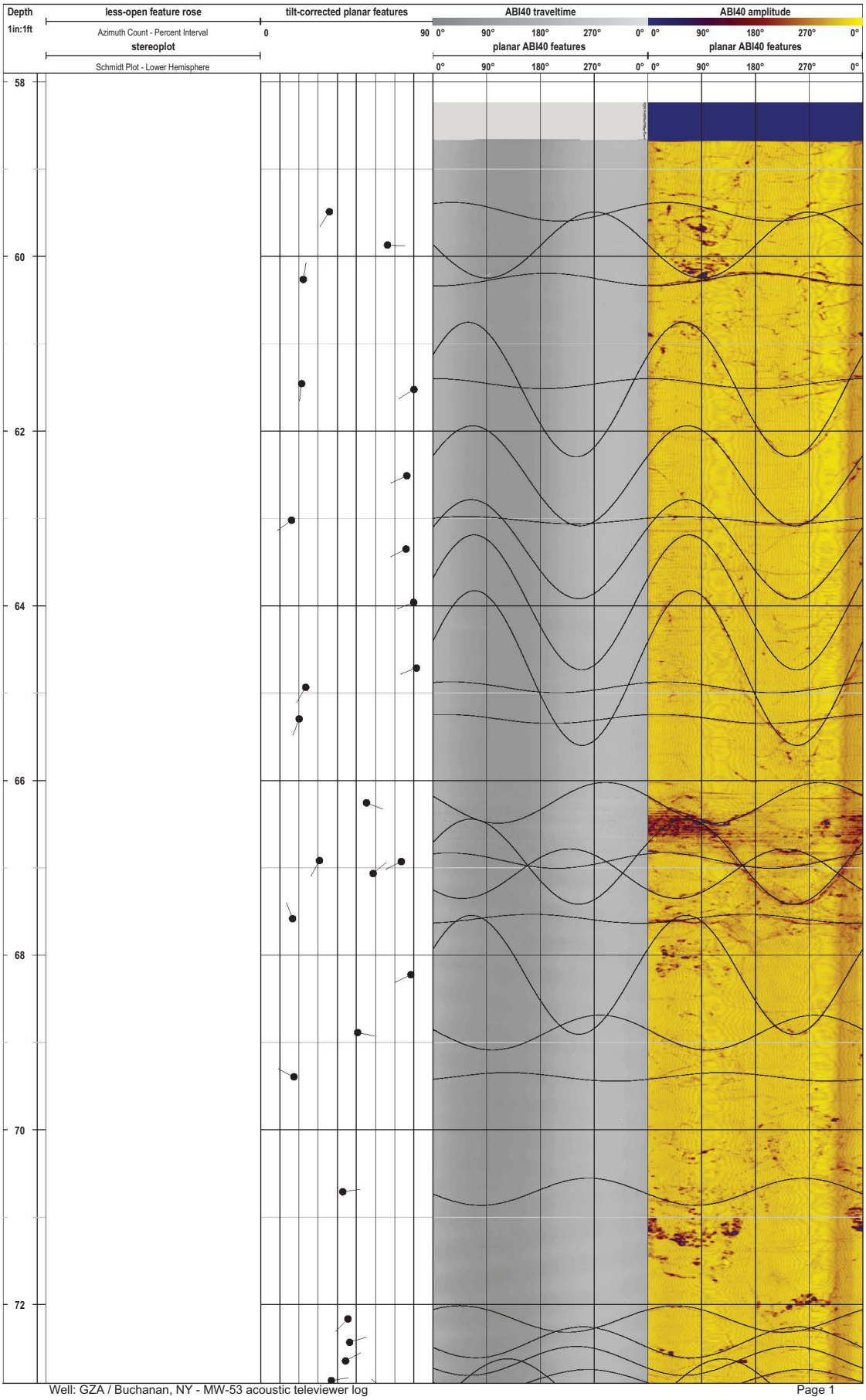
United States Nuclear Regulatory Commission Official Hearing Exhibit

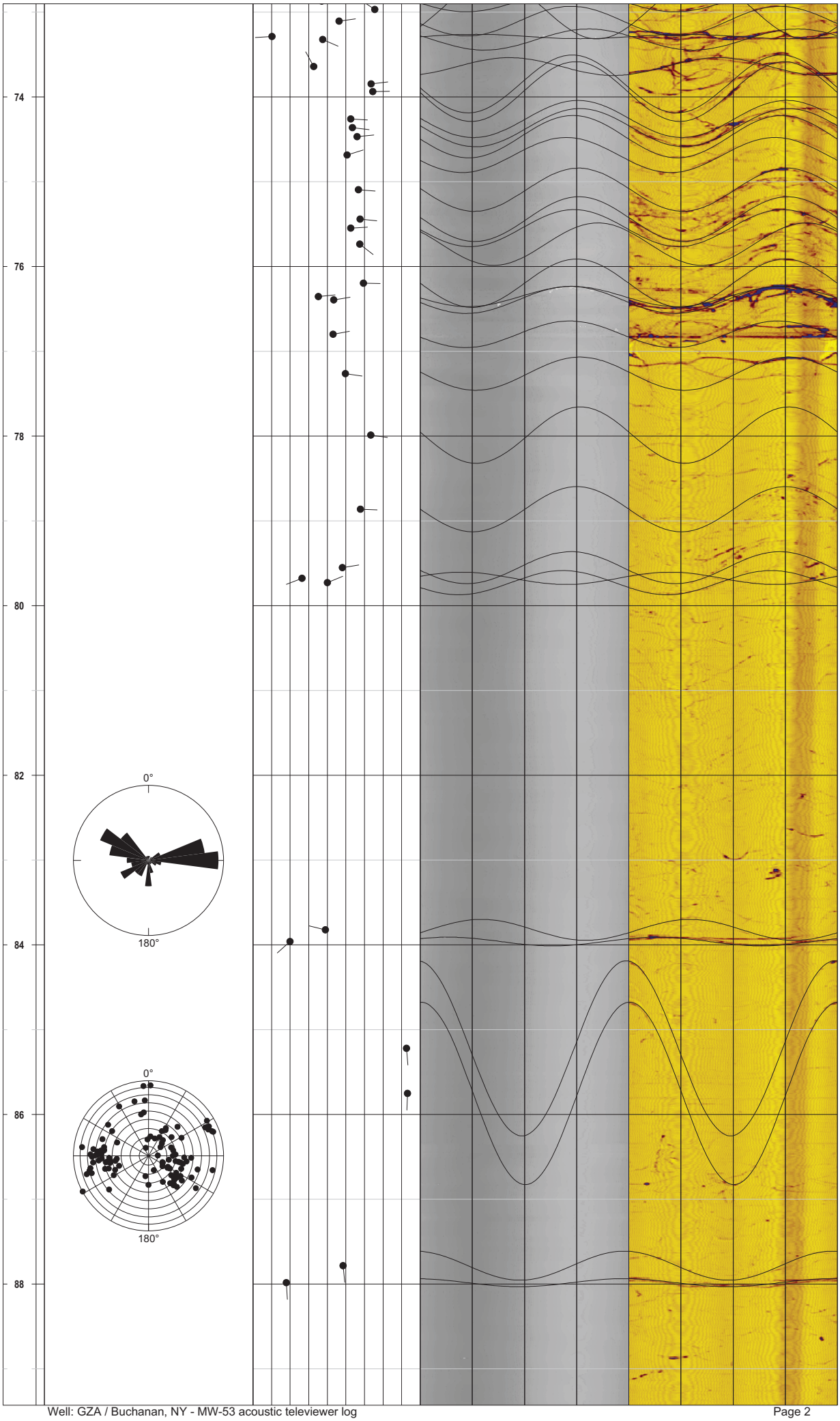
In the Matter of: Entergy Nuclear Operations, Inc.
(Indian Point Nuclear Generating Units 2 and 3)

ASLBP #: 07-858-03-LR-BD01
Docket #: 05000247 | 05000286
Exhibit #: ENT00331K-00-BD01
Identified: 10/15/2012
Admitted: 10/15/2012
Withdrawn:
Rejected:
Stricken:
Other:

ENT00331K
Submitted: March 29, 2012

Project - Well: GZA / Buchanan, NY - MW-53 acoustic televiewer log

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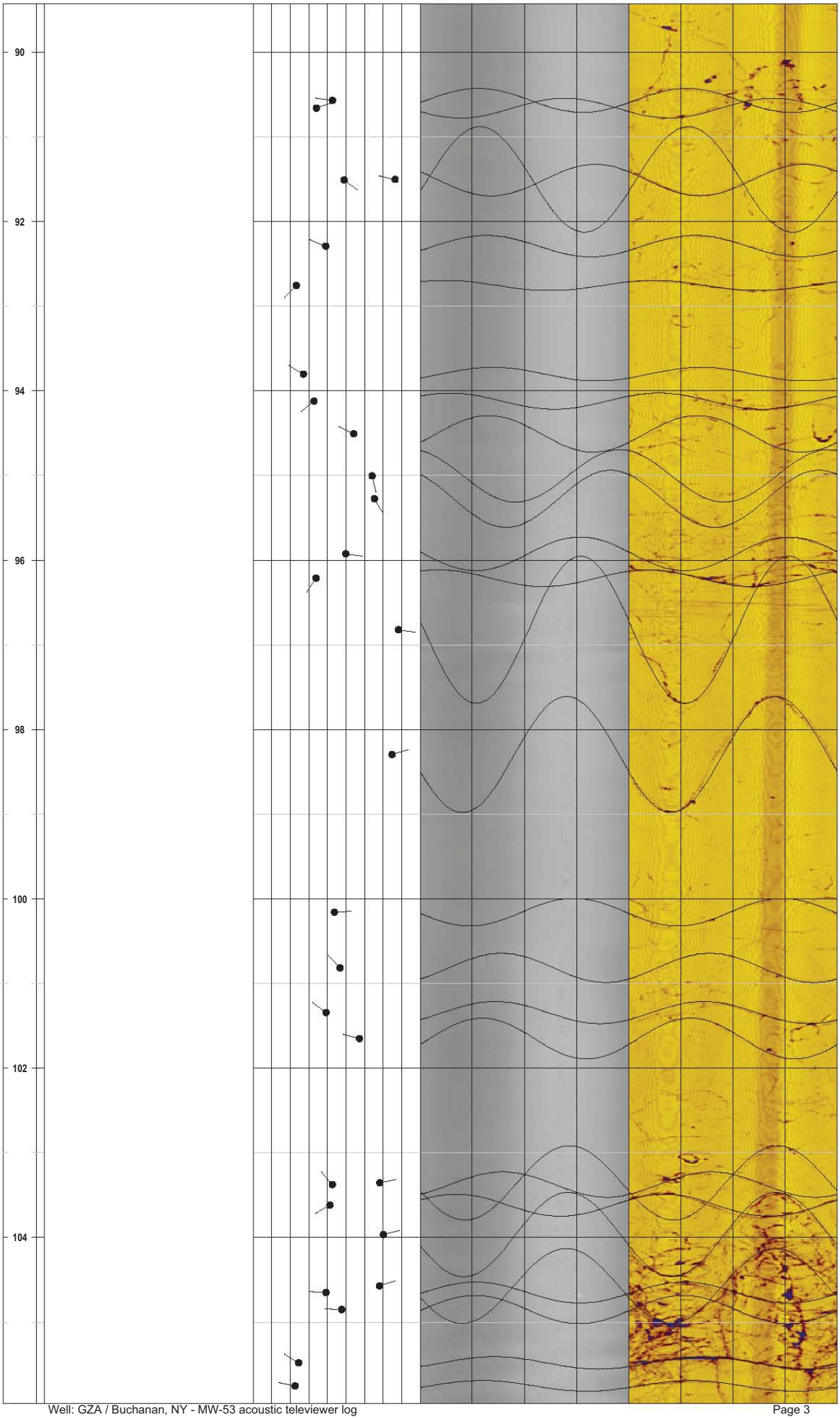
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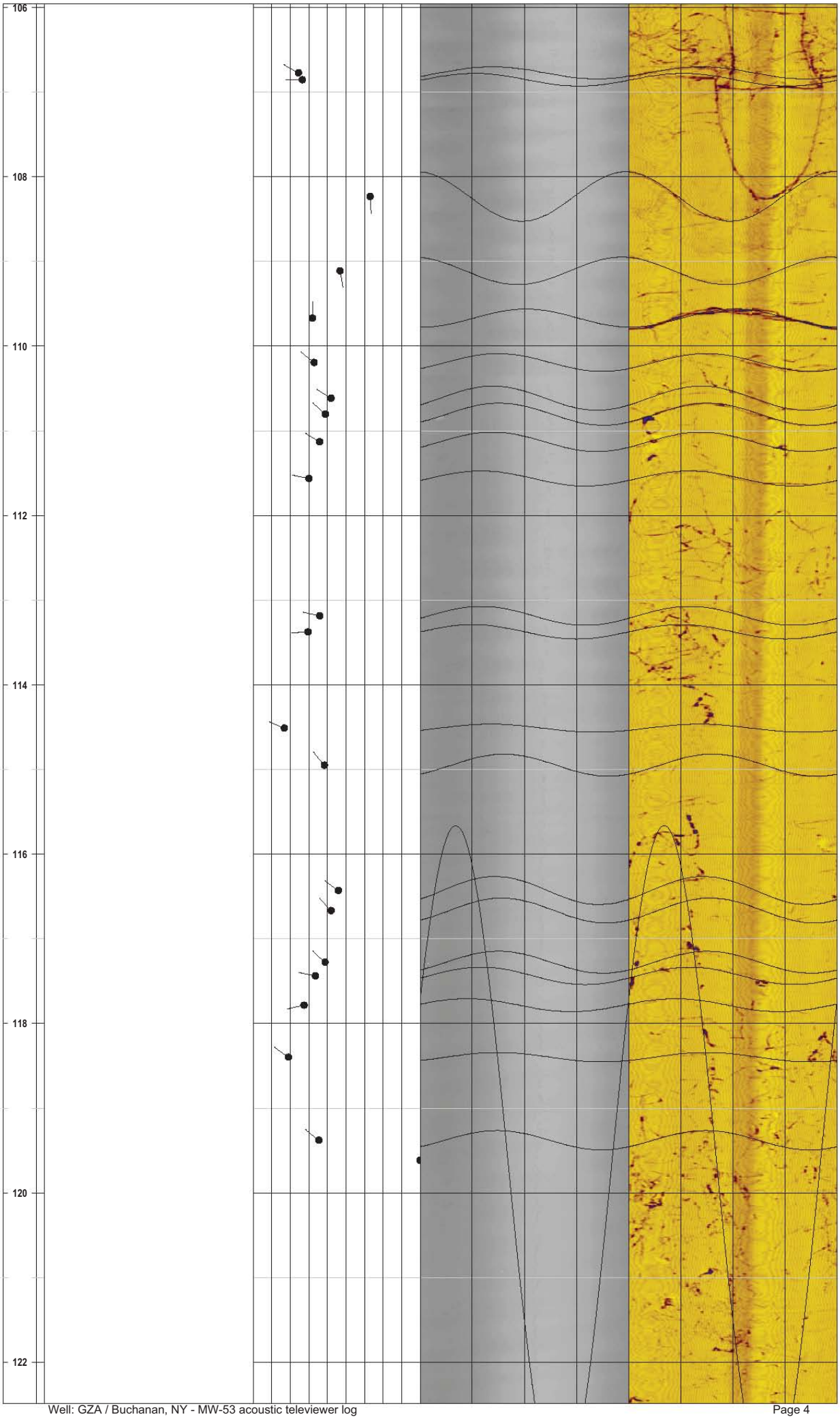
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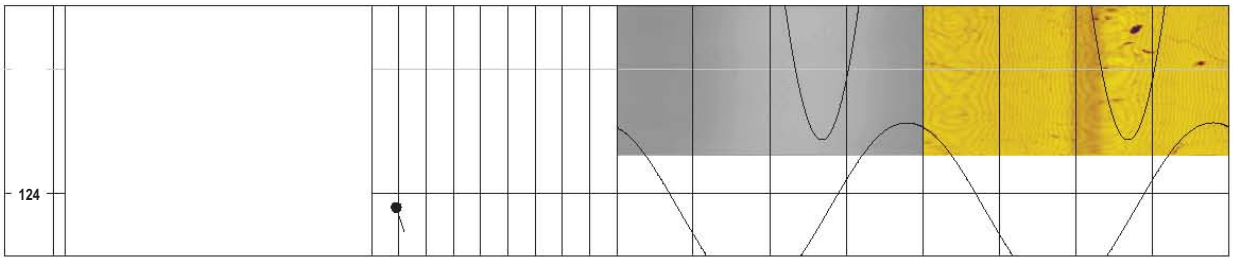
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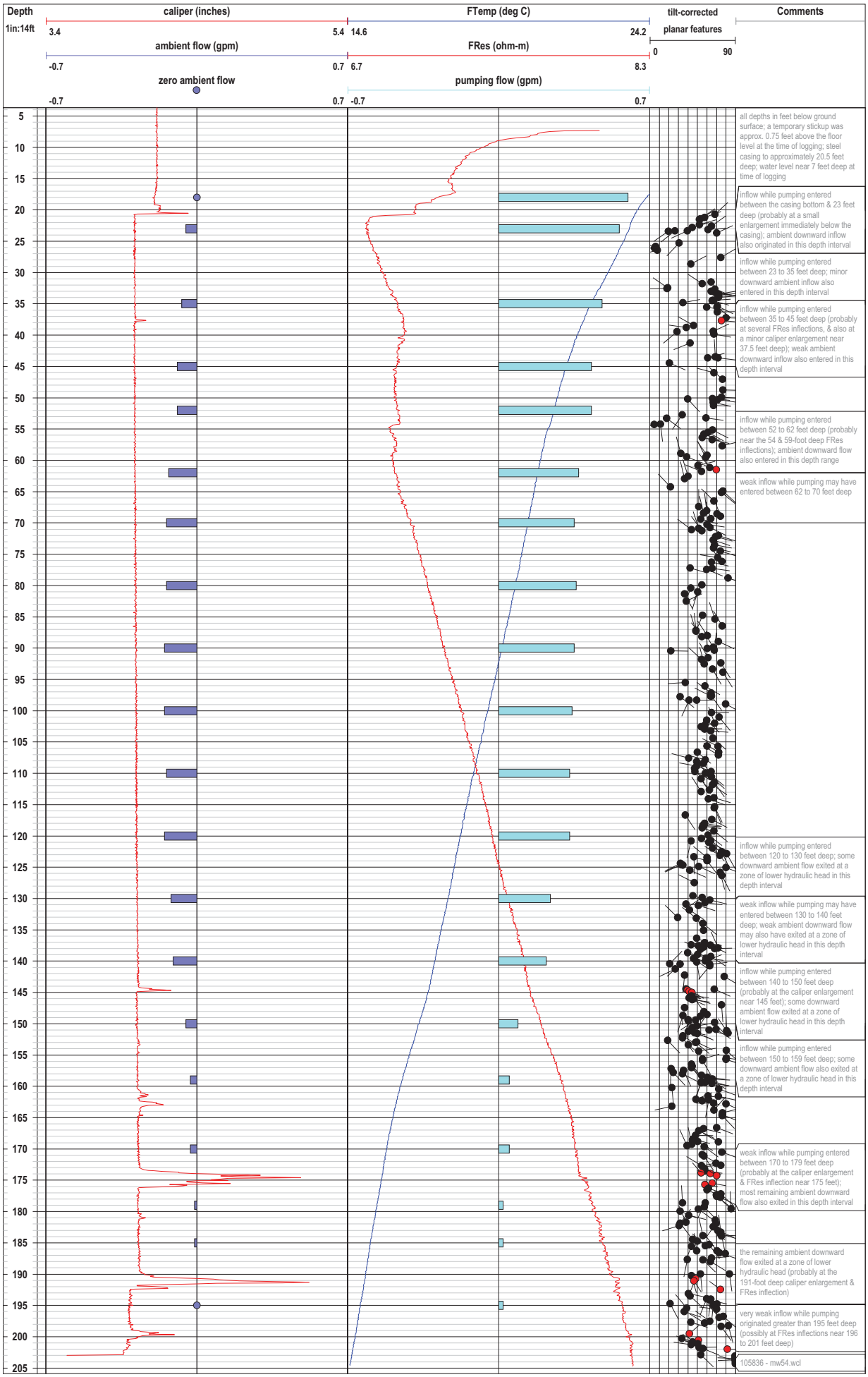
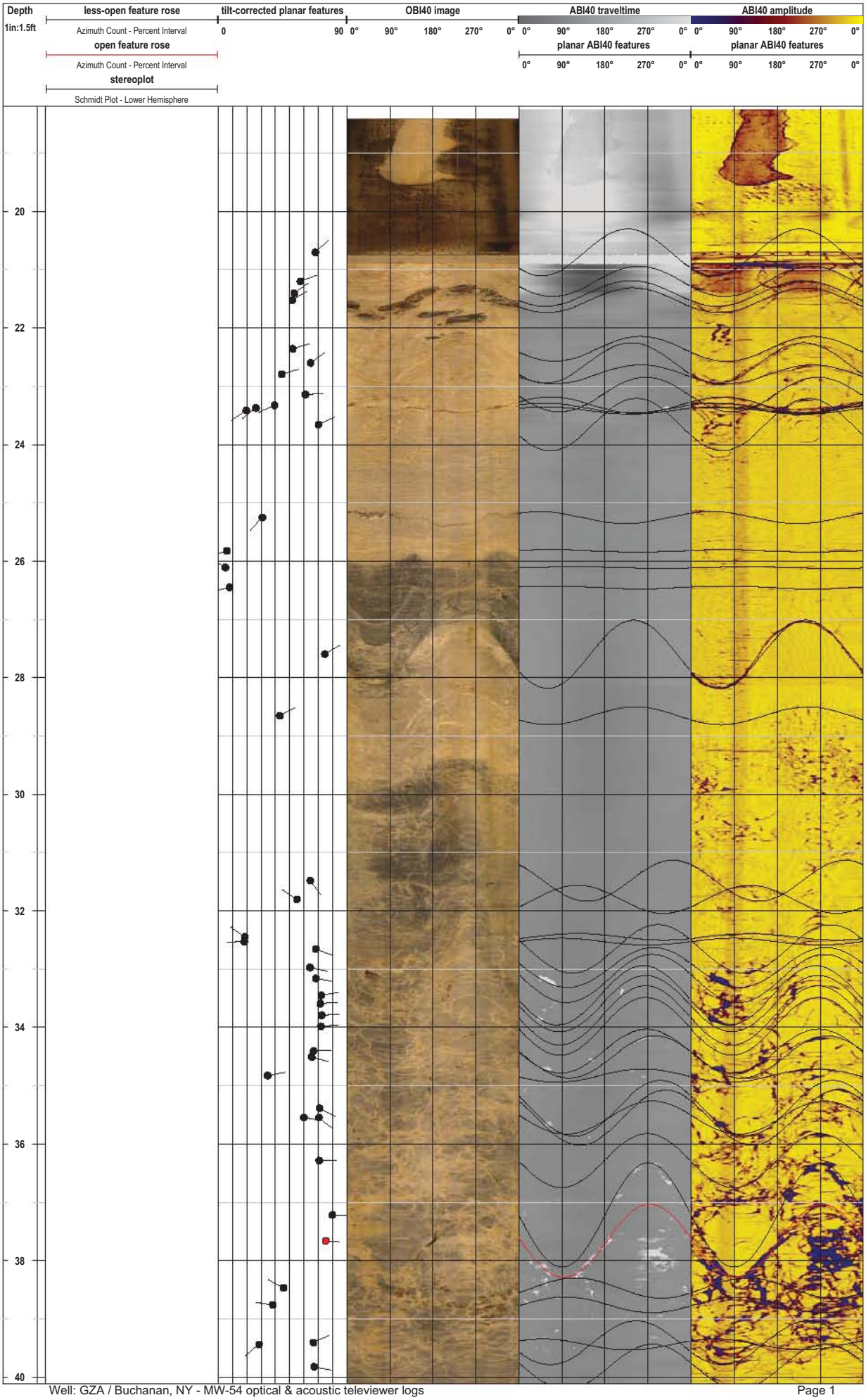
Project - Well: GZA / Buchanan, NY - MW-54 conventional logs



Well: GZA / Buchanan, NY - MW-54 conventional logs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Schmidt Plot - Lower Hemisphere
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0° 90° 180° 270° 0°
ABI40 traveltime
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planar ABI40 features
0° 90° 180° 270° 0°
ABI40 amplitude
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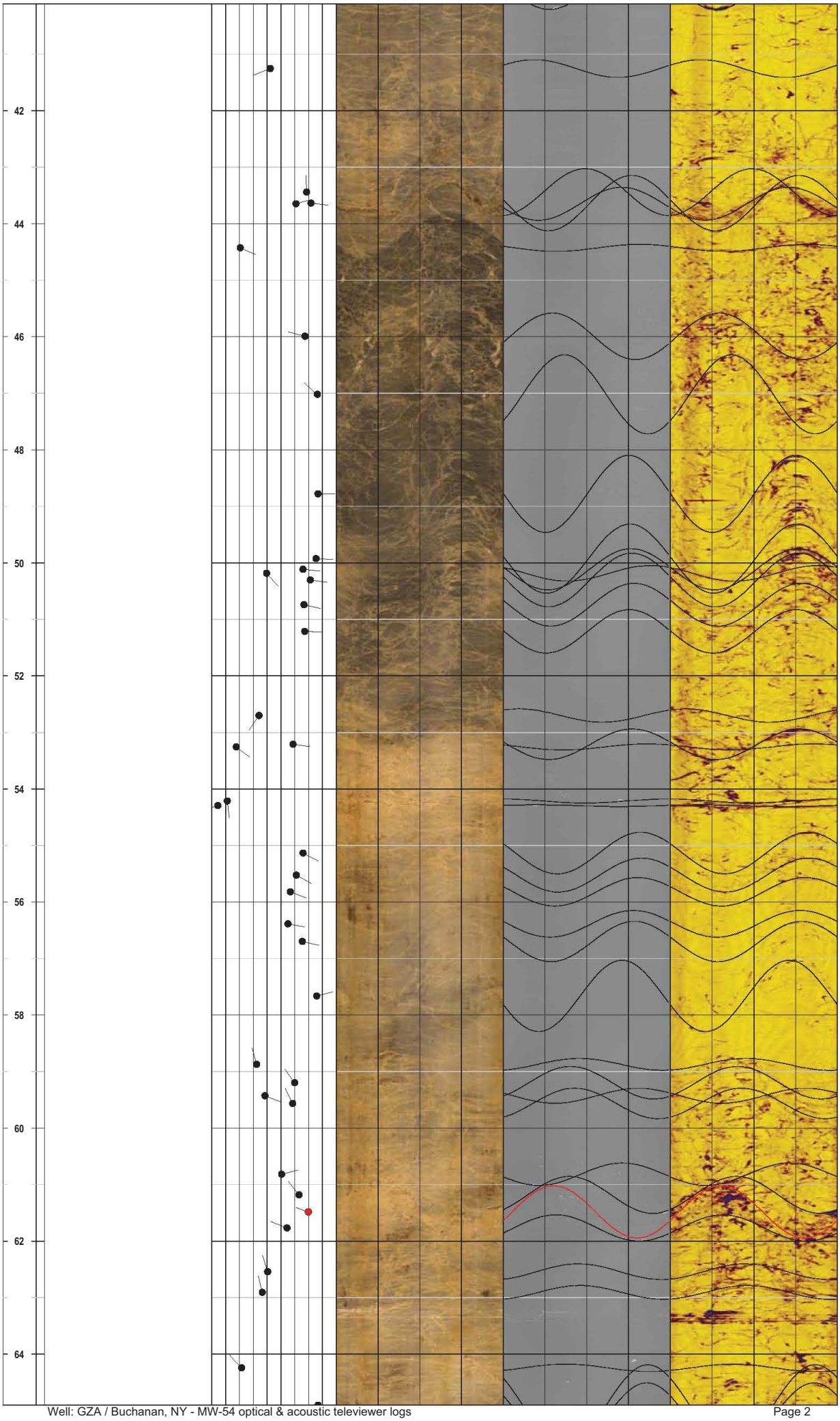
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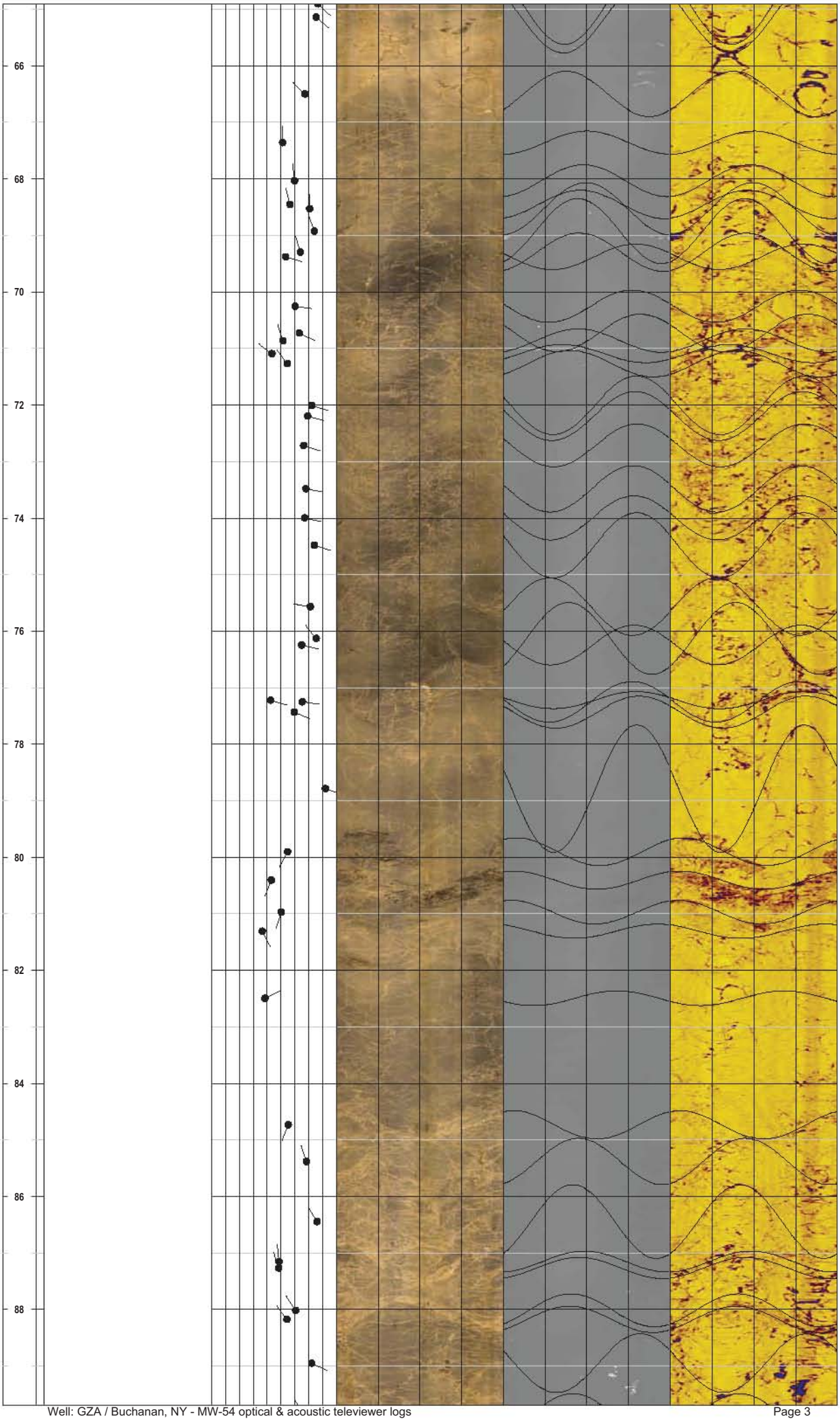
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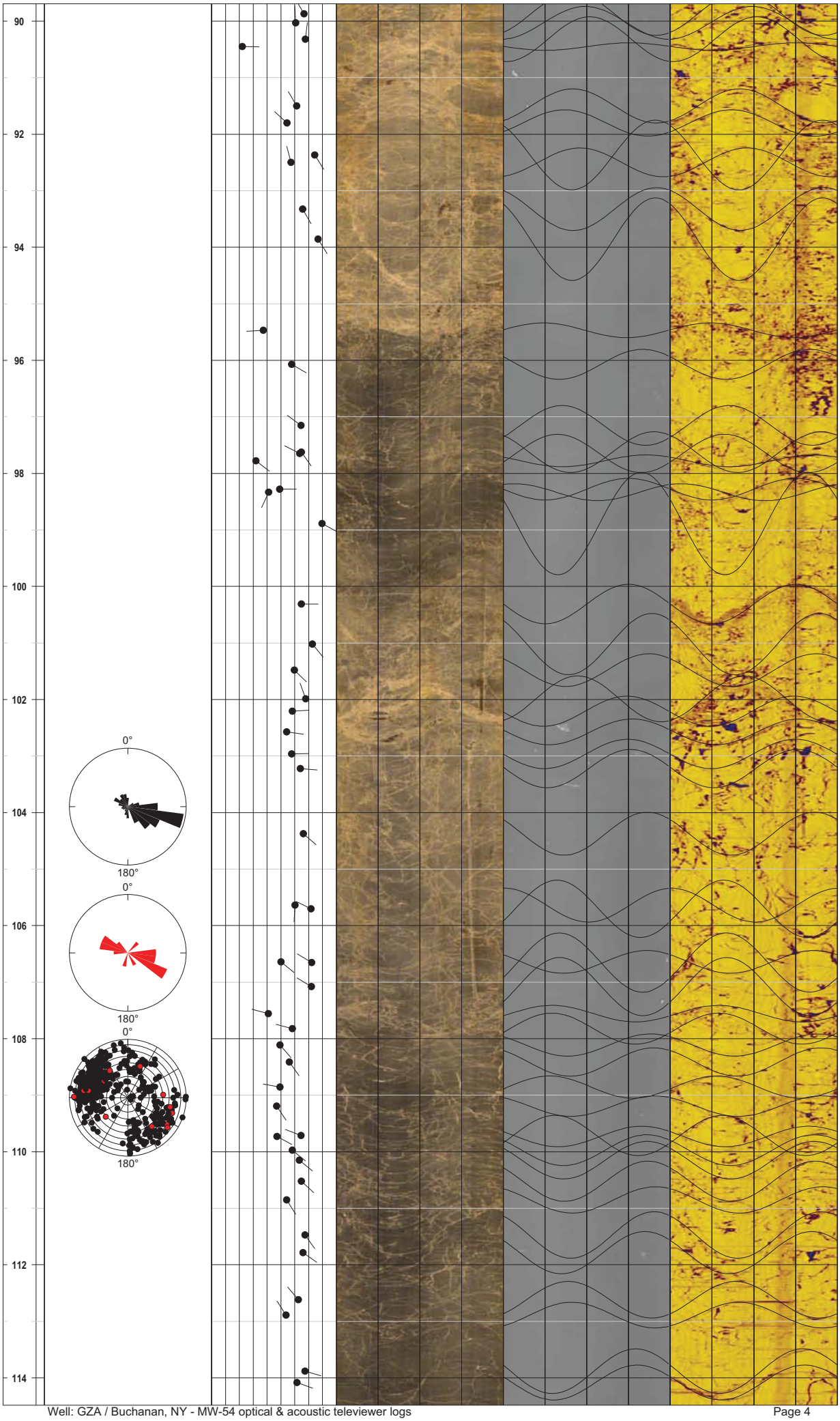
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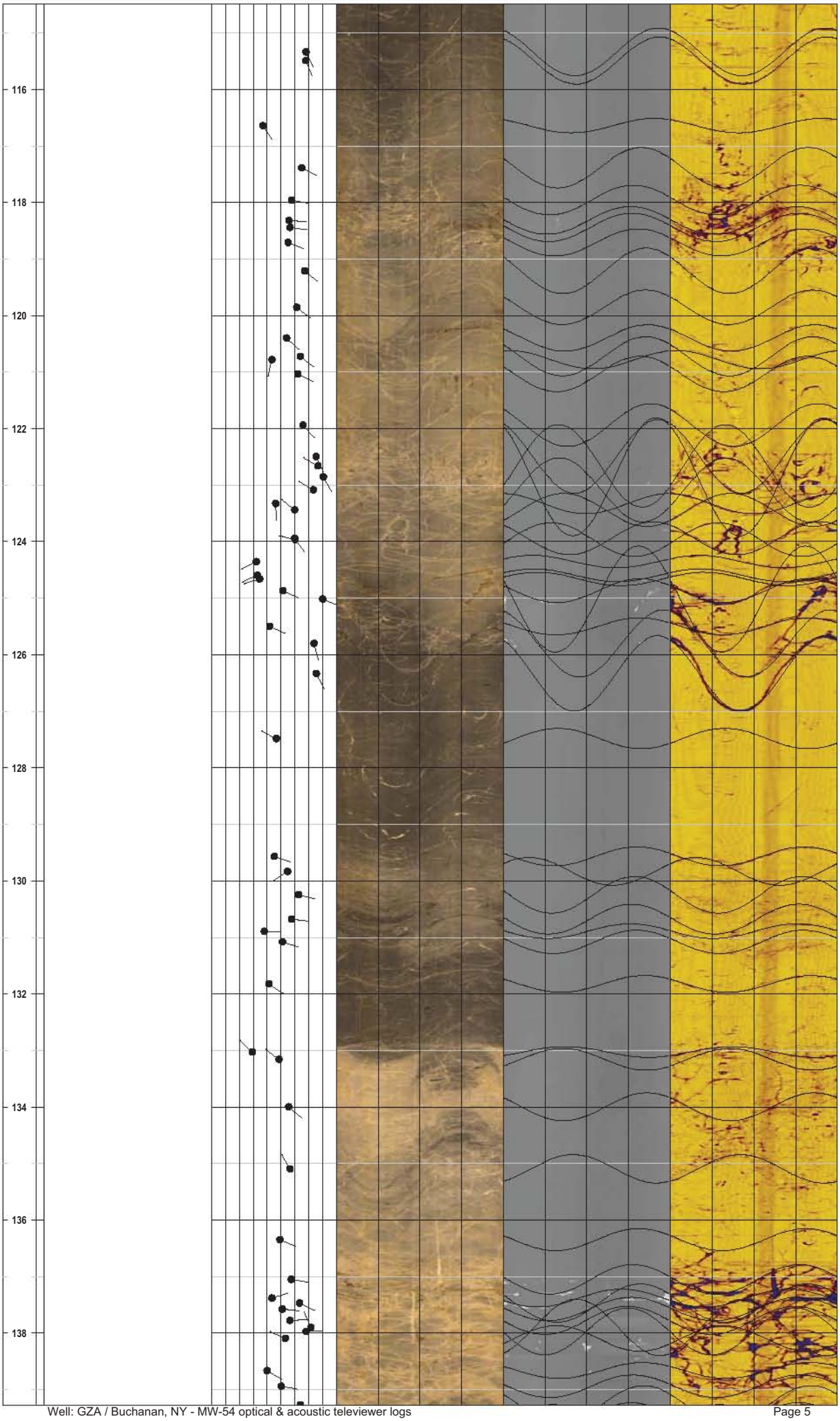
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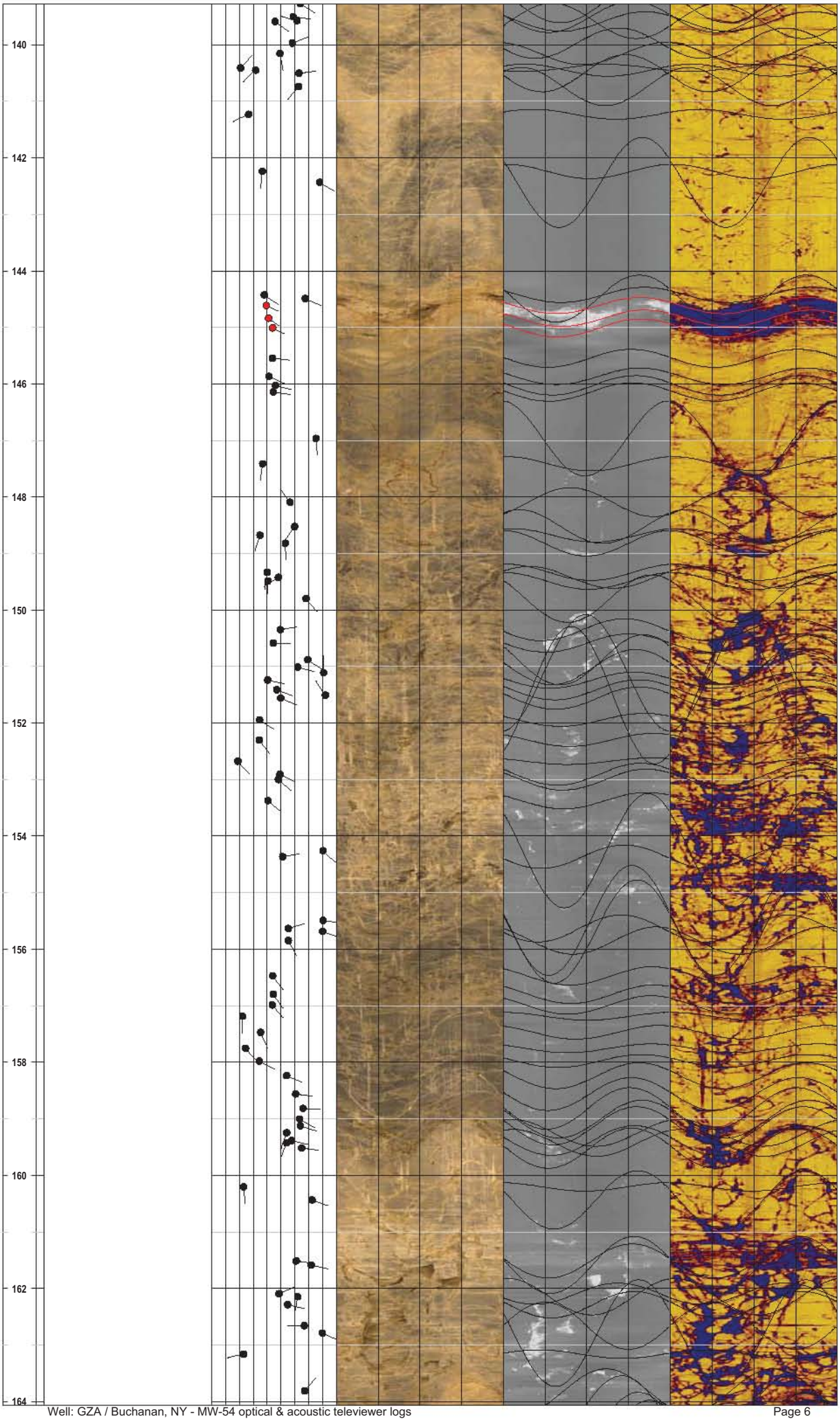
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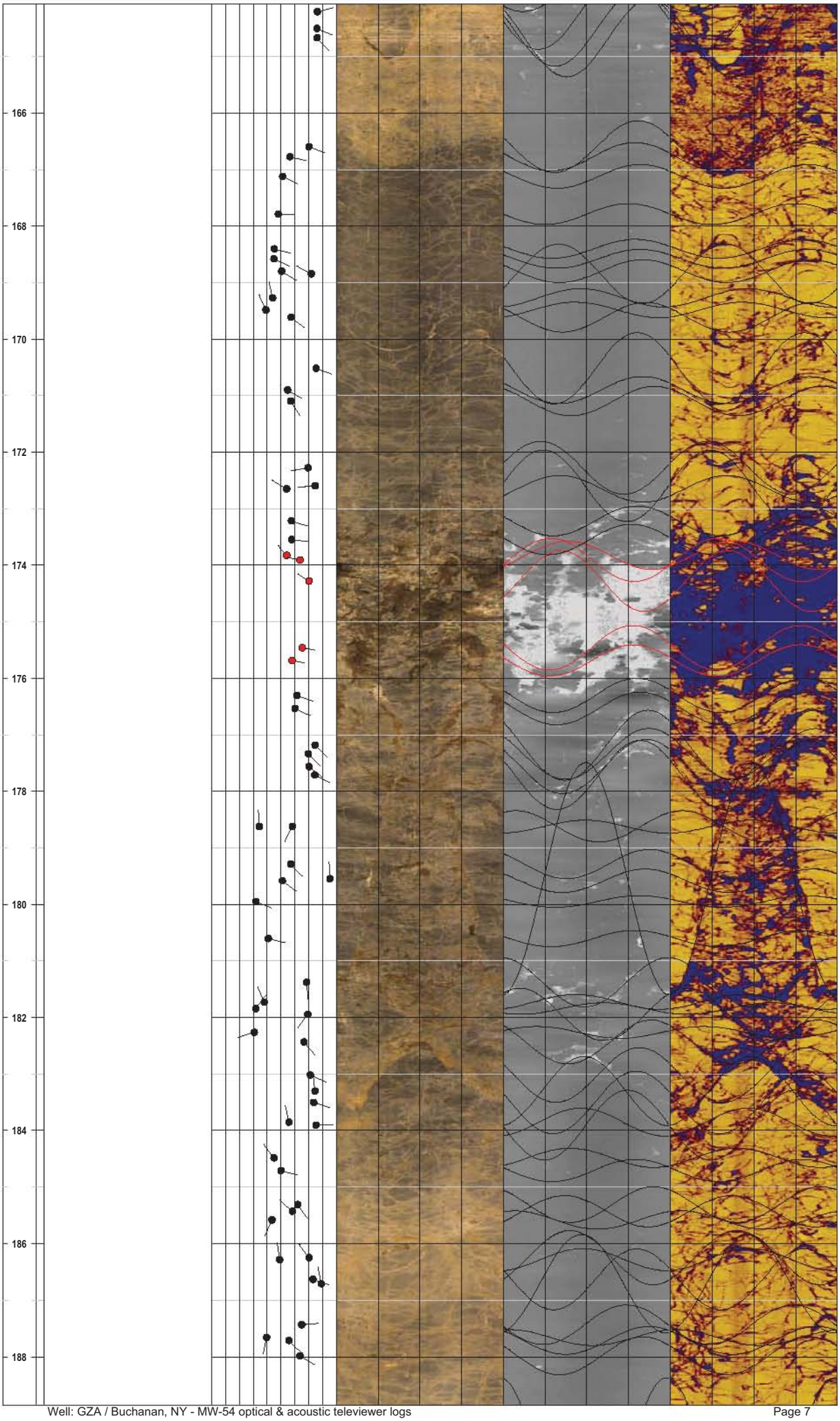
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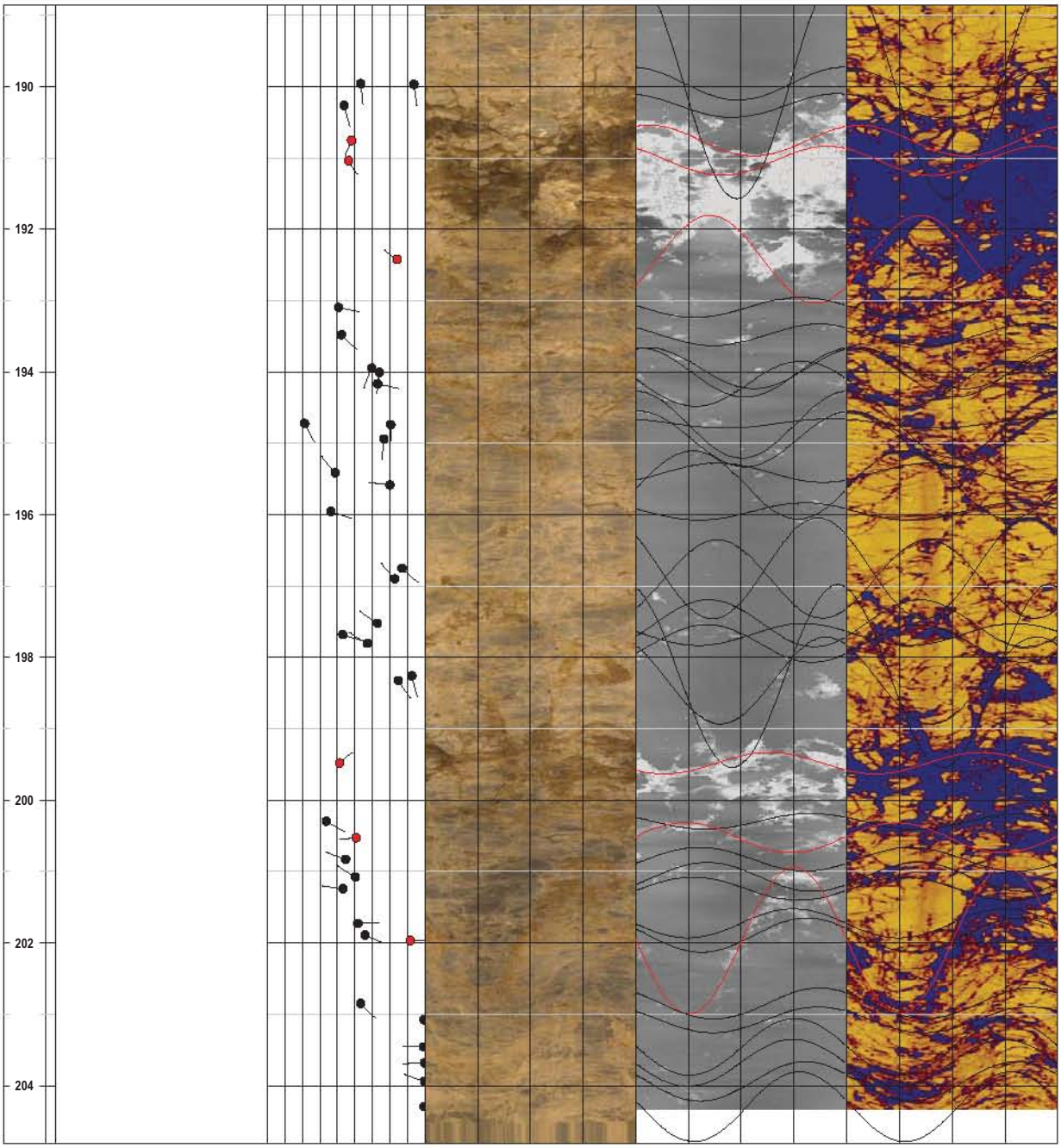
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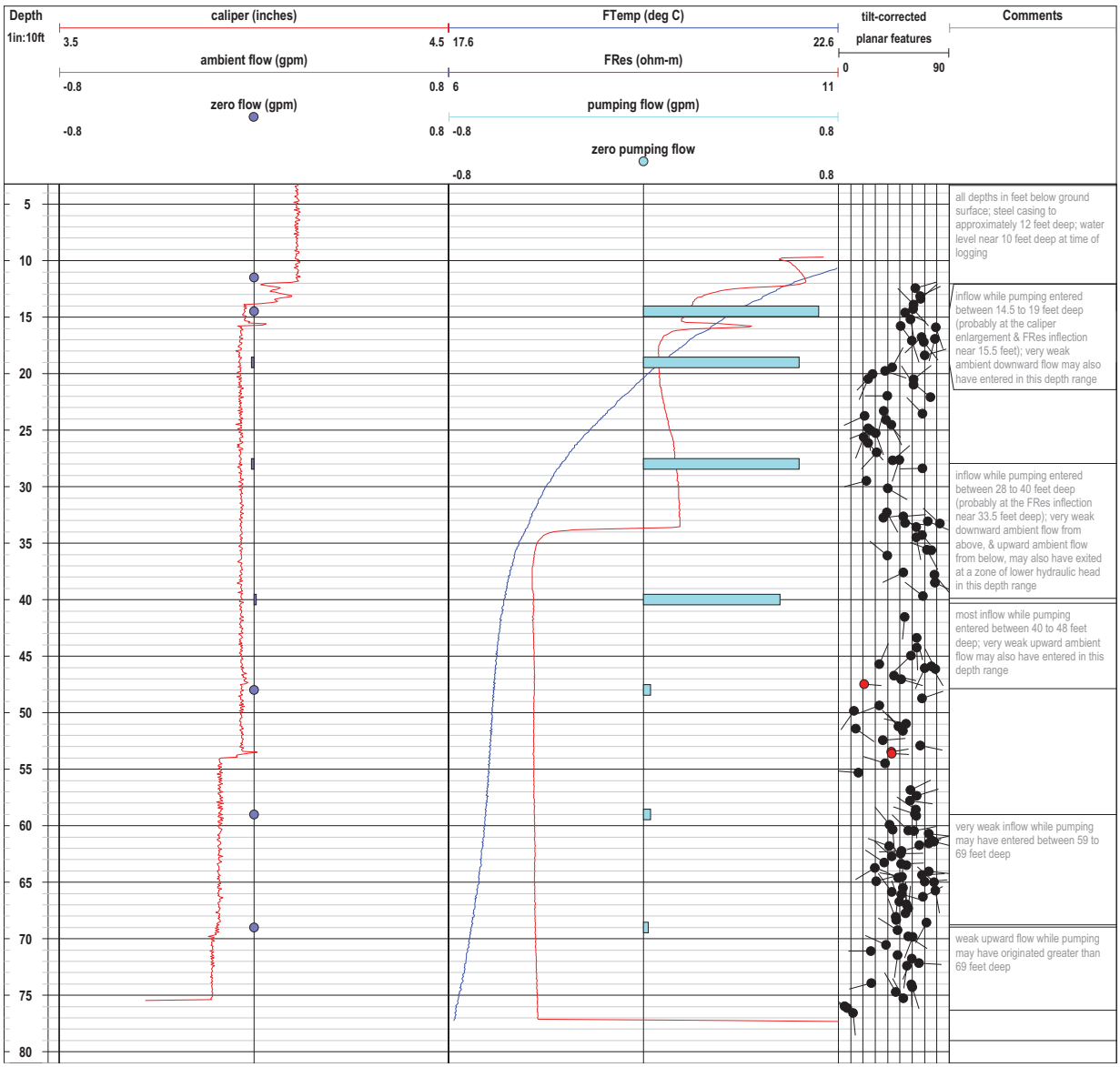
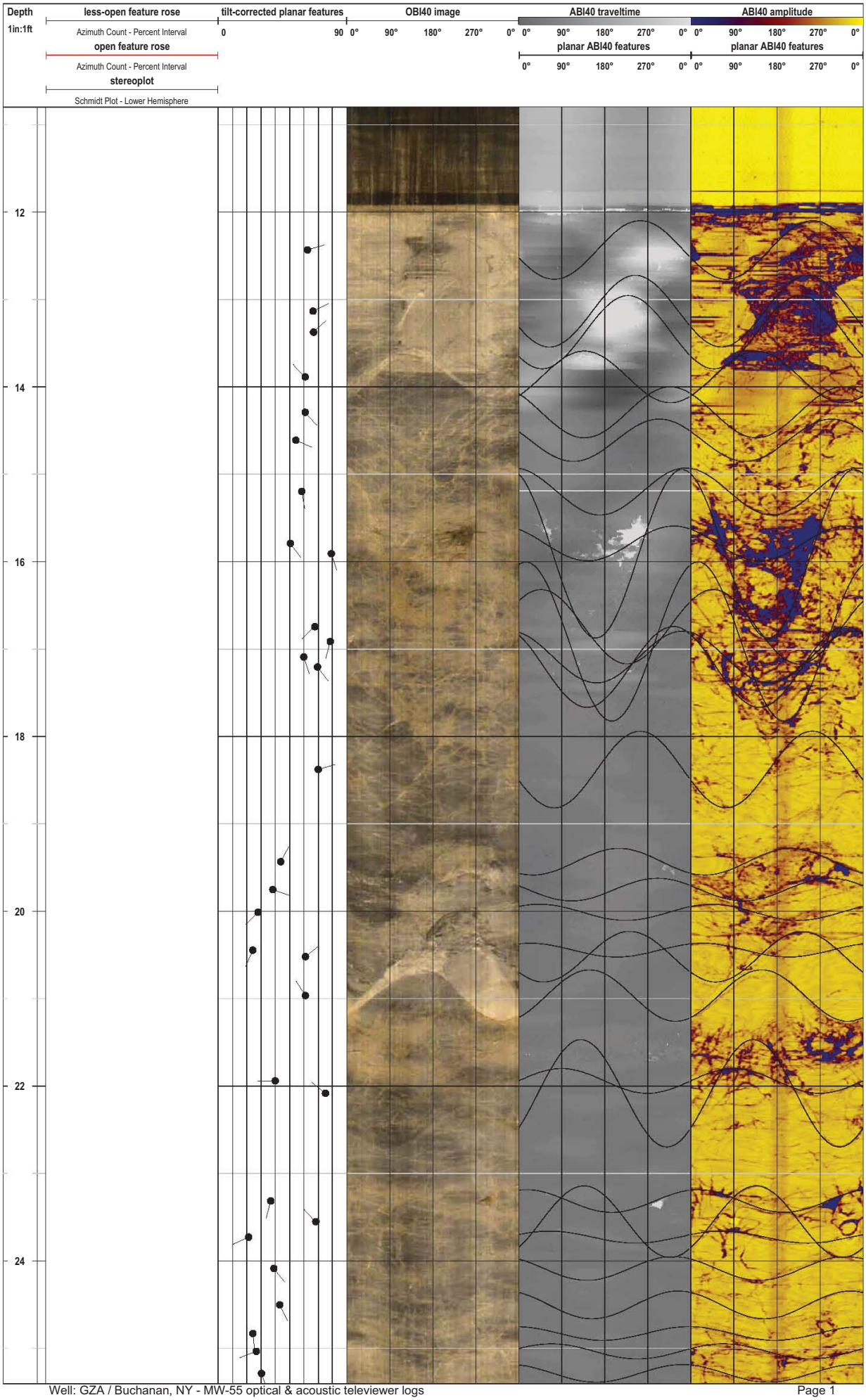
Project - Well: GZA / Buchanan, NY - MW-55 conventional logs

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open feature rose
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stereoplot
Schmidt Plot - Lower Hemisphere
tilt-corrected planar features
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ABI40 traveltime
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planar ABI40 features
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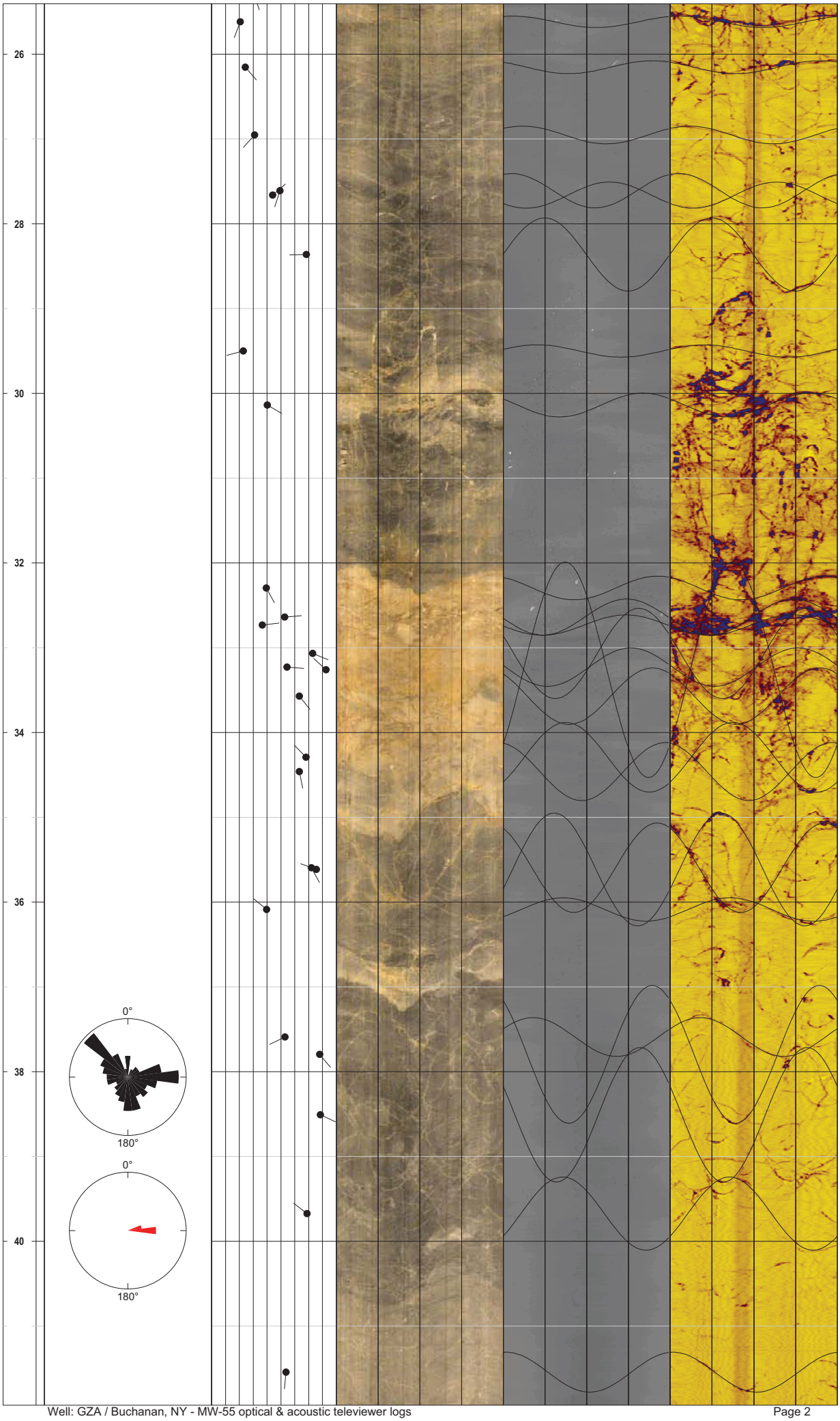
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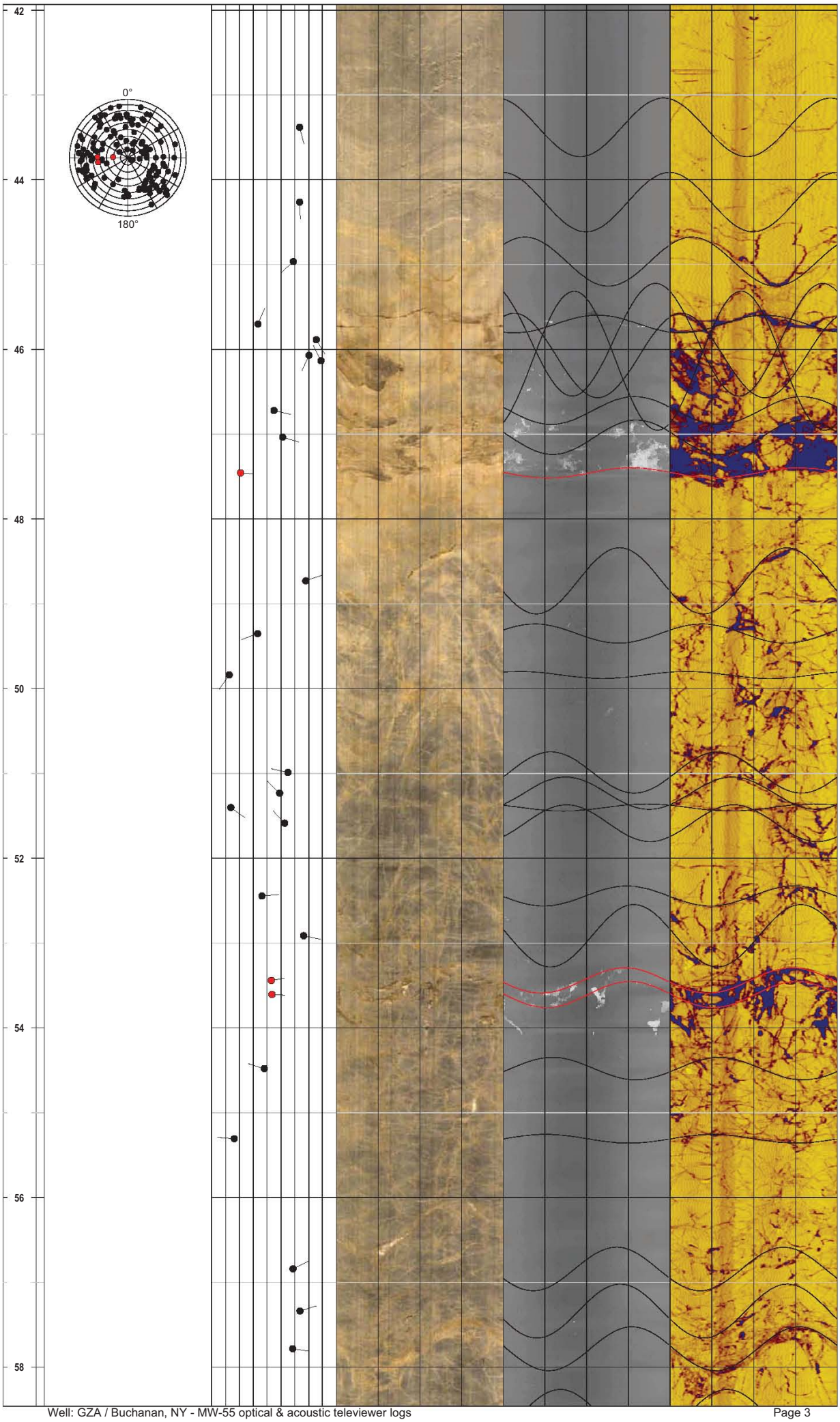
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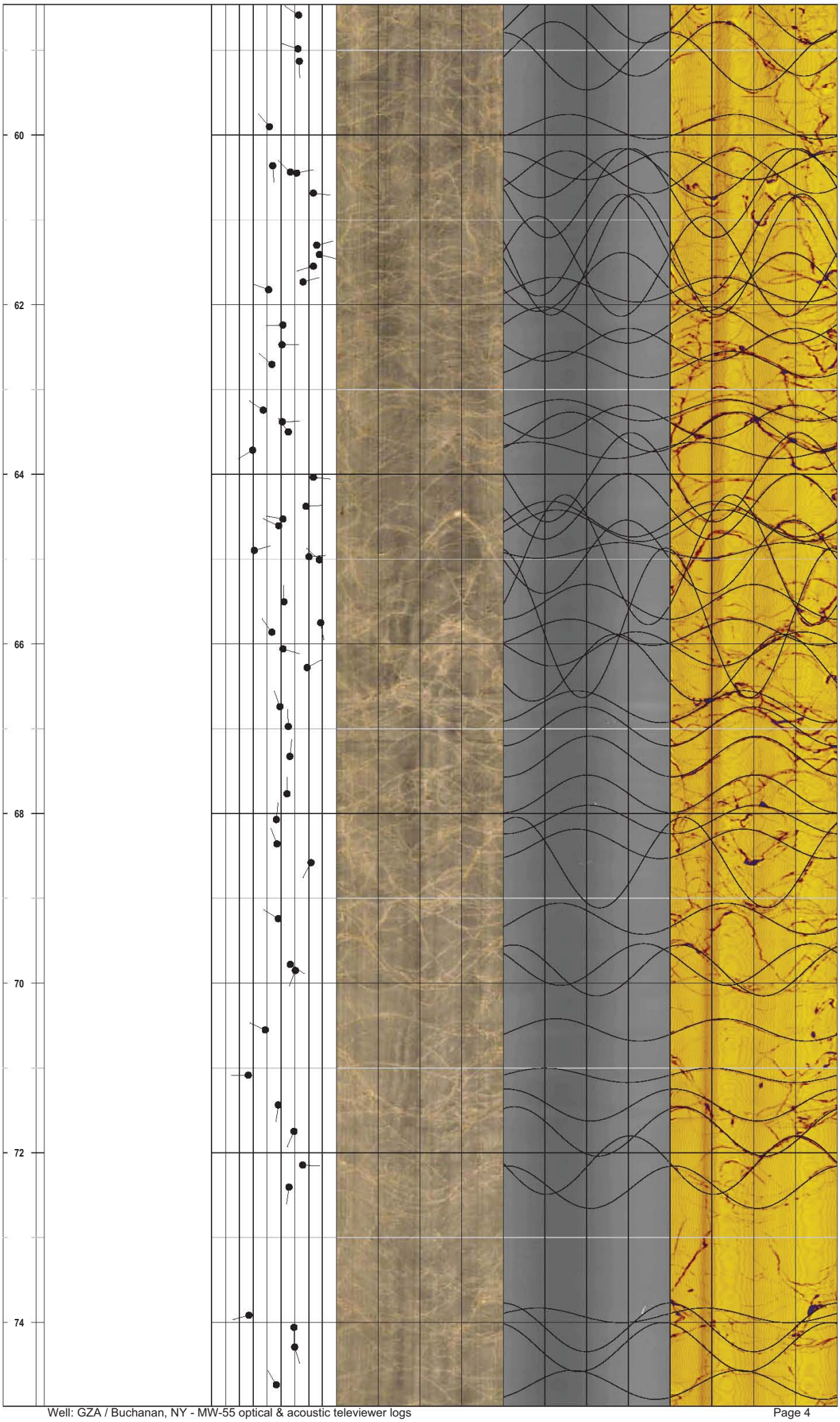
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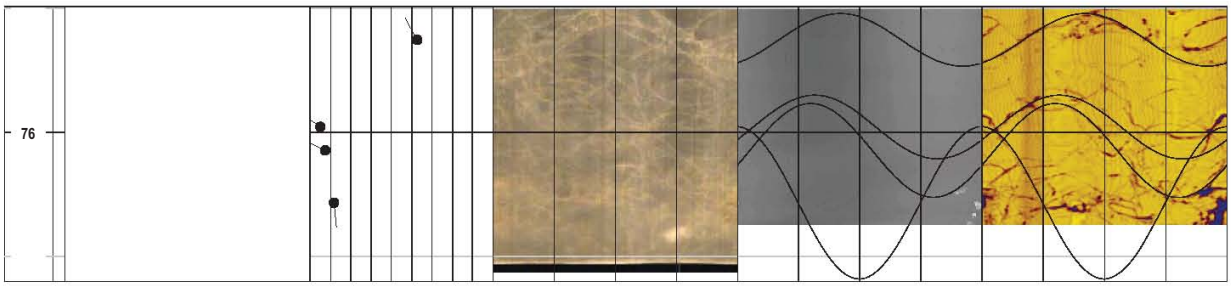
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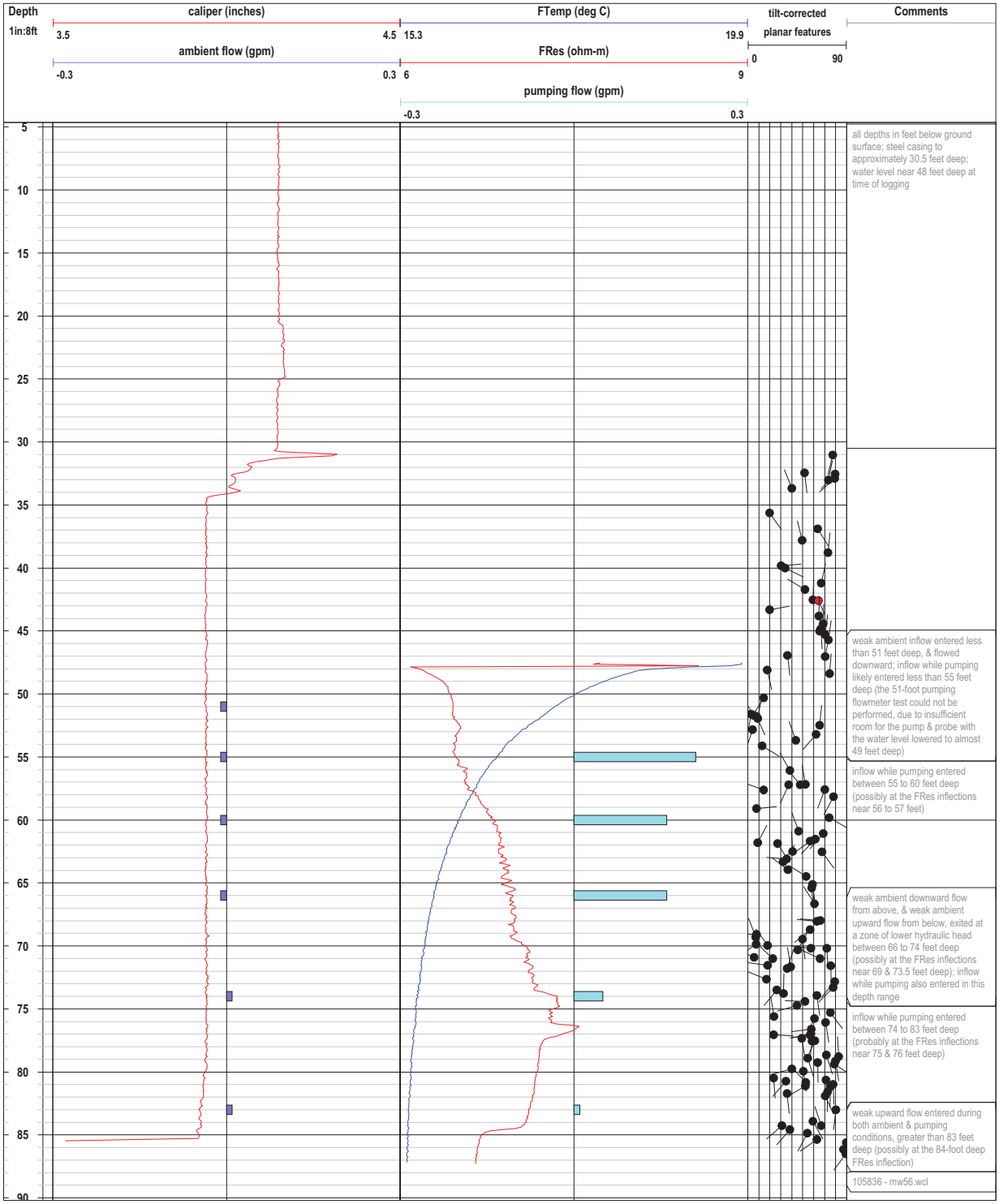
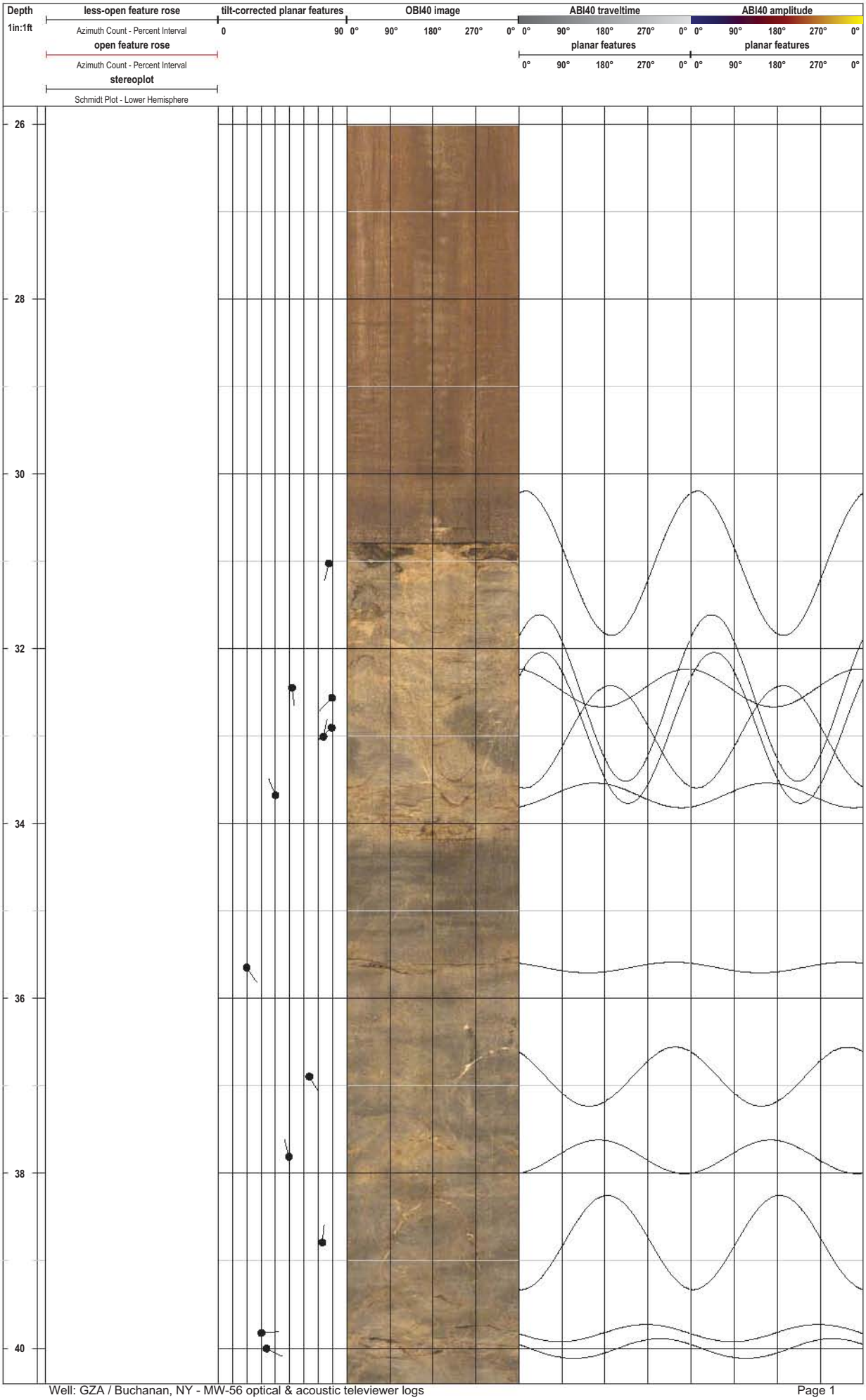
Project - Well: GZA / Buchanan, NY - MW-56 conventional logs

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Schmidt Plot - Lower Hemisphere
tilt-corrected planar features
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ABI40 traveltime
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planar features
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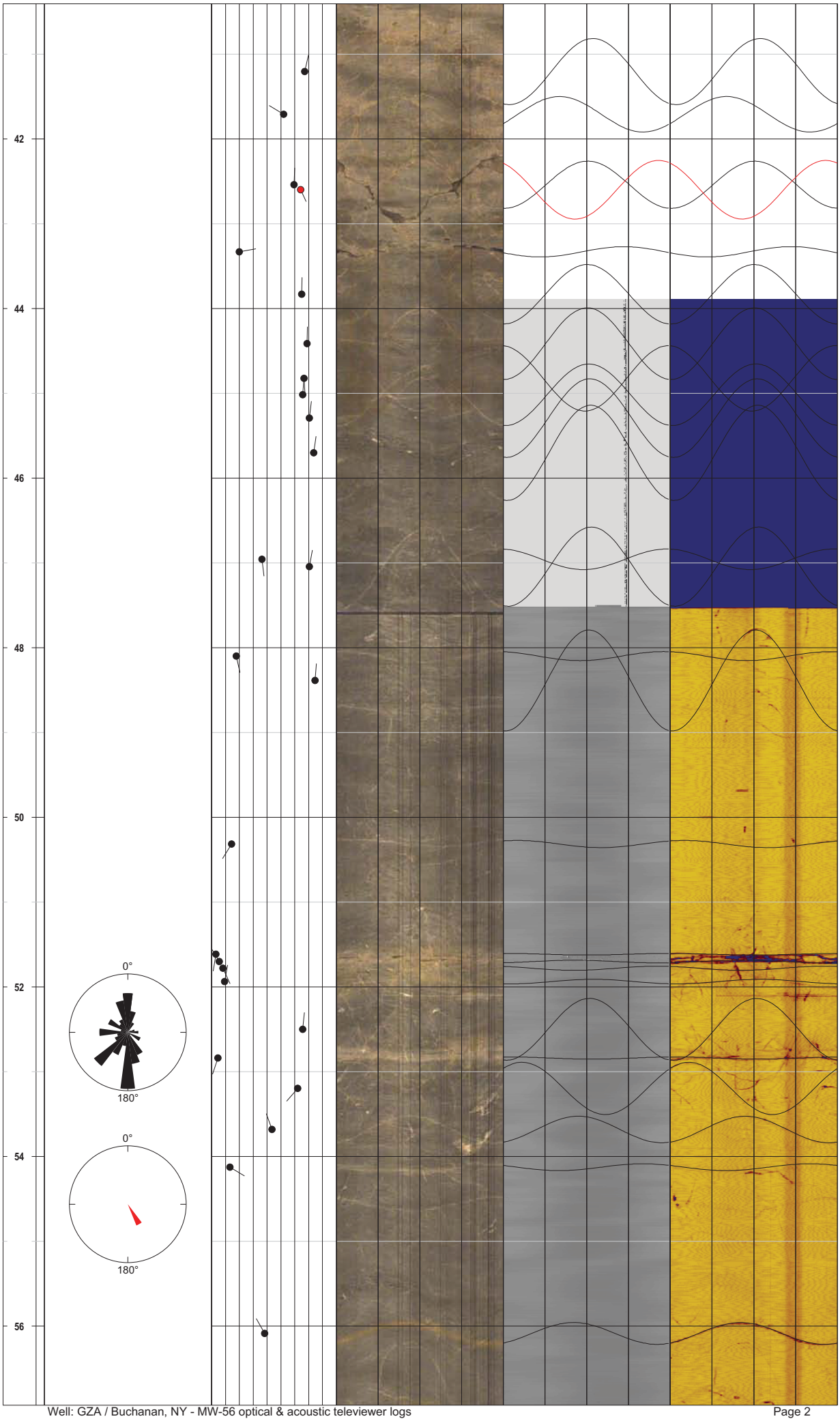
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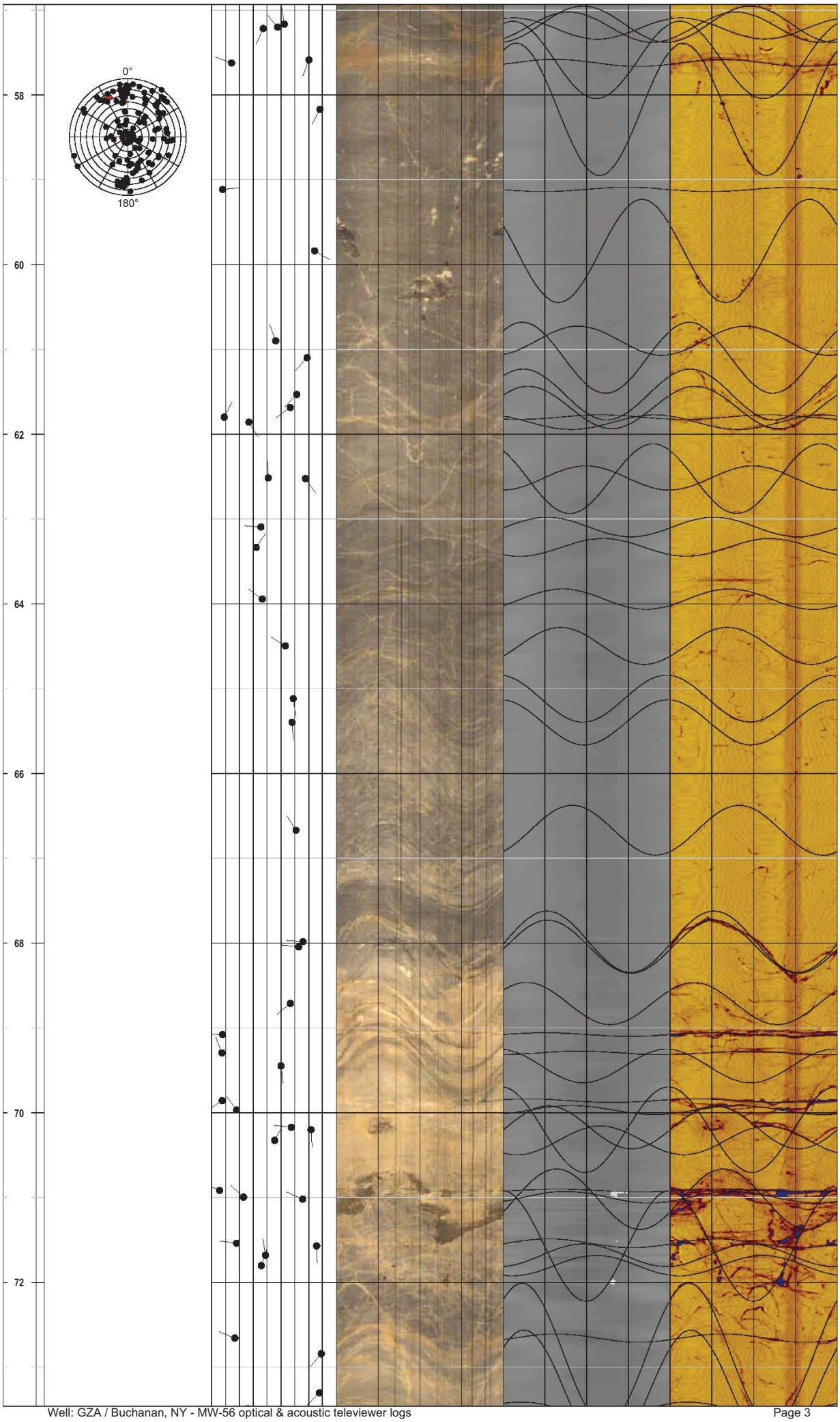
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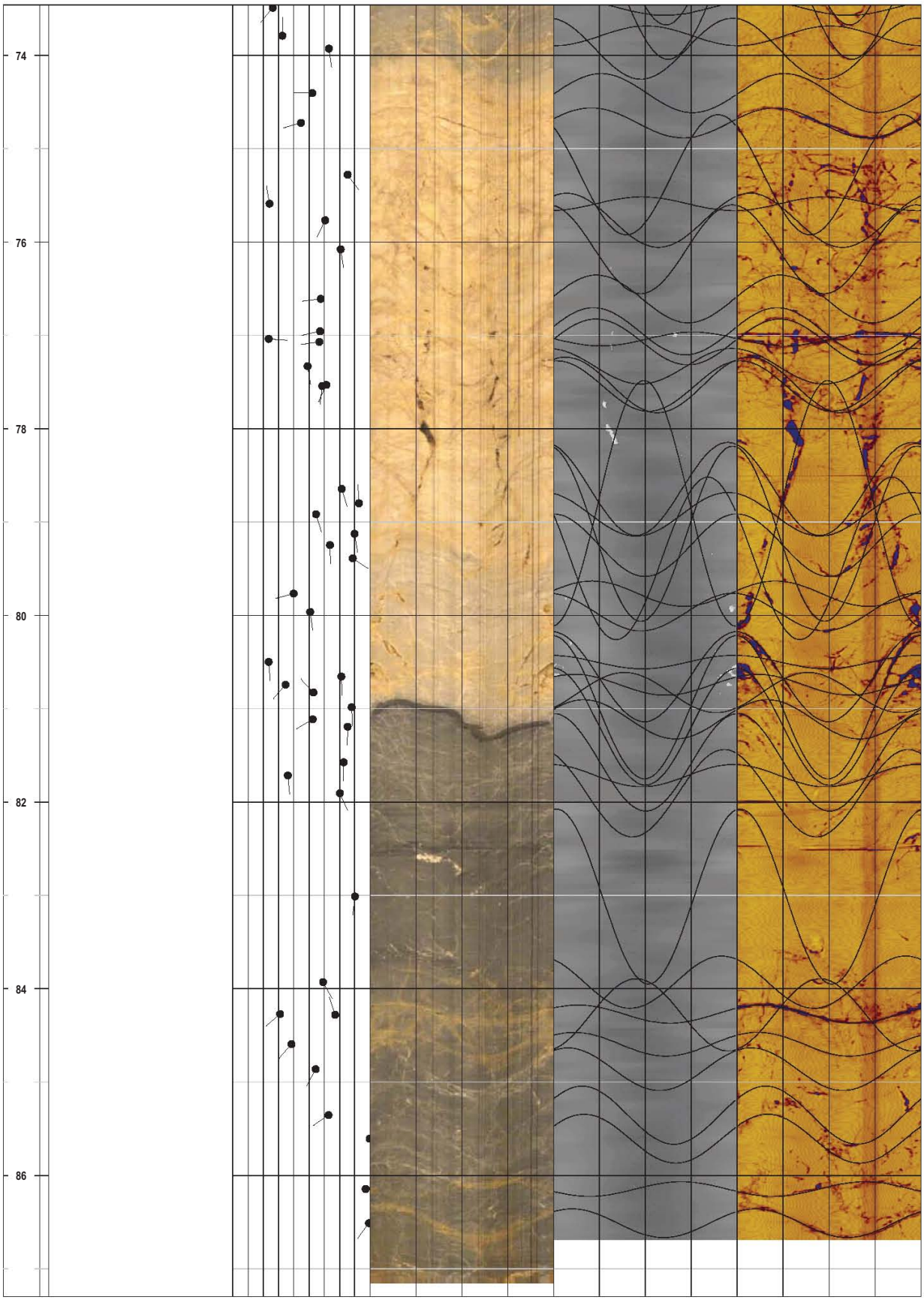
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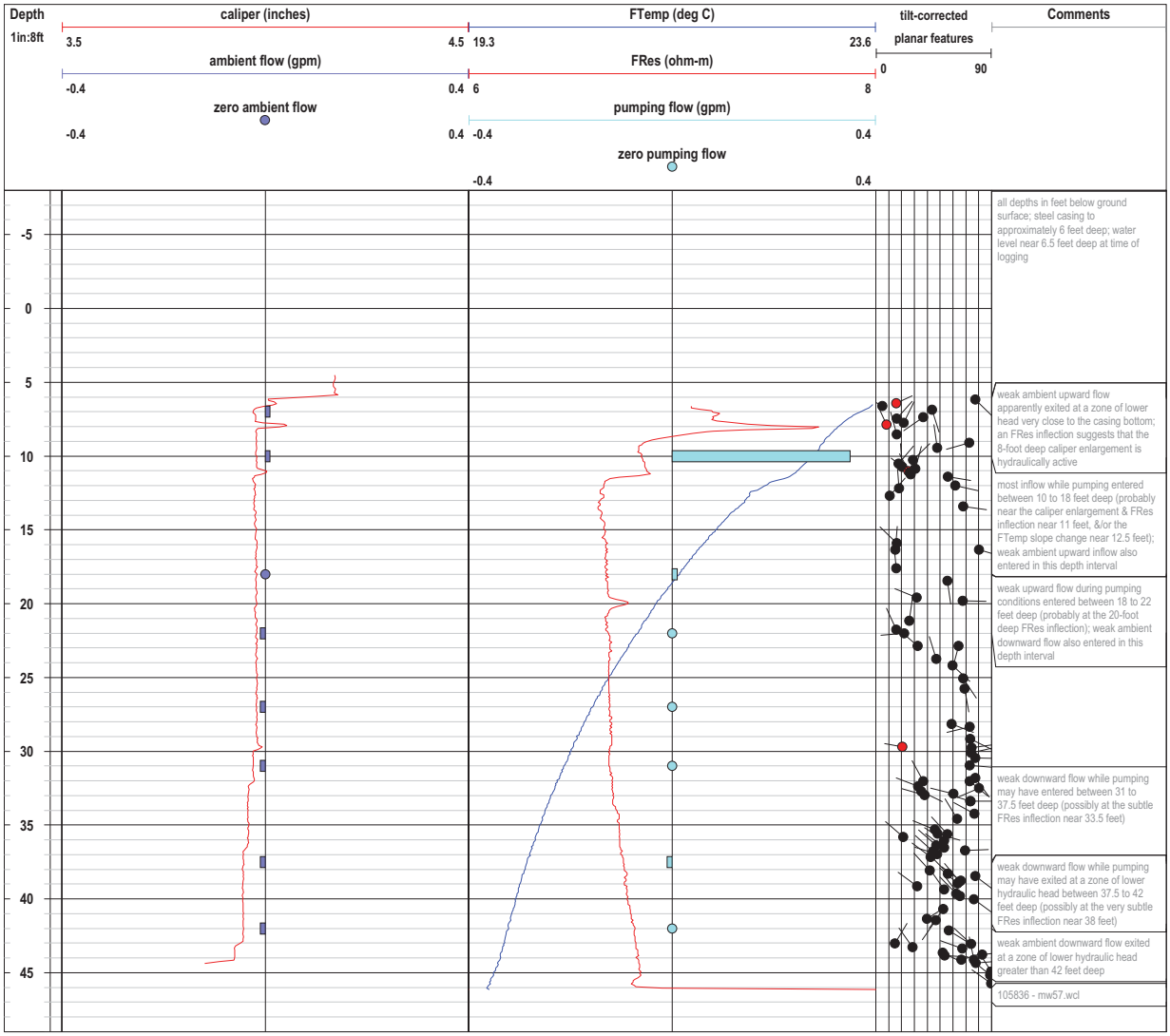
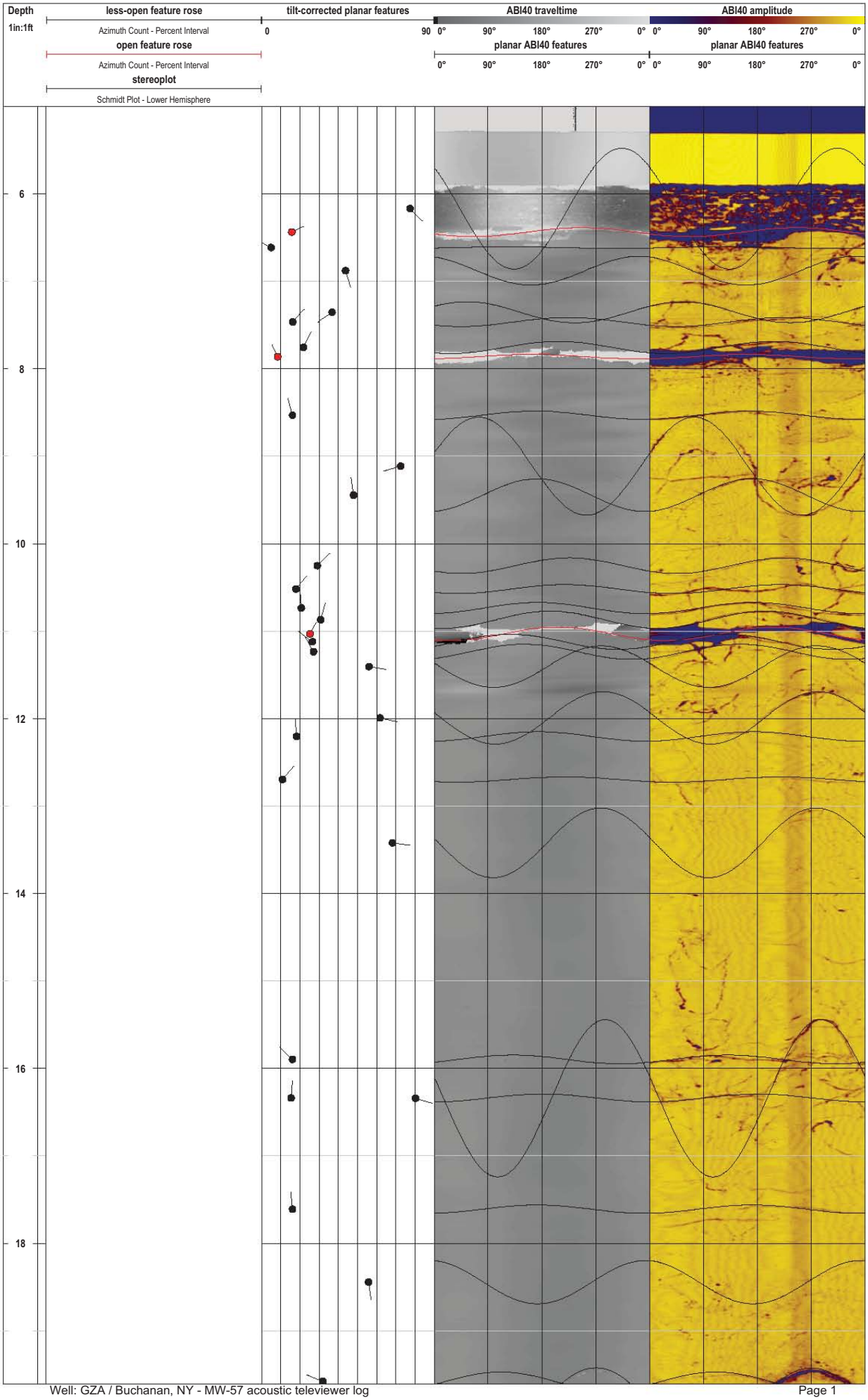
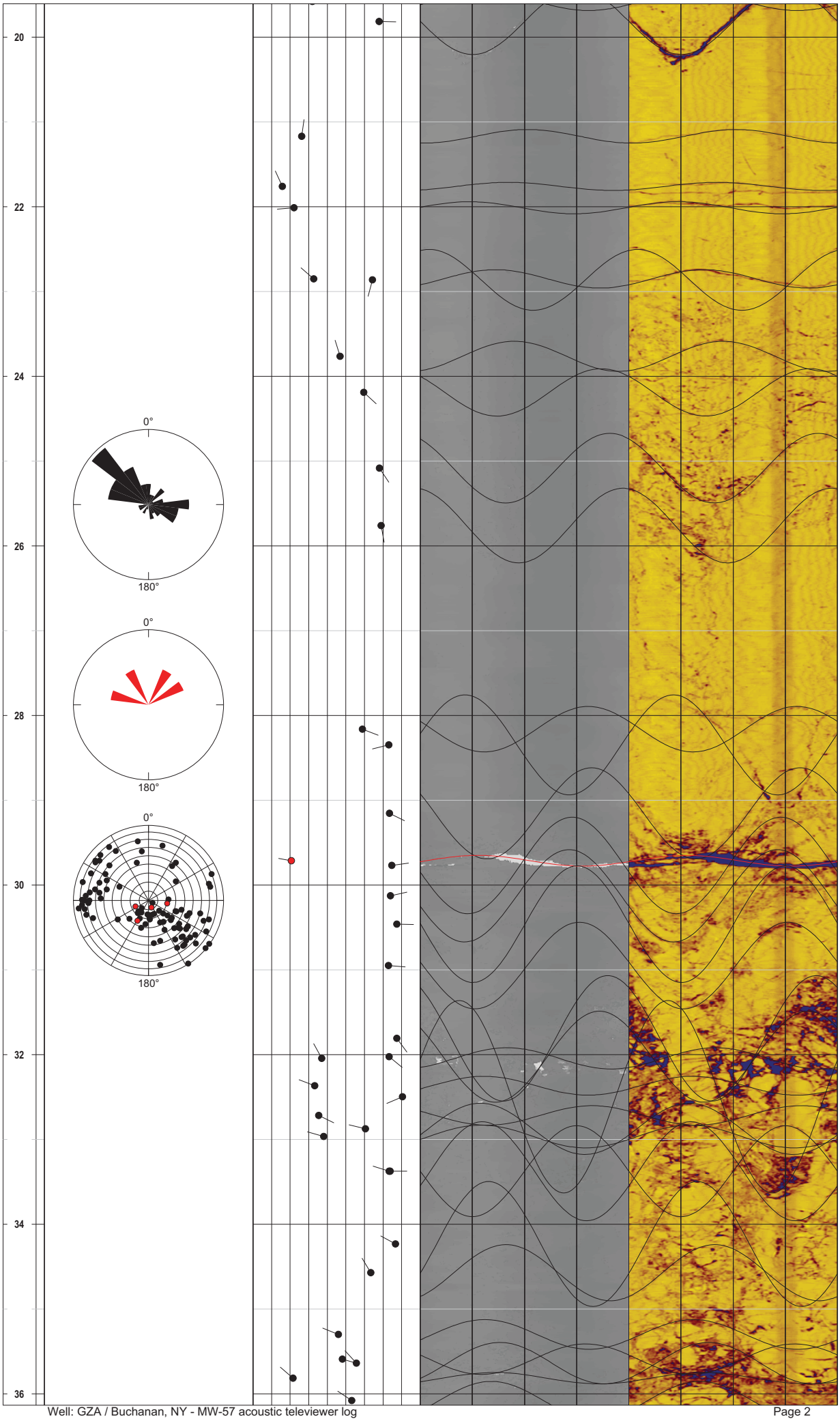
Project - Well: GZA / Buchanan, NY - MW-57 conventional logs



Project - Well: GZA / Buchanan, NY - MW-57 acoustic televiewer log

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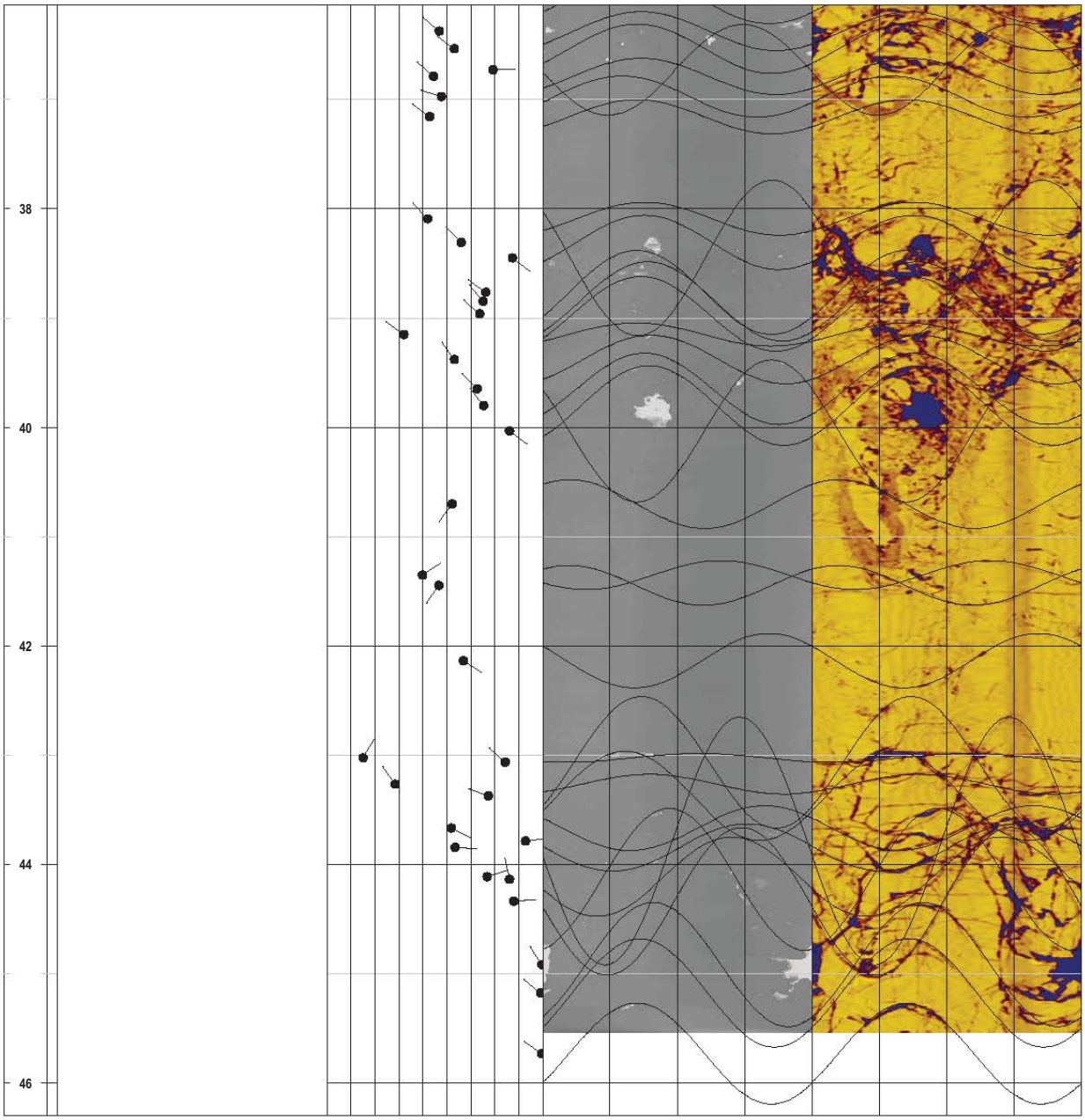
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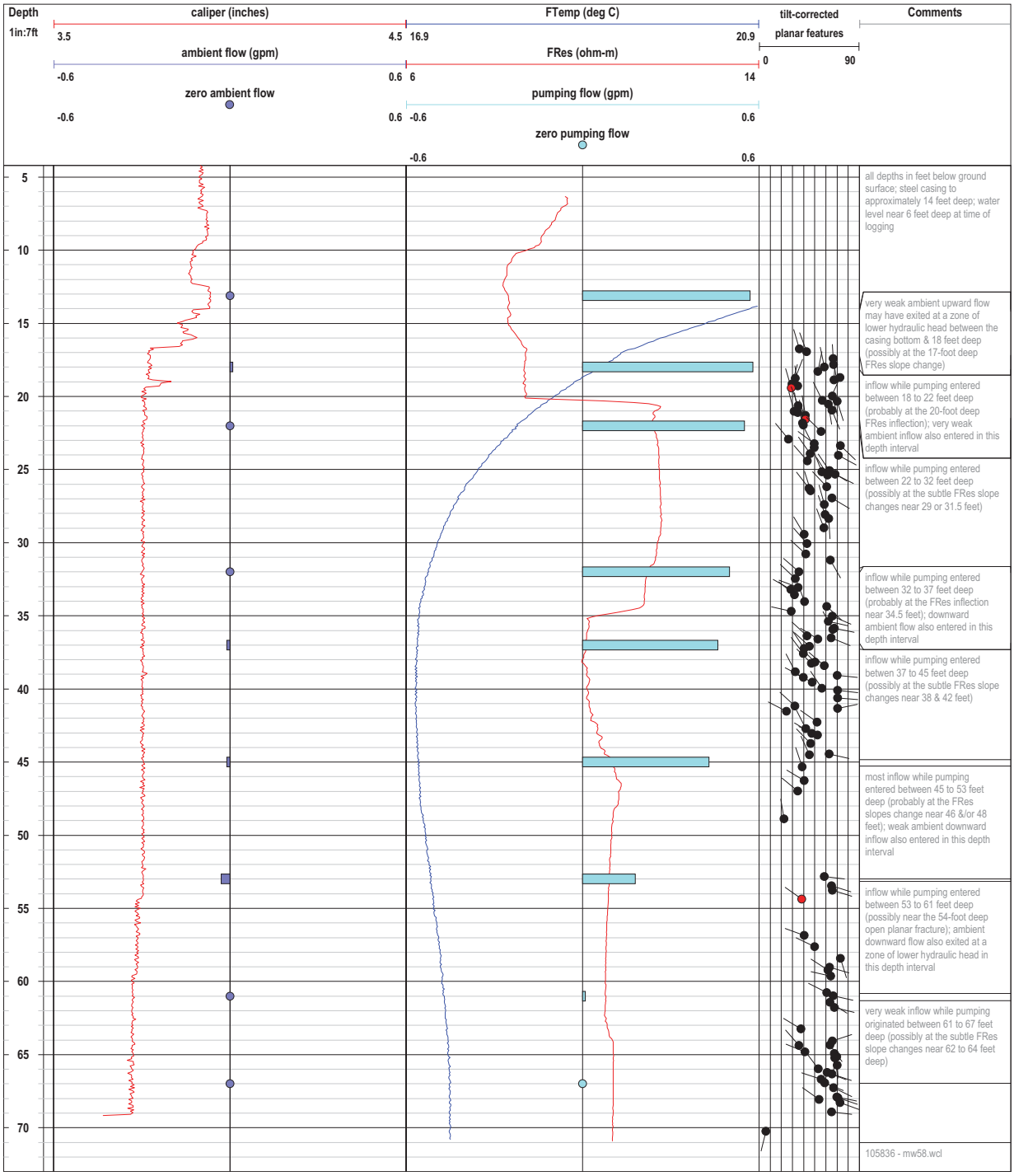
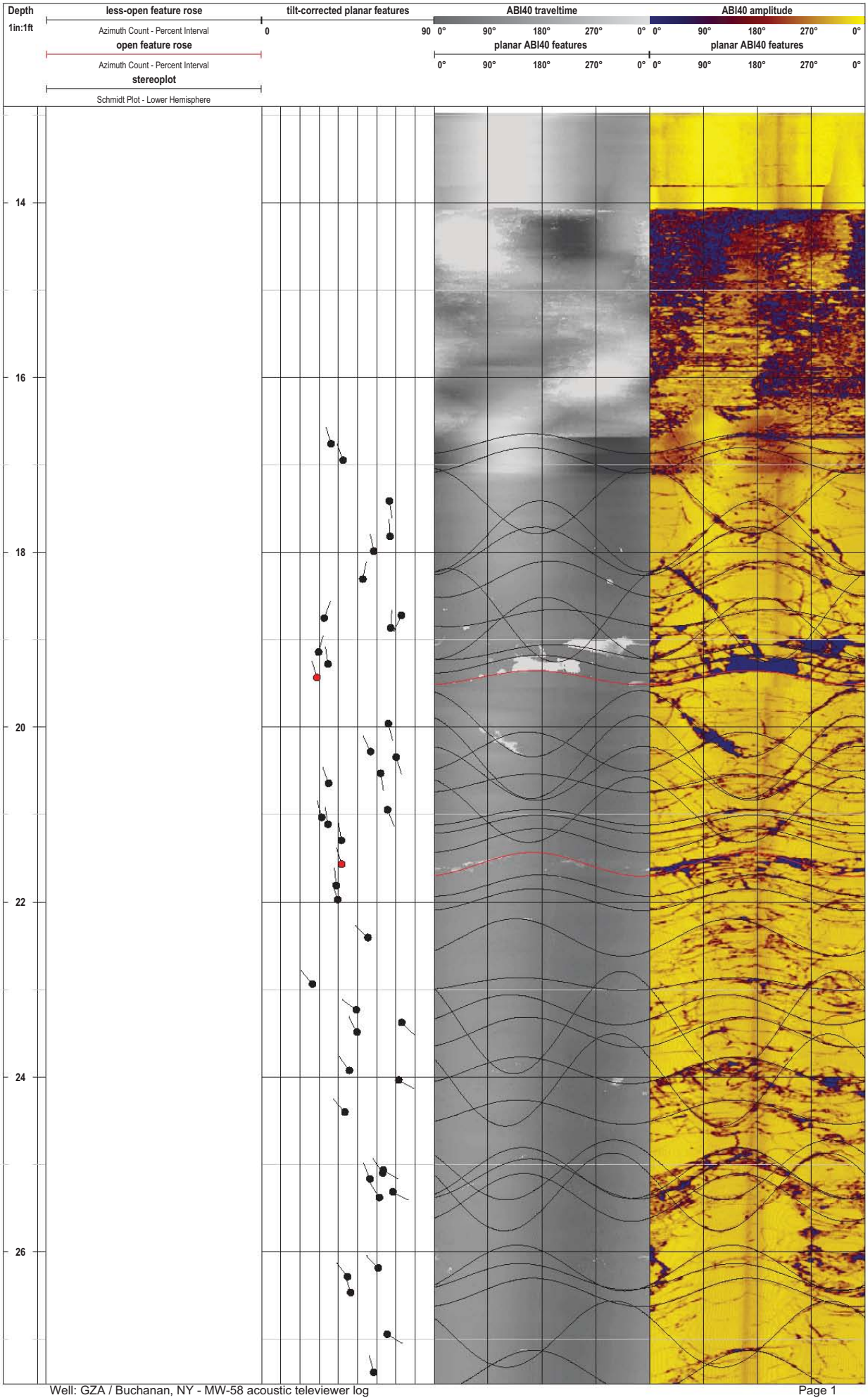
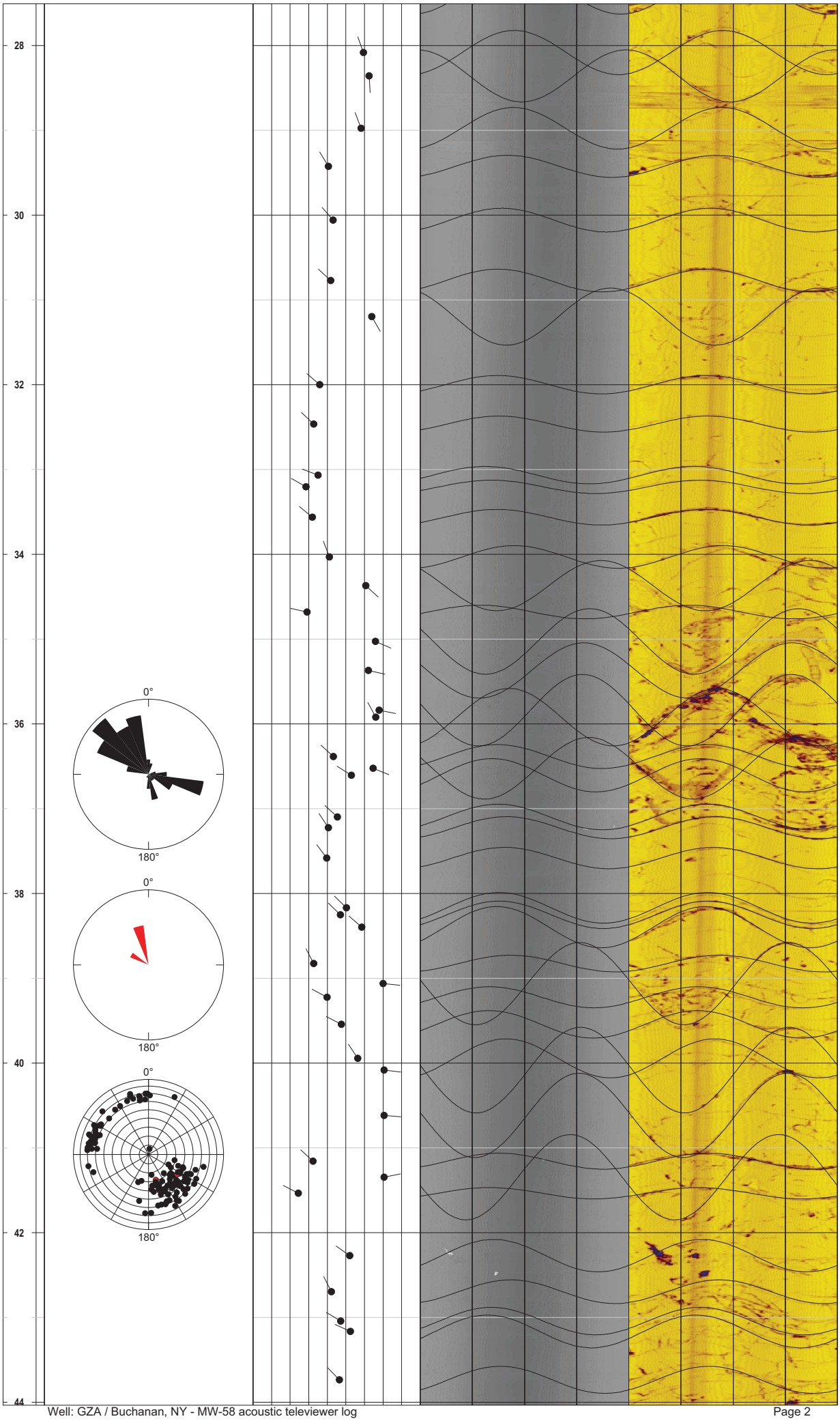
Project - Well: GZA / Buchanan, NY - MW-58 conventional logs



Well: GZA / Buchanan, NY - MW-58 conventional logs

Project - Well: GZA / Buchanan, NY - MW-58 acoustic televiewer log

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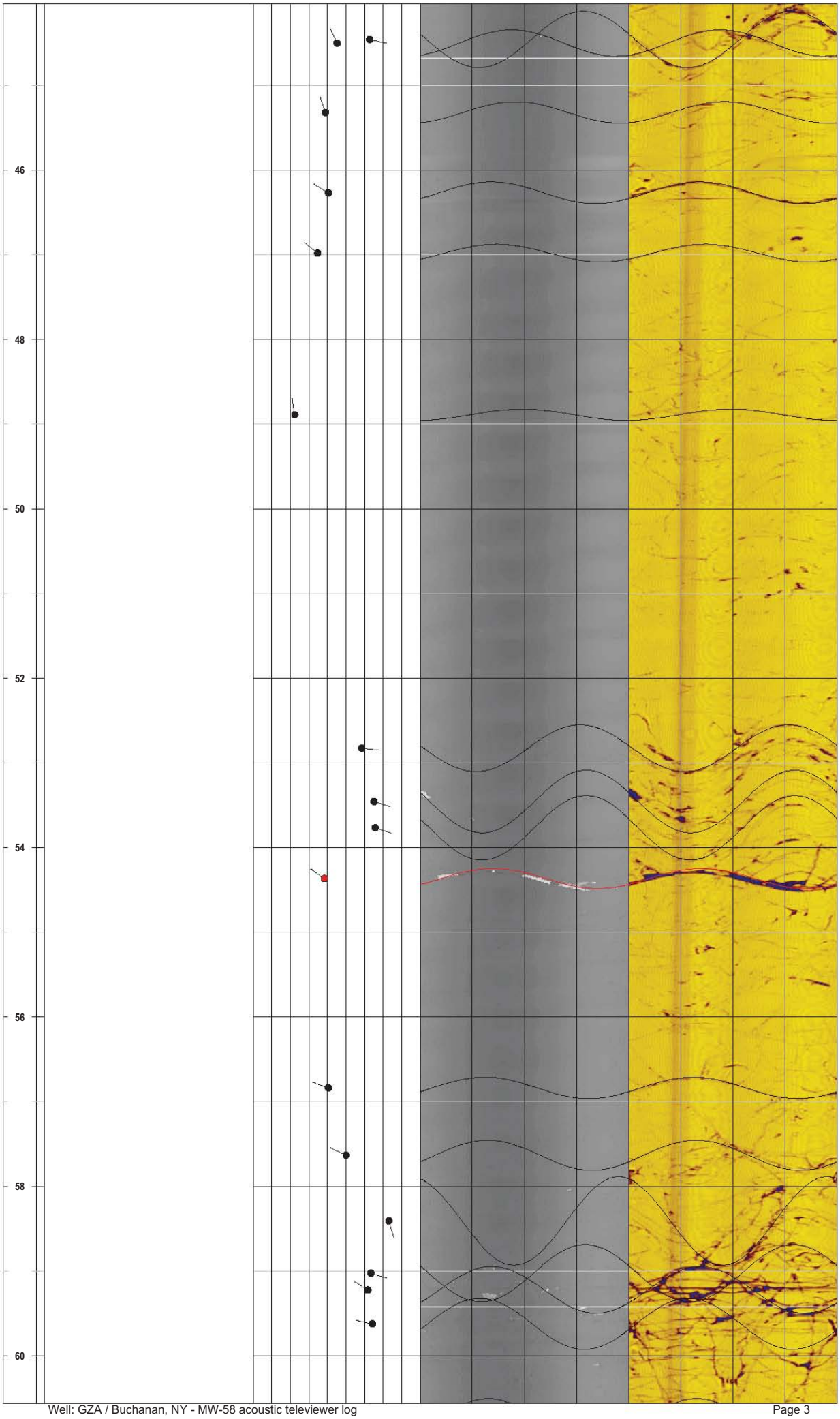
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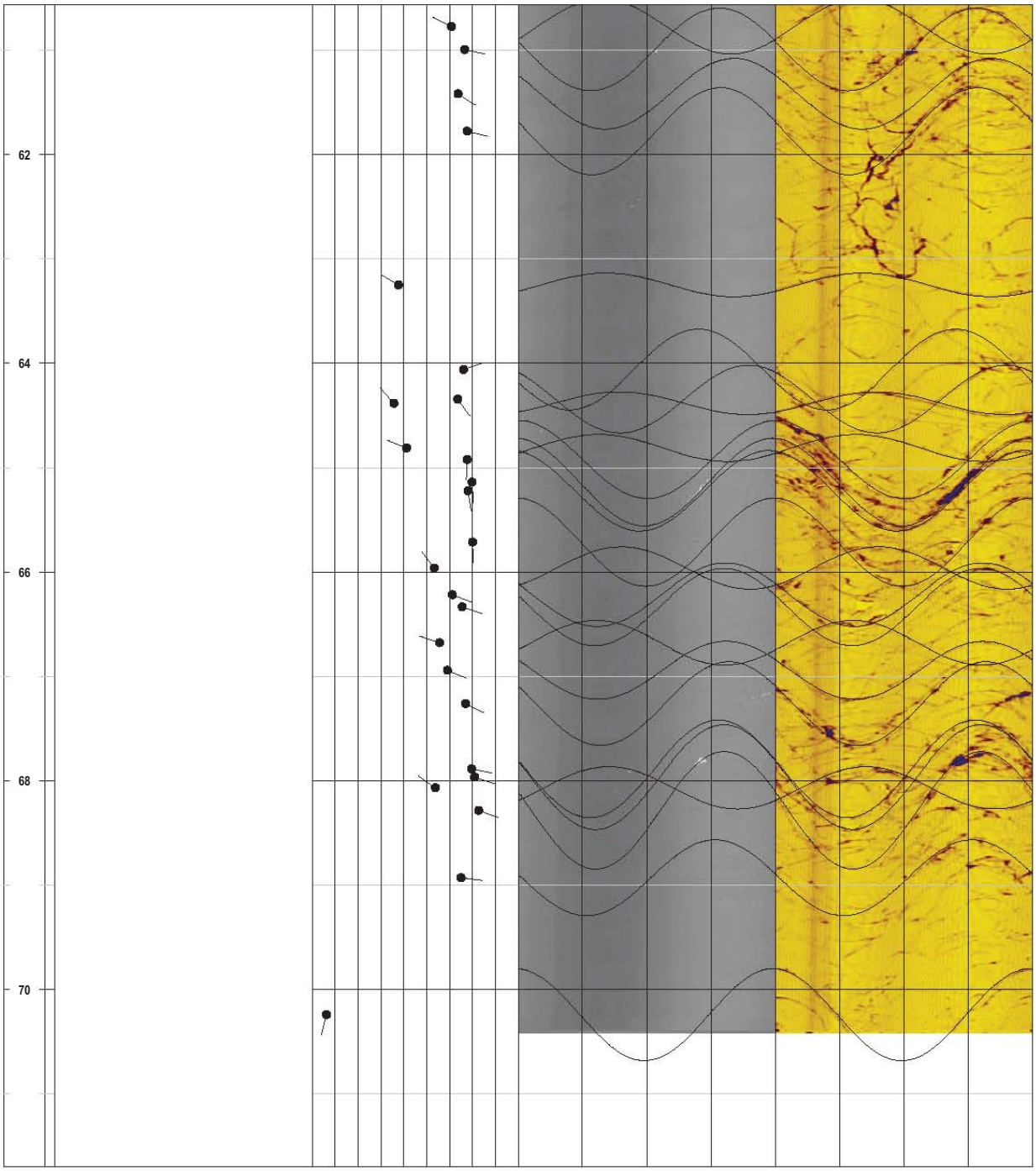
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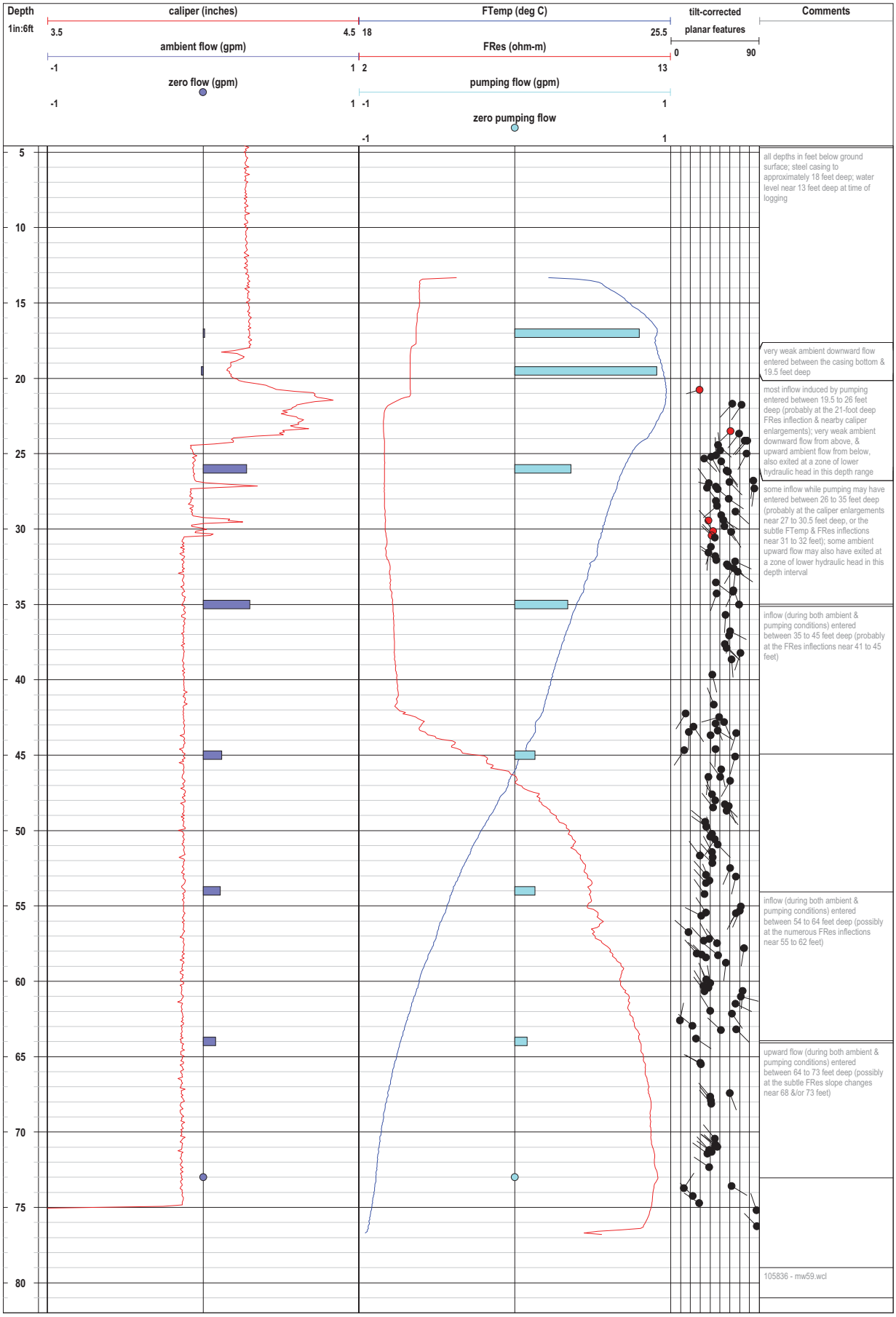
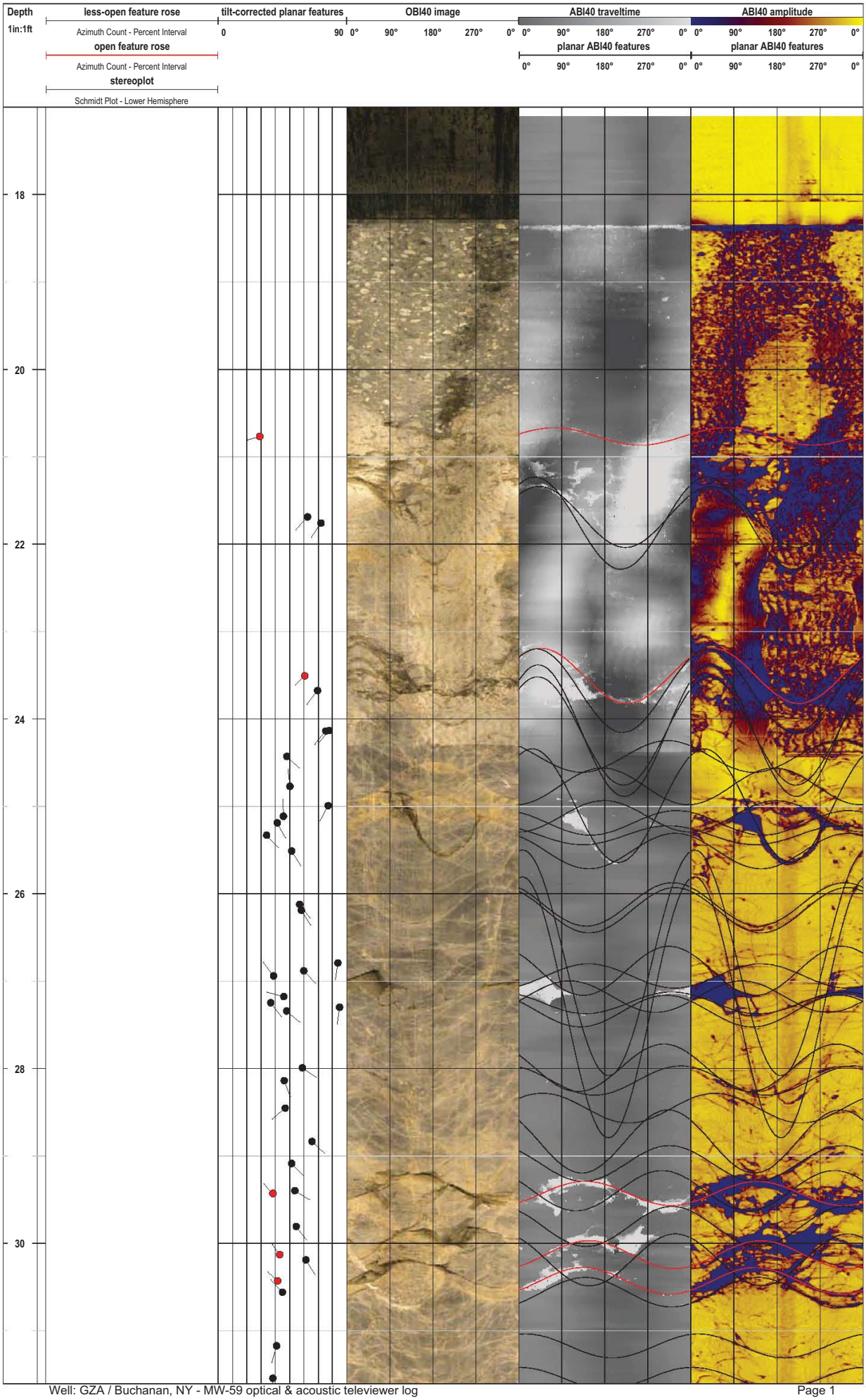
Project - Well: GZA / Buchanan, NY - MW-59 conventional logs



Well: GZA / Buchanan, NY - MW-59 conventional logs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Schmidt Plot - Lower Hemisphere
tilt-corrected planar features
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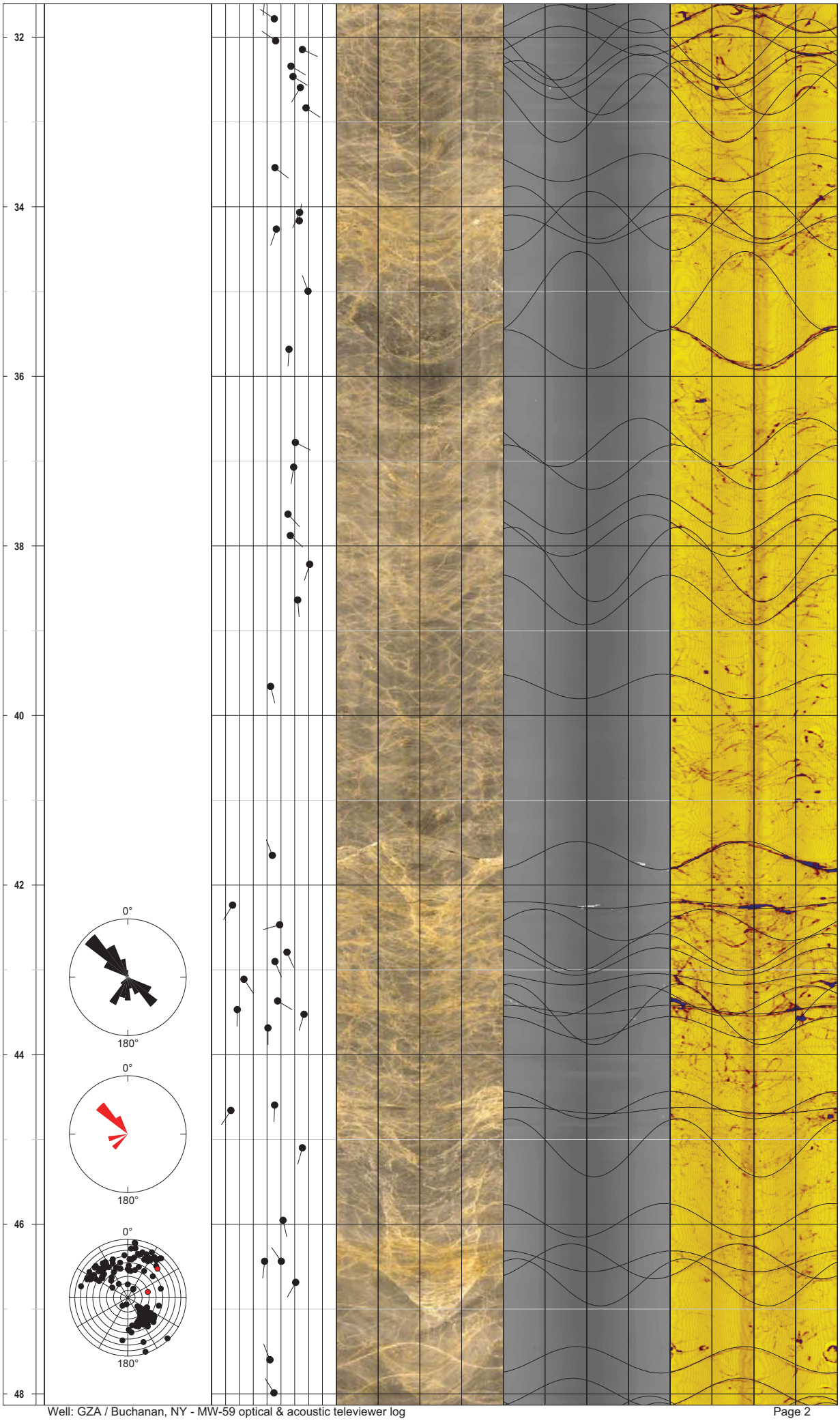
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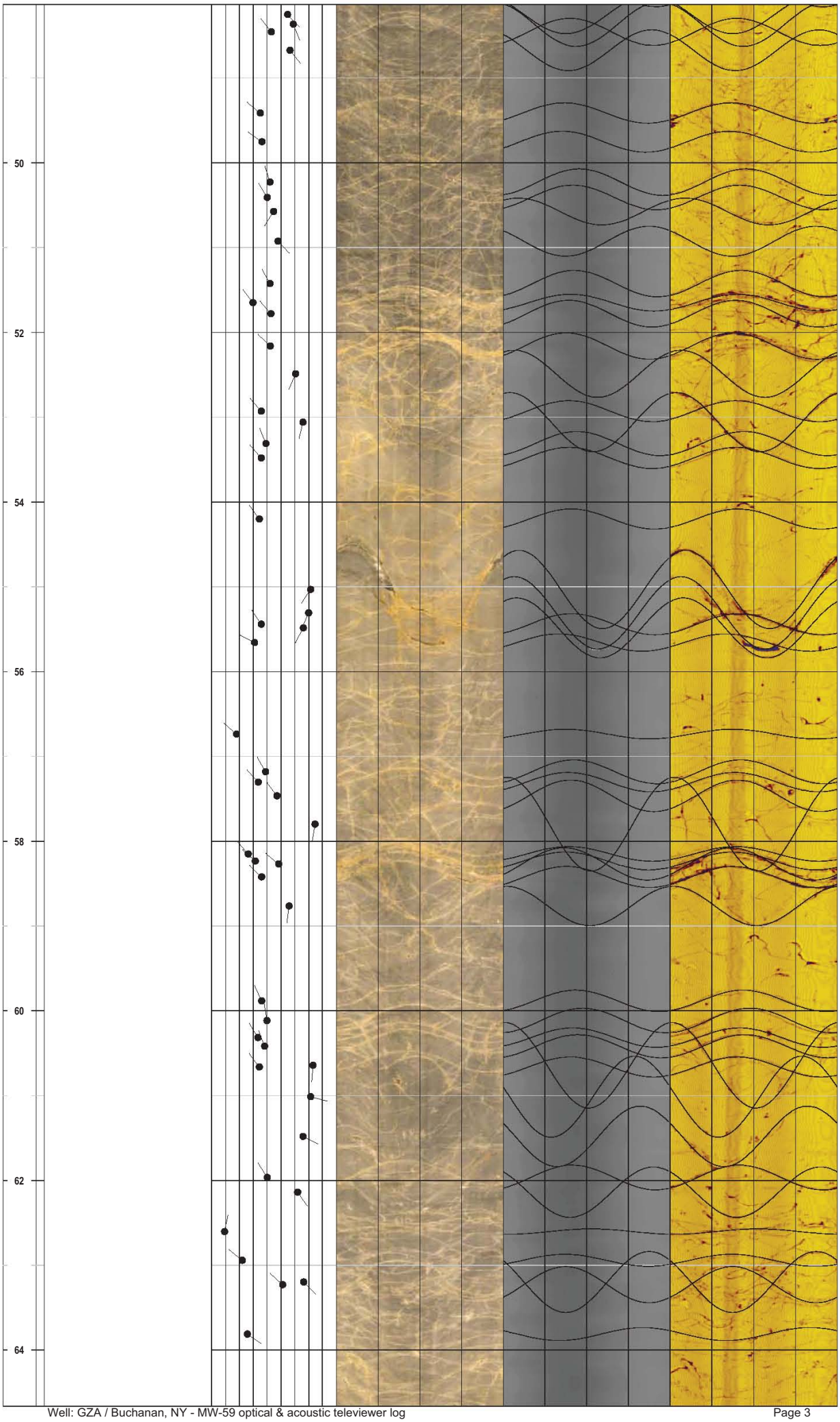
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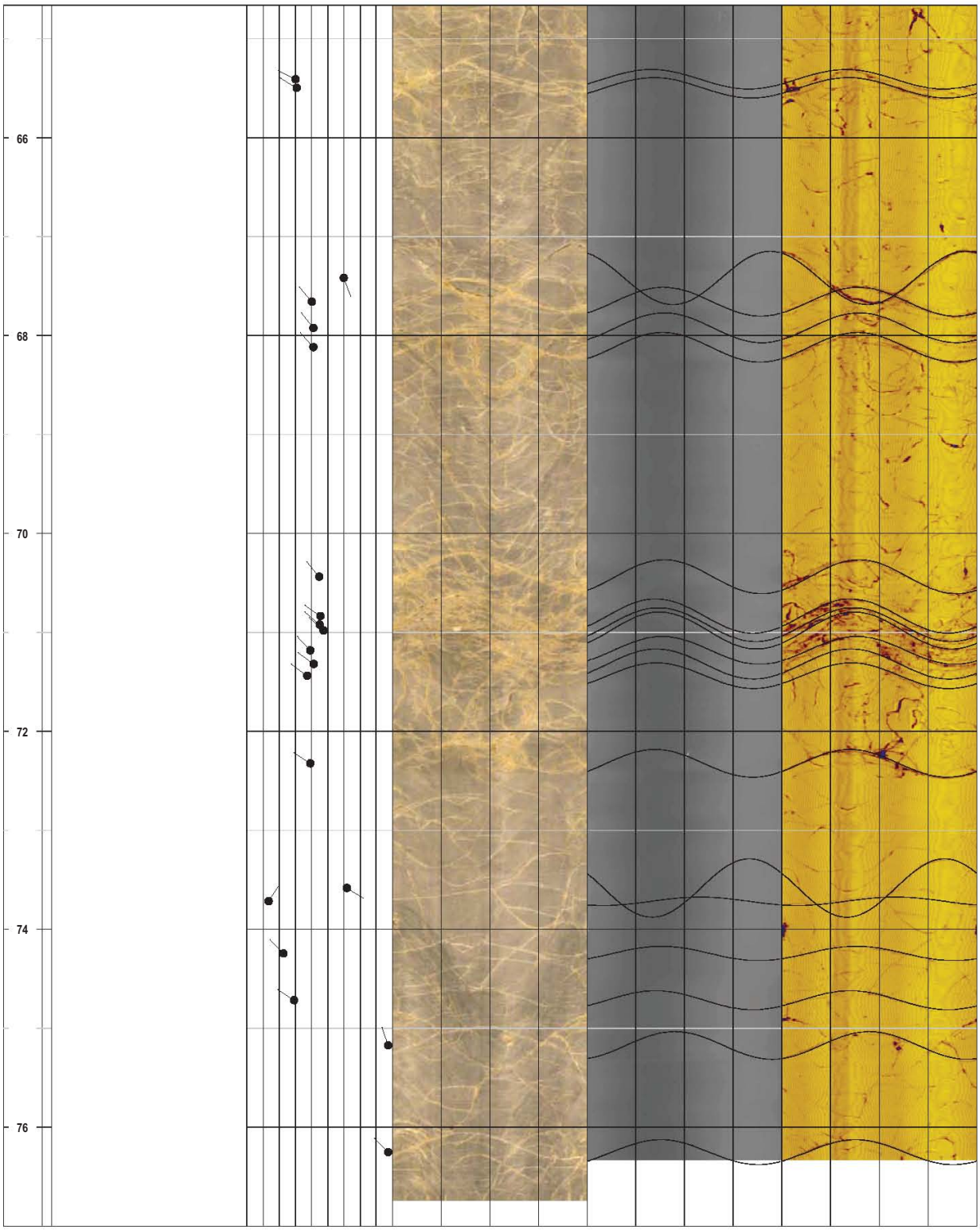
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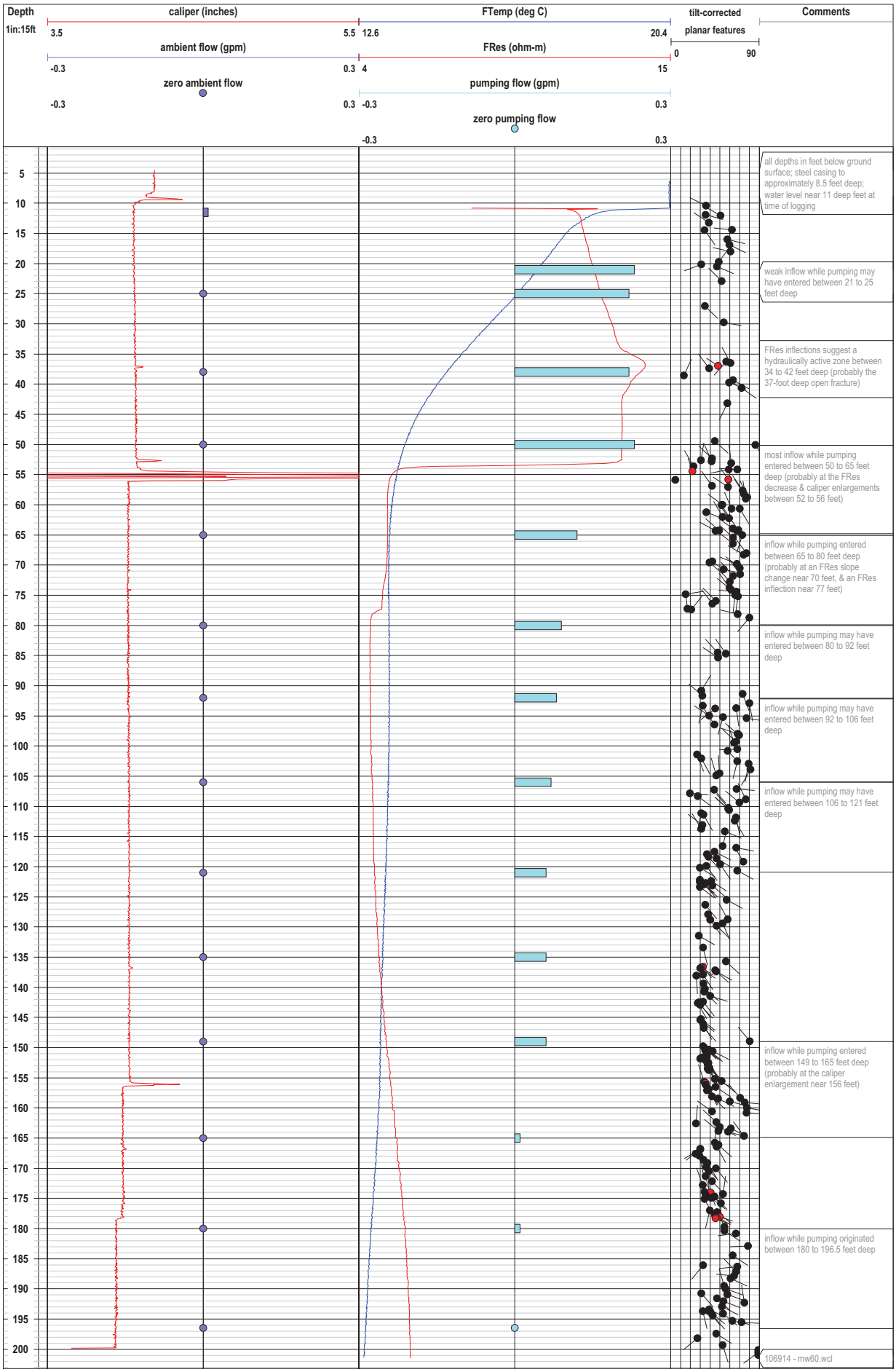
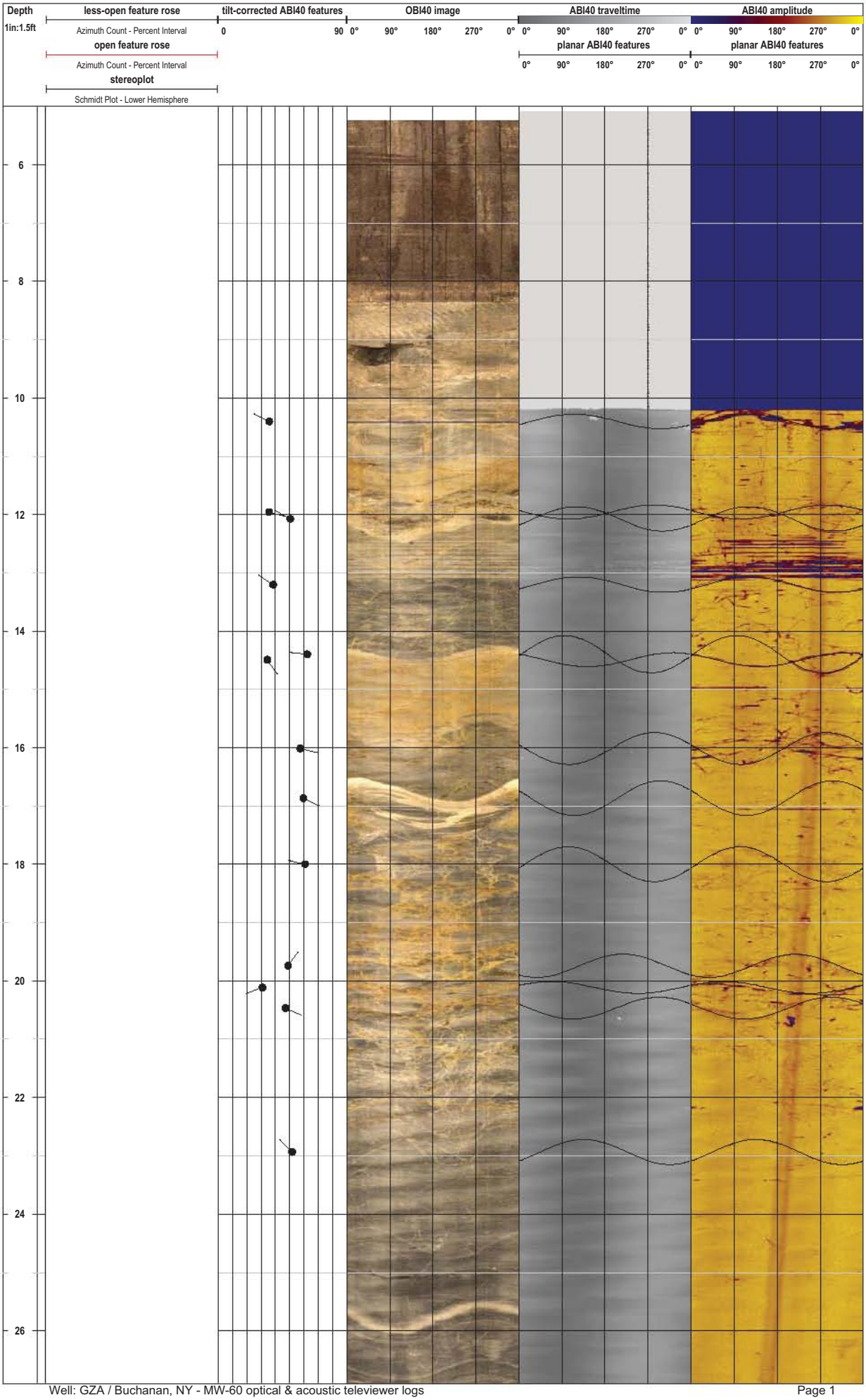
Project - Well: GZA / Buchanan, NY - MW-60 conventional logs



Well: GZA / Buchanan, NY - MW-60 conventional logs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Azimuth Count - Percent Interval
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Schmidt Plot - Lower Hemisphere
tilt-corrected ABI40 features
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ABI40 traveltime
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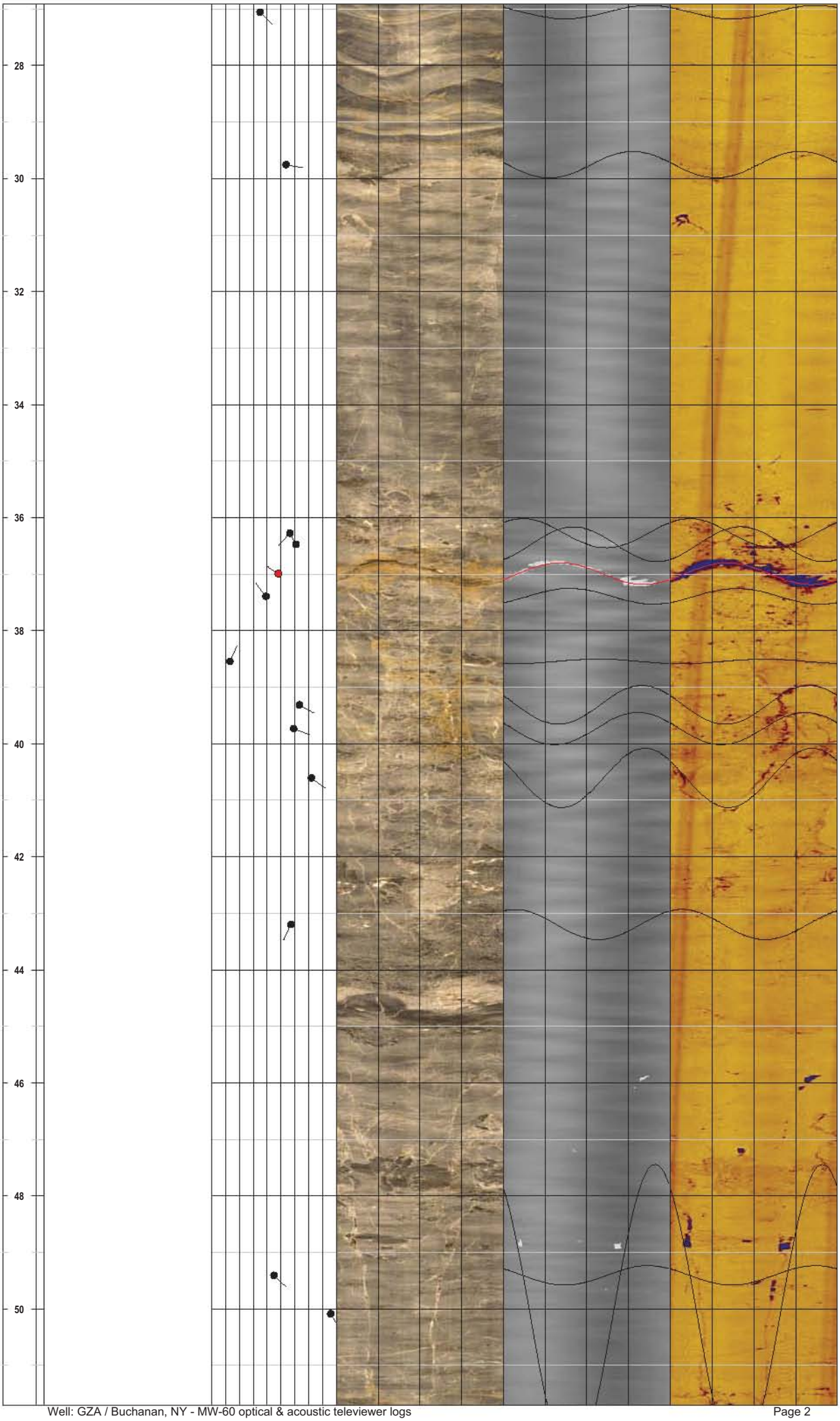
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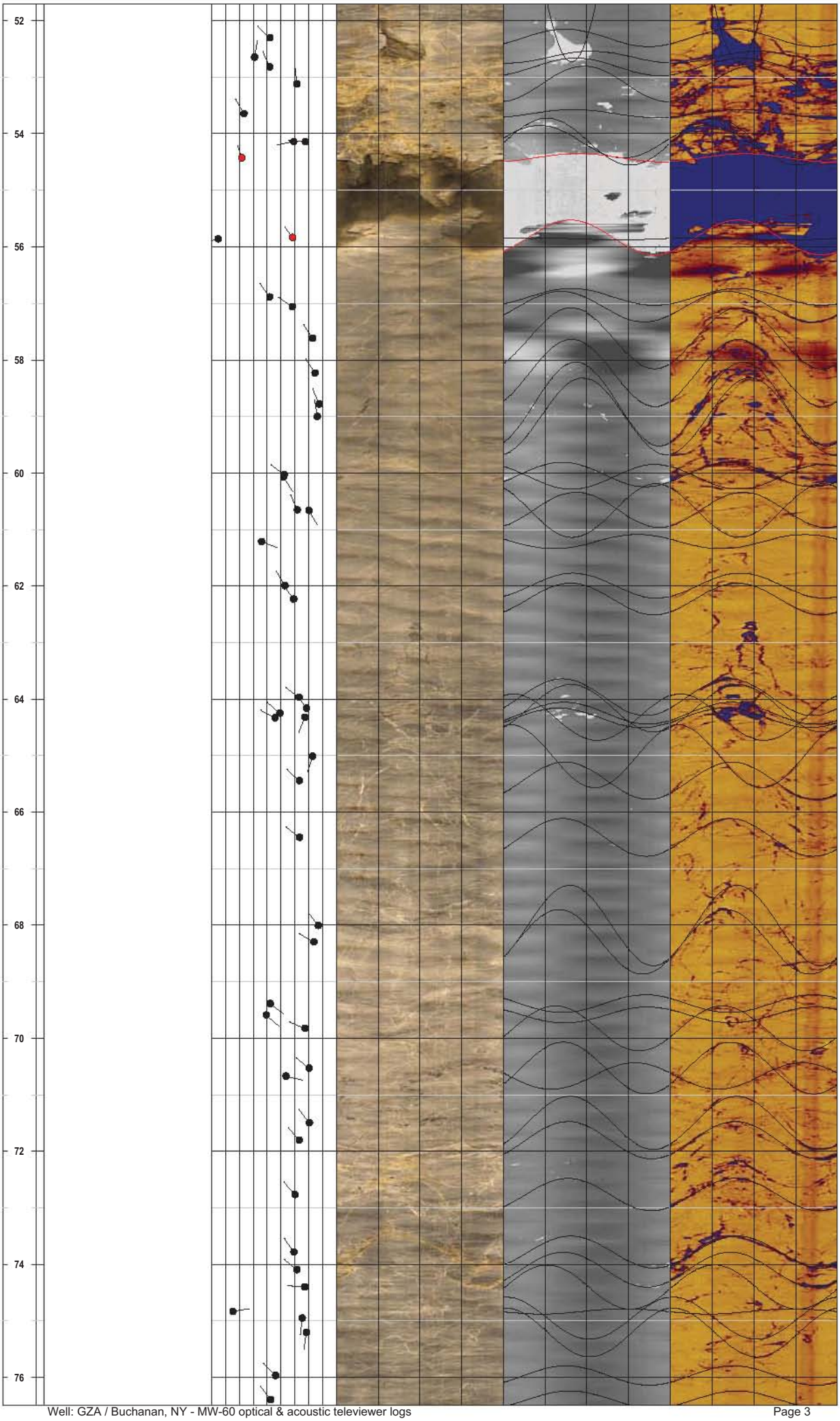
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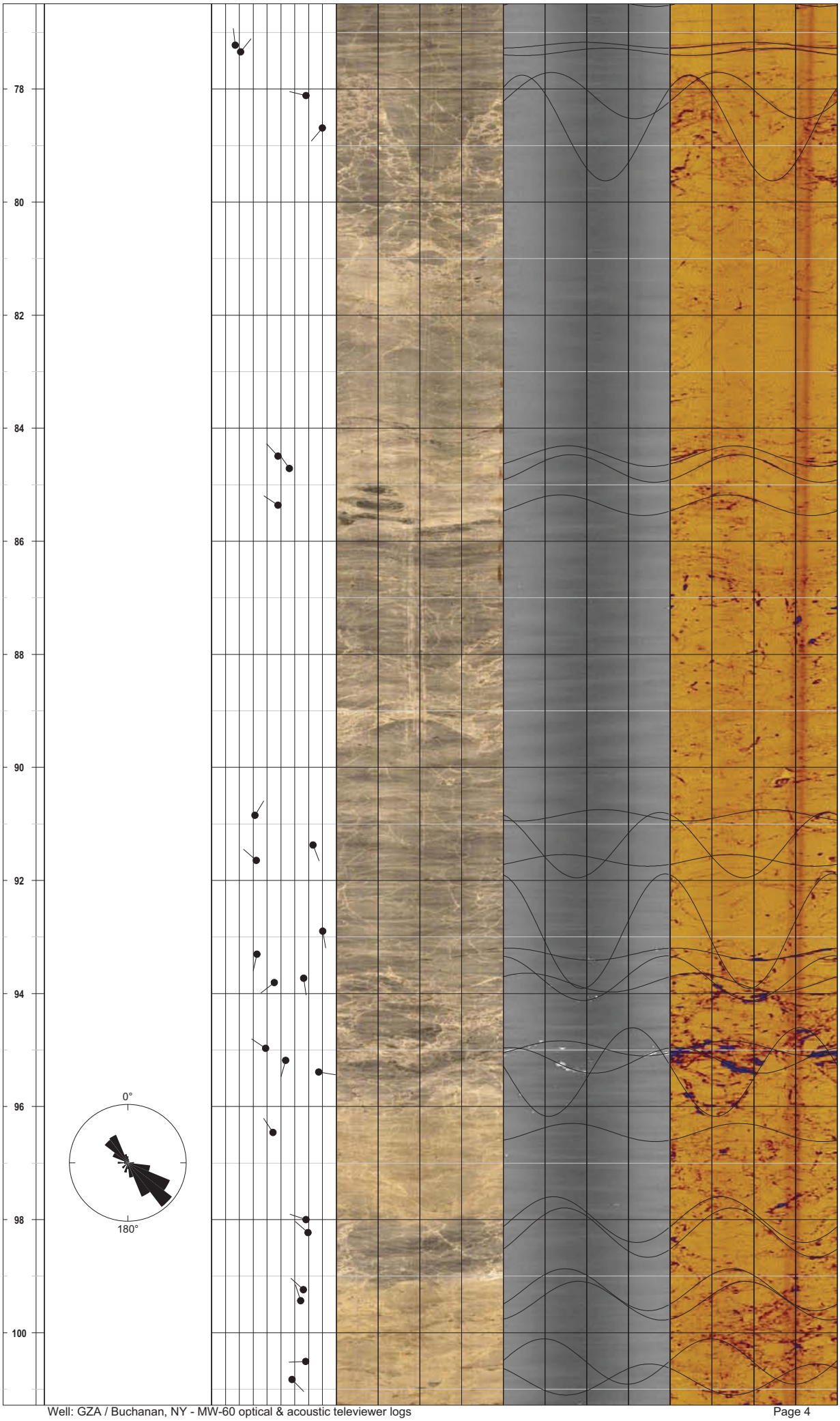
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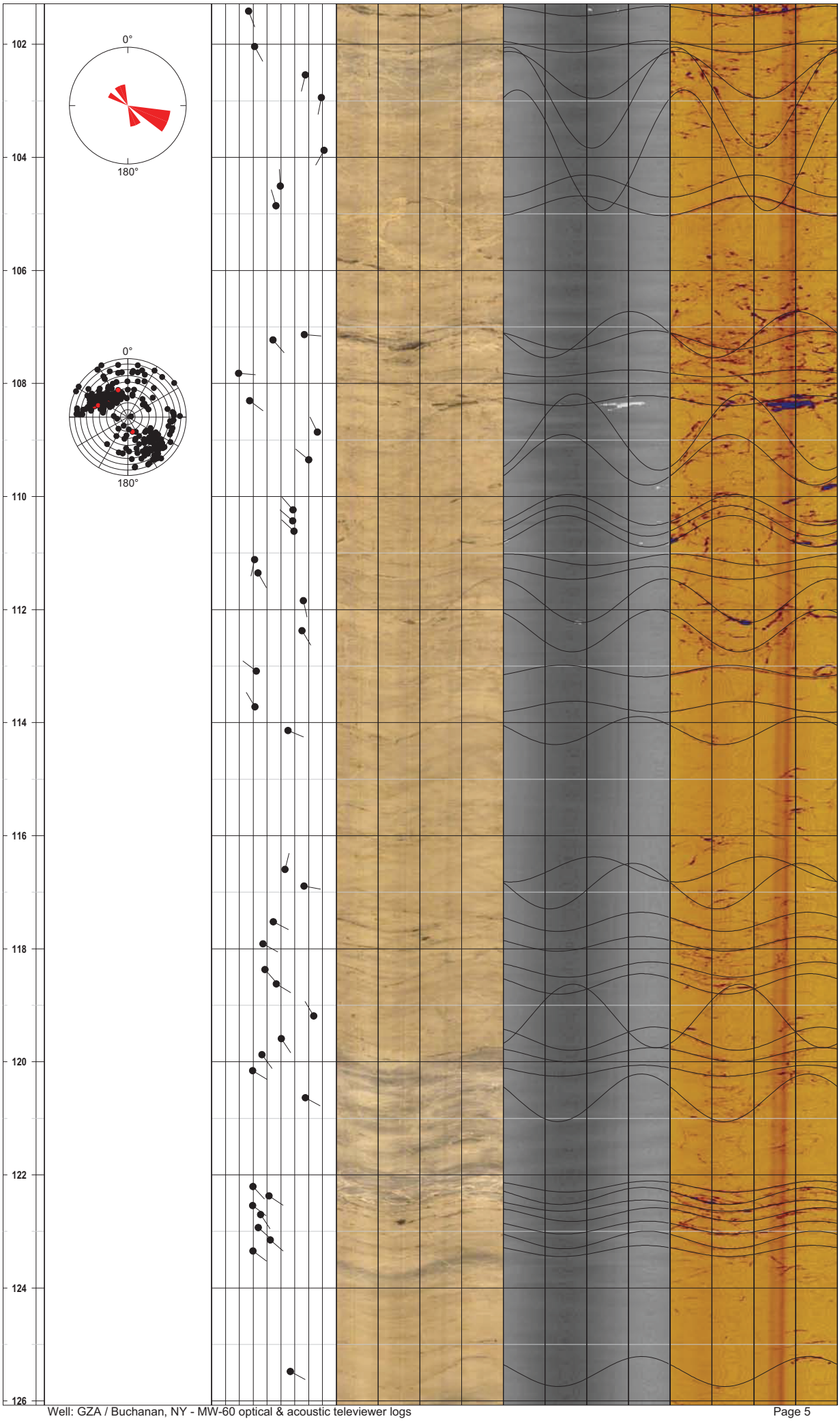
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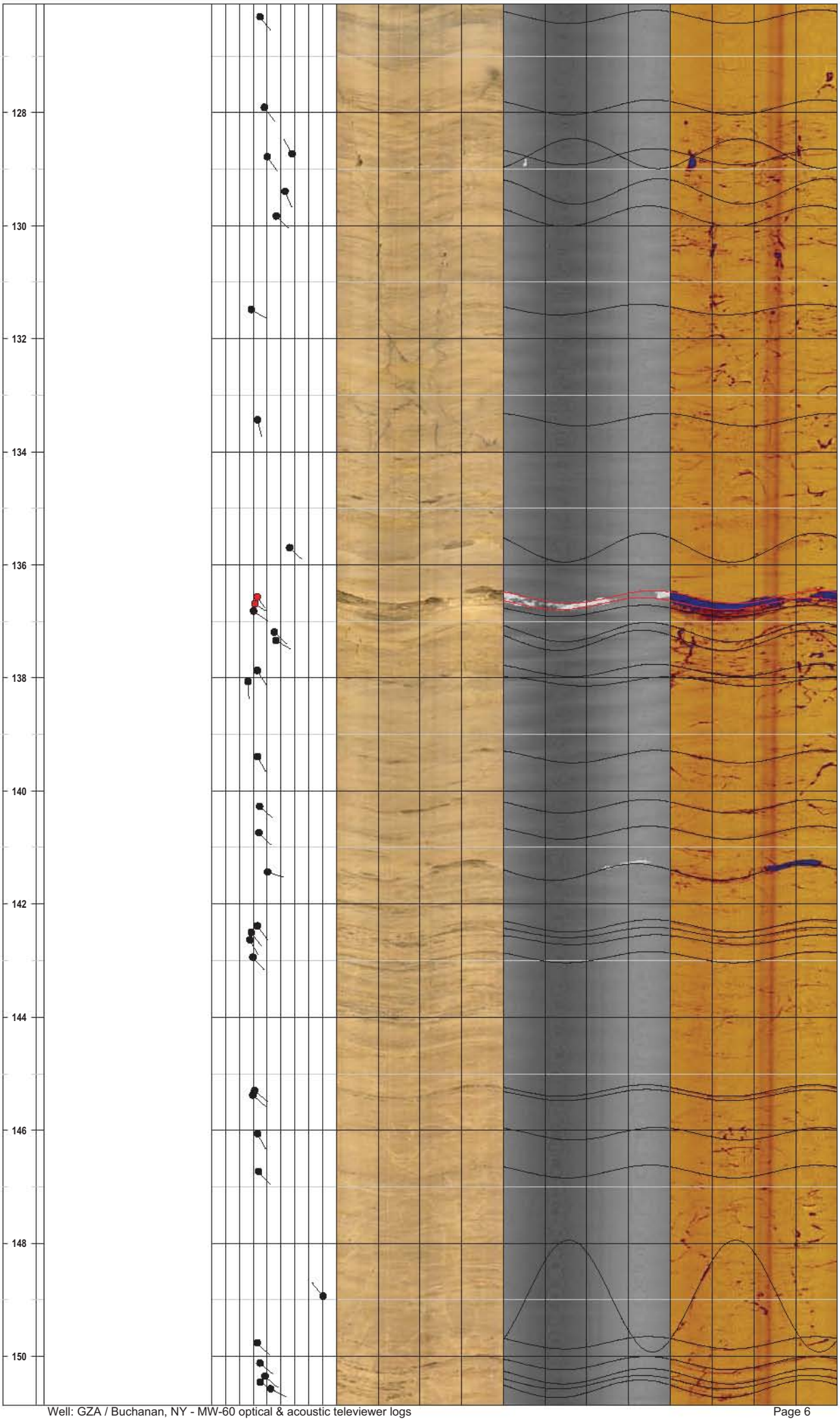
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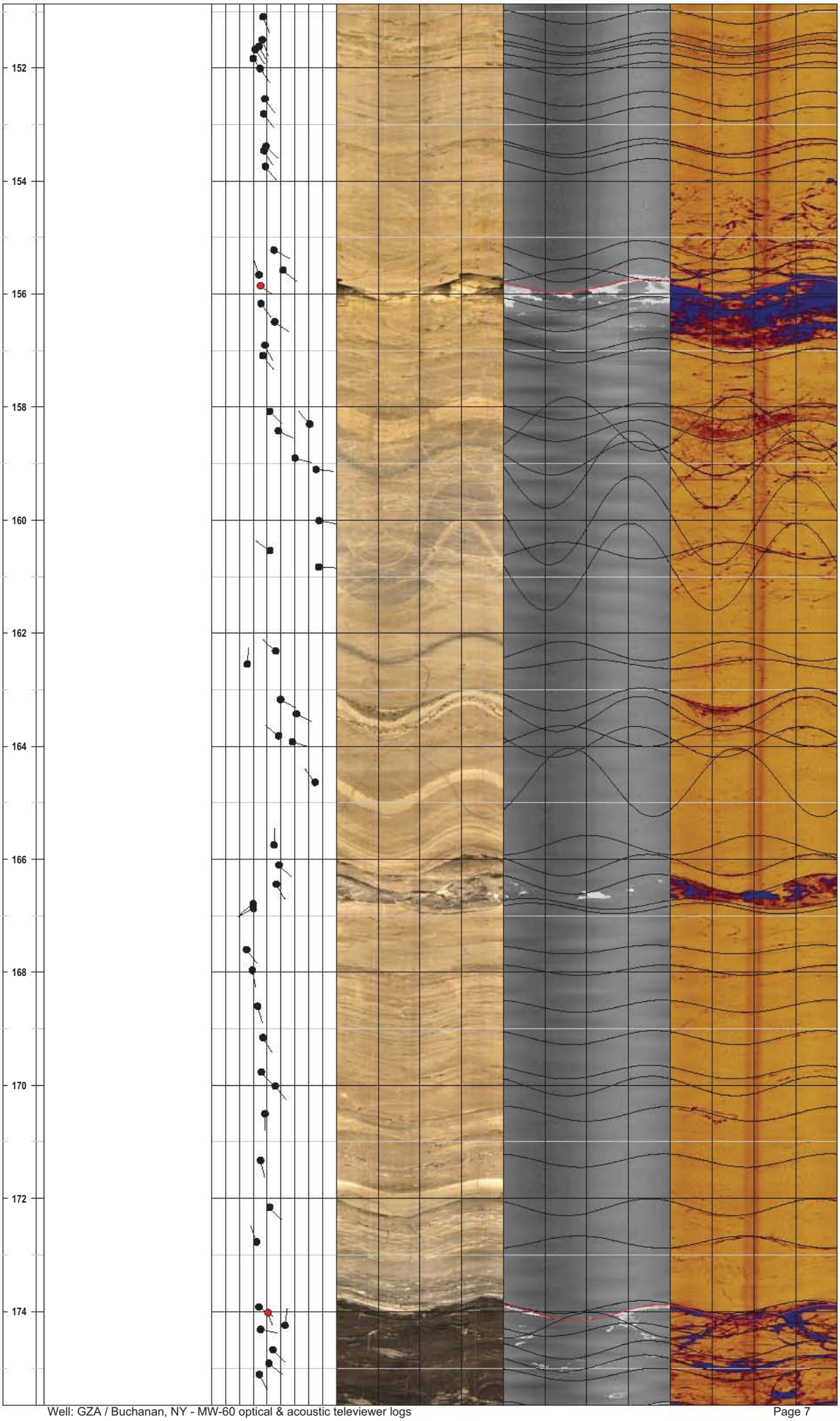
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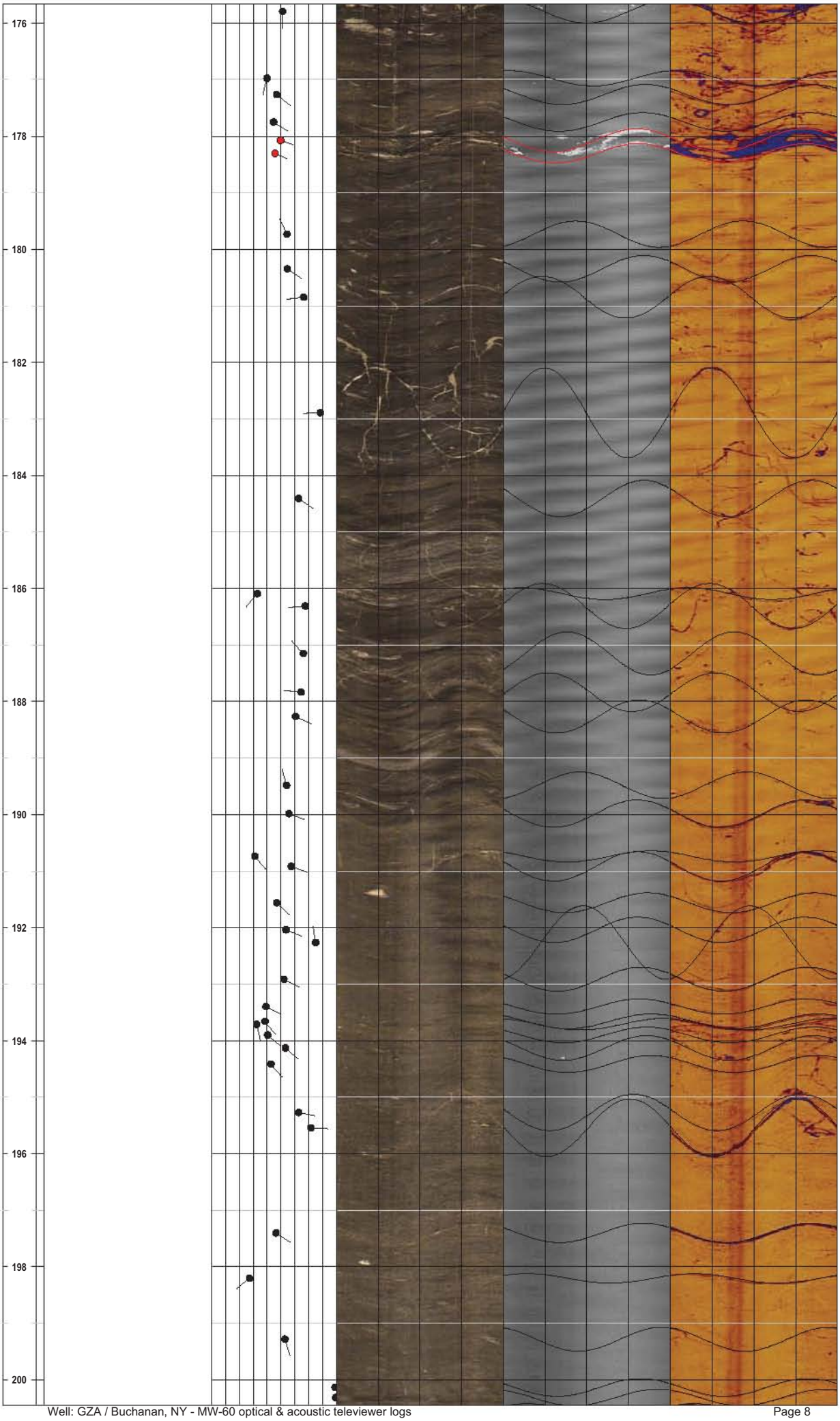
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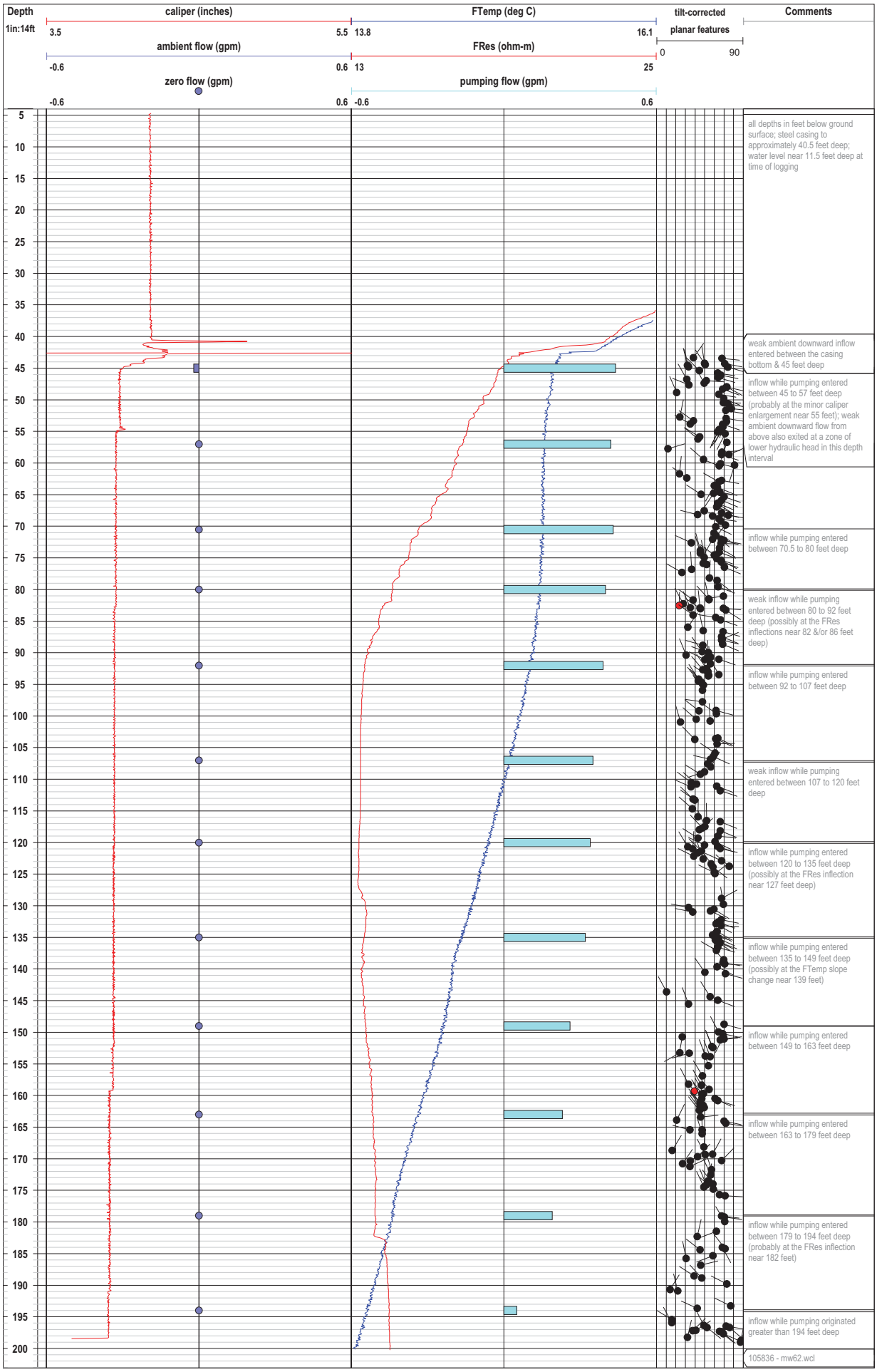
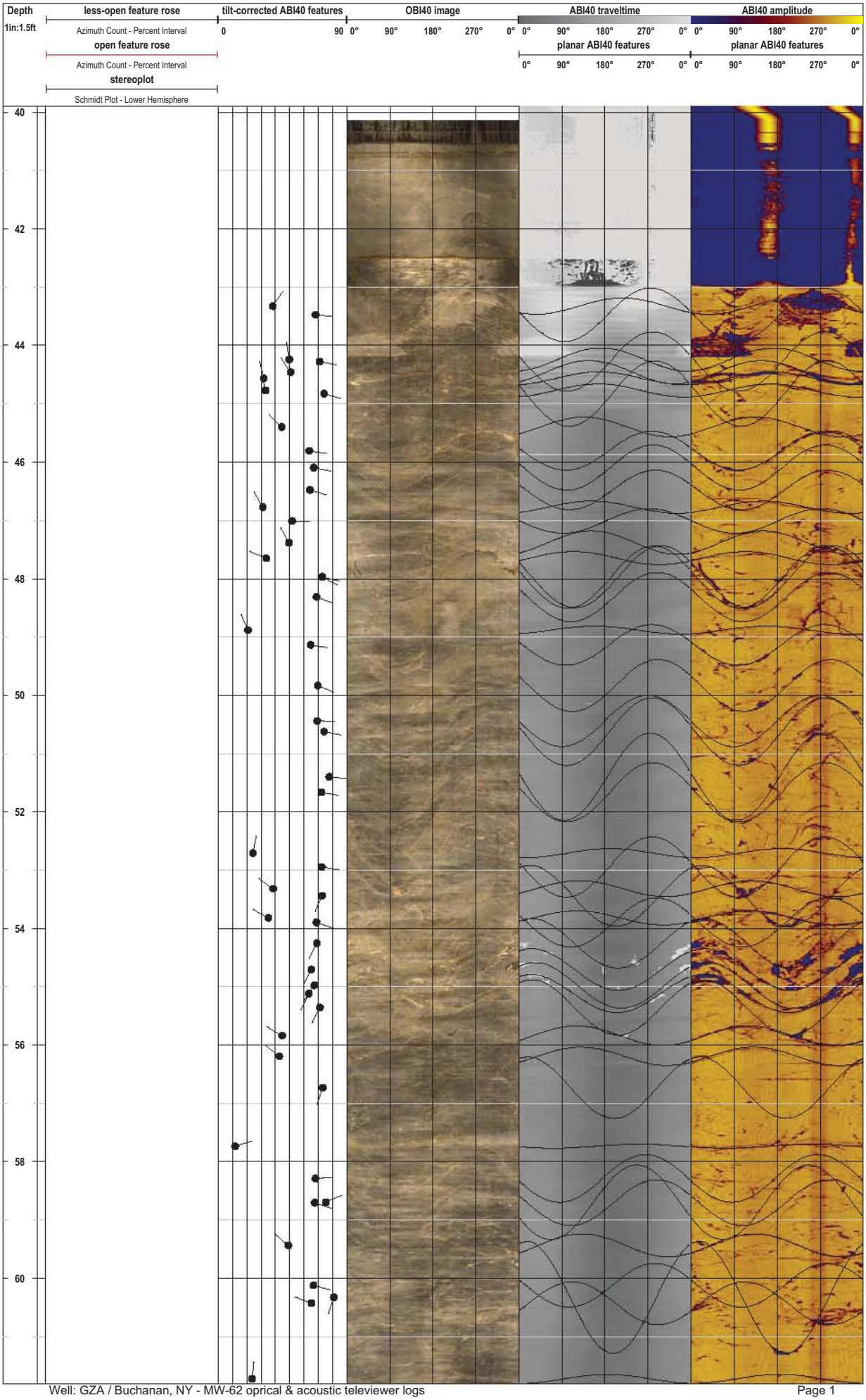
Project - Well: GZA / Buchanan, NY - MW-62 conventional logs

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Azimuth Count - Percent Interval
open feature rose
Azimuth Count - Percent Interval
stereoplot
Schmidt Plot - Lower Hemisphere
tilt-corrected ABI40 features
0
90
OBI40 image
0° 90° 180° 270° 0°
ABI40 traveltime
0° 90° 180° 270° 0°
planar ABI40 features
0° 90° 180° 270° 0°
ABI40 amplitude
0° 90° 180° 270° 0°
planar ABI40 features
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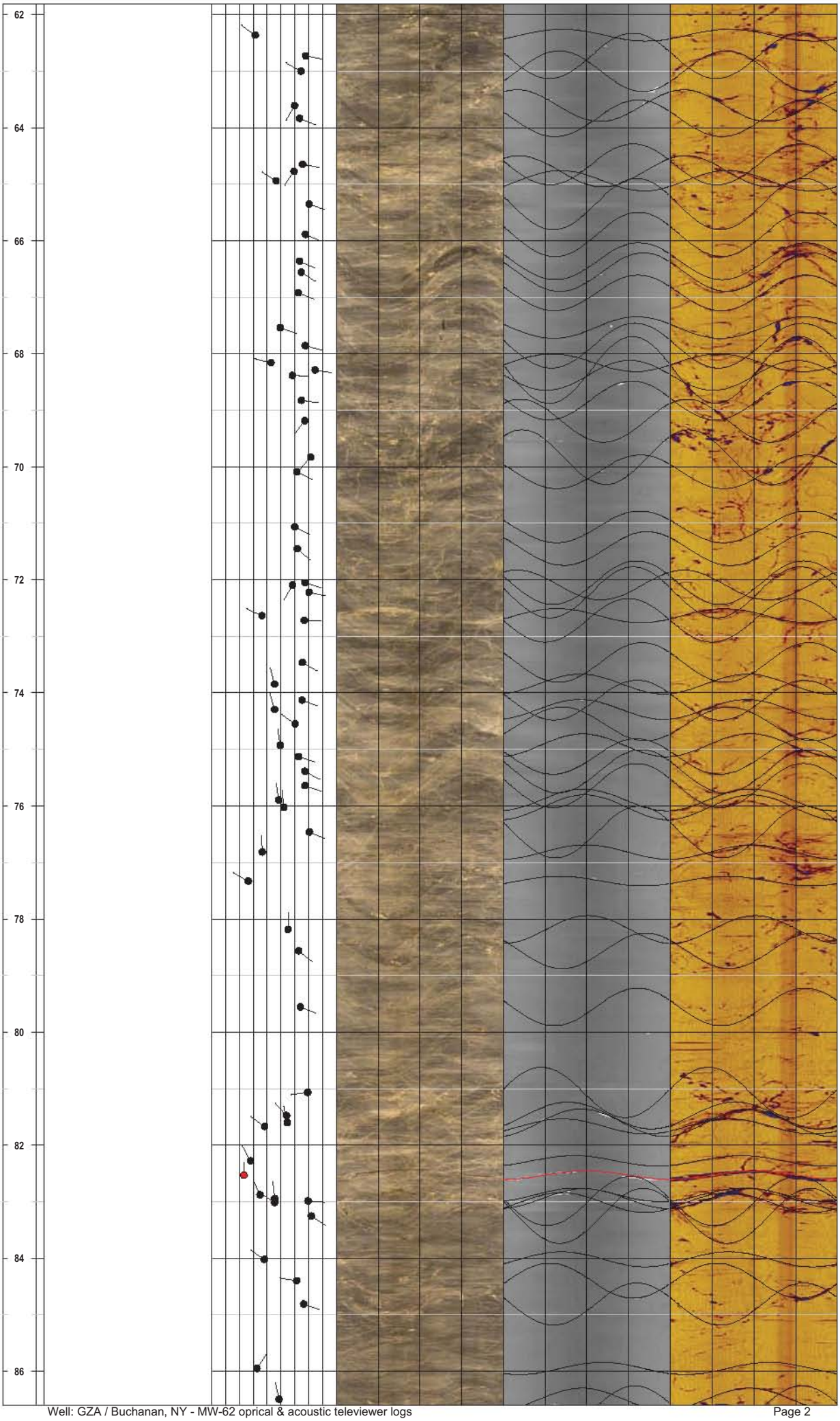
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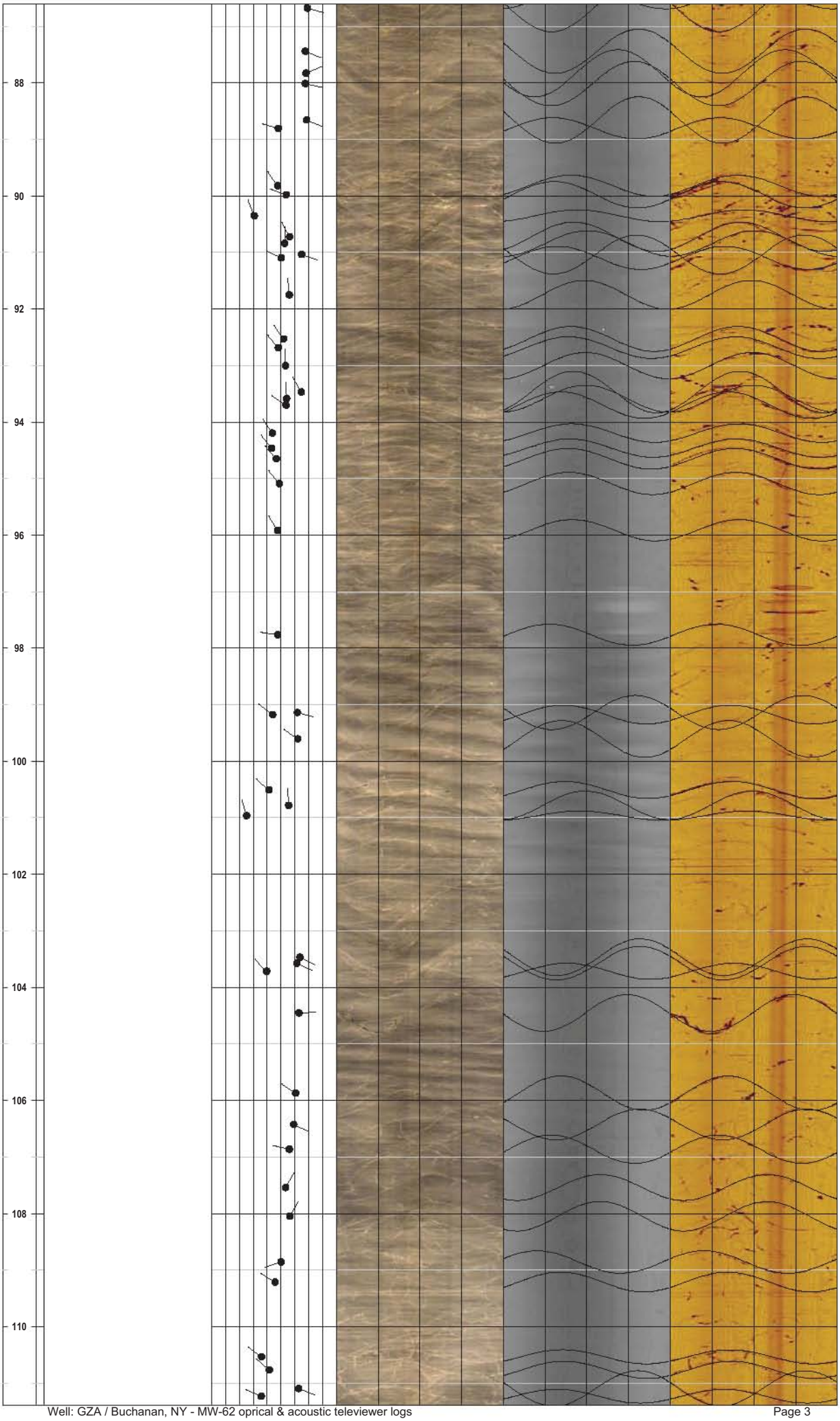
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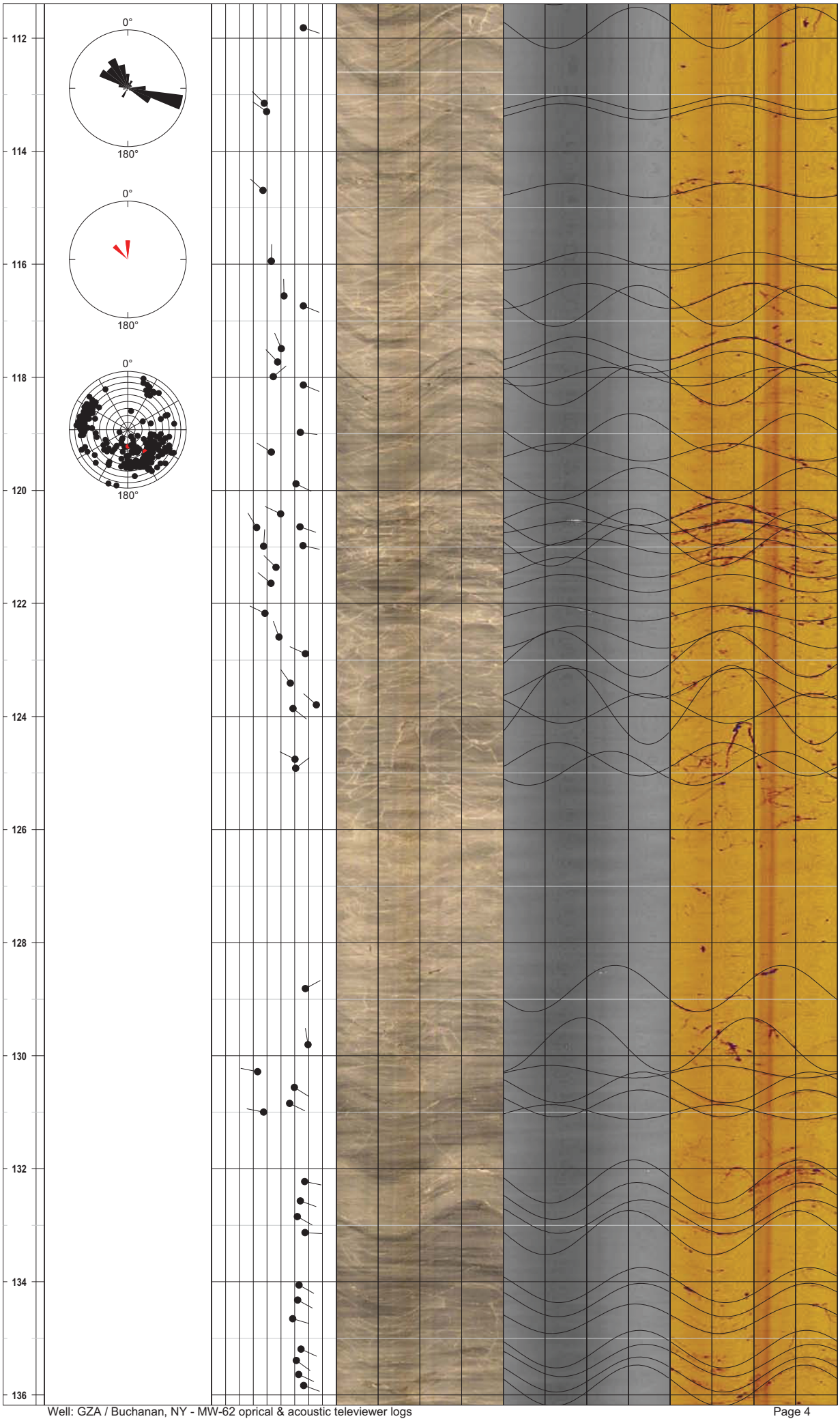
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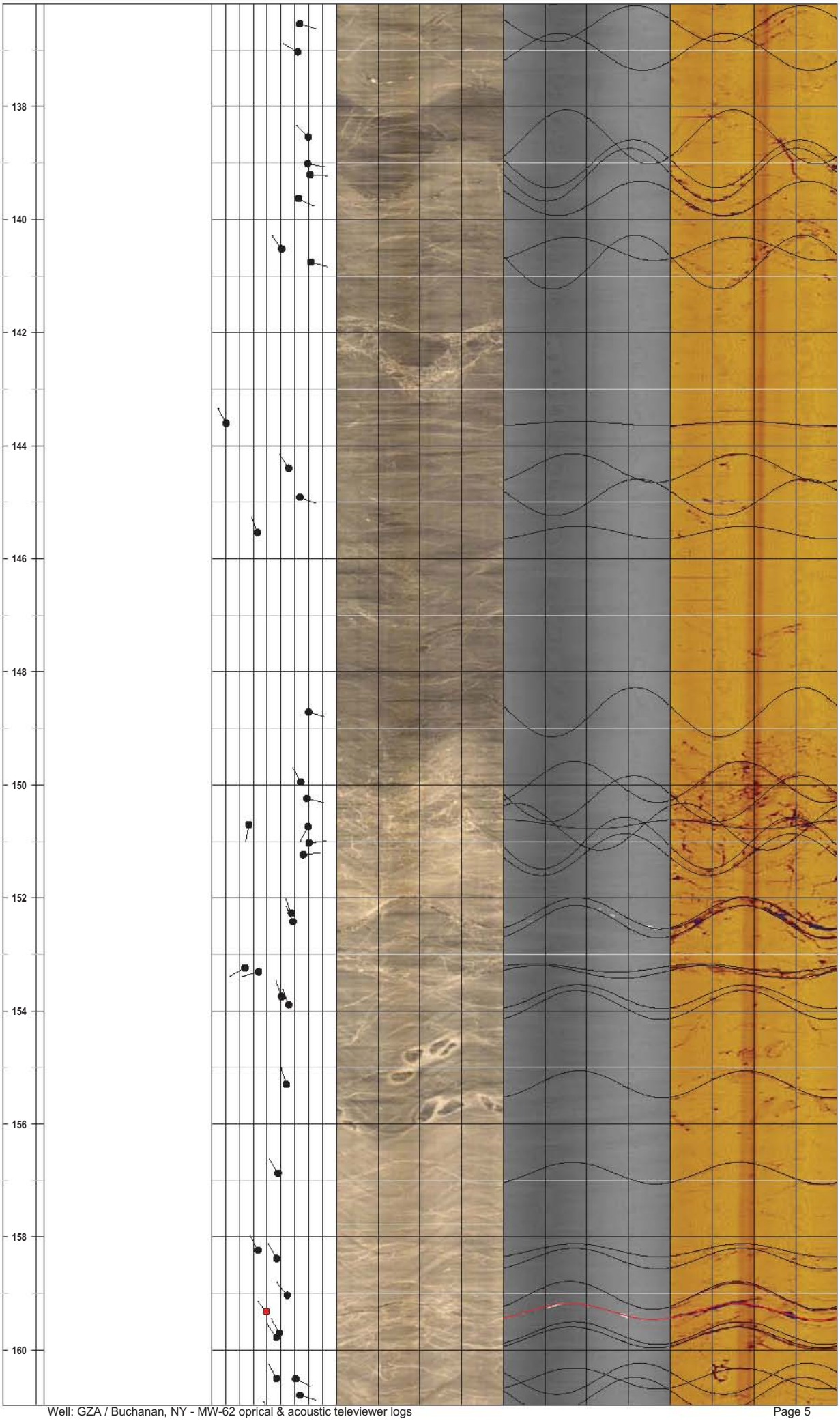
180°
0°
180°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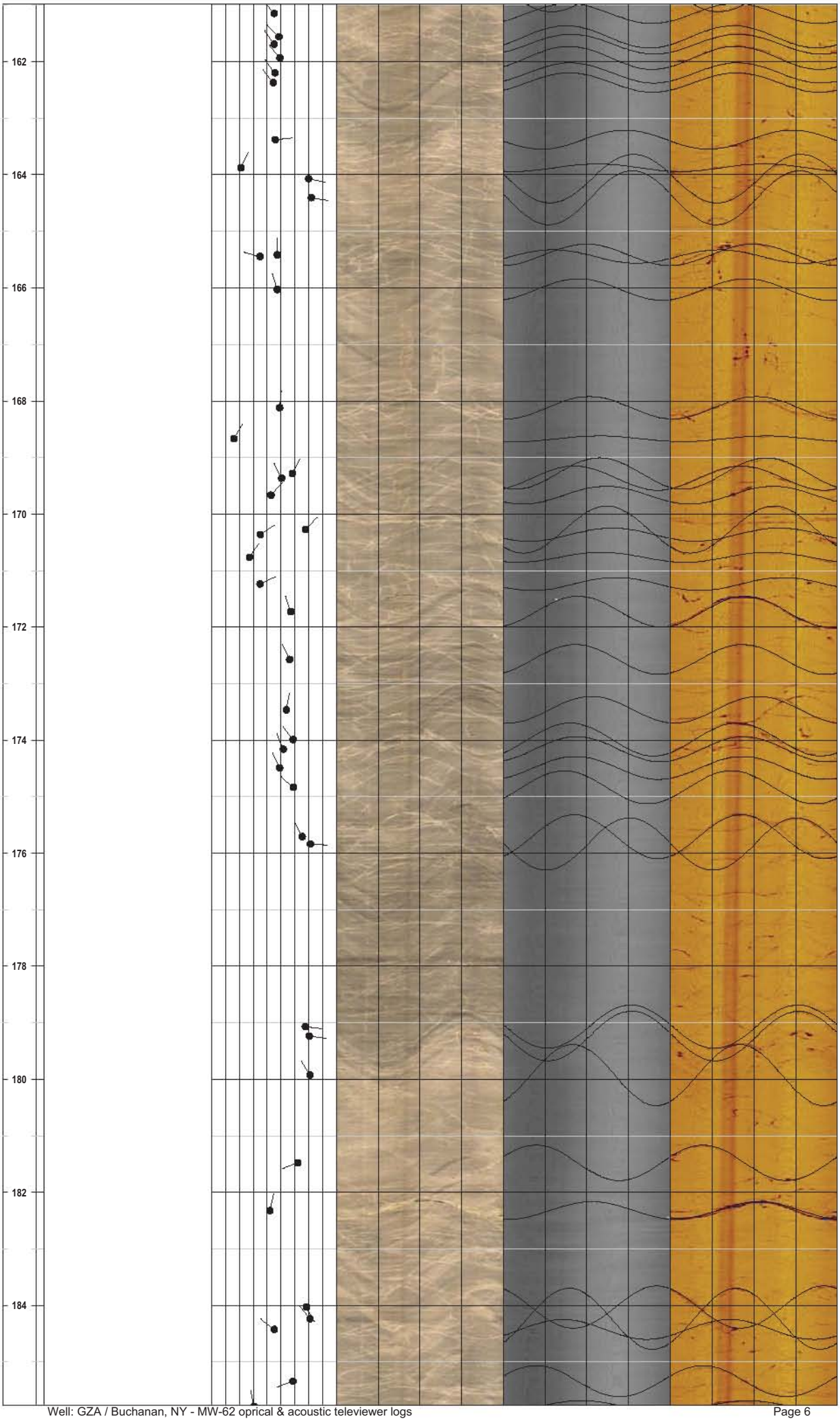
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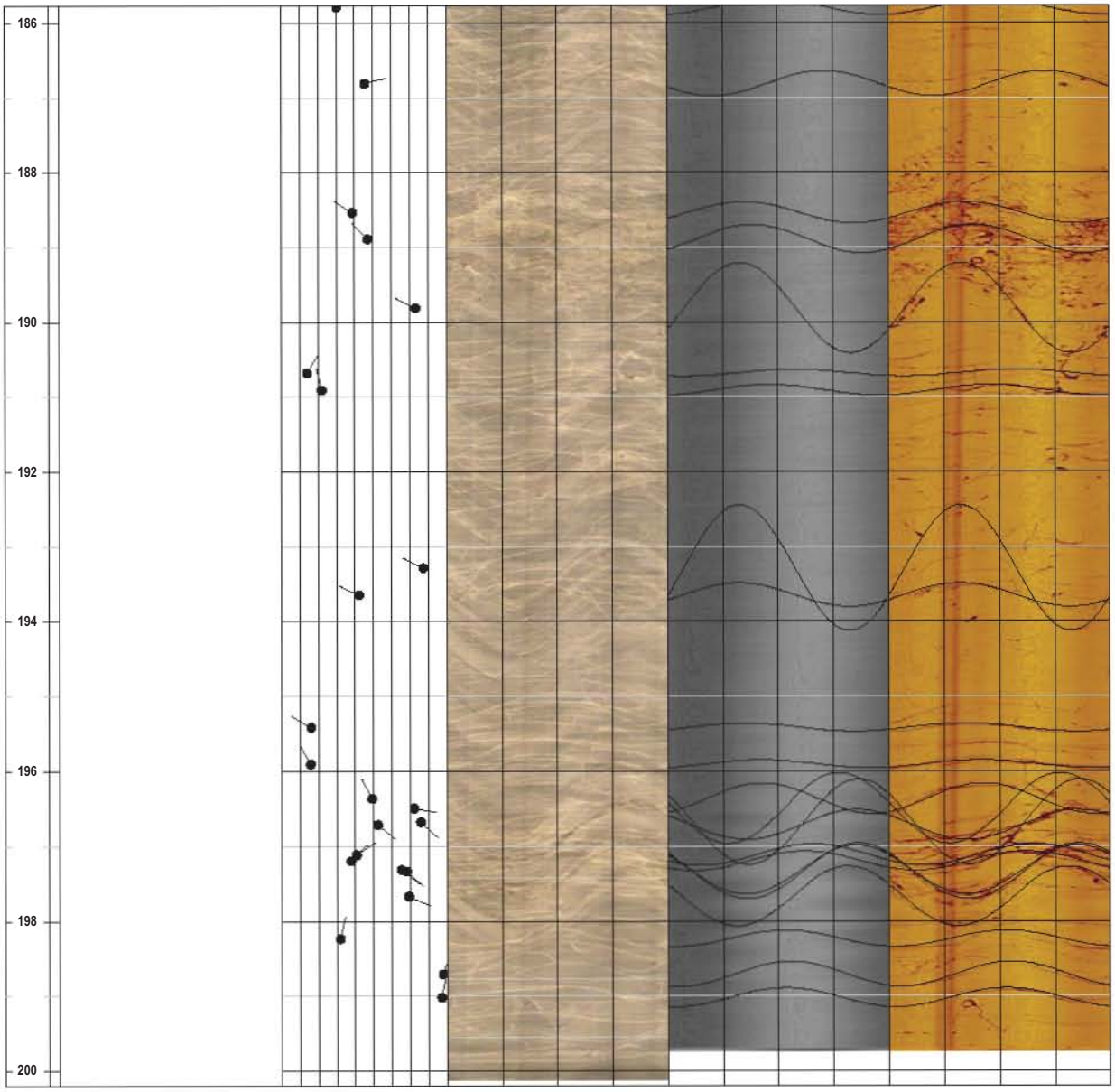
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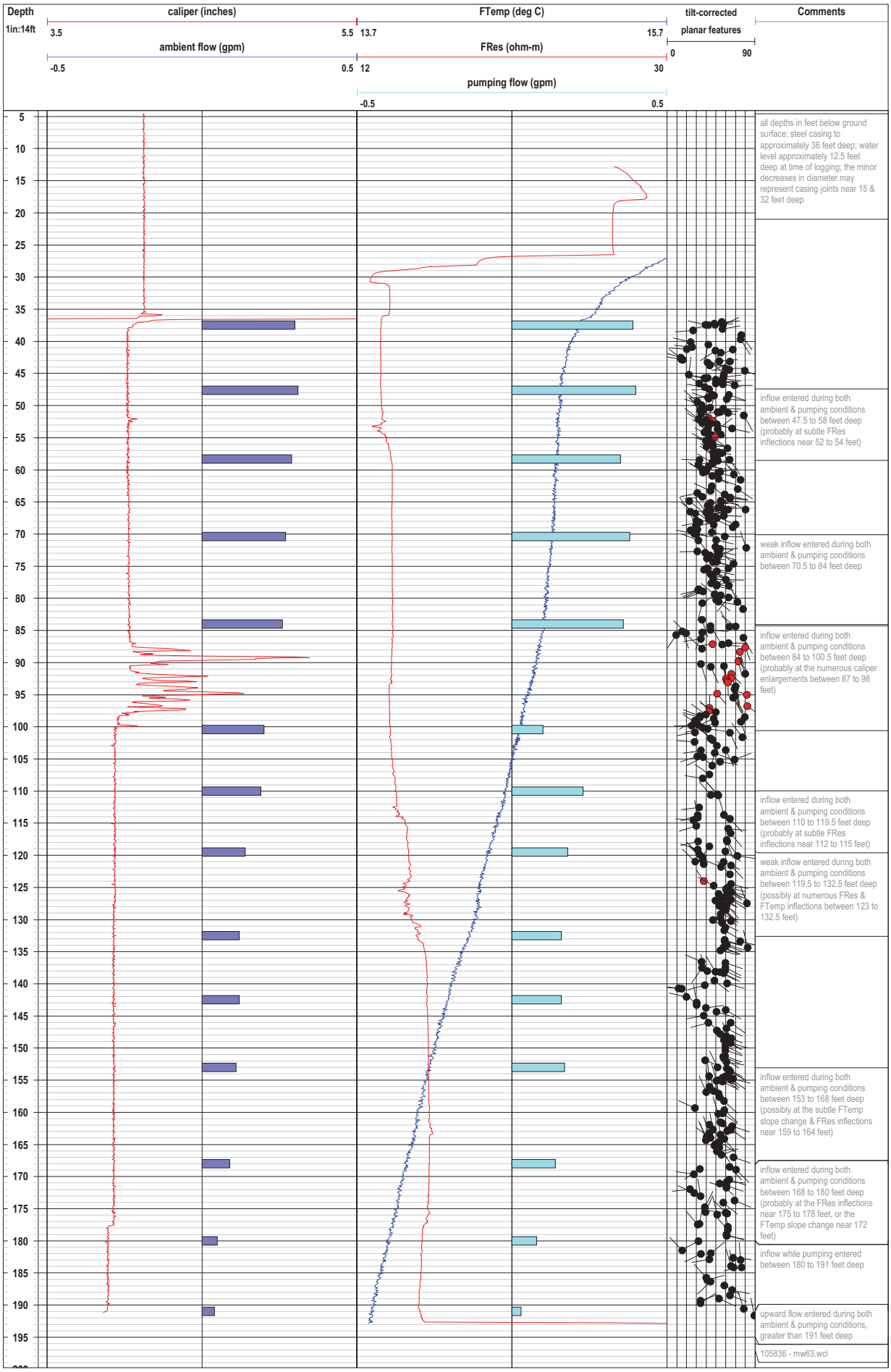
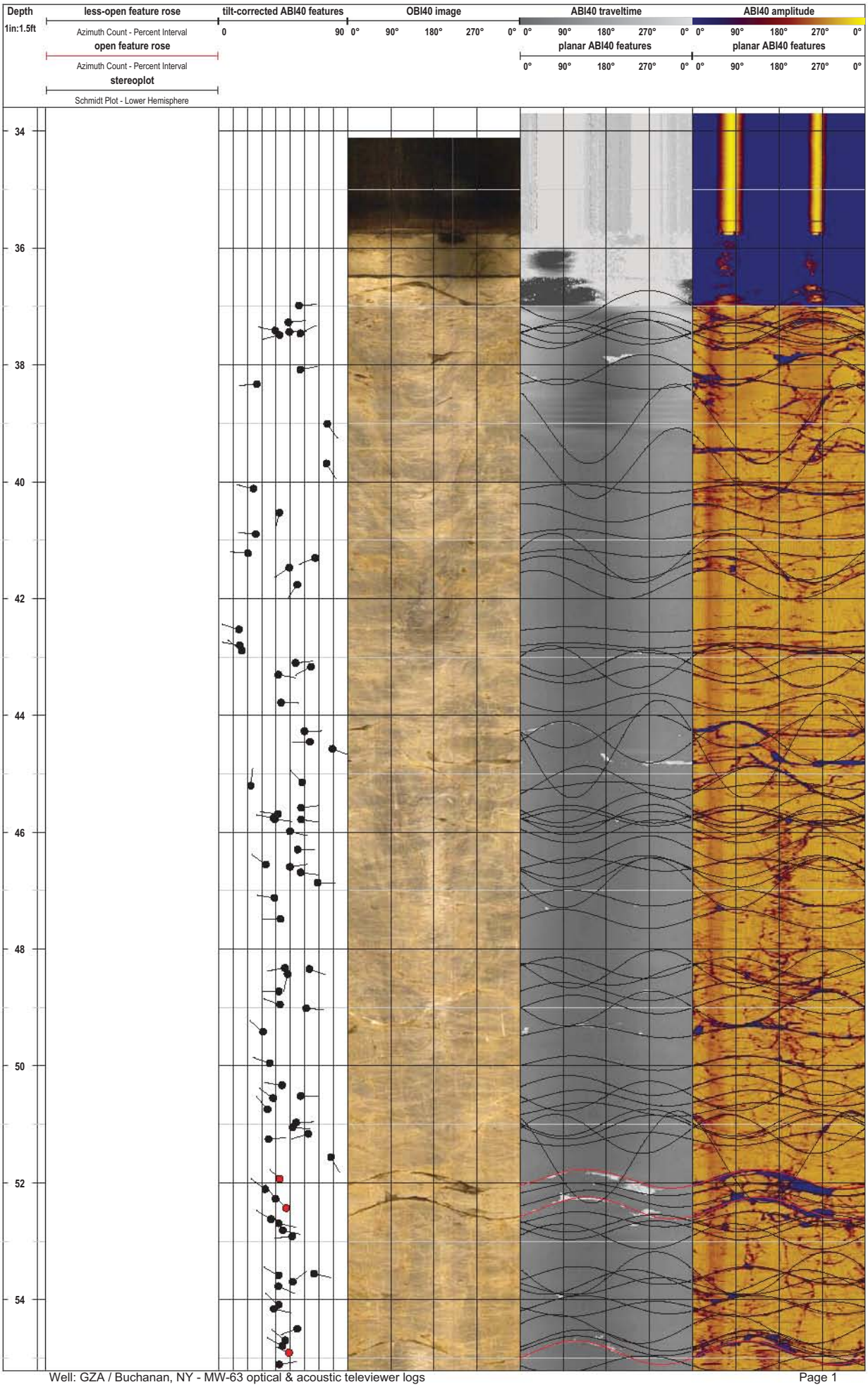
Project - Well: GZA / Buchanan, NY - MW-63 conventional logs

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Azimuth Count - Percent Interval
open feature rose
Azimuth Count - Percent Interval
stereoplot
Schmidt Plot - Lower Hemisphere
tilt-corrected ABI40 features
0
90
OBI40 image
0° 90° 180° 270° 0°
ABI40 traveltime
0° 90° 180° 270° 0°
planar ABI40 features
0° 90° 180° 270° 0°
ABI40 amplitude
0° 90° 180° 270° 0°
planar ABI40 features
0° 90° 180° 270° 0°
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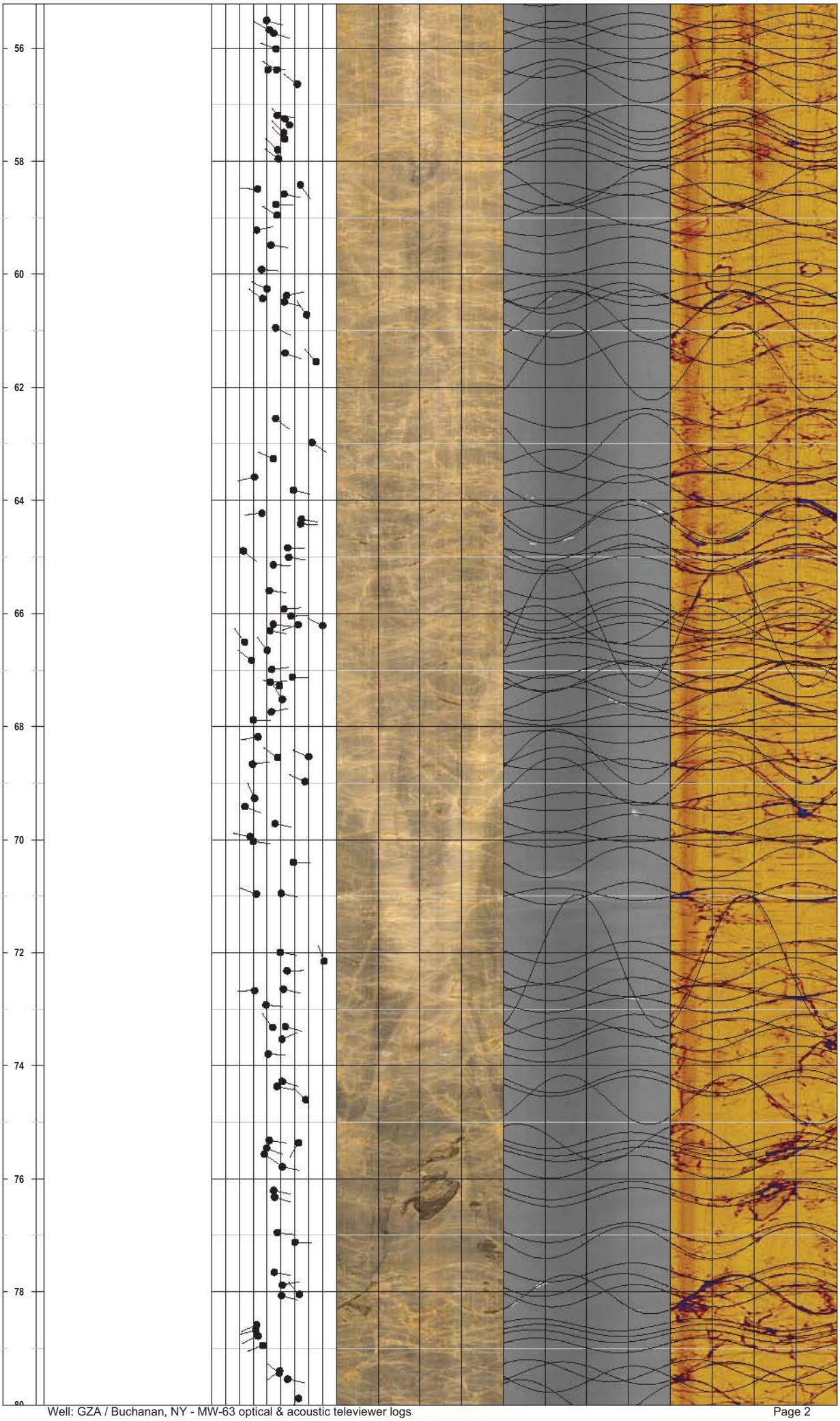
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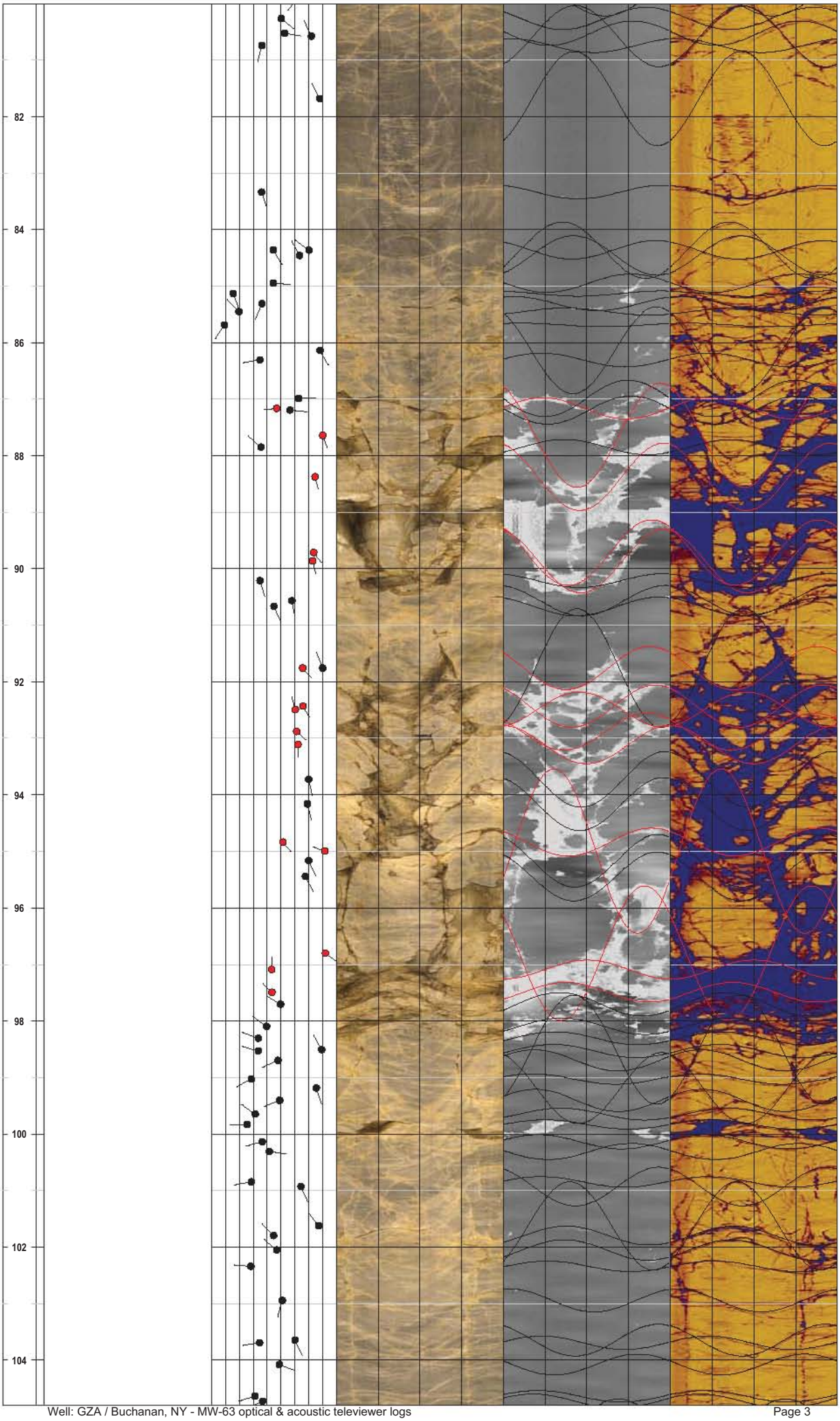
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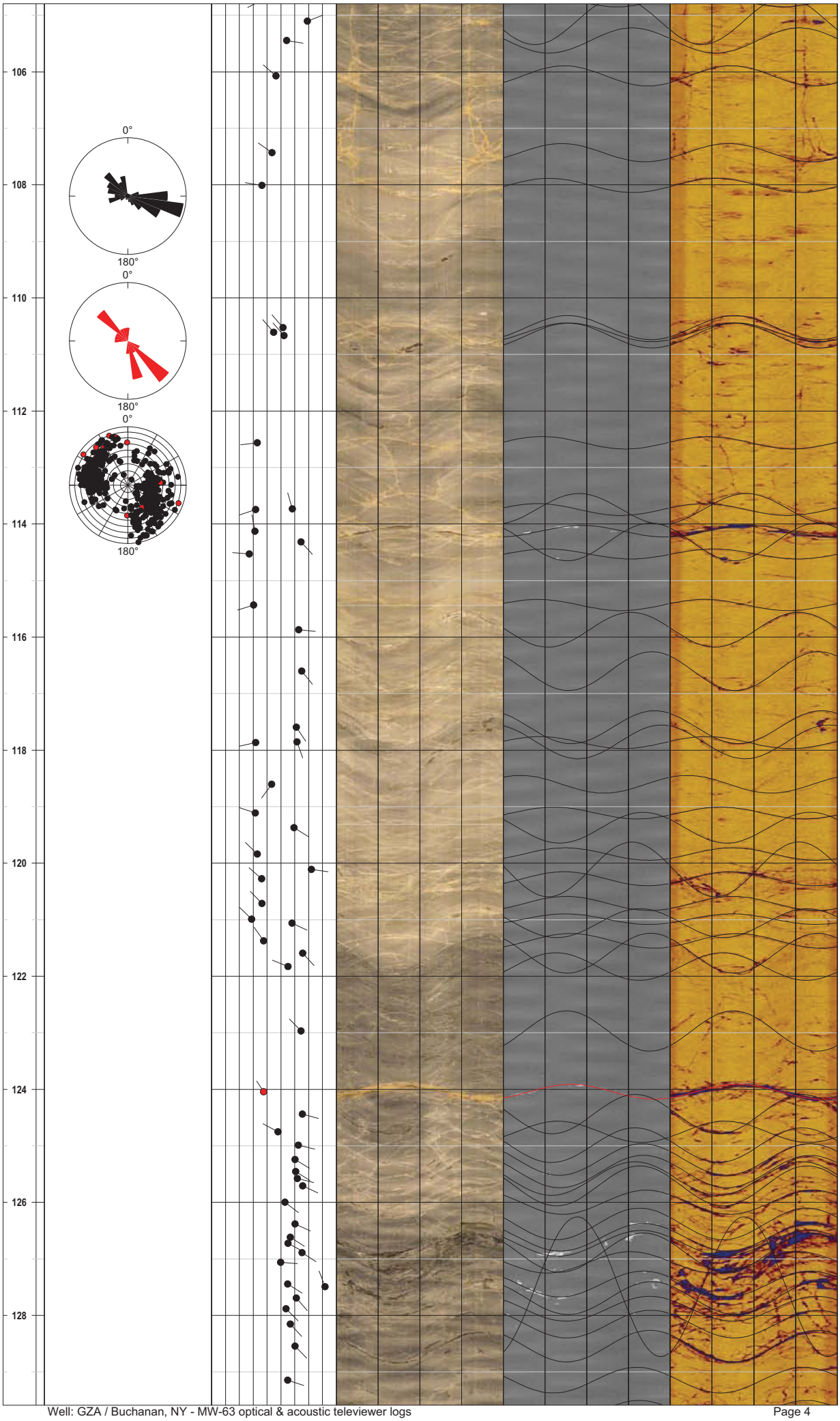
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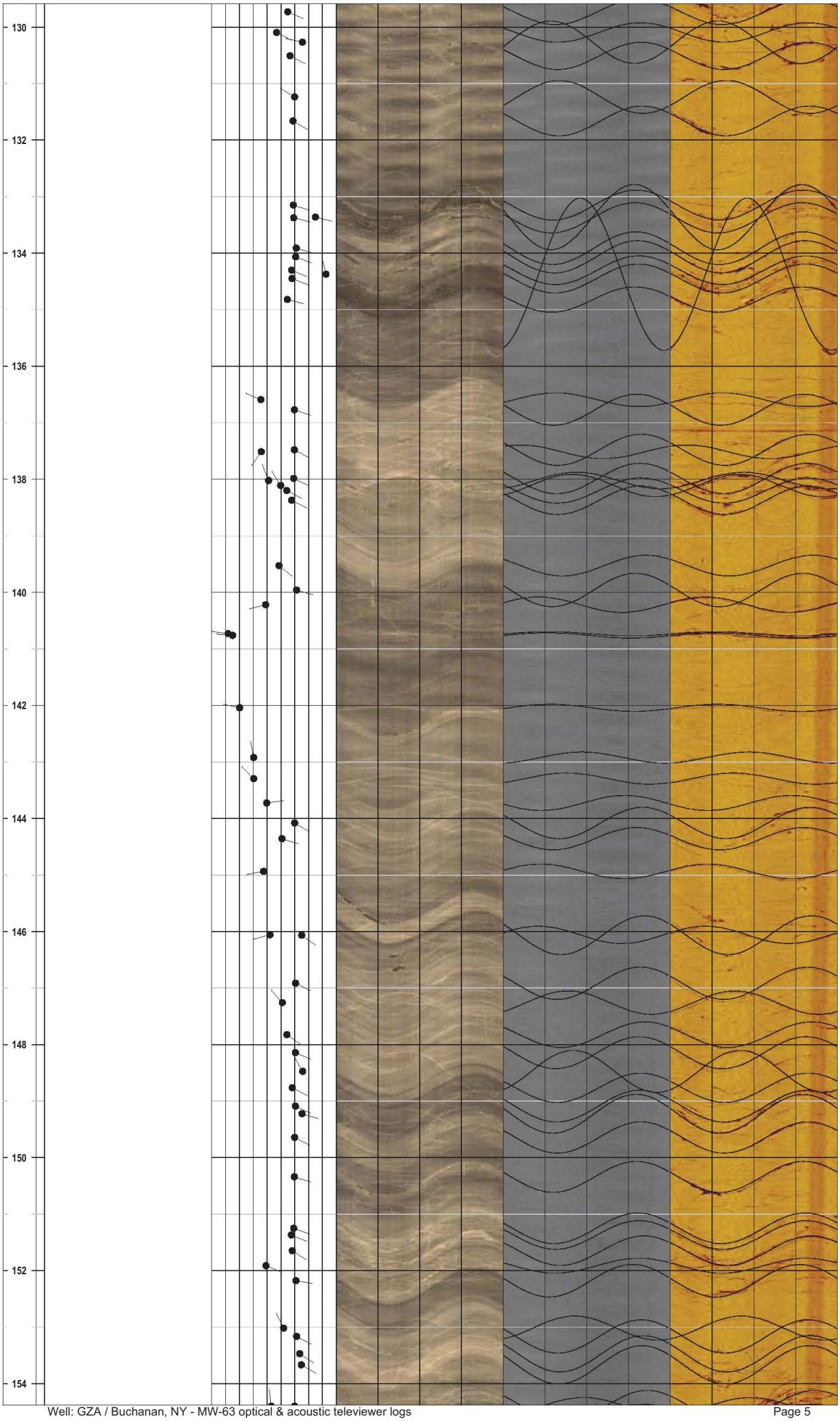
0°
180°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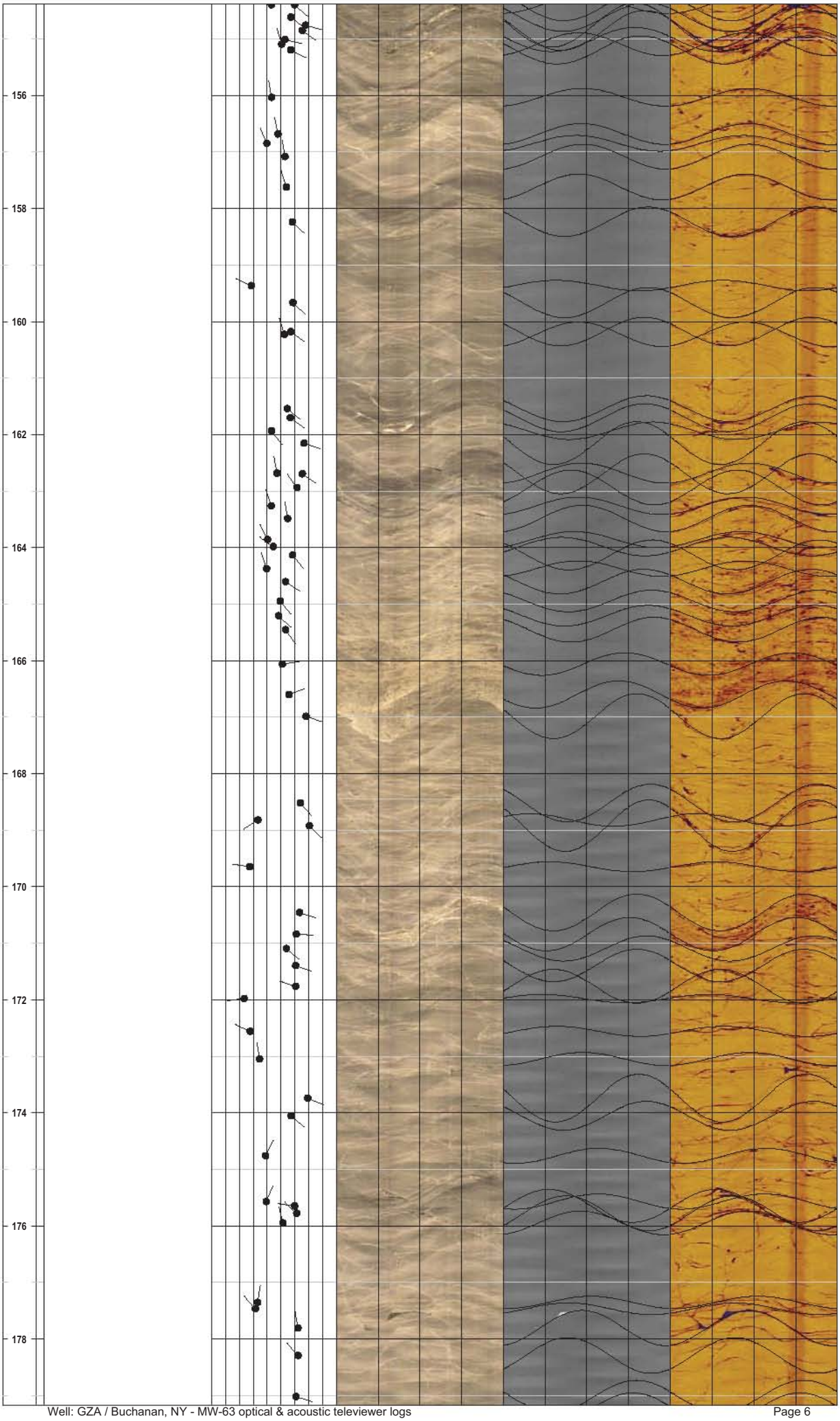
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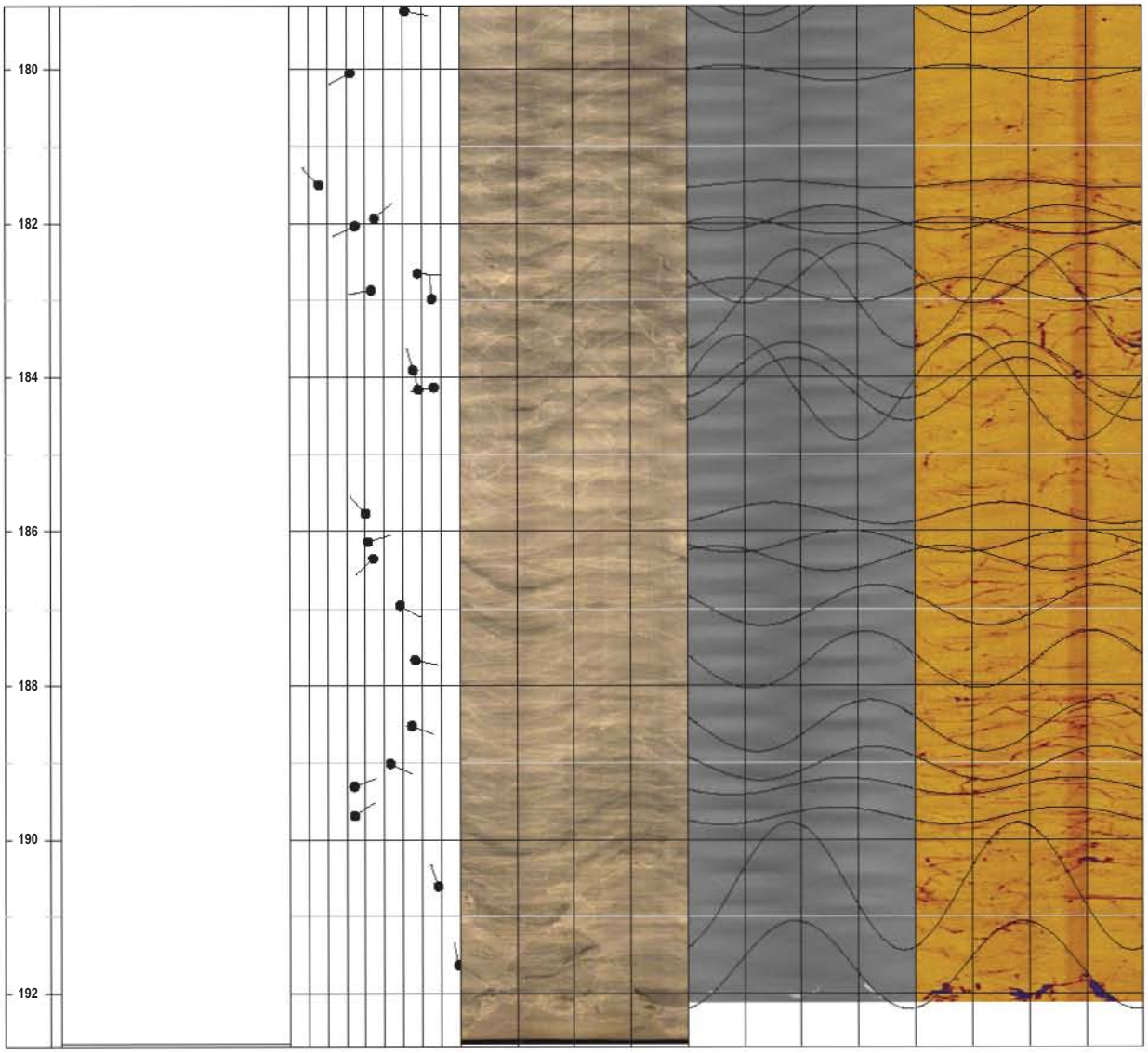
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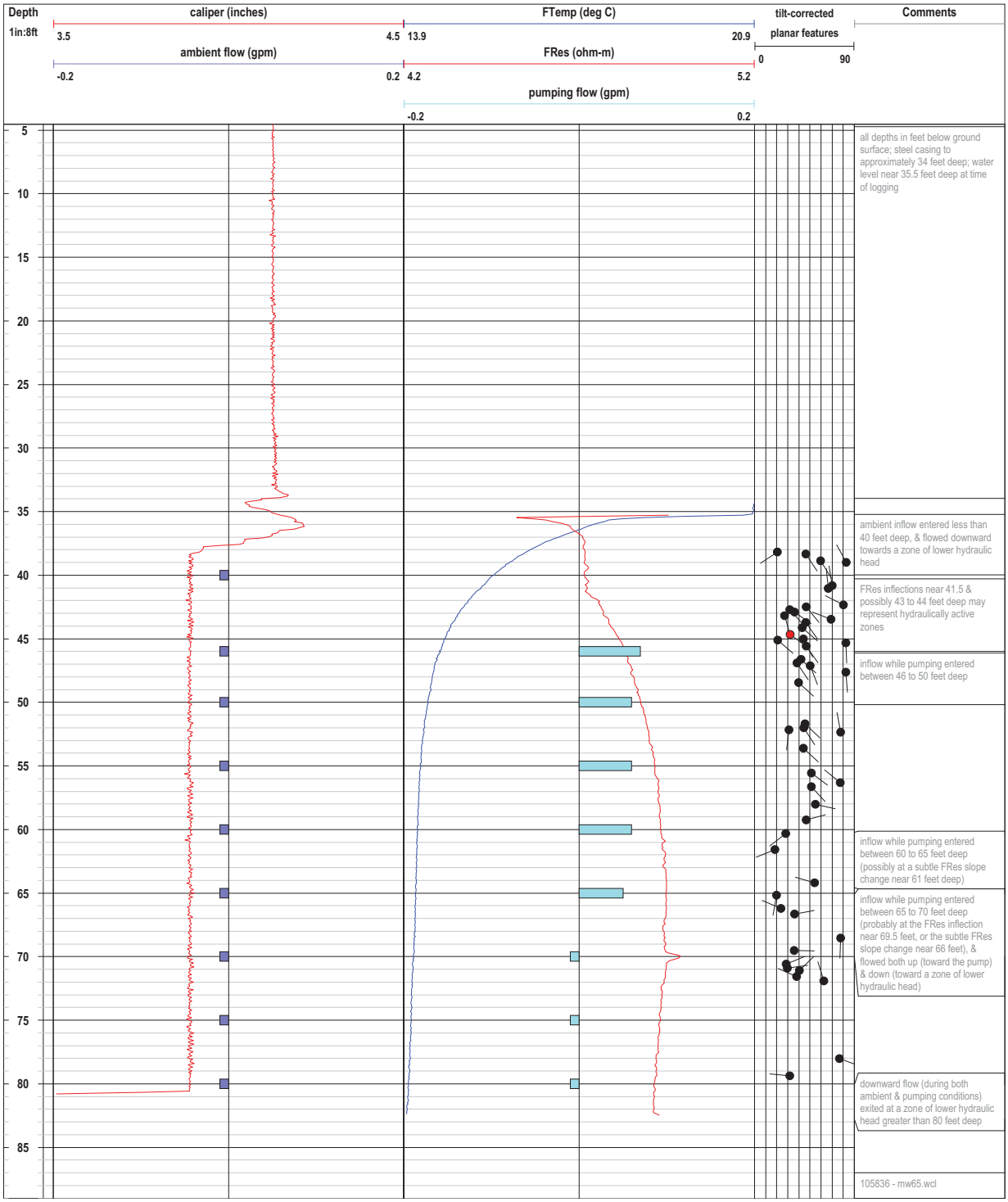
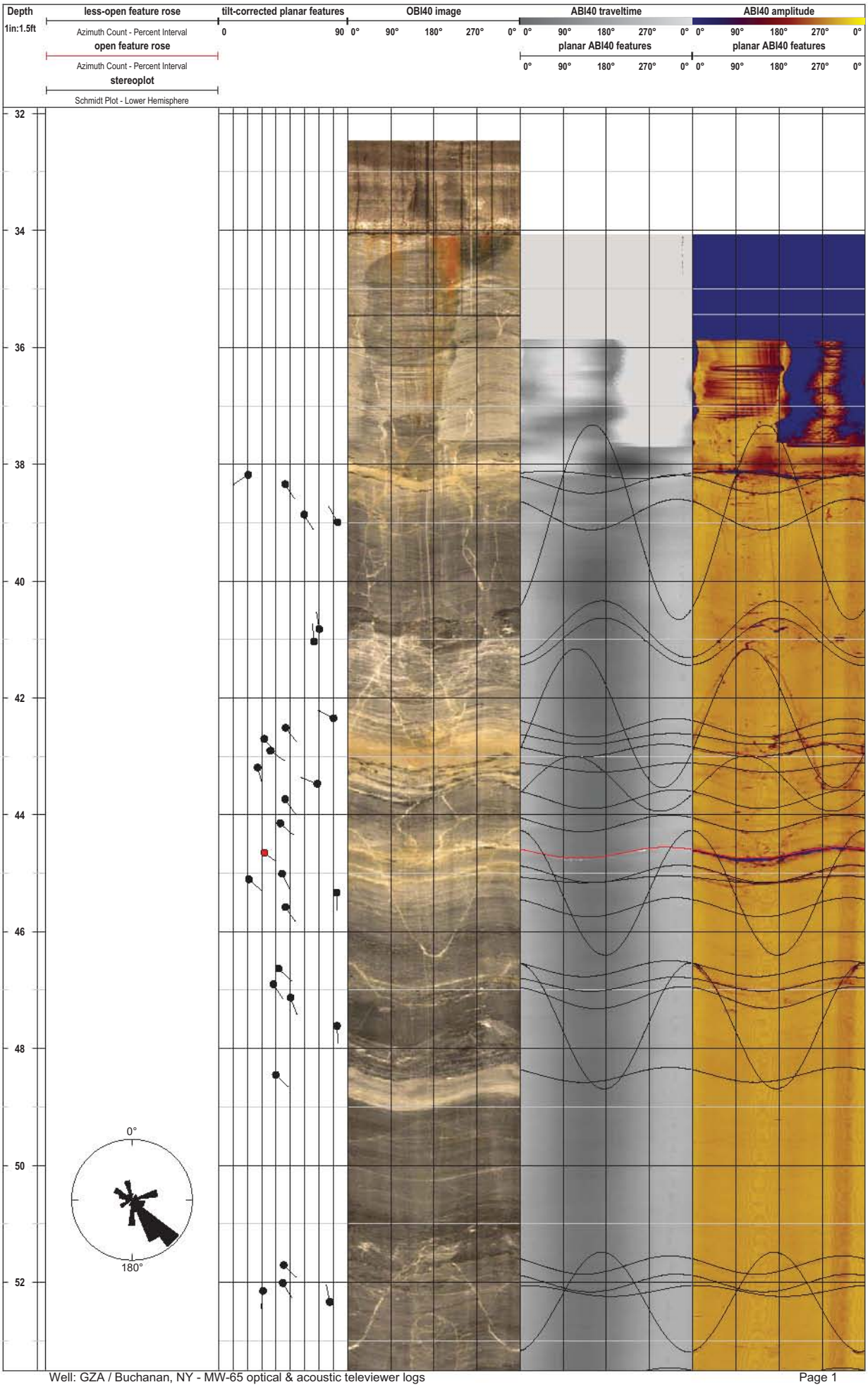
Project - Well: GZA / Buchanan, NY - MW-65 conventional logs



Well: GZA / Buchanan, NY - MW-65 conventional logs


Depth
1in:1.5ft
less-open feature rose
Azimuth Count - Percent Interval
open feature rose
Azimuth Count - Percent Interval
stereoplot
Schmidt Plot - Lower Hemisphere
tilt-corrected planar features
0
90
OBI40 image
0° 90° 180° 270° 0°
ABI40 traveltime
0° 90° 180° 270° 0°
planar ABI40 features
0° 90° 180° 270° 0°
ABI40 amplitude
0° 90° 180° 270° 0°
planar ABI40 features
0° 90° 180° 270° 0°
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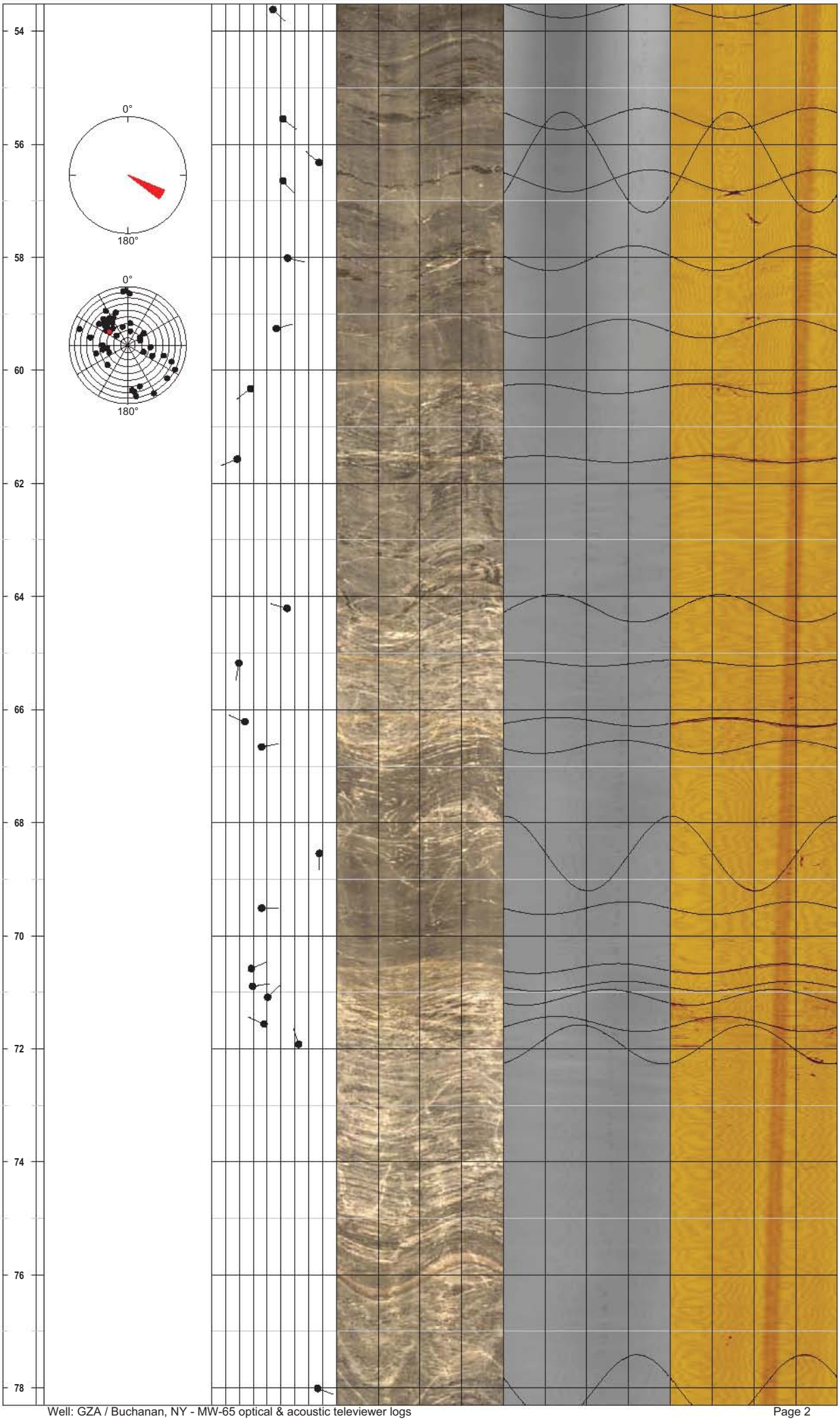
34
36
38
40
42
44
46
48
50
52
0°
180°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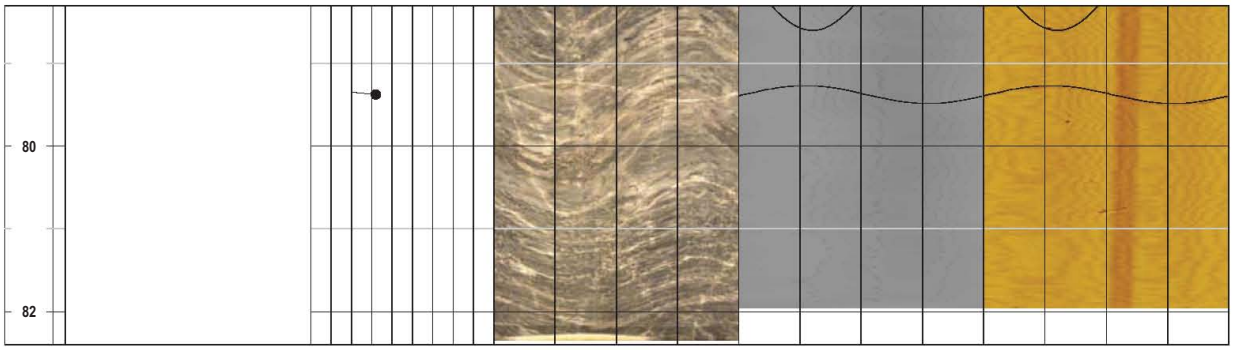
180°
0°
180°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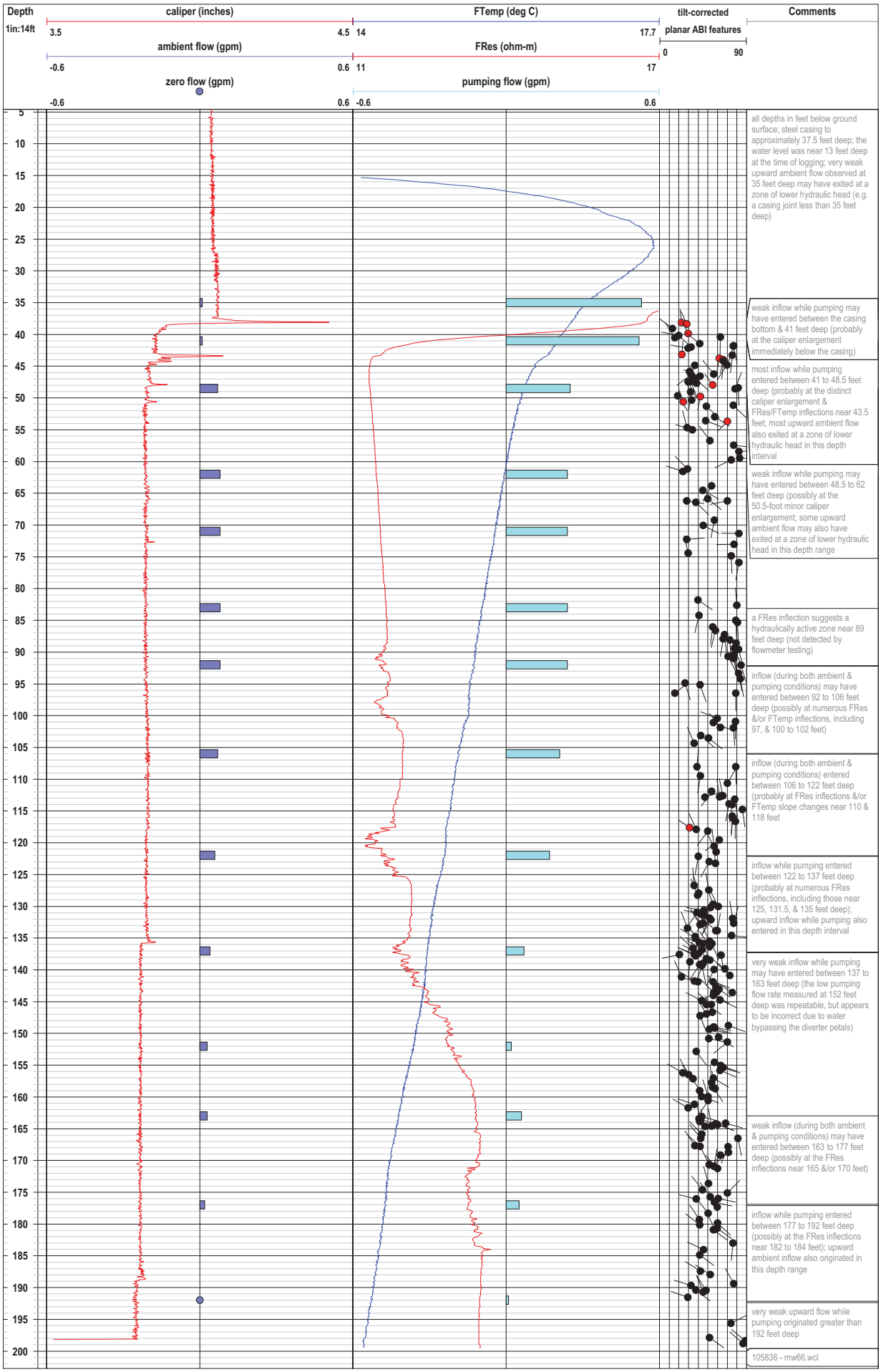
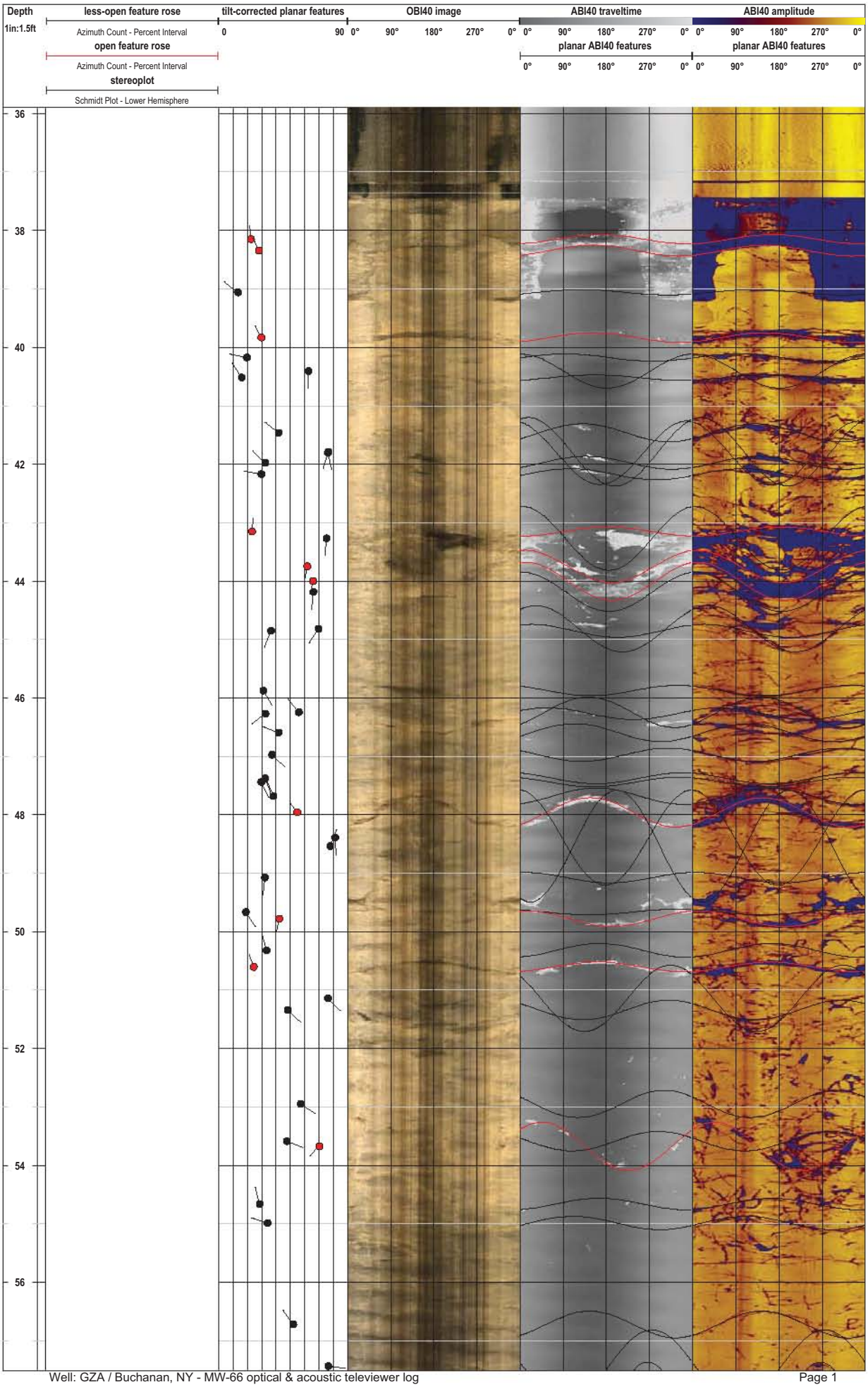
Project - Well: GZA / Buchanan, NY - MW-66 conventional logs




Depth
1in:1.5ft
less-open feature rose
Azimuth Count - Percent Interval
open feature rose
Azimuth Count - Percent Interval
stereoplot
Schmidt Plot - Lower Hemisphere
tilt-corrected planar features
0
90
OBI40 image
0° 90° 180° 270° 0°
ABI40 traveltime
0° 90° 180° 270° 0°
planar ABI40 features
0° 90° 180° 270° 0°
ABI40 amplitude
0° 90° 180° 270° 0°
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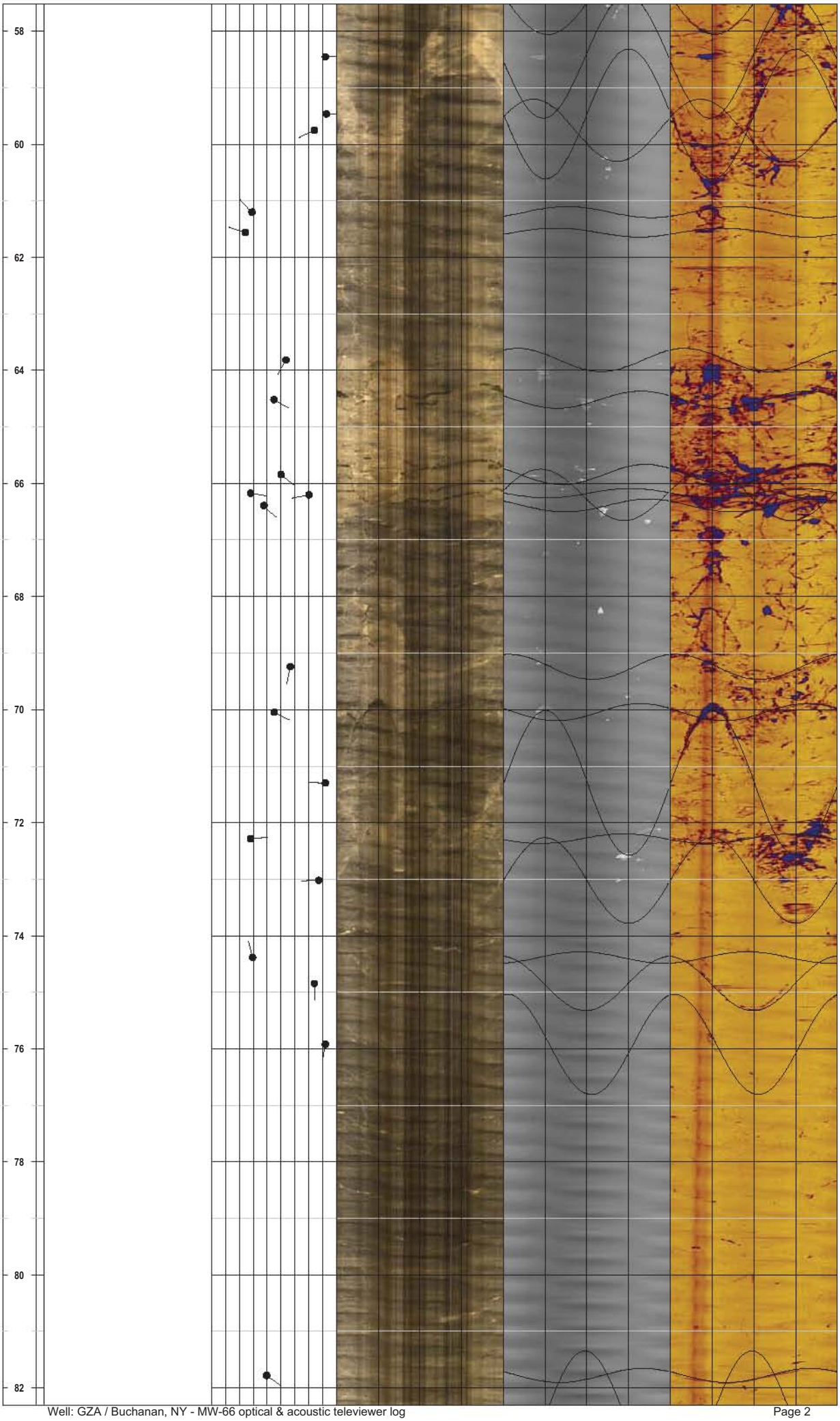
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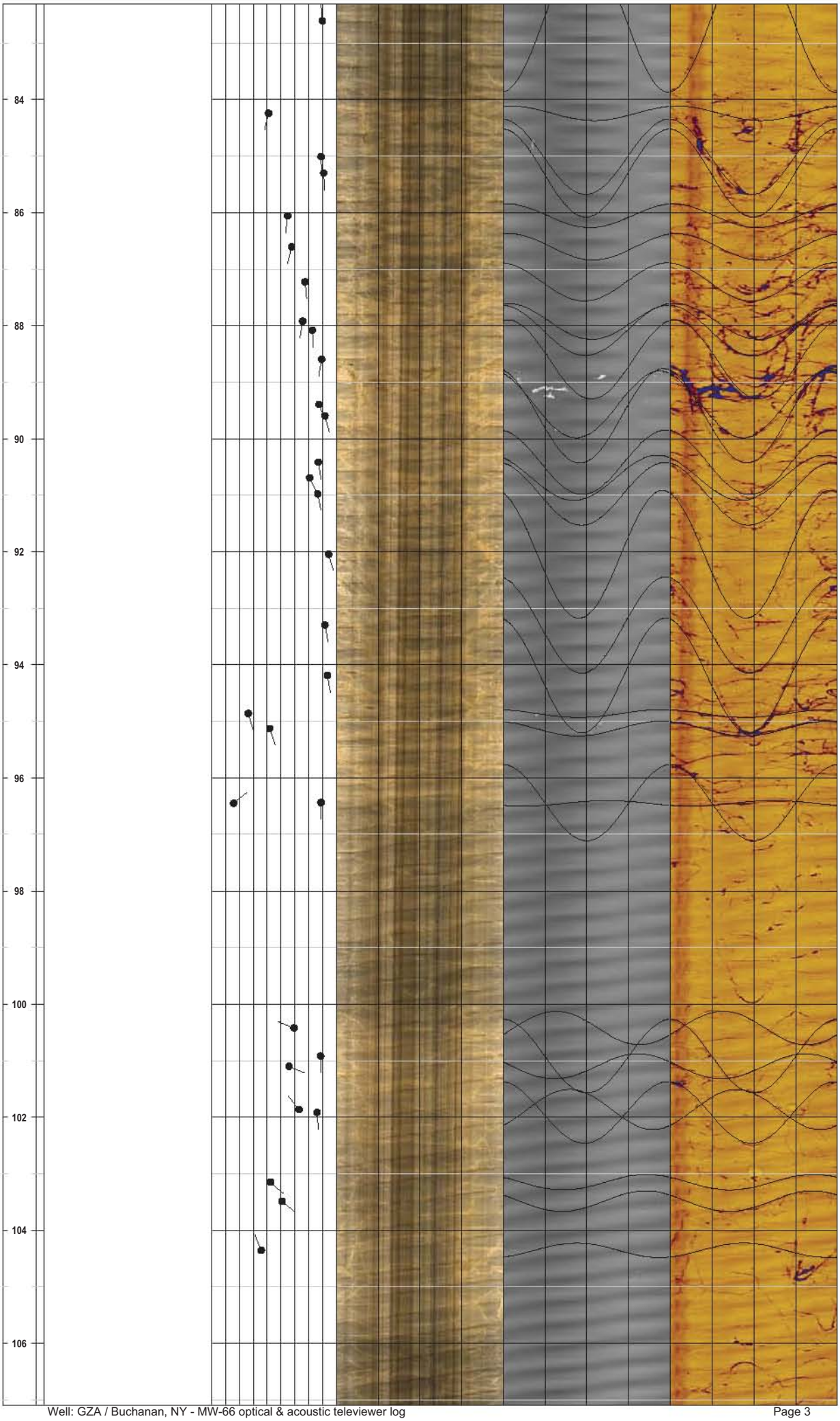
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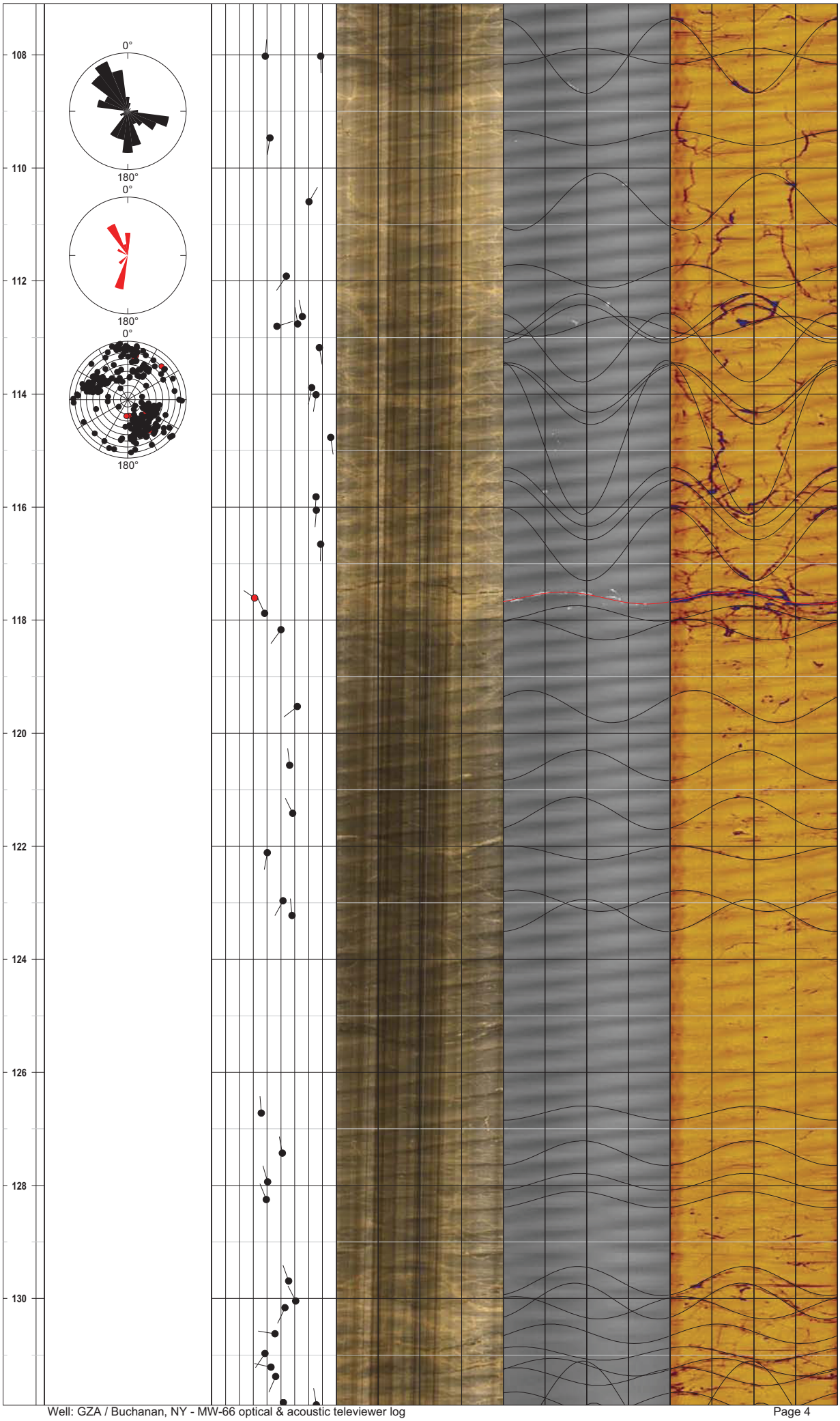
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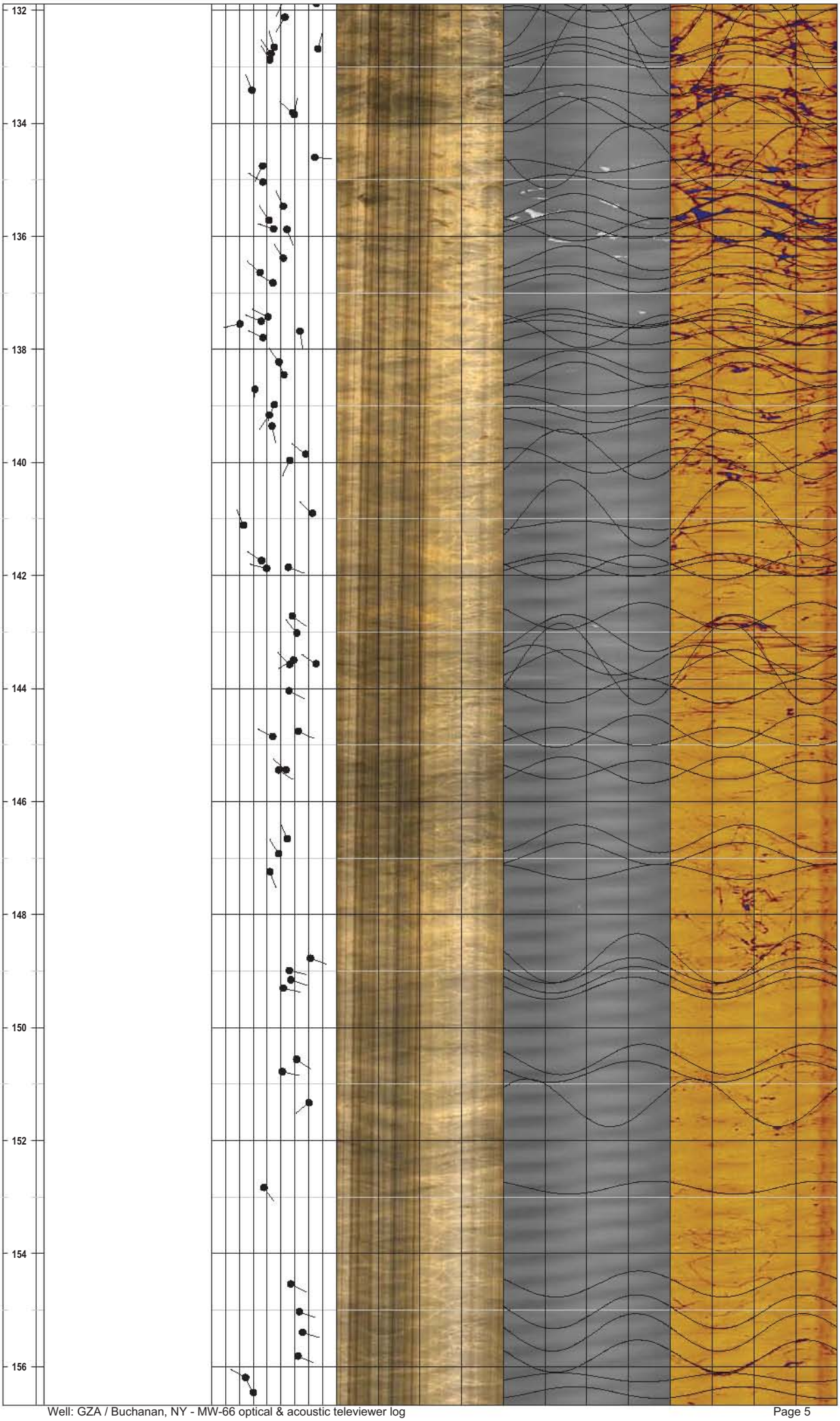
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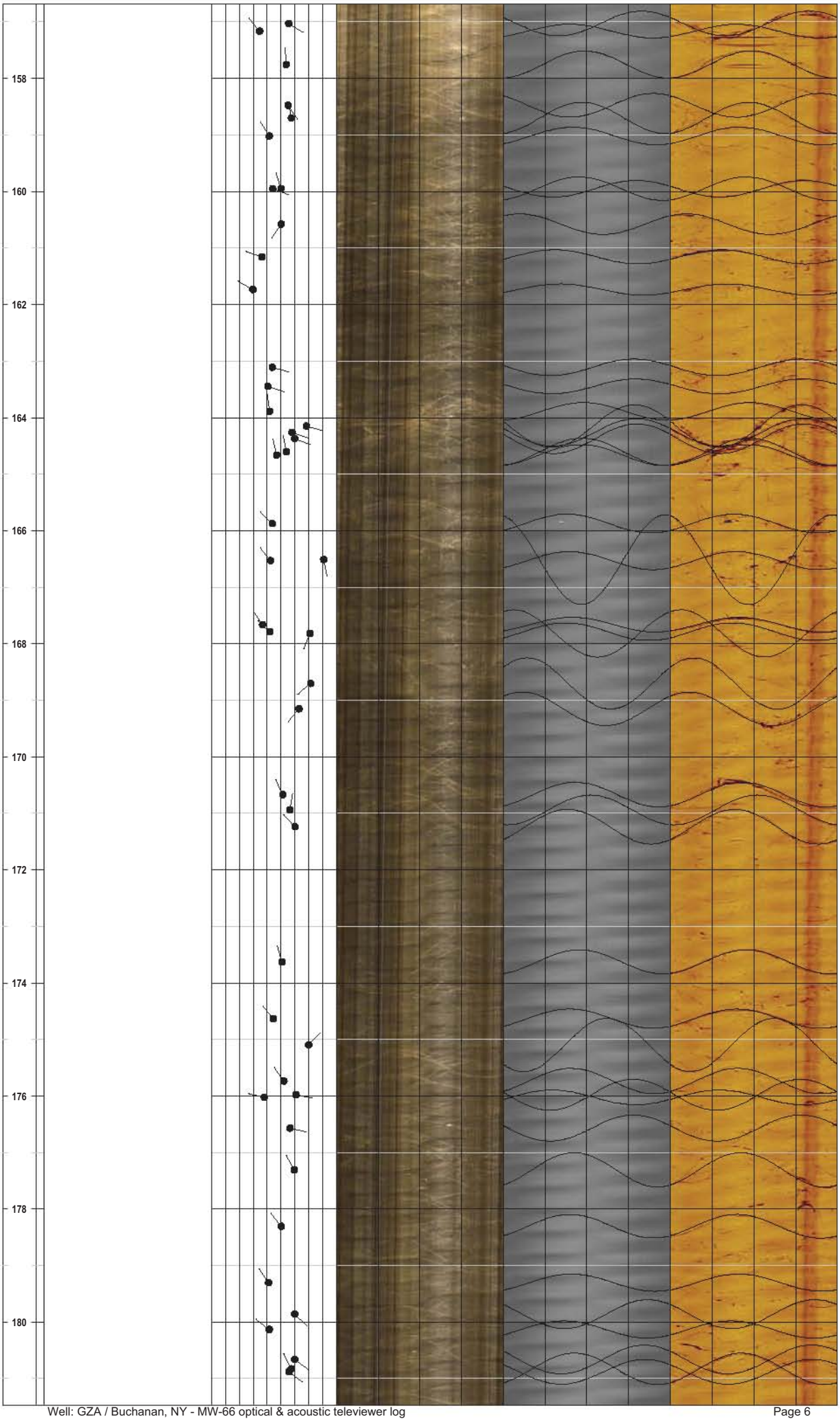
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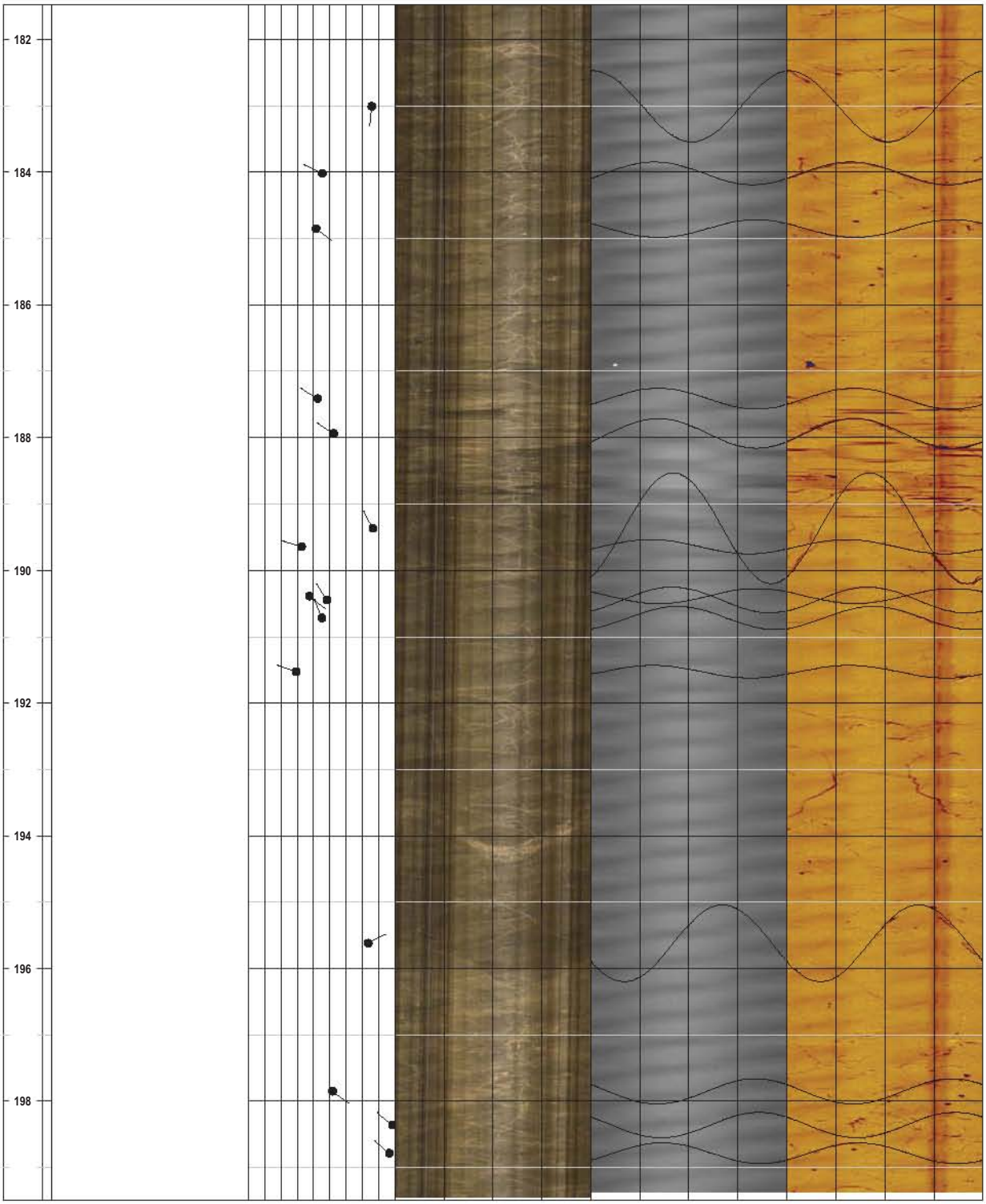
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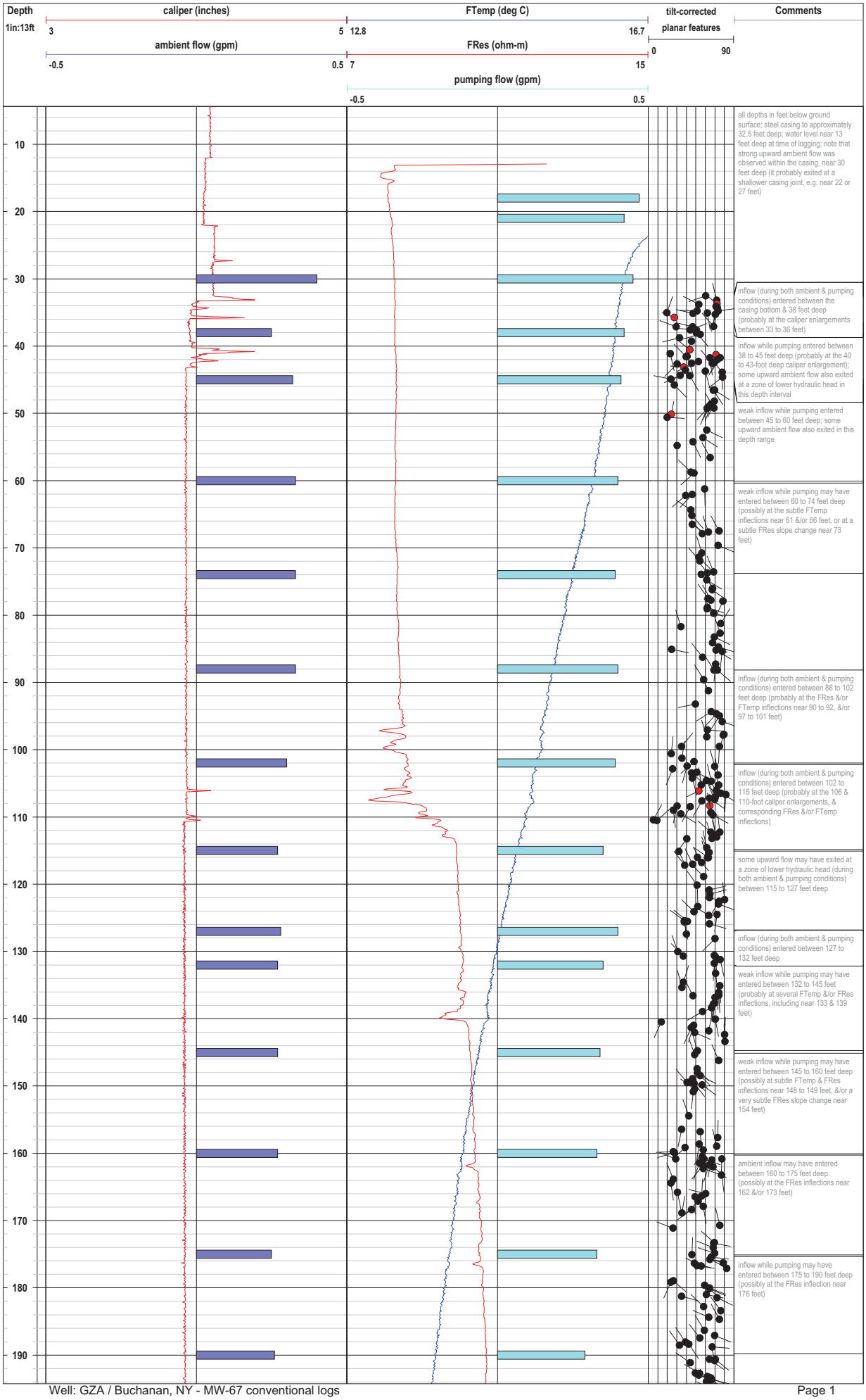
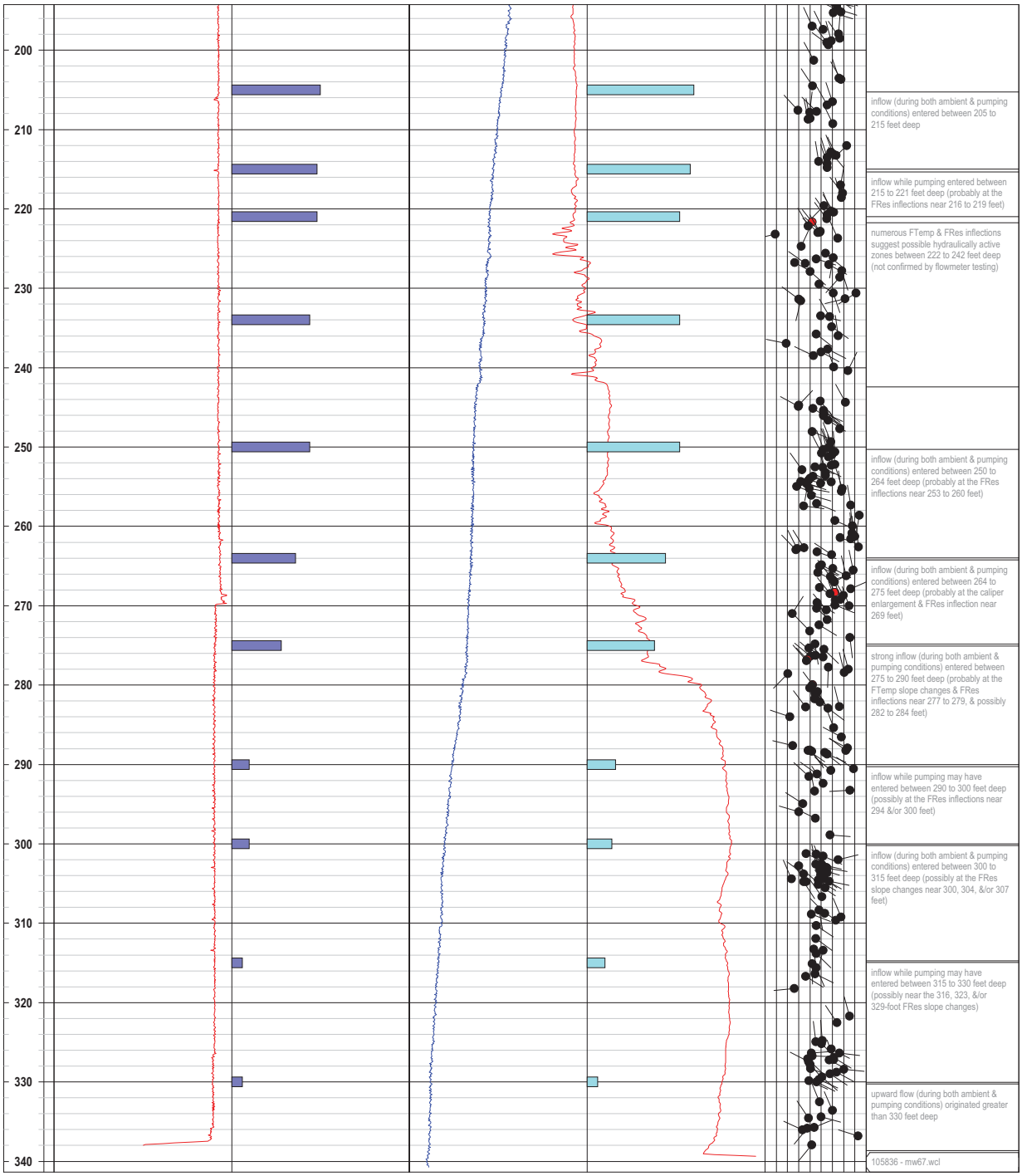

Depth
1in:13ft
caliper (inches)
3
5
ambient flow (gpm)
-0.5
0.5
FTemp (deg C)
12.8
16.7
FRes (ohm-m)
7
15
pumping flow (gpm)
-0.5
0.5
tilt-corrected
planar features
0
90
Comments
10
20
30
40
50
60
70
80
90
100
110
120
130
140
150
160
170
180
190
all depths in feet below ground surface; steel casing to approximately 32.5 feet deep; water level near 13 feet deep at time of logging; note that strong upward ambient flow was observed within the casing, near 30 feet deep (it probably exited at a shallower casing joint, e.g. near 22 or 27 feet)
inflow (during both ambient & pumping conditions) entered between the casing bottom & 38 feet deep (probably at the caliper enlargements between 33 to 36 feet)
inflow while pumping entered between 38 to 45 feet deep (probably at the 40 to 43-foot deep caliper enlargement); some upward ambient flow also exited at a zone of lower hydraulic head in this depth interval
weak inflow while pumping entered between 45 to 60 feet deep; some upward ambient flow also exited in this depth range
weak inflow while pumping may have entered between 60 to 74 feet deep (possibly at the subtle FTemp inflections near 61 &/or 66 feet, or at a subtle FRes slope change near 73 feet)
inflow (during both ambient & pumping conditions) entered between 88 to 102 feet deep (probably at the FRes &/or FTemp inflections near 90 to 92, &/or 97 to 101 feet)
inflow (during both ambient & pumping conditions) entered between 102 to 115 feet deep (probably at the 106 & 110-foot caliper enlargements, & corresponding FRes &/or FTemp inflections)
some upward flow may have exited at a zone of lower hydraulic head (during both ambient & pumping conditions) between 115 to 127 feet deep
inflow (during both ambient & pumping conditions) entered between 127 to 132 feet deep
weak inflow while pumping may have entered between 132 to 145 feet (probably at several FTemp &/or FRes inflections, including near 133 & 139 feet)
weak inflow while pumping may have entered between 145 to 160 feet deep (possibly at subtle FTemp & FRes inflections near 148 to 149 feet, &/or a very subtle FRes slope change near 154 feet)
ambient inflow may have entered between 160 to 175 feet deep (possibly at the FRes inflections near 162 &/or 173 feet)
inflow while pumping may have entered between 175 to 190 feet deep (possibly at the FRes inflection near 176 feet)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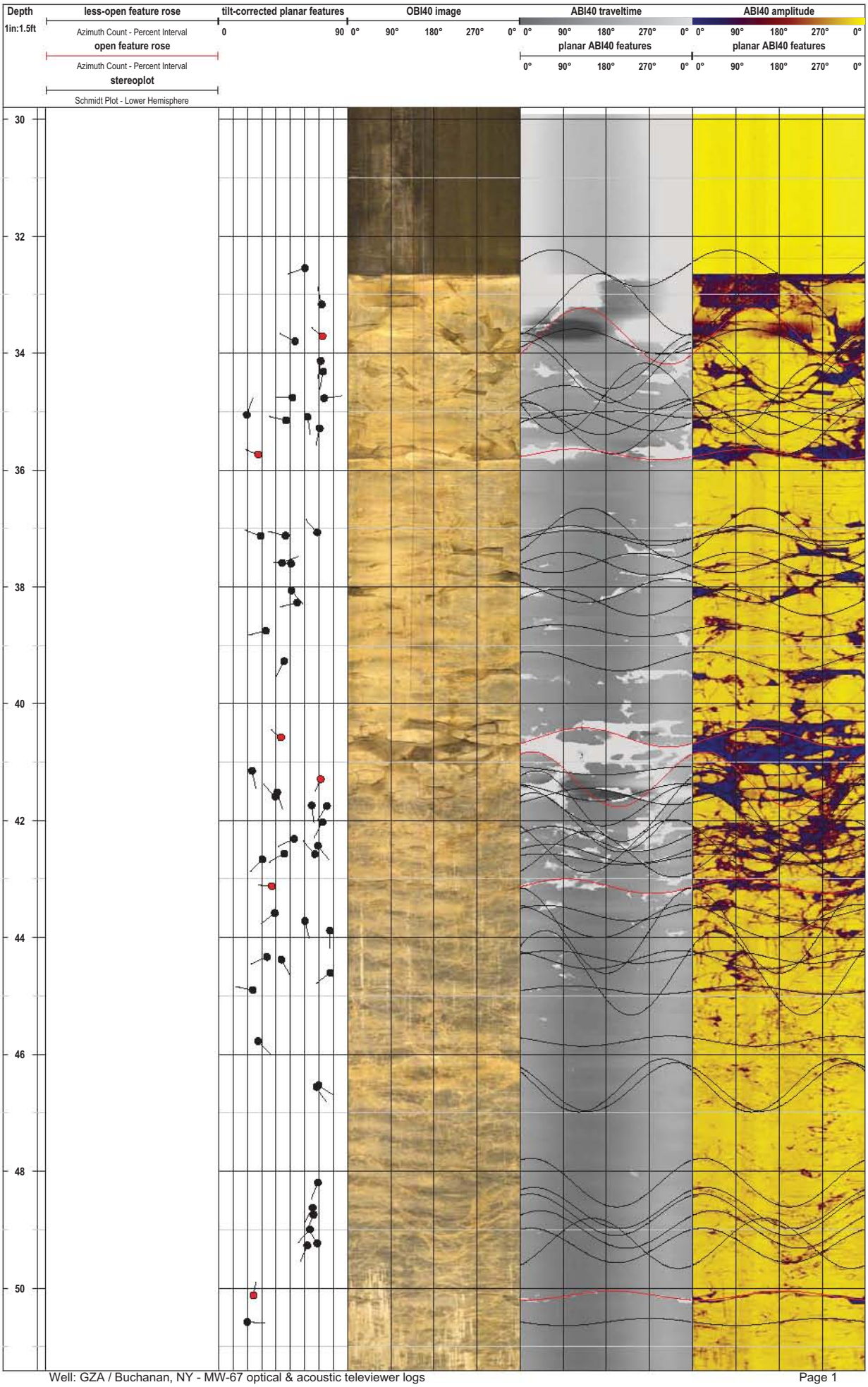
340
inflow (during both ambient & pumping conditions) entered between 205 to 215 feet deep
inflow while pumping entered between 215 to 221 feet deep (probably at the FRes inflections near 216 to 219 feet)
numerous FTemp & FRes inflections suggest possible hydraulically active zones between 222 to 242 feet deep (not confirmed by flowmeter testing)
inflow (during both ambient & pumping conditions) entered between 250 to 264 feet deep (probably at the FRes inflections near 253 to 260 feet)
inflow (during both ambient & pumping conditions) entered between 264 to 275 feet deep (probably at the caliper enlargement & FRes inflection near 269 feet)
strong inflow (during both ambient & pumping conditions) entered between 275 to 290 feet deep (probably at the FTemp slope changes & FRes inflections near 277 to 279, & possibly 282 to 284 feet)
inflow while pumping may have entered between 290 to 300 feet deep (possibly at the FRes inflections near 294 &/or 300 feet)
inflow (during both ambient & pumping conditions) entered between 300 to 315 feet deep (possibly at the FRes slope changes near 300, 304, &/or 307 feet)
inflow while pumping may have entered between 315 to 330 feet deep (possibly near the 316, 323, &/or 329-foot FRes slope changes)
upward flow (during both ambient & pumping conditions) originated greater than 330 feet deep
105836 - mw67.wcl


Depth
1in:1.5ft
less-open feature rose
Azimuth Count - Percent Interval
open feature rose
Azimuth Count - Percent Interval
stereoplot
Schmidt Plot - Lower Hemisphere
tilt-corrected planar features
0
90
OBI40 image
0° 90° 180° 270° 0°
ABI40 traveltime
0° 90° 180° 270° 0°
planar ABI40 features
0° 90° 180° 270° 0°
ABI40 amplitude
0° 90° 180° 270° 0°
planar ABI40 features
0° 90° 180° 270° 0°
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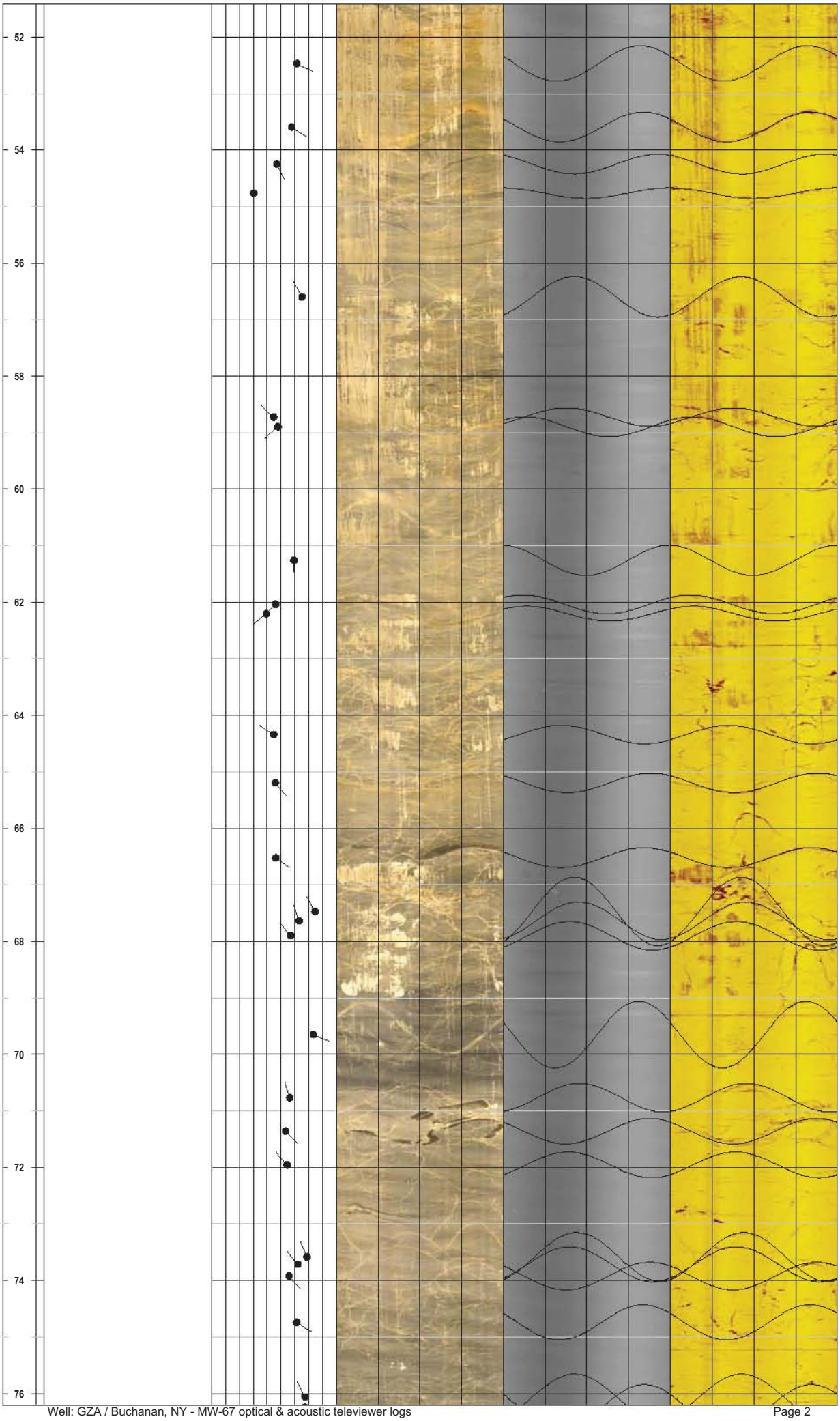
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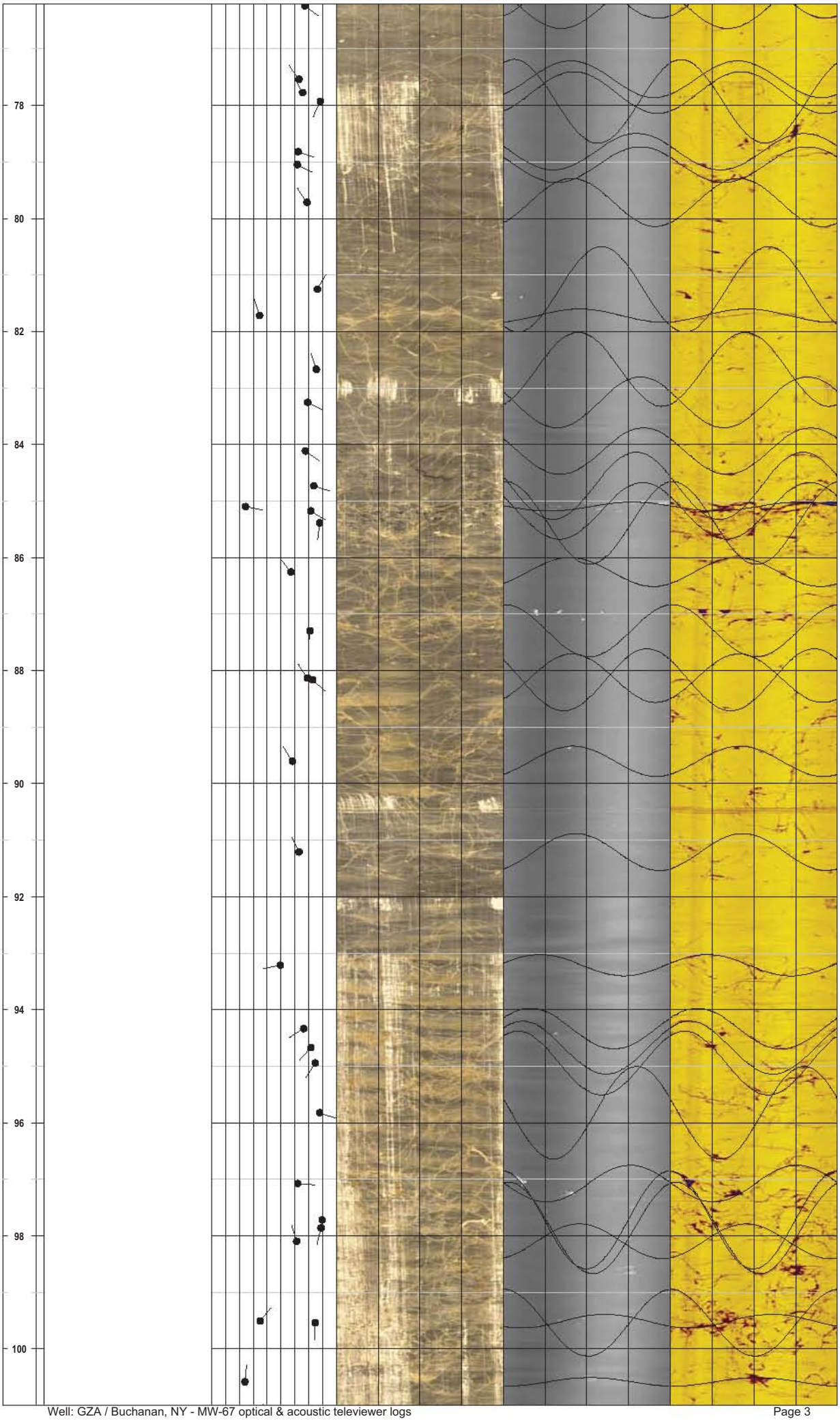
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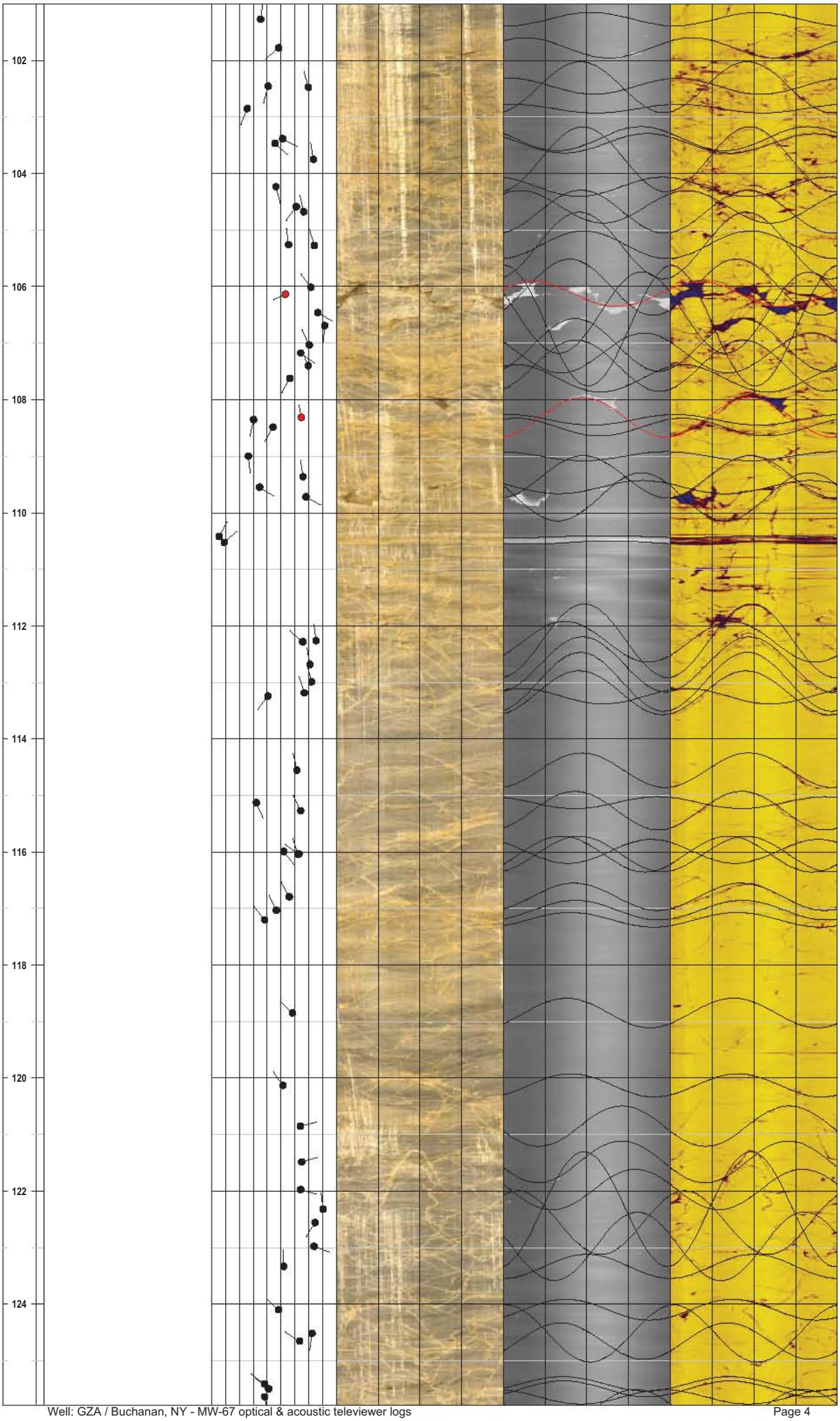
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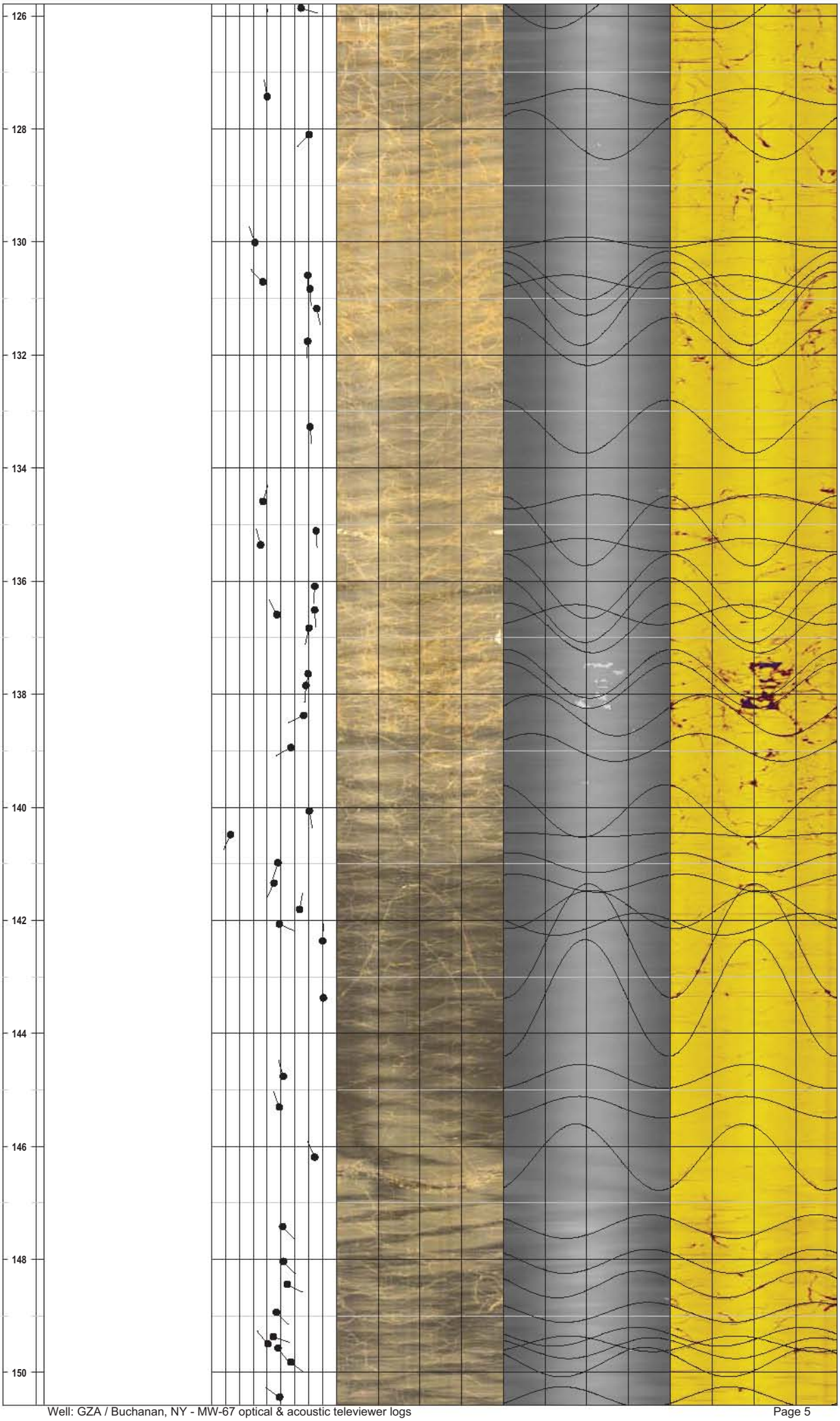
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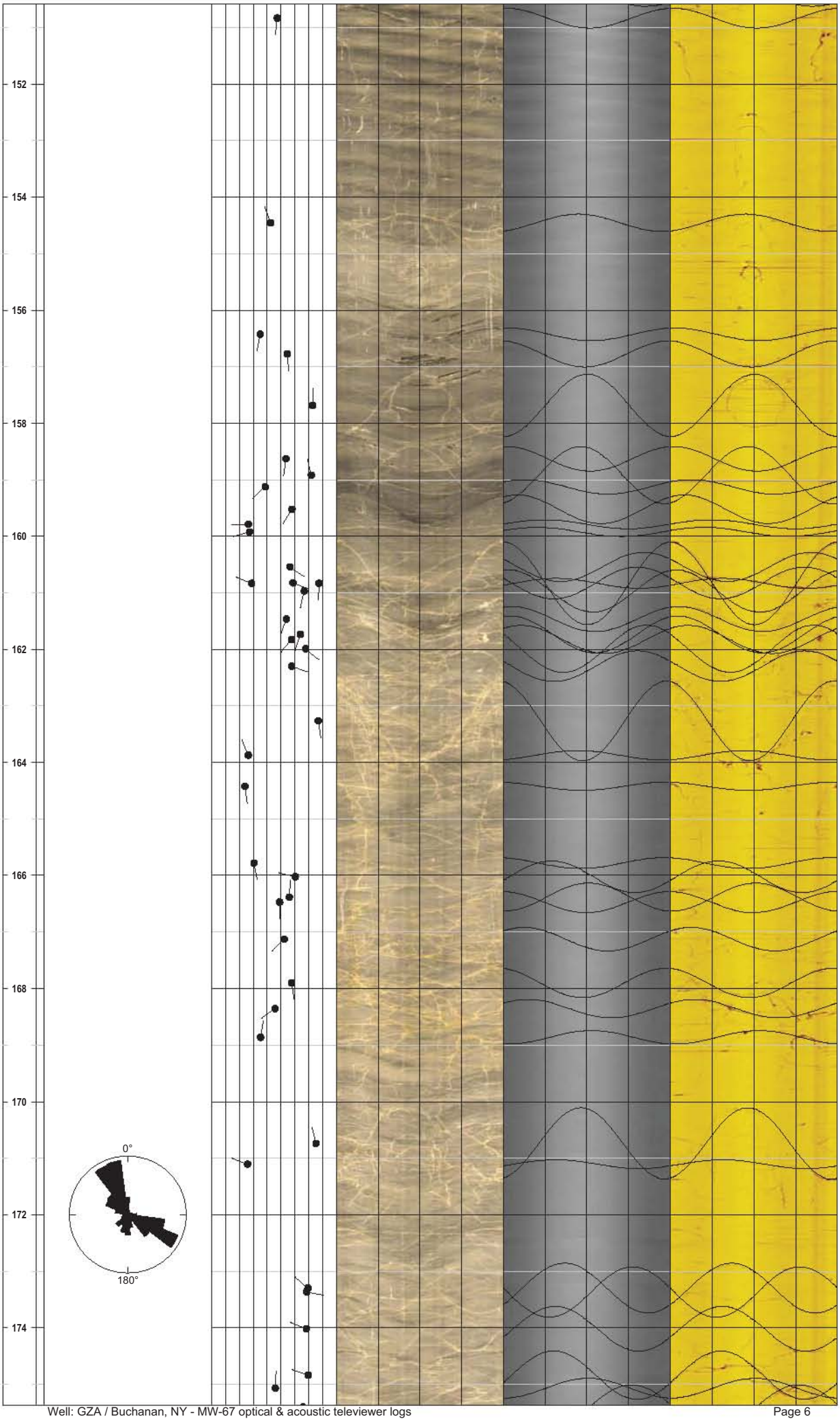
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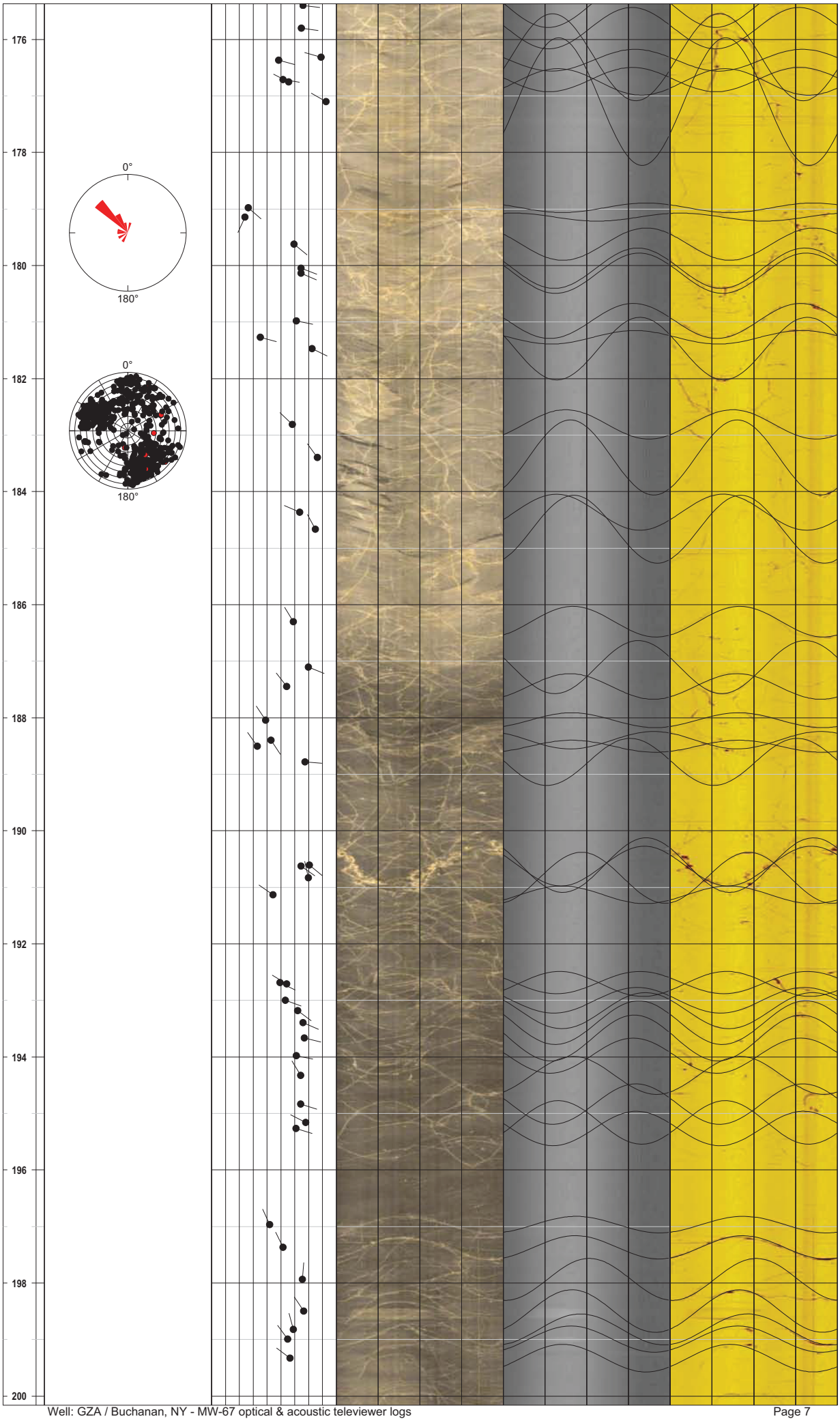
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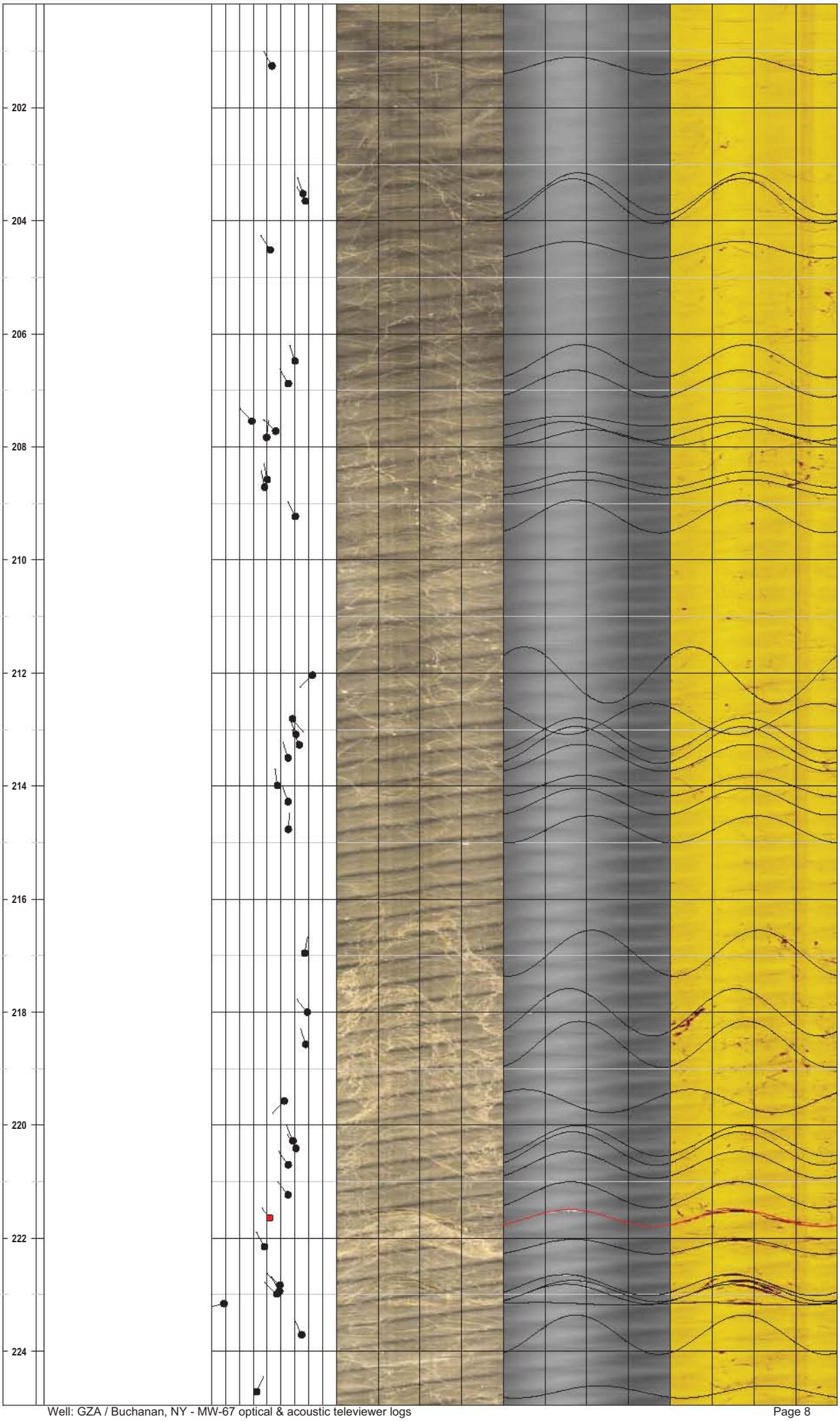
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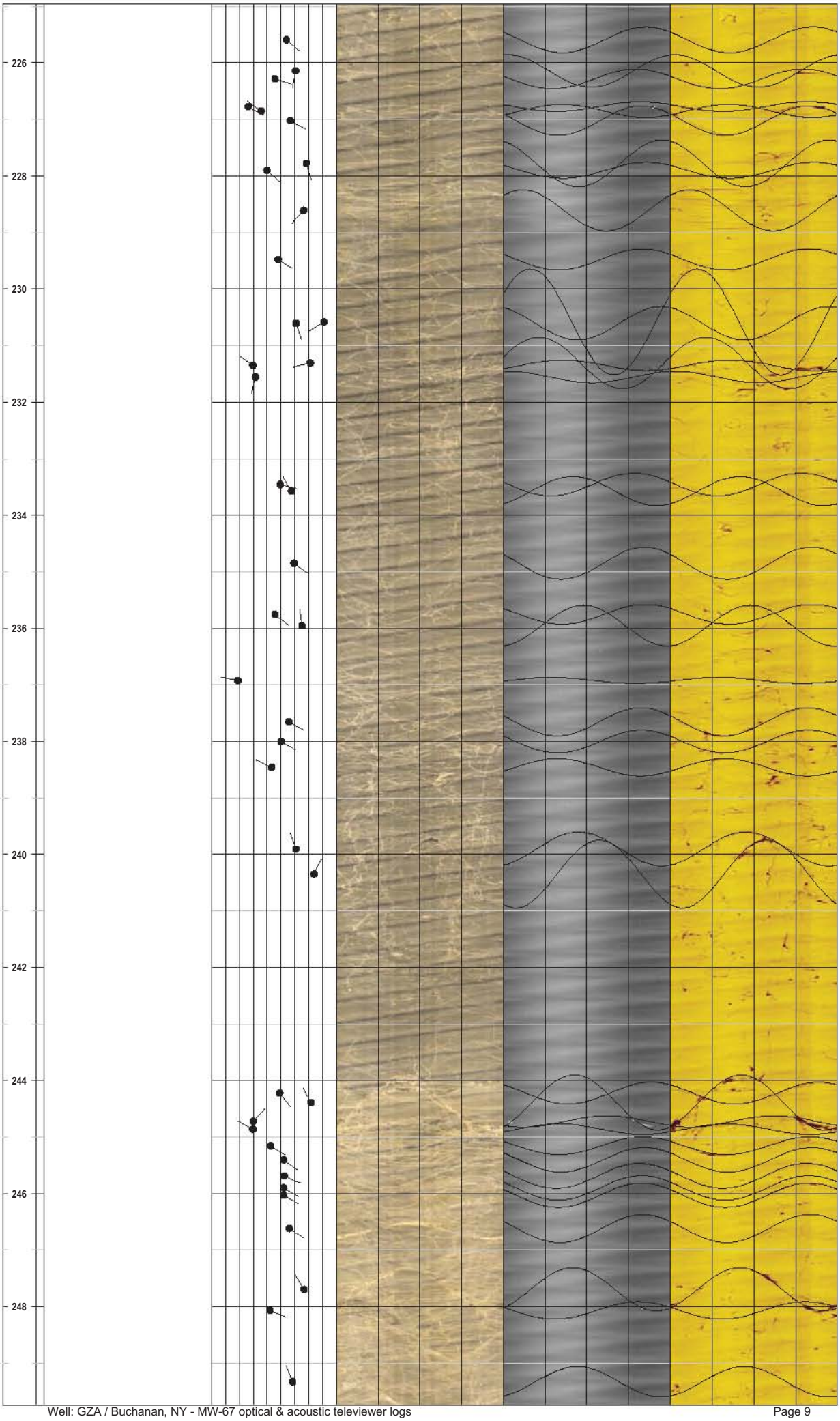
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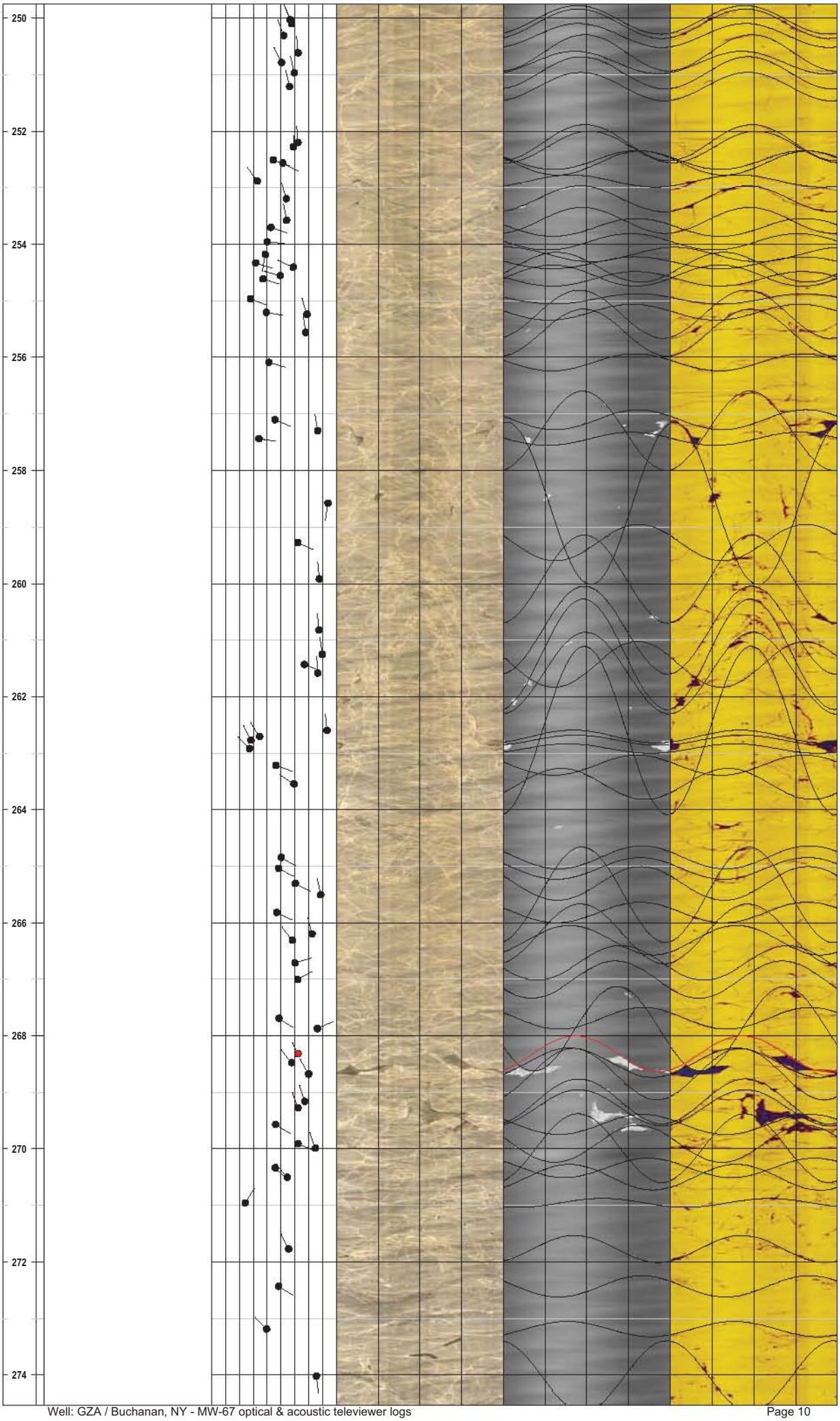
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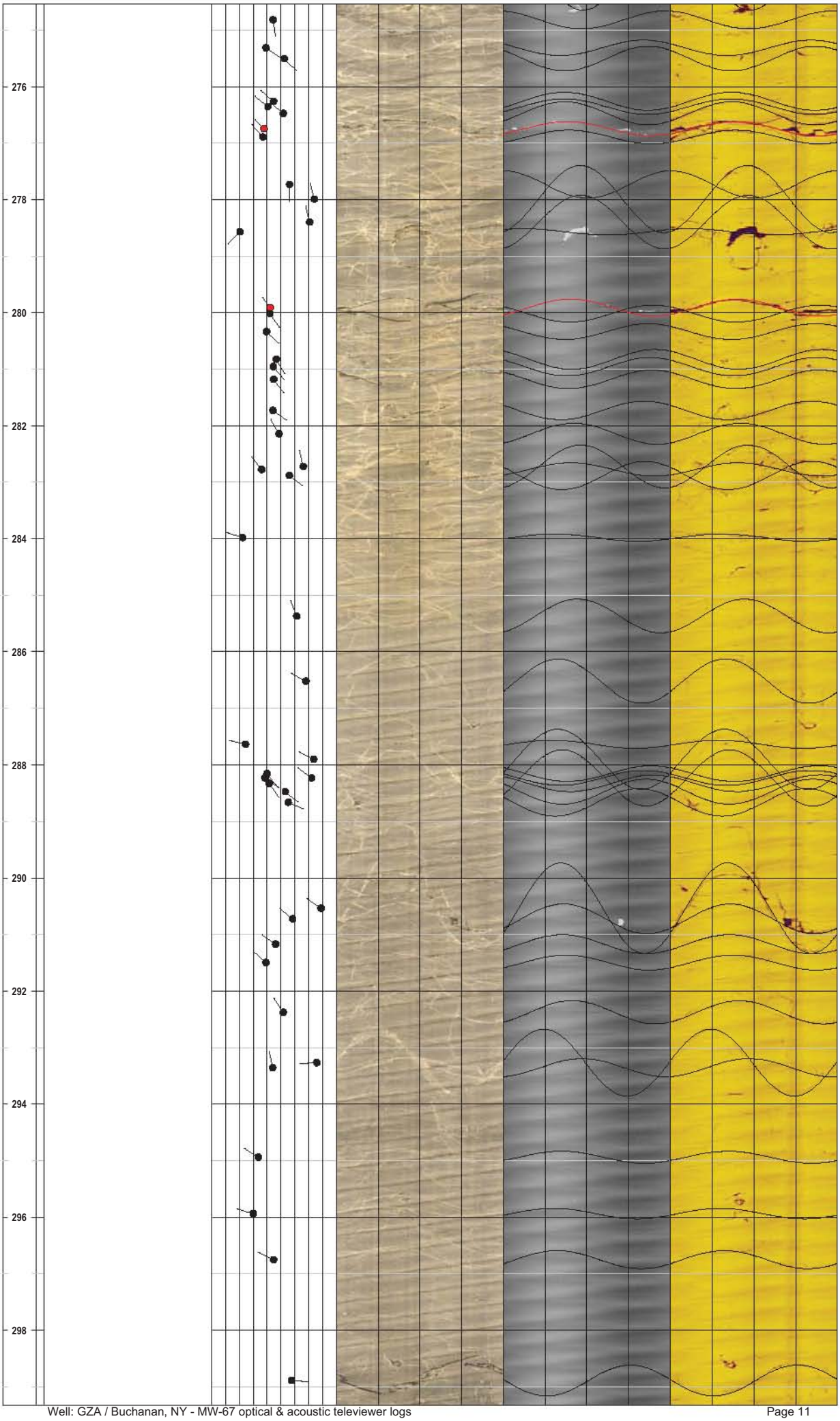
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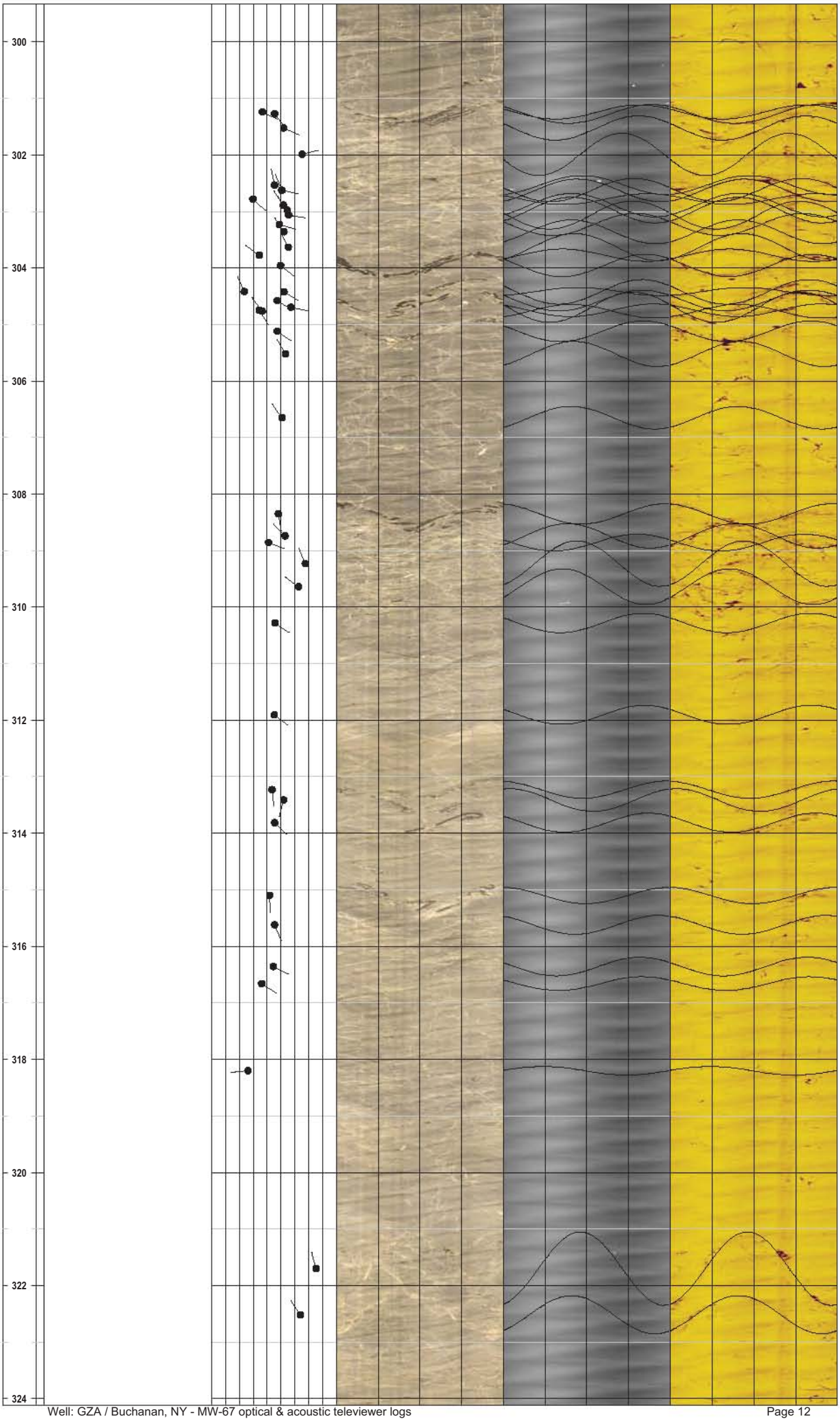
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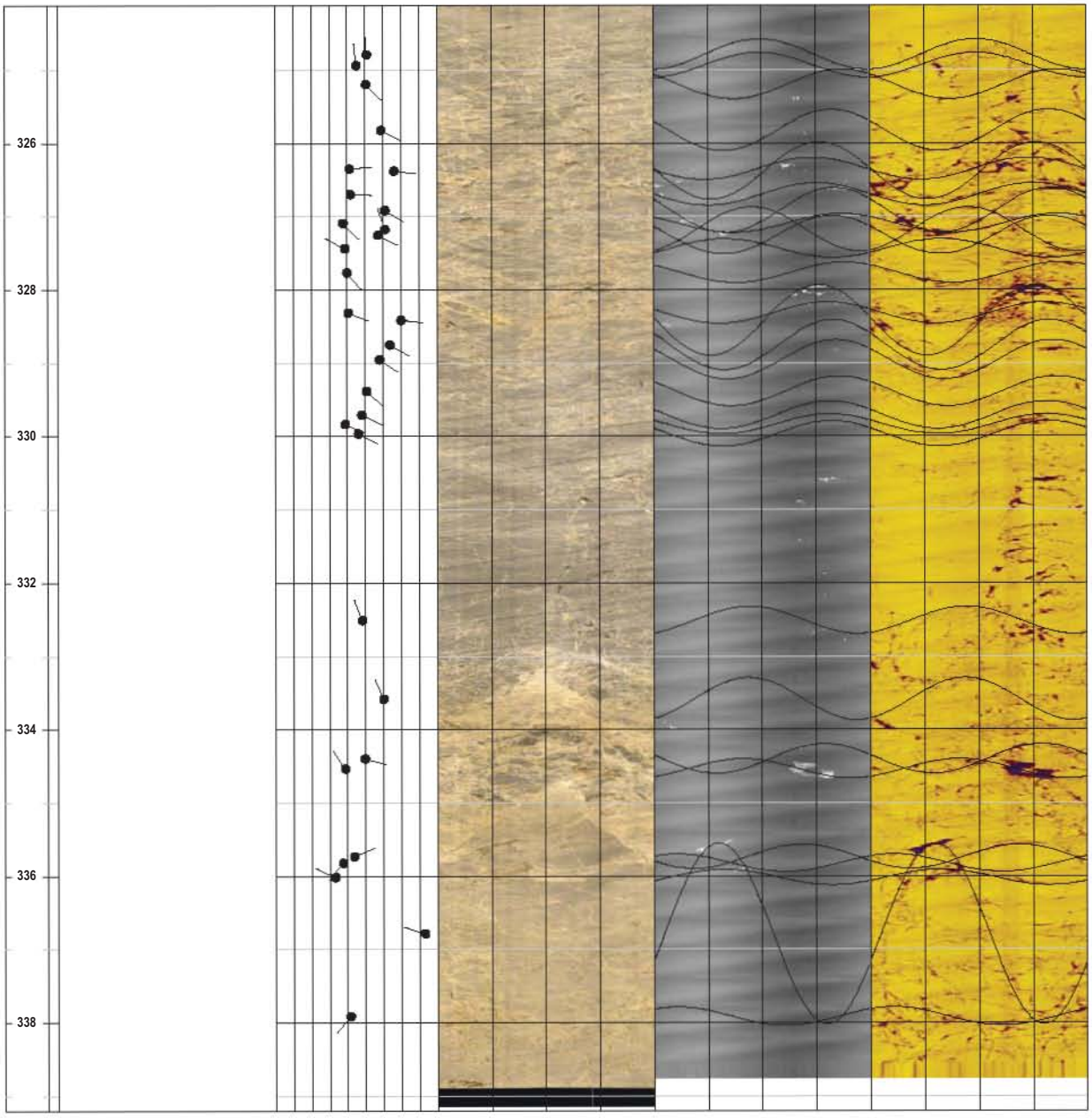
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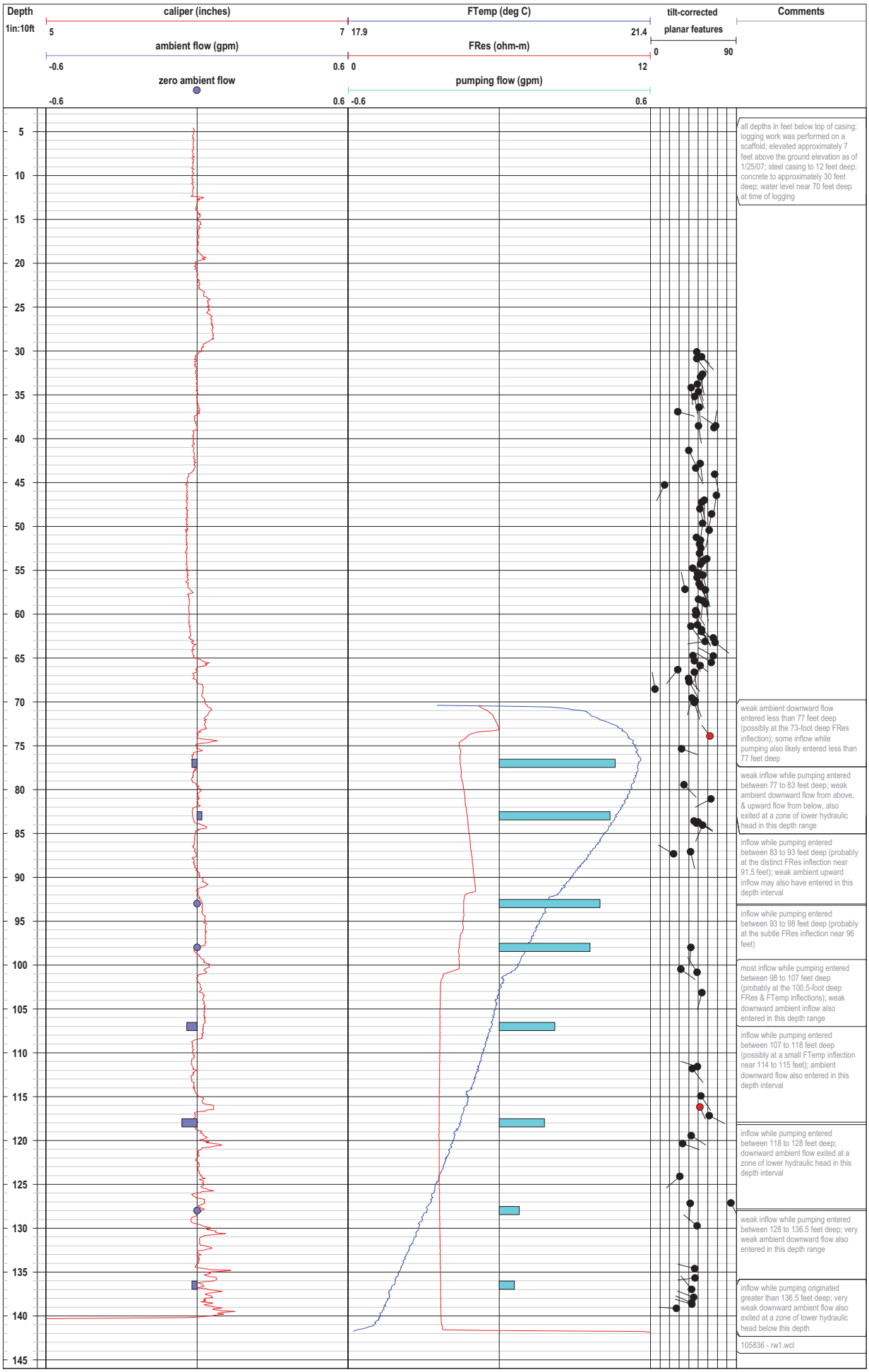
Depth
1in:10ft
caliper (inches)
5
7
ambient flow (gpm)
-0.6
0.6
zero ambient flow
-0.6
0.6
FTemp (deg C)
17.9
21.4
FRes (ohm-m)
0
12
pumping flow (gpm)
-0.6
0.6
tilt-corrected
planar features
0
90
Comments
5
10
15
20
25
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40
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85
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100
105
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115
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135
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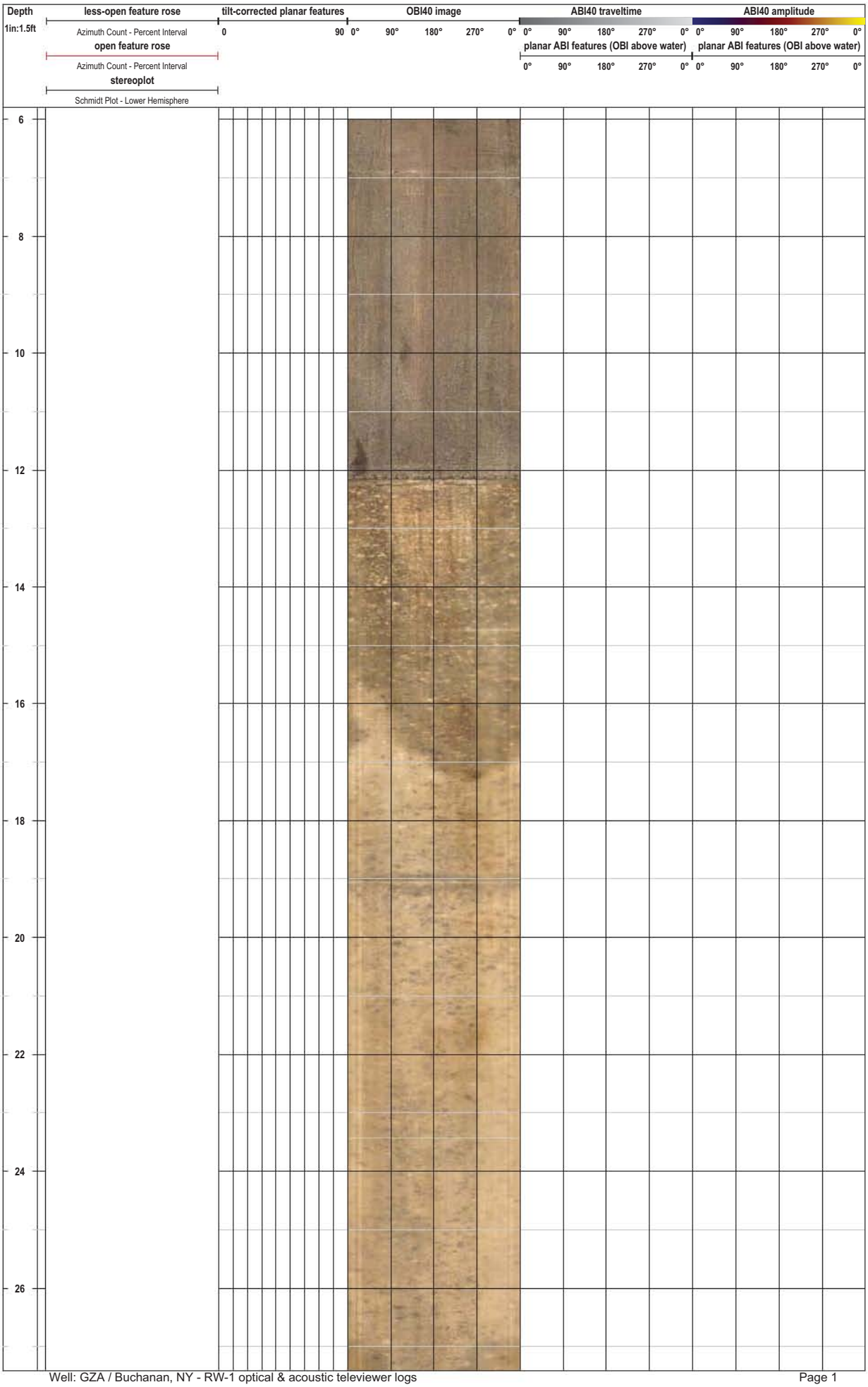
145
all depths in feet below top of casing; logging work was performed on a scaffold, elevated approximately 7 feet above the ground elevation as of 1/25/07; steel casing to 12 feet deep; concrete to approximately 30 feet deep; water level near 70 feet deep at time of logging
weak ambient downward flow entered less than 77 feet deep (possibly at the 73-foot deep FRes inflection); some inflow while pumping also likely entered less than 77 feet deep
weak inflow while pumping entered between 77 to 83 feet deep; weak ambient downward flow from above, & upward flow from below, also exited at a zone of lower hydraulic head in this depth range
inflow while pumping entered between 83 to 93 feet deep (probably at the distinct FRes inflection near 91.5 feet); weak ambient upward inflow may also have entered in this depth interval
inflow while pumping entered between 93 to 98 feet deep (probably at the subtle FRes inflection near 96 feet)
most inflow while pumping entered between 98 to 107 feet deep (probably at the 100.5-foot deep FRes & FTemp inflections); weak downward ambient inflow also entered in this depth range
inflow while pumping entered between 107 to 118 feet deep (possibly at a small FTemp inflection near 114 to 115 feet); ambient downward flow also entered in this depth interval
inflow while pumping entered between 118 to 128 feet deep; downward ambient flow exited at a zone of lower hydraulic head in this depth interval
weak inflow while pumping entered between 128 to 136.5 feet deep; very weak ambient downward flow also entered in this depth range
inflow while pumping originated greater than 136.5 feet deep; very weak downward ambient flow also exited at a zone of lower hydraulic head below this depth
105836 - rw1.wcl


Depth
1in:1.5ft
less-open feature rose
Azimuth Count - Percent Interval
open feature rose
Azimuth Count - Percent Interval
stereoplot
Schmidt Plot - Lower Hemisphere
tilt-corrected planar features
0
90
OBI40 image
0° 90° 180° 270° 0°
ABI40 traveltime
0° 90° 180° 270° 0°
planar ABI features (OBI above water)
0° 90° 180° 270° 0°
ABI40 amplitude
0° 90° 180° 270° 0°
planar ABI features (OBI above water)
0° 90° 180° 270° 0°
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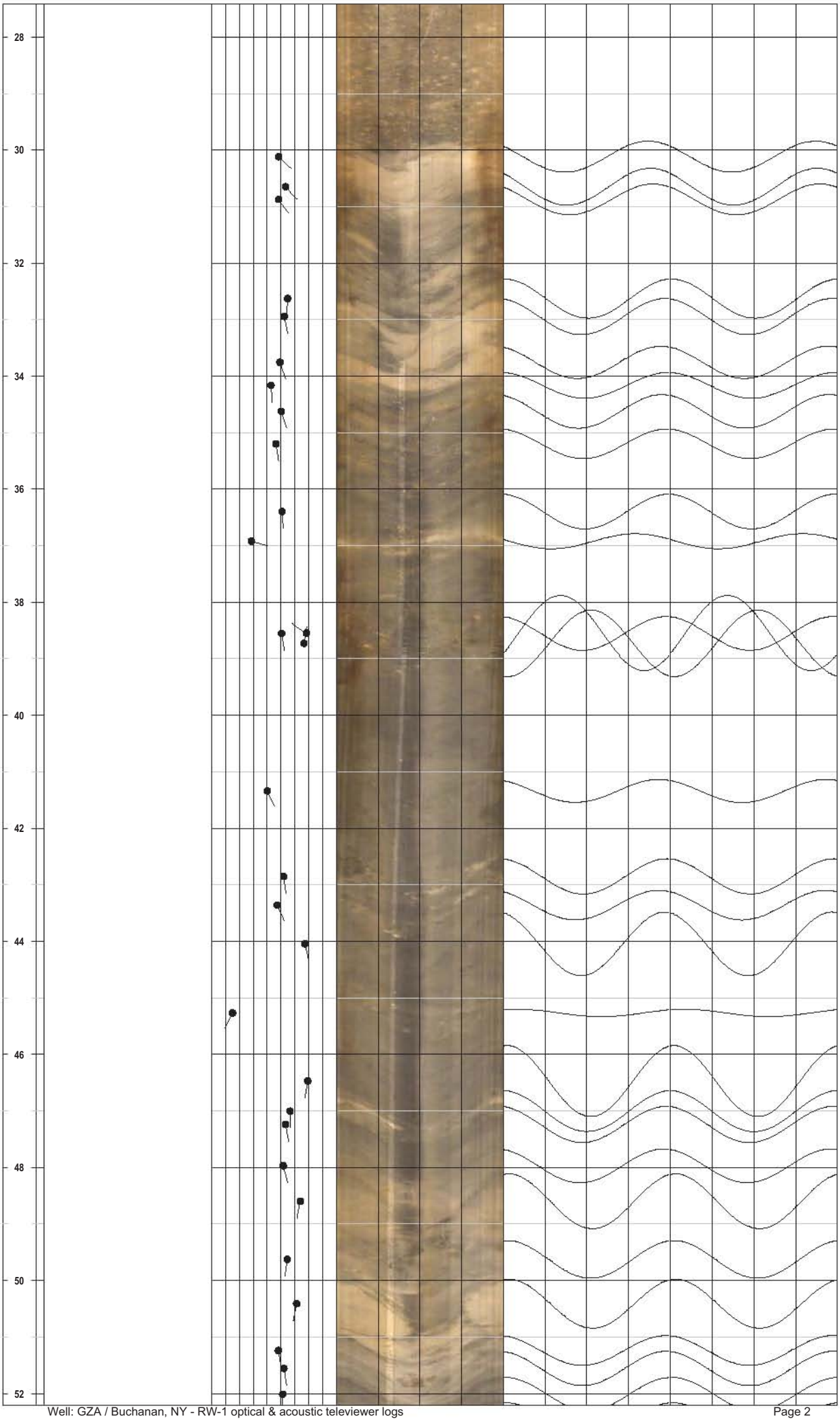
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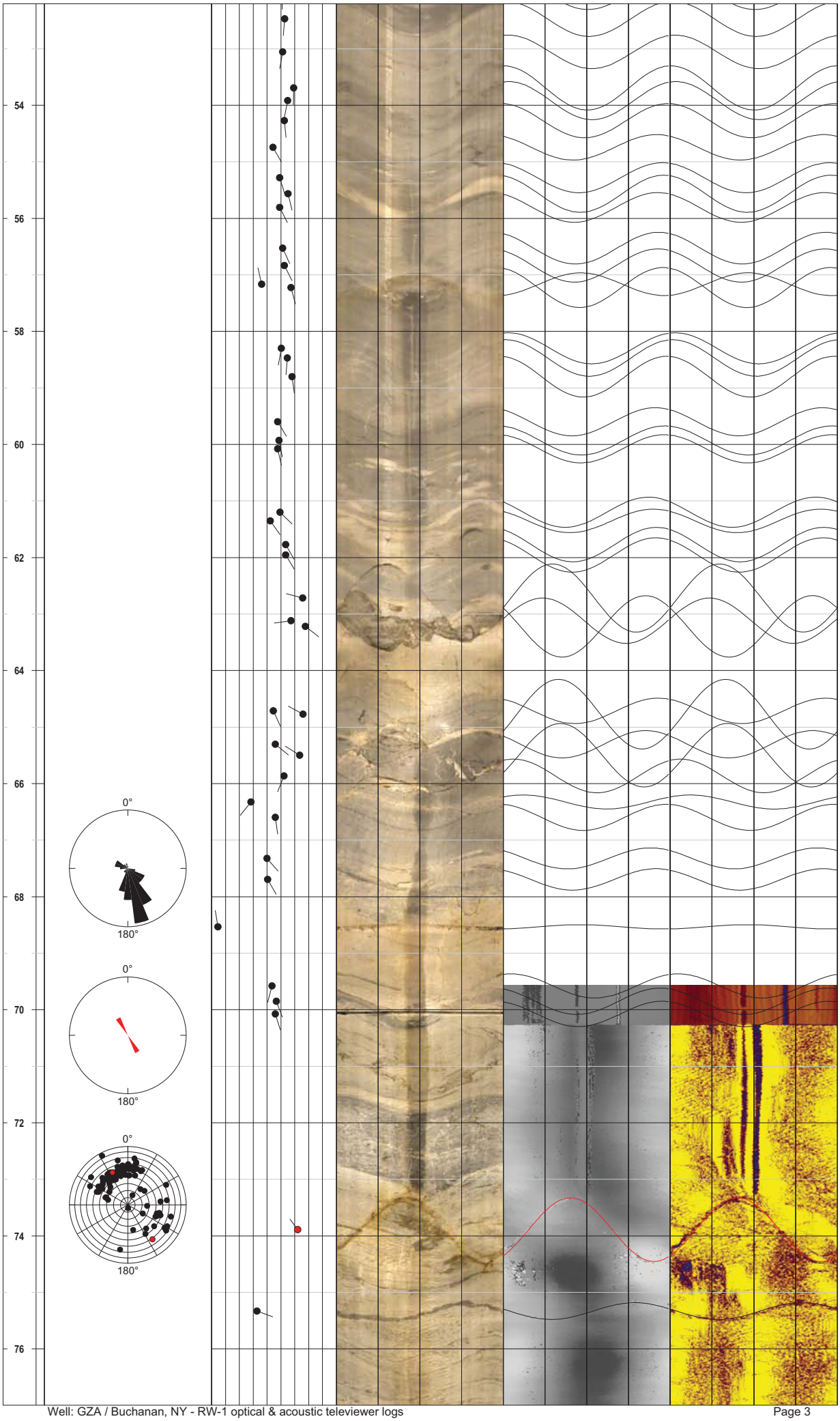
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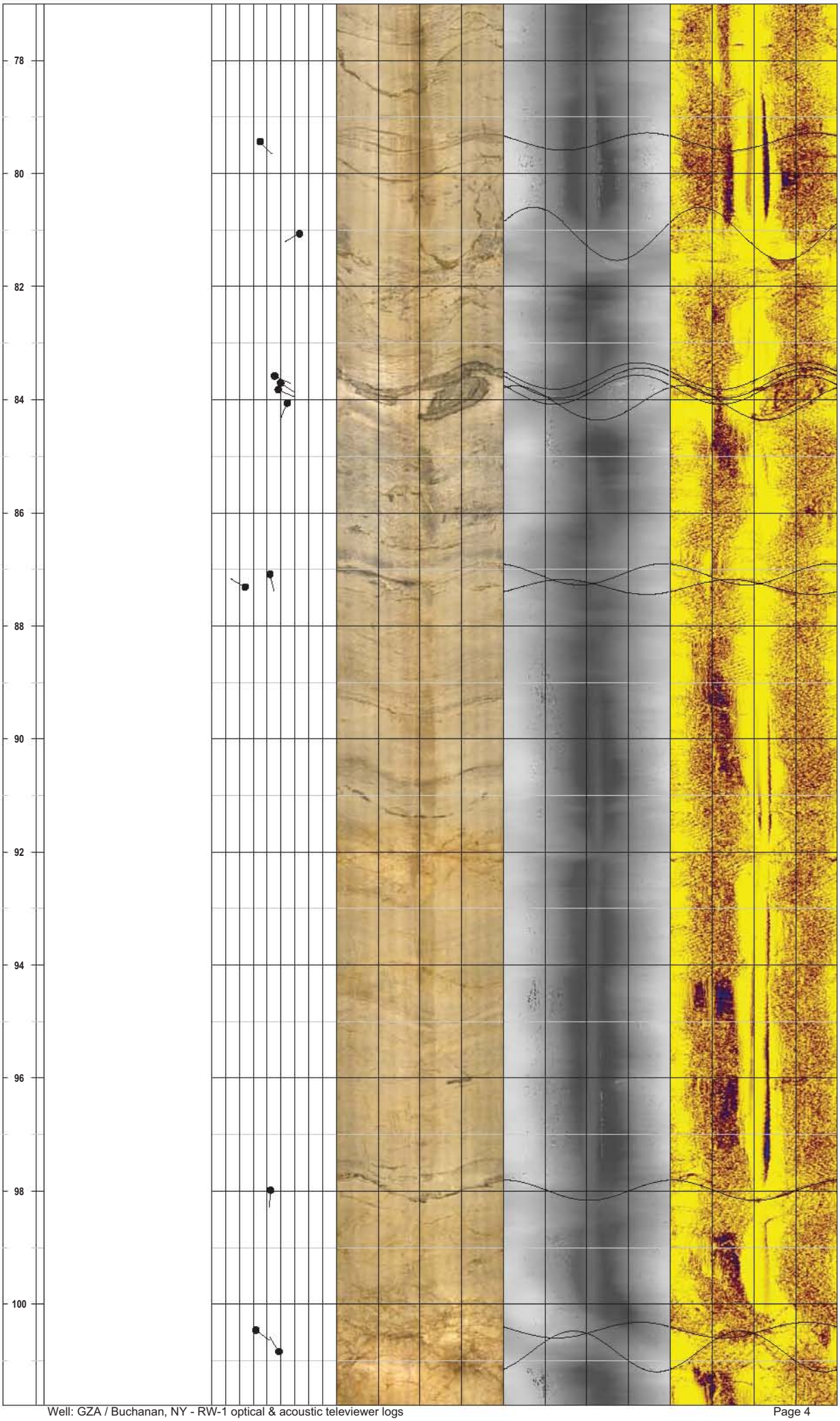
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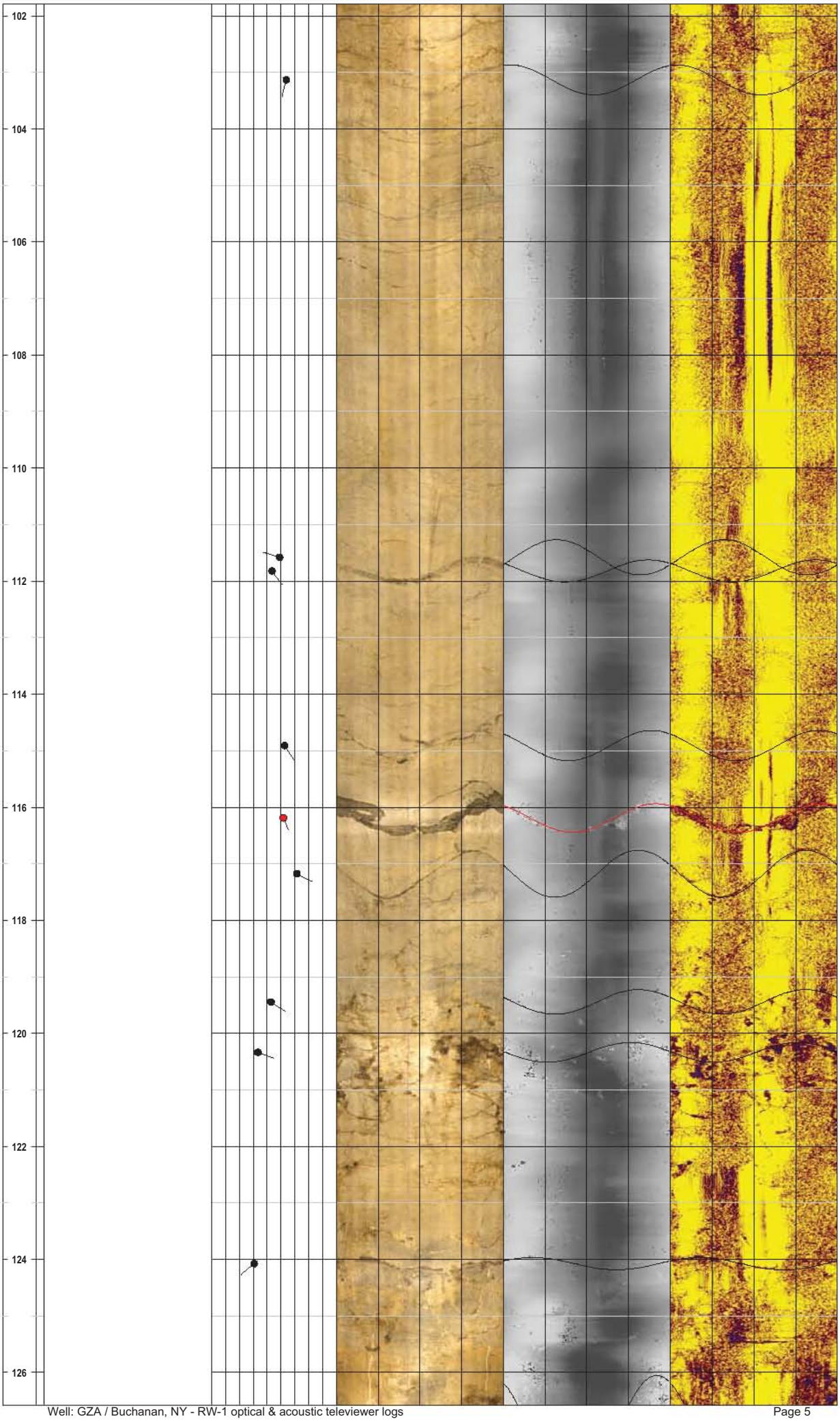
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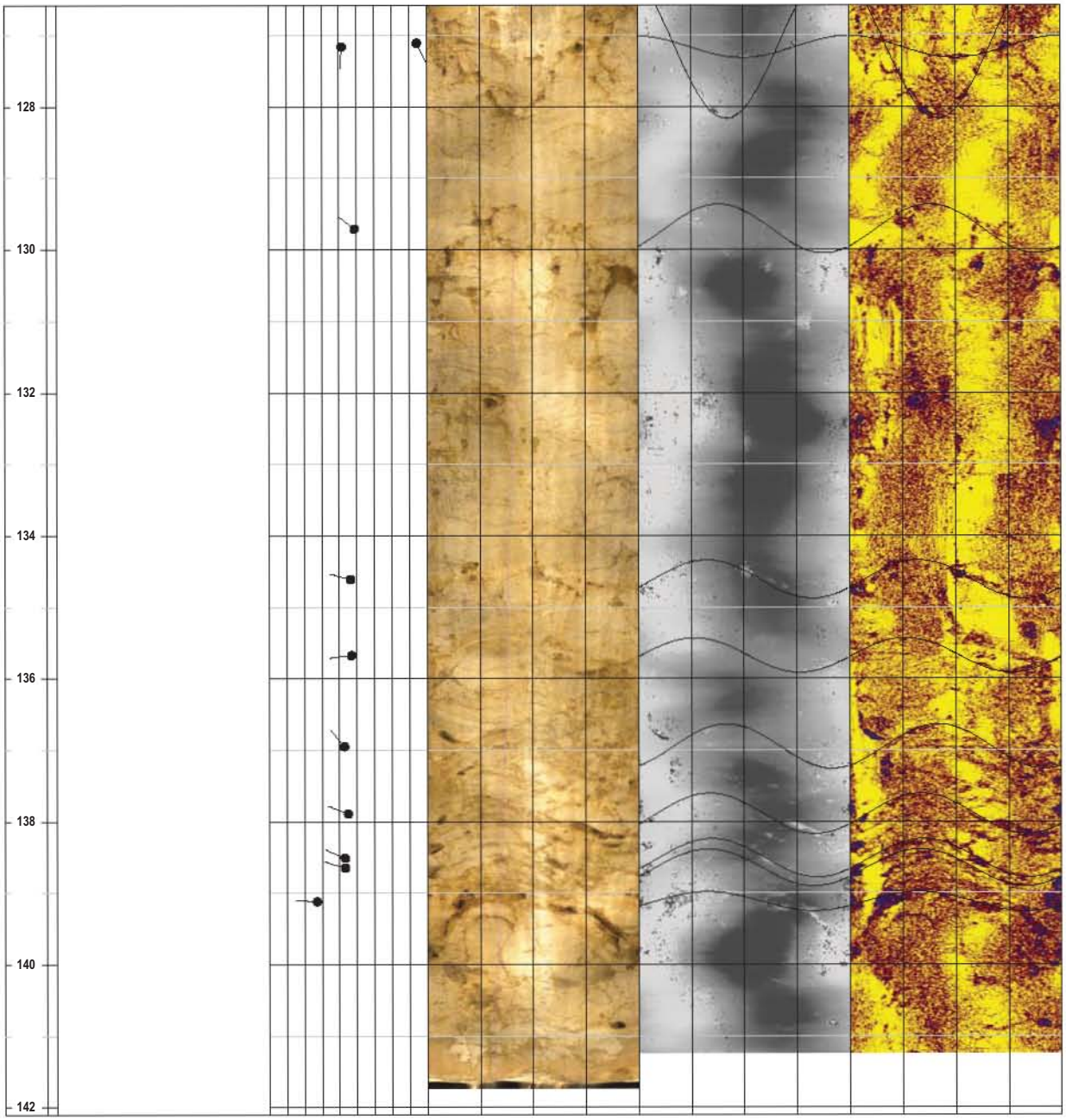
128
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Appendix B

Planar-feature Orientations Measured from Acoustic Televiewer Logs

Fracture Orientations Interpreted from MW-46 Acoustic Televiewer Log
Indian Point Site
Buchanan, NY
Prepared for: GZA
105836 - mw46i.xls

depth (feet)	down-dip compass azimuth (degrees)	dip angle (degrees)	interpreted planar feature category
6.64	9.9	55.3	less-open
6.87	21.3	57.9	open
7.17	17.0	61.5	less-open
7.51	9.6	41.9	less-open
7.73	23.9	42.9	less-open
8.12	14.7	47.1	less-open
8.32	11.2	55.7	less-open
8.65	132.2	72.6	less-open
8.69	353.6	61.3	less-open
8.91	358.9	54.9	less-open
9.06	355.1	54.1	less-open
9.18	348.1	53.9	less-open
9.27	349.0	53.4	less-open
9.63	25.9	51.0	less-open
9.82	30.5	61.4	less-open
10.09	42.2	57.5	less-open
10.27	67.8	40.7	open
10.47	355.3	45.8	less-open
10.82	337.3	61.9	less-open
11.22	8.3	55.8	less-open
11.98	74.7	58.5	less-open
12.14	135.6	43.2	less-open
12.57	129.1	62.8	less-open
13.15	137.7	63.2	less-open
14.10	359.5	49.3	less-open
14.44	358.5	51.0	less-open
14.82	127.3	75.7	less-open
15.66	354.4	41.6	less-open
15.96	135.3	47.7	less-open
17.01	161.6	63.1	less-open
17.34	174.9	54.7	less-open
17.57	120.1	58.0	less-open
17.61	9.6	41.2	less-open
18.68	0.8	54.3	less-open
19.10	356.9	66.4	less-open
19.34	176.8	55.4	less-open
19.51	174.19	57.57	less-open
20.27	159.25	51.82	less-open
20.70	172.5	60.4	less-open
21.62	343.2	70.2	less-open
22.65	307.8	74.2	less-open
23.66	288.6	62.1	less-open
25.74	339.5	75.2	less-open
26.59	317.3	71.9	less-open

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

Note that interpreted down-dip compass azimuths are with respect to magnetic north.

Down-dip azimuths & dip angles were corrected for borehole deviation from vertical.

Fracture Orientations Interpreted from MW-46 Acoustic Televiewer Log
Indian Point Site
Buchanan, NY
Prepared for: GZA
105836 - mw46i.xls

depth (feet)	down-dip compass azimuth (degrees)	dip angle (degrees)	interpreted planar feature category
26.87	170.5	58.6	less-open
27.80	325.8	68.9	less-open
29.58	154.7	89.9	less-open
29.83	182.1	89.5	less-open
30.10	160.7	89.5	less-open

Fracture Orientations Interpreted from MW-53 Acoustic Televiewer Log
Indian Point Site
Buchanan, NY
Prepared for: GZA
105836 - mw53i.xls

depth (feet)	down-dip compass azimuth (degrees)	dip angle (degrees)	interpreted planar feature category
59.49	212.0	35.9	less-open
59.87	91.4	66.4	less-open
60.26	9.2	22.5	less-open
61.46	186.0	21.4	less-open
61.52	239.1	80.2	less-open
62.51	246.1	76.4	less-open
63.02	234.1	16.3	less-open
63.35	243.8	76.1	less-open
63.96	248.8	80.1	less-open
64.71	249.7	81.5	less-open
64.93	210.7	23.7	less-open
65.30	200.0	20.3	less-open
66.26	110.1	55.4	less-open
66.92	208.2	30.9	less-open
66.93	243.4	73.6	less-open
67.07	49.5	58.9	less-open
67.58	339.7	16.7	less-open
68.22	244.1	78.7	less-open
68.89	101.2	50.7	less-open
69.39	298.0	17.5	less-open
70.71	81.8	43.0	less-open
72.16	225.0	45.6	less-open
72.43	72.0	46.6	less-open
72.64	60.7	44.5	less-open
72.87	81.0	37.1	less-open
72.97	304.5	65.7	less-open
73.11	81.7	46.4	less-open
73.29	267.3	10.4	less-open
73.32	113.4	37.6	less-open
73.64	331.3	32.8	less-open
73.84	83.1	63.7	less-open
73.94	88.7	64.5	less-open
74.26	93.2	52.8	less-open
74.36	96.8	53.6	less-open
74.47	84.6	56.2	less-open
74.69	73.1	50.8	less-open
75.09	94.2	56.8	less-open
75.44	94.9	57.8	less-open
75.55	86.8	52.7	less-open
75.73	127.6	57.6	less-open
76.20	90.8	59.6	less-open
76.35	84.4	35.3	less-open
76.39	80.7	43.6	less-open
76.80	79.2	43.2	less-open

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

Note that interpreted down-dip compass azimuths are with respect to magnetic north.

Down-dip azimuths & dip angles were corrected for borehole deviation from vertical.

Fracture Orientations Interpreted from MW-53 Acoustic Televiewer Log
Indian Point Site
Buchanan, NY
Prepared for: GZA
105836 - mw53i.xls

depth (feet)	down-dip compass azimuth (degrees)	dip angle (degrees)	interpreted planar feature category
77.26	97.1	49.9	less-open
77.98	97.1	63.4	less-open
78.86	91.5	57.9	less-open
79.55	81.3	48.3	less-open
79.68	249.3	26.5	less-open
79.73	67.2	40.1	less-open
83.82	283.3	39.1	less-open
83.96	227.8	20.0	less-open
85.22	175.8	82.8	less-open
85.75	181.8	83.3	less-open
87.78	173.7	48.7	less-open
87.98	176.5	18.1	less-open
90.57	278.43	42.81	less-open
90.66	71.17	34.2	less-open
91.50	282.7	76.7	less-open
91.51	124.3	49.1	less-open
92.29	291.9	39.2	less-open
92.76	223.0	23.4	less-open
93.80	300.7	27.2	less-open
94.12	231.0	32.9	less-open
94.51	296.7	54.3	less-open
95.00	165.6	64.2	less-open
95.28	149.3	65.6	less-open
95.92	98.0	50.1	less-open
96.21	213.5	34.0	less-open
96.82	97.5	78.3	less-open
98.29	73.3	75.0	less-open
100.16	86.8	44.0	less-open
100.81	317.7	47.0	less-open
101.34	307.4	39.5	less-open
101.65	285.6	57.5	less-open
103.35	78.0	68.3	less-open
103.37	319.5	42.8	less-open
103.62	241.3	41.6	less-open
103.96	75.8	70.4	less-open
104.57	72.8	68.2	less-open
104.65	273.2	39.4	less-open
104.85	272.8	47.8	less-open
105.48	302.7	24.8	less-open
105.75	281.5	22.7	less-open
106.77	299.6	24.6	less-open
106.85	270.3	26.6	less-open
108.23	176.1	63.2	less-open
109.11	169.84	47.02	less-open

Fracture Orientations Interpreted from MW-53 Acoustic Televiewer Log
Indian Point Site
Buchanan, NY
Prepared for: GZA
105836 - mw53i.xls

depth (feet)	down-dip compass azimuth (degrees)	dip angle (degrees)	interpreted planar feature category
109.67	0.31	31.98	less-open
110.19	310.4	33.0	less-open
110.61	302.7	42.1	less-open
110.80	313.3	39.0	less-open
111.13	301.4	36.0	less-open
111.56	281.4	30.2	less-open
113.18	282.1	36.0	less-open
113.37	266.8	29.7	less-open
114.51	294.1	17.0	less-open
114.95	321.5	38.6	less-open
116.43	306.7	46.2	less-open
116.66	318.2	42.1	less-open
117.27	312.4	39.0	less-open
117.44	281.6	33.8	less-open
117.78	257.5	27.7	less-open
118.40	306.9	19.2	less-open
119.38	309.7	35.5	less-open
119.61	61.3	90.0	less-open
124.11	161.2	9.3	less-open

Fracture Orientations Interpreted from MW-54 Acoustic Televiewer Log
Indian Point Site
Buchanan, NY
Prepared for: GZA
105836 - mw54i.xls

depth (feet)	down-dip compass azimuth (degrees)	dip angle (degrees)	interpreted planar feature category
20.71	47.8	68.3	less-open
21.20	70.2	57.6	less-open
21.41	54.9	53.2	less-open
21.52	58.1	52.1	less-open
22.36	74.3	52.4	less-open
22.60	55.1	64.9	less-open
22.79	74.3	44.7	less-open
23.14	85.2	61.3	less-open
23.32	245.7	39.5	less-open
23.37	231.5	26.7	less-open
23.41	235.2	19.8	less-open
23.66	65.8	70.3	less-open
25.25	223.6	31.0	less-open
25.82	252.3	6.3	less-open
26.11	304.8	5.3	less-open
26.45	256.1	8.1	less-open
27.60	60.1	74.7	less-open
28.65	62.8	43.1	less-open
31.48	141.7	64.5	less-open
31.80	303.4	55.2	less-open
32.45	304.8	18.9	less-open
32.53	269.0	18.4	less-open
32.65	110.7	68.5	less-open
32.97	101.1	64.5	less-open
33.16	98.9	68.5	less-open
33.45	80.5	72.4	less-open
33.59	85.1	71.5	less-open
33.79	85.1	72.4	less-open
33.98	85.4	72.0	less-open
34.40	86.7	66.8	less-open
34.51	104.5	65.7	less-open
34.82	79.2	34.7	less-open
35.39	115.7	71.0	less-open
35.54	98.3	60.0	less-open
35.55	127.1	70.7	less-open
36.28	88.5	70.9	less-open
37.22	90.2	80.1	less-open
37.66	94.0	75.4	open
38.47	299.5	45.9	less-open
38.76	278.2	38.4	less-open
39.40	65.4	66.8	less-open
39.43	229.8	28.7	less-open
39.82	99.8	67.3	less-open
41.26	247.7	42.4	less-open

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

Note that interpreted down-dip compass azimuths are with respect to magnetic north.

Down-dip azimuths & dip angles were corrected for borehole deviation from vertical.

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Prepared for: GZA
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depth (feet)	down-dip compass azimuth (degrees)	dip angle (degrees)	interpreted planar feature category
43.44	356.7	68.7	less-open
43.64	96.9	71.8	less-open
43.64	75.2	61.1	less-open
44.43	112.5	20.7	less-open
45.99	285.6	67.6	less-open
47.02	312.1	76.5	less-open
48.78	90.7	76.9	less-open
49.92	93.2	75.5	less-open
50.11	95.55	65.96	less-open
50.18	137.24	39.76	less-open
50.30	97.0	71.4	less-open
50.74	101.8	66.8	less-open
51.21	91.8	67.2	less-open
52.70	213.1	34.3	less-open
53.21	97.7	58.9	less-open
53.26	126.7	17.8	less-open
54.21	173.1	11.4	less-open
54.29	254.6	4.7	less-open
55.13	116.4	66.0	less-open
55.52	117.7	61.3	less-open
55.82	110.5	56.9	less-open
56.38	99.6	55.3	less-open
56.70	102.4	65.5	less-open
57.66	75.8	76.0	less-open
58.87	345.5	32.6	less-open
59.20	325.5	60.1	less-open
59.43	110.4	38.7	less-open
59.56	334.4	58.7	less-open
60.81	76.6	50.6	less-open
61.18	322.9	63.1	less-open
61.48	289.3	69.8	open
61.77	292.6	54.4	less-open
62.54	342.7	40.4	less-open
62.90	346.7	36.8	less-open
64.24	316.9	21.8	less-open
64.90	131.8	76.8	less-open
65.14	129.3	75.3	less-open
66.50	315.0	67.5	less-open
67.36	0.6	51.5	less-open
68.03	353.27	59.96	less-open
68.45	346.94	56.72	less-open
68.52	358.3	70.8	less-open
68.92	340.8	74.2	less-open
69.29	343.9	64.2	less-open

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depth (feet)	down-dip compass azimuth (degrees)	dip angle (degrees)	interpreted planar feature category
69.38	105.2	53.7	less-open
70.25	97.8	60.2	less-open
70.72	115.4	63.4	less-open
70.86	342.3	51.5	less-open
71.09	307.6	43.8	less-open
71.27	324.1	54.9	less-open
72.00	106.8	72.3	less-open
72.19	104.2	69.3	less-open
72.71	108.2	66.6	less-open
73.48	100.3	68.3	less-open
74.00	101.8	67.2	less-open
74.48	106.8	74.3	less-open
75.56	279.3	71.4	less-open
76.13	320.9	75.6	less-open
76.24	102.1	65.0	less-open
77.22	106.1	42.62	less-open
77.25	97.79	65.54	less-open
77.43	111.9	59.8	less-open
78.78	108.2	82.2	less-open
79.9	208.0	54.9	less-open
80.4	200.9	43.2	less-open
80.97	197.1	50.5	less-open
81.31	151.8	36.7	less-open
82.49	64.7	38.6	less-open
84.73	201.1	55.5	less-open
85.38	342.2	68.5	less-open
86.44	330.2	76.1	less-open
87.15	354.5	48.7	less-open
87.27	343.5	48.6	less-open
88.01	326.4	60.7	less-open
88.18	323.1	54.6	less-open
88.95	114.6	72.2	less-open
89.87	330.1	66.8	less-open
90.03	356.9	60.7	less-open
90.32	6.4	67.8	less-open
90.45	90.1	22.3	less-open
91.5	330.31	61.41	less-open
91.8	312.63	54.48	less-open
92.37	147.5	74.6	less-open
92.5	345.8	57.4	less-open
93.33	150.1	65.9	less-open
93.85	147.9	76.8	less-open
95.47	267.1	37.5	less-open
96.07	119.9	57.9	less-open

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depth (feet)	down-dip compass azimuth (degrees)	dip angle (degrees)	interpreted planar feature category
97.15	306.9	64.7	less-open
97.62	145.05	64.89	less-open
97.65	297.43	63.7	less-open
97.78	126.9	32.0	less-open
98.28	89.7	49.3	less-open
98.33	203.7	41.3	less-open
98.89	117.7	79.7	less-open
100.31	90.0	64.9	less-open
101.02	140.4	72.7	less-open
101.48	133.7	59.9	less-open
101.99	340.7	68.1	less-open
102.21	86.5	58.4	less-open
102.57	97.69	54.19	less-open
102.96	88.35	57.77	less-open
103.22	93.9	64.2	less-open
104.37	130.5	66.3	less-open
105.64	182.9	60.3	less-open
105.7	296.0	71.7	less-open
106.64	128.6	50.2	less-open
106.65	300.8	72.4	less-open
107.08	301.8	72.0	less-open
107.56	285.5	41.0	less-open
107.82	284.9	58.4	less-open
108.11	137.9	49.5	less-open
108.41	143.9	56.2	less-open
108.86	280.2	49.5	less-open
109.19	145.8	47.1	less-open
109.71	291.7	64.6	less-open
109.73	117.7	47.4	less-open
109.97	129.3	58.5	less-open
110.15	129.6	63.3	less-open
110.52	131.5	64.9	less-open
110.85	147.7	54.2	less-open
111.47	144.8	67.6	less-open
111.78	125.0	66.1	less-open
112.62	320.3	62.8	less-open
112.89	327.8	53.9	less-open
113.88	105.5	67.5	less-open
114.08	108.9	61.8	less-open
115.33	154.1	68.2	less-open
115.48	156.6	67.9	less-open
116.64	145.5	37.2	less-open
117.38	117.4	65.1	less-open
117.96	100.1	57.8	less-open

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depth (feet)	down-dip compass azimuth (degrees)	dip angle (degrees)	interpreted planar feature category
118.31	93.8	55.9	less-open
118.44	97.3	56.6	less-open
118.71	110.0	55.2	less-open
119.21	128.0	67.3	less-open
119.85	126.4	61.4	less-open
120.39	131.7	54.2	less-open
120.72	126.9	64.2	less-open
120.78	193.1	43.6	less-open
121.03	114.6	62.1	less-open
121.93	137.7	66.0	less-open
122.49	153.7	75.5	less-open
122.66	299.4	77.0	less-open
122.85	149.8	80.7	less-open
123.08	300.8	73.4	less-open
123.32	177.6	46.3	less-open
123.44	309.9	60.1	less-open
123.94	142.8	60.1	less-open
123.96	283.4	60.4	less-open
124.35	243.0	32.4	less-open
124.59	245.8	33.1	less-open
124.66	253.4	34.8	less-open
124.87	114.2	51.7	less-open
125.01	111.6	80.2	less-open
125.49	113.3	42.0	less-open
125.8	164.6	74.0	less-open
126.33	152.7	75.7	less-open
127.48	297.9	46.9	less-open
129.57	107.9	45.4	less-open
129.83	236.0	55.1	less-open
130.24	103.3	62.9	less-open
130.68	96.4	57.97	less-open
130.89	93.06	38.06	less-open
131.08	106.7	51.1	less-open
131.82	123.8	41.6	less-open
133.03	314.0	29.5	less-open
133.16	308.6	48.8	less-open
133.99	129.5	55.8	less-open
135.09	331.1	56.6	less-open
136.35	111.8	49.4	less-open
137.05	98.6	57.6	less-open
137.38	74.1	43.6	less-open
137.47	115.1	63.8	less-open
137.58	95.4	51.2	less-open
137.78	88.1	56.6	less-open

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depth (feet)	down-dip compass azimuth (degrees)	dip angle (degrees)	interpreted planar feature category
137.9	337.5	71.8	less-open
137.97	88.8	68.3	less-open
138.09	295.0	53.4	less-open
138.66	119.7	40.0	less-open
138.94	99.2	50.4	less-open
139.27	122.5	64.1	less-open
139.51	96.5	59.2	less-open
139.57	286.5	61.6	less-open
139.59	124.8	45.9	less-open
139.97	68.8	58.3	less-open
140.15	169.3	49.5	less-open
140.41	44.7	21.1	less-open
140.45	226.2	31.8	less-open
140.5	83.7	63.1	less-open
140.74	219.4	63.0	less-open
141.23	244.3	26.9	less-open
142.24	185.0	36.8	less-open
142.43	119.6	78.1	less-open
144.42	123.5	38.1	less-open
144.49	113.1	67.7	less-open
144.61	114.4	39.6	open
144.84	124.6	41.3	open
145.01	115.8	44.3	open
145.55	95.2	44.0	less-open
145.86	114.4	41.5	less-open
146.02	104.1	46.0	less-open
146.14	97.6	44.5	less-open
146.96	175.8	75.4	less-open
147.41	187.5	36.8	less-open
148.09	325.3	56.8	less-open
148.52	214.8	60.0	less-open
148.68	196.9	35.0	less-open
148.82	178.9	53.2	less-open
149.33	188.4	40.3	less-open
149.42	236.3	48.3	less-open
149.49	183.0	40.8	less-open
149.8	138.8	68.3	less-open
150.35	81.1	49.7	less-open
150.59	90.2	44.7	less-open
150.88	122.6	69.4	less-open
151.01	104.1	62.2	less-open
151.11	357.7	80.9	less-open
151.24	101.0	40.6	less-open
151.41	109.44	47.09	less-open

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depth (feet)	down-dip compass azimuth (degrees)	dip angle (degrees)	interpreted planar feature category
151.51	326.3	82.15	less-open
151.56	111.92	50.04	less-open
151.94	122	34.76	less-open
152.29	141.66	34.49	less-open
152.67	136.37	19.09	less-open
152.9	115.89	49.52	less-open
153	128.63	48.23	less-open
154.36	80.63	51.46	less-open
155.49	97.7	80.56	less-open
155.63	74.18	55.48	less-open
155.69	108.38	80.21	less-open
155.85	149.48	55.4	less-open
156.47	141.61	44.08	less-open
156.79	144.32	44.71	less-open
156.99	138.16	44.02	less-open
157.19	181.39	22.46	less-open
157.47	155.01	35.6	less-open
157.75	137.27	24.69	less-open
157.97	117.06	34.56	less-open
158.23	112.25	54.24	less-open
158.56	95.88	60.66	less-open
158.81	92.67	66.08	less-open
159	118.76	63.56	less-open
159.12	106.72	64.15	less-open
159.25	199.16	54.36	less-open
159.38	102.96	57.88	less-open
159.42	200.96	54.21	less-open
159.52	96.59	65.17	less-open
160.2	174.24	23.28	less-open
160.44	109.22	72.43	less-open
161.52	97.62	61.34	less-open
161.59	101.72	72.06	less-open
162.09	67.69	48.77	less-open
162.15	189.75	62.14	less-open
162.29	102.22	55.01	less-open
162.66	270.05	67.01	less-open
162.79	112.42	79.94	less-open
163.16	257.7	23.17	less-open
163.81	41.53	67.27	less-open
164.21	75.9	76.37	less-open
164.5	111.68	76.13	less-open
164.67	136.22	76.2	less-open
166.59	110.49	70.45	less-open
166.77	103.34	56.55	less-open

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depth (feet)	down-dip compass azimuth (degrees)	dip angle (degrees)	interpreted planar feature category
167.12	115.01	51.46	less-open
167.78	90.05	48.31	less-open
168.4	104.05	45.28	less-open
168.58	114.26	45.14	less-open
168.8	120.57	50.57	less-open
168.84	299.18	72.09	less-open
169.27	347.29	44.11	less-open
169.48	336.05	39.28	less-open
169.61	126.83	57.28	less-open
170.51	108.91	75.55	less-open
170.9	119.85	55.09	less-open
171.09	145.65	57.06	less-open
172.27	260.45	69.61	less-open
172.59	266.38	74.6	less-open
172.65	301.97	54.36	less-open
173.22	107.06	57.71	less-open
173.55	96.22	57.95	less-open
173.82	319.98	54.15	open
173.9	282.49	63.83	open
174.28	304.29	70.31	open
175.46	99.29	65.69	open
175.68	100.21	58.12	open
176.3	107.58	61.63	less-open
176.53	114.7	60.28	less-open
177.18	131.56	74.71	less-open
177.33	133.76	69.94	less-open
177.56	127.71	70.44	less-open
177.71	115.46	74.43	less-open
178.62	205.95	58.43	less-open
178.62	356.98	34.55	less-open
179.28	135.8	57.17	less-open
179.55	357.58	85.59	less-open
179.58	125.84	51.24	less-open
179.94	111.69	32.09	less-open
180.6	102.82	40.97	less-open
181.37	174.85	68.71	less-open
181.72	337.5	38.08	less-open
181.84	37.21	32.02	less-open
181.94	215.29	69.44	less-open
182.26	252.59	30.92	less-open
182.43	138.73	66.74	less-open
183.02	113.3	71.43	less-open
183.3	353.99	74.75	less-open
183.5	106.78	73.85	less-open

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depth (feet)	down-dip compass azimuth (degrees)	dip angle (degrees)	interpreted planar feature category
183.85	348.1	56.02	less-open
183.9	88.16	75.46	less-open
184.48	324.09	45.12	less-open
184.71	104.66	50.09	less-open
185.31	143.73	62.28	less-open
185.43	312.61	58.3	less-open
185.58	202.59	43.8	less-open
186.25	323.48	70.49	less-open
186.28	351.99	49.28	less-open
186.63	108.02	73.31	less-open
186.71	349.1	79.18	less-open
187.43	85.19	64.98	less-open
187.66	191.18	39.72	less-open
187.71	133.74	56.02	less-open
187.98	120.92	63.88	less-open
189.96	174.43	53.43	less-open
189.98	172.49	83.74	less-open
190.27	163.97	44.03	less-open
190.76	201.7	48.33	open
191.04	146.33	46.61	open
192.42	306.81	74.35	open
193.1	101.31	40.74	less-open
193.48	132.81	42.37	less-open
193.95	201.15	59.7	less-open
194	186.46	64.05	less-open
194.17	101.92	63.2	less-open
194.72	151.66	21.52	less-open
194.74	180.84	70.53	less-open
194.94	185.74	66.82	less-open
195.41	320.64	38.82	less-open
195.58	277.04	70.22	less-open
195.95	107.66	36.37	less-open
196.75	131.09	77.23	less-open
196.9	319.35	73	less-open
197.52	305.11	62.94	less-open
197.68	106.8	43.25	less-open
197.8	301.62	57.49	less-open
198.26	165.02	82.73	less-open
198.32	144.69	75.02	less-open
199.48	49.16	41.62	open
200.29	118.03	33.85	less-open
200.52	264.76	50.98	open
200.83	290.39	44.84	less-open
201.07	302.31	50.48	less-open

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depth (feet)	down-dip compass azimuth (degrees)	dip angle (degrees)	interpreted planar feature category
201.24	278.07	43.53	less-open
201.72	88.77	51.77	less-open
201.89	111.94	55.94	less-open
201.97	91.13	81.6	open
202.85	134.08	53.6	less-open
203.08	131.77	89.57	less-open
203.46	271.73	89.31	less-open
203.68	268.77	89.79	less-open
203.94	289.97	89.99	less-open
204.3	99.47	89.68	less-open

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depth (feet)	down-dip compass azimuth (degrees)	dip angle (degrees)	interpreted planar feature category
12.43	73.7	62.7	less-open
13.14	63.9	66.6	less-open
13.38	48.5	66.9	less-open
13.89	316.3	61.1	less-open
14.29	137.6	60.9	less-open
14.61	113.4	54.5	less-open
15.20	170.0	58.7	less-open
15.79	143.1	50.6	less-open
15.91	161.0	79.3	less-open
16.75	226.4	67.8	less-open
16.91	194.7	78.6	less-open
17.09	161.4	60.0	less-open
17.21	142.2	69.7	less-open
18.38	73.2	70.2	less-open
19.43	29.1	43.8	less-open
19.75	108.2	38.3	less-open
20.01	224.4	28.0	less-open
20.45	203.3	24.3	less-open
20.52	51.6	61.4	less-open
20.97	328.2	61.3	less-open
21.94	270.5	40.0	less-open
22.08	310.2	75.2	less-open
23.31	194.2	37.0	less-open
23.55	316.6	68.4	less-open
23.73	246.0	21.6	less-open
24.09	140.7	39.0	less-open
24.50	152.3	43.3	less-open
24.83	174.2	24.4	less-open
25.04	249.8	26.7	less-open
25.29	160.3	30.5	less-open
25.62	200.1	20.9	less-open
26.15	138.5	24.3	less-open
26.95	222.6	31.1	less-open
27.61	197.7	49.5	less-open
27.66	49.2	44.1	less-open
28.36	269.6	68.4	less-open
29.50	255.6	22.9	less-open
30.14	119.8	40.4	less-open
32.29	151.6	39.7	less-open
32.64	85.1	52.9	less-open
32.73	83.2	36.8	less-open
33.07	112.3	73.0	less-open
33.23	94.4	54.6	less-open
33.26	313.6	82.7	less-open

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

Note that interpreted down-dip compass azimuths are with respect to magnetic north.

Down-dip azimuths & dip angles were corrected for borehole deviation from vertical.

Fracture Orientations Interpreted from MW-55 Acoustic Televiewer Log
Indian Point Site
Buchanan, NY
Prepared for: GZA
105836 - mw55i.xls

depth (feet)	down-dip compass azimuth (degrees)	dip angle (degrees)	interpreted planar feature category
33.57	141.2	63.3	less-open
34.29	315.6	68.3	less-open
34.46	168.6	63.4	less-open
35.59	151.6	72.1	less-open
35.61	290.2	75.7	less-open
36.09	310.1	39.9	less-open
37.59	244.8	53.0	less-open
37.80	140.9	78.2	less-open
38.51	114.6	78.5	less-open
39.67	308.4	69.0	less-open
41.54	185.5	53.9	less-open
43.38	165.0	63.7	less-open
44.26	177.8	63.7	less-open
44.96	226.7	59.0	less-open
45.70	23.9	33.5	less-open
45.89	148.2	75.6	less-open
46.07	203.62	70.35	less-open
46.13	332.99	79.09	less-open
46.72	102.0	45.2	less-open
47.04	105.6	51.3	less-open
47.46	93.7	21.0	open
48.73	70.8	68.1	less-open
49.35	249.2	33.3	less-open
49.84	214.1	12.9	less-open
50.99	283.2	55.2	less-open
51.23	315.3	49.1	less-open
51.40	124.3	14.2	less-open
51.59	317.6	52.7	less-open
52.45	85.7	36.4	less-open
52.91	101.0	66.5	less-open
53.44	80.8	43.1	open
53.61	91.6	43.6	open
54.48	287.2	38.3	less-open
55.31	274.9	16.6	less-open
56.84	63.9	58.8	less-open
57.34	72.1	63.9	less-open
57.78	97.0	58.5	less-open
58.59	303.4	63.0	less-open
58.98	288.8	62.5	less-open
59.13	179.1	63.4	less-open
59.90	321.0	41.8	less-open
60.36	175.2	44.3	less-open
60.44	315.2	56.9	less-open
60.45	78.9	61.5	less-open

Fracture Orientations Interpreted from MW-55 Acoustic Televiewer Log
Indian Point Site
Buchanan, NY
Prepared for: GZA
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depth (feet)	down-dip compass azimuth (degrees)	dip angle (degrees)	interpreted planar feature category
60.68	96.1	73.6	less-open
61.30	75.6	75.9	less-open
61.41	103.2	77.8	less-open
61.55	254	73.52	less-open
61.73	74.96	65.95	less-open
61.82	290.3	41.2	less-open
62.24	268.3	51.6	less-open
62.47	89.2	50.8	less-open
62.70	311.2	43.6	less-open
63.25	304.4	37.5	less-open
63.38	87.5	51.2	less-open
63.50	325.4	55.4	less-open
63.72	238.9	29.7	less-open
64.04	95.2	73.6	less-open
64.38	87.1	68.2	less-open
64.53	280.0	51.7	less-open
64.61	295.5	48.5	less-open
64.90	74.6	31.0	less-open
64.97	85.4	70.3	less-open
65.01	313.3	78.0	less-open
65.51	359.9	52.5	less-open
65.75	170.2	78.9	less-open
65.86	324.3	43.7	less-open
66.06	105.7	51.6	less-open
66.28	62.5	68.9	less-open
66.74	340.3	49.6	less-open
66.97	358.6	55.5	less-open
67.33	5.8	56.8	less-open
67.77	1.3	54.6	less-open
68.07	5.4	46.9	less-open
68.36	338.9	47.3	less-open
68.58	207.9	71.8	less-open
69.24	302.5	48.3	less-open
69.78	121.9	57.0	less-open
69.85	201.0	60.4	less-open
70.55	295.3	38.8	less-open
71.09	270.1	26.7	less-open
71.44	187.9	48.3	less-open
71.75	203.4	59.7	less-open
72.14	93.1	65.7	less-open
72.41	187.4	56.0	less-open
73.92	255.3	27.0	less-open
74.06	178.9	59.6	less-open
74.29	162.8	60.1	less-open

Fracture Orientations Interpreted from MW-55 Acoustic Televiewer Log
Indian Point Site
Buchanan, NY
Prepared for: GZA
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depth (feet)	down-dip compass azimuth (degrees)	dip angle (degrees)	interpreted planar feature category
74.74	330.0	46.9	less-open
75.26	332.0	52.9	less-open
75.96	307.2	5.1	less-open
76.15	296.8	7.5	less-open
76.57	174.6	12.0	less-open

Fracture Orientations Interpreted from MW-56 Optical & Acoustic Televiewer Logs
Indian Point Site
Buchanan, NY
Prepared for: GZA
105836 - mw56i.xls

depth (feet)	down-dip compass azimuth (degrees)	dip angle (degrees)	interpreted planar feature category
31.02	193.2	77.7	less-open
32.45	172.6	51.9	less-open
32.56	223.5	79.8	less-open
32.91	228.3	79.4	less-open
33.01	11.8	73.6	less-open
33.68	338.5	40.3	less-open
35.65	144.0	20.1	less-open
36.90	147.2	63.8	less-open
37.81	346.6	49.7	less-open
38.79	5.3	73.1	less-open
39.83	85.6	30.5	less-open
40.01	115.0	34.2	less-open
41.21	13.2	67.1	less-open
41.71	301.2	52.2	less-open
42.54	1.9	59.5	less-open
42.60	155.1	64.4	open
43.33	79.6	20.0	less-open
43.83	0.8	65.0	less-open
44.42	1.0	68.8	less-open
44.83	176.1	66.8	less-open
45.02	4.3	65.8	less-open
45.29	6.9	70.5	less-open
45.70	8.3	73.7	less-open
46.96	173.3	36.4	less-open
47.05	10.0	70.6	less-open
48.10	166.9	17.8	less-open
48.39	4.4	74.6	less-open
50.31	212.2	14.6	less-open
51.62	188.2	3.2	less-open
51.70	329.9	5.7	less-open
51.78	155.6	8.3	less-open
51.94	10.3	9.4	less-open
52.50	6.0	65.7	less-open
52.84	198.0	4.6	less-open
53.20	220.7	62.2	less-open
53.68	341.3	43.8	less-open
54.13	121.1	13.3	less-open
56.09	330.9	38.3	less-open
57.17	351.7	52.6	less-open
57.20	320.9	47.7	less-open
57.22	203.7	37.4	less-open
57.59	200.8	70.3	less-open
57.62	290.5	14.6	less-open
58.17	207.9	78.3	less-open

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

Note that interpreted down-dip compass azimuths are with respect to magnetic north.

Down-dip azimuths & dip angles were corrected for borehole deviation from vertical.

Fracture Orientations Interpreted from MW-56 Optical & Acoustic Televiewer Logs
Indian Point Site
Buchanan, NY
Prepared for: GZA
105836 - mw56i.xls

depth (feet)	down-dip compass azimuth (degrees)	dip angle (degrees)	interpreted planar feature category
59.12	84.6	8.1	less-open
59.84	119.3	74.4	less-open
60.90	341.3	46.4	less-open
61.10	220.9	68.9	less-open
61.53	223.12	61.57	less-open
61.69	234.02	57.02	less-open
61.80	27.8	9.2	less-open
61.86	147.3	27.2	less-open
62.52	357.3	41.1	less-open
62.52	143.2	67.8	less-open
63.10	274.6	35.7	less-open
63.33	34.3	32.4	less-open
63.94	307.3	36.8	less-open
64.50	303.3	53.4	less-open
65.12	171.8	59.2	less-open
65.40	175.2	58.2	less-open
66.67	328.3	61.1	less-open
67.98	274.2	66.2	less-open
68.04	275.4	62.9	less-open
68.71	230.9	57.0	less-open
69.08	271.2	8.0	less-open
69.29	339.9	7.6	less-open
69.45	173.0	50.2	less-open
69.86	236.5	7.9	less-open
69.97	325.9	18.3	less-open
70.17	276.6	57.6	less-open
70.20	176.3	71.9	less-open
70.33	29.0	45.6	less-open
70.92	294.8	6.0	less-open
71.00	313.7	23.1	less-open
71.02	294.5	65.8	less-open
71.54	277.9	18.2	less-open
71.57	179.0	75.8	less-open
71.68	351.3	39.1	less-open
71.80	19.0	36.1	less-open
72.66	292.75	17.01	less-open
72.85	220.08	79.25	less-open
73.30	224.5	77.9	less-open
73.49	218.8	26.4	less-open
73.79	1.1	32.7	less-open
73.93	171.5	63.2	less-open
74.41	272.7	52.3	less-open
74.73	254.2	45.0	less-open
75.28	142.4	75.3	less-open

Fracture Orientations Interpreted from MW-56 Optical & Acoustic Televiewer Logs
Indian Point Site
Buchanan, NY
Prepared for: GZA
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depth (feet)	down-dip compass azimuth (degrees)	dip angle (degrees)	interpreted planar feature category
75.59	351.8	24.1	less-open
75.77	206.1	60.7	less-open
76.08	170.7	70.9	less-open
76.61	264.1	57.9	less-open
76.96	258.2	57.5	less-open
77.04	92.8	23.8	less-open
77.07	263.1	56.8	less-open
77.33	170.4	49.3	less-open
77.53	203.97	61.43	less-open
77.54	186.69	58.9	less-open
78.64	161.9	71.6	less-open
78.80	357.0	82.9	less-open
78.92	162.2	54.7	less-open
79.13	171.07	80.07	less-open
79.25	179.42	63.94	less-open
79.39	122.5	78.8	less-open
79.77	255.8	40.1	less-open
79.96	171.5	50.8	less-open
80.5	175.0	23.6	less-open
80.66	178.2	71.3	less-open
80.75	220.7	34.8	less-open
80.83	318.4	53.0	less-open
80.98	178.3	78.0	less-open
81.11	239.4	52.6	less-open
81.19	180.2	75.5	less-open
81.58	181.1	72.7	less-open
81.72	173.8	36.1	less-open
81.9	154.6	70.5	less-open
83.01	185.9	80.3	less-open
83.93	150.2	59.4	less-open
84.27	228.9	31.3	less-open
84.28	341.8	67.2	less-open
84.59	221.0	38.6	less-open
84.86	207.4	54.4	less-open
85.35	235.87	62.96	less-open
85.61	59.54	89.93	less-open
86.14	70.5	87.3	less-open
86.51	215.7	89.5	less-open

Fracture Orientations Interpreted from MW-57 Acoustic Televiewer Log
Indian Point Site
Buchanan, NY
Prepared for: GZA
105836 - mw57i.xls

depth (feet)	down-dip compass azimuth (degrees)	dip angle (degrees)	interpreted planar feature category
6.17	133.4	77.5	less-open
6.44	64.8	16.0	open
6.61	300.2	5.1	less-open
6.88	162.4	44.0	less-open
7.36	235.1	36.9	less-open
7.46	41.7	16.4	less-open
7.75	25.6	21.9	less-open
7.86	336.3	8.6	open
8.53	345.4	16.3	less-open
9.12	254.4	72.8	less-open
9.44	352.5	48.0	less-open
10.25	45.9	29.2	less-open
10.52	40.1	18.0	less-open
10.74	355.5	20.8	less-open
10.87	15.1	31.0	less-open
11.03	28.8	25.5	open
11.12	308.4	26.8	less-open
11.24	332.1	27.3	less-open
11.41	99.0	56.1	less-open
11.99	101.7	61.8	less-open
12.20	356.5	18.4	less-open
12.70	41.0	11.0	less-open
13.42	97.9	68.3	less-open
15.90	314.5	16.3	less-open
16.34	4.4	15.5	less-open
16.34	105.8	80.4	less-open
17.61	355.4	16.2	less-open
18.44	172.2	55.9	less-open
19.58	291.9	32.1	less-open
19.82	90.1	67.9	less-open
21.17	7.9	26.3	less-open
21.76	336.3	15.9	less-open
22.01	266.5	22.1	less-open
22.85	311.4	32.7	less-open
22.86	194.6	64.5	less-open
23.76	343.6	47.0	less-open
24.19	131.9	59.8	less-open
25.08	146.6	68.2	less-open
25.76	169.6	69.0	less-open
28.16	109.9	59.0	less-open
28.35	257.3	73.2	less-open
29.15	115.3	73.5	less-open
29.71	279.9	20.8	open
29.77	82.1	74.8	less-open

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

Note that interpreted down-dip compass azimuths are with respect to magnetic north.

Down-dip azimuths & dip angles were corrected for borehole deviation from vertical.

Fracture Orientations Interpreted from MW-57 Acoustic Televiewer Log
Indian Point Site
Buchanan, NY
Prepared for: GZA
105836 - mw57i.xls

depth (feet)	down-dip compass azimuth (degrees)	dip angle (degrees)	interpreted planar feature category
30.12	76.8	74.2	less-open
30.46	90.7	77.5	less-open
30.95	94.5	73.0	less-open
31.81	143.4	77.6	less-open
32.02	129.2	73.3	less-open
32.04	331.4	37.0	less-open
32.37	291.45	33.23	less-open
32.5	247.4	80.52	less-open
32.72	115.1	35.5	less-open
32.87	284.4	60.6	less-open
32.96	286.0	38.2	less-open
33.37	89.9	73.8	less-open
33.37	287.5	73.5	less-open
34.23	298.4	76.8	less-open
34.57	328.7	63.4	less-open
35.30	292.2	46.1	less-open
35.59	105.1	48.3	less-open
35.64	318.2	55.7	less-open
35.81	311.9	21.7	less-open
36.08	303.6	53.3	less-open
36.37	311.8	47.1	less-open
36.53	307.1	53.3	less-open
36.73	87.2	69.4	less-open
36.79	312.2	44.7	less-open
36.97	287.1	47.9	less-open
37.16	307.1	42.9	less-open
38.09	317.2	42.2	less-open
38.31	316.3	56.1	less-open
38.45	126.8	77.5	less-open
38.76	306.4	66.3	less-open
38.85	320.7	65.4	less-open
38.96	311.7	63.9	less-open
39.15	306.6	32.2	less-open
39.38	325.6	53.3	less-open
39.64	316.6	62.8	less-open
39.80	322.6	65.5	less-open
40.03	125.5	76.3	less-open
40.7	215.86	52.44	less-open
41.35	57.99	39.92	less-open
41.44	214.6	46.7	less-open
42.13	121.6	57.1	less-open
43.03	30.7	15.2	less-open
43.06	312.4	74.4	less-open
43.26	324.9	28.7	less-open

Fracture Orientations Interpreted from MW-57 Acoustic Televiewer Log
Indian Point Site
Buchanan, NY
Prepared for: GZA
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depth (feet)	down-dip compass azimuth (degrees)	dip angle (degrees)	interpreted planar feature category
43.37	290.4	67.5	less-open
43.66	115.8	52.1	less-open
43.78	83.3	82.9	less-open
43.84	92.6	53.7	less-open
44.11	72.2	66.9	less-open
44.13	349.5	76.3	less-open
44.33	85.8	78.0	less-open
44.91	327.7	89.7	less-open
45.17	309.9	89.3	less-open
45.73	305.7	89.7	less-open

Fracture Orientations Interpreted from MW-58 Acoustic Televiewer Log
Indian Point Site
Buchanan, NY
Prepared for: GZA
105836 - mw58i.xls

depth (feet)	down-dip compass azimuth (degrees)	dip angle (degrees)	interpreted planar feature category
16.76	344.0	36.5	less-open
16.95	340.6	42.7	less-open
17.41	171.3	66.7	less-open
17.82	357.3	67.1	less-open
17.99	349.1	58.7	less-open
18.30	11.6	53.0	less-open
18.72	204.5	72.9	less-open
18.75	20.8	32.8	less-open
18.86	3.6	67.5	less-open
19.14	15.5	29.9	less-open
19.28	352.8	34.8	less-open
19.43	344.0	29.1	open
19.96	164.5	66.1	less-open
20.28	335.1	57.0	less-open
20.34	162.4	70.2	less-open
20.53	170.9	62.2	less-open
20.64	340.2	35.2	less-open
20.94	158.1	65.8	less-open
21.03	345.1	31.5	less-open
21.11	351.1	34.7	less-open
21.30	351.7	41.8	less-open
21.56	342.8	41.9	open
21.81	354.9	39.1	less-open
21.97	343.2	39.8	less-open
22.40	314.6	55.7	less-open
22.94	320.7	26.7	less-open
23.23	307.1	49.5	less-open
23.38	133.0	73.2	less-open
23.49	333.7	49.8	less-open
23.92	325.0	45.9	less-open
24.04	118.5	71.6	less-open
24.40	319.2	43.7	less-open
25.06	121.2	63.5	less-open
25.10	326.9	63.3	less-open
25.16	338.6	56.7	less-open
25.31	117.1	68.6	less-open
25.38	328.5	61.5	less-open
26.18	317.0	61.1	less-open
26.28	322.3	45.0	less-open
26.46	342.8	46.6	less-open
26.94	120.7	65.7	less-open
27.37	345.2	58.7	less-open
28.08	341.1	59.6	less-open
28.36	176.3	62.7	less-open

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

Note that interpreted down-dip compass azimuths are with respect to magnetic north.

Down-dip azimuths & dip angles were corrected for borehole deviation from vertical.

Fracture Orientations Interpreted from MW-58 Acoustic Televiewer Log
Indian Point Site
Buchanan, NY
Prepared for: GZA
105836 - mw58i.xls

depth (feet)	down-dip compass azimuth (degrees)	dip angle (degrees)	interpreted planar feature category
28.98	339.7	58.4	less-open
29.42	328.8	40.7	less-open
30.06	319.5	43.1	less-open
30.77	312.6	42.0	less-open
31.20	149.6	64.0	less-open
32.00	311.1	36.1	less-open
32.46	313.7	32.7	less-open
33.06	290.8	35.1	less-open
33.20	300.3	28.6	less-open
33.56	310.0	32.1	less-open
34.03	339.91	41.14	less-open
34.37	132.58	60.75	less-open
34.68	282.7	29.2	less-open
35.02	113.0	66.1	less-open
35.37	102.5	62.2	less-open
35.84	100.5	67.9	less-open
35.92	332.5	66.3	less-open
36.38	312.3	43.3	less-open
36.52	111.3	64.8	less-open
36.60	302.6	53.1	less-open
37.10	312.6	45.5	less-open
37.22	326.6	40.7	less-open
37.58	323.4	39.8	less-open
38.17	314.9	50.4	less-open
38.25	314.7	47.1	less-open
38.40	311.2	58.6	less-open
38.82	332.8	32.9	less-open
39.06	95.3	70.2	less-open
39.22	298.1	40.0	less-open
39.54	297.3	47.8	less-open
39.94	327.2	56.5	less-open
40.08	96.7	70.8	less-open
40.62	94.2	70.8	less-open
41.16	313.6	32.5	less-open
41.35	78.7	70.7	less-open
41.53	296.7	24.6	less-open
42.27	305.6	52.1	less-open
42.70	333.9	42.2	less-open
43.04	301.5	47.4	less-open
43.16	295.0	52.6	less-open
43.74	316.6	46.6	less-open
44.46	101.8	63.02	less-open
44.5	335.9	45.32	less-open
45.32	342.3	39.0	less-open

Fracture Orientations Interpreted from MW-58 Acoustic Televiewer Log
Indian Point Site
Buchanan, NY
Prepared for: GZA
105836 - mw58i.xls

depth (feet)	down-dip compass azimuth (degrees)	dip angle (degrees)	interpreted planar feature category
46.27	301.2	40.8	less-open
46.98	310.0	34.9	less-open
48.89	351.1	22.6	less-open
52.82	96.6	58.6	less-open
53.46	107.2	65.3	less-open
53.77	107.0	65.8	less-open
54.36	305.0	38.6	open
56.84	290.2	40.6	less-open
57.63	295.5	50.2	less-open
58.41	162.9	73.1	less-open
59.02	105.5	63.5	less-open
59.22	302.9	61.9	less-open
59.63	282.8	64.5	less-open
60.77	297.1	61.0	less-open
60.99	101.8	66.7	less-open
61.41	122.4	63.8	less-open
61.77	103.0	67.9	less-open
63.25	301.09	37.77	less-open
64.06	71.9	66.14	less-open
64.34	143.2	63.6	less-open
64.38	319.0	35.9	less-open
64.81	291.8	41.4	less-open
64.92	181.4	67.9	less-open
65.13	177.0	69.9	less-open
65.22	170.8	68.1	less-open
65.71	178.8	70.2	less-open
65.96	323.2	53.5	less-open
66.21	110.7	61.3	less-open
66.33	107.7	65.6	less-open
66.68	288.1	55.7	less-open
66.94	111.8	59.3	less-open
67.26	115.3	67.2	less-open
67.89	100.5	69.9	less-open
67.96	108.1	71.0	less-open
68.07	305.7	53.9	less-open
68.28	108.8	72.9	less-open
68.93	95.9	65.1	less-open
70.24	192.9	6.4	less-open

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Indian Point Site
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depth (feet)	down-dip compass azimuth (degrees)	dip angle (degrees)	interpreted planar feature category
20.77	253.8	29.3	open
21.69	221.7	62.6	less-open
21.76	213.1	72.2	less-open
23.51	225.7	60.8	open
23.68	217.0	69.7	less-open
24.14	220.2	78.0	less-open
24.14	219.1	75.4	less-open
24.43	132.3	48.1	less-open
24.77	354.0	50.4	less-open
24.99	207.9	77.2	less-open
25.11	357.9	45.9	less-open
25.19	150.9	41.4	less-open
25.33	135.7	34.0	less-open
25.51	147.6	51.7	less-open
26.12	142.0	57.0	less-open
26.19	147.3	58.4	less-open
26.79	188.0	84.0	less-open
26.88	135.2	59.9	less-open
26.94	324.5	39.0	less-open
27.18	284.7	46.2	less-open
27.25	141.6	37.0	less-open
27.30	187.5	85.0	less-open
27.34	129.3	48.1	less-open
27.99	123.9	59.1	less-open
28.14	159.0	46.2	less-open
28.45	229.4	47.1	less-open
28.83	132.6	65.8	less-open
29.09	135.8	51.6	less-open
29.40	120.2	53.7	less-open
29.43	317.1	38.4	open
29.81	141.3	54.8	less-open
30.13	324.8	43.2	open
30.19	148.0	61.5	less-open
30.43	313.3	41.8	open
30.56	317.5	45.1	less-open
31.17	195.2	41.0	less-open
31.54	183.5	38.5	less-open
31.78	304.2	45.4	less-open
32.04	305.6	46.4	less-open
32.15	114.5	65.7	less-open
32.34	120.6	57.4	less-open
32.46	120.9	58.8	less-open
32.59	211.3	64.0	less-open
32.83	123.8	68.3	less-open

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

Note that interpreted down-dip compass azimuths are with respect to magnetic north.

Down-dip azimuths & dip angles were corrected for borehole deviation from vertical.

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depth (feet)	down-dip compass azimuth (degrees)	dip angle (degrees)	interpreted planar feature category
33.54	127.6	45.9	less-open
34.06	204.3	63.6	less-open
34.16	7.1	63.4	less-open
34.27	199.7	46.9	less-open
34.99	340.4	69.6	less-open
35.68	182.9	55.9	less-open
36.78	116.3	60.4	less-open
37.07	189.0	59.3	less-open
37.63	137.0	55.1	less-open
37.88	132.2	56.9	less-open
38.22	198.2	70.9	less-open
38.64	175.4	62.1	less-open
39.66	165.5	42.6	less-open
41.65	339.1	43.9	less-open
42.24	212.49	15.37	less-open
42.47	254.48	49.31	less-open
42.79	156.3	54.4	less-open
42.90	157.8	45.8	less-open
43.11	146.5	23.5	less-open
43.37	120.2	47.9	less-open
43.47	180.5	18.6	less-open
43.52	197.0	66.7	less-open
43.68	179.6	40.7	less-open
44.60	182.0	45.7	less-open
44.66	214.0	14.0	less-open
45.10	195.7	65.7	less-open
45.95	167.4	51.6	less-open
46.44	325.3	50.5	less-open
46.44	186.8	38.4	less-open
46.69	208.9	60.7	less-open
47.60	338.7	42.2	less-open
47.99	329.3	45.2	less-open
48.25	135.7	55.0	less-open
48.37	157.4	59.2	less-open
48.46	322.6	43.1	less-open
48.67	140.6	56.8	less-open
49.41	310.2	35.3	less-open
49.75	305.3	36.4	less-open
50.23	343.3	42.2	less-open
50.41	328.9	40.3	less-open
50.57	211.7	45.0	less-open
50.93	135.0	48.0	less-open
51.43	332.3	42.3	less-open
51.65	323.8	30.0	less-open

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depth (feet)	down-dip compass azimuth (degrees)	dip angle (degrees)	interpreted planar feature category
51.78	320.0	42.8	less-open
52.16	314.36	42.53	less-open
52.49	203.3	60.67	less-open
52.93	320.0	36.1	less-open
53.06	193.1	66.2	less-open
53.31	338.0	39.4	less-open
53.48	319.9	36.0	less-open
54.20	324.8	34.5	less-open
55.03	213.7	71.5	less-open
55.31	203.4	70.2	less-open
55.44	326.6	35.9	less-open
55.49	208.0	66.2	less-open
55.66	297.7	31.1	less-open
56.74	311.9	18.1	less-open
57.18	330.7	39.2	less-open
57.30	318.3	33.7	less-open
57.46	324.0	47.3	less-open
57.80	189.0	74.8	less-open
58.15	319.6	26.6	less-open
58.23	312.2	31.6	less-open
58.27	309.7	48.4	less-open
58.42	314.4	36.1	less-open
58.76	186.1	56.0	less-open
59.88	335.6	36.2	less-open
60.12	351.1	40.1	less-open
60.31	329.1	33.6	less-open
60.42	340.0	38.4	less-open
60.64	184.3	73.4	less-open
60.66	323.3	34.6	less-open
61.01	104.0	71.5	less-open
61.48	116.1	66.1	less-open
61.96	328.3	40.4	less-open
62.14	144.1	62.3	less-open
62.6	12.0	9.6	less-open
62.94	310.4	22.3	less-open
63.2	134.8	66.7	less-open
63.23	313.5	51.3	less-open
63.81	123.0	26.0	less-open
65.41	297.1	30.2	less-open
65.5	301.1	31.0	less-open
67.42	158.5	60.1	less-open
67.66	320.2	40.3	less-open
67.92	321.8	41.2	less-open
68.12	318.8	41.3	less-open

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depth (feet)	down-dip compass azimuth (degrees)	dip angle (degrees)	interpreted planar feature category
70.44	321.5	44.9	less-open
70.83	305.9	45.6	less-open
70.92	310.8	45.1	less-open
70.98	312.44	47.62	less-open
71.18	317.72	39.27	less-open
71.32	306.7	41.6	less-open
71.44	306.6	37.3	less-open
72.32	304.0	39.4	less-open
73.58	120.6	61.9	less-open
73.71	33.5	13.6	less-open
74.25	315.6	22.7	less-open
74.72	304.5	29.3	less-open
75.17	341.8	87.4	less-open
76.25	315.8	87.6	less-open

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depth (feet)	down-dip compass azimuth (degrees)	dip angle (degrees)	interpreted planar feature category
10.40	296.3	36.1	less-open
11.96	104.0	35.7	less-open
12.08	300.3	50.7	less-open
13.20	304.0	38.7	less-open
14.40	275.6	62.4	less-open
14.49	143.9	34.6	less-open
16.02	103.6	57.7	less-open
16.86	115.8	59.7	less-open
18.00	282.9	61.1	less-open
19.74	37.5	49.1	less-open
20.11	249.5	31.2	less-open
20.46	112.6	47.3	less-open
22.94	315.4	51.9	less-open
27.05	134.0	35.0	less-open
29.75	99.8	53.9	less-open
36.27	221.8	56.7	less-open
36.47	331.5	61.0	less-open
36.99	302.7	48.2	open
37.39	323.2	39.3	less-open
38.54	24.7	13.4	less-open
39.31	118.5	63.4	less-open
39.73	110.4	59.4	less-open
40.60	125.3	72.0	less-open
43.20	205.1	57.5	less-open
49.41	132.4	45.1	less-open
50.09	147.4	86.1	less-open
52.30	313.7	42.3	less-open
52.64	9.1	31.1	less-open
52.82	336.8	41.9	less-open
53.12	354.1	61.8	less-open
53.64	331.3	23.5	less-open
54.14	273.9	67.7	less-open
54.14	258.6	59.2	less-open
54.42	341.7	22.1	open
55.83	324.8	58.6	open
55.86	253.8	4.9	less-open
56.89	325.8	42.0	less-open
57.06	303.9	58.3	less-open
57.62	326.3	73.2	less-open
58.23	327.4	74.8	less-open
58.78	336.8	77.8	less-open
59.00	351.8	76.3	less-open
60.03	306.9	52.6	less-open
60.07	147.5	52.1	less-open

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

Note that interpreted down-dip compass azimuths are with respect to magnetic north.

Down-dip azimuths & dip angles were corrected for borehole deviation from vertical.

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depth (feet)	down-dip compass azimuth (degrees)	dip angle (degrees)	interpreted planar feature category
60.65	336.8	61.9	less-open
60.67	148.9	70.3	less-open
61.21	109.9	36.2	less-open
61.99	330.3	53.0	less-open
62.23	325.0	59.4	less-open
63.97	307.1	63.1	less-open
64.16	325.5	68.7	less-open
64.25	311.8	49.4	less-open
64.32	201.8	67.6	less-open
64.33	298.9	45.9	less-open
65.01	197.35	72.97	less-open
65.45	312.86	63.37	less-open
66.44	307.7	63.6	less-open
68.01	323.4	77.1	less-open
68.29	300.2	74.1	less-open
69.39	126.8	42.4	less-open
69.59	131.2	39.7	less-open
69.83	292.7	67.5	less-open
70.53	309.2	70.3	less-open
70.67	103.4	53.9	less-open
71.50	323.6	70.7	less-open
71.80	319.6	63.5	less-open
72.77	319.5	60.2	less-open
73.78	324.9	59.6	less-open
74.10	309.6	61.8	less-open
74.40	274.5	67.2	less-open
74.83	80.5	15.5	less-open
74.95	185.8	65.6	less-open
75.20	186.9	68.5	less-open
75.96	315.5	46.2	less-open
76.39	323.4	42.6	less-open
77.23	353.9	17.3	less-open
77.34	38.5	21.2	less-open
78.12	284.1	68.3	less-open
78.69	220.5	79.9	less-open
84.49	318.3	48.1	less-open
84.71	324.9	56.1	less-open
85.36	303.7	48.1	less-open
90.85	31.4	31.4	less-open
91.38	158.4	73.3	less-open
91.64	310.8	32.4	less-open
92.9	169.38	80.19	less-open
93.3	191.92	32.75	less-open
93.73	172.1	66.6	less-open

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depth (feet)	down-dip compass azimuth (degrees)	dip angle (degrees)	interpreted planar feature category
93.81	232.1	45.3	less-open
94.97	303.6	39.1	less-open
95.18	195.9	53.5	less-open
95.39	98.1	77.3	less-open
96.46	327.0	44.5	less-open
98.00	288.1	68.1	less-open
98.23	311.6	69.6	less-open
99.24	313.0	66.3	less-open
99.43	341.8	64.4	less-open
100.51	267.9	67.9	less-open
100.83	135.4	58.0	less-open
101.41	158.3	26.9	less-open
102.04	151.1	31.3	less-open
102.54	192.9	67.8	less-open
102.94	191.2	79.4	less-open
103.87	209.9	81.2	less-open
104.51	357.4	49.7	less-open
104.85	344.1	46.6	less-open
107.14	93.6	67.0	less-open
107.23	139.0	44.3	less-open
107.82	94.5	19.7	less-open
108.3	126.3	27.6	less-open
108.86	334.8	76.3	less-open
109.35	309.5	70.1	less-open
110.23	319.3	58.7	less-open
110.43	311.4	58.7	less-open
110.61	313.3	59.5	less-open
111.11	192.3	31.1	less-open
111.35	150.0	33.6	less-open
111.84	167.5	66.4	less-open
112.38	148.7	65.4	less-open
113.09	307.1	32.5	less-open
113.72	329.2	31.4	less-open
114.14	111.6	55.3	less-open
116.59	14.3	53.0	less-open
116.89	99.6	66.8	less-open
117.53	117.0	44.7	less-open
117.91	117.7	37.1	less-open
118.37	139.2	38.5	less-open
118.62	120.6	46.7	less-open
119.19	329.5	73.8	less-open
119.59	145.6	50.4	less-open
119.87	143.2	36.5	less-open
120.16	120.86	29.75	less-open

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depth (feet)	down-dip compass azimuth (degrees)	dip angle (degrees)	interpreted planar feature category
120.64	118.02	67.72	less-open
122.21	136.9	29.9	less-open
122.37	123.2	41.5	less-open
122.54	126.0	29.7	less-open
122.7	146.6	35.6	less-open
122.93	131.4	33.7	less-open
123.15	130.8	42.4	less-open
123.35	126.0	29.9	less-open
125.48	118.1	57.0	less-open
126.31	139.8	35.1	less-open
127.91	141.48	38.06	less-open
128.72	332.45	58.01	less-open
128.78	144.1	40.2	less-open
129.39	155.9	53.1	less-open
129.83	133.6	46.7	less-open
131.48	119.5	28.8	less-open
133.43	165.6	33.2	less-open
135.7	132.4	56.3	less-open
136.57	143.5	33.1	open
136.69	122.1	31.3	open
136.82	123.7	30.3	less-open
137.19	132.7	45.3	less-open
137.34	119.4	46.6	less-open
137.87	146.9	33.0	less-open
138.06	176.7	26.3	less-open
139.39	150.8	33.4	less-open
140.27	131.2	34.9	less-open
140.74	133.9	34.2	less-open
141.43	106.5	40.4	less-open
142.39	141.5	33.0	less-open
142.5	142.2	28.7	less-open
142.63	149.9	27.8	less-open
142.94	137.2	30.1	less-open
145.3	127.9	31.1	less-open
145.38	130.2	30.1	less-open
146.06	151.5	33.2	less-open
146.73	137.1	34.0	less-open
148.94	321.3	80.5	less-open
149.76	133.2	33.0	less-open
150.12	129.0	35.1	less-open
150.35	130.7	38.7	less-open
150.46	119.7	35.2	less-open
150.58	116.2	42.8	less-open
151.1	157.0	37.2	less-open

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depth (feet)	down-dip compass azimuth (degrees)	dip angle (degrees)	interpreted planar feature category
151.51	158.6	36.7	less-open
151.62	150.1	34.3	less-open
151.68	146.2	31.7	less-open
151.84	143.7	30.2	less-open
152.01	143.4	35.1	less-open
152.55	144.5	38.7	less-open
152.81	141.9	37.6	less-open
153.39	134.3	39.4	less-open
153.46	147.9	37.8	less-open
153.74	140.9	38.9	less-open
155.22	117.0	45.1	less-open
155.58	128.6	51.7	less-open
155.66	342.4	34.3	less-open
155.86	124.9	35.6	open
156.17	142.8	35.7	less-open
156.49	123.4	45.6	less-open
156.91	152.7	38.7	less-open
157.09	142.1	37.2	less-open
158.08	133.7	42.1	less-open
158.3	320.2	70.8	less-open
158.42	115.2	48.3	less-open
158.9	104.4	60.3	less-open
159.11	95.3	75.4	less-open
160.01	99.7	77.5	less-open
160.54	305.9	42.2	less-open
160.83	93.4	77.3	less-open
162.32	312.4	46.4	less-open
162.55	4.4	26.0	less-open
163.17	118.2	49.93	less-open
163.43	115.25	61.31	less-open
163.81	310.1	48.5	less-open
163.92	105.7	58.3	less-open
164.64	323.3	74.6	less-open
165.75	3.0	45.2	less-open
166.1	131.9	48.6	less-open
166.44	150.5	46.7	less-open
166.79	230.8	30.3	less-open
166.87	240.9	30.3	less-open
167.59	141.5	25.5	less-open
167.96	168.2	29.5	less-open
168.6	164.2	33.4	less-open
169.15	147.4	37.3	less-open
169.76	137.2	36.0	less-open
170.01	140.3	46.1	less-open

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depth (feet)	down-dip compass azimuth (degrees)	dip angle (degrees)	interpreted planar feature category
170.5	179.7	38.7	less-open
171.33	165.6	35.5	less-open
172.15	135.5	42.0	less-open
172.77	340.7	32.7	less-open
173.92	123.0	34.3	less-open
174.02	160.0	40.8	open
174.25	7.8	53.2	less-open
174.31	100.4	35.5	less-open
174.67	135.3	44.5	less-open
174.92	128.2	41.4	less-open
175.11	151.7	34.5	less-open
175.79	179.4	51.3	less-open
176.98	193.5	40.0	less-open
177.26	127.4	47.1	less-open
177.75	121.6	44.9	less-open
178.07	108.3	50.0	open
178.31	111.9	45.7	open
179.73	336.4	54.6	less-open
180.35	123.4	54.8	less-open
180.85	263.5	66.5	less-open
182.89	268.7	78.7	less-open
184.41	123.3	63.0	less-open
186.09	219.5	33.0	less-open
186.31	264.8	67.7	less-open
187.15	317.3	66.3	less-open
187.83	276.3	64.5	less-open
188.27	114.2	60.8	less-open
189.48	344.8	54.3	less-open
189.98	109.2	55.9	less-open
190.74	139.3	31.4	less-open
190.91	109.0	57.6	less-open
191.56	132.5	47.1	less-open
192.04	110.6	53.71	less-open
192.27	351.37	75.1	less-open
192.91	116.9	52.3	less-open
193.4	114.9	39.3	less-open
193.65	140.1	38.6	less-open
193.71	165.7	32.6	less-open
193.9	129.4	40.5	less-open
194.13	129.4	53.2	less-open
194.41	139.4	42.9	less-open
195.27	101.0	62.9	less-open
195.54	93.2	71.9	less-open
197.4	122.53	46.45	less-open

Fracture Orientations Interpreted from MW-60 Acoustic Televiewer Log
Indian Point Site
Buchanan, NY
Prepared for: GZA
105836 - mw60i.xls

depth (feet)	down-dip compass azimuth (degrees)	dip angle (degrees)	interpreted planar feature category
198.21	230.33	27.44	less-open
199.28	162.06	53.05	less-open
200.14	116.4	89.22	less-open
200.31	152.88	89.64	less-open
200.52	233.74	88.98	less-open
200.95	121.87	89.1	less-open

Fracture Orientations Interpreted from MW-62 Acoustic Televiewer Log
Indian Point Site
Buchanan, NY
Prepared for: GZA
105836 - mw62i.xls

depth (feet)	down-dip compass azimuth (degrees)	dip angle (degrees)	interpreted planar feature category
43.33	35.9	38.3	less-open
43.47	95.5	68.3	less-open
44.24	351.6	50.0	less-open
44.28	99.9	71.1	less-open
44.46	327.2	50.8	less-open
44.56	347.2	32.2	less-open
44.77	346.3	33.4	less-open
44.82	105.2	74.2	less-open
45.40	315.6	44.6	less-open
45.80	98.5	63.9	less-open
46.10	100.7	67.0	less-open
46.48	105.9	64.3	less-open
46.77	331.1	31.5	less-open
47.01	92.8	51.8	less-open
47.38	331.4	49.6	less-open
47.65	292.9	33.8	less-open
47.97	117.7	73.2	less-open
47.98	102.3	73.0	less-open
48.31	109.2	68.9	less-open
48.89	337.6	21.2	less-open
49.14	98.5	64.8	less-open
49.83	111.8	70.0	less-open
50.44	90.0	69.5	less-open
50.63	99.3	74.3	less-open
51.40	94.9	77.7	less-open
51.67	100.1	72.2	less-open
52.71	11.7	24.5	less-open
52.95	99.0	72.4	less-open
53.32	306.1	38.7	less-open
53.44	203.3	72.9	less-open
53.82	300.6	35.3	less-open
53.89	107.9	68.9	less-open
54.26	206.8	69.2	less-open
54.71	207.4	65.3	less-open
54.97	213.7	67.6	less-open
55.12	204.9	63.8	less-open
55.35	207.2	71.4	less-open
55.84	300.8	44.9	less-open
56.20	309.6	43.1	less-open
56.73	198.6	73.3	less-open
57.74	74.2	12.2	less-open
58.29	85.2	68.2	less-open
58.70	66.5	75.5	less-open
58.70	108.1	67.7	less-open

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

Note that interpreted down-dip compass azimuths are with respect to magnetic north.

Down-dip azimuths & dip angles were corrected for borehole deviation from vertical.

Fracture Orientations Interpreted from MW-62 Acoustic Televiewer Log
Indian Point Site
Buchanan, NY
Prepared for: GZA
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depth (feet)	down-dip compass azimuth (degrees)	dip angle (degrees)	interpreted planar feature category
59.43	312.0	49.1	less-open
60.12	104.9	66.7	less-open
60.33	197.2	81.0	less-open
60.43	291.01	65.26	less-open
61.73	5.58	24.04	less-open
62.36	306.8	31.7	less-open
62.73	99.58	67.95	less-open
63	300.07	64.71	less-open
63.61	208.7	60.1	less-open
63.84	111.3	63.5	less-open
64.65	100.0	65.8	less-open
64.78	213.5	59.6	less-open
64.94	303.2	46.6	less-open
65.35	108.3	70.5	less-open
65.89	111.7	67.7	less-open
66.36	112.5	63.7	less-open
66.56	122.2	64.8	less-open
66.92	110.3	62.7	less-open
67.54	109.0	49.7	less-open
67.86	104.0	67.8	less-open
68.16	283.7	42.9	less-open
68.29	99.0	74.7	less-open
68.38	93.3	58.3	less-open
68.82	97.4	64.8	less-open
69.19	215.7	67.2	less-open
69.83	220.4	71.7	less-open
70.09	116.0	61.7	less-open
71.06	114.9	60.0	less-open
71.45	130.4	61.9	less-open
72.05	107.2	67.4	less-open
72.09	209.1	58.5	less-open
72.22	100.4	70.3	less-open
72.64	295.4	36.4	less-open
72.72	90.5	67.1	less-open
73.46	119.2	65.5	less-open
73.85	346.1	45.7	less-open
74.13	108.9	65.4	less-open
74.29	344.76	45.71	less-open
74.55	306.53	60.33	less-open
74.93	351.2	49.7	less-open
75.12	107.5	62.8	less-open
75.38	117.5	67.4	less-open
75.64	107.7	67.5	less-open
75.89	352.2	48.6	less-open

Fracture Orientations Interpreted from MW-62 Acoustic Televiewer Log
Indian Point Site
Buchanan, NY
Prepared for: GZA
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depth (feet)	down-dip compass azimuth (degrees)	dip angle (degrees)	interpreted planar feature category
76.02	355.5	52.1	less-open
76.46	112.2	70.7	less-open
76.82	357.3	36.6	less-open
77.33	300.6	26.5	less-open
78.19	2.9	55.3	less-open
78.56	127.1	63.0	less-open
79.56	110.2	64.1	less-open
81.07	262.3	69.5	less-open
81.48	318.5	54.3	less-open
81.60	347.7	54.7	less-open
81.67	306.4	38.3	less-open
82.28	332.0	28.2	less-open
82.53	1.1	23.5	open
82.88	337.7	35.1	less-open
82.95	355.3	45.5	less-open
82.99	94.5	69.6	less-open
83.02	304.8	45.7	less-open
83.26	122.0	72.0	less-open
84.02	305.3	38.2	less-open
84.4	279.7	61.5	less-open
84.81	108.4	66.6	less-open
85.95	34.3	32.8	less-open
86.49	349.5	48.7	less-open
86.68	104.4	69.1	less-open
87.44	112.1	67.8	less-open
87.83	67.7	68.3	less-open
88.01	102.5	67.7	less-open
88.66	112.3	68.7	less-open
88.8	286.2	48.2	less-open
89.82	325.0	47.7	less-open
89.98	289.4	54.1	less-open
90.35	338.8	30.9	less-open
90.72	331.3	56.5	less-open
90.84	1.6	52.8	less-open
91.04	108.4	65.0	less-open
91.09	296.1	50.4	less-open
91.75	354.8	56.1	less-open
92.53	325.1	52.1	less-open
92.68	320.4	48.3	less-open
93	356.7	53.62	less-open
93.47	330.48	64.81	less-open
93.59	357.1	54.3	less-open
93.7	303.6	53.9	less-open
94.19	327.0	43.8	less-open

Fracture Orientations Interpreted from MW-62 Acoustic Televiewer Log
Indian Point Site
Buchanan, NY
Prepared for: GZA
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depth (feet)	down-dip compass azimuth (degrees)	dip angle (degrees)	interpreted planar feature category
94.46	322.0	43.5	less-open
94.65	319.2	46.9	less-open
95.09	321.0	48.9	less-open
95.91	328.5	47.8	less-open
97.76	278.0	47.8	less-open
99.14	105.1	61.9	less-open
99.17	308.41	44.25	less-open
99.61	304.96	62.27	less-open
100.51	311.6	41.5	less-open
100.78	356.9	55.7	less-open
100.97	344.5	25.3	less-open
103.47	115.5	63.8	less-open
103.57	114.8	61.6	less-open
103.72	316.3	39.8	less-open
104.45	87.5	63.1	less-open
105.87	303.7	60.8	less-open
106.43	113.8	59.2	less-open
106.86	282.5	56.1	less-open
107.54	29.6	53.5	less-open
108.05	29.6	56.8	less-open
108.86	252.0	50.2	less-open
109.21	302.7	45.9	less-open
110.54	307.5	36.3	less-open
110.77	310.9	41.7	less-open
111.1	110.5	62.8	less-open
111.23	293.4	36.0	less-open
111.82	107.8	66.2	less-open
113.15	314.8	38.1	less-open
113.3	305.8	39.9	less-open
114.7	312.2	37.3	less-open
115.95	1.0	43.1	less-open
116.56	359.6	52.3	less-open
116.74	111.4	66.2	less-open
117.49	336.6	50.4	less-open
117.73	316.9	47.8	less-open
117.99	50.0	44.5	less-open
118.14	111.4	66.2	less-open
118.98	96.6	64.1	less-open
119.33	302.6	43.2	less-open
119.88	115.9	60.9	less-open
120.41	295.8	49.9	less-open
120.65	108.5	63.8	less-open
120.66	329.1	32.6	less-open
120.98	101.6	66.2	less-open

Fracture Orientations Interpreted from MW-62 Acoustic Televiewer Log
Indian Point Site
Buchanan, NY
Prepared for: GZA
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depth (feet)	down-dip compass azimuth (degrees)	dip angle (degrees)	interpreted planar feature category
120.99	2.9	37.6	less-open
121.36	315.0	46.6	less-open
121.64	309.9	43.0	less-open
122.18	296.2	38.7	less-open
122.6	340.8	48.8	less-open
122.89	294.8	67.7	less-open
123.41	324.7	57.0	less-open
123.8	311.7	75.7	less-open
123.86	127.1	58.9	less-open
124.75	295.9	60.3	less-open
124.92	52.2	60.8	less-open
128.82	61.4	67.8	less-open
129.8	351.1	69.6	less-open
130.28	281.2	33.4	less-open
130.56	121.5	59.9	less-open
130.85	115.6	56.4	less-open
131	281.5	37.7	less-open
132.23	101.4	67.3	less-open
132.57	109.0	64.0	less-open
132.85	119.5	62.0	less-open
133.13	92.3	67.5	less-open
134.06	119.4	63.1	less-open
134.32	118.5	62.1	less-open
134.65	106.2	58.5	less-open
135.19	114.44	64.63	less-open
135.39	125.78	61.15	less-open
135.64	114.8	62.9	less-open
135.84	108.8	66.4	less-open
136.54	105.2	63.6	less-open
137.03	299.8	62.2	less-open
138.54	315.7	69.8	less-open
139.01	100.4	69.4	less-open
139.21	92.9	71.0	less-open
139.63	116.7	63.0	less-open
140.52	325.6	50.5	less-open
140.76	104.7	71.8	less-open
143.61	332.3	10.6	less-open
144.4	328.6	55.8	less-open
144.91	110.5	63.9	less-open
145.54	340.0	33.4	less-open
148.71	105.1	70.2	less-open
149.95	332.8	64.3	less-open
150.24	101.7	68.8	less-open
150.7	190.2	27.0	less-open

Fracture Orientations Interpreted from MW-62 Acoustic Televiewer Log
Indian Point Site
Buchanan, NY
Prepared for: GZA
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depth (feet)	down-dip compass azimuth (degrees)	dip angle (degrees)	interpreted planar feature category
150.74	207.1	69.6	less-open
151.03	83.0	70.5	less-open
151.24	83.0	66.2	less-open
152.27	339.3	57.7	less-open
152.42	336.7	58.9	less-open
153.24	240.4	24.2	less-open
153.31	254.0	34.0	less-open
153.75	340.8	50.7	less-open
153.89	339.0	55.8	less-open
155.3	343.2	54.0	less-open
156.87	328.7	47.9	less-open
158.23	333.8	33.5	less-open
158.38	332.6	46.9	less-open
159.03	322.2	54.7	less-open
159.32	321.8	39.5	open
159.7	332.4	48.9	less-open
159.78	325.5	47.2	less-open
160.5	332.1	47.0	less-open
160.51	115.5	60.8	less-open
160.8	105.3	63.8	less-open
161.15	320.5	45.4	less-open
161.56	315.0	48.7	less-open
161.69	325.6	45.3	less-open
161.93	320.6	49.5	less-open
162.2	324.0	45.8	less-open
162.37	322.0	44.7	less-open
163.38	84.0	46.1	less-open
163.87	25.8	21.2	less-open
164.07	101.5	70.2	less-open
164.41	98.79	72.05	less-open
165.42	359.5	47.5	less-open
165.44	285.4	34.9	less-open
166.03	342.8	47.4	less-open
168.12	6.2	49.2	less-open
168.67	31.4	16.3	less-open
169.28	28.3	58.3	less-open
169.37	332.8	50.6	less-open
169.67	43.7	42.9	less-open
170.28	44.1	67.9	less-open
170.37	57.11	35.34	less-open
170.77	34.39	27.47	less-open
171.24	65.69	35.01	less-open
171.73	341.53	57.13	less-open
172.57	335.41	56.48	less-open

Fracture Orientations Interpreted from MW-62 Acoustic Televiewer Log
Indian Point Site
Buchanan, NY
Prepared for: GZA
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depth (feet)	down-dip compass azimuth (degrees)	dip angle (degrees)	interpreted planar feature category
173.46	10.43	53.91	less-open
173.99	323.84	58.9	less-open
174.16	338.07	51.91	less-open
174.49	335.32	49.31	less-open
174.83	311.21	59.01	less-open
175.71	332.86	65.51	less-open
175.84	92.52	71.41	less-open
179.07	95.76	67.85	less-open
179.24	97.17	70.62	less-open
179.92	329.87	71.17	less-open
181.48	249.48	62.23	less-open
182.32	12.37	42.33	less-open
184.03	151.01	68.38	less-open
184.23	322.28	71.21	less-open
184.42	307.68	45.33	less-open
185.34	249.46	58.86	less-open
185.79	349.03	30.78	less-open
186.81	76.35	45.93	less-open
188.54	303.13	39.12	less-open
188.89	317.52	47.22	less-open
189.81	298	73.28	less-open
190.68	31.9	14.42	less-open
190.91	346.94	22.29	less-open
193.29	296.54	77.33	less-open
193.65	294.57	42.41	less-open
195.42	301.71	16.23	less-open
195.91	332.07	16.06	less-open
196.37	333.48	49.34	less-open
196.49	98.98	72.33	less-open
196.68	130.8	76.02	less-open
196.71	128.03	52.57	less-open
197.12	57.65	41.03	less-open
197.2	45.38	37.82	less-open
197.32	127.06	65.5	less-open
197.34	129.94	68.23	less-open
197.67	113.41	69.54	less-open
198.24	13.18	32.18	less-open
198.71	19.77	87.87	less-open
199.02	11.6	87.35	less-open

Fracture Orientations Interpreted from MW-63 Acoustic Televiewer Log
Indian Point Site
Buchanan, NY
Prepared for: GZA
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depth (feet)	down-dip compass azimuth (degrees)	dip angle (degrees)	interpreted planar feature category
36.98	87.0	56.2	less-open
37.28	84.2	48.8	less-open
37.41	282.4	39.6	less-open
37.44	87.1	49.4	less-open
37.46	64.5	57.1	less-open
37.49	257.0	42.6	less-open
38.08	79.2	57.1	less-open
38.33	266.2	26.9	less-open
39.01	143.8	76.0	less-open
39.69	147.1	75.5	less-open
40.12	283.5	24.5	less-open
40.53	193.5	42.5	less-open
40.90	275.8	26.0	less-open
41.22	275.0	20.6	less-open
41.31	248.9	67.4	less-open
41.47	236.3	49.5	less-open
41.76	213.0	55.1	less-open
42.53	287.8	14.3	less-open
42.80	280.5	14.9	less-open
42.89	308.5	16.3	less-open
43.10	83.9	53.7	less-open
43.17	241.5	64.5	less-open
43.31	100.1	41.9	less-open
43.78	90.3	43.7	less-open
44.27	89.3	60.1	less-open
44.45	269.4	63.8	less-open
44.57	109.5	79.6	less-open
45.14	316.0	58.4	less-open
45.20	7.2	22.6	less-open
45.59	83.1	57.7	less-open
45.69	277.9	41.6	less-open
45.75	280.4	38.5	less-open
45.78	96.6	39.4	less-open
45.78	97.5	57.6	less-open
45.98	103.2	50.0	less-open
46.30	89.5	55.2	less-open
46.55	305.9	33.1	less-open
46.59	81.6	50.0	less-open
46.68	98.0	57.4	less-open
46.87	89.9	69.2	less-open
47.12	278.9	39.0	less-open
47.48	267.9	43.1	less-open
48.32	259.9	46.4	less-open
48.34	108.6	63.5	less-open

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

Note that interpreted down-dip compass azimuths are with respect to magnetic north.

Down-dip azimuths & dip angles were corrected for borehole deviation from vertical.

Fracture Orientations Interpreted from MW-63 Acoustic Televiewer Log
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depth (feet)	down-dip compass azimuth (degrees)	dip angle (degrees)	interpreted planar feature category
48.43	191.9	48.2	less-open
48.72	269.04	42.11	less-open
48.95	290	42.87	less-open
49.01	94.3	61.2	less-open
49.41	311.47	31.1	less-open
49.95	289.66	35.66	less-open
50.33	279.3	44.4	less-open
50.51	90.4	57.5	less-open
50.55	306.5	38.2	less-open
50.74	320.4	34.2	less-open
50.97	87.5	54.3	less-open
51.04	96.8	52.0	less-open
51.17	253.2	62.6	less-open
51.25	85.6	35.1	less-open
51.56	149.4	78.6	less-open
51.93	316.1	42.7	open
52.11	307.0	32.6	less-open
52.27	325.6	39.8	less-open
52.43	319.0	47.3	open
52.62	301.9	36.7	less-open
52.69	102.4	42.1	less-open
52.81	102.6	44.9	less-open
52.92	265.4	51.3	less-open
53.56	102.4	66.7	less-open
53.59	300.7	41.9	less-open
53.70	53.8	51.9	less-open
53.77	112.5	41.7	less-open
54.09	312.1	42.1	less-open
54.16	102.7	38.5	less-open
54.50	251.0	55.1	less-open
54.70	310.0	46.7	less-open
54.79	299.1	44.7	less-open
54.91	295.6	49.2	open
55.11	80.7	42.5	less-open
55.51	105.3	39.9	less-open
55.67	299.14	41.72	less-open
55.73	107.05	44.95	less-open
56.01	290.6	46.6	less-open
56.38	301.6	47.2	less-open
56.39	89.1	40.8	less-open
56.64	308.3	62.0	less-open
57.19	97.2	47.6	less-open
57.25	307.9	53.1	less-open
57.36	307.6	56.4	less-open

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Buchanan, NY
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depth (feet)	down-dip compass azimuth (degrees)	dip angle (degrees)	interpreted planar feature category
57.49	316.1	52.0	less-open
57.61	314.9	52.9	less-open
57.80	315.0	47.8	less-open
57.96	307.0	48.2	less-open
58.41	144.9	64.2	less-open
58.49	272.6	33.4	less-open
58.58	101.0	52.4	less-open
58.76	91.8	46.7	less-open
58.95	301.0	47.2	less-open
59.22	79.0	32.5	less-open
59.48	97.2	42.9	less-open
59.92	94.4	36.3	less-open
60.26	295.0	40.2	less-open
60.37	78.0	54.2	less-open
60.43	305.6	36.9	less-open
60.49	102.7	52.6	less-open
60.72	325.0	68.6	less-open
60.95	114.8	46.4	less-open
61.39	109.4	53.0	less-open
61.54	319.3	75.4	less-open
62.55	127.4	46.2	less-open
62.98	123.1	72.5	less-open
63.26	295.3	44.6	less-open
63.59	258.3	31.2	less-open
63.82	103.5	59.2	less-open
64.23	264.9	36.5	less-open
64.33	98.2	65.0	less-open
64.42	92.8	64.4	less-open
64.84	91.8	55.1	less-open
64.89	127.6	23.1	less-open
65	98.3	55.7	less-open
65.14	91.9	44.7	less-open
65.6	95.8	41.8	less-open
65.92	86.3	52.4	less-open
66.05	89.0	57.4	less-open
66.19	95.9	44.7	less-open
66.2	250.9	62.7	less-open
66.22	297.83	80.36	less-open
66.3	99.31	42.17	less-open
66.5	323.7	23.9	less-open
66.66	324.1	40.3	less-open
66.83	308.7	29.0	less-open
66.99	83.0	43.5	less-open
67.12	91.3	58.4	less-open

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depth (feet)	down-dip compass azimuth (degrees)	dip angle (degrees)	interpreted planar feature category
67.21	86.6	42.6	less-open
67.28	290.1	48.9	less-open
67.52	329.3	51.2	less-open
67.74	79.7	43.2	less-open
67.88	90.74	30.17	less-open
68.18	260.41	33.48	less-open
68.53	292.4	70.1	less-open
68.55	306.6	47.8	less-open
68.67	82.1	29.7	less-open
68.97	294.4	67.6	less-open
69.27	335.9	31.2	less-open
69.42	111.0	24.3	less-open
69.72	101.5	45.9	less-open
69.95	281.3	28.0	less-open
70.03	97.0	30.2	less-open
70.4	90.4	59.0	less-open
70.95	102.0	50.4	less-open
70.97	290.9	32.5	less-open
71.99	99.7	49.8	less-open
72.15	341.3	81.2	less-open
72.32	88.9	54.5	less-open
72.65	101.9	51.8	less-open
72.67	269.8	31.1	less-open
72.92	94.6	39.3	less-open
73.31	104.7	53.3	less-open
73.32	323.8	44.1	less-open
73.53	66.1	51.0	less-open
73.79	92.5	41.0	less-open
74.28	107.1	51.3	less-open
74.37	100.8	47.3	less-open
74.6	314.1	68.0	less-open
75.33	97.0	41.8	less-open
75.36	211.1	63.0	less-open
75.46	110.9	39.9	less-open
75.57	122.7	38.2	less-open
75.79	100.7	51.2	less-open
76.21	101.3	44.8	less-open
76.33	105.6	45.6	less-open
76.96	95.9	47.4	less-open
77.13	90.5	60.4	less-open
77.65	100.3	45.5	less-open
77.88	79.2	51.1	less-open
78.05	319.7	63.4	less-open
78.07	104.6	50.7	less-open

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depth (feet)	down-dip compass azimuth (degrees)	dip angle (degrees)	interpreted planar feature category
78.58	245.5	32.7	less-open
78.69	256.2	32.1	less-open
78.79	244.7	33.6	less-open
78.95	249.8	37.1	less-open
79.4	231.6	49.1	less-open
79.44	309.4	49.0	less-open
79.54	101.2	55.0	less-open
79.89	218.7	63.0	less-open
80.26	128.0	50.4	less-open
80.52	99.1	52.9	less-open
80.58	335.5	72.1	less-open
80.75	194.3	36.4	less-open
81.68	333.1	78.0	less-open
83.34	160.9	36.1	less-open
84.36	148.0	44.6	less-open
84.37	307.4	70.5	less-open
84.46	331.5	63.6	less-open
84.95	94.5	44.7	less-open
85.13	158.3	15.7	less-open
85.31	201.6	36.5	less-open
85.45	315.6	19.8	less-open
85.69	213.3	9.6	less-open
86.14	150.27	78.24	less-open
86.31	261.63	34.99	less-open
86.98	89.5	62.9	less-open
87.16	265.1	47.0	open
87.19	95.7	56.7	less-open
87.64	159.2	80.2	open
87.85	312.1	35.8	less-open
88.37	164.5	74.7	open
89.71	139.9	73.7	open
89.86	166.0	73.1	open
90.21	162.5	34.9	less-open
90.56	169.1	58.2	less-open
90.67	155.4	45.2	less-open
91.76	339.7	80.2	less-open
91.76	135.4	65.9	open
92.43	147.6	66.0	open
92.49	344.8	60.5	open
92.88	130.2	61.4	open
93.11	178.9	62.4	open
93.72	167.6	70.2	less-open
94.16	164.5	69.1	less-open
94.84	139.7	51.5	open

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depth (feet)	down-dip compass azimuth (degrees)	dip angle (degrees)	interpreted planar feature category
95	289.52	81.78	open
95.17	153.6	70.0	less-open
95.45	151.6	67.8	less-open
96.8	124.73	82.15	open
97.09	1.7	43.5	open
97.49	315.0	43.7	open
97.71	300.8	50.0	less-open
98.09	306.7	40.0	less-open
98.31	291.1	33.8	less-open
98.51	331.4	79.6	less-open
98.53	286.5	33.8	less-open
98.7	246.0	48.0	less-open
99.03	241.6	28.7	less-open
99.19	161.9	75.8	less-open
99.4	248.4	49.3	less-open
99.65	305.6	31.7	less-open
99.83	269.7	25.6	less-open
100.14	255.2	36.7	less-open
100.31	97.0	41.7	less-open
100.84	260.5	28.9	less-open
100.93	155.3	64.5	less-open
101.62	323.7	77.3	less-open
101.8	316.2	44.8	less-open
102.05	312.0	46.9	less-open
102.34	274.9	28.5	less-open
102.95	195.1	51.1	less-open
103.65	154.2	60.3	less-open
103.7	261.8	34.8	less-open
104.08	109.93	49.01	less-open
104.64	253.58	31.29	less-open
104.73	243.4	36.9	less-open
105.1	68.3	69.1	less-open
105.45	98.3	54.4	less-open
106.07	311.6	46.5	less-open
107.43	306.0	43.6	less-open
108.01	278.8	36.6	less-open
110.53	319.0	51.6	less-open
110.61	320.0	44.9	less-open
110.67	320.0	52.4	less-open
112.57	263.36	33.15	less-open
113.73	344.04	58.34	less-open
113.74	252.12	31.8	less-open
114.13	350.58	31.52	less-open
114.32	137.01	64.52	less-open

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depth (feet)	down-dip compass azimuth (degrees)	dip angle (degrees)	interpreted planar feature category
114.53	274.06	27.43	less-open
115.43	253.24	30.36	less-open
115.87	95.72	62.81	less-open
116.6	139.87	65.13	less-open
117.6	146.1	61.22	less-open
117.85	160.56	61.64	less-open
117.87	258.22	31.98	less-open
118.6	216.1	43.4	less-open
119.11	288.79	31.64	less-open
119.37	121.55	59.66	less-open
119.84	314.73	33.02	less-open
120.11	97.44	72.18	less-open
120.27	311.77	36.3	less-open
120.71	316.07	36.53	less-open
120.99	314.29	28.93	less-open
121.06	114.79	58.17	less-open
121.37	325.61	37.73	less-open
121.59	137.4	65.71	less-open
121.83	292.8	55.32	less-open
122.97	316.23	64.58	less-open
124.04	326.69	37.69	open
124.44	104.86	65.55	less-open
124.75	298.26	48.02	less-open
124.99	103.52	62.67	less-open
125.24	120.19	60.36	less-open
125.45	121.65	60.88	less-open
125.58	103.59	61.89	less-open
125.71	114.58	65.9	less-open
126	127.51	53.02	less-open
126.38	113.83	60.37	less-open
126.62	122.56	56.86	less-open
126.73	117.71	55.11	less-open
126.89	122.66	65.44	less-open
127.06	94.3	49.84	less-open
127.44	121.63	54.99	less-open
127.49	339.35	81.93	less-open
127.69	139.26	61.23	less-open
127.88	134.59	53.84	less-open
128.15	137.43	56.86	less-open
128.55	135.86	60.24	less-open
129.15	107.96	55.03	less-open
129.73	112.9	54.93	less-open
130.1	116.18	47.05	less-open
130.27	282.59	65.52	less-open

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depth (feet)	down-dip compass azimuth (degrees)	dip angle (degrees)	interpreted planar feature category
130.51	116.82	56.56	less-open
131.23	300.7	59.97	less-open
131.66	119.68	58.83	less-open
133.15	106.33	58.99	less-open
133.36	102.79	74.86	less-open
133.38	103.52	59.27	less-open
133.91	105.11	61.26	less-open
134.06	109.88	60.85	less-open
134.3	112.33	57.91	less-open
134.37	346.22	82.76	less-open
134.45	110.86	58.15	less-open
134.82	103.53	54.67	less-open
136.59	293.56	35.63	less-open
136.77	107.88	59.84	less-open
137.48	117.24	59.87	less-open
137.51	214.7	35.92	less-open
137.98	114.83	59.32	less-open
138.02	338.68	41.3	less-open
138.11	329.41	49.84	less-open
138.2	116.27	54.34	less-open
138.37	117.06	57.88	less-open
139.52	127.22	48.78	less-open
139.96	105.12	61.48	less-open
140.22	255.56	39.02	less-open
140.73	277.76	12.19	less-open
140.76	274.08	15.38	less-open
142.05	282.23	20.24	less-open
142.92	350.42	30.4	less-open
143.3	316.45	30.54	less-open
143.73	81.93	39.87	less-open
144.08	119.88	60.02	less-open
144.36	106.92	50.78	less-open
144.94	260.66	37.76	less-open
146.06	255.39	42.3	less-open
146.07	124.13	65.09	less-open
146.92	115.71	60.8	less-open
147.26	319.9	51.04	less-open
147.83	124.7	54.58	less-open
148.14	112.31	60.59	less-open
148.47	330.59	65.8	less-open
148.77	116.25	58.39	less-open
149.09	114.78	60.42	less-open
149.22	106.13	65.22	less-open
149.64	116.23	59.94	less-open

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depth (feet)	down-dip compass azimuth (degrees)	dip angle (degrees)	interpreted planar feature category
150.34	106.99	59.72	less-open
151.25	109.84	59.43	less-open
151.37	112.33	57.71	less-open
151.64	122.62	58.33	less-open
151.91	111.62	39.26	less-open
152.17	98.68	60.91	less-open
153.02	334.34	52.01	less-open
153.16	117.27	61.38	less-open
153.47	121.62	63.63	less-open
153.66	118.75	64.78	less-open
154.4	130.48	60.1	less-open
154.4	353.57	43.1	less-open
154.62	127.18	57.43	less-open
154.76	104.09	67.8	less-open
154.85	124.56	65.62	less-open
155.01	103.18	53.16	less-open
155.09	343.8	50.71	less-open
155.2	116.29	57.05	less-open
156.03	350.76	43.44	less-open
156.69	348.73	47.92	less-open
156.85	337.43	40.13	less-open
157.09	351.56	53.05	less-open
157.62	342.85	53.98	less-open
158.24	131.99	58.32	less-open
159.36	294.35	28.72	less-open
159.67	131.91	58.9	less-open
160.18	124.08	57.21	less-open
160.22	342.65	52.51	less-open
161.54	128.07	54.83	less-open
161.7	124.38	56.83	less-open
161.93	142.26	43.55	less-open
162.15	107.97	66.86	less-open
162.68	350.1	47.24	less-open
162.69	124.02	65.53	less-open
162.94	325.41	61.76	less-open
163.26	342.33	43.27	less-open
163.49	351.46	54.91	less-open
163.86	332.9	40.56	less-open
163.98	305.8	44.52	less-open
164.13	140.85	58.56	less-open
164.37	342.46	39.91	less-open
164.6	122.62	53.51	less-open
164.95	139.88	49.65	less-open
165.21	131.9	48.54	less-open

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depth (feet)	down-dip compass azimuth (degrees)	dip angle (degrees)	interpreted planar feature category
165.45	144.99	53.61	less-open
166.06	82.48	51.05	less-open
166.6	69.69	55.95	less-open
166.98	108.49	68.11	less-open
168.52	136.96	64.22	less-open
168.82	237.18	33.63	less-open
168.92	133.44	70.67	less-open
169.65	279.07	27.48	less-open
170.45	107.96	63.68	less-open
170.84	92.7	61.18	less-open
171.09	128.76	54.02	less-open
171.39	108.42	60.73	less-open
171.76	287.77	60.83	less-open
171.98	263.41	23.64	less-open
172.56	295.17	28.02	less-open
173.05	351.76	34.68	less-open
173.74	112.22	69.34	less-open
174.05	129.07	57.49	less-open
174.76	26.99	38.98	less-open
175.57	24.15	39.51	less-open
175.65	278.15	60.07	less-open
175.77	314.81	61.53	less-open
175.94	346.81	51.68	less-open
177.35	9.14	33.44	less-open
177.47	319.98	31.74	less-open
177.81	349.83	62.33	less-open
178.29	319.35	62.48	less-open
179.02	106.98	60.95	less-open
179.24	99.37	61.16	less-open
180.05	243.82	32.39	less-open
181.5	317.12	15.72	less-open
181.94	50.37	45.09	less-open
182.03	245.15	34.86	less-open
182.65	94.26	67.91	less-open
182.87	260.05	43.53	less-open
182.98	356.15	75.44	less-open
183.9	343.91	65.59	less-open
184.13	260.33	76.33	less-open
184.15	347.41	68.25	less-open
185.77	318.7	40.4	less-open
186.13	73.7	41.56	less-open
186.35	226.61	44.51	less-open
186.96	118.81	58.6	less-open
187.67	100.64	66.57	less-open

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depth (feet)	down-dip compass azimuth (degrees)	dip angle (degrees)	interpreted planar feature category
188.52	109.8	64.59	less-open
189.02	114.26	53.4	less-open
189.31	69.75	34.35	less-open
189.7	56.5	34.53	less-open
190.61	342.45	78.68	less-open
191.63	349.37	89.46	less-open

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depth (feet)	down-dip compass azimuth (degrees)	dip angle (degrees)	interpreted planar feature category
38.18	236.7	20.7	less-open
38.34	145.7	46.5	less-open
38.86	147.3	59.9	less-open
38.99	331.5	83.1	less-open
40.82	351.6	70.3	less-open
41.03	354.4	66.8	less-open
42.35	297.4	80.3	less-open
42.51	139.7	46.7	less-open
42.70	137.8	32.0	less-open
42.90	124.3	36.2	less-open
43.19	163.5	27.3	less-open
43.47	290.7	69.0	less-open
43.73	145.0	46.6	less-open
44.15	130.4	43.3	less-open
44.65	125.7	32.2	open
45.01	152.0	44.4	less-open
45.10	130.0	21.2	less-open
45.34	177.3	82.5	less-open
45.58	144.5	46.7	less-open
46.63	132.8	42.0	less-open
46.90	145.7	38.5	less-open
47.13	159.5	50.4	less-open
47.61	175.0	82.7	less-open
48.46	132.6	40.1	less-open
51.70	133.0	45.7	less-open
52.01	146.9	44.8	less-open
52.15	186.6	31.2	less-open
52.34	350.6	77.7	less-open
53.61	132.0	44.4	less-open
55.55	126.7	51.6	less-open
56.32	310.0	77.7	less-open
56.64	137.1	51.6	less-open
58.01	101.9	55.1	less-open
59.26	75.2	46.8	less-open
60.32	232.8	28.4	less-open
61.57	248.0	18.6	less-open
64.21	286.3	54.4	less-open
65.18	190.3	19.9	less-open
66.22	293.0	24.2	less-open
66.66	80.0	36.2	less-open
68.54	181.9	77.9	less-open
69.51	90.1	36.1	less-open
70.58	68.0	28.7	less-open
70.89	82.0	29.8	less-open

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

Note that interpreted down-dip compass azimuths are with respect to magnetic north.

Down-dip azimuths & dip angles were corrected for borehole deviation from vertical.

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depth (feet)	down-dip compass azimuth (degrees)	dip angle (degrees)	interpreted planar feature category
71.09	45.9	40.6	less-open
71.56	293.7	38.0	less-open
71.92	343.7	62.8	less-open
78.01	108.8	76.7	less-open
79.38	275.6	32.1	less-open

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depth (feet)	down-dip compass azimuth (degrees)	dip angle (degrees)	interpreted planar feature category
38.15	354.8	22.8	open
38.35	336.5	28.3	open
39.06	308.3	13.5	less-open
39.83	332.3	30.0	open
40.18	281.5	19.9	less-open
40.40	180.8	63.0	less-open
40.52	328.2	16.2	less-open
41.46	309.0	41.9	less-open
41.79	197.6	77.0	less-open
41.81	167.1	76.5	less-open
41.98	314.6	32.6	less-open
42.17	280.7	29.9	less-open
43.15	4.9	23.3	open
43.27	184.9	75.5	less-open
43.75	189.6	61.9	open
44.00	191.1	66.1	open
44.19	185.5	66.4	less-open
44.82	213.2	69.9	less-open
44.86	202.1	36.7	less-open
45.88	149.2	31.4	less-open
46.24	321.8	56.2	less-open
46.27	232.6	32.9	less-open
46.59	291.5	42.1	less-open
46.97	131.7	37.5	less-open
47.38	159.3	32.7	less-open
47.44	153.5	29.9	less-open
47.68	338.6	38.4	less-open
47.96	325.2	55.0	open
48.39	177.9	81.5	less-open
48.54	21.4	78.2	less-open
49.07	185.1	32.3	less-open
49.67	146.4	19.0	less-open
49.78	190.7	42.5	open
50.32	345.5	33.6	less-open
50.61	341.1	24.7	open
51.15	134.4	76.5	less-open
51.34	132.2	48.6	less-open
52.95	121.8	57.4	less-open
53.58	110.6	47.7	less-open
53.68	225.2	70.3	open
54.66	345.6	28.8	less-open
54.99	287.8	34.2	less-open
56.72	324.2	52.4	less-open
57.44	96.3	76.7	less-open

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

Note that interpreted down-dip compass azimuths are with respect to magnetic north.

Down-dip azimuths & dip angles were corrected for borehole deviation from vertical.

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depth (feet)	down-dip compass azimuth (degrees)	dip angle (degrees)	interpreted planar feature category
58.45	86.7	82.3	less-open
59.46	91.1	83.0	less-open
59.75	244.8	74.1	less-open
61.20	316.6	29.3	less-open
61.56	288.9	24.5	less-open
63.81	209.5	53.9	less-open
64.52	118.5	45.1	less-open
65.84	128.2	50.1	less-open
66.17	98.8	28.4	less-open
66.20	259.5	70.3	less-open
66.39	134.4	37.8	less-open
69.24	191.0	56.9	less-open
70.05	116.98	45.29	less-open
71.3	271.1	82.12	less-open
72.28	85.1	28.4	less-open
73.02	269.9	77.3	less-open
74.39	346.8	29.7	less-open
74.85	178.1	74.2	less-open
75.92	189.6	82.3	less-open
81.78	124.0	39.9	less-open
82.61	356.2	80.1	less-open
84.24	193.9	41.2	less-open
85.01	177.4	79.2	less-open
85.30	178.0	80.9	less-open
86.06	186.1	55.1	less-open
86.61	192.8	57.9	less-open
87.23	174.3	67.5	less-open
87.92	189.1	65.9	less-open
88.08	176.6	72.9	less-open
88.59	189.9	79.5	less-open
89.39	157.2	77.5	less-open
89.59	165.4	82.0	less-open
90.41	170.5	77.0	less-open
90.69	152.1	71.0	less-open
90.97	168.4	76.7	less-open
92.04	163.5	84.6	less-open
93.29	169.6	81.9	less-open
94.19	169.6	83.6	less-open
94.86	162.7	26.5	less-open
95.13	160.7	42.0	less-open
96.44	179.8	79.1	less-open
96.45	51.6	16.1	less-open
100.43	292.4	59.7	less-open
100.92	179.91	78.76	less-open

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depth (feet)	down-dip compass azimuth (degrees)	dip angle (degrees)	interpreted planar feature category
101.1	111.7	55.83	less-open
101.87	322.5	63.2	less-open
101.92	174.9	76.3	less-open
103.15	130.6	42.7	less-open
103.49	127.9	51.0	less-open
104.35	337.9	35.9	less-open
108.02	178.9	78.9	less-open
108.03	5.0	38.8	less-open
109.47	189.2	42.4	less-open
110.60	29.7	70.5	less-open
111.91	214.8	54.0	less-open
112.63	348.9	65.7	less-open
112.76	351.9	62.2	less-open
112.80	73.1	47.3	less-open
113.18	170.8	77.8	less-open
113.89	191.5	72.2	less-open
114.01	188.5	75.5	less-open
114.77	172.1	86.0	less-open
115.82	182.8	75.5	less-open
116.06	183.8	75.7	less-open
116.66	180.3	78.7	less-open
117.61	305.0	31.3	open
117.88	336.1	38.3	less-open
118.17	216.6	50.1	less-open
119.53	232.5	61.9	less-open
120.57	353.8	56.5	less-open
121.42	334.0	58.6	less-open
122.12	189.7	40.4	less-open
122.97	208.5	51.6	less-open
123.23	354.9	58.1	less-open
126.72	355.7	36.0	less-open
127.43	350.5	51.2	less-open
127.94	343.9	40.5	less-open
128.25	338.6	39.6	less-open
129.69	341.0	55.6	less-open
130.05	333.5	60.8	less-open
130.16	205.0	53.1	less-open
130.62	279.6	46.0	less-open
130.97	213.0	38.7	less-open
131.21	282.1	43.0	less-open
131.38	203.5	46.4	less-open
131.84	204.2	51.8	less-open
131.88	351.7	75.8	less-open
132.13	210.0	53.2	less-open

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depth (feet)	down-dip compass azimuth (degrees)	dip angle (degrees)	interpreted planar feature category
132.66	341.5	45.3	less-open
132.69	15.59	76.88	less-open
132.77	325.59	42.93	less-open
132.88	329.9	42.2	less-open
133.42	338.9	29.2	less-open
133.81	311.5	58.5	less-open
133.85	10.0	59.8	less-open
134.61	94.9	74.5	less-open
134.76	205.9	36.9	less-open
135.04	302.0	37.3	less-open
135.47	334.0	51.8	less-open
135.71	326.7	41.4	less-open
135.87	286.93	44.93	less-open
135.88	157.81	54.39	less-open
136.39	327.9	51.9	less-open
136.64	313.0	34.9	less-open
136.82	301.1	44.4	less-open
137.43	296.8	40.8	less-open
137.5	291.8	36.0	less-open
137.55	257.6	20.7	less-open
137.68	171.1	63.8	less-open
137.79	296.7	37.3	less-open
138.22	325.4	48.7	less-open
138.45	337.4	52.3	less-open
138.71	185.1	31.5	less-open
138.98	200.0	45.3	less-open
139.16	213.2	41.8	less-open
139.36	167.4	43.8	less-open
139.86	308.2	67.9	less-open
139.96	205.0	56.6	less-open
140.9	312.3	72.7	less-open
141.11	336.7	23.1	less-open
141.74	303.2	36.2	less-open
141.86	109.2	55.4	less-open
141.88	283.6	39.8	less-open
142.72	124.3	58.4	less-open
143.02	320.6	61.8	less-open
143.5	240.7	59.4	less-open
143.56	303.9	75.5	less-open
143.58	316.2	56.3	less-open
144.04	115.3	55.9	less-open
144.76	114.2	62.8	less-open
144.85	297.7	44.0	less-open
145.44	310.9	53.7	less-open

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depth (feet)	down-dip compass azimuth (degrees)	dip angle (degrees)	interpreted planar feature category
145.44	123.2	48.6	less-open
146.66	336.8	54.8	less-open
146.93	328.9	48.6	less-open
147.24	158.9	42.2	less-open
148.77	109.2	71.4	less-open
148.99	102.0	56.1	less-open
149.16	107.5	57.2	less-open
149.3	101.9	51.8	less-open
150.56	123.2	61.4	less-open
150.78	102.6	51.0	less-open
151.33	230.5	70.3	less-open
152.83	143.0	38.0	less-open
154.53	115.0	57.1	less-open
155.03	109.2	63.4	less-open
155.39	106.6	65.8	less-open
155.81	112.0	62.6	less-open
156.19	299.6	24.6	less-open
156.45	332.2	30.3	less-open
157.03	120.1	55.8	less-open
157.16	321.8	34.9	less-open
157.75	355.6	54.1	less-open
158.47	144.1	55.2	less-open
158.7	349.9	57.6	less-open
159.02	329.3	41.8	less-open
159.95	343.6	50.2	less-open
159.95	109.2	44.1	less-open
160.58	213.3	50.4	less-open
161.16	288.4	36.4	less-open
161.73	299.8	29.9	less-open
163.11	104.2	43.9	less-open
163.45	107.98	40.85	less-open
163.89	353.09	41.88	less-open
164.15	104.5	68.5	less-open
164.26	108.0	58.1	less-open
164.37	108.8	60.0	less-open
164.61	349.9	54.0	less-open
164.67	347.8	47.1	less-open
165.88	316.6	44.0	less-open
166.51	168.5	81.1	less-open
166.53	322.0	42.7	less-open
167.67	327.1	36.9	less-open
167.79	313.4	42.2	less-open
167.81	202.2	71.1	less-open
168.7	230.2	71.6	less-open

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depth (feet)	down-dip compass azimuth (degrees)	dip angle (degrees)	interpreted planar feature category
169.15	219.3	63.1	less-open
170.67	335.1	51.5	less-open
170.94	8.6	56.6	less-open
171.24	318.0	60.3	less-open
173.63	344.2	50.8	less-open
174.63	322.0	44.6	less-open
175.1	44.3	70.2	less-open
175.73	324.8	52.4	less-open
175.98	101.1	61.0	less-open
176.02	283.3	38.1	less-open
176.57	102.0	56.8	less-open
177.31	332.2	59.9	less-open
178.31	322.9	50.4	less-open
179.3	326.3	41.4	less-open
179.86	132.4	60.1	less-open
180.13	308.3	41.7	less-open
180.66	125.4	60.0	less-open
180.83	333.1	57.7	less-open
180.88	126.4	56.0	less-open
183	185.2	76.0	less-open
184.01	295.5	45.6	less-open
184.85	126.2	41.8	less-open
187.41	302.4	42.6	less-open
187.94	302.9	52.6	less-open
189.36	331.7	76.7	less-open
189.65	287.1	32.8	less-open
190.39	127.7	37.7	less-open
190.45	328.1	48.4	less-open
190.72	338.7	45.3	less-open
191.53	289.8	29.6	less-open
195.62	62.9	73.9	less-open
197.85	124.3	51.9	less-open
198.36	309.1	88.6	less-open
198.79	311.6	86.7	less-open

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depth (feet)	down-dip compass azimuth (degrees)	dip angle (degrees)	interpreted planar feature category
32.54	251.1	60.4	less-open
33.17	346.9	72.1	less-open
33.71	309.7	72.5	open
33.80	297.4	53.4	less-open
34.14	188.2	71.4	less-open
34.32	189.6	72.9	less-open
34.76	272.8	51.7	less-open
34.77	82.1	73.7	less-open
35.05	19.9	19.8	less-open
35.09	171.0	62.3	less-open
35.15	282.2	47.2	less-open
35.29	192.5	70.5	less-open
35.74	292.3	27.8	open
37.07	319.2	68.9	less-open
37.13	284.4	46.7	less-open
37.13	291.7	29.6	less-open
37.59	68.8	44.4	less-open
37.60	274.1	50.6	less-open
38.06	137.9	51.0	less-open
38.27	255.9	54.9	less-open
38.75	257.1	33.2	less-open
39.27	206.6	45.7	less-open
40.58	309.6	43.7	open
41.15	167.4	23.4	less-open
41.29	204.8	71.4	open
41.52	161.3	41.0	less-open
41.59	316.2	39.9	less-open
41.74	171.9	65.0	less-open
41.75	212.8	75.7	less-open
42.03	207.9	72.5	less-open
42.31	245.0	52.8	less-open
42.43	139.8	69.4	less-open
42.57	240.9	45.8	less-open
42.57	319.9	67.2	less-open
42.66	225.3	30.7	less-open
43.12	275.1	37.3	open
43.58	231.6	39.3	less-open
43.72	165.5	60.3	less-open
43.89	179.7	77.9	less-open
44.33	245.3	33.9	less-open
44.38	150.3	43.8	less-open
44.60	231.7	78.2	less-open
44.90	281.3	24.1	less-open
45.77	134.8	27.6	less-open

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

Note that interpreted down-dip compass azimuths are with respect to magnetic north.

Down-dip azimuths & dip angles were corrected for borehole deviation from vertical.

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depth (feet)	down-dip compass azimuth (degrees)	dip angle (degrees)	interpreted planar feature category
46.53	122.7	69.9	less-open
46.56	145.4	68.4	less-open
48.20	202.0	69.5	less-open
48.63	208.3	65.9	less-open
48.75	200.9	66.2	less-open
49.00	221.4	63.9	less-open
49.23	330.3	69.0	less-open
49.27	201.9	62.0	less-open
50.13	10.6	24.4	open
50.58	92.7	20.0	less-open
52.47	115.39	61.75	less-open
53.59	122.52	57.78	less-open
54.25	154.0	47.3	less-open
54.77	179.6	30.5	less-open
56.60	332.4	65.3	less-open
58.73	315.0	44.9	less-open
58.90	228.0	48.1	less-open
61.26	178.4	59.5	less-open
62.04	223.6	46.4	less-open
62.21	229.9	39.5	less-open
64.34	303.8	45.0	less-open
65.20	138.9	46.1	less-open
66.52	125.0	46.4	less-open
67.47	332.4	74.7	less-open
67.64	341.4	63.3	less-open
67.90	321.9	57.1	less-open
69.65	112.3	73.6	less-open
70.77	343.3	56.4	less-open
71.36	135.9	53.5	less-open
71.96	319.4	54.4	less-open
73.58	337.7	68.9	less-open
73.71	322.0	62.2	less-open
73.92	136.5	55.9	less-open
74.74	121.7	61.6	less-open
76.06	333.4	67.6	less-open
76.24	124.8	67.3	less-open
77.54	325.1	63.1	less-open
77.77	331.9	65.8	less-open
77.93	203.8	78.5	less-open
78.82	108.2	62.5	less-open
79.05	115.4	61.9	less-open
79.72	327.21	68.85	less-open
81.25	31.4	76.5	less-open
81.72	343.7	34.7	less-open

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depth (feet)	down-dip compass azimuth (degrees)	dip angle (degrees)	interpreted planar feature category
82.67	341.4	75.7	less-open
83.25	116.0	69.4	less-open
84.12	122.8	67.8	less-open
84.73	106.7	73.9	less-open
85.10	100.7	24.6	less-open
85.17	121.3	71.5	less-open
85.39	186.2	78.0	less-open
86.26	322.6	57.4	less-open
87.30	185.1	71.1	less-open
88.14	327.9	69.2	less-open
88.17	130.5	73.0	less-open
89.61	329.2	58.5	less-open
91.21	335.4	63.3	less-open
93.22	259.6	49.8	less-open
94.34	238.6	66.4	less-open
94.67	221.6	71.8	less-open
94.94	211.4	74.9	less-open
95.82	108.0	78.0	less-open
97.07	93.7	62.2	less-open
97.72	179.2	79.8	less-open
97.86	193.0	79.1	less-open
98.1	342.6	61.5	less-open
99.51	39.1	35.3	less-open
99.54	182.4	75.1	less-open
100.58	5.2	24.3	less-open
101.27	8.2	35.4	less-open
101.78	228.3	48.4	less-open
102.46	196.0	40.9	less-open
102.47	345.6	69.8	less-open
102.85	201.5	25.8	less-open
103.38	117.7	51.3	less-open
103.47	131.3	45.9	less-open
103.75	350.9	73.6	less-open
104.23	164.8	46.5	less-open
104.59	215.5	61.3	less-open
104.68	347.3	66.5	less-open
105.26	352.8	55.8	less-open
105.27	344.2	74.3	less-open
106.01	323.1	71.8	less-open
106.13	244.3	53.3	open
106.46	119.5	76.6	less-open
106.69	183.5	81.7	less-open
107.03	334.9	70.6	less-open
107.18	124.36	64.36	less-open

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depth (feet)	down-dip compass azimuth (degrees)	dip angle (degrees)	interpreted planar feature category
107.4	336.82	70.01	less-open
107.62	209.9	56.7	less-open
108.31	350.6	65.0	open
108.36	191.6	30.4	less-open
108.48	208.4	44.4	less-open
109	173.4	26.5	less-open
109.37	352.5	66.1	less-open
109.55	121.3	34.7	less-open
109.72	118.3	68.1	less-open
110.42	28.6	5.7	less-open
110.53	49.31	9.32	less-open
112.27	354.12	75.52	less-open
112.28	312.0	65.8	less-open
112.68	350.2	71.1	less-open
112.99	345.8	72.3	less-open
113.18	343.0	67.1	less-open
113.24	215.8	40.8	less-open
114.56	348.5	61.7	less-open
115.13	155.4	32.3	less-open
115.27	334.0	64.3	less-open
115.99	140.2	52.0	less-open
116.04	304.8	63.3	less-open
116.04	342.4	62.4	less-open
116.8	331.8	56.1	less-open
117.03	334.3	46.8	less-open
117.2	322.6	38.5	less-open
118.85	315.5	58.3	less-open
120.13	325.0	51.6	less-open
120.85	76.0	64.2	less-open
121.48	74.9	65.1	less-open
121.97	105.4	64.5	less-open
122.32	353.7	80.5	less-open
122.56	211.3	74.7	less-open
122.97	109.4	74.0	less-open
123.33	359.1	52.1	less-open
124.1	315.0	48.4	less-open
124.52	187.6	72.6	less-open
124.66	302.8	63.6	less-open
125.41	306.4	38.3	less-open
125.5	309.1	41.3	less-open
125.64	168.7	38.3	less-open
125.86	105.7	64.6	less-open
127.43	349.8	40.4	less-open
128.1	224.6	70.5	less-open

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depth (feet)	down-dip compass azimuth (degrees)	dip angle (degrees)	interpreted planar feature category
130.01	341.1	31.3	less-open
130.59	178.3	69.5	less-open
130.71	316.6	37.1	less-open
130.83	177.1	71.2	less-open
131.18	167.6	75.9	less-open
131.76	182.6	69.5	less-open
133.27	173.7	71.0	less-open
134.59	16.9	37.1	less-open
135.11	176.5	75.4	less-open
135.36	346.1	35.5	less-open
136.09	183.1	74.4	less-open
136.51	176.0	74.4	less-open
136.6	333.7	47.3	less-open
136.83	191.7	70.3	less-open
137.64	185.2	69.8	less-open
137.85	184.4	68.3	less-open
138.38	244.4	66.6	less-open
138.95	240.5	57.3	less-open
140.07	169.7	70.7	less-open
140.49	203.9	13.8	less-open
140.99	197.0	48.1	less-open
141.34	204.2	45.2	less-open
141.81	10.2	63.8	less-open
142.07	113.5	49.1	less-open
142.37	2.8	80.3	less-open
143.37	356.8	80.7	less-open
144.77	344.6	52.0	less-open
145.31	340.5	48.9	less-open
146.19	336.8	74.42	less-open
147.42	135.33	51.39	less-open
148.03	134.6	51.9	less-open
148.44	116.6	54.8	less-open
148.94	133.5	46.8	less-open
149.37	108.1	44.7	less-open
149.49	320.3	40.9	less-open
149.57	141.1	48.1	less-open
149.82	126.1	57.0	less-open
150.44	306.0	49.1	less-open
150.84	186.8	47.4	less-open
154.45	340.5	42.8	less-open
156.42	191.3	35.2	less-open
156.77	175.9	54.7	less-open
157.68	0.9	73.1	less-open
158.63	188.0	53.7	less-open

Fracture Orientations Interpreted from MW-67 Acoustic Televiewer Log
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depth (feet)	down-dip compass azimuth (degrees)	dip angle (degrees)	interpreted planar feature category
158.92	346.9	72.0	less-open
159.12	226.3	38.8	less-open
159.52	210.9	58.1	less-open
159.79	268.3	26.6	less-open
159.92	253.8	27.5	less-open
160.54	123.3	56.8	less-open
160.83	109.0	58.7	less-open
160.83	181.5	77.7	less-open
160.83	292.0	29.0	less-open
160.97	193.5	67.0	less-open
161.46	199.2	54.1	less-open
161.73	198.1	64.2	less-open
161.82	218.8	57.8	less-open
161.99	129.5	68.0	less-open
162.3	109.2	57.9	less-open
163.27	171.6	77.0	less-open
163.87	338.6	26.7	less-open
164.42	172.0	24.1	less-open
165.78	169.0	30.8	less-open
166.02	283.5	60.5	less-open
166.38	3.1	56.2	less-open
166.47	179.7	49.2	less-open
167.12	225.4	52.6	less-open
167.9	171.0	57.9	less-open
168.36	233.4	45.9	less-open
168.86	9.3	35.6	less-open
170.74	347.1	75.4	less-open
171.11	291.1	26.1	less-open
173.3	311.9	69.7	less-open
173.37	99.3	68.7	less-open
174.02	291.8	68.5	less-open
174.84	288.8	69.9	less-open
175.07	1.78	46.13	less-open
175.4	96.71	66.18	less-open
175.8	97.8	64.9	less-open
176.32	286.0	79.0	less-open
176.37	104.9	48.6	less-open
176.71	99.0	51.6	less-open
176.75	297.4	55.8	less-open
177.1	299.5	82.6	less-open
178.98	130.4	26.6	less-open
179.14	204.5	24.2	less-open
179.62	129.1	59.6	less-open
180.05	110.45	64.54	less-open

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depth (feet)	down-dip compass azimuth (degrees)	dip angle (degrees)	interpreted planar feature category
180.14	113.2	64.5	less-open
180.98	100.55	61.17	less-open
181.27	104.26	35.35	less-open
181.47	115.67	72.62	less-open
182.81	313.72	58.29	less-open
183.4	324.21	76.37	less-open
184.36	294.02	63.7	less-open
184.66	331.65	74.92	less-open
186.3	329.3	59.12	less-open
187.1	111.22	69.92	less-open
187.45	323	54.33	less-open
188.04	326.34	39.07	less-open
188.4	145.95	42.86	less-open
188.51	325.8	33.15	less-open
188.78	93.75	67.49	less-open
190.61	128.68	70.64	less-open
190.63	124.39	64.52	less-open
190.83	348.16	69.86	less-open
191.14	304.9	44.31	less-open
192.68	115.36	49.55	less-open
192.71	300.78	54.16	less-open
193	108.94	53.4	less-open
193.18	126.62	62.27	less-open
193.4	112.41	66.14	less-open
193.67	102.94	66.99	less-open
193.98	100.61	61.3	less-open
194.33	329.91	64.28	less-open
194.84	106.59	64.38	less-open
195.16	297.94	67.89	less-open
195.27	107.19	60.91	less-open
196.97	335.89	41.99	less-open
197.37	334.78	51.7	less-open
197.93	4.69	65.65	less-open
198.49	327.17	66.62	less-open
198.82	345.72	58.97	less-open
198.99	324.32	55.1	less-open
199.33	307.22	56.71	less-open
201.26	331.48	43.72	less-open
203.52	341.76	66.03	less-open
203.65	330.43	67.69	less-open
204.51	326.22	42.42	less-open
206.48	341.55	60.23	less-open
206.88	331.01	55.49	less-open
207.55	317.44	29.34	less-open

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depth (feet)	down-dip compass azimuth (degrees)	dip angle (degrees)	interpreted planar feature category
207.72	314.89	46.24	less-open
207.83	6.66	39.9	less-open
208.58	348.9	40.4	less-open
208.71	349.28	38.4	less-open
209.24	334.4	60.54	less-open
212.04	225.55	72.68	less-open
212.81	140.24	58.69	less-open
213.09	339.84	61.08	less-open
213.27	335.45	63.39	less-open
213.5	343.13	55.3	less-open
214	351.87	47.84	less-open
214.28	341.34	55.32	less-open
214.77	4.92	55.47	less-open
216.96	10.21	67.31	less-open
218	322.02	69.09	less-open
218.57	342.81	68.05	less-open
219.58	223.95	52.5	less-open
220.28	338.13	58.73	less-open
220.41	329.03	61.11	less-open
220.7	324.84	55.53	less-open
221.23	323.59	55.11	less-open
221.64	321.08	42.12	open
222.15	330.46	38.41	less-open
222.83	312.19	49.43	less-open
222.94	330.19	49.1	less-open
222.99	313.91	47.21	less-open
223.16	256.86	9.07	less-open
223.71	335.55	65.01	less-open
224.72	25.4	32.49	less-open
225.59	128.46	53.91	less-open
226.14	190.24	60.82	less-open
226.28	107.06	45.9	less-open
226.77	117.51	26.6	less-open
226.85	305.23	35.88	less-open
227.02	118.67	56.89	less-open
227.78	162.25	68.4	less-open
227.9	129.83	40.18	less-open
228.61	222.04	66.65	less-open
229.48	120.05	48.11	less-open
230.58	238.4	81.26	less-open
230.6	160.82	60.93	less-open
231.31	256.82	71.24	less-open
231.35	306.5	30.05	less-open
231.55	193.1	31.97	less-open

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depth (feet)	down-dip compass azimuth (degrees)	dip angle (degrees)	interpreted planar feature category
233.46	102.97	49.58	less-open
233.57	330.04	57.59	less-open
234.85	124.92	59.51	less-open
235.75	127.27	45.84	less-open
235.96	352.45	65.23	less-open
236.92	281.92	19.01	less-open
237.66	116.75	55.68	less-open
238	118.21	50.12	less-open
238.46	295.47	43.36	less-open
239.9	341.54	61.1	less-open
240.35	26.33	73.9	less-open
244.22	140.43	49.32	less-open
244.39	332.41	71.72	less-open
244.72	43.47	30.31	less-open
244.86	298.98	29.98	less-open
245.15	121.34	42.7	less-open
245.4	124.97	52.18	less-open
245.69	114.34	52.67	less-open
245.9	119.2	52.2	less-open
246.03	119.2	52.14	less-open
246.62	121.77	56.09	less-open
247.7	329.25	66.69	less-open
248.07	111.64	42.2	less-open
249.33	338.82	58.63	less-open
250.03	338.23	56.9	less-open
250.1	340.16	57.78	less-open
250.31	341.31	52.17	less-open
250.61	355.65	62.41	less-open
250.79	333.56	50.58	less-open
250.97	347.82	59.71	less-open
251.21	346.66	56.54	less-open
252.2	355.82	62.4	less-open
252.28	4.83	59.16	less-open
252.51	109.46	44.65	less-open
252.56	116.17	51.66	less-open
252.88	324.65	33.13	less-open
253.2	344.67	53.97	less-open
253.58	349.67	54.17	less-open
253.7	108.44	42.94	less-open
253.96	95.13	40.23	less-open
254.18	190.25	38.88	less-open
254.33	106.5	31.86	less-open
254.4	294.77	58.97	less-open
254.55	285.04	49.66	less-open

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depth (feet)	down-dip compass azimuth (degrees)	dip angle (degrees)	interpreted planar feature category
254.61	106.52	37.12	less-open
254.96	110.09	28.37	less-open
255.2	99.62	39.6	less-open
255.24	343.52	68.83	less-open
255.56	352.44	68.07	less-open
256.09	105.44	41.56	less-open
257.1	112.27	45.91	less-open
257.3	351.26	76.53	less-open
257.44	97.05	34.35	less-open
258.58	188.99	84.17	less-open
259.28	113.01	62.31	less-open
259.92	354.62	77.79	less-open
260.82	354.71	77.56	less-open
261.25	352.49	80.01	less-open
261.43	109.94	67	less-open
261.58	357.47	76.58	less-open
262.6	354.53	83.34	less-open
262.71	328.47	34.86	less-open
262.77	333.42	28.6	less-open
262.92	316.43	27.58	less-open
263.21	109.44	46.47	less-open
263.55	304.16	59.64	less-open
264.85	119.73	50.52	less-open
265.04	116.22	48.51	less-open
265.3	117.35	60.48	less-open
265.51	349.33	78.79	less-open
265.82	115.72	47.01	less-open
266.2	346.61	72.49	less-open
266.31	322.38	58.28	less-open
266.71	73.22	60.38	less-open
267	61.38	62.1	less-open
267.69	122.42	48.71	less-open
267.88	65.82	76.42	less-open
268.32	334.82	62.39	open
268.48	321.8	57.88	less-open
268.68	330.71	70.06	less-open
269.16	342.06	67.28	less-open
269.28	341.3	62.55	less-open
269.57	121	46.42	less-open
269.91	111.37	62.53	less-open
269.99	341.17	74.91	less-open
270.34	132.53	46.04	less-open
270.5	321.55	54.74	less-open
270.96	32.23	24.54	less-open

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depth (feet)	down-dip compass azimuth (degrees)	dip angle (degrees)	interpreted planar feature category
271.77	333.34	55.66	less-open
272.43	120.11	48.41	less-open
273.19	316.51	39.86	less-open
274.02	172.61	75.74	less-open
274.82	170.35	44.48	less-open
275.32	123.78	39.27	less-open
275.5	133.52	52.64	less-open
276.26	311.15	44.95	less-open
276.36	309.79	40.68	less-open
276.47	311.22	51.82	less-open
276.75	316.57	37.79	open
276.89	319.77	37.09	less-open
277.73	182.23	56.4	less-open
277.99	346.04	74.18	less-open
278.4	347	70.77	less-open
278.57	224.02	20.46	less-open
279.91	324.13	42.46	open
280.01	143.87	42.13	less-open
280.34	133.51	39.91	less-open
280.82	148.22	46.88	less-open
280.95	138.04	44.54	less-open
281.18	142.02	44.93	less-open
281.73	124.93	44.4	less-open
282.15	330.66	48.8	less-open
282.72	346.89	66.37	less-open
282.77	324.08	36.31	less-open
282.88	126.34	56.23	less-open
283.98	288.8	22.41	less-open
285.37	339.67	61.38	less-open
286.52	298.28	68.16	less-open
287.64	283.55	24.78	less-open
287.9	296.84	73.64	less-open
288.15	139.56	40.09	less-open
288.23	124	38.51	less-open
288.23	307.26	72.25	less-open
288.33	144.78	41.82	less-open
288.47	128	53.19	less-open
288.66	112.43	55.52	less-open
290.53	303.72	79.05	less-open
290.72	309.21	58.71	less-open
291.17	306.01	46.3	less-open
291.5	313.58	39.27	less-open
292.38	327.15	51.84	less-open
293.27	267.07	75.88	less-open

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depth (feet)	down-dip compass azimuth (degrees)	dip angle (degrees)	interpreted planar feature category
293.35	348.8	44.17	less-open
294.94	303.29	33.74	less-open
295.94	286.86	30.32	less-open
296.75	295.71	44.93	less-open
298.89	94.5	57.99	less-open
301.24	114.52	36.62	less-open
301.28	140.69	45.56	less-open
301.53	112.5	52.03	less-open
301.99	76.34	65.3	less-open
302.53	348.53	45.5	less-open
302.62	101.83	50.54	less-open
302.63	338.76	50.85	less-open
302.78	131.4	30.04	less-open
302.89	326.77	51.97	less-open
302.98	326.01	54.75	less-open
303.06	99.07	55.62	less-open
303.23	105.66	48.9	less-open
303.36	326.15	52.41	less-open
303.63	333.18	55.53	less-open
303.78	306.16	34.56	less-open
303.96	127.25	49.87	less-open
304.42	337.37	23.63	less-open
304.43	119.96	52.43	less-open
304.57	120.81	47.62	less-open
304.7	100.84	57.37	less-open
304.75	146.97	34.46	less-open
304.77	323.9	36.73	less-open
305.12	123.36	47.54	less-open
305.52	331.02	53.53	less-open
306.65	325.5	50.83	less-open
308.35	170.02	48.13	less-open
308.74	316.59	53.17	less-open
308.86	110.12	41.37	less-open
309.23	337.69	67.75	less-open
309.64	306.86	63.02	less-open
310.28	123.5	45.9	less-open
311.91	125.65	45.35	less-open
313.23	172.72	43.66	less-open
313.41	194.1	52.02	less-open
313.81	133.97	45.58	less-open
315.1	178.69	42.09	less-open
315.62	156.26	45.65	less-open
316.36	116.02	44.64	less-open
316.66	121.77	36.29	less-open

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depth (feet)	down-dip compass azimuth (degrees)	dip angle (degrees)	interpreted planar feature category
318.2	264.89	26.31	less-open
321.7	345.84	75.33	less-open
322.52	326.26	64.07	less-open
324.79	355.46	51.14	less-open
324.94	354.22	45.36	less-open
325.2	133.66	50.55	less-open
325.83	116.85	59.07	less-open
326.35	84.85	41.55	less-open
326.38	95.84	66.25	less-open
326.7	92.13	42.06	less-open
326.92	120.62	61.35	less-open
327.09	133.81	37.99	less-open
327.18	342.4	61.29	less-open
327.25	117.36	57.42	less-open
327.44	297.04	38.86	less-open
327.77	138.65	40.12	less-open
328.32	111.04	40.69	less-open
328.42	95	70.18	less-open
328.75	118.57	63.83	less-open
328.95	123.47	58.16	less-open
329.39	129.95	50.85	less-open
329.71	113.89	48.32	less-open
329.84	114.28	39.07	less-open
329.97	116.57	46.26	less-open
332.51	337.86	48.59	less-open
333.59	337.13	60.34	less-open
334.4	104.55	50.05	less-open
334.53	326.15	38.93	less-open
335.73	67.24	43.85	less-open
335.82	219.16	37.64	less-open
336.02	295.18	33.32	less-open
336.78	287.45	83.11	less-open
337.91	218.78	41.71	less-open

Fracture Orientations Interpreted from RW-1 Acoustic Televiewer Log
Indian Point Site
Buchanan, NY
Prepared for: GZA
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depth (feet)	down-dip compass azimuth (degrees)	dip angle (degrees)	interpreted planar feature category
30.12	132.5	48.5	less-open
30.65	136.9	53.6	less-open
30.88	142.7	48.5	less-open
32.63	182.9	54.9	less-open
32.95	168.8	52.6	less-open
33.76	160.5	49.4	less-open
34.17	175.3	43.0	less-open
34.63	161.6	50.4	less-open
35.19	171.3	46.5	less-open
36.39	175.6	51.0	less-open
36.92	104.6	28.7	less-open
38.55	303.6	68.4	less-open
38.55	170.5	50.6	less-open
38.73	9.7	66.7	less-open
41.34	154.3	40.3	less-open
42.85	171.9	52.1	less-open
43.36	154.6	47.6	less-open
44.05	167.2	67.4	less-open
45.27	206.2	15.2	less-open
46.47	188.2	69.4	less-open
47.00	179.5	56.6	less-open
47.24	170.0	53.5	less-open
47.97	165.1	51.8	less-open
48.60	191.3	64.1	less-open
49.62	187.1	54.9	less-open
50.41	191.5	61.6	less-open
51.24	169.6	48.3	less-open
51.55	170.6	52.5	less-open
52.01	182.2	51.3	less-open
52.47	184.4	52.9	less-open
53.06	189.9	51.4	less-open
53.69	180.5	59.2	less-open
53.92	190.8	55.1	less-open
54.27	174.47	52.55	less-open
54.75	150.1	44.4	less-open
55.28	162.5	49.2	less-open
55.56	165.54	55.28	less-open
55.81	152.59	49.12	less-open
56.53	155.2	51.3	less-open
56.83	153.2	52.5	less-open
57.17	348.0	36.3	less-open
57.22	164.4	57.5	less-open
58.30	189.6	50.3	less-open
58.47	184.5	54.8	less-open

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

Note that interpreted down-dip compass azimuths are with respect to magnetic north.

Down-dip azimuths & dip angles were corrected for borehole deviation from vertical.

Fracture Orientations Interpreted from RW-1 Acoustic Televiewer Log
Indian Point Site
Buchanan, NY
Prepared for: GZA
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depth (feet)	down-dip compass azimuth (degrees)	dip angle (degrees)	interpreted planar feature category
58.80	172.1	58.1	less-open
59.60	148.4	47.7	less-open
59.93	168.2	48.7	less-open
60.08	166.76	47.7	less-open
61.2	134.08	49.41	less-open
61.36	144.4	42.5	less-open
61.77	150.6	53.5	less-open
61.95	149.2	53.6	less-open
62.72	285.5	65.8	less-open
63.12	263.1	57.3	less-open
63.22	126.99	67.86	less-open
64.71	154.72	44.73	less-open
64.77	298.4	66.0	less-open
65.31	129.0	46.1	less-open
65.50	302.3	63.7	less-open
65.87	201.1	52.4	less-open
66.33	218.7	28.6	less-open
66.60	172.0	46.2	less-open
67.32	139.3	40.0	less-open
67.70	150.3	40.6	less-open
68.53	351.6	4.7	less-open
69.58	194.5	43.6	less-open
69.85	158.6	46.8	less-open
70.08	162.2	46.0	less-open
73.89	324.2	62.2	open
75.33	109.3	32.8	less-open
79.44	135.7	35.3	less-open
81.07	242.2	63.6	less-open
83.58	114.4	45.7	less-open
83.71	122.3	50.0	less-open
83.82	112.7	48.3	less-open
84.06	202.7	54.7	less-open
87.09	166.2	42.2	less-open
87.31	299.8	24.5	less-open
97.98	183.8	42.7	less-open
100.46	125.5	32.1	less-open
100.84	328.4	48.8	less-open
103.13	194.6	54.0	less-open
111.58	287.9	49.2	less-open
111.82	141.5	43.8	less-open
114.91	146.0	52.9	less-open
116.19	154.43	51.91	open
117.18	116.62	61.61	less-open
119.45	122.1	42.9	less-open

Fracture Orientations Interpreted from RW-1 Acoustic Televiewer Log
Indian Point Site
Buchanan, NY
Prepared for: GZA
105836 - rw1i.xls

depth (feet)	down-dip compass azimuth (degrees)	dip angle (degrees)	interpreted planar feature category
120.34	108.7	33.7	less-open
124.07	229.6	30.8	less-open
127.11	152.4	84.5	less-open
127.16	182.4	41.8	less-open
129.71	309.2	48.9	less-open
134.61	284.5	46.5	less-open
135.67	263.7	47.0	less-open
136.95	322.0	43.0	less-open
137.89	290.6	45.2	less-open
138.51	293.1	43.1	less-open
138.64	286.6	43.4	less-open
139.11	273.7	27.2	less-open

Appendix C

Pump Rates & Observed Drawdown During Pumping Flowmeter Tests

Pumping rates & maximum observed drawdown
Indian Point borehole geophysics project
2nd report wells

filename = pumprates+drawdown.xls
updated 7/18/07

well name	pumping rate (gpm)	maximum drawdown (feet)
MW-46	0.42	2.1
MW-53	0.44	3.75
MW-54	0.77	1.28
MW-55	0.71	0.97
MW-56	0.43	0.92
MW-57	0.41	0.34
MW-58	0.6	2.35
MW-59	0.67	0.4
MW-60	0.52	3.75
MW-62	0.43	3.94
MW-63	0.58	0.05
MW-65	initially 0.21, dropped to 0.15 by end of tests	3.95
MW-66	0.54	0.55
MW-67	0.54	0.52
RW-1	0.6	1.93