welenco

5201 Woodmere Drive, Bakersfield, CA 93313– www.welenco.com–(800) 445-9914

DUAL INDUCTION - GAMMA RAY LOG

FILING NO.

COMPANY Mactec

WELL RI-SB-01

FIELD Casmalia

STATE California COUNTY Santa Barbara

LOCATION:
Casmalia Landfill

OTHER SERVICES:
OPTV
Video

JOB NO.
39919

SEC: ____ TWP: ____ RGE: ____ LONG.: ____ LAT.: ____

Permanent Datum: Ground Level, Elev. ____ Ft.
Log Measured From: Ground Level, 00 Ft. Above Perm. Datum
Drilling Measured From: Ground Level

Elev.: K.B. ____ Ft.
D.F. ____ Ft.
G.L. ____ Ft.

Date	Oct. 08, 2004			
Type Of Log	Dual Ind			
Run No.	One	Two	Three	Four
Depth-Driller	255 Ft	Ft	Ft	Ft
Depth-Logger	255 Ft	Ft	Ft	Ft
Top Logged Interval	13 Ft	Ft	Ft	Ft
Btm. Logged Interval	250 Ft	Ft	Ft	Ft
Type Fluid In Hole	Water			
Fluid Level	253 Ft	Ft	Ft	Ft
Max Temp	N/A °F	°F	°F	°F
Operating Rig Time	2.5 Hr	Hr	Hr	Hr
Van No. / Location	L-23 / Bfld			
Recorded By	Craig Corbell			
Witnessed By	Anna Henke			

RUN	BOREHOLE RECORD			CASING RECORD			
NO.	BIT	FROM	TO	SIZE	TYPE	FROM	TO
1	6.5 In	14 Ft	255 Ft	10 In	Steel	0 Ft	14 Ft
2	In	Ft	Ft	In		Ft	Ft
3	In	Ft	Ft	In		Ft	Ft

Miscellaneous Information

Remarks:

Perforated Intervals:

Line Speed:

Borehole Volume Calculations:

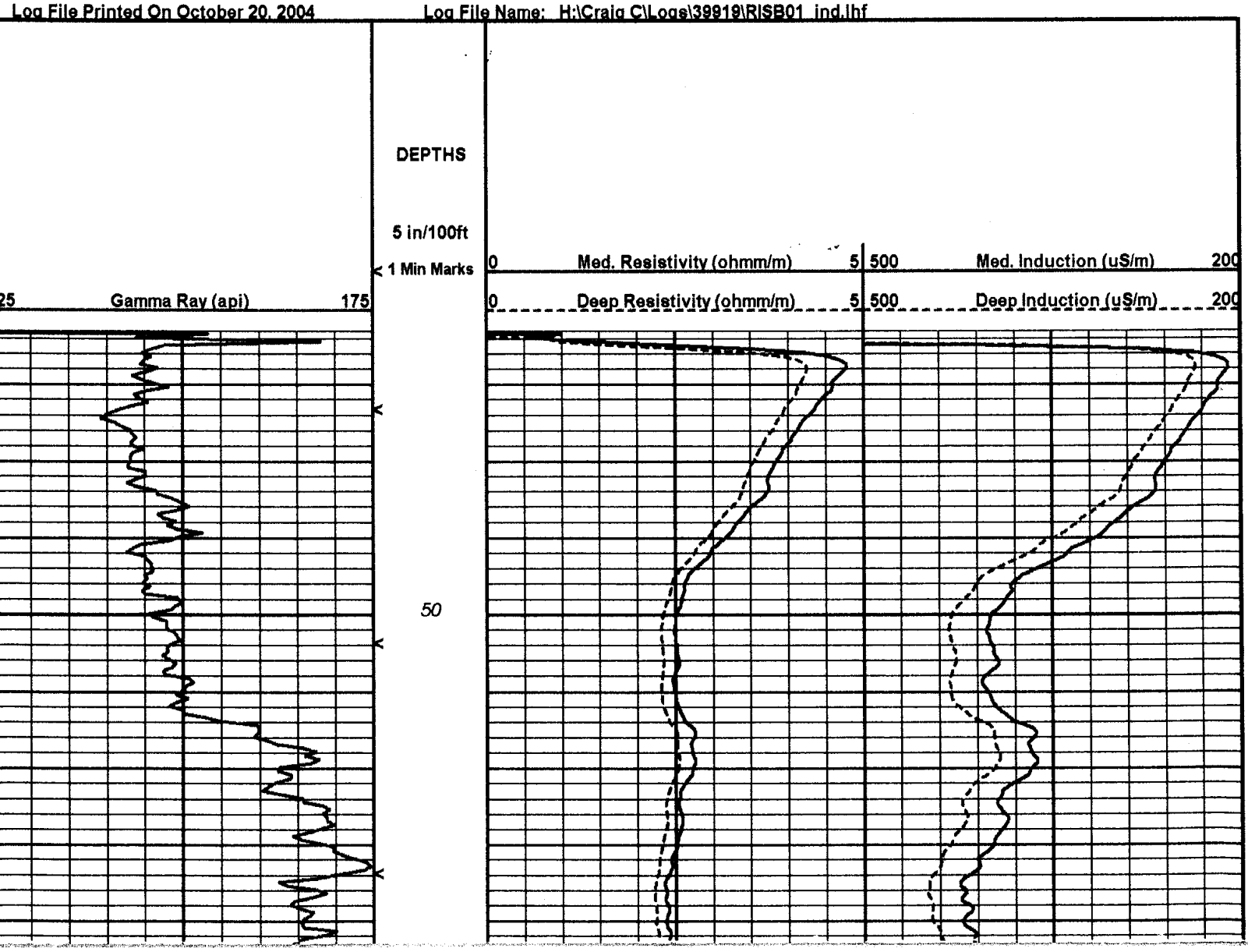
Other Information:

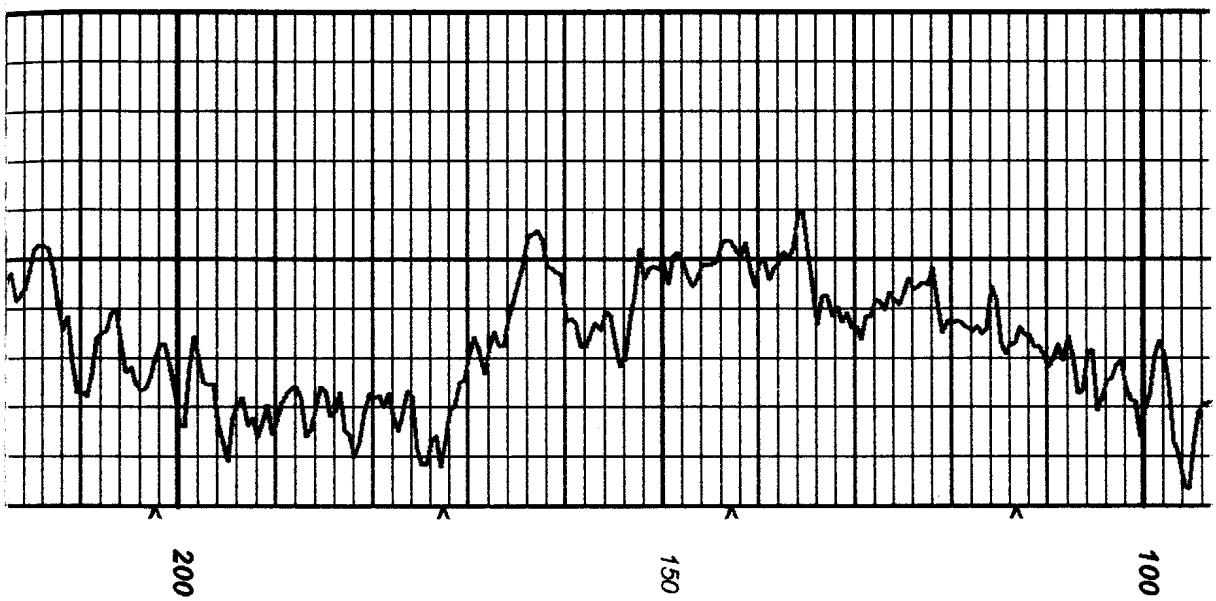
NOTICE

All Interpretations are opinions based on inferences from electrical and other measurements and we do not guarantee the accuracy or correctness of any verbal or written interpretation, and we shall not, except in the case of gross or willful negligence on our part, be liable or responsible for any loss, costs, damages or expenses incurred or sustained by anyone resulting from any interpretation made by one of our officers, agents or employees. These interpretations are also subject to our General Terms and Conditions as set out in our current Price Schedule.

welenco, inc. October 20, 2004

Log File Printed On October 20, 2004 Log File Name: H:\Craig C\Logs\39919\RISB01_ind.lhf

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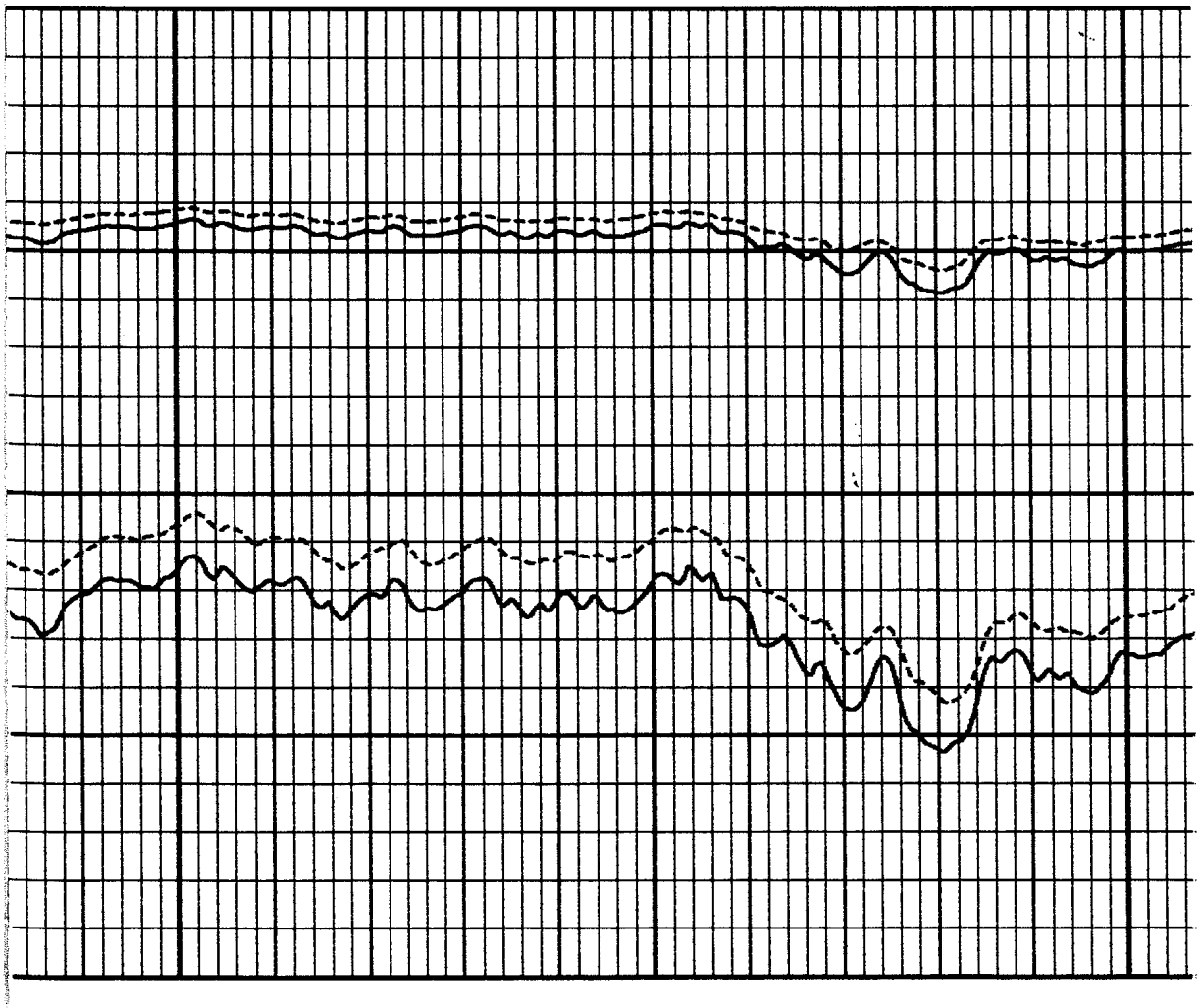

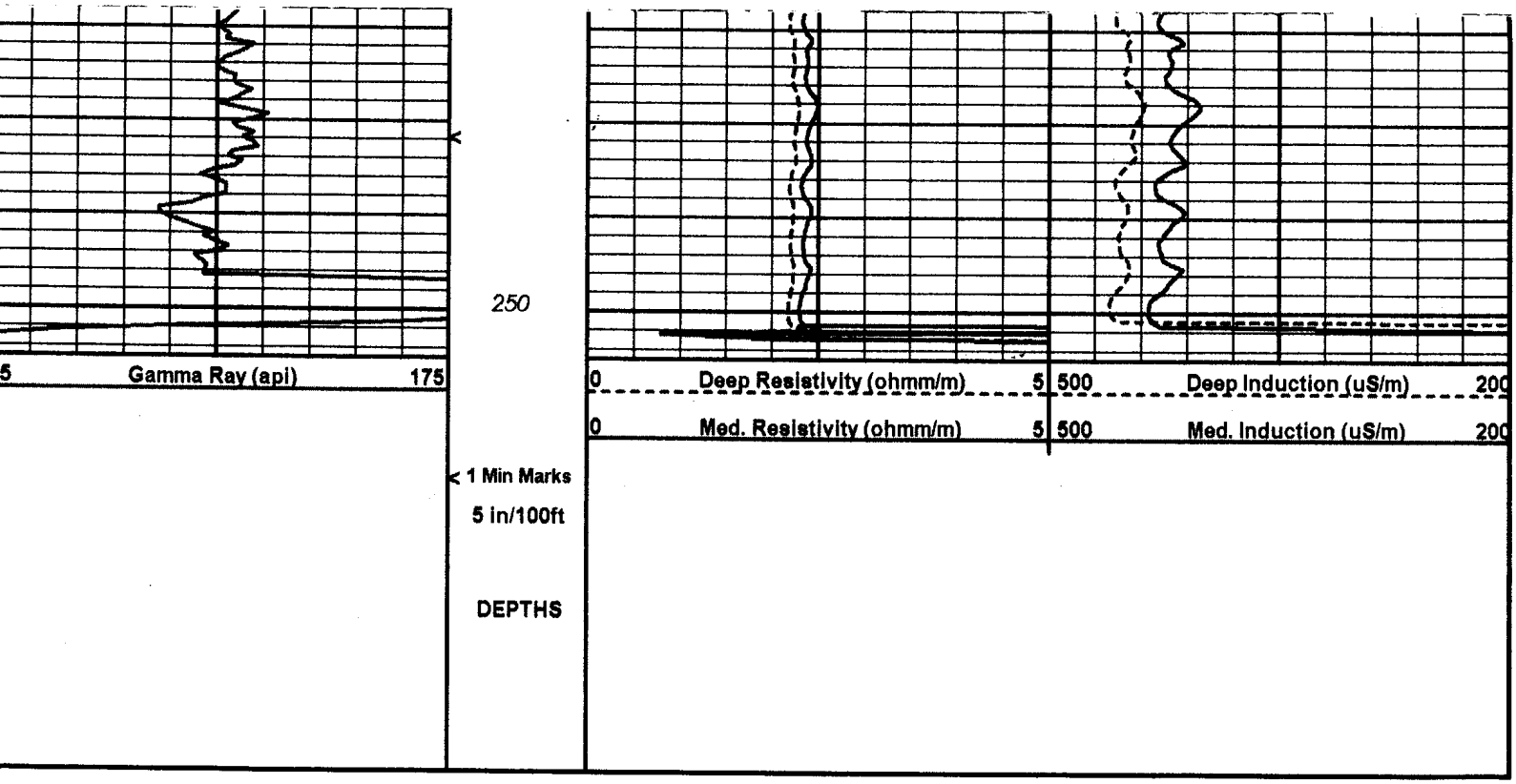
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5
500
Deep Induction (uS/m)
200
0
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5
500
Med. Induction (uS/m)
200
1 Min Marks
5 in/100ft
DEPTHS

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OPTV DATA PROCESSING
RGLDIP vsn 6.1
BOREHOLE IMAGE LOG

20 Oct 2004

MACTEC

Borehole: RI-SB-01

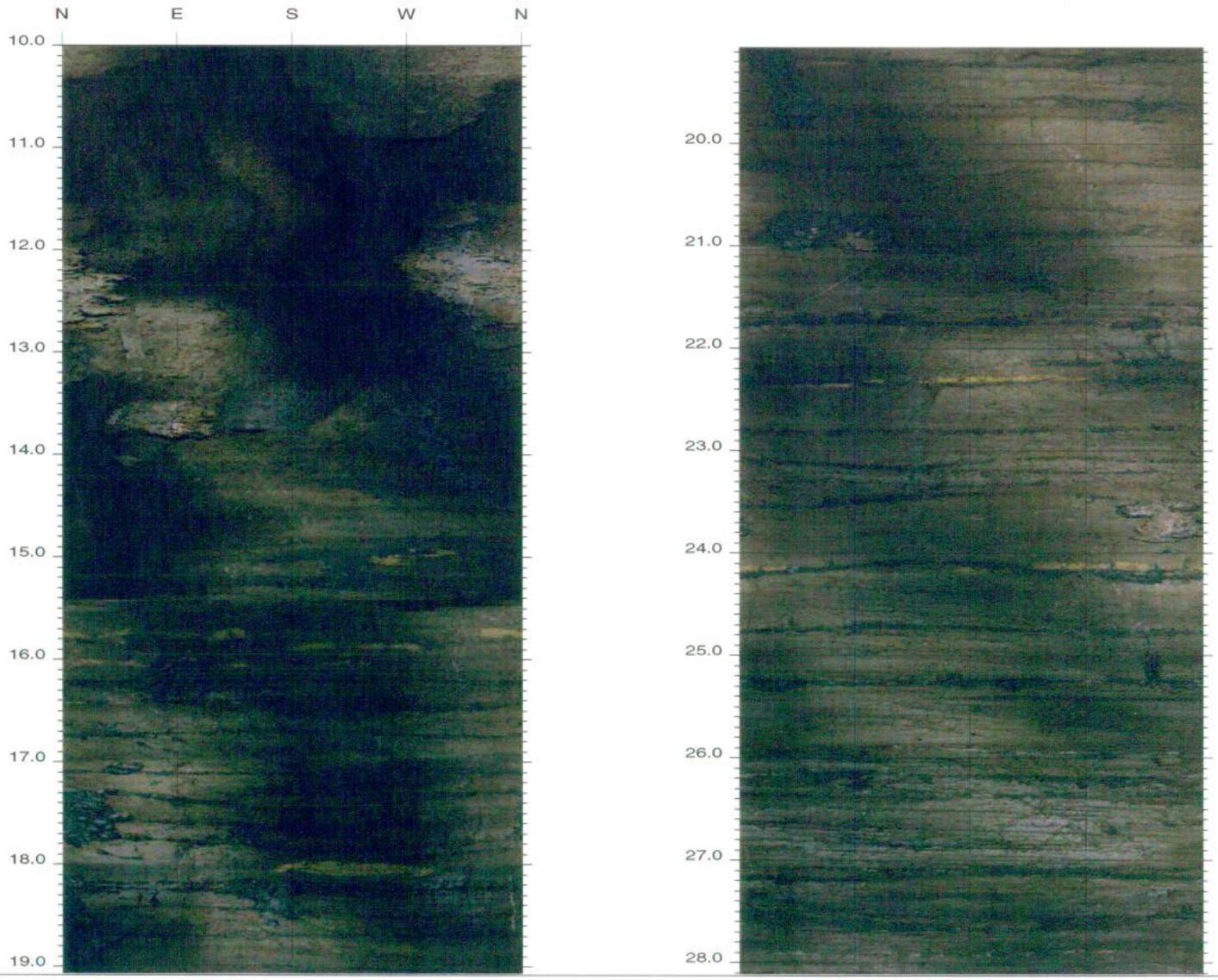
Casmalia Landfill

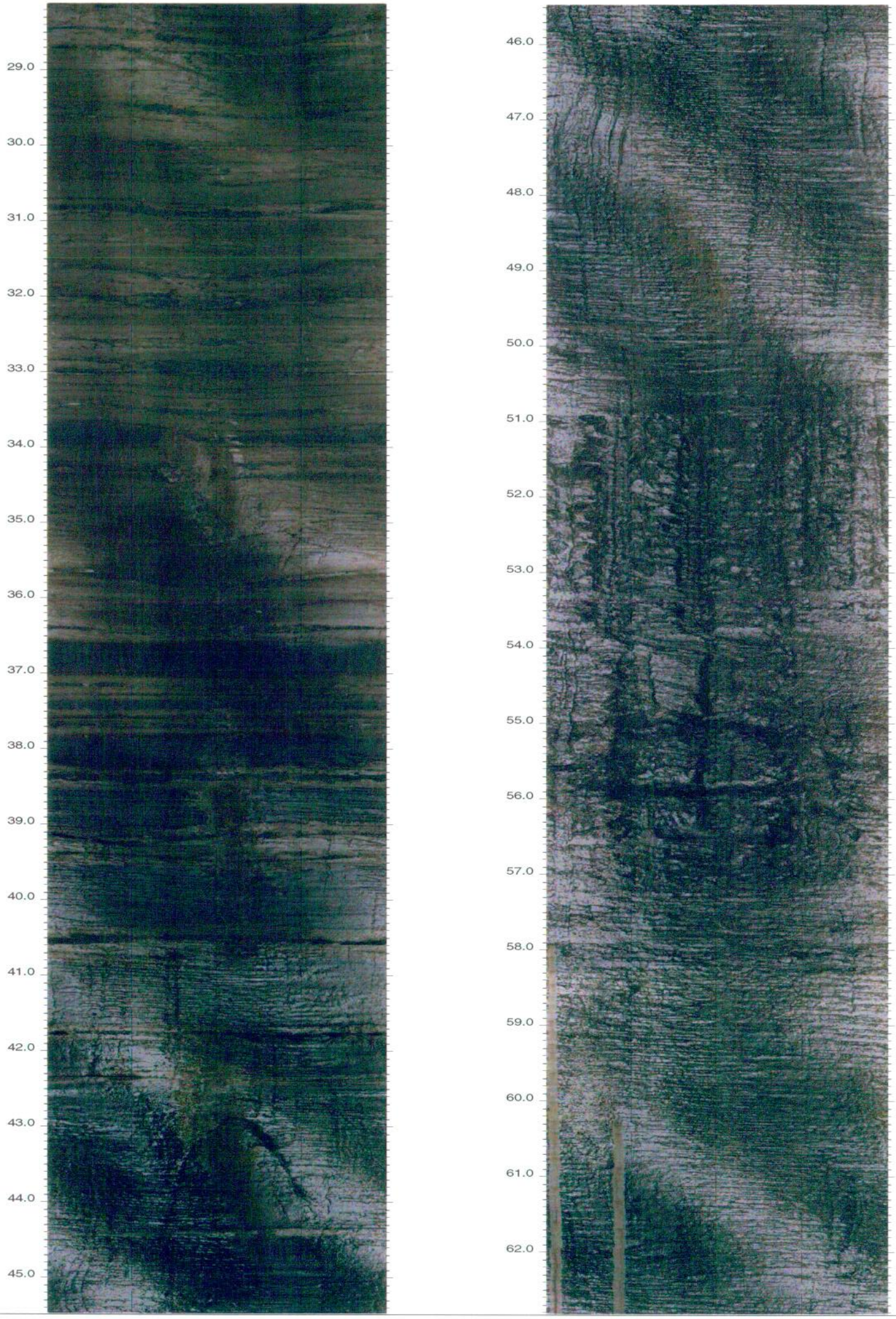
top of borehole.....
East:
North:
Elev:

North ref. is magnetic
Depth units are metres
Vertical scale: 1/20

Zone from 10.0000 to 253.0000ft
Format: BHTV NESWN

Borehole diam: 6.492inch
data intervals.....
Azimuth: 0.5000deg
Depth: 0.0080ft

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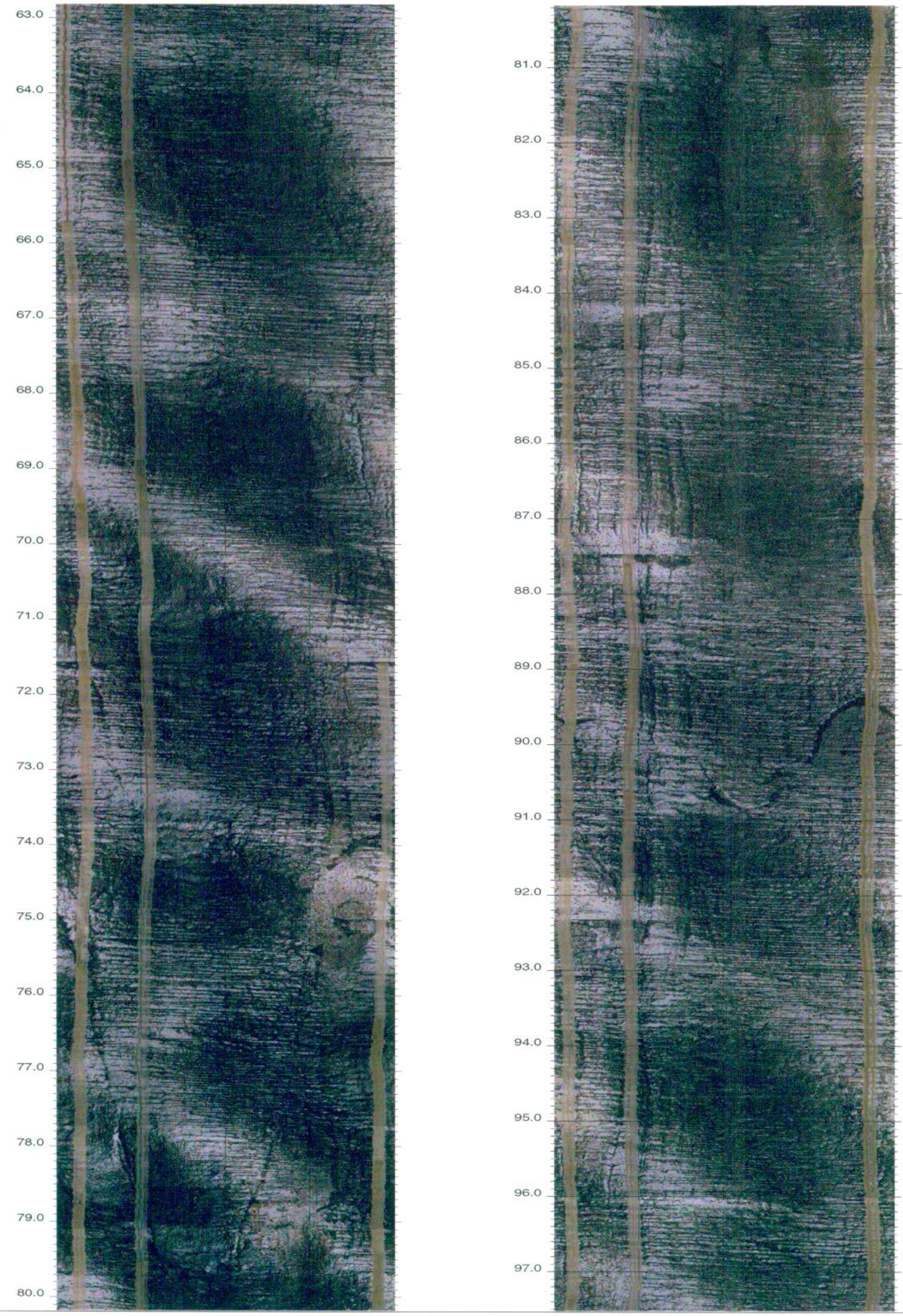
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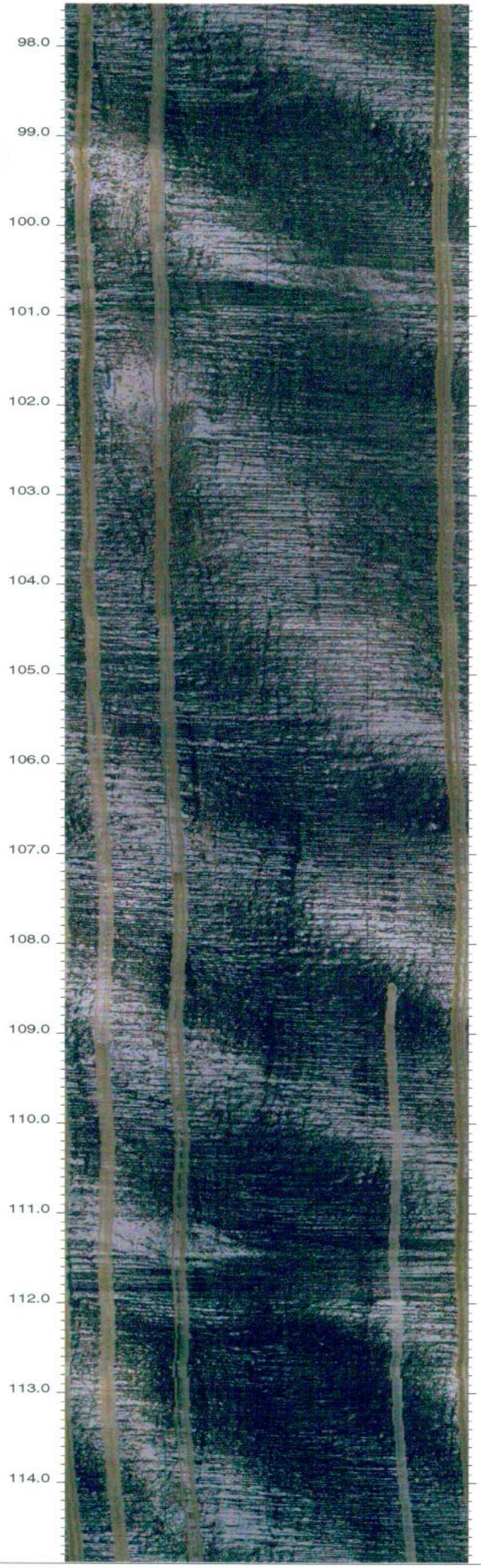
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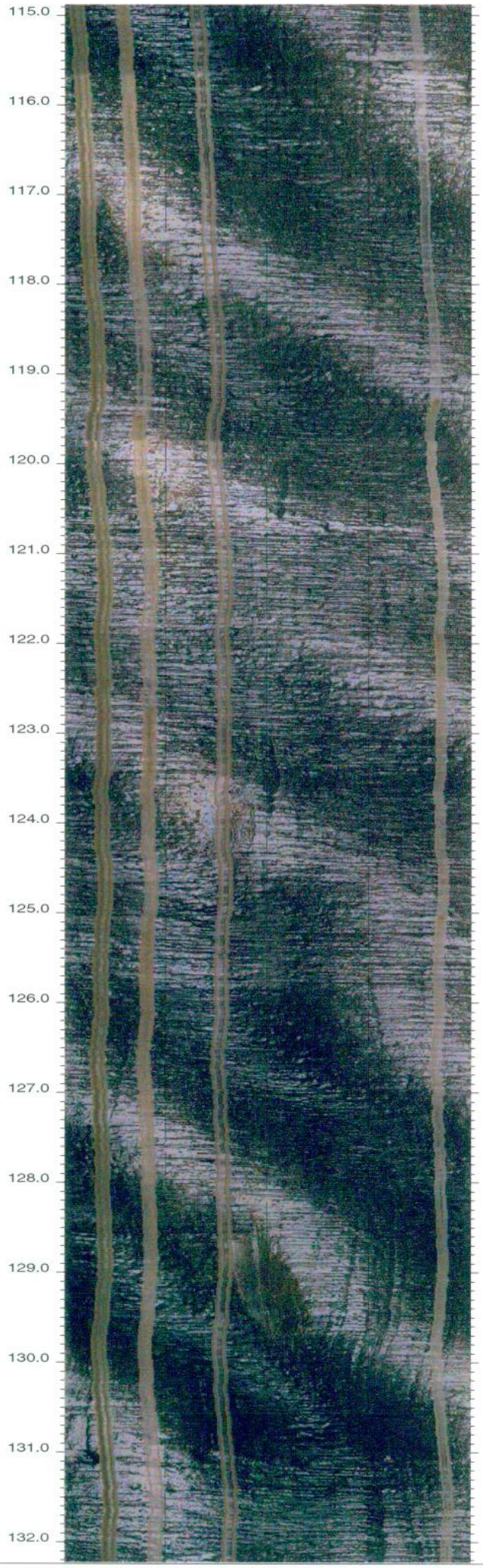
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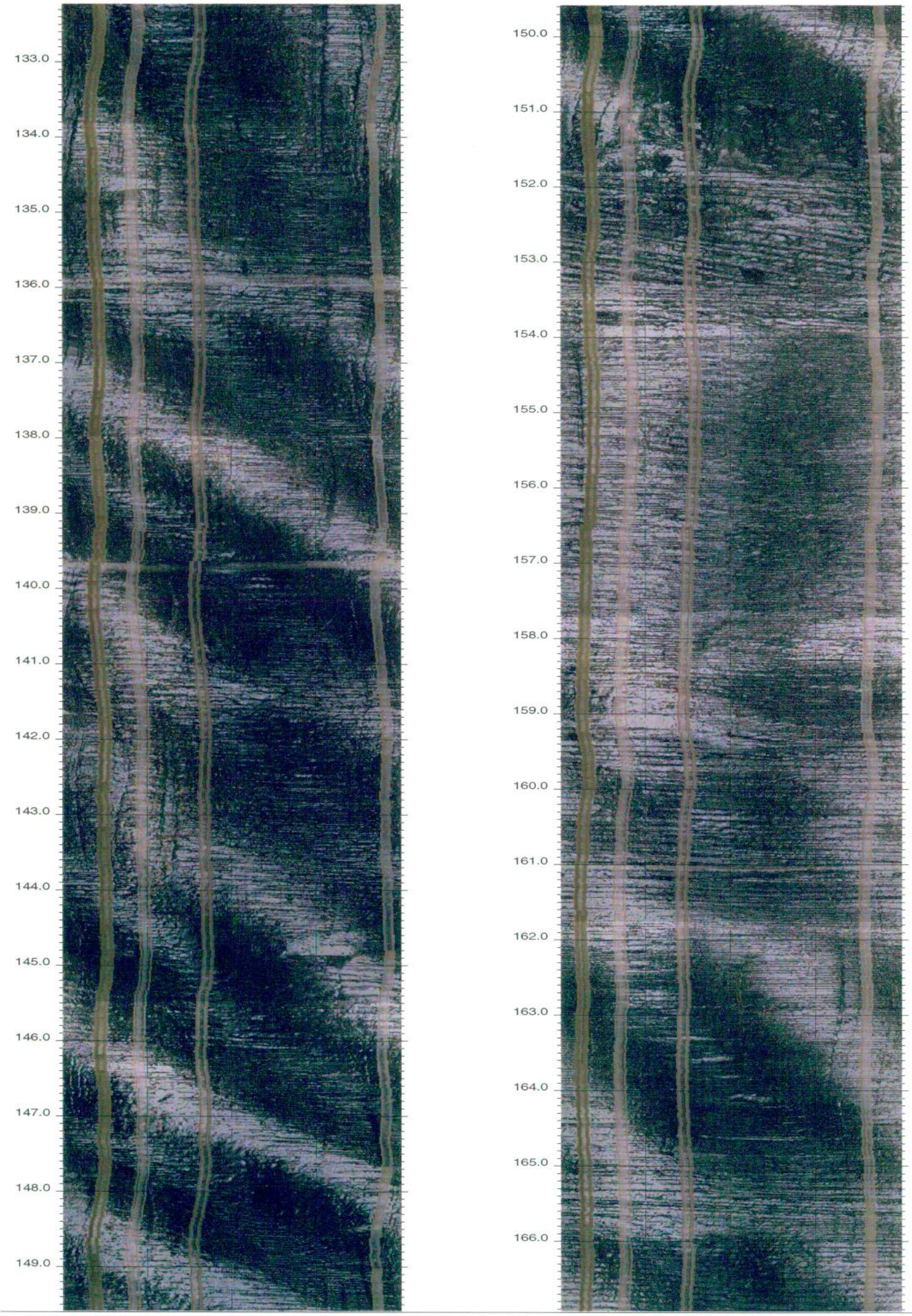
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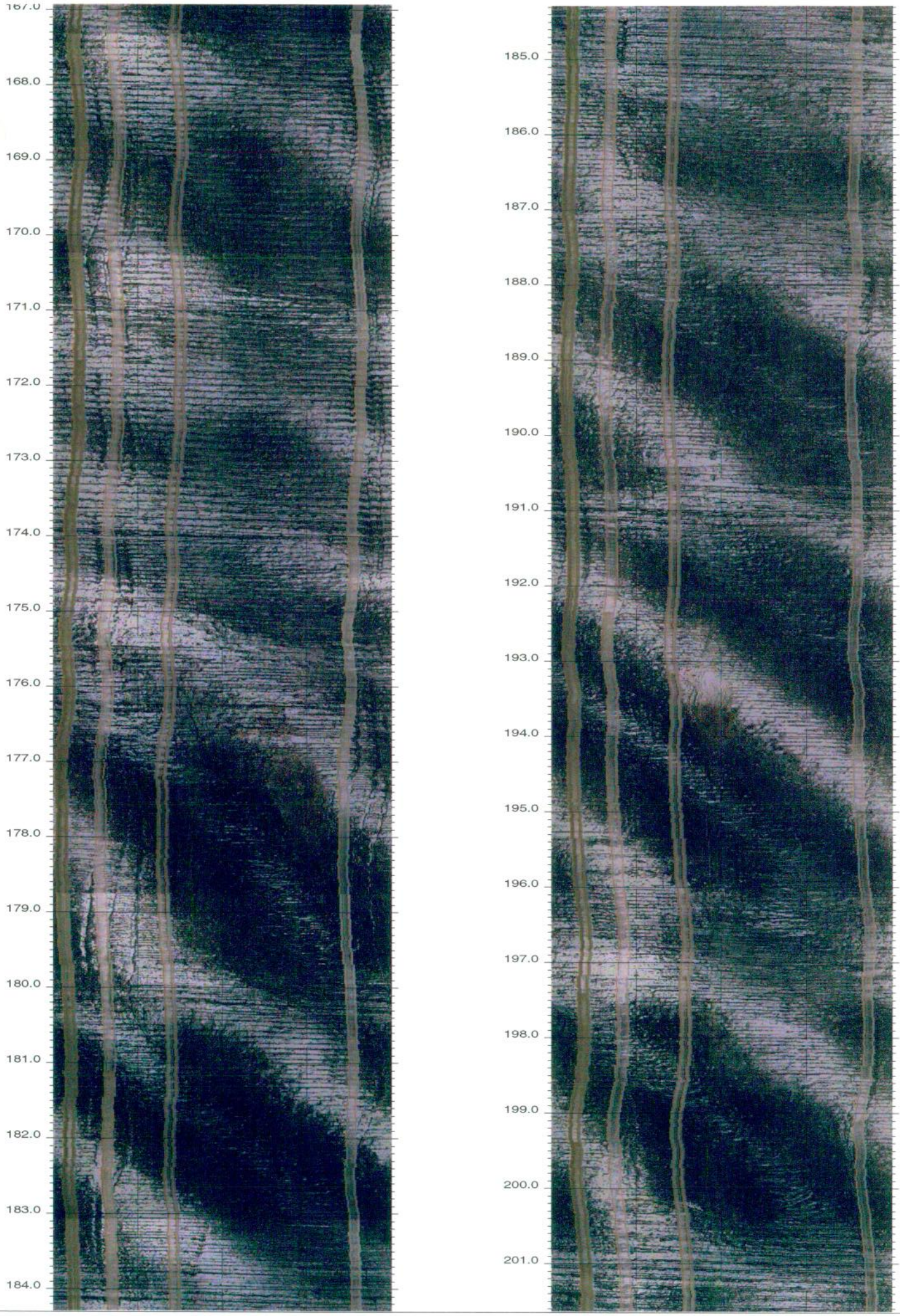
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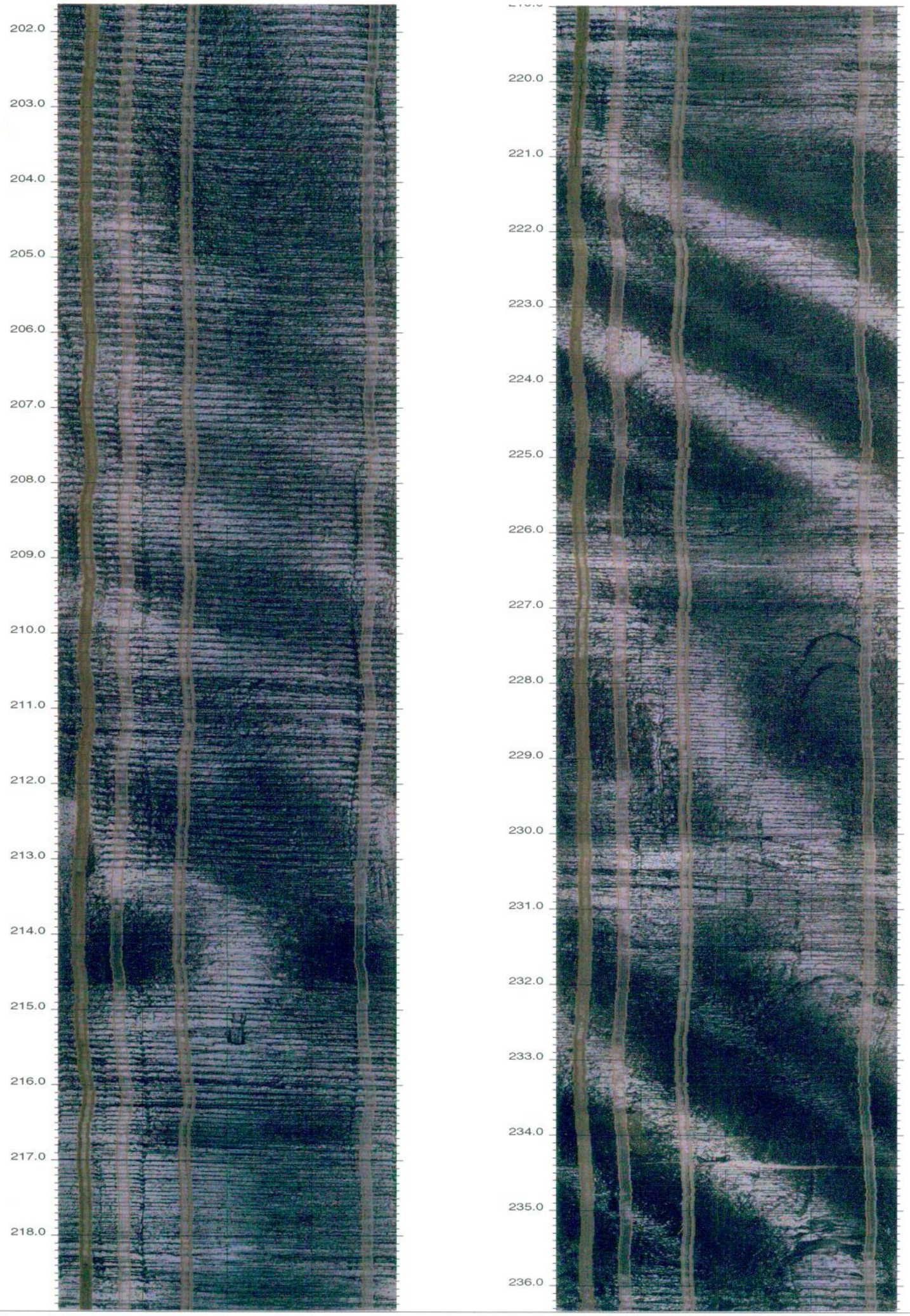
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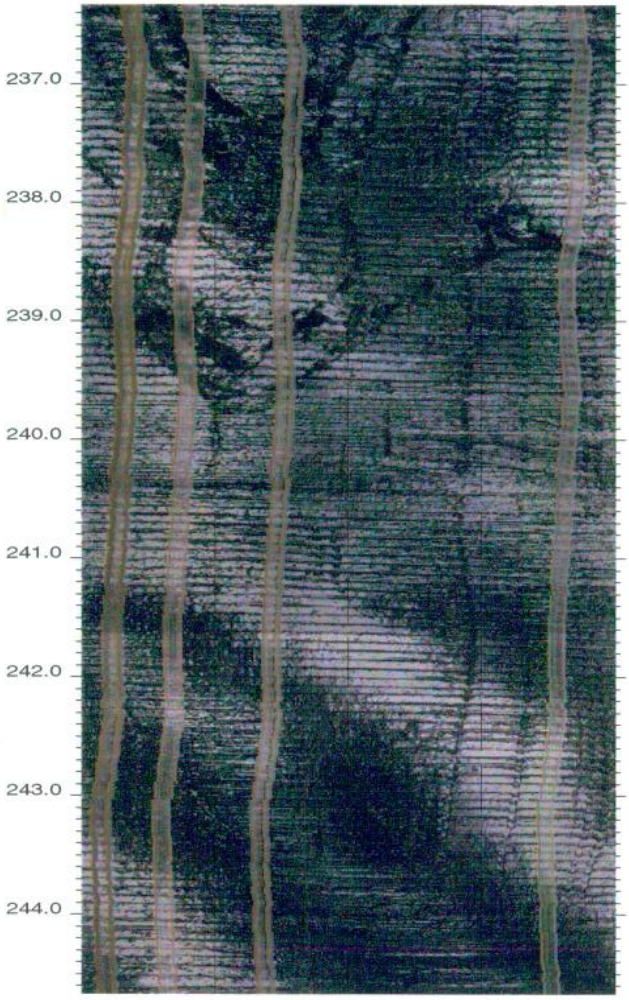
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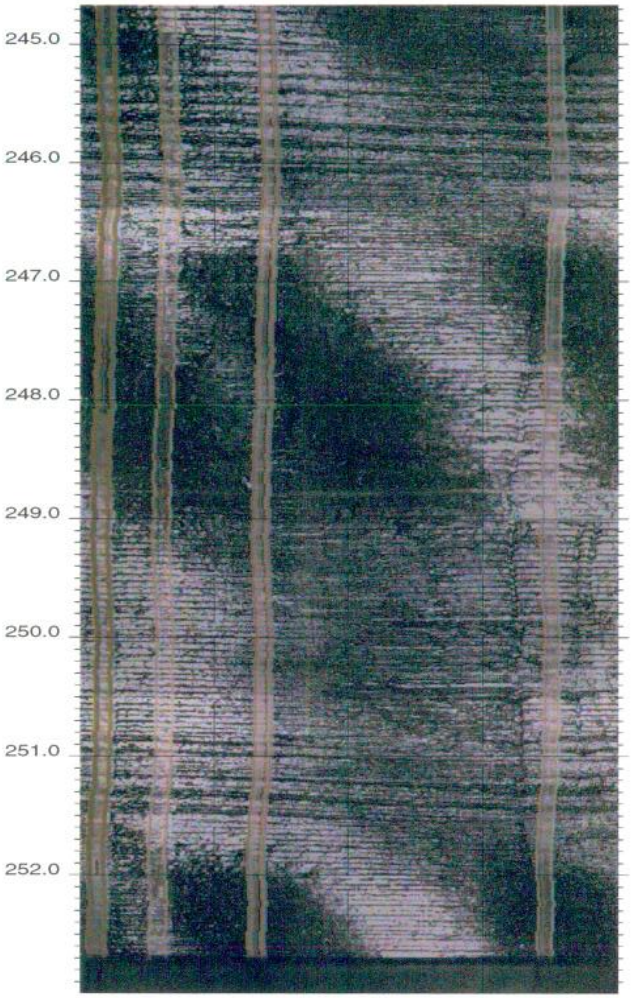
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OPTV DATA PROCESSING
RGLDIP vsn 6.1
INTERPRETED OPTV DIPS LOG

21 Oct 2004

MACTEC

Borehole: RI-SB-01

Casmalia Landfill

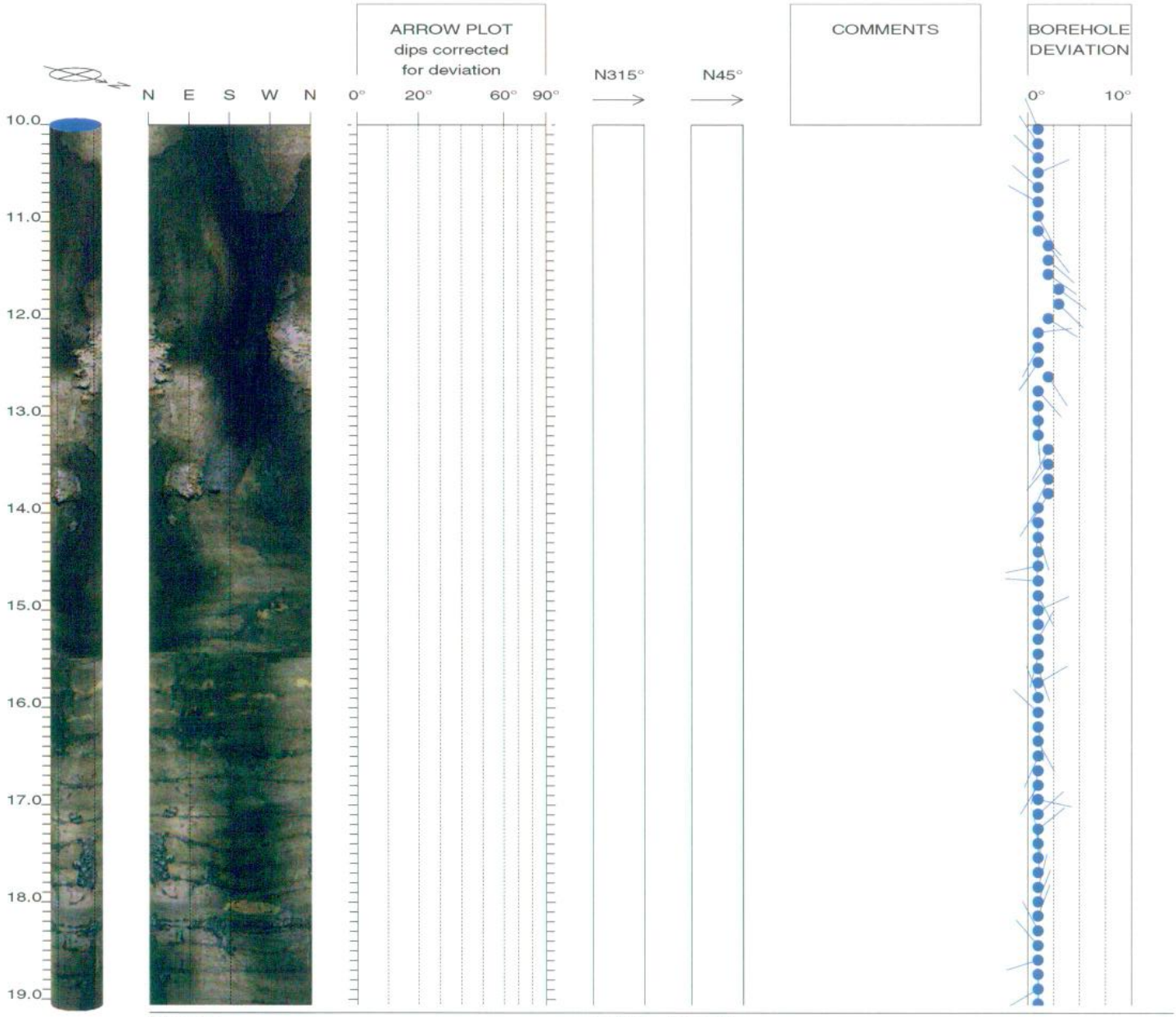
top of borehole.....
East:
North:
Elev:

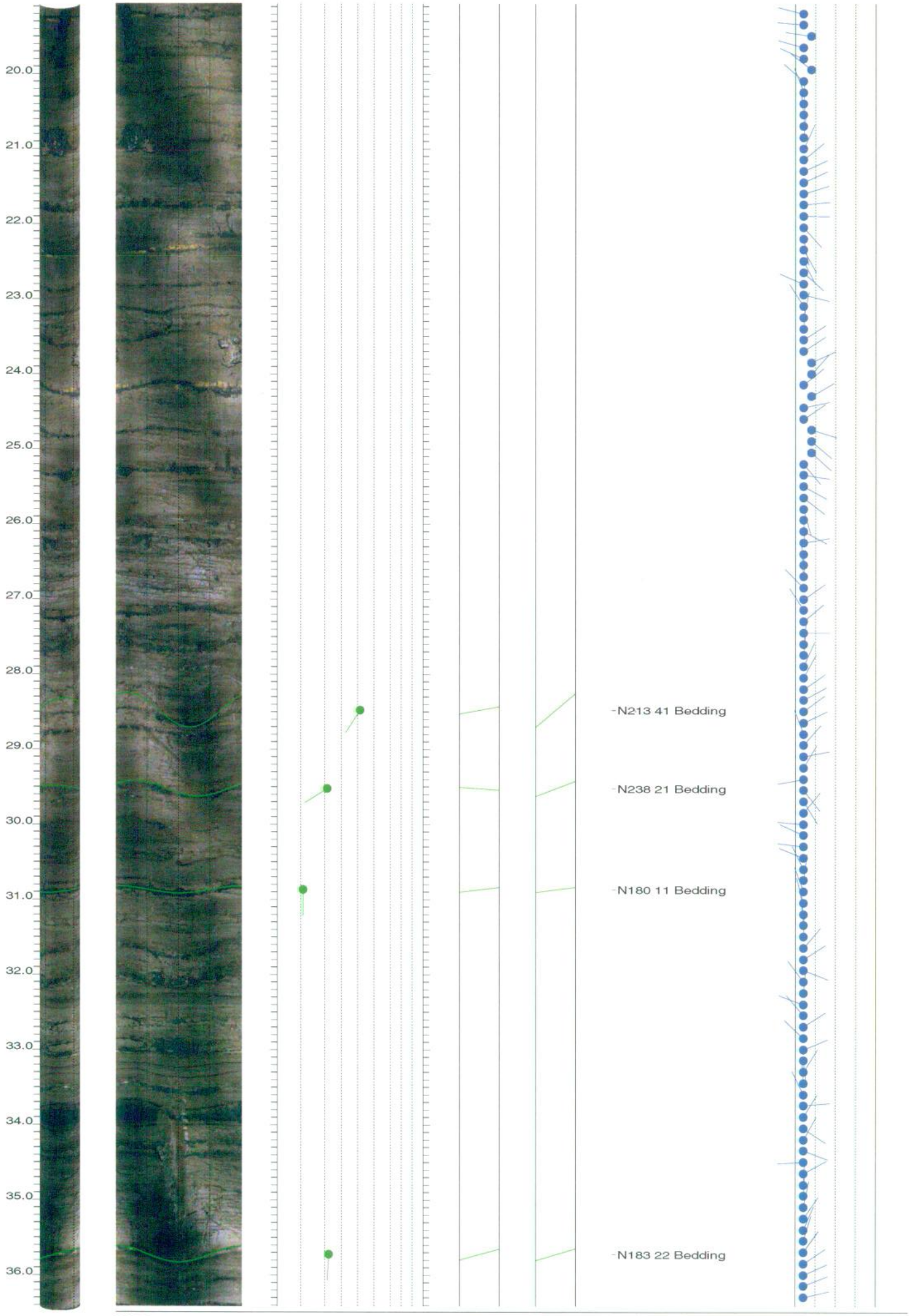
North ref. is magnetic
Depth units are feet
Vertical scale: 1/20
Horiz scale = vert scale

Zone from 253.000 to 10.000ft
Format: BHTV-NESWN

Borehole diam: 6.492inch
Vertical = borehole-axis

BEDDING
FRACTURE
Identified units

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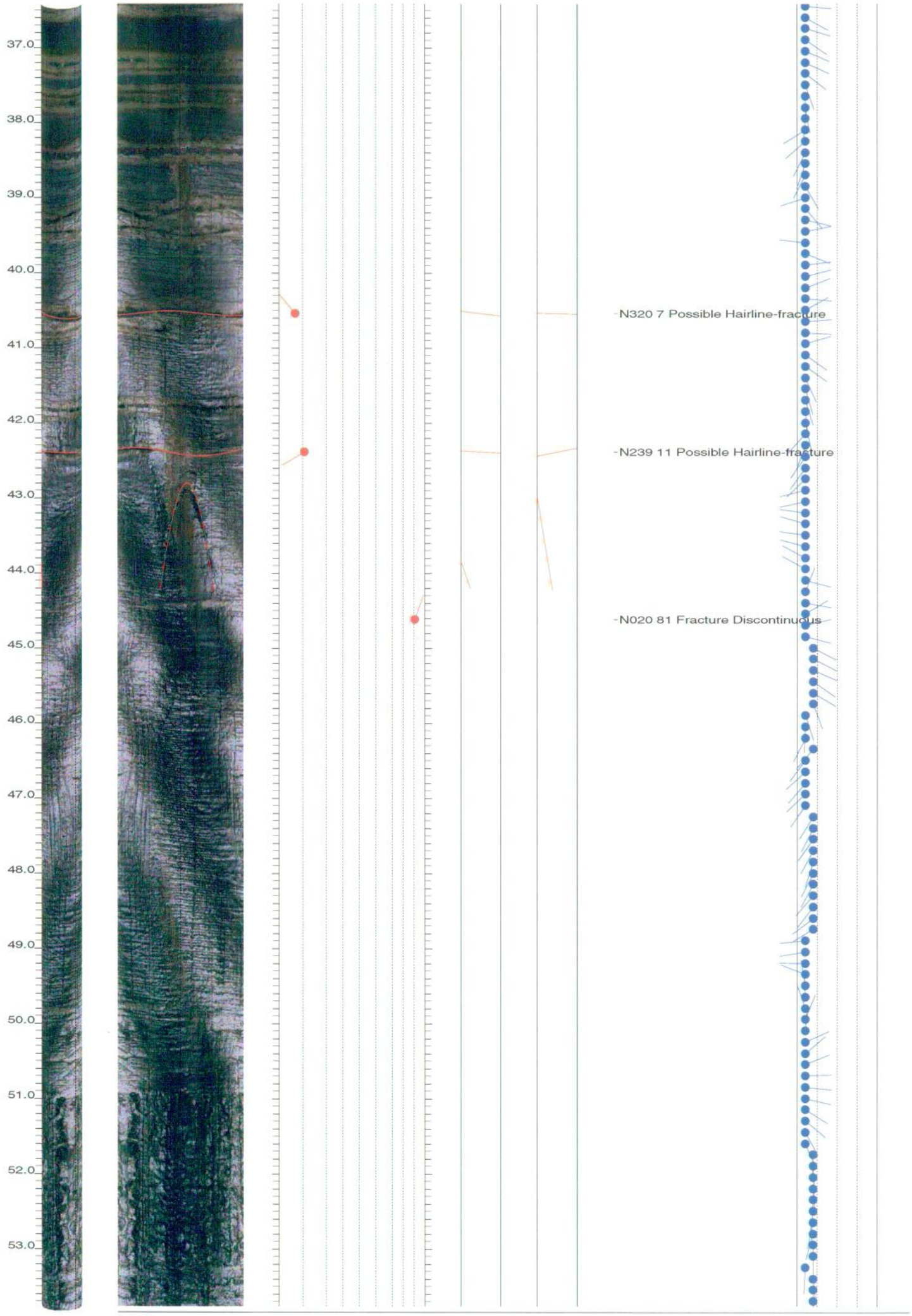
N238 21 Bedding
N180 11 Bedding
N183 22 Bedding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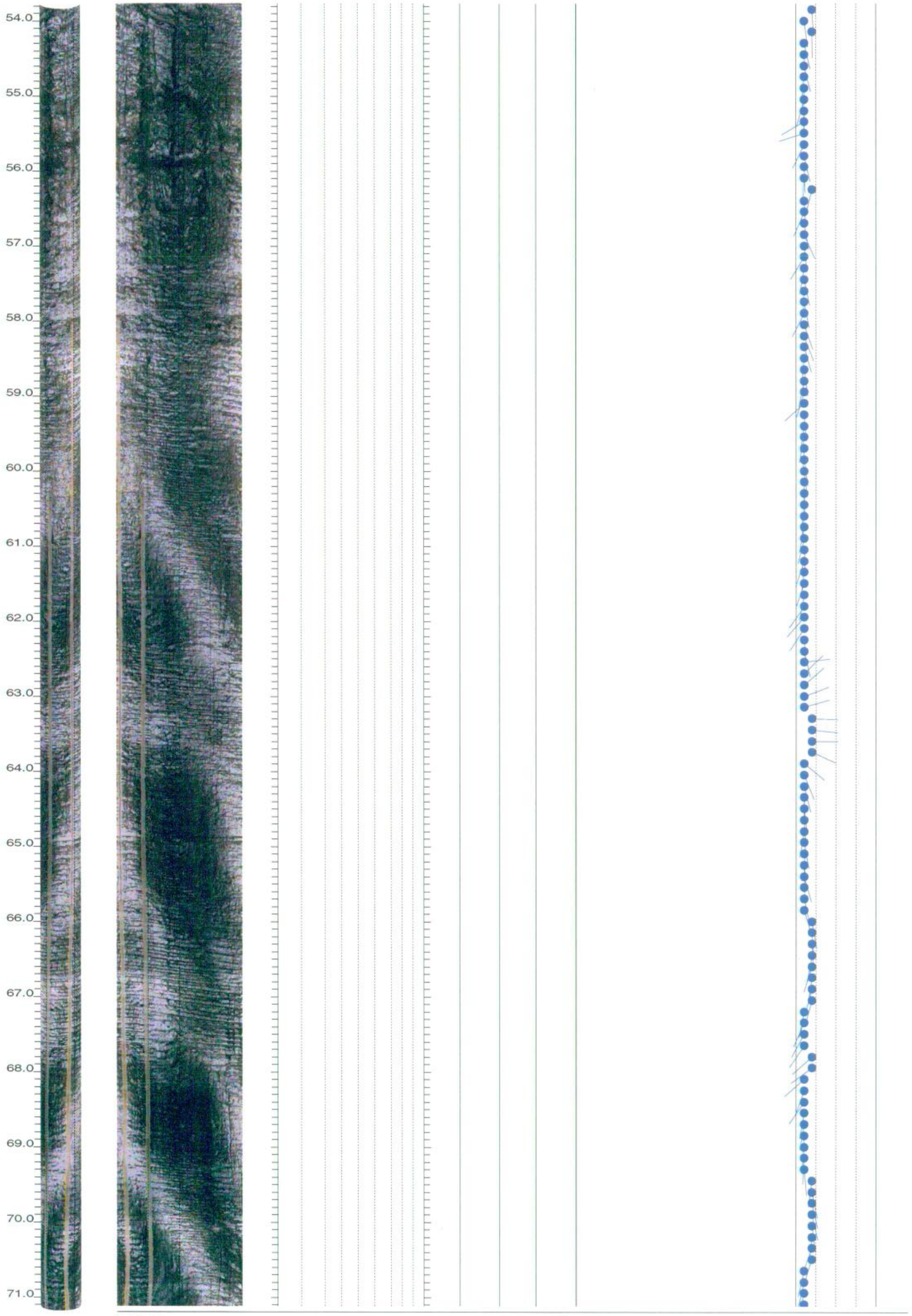
N320 7 Possible Hairline-fracture
N239 11 Possible Hairline-fracture
N020 81 Fracture Discontinuous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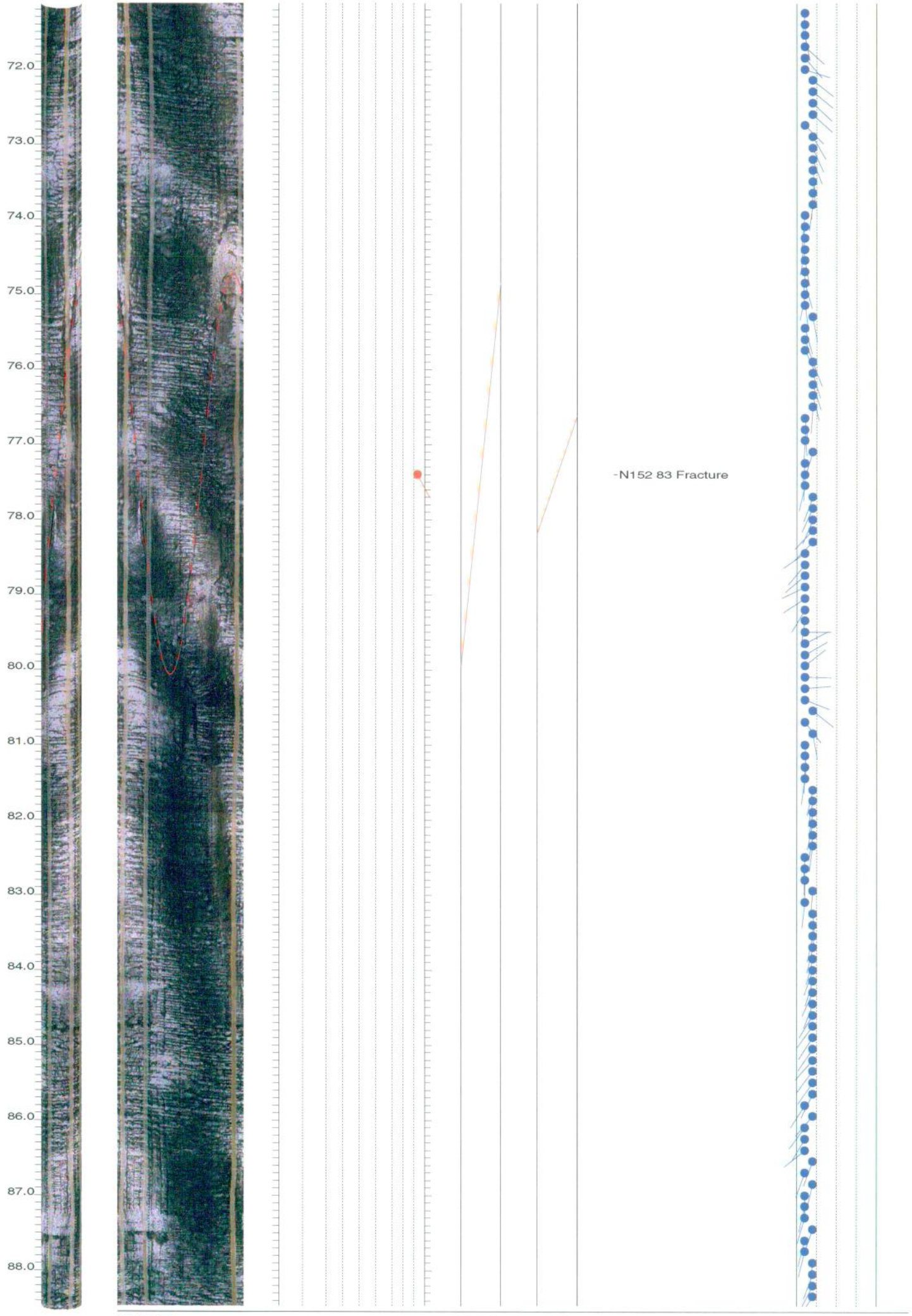
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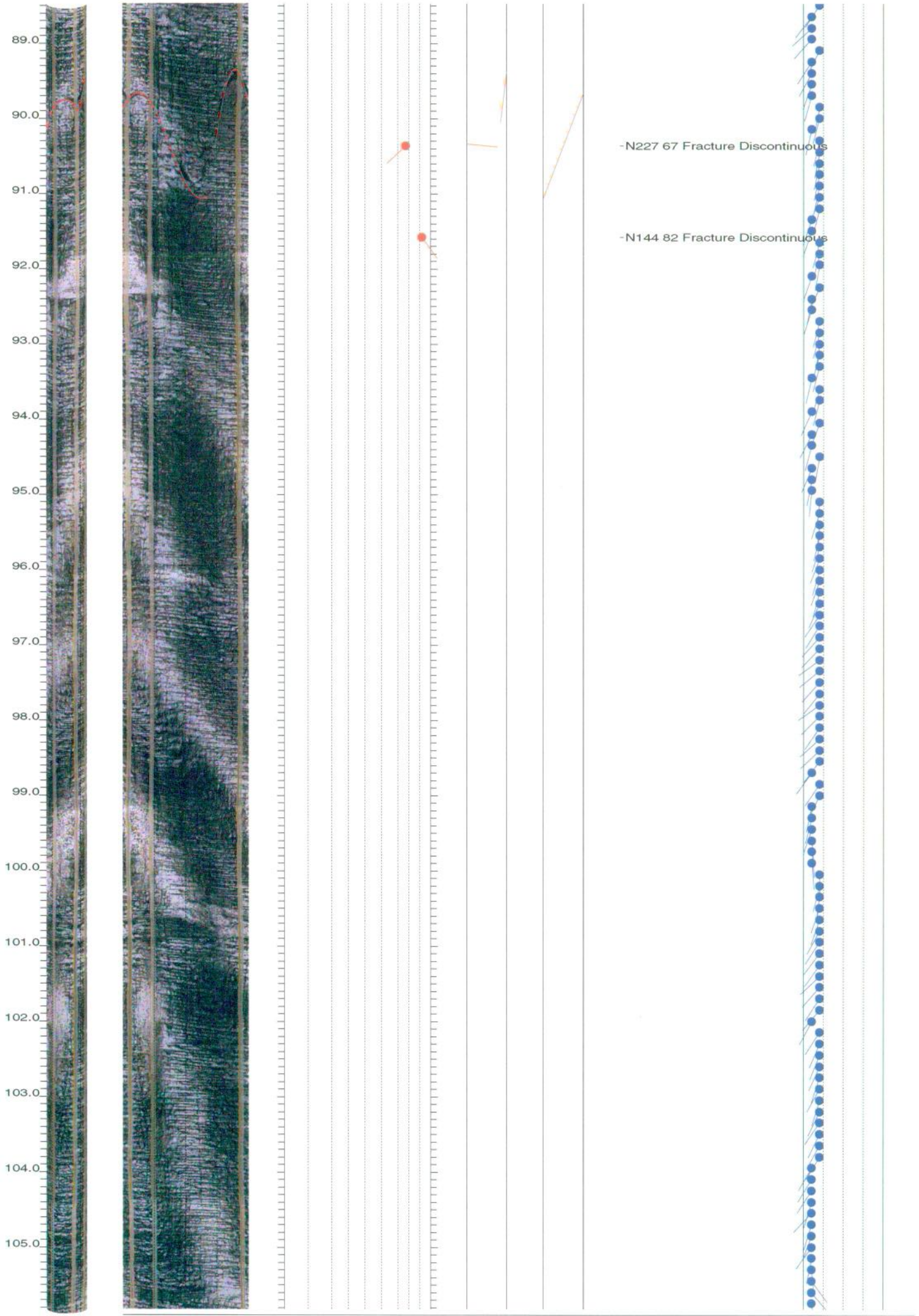
-N152 83 Fracture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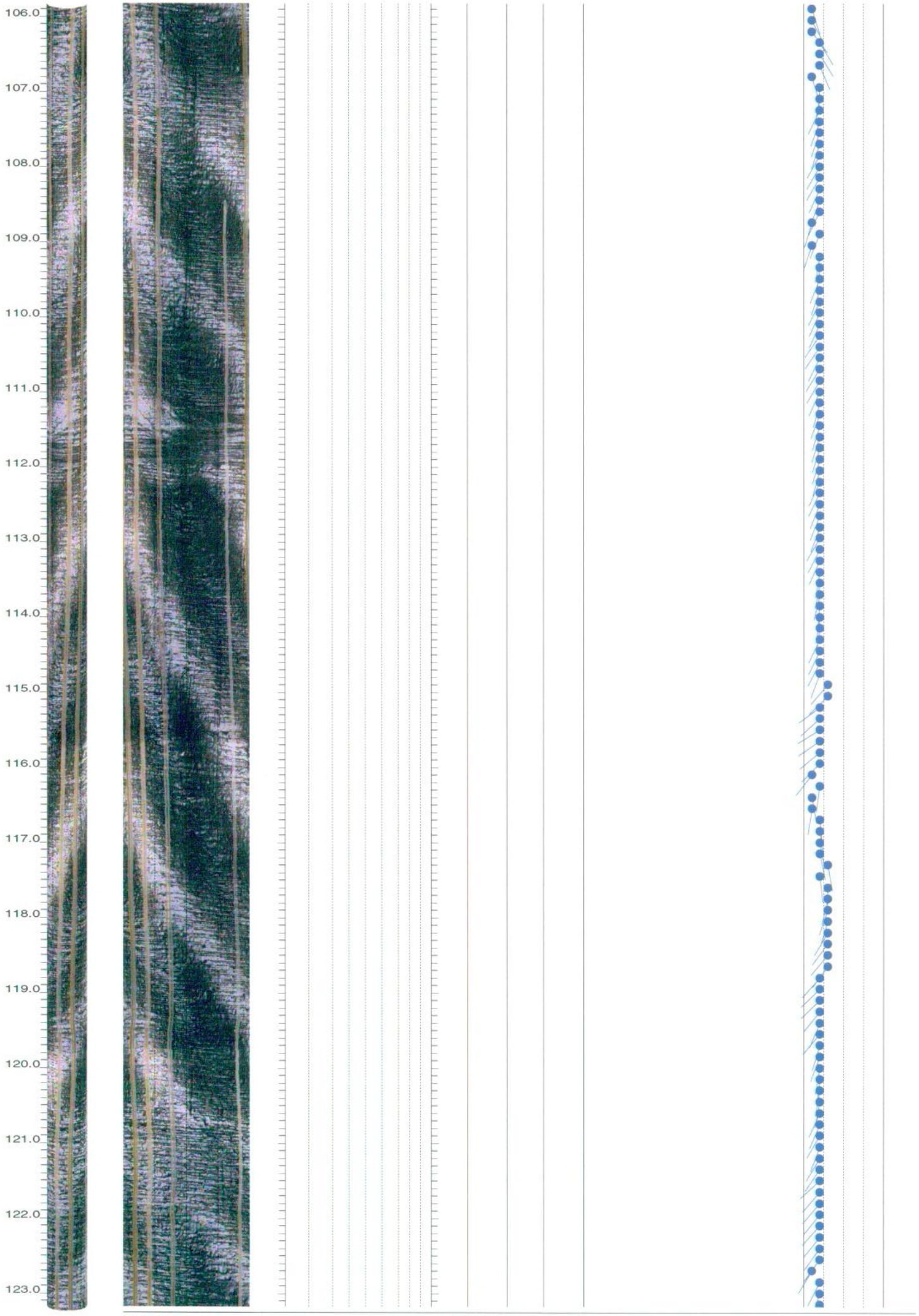
-N227 67 Fracture Discontinuous
-N144 82 Fracture Discontinuous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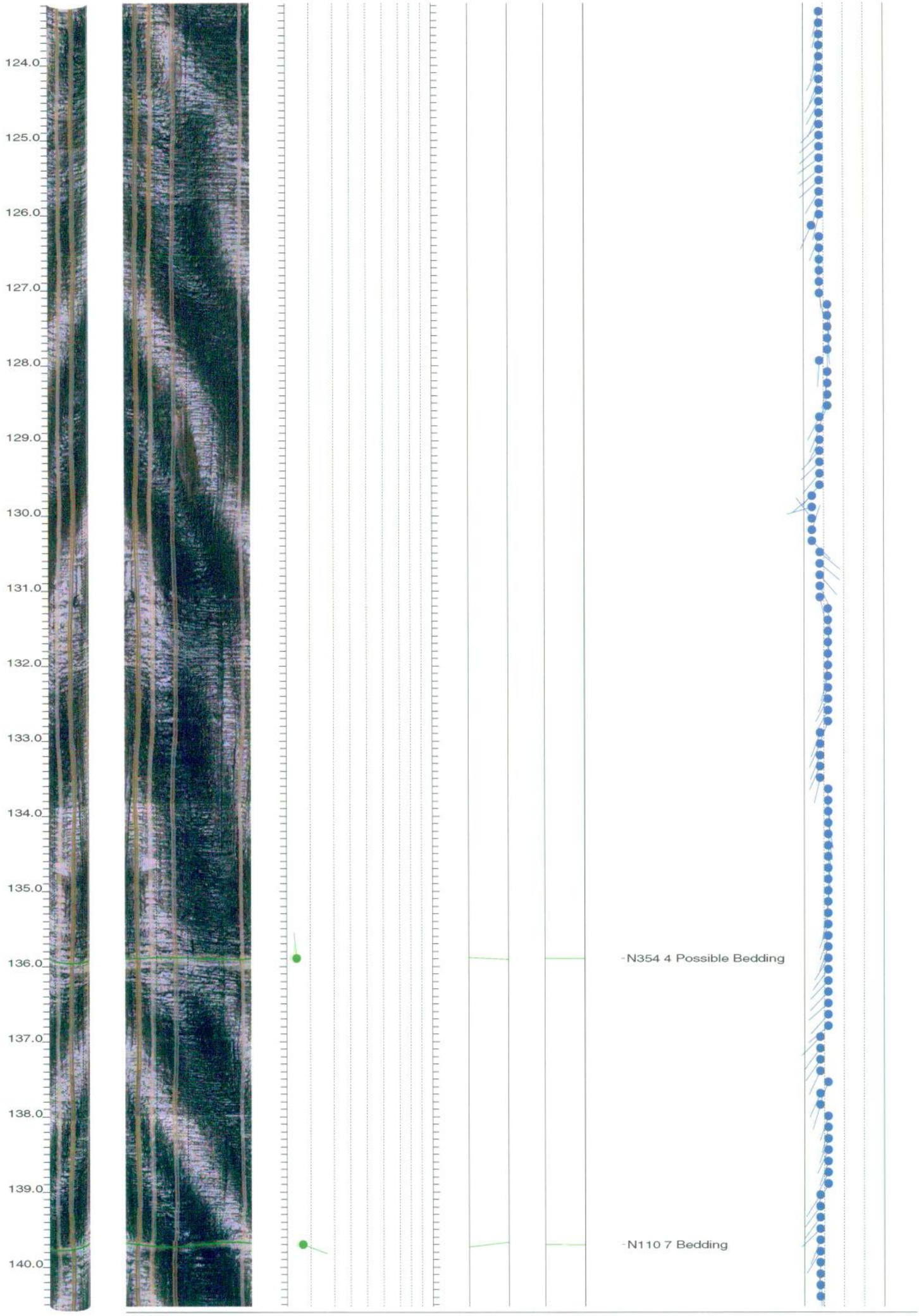
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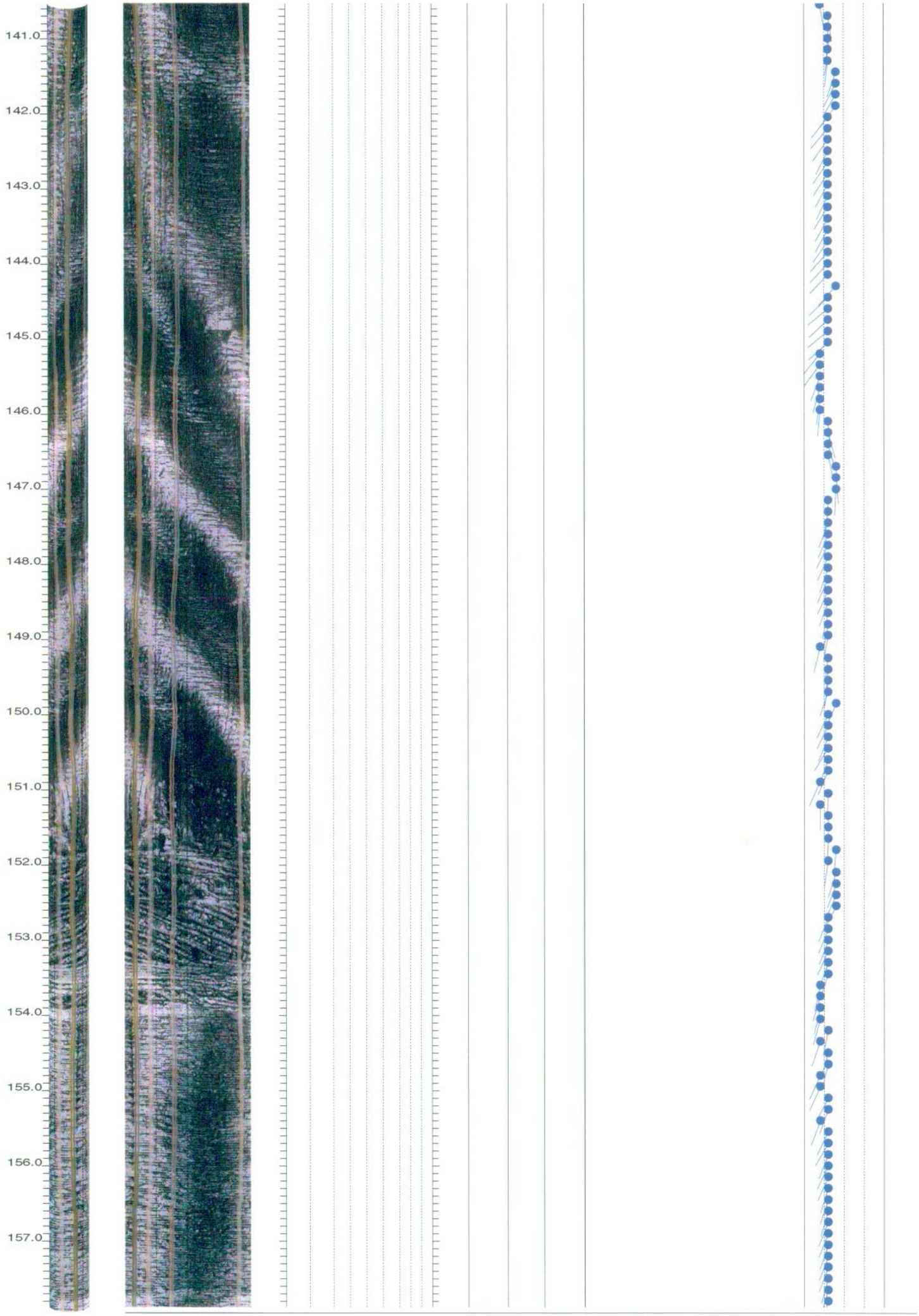
N110 7 Bedding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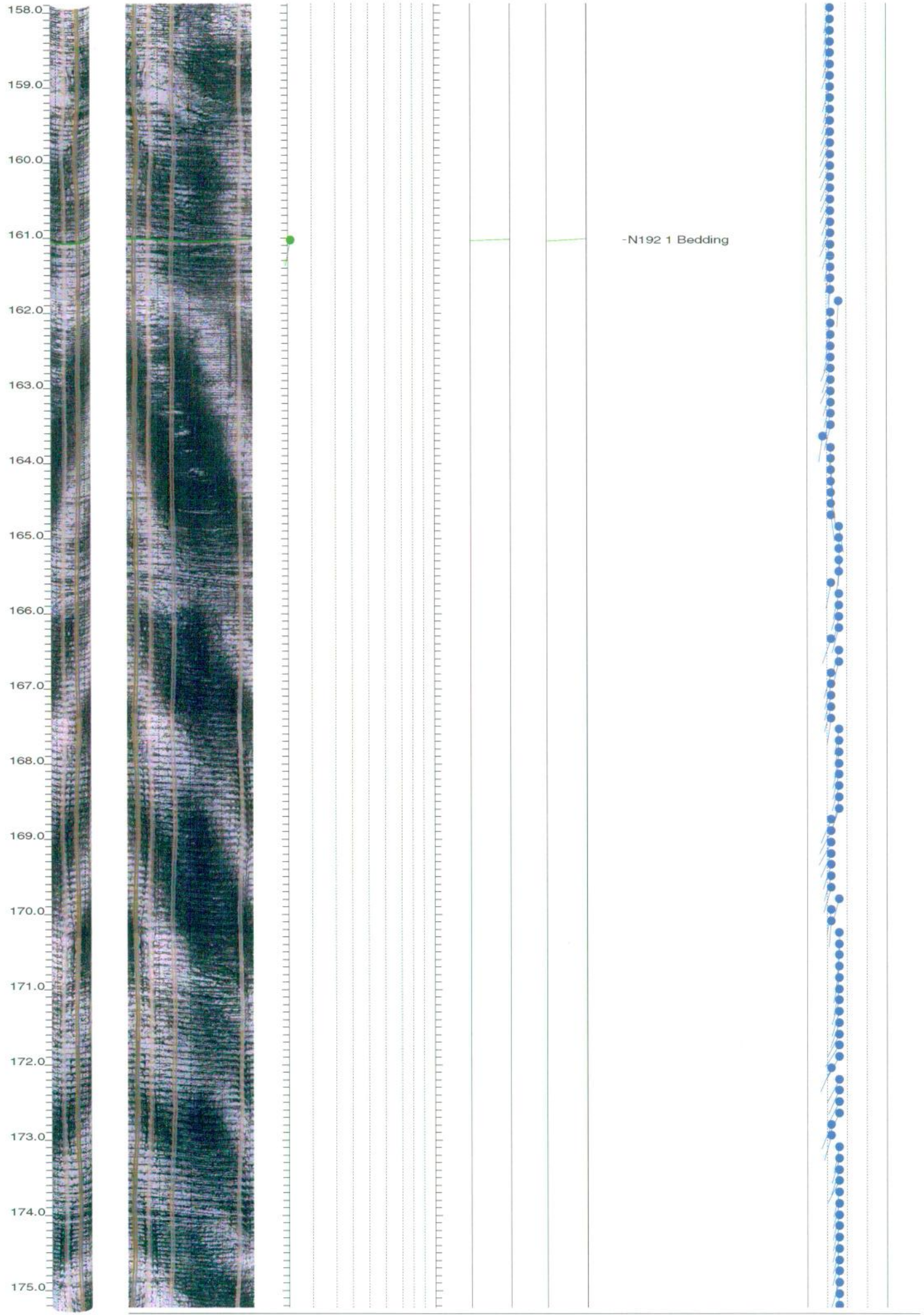
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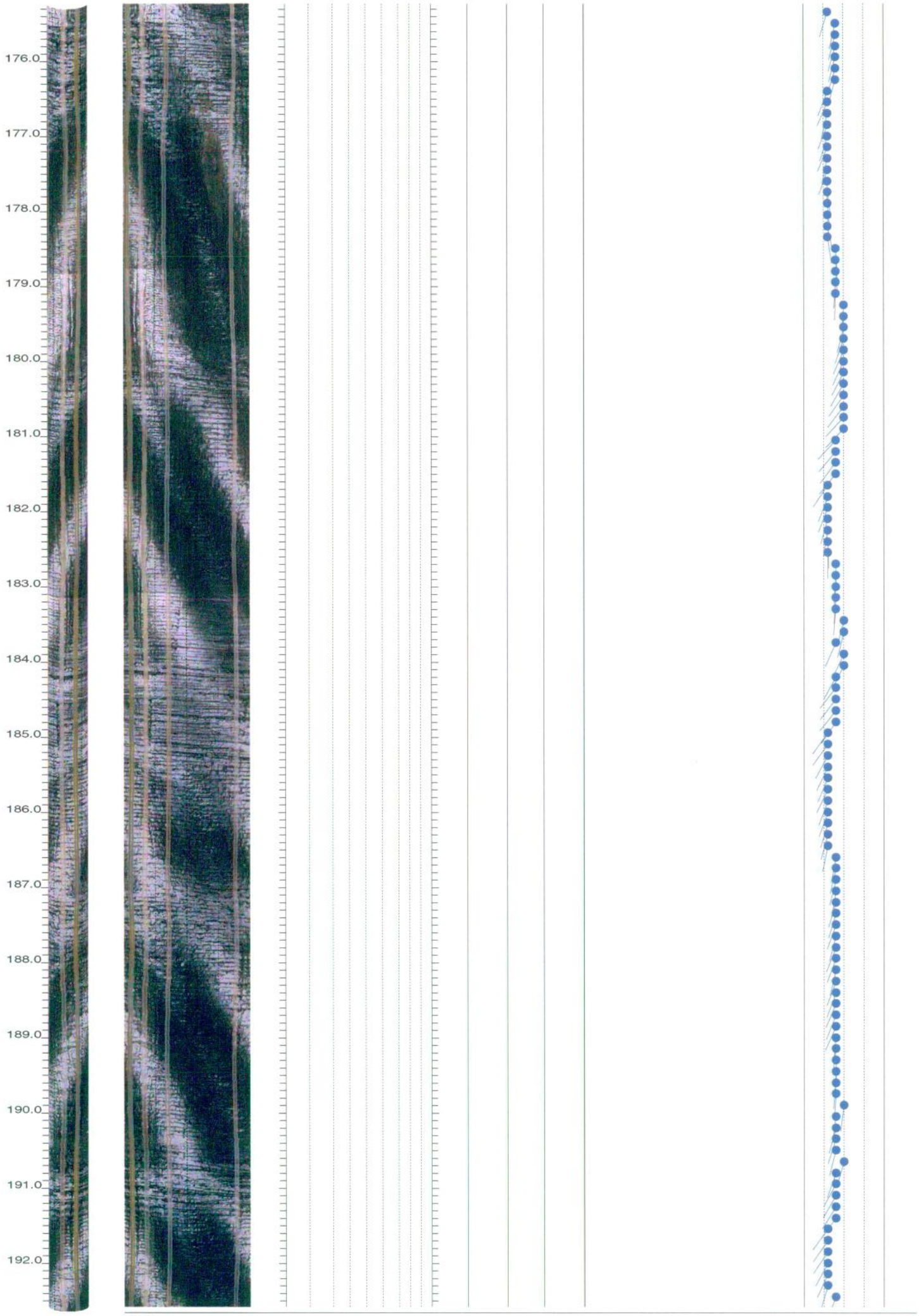
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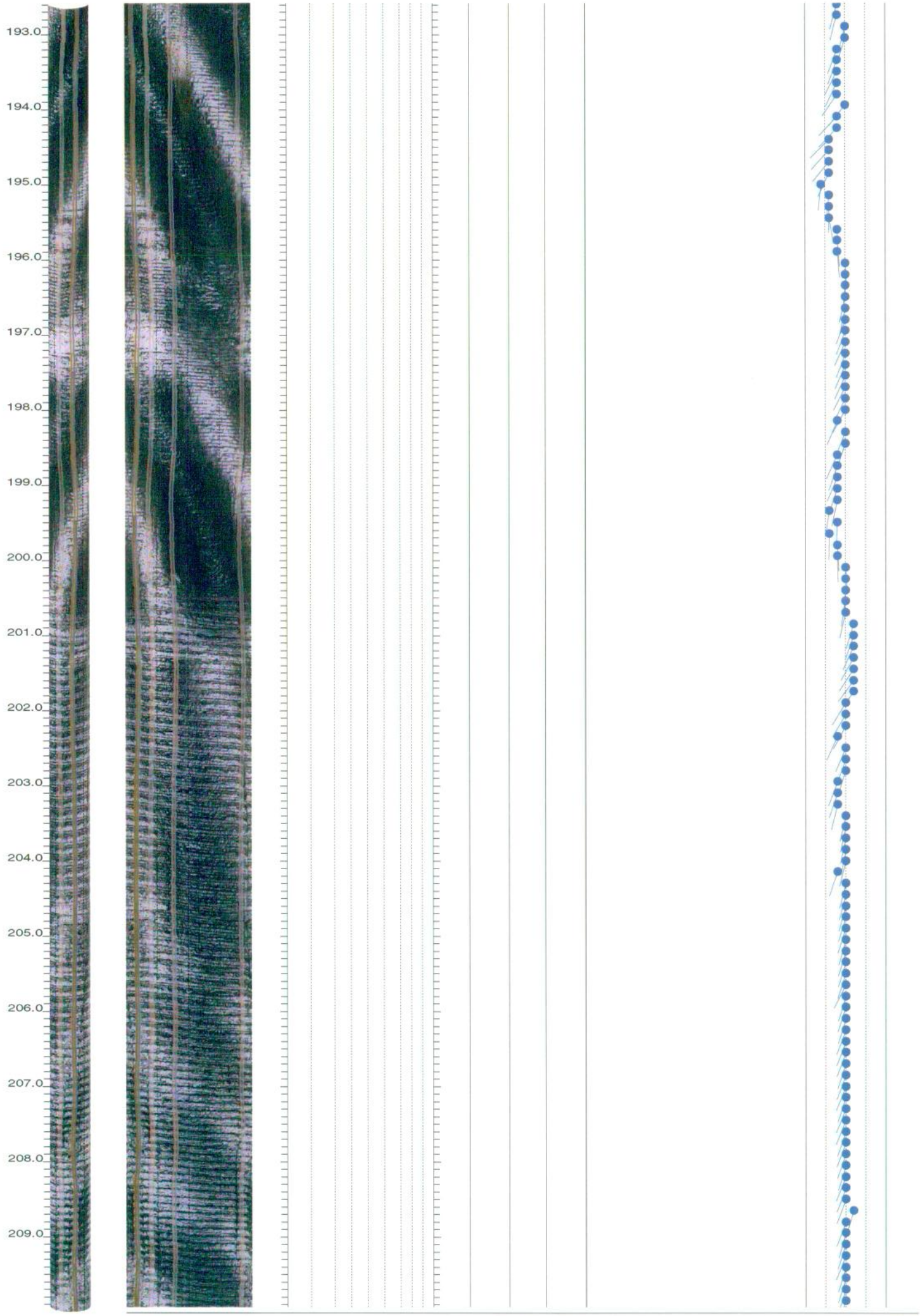
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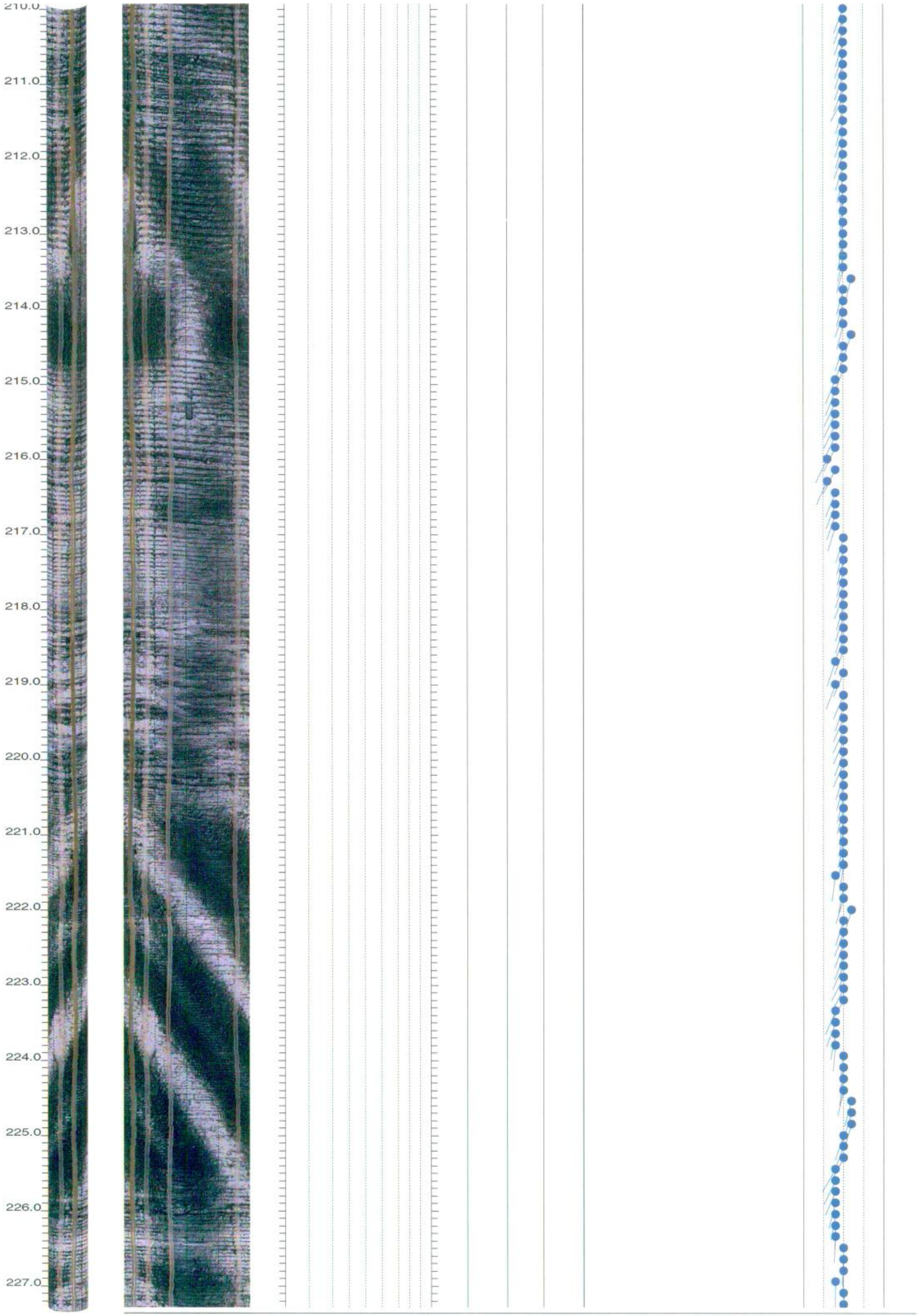
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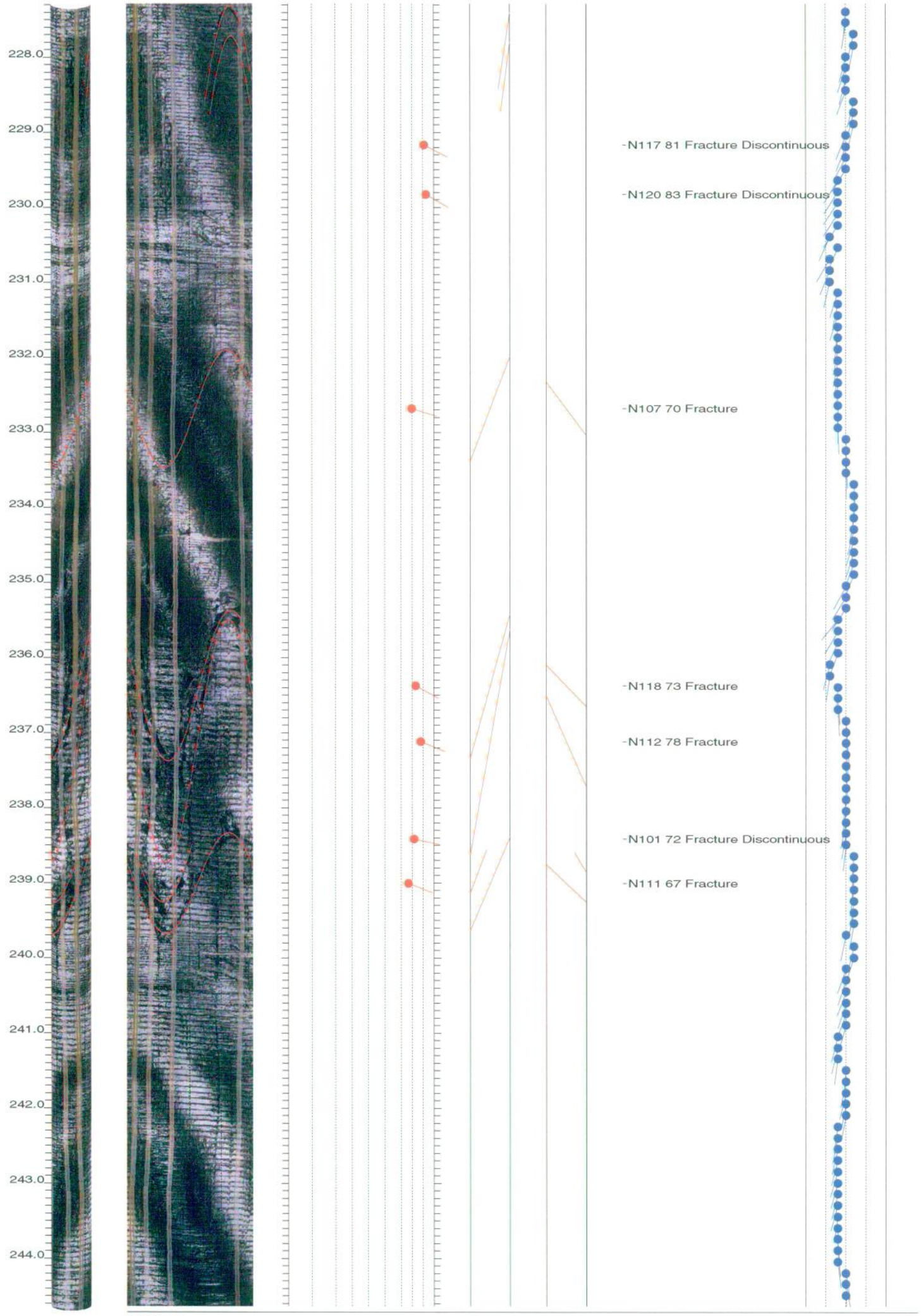
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-N120 83 Fracture Discontinuous
-N107 70 Fracture
-N118 73 Fracture
-N112 78 Fracture
-N101 72 Fracture Discontinuous
-N111 67 Fracture

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Fluid Level

RGLDIPv6.1 OPTV results

K = 0: BEDDING
K = 2: FRACTURE

borehole RI-SB-01
zone from -1.488 to 253.024 ft
North ref is magnetic

	Depth	Azimuth	Dip	1-P0/100	n	Q	K	Upper Depth	Lower Depth	Well Diam	Well deviation Azimuth	Dev	Thickness	
1	239.006	111	66.6	0.925	6	C	2	238.334	239.678	0.541	187.38	6.00	0.0000	Fracture
2	238.415	101	71.8	0.992	4	A	2	238.452	239.253	0.541	188.44	5.00	0.0000	Fracture Discontinuous
3	237.115	112	78.0	0.960	5	B	2	235.500	238.730	0.541	172.29	5.00	0.0000	Fracture
4	236.372	118	73.3	0.988	4	A	2	235.370	237.374	0.541	184.66	3.87	0.0000	Fracture
5	232.681	107	69.8	0.984	4	A	2	231.896	233.466	0.541	180.73	4.00	0.0000	Fracture
6	229.826	120	82.9	0.994	5	A	2	227.714	228.738	0.541	212.24	4.00	0.0000	Fracture Discontinuous
7	229.168	117	81.2	0.987	5	A	2	227.312	228.595	0.541	202.00	5.00	0.0000	Fracture Discontinuous
8	161.025	192	1.1	1.000	3	A	0	161.006	161.045	0.541	200.47	3.00	0.0000	Bedding
9	139.700	110	6.7	1.000	3	A	0	139.668	139.732	0.541	205.94	2.00	0.0000	Bedding
10	135.894	354	4.3	1.000	3	A	0	135.881	135.906	0.541	212.19	3.00	0.0000	Possible Bedding
11	91.575	144	82.1	0.979	4	A	2	89.343	90.359	0.541	196.71	1.57	0.0000	Fracture Discontinuous
12	90.361	227	67.3	0.997	4	A	2	89.659	91.062	0.541	192.04	2.00	0.0000	Fracture Discontinuous
13	77.396	152	83.4	0.969	5	B	2	74.727	80.064	0.541	183.26	1.00	0.0000	Fracture
14	44.615	20	80.9	0.955	5	B	2	42.801	44.284	0.541	68.33	1.00	0.0000	Fracture Discontinuous
15	42.384	239	10.7	0.992	4	A	2	42.329	42.440	0.541	209.87	1.00	0.0000	Possible Hairline-fracture
16	40.538	320	6.9	0.998	4	A	2	40.507	40.570	0.541	69.24	1.00	0.0000	Possible Hairline-fracture
17	35.720	183	22.4	1.000	4	A	0	35.613	35.827	0.541	39.48	1.00	0.0000	Bedding
18	30.866	180	10.9	0.980	5	A	0	30.819	30.913	0.541	344.07	1.00	0.0000	Bedding
19	29.521	238	21.5	0.948	5	B	0	29.418	29.625	0.541	117.31	1.00	0.0000	Bedding
20	28.477	213	41.5	0.830	7	D	0	28.246	28.709	0.541	53.56	1.00	0.0000	Bedding

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DIP DATA INTERPRETATION
RGLDIP vsn 6.1
STRUCTURAL INTERPRETATION LOG

21 Oct 2004

MACTEC

Borehole: RI-SB-01

Casmalia Landfill

top of borehole.....
East:
North:
Alt:

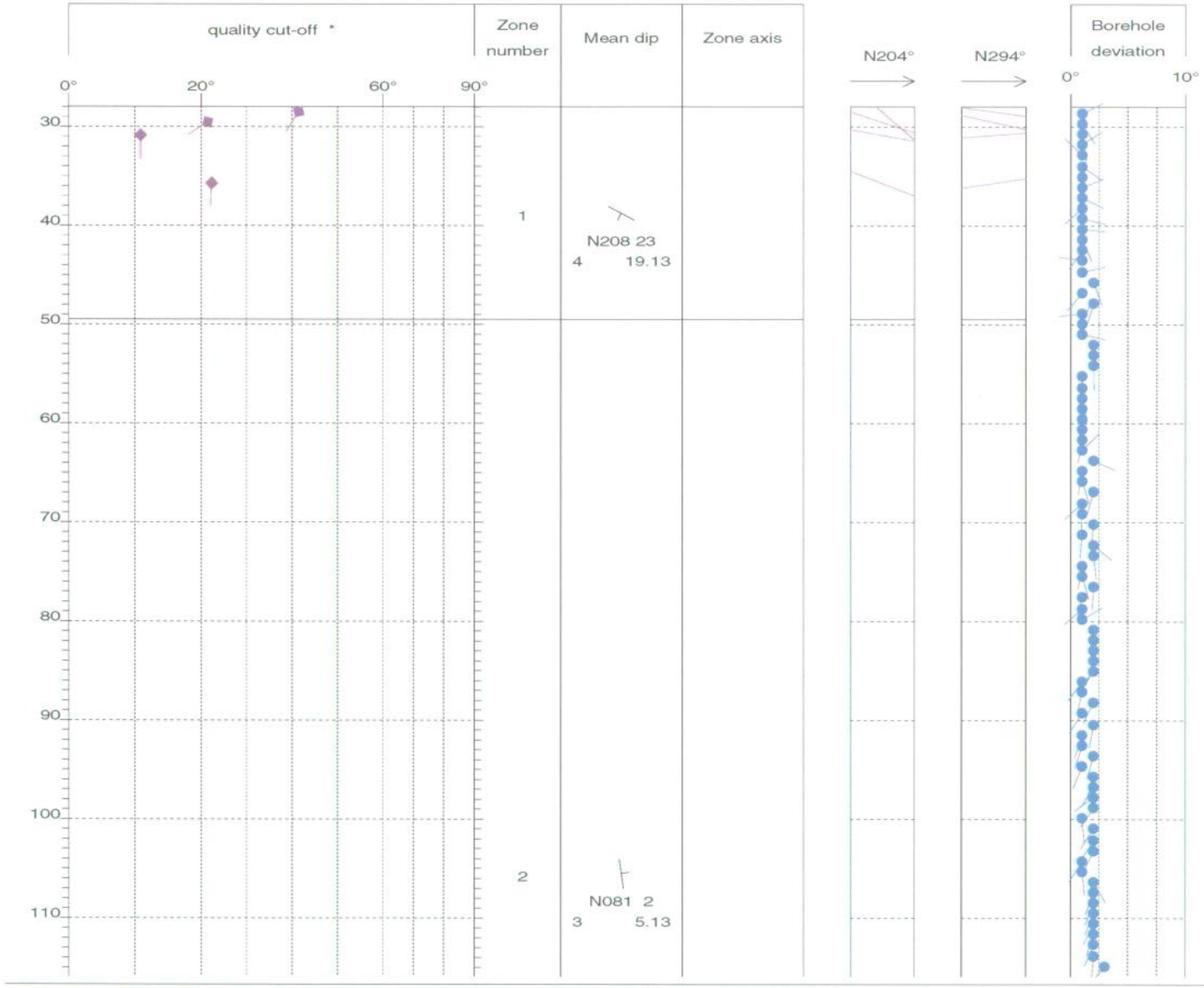
North ref: magnetic
Depth units are feet
Vertical scale: 1/200

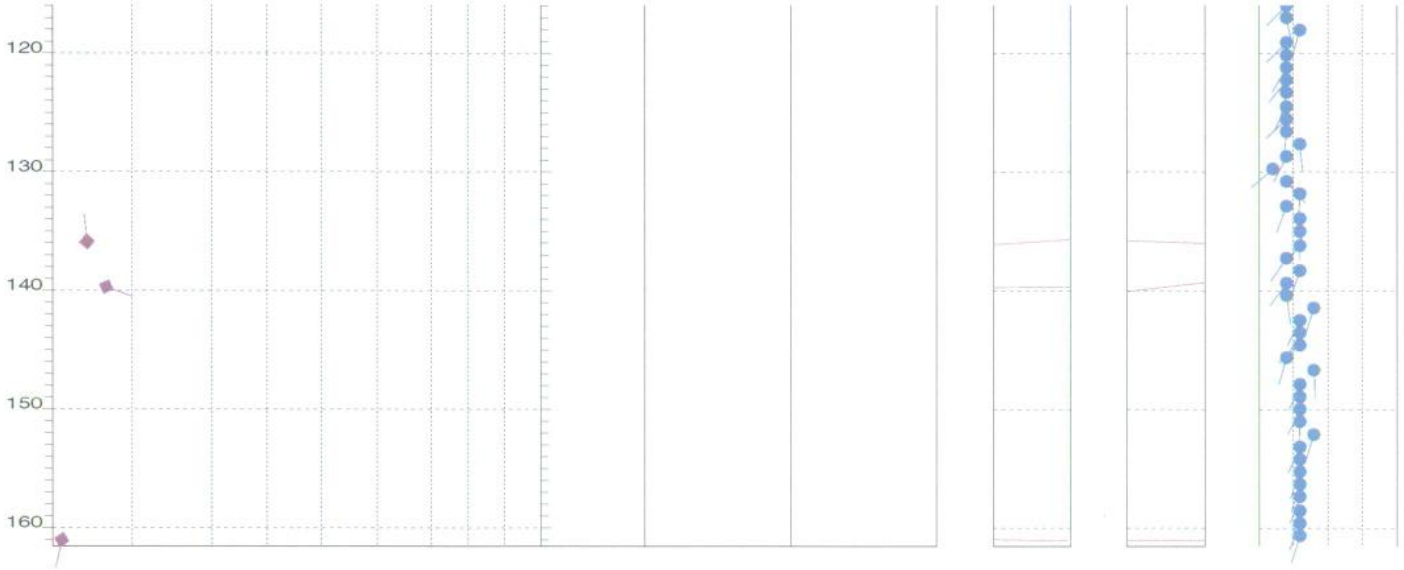
Zone from 161.525 to 27.977ft
Mean dip format: dip-azimuth and dip

Interpretation 1

Dip data sets .....
OPTV dips

open symbols not used in mean-dip/zone-axis calculation




120
130
140
150
160

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DIP DATA INTERPRETATION
RGLDIP vsn 6.1
STRUCTURAL INTERPRETATION STEREOGRAMS

21 Oct 2004

MACTEC

Borehole: RI-SB-01

Casmalia Landfill

top of borehole.....
East:
North:
Alt:

North ref: magnetic
Depth units are feet

Zone from 161.525 to 27.977ft
Mean dip format: dip-azimuth and dip

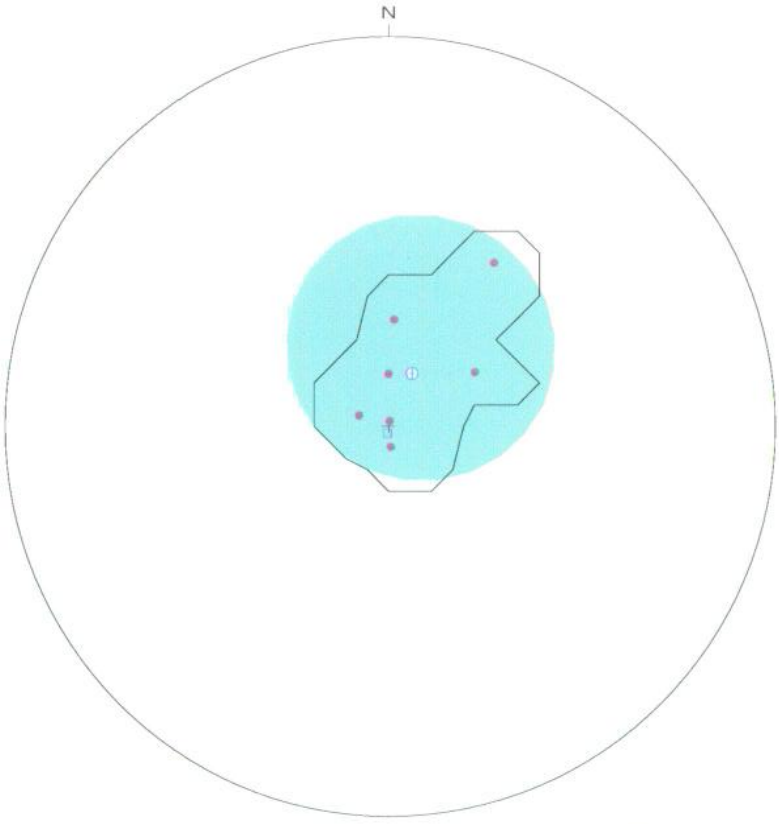
Interpretation 1

Dip data sets .....
OPTV dips

RI-SB-01
Zone 0. 27.977 - 161.525ft
Deviation 1.50 N195.10

dipdata sets.....
OPTV dips

	mean dip	n	dsp	zone axis	n	dev
N204 12	N204 12	7	5.1			



equal-area lower-hemisphere 0-90

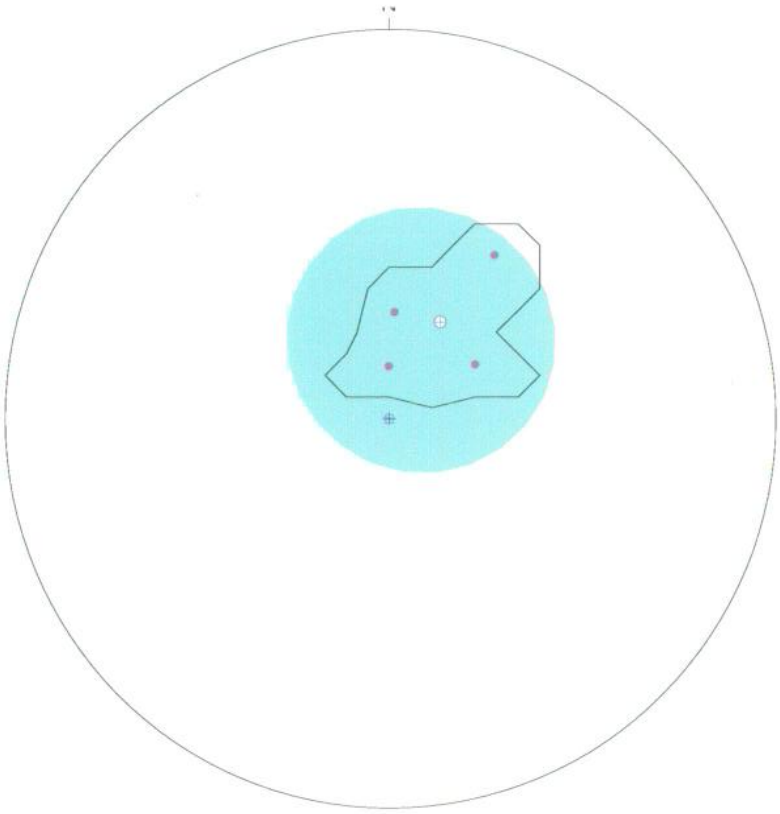
mean dip
zone axis
well axis

contour-levels 1,

Zone 1. 27.977 - 49.481ft
Deviation 0.18 N151.82

dipdata sets.....
OPTV dips

	mean dip	n	dsp	zone axis	n	dev
N204 12	N208 23	4	19.1			



equal-area lower-hemisphere 0-90

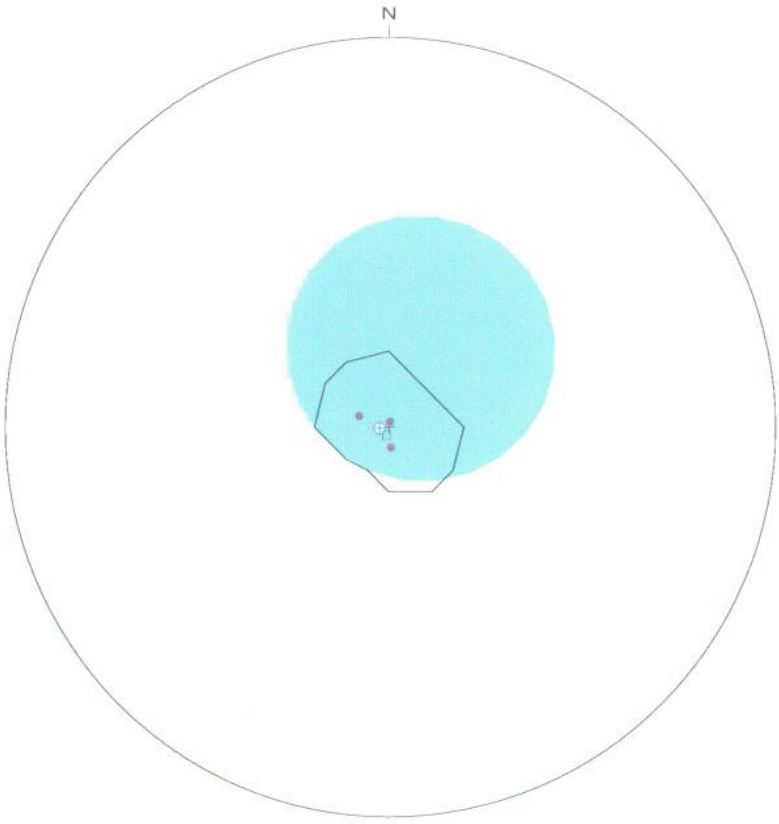
mean dip
zone axis
well axis

contour-levels 1,

RI-SB-01
Zone 2. 49.481 - 161.525ft
Deviation 1.80 N195.88

dipdata sets.....
OPTV dips

	mean dip	n	dsp	zone axis	n	dev
N204 12	N081 2	3	5.1			



equal-area lower-hemisphere 0-90

mean dip
zone axis
well axis

contour-levels 1,

RGLDIPv6.1 DIP DATA INTERPRETATION: STRUCTURAL

borehole RI-SB-01
zone from 27.000 to 161.000 m
North ref is magnetic
21 Oct 2004

Data is classed into 1 types
5 OPTV_dips

Quality cut-off level: *

Mean well deviation: 1.5deg to N195.1

1 small-circles defined

	SEARCH AREA			MEAN DIP		
	azim	pl	cone	strike	dip	n
1	21.8	71.7	28.3	114	12	7

Total number of data = 7
Number of data unaccounted for = 0

ZONE No.	DEVIATION Dev	Azim	DEPTHS m TOP	BASE	NO. DATA	MEAN DIPS and ZONE AXES
						Str Dip n Disp | Str Dip n Disp | Str Dip n Disp | Str Dip n Disp | Str Dip n Disp | Azm Pl n Dev | Azm Pl n Dev | Azm Pl n Dev | Azm Pl n Dev | Azm Pl n Dev
1	0.2	151.8	27.98	49.48	4	118 23 4 19.13 | 0 0 0 0.00 | 0 0 0 0.00 | 0 0 0 0.00 | 0 0 0 0.00 | 0 0 0 0.00 | 0 0 0 0.000 | 0 0 0 0.000 | 0 0 0 0.000 | 0 0 0 0.000 | 0 0 0 0.000
2	1.8	195.9	49.48	161.52	3	351 2 3 5.13 | 0 0 0 0.00 | 0 0 0 0.00 | 0 0 0 0.00 | 0 0 0 0.00 | 0 0 0 0.000 | 0 0 0 0.000 | 0 0 0 0.000 | 0 0 0 0.000 | 0 0 0 0.000

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DIP DATA INTERPRETATION
RGLDIP vsn 6.1
FRACTURE ANALYSIS LOG

21 Oct 2004

MACTEC

Borehole: RI-SB-01

Casmalia Landfill

top of borehole.....
East:
North:
Alt:

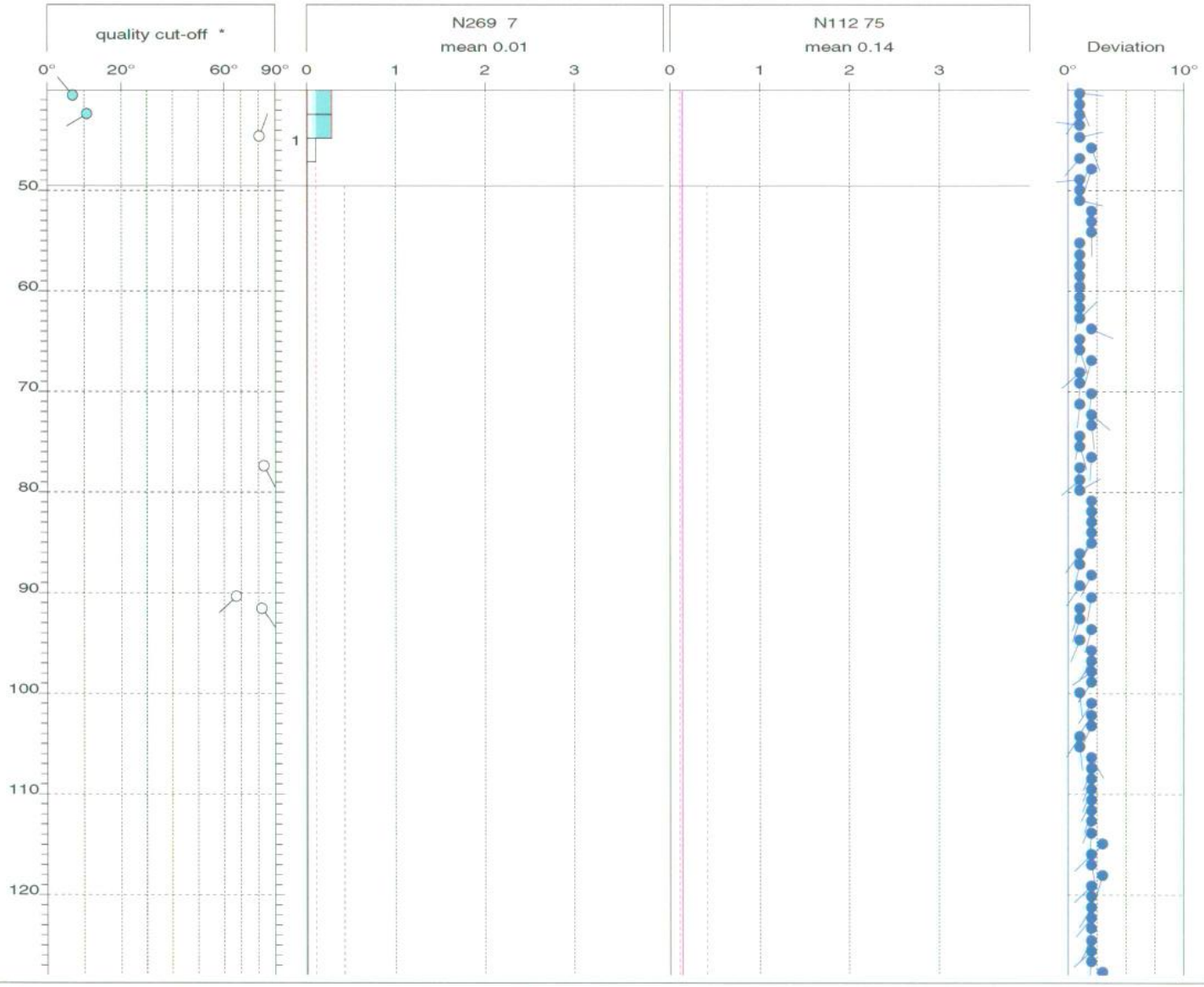
North ref: magnetic
Depth units are feet
Vertical scale: 1/200

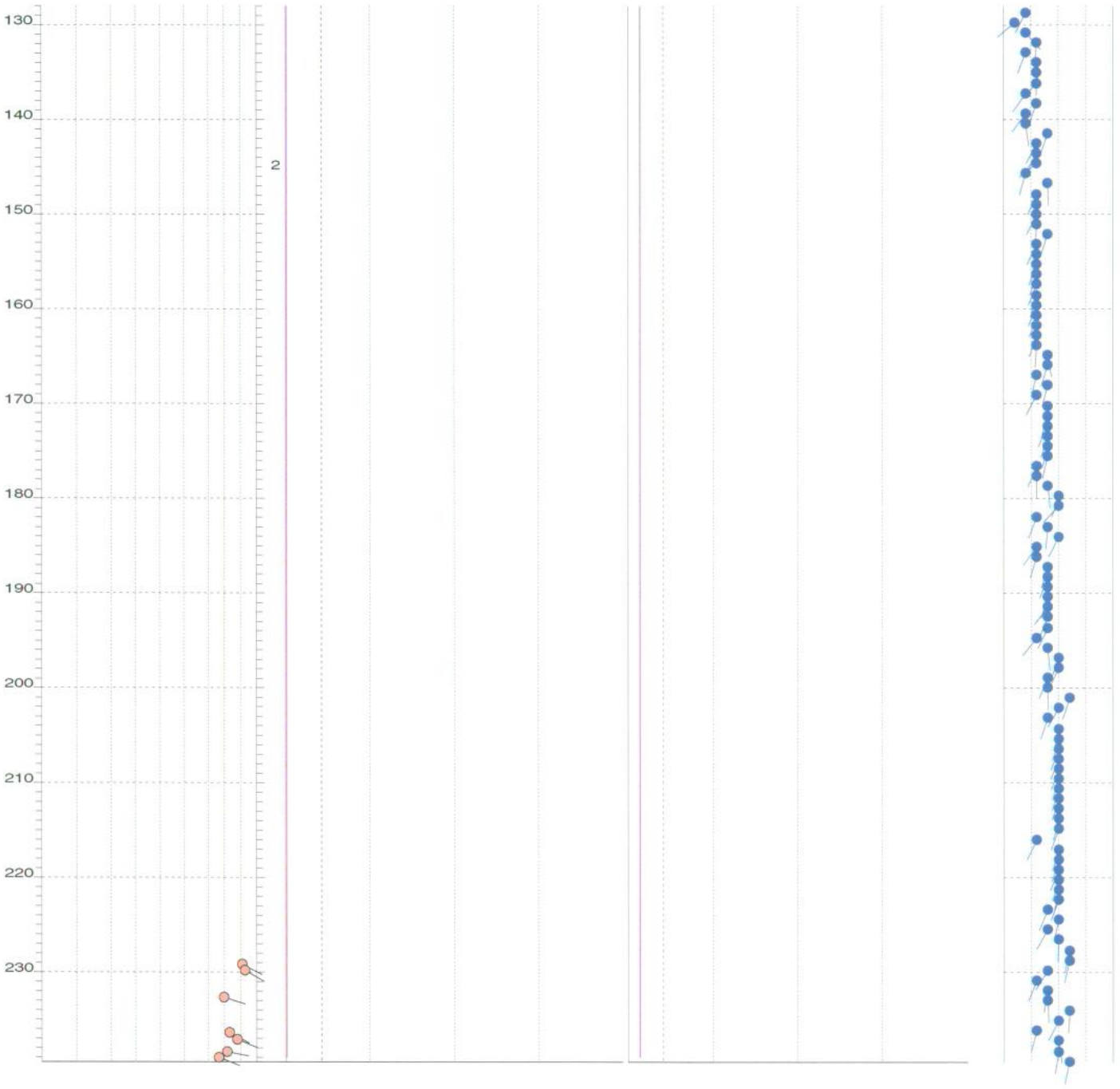
Zone from 239.506 to 40.038ft
Mean dip format: dip-azimuth and dip
Frequency histogram parameters:

measurement distance 7.101ft
step distance 2.367ft

Interpretation 1

Dip data sets .....
OPTV dips
Highlighted dips: Fracture Aquifer Open of Weathered
open symbols not used in mean-dip/zone-axis calculation




130
140
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200
210
220
230
2

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DIP DATA INTERPRETATION
RGLDIP vsn 6.1
FRACTURE ANALYSIS STEREOGRAMS

21 Oct 2004

MACTEC

Borehole: RI-SB-01

Casmalia Landfill

top of borehole.....
East:
North:
Alt:

North ref: magnetic
Depth units are feet

Zone from 239.506 to 40.038ft
Mean dip format: dip-azimuth and dip

Interpretation 1

Dip data sets .....
OPTV dips

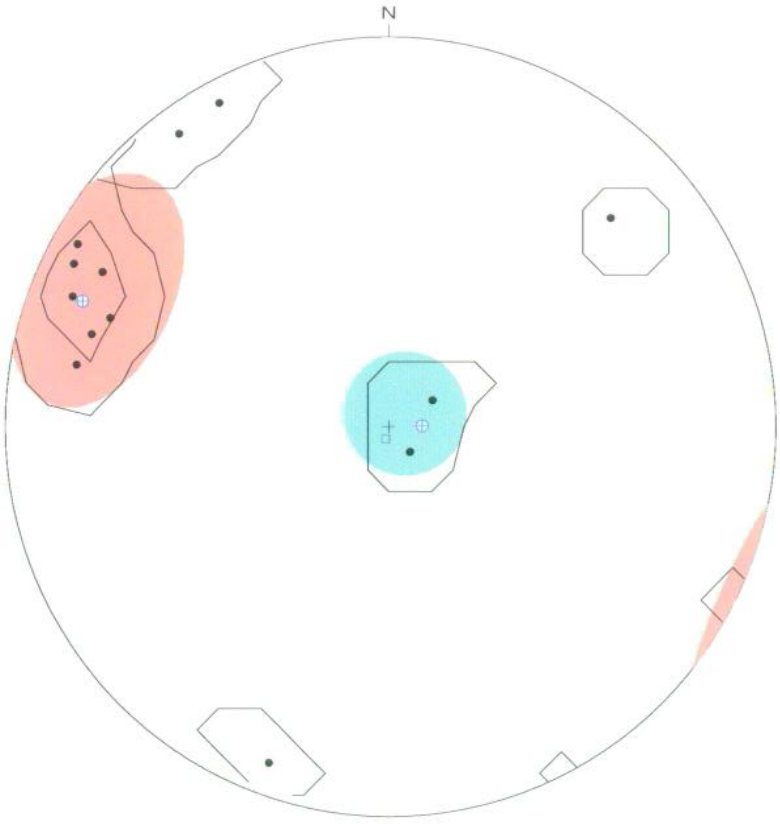
RI-SB-01
Zone 0. 40.038 - 239.506ft
Deviation 2.70 N196.00

dipdata sets.....
OPTV dips

	mean dip	n	f
N269 7	N269 7	2	(0.01)
N112 75	N112 75	7	(0.14)

intersections

	N269 7	N112 75
N269 7		03 N201
N112 75	03 N201	



⊕ mean dip
□ well axis

equal-area lower-hemisphere 0-90

contour-levels 1,3,

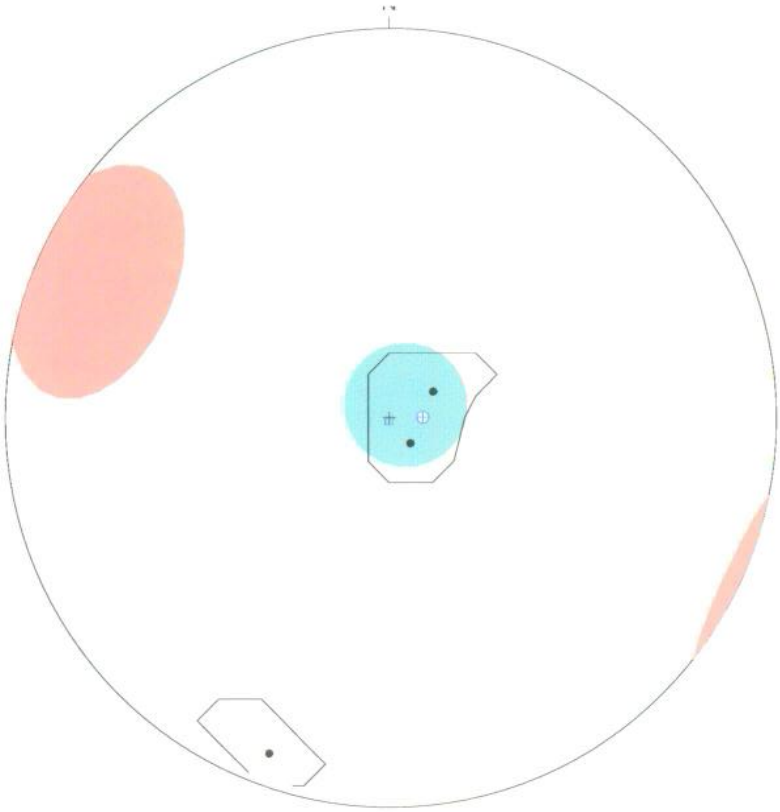
Zone 1. 40.048 - 49.515ft
Deviation 0.62 N192.69

dipdata sets.....
OPTV dips

	mean dip	n	f
N269 7	N269 7	2	0.21
N112 75			

intersections

	N269 7	N112 75
N269 7		
N112 75		



⊕ mean dip
□ well axis

equal-area lower-hemisphere 0-90

contour-levels 1,

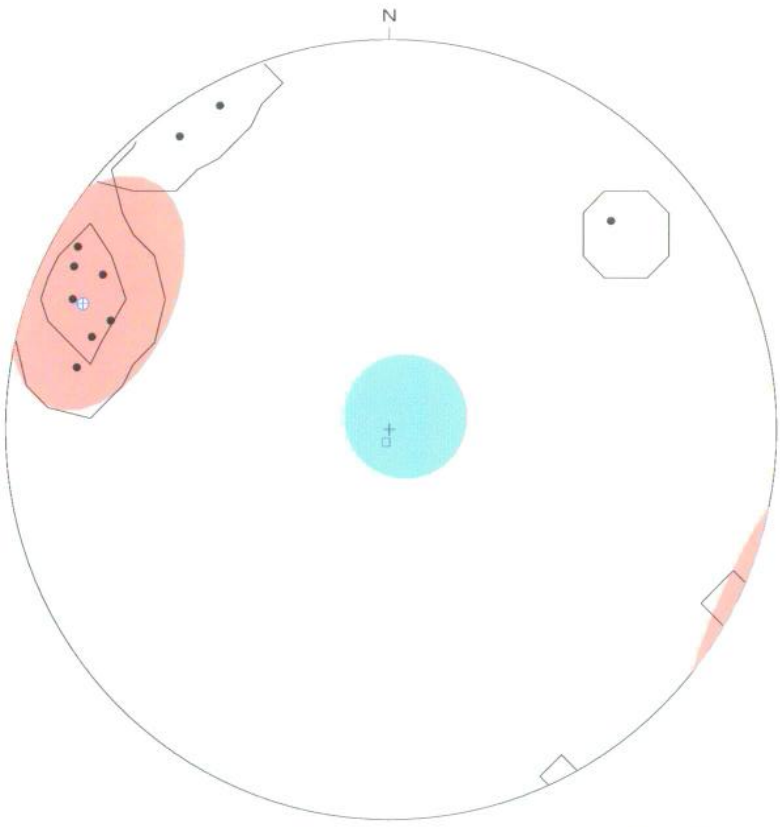
RI-SB-01
Zone 2. 49.515 - 239.506ft
Deviation 2.81 N196.04

dipdata sets.....
OPTV dips

	mean dip	n	dsp
N269 7			
N112 75	N112 75	7	11.28

intersections

	N269 7	N112 75
N269 7		
N112 75		



⊕ mean dip
□ well axis

equal-area lower-hemisphere 0-90

contour-levels 1,3,

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DIP DATA INTERPRETATION
RGLDIP vsn 6.1
FRACTURE DIP-AZIMUTH ROSE-DIAGRAM

21 Oct 2004

MACTEC

Borehole: RI-SB-01

Casmalia Landfill

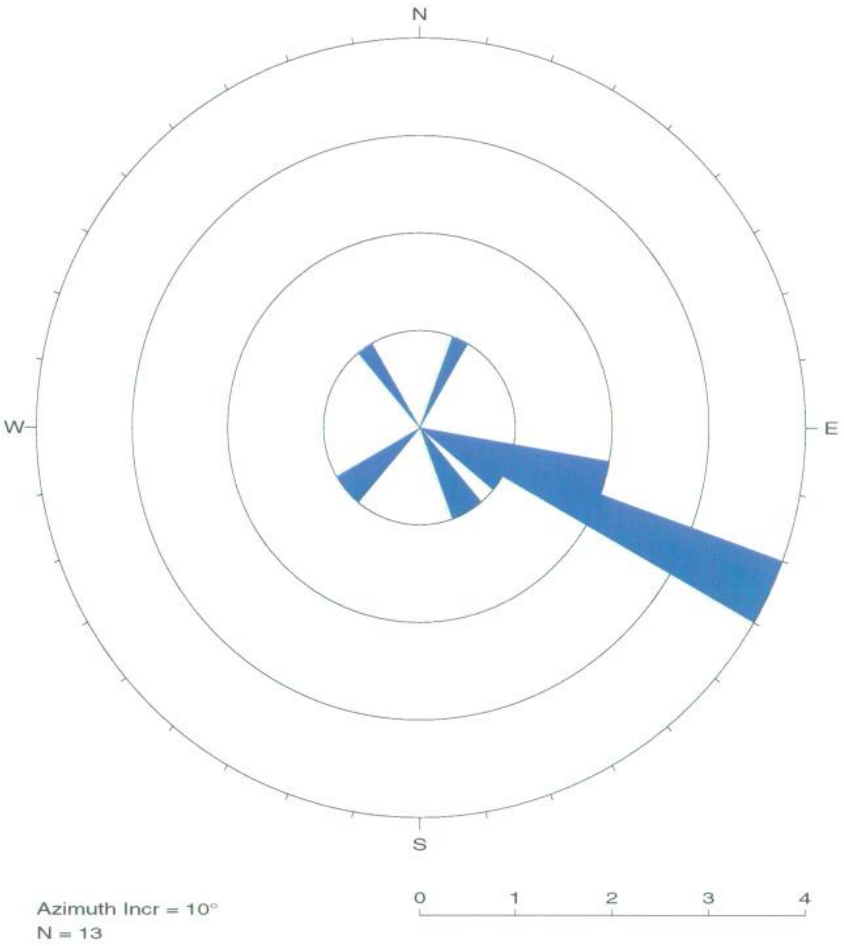
top of borehole.....
East:
North:
Alt:

North ref. is magnetic
Depth units are feet

Zone from 239.506 to 40.038ft

Dip data sets .....
OPTV dips

RI-SB-01
40.038 - 239.506ft
Dip-azimuth rose-diagram



Azimuth Incr = 10°
N = 13

RGLDIPv6.1 DIP DATA INTERPRETATION: FRACTURE ANALYSIS

borehole RI-SB-01
zone from 40.000 to 239.000 m
North ref is magnetic
21 Oct 2004

Data is classed into 1 types
5 OPTV_dips

Quality cut-off level: *

Mean well deviation: 2.7deg to N196.0

2 small-circles defined

	SEARCH AREA			MEAN DIP			
	azim	pl	cone	strike	dip	n	f
1	51.3	85.7	13.0	179	7	2	0.01
2	294.8	15.7	20.7	22	75	7	0.14

Total number of data = 9
Number of data unaccounted for = 4

ZONE No.	DEVIATION Dev	Azim	DEPTHS m TOP	BASE	No. DATA	MEAN DIPS and FREQUENCIES Str	Dip	n	f	Str	Dip	n	f	Str	Dip	n	f	Str	Dip	n	f
1	0.6	192.7	40.05	49.51	3	179	7	2	0.21	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
2	2.8	196.0	49.51	239.51	10	0	0	0	0.00	22	75	7	11.28	0	0	0	0.00	0	0	0	0.00