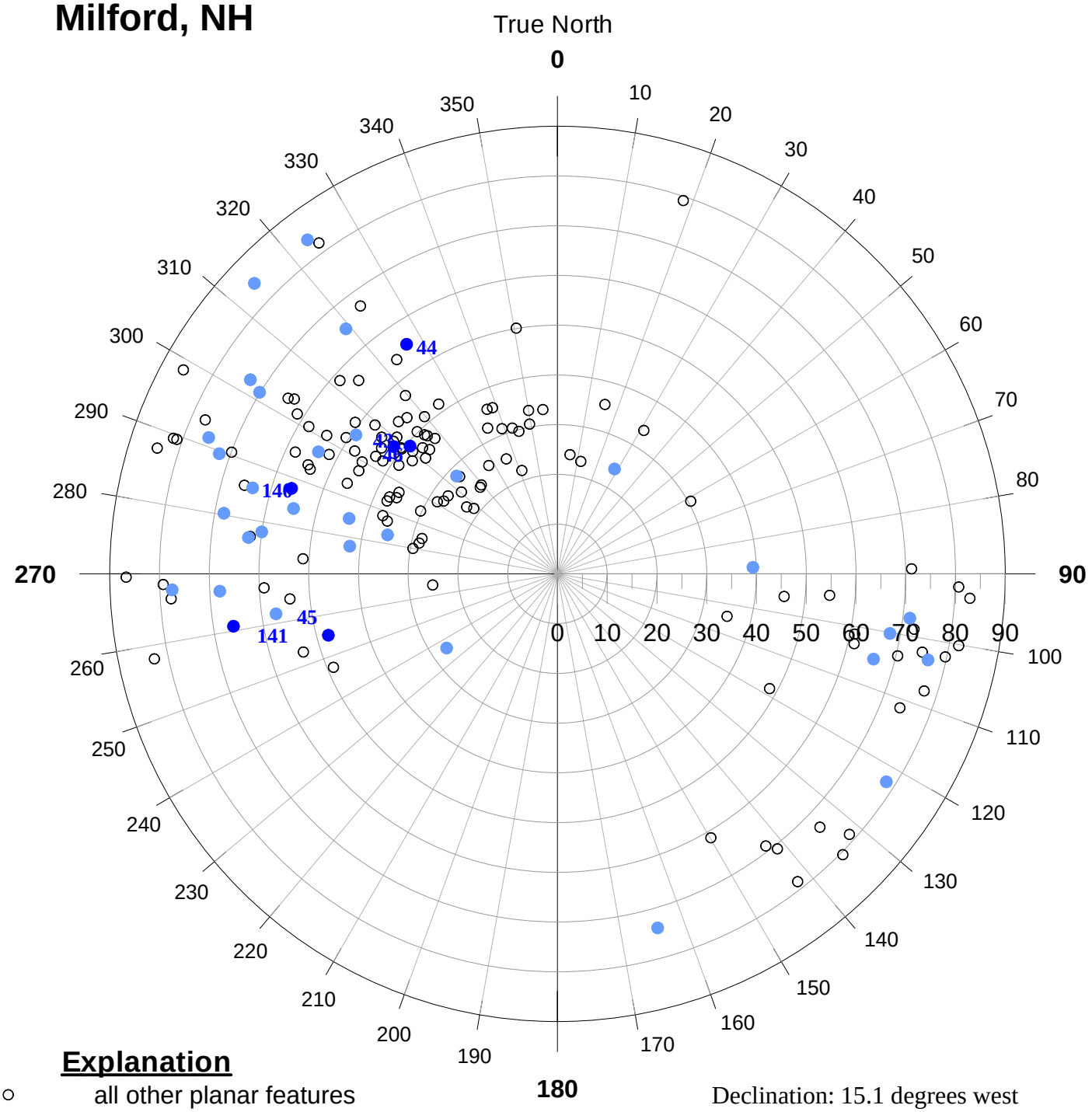
- Dip direction of feature
- Strike of feature
- Dip Amount (Tilt)

Based on 160 measurements

Northeast Geophysical Services

BR-1
Savage Well Site
Milford, NH

FIGURE A-3
Dip Amount and Dip Azimuth of planar features (upper hemisphere plot)



Explanation

- ○ all other planar features
- ● Likely water bearing
- ● Possibly water bearing

Declination: 15.1 degrees west

Based on 160 measurements

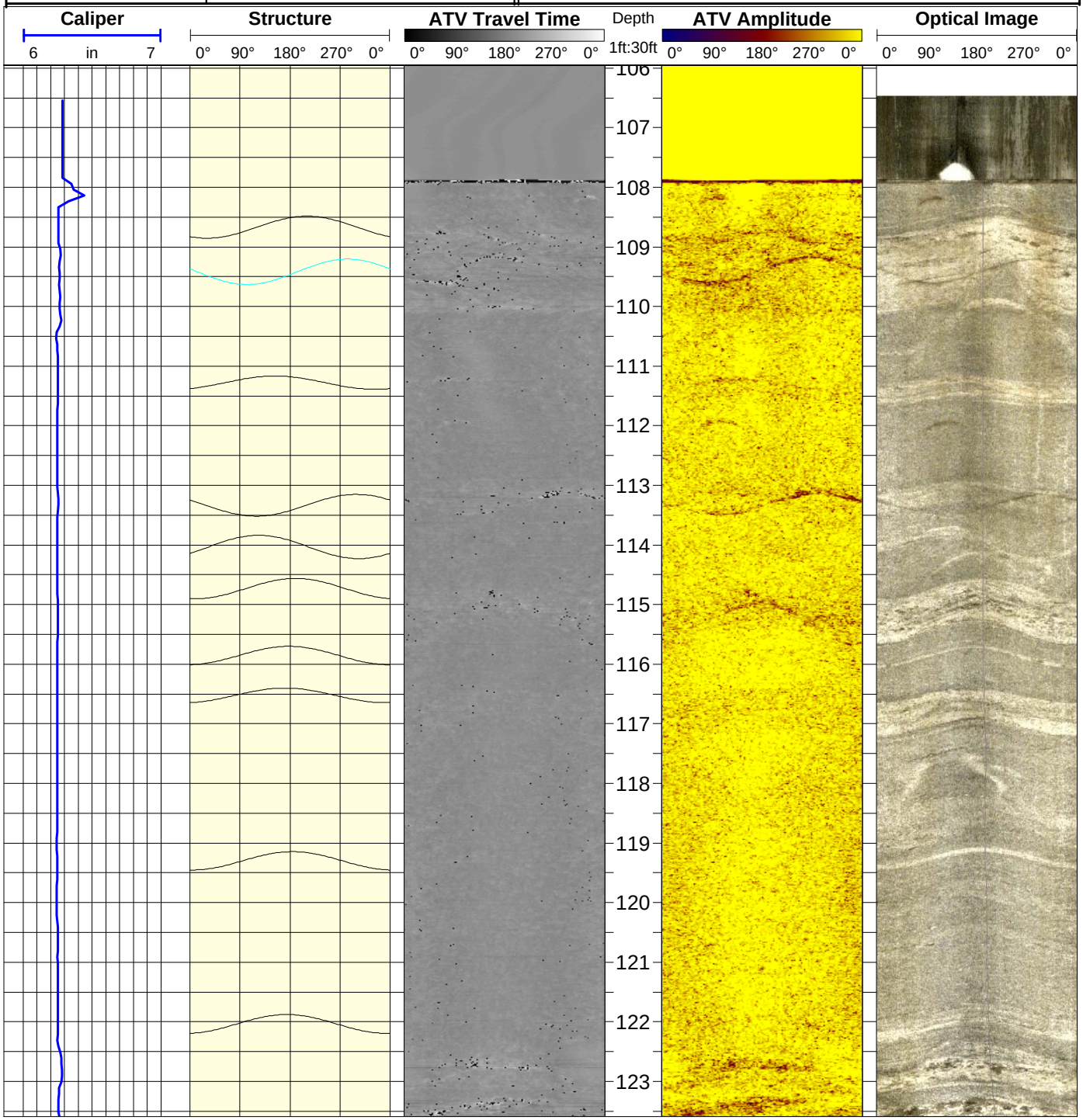
Northeast Geophysical Services
4 Union Street Bangor, Maine 04401
Tel. 207-942-2700
email: ngsinc@negeophysical.com

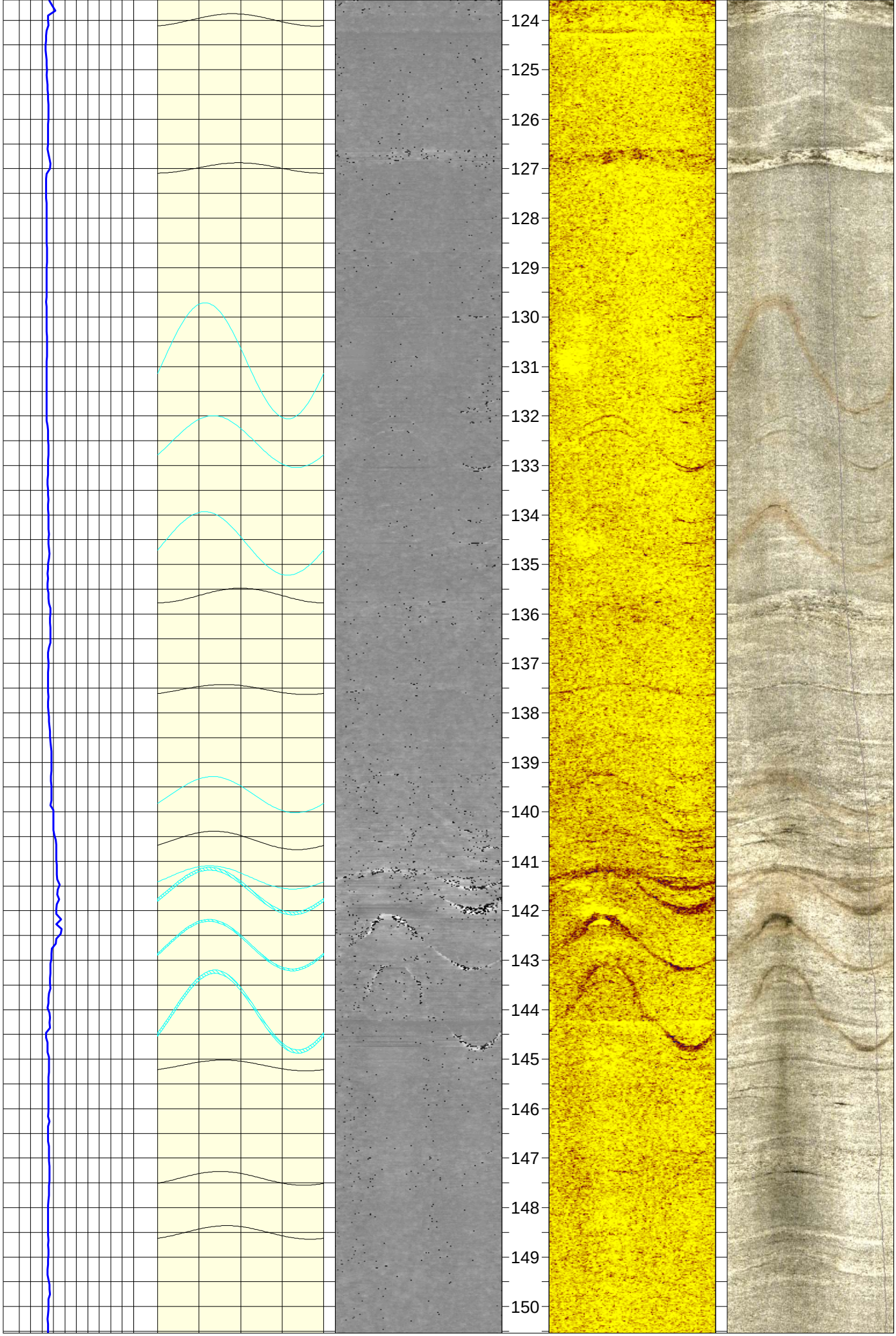
Log: Figure A-4 Televiewer logs

Well: BR-1

Site: Savage Municipal Well Site

Date:	2/17/10	Location:	Milford, NH
Casing Depth:	108 ft	For:	Weston Solutions
Casing Type:	6 in	Logged by:	R. Rawcliffe
Boring Depth:	403.5 ft	Orientation:	magnetic
Meas. From:	top of casing	Structure Plots:	black = planar features (faults, foliation, bedding, joints, etc) light blue = possibly transmissive fracture dark blue = likely transmissive fracture
Stickup:	1.1 ft		
Water Level:	7.88 ft		

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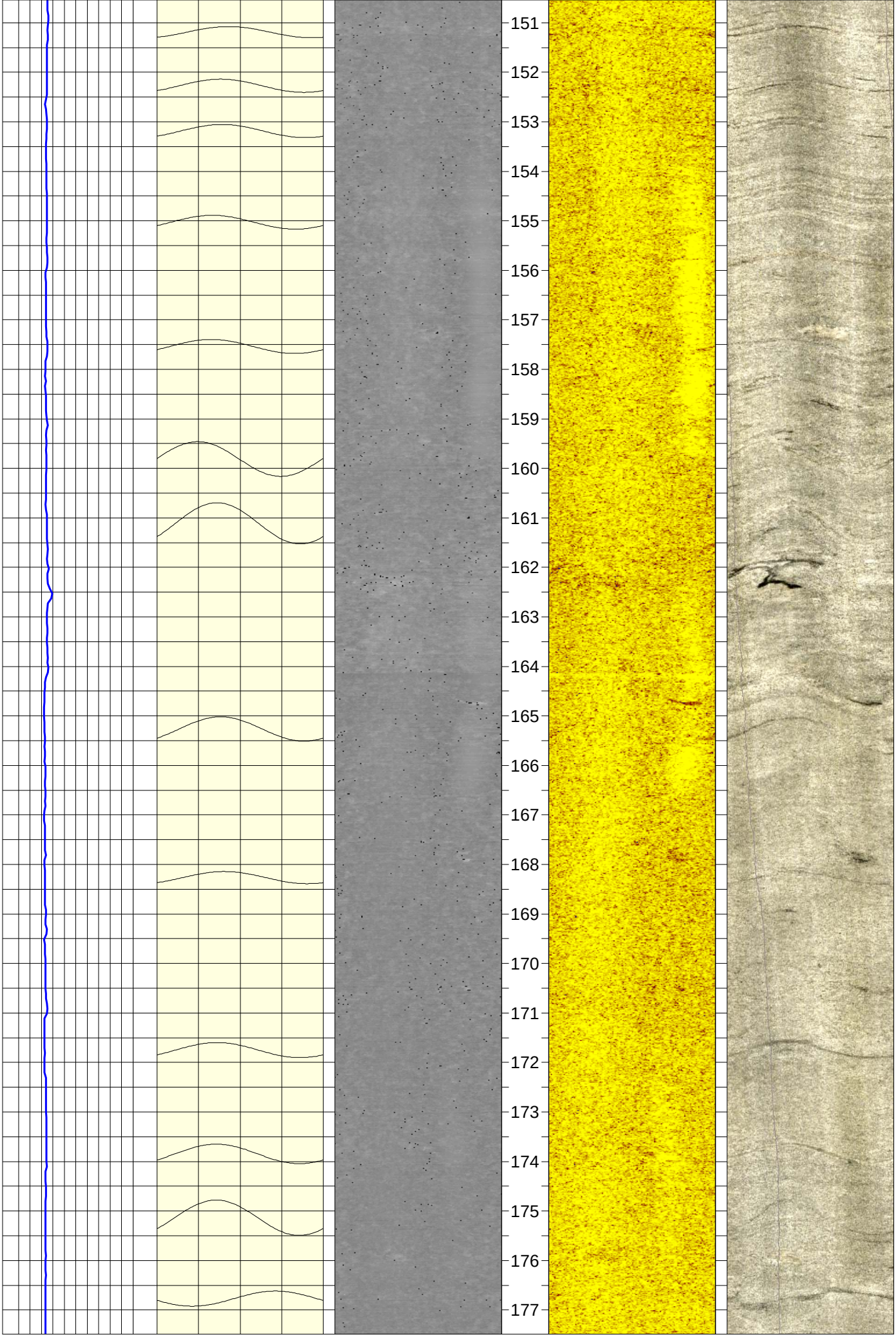
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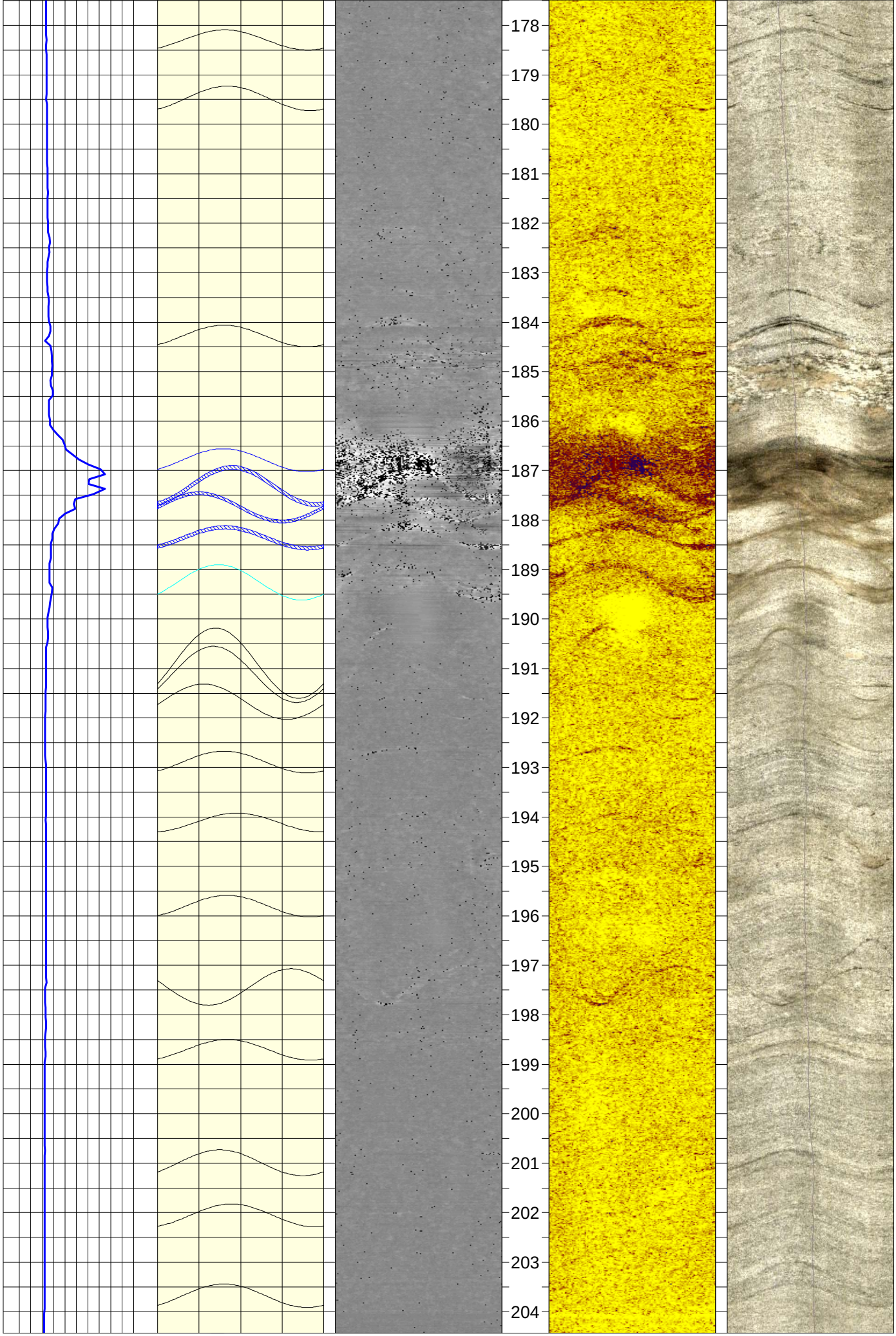
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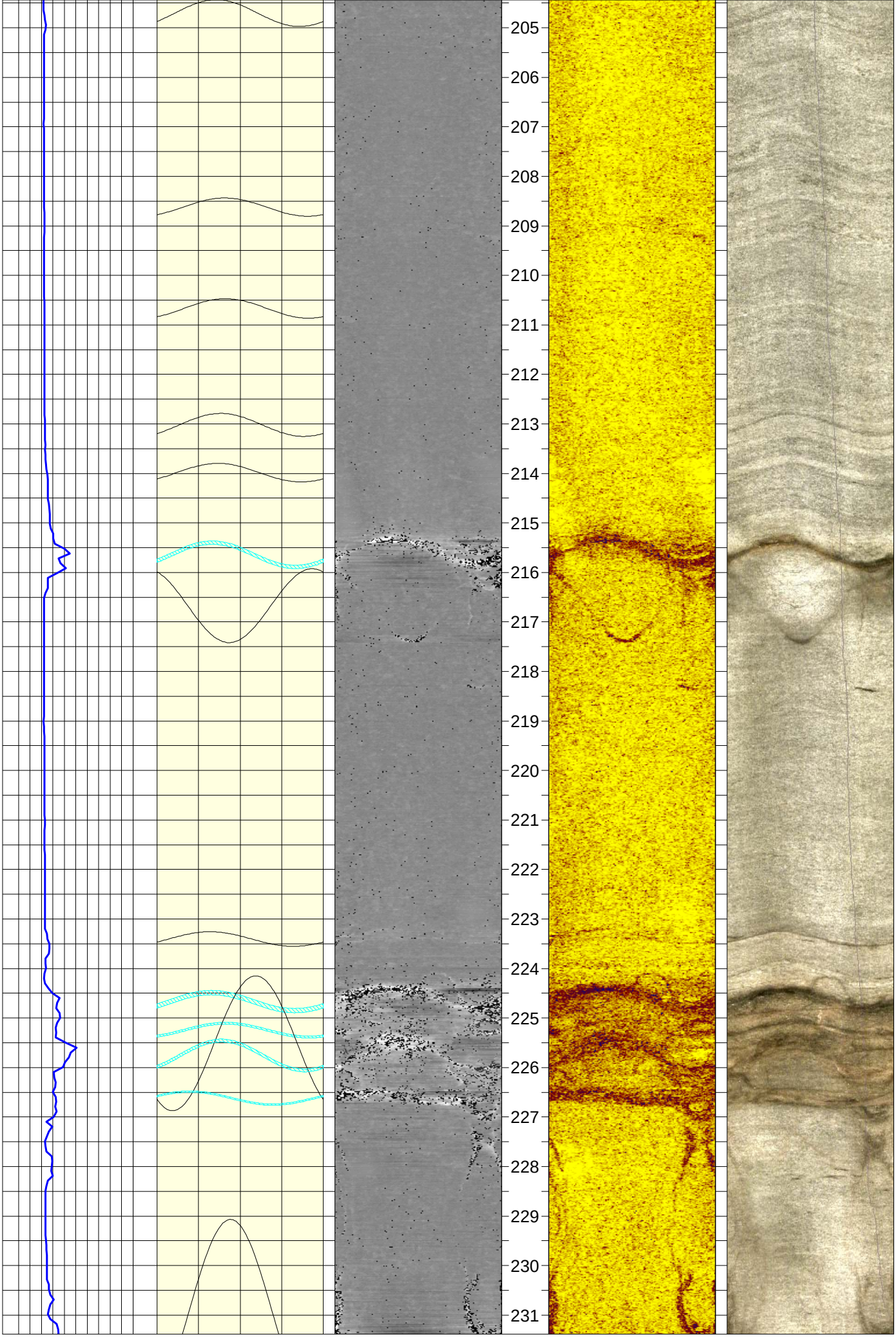
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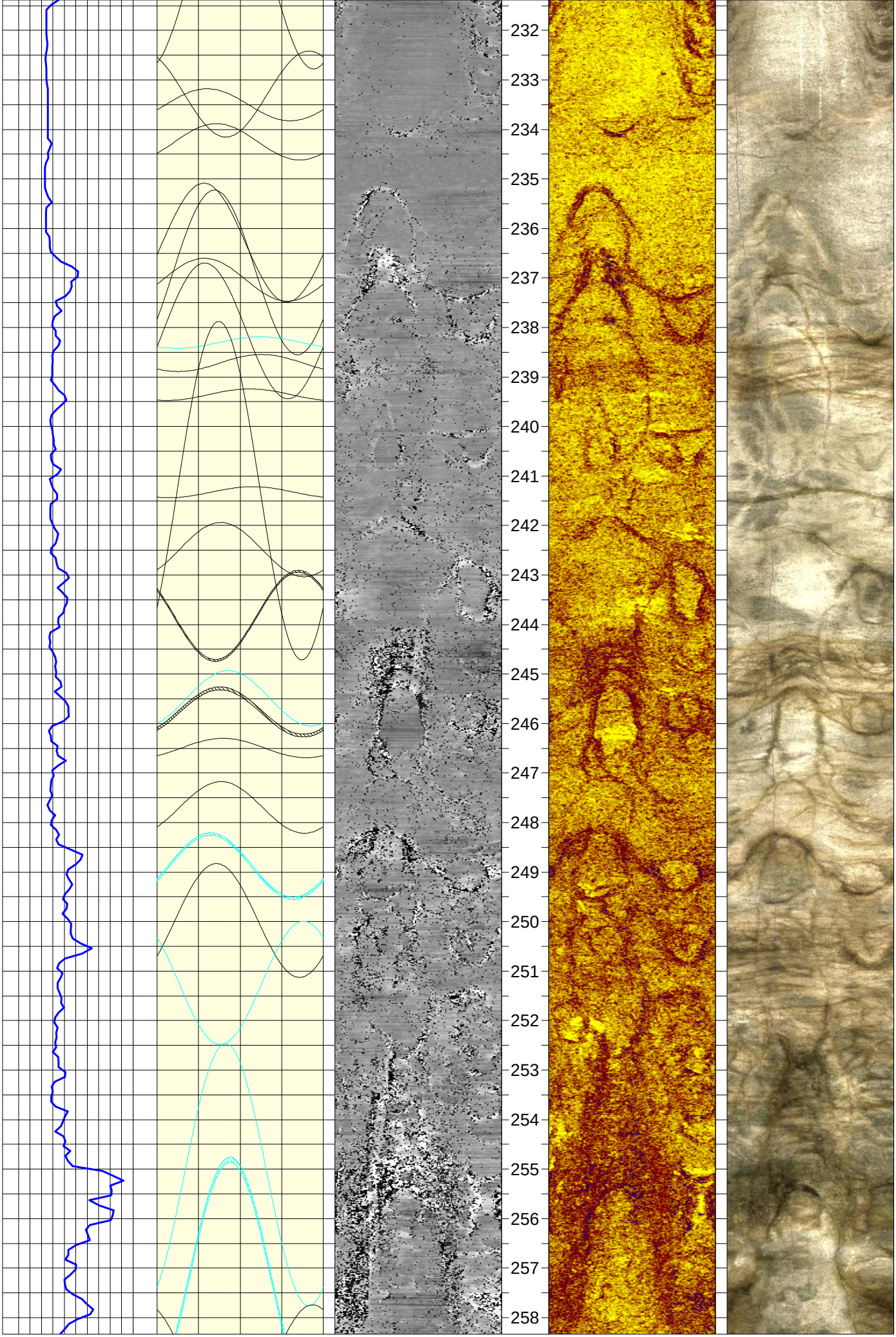
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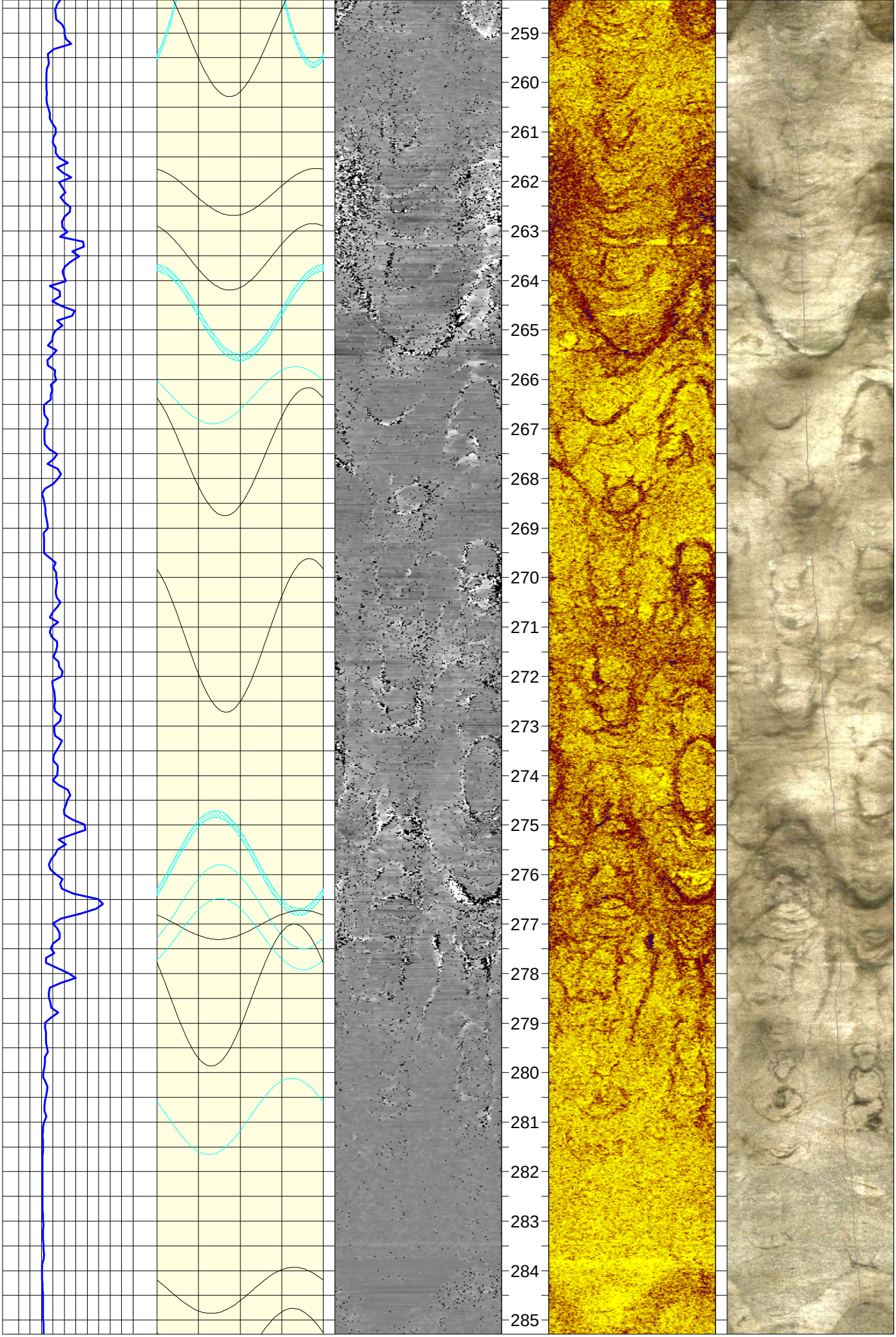
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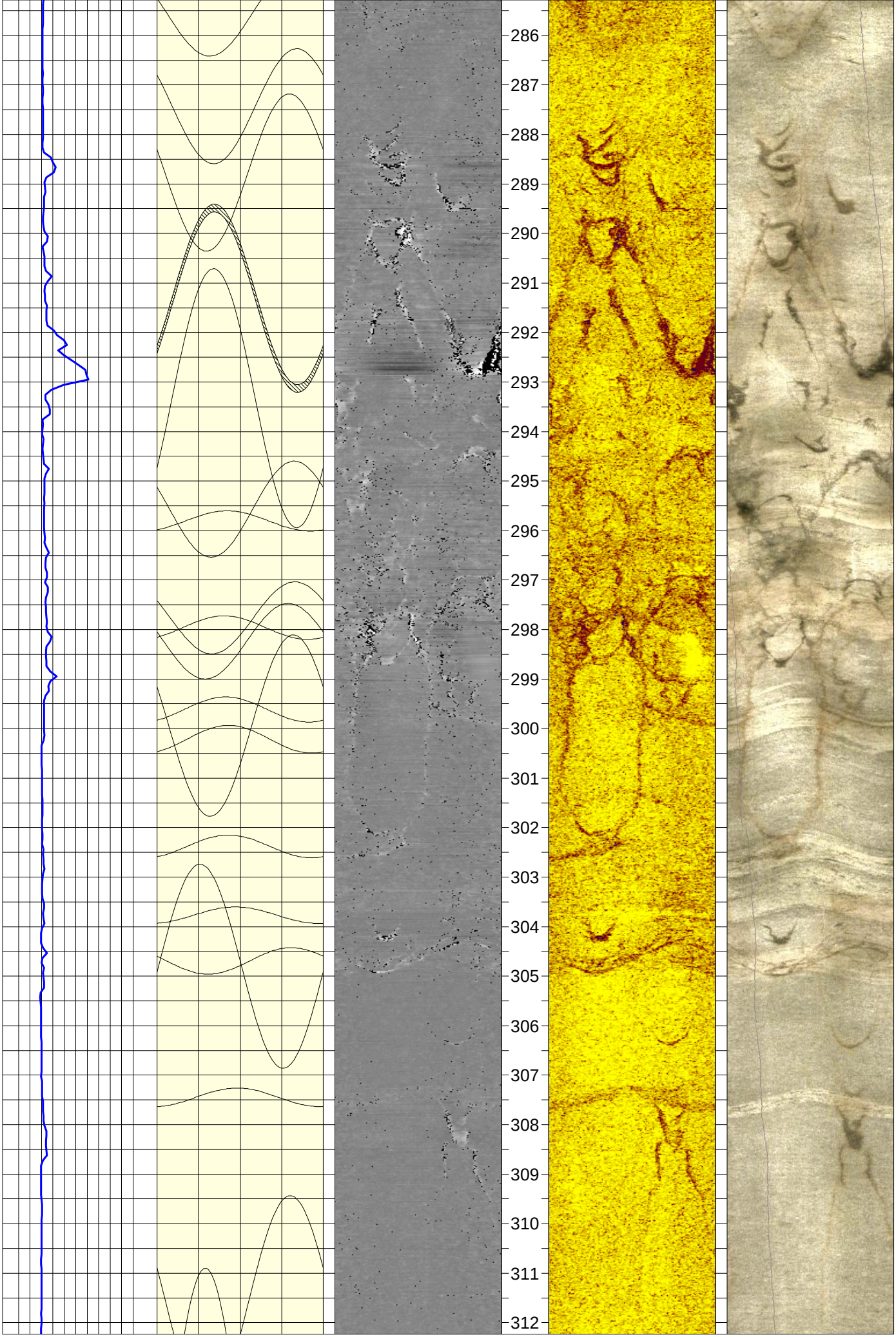
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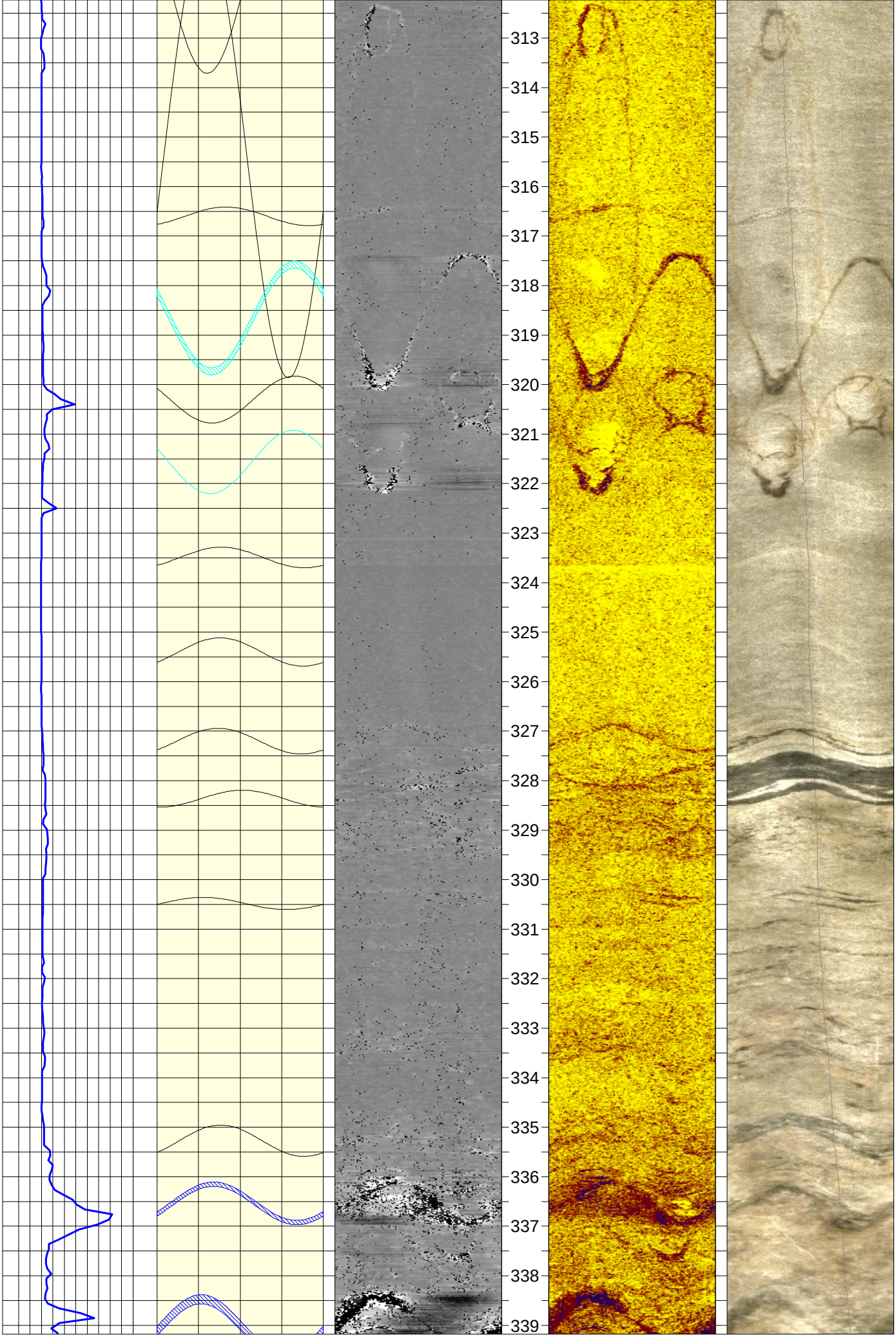
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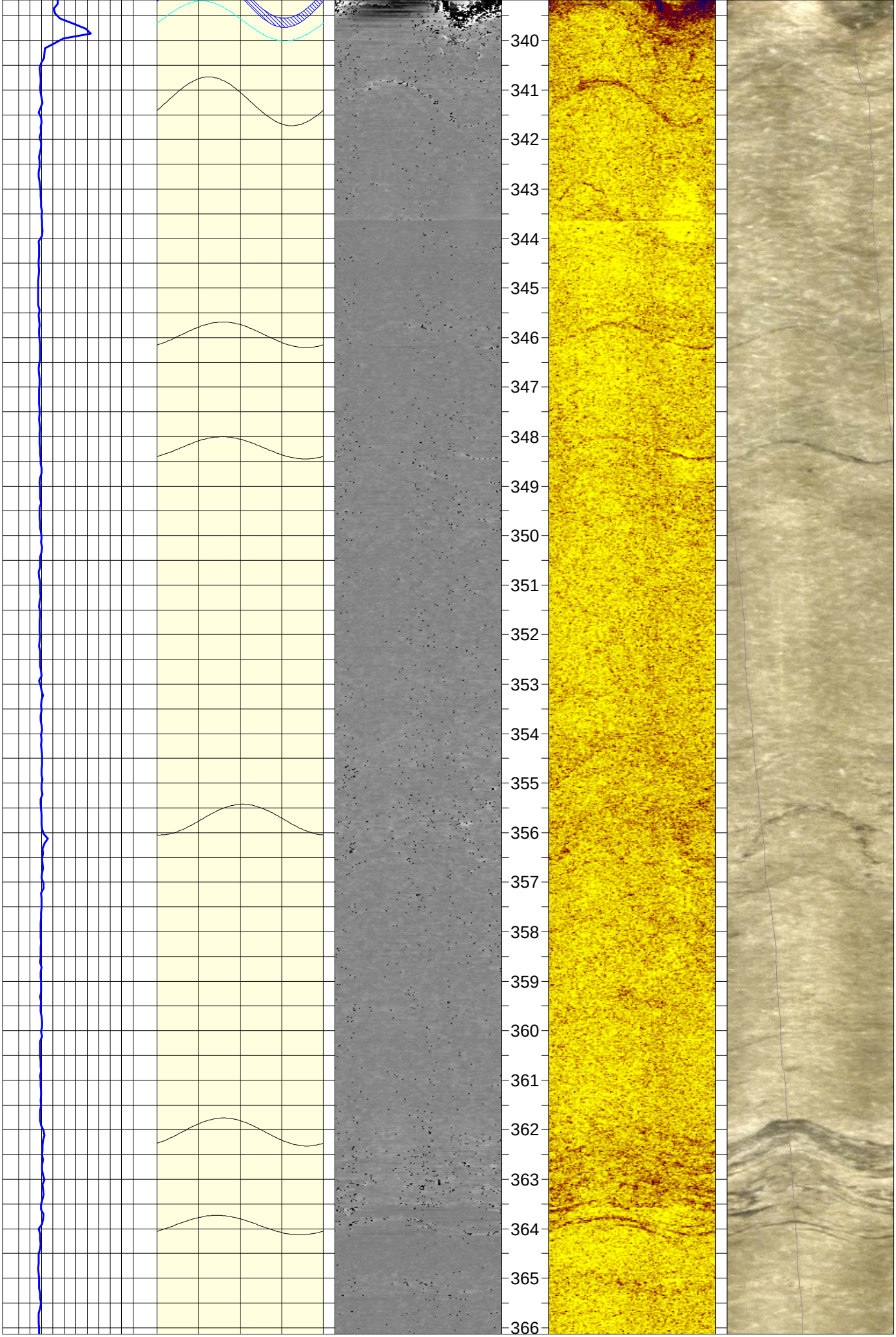
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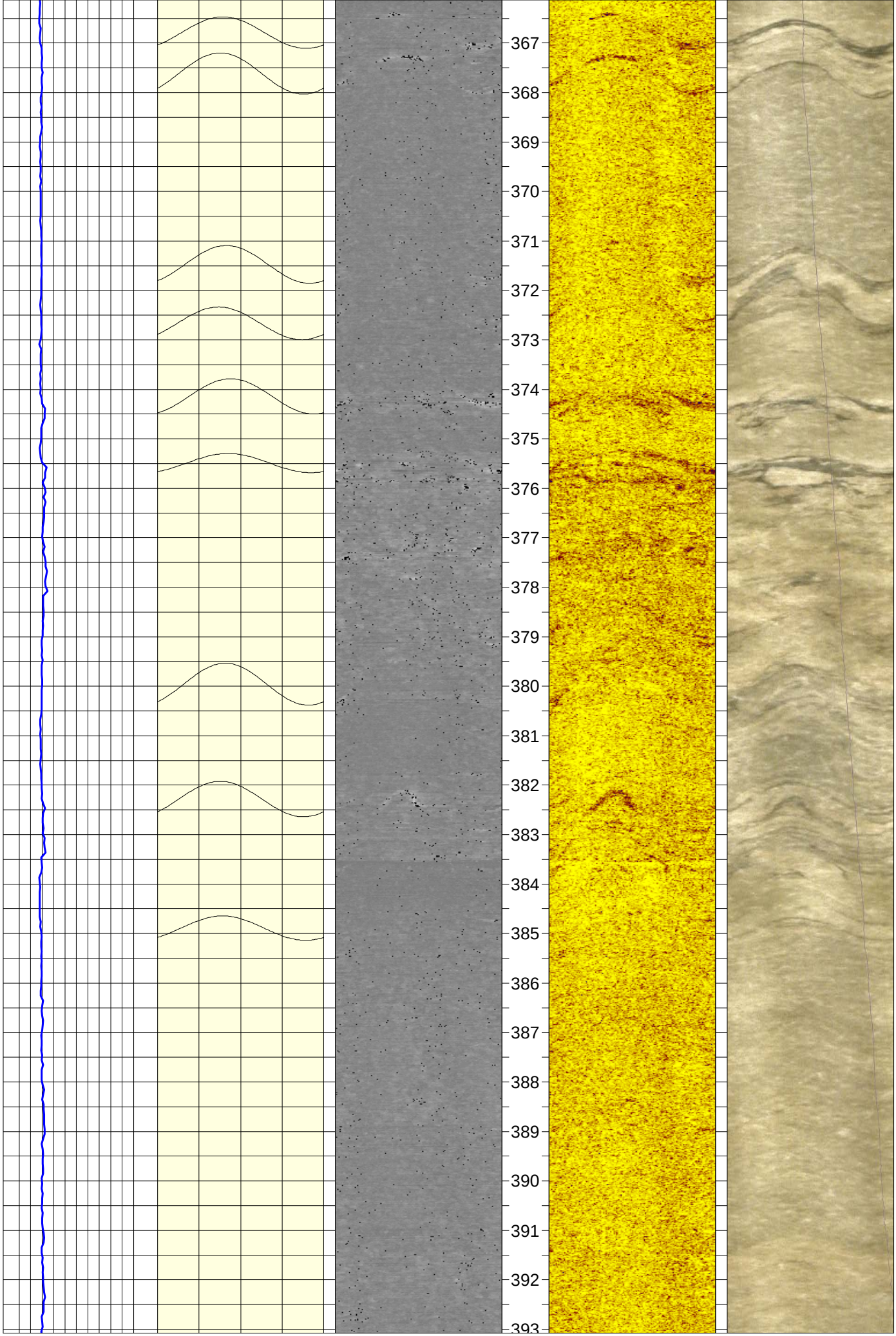
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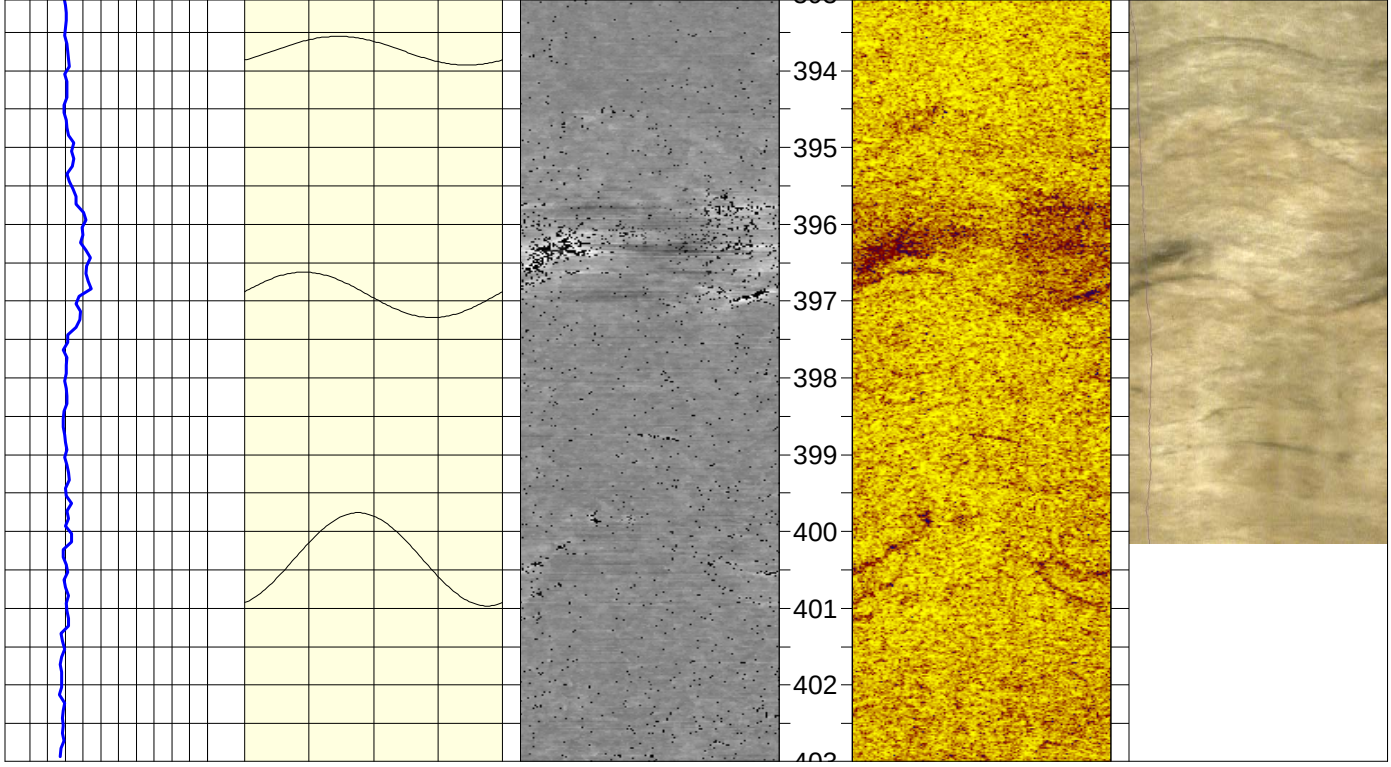
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TABLE A-1 Planar features interpreted from acoustical and optical televiewers
BR-1 Borehole - Savage Municipal Well Site - Milford, New Hampshire **Logged: February 2010**

Borehole	Feature # Number	Feature depth Feet	Dip Degrees	Dip Azimuth magnetic	Strike magnetic	Dip Azimuth True	Strike True	Aperture millimeters	Category Type
BR-1	1	108.7	35	31	301	16	286	0	100
BR-1	2	109.4	39	103	13	88	358	0	108
BR-1	3	111.3	23	333	63	318	48	0	100
BR-1	4	113.3	35	119	29	104	14	0	100
BR-1	5	114.0	37	304	34	288	18	0	100
BR-1	6	114.7	33	10	280	355	85	0	100
BR-1	7	115.9	31	358	88	343	73	0	100
BR-1	8	116.5	25	351	81	336	66	0	100
BR-1	9	119.3	31	5	275	349	79	0	100
BR-1	10	122.0	31	354	84	339	69	0	100
BR-1	11	124.0	26	343	73	328	58	0	100
BR-1	12	127.0	22	356	86	341	71	0	100
BR-1	13	130.9	78	283	13	268	358	0	108
BR-1	14	132.5	64	301	31	286	16	0	108
BR-1	15	134.6	68	282	12	267	357	0	108
BR-1	16	135.6	30	360	90	345	75	0	100
BR-1	17	137.5	21	323	53	308	38	0	100
BR-1	18	139.7	55	299	29	284	14	0	108
BR-1	19	140.6	36	302	32	287	17	0	100
BR-1	20	141.3	42	293	23	278	8	0	108
BR-1	21	141.6	60	293	23	278	8	8	108
BR-1	22	142.7	63	292	22	277	7	5	108
BR-1	23	144.0	72	305	35	290	20	7	108
BR-1	24	145.1	23	321	51	306	36	0	100
BR-1	25	147.4	28	316	46	301	31	0	100
BR-1	26	148.5	28	330	60	315	45	0	100
BR-1	27	151.2	24	335	65	319	49	0	100
BR-1	28	152.3	27	318	48	303	33	0	100
BR-1	29	153.2	27	321	51	305	35	0	100
BR-1	30	155.0	28	300	30	285	15	0	100
BR-1	31	157.5	29	298	28	283	13	0	100
BR-1	32	159.8	53	268	358	253	343	0	100
BR-1	33	161.1	58	310	40	295	25	0	100
BR-1	34	165.3	44	318	48	303	33	0	100
BR-1	35	168.3	25	326	56	310	40	0	100
BR-1	36	171.8	30	310	40	295	25	0	100
BR-1	37	173.9	37	308	38	293	23	0	100
BR-1	38	175.1	54	308	38	293	23	0	100
BR-1	39	176.8	31	77	347	61	331	0	100
BR-1	40	178.3	38	325	55	310	40	0	100
BR-1	41	179.5	44	331	61	316	46	0	100
BR-1	42	184.3	40	324	54	309	39	0	100
BR-1	43	186.8	42	323	53	308	38	0	107
BR-1	44	187.3	55	342	72	327	57	15	107
BR-1	45	187.7	48	270	0	255	345	12	107
BR-1	46	188.4	39	326	56	311	41	17	107
BR-1	47	189.3	54	312	42	297	27	0	108
BR-1	48	190.9	70	306	36	290	20	0	100
BR-1	49	191.1	65	301	31	286	16	0	100
BR-1	50	191.7	54	280	10	265	355	0	100
BR-1	51	192.9	40	324	54	309	39	0	100
BR-1	52	194.1	36	352	82	337	67	0	100
BR-1	53	195.8	40	330	60	315	45	0	100
BR-1	54	197.4	55	110	20	95	5	0	100
BR-1	55	198.7	39	331	61	316	46	0	100
BR-1	56	201.0	45	315	45	300	30	0	100
BR-1	57	202.1	42	340	70	325	55	0	100
BR-1	58	203.7	42	324	54	309	39	0	100
BR-1	59	204.7	46	308	38	293	23	0	100

TABLE A-1 Planar features interpreted from acoustical and optical televiewers
BR-1 Borehole - Savage Municipal Well Site - Milford, New Hampshire **Logged: February 2010**

Borehole	Feature # Number	Feature depth Feet	Dip Degrees	Dip Azimuth magnetic	Strike magnetic	Dip Azimuth True	Strike True	Aperture millimeters	Category Type
BR-1	60	208.6	35	326	56	311	41	0	100
BR-1	61	210.7	37	328	58	313	43	0	100
BR-1	62	213.0	42	318	48	303	33	0	100
BR-1	63	214.0	36	312	42	297	27	0	100
BR-1	64	215.6	43	300	30	285	15	16	108
BR-1	65	216.7	71	156	66	141	51	0	100
BR-1	66	223.4	30	295	25	280	10	0	100
BR-1	67	224.7	35	298	28	283	13	22	108
BR-1	68	225.3	28	329	59	314	44	9	108
BR-1	69	225.5	79	34	304	19	289	0	100
BR-1	70	225.8	49	320	50	305	35	10	108
BR-1	71	226.6	27	251	341	236	326	7	108
BR-1	72	230.9	82	339	69	324	54	0	100
BR-1	73	233.3	73	149	59	134	44	0	100
BR-1	74	233.5	51	288	18	273	3	0	100
BR-1	75	234.3	55	309	39	294	24	0	100
BR-1	76	236.3	78	281	11	266	356	0	100
BR-1	77	236.9	81	305	35	289	19	0	100
BR-1	78	237.0	59	282	12	267	357	0	100
BR-1	79	238.1	79	284	14	268	358	0	100
BR-1	80	238.3	24	44	314	29	299	0	108
BR-1	81	238.7	34	46	316	31	301	0	100
BR-1	82	239.4	24	21	291	6	276	0	100
BR-1	83	241.3	86	314	44	299	29	0	100
BR-1	84	241.3	23	27	297	12	282	0	100
BR-1	85	242.5	65	318	48	303	33	0	100
BR-1	86	243.8	74	126	36	111	21	4	100
BR-1	87	245.5	65	334	64	319	49	0	108
BR-1	88	245.8	61	317	47	302	32	8	100
BR-1	89	246.5	37	323	53	308	38	0	100
BR-1	90	247.7	64	319	49	304	34	0	100
BR-1	91	248.9	68	295	25	280	10	5	108
BR-1	92	250.0	77	309	39	294	24	0	100
BR-1	93	251.2	78	137	47	122	32	0	108
BR-1	94	255.1	84	329	59	314	44	0	108
BR-1	95	257.2	84	338	68	323	53	4	108
BR-1	96	259.0	78	157	67	142	52	0	100
BR-1	97	262.2	61	165	75	150	60	0	100
BR-1	98	263.5	69	158	68	143	53	0	100
BR-1	99	264.7	74	179	89	164	74	12	108
BR-1	100	266.3	66	120	30	105	15	0	108
BR-1	101	267.5	79	147	57	132	42	0	100
BR-1	102	271.2	81	150	60	135	45	0	100
BR-1	103	275.8	75	306	36	291	21	11	108
BR-1	104	276.7	73	317	47	302	32	0	108
BR-1	105	277.0	48	134	44	118	28	0	100
BR-1	106	277.2	70	316	46	301	31	0	108
BR-1	107	278.4	80	117	27	102	12	0	100
BR-1	108	280.9	71	112	22	97	7	0	108
BR-1	109	284.4	61	117	27	101	11	0	100
BR-1	110	285.6	73	114	24	99	9	0	100
BR-1	111	287.4	77	123	33	108	18	0	100
BR-1	112	288.8	81	107	17	92	2	0	100
BR-1	113	291.3	82	305	35	289	19	7	100
BR-1	114	293.3	84	303	33	287	17	0	100
BR-1	115	295.6	75	117	27	102	12	0	100
BR-1	116	295.8	38	332	62	317	47	0	100
BR-1	117	297.8	70	119	29	104	14	0	100
BR-1	118	298.0	42	326	56	310	40	0	100

TABLE A-1 Planar features interpreted from acoustical and optical televiewers
BR-1 Borehole - Savage Municipal Well Site - Milford, New Hampshire **Logged: February 2010**

Borehole	Feature # Number	Feature depth Feet	Dip Degrees	Dip Azimuth magnetic	Strike magnetic	Dip Azimuth True	Strike True	Aperture millimeters	Category Type
BR-1	119	298.2	71	104	14	89	359	0	100
BR-1	120	299.6	44	329	59	314	44	0	100
BR-1	121	299.9	82	115	25	100	10	0	100
BR-1	122	300.2	47	335	65	320	50	0	100
BR-1	123	302.4	41	335	65	320	50	0	100
BR-1	124	303.8	33	349	79	334	64	0	100
BR-1	125	304.7	46	111	21	96	6	0	100
BR-1	126	304.8	83	273	3	258	348	0	100
BR-1	127	307.5	36	354	84	339	69	0	100
BR-1	128	311.6	83	109	19	93	3	0	100
BR-1	129	315.4	87	285	15	270	360	0	100
BR-1	130	316.6	36	329	59	314	44	0	100
BR-1	131	318.7	76	118	28	103	13	11	108
BR-1	132	320.3	61	118	28	103	13	0	100
BR-1	133	321.6	68	115	25	100	10	0	108
BR-1	134	323.5	39	320	50	304	34	0	100
BR-1	135	325.4	48	316	46	301	31	0	100
BR-1	136	327.2	45	313	43	297	27	0	100
BR-1	137	328.4	33	5	275	350	80	0	100
BR-1	138	330.5	25	280	10	265	355	0	100
BR-1	139	335.3	51	318	48	303	33	0	100
BR-1	140	336.5	56	303	33	288	18	15	107
BR-1	141	339.1	66	276	6	261	351	23	107
BR-1	142	339.6	57	277	7	262	352	0	108
BR-1	143	341.2	62	292	22	277	7	0	100
BR-1	144	346.0	45	323	53	308	38	0	100
BR-1	145	348.2	41	322	52	306	36	0	100
BR-1	146	355.7	50	6	276	350	80	0	100
BR-1	147	362.1	47	324	54	309	39	0	100
BR-1	148	363.9	37	310	40	295	25	0	100
BR-1	149	366.8	51	322	52	307	37	0	100
BR-1	150	367.6	58	316	46	301	31	0	100
BR-1	151	371.5	56	329	59	314	44	0	100
BR-1	152	372.7	52	313	43	298	28	0	100
BR-1	153	374.1	54	338	68	323	53	0	100
BR-1	154	375.5	37	333	63	318	48	0	100
BR-1	155	380.0	59	327	57	312	42	0	100
BR-1	156	382.3	54	316	46	301	31	0	100
BR-1	157	384.9	44	321	51	306	36	0	100
BR-1	158	393.7	36	310	40	295	25	0	100
BR-1	159	396.9	49	262	352	247	337	0	100
BR-1	160	400.4	67	339	69	324	54	0	100

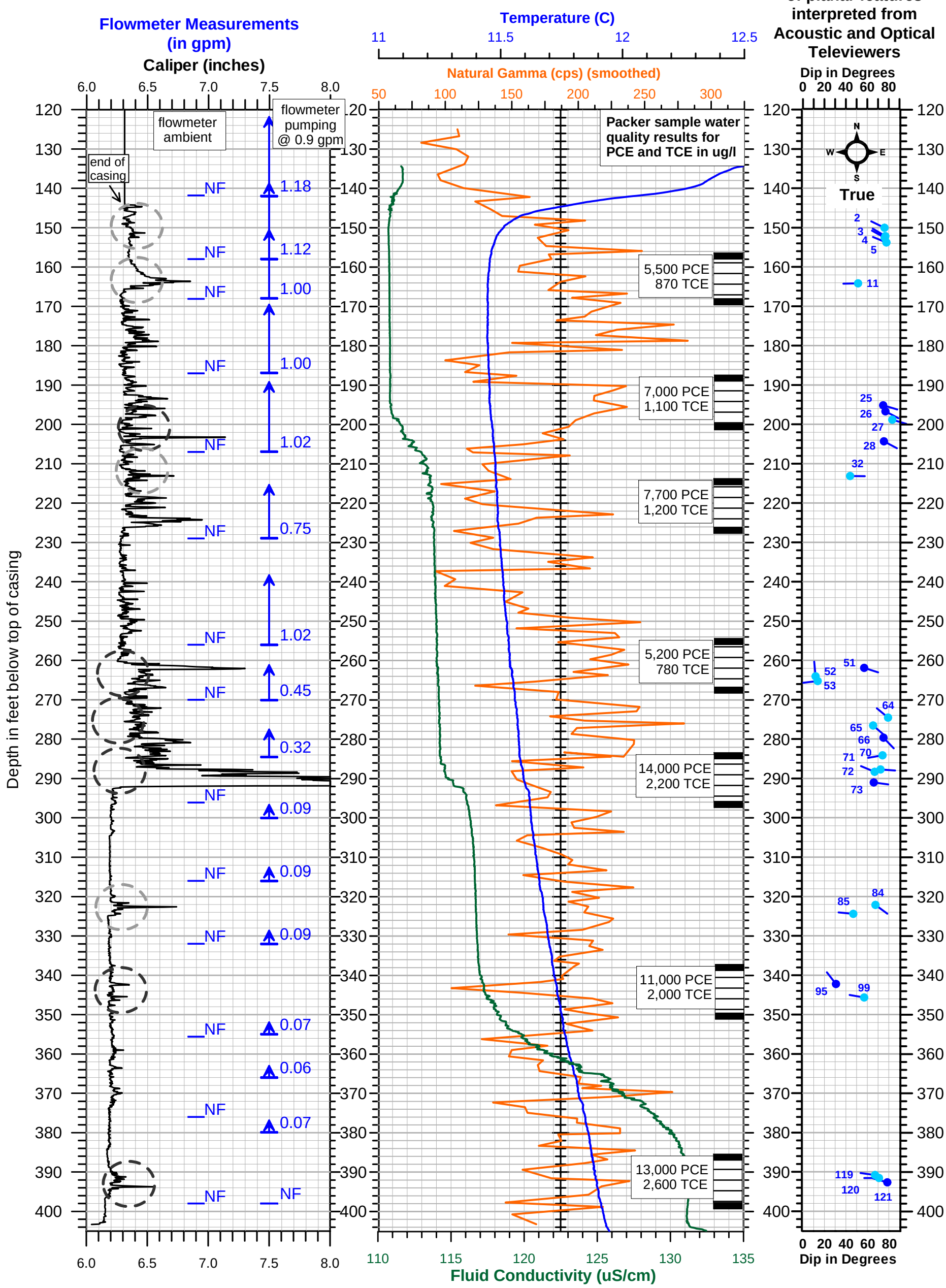
Explanation:

Category 100 = planar feature (possible fracture, joint, foliation, bedding, etc.)
Category 107 = Likely water bearing feature
Category 108 = Possible water bearing fracture

Northeast Geophysical Services

Borehole Geophysical Log
BR-2 - Savage Site
Milford, New Hampshire

Date logged: 2/16/10



= Likely transmissive zone

= Possible transmissive zone

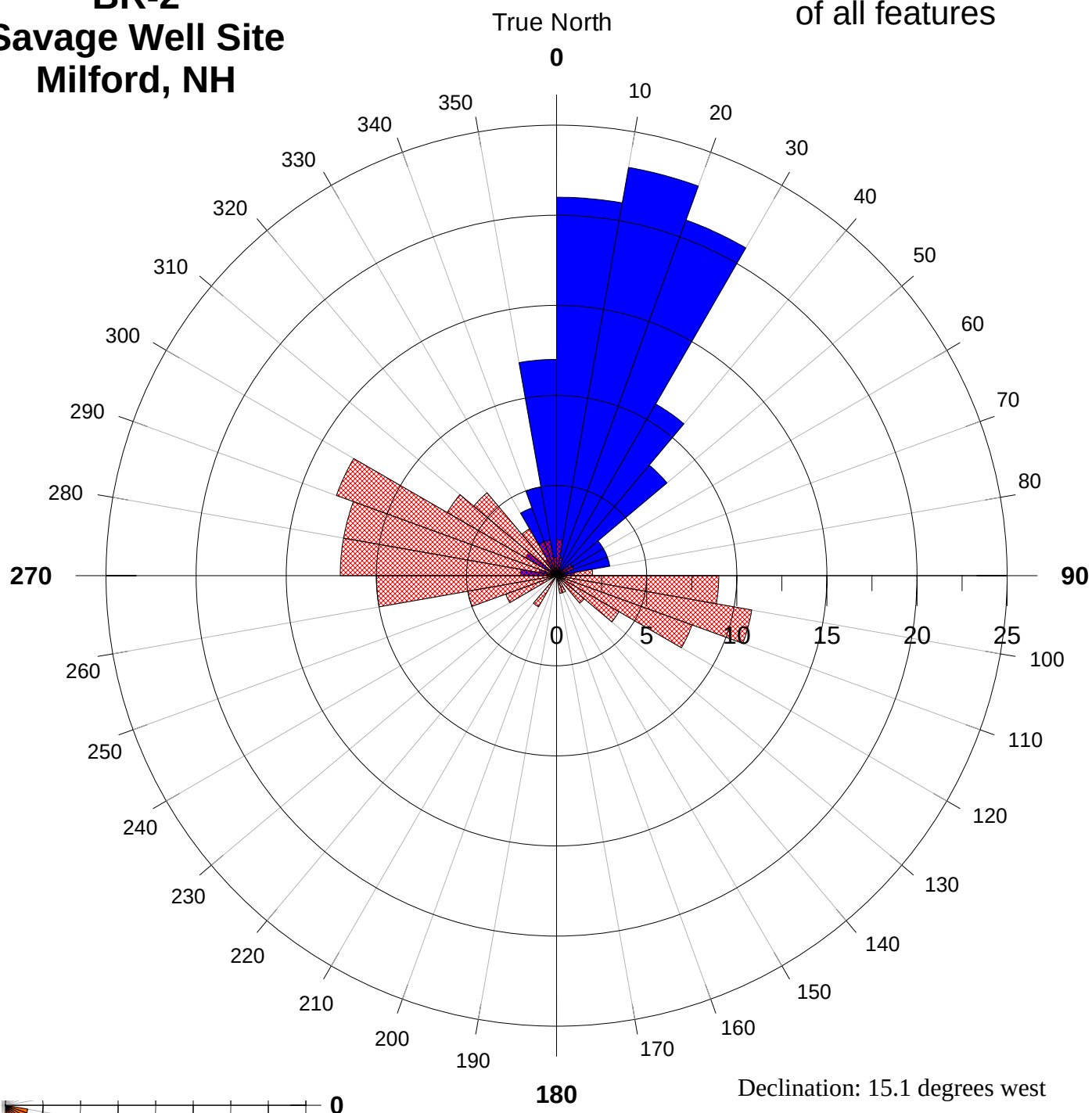
FIGURE B-1
Borehole Geophysical Log
BR-2 - Savage Site
Milford, New Hampshire

Tadpole tail indicates dip direction.
The solid tadpoles with a feature number are the ones interpreted to be likely or possibly transmissive.

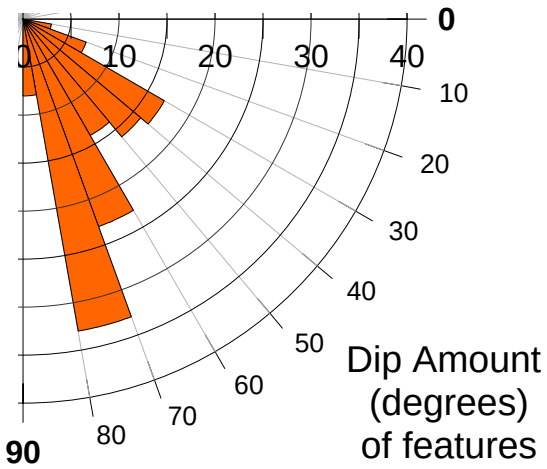
Northeast Geophysical Services

BR-2
Savage Well Site
Milford, NH

FIGURE B-2
Strike and Dip Direction of all features



Declination: 15.1 degrees west



Explanation

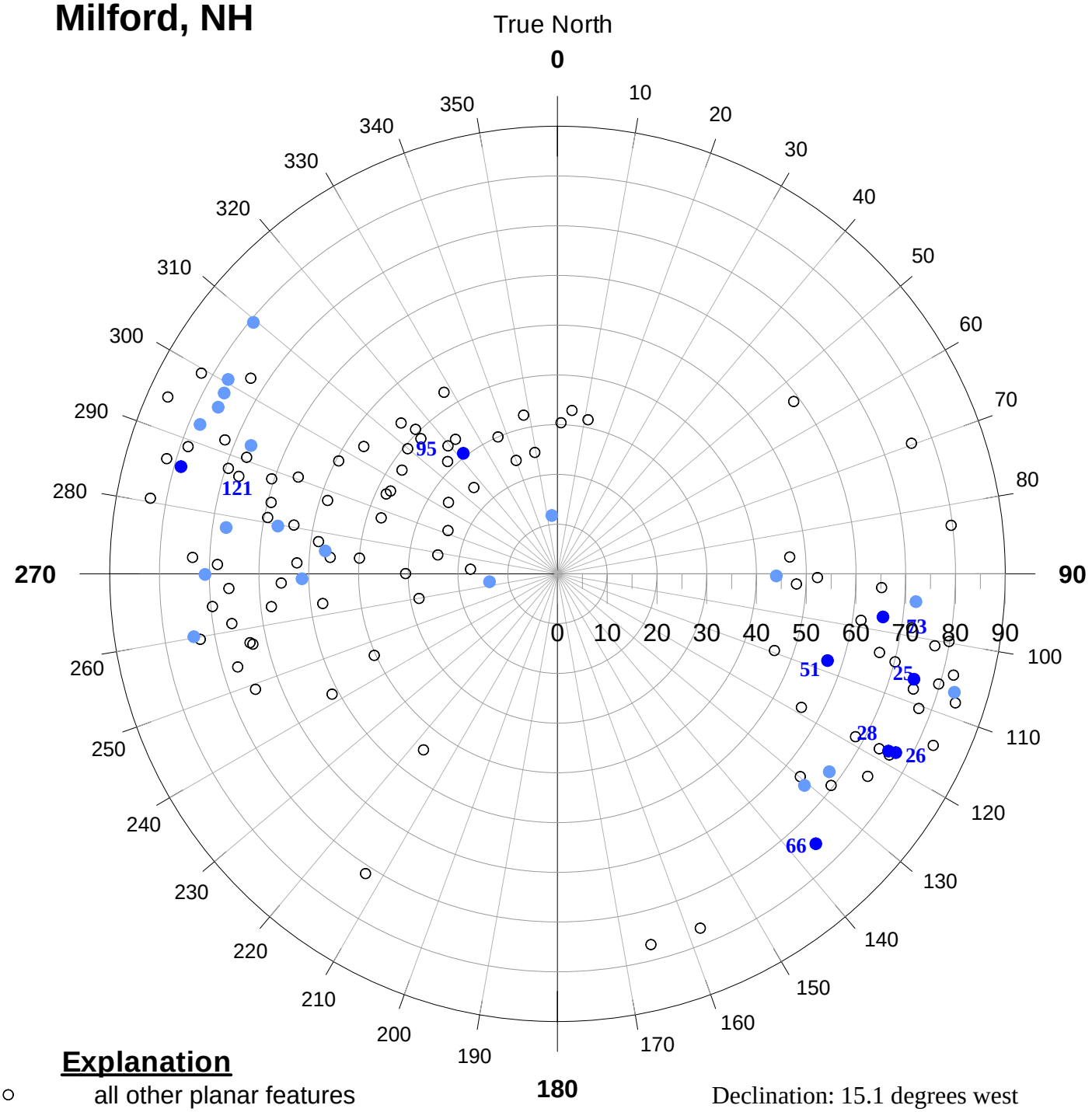
- Dip direction of feature
- Strike of feature
- Dip Amount (Tilt)

Based on 121 measurements

Northeast Geophysical Services

BR-2
Savage Well Site
Milford, NH

FIGURE B-3
Dip Amount and Dip Azimuth of planar features (upper hemisphere plot)



Explanation

- ○ all other planar features
- ● Likely water bearing
- ● Possibly water bearing

Declination: 15.1 degrees west

Based on 121 measurements

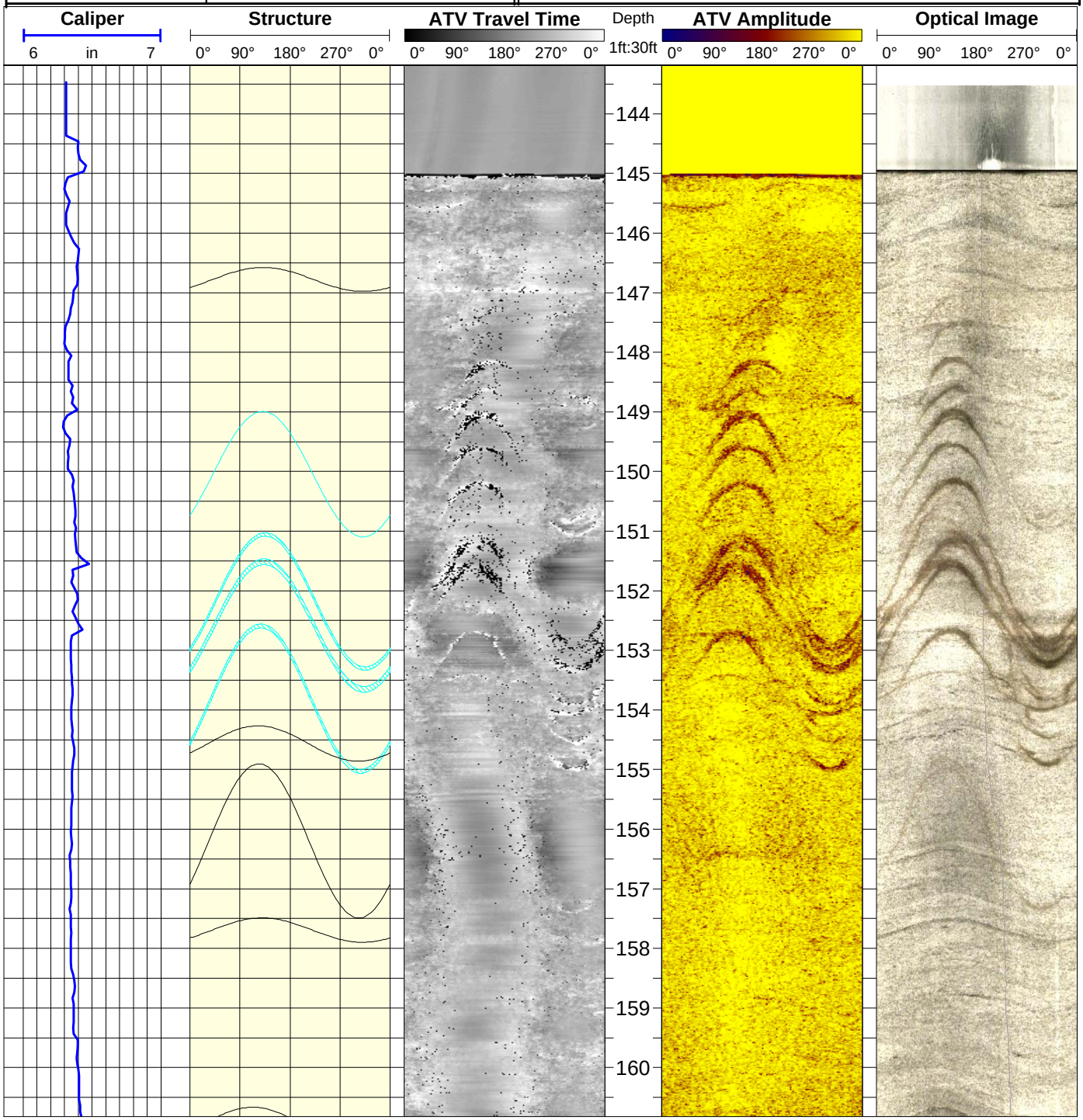
Northeast Geophysical Services
4 Union Street Bangor, Maine 04401
Tel. 207-942-2700
email: ngsinc@negeophysical.com

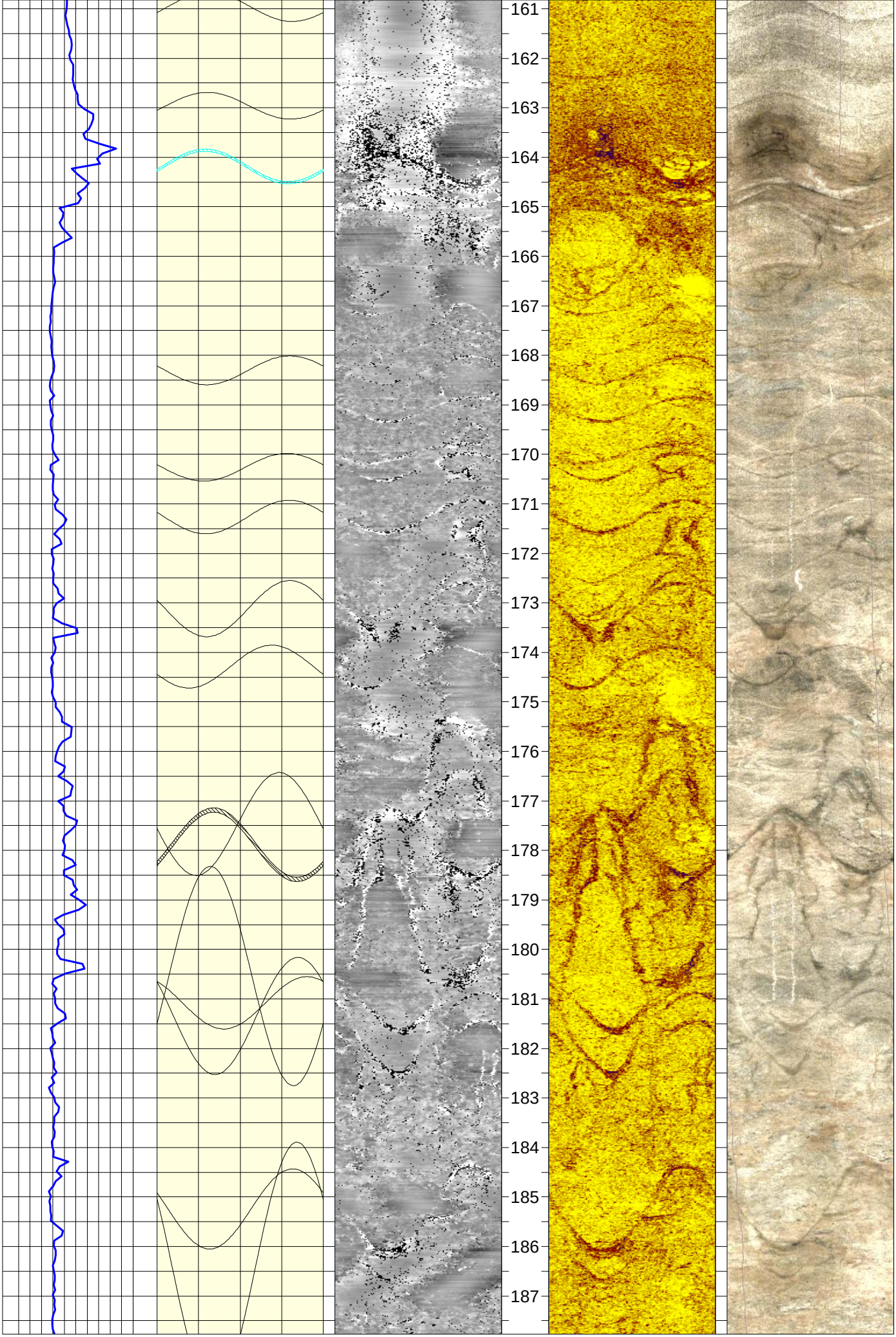
Log: Figure B-4 Televiewer Logs

Well: BR-2

Site: Savage Municipal Well Site

Date:	2/16/10	Location:	Milford, NH
Casing Depth:	144 ft	For:	Weston Solutions
Casing Type:	6 in	Logged by:	R. Rawcliffe
Boring Depth:	404.4 ft	Orientation:	magnetic
Meas. From:	top of casing	Structure Plots:	black = planar features (faults, foliation, bedding, joints, etc) light blue = possibly transmissive fracture dark blue = likely transmissive fracture
Stickup:	2.5 ft		
Water Level:	13.47 ft		

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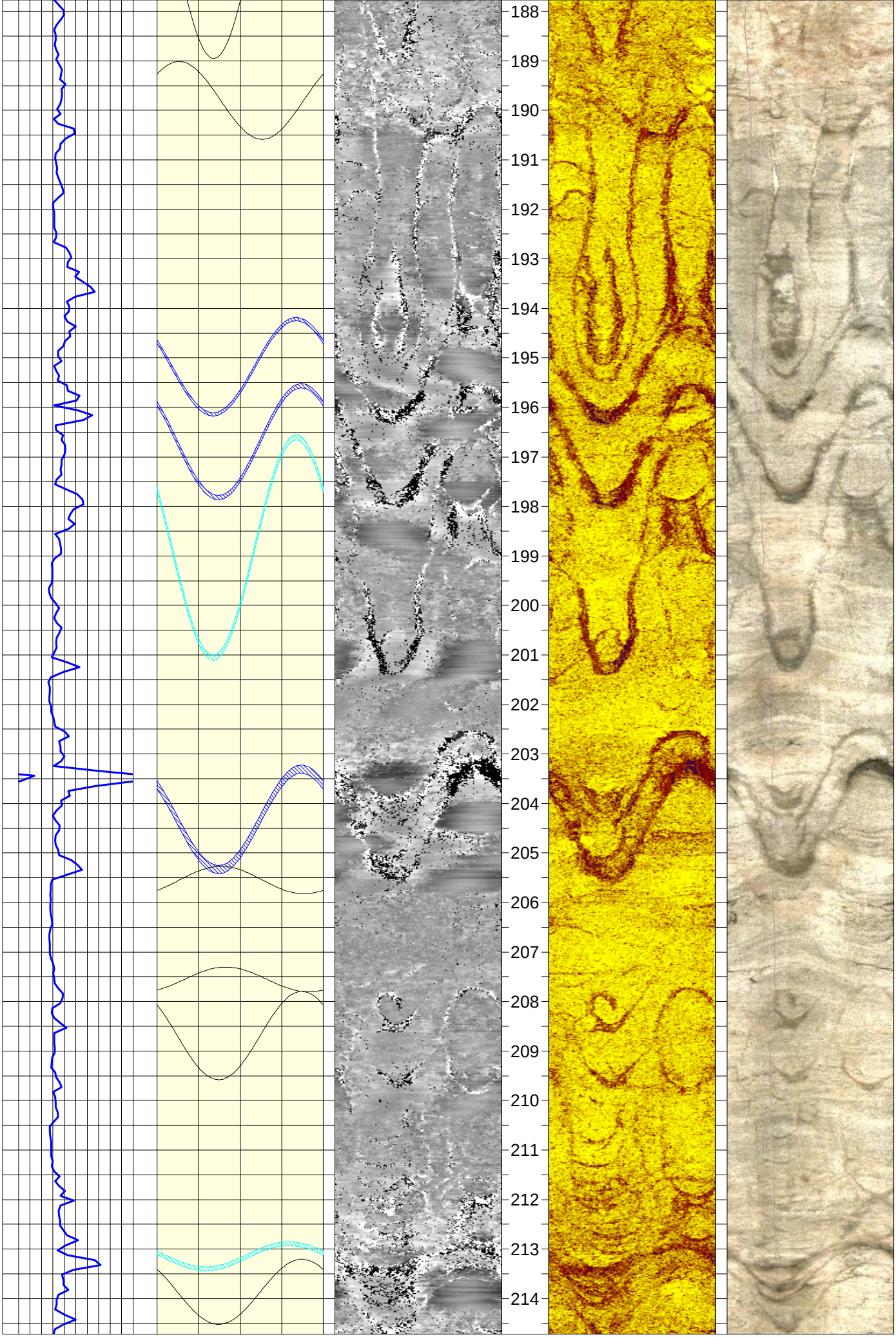
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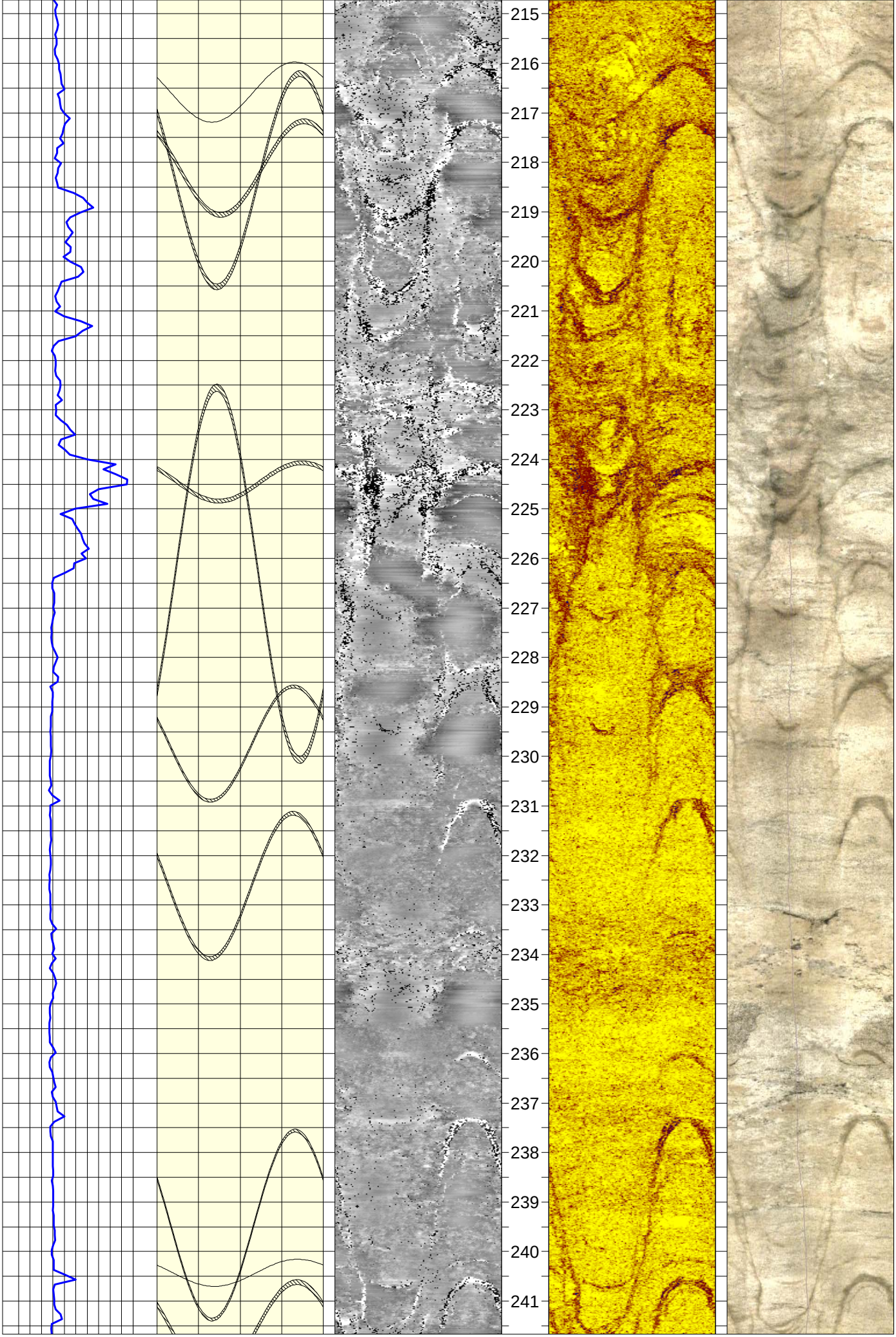
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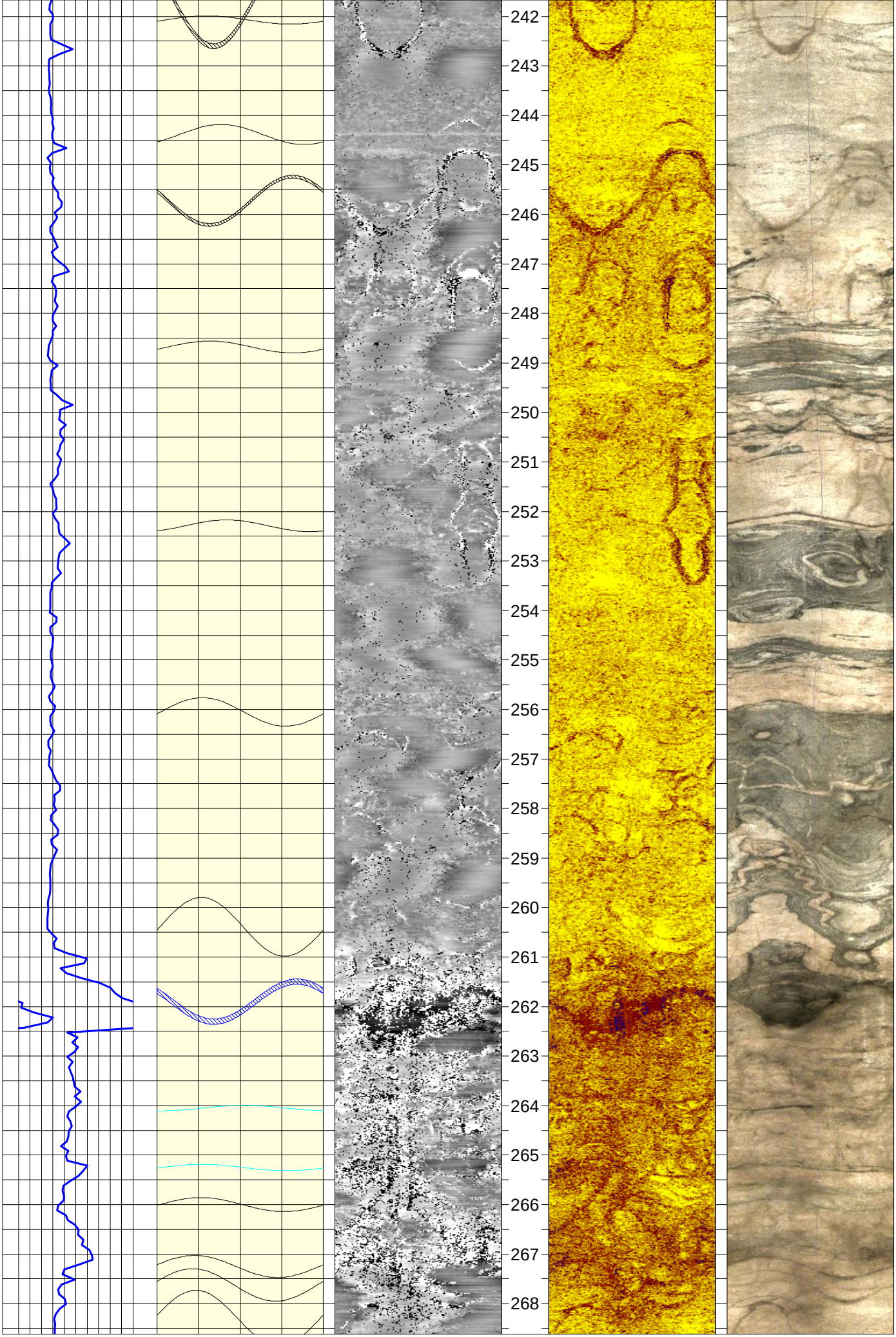
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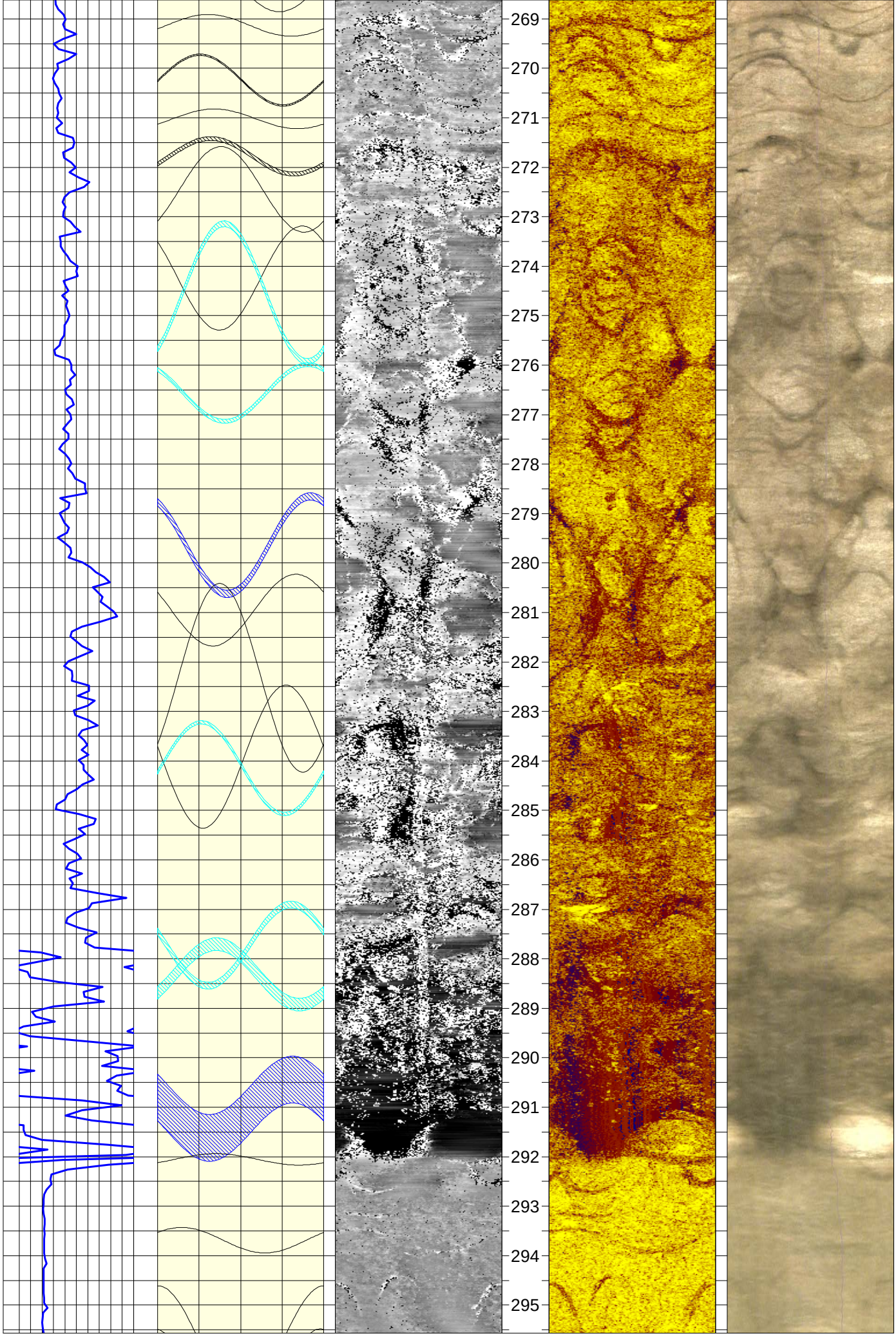
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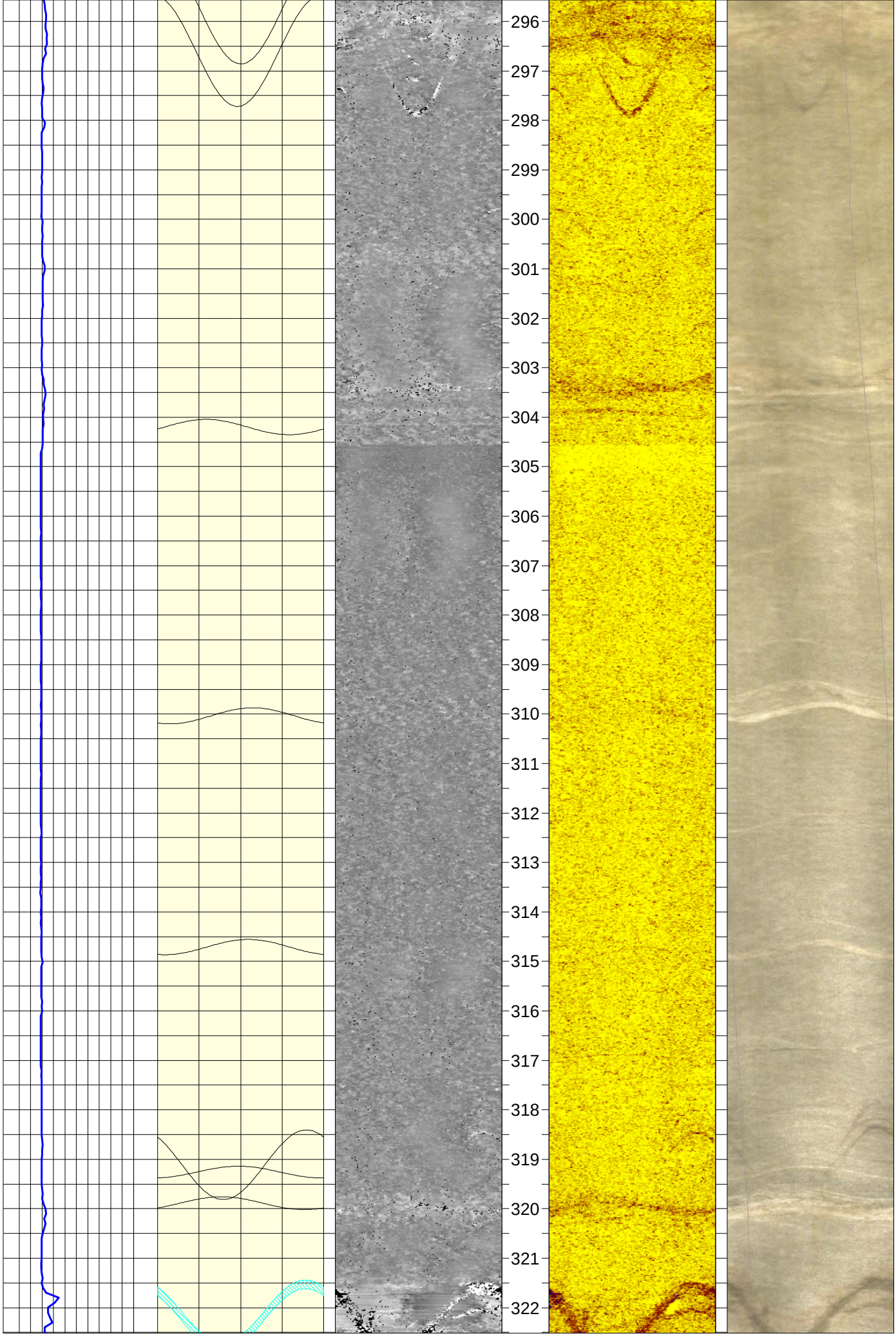
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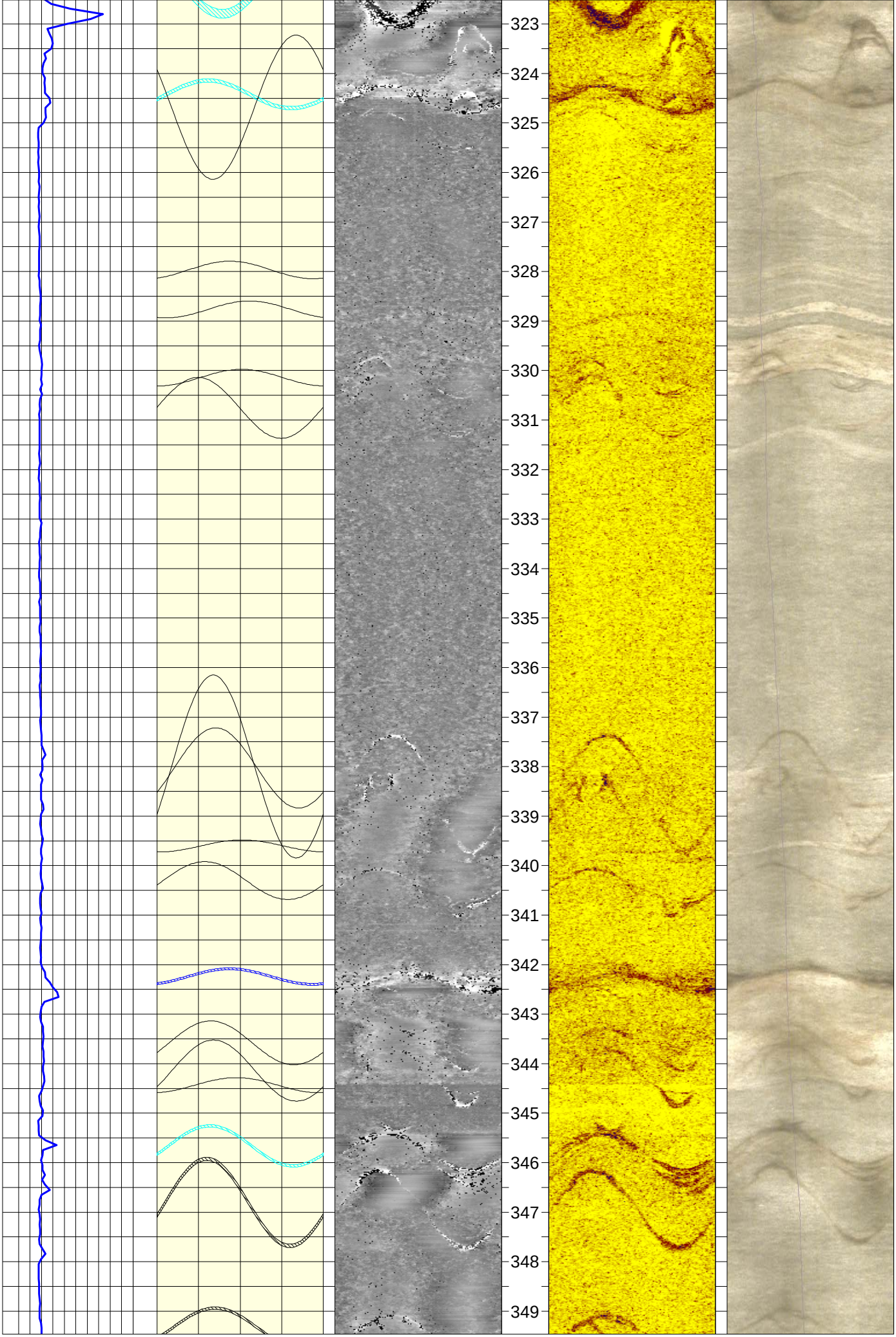
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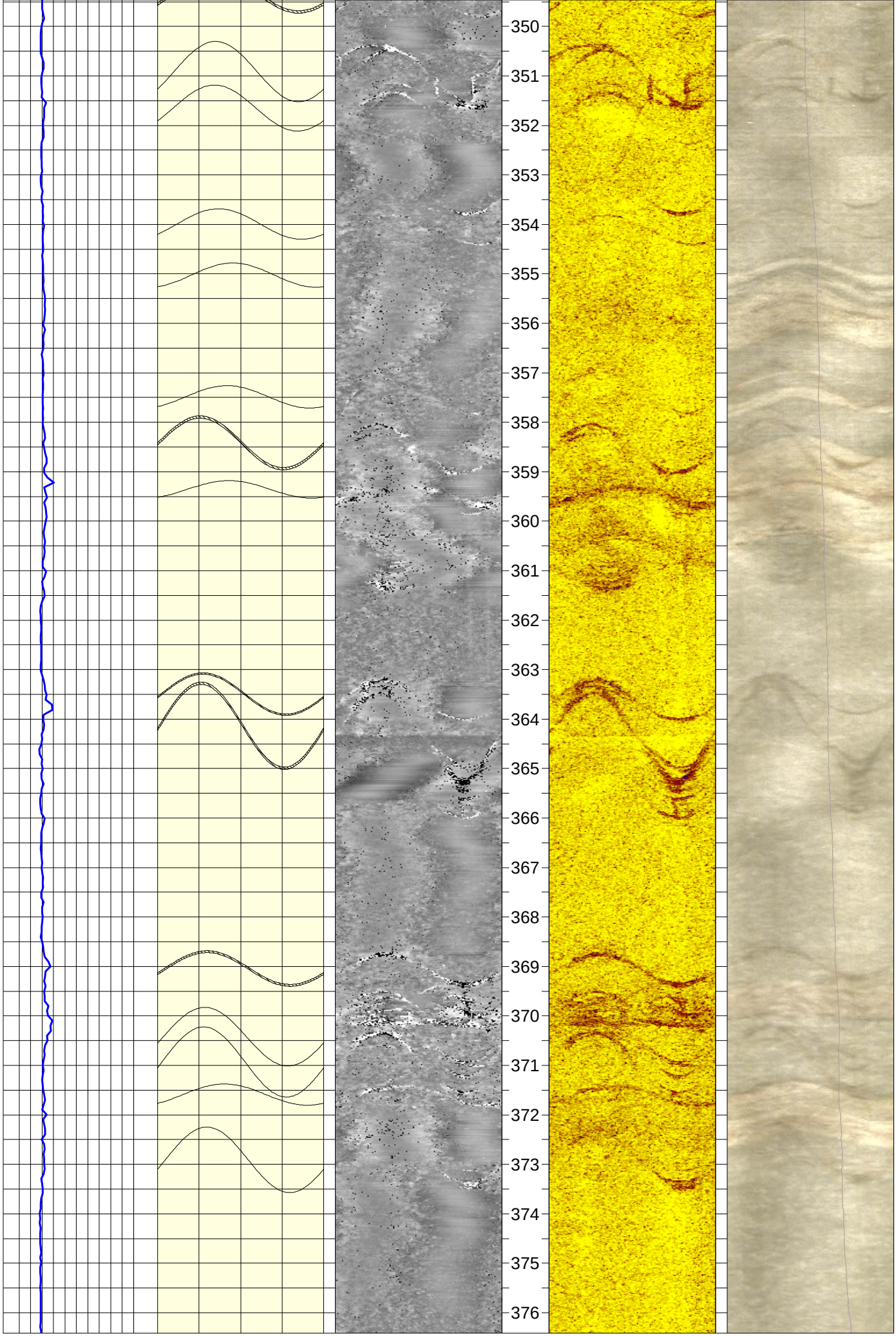
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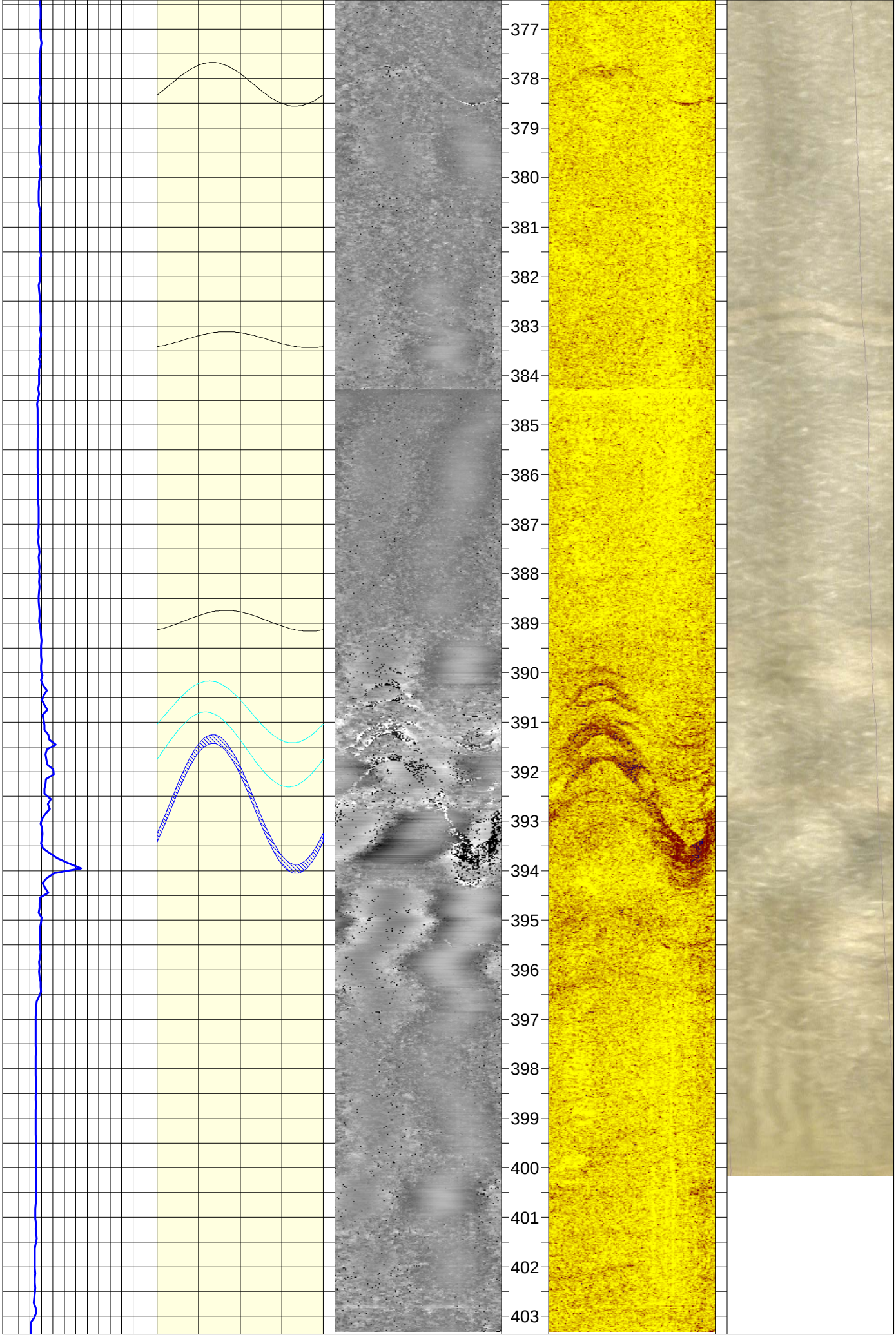
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TABLE B-1 Planar features interpreted from acoustical and optical televiewers
BR-2 Borehole - Savage Municipal Well Site - Milford, New Hampshire **Logged: February 2010**

Borehole	Feature # Number	Feature depth Feet	Dip Degrees	Dip Azimuth magnetic	Strike magnetic	Dip Azimuth True	Strike True	Aperture millimeters	Category Type
BR-2	1	146.8	37	312	42	296	26	0	100
BR-2	2	150.1	76	311	41	296	26	0	108
BR-2	3	152.2	77	316	46	301	31	4	108
BR-2	4	152.6	76	314	44	298	28	7	108
BR-2	5	153.8	78	308	38	293	23	5	108
BR-2	6	154.6	49	303	33	288	18	0	100
BR-2	7	156.2	79	304	34	289	19	0	100
BR-2	8	157.7	38	310	40	295	25	0	100
BR-2	9	161.0	48	293	23	278	8	0	100
BR-2	10	163.0	46	289	19	274	4	0	100
BR-2	11	164.2	51	284	14	269	359	11	108
BR-2	12	168.3	48	108	18	92	2	0	100
BR-2	13	170.3	47	101	11	86	356	0	100
BR-2	14	171.3	52	106	16	91	1	0	100
BR-2	15	173.1	65	108	18	92	2	0	100
BR-2	16	174.3	59	69	339	54	324	0	100
BR-2	17	177.5	76	85	355	70	340	0	100
BR-2	18	177.9	69	303	33	288	18	10	100
BR-2	19	180.5	83	296	26	281	11	0	100
BR-2	20	181.1	64	145	55	130	40	0	100
BR-2	21	181.3	77	126	36	110	20	0	100
BR-2	22	185.3	72	114	24	99	9	0	100
BR-2	23	186.4	84	123	33	108	18	0	100
BR-2	24	189.8	72	228	318	213	303	0	100
BR-2	25	195.2	75	122	32	106	16	5	107
BR-2	26	196.7	77	133	43	118	28	6	107
BR-2	27	198.8	83	122	32	107	17	4	108
BR-2	28	204.3	76	133	43	118	28	12	107
BR-2	29	205.6	47	318	48	303	33	0	100
BR-2	30	207.6	44	329	59	314	44	0	100
BR-2	31	208.7	74	134	44	119	29	0	100
BR-2	32	213.2	44	106	16	91	1	17	108
BR-2	33	213.9	68	134	44	119	29	0	100
BR-2	34	216.6	67	119	29	104	14	0	100
BR-2	35	218.1	74	138	48	123	33	8	100
BR-2	36	218.4	83	130	40	115	25	4	100
BR-2	37	224.5	56	134	44	119	29	13	100
BR-2	38	226.3	86	310	40	294	24	3	100
BR-2	39	229.7	77	116	26	101	11	4	100
BR-2	40	232.6	80	115	25	100	10	4	100
BR-2	41	239.5	82	119	29	104	14	2	100
BR-2	42	240.4	46	125	35	109	19	0	100
BR-2	43	241.6	75	123	33	108	18	8	100
BR-2	44	242.1	18	288	18	273	3	0	100
BR-2	45	244.4	38	319	49	304	34	0	100
BR-2	46	245.7	62	114	24	99	9	9	100
BR-2	47	248.7	24	294	24	279	9	0	100
BR-2	48	252.3	24	331	61	316	46	0	100
BR-2	49	256.1	48	278	8	263	353	0	100
BR-2	50	260.4	66	276	6	261	351	0	100
BR-2	51	261.9	57	123	33	108	18	18	107
BR-2	52	264.1	12	10	280	355	85	0	108
BR-2	53	265.3	14	278	8	263	353	0	108
BR-2	54	266.0	28	275	5	260	350	0	100
BR-2	55	267.3	40	261	351	246	336	0	100
BR-2	56	267.6	51	257	347	242	332	0	100
BR-2	57	268.3	65	264	354	249	339	0	100
BR-2	58	269.1	40	290	20	275	5	0	100
BR-2	59	270.2	63	272	2	257	347	4	100

TABLE B-1 Planar features interpreted from acoustical and optical televiewers
BR-2 Borehole - Savage Municipal Well Site - Milford, New Hampshire **Logged: February 2010**

Borehole	Feature # Number	Feature depth Feet	Dip Degrees	Dip Azimuth magnetic	Strike magnetic	Dip Azimuth True	Strike True	Aperture millimeters	Category Type
BR-2	60	271.0	37	303	33	288	18	0	100
BR-2	61	271.8	54	296	26	280	10	15	100
BR-2	62	272.5	73	318	48	303	33	0	100
BR-2	63	274.2	76	134	44	119	29	0	100
BR-2	64	274.5	79	325	55	310	40	7	108
BR-2	65	276.6	65	146	56	131	41	11	108
BR-2	66	279.6	75	151	61	136	46	11	107
BR-2	67	281.0	70	120	30	105	15	0	100
BR-2	68	282.3	82	315	45	299	29	0	100
BR-2	69	283.9	80	98	8	83	353	0	100
BR-2	70	284.1	74	275	5	260	350	6	108
BR-2	71	287.7	72	110	20	94	4	12	108
BR-2	72	288.3	67	308	38	293	23	30	108
BR-2	73	291.0	66	113	23	98	8	117	107
BR-2	74	292.1	24	307	37	292	22	0	100
BR-2	75	293.7	44	232	322	217	307	0	100
BR-2	76	295.7	77	181	271	166	76	0	100
BR-2	77	296.6	77	173	83	158	68	0	100
BR-2	78	304.2	31	285	15	270	0	0	100
BR-2	79	310.0	32	26	296	11	281	0	100
BR-2	80	314.7	30	16	286	1	271	0	100
BR-2	81	319.1	70	143	53	128	38	0	100
BR-2	82	319.3	24	355	85	340	70	0	100
BR-2	83	319.9	26	318	48	303	33	0	100
BR-2	84	322.2	68	141	51	126	36	21	108
BR-2	85	324.4	47	291	21	276	6	14	108
BR-2	86	324.7	80	121	31	106	16	0	100
BR-2	87	328.0	34	338	68	323	53	0	100
BR-2	88	328.8	33	20	290	5	275	0	100
BR-2	89	330.1	33	3	273	348	78	0	100
BR-2	90	330.8	67	269	359	254	344	0	100
BR-2	91	338.0	82	302	32	286	16	0	100
BR-2	92	338.0	72	307	37	292	22	0	100
BR-2	93	339.6	25	5	275	349	79	0	100
BR-2	94	340.3	56	283	13	268	358	0	100
BR-2	95	342.2	31	337	67	322	52	10	107
BR-2	96	343.6	59	296	26	281	11	0	100
BR-2	97	344.1	67	302	32	287	17	0	100
BR-2	98	344.4	30	352	82	336	66	0	100
BR-2	99	345.7	57	295	25	280	10	9	108
BR-2	100	346.8	73	288	18	273	3	6	100
BR-2	101	349.3	56	306	36	291	21	8	100
BR-2	102	350.9	67	306	36	291	21	0	100
BR-2	103	351.7	61	304	34	288	18	0	100
BR-2	104	354.0	50	312	42	297	27	0	100
BR-2	105	355.0	43	343	73	328	58	0	100
BR-2	106	357.5	41	331	61	316	46	0	100
BR-2	107	358.4	63	272	2	257	347	7	100
BR-2	108	359.4	34	335	65	319	49	0	100
BR-2	109	363.5	58	279	9	263	353	6	100
BR-2	110	364.1	73	275	5	260	350	4	100
BR-2	111	369.0	52	288	18	272	2	8	100
BR-2	112	370.4	66	283	13	267	357	0	100
BR-2	113	370.9	70	280	10	265	355	0	100
BR-2	114	371.6	39	325	55	310	40	0	100
BR-2	115	372.9	68	287	17	272	2	0	100
BR-2	116	378.1	59	299	29	284	14	0	100
BR-2	117	383.3	32	331	61	316	46	0	100
BR-2	118	389.0	39	330	60	315	45	0	100

TABLE B-1 Planar features interpreted from acoustical and optical televiewers
BR-2 Borehole - Savage Municipal Well Site - Milford, New Hampshire **Logged: February 2010**

Borehole	Feature # Number	Feature depth Feet	Dip Degrees	Dip Azimuth magnetic	Strike magnetic	Dip Azimuth True	Strike True	Aperture millimeters	Category Type
BR-2	119	390.8	67	293	23	278	8	0	108
BR-2	120	391.6	71	285	15	270	360	0	108
BR-2	121	392.7	79	301	31	286	16	11	107

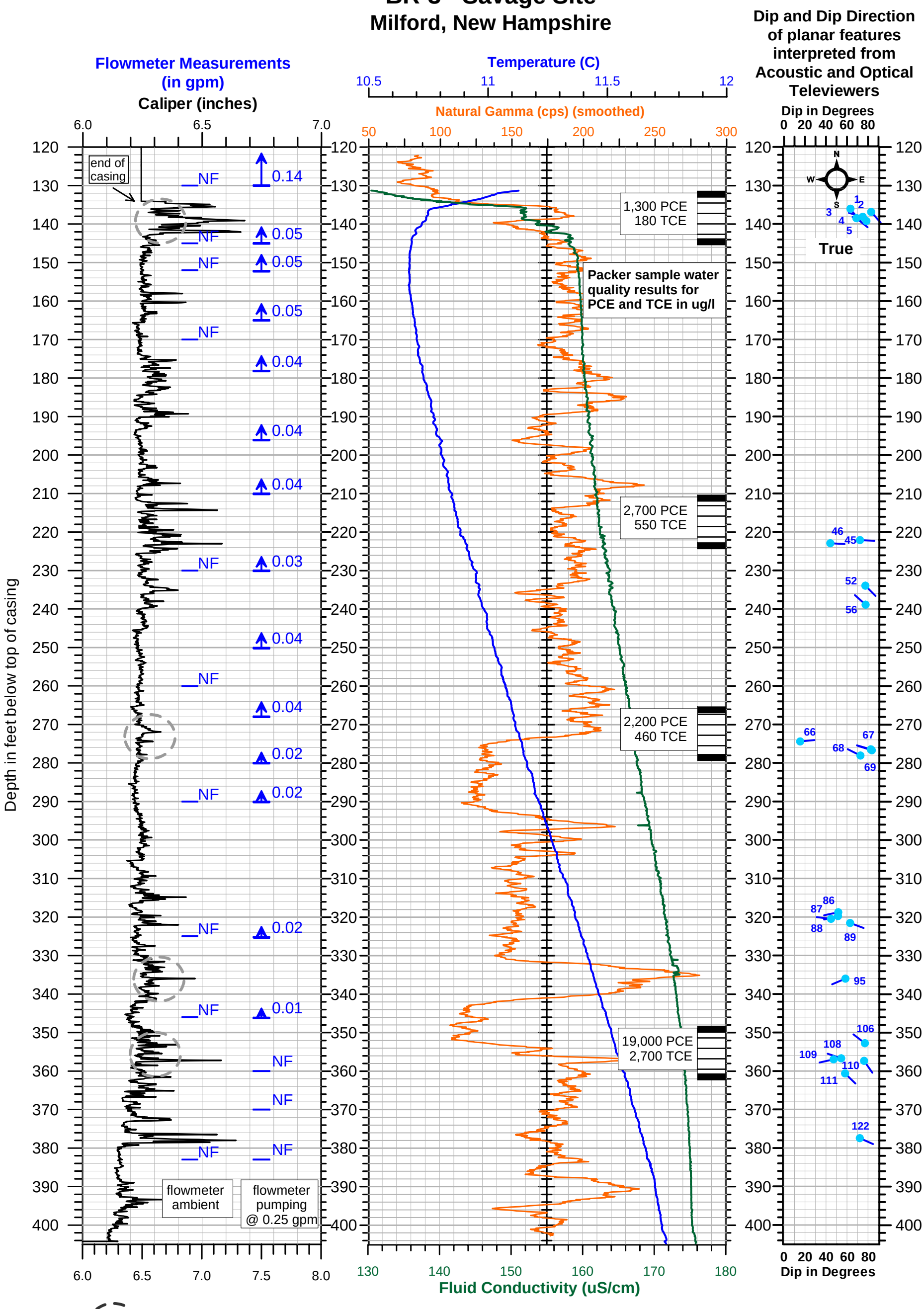
Explanation:

Category 100 = planar feature (possible fracture, joint, foliation, bedding, etc.)
Category 107 = Likely water bearing feature
Category 108 = Possible water bearing fracture

Northeast Geophysical Services

Borehole Geophysical Log
BR-3 - Savage Site
Milford, New Hampshire

Date logged: 2/15/10



= Likely transmissive zone

= Possible transmissive zone

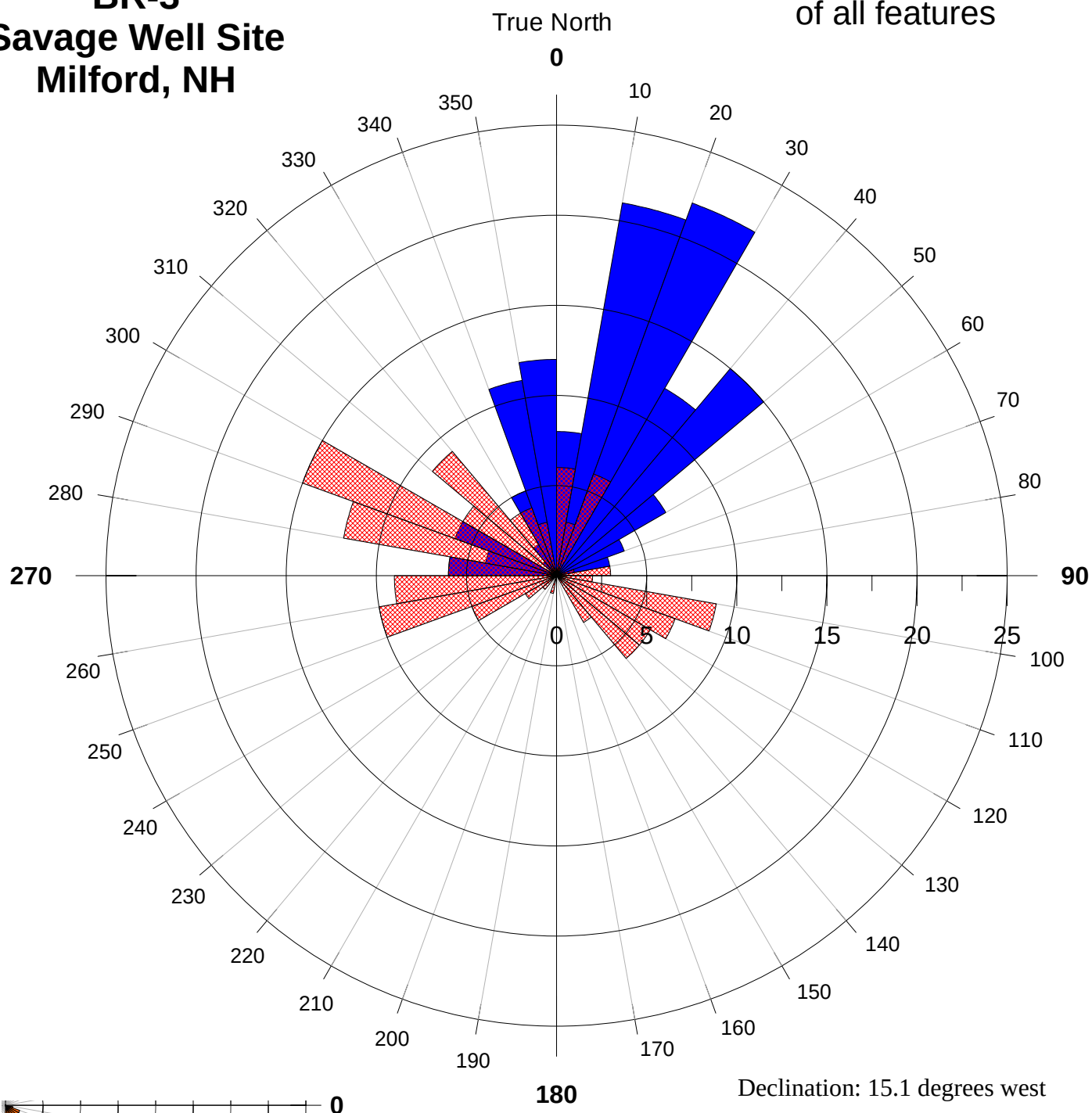
FIGURE C-1
Borehole Geophysical Log
BR-3 - Savage Site
Milford, New Hampshire

Tadpole tail indicates dip direction.
The solid tadpoles with a feature number are the ones interpreted to be likely or possibly transmissive.

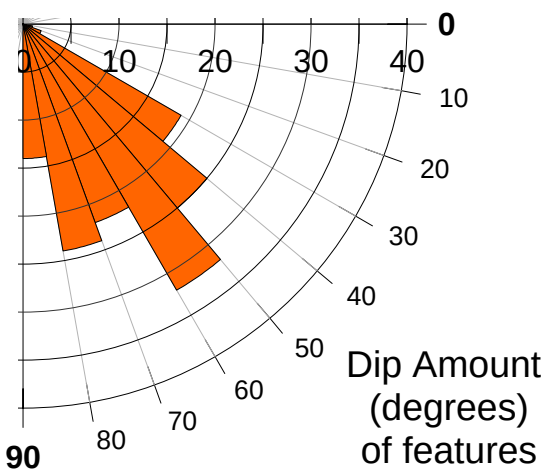
Northeast Geophysical Services

BR-3
Savage Well Site
Milford, NH

FIGURE C-2
Strike and Dip Direction of all features



Declination: 15.1 degrees west



Explanation

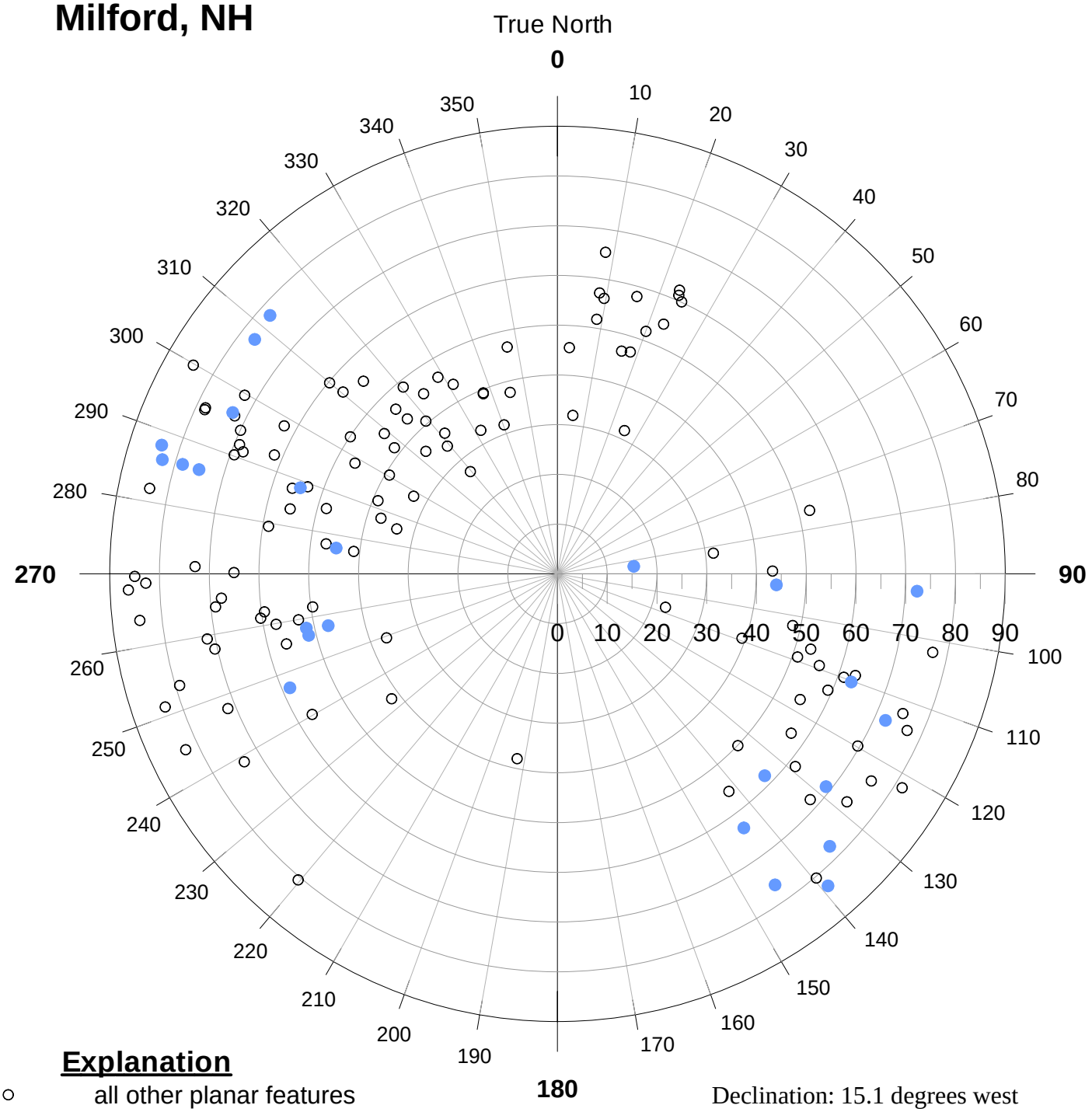
- Dip direction of feature
- Strike of feature
- Dip Amount (Tilt)

Based on 139 measurements

Northeast Geophysical Services

BR-3
Savage Well Site
Milford, NH

FIGURE C-3
Dip Amount and Dip Azimuth of planar features (upper hemisphere plot)



Explanation

- ○ all other planar features
- ● Likely water bearing
- ● Possibly water bearing

Declination: 15.1 degrees west

Based on 139 measurements

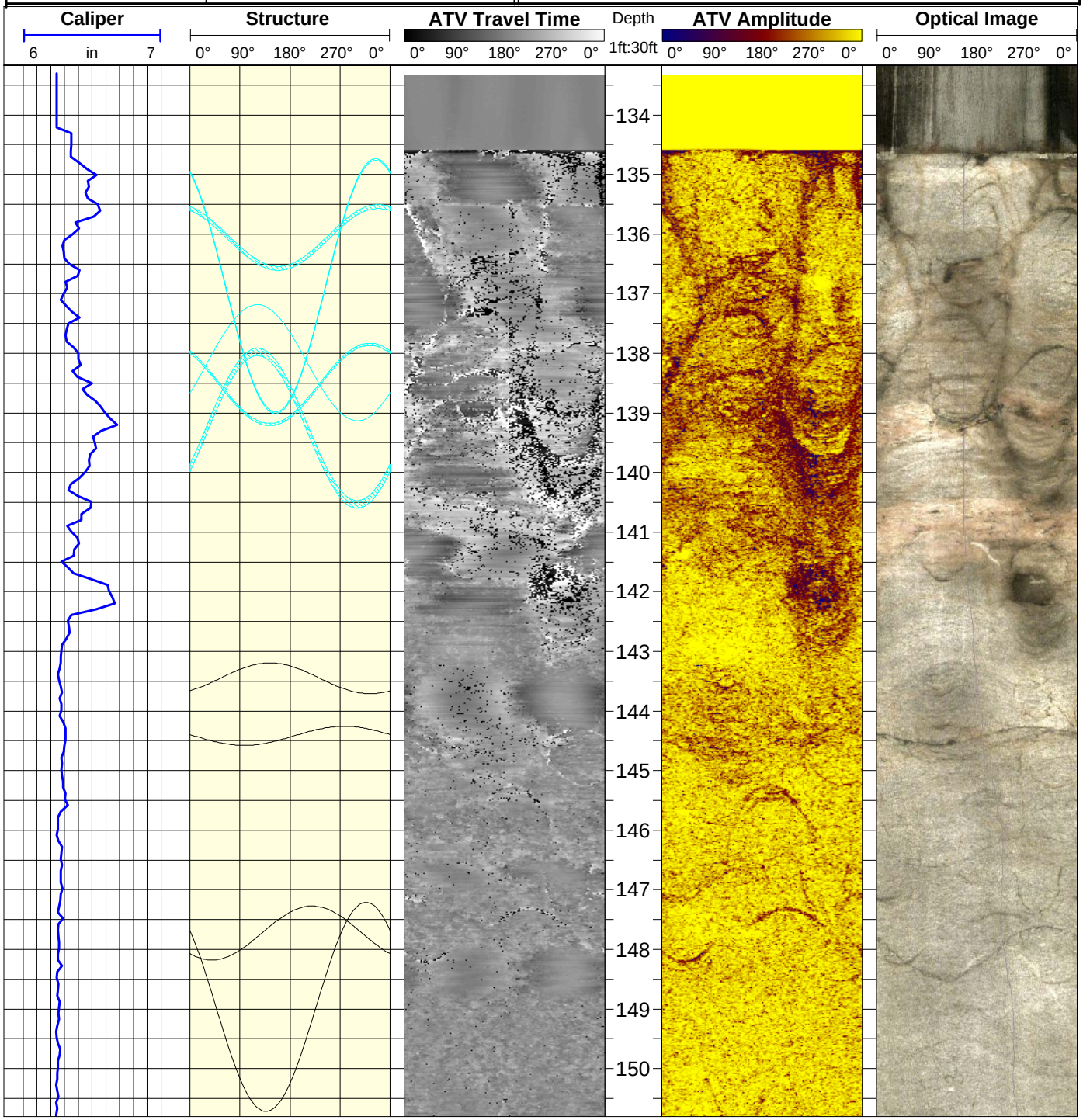
Northeast Geophysical Services
4 Union Street Bangor, Maine 04401
Tel. 207-942-2700
email: ngsinc@negeophysical.com

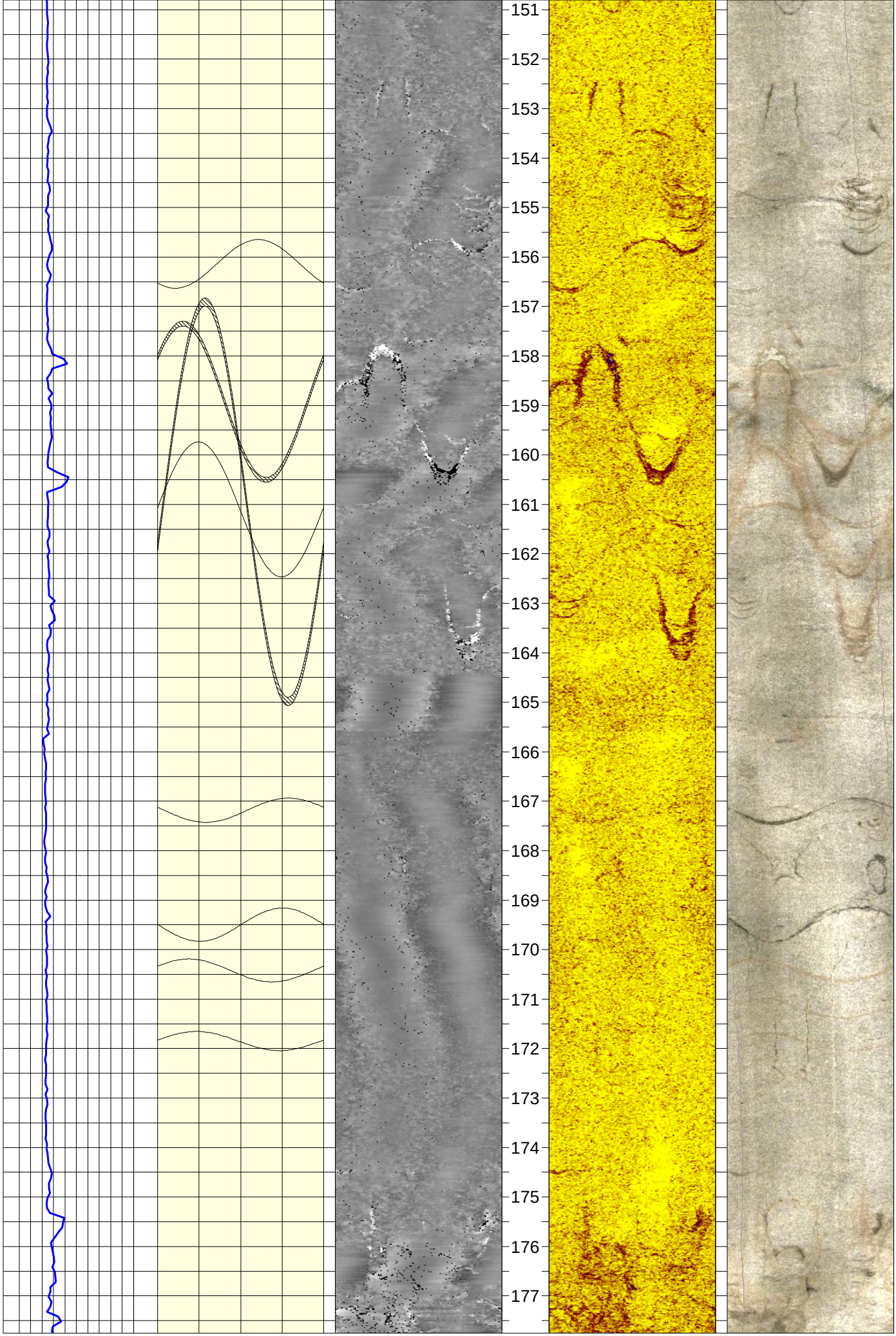
Log: Figure C-4 Televiewer Logs

Well: BR-3

Site: Savage Municipal Well Site

Date:	2/15/2010	Location:	Milford, NH
Casing Depth:	134 ft	For:	Weston Solutions
Casing Type:	6 in steel	Logged by:	R Rawcliffe
Boring Depth:	405.4 ft	Orientation:	magnetic
Meas. From:	top of casing	Structure Plots:	black = planar features (faults, foliation, bedding, joints, etc) light blue = possibly transmissive fracture dark blue = likely transmissive fracture
Stickup:	2.5 ft		
Water Level:	14.04 ft		

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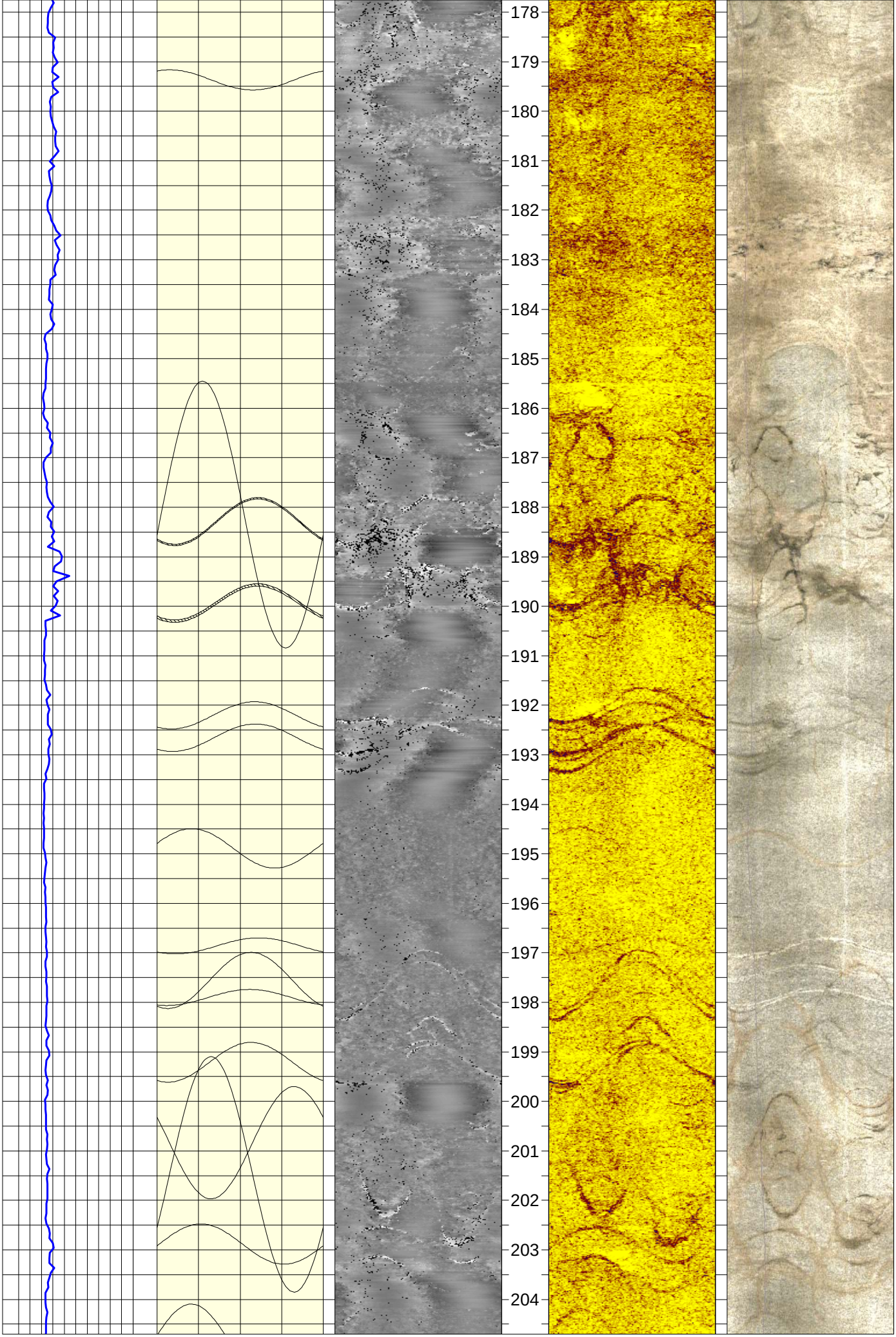
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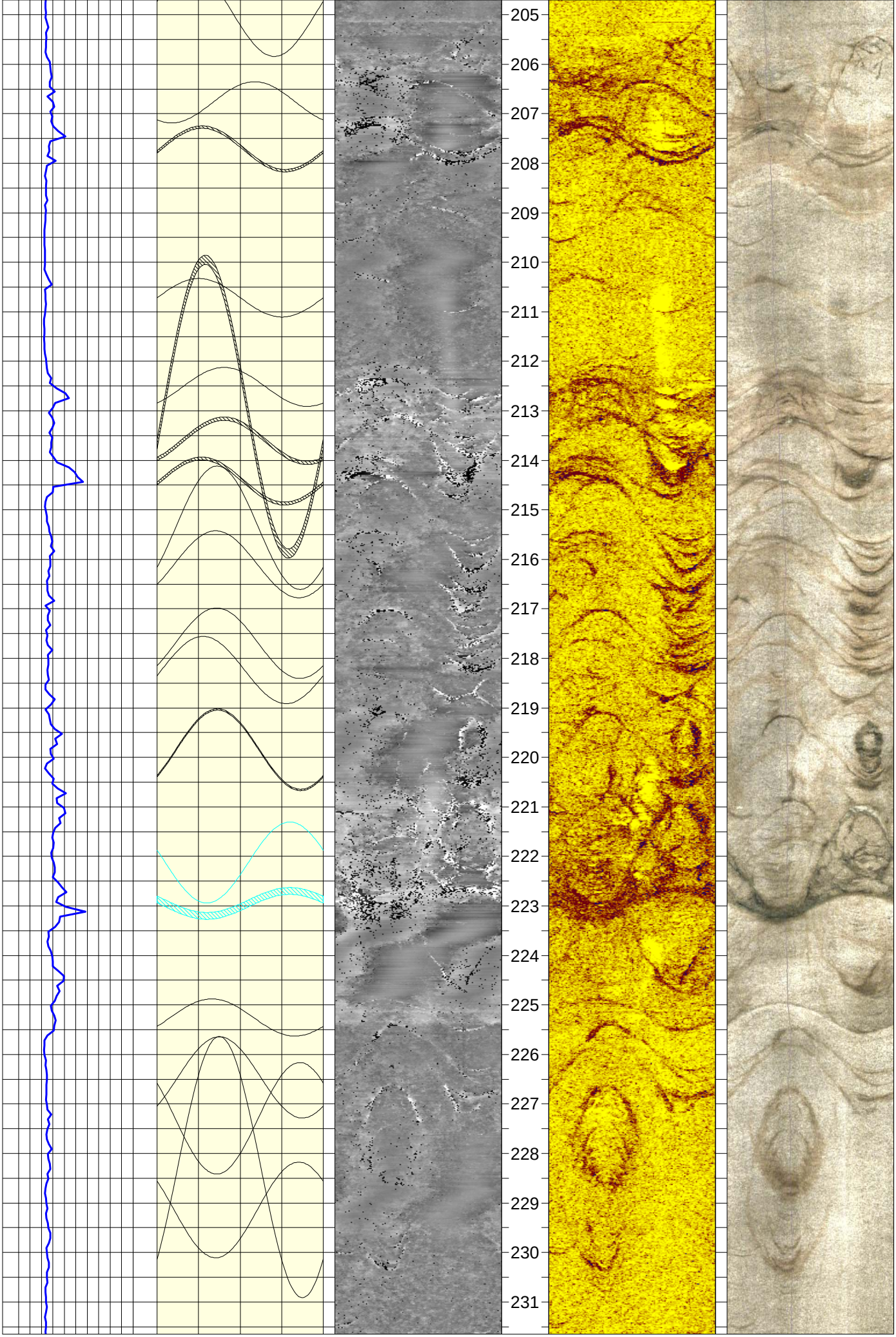
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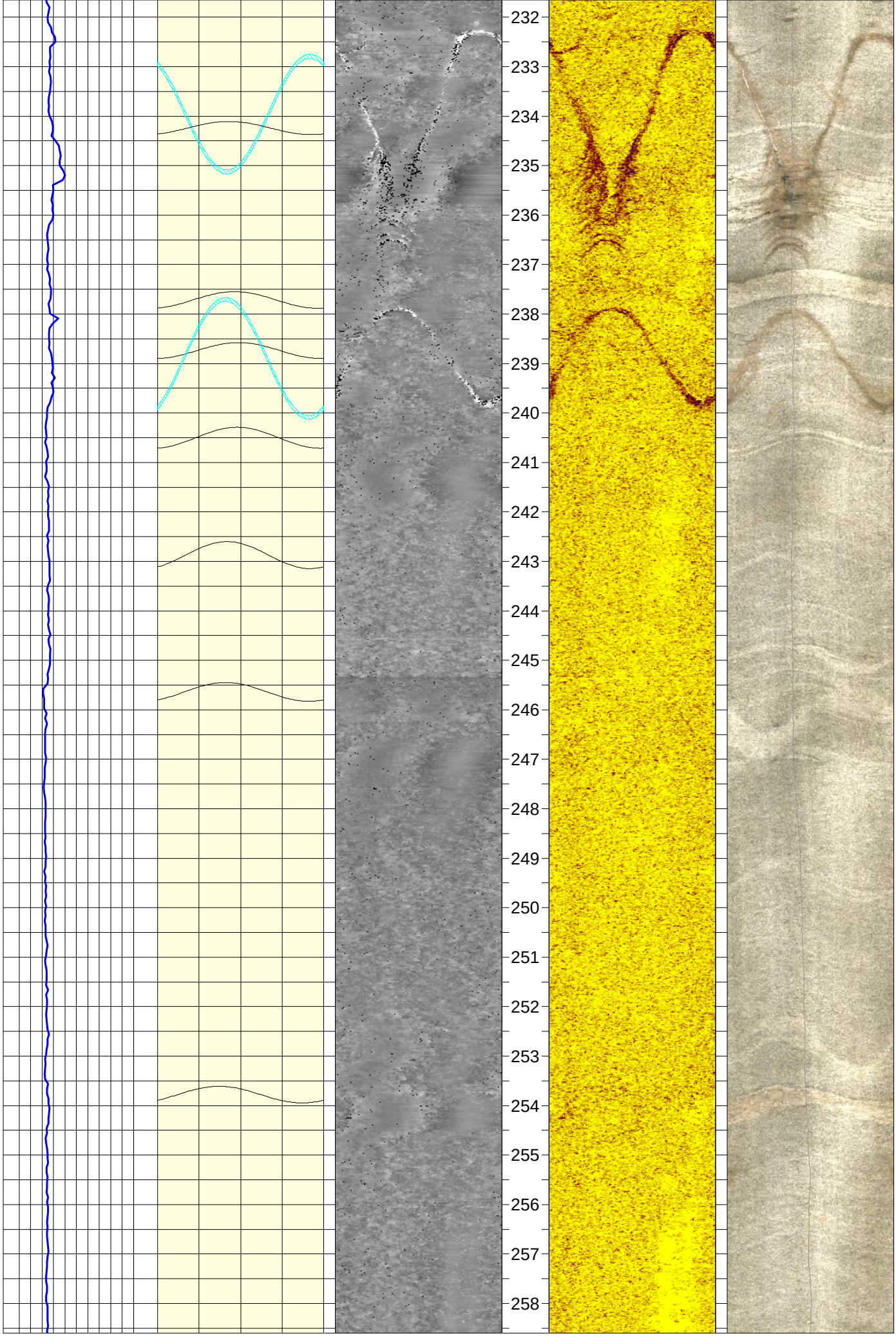
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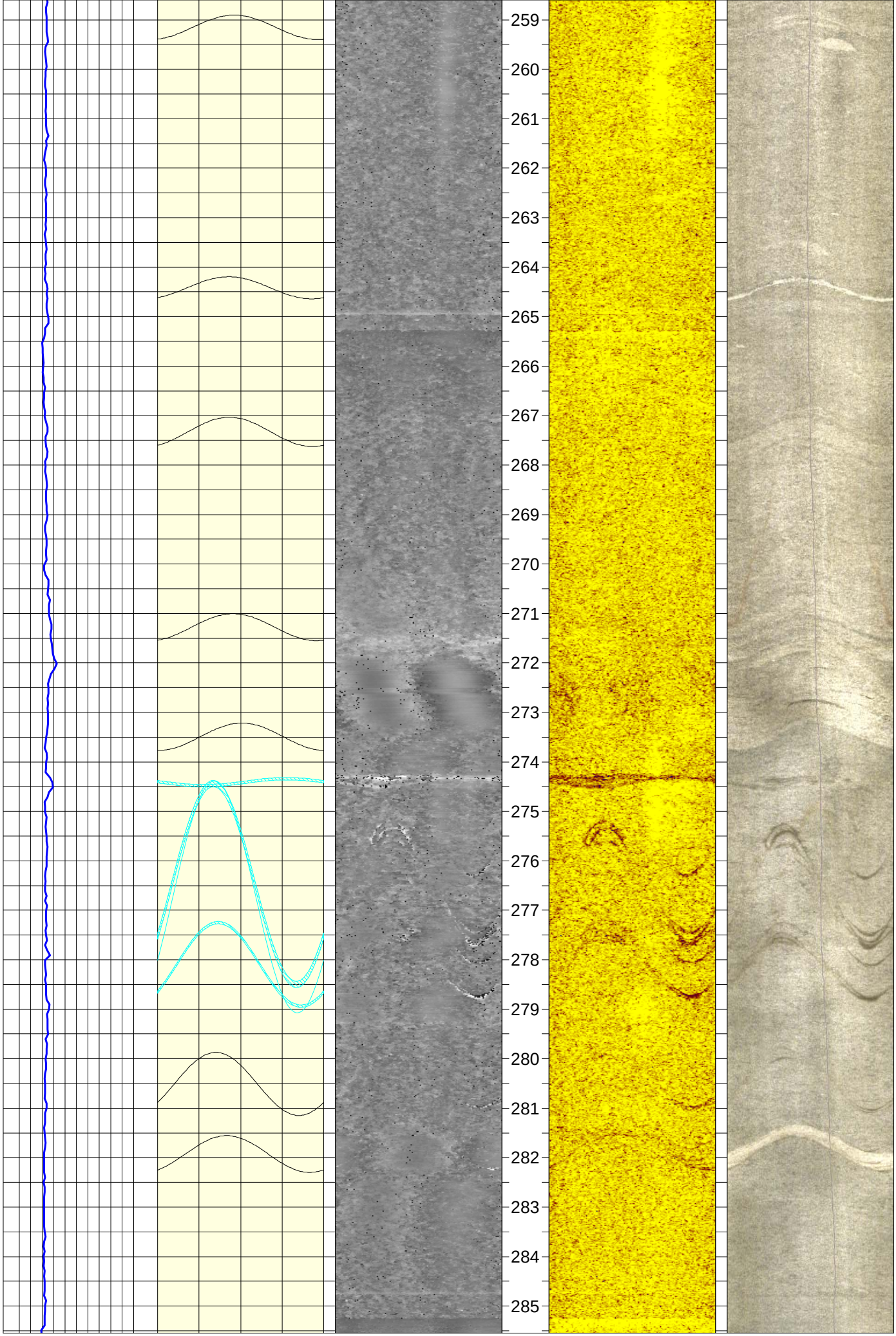
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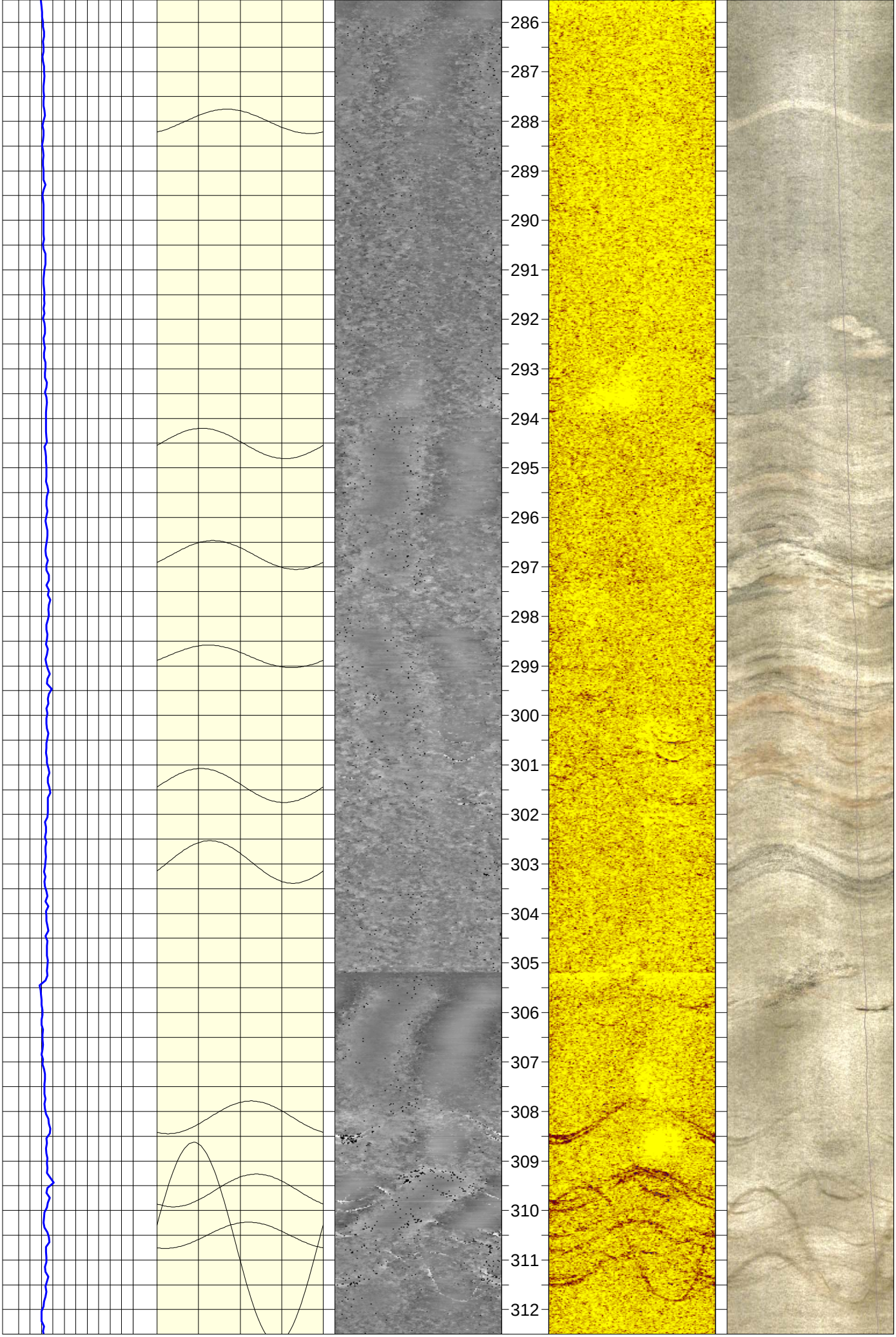
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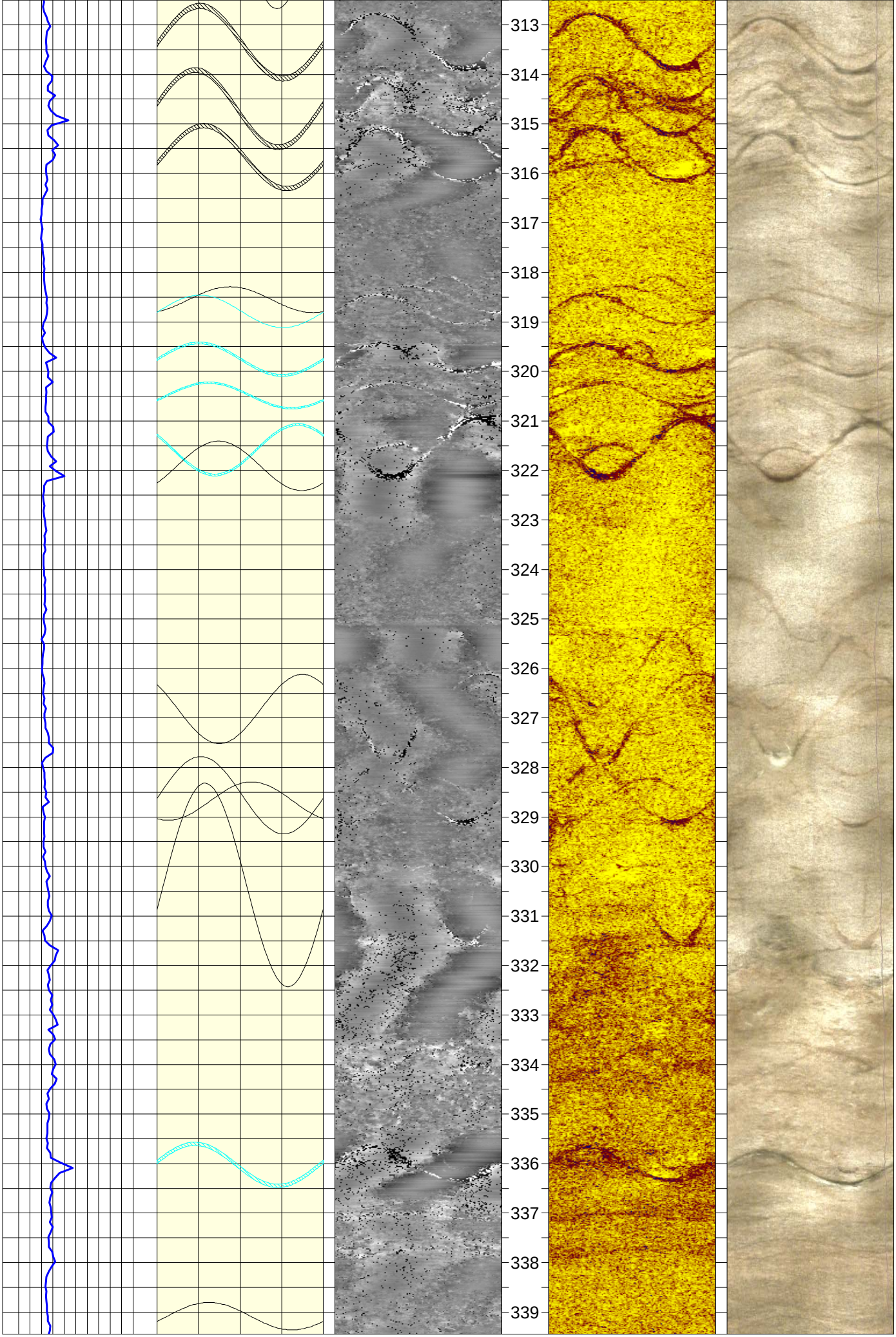
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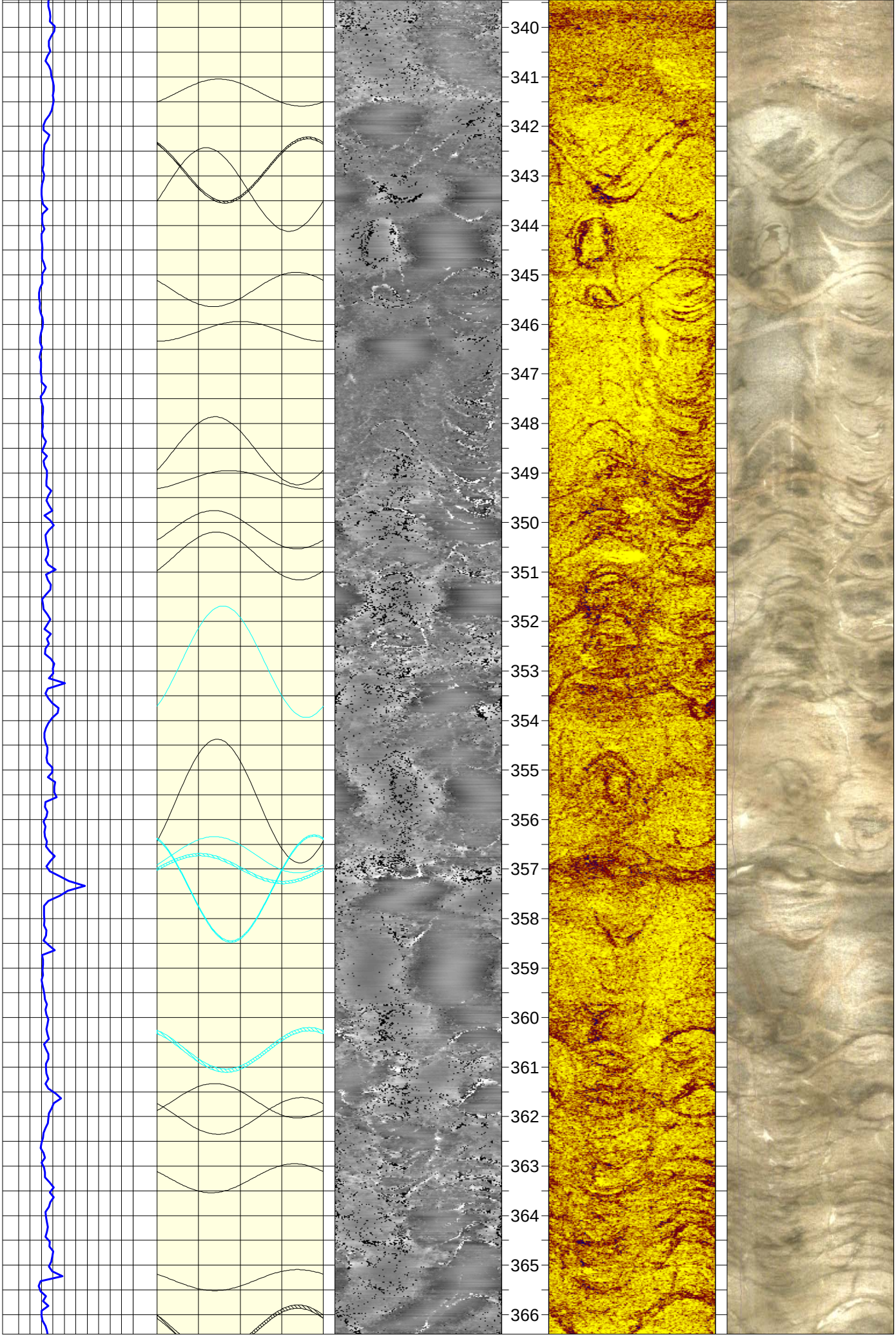
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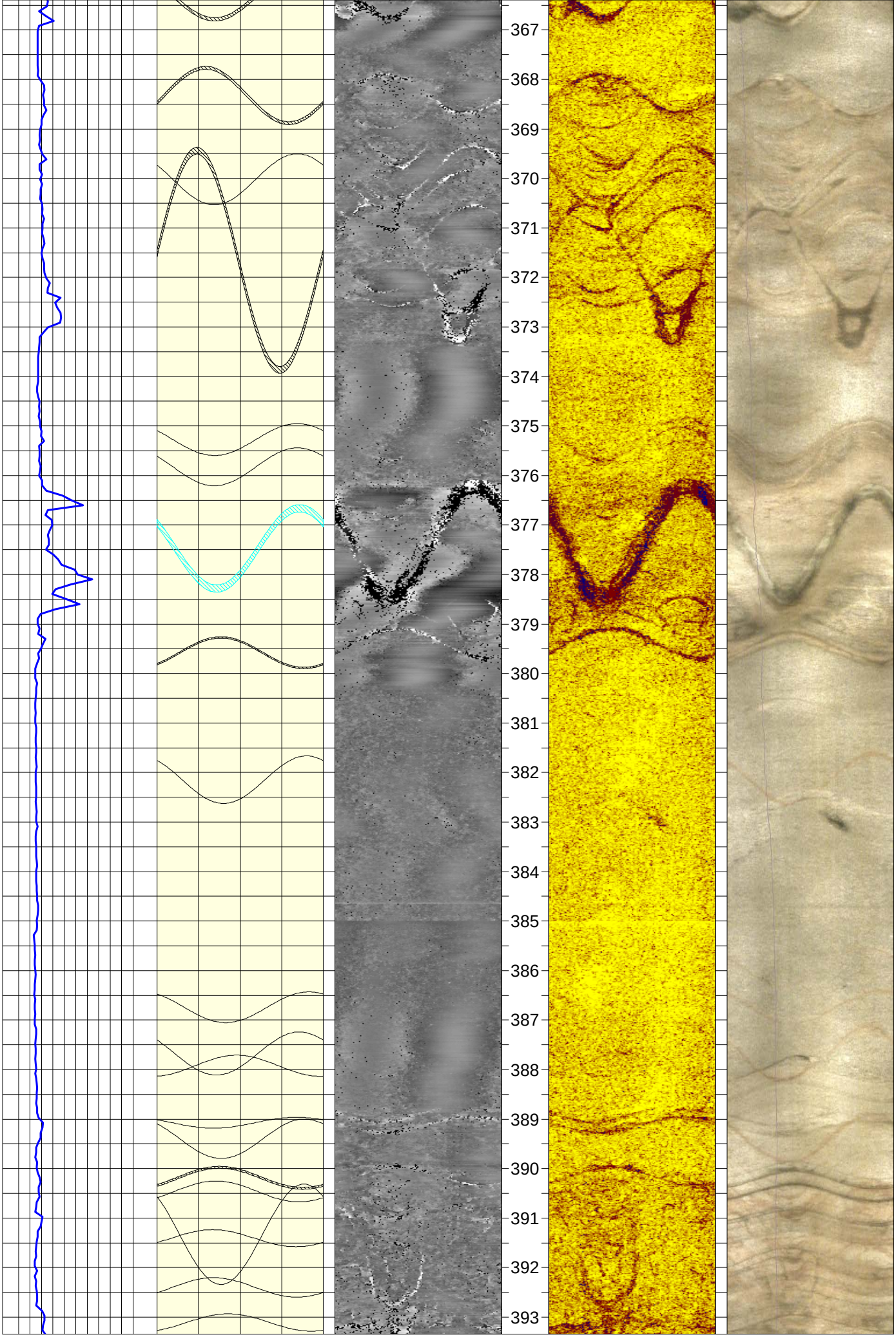
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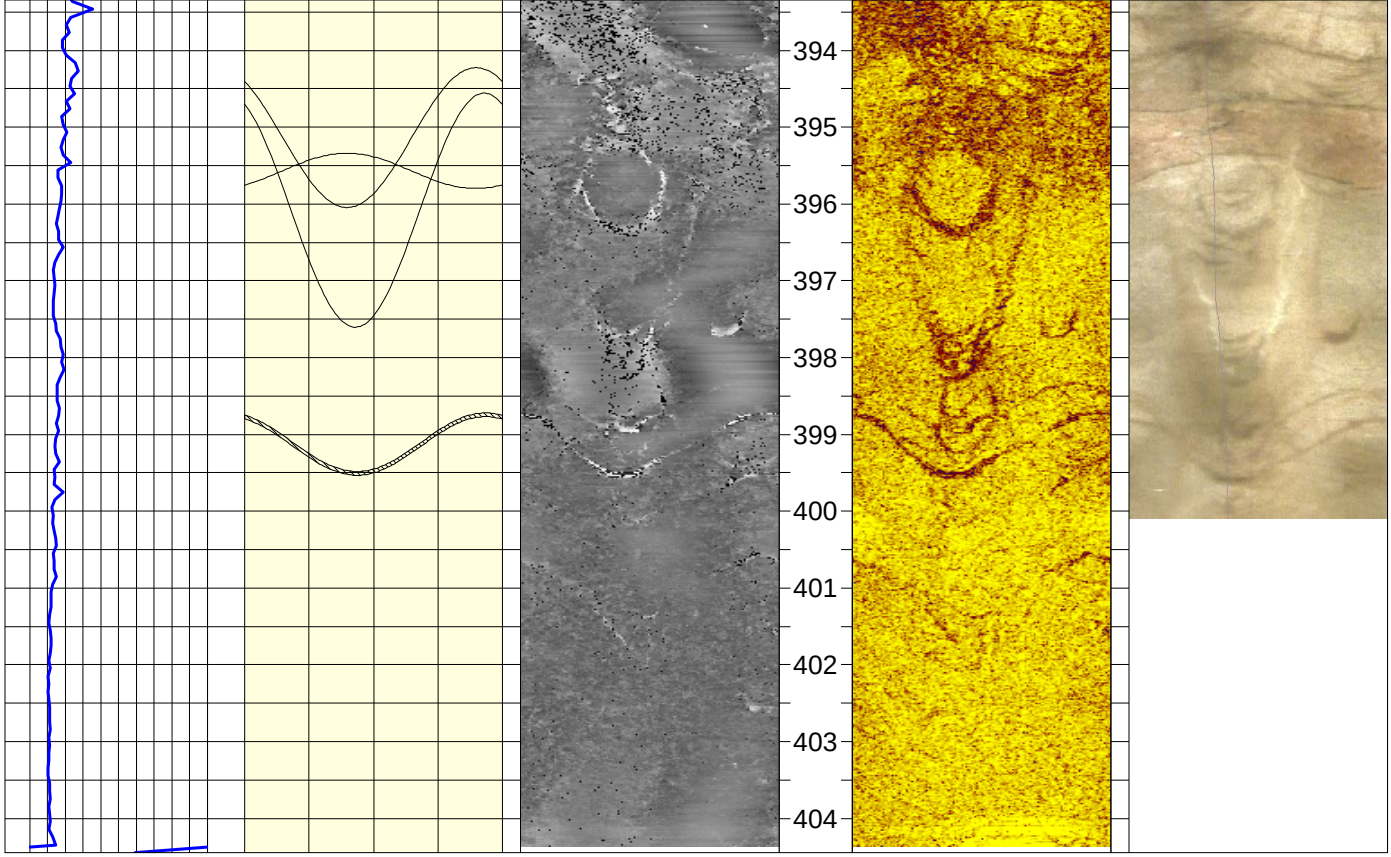
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TABLE C-1 Planar features interpreted from acoustical and optical televiewers
BR-3 Borehole - Savage Municipal Well Site - Milford, New Hampshire **Logged: February 2010**

Borehole	Feature # Number	Feature depth Feet	Dip Degrees	Dip Azimuth magnetic	Strike magnetic	Dip Azimuth True	Strike True	Aperture millimeters	Category Type
BR-3	1	136.1	63	159	69	144	54	9	108
BR-3	2	136.9	83	154	64	139	49	1	108
BR-3	3	138.2	75	301	31	286	16	0	108
BR-3	4	138.5	69	143	53	128	38	5	108
BR-3	5	139.3	79	301	31	286	16	8	108
BR-3	6	143.5	45	324	54	309	39	0	100
BR-3	7	144.4	32	98	8	82	352	0	100
BR-3	8	147.7	60	40	310	25	295	0	100
BR-3	9	149.0	82	137	47	122	32	0	100
BR-3	10	156.1	62	38	308	23	293	0	100
BR-3	11	158.9	81	235	325	220	310	5	100
BR-3	12	161.0	86	283	13	268	358	3	100
BR-3	13	161.1	79	269	359	254	344	0	100
BR-3	14	167.2	43	104	14	89	359	0	100
BR-3	15	169.5	52	91	1	76	346	0	100
BR-3	16	170.4	42	248	338	233	323	0	100
BR-3	17	171.9	37	265	355	249	339	0	100
BR-3	18	179.4	38	207	297	192	282	0	100
BR-3	19	188.1	84	279	9	264	354	0	100
BR-3	20	188.3	61	39	309	24	294	5	100
BR-3	21	189.9	55	38	308	23	293	9	100
BR-3	22	192.2	47	31	301	16	286	0	100
BR-3	23	192.7	47	33	303	18	288	0	100
BR-3	24	194.9	57	255	345	240	330	0	100
BR-3	25	196.9	32	40	310	25	295	0	100
BR-3	26	197.6	65	24	294	8	278	0	100
BR-3	27	197.9	32	21	291	6	276	0	100
BR-3	28	199.2	57	24	294	9	279	0	100
BR-3	29	200.8	77	117	27	102	12	0	100
BR-3	30	201.5	84	297	27	282	12	0	100
BR-3	31	202.9	57	275	5	260	350	0	100
BR-3	32	205.0	73	254	344	239	329	0	100
BR-3	33	206.8	58	31	301	16	286	0	100
BR-3	34	207.7	59	278	8	263	353	8	100
BR-3	35	210.7	56	271	1	255	345	0	100
BR-3	36	212.5	57	325	55	310	40	0	100
BR-3	37	212.9	85	285	15	270	360	5	100
BR-3	38	213.6	60	325	55	310	40	11	100
BR-3	39	214.4	60	277	7	262	352	9	100
BR-3	40	215.4	78	310	40	295	25	0	100
BR-3	41	216.1	69	307	37	292	22	0	100
BR-3	42	217.7	70	309	39	294	24	0	100
BR-3	43	218.2	69	280	10	265	355	0	100
BR-3	44	219.9	72	311	41	296	26	3	100
BR-3	45	222.1	72	108	18	93	3	0	108
BR-3	46	223.0	44	108	18	93	3	29	108
BR-3	47	225.3	55	299	29	284	14	0	100
BR-3	48	226.5	72	315	45	300	30	0	100
BR-3	49	227.3	77	129	39	114	24	0	100
BR-3	50	228.3	84	315	45	300	30	0	100
BR-3	51	229.1	75	127	37	112	22	0	100
BR-3	52	234.0	77	150	60	135	45	6	108
BR-3	53	234.2	27	335	65	320	50	0	100
BR-3	54	237.7	33	347	77	332	62	0	100
BR-3	55	238.7	32	355	85	340	70	0	100
BR-3	56	238.9	78	327	57	312	42	5	108
BR-3	57	240.5	39	353	83	338	68	0	100
BR-3	58	242.9	46	331	61	316	46	0	100
BR-3	59	245.6	36	328	58	313	43	0	100

TABLE C-1 Planar features interpreted from acoustical and optical televiewers
BR-3 Borehole - Savage Municipal Well Site - Milford, New Hampshire **Logged: February 2010**

Borehole	Feature # Number	Feature depth Feet	Dip Degrees	Dip Azimuth magnetic	Strike magnetic	Dip Azimuth True	Strike True	Aperture millimeters	Category Type
BR-3	60	253.8	33	313	43	298	28	0	100
BR-3	61	259.2	43	346	76	331	61	0	100
BR-3	62	264.4	41	334	64	319	49	0	100
BR-3	63	267.3	49	336	66	320	50	0	100
BR-3	64	271.3	46	344	74	329	59	0	100
BR-3	65	273.5	47	3	273	348	78	0	100
BR-3	66	274.4	15	99	9	84	354	15	108
BR-3	67	276.5	83	301	31	286	16	5	108
BR-3	68	276.7	84	303	33	288	18	0	108
BR-3	69	278.1	73	312	42	296	26	5	108
BR-3	70	280.5	68	306	36	291	21	0	100
BR-3	71	281.9	55	330	60	315	45	0	100
BR-3	72	288.0	43	331	61	316	46	0	100
BR-3	73	294.5	50	277	7	262	352	0	100
BR-3	74	296.8	48	301	31	286	16	0	100
BR-3	75	298.8	41	291	21	276	6	0	100
BR-3	76	301.4	53	275	5	260	350	0	100
BR-3	77	303.0	59	294	24	279	9	0	100
BR-3	78	308.1	52	24	294	9	279	0	100
BR-3	79	309.6	52	35	305	20	290	0	100
BR-3	80	310.5	46	18	288	3	273	0	100
BR-3	81	310.6	83	260	350	245	335	0	100
BR-3	82	313.4	70	273	3	258	348	11	100
BR-3	83	314.7	72	263	353	248	338	10	100
BR-3	84	315.7	68	281	11	266	356	11	100
BR-3	85	318.6	45	338	68	323	53	0	100
BR-3	86	318.8	52	273	3	258	348	0	108
BR-3	87	319.8	52	271	1	256	346	7	108
BR-3	88	320.5	45	292	22	277	7	5	108
BR-3	89	321.6	63	125	35	110	20	5	108
BR-3	90	321.9	62	314	44	298	28	0	100
BR-3	91	326.8	70	135	45	120	30	0	100
BR-3	92	328.6	72	275	5	259	349	0	100
BR-3	93	328.7	56	25	295	10	280	0	100
BR-3	94	330.4	83	284	14	269	359	0	100
BR-3	95	336.0	58	262	352	247	337	10	108
BR-3	96	339.1	47	292	22	277	7	0	100
BR-3	97	341.3	46	314	44	299	29	0	100
BR-3	98	342.9	68	147	57	132	42	3	100
BR-3	99	343.3	73	286	16	271	1	0	100
BR-3	100	345.3	53	122	32	107	17	0	100
BR-3	101	346.1	38	0	270	345	75	0	100
BR-3	102	348.6	69	305	35	290	20	0	100
BR-3	103	349.1	36	336	66	321	51	0	100
BR-3	104	350.1	56	303	33	288	18	0	100
BR-3	105	350.7	62	308	38	293	23	0	100
BR-3	106	352.8	77	323	53	308	38	0	108
BR-3	107	355.6	78	310	40	295	25	0	100
BR-3	108	356.7	55	304	34	289	19	0	108
BR-3	109	357.0	47	272	2	257	347	10	108
BR-3	110	357.4	76	160	70	145	55	2	108
BR-3	111	360.7	58	149	59	134	44	10	108
BR-3	112	361.7	53	304	34	289	19	0	100
BR-3	113	362.0	55	132	42	117	27	0	100
BR-3	114	363.3	48	117	27	102	12	0	100
BR-3	115	365.3	39	124	34	109	19	0	100
BR-3	116	366.3	61	125	35	110	20	11	100
BR-3	117	368.3	65	285	15	270	0	7	100
BR-3	118	370.0	63	124	34	109	19	0	100

TABLE C-1 Planar features interpreted from acoustical and optical televiewers
BR-3 Borehole - Savage Municipal Well Site - Milford, New Hampshire **Logged: February 2010**

Borehole	Feature # Number	Feature depth Feet	Dip Degrees	Dip Azimuth magnetic	Strike magnetic	Dip Azimuth True	Strike True	Aperture millimeters	Category Type
BR-3	119	371.7	83	266	356	251	341	5	100
BR-3	120	375.3	51	124	34	109	19	0	100
BR-3	121	375.8	56	124	34	109	19	0	100
BR-3	122	377.5	72	129	39	114	24	14	108
BR-3	123	379.6	50	319	49	304	34	7	100
BR-3	124	382.2	62	144	54	129	39	0	100
BR-3	125	386.7	50	149	59	134	44	0	100
BR-3	126	387.7	59	128	38	113	23	0	100
BR-3	127	387.9	39	353	83	338	68	0	100
BR-3	128	389.1	23	122	32	107	17	0	100
BR-3	129	389.4	57	139	49	124	34	0	100
BR-3	130	390.2	39	316	46	300	30	8	100
BR-3	131	390.5	39	307	37	292	22	0	100
BR-3	132	391.3	76	139	49	123	33	0	100
BR-3	133	391.4	34	301	31	286	16	0	100
BR-3	134	392.4	37	303	33	288	18	0	100
BR-3	135	393.1	34	334	64	319	49	0	100
BR-3	136	395.1	74	143	53	128	38	0	100
BR-3	137	395.6	41	323	53	308	38	0	100
BR-3	138	396.1	80	155	65	140	50	0	100
BR-3	139	399.1	56	157	67	142	52	7	100

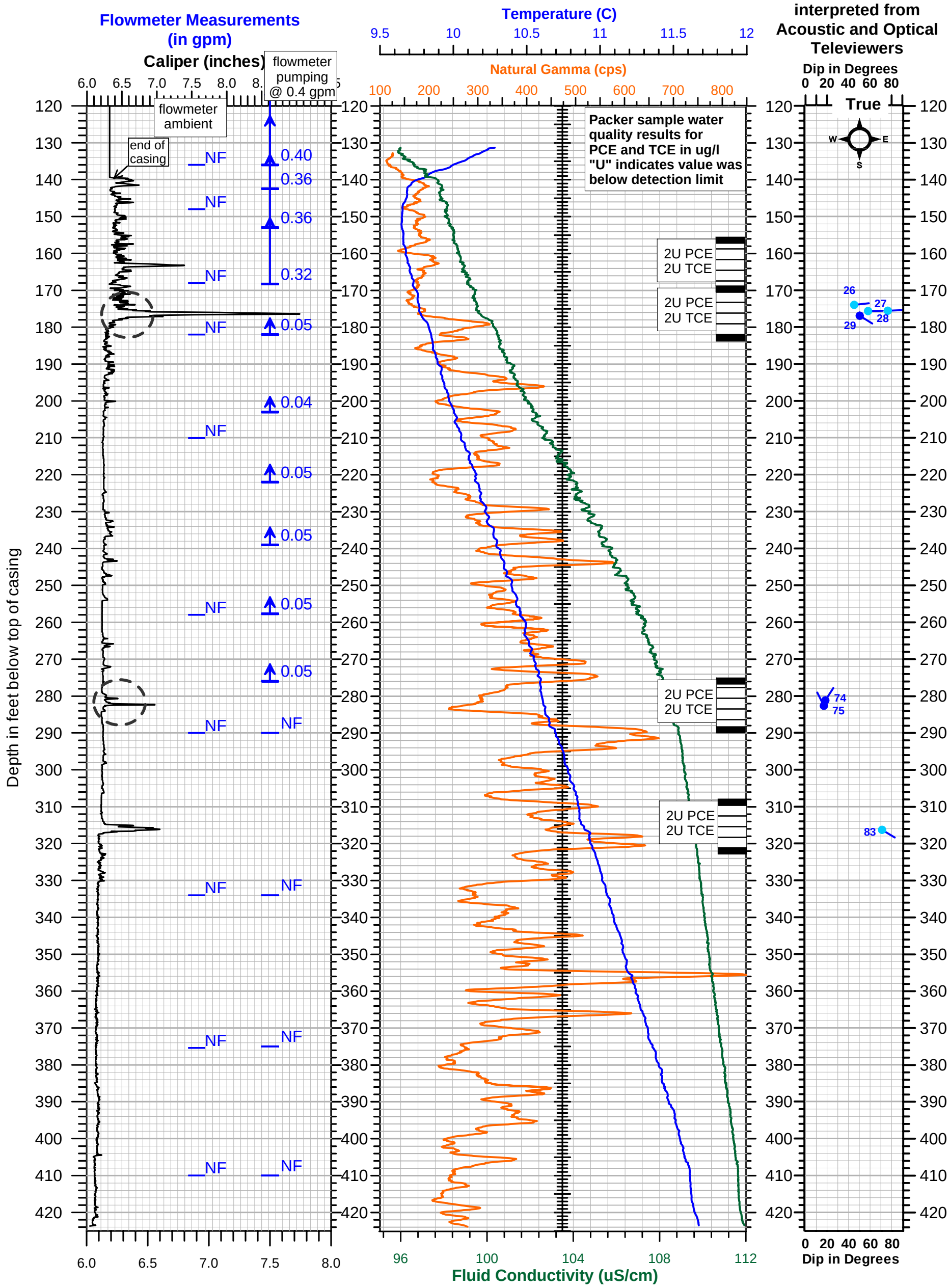
Explanation:

Category 100 = planar feature (possible fracture, joint, foliation, bedding, etc.)
Category 107 = Likely water bearing feature
Category 108 = Possible water bearing fracture

Northeast Geophysical Services

Borehole Geophysical Log
BR-4 - Savage Site
Milford, New Hampshire

Date logged: 3/01/10



= Likely transmissive zone

= Possible transmissive zone

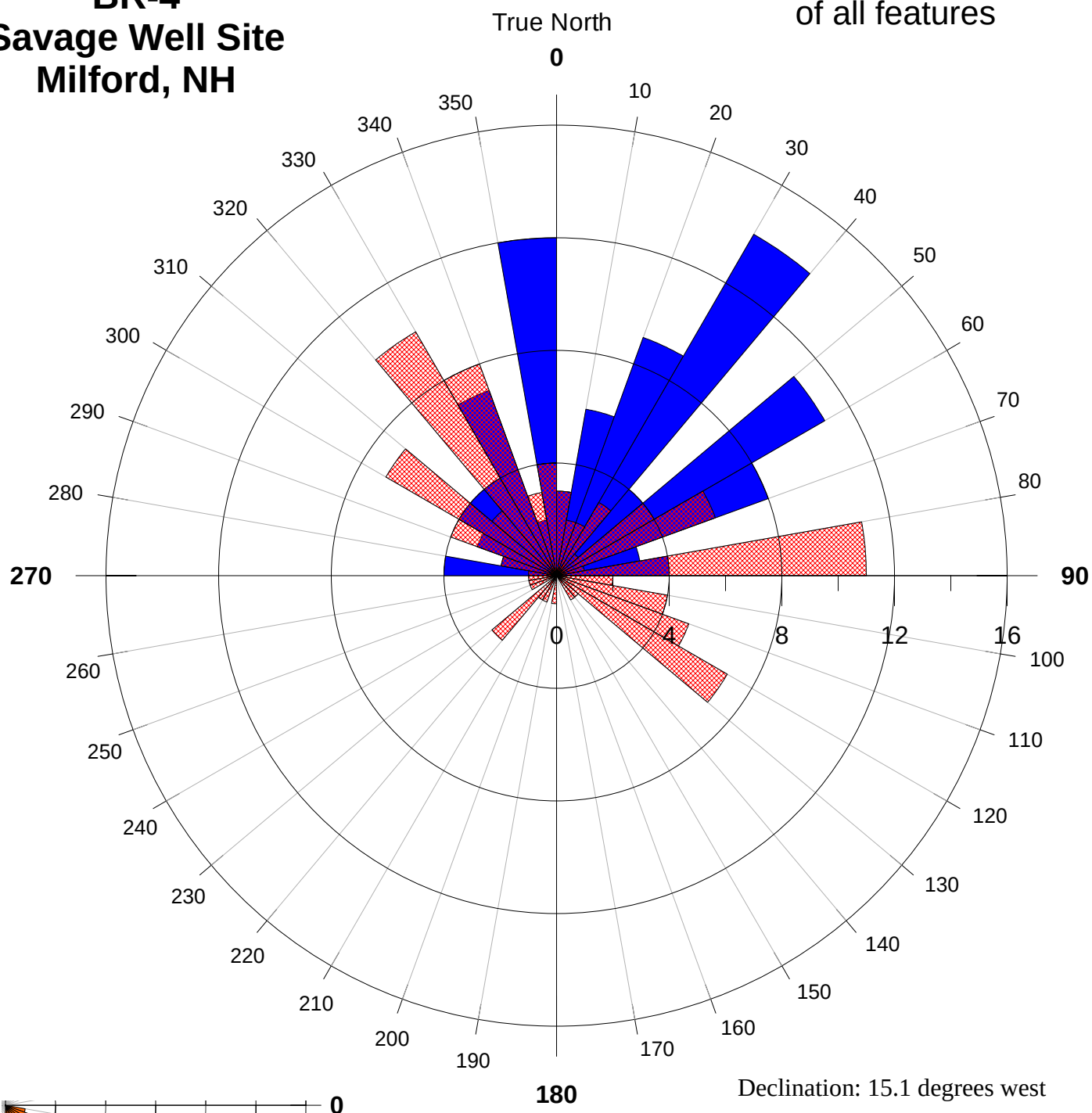
FIGURE D-1
Borehole Geophysical Log
BR-4 - Savage Site
Milford, New Hampshire

Tadpole tail indicates dip direction.
The solid tadpoles with a feature number are the ones interpreted to be likely or possibly transmissive.

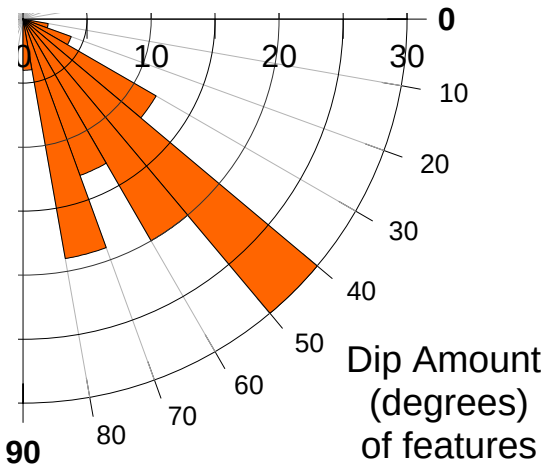
Northeast Geophysical Services

BR-4
Savage Well Site
Milford, NH

FIGURE D-2
Strike and Dip Direction of all features



Declination: 15.1 degrees west



Explanation

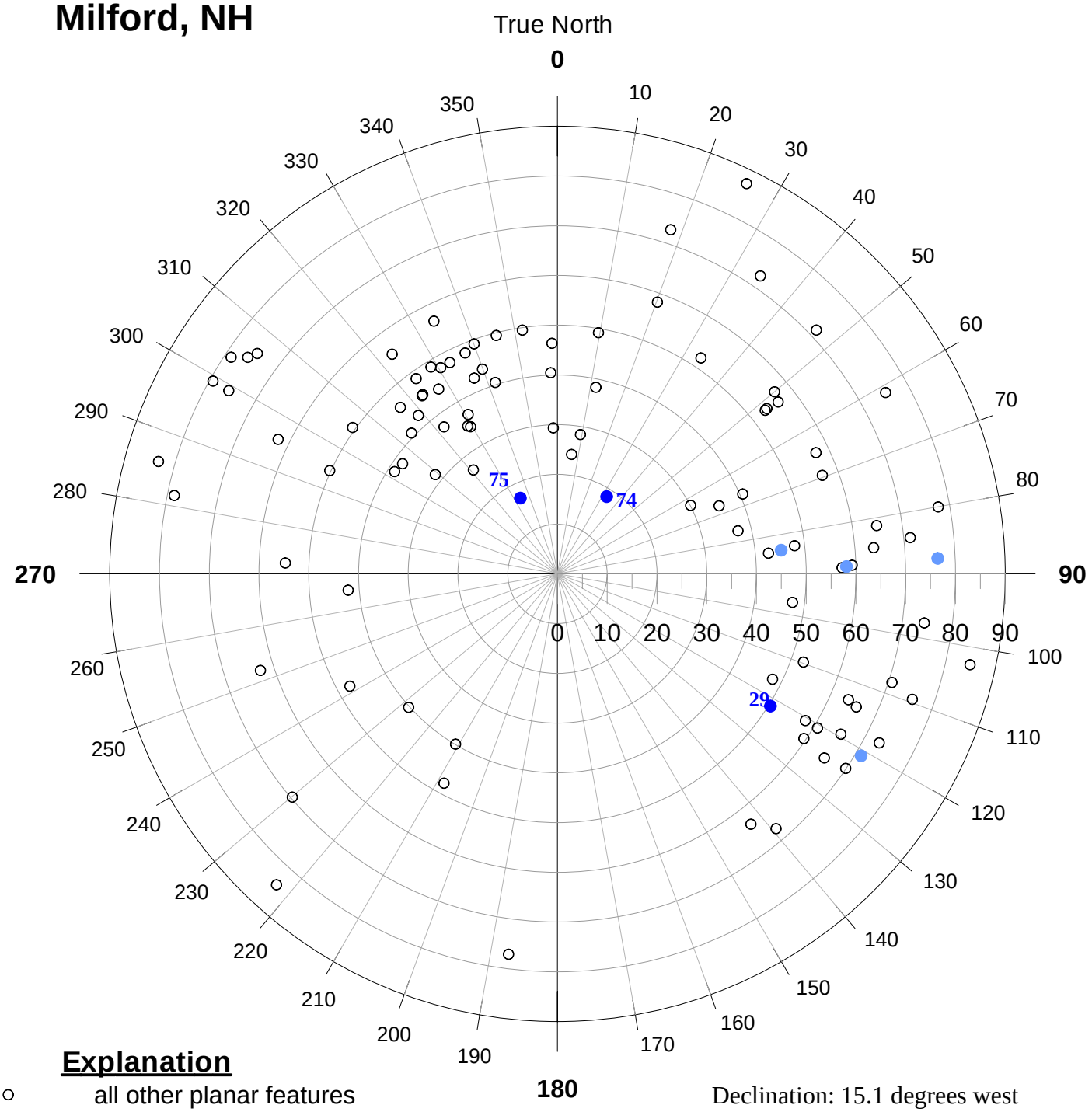
- Dip direction of feature
- Strike of feature
- Dip Amount (Tilt)

Based on 104 measurements

Northeast Geophysical Services

BR-4
Savage Well Site
Milford, NH

FIGURE D-3
Dip Amount and Dip Azimuth of planar features (upper hemisphere plot)



Explanation

- ○ all other planar features
- ● Likely water bearing
- ● Possibly water bearing

Declination: 15.1 degrees west

Based on 104 measurements

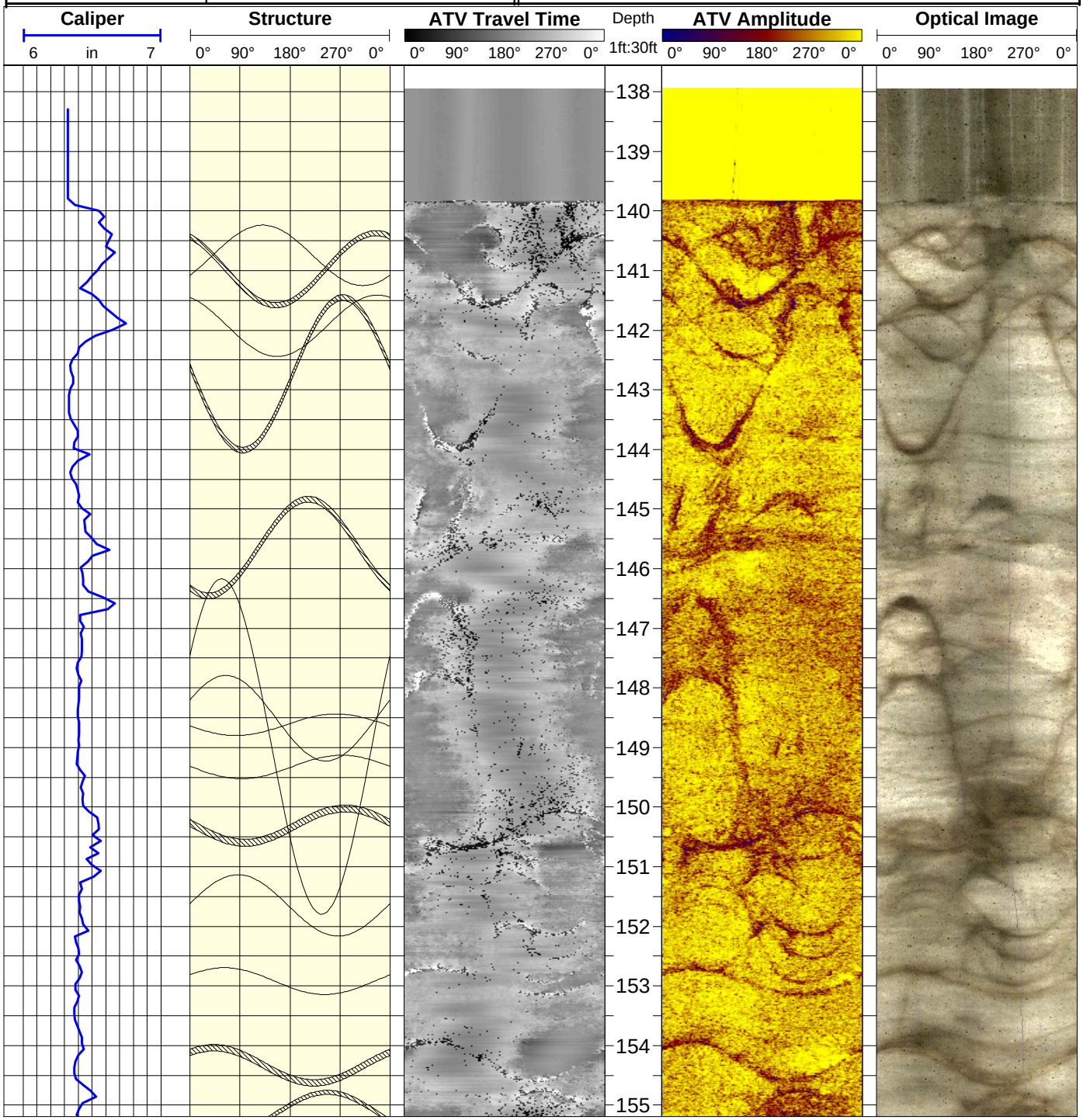
Northeast Geophysical Services
4 Union Street Bangor, Maine 04401
Tel. 207-942-2700
email: ngsinc@negeophysical.com

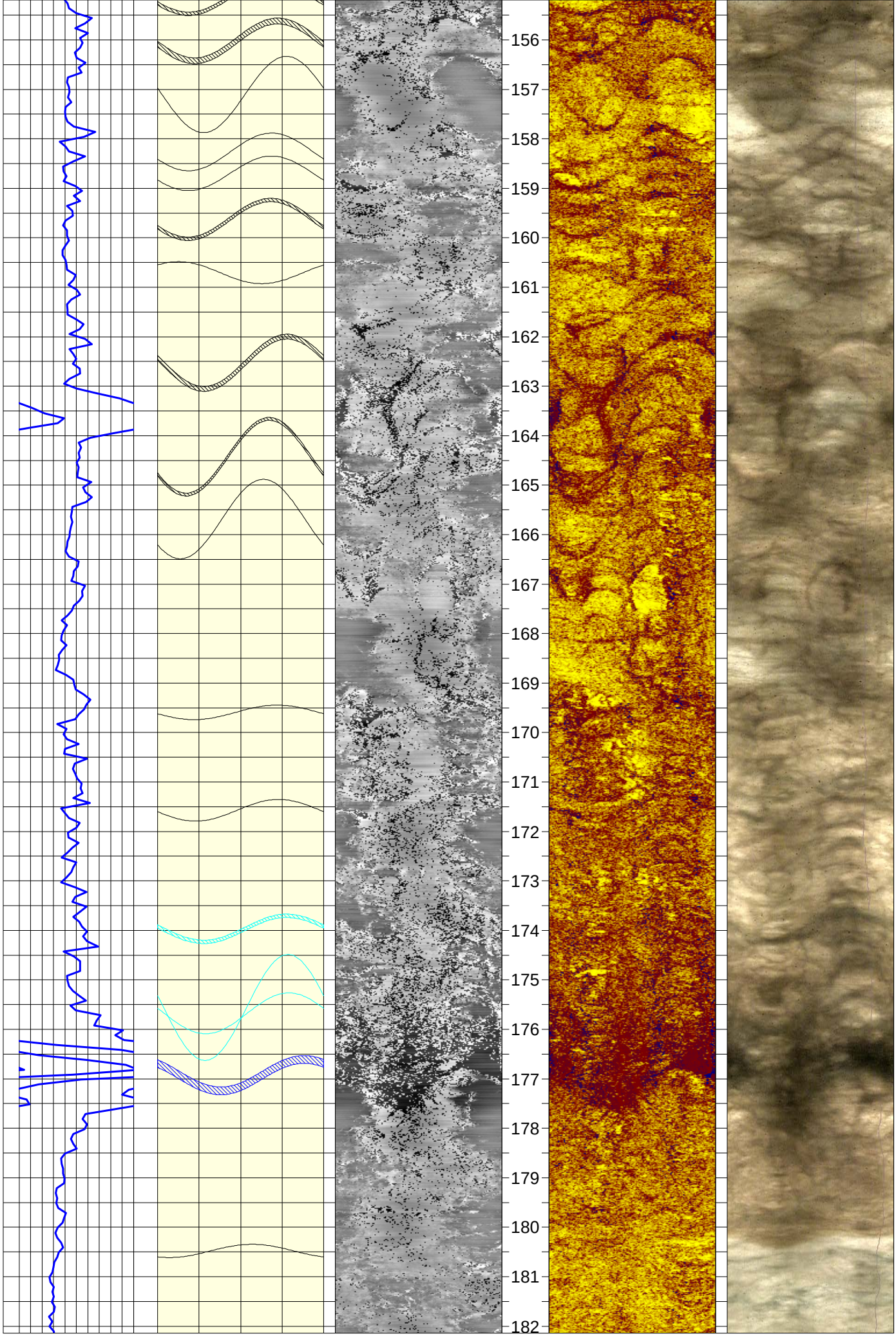
Log: Figure D-4 Televiewer Logs

Well: BR-4

Site: Savage Municipal Well Site

Date:	3/01/10	Location:	Milford, NH
Casing Depth:	140 ft	For:	Weston Solutions
Casing Type:	6 in	Logged by:	R. Rawcliffe
Boring Depth:	424.9 ft	Orientation:	magnetic
Meas. From:	top of casing	Structure Plots:	black = planar features (faults, foliation, bedding, joints, etc) light blue = possibly transmissive fracture dark blue = likely transmissive fracture
Stickup:	2.5 ft		
Water Level:	6.99 ft		

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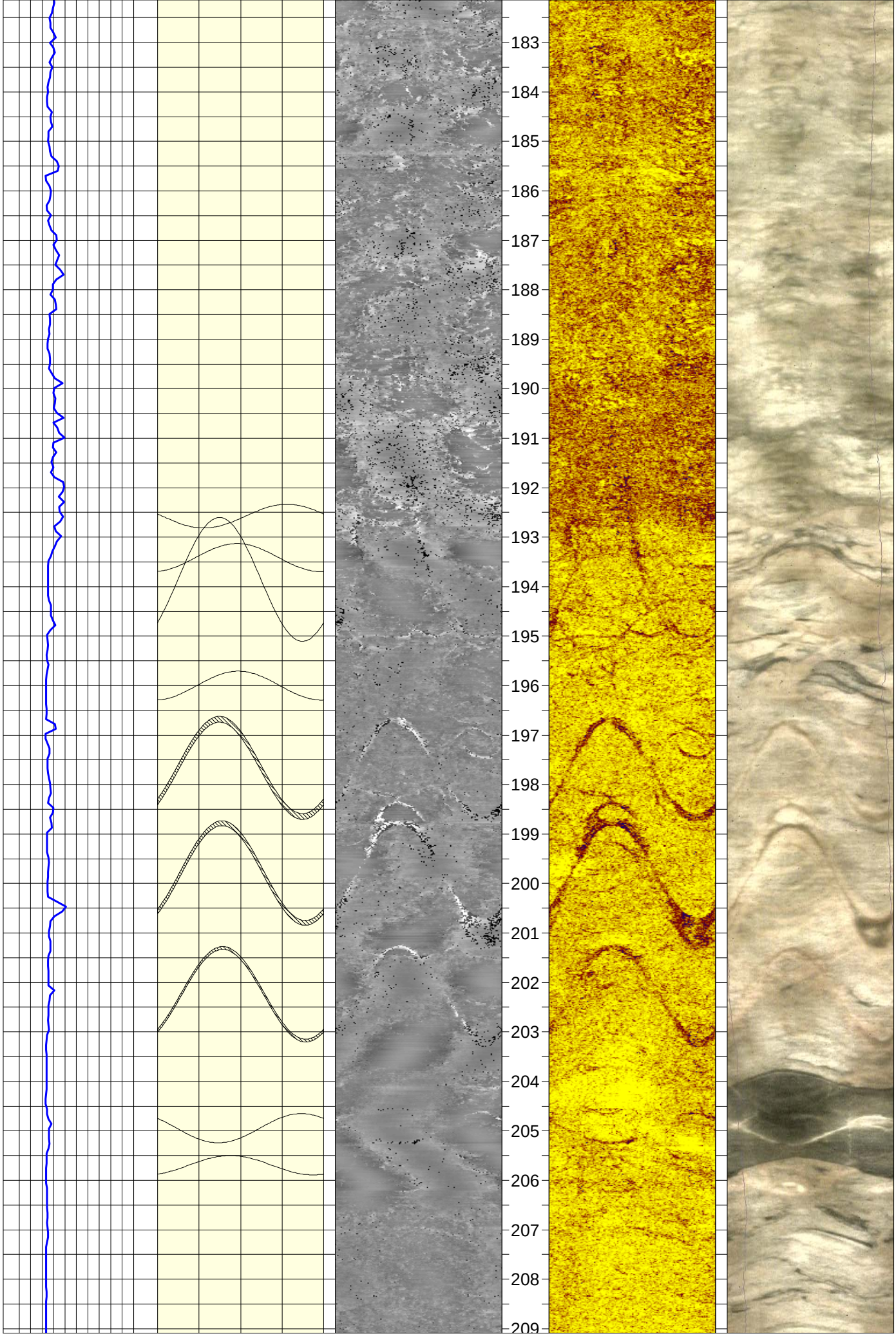
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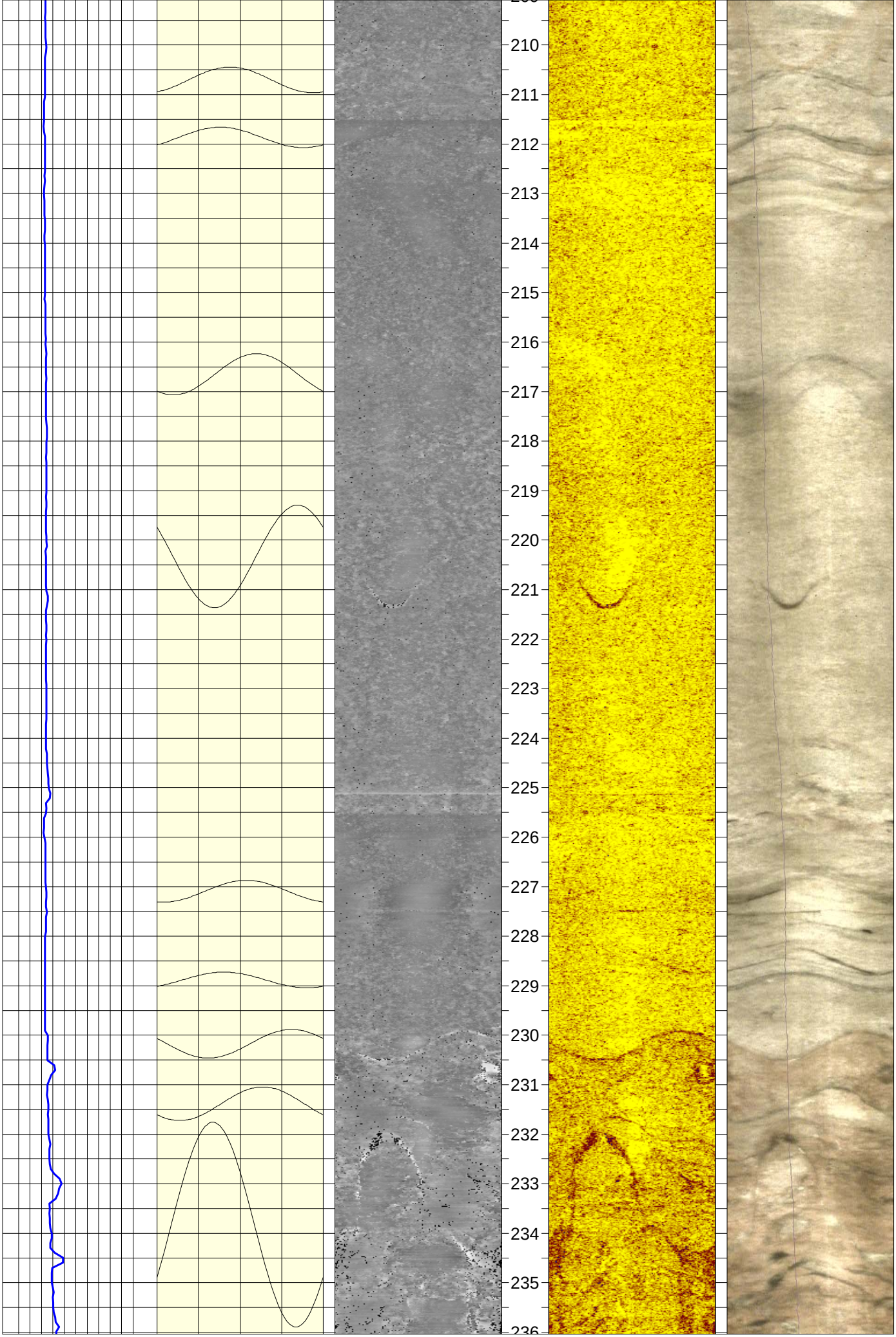
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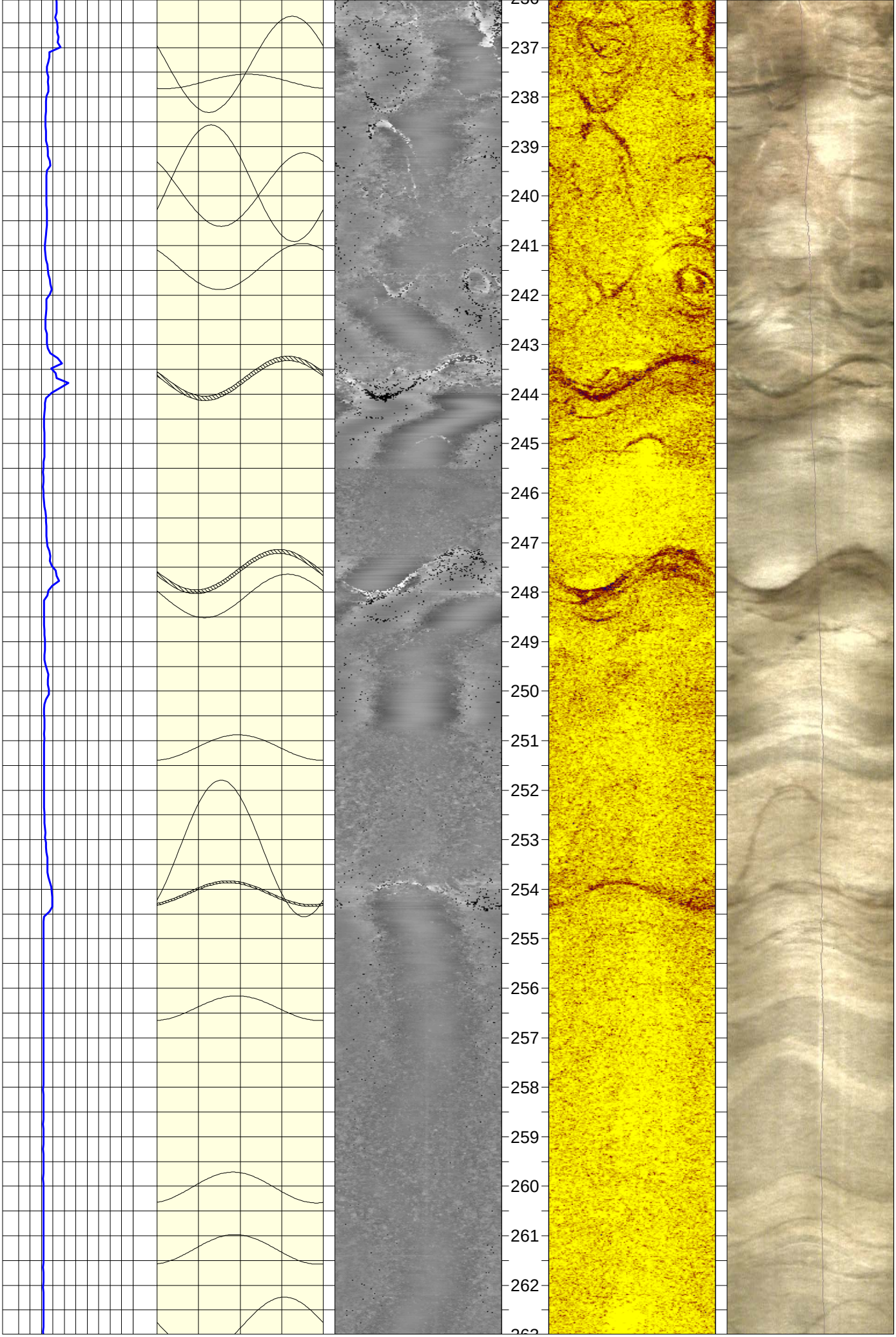
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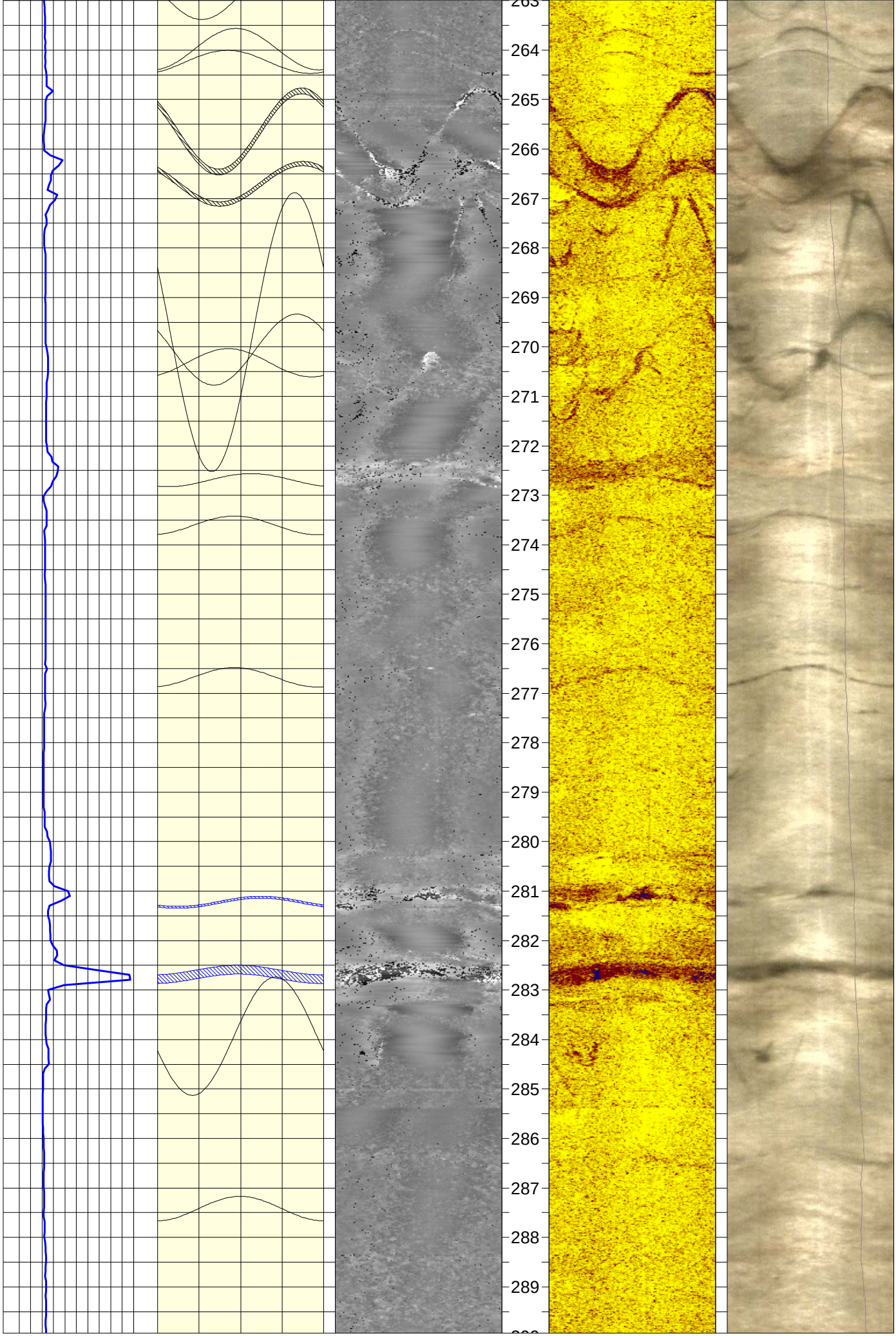
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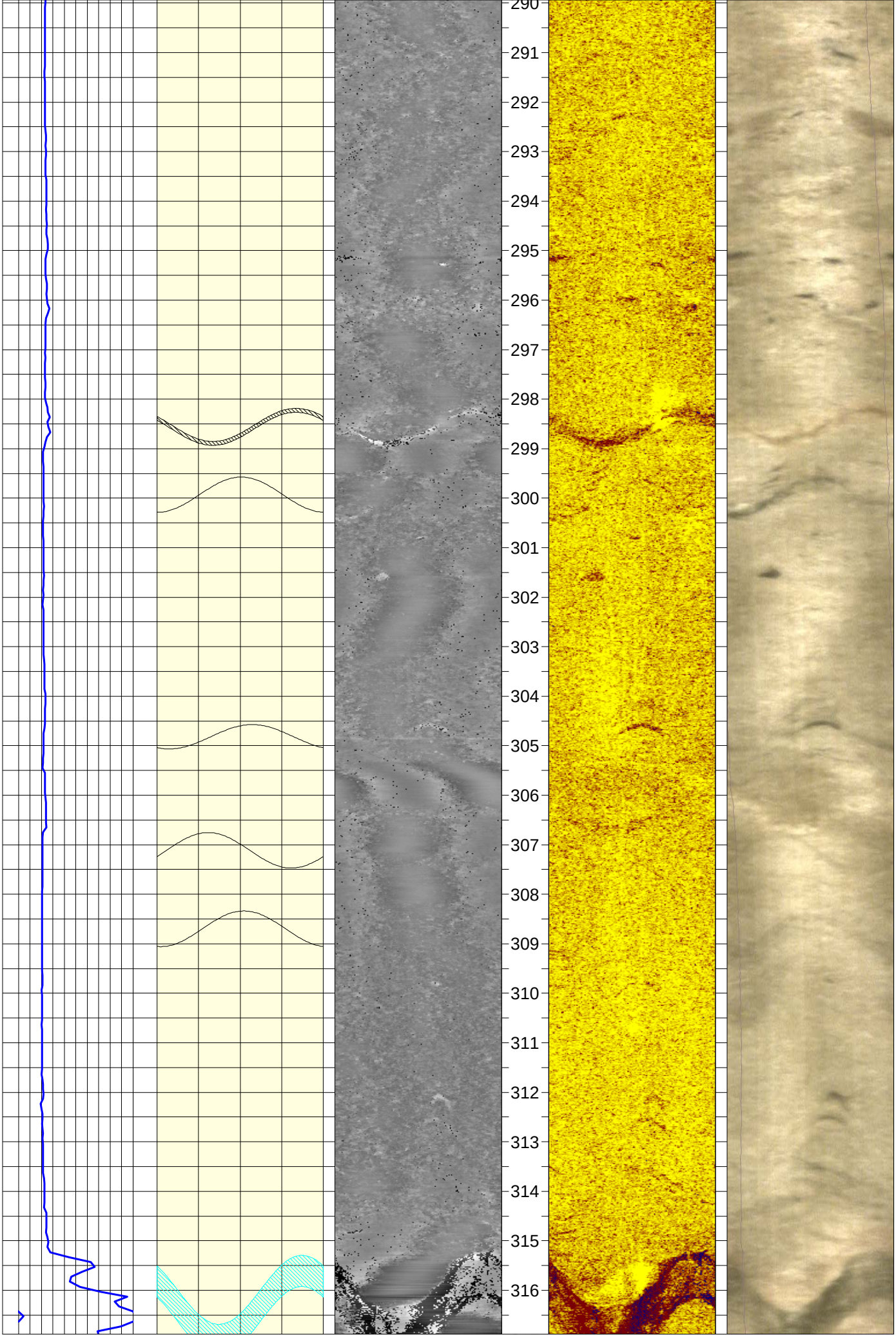
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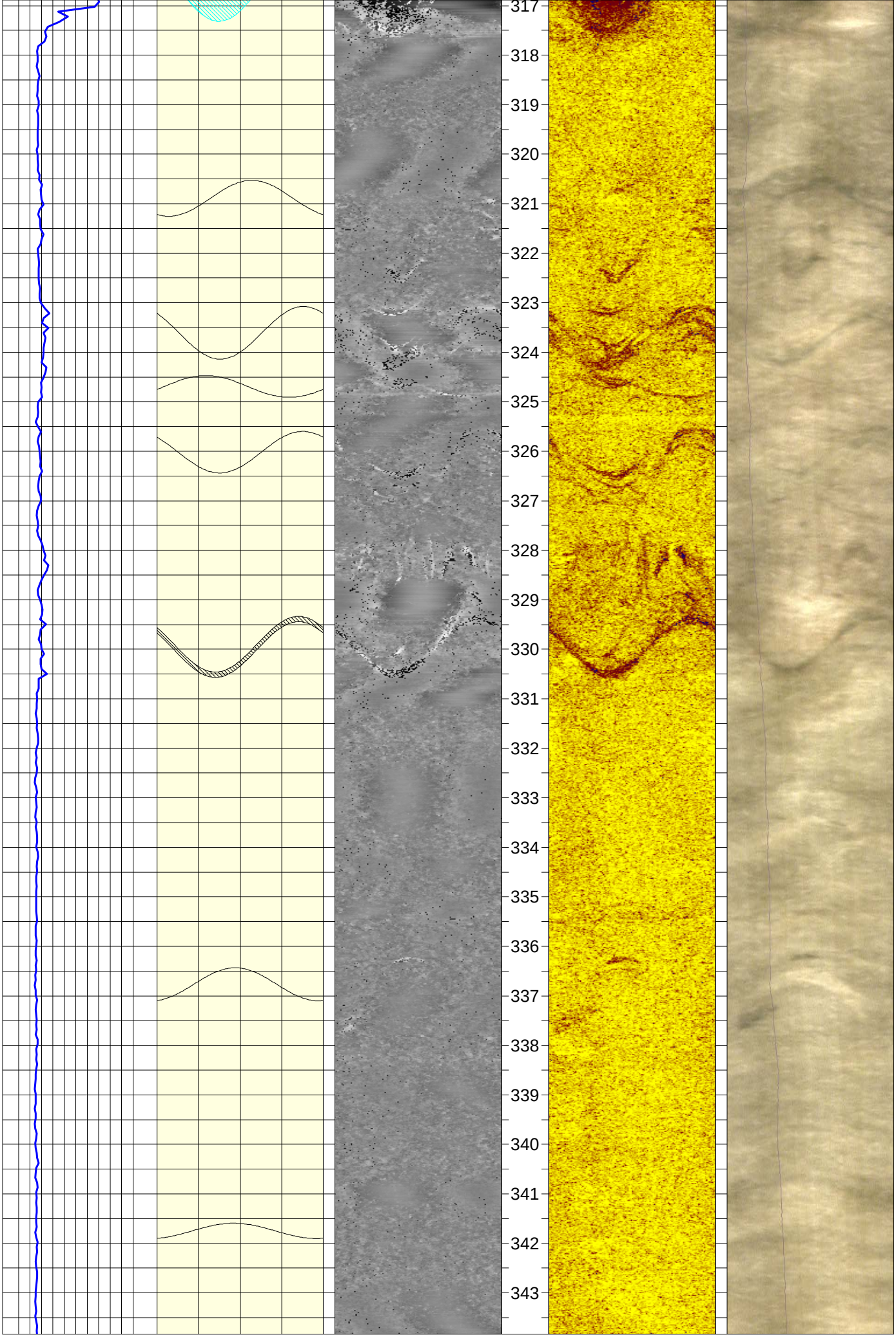
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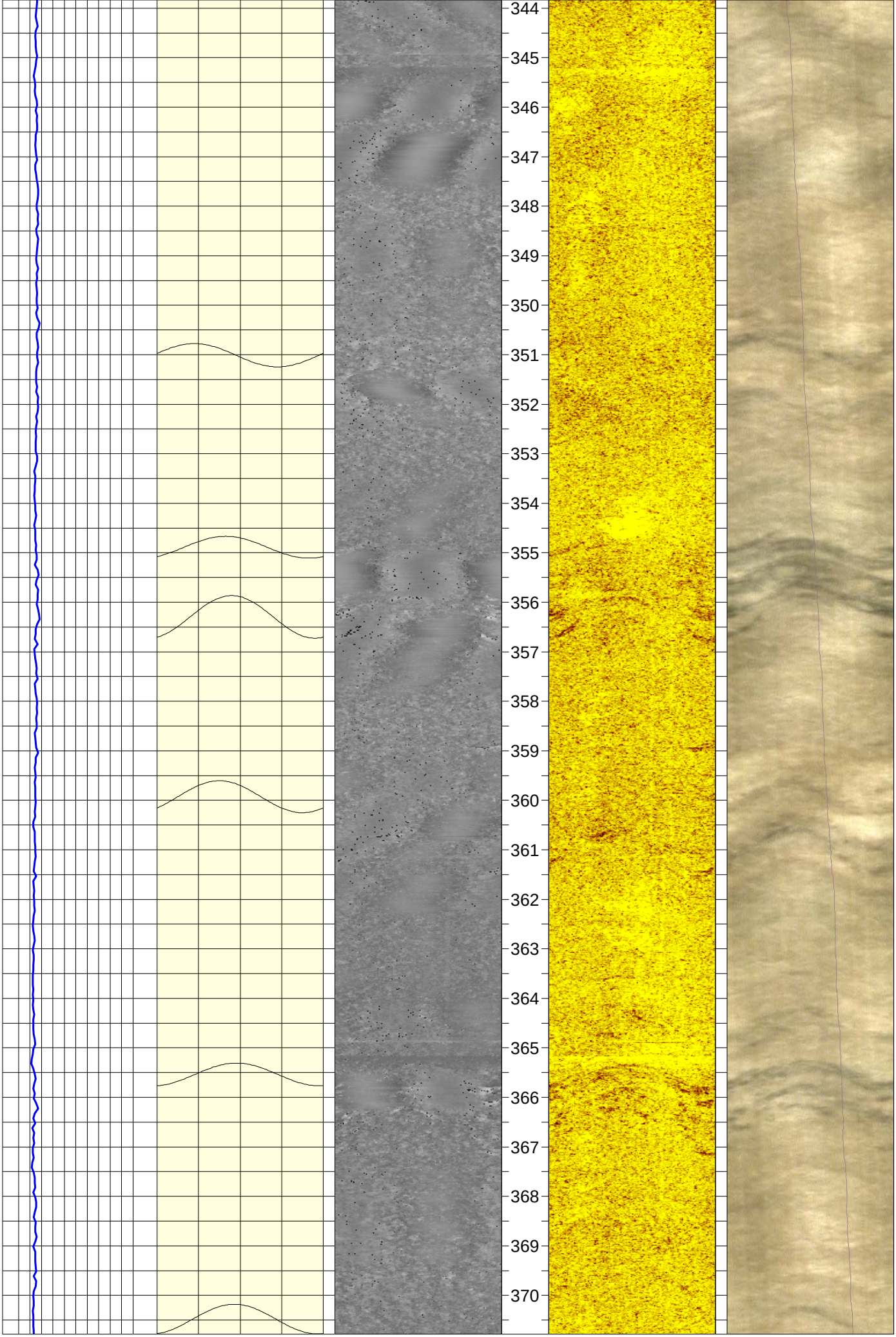
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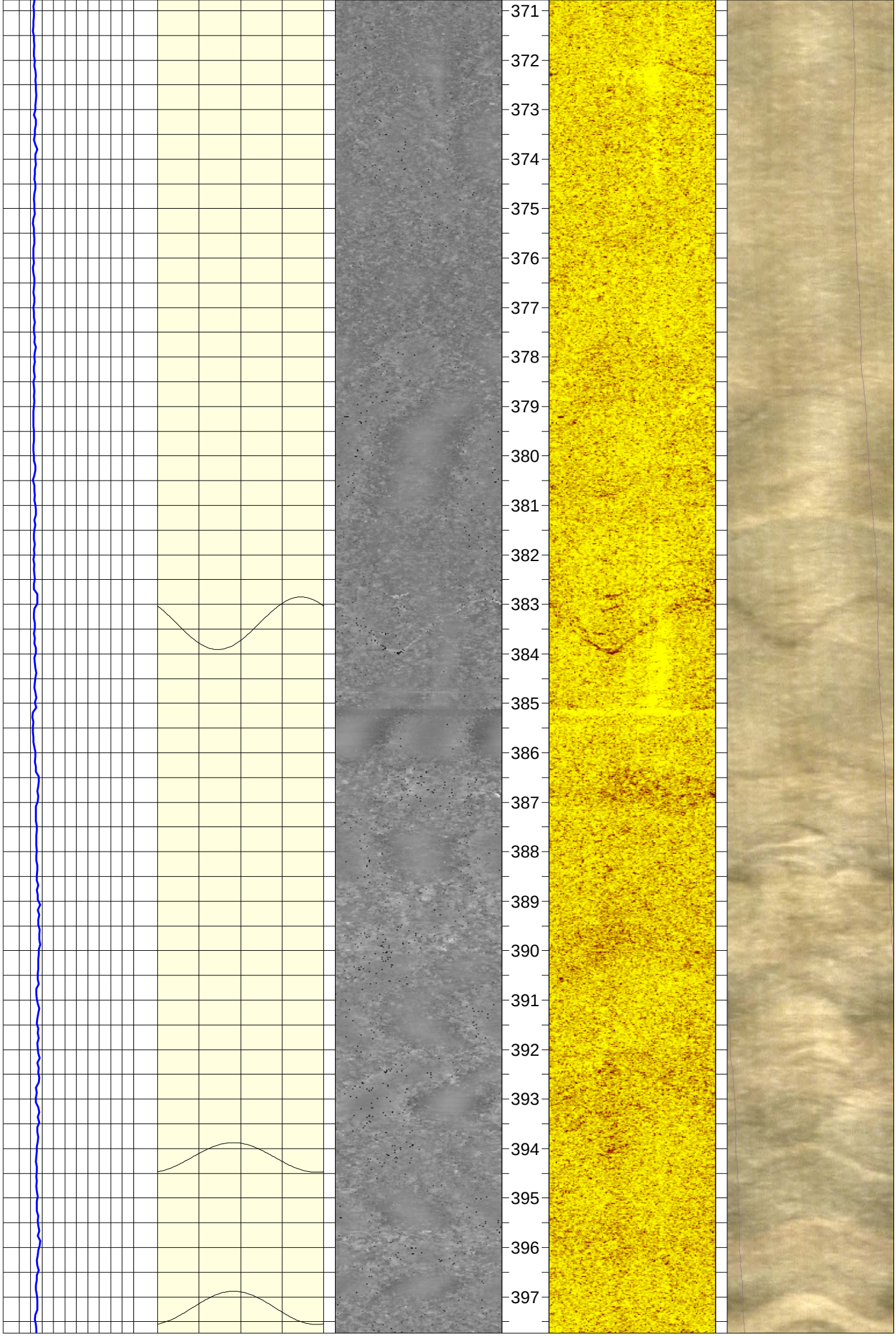
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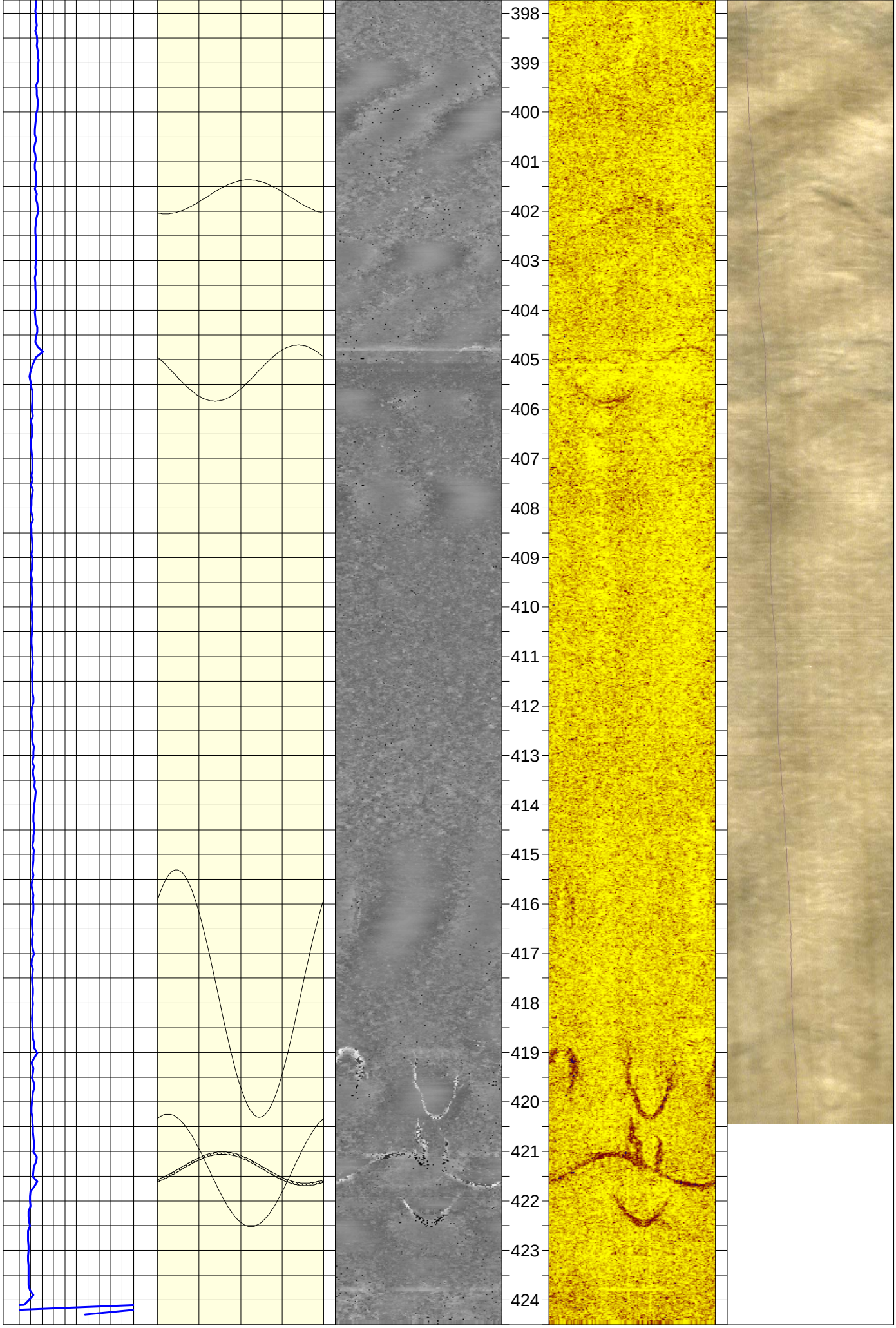
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TABLE D-1 Planar features interpreted from acoustical and optical televiewers
BR-4 Borehole - Savage Municipal Well Site - Milford, New Hampshire **Logged: March 2010**

Borehole	Feature # Number	Feature depth Feet	Dip Degrees	Dip Azimuth magnetic	Strike magnetic	Dip Azimuth True	Strike True	Aperture millimeters	Category Type
BR-4	1	140.7	62	311	41	311	26	0	100
BR-4	2	141.0	68	154	64	154	49	11	100
BR-4	3	141.9	64	157	67	157	52	0	100
BR-4	4	142.7	78	95	5	95	350	6	100
BR-4	5	145.6	73	33	303	33	288	9	100
BR-4	6	148.5	70	245	335	245	320	0	100
BR-4	7	148.6	35	82	352	82	337	0	100
BR-4	8	149.0	84	237	327	237	312	0	100
BR-4	9	149.3	37	92	2	92	347	0	100
BR-4	10	150.3	48	98	8	98	353	23	100
BR-4	11	151.7	63	267	357	267	342	0	100
BR-4	12	152.9	40	243	333	243	318	0	100
BR-4	13	154.3	48	224	314	224	298	22	100
BR-4	14	155.1	53	67	337	67	322	12	100
BR-4	15	156.0	57	80	350	80	335	20	100
BR-4	16	157.1	71	99	9	99	354	0	100
BR-4	17	158.3	56	67	337	67	322	0	100
BR-4	18	158.7	54	67	337	67	322	0	100
BR-4	19	159.6	57	65	335	65	320	11	100
BR-4	20	160.7	40	226	316	226	301	0	100
BR-4	21	162.5	64	100	10	100	355	13	100
BR-4	22	164.4	72	62	332	62	317	5	100
BR-4	23	165.7	72	49	319	49	304	0	100
BR-4	24	169.6	30	78	348	78	333	0	100
BR-4	25	171.6	41	82	352	82	337	0	100
BR-4	26	174.0	45	99	9	99	354	14	108
BR-4	27	175.6	77	103	13	103	358	0	108
BR-4	28	175.7	58	104	14	104	359	0	108
BR-4	29	176.9	50	137	47	137	32	30	107
BR-4	30	180.5	28	24	294	24	279	0	100
BR-4	31	192.6	43	100	10	100	354	0	100
BR-4	32	193.4	48	352	82	352	67	0	100
BR-4	33	193.9	79	314	44	314	29	0	100
BR-4	34	196.0	49	355	85	355	70	0	100
BR-4	35	197.7	76	314	44	314	29	9	100
BR-4	36	199.8	76	320	50	320	35	7	100
BR-4	37	202.2	75	321	51	321	36	5	100
BR-4	38	204.9	48	131	41	131	26	0	100
BR-4	39	205.7	37	337	67	337	52	0	100
BR-4	40	210.7	45	338	68	338	53	0	100
BR-4	41	211.9	39	317	47	317	32	0	100
BR-4	42	216.7	58	35	305	35	290	0	100
BR-4	43	220.3	76	125	35	125	19	0	100
BR-4	44	227.1	40	13	283	13	88	0	100
BR-4	45	228.9	32	324	54	324	39	0	100
BR-4	46	230.2	48	112	22	112	7	0	100
BR-4	47	231.4	52	49	319	49	304	0	100
BR-4	48	233.8	83	301	31	301	16	0	100
BR-4	49	237.3	74	113	23	113	8	0	100
BR-4	50	237.7	29	13	283	13	88	0	100
BR-4	51	239.7	79	297	27	297	12	0	100
BR-4	52	239.9	70	139	49	139	34	0	100
BR-4	53	241.4	61	136	46	136	31	0	100
BR-4	54	243.7	57	104	14	104	359	15	100
BR-4	55	247.6	57	85	355	85	340	12	100
BR-4	56	248.1	59	103	13	103	358	0	100
BR-4	57	251.1	44	355	85	355	70	0	100
BR-4	58	253.2	79	319	49	319	34	0	100
BR-4	59	254.1	42	334	64	334	49	10	100

TABLE D-1 Planar features interpreted from acoustical and optical televiewers
BR-4 Borehole - Savage Municipal Well Site - Milford, New Hampshire **Logged: March 2010**

Borehole	Feature # Number	Feature depth Feet	Dip Degrees	Dip Azimuth magnetic	Strike magnetic	Dip Azimuth True	Strike True	Aperture millimeters	Category Type
BR-4	60	256.4	43	352	82	352	67	0	100
BR-4	61	260.0	49	344	74	344	59	0	100
BR-4	62	261.3	48	348	78	348	63	0	100
BR-4	63	262.8	65	96	6	96	351	0	100
BR-4	64	264.0	57	349	79	349	64	0	100
BR-4	65	264.2	41	329	59	329	44	0	100
BR-4	66	265.7	73	133	43	133	28	11	100
BR-4	67	266.7	58	136	46	136	31	14	100
BR-4	68	269.7	85	118	28	118	12	0	100
BR-4	69	270.1	71	123	33	123	18	0	100
BR-4	70	270.3	46	332	62	332	47	0	100
BR-4	71	272.7	24	22	292	22	277	0	100
BR-4	72	273.6	34	345	75	345	59	0	100
BR-4	73	276.7	35	344	74	344	59	0	100
BR-4	74	281.2	18	48	318	32	302	9	107
BR-4	75	282.7	17	349	79	334	64	50	107
BR-4	76	283.9	75	76	346	61	331	0	100
BR-4	77	287.4	40	357	87	342	72	0	100
BR-4	78	298.6	53	125	35	110	20	14	100
BR-4	79	299.9	50	1	271	346	76	0	100
BR-4	80	304.8	38	27	297	12	282	0	100
BR-4	81	307.1	55	287	17	272	2	0	100
BR-4	82	308.7	50	7	277	352	82	0	100
BR-4	83	316.3	71	136	46	121	31	67	108
BR-4	84	320.9	49	25	295	10	280	0	100
BR-4	85	323.6	65	140	50	125	35	0	100
BR-4	86	324.7	42	281	11	266	356	0	100
BR-4	87	326.0	60	139	49	124	34	0	100
BR-4	88	330.0	66	129	39	114	24	14	100
BR-4	89	336.8	48	346	76	330	60	0	100
BR-4	90	341.8	27	336	66	321	51	0	100
BR-4	91	351.0	47	257	347	242	332	0	100
BR-4	92	354.9	38	321	51	305	35	0	100
BR-4	93	356.3	55	338	68	323	53	0	100
BR-4	94	359.9	50	310	40	294	24	0	100
BR-4	95	365.5	37	346	76	331	61	0	100
BR-4	96	370.5	44	342	72	327	57	0	100
BR-4	97	383.4	65	135	45	120	30	0	100
BR-4	98	394.2	45	338	68	323	53	0	100
BR-4	99	397.2	48	339	69	324	54	0	100
BR-4	100	401.7	46	14	284	359	89	0	100
BR-4	101	405.3	64	129	39	113	23	0	100
BR-4	102	417.8	87	41	311	26	296	0	100
BR-4	103	421.4	51	321	51	306	36	10	100
BR-4	104	421.4	77	202	292	187	277	0	100

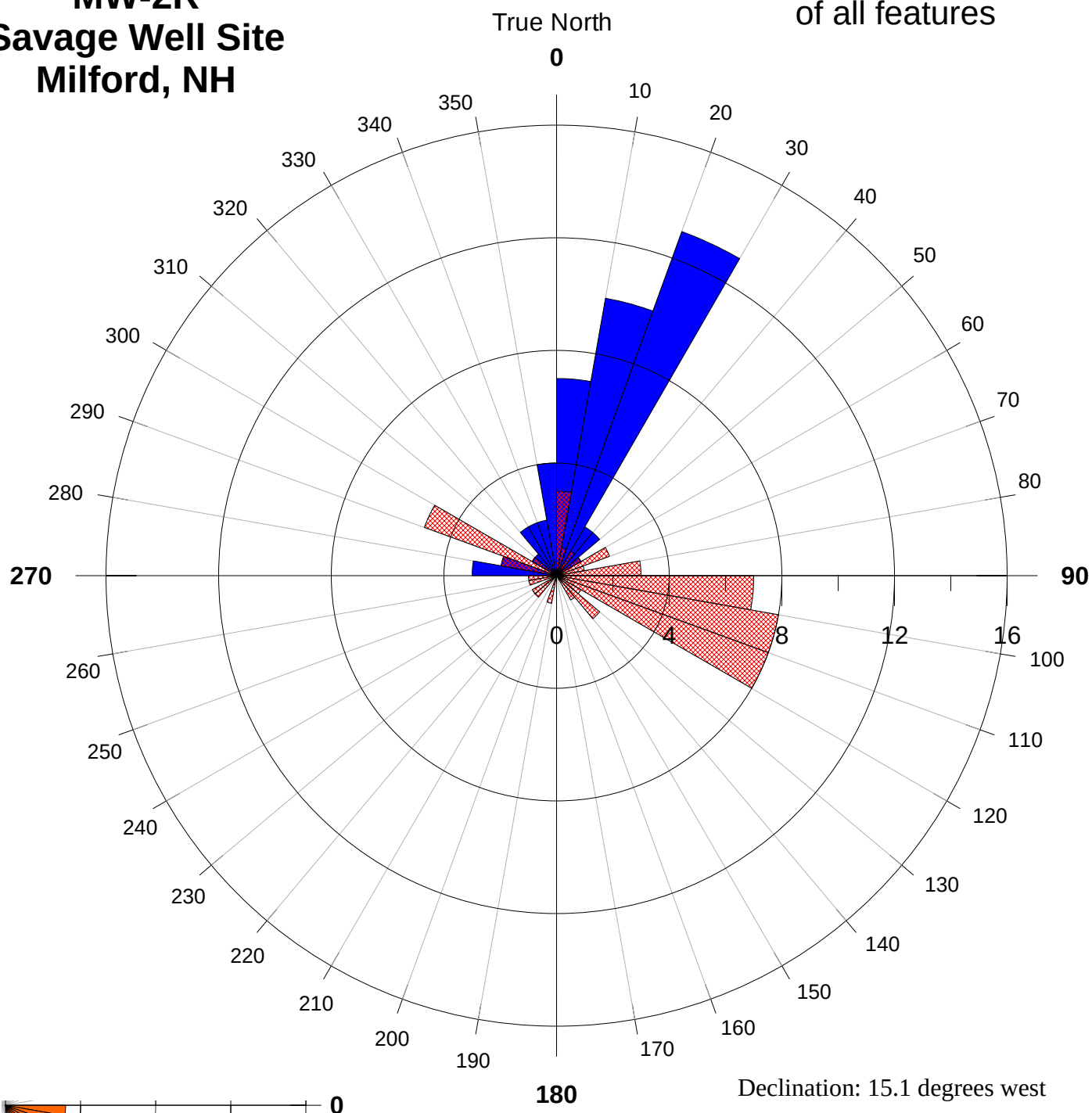
Explanation:

Category 100 = planar feature (possible fracture, joint, foliation, bedding, etc.)
Category 107 = Likely water bearing feature
Category 108 = Possible water bearing fracture

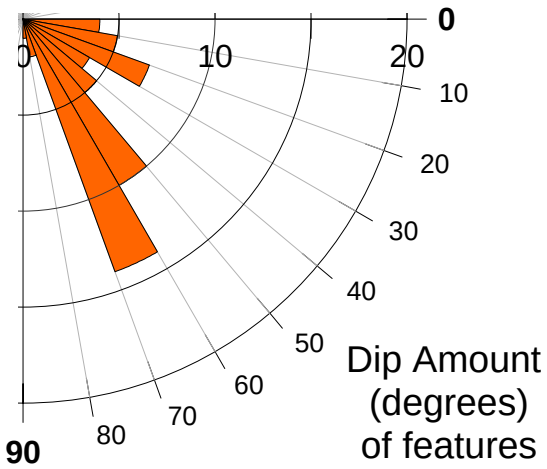
Northeast Geophysical Services

MW-2R
Savage Well Site
Milford, NH

Figure E-1
Strike and Dip Direction of all features



Declination: 15.1 degrees west



Explanation

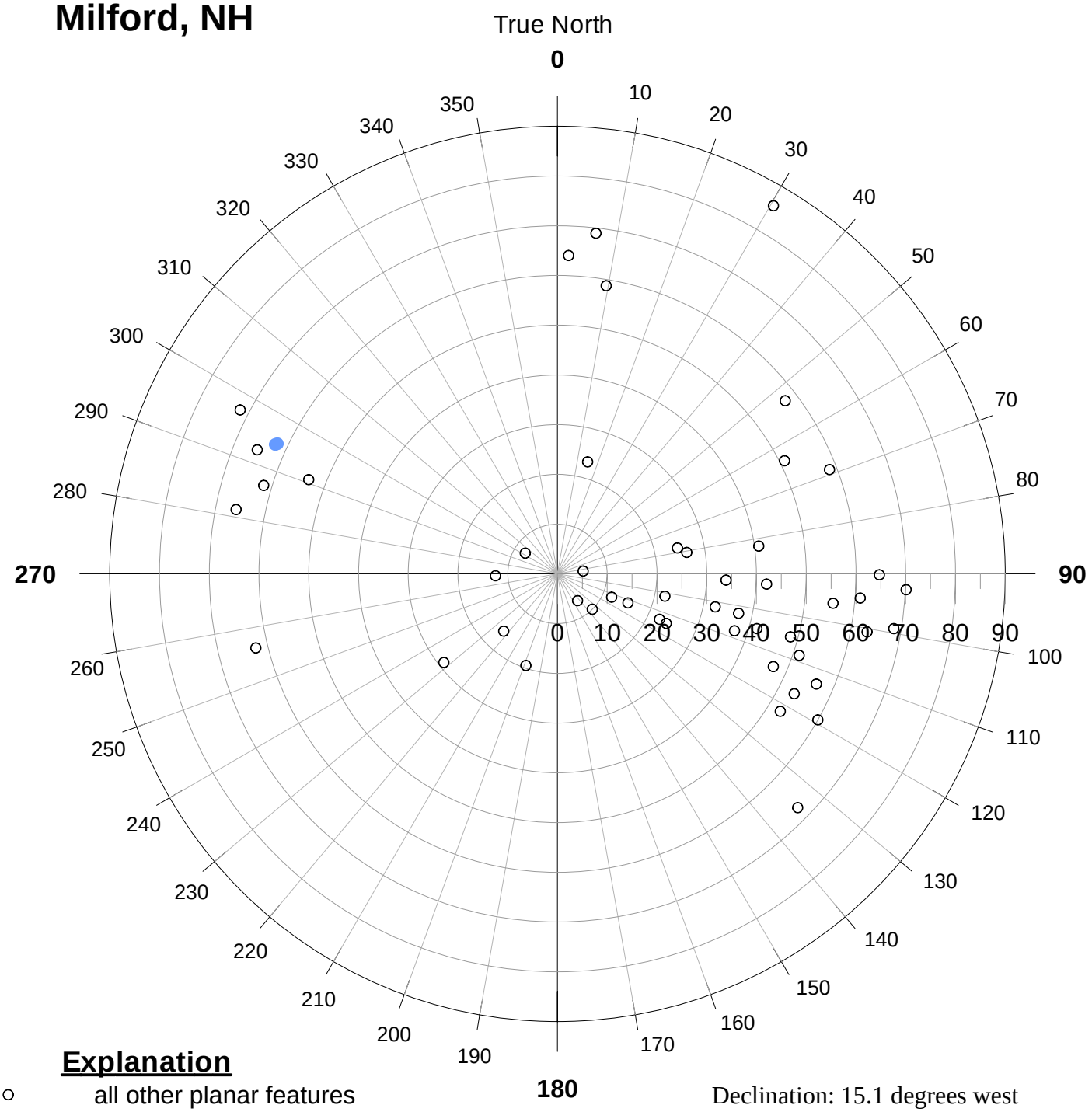
- Dip direction of feature
- Strike of feature
- Dip Amount (Tilt)

Based on 52 measurements

Northeast Geophysical Services

MW-2R
Savage Well Site
Milford, NH

FIGURE E-2
Dip Amount and Dip Azimuth of planar features (upper hemisphere plot)



Explanation

- ○ all other planar features
- ● Likely water bearing
- ● Possibly water bearing

Declination: 15.1 degrees west

Based on 52 measurements

Northeast Geophysical Services
4 Union Street Bangor, Maine 04401
Tel. 207-942-2700
email: ngsinc@negeophysical.com

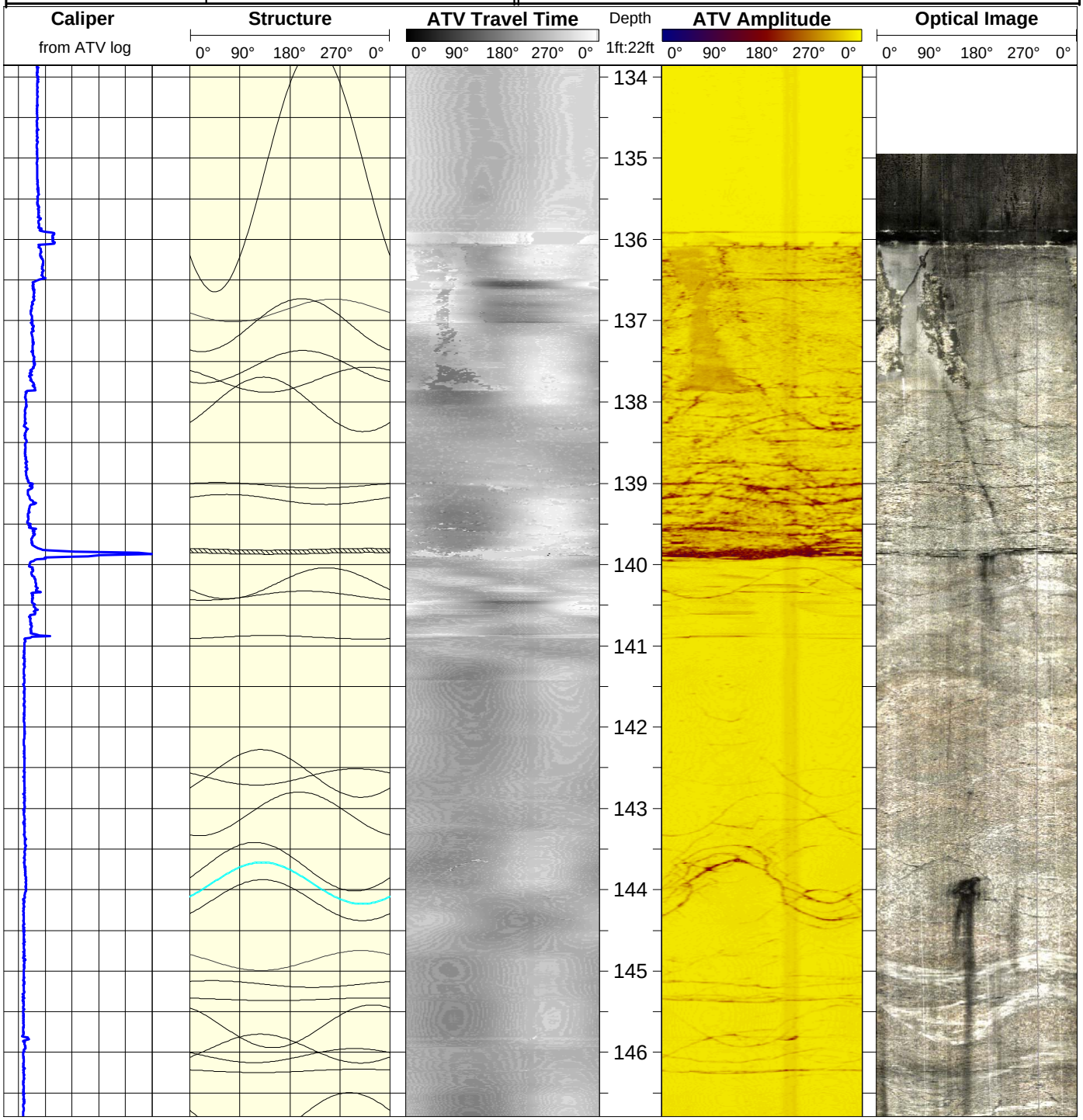
Log: Figure E-3 Televiewer Logs

Well: MW-2R

Site: Savage Municipal Well Site

Location: Milford, NH

Date:	3/2/10	For:	Weston Solutions
Casing Depth:	136 ft	Logged by:	R Rawcliffe
Casing Type:	3 in steel	Orientation:	magnetic
Boring Depth:	165.2 ft	Structure Plots:	The bottom five feet of the optical log is discolored because the televiewer had disturbed the mud at the bottom of the borehole prior to logging this section.
Meas. From:	top of casing		
Stickup:	2.5 ft		
Water Level:	8.13 ft		



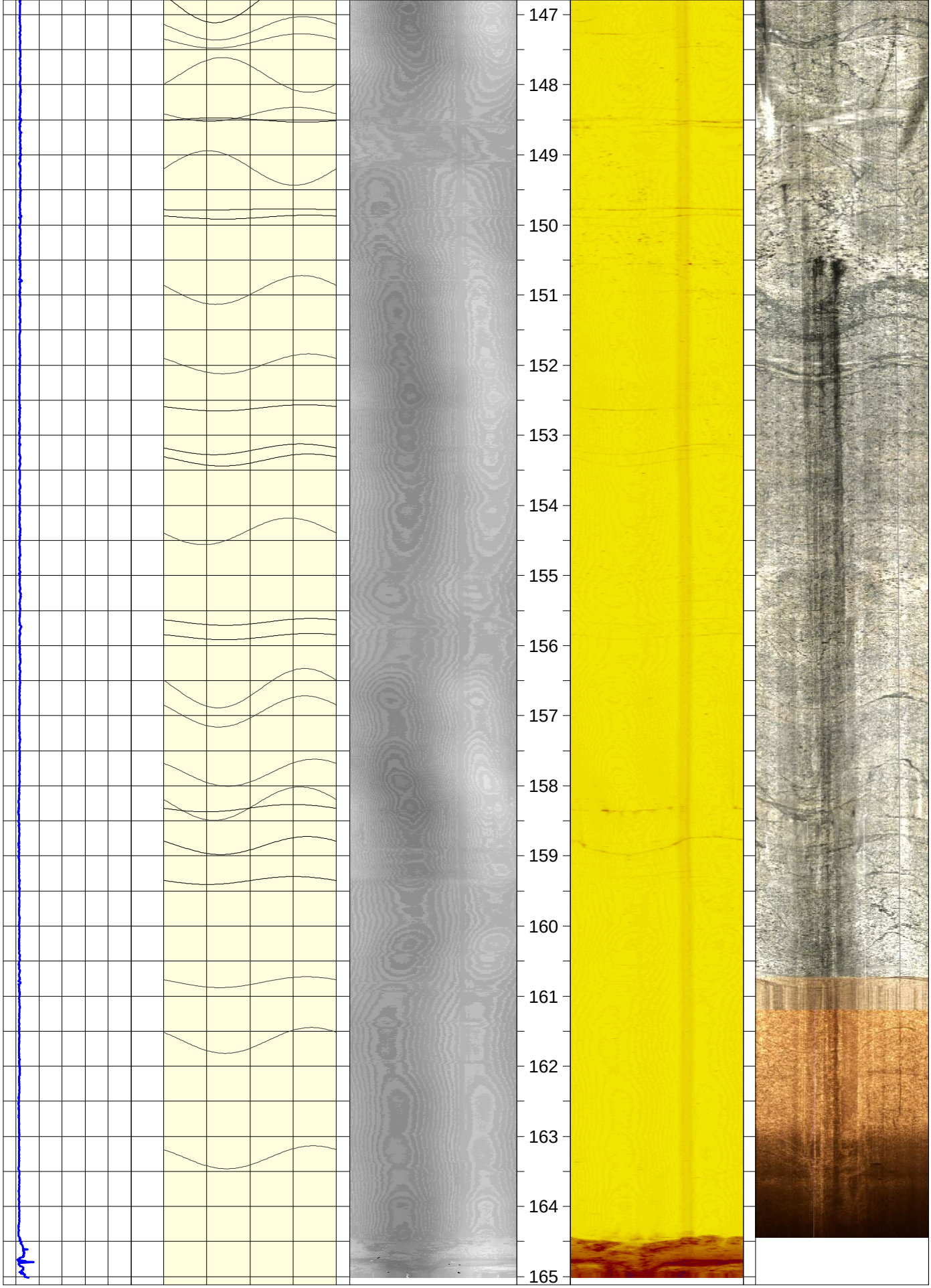

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TABLE E-1 Planar features interpreted from acoustical and optical televiewers
MW-2R Borehole - Savage Municipal Well Site - Milford, New Hampshire **Logged: March 2010**

Borehole	Feature # Number	Feature depth Feet	Dip Degrees	Dip Azimuth magnetic	Strike magnetic	Dip Azimuth True	Strike True	Aperture millimeters	Category Type
MW-2R	1	135.1	86	45	315	30	300	0	100
MW-2R	2	136.9	51	79	349	64	334	0	100
MW-2R	3	137.1	69	22	292	6	276	0	100
MW-2R	4	137.6	59	25	295	10	280	0	100
MW-2R	5	137.7	53	137	47	122	32	0	100
MW-2R	6	138.0	72	312	42	297	27	0	100
MW-2R	7	139.0	16	238	328	223	313	0	100
MW-2R	8	139.2	29	247	337	232	322	0	100
MW-2R	9	139.8	7	158	68	143	53	15	100
MW-2R	10	140.2	58	68	338	53	323	0	100
MW-2R	11	140.4	23	30	300	15	285	0	100
MW-2R	12	140.9	8	318	48	303	33	0	100
MW-2R	13	142.6	65	308	38	292	22	0	100
MW-2R	14	142.6	42	120	30	105	15	0	100
MW-2R	15	143.1	64	17	287	2	272	0	100
MW-2R	16	143.7	66	296	26	281	11	0	100
MW-2R	17	143.9	62	310	40	295	25	2	108
MW-2R	18	144.1	62	310	40	295	25	0	108
MW-2R	19	144.9	47	128	38	113	23	0	100
MW-2R	20	145.2	19	214	304	199	289	0	100
MW-2R	21	145.4	10	151	61	136	46	0	100
MW-2R	22	145.7	67	149	59	134	44	0	100
MW-2R	23	146.0	53	306	36	291	21	0	100
MW-2R	24	146.0	37	117	27	102	12	0	100
MW-2R	25	146.2	12	128	38	113	23	0	100
MW-2R	26	146.8	70	108	18	93	3	0	100
MW-2R	27	147.2	56	111	21	96	6	0	100
MW-2R	28	147.4	42	108	18	93	3	0	100
MW-2R	29	147.9	62	302	32	287	17	0	100
MW-2R	30	148.4	41	97	7	82	352	0	100
MW-2R	31	148.5	12	283	13	268	358	0	100
MW-2R	32	149.2	62	271	1	256	346	0	100
MW-2R	33	149.8	5	99	9	84	354	0	100
MW-2R	34	149.9	15	128	38	112	22	0	100
MW-2R	35	150.9	61	110	20	95	5	0	100
MW-2R	36	152.0	51	124	34	109	19	0	100
MW-2R	37	152.6	22	117	27	102	12	0	100
MW-2R	38	153.2	34	107	17	92	2	0	100
MW-2R	39	153.4	37	123	33	108	18	0	100
MW-2R	40	154.4	59	84	354	69	339	0	100
MW-2R	41	155.7	24	130	40	115	25	0	100
MW-2R	42	155.9	22	129	39	114	24	0	100
MW-2R	43	156.6	69	114	24	99	9	0	100
MW-2R	44	156.9	63	116	26	101	11	0	100
MW-2R	45	157.8	60	134	44	119	29	0	100
MW-2R	46	158.3	65	105	15	90	0	0	100
MW-2R	47	158.3	25	93	3	78	348	0	100
MW-2R	48	158.9	49	120	30	105	15	0	100
MW-2R	49	159.4	26	96	6	81	351	0	100
MW-2R	50	160.8	32	117	27	102	12	0	100
MW-2R	51	161.6	57	128	38	113	23	0	100
MW-2R	52	163.3	53	132	42	117	27	0	100

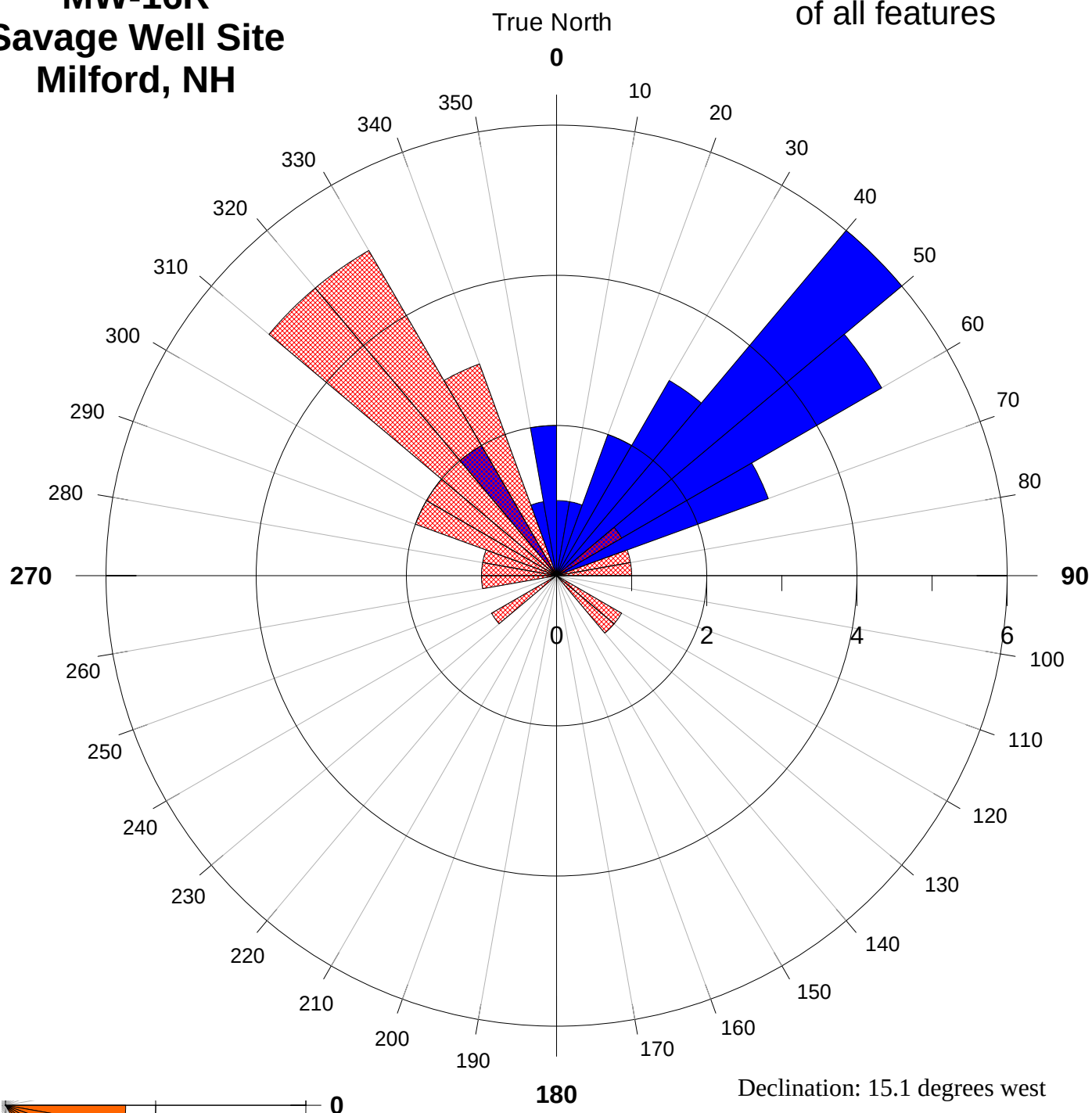
Explanation:

Category 100 = planar feature (possible fracture, joint, foliation, bedding, etc.)
Category 107 = Likely water bearing feature
Category 108 = Possible water bearing fracture

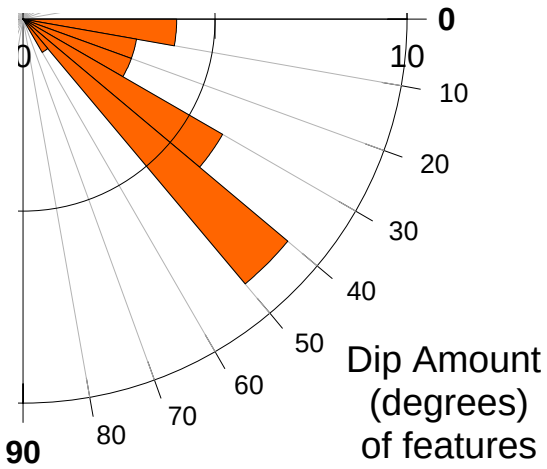
Northeast Geophysical Services

MW-16R
Savage Well Site
Milford, NH

FIGURE F-1
Strike and Dip Direction of all features



Declination: 15.1 degrees west



Explanation

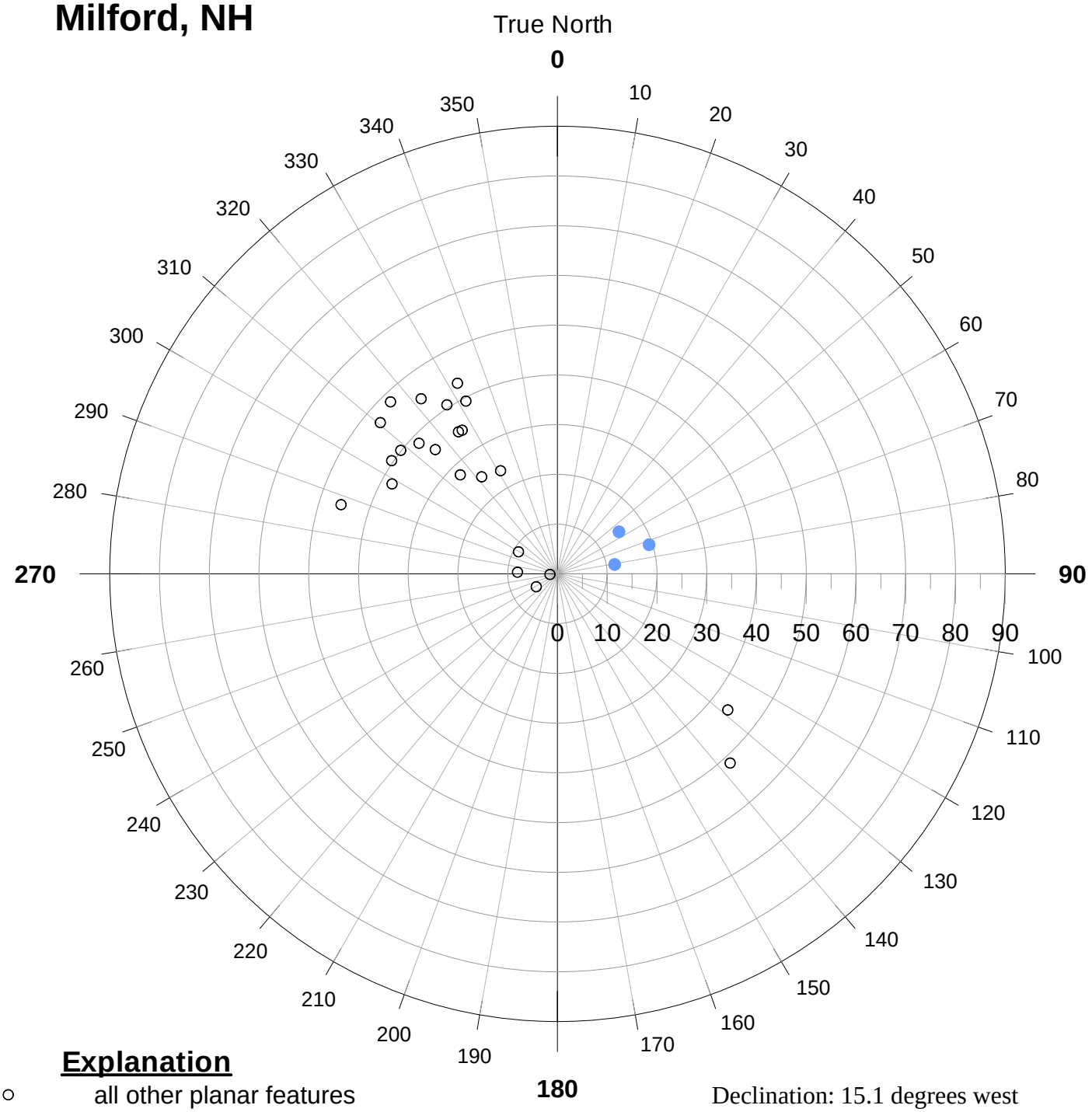
- Dip direction of feature
- Strike of feature
- Dip Amount (Tilt)

Based on 26 measurements

Northeast Geophysical Services

MW- 16R
Savage Well Site
Milford, NH

FIGURE F-2
Dip Amount and Dip Azimuth of planar features (upper hemisphere plot)



Explanation

- ○ all other planar features
- ● Likely water bearing
- ● Possibly water bearing

Declination: 15.1 degrees west

Based on 26 measurements

Northeast Geophysical Services
4 Union Street Bangor, Maine 04401
Tel. 207-942-2700
email: ngsinc@negeophysical.com

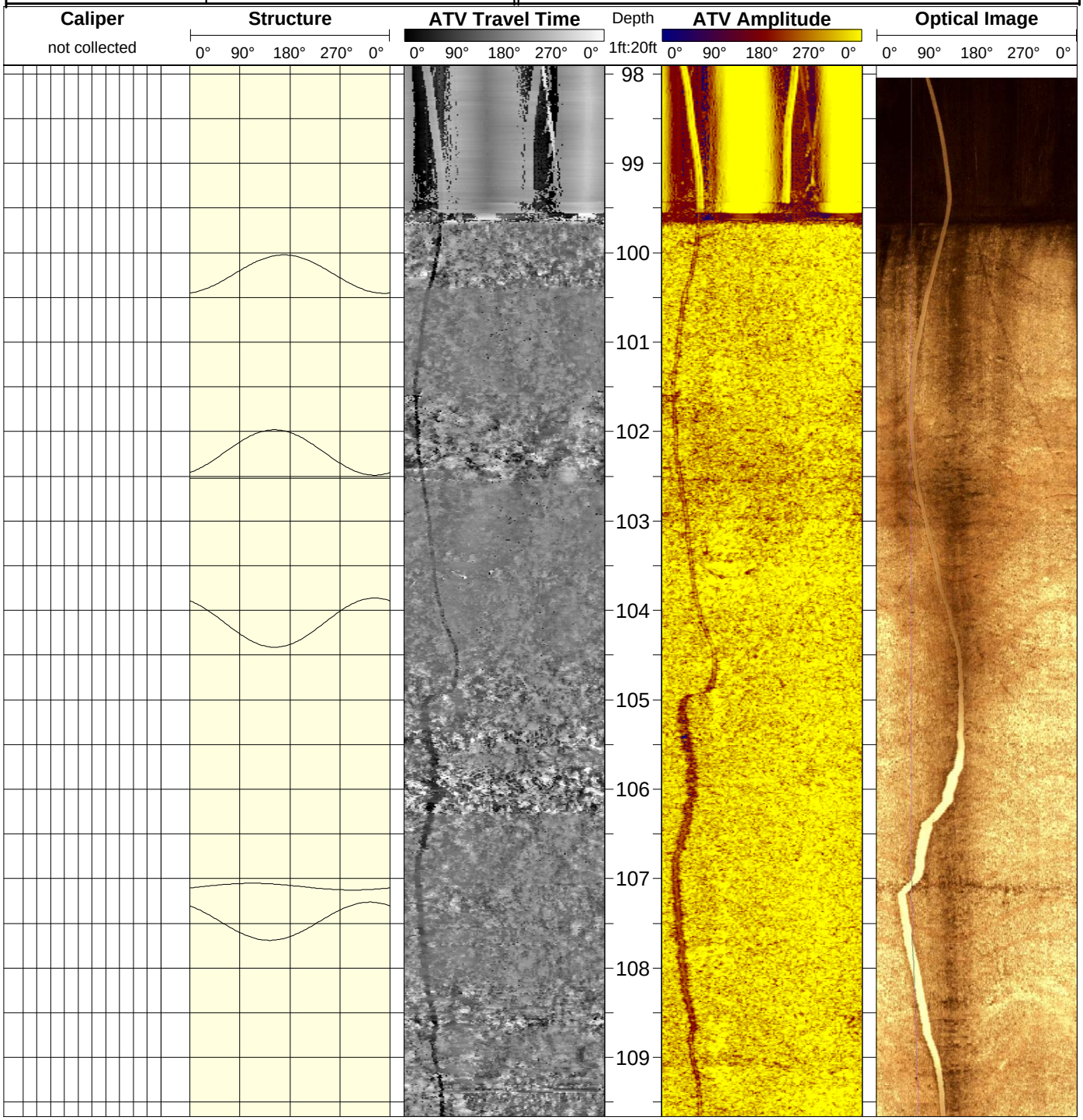
Log: Figure F-3 Televiewer Logs

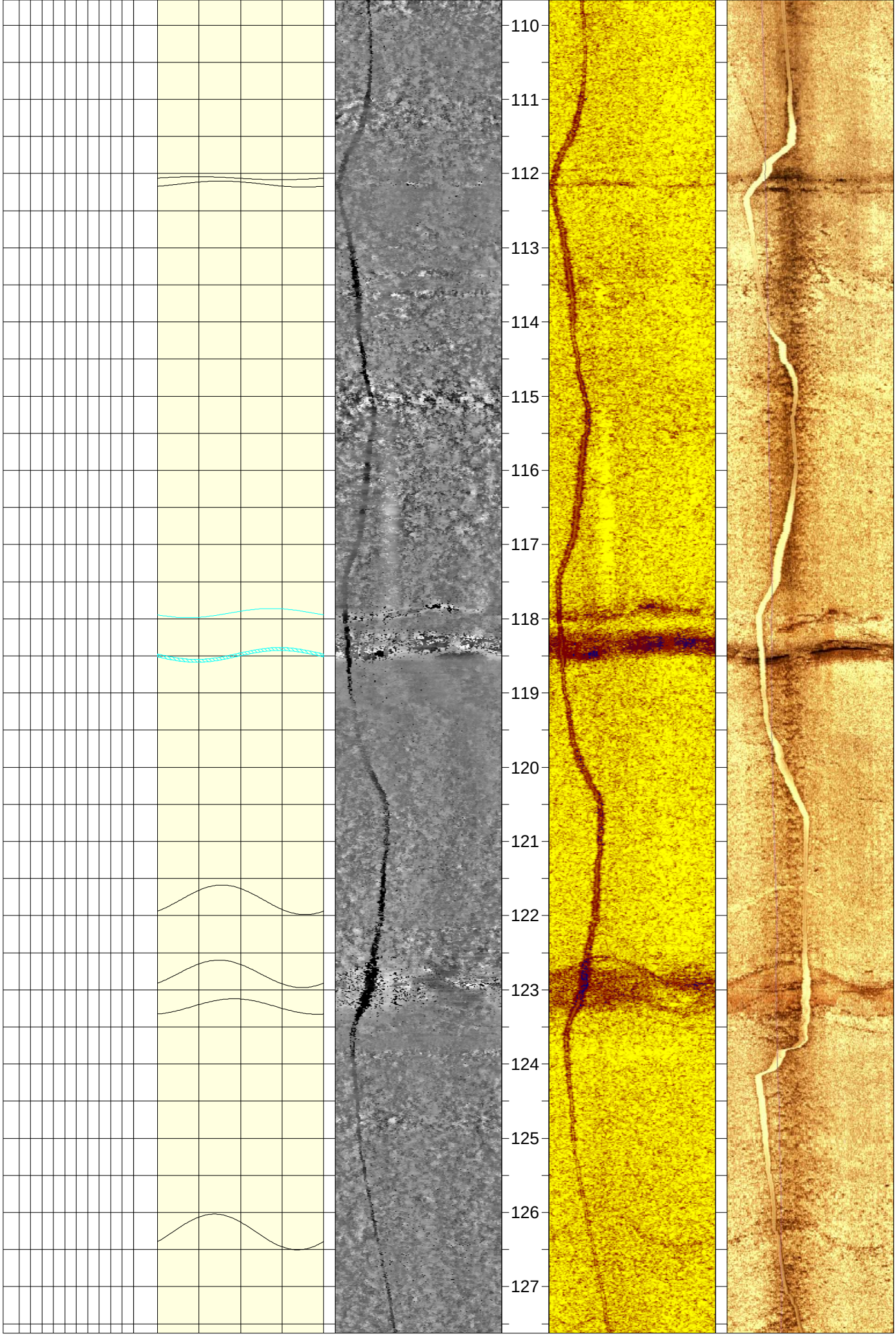
Well: MW-16R

Site: Savage Municipal Well Site

Location: Milford, NH

Date:	3/2/10	For:	Weston Solutions
Casing Depth:	99.5 ft	Logged by:	R Rawcliffe
Casing Type:	6 in steel	Orientation:	magnetic north
Boring Depth:	137 ft	Structure Plots:	black = planar features (faults, foliation, bedding, joints, etc) light blue = possibly transmissive fracture dark blue = likely transmissive fracture
Meas. From:	top of casing		
Stickup:	1.8 ft		
Water Level:	7.40 ft		

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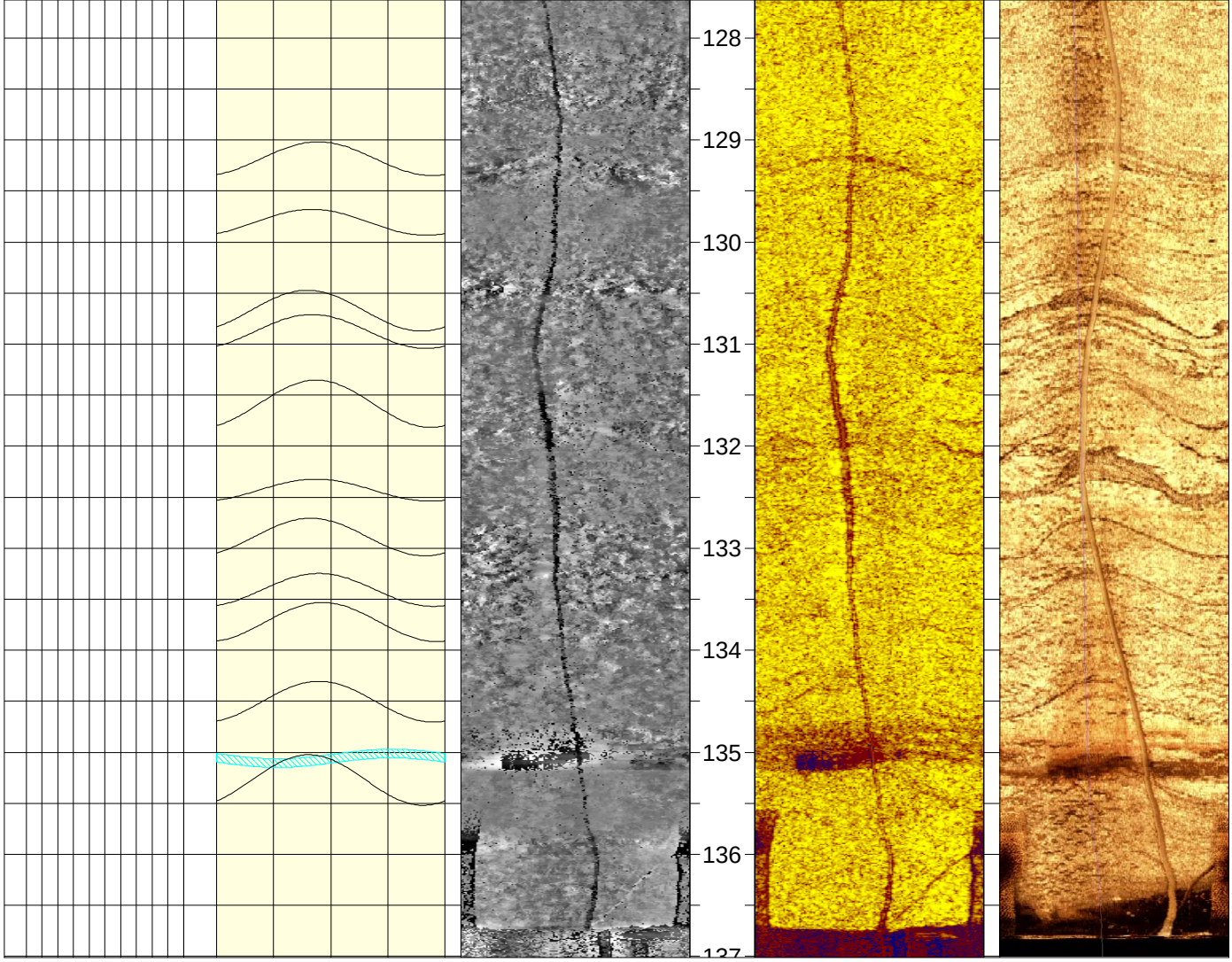
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TABLE F-1 Planar features interpreted from acoustical and optical televiewers
MW-16R Borehole - Savage Municipal Well Site - Milford, New Hampshire **Logged: March 2010**

Borehole	Feature # Number	Feature depth Feet	Dip Degrees	Dip Azimuth magnetic	Strike magnetic	Dip Azimuth True	Strike True	Aperture millimeters	Category Type
MW-16R	1	100.2	43	347	77	332	62	0	100
MW-16R	2	102.2	48	331	61	316	46	0	100
MW-16R	3	102.5	2	281	11	265	355	0	100
MW-16R	4	104.1	51	153	63	138	48	0	100
MW-16R	5	107.1	8	287	17	272	2	0	100
MW-16R	6	107.5	44	144	54	129	39	0	100
MW-16R	7	112.1	5	254	344	239	329	0	100
MW-16R	8	112.1	9	315	45	300	30	0	100
MW-16R	9	117.9	15	71	341	56	326	0	108
MW-16R	10	118.5	19	87	357	72	342	11	108
MW-16R	11	121.8	40	319	49	304	34	0	100
MW-16R	12	122.8	38	314	44	299	29	0	100
MW-16R	13	123.2	24	346	76	331	61	0	100
MW-16R	14	126.3	46	303	33	288	18	0	100
MW-16R	15	129.2	35	340	70	325	55	0	100
MW-16R	16	129.8	28	331	61	316	46	0	100
MW-16R	17	130.7	40	323	53	308	38	0	100
MW-16R	18	130.9	35	331	61	315	45	0	100
MW-16R	19	131.6	45	337	67	322	52	0	100
MW-16R	20	132.4	25	337	67	322	52	0	100
MW-16R	21	132.9	38	328	58	313	43	0	100
MW-16R	22	133.4	35	342	72	326	56	0	100
MW-16R	23	133.7	39	347	77	332	62	0	100
MW-16R	24	134.5	41	342	72	327	57	0	100
MW-16R	25	135.1	12	96	6	81	351	25	108
MW-16R	26	135.3	47	326	56	311	41	0	100

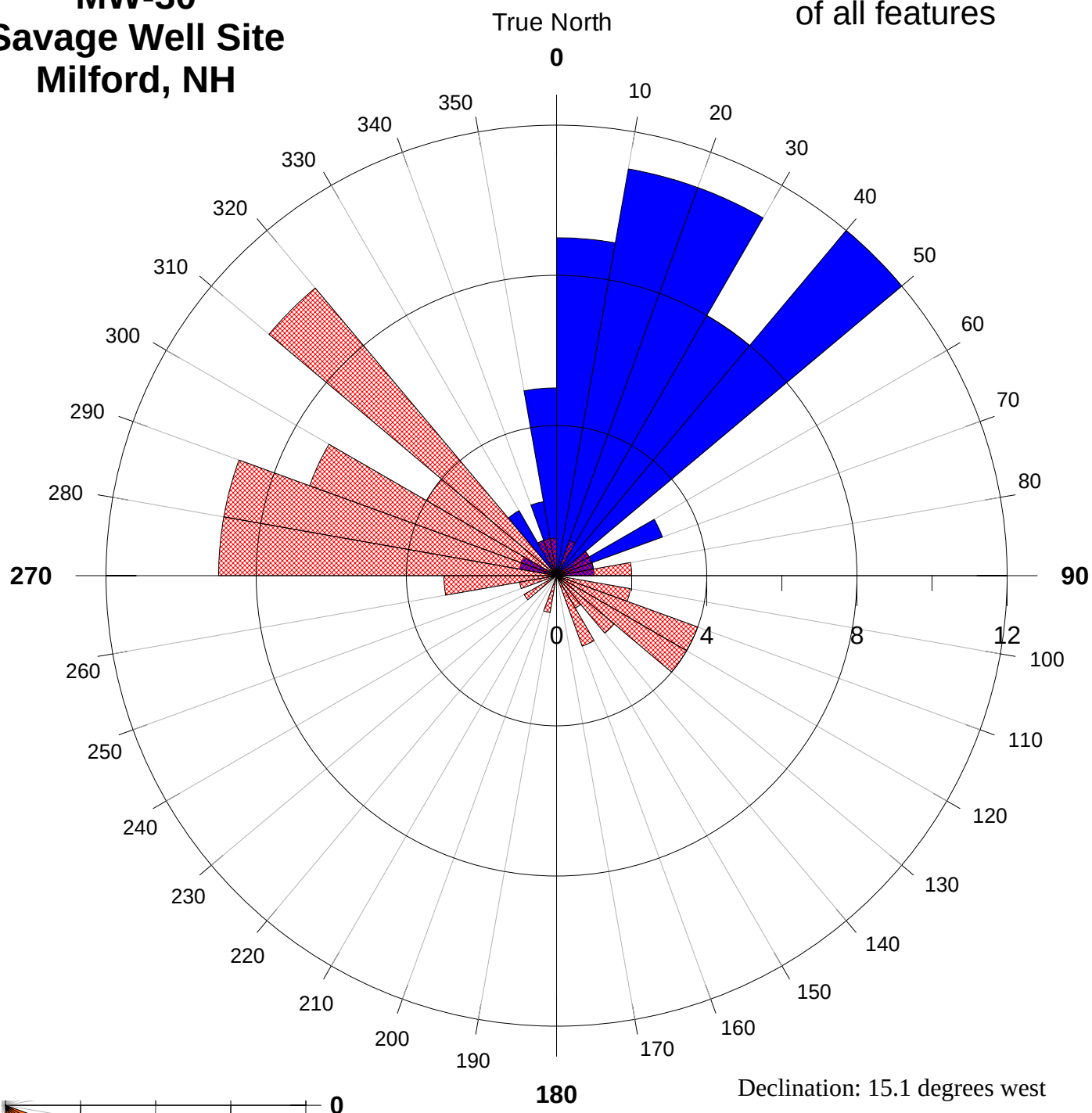
Explanation:

Category 100 = planar feature (possible fracture, joint, foliation, bedding, etc.)
Category 107 = Likely water bearing feature
Category 108 = Possible water bearing fracture

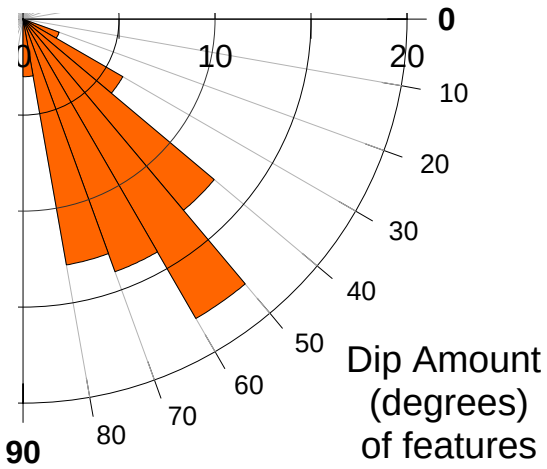
Northeast Geophysical Services

MW-30
Savage Well Site
Milford, NH

FIGURE G-1
Strike and Dip Direction of all features



Declination: 15.1 degrees west



Explanation

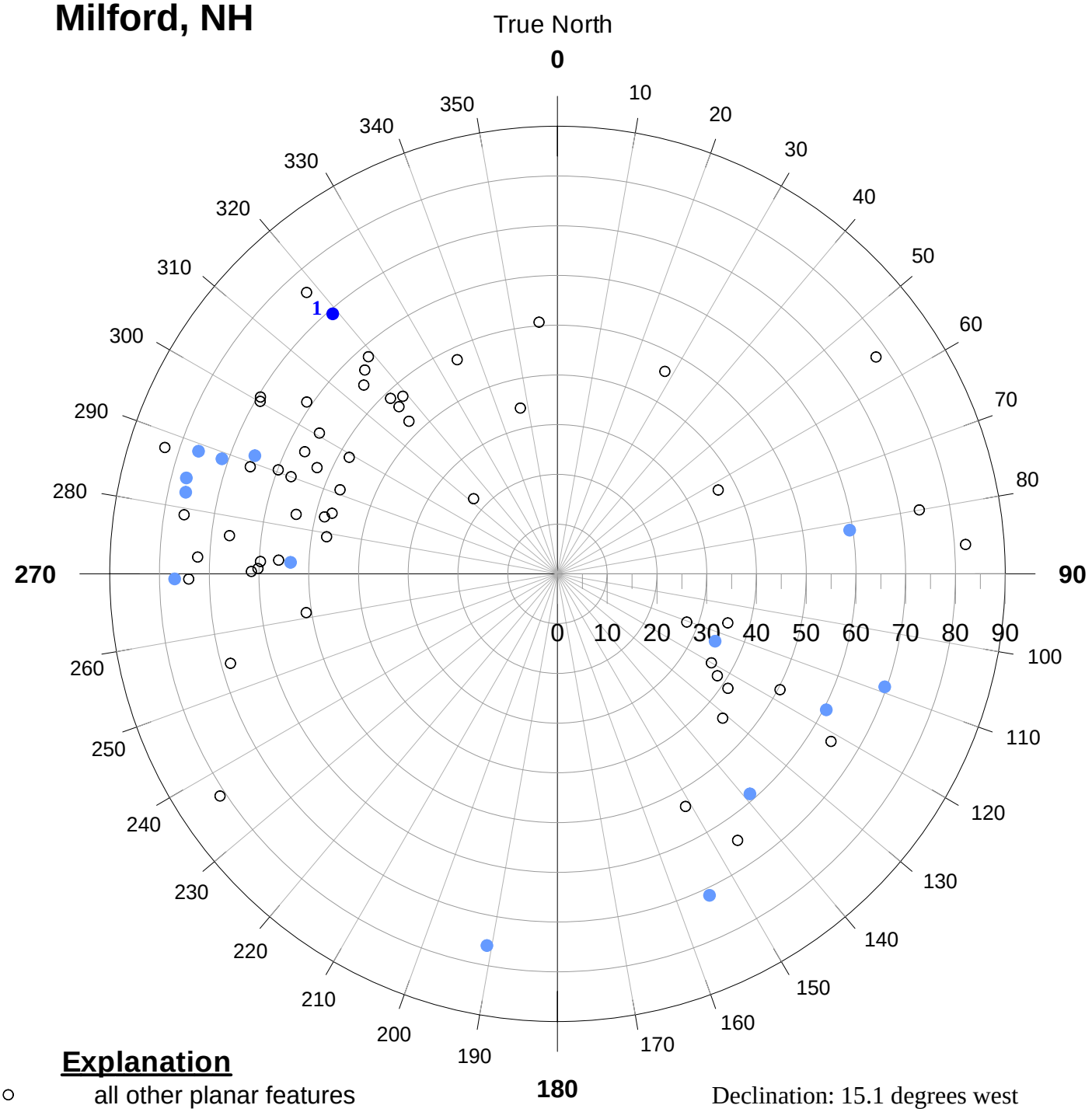
- Dip direction of feature
- Strike of feature
- Dip Amount (Tilt)

Based on 69 measurements

Northeast Geophysical Services

MW- 30
Savage Well Site
Milford, NH

FIGURE G-2
Dip Amount and Dip Azimuth of planar features (upper hemisphere plot)



Explanation

- ○ all other planar features
- ● Likely water bearing
- ● Possibly water bearing

Declination: 15.1 degrees west

Based on 69 measurements

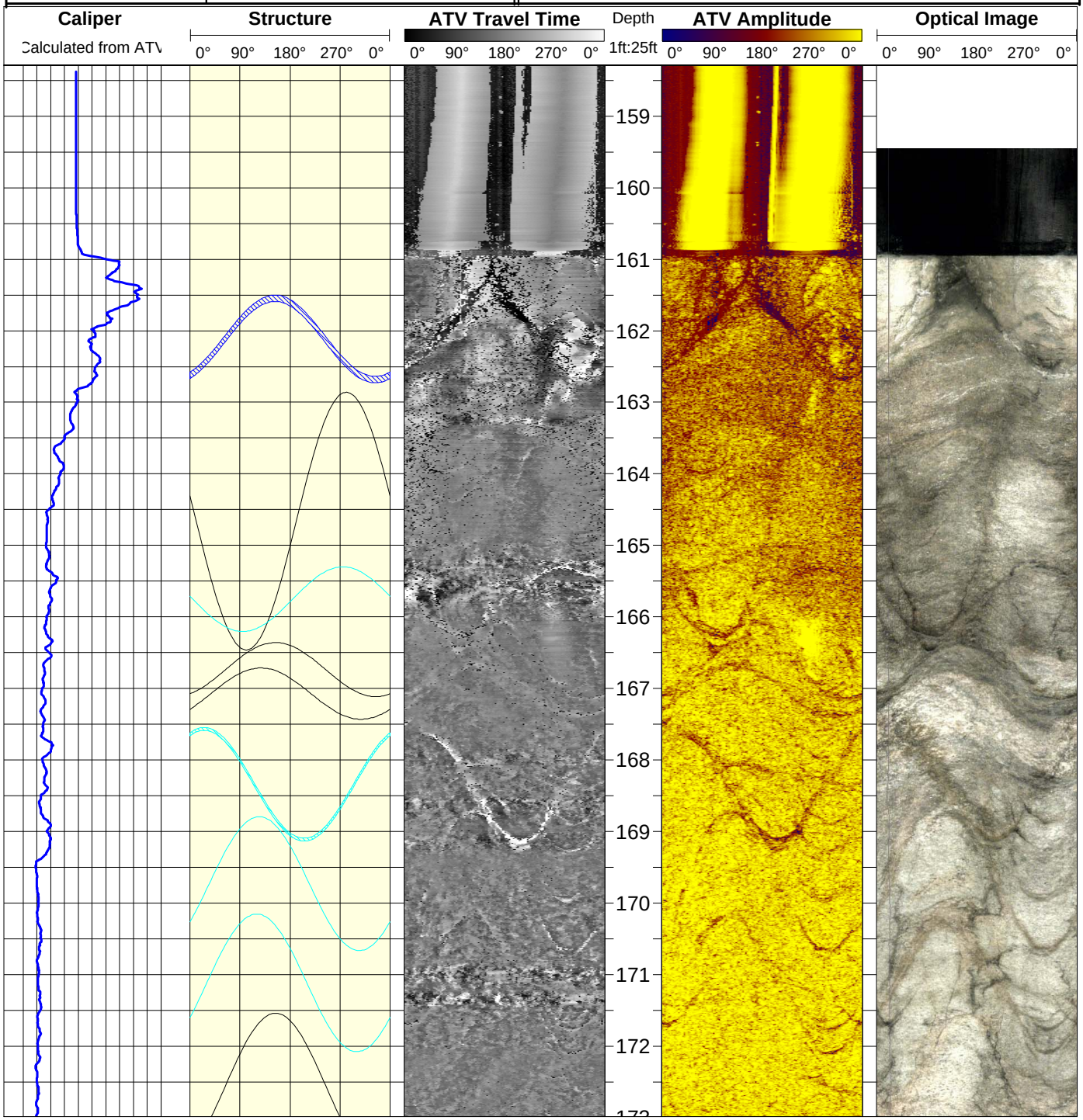
Northeast Geophysical Services
4 Union Street Bangor, Maine 04401
Tel. 207-942-2700
email: ngsinc@negeophysical.com

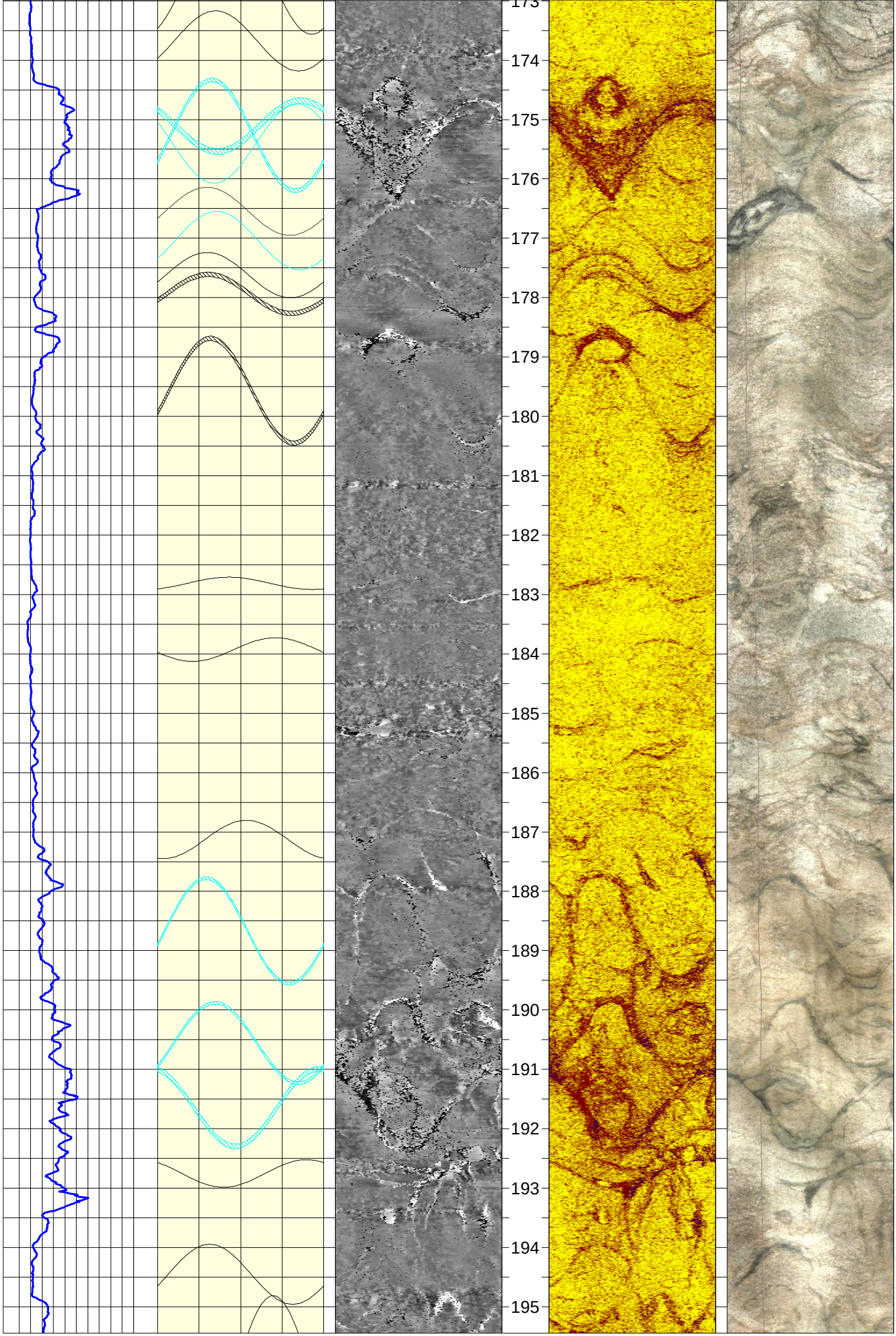
Log: Figure G-3 Televiewer Logs

Well: MW-30

Site: Savage Municipal Well Site

Date:	3/2/10	Location:	Milford, NH
Casing Depth:	161 ft	For:	Weston Solutions
Casing Type:	6 in	Logged by:	R. Rawcliffe
Boring Depth:	237.8 ft	Orientation:	magnetic
Meas. From:	top of casing	Structure Plots:	black = planar features (faults, foliation, bedding, joints, etc) light blue = possibly transmissive fracture dark blue = likely transmissive fracture
Stickup:	2.1		
Water Level:	6.79 ft		

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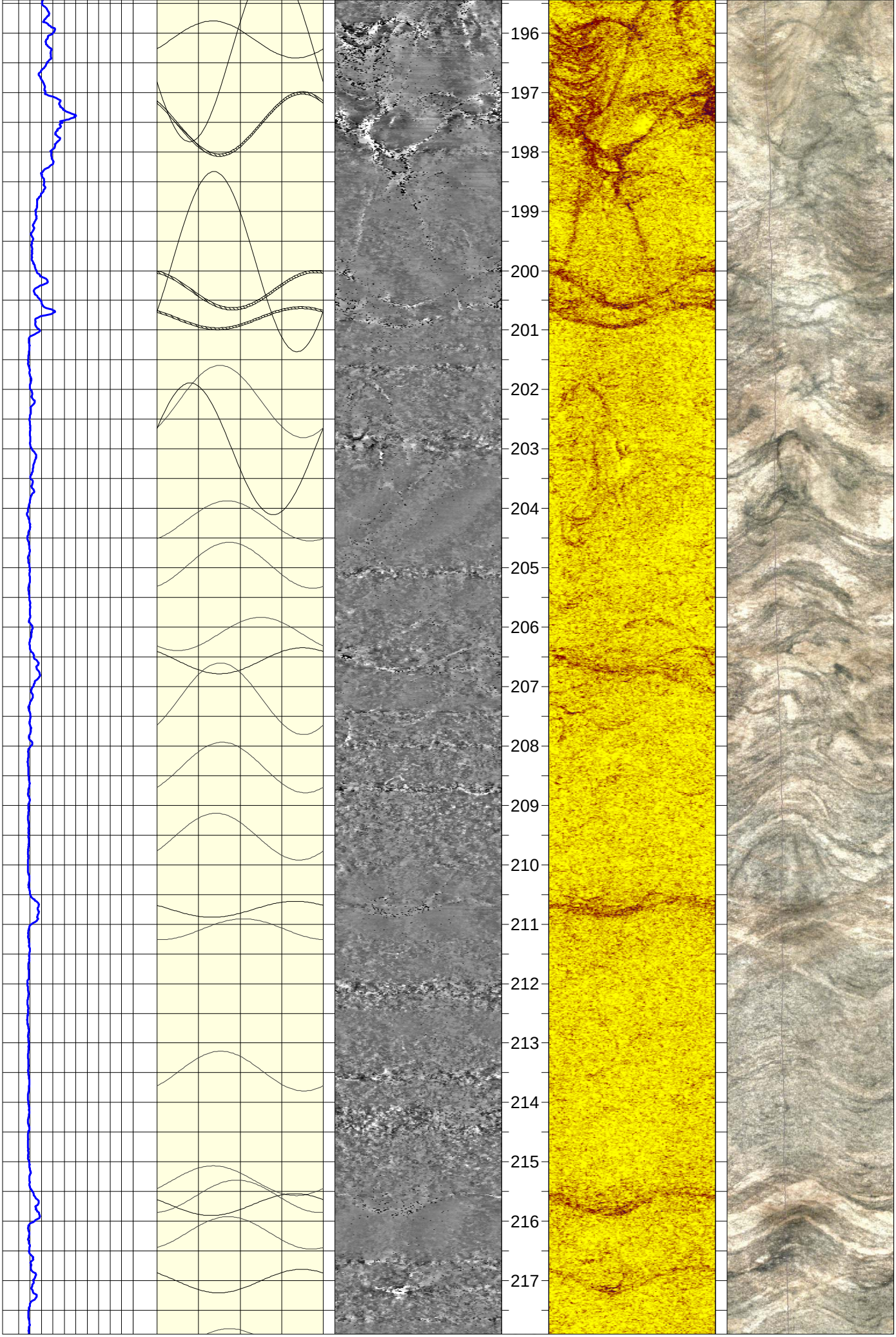
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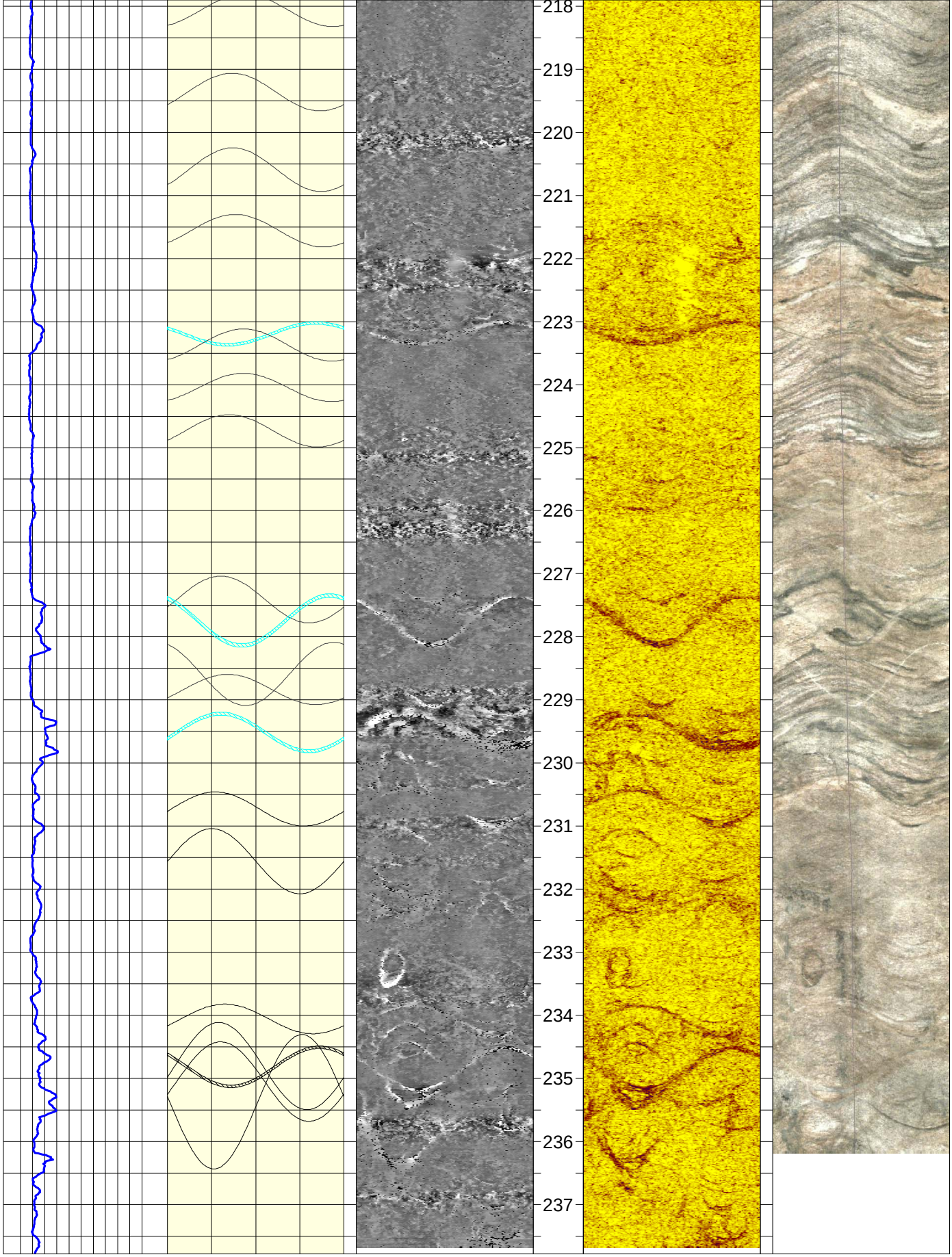
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TABLE G-1 Planar features interpreted from acoustical and optical televiewers
MW-30 Borehole - Savage Municipal Well Site - Milford, New Hampshire **Logged: March 2010**

Borehole	Feature # Number	Feature depth Feet	Dip Degrees	Dip Azimuth magnetic	Strike magnetic	Dip Azimuth True	Strike True	Aperture millimeters	Category Type
MW-30	1	162.1	69	334	64	319	49	11	107
MW-30	2	164.7	82	101	11	86	356	0	100
MW-30	3	165.8	59	97	7	82	352	0	108
MW-30	4	166.7	56	332	62	317	47	0	100
MW-30	5	167.1	57	305	35	290	20	0	100
MW-30	6	168.3	76	206	296	191	281	4	108
MW-30	7	169.7	76	304	34	289	19	0	108
MW-30	8	171.1	77	300	30	285	15	0	108
MW-30	9	172.6	76	333	63	318	48	0	100
MW-30	10	173.7	65	304	34	289	19	0	100
MW-30	11	175.1	61	132	42	117	27	14	108
MW-30	12	175.3	77	297	27	282	12	4	108
MW-30	13	175.4	70	124	34	109	19	0	108
MW-30	14	176.6	62	286	16	270	0	0	100
MW-30	15	177.0	65	306	36	291	21	0	108
MW-30	16	177.6	60	286	16	271	1	0	100
MW-30	17	177.9	56	288	18	273	3	14	100
MW-30	18	179.6	76	294	24	279	9	6	100
MW-30	19	182.8	23	327	57	312	42	0	100
MW-30	20	183.9	36	78	348	62	332	0	100
MW-30	21	187.1	51	11	281	356	86	0	100
MW-30	22	188.7	77	284	14	269	359	4	108
MW-30	23	190.6	71	304	34	289	19	5	108
MW-30	24	191.7	72	170	80	155	65	8	108
MW-30	25	192.8	44	146	56	131	41	0	100
MW-30	26	194.5	66	292	22	277	7	0	100
MW-30	27	196.1	54	298	28	283	13	0	100
MW-30	28	196.3	77	71	341	56	326	0	100
MW-30	29	197.5	65	137	47	122	32	5	100
MW-30	30	199.9	83	303	33	288	18	0	100
MW-30	31	200.3	53	166	76	151	61	7	100
MW-30	32	200.8	36	135	45	120	30	8	100
MW-30	33	202.2	69	315	45	300	30	0	100
MW-30	34	203.0	81	252	342	237	327	0	100
MW-30	35	204.2	54	329	59	314	44	0	100
MW-30	36	205.0	58	334	64	319	49	0	100
MW-30	37	206.1	46	43	313	28	298	0	100
MW-30	38	206.6	41	139	49	124	34	0	100
MW-30	39	207.2	69	316	46	301	31	0	100
MW-30	40	208.4	61	320	50	304	34	0	100
MW-30	41	209.5	60	306	36	290	20	0	100
MW-30	42	210.8	28	126	36	110	20	0	100
MW-30	43	211.1	34	2	272	347	77	0	100
MW-30	44	213.5	56	316	46	301	31	0	100
MW-30	45	215.3	48	299	29	284	14	0	100
MW-30	46	215.6	48	350	80	335	65	0	100
MW-30	47	215.7	36	121	31	106	16	0	100
MW-30	48	216.2	49	332	62	316	46	0	100
MW-30	49	217.0	38	138	48	123	33	0	100
MW-30	50	218.1	47	334	64	319	49	0	100
MW-30	51	219.4	53	309	39	294	24	0	100
MW-30	52	220.6	56	311	41	296	26	0	100
MW-30	53	221.6	48	314	44	299	29	0	100
MW-30	54	223.2	34	128	38	113	23	11	108
MW-30	55	223.4	46	332	62	317	47	0	100
MW-30	56	224.0	43	331	61	316	46	0	100
MW-30	57	224.7	47	306	36	291	21	0	100
MW-30	58	227.4	60	288	18	272	2	0	100
MW-30	59	227.7	59	154	64	139	49	10	108

TABLE G-1 Planar features interpreted from acoustical and optical televiewers
MW-30 Borehole - Savage Municipal Well Site - Milford, New Hampshire **Logged: March 2010**

Borehole	Feature # Number	Feature depth Feet	Dip Degrees	Dip Azimuth magnetic	Strike magnetic	Dip Azimuth True	Strike True	Aperture millimeters	Category Type
MW-30	60	228.6	65	161	71	146	56	0	100
MW-30	61	228.8	47	300	30	285	15	0	100
MW-30	62	229.5	54	288	18	272	2	8	108
MW-30	63	230.7	51	276	6	261	351	0	100
MW-30	64	231.6	68	270	360	255	345	0	100
MW-30	65	234.1	47	294	24	279	9	0	100
MW-30	66	234.8	74	284	14	269	359	0	100
MW-30	67	234.8	50	133	43	117	27	7	100
MW-30	68	235.1	72	288	18	273	3	0	100
MW-30	69	235.4	74	95	5	80	350	0	100

Explanation:

Category 100 = planar feature (possible fracture, joint, foliation, bedding, etc.)
Category 107 = Likely water bearing feature
Category 108 = Possible water bearing fracture

HAGER-RICHTER
GEOSCIENCE, INC.

BOREHOLE GEOPHYSICAL LOGGING
SAVAGE MUNICIPAL WATER SUPPLY SUPERFUND SITE
MILFORD, NEW HAMPSHIRE

Prepared for:

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45 Constitution Drive, Suite 100
Concord, New Hampshire 03301

Prepared by:

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File 10RG30
May, 2011

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May 13, 2011
File 10RG30

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RE: Borehole Geophysical Logging
Savage Municipal Water Supply Superfund Site
Milford, New Hampshire

Dear Ms. Nowack:

In this report, we present the results of borehole geophysical logging conducted by Hager-Richter Geoscience, Inc. (Hager-Richter) at the Savage Municipal Water Supply Superfund Site (Site) located in Milford, New Hampshire for Weston Solutions, Inc. (WESTON). The borehole geophysical logging program was conducted as part of an ongoing environmental investigation by WESTON under the direction of the New Hampshire Department of Environmental Services (NHDES) and the United States Environmental Protection Agency (USEPA). The scope of work for the borehole geophysical logging reported herein was specified by WESTON.

Introduction

The Savage Municipal Water Supply Superfund Site is located in the western portion of the Town of Milford, New Hampshire. The general location of the Site is shown in Figure 1. The Site is the location of the former water supply well, the Savage Well, for the town of Milford, New Hampshire. The Savage Well was operated from 1960 to 1983. NHDES detected concentrations of volatile organic compounds (VOCs) in the well that were above drinking water standards in February, 1983, and the well was shut down.

During remedial investigations of the Site, one of the source areas was identified as the OK Tool Company, Inc., which manufactured metal cutting tools and hardware from approximately 1940 through 1987. Hazardous chemicals were stored and used at the facility. As a result of releases at the facility, several VOC plumes are present in the groundwater beneath the facility.

According to WESTON, remedial actions performed at the Site include building demolition, construction of a containment slurry wall, construction of a groundwater extraction and treatment facility, and in-situ chemical remediation. The chemical remediation consisted of the injecting of sodium permanganate into the ground.

According to WESTON, overburden at the Site consists of approximately 70 to 100 feet of medium to course sand and gravel. A thin (5-10 feet thick) layer of glacial till underlies the sand gravel. According to WESTON, bedrock is present beneath the till at a depth of approximately 80 to 100 feet and consists of granite and gneiss.

WESTON requested borehole geophysical logging as part of the ongoing environmental investigations of the Site. WESTON was interested in determining the depth and orientation (dip azimuth and dip angle) of bedrock fractures intersected by the boreholes, depths where water flows into and out of the boreholes under ambient and stressed (pumped) conditions that could act as containment migration pathways, and depths of lithologic variation in the bedrock encountered in the boreholes.

Borehole geophysical logging was conducted in four (4) boreholes in September, 2010. The boreholes were identified as BR-3, BR-5, BR-6, and MW-16R. The approximate locations of the boreholes logged in September, 2010 are shown in Figure 2. The datum for depths in this report is the top of the 6-inch steel casing at each borehole. The boreholes were cased through the overburden with 6-inch steel casing and were open-hole throughout the bedrock portions of the boreholes. The date logged, casing depth, open-hole interval, open bedrock diameter, and water level for each logged boreholes are reported in Table 1.

Table 1 - Borehole Information

Borehole (date logged)	Bottom of Casing	Open-Hole Interval	Open Bedrock Diameter	Water Level
BR-3 (Sept. 16, 2010)	134.9 feet btoc	134.9 - 504.5 feet btoc	6 inches	15.2 feet btoc
BR-5 (Sept. 14, 2010)	77.2 feet btoc	77.2 - 363.8 feet btoc	6 inches	16.3 feet btoc
BR-6 (Sept. 15, 2010)	112.4 feet btoc	112.4 - 605.1 feet btoc	6 inches	20.5 feet btoc
MW-16R (Sept. 13, 2010)	99.6 feet btoc	99.6 - 390.0 feet btoc	6 inches to 142.9 feet 5 inches to 390.0 feet	10.6 feet btoc

btoc = below the top of casing

Borehole MW-16R was air-rotary drilled to 6 inches in diameter to a depth of 142.9 feet. The depth of borehole MW-16R was increased to 390.0 feet prior to start of the borehole geophysical logging by air-rotary drilling the borehole to 5.5 inches in diameter. Boreholes BR-3, BR-5, and BR-6 were all air rotary drilled to 6 inches in diameter throughout the open bedrock portions of the boreholes.

Borehole BR-3 had previously been logged by others to a depth of approximately 400 feet. After the original borehole geophysical logging conducted by others, the depth of the borehole was increased to approximately 505 feet. WESTON specified that the borehole geophysical logging by Hager-Richter should only be conducted in the bottom 100 feet of borehole BR-3. However, logging was conducted by Hager-Richter throughout the entire borehole. Fracture interpretation for borehole BR-3 is only provided for the bottom 100 feet as specified by WESTON, but the logging data and flow interpretation are provided for the entire borehole as a courtesy to WESTON.

The borehole geophysical logging program consisted of:

- Optical Televiewer (OTV)
- Acoustic Televiewer (ATV)
- Acoustic Caliper
- Fluid Temperature
- Fluid Resistivity
- Natural Gamma Ray
- Heat Pulse Flow Meter (HPFM) under ambient and pumped conditions

In addition, HPFM logging was conducted in six (6) boreholes during a multi-day pump test conducted by WESTON. On the third day of the WESTON pump test, December 9, 2010, HPFM data were acquired by Hager-Richter in boreholes BR-1, BR-2, BR-3, BR-5, MW-16R, and MW-30. The approximate locations of the boreholes logged during the WESTON pump test are shown in Figure 3. HPFM data were acquired at discrete depths selected by WESTON and Hager-Richter after review of previous borehole geophysical logging data acquired by Hager-Richter and others.

Objectives

The objectives of the borehole geophysical logging program were to determine the depth and orientation (dip azimuth and dip angle) of bedrock fractures intersected by the boreholes, depths where water flows into and out of the boreholes under ambient and stressed (pumped) conditions that could act as containment migration pathways, and depths of lithologic variation in the bedrock encountered in the boreholes.

Field Operations

Robert Garfield, Nicholas DeCristofaro, Eric Rickert, and Michael Howley of Hager-Richter conducted the field operations on September 13-16, 2010 and December 9, 2010. The project was coordinated with Ms. Bette Nowack and Mr. Andrew Fuller of WESTON. Mr. Fuller was on-site during field operations. Data analysis and interpretation were completed at the Hager-Richter offices. Preliminary logging results were provided to WESTON electronically from September to November, 2010. Final pump test HPFM results were provided to WESTON electronically on December 13, 2010. Original data and field notes reside in the Hager-Richter files and will be retained for at least three years.

Equipment

A Mount Sopris Matrix portable digital logging system was used with a 4MXA-1000 winch for the borehole geophysical logging. Data were recorded in digital format using a PC. Data were displayed in real time in the field and were processed in the office using WellCAD v4.3, commercially licensed software.

Optical Televiewer. An ALT OBI-40 optical televiewer (OTV) probe was used for this project. The OTV acquires a high resolution, effectively continuous, magnetically oriented, 360° image of the borehole wall. The image can be used to detect bedrock structures such as fractures, foliation, and bedding and to provide information about lithology. The probe includes a 3-axis magnetometer and three accelerometers to orient the image and to provide borehole deviation data that are used to correct structure orientations from apparent to true orientations.

Acoustic Televiewer. An ALT ABI-40 acoustic televiewer (ATV) probe was used for this project. The ATV acquires a high resolution, effectively continuous, magnetically oriented, 360° image of the borehole wall using the reflected signal of sound waves in the ultrasonic frequency range. Both amplitude and travel time of the reflected signal are recorded and can be used to detect bedrock structures such as fractures, foliation, and bedding. The probe includes a 3-axis magnetometer and three accelerometers to orient the image and to provide borehole deviation data that are used to correct structure orientations from apparent to true orientations.

ATV travel time data can also be used to calculate an acoustic caliper log. The acoustic caliper log measures the average borehole diameter as a function of depth. The acoustic caliper log is derived from the travel time data and the velocity of the acoustic signal in water. The acoustic caliper log is used to locate possible fractures and to aid in the interpretation of other borehole geophysical logs.

*Fluid Temperature***.** A Mount Sopris 2SFB-1000 fluid resistivity/temperature probe was used for the temperature logging. The temperature sensor is a semiconductor device for which the voltage output is linearly related to temperature. Temperature logs record the temperature of the borehole fluid with depth and are useful for detecting flow into or out of a borehole.

Fluid Resistivity. A Mount Sopris 2SFB-1000 fluid resistivity/temperature probe was used for the fluid resistivity logging. The probe uses an electrically shielded Wenner array to measure the capacity of the borehole fluid to transmit electric current with depth and can be an indicator of salinity and water quality. If fluid resistivity contrasts are present between the borehole fluid and individual fractures and fracture zones, the fluid resistivity logs are also useful indicators of flow into or out of the borehole.

Resistivity is the physical property that relates electric current density to potential gradient and is defined as:

$$ñ = (A / L) * (V / I) \qquad \text{Eq. 1}$$

where:

ñ	is resistivity
A	is cross-sectional area of a homogeneous tube
L	is length of the tube
V	is potential
I	is current

Natural Gamma Ray. A Mount Sopris 2PGA-1000 poly-gamma probe was used for the natural gamma ray logging. The probe uses a sodium iodide crystal that produces a pulse of light when struck by a gamma ray. The variation of radioactivity naturally occurring in rocks and sediments makes the natural gamma ray log an excellent indicator of changes in lithology. Radioactive minerals tend to accumulate in clays with the practical result that layers with higher clay content are commonly expressed in the natural gamma ray log as relatively higher counts per second (cps). Clean sands, which are normally low in radioactivity, produce low count rates.

Heat Pulse Flow Meter. A Mount Sopris HFP-2293 heat pulse flow meter (HPFM) was used for the HPFM logging. The HPFM measures the vertical rate and direction of fluid flow in a borehole at discrete depths and is designed to be used for boreholes with flow rates less than one gallon per minute (gpm). A heating grid heats a thin sheet of water in a short time interval (less than 0.05 seconds), and, if vertical flow is present, the sheet of water moves along the borehole in the direction of flow. Temperature sensors located at known distances above and below the heating grid monitor the differential temperature of the borehole fluid. The time required for the sheet of heated water to reach one of the sensors is measured, and, based on factory calibrations, the time is used to calculate the vertical flow rate. Depths where water

flows into and out of the borehole can be interpreted based on changes in the vertical flow rate and/or direction. HPFM measurements can be made under ambient or stressed (pumped or injected) conditions.

Measurement depths are selected based on information provided by other borehole geophysical logging data such as OTV, ATV, fluid temperature, and fluid resistivity data. To make a measurement, the probe is positioned at a selected depth and the probe is stabilized by the friction between the centralizers on the tool and the borehole wall. When the borehole fluid has stabilized after the disturbance caused by the probe being moved to the measurement depth, the heating grid is fired, and a measurement cycle starts.

Limitations of the Methods

With the 4MXA-1000 winch, the logging cable passes over a calibrated wheel, and an encoder counts the revolutions, which are converted to depth. Slippage of the logging cable may occur, resulting in errors in recorded depth. At the beginning and end of a logging run, fiducial depths (commonly ground surface or top of casing) are measured and are compared to determine if slippage occurred.

Optical Televiewer. OTV data can be acquired in both air and optically clear water-filled boreholes. If the borehole is water-filled, the clarity of the water directly affects the quality of the OTV image. The OTV probe must be centralized in the borehole to acquire optimal images of the borehole wall. If the borehole wall is rough and/or irregular or the diameter of the open borehole is larger than the diameter of the casing, the probe may not be adequately centralized and the quality of the optical images may be compromised.

The OTV logs are used to determine the depth and orientation of fractures and other planar features intersected by a borehole. In some cases, natural planar features in the bedrock, such as mineral veins, bedding, and foliation may appear to be fractures in the OTV logs, but are not actual discontinuities in the bedrock. The OTV images are also used to provide information about lithology.

The accuracy of the orientation measured by the OBI-40, as stated by the manufacturer, is ±0.5° for the inclination data and ±1° for the azimuth data. The OBI-40 relies on the earth's magnetic field to determine azimuth. Therefore, in areas where the magnetic field may be significantly affected by local magnetic objects, the dip azimuths reported in the logs may be compromised. Specifically, the dip azimuth of bedrock structures and the borehole deviation data within approximately five feet of steel casing are not accurate. However, the depth and dip angle of bedrock structures within five feet of steel casing are accurate.

Acoustic Televiewer. ATV logging requires that liquid be present in the portion of the borehole to be logged. However, the liquid does not need to be optically clear. The ATV probe must be centralized in the borehole to acquire optimal images of the borehole wall. If the borehole wall is rough and/or irregular or the diameter of the open borehole is larger than the diameter of the casing, the probe may not be adequately centralized and the quality of the acoustic images may be compromised.

The ATV logs are used to determine the depth and orientation of fractures and other planar features intersected by a borehole. In some cases, natural planar features in the bedrock, such as mineral veins, bedding, and foliation may appear to be fractures in the ATV logs, but are not actual discontinuities in the bedrock.

The accuracy of the orientation measured by the ABI-40, as stated by the manufacturer, is ±0.5° for the inclination data and ±1° for the azimuth data. The ABI-40 relies on the earth's magnetic field to determine azimuth. Therefore, in areas where the magnetic field may be significantly affected by local magnetic objects, the accuracy of dip azimuths reported in the logs may be reduced. Specifically, the dip azimuth data of bedrock structures and the borehole deviation data within approximately five feet of steel casing are not accurate. However, the depth and dip angle of bedrock structures within approximately five feet of steel casing are accurate.

The acoustic caliper data are unlikely to indicate the presence of high angle fractures or fractures with small aperture. High angle fractures with large aperture may show small enlargements in the caliper log at both the top and bottom of the intersection of the fracture with the borehole wall. It also may be difficult to identify fractures in the caliper log located near the bottom of casing where an enlargement commonly occurs and may be due to causes other than natural fractures.

Fluid Temperature. Fluid temperature logging requires that liquid be present in the portion of the borehole to be logged. According to the manufacturer's specifications, the measurement range is -20°C to 80°C, the accuracy is better than ±1%, and the resolution is 0.01° C. Temperature logging is ineffective for accurately measuring the formation fluid temperature unless the borehole fluid is at equilibrium, except for detecting flow into or out of the borehole via hydraulically transmissive fractures. Additionally, a vertical temperature gradient must be present in the borehole in order to detect water movement into or out of the borehole.

Fluid Resistivity. Fluid resistivity logging requires that liquid be present in the portion of the borehole to be logged. According to the manufacturer's specifications, the measurement range is 0 ohm-m to 100 ohm-m, the accuracy is better than ±1%, and the resolution is 0.05%. A contrast in fluid resistivity must be present between the borehole fluid and fluid in the fractures in order to detect water movement into or out of the borehole.

Natural Gamma Ray. Natural gamma ray data can be acquired with or without liquid in the borehole and in an un-cased, PVC-cased, or steel-cased borehole. However, if a liquid or casing is present, the liquid or the casing attenuates the natural gamma rays, and, therefore, lower values are measured than if the borehole was air-filled and/or un-cased. According to the manufacturer's specifications, the measurement range is 0 CPS to 100,000 CPS, the accuracy is ±1% of full scale, and the resolution is 0.02% of full scale. Natural gamma ray data do not have a quantitative value in terms of geologic properties.

Heat Pulse Flow Meter. The HPFM requires liquid in the interval to be logged. According to the manufacturer's specifications for the HPFM, the measuring range is 0.03 to 1.0 gpm, the accuracy is ±5% for the mid-range, increasing to ±15% for the extremes of the range, and the resolution is 5%. Data below the stated calibration range are reported when such data are repeatable. Although the accuracy of such data may be low, non-zero values indicate that flow is occurring and indicate the direction of flow. The HPFM probe measures the difference in temperature between the upper and lower temperature sensors. In the absence of flow, the thermal pulse would move symmetrically out from the grid, affecting the two sensors equally as a function of time. Therefore, the conductive or convective dissipation of the heat pulse would yield a zero value in the absence of flow.

Field Procedures & Data Acquisition

Adequate tension was maintained with the logging cable during the borehole geophysical logging and the depth encoder was cleaned after each logging run in order to maintain accurate depth measurements. Repeat sections were acquired to verify depth consistency. In addition, at the beginning and end of a logging run, a fiducial depth (top of casing or ground surface) was measured and checked for consistency.

The cable and downhole probes were decontaminated prior to first use with an Alconox and water solution followed by rinsing with water. The cable and downhole probes were also decontaminated after logging each borehole with a solution of water, vinegar, and hydrogen peroxide, which was provided by WESTON to clean the sodium permanganate off of the logging equipment. After using the WESTON provided solution, the cable and downhole probes were also decontaminated with an Alconox and water solution followed by rinsing with water.

The borehole geophysical logging sequence and the data acquisition parameters for the four (4) boreholes logged in September, 2010 are reported in Table 2. HPFM data were acquired under ambient and pumped conditions in each borehole. After completing HPFM logging under ambient conditions, a pump was placed in the borehole and HPFM logging under stressed conditions was conducted while pumping from the borehole at a constant rate.

Table 2 – Logging Sequence & Data Acquisition Parameters
September, 2010

Log	Sampling Interval	Logging Speed	Logging Direction
1. Fluid Temperature & Fluid Resistivity	0.10 feet	12 feet/minute	down and repeat up
2. OTV	0.01 feet	5 feet/minute	down and repeat up
3. ATV & Acoustic Caliper	0.01 feet	8 feet/minute	down and repeat up
4. Natural Gamma Ray	0.10 feet	12 feet/minute	down and repeat up
5. HPFM under ambient conditions	HPFM data were acquired at discrete depths under ambient conditions		
6. HPFM under pumped conditions	HPFM data were acquired at discrete depths while water was pumped from the borehole		

In addition, HPFM data were acquired at discrete depths in six (6) boreholes on December 9, 2010, the third day of the WESTON pump test.

Data Processing

The processing consists mainly of selecting scales, filters, and the layout of the tracks. In addition, the OTV and ATV data require determining the depth, orientation, and category of the bedrock structures detected. To increase the quality of the OTV images, the brightness and contrast of the images were adjusted. To increase the quality of the images, the ATV travel time images were digitally centralized. The ATV amplitude images can be normalized, although normalization was not applied to the ATV amplitude data for this project.

Data Interpretation & Presentation

Bedrock Fracture Interpretation & Presentation. Fractures can be identified on the basis of the OTV images, ATV amplitude images, and ATV travel time images. Some, if not most, of the criteria for identifying fractures in the OTV and ATV data require a judgment call, and different log analysts will not necessarily make the same call. Hence, some of the bedrock structures identified as fractures may not be fractures. Bedding, foliation, veins, and other planar geologic features in the rock may appear similar to fractures in the borehole geophysical data.

The datum for depths in this report is the top of the 6-inch steel casing at each borehole. An elevation track is provided along with depth in the borehole geophysical logs and tables of bedrock structures. When both the depth track and elevation track are provided on the same log or table, the depth track is provided in black and the elevation track is provided in blue to

minimize confusion between depths and elevations. The elevation track is based on the top of casing elevations provided by WESTON.

The depth of bedrock structures are reported as the average depth of the top and bottom intersections of each bedrock structure and the borehole wall. The orientation of bedrock structures (fractures, bedding, foliation, veins, and other planar geologic features) are reported as the dip azimuth (dip direction) and dip angle of each structure. The dip azimuth is perpendicular to strike as used commonly by geologists. The televiewer logs and the dip azimuth data are referenced to true north using a magnetic declination of 15° west. The dip angle data are reported from horizontal.

Bedrock structures detected in the televiewer logs are grouped into three categories: Fracture Rank 1, Fracture Rank 2, and Fracture Rank 3. The categories are shown as color-coded lines and symbols on the structure projection plots, tadpole plots, and on the structure statistics plots. Figure 4 explains the bedrock structure categories and Figure 5 explains how to read the tadpole plots.

Fracture Rank 1 describes minor fractures that are not distinct and may not be continuous around the borehole. Fracture Rank 2 describes intermediate fractures that are distinct and continuous around the borehole with little or no apparent aperture. Fracture Rank 3 describes major fractures that are distinct and continuous around the borehole with apparent aperture.

The structure projection, sinusoidal curves in the log track labeled Structure Projection, display the depth, orientation, and category of the bedrock structures detected in the televiewer data. Bedrock structures are essentially planar for short distances such as the intersection of the open borehole and the bedrock structure. The intersection of a plane, the bedrock structure, with a cylinder, the borehole, is a circle on the plane. When the circle is unwrapped and plotted as it is in the structure projection plots, the circle plots as a sine curve as shown in Figure 6. The structures plotted in the structure projection plots are not corrected for borehole deviation. Therefore, the orientation of the structures are referred to as *apparent* orientations (that is, *apparent* dip angle and *apparent* dip azimuth). The true orientation (that is, *true* dip angle and *true* dip azimuth) of the detected bedrock structures are shown in the log track labeled Tadpole Plot. The correction from apparent to true orientation is made using the borehole deviation data acquired by the televiewer probes (OTV and ATV probes).

The tadpole plots are created from the structure projection plots after the data are corrected from apparent to true dip azimuth and dip angle as previously discussed. The tadpole plots graphically display the depth, orientation, and category of the bedrock structures interpreted from the televiewer images. The orientation of bedrock structures are graphically displayed on the tadpole plots by a tadpole made up of a circle, the head, and a line, the tail. The position of the head, left to right on the tadpole plot, gives the dip angle of the bedrock structure. The left side of the track indicates a dip angle of 0° and the right side of the track indicates a dip

angle of 90° from horizontal. The position of the tail gives the dip azimuth of the fracture and can be read like a compass. The tail pointing directly up is 0°, north. We note explicitly that dip azimuth is perpendicular to strike as the term is used by geologists.

Borehole Flow Interpretation. The interpretation of flow in the logged borehole is based on the fluid temperature, fluid resistivity, and HPFM data. Fluctuations in the fluid temperature and fluid resistivity data indicate depths of possible flow into or out of the borehole. Changes in the flow rate and/or direction in the HPFM data also indicate depths of flow into or out of the borehole. It is possible to calculate the flow rate, in gallons per minute (gpm), and flow direction based on the HPFM data. Therefore, it is possible to differentiate between flow into and flow out of the borehole based on the HPFM data. However, the fluid temperature and fluid resistivity data alone can only be used to determine depths of possible flow into or out of the borehole. It is not possible to determine the flow rate, flow direction, or differentiate between flow into and flow out of the borehole based on fluid temperature and fluid resistivity alone.

Flow into and out of boreholes in fractured bedrock primarily occurs through transmissive fractures intersected by the boreholes. Since HPFM data are acquired at discrete depths, changes in flow rate and/or direction occur between two HPFM measurement depths. Depths of flow into and out of the boreholes detected by the HPFM are further refined by consideration of the fluid temperature and fluid resistivity logs, and the bedrock fractures detected in the OTV and/or ATV logs in the depth zones between HPFM measurements points where a change in the flow rate and/or direction is detected.

Lithologic Variation Interpretation. The interpretation of lithologic variation in the bedrock encountered in the logged boreholes is based on the OTV, ATV, and natural gamma ray data. Lithologic variation can be detected based on changes in the color and texture of the bedrock observed in the OTV images and based on changes in the bedrock texture and reflectivity evident in the ATV amplitude logs. Lithologic variation can also be detected based on baseline shifts in the natural gamma ray logs. The borehole geophysical logging data can be used to determine the depths of lithologic variation in the bedrock, but cannot be used to identify a specific bedrock type.

Presentation of Borehole Geophysical Logs. Two sets of borehole geophysical logs are provided for each logged borehole:

1. Borehole Image & Flow Logs
2. Borehole Fluid & Geology

The Borehole Image & Flow Logs are provided at a scale of one inch to two feet. The Borehole Fluid & Geology Logs are provided at a scale of one inch to five feet. The scale of one inch to two feet for the Borehole Image & Flow Logs provide a more detailed view of the image logs, which consist of high resolution optical and acoustic images. The more compressed scale

of one inch to five feet for the Borehole Fluid & Geology Logs enables easier interpretation of the linear data where anomalies may be subtle and take place over broad depth ranges.

The Borehole Image & Flow Logs consist of:

Track 1. OTV Image
Track 2. Depth Track in feet below top of casing - scale at 1 inch to 2 feet
Track 3. ATV Amplitude
Track 4. ATV Travel Time & Structure Projection
Track 5. Acoustic Caliper & Tadpole Plot
Track 6. Fluid Temperature & Fluid Resistivity
Track 7. Elevation Track in feet - based on top of casing elevations provided by WESTON - scale at 1 inch to 2 feet
Track 8. HPFM - Pumped Conditions & Flow Comments

The Borehole Fluid & Geology Logs consist of:

Track 1. ATV Amplitude
Track 2. Depth Track in feet below top of casing - scale at 1 inch to 5 feet
Track 3. Natural Gamma Ray
Track 4. Acoustic Caliper & Tadpole Plot
Track 5. Fluid Temperature & Fluid Resistivity
Track 6. Hydraulic Transmissivity, PCE Concentration, & TCE Concentration The transmissivity, PCE, & TCE data were provided by Weston and were acquired during packer testing
Track 7. Elevation Track in feet - based on top of casing elevations provided by WESTON - scale at 1 inch to 5 feet
Track 8. HPFM - Pumped Conditions & Flow Comments

HPFM data under pumped conditions, provided in Track 8 for both the Borehole Image & Flow Logs and the Borehole Fluid & Geology Logs do not refer to the HPFM data acquired during the WESTON pump test. HPFM data under pumped conditions are HPFM data acquired while water was pumped at a constant low flow rate, less than one gallon per minute (gpm), in the casing of the borehole being logged with the HPFM. Because flow was not detected under ambient conditions, pumping each borehole at a low and constant rate during HPFM testing provides information on depths where water flows into the boreholes under stressed conditions, which indicates the depths of hydraulically transmissive fractures. The borehole flow conditions for each of the logged boreholes are reported in Table 4 to Table 7.

Borehole Deviation Interpretation & Presentation. Borehole deviation logs are also provided for the logged boreholes. The borehole deviation data are reported as Borehole Angle, Borehole Northing, and Borehole Easting. The borehole angle is reported as the angle of the

borehole from vertical. The northing and easting data are referenced to true north. The northing and easting data are the distance in feet the borehole has horizontally deviated from where the borehole would be if it were vertical. Zero northing and zero easting is located at the start of the data acquisition, typically the bottom of casing. Deviation data cannot be acquired in the steel casing due to magnetic interference from the steel casing.

Results

The general location of the site is shown in Figure 1, and Figure 2 shows the approximate locations of the logged boreholes. The borehole geophysical logs are given in Appendix 1, the bedrock structure statistics plots are given in Appendix 2, the tables of bedrock structures are given in Appendix 3, the borehole deviation logs are given in Appendix 4, and the tables of HPFM results during the WESTON pump test are given in Appendix 5. The datum for depths in this report is the top of the 6-inch steel casing at each borehole. An elevation track is provided along with depth in the logs and tables of bedrock structures. The depth track is provided in black and the elevation track is provided in blue to minimize confusion between depths and elevations. The elevation track is based on the top of casing elevations provided by WESTON. The televiewer logs, dip azimuth data, and borehole deviation data are referenced to true north using a magnetic declination of 15°west. The dip angle data are reported from horizontal.

Borehole geophysical logging was conducted in four (4) boreholes in September, 2010. The boreholes were identified as BR-3, BR-5, BR-6, and MW-16R. The approximate locations of the boreholes logged in September, 2010 are shown in Figure 2. The boreholes were cased through the overburden with 6-inch steel casing and were open-hole throughout the bedrock portions of the boreholes. The date logged, casing depth, open-hole interval, open bedrock diameter, and water level for each logged boreholes are reported in Table 1.

Borehole BR-3 had previously been logged by others to a depth of approximately 400 feet. After the original borehole geophysical logging conducted by others, the depth of the borehole was increased to approximately 505 feet. WESTON specified that the borehole geophysical logging by Hager-Richter should only be conducted in the bottom 100 feet of borehole BR-3. However, logging was conducted by Hager-Richter throughout the entire borehole. Fracture interpretation for borehole BR-3 is only provided for the bottom 100 feet as specified by WESTON, but the logging data and flow interpretation are provided for the entire borehole as a courtesy to WESTON.

Due to poor water clarity in borehole BR-5, OTV data were not acquired below approximately 100 feet. The poor water clarity in borehole BR-5 was caused by sodium permanganate in the borehole. As previously discussed in the introduction of this report, a sodium permanganate in-situ chemical remediation technique had been used at the site. Based on the fluid resistivity and OTV logs, provided in Appendix 1, the concentrations of the sodium permanganate at the time of logging increased with depth and stratified in the water column in

borehole BR-5. As the sodium permanganate concentration increases, fluid resistivity values decrease, and the water clarity evident in the OTV logs decreases. Depths where the sodium permanganate concentrations increased coincide with depths of hydraulically transmissive fractures as determined by the HPFM data. Between depths of approximately 92 and 100 feet, the concentration of sodium permanganate increased to a point where the water clarity was too poor to image the open bedrock borehole.

Bedrock Fracture Results. The number of bedrock structures interpreted as fractures in the logged boreholes and the most prominent orientations of fractures detected in the logged boreholes are reported in Table 3 and are evident in the bedrock structure statistics plots in Appendix 2. Based on the televiewer data from the logged boreholes, the most prominent fracture orientation is approximately parallel to foliation in the bedrock encountered at the Site.

Table 3 – Summary of Bedrock Fractures Statistics

Borehole	Number of Fractures	Most Prominent Fracture Dip Azimuth	Most Prominent Fracture Dip Angle
BR-3	56	west-northwest (285°- 315°)	65° - 75°from horizontal
BR-5	210	east (75°- 105°) west-northwest (285°- 300°)	60° - 75°from horizontal
BR-6	524	east (90°- 105°) west (255°- 285°)	65° - 75°from horizontal
MW-16R	279	northwest (300°- 330°)	30° - 40°from horizontal 65° - 70°from horizontal

Borehole Flow Results. The borehole flow data (fluid temperature, fluid resistivity, and HPFM data) are plotted in the borehole geophysical logs provided in Appendix 1. Depths of interpreted flow into and out of the boreholes are reported as text overlaid on the HPFM track (the last track to the right) on the borehole geophysical logs.

Flow was not detected in the logged boreholes with the HPFM under ambient conditions. Therefore, flow results reported in the borehole geophysical logs and in this report are based only on the HPFM data under pumped conditions as well as the fluid temperature and fluid resistivity. HPFM data under pumped conditions do not refer to the HPFM data acquired during the WESTON pump test. HPFM data under pumped conditions are HPFM data acquired while water was pumped at a constant low flow rate, less than one gallon per minute (gpm), in the casing of the borehole being logged with the HPFM. Because flow was not detected under ambient conditions, pumping each borehole at a low and constant rate during HPFM testing provides information on depths where water flows into the boreholes under stressed conditions, which indicates the depths of hydraulically transmissive fractures. The borehole flow conditions for each of the logged boreholes are reported in Table 4 to Table 7.

Table 4 - Summary of Borehole Flow in BR-3

Depths (feet btoc)	Comments
15.2	water level
29.0 - 30.0	location of the pump for HPFM under pumped conditions; water was pumped at approximately 0.25 gpm
30.0 - 134.9	flow up the borehole in the casing at 0.22 gpm under pumped conditions
134.9	bottom of 6-inch steel casing
134.9 - 143.3	flow into and up the borehole under pumped conditions
143.3 - 175.4	flow up the borehole at 0.12 gpm under pumped conditions
175.4 - 193.7	flow into and up the borehole under pumped conditions
193.7 - 212.6	flow up the borehole at 0.05 gpm under pumped conditions
212.6 - 225.1	minor flow into and up the borehole under pumped conditions
225.1 - 331.2	flow up the borehole at 0.04 gpm under pumped conditions
331.2 - 343.8	minor flow into and up the borehole under pumped conditions
343.8 - 348.9	flow up the borehole at 0.03 gpm under pumped conditions
348.9 - 357.6	flow into and up the borehole under pumped conditions
357.6 - 504.5	no flow under pumped conditions
504.5	bottom of the borehole

Table 5 - Summary of Borehole Flow in BR-5

Depths (feet btoc)	Comments
16.3	water level
24.0 - 25.0	location of the pump for HPFM under pumped conditions; water was pumped at approximately 0.4 gpm
25.0 - 77.2	flow up the borehole in the casing at 0.40 gpm under pumped conditions
77.2	bottom of 6-inch steel casing
77.2 - 80.6	flow up the borehole at 0.40 gpm under pumped conditions
80.6 - 82.7	flow into and up the borehole under pumped conditions
82.7 - 89.5	flow up the borehole at 0.23 gpm under pumped conditions
89.5 - 94.4	flow into and up the borehole under pumped conditions
94.4 - 171.5	flow up the borehole at 0.05 gpm under pumped conditions
171.5 - 174.2	minor flow into and up the borehole under pumped conditions
174.2 - 210.7	flow up the borehole at 0.04 gpm under pumped conditions
210.7 - 216.1	minor flow into and up the borehole under pumped conditions
216.1 - 339.7	flow up the borehole at 0.03 gpm under pumped conditions
339.7 - 344.6	flow into and up the borehole under pumped conditions
344.6 - 363.8	no flow under pumped conditions
363.8	bottom of the borehole

Table 6 - Summary of Borehole Flow in BR-6

Depths (feet btoc)	Comments
20.5	water level
29.0 - 30.0	location of the pump for HPFM under pumped conditions; water was pumped at approximately 0.35 gpm
30.0 - 112.4	flow up the borehole in the casing at 0.33 gpm under pumped conditions
112.4	bottom of 6-inch steel casing
112.4 - 145.0	flow into and up the borehole under pumped conditions
145.0 - 160.7	flow up the borehole at 0.28 gpm under pumped conditions
160.7 - 165.7	flow into and up the borehole under pumped conditions
165.7 - 168.4	flow up the borehole at 0.20 gpm under pumped conditions
168.4 - 171.1	flow into and up the borehole under pumped conditions
171.1 - 226.0	flow up the borehole at 0.13 gpm under pumped conditions
226.0 - 235.0	flow into and up the borehole under pumped conditions
235.0 - 237.7	flow up the borehole at 0.10 gpm under pumped conditions
237.7 - 239.7	flow into and up the borehole under pumped conditions
239.7 - 387.4	flow up the borehole at 0.07 gpm under pumped conditions
387.4 - 402.1	flow into and up the borehole under pumped conditions
402.1 - 419.9	flow up the borehole at 0.04 gpm under pumped conditions
419.9 - 426.8	minor flow into and up the borehole under pumped conditions
426.8 - 508.4	flow up the borehole at 0.03 gpm under pumped conditions
508.4 - 520.9	flow into and up the borehole under pumped conditions
520.9 - 605.1	no flow under pumped conditions
605.1	bottom of the borehole

Table 7 - Summary of Borehole Flow in MW-16R

Depths (feet btoc)	Comments
10.6	water level
22.0 -23.0	location of the pump for HPFM under pumped conditions; water was pumped at approximately 0.3 gpm
23.0 - 99.6	flow up the borehole in the casing at 0.30 gpm under pumped conditions
99.6	bottom of 6-inch steel casing
99.6 - 118.0	flow up the borehole at 0.30 gpm under pumped conditions
118.0 - 118.5	flow into and up the borehole under pumped conditions
118.5 - 142.9	flow up the borehole at 0.13 gpm under pumped conditions
142.9	open borehole diameter decrease from 6.0 inches above to 5.5 inches below
142.9 - 156.5	flow up the borehole at 0.13 gpm under pumped conditions
156.5 - 159.1	flow into and up the borehole under pumped conditions
159.1 - 193.4	flow up the borehole at 0.10 gpm under pumped conditions
193.4 - 196.0	flow into and up the borehole under pumped conditions
196.0 - 282.3	flow up the borehole at 0.02 gpm under pumped conditions
282.3 - 283.7	flow into and up the borehole under pumped conditions
283.7 - 390.0	no flow under pumped conditions
390.0	bottom of the borehole

Lithologic Variation Results. Lithologic variation was not detected in the bedrock encountered in logged boreholes based on the OTV, ATV, and natural gamma ray data. The relatively minor fluctuations exhibited in the natural gamma ray logs are interpreted as natural variation in the bedrock and not changes in bedrock lithology.

Borehole Deviation Results. Although borehole deviation was not part of the scope of work, we note that the logged boreholes all have relatively high deviation from vertical based on the televiewer data. The borehole deviation results and discussion are provided to WESTON as a courtesy. Borehole deviation data were calculated starting at the bottom of the steel casing. The borehole angle is reported as the angle of the borehole from vertical. The northing and easting data are referenced to true north. The northing and easting data are the distance in feet the borehole has horizontally deviated from where the borehole would be if it were vertical. Zero northing and zero easting is located at the start of the data acquisition at the bottom of casing. The deviation data cannot be acquired in the steel casing due to magnetic interference from the steel casing. The borehole deviation logs are provided in Appendix 4 and a summary of the borehole deviation results is provided in Table 8.

Table 8 - Summary of Borehole Deviation

Borehole	Borehole Angle at the Bottom of Casing	Borehole Angle at the Bottom of the Borehole	Borehole Northing	Borehole Easting
BR-3	2°from vertical at 134.9 feet	13°from vertical at 504.5 feet	6 feet to the north	40 feet to the east
BR-5	1°from vertical at 77.2 feet	8°from vertical at 363.8 feet	10 feet to the north	8 feet to the east
BR-6	1°from vertical at 112.4 feet	16°from vertical at 605.1 feet	60 feet to the north	17feet to the west
MW-16R	1°from vertical at 99.6 feet & 1°from vertical at 142.9 feet where the borehole diameter decrease	15°from vertical at 390.0 feet	26 feet to the south	7 feet to the east

HPFM During the WESTON Pump Test Results. HPFM logging was conducted in six (6) boreholes during a multi-day pump test conducted by WESTON. WESTON pumped water during the pump test from borehole BR-6 at approximately 10 gpm. On the third day of the WESTON pump test, HPFM data were acquired by Hager-Richter in boreholes BR-1, BR-2, BR-3, BR-5, MW-16R, and MW-30 to determine the interconnectivity of bedrock fractures intersected by the pumped borehole, BR-6, and the boreholes logged with the HPFM during the pump test. The approximate locations of the boreholes logged during the WESTON pump test are shown in Figure 3. HPFM data were acquired at discrete depths selected by WESTON and Hager-Richter after review of previous borehole geophysical logging data acquired by Hager-Richter and others.

According to WESTON, drawdowns were detected in the water levels in boreholes BR-2, BR-3, BR-5, and MW-30 during the WESTON pump test. During the WESTON pump test, the most significant drawdown was detected in borehole BR-3, with approximately 25 feet of drawdown during the pump test. The water levels in boreholes BR-1 and MW-16R were constant at the time of HPFM logging and never exhibited significant drawdown during the pump test. At the time of HPFM logging, the water levels in boreholes BR-2, BR-3, BR-5, and MW-30 had virtually stabilized.

Based on the HPFM logging during the third day of the WESTON pump test, flow was detected in the open bedrock portions of boreholes MW-2, MW-3, and MW-5. Flow was not detected in boreholes MW-1, MW-16R, and MW-30. Tables of the HPFM results during the WESTON pump test are provided in Appendix 5.

Limitations on the Use of this Report

This letter report was prepared for the exclusive use of Weston Solutions, Inc. (Client). No other party shall be entitled to rely on this Report or any information, documents, records, data, interpretations, advice or opinions given to Client by Hager-Richter Geoscience, Inc. in the performance of its work. The Report relates solely to the specific project for which Hager-Richter has been retained and shall not be used or relied upon by Client or any third party for any variation or extension of this project, any other project or any other purpose without the express written permission of Hager-Richter. Any unpermitted use by Client or any third party shall be at Client's or such third party's own risk and without any liability to Hager-Richter.

Hager-Richter has used reasonable care, skill, competence and judgment in the performance of its services for this project consistent with professional standards for those providing similar services at the same time, in the same locale, and under like circumstances. Unless otherwise stated, the work performed by Hager-Richter should be understood to be exploratory and interpretational in character and any results, findings or recommendations contained in this Report or resulting from the work proposed may include decisions which are judgmental in nature and not necessarily based solely on pure science or engineering. It should

be noted that our conclusions might be modified if subsurface conditions were better delineated with additional subsurface exploration including, but not limited to, test pits, soil borings with collection of soil and water samples, and laboratory testing.

Except as expressly provided in this limitations section, Hager-Richter makes no other representation or warranty of any kind whatsoever, oral or written, expressed or implied; and all implied warranties of merchantability and fitness for a particular purpose, are hereby disclaimed.

If you have any questions or comments on this report, please contact us at your convenience. It has been a pleasure to work with WESTON on this project. We look forward to working with you again in the future.

Sincerely yours,
HAGER-RICHTER GEOSCIENCE, INC.

Robert L. Garfield

Robert Garfield
Senior Borehole Geophysicist

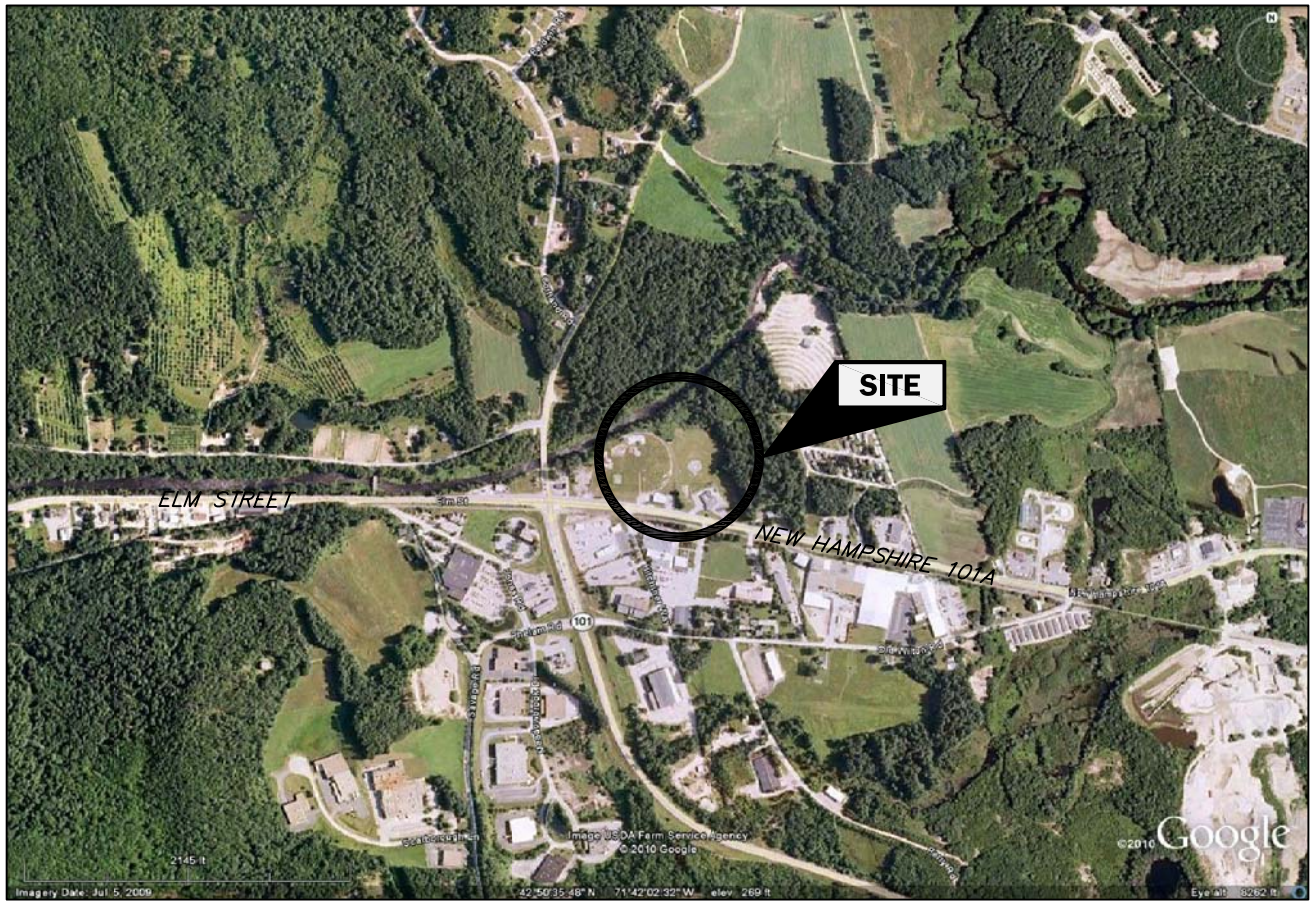
Dorothy Richter, P.G.
President

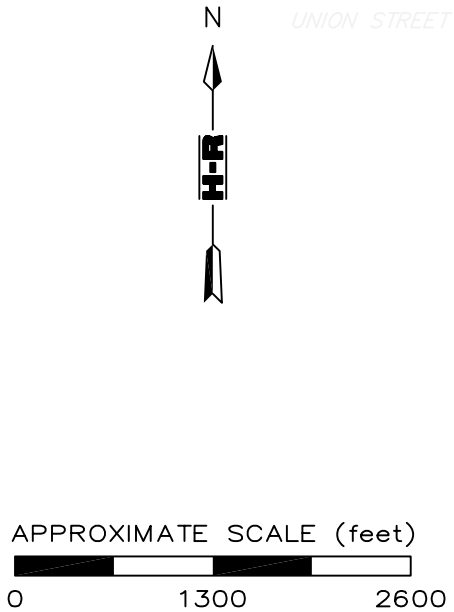
List of Enclosures:

Figures:
- Figure 1. General Site Location
- Figure 2. Borehole Location Plan
- Figure 3. Borehole Location Plan - WESTON Pump Test
- Figure 4. Key to Bedrock Structure Categories
- Figure 5. Tadpole Plot Explanation Figure
- Figure 6. Televiewer Explanation Figure

Appendix 1: Borehole Geophysical Logs
Appendix 2: Bedrock Structure Statistics Plots
Appendix 3: Tables of Bedrock Structures
Appendix 4: Borehole Deviation Logs
Appendix 5: Tables of HPFM Results During the WESTON Pump Test

FIGURES





NOTE:

Modified from Google Earth aerial photograph.

Figure 1
General Site Location
Savage Municipal Water Supply
Superfund Site
Milford, New Hampshire

File 10RG30	May, 2011

HAGER–RICHTER GEOSCIENCE, INC.
Salem, New Hampshire

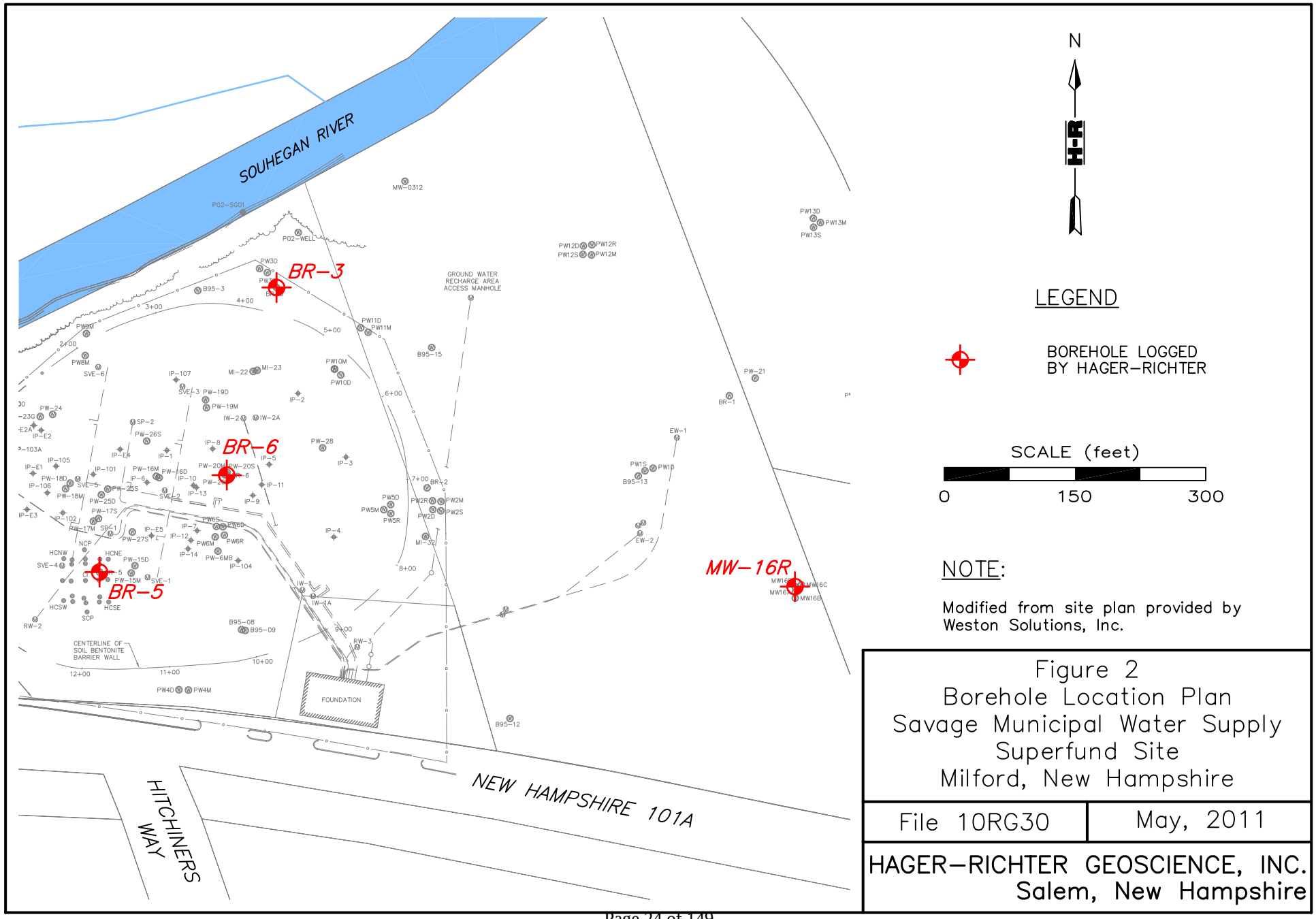
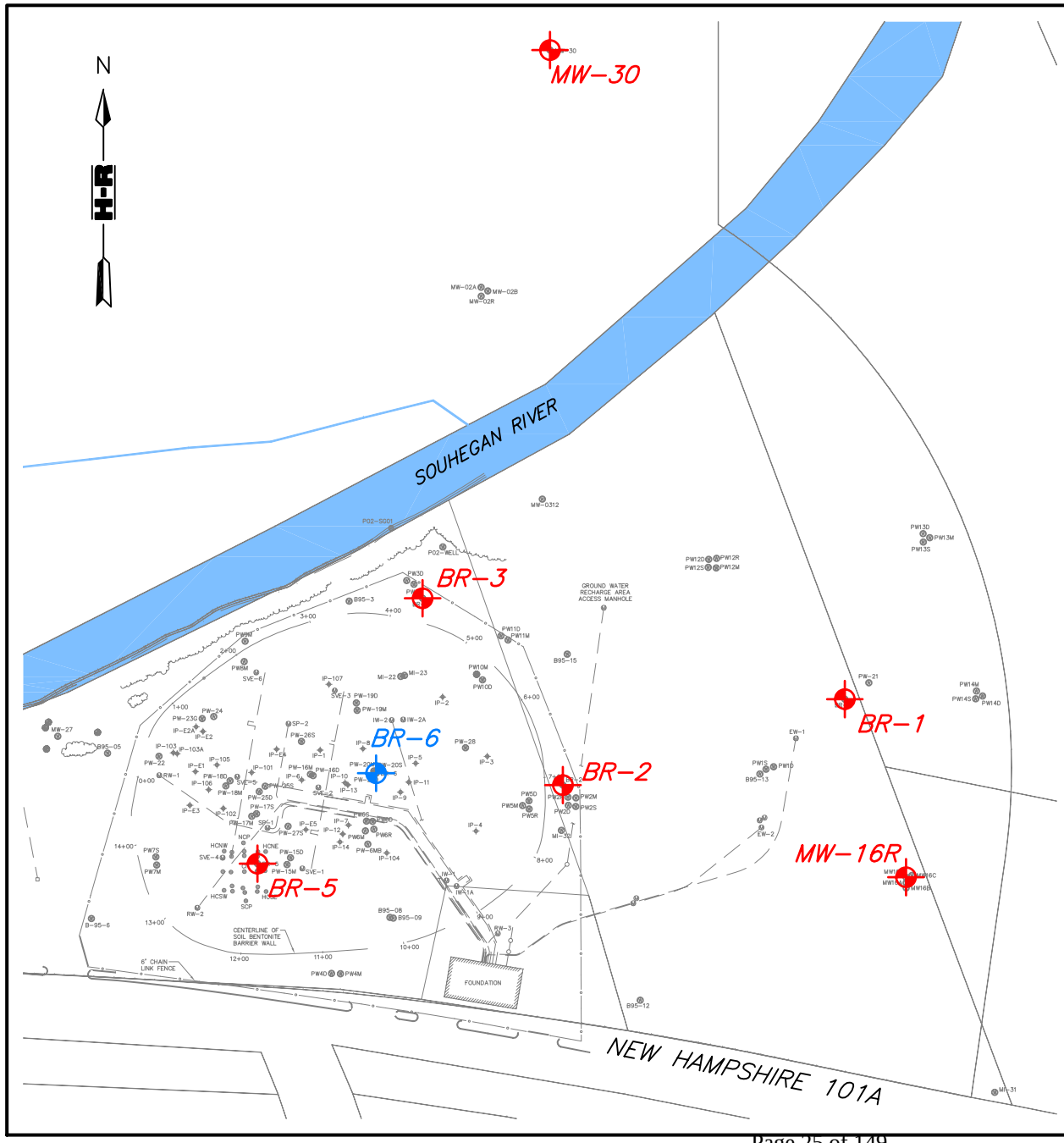


Figure 2
Borehole Location Plan
Savage Municipal Water Supply Superfund Site
Milford, New Hampshire

File 10RG30	May, 2011

HAGER-RICHTER GEOSCIENCE, INC.
Salem, New Hampshire



LEGEND

BOREHOLE LOGGED BY HAGER–RICHTER DURING THE WESTON PUMP TEST

PUMPED BOREHOLE DURING THE WESTON PUMP TEST

SCALE (feet)

0 200 400

NOTE:

Modified from site plan provided by Weston Solutions, Inc.

Figure 3
Borehole Location Plan
WESTON Pump Test
Savage Municipal Water Supply
Superfund Site
Milford, New Hampshire

File 10RG30	May, 2011

HAGER–RICHTER GEOSCIENCE, INC.
Salem, New Hampshire

Tadpole	Structure Category (Symbol Color)	Description
	Fracture Rank 1 (Light Blue)	Minor Fracture - not distinct and may not be continuous around the borehole
	Fracture Rank 2 (Blue)	Intermediate Fracture - distinct and continuous around the borehole with little or no apparent aperture
	Fracture Rank 3 (Red)	Major Fracture - distinct and continuous around the borehole with apparent aperture

Figure 4. Key to bedrock structure categories.

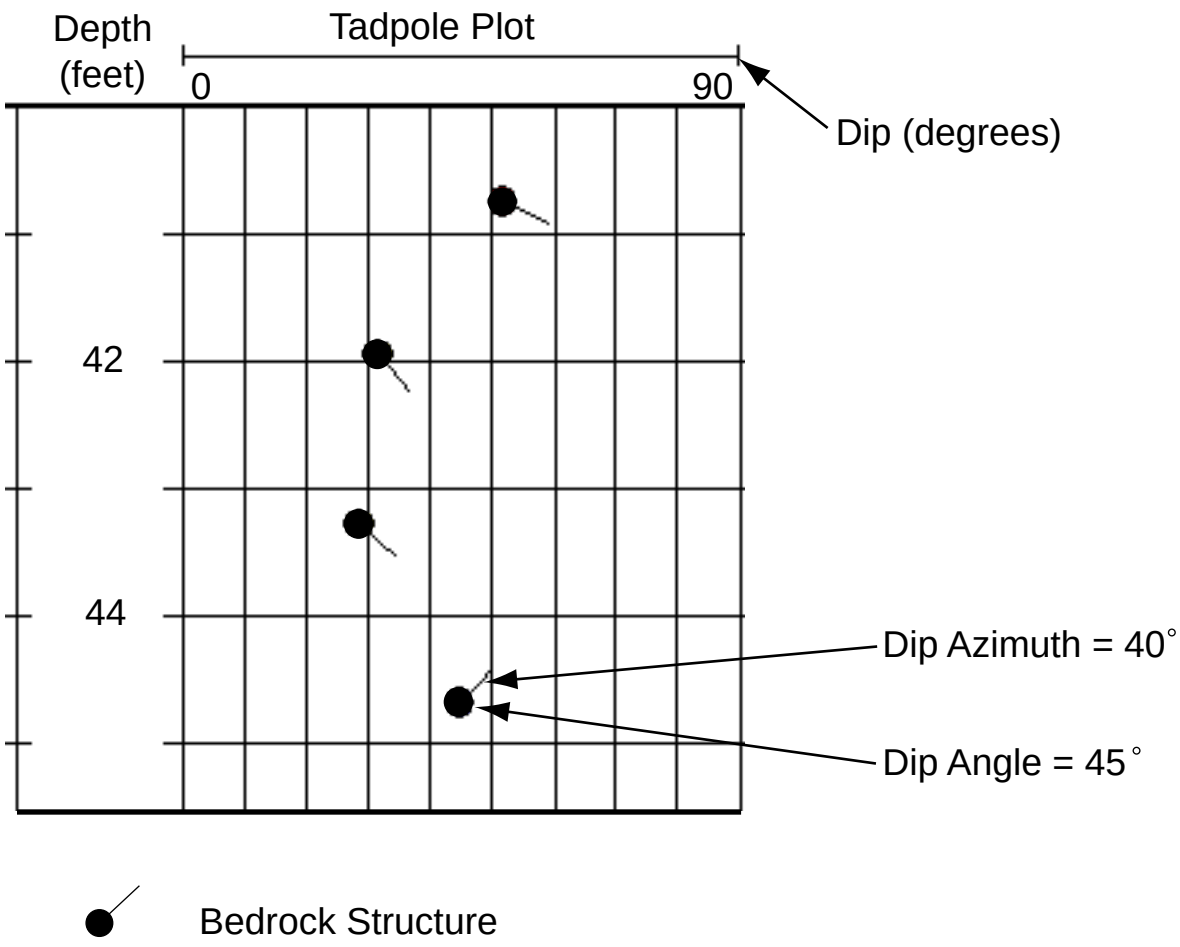


Figure 5. Tadpole plot explanation figure. The orientation of the bedrock structures is graphically displayed by a tadpole made up of a circle, the head, and a line, the tail. The position of the head, left to right on the tadpole plot, gives the dip angle of the structure. The left side of the track indicates a dip angle of 0°, and the right side of the track indicates a dip angle of 90° from horizontal. The position of the tail gives the dip azimuth of the structure and can be read like a compass. The tail pointing directly up is 0°, true north.

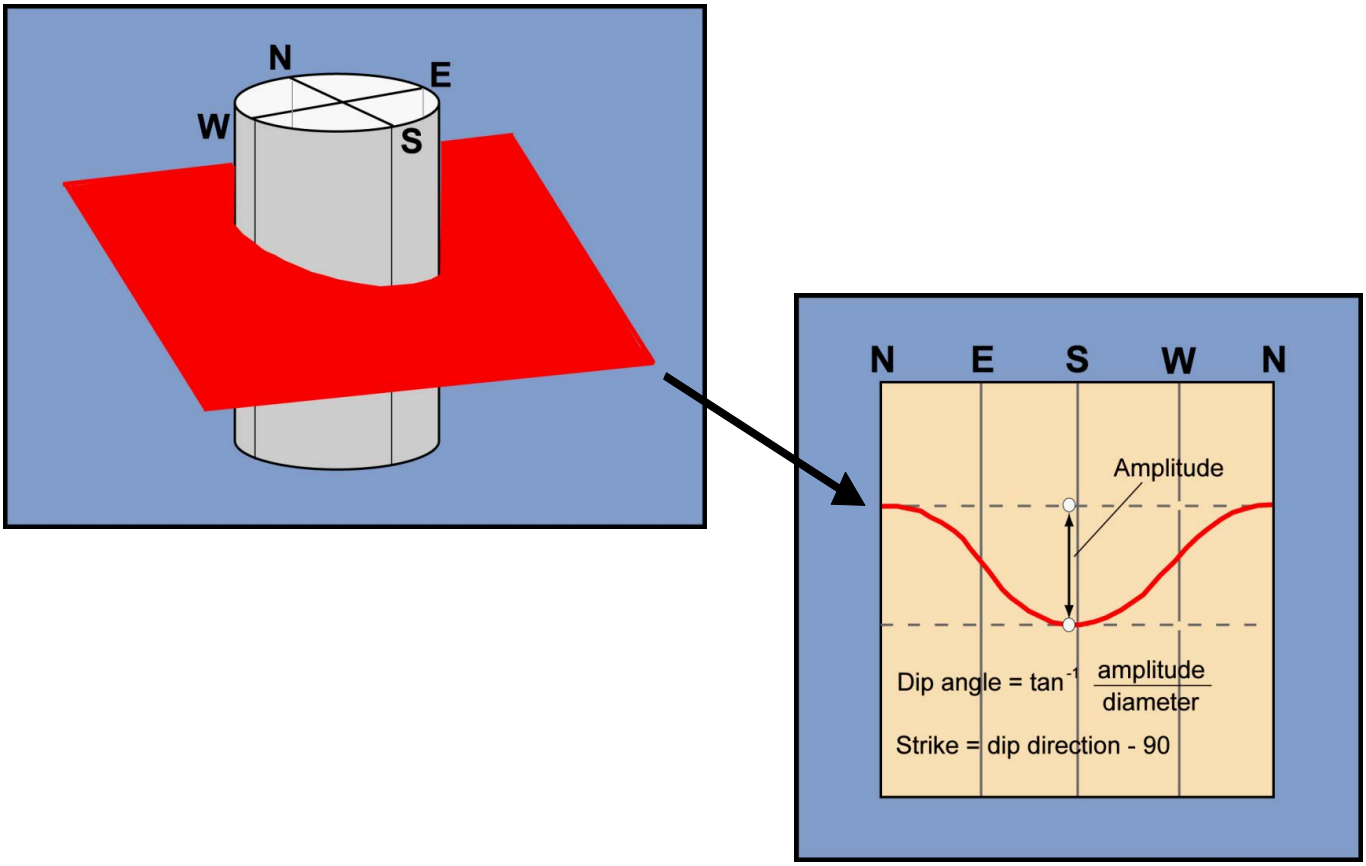


Figure 6. Televiewer explanation figure. The image on the left depicts a planar structure in red, such as a fracture or bedding plane, intersecting a borehole wall. The image on the right depicts the same structure unwrapped as it would be displayed in an optical televiewer (OTV) or acoustic televiewer (ATV) log.

Figure modified from: Garfield, R.L., Day-Lewis, F.D., Gray, M.B., Johnson, C.D., Williams, J.H. and Day-Lewis, A.D.F., 2003, Fractured-Rock Aquifer Characterization within a Regional Geologic Context: Results from the Bucknell University Hydrogeophysics Test Site, GSA Northeastern Section, 38th Annual Meeting, Paper No. 25-19.

APPENDIX 1

BOREHOLE GEOPHYSICAL LOGS

HAGER-RICHTER GEOSCIENCE, INC.

8 Industrial Way - D10
Salem, NH 03079
Phone: 603-893-9944
Fax: 603-893-8313

BOREHOLE: BR-3 BOREHOLE FLUID & GEOLOGY LOGS

DATE LOGGED: September 16, 2010

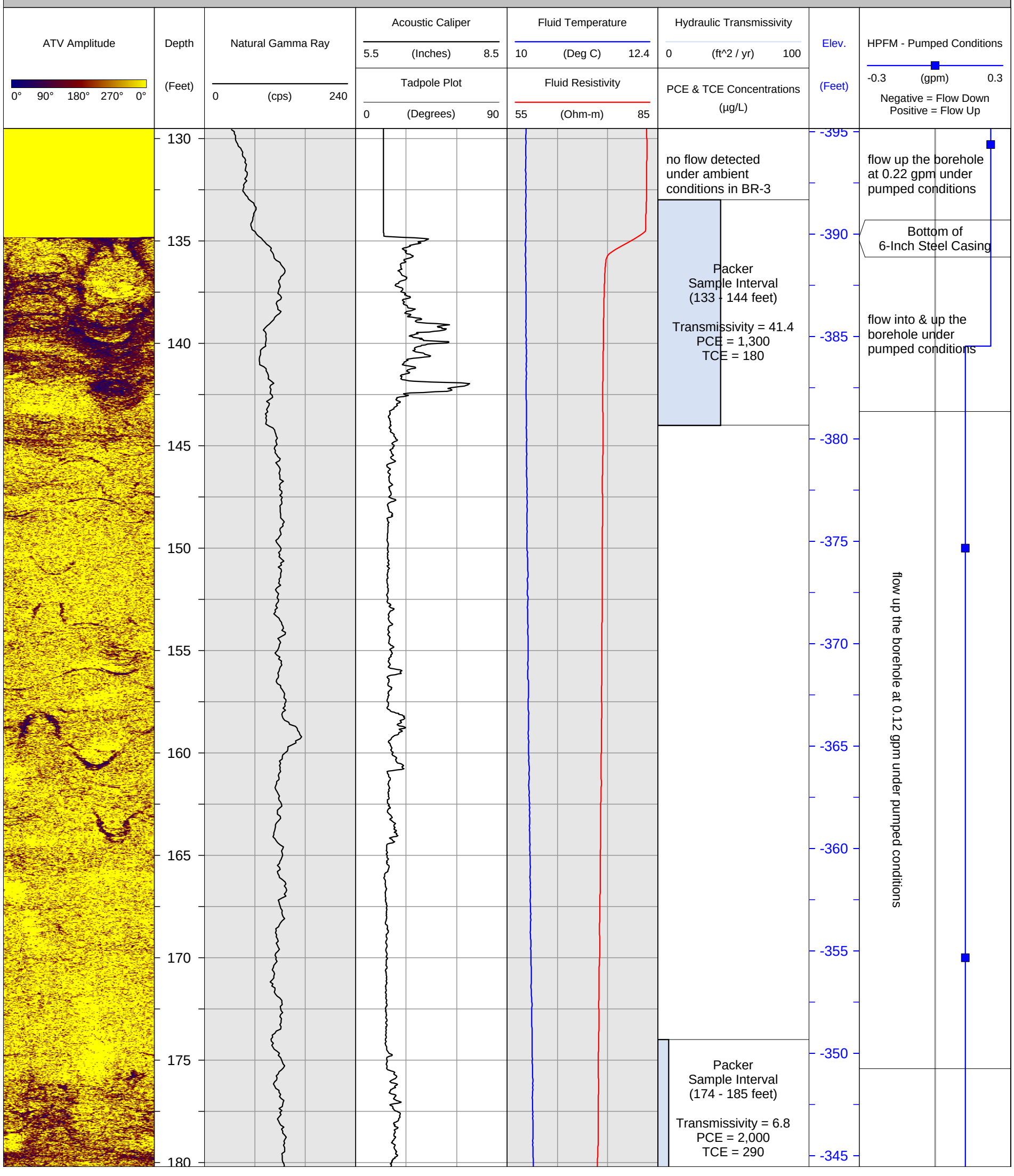
CLIENT:	Weston Solutions, Inc.	H-R FILE:	10RG30
PROJECT:	Borehole Geophysical Logging	LOG DATUM:	Top of the 6-Inch Steel Casing
LOCATION:	Savage Municipal Water Supply Superfund Site	TOP OF CASING ELEVATION:	274.7 Feet
CITY, STATE:	Milford, New Hampshire	ORIENTATION REFERENCE:	True North (Declination = 15 Degrees West)
LOGGING GEOPHYSICISTS:	N. DeCristofaro & M. Howley	CASING STICK-UP:	2.5 Feet Above the Ground Surface
CLIENT REP. ON-SITE:	Andrew Fuller	BOREHOLE DIAMETER:	6 Inches
LOGS PROCESSED BY:	Robert Garfield	WATER LEVEL DEPTH:	15.2 Feet

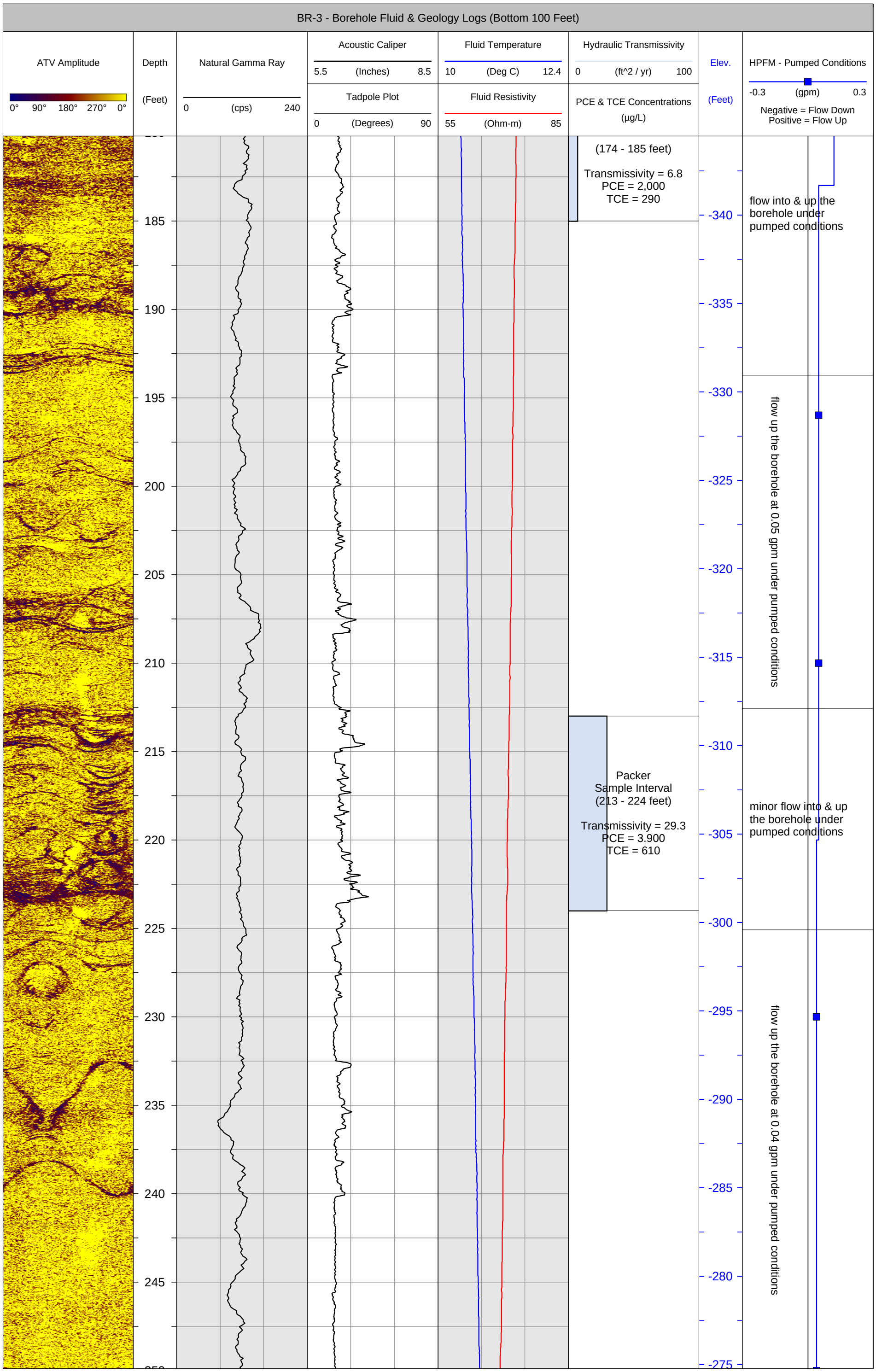
STRUCTURE LEGEND

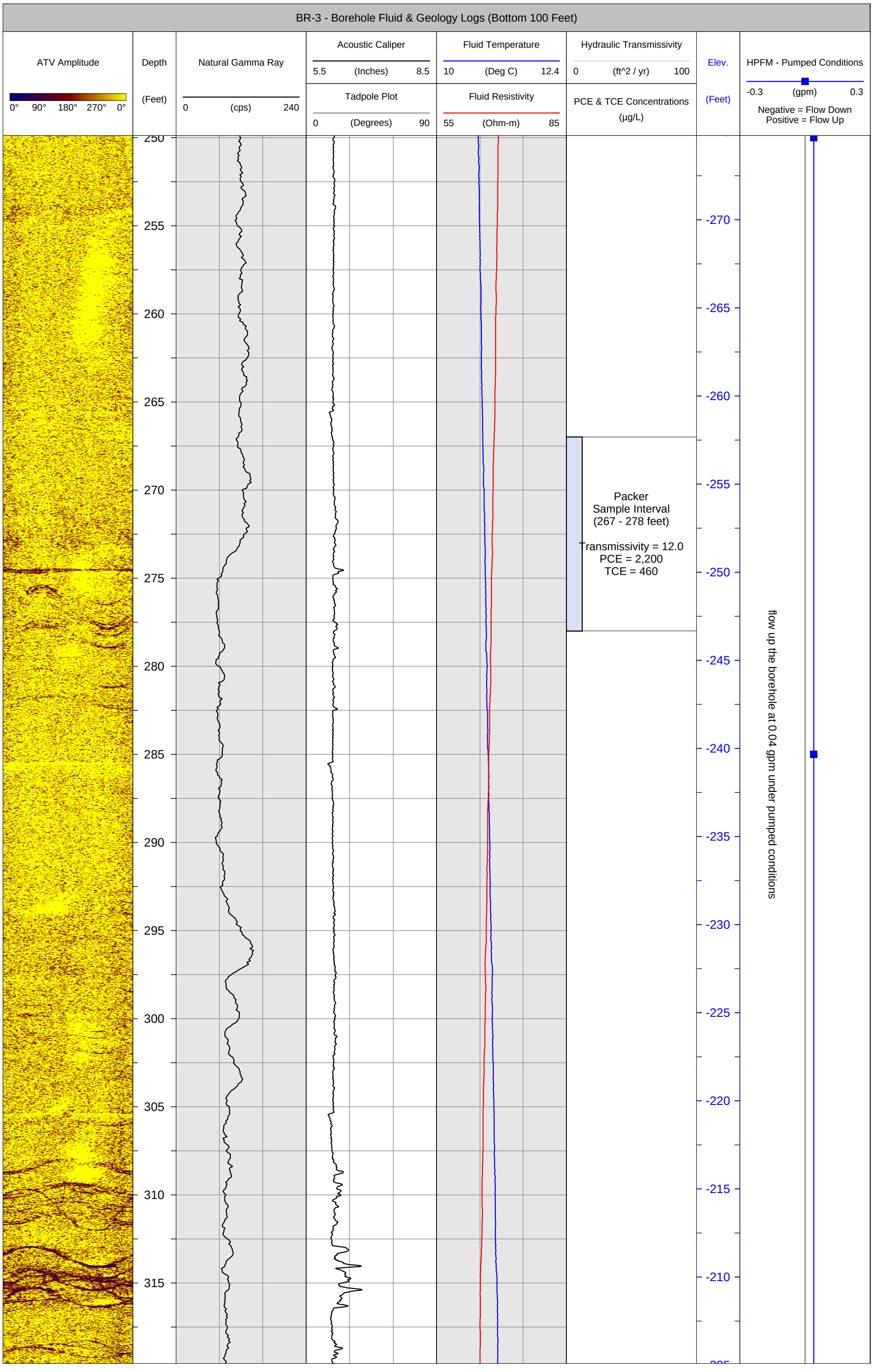
Fracture Rank 1 Fracture Rank 2 Fracture Rank 3

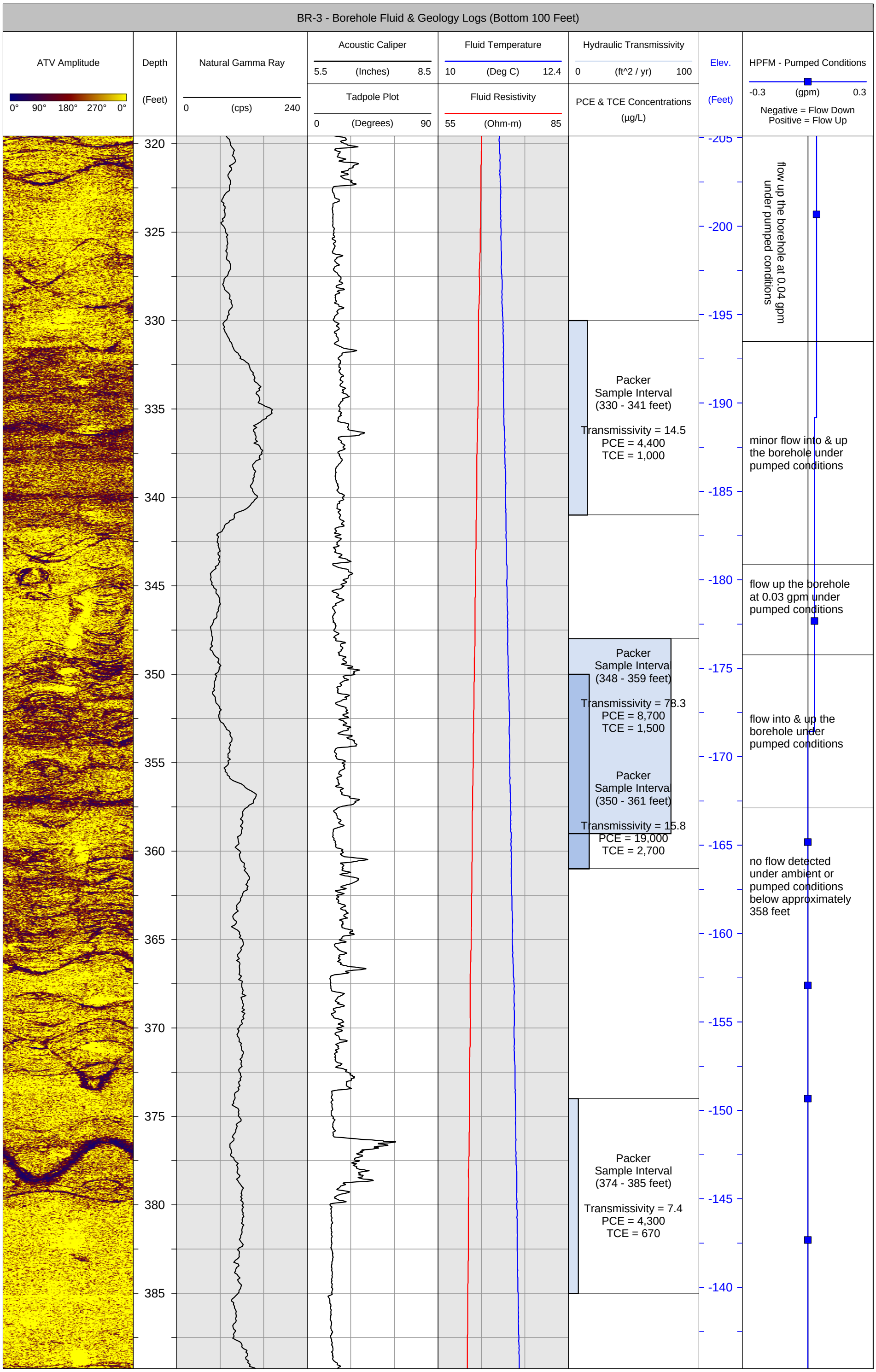
NOTES:
Weston specified that the fracture interpretation should only be provided for the bottom 100 feet of borehole BR-3.
HPFM data under ambient conditions are not plotted in the logs below because flow was not detected under ambient conditions.
During HPFM logging under pumped conditions water was pumped from the borehole at 0.25 gpm from inside the casing.
The transmissivity, PCE, and TCE data were provided by Weston and were acquired during packer testing.

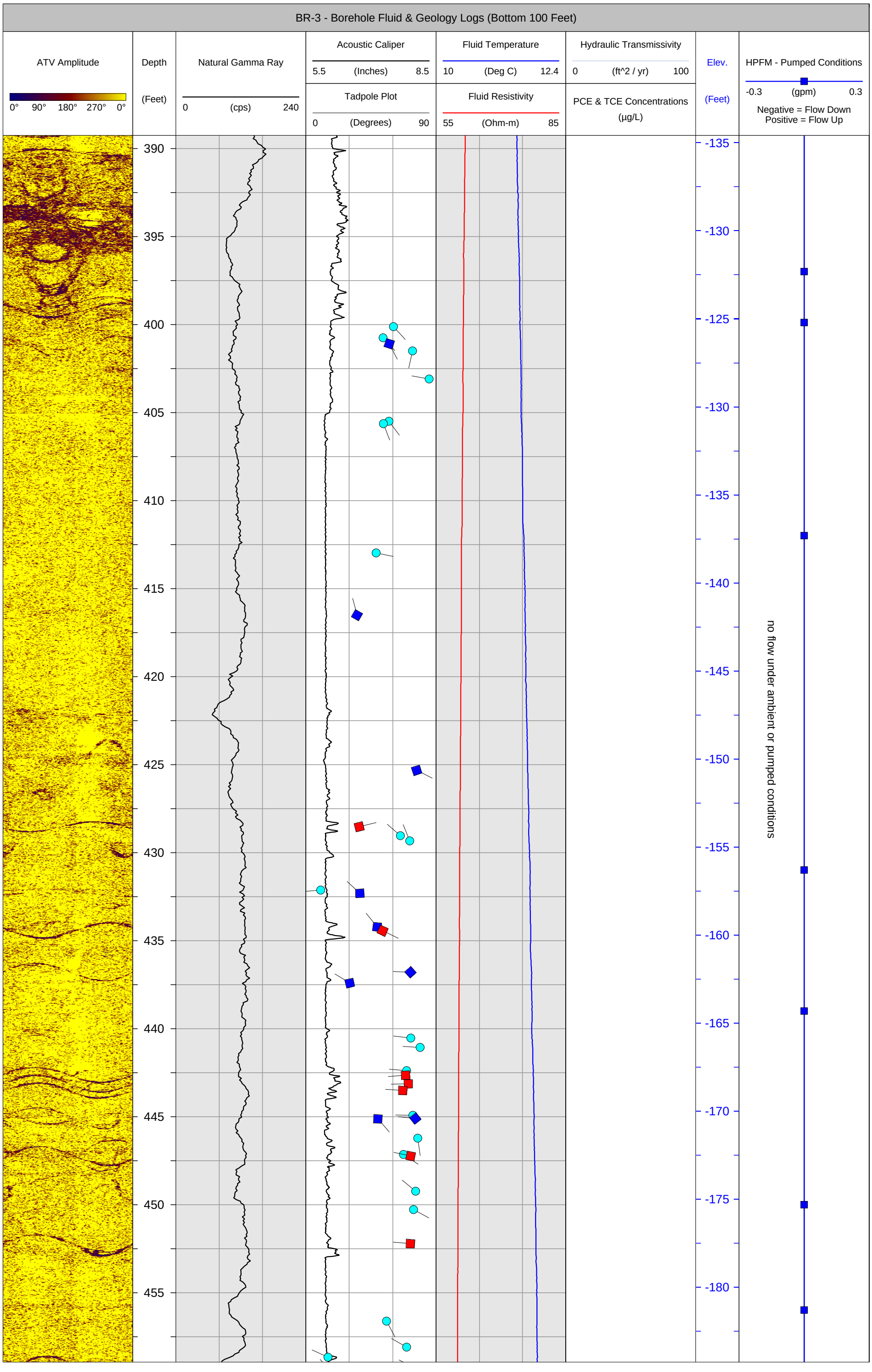
BR-3 - Borehole Fluid & Geology Logs (Bottom 100 Feet)

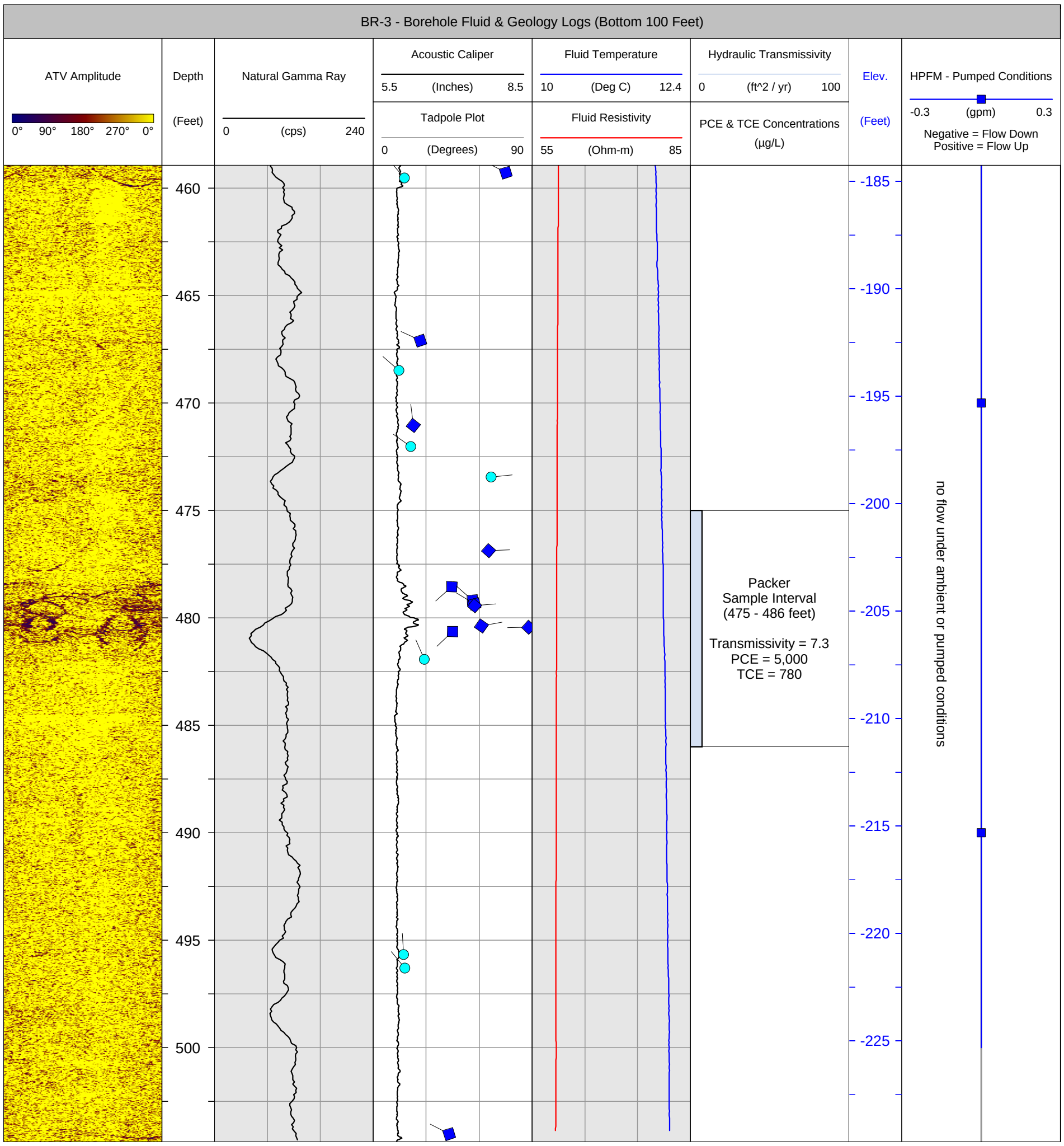



BR-3 - Borehole Fluid & Geology Logs (Bottom 100 Feet)
ATV Amplitude
0° 90° 180° 270° 0°
Depth
(Feet)
Natural Gamma Ray
0 (cps) 240
Acoustic Caliper
5.5 (Inches) 8.5
Tadpole Plot
0 (Degrees) 90
Fluid Temperature
10 (Deg C) 12.4
Fluid Resistivity
55 (Ohm-m) 85
Hydraulic Transmissivity
0 (ft^2 / yr) 100
PCE & TCE Concentrations
(µg/L)
Elev.
(Feet)
HPFM - Pumped Conditions
-0.3 (gpm) 0.3
Negative = Flow Down
Positive = Flow Up
(174 - 185 feet)
Transmissivity = 6.8
PCE = 2,000
TCE = 290
Packer
Sample Interval
(213 - 224 feet)
Transmissivity = 29.3
PCE = 3.900
TCE = 610
flow into & up the borehole under pumped conditions
flow up the borehole at 0.05 gpm under pumped conditions
minor flow into & up the borehole under pumped conditions
flow up the borehole at 0.04 gpm under pumped conditions
185
190
195
200
205
210
215
220
225
230
235
240
245
-340
-335
-330
-325
-320
-315
-310
-305
-300
-295
-290
-285
-280
-275


BR-3 - Borehole Fluid & Geology Logs (Bottom 100 Feet)
ATV Amplitude
0° 90° 180° 270° 0°
Depth
(Feet)
Natural Gamma Ray
0 (cps) 240
Acoustic Caliper
5.5 (Inches) 8.5
Tadpole Plot
0 (Degrees) 90
Fluid Temperature
10 (Deg C) 12.4
Fluid Resistivity
55 (Ohm-m) 85
Hydraulic Transmissivity
0 (ft^2 / yr) 100
PCE & TCE Concentrations
(µg/L)
Elev.
(Feet)
HPFM - Pumped Conditions
-0.3 (gpm) 0.3
Negative = Flow Down
Positive = Flow Up
250
255
260
265
270
275
280
285
290
295
300
305
310
315
-270
-265
-260
-255
-250
-245
-240
-235
-230
-225
-220
-215
-210
Packer
Sample Interval
(267 - 278 feet)
Transmissivity = 12.0
PCE = 2,200
TCE = 460
flow up the borehole at 0.04 gpm under pumped conditions


BR-3 - Borehole Fluid & Geology Logs (Bottom 100 Feet)
ATV Amplitude
0° 90° 180° 270° 0°
Depth
(Feet)
Natural Gamma Ray
0 (cps) 240
Acoustic Caliper
5.5 (Inches) 8.5
Tadpole Plot
0 (Degrees) 90
Fluid Temperature
10 (Deg C) 12.4
Fluid Resistivity
55 (Ohm-m) 85
Hydraulic Transmissivity
0 (ft^2 / yr) 100
PCE & TCE Concentrations
(µg/L)
Elev.
(Feet)
HPFM - Pumped Conditions
-0.3 (gpm) 0.3
Negative = Flow Down
Positive = Flow Up
320
325
330
335
340
345
350
355
360
365
370
375
380
385
-205
-200
-195
-190
-185
-180
-175
-170
-165
-160
-155
-150
-145
-140
Packer
Sample Interval
(330 - 341 feet)
Transmissivity = 14.5
PCE = 4,400
TCE = 1,000
Packer
Sample Interva
(348 - 359 feet)
Transmissivity = 78.3
PCE = 8,700
TCE = 1,500
Packer
Sample Interva
(350 - 361 feet)
Transmissivity = 15.8
PCE = 19,000
TCE = 2,700
Packer
Sample Interval
(374 - 385 feet)
Transmissivity = 7.4
PCE = 4,300
TCE = 670
flow up the borehole at 0.04 gpm under pumped conditions
minor flow into & up the borehole under pumped conditions
flow up the borehole at 0.03 gpm under pumped conditions
flow into & up the borehole under pumped conditions
no flow detected under ambient or pumped conditions below approximately 358 feet


BR-3 - Borehole Fluid & Geology Logs (Bottom 100 Feet)
ATV Amplitude
0° 90° 180° 270° 0°
Depth
(Feet)
Natural Gamma Ray
0 (cps) 240
Acoustic Caliper
5.5 (Inches) 8.5
Tadpole Plot
0 (Degrees) 90
Fluid Temperature
10 (Deg C) 12.4
Fluid Resistivity
55 (Ohm-m) 85
Hydraulic Transmissivity
0 (ft^2 / yr) 100
PCE & TCE Concentrations
(µg/L)
Elev.
(Feet)
HPFM - Pumped Conditions
-0.3 (gpm) 0.3
Negative = Flow Down
Positive = Flow Up
390
395
400
405
410
415
420
425
430
435
440
445
450
455
-135
-130
-125
-130
-135
-140
-145
-150
-155
-160
-165
-170
-175
-180
no flow under ambient or pumped conditions


BR-3 - Borehole Fluid & Geology Logs (Bottom 100 Feet)
ATV Amplitude
0° 90° 180° 270° 0°
Depth
(Feet)
Natural Gamma Ray
0 (cps) 240
Acoustic Caliper
5.5 (Inches) 8.5
Tadpole Plot
0 (Degrees) 90
Fluid Temperature
10 (Deg C) 12.4
Fluid Resistivity
55 (Ohm-m) 85
Hydraulic Transmissivity
0 (ft^2 / yr) 100
PCE & TCE Concentrations
(µg/L)
Elev.
(Feet)
HPFM - Pumped Conditions
-0.3 (gpm) 0.3
Negative = Flow Down
Positive = Flow Up
460
465
470
475
480
485
490
495
500
-185
-190
-195
-200
-205
-210
-215
-220
-225
Packer
Sample Interval
(475 - 486 feet)
Transmissivity = 7.3
PCE = 5,000
TCE = 780
no flow under ambient or pumped conditions

HAGER-RICHTER GEOSCIENCE, INC.
8 Industrial Way - D10
Salem, NH 03079
Phone: 603-893-9944
Fax: 603-893-8313

BOREHOLE: BR-3 BOREHOLE IMAGE & FLOW LOGS

DATE LOGGED: September 16, 2010

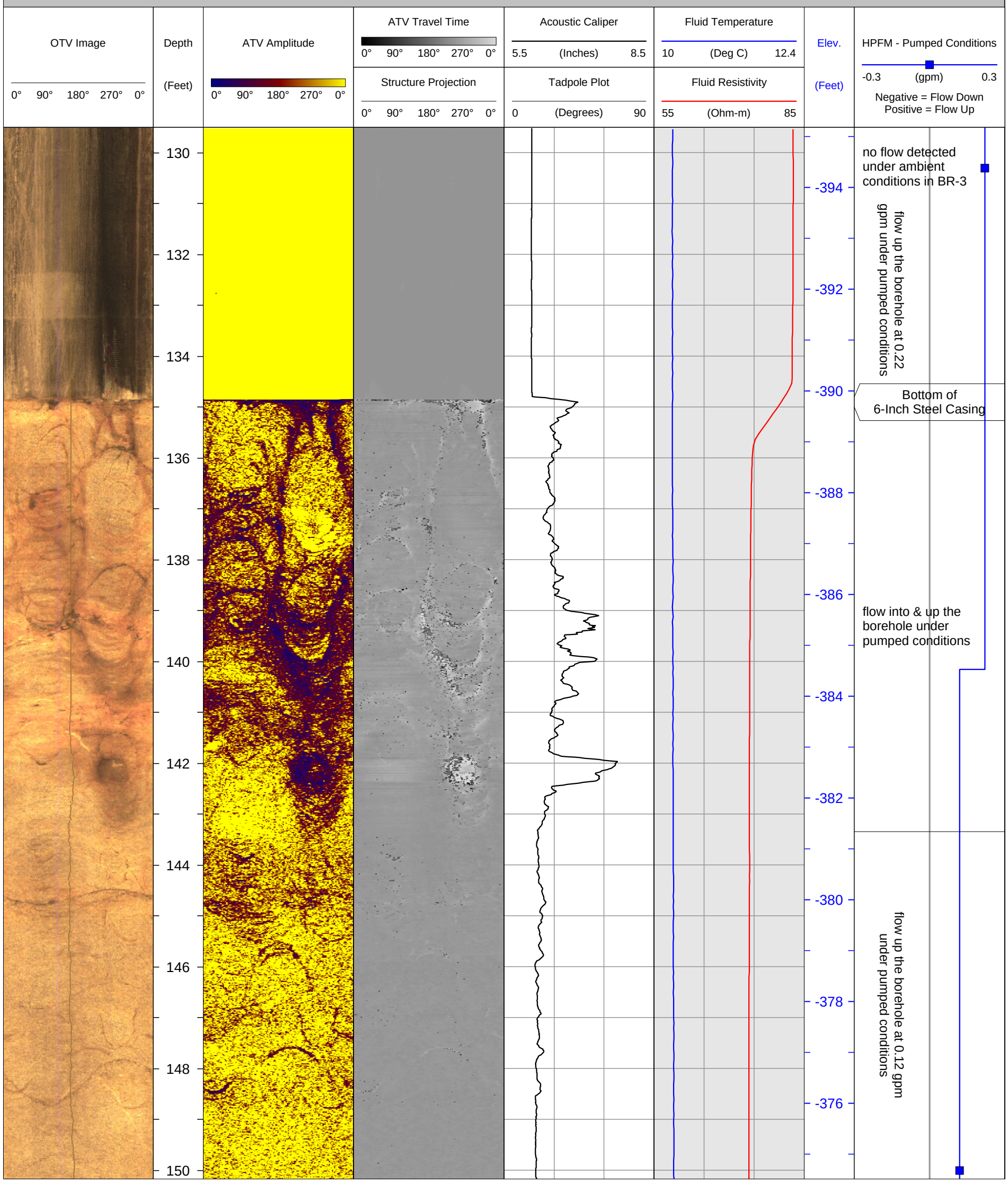
CLIENT:	Weston Solutions, Inc.	H-R FILE:	10RG30
PROJECT:	Borehole Geophysical Logging	LOG DATUM:	Top of the 6-Inch Steel Casing
LOCATION:	Savage Municipal Water Supply Superfund Site	TOP OF CASING ELEVATION:	274.7 Feet
CITY, STATE:	Milford, New Hampshire	ORIENTATION REFERENCE:	True North (Declination = 15 Degrees West)
LOGGING GEOPHYSICISTS:	N. DeCristofaro & M. Howley	CASING STICK-UP:	2.5 Feet Above the Ground Surface
CLIENT REP. ON-SITE:	Andrew Fuller	BOREHOLE DIAMETER:	6 Inches
LOGS PROCESSED BY:	Robert Garfield	WATER LEVEL DEPTH:	15.2 Feet

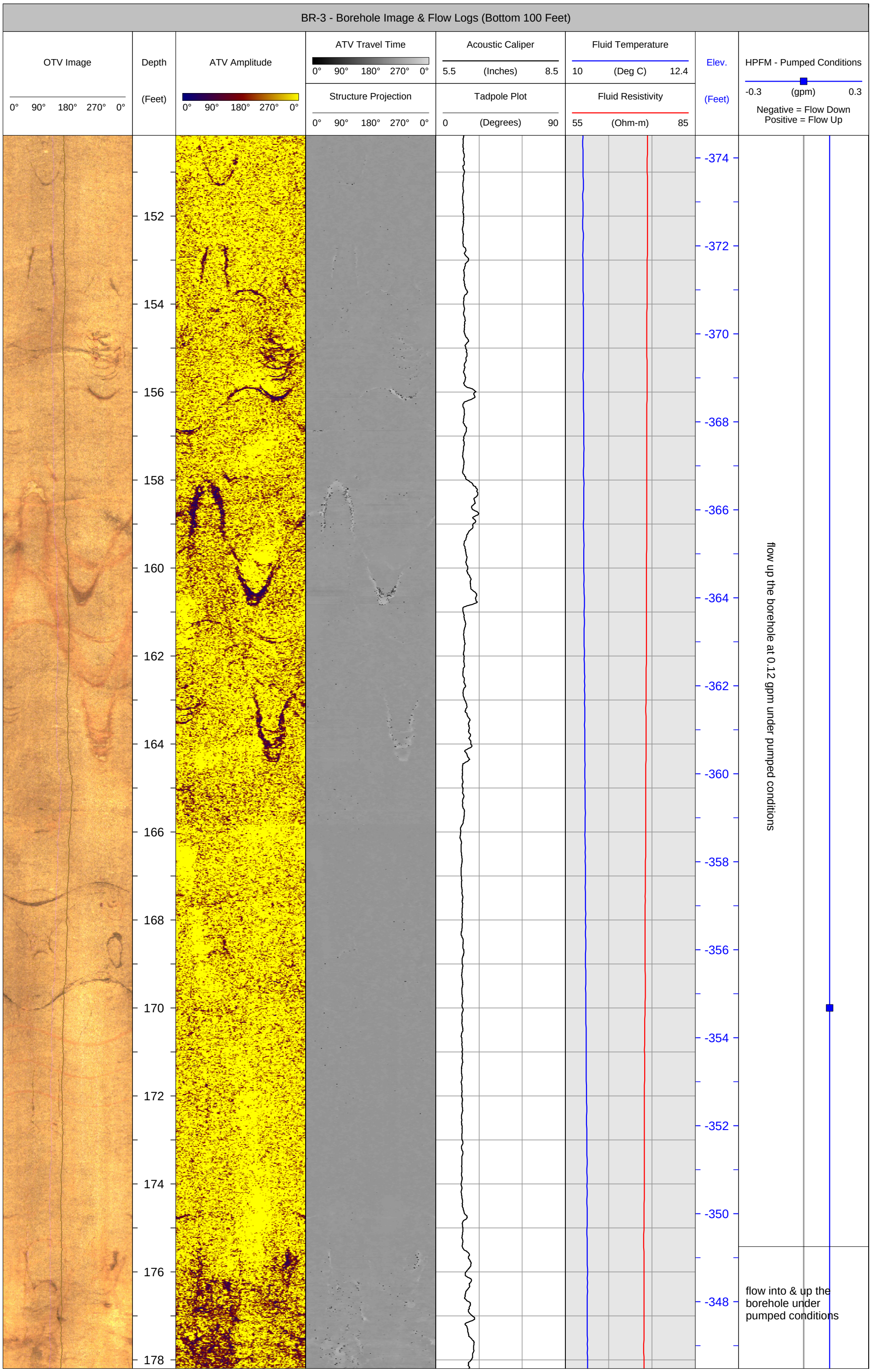
STRUCTURE LEGEND

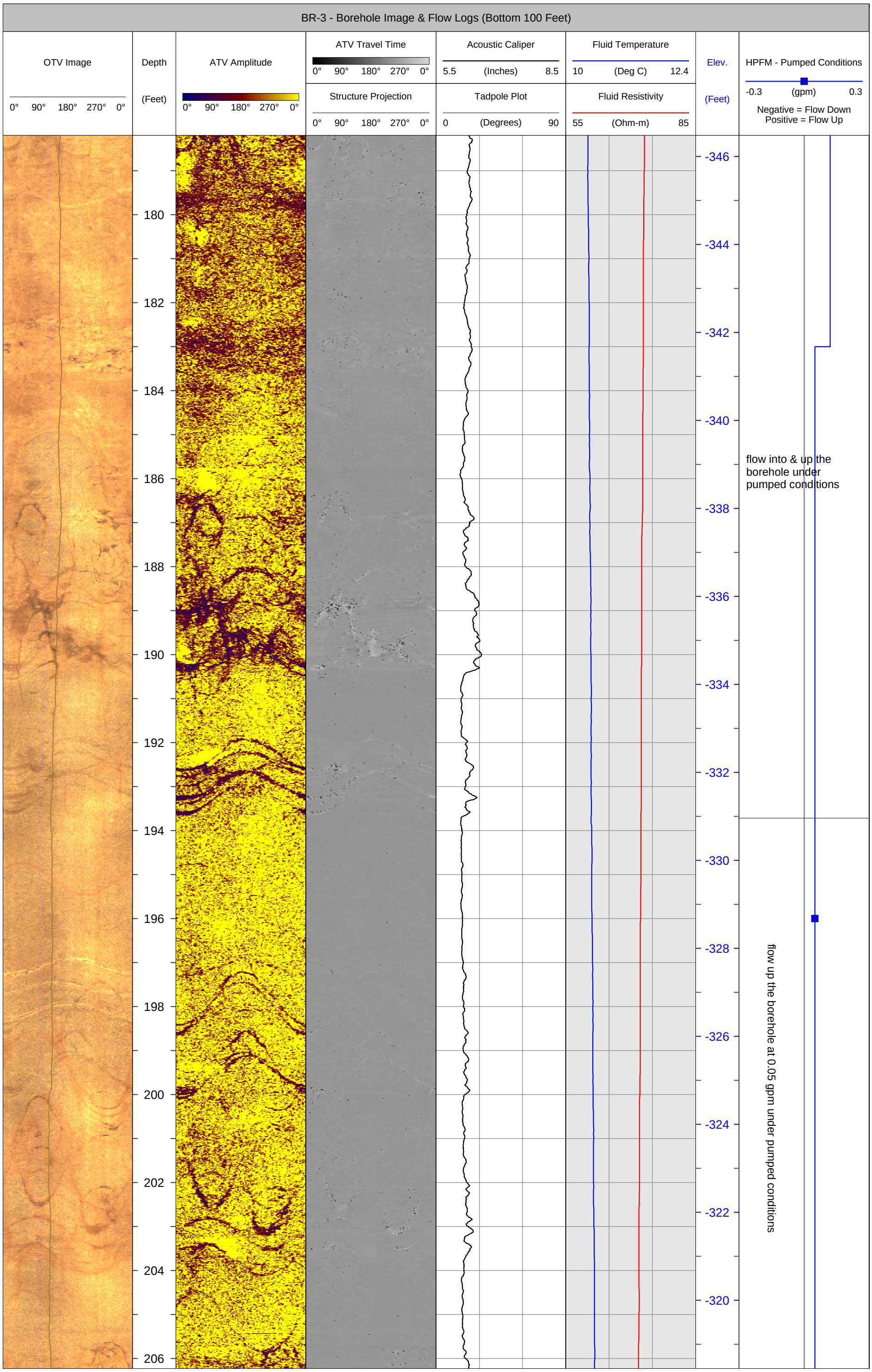
Fracture Rank 1 Fracture Rank 2 Fracture Rank 3

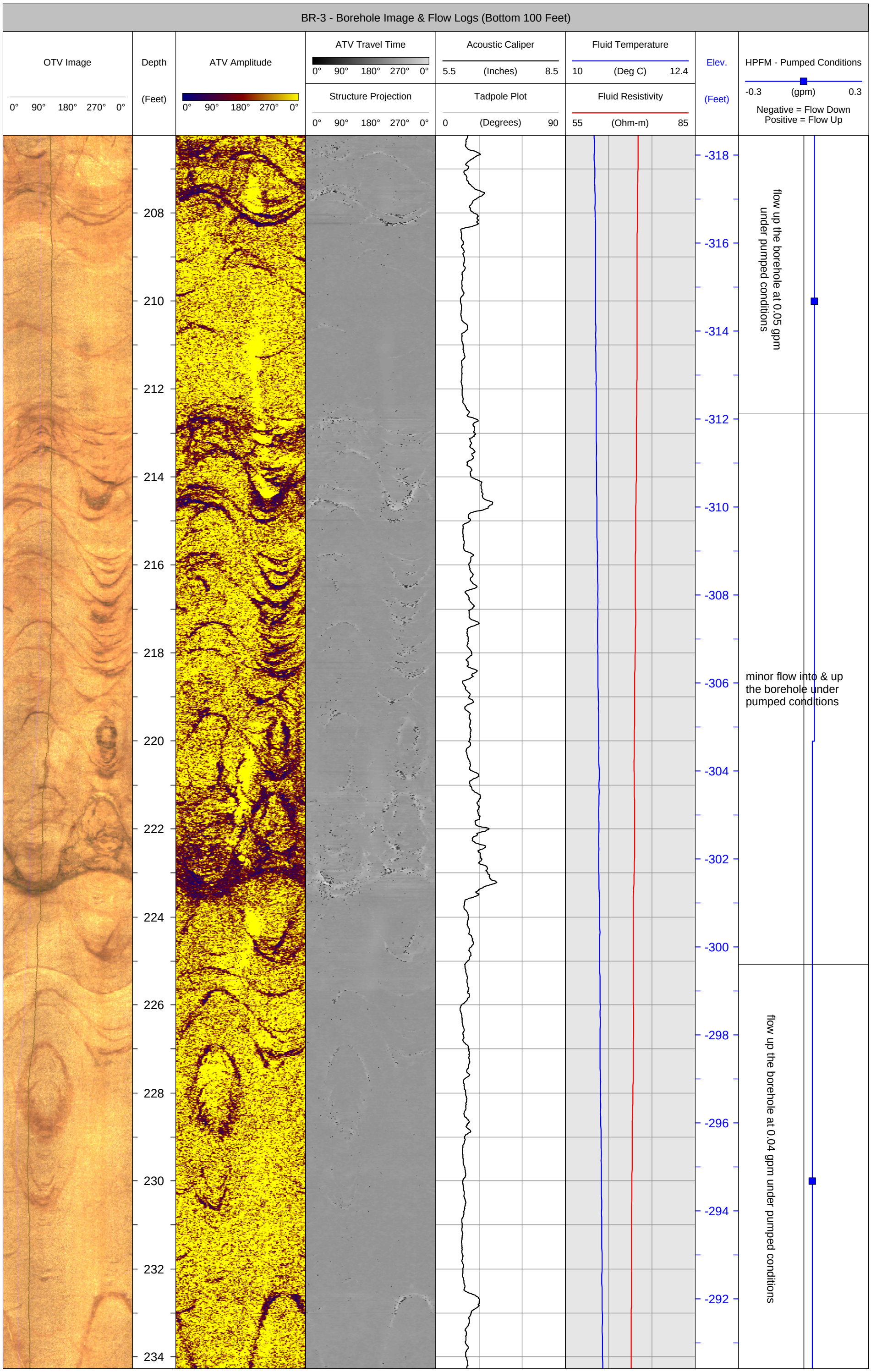
NOTES: Weston specified that the fracture interpretation should only be provided for the bottom 100 feet of borehole BR-3.
HPFM data under ambient conditions are not plotted in the logs below because flow was not detected under ambient conditions.
During HPFM logging under pumped conditions water was pumped from the borehole at 0.25 gpm from inside the casing.

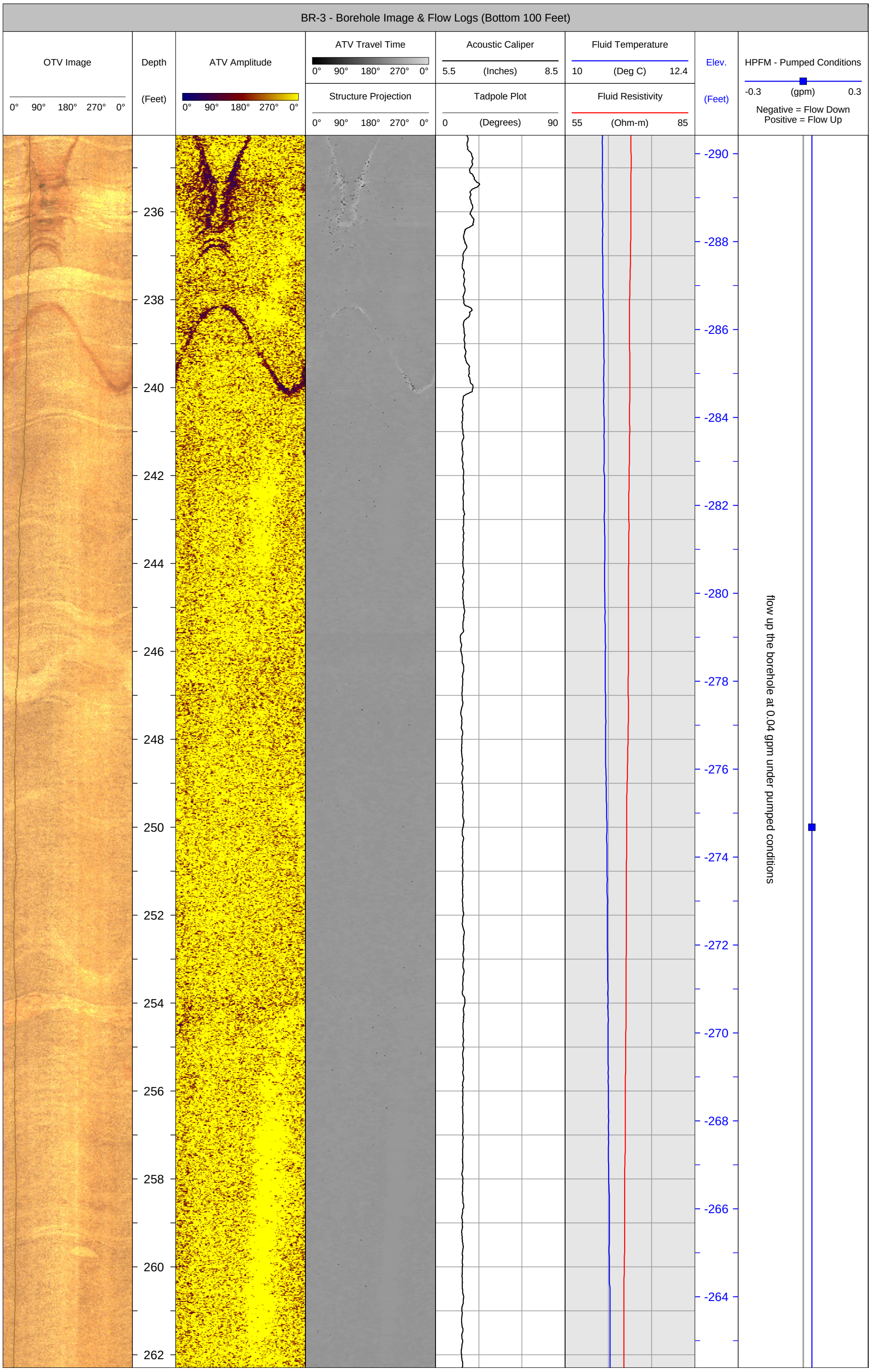
BR-3 - Borehole Image & Flow Logs (Bottom 100 Feet)

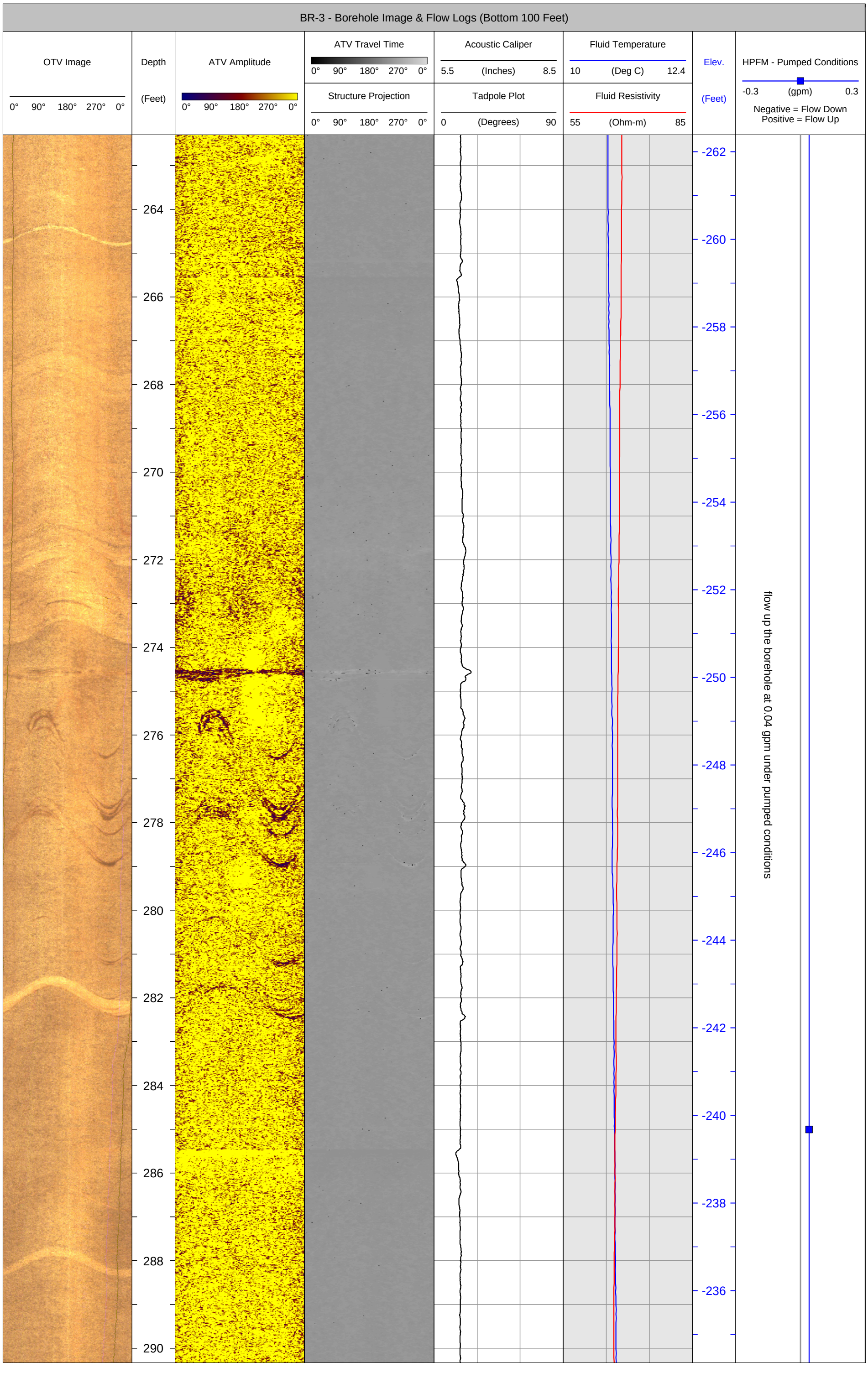


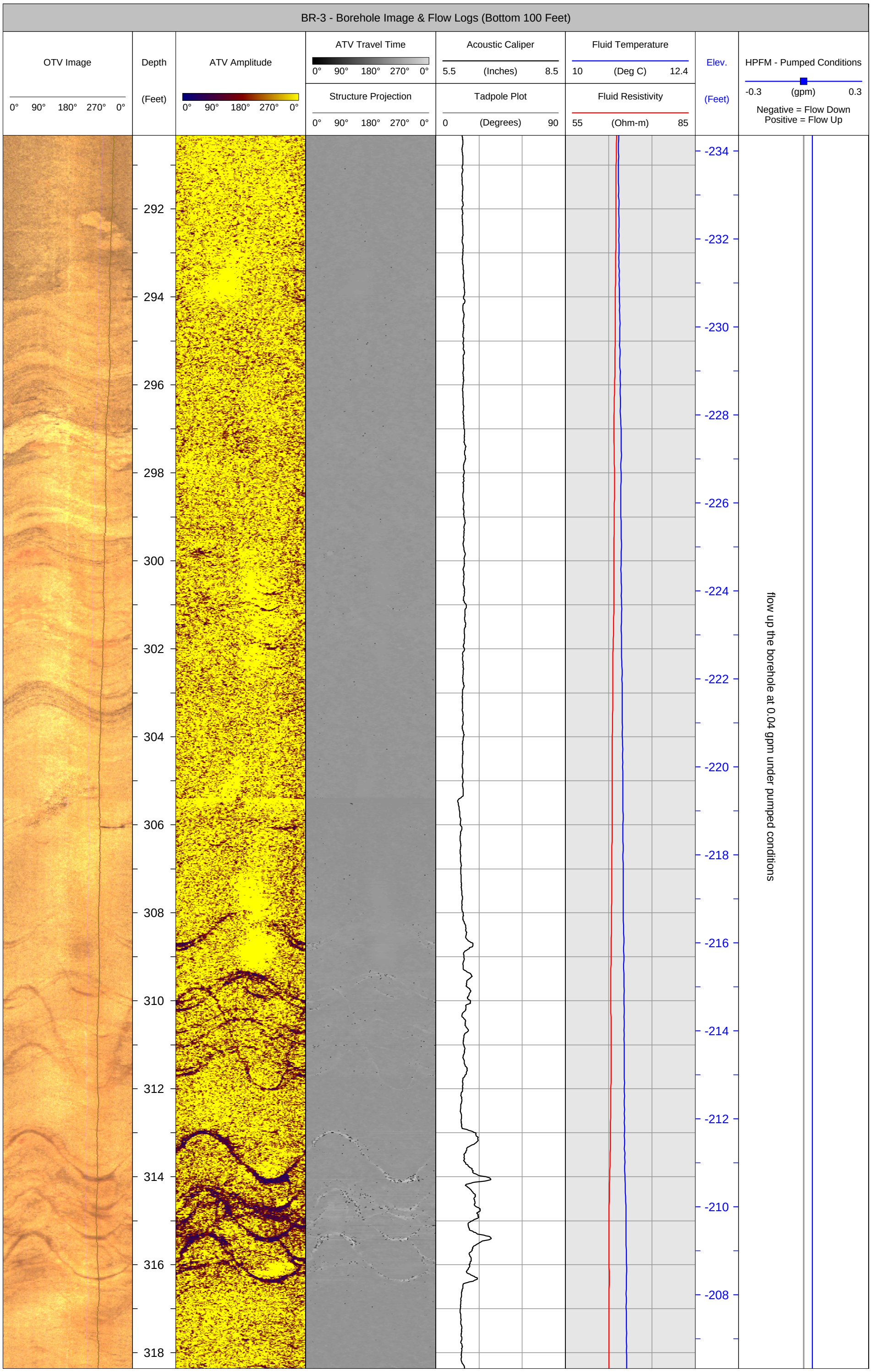

BR-3 - Borehole Image & Flow Logs (Bottom 100 Feet)
OTV Image
0° 90° 180° 270° 0°
Depth
(Feet)
ATV Amplitude
0° 90° 180° 270° 0°
ATV Travel Time
0° 90° 180° 270° 0°
Structure Projection
0° 90° 180° 270° 0°
Acoustic Caliper
5.5 (Inches) 8.5
Tadpole Plot
0 (Degrees) 90
Fluid Temperature
10 (Deg C) 12.4
Fluid Resistivity
55 (Ohm-m) 85
Elev.
(Feet)
HPFM - Pumped Conditions
-0.3 (gpm) 0.3
Negative = Flow Down
Positive = Flow Up
152
154
156
158
160
162
164
166
168
170
172
174
176
178
-374
-372
-370
-368
-366
-364
-362
-360
-358
-356
-354
-352
-350
-348
flow up the borehole at 0.12 gpm under pumped conditions
flow into & up the borehole under pumped conditions

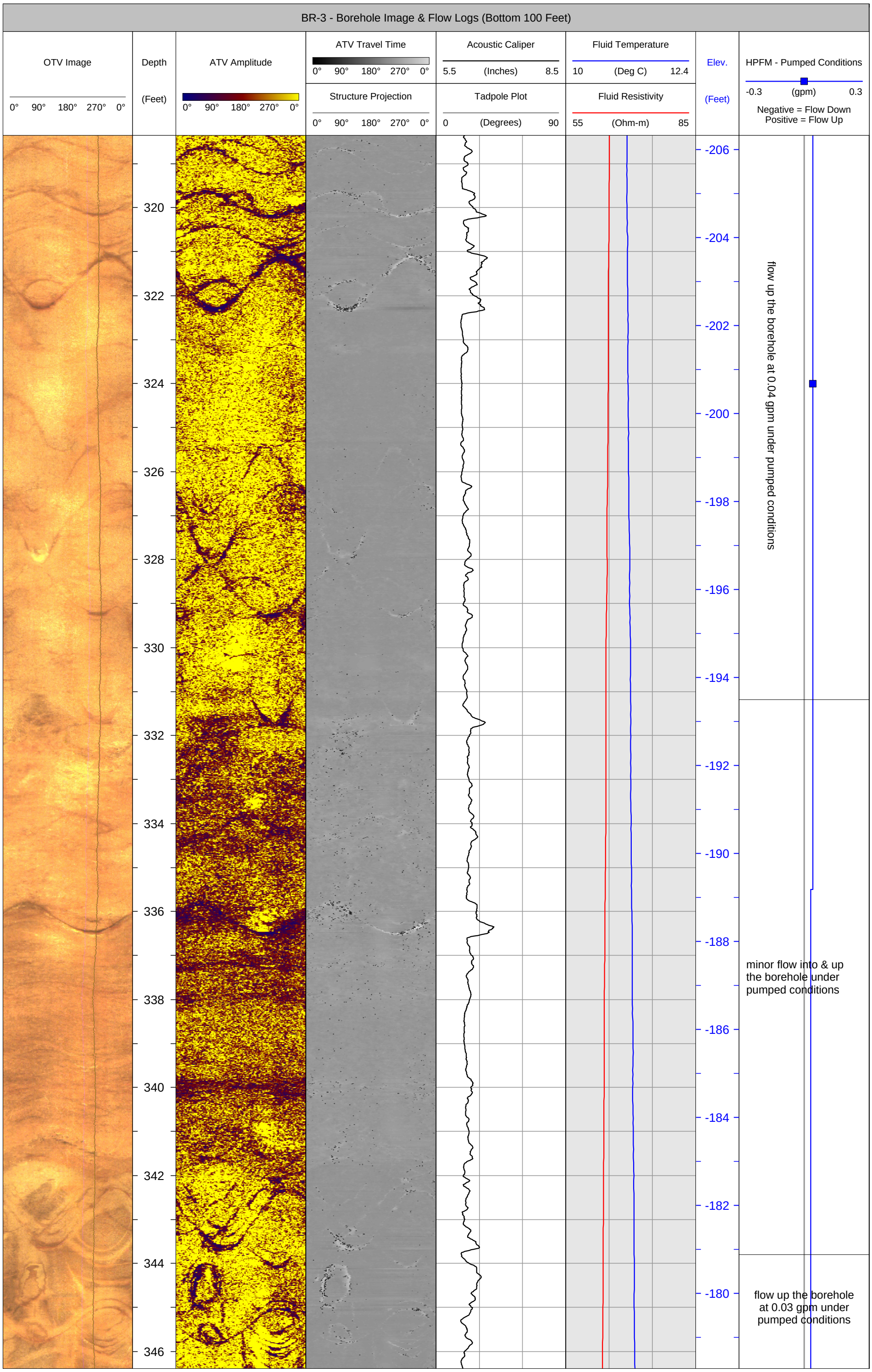

BR-3 - Borehole Image & Flow Logs (Bottom 100 Feet)
OTV Image
0° 90° 180° 270° 0°
Depth
(Feet)
ATV Amplitude
0° 90° 180° 270° 0°
ATV Travel Time
0° 90° 180° 270° 0°
Structure Projection
0° 90° 180° 270° 0°
Acoustic Caliper
5.5 (Inches) 8.5
Tadpole Plot
0 (Degrees) 90
Fluid Temperature
10 (Deg C) 12.4
Fluid Resistivity
55 (Ohm-m) 85
Elev.
(Feet)
HPFM - Pumped Conditions
-0.3 (gpm) 0.3
Negative = Flow Down
Positive = Flow Up
180
182
184
186
188
190
192
194
196
198
200
202
204
206
-346
-344
-342
-340
-338
-336
-334
-332
-330
-328
-326
-324
-322
-320
flow into & up the borehole under pumped conditions
flow up the borehole at 0.05 gpm under pumped conditions

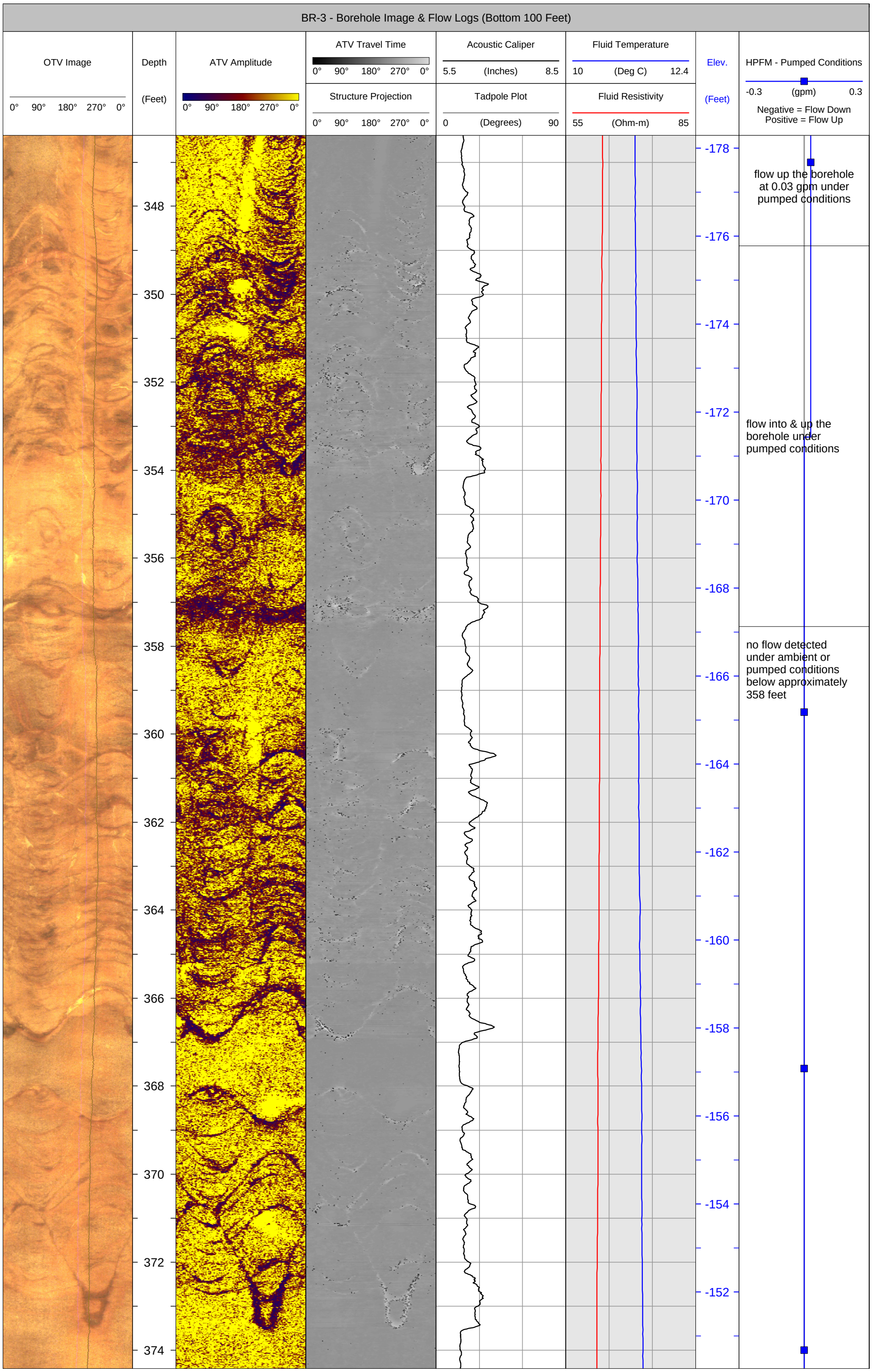

BR-3 - Borehole Image & Flow Logs (Bottom 100 Feet)
OTV Image
0° 90° 180° 270° 0°
Depth
(Feet)
ATV Amplitude
0° 90° 180° 270° 0°
ATV Travel Time
0° 90° 180° 270° 0°
Structure Projection
0° 90° 180° 270° 0°
Acoustic Caliper
5.5 (Inches) 8.5
Tadpole Plot
0 (Degrees) 90
Fluid Temperature
10 (Deg C) 12.4
Fluid Resistivity
55 (Ohm-m) 85
Elev.
(Feet)
HPFM - Pumped Conditions
-0.3 (gpm) 0.3
Negative = Flow Down
Positive = Flow Up
208
210
212
214
216
218
220
222
224
226
228
230
232
234
-318
-316
-314
-312
-310
-308
-306
-304
-302
-300
-298
-296
-294
-292
flow up the borehole at 0.05 gpm under pumped conditions
minor flow into & up the borehole under pumped conditions
flow up the borehole at 0.04 gpm under pumped conditions

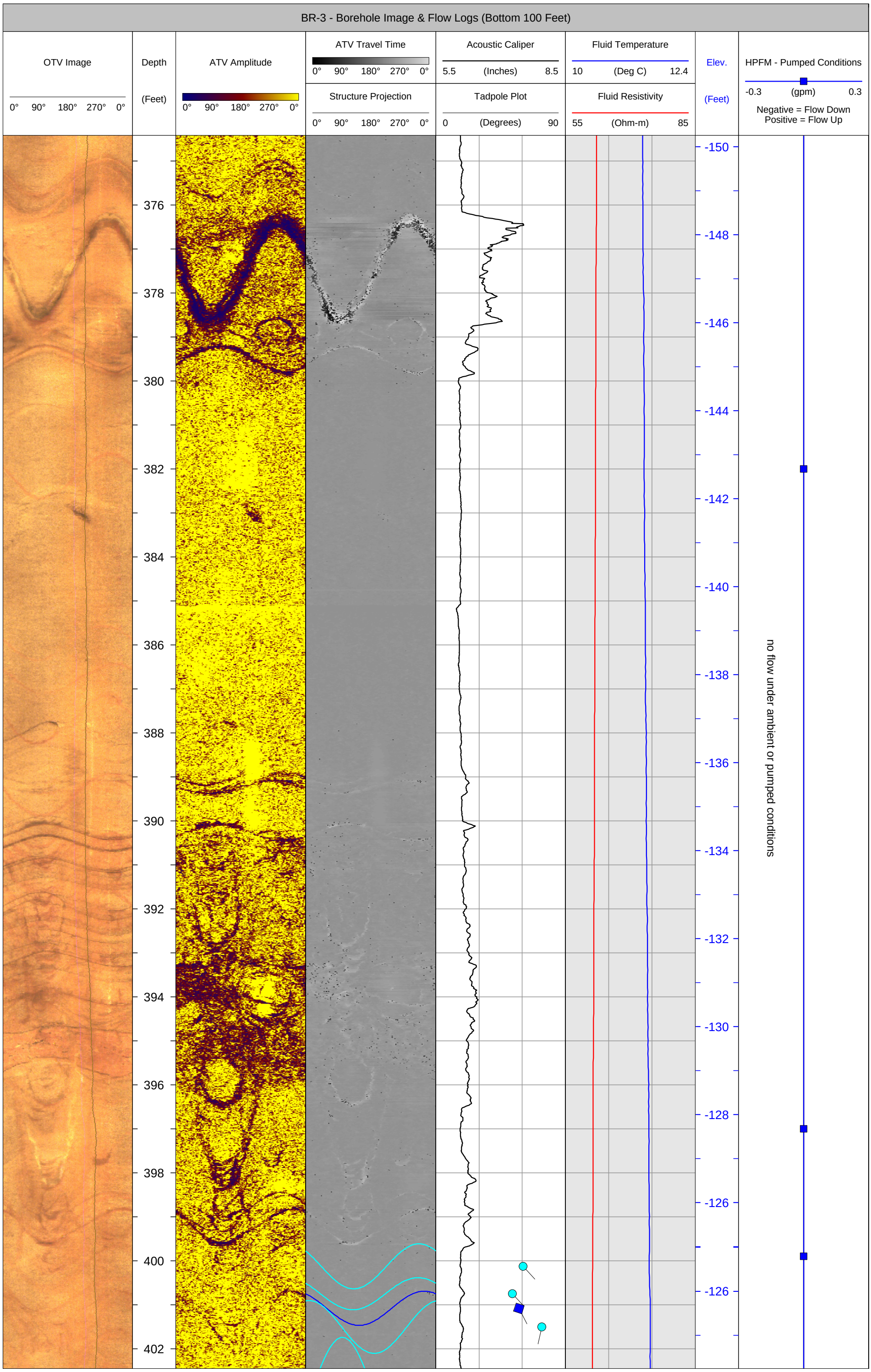

BR-3 - Borehole Image & Flow Logs (Bottom 100 Feet)
OTV Image
0° 90° 180° 270° 0°
Depth
(Feet)
ATV Amplitude
0° 90° 180° 270° 0°
ATV Travel Time
0° 90° 180° 270° 0°
Structure Projection
0° 90° 180° 270° 0°
Acoustic Caliper
5.5 (Inches) 8.5
Tadpole Plot
0 (Degrees) 90
Fluid Temperature
10 (Deg C) 12.4
Fluid Resistivity
55 (Ohm-m) 85
Elev.
(Feet)
HPFM - Pumped Conditions
-0.3 (gpm) 0.3
Negative = Flow Down
Positive = Flow Up
236
238
240
242
244
246
248
250
252
254
256
258
260
262
-290
-288
-286
-284
-282
-280
-278
-276
-274
-272
-270
-268
-266
-264
flow up the borehole at 0.04 gpm under pumped conditions

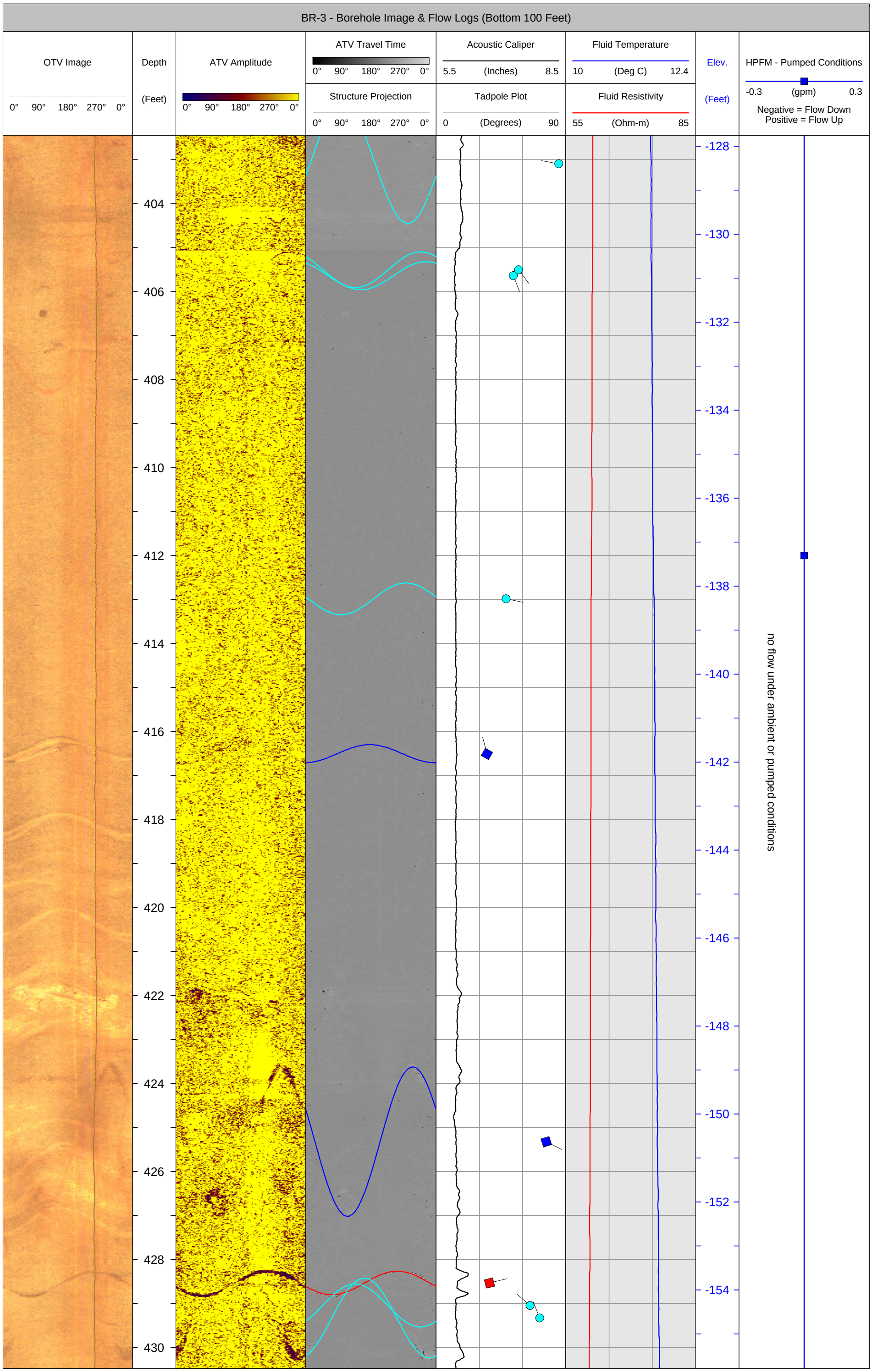

BR-3 - Borehole Image & Flow Logs (Bottom 100 Feet)
OTV Image
0° 90° 180° 270° 0°
Depth
(Feet)
ATV Amplitude
0° 90° 180° 270° 0°
ATV Travel Time
0° 90° 180° 270° 0°
Structure Projection
0° 90° 180° 270° 0°
Acoustic Caliper
5.5 (Inches) 8.5
Tadpole Plot
0 (Degrees) 90
Fluid Temperature
10 (Deg C) 12.4
Fluid Resistivity
55 (Ohm-m) 85
Elev.
(Feet)
HPFM - Pumped Conditions
-0.3 (gpm) 0.3
Negative = Flow Down
Positive = Flow Up
264
266
268
270
272
274
276
278
280
282
284
286
288
290
-262
-260
-258
-256
-254
-252
-250
-248
-246
-244
-242
-240
-238
-236
flow up the borehole at 0.04 gpm under pumped conditions

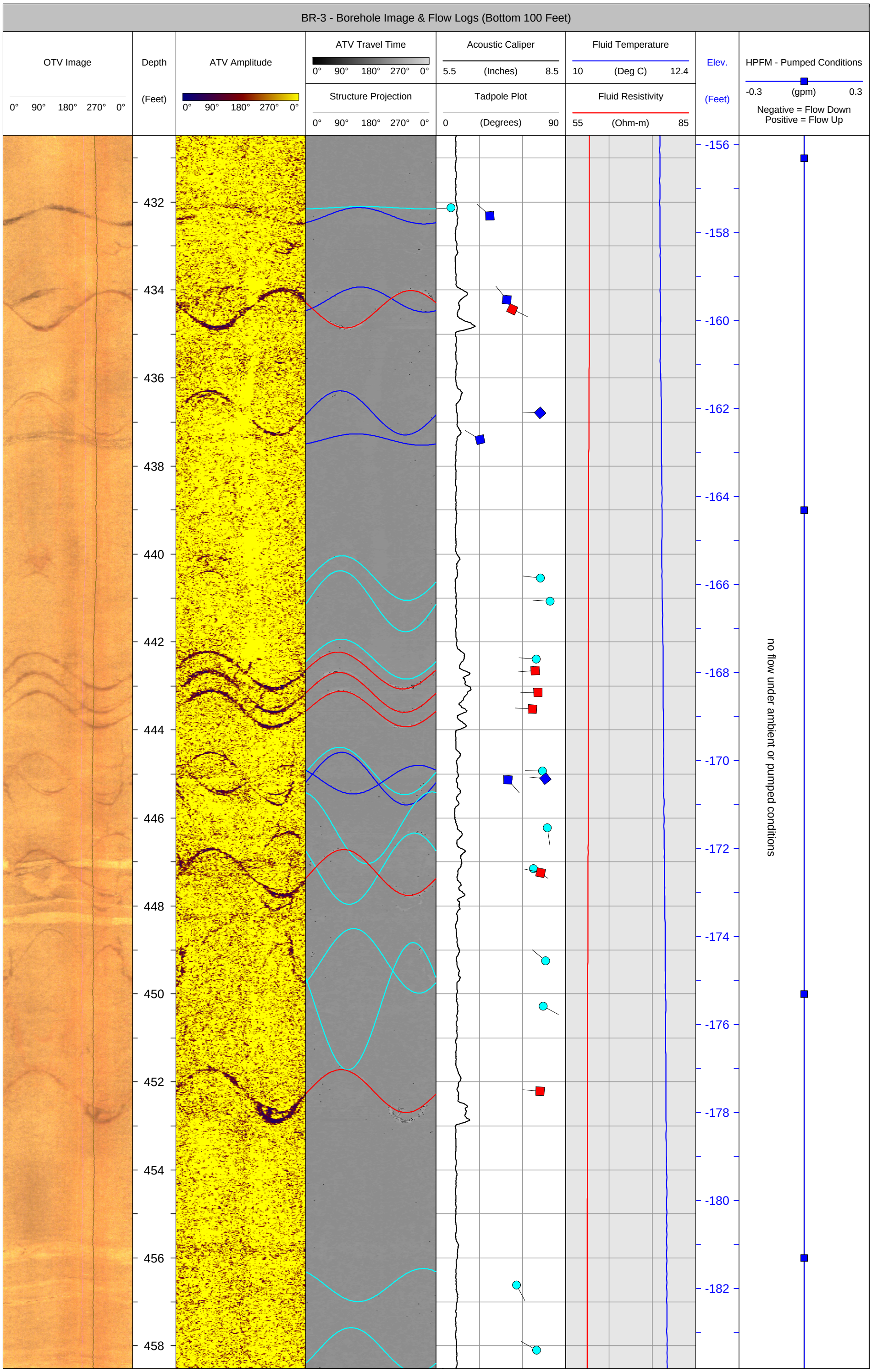

BR-3 - Borehole Image & Flow Logs (Bottom 100 Feet)
OTV Image
0° 90° 180° 270° 0°
Depth
(Feet)
ATV Amplitude
0° 90° 180° 270° 0°
ATV Travel Time
0° 90° 180° 270° 0°
Structure Projection
0° 90° 180° 270° 0°
Acoustic Caliper
5.5 (Inches) 8.5
Tadpole Plot
0 (Degrees) 90
Fluid Temperature
10 (Deg C) 12.4
Fluid Resistivity
55 (Ohm-m) 85
Elev.
(Feet)
HPFM - Pumped Conditions
-0.3 (gpm) 0.3
Negative = Flow Down
Positive = Flow Up
292
294
296
298
300
302
304
306
308
310
312
314
316
318
-234
-232
-230
-228
-226
-224
-222
-220
-218
-216
-214
-212
-210
-208
flow up the borehole at 0.04 gpm under pumped conditions

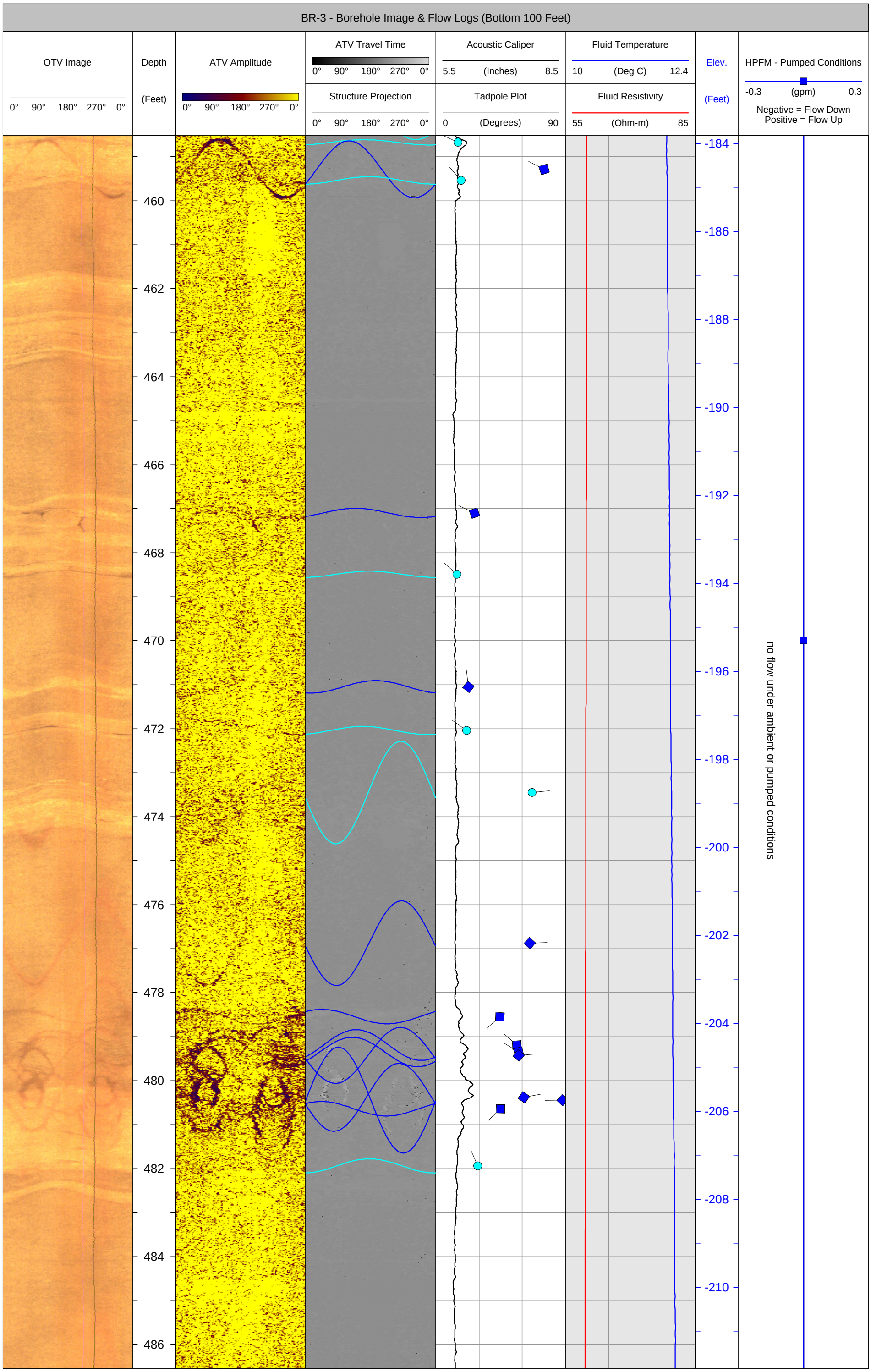

BR-3 - Borehole Image & Flow Logs (Bottom 100 Feet)
OTV Image
0° 90° 180° 270° 0°
Depth
(Feet)
ATV Amplitude
0° 90° 180° 270° 0°
ATV Travel Time
0° 90° 180° 270° 0°
Structure Projection
0° 90° 180° 270° 0°
Acoustic Caliper
5.5 (Inches) 8.5
Tadpole Plot
0 (Degrees) 90
Fluid Temperature
10 (Deg C) 12.4
Fluid Resistivity
55 (Ohm-m) 85
Elev.
(Feet)
HPFM - Pumped Conditions
-0.3 (gpm) 0.3
Negative = Flow Down
Positive = Flow Up
320
322
324
326
328
330
332
334
336
338
340
342
344
346
-206
-204
-202
-200
-198
-196
-194
-192
-190
-188
-186
-184
-182
-180
flow up the borehole at 0.04 gpm under pumped conditions
minor flow into & up the borehole under pumped conditions
flow up the borehole at 0.03 gpm under pumped conditions

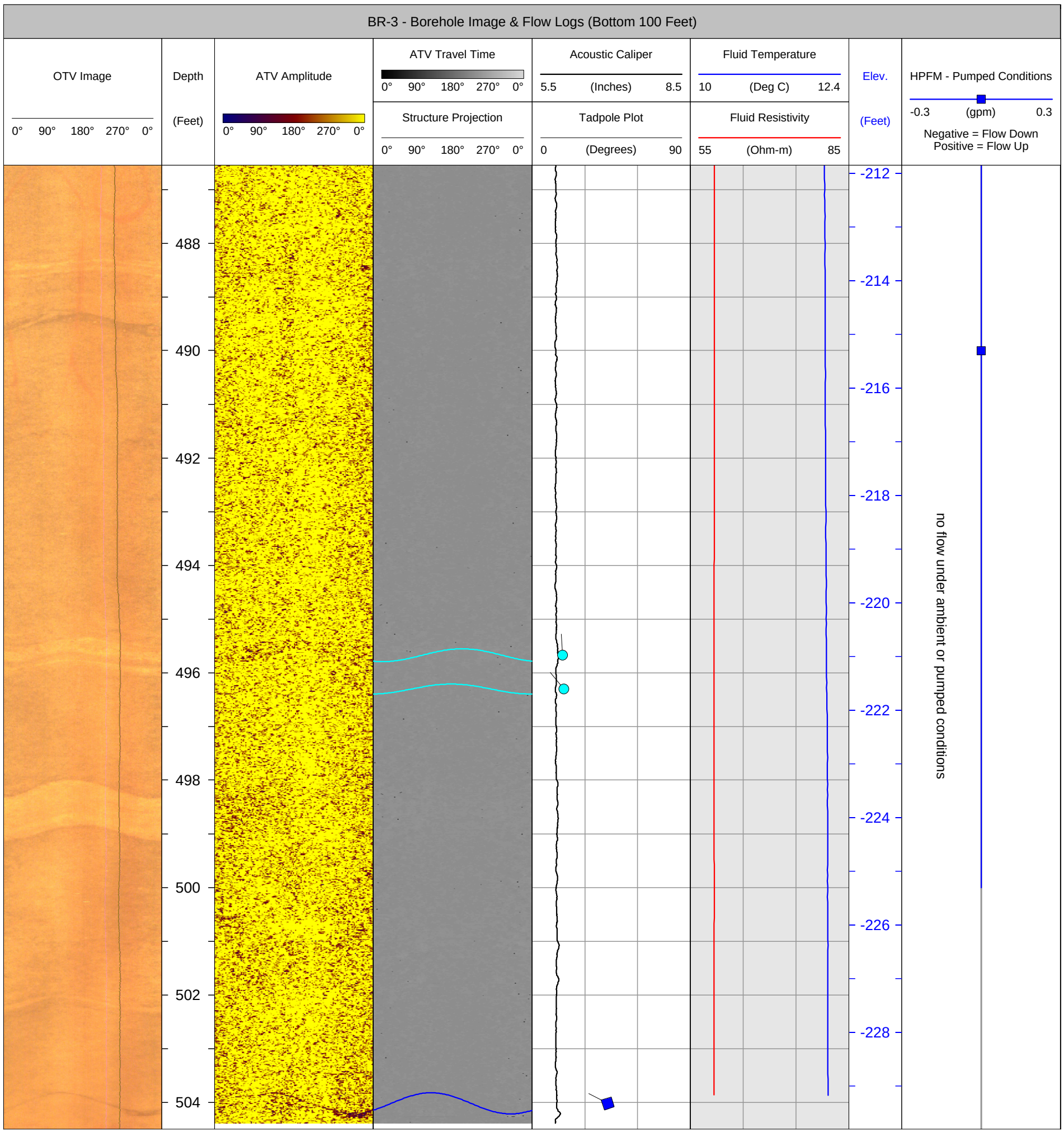

BR-3 - Borehole Image & Flow Logs (Bottom 100 Feet)
OTV Image
0° 90° 180° 270° 0°
Depth
(Feet)
ATV Amplitude
0° 90° 180° 270° 0°
ATV Travel Time
0° 90° 180° 270° 0°
Structure Projection
0° 90° 180° 270° 0°
Acoustic Caliper
5.5 (Inches) 8.5
Tadpole Plot
0 (Degrees) 90
Fluid Temperature
10 (Deg C) 12.4
Fluid Resistivity
55 (Ohm-m) 85
Elev.
(Feet)
HPFM - Pumped Conditions
-0.3 (gpm) 0.3
Negative = Flow Down
Positive = Flow Up
348
350
352
354
356
358
360
362
364
366
368
370
372
374
-178
-176
-174
-172
-170
-168
-166
-164
-162
-160
-158
-156
-154
-152
flow up the borehole at 0.03 gpm under pumped conditions
flow into & up the borehole under pumped conditions
no flow detected under ambient or pumped conditions below approximately 358 feet


BR-3 - Borehole Image & Flow Logs (Bottom 100 Feet)
OTV Image
0° 90° 180° 270° 0°
Depth
(Feet)
ATV Amplitude
0° 90° 180° 270° 0°
ATV Travel Time
0° 90° 180° 270° 0°
Structure Projection
0° 90° 180° 270° 0°
Acoustic Caliper
5.5 (Inches) 8.5
Tadpole Plot
0 (Degrees) 90
Fluid Temperature
10 (Deg C) 12.4
Fluid Resistivity
55 (Ohm-m) 85
Elev.
(Feet)
HPFM - Pumped Conditions
-0.3 (gpm) 0.3
Negative = Flow Down
Positive = Flow Up
376
378
380
382
384
386
388
390
392
394
396
398
400
402
-150
-148
-146
-144
-142
-140
-138
-136
-134
-132
-130
-128
-126
-126
no flow under ambient or pumped conditions


BR-3 - Borehole Image & Flow Logs (Bottom 100 Feet)
OTV Image
0° 90° 180° 270° 0°
Depth
(Feet)
ATV Amplitude
0° 90° 180° 270° 0°
ATV Travel Time
0° 90° 180° 270° 0°
Structure Projection
0° 90° 180° 270° 0°
Acoustic Caliper
5.5 (Inches) 8.5
Tadpole Plot
0 (Degrees) 90
Fluid Temperature
10 (Deg C) 12.4
Fluid Resistivity
55 (Ohm-m) 85
Elev.
(Feet)
HPFM - Pumped Conditions
-0.3 (gpm) 0.3
Negative = Flow Down
Positive = Flow Up
404
406
408
410
412
414
416
418
420
422
424
426
428
430
-128
-130
-132
-134
-136
-138
-140
-142
-144
-146
-148
-150
-152
-154
no flow under ambient or pumped conditions


BR-3 - Borehole Image & Flow Logs (Bottom 100 Feet)
OTV Image
0° 90° 180° 270° 0°
Depth
(Feet)
ATV Amplitude
0° 90° 180° 270° 0°
ATV Travel Time
0° 90° 180° 270° 0°
Structure Projection
0° 90° 180° 270° 0°
Acoustic Caliper
5.5 (Inches) 8.5
Tadpole Plot
0 (Degrees) 90
Fluid Temperature
10 (Deg C) 12.4
Fluid Resistivity
55 (Ohm-m) 85
Elev.
(Feet)
HPFM - Pumped Conditions
-0.3 (gpm) 0.3
Negative = Flow Down
Positive = Flow Up
432
434
436
438
440
442
444
446
448
450
452
454
456
458
-156
-158
-160
-162
-164
-166
-168
-170
-172
-174
-176
-178
-180
-182
no flow under ambient or pumped conditions


BR-3 - Borehole Image & Flow Logs (Bottom 100 Feet)
OTV Image
0° 90° 180° 270° 0°
Depth
(Feet)
ATV Amplitude
0° 90° 180° 270° 0°
ATV Travel Time
0° 90° 180° 270° 0°
Structure Projection
0° 90° 180° 270° 0°
Acoustic Caliper
5.5 (Inches) 8.5
Tadpole Plot
0 (Degrees) 90
Fluid Temperature
10 (Deg C) 12.4
Fluid Resistivity
55 (Ohm-m) 85
Elev.
(Feet)
HPFM - Pumped Conditions
-0.3 (gpm) 0.3
Negative = Flow Down
Positive = Flow Up
460
462
464
466
468
470
472
474
476
478
480
482
484
486
-184
-186
-188
-190
-192
-194
-196
-198
-200
-202
-204
-206
-208
-210
no flow under ambient or pumped conditions


BR-3 - Borehole Image & Flow Logs (Bottom 100 Feet)
OTV Image
0° 90° 180° 270° 0°
Depth
(Feet)
ATV Amplitude
0° 90° 180° 270° 0°
ATV Travel Time
0° 90° 180° 270° 0°
Structure Projection
0° 90° 180° 270° 0°
Acoustic Caliper
5.5 (Inches) 8.5
Tadpole Plot
0 (Degrees) 90
Fluid Temperature
10 (Deg C) 12.4
Fluid Resistivity
55 (Ohm-m) 85
Elev.
(Feet)
HPFM - Pumped Conditions
-0.3 (gpm) 0.3
Negative = Flow Down
Positive = Flow Up
488
490
492
494
496
498
500
502
504
-212
-214
-216
-218
-220
-222
-224
-226
-228
no flow under ambient or pumped conditions

HAGER-RICHTER GEOSCIENCE, INC.

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BOREHOLE: BR-5 BOREHOLE FLUID & GEOLOGY LOGS

DATE LOGGED: September 14, 2010

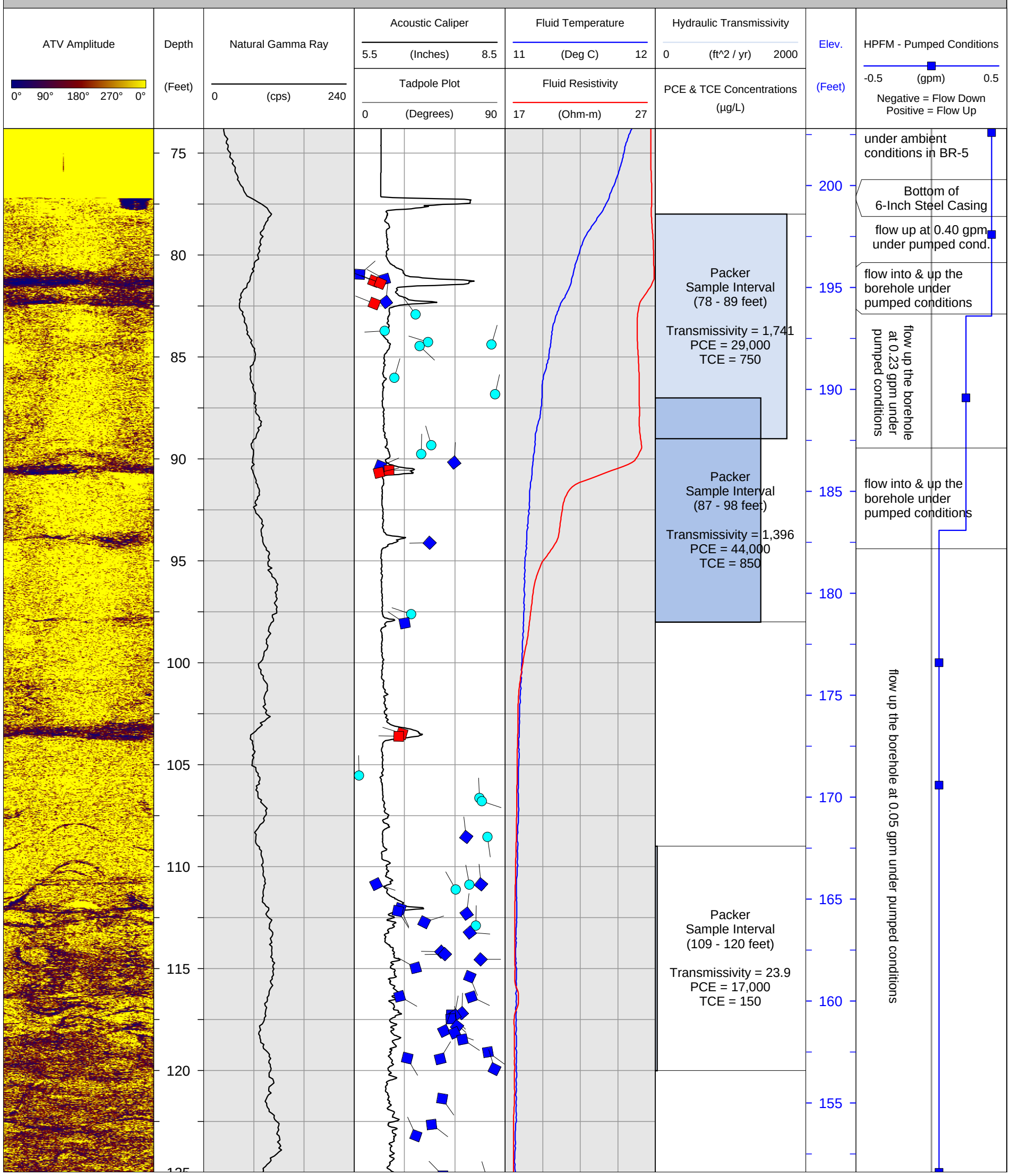
CLIENT:	Weston Solutions, Inc.	H-R FILE:	10RG30
PROJECT:	Borehole Geophysical Logging	LOG DATUM:	Top of the 6-Inch Steel Casing
LOCATION:	Savage Municipal Water Supply Superfund Site	TOP OF CASING ELEVATION:	276.6 Feet
CITY, STATE:	Milford, New Hampshire	ORIENTATION REFERENCE:	True North (Declination = 15 Degrees West)
LOGGING GEOPHYSICISTS:	Nick DeCristofaro & Eric Rickert	CASING STICK-UP:	1.9 Feet Above the Ground Surface
CLIENT REP. ON-SITE:	Andrew Fuller	BOREHOLE DIAMETER:	6 Inches
LOGS PROCESSED BY:	Robert Garfield	WATER LEVEL DEPTH:	16.3 Feet

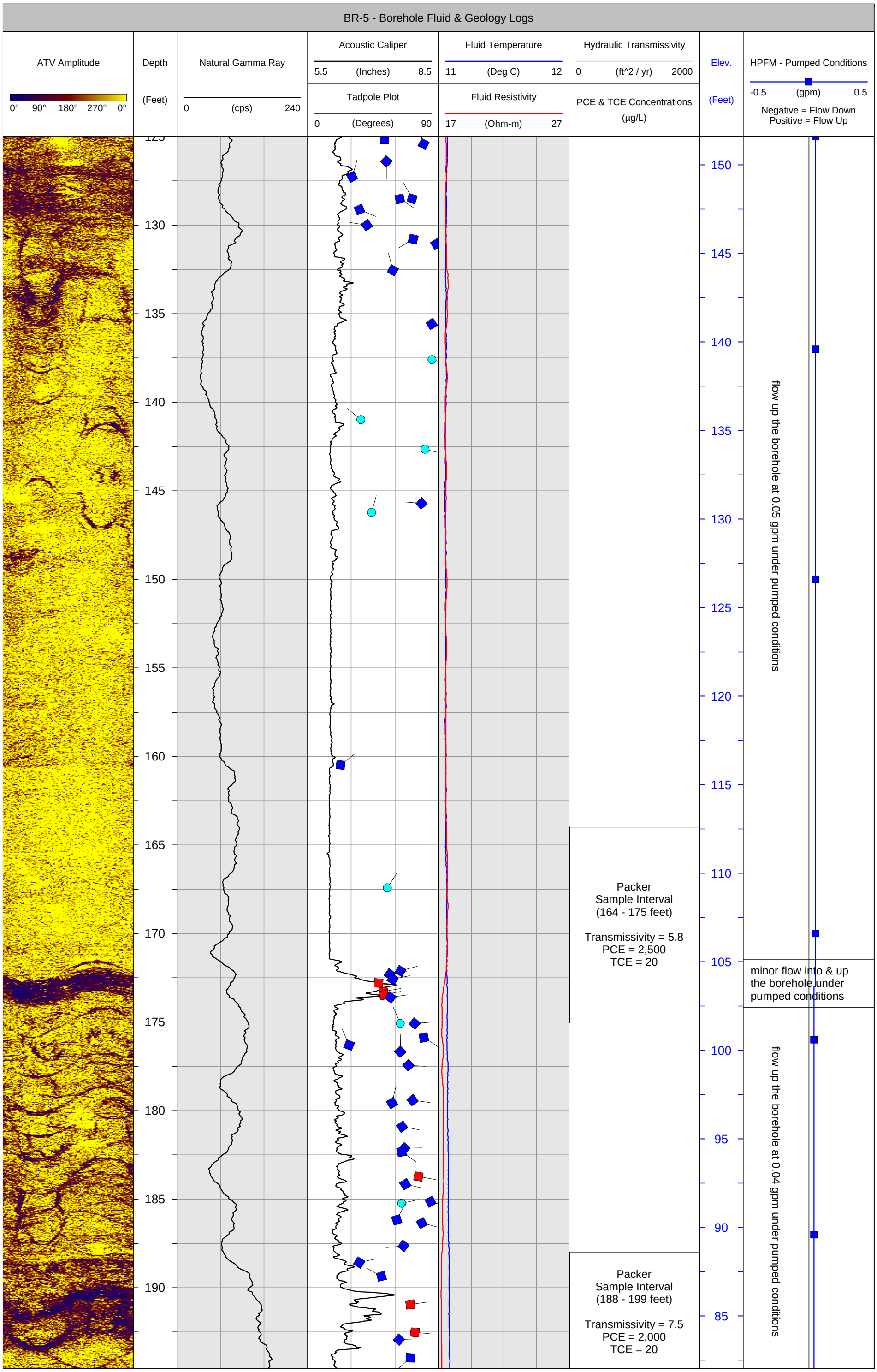
STRUCTURE LEGEND

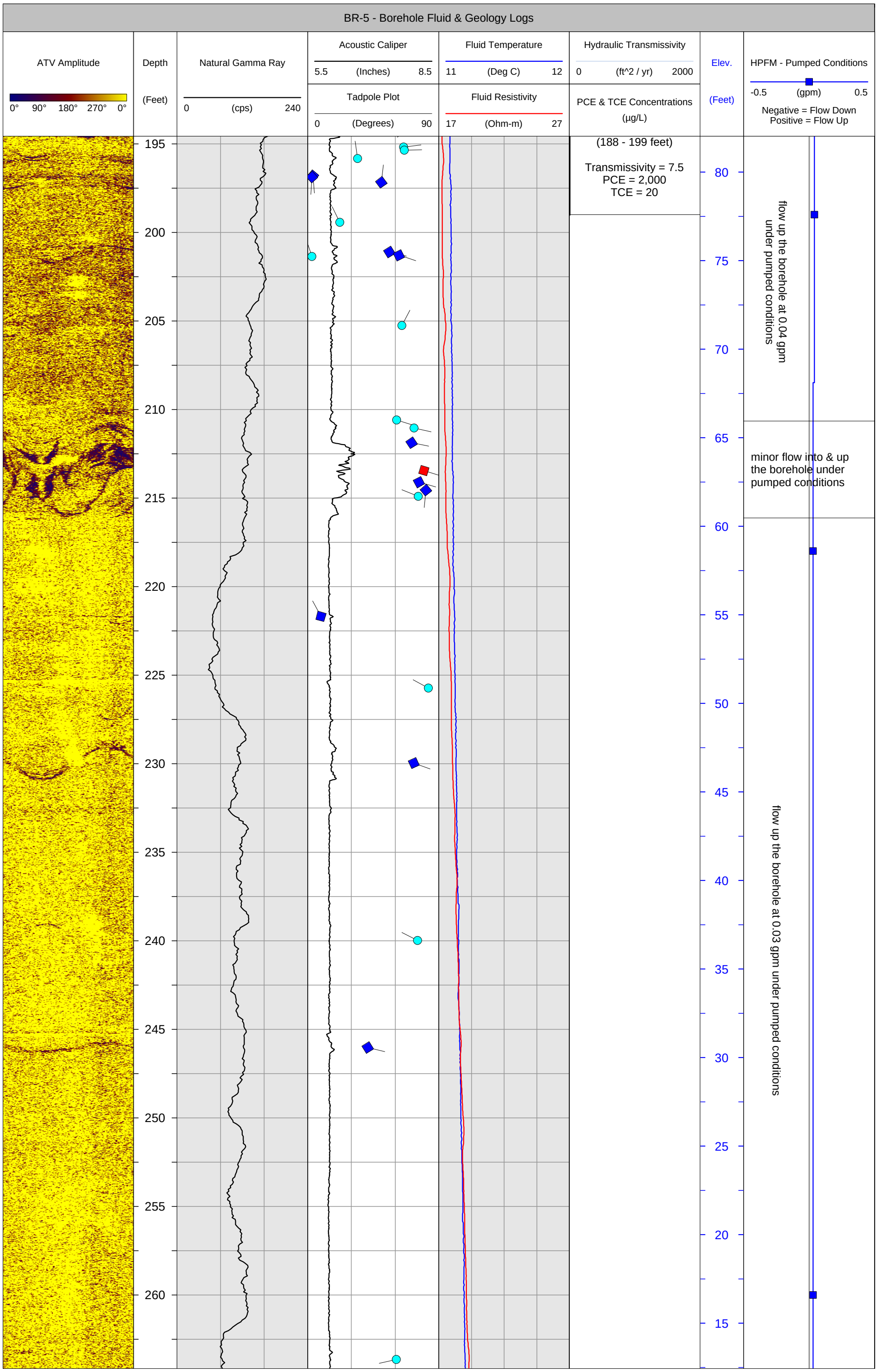
Fracture Rank 1 Fracture Rank 2 Fracture Rank 3

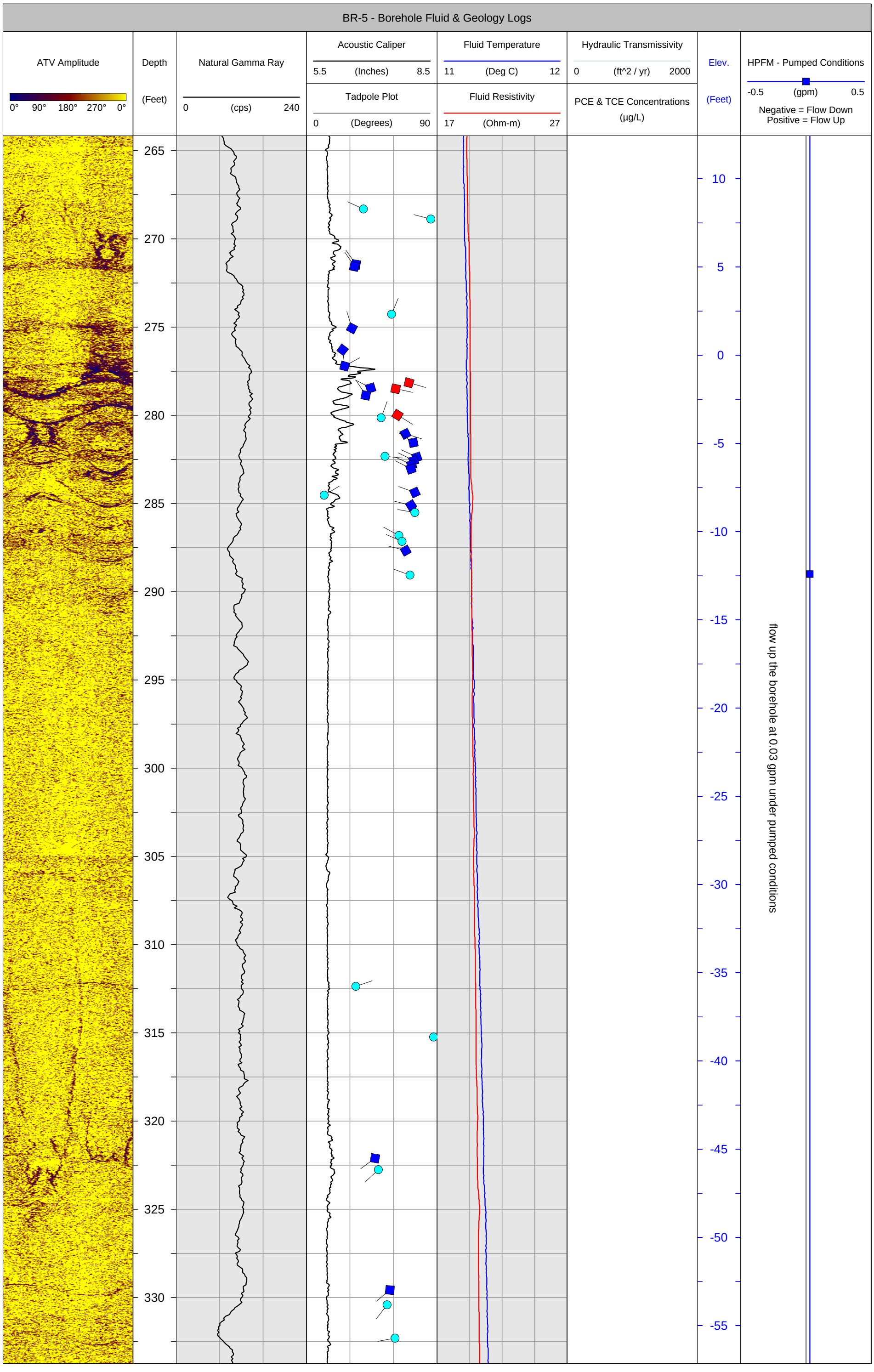
NOTES: HPFM data under ambient conditions are not plotted in the logs below because flow was not detected under ambient conditions.
During HPFM logging under pumped conditions water was pumped from the borehole at 0.4 gpm from inside the casing.
The transmissivity, PCE, and TCE data were provided by Weston and were acquired during packer testing.

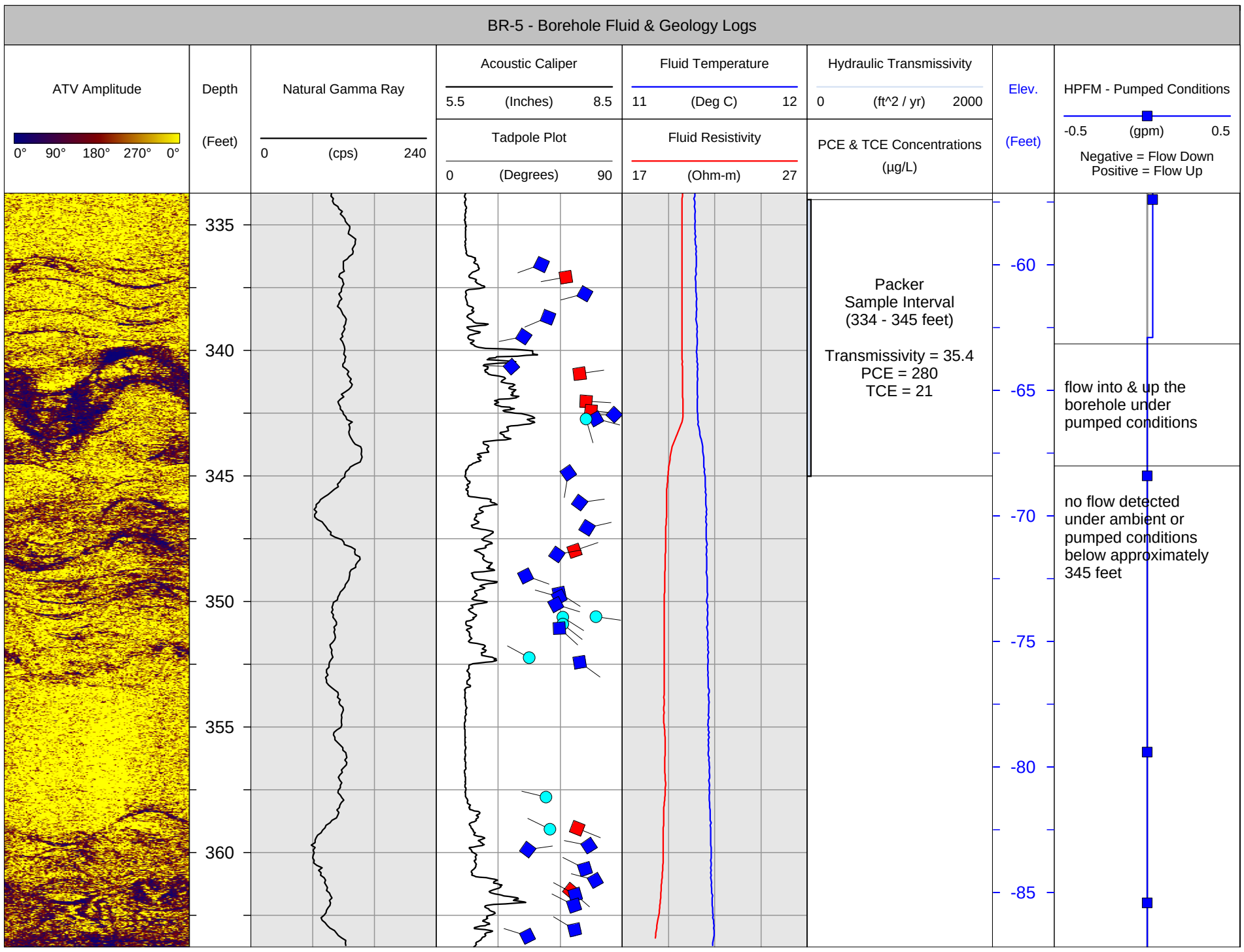
BR-5 - Borehole Fluid & Geology Logs




BR-5 - Borehole Fluid & Geology Logs
ATV Amplitude
0° 90° 180° 270° 0°
Depth
(Feet)
Natural Gamma Ray
0 (cps) 240
Acoustic Caliper
5.5 (Inches) 8.5
Tadpole Plot
0 (Degrees) 90
Fluid Temperature
11 (Deg C) 12
Fluid Resistivity
17 (Ohm-m) 27
Hydraulic Transmissivity
0 (ft^2 / yr) 2000
PCE & TCE Concentrations
(µg/L)
Elev.
(Feet)
HPFM - Pumped Conditions
-0.5 (gpm) 0.5
Negative = Flow Down
Positive = Flow Up
flow up the borehole at 0.05 gpm under pumped conditions
minor flow into & up the borehole under pumped conditions
flow up the borehole at 0.04 gpm under pumped conditions
Packer
Sample Interval
(164 - 175 feet)
Transmissivity = 5.8
PCE = 2,500
TCE = 20
Packer
Sample Interval
(188 - 199 feet)
Transmissivity = 7.5
PCE = 2,000
TCE = 20


BR-5 - Borehole Fluid & Geology Logs
ATV Amplitude
0° 90° 180° 270° 0°
Depth
(Feet)
Natural Gamma Ray
0 (cps) 240
Acoustic Caliper
5.5 (Inches) 8.5
Tadpole Plot
0 (Degrees) 90
Fluid Temperature
11 (Deg C) 12
Fluid Resistivity
17 (Ohm-m) 27
Hydraulic Transmissivity
0 (ft^2 / yr) 2000
PCE & TCE Concentrations
(µg/L)
Elev.
(Feet)
HPFM - Pumped Conditions
-0.5 (gpm) 0.5
Negative = Flow Down
Positive = Flow Up
195
200
205
210
215
220
225
230
235
240
245
250
255
260
(188 - 199 feet)
Transmissivity = 7.5
PCE = 2,000
TCE = 20
80
75
70
65
60
55
50
45
40
35
30
25
20
15
flow up the borehole at 0.04 gpm under pumped conditions
minor flow into & up the borehole under pumped conditions
flow up the borehole at 0.03 gpm under pumped conditions


BR-5 - Borehole Fluid & Geology Logs
ATV Amplitude
0° 90° 180° 270° 0°
Depth
(Feet)
Natural Gamma Ray
0 (cps) 240
Acoustic Caliper
5.5 (Inches) 8.5
Tadpole Plot
0 (Degrees) 90
Fluid Temperature
11 (Deg C) 12
Fluid Resistivity
17 (Ohm-m) 27
Hydraulic Transmissivity
0 (ft^2 / yr) 2000
PCE & TCE Concentrations
(µg/L)
Elev.
(Feet)
HPFM - Pumped Conditions
-0.5 (gpm) 0.5
Negative = Flow Down
Positive = Flow Up
265
270
275
280
285
290
295
300
305
310
315
320
325
330
10
5
0
-5
-10
-15
-20
-25
-30
-35
-40
-45
-50
-55
flow up the borehole at 0.03 gpm under pumped conditions


BR-5 - Borehole Fluid & Geology Logs
ATV Amplitude
0° 90° 180° 270° 0°
Depth
(Feet)
Natural Gamma Ray
0 (cps) 240
Acoustic Caliper
5.5 (Inches) 8.5
Tadpole Plot
0 (Degrees) 90
Fluid Temperature
11 (Deg C) 12
Fluid Resistivity
17 (Ohm-m) 27
Hydraulic Transmissivity
0 (ft^2 / yr) 2000
PCE & TCE Concentrations
(µg/L)
Elev.
(Feet)
HPFM - Pumped Conditions
-0.5 (gpm) 0.5
Negative = Flow Down
Positive = Flow Up
335
340
345
350
355
360
-60
-65
-70
-75
-80
-85
Packer
Sample Interval
(334 - 345 feet)
Transmissivity = 35.4
PCE = 280
TCE = 21
flow into & up the borehole under pumped conditions
no flow detected under ambient or pumped conditions below approximately 345 feet

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BOREHOLE: BR-5 BOREHOLE IMAGE & FLOW LOGS

DATE LOGGED: September 14, 2010

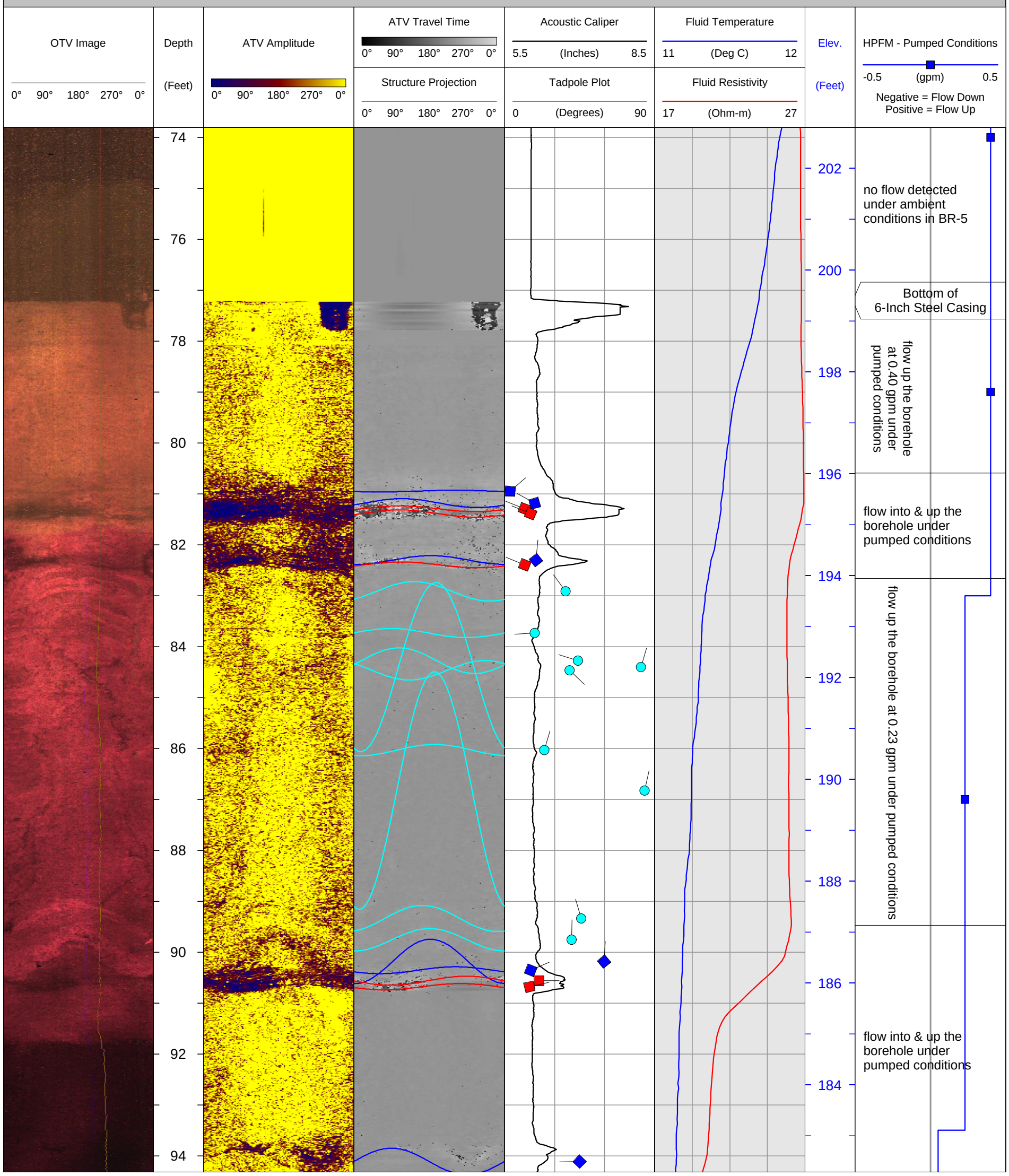
CLIENT:	Weston Solutions, Inc.	H-R FILE:	10RG30
PROJECT:	Borehole Geophysical Logging	LOG DATUM:	Top of the 6-Inch Steel Casing
LOCATION:	Savage Municipal Water Supply Superfund Site	TOP OF CASING ELEVATION:	276.6 Feet
CITY, STATE:	Milford, New Hampshire	ORIENTATION REFERENCE:	True North (Declination = 15 Degrees West)
LOGGING GEOPHYSICISTS:	Nick DeCristofaro & Eric Rickert	CASING STICK-UP:	1.9 Feet Above the Ground Surface
CLIENT REP. ON-SITE:	Andrew Fuller	BOREHOLE DIAMETER:	6 Inches
LOGS PROCESSED BY:	Robert Garfield	WATER LEVEL DEPTH:	16.3 Feet

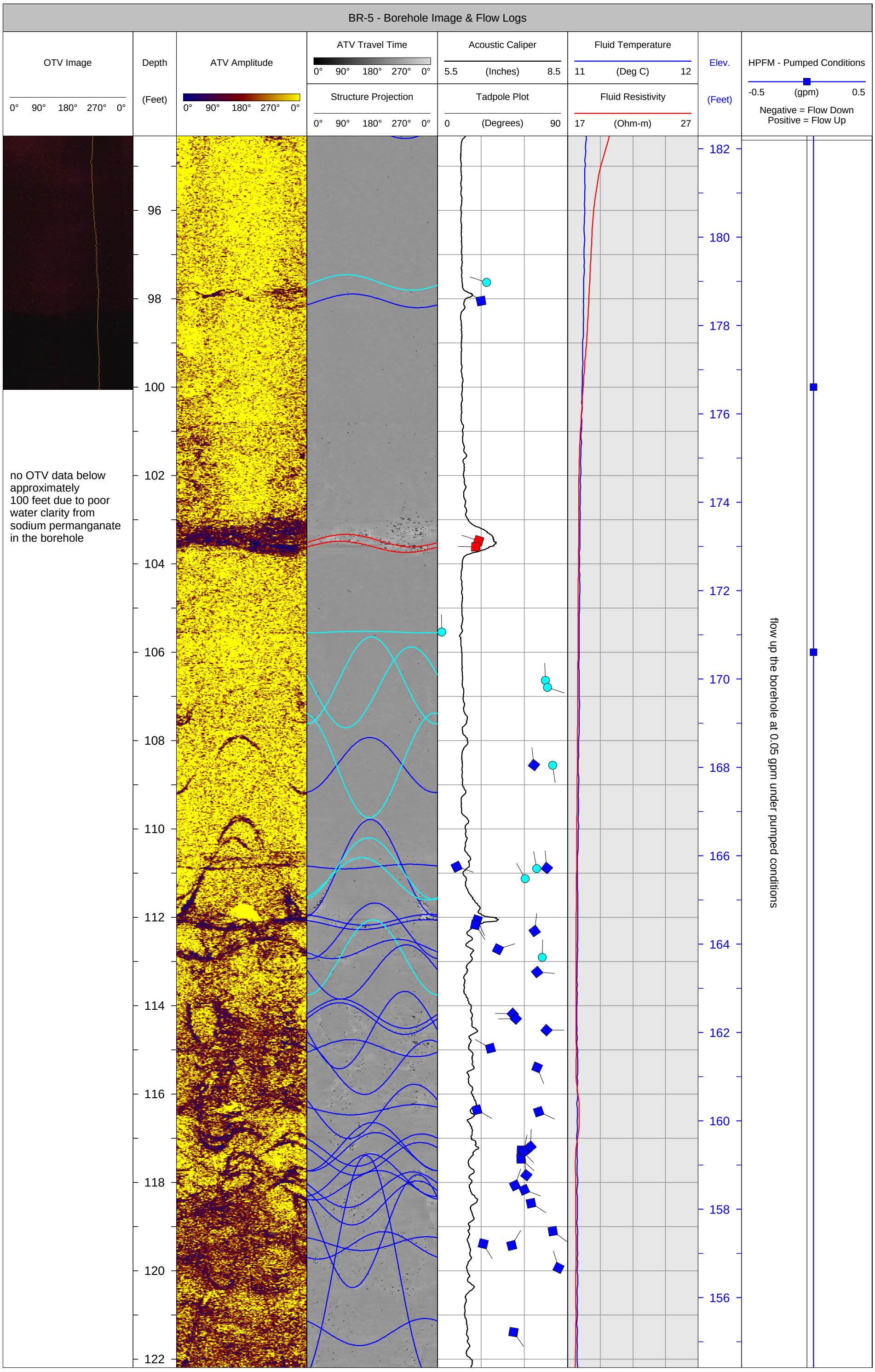
STRUCTURE LEGEND

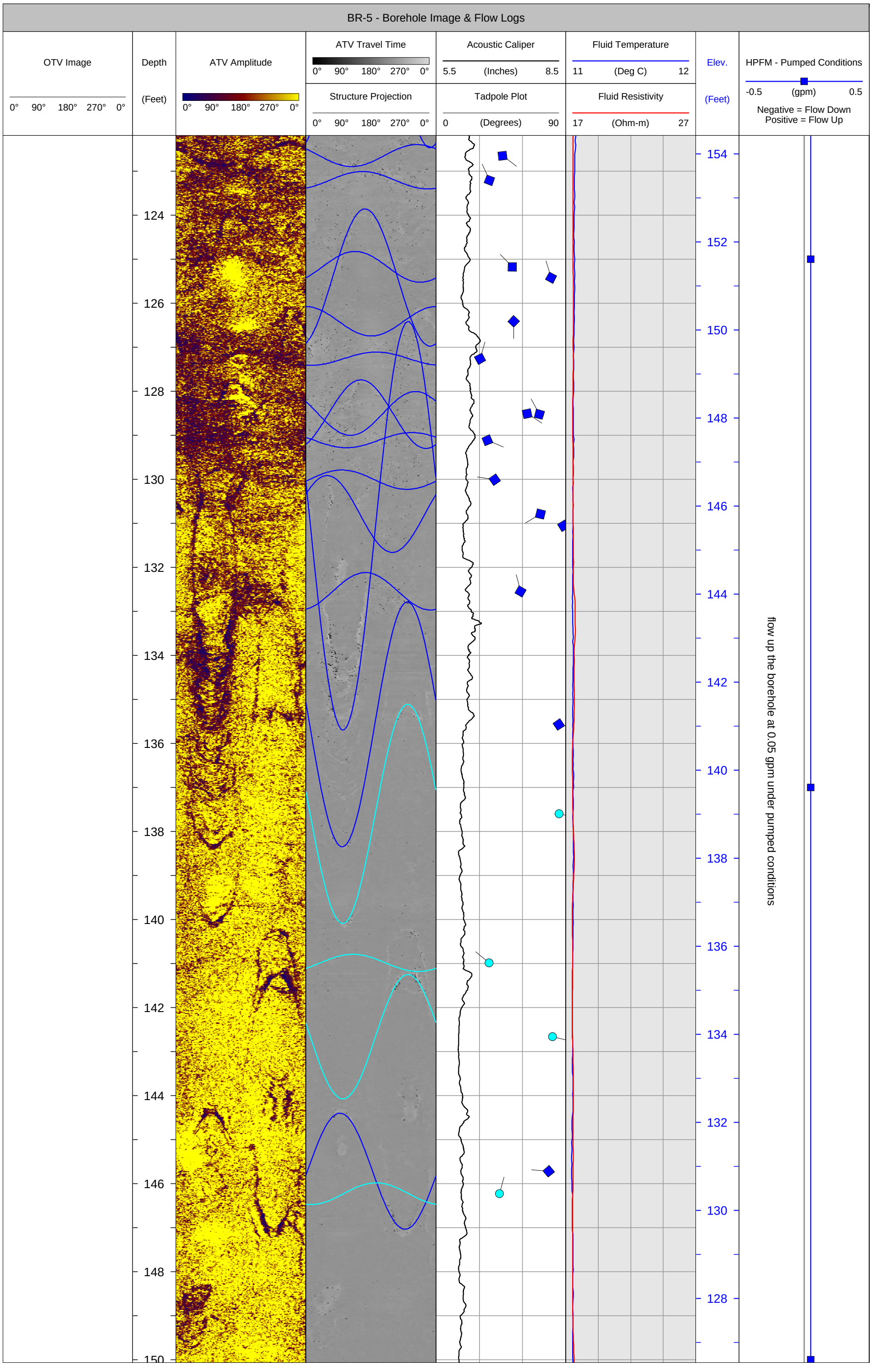
Fracture Rank 1 Fracture Rank 2 Fracture Rank 3

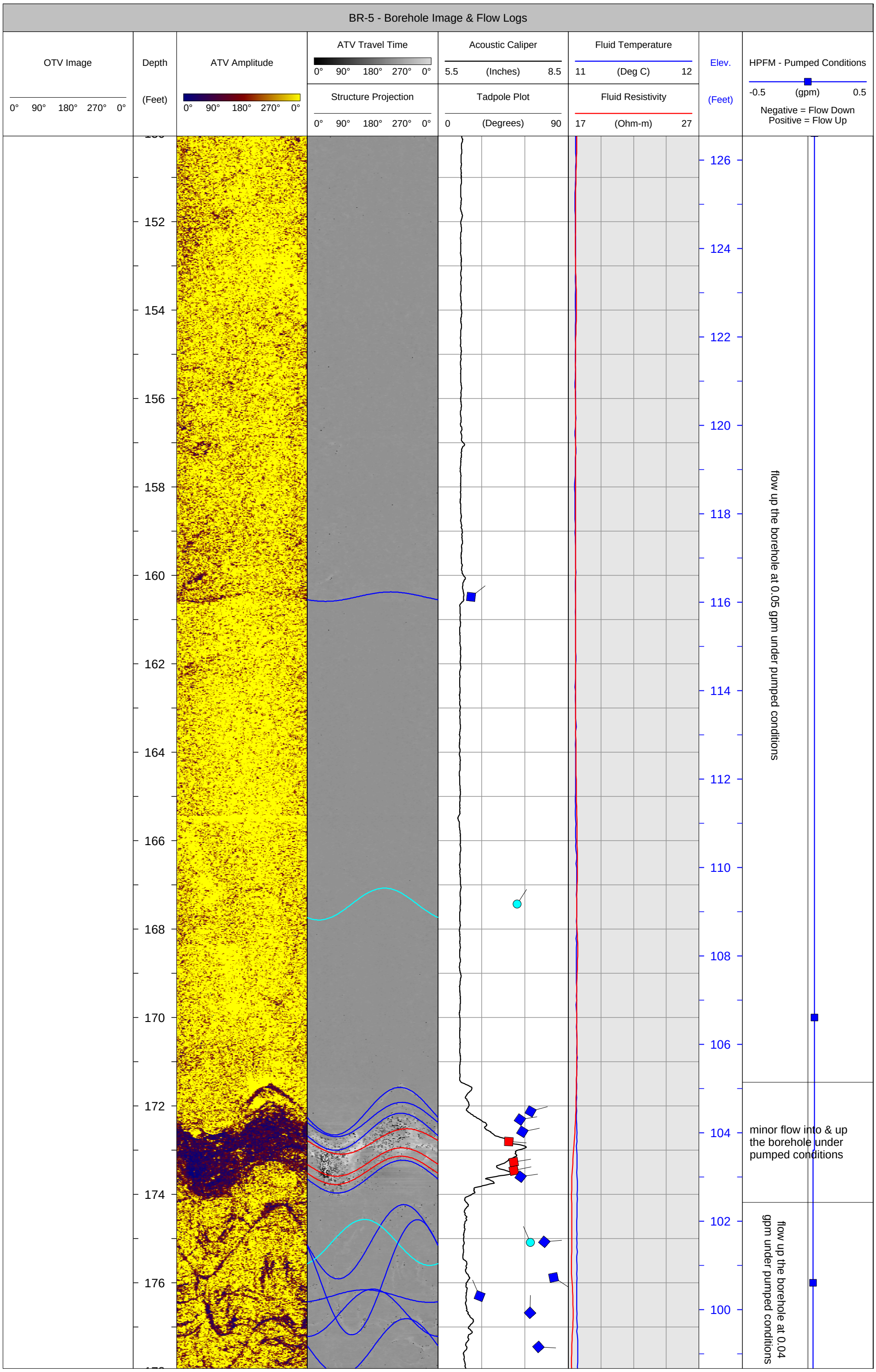
NOTES: HPFM data under ambient conditions are not plotted in the logs below because flow was not detected under ambient conditions.
During HPFM logging under pumped conditions water was pumped from the borehole at 0.4 gpm from inside the casing.

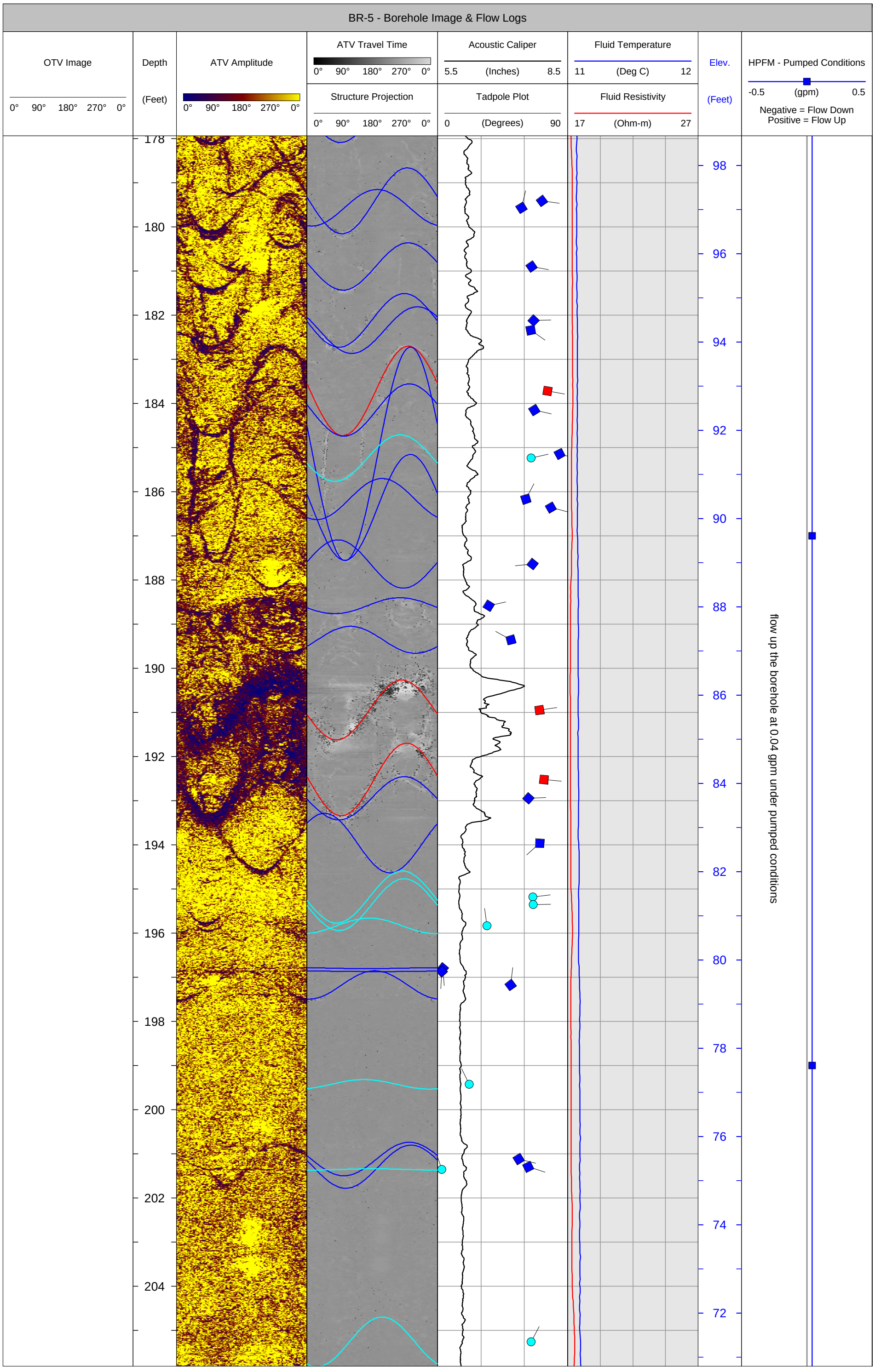
BR-5 - Borehole Image & Flow Logs

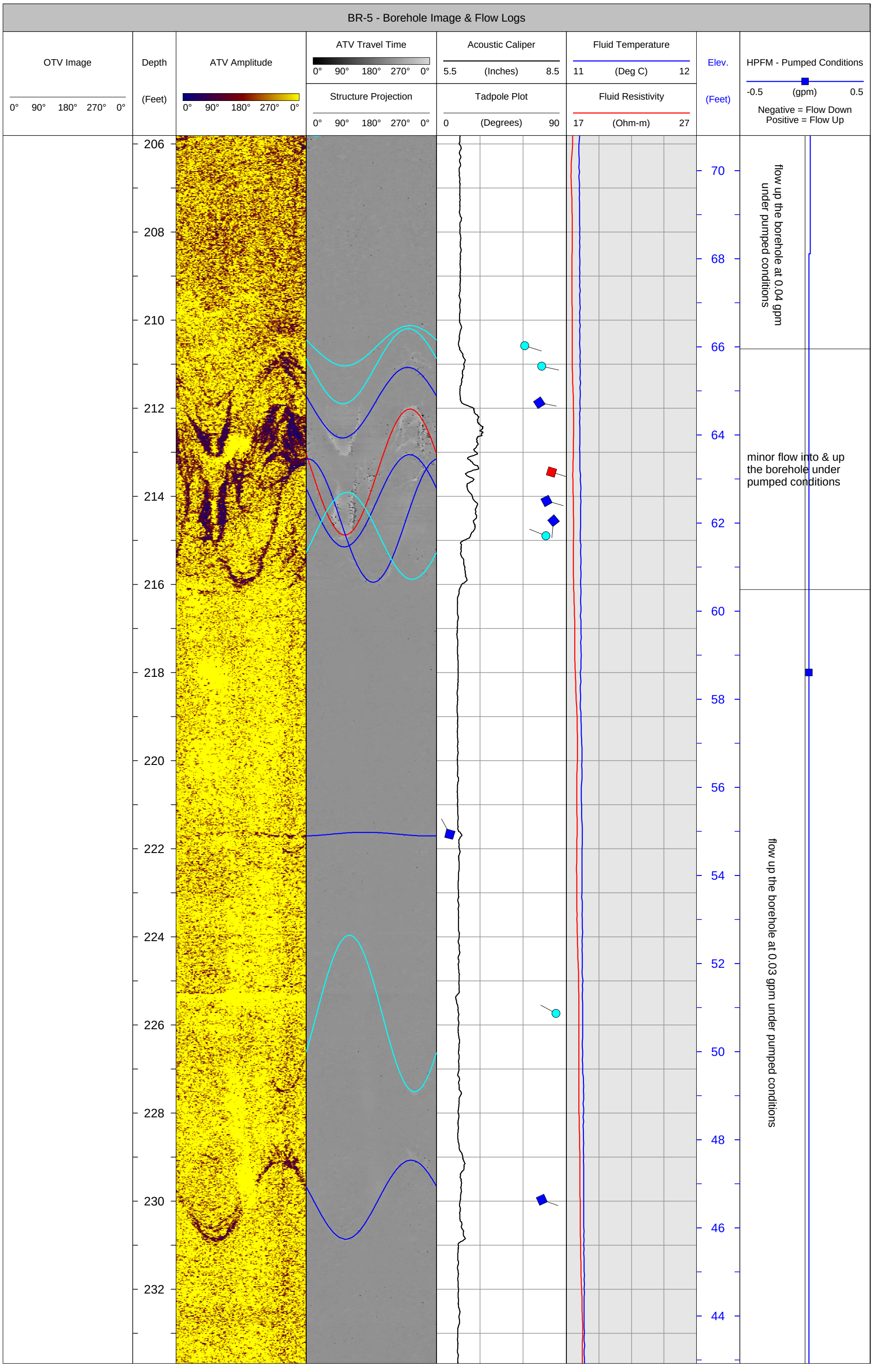


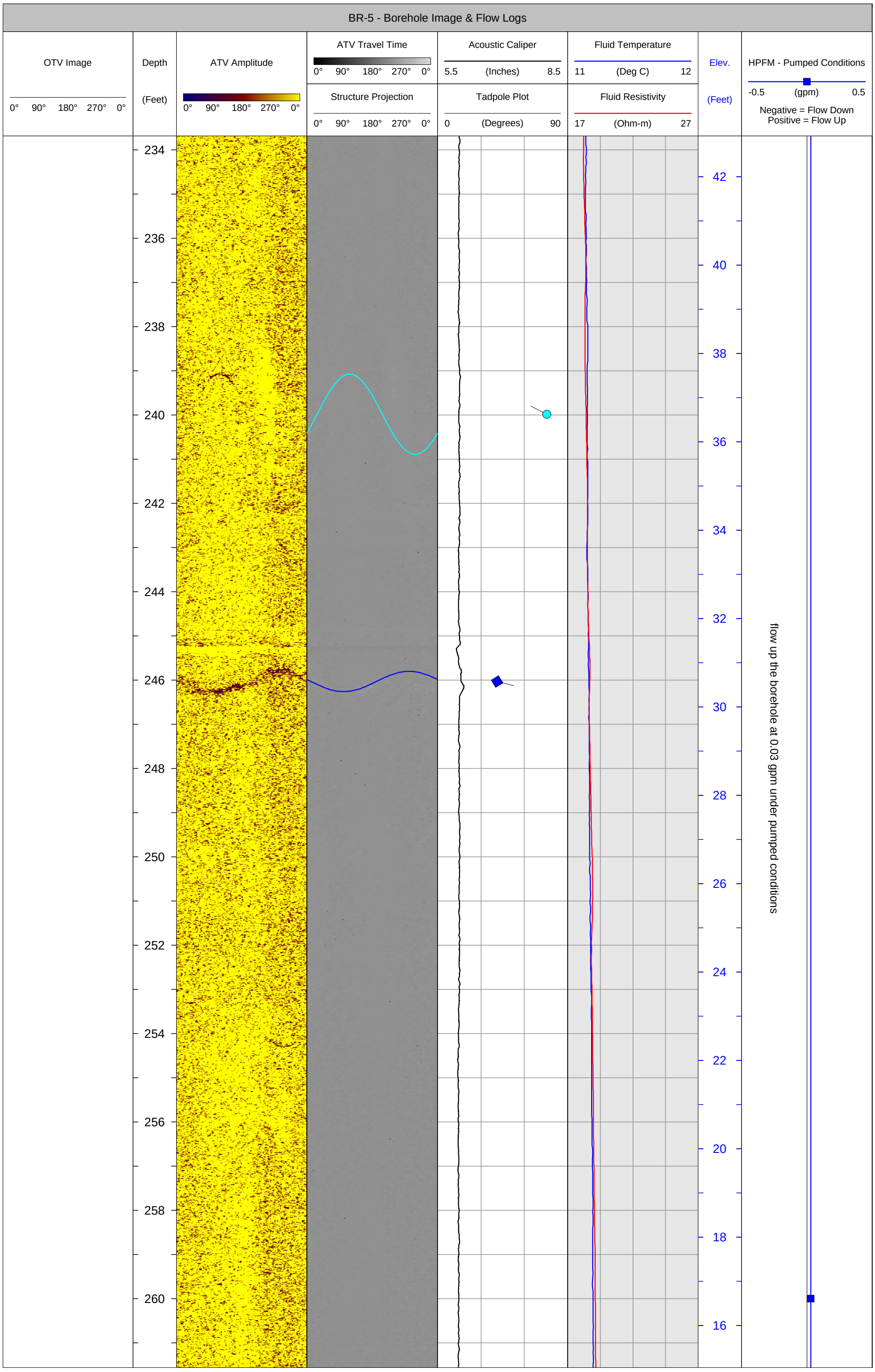

BR-5 - Borehole Image & Flow Logs
OTV Image
0° 90° 180° 270° 0°
Depth
(Feet)
ATV Amplitude
0° 90° 180° 270° 0°
ATV Travel Time
0° 90° 180° 270° 0°
Structure Projection
0° 90° 180° 270° 0°
Acoustic Caliper
5.5 (Inches) 8.5
Tadpole Plot
0 (Degrees) 90
Fluid Temperature
11 (Deg C) 12
Fluid Resistivity
17 (Ohm-m) 27
Elev.
(Feet)
HPFM - Pumped Conditions
-0.5 (gpm) 0.5
Negative = Flow Down
Positive = Flow Up
no OTV data below approximately 100 feet due to poor water clarity from sodium permanganate in the borehole
flow up the borehole at 0.05 gpm under pumped conditions
96
98
100
102
104
106
108
110
112
114
116
118
120
122
182
180
178
176
174
172
170
168
166
164
162
160
158
156

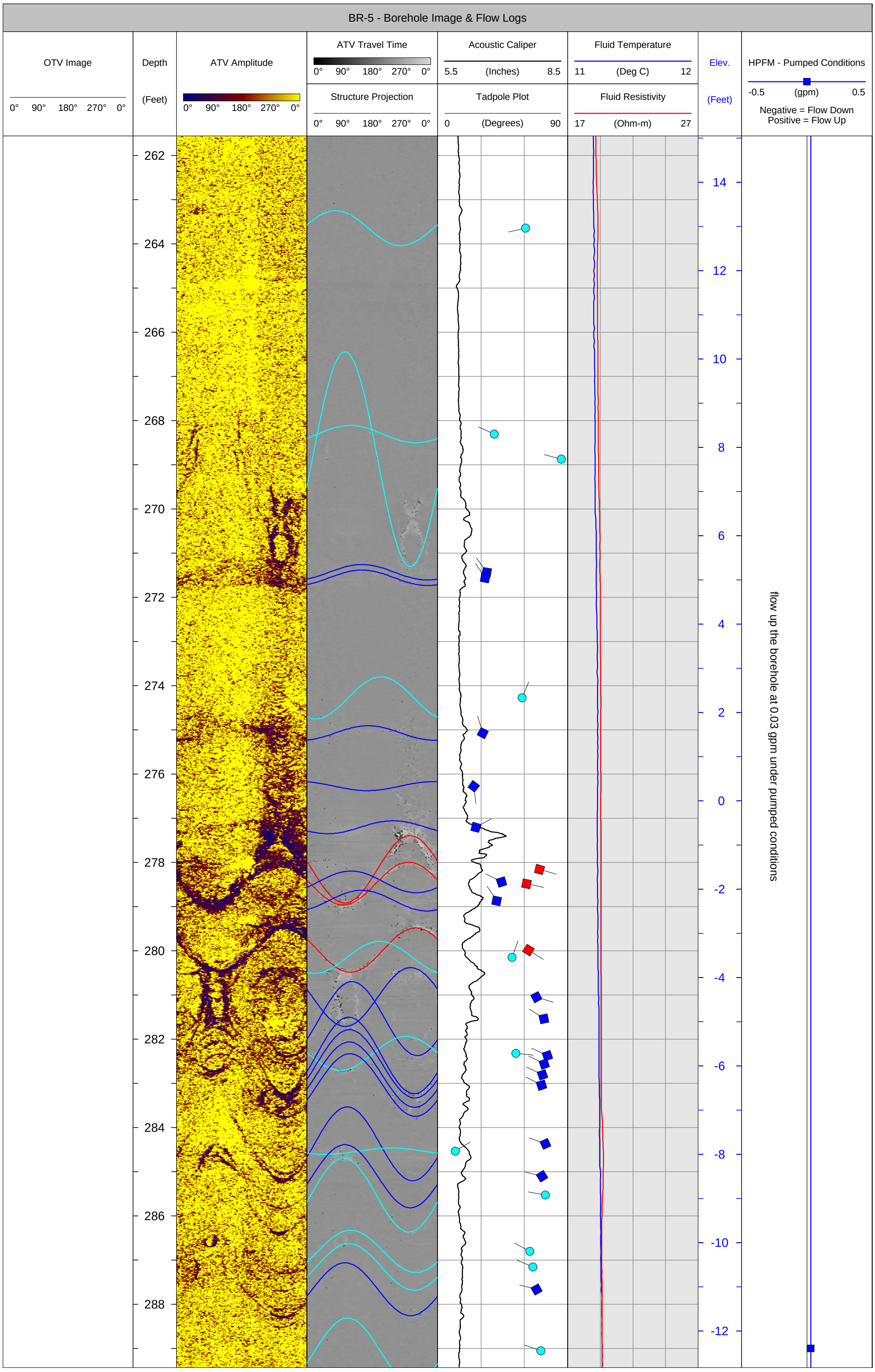

BR-5 - Borehole Image & Flow Logs
OTV Image
0° 90° 180° 270° 0°
Depth
(Feet)
ATV Amplitude
0° 90° 180° 270° 0°
ATV Travel Time
0° 90° 180° 270° 0°
Structure Projection
0° 90° 180° 270° 0°
Acoustic Caliper
5.5 (Inches) 8.5
Tadpole Plot
0 (Degrees) 90
Fluid Temperature
11 (Deg C) 12
Fluid Resistivity
17 (Ohm-m) 27
Elev.
(Feet)
HPFM - Pumped Conditions
-0.5 (gpm) 0.5
Negative = Flow Down
Positive = Flow Up
flow up the borehole at 0.05 gpm under pumped conditions

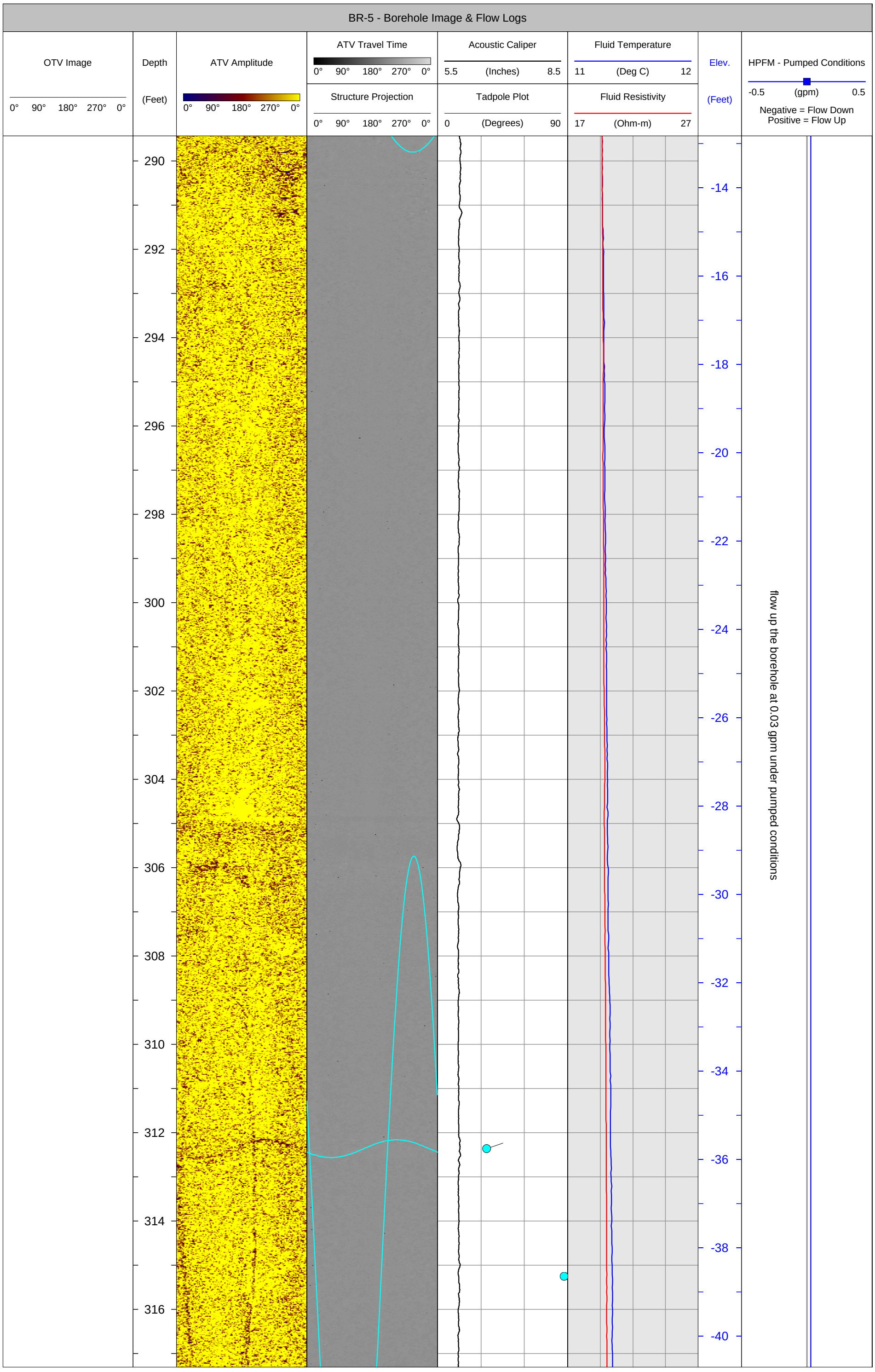

BR-5 - Borehole Image & Flow Logs
OTV Image
0° 90° 180° 270° 0°
Depth
(Feet)
ATV Amplitude
0° 90° 180° 270° 0°
ATV Travel Time
0° 90° 180° 270° 0°
Structure Projection
0° 90° 180° 270° 0°
Acoustic Caliper
5.5 (Inches) 8.5
Tadpole Plot
0 (Degrees) 90
Fluid Temperature
11 (Deg C) 12
Fluid Resistivity
17 (Ohm-m) 27
Elev.
(Feet)
HPFM - Pumped Conditions
-0.5 (gpm) 0.5
Negative = Flow Down
Positive = Flow Up
152
154
156
158
160
162
164
166
168
170
172
174
176
126
124
122
120
118
116
114
112
110
108
106
104
102
100
flow up the borehole at 0.05 gpm under pumped conditions
minor flow into & up the borehole under pumped conditions
flow up the borehole at 0.04 gpm under pumped conditions

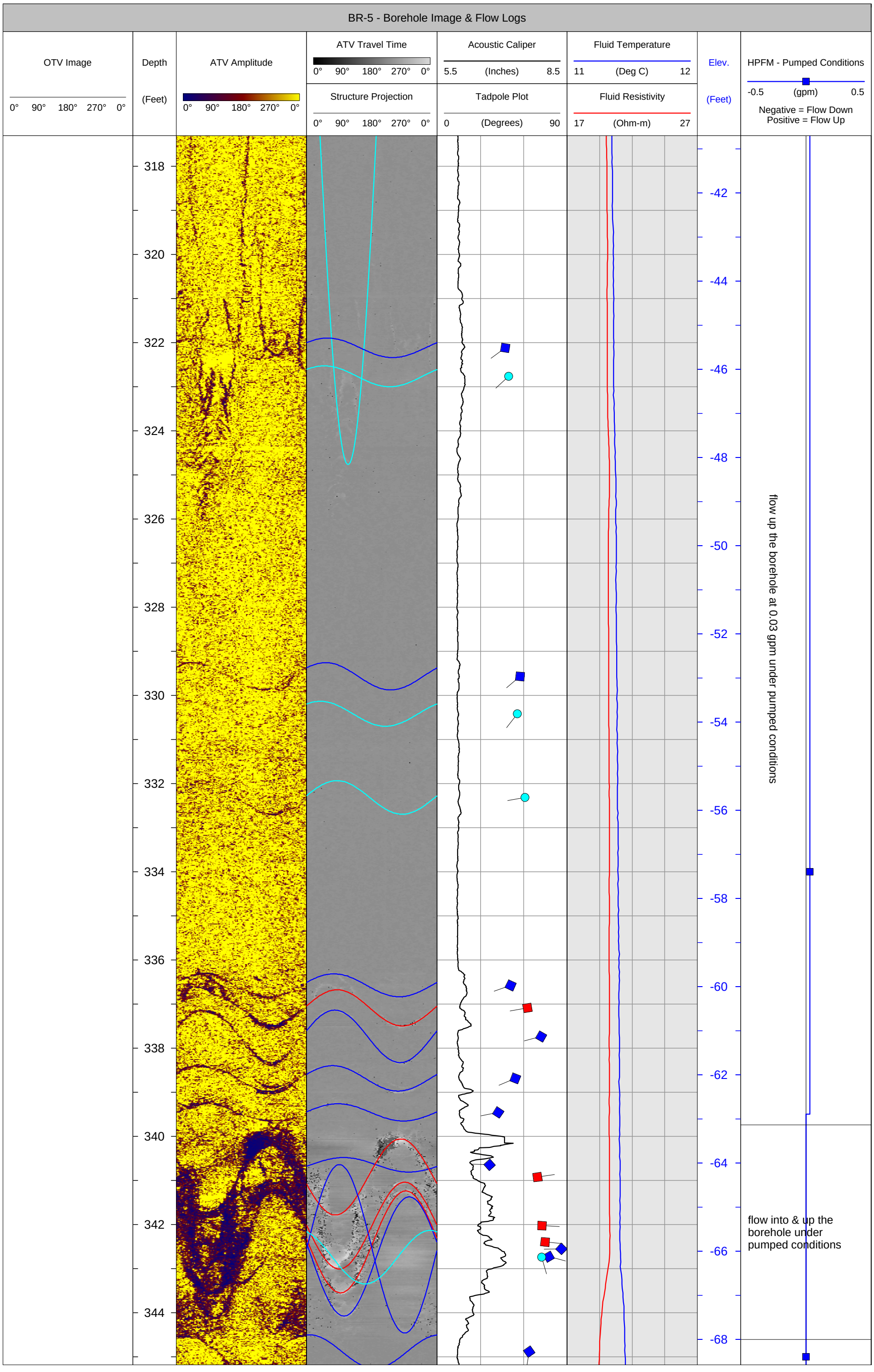

BR-5 - Borehole Image & Flow Logs
OTV Image
0° 90° 180° 270° 0°
Depth
(Feet)
ATV Amplitude
0° 90° 180° 270° 0°
ATV Travel Time
0° 90° 180° 270° 0°
Structure Projection
0° 90° 180° 270° 0°
Acoustic Caliper
5.5 (Inches) 8.5
Tadpole Plot
0 (Degrees) 90
Fluid Temperature
11 (Deg C) 12
Fluid Resistivity
17 (Ohm-m) 27
Elev.
(Feet)
HPFM - Pumped Conditions
-0.5 (gpm) 0.5
Negative = Flow Down
Positive = Flow Up
178
180
182
184
186
188
190
192
194
196
198
200
202
204
98
96
94
92
90
88
86
84
82
80
78
76
74
72
flow up the borehole at 0.04 gpm under pumped conditions

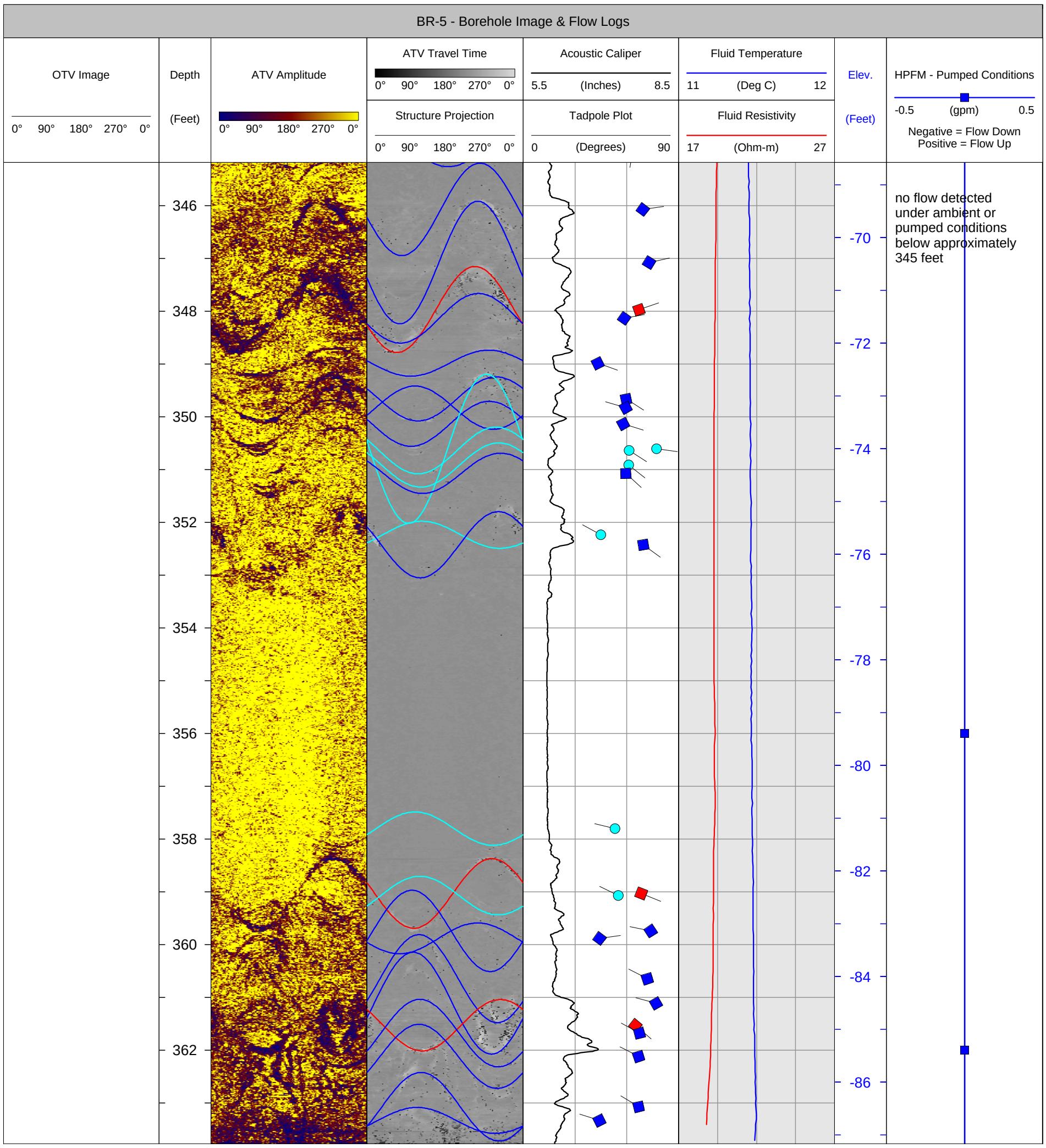

BR-5 - Borehole Image & Flow Logs
OTV Image
0° 90° 180° 270° 0°
Depth
(Feet)
ATV Amplitude
0° 90° 180° 270° 0°
ATV Travel Time
0° 90° 180° 270° 0°
Structure Projection
0° 90° 180° 270° 0°
Acoustic Caliper
5.5 (Inches) 8.5
Tadpole Plot
0 (Degrees) 90
Fluid Temperature
11 (Deg C) 12
Fluid Resistivity
17 (Ohm-m) 27
Elev.
(Feet)
HPFM - Pumped Conditions
-0.5 (gpm) 0.5
Negative = Flow Down
Positive = Flow Up
206
208
210
212
214
216
218
220
222
224
226
228
230
232
70
68
66
64
62
60
58
56
54
52
50
48
46
44
flow up the borehole at 0.04 gpm under pumped conditions
minor flow into & up the borehole under pumped conditions
flow up the borehole at 0.03 gpm under pumped conditions


BR-5 - Borehole Image & Flow Logs
OTV Image
0° 90° 180° 270° 0°
Depth
(Feet)
ATV Amplitude
0° 90° 180° 270° 0°
ATV Travel Time
0° 90° 180° 270° 0°
Structure Projection
0° 90° 180° 270° 0°
Acoustic Caliper
5.5 (Inches) 8.5
Tadpole Plot
0 (Degrees) 90
Fluid Temperature
11 (Deg C) 12
Fluid Resistivity
17 (Ohm-m) 27
Elev.
(Feet)
HPFM - Pumped Conditions
-0.5 (gpm) 0.5
Negative = Flow Down
Positive = Flow Up
234
236
238
240
242
244
246
248
250
252
254
256
258
260
42
40
38
36
34
32
30
28
26
24
22
20
18
16
flow up the borehole at 0.03 gpm under pumped conditions


BR-5 - Borehole Image & Flow Logs
OTV Image
0° 90° 180° 270° 0°
Depth
(Feet)
ATV Amplitude
0° 90° 180° 270° 0°
ATV Travel Time
0° 90° 180° 270° 0°
Structure Projection
0° 90° 180° 270° 0°
Acoustic Caliper
5.5 (Inches) 8.5
Tadpole Plot
0 (Degrees) 90
Fluid Temperature
11 (Deg C) 12
Fluid Resistivity
17 (Ohm-m) 27
Elev.
(Feet)
HPFM - Pumped Conditions
-0.5 (gpm) 0.5
Negative = Flow Down
Positive = Flow Up
262
264
266
268
270
272
274
276
278
280
282
284
286
288
14
12
10
8
6
4
2
0
-2
-4
-6
-8
-10
-12
flow up the borehole at 0.03 gpm under pumped conditions


BR-5 - Borehole Image & Flow Logs
OTV Image
0° 90° 180° 270° 0°
Depth
(Feet)
ATV Amplitude
0° 90° 180° 270° 0°
ATV Travel Time
0° 90° 180° 270° 0°
Structure Projection
0° 90° 180° 270° 0°
Acoustic Caliper
5.5 (Inches) 8.5
Tadpole Plot
0 (Degrees) 90
Fluid Temperature
11 (Deg C) 12
Fluid Resistivity
17 (Ohm-m) 27
Elev.
(Feet)
HPFM - Pumped Conditions
-0.5 (gpm) 0.5
Negative = Flow Down
Positive = Flow Up
290
292
294
296
298
300
302
304
306
308
310
312
314
316
-14
-16
-18
-20
-22
-24
-26
-28
-30
-32
-34
-36
-38
-40
flow up the borehole at 0.03 gpm under pumped conditions


BR-5 - Borehole Image & Flow Logs
OTV Image
0° 90° 180° 270° 0°
Depth
(Feet)
ATV Amplitude
0° 90° 180° 270° 0°
ATV Travel Time
0° 90° 180° 270° 0°
Structure Projection
0° 90° 180° 270° 0°
Acoustic Caliper
5.5 (Inches) 8.5
Tadpole Plot
0 (Degrees) 90
Fluid Temperature
11 (Deg C) 12
Fluid Resistivity
17 (Ohm-m) 27
Elev.
(Feet)
HPFM - Pumped Conditions
-0.5 (gpm) 0.5
Negative = Flow Down
Positive = Flow Up
318
320
322
324
326
328
330
332
334
336
338
340
342
344
-42
-44
-46
-48
-50
-52
-54
-56
-58
-60
-62
-64
-66
-68
flow up the borehole at 0.03 gpm under pumped conditions
flow into & up the borehole under pumped conditions


BR-5 - Borehole Image & Flow Logs
OTV Image
0° 90° 180° 270° 0°
Depth
(Feet)
ATV Amplitude
0° 90° 180° 270° 0°
ATV Travel Time
0° 90° 180° 270° 0°
Structure Projection
0° 90° 180° 270° 0°
Acoustic Caliper
5.5 (Inches) 8.5
Tadpole Plot
0 (Degrees) 90
Fluid Temperature
11 (Deg C) 12
Fluid Resistivity
17 (Ohm-m) 27
Elev.
(Feet)
HPFM - Pumped Conditions
-0.5 (gpm) 0.5
Negative = Flow Down
Positive = Flow Up
346
348
350
352
354
356
358
360
362
-70
-72
-74
-76
-78
-80
-82
-84
-86
no flow detected under ambient or pumped conditions below approximately 345 feet

HAGER-RICHTER GEOSCIENCE, INC.

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BOREHOLE: BR-6 BOREHOLE FLUID & GEOLOGY LOGS

DATE LOGGED: September 15, 2010

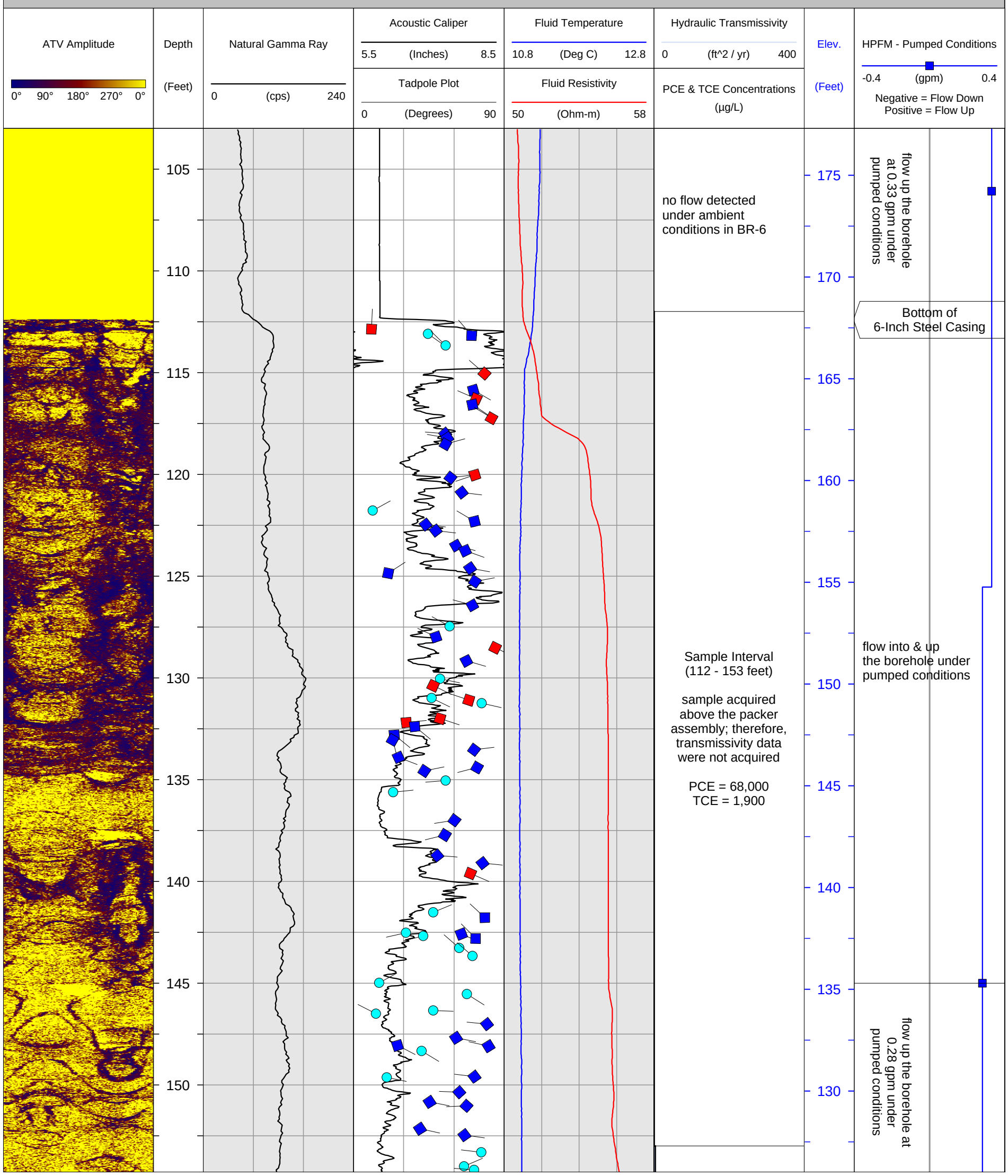
CLIENT:	Weston Solutions, Inc.	H-R FILE:	10RG30
PROJECT:	Borehole Geophysical Logging	LOG DATUM:	Top of the 6-Inch Steel Casing
LOCATION:	Savage Municipal Water Supply Superfund Site	TOP OF CASING ELEVATION:	280.3 Feet
CITY, STATE:	Milford, New Hampshire	ORIENTATION REFERENCE:	True North (Declination = 15 Degrees West)
LOGGING GEOPHYSICISTS:	N. DeCristofaro & E. Rickert	CASING STICK-UP:	2.5 Feet Above the Ground Surface
CLIENT REP. ON-SITE:	Andrew Fuller	BOREHOLE DIAMETER:	6 Inches
LOGS PROCESSED BY:	Robert Garfield	WATER LEVEL DEPTH:	20.5 Feet

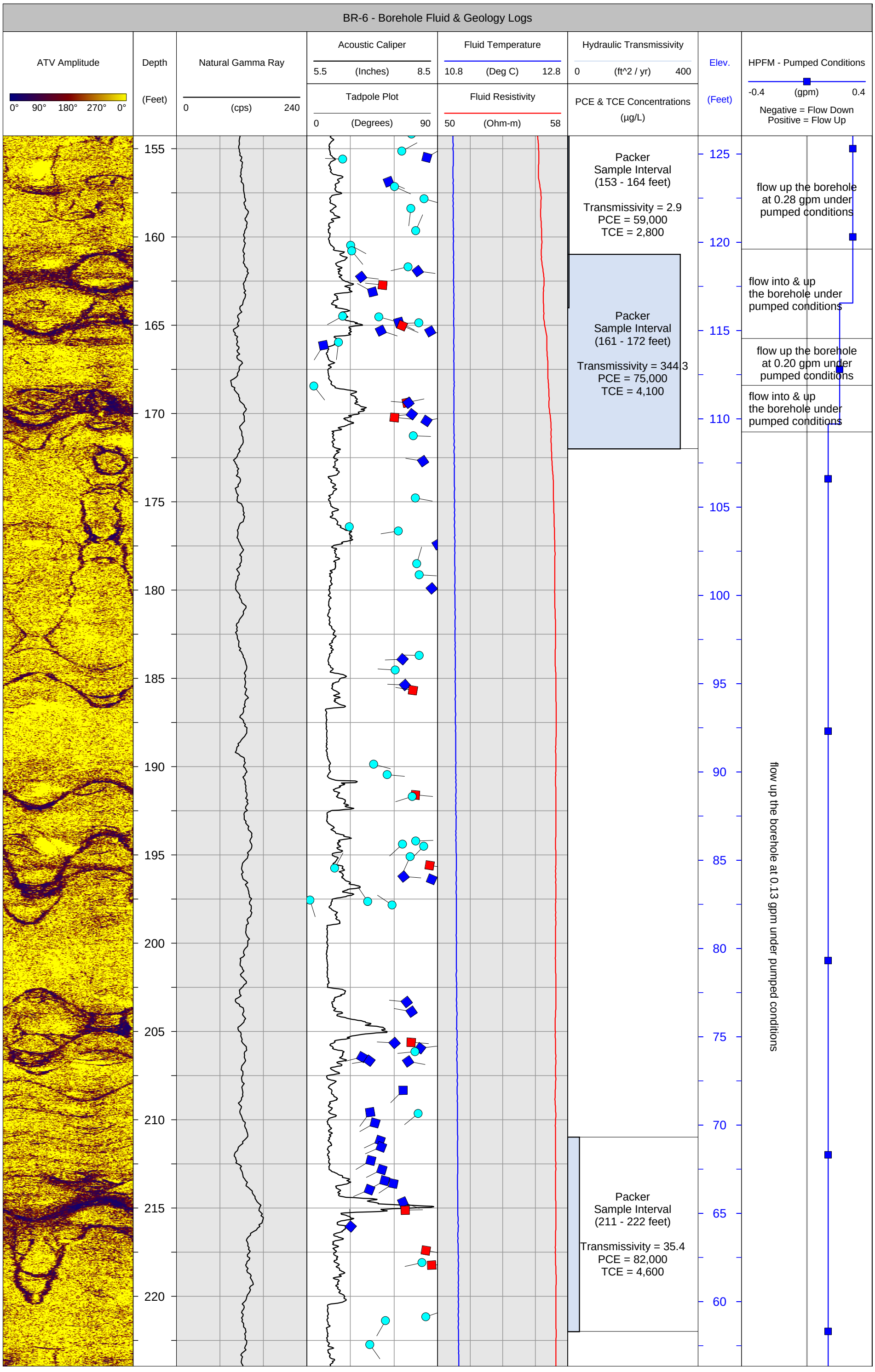
STRUCTURE LEGEND

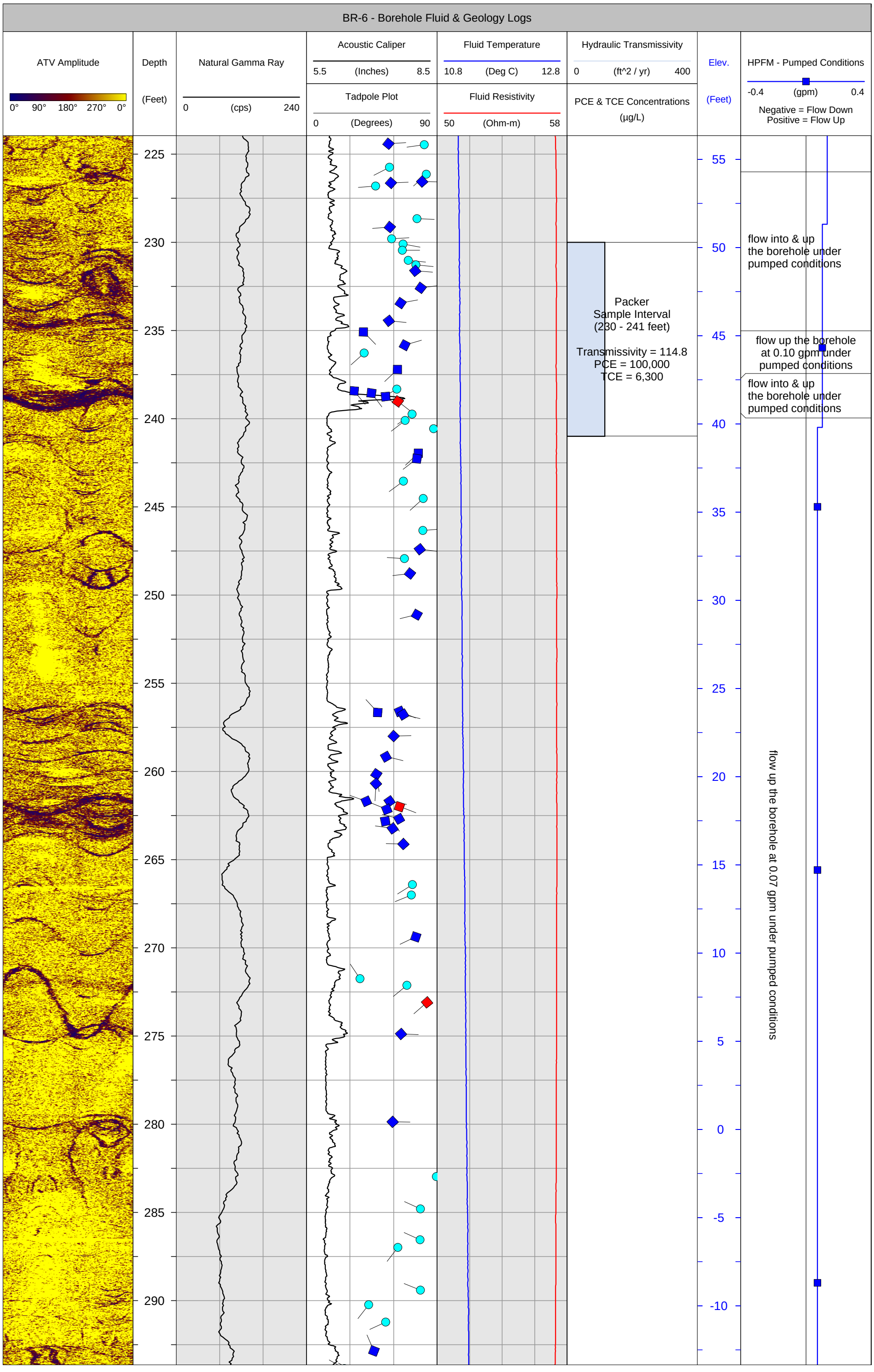
Fracture Rank 1 Fracture Rank 2 Fracture Rank 3

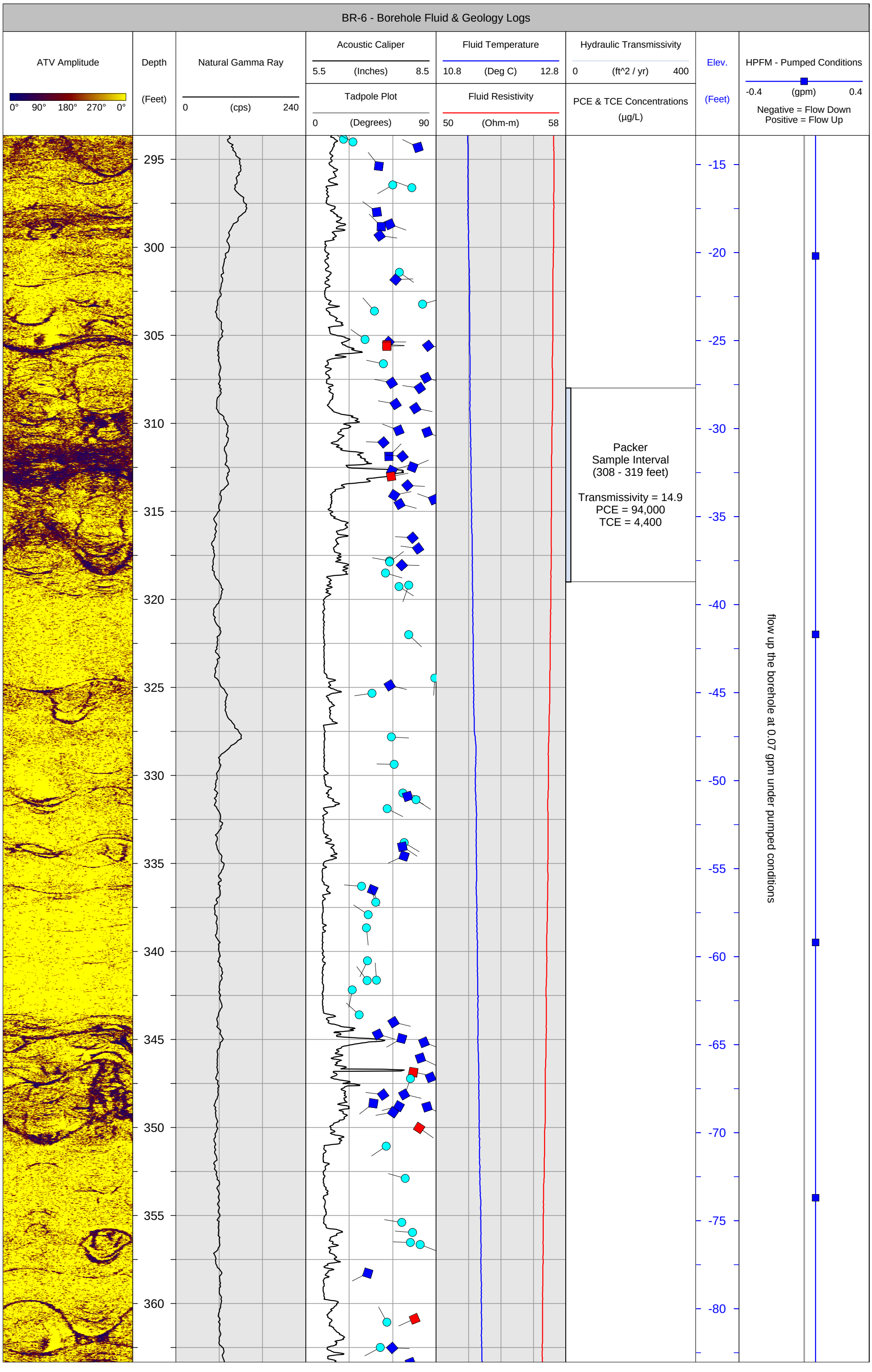
NOTES: HPFM data under ambient conditions are not plotted in the logs below because flow was not detected under ambient conditions.
During HPFM logging under pumped conditions water was pumped from the borehole at 0.35 gpm from inside the casing.
The transmissivity, PCE, and TCE data were provided by Weston and were acquired during packer testing.

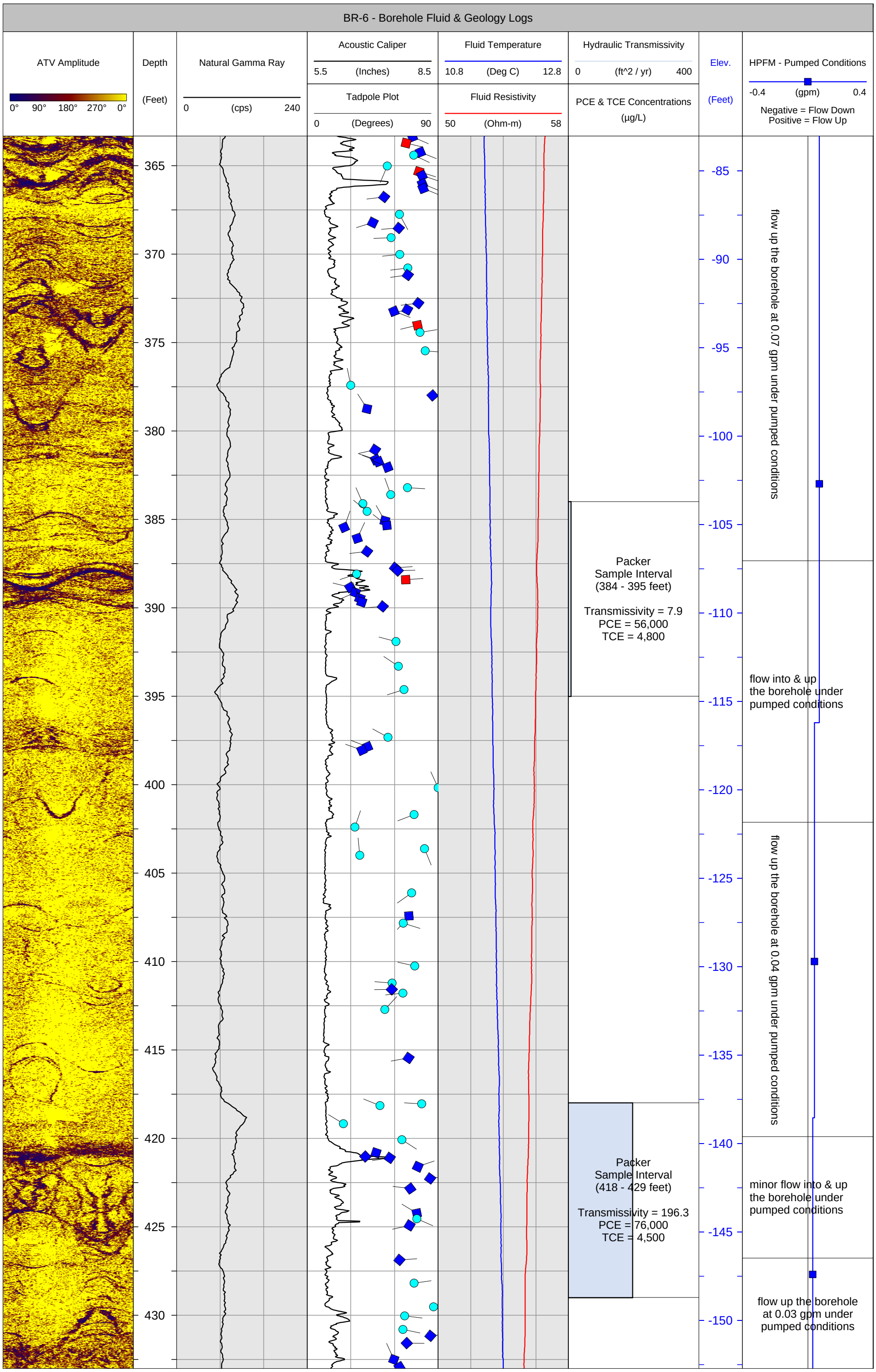
BR-6 - Borehole Fluid & Geology Logs

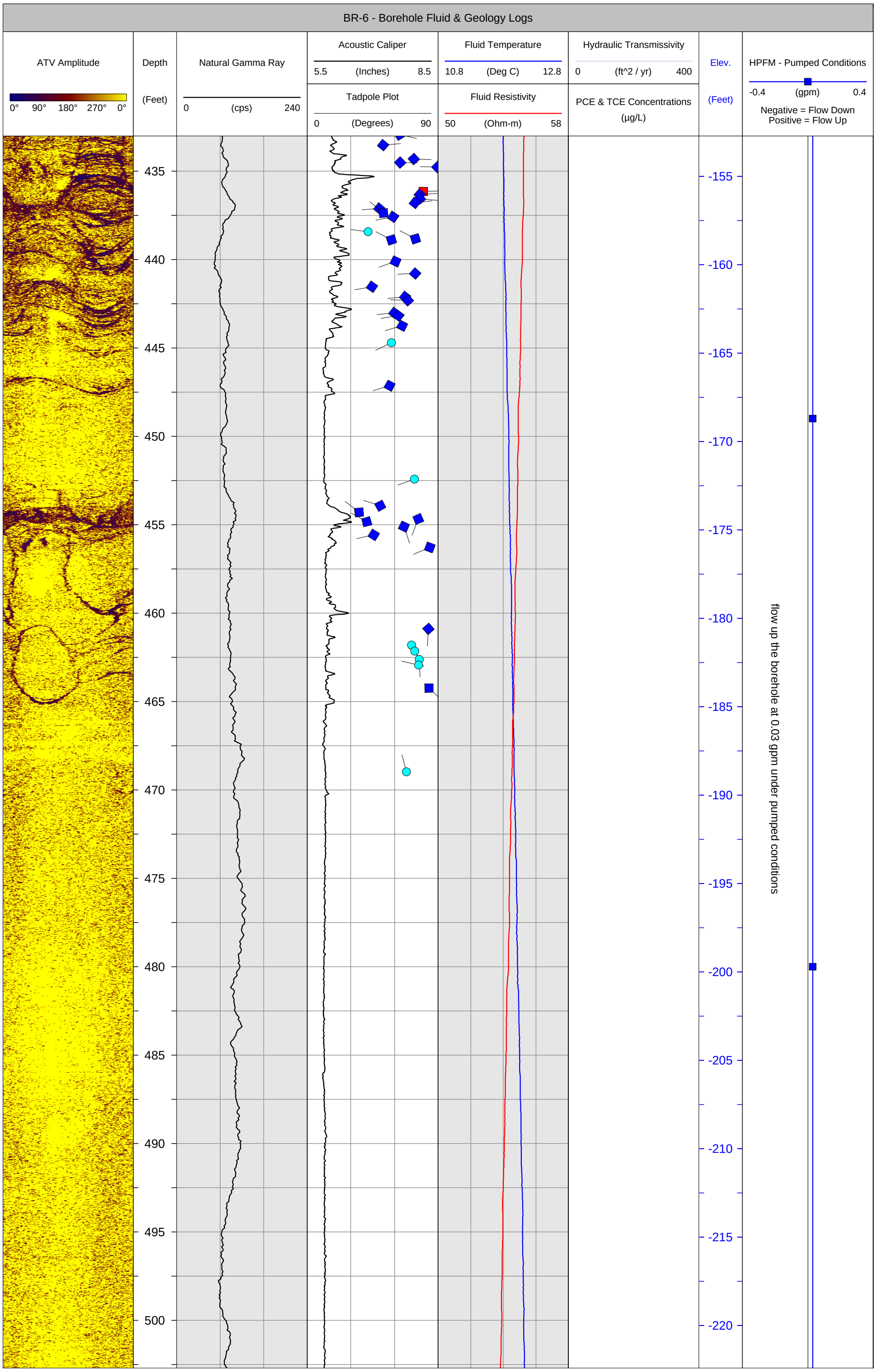


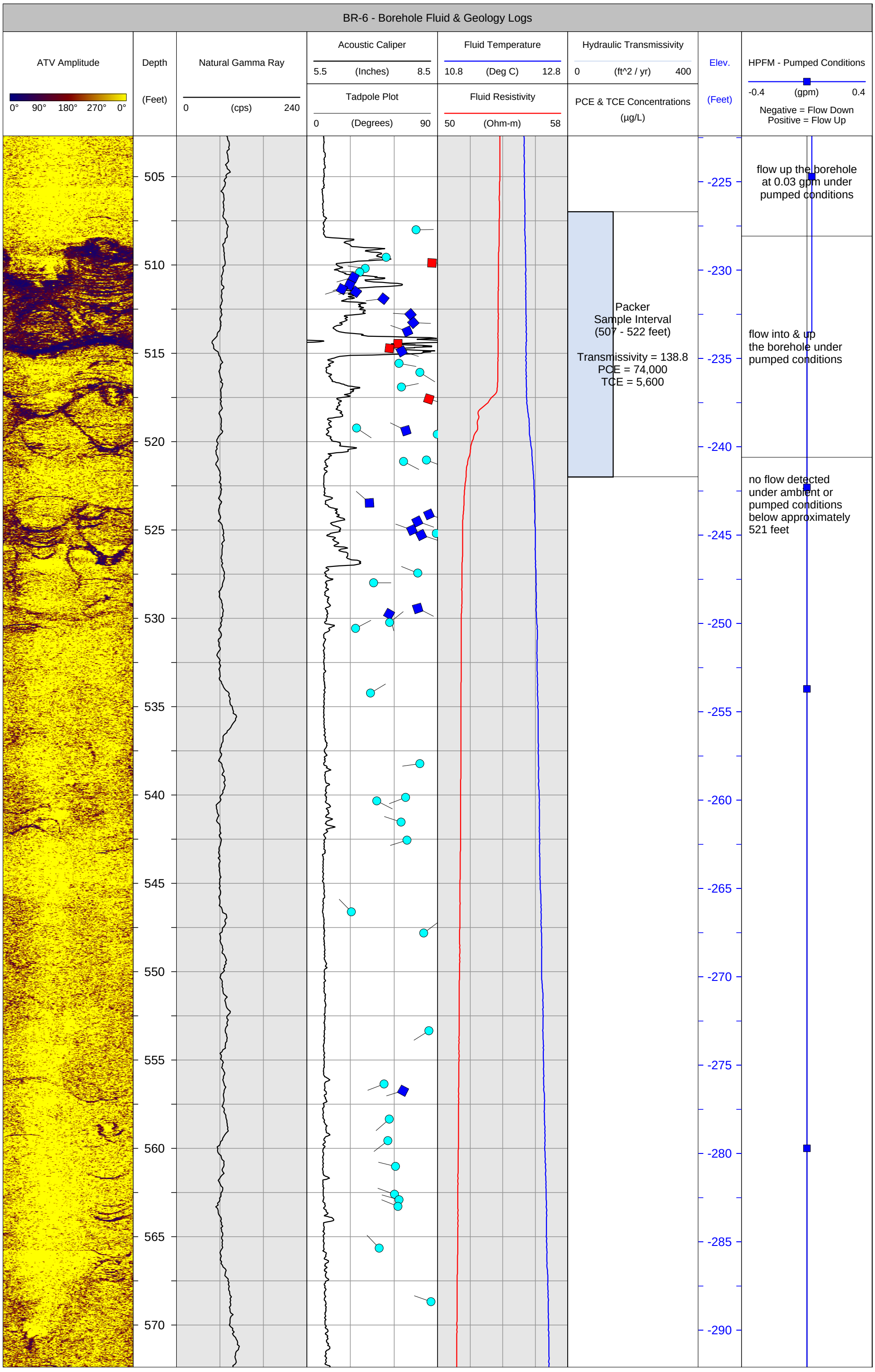

BR-6 - Borehole Fluid & Geology Logs
ATV Amplitude
0° 90° 180° 270° 0°
Depth
(Feet)
Natural Gamma Ray
0 (cps) 240
Acoustic Caliper
5.5 (Inches) 8.5
Tadpole Plot
0 (Degrees) 90
Fluid Temperature
10.8 (Deg C) 12.8
Fluid Resistivity
50 (Ohm-m) 58
Hydraulic Transmissivity
0 (ft^2 / yr) 400
PCE & TCE Concentrations
(µg/L)
Elev.
(Feet)
HPFM - Pumped Conditions
-0.4 (gpm) 0.4
Negative = Flow Down
Positive = Flow Up
155
160
165
170
175
180
185
190
195
200
205
210
215
220
125
120
115
110
105
100
95
90
85
80
75
70
65
60
Packer
Sample Interval
(153 - 164 feet)
Transmissivity = 2.9
PCE = 59,000
TCE = 2,800
Packer
Sample Interval
(161 - 172 feet)
Transmissivity = 344.3
PCE = 75,000
TCE = 4,100
Packer
Sample Interval
(211 - 222 feet)
Transmissivity = 35.4
PCE = 82,000
TCE = 4,600
flow up the borehole at 0.28 gpm under pumped conditions
flow into & up the borehole under pumped conditions
flow up the borehole at 0.20 gpm under pumped conditions
flow into & up the borehole under pumped conditions
flow up the borehole at 0.13 gpm under pumped conditions

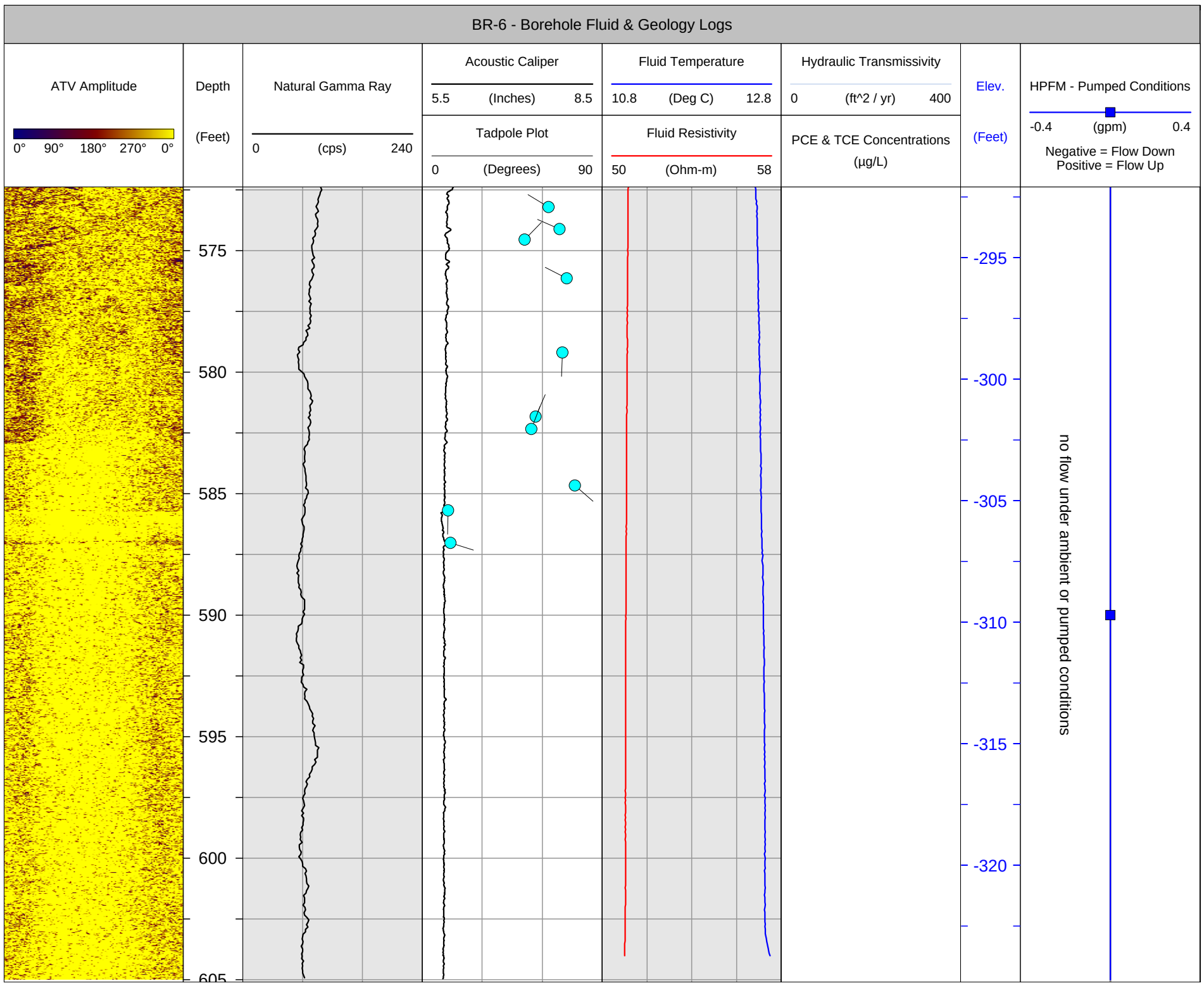

BR-6 - Borehole Fluid & Geology Logs
ATV Amplitude
0° 90° 180° 270° 0°
Depth
(Feet)
Natural Gamma Ray
0 (cps) 240
Acoustic Caliper
5.5 (Inches) 8.5
Tadpole Plot
0 (Degrees) 90
Fluid Temperature
10.8 (Deg C) 12.8
Fluid Resistivity
50 (Ohm-m) 58
Hydraulic Transmissivity
0 (ft^2 / yr) 400
PCE & TCE Concentrations
(µg/L)
Elev.
(Feet)
HPFM - Pumped Conditions
-0.4 (gpm) 0.4
Negative = Flow Down
Positive = Flow Up
225
230
235
240
245
250
255
260
265
270
275
280
285
290
55
50
45
40
35
30
25
20
15
10
5
0
-5
-10
Packer
Sample Interval
(230 - 241 feet)
Transmissivity = 114.8
PCE = 100,000
TCE = 6,300
flow into & up
the borehole under
pumped conditions
flow up the borehole
at 0.10 gpm under
pumped conditions
flow into & up
the borehole under
pumped conditions
flow up the borehole at 0.07 gpm under pumped conditions


BR-6 - Borehole Fluid & Geology Logs
ATV Amplitude
0° 90° 180° 270° 0°
Depth
(Feet)
Natural Gamma Ray
0 (cps) 240
Acoustic Caliper
5.5 (Inches) 8.5
Tadpole Plot
0 (Degrees) 90
Fluid Temperature
10.8 (Deg C) 12.8
Fluid Resistivity
50 (Ohm-m) 58
Hydraulic Transmissivity
0 (ft^2 / yr) 400
PCE & TCE Concentrations
(µg/L)
Elev.
(Feet)
HPFM - Pumped Conditions
-0.4 (gpm) 0.4
Negative = Flow Down
Positive = Flow Up
295
300
305
310
315
320
325
330
335
340
345
350
355
360
-15
-20
-25
-30
-35
-40
-45
-50
-55
-60
-65
-70
-75
-80
Packer
Sample Interval
(308 - 319 feet)
Transmissivity = 14.9
PCE = 94,000
TCE = 4,400
flow up the borehole at 0.07 gpm under pumped conditions


BR-6 - Borehole Fluid & Geology Logs
ATV Amplitude
0° 90° 180° 270° 0°
Depth
(Feet)
Natural Gamma Ray
0 (cps) 240
Acoustic Caliper
5.5 (Inches) 8.5
Tadpole Plot
0 (Degrees) 90
Fluid Temperature
10.8 (Deg C) 12.8
Fluid Resistivity
50 (Ohm-m) 58
Hydraulic Transmissivity
0 (ft^2 / yr) 400
PCE & TCE Concentrations
(µg/L)
Elev.
(Feet)
HPFM - Pumped Conditions
-0.4 (gpm) 0.4
Negative = Flow Down
Positive = Flow Up
365
370
375
380
385
390
395
400
405
410
415
420
425
430
-85
-90
-95
-100
-105
-110
-115
-120
-125
-130
-135
-140
-145
-150
Packer
Sample Interval
(384 - 395 feet)
Transmissivity = 7.9
PCE = 56,000
TCE = 4,800
Packer
Sample Interval
(418 - 429 feet)
Transmissivity = 196.3
PCE = 76,000
TCE = 4,500
flow up the borehole at 0.07 gpm under pumped conditions
flow into & up the borehole under pumped conditions
flow up the borehole at 0.04 gpm under pumped conditions
minor flow into & up the borehole under pumped conditions
flow up the borehole at 0.03 gpm under pumped conditions


BR-6 - Borehole Fluid & Geology Logs
ATV Amplitude
0° 90° 180° 270° 0°
Depth
(Feet)
Natural Gamma Ray
0 (cps) 240
Acoustic Caliper
5.5 (Inches) 8.5
Tadpole Plot
0 (Degrees) 90
Fluid Temperature
10.8 (Deg C) 12.8
Fluid Resistivity
50 (Ohm-m) 58
Hydraulic Transmissivity
0 (ft^2 / yr) 400
PCE & TCE Concentrations
(µg/L)
Elev.
(Feet)
HPFM - Pumped Conditions
-0.4 (gpm) 0.4
Negative = Flow Down
Positive = Flow Up
435
440
445
450
455
460
465
470
475
480
485
490
495
500
-155
-160
-165
-170
-175
-180
-185
-190
-195
-200
-205
-210
-215
-220
flow up the borehole at 0.03 gpm under pumped conditions


BR-6 - Borehole Fluid & Geology Logs
ATV Amplitude
0° 90° 180° 270° 0°
Depth
(Feet)
Natural Gamma Ray
0 (cps) 240
Acoustic Caliper
5.5 (Inches) 8.5
Tadpole Plot
0 (Degrees) 90
Fluid Temperature
10.8 (Deg C) 12.8
Fluid Resistivity
50 (Ohm-m) 58
Hydraulic Transmissivity
0 (ft^2 / yr) 400
PCE & TCE Concentrations
(µg/L)
Elev.
(Feet)
HPFM - Pumped Conditions
-0.4 (gpm) 0.4
Negative = Flow Down
Positive = Flow Up
505
510
515
520
525
530
535
540
545
550
555
560
565
570
-225
-230
-235
-240
-245
-250
-255
-260
-265
-270
-275
-280
-285
-290
Packer
Sample Interval
(507 - 522 feet)
Transmissivity = 138.8
PCE = 74,000
TCE = 5,600
flow up the borehole
at 0.03 gpm under
pumped conditions
flow into & up
the borehole under
pumped conditions
no flow detected
under ambient or
pumped conditions
below approximately
521 feet


BR-6 - Borehole Fluid & Geology Logs
ATV Amplitude
0° 90° 180° 270° 0°
Depth
(Feet)
Natural Gamma Ray
0 (cps) 240
Acoustic Caliper
5.5 (Inches) 8.5
Tadpole Plot
0 (Degrees) 90
Fluid Temperature
10.8 (Deg C) 12.8
Fluid Resistivity
50 (Ohm-m) 58
Hydraulic Transmissivity
0 (ft^2 / yr) 400
PCE & TCE Concentrations
(µg/L)
Elev.
(Feet)
HPFM - Pumped Conditions
-0.4 (gpm) 0.4
Negative = Flow Down
Positive = Flow Up
575
580
585
590
595
600
605
-295
-300
-305
-310
-315
-320
no flow under ambient or pumped conditions

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BOREHOLE: BR-6 BOREHOLE IMAGE & FLOW LOGS

DATE LOGGED: September 15, 2010

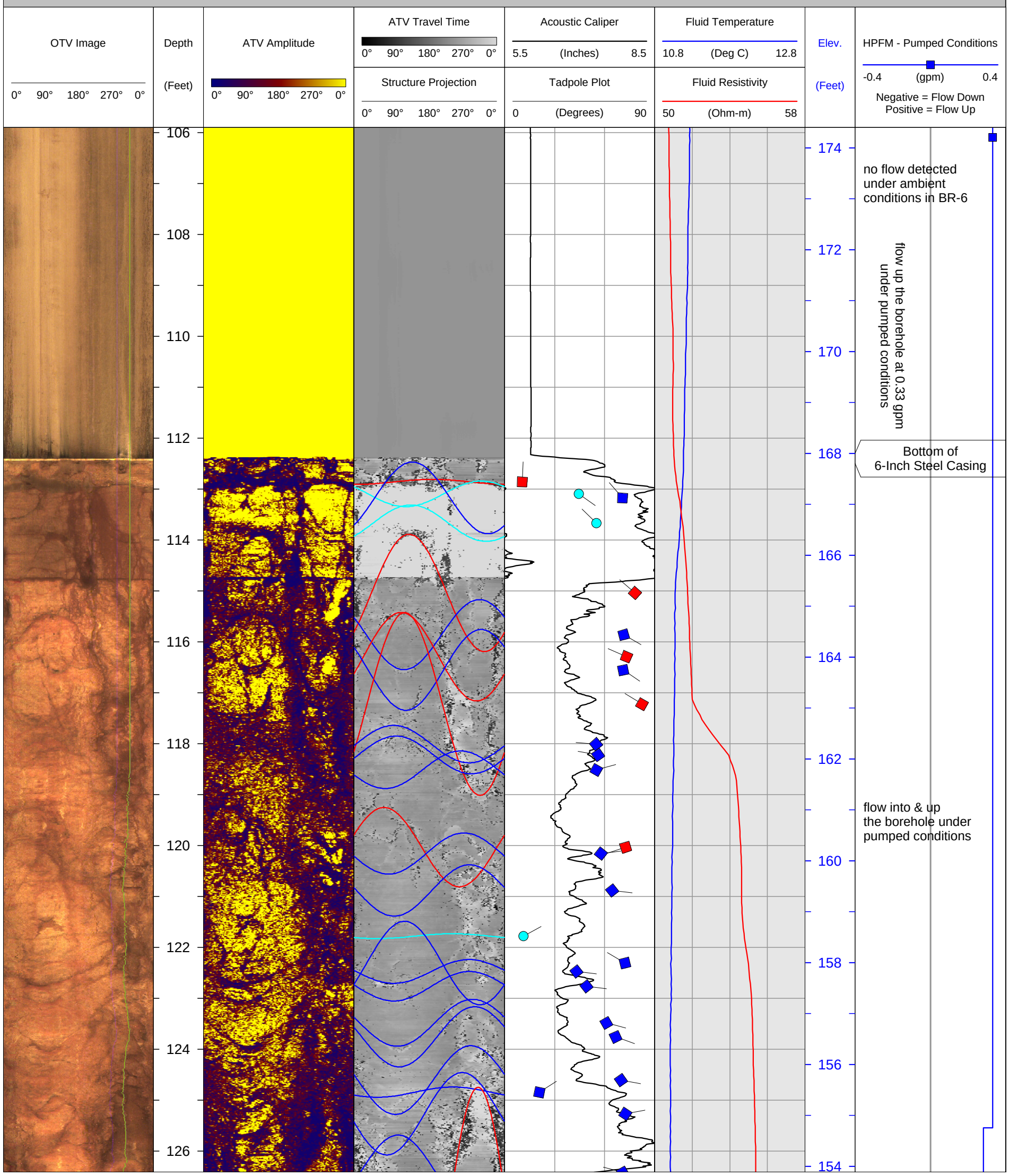
CLIENT:	Weston Solutions, Inc.	H-R FILE:	10RG30
PROJECT:	Borehole Geophysical Logging	LOG DATUM:	Top of the 6-Inch Steel Casing
LOCATION:	Savage Municipal Water Supply Superfund Site	TOP OF CASING ELEVATION:	280.3 Feet
CITY, STATE:	Milford, New Hampshire	ORIENTATION REFERENCE:	True North (Declination = 15 Degrees West)
LOGGING GEOPHYSICISTS:	N. DeCristofaro & E. Rickert	CASING STICK-UP:	2.5 Feet Above the Ground Surface
CLIENT REP. ON-SITE:	Andrew Fuller	BOREHOLE DIAMETER:	6 Inches
LOGS PROCESSED BY:	Robert Garfield	WATER LEVEL DEPTH:	20.5 Feet

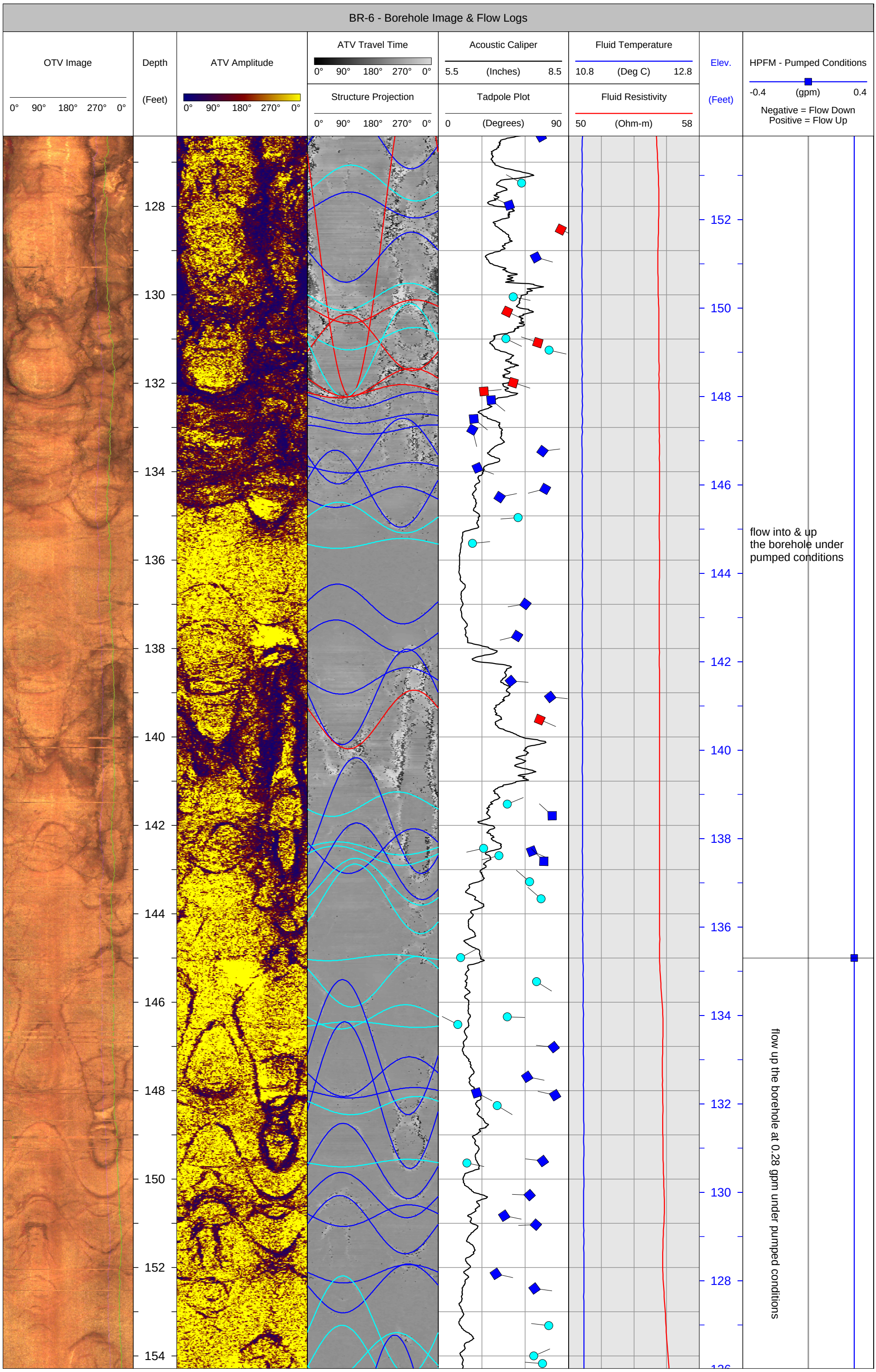
STRUCTURE LEGEND

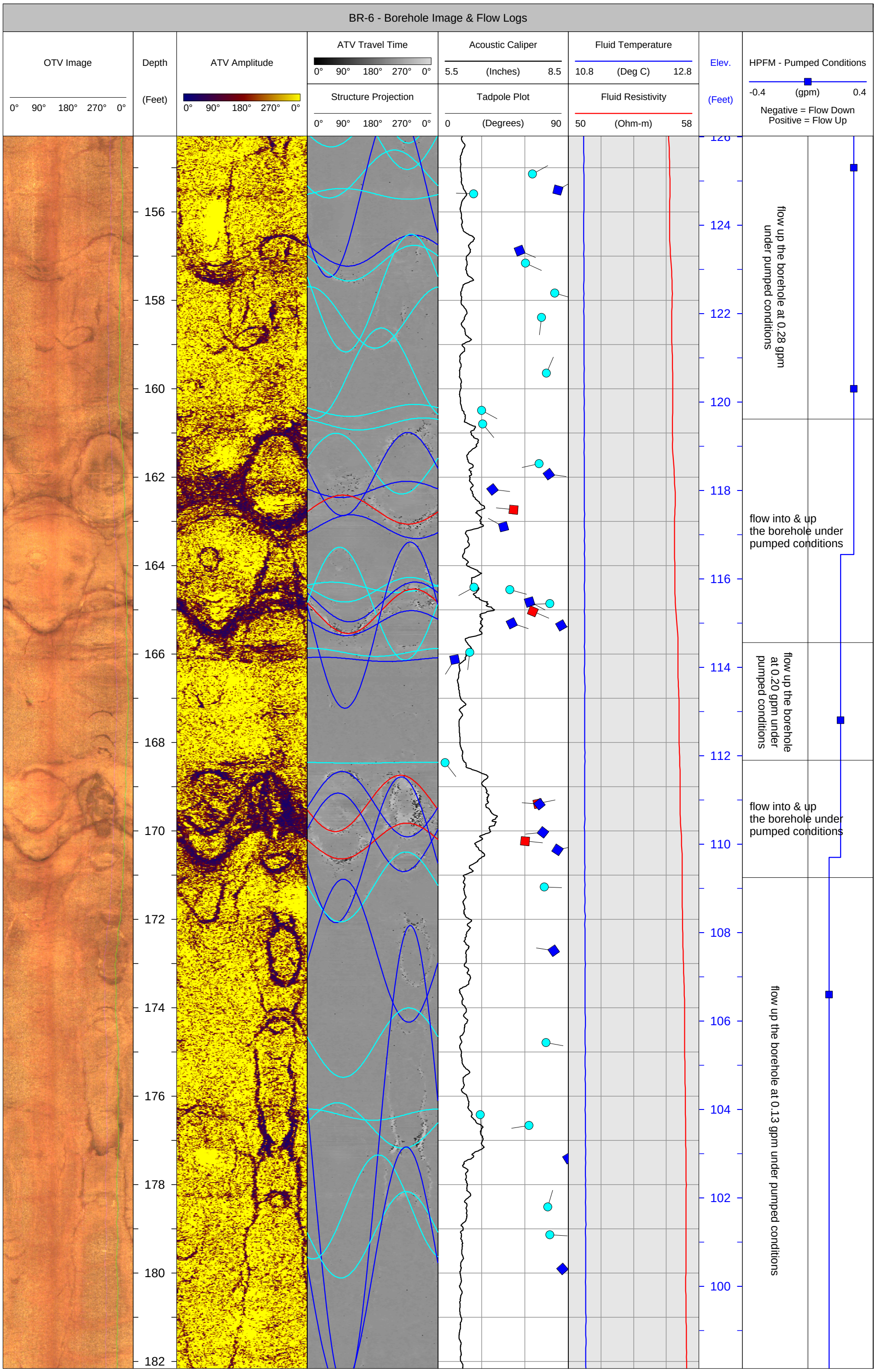
Fracture Rank 1 Fracture Rank 2 Fracture Rank 3

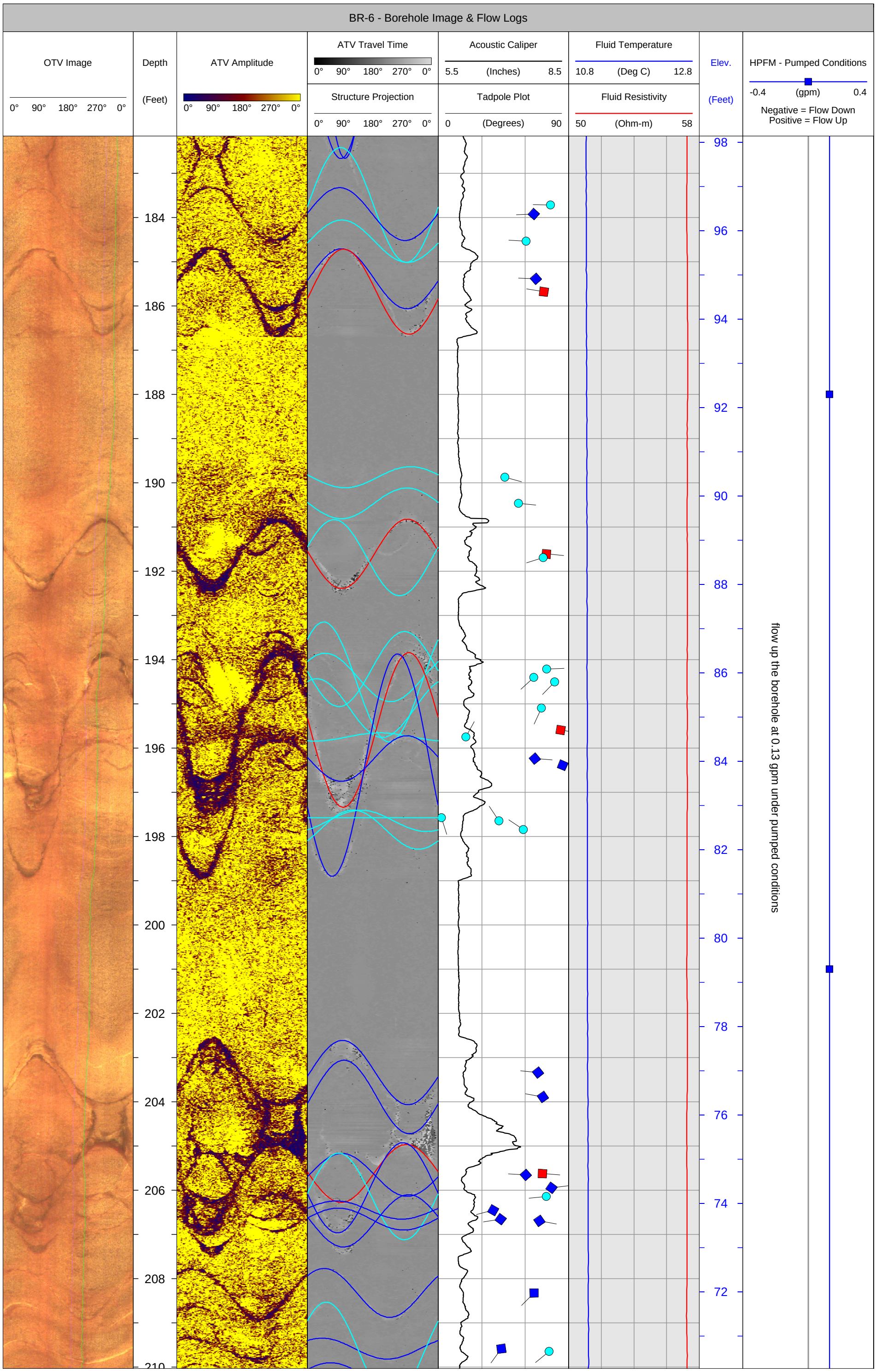
NOTES: HPFM data under ambient conditions are not plotted in the logs below because flow was not detected under ambient conditions.
During HPFM logging under pumped conditions water was pumped from the borehole at 0.35 gpm from inside the casing.

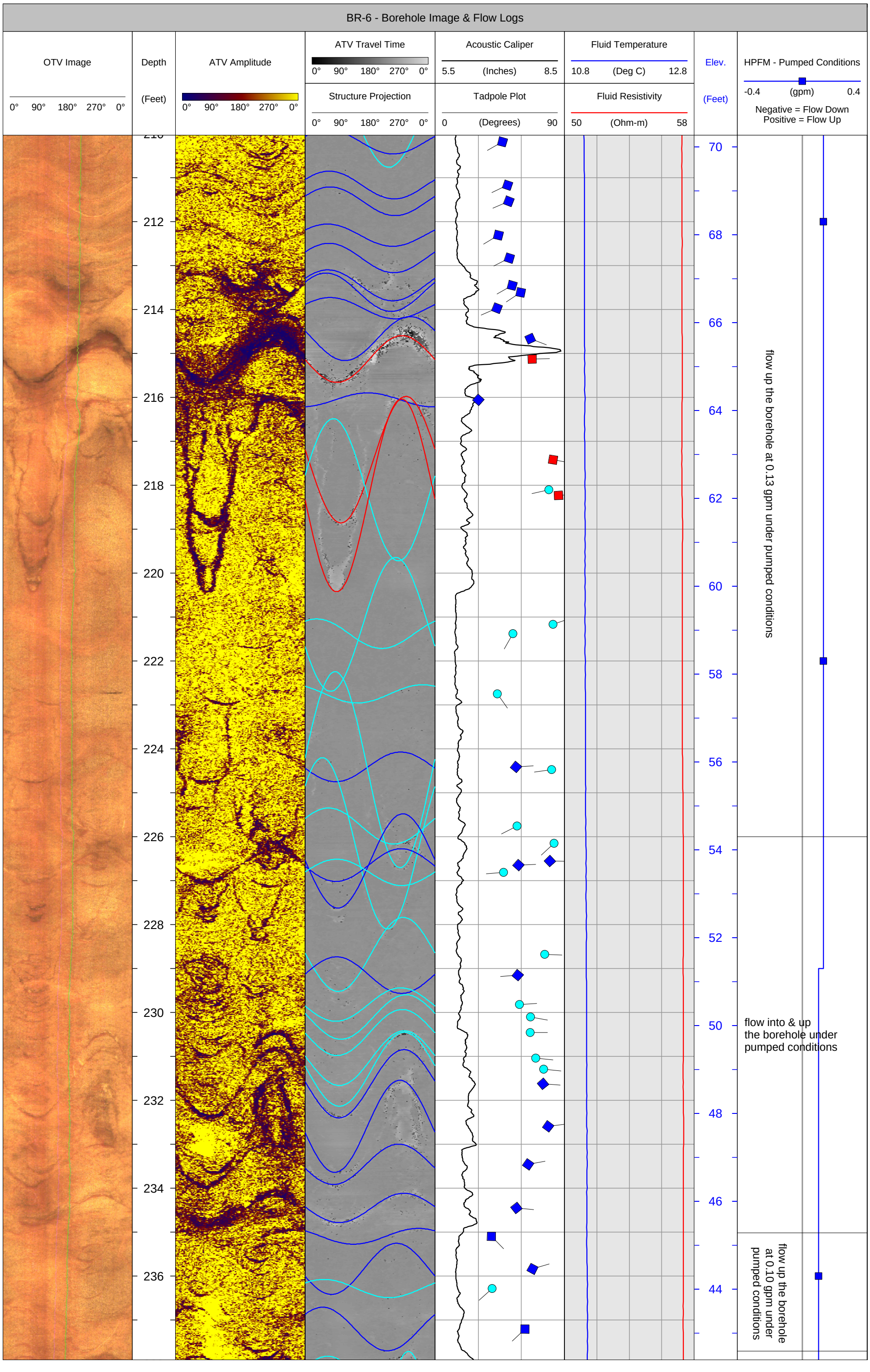
BR-6 - Borehole Image & Flow Logs

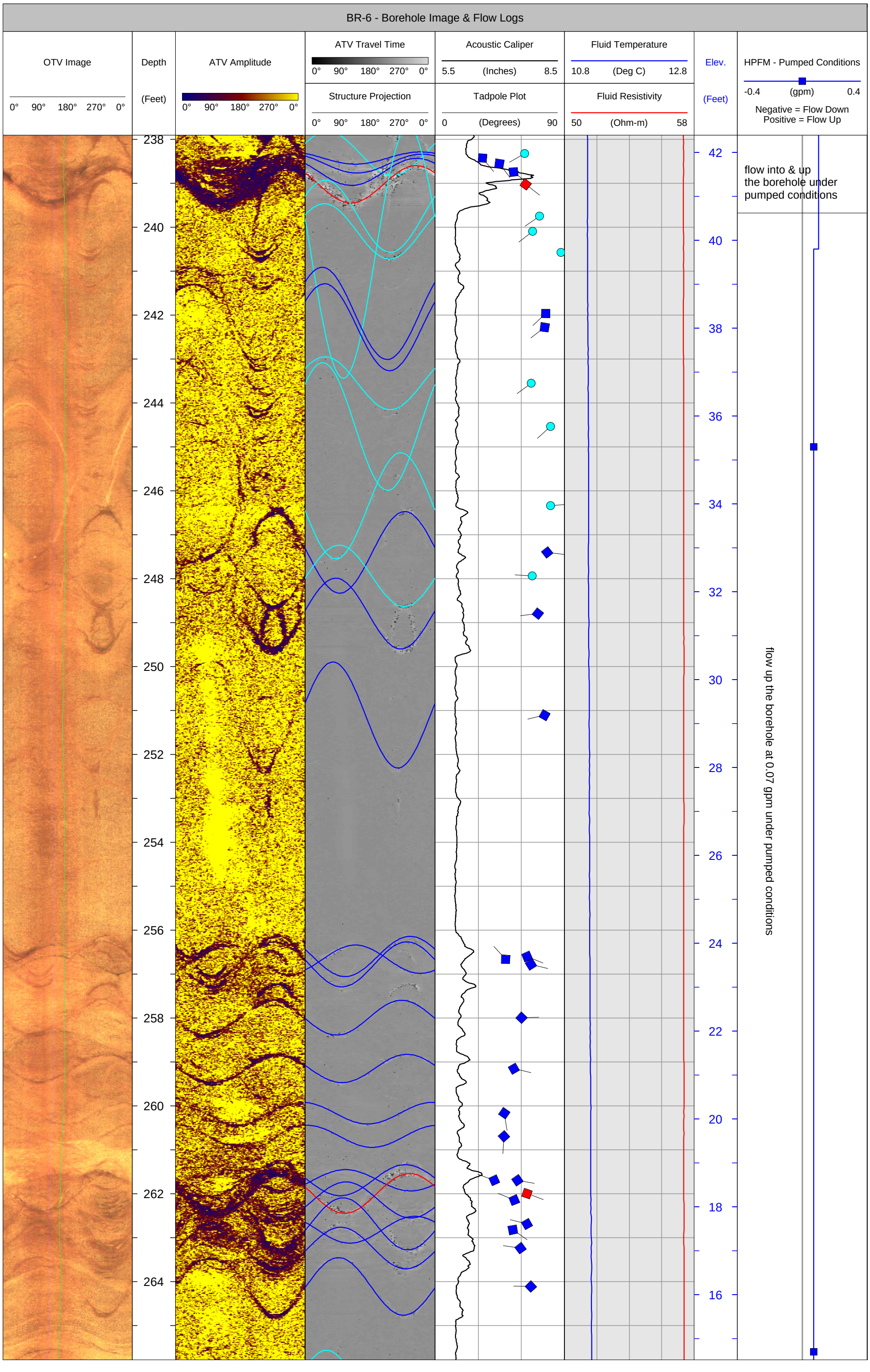


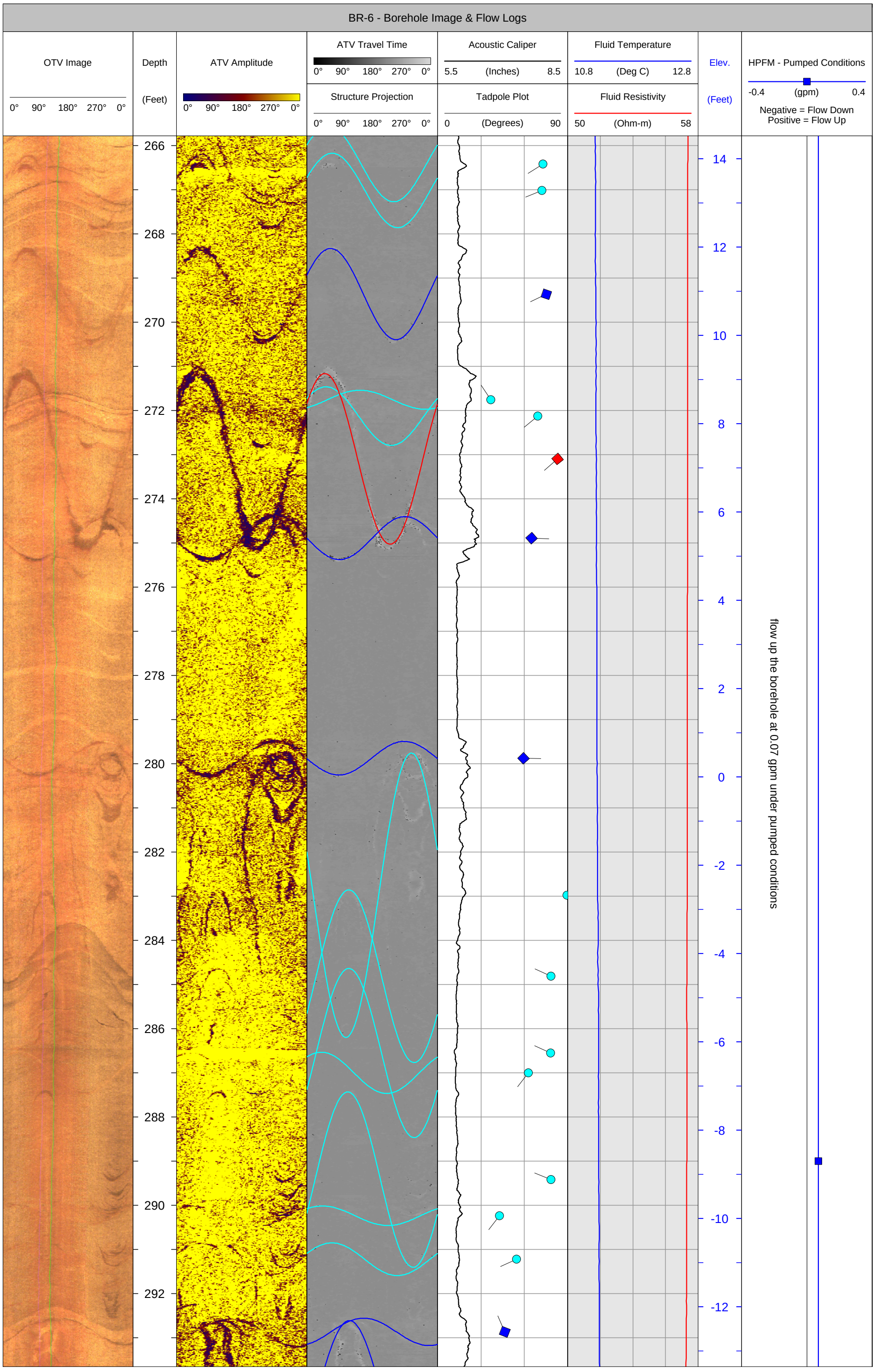

BR-6 - Borehole Image & Flow Logs
OTV Image
0° 90° 180° 270° 0°
Depth
(Feet)
ATV Amplitude
0° 90° 180° 270° 0°
ATV Travel Time
0° 90° 180° 270° 0°
Structure Projection
0° 90° 180° 270° 0°
Acoustic Caliper
5.5 (Inches) 8.5
Tadpole Plot
0 (Degrees) 90
Fluid Temperature
10.8 (Deg C) 12.8
Fluid Resistivity
50 (Ohm-m) 58
Elev.
(Feet)
HPFM - Pumped Conditions
-0.4 (gpm) 0.4
Negative = Flow Down
Positive = Flow Up
128
130
132
134
136
138
140
142
144
146
148
150
152
154
152
150
148
146
144
142
140
138
136
134
132
130
128
flow into & up
the borehole under
pumped conditions
flow up the borehole at 0.28 gpm under pumped conditions

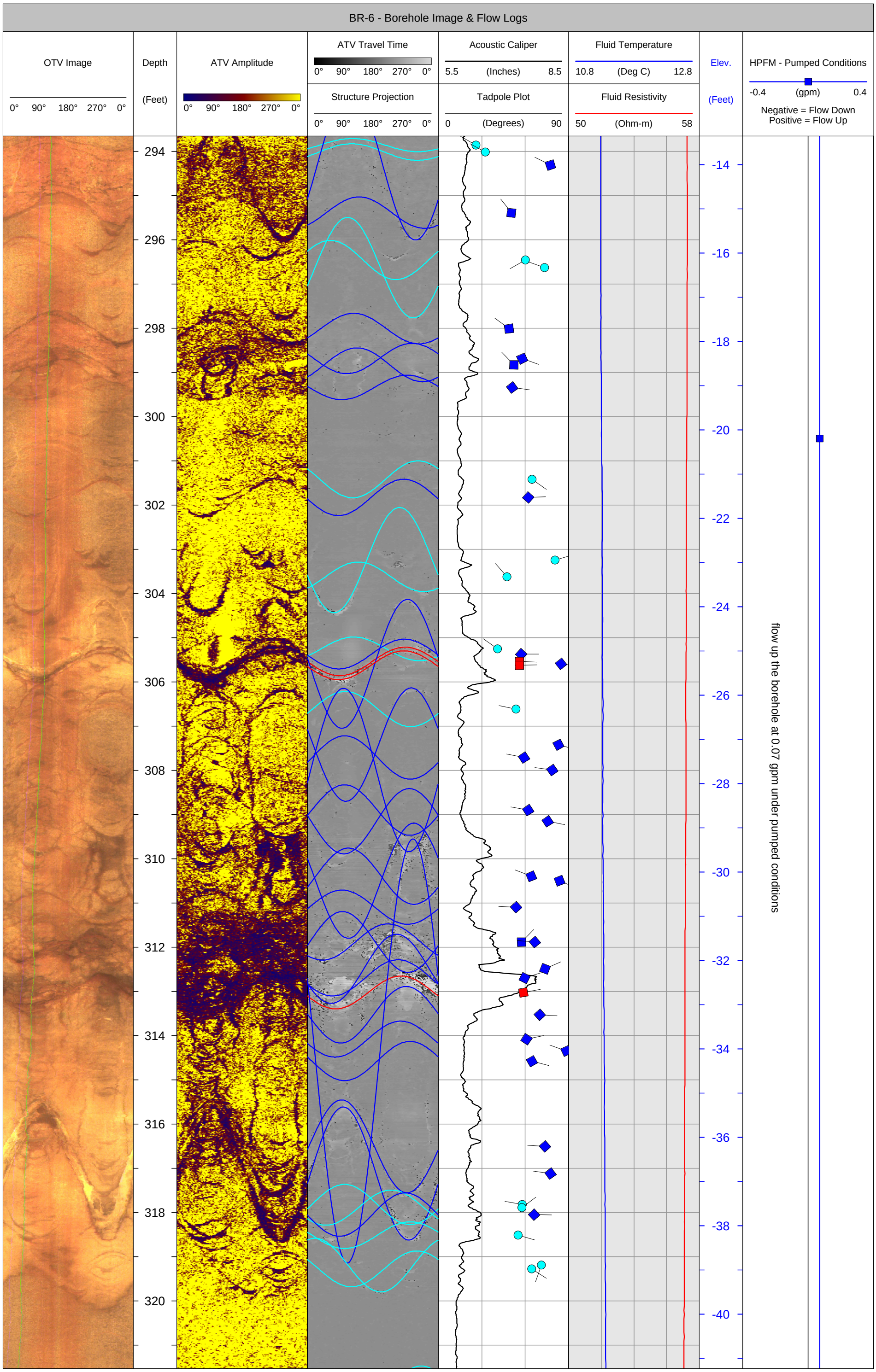

BR-6 - Borehole Image & Flow Logs
OTV Image
0° 90° 180° 270° 0°
Depth
(Feet)
ATV Amplitude
0° 90° 180° 270° 0°
ATV Travel Time
0° 90° 180° 270° 0°
Structure Projection
0° 90° 180° 270° 0°
Acoustic Caliper
5.5 (Inches) 8.5
Tadpole Plot
0 (Degrees) 90
Fluid Temperature
10.8 (Deg C) 12.8
Fluid Resistivity
50 (Ohm-m) 58
Elev.
(Feet)
HPFM - Pumped Conditions
-0.4 (gpm) 0.4
Negative = Flow Down
Positive = Flow Up
156
158
160
162
164
166
168
170
172
174
176
178
180
182
126
124
122
120
118
116
114
112
110
108
106
104
102
100
flow up the borehole at 0.28 gpm under pumped conditions
flow into & up the borehole under pumped conditions
flow up the borehole at 0.20 gpm under pumped conditions
flow into & up the borehole under pumped conditions
flow up the borehole at 0.13 gpm under pumped conditions

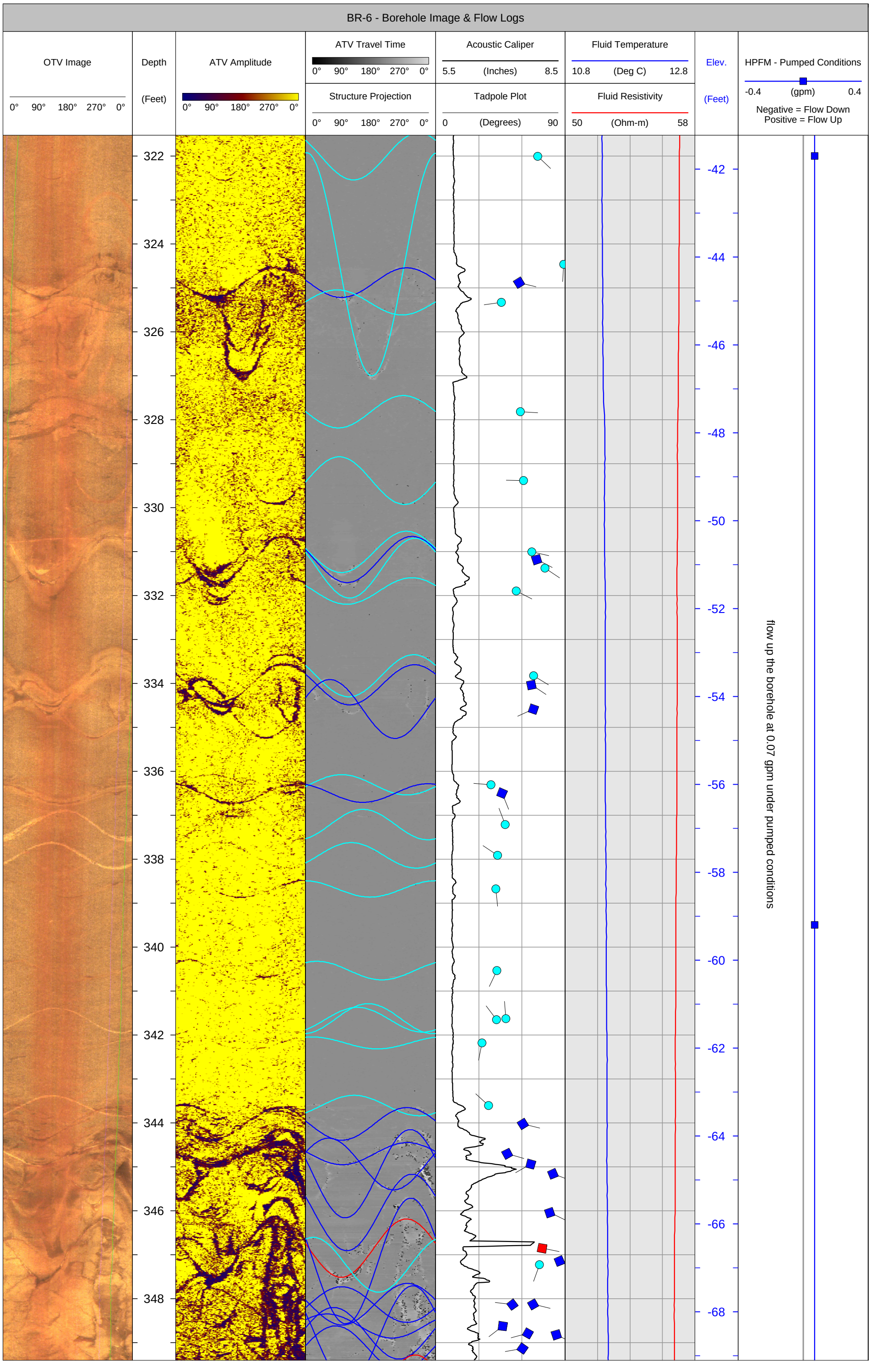

BR-6 - Borehole Image & Flow Logs
OTV Image
0° 90° 180° 270° 0°
Depth
(Feet)
ATV Amplitude
0° 90° 180° 270° 0°
ATV Travel Time
0° 90° 180° 270° 0°
Structure Projection
0° 90° 180° 270° 0°
Acoustic Caliper
5.5 (Inches) 8.5
Tadpole Plot
0 (Degrees) 90
Fluid Temperature
10.8 (Deg C) 12.8
Fluid Resistivity
50 (Ohm-m) 58
Elev.
(Feet)
HPFM - Pumped Conditions
-0.4 (gpm) 0.4
Negative = Flow Down
Positive = Flow Up
184
186
188
190
192
194
196
198
200
202
204
206
208
210
98
96
94
92
90
88
86
84
82
80
78
76
74
72
flow up the borehole at 0.13 gpm under pumped conditions

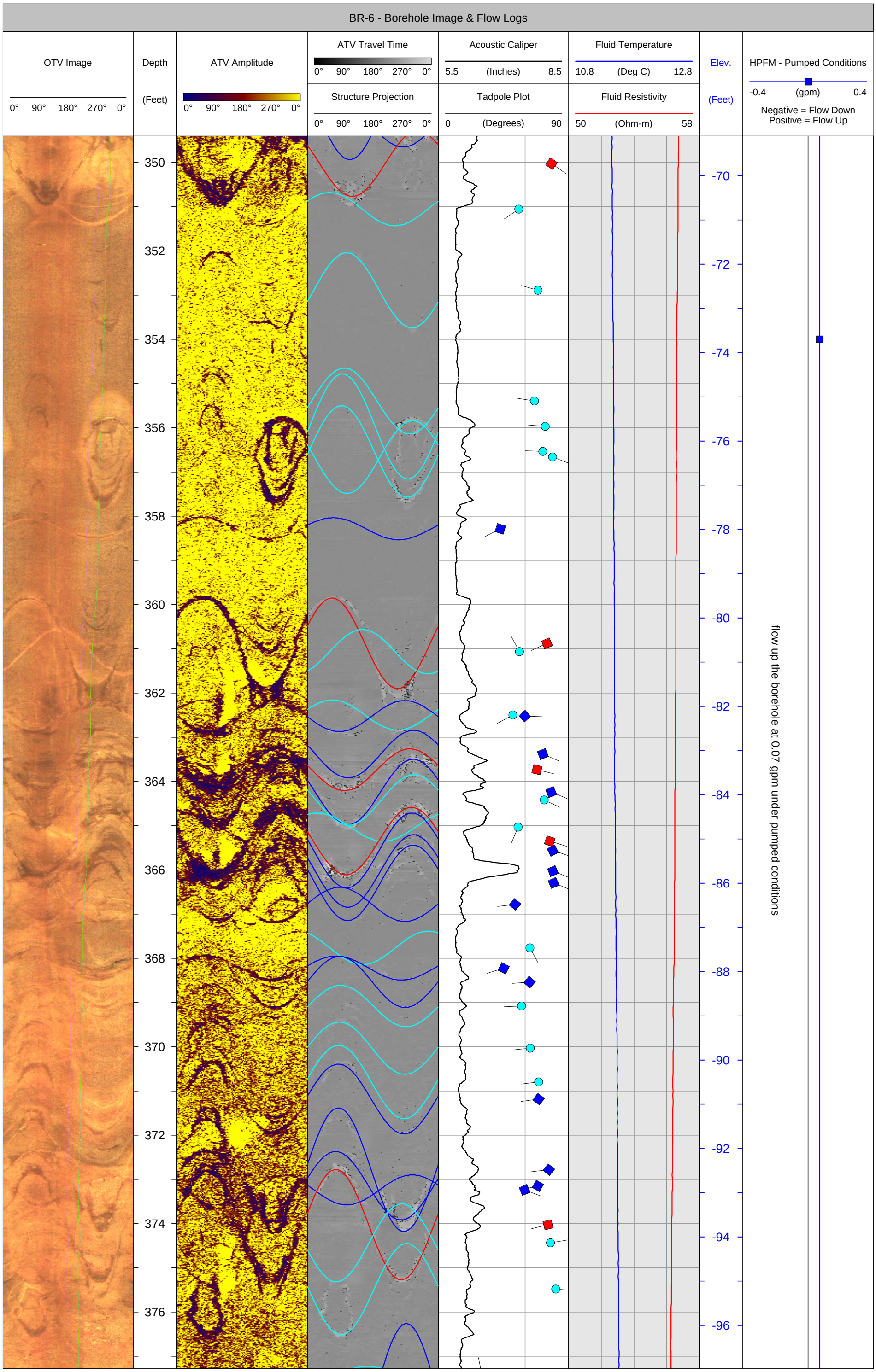

BR-6 - Borehole Image & Flow Logs
OTV Image
0° 90° 180° 270° 0°
Depth
(Feet)
ATV Amplitude
0° 90° 180° 270° 0°
ATV Travel Time
0° 90° 180° 270° 0°
Structure Projection
0° 90° 180° 270° 0°
Acoustic Caliper
5.5 (Inches) 8.5
Tadpole Plot
0 (Degrees) 90
Fluid Temperature
10.8 (Deg C) 12.8
Fluid Resistivity
50 (Ohm-m) 58
Elev.
(Feet)
HPFM - Pumped Conditions
-0.4 (gpm) 0.4
Negative = Flow Down
Positive = Flow Up
flow up the borehole at 0.13 gpm under pumped conditions
flow into & up the borehole under pumped conditions
flow up the borehole at 0.10 gpm under pumped conditions

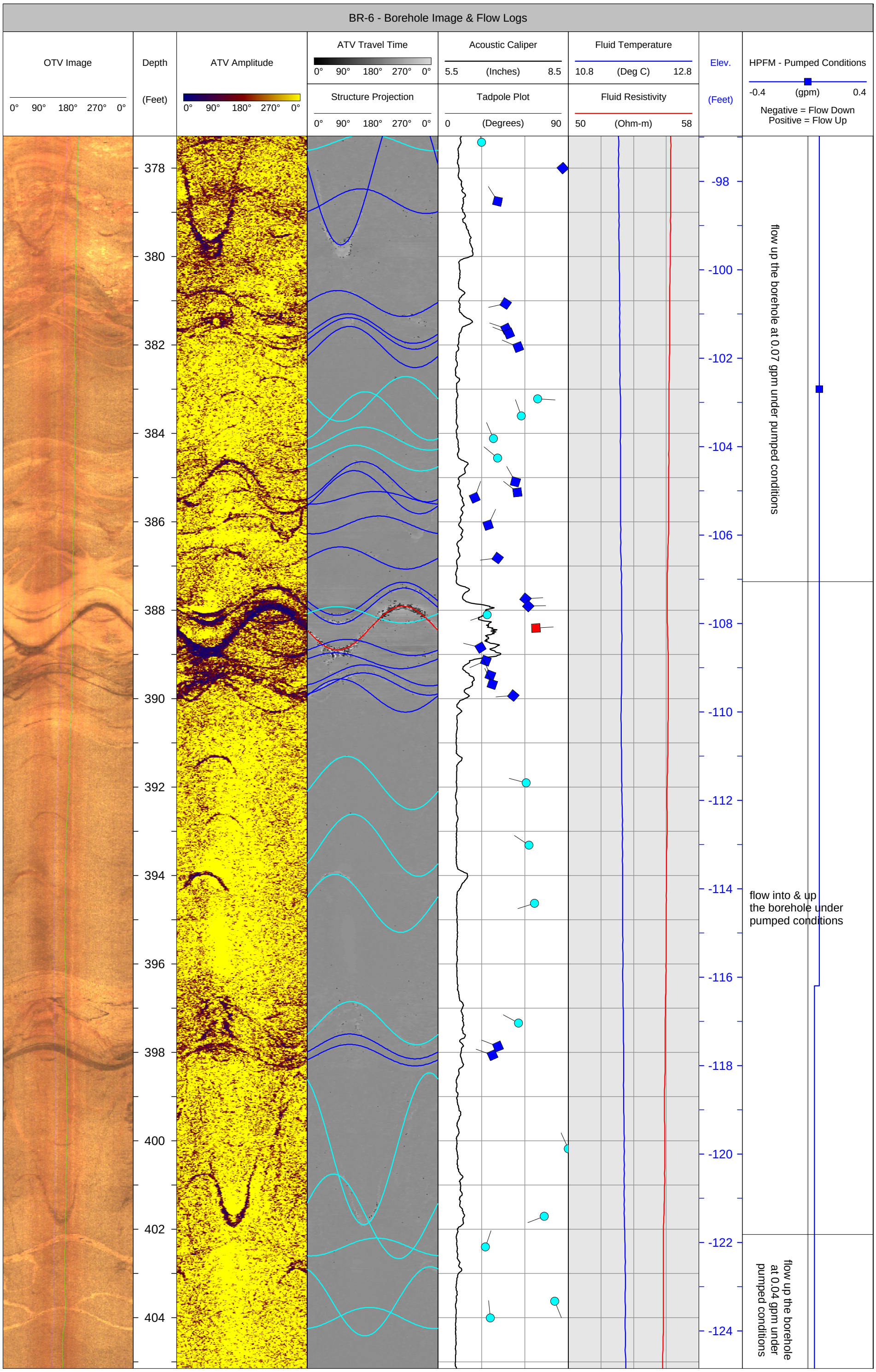

BR-6 - Borehole Image & Flow Logs
OTV Image
0° 90° 180° 270° 0°
Depth
(Feet)
ATV Amplitude
0° 90° 180° 270° 0°
ATV Travel Time
0° 90° 180° 270° 0°
Structure Projection
0° 90° 180° 270° 0°
Acoustic Caliper
5.5 (Inches) 8.5
Tadpole Plot
0 (Degrees) 90
Fluid Temperature
10.8 (Deg C) 12.8
Fluid Resistivity
50 (Ohm-m) 58
Elev.
(Feet)
HPFM - Pumped Conditions
-0.4 (gpm) 0.4
Negative = Flow Down
Positive = Flow Up
flow into & up the borehole under pumped conditions
flow up the borehole at 0.07 gpm under pumped conditions
238
240
242
244
246
248
250
252
254
256
258
260
262
264
42
40
38
36
34
32
30
28
26
24
22
20
18
16

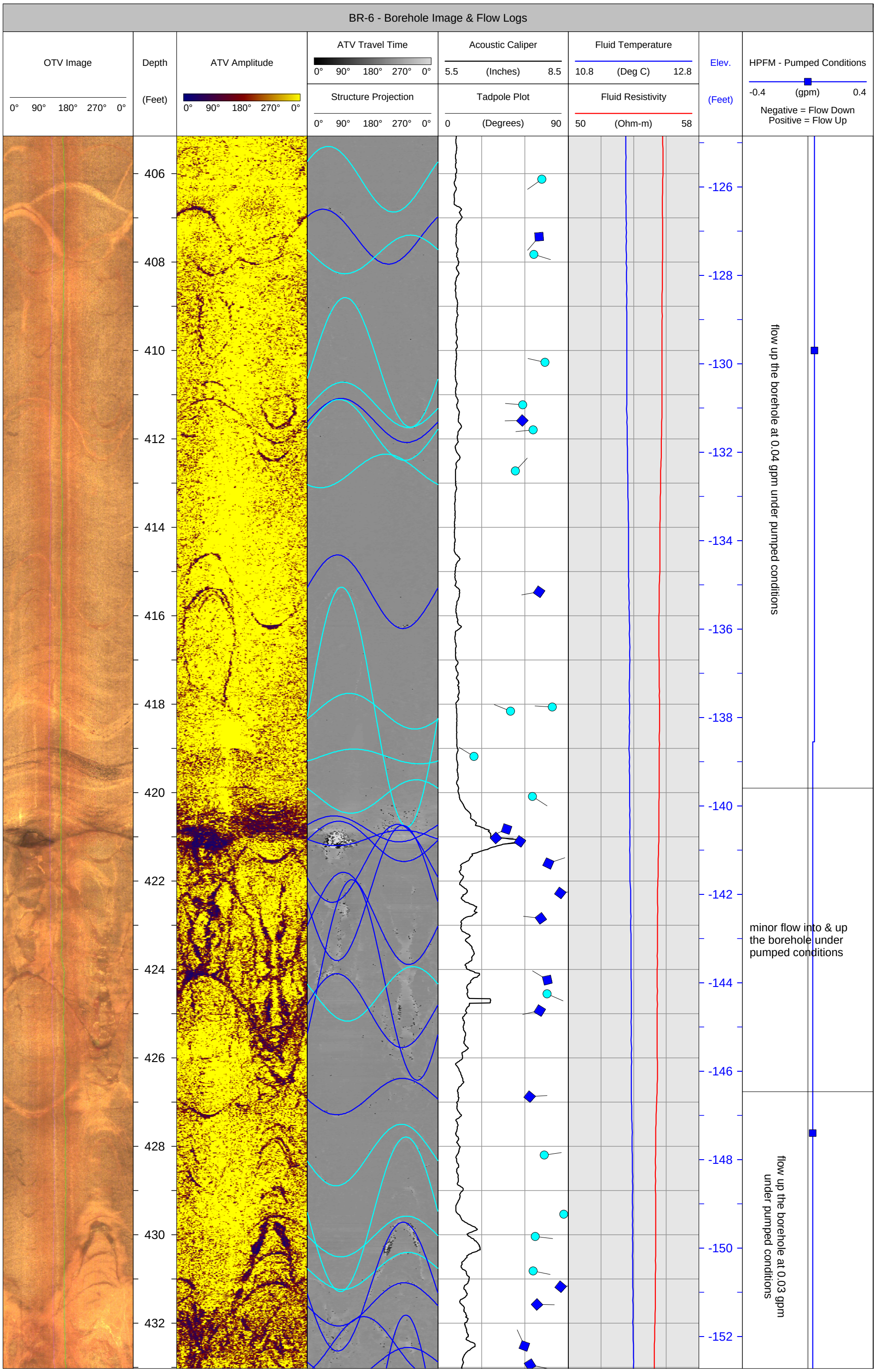

BR-6 - Borehole Image & Flow Logs
OTV Image
0° 90° 180° 270° 0°
Depth
(Feet)
ATV Amplitude
0° 90° 180° 270° 0°
ATV Travel Time
0° 90° 180° 270° 0°
Structure Projection
0° 90° 180° 270° 0°
Acoustic Caliper
5.5 (Inches) 8.5
Tadpole Plot
0 (Degrees) 90
Fluid Temperature
10.8 (Deg C) 12.8
Fluid Resistivity
50 (Ohm-m) 58
Elev.
(Feet)
HPFM - Pumped Conditions
-0.4 (gpm) 0.4
Negative = Flow Down
Positive = Flow Up
266
268
270
272
274
276
278
280
282
284
286
288
290
292
14
12
10
8
6
4
2
0
-2
-4
-6
-8
-10
-12
flow up the borehole at 0.07 gpm under pumped conditions

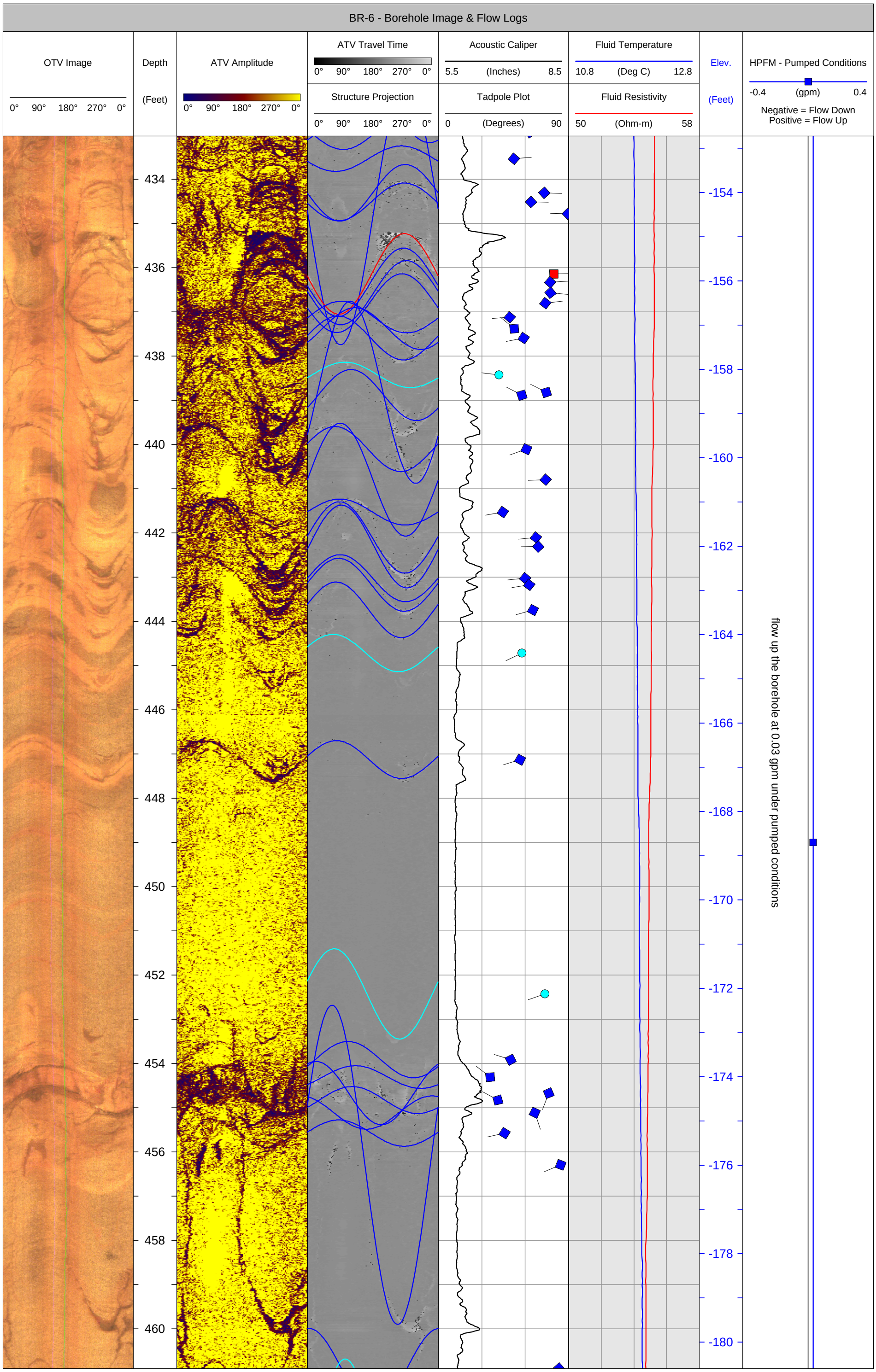

BR-6 - Borehole Image & Flow Logs
OTV Image
0° 90° 180° 270° 0°
Depth
(Feet)
ATV Amplitude
0° 90° 180° 270° 0°
ATV Travel Time
0° 90° 180° 270° 0°
Structure Projection
0° 90° 180° 270° 0°
Acoustic Caliper
5.5 (Inches) 8.5
Tadpole Plot
0 (Degrees) 90
Fluid Temperature
10.8 (Deg C) 12.8
Fluid Resistivity
50 (Ohm-m) 58
Elev.
(Feet)
HPFM - Pumped Conditions
-0.4 (gpm) 0.4
Negative = Flow Down
Positive = Flow Up
294
296
298
300
302
304
306
308
310
312
314
316
318
320
-14
-16
-18
-20
-22
-24
-26
-28
-30
-32
-34
-36
-38
-40
flow up the borehole at 0.07 gpm under pumped conditions

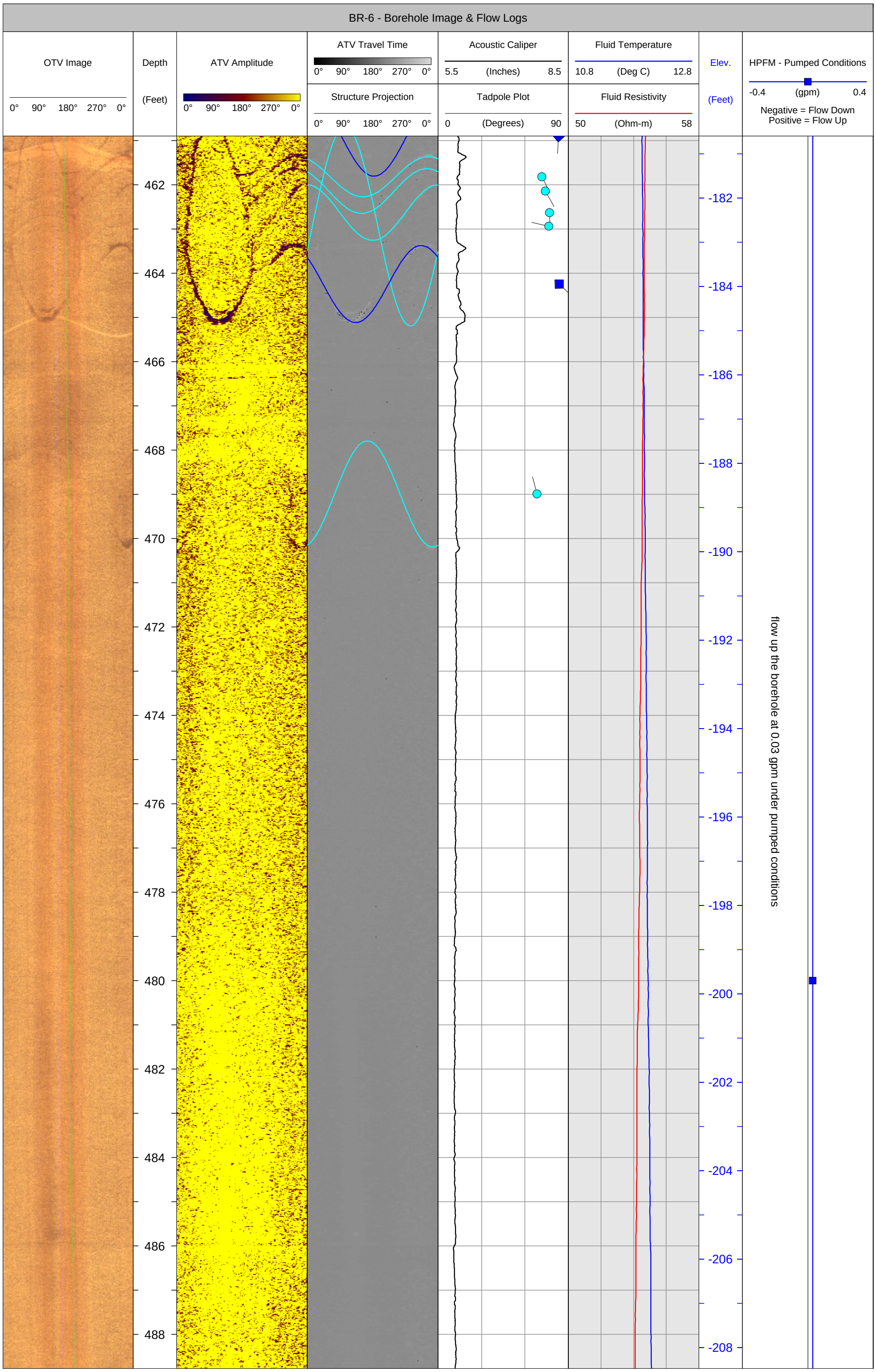

BR-6 - Borehole Image & Flow Logs
OTV Image
0° 90° 180° 270° 0°
Depth
(Feet)
ATV Amplitude
0° 90° 180° 270° 0°
ATV Travel Time
0° 90° 180° 270° 0°
Structure Projection
0° 90° 180° 270° 0°
Acoustic Caliper
5.5 (Inches) 8.5
Tadpole Plot
0 (Degrees) 90
Fluid Temperature
10.8 (Deg C) 12.8
Fluid Resistivity
50 (Ohm-m) 58
Elev.
(Feet)
HPFM - Pumped Conditions
-0.4 (gpm) 0.4
Negative = Flow Down
Positive = Flow Up
322
324
326
328
330
332
334
336
338
340
342
344
346
348
-42
-44
-46
-48
-50
-52
-54
-56
-58
-60
-62
-64
-66
-68
flow up the borehole at 0.07 gpm under pumped conditions

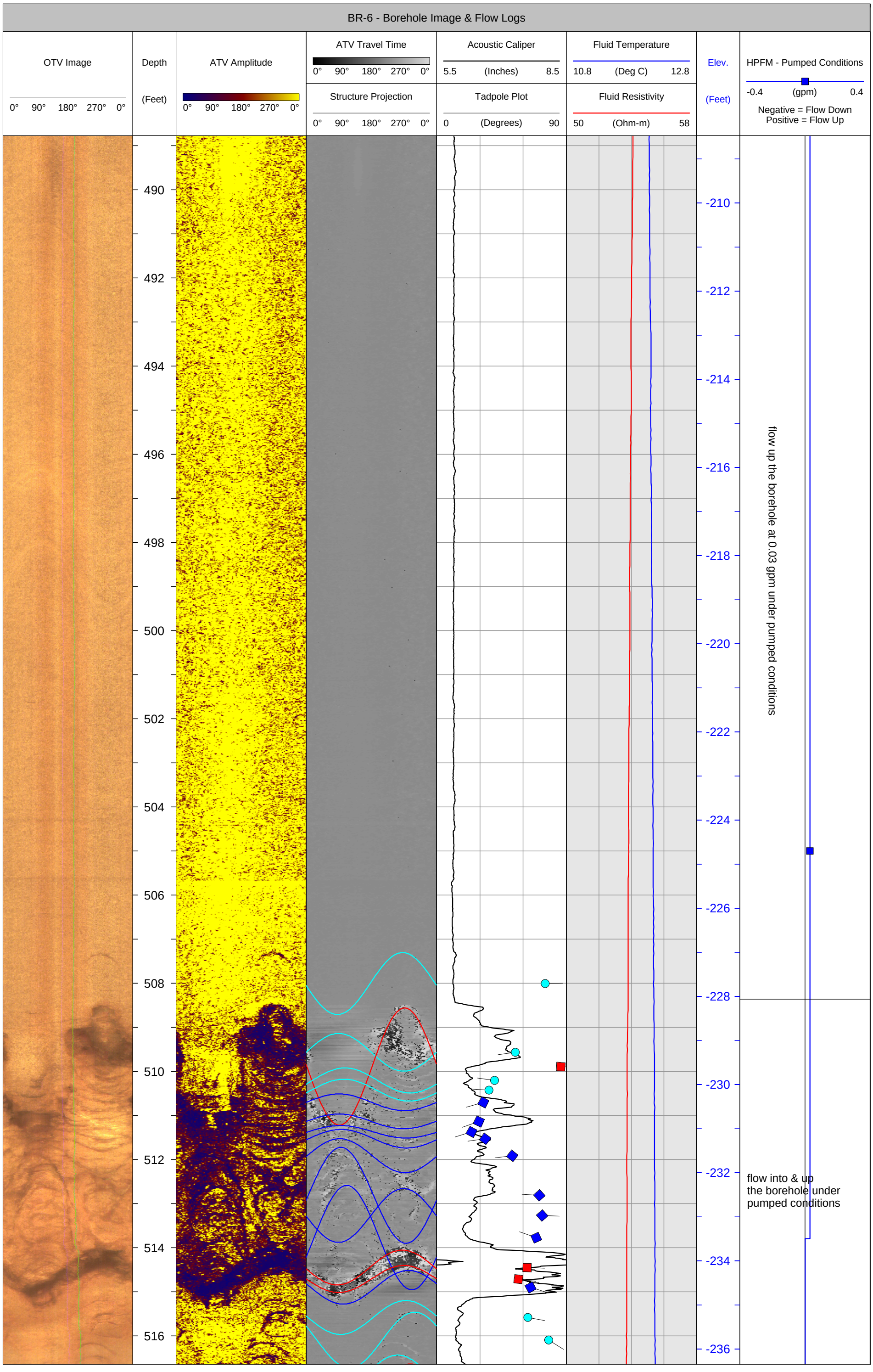

BR-6 - Borehole Image & Flow Logs
OTV Image
0° 90° 180° 270° 0°
Depth
(Feet)
ATV Amplitude
0° 90° 180° 270° 0°
ATV Travel Time
0° 90° 180° 270° 0°
Structure Projection
0° 90° 180° 270° 0°
Acoustic Caliper
5.5 (Inches) 8.5
Tadpole Plot
0 (Degrees) 90
Fluid Temperature
10.8 (Deg C) 12.8
Fluid Resistivity
50 (Ohm-m) 58
Elev.
(Feet)
HPFM - Pumped Conditions
-0.4 (gpm) 0.4
Negative = Flow Down
Positive = Flow Up
350
352
354
356
358
360
362
364
366
368
370
372
374
376
-70
-72
-74
-76
-78
-80
-82
-84
-86
-88
-90
-92
-94
-96
flow up the borehole at 0.07 gpm under pumped conditions

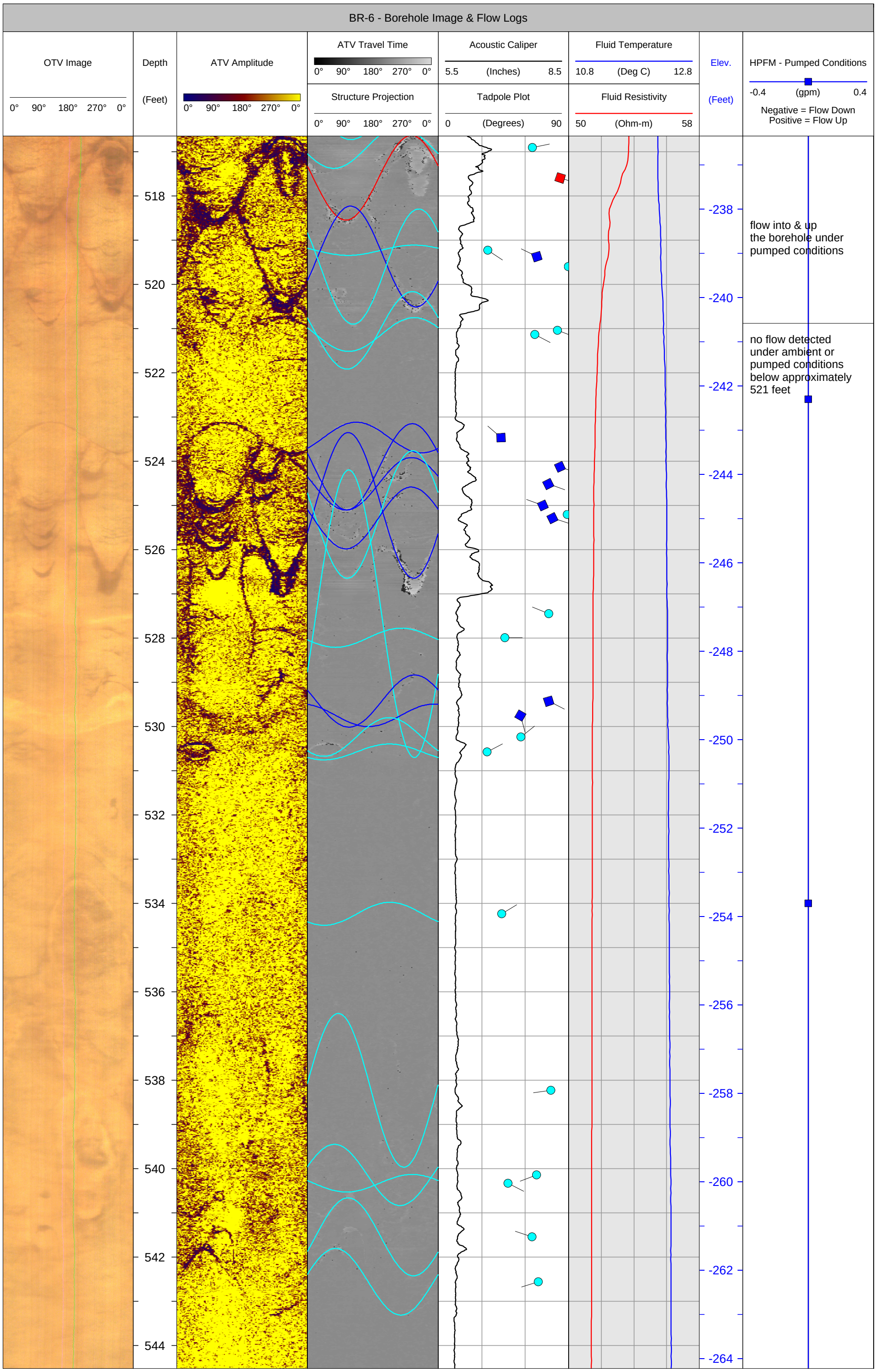

BR-6 - Borehole Image & Flow Logs
OTV Image
0° 90° 180° 270° 0°
Depth
(Feet)
ATV Amplitude
0° 90° 180° 270° 0°
ATV Travel Time
0° 90° 180° 270° 0°
Structure Projection
0° 90° 180° 270° 0°
Acoustic Caliper
5.5 (Inches) 8.5
Tadpole Plot
0 (Degrees) 90
Fluid Temperature
10.8 (Deg C) 12.8
Fluid Resistivity
50 (Ohm-m) 58
Elev.
(Feet)
HPFM - Pumped Conditions
-0.4 (gpm) 0.4
Negative = Flow Down
Positive = Flow Up
378
380
382
384
386
388
390
392
394
396
398
400
402
404
-98
-100
-102
-104
-106
-108
-110
-112
-114
-116
-118
-120
-122
-124
flow up the borehole at 0.07 gpm under pumped conditions
flow into & up the borehole under pumped conditions
flow up the borehole at 0.04 gpm under pumped conditions

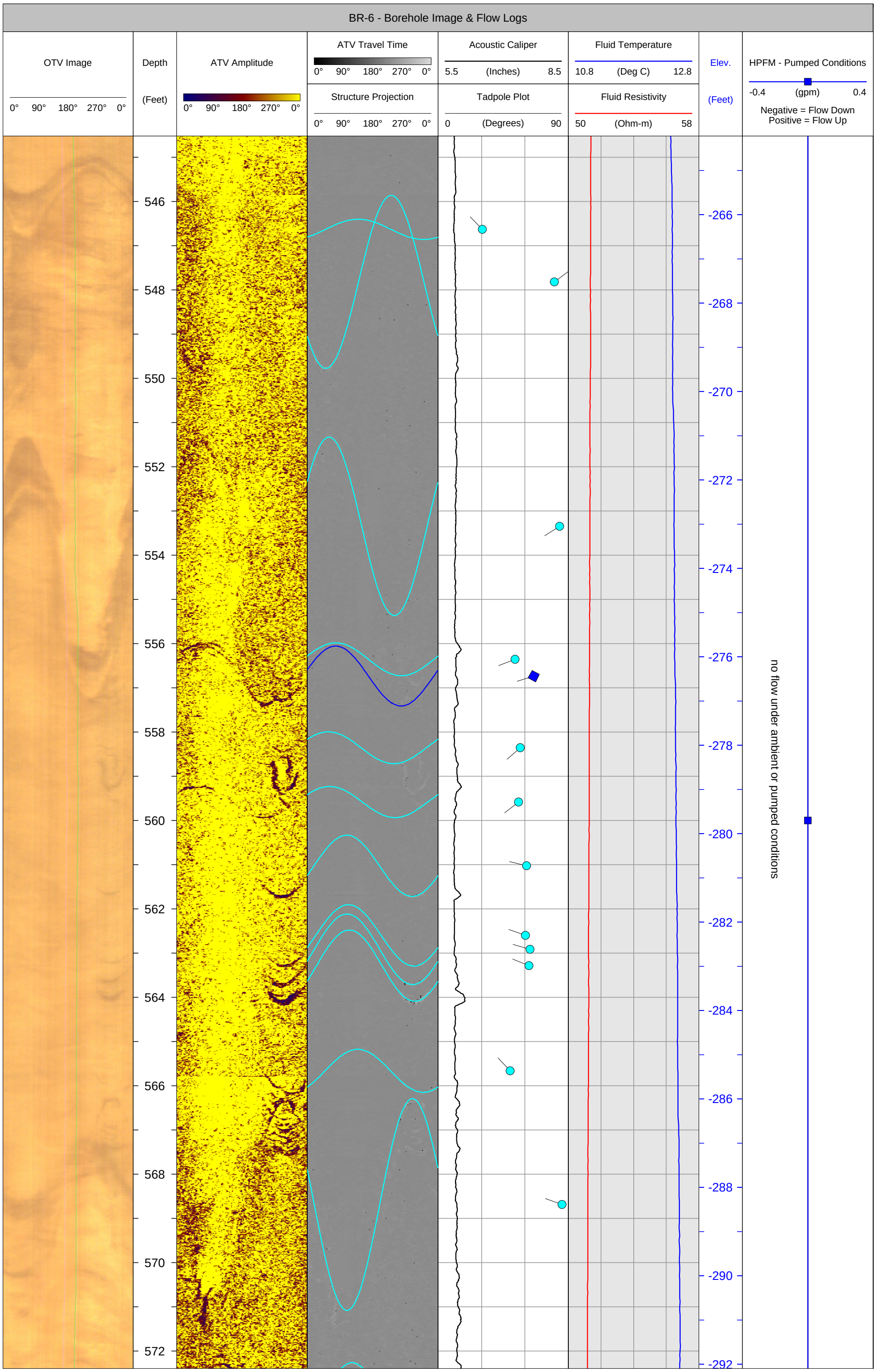

BR-6 - Borehole Image & Flow Logs
OTV Image
0° 90° 180° 270° 0°
Depth
(Feet)
ATV Amplitude
0° 90° 180° 270° 0°
ATV Travel Time
0° 90° 180° 270° 0°
Structure Projection
0° 90° 180° 270° 0°
Acoustic Caliper
5.5 (Inches) 8.5
Tadpole Plot
0 (Degrees) 90
Fluid Temperature
10.8 (Deg C) 12.8
Fluid Resistivity
50 (Ohm-m) 58
Elev.
(Feet)
HPFM - Pumped Conditions
-0.4 (gpm) 0.4
Negative = Flow Down
Positive = Flow Up
406
408
410
412
414
416
418
420
422
424
426
428
430
432
-126
-128
-130
-132
-134
-136
-138
-140
-142
-144
-146
-148
-150
-152
flow up the borehole at 0.04 gpm under pumped conditions
minor flow into & up the borehole under pumped conditions
flow up the borehole at 0.03 gpm under pumped conditions

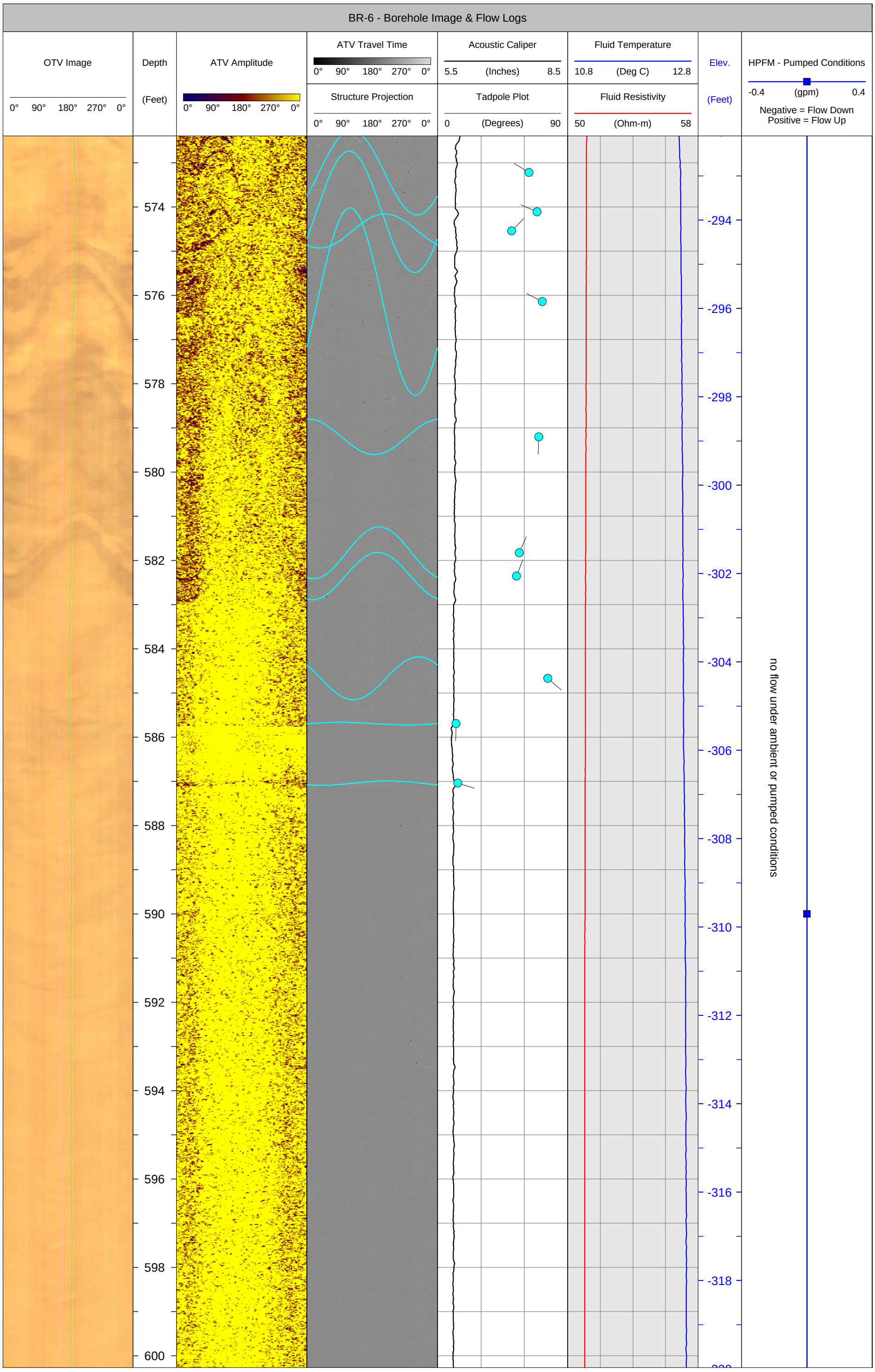

BR-6 - Borehole Image & Flow Logs
OTV Image
0° 90° 180° 270° 0°
Depth
(Feet)
ATV Amplitude
0° 90° 180° 270° 0°
ATV Travel Time
0° 90° 180° 270° 0°
Structure Projection
0° 90° 180° 270° 0°
Acoustic Caliper
5.5 (Inches) 8.5
Tadpole Plot
0 (Degrees) 90
Fluid Temperature
10.8 (Deg C) 12.8
Fluid Resistivity
50 (Ohm-m) 58
Elev.
(Feet)
HPFM - Pumped Conditions
-0.4 (gpm) 0.4
Negative = Flow Down
Positive = Flow Up
434
436
438
440
442
444
446
448
450
452
454
456
458
460
-154
-156
-158
-160
-162
-164
-166
-168
-170
-172
-174
-176
-178
-180
flow up the borehole at 0.03 gpm under pumped conditions

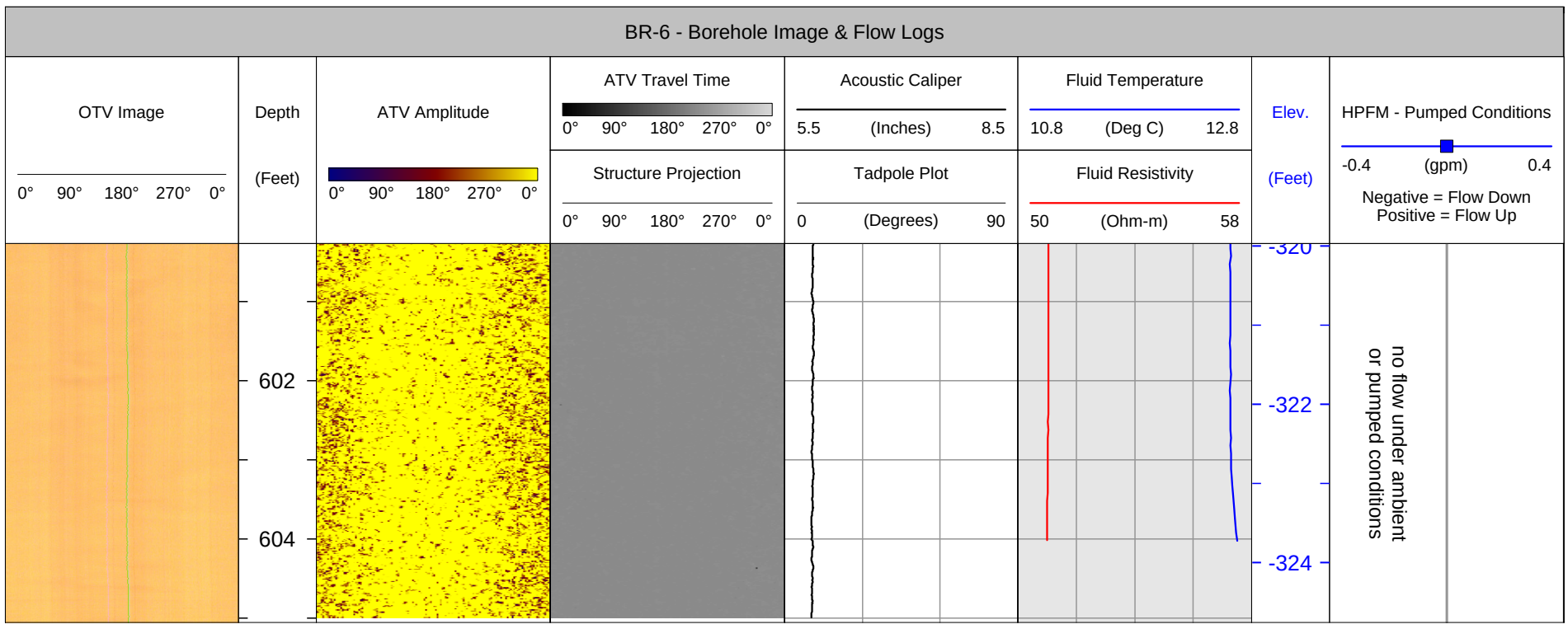

BR-6 - Borehole Image & Flow Logs
OTV Image
0° 90° 180° 270° 0°
Depth
(Feet)
ATV Amplitude
0° 90° 180° 270° 0°
ATV Travel Time
0° 90° 180° 270° 0°
Structure Projection
0° 90° 180° 270° 0°
Acoustic Caliper
5.5 (Inches) 8.5
Tadpole Plot
0 (Degrees) 90
Fluid Temperature
10.8 (Deg C) 12.8
Fluid Resistivity
50 (Ohm-m) 58
Elev.
(Feet)
HPFM - Pumped Conditions
-0.4 (gpm) 0.4
Negative = Flow Down
Positive = Flow Up
462
464
466
468
470
472
474
476
478
480
482
484
486
488
-182
-184
-186
-188
-190
-192
-194
-196
-198
-200
-202
-204
-206
-208
flow up the borehole at 0.03 gpm under pumped conditions


BR-6 - Borehole Image & Flow Logs
OTV Image
0° 90° 180° 270° 0°
Depth
(Feet)
ATV Amplitude
0° 90° 180° 270° 0°
ATV Travel Time
0° 90° 180° 270° 0°
Structure Projection
0° 90° 180° 270° 0°
Acoustic Caliper
5.5 (Inches) 8.5
Tadpole Plot
0 (Degrees) 90
Fluid Temperature
10.8 (Deg C) 12.8
Fluid Resistivity
50 (Ohm-m) 58
Elev.
(Feet)
HPFM - Pumped Conditions
-0.4 (gpm) 0.4
Negative = Flow Down
Positive = Flow Up
490
492
494
496
498
500
502
504
506
508
510
512
514
516
-210
-212
-214
-216
-218
-220
-222
-224
-226
-228
-230
-232
-234
-236
flow up the borehole at 0.03 gpm under pumped conditions
flow into & up
the borehole under
pumped conditions


BR-6 - Borehole Image & Flow Logs
OTV Image
0° 90° 180° 270° 0°
Depth
(Feet)
ATV Amplitude
0° 90° 180° 270° 0°
ATV Travel Time
0° 90° 180° 270° 0°
Structure Projection
0° 90° 180° 270° 0°
Acoustic Caliper
5.5 (Inches) 8.5
Tadpole Plot
0 (Degrees) 90
Fluid Temperature
10.8 (Deg C) 12.8
Fluid Resistivity
50 (Ohm-m) 58
Elev.
(Feet)
HPFM - Pumped Conditions
-0.4 (gpm) 0.4
Negative = Flow Down
Positive = Flow Up
518
520
522
524
526
528
530
532
534
536
538
540
542
544
-238
-240
-242
-244
-246
-248
-250
-252
-254
-256
-258
-260
-262
-264
flow into & up
the borehole under
pumped conditions
no flow detected
under ambient or
pumped conditions
below approximately
521 feet


BR-6 - Borehole Image & Flow Logs
OTV Image
0° 90° 180° 270° 0°
Depth
(Feet)
ATV Amplitude
0° 90° 180° 270° 0°
ATV Travel Time
0° 90° 180° 270° 0°
Structure Projection
0° 90° 180° 270° 0°
Acoustic Caliper
5.5 (Inches) 8.5
Tadpole Plot
0 (Degrees) 90
Fluid Temperature
10.8 (Deg C) 12.8
Fluid Resistivity
50 (Ohm-m) 58
Elev.
(Feet)
HPFM - Pumped Conditions
-0.4 (gpm) 0.4
Negative = Flow Down
Positive = Flow Up
546
548
550
552
554
556
558
560
562
564
566
568
570
572
-266
-268
-270
-272
-274
-276
-278
-280
-282
-284
-286
-288
-290
-292
no flow under ambient or pumped conditions


BR-6 - Borehole Image & Flow Logs
OTV Image
0° 90° 180° 270° 0°
Depth
(Feet)
ATV Amplitude
0° 90° 180° 270° 0°
ATV Travel Time
0° 90° 180° 270° 0°
Structure Projection
0° 90° 180° 270° 0°
Acoustic Caliper
5.5 (Inches) 8.5
Tadpole Plot
0 (Degrees) 90
Fluid Temperature
10.8 (Deg C) 12.8
Fluid Resistivity
50 (Ohm-m) 58
Elev.
(Feet)
HPFM - Pumped Conditions
-0.4 (gpm) 0.4
Negative = Flow Down
Positive = Flow Up
574
576
578
580
582
584
586
588
590
592
594
596
598
600
-294
-296
-298
-300
-302
-304
-306
-308
-310
-312
-314
-316
-318
no flow under ambient or pumped conditions


BR-6 - Borehole Image & Flow Logs
OTV Image
0° 90° 180° 270° 0°
Depth
(Feet)
ATV Amplitude
0° 90° 180° 270° 0°
ATV Travel Time
0° 90° 180° 270° 0°
Structure Projection
0° 90° 180° 270° 0°
Acoustic Caliper
5.5 (Inches) 8.5
Tadpole Plot
0 (Degrees) 90
Fluid Temperature
10.8 (Deg C) 12.8
Fluid Resistivity
50 (Ohm-m) 58
Elev.
(Feet)
HPFM - Pumped Conditions
-0.4 (gpm) 0.4
Negative = Flow Down
Positive = Flow Up
602
604
-320
-322
-324
no flow under ambient
or pumped conditions

HAGER-RICHTER GEOSCIENCE, INC.
8 Industrial Way - D10
Salem, NH 03079
Phone: 603-893-9944
Fax: 603-893-8313

BOREHOLE: MW-16R BOREHOLE FLUID & GEOLOGY LOGS

DATE LOGGED: September 13, 2010

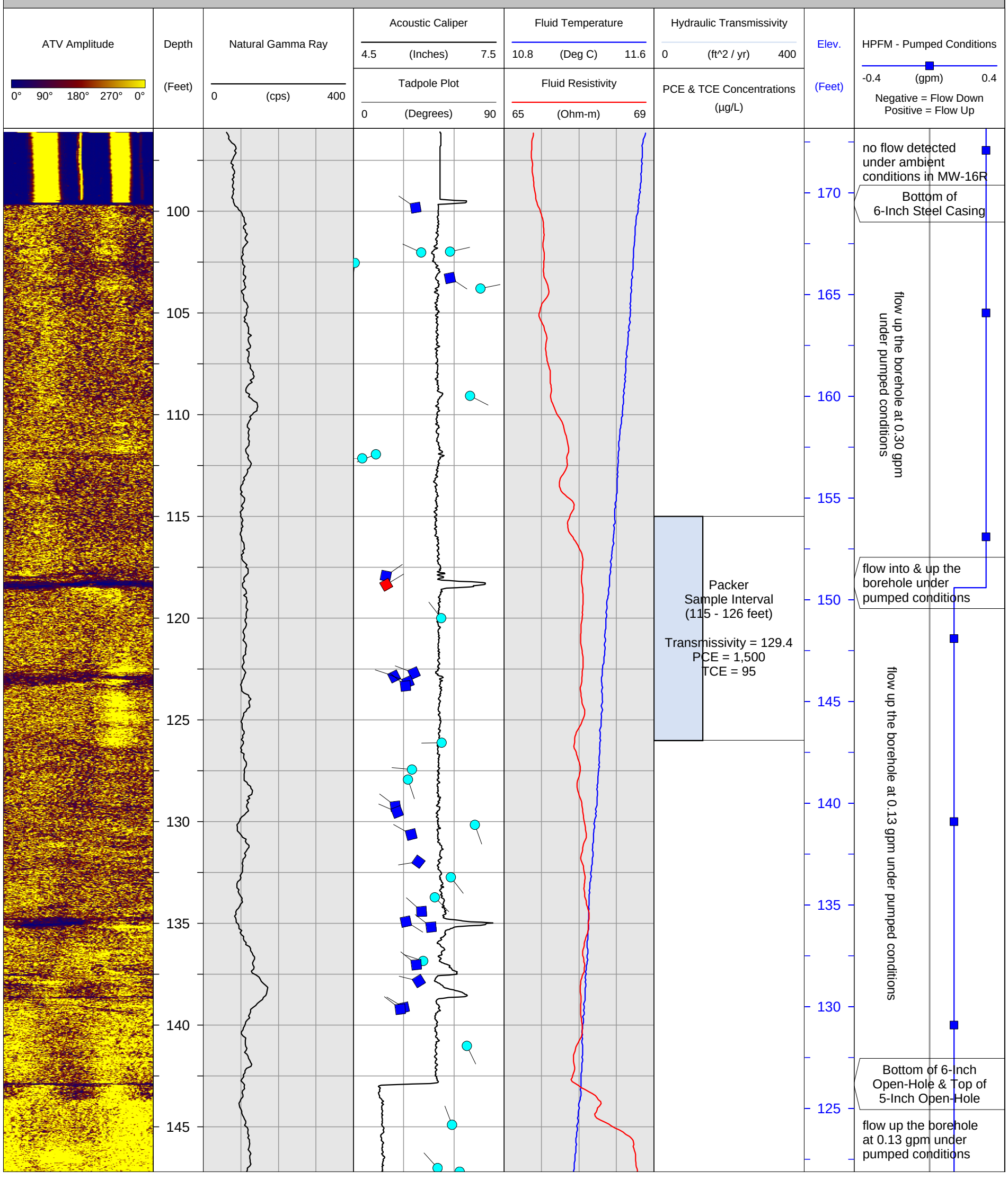
CLIENT:	Weston Solutions, Inc.	H-R FILE:	10RG30
PROJECT:	Borehole Geophysical Logging	LOG DATUM:	Top of the 6-Inch Steel Casing
LOCATION:	Savage Municipal Water Supply Superfund Site	TOP OF CASING ELEVATION:	269.1 Feet
CITY, STATE:	Milford, New Hampshire	ORIENTATION REFERENCE:	True North (Declination = 15 Degrees West)
LOGGING GEOPHYSICISTS:	Nick DeCristofaro & Eric Rickert	CASING STICK-UP:	1.7 Feet Above the Ground Surface
CLIENT REP. ON-SITE:	Andrew Fuller	BOREHOLE DIAMETER:	6 Inches to 143 Feet & 5 Inches to 390 Feet
LOGS PROCESSED BY:	Robert Garfield	WATER LEVEL DEPTH:	10.6 Feet

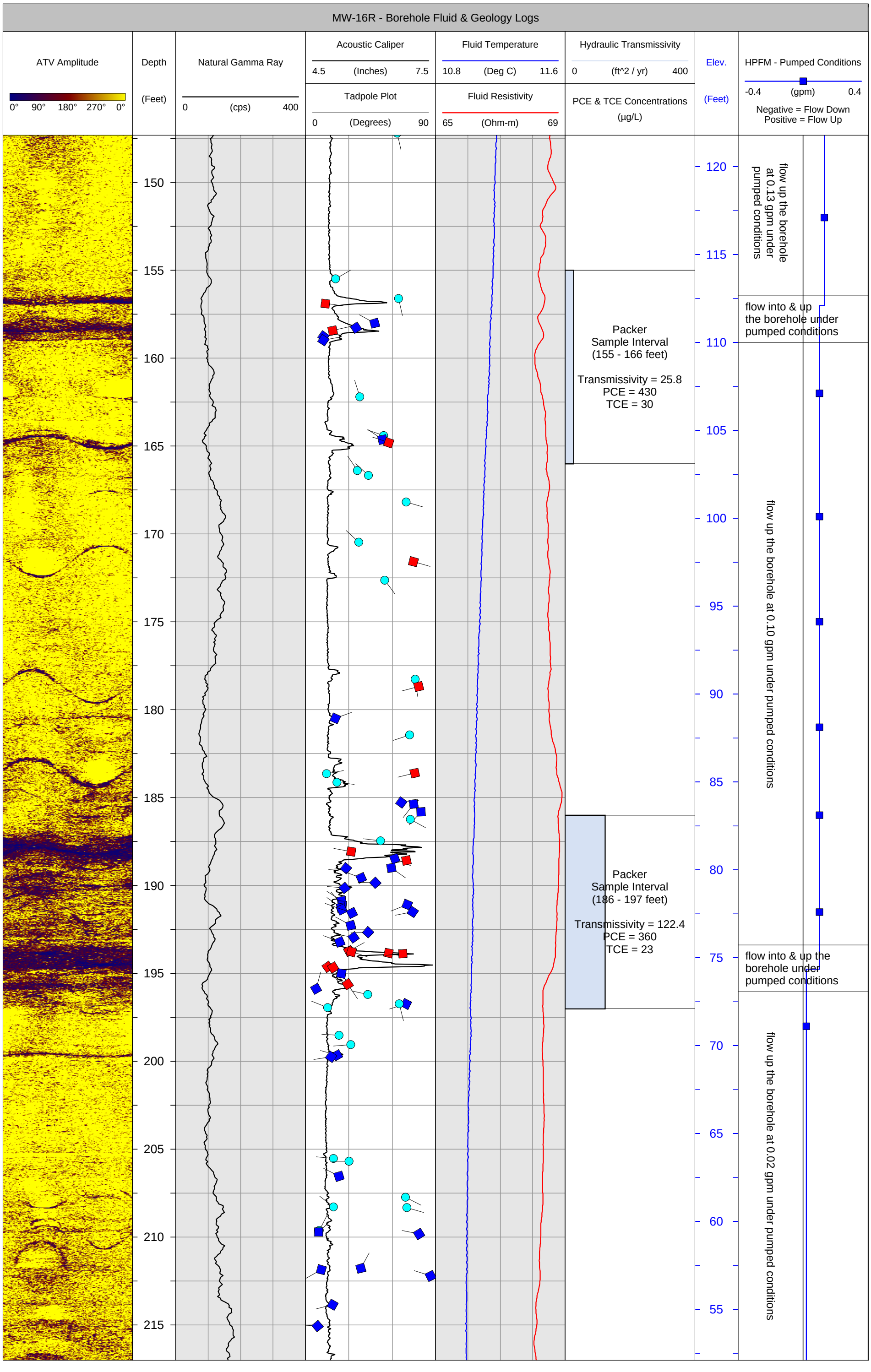
STRUCTURE LEGEND

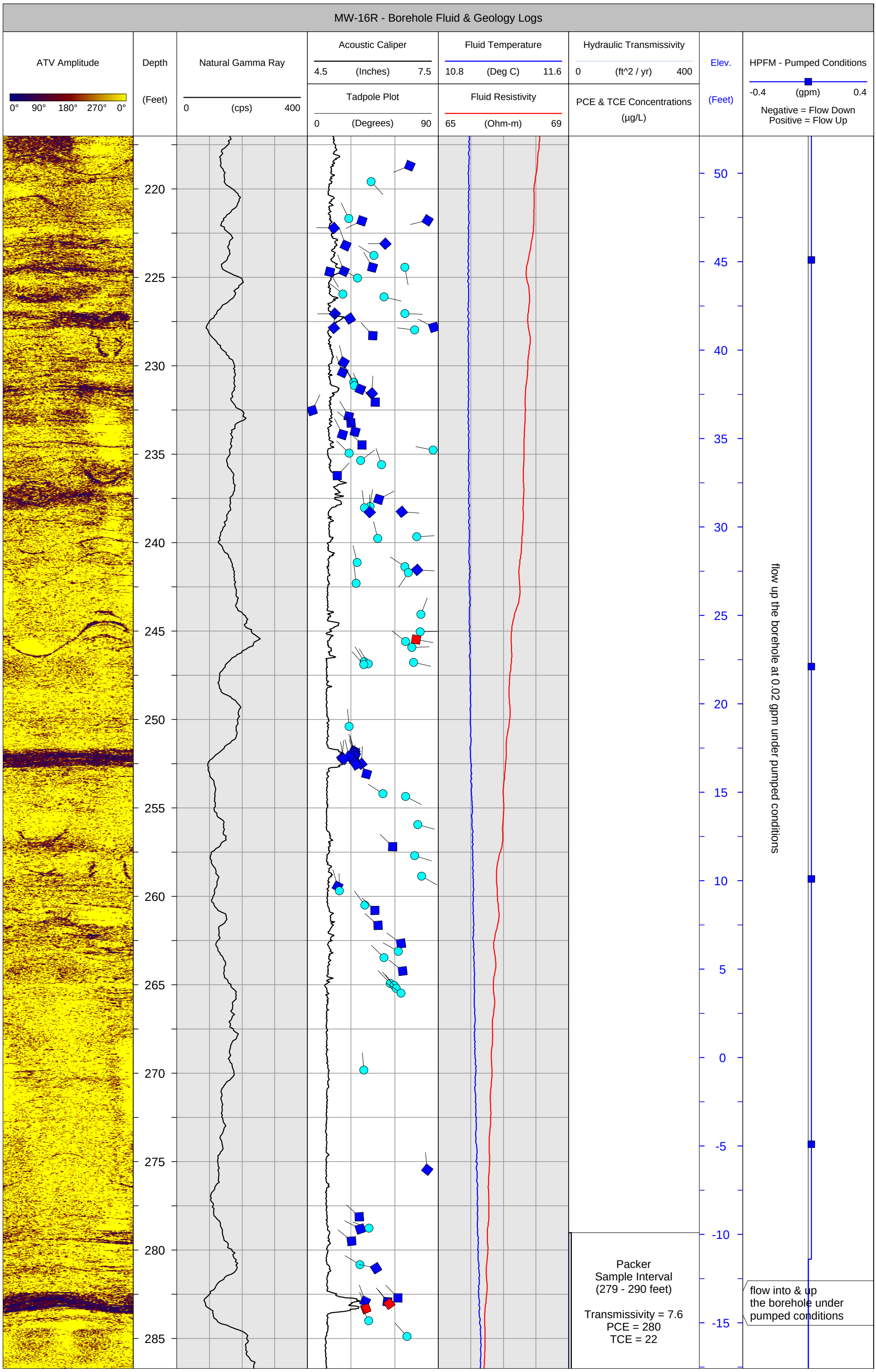
Fracture Rank 1 Fracture Rank 2 Fracture Rank 3

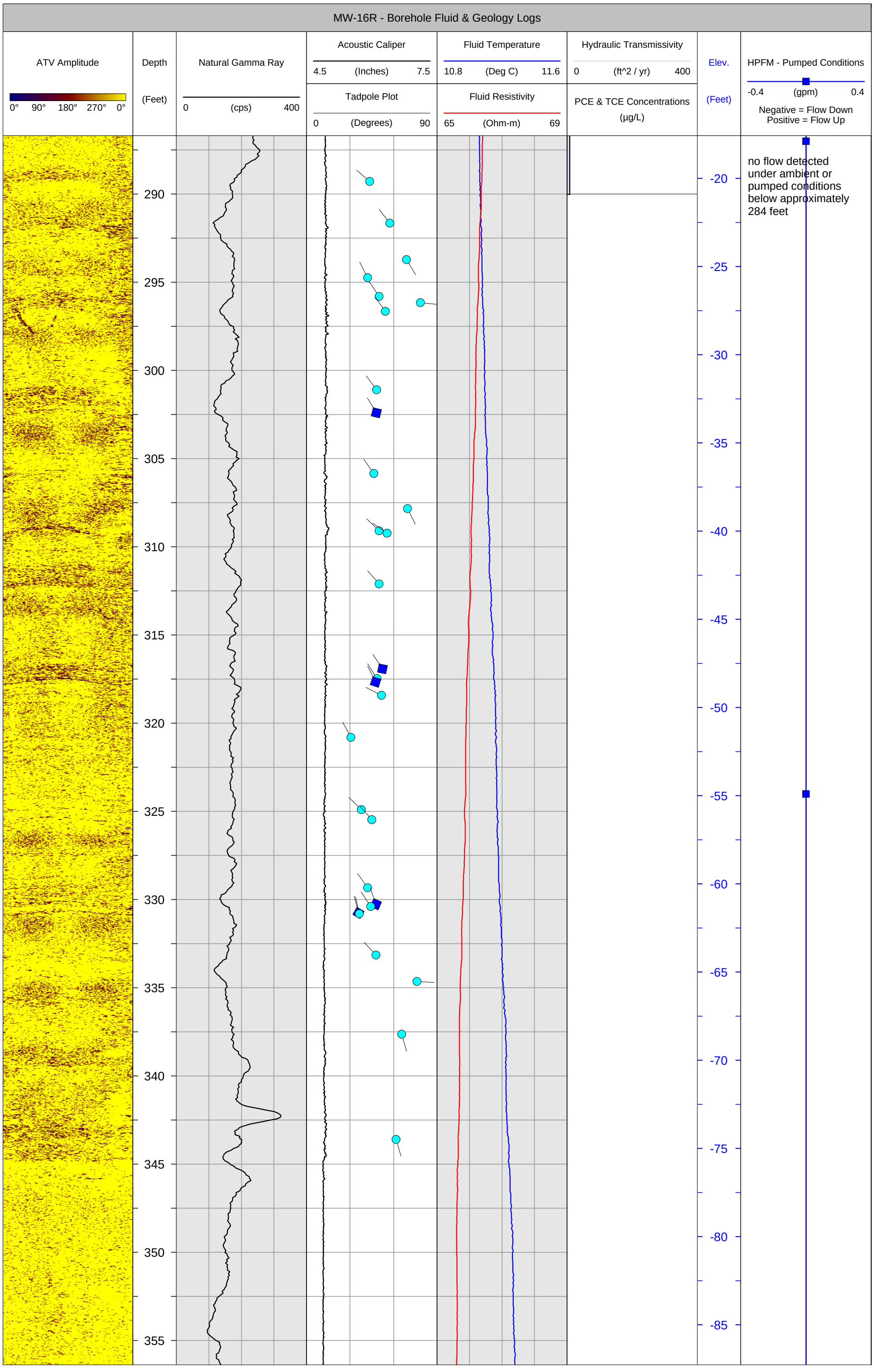
NOTES: HPFM data under ambient conditions are not plotted in the logs below because flow was not detected under ambient conditions.
During HPFM logging under pumped conditions water was pumped from the borehole at 0.3 gpm from inside the casing.
The transmissivity, PCE, and TCE data were provided by Weston and were acquired during packer testing.

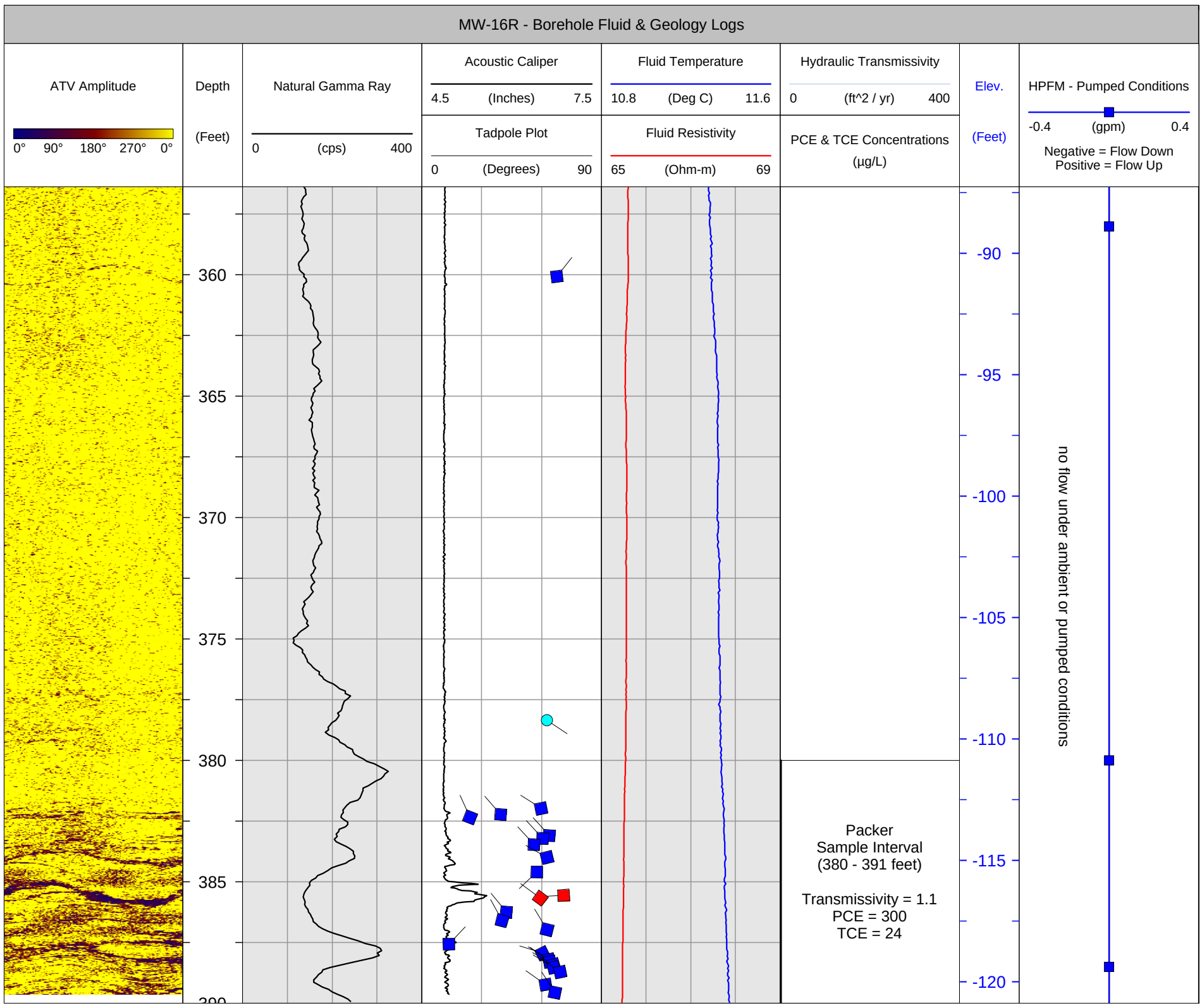
MW-16R - Borehole Fluid & Geology Logs




MW-16R - Borehole Fluid & Geology Logs
ATV Amplitude
0° 90° 180° 270° 0°
Depth
(Feet)
Natural Gamma Ray
0 (cps) 400
Acoustic Caliper
4.5 (Inches) 7.5
Tadpole Plot
0 (Degrees) 90
Fluid Temperature
10.8 (Deg C) 11.6
Fluid Resistivity
65 (Ohm-m) 69
Hydraulic Transmissivity
0 (ft^2 / yr) 400
PCE & TCE Concentrations
(µg/L)
Elev.
(Feet)
HPFM - Pumped Conditions
-0.4 (gpm) 0.4
Negative = Flow Down
Positive = Flow Up
150
155
160
165
170
175
180
185
190
195
200
205
210
215
120
115
110
105
100
95
90
85
80
75
70
65
60
55
Packer
Sample Interval
(155 - 166 feet)
Transmissivity = 25.8
PCE = 430
TCE = 30
Packer
Sample Interval
(186 - 197 feet)
Transmissivity = 122.4
PCE = 360
TCE = 23
flow up the borehole at 0.13 gpm under pumped conditions
flow into & up the borehole under pumped conditions
flow up the borehole at 0.10 gpm under pumped conditions
flow into & up the borehole under pumped conditions
flow up the borehole at 0.02 gpm under pumped conditions


MW-16R - Borehole Fluid & Geology Logs
ATV Amplitude
0° 90° 180° 270° 0°
Depth
(Feet)
Natural Gamma Ray
0 (cps) 400
Acoustic Caliper
4.5 (Inches) 7.5
Tadpole Plot
0 (Degrees) 90
Fluid Temperature
10.8 (Deg C) 11.6
Fluid Resistivity
65 (Ohm-m) 69
Hydraulic Transmissivity
0 (ft^2 / yr) 400
PCE & TCE Concentrations
(µg/L)
Elev.
(Feet)
HPFM - Pumped Conditions
-0.4 (gpm) 0.4
Negative = Flow Down
Positive = Flow Up
220
225
230
235
240
245
250
255
260
265
270
275
280
285
50
45
40
35
30
25
20
15
10
5
0
-5
-10
-15
flow up the borehole at 0.02 gpm under pumped conditions
Packer
Sample Interval
(279 - 290 feet)
Transmissivity = 7.6
PCE = 280
TCE = 22
flow into & up
the borehole under
pumped conditions


MW-16R - Borehole Fluid & Geology Logs
ATV Amplitude
0° 90° 180° 270° 0°
Depth
(Feet)
Natural Gamma Ray
0 (cps) 400
Acoustic Caliper
4.5 (Inches) 7.5
Tadpole Plot
0 (Degrees) 90
Fluid Temperature
10.8 (Deg C) 11.6
Fluid Resistivity
65 (Ohm-m) 69
Hydraulic Transmissivity
0 (ft^2 / yr) 400
PCE & TCE Concentrations
(µg/L)
Elev.
(Feet)
HPFM - Pumped Conditions
-0.4 (gpm) 0.4
Negative = Flow Down
Positive = Flow Up
no flow detected under ambient or pumped conditions below approximately 284 feet
290
295
300
305
310
315
320
325
330
335
340
345
350
355
-20
-25
-30
-35
-40
-45
-50
-55
-60
-65
-70
-75
-80
-85


MW-16R - Borehole Fluid & Geology Logs
ATV Amplitude
0° 90° 180° 270° 0°
Depth
(Feet)
Natural Gamma Ray
0 (cps) 400
Acoustic Caliper
4.5 (Inches) 7.5
Tadpole Plot
0 (Degrees) 90
Fluid Temperature
10.8 (Deg C) 11.6
Fluid Resistivity
65 (Ohm-m) 69
Hydraulic Transmissivity
0 (ft^2 / yr) 400
PCE & TCE Concentrations
(µg/L)
Elev.
(Feet)
HPFM - Pumped Conditions
-0.4 (gpm) 0.4
Negative = Flow Down
Positive = Flow Up
360
365
370
375
380
385
-90
-95
-100
-105
-110
-115
-120
no flow under ambient or pumped conditions
Packer
Sample Interval
(380 - 391 feet)
Transmissivity = 1.1
PCE = 300
TCE = 24

HAGER-RICHTER GEOSCIENCE, INC.

8 Industrial Way - D10
Salem, NH 03079
Phone: 603-893-9944
Fax: 603-893-8313

BOREHOLE: MW-16R BOREHOLE IMAGE & FLOW LOGS

DATE LOGGED: September 13, 2010

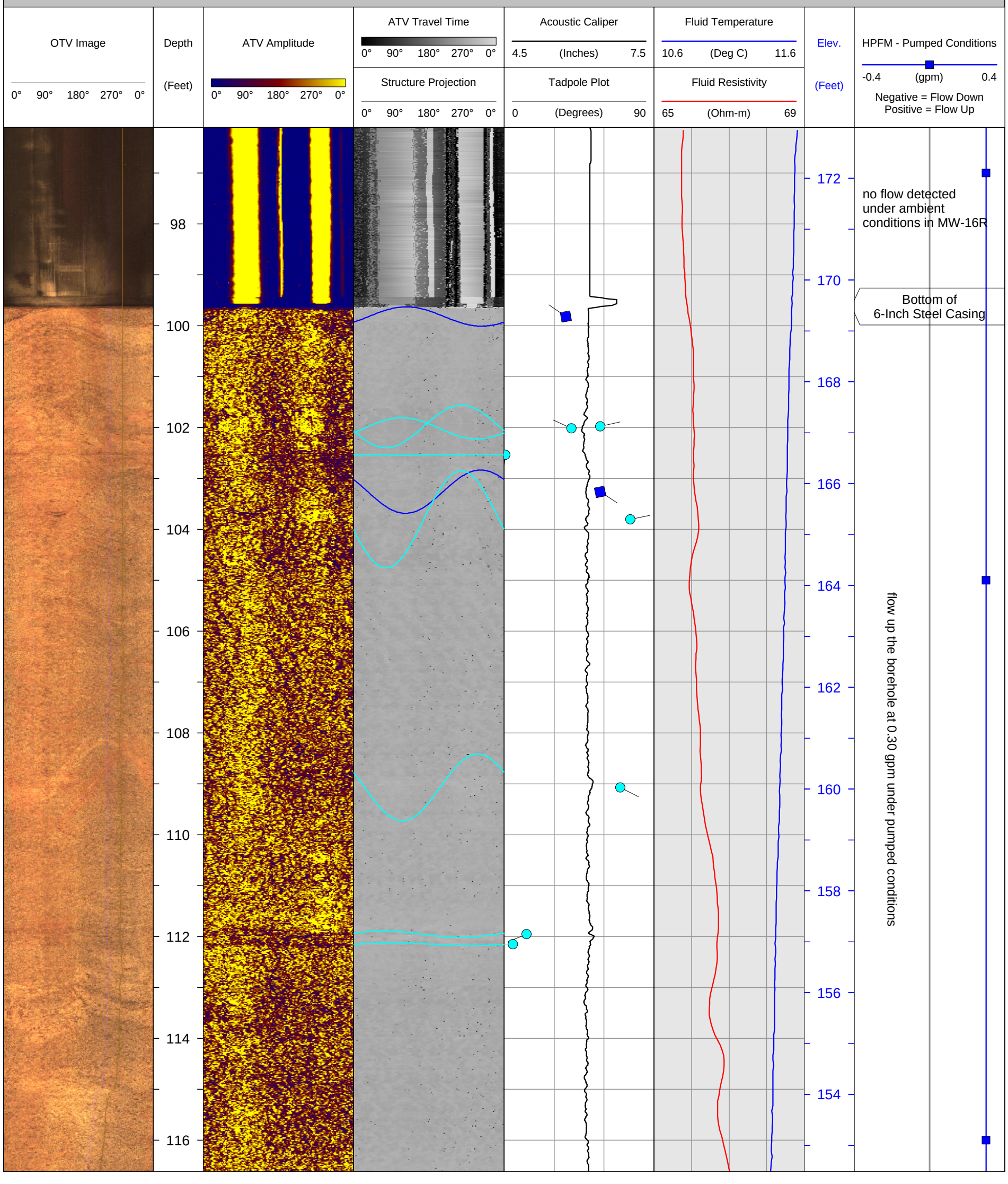
CLIENT:	Weston Solutions, Inc.	H-R FILE:	10RG30
PROJECT:	Borehole Geophysical Logging	LOG DATUM:	Top of the 6-Inch Steel Casing
LOCATION:	Savage Municipal Water Supply Superfund Site	TOP OF CASING ELEVATION:	269.1 Feet
CITY, STATE:	Milford, New Hampshire	ORIENTATION REFERENCE:	True North (Declination = 15 Degrees West)
LOGGING GEOPHYSICISTS:	Nick DeCristofaro & Eric Rickert	CASING STICK-UP:	1.7 Feet Above the Ground Surface
CLIENT REP. ON-SITE:	Andrew Fuller	BOREHOLE DIAMETER:	6 Inches to 143 Feet & 5 Inches to 390 Feet
LOGS PROCESSED BY:	Robert Garfield	WATER LEVEL DEPTH:	10.6 Feet

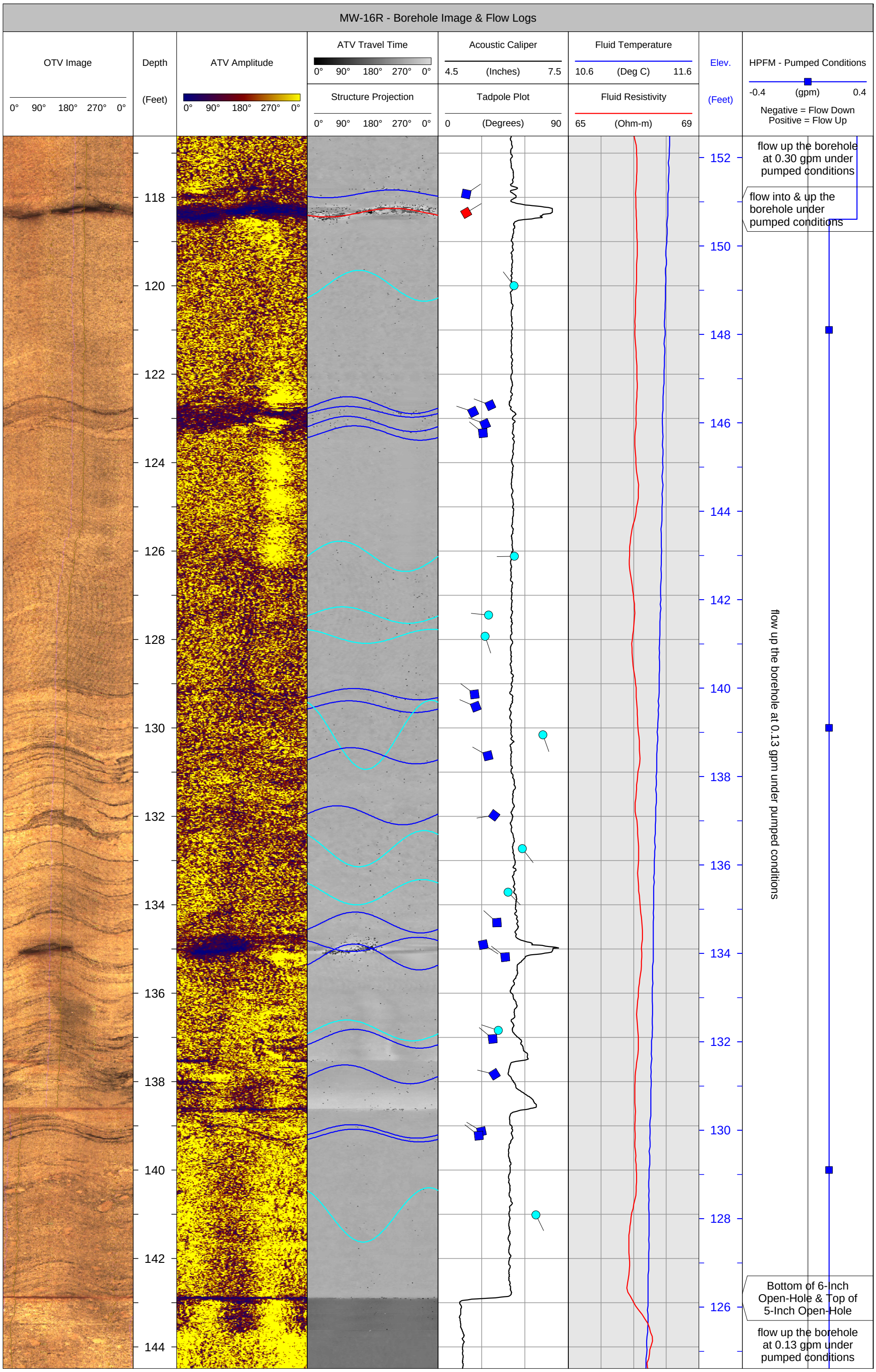
STRUCTURE LEGEND

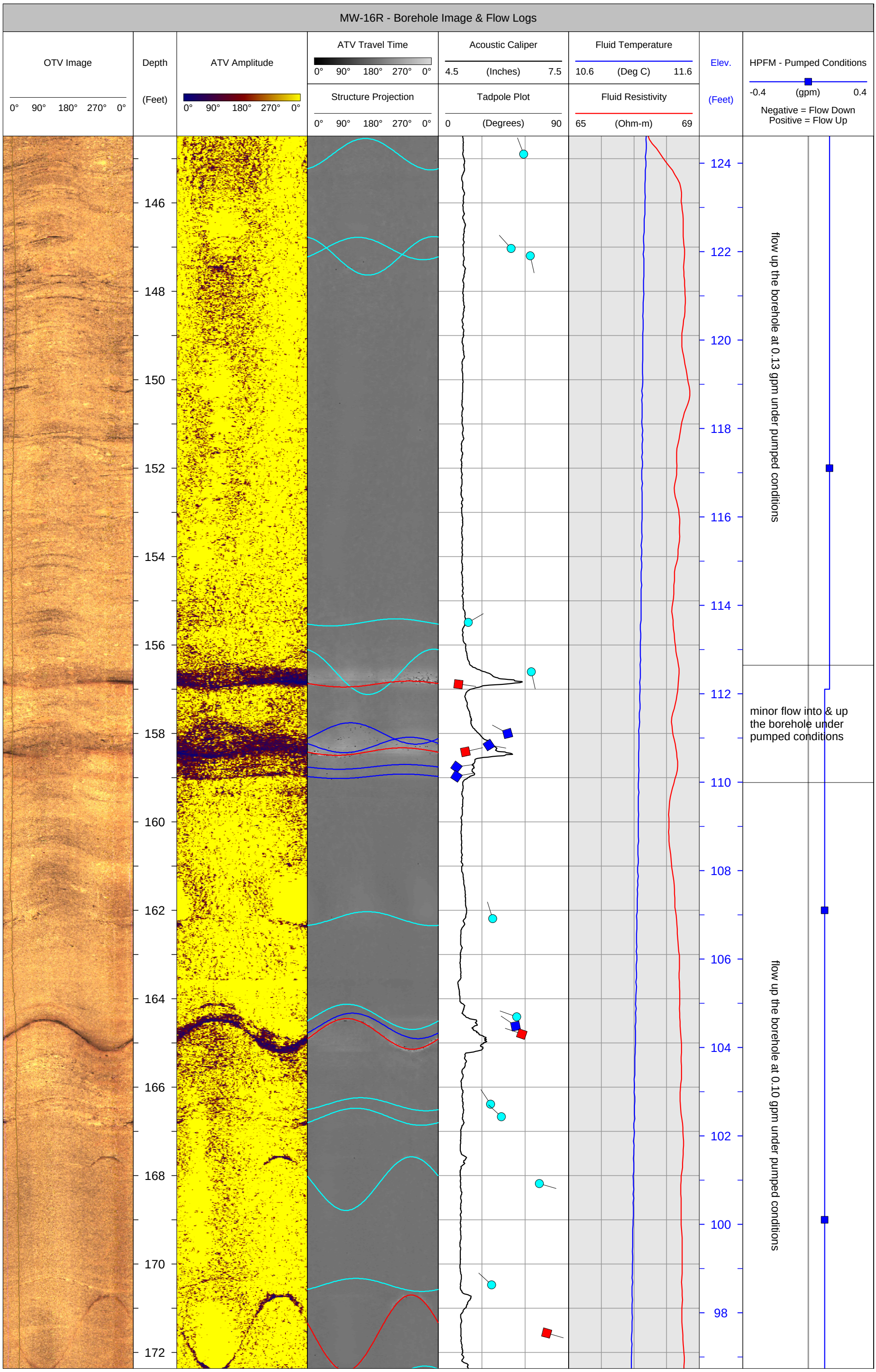
Fracture Rank 1 Fracture Rank 2 Fracture Rank 3

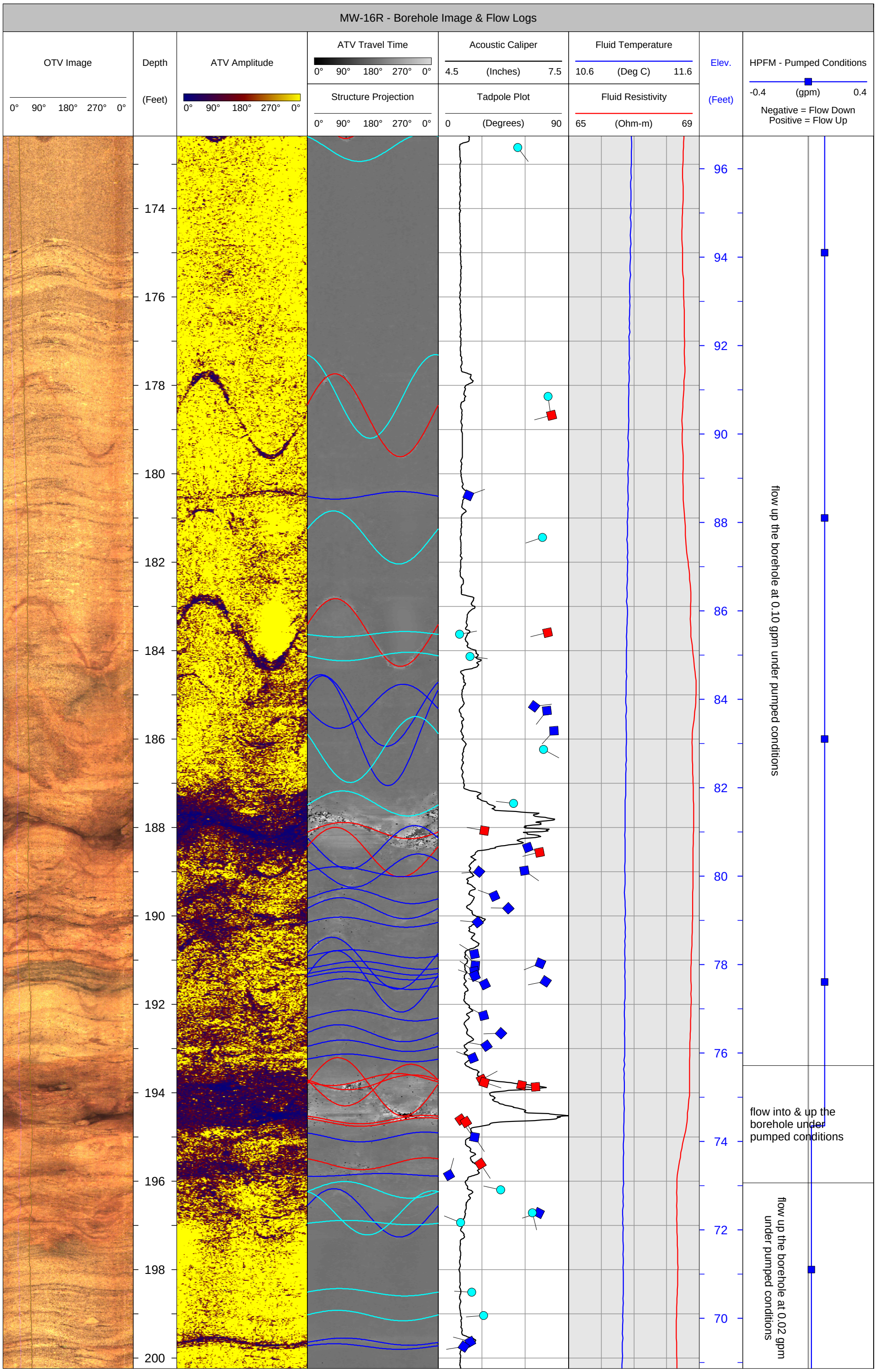
NOTES: HPFM data under ambient conditions are not plotted in the logs below because flow was not detected under ambient conditions.
During HPFM logging under pumped conditions water was pumped from the borehole at 0.3 gpm from inside the casing.

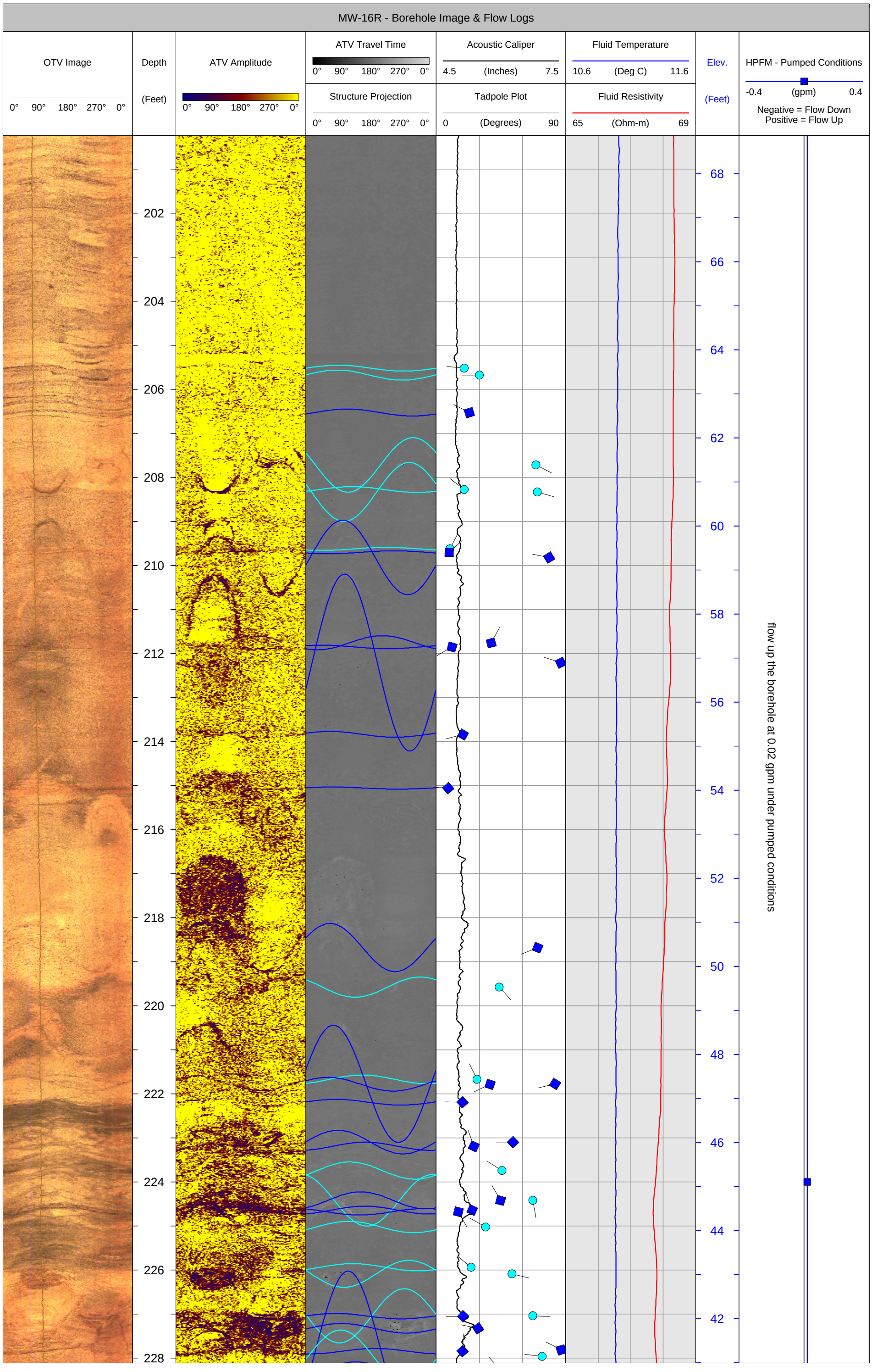
MW-16R - Borehole Image & Flow Logs

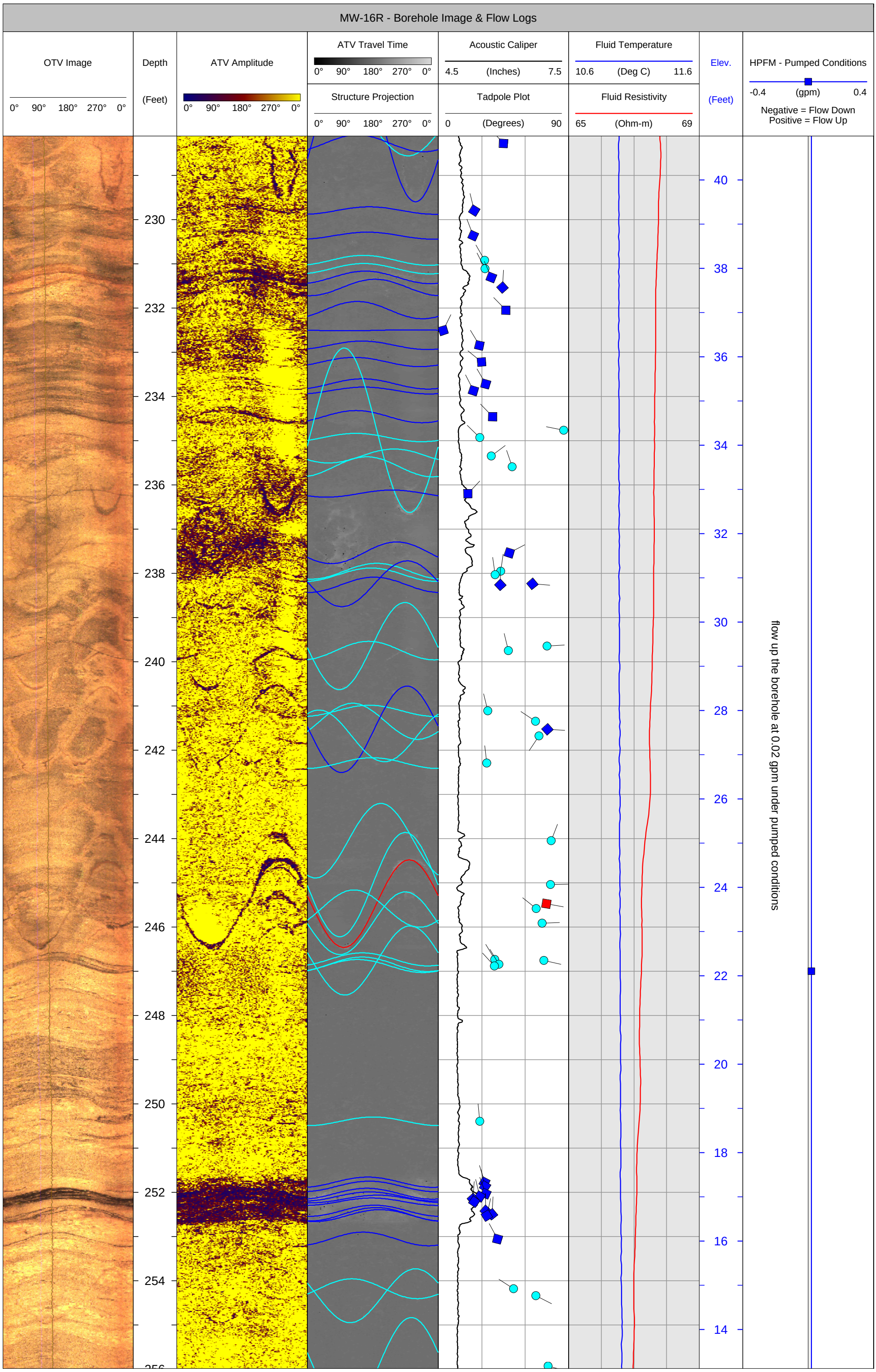


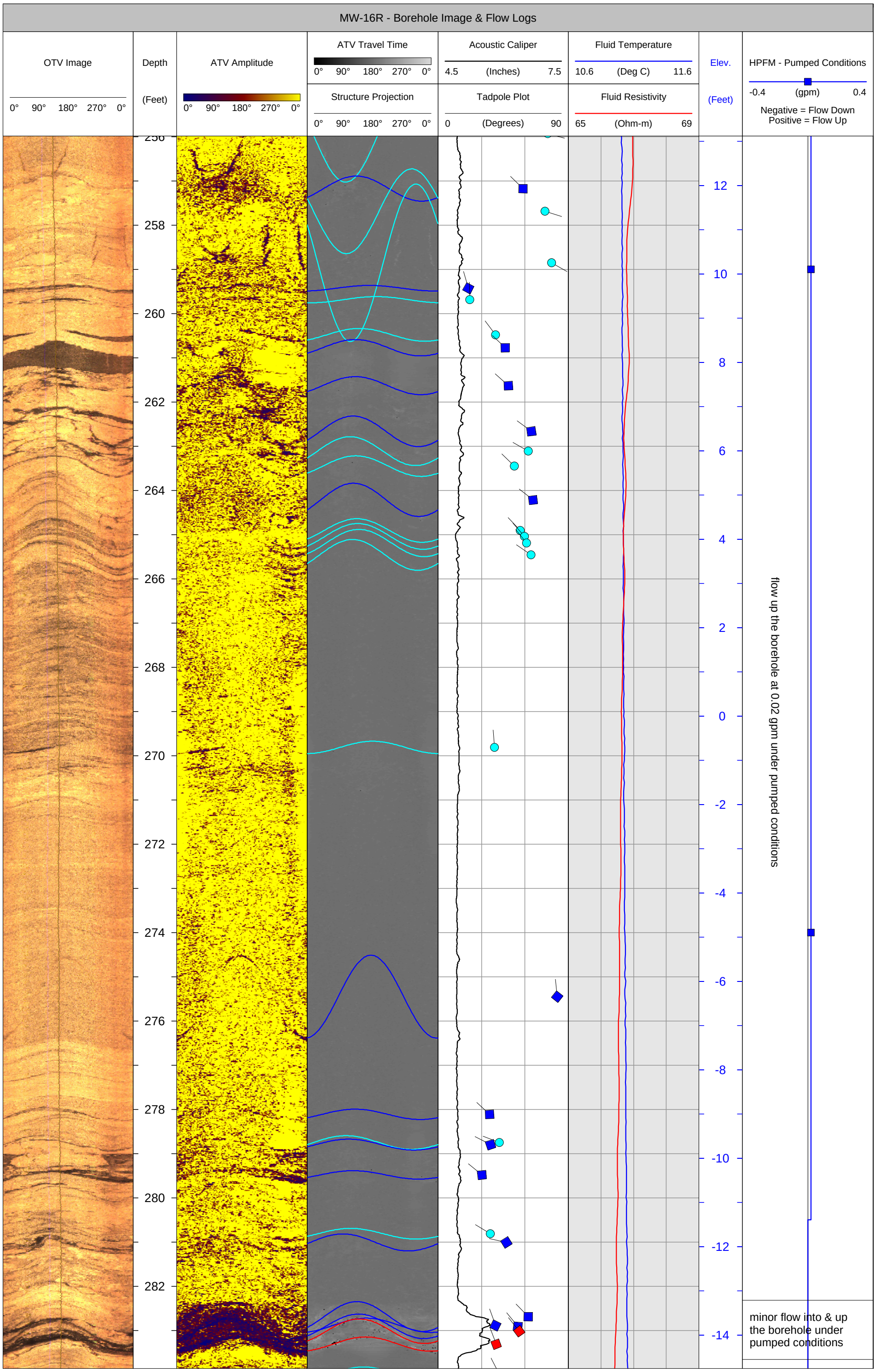

MW-16R - Borehole Image & Flow Logs
OTV Image
0° 90° 180° 270° 0°
Depth
(Feet)
ATV Amplitude
0° 90° 180° 270° 0°
ATV Travel Time
0° 90° 180° 270° 0°
Structure Projection
0° 90° 180° 270° 0°
Acoustic Caliper
4.5 (Inches) 7.5
Tadpole Plot
0 (Degrees) 90
Fluid Temperature
10.6 (Deg C) 11.6
Fluid Resistivity
65 (Ohm-m) 69
Elev.
(Feet)
HPFM - Pumped Conditions
-0.4 (gpm) 0.4
Negative = Flow Down
Positive = Flow Up
118
120
122
124
126
128
130
132
134
136
138
140
142
144
152
150
148
146
144
142
140
138
136
134
132
130
128
126
flow up the borehole at 0.30 gpm under pumped conditions
flow into & up the borehole under pumped conditions
flow up the borehole at 0.13 gpm under pumped conditions
Bottom of 6-Inch Open-Hole & Top of 5-Inch Open-Hole
flow up the borehole at 0.13 gpm under pumped conditions

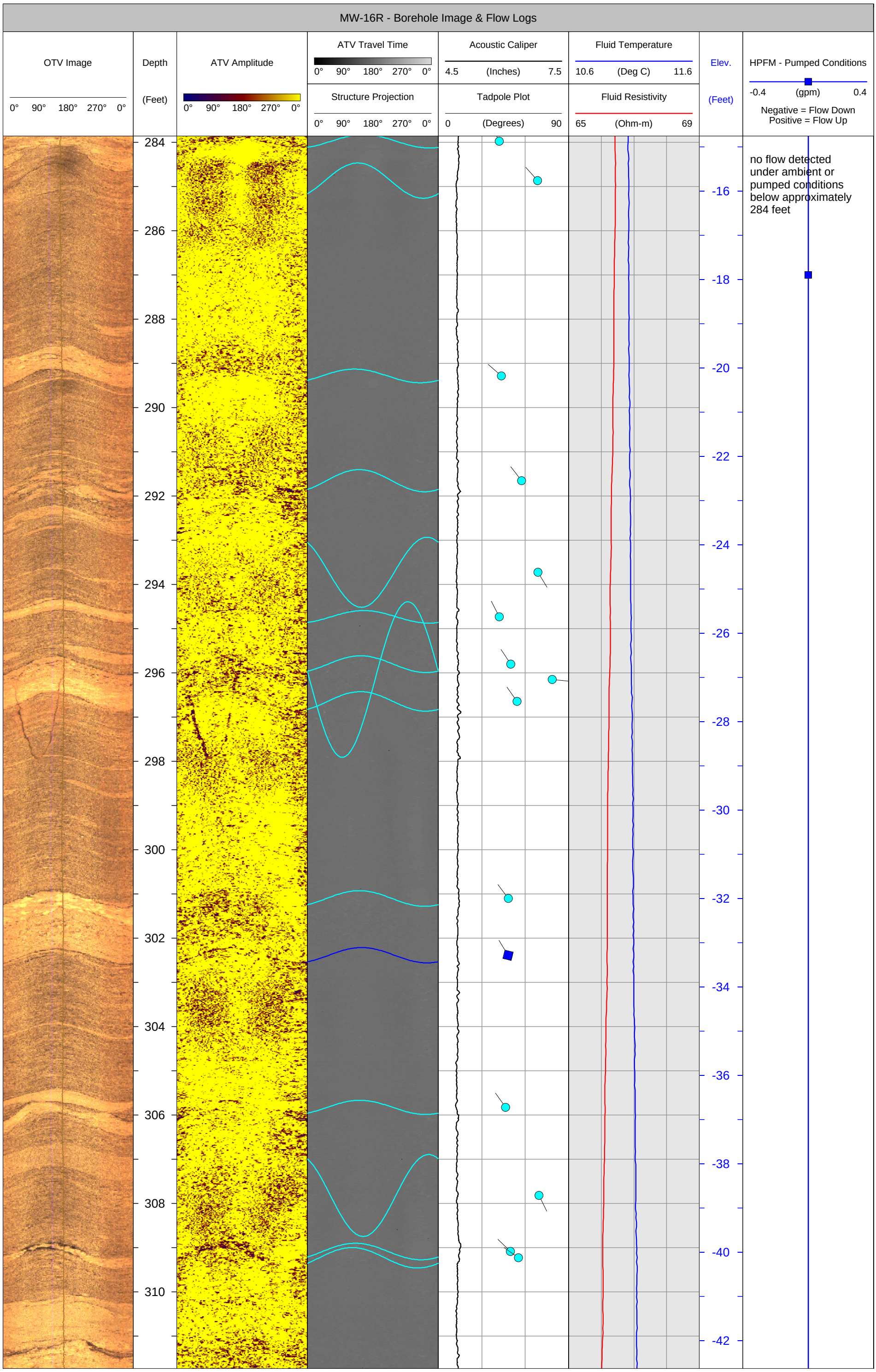

MW-16R - Borehole Image & Flow Logs
OTV Image
0° 90° 180° 270° 0°
Depth
(Feet)
ATV Amplitude
0° 90° 180° 270° 0°
ATV Travel Time
0° 90° 180° 270° 0°
Structure Projection
0° 90° 180° 270° 0°
Acoustic Caliper
4.5 (Inches) 7.5
Tadpole Plot
0 (Degrees) 90
Fluid Temperature
10.6 (Deg C) 11.6
Fluid Resistivity
65 (Ohm-m) 69
Elev.
(Feet)
HPFM - Pumped Conditions
-0.4 (gpm) 0.4
Negative = Flow Down
Positive = Flow Up
146
148
150
152
154
156
158
160
162
164
166
168
170
172
124
122
120
118
116
114
112
110
108
106
104
102
100
98
flow up the borehole at 0.13 gpm under pumped conditions
minor flow into & up the borehole under pumped conditions
flow up the borehole at 0.10 gpm under pumped conditions

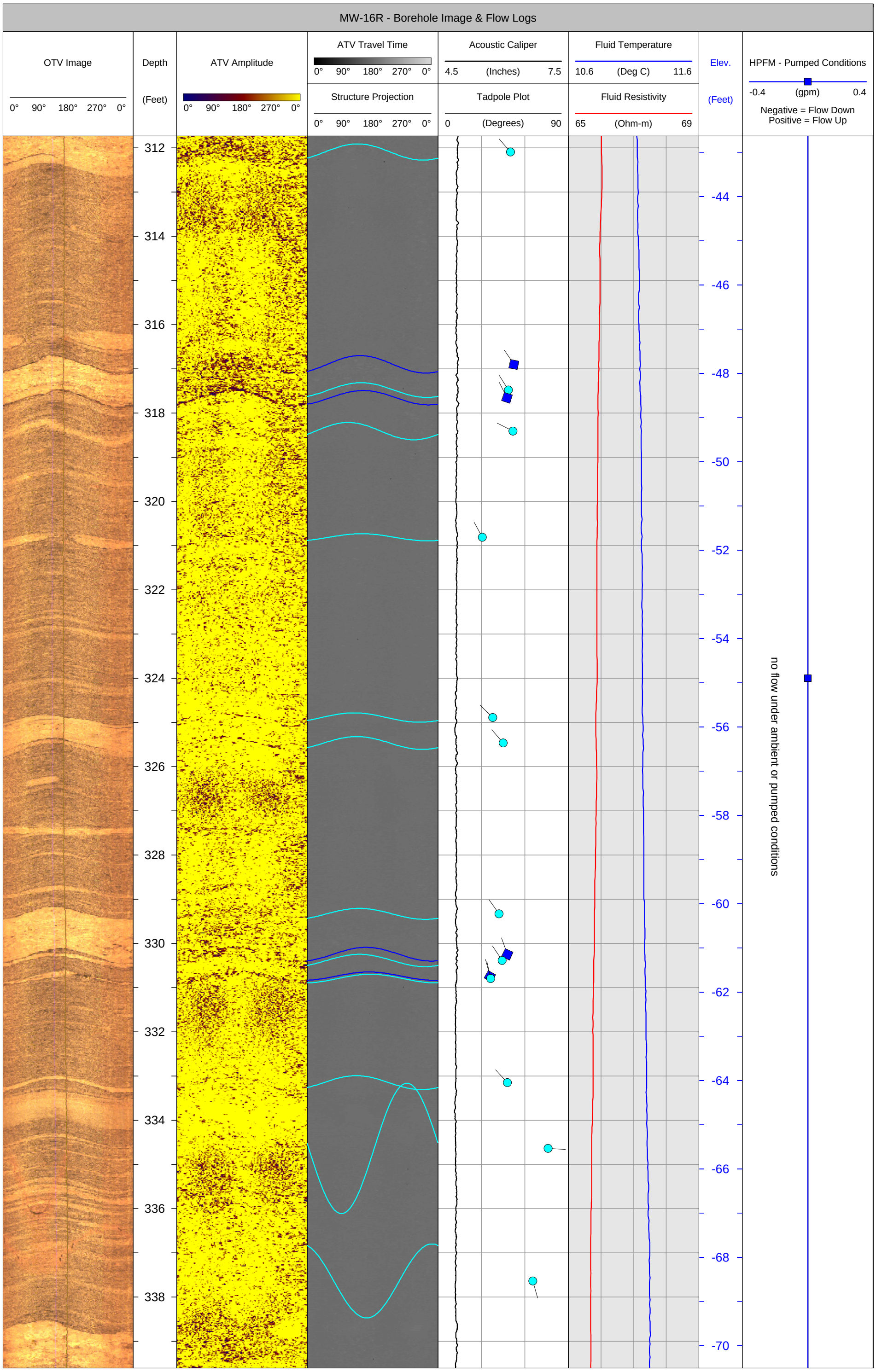

MW-16R - Borehole Image & Flow Logs
OTV Image
0° 90° 180° 270° 0°
Depth
(Feet)
ATV Amplitude
0° 90° 180° 270° 0°
ATV Travel Time
0° 90° 180° 270° 0°
Structure Projection
0° 90° 180° 270° 0°
Acoustic Caliper
4.5 (Inches) 7.5
Tadpole Plot
0 (Degrees) 90
Fluid Temperature
10.6 (Deg C) 11.6
Fluid Resistivity
65 (Ohm-m) 69
Elev.
(Feet)
HPFM - Pumped Conditions
-0.4 (gpm) 0.4
Negative = Flow Down
Positive = Flow Up
174
176
178
180
182
184
186
188
190
192
194
196
198
200
96
94
92
90
88
86
84
82
80
78
76
74
72
70
flow up the borehole at 0.10 gpm under pumped conditions
flow into & up the borehole under pumped conditions
flow up the borehole at 0.02 gpm under pumped conditions

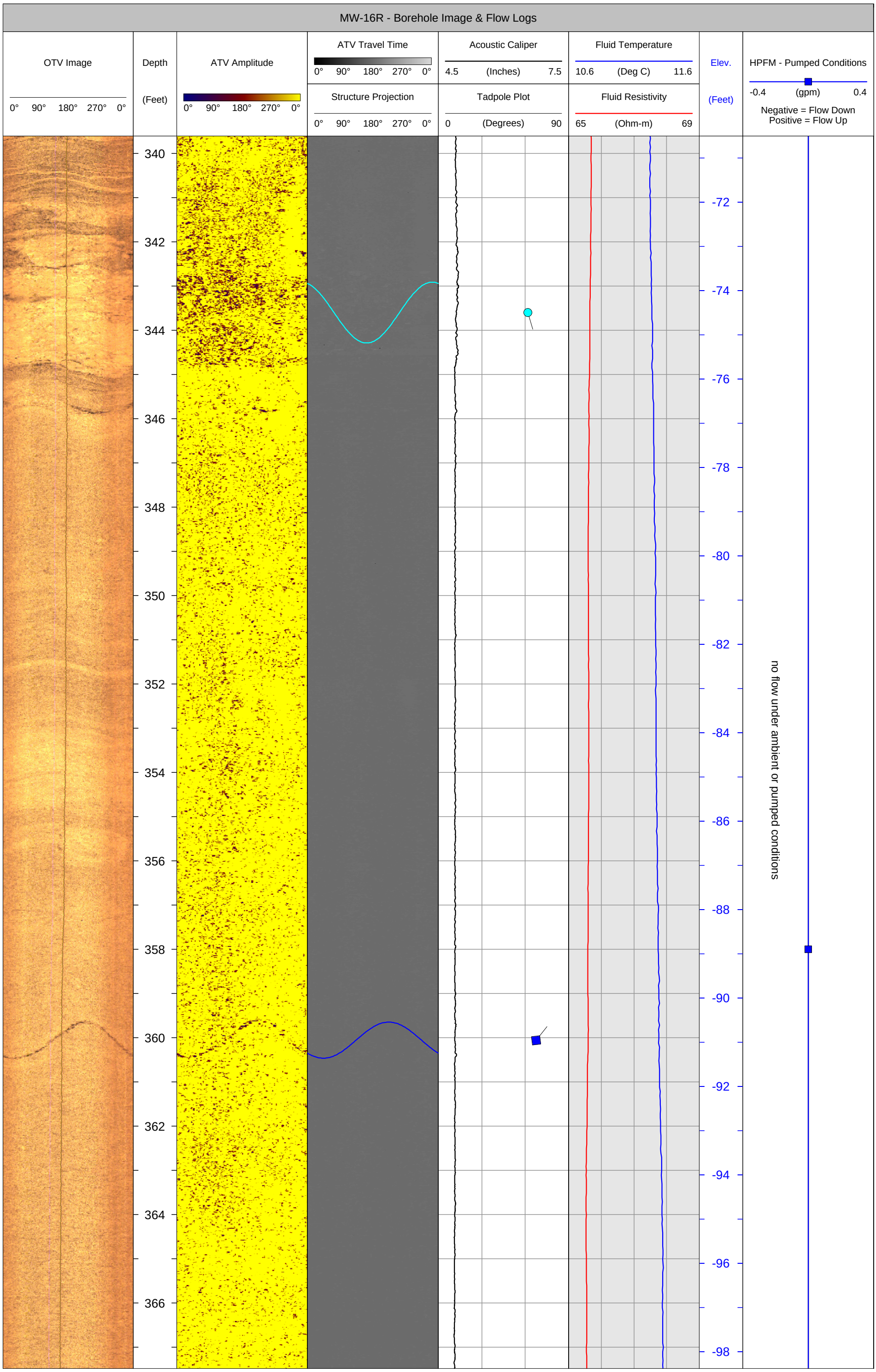

MW-16R - Borehole Image & Flow Logs
OTV Image
0° 90° 180° 270° 0°
Depth
(Feet)
ATV Amplitude
0° 90° 180° 270° 0°
ATV Travel Time
0° 90° 180° 270° 0°
Structure Projection
0° 90° 180° 270° 0°
Acoustic Caliper
4.5 (Inches) 7.5
Tadpole Plot
0 (Degrees) 90
Fluid Temperature
10.6 (Deg C) 11.6
Fluid Resistivity
65 (Ohm-m) 69
Elev.
(Feet)
HPFM - Pumped Conditions
-0.4 (gpm) 0.4
Negative = Flow Down
Positive = Flow Up
202
204
206
208
210
212
214
216
218
220
222
224
226
228
68
66
64
62
60
58
56
54
52
50
48
46
44
42
flow up the borehole at 0.02 gpm under pumped conditions

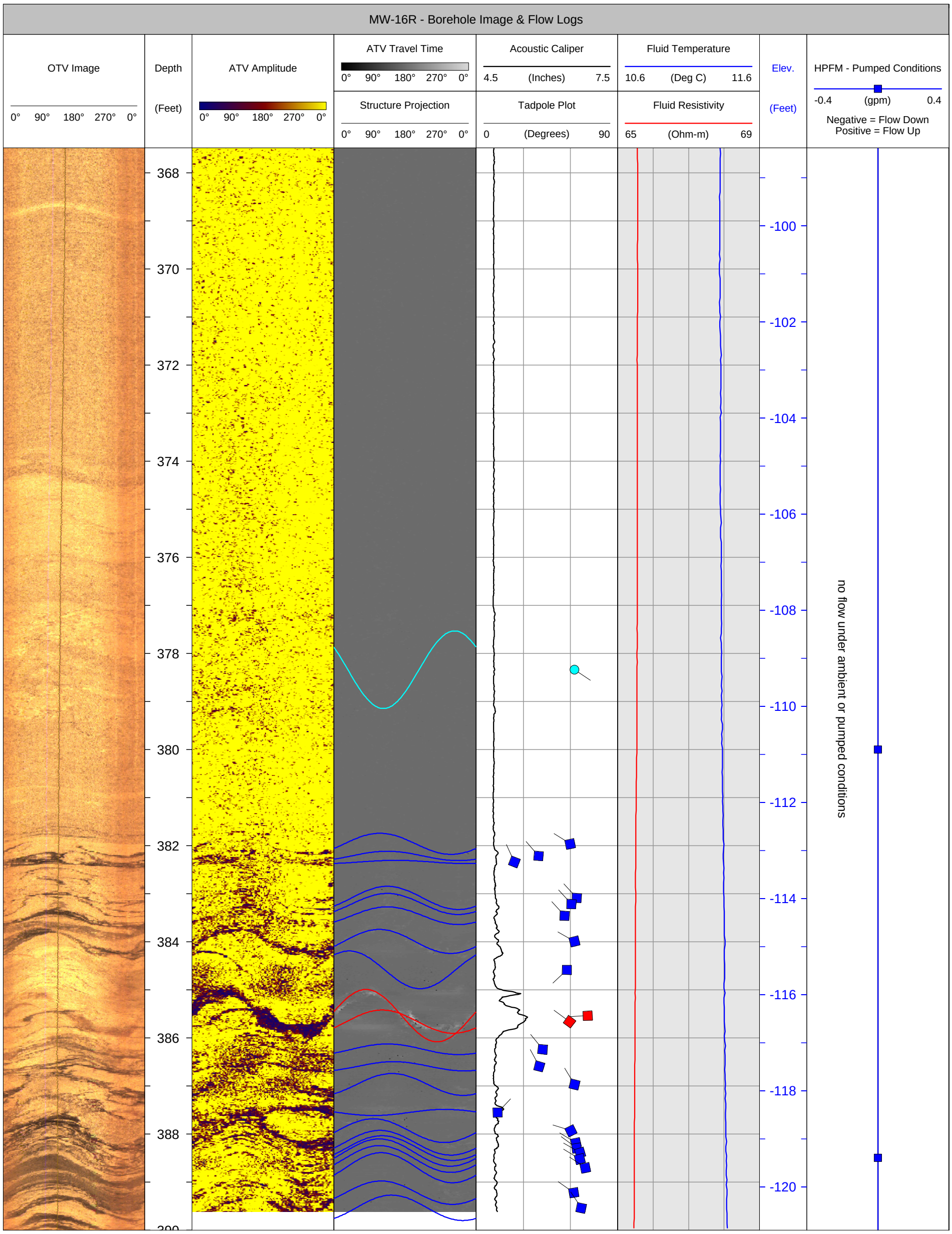

MW-16R - Borehole Image & Flow Logs
OTV Image
0° 90° 180° 270° 0°
Depth
(Feet)
ATV Amplitude
0° 90° 180° 270° 0°
ATV Travel Time
0° 90° 180° 270° 0°
Structure Projection
0° 90° 180° 270° 0°
Acoustic Caliper
4.5 (Inches) 7.5
Tadpole Plot
0 (Degrees) 90
Fluid Temperature
10.6 (Deg C) 11.6
Fluid Resistivity
65 (Ohm-m) 69
Elev.
(Feet)
HPFM - Pumped Conditions
-0.4 (gpm) 0.4
Negative = Flow Down
Positive = Flow Up
230
232
234
236
238
240
242
244
246
248
250
252
254
40
38
36
34
32
30
28
26
24
22
20
18
16
14
flow up the borehole at 0.02 gpm under pumped conditions


MW-16R - Borehole Image & Flow Logs
OTV Image
0° 90° 180° 270° 0°
Depth
(Feet)
ATV Amplitude
0° 90° 180° 270° 0°
ATV Travel Time
0° 90° 180° 270° 0°
Structure Projection
0° 90° 180° 270° 0°
Acoustic Caliper
4.5 (Inches) 7.5
Tadpole Plot
0 (Degrees) 90
Fluid Temperature
10.6 (Deg C) 11.6
Fluid Resistivity
65 (Ohm-m) 69
Elev.
(Feet)
HPFM - Pumped Conditions
-0.4 (gpm) 0.4
Negative = Flow Down
Positive = Flow Up
256
258
260
262
264
266
268
270
272
274
276
278
280
282
12
10
8
6
4
2
0
-2
-4
-6
-8
-10
-12
-14
flow up the borehole at 0.02 gpm under pumped conditions
minor flow into & up the borehole under pumped conditions


MW-16R - Borehole Image & Flow Logs
OTV Image
0° 90° 180° 270° 0°
Depth
(Feet)
ATV Amplitude
0° 90° 180° 270° 0°
ATV Travel Time
0° 90° 180° 270° 0°
Structure Projection
0° 90° 180° 270° 0°
Acoustic Caliper
4.5 (Inches) 7.5
Tadpole Plot
0 (Degrees) 90
Fluid Temperature
10.6 (Deg C) 11.6
Fluid Resistivity
65 (Ohm-m) 69
Elev.
(Feet)
HPFM - Pumped Conditions
-0.4 (gpm) 0.4
Negative = Flow Down
Positive = Flow Up
no flow detected under ambient or pumped conditions below approximately 284 feet
284
286
288
290
292
294
296
298
300
302
304
306
308
310
-16
-18
-20
-22
-24
-26
-28
-30
-32
-34
-36
-38
-40
-42


MW-16R - Borehole Image & Flow Logs
OTV Image
0° 90° 180° 270° 0°
Depth
(Feet)
ATV Amplitude
0° 90° 180° 270° 0°
ATV Travel Time
0° 90° 180° 270° 0°
Structure Projection
0° 90° 180° 270° 0°
Acoustic Caliper
4.5 (Inches) 7.5
Tadpole Plot
0 (Degrees) 90
Fluid Temperature
10.6 (Deg C) 11.6
Fluid Resistivity
65 (Ohm-m) 69
Elev.
(Feet)
HPFM - Pumped Conditions
-0.4 (gpm) 0.4
Negative = Flow Down
Positive = Flow Up
312
314
316
318
320
322
324
326
328
330
332
334
336
338
-44
-46
-48
-50
-52
-54
-56
-58
-60
-62
-64
-66
-68
-70
no flow under ambient or pumped conditions


MW-16R - Borehole Image & Flow Logs
OTV Image
0° 90° 180° 270° 0°
Depth
(Feet)
ATV Amplitude
0° 90° 180° 270° 0°
ATV Travel Time
0° 90° 180° 270° 0°
Structure Projection
0° 90° 180° 270° 0°
Acoustic Caliper
4.5 (Inches) 7.5
Tadpole Plot
0 (Degrees) 90
Fluid Temperature
10.6 (Deg C) 11.6
Fluid Resistivity
65 (Ohm-m) 69
Elev.
(Feet)
HPFM - Pumped Conditions
-0.4 (gpm) 0.4
Negative = Flow Down
Positive = Flow Up
340
342
344
346
348
350
352
354
356
358
360
362
364
366
-72
-74
-76
-78
-80
-82
-84
-86
-88
-90
-92
-94
-96
-98
no flow under ambient or pumped conditions


MW-16R - Borehole Image & Flow Logs
OTV Image
0° 90° 180° 270° 0°
Depth
(Feet)
ATV Amplitude
0° 90° 180° 270° 0°
ATV Travel Time
0° 90° 180° 270° 0°
Structure Projection
0° 90° 180° 270° 0°
Acoustic Caliper
4.5 (Inches) 7.5
Tadpole Plot
0 (Degrees) 90
Fluid Temperature
10.6 (Deg C) 11.6
Fluid Resistivity
65 (Ohm-m) 69
Elev.
(Feet)
HPFM - Pumped Conditions
-0.4 (gpm) 0.4
Negative = Flow Down
Positive = Flow Up
368
370
372
374
376
378
380
382
384
386
388
-100
-102
-104
-106
-108
-110
-112
-114
-116
-118
-120
no flow under ambient or pumped conditions

APPENDIX 2

BEDROCK STRUCTURE STATISTICS PLOTS

HAGER-RICHTER GEOSCIENCE, INC.

8 Industrial Way - D10
Salem, NH 03079
Phone: 603-893-9944
Fax: 603-893-8313

FRACTURE STATISTICS PLOTS

BOREHOLE: BR-3

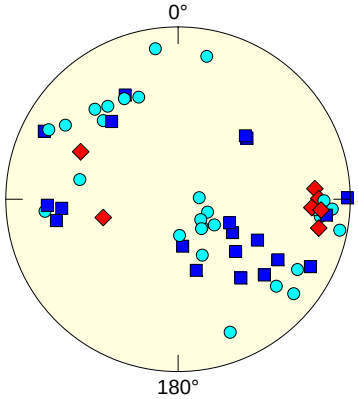
CLIENT:	Weston Solutions, Inc.	H-R FILE:	10RG30
PROJECT:	Savage Municipal Water Supply Superfund Site	DATE LOGGED:	September 16, 2010
CITY:	Milford	ORIENTATION REFERENCE:	True North
STATE:	New Hampshire	MAGNETIC DECLINATION:	15 Degrees West

STRUCTURE LEGEND

Fracture Rank 1 ● Fracture Rank 2 ■ Fracture Rank 3 ◆

Stereogram - Lower Hemisphere of Fractures

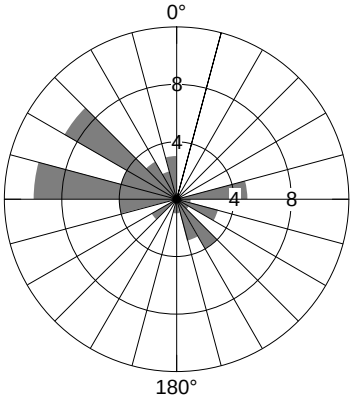
Schmidt Plot - LH - Bedrock Structures



	Counts	Dip[deg]	Azi[deg]
Mean	56	55.03	285.93
●	28	53.90	279.33
■	21	53.69	298.38
◆	7	63.18	270.95

Dip Azimuth Rose Diagram of Fractures

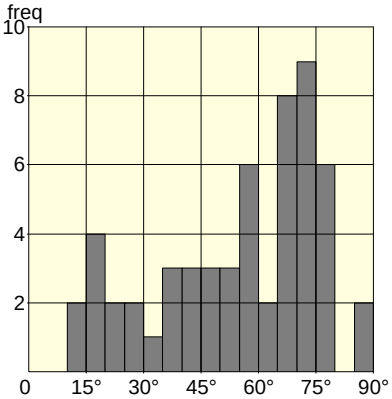
Azimuth - Absolute (Count)



Counts:	56.00
Mean:	285.93
Std.Dev.:	89.45
Min:	76.16
Max:	357.58

Dip Angle Histogram of Fractures

Dip Histogram (Count)



Counts:	56.00
Mean:	55.03
Std.Dev.:	20.85
Min:	10.28
Max:	88.18

HAGER-RICHTER GEOSCIENCE, INC.

8 Industrial Way - D10
Salem, NH 03079
Phone: 603-893-9944
Fax: 603-893-8313

FRACTURE STATISTICS PLOTS

BOREHOLE: BR-5

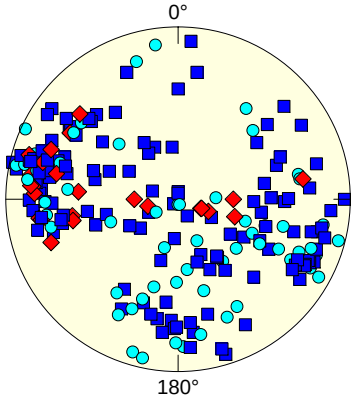
CLIENT:	Weston Solutions, Inc.	H-R FILE:	10RG30
PROJECT:	Savage Municipal Water Supply Superfund Site	DATE LOGGED:	September 14, 2010
CITY:	Milford	ORIENTATION REFERENCE:	True North
STATE:	New Hampshire	MAGNETIC DECLINATION:	15 Degrees West

STRUCTURE LEGEND

Fracture Rank 1 ● Fracture Rank 2 ■ Fracture Rank 3 ◆

Stereogram - Lower Hemisphere of Fractures

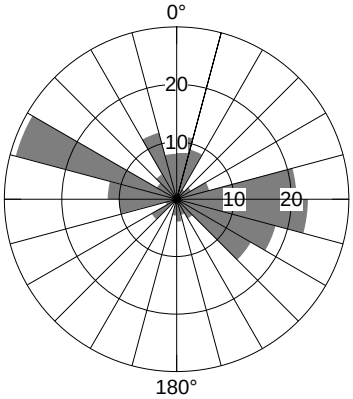
Schmidt Plot - LH - Bedrock Structures



	Counts	Dip[deg]	Azi[deg]
Mean	210	56.16	37.98
■	128	56.37	50.93
◆	24	52.90	91.50
●	58	57.03	351.72

Dip Azimuth Rose Diagram of Fractures

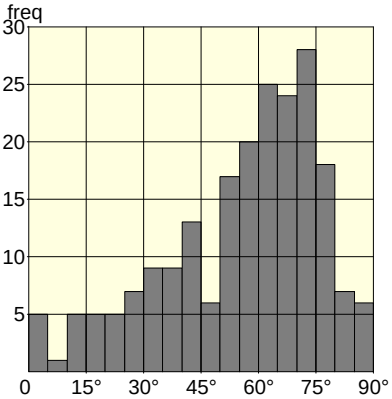
Azimuth - Absolute (Count)



Counts:	210.00
Mean:	37.98
Std.Dev.:	106.38
Min:	0.77
Max:	359.15

Dip Angle Histogram of Fractures

Dip Histogram (Count)



Counts:	210.00
Mean:	56.16
Std.Dev.:	20.37
Min:	2.81
Max:	88.40

HAGER-RICHTER GEOSCIENCE, INC.

8 Industrial Way - D10
Salem, NH 03079
Phone: 603-893-9944
Fax: 603-893-8313

FRACTURE STATISTICS PLOTS

BOREHOLE: BR-6

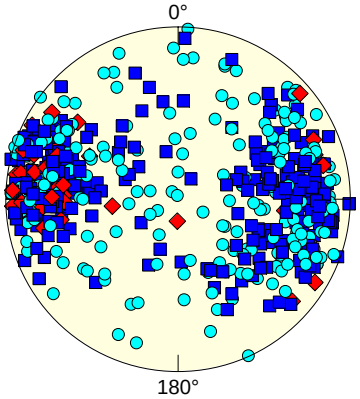
CLIENT:	Weston Solutions, Inc.	H-R FILE:	10RG30
PROJECT:	Savage Municipal Water Supply Superfund Site	DATE LOGGED:	September 15, 2010
CITY:	Milford	ORIENTATION REFERENCE:	True North
STATE:	New Hampshire	MAGNETIC DECLINATION:	15 Degrees West

STRUCTURE LEGEND

Fracture Rank 1 ● Fracture Rank 2 ■ Fracture Rank 3 ◆

Stereogram - Lower Hemisphere of Fractures

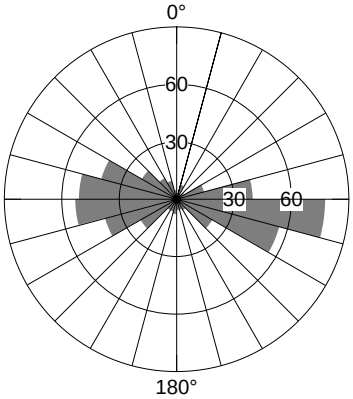
Schmidt Plot - LH - Bedrock Structures



	Counts	Dip[deg]	Azi[deg]
Mean	524	61.06	202.60
◆	40	68.41	99.43
●	223	59.59	241.83
■	261	61.17	202.85

Dip Azimuth Rose Diagram of Fractures

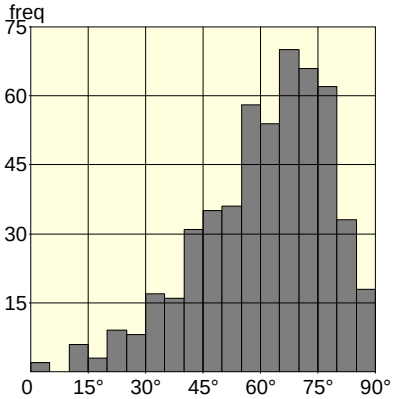
Azimuth - Absolute (Count)



Counts:	524.00
Mean:	202.60
Std.Dev.:	131.83
Min:	2.51
Max:	357.10

Dip Angle Histogram of Fractures

Dip Histogram (Count)



Counts:	524.00
Mean:	61.06
Std.Dev.:	16.80
Min:	2.10
Max:	89.99

HAGER-RICHTER GEOSCIENCE, INC.

8 Industrial Way - D10
Salem, NH 03079
Phone: 603-893-9944
Fax: 603-893-8313

FRACTURE STATISTICS PLOTS

BOREHOLE: MW-16R

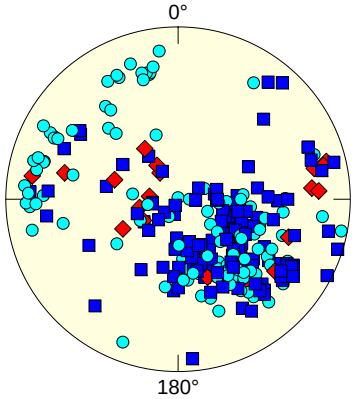
CLIENT:	Weston Solutions, Inc.	H-R FILE:	10RG30
PROJECT:	Savage Municipal Water Supply Superfund Site	DATE LOGGED:	September 13, 2010
CITY:	Milford	ORIENTATION REFERENCE:	True North
STATE:	New Hampshire	MAGNETIC DECLINATION:	15 Degrees West

STRUCTURE LEGEND

Fracture Rank 1 ■ Fracture Rank 2 ◆ Fracture Rank 3

Stereogram - Lower Hemisphere of Fractures

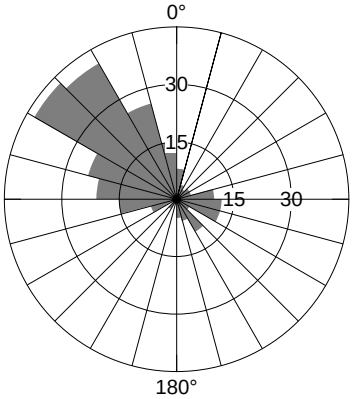
Schmidt Plot - LH - Bedrock Structures



	Counts	Dip[deg]	Azi[deg]
Mean	279	45.42	318.39
■	137	41.31	315.20
●	121	49.75	325.53
◆	21	47.29	121.75

Dip Azimuth Rose Diagram of Fractures

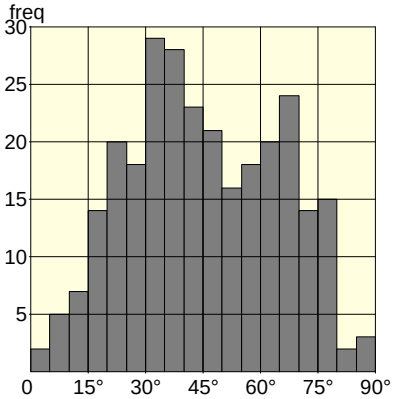
Azimuth - Absolute (Count)



Counts:	279.00
Mean:	318.39
Std.Dev.:	73.11
Min:	0.37
Max:	358.89

Dip Angle Histogram of Fractures

Dip Histogram (Count)



Counts:	279.00
Mean:	45.42
Std.Dev.:	19.64
Min:	0.71
Max:	86.83

APPENDIX 3

TABLES OF BEDROCK STRUCTURES

HAGER-RICHTER GEOSCIENCE, INC.	
TABLE OF BEDROCK STRUCTURES FOR BOREHOLE BR-3 (Bottom 100 Feet)	
CLIENT	Weston Solutions, Inc.
PROJECT	Savage Municipal Water Supply Superfund Site
CITY, STATE	Milford, New Hampshire
H-R FILE	10RG30
DATE LOGGED	September 16, 2010
LOG DATUM	Top of the 6-Inch Steel Casing (TOC)
TOC ELEVATION	274.7 Feet
DIP AZIMUTH	Referenced to True North
DECLINATION	15 Degrees West
DIP ANGLE	Measured from Horizontal

TABLE OF BEDROCK STRUCTURES FOR BOREHOLE BR-3 (Bottom 100 Feet)

Depth (feet)	Elevation (feet)	Dip Azimuth (degrees)	Dip Angle (degrees)	Bedrock Structure Category
400.1	-125.4	137	61	Fracture Rank 1
400.8	-126.1	137	53	Fracture Rank 1
401.1	-126.4	153	58	Fracture Rank 2
401.5	-126.8	192	74	Fracture Rank 1
403.1	-128.4	281	85	Fracture Rank 1
405.5	-130.8	143	57	Fracture Rank 1
405.6	-130.9	159	54	Fracture Rank 1
413.0	-138.3	101	49	Fracture Rank 1
416.5	-141.8	346	35	Fracture Rank 2
425.3	-150.6	117	77	Fracture Rank 2
428.5	-153.8	76	37	Fracture Rank 3
429.1	-154.4	312	65	Fracture Rank 1
429.3	-154.6	338	72	Fracture Rank 1
432.1	-157.4	266	10	Fracture Rank 1
432.3	-157.6	313	37	Fracture Rank 2
434.2	-159.5	321	49	Fracture Rank 2
434.4	-159.7	116	53	Fracture Rank 3
436.8	-162.1	272	72	Fracture Rank 2
437.4	-162.7	302	31	Fracture Rank 2
440.5	-165.8	277	72	Fracture Rank 1
441.1	-166.4	274	79	Fracture Rank 1
442.4	-167.7	274	70	Fracture Rank 1
442.7	-168.0	265	69	Fracture Rank 3
443.2	-168.5	269	71	Fracture Rank 3
443.5	-168.8	274	67	Fracture Rank 3
444.9	-170.2	271	74	Fracture Rank 1
445.1	-170.4	276	76	Fracture Rank 2
445.1	-170.4	139	50	Fracture Rank 2
446.2	-171.5	171	77	Fracture Rank 1
447.2	-172.5	123	68	Fracture Rank 1
447.2	-172.5	282	73	Fracture Rank 3
449.3	-174.6	309	76	Fracture Rank 1
450.3	-175.6	119	74	Fracture Rank 1
452.2	-177.5	274	72	Fracture Rank 3

TABLE OF BEDROCK STRUCTURES FOR BOREHOLE BR-3 (Bottom 100 Feet)

Depth (feet)	Elevation (feet)	Dip Azimuth (degrees)	Dip Angle (degrees)	Bedrock Structure Category
456.6	-181.9	152	56	Fracture Rank 1
458.1	-183.4	300	70	Fracture Rank 1
458.7	-184.0	294	15	Fracture Rank 1
459.3	-184.6	297	75	Fracture Rank 2
459.5	-184.8	319	18	Fracture Rank 1
467.1	-192.4	295	27	Fracture Rank 2
468.5	-193.8	311	15	Fracture Rank 1
471.1	-196.4	354	23	Fracture Rank 2
472.0	-197.3	306	21	Fracture Rank 1
473.5	-198.8	85	67	Fracture Rank 1
476.9	-202.2	87	65	Fracture Rank 2
478.6	-203.9	228	45	Fracture Rank 2
479.2	-204.5	311	56	Fracture Rank 2
479.4	-204.7	301	57	Fracture Rank 2
479.4	-204.7	85	58	Fracture Rank 2
480.4	-205.7	80	61	Fracture Rank 2
480.4	-205.7	269	88	Fracture Rank 2
480.6	-205.9	226	45	Fracture Rank 2
481.9	-207.2	337	29	Fracture Rank 1
495.7	-221.0	358	17	Fracture Rank 1
496.3	-221.6	321	18	Fracture Rank 1
504.0	-229.3	297	43	Fracture Rank 2

HAGER-RICHTER GEOSCIENCE, INC.	
TABLE OF BEDROCK STRUCTURES FOR BOREHOLE BR-5	
CLIENT	Weston Solutions, Inc.
PROJECT	Savage Municipal Water Supply Superfund Site
CITY, STATE	Milford, New Hampshire
H-R FILE	10RG30
DATE LOGGED	September 14, 2010
LOG DATUM	Top of the 6-Inch Steel Casing (TOC)
TOC ELEVATION	276.6 Feet
DIP AZIMUTH	Referenced to True North
DECLINATION	15 Degrees West
DIP ANGLE	Measured from Horizontal

TABLE OF BEDROCK STRUCTURES FOR BOREHOLE BR-5

Depth (feet)	Elevation (feet)	Dip Azimuth (degrees)	Dip Angle (degrees)	Bedrock Structure Category
80.9	195.7	49	3	Fracture Rank 2
81.2	195.4	299	18	Fracture Rank 2
81.3	195.3	292	12	Fracture Rank 3
81.4	195.2	293	16	Fracture Rank 3
82.3	194.3	6	19	Fracture Rank 2
82.4	194.2	292	12	Fracture Rank 3
82.9	193.7	324	37	Fracture Rank 1
83.7	192.9	267	18	Fracture Rank 1
84.3	192.3	287	44	Fracture Rank 1
84.4	192.2	17	82	Fracture Rank 1
84.5	192.1	133	39	Fracture Rank 1
86.0	190.6	16	24	Fracture Rank 1
86.8	189.8	13	84	Fracture Rank 1
89.3	187.3	344	46	Fracture Rank 1
89.8	186.8	1	40	Fracture Rank 1
90.2	186.4	4	60	Fracture Rank 2
90.4	186.3	66	16	Fracture Rank 2
90.6	186.0	90	21	Fracture Rank 3
90.7	185.9	77	15	Fracture Rank 3
94.1	182.5	269	45	Fracture Rank 2
97.6	179.0	288	34	Fracture Rank 1
98.0	178.6	304	30	Fracture Rank 2
103.5	173.1	288	28	Fracture Rank 3
103.6	173.0	271	27	Fracture Rank 3
105.5	171.1	359	3	Fracture Rank 1
106.6	170.0	358	75	Fracture Rank 1
106.8	169.8	108	76	Fracture Rank 1
108.6	168.1	353	67	Fracture Rank 2
108.6	168.1	171	80	Fracture Rank 1
110.9	165.8	108	13	Fracture Rank 2
110.9	165.7	355	76	Fracture Rank 2
110.9	165.7	350	69	Fracture Rank 1
111.1	165.5	331	61	Fracture Rank 1
112.1	164.6	156	27	Fracture Rank 2

TABLE OF BEDROCK STRUCTURES FOR BOREHOLE BR-5

Depth (feet)	Elevation (feet)	Dip Azimuth (degrees)	Dip Angle (degrees)	Bedrock Structure Category
112.2	164.4	147	26	Fracture Rank 2
112.3	164.3	7	67	Fracture Rank 2
112.7	163.9	72	42	Fracture Rank 2
112.9	163.7	1	72	Fracture Rank 1
113.2	163.4	94	69	Fracture Rank 2
114.2	162.4	271	52	Fracture Rank 2
114.3	162.3	269	54	Fracture Rank 2
114.6	162.1	89	75	Fracture Rank 2
115.0	161.6	300	37	Fracture Rank 2
115.4	161.2	158	69	Fracture Rank 2
116.4	160.3	120	27	Fracture Rank 2
116.4	160.2	115	70	Fracture Rank 2
117.2	159.4	2	64	Fracture Rank 2
117.3	159.3	136	58	Fracture Rank 2
117.3	159.3	10	60	Fracture Rank 2
117.5	159.1	132	58	Fracture Rank 2
117.8	158.8	354	61	Fracture Rank 2
118.1	158.5	19	54	Fracture Rank 2
118.2	158.4	111	60	Fracture Rank 2
118.5	158.1	123	65	Fracture Rank 2
119.1	157.5	126	80	Fracture Rank 2
119.4	157.2	149	32	Fracture Rank 2
119.4	157.2	31	51	Fracture Rank 2
119.9	156.7	343	84	Fracture Rank 2
121.4	155.2	144	53	Fracture Rank 2
122.6	154.0	127	46	Fracture Rank 2
123.2	153.4	336	37	Fracture Rank 2
125.2	151.4	316	53	Fracture Rank 2
125.4	151.2	344	80	Fracture Rank 2
126.4	150.2	180	54	Fracture Rank 2
127.3	149.3	16	31	Fracture Rank 2
128.5	148.1	124	63	Fracture Rank 2
128.5	148.1	332	72	Fracture Rank 2
129.1	147.5	112	36	Fracture Rank 2
130.0	146.6	279	41	Fracture Rank 2
130.8	145.8	239	73	Fracture Rank 2
131.1	145.5	103	88	Fracture Rank 2
132.5	144.1	345	59	Fracture Rank 2
135.6	141.0	101	85	Fracture Rank 2
137.6	139.0	102	85	Fracture Rank 1
141.0	135.6	310	37	Fracture Rank 1
142.7	133.9	103	81	Fracture Rank 1
145.7	130.9	274	78	Fracture Rank 2
146.2	130.4	16	44	Fracture Rank 1
160.5	116.1	52	23	Fracture Rank 2
167.4	109.2	33	55	Fracture Rank 1

TABLE OF BEDROCK STRUCTURES FOR BOREHOLE BR-5

Depth (feet)	Elevation (feet)	Dip Azimuth (degrees)	Dip Angle (degrees)	Bedrock Structure Category
172.1	104.5	75	64	Fracture Rank 2
172.3	104.3	81	57	Fracture Rank 2
172.6	104.0	78	58	Fracture Rank 2
172.8	103.8	95	49	Fracture Rank 3
173.3	103.3	81	52	Fracture Rank 3
173.5	103.1	79	53	Fracture Rank 3
173.6	103.0	82	57	Fracture Rank 2
175.1	101.5	85	74	Fracture Rank 2
175.1	101.5	337	64	Fracture Rank 1
175.9	100.7	123	80	Fracture Rank 2
176.3	100.3	337	29	Fracture Rank 2
176.7	99.9	1	64	Fracture Rank 2
177.5	99.2	93	69	Fracture Rank 2
179.4	97.2	97	72	Fracture Rank 2
179.6	97.0	14	58	Fracture Rank 2
180.9	95.7	100	65	Fracture Rank 2
182.1	94.5	89	67	Fracture Rank 2
182.3	94.3	124	65	Fracture Rank 2
183.7	92.9	100	76	Fracture Rank 3
184.2	92.5	102	67	Fracture Rank 2
185.1	91.5	106	85	Fracture Rank 2
185.2	91.4	77	65	Fracture Rank 1
186.2	90.4	27	61	Fracture Rank 2
186.4	90.3	105	79	Fracture Rank 2
187.6	89.0	265	66	Fracture Rank 2
188.6	88.0	78	35	Fracture Rank 2
189.4	87.3	299	51	Fracture Rank 2
190.9	85.7	82	71	Fracture Rank 3
192.5	84.1	95	74	Fracture Rank 3
192.9	83.7	88	63	Fracture Rank 2
194.0	82.7	229	71	Fracture Rank 2
195.2	81.4	83	66	Fracture Rank 1
195.4	81.3	89	66	Fracture Rank 1
195.8	80.8	352	34	Fracture Rank 1
196.8	79.8	175	4	Fracture Rank 2
196.9	79.7	183	3	Fracture Rank 2
197.2	79.4	7	51	Fracture Rank 2
199.4	77.2	335	22	Fracture Rank 1
201.1	75.5	103	56	Fracture Rank 2
201.3	75.3	108	63	Fracture Rank 2
201.4	75.3	342	3	Fracture Rank 1
205.3	71.3	27	65	Fracture Rank 1
210.6	66.0	107	61	Fracture Rank 1
211.0	65.6	102	73	Fracture Rank 1
211.9	64.7	101	71	Fracture Rank 2
213.5	63.2	107	80	Fracture Rank 3

TABLE OF BEDROCK STRUCTURES FOR BOREHOLE BR-5

Depth (feet)	Elevation (feet)	Dip Azimuth (degrees)	Dip Angle (degrees)	Bedrock Structure Category
214.1	62.5	106	76	Fracture Rank 2
214.6	62.1	185	81	Fracture Rank 2
214.9	61.7	292	76	Fracture Rank 1
221.7	54.9	332	9	Fracture Rank 2
225.7	50.9	299	83	Fracture Rank 1
230.0	46.6	110	73	Fracture Rank 2
240.0	36.6	297	75	Fracture Rank 1
246.0	30.6	103	41	Fracture Rank 2
263.6	13.0	258	61	Fracture Rank 1
268.3	8.3	295	39	Fracture Rank 1
268.9	7.7	285	86	Fracture Rank 1
271.4	5.2	326	34	Fracture Rank 2
271.6	5.0	326	33	Fracture Rank 2
274.3	2.3	23	59	Fracture Rank 1
275.1	1.5	343	31	Fracture Rank 2
276.3	0.3	173	25	Fracture Rank 2
277.2	-0.6	61	26	Fracture Rank 2
278.2	-1.6	105	71	Fracture Rank 3
278.4	-1.8	297	44	Fracture Rank 2
278.5	-1.9	102	62	Fracture Rank 3
278.9	-2.3	327	41	Fracture Rank 2
280.0	-3.4	122	63	Fracture Rank 3
280.1	-3.5	20	52	Fracture Rank 1
281.0	-4.4	107	68	Fracture Rank 2
281.5	-4.9	303	74	Fracture Rank 2
282.3	-5.7	95	54	Fracture Rank 1
282.4	-5.8	295	76	Fracture Rank 2
282.6	-5.9	296	74	Fracture Rank 2
282.8	-6.2	295	73	Fracture Rank 2
283.0	-6.4	297	72	Fracture Rank 2
284.4	-7.8	290	75	Fracture Rank 2
284.5	-7.9	59	12	Fracture Rank 1
285.1	-8.5	283	72	Fracture Rank 2
285.5	-8.9	280	75	Fracture Rank 1
286.8	-10.2	298	64	Fracture Rank 1
287.2	-10.6	294	66	Fracture Rank 1
287.7	-11.1	284	69	Fracture Rank 2
289.1	-12.5	290	71	Fracture Rank 1
312.4	-35.8	71	34	Fracture Rank 1
315.3	-38.7	115	88	Fracture Rank 1
322.1	-45.5	234	47	Fracture Rank 2
322.8	-46.2	227	49	Fracture Rank 1
329.6	-53.0	230	57	Fracture Rank 2
330.4	-53.8	217	56	Fracture Rank 1
332.3	-55.7	260	61	Fracture Rank 1
336.6	-60.0	251	51	Fracture Rank 2

TABLE OF BEDROCK STRUCTURES FOR BOREHOLE BR-5

Depth (feet)	Elevation (feet)	Dip Azimuth (degrees)	Dip Angle (degrees)	Bedrock Structure Category
337.1	-60.5	261	63	Fracture Rank 3
337.7	-61.1	256	72	Fracture Rank 2
338.7	-62.1	247	54	Fracture Rank 2
339.5	-62.9	259	42	Fracture Rank 2
340.7	-64.1	272	36	Fracture Rank 2
340.9	-64.3	82	69	Fracture Rank 3
342.0	-65.4	93	73	Fracture Rank 3
342.4	-65.8	95	75	Fracture Rank 3
342.6	-66.0	270	86	Fracture Rank 2
342.7	-66.1	105	77	Fracture Rank 2
342.7	-66.1	163	73	Fracture Rank 1
344.9	-68.3	189	64	Fracture Rank 2
346.1	-69.5	82	69	Fracture Rank 2
347.1	-70.5	77	73	Fracture Rank 2
348.0	-71.4	71	67	Fracture Rank 3
348.1	-71.5	80	58	Fracture Rank 2
349.0	-72.4	109	43	Fracture Rank 2
349.7	-73.1	122	60	Fracture Rank 2
349.8	-73.2	286	60	Fracture Rank 2
350.1	-73.5	106	58	Fracture Rank 2
350.6	-74.0	98	77	Fracture Rank 1
350.6	-74.0	123	61	Fracture Rank 1
350.9	-74.3	128	61	Fracture Rank 1
351.1	-74.5	132	60	Fracture Rank 2
352.2	-75.6	299	45	Fracture Rank 1
352.4	-75.8	126	69	Fracture Rank 2
357.8	-81.2	284	53	Fracture Rank 1
359.0	-82.4	112	68	Fracture Rank 3
359.1	-82.5	296	55	Fracture Rank 1
359.7	-83.1	281	74	Fracture Rank 2
359.9	-83.3	82	44	Fracture Rank 2
360.6	-84.0	298	72	Fracture Rank 2
361.1	-84.5	285	77	Fracture Rank 2
361.5	-84.9	131	65	Fracture Rank 3
361.7	-85.1	299	67	Fracture Rank 2
362.1	-85.5	297	67	Fracture Rank 2
363.1	-86.5	302	67	Fracture Rank 2
363.3	-86.7	287	44	Fracture Rank 2

HAGER-RICHTER GEOSCIENCE, INC.	
TABLE OF BEDROCK STRUCTURES FOR BOREHOLE BR-6	
CLIENT	Weston Solutions, Inc.
PROJECT	Savage Municipal Water Supply Superfund Site
CITY, STATE	Milford, New Hampshire
H-R FILE	10RG30
DATE LOGGED	September 15, 2010
LOG DATUM	Top of the 6-Inch Steel Casing (TOC)
TOC ELEVATION	280.3 Feet
DIP AZIMUTH	Referenced to True North
DECLINATION	15 Degrees West
DIP ANGLE	Measured from Horizontal

TABLE OF BEDROCK STRUCTURES FOR BOREHOLE BR-6

Depth (feet)	Elevation (feet)	Dip Azimuth (degrees)	Dip Angle (degrees)	Bedrock Structure Category
112.9	167.4	3	11	Fracture Rank 3
113.1	167.2	125	44	Fracture Rank 1
113.2	167.1	319	71	Fracture Rank 2
113.7	166.6	315	55	Fracture Rank 1
115.0	165.3	312	78	Fracture Rank 3
115.9	164.4	120	71	Fracture Rank 2
116.3	164.0	293	73	Fracture Rank 3
116.6	163.7	124	71	Fracture Rank 2
117.2	163.1	301	82	Fracture Rank 3
118.0	162.3	274	55	Fracture Rank 2
118.2	162.1	280	56	Fracture Rank 2
118.5	161.8	75	55	Fracture Rank 2
120.0	160.3	252	73	Fracture Rank 3
120.2	160.1	83	58	Fracture Rank 2
120.9	159.4	96	65	Fracture Rank 2
121.8	158.5	61	11	Fracture Rank 1
122.3	158.0	301	72	Fracture Rank 2
122.5	157.8	96	43	Fracture Rank 2
122.8	157.5	96	49	Fracture Rank 2
123.5	156.8	104	61	Fracture Rank 2
123.8	156.5	109	67	Fracture Rank 2
124.6	155.7	100	70	Fracture Rank 2
124.9	155.5	58	21	Fracture Rank 2
125.3	155.0	79	72	Fracture Rank 2
126.4	153.9	285	71	Fracture Rank 2
127.5	152.8	299	57	Fracture Rank 1
128.0	152.3	295	49	Fracture Rank 2
128.5	151.8	117	85	Fracture Rank 3
129.2	151.1	106	67	Fracture Rank 2
130.1	150.3	101	52	Fracture Rank 1
130.4	149.9	116	48	Fracture Rank 3
131.0	149.3	115	47	Fracture Rank 1
131.1	149.2	288	69	Fracture Rank 3
131.3	149.1	102	77	Fracture Rank 1

TABLE OF BEDROCK STRUCTURES FOR BOREHOLE BR-6

Depth (feet)	Elevation (feet)	Dip Azimuth (degrees)	Dip Angle (degrees)	Bedrock Structure Category
132.0	148.3	108	52	Fracture Rank 3
132.2	148.1	84	32	Fracture Rank 3
132.4	147.9	128	37	Fracture Rank 2
132.8	147.5	129	24	Fracture Rank 2
133.1	147.3	166	24	Fracture Rank 2
133.5	146.8	83	72	Fracture Rank 2
133.9	146.4	110	27	Fracture Rank 2
134.4	145.9	256	74	Fracture Rank 2
134.6	145.7	79	42	Fracture Rank 2
135.0	145.3	266	55	Fracture Rank 1
135.6	144.7	84	24	Fracture Rank 1
137.0	143.3	262	60	Fracture Rank 2
137.7	142.6	257	55	Fracture Rank 2
138.7	141.6	94	50	Fracture Rank 2
139.1	141.2	95	77	Fracture Rank 2
139.6	140.7	113	70	Fracture Rank 3
141.5	138.8	68	48	Fracture Rank 1
141.8	138.5	313	79	Fracture Rank 2
142.5	137.8	258	31	Fracture Rank 1
142.6	137.7	113	64	Fracture Rank 2
142.7	137.6	257	42	Fracture Rank 1
142.8	137.5	315	73	Fracture Rank 2
143.3	137.0	312	63	Fracture Rank 1
143.7	136.6	311	71	Fracture Rank 1
145.0	135.3	61	15	Fracture Rank 1
145.5	134.8	122	68	Fracture Rank 1
146.3	134.0	91	48	Fracture Rank 1
146.5	133.8	297	13	Fracture Rank 1
147.0	133.3	276	80	Fracture Rank 2
147.7	132.6	101	61	Fracture Rank 2
148.1	132.3	117	26	Fracture Rank 2
148.1	132.2	282	81	Fracture Rank 2
148.3	132.0	121	41	Fracture Rank 1
149.6	130.7	277	72	Fracture Rank 2
149.6	130.7	101	20	Fracture Rank 1
150.4	129.9	272	63	Fracture Rank 2
150.8	129.5	101	45	Fracture Rank 2
151.0	129.3	268	67	Fracture Rank 2
152.1	128.2	102	40	Fracture Rank 2
152.5	127.8	98	66	Fracture Rank 2
153.3	127.0	277	76	Fracture Rank 1
154.0	126.3	67	66	Fracture Rank 1
154.2	126.1	275	72	Fracture Rank 1
155.1	125.2	61	65	Fracture Rank 1
155.5	124.8	60	83	Fracture Rank 2
155.6	124.7	272	25	Fracture Rank 1

TABLE OF BEDROCK STRUCTURES FOR BOREHOLE BR-6

Depth (feet)	Elevation (feet)	Dip Azimuth (degrees)	Dip Angle (degrees)	Bedrock Structure Category
156.9	123.4	113	56	Fracture Rank 2
157.2	123.1	114	60	Fracture Rank 1
157.8	122.5	106	81	Fracture Rank 1
158.4	121.9	186	71	Fracture Rank 1
159.6	120.7	24	75	Fracture Rank 1
160.5	119.8	118	30	Fracture Rank 1
160.8	119.5	140	31	Fracture Rank 1
161.7	118.6	258	70	Fracture Rank 1
161.9	118.4	98	76	Fracture Rank 2
162.3	118.0	97	37	Fracture Rank 2
162.7	117.6	276	52	Fracture Rank 3
163.1	117.2	299	45	Fracture Rank 2
164.5	115.8	242	25	Fracture Rank 1
164.6	115.8	105	50	Fracture Rank 1
164.8	115.5	117	63	Fracture Rank 2
164.9	115.4	269	77	Fracture Rank 1
165.0	115.3	113	66	Fracture Rank 3
165.3	115.0	108	51	Fracture Rank 2
165.4	115.0	104	85	Fracture Rank 2
166.0	114.3	186	22	Fracture Rank 1
166.1	114.2	212	11	Fracture Rank 2
168.5	111.8	142	5	Fracture Rank 1
169.4	110.9	78	69	Fracture Rank 3
169.4	110.9	275	70	Fracture Rank 2
170.0	110.3	265	72	Fracture Rank 2
170.2	110.1	95	60	Fracture Rank 3
170.4	109.9	79	82	Fracture Rank 2
171.3	109.0	92	73	Fracture Rank 1
172.7	107.6	279	80	Fracture Rank 2
174.8	105.5	100	75	Fracture Rank 1
176.4	103.9	177	29	Fracture Rank 1
176.7	103.6	261	63	Fracture Rank 1
177.4	102.9	103	90	Fracture Rank 2
178.5	101.8	16	76	Fracture Rank 1
179.1	101.2	93	77	Fracture Rank 1
179.9	100.4	92	86	Fracture Rank 2
183.7	96.6	271	77	Fracture Rank 1
183.9	96.4	268	66	Fracture Rank 2
184.5	95.8	274	61	Fracture Rank 1
185.4	94.9	273	67	Fracture Rank 2
185.7	94.6	279	73	Fracture Rank 3
189.9	90.4	105	46	Fracture Rank 1
190.5	89.8	95	55	Fracture Rank 1
191.6	88.7	95	75	Fracture Rank 3
191.7	88.6	253	72	Fracture Rank 1
194.2	86.1	87	75	Fracture Rank 1

TABLE OF BEDROCK STRUCTURES FOR BOREHOLE BR-6

Depth (feet)	Elevation (feet)	Dip Azimuth (degrees)	Dip Angle (degrees)	Bedrock Structure Category
194.4	85.9	228	66	Fracture Rank 1
194.5	85.8	224	80	Fracture Rank 1
195.1	85.2	204	71	Fracture Rank 1
195.6	84.7	99	84	Fracture Rank 3
195.8	84.6	28	19	Fracture Rank 1
196.2	84.1	94	67	Fracture Rank 2
196.4	83.9	68	86	Fracture Rank 2
197.6	82.7	163	2	Fracture Rank 1
197.7	82.7	327	42	Fracture Rank 1
197.9	82.5	305	59	Fracture Rank 1
203.3	77.0	276	69	Fracture Rank 2
203.9	76.4	280	72	Fracture Rank 2
205.6	74.7	94	72	Fracture Rank 3
205.7	74.7	273	60	Fracture Rank 2
206.0	74.4	83	78	Fracture Rank 2
206.1	74.2	265	75	Fracture Rank 1
206.5	73.9	255	38	Fracture Rank 2
206.7	73.6	262	43	Fracture Rank 2
206.7	73.6	99	70	Fracture Rank 2
208.3	72.0	225	66	Fracture Rank 2
209.6	70.7	217	44	Fracture Rank 2
209.7	70.7	231	77	Fracture Rank 1
210.2	70.1	241	47	Fracture Rank 2
211.2	69.1	244	50	Fracture Rank 2
211.5	68.8	247	51	Fracture Rank 2
212.3	68.0	239	44	Fracture Rank 2
212.8	67.5	244	52	Fracture Rank 2
213.5	66.9	241	54	Fracture Rank 2
213.6	66.7	236	60	Fracture Rank 2
214.0	66.3	247	43	Fracture Rank 2
214.7	65.6	111	66	Fracture Rank 2
215.1	65.2	89	68	Fracture Rank 3
216.1	64.2	357	30	Fracture Rank 2
217.4	62.9	100	82	Fracture Rank 3
218.1	62.2	258	79	Fracture Rank 1
218.2	62.1	88	86	Fracture Rank 3
221.2	59.1	71	82	Fracture Rank 1
221.4	58.9	210	54	Fracture Rank 1
222.8	57.6	145	43	Fracture Rank 1
224.4	55.9	86	56	Fracture Rank 2
224.5	55.8	263	81	Fracture Rank 1
225.8	54.5	243	57	Fracture Rank 1
226.2	54.2	227	83	Fracture Rank 1
226.6	53.7	91	80	Fracture Rank 2
226.7	53.7	88	58	Fracture Rank 2
226.8	53.5	266	48	Fracture Rank 1

TABLE OF BEDROCK STRUCTURES FOR BOREHOLE BR-6

Depth (feet)	Elevation (feet)	Dip Azimuth (degrees)	Dip Angle (degrees)	Bedrock Structure Category
228.7	51.6	92	76	Fracture Rank 1
229.2	51.2	266	57	Fracture Rank 2
229.8	50.5	86	59	Fracture Rank 1
230.1	50.2	100	66	Fracture Rank 1
230.5	49.8	90	66	Fracture Rank 1
231.0	49.3	96	70	Fracture Rank 1
231.3	49.0	95	76	Fracture Rank 1
231.6	48.7	94	75	Fracture Rank 2
232.6	47.7	83	79	Fracture Rank 2
233.5	46.8	80	65	Fracture Rank 2
234.5	45.9	95	57	Fracture Rank 2
235.1	45.2	135	39	Fracture Rank 2
235.8	44.5	74	68	Fracture Rank 2
236.3	44.0	228	40	Fracture Rank 1
237.2	43.1	226	63	Fracture Rank 2
238.3	42.0	241	62	Fracture Rank 1
238.4	41.9	140	33	Fracture Rank 2
238.6	41.8	143	45	Fracture Rank 2
238.8	41.6	129	55	Fracture Rank 2
239.0	41.3	127	63	Fracture Rank 3
239.8	40.6	235	73	Fracture Rank 1
240.1	40.2	232	68	Fracture Rank 1
240.6	39.7	106	88	Fracture Rank 1
242.0	38.3	227	77	Fracture Rank 2
242.3	38.0	233	76	Fracture Rank 2
243.6	36.7	234	67	Fracture Rank 1
244.5	35.8	228	80	Fracture Rank 1
246.3	34.0	85	80	Fracture Rank 1
247.4	32.9	96	78	Fracture Rank 2
247.9	32.4	273	68	Fracture Rank 1
248.8	31.5	264	71	Fracture Rank 2
251.1	29.2	256	76	Fracture Rank 2
256.6	23.7	112	64	Fracture Rank 2
256.7	23.6	319	49	Fracture Rank 2
256.8	23.5	103	67	Fracture Rank 2
258.0	22.3	89	60	Fracture Rank 2
259.2	21.2	104	55	Fracture Rank 2
260.2	20.1	171	48	Fracture Rank 2
260.7	19.6	183	48	Fracture Rank 2
261.7	18.6	99	57	Fracture Rank 2
261.7	18.6	290	41	Fracture Rank 2
262.0	18.3	110	64	Fracture Rank 3
262.2	18.2	292	55	Fracture Rank 2
262.7	17.6	284	64	Fracture Rank 2
262.8	17.5	124	54	Fracture Rank 2
263.2	17.1	278	59	Fracture Rank 2

TABLE OF BEDROCK STRUCTURES FOR BOREHOLE BR-6

Depth (feet)	Elevation (feet)	Dip Azimuth (degrees)	Dip Angle (degrees)	Bedrock Structure Category
264.1	16.2	271	67	Fracture Rank 2
266.4	13.9	238	73	Fracture Rank 1
267.0	13.3	249	72	Fracture Rank 1
269.4	10.9	245	75	Fracture Rank 2
271.8	8.5	327	37	Fracture Rank 1
272.1	8.2	231	69	Fracture Rank 1
273.1	7.2	229	83	Fracture Rank 3
274.9	5.4	92	65	Fracture Rank 2
279.9	0.4	90	59	Fracture Rank 2
283.0	-2.7	108	90	Fracture Rank 1
284.8	-4.5	295	79	Fracture Rank 1
286.6	-6.3	295	78	Fracture Rank 1
287.0	-6.7	217	63	Fracture Rank 1
289.4	-9.1	292	79	Fracture Rank 1
290.2	-9.9	217	43	Fracture Rank 1
291.2	-10.9	246	55	Fracture Rank 1
292.9	-12.6	337	46	Fracture Rank 2
293.9	-13.6	300	26	Fracture Rank 1
294.0	-13.7	299	33	Fracture Rank 1
294.3	-14.0	297	78	Fracture Rank 2
295.4	-15.1	322	51	Fracture Rank 2
296.5	-16.2	240	60	Fracture Rank 1
296.6	-16.3	290	73	Fracture Rank 1
298.0	-17.7	306	49	Fracture Rank 2
298.7	-18.4	109	58	Fracture Rank 2
298.8	-18.5	316	52	Fracture Rank 2
299.3	-19.0	98	51	Fracture Rank 2
301.4	-21.1	125	65	Fracture Rank 1
301.8	-21.5	88	62	Fracture Rank 2
303.2	-22.9	74	81	Fracture Rank 1
303.6	-23.3	320	47	Fracture Rank 1
305.3	-25.0	306	41	Fracture Rank 1
305.4	-25.1	90	57	Fracture Rank 2
305.5	-25.2	92	56	Fracture Rank 3
305.6	-25.3	96	85	Fracture Rank 2
305.6	-25.3	89	56	Fracture Rank 3
306.6	-26.3	282	54	Fracture Rank 1
307.4	-27.1	106	83	Fracture Rank 2
307.7	-27.4	281	59	Fracture Rank 2
308.0	-27.7	279	79	Fracture Rank 2
308.9	-28.6	280	62	Fracture Rank 2
309.2	-28.9	101	76	Fracture Rank 2
310.4	-30.1	292	64	Fracture Rank 2
310.5	-30.2	113	84	Fracture Rank 2
311.1	-30.8	273	54	Fracture Rank 2
311.9	-31.6	45	58	Fracture Rank 2

TABLE OF BEDROCK STRUCTURES FOR BOREHOLE BR-6

Depth (feet)	Elevation (feet)	Dip Azimuth (degrees)	Dip Angle (degrees)	Bedrock Structure Category
311.9	-31.6	275	67	Fracture Rank 2
312.5	-32.2	67	74	Fracture Rank 2
312.7	-32.4	72	60	Fracture Rank 2
313.0	-32.7	80	59	Fracture Rank 3
313.5	-33.2	93	70	Fracture Rank 2
314.1	-33.8	79	61	Fracture Rank 2
314.4	-34.1	290	88	Fracture Rank 2
314.6	-34.3	104	65	Fracture Rank 2
316.5	-36.2	273	74	Fracture Rank 2
317.1	-36.8	278	77	Fracture Rank 2
317.8	-37.5	280	58	Fracture Rank 1
317.9	-37.6	54	58	Fracture Rank 1
318.1	-37.8	91	66	Fracture Rank 2
318.5	-38.2	105	55	Fracture Rank 1
319.2	-38.9	200	71	Fracture Rank 1
319.3	-39.0	122	65	Fracture Rank 1
322.0	-41.7	133	71	Fracture Rank 1
324.5	-44.2	183	89	Fracture Rank 1
324.9	-44.6	103	58	Fracture Rank 2
325.3	-45.0	262	46	Fracture Rank 1
327.8	-47.5	93	59	Fracture Rank 1
329.4	-49.1	271	61	Fracture Rank 1
331.0	-50.7	102	67	Fracture Rank 1
331.2	-50.9	116	70	Fracture Rank 2
331.4	-51.1	123	76	Fracture Rank 1
331.9	-51.6	117	56	Fracture Rank 1
333.8	-53.5	121	68	Fracture Rank 1
334.0	-53.7	123	67	Fracture Rank 2
334.6	-54.3	245	68	Fracture Rank 2
336.3	-56.0	275	39	Fracture Rank 1
336.5	-56.2	158	46	Fracture Rank 2
337.2	-56.9	340	48	Fracture Rank 1
337.9	-57.6	305	43	Fracture Rank 1
338.7	-58.4	174	42	Fracture Rank 1
340.5	-60.2	205	43	Fracture Rank 1
341.6	-61.3	357	49	Fracture Rank 1
341.7	-61.4	323	42	Fracture Rank 1
342.2	-61.9	191	32	Fracture Rank 1
343.6	-63.3	313	37	Fracture Rank 1
344.0	-63.7	103	61	Fracture Rank 2
344.7	-64.4	106	50	Fracture Rank 2
344.9	-64.6	241	66	Fracture Rank 2
345.2	-64.9	111	82	Fracture Rank 2
346.0	-65.7	116	79	Fracture Rank 2
346.9	-66.6	101	74	Fracture Rank 3
347.2	-66.9	112	86	Fracture Rank 2

TABLE OF BEDROCK STRUCTURES FOR BOREHOLE BR-6

Depth (feet)	Elevation (feet)	Dip Azimuth (degrees)	Dip Angle (degrees)	Bedrock Structure Category
347.2	-66.9	199	72	Fracture Rank 1
348.1	-67.8	104	68	Fracture Rank 2
348.1	-67.8	277	53	Fracture Rank 2
348.6	-68.3	233	47	Fracture Rank 2
348.8	-68.5	255	64	Fracture Rank 2
348.8	-68.5	117	84	Fracture Rank 2
349.1	-68.8	260	60	Fracture Rank 2
350.0	-69.7	125	78	Fracture Rank 3
351.1	-70.8	237	56	Fracture Rank 1
352.9	-72.6	286	69	Fracture Rank 1
355.4	-75.1	280	66	Fracture Rank 1
356.0	-75.7	275	74	Fracture Rank 1
356.5	-76.2	272	72	Fracture Rank 1
356.7	-76.4	110	79	Fracture Rank 1
358.3	-78.0	244	43	Fracture Rank 2
360.9	-80.6	246	75	Fracture Rank 3
361.1	-80.8	331	56	Fracture Rank 1
362.5	-82.2	243	52	Fracture Rank 1
362.5	-82.2	92	60	Fracture Rank 2
363.4	-83.1	113	72	Fracture Rank 2
363.7	-83.4	104	68	Fracture Rank 3
364.2	-83.9	112	78	Fracture Rank 2
364.4	-84.1	115	73	Fracture Rank 1
365.0	-84.7	203	55	Fracture Rank 1
365.4	-85.1	107	77	Fracture Rank 3
365.6	-85.3	108	79	Fracture Rank 2
366.0	-85.7	112	79	Fracture Rank 2
366.3	-86.0	112	80	Fracture Rank 2
366.8	-86.5	264	53	Fracture Rank 2
367.8	-87.5	151	63	Fracture Rank 1
368.2	-87.9	253	45	Fracture Rank 2
368.5	-88.2	266	63	Fracture Rank 2
369.1	-88.8	268	58	Fracture Rank 1
370.0	-89.7	265	64	Fracture Rank 1
370.8	-90.5	264	69	Fracture Rank 1
371.2	-90.9	263	69	Fracture Rank 2
372.8	-92.5	264	76	Fracture Rank 2
373.1	-92.8	255	69	Fracture Rank 2
373.2	-92.9	111	60	Fracture Rank 2
374.0	-93.7	257	76	Fracture Rank 3
374.4	-94.1	81	78	Fracture Rank 1
375.5	-95.2	94	81	Fracture Rank 1
377.4	-97.1	349	30	Fracture Rank 1
378.0	-97.7	93	86	Fracture Rank 2
378.8	-98.5	328	41	Fracture Rank 2
381.1	-100.8	258	47	Fracture Rank 2

TABLE OF BEDROCK STRUCTURES FOR BOREHOLE BR-6

Depth (feet)	Elevation (feet)	Dip Azimuth (degrees)	Dip Angle (degrees)	Bedrock Structure Category
381.6	-101.3	288	47	Fracture Rank 2
381.8	-101.5	291	49	Fracture Rank 2
382.1	-101.8	294	55	Fracture Rank 2
383.2	-102.9	93	69	Fracture Rank 1
383.6	-103.3	340	57	Fracture Rank 1
384.1	-103.8	337	38	Fracture Rank 1
384.6	-104.3	310	41	Fracture Rank 1
385.1	-104.8	331	53	Fracture Rank 2
385.3	-105.0	308	55	Fracture Rank 2
385.5	-105.2	20	25	Fracture Rank 2
386.1	-105.8	25	35	Fracture Rank 2
386.8	-106.5	263	41	Fracture Rank 2
387.7	-107.4	86	60	Fracture Rank 2
387.9	-107.6	89	62	Fracture Rank 2
388.1	-107.8	252	34	Fracture Rank 1
388.4	-108.1	87	68	Fracture Rank 3
388.9	-108.6	284	29	Fracture Rank 2
389.1	-108.8	247	33	Fracture Rank 2
389.5	-109.2	337	36	Fracture Rank 2
389.7	-109.4	335	38	Fracture Rank 2
389.9	-109.6	266	52	Fracture Rank 2
391.9	-111.6	286	61	Fracture Rank 1
393.3	-113.0	305	63	Fracture Rank 1
394.6	-114.3	254	67	Fracture Rank 1
397.3	-117.0	298	56	Fracture Rank 1
397.9	-117.6	291	41	Fracture Rank 2
398.1	-117.8	290	37	Fracture Rank 2
400.2	-119.9	336	90	Fracture Rank 1
401.7	-121.4	249	73	Fracture Rank 1
402.4	-122.1	18	33	Fracture Rank 1
403.6	-123.3	158	81	Fracture Rank 1
404.0	-123.7	355	36	Fracture Rank 1
406.1	-125.8	235	72	Fracture Rank 1
407.4	-127.1	220	70	Fracture Rank 2
407.8	-127.5	106	66	Fracture Rank 1
410.3	-130.0	283	74	Fracture Rank 1
411.2	-130.9	274	58	Fracture Rank 1
411.6	-131.3	269	58	Fracture Rank 2
411.8	-131.5	265	66	Fracture Rank 1
412.7	-132.4	42	53	Fracture Rank 1
415.5	-135.2	261	70	Fracture Rank 2
418.1	-137.8	274	79	Fracture Rank 1
418.2	-137.9	292	50	Fracture Rank 1
419.2	-138.9	301	25	Fracture Rank 1
420.1	-139.8	122	65	Fracture Rank 1
420.8	-140.5	244	47	Fracture Rank 2

TABLE OF BEDROCK STRUCTURES FOR BOREHOLE BR-6

Depth (feet)	Elevation (feet)	Dip Azimuth (degrees)	Dip Angle (degrees)	Bedrock Structure Category
421.0	-140.7	91	40	Fracture Rank 2
421.1	-140.8	261	57	Fracture Rank 2
421.6	-141.3	71	76	Fracture Rank 2
422.3	-142.0	83	84	Fracture Rank 2
422.8	-142.5	277	71	Fracture Rank 2
424.2	-143.9	302	75	Fracture Rank 2
424.6	-144.3	113	75	Fracture Rank 1
424.9	-144.6	258	70	Fracture Rank 2
426.9	-146.6	87	63	Fracture Rank 2
428.2	-147.9	82	73	Fracture Rank 1
429.5	-149.2	92	87	Fracture Rank 1
430.0	-149.7	96	67	Fracture Rank 1
430.8	-150.5	101	66	Fracture Rank 1
431.2	-150.9	85	85	Fracture Rank 2
431.6	-151.3	91	68	Fracture Rank 2
432.5	-152.2	336	60	Fracture Rank 2
432.9	-152.6	103	63	Fracture Rank 2
433.5	-153.2	85	52	Fracture Rank 2
434.3	-154.0	92	73	Fracture Rank 2
434.5	-154.2	90	64	Fracture Rank 2
434.8	-154.5	272	90	Fracture Rank 2
436.1	-155.8	89	80	Fracture Rank 3
436.3	-156.0	87	77	Fracture Rank 2
436.6	-156.3	95	78	Fracture Rank 2
436.8	-156.5	84	74	Fracture Rank 2
437.1	-156.8	266	49	Fracture Rank 2
437.4	-157.1	310	52	Fracture Rank 2
437.6	-157.3	259	59	Fracture Rank 2
438.4	-158.1	277	42	Fracture Rank 1
438.8	-158.5	297	74	Fracture Rank 2
438.9	-158.6	297	58	Fracture Rank 2
440.1	-159.8	251	61	Fracture Rank 2
440.8	-160.5	268	74	Fracture Rank 2
441.5	-161.2	260	45	Fracture Rank 2
442.1	-161.8	265	67	Fracture Rank 2
442.3	-162.0	271	69	Fracture Rank 2
443.0	-162.7	265	60	Fracture Rank 2
443.2	-162.9	262	63	Fracture Rank 2
443.8	-163.5	254	65	Fracture Rank 2
444.7	-164.4	244	58	Fracture Rank 1
447.1	-166.8	254	57	Fracture Rank 2
452.4	-172.1	251	74	Fracture Rank 1
453.9	-173.6	287	50	Fracture Rank 2
454.3	-174.0	309	36	Fracture Rank 2
454.7	-174.4	201	76	Fracture Rank 2
454.8	-174.5	299	41	Fracture Rank 2

TABLE OF BEDROCK STRUCTURES FOR BOREHOLE BR-6

Depth (feet)	Elevation (feet)	Dip Azimuth (degrees)	Dip Angle (degrees)	Bedrock Structure Category
455.1	-174.8	161	67	Fracture Rank 2
455.6	-175.3	257	46	Fracture Rank 2
456.3	-176.0	247	84	Fracture Rank 2
460.9	-180.6	183	83	Fracture Rank 2
461.8	-181.5	153	72	Fracture Rank 1
462.2	-181.9	150	74	Fracture Rank 1
462.6	-182.3	178	77	Fracture Rank 1
462.9	-182.6	283	77	Fracture Rank 1
464.3	-184.0	134	84	Fracture Rank 2
469.0	-188.7	346	68	Fracture Rank 1
508.0	-227.7	89	75	Fracture Rank 1
509.6	-229.3	263	55	Fracture Rank 1
509.9	-229.6	93	86	Fracture Rank 3
510.2	-229.9	278	40	Fracture Rank 1
510.4	-230.1	273	36	Fracture Rank 1
510.7	-230.4	254	32	Fracture Rank 2
511.1	-230.8	251	29	Fracture Rank 2
511.4	-231.1	253	24	Fracture Rank 2
511.5	-231.2	262	34	Fracture Rank 2
511.9	-231.6	264	53	Fracture Rank 2
512.8	-232.5	273	71	Fracture Rank 2
513.3	-233.0	92	73	Fracture Rank 2
513.8	-233.5	290	69	Fracture Rank 2
514.5	-234.2	91	63	Fracture Rank 3
514.7	-234.4	97	57	Fracture Rank 3
514.9	-234.6	107	65	Fracture Rank 2
515.6	-235.3	100	63	Fracture Rank 1
516.1	-235.8	122	78	Fracture Rank 1
516.9	-236.6	78	65	Fracture Rank 1
517.6	-237.3	108	84	Fracture Rank 3
519.2	-238.9	123	34	Fracture Rank 1
519.4	-239.1	297	68	Fracture Rank 2
519.6	-239.3	126	90	Fracture Rank 1
521.1	-240.8	110	82	Fracture Rank 1
521.1	-240.8	117	67	Fracture Rank 1
523.5	-243.2	312	43	Fracture Rank 2
524.1	-243.8	110	84	Fracture Rank 2
524.5	-244.2	109	76	Fracture Rank 2
525.0	-244.7	290	72	Fracture Rank 2
525.2	-244.9	110	89	Fracture Rank 1
525.3	-245.0	108	79	Fracture Rank 2
527.5	-247.2	293	76	Fracture Rank 1
528.0	-247.7	90	46	Fracture Rank 1
529.4	-249.1	117	76	Fracture Rank 2
529.8	-249.5	165	57	Fracture Rank 2
530.2	-249.9	52	57	Fracture Rank 1

TABLE OF BEDROCK STRUCTURES FOR BOREHOLE BR-6

Depth (feet)	Elevation (feet)	Dip Azimuth (degrees)	Dip Angle (degrees)	Bedrock Structure Category
530.6	-250.3	62	34	Fracture Rank 1
534.2	-253.9	58	44	Fracture Rank 1
538.2	-257.9	263	78	Fracture Rank 1
540.1	-259.8	250	68	Fracture Rank 1
540.3	-260.0	116	48	Fracture Rank 1
541.6	-261.3	289	65	Fracture Rank 1
542.6	-262.3	253	69	Fracture Rank 1
546.6	-266.3	316	31	Fracture Rank 1
547.8	-267.5	53	80	Fracture Rank 1
553.4	-273.1	238	84	Fracture Rank 1
556.4	-276.1	250	53	Fracture Rank 1
556.7	-276.4	253	66	Fracture Rank 2
558.4	-278.1	229	57	Fracture Rank 1
559.6	-279.3	232	56	Fracture Rank 1
561.0	-280.7	284	61	Fracture Rank 1
562.6	-282.3	289	60	Fracture Rank 1
562.9	-282.6	286	63	Fracture Rank 1
563.3	-283.0	292	63	Fracture Rank 1
565.7	-285.4	317	50	Fracture Rank 1
568.7	-288.4	290	86	Fracture Rank 1
573.2	-292.9	301	63	Fracture Rank 1
574.1	-293.8	294	69	Fracture Rank 1
574.6	-294.3	44	51	Fracture Rank 1
576.2	-295.9	297	72	Fracture Rank 1
579.2	-298.9	182	70	Fracture Rank 1
581.8	-301.5	24	57	Fracture Rank 1
582.4	-302.1	21	55	Fracture Rank 1
584.7	-304.4	130	76	Fracture Rank 1
585.7	-305.4	181	13	Fracture Rank 1
587.0	-306.7	107	14	Fracture Rank 1

HAGER-RICHTER GEOSCIENCE, INC.	
TABLE OF BEDROCK STRUCTURES FOR BOREHOLE MW-16R	
CLIENT	Weston Solutions, Inc.
PROJECT	Savage Municipal Water Supply Superfund Site
CITY, STATE	Milford, New Hampshire
H-R FILE	10RG30
DATE LOGGED	September 13, 2010
LOG DATUM	Top of the 6-Inch Steel Casing (TOC)
TOC ELEVATION	269.1 Feet
DIP AZIMUTH	Referenced to True North
DECLINATION	15 Degrees West
DIP ANGLE	Measured from Horizontal

TABLE OF BEDROCK STRUCTURES FOR BOREHOLE MW-16R

Depth (feet)	Elevation (feet)	Dip Azimuth (degrees)	Dip Angle (degrees)	Bedrock Structure Category
99.8	169.3	305	37	Fracture Rank 2
102.0	167.1	78	58	Fracture Rank 1
102.0	167.1	295	40	Fracture Rank 1
102.5	166.6	185	1	Fracture Rank 1
103.3	165.8	124	58	Fracture Rank 2
103.8	165.3	78	76	Fracture Rank 1
109.1	160.0	117	70	Fracture Rank 1
112.0	157.2	248	14	Fracture Rank 1
112.2	157.0	270	5	Fracture Rank 1
117.9	151.2	56	19	Fracture Rank 2
118.4	150.8	59	20	Fracture Rank 3
120.0	149.1	323	52	Fracture Rank 1
122.7	146.4	291	36	Fracture Rank 2
122.9	146.3	289	24	Fracture Rank 2
123.1	146.0	291	32	Fracture Rank 2
123.3	145.8	309	31	Fracture Rank 2
126.1	143.0	269	53	Fracture Rank 1
127.5	141.7	276	35	Fracture Rank 1
127.9	141.2	161	33	Fracture Rank 1
129.2	139.9	307	25	Fracture Rank 2
129.5	139.6	294	26	Fracture Rank 2
130.2	138.9	161	72	Fracture Rank 1
130.6	138.5	300	34	Fracture Rank 2
132.0	137.1	262	39	Fracture Rank 2
132.7	136.4	142	58	Fracture Rank 1
133.7	135.4	136	48	Fracture Rank 1
134.4	134.7	312	41	Fracture Rank 2
134.9	134.2	123	31	Fracture Rank 2
135.2	133.9	309	47	Fracture Rank 2
136.9	132.3	289	42	Fracture Rank 1
137.0	132.1	310	38	Fracture Rank 2
137.8	131.3	283	39	Fracture Rank 2
139.1	130.0	301	30	Fracture Rank 2
139.2	129.9	308	28	Fracture Rank 2

TABLE OF BEDROCK STRUCTURES FOR BOREHOLE MW-16R

Depth (feet)	Elevation (feet)	Dip Azimuth (degrees)	Dip Angle (degrees)	Bedrock Structure Category
141.0	128.1	154	68	Fracture Rank 1
144.9	124.2	340	59	Fracture Rank 1
147.0	122.1	319	50	Fracture Rank 1
147.2	121.9	167	63	Fracture Rank 1
155.5	113.6	60	21	Fracture Rank 1
156.6	112.5	168	64	Fracture Rank 1
156.9	112.2	97	14	Fracture Rank 3
158.0	111.1	299	48	Fracture Rank 2
158.3	110.8	100	35	Fracture Rank 2
158.4	110.7	77	19	Fracture Rank 3
158.8	110.3	82	13	Fracture Rank 2
159.0	110.1	79	13	Fracture Rank 2
162.2	106.9	344	38	Fracture Rank 1
164.4	104.7	289	54	Fracture Rank 1
164.6	104.5	304	53	Fracture Rank 2
164.8	104.3	289	58	Fracture Rank 3
166.4	102.7	327	36	Fracture Rank 1
166.7	102.4	313	44	Fracture Rank 1
168.2	100.9	106	70	Fracture Rank 1
170.5	98.6	313	37	Fracture Rank 1
171.6	97.5	105	75	Fracture Rank 3
172.6	96.5	143	55	Fracture Rank 1
178.3	90.9	173	76	Fracture Rank 1
178.7	90.4	256	78	Fracture Rank 3
180.5	88.6	71	21	Fracture Rank 2
181.4	87.7	252	72	Fracture Rank 1
183.6	85.5	257	76	Fracture Rank 3
183.6	85.5	80	15	Fracture Rank 1
184.1	85.0	97	22	Fracture Rank 1
185.3	83.8	83	66	Fracture Rank 2
185.4	83.8	217	75	Fracture Rank 2
185.8	83.3	222	80	Fracture Rank 2
186.2	82.9	118	73	Fracture Rank 1
187.5	81.6	277	52	Fracture Rank 1
188.1	81.0	280	32	Fracture Rank 3
188.5	80.7	114	62	Fracture Rank 2
188.6	80.5	257	70	Fracture Rank 3
189.0	80.1	125	59	Fracture Rank 2
189.0	80.1	266	28	Fracture Rank 2
189.6	79.6	290	39	Fracture Rank 2
189.8	79.3	271	48	Fracture Rank 2
190.1	79.0	274	27	Fracture Rank 2
190.9	78.2	302	25	Fracture Rank 2
191.1	78.0	248	70	Fracture Rank 2
191.1	78.0	320	25	Fracture Rank 2
191.3	77.8	306	25	Fracture Rank 2

TABLE OF BEDROCK STRUCTURES FOR BOREHOLE MW-16R

Depth (feet)	Elevation (feet)	Dip Azimuth (degrees)	Dip Angle (degrees)	Bedrock Structure Category
191.4	77.7	289	25	Fracture Rank 2
191.5	77.6	259	74	Fracture Rank 2
191.5	77.6	289	32	Fracture Rank 2
192.3	76.9	299	31	Fracture Rank 2
192.7	76.5	268	43	Fracture Rank 2
192.9	76.2	280	33	Fracture Rank 2
193.2	75.9	291	24	Fracture Rank 2
193.7	75.4	62	30	Fracture Rank 3
193.8	75.3	108	32	Fracture Rank 3
193.8	75.3	103	57	Fracture Rank 3
193.9	75.2	265	67	Fracture Rank 3
194.6	74.5	145	15	Fracture Rank 3
194.7	74.4	148	19	Fracture Rank 3
195.0	74.1	146	25	Fracture Rank 2
195.6	73.5	147	29	Fracture Rank 3
195.9	73.2	15	7	Fracture Rank 2
196.2	72.9	282	43	Fracture Rank 1
196.7	72.4	253	70	Fracture Rank 2
196.7	72.4	166	65	Fracture Rank 1
196.9	72.2	292	15	Fracture Rank 1
198.5	70.6	273	23	Fracture Rank 1
199.0	70.1	266	31	Fracture Rank 1
199.6	69.5	285	22	Fracture Rank 2
199.7	69.4	261	18	Fracture Rank 2
205.5	63.6	276	19	Fracture Rank 1
205.7	63.4	271	30	Fracture Rank 1
206.5	62.6	297	23	Fracture Rank 2
207.7	61.4	116	69	Fracture Rank 1
208.3	60.8	308	19	Fracture Rank 1
208.3	60.8	105	70	Fracture Rank 1
209.6	59.5	27	10	Fracture Rank 1
209.7	59.4	47	9	Fracture Rank 2
209.8	59.3	282	78	Fracture Rank 2
211.8	57.3	28	38	Fracture Rank 2
211.9	57.3	241	11	Fracture Rank 2
212.2	56.9	288	87	Fracture Rank 2
213.8	55.3	255	19	Fracture Rank 2
215.1	54.0	273	8	Fracture Rank 2
218.7	50.4	248	70	Fracture Rank 2
219.6	49.5	137	44	Fracture Rank 1
221.7	47.4	334	28	Fracture Rank 1
221.8	47.3	257	83	Fracture Rank 2
221.8	47.3	245	37	Fracture Rank 2
222.2	46.9	272	18	Fracture Rank 2
223.1	46.0	270	54	Fracture Rank 2
223.2	45.9	341	26	Fracture Rank 2

TABLE OF BEDROCK STRUCTURES FOR BOREHOLE MW-16R

Depth (feet)	Elevation (feet)	Dip Azimuth (degrees)	Dip Angle (degrees)	Bedrock Structure Category
223.7	45.4	302	46	Fracture Rank 1
224.4	44.7	169	67	Fracture Rank 1
224.4	44.7	330	45	Fracture Rank 2
224.6	44.5	340	25	Fracture Rank 2
224.7	44.4	150	15	Fracture Rank 2
225.0	44.1	300	34	Fracture Rank 1
225.9	43.2	310	24	Fracture Rank 1
226.1	43.0	103	53	Fracture Rank 1
227.0	42.1	92	67	Fracture Rank 1
227.1	42.1	270	19	Fracture Rank 2
227.3	41.8	282	29	Fracture Rank 2
227.8	41.3	297	87	Fracture Rank 2
227.8	41.3	3	18	Fracture Rank 2
228.0	41.1	277	74	Fracture Rank 1
228.3	40.8	318	45	Fracture Rank 2
229.8	39.3	346	25	Fracture Rank 2
230.4	38.7	340	24	Fracture Rank 2
230.9	38.2	331	32	Fracture Rank 1
231.1	38.0	333	32	Fracture Rank 1
231.3	37.8	337	36	Fracture Rank 2
231.5	37.6	3	44	Fracture Rank 2
232.1	37.1	317	47	Fracture Rank 2
232.5	36.6	26	3	Fracture Rank 2
232.8	36.3	329	28	Fracture Rank 2
233.2	35.9	310	30	Fracture Rank 2
233.7	35.4	330	33	Fracture Rank 2
233.9	35.2	333	24	Fracture Rank 2
234.5	34.6	316	38	Fracture Rank 2
234.8	34.3	281	87	Fracture Rank 1
234.9	34.2	315	29	Fracture Rank 1
235.4	33.8	54	37	Fracture Rank 1
235.6	33.5	342	51	Fracture Rank 1
236.2	32.9	43	20	Fracture Rank 2
237.5	31.6	63	49	Fracture Rank 2
238.0	31.2	9	43	Fracture Rank 1
238.0	31.1	353	39	Fracture Rank 1
238.2	30.9	94	65	Fracture Rank 2
238.3	30.8	0	43	Fracture Rank 2
239.7	29.5	87	75	Fracture Rank 1
239.8	29.4	346	48	Fracture Rank 1
241.1	28.0	347	34	Fracture Rank 1
241.4	27.8	304	67	Fracture Rank 1
241.5	27.6	93	75	Fracture Rank 2
241.7	27.4	213	70	Fracture Rank 1
242.3	26.8	354	33	Fracture Rank 1
244.1	25.1	21	78	Fracture Rank 1

TABLE OF BEDROCK STRUCTURES FOR BOREHOLE MW-16R

Depth (feet)	Elevation (feet)	Dip Azimuth (degrees)	Dip Angle (degrees)	Bedrock Structure Category
245.0	24.1	88	77	Fracture Rank 1
245.5	23.6	99	75	Fracture Rank 3
245.6	23.5	309	68	Fracture Rank 1
245.9	23.2	88	72	Fracture Rank 1
246.7	22.4	330	39	Fracture Rank 1
246.8	22.3	102	73	Fracture Rank 1
246.8	22.3	329	42	Fracture Rank 1
246.9	22.2	318	39	Fracture Rank 1
250.4	18.7	355	29	Fracture Rank 1
251.8	17.3	343	32	Fracture Rank 2
251.9	17.2	347	32	Fracture Rank 2
252.0	17.1	340	33	Fracture Rank 2
252.1	17.0	347	29	Fracture Rank 2
252.2	17.0	4	24	Fracture Rank 2
252.2	16.9	350	25	Fracture Rank 2
252.4	16.7	359	33	Fracture Rank 2
252.5	16.6	3	37	Fracture Rank 2
252.5	16.6	13	33	Fracture Rank 2
253.1	16.0	331	41	Fracture Rank 2
254.2	14.9	303	52	Fracture Rank 1
254.3	14.8	117	67	Fracture Rank 1
255.9	13.2	105	76	Fracture Rank 1
257.2	11.9	315	59	Fracture Rank 2
257.7	11.4	107	74	Fracture Rank 1
258.9	10.3	119	78	Fracture Rank 1
259.4	9.7	344	21	Fracture Rank 2
259.7	9.4	359	22	Fracture Rank 1
260.5	8.6	323	40	Fracture Rank 1
260.8	8.3	314	46	Fracture Rank 2
261.6	7.5	312	48	Fracture Rank 2
262.7	6.4	307	64	Fracture Rank 2
263.1	6.0	299	62	Fracture Rank 1
263.5	5.7	314	53	Fracture Rank 1
264.2	4.9	308	66	Fracture Rank 2
264.9	4.2	317	57	Fracture Rank 1
265.0	4.1	319	60	Fracture Rank 1
265.2	3.9	322	61	Fracture Rank 1
265.5	3.6	305	64	Fracture Rank 1
269.8	-0.7	356	39	Fracture Rank 1
275.5	-6.3	355	82	Fracture Rank 2
278.1	-9.0	312	36	Fracture Rank 2
278.8	-9.6	291	42	Fracture Rank 1
278.8	-9.7	297	36	Fracture Rank 2
279.5	-10.4	310	30	Fracture Rank 2
280.8	-11.7	302	36	Fracture Rank 1
281.0	-11.9	282	47	Fracture Rank 2

TABLE OF BEDROCK STRUCTURES FOR BOREHOLE MW-16R

Depth (feet)	Elevation (feet)	Dip Azimuth (degrees)	Dip Angle (degrees)	Bedrock Structure Category
282.7	-13.6	317	62	Fracture Rank 2
282.9	-13.8	341	40	Fracture Rank 2
282.9	-13.8	321	55	Fracture Rank 2
283.0	-13.9	322	56	Fracture Rank 3
283.3	-14.2	339	40	Fracture Rank 3
284.0	-14.9	333	42	Fracture Rank 1
284.9	-15.8	319	69	Fracture Rank 1
289.3	-20.2	312	43	Fracture Rank 1
291.7	-22.6	323	58	Fracture Rank 1
293.7	-24.6	149	69	Fracture Rank 1
294.7	-25.6	333	42	Fracture Rank 1
295.8	-26.7	326	50	Fracture Rank 1
296.2	-27.1	95	79	Fracture Rank 1
296.7	-27.6	325	54	Fracture Rank 1
301.1	-32.0	323	48	Fracture Rank 1
302.4	-33.3	329	48	Fracture Rank 2
305.8	-36.7	325	46	Fracture Rank 1
307.8	-38.7	154	70	Fracture Rank 1
309.1	-40.0	315	50	Fracture Rank 1
309.2	-40.1	306	55	Fracture Rank 1
312.1	-43.0	320	50	Fracture Rank 1
316.9	-47.8	326	52	Fracture Rank 2
317.5	-48.4	328	49	Fracture Rank 1
317.7	-48.6	333	48	Fracture Rank 2
318.4	-49.3	298	52	Fracture Rank 1
320.8	-51.7	332	31	Fracture Rank 1
324.9	-55.8	315	38	Fracture Rank 1
325.5	-56.4	320	45	Fracture Rank 1
329.3	-60.2	326	42	Fracture Rank 1
330.2	-61.1	341	48	Fracture Rank 2
330.4	-61.3	327	44	Fracture Rank 1
330.7	-61.6	345	36	Fracture Rank 2
330.8	-61.7	348	36	Fracture Rank 1
333.2	-64.1	318	48	Fracture Rank 1
334.6	-65.5	92	76	Fracture Rank 1
337.6	-68.5	164	66	Fracture Rank 1
343.6	-74.5	164	62	Fracture Rank 1
360.1	-91.0	38	68	Fracture Rank 2
378.3	-109.2	123	63	Fracture Rank 1
382.0	-112.9	302	60	Fracture Rank 2
382.2	-113.1	320	40	Fracture Rank 2
382.3	-113.2	336	24	Fracture Rank 2
383.1	-114.0	318	64	Fracture Rank 2
383.2	-114.1	318	61	Fracture Rank 2
383.5	-114.4	318	56	Fracture Rank 2
384.0	-114.9	300	63	Fracture Rank 2

TABLE OF BEDROCK STRUCTURES FOR BOREHOLE MW-16R

Depth (feet)	Elevation (feet)	Dip Azimuth (degrees)	Dip Angle (degrees)	Bedrock Structure Category
384.6	-115.5	227	58	Fracture Rank 2
385.5	-116.4	267	71	Fracture Rank 3
385.7	-116.6	307	59	Fracture Rank 3
386.2	-117.1	321	42	Fracture Rank 2
386.6	-117.5	332	40	Fracture Rank 2
387.0	-117.9	329	63	Fracture Rank 2
387.6	-118.5	44	14	Fracture Rank 2
387.9	-118.8	288	61	Fracture Rank 2
388.2	-119.1	302	64	Fracture Rank 2
388.3	-119.2	307	64	Fracture Rank 2
388.4	-119.3	300	66	Fracture Rank 2
388.5	-119.4	301	66	Fracture Rank 2
388.7	-119.6	304	69	Fracture Rank 2
389.2	-120.1	305	62	Fracture Rank 2
389.5	-120.4	327	67	Fracture Rank 2

APPENDIX 4

BOREHOLE DEVIATION LOGS

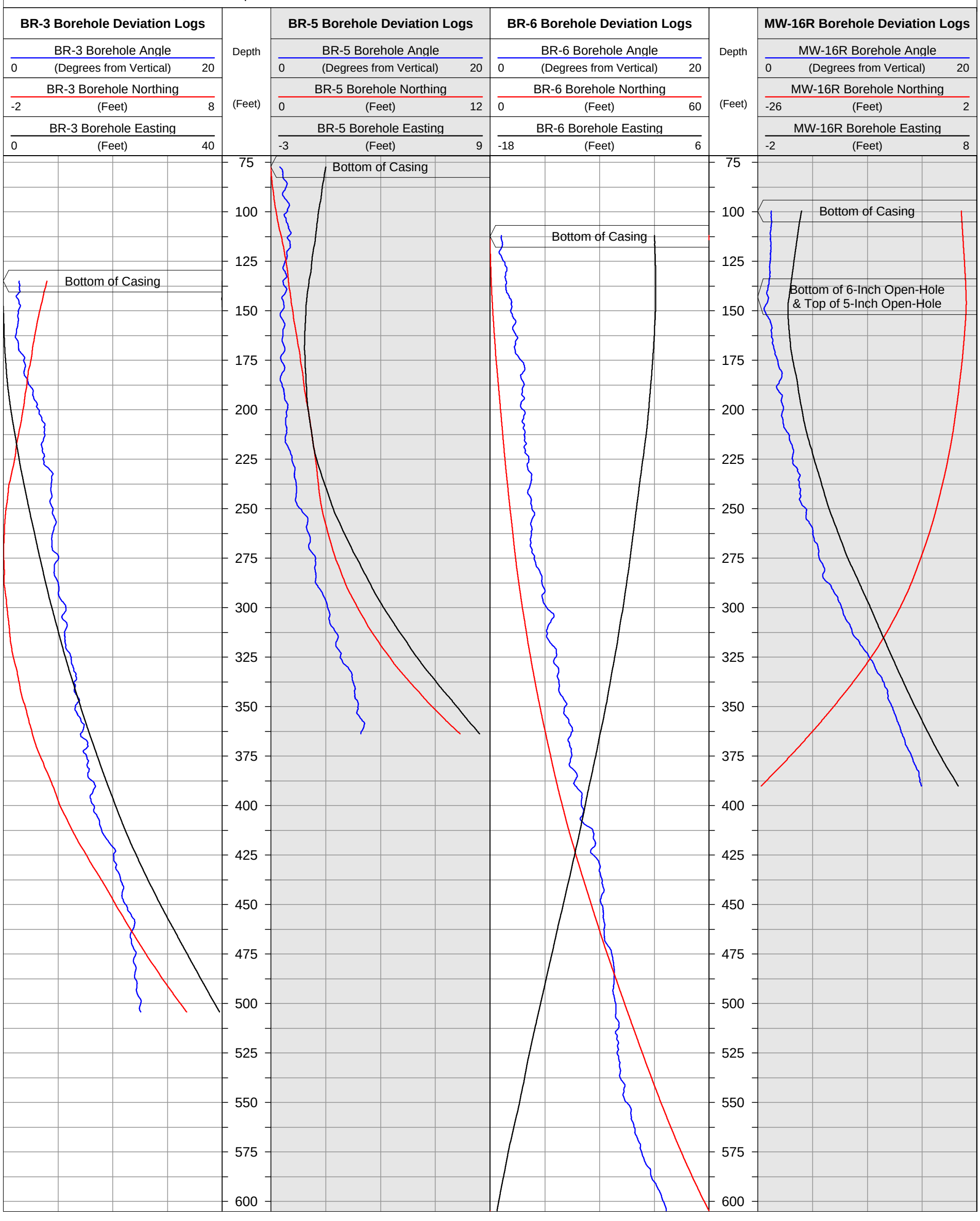
HAGER-RICHTER GEOSCIENCE, INC.

8 Industrial Way - D10
Salem, NH 03079
Phone: 603-893-9944
Fax: 603-893-8313

BOREHOLES: BR-3, BR-5, BR-6, MW-16R — BOREHOLE DEVIATION LOGS

DATES LOGGED: September 13 - 16, 2010

CLIENT:	Weston Solutions, Inc.	H-R FILE:	10RG30
PROJECT:	Borehole Geophysical Logging	LOG DATUM:	Top of the 6-Inch Steel Casing at Each Borehole
LOCATION:	Savage Municipal Water Supply Superfund Site	ORIENTATION REFERENCE:	Magnetic North
CITY, STATE:	Milford, New Hampshire	LOGS PROCESSED BY:	Robert Garfield



APPENDIX 5

TABLES OF HPFM RESULTS DURING THE WESTON PUMP TEST

HAGER-RICHTER GEOSCIENCE, INC.	
BR-1 - HPFM Results During the WESTON Pump Test	
CLIENT	Weston Solutions, Inc.
PROJECT	Savage Municipal Water Supply Superfund Site
CITY, STATE	Milford, New Hampshire
H-R FILE	10RG30
DATE LOGGED	December 9, 2010
LOG DATUM	Top of the 6-Inch Steel Casing

BR-1 - HPFM Results During the WESTON Pump Test

Depth (feet)	Flow (gpm)	Flow Interpretation
100.0	0.00	No flow was detected in borehole BR-1 during the pump test.
118.0	0.00	
139.0	0.00	
146.0	0.00	
182.0	0.00	
191.0	0.00	
213.0	0.00	
221.0	0.00	
229.0	0.00	
260.0	0.00	
282.0	0.00	
293.5	0.00	
312.0	0.00	
324.0	0.00	
343.0	0.00	
388.0	0.00	
399.0	0.00	

HAGER-RICHTER GEOSCIENCE, INC.	
BR-2 - HPFM Results During the WESTON Pump Test	
CLIENT	Weston Solutions, Inc.
PROJECT	Savage Municipal Water Supply Superfund Site
CITY, STATE	Milford, New Hampshire
H-R FILE	10RG30
DATE LOGGED	December 9, 2010
LOG DATUM	Top of the 6-Inch Steel Casing
Positive (+) Flow is Flow Up the Borehole	
Negative (-) Flow is Flow Down the Borehole	

BR-2 - HPFM Results During the WESTON Pump Test

Depth (feet)	Flow (gpm)	Flow Interpretation
130.0	0.00	no flow into or out of the borehole
158.0	0.00	no flow into or out of the borehole
167.0	0.00	no flow into or out of the borehole
187.0	0.00	no flow into or out of the borehole
202.0	0.00	no flow into or out of the borehole
207.0	0.00	no flow into or out of the borehole
215.0	0.00	no flow into or out of the borehole
230.0	0.00	no flow into or out of the borehole
244.0	0.00	no flow into or out of the borehole
259.0	0.00	flow into and down the borehole from the fractures at 262 feet and 278 to 292 feet.
270.5	-0.05	
299.0	-0.09	
317.0	-0.09	no flow into or out of the borehole
327.0	-0.09	no flow into or out of the borehole
341.5	-0.09	minor flow out of the borehole most likely through the fractures between 342 and 348 feet.
355.0	-0.08	
387.0	-0.08	flow out of the borehole through the fractures at 390 to 394 feet.
397.0	0.00	

HAGER-RICHTER GEOSCIENCE, INC.	
BR-3 - HPFM Results During the WESTON Pump Test	
CLIENT	Weston Solutions, Inc.
PROJECT	Savage Municipal Water Supply Superfund Site
CITY, STATE	Milford, New Hampshire
H-R FILE	10RG30
DATE LOGGED	December 9, 2010
LOG DATUM	Top of the 6-Inch Steel Casing
Positive (+) Flow is Flow Up the Borehole	
Negative (-) Flow is Flow Down the Borehole	

BR-3 - HPFM Results During the WESTON Pump Test

Depth (feet)	Flow (gpm)	Flow Interpretation
125.0	-0.01	flow into and down the borehole
150.0	-0.35	from the fractures at 135 to 143 feet.
196.0	-0.35	flow out of the borehole through
230.0	-0.29	the fractures at 212 to 225 feet.
250.0	-0.29	flow out of the borehole through
300.0	-0.15	the fractures at 274 to 279 feet.
324.0	-0.15	no flow into or out of the borehole
347.0	-0.15	flow out of the borehole through
367.5	0.00	the fractures at 349 to 358 feet.
385.0	0.00	no flow into or out of the borehole
410.0	0.00	no flow into or out of the borehole
470.0	0.00	no flow into or out of the borehole
485.0	0.00	no flow into or out of the borehole

HAGER-RICHTER GEOSCIENCE, INC.	
BR-5 - HPFM Results During the WESTON Pump Test	
CLIENT	Weston Solutions, Inc.
PROJECT	Savage Municipal Water Supply Superfund Site
CITY, STATE	Milford, New Hampshire
H-R FILE	10RG30
DATE LOGGED	December 9, 2010
LOG DATUM	Top of the 6-Inch Steel Casing
Positive (+) Flow is Flow Up the Borehole	
Negative (-) Flow is Flow Down the Borehole	

BR-5 - HPFM Results During the WESTON Pump Test

Depth (feet)	Flow (gpm)	Flow Interpretation
70.0	0.00	no flow into or out of the borehole
79.0	0.00	flow into and down the borehole from the fractures at 81 to 83 feet and 89 to 95 feet.
87.0	-0.01	
92.5	-0.03	
95.0	-0.03	no flow into or out of the borehole
106.0	-0.03	no flow into or out of the borehole
150.0	-0.03	no flow into or out of the borehole
170.0	-0.03	no flow into or out of the borehole
199.0	-0.03	no flow into or out of the borehole
219.0	-0.03	no flow into or out of the borehole
273.0	-0.03	no flow into or out of the borehole
295.0	-0.03	no flow into or out of the borehole
335.0	-0.03	flow out of the borehole through the fractures at 336 to 345 feet.
345.0	0.00	
355.0	0.00	no flow detected

HAGER-RICHTER GEOSCIENCE, INC.	
MW-16R - HPFM Results During the WESTON Pump Test	
CLIENT	Weston Solutions, Inc.
PROJECT	Savage Municipal Water Supply Superfund Site
CITY, STATE	Milford, New Hampshire
H-R FILE	10RG30
DATE LOGGED	December 9, 2010
LOG DATUM	Top of the 6-Inch Steel Casing

MW-16R - HPFM Results During the WESTON Pump Test

Depth (feet)	Flow (gpm)	Flow Interpretation
90.0	0.00	No flow was detected in borehole MW-16R during the pump test.
115.0	0.00	
120.5	0.00	
125.0	0.00	
150.0	0.00	
161.0	0.00	
169.0	0.00	
176.0	0.00	
191.5	0.00	
198.0	0.00	
243.0	0.00	
249.0	0.00	
267.0	0.00	
277.0	0.00	
286.0	0.00	
340.0	0.00	
380.0	0.00	

HAGER-RICHTER GEOSCIENCE, INC.	
MW-30 - HPFM Results During the WESTON Pump Test	
CLIENT	Weston Solutions, Inc.
PROJECT	Savage Municipal Water Supply Superfund Site
CITY, STATE	Milford, New Hampshire
H-R FILE	10RG30
DATE LOGGED	December 9, 2010
LOG DATUM	Top of the 6-Inch Steel Casing

MW-30 - HPFM Results During the WESTON Pump Test

Depth (feet)	Flow (gpm)	Flow Interpretation
150.0	0.00	No flow was detected in borehole MW-30 during the pump test.
164.0	0.00	
173.0	0.00	
181.5	0.00	
201.5	0.00	
213.0	0.00	
220.0	0.00	
226.0	0.00	
228.5	0.00	
233.0	0.00	

HAGER-RICHTER
GEOSCIENCE, INC.

BOREHOLE GEOPHYSICAL LOGGING
SAVAGE MUNICIPAL WATER SUPPLY SUPERFUND SITE
MILFORD, NEW HAMPSHIRE

Prepared for:

Weston Solutions, Inc.
45 Constitution Drive, Suite 100
Concord, New Hampshire 03301

Prepared by:

Hager-Richter Geoscience, Inc.
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Salem, New Hampshire 03079

File 11RG69
March, 2012

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March 9, 2012
File 11RG69

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RE: Borehole Geophysical Logging
Savage Municipal Water Supply Superfund Site
Milford, New Hampshire

Dear Ms. Nowack:

In this report, we present the results of borehole geophysical logging conducted by Hager-Richter Geoscience, Inc. (Hager-Richter) at the Savage Municipal Water Supply Superfund Site (Site) located in Milford, New Hampshire for Weston Solutions, Inc. (WESTON) in November and December, 2011 and January, 2012. As you know, Hager-Richter provided borehole geophysical logging services at the Site in 2010.[1] The borehole geophysical logging program was conducted as part of an ongoing environmental investigation by WESTON under the direction of the New Hampshire Department of Environmental Services (NHDES) and the United States Environmental Protection Agency (USEPA). The scope of work for the borehole geophysical logging reported herein was specified by WESTON.

Introduction

The Savage Municipal Water Supply Superfund Site is located in the western portion of the Town of Milford, New Hampshire. The general location of the Site is shown in Figure 1. The Site is the location of the former water supply well, the Savage Well, for the town of Milford, New Hampshire. The Savage Well operated from 1960 to 1983. NHDES detected concentrations of volatile organic compounds (VOCs) in the well that were above drinking water standards in February, 1983, and the well was shut down.

[1] Results reported in document entitled "Borehole Geophysical Logging, Savage Municipal Water Supply Superfund Site, Milford, New Hampshire," dated May, 2011.

During remedial investigations of the Site, one of the source areas was identified as the OK Tool Company, Inc., which manufactured metal cutting tools and hardware from approximately 1940 through 1987. As a result of releases at the facility, several VOC plumes are present in the groundwater beneath the Site.

According to information provided by WESTON, remedial actions performed at the Site include building demolition, construction of a containment slurry wall, construction of a groundwater extraction and treatment facility, and in-situ chemical remediation. The chemical remediation consisted of injecting sodium permanganate into the ground.

Overburden at the Site consists of approximately 70 to 100 feet of medium to coarse sand and gravel. A thin (5-10 feet thick) layer of glacial till underlies the sand and gravel. According to WESTON, bedrock occurs at a depth of approximately 80 to 110 feet and consists of granite and gneiss.

WESTON requested borehole geophysical logging as part of the ongoing environmental investigations of the Site. WESTON was interested in determining the depth and orientation (dip azimuth and dip angle) of bedrock fractures intersected by the boreholes, depths where water flows into and out of the boreholes under ambient and stressed (low constant rate pumping) conditions, and depths of lithologic variation in the bedrock encountered in the boreholes.

Borehole geophysical logging was conducted in four (4) boreholes in November and December, 2011 and January, 2012. The boreholes were identified as BR-7, BR-8, BR-9, and MW-30. The approximate locations of the logged boreholes are shown in Figure 2. The boreholes were cased through the overburden with 6-inch steel casing and were open-hole throughout the bedrock portions of the boreholes. The date logged, casing depth, open-hole interval, open bedrock diameter, and water level for each of the logged boreholes are reported in Table 1. The datum for depths in this report is the top of the 6-inch steel casing at each borehole. Elevations are also provided in this report and are based on the top of casing elevations provided by WESTON.

Table 1 - Borehole Information

Borehole (date logged)	Bottom of Casing	Open-Hole Interval	Open Bedrock Diameter	Water Level
BR-7 (Nov. 14, 29-30, 2011)	110.3 feet btoc	110.3 - 497.6 feet btoc	6 inches	231-247 ft btoc (Nov. 14) 6.1 ft btoc (Nov. 29-30)
BR-8 (Nov. 30, Dec. 1, 2011)	90.4 feet btoc	90.4 - 478.4 feet btoc	6 inches	5.6 feet btoc
BR-9 (Nov. 29, 2011)	88.9 feet btoc	88.9 - 379.0 feet btoc	6 inches	10.4 feet btoc
MW-30 (Nov. 30, 2011, Jan. 13, 2012)	160.9 feet btoc	160.9 - 287.9 feet btoc	6 inches	8.0 feet btoc

btoc = below the top of casing

All of the boreholes were air rotary drilled to 6 inches in diameter throughout the open bedrock portions of the boreholes. MW-30 was originally drilled to a depth of 440 feet, but a blockage was encountered at a depth of 287.9 feet. WESTON attempted to remove the blockage several times unsuccessfully. Therefore, the available portion of the borehole above the blockage was logged on January 13, 2012.

The borehole geophysical logging program consisted of:

- Optical Televiewer (OTV)
- Acoustic Televiewer (ATV)
- Acoustic Caliper
- Fluid Temperature
- Fluid Resistivity
- Natural Gamma Ray
- Heat Pulse Flow Meter (HPFM) under ambient and stressed (low constant rate pumping) conditions*

* HPFM data were acquired under ambient and pumping conditions in boreholes BR-8, BR-9, and MW-30. At the time of logging borehole BR-7, the borehole was still filling with water after drilling activities. Based on the HPFM data, the water was rising in BR-7 at a rate of approximately 0.05 gpm. HPFM data were only acquired while the borehole was filling. HPFM data were not acquired under pumping conditions in BR-7.

Borehole Geophysical Logging
Savage Municipal Water Supply Superfund Site
Milford, New Hampshire
File 11RG69 March, 2012

HAGER-RICHTER
GEOSCIENCE, INC.

Objectives

The objectives of the borehole geophysical logging program were to determine the depth and orientation (dip azimuth and dip angle) of bedrock fractures intersected by the boreholes, depths where water flows into and out of the boreholes under ambient and stressed (low constant rate pumping) conditions, and depths of lithologic variation in the bedrock encountered in the boreholes.

Field Operations

Nicholas DeCristofaro, Eric Rickert, and Michael Howley of Hager-Richter conducted the field operations on November 14, November 29 to December 1, 2011, and January 13, 2012. The project was coordinated with Ms. Bette Nowack and Mr. Andrew Fuller of WESTON. Mr. Fuller was on-site during field operations. Data analysis and interpretation were completed at the Hager-Richter offices. Preliminary logging results were provided to WESTON electronically in December, 2011 and January, 2012. Original data and field notes reside in the Hager-Richter files and will be retained for at least three years.

Equipment

General. A Mount Sopris Matrix portable digital logging system was used with a 4MXA-1000 winch for the borehole geophysical logging. Data were recorded in digital format using a PC. Data were displayed in real time in the field and were processed in the office using WellCAD v4.4, commercially licensed software.

Optical Televiewer. An ALT OBI-40 optical televiewer (OTV) probe was used for this project. The OTV acquires a high resolution, effectively continuous, magnetically oriented, 360° image of the borehole wall. The image can be used to detect bedrock structures such as fractures, foliation, and bedding and to provide information about lithology. The probe includes a 3-axis magnetometer and three accelerometers to orient the image and to provide borehole deviation data that are used to correct structure orientations from apparent to true orientations.

Acoustic Televiewer. An ALT ABI-40 acoustic televiewer (ATV) probe was used for this project. The ATV acquires a high resolution, effectively continuous, magnetically oriented, 360° image of the borehole wall using the reflected signal of sound waves in the ultrasonic frequency range. Both amplitude and travel time of the reflected signal are recorded and can be used to detect bedrock structures such as fractures, foliation, and bedding. The probe includes a 3-axis magnetometer and three accelerometers to orient the image and to provide borehole deviation data that are used to correct structure orientations from apparent to true orientations.

ATV travel time data can also be used to calculate an acoustic caliper log. The acoustic caliper log measures the average borehole diameter as a function of depth. The acoustic caliper

log is derived from the travel time data and the velocity of the acoustic signal in water. The acoustic caliper log is used to locate fractures and to aid in the interpretation of other borehole geophysical logs.

Fluid Temperature. A Mount Sopris 2SFB-1000 fluid resistivity/temperature probe was used for the temperature logging. The temperature sensor is a semiconductor device for which the voltage output is linearly related to temperature. Temperature logs record the temperature of the borehole fluid with depth and are useful for detecting flow into or out of a borehole. If fluid temperature contrasts are present between the borehole fluid and individual fractures and fracture zones, the fluid temperature logs are also useful indicators of flow into and out of the borehole.

Fluid Resistivity. A Mount Sopris 2SFB-1000 fluid resistivity/temperature probe was used for the fluid resistivity logging. The probe uses an electrically shielded Wenner array to measure the capacity of the borehole fluid to transmit electric current with depth and can be an indicator of salinity and water quality. If fluid resistivity contrasts are present between the borehole fluid and individual fractures and fracture zones, the fluid resistivity logs are also useful indicators of flow into and out of the borehole.

Resistivity is the physical property that relates electric current density to potential gradient and is defined as:

$$\tilde{n} = (A / L) * (V / I) \qquad \text{Eq. 1}$$

where:

ñ	is resistivity
A	is cross-sectional area of a homogeneous tube
L	is length of the tube
V	is potential
I	is current

Natural Gamma Ray. A Mount Sopris 2PGA-1000 poly-gamma probe was used for the natural gamma ray logging. The probe uses a sodium iodide crystal that produces a pulse of light when struck by a gamma ray. The variation of radioactivity naturally occurring in rocks and sediments makes the natural gamma ray log an excellent indicator of changes in lithology. Radioactive minerals tend to accumulate in clays with the practical result that layers with higher clay content are commonly expressed in the natural gamma ray log as relatively higher counts per second (cps). Clean sands, which are normally low in radioactivity, produce low count rates.

Heat Pulse Flow Meter. A Mount Sopris HFP-2293 heat pulse flow meter (HPFM) was used for the HPFM logging. The HPFM measures the vertical rate and direction of fluid flow in a borehole at discrete depths and is designed to be used for boreholes with flow rates less than one gallon per minute (gpm). A heating grid heats a thin sheet of water in a short time interval (less than 0.05 seconds), and, if vertical flow is present, the sheet of water moves along the

borehole in the direction of flow. Temperature sensors located at known distances above and below the heating grid monitor the differential temperature of the borehole fluid. The time required for the sheet of heated water to reach one of the sensors is measured, and, based on factory calibrations, the time is used to calculate the vertical flow rate. Depths where water flows into and out of the borehole can be interpreted based on changes in the vertical flow rate and/or direction. HPFM measurements can be made under ambient and stressed (pumping or injection) conditions.

Measurement depths are selected based on information provided by other borehole geophysical data such as OTV, ATV, fluid temperature, and fluid resistivity data. To make a measurement, the probe is positioned at a selected depth and the probe is stabilized by the friction between the centralizers and diverter petal on the probe and the borehole wall. When the borehole fluid has stabilized after the disturbance caused by the probe being moved to the measurement depth, the heating grid is fired, and a measurement cycle starts.

Limitations of the Methods

General. With the 4MXA-1000 winch, the logging cable passes over a calibrated wheel, and an encoder counts the revolutions, which are converted to depth. Slippage of the logging cable may occur, resulting in errors in recorded depth. At the beginning and end of a logging run, fiducial depths (commonly ground surface or top of casing) are measured and are compared to determine if slippage occurred.

Optical Televiewer. The OTV logs can be acquired in both air and optically clear water-filled boreholes. If the borehole is water-filled, the clarity of the water directly affects the quality of the OTV image. The OTV probe must be centralized in the borehole to acquire optimal images of the borehole wall. If the borehole wall is rough and/or irregular or the diameter of the open borehole is larger than the diameter of the casing, the probe may not be adequately centralized and the quality of the optical images may be compromised.

The OTV logs are used to determine the depth and orientation of fractures and other planar features intersected by a borehole. In some cases, natural planar features in the bedrock, such as mineral veins, bedding, and foliation may appear to be fractures in the OTV logs, but are not actual discontinuities in the bedrock. The OTV images are also used to provide information about lithology.

The accuracy of the orientation measured by the OBI-40, as stated by the manufacturer, is ±0.5° for the inclination data and ±1° for the azimuth data. The OBI-40 relies on the earth's magnetic field to determine azimuth. Therefore, in areas where the magnetic field may be significantly affected by local magnetic objects, the dip azimuths reported in the logs may be compromised. Specifically, the dip azimuth of bedrock structures and the borehole deviation data within approximately five feet of steel casing are not accurate.

Acoustic Televiewer. ATV logging requires that liquid be present in the portion of the borehole to be logged. However, the liquid does not need to be optically clear. The ATV probe must be centralized in the borehole to acquire optimal images of the borehole wall. If the borehole wall is rough and/or irregular or the diameter of the open borehole is larger than the diameter of the casing, the probe may not be adequately centralized and the quality of the acoustic images may be compromised.

The ATV logs are used to determine the depth and orientation of fractures and other planar features intersected by a borehole. In some cases, natural planar features in the bedrock, such as mineral veins, bedding, and foliation may appear to be fractures in the ATV logs, but are not actual discontinuities in the bedrock.

The accuracy of the orientation measured by the ABI-40, as stated by the manufacturer, is ±0.5° for the inclination data and ±1° for the azimuth data. The ABI-40 relies on the earth's magnetic field to determine azimuth. Therefore, in areas where the magnetic field may be significantly affected by local magnetic objects, the accuracy of dip azimuths reported in the logs may be reduced. Specifically, the dip azimuth data of bedrock structures and the borehole deviation data within approximately five feet of steel casing are not accurate.

Fluid Temperature. Fluid temperature logging requires that liquid be present in the portion of the borehole to be logged. According to the manufacturer's specifications, the measurement range is -20°C to 80°C, the accuracy is better than ±1%, and the resolution is 0.01° C. Temperature logging is ineffective for accurately measuring the formation fluid temperature unless the borehole fluid is at equilibrium, except for detecting flow into or out of the borehole via hydraulically transmissive fractures. Additionally, a vertical temperature gradient must be present in the borehole in order to detect water movement into or out of the borehole.

Fluid Resistivity. Fluid resistivity logging requires that liquid be present in the portion of the borehole to be logged. According to the manufacturer's specifications, the measurement range is 0 ohm-m to 100 ohm-m, the accuracy is better than ±1%, and the resolution is 0.05%. A contrast in fluid resistivity must be present between the borehole fluid and fluid in the fractures in order to detect water movement into or out of the borehole.

Natural Gamma Ray. Natural gamma ray data can be acquired with or without liquid in the borehole and in an un-cased, PVC-cased, or steel-cased borehole. However, if a liquid or casing is present, the liquid or the casing attenuates the natural gamma rays, and, therefore, lower values are measured than if the borehole was air-filled and/or un-cased. According to the manufacturer's specifications, the measurement range is 0 CPS to 100,000 CPS, the accuracy is ±1% of full scale, and the resolution is 0.02% of full scale. Natural gamma ray data do not have a quantitative value in terms of geologic properties.

Heat Pulse Flow Meter. The HPFM requires liquid in the interval to be logged. According to the manufacturer's specifications for the HPFM, the measuring range is 0.03 to 1.0 gpm, the accuracy is ±5% for the mid-range, increasing to ±15% for the extremes of the range, and the resolution is 5%. Data below the stated calibration range are reported when such data are repeatable. Although the accuracy of such data may be low, non-zero values indicate that flow is occurring and indicate the direction of flow. The HPFM probe measures the difference in temperature between the upper and lower temperature sensors. In the absence of flow, the thermal pulse would move symmetrically out from the grid, affecting the two sensors equally as a function of time. Therefore, the conductive or convective dissipation of the heat pulse would yield a zero value in the absence of flow.

Field Procedures & Data Acquisition

Adequate tension was maintained with the logging cable during the borehole geophysical logging and the depth encoder was cleaned after each logging run in order to maintain accurate depth measurements. Repeat sections for each log were acquired to verify depth consistency. In addition, at the beginning and end of a logging run, a fiducial depth (top of casing) was measured and checked for consistency. Recorded depths of fixed features in the borehole (i.e. reported casing lengths and reported borehole depths) were also checked for depth consistency. The cable and downhole probes were decontaminated prior to first use and after logging each borehole with an Alconox and water solution followed by rinsing with water.

The borehole geophysical logging sequence and the data acquisition parameters for the logged boreholes are reported in Table 2.

Table 2 – Borehole Geophysical Logging Sequence & Data Acquisition Parameters

Log	Sampling Interval	Logging Speed	Logging Direction
1. Fluid Temperature & Fluid Resistivity	0.10 feet	10 feet/minute	down and repeat up
2. OTV	0.01 feet	5 feet/minute	down
3. ATV& Acoustic Caliper	0.01 feet	8 feet/minute	down and repeat up
4. HPFM under ambient conditions	HPFM data were acquired at discrete depths under ambient conditions.		
5. HPFM under pumping conditions	HPFM data were acquired at discrete depths while water was pumped from each borehole at a low constant rate.		

Data Processing

The processing consists mainly of selecting scales, filters, and the layout of the tracks. In addition, the OTV and ATV data require determining the depth, orientation, and category of the bedrock structures detected. To increase the quality of the OTV images, the brightness and contrast of the images were adjusted. To increase the quality of the images, the ATV travel time images were digitally centralized. The ATV amplitude images can be normalized, although normalization was not applied to the ATV amplitude data for this project.

Data Interpretation & Presentation

Bedrock Fracture Interpretation & Presentation. Fractures can be identified on the basis of the OTV images, ATV amplitude images, and ATV travel time images. Some, if not most, of the criteria for identifying fractures based on the OTV and ATV data require a judgment call, and different log analysts will not necessarily make the same call. Hence, some of the bedrock structures identified as fractures may not be fractures. Bedding, foliation, veins, and other planar geologic features in the bedrock may appear similar to fractures in the borehole geophysical data.

The datum for depths in this report is the top of the 6-inch steel casing at each borehole. An elevation track is provided along with depth in the borehole geophysical logs and tables of bedrock structures. When both the depth track and elevation track are provided on the same log or table, the depth track is provided in black and the elevation track is provided in blue to minimize confusion between depths and elevations. The elevation track is based on the top of casing elevations provided by WESTON.

The depths of bedrock structures are reported as the average depth of the top and bottom intersections of each bedrock structure and the borehole wall. The orientations of bedrock structures (fractures, bedding, foliation, veins, and other planar geologic features) are reported as the dip azimuth (dip direction) and dip angle of each structure. The dip azimuth is perpendicular to strike as used commonly by geologists. The televiewer logs and the dip azimuth data are referenced to true north using a magnetic declination of 15° west. The dip angle data are reported from horizontal.

Bedrock structures detected in the televiewer logs are grouped into three categories: Fracture Rank 1, Fracture Rank 2, and Fracture Rank 3. The categories are shown as color-coded lines and symbols on the structure projection plots, tadpole plots, and on the structure statistics plots. Figure 3 explains the bedrock structure categories and Figure 4 explains how to read the tadpole plots.

Fracture Rank 1 describes minor fractures that are not distinct and may not be continuous around the borehole. Fracture Rank 2 describes intermediate fractures that are distinct and

continuous around the borehole with little or no apparent aperture. Fracture Rank 3 describes major fractures that are distinct and continuous around the borehole with apparent aperture.

The structure projection plots, sinusoidal curves in the log track labeled Structure Projection, display the depth, orientation, and category of the bedrock structures detected in the televiewer data. Bedrock structures are essentially planar for short distances such as the intersection of the open borehole and the bedrock structure. The intersection of a plane, the bedrock structure, with a cylinder, the borehole, is a circle on the plane. When the circle is unwrapped and plotted as it is in the structure projection plots, the circle plots as a sine curve as shown in Figure 5. The orientations of structures plotted in the structure projection plots are referenced to magnetic north. The structures plotted in the structure projection plots are not corrected for borehole deviation. Therefore, the orientation of the structures are referred to as *apparent* orientations (that is, *apparent* dip angle and *apparent* dip azimuth). The true orientation (that is, *true* dip angle and *true* dip azimuth) of the detected bedrock structures are shown in the log track labeled Tadpole Plot. The correction from apparent to true orientation is made using the borehole deviation data acquired by the televiewer probes (OTV and ATV probes).

The tadpole plots are created from the structure projection plots after the data are corrected from apparent to true dip azimuth and dip angle as previously discussed. The tadpole plots graphically display the depth, orientation, and category of the bedrock structures interpreted from the televiewer images. The orientations of bedrock structures are graphically displayed on the tadpole plots by a tadpole consisting of a circle, the head, and a line, the tail. The position of the head, left to right on the tadpole plot, gives the dip angle of the bedrock structure. The left side of the track indicates a dip angle of 0° and the right side of the track indicates a dip angle of 90° from horizontal. The position of the tail gives the dip azimuth of the fracture and can be read like a compass. The tail pointing directly up is 0°, north. We note explicitly that dip azimuth is perpendicular to strike as the term is used by geologists.

Borehole Flow. The interpretation of flow under ambient and pumping conditions in the logged borehole is based on the fluid temperature, fluid resistivity, and HPFM data. Fluctuations in fluid temperature and fluid resistivity data indicate depths of possible flow into or out of the boreholes. Changes in the flow rate and/or direction in the HPFM data also indicate depths of flow into or out of the boreholes. It is possible to calculate the flow rate, in gallons per minute (gpm), and flow direction based on the HPFM data. Therefore, it is possible to differentiate between flow into and flow out of the boreholes based on the HPFM data. However, the fluid temperature and fluid resistivity data alone can only be used to determine depths of possible flow into or out of the boreholes. It is not possible to determine the flow rate, flow direction, or differentiate between flow into and flow out of the boreholes based on fluid temperature and fluid resistivity alone.

Flow into and out of a borehole in fractured bedrock primarily occurs through transmissive fractures intersected by the borehole. Since HPFM data are acquired at discrete depths, changes in the flow rate and/or direction are detected between a pair of HPFM measurement depths. Depths of flow into and out of the boreholes detected by the HPFM are further refined by consideration of the fluid temperature and fluid resistivity logs, and the bedrock fractures detected in the televiewer (OTV and ATV) logs in the depth zones between HPFM measurements points where a change in the flow rate and/or direction is detected.

Lithologic Variation Interpretation. The interpretation of lithologic variation in the bedrock encountered in the logged borehole is based on the natural gamma ray, OTV, and ATV data. Lithologic variation can be identified based on baseline shifts in the natural gamma ray data, changes in the color and texture of the bedrock in the OTV images, and in changes in the reflectivity of the acoustic signal in the ATV amplitude images. The borehole geophysical logging data can be used to determine the depths of lithologic variation in the bedrock, but cannot be used to identify a specific bedrock type.

Presentation of Borehole Geophysical Logs. Two sets of borehole geophysical logs are provided for each logged borehole:

1. Borehole Image Logs
2. Borehole Geophysical Logs

The different scales for the Borehole Image Logs and the Borehole Geophysical Logs are designed to enhance presentation of the specific data plotted in each log. The scale of 1-inch to 2-feet for the Borehole Image Logs provides a more detailed view of the high revolution OTV and ATV images, while the more compressed scales of 1-inch to 10-feet for the Borehole Geophysical Logs enable better interpretation of the linear data where anomalies may be subtle and take place over broad depth ranges.

The Borehole Image Logs consist of:

Track 1. OTV Image
Track 2. Depth in feet below the top of the steel casing - scale at 1-inch to 2-feet
Track 3. ATV Amplitude
Track 4. ATV Travel Time & Structure Projection
Track 5. Acoustic Caliper & Tadpole Plot
Track 6. OTV Virtual Core
Track 7. Elevation Track in feet - based on the top of casing elevations provided by WESTON - scale at 1-inch to 2-feet
Track 8. ATV Virtual Core

The Borehole Geophysical Logs for boreholes BR-8, BR-9, and MW-30 consist of:

Track 1. ATV Amplitude
Track 2. Depth in feet below the top of the steel casing - scale at 1-inch to 10-feet
Track 3. Natural Gamma Ray
Track 4. Acoustic Caliper & Tadpole Plot
Track 5. Fluid Temperature & Fluid Resistivity
Track 6. Hydraulic Transmissivity, PCE Concentration, & TCE Concentration
The transmissivity, PCE, & TCE data were provided by Weston
and were acquired during packer testing
Track 7. Elevation Track in feet - based on the top of casing elevations
provided by WESTON - scale at 1-inch to 10-feet
Track 8. HPFM & Flow Comments

According to WESTON, packer testing was not conducted in BR-7. Therefore, hydraulic transmissivity, PCE, and TCE data are not reported on the logs for borehole BR-7. The Borehole Geophysical Logs for borehole BR-7 consist of:

Track 1. ATV Amplitude
Track 2. Depth in feet below the top of the steel casing - scale at 1-inch to 10-feet
Track 3. Natural Gamma Ray
Track 4. Acoustic Caliper & Tadpole Plot
Track 5. Fluid Temperature & Fluid Resistivity
Track 6. Elevation Track in feet - based on the top of casing elevations
provided by WESTON - scale at 1-inch to 10-feet
Track 7. HPFM & Flow Comments

Results

General. The general location of the site is shown in Figure 1. The borehole geophysical logs are given in Appendix 1, the bedrock structure statistics plots are given in Appendix 2, and the tables of bedrock structures are given in Appendix 3. The datum for depths in this report is the top of the 6-inch steel casing at each borehole. An elevation track is provided along with depth in the logs and tables of bedrock structures. The depth track is provided in black and the elevation track is provided in blue to minimize confusion between depths and elevations. The elevation track is based on the top of casing elevations provided by WESTON. The televiewer logs, dip azimuth data, and borehole deviation data are referenced to true north using a magnetic declination of 15°west. The dip angle data are reported from horizontal.

Borehole geophysical logging was conducted in four (4) boreholes in November and December, 2011 and January, 2012. The boreholes were identified as BR-7, BR-8, BR-9, and MW-30. The approximate locations of the logged boreholes are shown in Figure 2. The

boreholes were cased through the overburden with 6-inch steel casing and were open-hole throughout the bedrock portions of the boreholes. The date logged, casing depth, open-hole interval, open bedrock diameter, and water level for each of the logged boreholes are reported in Table 1.

All of the boreholes were air rotary drilled to 6 inches in diameter throughout the open bedrock portions of the boreholes. MW-30 was originally drilled to a depth of 440 feet, but a blockage was encountered at a depth of 287.9 feet. WESTON attempted to remove the blockage several times unsuccessfully. Therefore, the available portion of the borehole above the blockage was logged on January 13, 2012.

Bedrock Fracture Results. The number of bedrock structures interpreted as fractures in the logged boreholes and the most prominent orientations of the fractures detected in the logged boreholes are reported in Table 3 and are evident in the bedrock structure statistics plots in Appendix 2.

Table 3 – Summary of Bedrock Fracture Statistics

Borehole	Number of Fractures	Most Prominent Fracture Dip Azimuths	Most Prominent Fracture Dip Angles
BR-7	341	primary: west-northwest (285° - 315°) secondary: east-southeast (90° - 120°)	45° - 60° from horizontal
BR-8	273	primary: west-northwest (285° - 330°) secondary: east-southeast (105° - 120°)	30° - 80° from horizontal
BR-9	297	primary: west-northwest (270° - 300°) secondary: east (60° - 120°)	60° - 85° from horizontal
MW-30	187	primary: west-northwest (285° - 315°) secondary: east-southeast (105° - 120°)	35° - 80° from horizontal

Borehole Flow Results. The borehole flow data (fluid temperature, fluid resistivity, and HPFM data) are plotted in the borehole geophysical logs provided in Appendix 1. Depths of interpreted flow into and out of the boreholes are reported as text overlaid on the HPFM track (the last track to the right) on the borehole geophysical logs. The borehole flow conditions for each of the logged boreholes are reported in Table 4 to Table 7.

At the time of logging borehole BR-7, the borehole was still filling with water after drilling activities. Based on the HPFM data, the water was rising in BR-7 at a rate of approximately 0.05 gpm. HPFM data were only acquired while the borehole was filling. HPFM data were not acquired under pumping conditions in BR-7.

Table 4 - Summary of Borehole Flow in BR-7

Depths (feet)	Comments
6.1	water level on November 29-30
110.3	bottom of casing
118.4 - 122.1	possible flow into or out of the borehole
231.0 - 235.0	water level during the HPFM logging
235.0 - 256.9	flow up the borehole at 0.05 gpm
256.9 - 259.6	flow into and up the borehole
259.6 - 276.8	flow up the borehole at 0.04 gpm
276.8 - 277.6	possible flow into or out of the borehole
277.6 - 355.0	flow up the borehole at 0.04 gpm
355.0 - 360.3	flow into and up the borehole
360.3 - 372.0	flow up the borehole at 0.03 gpm
372.0 - 381.5	flow into and up the borehole
381.5 - 407.5	flow up the borehole at 0.02 gpm
407.5 - 417.1	flow into and up the borehole
417.1 - 497.6	no flow detected
497.6	bottom of the borehole

HPFM data were acquired under ambient and pumping conditions in borehole BR-8. Flow was detected in the borehole with the HPFM under both ambient and pumping conditions.

Table 5 - Summary of Borehole Flow in BR-8

Depths (feet)	Comments
5.6	water level
20.0 - 21.5	location of the pump for HPFM logging under pumping conditions
21.5 - 90.4	no flow detected in the casing under ambient conditions; flow up the borehole in the casing at 0.18 gpm under pumping conditions
90.4	bottom of casing
90.4 - 109.7	no flow detected under ambient conditions; flow up the borehole at 0.18 gpm under pumping conditions
109.7 - 121.7	flow out of the borehole under ambient conditions
121.7 - 235.6	flow up the borehole at 0.02 gpm under ambient conditions; flow up the borehole at 0.18 gpm under pumping conditions
235.6 - 238.2	flow into and up the borehole under pumping conditions
238.2 - 314.3	flow up the borehole at 0.02 gpm under ambient conditions; flow up the borehole at 0.05 gpm under pumping conditions
314.3 - 325.7	flow into and up the borehole under ambient and pumping conditions
325.7 - 478.4	no flow detected
478.4	bottom of the borehole

HPFM data were acquired under ambient and pumping conditions in borehole BR-9. However, flow was detected in the borehole with the HPFM under ambient conditions. Therefore, the flow interpretation for BR-9 is based on the HPFM data under pumping conditions along with the fluid temperature and fluid resistivity data.

Table 6 - Summary of Borehole Flow in BR-9

Depths (feet)	Comments
10.4	water level
20.0 - 21.5	location of the pump for HPFM logging under pumping conditions
21.5 - 89.0	flow up the borehole in the casing at 0.07 gpm under pumping conditions
89.0	bottom of casing
89.0 - 93.5	flow up the borehole at 0.07 gpm under pumping conditions
93.5 - 101.1	flow into and up the borehole under pumping conditions
101.1 - 300.2	flow up the borehole at 0.03 gpm under pumping conditions
300.2 - 314.4	possible flow into or out of the borehole
314.4 - 320.7	flow up the borehole at 0.03 gpm under pumping conditions
320.7 - 324.0	flow into and up the borehole under pumping conditions
324.0 - 379.0	no flow detected
379.0	bottom of the borehole

HPFM data were acquired under ambient and pumping conditions in borehole MW-30. However, flow was detected in the borehole with the HPFM under ambient conditions. Therefore, the flow interpretation for MW-30 is based on the HPFM data under pumping conditions along with the fluid temperature and fluid resistivity data.

Table 7 - Summary of Borehole Flow in MW-30

Depths (feet)	Comments
8.0	water level
20.0 - 21.5	location of the pump for HPFM logging under pumping conditions
21.5 - 160.8	flow up the borehole in the casing at 0.09 gpm under pumping conditions
160.8	bottom of casing
160.8 - 164.0	flow into and up the borehole under pumping conditions
164.0 - 205.7	flow up the borehole at 0.06 gpm under pumping conditions
205.7 - 207.7	flow into and up the borehole under pumping conditions
207.7 - 227.1	flow up the borehole at 0.04 gpm under pumping conditions
227.1 - 236.8	flow into and up the borehole under pumping conditions
236.8 - 241.6	flow up the borehole at 0.02 gpm under pumping conditions
241.6 - 243.7	possible flow into or out of the borehole
243.7 - 245.9	flow up the borehole at 0.02 gpm under pumping conditions
245.9 - 249.2	possible flow into or out of the borehole
249.2 - 267.4	flow up the borehole at 0.02 gpm under pumping conditions
267.4 - 271.6	flow into and up the borehole under pumping conditions
271.6 - 287.9	no flow detected
287.9	borehole blocked at 287.9 feet at the time of logging

Lithologic Variation Results. Lithologic variation was not detected in the bedrock encountered in logged boreholes based on the OTV, ATV, and natural gamma ray data. The relatively minor fluctuations exhibited in the natural gamma ray logs are interpreted as natural variation in the bedrock and not changes in bedrock lithology.

Limitations on the Use of this Report

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Hager-Richter has used reasonable care, skill, competence and judgment in the performance of its services for this project consistent with professional standards for those providing similar services at the same time, in the same locale, and under like circumstances. Unless otherwise stated, the work performed by Hager-Richter should be understood to be exploratory and interpretational in character and any results, findings or recommendations contained in this Report or resulting from the work proposed may include decisions which are judgmental in nature and not necessarily based solely on pure science or engineering. It should be noted that our conclusions might be modified if subsurface conditions were better delineated with additional subsurface exploration including, but not limited to, test pits, soil borings with collection of soil and water samples, and laboratory testing.

Except as expressly provided in this limitations section, Hager-Richter makes no other representation or warranty of any kind whatsoever, oral or written, expressed or implied; and all implied warranties of merchantability and fitness for a particular purpose, are hereby disclaimed.

If you have any questions or comments on this report, please contact us at your convenience. It has been a pleasure to work with WESTON on this project. We look forward to working with you again in the future.

Sincerely yours,
HAGER-RICHTER GEOSCIENCE, INC.

Robert L. Garfield

Robert Garfield
Vice President/Senior Borehole Geophysicist

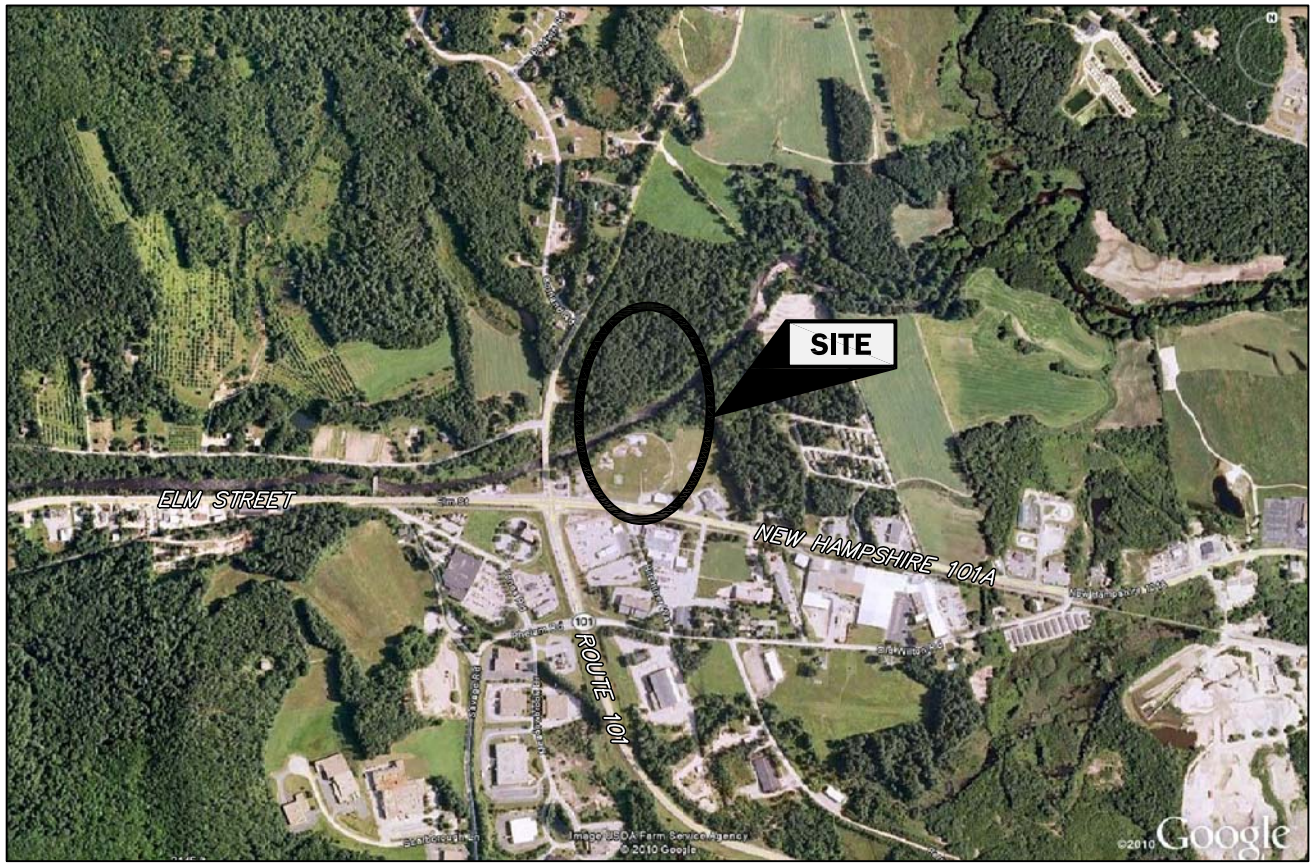
Dorothy Richter, P.G.
President

List of Enclosures

Figures: Figure 1. General Site Location
Figure 2. Borehole Location Plan
Figure 3. Key to Bedrock Structure Categories
Figure 4. Tadpole Plot Explanation
Figure 5. Televiewer Explanation

Appendix 1: Borehole Geophysical Logs
Appendix 2: Bedrock Structure Statistics Plots
Appendix 3: Tables of Bedrock Structures

FIGURES



N

APPROXIMATE SCALE (feet)

0 1300 2600

NH

LOCATION

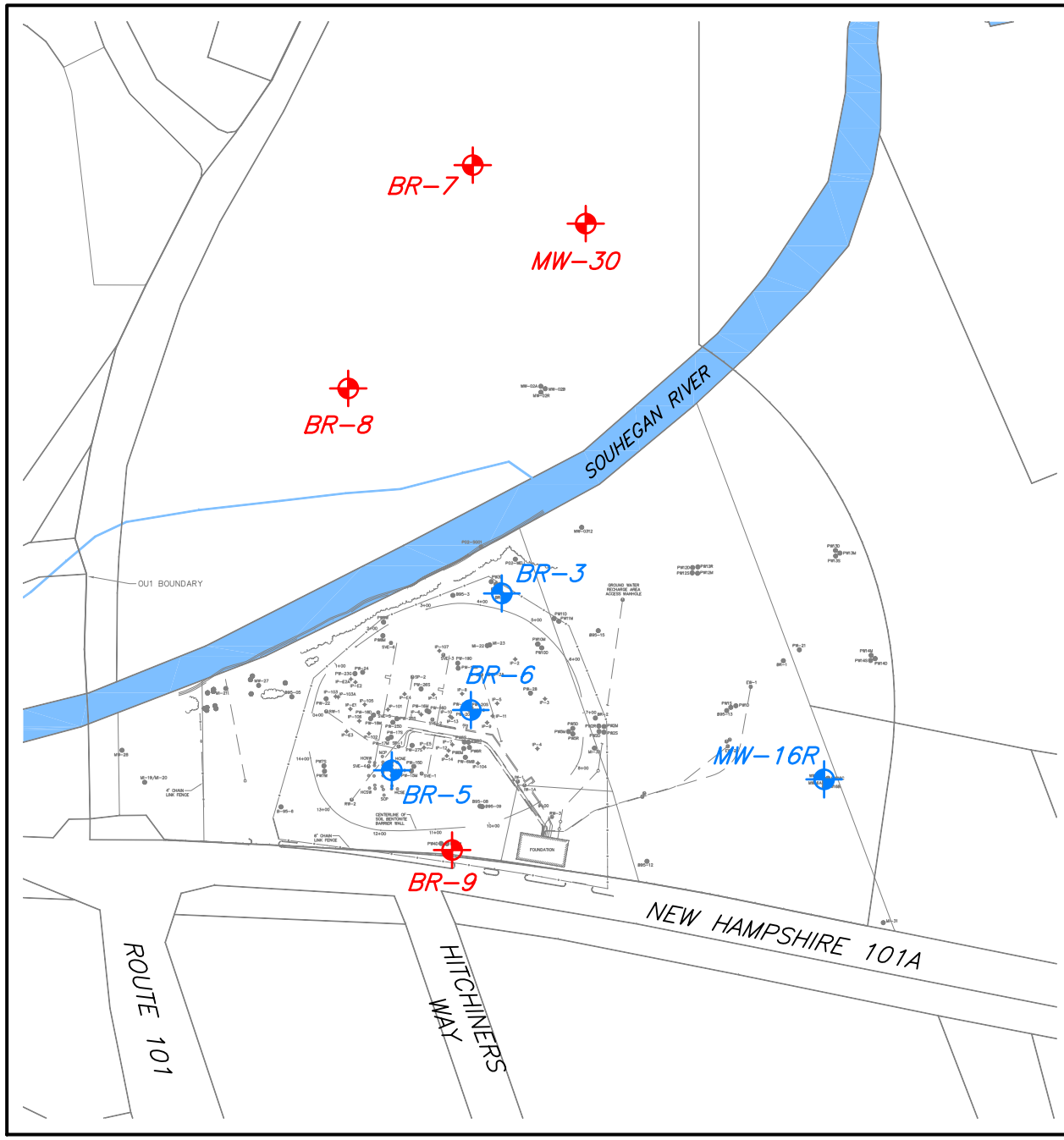
NOTE:

Modified from Google Earth aerial photograph.

Figure 1
General Site Location
Savage Municipal Water Supply
Superfund Site
Milford, New Hampshire

File 11RG69	March, 2012

HAGER–RICHTER GEOSCIENCE, INC.
Salem, New Hampshire



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LEGEND

BOREHOLE LOGGED BY HAGER-RICHTER (2011 & 2012)

BOREHOLE LOGGED BY HAGER-RICHTER (2010)

SCALE (feet)

0 300 600

NOTE:

Modified from site plan provided by Weston Solutions, Inc.

Figure 2
Borehole Location Plan
Savage Municipal Water Supply Superfund Site
Milford, New Hampshire

File 11RG69	March, 2012

HAGER-RICHTER GEOSCIENCE, INC.
Salem, New Hampshire

Tadpole	Structure Category (Symbol Color)	Description
	Fracture Rank 1 (Light Blue)	Minor Fracture - not distinct and may not be continuous around the borehole
	Fracture Rank 2 (Blue)	Intermediate Fracture - distinct and continuous around the borehole with little or no apparent aperture
	Fracture Rank 3 (Red)	Major Fracture - distinct and continuous around the borehole with apparent aperture

Figure 3. Key to bedrock structure categories.

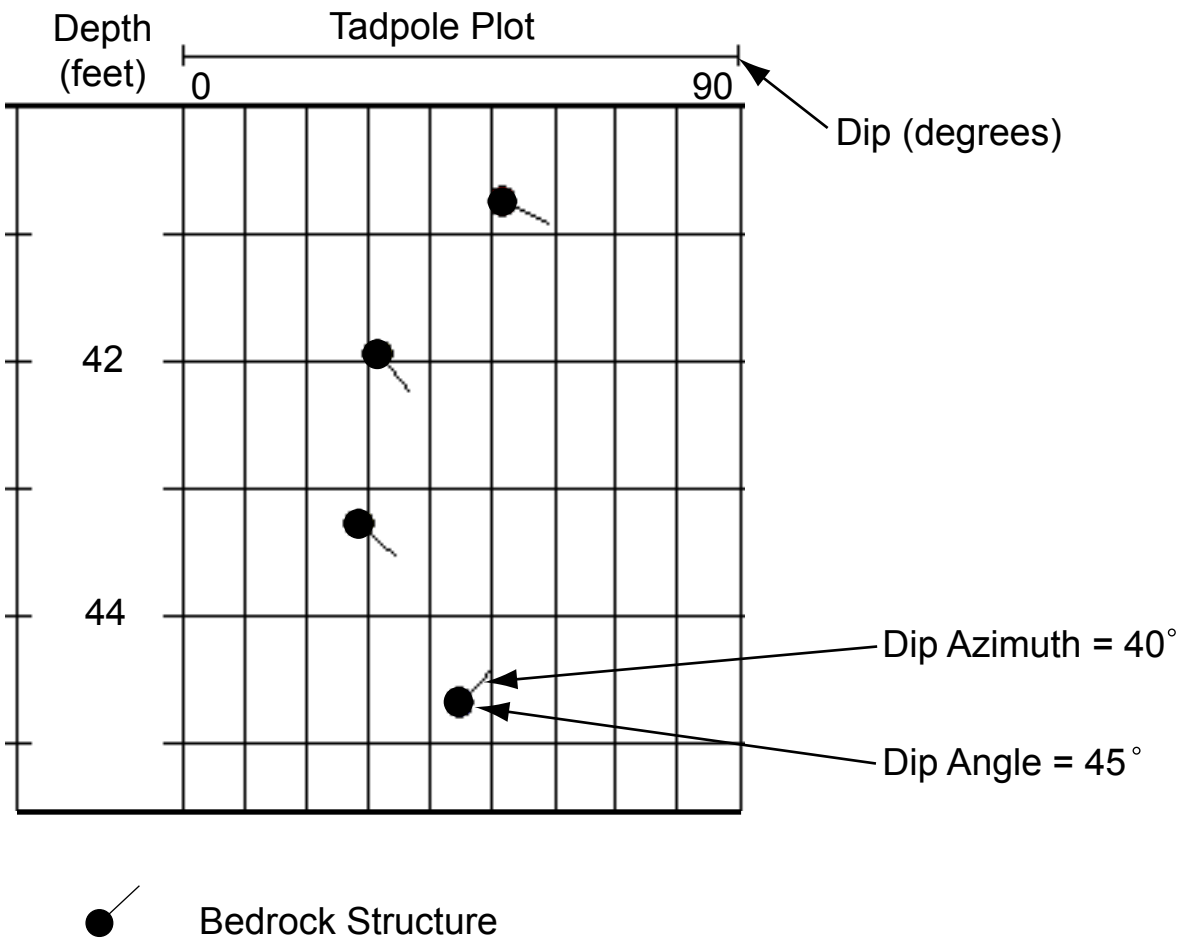


Figure 4. Tadpole plot explanation. The orientation of the bedrock structures is graphically displayed by a tadpole consisting of a circle, the head, and a line, the tail. The position of the head, left to right on the tadpole plot, gives the dip angle of the structure. The left side of the track indicates a dip angle of 0°, and the right side of the track indicates a dip angle of 90° from horizontal. The orientation of the tail gives the dip azimuth of the structure and can be read like a compass. The tail pointing directly up is 0°, north.

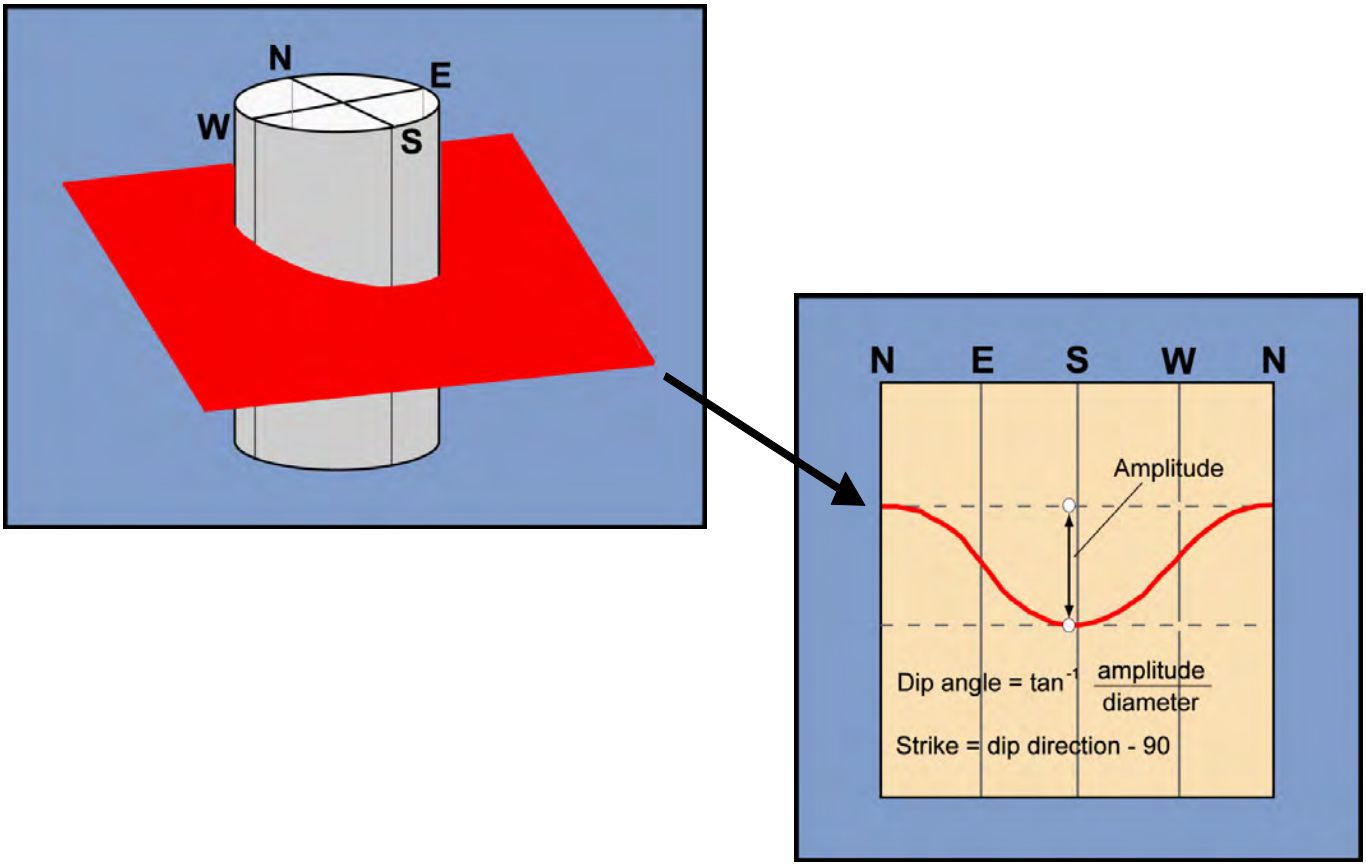


Figure 5. Televiewer Explanation Figure. The image on the left depicts a planar structure in red, such as a fracture or bedding plane, intersected by a borehole. The image on the right depicts the same structure unwrapped as it would be displayed in an optical televiewer (OTV) or acoustic televiewer (ATV) log.

Figure modified from: Garfield, R.L., Day-Lewis, F.D., Gray, M.B., Johnson, C.D., Williams, J.H. and Day-Lewis, A.D.F., 2003, Fractured-Rock Aquifer Characterization within a Regional Geologic Context: Results from the Bucknell University Hydrogeophysics Test Site, GSA Northeastern Section, 38th Annual Meeting, Paper No. 25-19.

APPENDIX 1

BOREHOLE GEOPHYSICAL LOGS

HAGER-RICHTER GEOSCIENCE, INC.

8 Industrial Way - D10
Salem, NH 03079
Phone: 603-893-9944
Fax: 603-893-8313

BR-7 - BOREHOLE IMAGE LOGS

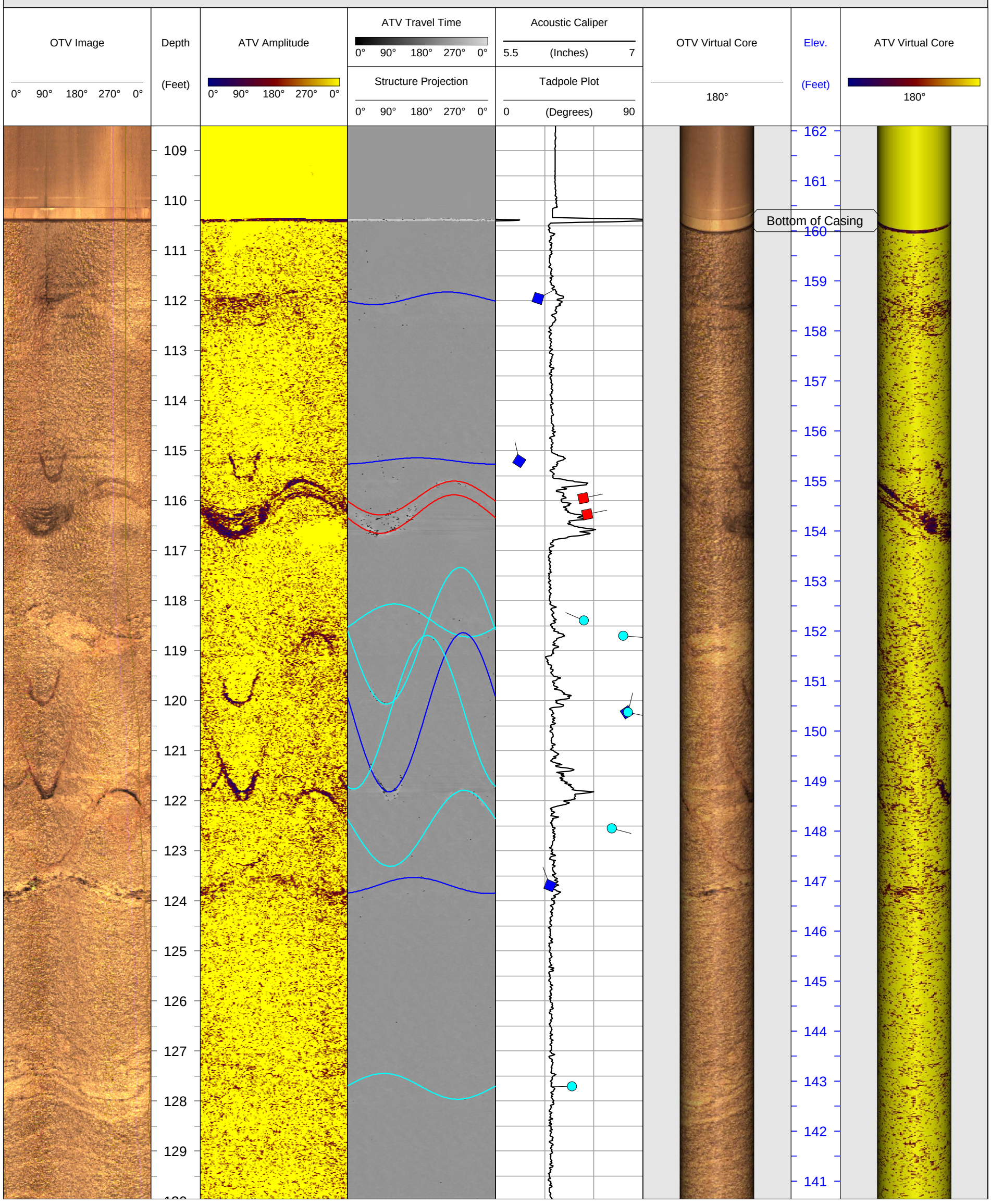
DATE LOGGED: November 14, 29, & 30, 2011

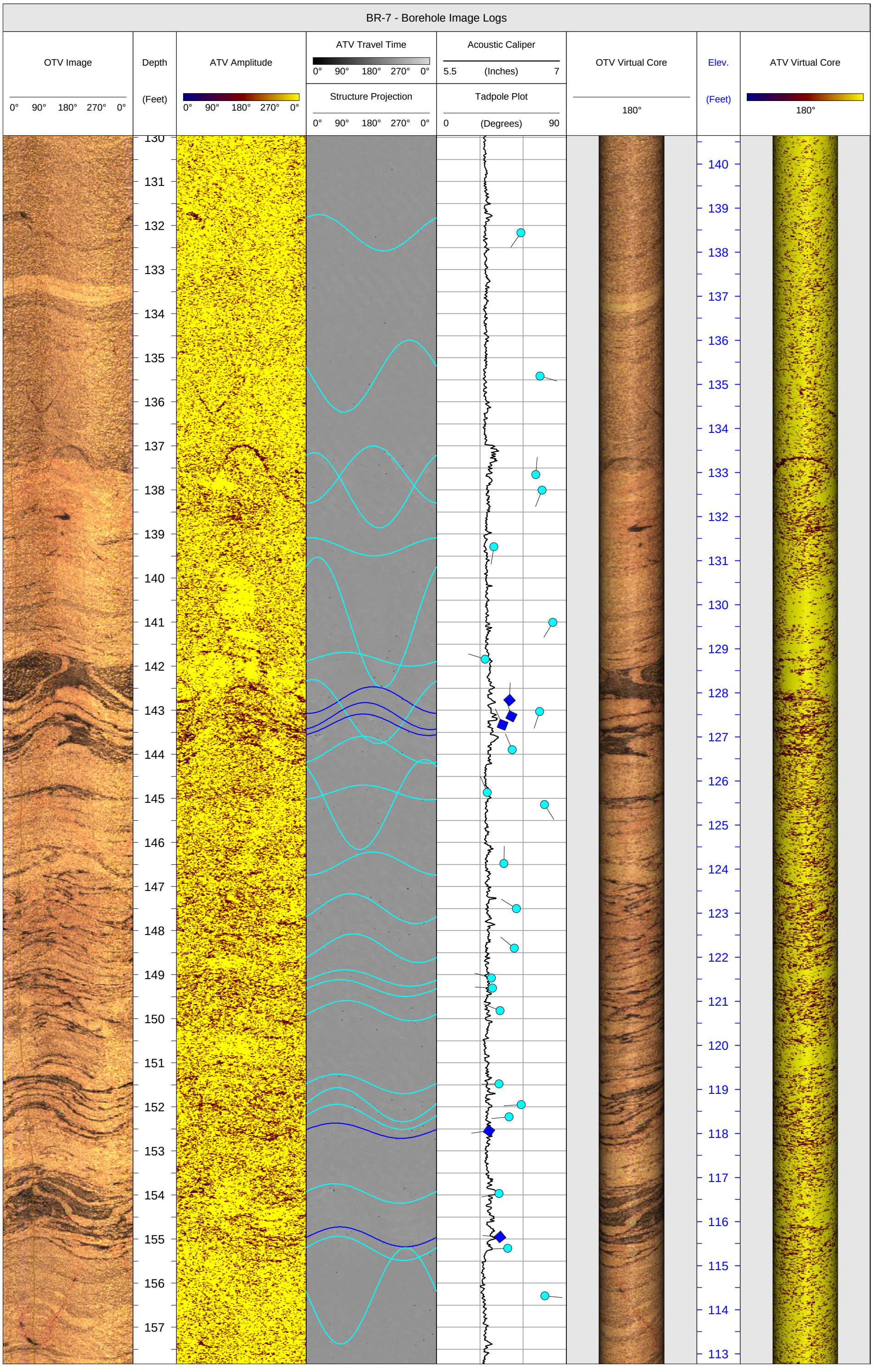
CLIENT:	Weston Solutions, Inc.	H-R FILE:	11RG69
PROJECT:	Borehole Geophysical Logging	LOG DATUM:	Top of the 6-Inch Steel Casing
LOCATION:	Savage Municipal Water Supply Superfund Site	TOP OF CASING ELEVATION:	270.6 Feet
CITY, STATE:	Milford, New Hampshire	ORIENTATION REFERENCE:	True North (Declination = 15 Degrees West)
LOGGING GEOPHYSICISTS:	N. DeCristofaro, M. Howley, & E. Rickert	CASING STICK-UP:	1.6 Feet Above the Ground Surface
CLIENT REP. ON-SITE:	Andrew Fuller	BOREHOLE DIAMETER:	6 Inches
LOGS PROCESSED BY:	Robert Garfield	WATER LEVEL DEPTH:	247-231 ft on Nov. 14; 6.1 ft on Nov. 29 & 30

STRUCTURE LEGEND

Fracture Rank 1 Fracture Rank 2 Fracture Rank 3

BR-7 - Borehole Image Logs

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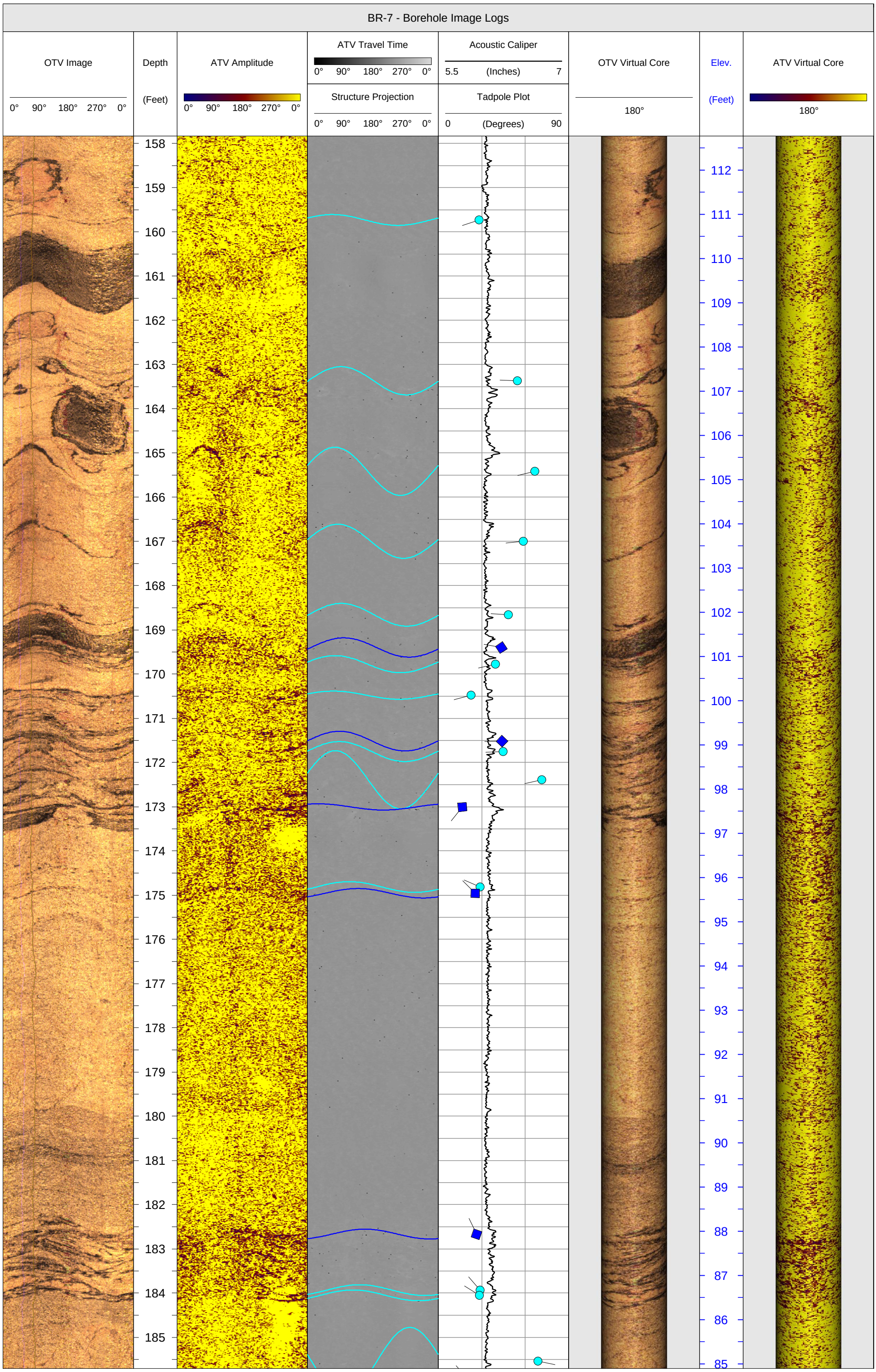
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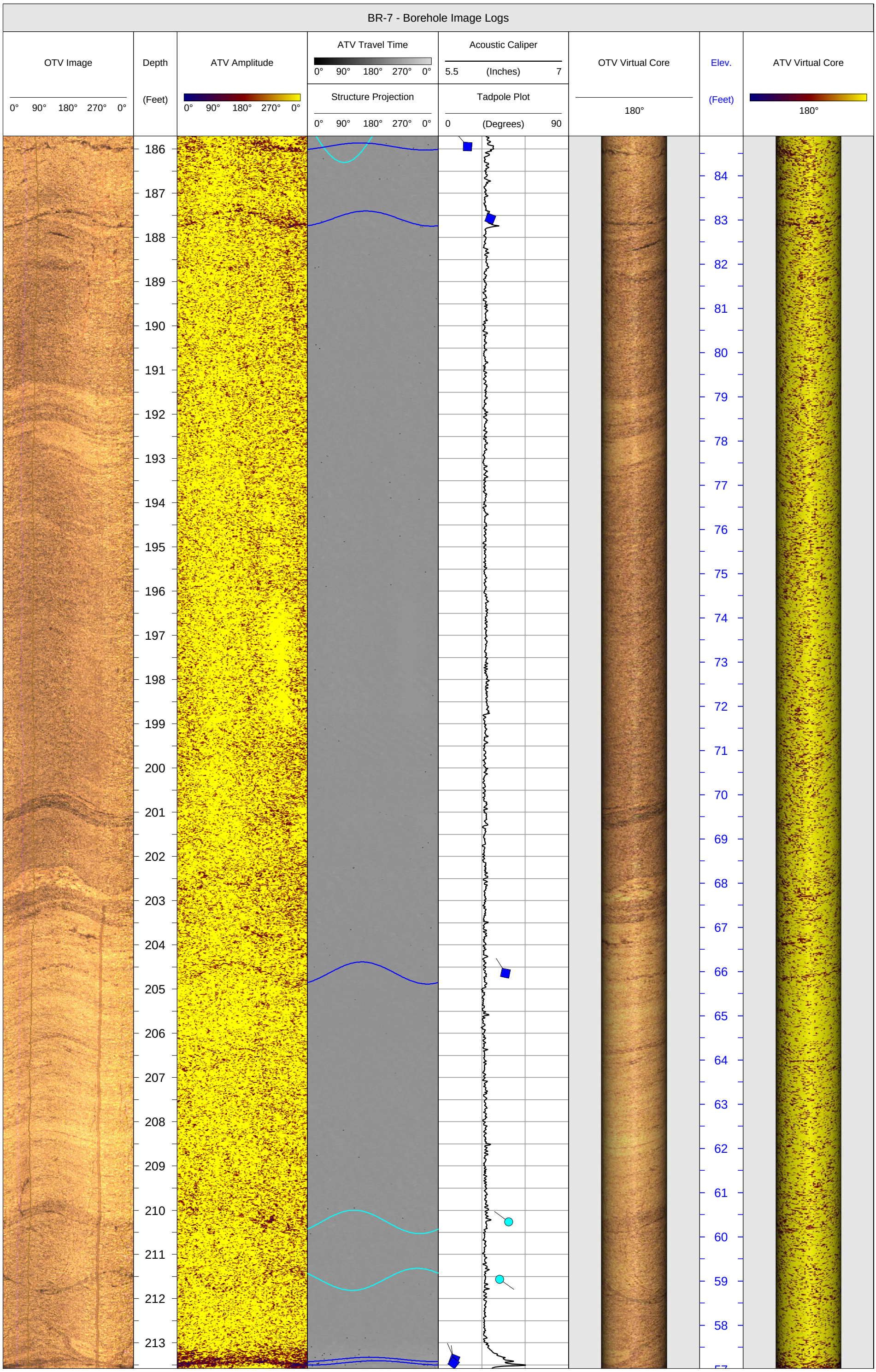
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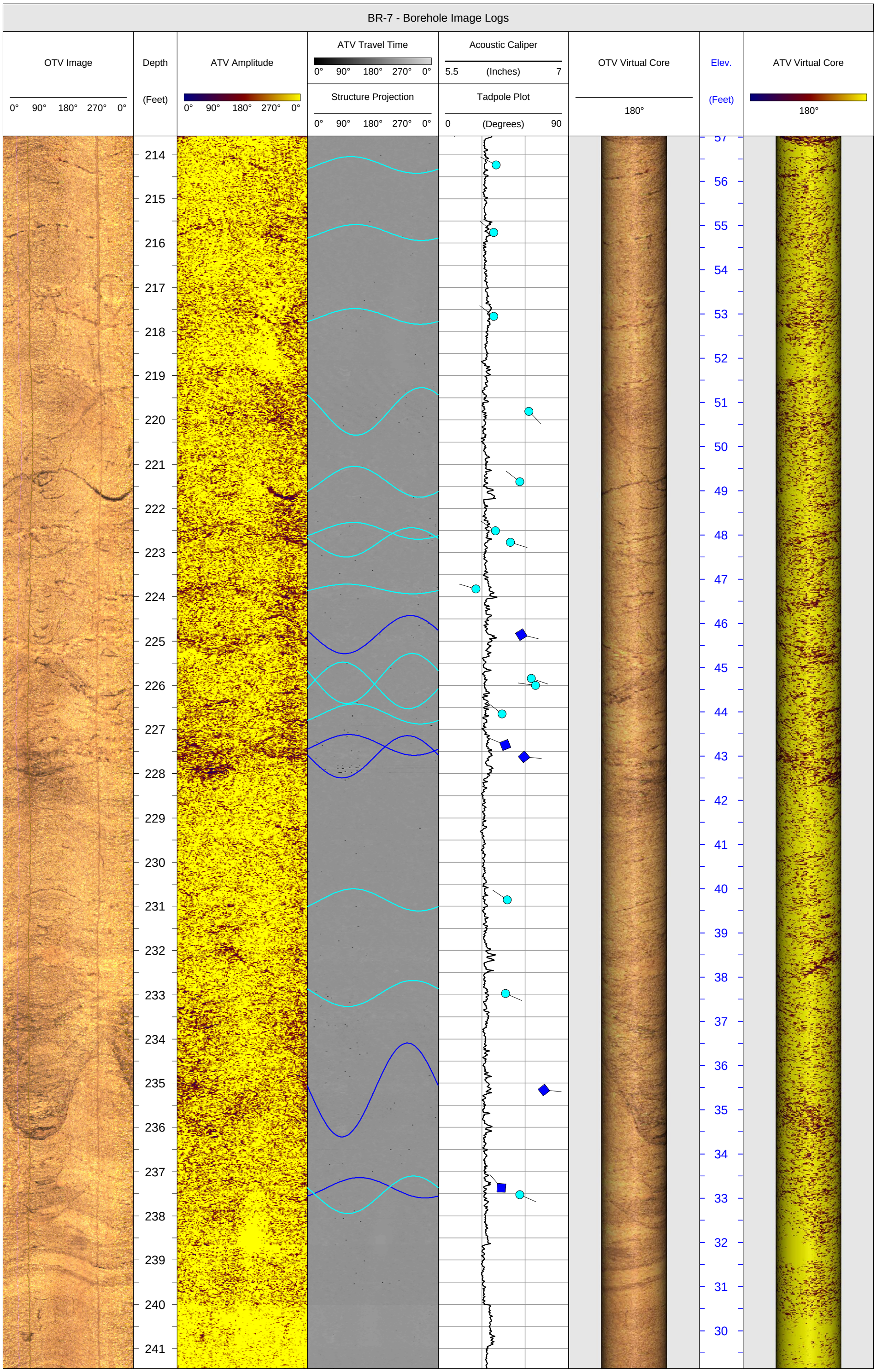
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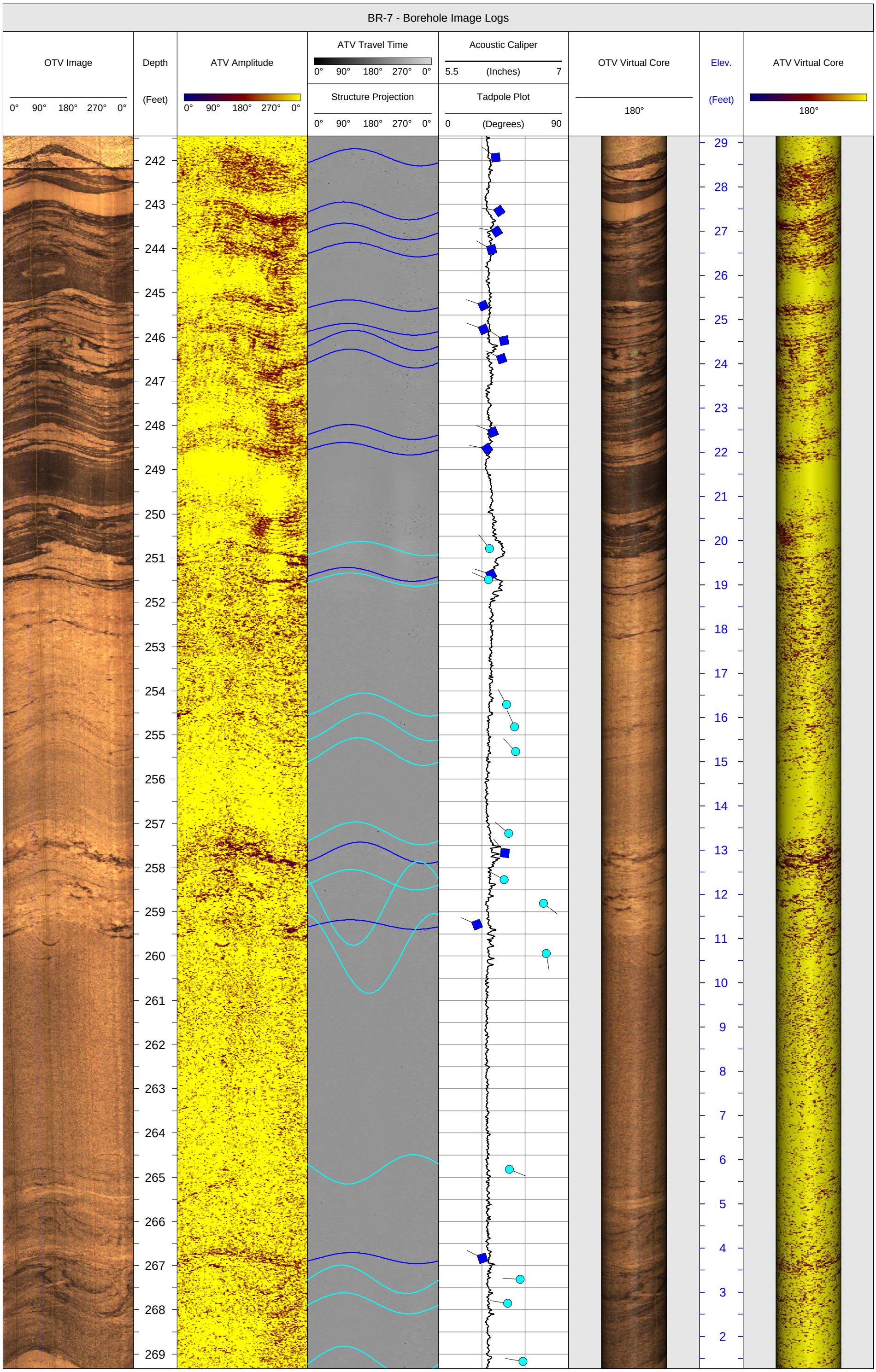
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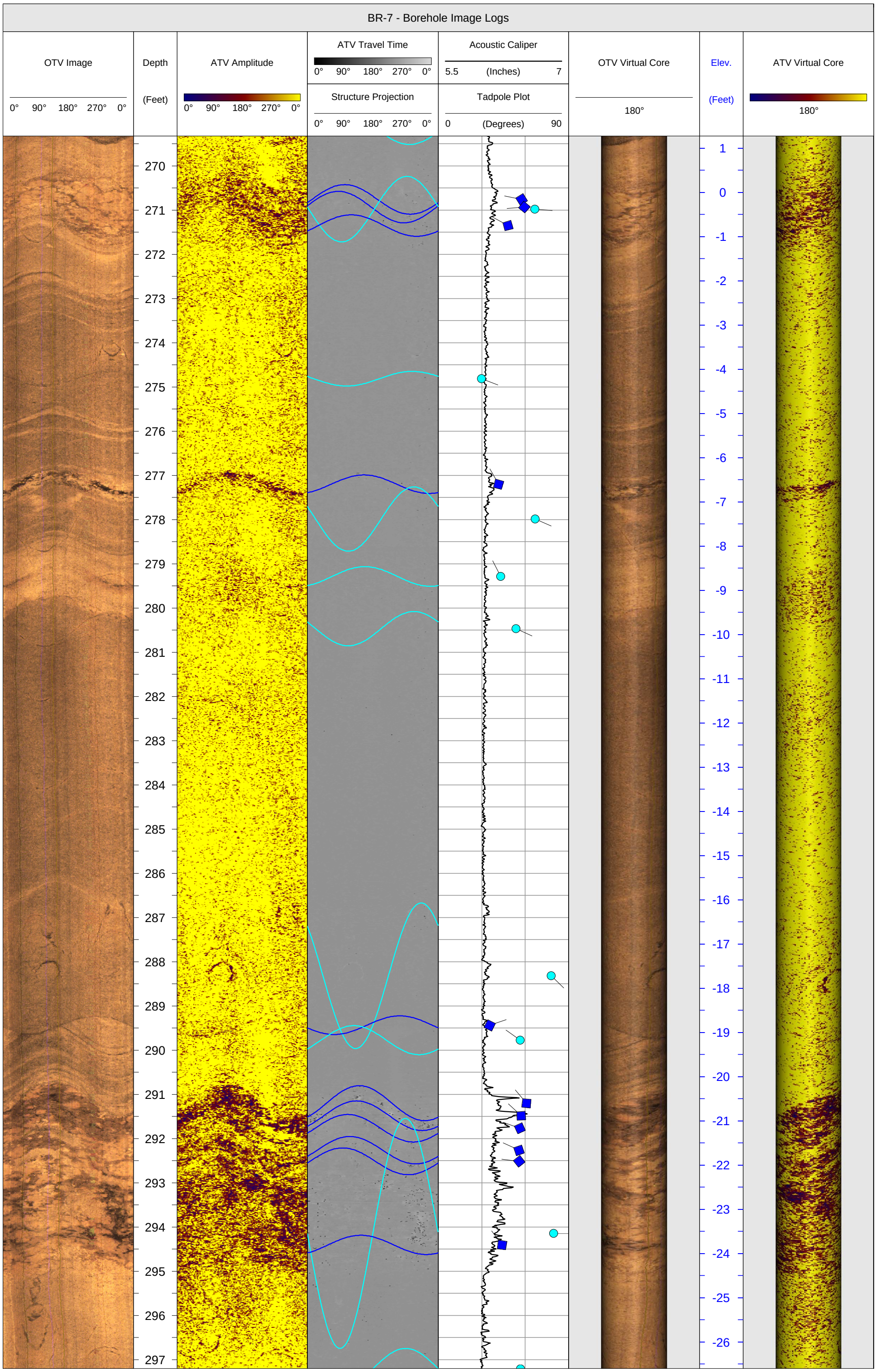
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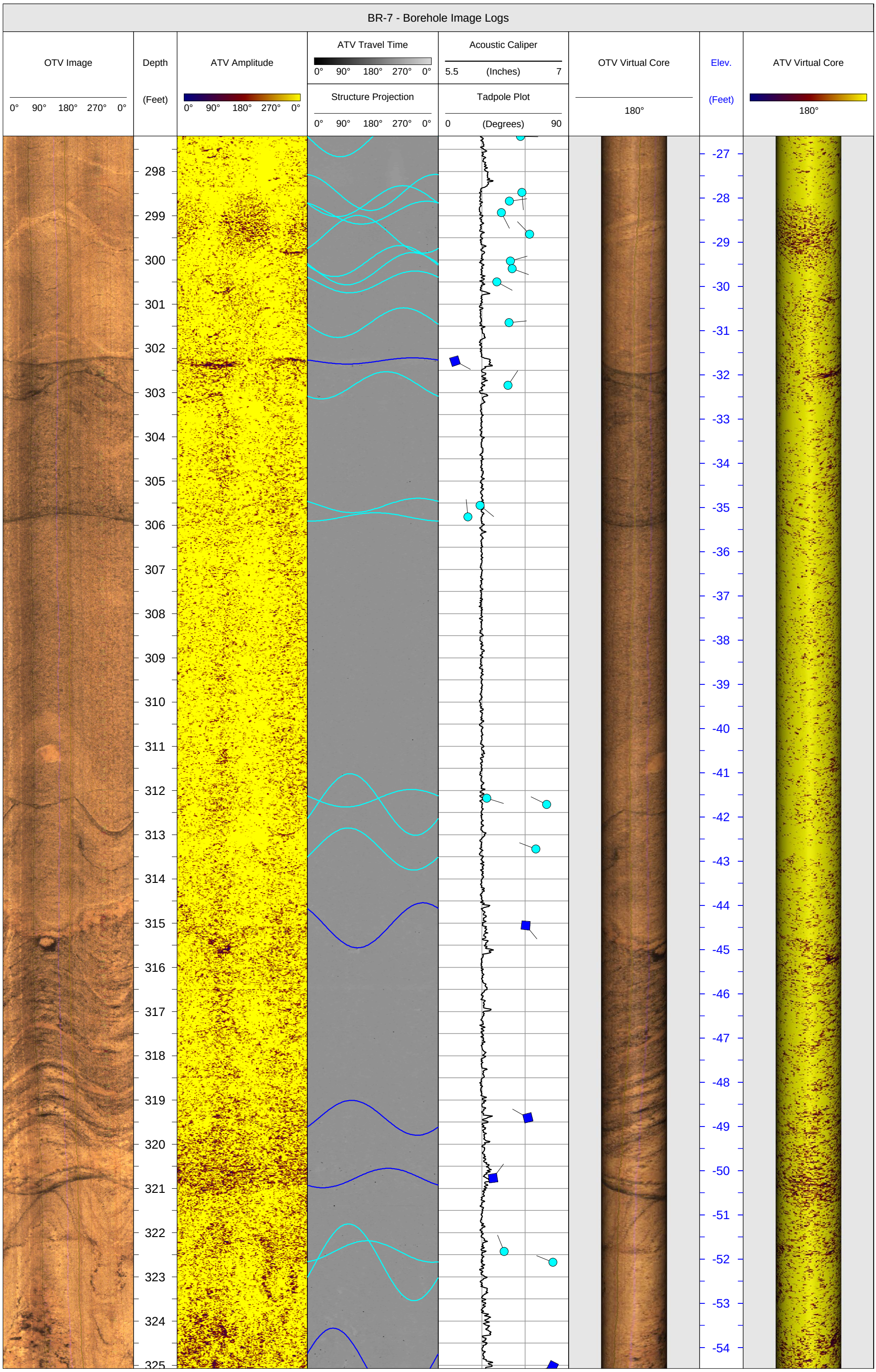
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Acoustic Caliper
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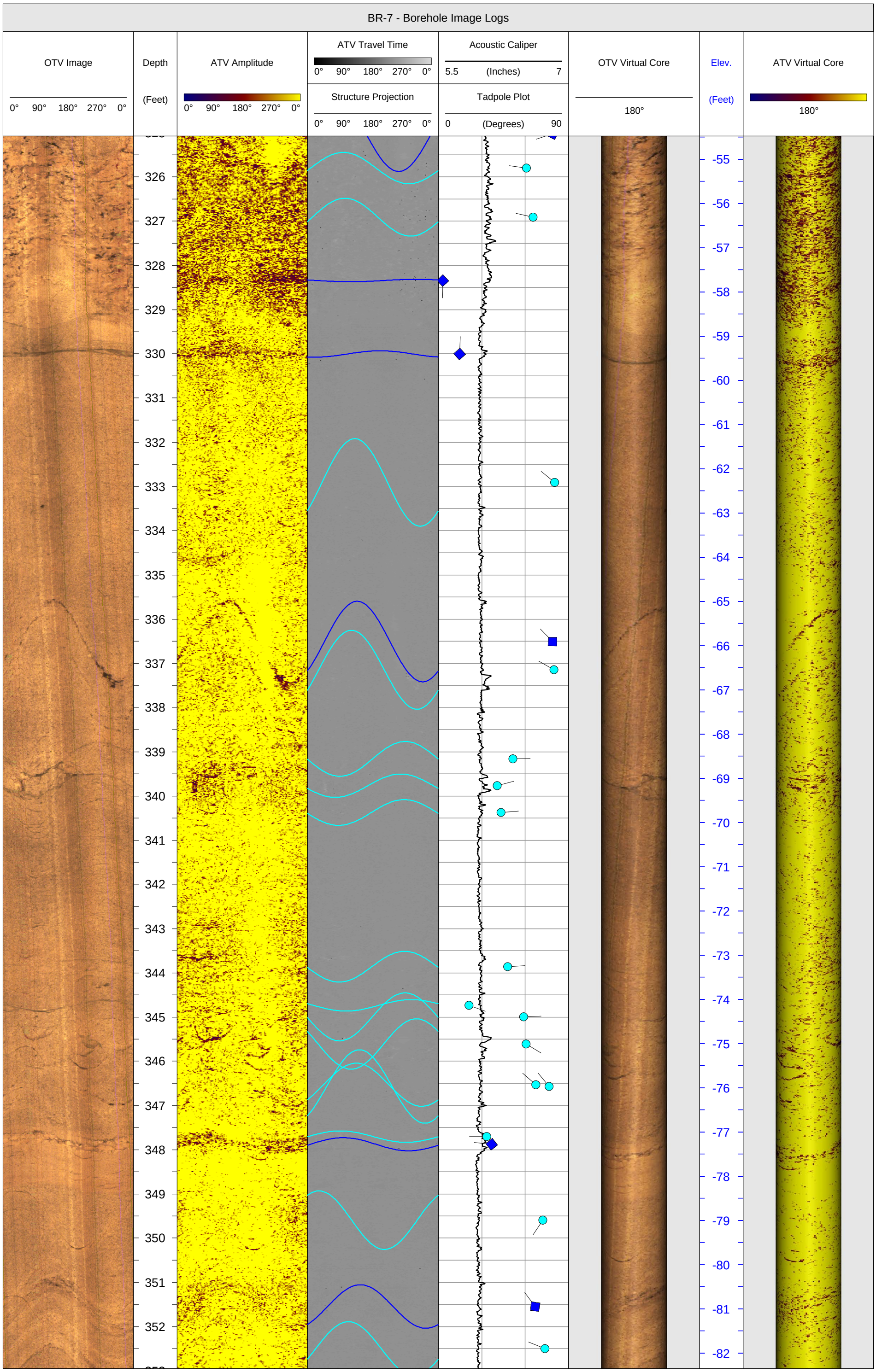
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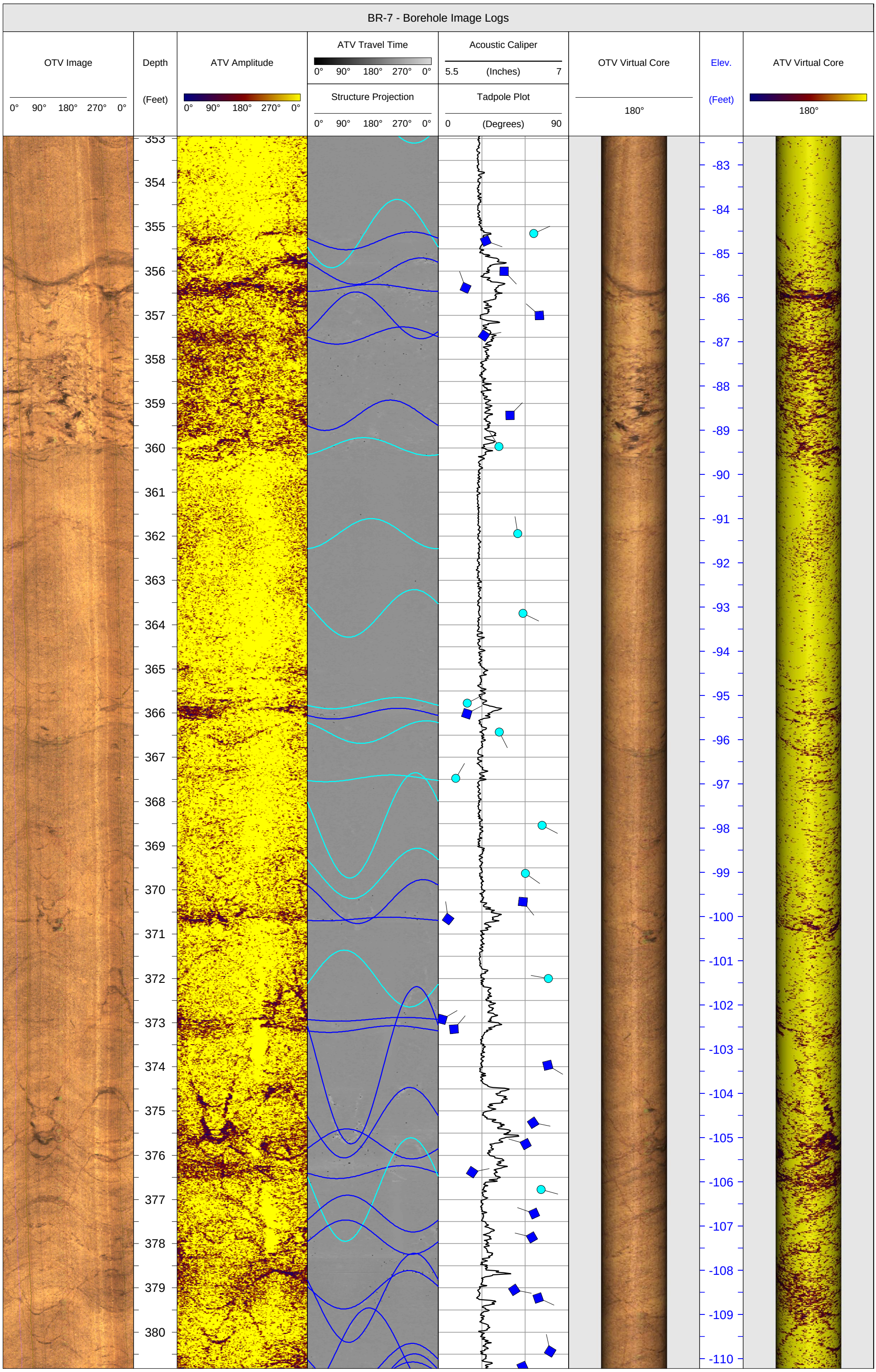
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Acoustic Caliper
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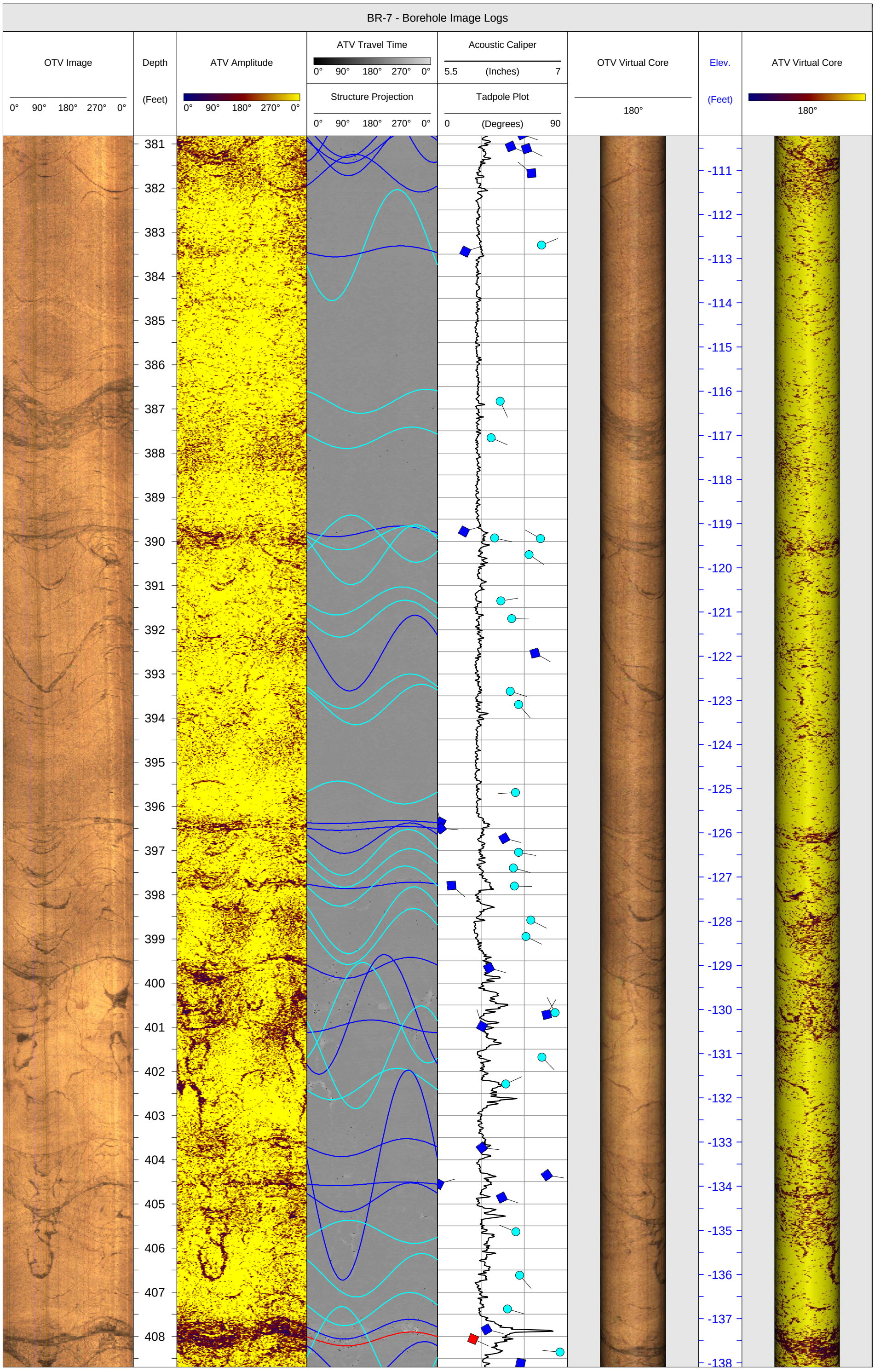
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ATV Travel Time
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Acoustic Caliper
5.5 (Inches) 7
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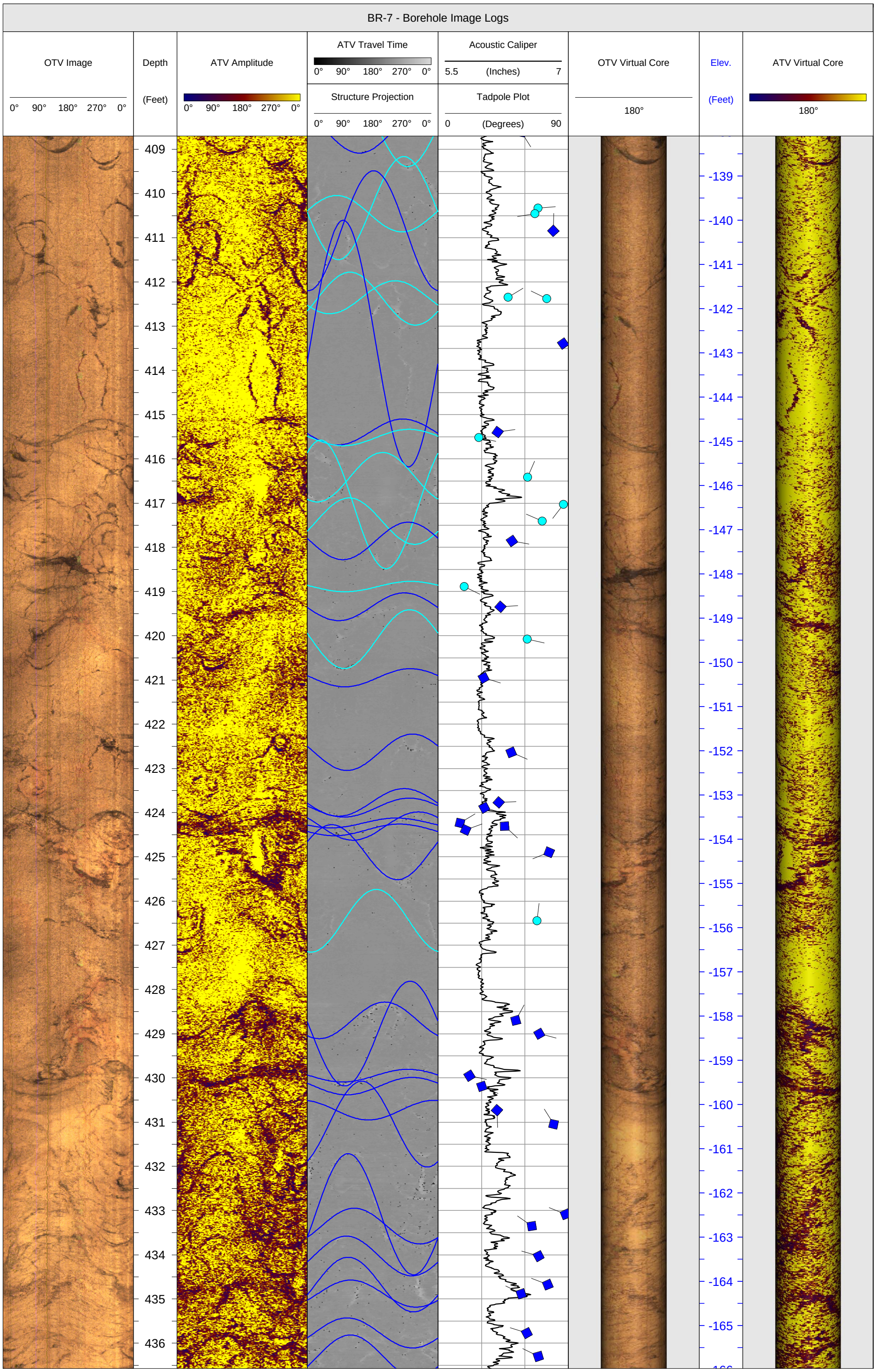
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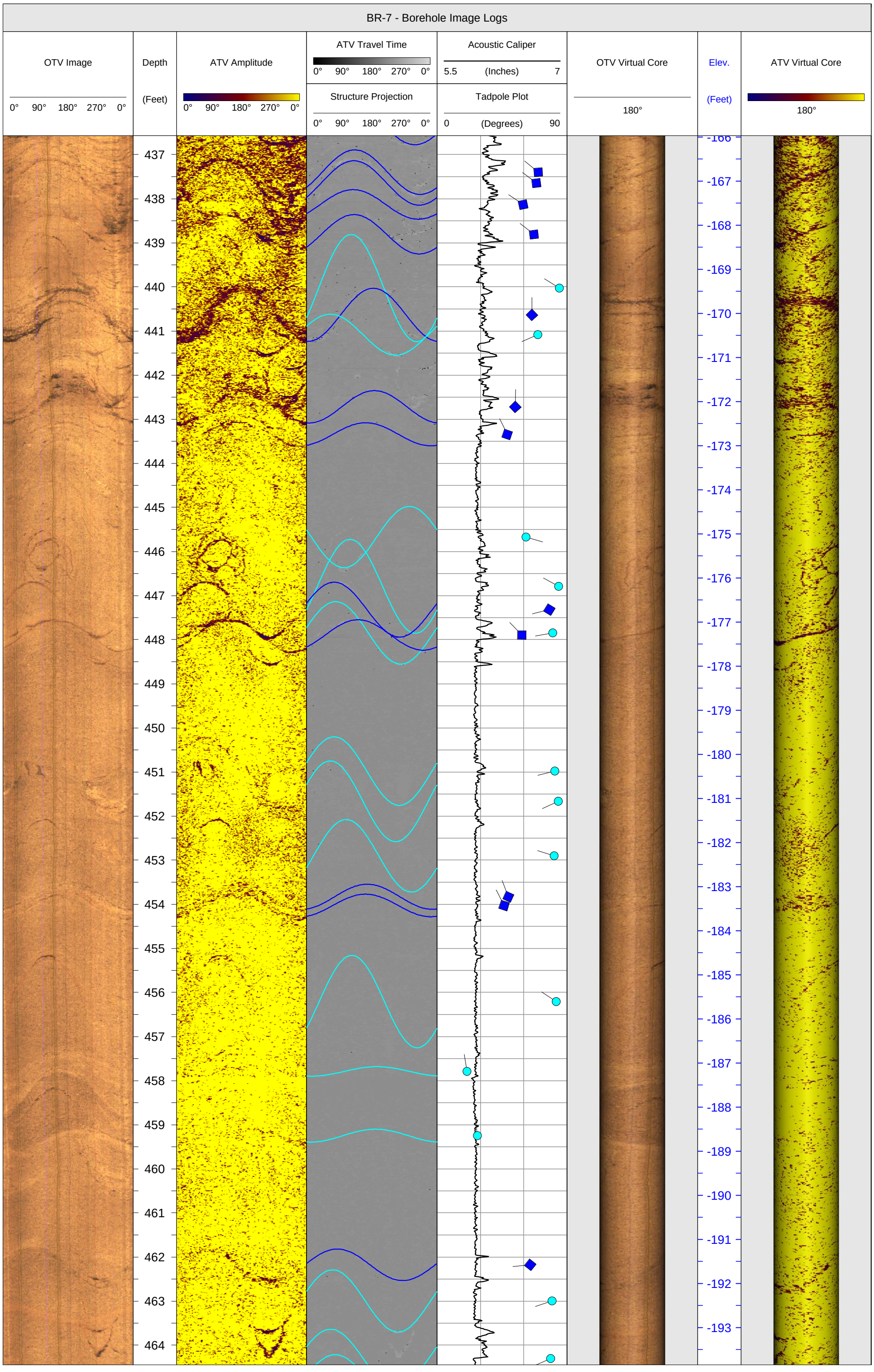
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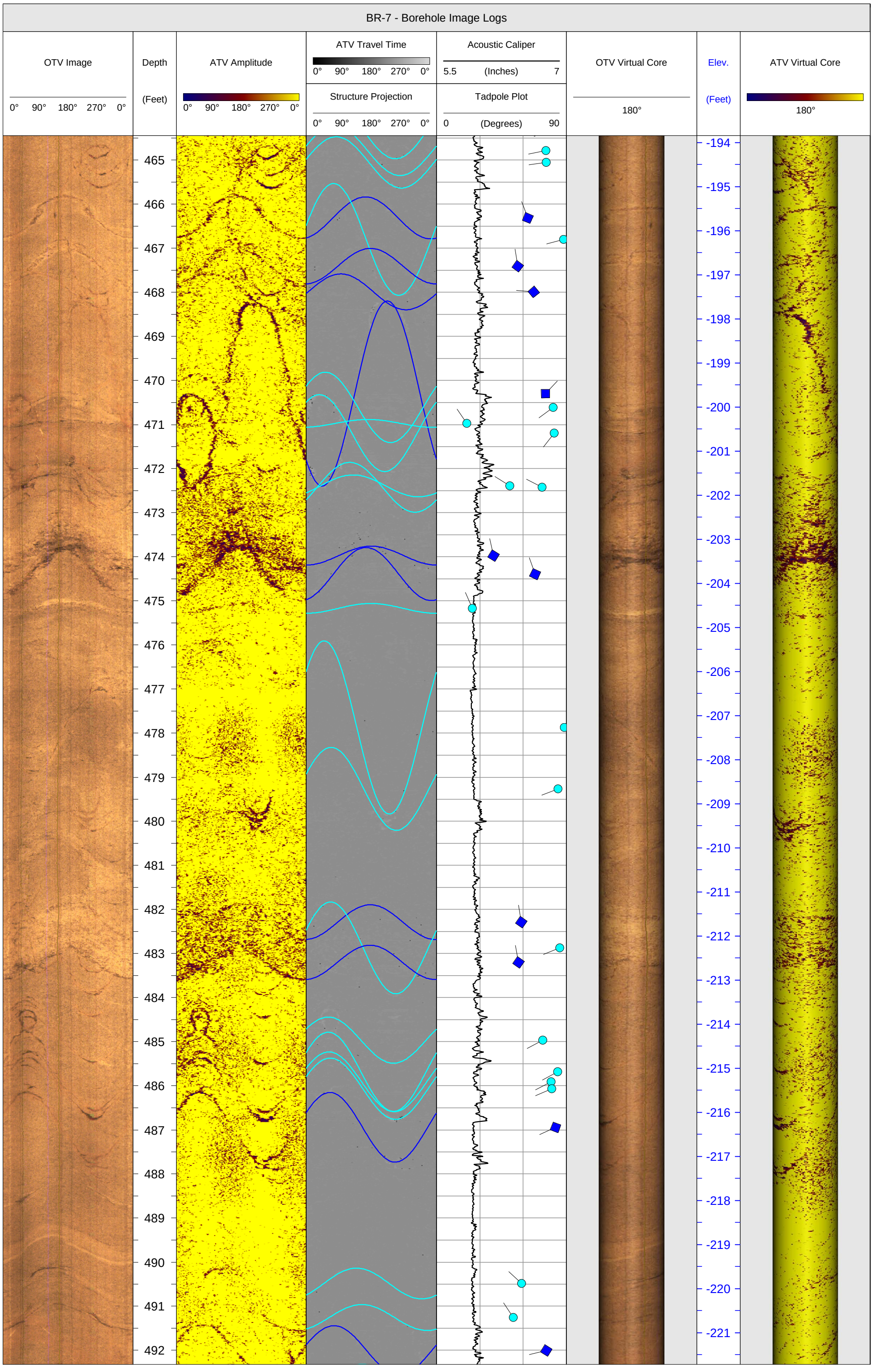
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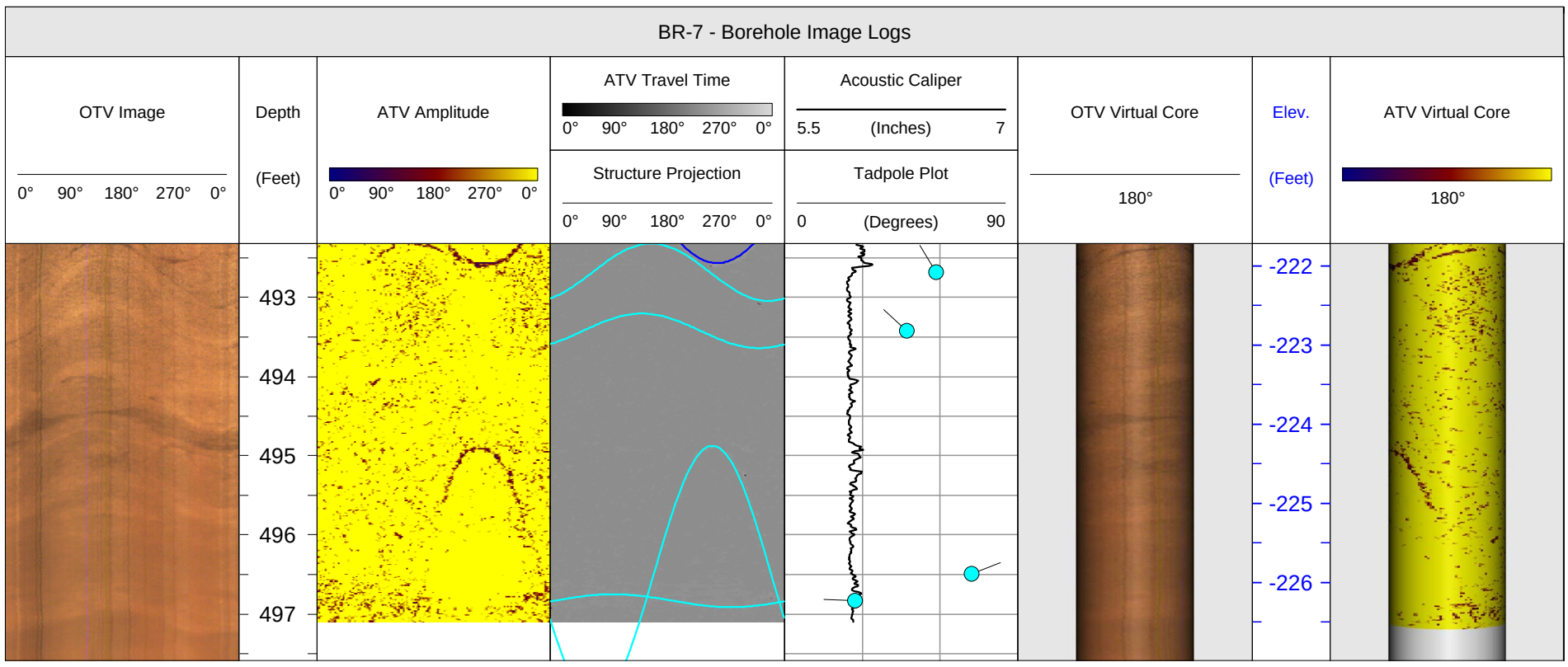
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Acoustic Caliper
5.5 (Inches) 7
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0 (Degrees) 90
OTV Virtual Core
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(Feet)
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HAGER-RICHTER GEOSCIENCE, INC.

8 Industrial Way - D10
Salem, NH 03079
Phone: 603-893-9944
Fax: 603-893-8313

BR-8 - BOREHOLE IMAGE LOGS

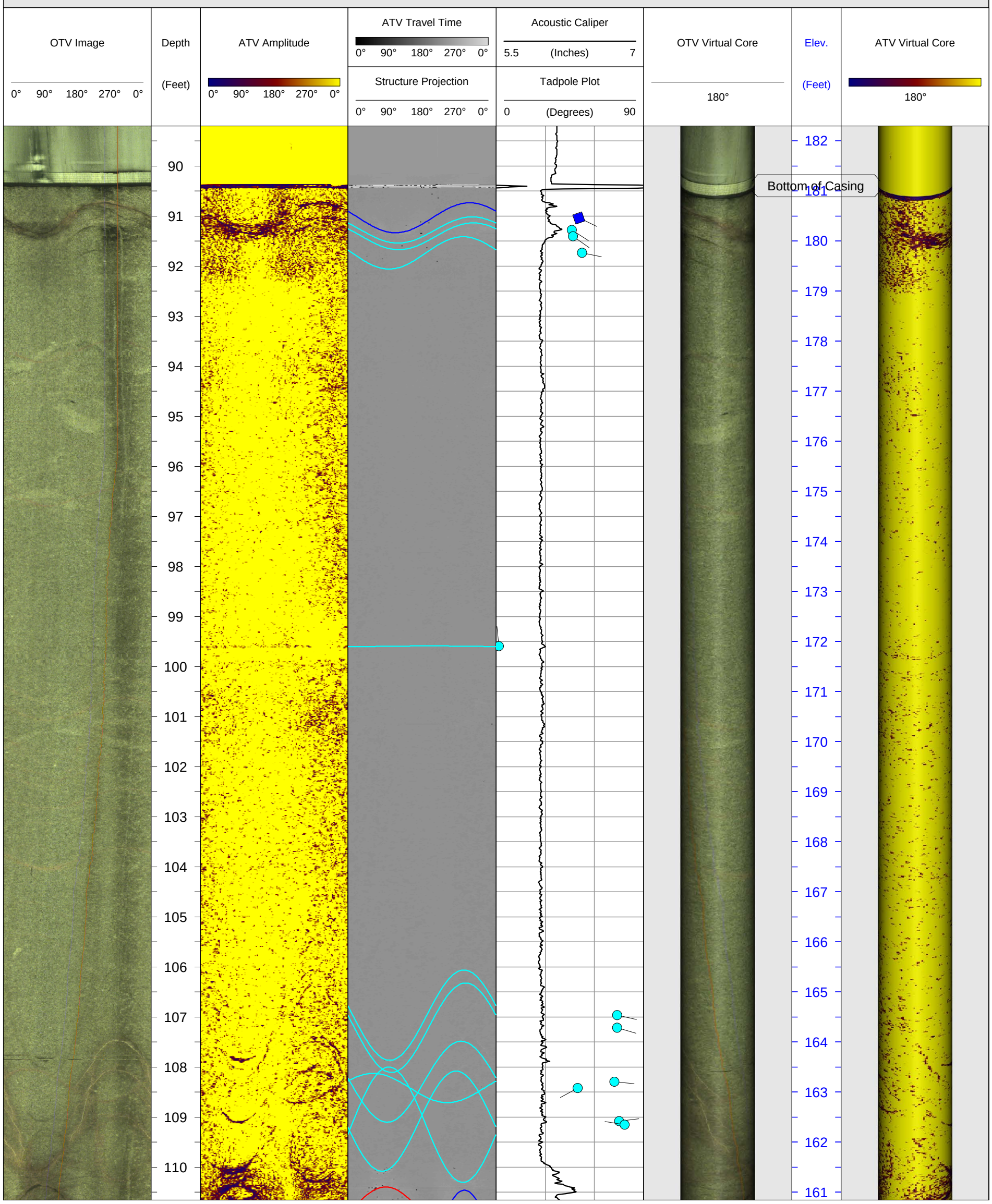
DATE LOGGED: November 30 & December 1, 2011

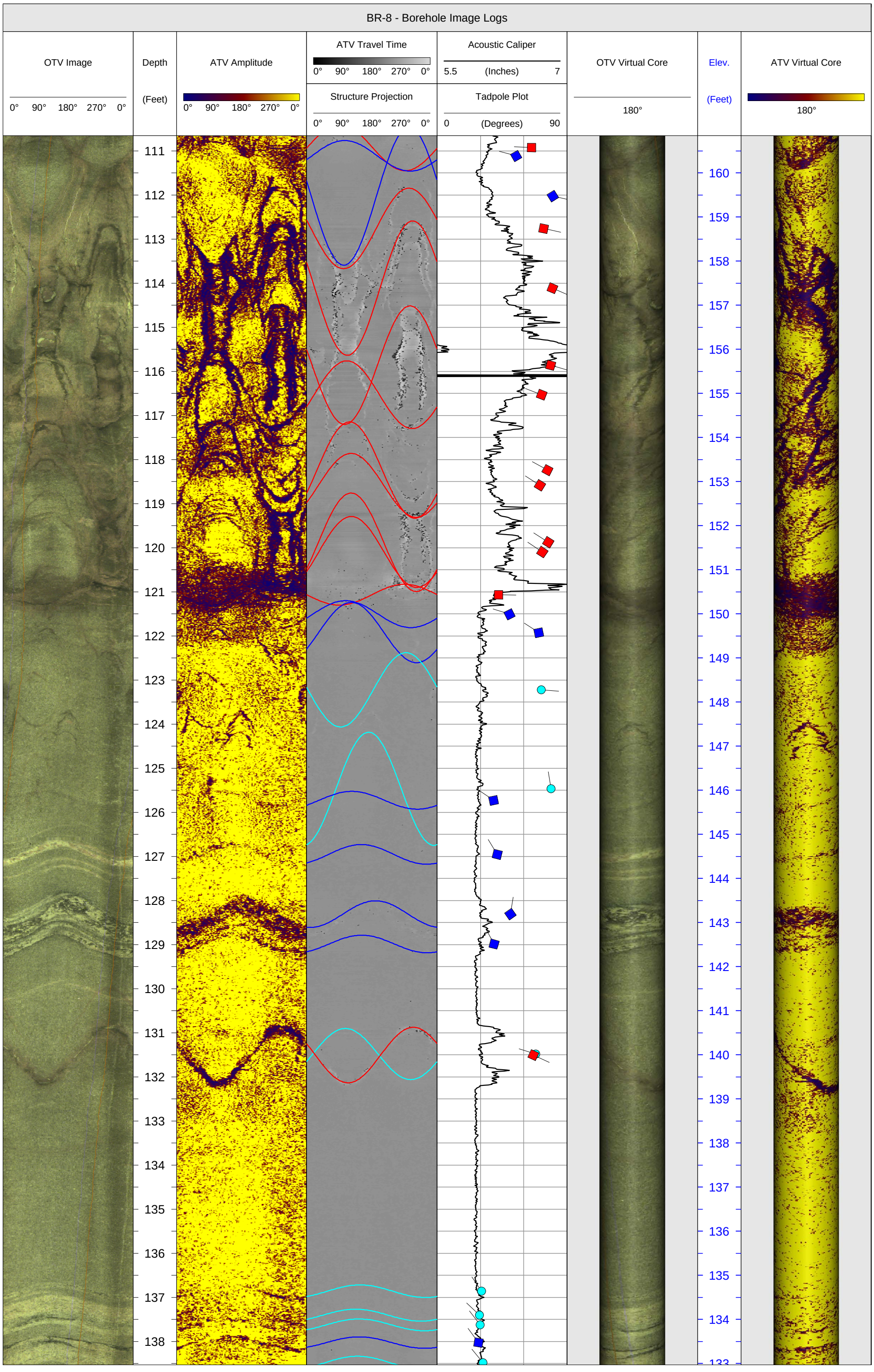
CLIENT:	Weston Solutions, Inc.	H-R FILE:	11RG69
PROJECT:	Borehole Geophysical Logging	LOG DATUM:	Top of the 6-Inch Steel Casing
LOCATION:	Savage Municipal Water Supply Superfund Site	TOP OF CASING ELEVATION:	271.5 Feet
CITY, STATE:	Milford, New Hampshire	ORIENTATION REFERENCE:	True North (Declination = 15 Degrees West)
LOGGING GEOPHYSICISTS:	Nick DeCristofaro & Eric Richert	CASING STICK-UP:	1.5 Feet Above the Ground Surface
CLIENT REP. ON-SITE:	Andrew Fuller	BOREHOLE DIAMETER:	6 Inches
LOGS PROCESSED BY:	Robert Garfield	WATER LEVEL DEPTH:	5.6 Feet

STRUCTURE LEGEND

Fracture Rank 1 Fracture Rank 2 Fracture Rank 3

BR-8 - Borehole Image Logs

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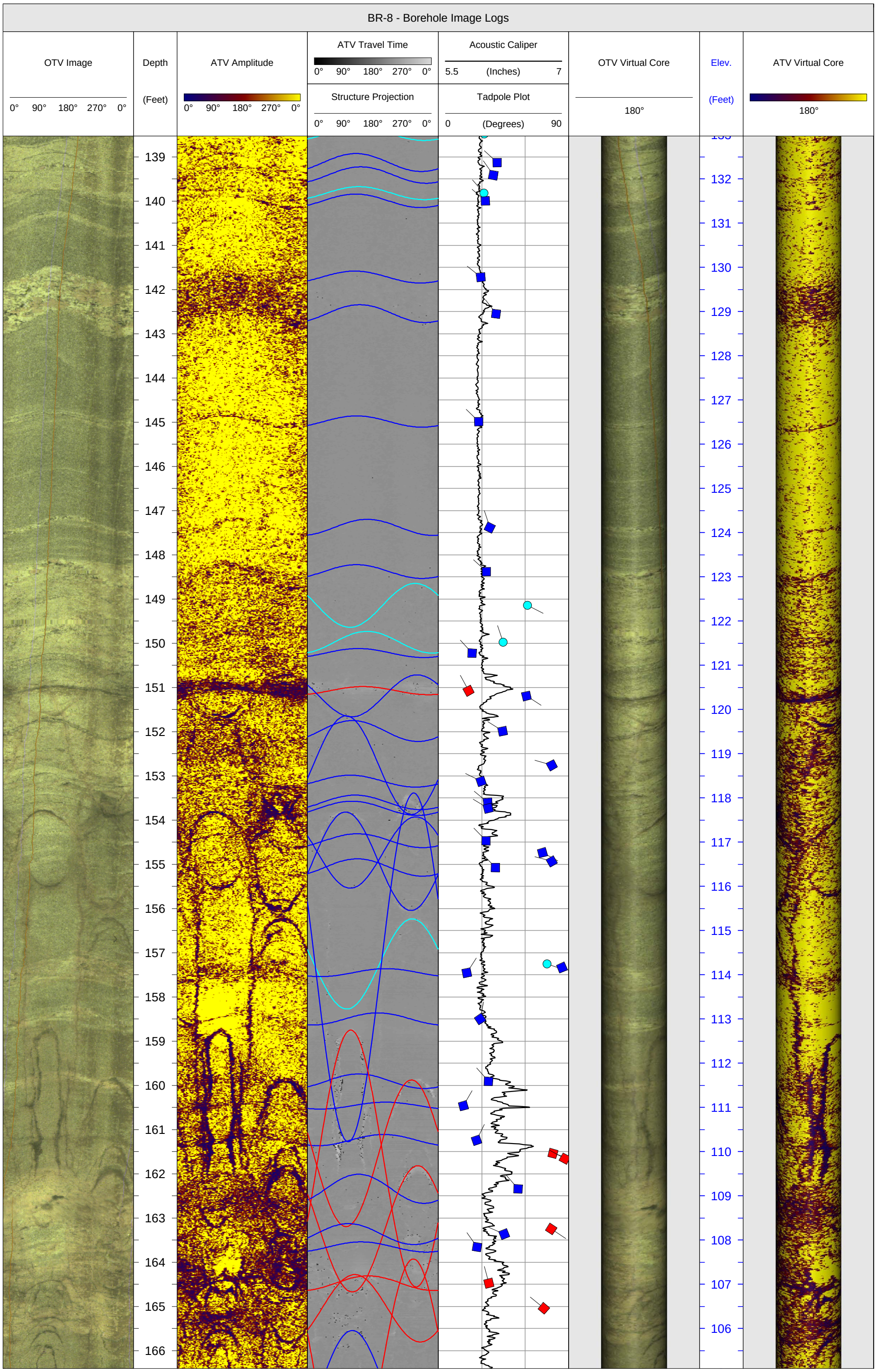
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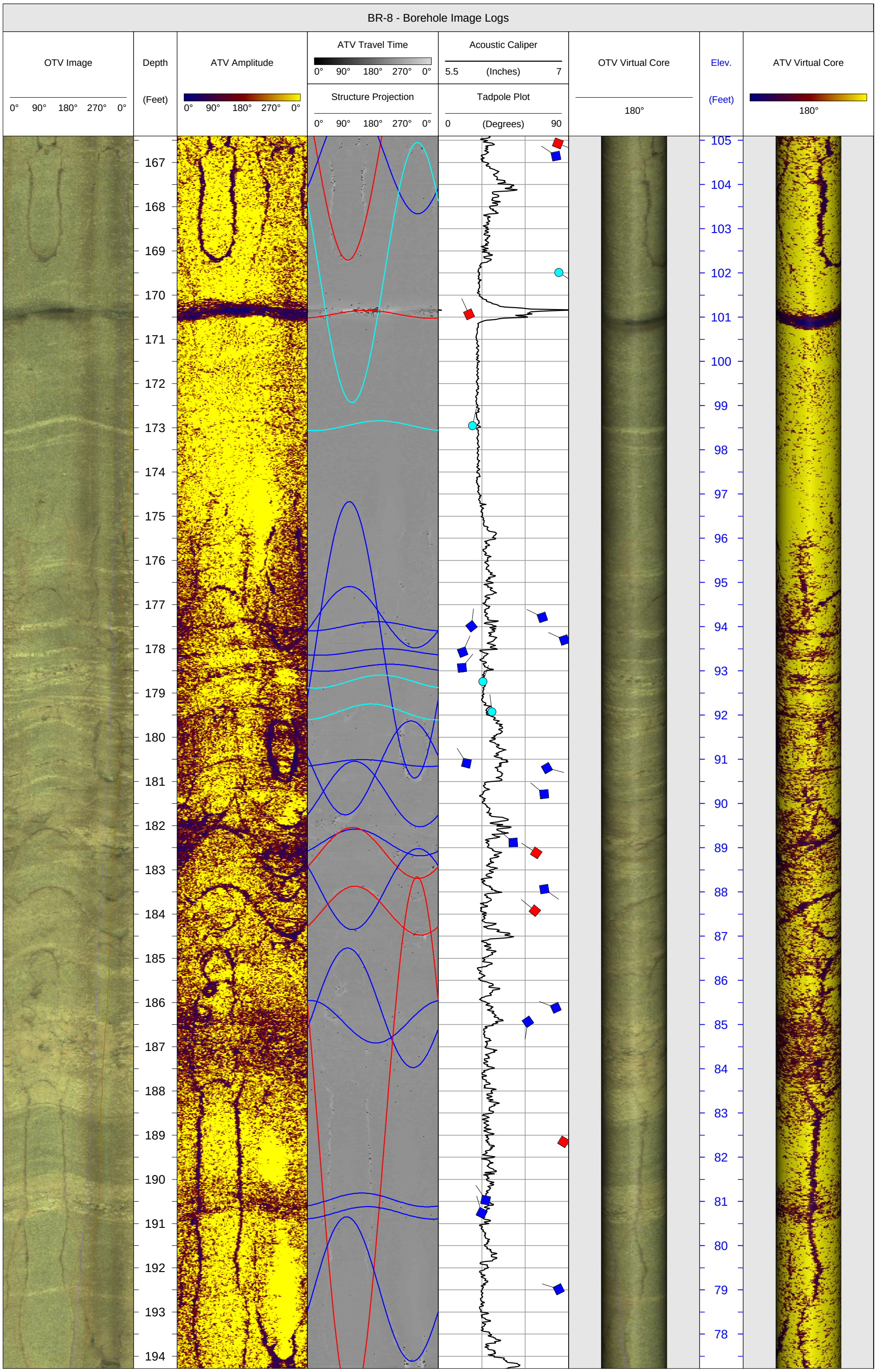
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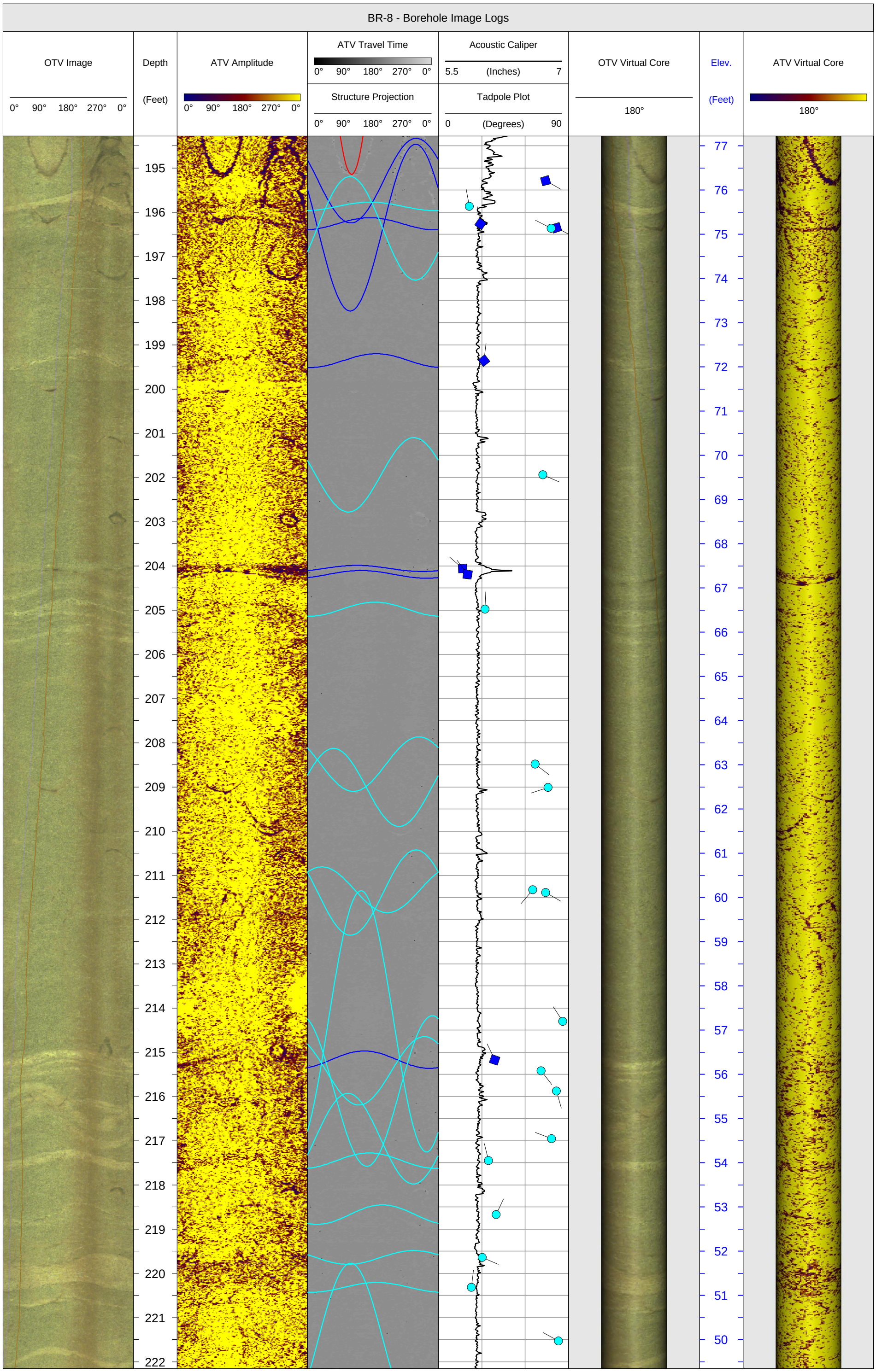
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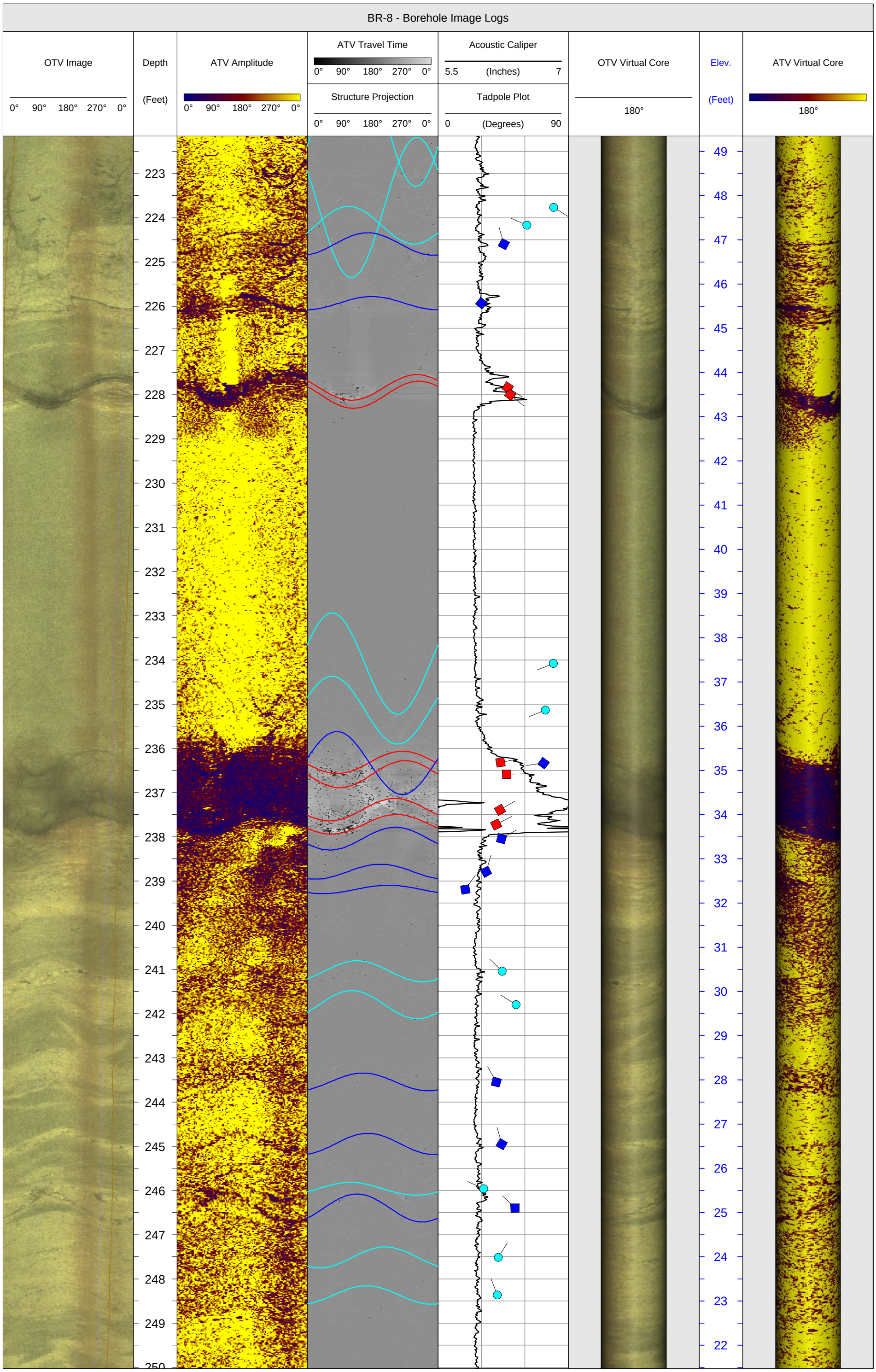
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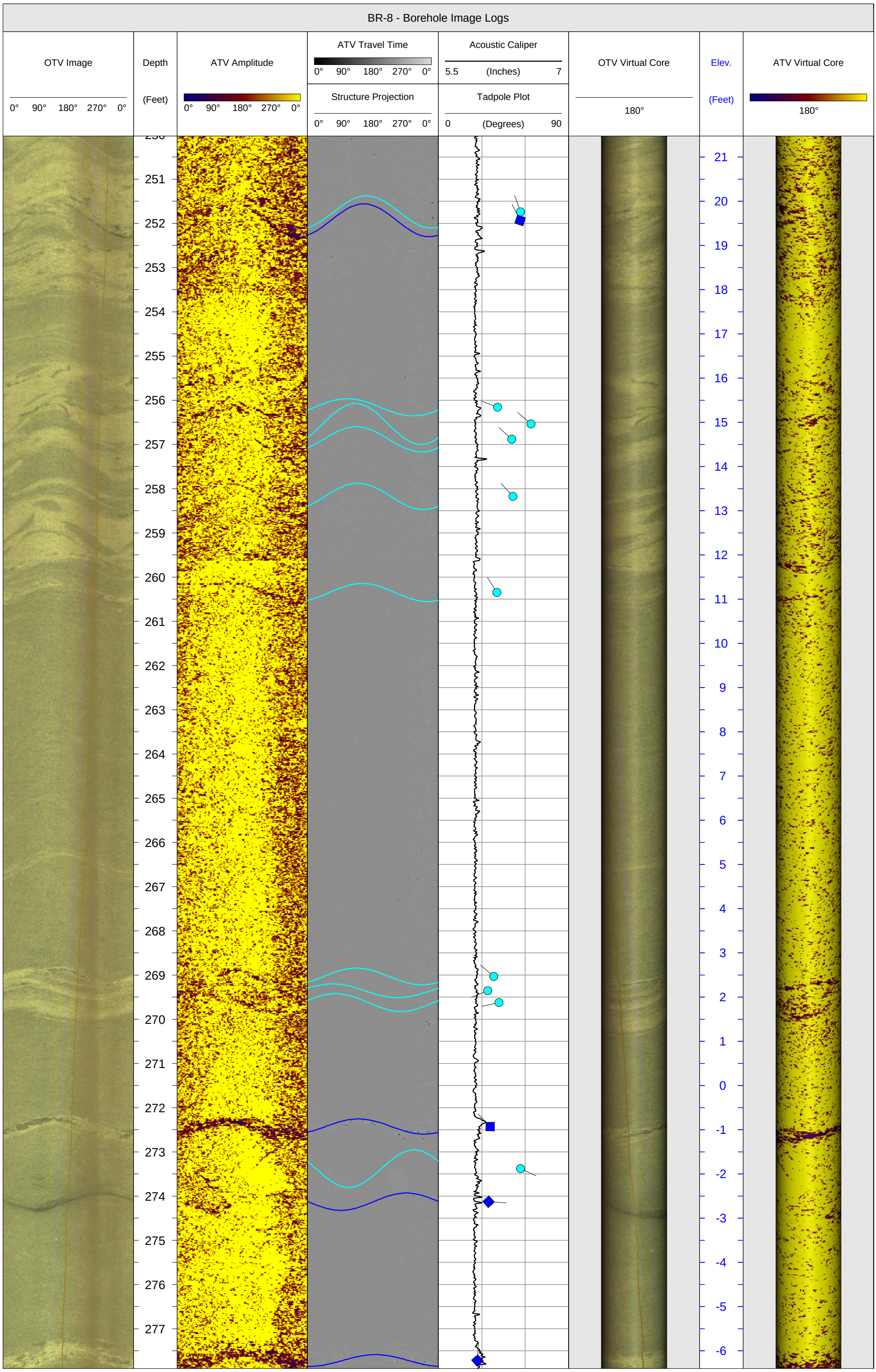
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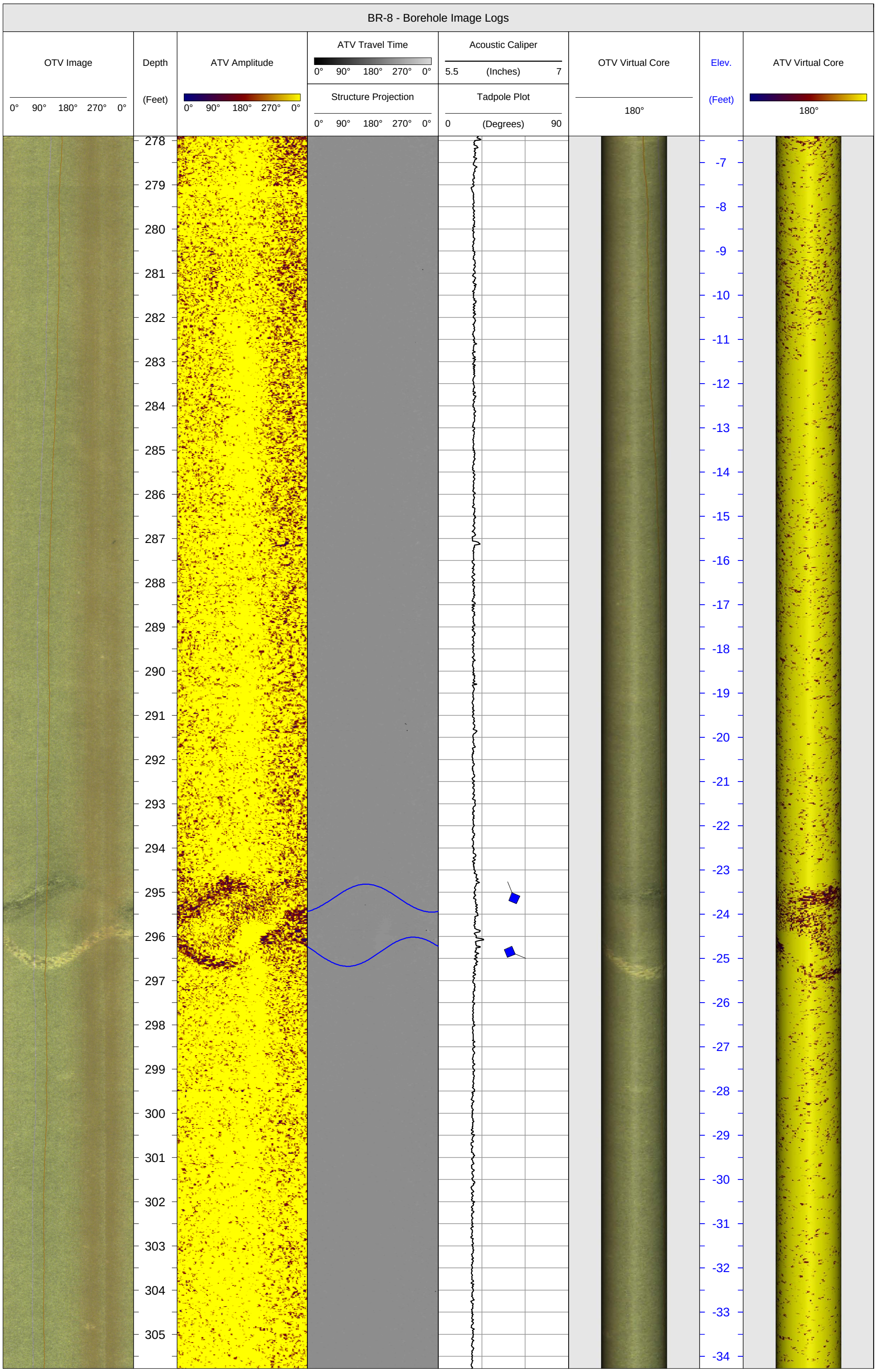
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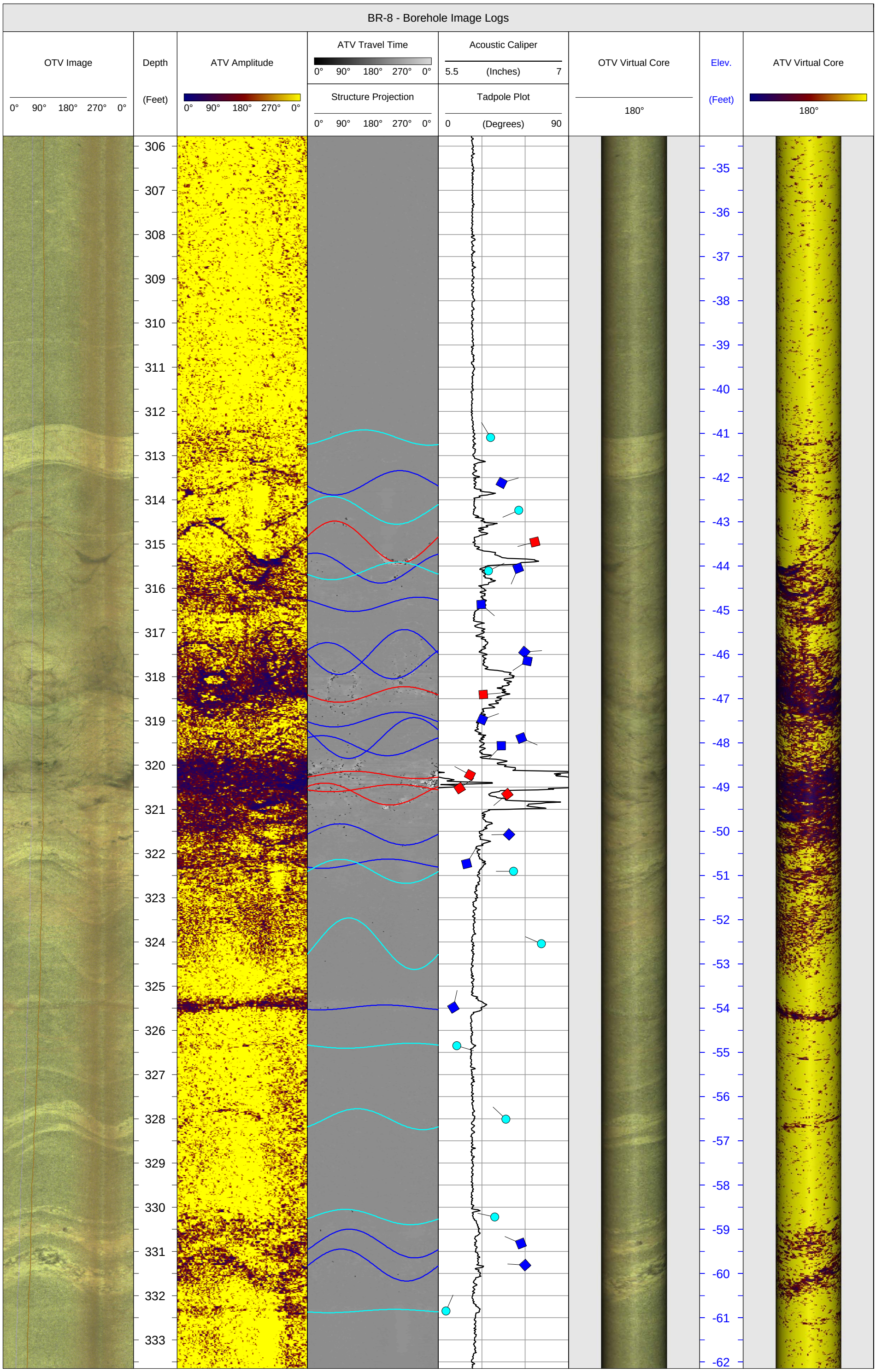
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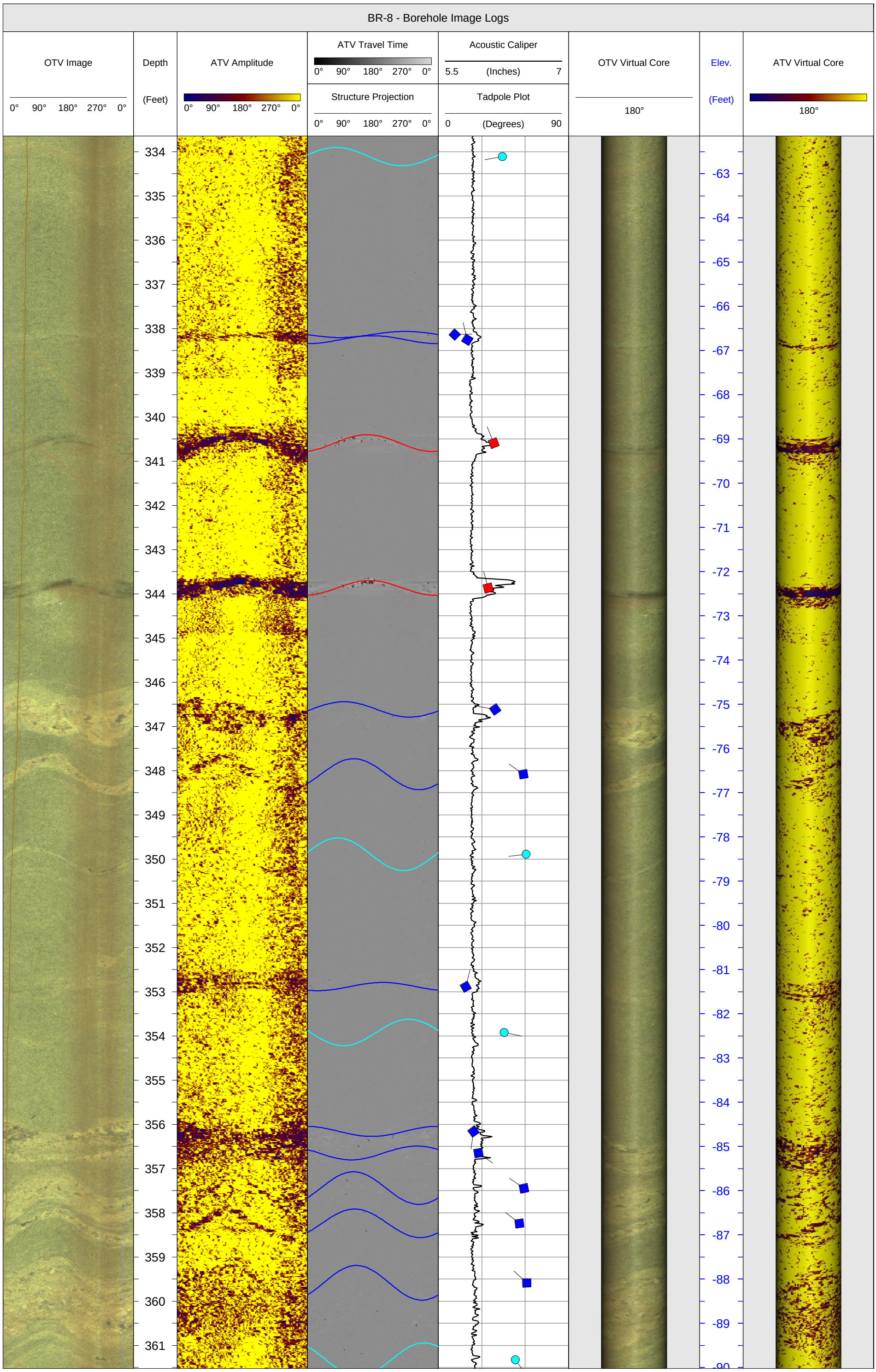
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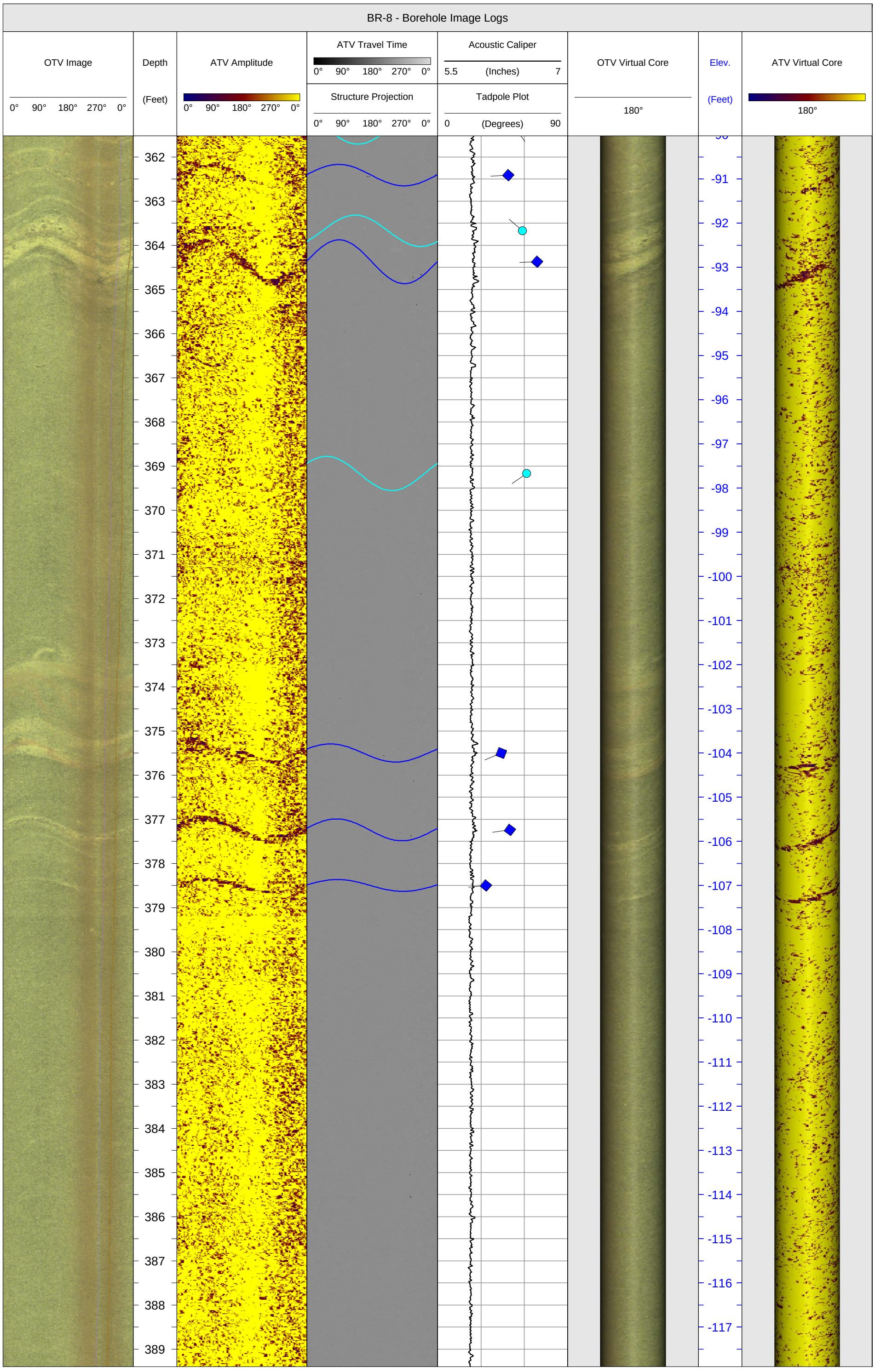
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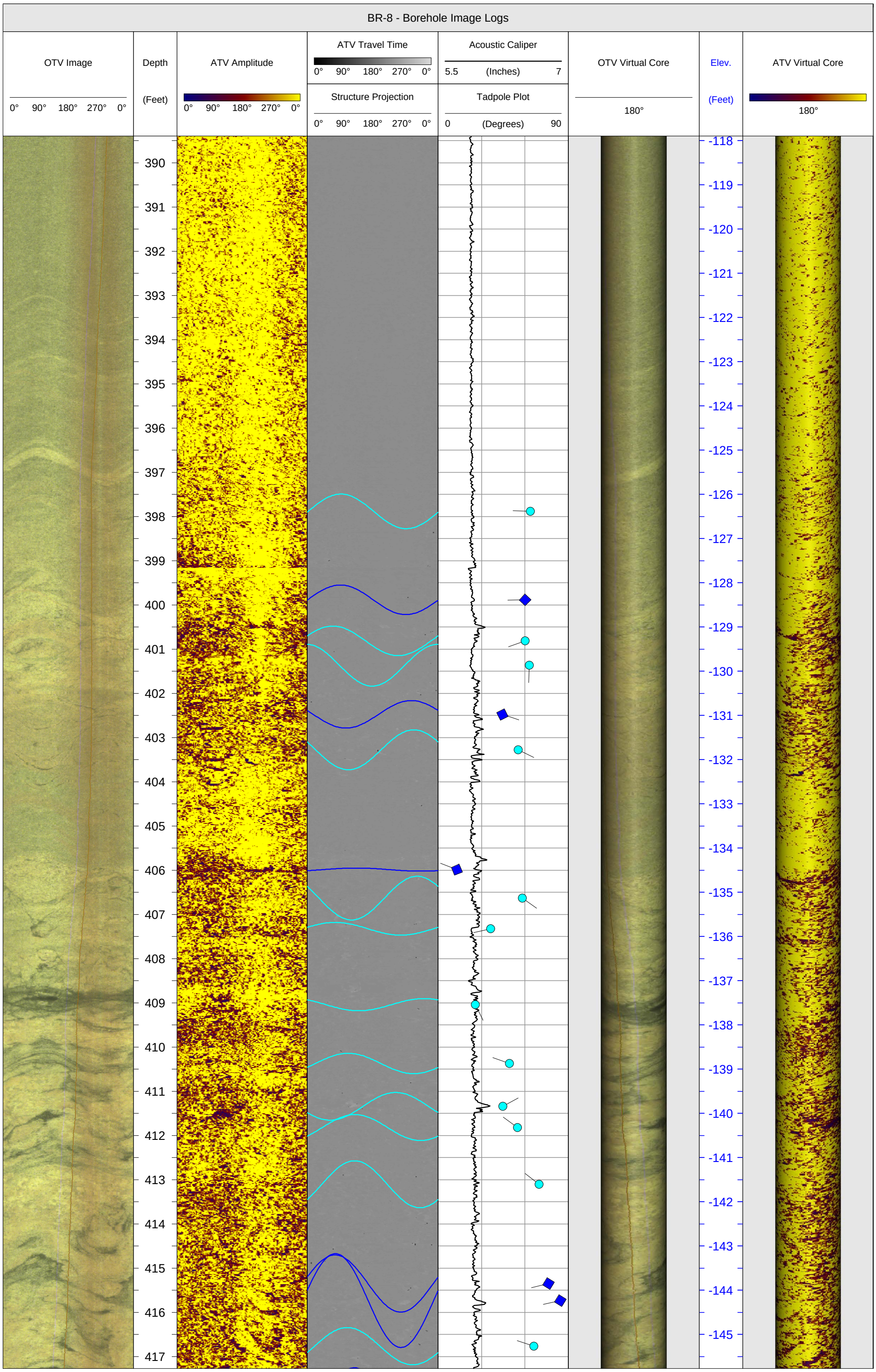
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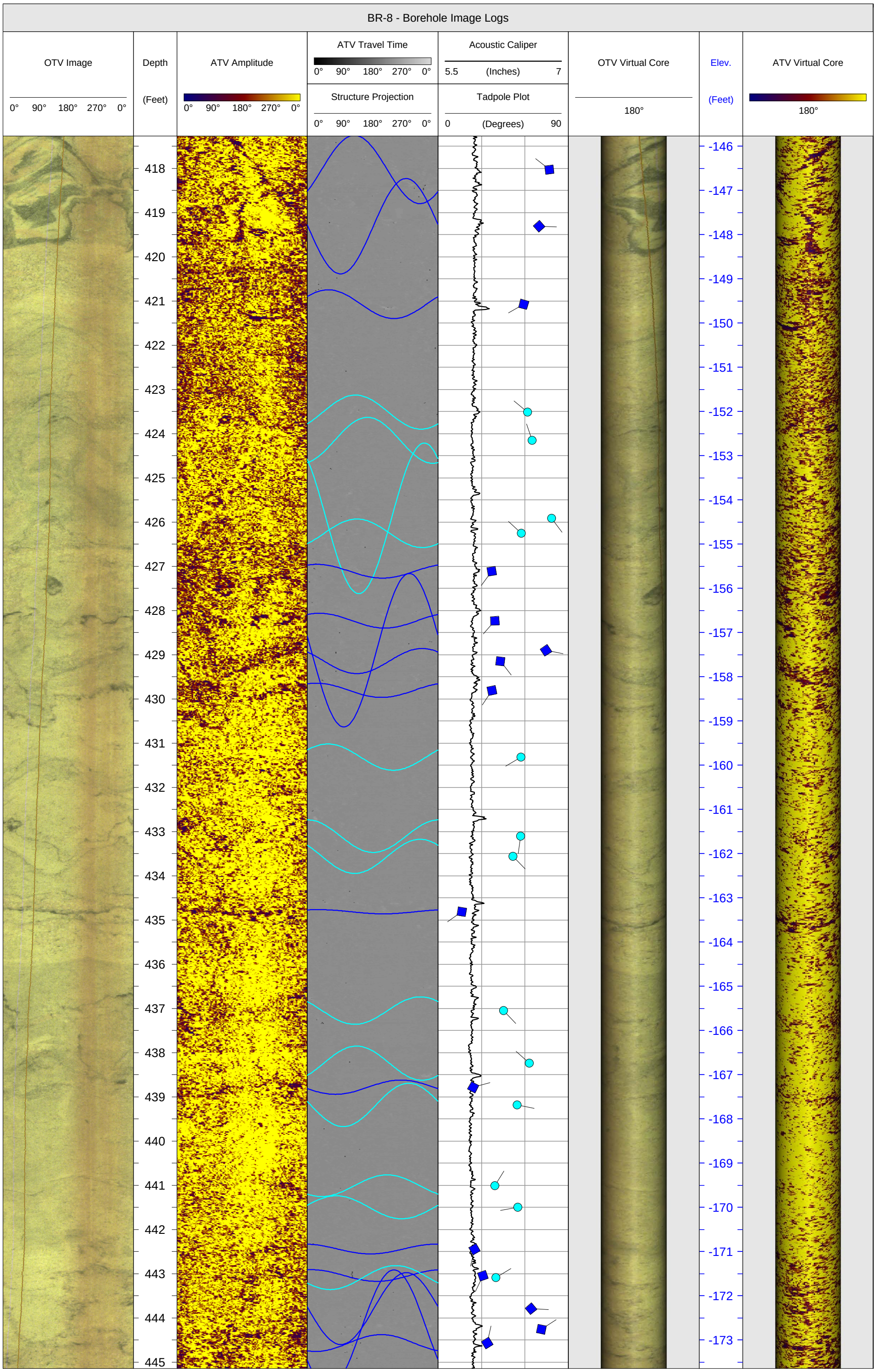
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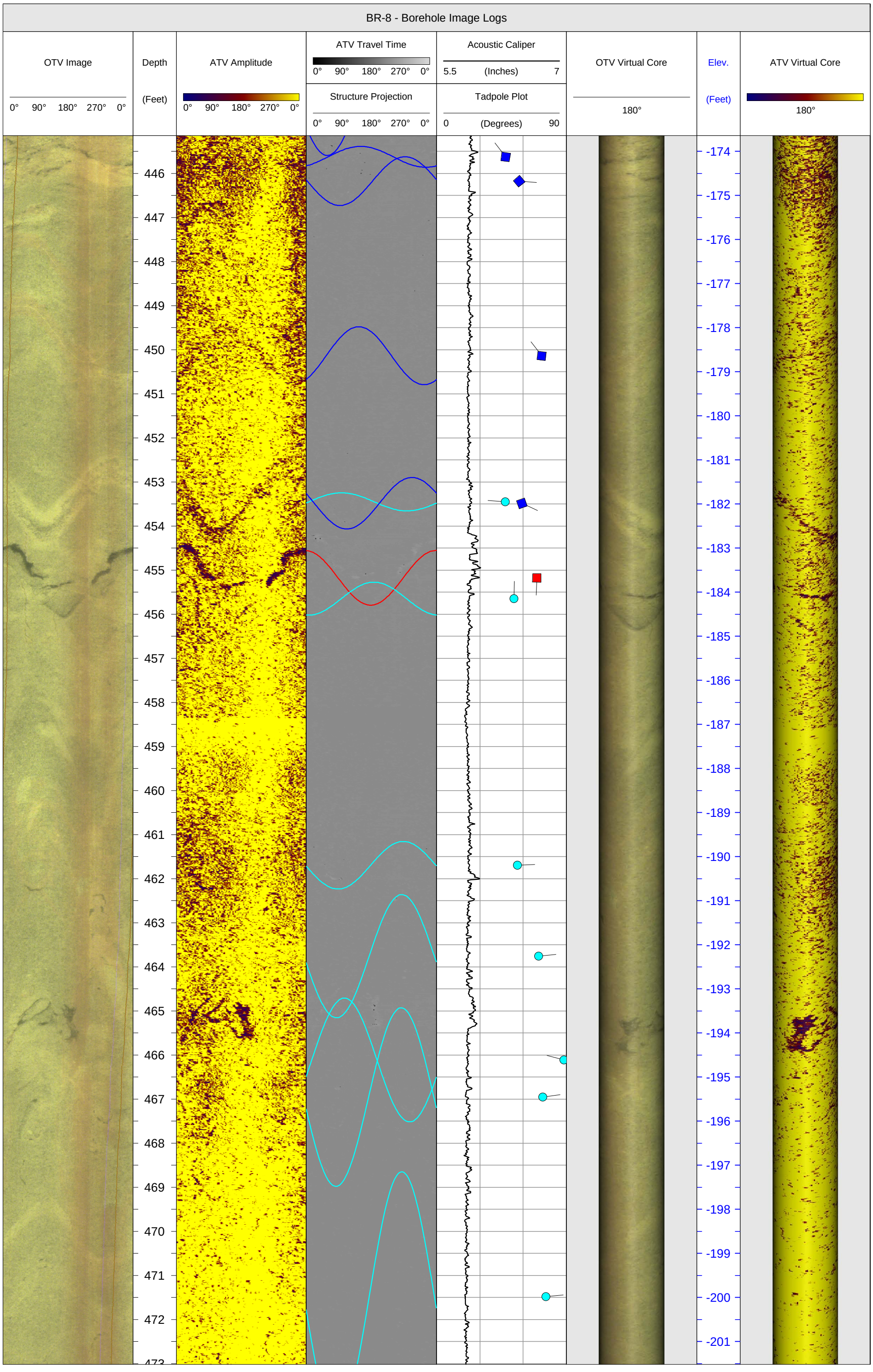
BR-8 - Borehole Image Logs
OTV Image
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Depth
(Feet)
ATV Amplitude
0° 90° 180° 270° 0°
ATV Travel Time
0° 90° 180° 270° 0°
Structure Projection
0° 90° 180° 270° 0°
Acoustic Caliper
5.5 (Inches) 7
Tadpole Plot
0 (Degrees) 90
OTV Virtual Core
180°
Elev.
(Feet)
ATV Virtual Core
180°
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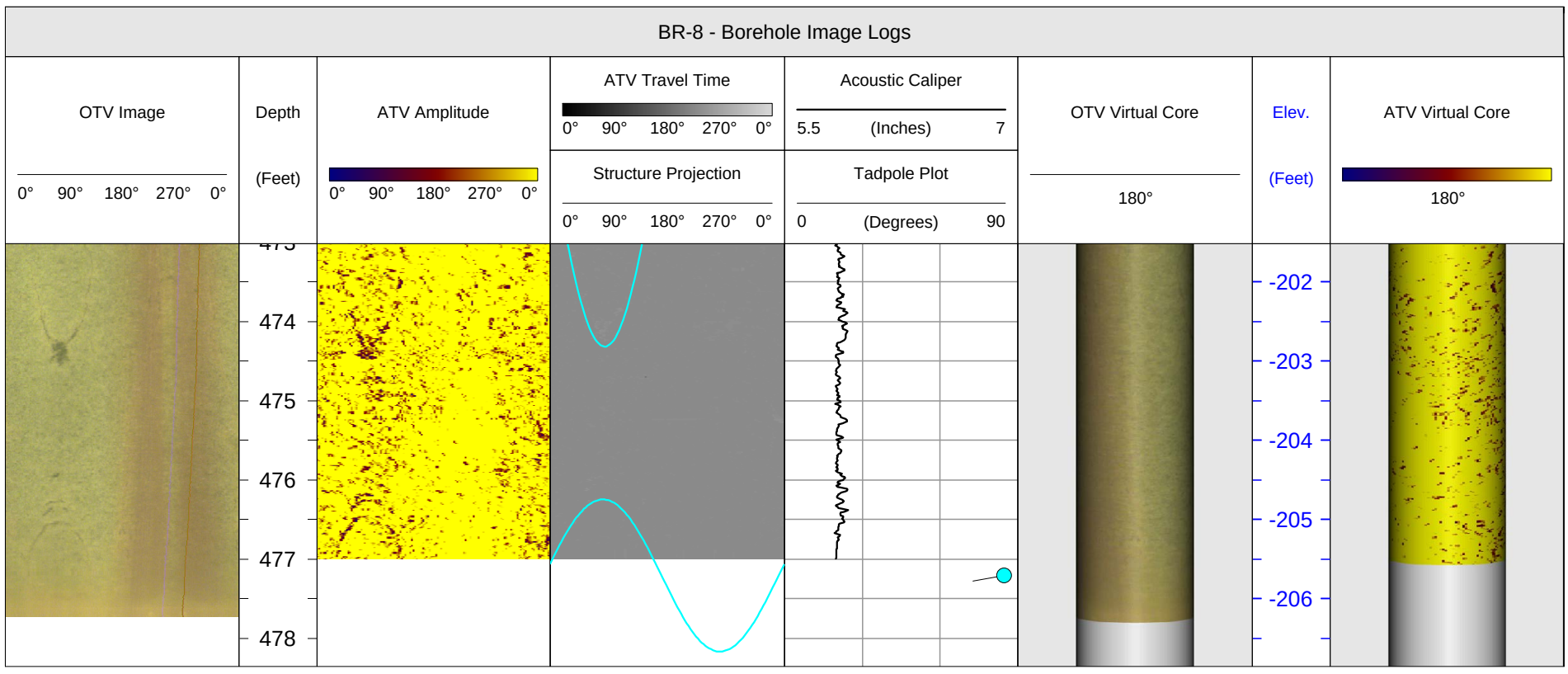
BR-8 - Borehole Image Logs
OTV Image
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Depth
(Feet)
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ATV Travel Time
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Structure Projection
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Acoustic Caliper
5.5 (Inches) 7
Tadpole Plot
0 (Degrees) 90
OTV Virtual Core
180°
Elev.
(Feet)
ATV Virtual Core
180°
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BR-9 - BOREHOLE IMAGE LOGS

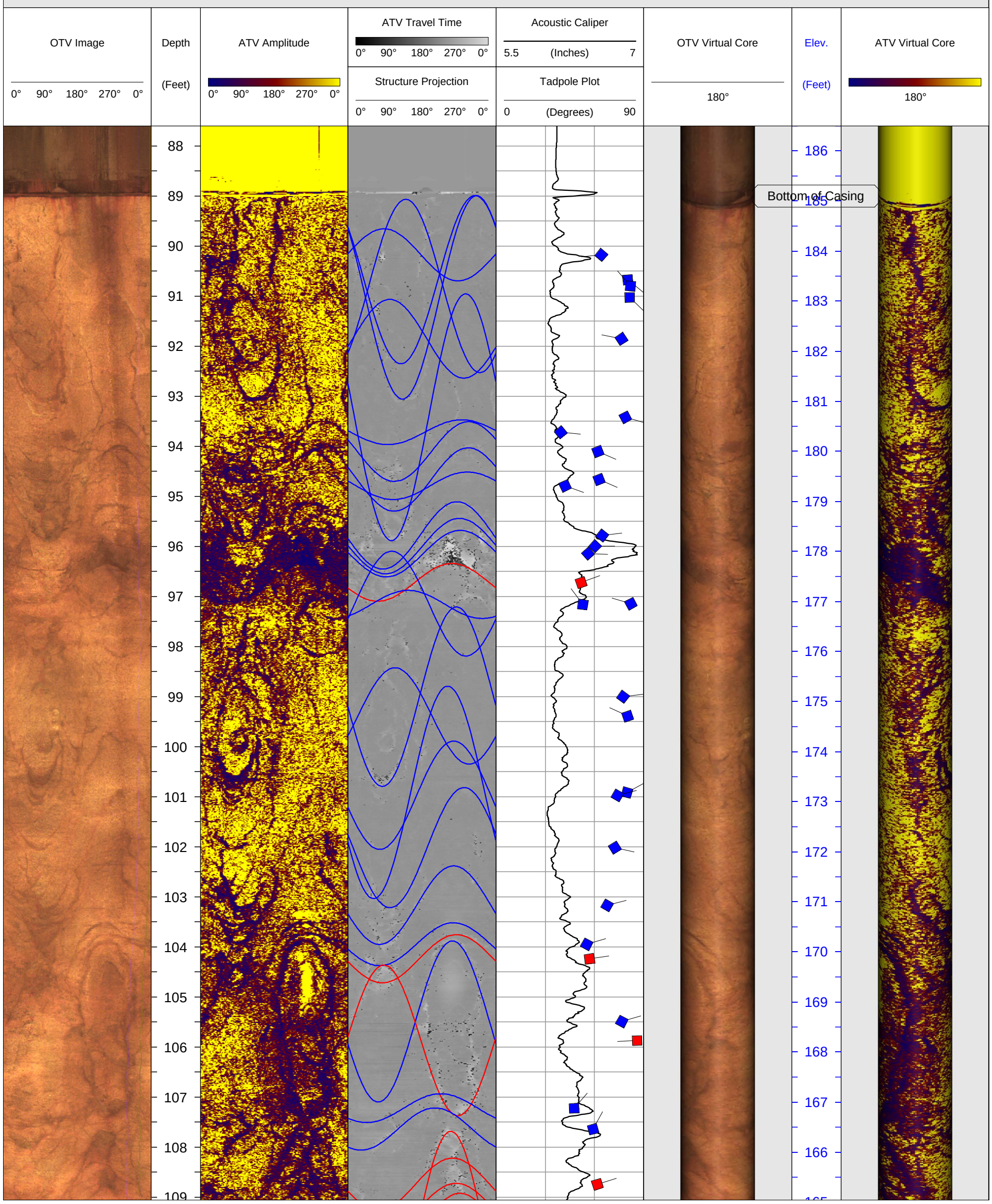
DATE LOGGED: November 29, 2011

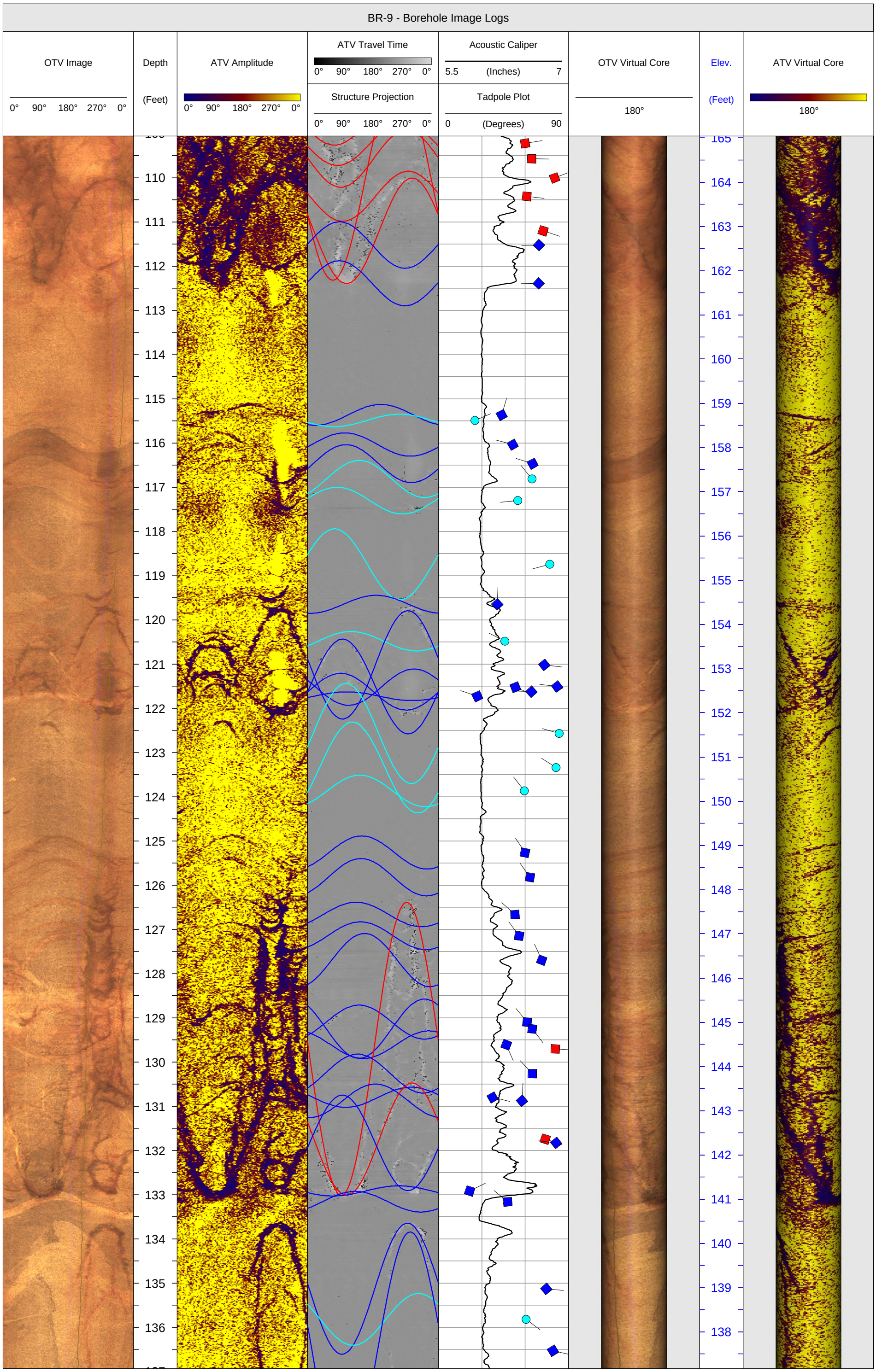
CLIENT:	Weston Solutions, Inc.	H-R FILE:	11RG69
PROJECT:	Borehole Geophysical Logging	LOG DATUM:	Top of the 6-Inch Steel Casing
LOCATION:	Savage Municipal Water Supply Superfund Site	TOP OF CASING ELEVATION:	274.1 Feet
CITY, STATE:	Milford, New Hampshire	ORIENTATION REFERENCE:	True North (Declination = 15 Degrees West)
LOGGING GEOPHYSICISTS:	Nick DeCristofaro & Eric Richert	CASING STICK-UP:	2.1 Feet Above the Ground Surface
CLIENT REP. ON-SITE:	Andrew Fuller	BOREHOLE DIAMETER:	6 Inches
LOGS PROCESSED BY:	Robert Garfield	WATER LEVEL DEPTH:	10.4 Feet

STRUCTURE LEGEND

Fracture Rank 1 Fracture Rank 2 Fracture Rank 3

BR-9 - Borehole Image Logs

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OTV Image
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ATV Travel Time
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Structure Projection
0° 90° 180° 270° 0°
Acoustic Caliper
5.5 (Inches) 7
Tadpole Plot
0 (Degrees) 90
OTV Virtual Core
180°
Elev.
(Feet)
ATV Virtual Core
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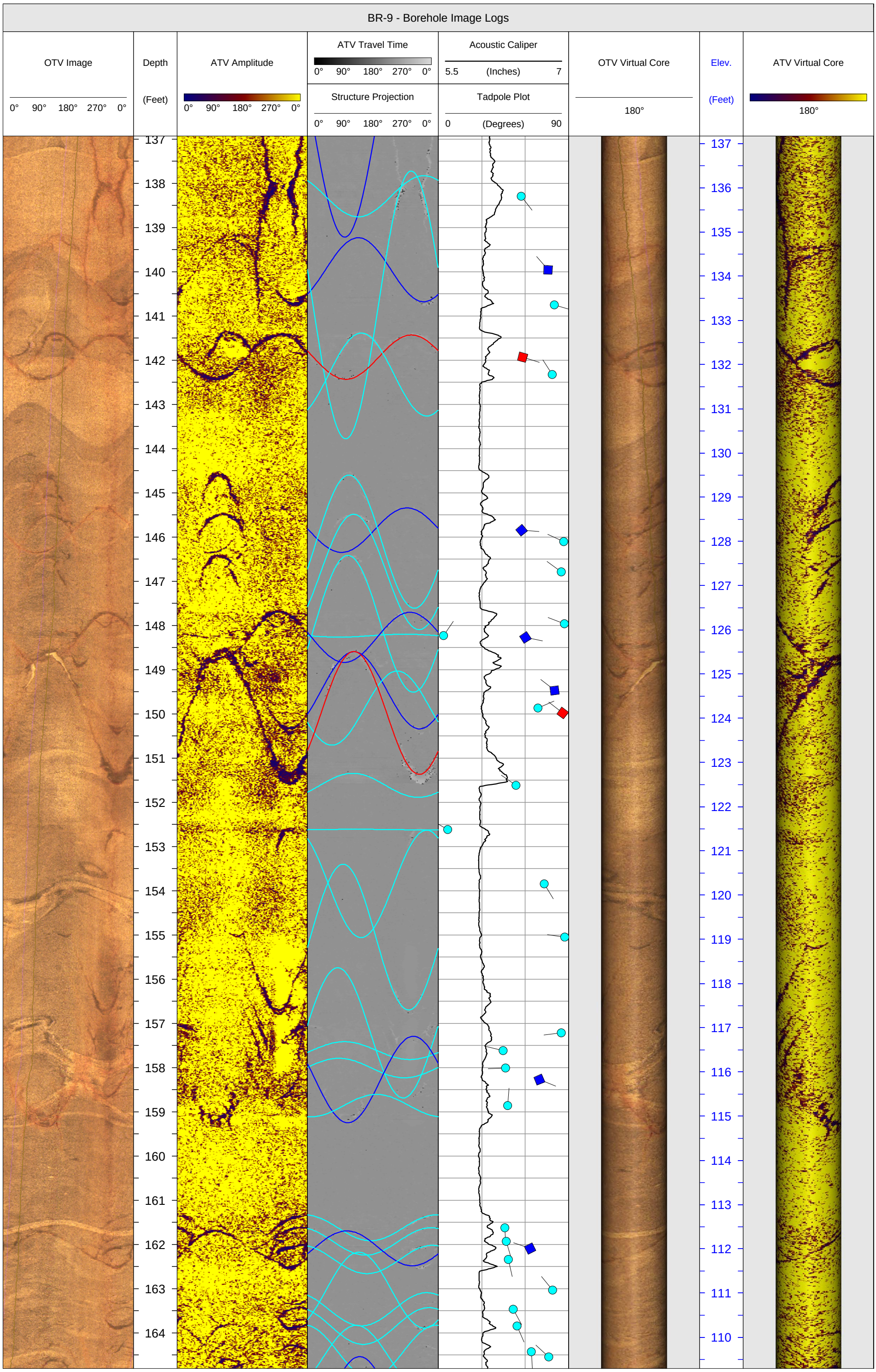
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ATV Travel Time
0° 90° 180° 270° 0°
Structure Projection
0° 90° 180° 270° 0°
Acoustic Caliper
5.5 (Inches) 7
Tadpole Plot
0 (Degrees) 90
OTV Virtual Core
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Elev.
(Feet)
ATV Virtual Core
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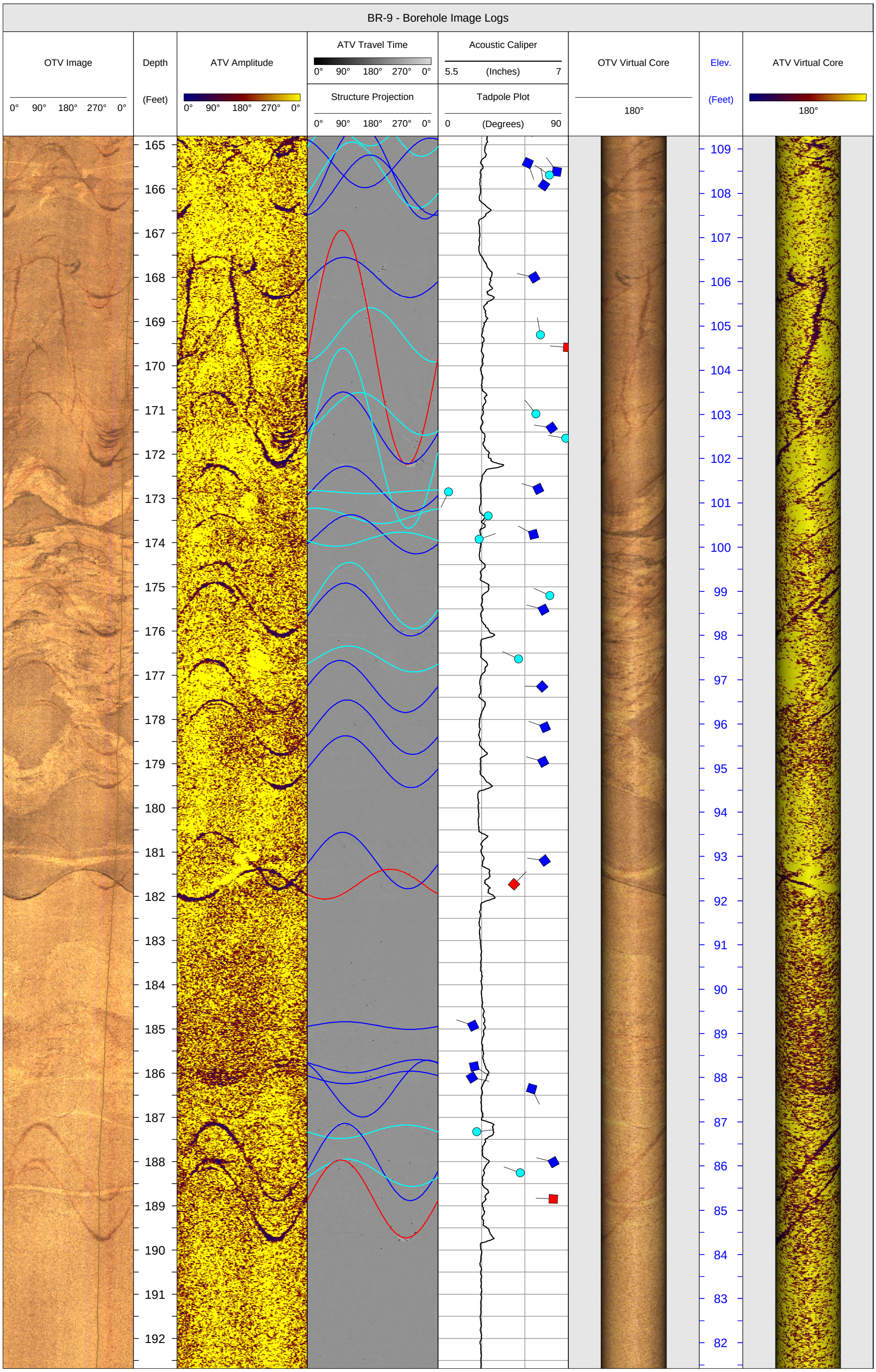
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ATV Travel Time
0° 90° 180° 270° 0°
Structure Projection
0° 90° 180° 270° 0°
Acoustic Caliper
5.5 (Inches) 7
Tadpole Plot
0 (Degrees) 90
OTV Virtual Core
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Elev.
(Feet)
ATV Virtual Core
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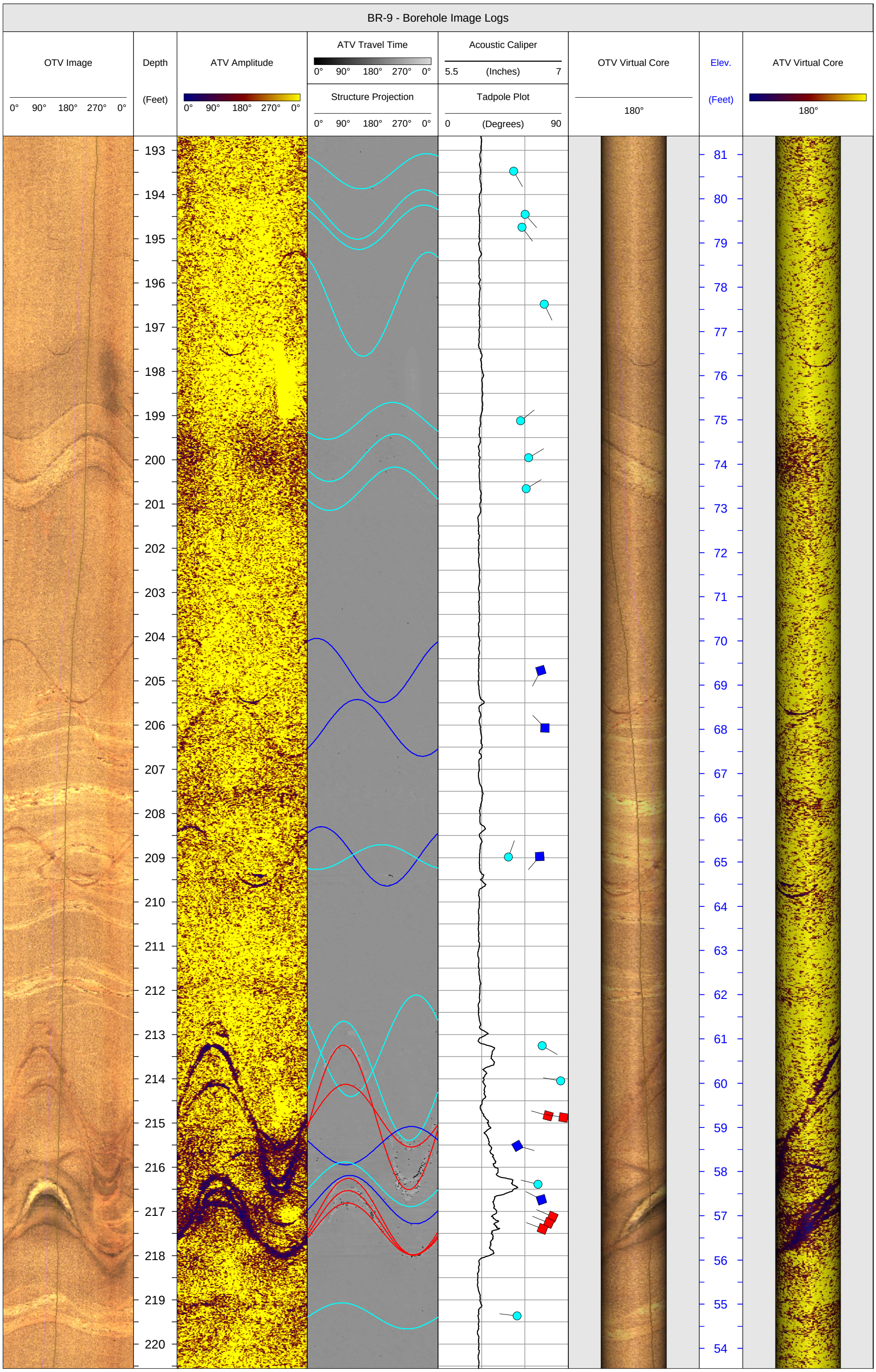
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0° 90° 180° 270° 0°
Structure Projection
0° 90° 180° 270° 0°
Acoustic Caliper
5.5 (Inches) 7
Tadpole Plot
0 (Degrees) 90
OTV Virtual Core
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Elev.
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ATV Virtual Core
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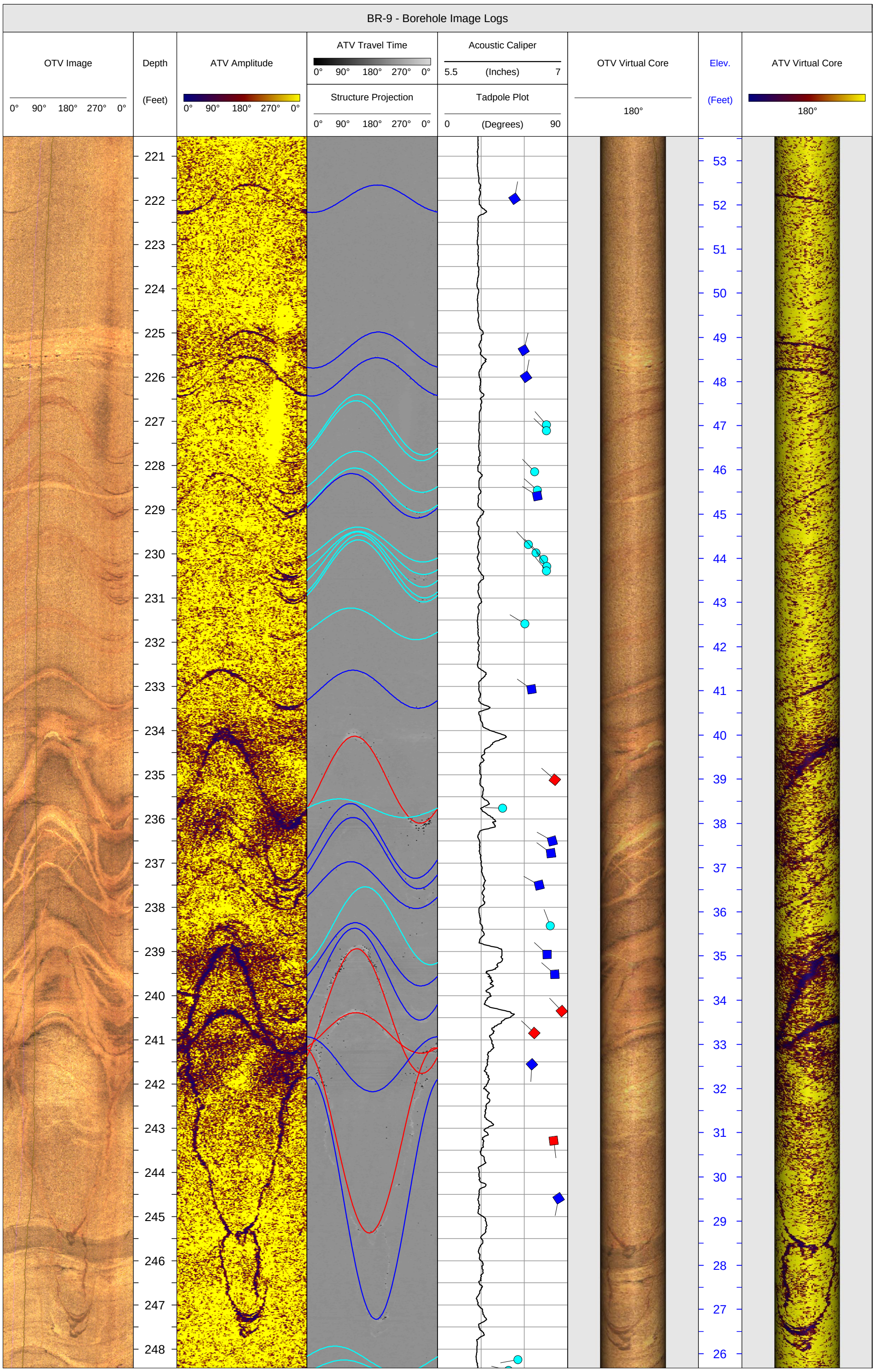
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Structure Projection
0° 90° 180° 270° 0°
Acoustic Caliper
5.5 (Inches) 7
Tadpole Plot
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Elev.
(Feet)
ATV Virtual Core
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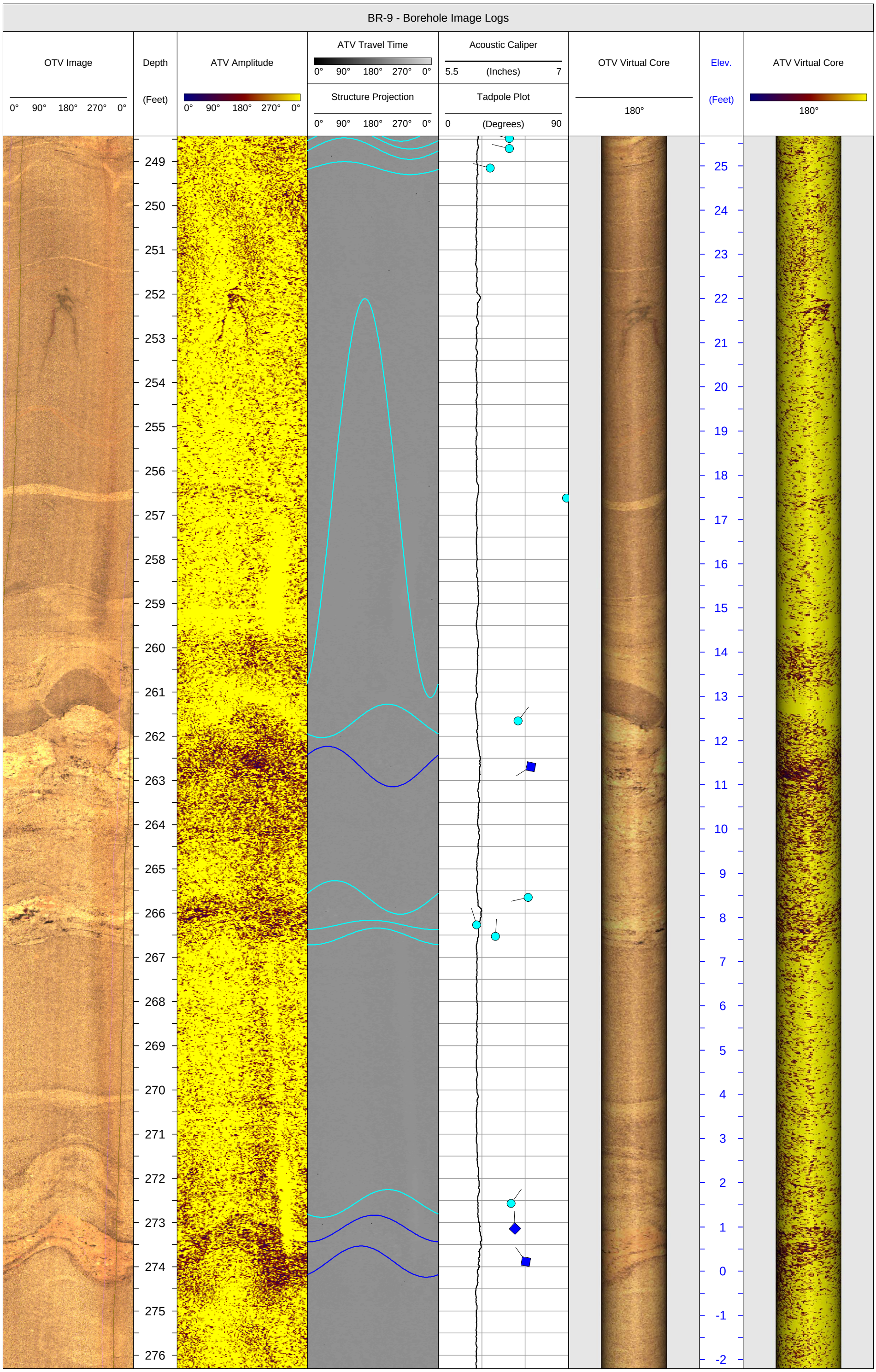
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0° 90° 180° 270° 0°
ATV Travel Time
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Structure Projection
0° 90° 180° 270° 0°
Acoustic Caliper
5.5 (Inches) 7
Tadpole Plot
0 (Degrees) 90
OTV Virtual Core
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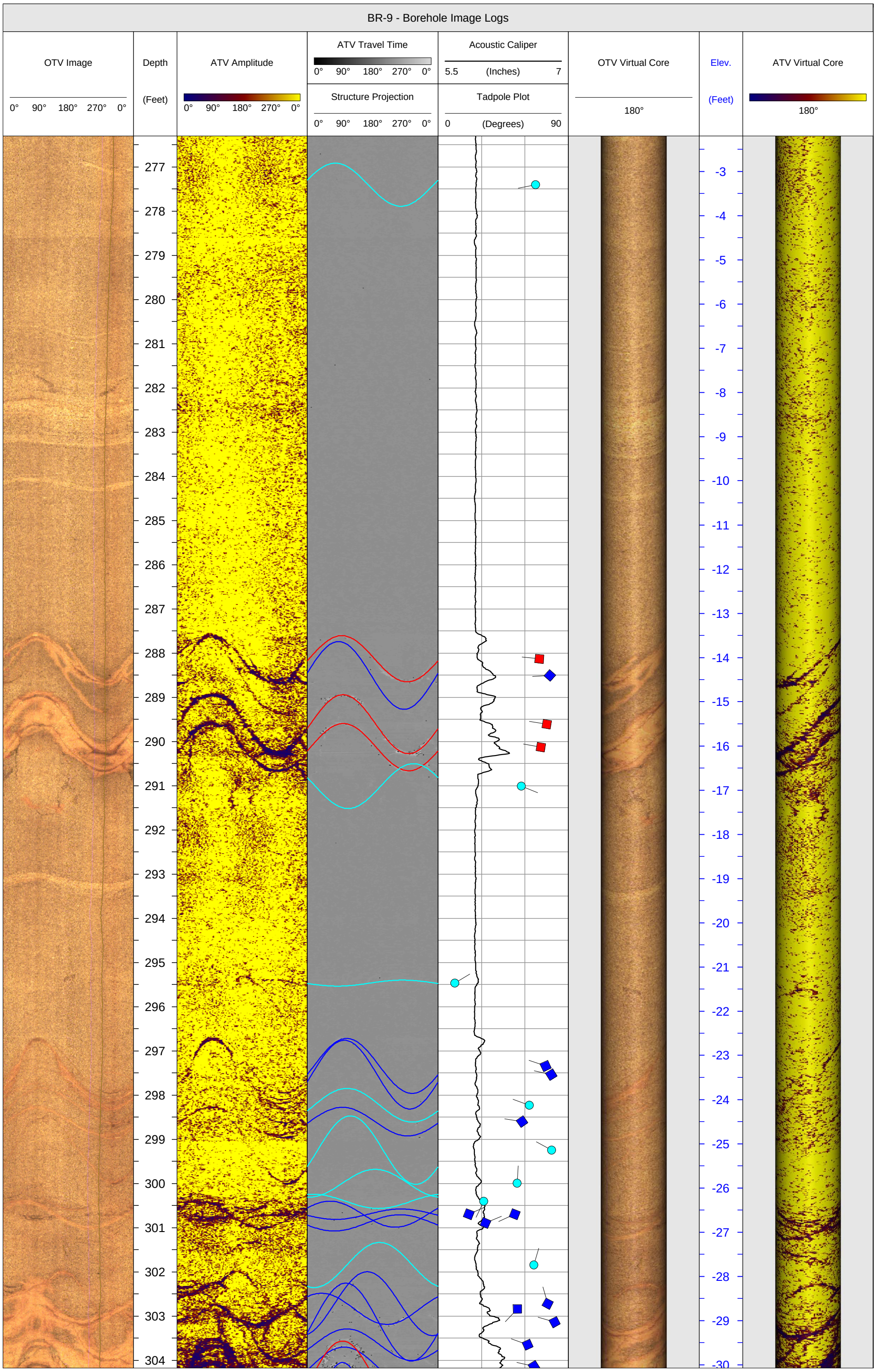
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ATV Travel Time
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Structure Projection
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Acoustic Caliper
5.5 (Inches) 7
Tadpole Plot
0 (Degrees) 90
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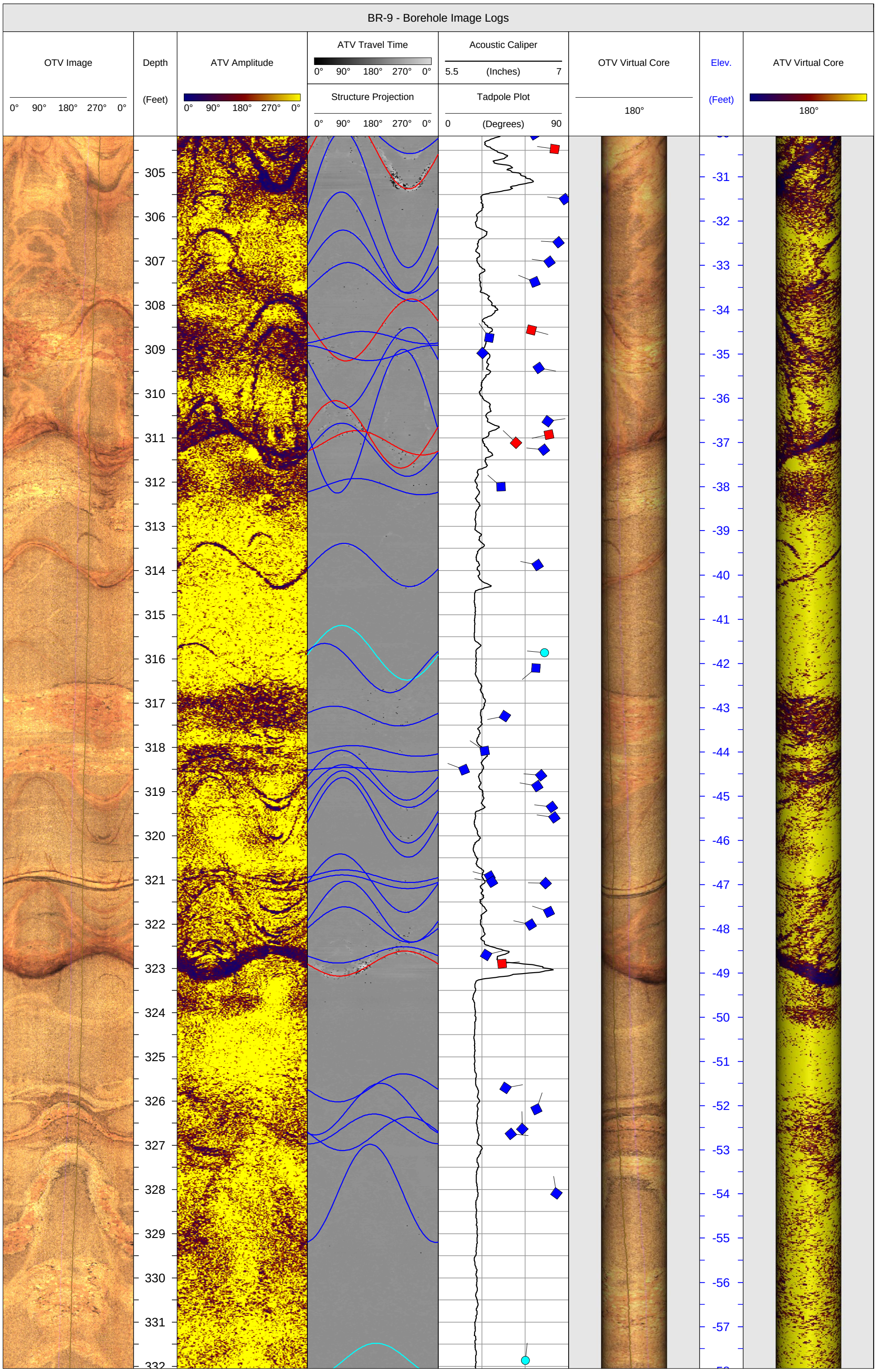
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Structure Projection
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Acoustic Caliper
5.5 (Inches) 7
Tadpole Plot
0 (Degrees) 90
OTV Virtual Core
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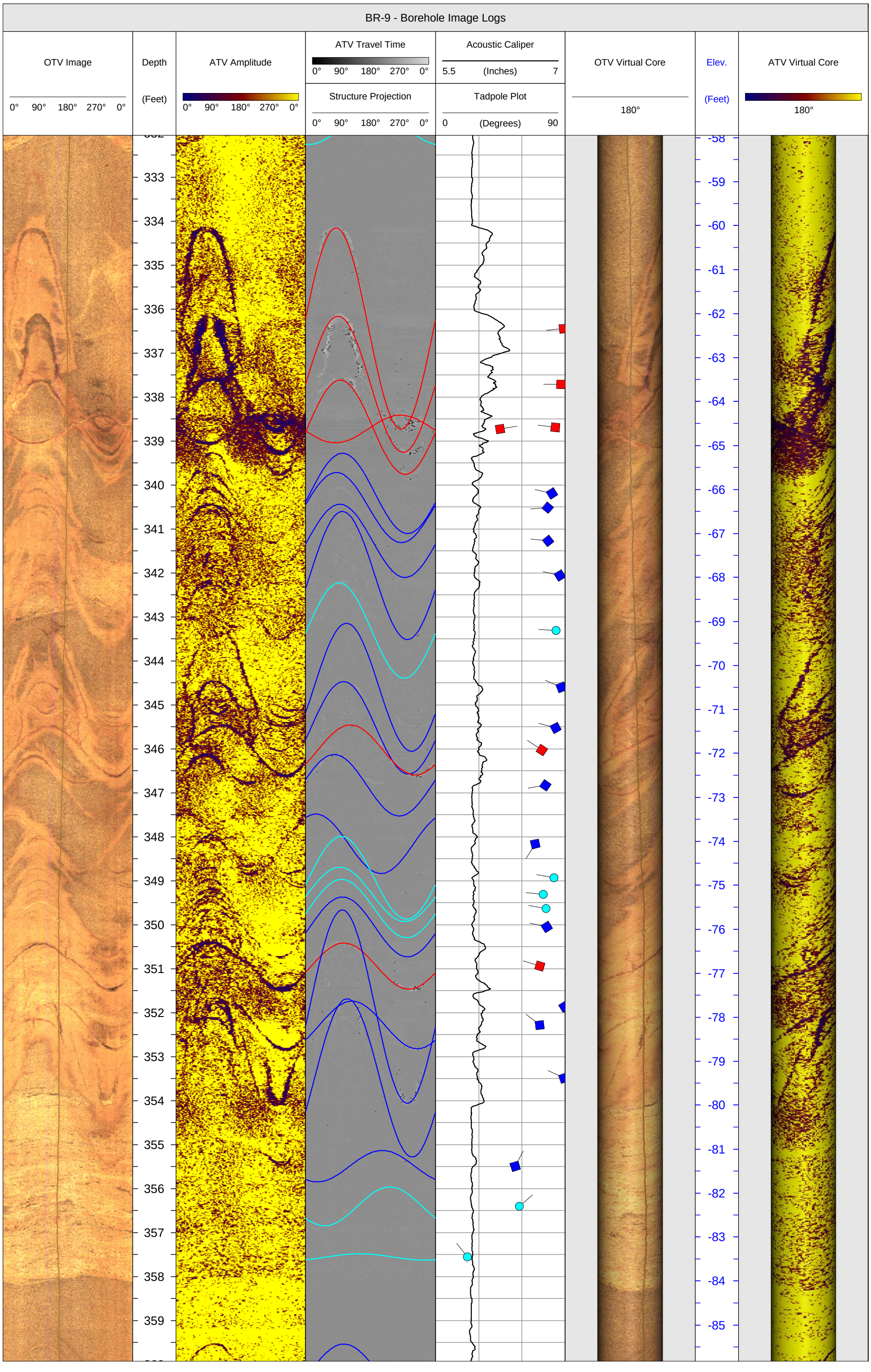
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OTV Image
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Depth
(Feet)
ATV Amplitude
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Structure Projection
0° 90° 180° 270° 0°
Acoustic Caliper
5.5 (Inches) 7
Tadpole Plot
0 (Degrees) 90
OTV Virtual Core
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ATV Virtual Core
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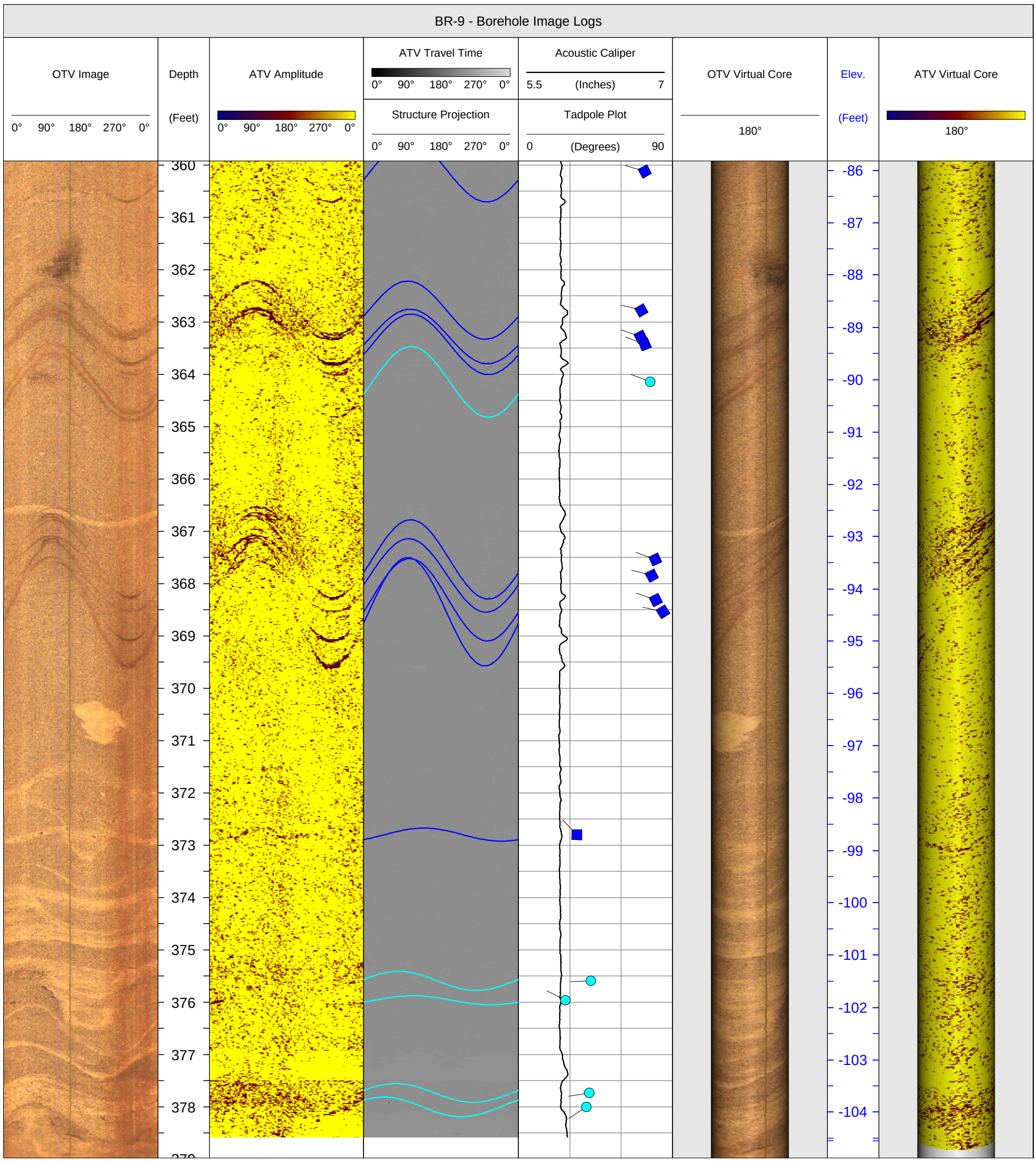
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Structure Projection
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Acoustic Caliper
5.5 (Inches) 7
Tadpole Plot
0 (Degrees) 90
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MW-30 - BOREHOLE IMAGE LOGS

DATE LOGGED: November 30, 2011 & January 13, 2012

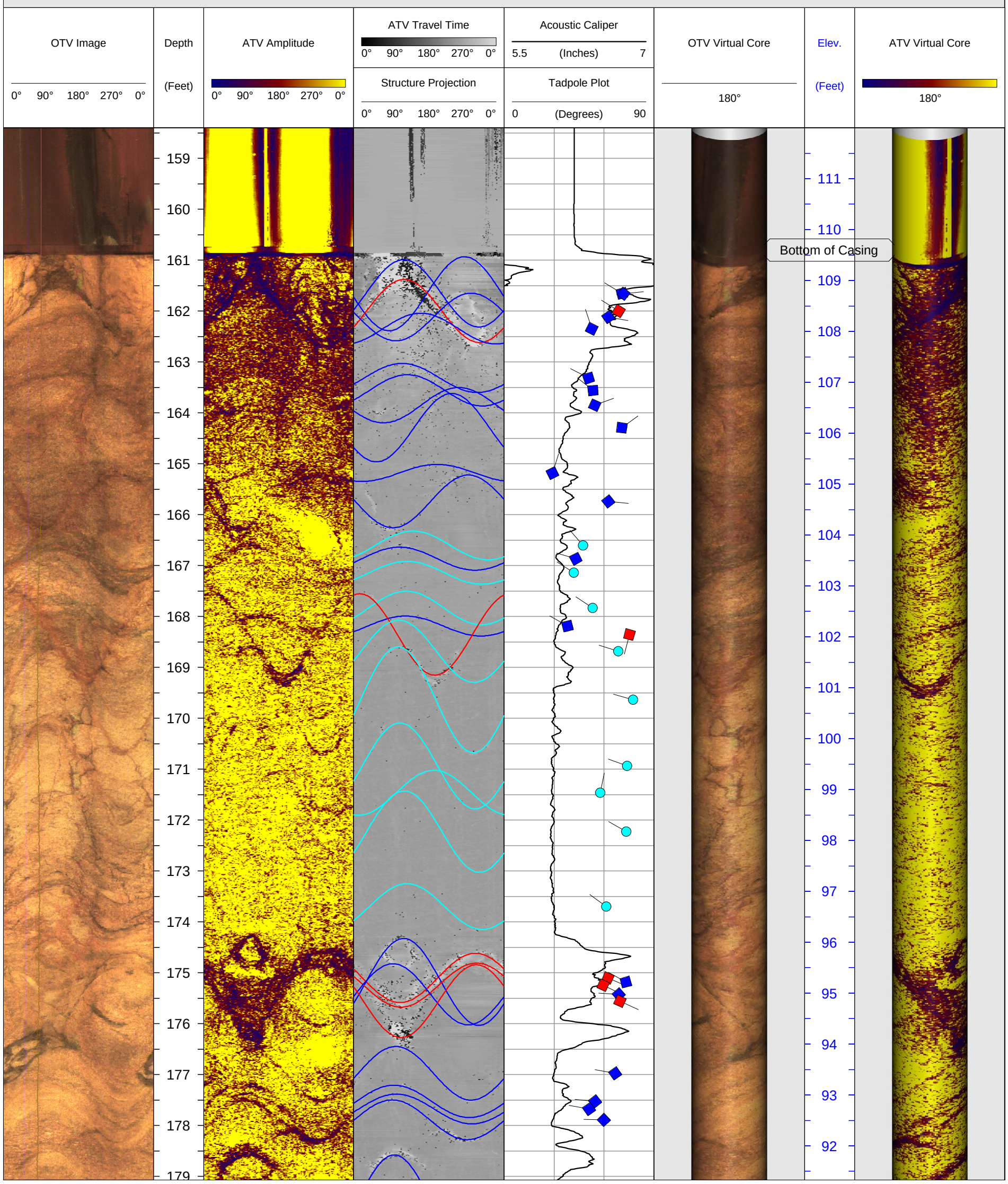
CLIENT:	Weston Solutions, Inc.	H-R FILE:	11RG69
PROJECT:	Borehole Geophysical Logging	LOG DATUM:	Top of the 6-Inch Steel Casing
LOCATION:	Savage Municipal Water Supply Superfund Site	TOP OF CASING ELEVATION:	270.4 Feet
CITY, STATE:	Milford, New Hampshire	ORIENTATION REFERENCE:	True North (Declination = 15 Degrees West)
LOGGING GEOPHYSICISTS:	Nick DeCristofaro & Micheal Howley	CASING STICK-UP:	2.1 Feet Above the Ground Surface
CLIENT REP. ON-SITE:	Andrew Fuller	BOREHOLE DIAMETER:	6 Inches
LOGS PROCESSED BY:	Robert Garfield	WATER LEVEL DEPTH:	8.0 Feet

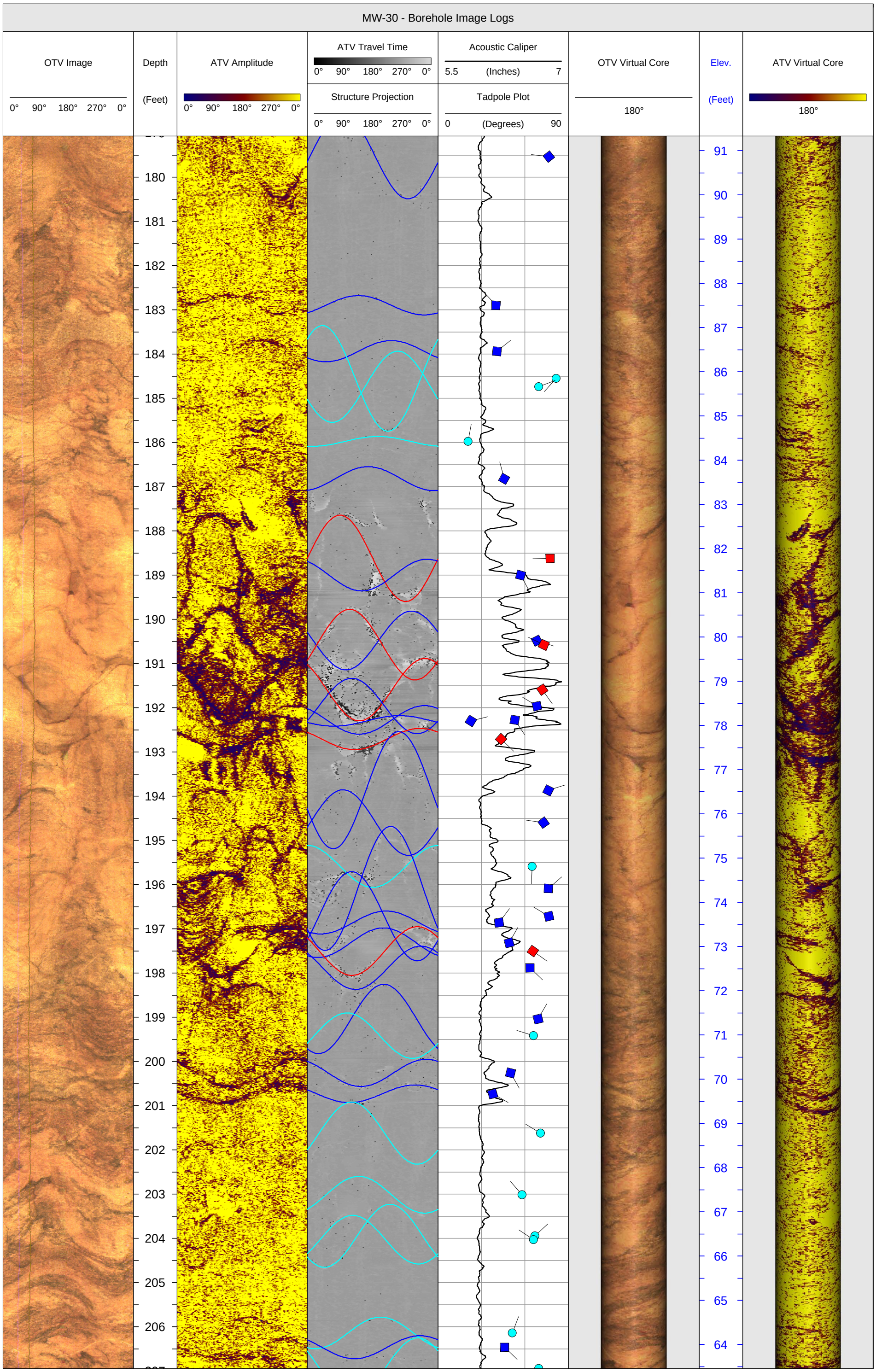
STRUCTURE LEGEND

Fracture Rank 1 Fracture Rank 2 Fracture Rank 3

NOTES: Borehole MW-30 was blocked at 288 feet at the time of logging.

MW-30 - Borehole Image Logs




MW-30 - Borehole Image Logs
OTV Image
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Depth
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ATV Amplitude
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ATV Travel Time
0° 90° 180° 270° 0°
Structure Projection
0° 90° 180° 270° 0°
Acoustic Caliper
5.5 (Inches) 7
Tadpole Plot
0 (Degrees) 90
OTV Virtual Core
180°
Elev.
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ATV Virtual Core
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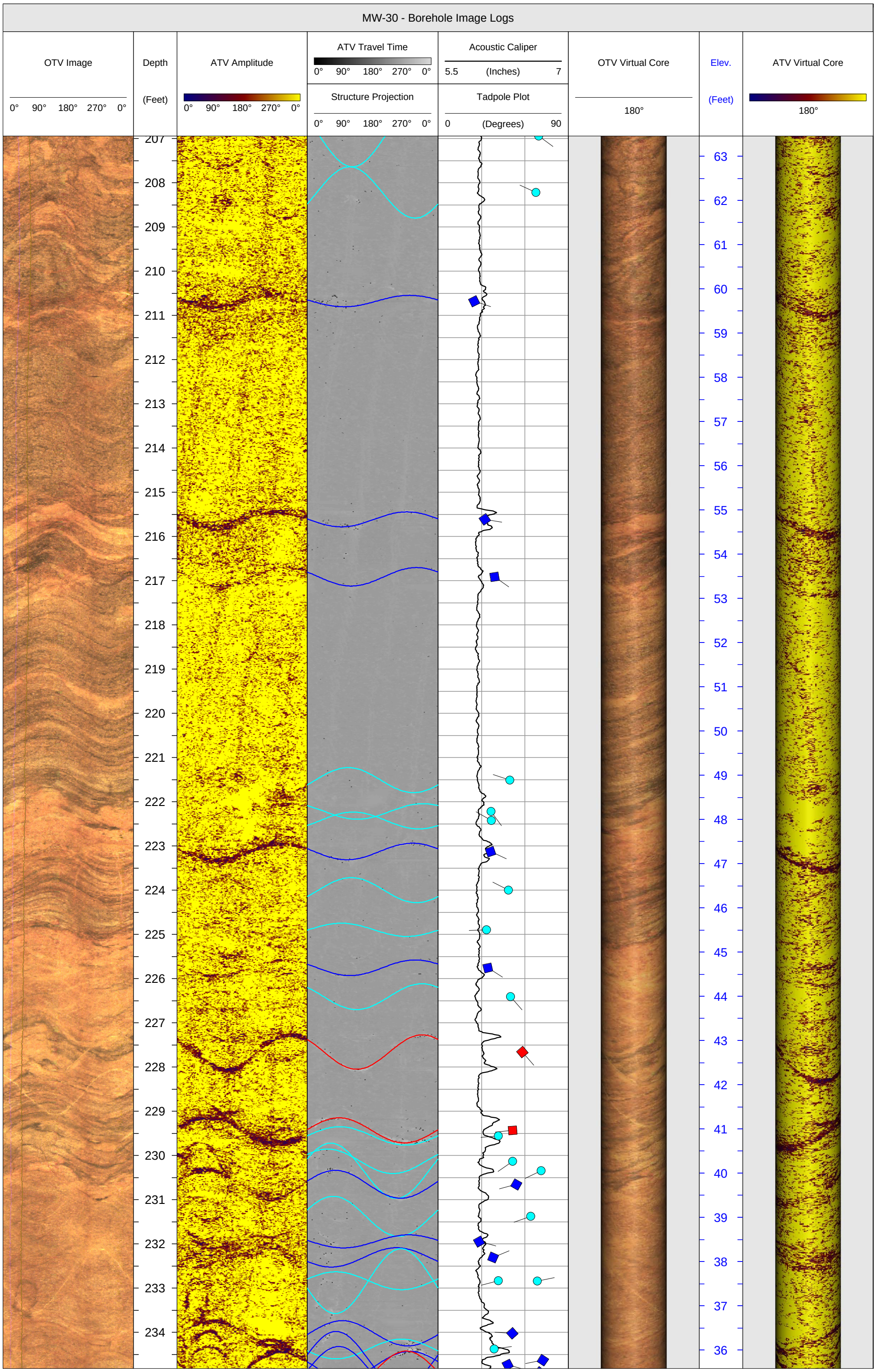
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ATV Travel Time
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Structure Projection
0° 90° 180° 270° 0°
Acoustic Caliper
5.5 (Inches) 7
Tadpole Plot
0 (Degrees) 90
OTV Virtual Core
180°
Elev.
(Feet)
ATV Virtual Core
180°
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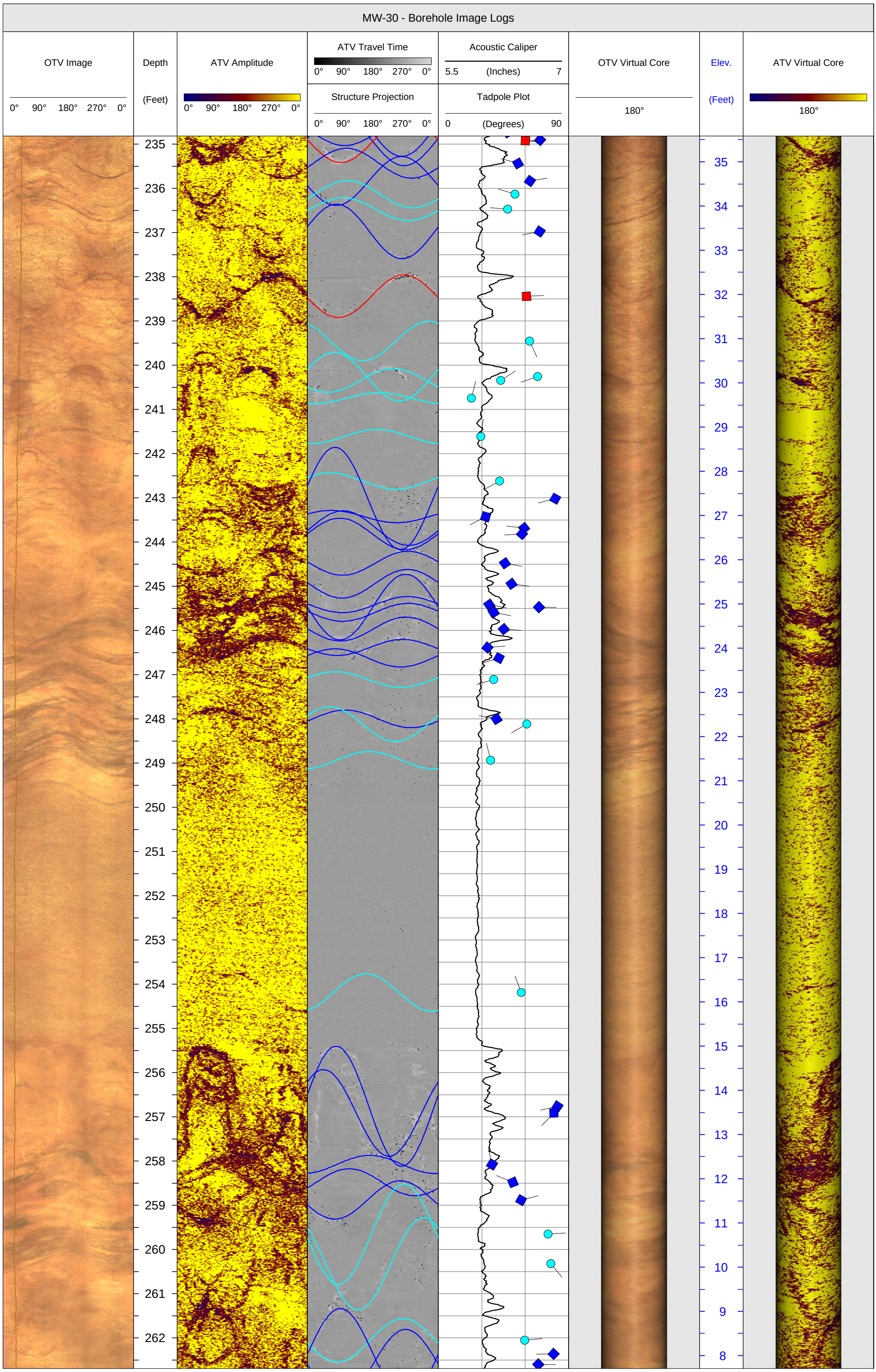
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Structure Projection
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Acoustic Caliper
5.5 (Inches) 7
Tadpole Plot
0 (Degrees) 90
OTV Virtual Core
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Elev.
(Feet)
ATV Virtual Core
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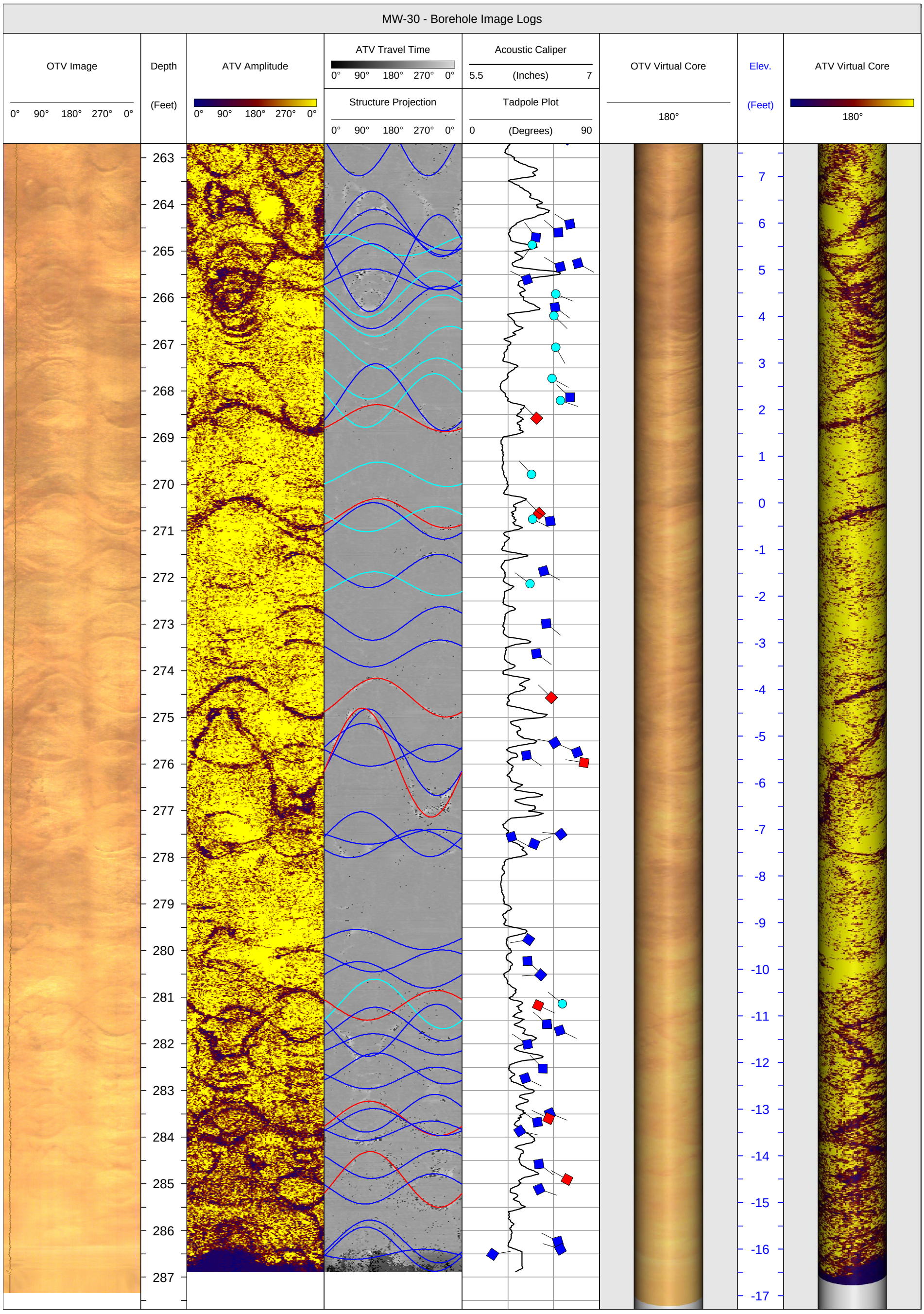
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ATV Travel Time
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Structure Projection
0° 90° 180° 270° 0°
Acoustic Caliper
5.5 (Inches) 7
Tadpole Plot
0 (Degrees) 90
OTV Virtual Core
180°
Elev.
(Feet)
ATV Virtual Core
180°
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BR-7 - BOREHOLE GEOPHYSICAL LOGS

DATE LOGGED: November 14, 29, & 30, 2011

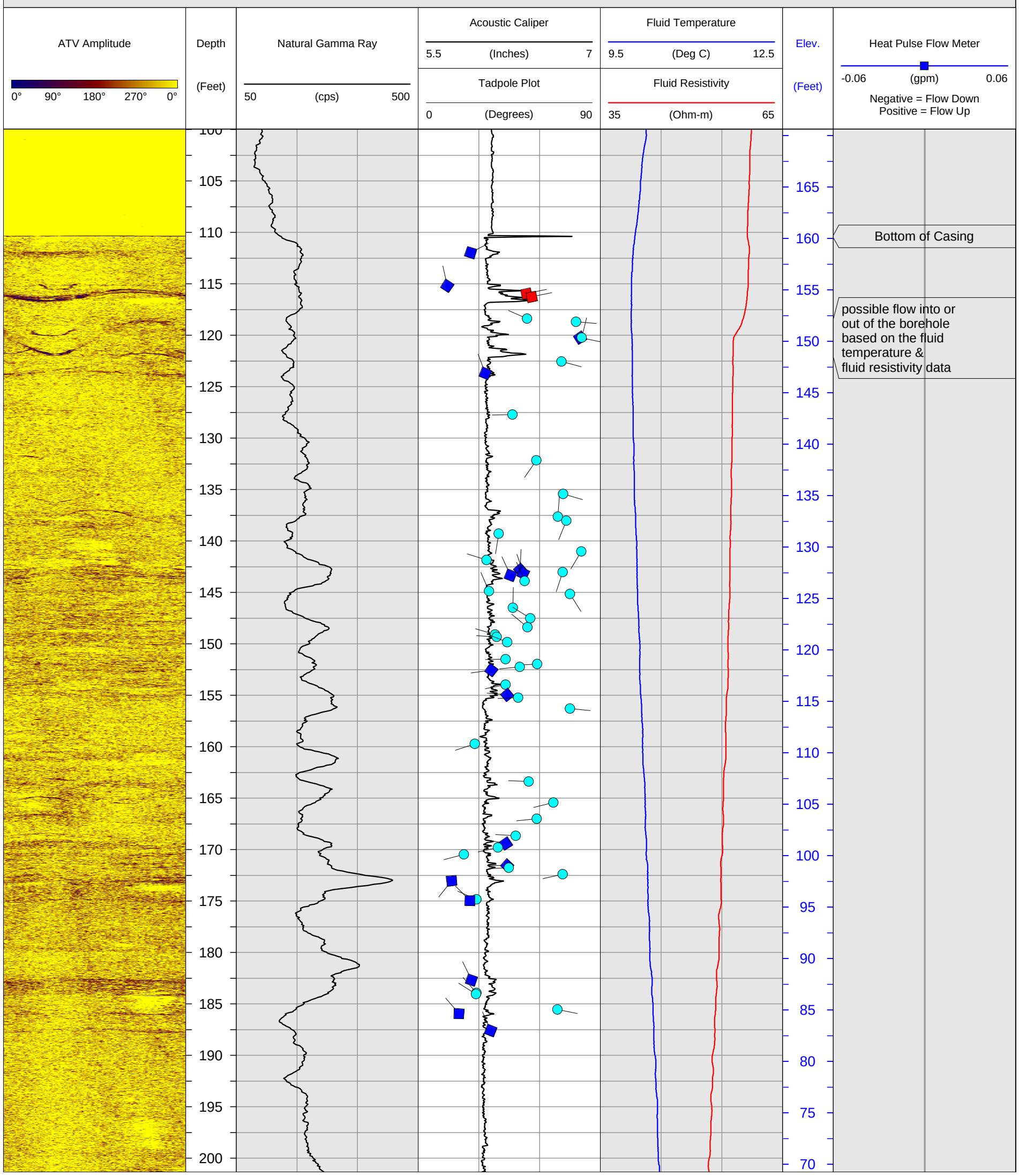
CLIENT:	Weston Solutions, Inc.	H-R FILE:	11RG69
PROJECT:	Borehole Geophysical Logging	LOG DATUM:	Top of the 6-Inch Steel Casing
LOCATION:	Savage Municipal Water Supply Superfund Site	TOP OF CASING ELEVATION:	270.6 Feet
CITY, STATE:	Milford, New Hampshire	ORIENTATION REFERENCE:	True North (Declination = 15 Degrees West)
LOGGING GEOPHYSICISTS:	N. DeCristofaro, M. Howley, & E. Rickert	CASING STICK-UP:	1.6 Feet Above the Ground Surface
CLIENT REP. ON-SITE:	Andrew Fuller	BOREHOLE DIAMETER:	6 Inches
LOGS PROCESSED BY:	Robert Garfield	WATER LEVEL DEPTH:	247-231 ft on Nov. 14; 6.1 ft on Nov. 29 & 30

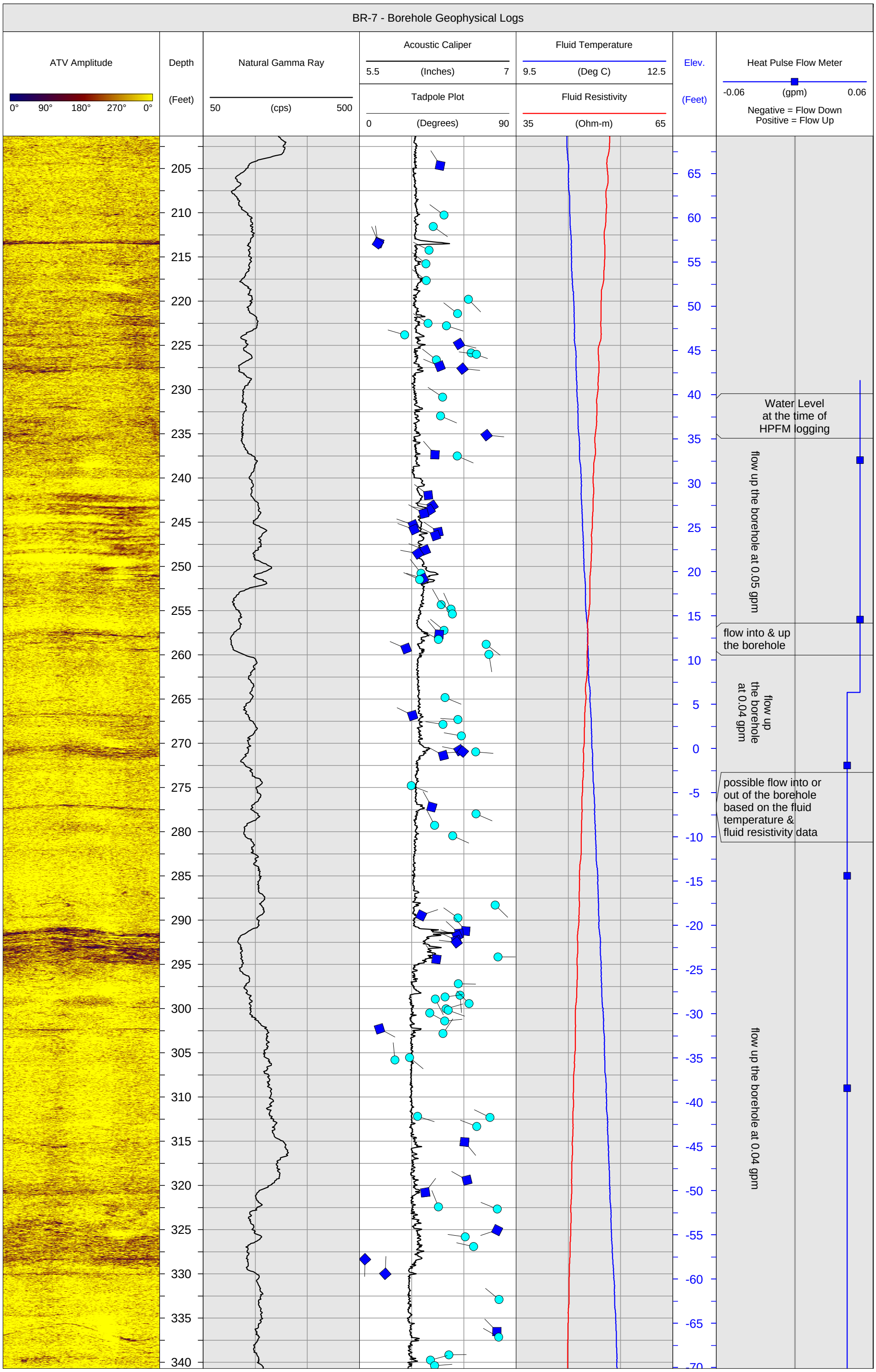
STRUCTURE LEGEND

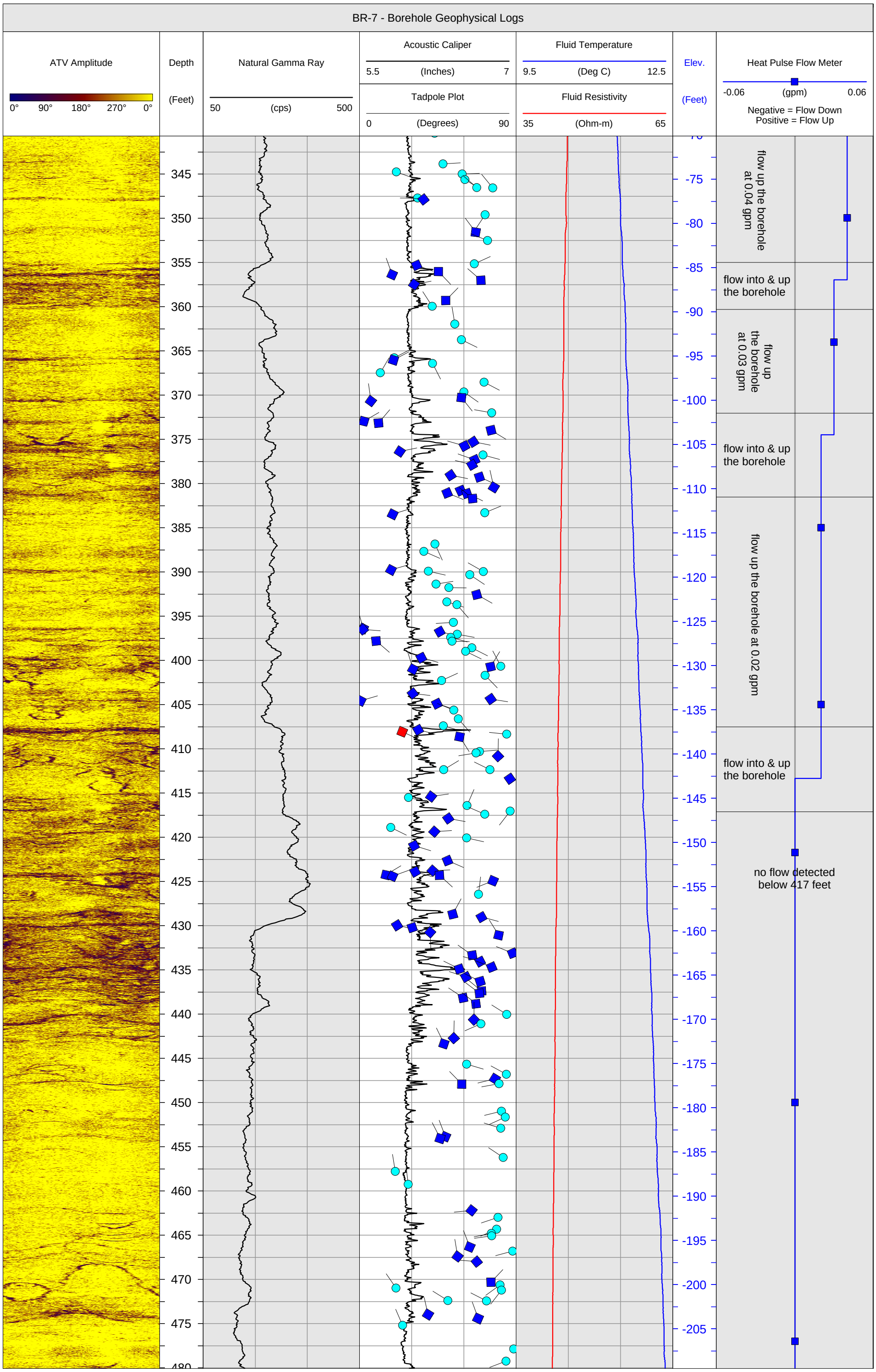
Fracture Rank 1 Fracture Rank 2 Fracture Rank 3

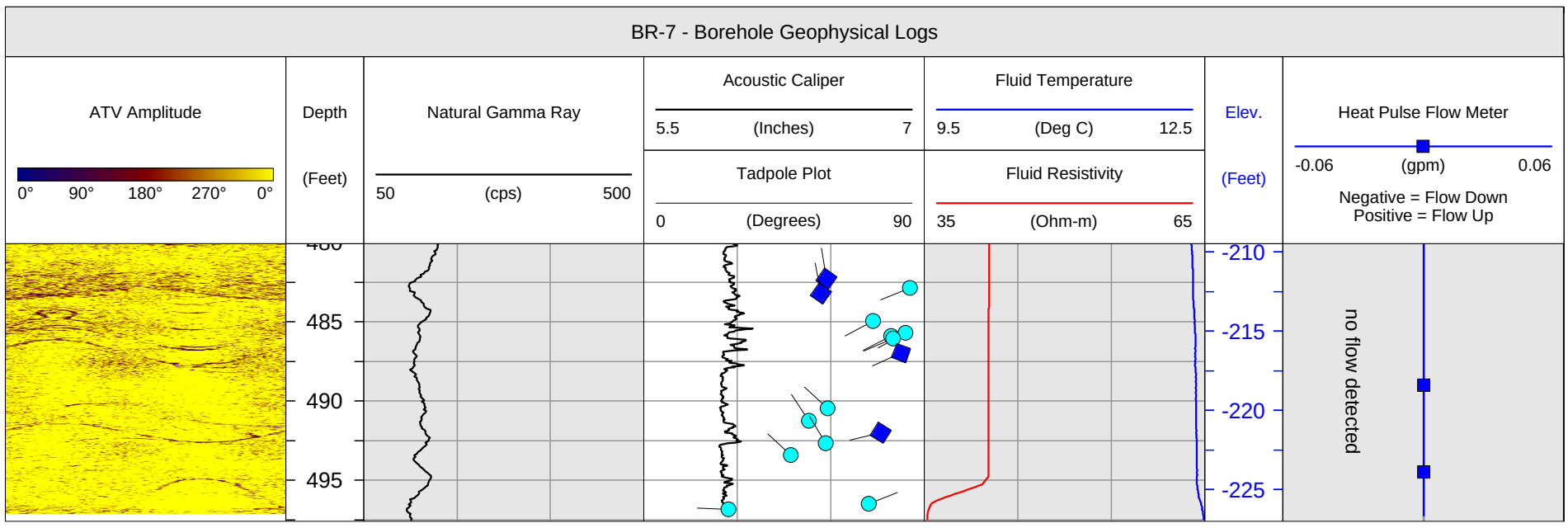
NOTES: At the time of logging, BR-7 was still filling with water after drilling activities. Based on the HPFM data, the water was rising in BR-7 at a rate of approximately 0.05 gpm. HPFM data were only acquired while the borehole was filling. HPFM data were not acquired under pumping conditions. According to Weston, packer testing was not conducted in BR-7. Therefore, hydraulic transmissivity, PCE, and TCE data are not reported in the logs below.

BR-7 - Borehole Geophysical Logs




BR-7 - Borehole Geophysical Logs
ATV Amplitude
0° 90° 180° 270° 0°
Depth
(Feet)
Natural Gamma Ray
50 (cps) 500
Acoustic Caliper
5.5 (Inches) 7
Tadpole Plot
0 (Degrees) 90
Fluid Temperature
9.5 (Deg C) 12.5
Fluid Resistivity
35 (Ohm-m) 65
Elev.
(Feet)
Heat Pulse Flow Meter
-0.06 (gpm) 0.06
Negative = Flow Down
Positive = Flow Up
Water Level at the time of HPFM logging
flow up the borehole at 0.05 gpm
flow into & up the borehole
flow up the borehole at 0.04 gpm
possible flow into or out of the borehole based on the fluid temperature & fluid resistivity data
flow up the borehole at 0.04 gpm


BR-7 - Borehole Geophysical Logs
ATV Amplitude
0° 90° 180° 270° 0°
Depth
(Feet)
Natural Gamma Ray
50 (cps) 500
Acoustic Caliper
5.5 (Inches) 7
Tadpole Plot
0 (Degrees) 90
Fluid Temperature
9.5 (Deg C) 12.5
Fluid Resistivity
35 (Ohm-m) 65
Elev.
(Feet)
Heat Pulse Flow Meter
-0.06 (gpm) 0.06
Negative = Flow Down
Positive = Flow Up
flow up the borehole at 0.04 gpm
flow into & up the borehole
flow up the borehole at 0.03 gpm
flow into & up the borehole
flow up the borehole at 0.02 gpm
flow into & up the borehole
no flow detected below 417 feet


BR-7 - Borehole Geophysical Logs
ATV Amplitude
0° 90° 180° 270° 0°
Depth
(Feet)
Natural Gamma Ray
50 (cps) 500
Acoustic Caliper
5.5 (Inches) 7
Tadpole Plot
0 (Degrees) 90
Fluid Temperature
9.5 (Deg C) 12.5
Fluid Resistivity
35 (Ohm-m) 65
Elev.
(Feet)
Heat Pulse Flow Meter
-0.06 (gpm) 0.06
Negative = Flow Down
Positive = Flow Up
485
490
495
-210
-215
-220
-225
no flow detected

HAGER-RICHTER GEOSCIENCE, INC.

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BR-8 - BOREHOLE GEOPHYSICAL LOGS

DATE LOGGED: November 30 & December 1, 2011

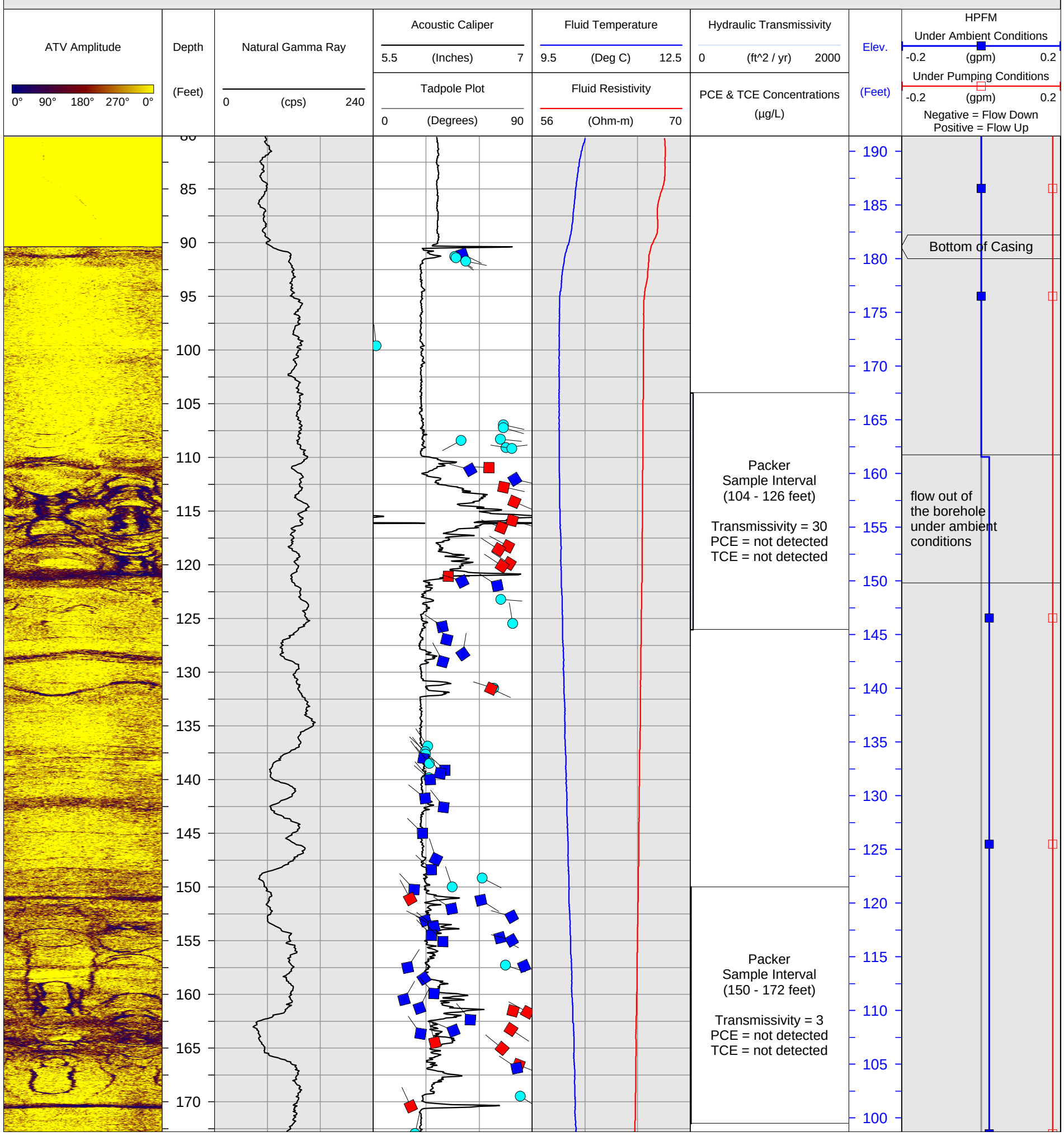
CLIENT:	Weston Solutions, Inc.	H-R FILE:	11RG69
PROJECT:	Borehole Geophysical Logging	LOG DATUM:	Top of the 6-Inch Steel Casing
LOCATION:	Savage Municipal Water Supply Superfund Site	TOP OF CASING ELEVATION:	271.5 Feet
CITY, STATE:	Milford, New Hampshire	ORIENTATION REFERENCE:	True North (Declination = 15 Degrees West)
LOGGING GEOPHYSICISTS:	Nick DeCristofaro & Eric Richert	CASING STICK-UP:	1.5 Feet Above the Ground Surface
CLIENT REP. ON-SITE:	Andrew Fuller	BOREHOLE DIAMETER:	6 Inches
LOGS PROCESSED BY:	Robert Garfield	WATER LEVEL DEPTH:	5.6 Feet

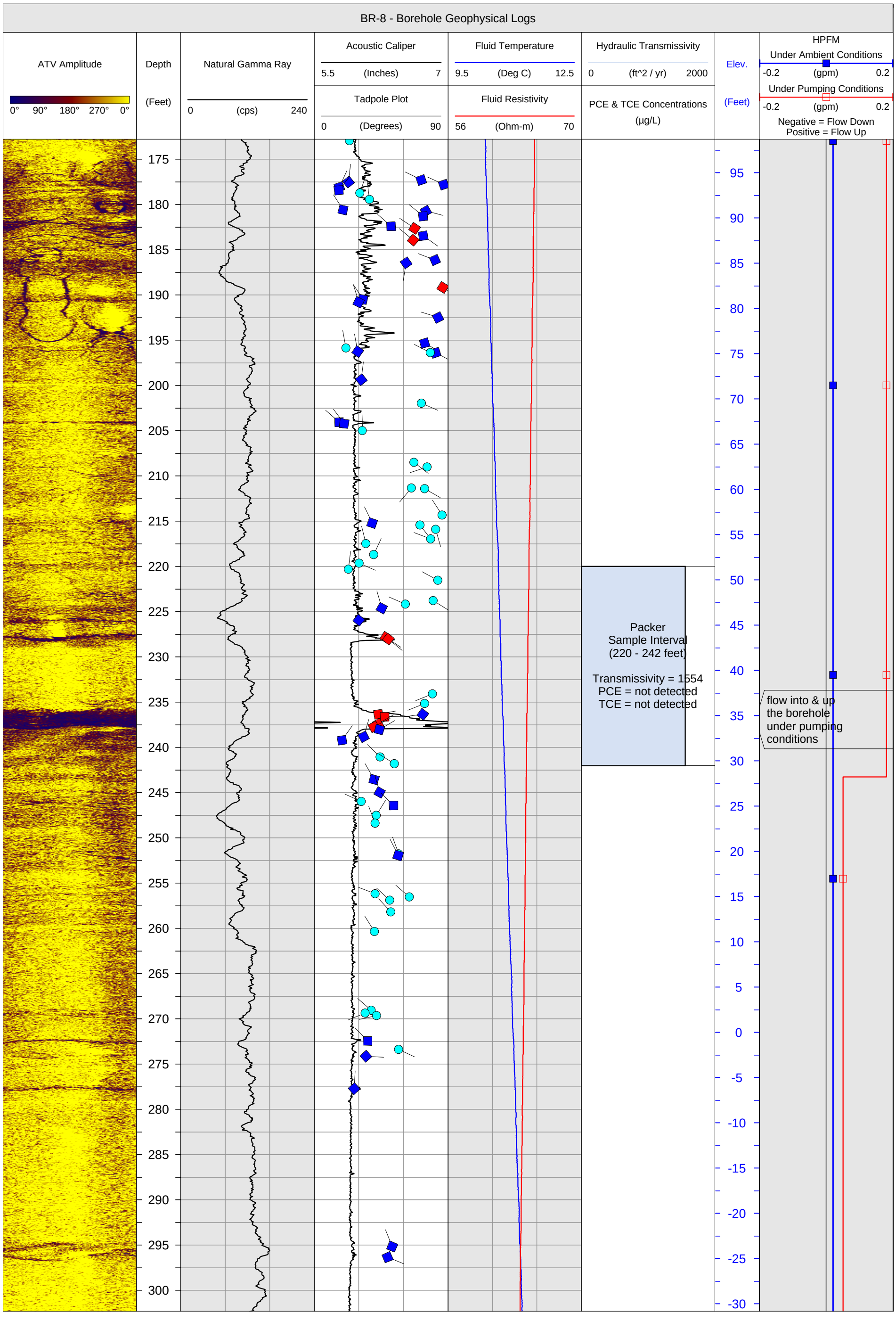
STRUCTURE LEGEND

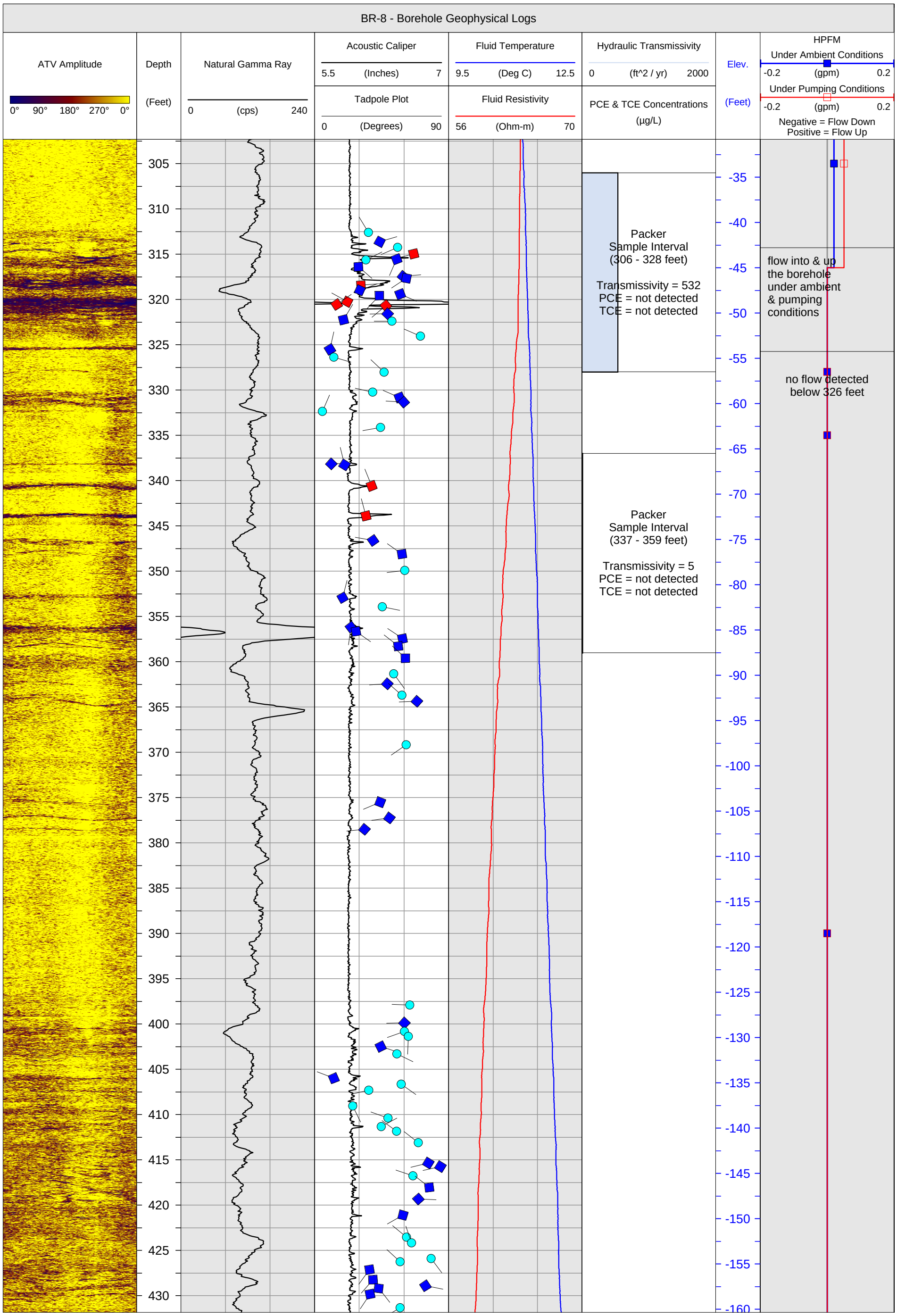
Fracture Rank 1 Fracture Rank 2 Fracture Rank 3

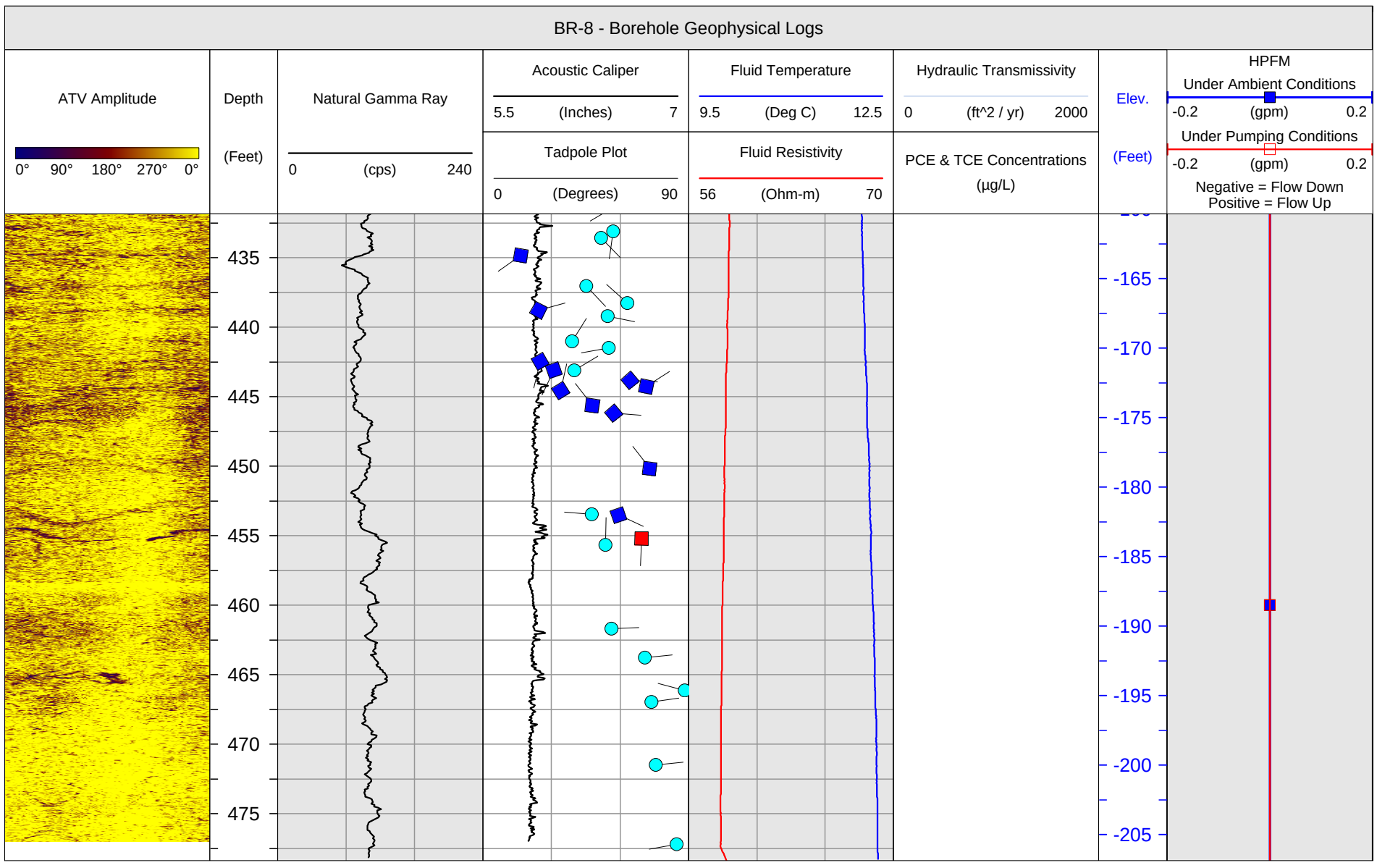
NOTES: During HPFM logging under pumping conditions water was pumped from the borehole at 0.3 gpm from inside the casing.
The hydraulic transmissivity, PCE, and TCE data reported in the logs below were provided by Weston and were acquired during packer testing.

BR-8 - Borehole Geophysical Logs




BR-8 - Borehole Geophysical Logs
ATV Amplitude
0° 90° 180° 270° 0°
Depth
(Feet)
Natural Gamma Ray
0 (cps) 240
Acoustic Caliper
5.5 (Inches) 7
Tadpole Plot
0 (Degrees) 90
Fluid Temperature
9.5 (Deg C) 12.5
Fluid Resistivity
56 (Ohm-m) 70
Hydraulic Transmissivity
0 (ft^2 / yr) 2000
PCE & TCE Concentrations
(µg/L)
Elev.
(Feet)
HPFM
Under Ambient Conditions
-0.2 (gpm) 0.2
Under Pumping Conditions
-0.2 (gpm) 0.2
Negative = Flow Down
Positive = Flow Up
Packer
Sample Interval
(220 - 242 feet)
Transmissivity = 1554
PCE = not detected
TCE = not detected
flow into & up
the borehole
under pumping
conditions


BR-8 - Borehole Geophysical Logs
ATV Amplitude
0° 90° 180° 270° 0°
Depth
(Feet)
Natural Gamma Ray
0 (cps) 240
Acoustic Caliper
5.5 (Inches) 7
Tadpole Plot
0 (Degrees) 90
Fluid Temperature
9.5 (Deg C) 12.5
Fluid Resistivity
56 (Ohm-m) 70
Hydraulic Transmissivity
0 (ft^2 / yr) 2000
PCE & TCE Concentrations
(µg/L)
Elev.
(Feet)
HPFM
Under Ambient Conditions
-0.2 (gpm) 0.2
Under Pumping Conditions
-0.2 (gpm) 0.2
Negative = Flow Down
Positive = Flow Up
Packer
Sample Interval
(306 - 328 feet)
Transmissivity = 532
PCE = not detected
TCE = not detected
Packer
Sample Interval
(337 - 359 feet)
Transmissivity = 5
PCE = not detected
TCE = not detected
flow into & up the borehole under ambient & pumping conditions
no flow detected below 326 feet


BR-8 - Borehole Geophysical Logs
ATV Amplitude
0° 90° 180° 270° 0°
Depth
(Feet)
Natural Gamma Ray
0 (cps) 240
Acoustic Caliper
5.5 (Inches) 7
Tadpole Plot
0 (Degrees) 90
Fluid Temperature
9.5 (Deg C) 12.5
Fluid Resistivity
56 (Ohm-m) 70
Hydraulic Transmissivity
0 (ft^2 / yr) 2000
PCE & TCE Concentrations
(µg/L)
Elev.
(Feet)
HPFM
Under Ambient Conditions
-0.2 (gpm) 0.2
Under Pumping Conditions
-0.2 (gpm) 0.2
Negative = Flow Down
Positive = Flow Up
435
440
445
450
455
460
465
470
475
-165
-170
-175
-180
-185
-190
-195
-200
-205

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BR-9 - BOREHOLE GEOPHYSICAL LOGS

DATE LOGGED: November 29, 2011

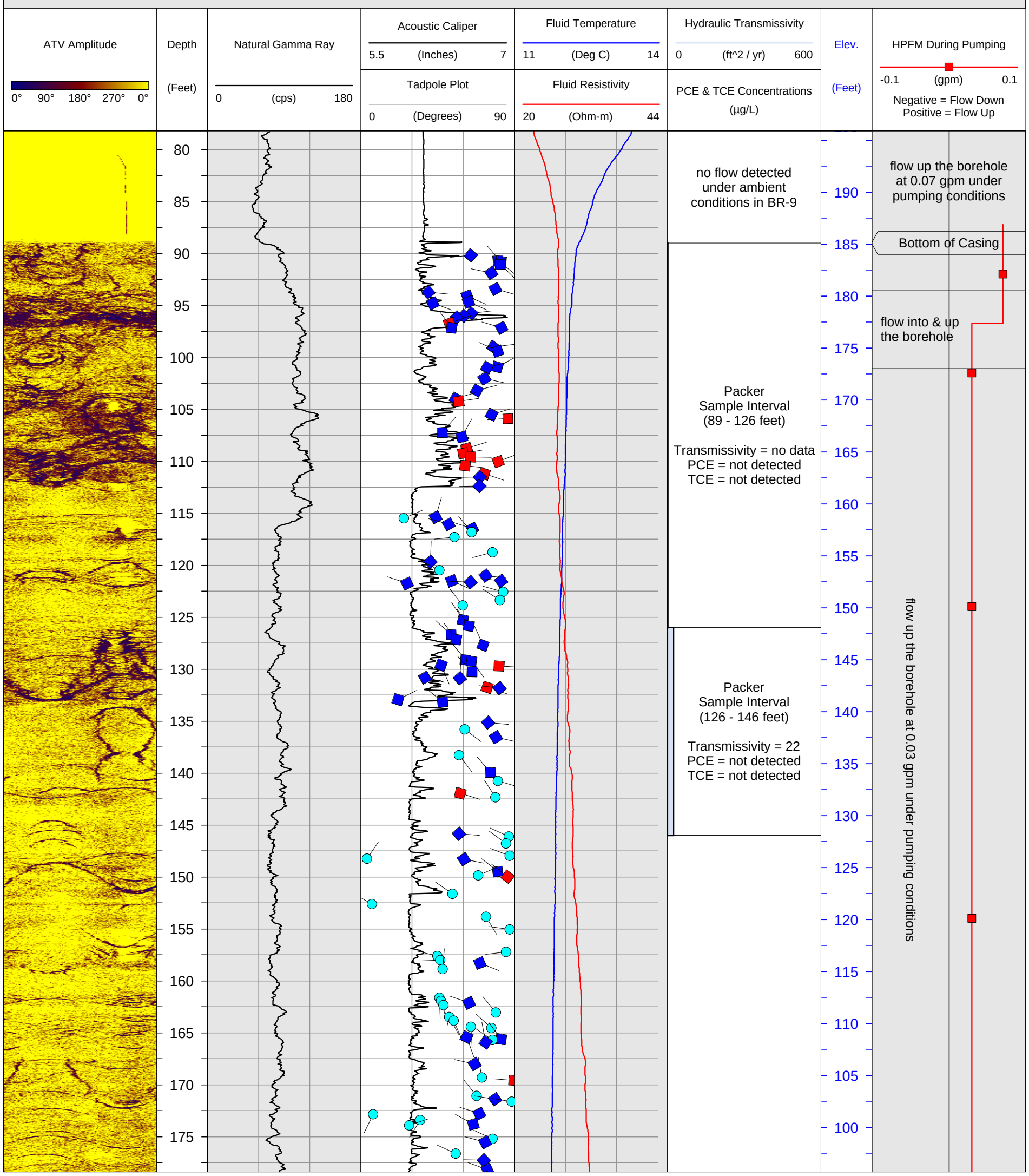
CLIENT:	Weston Solutions, Inc.	H-R FILE:	11RG69
PROJECT:	Borehole Geophysical Logging	LOG DATUM:	Top of the 6-Inch Steel Casing
LOCATION:	Savage Municipal Water Supply Superfund Site	TOP OF CASING ELEVATION:	274.1 Feet
CITY, STATE:	Milford, New Hampshire	ORIENTATION REFERENCE:	True North (Declination = 15 Degrees West)
LOGGING GEOPHYSICISTS:	Nick DeCristofaro & Eric Richert	CASING STICK-UP:	2.1 Feet Above the Ground Surface
CLIENT REP. ON-SITE:	Andrew Fuller	BOREHOLE DIAMETER:	6 Inches
LOGS PROCESSED BY:	Robert Garfield	WATER LEVEL DEPTH:	10.4 Feet

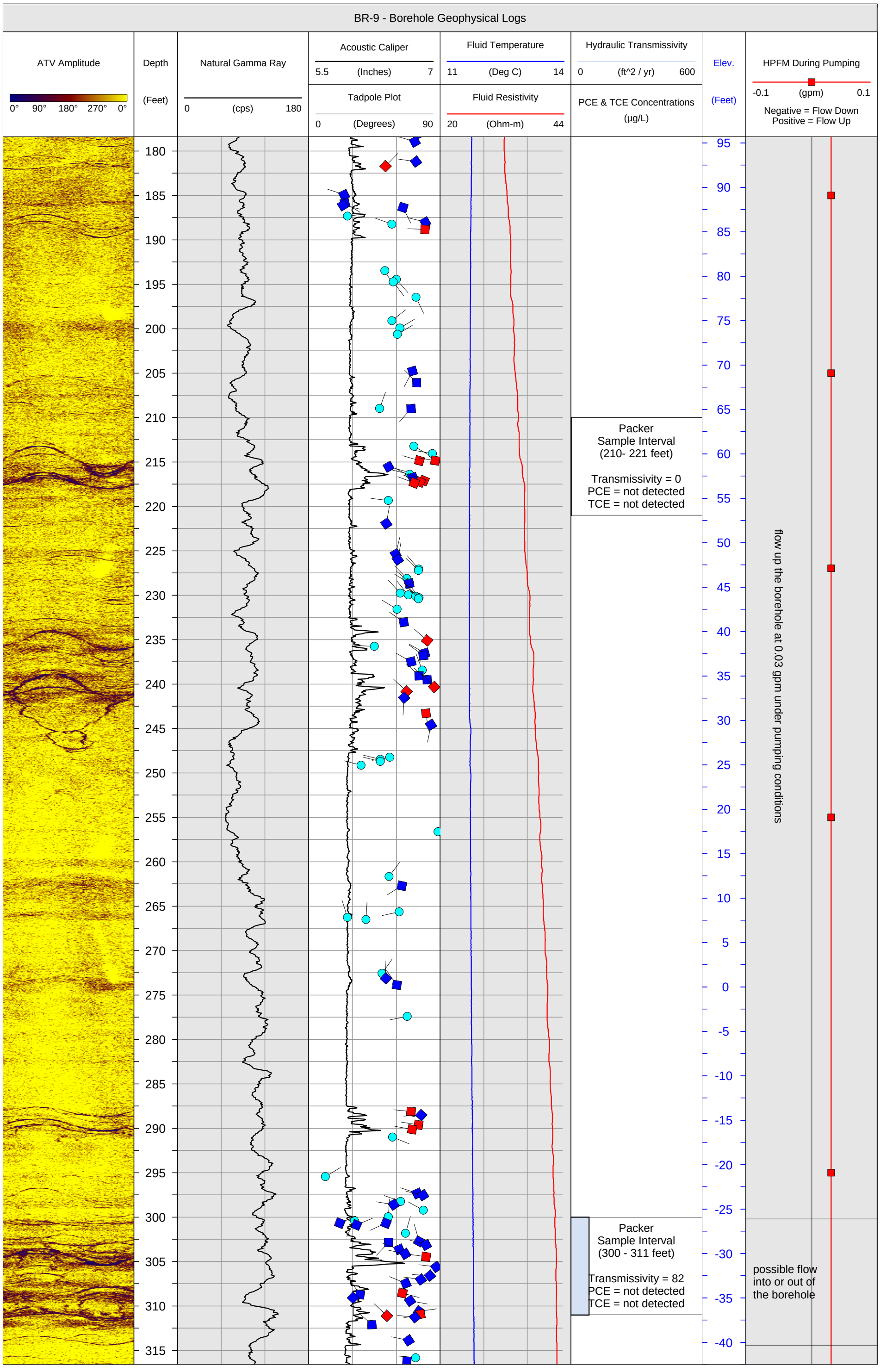
STRUCTURE LEGEND

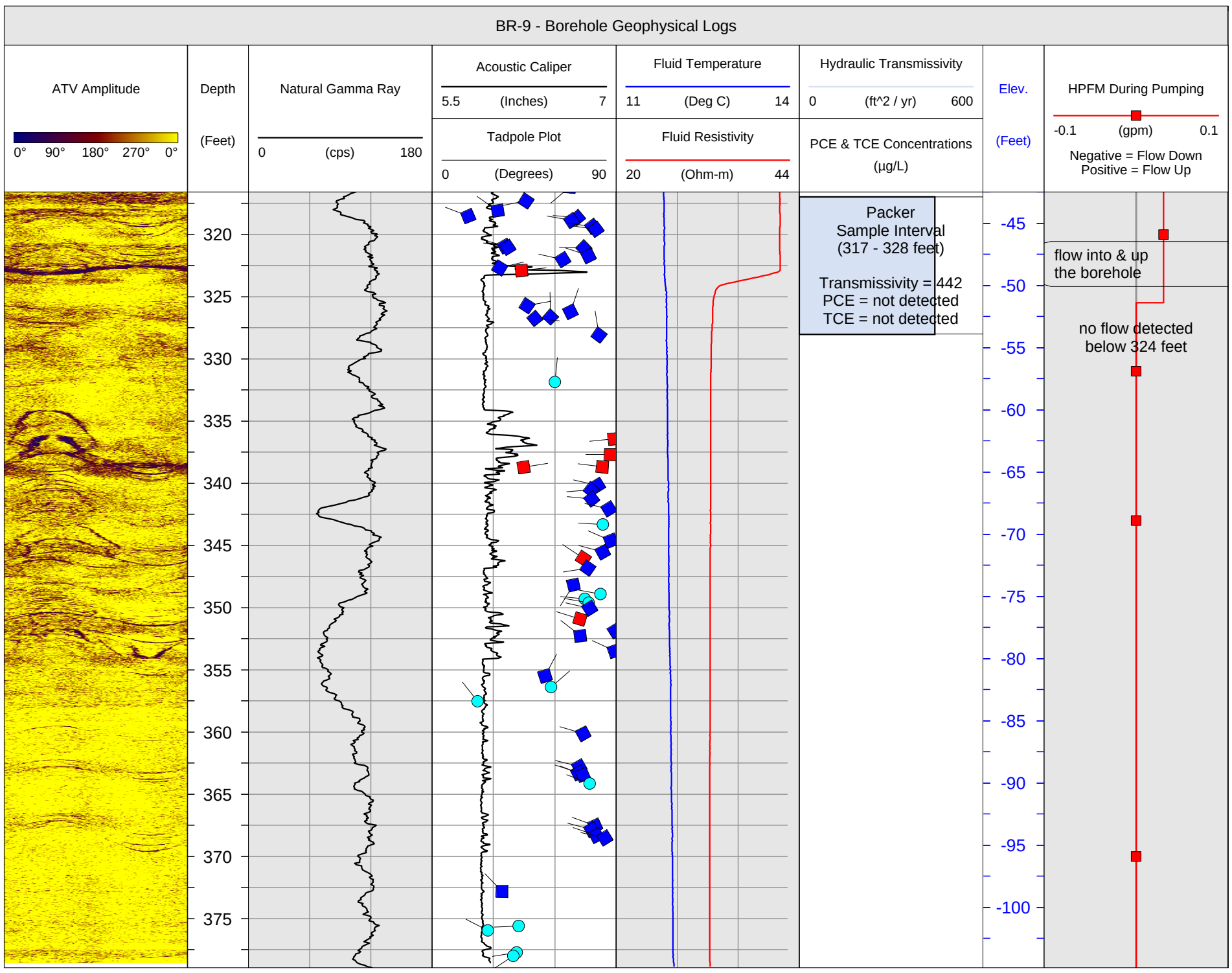
Fracture Rank 1 Fracture Rank 2 Fracture Rank 3

NOTES:
HPFM data under ambient conditions are not plotted in the logs below because flow was not detected under ambient conditions.
During HPFM logging under pumping conditions water was pumped from the borehole at 0.2 gpm from inside the casing.
The hydraulic transmissivity, PCE, and TCE data reported in the logs below were provided by Weston and were acquired during packer testing.

BR-9 - Borehole Geophysical Logs




BR-9 - Borehole Geophysical Logs
ATV Amplitude
0° 90° 180° 270° 0°
Depth
(Feet)
Natural Gamma Ray
0 (cps) 180
Acoustic Caliper
5.5 (Inches) 7
Tadpole Plot
0 (Degrees) 90
Fluid Temperature
11 (Deg C) 14
Fluid Resistivity
20 (Ohm-m) 44
Hydraulic Transmissivity
0 (ft^2 / yr) 600
PCE & TCE Concentrations
(µg/L)
Elev.
(Feet)
HPFM During Pumping
-0.1 (gpm) 0.1
Negative = Flow Down
Positive = Flow Up
Packer
Sample Interval
(210- 221 feet)
Transmissivity = 0
PCE = not detected
TCE = not detected
Packer
Sample Interval
(300 - 311 feet)
Transmissivity = 82
PCE = not detected
TCE = not detected
flow up the borehole at 0.03 gpm under pumping conditions
possible flow
into or out of
the borehole


BR-9 - Borehole Geophysical Logs
ATV Amplitude
0° 90° 180° 270° 0°
Depth
(Feet)
Natural Gamma Ray
0 (cps) 180
Acoustic Caliper
5.5 (Inches) 7
Tadpole Plot
0 (Degrees) 90
Fluid Temperature
11 (Deg C) 14
Fluid Resistivity
20 (Ohm-m) 44
Hydraulic Transmissivity
0 (ft^2 / yr) 600
PCE & TCE Concentrations
(µg/L)
Packer
Sample Interval
(317 - 328 feet)
Transmissivity = 442
PCE = not detected
TCE = not detected
Elev.
(Feet)
HPFM During Pumping
-0.1 (gpm) 0.1
Negative = Flow Down
Positive = Flow Up
flow into & up
the borehole
no flow detected
below 324 feet
320
325
330
335
340
345
350
355
360
365
370
375
-45
-50
-55
-60
-65
-70
-75
-80
-85
-90
-95
-100

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MW-30 - BOREHOLE GEOPHYSICAL LOGS

DATE LOGGED: November 30, 2011 & January 13, 2012

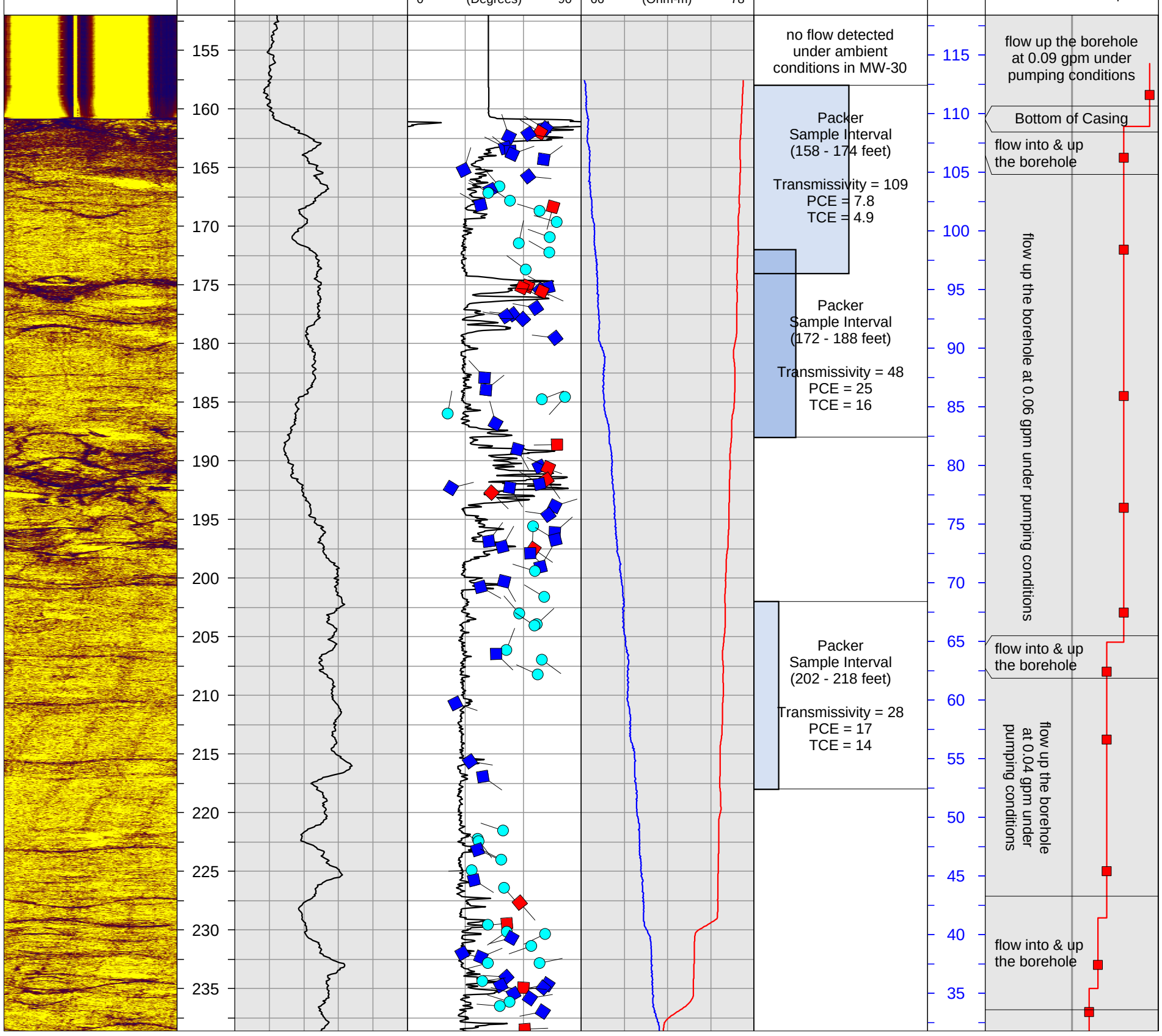
CLIENT:	Weston Solutions, Inc.	H-R FILE:	11RG69
PROJECT:	Borehole Geophysical Logging	LOG DATUM:	Top of the 6-Inch Steel Casing
LOCATION:	Savage Municipal Water Supply Superfund Site	TOP OF CASING ELEVATION:	270.4 Feet
CITY, STATE:	Milford, New Hampshire	ORIENTATION REFERENCE:	True North (Declination = 15 Degrees West)
LOGGING GEOPHYSICISTS:	Nick DeCristofaro & Micheal Howley	CASING STICK-UP:	2.1 Feet Above the Ground Surface
CLIENT REP. ON-SITE:	Andrew Fuller	BOREHOLE DIAMETER:	6 Inches
LOGS PROCESSED BY:	Robert Garfield	WATER LEVEL DEPTH:	8.0 Feet

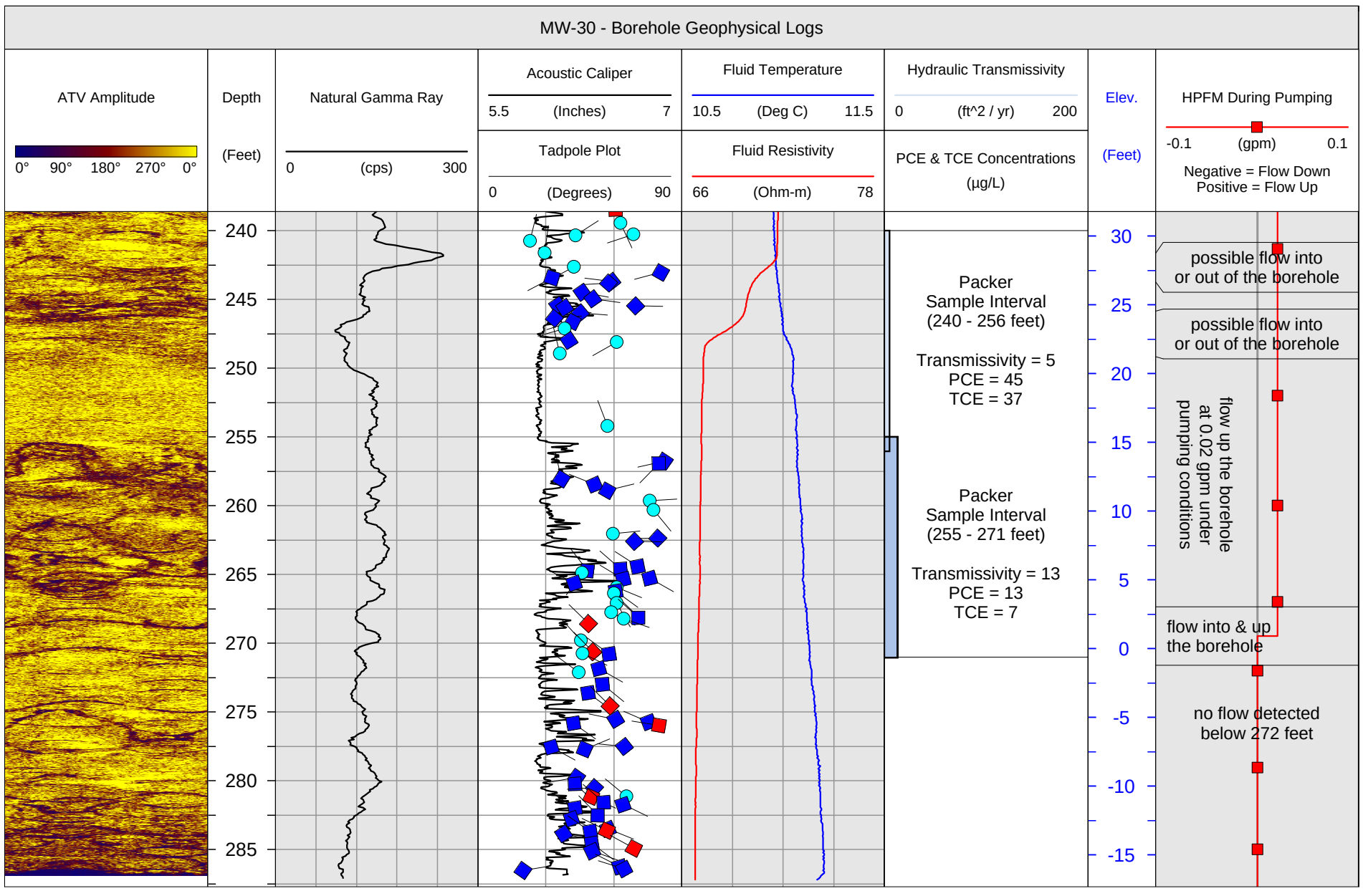
STRUCTURE LEGEND

Fracture Rank 1 Fracture Rank 2 Fracture Rank 3

NOTES:
HPFM data under ambient conditions are not plotted in the logs below because flow was not detected under ambient conditions.
During HPFM logging under pumping conditions water was pumped from the borehole at 0.2 gpm from inside the casing.
The hydraulic transmissivity, PCE, and TCE data reported in the logs below were provided by Weston and were acquired during packer testing.
Borehole MW-30 was blocked at 288 feet at the time of logging.

MW-30 - Borehole Geophysical Logs




MW-30 - Borehole Geophysical Logs
ATV Amplitude
0° 90° 180° 270° 0°
Depth
(Feet)
Natural Gamma Ray
0 (cps) 300
Acoustic Caliper
5.5 (Inches) 7
Tadpole Plot
0 (Degrees) 90
Fluid Temperature
10.5 (Deg C) 11.5
Fluid Resistivity
66 (Ohm-m) 78
Hydraulic Transmissivity
0 (ft^2 / yr) 200
PCE & TCE Concentrations
(µg/L)
Elev.
(Feet)
HPFM During Pumping
-0.1 (gpm) 0.1
Negative = Flow Down
Positive = Flow Up
240
245
250
255
260
265
270
275
280
285
30
25
20
15
10
5
0
-5
-10
-15
Packer
Sample Interval
(240 - 256 feet)
Transmissivity = 5
PCE = 45
TCE = 37
Packer
Sample Interval
(255 - 271 feet)
Transmissivity = 13
PCE = 13
TCE = 7
possible flow into
or out of the borehole
possible flow into
or out of the borehole
flow up the borehole
at 0.02 gpm under
pumping conditions
flow into & up
the borehole
no flow detected
below 272 feet

APPENDIX 2

BEDROCK STRUCTURE STATISTICS PLOTS

HAGER-RICHTER GEOSCIENCE, INC.

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BR-7 - FRACTURE STATISTICS PLOTS

DATE LOGGED: Nov. 14, 29, & 30, 2011

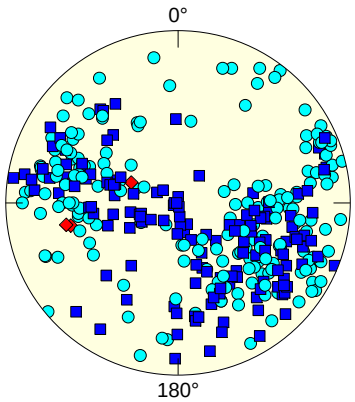
CLIENT:	Weston Solutions, Inc.	H-R FILE:	11RG69
PROJECT:	Savage Municipal Water Supply Superfund Site	ORIENTATION REFERENCE:	True North
CITY, STATE:	Milford, New Hampshire	MAGNETIC DECLINATION:	15 Degrees West

STRUCTURE LEGEND

Fracture Rank 1 ● Fracture Rank 2 ■ Fracture Rank 3 ◆

Stereogram - Lower Hemisphere of Fractures

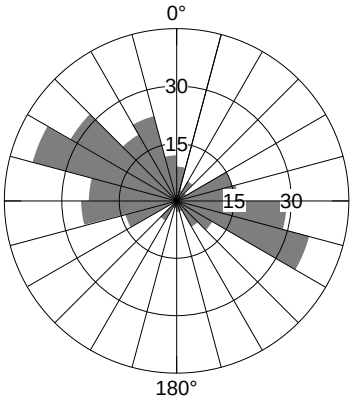
Schmidt Plot - LH - Bedrock Structures



	Counts	Dip[deg]	Azi[deg]
Mean	341	52.61	328.36
■	147	47.38	344.90
◆	3	44.91	90.06
●	191	56.67	297.59

Dip Azimuth Rose Diagram of Fractures

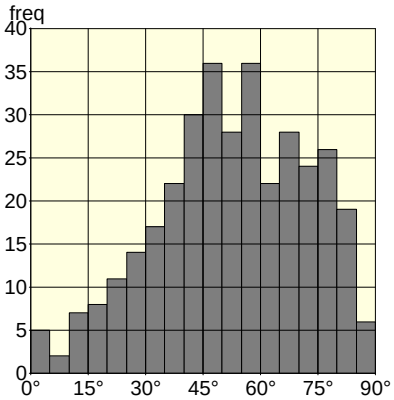
Azimuth - Absolute (Count)



Counts:	341.00
Mean:	328.36
Std.Dev.:	103.64
Min:	0.46
Max:	354.47

Dip Angle Histogram of Fractures

Dip Histogram (Count)



Counts:	341.00
Mean:	52.61
Std.Dev.:	19.70
Min:	0.80
Max:	88.59

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BR-8 - FRACTURE STATISTICS PLOTS

DATE LOGGED: Nov. 30 & Dec. 1, 2011

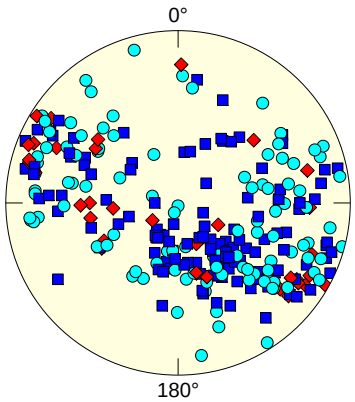
CLIENT:	Weston Solutions, Inc.	H-R FILE:	11RG69
PROJECT:	Savage Municipal Water Supply Superfund Site	ORIENTATION REFERENCE:	True North
CITY, STATE:	Milford, New Hampshire	MAGNETIC DECLINATION:	15 Degrees West

STRUCTURE LEGEND

Fracture Rank 1 ● Fracture Rank 2 ■ Fracture Rank 3 ◆

Stereogram - Lower Hemisphere of Fractures

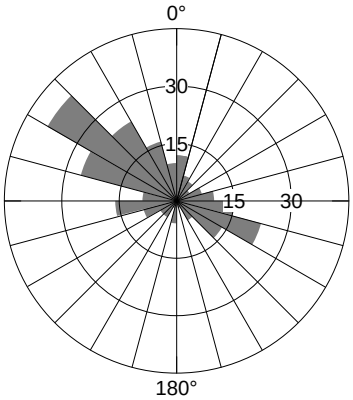
Schmidt Plot - LH - Bedrock Structures



	Counts	Dip[deg]	Azi[deg]
Mean	273	50.73	328.35
■	128	45.79	324.42
●	109	54.21	323.38
◆	36	57.74	24.17

Dip Azimuth Rose Diagram of Fractures

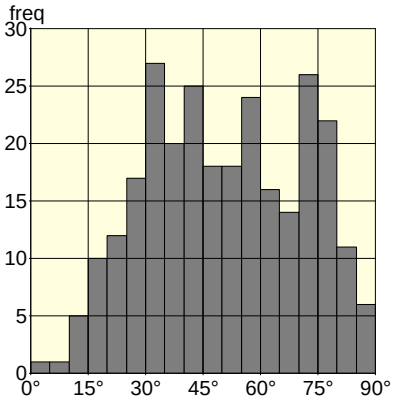
Azimuth - Absolute (Count)



Counts:	273.00
Mean:	328.35
Std.Dev.:	92.80
Min:	0.77
Max:	354.62

Dip Angle Histogram of Fractures

Dip Histogram (Count)



Counts:	273.00
Mean:	50.73
Std.Dev.:	20.10
Min:	1.70
Max:	88.42

HAGER-RICHTER GEOSCIENCE, INC.

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BR-9 - FRACTURE STATISTICS PLOTS

DATE LOGGED: November 29, 2011

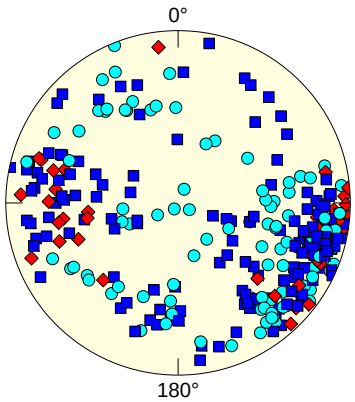
CLIENT:	Weston Solutions, Inc.	H-R FILE:	11RG69
PROJECT:	Savage Municipal Water Supply Superfund Site	ORIENTATION REFERENCE:	True North
CITY, STATE:	Milford, New Hampshire	MAGNETIC DECLINATION:	15 Degrees West

STRUCTURE LEGEND

Fracture Rank 1 ● Fracture Rank 2 ■ Fracture Rank 3 ◆

Stereogram - Lower Hemisphere of Fractures

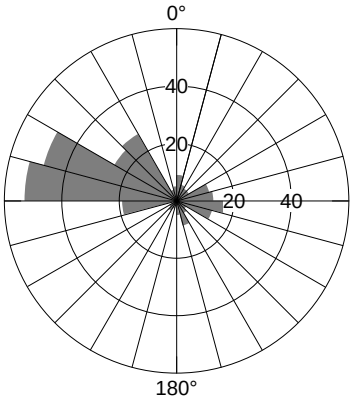
Schmidt Plot - LH - Bedrock Structures



	Counts	Dip[deg]	Azi[deg]
Mean	297	64.22	303.95
■	159	65.04	304.28
◆	39	72.01	313.51
●	99	59.71	301.18

Dip Azimuth Rose Diagram of Fractures

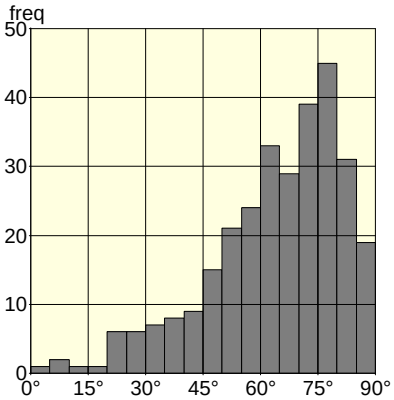
Azimuth - Absolute (Count)



Counts:	297.00
Mean:	303.95
Std.Dev.:	82.25
Min:	2.36
Max:	359.34

Dip Angle Histogram of Fractures

Dip Histogram (Count)



Counts:	297.00
Mean:	64.22
Std.Dev.:	17.34
Min:	3.54
Max:	89.53

HAGER-RICHTER GEOSCIENCE, INC.

8 Industrial Way - D10
Salem, NH 03079
Phone: 603-893-9944
Fax: 603-893-8313

MW-30 - FRACTURE STATISTICS PLOTS

DATE LOGGED: Nov. 2011 & Jan. 2012

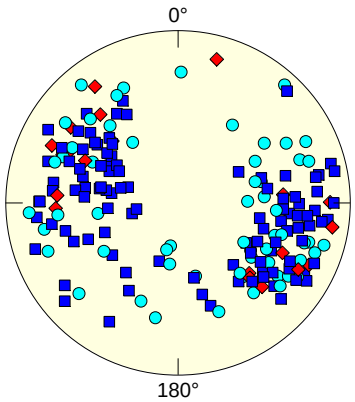
CLIENT:	Weston Solutions, Inc.	H-R FILE:	11RG69
PROJECT:	Savage Municipal Water Supply Superfund Site	ORIENTATION REFERENCE:	True North
CITY, STATE:	Milford, New Hampshire	MAGNETIC DECLINATION:	15 Degrees West

STRUCTURE LEGEND

Fracture Rank 1 ● Fracture Rank 2 ■ Fracture Rank 3 ◆

Stereogram - Lower Hemisphere of Fractures

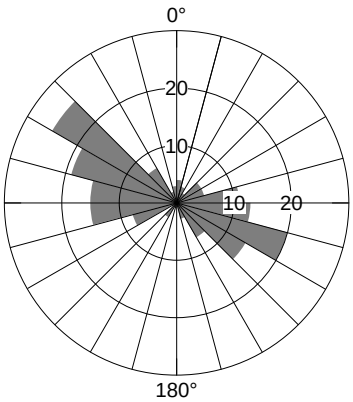
Schmidt Plot - LH - Bedrock Structures



	Counts	Dip[deg]	Azi[deg]
Mean	187	55.51	311.53
■	107	54.15	1.99
◆	21	62.44	197.91
●	59	55.48	294.70

Dip Azimuth Rose Diagram of Fractures

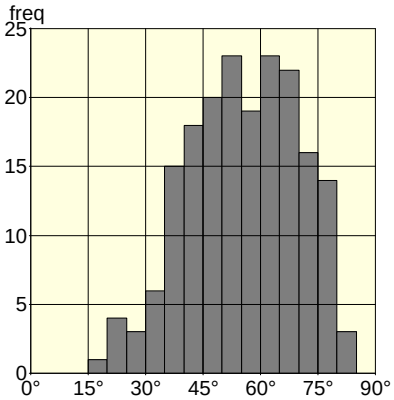
Azimuth - Absolute (Count)



Counts:	187.00
Mean:	311.53
Std.Dev.:	123.58
Min:	7.93
Max:	347.60

Dip Angle Histogram of Fractures

Dip Histogram (Count)



Counts:	187.00
Mean:	55.51
Std.Dev.:	14.25
Min:	19.89
Max:	82.36

APPENDIX 3

TABLES OF BEDROCK STRUCTURES

HAGER-RICHTER GEOSCIENCE, INC.	
BR-7 - TABLE OF BEDROCK STRUCTURES	
CLIENT	Weston Solutions, Inc.
PROJECT	Savage Municipal Water Supply Superfund Site
CITY, STATE	Milford, New Hampshire
H-R FILE	11RG69
DATE LOGGED	November 14, 29, & 30, 2011
LOG DATUM	Top of the 6-Inch Steel Casing (TOC)
TOC ELEVATION	270.6 Feet
DIP AZIMUTH	Referenced to True North
DECLINATION	15 Degrees West
DIP ANGLE	Measured from Horizontal

BR-7 - TABLE OF BEDROCK STRUCTURES

Depth (feet)	Elevation (feet)	Dip Azimuth (degrees)	Dip Angle (degrees)	Bedrock Structure Category
112.0	158.7	62	26	Fracture Rank 2
115.2	155.4	348	14	Fracture Rank 2
115.9	154.7	78	54	Fracture Rank 3
116.3	154.3	79	56	Fracture Rank 3
118.4	152.2	293	54	Fracture Rank 1
118.7	151.9	94	78	Fracture Rank 1
120.2	150.4	101	80	Fracture Rank 2
120.2	150.4	14	81	Fracture Rank 1
122.6	148.1	104	71	Fracture Rank 1
123.7	146.9	339	33	Fracture Rank 2
127.7	142.9	269	47	Fracture Rank 1
132.2	138.4	215	58	Fracture Rank 1
135.4	135.2	105	72	Fracture Rank 1
137.7	133.0	4	69	Fracture Rank 1
138.0	132.6	202	73	Fracture Rank 1
139.3	131.3	189	40	Fracture Rank 1
141.0	129.6	211	81	Fracture Rank 1
141.8	128.8	288	34	Fracture Rank 1
142.8	127.8	2	50	Fracture Rank 2
143.0	127.6	198	71	Fracture Rank 1
143.1	127.5	342	52	Fracture Rank 2
143.3	127.3	336	46	Fracture Rank 2
143.9	126.7	336	53	Fracture Rank 1
144.9	125.7	337	35	Fracture Rank 1
145.1	125.5	148	75	Fracture Rank 1
146.5	124.1	1	47	Fracture Rank 1
147.5	123.1	302	55	Fracture Rank 1
148.4	122.2	310	54	Fracture Rank 1
149.1	121.5	287	38	Fracture Rank 1
149.3	121.3	274	39	Fracture Rank 1
149.8	120.8	292	44	Fracture Rank 1
151.5	119.1	269	43	Fracture Rank 1

BR-7 - TABLE OF BEDROCK STRUCTURES

Depth (feet)	Elevation (feet)	Dip Azimuth (degrees)	Dip Angle (degrees)	Bedrock Structure Category
152.0	118.7	267	59	Fracture Rank 1
152.2	118.4	265	50	Fracture Rank 1
152.5	118.1	262	36	Fracture Rank 2
154.0	116.6	259	43	Fracture Rank 1
155.0	115.7	274	44	Fracture Rank 2
155.2	115.4	268	49	Fracture Rank 1
156.3	114.3	95	75	Fracture Rank 1
159.7	110.9	252	28	Fracture Rank 1
163.4	107.2	273	55	Fracture Rank 1
165.4	105.2	256	67	Fracture Rank 1
167.0	103.6	265	59	Fracture Rank 1
168.7	101.9	273	48	Fracture Rank 1
169.4	101.2	280	43	Fracture Rank 2
169.8	100.8	258	39	Fracture Rank 1
170.5	100.1	256	23	Fracture Rank 1
171.5	99.1	269	44	Fracture Rank 2
171.8	98.9	269	45	Fracture Rank 1
172.4	98.2	257	71	Fracture Rank 1
173.0	97.6	218	17	Fracture Rank 2
174.8	95.8	294	29	Fracture Rank 1
175.0	95.6	316	26	Fracture Rank 2
182.7	87.9	335	26	Fracture Rank 2
183.9	86.7	320	29	Fracture Rank 1
184.1	86.6	303	29	Fracture Rank 1
185.5	85.1	101	69	Fracture Rank 1
185.9	84.7	319	20	Fracture Rank 2
187.6	83.0	337	36	Fracture Rank 2
204.6	66.0	328	46	Fracture Rank 2
210.3	60.3	306	49	Fracture Rank 1
211.6	59.0	125	42	Fracture Rank 1
213.4	57.2	337	11	Fracture Rank 2
213.5	57.2	353	11	Fracture Rank 2
214.2	56.4	297	40	Fracture Rank 1
215.8	54.8	310	38	Fracture Rank 1
217.7	52.9	308	38	Fracture Rank 1
219.8	50.8	135	63	Fracture Rank 1
221.4	49.2	308	56	Fracture Rank 1
222.5	48.1	304	39	Fracture Rank 1
222.8	47.8	107	50	Fracture Rank 1
223.8	46.8	286	26	Fracture Rank 1
224.9	45.8	103	57	Fracture Rank 2
225.9	44.8	108	64	Fracture Rank 1
226.0	44.6	278	67	Fracture Rank 1
226.7	44.0	308	44	Fracture Rank 1
227.4	43.3	293	46	Fracture Rank 2

BR-7 - TABLE OF BEDROCK STRUCTURES

Depth (feet)	Elevation (feet)	Dip Azimuth (degrees)	Dip Angle (degrees)	Bedrock Structure Category
227.6	43.0	95	59	Fracture Rank 2
230.9	39.8	303	48	Fracture Rank 1
233.0	37.6	112	47	Fracture Rank 1
235.2	35.5	95	73	Fracture Rank 2
237.4	33.2	319	43	Fracture Rank 2
237.5	33.1	113	56	Fracture Rank 1
241.9	28.7	307	40	Fracture Rank 2
243.1	27.5	279	42	Fracture Rank 2
243.6	27.0	281	40	Fracture Rank 2
244.0	26.6	301	37	Fracture Rank 2
245.3	25.3	290	31	Fracture Rank 2
245.8	24.8	290	31	Fracture Rank 2
246.1	24.5	304	45	Fracture Rank 2
246.5	24.1	296	44	Fracture Rank 2
248.2	22.5	291	38	Fracture Rank 2
248.5	22.1	280	34	Fracture Rank 2
250.8	19.8	322	35	Fracture Rank 1
251.4	19.2	288	37	Fracture Rank 2
251.5	19.1	293	35	Fracture Rank 1
254.3	16.3	331	47	Fracture Rank 1
254.8	15.8	336	53	Fracture Rank 1
255.4	15.2	317	53	Fracture Rank 1
257.2	13.4	310	49	Fracture Rank 1
257.7	12.9	321	46	Fracture Rank 2
258.3	12.3	299	45	Fracture Rank 1
258.8	11.8	127	73	Fracture Rank 1
259.3	11.3	294	27	Fracture Rank 2
259.9	10.7	171	74	Fracture Rank 1
264.8	5.8	112	49	Fracture Rank 1
266.8	3.8	296	31	Fracture Rank 2
267.3	3.3	273	57	Fracture Rank 1
267.9	2.8	279	48	Fracture Rank 1
269.2	1.4	280	59	Fracture Rank 1
270.8	-0.2	282	57	Fracture Rank 2
270.9	-0.3	266	59	Fracture Rank 2
271.0	-0.4	94	67	Fracture Rank 1
271.4	-0.8	299	48	Fracture Rank 2
274.8	-4.2	111	30	Fracture Rank 1
277.2	-6.6	331	42	Fracture Rank 2
278.0	-7.4	113	67	Fracture Rank 1
279.3	-8.7	333	43	Fracture Rank 1
280.5	-9.9	114	54	Fracture Rank 1
288.3	-17.7	133	78	Fracture Rank 1
289.4	-18.8	72	36	Fracture Rank 2
289.8	-19.2	305	57	Fracture Rank 1

BR-7 - TABLE OF BEDROCK STRUCTURES

Depth (feet)	Elevation (feet)	Dip Azimuth (degrees)	Dip Angle (degrees)	Bedrock Structure Category
291.2	-20.6	320	61	Fracture Rank 2
291.5	-20.9	312	57	Fracture Rank 2
291.8	-21.2	290	56	Fracture Rank 2
292.3	-21.7	295	56	Fracture Rank 2
292.5	-21.9	277	56	Fracture Rank 2
294.2	-23.6	90	80	Fracture Rank 1
294.4	-23.8	324	44	Fracture Rank 2
297.2	-26.6	90	57	Fracture Rank 1
298.5	-27.9	176	58	Fracture Rank 1
298.7	-28.1	82	49	Fracture Rank 1
298.9	-28.3	153	44	Fracture Rank 1
299.4	-28.8	317	63	Fracture Rank 1
300.0	-29.4	74	50	Fracture Rank 1
300.2	-29.6	110	51	Fracture Rank 1
300.5	-29.9	118	40	Fracture Rank 1
301.4	-30.8	84	49	Fracture Rank 1
302.3	-31.7	117	12	Fracture Rank 2
302.8	-32.2	34	48	Fracture Rank 1
305.6	-35.0	129	29	Fracture Rank 1
305.8	-35.2	354	20	Fracture Rank 1
312.2	-41.6	107	33	Fracture Rank 1
312.3	-41.7	296	75	Fracture Rank 1
313.3	-42.7	291	67	Fracture Rank 1
315.1	-44.5	140	60	Fracture Rank 2
319.4	-48.8	300	62	Fracture Rank 2
320.8	-50.2	37	38	Fracture Rank 2
322.4	-51.8	339	45	Fracture Rank 1
322.7	-52.1	293	79	Fracture Rank 1
325.0	-54.4	251	79	Fracture Rank 2
325.8	-55.2	278	61	Fracture Rank 1
326.9	-56.3	283	66	Fracture Rank 1
328.3	-57.7	180	3	Fracture Rank 2
330.0	-59.4	3	15	Fracture Rank 2
332.9	-62.3	309	80	Fracture Rank 1
336.5	-65.9	316	79	Fracture Rank 2
337.2	-66.6	301	80	Fracture Rank 1
339.2	-68.6	89	51	Fracture Rank 1
339.8	-69.2	75	41	Fracture Rank 1
340.4	-69.8	85	43	Fracture Rank 1
343.9	-73.3	87	48	Fracture Rank 1
344.7	-74.1	109	21	Fracture Rank 1
345.0	-74.4	88	59	Fracture Rank 1
345.6	-75.0	121	61	Fracture Rank 1
346.5	-75.9	312	67	Fracture Rank 1
346.6	-76.0	322	77	Fracture Rank 1

BR-7 - TABLE OF BEDROCK STRUCTURES

Depth (feet)	Elevation (feet)	Dip Azimuth (degrees)	Dip Angle (degrees)	Bedrock Structure Category
347.7	-77.1	271	33	Fracture Rank 1
347.9	-77.3	276	37	Fracture Rank 2
349.6	-79.0	214	72	Fracture Rank 1
351.6	-81.0	323	67	Fracture Rank 2
352.5	-81.9	292	74	Fracture Rank 1
355.2	-84.6	66	66	Fracture Rank 1
355.3	-84.7	110	33	Fracture Rank 2
356.0	-85.4	136	45	Fracture Rank 2
356.4	-85.8	340	19	Fracture Rank 2
357.0	-86.4	311	70	Fracture Rank 2
357.5	-86.9	80	31	Fracture Rank 2
359.3	-88.7	45	50	Fracture Rank 2
360.0	-89.4	328	42	Fracture Rank 1
361.9	-91.3	351	55	Fracture Rank 1
363.8	-93.2	115	59	Fracture Rank 1
365.8	-95.2	62	20	Fracture Rank 1
366.0	-95.4	63	20	Fracture Rank 2
366.4	-95.8	153	42	Fracture Rank 1
367.5	-96.9	30	12	Fracture Rank 1
368.5	-97.9	117	72	Fracture Rank 1
369.6	-99.0	125	60	Fracture Rank 1
370.3	-99.7	141	59	Fracture Rank 2
370.66	-100.1	352	7	Fracture Rank 2
372	-101.4	280	76	Fracture Rank 1
372.93	-102.3	60	3	Fracture Rank 2
373.14	-102.5	40	11	Fracture Rank 2
373.96	-103.4	121	76	Fracture Rank 2
375.26	-104.7	101	65	Fracture Rank 2
375.74	-105.1	286	60	Fracture Rank 2
376.39	-105.8	79	23	Fracture Rank 2
376.77	-106.2	105	71	Fracture Rank 1
377.32	-106.7	290	66	Fracture Rank 2
377.85	-107.3	284	65	Fracture Rank 2
379.04	-108.4	101	52	Fracture Rank 2
379.23	-108.6	115	69	Fracture Rank 2
380.44	-109.8	348	77	Fracture Rank 2
380.79	-110.2	109	58	Fracture Rank 2
381.06	-110.5	112	50	Fracture Rank 2
381.11	-110.5	115	62	Fracture Rank 2
381.67	-111.1	310	65	Fracture Rank 2
383.3	-112.7	68	72	Fracture Rank 1
383.44	-112.8	73	19	Fracture Rank 2
386.83	-116.2	155	43	Fracture Rank 1
387.66	-117.1	113	37	Fracture Rank 1
389.77	-119.2	73	18	Fracture Rank 2

BR-7 - TABLE OF BEDROCK STRUCTURES

Depth (feet)	Elevation (feet)	Dip Azimuth (degrees)	Dip Angle (degrees)	Bedrock Structure Category
389.92	-119.3	102	40	Fracture Rank 1
389.94	-119.3	300	71	Fracture Rank 1
390.3	-119.7	123	63	Fracture Rank 1
391.35	-120.8	80	44	Fracture Rank 1
391.76	-121.2	90	51	Fracture Rank 1
392.53	-121.9	119	67	Fracture Rank 2
393.39	-122.8	107	50	Fracture Rank 1
393.7	-123.1	138	56	Fracture Rank 1
395.69	-125.1	267	54	Fracture Rank 1
396.36	-125.8	345	2	Fracture Rank 2
396.5	-125.9	95	2	Fracture Rank 2
396.72	-126.1	105	46	Fracture Rank 2
397.0	-126.4	99	56	Fracture Rank 1
397.4	-126.8	105	52	Fracture Rank 1
397.8	-127.2	130	10	Fracture Rank 2
397.8	-127.2	90	53	Fracture Rank 1
398.6	-128.0	116	65	Fracture Rank 1
399.0	-128.4	116	61	Fracture Rank 1
399.7	-129.1	106	36	Fracture Rank 2
400.7	-130.1	333	81	Fracture Rank 1
400.7	-130.1	32	75	Fracture Rank 2
401.0	-130.4	343	31	Fracture Rank 2
401.7	-131.1	136	72	Fracture Rank 1
402.3	-131.7	66	47	Fracture Rank 1
403.7	-133.1	97	31	Fracture Rank 2
404.4	-133.8	99	75	Fracture Rank 2
404.6	-134.0	74	1	Fracture Rank 2
404.9	-134.3	108	45	Fracture Rank 2
405.6	-135.0	292	54	Fracture Rank 1
406.6	-136.0	139	57	Fracture Rank 1
407.4	-136.8	105	48	Fracture Rank 1
407.8	-137.2	105	34	Fracture Rank 2
408.1	-137.5	114	25	Fracture Rank 3
408.4	-137.8	276	85	Fracture Rank 1
408.6	-138.0	148	58	Fracture Rank 2
410.3	-139.7	86	69	Fracture Rank 1
410.5	-139.9	261	67	Fracture Rank 1
410.8	-140.2	1	80	Fracture Rank 2
412.3	-141.7	58	48	Fracture Rank 1
412.4	-141.8	296	75	Fracture Rank 1
413.4	-142.8	99	86	Fracture Rank 2
415.4	-144.8	82	41	Fracture Rank 2
415.5	-144.9	102	28	Fracture Rank 1
416.4	-145.8	24	62	Fracture Rank 1
417.0	-146.4	218	87	Fracture Rank 1

BR-7 - TABLE OF BEDROCK STRUCTURES

Depth (feet)	Elevation (feet)	Dip Azimuth (degrees)	Dip Angle (degrees)	Bedrock Structure Category
417.4	-146.8	294	72	Fracture Rank 1
417.9	-147.3	99	51	Fracture Rank 2
418.9	-148.3	115	18	Fracture Rank 1
419.3	-148.7	87	43	Fracture Rank 2
420.1	-149.5	102	62	Fracture Rank 1
421.0	-150.4	107	31	Fracture Rank 2
422.6	-152.0	112	51	Fracture Rank 2
423.8	-153.2	87	42	Fracture Rank 2
423.9	-153.3	106	32	Fracture Rank 2
424.2	-153.6	58	15	Fracture Rank 2
424.3	-153.7	132	46	Fracture Rank 2
424.4	-153.8	70	19	Fracture Rank 2
424.9	-154.3	249	77	Fracture Rank 2
426.5	-155.9	7	68	Fracture Rank 1
428.7	-158.1	28	54	Fracture Rank 2
429.0	-158.4	104	70	Fracture Rank 2
430.0	-159.4	102	22	Fracture Rank 2
430.2	-159.6	114	30	Fracture Rank 2
430.7	-160.1	178	41	Fracture Rank 2
431.1	-160.5	328	80	Fracture Rank 2
433.1	-162.5	292	88	Fracture Rank 2
433.4	-162.8	306	65	Fracture Rank 2
434.0	-163.4	286	70	Fracture Rank 2
434.7	-164.1	291	76	Fracture Rank 2
434.9	-164.3	296	57	Fracture Rank 2
435.8	-165.2	287	61	Fracture Rank 2
436.3	-165.7	296	69	Fracture Rank 2
437.4	-166.8	310	70	Fracture Rank 2
437.6	-167.0	308	69	Fracture Rank 2
438.1	-167.5	304	60	Fracture Rank 2
438.8	-168.2	308	67	Fracture Rank 2
440.0	-169.4	303	85	Fracture Rank 1
440.6	-170.0	0	66	Fracture Rank 2
441.1	-170.5	247	70	Fracture Rank 1
442.7	-172.1	1	54	Fracture Rank 2
443.3	-172.7	335	49	Fracture Rank 2
445.7	-175.1	105	62	Fracture Rank 1
446.8	-176.2	299	84	Fracture Rank 1
447.3	-176.7	257	78	Fracture Rank 2
447.9	-177.3	260	80	Fracture Rank 1
447.9	-177.3	316	59	Fracture Rank 2
451.0	-180.4	256	82	Fracture Rank 1
451.7	-181.1	246	84	Fracture Rank 1
452.9	-182.3	288	81	Fracture Rank 1
453.8	-183.2	340	49	Fracture Rank 2

BR-7 - TABLE OF BEDROCK STRUCTURES

Depth (feet)	Elevation (feet)	Dip Azimuth (degrees)	Dip Angle (degrees)	Bedrock Structure Category
454.0	-183.4	334	46	Fracture Rank 2
456.2	-185.6	304	83	Fracture Rank 1
457.8	-187.2	352	21	Fracture Rank 1
459.3	-188.7	354	28	Fracture Rank 1
462.2	-191.6	264	64	Fracture Rank 2
463.0	-192.4	252	80	Fracture Rank 1
464.3	-193.7	247	79	Fracture Rank 1
464.8	-194.2	259	76	Fracture Rank 1
465.1	-194.5	263	76	Fracture Rank 1
466.3	-195.7	339	63	Fracture Rank 2
466.8	-196.2	256	88	Fracture Rank 1
467.4	-196.8	352	56	Fracture Rank 2
468.0	-197.4	274	67	Fracture Rank 2
470.3	-199.7	43	76	Fracture Rank 2
470.6	-200.0	234	81	Fracture Rank 1
471.0	-200.4	326	21	Fracture Rank 1
471.2	-200.6	218	82	Fracture Rank 1
472.4	-201.8	303	51	Fracture Rank 1
472.4	-201.8	298	73	Fracture Rank 1
474.0	-203.4	348	39	Fracture Rank 2
474.4	-203.8	341	68	Fracture Rank 2
475.2	-204.6	337	25	Fracture Rank 1
477.9	-207.3	50	89	Fracture Rank 1
479.3	-208.7	249	84	Fracture Rank 1
482.3	-211.7	351	59	Fracture Rank 2
482.9	-212.3	248	85	Fracture Rank 1
483.2	-212.6	350	57	Fracture Rank 2
485.0	-214.4	242	74	Fracture Rank 1
485.7	-215.1	242	84	Fracture Rank 1
485.9	-215.3	243	79	Fracture Rank 1
486.1	-215.5	247	80	Fracture Rank 1
486.9	-216.3	246	83	Fracture Rank 2
490.5	-219.9	313	59	Fracture Rank 1
491.3	-220.7	327	53	Fracture Rank 1
492.0	-221.4	257	76	Fracture Rank 2
492.7	-222.1	329	58	Fracture Rank 1
493.4	-222.8	313	47	Fracture Rank 1
496.5	-225.9	68	72	Fracture Rank 1
496.8	-226.2	272	27	Fracture Rank 1

HAGER-RICHTER GEOSCIENCE, INC.	
BR-8 - TABLE OF BEDROCK STRUCTURES	
CLIENT	Weston Solutions, Inc.
PROJECT	Savage Municipal Water Supply Superfund Site
CITY, STATE	Milford, New Hampshire
H-R FILE	11RG69
DATE LOGGED	November 30 & December 1, 2011
LOG DATUM	Top of the 6-Inch Steel Casing (TOC)
TOC ELEVATION	271.5 Feet
DIP AZIMUTH	Referenced to True North
DECLINATION	15 Degrees West
DIP ANGLE	Measured from Horizontal

BR-8 - TABLE OF BEDROCK STRUCTURES

Depth (feet)	Elevation (feet)	Dip Azimuth (degrees)	Dip Angle (degrees)	Bedrock Structure Category
91.0	180.5	116	51	Fracture Rank 2
91.3	180.2	123	46	Fracture Rank 1
91.4	180.1	124	47	Fracture Rank 1
91.7	179.8	101	52	Fracture Rank 1
99.6	171.9	355	2	Fracture Rank 1
107.0	164.5	102	74	Fracture Rank 1
107.2	164.3	106	74	Fracture Rank 1
108.3	163.2	95	72	Fracture Rank 1
108.4	163.1	242	50	Fracture Rank 1
109.1	162.4	83	75	Fracture Rank 1
109.2	162.4	279	78	Fracture Rank 1
110.9	160.6	272	66	Fracture Rank 3
111.1	160.4	285	55	Fracture Rank 2
112.0	159.5	103	80	Fracture Rank 2
112.8	158.7	102	74	Fracture Rank 3
114.1	157.4	113	80	Fracture Rank 3
115.9	155.6	105	79	Fracture Rank 3
116.5	155.0	291	73	Fracture Rank 3
118.2	153.3	299	76	Fracture Rank 3
118.6	152.9	303	71	Fracture Rank 3
119.9	151.6	303	77	Fracture Rank 3
120.1	151.4	304	73	Fracture Rank 3
121.1	150.4	90	43	Fracture Rank 3
121.5	150.0	287	50	Fracture Rank 2
121.9	149.6	303	70	Fracture Rank 2
123.2	148.3	94	72	Fracture Rank 1
125.5	146.0	351	79	Fracture Rank 1
125.7	145.8	304	39	Fracture Rank 2
127.0	144.6	329	42	Fracture Rank 2
128.3	143.2	9	51	Fracture Rank 2
129.0	142.5	331	39	Fracture Rank 2
131.5	140.0	287	68	Fracture Rank 1

BR-8 - TABLE OF BEDROCK STRUCTURES

Depth (feet)	Elevation (feet)	Dip Azimuth (degrees)	Dip Angle (degrees)	Bedrock Structure Category
131.5	140.0	114	67	Fracture Rank 3
136.9	134.6	326	31	Fracture Rank 1
137.4	134.1	314	29	Fracture Rank 1
137.6	133.9	323	30	Fracture Rank 1
138.0	133.5	324	29	Fracture Rank 2
138.5	133.0	320	32	Fracture Rank 1
139.1	132.4	313	41	Fracture Rank 2
139.4	132.1	326	38	Fracture Rank 2
139.8	131.7	320	32	Fracture Rank 1
140.0	131.5	311	32	Fracture Rank 2
141.7	129.8	309	29	Fracture Rank 2
142.5	129.0	322	40	Fracture Rank 2
145.0	126.5	314	28	Fracture Rank 2
147.4	124.1	343	36	Fracture Rank 2
148.4	123.1	314	33	Fracture Rank 2
149.2	122.4	117	62	Fracture Rank 1
150.0	121.5	342	45	Fracture Rank 1
150.2	121.3	318	23	Fracture Rank 2
151.1	120.4	332	21	Fracture Rank 3
151.2	120.3	122	61	Fracture Rank 2
152.0	119.5	303	45	Fracture Rank 2
152.8	118.7	286	78	Fracture Rank 2
153.1	118.4	296	30	Fracture Rank 2
153.6	117.9	309	34	Fracture Rank 2
153.7	117.8	301	34	Fracture Rank 2
154.5	117.0	316	33	Fracture Rank 2
154.7	116.8	118	72	Fracture Rank 2
154.9	116.6	285	79	Fracture Rank 2
155.1	116.4	316	39	Fracture Rank 2
157.3	114.2	108	75	Fracture Rank 1
157.3	114.2	112	86	Fracture Rank 2
157.5	114.1	33	20	Fracture Rank 2
158.5	113.0	11	29	Fracture Rank 2
159.9	111.6	319	35	Fracture Rank 2
160.5	111.0	30	17	Fracture Rank 2
161.2	110.3	26	26	Fracture Rank 2
161.5	110.0	106	79	Fracture Rank 3
161.7	109.8	299	87	Fracture Rank 3
162.3	109.2	320	55	Fracture Rank 2
163.3	108.3	124	78	Fracture Rank 3
163.4	108.1	293	46	Fracture Rank 2
163.7	107.8	325	27	Fracture Rank 2
164.5	107.0	346	35	Fracture Rank 3
165.0	106.5	310	73	Fracture Rank 3
166.6	104.9	111	82	Fracture Rank 3

BR-8 - TABLE OF BEDROCK STRUCTURES

Depth (feet)	Elevation (feet)	Dip Azimuth (degrees)	Dip Angle (degrees)	Bedrock Structure Category
166.9	104.7	303	81	Fracture Rank 2
169.5	102.0	123	83	Fracture Rank 1
170.4	101.1	335	21	Fracture Rank 3
173.0	98.6	13	24	Fracture Rank 1
177.3	94.2	296	72	Fracture Rank 2
177.5	94.0	6	23	Fracture Rank 2
177.8	93.7	295	87	Fracture Rank 2
178.1	93.4	24	17	Fracture Rank 2
178.4	93.1	39	16	Fracture Rank 2
178.7	92.8	19	31	Fracture Rank 1
179.4	92.1	353	37	Fracture Rank 1
180.6	90.9	328	19	Fracture Rank 2
180.7	90.8	104	75	Fracture Rank 2
181.3	90.2	309	73	Fracture Rank 2
182.4	89.1	311	52	Fracture Rank 2
182.6	88.9	304	68	Fracture Rank 3
183.4	88.1	125	73	Fracture Rank 2
183.9	87.6	310	67	Fracture Rank 3
186.1	85.4	291	81	Fracture Rank 2
186.4	85.1	189	62	Fracture Rank 2
189.2	82.3	122	86	Fracture Rank 3
190.5	81.0	327	33	Fracture Rank 2
190.8	80.7	343	30	Fracture Rank 2
192.5	79.0	288	83	Fracture Rank 2
195.3	76.2	119	74	Fracture Rank 2
195.9	75.6	350	21	Fracture Rank 1
196.3	75.2	350	29	Fracture Rank 2
196.4	75.2	118	82	Fracture Rank 2
196.4	75.1	297	78	Fracture Rank 1
199.4	72.1	7	32	Fracture Rank 2
201.9	69.6	113	72	Fracture Rank 1
204.1	67.4	312	17	Fracture Rank 2
204.2	67.3	323	20	Fracture Rank 2
205.0	66.5	3	32	Fracture Rank 1
208.5	63.0	127	67	Fracture Rank 1
209.0	62.5	252	76	Fracture Rank 1
211.3	60.2	220	65	Fracture Rank 1
211.4	60.1	119	74	Fracture Rank 1
214.3	57.2	327	86	Fracture Rank 1
215.2	56.3	334	39	Fracture Rank 2
215.4	56.1	142	71	Fracture Rank 1
215.9	55.6	164	82	Fracture Rank 1
217.0	54.5	292	78	Fracture Rank 1
217.5	54.1	347	35	Fracture Rank 1
218.7	52.8	25	40	Fracture Rank 1

BR-8 - TABLE OF BEDROCK STRUCTURES

Depth (feet)	Elevation (feet)	Dip Azimuth (degrees)	Dip Angle (degrees)	Bedrock Structure Category
219.6	51.9	114	30	Fracture Rank 1
220.3	51.2	7	23	Fracture Rank 1
221.5	50.0	299	83	Fracture Rank 1
223.8	47.7	122	80	Fracture Rank 1
224.2	47.3	294	61	Fracture Rank 1
224.6	46.9	344	46	Fracture Rank 2
225.9	45.6	354	30	Fracture Rank 2
227.8	43.7	123	48	Fracture Rank 3
228.0	43.5	129	50	Fracture Rank 3
234.1	37.4	249	80	Fracture Rank 1
235.1	36.4	249	74	Fracture Rank 1
236.3	35.2	80	43	Fracture Rank 3
236.3	35.2	262	73	Fracture Rank 2
236.6	34.9	88	48	Fracture Rank 3
237.4	34.1	59	43	Fracture Rank 3
237.7	33.8	63	40	Fracture Rank 3
238.0	33.5	60	44	Fracture Rank 2
238.8	32.7	16	33	Fracture Rank 2
239.2	32.3	35	19	Fracture Rank 2
241.1	30.5	315	44	Fracture Rank 1
241.8	29.7	302	54	Fracture Rank 1
243.6	28.0	331	40	Fracture Rank 2
245.0	26.6	345	44	Fracture Rank 2
246.0	25.5	295	32	Fracture Rank 1
246.4	25.1	315	53	Fracture Rank 2
247.5	24.0	32	42	Fracture Rank 1
248.4	23.1	340	41	Fracture Rank 1
251.7	19.8	341	57	Fracture Rank 1
251.9	19.6	333	57	Fracture Rank 2
256.2	15.3	291	41	Fracture Rank 1
256.5	15.0	312	64	Fracture Rank 1
256.9	14.6	313	51	Fracture Rank 1
258.2	13.3	317	51	Fracture Rank 1
260.4	11.2	329	41	Fracture Rank 1
269.0	2.5	312	38	Fracture Rank 1
269.4	2.1	249	34	Fracture Rank 1
269.6	1.9	258	42	Fracture Rank 1
272.4	-0.9	317	36	Fracture Rank 2
273.4	-1.9	115	57	Fracture Rank 1
274.1	-2.6	93	35	Fracture Rank 2
277.7	-6.2	3	27	Fracture Rank 2
295.1	-23.6	339	53	Fracture Rank 2
296.4	-24.9	112	49	Fracture Rank 2
312.6	-41.1	329	36	Fracture Rank 1
313.6	-42.1	74	44	Fracture Rank 2

BR-8 - TABLE OF BEDROCK STRUCTURES

Depth (feet)	Elevation (feet)	Dip Azimuth (degrees)	Dip Angle (degrees)	Bedrock Structure Category
314.2	-42.7	247	56	Fracture Rank 1
315.0	-43.5	256	67	Fracture Rank 3
315.6	-44.1	203	55	Fracture Rank 2
315.6	-44.1	63	35	Fracture Rank 1
316.4	-44.9	131	30	Fracture Rank 2
317.4	-45.9	86	59	Fracture Rank 2
317.6	-46.1	237	62	Fracture Rank 2
318.4	-46.9	85	31	Fracture Rank 3
319.0	-47.5	70	30	Fracture Rank 2
319.4	-47.9	113	57	Fracture Rank 2
319.6	-48.1	223	44	Fracture Rank 2
320.2	-48.7	299	22	Fracture Rank 3
320.5	-49.0	56	15	Fracture Rank 3
320.7	-49.2	230	48	Fracture Rank 3
321.6	-50.1	269	49	Fracture Rank 2
322.2	-50.7	31	19	Fracture Rank 2
322.4	-50.9	271	52	Fracture Rank 1
324.1	-52.6	293	71	Fracture Rank 1
325.5	-54.0	12	10	Fracture Rank 2
326.4	-54.9	105	13	Fracture Rank 1
328.0	-56.5	314	47	Fracture Rank 1
330.2	-58.7	283	39	Fracture Rank 1
330.82	-59.3	294	57	Fracture Rank 2
331.31	-59.8	273	60	Fracture Rank 2
332.35	-60.9	24	5	Fracture Rank 1
334.11	-62.6	261	44	Fracture Rank 1
338.13	-66.6	88	11	Fracture Rank 2
338.25	-66.8	347	20	Fracture Rank 2
340.6	-69.1	339	38	Fracture Rank 3
343.87	-72.4	345	35	Fracture Rank 3
346.62	-75.1	280	39	Fracture Rank 2
348.08	-76.6	306	59	Fracture Rank 2
349.9	-78.4	264	61	Fracture Rank 1
352.89	-81.4	14	19	Fracture Rank 2
353.92	-82.4	100	46	Fracture Rank 1
356.16	-84.7	187	24	Fracture Rank 2
356.65	-85.2	125	28	Fracture Rank 2
357.44	-85.9	304	59	Fracture Rank 2
358.24	-86.7	308	56	Fracture Rank 2
359.59	-88.1	313	61	Fracture Rank 2
361.33	-89.8	143	53	Fracture Rank 1
362.41	-90.9	268	49	Fracture Rank 2
363.67	-92.2	311	59	Fracture Rank 1
364.37	-92.9	268	69	Fracture Rank 2
369.17	-97.7	236	62	Fracture Rank 1

BR-8 - TABLE OF BEDROCK STRUCTURES

Depth (feet)	Elevation (feet)	Dip Azimuth (degrees)	Dip Angle (degrees)	Bedrock Structure Category
375.5	-104.0	247	44	Fracture Rank 2
377.24	-105.7	262	50	Fracture Rank 2
378.5	-107.0	265	33	Fracture Rank 2
397.88	-126.4	272	64	Fracture Rank 1
399.89	-128.4	270	60	Fracture Rank 2
400.81	-129.3	251	60	Fracture Rank 1
401.37	-129.9	182	63	Fracture Rank 1
402.47	-131.0	108	44	Fracture Rank 2
403.28	-131.8	115	55	Fracture Rank 1
405.99	-134.5	292	13	Fracture Rank 2
406.63	-135.1	125	58	Fracture Rank 1
407.32	-135.8	258	36	Fracture Rank 1
409.1	-137.6	153	26	Fracture Rank 1
410.4	-138.9	289	49	Fracture Rank 1
411.3	-139.8	61	45	Fracture Rank 1
411.8	-140.3	307	55	Fracture Rank 1
413.1	-141.6	308	70	Fracture Rank 1
415.4	-143.9	257	76	Fracture Rank 2
415.7	-144.2	258	84	Fracture Rank 2
416.8	-145.3	289	66	Fracture Rank 1
418.0	-146.5	308	77	Fracture Rank 2
419.3	-147.8	92	70	Fracture Rank 2
421.1	-149.6	240	59	Fracture Rank 2
423.5	-152.0	310	62	Fracture Rank 1
424.2	-152.7	342	65	Fracture Rank 1
425.9	-154.4	143	78	Fracture Rank 1
426.3	-154.8	312	58	Fracture Rank 1
427.1	-155.6	216	37	Fracture Rank 2
428.2	-156.7	221	39	Fracture Rank 2
428.9	-157.4	101	75	Fracture Rank 2
429.1	-157.6	142	43	Fracture Rank 2
429.8	-158.3	214	37	Fracture Rank 2
431.3	-159.8	240	57	Fracture Rank 1
433.1	-161.6	187	57	Fracture Rank 1
433.6	-162.1	135	52	Fracture Rank 1
434.8	-163.3	235	16	Fracture Rank 2
437.1	-165.6	136	45	Fracture Rank 1
438.2	-166.7	312	63	Fracture Rank 1
438.8	-167.3	75	24	Fracture Rank 2
439.2	-167.7	101	55	Fracture Rank 1
441.0	-169.5	32	39	Fracture Rank 1
441.5	-170.0	260	55	Fracture Rank 1
442.4	-170.9	194	25	Fracture Rank 2
443.0	-171.5	205	31	Fracture Rank 2
443.1	-171.6	59	40	Fracture Rank 1

BR-8 - TABLE OF BEDROCK STRUCTURES

Depth (feet)	Elevation (feet)	Dip Azimuth (degrees)	Dip Angle (degrees)	Bedrock Structure Category
443.8	-172.3	93	64	Fracture Rank 2
444.3	-172.8	58	72	Fracture Rank 2
444.6	-173.1	12	34	Fracture Rank 2
445.6	-174.1	323	48	Fracture Rank 2
446.2	-174.7	94	57	Fracture Rank 2
450.1	-178.6	323	73	Fracture Rank 2
453.5	-182.0	275	48	Fracture Rank 1
453.5	-182.0	115	59	Fracture Rank 2
455.2	-183.7	181	69	Fracture Rank 3
455.7	-184.2	1	54	Fracture Rank 1
461.7	-190.2	88	56	Fracture Rank 1
463.8	-192.3	84	71	Fracture Rank 1
466.1	-194.6	285	88	Fracture Rank 1
467.0	-195.5	82	74	Fracture Rank 1
471.5	-200.0	84	76	Fracture Rank 1
477.2	-205.7	261	85	Fracture Rank 1

HAGER-RICHTER GEOSCIENCE, INC.	
BR-9 - TABLE OF BEDROCK STRUCTURES	
CLIENT	Weston Solutions, Inc.
PROJECT	Savage Municipal Water Supply Superfund Site
CITY, STATE	Milford, New Hampshire
H-R FILE	11RG69
DATE LOGGED	November 29, 2011
LOG DATUM	Top of the 6-Inch Steel Casing (TOC)
TOC ELEVATION	274.1 Feet
DIP AZIMUTH	Referenced to True North
DECLINATION	15 Degrees West
DIP ANGLE	Measured from Horizontal

BR-9 - TABLE OF BEDROCK STRUCTURES

Depth (feet)	Elevation (feet)	Dip Azimuth (degrees)	Dip Angle (degrees)	Bedrock Structure Category
90.2	183.9	265	64	Fracture Rank 2
90.7	183.4	129	80	Fracture Rank 2
90.8	183.3	320	82	Fracture Rank 2
91.0	183.1	133	82	Fracture Rank 2
91.9	182.3	281	76	Fracture Rank 2
93.4	180.7	106	79	Fracture Rank 2
93.7	180.4	95	39	Fracture Rank 2
94.1	180.0	113	62	Fracture Rank 2
94.7	179.4	113	63	Fracture Rank 2
94.8	179.3	109	42	Fracture Rank 2
95.8	178.3	84	65	Fracture Rank 2
96.0	178.1	90	60	Fracture Rank 2
96.1	178.0	92	56	Fracture Rank 2
96.7	177.4	70	52	Fracture Rank 3
97.1	177.0	287	82	Fracture Rank 2
97.2	176.9	324	53	Fracture Rank 2
99.0	175.1	83	78	Fracture Rank 2
99.4	174.7	294	80	Fracture Rank 2
100.9	173.2	62	80	Fracture Rank 2
101.0	173.1	76	74	Fracture Rank 2
102.0	172.1	102	72	Fracture Rank 2
103.2	170.9	76	68	Fracture Rank 2
103.9	170.2	74	55	Fracture Rank 2
104.2	169.9	82	57	Fracture Rank 3
105.5	168.6	73	77	Fracture Rank 2
105.9	168.2	268	86	Fracture Rank 3
107.2	166.9	41	48	Fracture Rank 2
107.6	166.5	29	59	Fracture Rank 2
108.7	165.4	72	62	Fracture Rank 3
109.2	164.9	81	60	Fracture Rank 3
109.6	164.5	91	64	Fracture Rank 3
110.0	164.1	69	80	Fracture Rank 3

BR-9 - TABLE OF BEDROCK STRUCTURES

Depth (feet)	Elevation (feet)	Dip Azimuth (degrees)	Dip Angle (degrees)	Bedrock Structure Category
110.4	163.7	96	61	Fracture Rank 3
111.2	162.9	108	72	Fracture Rank 3
111.5	162.6	269	70	Fracture Rank 2
112.4	161.7	269	69	Fracture Rank 2
115.4	158.7	16	44	Fracture Rank 2
115.5	158.6	66	25	Fracture Rank 1
116.0	158.1	285	52	Fracture Rank 2
116.5	157.6	287	65	Fracture Rank 2
116.8	157.3	321	65	Fracture Rank 1
117.3	156.8	264	55	Fracture Rank 1
118.7	155.4	256	77	Fracture Rank 1
119.7	154.5	2	41	Fracture Rank 2
120.5	153.6	298	46	Fracture Rank 1
121.0	153.1	96	73	Fracture Rank 2
121.5	152.6	277	82	Fracture Rank 2
121.5	152.6	113	53	Fracture Rank 2
121.6	152.5	273	64	Fracture Rank 2
121.7	152.4	289	27	Fracture Rank 2
122.6	151.5	286	83	Fracture Rank 1
123.3	150.8	303	81	Fracture Rank 1
123.9	150.2	322	60	Fracture Rank 1
125.3	148.8	327	60	Fracture Rank 2
125.8	148.3	325	63	Fracture Rank 2
126.7	147.4	312	53	Fracture Rank 2
127.2	147.0	324	56	Fracture Rank 2
127.7	146.4	336	72	Fracture Rank 2
129.1	145.0	321	61	Fracture Rank 2
129.2	144.9	142	65	Fracture Rank 2
129.6	144.5	156	47	Fracture Rank 2
129.7	144.4	93	81	Fracture Rank 3
130.3	143.8	317	65	Fracture Rank 2
130.8	143.3	104	38	Fracture Rank 2
130.9	143.2	4	58	Fracture Rank 2
131.7	142.4	108	74	Fracture Rank 3
131.8	142.3	277	81	Fracture Rank 2
132.9	141.2	63	22	Fracture Rank 2
133.2	140.9	310	48	Fracture Rank 2
135.1	139.0	95	75	Fracture Rank 2
135.8	138.3	126	61	Fracture Rank 1
136.5	137.6	103	79	Fracture Rank 2
138.3	135.8	142	57	Fracture Rank 1
140.0	134.1	319	76	Fracture Rank 2
140.8	133.4	105	80	Fracture Rank 1
141.9	132.2	106	58	Fracture Rank 3
142.3	131.8	327	79	Fracture Rank 1

BR-9 - TABLE OF BEDROCK STRUCTURES

Depth (feet)	Elevation (feet)	Dip Azimuth (degrees)	Dip Angle (degrees)	Bedrock Structure Category
145.8	128.3	93	58	Fracture Rank 2
146.1	128.0	294	87	Fracture Rank 1
146.8	127.3	307	85	Fracture Rank 1
148.0	126.1	291	87	Fracture Rank 1
148.2	125.9	34	4	Fracture Rank 1
148.3	125.8	101	60	Fracture Rank 2
149.5	124.6	308	80	Fracture Rank 2
149.9	124.2	66	69	Fracture Rank 1
150.0	124.1	308	86	Fracture Rank 3
151.6	122.5	305	54	Fracture Rank 1
152.6	121.5	300	7	Fracture Rank 1
153.8	120.3	148	73	Fracture Rank 1
155.1	119.1	278	87	Fracture Rank 1
157.2	116.9	264	85	Fracture Rank 1
157.6	116.5	284	45	Fracture Rank 1
158.0	116.1	269	46	Fracture Rank 1
158.3	115.8	111	70	Fracture Rank 2
158.9	115.2	5	48	Fracture Rank 1
161.6	112.5	178	46	Fracture Rank 1
161.9	112.2	163	47	Fracture Rank 1
162.1	112.0	289	63	Fracture Rank 2
162.3	111.8	167	48	Fracture Rank 1
163.0	111.1	321	79	Fracture Rank 1
163.5	110.6	151	52	Fracture Rank 1
163.9	110.3	156	54	Fracture Rank 1
164.4	109.7	176	64	Fracture Rank 1
164.6	109.6	313	76	Fracture Rank 1
165.4	108.7	161	62	Fracture Rank 2
165.6	108.5	323	82	Fracture Rank 2
165.7	108.4	303	77	Fracture Rank 1
165.9	108.2	351	73	Fracture Rank 2
168.0	106.1	282	66	Fracture Rank 2
169.3	104.8	351	71	Fracture Rank 1
169.6	104.5	275	89	Fracture Rank 3
171.1	103.0	322	68	Fracture Rank 1
171.4	102.7	279	79	Fracture Rank 2
171.6	102.5	279	88	Fracture Rank 1
172.8	101.3	287	69	Fracture Rank 2
172.9	101.3	206	7	Fracture Rank 1
173.4	100.7	211	35	Fracture Rank 1
173.8	100.3	299	66	Fracture Rank 2
173.9	100.2	71	28	Fracture Rank 1
175.2	98.9	295	77	Fracture Rank 1
175.5	98.6	286	73	Fracture Rank 2
176.6	97.5	294	56	Fracture Rank 1

BR-9 - TABLE OF BEDROCK STRUCTURES

Depth (feet)	Elevation (feet)	Dip Azimuth (degrees)	Dip Angle (degrees)	Bedrock Structure Category
177.3	96.9	271	72	Fracture Rank 2
178.2	95.9	290	74	Fracture Rank 2
179.0	95.2	286	73	Fracture Rank 2
181.2	92.9	278	74	Fracture Rank 2
181.7	92.4	44	53	Fracture Rank 3
184.9	89.2	288	24	Fracture Rank 2
185.8	88.3	122	25	Fracture Rank 2
186.1	88.0	103	23	Fracture Rank 2
186.4	87.8	154	65	Fracture Rank 2
187.3	86.8	84	27	Fracture Rank 1
188.0	86.1	284	80	Fracture Rank 2
188.3	85.9	290	57	Fracture Rank 1
188.8	85.3	273	80	Fracture Rank 3
193.5	80.6	150	52	Fracture Rank 1
194.5	79.7	139	60	Fracture Rank 1
194.7	79.4	143	58	Fracture Rank 1
196.5	77.6	154	73	Fracture Rank 1
199.1	75.0	51	57	Fracture Rank 1
200.0	74.2	58	63	Fracture Rank 1
200.7	73.4	58	61	Fracture Rank 1
204.8	69.3	208	71	Fracture Rank 2
206.1	68.0	316	74	Fracture Rank 2
209.0	65.1	221	70	Fracture Rank 2
209.0	65.1	20	49	Fracture Rank 1
213.3	60.8	120	72	Fracture Rank 1
214.1	60.1	280	85	Fracture Rank 1
214.8	59.3	287	76	Fracture Rank 3
214.9	59.2	279	87	Fracture Rank 3
215.5	58.6	105	55	Fracture Rank 2
216.4	57.7	284	69	Fracture Rank 1
216.7	57.4	297	71	Fracture Rank 2
217.1	57.0	293	79	Fracture Rank 3
217.3	56.8	293	76	Fracture Rank 3
217.4	56.7	291	72	Fracture Rank 3
219.4	54.7	277	55	Fracture Rank 1
222.0	52.1	10	53	Fracture Rank 2
225.4	48.7	14	60	Fracture Rank 2
226.0	48.1	10	61	Fracture Rank 2
227.1	47.0	320	75	Fracture Rank 1
227.2	46.9	315	75	Fracture Rank 1
228.1	46.0	316	67	Fracture Rank 1
228.6	45.5	311	69	Fracture Rank 1
228.7	45.4	302	69	Fracture Rank 2
229.8	44.3	319	63	Fracture Rank 1
230.0	44.1	321	68	Fracture Rank 1

BR-9 - TABLE OF BEDROCK STRUCTURES

Depth (feet)	Elevation (feet)	Dip Azimuth (degrees)	Dip Angle (degrees)	Bedrock Structure Category
230.1	44.0	320	73	Fracture Rank 1
230.3	43.8	323	76	Fracture Rank 1
230.4	43.7	321	75	Fracture Rank 1
231.6	42.5	301	60	Fracture Rank 1
233.1	41.0	306	65	Fracture Rank 2
235.1	39.0	312	81	Fracture Rank 3
235.8	38.3	273	45	Fracture Rank 1
236.5	37.6	300	79	Fracture Rank 2
236.8	37.3	306	79	Fracture Rank 2
237.5	36.6	301	70	Fracture Rank 2
238.4	35.7	339	78	Fracture Rank 1
239.1	35.0	313	76	Fracture Rank 2
239.5	34.6	311	81	Fracture Rank 2
240.4	33.8	317	86	Fracture Rank 3
240.8	33.3	314	67	Fracture Rank 3
241.6	32.5	183	65	Fracture Rank 2
243.3	30.8	173	80	Fracture Rank 3
244.6	29.5	191	84	Fracture Rank 2
248.2	25.9	260	55	Fracture Rank 1
248.5	25.6	284	49	Fracture Rank 1
248.7	25.4	284	49	Fracture Rank 1
249.2	25.0	285	36	Fracture Rank 1
256.6	17.5	158	89	Fracture Rank 1
261.7	12.5	36	55	Fracture Rank 1
262.7	11.4	238	64	Fracture Rank 2
265.7	8.5	258	62	Fracture Rank 1
266.3	7.8	343	27	Fracture Rank 1
266.5	7.6	3	39	Fracture Rank 1
272.6	1.5	36	50	Fracture Rank 1
273.1	1.0	359	53	Fracture Rank 2
273.9	0.2	325	60	Fracture Rank 2
277.4	-3.3	259	67	Fracture Rank 1
288.1	-14.0	276	70	Fracture Rank 3
288.5	-14.4	267	77	Fracture Rank 2
289.6	-15.5	280	75	Fracture Rank 3
290.1	-16.0	280	71	Fracture Rank 3
291.0	-16.9	111	57	Fracture Rank 1
295.5	-21.4	59	12	Fracture Rank 1
297.3	-23.2	289	74	Fracture Rank 2
297.5	-23.4	283	78	Fracture Rank 2
298.2	-24.1	290	63	Fracture Rank 1
298.6	-24.5	279	58	Fracture Rank 2
299.2	-25.1	299	79	Fracture Rank 1
300.0	-25.9	3	55	Fracture Rank 1
300.4	-26.3	206	31	Fracture Rank 1

BR-9 - TABLE OF BEDROCK STRUCTURES

Depth (feet)	Elevation (feet)	Dip Azimuth (degrees)	Dip Angle (degrees)	Bedrock Structure Category
300.7	-26.6	67	21	Fracture Rank 2
300.7	-26.6	246	53	Fracture Rank 2
300.9	-26.8	68	33	Fracture Rank 2
301.8	-27.7	16	66	Fracture Rank 1
302.7	-28.6	344	76	Fracture Rank 2
302.8	-28.7	224	55	Fracture Rank 2
303.1	-29.0	286	81	Fracture Rank 2
303.7	-29.6	290	62	Fracture Rank 2
304.1	-30.0	283	66	Fracture Rank 2
304.5	-30.4	278	80	Fracture Rank 3
305.6	-31.5	277	87	Fracture Rank 2
306.6	-32.5	274	83	Fracture Rank 2
307.0	-32.9	278	77	Fracture Rank 2
307.5	-33.4	292	67	Fracture Rank 2
308.6	-34.5	105	64	Fracture Rank 3
308.7	-34.6	325	35	Fracture Rank 2
309.1	-35.0	179	31	Fracture Rank 2
309.4	-35.3	100	69	Fracture Rank 2
310.6	-36.5	82	76	Fracture Rank 2
310.9	-36.8	258	77	Fracture Rank 3
311.1	-37.0	314	54	Fracture Rank 3
311.3	-37.2	276	73	Fracture Rank 2
312.1	-38.0	311	43	Fracture Rank 2
313.9	-39.8	282	69	Fracture Rank 2
315.9	-41.8	275	73	Fracture Rank 1
316.2	-42.1	230	67	Fracture Rank 2
317.3	-43.2	259	46	Fracture Rank 2
318.1	-44.0	305	32	Fracture Rank 2
318.5	-44.4	291	18	Fracture Rank 2
318.6	-44.5	275	71	Fracture Rank 2
318.9	-44.8	280	68	Fracture Rank 2
319.4	-45.3	277	79	Fracture Rank 2
319.6	-45.5	278	80	Fracture Rank 2
320.9	-46.8	285	36	Fracture Rank 2
321.0	-46.9	280	37	Fracture Rank 2
321.1	-47.0	271	74	Fracture Rank 2
321.7	-47.6	288	76	Fracture Rank 2
322.0	-47.9	283	64	Fracture Rank 2
322.7	-48.6	77	33	Fracture Rank 2
322.9	-48.8	84	44	Fracture Rank 3
325.7	-51.6	80	46	Fracture Rank 2
326.2	-52.1	19	68	Fracture Rank 2
326.6	-52.5	359	58	Fracture Rank 2
326.7	-52.6	95	50	Fracture Rank 2
328.1	-54.0	352	82	Fracture Rank 2

BR-9 - TABLE OF BEDROCK STRUCTURES

Depth (feet)	Elevation (feet)	Dip Azimuth (degrees)	Dip Angle (degrees)	Bedrock Structure Category
331.9	-57.8	6	60	Fracture Rank 1
336.5	-62.4	265	89	Fracture Rank 3
337.7	-63.6	271	87	Fracture Rank 3
338.7	-64.6	277	83	Fracture Rank 3
338.7	-64.6	80	45	Fracture Rank 3
340.2	-66.1	283	81	Fracture Rank 2
340.5	-66.4	267	78	Fracture Rank 2
341.3	-67.2	276	78	Fracture Rank 2
342.1	-68.0	282	86	Fracture Rank 2
343.3	-69.2	274	84	Fracture Rank 1
344.6	-70.5	294	87	Fracture Rank 2
345.5	-71.4	286	84	Fracture Rank 2
346.0	-71.9	304	74	Fracture Rank 3
346.8	-72.7	261	76	Fracture Rank 2
348.2	-74.1	212	69	Fracture Rank 2
348.9	-74.8	280	82	Fracture Rank 1
349.3	-75.2	276	75	Fracture Rank 1
349.6	-75.5	281	77	Fracture Rank 1
350.1	-76.0	283	77	Fracture Rank 2
350.9	-76.8	287	72	Fracture Rank 3
351.9	-77.8	102	90	Fracture Rank 2
352.3	-78.2	308	73	Fracture Rank 2
353.5	-79.4	295	89	Fracture Rank 2
355.5	-81.4	27	55	Fracture Rank 2
356.4	-82.3	49	58	Fracture Rank 1
357.6	-83.5	322	22	Fracture Rank 1
360.1	-86.0	287	74	Fracture Rank 2
362.8	-88.7	284	72	Fracture Rank 2
363.3	-89.2	289	71	Fracture Rank 2
363.4	-89.3	291	74	Fracture Rank 2
364.1	-90.0	291	77	Fracture Rank 1
367.5	-93.4	290	80	Fracture Rank 2
367.8	-93.7	286	78	Fracture Rank 2
368.3	-94.2	288	80	Fracture Rank 2
368.5	-94.4	283	85	Fracture Rank 2
372.8	-98.7	317	34	Fracture Rank 2
375.6	-101.5	268	42	Fracture Rank 1
376.0	-101.9	297	27	Fracture Rank 1
377.7	-103.6	262	41	Fracture Rank 1
378.0	-103.9	237	40	Fracture Rank 1

HAGER-RICHTER GEOSCIENCE, INC.	
MW-30 - TABLE OF BEDROCK STRUCTURES	
CLIENT	Weston Solutions, Inc.
PROJECT	Savage Municipal Water Supply Superfund Site
CITY, STATE	Milford, New Hampshire
H-R FILE	11RG69
DATE LOGGED	November 30, 2011 & January 13, 2012
LOG DATUM	Top of the 6-Inch Steel Casing (TOC)
TOC ELEVATION	270.4 Feet
DIP AZIMUTH	Referenced to True North
DECLINATION	15 Degrees West
DIP ANGLE	Measured from Horizontal

MW-30 - TABLE OF BEDROCK STRUCTURES

Depth (feet)	Elevation (feet)	Dip Azimuth (degrees)	Dip Angle (degrees)	Bedrock Structure Category
161.7	108.7	301	71	Fracture Rank 2
161.7	108.7	84	72	Fracture Rank 2
162.0	108.4	302	69	Fracture Rank 3
162.1	108.3	100	63	Fracture Rank 2
162.3	108.1	342	53	Fracture Rank 2
163.3	107.1	297	51	Fracture Rank 2
163.6	106.8	309	53	Fracture Rank 2
163.9	106.6	70	54	Fracture Rank 2
164.3	106.1	54	71	Fracture Rank 2
165.2	105.2	18	29	Fracture Rank 2
165.7	104.7	96	62	Fracture Rank 2
166.6	103.8	319	48	Fracture Rank 1
166.9	103.5	287	43	Fracture Rank 2
167.1	103.3	303	42	Fracture Rank 1
167.8	102.6	304	53	Fracture Rank 1
168.2	102.2	301	38	Fracture Rank 2
168.4	102.1	195	75	Fracture Rank 3
168.7	101.7	287	68	Fracture Rank 1
169.6	100.8	286	77	Fracture Rank 1
170.9	99.5	290	74	Fracture Rank 1
171.5	98.9	11	58	Fracture Rank 1
172.2	98.2	301	74	Fracture Rank 1
173.7	96.7	306	61	Fracture Rank 1
175.1	95.3	113	62	Fracture Rank 3
175.2	95.2	299	73	Fracture Rank 2
175.2	95.2	115	59	Fracture Rank 3
175.4	95.0	273	69	Fracture Rank 2
175.6	94.8	114	70	Fracture Rank 3
177.0	93.4	280	67	Fracture Rank 2
177.5	92.9	276	55	Fracture Rank 2
177.7	92.7	280	51	Fracture Rank 2
177.9	92.5	271	60	Fracture Rank 2

MW-30 - TABLE OF BEDROCK STRUCTURES

Depth (feet)	Elevation (feet)	Dip Azimuth (degrees)	Dip Angle (degrees)	Bedrock Structure Category
179.5	90.9	277	76	Fracture Rank 2
182.9	87.5	318	40	Fracture Rank 2
183.9	86.5	52	41	Fracture Rank 2
184.6	85.9	222	82	Fracture Rank 1
184.7	85.7	69	70	Fracture Rank 1
186.0	84.4	10	21	Fracture Rank 1
186.8	83.6	345	46	Fracture Rank 2
188.6	81.8	270	78	Fracture Rank 3
189.0	81.4	152	57	Fracture Rank 2
190.5	79.9	108	68	Fracture Rank 2
190.6	79.8	296	73	Fracture Rank 3
191.6	78.8	144	72	Fracture Rank 3
192.0	78.4	301	68	Fracture Rank 2
192.3	78.1	145	53	Fracture Rank 2
192.3	78.1	77	23	Fracture Rank 2
192.7	77.7	133	44	Fracture Rank 3
193.9	76.5	72	76	Fracture Rank 2
194.6	75.8	278	73	Fracture Rank 2
195.6	74.8	181	65	Fracture Rank 1
196.1	74.3	49	76	Fracture Rank 2
196.7	73.7	301	77	Fracture Rank 2
196.9	73.5	37	42	Fracture Rank 2
197.3	73.1	29	49	Fracture Rank 2
197.5	72.9	125	65	Fracture Rank 3
197.9	72.5	134	64	Fracture Rank 2
199.0	71.4	30	69	Fracture Rank 2
199.4	71.0	288	66	Fracture Rank 1
200.3	70.1	150	50	Fracture Rank 2
200.7	69.7	119	38	Fracture Rank 2
201.6	68.8	302	71	Fracture Rank 1
203.0	67.4	320	58	Fracture Rank 1
203.9	66.5	48	67	Fracture Rank 1
204.0	66.4	304	66	Fracture Rank 1
206.1	64.3	21	51	Fracture Rank 1
206.5	63.9	134	46	Fracture Rank 2
206.9	63.5	125	70	Fracture Rank 1
208.2	62.2	295	68	Fracture Rank 1
210.7	59.7	108	25	Fracture Rank 2
215.6	54.8	99	32	Fracture Rank 2
216.9	53.5	125	39	Fracture Rank 2
221.5	48.9	289	50	Fracture Rank 1
222.2	48.2	143	36	Fracture Rank 1
222.4	48.0	301	37	Fracture Rank 1
223.1	47.3	115	36	Fracture Rank 2
224.0	46.4	297	49	Fracture Rank 1

MW-30 - TABLE OF BEDROCK STRUCTURES

Depth (feet)	Elevation (feet)	Dip Azimuth (degrees)	Dip Angle (degrees)	Bedrock Structure Category
224.9	45.5	268	33	Fracture Rank 1
225.8	44.6	122	34	Fracture Rank 2
226.4	44.0	139	50	Fracture Rank 1
227.7	42.7	139	58	Fracture Rank 3
229.4	41.0	265	52	Fracture Rank 3
229.6	40.8	266	42	Fracture Rank 1
230.1	40.3	235	51	Fracture Rank 1
230.3	40.1	244	71	Fracture Rank 1
230.7	39.8	255	54	Fracture Rank 2
231.4	39.0	250	64	Fracture Rank 1
232.0	38.5	105	29	Fracture Rank 2
232.3	38.1	68	38	Fracture Rank 2
232.8	37.6	255	42	Fracture Rank 1
232.8	37.6	79	68	Fracture Rank 1
234.0	36.4	273	51	Fracture Rank 2
234.4	36.0	82	39	Fracture Rank 1
234.6	35.8	259	72	Fracture Rank 2
234.7	35.7	106	48	Fracture Rank 2
234.9	35.5	265	70	Fracture Rank 2
234.9	35.5	94	60	Fracture Rank 3
235.4	35.0	285	55	Fracture Rank 2
235.8	34.6	80	63	Fracture Rank 2
236.1	34.3	287	53	Fracture Rank 1
236.5	33.9	275	48	Fracture Rank 1
237.0	33.4	259	70	Fracture Rank 2
238.4	32.0	87	61	Fracture Rank 3
239.5	30.9	155	63	Fracture Rank 1
240.3	30.1	252	69	Fracture Rank 1
240.3	30.1	57	43	Fracture Rank 1
240.8	29.7	14	23	Fracture Rank 1
241.6	28.8	8	29	Fracture Rank 1
242.6	27.8	241	42	Fracture Rank 1
243.0	27.4	256	81	Fracture Rank 2
243.4	27.0	242	33	Fracture Rank 2
243.7	26.7	276	59	Fracture Rank 2
243.8	26.6	267	58	Fracture Rank 2
244.5	25.9	99	46	Fracture Rank 2
244.9	25.5	97	51	Fracture Rank 2
245.4	25.0	100	35	Fracture Rank 2
245.5	24.9	91	70	Fracture Rank 2
245.6	24.8	100	38	Fracture Rank 2
246.0	24.4	94	45	Fracture Rank 2
246.4	24.0	85	34	Fracture Rank 2
246.6	23.8	253	42	Fracture Rank 2
247.1	23.3	255	38	Fracture Rank 1

MW-30 - TABLE OF BEDROCK STRUCTURES

Depth (feet)	Elevation (feet)	Dip Azimuth (degrees)	Dip Angle (degrees)	Bedrock Structure Category
248.0	22.4	281	40	Fracture Rank 2
248.1	22.3	241	61	Fracture Rank 1
248.9	21.5	346	36	Fracture Rank 1
254.2	16.2	339	57	Fracture Rank 1
256.8	13.6	258	82	Fracture Rank 2
256.9	13.5	224	80	Fracture Rank 2
258.1	12.3	348	37	Fracture Rank 2
258.5	11.9	292	52	Fracture Rank 2
258.9	11.5	76	57	Fracture Rank 2
259.7	10.8	86	76	Fracture Rank 1
260.3	10.1	141	78	Fracture Rank 1
262.1	8.3	84	60	Fracture Rank 1
262.4	8.0	270	80	Fracture Rank 2
262.6	7.8	91	69	Fracture Rank 2
264.4	6.0	303	71	Fracture Rank 2
264.6	5.8	311	63	Fracture Rank 2
264.7	5.7	323	48	Fracture Rank 2
264.9	5.5	215	46	Fracture Rank 1
265.3	5.1	120	76	Fracture Rank 2
265.3	5.1	301	64	Fracture Rank 2
265.6	4.8	296	43	Fracture Rank 2
265.9	4.5	112	61	Fracture Rank 1
266.2	4.2	126	61	Fracture Rank 2
266.4	4.0	134	60	Fracture Rank 1
267.1	3.3	150	61	Fracture Rank 1
267.7	2.7	118	59	Fracture Rank 1
268.1	2.3	313	71	Fracture Rank 2
268.2	2.2	109	65	Fracture Rank 1
268.6	1.8	315	49	Fracture Rank 3
269.8	0.6	318	45	Fracture Rank 1
270.6	-0.2	316	51	Fracture Rank 3
270.8	-0.4	116	46	Fracture Rank 1
270.8	-0.4	306	58	Fracture Rank 2
271.9	-1.5	119	53	Fracture Rank 2
272.1	-1.7	307	44	Fracture Rank 1
273.0	-2.6	129	55	Fracture Rank 2
273.6	-3.2	126	49	Fracture Rank 2
274.6	-4.2	315	58	Fracture Rank 3
275.5	-5.1	282	61	Fracture Rank 2
275.8	-5.4	294	75	Fracture Rank 2
275.8	-5.4	125	42	Fracture Rank 2
276.0	-5.6	279	80	Fracture Rank 3
277.5	-7.1	276	65	Fracture Rank 2
277.6	-7.2	118	32	Fracture Rank 2
277.7	-7.3	68	47	Fracture Rank 2

MW-30 - TABLE OF BEDROCK STRUCTURES

Depth (feet)	Elevation (feet)	Dip Azimuth (degrees)	Dip Angle (degrees)	Bedrock Structure Category
279.8	-9.4	260	44	Fracture Rank 2
280.2	-9.8	132	43	Fracture Rank 2
280.5	-10.1	267	51	Fracture Rank 2
281.1	-10.7	309	66	Fracture Rank 1
281.2	-10.8	115	50	Fracture Rank 3
281.6	-11.2	311	56	Fracture Rank 2
281.7	-11.3	116	64	Fracture Rank 2
282.0	-11.6	305	43	Fracture Rank 2
282.5	-12.1	316	53	Fracture Rank 2
282.7	-12.3	116	41	Fracture Rank 2
283.5	-13.1	111	57	Fracture Rank 2
283.6	-13.2	296	57	Fracture Rank 3
283.7	-13.3	306	49	Fracture Rank 2
283.9	-13.5	102	38	Fracture Rank 2
284.6	-14.2	126	50	Fracture Rank 2
284.9	-14.5	299	69	Fracture Rank 3
285.1	-14.7	109	51	Fracture Rank 2
286.2	-15.8	298	63	Fracture Rank 2
286.4	-16.0	287	65	Fracture Rank 2
286.5	-16.1	81	20	Fracture Rank 2

HAGER-RICHTER
GEOSCIENCE, INC.

BOREHOLE GEOPHYSICAL LOGGING
SAVAGE MUNICIPAL WATER SUPPLY SUPERFUND SITE
MILFORD, NEW HAMPSHIRE

Prepared for:

Weston Solutions, Inc.
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Prepared by:

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RE: Borehole Geophysical Logging
Savage Municipal Water Supply Superfund Site
Milford, New Hampshire

Dear Ms. Nowack:

In this report, we present the results of borehole geophysical logging conducted by Hager-Richter Geoscience, Inc. (Hager-Richter) at the Savage Municipal Water Supply Superfund Site (Site) located in Milford, New Hampshire for Weston Solutions, Inc. (WESTON) in November, 2012 and April, 2013. As you know, Hager-Richter provided borehole geophysical logging services at the Site in 2010 and 2011.[1] The borehole geophysical logging program was conducted as part of an ongoing environmental investigation by WESTON under the direction of the New Hampshire Department of Environmental Services (NHDES) and the United States Environmental Protection Agency (USEPA). The scope of work for the borehole geophysical logging reported herein was specified by WESTON.

Introduction

The Savage Municipal Water Supply Superfund Site is located in the western portion of the Town of Milford, New Hampshire. The general location of the Site is shown in Figure 1. The Site is the location of the former water supply well, the Savage Well, for the town of Milford, New Hampshire. The Savage Well operated from 1960 to 1983. NHDES detected concentrations of volatile organic compounds (VOCs) in the well that were above drinking water standards in February, 1983, and the well was shut down.

[1] Hager-Richter Geoscience, Inc. report entitled "Borehole Geophysical Logging, Savage Municipal Water Supply Superfund Site, Milford, New Hampshire," dated May, 2011.

During remedial investigations of the Site, one of the source areas was identified as the OK Tool Company, Inc., which manufactured metal cutting tools and hardware from approximately 1940 through 1987. As a result of releases at the facility, several VOC plumes are present in the groundwater beneath the Site.

According to information provided by WESTON, remedial actions performed at the Site include building demolition, construction of a containment slurry wall, construction of a groundwater extraction and treatment facility, and in-situ chemical remediation. The chemical remediation consisted of injecting sodium permanganate into the ground.

Overburden at the Site consists of approximately 70 to 100 feet of medium to coarse sand and gravel. A thin (5-10 feet thick) layer of glacial till underlies the sand and gravel. According to WESTON, bedrock occurs at a depth of approximately 80 to 110 feet and consists of granite and gneiss.

WESTON requested borehole geophysical logging as part of the ongoing environmental investigations of the Site. WESTON was interested in determining the depth and orientation (dip azimuth and dip angle) of bedrock fractures intersected by the boreholes, depths where water flows into and out of the boreholes under ambient and stressed (low constant rate pumping) conditions, and depths of lithologic variation in the bedrock encountered in the boreholes.

Borehole geophysical logging was conducted in seven (7) boreholes in November, 2012. The boreholes were identified as BR-10, BR-11, BR-12, BR-13, BR-14, BR-15 and BR-16. The approximate locations of the logged boreholes are shown in Figure 2. The boreholes were cased through the overburden with 6-inch steel casing and were open-hole throughout the bedrock portions of the boreholes. The date logged, casing depth, open-hole interval, open bedrock diameter, and water level for each of the logged boreholes are reported in Table 1. The datum for depths in this report is the top of the 6-inch steel casing at each borehole. Elevations are also provided in this report and are based on the top of casing elevations provided by WESTON.

Table 1 - Borehole Information

Borehole (Date Logged)	Bottom of Casing (feet btoc)	Open-Hole Interval (feet btoc)	Open Bedrock Diameter	Water Level (feet btoc)
BR-10 (November 13 & 14, 2012)	83.1	83.1 - 376.7	6 inches	11.6
BR-11 (November 15, 2012)	131.3	131.3 - 441.2	6 inches	5.8
BR-12 (November 13, 2012)	115.6	115.6 - 423.0	6 inches	10.0
BR-13 (November 13 & 14, 2012)	73.9	73.9 - 462.7	6 inches	8.1
BR-14 (November 12, 2012)	109.0	109.0 - 442.9	6 inches	6.8
BR-15 (November 12 & 13, 2012)	103.0	103.0 - 394.3	6 inches	5.0
MW-16 (November 12 & 13, 2012)	100.4	100.4 - 443.3	6 inches	7.9

btoc = below the top of the casing

The borehole geophysical logging program consisted of:

- Optical Televiewer (OTV)
- Acoustic Televiewer (ATV)
- Acoustic Caliper
- Fluid Temperature
- Fluid Resistivity
- Natural Gamma Ray
- Heat Pulse Flow Meter (HPFM) under ambient and pumping conditions

In addition, HPFM logging was conducted in eleven (11) boreholes during a multi-day pump test conducted by WESTON. During the last two days of the WESTON pump test, April 25 and 26, 2013, HPFM data were acquired by Hager-Richter in boreholes BR-1, BR-2, BR-3, BR-5, BR-9, BR-10, BR-11, BR-12, BR-16, MW-16R, and MW-30 while WESTON pumped from borehole BR-6. The approximate locations of the boreholes logged during the WESTON pump test are shown in Figure 3. HPFM data were acquired at discrete depths selected by WESTON and Hager-Richter after review of previous borehole geophysical logging data acquired by Hager-Richter and others.

Objectives

The objectives of the borehole geophysical logging program were to determine the depth and orientation (dip azimuth and dip angle) of bedrock fractures intersected by the boreholes, depths where water flows into and out of the boreholes under ambient and pumping conditions, and depths of lithologic variation in the bedrock encountered in the boreholes.

Field Operations

Nicholas DeCristofaro and Eric Rickert of Hager-Richter conducted the field operations November 12-15, 2012. Nicholas DeCristofaro, Eric Rickert, and Mikko Aarnio of Hager-Richter conducted the HPFM field operations on April 25 and 26, 2013 during the WESTON pump test. The project was coordinated with Ms. Bette Nowack and Mr. Andrew Fuller of WESTON. Mr. Fuller was on-site during field operations. Data analysis and interpretation were completed at the Hager-Richter offices. Preliminary logging results were provided to WESTON electronically on November 18 and 25, 2012. Preliminary pump test HPFM results were provided to WESTON electronically on May 3, 2013. Original data and field notes reside in the Hager-Richter files and will be retained for at least three years.

Equipment

General. A Mount Sopris Matrix portable digital logging system was used with a 4MXA-1000 winch for the borehole geophysical logging. Data were recorded in digital format using a PC. Data were displayed in real time in the field and were processed in the office using WellCAD v4.4, commercially licensed software.

Optical Televiewer. An ALT OBI-40 optical televiewer (OTV) probe was used for this project. The OTV acquires a high resolution, effectively continuous, magnetically oriented, 360° image of the borehole wall. The image can be used to detect bedrock structures such as fractures, foliation, and bedding and to provide information about lithology. The probe includes a 3-axis magnetometer and three accelerometers to orient the image and to provide borehole deviation data that are used to correct structure orientations from apparent to true orientations.

Acoustic Televiewer. An ALT ABI-40 acoustic televiewer (ATV) probe was used for this project. The ATV acquires a high resolution, effectively continuous, magnetically oriented, 360° image of the borehole wall using the reflected signal of sound waves in the ultrasonic frequency range. Both amplitude and travel time of the reflected signal are recorded and can be used to detect bedrock structures such as fractures, foliation, and bedding. The probe includes a 3-axis magnetometer and three accelerometers to orient the image and to provide borehole deviation data that are used to correct structure orientations from apparent to true orientations.

ATV travel time data can also be used to calculate an acoustic caliper log. The acoustic caliper log measures the average borehole diameter as a function of depth. The acoustic caliper log is derived from the travel time data and the velocity of the acoustic signal in water. The acoustic caliper log is used to locate fractures and to aid in the interpretation of other borehole geophysical logs.

Fluid Temperature. A Mount Sopris 2SFB-1000 fluid resistivity/temperature probe was used for the temperature logging. The temperature sensor is a semiconductor device for which the voltage output is linearly related to temperature. Temperature logs record the temperature of the borehole fluid with depth and are useful for detecting flow into or out of a borehole. If fluid temperature contrasts are present between the borehole fluid and individual fractures and fracture zones, the fluid temperature logs are also useful indicators of flow into and out of the borehole.

Fluid Resistivity. A Mount Sopris 2SFB-1000 fluid resistivity/temperature probe was used for the fluid resistivity logging. The probe uses an electrically shielded Wenner array to measure the capacity of the borehole fluid to transmit electric current with depth and can be an indicator of salinity and water quality. If fluid resistivity contrasts are present between the borehole fluid and individual fractures and fracture zones, the fluid resistivity logs are also useful indicators of flow into and out of the borehole.

Resistivity is the physical property that relates electric current density to potential gradient and is defined as:

$$\tilde{n} = (A / L) * (V / I) \qquad \text{Eq. 1}$$

where:

ñ	is resistivity
A	is cross-sectional area of a homogeneous tube
L	is length of the tube
V	is potential
I	is current

Natural Gamma Ray. A Mount Sopris 2PGA-1000 poly-gamma probe was used for the natural gamma ray logging. The probe uses a sodium iodide crystal that produces a pulse of light when struck by a gamma ray. The variation of radioactivity naturally occurring in rocks and sediments makes the natural gamma ray log an excellent indicator of changes in lithology. Radioactive minerals tend to accumulate in clays with the practical result that layers with higher clay content are commonly expressed in the natural gamma ray log as relatively higher counts per second (cps). Clean sands, which are normally low in radioactivity, produce low count rates.

Heat Pulse Flow Meter. A Mount Sopris HFP-2293 heat pulse flow meter (HPFM) was used for the HPFM logging. The HPFM measures the vertical rate and direction of fluid flow in a borehole at discrete depths and is designed to be used for boreholes with flow rates less than

one gallon per minute (gpm). A heating grid heats a thin sheet of water in a short time interval (less than 0.05 seconds), and, if vertical flow is present, the sheet of water moves along the borehole in the direction of flow. Temperature sensors located at known distances above and below the heating grid monitor the differential temperature of the borehole fluid. The time required for the sheet of heated water to reach one of the sensors is measured, and, based on factory calibrations, the time is used to calculate the vertical flow rate. Depths where water flows into and out of the borehole can be interpreted based on changes in the vertical flow rate and/or direction. HPFM measurements can be made under ambient and stressed (pumping or injection) conditions.

Measurement depths are selected based on information provided by other borehole geophysical data such as OTV, ATV, fluid temperature, and fluid resistivity data. To make a measurement, the probe is positioned at a selected depth and the probe is stabilized by the friction between the centralizers and diverter petal on the probe and the borehole wall. When the borehole fluid has stabilized after the disturbance caused by the probe being moved to the measurement depth, the heating grid is fired, and a measurement cycle starts.

Limitations of the Methods

General. With the 4MXA-1000 winch, the logging cable passes over a calibrated wheel, and an encoder counts the revolutions, which are converted to depth. Slippage of the logging cable may occur, resulting in errors in recorded depth. At the beginning and end of a logging run, fiducial depths (commonly ground surface or top of casing) are measured and are compared to determine if slippage occurred.

Optical Televiewer. The OTV logs can be acquired in both air and optically clear water-filled boreholes. If the borehole is water-filled, the clarity of the water directly affects the quality of the OTV image. The OTV probe must be centralized in the borehole to acquire optimal images of the borehole wall. If the borehole wall is rough and/or irregular or the diameter of the open borehole is larger than the diameter of the casing, the probe may not be adequately centralized and the quality of the optical images may be compromised.

The OTV logs are used to determine the depth and orientation of fractures and other planar features intersected by a borehole. In some cases, natural planar features in the bedrock, such as mineral veins, bedding, and foliation may appear to be fractures in the OTV logs, but are not actual discontinuities in the bedrock. The OTV images are also used to provide information about lithology.

The accuracy of the orientation measured by the OBI-40, as stated by the manufacturer, is ±0.5° for the inclination data and ±1° for the azimuth data. The OBI-40 relies on the earth's magnetic field to determine azimuth. Therefore, in areas where the magnetic field may be significantly affected by local magnetic objects, the dip azimuths reported in the logs may be

compromised. Specifically, the dip azimuth of bedrock structures and the borehole deviation data within approximately five feet of steel casing are not accurate.

Acoustic Televiewer. ATV logging requires that liquid be present in the portion of the borehole to be logged. However, the liquid does not need to be optically clear. The ATV probe must be centralized in the borehole to acquire optimal images of the borehole wall. If the borehole wall is rough and/or irregular or the diameter of the open borehole is larger than the diameter of the casing, the probe may not be adequately centralized and the quality of the acoustic images may be compromised.

The ATV logs are used to determine the depth and orientation of fractures and other planar features intersected by a borehole. In some cases, natural planar features in the bedrock, such as mineral veins, bedding, and foliation may appear to be fractures in the ATV logs, but are not actual discontinuities in the bedrock.

The accuracy of the orientation measured by the ABI-40, as stated by the manufacturer, is ±0.5° for the inclination data and ±1° for the azimuth data. The ABI-40 relies on the earth's magnetic field to determine azimuth. Therefore, in areas where the magnetic field may be significantly affected by local magnetic objects, the accuracy of dip azimuths reported in the logs may be reduced. Specifically, the dip azimuth data of bedrock structures and the borehole deviation data within approximately five feet of steel casing are not accurate.

Fluid Temperature. Fluid temperature logging requires that liquid be present in the portion of the borehole to be logged. According to the manufacturer's specifications, the measurement range is -20°C to 80°C, the accuracy is better than ±1%, and the resolution is 0.01° C. Temperature logging is ineffective for accurately measuring the formation fluid temperature unless the borehole fluid is at equilibrium, except for detecting flow into or out of the borehole via hydraulically transmissive fractures. Additionally, a vertical temperature gradient must be present in the borehole in order to detect water movement into or out of the borehole.

Fluid Resistivity. Fluid resistivity logging requires that liquid be present in the portion of the borehole to be logged. According to the manufacturer's specifications, the measurement range is 0 ohm-m to 100 ohm-m, the accuracy is better than ±1%, and the resolution is 0.05%. A contrast in fluid resistivity must be present between the borehole fluid and fluid in the fractures in order to detect water movement into or out of the borehole.

Natural Gamma Ray. Natural gamma ray data can be acquired with or without liquid in the borehole and in an un-cased, PVC-cased, or steel-cased borehole. However, if a liquid or casing is present, the liquid or the casing attenuates the natural gamma rays, and, therefore, lower values are measured than if the borehole was air-filled and/or un-cased. According to the manufacturer's specifications, the measurement range is 0 CPS to 100,000 CPS, the accuracy is

±1% of full scale, and the resolution is 0.02% of full scale. Natural gamma ray data do not have a quantitative value in terms of geologic properties.

Heat Pulse Flow Meter. The HPFM requires liquid in the interval to be logged. According to the manufacturer's specifications for the HPFM, the measuring range is 0.03 to 1.0 gpm, the accuracy is ±5% for the mid-range, increasing to ±15% for the extremes of the range, and the resolution is 5%. Data below the stated calibration range are reported when such data are repeatable. Although the accuracy of such data may be low, non-zero values indicate that flow is occurring and indicate the direction of flow. The HPFM probe measures the difference in temperature between the upper and lower temperature sensors. In the absence of flow, the thermal pulse would move symmetrically out from the grid, affecting the two sensors equally as a function of time. Therefore, the conductive or convective dissipation of the heat pulse would yield a zero value in the absence of flow.

Field Procedures & Data Acquisition

Adequate tension was maintained with the logging cable during the borehole geophysical logging and the depth encoder was cleaned after each logging run in order to maintain accurate depth measurements. Repeat sections for each log were acquired to verify depth consistency. In addition, at the beginning and end of a logging run, a fiducial depth (top of casing) was measured and checked for consistency. Recorded depths of fixed features in the borehole (i.e. reported casing lengths and reported borehole depths) were also checked for depth consistency. The cable and downhole probes were decontaminated prior to first use and after logging each borehole with an Alconox and water solution followed by rinsing with water.

The borehole geophysical logging sequence and the data acquisition parameters for the seven (7) logged boreholes are reported in Table 2.

Table 2 – Borehole Geophysical Logging Sequence & Data Acquisition Parameters

Log	Sampling Interval	Logging Speed	Logging Direction
1. Fluid Temperature & Fluid Resistivity	0.10 feet	10 feet/minute	down and repeat up
2. OTV	0.01 feet	5 feet/minute	down
3. ATV& Acoustic Caliper	0.01 feet	8 feet/minute	down and repeat up
4. HPFM under ambient conditions	HPFM data were acquired at discrete depths under ambient conditions.		
5. HPFM under pumping conditions	HPFM data were acquired at discrete depths while water was pumped from each borehole at a low constant rate.		

Data Processing

The processing consists mainly of selecting scales, filters, and the layout of the tracks. In addition, the OTV and ATV data require determining the depth, orientation, and category of the bedrock structures detected. To increase the quality of the OTV images, the brightness and contrast of the images were adjusted. To increase the quality of the images, the ATV travel time images were digitally centralized. The ATV amplitude images can be normalized, although normalization was not applied to the ATV amplitude data for this project.

Data Interpretation & Presentation

Bedrock Fracture Interpretation & Presentation. Fractures can be identified on the basis of the OTV images, ATV amplitude images, and ATV travel time images. Some, if not most, of the criteria for identifying fractures based on the OTV and ATV data require a judgment call, and different log analysts will not necessarily make the same call. Hence, some of the bedrock structures identified as fractures may not be fractures. Bedding, foliation, veins, and other planar geologic features in the bedrock may appear similar to fractures in the borehole geophysical data.

The datum for depths in this report is the top of the 6-inch steel casing at each borehole. An elevation track is provided along with depth in the borehole geophysical logs and tables of bedrock structures. When both the depth track and elevation track are provided on the same log or table, the depth track is provided in black and the elevation track is provided in blue to minimize confusion between depths and elevations. The elevation track is based on the top of casing elevations provided by WESTON.

The depths of bedrock structures are reported as the average depth of the top and bottom intersections of each bedrock structure and the borehole wall. The orientations of bedrock structures (fractures, bedding, foliation, veins, and other planar geologic features) are reported as the dip azimuth (dip direction) and dip angle of each structure. The dip azimuth is perpendicular to strike as used commonly by geologists. The televiewer logs and the dip azimuth data are referenced to true north using a magnetic declination of 15° west. The dip angle data are reported from horizontal.

Bedrock structures detected in the televiewer logs are grouped into three categories: Fracture Rank 1, Fracture Rank 2, and Fracture Rank 3. The categories are shown as color-coded lines and symbols on the structure projection plots, tadpole plots, and on the structure statistics plots. Figure 4 explains the bedrock structure categories and Figure 5 explains how to read the tadpole plots.

Fracture Rank 1 describes minor fractures that are not distinct and may not be continuous around the borehole. Fracture Rank 2 describes intermediate fractures that are distinct and

continuous around the borehole with little or no apparent aperture. Fracture Rank 3 describes major fractures that are distinct and continuous around the borehole with apparent aperture.

The structure projection plots, sinusoidal curves in the log track labeled Structure Projection, display the depth, orientation, and category of the bedrock structures detected in the televiewer data. Bedrock structures are essentially planar for short distances such as the intersection of the open borehole and the bedrock structure. The intersection of a plane, the bedrock structure, with a cylinder, the borehole, is a circle on the plane. When the circle is unwrapped and plotted as it is in the structure projection plots, the circle plots as a sine curve as shown in Figure 6. The orientations of structures plotted in the structure projection plots are referenced to magnetic north. The structures plotted in the structure projection plots are not corrected for borehole deviation. Therefore, the orientation of the structures are referred to as *apparent* orientations (that is, *apparent* dip angle and *apparent* dip azimuth). The true orientation (that is, *true* dip angle and *true* dip azimuth) of the detected bedrock structures are shown in the log track labeled Tadpole Plot. The correction from apparent to true orientation is made using the borehole deviation data acquired by the televiewer probes (OTV and ATV probes).

The tadpole plots are created from the structure projection plots after the data are corrected from apparent to true dip azimuth and dip angle as previously discussed. The tadpole plots graphically display the depth, orientation, and category of the bedrock structures interpreted from the televiewer images. The orientations of bedrock structures are graphically displayed on the tadpole plots by a tadpole consisting of a circle, the head, and a line, the tail. The position of the head, left to right on the tadpole plot, gives the dip angle of the bedrock structure. The left side of the track indicates a dip angle of 0° and the right side of the track indicates a dip angle of 90° from horizontal. The position of the tail gives the dip azimuth of the fracture and can be read like a compass. The tail pointing directly up is 0°, north. We note explicitly that dip azimuth is perpendicular to strike as the term is used by geologists.

Borehole Flow. The interpretation of flow under ambient and pumping conditions in the logged borehole is based on the fluid temperature, fluid resistivity, and HPFM data. Fluctuations in fluid temperature and fluid resistivity data indicate depths of possible flow into or out of the boreholes. Changes in the flow rate and/or direction in the HPFM data also indicate depths of flow into or out of the boreholes. It is possible to calculate the flow rate, in gallons per minute (gpm), and flow direction based on the HPFM data. Therefore, it is possible to differentiate between flow into and flow out of the boreholes based on the HPFM data. However, the fluid temperature and fluid resistivity data alone can only be used to determine depths of possible flow into or out of the boreholes. It is not possible to determine the flow rate, flow direction, or differentiate between flow into and flow out of the boreholes based on fluid temperature and fluid resistivity alone.

Flow into and out of a borehole in fractured bedrock primarily occurs through transmissive fractures intersected by the borehole. Since HPFM data are acquired at discrete depths, changes in the flow rate and/or direction are detected between a pair of HPFM measurement depths. Depths of flow into and out of the boreholes detected by the HPFM are further refined by consideration of the fluid temperature and fluid resistivity logs, and the bedrock fractures detected in the televiewer (OTV and ATV) logs in the depth zones between HPFM measurements points where a change in the flow rate and/or direction is detected.

Lithologic Variation Interpretation. The interpretation of lithologic variation in the bedrock encountered in the logged borehole is based on the natural gamma ray, OTV, and ATV data. Lithologic variation can be identified based on baseline shifts in the natural gamma ray data, changes in the color and texture of the bedrock in the OTV images, and in changes in the reflectivity of the acoustic signal in the ATV amplitude images. The borehole geophysical logging data can be used to determine the depths of lithologic variation in the bedrock, but cannot be used to identify a specific bedrock type.

Presentation of Borehole Geophysical Logs. Two sets of borehole geophysical logs are provided for each logged borehole:

1. Borehole Image Logs
2. Borehole Geophysical Logs

The different scales for the Borehole Image Logs and the Borehole Geophysical Logs are designed to enhance presentation of the specific data plotted in each log. The scale of 1-inch to 2-feet for the Borehole Image Logs provides a more detailed view of the high revolution OTV and ATV images, while the more compressed scales of 1-inch to 10-feet for the Borehole Geophysical Logs enable better interpretation of the linear data where anomalies may be subtle and take place over broad depth ranges.

The Borehole Image Logs consist of:

Track 1. OTV Image
Track 2. Depth in feet below the top of the steel casing - scale at 1-inch to 2-feet
Track 3. ATV Amplitude
Track 4. ATV Travel Time & Structure Projection
Track 5. Acoustic Caliper & Tadpole Plot
Track 6. OTV Virtual Core
Track 7. Elevation Track in feet - based on the top of casing elevations provided by WESTON - scale at 1-inch to 2-feet
Track 8. ATV Virtual Core

The Borehole Geophysical Logs consist of:

Track 1. OTV Image
Track 2. Depth in feet below the top of the steel casing - scale at 1-inch to 10-feet
Track 3. ATV Amplitude
Track 4. Acoustic Caliper & Tadpole Plot
Track 5. Natural Gamma Ray
Track 6. Fluid Temperature & Fluid Resistivity
Track 7. Hydraulic Transmissivity, PCE Concentration, & TCE Concentration
The transmissivity, PCE, & TCE data were provided by Weston
and were acquired during packer testing
Track 8. Elevation Track in feet - based on the top of casing elevations
provided by WESTON - scale at 1-inch to 10-feet
Track 8. HPFM & Flow Comments

Results

General. The general location of the site is shown in Figure 1. The borehole geophysical logs are given in Appendix 1, the bedrock structure statistics plots are given in Appendix 2, the tables of bedrock structures are given in Appendix 3, and the HPFM results during the WESTON pump test are given in Appendix 4. The datum for depths in this report is the top of the 6-inch steel casing at each borehole. An elevation track is provided along with depth in the logs and tables of bedrock structures. The depth track is provided in black and the elevation track is provided in blue to minimize confusion between depths and elevations. The elevation track is based on the top of casing elevations provided by WESTON. The televiewer logs, dip azimuth data, and borehole deviation data are referenced to true north using a magnetic declination of 15°west. The dip angle data are reported from horizontal.

Borehole geophysical logging was conducted in seven (7) boreholes in November, 2012. The logged boreholes were identified as BR-10, BR-11, BR-12, BR-13, BR-14, BR-15 and BR-16. The approximate locations of the logged boreholes are shown in Figure 2. The boreholes were cased through the overburden with 6-inch steel casing and were open-hole throughout the bedrock portions of the boreholes. The date logged, casing depth, open-hole interval, open bedrock diameter, and water level for each logged boreholes are reported in Table 1.

Bedrock Fracture Results. The number of bedrock structures interpreted as fractures in the logged boreholes and the most prominent orientations of the fractures detected in the logged boreholes are reported in Table 3 and are evident in the bedrock structure statistics plots in Appendix 2.

Table 3 – Summary of Bedrock Fracture Statistics

Borehole	Number of Fractures	Most Prominent Fracture Dip Azimuths	Most Prominent Fracture Dip Angles
BR-10	242	primary: east-southeast (105° - 120°) secondary: west-northwest (285° - 300°)	70° - 75° from horizontal
BR-11	238	primary: west-northwest (285° - 300°) secondary: east-southeast (90° - 120°)	55° - 70° from horizontal
BR-12	241	primary: west-northwest (270° - 315°) secondary: east-southeast (90° - 120°)	60° - 75° from horizontal
BR-13	295	primary: west-northwest (270° - 285°) secondary: east-southeast (105° - 120°)	primary: 20° - 40° from horizontal secondary: 70° - 75° from horizontal
BR-14	113	primary: northwest (300° - 345°) secondary: east-southeast (105° - 120°)	primary: 30° - 35° from horizontal secondary: 70° - 75° from horizontal
BR-15	128	northwest (300° - 315°)	45° - 65° from horizontal
BR-16	92	northwest (300° - 345°)	15° - 50° from horizontal

Borehole Flow Results. The borehole flow data (fluid temperature, fluid resistivity, and HPFM data) are plotted in the borehole geophysical logs provided in Appendix 1. Depths of interpreted flow into and out of the boreholes are reported as text overlaid on the HPFM track (the last track to the right) on the borehole geophysical logs.

Flow was not detected in any of the logged boreholes with the HPFM under ambient conditions. Therefore, flow results in this report are based only on the HPFM data under pumping conditions as well as the fluid temperature and fluid resistivity data. Flow was not detected in borehole BR-14 under ambient or pumping conditions. Therefore, flow for BR-14 is based only on the fluid temperature and fluid resistivity data. HPFM data under pumping conditions do not refer to the HPFM data acquired during the WESTON pump test. HPFM data under pumping conditions are HPFM data acquired while water was pumped at a constant low flow rate, less than one gallon per minute (gpm), in the casing of the borehole being logged with the HPFM. Because flow was not detected under ambient conditions, pumping each borehole at a low and constant rate during HPFM testing provides information on depths where water flows into the boreholes under stressed conditions, which indicates the depths of hydraulically transmissive fractures. The borehole flow conditions for each of the logged boreholes are reported in Table 4 to Table 10.

Table 4 - Summary of Borehole Flow in BR-10 Under Pumping Conditions

Depths (feet)	Comments
11.6	water level
18.0 - 20.0	location of the pump for HPFM logging under pumping conditions
20.0 - 83.1	flow up the borehole in the casing at 0.11 gpm
83.1	bottom of casing
83.1 - 90.3	flow into and up the borehole under pumping conditions
90.3 - 94.4	flow up the borehole at 0.04 gpm under pumping conditions
94.4 - 100.5	flow into and up the borehole under pumping conditions
100.5 - 103.4	flow up the borehole at 0.02 gpm under pumping conditions
103.4 - 111.8	possible flow into or out the borehole
111.8 - 238.7	flow up the borehole at 0.02 gpm under pumping conditions
238.7 - 240.0	flow into and up the borehole under pumping conditions
240.0 - 376.7	no flow detected
376.7	bottom of the borehole

Table 5 - Summary of Borehole Flow in BR-11 Under Pumping Conditions

Depths (feet)	Comments
5.8	water level
18.0 - 20.0	location of the pump for HPFM logging under pumping conditions
20.0 - 131.3	flow up the borehole in the casing at 0.03 gpm
131.3	bottom of casing
131.3 - 136.0	flow up the borehole at 0.03 gpm under pumping conditions
136.0 - 138.6	flow into and up the borehole under pumping conditions
138.6 - 250.2	flow up the borehole at 0.02 gpm under pumping conditions
250.2 - 254.5	flow into and up the borehole under pumping conditions
254.5 - 328.3	no flow detected
328.3 - 336.2	possible flow into or out the borehole
336.2 - 441.2	no flow detected
441.2	bottom of the borehole

Table 6 - Summary of Borehole Flow in BR-12 Under Pumping Conditions

Depths (feet)	Comments
10.0	water level
18.0 - 20.0	location of the pump for HPFM logging under pumping conditions
20.0 - 115.6	flow up the borehole in the casing at 0.15 gpm
115.6	bottom of casing
115.6 - 121.3	flow up the borehole at 0.15 gpm under pumping conditions
121.3 - 131.6	flow into and up the borehole under pumping conditions
131.6 - 152.7	flow up the borehole at 0.08 gpm under pumping conditions
152.7 - 171.3	flow into and up the borehole under pumping conditions
171.3 - 247.2	flow up the borehole at 0.03 gpm under pumping conditions
247.2 - 257.5	flow into and up the borehole under pumping conditions
257.5 - 423.0	no flow detected
423.0	bottom of the borehole

Table 7 - Summary of Borehole Flow in BR-13 Under Pumping Conditions

Depths (feet)	Comments
8.1	water level
18.0 - 20.0	location of the pump for HPFM logging under pumping conditions
20.0 - 73.9	flow up the borehole in the casing at 0.02 gpm
73.9	bottom of casing
73.9 - 85.3	flow up the borehole at 0.02 gpm under pumping conditions
85.3 - 88.2	flow into and up the borehole under pumping conditions
88.2- 132.6	no flow detected
132.6 - 143.4	possible flow into or out the borehole
143.4 - 148.7	no flow detected
148.7 - 150.5	possible flow into or out the borehole
150.5 - 462.7	no flow detected
462.7	bottom of the borehole

Flow was not detected in borehole BR-14 with the HPFM under ambient or pumping conditions. During pumping, all of the water pumped from the borehole was generated from a drop in the water level, water was not produced from the bedrock fractures. Therefore, the flow interpretation for borehole BR-14 is based on the fluid temperature and fluid resistivity data.

Table 8 - Summary of Borehole Flow in BR-14

Depths (feet)	Comments
6.8	water level
18.0 - 20.0	location of the pump for HPFM logging under stressed conditions
109.0	bottom of casing
109.0 - 113.7	no flow detected
113.7 - 125.2	possible flow into or out the borehole
125.2 - 249.3	no flow detected
249.3 - 255.9	possible flow into or out the borehole
255.9 - 425.2	no flow detected
425.2 - 431.8	possible flow into or out the borehole
431.8 - 442.9	no flow detected
442.9	bottom of the borehole

Table 9 - Summary of Borehole Flow in BR-15 Under Pumping Conditions

Depths (feet)	Comments
5.0	water level
18.0 - 20.0	location of the pump for HPFM logging under stressed conditions
20.0 - 103.0	flow up the borehole in the casing at 0.11 gpm
103.0	bottom of casing
103.0 - 111.8	flow up the borehole at 0.11 gpm under pumping conditions
111.8 - 118.6	flow into and up the borehole under pumping conditions
118.6 - 153.6	flow up the borehole at 0.10 gpm under pumping conditions
153.6 - 154.0	flow into and up the borehole under pumping conditions
154.0 - 206.4	flow up the borehole at 0.07 gpm under pumping conditions
206.4 - 206.9	flow into and up the borehole under pumping conditions
206.9 - 262.2	flow up the borehole at 0.03 gpm under pumping conditions
262.2 - 265.2	possible flow into or out the borehole
265.2 - 320.4	flow up the borehole at 0.03 gpm under pumping conditions
320.4 - 323.0	flow into and up the borehole under pumping conditions
323.0 - 394.3	no flow detected
394.3	bottom of the borehole

Table 10 - Summary of Borehole Flow in BR-16 Under Pumping Conditions

Depths (feet)	Comments
7.9	water level
18.0 - 20.0	location of the pump for HPFM logging under stressed conditions
20.0 - 100.4	flow up the borehole in the casing at 0.03 gpm
100.4	bottom of casing
100.4 - 223.9	flow up the borehole at 0.03 gpm under pumping conditions
223.9 - 224.8	flow into and up the borehole under pumping conditions
224.8 - 282.0	no flow detected
282.0 - 288.0	possible flow into or out the borehole
288.0 - 308.6	no flow detected
308.6 - 316.1	possible flow into or out the borehole
316.1 - 443.3	no flow detected
443.3	bottom of the borehole

Lithologic Variation Results. Lithologic variation was not detected in the bedrock encountered in logged boreholes based on the OTV, ATV, and natural gamma ray data. The relatively minor fluctuations exhibited in the natural gamma ray logs are interpreted as natural variation in the bedrock and not changes in bedrock lithology.

HPFM During the WESTON Pump Test Results. HPFM logging was conducted in eleven (11) boreholes during a multi-day pump test conducted by WESTON. During the last two days of the WESTON pump test, April 25 and 26, 2013, HPFM data were acquired by Hager-Richter in boreholes BR-1, BR-2, BR-3, BR-5, BR-9, BR-10, BR-11, BR-12, BR-16, MW-16R, and MW-30 to determine the interconnectivity of bedrock fractures intersected by the pumped borehole, BR-6, and the boreholes logged with the HPFM during the pump test. The approximate locations of the boreholes logged during the WESTON pump test are shown in Figure 3. HPFM data were acquired at discrete depths selected by WESTON and Hager-Richter after review of previous borehole geophysical logging data acquired by Hager-Richter and others.

Based on the HPFM logging during the last two days of the WESTON pump test, flow was detected in the open bedrock portions of boreholes BR-2, BR-3, BR-5, and BR-10. During the same time frame, flow was not detected in boreholes BR-1, BR-9, BR-11, BR-12, BR-16, MW-16R, and MW-30. Tables of the HPFM results during the WESTON pump test are provided in Appendix 5.

Limitations on the Use of this Report

This letter report was prepared for the exclusive use of Weston Solutions, Inc. (Client). No other party shall be entitled to rely on this Report or any information, documents, records, data, interpretations, advice or opinions given to Client by Hager-Richter Geoscience, Inc. in the performance of its work. The Report relates solely to the specific project for which Hager-Richter has been retained and shall not be used or relied upon by Client or any third party for any variation or extension of this project, any other project or any other purpose without the express written permission of Hager-Richter. Any unpermitted use by Client or any third party shall be at Client's or such third party's own risk and without any liability to Hager-Richter.

Hager-Richter has used reasonable care, skill, competence and judgment in the performance of its services for this project consistent with professional standards for those providing similar services at the same time, in the same locale, and under like circumstances. Unless otherwise stated, the work performed by Hager-Richter should be understood to be exploratory and interpretational in character and any results, findings or recommendations contained in this Report or resulting from the work proposed may include decisions which are judgmental in nature and not necessarily based solely on pure science or engineering. It should be noted that our conclusions might be modified if subsurface conditions were better delineated with additional subsurface exploration including, but not limited to, test pits, soil borings with collection of soil and water samples, and laboratory testing.

Except as expressly provided in this limitations section, Hager-Richter makes no other representation or warranty of any kind whatsoever, oral or written, expressed or implied; and all implied warranties of merchantability and fitness for a particular purpose, are hereby disclaimed.

If you have any questions or comments on this report, please contact us at your convenience. It has been a pleasure to work with WESTON on this project. We look forward to working with you again in the future.

Sincerely yours,
HAGER-RICHTER GEOSCIENCE, INC.

Robert L. Garfield

Robert Garfield
Vice President/Senior Borehole Geophysicist

Dorothy Richter, P.G.
President

List of Enclosures

Figures:
- Figure 1. General Site Location
- Figure 2. Borehole Location Plan
- Figure 3. Weston Pump Test Borehole Location Plan
- Figure 4. Key to Bedrock Structure Categories
- Figure 5. Tadpole Plot Explanation
- Figure 6. Televiewer Explanation

Appendix 1: Borehole Geophysical Logs
Appendix 2: Bedrock Structure Statistics Plots
Appendix 3: Tables of Bedrock Structures
Appendix 4: HPFM Results During the Weston Pump Test

FIGURES

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APPROXIMATE SCALE (feet)

0 2000 4000

NOTE:

Modified from Google Earth Pro aerial photograph.

LOCATION

Figure 1
General Site Location
Savage Municipal Water Supply
Superfund Site
Milford, New Hampshire

File 12RG62	October, 2013

HAGER–RICHTER GEOSCIENCE, INC.
Salem, New Hampshire

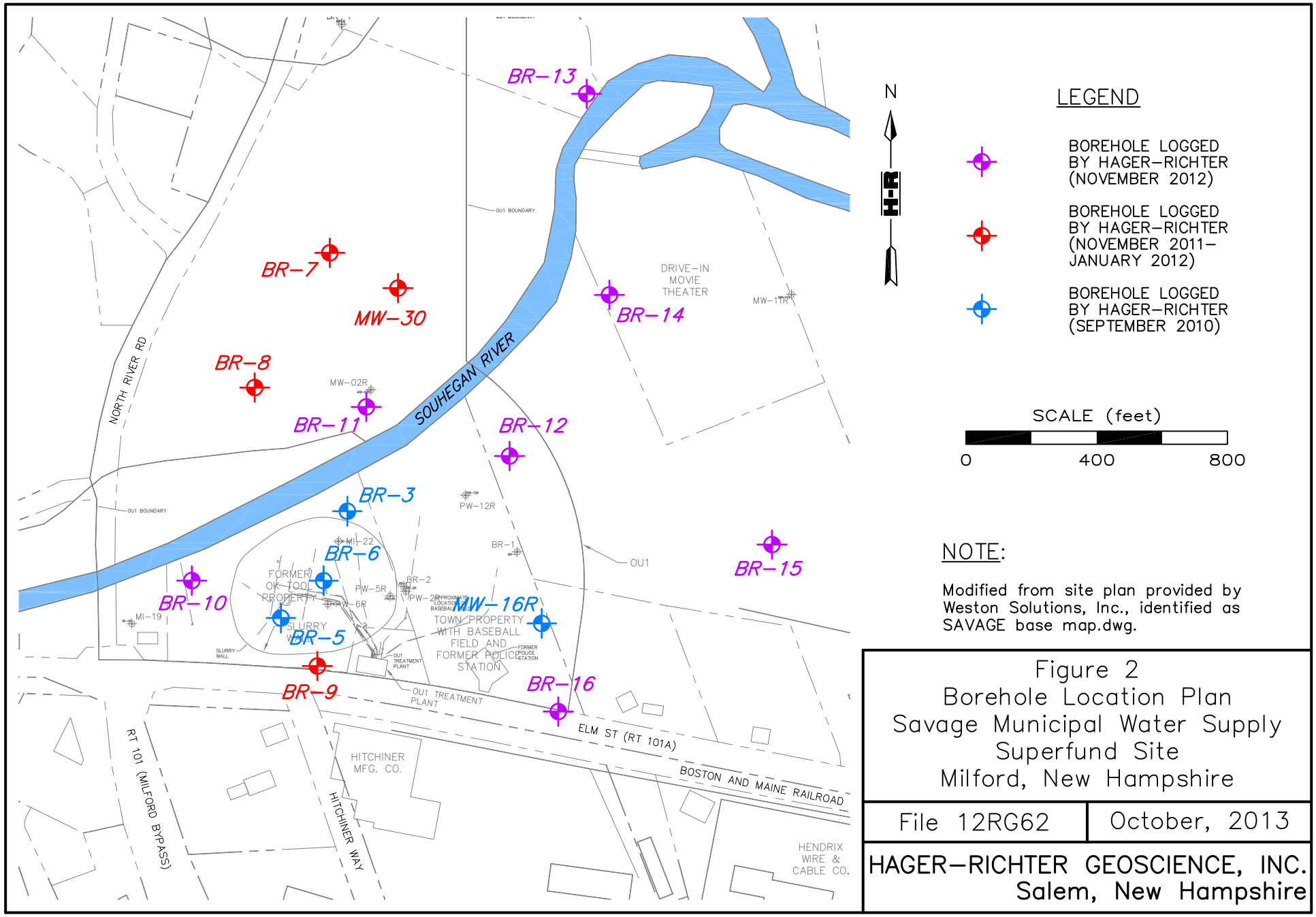


Figure 2
Borehole Location Plan
Savage Municipal Water Supply
Superfund Site
Milford, New Hampshire

File 12RG62	October, 2013

HAGER-RICHTER GEOSCIENCE, INC.
Salem, New Hampshire

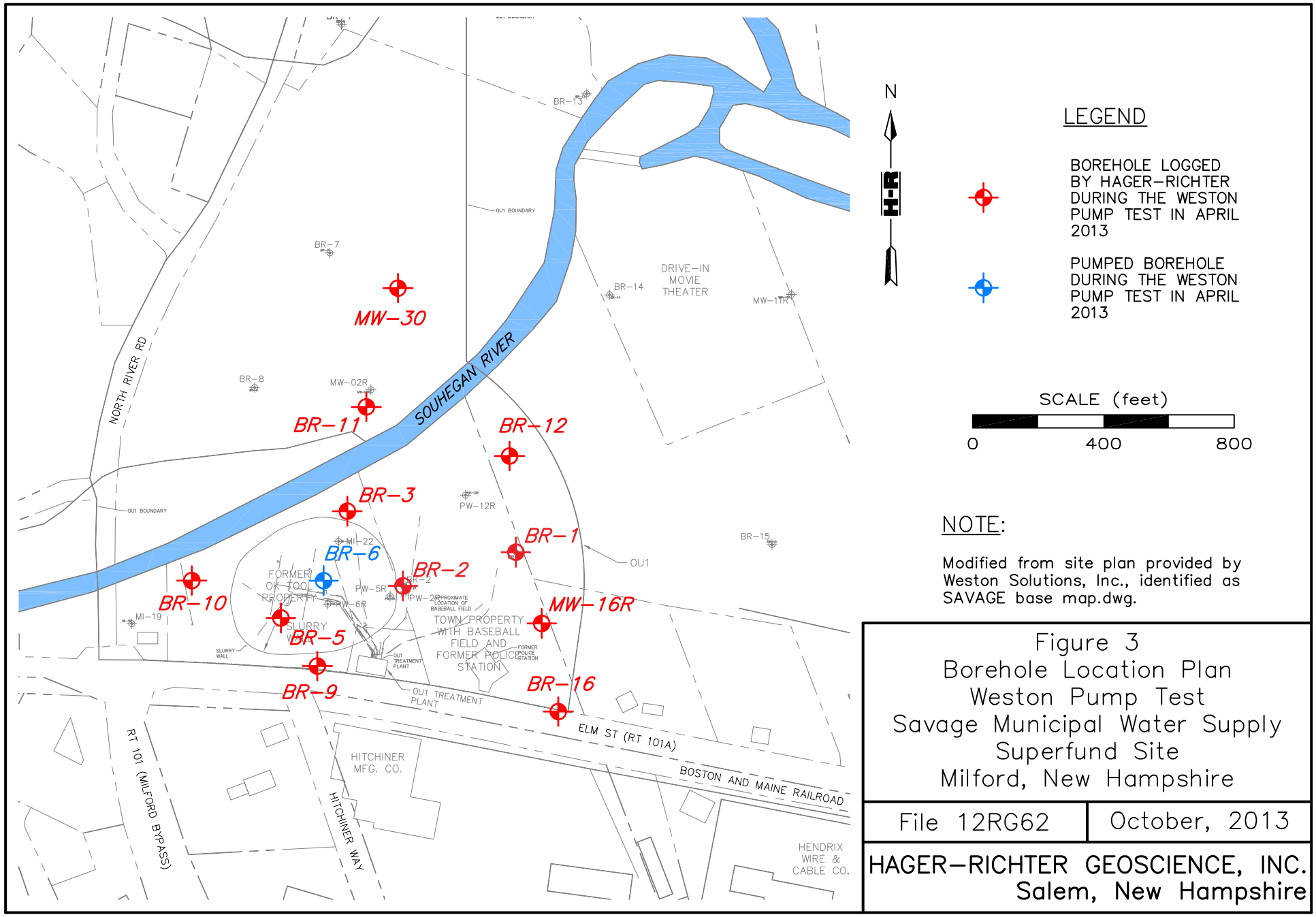


Figure 3
Borehole Location Plan
Weston Pump Test
Savage Municipal Water Supply
Superfund Site
Milford, New Hampshire

File 12RG62	October, 2013

HAGER-RICHTER GEOSCIENCE, INC.
Salem, New Hampshire

Tadpole	Structure Category (Symbol Color)	Description
	Fracture Rank 1 (Light Blue)	Minor Fracture - not distinct and may not be continuous around the borehole
	Fracture Rank 2 (Blue)	Intermediate Fracture - distinct and continuous around the borehole with little or no apparent aperture
	Fracture Rank 3 (Red)	Major Fracture - distinct and continuous around the borehole with apparent aperture

Figure 4. Key to bedrock structure categories.

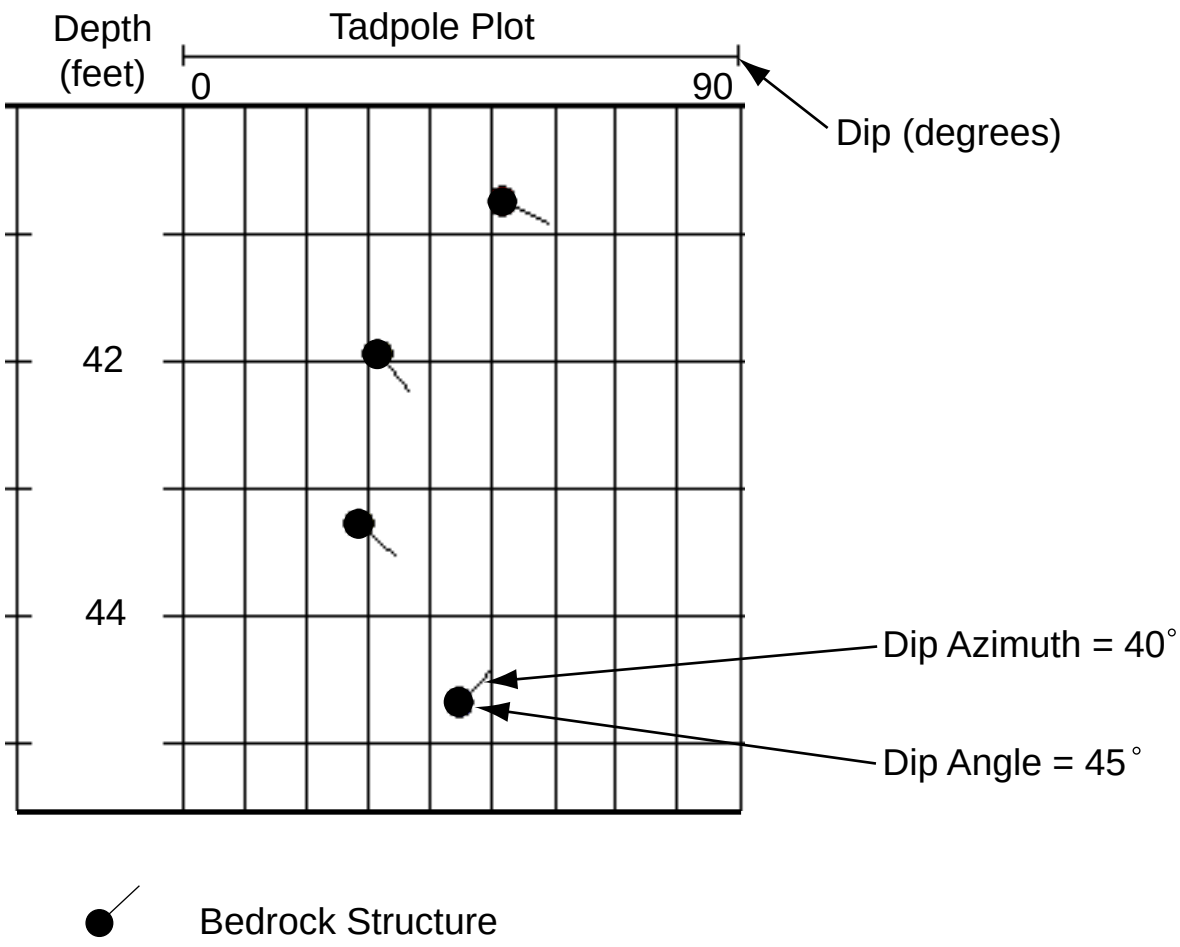


Figure 5. Tadpole plot explanation. The orientation of the bedrock structures is graphically displayed by a tadpole consisting of a circle, the head, and a line, the tail. The position of the head, left to right on the tadpole plot, gives the dip angle of the structure. The left side of the track indicates a dip angle of 0°, and the right side of the track indicates a dip angle of 90° from horizontal. The orientation of the tail gives the dip azimuth of the structure and can be read like a compass. The tail pointing directly up is 0°, north.

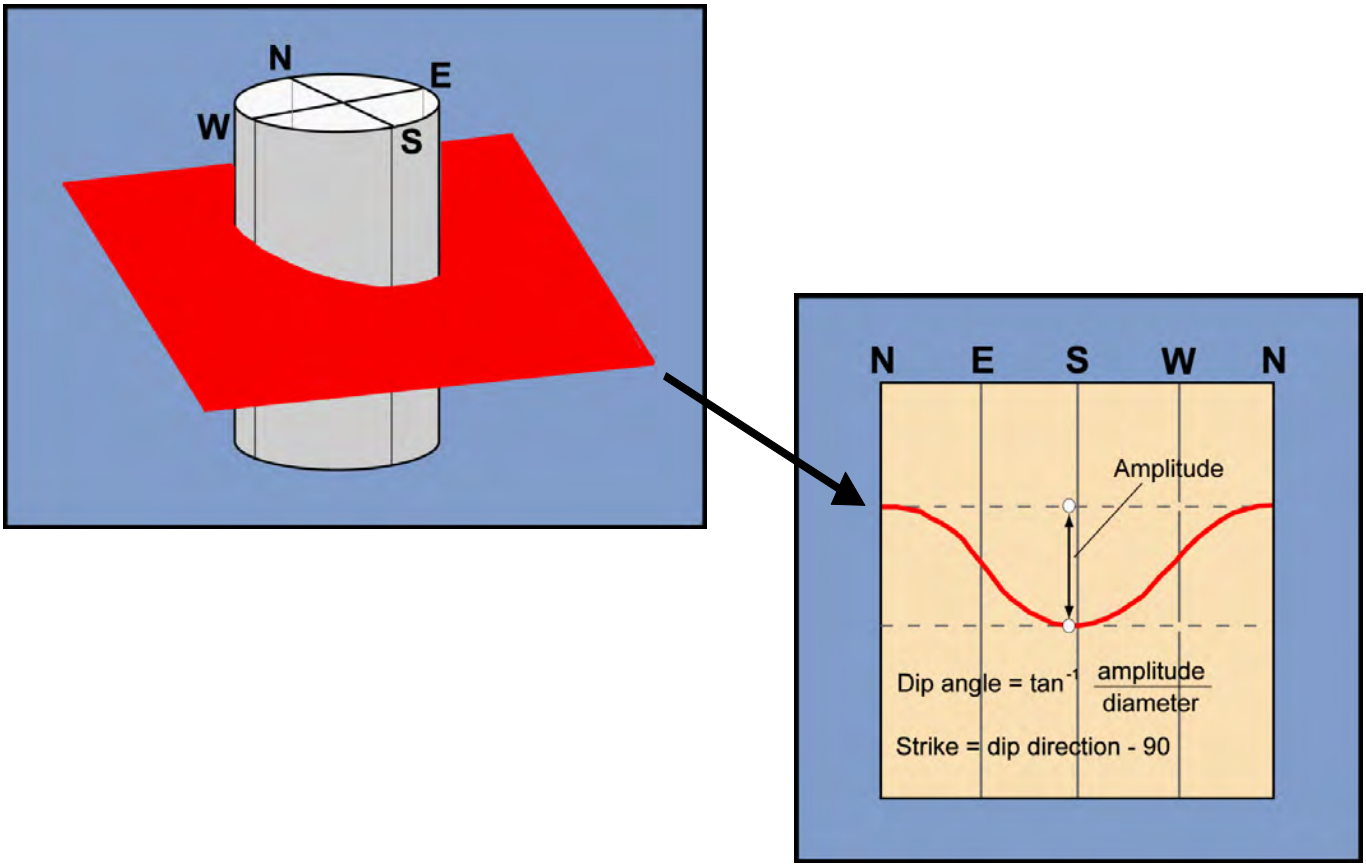


Figure 6. Televiewer explanation. The image on the left depicts a planar structure in red, such as a fracture or bedding plane, intersected by a borehole. The image on the right depicts the same structure unwrapped as it would be displayed in an optical televiewer (OTV) or acoustic televiewer (ATV) log.

Figure modified from: Garfield, R.L., Day-Lewis, F.D., Gray, M.B., Johnson, C.D., Williams, J.H. and Day-Lewis, A.D.F., 2003, Fractured-Rock Aquifer Characterization within a Regional Geologic Context: Results from the Bucknell University Hydrogeophysics Test Site, GSA Northeastern Section, 38th Annual Meeting, Paper No. 25-19.

APPENDIX 1

BOREHOLE GEOPHYSICAL LOGS

HAGER-RICHTER GEOSCIENCE, INC.

8 Industrial Way - D10
Salem, NH 03079
Phone: 603-893-9944
Fax: 603-893-8313

BR-10 - BOREHOLE IMAGE LOGS

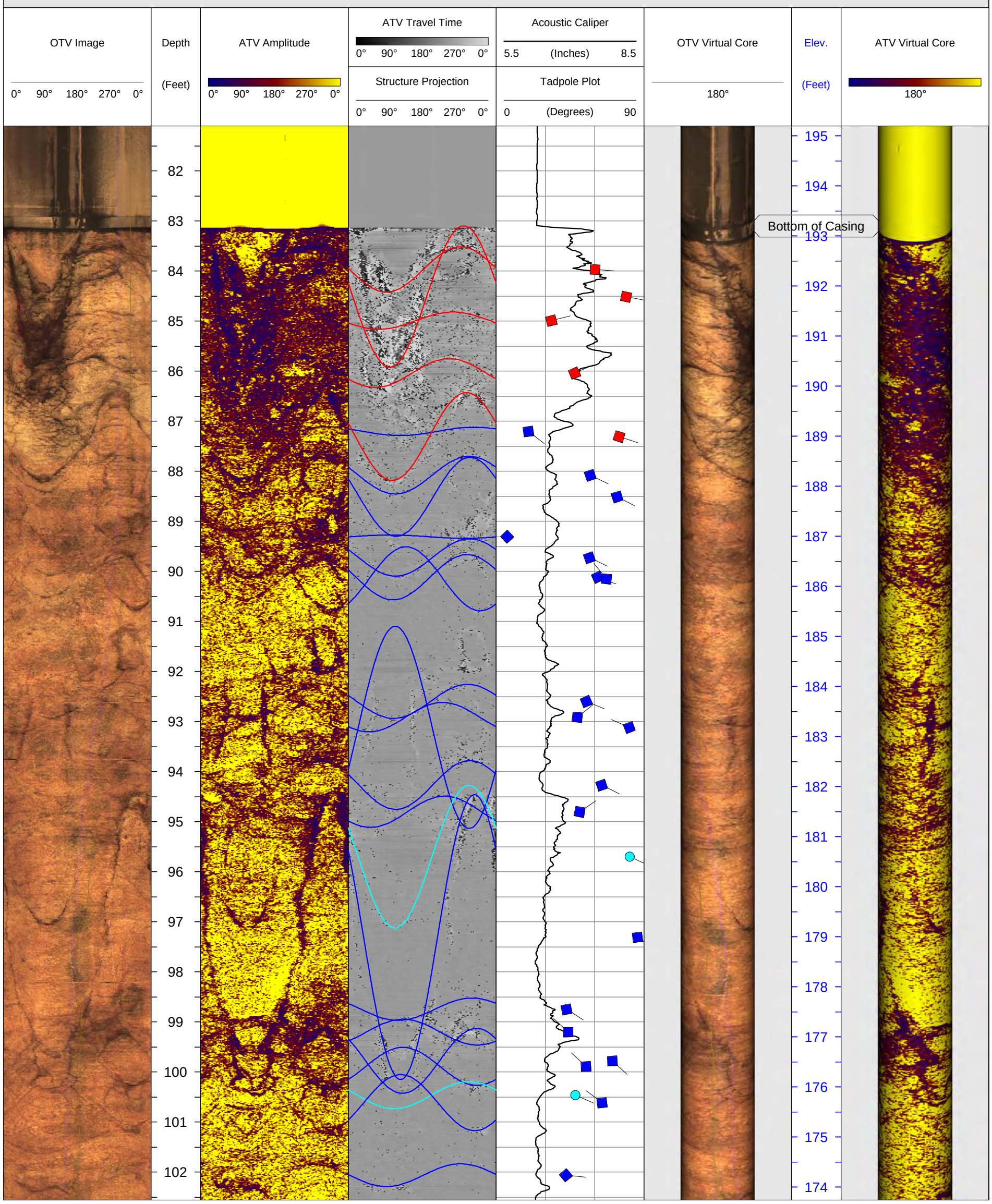
DATE LOGGED: November 13 & 14, 2012

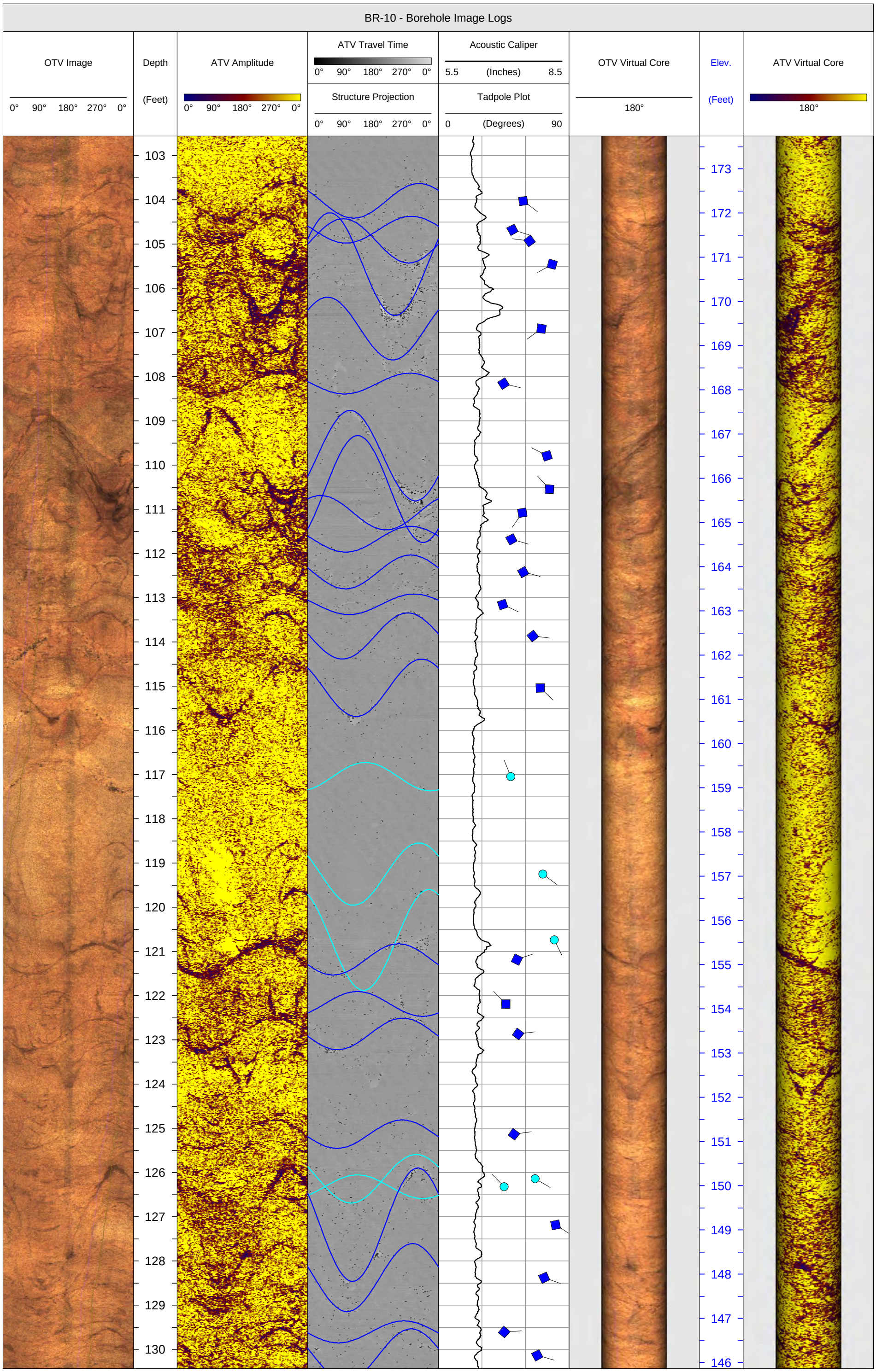
CLIENT:	Weston Solutions, Inc.	H-R FILE:	12RG62
PROJECT:	Borehole Geophysical Logging	LOG DATUM:	Top of the 6-Inch Steel Casing
LOCATION:	Savage Municipal Water Supply Superfund Site	TOP OF CASING ELEVATION:	276.3 Feet
CITY, STATE:	Milford, New Hampshire	ORIENTATION REFERENCE:	True North (Declination = 15 Degrees West)
LOGGING GEOPHYSICISTS:	Nick DeCristofaro & Eric Rickert	CASING STICK-UP:	1.9 Feet Above the Ground Surface
CLIENT REP. ON-SITE:	Andrew Fuller	BOREHOLE DIAMETER:	6 Inches
LOGS PROCESSED BY:	Robert Garfield	WATER LEVEL DEPTH:	11.6 Feet

STRUCTURE LEGEND

Fracture Rank 1 Fracture Rank 2 Fracture Rank 3

BR-10 - Borehole Image Logs




BR-10 - Borehole Image Logs
OTV Image
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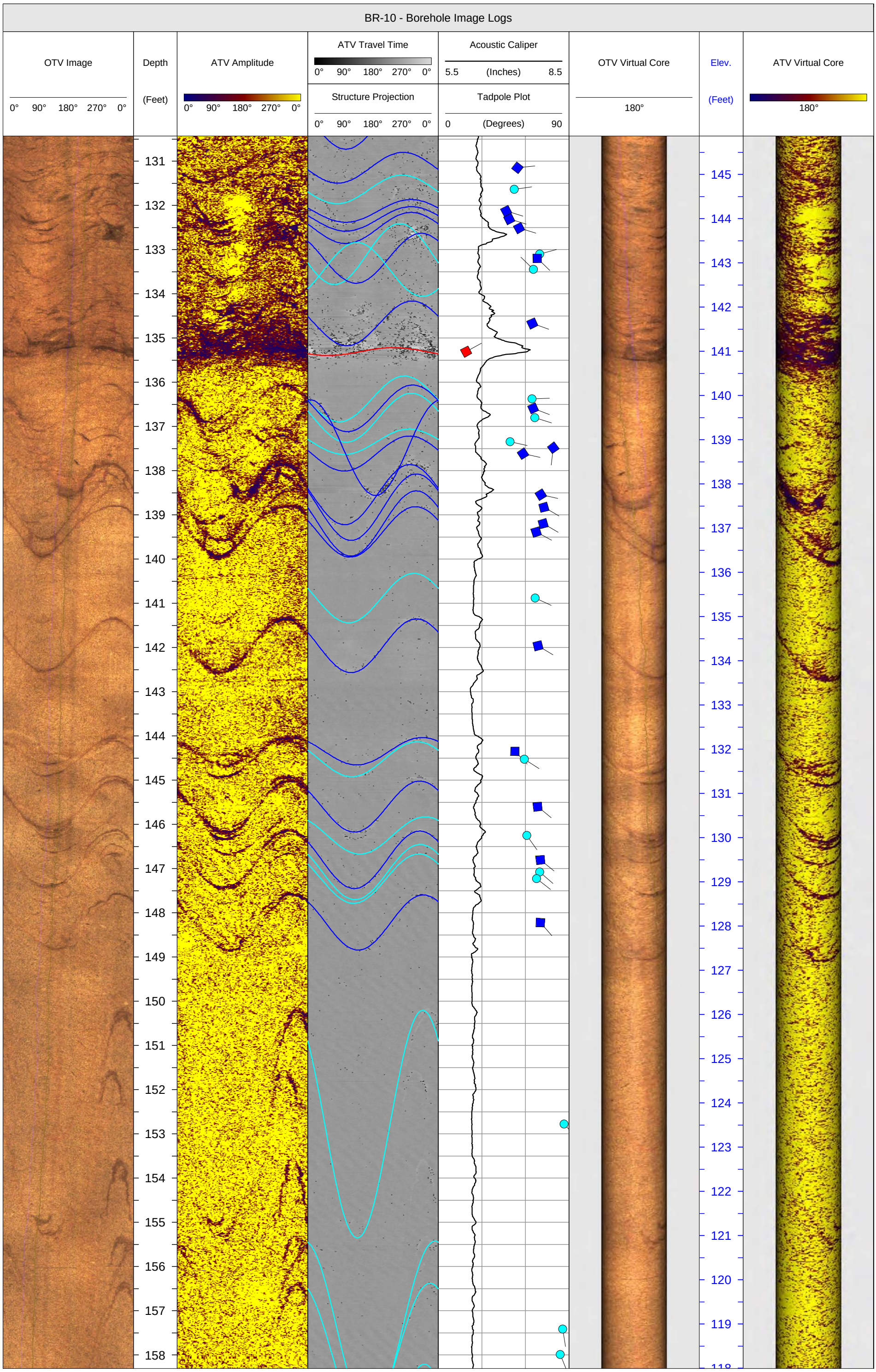
BR-10 - Borehole Image Logs
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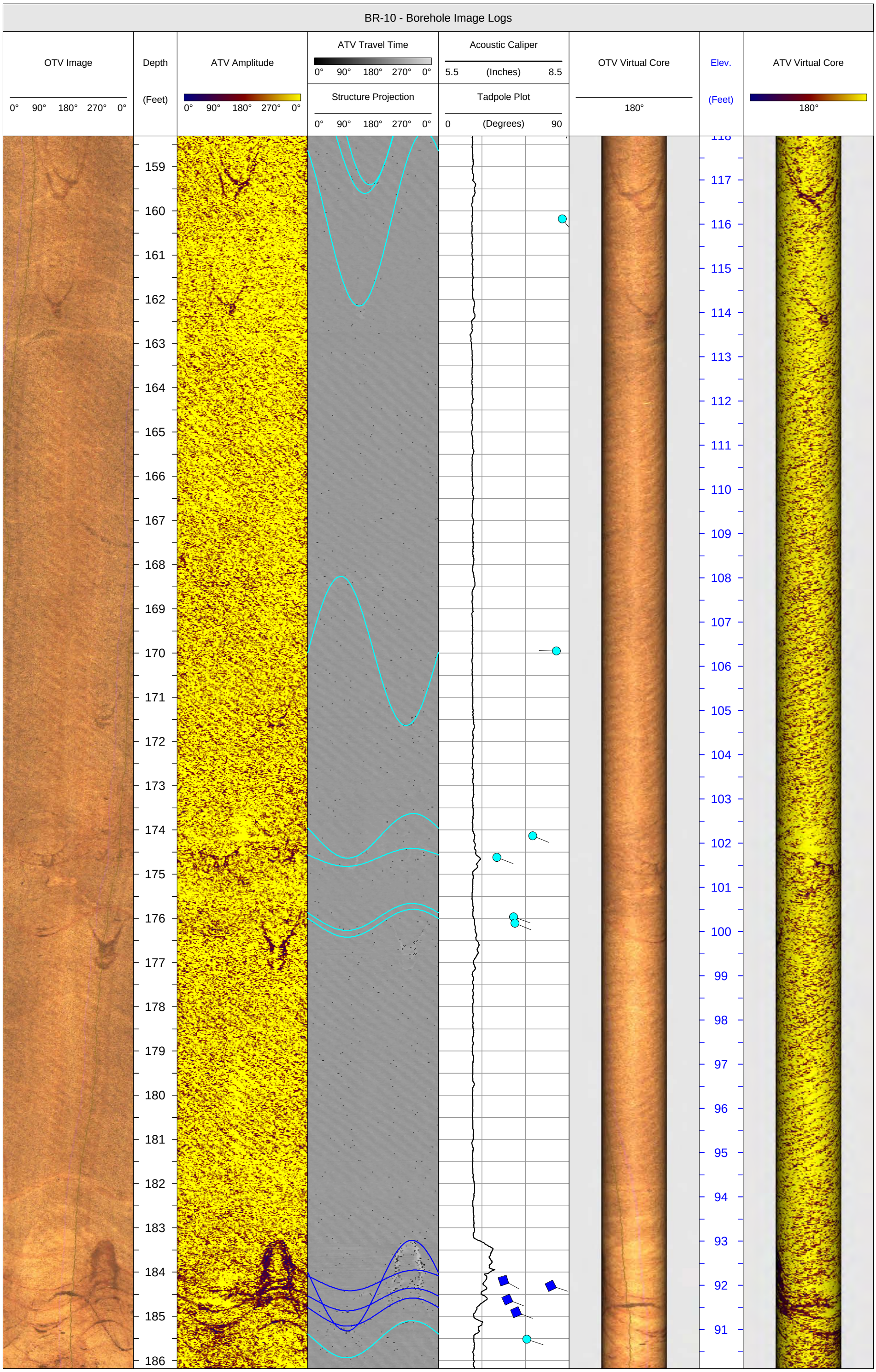
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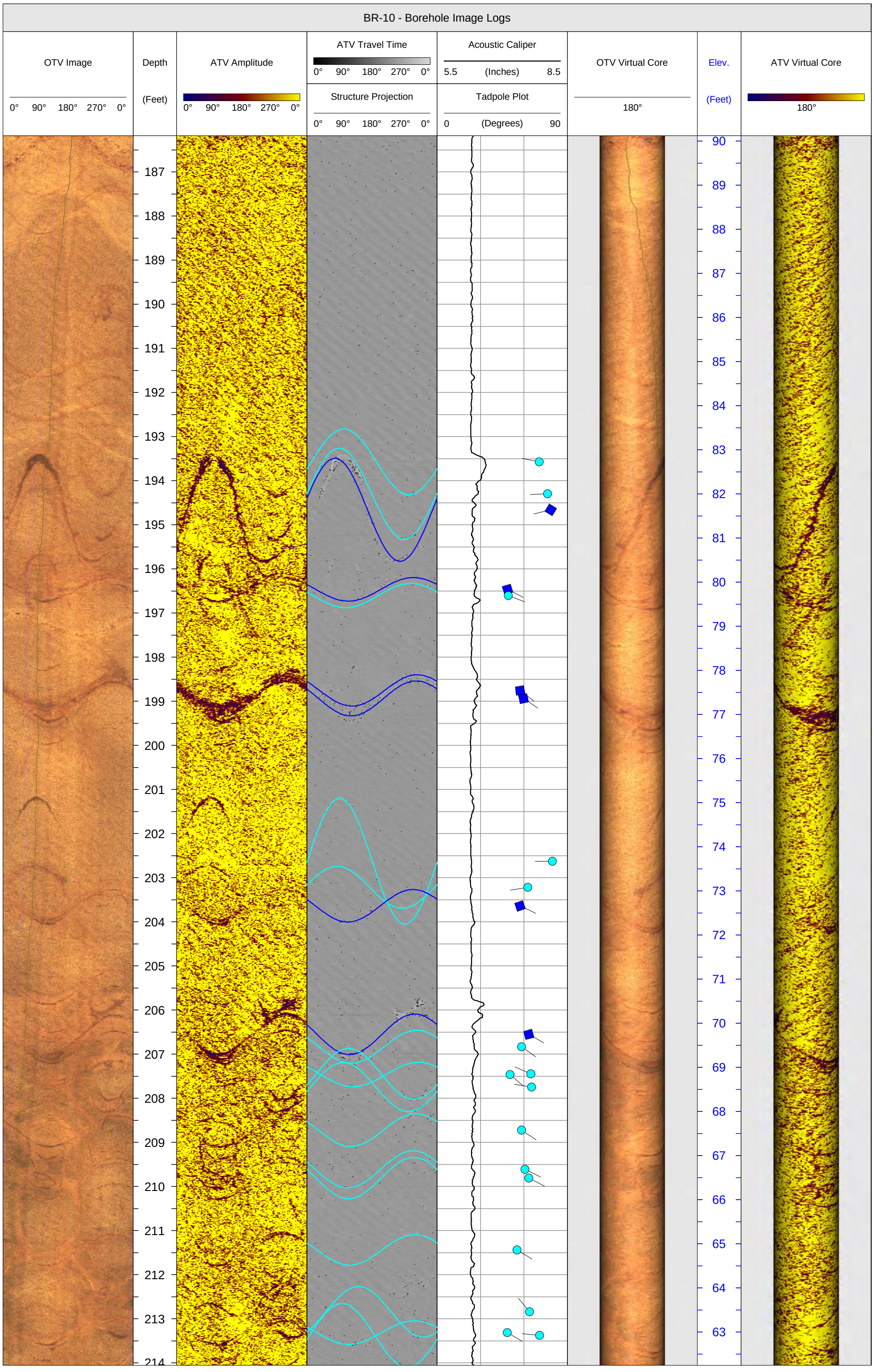
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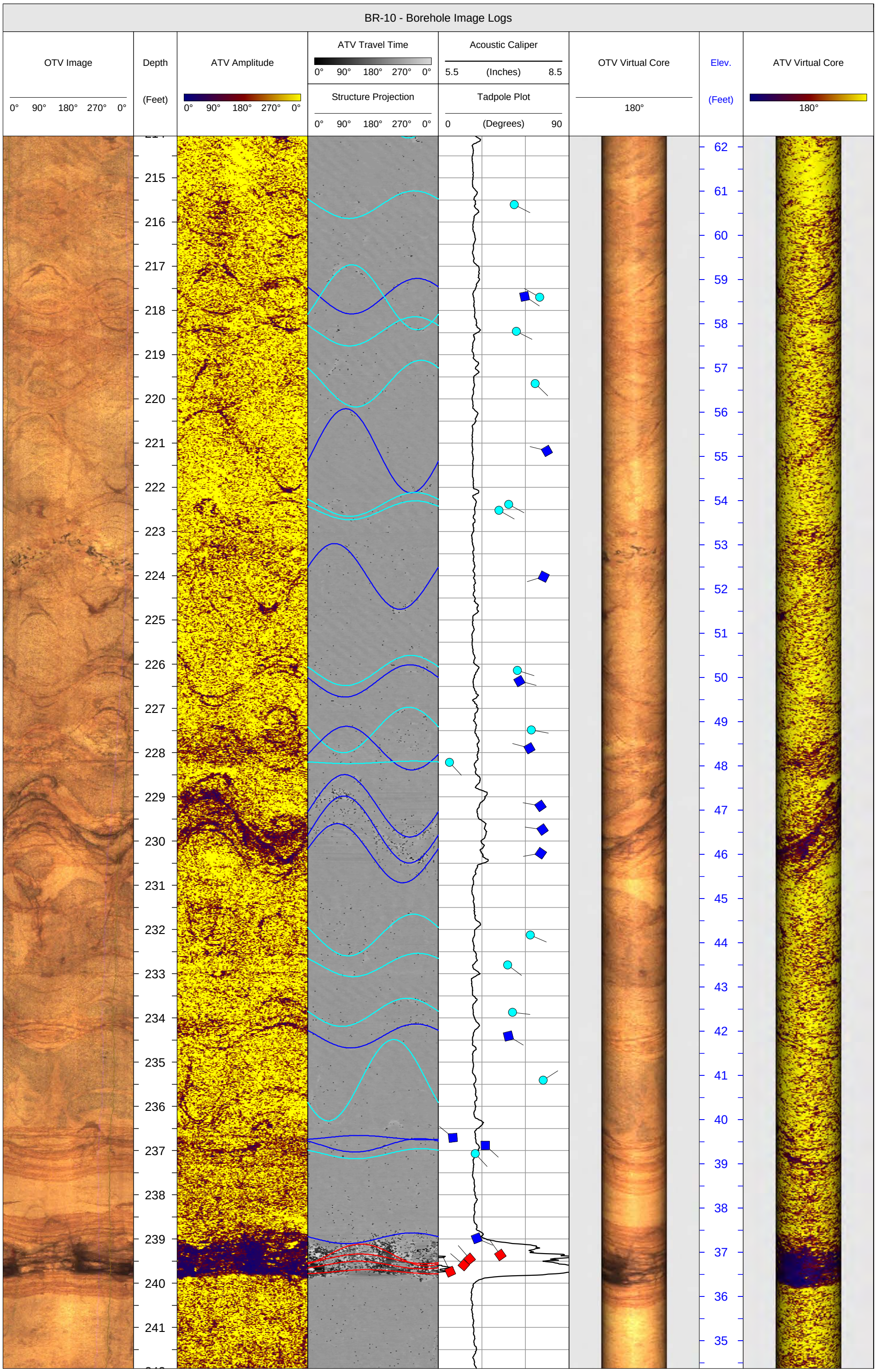
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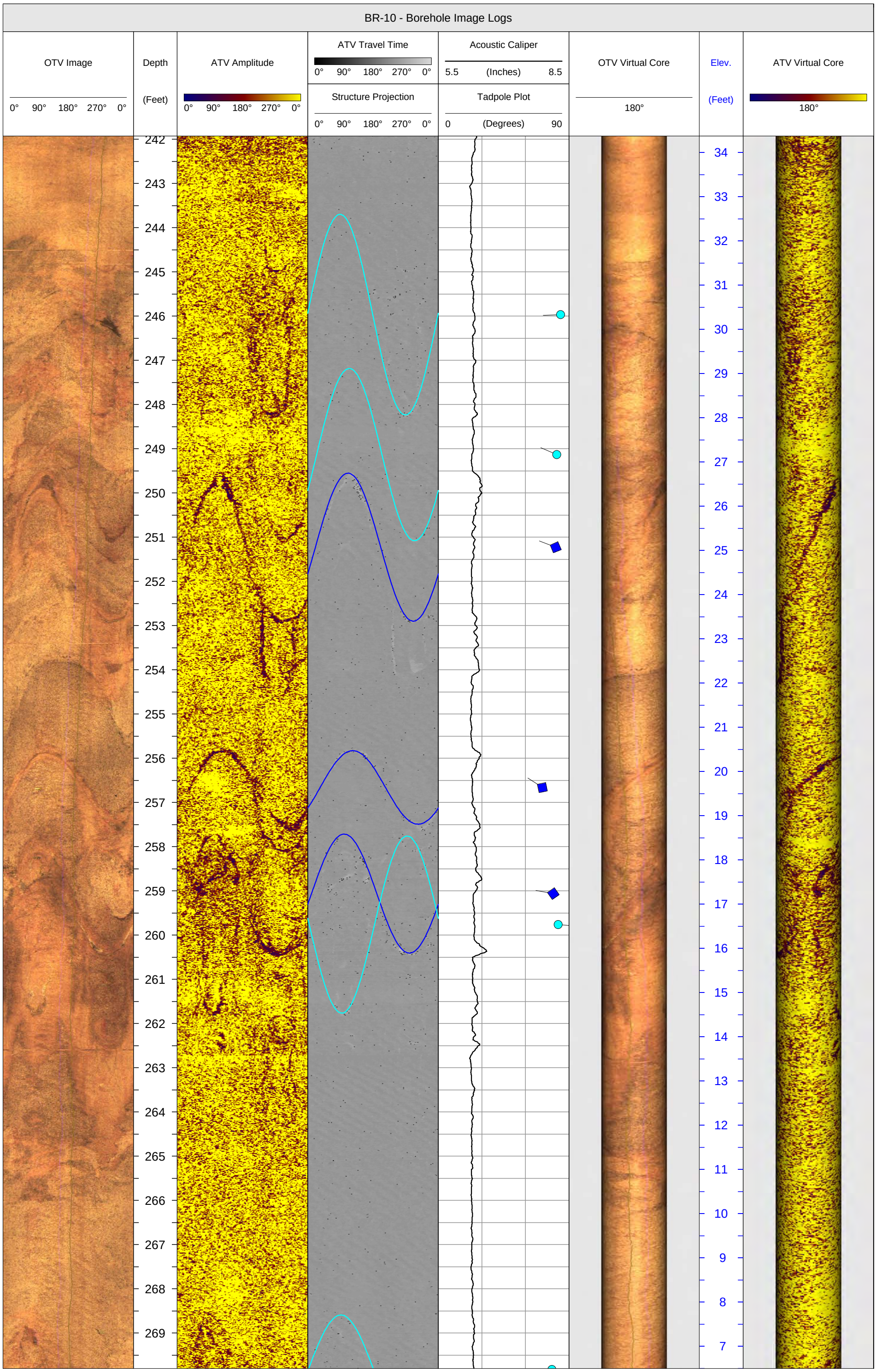
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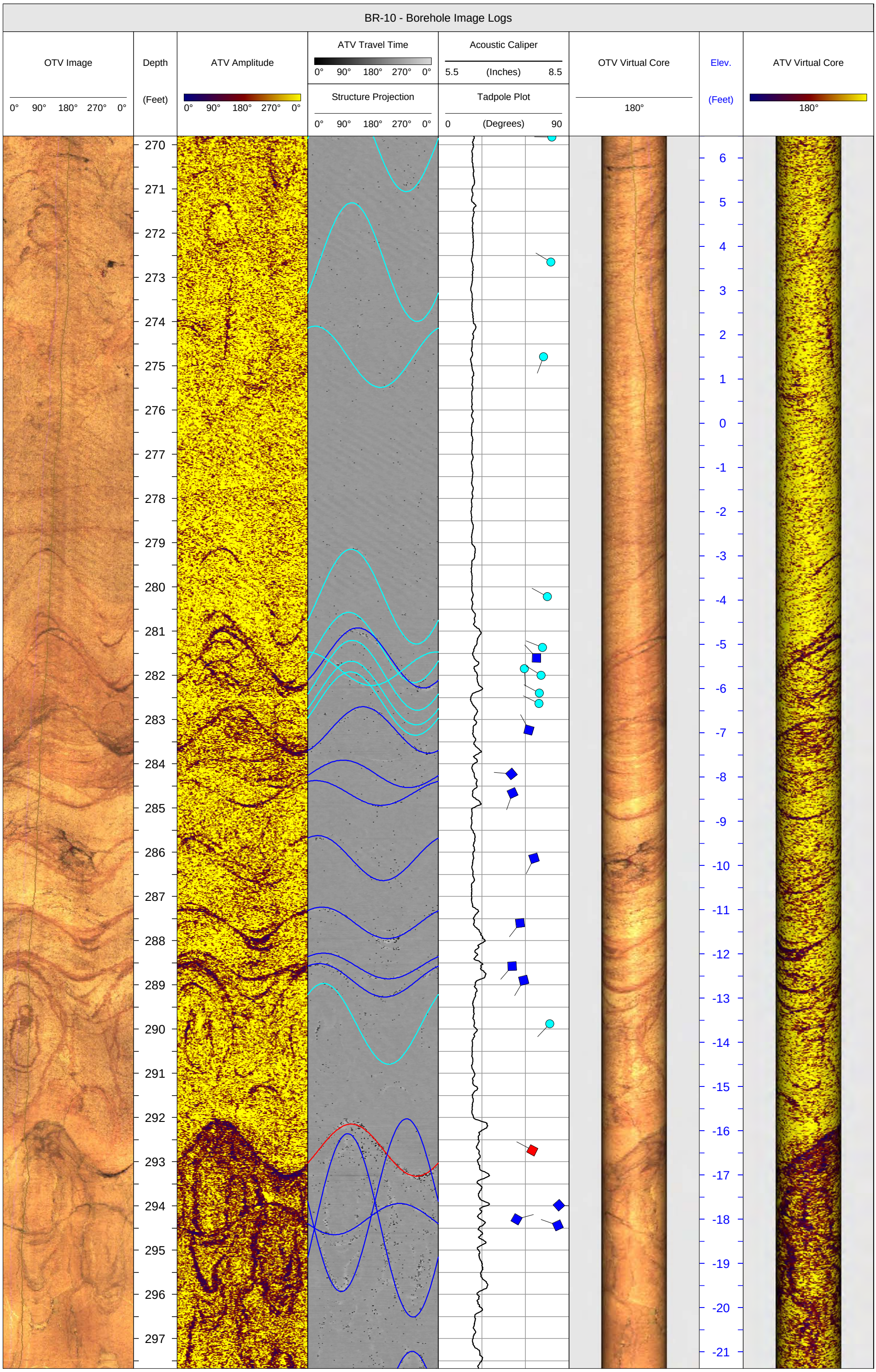
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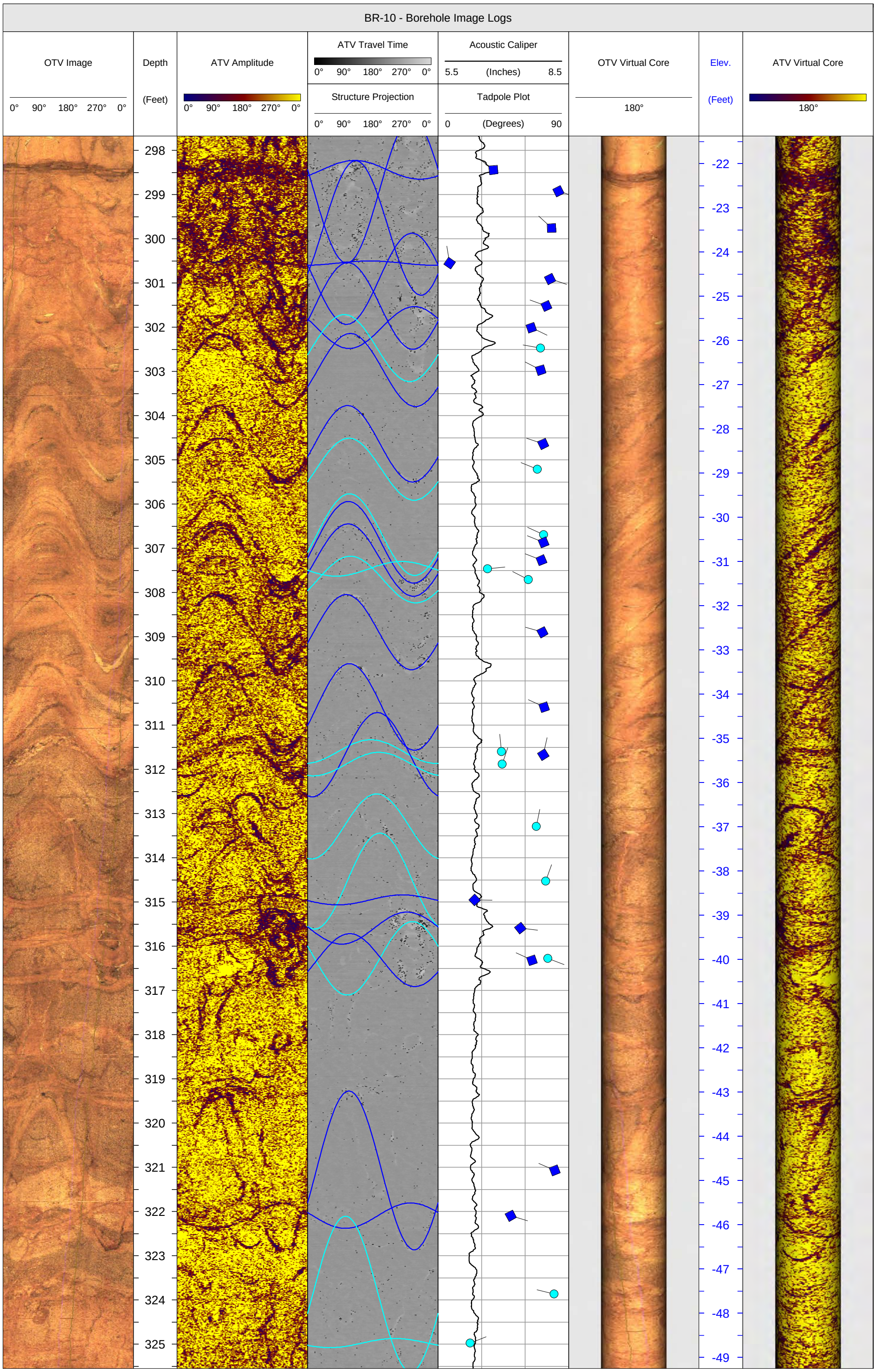
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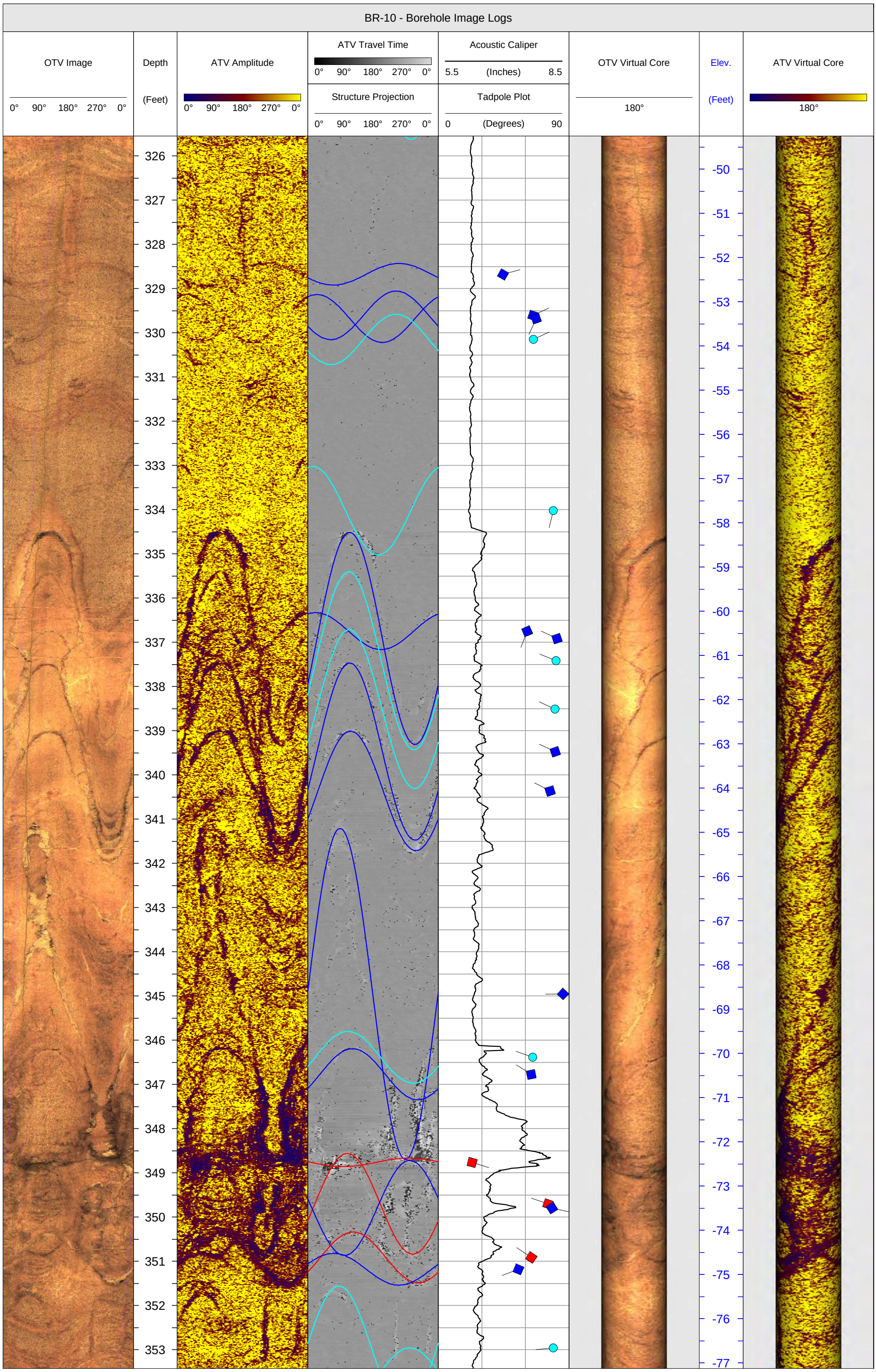
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Acoustic Caliper
5.5 (Inches) 8.5
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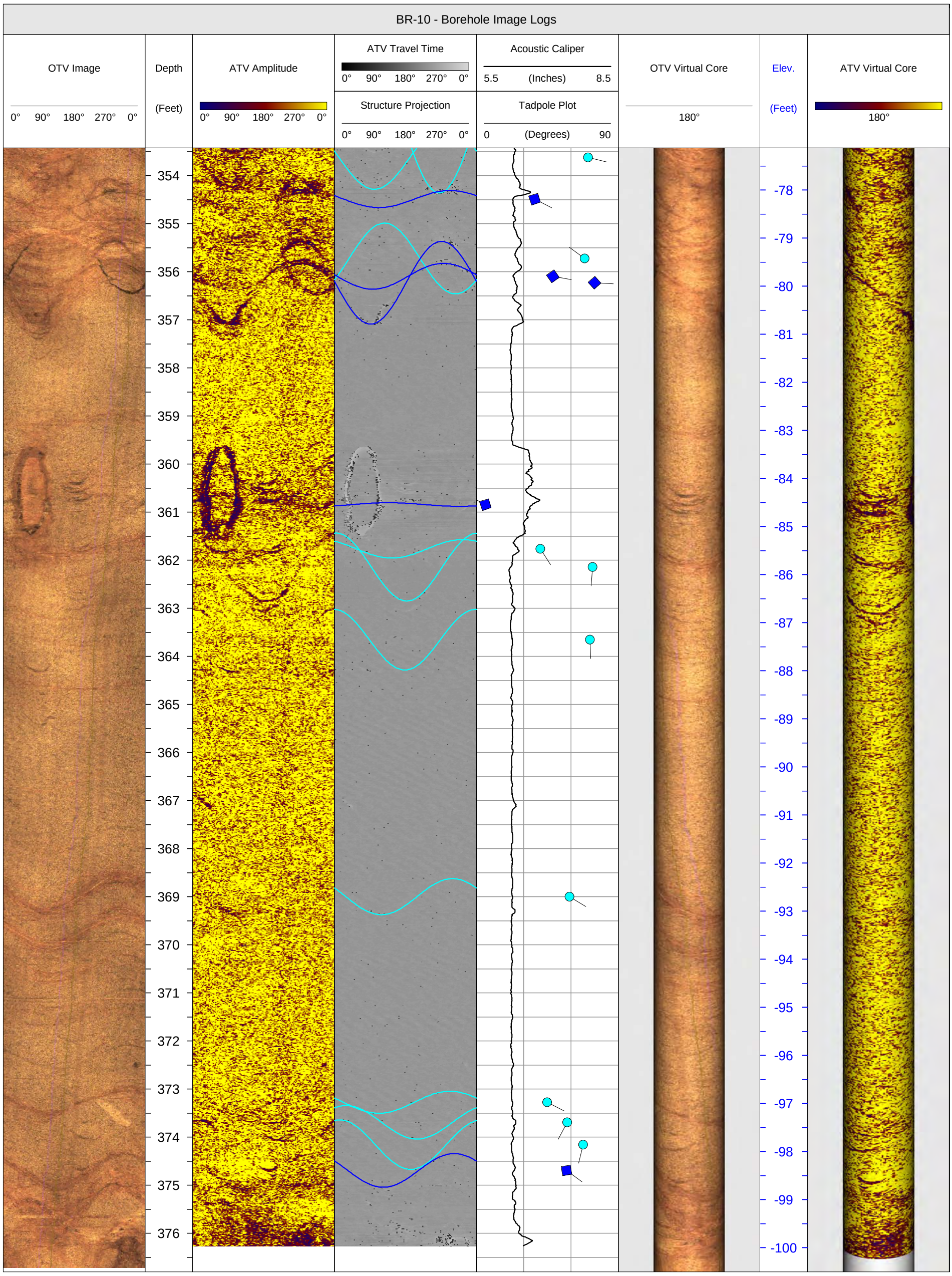
BR-10 - Borehole Image Logs
OTV Image
0° 90° 180° 270° 0°
Depth
(Feet)
ATV Amplitude
0° 90° 180° 270° 0°
ATV Travel Time
0° 90° 180° 270° 0°
Structure Projection
0° 90° 180° 270° 0°
Acoustic Caliper
5.5 (Inches) 8.5
Tadpole Plot
0 (Degrees) 90
OTV Virtual Core
180°
Elev.
(Feet)
ATV Virtual Core
180°
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HAGER-RICHTER GEOSCIENCE, INC.

8 Industrial Way - D10
Salem, NH 03079
Phone: 603-893-9944
Fax: 603-893-8313

BR-10 - BOREHOLE GEOPHYSICAL LOGS

DATE LOGGED: November 13 & 14, 2012

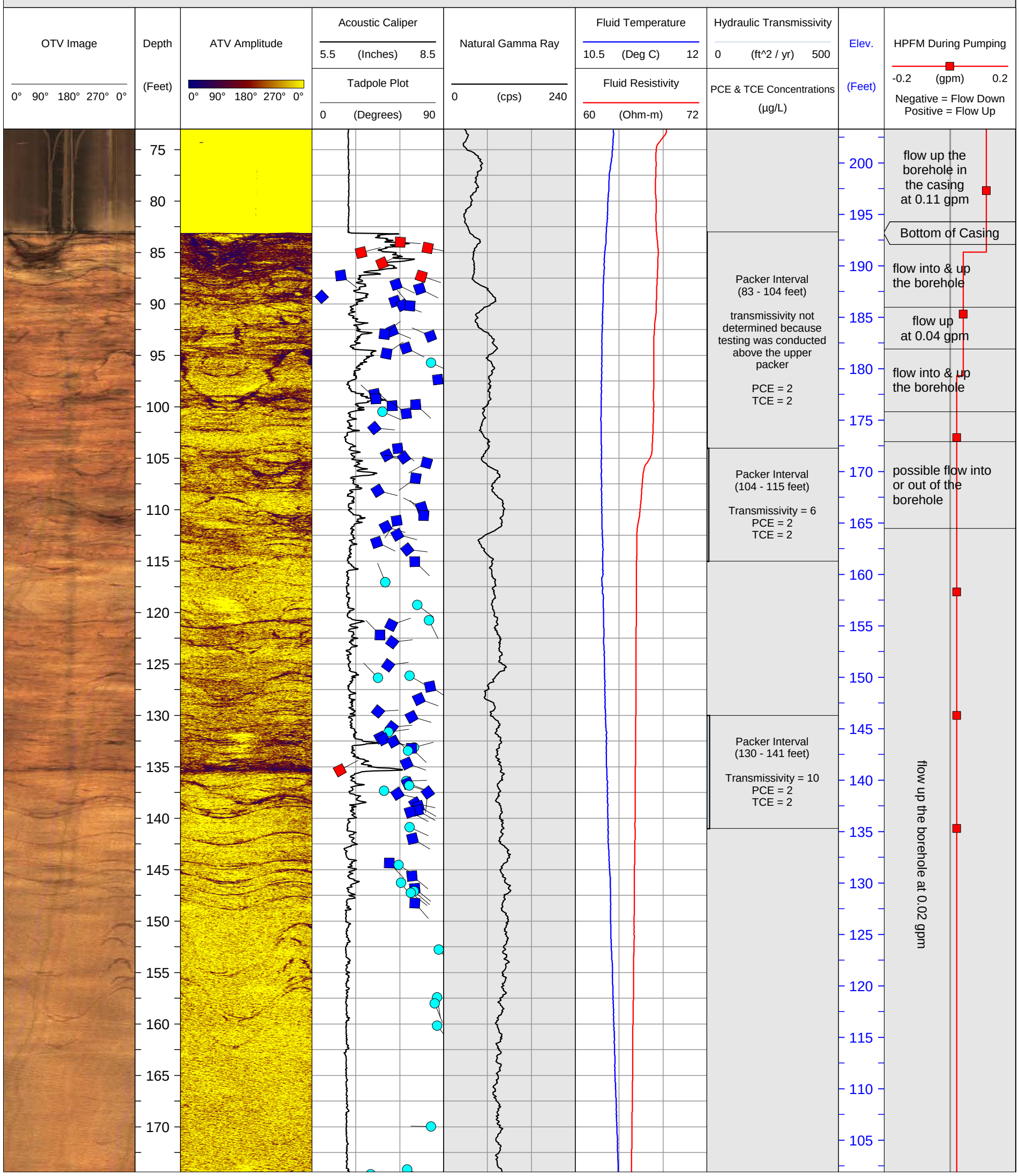
CLIENT:	Weston Solutions, Inc.	H-R FILE:	12RG62
PROJECT:	Borehole Geophysical Logging	LOG DATUM:	Top of the 6-Inch Steel Casing
LOCATION:	Savage Municipal Water Supply Superfund Site	TOP OF CASING ELEVATION:	276.3 Feet
CITY, STATE:	Milford, New Hampshire	ORIENTATION REFERENCE:	True North (Declination = 15 Degrees West)
LOGGING GEOPHYSICISTS:	Nick DeCristofaro & Eric Rickert	CASING STICK-UP:	1.9 Feet Above the Ground Surface
CLIENT REP. ON-SITE:	Andrew Fuller	BOREHOLE DIAMETER:	6 Inches
LOGS PROCESSED BY:	Robert Garfield	WATER LEVEL DEPTH:	11.6 Feet

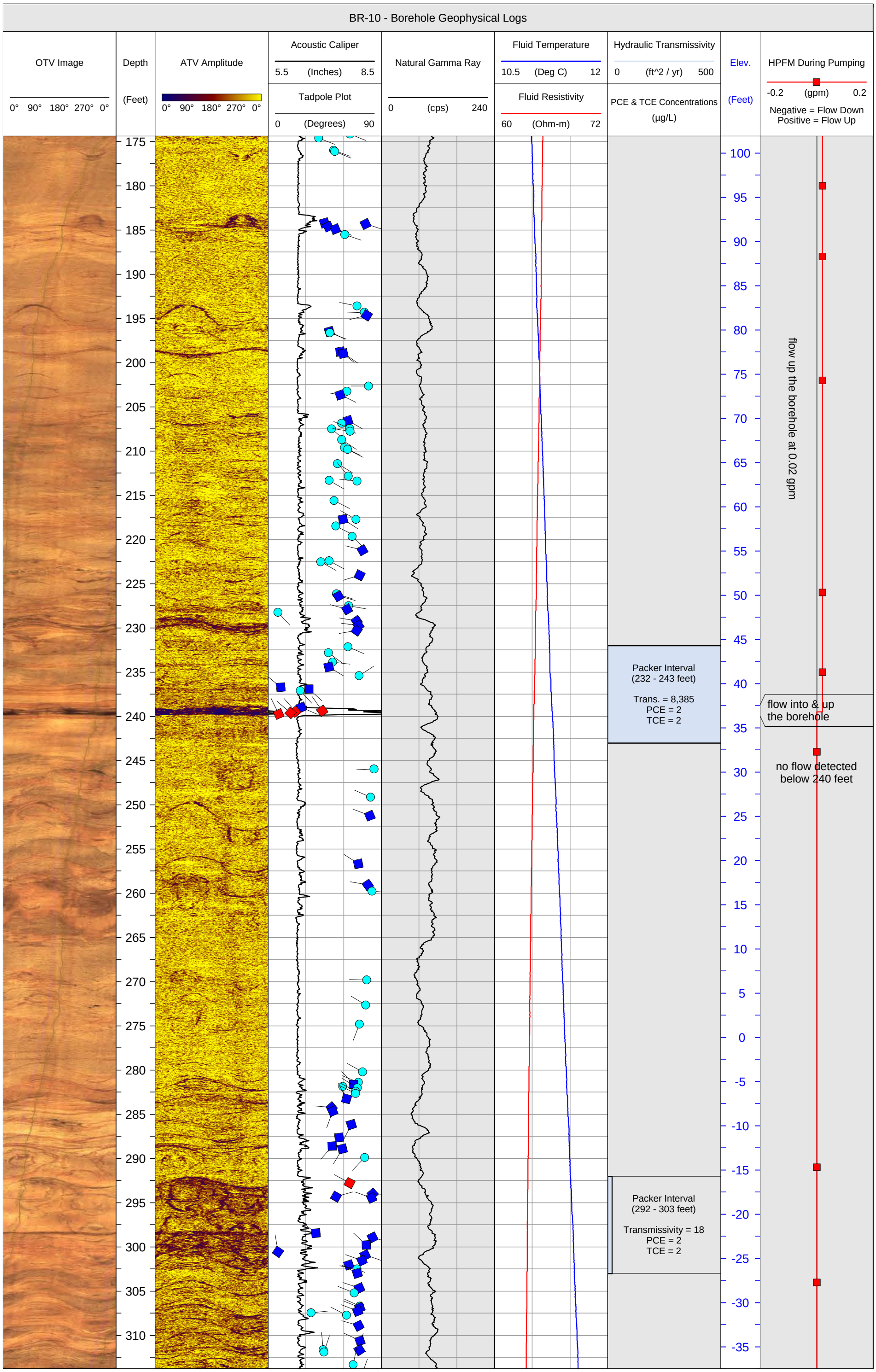
STRUCTURE LEGEND

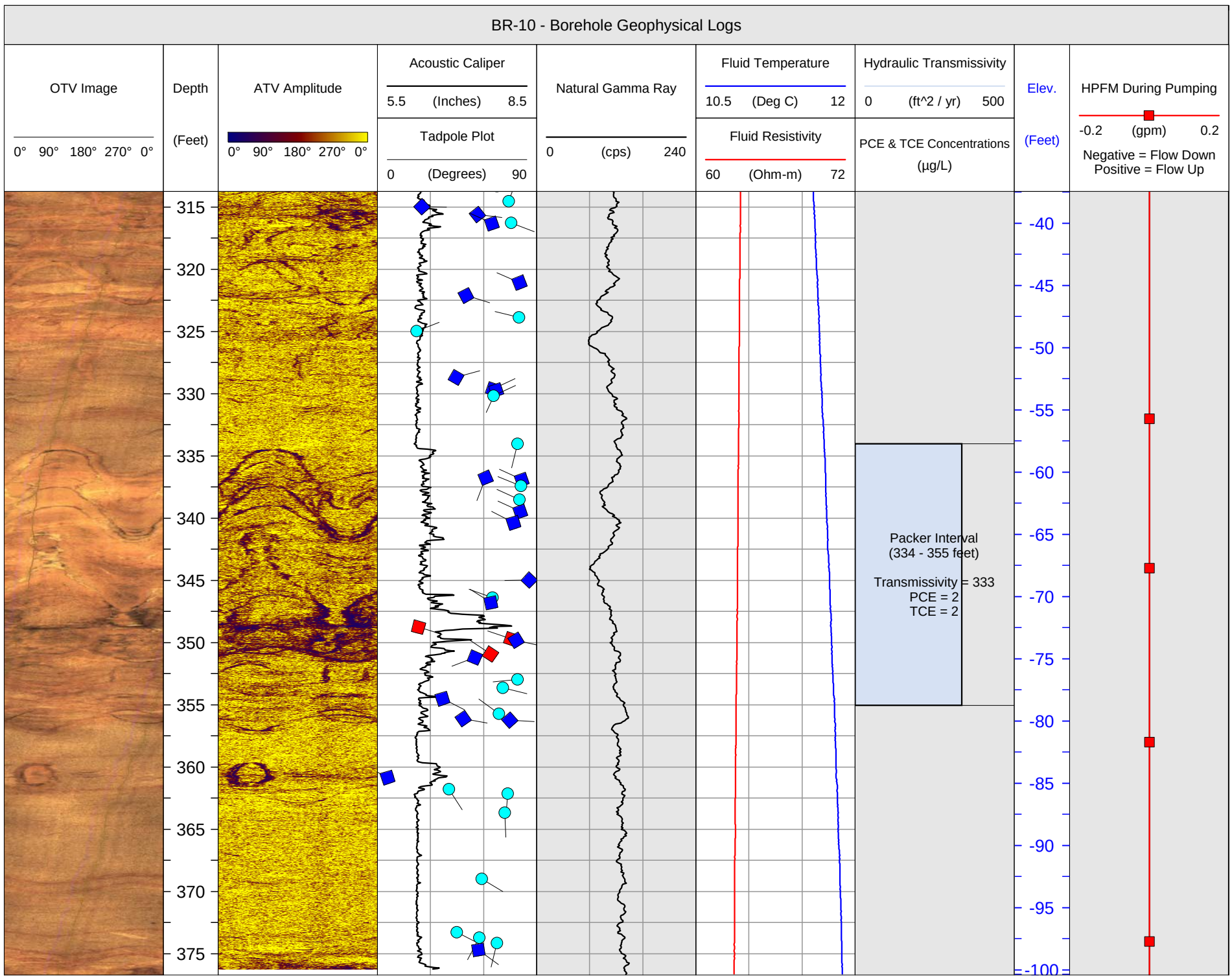
Fracture Rank 1 Fracture Rank 2 Fracture Rank 3

NOTES: HPFM data under ambient conditions are not plotted in the logs below because flow was not detected under ambient conditions.
During HPFM logging under pumping conditions water was pumped from the borehole from inside the casing.
The hydraulic transmissivity, PCE, and TCE data reported in the logs below were provided by Weston and were acquired during packer testing.

BR-10 - Borehole Geophysical Logs




BR-10 - Borehole Geophysical Logs
OTV Image
0° 90° 180° 270° 0°
Depth
(Feet)
ATV Amplitude
0° 90° 180° 270° 0°
Acoustic Caliper
5.5 (Inches) 8.5
Tadpole Plot
0 (Degrees) 90
Natural Gamma Ray
0 (cps) 240
Fluid Temperature
10.5 (Deg C) 12
Fluid Resistivity
60 (Ohm-m) 72
Hydraulic Transmissivity
0 (ft^2 / yr) 500
PCE & TCE Concentrations
(µg/L)
Elev.
(Feet)
HPFM During Pumping
-0.2 (gpm) 0.2
Negative = Flow Down
Positive = Flow Up
Packer Interval
(232 - 243 feet)
Trans. = 8,385
PCE = 2
TCE = 2
Packer Interval
(292 - 303 feet)
Transmissivity = 18
PCE = 2
TCE = 2
flow up the borehole at 0.02 gpm
flow into & up
the borehole
no flow detected
below 240 feet


BR-10 - Borehole Geophysical Logs
OTV Image
0° 90° 180° 270° 0°
Depth
(Feet)
ATV Amplitude
0° 90° 180° 270° 0°
Acoustic Caliper
5.5 (Inches) 8.5
Tadpole Plot
0 (Degrees) 90
Natural Gamma Ray
0 (cps) 240
Fluid Temperature
10.5 (Deg C) 12
Fluid Resistivity
60 (Ohm-m) 72
Hydraulic Transmissivity
0 (ft^2 / yr) 500
PCE & TCE Concentrations
(µg/L)
Elev.
(Feet)
HPFM During Pumping
-0.2 (gpm) 0.2
Negative = Flow Down
Positive = Flow Up
315
320
325
330
335
340
345
350
355
360
365
370
375
-40
-45
-50
-55
-60
-65
-70
-75
-80
-85
-90
-95
-100
Packer Interval
(334 - 355 feet)
Transmissivity = 333
PCE = 2
TCE = 2

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Salem, NH 03079
Phone: 603-893-9944
Fax: 603-893-8313

BR-11 - BOREHOLE IMAGE LOGS

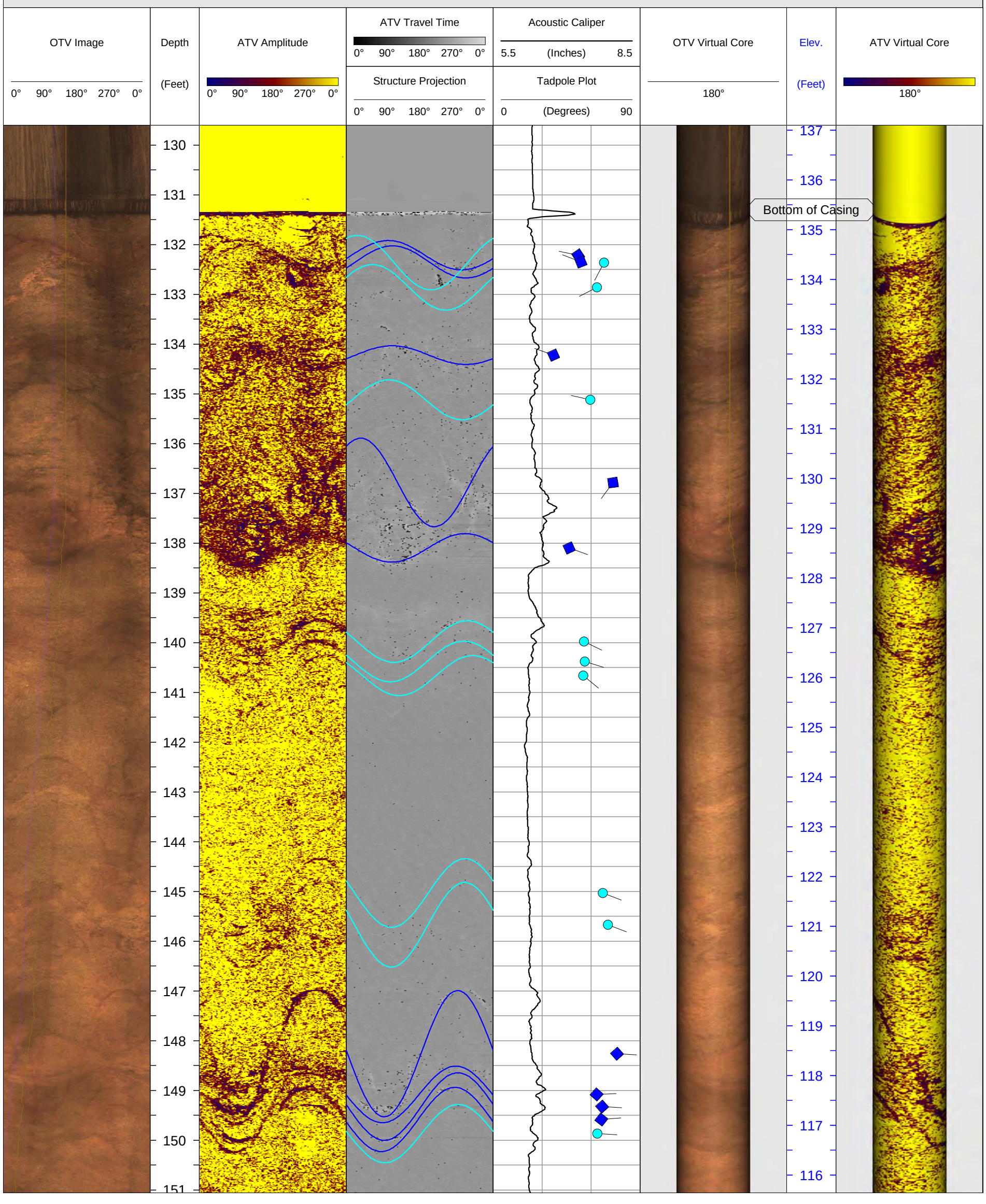
DATE LOGGED: November 15, 2012

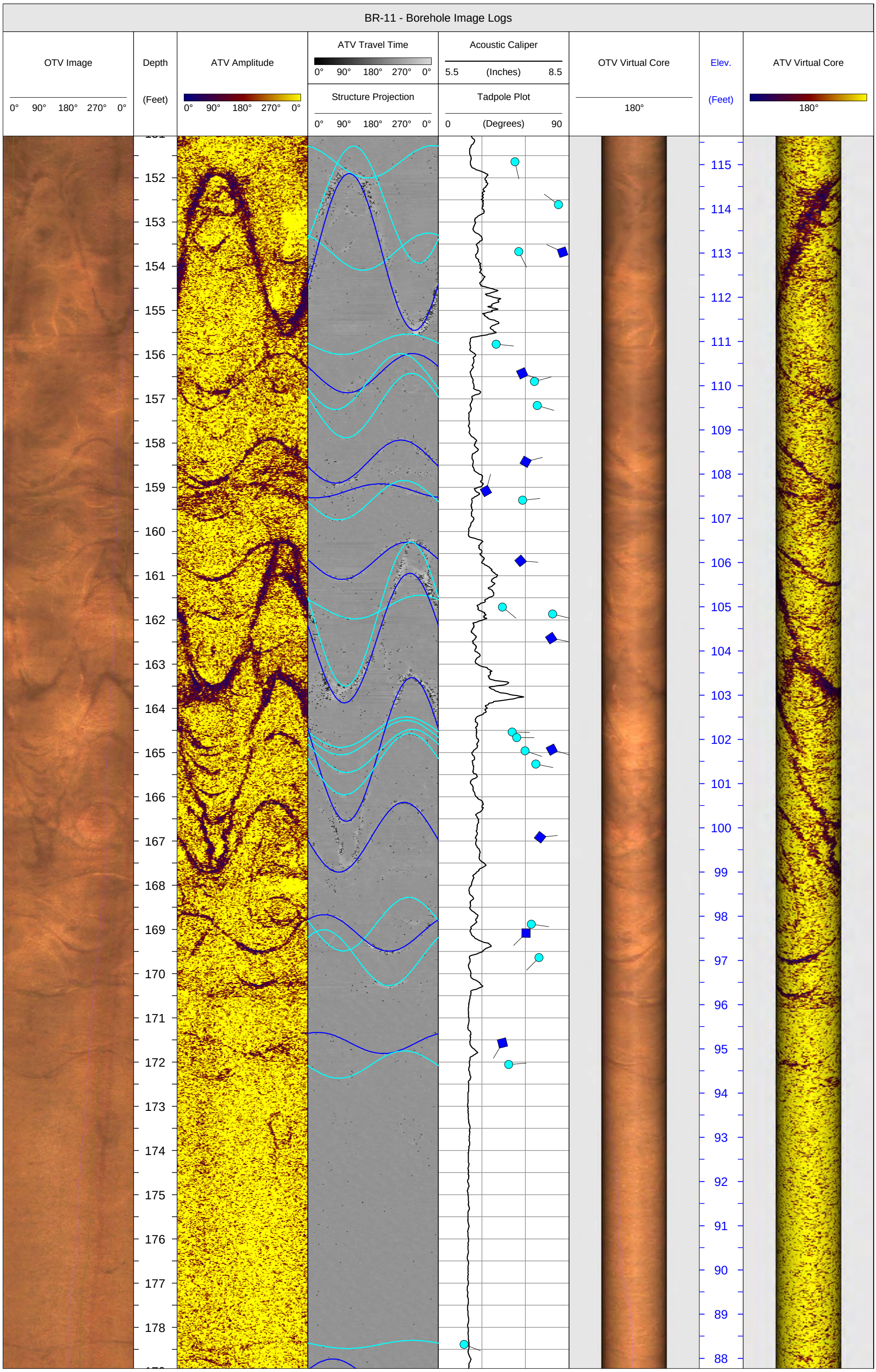
CLIENT:	Weston Solutions, Inc.	H-R FILE:	12RG62
PROJECT:	Borehole Geophysical Logging	LOG DATUM:	Top of the 6-Inch Steel Casing
LOCATION:	Savage Municipal Water Supply Superfund Site	TOP OF CASING ELEVATION:	266.7 Feet
CITY, STATE:	Milford, New Hampshire	ORIENTATION REFERENCE:	True North (Declination = 15 Degrees West)
LOGGING GEOPHYSICISTS:	Nick DeCristofaro	CASING STICK-UP:	1.1 Feet Below the Ground Surface
CLIENT REP. ON-SITE:	Andrew Fuller	BOREHOLE DIAMETER:	6 Inches
LOGS PROCESSED BY:	Robert Garfield	WATER LEVEL DEPTH:	5.8 Feet

STRUCTURE LEGEND

Fracture Rank 1 Fracture Rank 2 Fracture Rank 3

BR-11 - Borehole Image Logs




BR-11 - Borehole Image Logs
OTV Image
0° 90° 180° 270° 0°
Depth
(Feet)
ATV Amplitude
0° 90° 180° 270° 0°
ATV Travel Time
0° 90° 180° 270° 0°
Structure Projection
0° 90° 180° 270° 0°
Acoustic Caliper
5.5 (Inches) 8.5
Tadpole Plot
0 (Degrees) 90
OTV Virtual Core
180°
Elev.
(Feet)
ATV Virtual Core
180°
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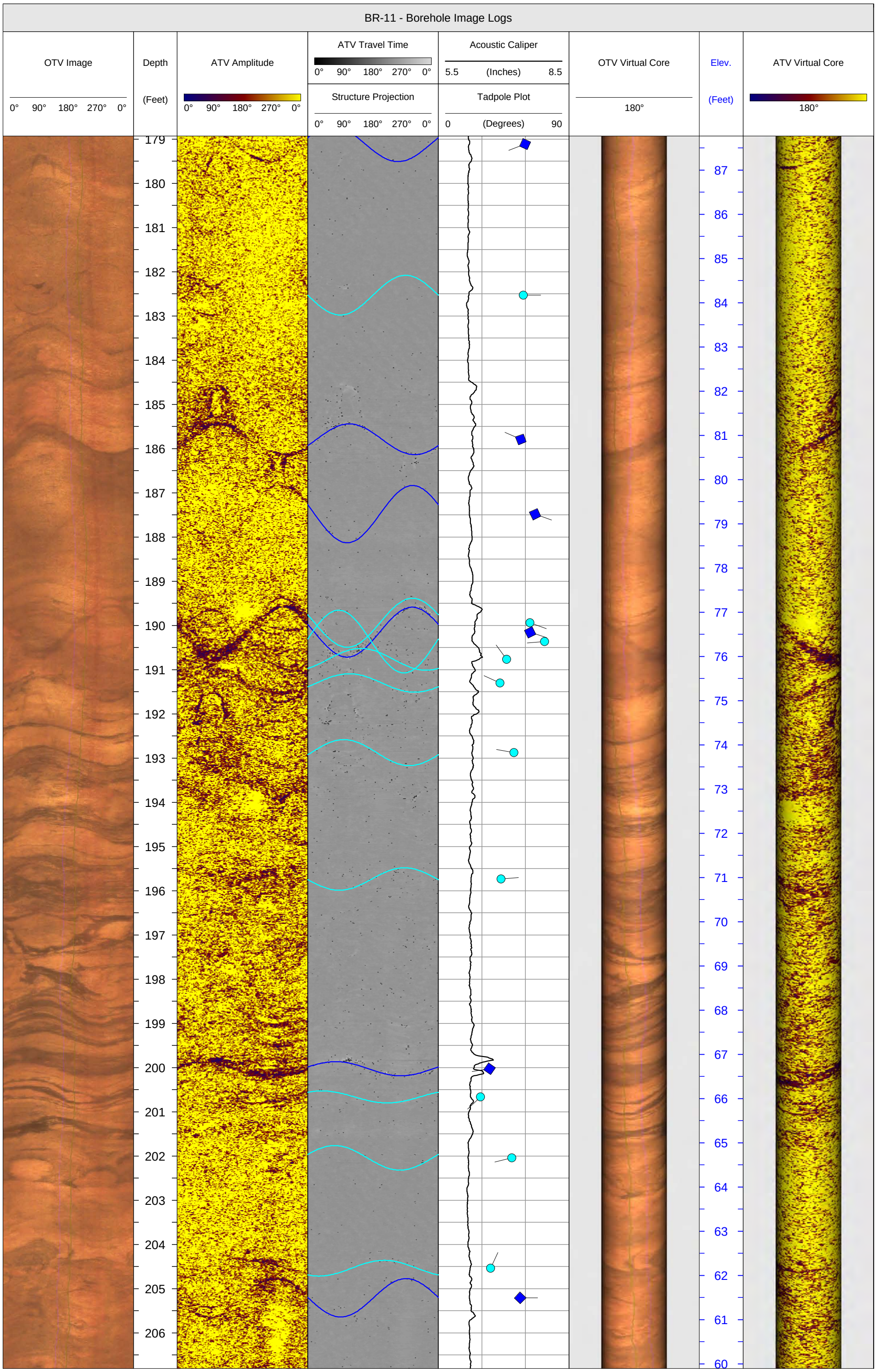
BR-11 - Borehole Image Logs
OTV Image
0° 90° 180° 270° 0°
Depth
(Feet)
ATV Amplitude
0° 90° 180° 270° 0°
ATV Travel Time
0° 90° 180° 270° 0°
Structure Projection
0° 90° 180° 270° 0°
Acoustic Caliper
5.5 (Inches) 8.5
Tadpole Plot
0 (Degrees) 90
OTV Virtual Core
180°
Elev.
(Feet)
ATV Virtual Core
180°
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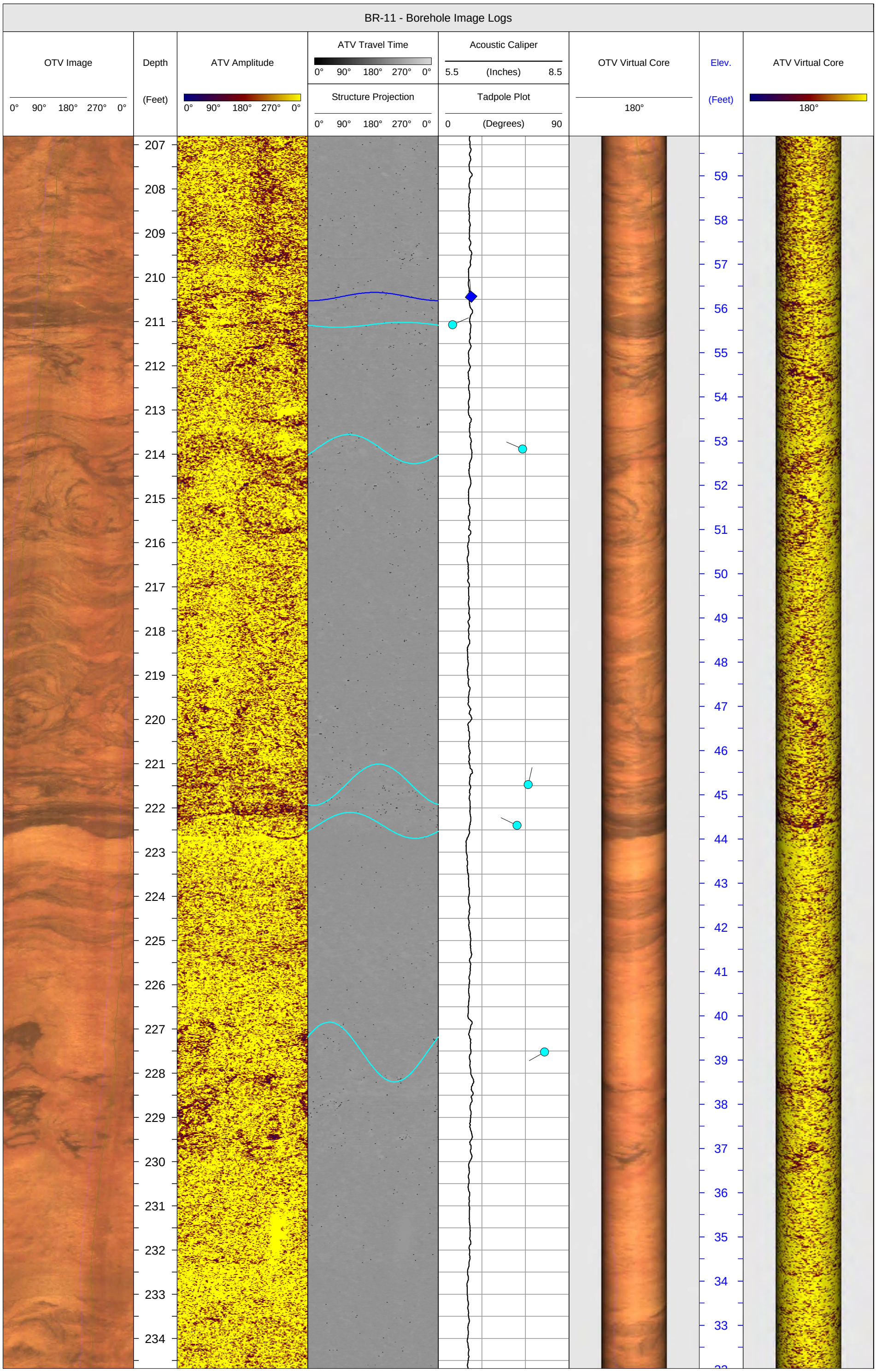
BR-11 - Borehole Image Logs
OTV Image
0° 90° 180° 270° 0°
Depth
(Feet)
ATV Amplitude
0° 90° 180° 270° 0°
ATV Travel Time
0° 90° 180° 270° 0°
Structure Projection
0° 90° 180° 270° 0°
Acoustic Caliper
5.5 (Inches) 8.5
Tadpole Plot
0 (Degrees) 90
OTV Virtual Core
180°
Elev.
(Feet)
ATV Virtual Core
180°
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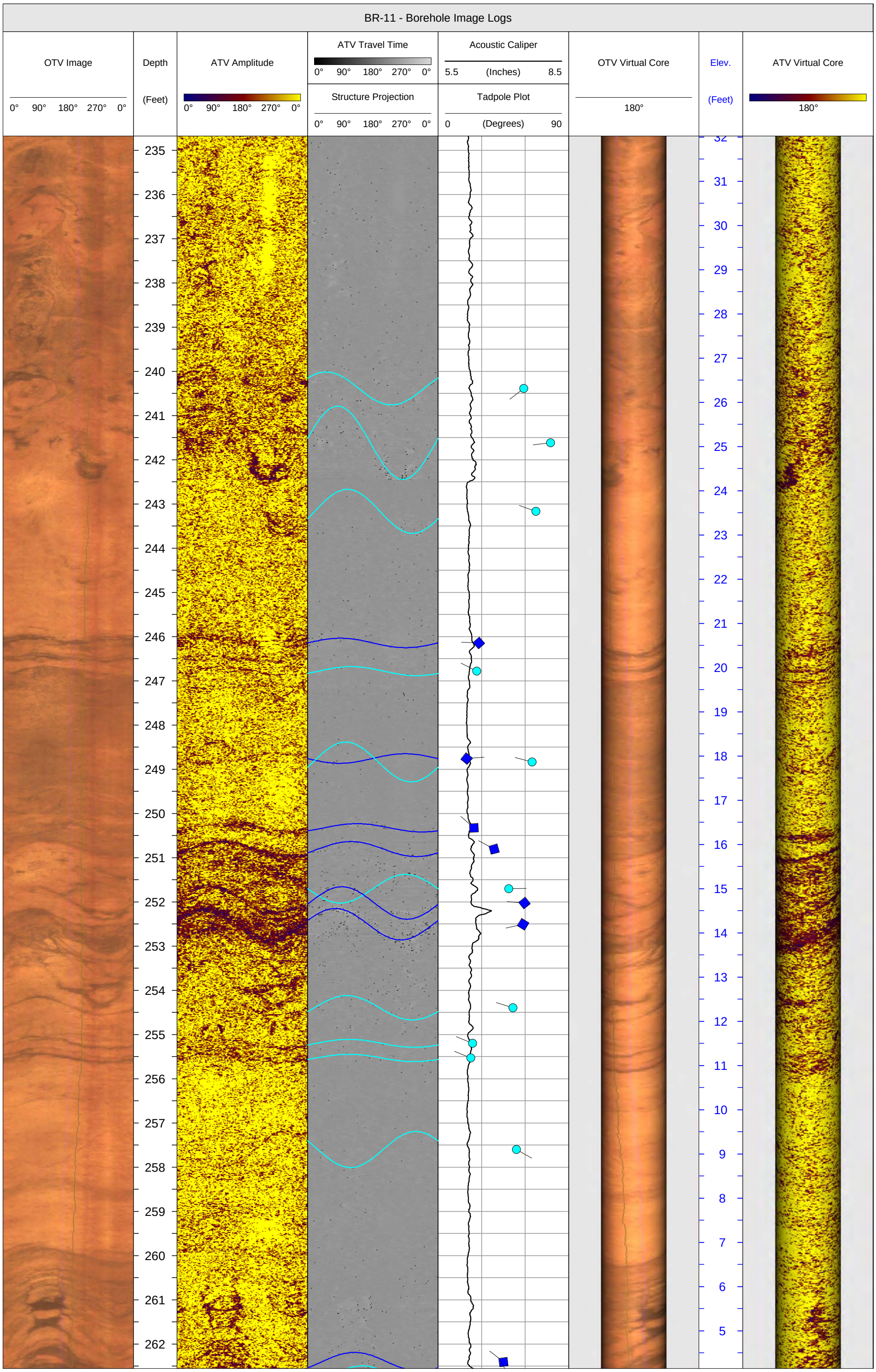
BR-11 - Borehole Image Logs
OTV Image
0° 90° 180° 270° 0°
Depth
(Feet)
ATV Amplitude
0° 90° 180° 270° 0°
ATV Travel Time
0° 90° 180° 270° 0°
Structure Projection
0° 90° 180° 270° 0°
Acoustic Caliper
5.5 (Inches) 8.5
Tadpole Plot
0 (Degrees) 90
OTV Virtual Core
180°
Elev.
(Feet)
ATV Virtual Core
180°
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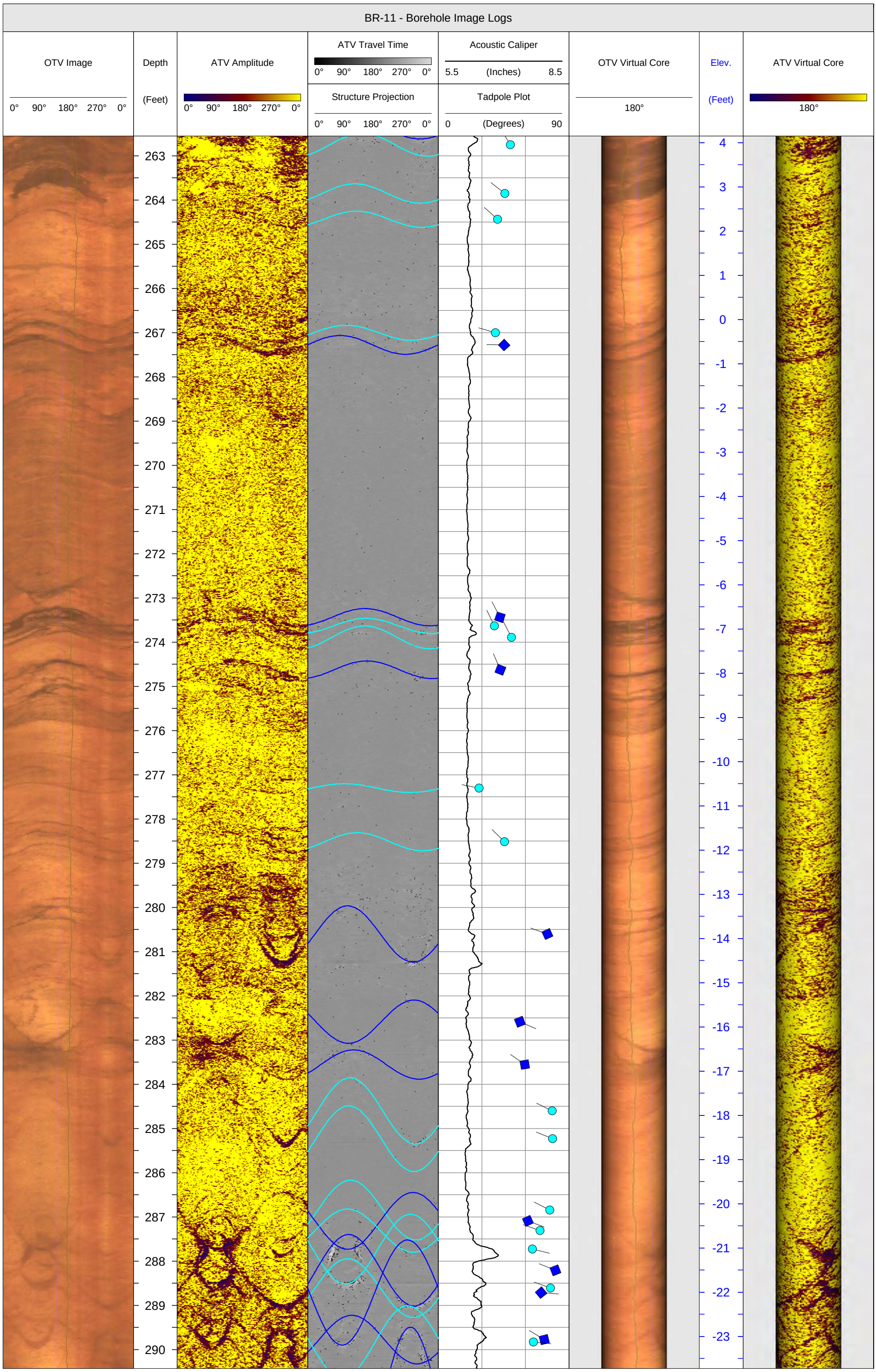
BR-11 - Borehole Image Logs
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Depth
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ATV Amplitude
0° 90° 180° 270° 0°
ATV Travel Time
0° 90° 180° 270° 0°
Structure Projection
0° 90° 180° 270° 0°
Acoustic Caliper
5.5 (Inches) 8.5
Tadpole Plot
0 (Degrees) 90
OTV Virtual Core
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Elev.
(Feet)
ATV Virtual Core
180°
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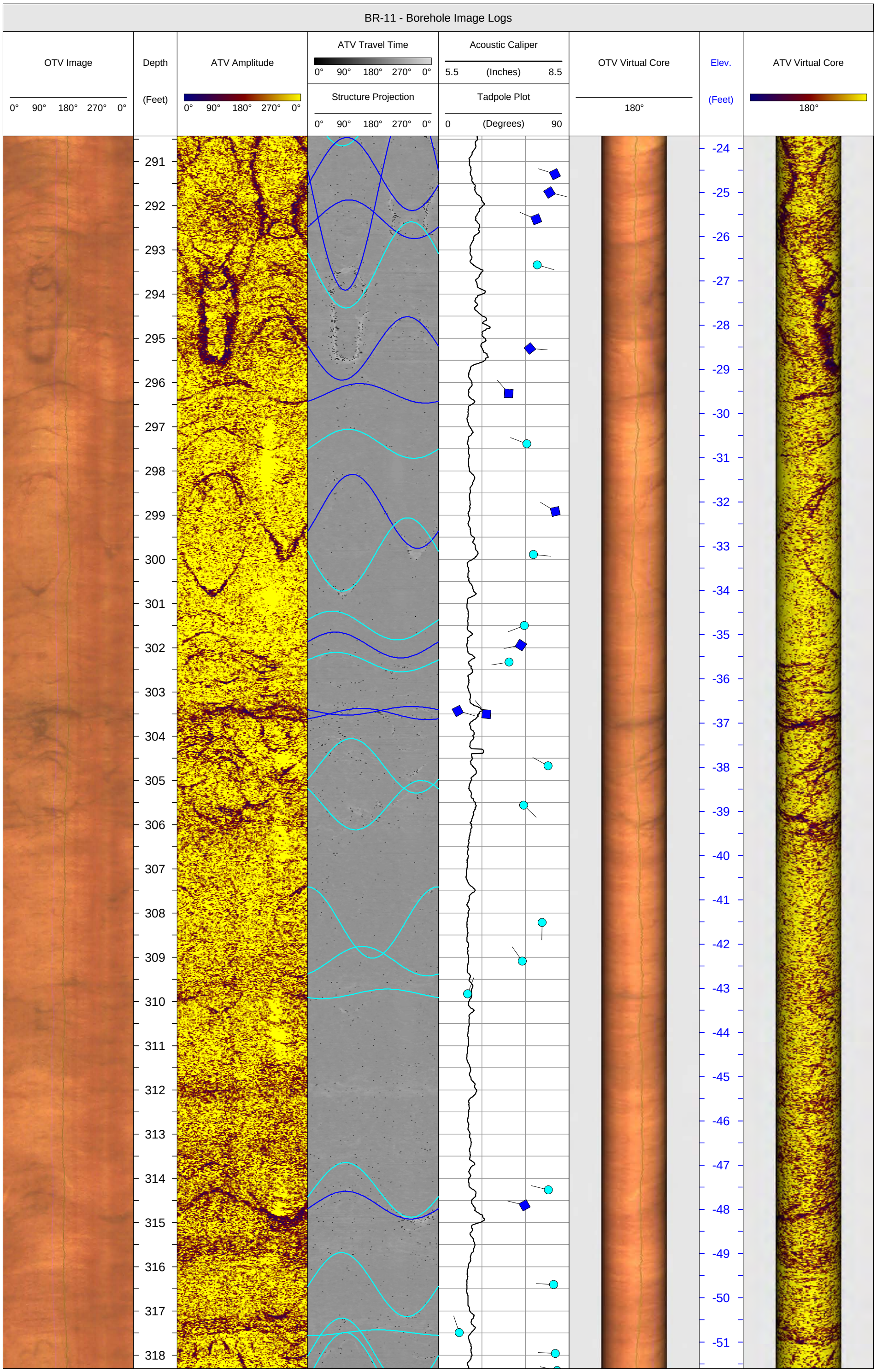
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(Feet)
ATV Amplitude
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ATV Travel Time
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Structure Projection
0° 90° 180° 270° 0°
Acoustic Caliper
5.5 (Inches) 8.5
Tadpole Plot
0 (Degrees) 90
OTV Virtual Core
180°
Elev.
(Feet)
ATV Virtual Core
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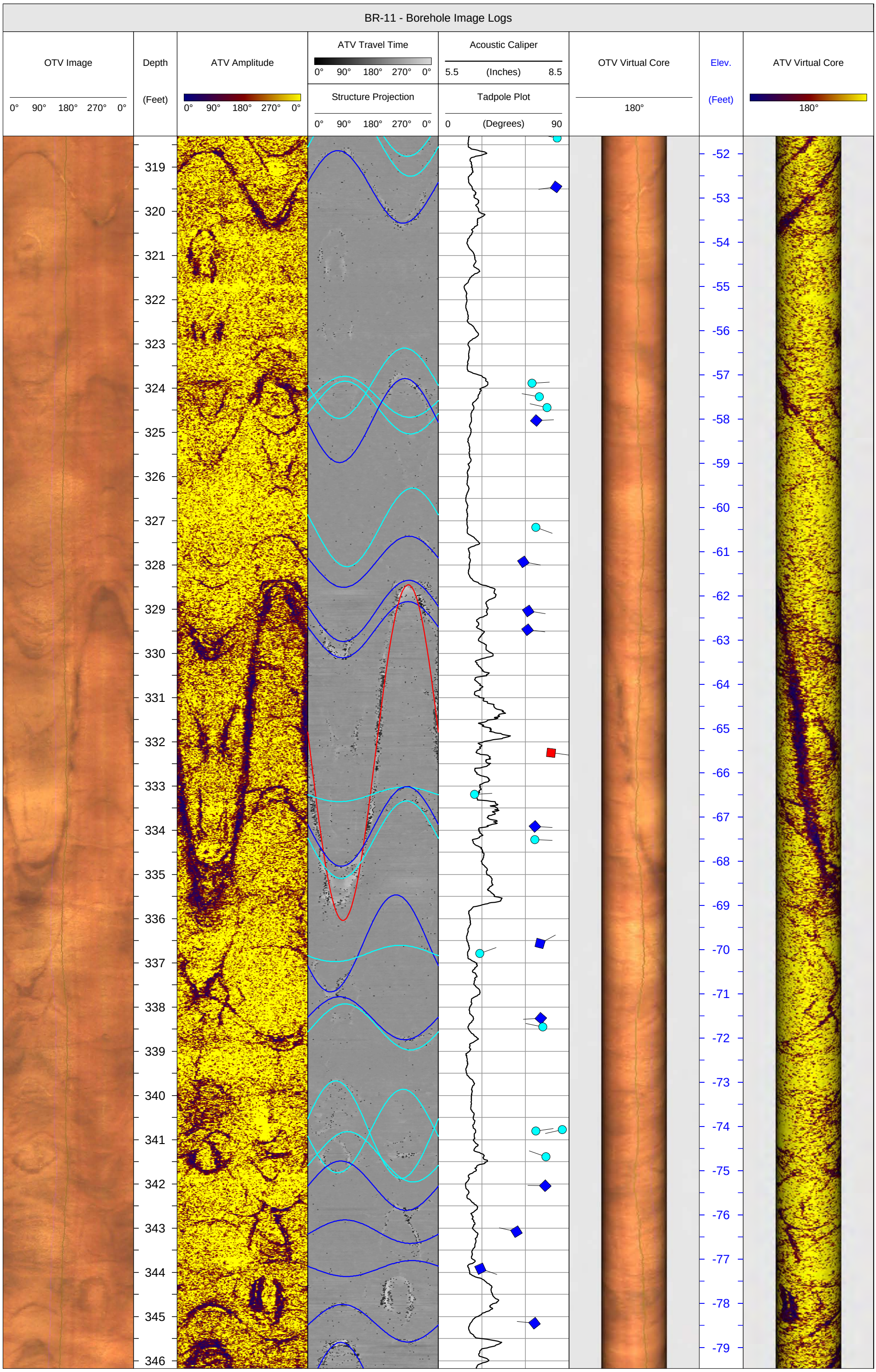
BR-11 - Borehole Image Logs
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Depth
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ATV Amplitude
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Structure Projection
0° 90° 180° 270° 0°
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5.5 (Inches) 8.5
Tadpole Plot
0 (Degrees) 90
OTV Virtual Core
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Elev.
(Feet)
ATV Virtual Core
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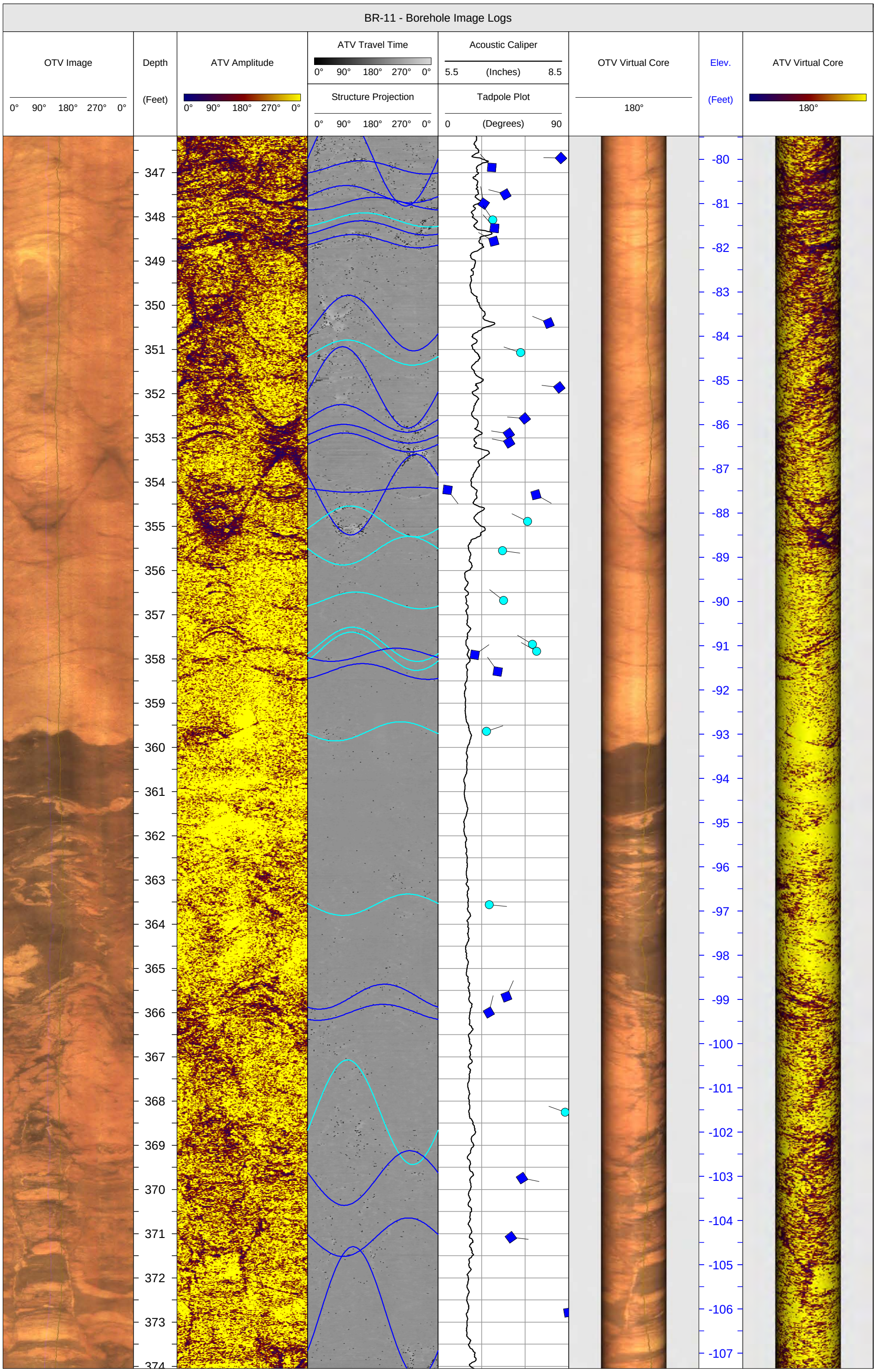
BR-11 - Borehole Image Logs
OTV Image
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Depth
(Feet)
ATV Amplitude
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ATV Travel Time
0° 90° 180° 270° 0°
Structure Projection
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Acoustic Caliper
5.5 (Inches) 8.5
Tadpole Plot
0 (Degrees) 90
OTV Virtual Core
180°
Elev.
(Feet)
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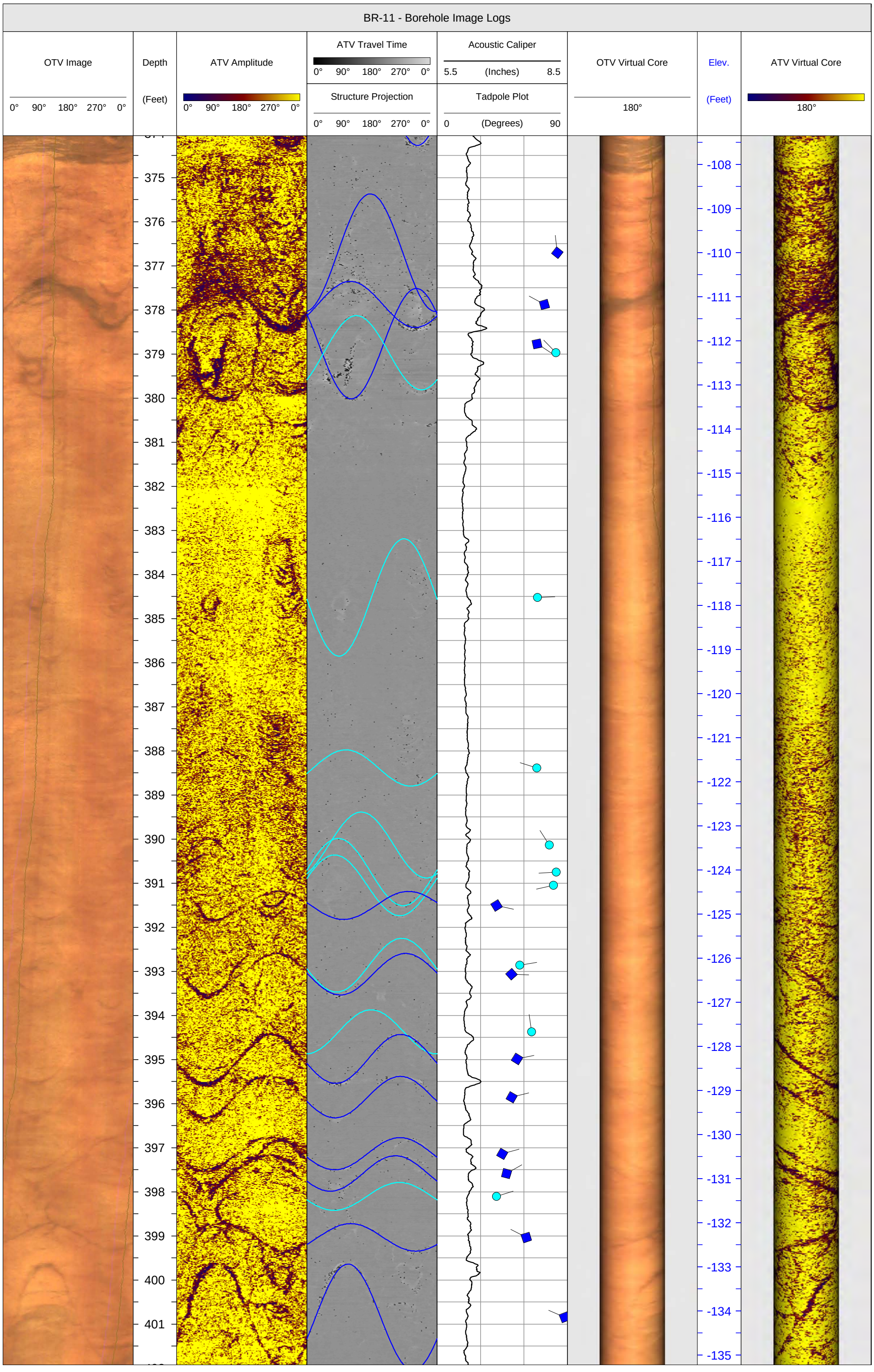
BR-11 - Borehole Image Logs
OTV Image
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(Feet)
ATV Amplitude
0° 90° 180° 270° 0°
ATV Travel Time
0° 90° 180° 270° 0°
Structure Projection
0° 90° 180° 270° 0°
Acoustic Caliper
5.5 (Inches) 8.5
Tadpole Plot
0 (Degrees) 90
OTV Virtual Core
180°
Elev.
(Feet)
ATV Virtual Core
180°
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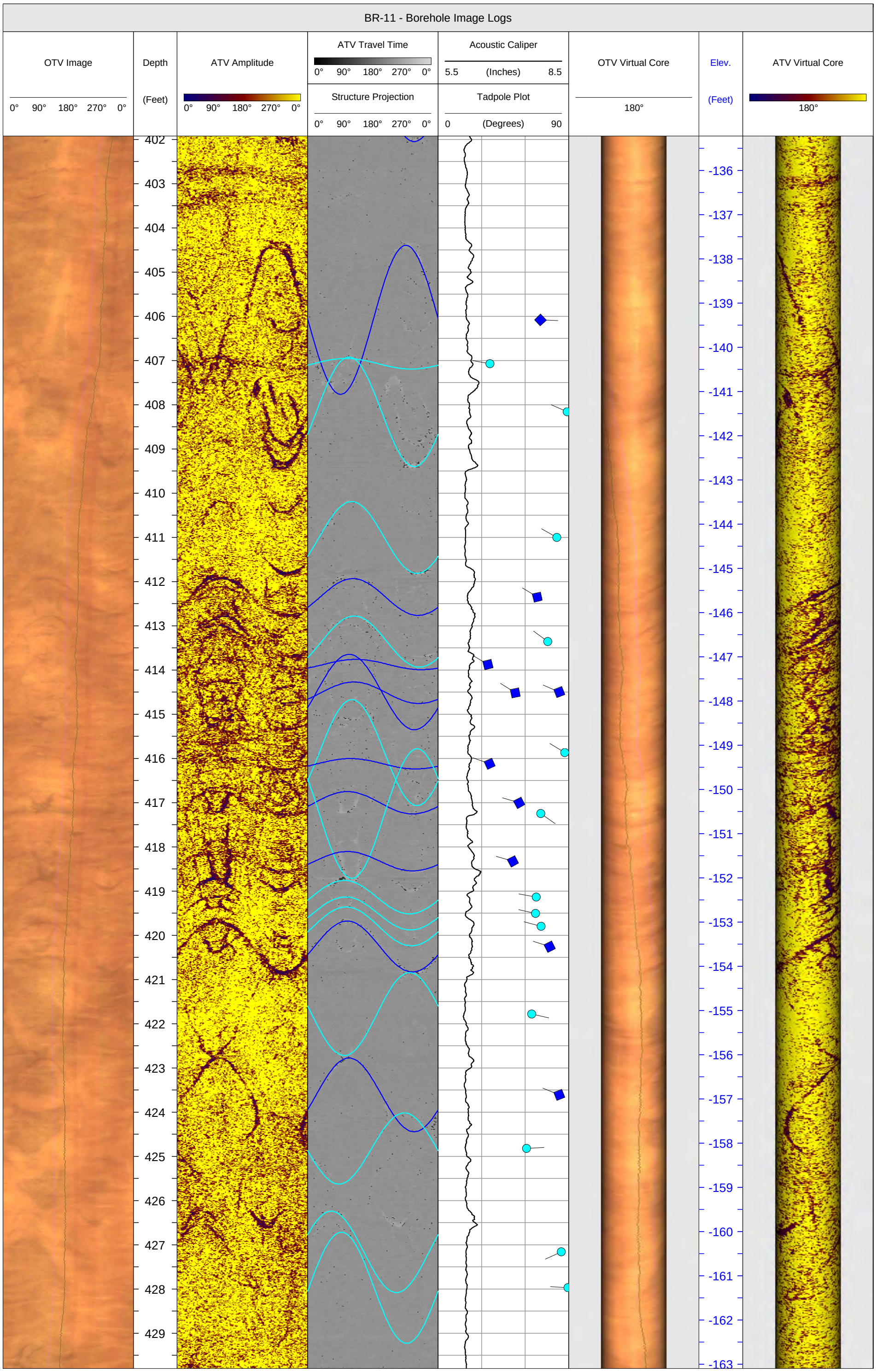
BR-11 - Borehole Image Logs
OTV Image
0° 90° 180° 270° 0°
Depth
(Feet)
ATV Amplitude
0° 90° 180° 270° 0°
ATV Travel Time
0° 90° 180° 270° 0°
Structure Projection
0° 90° 180° 270° 0°
Acoustic Caliper
5.5 (Inches) 8.5
Tadpole Plot
0 (Degrees) 90
OTV Virtual Core
180°
Elev.
(Feet)
ATV Virtual Core
180°
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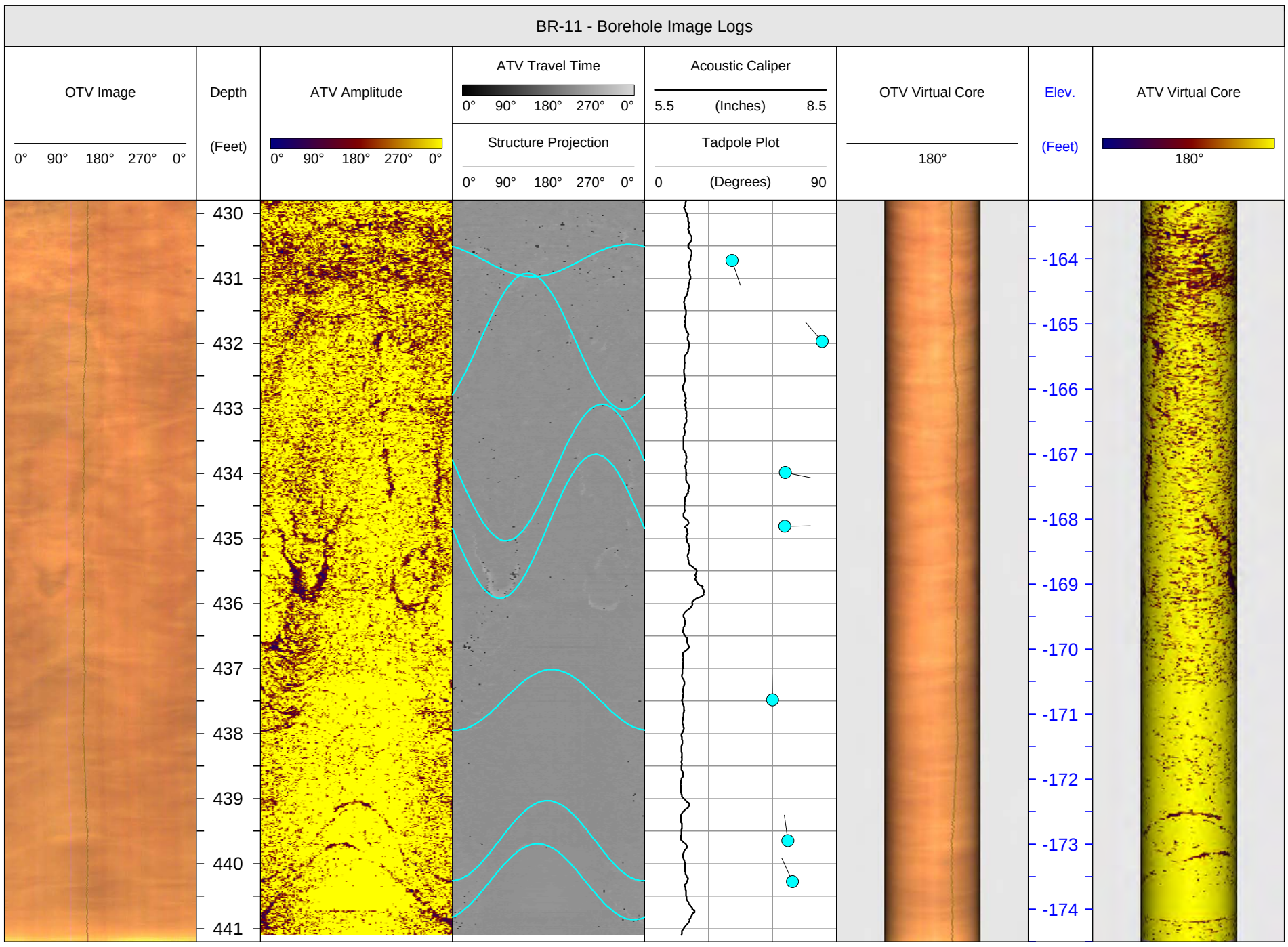
BR-11 - Borehole Image Logs
OTV Image
0° 90° 180° 270° 0°
Depth
(Feet)
ATV Amplitude
0° 90° 180° 270° 0°
ATV Travel Time
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Structure Projection
0° 90° 180° 270° 0°
Acoustic Caliper
5.5 (Inches) 8.5
Tadpole Plot
0 (Degrees) 90
OTV Virtual Core
180°
Elev.
(Feet)
ATV Virtual Core
180°
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HAGER-RICHTER GEOSCIENCE, INC.

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Salem, NH 03079
Phone: 603-893-9944
Fax: 603-893-8313

BR-11 - BOREHOLE GEOPHYSICAL LOGS

DATE LOGGED: November 15, 2012

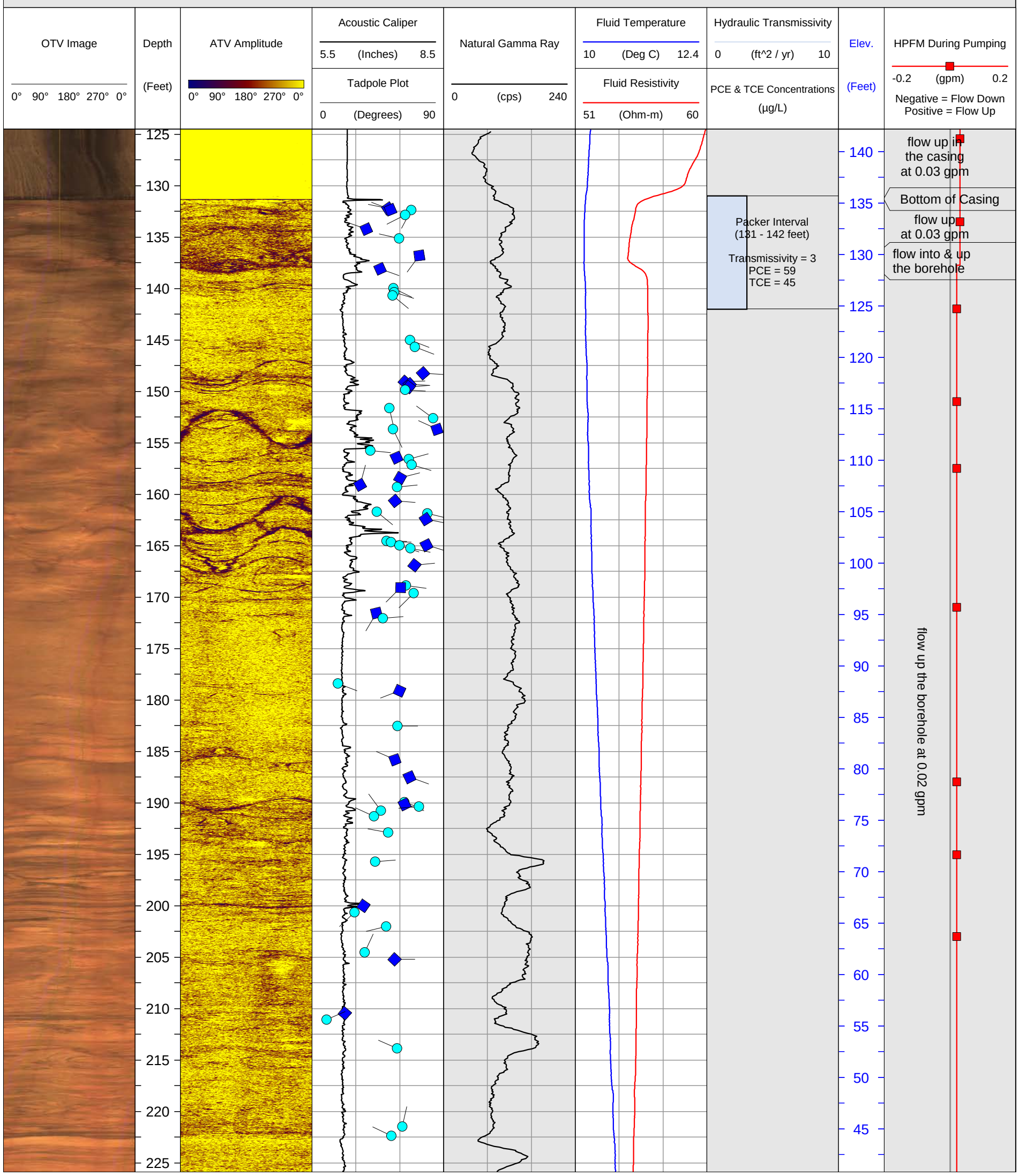
CLIENT:	Weston Solutions, Inc.	H-R FILE:	12RG62
PROJECT:	Borehole Geophysical Logging	LOG DATUM:	Top of the 6-Inch Steel Casing
LOCATION:	Savage Municipal Water Supply Superfund Site	TOP OF CASING ELEVATION:	266.7 Feet
CITY, STATE:	Milford, New Hampshire	ORIENTATION REFERENCE:	True North (Declination = 15 Degrees West)
LOGGING GEOPHYSICISTS:	Nick DeCristofaro	CASING STICK-UP:	1.1 Feet Below the Ground Surface
CLIENT REP. ON-SITE:	Andrew Fuller	BOREHOLE DIAMETER:	6 Inches
LOGS PROCESSED BY:	Robert Garfield	WATER LEVEL DEPTH:	5.8 Feet

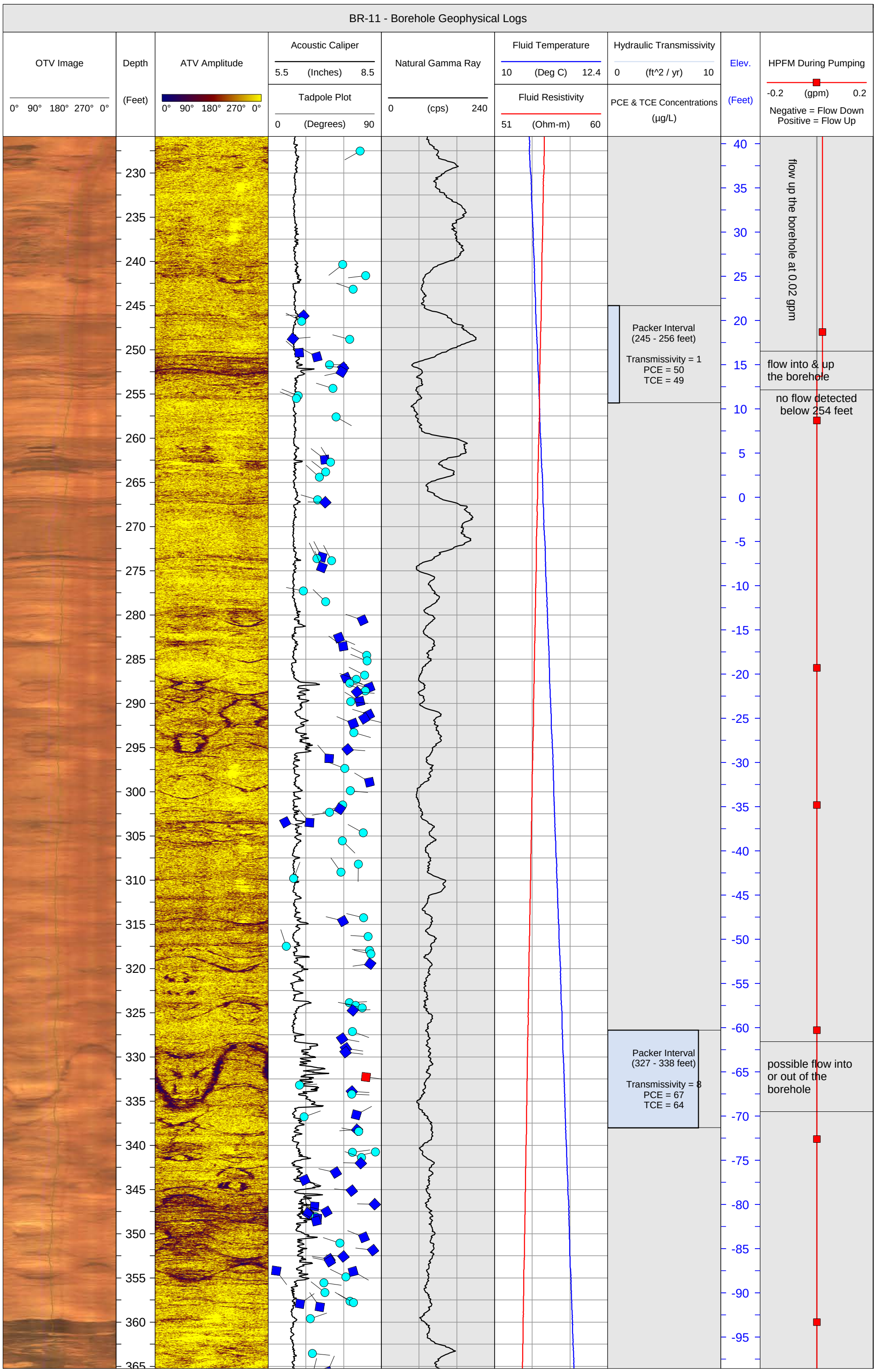
STRUCTURE LEGEND

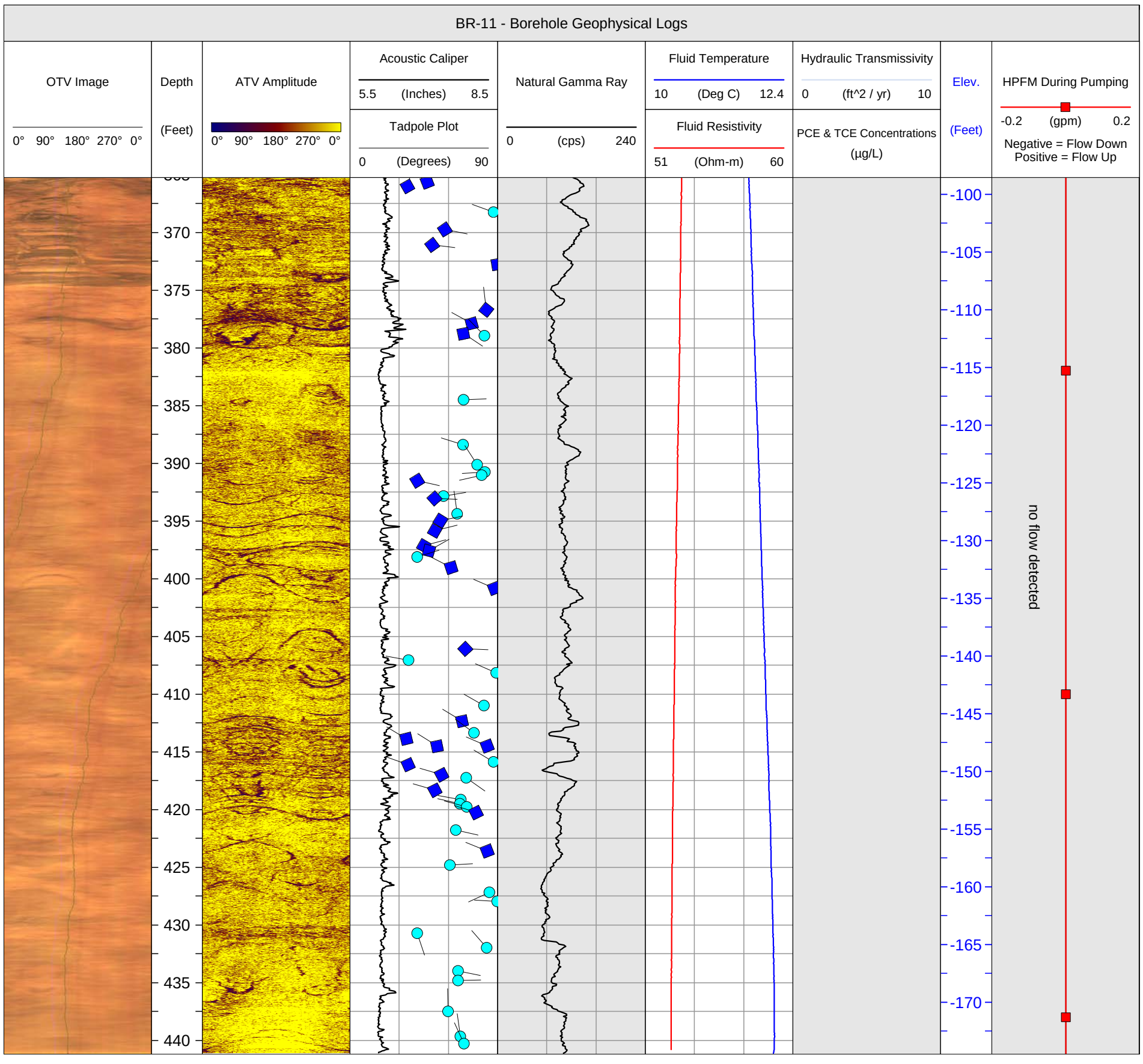
Fracture Rank 1 Fracture Rank 2 Fracture Rank 3

NOTES: HPFM data under ambient conditions are not plotted in the logs below because flow was not detected under ambient conditions.
During HPFM logging under pumping conditions water was pumped from the borehole from inside the casing.
The hydraulic transmissivity, PCE, and TCE data reported in the logs below were provided by Weston and were acquired during packer testing.

BR-11 - Borehole Geophysical Logs




BR-11 - Borehole Geophysical Logs
OTV Image
0° 90° 180° 270° 0°
Depth
(Feet)
ATV Amplitude
0° 90° 180° 270° 0°
Acoustic Caliper
5.5 (Inches) 8.5
Tadpole Plot
0 (Degrees) 90
Natural Gamma Ray
0 (cps) 240
Fluid Temperature
10 (Deg C) 12.4
Fluid Resistivity
51 (Ohm-m) 60
Hydraulic Transmissivity
0 (ft^2 / yr) 10
PCE & TCE Concentrations
(µg/L)
Packer Interval
(245 - 256 feet)
Transmissivity = 1
PCE = 50
TCE = 49
Packer Interval
(327 - 338 feet)
Transmissivity = 8
PCE = 67
TCE = 64
Elev.
(Feet)
HPFM During Pumping
-0.2 (gpm) 0.2
Negative = Flow Down
Positive = Flow Up
flow up the borehole at 0.02 gpm
flow into & up the borehole
no flow detected below 254 feet
possible flow into or out of the borehole


BR-11 - Borehole Geophysical Logs
OTV Image
0° 90° 180° 270° 0°
Depth
(Feet)
ATV Amplitude
0° 90° 180° 270° 0°
Acoustic Caliper
5.5 (Inches) 8.5
Tadpole Plot
0 (Degrees) 90
Natural Gamma Ray
0 (cps) 240
Fluid Temperature
10 (Deg C) 12.4
Fluid Resistivity
51 (Ohm-m) 60
Hydraulic Transmissivity
0 (ft^2 / yr) 10
PCE & TCE Concentrations
(µg/L)
Elev.
(Feet)
HPFM During Pumping
-0.2 (gpm) 0.2
Negative = Flow Down
Positive = Flow Up
no flow detected
370
375
380
385
390
395
400
405
410
415
420
425
430
435
440
-100
-105
-110
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HAGER-RICHTER GEOSCIENCE, INC.

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BR-12 - BOREHOLE IMAGE LOGS

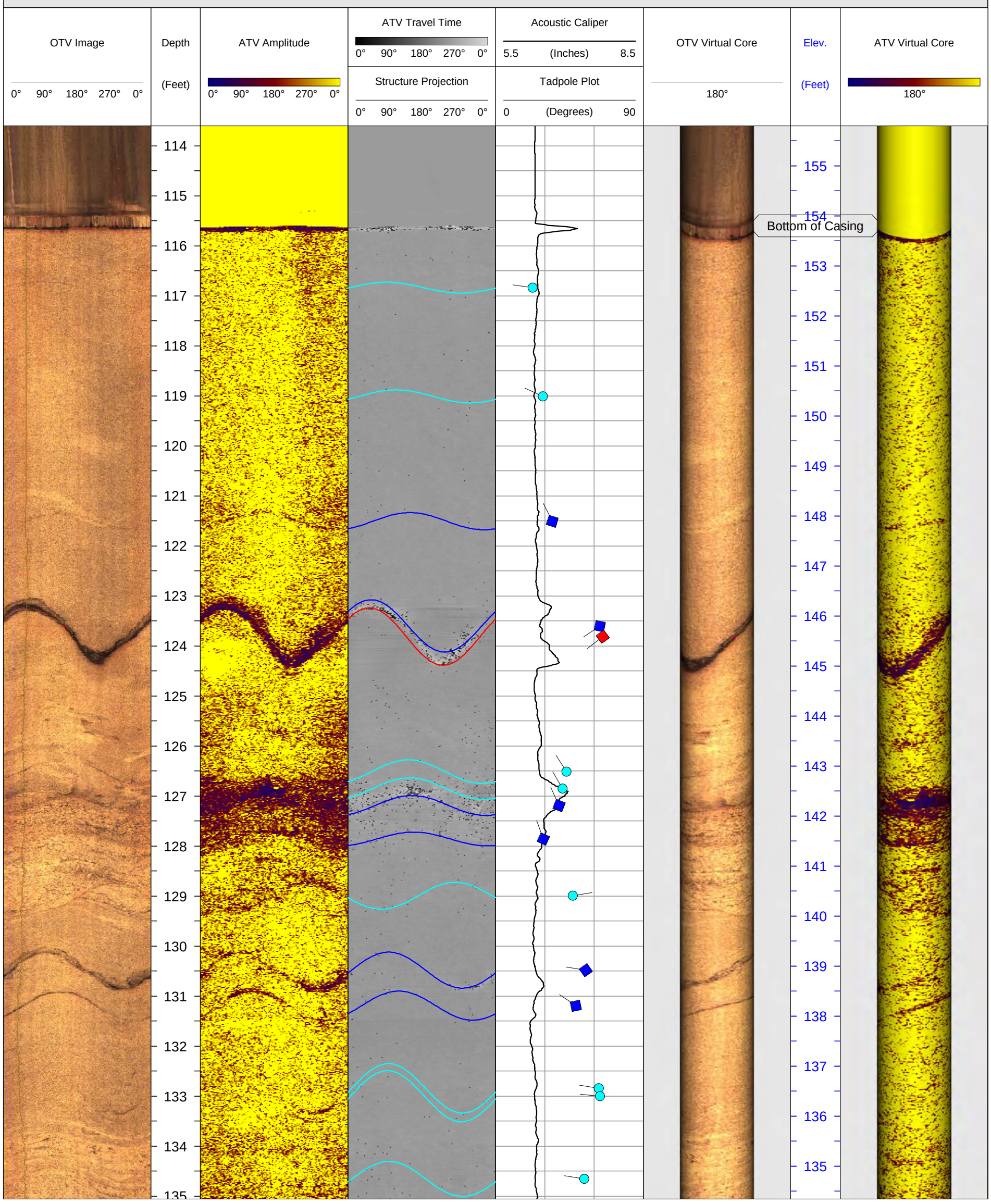
DATE LOGGED: November 13, 2012

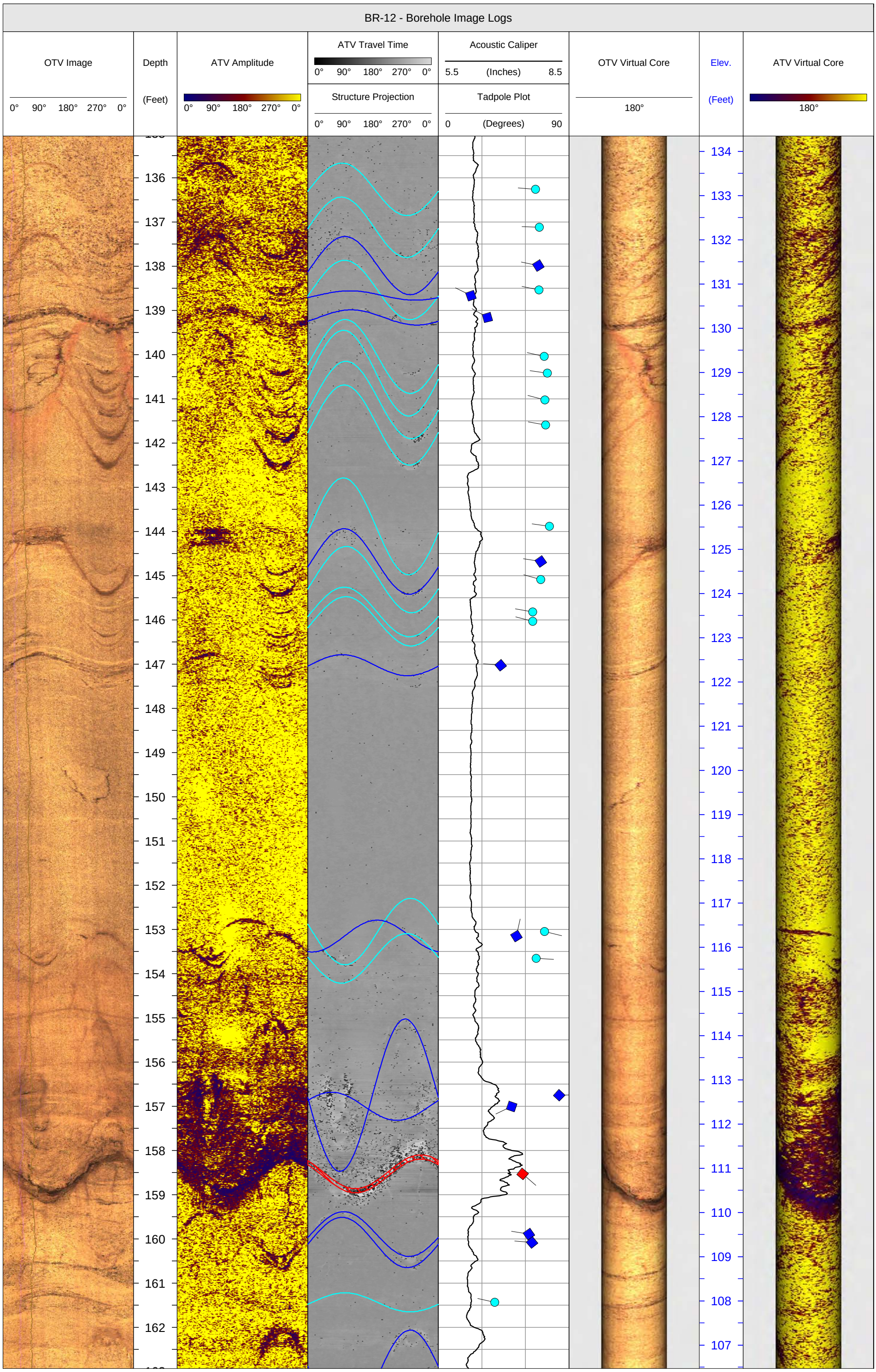
CLIENT:	Weston Solutions, Inc.	H-R FILE:	12RG62
PROJECT:	Borehole Geophysical Logging	LOG DATUM:	Top of the 6-Inch Steel Casing
LOCATION:	Savage Municipal Water Supply Superfund Site	TOP OF CASING ELEVATION:	269.4 Feet
CITY, STATE:	Milford, New Hampshire	ORIENTATION REFERENCE:	True North (Declination = 15 Degrees West)
LOGGING GEOPHYSICISTS:	Nick DeCristofaro & Eric Rickert	CASING STICK-UP:	1.5 Feet Below the Ground Surface
CLIENT REP. ON-SITE:	Andrew Fuller	BOREHOLE DIAMETER:	6 Inches
LOGS PROCESSED BY:	Robert Garfield	WATER LEVEL DEPTH:	10.0 Feet

STRUCTURE LEGEND

Fracture Rank 1 Fracture Rank 2 Fracture Rank 3

BR-12 - Borehole Image Logs




BR-12 - Borehole Image Logs
OTV Image
0° 90° 180° 270° 0°
Depth
(Feet)
ATV Amplitude
0° 90° 180° 270° 0°
ATV Travel Time
0° 90° 180° 270° 0°
Structure Projection
0° 90° 180° 270° 0°
Acoustic Caliper
5.5 (Inches) 8.5
Tadpole Plot
0 (Degrees) 90
OTV Virtual Core
180°
Elev.
(Feet)
ATV Virtual Core
180°
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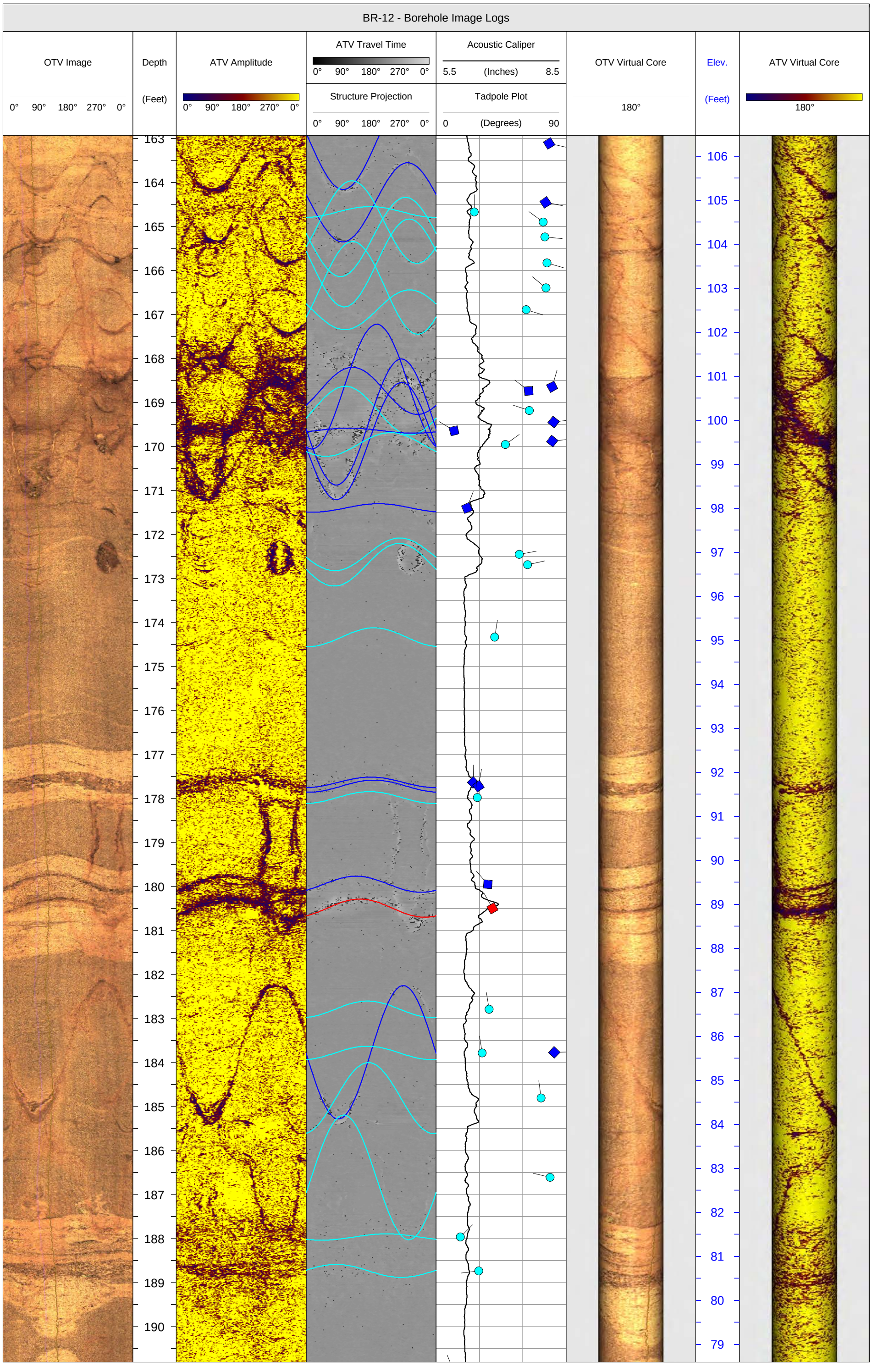
BR-12 - Borehole Image Logs
OTV Image
0° 90° 180° 270° 0°
Depth
(Feet)
ATV Amplitude
0° 90° 180° 270° 0°
ATV Travel Time
0° 90° 180° 270° 0°
Structure Projection
0° 90° 180° 270° 0°
Acoustic Caliper
5.5 (Inches) 8.5
Tadpole Plot
0 (Degrees) 90
OTV Virtual Core
180°
Elev.
(Feet)
ATV Virtual Core
180°
163
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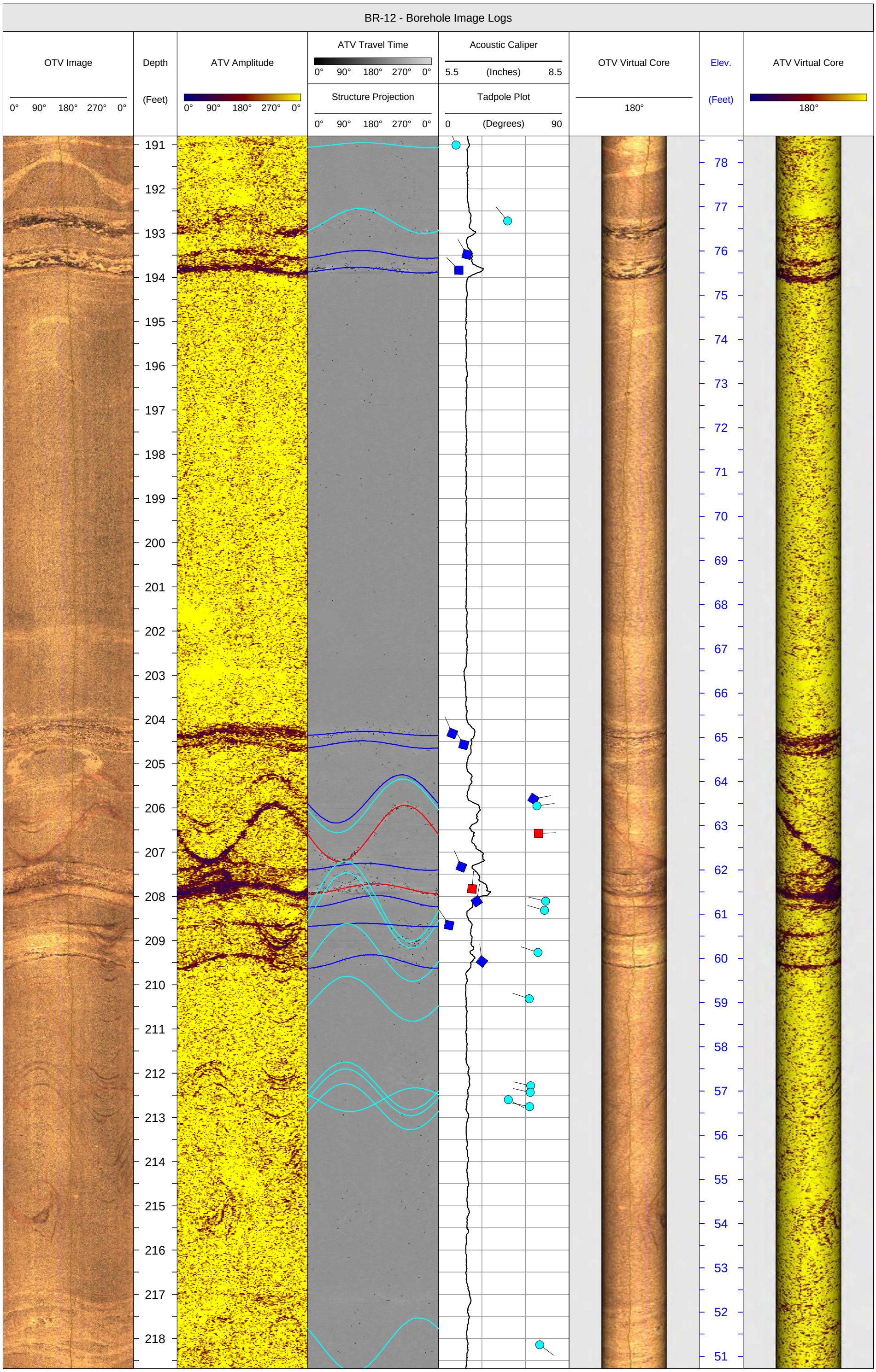
BR-12 - Borehole Image Logs
OTV Image
0° 90° 180° 270° 0°
Depth
(Feet)
ATV Amplitude
0° 90° 180° 270° 0°
ATV Travel Time
0° 90° 180° 270° 0°
Structure Projection
0° 90° 180° 270° 0°
Acoustic Caliper
5.5 (Inches) 8.5
Tadpole Plot
0 (Degrees) 90
OTV Virtual Core
180°
Elev.
(Feet)
ATV Virtual Core
180°
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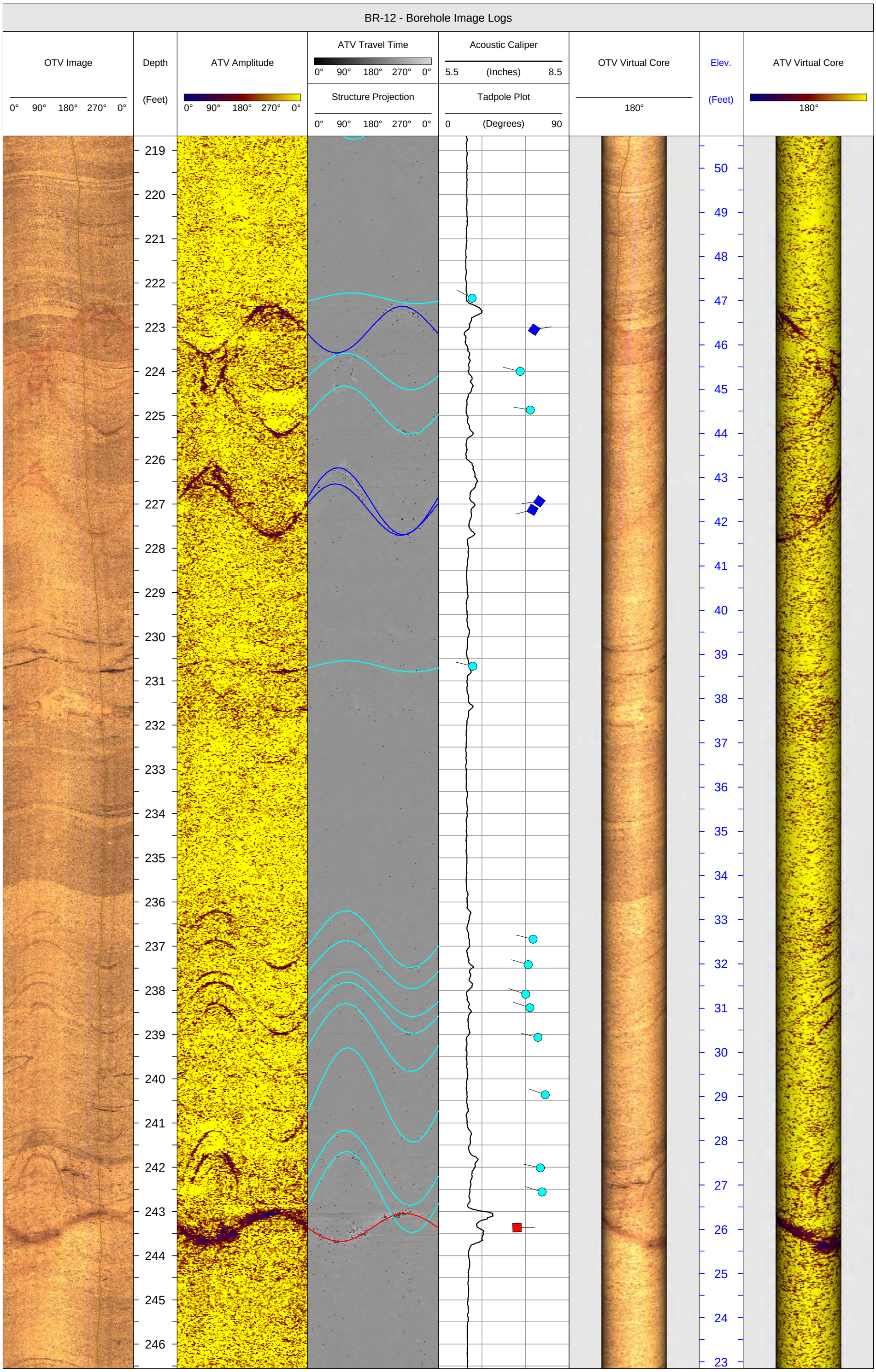
BR-12 - Borehole Image Logs
OTV Image
0° 90° 180° 270° 0°
Depth
(Feet)
ATV Amplitude
0° 90° 180° 270° 0°
ATV Travel Time
0° 90° 180° 270° 0°
Structure Projection
0° 90° 180° 270° 0°
Acoustic Caliper
5.5 (Inches) 8.5
Tadpole Plot
0 (Degrees) 90
OTV Virtual Core
180°
Elev.
(Feet)
ATV Virtual Core
180°
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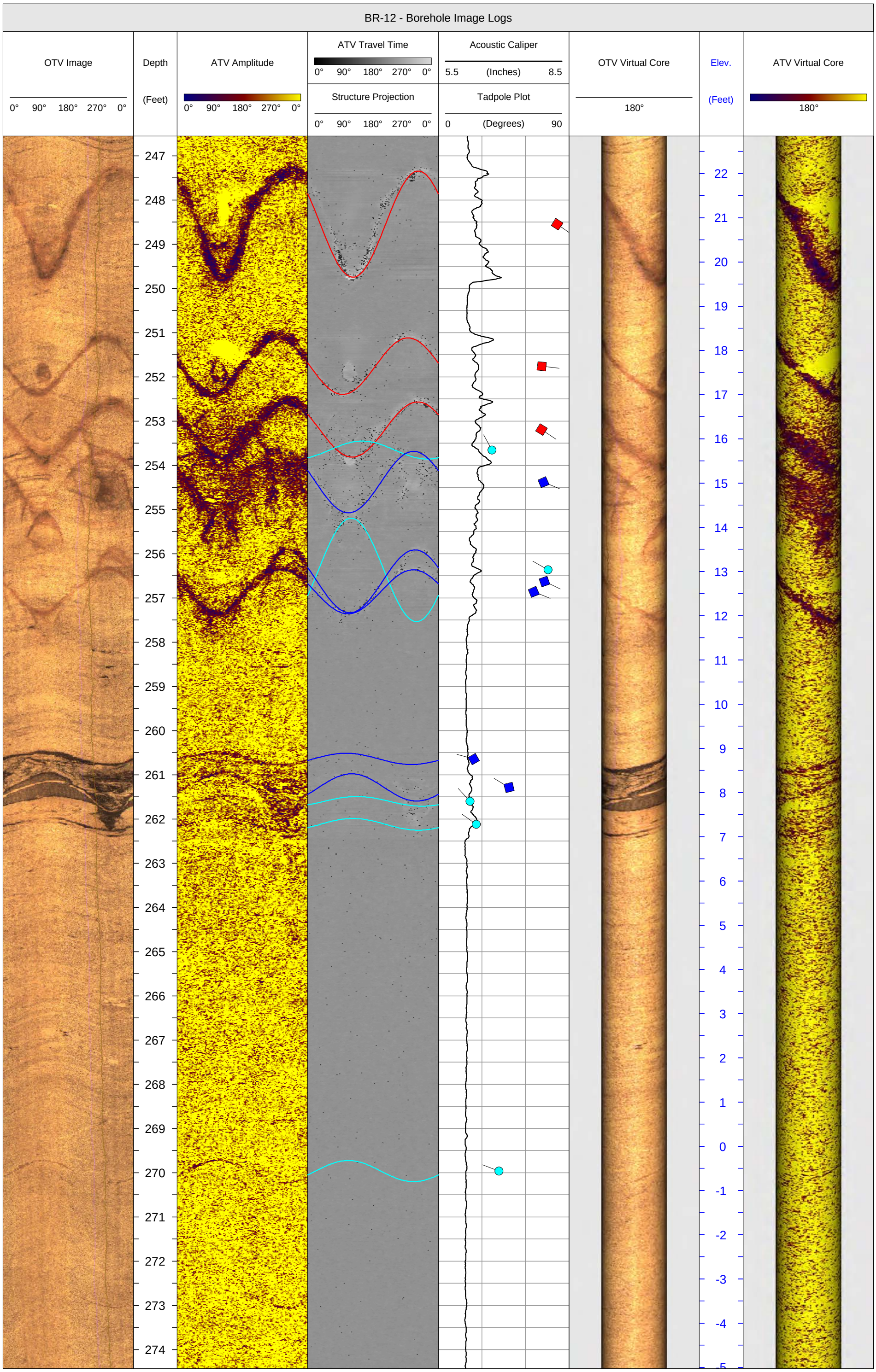
BR-12 - Borehole Image Logs
OTV Image
0° 90° 180° 270° 0°
Depth
(Feet)
ATV Amplitude
0° 90° 180° 270° 0°
ATV Travel Time
0° 90° 180° 270° 0°
Structure Projection
0° 90° 180° 270° 0°
Acoustic Caliper
5.5 (Inches) 8.5
Tadpole Plot
0 (Degrees) 90
OTV Virtual Core
180°
Elev.
(Feet)
ATV Virtual Core
180°
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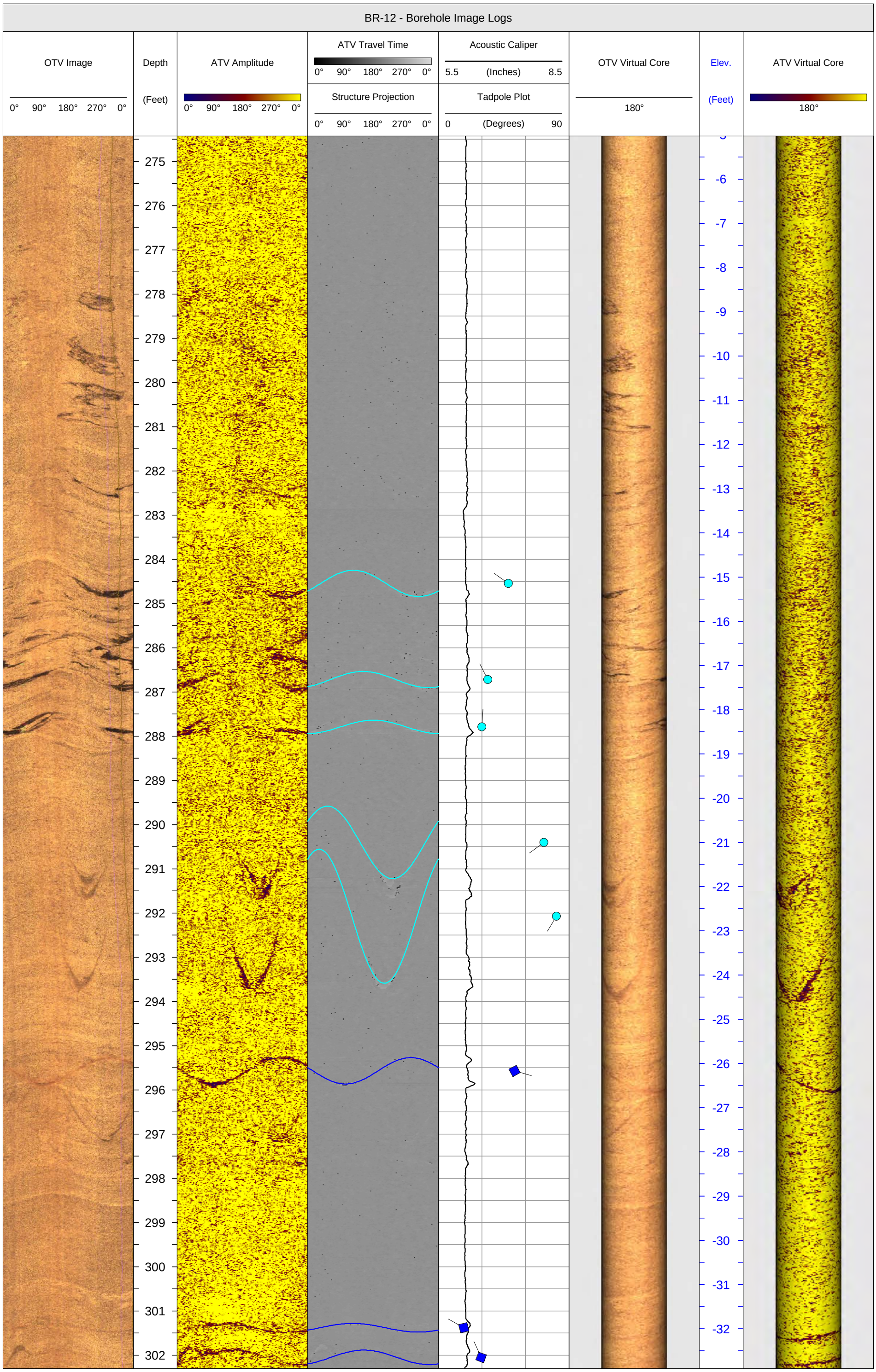
BR-12 - Borehole Image Logs
OTV Image
0° 90° 180° 270° 0°
Depth
(Feet)
ATV Amplitude
0° 90° 180° 270° 0°
ATV Travel Time
0° 90° 180° 270° 0°
Structure Projection
0° 90° 180° 270° 0°
Acoustic Caliper
5.5 (Inches) 8.5
Tadpole Plot
0 (Degrees) 90
OTV Virtual Core
180°
Elev.
(Feet)
ATV Virtual Core
180°
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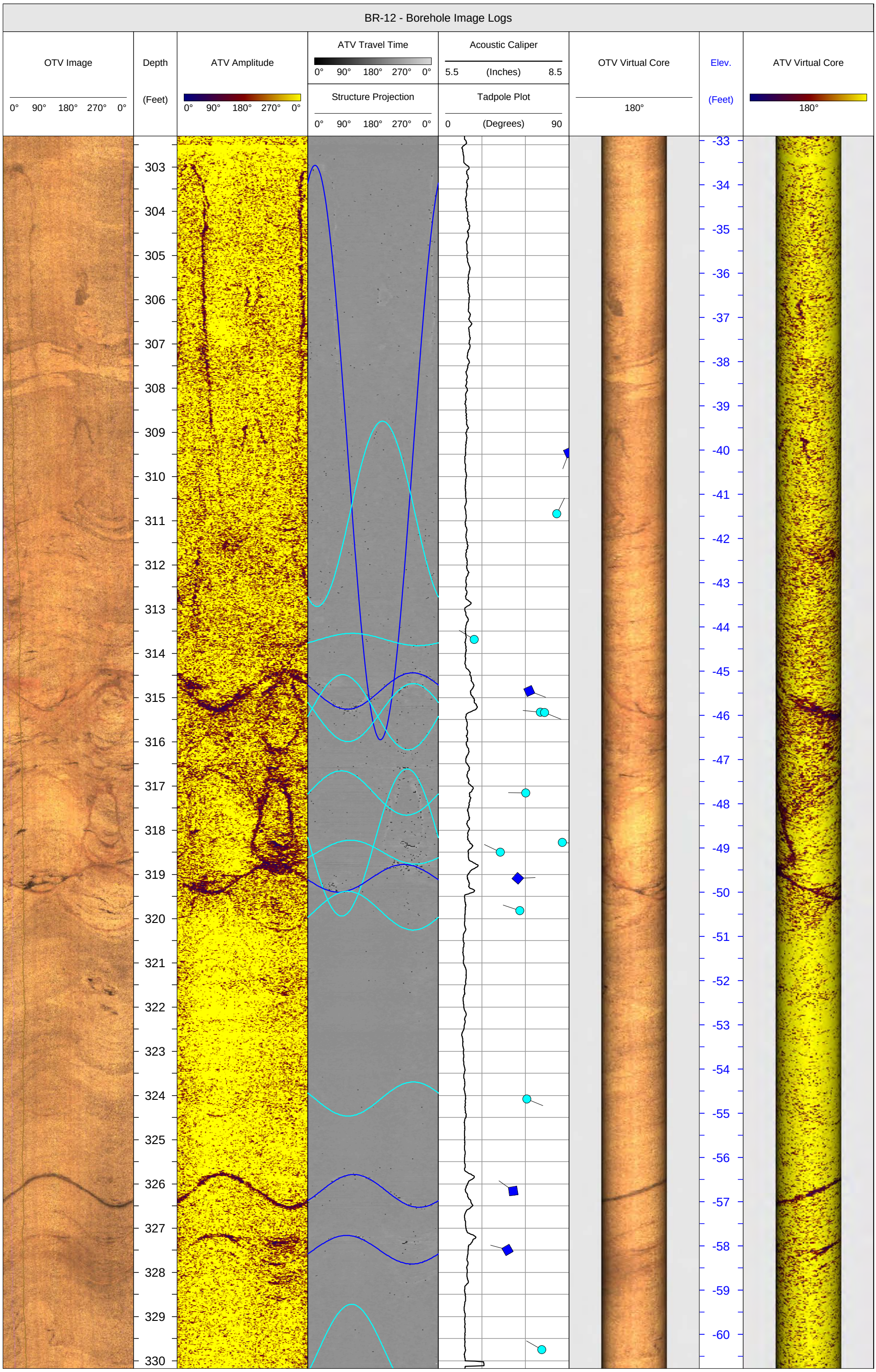
BR-12 - Borehole Image Logs
OTV Image
0° 90° 180° 270° 0°
Depth
(Feet)
ATV Amplitude
0° 90° 180° 270° 0°
ATV Travel Time
0° 90° 180° 270° 0°
Structure Projection
0° 90° 180° 270° 0°
Acoustic Caliper
5.5 (Inches) 8.5
Tadpole Plot
0 (Degrees) 90
OTV Virtual Core
180°
Elev.
(Feet)
ATV Virtual Core
180°
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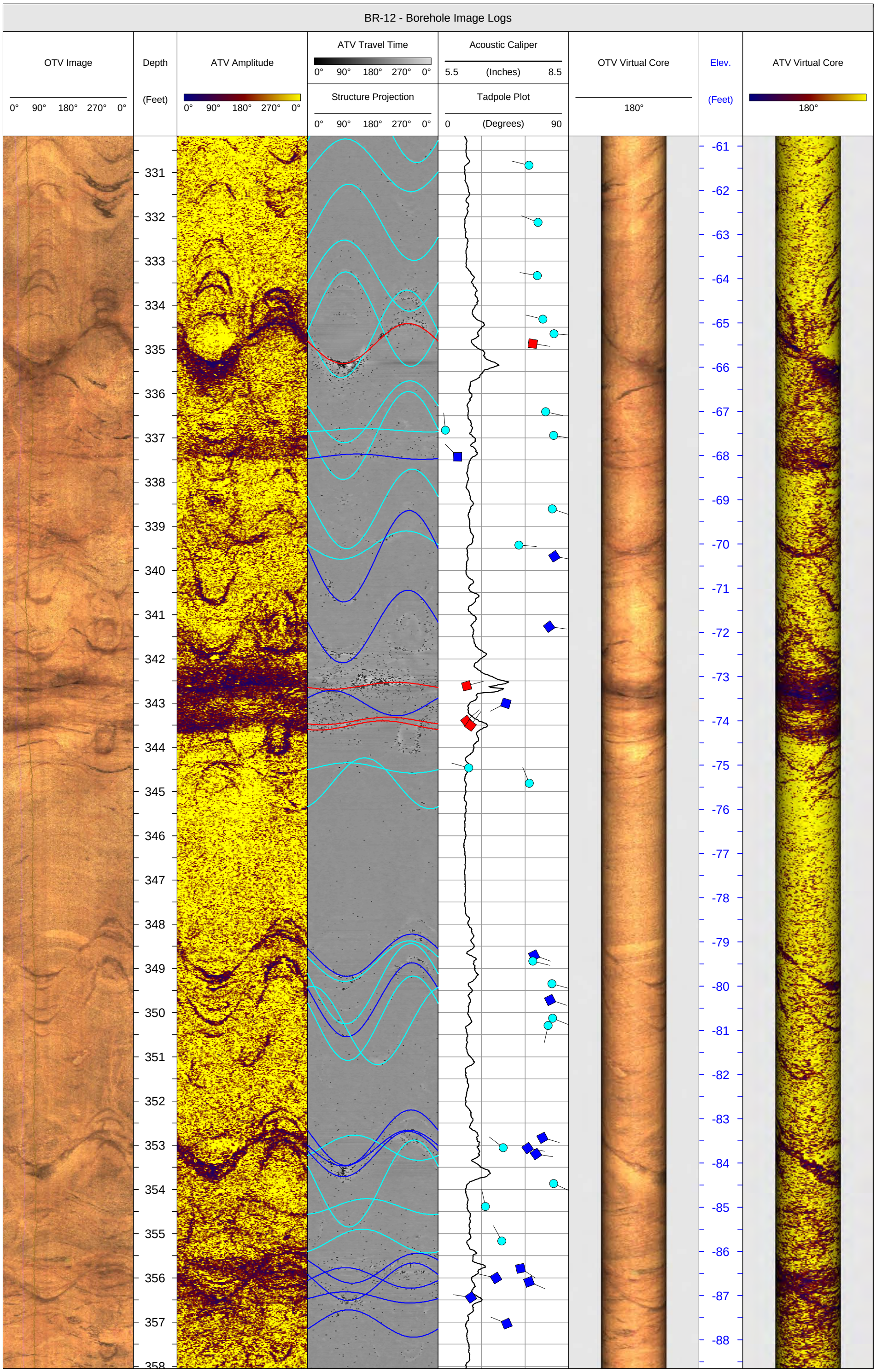
BR-12 - Borehole Image Logs
OTV Image
0° 90° 180° 270° 0°
Depth
(Feet)
ATV Amplitude
0° 90° 180° 270° 0°
ATV Travel Time
0° 90° 180° 270° 0°
Structure Projection
0° 90° 180° 270° 0°
Acoustic Caliper
5.5 (Inches) 8.5
Tadpole Plot
0 (Degrees) 90
OTV Virtual Core
180°
Elev.
(Feet)
ATV Virtual Core
180°
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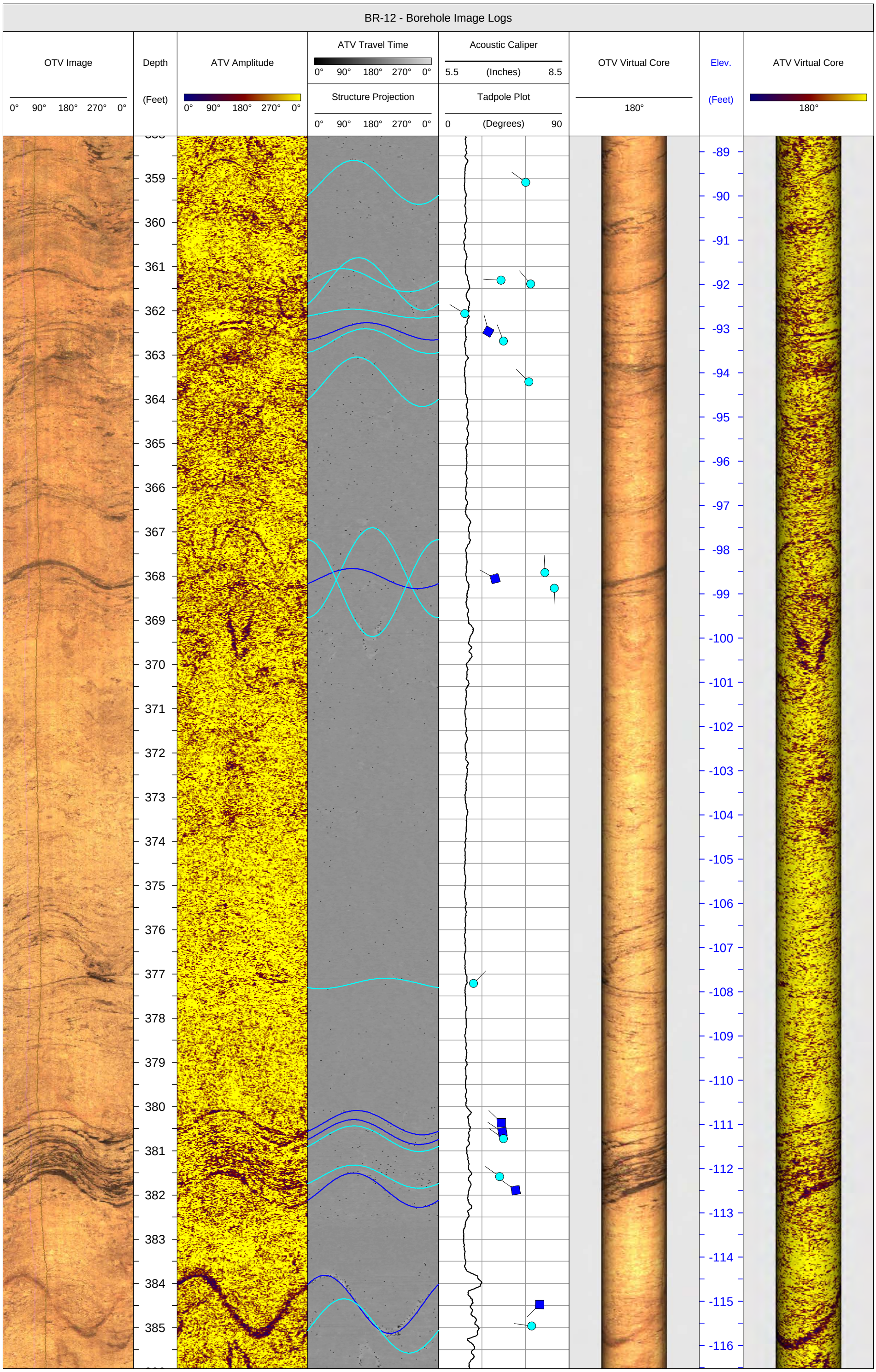
BR-12 - Borehole Image Logs
OTV Image
0° 90° 180° 270° 0°
Depth
(Feet)
ATV Amplitude
0° 90° 180° 270° 0°
ATV Travel Time
0° 90° 180° 270° 0°
Structure Projection
0° 90° 180° 270° 0°
Acoustic Caliper
5.5 (Inches) 8.5
Tadpole Plot
0 (Degrees) 90
OTV Virtual Core
180°
Elev.
(Feet)
ATV Virtual Core
180°
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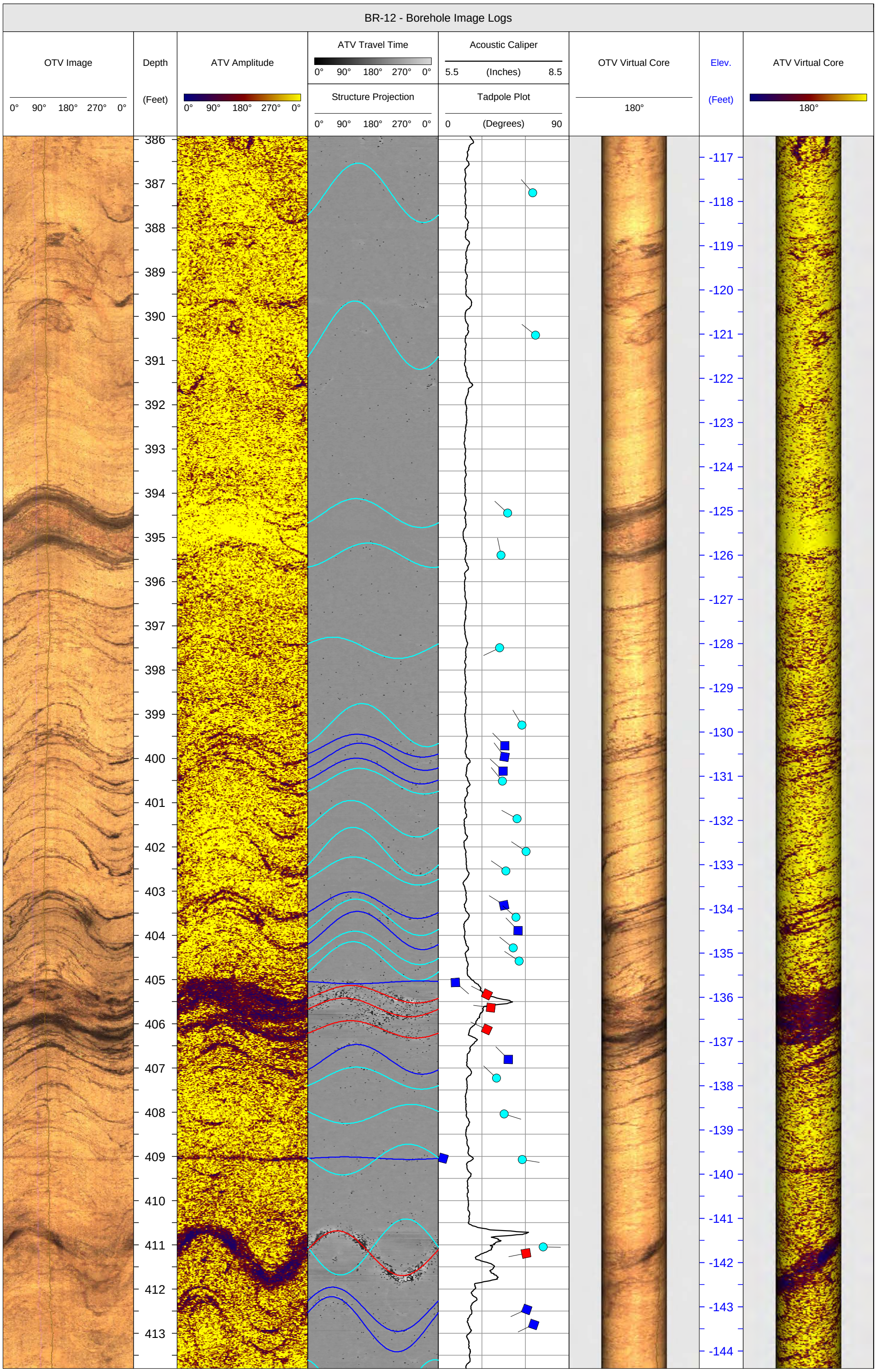
BR-12 - Borehole Image Logs
OTV Image
0° 90° 180° 270° 0°
Depth
(Feet)
ATV Amplitude
0° 90° 180° 270° 0°
ATV Travel Time
0° 90° 180° 270° 0°
Structure Projection
0° 90° 180° 270° 0°
Acoustic Caliper
5.5 (Inches) 8.5
Tadpole Plot
0 (Degrees) 90
OTV Virtual Core
180°
Elev.
(Feet)
ATV Virtual Core
180°
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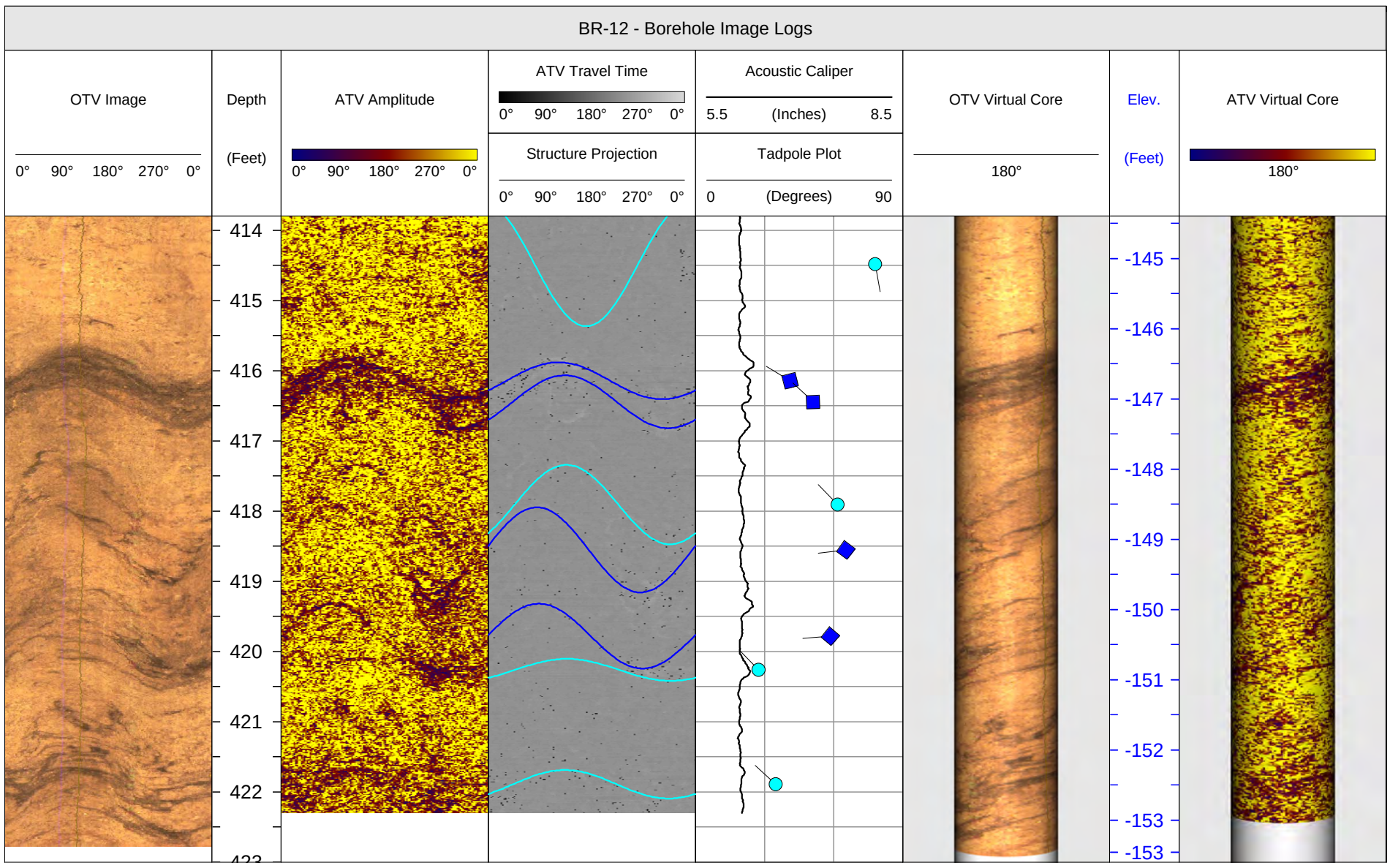
BR-12 - Borehole Image Logs
OTV Image
0° 90° 180° 270° 0°
Depth
(Feet)
ATV Amplitude
0° 90° 180° 270° 0°
ATV Travel Time
0° 90° 180° 270° 0°
Structure Projection
0° 90° 180° 270° 0°
Acoustic Caliper
5.5 (Inches) 8.5
Tadpole Plot
0 (Degrees) 90
OTV Virtual Core
180°
Elev.
(Feet)
ATV Virtual Core
180°
414
415
416
417
418
419
420
421
422
-145
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HAGER-RICHTER GEOSCIENCE, INC.

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BR-12 - BOREHOLE GEOPHYSICAL LOGS

DATE LOGGED: November 13, 2012

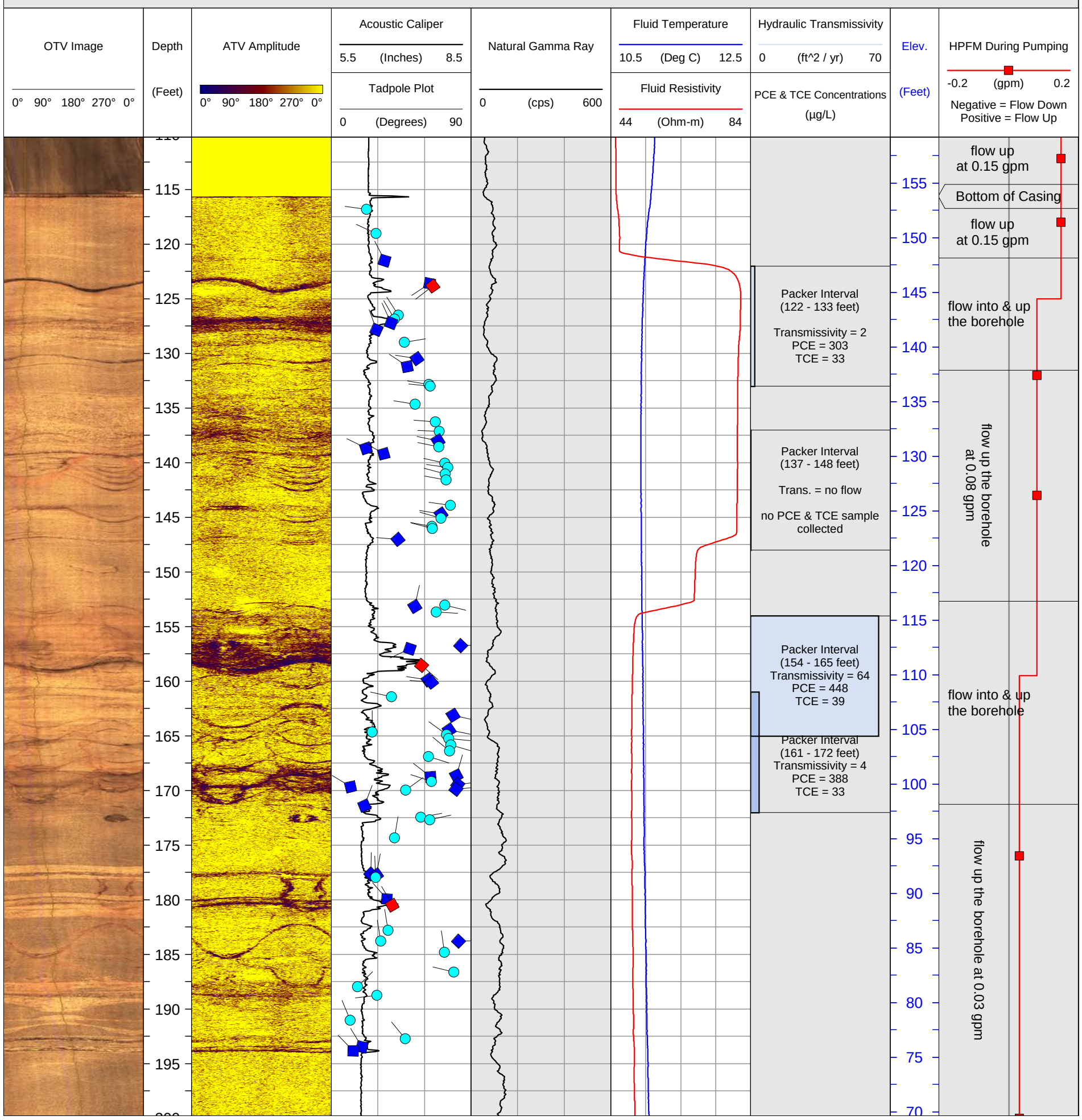
CLIENT:	Weston Solutions, Inc.	H-R FILE:	12RG62
PROJECT:	Borehole Geophysical Logging	LOG DATUM:	Top of the 6-Inch Steel Casing
LOCATION:	Savage Municipal Water Supply Superfund Site	TOP OF CASING ELEVATION:	269.4 Feet
CITY, STATE:	Milford, New Hampshire	ORIENTATION REFERENCE:	True North (Declination = 15 Degrees West)
LOGGING GEOPHYSICISTS:	Nick DeCristofaro & Eric Rickert	CASING STICK-UP:	1.5 Feet Below the Ground Surface
CLIENT REP. ON-SITE:	Andrew Fuller	BOREHOLE DIAMETER:	6 Inches
LOGS PROCESSED BY:	Robert Garfield	WATER LEVEL DEPTH:	10.0 Feet

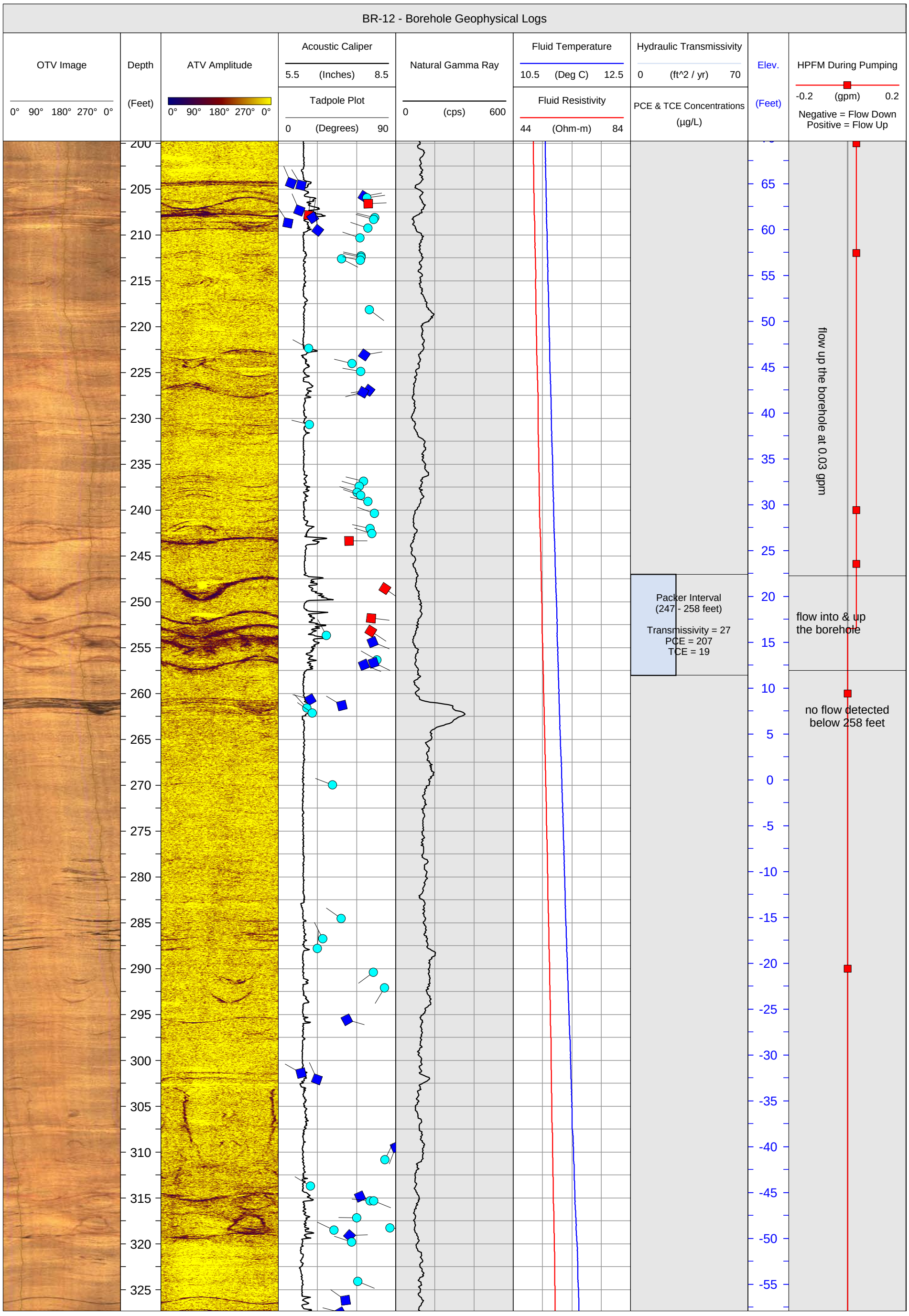
STRUCTURE LEGEND

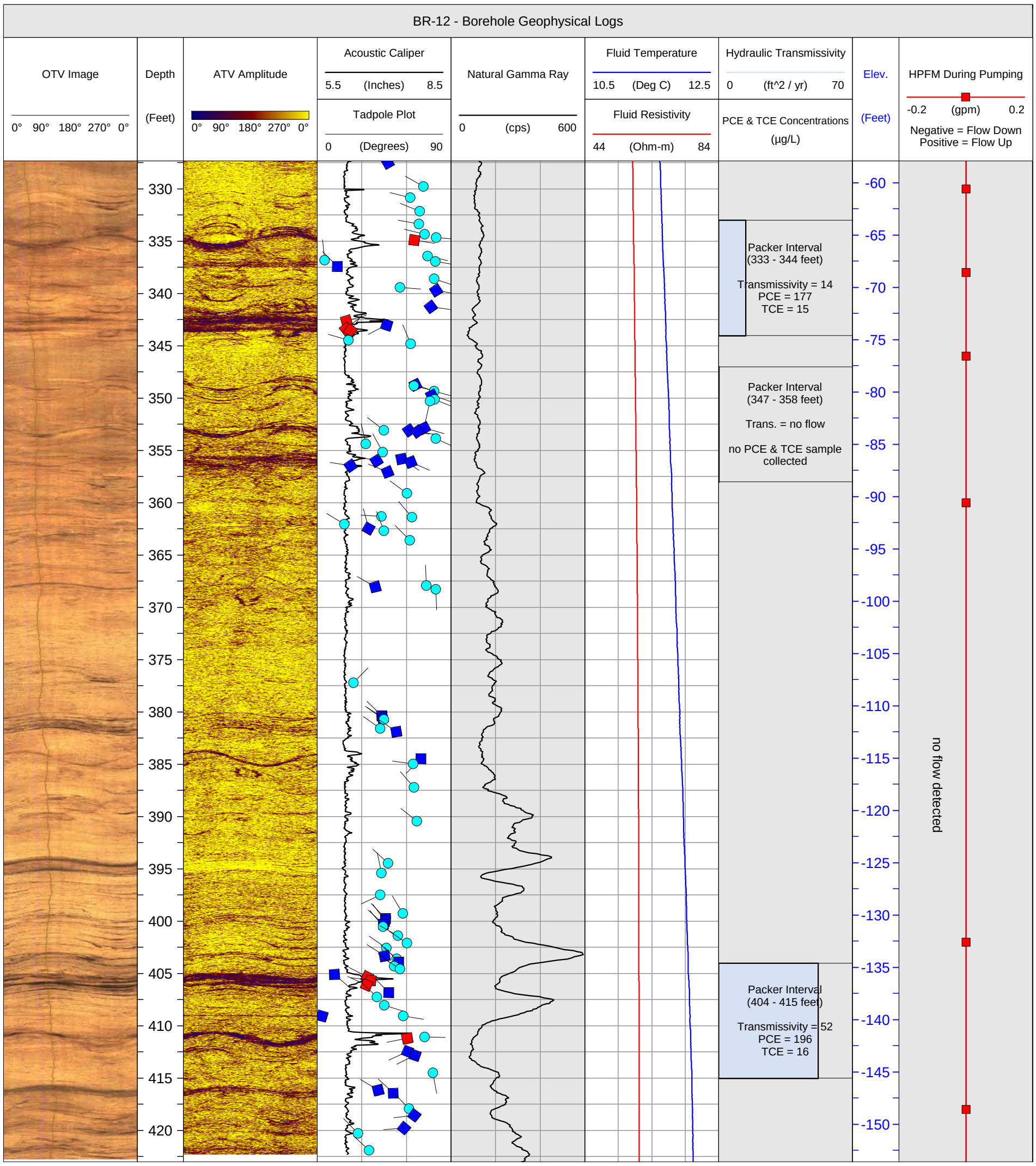
Fracture Rank 1 Fracture Rank 2 Fracture Rank 3

NOTES:
HPFM data under ambient conditions are not plotted in the logs below because flow was not detected under ambient conditions.
During HPFM logging under pumping conditions water was pumped from the borehole from inside the casing.
The hydraulic transmissivity, PCE, and TCE data reported in the logs below were provided by Weston and were acquired during packer testing.

BR-12 - Borehole Geophysical Logs




BR-12 - Borehole Geophysical Logs
OTV Image
0° 90° 180° 270° 0°
Depth
(Feet)
ATV Amplitude
0° 90° 180° 270° 0°
Acoustic Caliper
5.5 (Inches) 8.5
Tadpole Plot
0 (Degrees) 90
Natural Gamma Ray
0 (cps) 600
Fluid Temperature
10.5 (Deg C) 12.5
Fluid Resistivity
44 (Ohm-m) 84
Hydraulic Transmissivity
0 (ft^2 / yr) 70
PCE & TCE Concentrations
(µg/L)
Elev.
(Feet)
HPFM During Pumping
-0.2 (gpm) 0.2
Negative = Flow Down
Positive = Flow Up
Packer Interval
(247 - 258 feet)
Transmissivity = 27
PCE = 207
TCE = 19
flow up the borehole at 0.03 gpm
flow into & up the borehole
no flow detected below 258 feet


BR-12 - Borehole Geophysical Logs
OTV Image
0° 90° 180° 270° 0°
Depth
(Feet)
ATV Amplitude
0° 90° 180° 270° 0°
Acoustic Caliper
5.5 (Inches) 8.5
Tadpole Plot
0 (Degrees) 90
Natural Gamma Ray
0 (cps) 600
Fluid Temperature
10.5 (Deg C) 12.5
Fluid Resistivity
44 (Ohm-m) 84
Hydraulic Transmissivity
0 (ft^2 / yr) 70
PCE & TCE Concentrations
(µg/L)
Elev.
(Feet)
HPFM During Pumping
-0.2 (gpm) 0.2
Negative = Flow Down
Positive = Flow Up
330
335
340
345
350
355
360
365
370
375
380
385
390
395
400
405
410
415
420
-60
-65
-70
-75
-80
-85
-90
-95
-100
-105
-110
-115
-120
-125
-130
-135
-140
-145
-150
Packer Interval
(333 - 344 feet)
Transmissivity = 14
PCE = 177
TCE = 15
Packer Interval
(347 - 358 feet)
Trans. = no flow
no PCE & TCE sample
collected
Packer Interval
(404 - 415 feet)
Transmissivity = 52
PCE = 196
TCE = 16
no flow detected

HAGER-RICHTER GEOSCIENCE, INC.

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Salem, NH 03079
Phone: 603-893-9944
Fax: 603-893-8313

BR-13 - BOREHOLE IMAGE LOGS

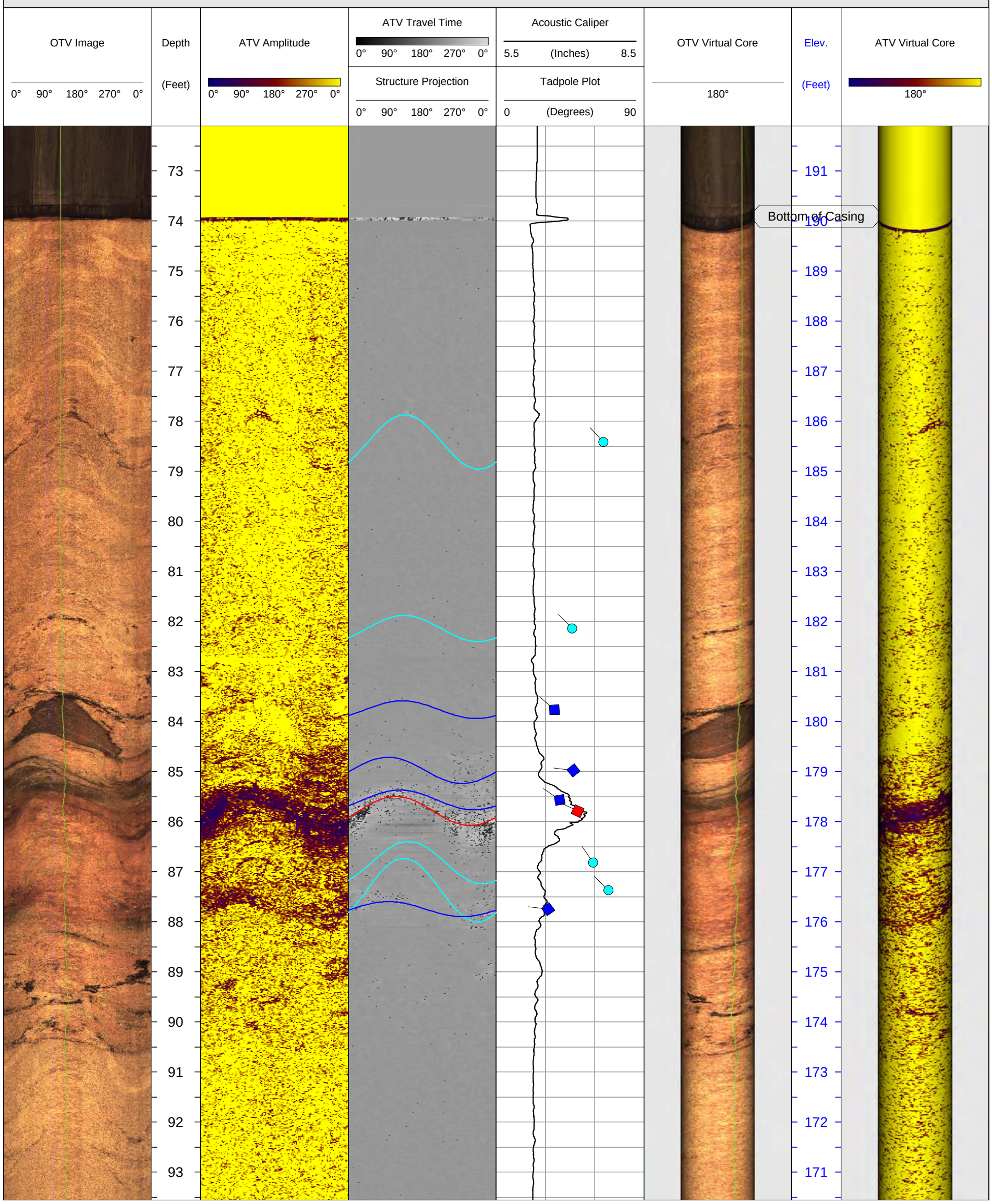
DATE LOGGED: November 13 & 14, 2012

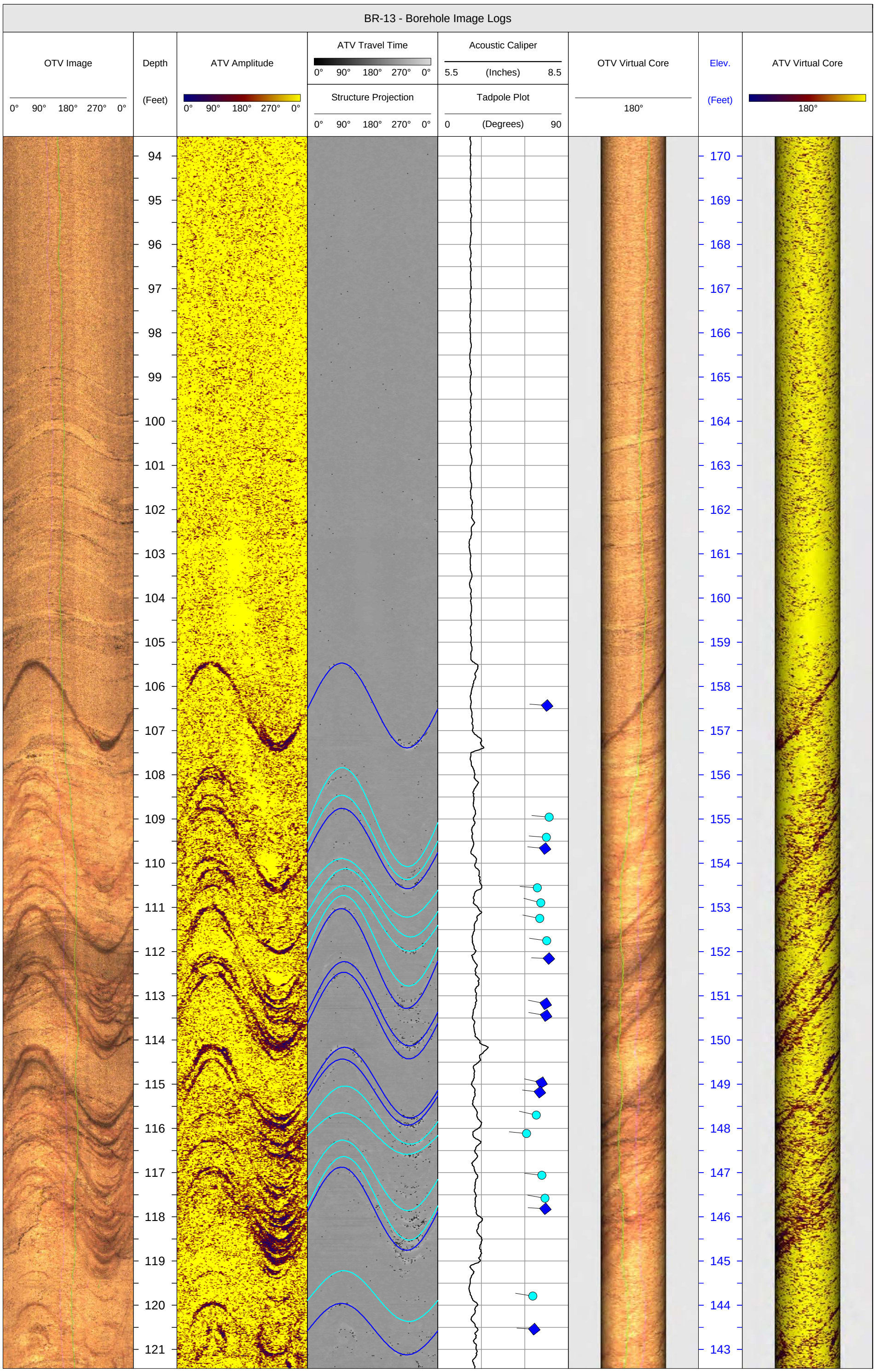
CLIENT:	Weston Solutions, Inc.	H-R FILE:	12RG62
PROJECT:	Borehole Geophysical Logging	LOG DATUM:	Top of the 6-Inch Steel Casing
LOCATION:	Savage Municipal Water Supply Superfund Site	TOP OF CASING ELEVATION:	264.0 Feet
CITY, STATE:	Milford, New Hampshire	ORIENTATION REFERENCE:	True North (Declination = 15 Degrees West)
LOGGING GEOPHYSICISTS:	Nick DeCristofaro & Eric Rickert	CASING STICK-UP:	1.2 Feet Below the Ground Surface
CLIENT REP. ON-SITE:	Andrew Fuller	BOREHOLE DIAMETER:	6 Inches
LOGS PROCESSED BY:	Robert Garfield	WATER LEVEL DEPTH:	8.1 Feet

STRUCTURE LEGEND

Fracture Rank 1 Fracture Rank 2 Fracture Rank 3

BR-13 - Borehole Image Logs




BR-13 - Borehole Image Logs
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0° 90° 180° 270° 0°
ATV Travel Time
0° 90° 180° 270° 0°
Structure Projection
0° 90° 180° 270° 0°
Acoustic Caliper
5.5 (Inches) 8.5
Tadpole Plot
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OTV Virtual Core
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Elev.
(Feet)
ATV Virtual Core
180°
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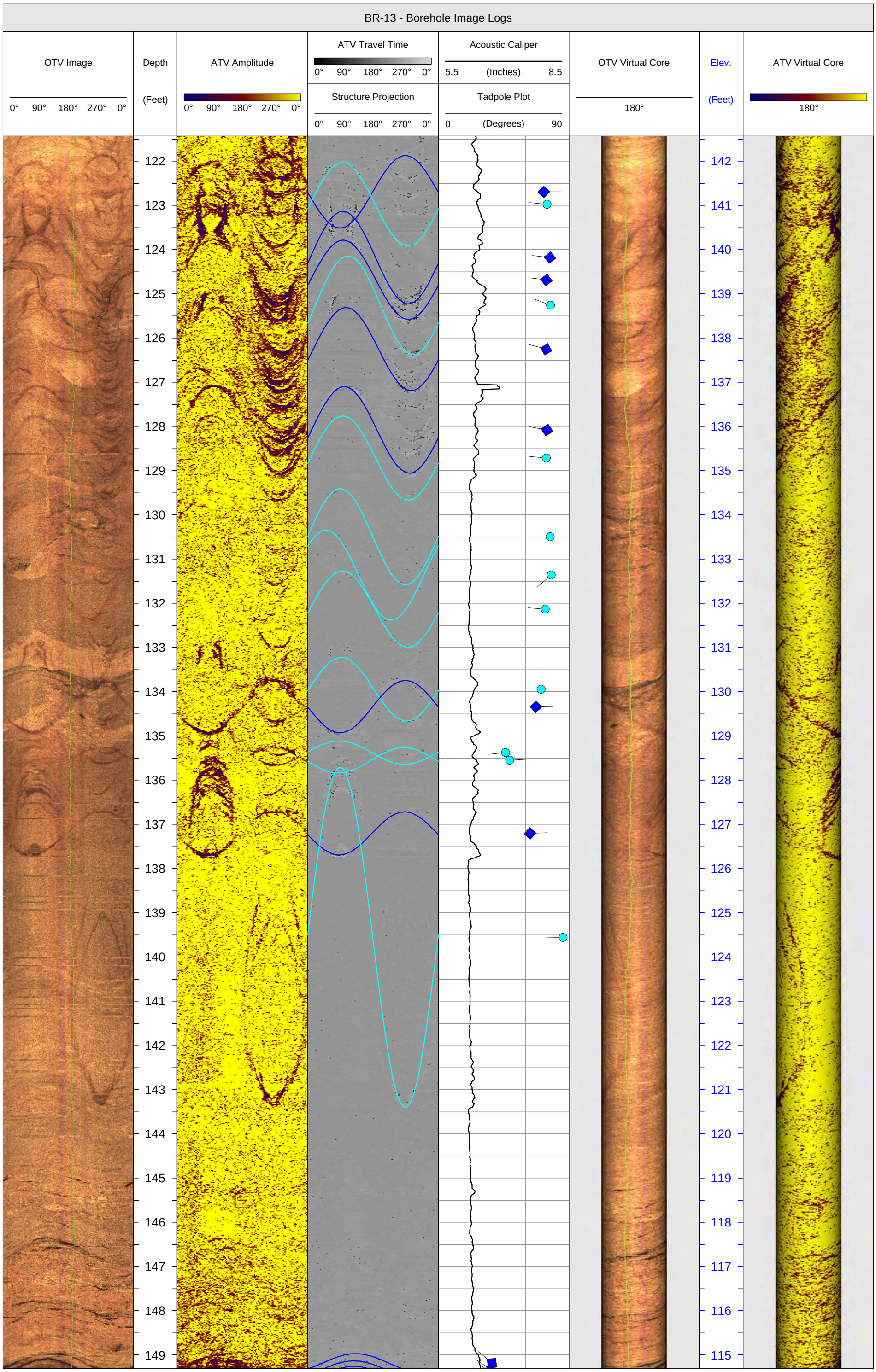
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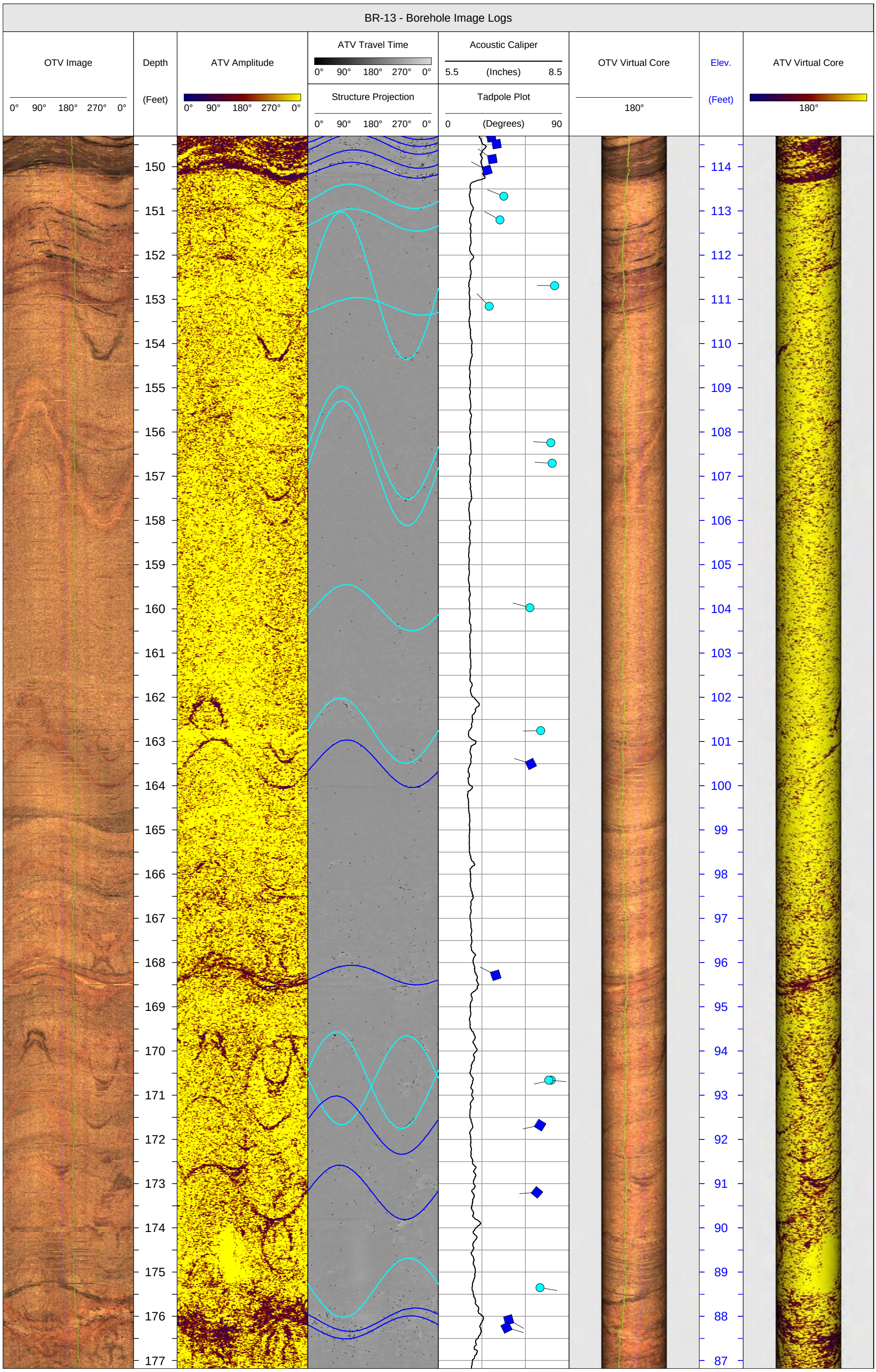
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0 (Degrees) 90
OTV Virtual Core
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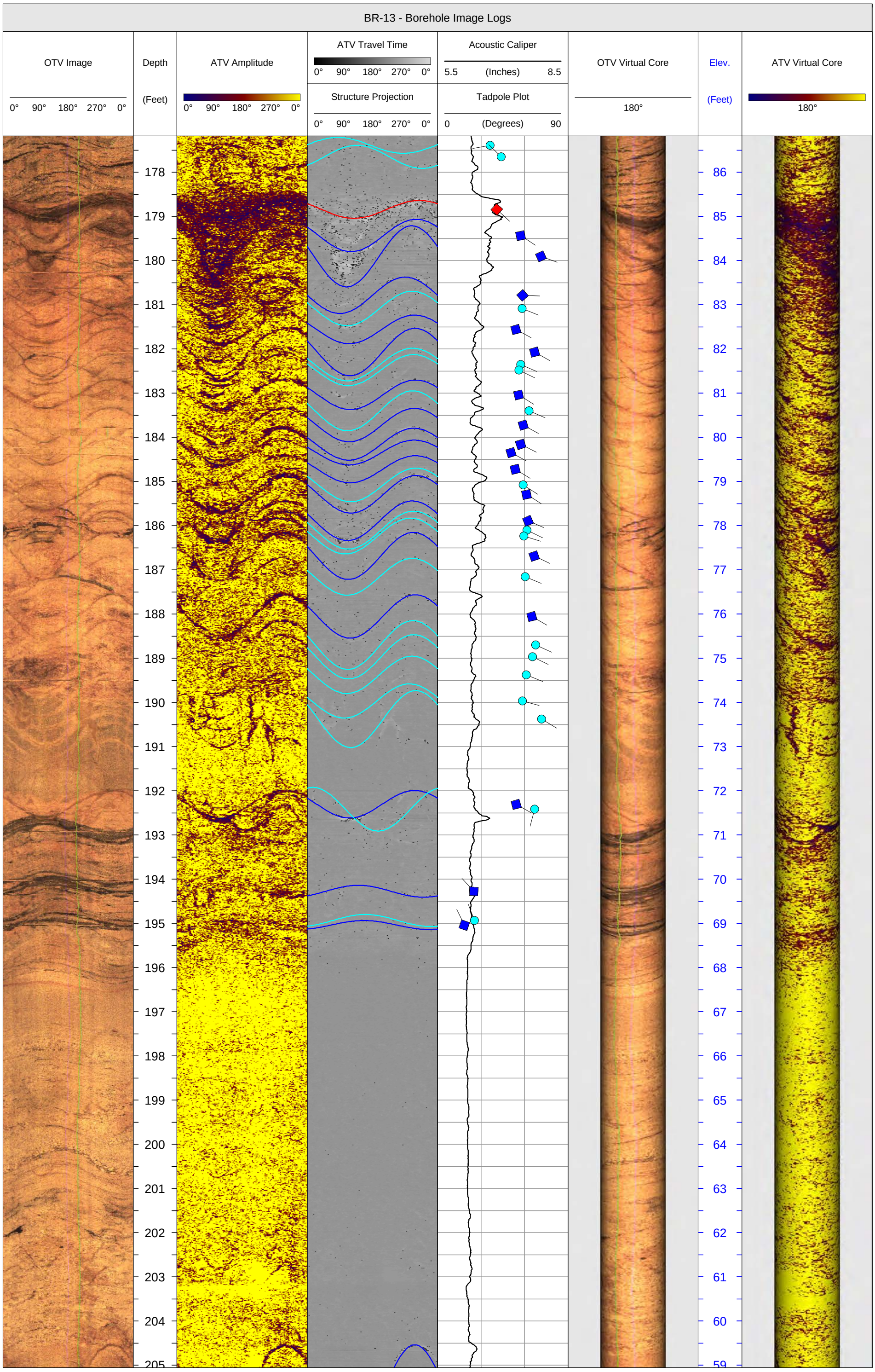
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Depth
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0 (Degrees) 90
OTV Virtual Core
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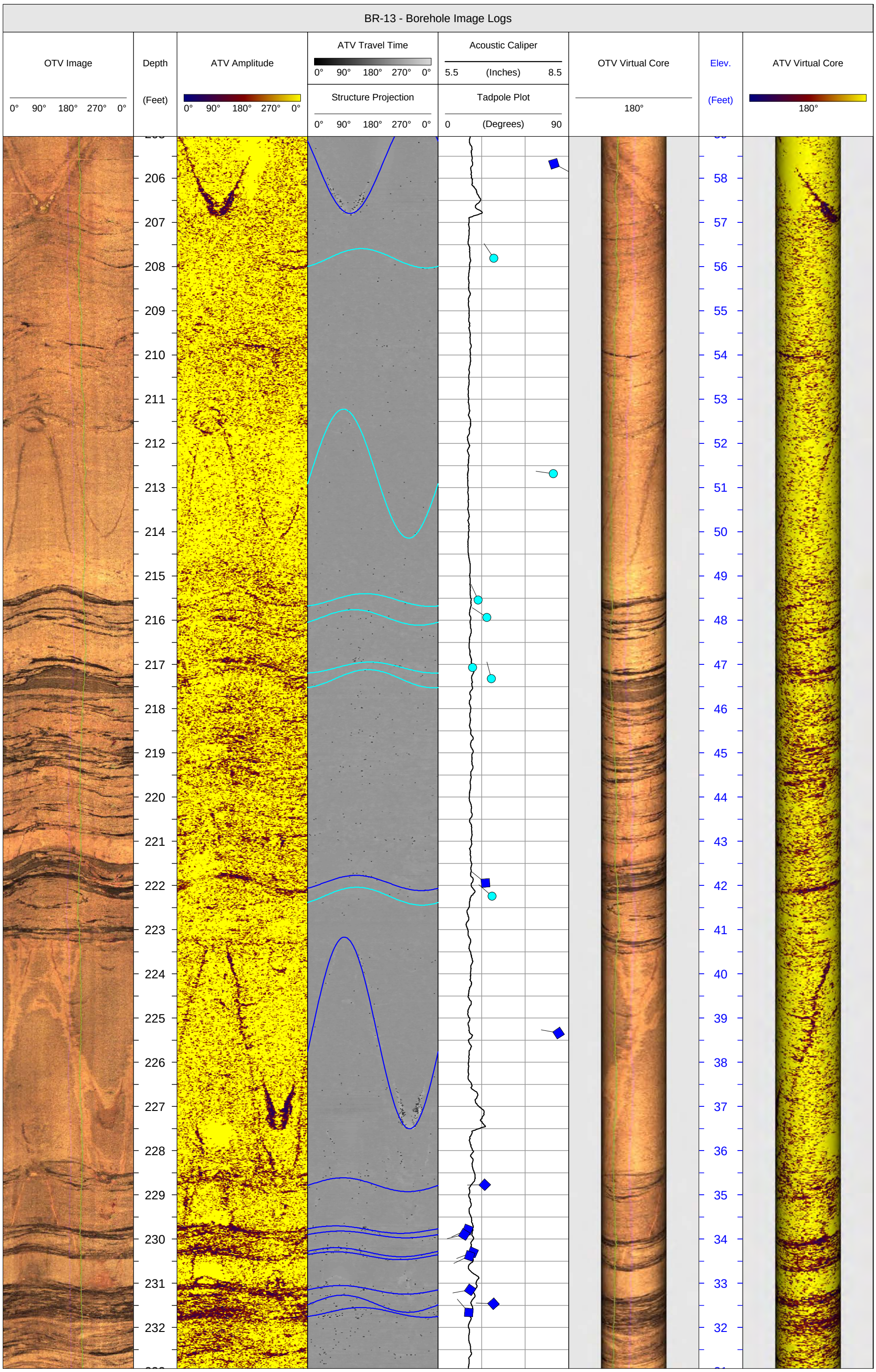
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Acoustic Caliper
5.5 (Inches) 8.5
Tadpole Plot
0 (Degrees) 90
OTV Virtual Core
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(Feet)
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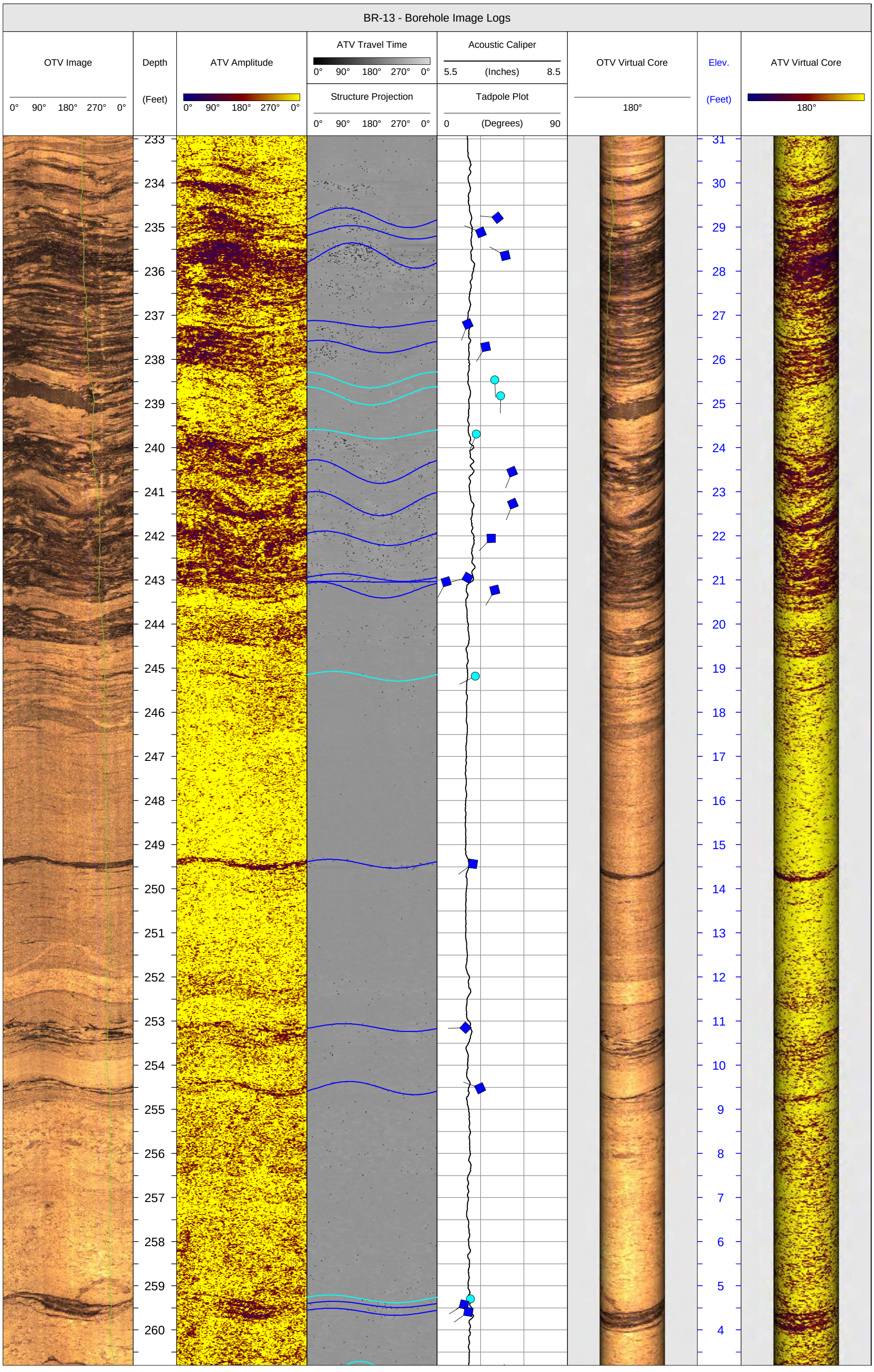
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0 (Degrees) 90
OTV Virtual Core
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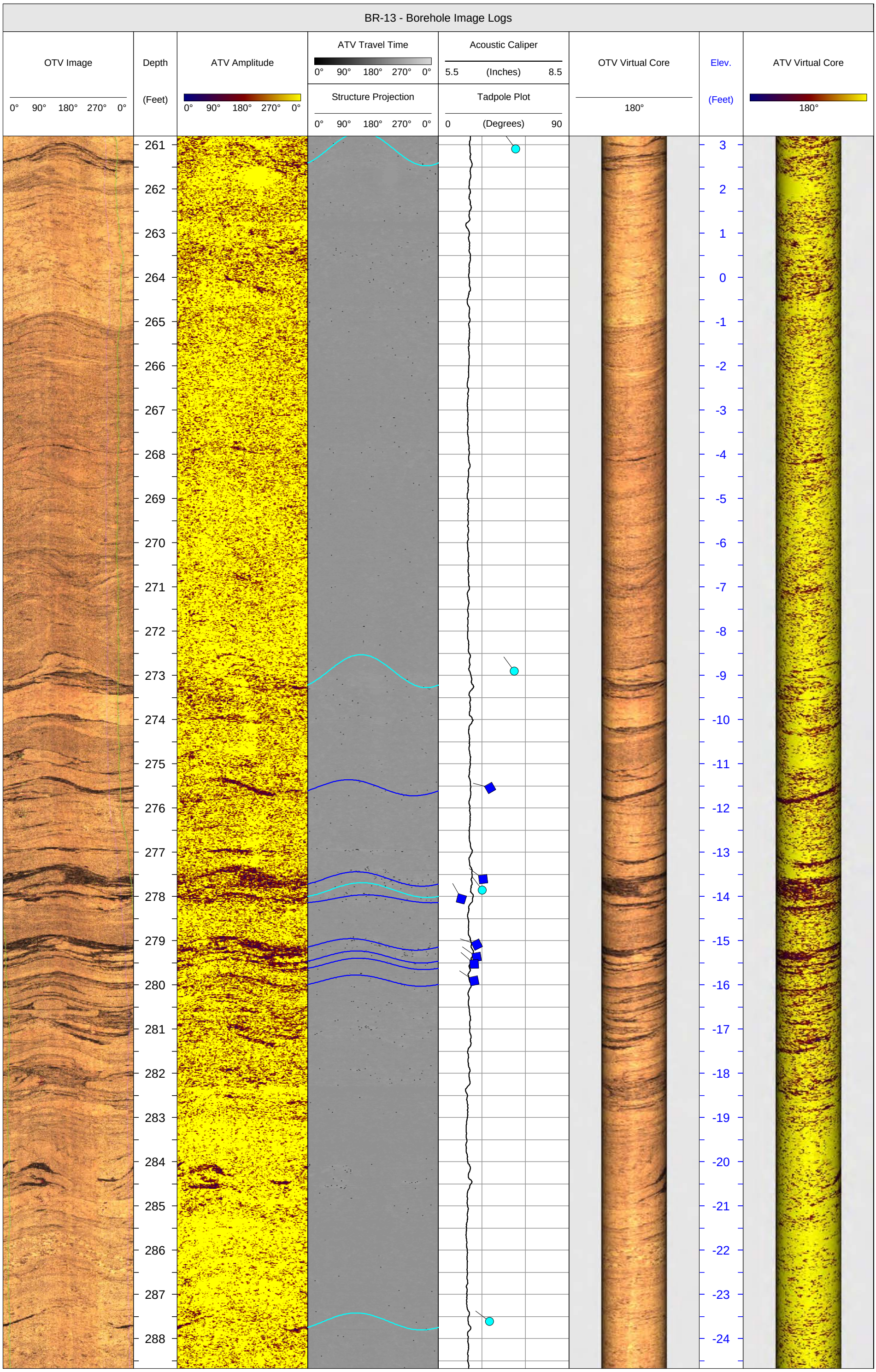
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0 (Degrees) 90
OTV Virtual Core
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180°
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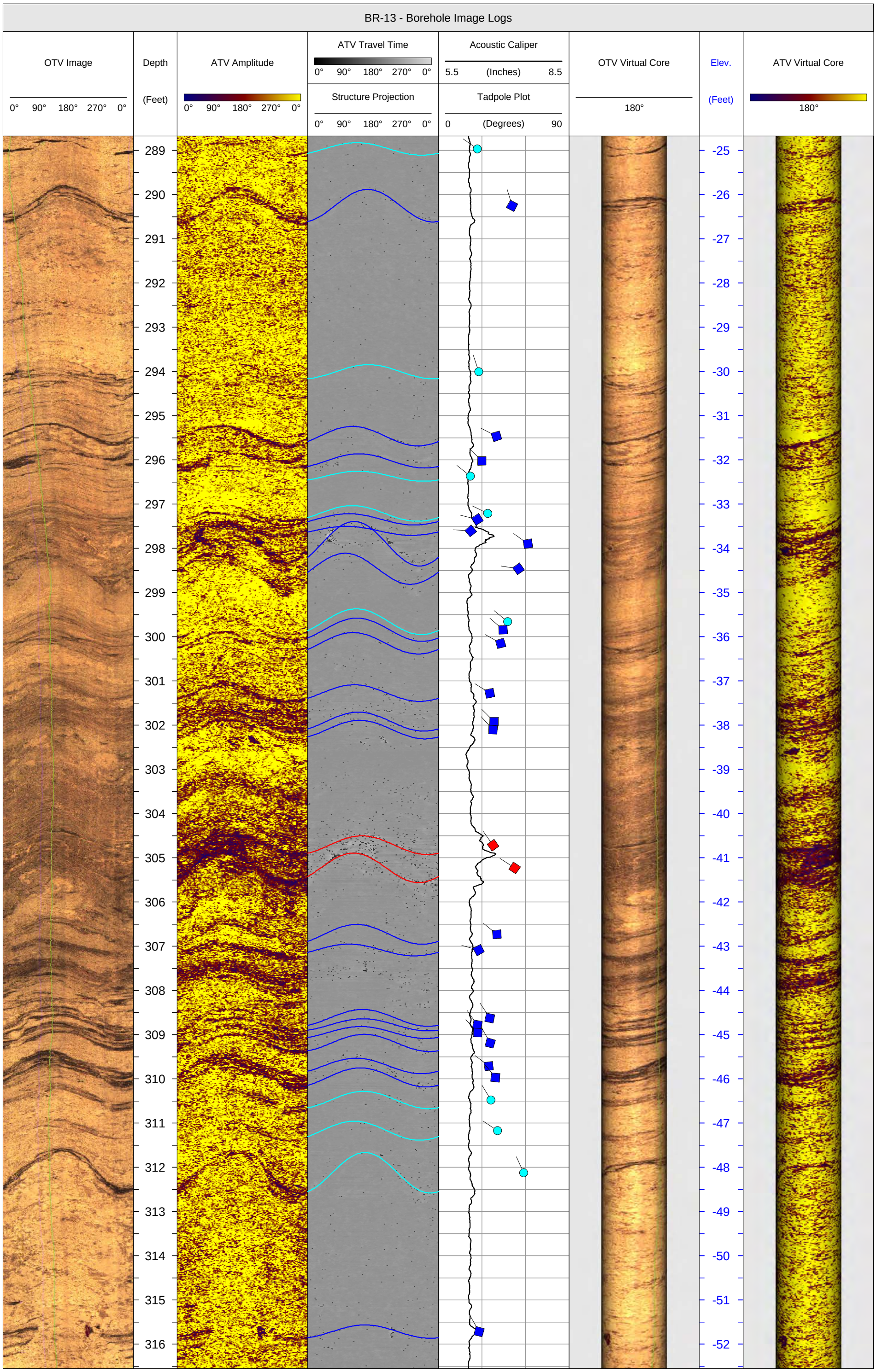
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5.5 (Inches) 8.5
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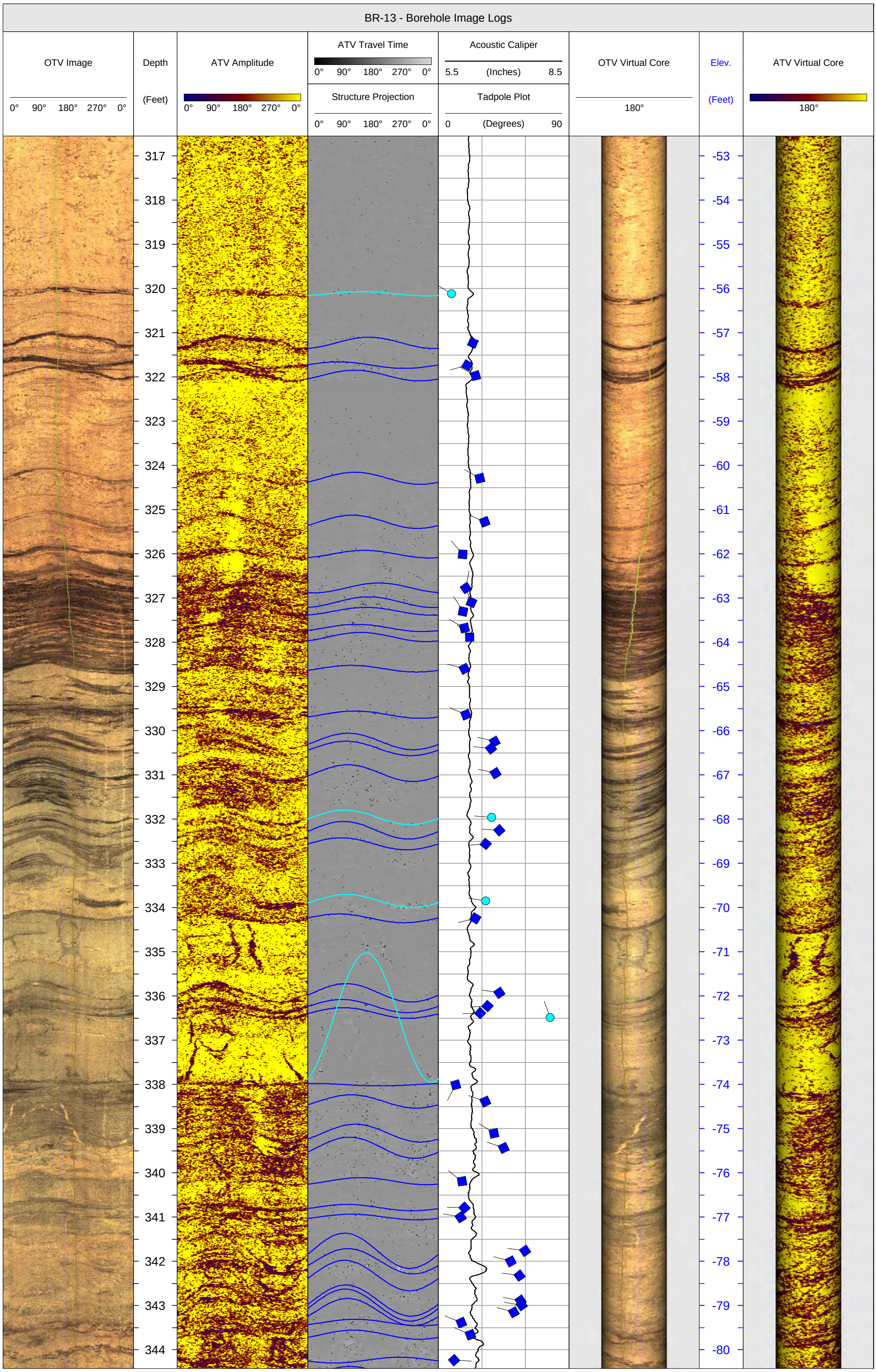
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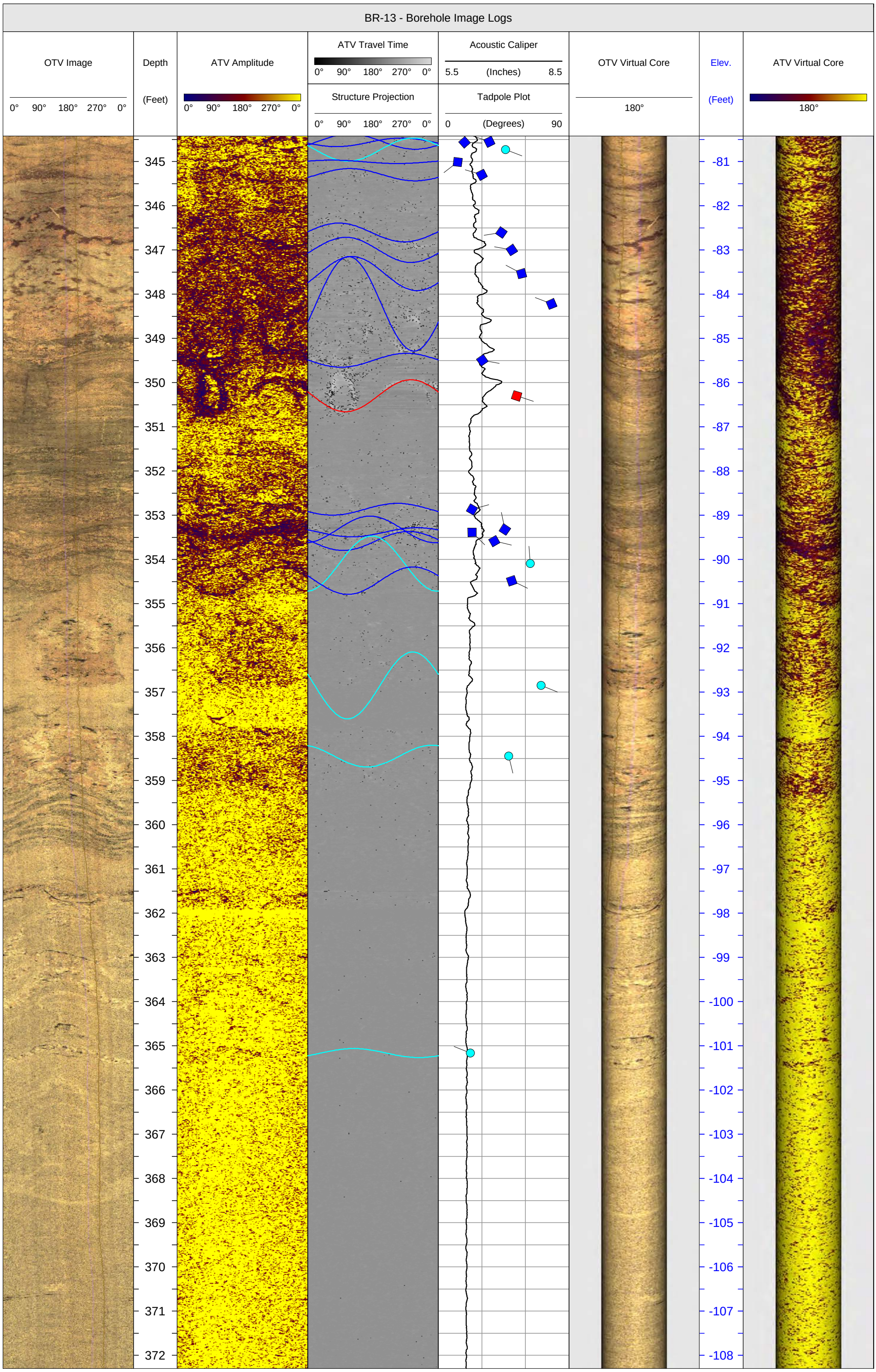
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OTV Virtual Core
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(Feet)
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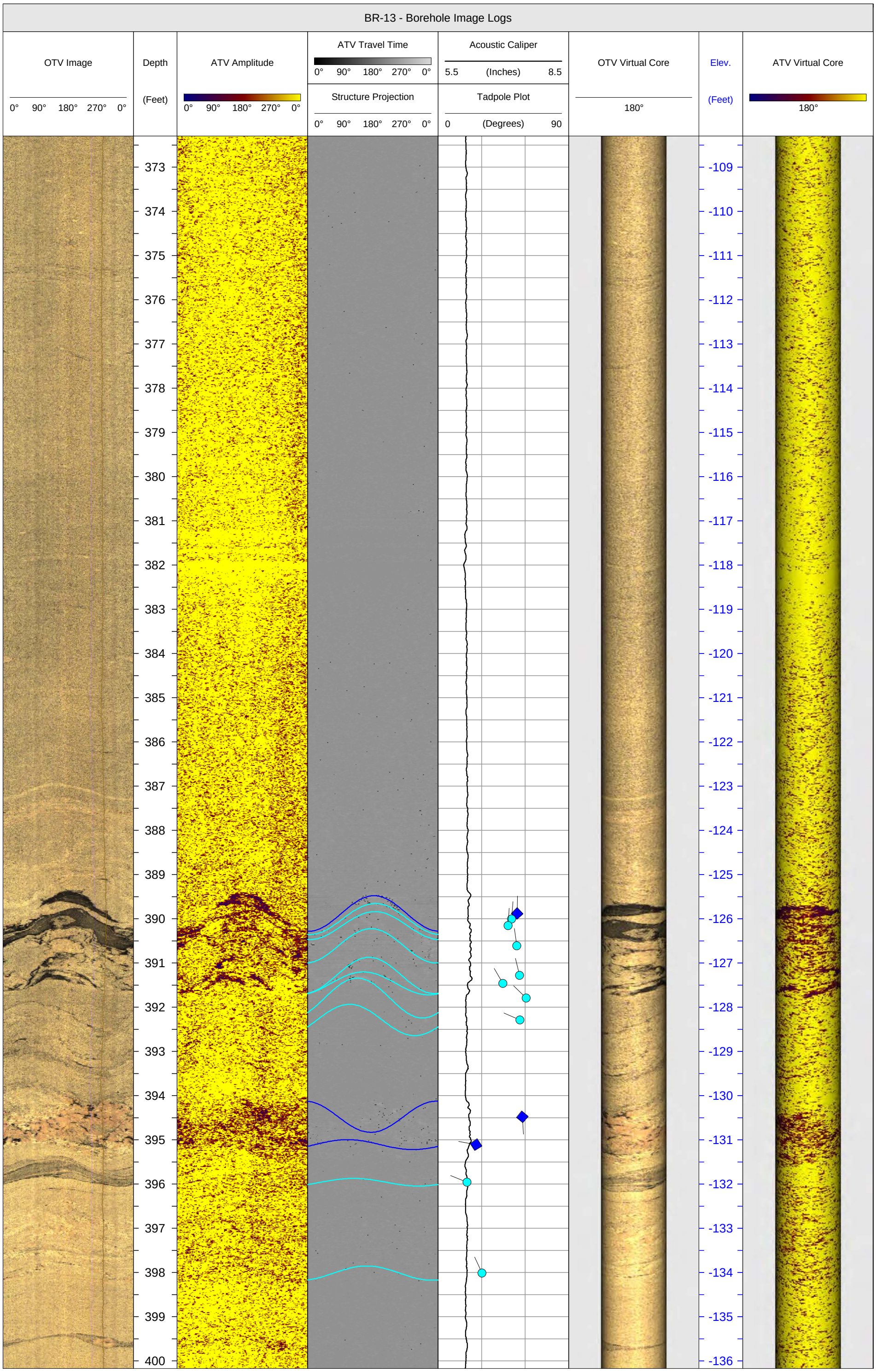
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Acoustic Caliper
5.5 (Inches) 8.5
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0 (Degrees) 90
OTV Virtual Core
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Elev.
(Feet)
ATV Virtual Core
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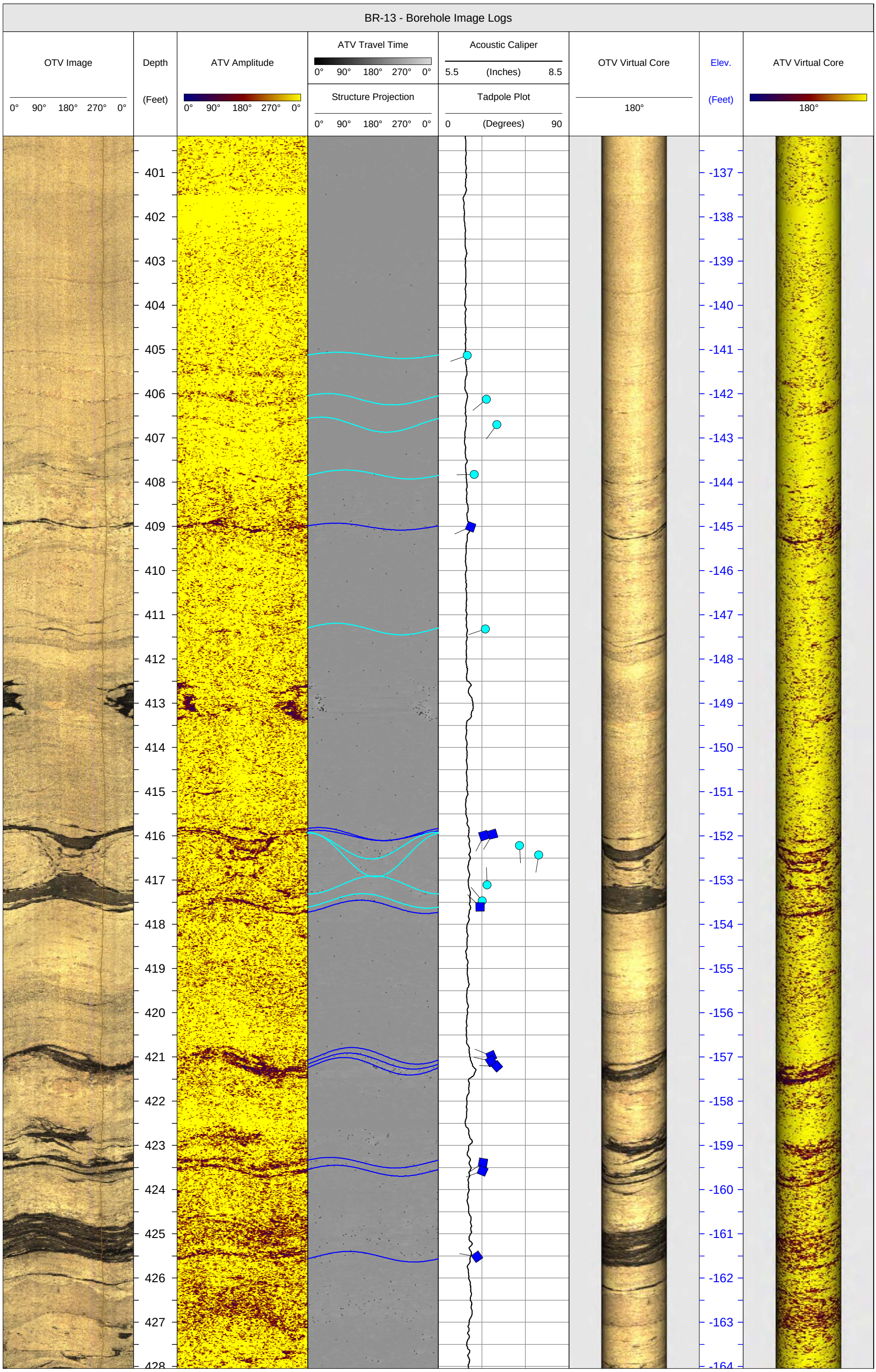
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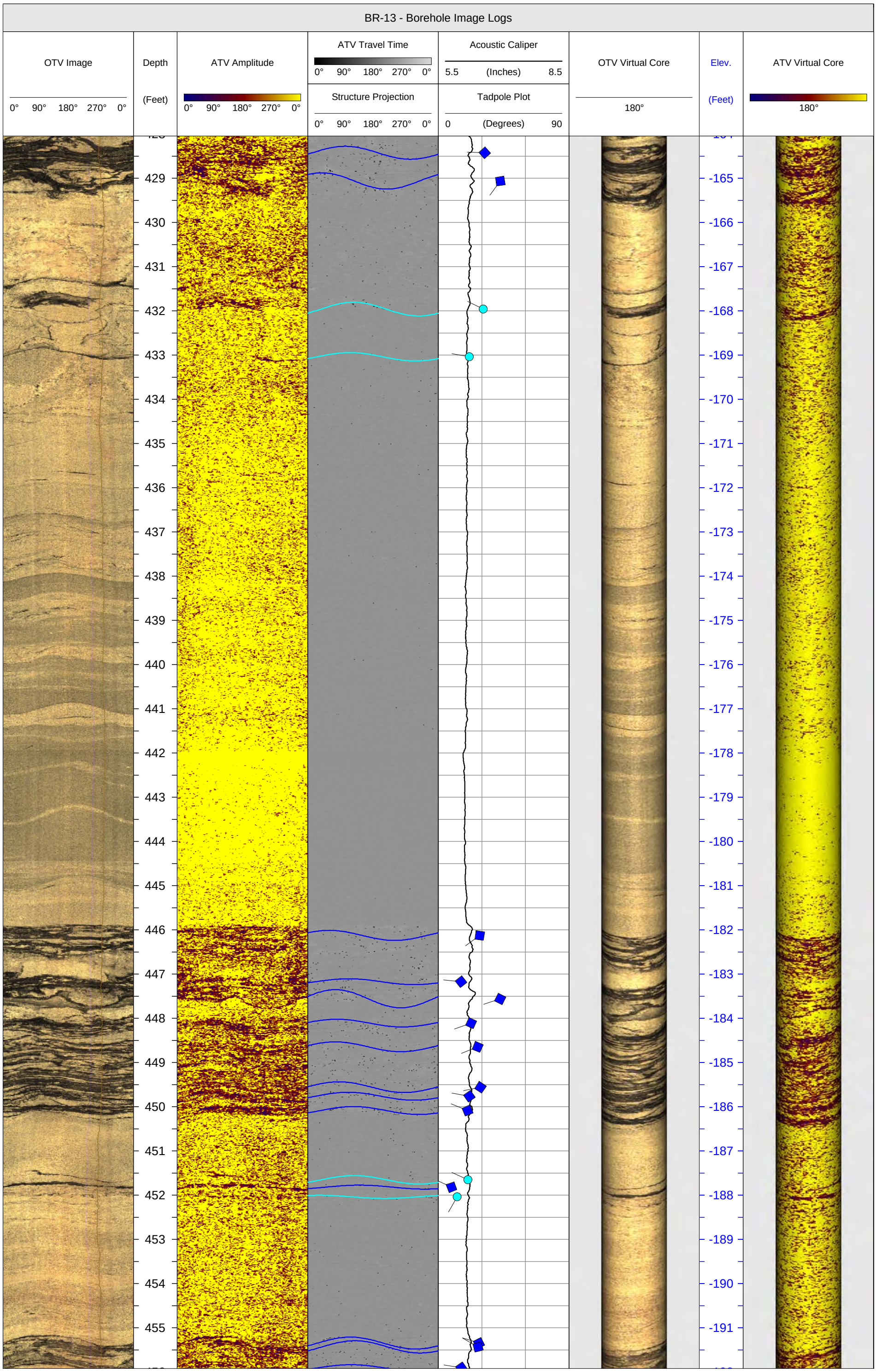
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Acoustic Caliper
5.5 (Inches) 8.5
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0 (Degrees) 90
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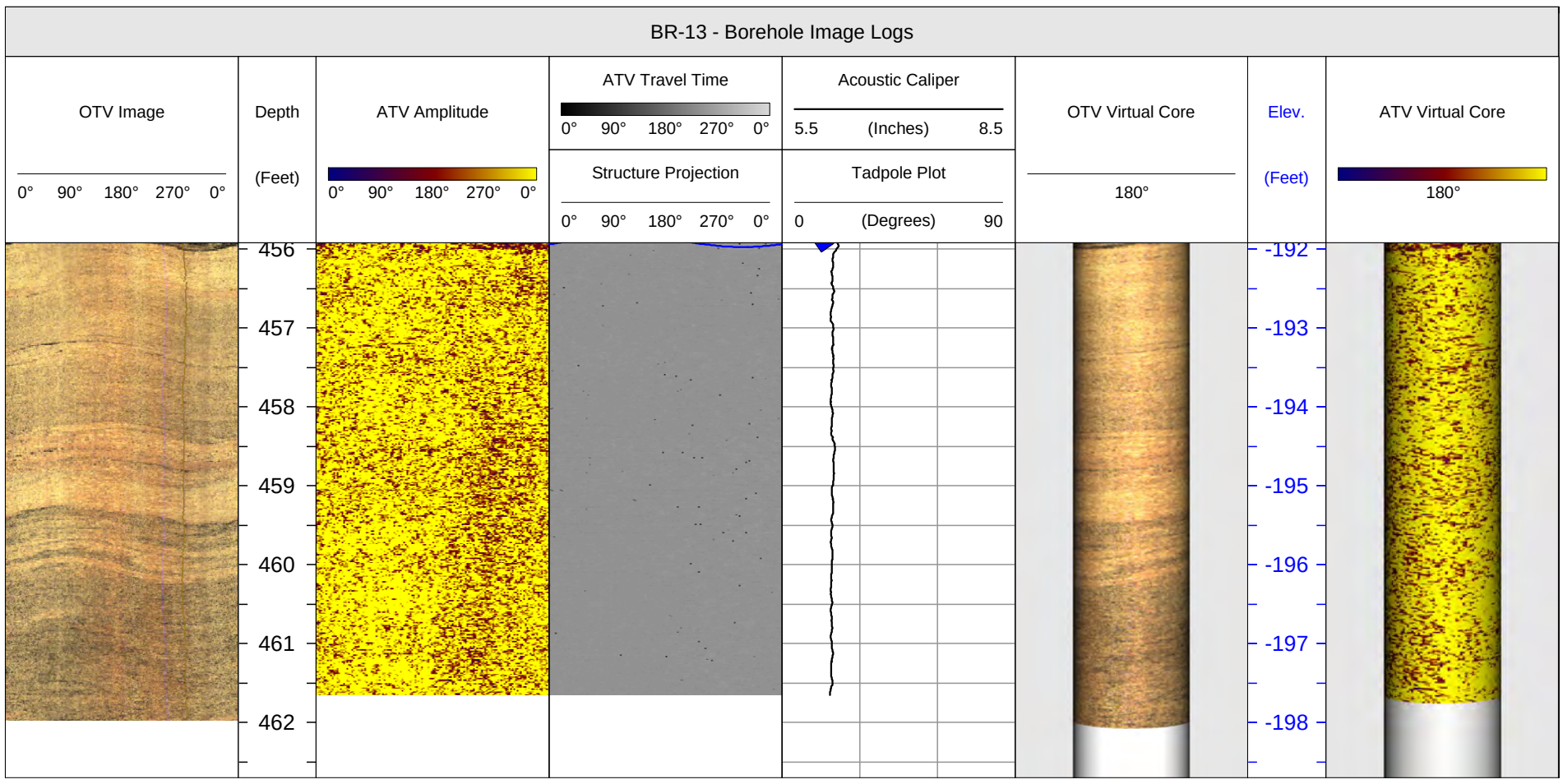
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5.5 (Inches) 8.5
Tadpole Plot
0 (Degrees) 90
OTV Virtual Core
180°
Elev.
(Feet)
ATV Virtual Core
180°
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HAGER-RICHTER GEOSCIENCE, INC.

8 Industrial Way - D10
Salem, NH 03079
Phone: 603-893-9944
Fax: 603-893-8313

BR-13 - BOREHOLE GEOPHYSICAL LOGS

DATE LOGGED: November 13 & 14, 2012

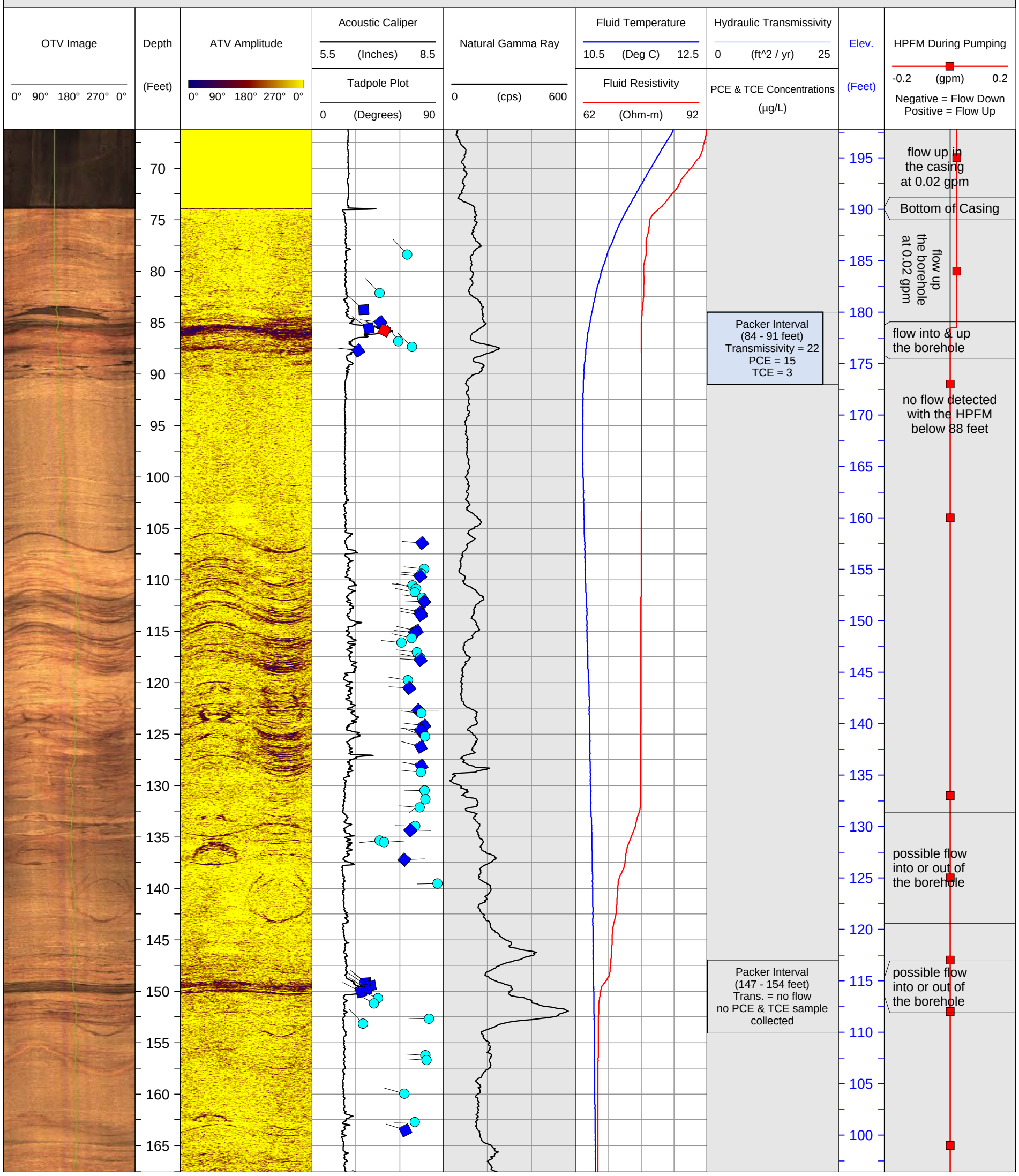
CLIENT:	Weston Solutions, Inc.	H-R FILE:	12RG62
PROJECT:	Borehole Geophysical Logging	LOG DATUM:	Top of the 6-Inch Steel Casing
LOCATION:	Savage Municipal Water Supply Superfund Site	TOP OF CASING ELEVATION:	264.0 Feet
CITY, STATE:	Milford, New Hampshire	ORIENTATION REFERENCE:	True North (Declination = 15 Degrees West)
LOGGING GEOPHYSICISTS:	Nick DeCristofaro & Eric Rickert	CASING STICK-UP:	1.2 Feet Below the Ground Surface
CLIENT REP. ON-SITE:	Andrew Fuller	BOREHOLE DIAMETER:	6 Inches
LOGS PROCESSED BY:	Robert Garfield	WATER LEVEL DEPTH:	8.1 Feet

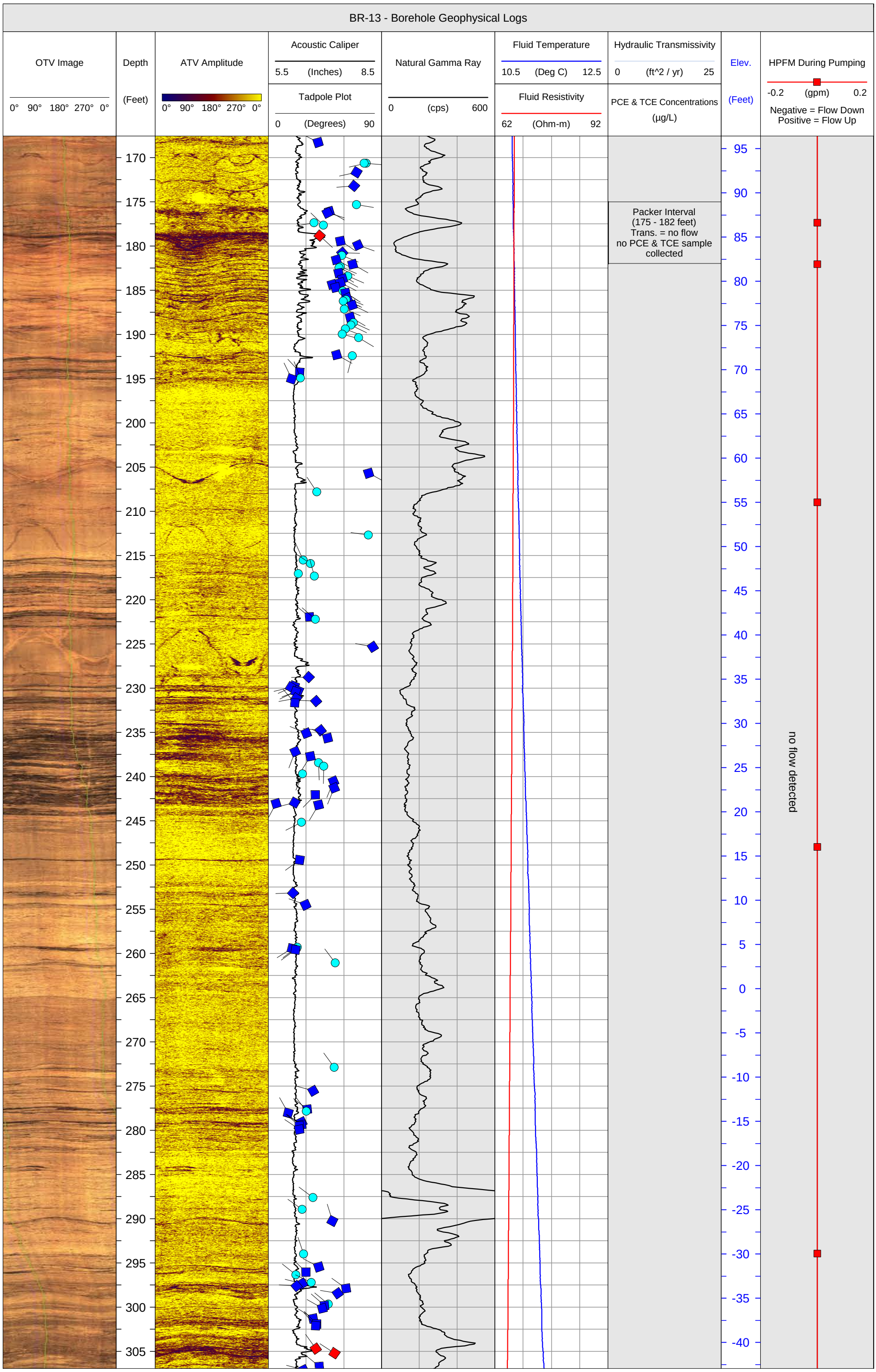
STRUCTURE LEGEND

Fracture Rank 1 Fracture Rank 2 Fracture Rank 3

NOTES:
HPFM data under ambient conditions are not plotted in the logs below because flow was not detected under ambient conditions.
During HPFM logging under pumping conditions water was pumped from the borehole from inside the casing.
The hydraulic transmissivity, PCE, and TCE data reported in the logs below were provided by Weston and were acquired during packer testing.

BR-13 - Borehole Geophysical Logs

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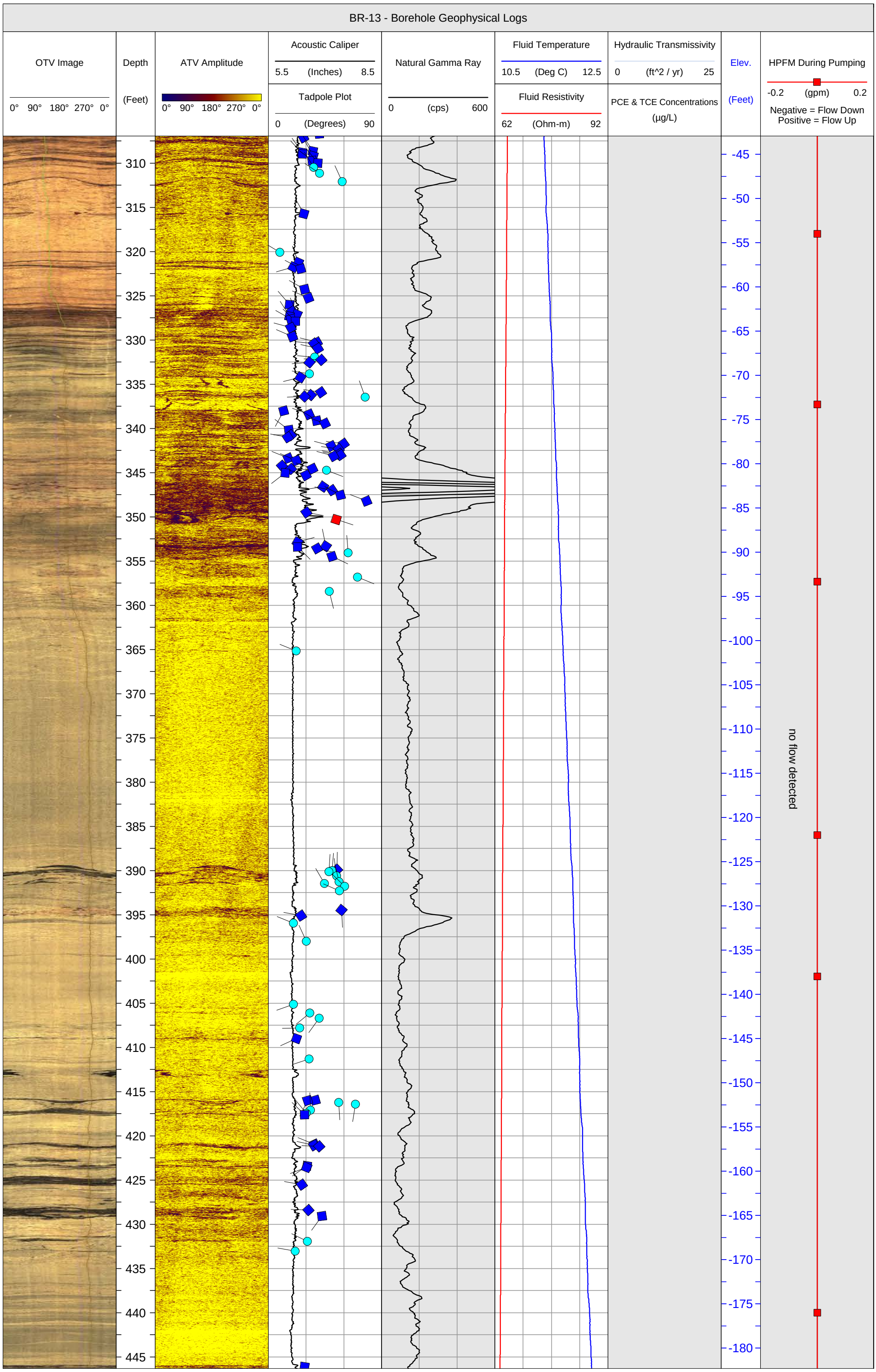
Depth
(Feet)
ATV Amplitude
0° 90° 180° 270° 0°
Acoustic Caliper
5.5 (Inches) 8.5
Tadpole Plot
0 (Degrees) 90
Natural Gamma Ray
0 (cps) 600
Fluid Temperature
10.5 (Deg C) 12.5
Fluid Resistivity
62 (Ohm-m) 92
Hydraulic Transmissivity
0 (ft^2 / yr) 25
PCE & TCE Concentrations
(µg/L)
Packer Interval
(175 - 182 feet)
Trans. = no flow
no PCE & TCE sample
collected
Elev.
(Feet)
HPFM During Pumping
-0.2 (gpm) 0.2
Negative = Flow Down
Positive = Flow Up
no flow detected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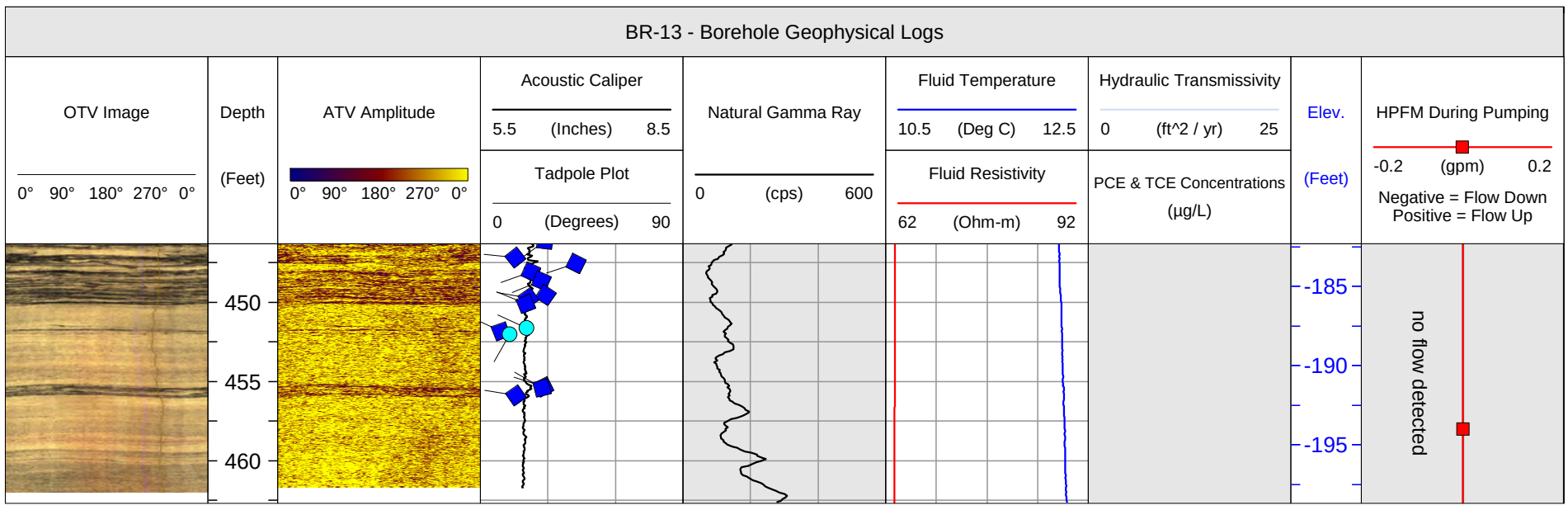
10.5 (Deg C) 12.5
Fluid Resistivity
62 (Ohm-m) 92
Hydraulic Transmissivity
0 (ft^2 / yr) 25
PCE & TCE Concentrations
(µg/L)
Elev.
(Feet)
HPFM During Pumping
-0.2 (gpm) 0.2
Negative = Flow Down
Positive = Flow Up
no flow detected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10.5 (Deg C) 12.5
Fluid Resistivity
62 (Ohm-m) 92
Hydraulic Transmissivity
0 (ft^2 / yr) 25
PCE & TCE Concentrations
(µg/L)
Elev.
(Feet)
HPFM During Pumping
-0.2 (gpm) 0.2
Negative = Flow Down
Positive = Flow Up
450
455
460
-185
-190
-195
no flow detected

HAGER-RICHTER GEOSCIENCE, INC.

8 Industrial Way - D10
Salem, NH 03079
Phone: 603-893-9944
Fax: 603-893-8313

BR-14 - BOREHOLE IMAGE LOGS

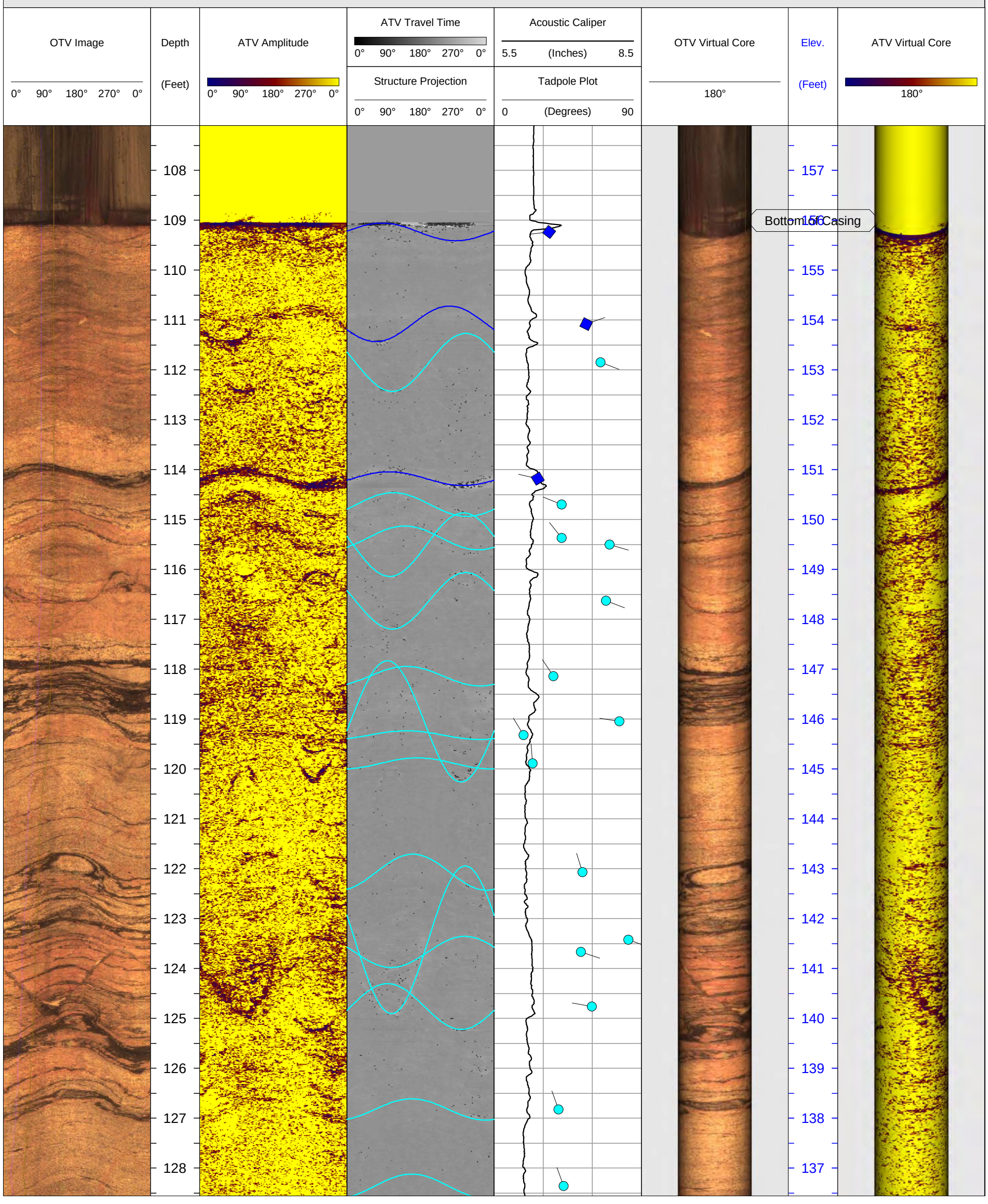
DATE LOGGED: November 12, 2012

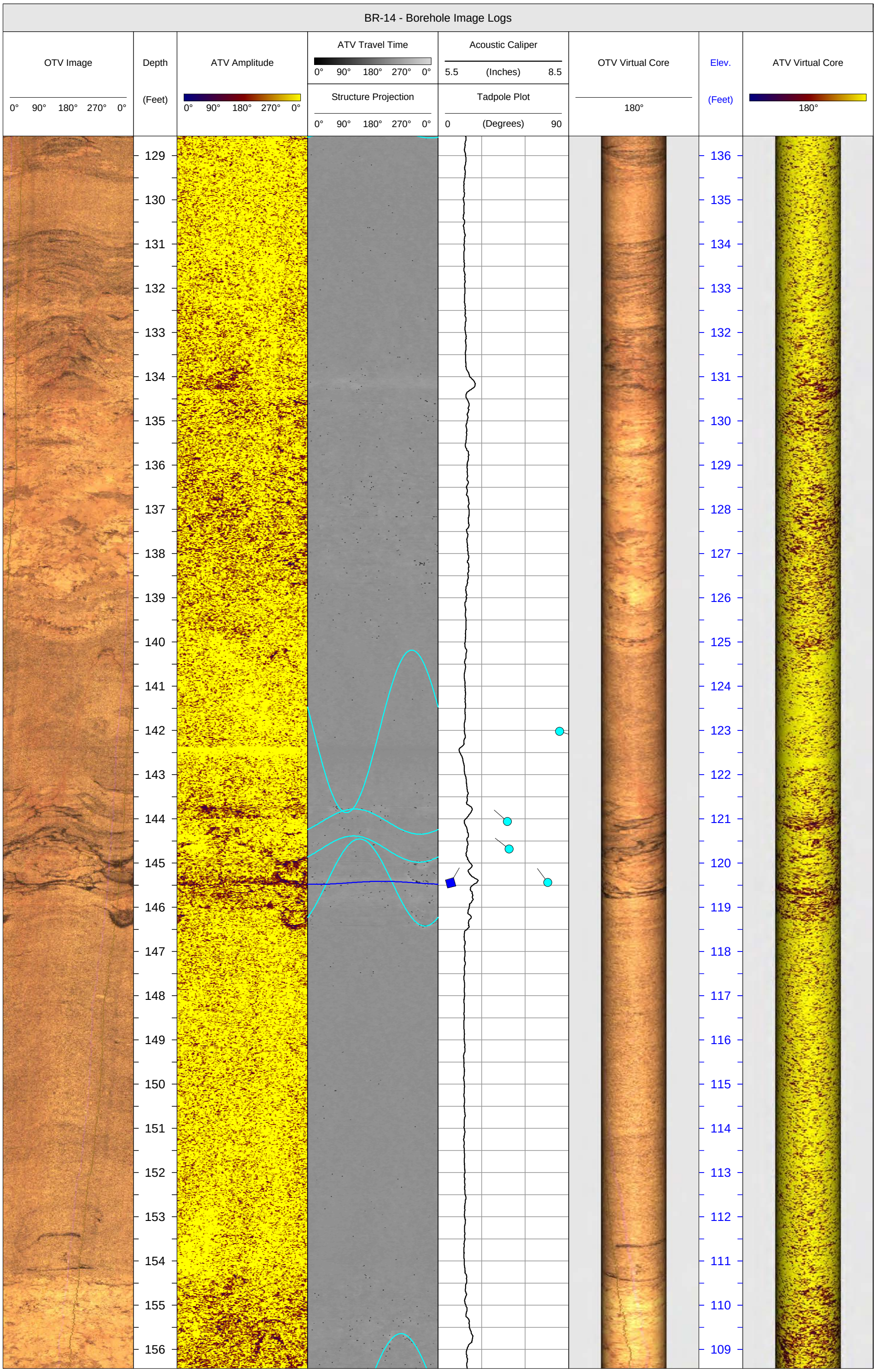
CLIENT:	Weston Solutions, Inc.	H-R FILE:	12RG62
PROJECT:	Borehole Geophysical Logging	LOG DATUM:	Top of the 6-Inch Steel Casing
LOCATION:	Savage Municipal Water Supply Superfund Site	TOP OF CASING ELEVATION:	265.0 Feet
CITY, STATE:	Milford, New Hampshire	ORIENTATION REFERENCE:	True North (Declination = 15 Degrees West)
LOGGING GEOPHYSICISTS:	Nick DeCristofaro & Eric Rickert	CASING STICK-UP:	1.6 Feet Below the Ground Surface
CLIENT REP. ON-SITE:	Andrew Fuller	BOREHOLE DIAMETER:	6 Inches
LOGS PROCESSED BY:	Robert Garfield	WATER LEVEL DEPTH:	6.8 Feet

STRUCTURE LEGEND

Fracture Rank 1 Fracture Rank 2 Fracture Rank 3

BR-14 - Borehole Image Logs




BR-14 - Borehole Image Logs
OTV Image
0° 90° 180° 270° 0°
Depth
(Feet)
ATV Amplitude
0° 90° 180° 270° 0°
ATV Travel Time
0° 90° 180° 270° 0°
Structure Projection
0° 90° 180° 270° 0°
Acoustic Caliper
5.5 (Inches) 8.5
Tadpole Plot
0 (Degrees) 90
OTV Virtual Core
180°
Elev.
(Feet)
ATV Virtual Core
180°
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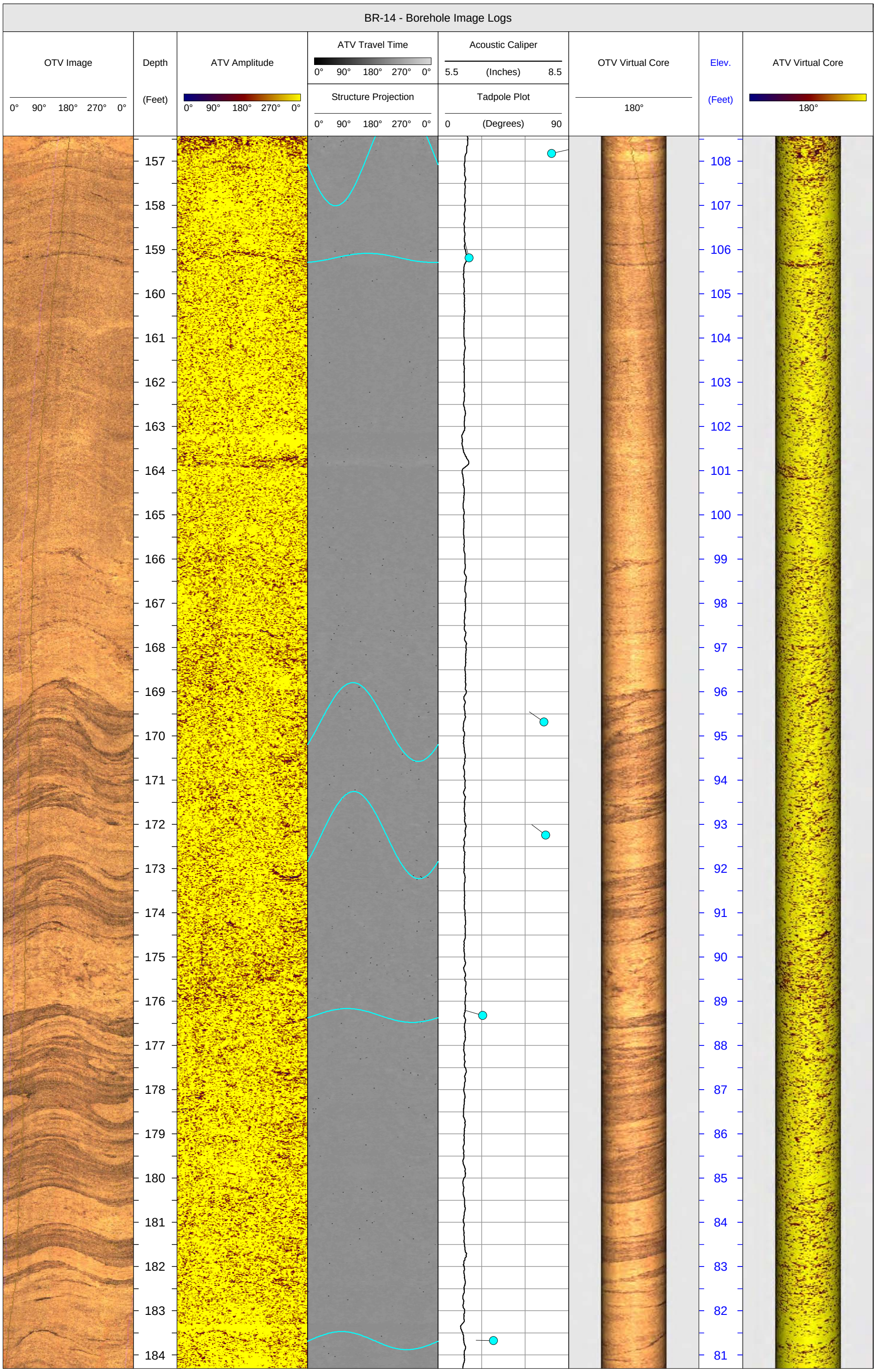
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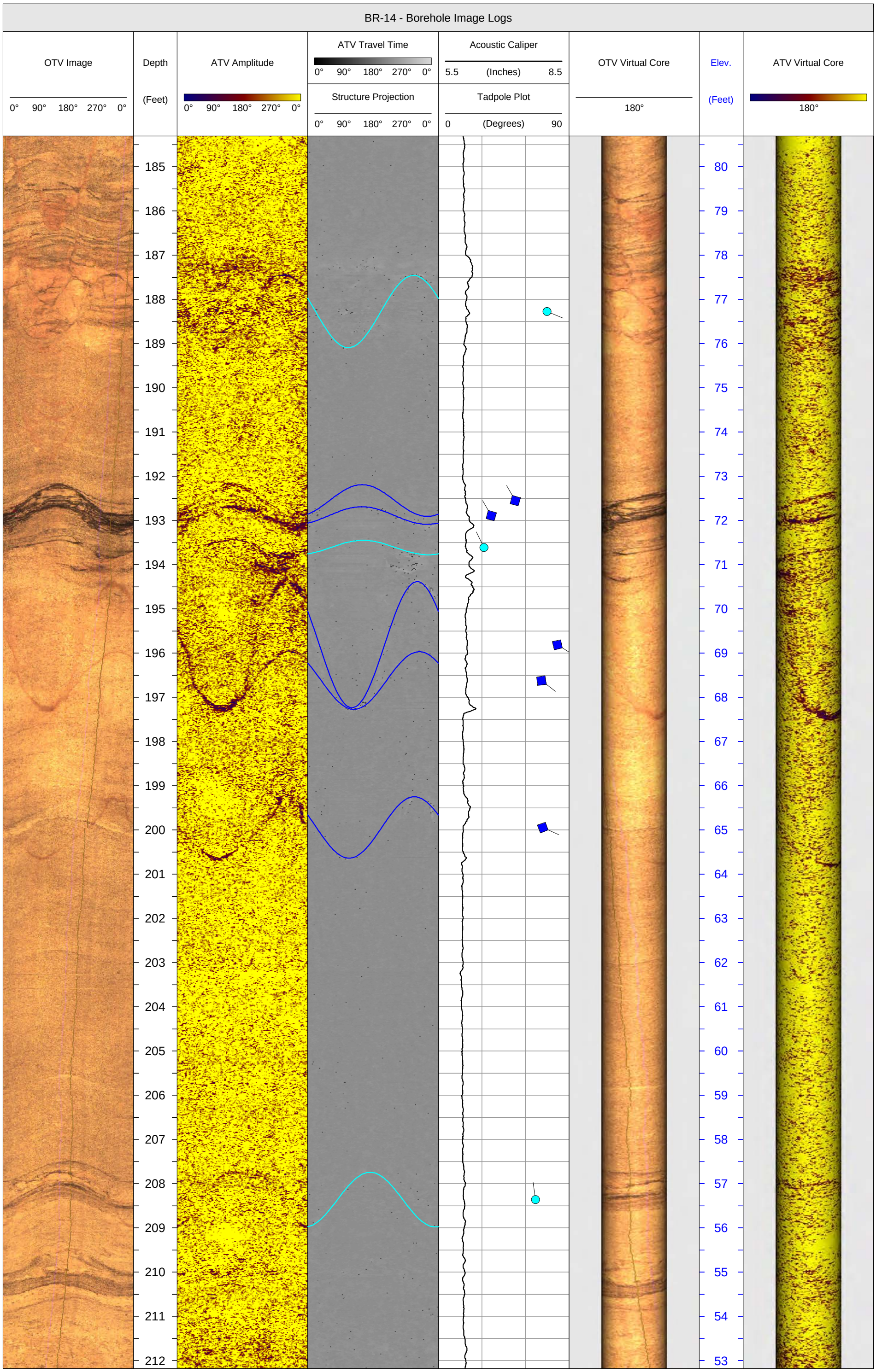
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180°
Elev.
(Feet)
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180°
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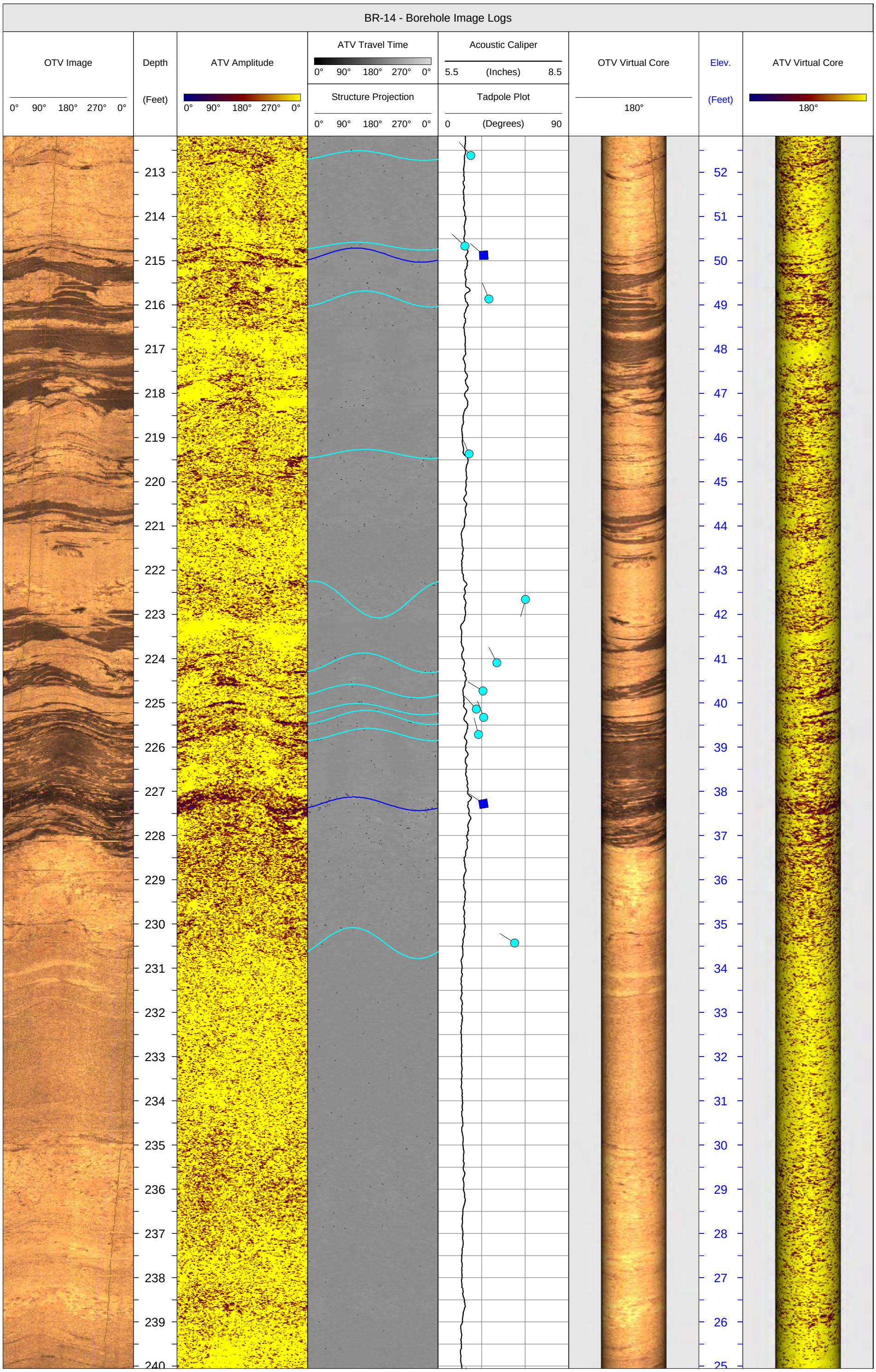
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ATV Virtual Core
180°
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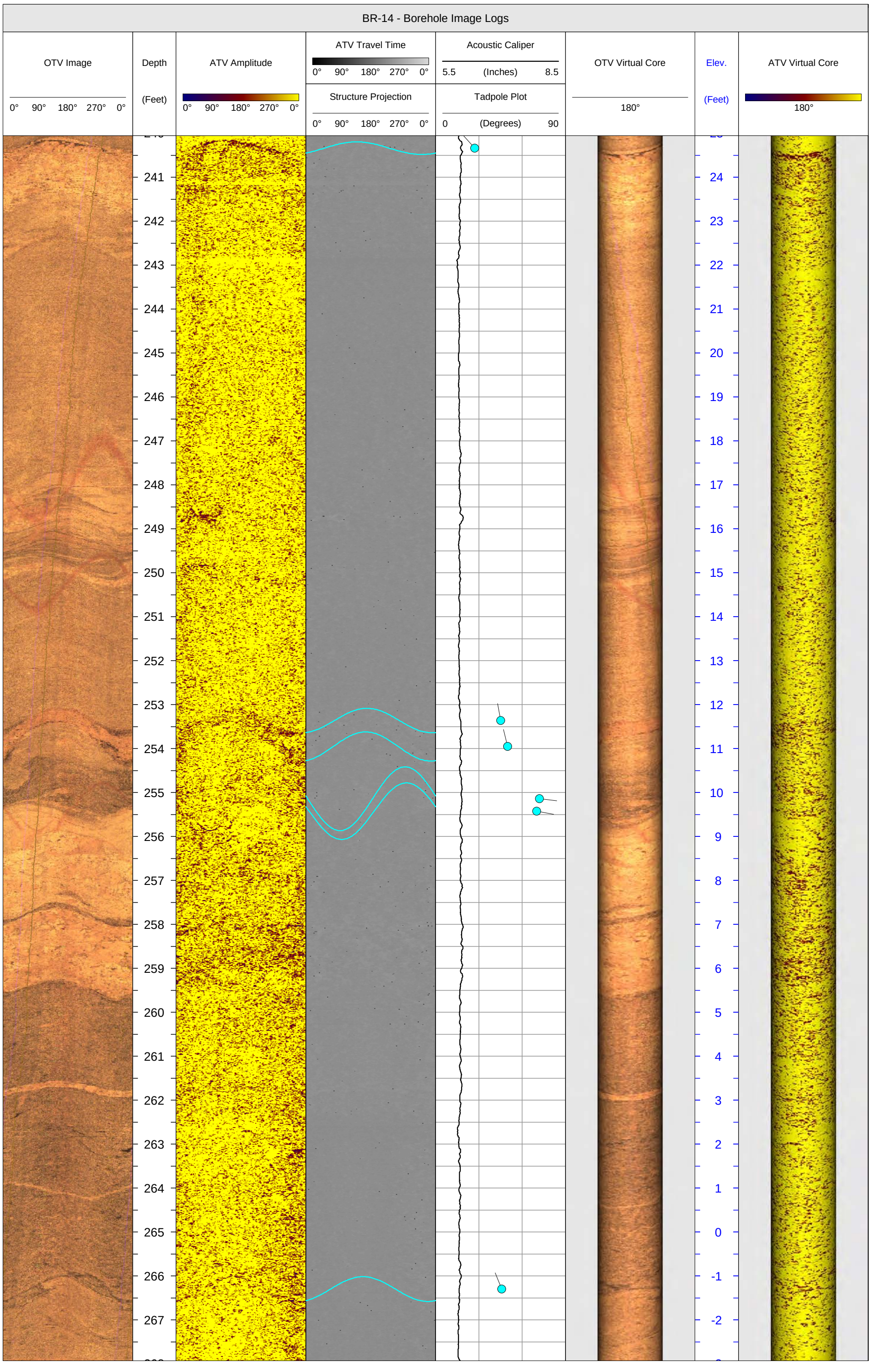
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180°
Elev.
(Feet)
ATV Virtual Core
180°
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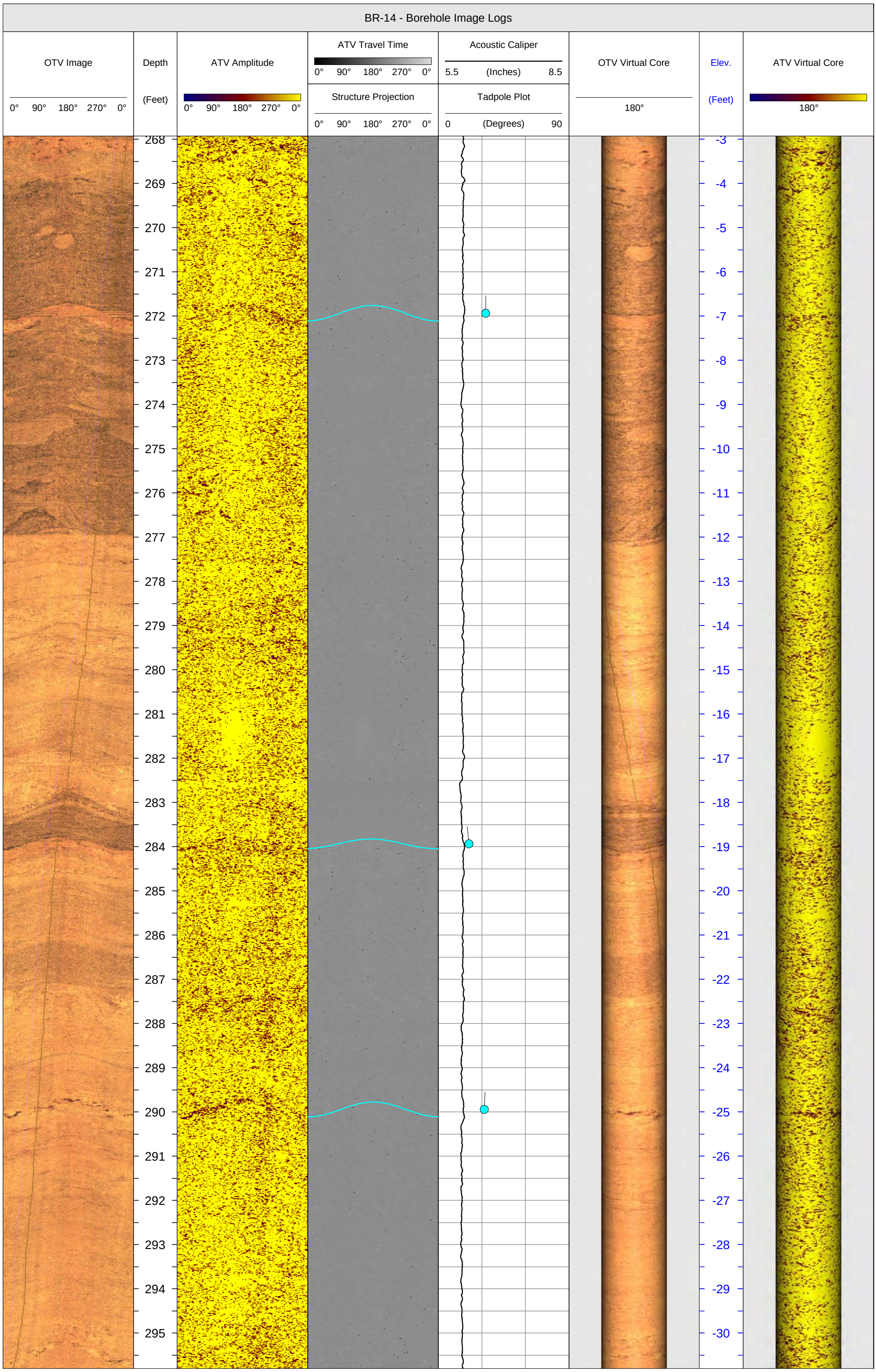
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ATV Virtual Core
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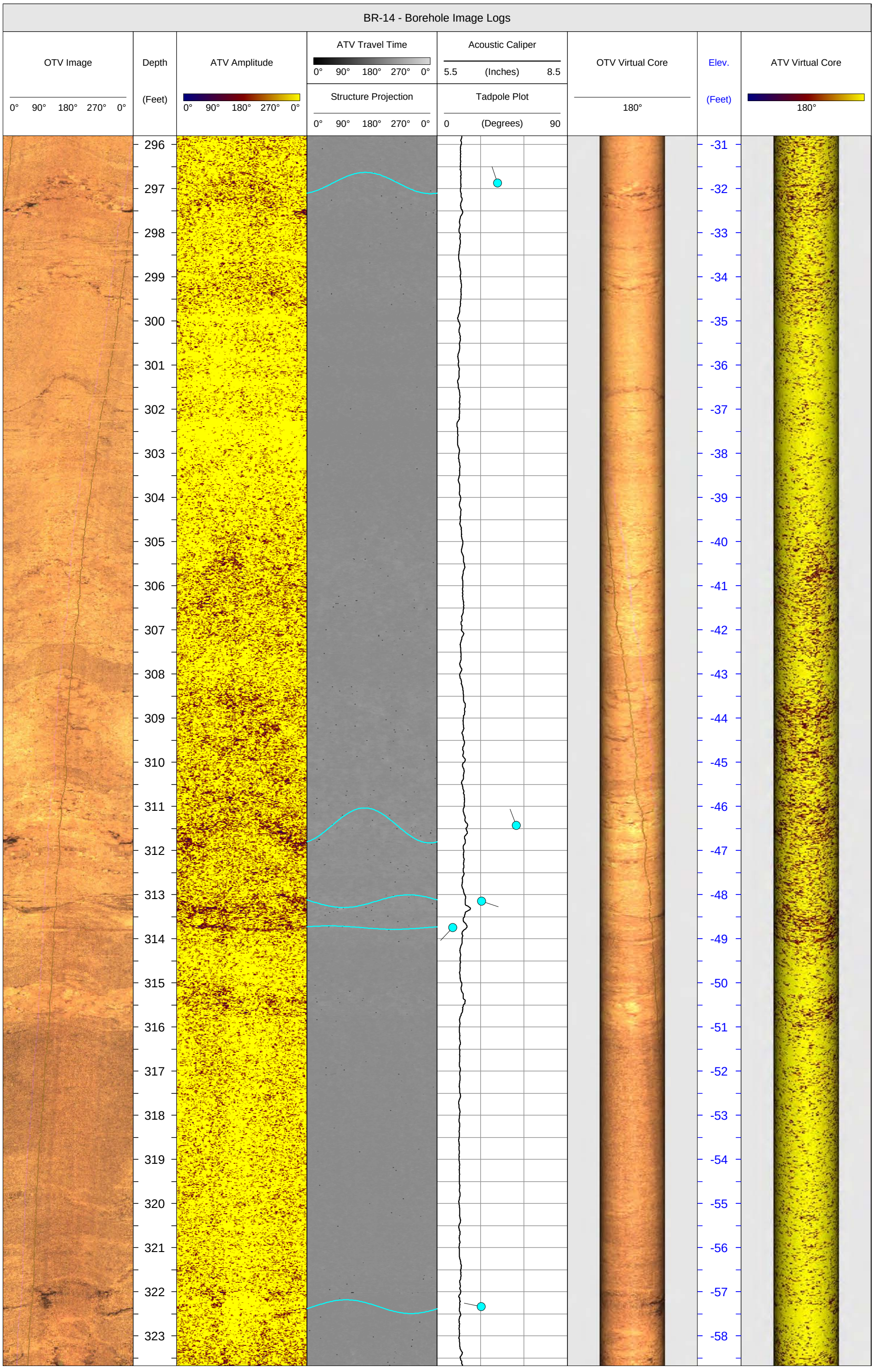
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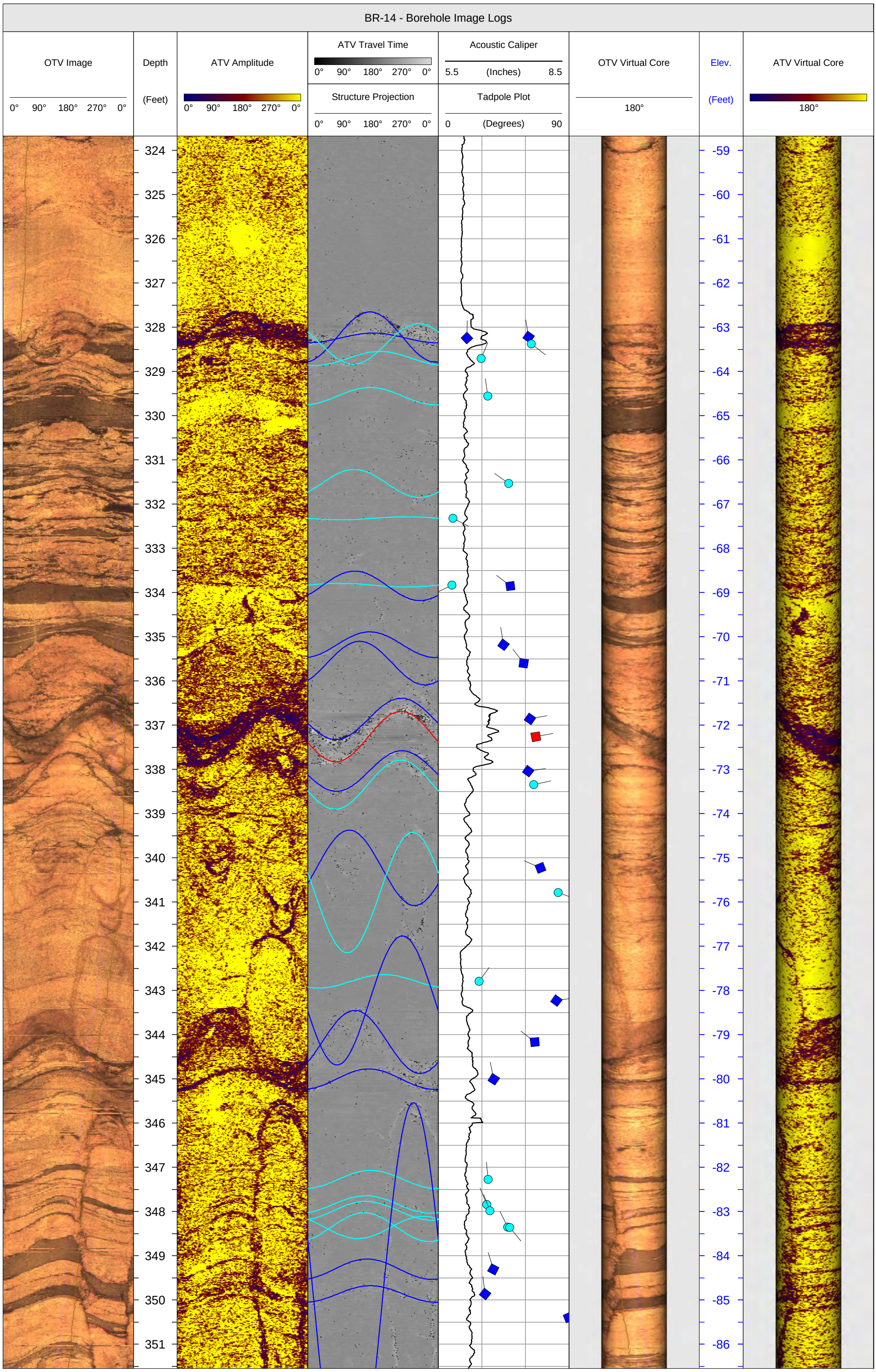
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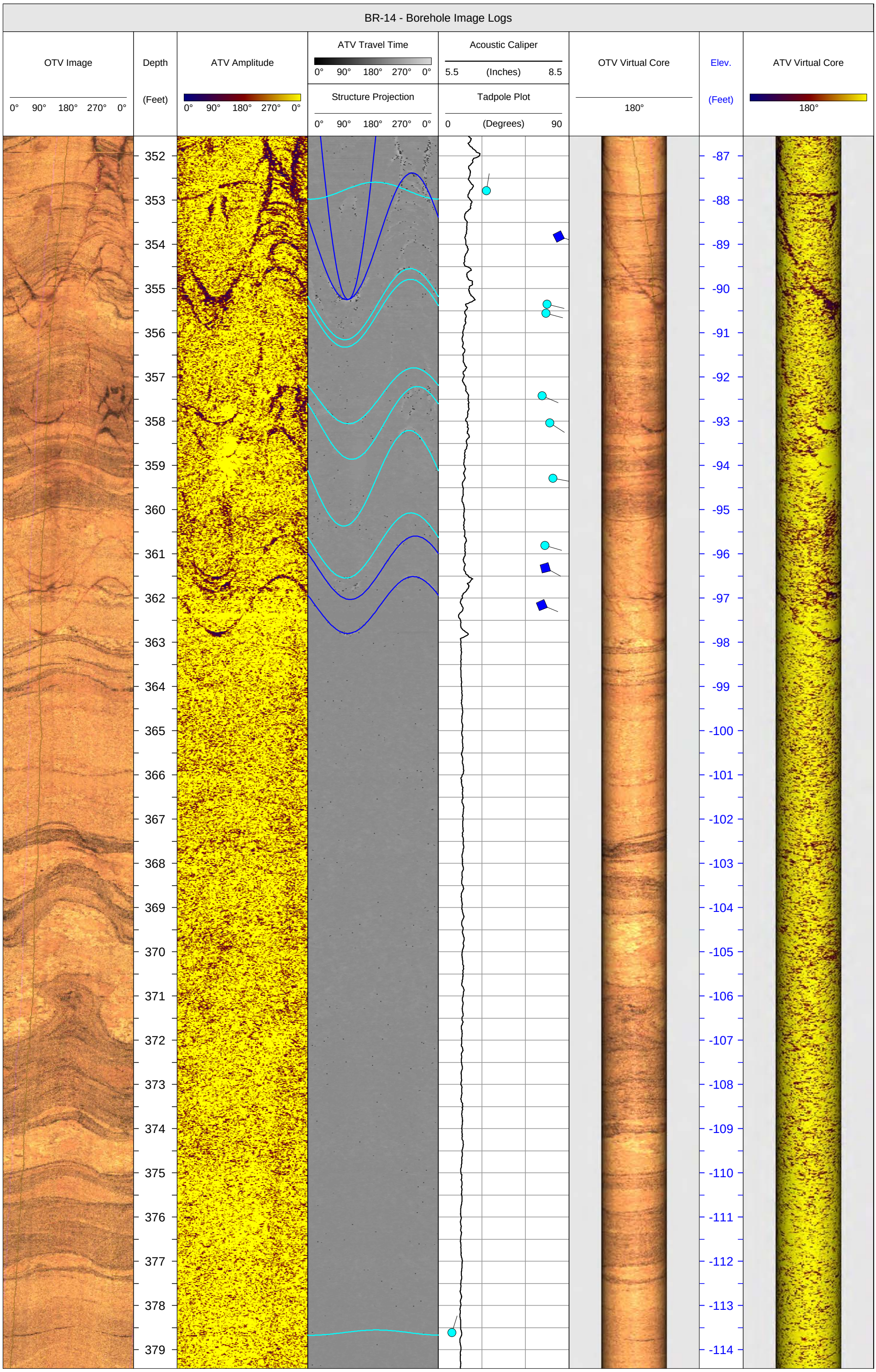
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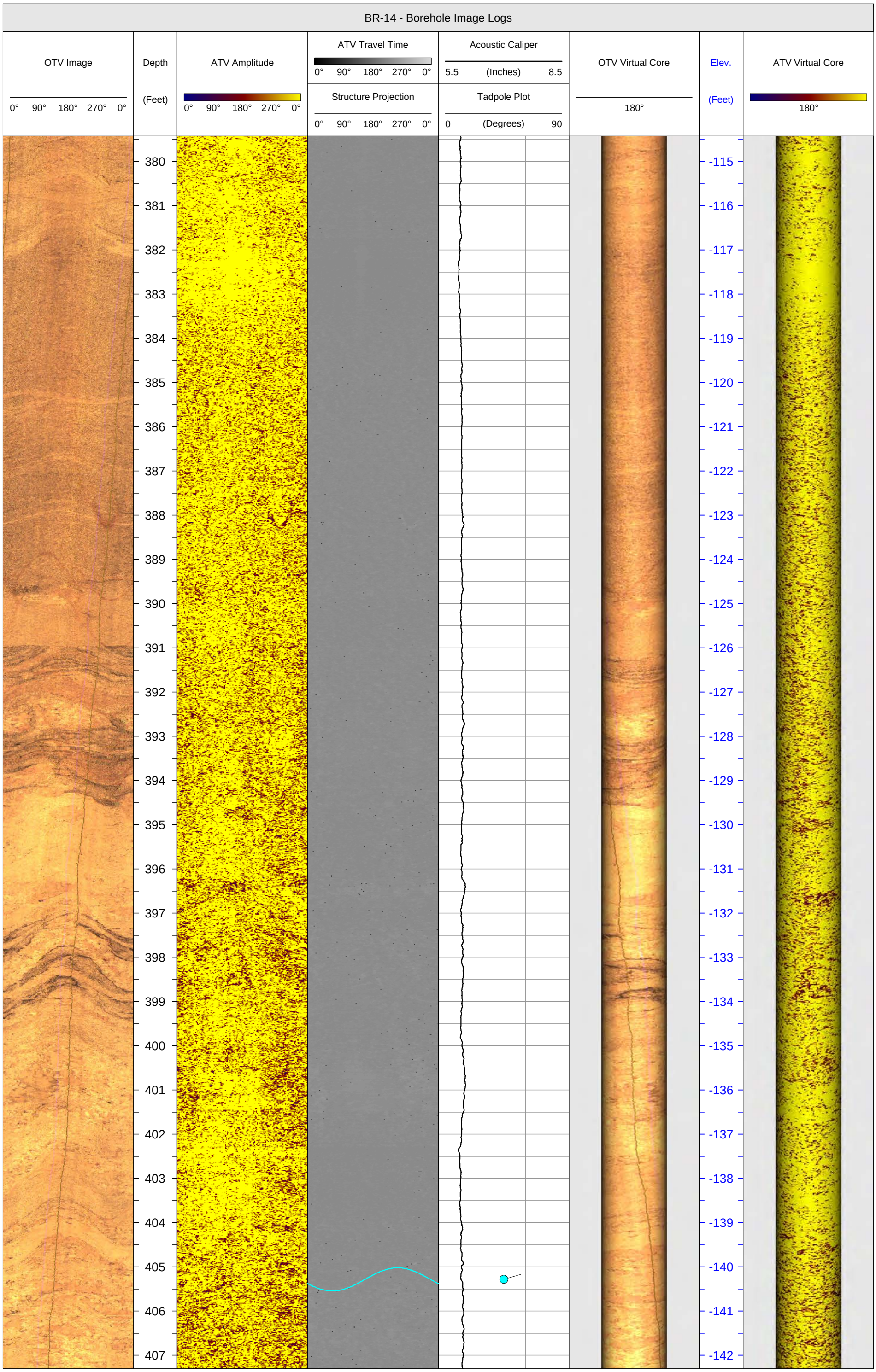
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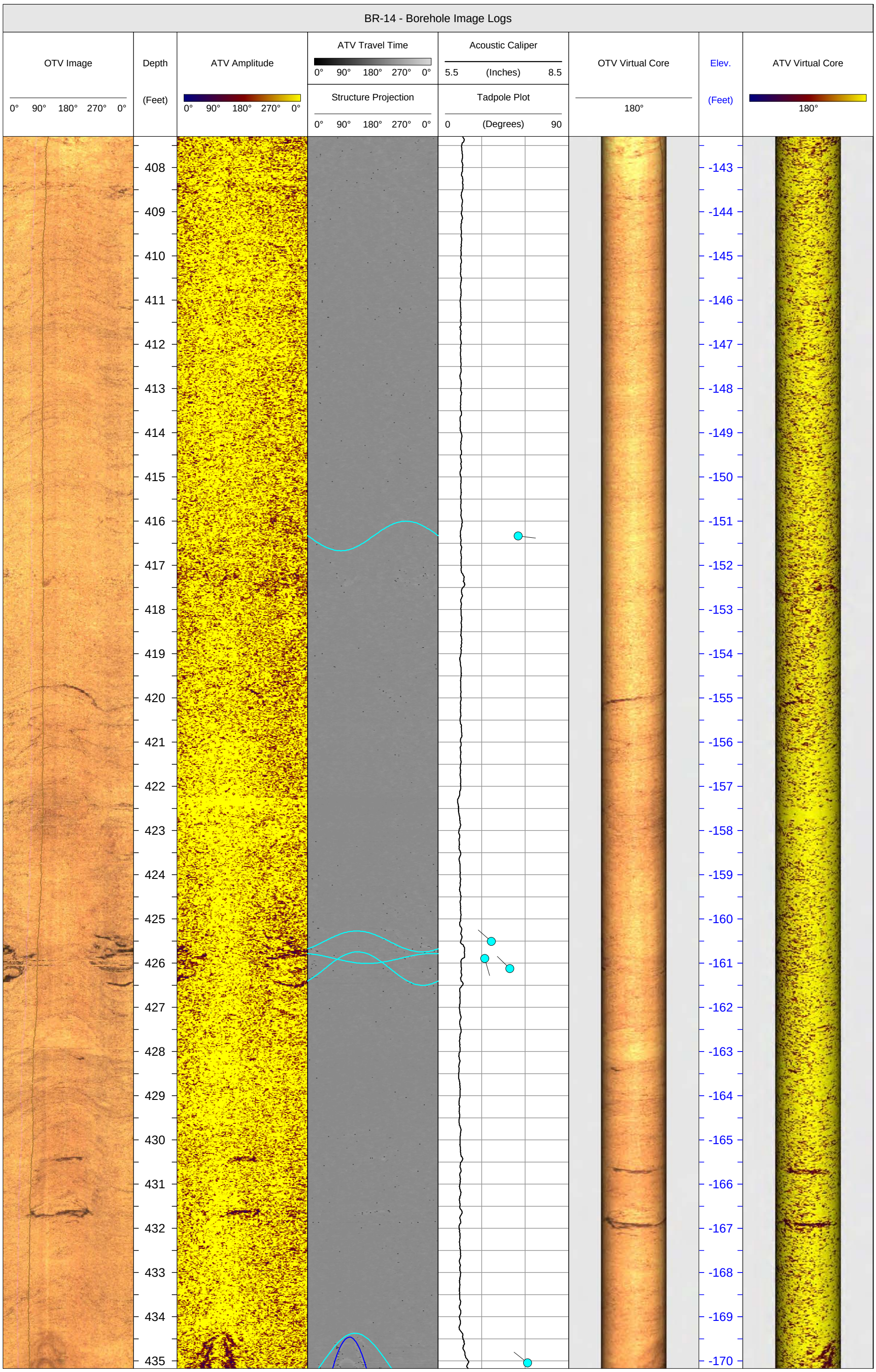
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ATV Virtual Core
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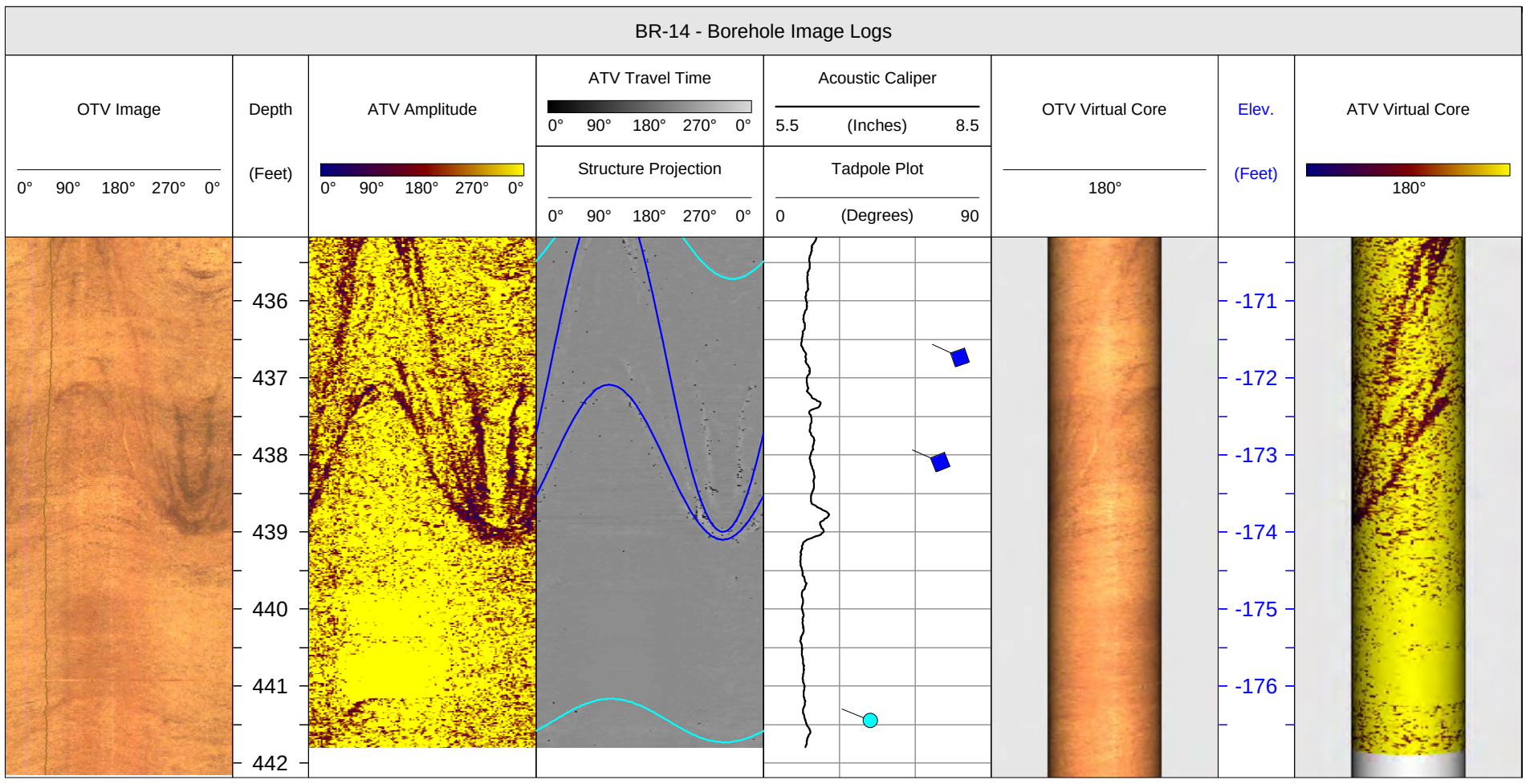
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Fax: 603-893-8313

BR-14 - BOREHOLE GEOPHYSICAL LOGS

DATE LOGGED: November 12, 2012

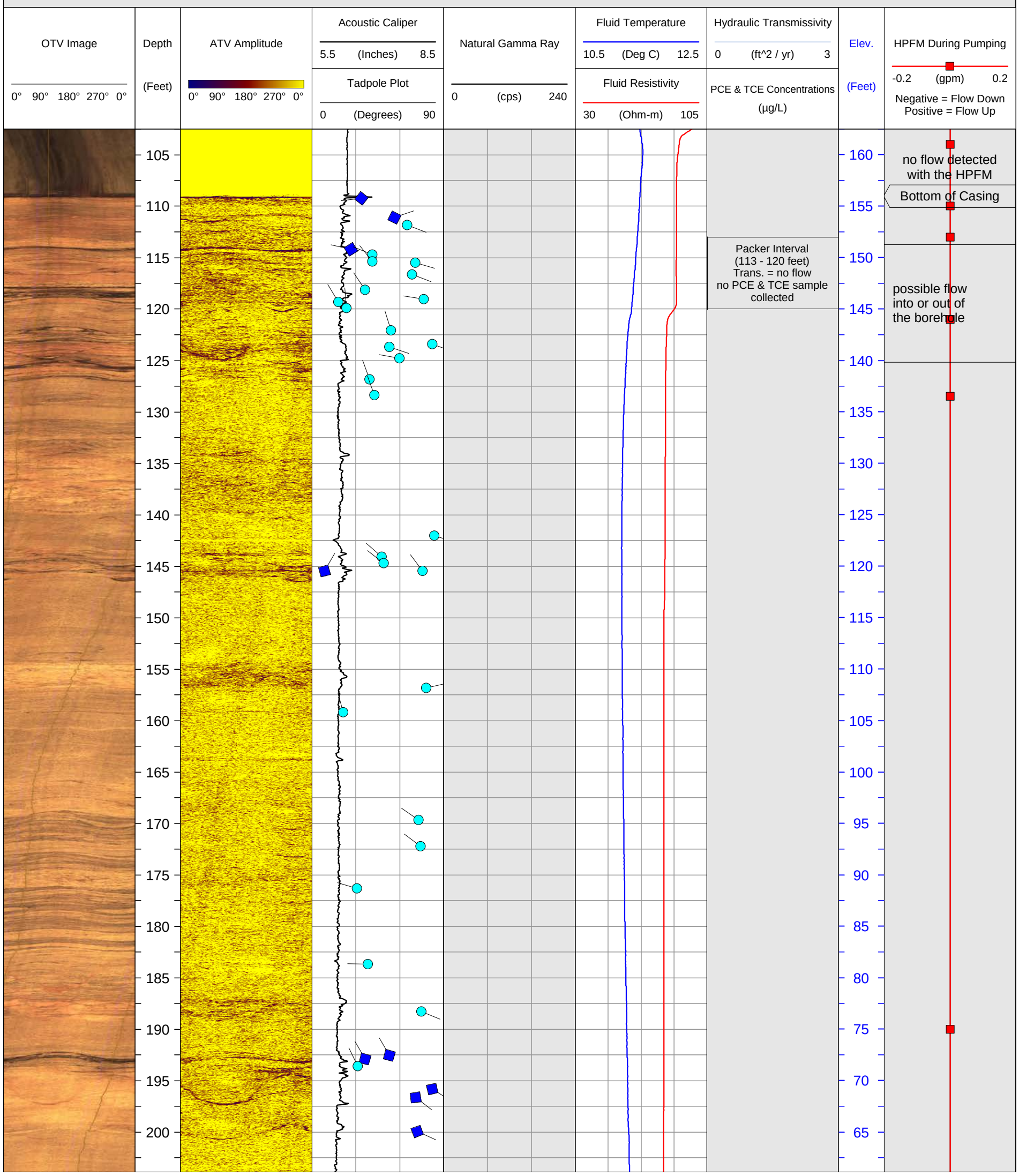
CLIENT:	Weston Solutions, Inc.	H-R FILE:	12RG62
PROJECT:	Borehole Geophysical Logging	LOG DATUM:	Top of the 6-Inch Steel Casing
LOCATION:	Savage Municipal Water Supply Superfund Site	TOP OF CASING ELEVATION:	265.0 Feet
CITY, STATE:	Milford, New Hampshire	ORIENTATION REFERENCE:	True North (Declination = 15 Degrees West)
LOGGING GEOPHYSICISTS:	Nick DeCristofaro & Eric Rickert	CASING STICK-UP:	1.6 Feet Below the Ground Surface
CLIENT REP. ON-SITE:	Andrew Fuller	BOREHOLE DIAMETER:	6 Inches
LOGS PROCESSED BY:	Robert Garfield	WATER LEVEL DEPTH:	6.8 Feet

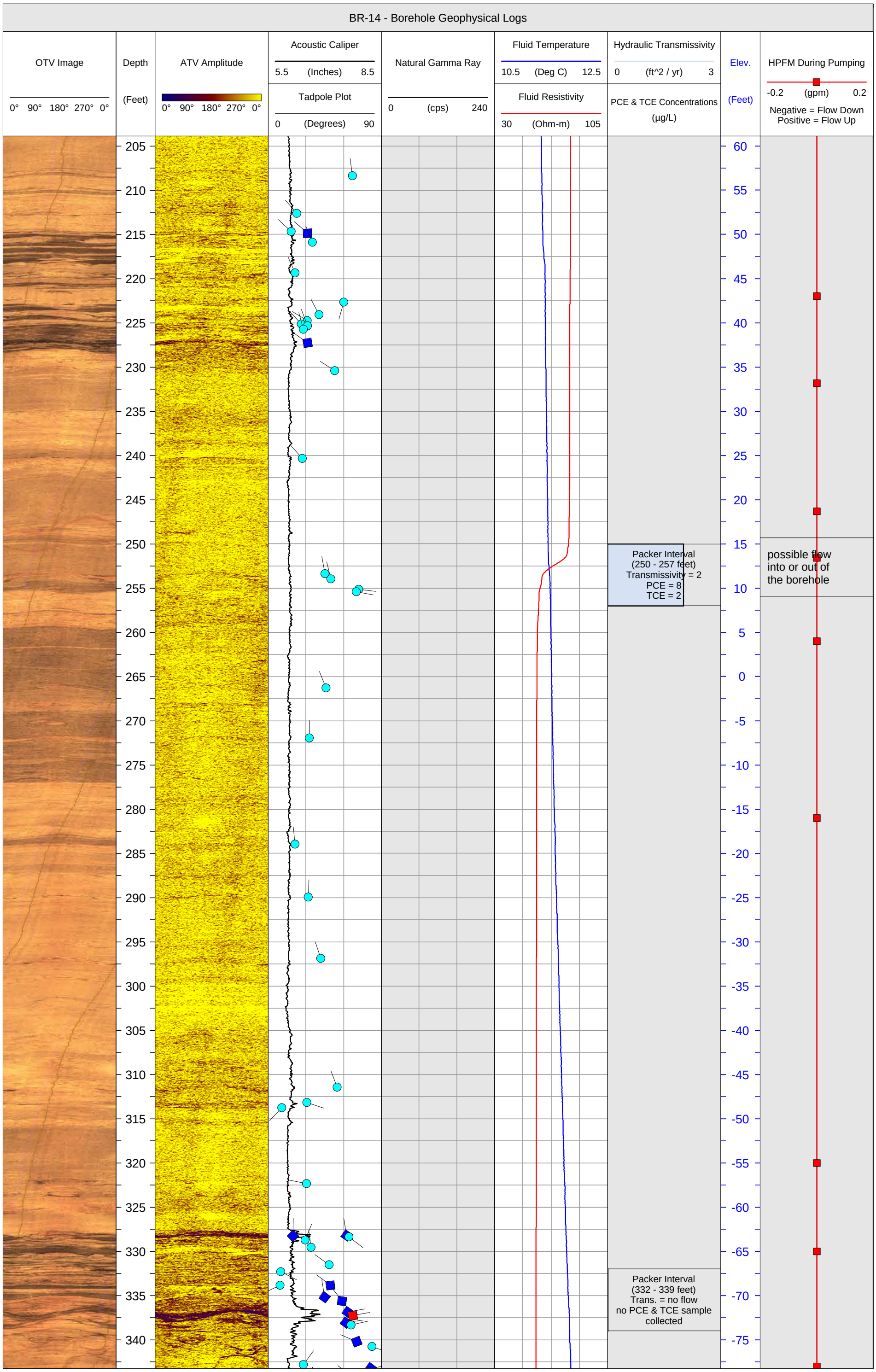
STRUCTURE LEGEND

Fracture Rank 1 Fracture Rank 2 Fracture Rank 3

NOTES: Flow was not detected with the HPFM under ambient or pumping conditions. Possible flow reported in the logs below are based on the fluid temperature and fluid resistivity data. Flow interpreted was either not active during HPFM testing or was too low to detect with the HPFM. The hydraulic transmissivity, PCE, and TCE data reported in the logs below were provided by Weston and were acquired during packer testing.

BR-14 - Borehole Geophysical Logs

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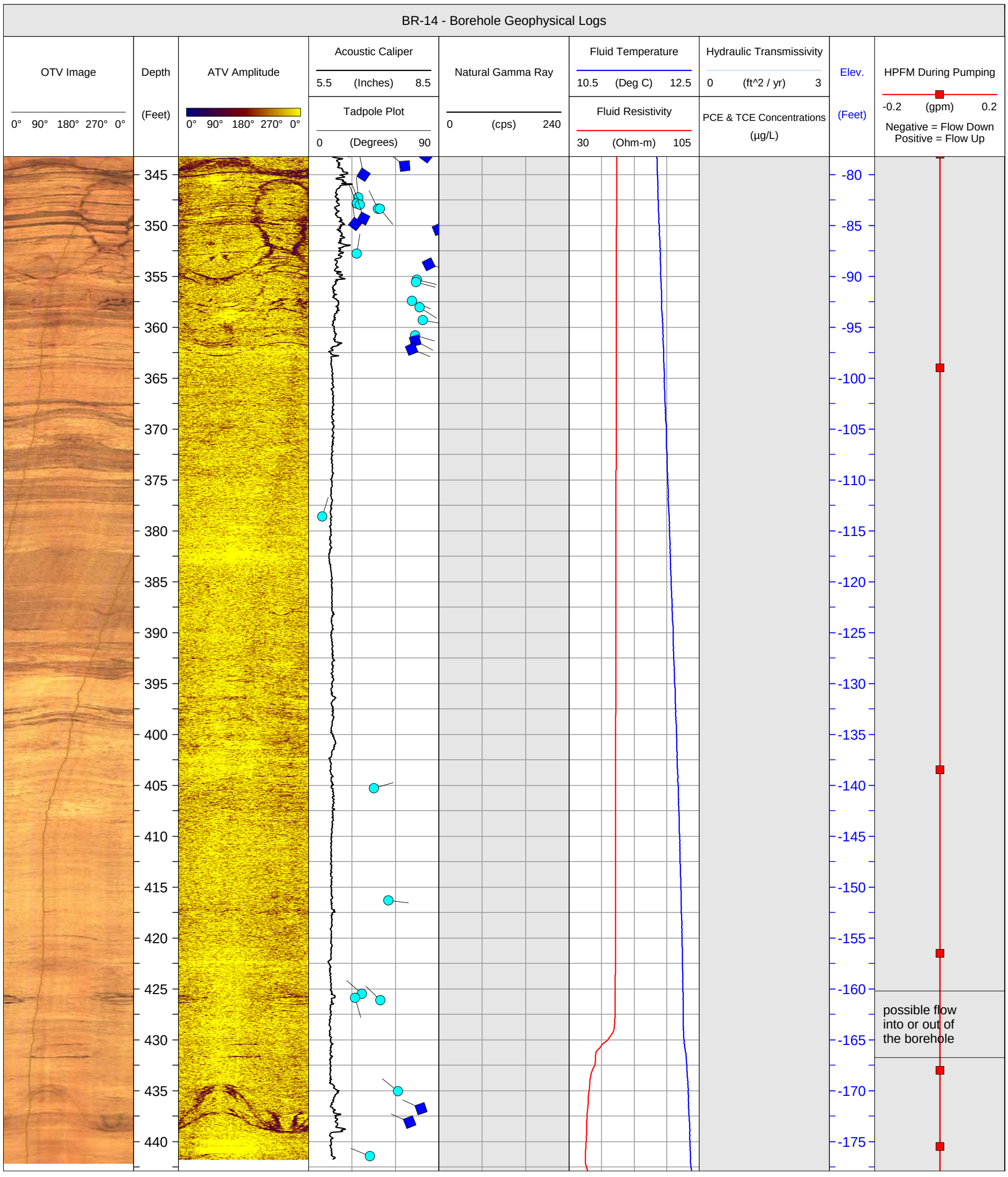
OTV Image
0° 90° 180° 270° 0°
Depth
(Feet)
ATV Amplitude
0° 90° 180° 270° 0°
Acoustic Caliper
5.5 (Inches) 8.5
Tadpole Plot
0 (Degrees) 90
Natural Gamma Ray
0 (cps) 240
Fluid Temperature
10.5 (Deg C) 12.5
Fluid Resistivity
30 (Ohm-m) 105
Hydraulic Transmissivity
0 (ft^2 / yr) 3
PCE & TCE Concentrations
(µg/L)
Elev.
(Feet)
HPFM During Pumping
-0.2 (gpm) 0.2
Negative = Flow Down
Positive = Flow Up
Packer Interval
(250 - 257 feet)
Transmissivity = 2
PCE = 8
TCE = 2
possible flow
into or out of
the borehole
Packer Interval
(332 - 339 feet)
Trans. = no flow
no PCE & TCE sample
collected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ATV Amplitude
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5.5 (Inches) 8.5
Tadpole Plot
0 (Degrees) 90
Natural Gamma Ray
0 (cps) 240
Fluid Temperature
10.5 (Deg C) 12.5
Fluid Resistivity
30 (Ohm-m) 105
Hydraulic Transmissivity
0 (ft^2 / yr) 3
PCE & TCE Concentrations
(µg/L)
Elev.
(Feet)
HPFM During Pumping
-0.2 (gpm) 0.2
Negative = Flow Down
Positive = Flow Up
345
350
355
360
365
370
375
380
385
390
395
400
405
410
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425
430
435
440
-80
-85
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-115
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possible flow
into or out of
the borehole

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BR-15 - BOREHOLE IMAGE LOGS

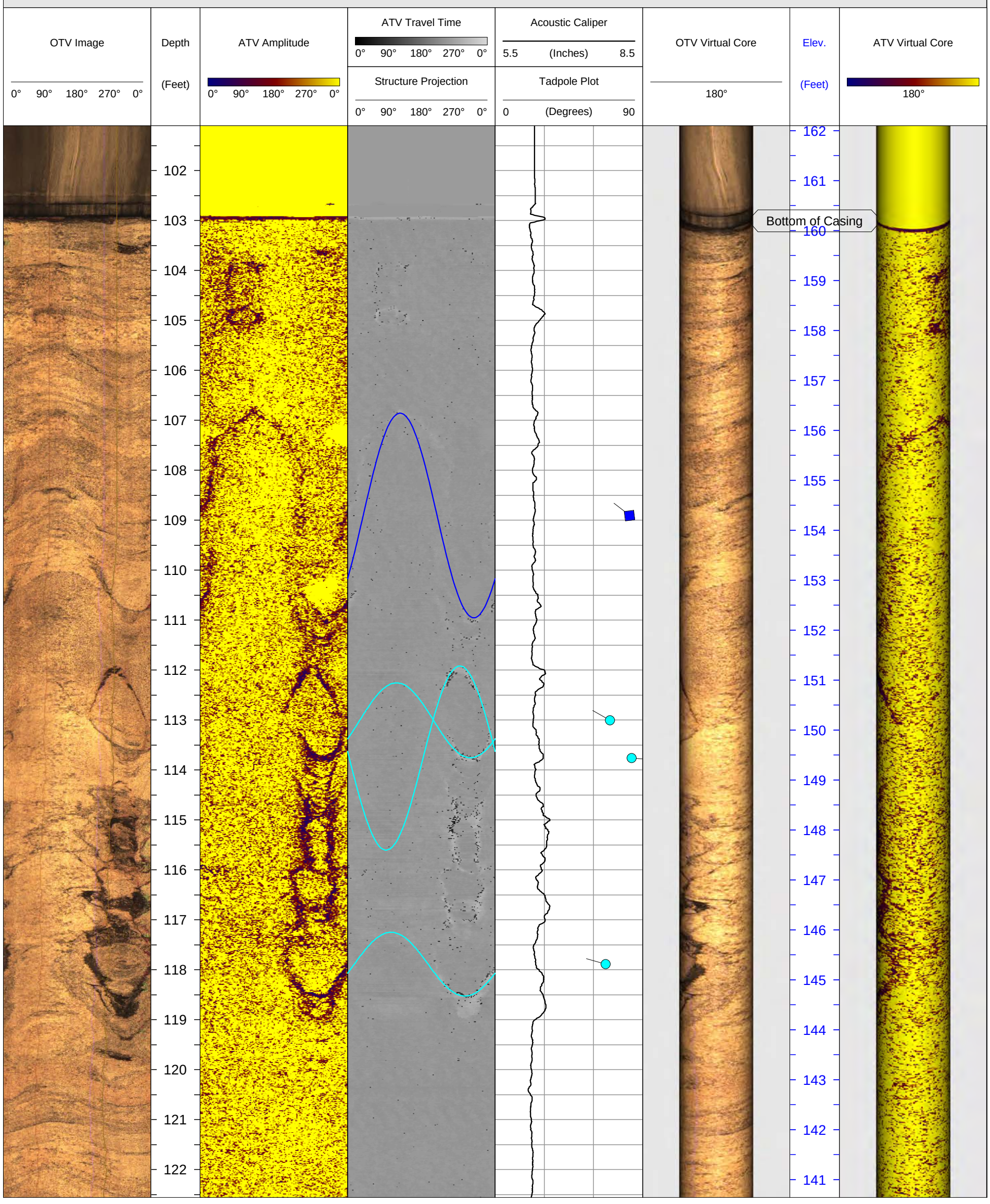
DATE LOGGED: November 12 & 13, 2012

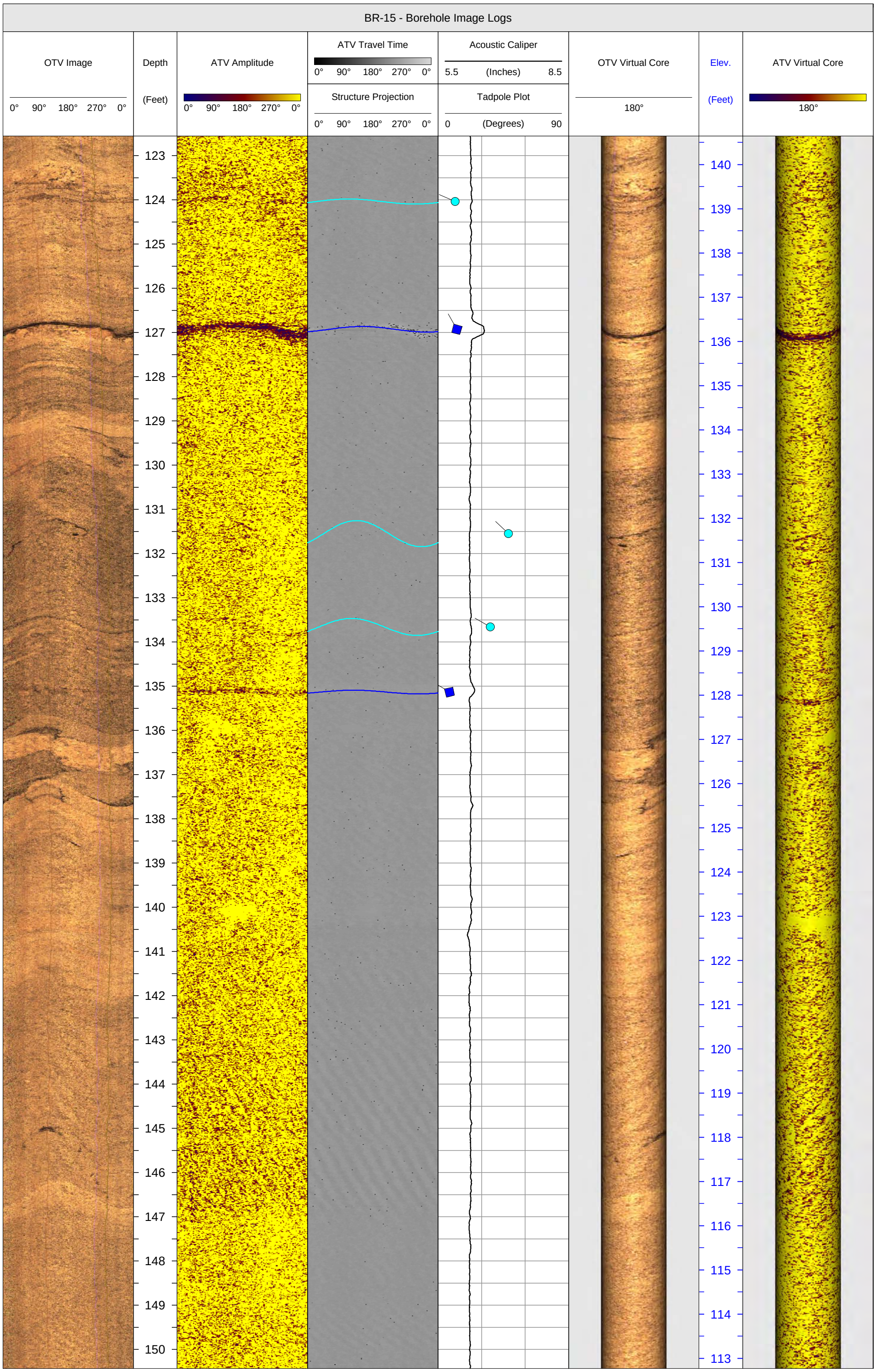
CLIENT:	Weston Solutions, Inc.	H-R FILE:	12RG62
PROJECT:	Borehole Geophysical Logging	LOG DATUM:	Top of the 6-Inch Steel Casing
LOCATION:	Savage Municipal Water Supply Superfund Site	TOP OF CASING ELEVATION:	263.2 Feet
CITY, STATE:	Milford, New Hampshire	ORIENTATION REFERENCE:	True North (Declination = 15 Degrees West)
LOGGING GEOPHYSICISTS:	Nick DeCristofaro & Eric Rickert	CASING STICK-UP:	0.3 Feet Below the Ground Surface
CLIENT REP. ON-SITE:	Andrew Fuller	BOREHOLE DIAMETER:	6 Inches
LOGS PROCESSED BY:	Robert Garfield	WATER LEVEL DEPTH:	5.0 Feet

STRUCTURE LEGEND

Fracture Rank 1 Fracture Rank 2 Fracture Rank 3

BR-15 - Borehole Image Logs




BR-15 - Borehole Image Logs
OTV Image
0° 90° 180° 270° 0°
Depth
(Feet)
ATV Amplitude
0° 90° 180° 270° 0°
ATV Travel Time
0° 90° 180° 270° 0°
Structure Projection
0° 90° 180° 270° 0°
Acoustic Caliper
5.5 (Inches) 8.5
Tadpole Plot
0 (Degrees) 90
OTV Virtual Core
180°
Elev.
(Feet)
ATV Virtual Core
180°
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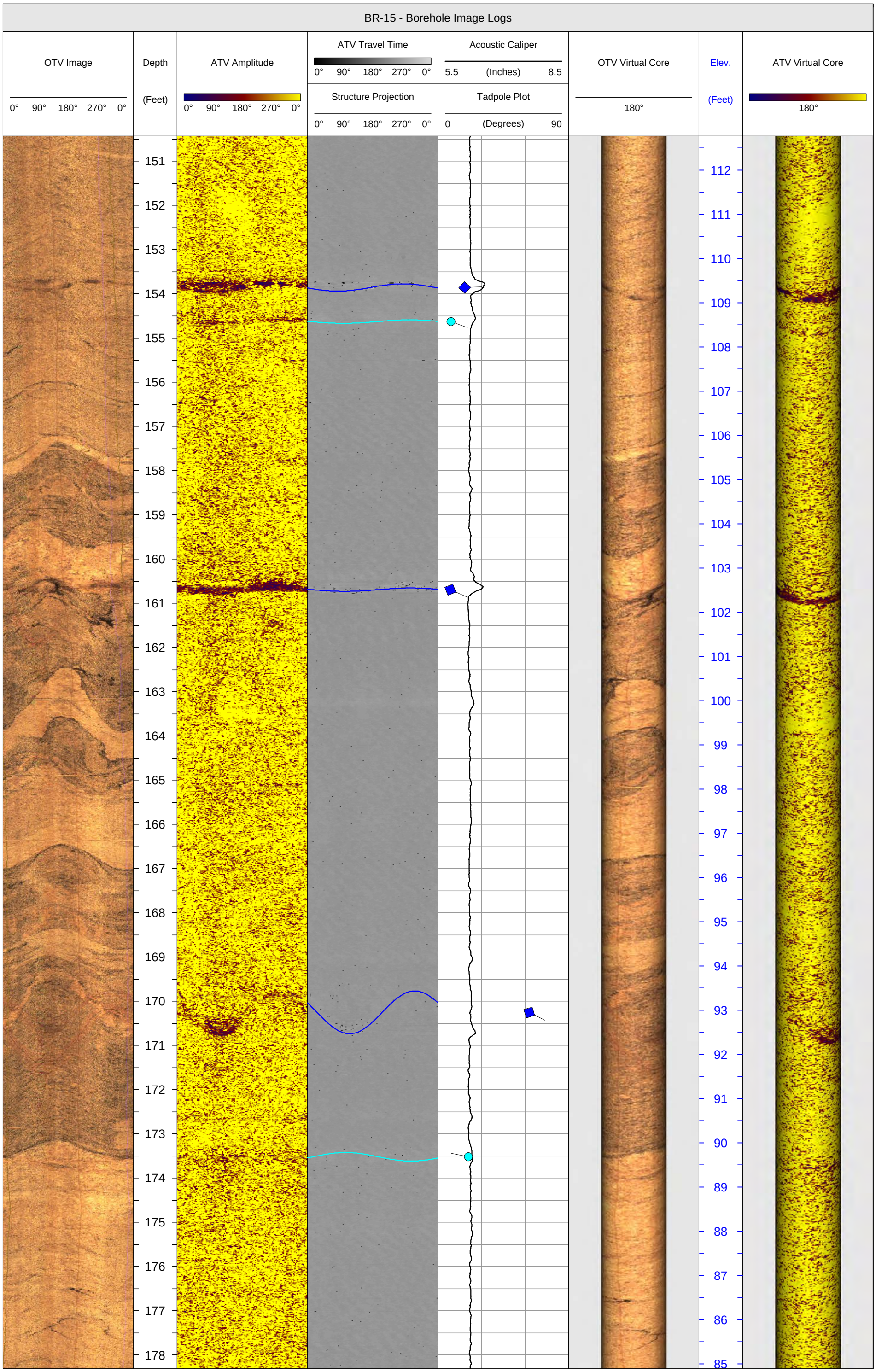
BR-15 - Borehole Image Logs
OTV Image
0° 90° 180° 270° 0°
Depth
(Feet)
ATV Amplitude
0° 90° 180° 270° 0°
ATV Travel Time
0° 90° 180° 270° 0°
Structure Projection
0° 90° 180° 270° 0°
Acoustic Caliper
5.5 (Inches) 8.5
Tadpole Plot
0 (Degrees) 90
OTV Virtual Core
180°
Elev.
(Feet)
ATV Virtual Core
180°
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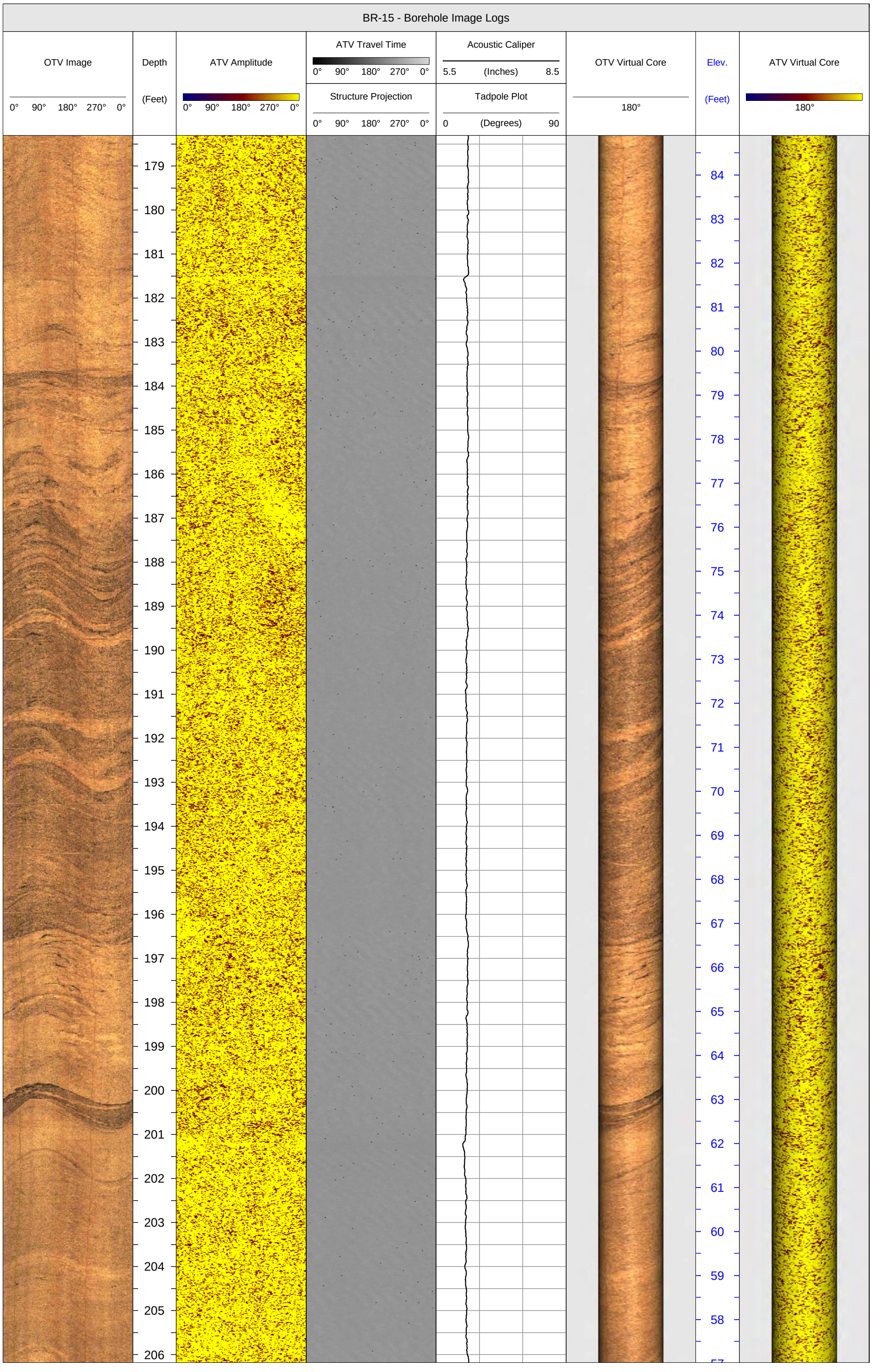
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OTV Image
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Structure Projection
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Acoustic Caliper
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Tadpole Plot
0 (Degrees) 90
OTV Virtual Core
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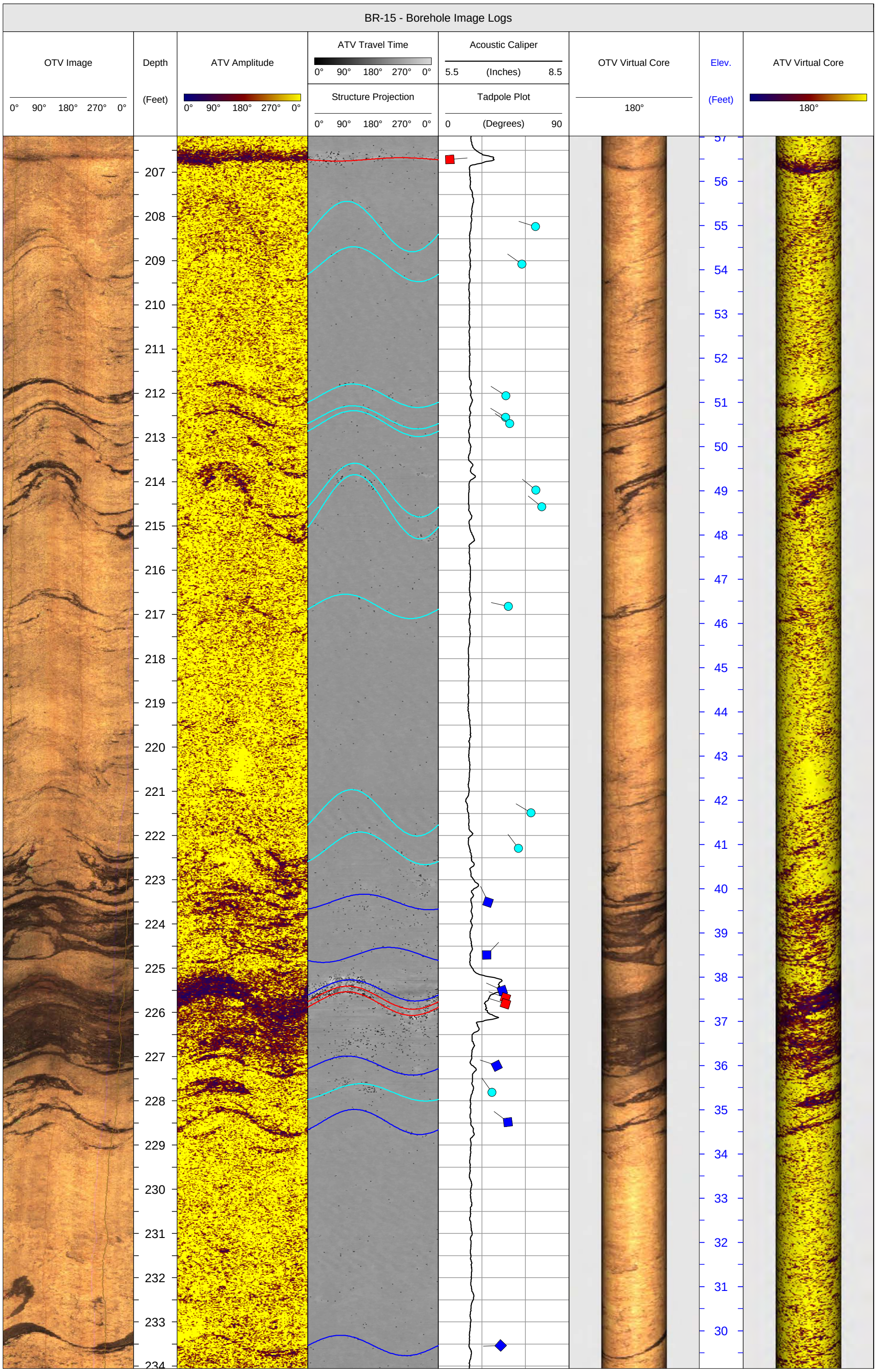
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ATV Travel Time
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Structure Projection
0° 90° 180° 270° 0°
Acoustic Caliper
5.5 (Inches) 8.5
Tadpole Plot
0 (Degrees) 90
OTV Virtual Core
180°
Elev.
(Feet)
ATV Virtual Core
180°
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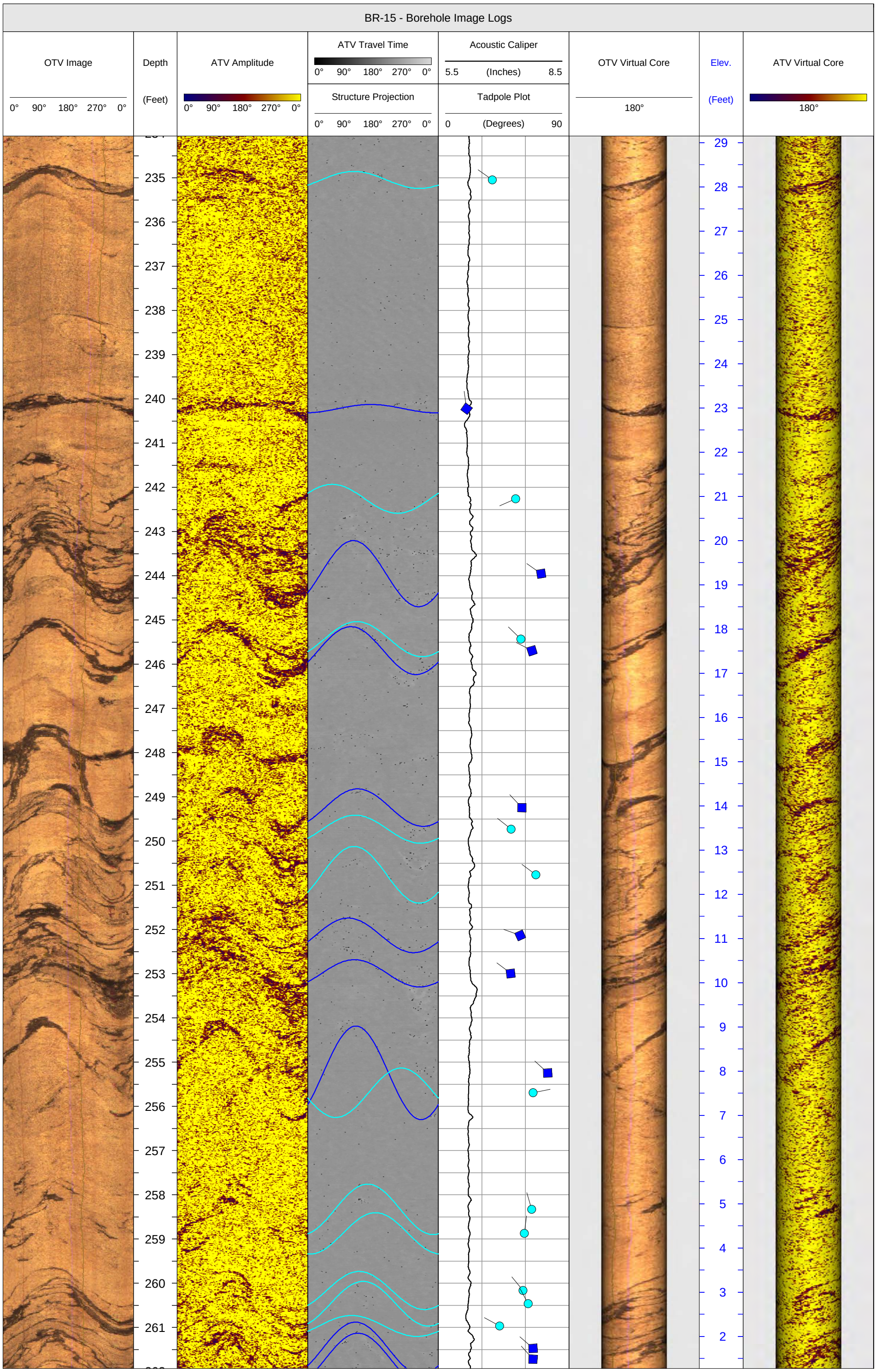
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ATV Amplitude
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ATV Travel Time
0° 90° 180° 270° 0°
Structure Projection
0° 90° 180° 270° 0°
Acoustic Caliper
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0 (Degrees) 90
OTV Virtual Core
180°
Elev.
(Feet)
ATV Virtual Core
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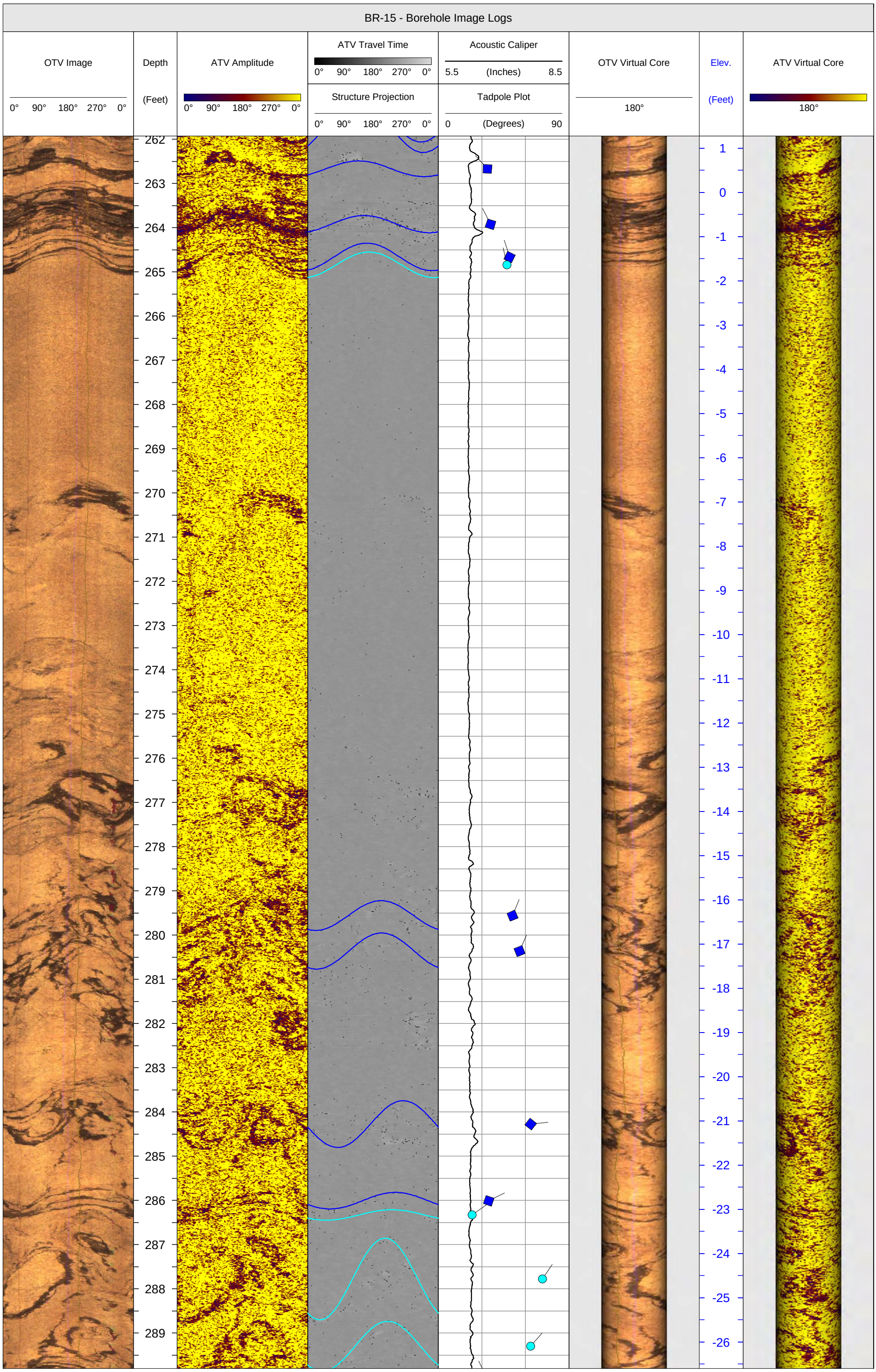
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Depth
(Feet)
ATV Amplitude
0° 90° 180° 270° 0°
ATV Travel Time
0° 90° 180° 270° 0°
Structure Projection
0° 90° 180° 270° 0°
Acoustic Caliper
5.5 (Inches) 8.5
Tadpole Plot
0 (Degrees) 90
OTV Virtual Core
180°
Elev.
(Feet)
ATV Virtual Core
180°
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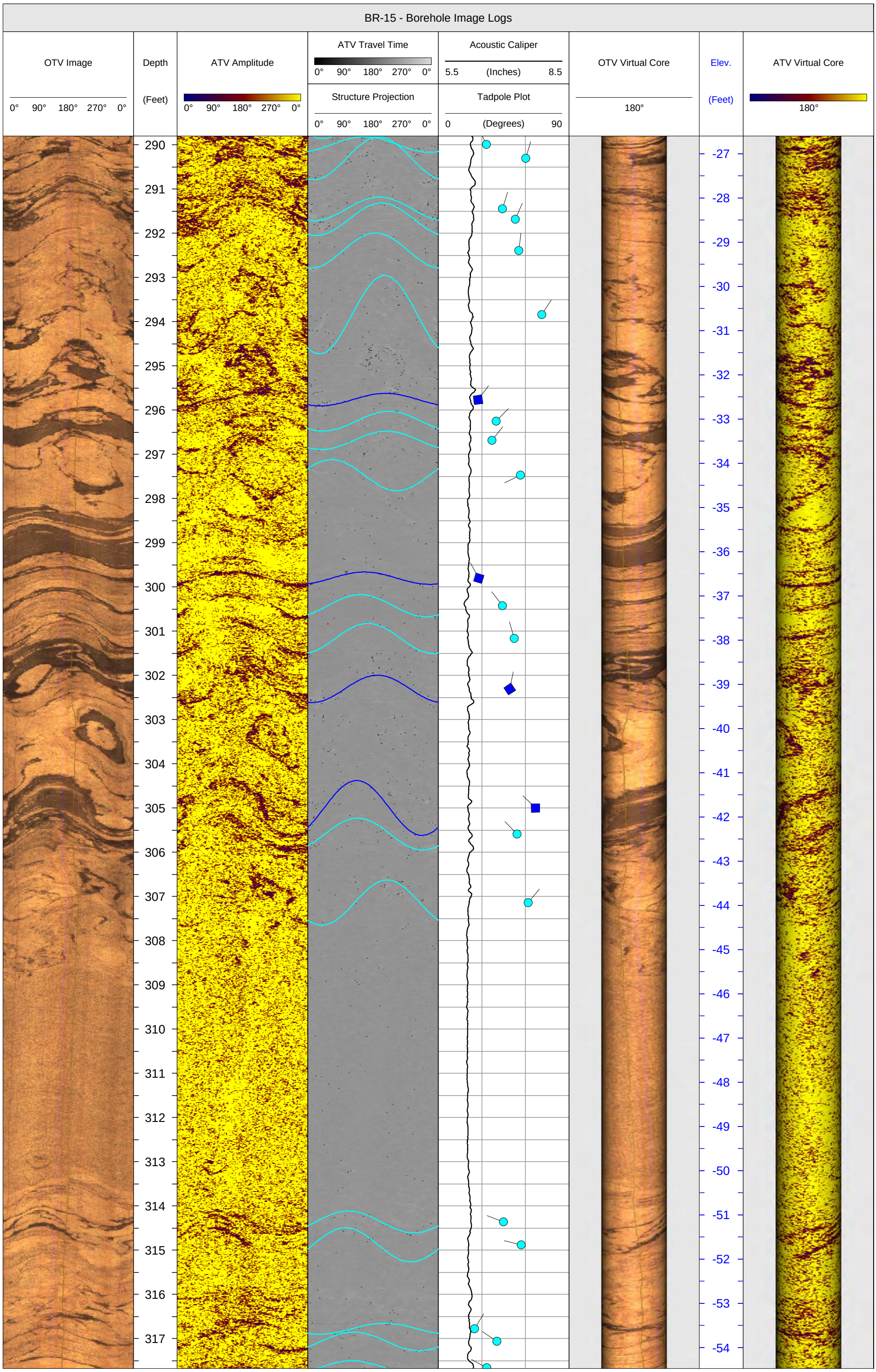
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Depth
(Feet)
ATV Amplitude
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ATV Travel Time
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Structure Projection
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OTV Virtual Core
180°
Elev.
(Feet)
ATV Virtual Core
180°
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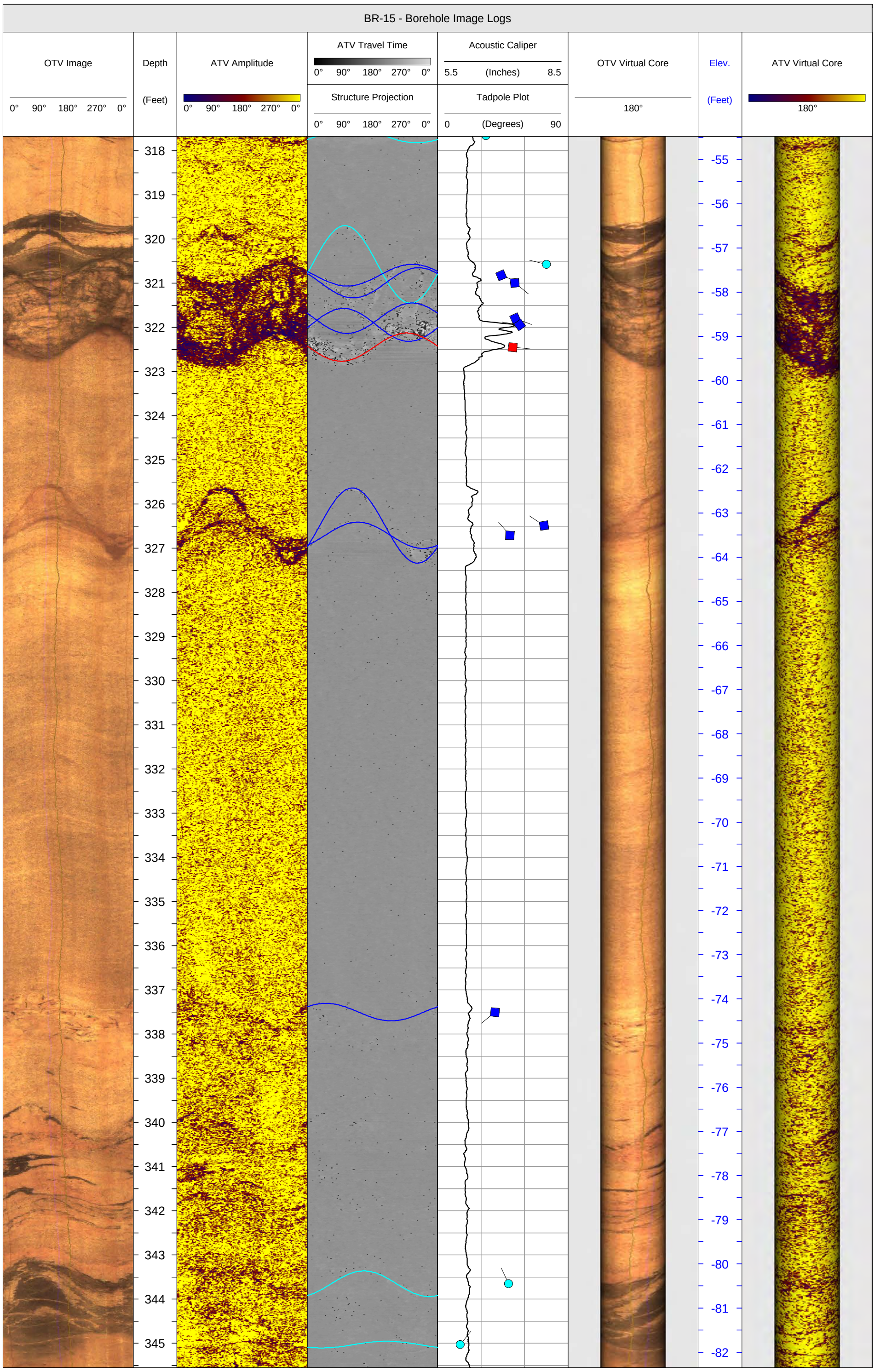
BR-15 - Borehole Image Logs
OTV Image
0° 90° 180° 270° 0°
Depth
(Feet)
ATV Amplitude
0° 90° 180° 270° 0°
ATV Travel Time
0° 90° 180° 270° 0°
Structure Projection
0° 90° 180° 270° 0°
Acoustic Caliper
5.5 (Inches) 8.5
Tadpole Plot
0 (Degrees) 90
OTV Virtual Core
180°
Elev.
(Feet)
ATV Virtual Core
180°
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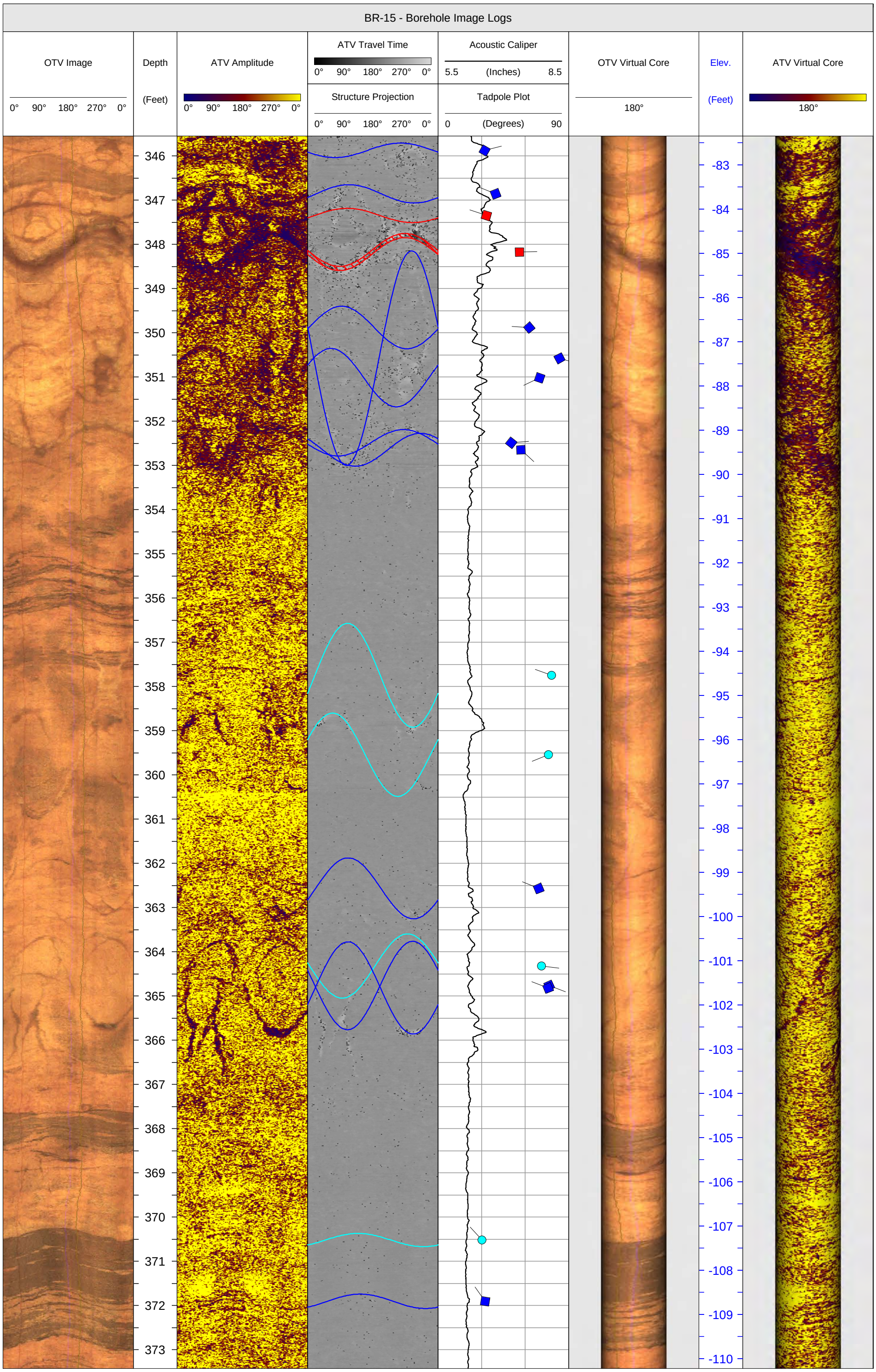
BR-15 - Borehole Image Logs
OTV Image
0° 90° 180° 270° 0°
Depth
(Feet)
ATV Amplitude
0° 90° 180° 270° 0°
ATV Travel Time
0° 90° 180° 270° 0°
Structure Projection
0° 90° 180° 270° 0°
Acoustic Caliper
5.5 (Inches) 8.5
Tadpole Plot
0 (Degrees) 90
OTV Virtual Core
180°
Elev.
(Feet)
ATV Virtual Core
180°
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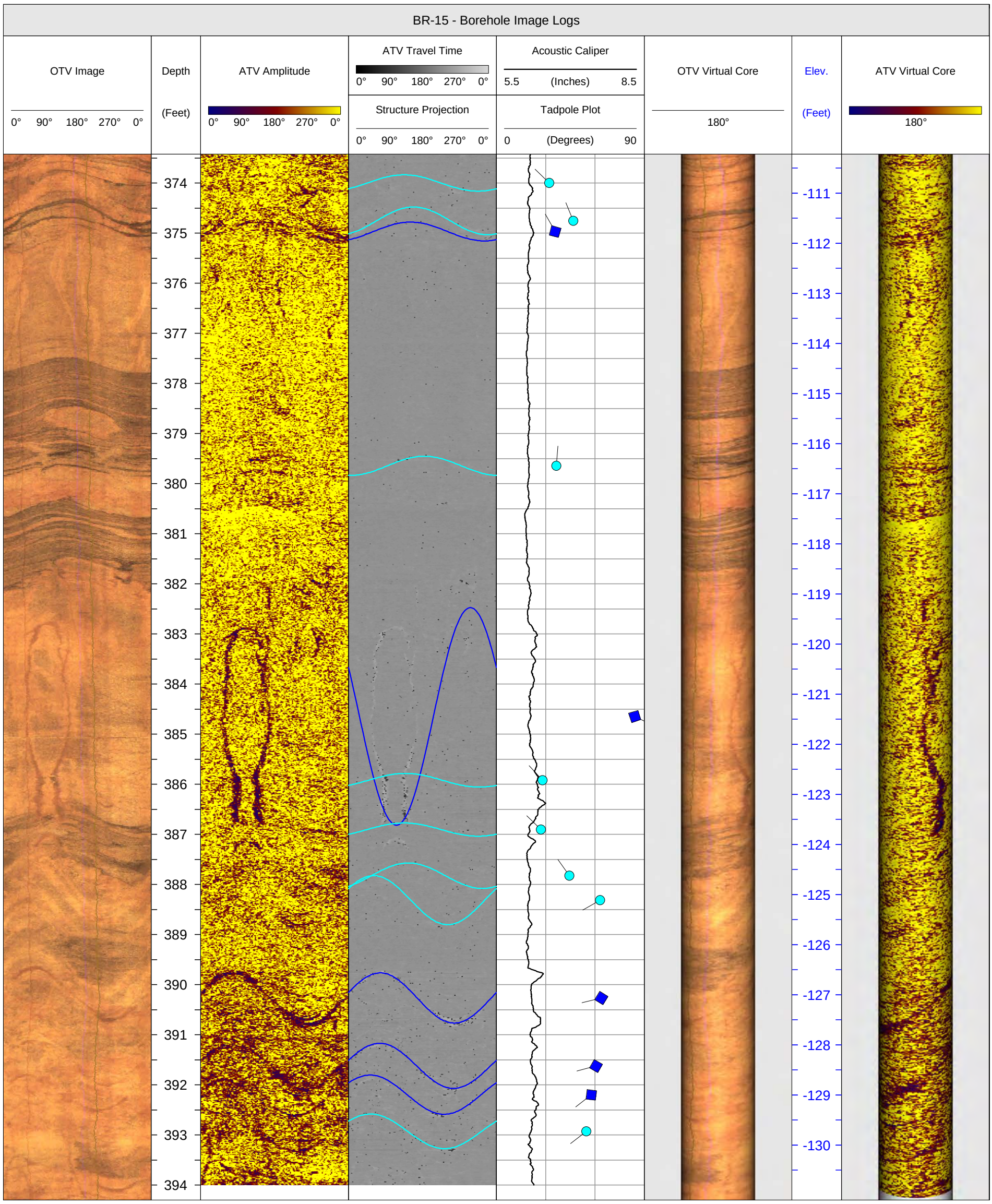
BR-15 - Borehole Image Logs
OTV Image
0° 90° 180° 270° 0°
Depth
(Feet)
ATV Amplitude
0° 90° 180° 270° 0°
ATV Travel Time
0° 90° 180° 270° 0°
Structure Projection
0° 90° 180° 270° 0°
Acoustic Caliper
5.5 (Inches) 8.5
Tadpole Plot
0 (Degrees) 90
OTV Virtual Core
180°
Elev.
(Feet)
ATV Virtual Core
180°
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HAGER-RICHTER GEOSCIENCE, INC.

8 Industrial Way - D10
Salem, NH 03079
Phone: 603-893-9944
Fax: 603-893-8313

BR-15 - BOREHOLE GEOPHYSICAL LOGS

DATE LOGGED: November 12 & 13, 2012

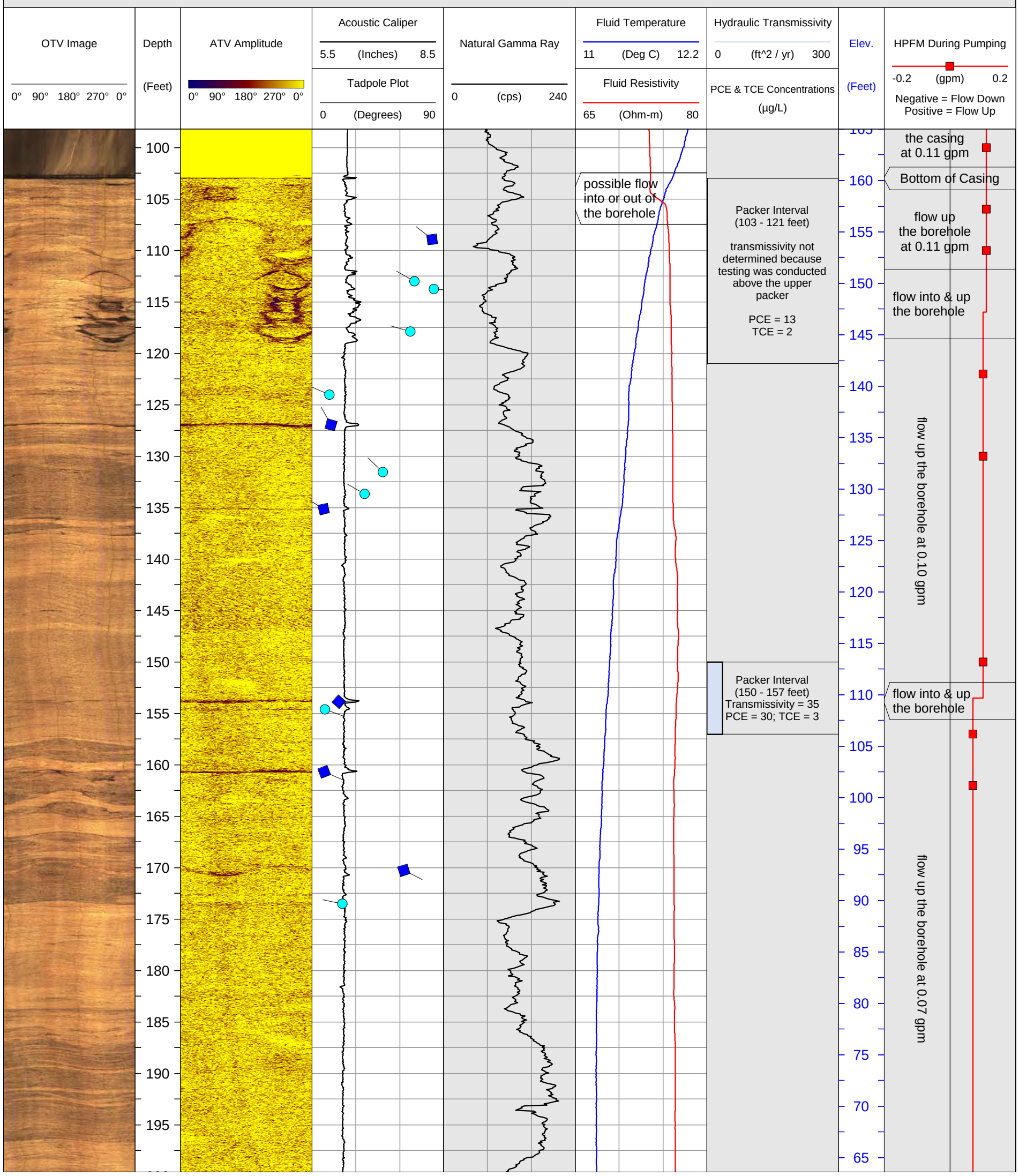
CLIENT:	Weston Solutions, Inc.	H-R FILE:	12RG62
PROJECT:	Borehole Geophysical Logging	LOG DATUM:	Top of the 6-Inch Steel Casing
LOCATION:	Savage Municipal Water Supply Superfund Site	TOP OF CASING ELEVATION:	263.2 Feet
CITY, STATE:	Milford, New Hampshire	ORIENTATION REFERENCE:	True North (Declination = 15 Degrees West)
LOGGING GEOPHYSICISTS:	Nick DeCristofaro & Eric Rickert	CASING STICK-UP:	0.3 Feet Below the Ground Surface
CLIENT REP. ON-SITE:	Andrew Fuller	BOREHOLE DIAMETER:	6 Inches
LOGS PROCESSED BY:	Robert Garfield	WATER LEVEL DEPTH:	5.0 Feet

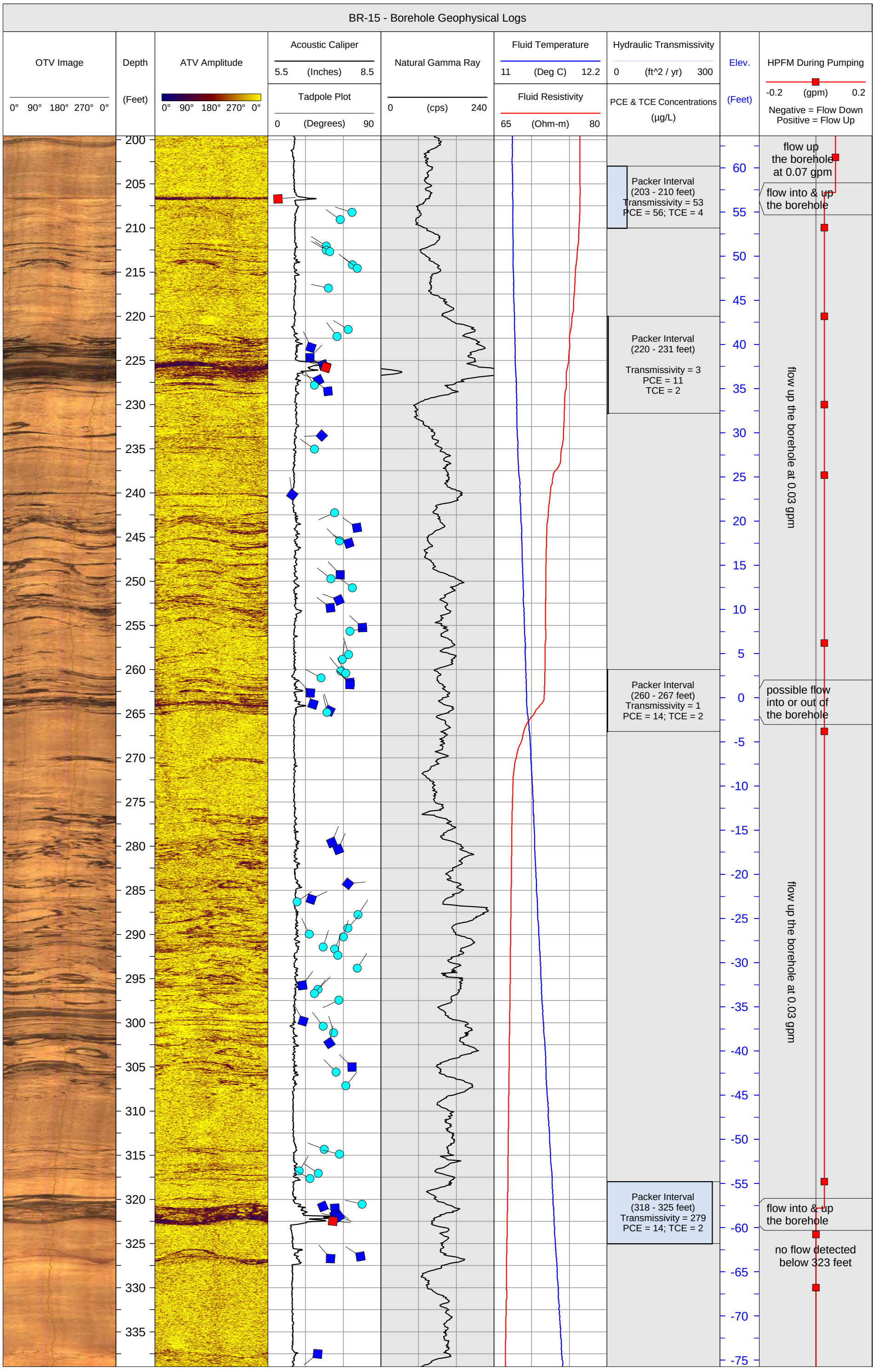
STRUCTURE LEGEND

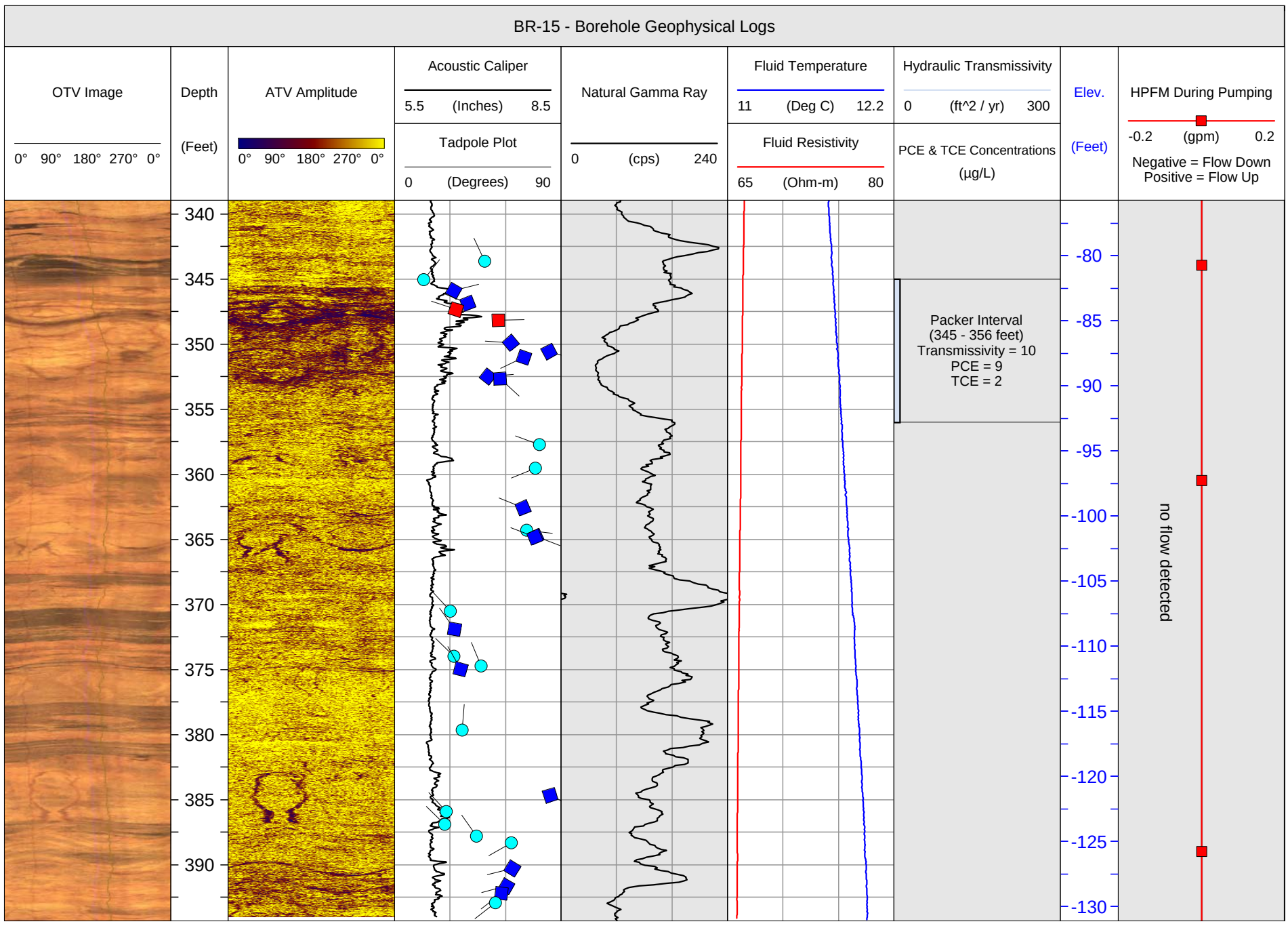
Fracture Rank 1 Fracture Rank 2 Fracture Rank 3

NOTES: HPFM data under ambient conditions are not plotted in the logs below because flow was not detected under ambient conditions.
During HPFM logging under pumping conditions water was pumped from the borehole from inside the casing.
The hydraulic transmissivity, PCE, and TCE data reported in the logs below were provided by Weston and were acquired during packer testing.

BR-15 - Borehole Geophysical Logs




BR-15 - Borehole Geophysical Logs
OTV Image
0° 90° 180° 270° 0°
Depth
(Feet)
ATV Amplitude
0° 90° 180° 270° 0°
Acoustic Caliper
5.5 (Inches) 8.5
Tadpole Plot
0 (Degrees) 90
Natural Gamma Ray
0 (cps) 240
Fluid Temperature
11 (Deg C) 12.2
Fluid Resistivity
65 (Ohm-m) 80
Hydraulic Transmissivity
0 (ft^2 / yr) 300
PCE & TCE Concentrations
(µg/L)
Elev.
(Feet)
HPFM During Pumping
-0.2 (gpm) 0.2
Negative = Flow Down
Positive = Flow Up
Packer Interval
(203 - 210 feet)
Transmissivity = 53
PCE = 56; TCE = 4
Packer Interval
(220 - 231 feet)
Transmissivity = 3
PCE = 11
TCE = 2
Packer Interval
(260 - 267 feet)
Transmissivity = 1
PCE = 14; TCE = 2
Packer Interval
(318 - 325 feet)
Transmissivity = 279
PCE = 14; TCE = 2
flow up the borehole at 0.07 gpm
flow into & up the borehole
flow up the borehole at 0.03 gpm
possible flow into or out of the borehole
flow up the borehole at 0.03 gpm
flow into & up the borehole
no flow detected below 323 feet


BR-15 - Borehole Geophysical Logs
OTV Image
0° 90° 180° 270° 0°
Depth
(Feet)
ATV Amplitude
0° 90° 180° 270° 0°
Acoustic Caliper
5.5 (Inches) 8.5
Tadpole Plot
0 (Degrees) 90
Natural Gamma Ray
0 (cps) 240
Fluid Temperature
11 (Deg C) 12.2
Fluid Resistivity
65 (Ohm-m) 80
Hydraulic Transmissivity
0 (ft^2 / yr) 300
PCE & TCE Concentrations
(µg/L)
Elev.
(Feet)
HPFM During Pumping
-0.2 (gpm) 0.2
Negative = Flow Down
Positive = Flow Up
340
345
350
355
360
365
370
375
380
385
390
Packer Interval
(345 - 356 feet)
Transmissivity = 10
PCE = 9
TCE = 2
-80
-85
-90
-95
-100
-105
-110
-115
-120
-125
-130
no flow detected

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BR-16 - BOREHOLE IMAGE LOGS

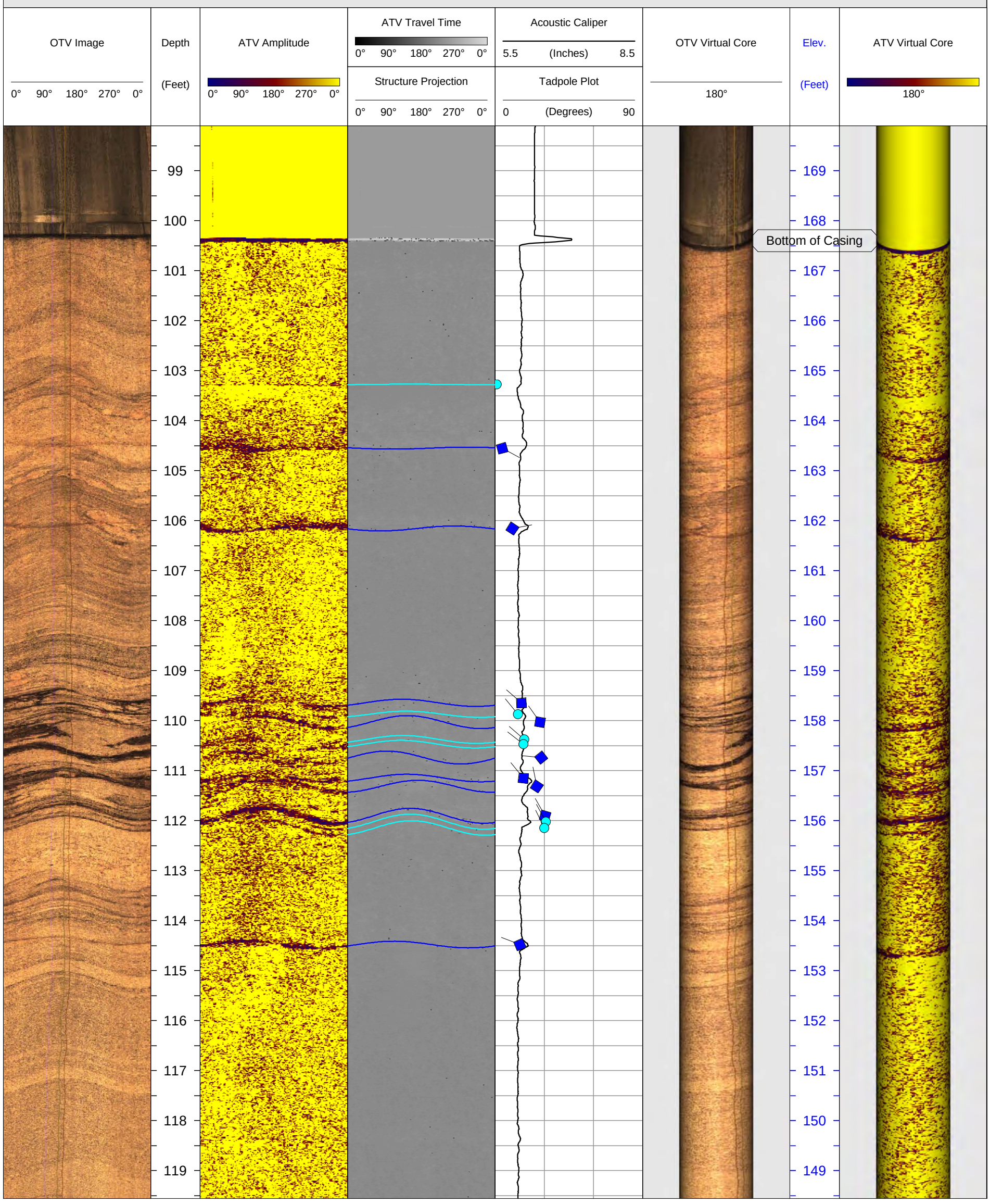
DATE LOGGED: November 12 & 13, 2012

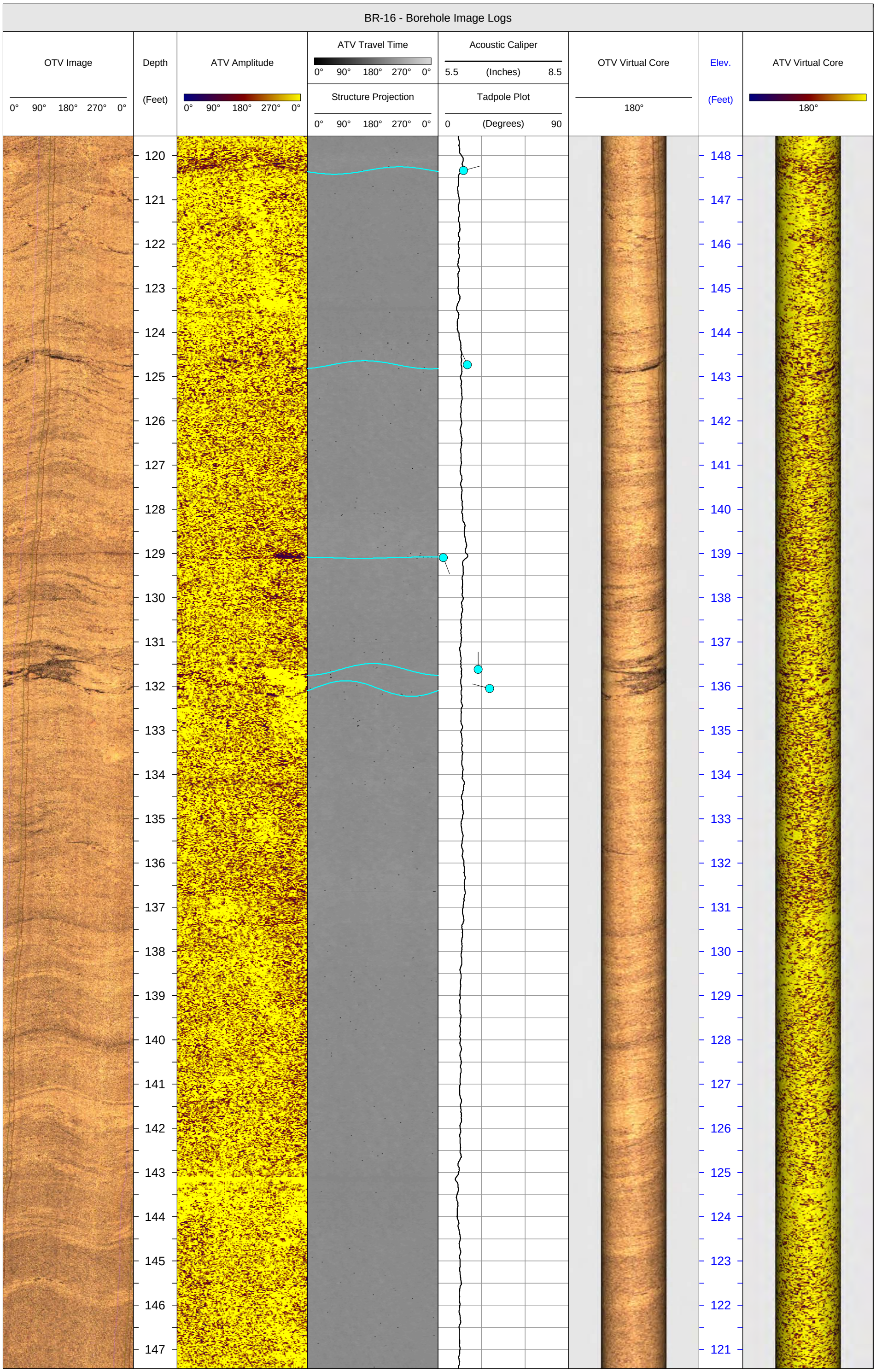
CLIENT:	Weston Solutions, Inc.	H-R FILE:	12RG62
PROJECT:	Borehole Geophysical Logging	LOG DATUM:	Top of the 6-Inch Steel Casing
LOCATION:	Savage Municipal Water Supply Superfund Site	TOP OF CASING ELEVATION:	268.0 Feet
CITY, STATE:	Milford, New Hampshire	ORIENTATION REFERENCE:	True North (Declination = 15 Degrees West)
LOGGING GEOPHYSICISTS:	Nick DeCristofaro & Eric Rickert	CASING STICK-UP:	1.4 Feet Below the Ground Surface
CLIENT REP. ON-SITE:	Andrew Fuller	BOREHOLE DIAMETER:	6 Inches
LOGS PROCESSED BY:	Robert Garfield	WATER LEVEL DEPTH:	7.9 Feet

STRUCTURE LEGEND

Fracture Rank 1 Fracture Rank 2 Fracture Rank 3

BR-16 - Borehole Image Logs

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OTV Image
0° 90° 180° 270° 0°
Depth
(Feet)
ATV Amplitude
0° 90° 180° 270° 0°
ATV Travel Time
0° 90° 180° 270° 0°
Structure Projection
0° 90° 180° 270° 0°
Acoustic Caliper
5.5 (Inches) 8.5
Tadpole Plot
0 (Degrees) 90
OTV Virtual Core
180°
Elev.
(Feet)
ATV Virtual Core
180°
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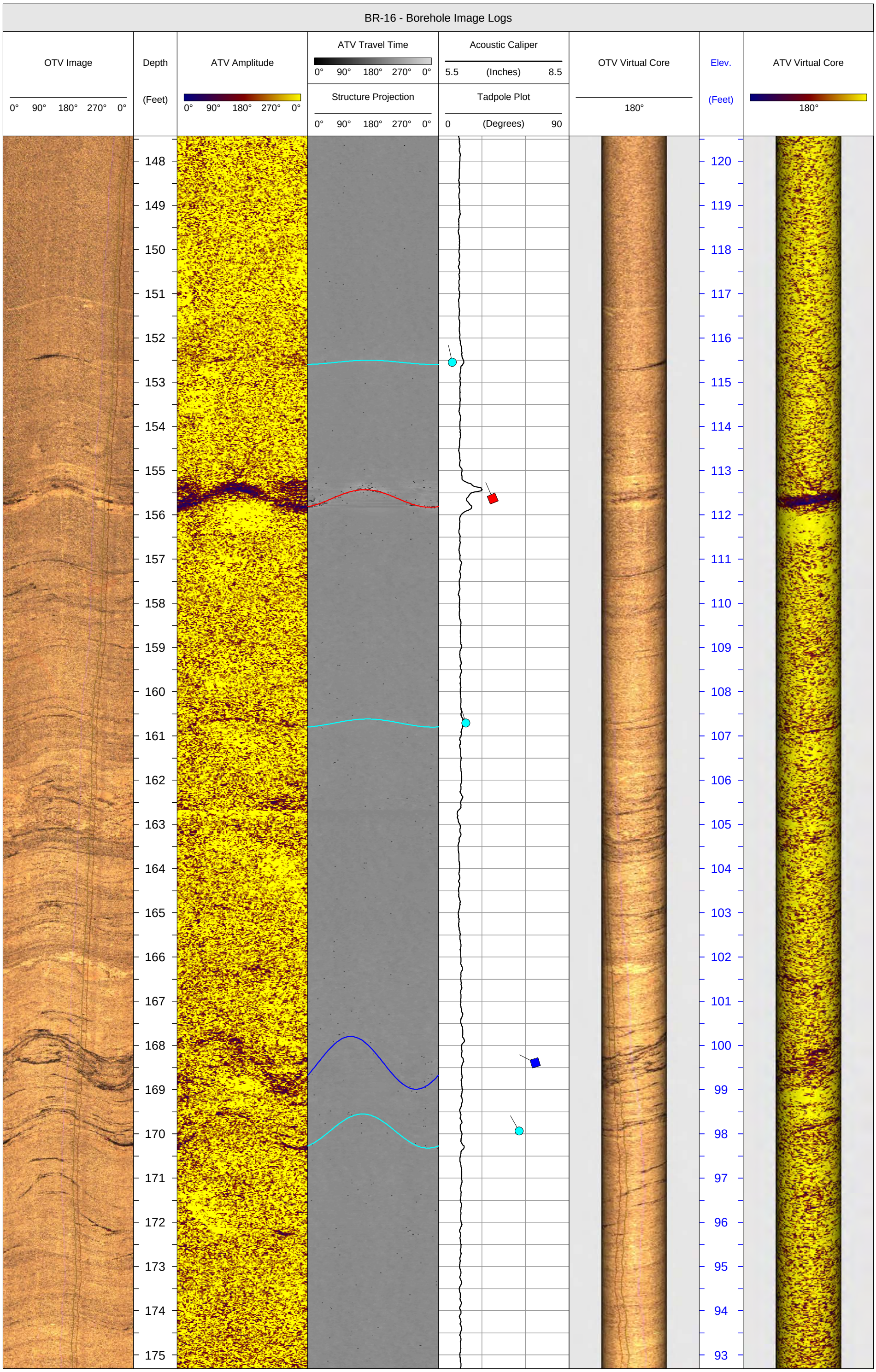
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Structure Projection
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Acoustic Caliper
5.5 (Inches) 8.5
Tadpole Plot
0 (Degrees) 90
OTV Virtual Core
180°
Elev.
(Feet)
ATV Virtual Core
180°
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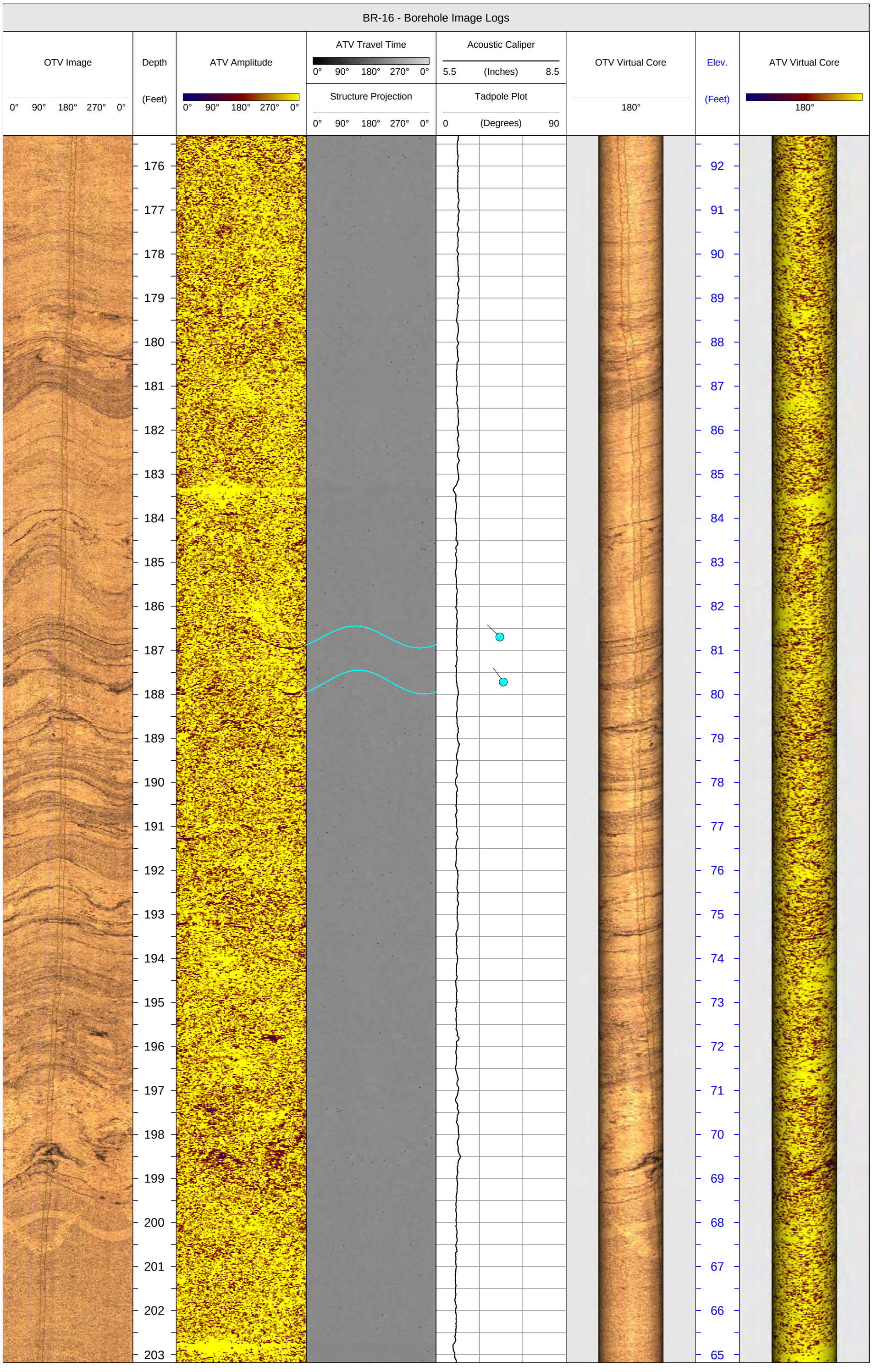
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(Feet)
ATV Virtual Core
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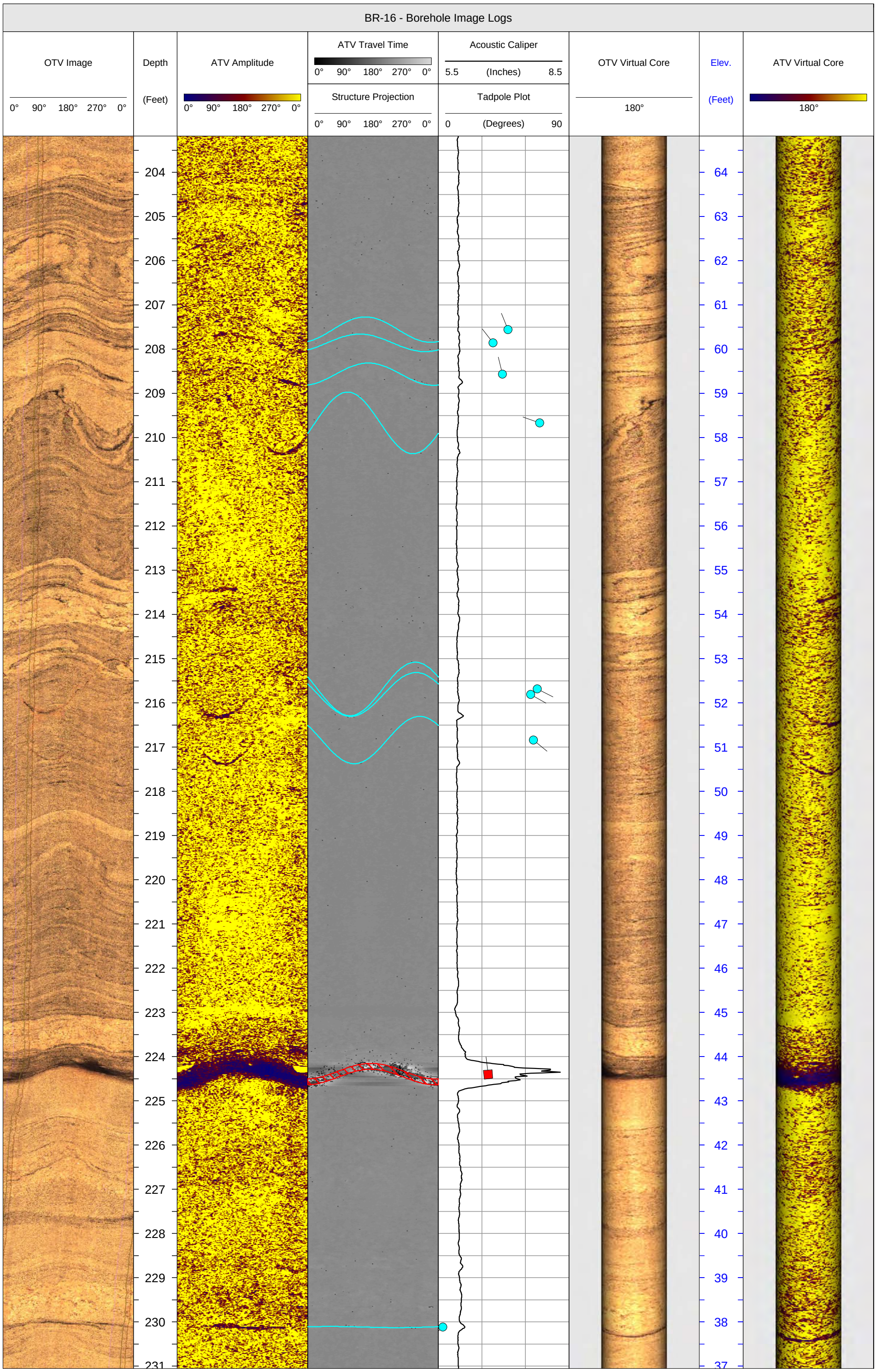
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ATV Amplitude
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ATV Travel Time
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Structure Projection
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5.5 (Inches) 8.5
Tadpole Plot
0 (Degrees) 90
OTV Virtual Core
180°
Elev.
(Feet)
ATV Virtual Core
180°
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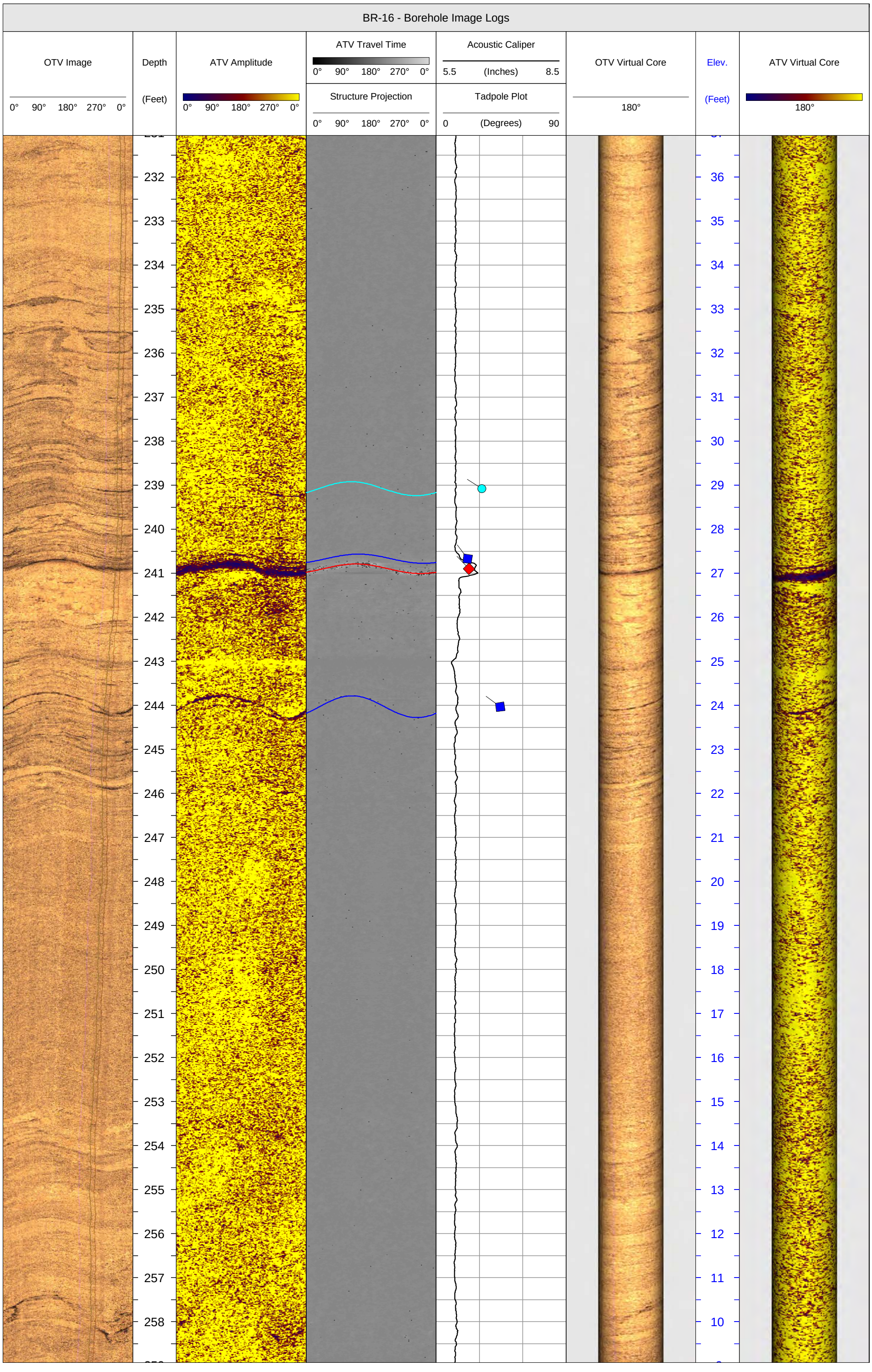
BR-16 - Borehole Image Logs
OTV Image
0° 90° 180° 270° 0°
Depth
(Feet)
ATV Amplitude
0° 90° 180° 270° 0°
ATV Travel Time
0° 90° 180° 270° 0°
Structure Projection
0° 90° 180° 270° 0°
Acoustic Caliper
5.5 (Inches) 8.5
Tadpole Plot
0 (Degrees) 90
OTV Virtual Core
180°
Elev.
(Feet)
ATV Virtual Core
180°
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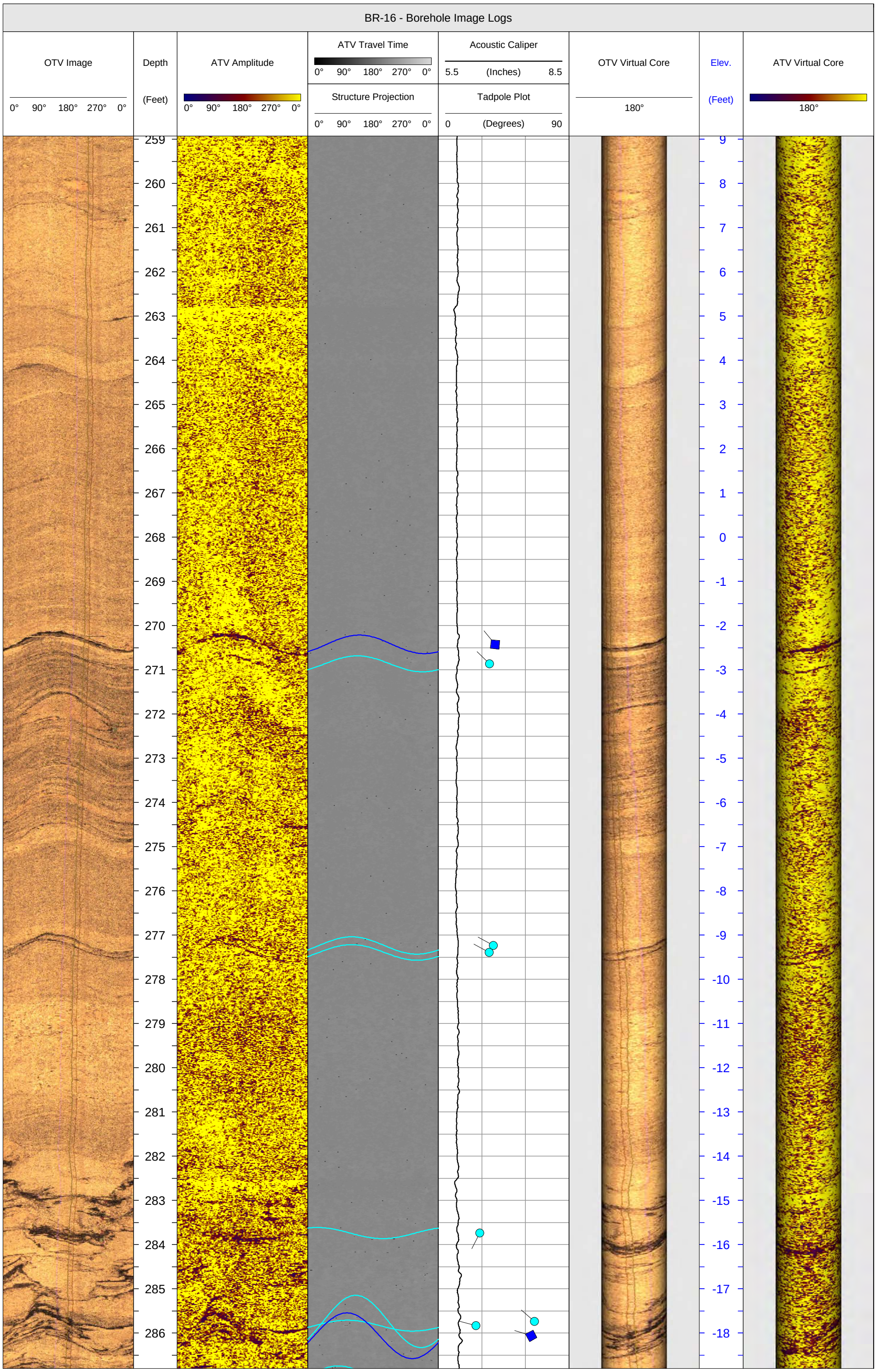
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OTV Image
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Depth
(Feet)
ATV Amplitude
0° 90° 180° 270° 0°
ATV Travel Time
0° 90° 180° 270° 0°
Structure Projection
0° 90° 180° 270° 0°
Acoustic Caliper
5.5 (Inches) 8.5
Tadpole Plot
0 (Degrees) 90
OTV Virtual Core
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Elev.
(Feet)
ATV Virtual Core
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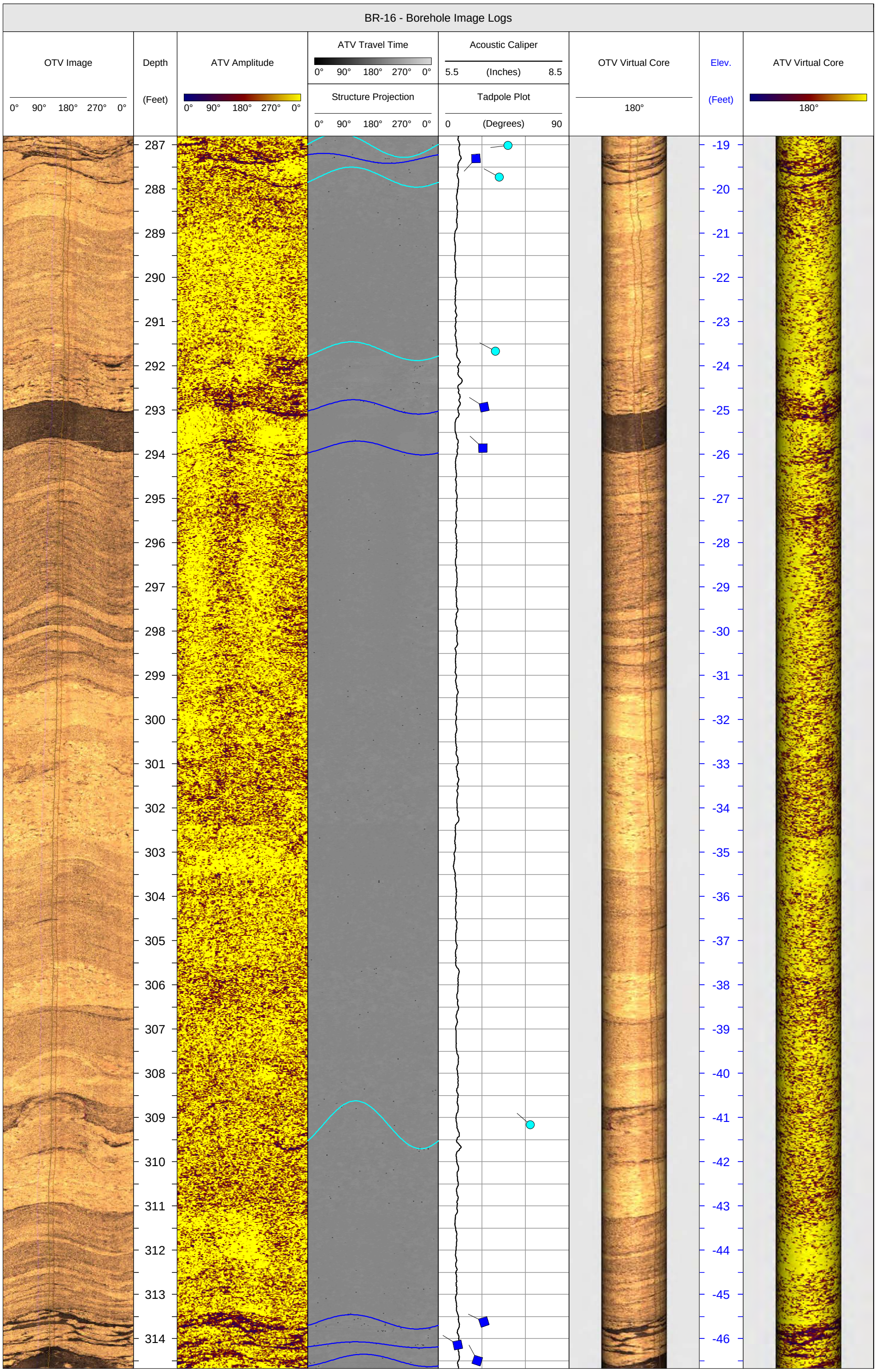
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OTV Image
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Depth
(Feet)
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ATV Travel Time
0° 90° 180° 270° 0°
Structure Projection
0° 90° 180° 270° 0°
Acoustic Caliper
5.5 (Inches) 8.5
Tadpole Plot
0 (Degrees) 90
OTV Virtual Core
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ATV Virtual Core
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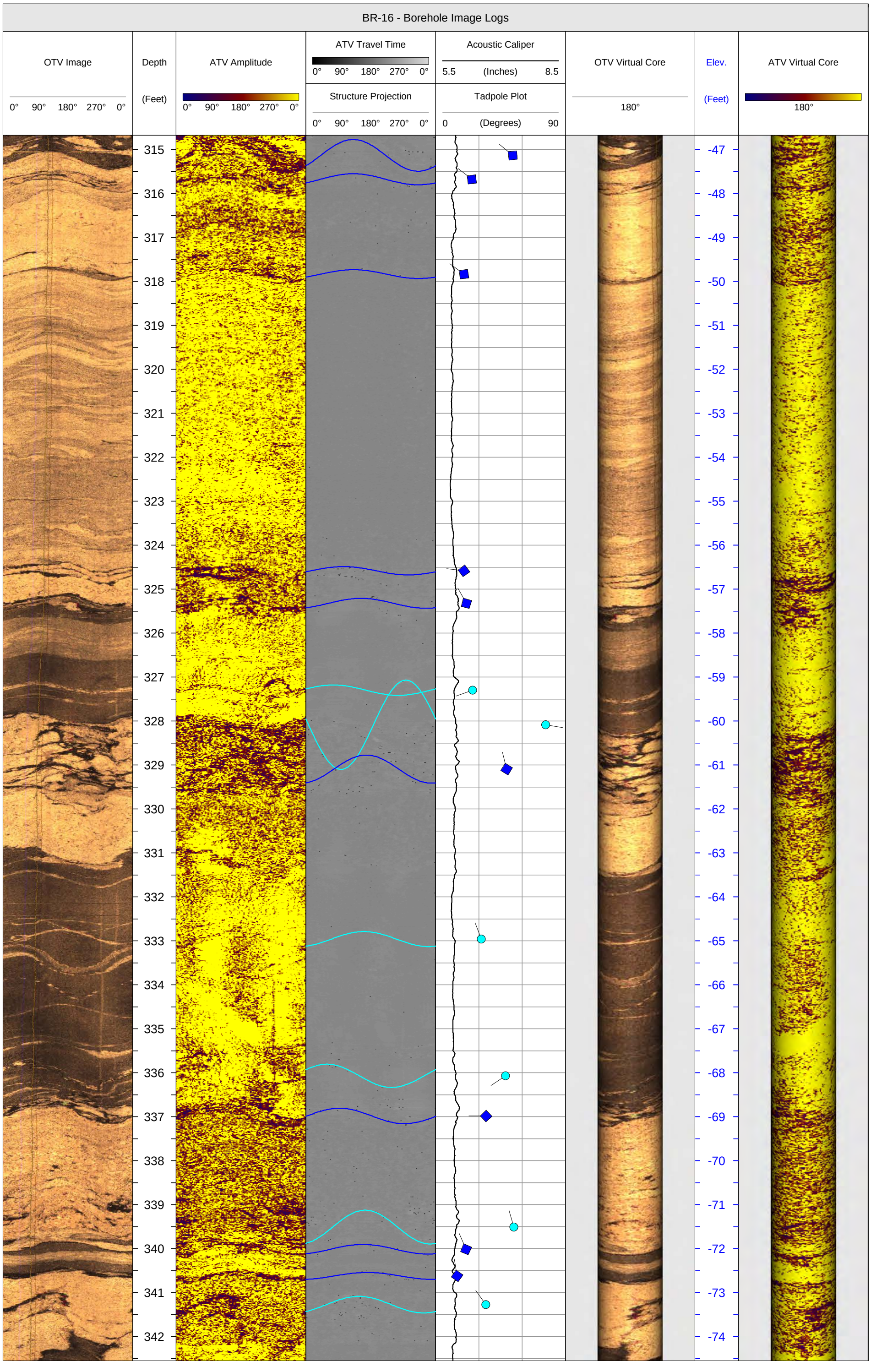
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OTV Image
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Depth
(Feet)
ATV Amplitude
0° 90° 180° 270° 0°
ATV Travel Time
0° 90° 180° 270° 0°
Structure Projection
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Acoustic Caliper
5.5 (Inches) 8.5
Tadpole Plot
0 (Degrees) 90
OTV Virtual Core
180°
Elev.
(Feet)
ATV Virtual Core
180°
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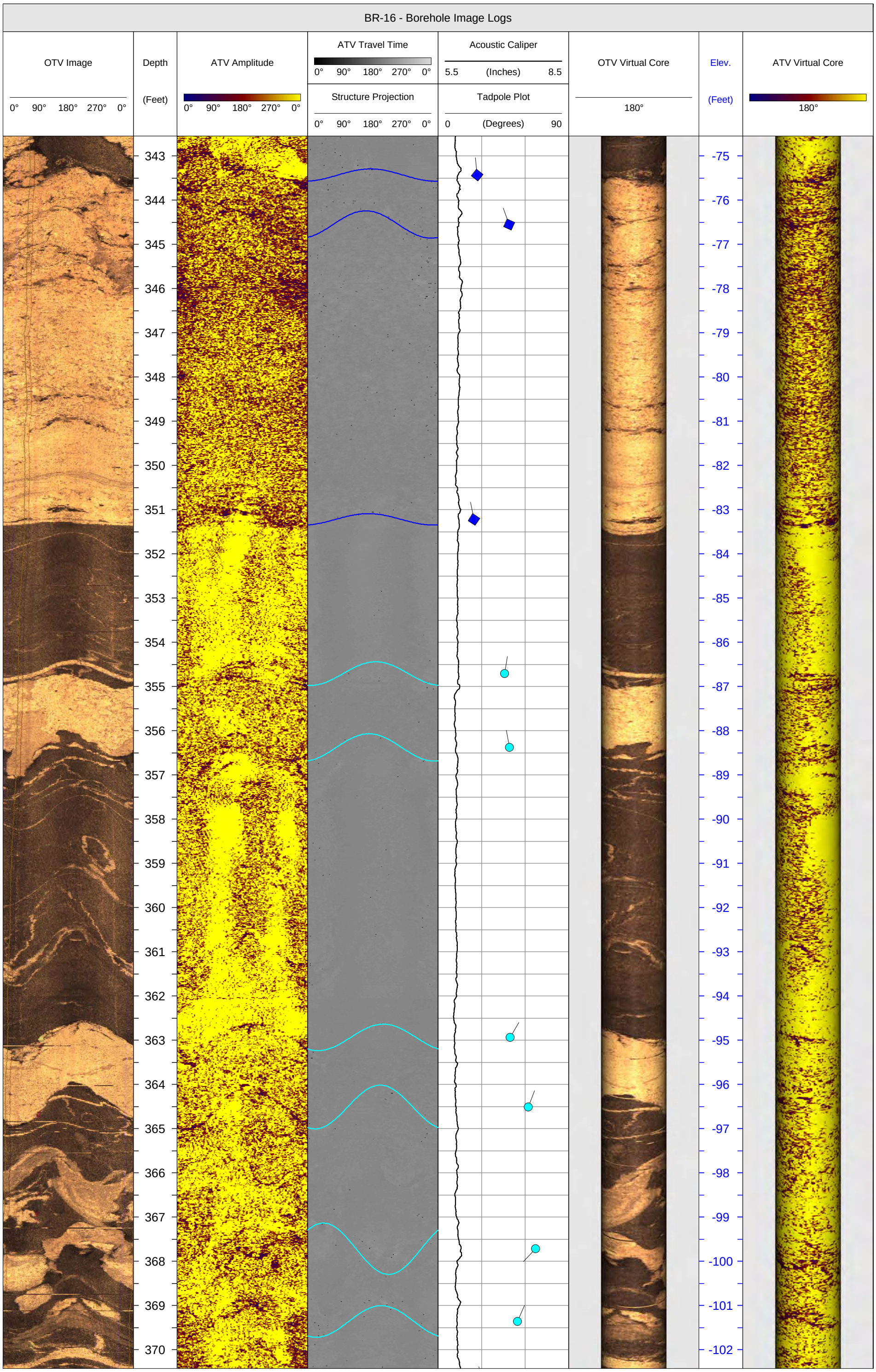
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OTV Image
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Depth
(Feet)
ATV Amplitude
0° 90° 180° 270° 0°
ATV Travel Time
0° 90° 180° 270° 0°
Structure Projection
0° 90° 180° 270° 0°
Acoustic Caliper
5.5 (Inches) 8.5
Tadpole Plot
0 (Degrees) 90
OTV Virtual Core
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(Feet)
ATV Virtual Core
180°
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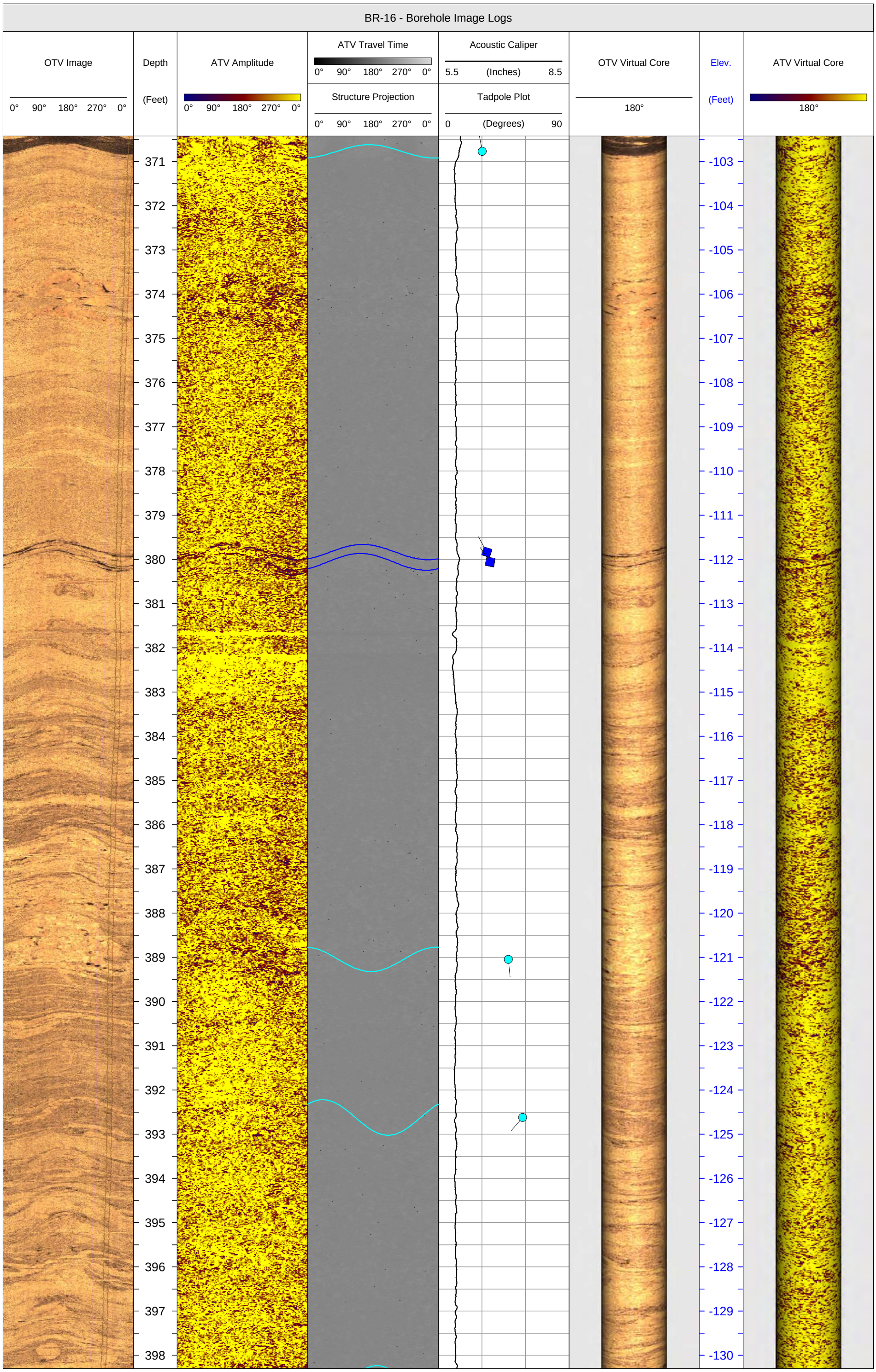
BR-16 - Borehole Image Logs
OTV Image
0° 90° 180° 270° 0°
Depth
(Feet)
ATV Amplitude
0° 90° 180° 270° 0°
ATV Travel Time
0° 90° 180° 270° 0°
Structure Projection
0° 90° 180° 270° 0°
Acoustic Caliper
5.5 (Inches) 8.5
Tadpole Plot
0 (Degrees) 90
OTV Virtual Core
180°
Elev.
(Feet)
ATV Virtual Core
180°
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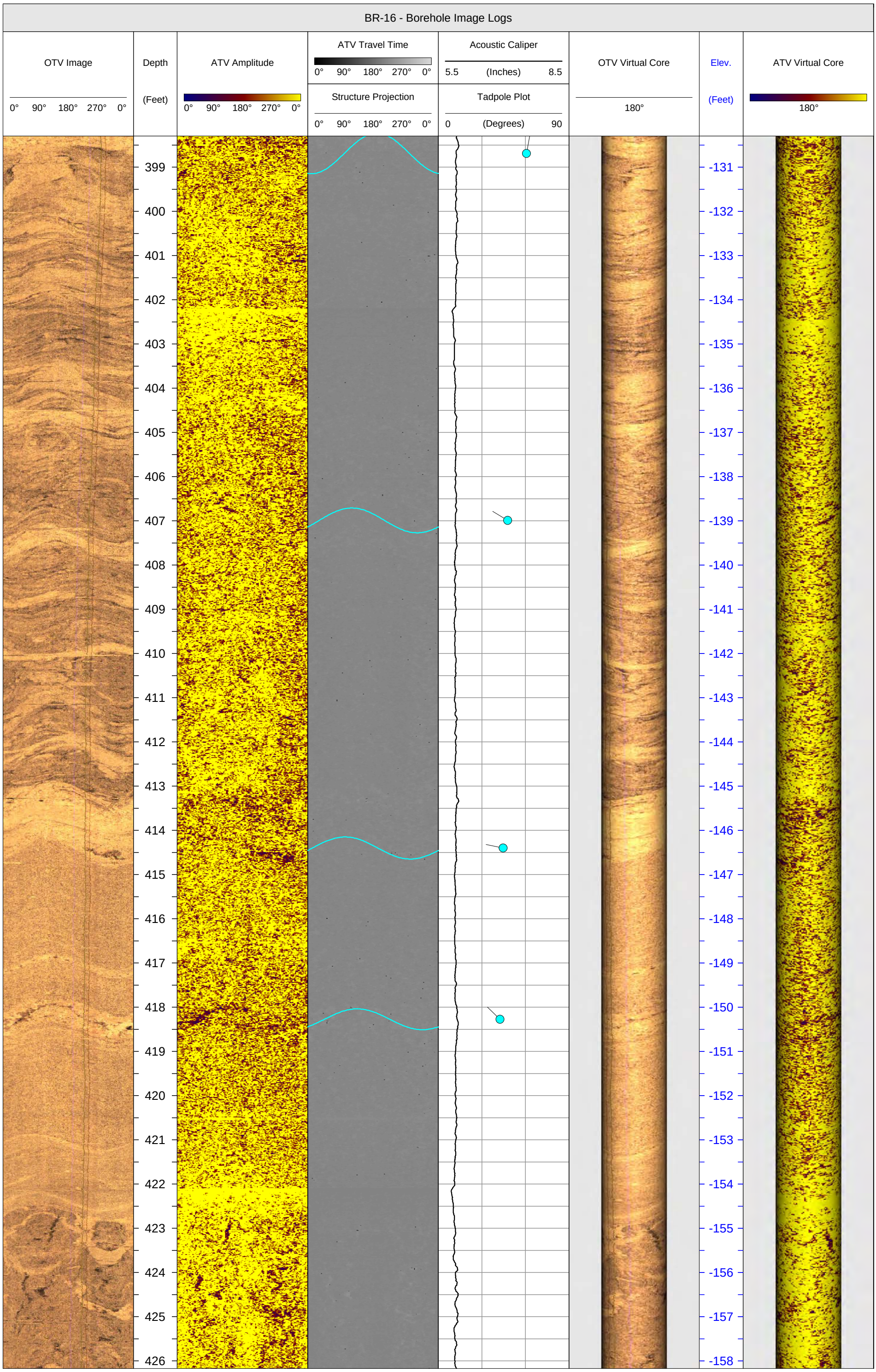
BR-16 - Borehole Image Logs
OTV Image
0° 90° 180° 270° 0°
Depth
(Feet)
ATV Amplitude
0° 90° 180° 270° 0°
ATV Travel Time
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Structure Projection
0° 90° 180° 270° 0°
Acoustic Caliper
5.5 (Inches) 8.5
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0 (Degrees) 90
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ATV Virtual Core
180°
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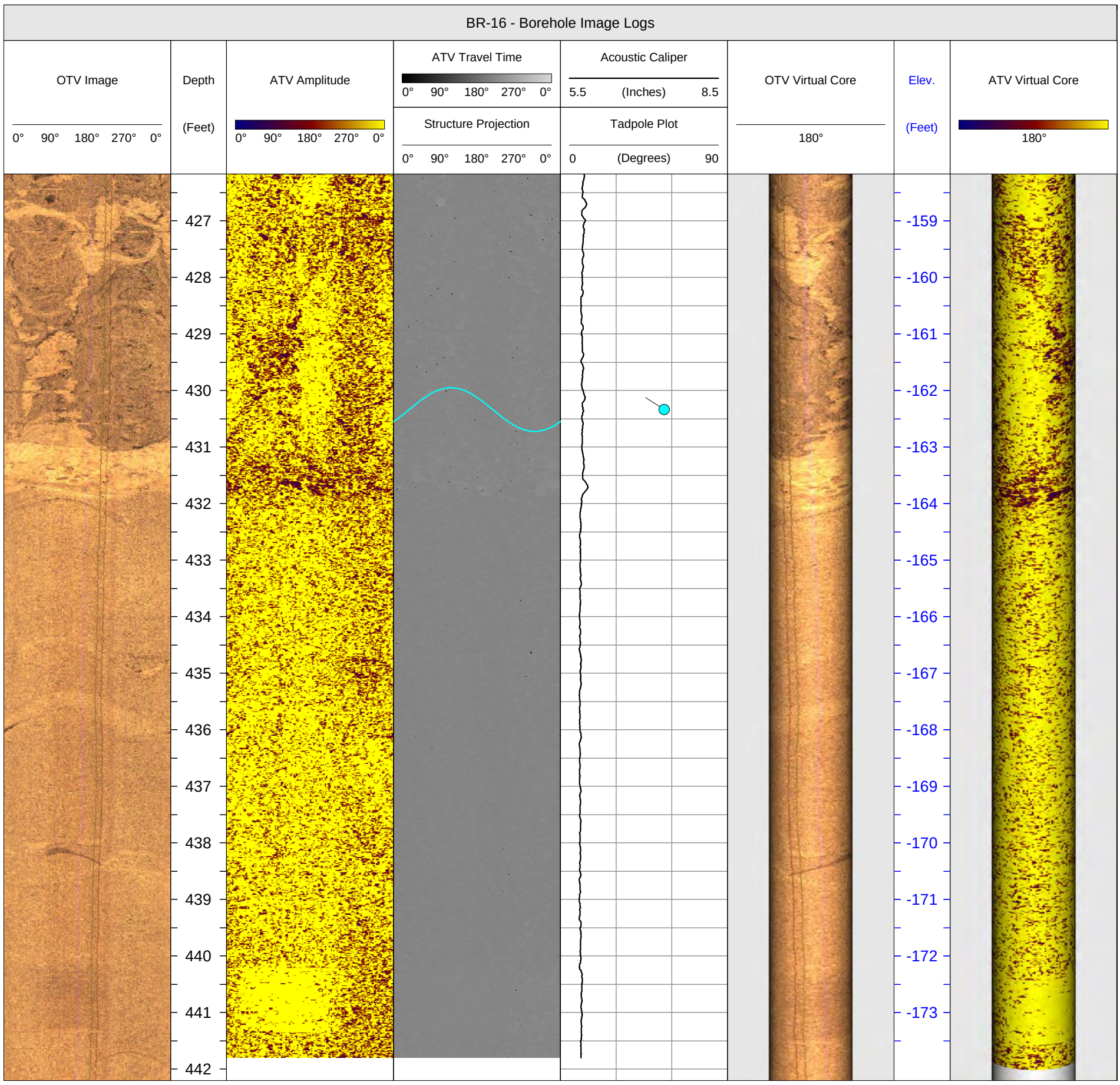
BR-16 - Borehole Image Logs
OTV Image
0° 90° 180° 270° 0°
Depth
(Feet)
ATV Amplitude
0° 90° 180° 270° 0°
ATV Travel Time
0° 90° 180° 270° 0°
Structure Projection
0° 90° 180° 270° 0°
Acoustic Caliper
5.5 (Inches) 8.5
Tadpole Plot
0 (Degrees) 90
OTV Virtual Core
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Elev.
(Feet)
ATV Virtual Core
180°
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HAGER-RICHTER GEOSCIENCE, INC.

8 Industrial Way - D10
Salem, NH 03079
Phone: 603-893-9944
Fax: 603-893-8313

BR-16 - BOREHOLE GEOPHYSICAL LOGS

DATE LOGGED: November 12 & 13, 2012

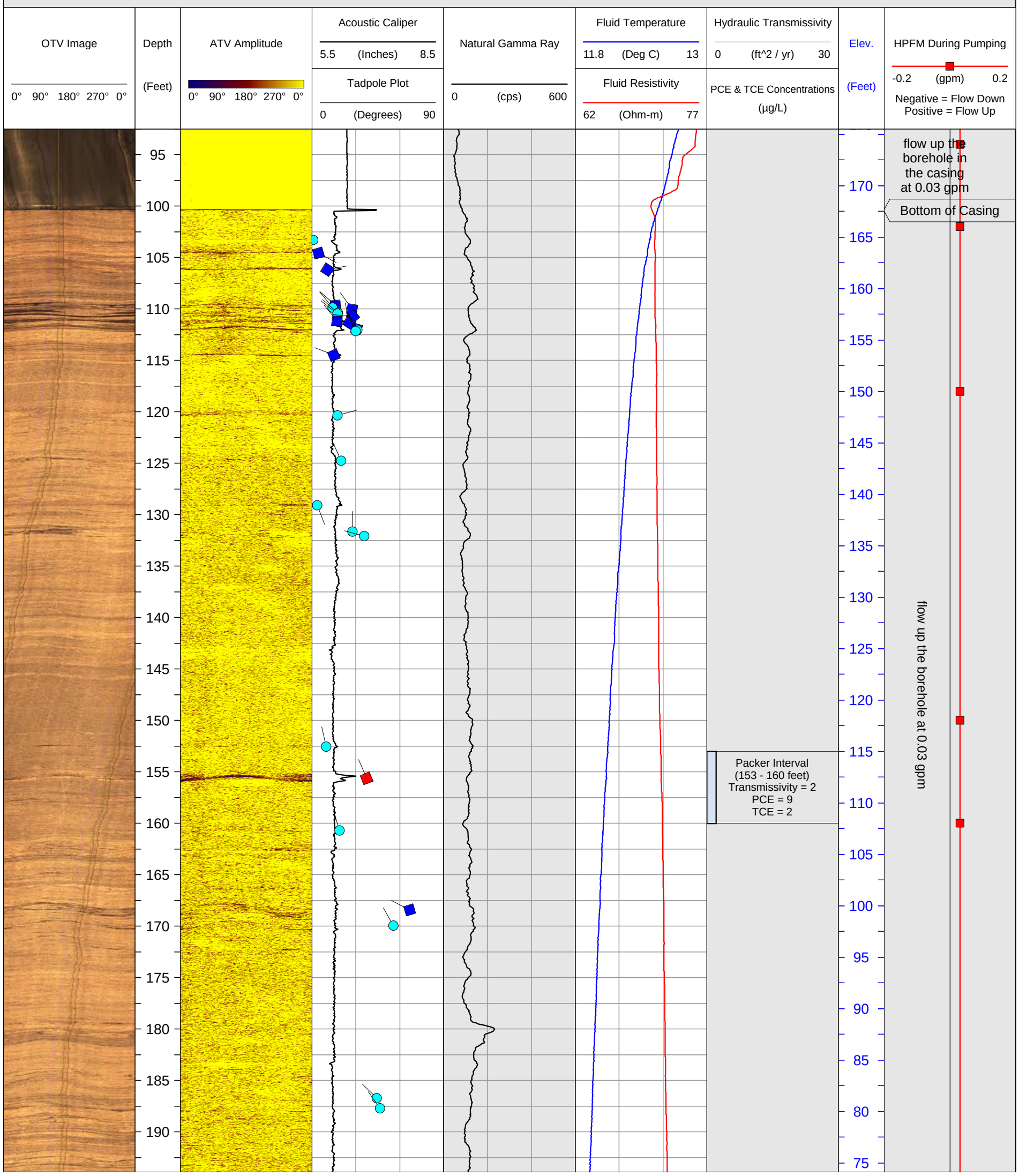
CLIENT:	Weston Solutions, Inc.	H-R FILE:	12RG62
PROJECT:	Borehole Geophysical Logging	LOG DATUM:	Top of the 6-Inch Steel Casing
LOCATION:	Savage Municipal Water Supply Superfund Site	TOP OF CASING ELEVATION:	268.0 Feet
CITY, STATE:	Milford, New Hampshire	ORIENTATION REFERENCE:	True North (Declination = 15 Degrees West)
LOGGING GEOPHYSICISTS:	Nick DeCristofaro & Eric Rickert	CASING STICK-UP:	1.4 Feet Below the Ground Surface
CLIENT REP. ON-SITE:	Andrew Fuller	BOREHOLE DIAMETER:	6 Inches
LOGS PROCESSED BY:	Robert Garfield	WATER LEVEL DEPTH:	7.9 Feet

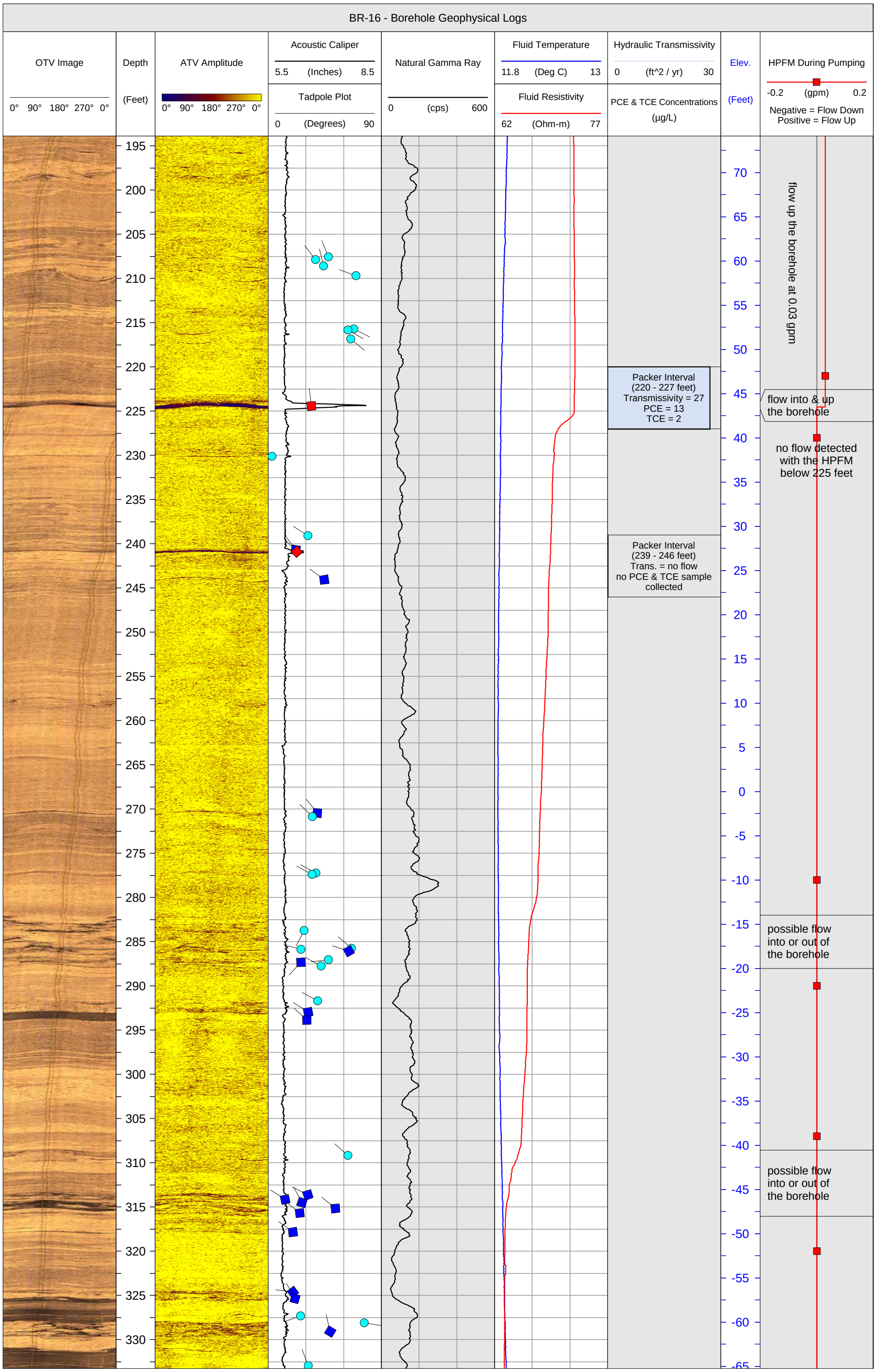
STRUCTURE LEGEND

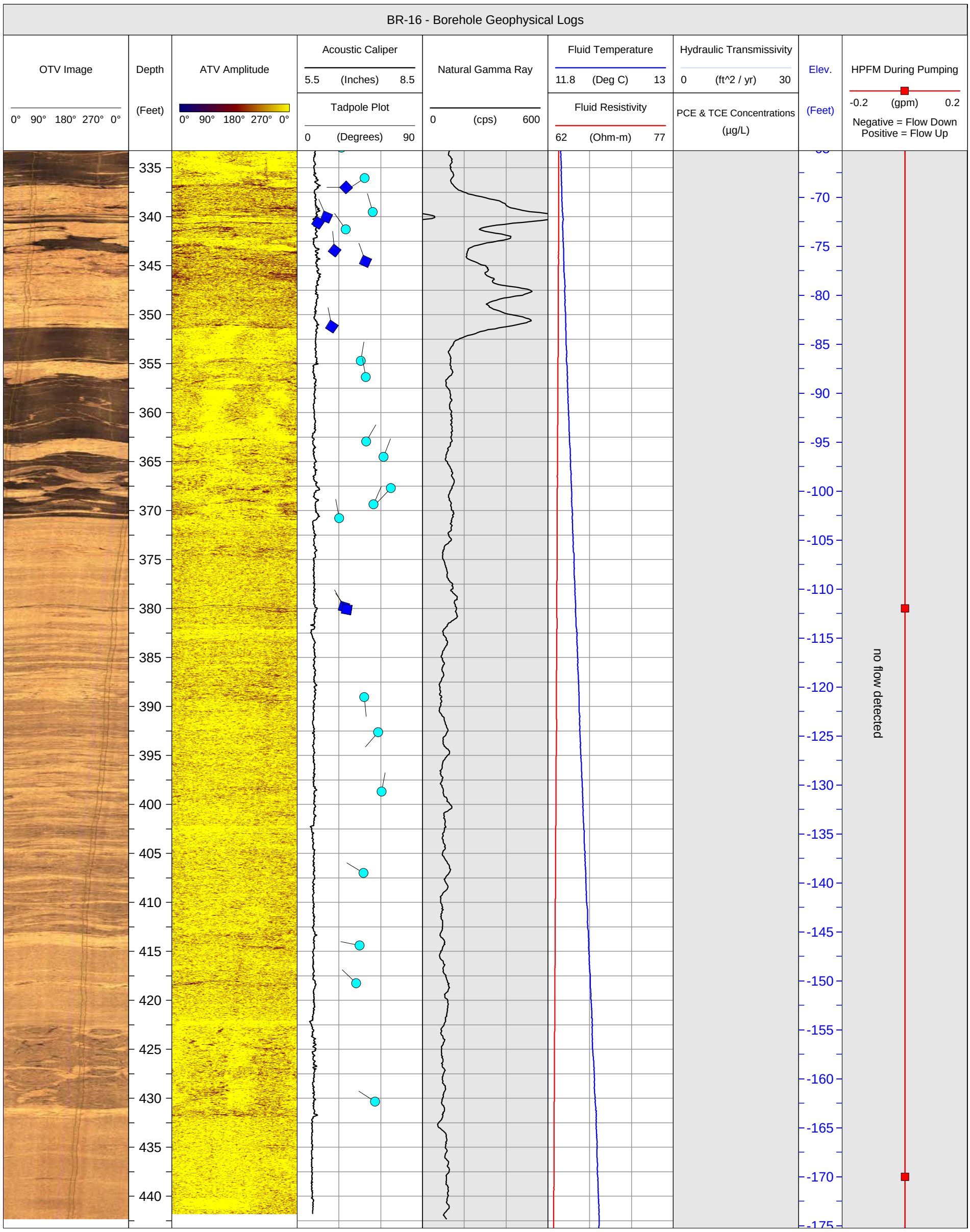
Fracture Rank 1 Fracture Rank 2 Fracture Rank 3

NOTES:
HPFM data under ambient conditions are not plotted in the logs below because flow was not detected under ambient conditions.
During HPFM logging under pumping conditions water was pumped from the borehole from inside the casing.
The hydraulic transmissivity, PCE, and TCE data reported in the logs below were provided by Weston and were acquired during packer testing.

BR-16 - Borehole Geophysical Logs




BR-16 - Borehole Geophysical Logs
OTV Image
0° 90° 180° 270° 0°
Depth
(Feet)
ATV Amplitude
0° 90° 180° 270° 0°
Acoustic Caliper
5.5 (Inches) 8.5
Tadpole Plot
0 (Degrees) 90
Natural Gamma Ray
0 (cps) 600
Fluid Temperature
11.8 (Deg C) 13
Fluid Resistivity
62 (Ohm-m) 77
Hydraulic Transmissivity
0 (ft^2 / yr) 30
PCE & TCE Concentrations
(µg/L)
Elev.
(Feet)
HPFM During Pumping
-0.2 (gpm) 0.2
Negative = Flow Down
Positive = Flow Up
Packer Interval
(220 - 227 feet)
Transmissivity = 27
PCE = 13
TCE = 2
Packer Interval
(239 - 246 feet)
Trans. = no flow
no PCE & TCE sample
collected
flow up the borehole at 0.03 gpm
flow into & up
the borehole
no flow detected
with the HPFM
below 225 feet
possible flow
into or out of
the borehole
possible flow
into or out of
the borehole


BR-16 - Borehole Geophysical Logs
OTV Image
0° 90° 180° 270° 0°
Depth
(Feet)
ATV Amplitude
0° 90° 180° 270° 0°
Acoustic Caliper
5.5 (Inches) 8.5
Tadpole Plot
0 (Degrees) 90
Natural Gamma Ray
0 (cps) 600
Fluid Temperature
11.8 (Deg C) 13
Fluid Resistivity
62 (Ohm-m) 77
Hydraulic Transmissivity
0 (ft^2 / yr) 30
PCE & TCE Concentrations
(µg/L)
Elev.
(Feet)
HPFM During Pumping
-0.2 (gpm) 0.2
Negative = Flow Down
Positive = Flow Up
no flow detected

APPENDIX 2

BEDROCK STRUCTURE STATISTICS PLOTS

HAGER-RICHTER GEOSCIENCE, INC.

8 Industrial Way - D10
Salem, NH 03079
Phone: 603-893-9944
Fax: 603-893-8313

BR-10 - FRACTURE STATISTICS PLOTS

DATE LOGGED: November 13 & 14, 2012

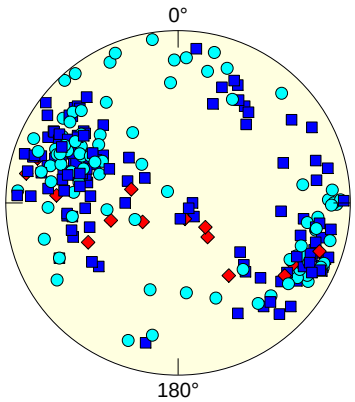
CLIENT:	Weston Solutions, Inc.	H-R FILE:	12RG62
PROJECT:	Savage Municipal Water Supply Superfund Site	ORIENTATION REFERENCE:	True North
CITY, STATE:	Milford, New Hampshire	MAGNETIC DECLINATION:	15 Degrees West

STRUCTURE LEGEND

Fracture Rank 1 ● Fracture Rank 2 ■ Fracture Rank 3 ◆

Stereogram - Lower Hemisphere of Fractures

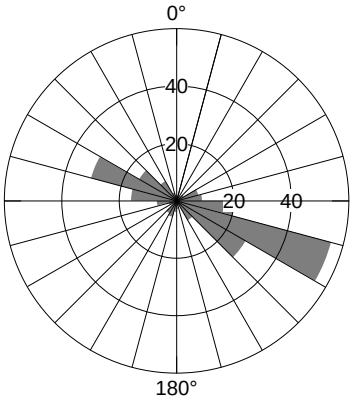
Schmidt Plot - LH - Bedrock Structures



	Counts	Dip[deg]	Azi[deg]
Mean	242	61.27	120.38
◆	14	45.23	18.49
■	130	60.97	121.45
●	98	63.80	132.45

Dip Azimuth Rose Diagram of Fractures

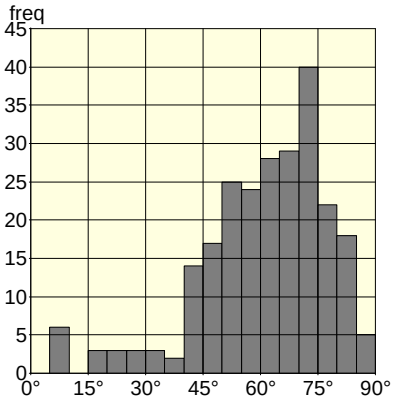
Azimuth - Absolute (Count)



Counts:	242.00
Mean:	120.38
Std.Dev.:	103.82
Min:	11.15
Max:	354.64

Dip Angle Histogram of Fractures

Dip Histogram (Count)



Counts:	242.00
Mean:	61.27
Std.Dev.:	16.59
Min:	5.80
Max:	86.75

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BR-11 - FRACTURE STATISTICS PLOTS

DATE LOGGED: November 15, 2012

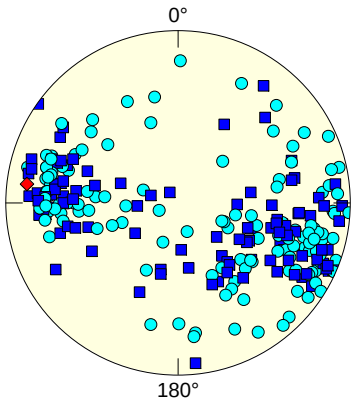
CLIENT:	Weston Solutions, Inc.	H-R FILE:	12RG62
PROJECT:	Savage Municipal Water Supply Superfund Site	ORIENTATION REFERENCE:	True North
CITY, STATE:	Milford, New Hampshire	MAGNETIC DECLINATION:	15 Degrees West

STRUCTURE LEGEND

Fracture Rank 1 ● Fracture Rank 2 ■ Fracture Rank 3 ◆

Stereogram - Lower Hemisphere of Fractures

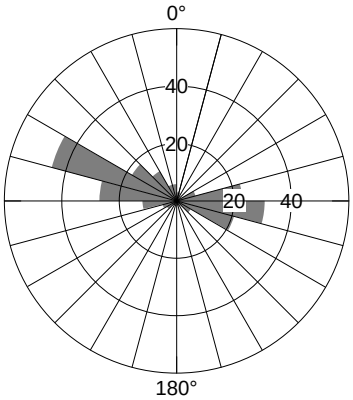
Schmidt Plot - LH - Bedrock Structures



	Counts	Dip[deg]	Azi[deg]
Mean	238	58.65	323.83
■	106	57.08	330.31
●	131	59.78	316.51
◆	1	77.87	97.28

Dip Azimuth Rose Diagram of Fractures

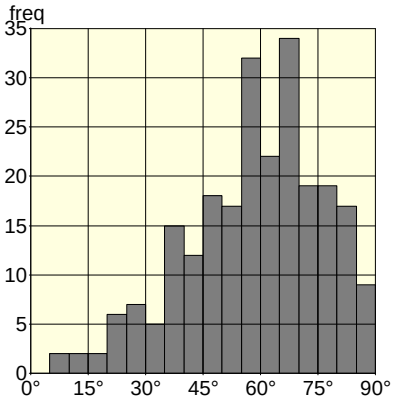
Azimuth - Absolute (Count)



Counts:	238.00
Mean:	323.83
Std.Dev.:	105.90
Min:	12.71
Max:	359.54

Dip Angle Histogram of Fractures

Dip Histogram (Count)



Counts:	238.00
Mean:	58.65
Std.Dev.:	17.54
Min:	6.49
Max:	89.84

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BR-12 - FRACTURE STATISTICS PLOTS

DATE LOGGED: November 13, 2012

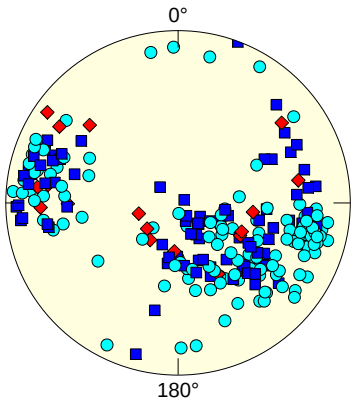
CLIENT:	Weston Solutions, Inc.	H-R FILE:	12RG62
PROJECT:	Savage Municipal Water Supply Superfund Site	ORIENTATION REFERENCE:	True North
CITY, STATE:	Milford, New Hampshire	MAGNETIC DECLINATION:	15 Degrees West

STRUCTURE LEGEND

Fracture Rank 1 ● Fracture Rank 2 ■ Fracture Rank 3 ◆

Stereogram - Lower Hemisphere of Fractures

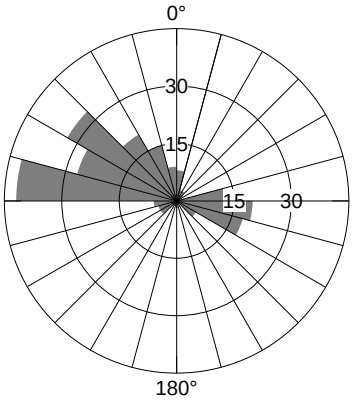
Schmidt Plot - LH - Bedrock Structures



	Counts	Dip[deg]	Azi[deg]
Mean	241	53.65	315.10
●	137	56.79	309.76
■	87	49.63	319.61
◆	17	48.47	64.67

Dip Azimuth Rose Diagram of Fractures

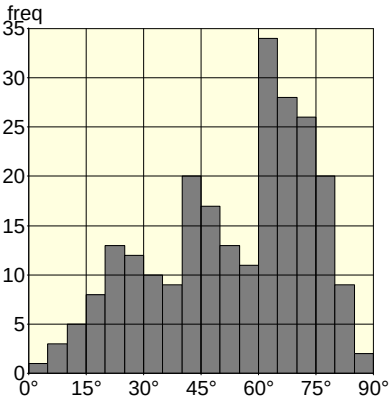
Azimuth - Absolute (Count)



Counts:	241.00
Mean:	315.10
Std.Dev.:	78.21
Min:	0.08
Max:	358.69

Dip Angle Histogram of Fractures

Dip Histogram (Count)



Counts:	241.00
Mean:	53.65
Std.Dev.:	19.96
Min:	3.43
Max:	89.88

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BR-13 - FRACTURE STATISTICS PLOTS

DATE LOGGED: November 13 & 14, 2012

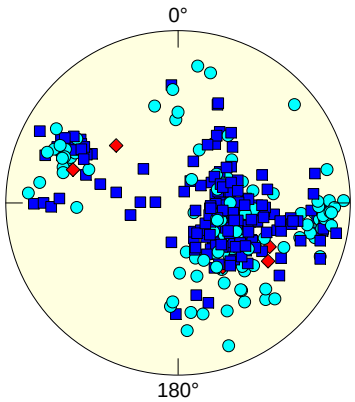
CLIENT:	Weston Solutions, Inc.	H-R FILE:	12RG62
PROJECT:	Savage Municipal Water Supply Superfund Site	ORIENTATION REFERENCE:	True North
CITY, STATE:	Milford, New Hampshire	MAGNETIC DECLINATION:	15 Degrees West

STRUCTURE LEGEND

Fracture Rank 1 ● Fracture Rank 2 ■ Fracture Rank 3 ◆

Stereogram - Lower Hemisphere of Fractures

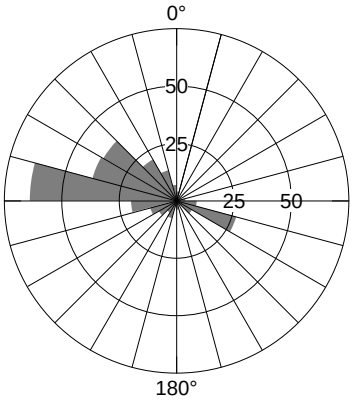
Schmidt Plot - LH - Bedrock Structures



	Counts	Dip[deg]	Azi[deg]
Mean	295	43.79	284.42
●	108	51.62	290.98
■	182	39.10	280.95
◆	5	46.91	322.66

Dip Azimuth Rose Diagram of Fractures

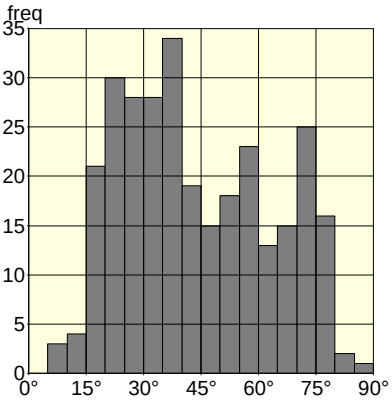
Azimuth - Absolute (Count)



Counts:	295.00
Mean:	284.42
Std.Dev.:	65.70
Min:	1.29
Max:	358.27

Dip Angle Histogram of Fractures

Dip Histogram (Count)



Counts:	295.00
Mean:	43.79
Std.Dev.:	19.44
Min:	6.20
Max:	85.85

HAGER-RICHTER GEOSCIENCE, INC.

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Salem, NH 03079
Phone: 603-893-9944
Fax: 603-893-8313

BR-14 - FRACTURE STATISTICS PLOTS

DATE LOGGED: November 12, 2012

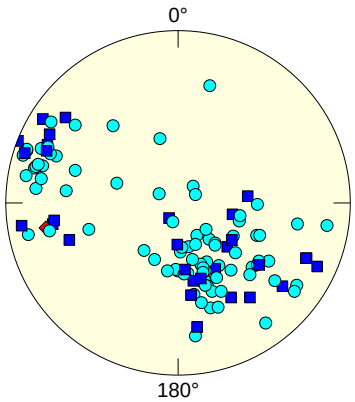
CLIENT:	Weston Solutions, Inc.	H-R FILE:	12RG62
PROJECT:	Savage Municipal Water Supply Superfund Site	ORIENTATION REFERENCE:	True North
CITY, STATE:	Milford, New Hampshire	MAGNETIC DECLINATION:	15 Degrees West

STRUCTURE LEGEND

Fracture Rank 1 ● Fracture Rank 2 ■ Fracture Rank 3 ◆

Stereogram - Lower Hemisphere of Fractures

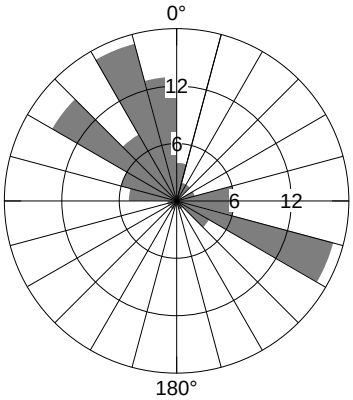
Schmidt Plot - LH - Bedrock Structures



	Counts	Dip[deg]	Azi[deg]
Mean	113	49.17	356.53
■	30	55.32	1.91
●	82	46.71	352.97
◆	1	67.23	79.34

Dip Azimuth Rose Diagram of Fractures

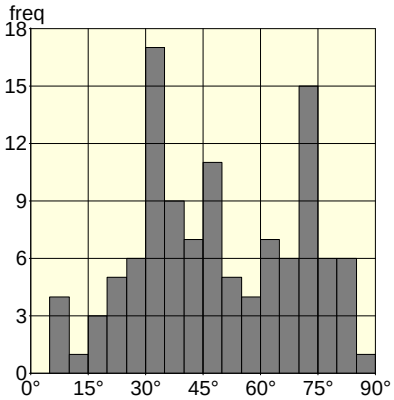
Azimuth - Absolute (Count)



Counts:	113.00
Mean:	356.53
Std.Dev.:	79.49
Min:	0.41
Max:	356.54

Dip Angle Histogram of Fractures

Dip Histogram (Count)



Counts:	113.00
Mean:	49.17
Std.Dev.:	20.90
Min:	8.56
Max:	89.84

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BR-15 - FRACTURE STATISTICS PLOTS

DATE LOGGED: November 12 & 13, 2012

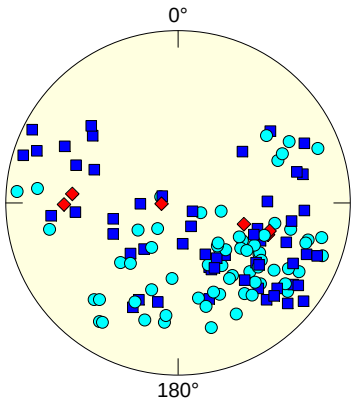
CLIENT:	Weston Solutions, Inc.	H-R FILE:	12RG62
PROJECT:	Savage Municipal Water Supply Superfund Site	ORIENTATION REFERENCE:	True North
CITY, STATE:	Milford, New Hampshire	MAGNETIC DECLINATION:	15 Degrees West

STRUCTURE LEGEND

Fracture Rank 1 ● Fracture Rank 2 ■ Fracture Rank 3 ◆

Stereogram - Lower Hemisphere of Fractures

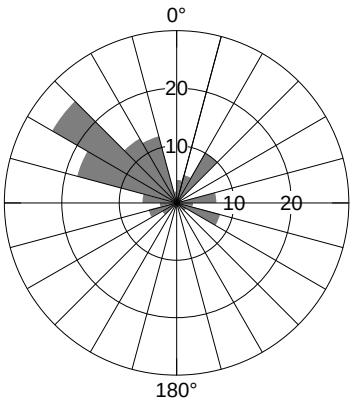
Schmidt Plot - LH - Bedrock Structures



	Counts	Dip[deg]	Azi[deg]
Mean	128	50.04	326.48
■	55	50.63	326.23
●	67	50.40	325.77
◆	6	40.55	8.74

Dip Azimuth Rose Diagram of Fractures

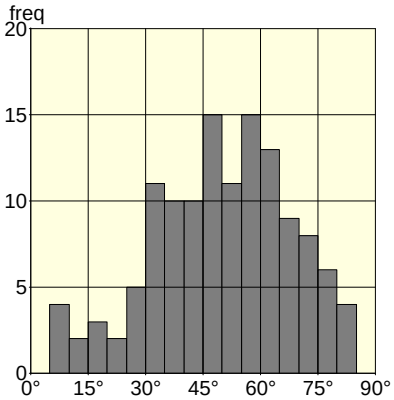
Azimuth - Absolute (Count)



Counts:	128.00
Mean:	326.48
Std.Dev.:	65.73
Min:	5.05
Max:	352.72

Dip Angle Histogram of Fractures

Dip Histogram (Count)



Counts:	128.00
Mean:	50.04
Std.Dev.:	17.75
Min:	7.96
Max:	84.31

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BR-16 - FRACTURE STATISTICS PLOTS

DATE LOGGED: November 12 & 13, 2012

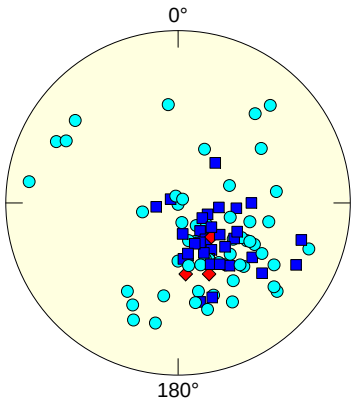
CLIENT:	Weston Solutions, Inc.	H-R FILE:	12RG62
PROJECT:	Savage Municipal Water Supply Superfund Site	ORIENTATION REFERENCE:	True North
CITY, STATE:	Milford, New Hampshire	MAGNETIC DECLINATION:	15 Degrees West

STRUCTURE LEGEND

Fracture Rank 1 ● Fracture Rank 2 ■ Fracture Rank 3 ◆

Stereogram - Lower Hemisphere of Fractures

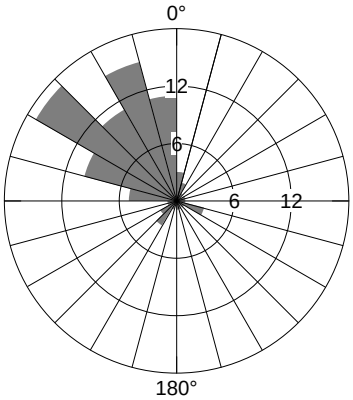
Schmidt Plot - LH - Bedrock Structures



	Counts	Dip[deg]	Azi[deg]
Mean	92	36.10	318.86
●	55	40.65	318.61
■	34	29.30	317.41
◆	3	31.50	335.44

Dip Azimuth Rose Diagram of Fractures

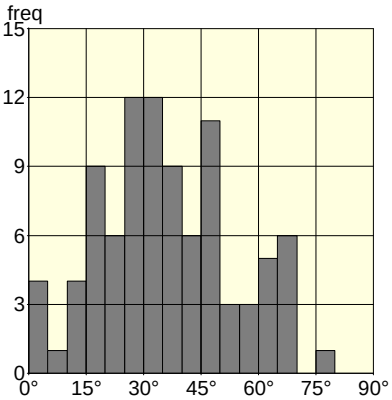
Azimuth - Absolute (Count)



Counts:	92.00
Mean:	318.86
Std.Dev.:	52.47
Min:	0.05
Max:	354.34

Dip Angle Histogram of Fractures

Dip Histogram (Count)



Counts:	92.00
Mean:	36.10
Std.Dev.:	17.49
Min:	0.95
Max:	76.42

APPENDIX 3

TABLES OF BEDROCK STRUCTURES

HAGER-RICHTER GEOSCIENCE, INC.	
BR-10 - TABLE OF BEDROCK STRUCTURES	
CLIENT	Weston Solutions, Inc.
PROJECT	Savage Municipal Water Supply Superfund Site
CITY, STATE	Milford, New Hampshire
H-R FILE	12RG62
DATE LOGGED	November 13 & 14, 2012
LOG DATUM	Top of the 6-Inch Steel Casing (TOC)
TOC ELEVATION	276.3 Feet
DIP AZIMUTH	Referenced to True North
DECLINATION	15 Degrees West
DIP ANGLE	Measured from Horizontal

BR-10 - TABLE OF BEDROCK STRUCTURES

Depth (feet)	Elevation (feet)	Dip Azimuth (degrees)	Dip Angle (degrees)	Bedrock Structure Category
84.0	192.3	94	60	Fracture Rank 3
84.5	191.8	101	79	Fracture Rank 3
85.0	191.3	76	33	Fracture Rank 3
86.0	190.3	66	48	Fracture Rank 3
87.2	189.1	127	20	Fracture Rank 2
87.3	189.0	108	75	Fracture Rank 3
88.1	188.2	115	57	Fracture Rank 2
88.5	187.8	117	74	Fracture Rank 2
89.3	187.0	270	7	Fracture Rank 2
89.7	186.6	116	57	Fracture Rank 2
90.1	186.2	110	62	Fracture Rank 2
90.2	186.2	320	67	Fracture Rank 2
92.6	183.7	112	55	Fracture Rank 2
92.9	183.4	51	49	Fracture Rank 2
93.1	183.2	294	81	Fracture Rank 2
94.3	182.0	116	64	Fracture Rank 2
94.8	181.5	56	51	Fracture Rank 2
95.7	180.6	114	81	Fracture Rank 1
97.3	179.0	127	86	Fracture Rank 2
98.8	177.6	122	43	Fracture Rank 2
99.2	177.1	313	44	Fracture Rank 2
99.8	176.5	133	71	Fracture Rank 2
99.9	176.4	312	55	Fracture Rank 2
100.5	175.8	113	48	Fracture Rank 1
100.6	175.7	308	65	Fracture Rank 2
102.1	174.2	95	43	Fracture Rank 2
104.0	172.3	127	59	Fracture Rank 2
104.7	171.6	107	51	Fracture Rank 2
104.9	171.4	277	63	Fracture Rank 2
105.5	170.9	240	78	Fracture Rank 2
106.9	169.4	234	71	Fracture Rank 2
108.2	168.2	103	45	Fracture Rank 2
109.8	166.5	297	75	Fracture Rank 2

BR-10 - TABLE OF BEDROCK STRUCTURES

Depth (feet)	Elevation (feet)	Dip Azimuth (degrees)	Dip Angle (degrees)	Bedrock Structure Category
110.5	165.8	318	77	Fracture Rank 2
111.1	165.2	215	58	Fracture Rank 2
111.7	164.6	106	51	Fracture Rank 2
112.4	163.9	105	59	Fracture Rank 2
113.1	163.2	115	44	Fracture Rank 2
113.9	162.4	96	65	Fracture Rank 2
115.0	161.3	134	70	Fracture Rank 2
117.1	159.3	338	50	Fracture Rank 1
119.3	157.1	126	72	Fracture Rank 1
120.7	155.6	154	80	Fracture Rank 1
121.2	155.1	72	54	Fracture Rank 2
122.2	154.1	316	47	Fracture Rank 2
122.9	153.4	83	55	Fracture Rank 2
125.1	151.2	82	52	Fracture Rank 2
126.1	150.2	120	67	Fracture Rank 1
126.3	150.0	316	45	Fracture Rank 1
127.2	149.1	124	81	Fracture Rank 2
128.4	147.9	109	73	Fracture Rank 2
129.6	146.7	87	45	Fracture Rank 2
130.1	146.2	106	68	Fracture Rank 2
131.1	145.2	85	55	Fracture Rank 2
131.6	144.7	82	52	Fracture Rank 1
132.1	144.2	107	47	Fracture Rank 2
132.3	144.0	107	49	Fracture Rank 2
132.5	143.8	107	56	Fracture Rank 2
133.1	143.2	75	70	Fracture Rank 1
133.2	143.1	134	68	Fracture Rank 2
133.4	142.9	315	66	Fracture Rank 1
134.7	141.6	109	65	Fracture Rank 2
135.3	141.0	62	19	Fracture Rank 3
136.4	139.9	88	65	Fracture Rank 1
136.6	139.7	110	65	Fracture Rank 2
136.8	139.5	106	67	Fracture Rank 1
137.3	139.0	102	49	Fracture Rank 1
137.5	138.8	187	79	Fracture Rank 2
137.6	138.7	102	58	Fracture Rank 2
138.5	137.8	103	71	Fracture Rank 2
138.8	137.5	120	73	Fracture Rank 2
139.2	137.1	120	72	Fracture Rank 2
139.4	136.9	118	67	Fracture Rank 2
140.9	135.4	114	67	Fracture Rank 1
142.0	134.3	120	69	Fracture Rank 2
144.4	132.0	136	53	Fracture Rank 2
144.5	131.8	122	59	Fracture Rank 1
145.6	130.7	129	68	Fracture Rank 2

BR-10 - TABLE OF BEDROCK STRUCTURES

Depth (feet)	Elevation (feet)	Dip Azimuth (degrees)	Dip Angle (degrees)	Bedrock Structure Category
146.3	130.1	144	61	Fracture Rank 1
146.8	129.5	129	70	Fracture Rank 2
147.1	129.2	131	70	Fracture Rank 1
147.2	129.1	127	68	Fracture Rank 1
148.2	128.1	139	70	Fracture Rank 2
152.8	123.5	137	87	Fracture Rank 1
157.4	118.9	171	86	Fracture Rank 1
158.0	118.3	157	84	Fracture Rank 1
160.2	116.1	141	85	Fracture Rank 1
170.0	106.4	271	81	Fracture Rank 1
174.1	102.2	112	65	Fracture Rank 1
174.6	101.7	110	40	Fracture Rank 1
176.0	100.3	109	52	Fracture Rank 1
176.1	100.2	112	53	Fracture Rank 1
184.2	92.1	118	45	Fracture Rank 2
184.3	92.0	108	78	Fracture Rank 2
184.6	91.7	111	48	Fracture Rank 2
184.9	91.4	111	54	Fracture Rank 2
185.5	90.8	108	61	Fracture Rank 1
193.6	82.7	281	71	Fracture Rank 1
194.3	82.0	269	76	Fracture Rank 1
194.7	81.6	257	78	Fracture Rank 2
196.5	79.8	117	49	Fracture Rank 2
196.6	79.7	110	49	Fracture Rank 1
198.8	77.5	127	57	Fracture Rank 2
198.9	77.4	124	60	Fracture Rank 2
202.6	73.7	270	80	Fracture Rank 1
203.2	73.1	262	63	Fracture Rank 1
203.6	72.7	115	57	Fracture Rank 2
206.6	69.8	120	63	Fracture Rank 2
206.8	69.5	125	58	Fracture Rank 1
207.4	68.9	294	65	Fracture Rank 1
207.5	68.8	131	51	Fracture Rank 1
207.8	68.6	279	65	Fracture Rank 1
208.7	67.6	124	58	Fracture Rank 1
209.6	66.7	115	61	Fracture Rank 1
209.8	66.5	117	63	Fracture Rank 1
211.4	64.9	120	55	Fracture Rank 1
212.8	63.5	321	64	Fracture Rank 1
213.3	63.0	120	49	Fracture Rank 1
213.4	62.9	276	71	Fracture Rank 1
215.6	60.7	116	52	Fracture Rank 1
217.7	58.6	123	59	Fracture Rank 2
217.7	58.6	301	70	Fracture Rank 1
218.5	57.8	117	54	Fracture Rank 1

BR-10 - TABLE OF BEDROCK STRUCTURES

Depth (feet)	Elevation (feet)	Dip Azimuth (degrees)	Dip Angle (degrees)	Bedrock Structure Category
219.7	56.7	134	67	Fracture Rank 1
221.2	55.1	284	75	Fracture Rank 2
222.4	53.9	118	49	Fracture Rank 1
222.5	53.8	119	42	Fracture Rank 1
224.0	52.3	253	73	Fracture Rank 2
226.1	50.2	107	54	Fracture Rank 1
226.4	49.9	104	56	Fracture Rank 2
227.5	48.8	99	64	Fracture Rank 1
227.9	48.4	285	63	Fracture Rank 2
228.2	48.1	137	8	Fracture Rank 1
229.2	47.1	280	70	Fracture Rank 2
229.7	46.6	278	72	Fracture Rank 2
230.3	46.0	260	70	Fracture Rank 2
232.1	44.2	113	63	Fracture Rank 1
232.8	43.5	126	48	Fracture Rank 1
233.9	42.4	96	51	Fracture Rank 1
234.4	41.9	120	48	Fracture Rank 2
235.4	40.9	57	72	Fracture Rank 1
236.7	39.6	310	10	Fracture Rank 2
236.9	39.4	133	32	Fracture Rank 2
237.1	39.2	137	25	Fracture Rank 1
239.0	37.3	113	26	Fracture Rank 2
239.4	36.9	325	43	Fracture Rank 3
239.5	36.9	319	22	Fracture Rank 3
239.6	36.7	312	18	Fracture Rank 3
239.7	36.6	335	8	Fracture Rank 3
246.0	30.3	269	84	Fracture Rank 1
249.1	27.2	294	82	Fracture Rank 1
251.2	25.1	291	81	Fracture Rank 2
256.7	19.6	303	72	Fracture Rank 2
259.1	17.2	280	79	Fracture Rank 2
259.8	16.5	94	83	Fracture Rank 1
269.8	6.5	271	78	Fracture Rank 1
272.7	3.7	301	78	Fracture Rank 1
274.8	1.5	200	72	Fracture Rank 1
280.2	-3.9	299	75	Fracture Rank 1
281.4	-5.1	292	72	Fracture Rank 1
281.6	-5.3	317	68	Fracture Rank 2
281.9	-5.6	176	59	Fracture Rank 1
282.0	-5.7	302	71	Fracture Rank 1
282.4	-6.1	299	70	Fracture Rank 1
282.6	-6.3	296	69	Fracture Rank 1
283.2	-6.9	332	62	Fracture Rank 2
284.2	-7.9	275	50	Fracture Rank 2
284.7	-8.4	200	51	Fracture Rank 2

BR-10 - TABLE OF BEDROCK STRUCTURES

Depth (feet)	Elevation (feet)	Dip Azimuth (degrees)	Dip Angle (degrees)	Bedrock Structure Category
286.1	-9.8	207	66	Fracture Rank 2
287.6	-11.3	218	56	Fracture Rank 2
288.6	-12.3	221	51	Fracture Rank 2
288.9	-12.6	210	59	Fracture Rank 2
289.9	-13.6	223	77	Fracture Rank 1
292.7	-16.4	298	65	Fracture Rank 3
294.0	-17.7	93	83	Fracture Rank 2
294.3	-18.0	75	54	Fracture Rank 2
294.4	-18.1	290	82	Fracture Rank 2
298.4	-22.1	309	38	Fracture Rank 2
298.9	-22.6	108	83	Fracture Rank 2
299.8	-23.5	313	78	Fracture Rank 2
300.6	-24.3	351	8	Fracture Rank 2
300.9	-24.6	108	77	Fracture Rank 2
301.5	-25.2	290	75	Fracture Rank 2
302.0	-25.7	116	64	Fracture Rank 2
302.5	-26.2	281	71	Fracture Rank 1
303.0	-26.7	297	71	Fracture Rank 2
304.6	-28.3	289	73	Fracture Rank 2
305.21	-28.9	293	68	Fracture Rank 1
306.69	-30.4	295	73	Fracture Rank 1
306.86	-30.6	292	73	Fracture Rank 2
307.26	-31.0	291	71	Fracture Rank 2
307.46	-31.2	84	34	Fracture Rank 1
307.71	-31.4	297	62	Fracture Rank 1
308.9	-32.6	286	72	Fracture Rank 2
310.59	-34.3	295	73	Fracture Rank 2
311.6	-35.3	355	44	Fracture Rank 1
311.67	-35.4	13	73	Fracture Rank 2
311.88	-35.6	18	44	Fracture Rank 1
313.29	-37.0	11	68	Fracture Rank 1
314.53	-38.2	20	74	Fracture Rank 1
314.95	-38.7	90	25	Fracture Rank 2
315.59	-39.3	96	57	Fracture Rank 2
316.27	-40.0	110	76	Fracture Rank 1
316.31	-40.0	295	65	Fracture Rank 2
321.07	-44.8	294	80	Fracture Rank 2
322.09	-45.8	107	50	Fracture Rank 2
323.86	-47.6	284	80	Fracture Rank 1
324.98	-48.7	68	22	Fracture Rank 1
328.67	-52.4	75	45	Fracture Rank 2
329.61	-53.3	65	65	Fracture Rank 2
329.67	-53.4	205	67	Fracture Rank 2
330.15	-53.9	65	66	Fracture Rank 1
334.02	-57.7	194	79	Fracture Rank 1

BR-10 - TABLE OF BEDROCK STRUCTURES

Depth (feet)	Elevation (feet)	Dip Azimuth (degrees)	Dip Angle (degrees)	Bedrock Structure Category
336.75	-60.5	201	61	Fracture Rank 2
336.91	-60.6	295	82	Fracture Rank 2
337.41	-61.1	293	81	Fracture Rank 1
338.51	-62.2	294	80	Fracture Rank 1
339.47	-63.2	295	81	Fracture Rank 2
340.36	-64.1	298	77	Fracture Rank 2
344.95	-68.7	269	86	Fracture Rank 2
346.38	-70.1	289	65	Fracture Rank 1
346.77	-70.5	303	64	Fracture Rank 2
348.8	-72.5	107	23	Fracture Rank 3
349.7	-73.4	289	76	Fracture Rank 3
349.8	-73.5	102	78	Fracture Rank 2
350.9	-74.6	304	64	Fracture Rank 3
351.2	-74.9	249	55	Fracture Rank 2
353.0	-76.7	265	79	Fracture Rank 1
353.6	-77.3	103	71	Fracture Rank 1
354.5	-78.2	116	37	Fracture Rank 2
355.7	-79.4	306	69	Fracture Rank 1
356.1	-79.8	100	48	Fracture Rank 2
356.2	-79.9	93	75	Fracture Rank 2
360.8	-84.5	298	6	Fracture Rank 2
361.8	-85.5	147	41	Fracture Rank 1
362.1	-85.8	183	74	Fracture Rank 1
363.7	-87.4	178	72	Fracture Rank 1
369.0	-92.7	121	59	Fracture Rank 1
373.3	-97.0	116	45	Fracture Rank 1
373.7	-97.4	208	58	Fracture Rank 1
374.2	-97.9	193	68	Fracture Rank 1
374.7	-98.4	126	57	Fracture Rank 2

HAGER-RICHTER GEOSCIENCE, INC.	
BR-11 - TABLE OF BEDROCK STRUCTURES	
CLIENT	Weston Solutions, Inc.
PROJECT	Savage Municipal Water Supply Superfund Site
CITY, STATE	Milford, New Hampshire
H-R FILE	12RG62
DATE LOGGED	November 15, 2012
LOG DATUM	Top of the 6-Inch Steel Casing (TOC)
TOC ELEVATION	266.7 Feet
DIP AZIMUTH	Referenced to True North
DECLINATION	15 Degrees West
DIP ANGLE	Measured from Horizontal

BR-11 - TABLE OF BEDROCK STRUCTURES

Depth (feet)	Elevation (feet)	Dip Azimuth (degrees)	Dip Angle (degrees)	Bedrock Structure Category
132.2	134.5	282	52	Fracture Rank 2
132.3	134.4	292	54	Fracture Rank 2
132.4	134.3	208	68	Fracture Rank 1
132.9	133.8	243	64	Fracture Rank 1
134.2	132.5	290	37	Fracture Rank 2
135.1	131.6	283	60	Fracture Rank 1
136.8	129.9	216	73	Fracture Rank 2
138.1	128.6	110	47	Fracture Rank 2
140.0	126.7	115	56	Fracture Rank 1
140.4	126.3	106	56	Fracture Rank 1
140.7	126.0	129	55	Fracture Rank 1
145.0	121.7	110	67	Fracture Rank 1
145.7	121.0	110	70	Fracture Rank 1
148.3	118.4	93	76	Fracture Rank 2
149.1	117.6	88	63	Fracture Rank 2
149.3	117.4	93	67	Fracture Rank 2
149.6	117.1	85	66	Fracture Rank 2
149.9	116.8	93	64	Fracture Rank 1
151.6	115.1	167	53	Fracture Rank 1
152.6	114.1	306	83	Fracture Rank 1
153.7	113.0	153	55	Fracture Rank 1
153.7	113.0	294	86	Fracture Rank 2
155.8	110.9	95	40	Fracture Rank 1
156.4	110.3	109	58	Fracture Rank 2
156.6	110.1	75	66	Fracture Rank 1
157.2	109.6	105	68	Fracture Rank 1
158.4	108.3	76	60	Fracture Rank 2
159.1	107.6	15	33	Fracture Rank 2
159.3	107.4	85	58	Fracture Rank 1
160.7	106.0	94	57	Fracture Rank 2
161.7	105.0	129	44	Fracture Rank 1
161.9	104.8	103	79	Fracture Rank 1
162.4	104.3	101	78	Fracture Rank 2

BR-11 - TABLE OF BEDROCK STRUCTURES

Depth (feet)	Elevation (feet)	Dip Azimuth (degrees)	Dip Angle (degrees)	Bedrock Structure Category
164.5	102.2	90	51	Fracture Rank 1
164.7	102.0	90	54	Fracture Rank 1
164.9	101.8	107	78	Fracture Rank 2
165.0	101.7	108	60	Fracture Rank 1
165.3	101.4	101	67	Fracture Rank 1
166.9	99.8	85	70	Fracture Rank 2
168.9	97.8	98	64	Fracture Rank 1
169.1	97.6	226	61	Fracture Rank 2
169.6	97.1	225	69	Fracture Rank 1
171.6	95.1	211	44	Fracture Rank 2
172.1	94.6	85	49	Fracture Rank 1
178.4	88.3	110	18	Fracture Rank 1
179.1	87.6	250	60	Fracture Rank 2
182.5	84.2	90	59	Fracture Rank 1
185.8	80.9	294	57	Fracture Rank 2
187.5	79.2	109	67	Fracture Rank 2
189.9	76.8	109	63	Fracture Rank 1
190.2	76.6	108	63	Fracture Rank 2
190.4	76.3	266	73	Fracture Rank 1
190.8	75.9	324	47	Fracture Rank 1
191.3	75.4	294	42	Fracture Rank 1
192.9	73.8	281	52	Fracture Rank 1
195.7	71.0	85	43	Fracture Rank 1
200.0	66.7	261	35	Fracture Rank 2
200.7	66.0	227	29	Fracture Rank 1
202.0	64.7	257	51	Fracture Rank 1
204.5	62.2	25	36	Fracture Rank 1
205.2	61.5	90	56	Fracture Rank 2
210.4	56.3	356	23	Fracture Rank 2
211.1	55.6	67	10	Fracture Rank 1
213.9	52.8	293	58	Fracture Rank 1
221.5	45.2	13	62	Fracture Rank 1
222.4	44.3	296	54	Fracture Rank 1
227.5	39.2	241	73	Fracture Rank 1
240.4	26.3	233	59	Fracture Rank 1
241.6	25.1	263	78	Fracture Rank 1
243.2	23.5	289	68	Fracture Rank 1
246.2	20.6	272	28	Fracture Rank 2
246.8	19.9	297	27	Fracture Rank 1
248.8	18.0	86	20	Fracture Rank 2
248.8	17.9	285	65	Fracture Rank 1
250.3	16.4	312	25	Fracture Rank 2
250.8	15.9	298	39	Fracture Rank 2
251.7	15.0	89	49	Fracture Rank 1
252.0	14.7	275	59	Fracture Rank 2

BR-11 - TABLE OF BEDROCK STRUCTURES

Depth (feet)	Elevation (feet)	Dip Azimuth (degrees)	Dip Angle (degrees)	Bedrock Structure Category
252.5	14.2	258	59	Fracture Rank 2
254.4	12.3	288	52	Fracture Rank 1
255.2	11.5	292	24	Fracture Rank 1
255.5	11.2	293	23	Fracture Rank 1
257.6	9.1	119	54	Fracture Rank 1
262.4	4.3	308	45	Fracture Rank 2
262.8	3.9	328	50	Fracture Rank 1
263.9	2.8	309	46	Fracture Rank 1
264.4	2.3	312	41	Fracture Rank 1
267.0	-0.3	287	39	Fracture Rank 1
267.3	-0.6	272	45	Fracture Rank 2
273.4	-6.7	333	43	Fracture Rank 2
273.6	-6.9	335	39	Fracture Rank 1
273.9	-7.2	333	50	Fracture Rank 1
274.6	-7.9	337	43	Fracture Rank 2
277.3	-10.6	282	28	Fracture Rank 1
278.5	-11.8	314	46	Fracture Rank 1
280.6	-13.9	290	75	Fracture Rank 2
282.6	-15.9	113	56	Fracture Rank 2
283.6	-16.9	305	59	Fracture Rank 2
284.6	-17.9	296	78	Fracture Rank 1
285.2	-18.5	293	79	Fracture Rank 1
286.9	-20.2	298	77	Fracture Rank 1
287.1	-20.4	110	62	Fracture Rank 2
287.3	-20.6	290	70	Fracture Rank 1
287.7	-21.0	104	65	Fracture Rank 1
288.2	-21.5	293	81	Fracture Rank 2
288.6	-21.9	290	77	Fracture Rank 1
288.7	-22.0	94	71	Fracture Rank 2
289.8	-23.1	301	73	Fracture Rank 2
289.8	-23.1	95	66	Fracture Rank 1
291.3	-24.6	288	80	Fracture Rank 2
291.7	-25.0	103	77	Fracture Rank 2
292.3	-25.6	293	68	Fracture Rank 2
293.3	-26.6	105	68	Fracture Rank 1
295.2	-28.5	94	63	Fracture Rank 2
296.3	-29.6	319	48	Fracture Rank 2
297.4	-30.7	291	61	Fracture Rank 1
298.9	-32.2	302	81	Fracture Rank 2
299.9	-33.2	95	65	Fracture Rank 1
301.5	-34.8	250	59	Fracture Rank 1
301.9	-35.2	259	57	Fracture Rank 2
302.3	-35.6	261	49	Fracture Rank 1
303.4	-36.7	106	14	Fracture Rank 2
303.5	-36.8	320	33	Fracture Rank 2

BR-11 - TABLE OF BEDROCK STRUCTURES

Depth (feet)	Elevation (feet)	Dip Azimuth (degrees)	Dip Angle (degrees)	Bedrock Structure Category
304.7	-38.0	299	76	Fracture Rank 1
305.6	-38.9	134	59	Fracture Rank 1
308.2	-41.5	181	72	Fracture Rank 1
309.1	-42.4	326	58	Fracture Rank 1
309.8	-43.1	21	20	Fracture Rank 1
314.3	-47.6	284	76	Fracture Rank 1
314.6	-47.9	284	60	Fracture Rank 2
316.4	-49.7	273	79	Fracture Rank 1
317.5	-50.8	342	14	Fracture Rank 1
318.0	-51.3	274	81	Fracture Rank 1
318.4	-51.7	283	82	Fracture Rank 1
319.5	-52.8	263	81	Fracture Rank 2
323.9	-57.2	86	65	Fracture Rank 1
324.2	-57.5	281	70	Fracture Rank 1
324.5	-57.8	282	75	Fracture Rank 1
324.7	-58.0	87	67	Fracture Rank 2
327.2	-60.5	109	67	Fracture Rank 1
327.9	-61.2	100	59	Fracture Rank 2
329.0	-62.3	99	62	Fracture Rank 2
329.5	-62.8	96	61	Fracture Rank 2
332.3	-65.6	97	78	Fracture Rank 3
333.2	-66.5	87	25	Fracture Rank 1
333.9	-67.2	93	67	Fracture Rank 2
334.2	-67.5	92	67	Fracture Rank 1
336.6	-69.9	61	70	Fracture Rank 2
336.8	-70.1	70	29	Fracture Rank 1
338.3	-71.6	268	71	Fracture Rank 2
338.5	-71.8	282	72	Fracture Rank 1
340.8	-74.1	257	85	Fracture Rank 1
340.8	-74.1	82	67	Fracture Rank 1
341.4	-74.7	290	74	Fracture Rank 1
342.0	-75.3	271	74	Fracture Rank 2
343.1	-76.4	282	54	Fracture Rank 2
343.9	-77.2	109	29	Fracture Rank 2
345.2	-78.5	276	66	Fracture Rank 2
346.7	-80.0	271	85	Fracture Rank 2
346.9	-80.2	320	37	Fracture Rank 2
347.5	-80.8	285	47	Fracture Rank 2
347.7	-81.0	350	32	Fracture Rank 2
348.1	-81.4	326	38	Fracture Rank 1
348.3	-81.6	320	39	Fracture Rank 2
348.6	-81.9	300	38	Fracture Rank 2
350.4	-83.7	292	76	Fracture Rank 2
351.1	-84.4	288	57	Fracture Rank 1
351.9	-85.2	277	83	Fracture Rank 2

BR-11 - TABLE OF BEDROCK STRUCTURES

Depth (feet)	Elevation (feet)	Dip Azimuth (degrees)	Dip Angle (degrees)	Bedrock Structure Category
352.6	-85.9	275	60	Fracture Rank 2
352.9	-86.2	280	49	Fracture Rank 2
353.1	-86.4	282	49	Fracture Rank 2
354.2	-87.5	143	6	Fracture Rank 2
354.3	-87.6	119	67	Fracture Rank 2
354.9	-88.2	296	62	Fracture Rank 1
355.6	-88.9	97	44	Fracture Rank 1
356.7	-90.0	308	45	Fracture Rank 1
357.7	-91.0	301	65	Fracture Rank 1
357.8	-91.1	300	68	Fracture Rank 1
357.9	-91.2	55	25	Fracture Rank 2
358.3	-91.6	325	41	Fracture Rank 2
359.6	-92.9	71	33	Fracture Rank 1
363.6	-96.9	95	35	Fracture Rank 1
365.6	-98.9	24	47	Fracture Rank 2
366.0	-99.3	14	35	Fracture Rank 2
368.3	-101.6	290	88	Fracture Rank 1
369.7	-103.0	101	58	Fracture Rank 2
371.1	-104.4	97	50	Fracture Rank 2
372.78	-106.1	125	90	Fracture Rank 2
376.7	-110.0	354	83	Fracture Rank 2
377.88	-111.2	299	74	Fracture Rank 2
378.76	-112.1	123	69	Fracture Rank 2
378.97	-112.3	316	82	Fracture Rank 1
384.52	-117.8	88	69	Fracture Rank 1
388.39	-121.7	287	69	Fracture Rank 1
390.13	-123.4	328	77	Fracture Rank 1
390.75	-124.1	267	82	Fracture Rank 1
391.05	-124.4	258	80	Fracture Rank 1
391.5	-124.8	102	41	Fracture Rank 2
392.86	-126.2	81	57	Fracture Rank 1
393.07	-126.4	92	51	Fracture Rank 2
394.37	-127.7	352	65	Fracture Rank 1
394.99	-128.3	78	55	Fracture Rank 2
395.85	-129.2	76	52	Fracture Rank 2
397.13	-130.4	75	45	Fracture Rank 2
397.59	-130.9	61	48	Fracture Rank 2
398.11	-131.4	72	41	Fracture Rank 1
399.03	-132.3	298	62	Fracture Rank 2
400.84	-134.1	294	88	Fracture Rank 2
406.08	-139.4	91	70	Fracture Rank 2
407.07	-140.4	280	36	Fracture Rank 1
408.16	-141.5	294	89	Fracture Rank 1
411	-144.3	300	82	Fracture Rank 1
412.35	-145.7	302	68	Fracture Rank 2

BR-11 - TABLE OF BEDROCK STRUCTURES

Depth (feet)	Elevation (feet)	Dip Azimuth (degrees)	Dip Angle (degrees)	Bedrock Structure Category
413.35	-146.7	306	76	Fracture Rank 1
413.88	-147.2	301	34	Fracture Rank 2
414.49	-147.8	294	84	Fracture Rank 2
414.51	-147.8	302	53	Fracture Rank 2
415.87	-149.2	302	87	Fracture Rank 1
416.12	-149.4	290	36	Fracture Rank 2
417	-150.3	287	56	Fracture Rank 2
417.24	-150.5	124	71	Fracture Rank 1
418.33	-151.6	286	52	Fracture Rank 2
419.1	-152.4	280	68	Fracture Rank 1
419.5	-152.8	283	67	Fracture Rank 1
419.8	-153.1	285	71	Fracture Rank 1
420.3	-153.6	288	77	Fracture Rank 2
421.8	-155.1	103	65	Fracture Rank 1
423.6	-156.9	293	84	Fracture Rank 2
424.8	-158.1	87	61	Fracture Rank 1
427.2	-160.5	246	85	Fracture Rank 1
428.0	-161.3	273	90	Fracture Rank 1
430.7	-164.0	161	41	Fracture Rank 1
432.0	-165.3	320	83	Fracture Rank 1
434.0	-167.3	101	66	Fracture Rank 1
434.8	-168.1	89	66	Fracture Rank 1
437.5	-170.8	360	60	Fracture Rank 1
439.7	-173.0	353	67	Fracture Rank 1
440.3	-173.6	336	69	Fracture Rank 1

HAGER-RICHTER GEOSCIENCE, INC.	
BR-12 - TABLE OF BEDROCK STRUCTURES	
CLIENT	Weston Solutions, Inc.
PROJECT	Savage Municipal Water Supply Superfund Site
CITY, STATE	Milford, New Hampshire
H-R FILE	12RG62
DATE LOGGED	November 13, 2012
LOG DATUM	Top of the 6-Inch Steel Casing (TOC)
TOC ELEVATION	269.4 Feet
DIP AZIMUTH	Referenced to True North
DECLINATION	15 Degrees West
DIP ANGLE	Measured from Horizontal

BR-12 - TABLE OF BEDROCK STRUCTURES

Depth (feet)	Elevation (feet)	Dip Azimuth (degrees)	Dip Angle (degrees)	Bedrock Structure Category
116.8	152.6	278	23	Fracture Rank 1
119.0	150.4	295	29	Fracture Rank 1
121.5	147.9	333	34	Fracture Rank 2
123.6	145.8	237	64	Fracture Rank 2
123.8	145.6	232	65	Fracture Rank 3
126.5	142.9	328	43	Fracture Rank 1
126.9	142.6	330	41	Fracture Rank 1
127.2	142.2	336	39	Fracture Rank 2
127.9	141.5	340	29	Fracture Rank 2
129.0	140.4	81	47	Fracture Rank 1
130.5	138.9	279	55	Fracture Rank 2
131.2	138.2	304	49	Fracture Rank 2
132.8	136.6	279	63	Fracture Rank 1
133.0	136.4	276	64	Fracture Rank 1
134.7	134.7	279	54	Fracture Rank 1
136.3	133.1	274	67	Fracture Rank 1
137.1	132.3	273	70	Fracture Rank 1
138.0	131.4	282	69	Fracture Rank 2
138.5	130.9	282	69	Fracture Rank 1
138.7	130.7	296	23	Fracture Rank 2
139.2	130.2	299	34	Fracture Rank 2
140.0	129.4	283	73	Fracture Rank 1
140.4	129.0	278	75	Fracture Rank 1
141.0	128.4	285	73	Fracture Rank 1
141.6	127.8	281	74	Fracture Rank 1
143.9	125.5	278	77	Fracture Rank 1
144.7	124.7	280	71	Fracture Rank 2
145.1	124.3	286	71	Fracture Rank 1
145.8	123.6	280	65	Fracture Rank 1
146.0	123.4	285	65	Fracture Rank 1
147.0	122.4	274	43	Fracture Rank 2
153.1	116.4	103	73	Fracture Rank 1
153.2	116.3	12	54	Fracture Rank 2

BR-12 - TABLE OF BEDROCK STRUCTURES

Depth (feet)	Elevation (feet)	Dip Azimuth (degrees)	Dip Angle (degrees)	Bedrock Structure Category
153.7	115.7	93	67	Fracture Rank 1
156.8	112.7	88	83	Fracture Rank 2
157.0	112.4	245	51	Fracture Rank 2
158.5	110.9	131	58	Fracture Rank 3
159.9	109.5	279	62	Fracture Rank 2
160.1	109.3	274	65	Fracture Rank 2
161.4	108.0	283	39	Fracture Rank 1
163.1	106.3	102	78	Fracture Rank 2
164.5	105.0	101	76	Fracture Rank 2
164.7	104.7	0	26	Fracture Rank 1
164.9	104.5	307	74	Fracture Rank 1
165.2	104.2	95	75	Fracture Rank 1
165.8	103.6	105	77	Fracture Rank 1
166.4	103.0	309	76	Fracture Rank 1
166.9	102.5	106	62	Fracture Rank 1
168.6	100.8	16	80	Fracture Rank 2
168.7	100.7	308	64	Fracture Rank 2
169.2	100.2	289	65	Fracture Rank 1
169.5	100.0	84	81	Fracture Rank 2
169.6	99.8	302	12	Fracture Rank 2
169.9	99.5	84	80	Fracture Rank 2
170.0	99.5	54	48	Fracture Rank 1
171.4	98.0	21	21	Fracture Rank 2
172.5	97.0	80	58	Fracture Rank 1
172.7	96.7	78	63	Fracture Rank 1
174.3	95.1	9	41	Fracture Rank 1
177.6	91.8	1	26	Fracture Rank 2
177.7	91.7	10	29	Fracture Rank 2
178.0	91.4	358	29	Fracture Rank 1
179.9	89.5	320	36	Fracture Rank 2
180.5	88.9	330	39	Fracture Rank 3
182.8	86.6	352	37	Fracture Rank 1
183.8	85.6	89	82	Fracture Rank 2
183.8	85.6	352	32	Fracture Rank 1
184.8	84.6	353	73	Fracture Rank 1
186.6	82.8	284	79	Fracture Rank 1
188.0	81.4	45	17	Fracture Rank 1
188.7	80.7	264	29	Fracture Rank 1
191.0	78.4	338	12	Fracture Rank 1
192.7	76.7	322	48	Fracture Rank 1
193.5	75.9	329	20	Fracture Rank 2
193.8	75.6	316	14	Fracture Rank 2
204.3	65.1	337	10	Fracture Rank 2
204.6	64.8	330	17	Fracture Rank 2
205.8	63.6	79	66	Fracture Rank 2

BR-12 - TABLE OF BEDROCK STRUCTURES

Depth (feet)	Elevation (feet)	Dip Azimuth (degrees)	Dip Angle (degrees)	Bedrock Structure Category
206.0	63.4	82	68	Fracture Rank 1
206.6	62.8	88	69	Fracture Rank 3
207.3	62.1	337	16	Fracture Rank 2
207.8	61.6	5	23	Fracture Rank 3
208.1	61.3	10	26	Fracture Rank 2
208.1	61.3	283	74	Fracture Rank 1
208.3	61.1	286	73	Fracture Rank 1
208.7	60.8	327	8	Fracture Rank 2
209.3	60.1	289	69	Fracture Rank 1
209.5	59.9	354	30	Fracture Rank 2
210.3	59.1	288	63	Fracture Rank 1
212.3	57.1	282	64	Fracture Rank 1
212.4	57.0	283	63	Fracture Rank 1
212.6	56.8	117	48	Fracture Rank 1
212.8	56.6	282	63	Fracture Rank 1
218.1	51.3	126	70	Fracture Rank 1
222.4	47.1	298	23	Fracture Rank 1
223.1	46.3	81	66	Fracture Rank 2
224.0	45.4	284	56	Fracture Rank 1
224.9	44.5	281	63	Fracture Rank 1
226.9	42.5	263	70	Fracture Rank 2
227.1	42.3	255	65	Fracture Rank 2
230.7	38.7	284	24	Fracture Rank 1
236.9	32.6	284	65	Fracture Rank 1
237.4	32.0	286	62	Fracture Rank 1
238.1	31.3	289	60	Fracture Rank 1
238.4	31.0	289	63	Fracture Rank 1
239.1	30.3	284	69	Fracture Rank 1
240.4	29.0	290	74	Fracture Rank 1
242.0	27.4	282	70	Fracture Rank 1
242.6	26.8	287	72	Fracture Rank 1
243.4	26.0	90	54	Fracture Rank 3
248.5	20.9	125	82	Fracture Rank 3
251.8	17.6	97	71	Fracture Rank 3
253.2	16.2	123	71	Fracture Rank 3
253.7	15.7	332	37	Fracture Rank 1
254.4	15.0	112	72	Fracture Rank 2
256.4	13.0	300	76	Fracture Rank 1
256.6	12.8	116	73	Fracture Rank 2
256.9	12.5	111	66	Fracture Rank 2
260.6	8.8	285	25	Fracture Rank 2
261.3	8.1	301	49	Fracture Rank 2
261.6	7.8	318	22	Fracture Rank 1
262.1	7.3	306	26	Fracture Rank 1
270.0	-0.6	291	42	Fracture Rank 1

BR-12 - TABLE OF BEDROCK STRUCTURES

Depth (feet)	Elevation (feet)	Dip Azimuth (degrees)	Dip Angle (degrees)	Bedrock Structure Category
284.6	-15.2	306	48	Fracture Rank 1
286.7	-17.3	334	34	Fracture Rank 1
287.8	-18.4	3	30	Fracture Rank 1
290.4	-21.0	233	73	Fracture Rank 1
292.1	-22.7	211	81	Fracture Rank 1
295.6	-26.2	106	53	Fracture Rank 2
301.4	-32.0	300	18	Fracture Rank 2
302.1	-32.7	336	30	Fracture Rank 2
309.5	-40.1	200	90	Fracture Rank 2
310.8	-41.4	26	82	Fracture Rank 1
313.7	-44.3	301	25	Fracture Rank 1
314.9	-45.5	111	63	Fracture Rank 2
315.3	-45.9	276	70	Fracture Rank 1
315.3	-45.9	111	73	Fracture Rank 1
317.2	-47.8	271	60	Fracture Rank 1
318.3	-48.9	94	86	Fracture Rank 1
318.5	-49.1	295	43	Fracture Rank 1
319.1	-49.7	88	55	Fracture Rank 2
319.8	-50.4	289	56	Fracture Rank 1
324.1	-54.7	112	61	Fracture Rank 1
326.2	-56.8	306	52	Fracture Rank 2
327.5	-58.1	285	48	Fracture Rank 2
329.8	-60.4	301	71	Fracture Rank 1
330.8	-61.4	284	63	Fracture Rank 1
332.1	-62.7	293	69	Fracture Rank 1
333.3	-63.9	281	68	Fracture Rank 1
334.3	-64.9	284	72	Fracture Rank 1
334.7	-65.3	94	80	Fracture Rank 1
334.9	-65.5	98	65	Fracture Rank 3
336.4	-67.0	102	74	Fracture Rank 1
336.8	-67.4	355	5	Fracture Rank 1
337.0	-67.6	99	80	Fracture Rank 1
337.4	-68.0	315	14	Fracture Rank 2
338.6	-69.2	109	79	Fracture Rank 1
339.4	-70.0	94	56	Fracture Rank 1
339.7	-70.3	100	80	Fracture Rank 2
341.3	-71.9	97	77	Fracture Rank 2
342.6	-73.2	74	20	Fracture Rank 3
343.0	-73.6	243	47	Fracture Rank 2
343.4	-74.0	50	19	Fracture Rank 3
343.5	-74.1	37	22	Fracture Rank 3
344.5	-75.1	286	21	Fracture Rank 1
344.8	-75.4	338	63	Fracture Rank 1
348.7	-79.3	109	66	Fracture Rank 2
348.8	-79.4	103	65	Fracture Rank 1

BR-12 - TABLE OF BEDROCK STRUCTURES

Depth (feet)	Elevation (feet)	Dip Azimuth (degrees)	Dip Angle (degrees)	Bedrock Structure Category
349.4	-80.0	105	79	Fracture Rank 1
349.7	-80.3	108	77	Fracture Rank 2
350.1	-80.7	111	79	Fracture Rank 1
350.3	-80.9	192	76	Fracture Rank 1
352.8	-83.4	106	72	Fracture Rank 2
353.1	-83.7	308	45	Fracture Rank 1
353.1	-83.7	100	62	Fracture Rank 2
353.2	-83.8	99	67	Fracture Rank 2
353.9	-84.5	114	80	Fracture Rank 1
354.4	-85.0	348	33	Fracture Rank 1
355.2	-85.8	332	44	Fracture Rank 1
355.8	-86.4	123	57	Fracture Rank 2
356.0	-86.6	283	40	Fracture Rank 2
356.1	-86.7	113	63	Fracture Rank 2
356.4	-87.0	279	22	Fracture Rank 2
357.0	-87.6	292	47	Fracture Rank 2
359.1	-89.7	306	60	Fracture Rank 1
361.3	-91.9	273	43	Fracture Rank 1
361.4	-92.0	320	64	Fracture Rank 1
362.07	-92.7	302	18	Fracture Rank 1
362.46	-93.1	345	35	Fracture Rank 2
362.68	-93.3	339	45	Fracture Rank 1
363.61	-94.2	315	62	Fracture Rank 1
367.92	-98.5	359	73	Fracture Rank 1
368.05	-98.7	300	39	Fracture Rank 2
368.28	-98.9	178	80	Fracture Rank 1
377.21	-107.8	44	24	Fracture Rank 1
380.37	-111.0	314	43	Fracture Rank 2
380.57	-111.2	305	44	Fracture Rank 2
380.73	-111.3	306	45	Fracture Rank 1
381.58	-112.2	306	42	Fracture Rank 1
381.89	-112.5	305	53	Fracture Rank 2
384.47	-115.1	225	70	Fracture Rank 2
384.96	-115.6	278	64	Fracture Rank 1
387.21	-117.8	319	65	Fracture Rank 1
390.42	-121.0	309	67	Fracture Rank 1
394.45	-125.1	312	48	Fracture Rank 1
395.4	-126.0	349	43	Fracture Rank 1
397.49	-128.1	244	42	Fracture Rank 1
399.25	-129.9	329	58	Fracture Rank 1
399.71	-130.3	316	46	Fracture Rank 2
399.96	-130.6	324	46	Fracture Rank 2
400.29	-130.9	313	45	Fracture Rank 2
400.51	-131.1	322	44	Fracture Rank 1
401.36	-132.0	299	54	Fracture Rank 1

BR-12 - TABLE OF BEDROCK STRUCTURES

Depth (feet)	Elevation (feet)	Dip Azimuth (degrees)	Dip Angle (degrees)	Bedrock Structure Category
402.1	-132.7	304	61	Fracture Rank 1
402.55	-133.2	305	47	Fracture Rank 1
403.32	-133.9	302	45	Fracture Rank 2
403.59	-134.2	311	54	Fracture Rank 1
403.89	-134.5	317	55	Fracture Rank 2
404.28	-134.9	309	52	Fracture Rank 1
404.59	-135.2	304	56	Fracture Rank 1
405.07	-135.7	131	12	Fracture Rank 2
405.33	-135.9	298	34	Fracture Rank 3
405.6	-136.2	277	36	Fracture Rank 3
406.1	-136.7	294	33	Fracture Rank 3
406.8	-137.4	315	48	Fracture Rank 2
407.2	-137.8	314	40	Fracture Rank 1
408.0	-138.6	107	45	Fracture Rank 1
409.0	-139.6	240	3	Fracture Rank 2
409.1	-139.7	98	58	Fracture Rank 1
411.1	-141.7	91	72	Fracture Rank 1
411.2	-141.8	259	61	Fracture Rank 3
412.5	-143.1	246	61	Fracture Rank 2
412.8	-143.4	244	66	Fracture Rank 2
414.5	-145.1	170	78	Fracture Rank 1
416.1	-146.7	301	41	Fracture Rank 2
416.4	-147.0	313	51	Fracture Rank 2
417.9	-148.5	316	62	Fracture Rank 1
418.6	-149.2	263	65	Fracture Rank 2
419.8	-150.4	266	59	Fracture Rank 2
420.3	-150.9	317	27	Fracture Rank 1
421.9	-152.5	313	35	Fracture Rank 1

HAGER-RICHTER GEOSCIENCE, INC.	
BR-13 - TABLE OF BEDROCK STRUCTURES	
CLIENT	Weston Solutions, Inc.
PROJECT	Savage Municipal Water Supply Superfund Site
CITY, STATE	Milford, New Hampshire
H-R FILE	12RG62
DATE LOGGED	November 13 & 14, 2012
LOG DATUM	Top of the 6-Inch Steel Casing (TOC)
TOC ELEVATION	264.0 Feet
DIP AZIMUTH	Referenced to True North
DECLINATION	15 Degrees West
DIP ANGLE	Measured from Horizontal

BR-13 - TABLE OF BEDROCK STRUCTURES

Depth (feet)	Elevation (feet)	Dip Azimuth (degrees)	Dip Angle (degrees)	Bedrock Structure Category
78.4	185.6	318	65	Fracture Rank 1
82.1	181.9	316	46	Fracture Rank 1
83.8	180.2	311	36	Fracture Rank 2
85.0	179.0	277	47	Fracture Rank 2
85.6	178.4	305	39	Fracture Rank 2
85.8	178.2	296	50	Fracture Rank 3
86.8	177.2	326	59	Fracture Rank 1
87.4	176.6	315	69	Fracture Rank 1
87.8	176.3	277	32	Fracture Rank 2
106.4	157.6	274	75	Fracture Rank 2
109.0	155.0	276	77	Fracture Rank 1
109.4	154.6	275	75	Fracture Rank 1
109.7	154.3	275	74	Fracture Rank 2
110.6	153.4	275	69	Fracture Rank 1
110.9	153.1	284	71	Fracture Rank 1
111.3	152.8	282	70	Fracture Rank 1
111.8	152.2	279	75	Fracture Rank 1
112.2	151.9	273	77	Fracture Rank 2
113.2	150.8	281	74	Fracture Rank 2
113.5	150.6	280	75	Fracture Rank 2
115.0	149.0	282	71	Fracture Rank 2
115.2	148.8	276	70	Fracture Rank 2
115.7	148.3	283	68	Fracture Rank 1
116.1	147.9	275	61	Fracture Rank 1
117.1	146.9	277	72	Fracture Rank 1
117.6	146.4	280	74	Fracture Rank 1
117.8	146.2	274	74	Fracture Rank 2
119.8	144.2	280	66	Fracture Rank 1
120.5	143.5	274	67	Fracture Rank 2
122.7	141.3	90	73	Fracture Rank 2
123.0	141.0	276	75	Fracture Rank 1
124.2	139.8	277	77	Fracture Rank 2
124.7	139.3	277	74	Fracture Rank 2

BR-13 - TABLE OF BEDROCK STRUCTURES

Depth (feet)	Elevation (feet)	Dip Azimuth (degrees)	Dip Angle (degrees)	Bedrock Structure Category
125.3	138.8	291	77	Fracture Rank 1
126.3	137.8	285	74	Fracture Rank 2
128.1	135.9	280	75	Fracture Rank 2
128.7	135.3	276	75	Fracture Rank 1
130.5	133.5	269	77	Fracture Rank 1
131.4	132.6	230	78	Fracture Rank 1
132.1	131.9	275	74	Fracture Rank 1
133.9	130.1	272	71	Fracture Rank 1
134.3	129.7	90	67	Fracture Rank 2
135.4	128.6	264	46	Fracture Rank 1
135.6	128.5	87	49	Fracture Rank 1
137.2	126.8	88	63	Fracture Rank 2
139.6	124.4	269	86	Fracture Rank 1
149.2	114.8	310	37	Fracture Rank 2
149.3	114.7	304	36	Fracture Rank 2
149.5	114.5	305	40	Fracture Rank 2
149.8	114.2	306	37	Fracture Rank 2
150.1	113.9	298	34	Fracture Rank 2
150.7	113.3	293	45	Fracture Rank 1
151.2	112.8	299	42	Fracture Rank 1
152.7	111.3	272	80	Fracture Rank 1
153.2	110.8	316	35	Fracture Rank 1
156.2	107.8	274	77	Fracture Rank 1
156.7	107.3	274	78	Fracture Rank 1
160.0	104.0	286	63	Fracture Rank 1
162.8	101.3	269	70	Fracture Rank 1
163.5	100.5	287	64	Fracture Rank 2
168.3	95.7	297	40	Fracture Rank 2
170.7	93.3	257	78	Fracture Rank 1
170.7	93.3	94	76	Fracture Rank 1
171.7	92.3	258	70	Fracture Rank 2
173.2	90.8	266	68	Fracture Rank 2
175.4	88.7	99	70	Fracture Rank 1
176.1	87.9	120	49	Fracture Rank 2
176.3	87.8	107	47	Fracture Rank 2
177.4	86.6	260	36	Fracture Rank 1
177.7	86.4	314	44	Fracture Rank 1
178.8	85.2	133	41	Fracture Rank 3
179.4	84.6	123	57	Fracture Rank 2
179.9	84.1	110	71	Fracture Rank 2
180.8	83.2	92	59	Fracture Rank 2
181.1	82.9	112	58	Fracture Rank 1
181.6	82.5	118	54	Fracture Rank 2
182.1	81.9	119	67	Fracture Rank 2
182.4	81.7	113	57	Fracture Rank 1

BR-13 - TABLE OF BEDROCK STRUCTURES

Depth (feet)	Elevation (feet)	Dip Azimuth (degrees)	Dip Angle (degrees)	Bedrock Structure Category
182.5	81.5	116	56	Fracture Rank 1
183.0	81.0	121	56	Fracture Rank 2
183.4	80.6	113	63	Fracture Rank 1
183.7	80.3	118	59	Fracture Rank 2
184.2	79.8	117	57	Fracture Rank 2
184.3	79.7	118	51	Fracture Rank 2
184.7	79.3	121	53	Fracture Rank 2
185.1	78.9	122	59	Fracture Rank 1
185.3	78.7	122	61	Fracture Rank 2
185.9	78.1	112	62	Fracture Rank 2
186.1	77.9	116	62	Fracture Rank 1
186.2	77.8	107	59	Fracture Rank 1
186.7	77.3	115	67	Fracture Rank 2
187.2	76.8	112	60	Fracture Rank 1
188.1	75.9	120	65	Fracture Rank 2
188.7	75.3	114	68	Fracture Rank 1
189.0	75.0	116	66	Fracture Rank 1
189.4	74.6	111	61	Fracture Rank 1
190.0	74.0	105	59	Fracture Rank 1
190.4	73.6	121	72	Fracture Rank 1
192.3	71.7	119	54	Fracture Rank 2
192.4	71.6	194	67	Fracture Rank 1
194.3	69.7	318	25	Fracture Rank 2
194.9	69.1	340	25	Fracture Rank 1
195.0	69.0	335	19	Fracture Rank 2
205.7	58.3	118	80	Fracture Rank 2
207.8	56.2	327	38	Fracture Rank 1
212.7	51.3	278	79	Fracture Rank 1
215.5	48.5	336	28	Fracture Rank 1
215.9	48.1	305	34	Fracture Rank 1
217.1	46.9	350	24	Fracture Rank 1
217.3	46.7	345	37	Fracture Rank 1
221.9	42.1	310	33	Fracture Rank 2
222.2	41.8	312	37	Fracture Rank 1
225.3	38.7	281	83	Fracture Rank 2
228.8	35.2	270	32	Fracture Rank 2
229.8	34.2	246	20	Fracture Rank 2
229.9	34.1	257	18	Fracture Rank 2
230.3	33.7	249	24	Fracture Rank 2
230.4	33.6	245	22	Fracture Rank 2
231.2	32.9	260	22	Fracture Rank 2
231.5	32.5	272	38	Fracture Rank 2
231.7	32.3	320	21	Fracture Rank 2
234.8	29.2	276	42	Fracture Rank 2
235.1	28.9	292	30	Fracture Rank 2

BR-13 - TABLE OF BEDROCK STRUCTURES

Depth (feet)	Elevation (feet)	Dip Azimuth (degrees)	Dip Angle (degrees)	Bedrock Structure Category
235.7	28.4	300	47	Fracture Rank 2
237.2	26.8	200	21	Fracture Rank 2
237.7	26.3	212	34	Fracture Rank 2
238.5	25.5	178	40	Fracture Rank 1
238.8	25.2	180	44	Fracture Rank 1
239.7	24.3	202	27	Fracture Rank 1
240.5	23.5	202	52	Fracture Rank 2
241.3	22.7	202	52	Fracture Rank 2
242.1	21.9	224	37	Fracture Rank 2
242.9	21.1	256	21	Fracture Rank 2
243.0	21.0	208	6	Fracture Rank 2
243.2	20.8	210	40	Fracture Rank 2
245.2	18.8	243	26	Fracture Rank 1
249.4	14.6	233	25	Fracture Rank 2
253.2	10.9	269	20	Fracture Rank 2
254.5	9.5	289	30	Fracture Rank 2
259.3	4.7	233	23	Fracture Rank 1
259.4	4.6	238	19	Fracture Rank 2
259.6	4.4	234	22	Fracture Rank 2
261.1	2.9	324	53	Fracture Rank 1
272.9	-8.9	324	52	Fracture Rank 1
275.5	-11.5	285	36	Fracture Rank 2
277.6	-13.6	307	31	Fracture Rank 2
277.9	-13.9	323	30	Fracture Rank 1
278.1	-14.1	331	16	Fracture Rank 2
279.1	-15.1	288	27	Fracture Rank 2
279.4	-15.4	305	26	Fracture Rank 2
279.5	-15.5	311	25	Fracture Rank 2
279.9	-15.9	303	25	Fracture Rank 2
287.6	-23.6	307	35	Fracture Rank 1
289.0	-25.0	305	27	Fracture Rank 1
290.3	-26.3	343	51	Fracture Rank 2
294.0	-30.0	342	28	Fracture Rank 1
295.5	-31.5	297	40	Fracture Rank 2
296.0	-32.0	315	30	Fracture Rank 2
296.4	-32.4	309	22	Fracture Rank 1
297.2	-33.2	296	34	Fracture Rank 1
297.3	-33.3	283	27	Fracture Rank 2
297.6	-33.6	274	22	Fracture Rank 2
297.9	-33.9	306	62	Fracture Rank 2
298.5	-34.5	280	55	Fracture Rank 2
299.7	-35.7	310	48	Fracture Rank 1
299.8	-35.8	311	45	Fracture Rank 2
300.2	-36.2	300	43	Fracture Rank 2
301.3	-37.3	303	36	Fracture Rank 2

BR-13 - TABLE OF BEDROCK STRUCTURES

Depth (feet)	Elevation (feet)	Dip Azimuth (degrees)	Dip Angle (degrees)	Bedrock Structure Category
301.9	-37.9	315	39	Fracture Rank 2
302.1	-38.1	318	38	Fracture Rank 2
304.7	-40.7	325	38	Fracture Rank 3
305.2	-41.2	303	52	Fracture Rank 3
306.7	-42.7	310	40	Fracture Rank 2
307.1	-43.1	285	28	Fracture Rank 2
308.6	-44.6	326	35	Fracture Rank 2
308.8	-44.8	325	27	Fracture Rank 2
309.0	-45.0	318	27	Fracture Rank 2
309.2	-45.2	331	36	Fracture Rank 2
309.7	-45.7	307	35	Fracture Rank 2
310.0	-46.0	320	39	Fracture Rank 2
310.5	-46.5	329	36	Fracture Rank 1
311.2	-47.2	304	41	Fracture Rank 1
312.1	-48.1	336	59	Fracture Rank 1
315.7	-51.7	331	28	Fracture Rank 2
320.1	-56.1	302	9	Fracture Rank 1
321.2	-57.2	340	24	Fracture Rank 2
321.7	-57.7	254	20	Fracture Rank 2
321.97	-58.0	298	26	Fracture Rank 2
324.29	-60.3	300	29	Fracture Rank 2
325.27	-61.3	293	32	Fracture Rank 2
326.01	-62.0	320	17	Fracture Rank 2
326.77	-62.8	11	19	Fracture Rank 2
327.09	-63.1	339	23	Fracture Rank 2
327.3	-63.3	328	17	Fracture Rank 2
327.67	-63.7	301	18	Fracture Rank 2
327.88	-63.9	315	22	Fracture Rank 2
328.6	-64.6	285	18	Fracture Rank 2
329.64	-65.6	294	19	Fracture Rank 2
330.24	-66.2	284	39	Fracture Rank 2
330.4	-66.4	276	36	Fracture Rank 2
330.96	-67.0	283	39	Fracture Rank 2
331.96	-68.0	275	37	Fracture Rank 1
332.25	-68.3	273	42	Fracture Rank 2
332.56	-68.6	266	33	Fracture Rank 2
333.85	-69.9	279	33	Fracture Rank 1
334.25	-70.3	257	26	Fracture Rank 2
335.92	-71.9	280	42	Fracture Rank 2
336.22	-72.2	267	34	Fracture Rank 2
336.38	-72.4	269	29	Fracture Rank 2
336.49	-72.5	340	77	Fracture Rank 1
338	-74.0	208	12	Fracture Rank 2
338.39	-74.4	289	32	Fracture Rank 2
339.1	-75.1	303	38	Fracture Rank 2

BR-13 - TABLE OF BEDROCK STRUCTURES

Depth (feet)	Elevation (feet)	Dip Azimuth (degrees)	Dip Angle (degrees)	Bedrock Structure Category
339.43	-75.4	289	45	Fracture Rank 2
340.18	-76.2	307	16	Fracture Rank 2
340.79	-76.8	271	18	Fracture Rank 2
341	-77.0	280	15	Fracture Rank 2
341.76	-77.8	279	60	Fracture Rank 2
342	-78.0	286	50	Fracture Rank 2
342.32	-78.3	278	56	Fracture Rank 2
342.89	-78.9	281	57	Fracture Rank 2
342.99	-79.0	279	57	Fracture Rank 2
343.2	-79.2	285	52	Fracture Rank 2
343.4	-79.4	292	16	Fracture Rank 2
343.7	-79.7	293	22	Fracture Rank 2
344.2	-80.2	92	11	Fracture Rank 2
344.6	-80.6	288	35	Fracture Rank 2
344.6	-80.6	92	18	Fracture Rank 2
344.7	-80.7	111	46	Fracture Rank 1
345.0	-81.0	232	14	Fracture Rank 2
345.3	-81.3	287	30	Fracture Rank 2
346.6	-82.6	261	43	Fracture Rank 2
347.0	-83.0	280	51	Fracture Rank 2
347.5	-83.5	298	57	Fracture Rank 2
348.2	-84.2	291	78	Fracture Rank 2
349.5	-85.5	100	30	Fracture Rank 2
350.3	-86.3	108	54	Fracture Rank 3
352.9	-88.9	75	23	Fracture Rank 2
353.3	-89.3	349	46	Fracture Rank 2
353.4	-89.4	135	23	Fracture Rank 2
353.6	-89.6	104	39	Fracture Rank 2
354.1	-90.1	356	63	Fracture Rank 1
354.5	-90.5	115	51	Fracture Rank 2
356.9	-92.9	111	71	Fracture Rank 1
358.5	-94.5	166	48	Fracture Rank 1
365.2	-101.2	293	22	Fracture Rank 1
389.9	-125.9	1	54	Fracture Rank 2
390.0	-126.0	4	51	Fracture Rank 1
390.2	-126.2	3	48	Fracture Rank 1
390.6	-126.6	353	54	Fracture Rank 1
391.3	-127.3	347	56	Fracture Rank 1
391.5	-127.5	330	45	Fracture Rank 1
391.8	-127.8	315	61	Fracture Rank 1
392.3	-128.3	293	56	Fracture Rank 1
394.5	-130.5	177	58	Fracture Rank 2
395.1	-131.1	281	26	Fracture Rank 2
396.0	-132.0	292	20	Fracture Rank 1
398.0	-134.0	336	30	Fracture Rank 1

BR-13 - TABLE OF BEDROCK STRUCTURES

Depth (feet)	Elevation (feet)	Dip Azimuth (degrees)	Dip Angle (degrees)	Bedrock Structure Category
405.1	-141.1	251	20	Fracture Rank 1
406.1	-142.1	231	33	Fracture Rank 1
406.7	-142.7	217	40	Fracture Rank 1
407.8	-143.8	270	25	Fracture Rank 1
409.0	-145.0	246	22	Fracture Rank 2
411.3	-147.3	251	32	Fracture Rank 1
416.0	-152.0	210	37	Fracture Rank 2
416.0	-152.0	207	31	Fracture Rank 2
416.2	-152.2	177	56	Fracture Rank 1
416.4	-152.4	188	69	Fracture Rank 1
417.1	-153.1	358	34	Fracture Rank 1
417.5	-153.5	321	30	Fracture Rank 1
417.6	-153.6	314	29	Fracture Rank 2
421.0	-157.0	292	37	Fracture Rank 2
421.1	-157.1	283	36	Fracture Rank 2
421.2	-157.2	272	40	Fracture Rank 2
423.4	-159.4	235	31	Fracture Rank 2
423.6	-159.6	249	30	Fracture Rank 2
425.5	-161.5	280	27	Fracture Rank 2
428.4	-164.4	272	32	Fracture Rank 2
429.1	-165.1	217	43	Fracture Rank 2
432.0	-168.0	296	31	Fracture Rank 1
433.0	-169.0	281	21	Fracture Rank 1
446.1	-182.1	233	29	Fracture Rank 2
447.2	-183.2	276	16	Fracture Rank 2
447.6	-183.6	251	43	Fracture Rank 2
448.1	-184.1	250	23	Fracture Rank 2
448.6	-184.6	249	27	Fracture Rank 2
449.6	-185.6	258	29	Fracture Rank 2
449.8	-185.8	280	21	Fracture Rank 2
450.1	-186.1	292	20	Fracture Rank 2
451.7	-187.7	294	20	Fracture Rank 1
451.8	-187.8	294	9	Fracture Rank 2
452.0	-188.0	210	13	Fracture Rank 1
455.3	-191.3	287	28	Fracture Rank 2
455.4	-191.4	300	27	Fracture Rank 2
455.9	-191.9	280	16	Fracture Rank 2

HAGER-RICHTER GEOSCIENCE, INC.	
BR-14 - TABLE OF BEDROCK STRUCTURES	
CLIENT	Weston Solutions, Inc.
PROJECT	Savage Municipal Water Supply Superfund Site
CITY, STATE	Milford, New Hampshire
H-R FILE	12RG62
DATE LOGGED	November 12, 2012
LOG DATUM	Top of the 6-Inch Steel Casing (TOC)
TOC ELEVATION	265.0 Feet
DIP AZIMUTH	Referenced to True North
DECLINATION	15 Degrees West
DIP ANGLE	Measured from Horizontal

BR-14 - TABLE OF BEDROCK STRUCTURES

Depth (feet)	Elevation (feet)	Dip Azimuth (degrees)	Dip Angle (degrees)	Bedrock Structure Category
109.2	155.8	264	34	Fracture Rank 2
111.1	153.9	71	57	Fracture Rank 2
111.9	153.2	111	65	Fracture Rank 1
114.2	150.8	282	27	Fracture Rank 2
114.7	150.3	293	41	Fracture Rank 1
115.4	149.6	322	41	Fracture Rank 1
115.5	149.5	105	71	Fracture Rank 1
116.6	148.4	111	68	Fracture Rank 1
118.1	146.9	327	36	Fracture Rank 1
119.1	146.0	279	77	Fracture Rank 1
119.3	145.7	329	18	Fracture Rank 1
119.9	145.1	357	24	Fracture Rank 1
122.1	142.9	343	54	Fracture Rank 1
123.4	141.6	109	82	Fracture Rank 1
123.7	141.3	108	53	Fracture Rank 1
124.8	140.2	280	60	Fracture Rank 1
126.8	138.2	341	39	Fracture Rank 1
128.4	136.6	340	43	Fracture Rank 1
142.0	123.0	107	84	Fracture Rank 1
144.1	120.9	311	48	Fracture Rank 1
144.7	120.3	308	49	Fracture Rank 1
145.4	119.6	324	76	Fracture Rank 1
145.5	119.6	30	9	Fracture Rank 2
156.8	108.2	78	78	Fracture Rank 1
159.2	105.8	346	21	Fracture Rank 1
169.7	95.3	305	73	Fracture Rank 1
172.2	92.8	307	74	Fracture Rank 1
176.3	88.7	287	31	Fracture Rank 1
183.7	81.3	272	38	Fracture Rank 1
188.3	76.7	112	75	Fracture Rank 1
192.6	72.5	330	53	Fracture Rank 2
192.9	72.1	330	36	Fracture Rank 2
193.6	71.4	334	31	Fracture Rank 1

BR-14 - TABLE OF BEDROCK STRUCTURES

Depth (feet)	Elevation (feet)	Dip Azimuth (degrees)	Dip Angle (degrees)	Bedrock Structure Category
195.8	69.2	122	82	Fracture Rank 2
196.6	68.4	127	71	Fracture Rank 2
199.9	65.1	114	72	Fracture Rank 2
208.4	56.6	352	67	Fracture Rank 1
212.6	52.4	319	23	Fracture Rank 1
214.7	50.3	313	18	Fracture Rank 1
214.9	50.1	312	31	Fracture Rank 2
215.9	49.1	338	35	Fracture Rank 1
219.4	45.6	337	21	Fracture Rank 1
222.7	42.3	195	60	Fracture Rank 1
224.1	40.9	333	40	Fracture Rank 1
224.7	40.3	302	31	Fracture Rank 1
225.1	39.9	317	26	Fracture Rank 1
225.3	39.7	340	31	Fracture Rank 1
225.7	39.3	345	28	Fracture Rank 1
227.3	37.7	305	31	Fracture Rank 2
230.4	34.6	303	53	Fracture Rank 1
240.3	24.7	319	27	Fracture Rank 1
253.4	11.6	350	45	Fracture Rank 1
254.0	11.1	347	50	Fracture Rank 1
255.1	9.9	96	72	Fracture Rank 1
255.4	9.6	100	70	Fracture Rank 1
266.3	-1.3	339	46	Fracture Rank 1
271.9	-6.9	0	33	Fracture Rank 1
283.9	-18.9	355	21	Fracture Rank 1
289.9	-24.9	2	32	Fracture Rank 1
296.9	-31.9	342	42	Fracture Rank 1
311.4	-46.4	339	55	Fracture Rank 1
313.2	-48.2	108	31	Fracture Rank 1
313.8	-48.8	223	11	Fracture Rank 1
322.3	-57.3	282	30	Fracture Rank 1
328.2	-63.2	351	62	Fracture Rank 2
328.2	-63.2	1	20	Fracture Rank 2
328.4	-63.4	127	64	Fracture Rank 1
328.7	-63.7	22	29	Fracture Rank 1
329.6	-64.6	352	34	Fracture Rank 1
331.5	-66.5	306	48	Fracture Rank 1
332.3	-67.3	117	10	Fracture Rank 1
333.8	-68.8	244	9	Fracture Rank 1
333.9	-68.9	307	50	Fracture Rank 2
335.2	-70.2	352	45	Fracture Rank 2
335.6	-70.6	323	59	Fracture Rank 2
336.9	-71.9	80	63	Fracture Rank 2
337.3	-72.3	79	67	Fracture Rank 3
338.0	-73.0	82	62	Fracture Rank 2

BR-14 - TABLE OF BEDROCK STRUCTURES

Depth (feet)	Elevation (feet)	Dip Azimuth (degrees)	Dip Angle (degrees)	Bedrock Structure Category
338.3	-73.3	78	66	Fracture Rank 1
340.2	-75.2	293	70	Fracture Rank 2
340.8	-75.8	110	83	Fracture Rank 1
342.8	-77.8	36	28	Fracture Rank 1
343.2	-78.2	82	81	Fracture Rank 2
344.2	-79.2	309	67	Fracture Rank 2
345.0	-80.0	349	38	Fracture Rank 2
347.3	-82.3	355	34	Fracture Rank 1
347.8	-82.8	339	33	Fracture Rank 1
348.0	-83.0	340	35	Fracture Rank 1
348.4	-83.4	334	48	Fracture Rank 1
348.4	-83.4	140	49	Fracture Rank 1
349.3	-84.3	343	38	Fracture Rank 2
349.9	-84.9	354	32	Fracture Rank 2
350.4	-85.4	111	90	Fracture Rank 2
352.8	-87.8	9	33	Fracture Rank 1
353.8	-88.8	108	83	Fracture Rank 2
355.4	-90.4	104	75	Fracture Rank 1
355.6	-90.6	105	74	Fracture Rank 1
357.4	-92.4	113	71	Fracture Rank 1
358.0	-93.0	122	77	Fracture Rank 1
359.3	-94.3	100	79	Fracture Rank 1
360.8	-95.8	106	74	Fracture Rank 1
361.3	-96.3	118	74	Fracture Rank 2
362.2	-97.2	112	71	Fracture Rank 2
378.6	-113.6	17	9	Fracture Rank 1
405.3	-140.3	74	45	Fracture Rank 1
416.3	-151.3	96	55	Fracture Rank 1
425.5	-160.5	311	37	Fracture Rank 1
425.9	-160.9	164	32	Fracture Rank 1
426.1	-161.1	315	49	Fracture Rank 1
435.0	-170.0	309	62	Fracture Rank 1
436.7	-171.7	295	78	Fracture Rank 2
438.1	-173.1	294	70	Fracture Rank 2
441.4	-176.4	292	42	Fracture Rank 1

HAGER-RICHTER GEOSCIENCE, INC.	
BR-15 - TABLE OF BEDROCK STRUCTURES	
CLIENT	Weston Solutions, Inc.
PROJECT	Savage Municipal Water Supply Superfund Site
CITY, STATE	Milford, New Hampshire
H-R FILE	12RG62
DATE LOGGED	November 12 & 13, 2012
LOG DATUM	Top of the 6-Inch Steel Casing (TOC)
TOC ELEVATION	263.2 Feet
DIP AZIMUTH	Referenced to True North
DECLINATION	15 Degrees West
DIP ANGLE	Measured from Horizontal

BR-15 - TABLE OF BEDROCK STRUCTURES

Depth (feet)	Elevation (feet)	Dip Azimuth (degrees)	Dip Angle (degrees)	Bedrock Structure Category
108.9	154.3	308	82	Fracture Rank 2
113.0	150.2	300	70	Fracture Rank 1
113.8	149.4	94	83	Fracture Rank 1
117.9	145.3	286	67	Fracture Rank 1
124.0	139.2	293	12	Fracture Rank 1
126.9	136.3	331	13	Fracture Rank 2
131.6	131.7	314	48	Fracture Rank 1
133.7	129.5	301	36	Fracture Rank 1
135.1	128.1	302	8	Fracture Rank 2
153.9	109.3	88	18	Fracture Rank 2
154.6	108.6	109	9	Fracture Rank 1
160.7	102.5	113	8	Fracture Rank 2
170.3	93.0	116	63	Fracture Rank 2
173.5	89.7	282	21	Fracture Rank 1
206.7	56.5	86	8	Fracture Rank 3
208.2	55.0	288	67	Fracture Rank 1
209.1	54.1	305	58	Fracture Rank 1
212.1	51.2	303	47	Fracture Rank 1
212.5	50.7	302	46	Fracture Rank 1
212.7	50.5	305	49	Fracture Rank 1
214.2	49.0	309	67	Fracture Rank 1
214.6	48.6	309	71	Fracture Rank 1
216.8	46.4	282	48	Fracture Rank 1
221.5	41.7	301	64	Fracture Rank 1
222.3	40.9	324	55	Fracture Rank 1
223.5	39.7	334	34	Fracture Rank 2
224.7	38.5	43	33	Fracture Rank 2
225.5	37.7	295	44	Fracture Rank 2
225.7	37.5	290	46	Fracture Rank 3
225.8	37.4	287	46	Fracture Rank 3
227.2	36.0	288	40	Fracture Rank 2
227.8	35.4	325	37	Fracture Rank 1
228.5	34.7	308	48	Fracture Rank 2

BR-15 - TABLE OF BEDROCK STRUCTURES

Depth (feet)	Elevation (feet)	Dip Azimuth (degrees)	Dip Angle (degrees)	Bedrock Structure Category
233.5	29.7	269	43	Fracture Rank 2
235.1	28.2	306	37	Fracture Rank 1
240.2	23.0	353	20	Fracture Rank 2
242.3	21.0	247	53	Fracture Rank 1
244.0	19.3	305	71	Fracture Rank 2
245.4	17.8	314	57	Fracture Rank 1
245.7	17.5	298	65	Fracture Rank 2
249.2	14.0	317	58	Fracture Rank 2
249.7	13.5	309	50	Fracture Rank 1
250.8	12.4	307	67	Fracture Rank 1
252.1	11.1	290	56	Fracture Rank 2
253.0	10.2	308	50	Fracture Rank 2
255.2	8.0	312	75	Fracture Rank 2
255.7	7.5	78	65	Fracture Rank 1
258.3	4.9	345	64	Fracture Rank 1
258.9	4.3	7	59	Fracture Rank 1
260.2	3.0	321	58	Fracture Rank 1
260.5	2.7	332	62	Fracture Rank 1
261.0	2.2	299	42	Fracture Rank 1
261.5	1.7	311	65	Fracture Rank 2
261.7	1.5	318	65	Fracture Rank 2
262.7	0.5	318	34	Fracture Rank 2
263.9	-0.7	333	36	Fracture Rank 2
264.7	-1.5	342	49	Fracture Rank 2
264.8	-1.6	348	47	Fracture Rank 1
279.6	-16.4	22	51	Fracture Rank 2
280.4	-17.2	24	56	Fracture Rank 2
284.3	-21.1	84	64	Fracture Rank 2
286.0	-22.8	64	35	Fracture Rank 2
286.3	-23.1	55	23	Fracture Rank 1
287.8	-24.6	33	72	Fracture Rank 1
289.3	-26.1	41	64	Fracture Rank 1
290.0	-26.8	334	33	Fracture Rank 1
290.3	-27.1	16	60	Fracture Rank 1
291.4	-28.2	17	44	Fracture Rank 1
291.7	-28.5	24	53	Fracture Rank 1
292.4	-29.2	6	56	Fracture Rank 1
293.8	-30.6	32	71	Fracture Rank 1
295.8	-32.6	36	27	Fracture Rank 2
296.3	-33.1	44	40	Fracture Rank 1
296.7	-33.5	38	37	Fracture Rank 1
297.5	-34.3	245	57	Fracture Rank 1
299.8	-36.6	332	28	Fracture Rank 2
300.4	-37.2	323	44	Fracture Rank 1
301.2	-38.0	345	52	Fracture Rank 1

BR-15 - TABLE OF BEDROCK STRUCTURES

Depth (feet)	Elevation (feet)	Dip Azimuth (degrees)	Dip Angle (degrees)	Bedrock Structure Category
302.3	-39.1	12	49	Fracture Rank 2
305.0	-41.8	314	67	Fracture Rank 2
305.6	-42.4	316	54	Fracture Rank 1
307.1	-43.9	39	62	Fracture Rank 1
314.4	-51.2	291	45	Fracture Rank 1
314.9	-51.7	283	57	Fracture Rank 1
316.8	-53.6	31	25	Fracture Rank 1
317.1	-53.9	305	40	Fracture Rank 1
317.7	-54.5	299	33	Fracture Rank 1
320.6	-57.4	284	75	Fracture Rank 1
320.8	-57.6	112	44	Fracture Rank 2
321.0	-57.8	128	53	Fracture Rank 2
321.8	-58.6	110	53	Fracture Rank 2
321.9	-58.7	279	57	Fracture Rank 2
322.5	-59.3	95	52	Fracture Rank 3
326.5	-63.3	304	74	Fracture Rank 2
326.7	-63.5	319	50	Fracture Rank 2
337.5	-74.3	231	40	Fracture Rank 2
343.7	-80.5	335	49	Fracture Rank 1
345.0	-81.8	38	16	Fracture Rank 1
345.9	-82.7	76	32	Fracture Rank 2
346.9	-83.7	293	40	Fracture Rank 2
347.3	-84.1	288	33	Fracture Rank 3
348.2	-85.0	89	56	Fracture Rank 3
349.9	-86.7	274	63	Fracture Rank 2
350.6	-87.4	107	84	Fracture Rank 2
351.0	-87.8	245	70	Fracture Rank 2
352.5	-89.3	85	50	Fracture Rank 2
352.6	-89.4	132	57	Fracture Rank 2
357.7	-94.5	290	78	Fracture Rank 1
359.5	-96.3	249	76	Fracture Rank 1
362.6	-99.4	292	69	Fracture Rank 2
364.3	-101.1	96	71	Fracture Rank 1
364.8	-101.6	110	76	Fracture Rank 2
364.8	-101.6	291	76	Fracture Rank 2
370.5	-107.3	318	30	Fracture Rank 1
371.9	-108.7	325	32	Fracture Rank 2
374.0	-110.8	315	32	Fracture Rank 1
374.8	-111.6	338	47	Fracture Rank 1
375.0	-111.8	331	36	Fracture Rank 2
379.6	-116.4	5	37	Fracture Rank 1
384.7	-121.5	117	84	Fracture Rank 2
385.9	-122.7	318	28	Fracture Rank 1
386.9	-123.7	315	27	Fracture Rank 1
387.8	-124.6	326	44	Fracture Rank 1

BR-15 - TABLE OF BEDROCK STRUCTURES

Depth (feet)	Elevation (feet)	Dip Azimuth (degrees)	Dip Angle (degrees)	Bedrock Structure Category
388.3	-125.1	241	63	Fracture Rank 1
390.3	-127.1	257	64	Fracture Rank 2
391.6	-128.4	255	61	Fracture Rank 2
392.2	-129.0	232	58	Fracture Rank 2
392.9	-129.7	233	55	Fracture Rank 1

HAGER-RICHTER GEOSCIENCE, INC.	
BR-16 - TABLE OF BEDROCK STRUCTURES	
CLIENT	Weston Solutions, Inc.
PROJECT	Savage Municipal Water Supply Superfund Site
CITY, STATE	Milford, New Hampshire
H-R FILE	12RG62
DATE LOGGED	November 12 & 13, 2012
LOG DATUM	Top of the 6-Inch Steel Casing (TOC)
TOC ELEVATION	268.0 Feet
DIP AZIMUTH	Referenced to True North
DECLINATION	15 Degrees West
DIP ANGLE	Measured from Horizontal

BR-16 - TABLE OF BEDROCK STRUCTURES

Depth (feet)	Elevation (feet)	Dip Azimuth (degrees)	Dip Angle (degrees)	Bedrock Structure Category
103.3	164.7	346	1	Fracture Rank 1
104.6	163.5	118	4	Fracture Rank 2
106.2	161.8	80	11	Fracture Rank 2
109.6	158.4	311	16	Fracture Rank 2
109.9	158.1	321	14	Fracture Rank 1
110.0	158.0	325	27	Fracture Rank 2
110.4	157.6	312	18	Fracture Rank 1
110.5	157.5	308	17	Fracture Rank 1
110.7	157.3	276	28	Fracture Rank 2
111.2	156.9	322	17	Fracture Rank 2
111.3	156.7	349	25	Fracture Rank 2
111.9	156.1	331	31	Fracture Rank 2
112.0	156.0	332	31	Fracture Rank 1
112.2	155.9	334	30	Fracture Rank 1
114.5	153.5	292	15	Fracture Rank 2
120.3	147.7	75	17	Fracture Rank 1
124.7	143.3	336	20	Fracture Rank 1
129.1	138.9	159	4	Fracture Rank 1
131.6	136.4	0	28	Fracture Rank 1
132.1	136.0	285	36	Fracture Rank 1
152.6	115.5	348	10	Fracture Rank 1
155.6	112.4	337	37	Fracture Rank 3
160.7	107.3	344	19	Fracture Rank 1
168.4	99.6	298	67	Fracture Rank 2
169.9	98.1	331	56	Fracture Rank 1
186.7	81.3	314	44	Fracture Rank 1
187.7	80.3	325	46	Fracture Rank 1
207.6	60.4	339	48	Fracture Rank 1
207.9	60.1	323	38	Fracture Rank 1
208.6	59.4	347	44	Fracture Rank 1
209.7	58.3	290	70	Fracture Rank 1
215.7	52.3	117	68	Fracture Rank 1
215.8	52.2	119	64	Fracture Rank 1

BR-16 - TABLE OF BEDROCK STRUCTURES

Depth (feet)	Elevation (feet)	Dip Azimuth (degrees)	Dip Angle (degrees)	Bedrock Structure Category
216.8	51.2	129	66	Fracture Rank 1
224.4	43.6	354	34	Fracture Rank 3
230.1	37.9	228	3	Fracture Rank 1
239.1	28.9	303	32	Fracture Rank 1
240.7	27.3	324	22	Fracture Rank 2
240.9	27.1	316	23	Fracture Rank 3
244.0	24.0	306	45	Fracture Rank 2
270.4	-2.4	320	39	Fracture Rank 2
270.9	-2.9	315	35	Fracture Rank 1
277.2	-9.2	299	38	Fracture Rank 1
277.4	-9.4	299	35	Fracture Rank 1
283.7	-15.7	206	29	Fracture Rank 1
285.7	-17.7	312	66	Fracture Rank 1
285.8	-17.8	285	26	Fracture Rank 1
286.1	-18.1	287	64	Fracture Rank 2
287.0	-19.0	263	48	Fracture Rank 1
287.3	-19.3	223	26	Fracture Rank 2
287.7	-19.7	298	42	Fracture Rank 1
291.7	-23.7	298	39	Fracture Rank 1
292.9	-24.9	302	32	Fracture Rank 2
293.9	-25.9	313	31	Fracture Rank 2
309.2	-41.2	311	63	Fracture Rank 1
313.6	-45.6	296	32	Fracture Rank 2
314.1	-46.1	302	13	Fracture Rank 2
314.5	-46.5	332	27	Fracture Rank 2
315.1	-47.1	310	54	Fracture Rank 2
315.7	-47.7	308	25	Fracture Rank 2
317.8	-49.8	307	20	Fracture Rank 2
324.6	-56.6	277	20	Fracture Rank 2
325.3	-57.3	331	21	Fracture Rank 2
327.3	-59.3	251	26	Fracture Rank 1
328.1	-60.1	98	76	Fracture Rank 1
329.1	-61.1	347	49	Fracture Rank 2
333.0	-65.0	340	32	Fracture Rank 1
336.1	-68.1	237	48	Fracture Rank 1
337.0	-69.0	270	35	Fracture Rank 2
339.5	-71.5	344	54	Fracture Rank 1
340.0	-72.0	338	21	Fracture Rank 2
340.6	-72.6	351	15	Fracture Rank 2
341.3	-73.3	325	35	Fracture Rank 1
343.4	-75.4	354	27	Fracture Rank 2
344.6	-76.6	340	49	Fracture Rank 2
351.2	-83.2	349	25	Fracture Rank 2
354.7	-86.7	9	46	Fracture Rank 1
356.4	-88.4	350	49	Fracture Rank 1

BR-16 - TABLE OF BEDROCK STRUCTURES

Depth (feet)	Elevation (feet)	Dip Azimuth (degrees)	Dip Angle (degrees)	Bedrock Structure Category
362.9	-94.9	30	50	Fracture Rank 1
364.5	-96.5	21	62	Fracture Rank 1
367.7	-99.7	223	67	Fracture Rank 1
369.4	-101.4	24	55	Fracture Rank 1
370.8	-102.8	350	30	Fracture Rank 1
379.8	-111.8	332	33	Fracture Rank 2
380.1	-112.1	326	36	Fracture Rank 2
389.1	-121.1	174	48	Fracture Rank 1
392.6	-124.6	221	58	Fracture Rank 1
398.7	-130.7	11	61	Fracture Rank 1
407.0	-139.0	301	48	Fracture Rank 1
414.4	-146.4	282	45	Fracture Rank 1
418.3	-150.3	315	42	Fracture Rank 1
430.3	-162.3	303	56	Fracture Rank 1

APPENDIX 4

HPFM RESULTS DURING THE WESTON PUMP TEST

HAGER-RICHTER GEOSCIENCE, INC.	
BR-1 - HPFM During the WESTON Pump Test	
CLIENT	Weston Solutions, Inc.
PROJECT	Savage Municipal Water Supply Superfund Site
CITY, STATE	Milford, New Hampshire
H-R FILE	12RG62
DATE LOGGED	April 25, 2013
LOG DATUM	Top of the 6-Inch Steel Casing
Positive (+) Flow is Flow Up the Borehole	
Negative (-) Flow is Flow Down the Borehole	

BR-1 - HPFM During the WESTON Pump Test

Depth (feet)	Flow (gpm)	Flow Interpretation
100.0	0.00	No flow was detected in borehole BR-1 during the pump test.
118.0	0.00	
139.0	0.00	
146.0	0.00	
182.0	0.00	
191.0	0.00	
213.0	0.00	
221.0	0.00	
229.0	0.00	
260.0	0.00	
282.0	0.00	
293.5	0.00	
312.0	0.00	
334.0	0.00	
343.0	0.00	
388.0	0.00	
399.0	0.00	

HAGER-RICHTER GEOSCIENCE, INC.	
BR-2 - HPFM During the WESTON Pump Test	
CLIENT	Weston Solutions, Inc.
PROJECT	Savage Municipal Water Supply Superfund Site
CITY, STATE	Milford, New Hampshire
H-R FILE	12RG62
DATE LOGGED	April 25, 2013
LOG DATUM	Top of the 6-Inch Steel Casing
Positive (+) Flow is Flow Up the Borehole	
Negative (-) Flow is Flow Down the Borehole	

BR-2 - HPFM During the WESTON Pump Test

Depth (feet)	Flow (gpm)	Flow Interpretation
130.0	0.00	no flow into or out of the borehole
158.0	0.00	no flow into or out of the borehole
167.0	0.00	no flow into or out of the borehole
187.0	0.00	no flow into or out of the borehole
202.0	0.00	no flow into or out of the borehole
207.0	0.00	no flow into or out of the borehole
215.0	0.00	no flow into or out of the borehole
230.0	0.00	no flow into or out of the borehole
244.0	0.00	no flow into or out of the borehole
259.0	0.00	flow into and down the borehole from the fractures at 262 feet and 278-292 feet
270.5	-0.04	
299.0	-0.08	
317.0	-0.08	no flow into or out of the borehole
327.0	-0.08	no flow into or out of the borehole
341.5	-0.08	flow out of the borehole through the fractures at 342-348 feet
355.0	-0.06	
367.0	-0.06	flow out of the borehole through the fractures at 368-374 feet and 390-394 feet
387.0	-0.04	
397.0	0.00	

HAGER-RICHTER GEOSCIENCE, INC.	
BR-3 - HPFM During the WESTON Pump Test	
CLIENT	Weston Solutions, Inc.
PROJECT	Savage Municipal Water Supply Superfund Site
CITY, STATE	Milford, New Hampshire
H-R FILE	12RG62
DATE LOGGED	April 25, 2013
LOG DATUM	Top of the 6-Inch Steel Casing
Positive (+) Flow is Flow Up the Borehole	
Negative (-) Flow is Flow Down the Borehole	

BR-3 - HPFM During the WESTON Pump Test

Depth (feet)	Flow (gpm)	Flow Interpretation
125.0	0.00	flow into and down the borehole from the fractures at 135 to 143 feet
150.0	-0.31	
170.0	-0.31	flow out of the borehole through the fractures at 175-194 feet
196.0	-0.23	
210.5	-0.23	no flow into or out of the borehole
230.0	-0.23	no flow into or out of the borehole
250.0	-0.23	flow out of the borehole through the fractures at 274 to 279 feet.
300.0	-0.12	
324.0	-0.12	flow out of the borehole through the fractures at 331-344 feet and 349-358 feet
347.0	-0.07	
367.5	0.00	
385.0	0.00	no flow into or out of the borehole
410.0	0.00	no flow into or out of the borehole
470.0	0.00	no flow into or out of the borehole
485.0	0.00	no flow into or out of the borehole

HAGER-RICHTER GEOSCIENCE, INC.	
BR-5 - HPFM During the WESTON Pump Test	
CLIENT	Weston Solutions, Inc.
PROJECT	Savage Municipal Water Supply Superfund Site
CITY, STATE	Milford, New Hampshire
H-R FILE	12RG62
DATE LOGGED	April 25, 2013
LOG DATUM	Top of the 6-Inch Steel Casing
Positive (+) Flow is Flow Up the Borehole	
Negative (-) Flow is Flow Down the Borehole	

BR-5 - HPFM During the WESTON Pump Test

Depth (feet)	Flow (gpm)	Flow Interpretation
70.0	0.00	no flow into or out of the borehole
79.0	0.00	flow into and down the borehole from the fractures at 81-83 feet and 89-95 feet
87.0	-0.05	
92.5	-0.12	
95.0	-0.12	no flow into or out of the borehole
106.0	-0.12	no flow into or out of the borehole
150.0	-0.12	no flow into or out of the borehole
170.0	-0.12	no flow into or out of the borehole
199.0	-0.12	no flow into or out of the borehole
219.0	-0.12	no flow into or out of the borehole
268.0	-0.12	flow out of the borehole through the fractures at 277-284 feet
295.0	-0.06	
335.0	-0.06	flow out of the borehole through the fractures at 336 to 345 feet
345.0	0.00	
355.0	0.00	no flow detected

HAGER-RICHTER GEOSCIENCE, INC.	
BR-9 - HPFM During the WESTON Pump Test	
CLIENT	Weston Solutions, Inc.
PROJECT	Savage Municipal Water Supply Superfund Site
CITY, STATE	Milford, New Hampshire
H-R FILE	12RG62
DATE LOGGED	April 25, 2013
LOG DATUM	Top of the 6-Inch Steel Casing
Positive (+) Flow is Flow Up the Borehole	
Negative (-) Flow is Flow Down the Borehole	

BR-9 - HPFM During the WESTON Pump Test

Depth (feet)	Flow (gpm)	Flow Interpretation
80.0	0.00	Vertical flow was not detected in borehole BR-9 during the pump test.
92.0	0.00	
101.5	0.00	
124.0	0.00	
154.0	0.00	
205.0	0.00	
227.0	0.00	
295.0	0.00	
320.0	0.00	
331.0	0.00	
343.0	0.00	

HAGER-RICHTER GEOSCIENCE, INC.	
BR-10 - HPFM During the WESTON Pump Test	
CLIENT	Weston Solutions, Inc.
PROJECT	Savage Municipal Water Supply Superfund Site
CITY, STATE	Milford, New Hampshire
H-R FILE	12RG62
DATE LOGGED	April 26, 2013
LOG DATUM	Top of the 6-Inch Steel Casing
Positive (+) Flow is Flow Up the Borehole	
Negative (-) Flow is Flow Down the Borehole	

BR-10 - HPFM During the WESTON Pump Test

Depth (feet)	Flow (gpm)	Flow Interpretation
79.0	0.00	no flow into or out of the borehole
91.0	0.00	no flow into or out of the borehole
103.0	0.00	no flow into or out of the borehole
118.0	0.00	no flow into or out of the borehole
130.0	0.00	no flow into or out of the borehole
141.0	0.00	no flow into or out of the borehole
188.0	0.00	no flow into or out of the borehole
226.0	0.00	no flow into or out of the borehole
235.0	0.00	flow out of the borehole through the fractures at 239-240 feet
244.0	0.02	
291.0	0.02	flow out of the borehole through the fractures at 292-303 feet
304.0	0.03	
332.0	0.03	no flow into or out of the borehole
344.0	0.03	flow into and up the borehole from the fractures at 344-352 feet
358.0	0.00	

HAGER-RICHTER GEOSCIENCE, INC.	
BR-11 - HPFM During the WESTON Pump Test	
CLIENT	Weston Solutions, Inc.
PROJECT	Savage Municipal Water Supply Superfund Site
CITY, STATE	Milford, New Hampshire
H-R FILE	12RG62
DATE LOGGED	April 25, 2013
LOG DATUM	Top of the 6-Inch Steel Casing
Positive (+) Flow is Flow Up the Borehole	
Negative (-) Flow is Flow Down the Borehole	

BR-11 - HPFM During the WESTON Pump Test

Depth (feet)	Flow (gpm)	Flow Interpretation
125.0	0.00	Vertical flow was not detected in borehole BR-11 during the pump test.
133.5	0.00	
142.0	0.00	
151.0	0.00	
157.5	0.00	
171.0	0.00	
203.0	0.00	
248.0	0.00	
258.0	0.00	
286.0	0.00	
301.5	0.00	
327.0	0.00	
339.0	0.00	
360.0	0.00	
382.0	0.00	

HAGER-RICHTER GEOSCIENCE, INC.	
BR-12 - HPFM During the WESTON Pump Test	
CLIENT	Weston Solutions, Inc.
PROJECT	Savage Municipal Water Supply Superfund Site
CITY, STATE	Milford, New Hampshire
H-R FILE	12RG62
DATE LOGGED	April 25, 2013
LOG DATUM	Top of the 6-Inch Steel Casing
Positive (+) Flow is Flow Up the Borehole	
Negative (-) Flow is Flow Down the Borehole	

BR-12 - HPFM During the WESTON Pump Test

Depth (feet)	Flow (gpm)	Flow Interpretation
112.0	0.00	Vertical flow was not detected in borehole BR-12 during the pump test.
118.0	0.00	
125.5	0.00	
143.0	0.00	
152.0	0.00	
161.0	0.00	
246.0	0.00	
260.0	0.00	
330.0	0.00	
346.0	0.00	
402.0	0.00	

HAGER-RICHTER GEOSCIENCE, INC.	
BR-16 - HPFM During the WESTON Pump Test	
CLIENT	Weston Solutions, Inc.
PROJECT	Savage Municipal Water Supply Superfund Site
CITY, STATE	Milford, New Hampshire
H-R FILE	12RG62
DATE LOGGED	April 26, 2013
LOG DATUM	Top of the 6-Inch Steel Casing
Positive (+) Flow is Flow Up the Borehole	
Negative (-) Flow is Flow Down the Borehole	

BR-16 - HPFM During the WESTON Pump Test

Depth (feet)	Flow (gpm)	Flow Interpretation
94.0	0.00	Vertical flow was not detected in borehole BR-16 during the pump test.
102.0	0.00	
160.0	0.00	
221.0	0.00	
228.0	0.00	
278.0	0.00	
290.0	0.00	
307.0	0.00	
320.0	0.00	
380.0	0.00	

HAGER-RICHTER GEOSCIENCE, INC.	
MW-16R - HPFM During the WESTON Pump Test	
CLIENT	Weston Solutions, Inc.
PROJECT	Savage Municipal Water Supply Superfund Site
CITY, STATE	Milford, New Hampshire
H-R FILE	12RG62
DATE LOGGED	April 26, 2013
LOG DATUM	Top of the 6-Inch Steel Casing
Positive (+) Flow is Flow Up the Borehole	
Negative (-) Flow is Flow Down the Borehole	

MW-16R - HPFM During the WESTON Pump Test

Depth (feet)	Flow (gpm)	Flow Interpretation
90.0	0.00	Vertical flow was not detected in borehole MW-16R during the pump test.
115.0	0.00	
120.5	0.00	
125.0	0.00	
150.0	0.00	
161.0	0.00	
169.0	0.00	
176.0	0.00	
191.5	0.00	
198.0	0.00	
243.0	0.00	
249.0	0.00	
267.0	0.00	
277.0	0.00	
286.0	0.00	
340.0	0.00	
380.0	0.00	

HAGER-RICHTER GEOSCIENCE, INC.	
MW-30 - HPFM During the WESTON Pump Test	
CLIENT	Weston Solutions, Inc.
PROJECT	Savage Municipal Water Supply Superfund Site
CITY, STATE	Milford, New Hampshire
H-R FILE	12RG62
DATE LOGGED	April 25, 2013
LOG DATUM	Top of the 6-Inch Steel Casing
Positive (+) Flow is Flow Up the Borehole	
Negative (-) Flow is Flow Down the Borehole	

MW-30 - HPFM During the WESTON Pump Test

Depth (feet)	Flow (gpm)	Flow Interpretation
150.0	0.00	Vertical flow was not detected in borehole MW-30 during the pump test.
164.0	0.00	
173.0	0.00	
181.5	0.00	
201.5	0.00	
213.0	0.00	
220.0	0.00	
226.0	0.00	
228.5	0.00	
233.0	0.00	
252.0	0.00	
267.0	0.00	
272.0	0.00	
279.0	0.00	