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Submitted to:

Atlas Salt Inc.
333 Duckworth Street
St. John's, NL
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Salt Drilling Program Support
Factual Summary Report of Geotechnical Logging, Packer Testing and Downhole Geophysical Surveys
Great Atlantic Salt Deposit
St. George's, NL

March 10, 2023
GEMTEC Project: 101556.001

GEMTEC Consulting Engineers and Scientists Limited
19 Dundee Avenue
Mount Pearl, NL, Canada
A1N 4R6

March 10, 2023

File: 101556.001 – R00

Atlas Salt Inc.
333 Duckworth Street
St. John's, NL
A1C 1G9

Attention: Mr. Patrick Laracy, LL.B., P.Geo, CEO & Director

Re: Salt Drilling Program Support, Factual Summary Report of Geotechnical Logging, Packer Testing and Downhole Geophysical Surveys, Great Atlantic Salt Deposit, St. George's, NL

Please find enclosed GEMTEC Consulting Engineers and Scientists Limited's Factual Summary Report submitted for the services carried out in support of Atlas Salt Inc.'s salt drilling program at the Great Atlantic Salt Deposit located in Turf Point, NL. This report contains a description of the scope and methodology of the services carried out, as well as a factual summary of the results of the various tasks.

Please direct all comments and questions regarding the contents of this report to the undersigned.

Sincerely,

Leanne Stein

Leanne Stein, P.Eng.

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1.0 INTRODUCTION

Atlas Salt Inc. (Atlas) retained GEMTEC Consulting Engineers and Scientists Limited (GEMTEC), in collaboration with Terrane Geoscience Inc. (Terrane), to carry out downhole geophysics data acquisition and in-situ hydraulic conductivity testing (packer testing) in support of Atlas' pre-feasibility drilling program at the Great Atlantic Salt deposit located near St. George's, NL. This scope of work was performed in accordance with GEMTEC's proposal dated January 17, 2022 and was adapted in consultation with Atlas during the course of the drilling program.

This report presents a summary of the applied methods associated with this program, the results of the collected survey and packer test data, and calculated hydraulic conductivity values. This report does not include any design recommendations for mine development based on the collected data.

2.0 SCOPE AND METHODOLOGY

The original proposed scope of work provided in GEMTEC's proposal consisted of the provision of a geophysical survey, hydrogeological testing (packer testing), and geotechnical logging of two boreholes, identified by Atlas Salt as CC#6 and CC#7 that were intended to be advanced through the overburden and upper siliciclastic sedimentary rock sequences and terminated within the underlying salt deposit.

Based on direction received from Atlas as the program progressed due to encountered ground conditions and Atlas' drilling sub-contractor's field work schedule, actual drilling consisted of a total of six (6) borehole collars, identified as CC#6, CC#7, CC#8, CC#9, CC#9a, and CC#9b, respectively. Boreholes CC#9 and CC#9a were ultimately abandoned by Atlas.

GEMTEC/Terrane's revised scope was performed over a series of five (5) separate site visits between February 3, 2022 and January 22, 2023, and consisted of geophysical survey and geotechnical logging of six (6) boreholes (CC#6, CC#7, CC#8, CC#9, and CC#9b, and additional logging of CC#4 previously drilled under a different program), hydrogeological testing of two (2) boreholes (CC#6 and CC#7), and collection and shipping of selected rock core samples obtained from two (2) boreholes (CC#6 and CC#7) under the direction of SLR Consulting (Canada) Ltd. (SLR), on behalf of Atlas. Figure 1 in Appendix A presents the client's borehole layout.

The geophysical survey was originally proposed to consist of optical borehole imagery, acoustic borehole imagery, and natural gamma. Due to poor visibility and downhole conditions caused by accumulated sediment in the first attempted borehole (CC#7), it was determined in consultation with Atlas that optical and acoustic surveys would be removed from the program, and only a natural gamma survey was conducted in the other three holes. Preliminary acoustic and gamma survey results were provided to Atlas during the program. Details on the methodology of the geophysical survey are presented in Terrane's technical memorandum (titled Downhole

Geolphysics Data Acquisition and Interpretation & Geotechnical Logging – Atlas Salt – Great Atlantic Salt Deposit – Near Turf Point, NL), dated March 10th, 2023, provided in Appendix B.

Hydrogeological testing of the upper sedimentary rock sequence was carried out in boreholes CC#6 and CC#7 as per GEMTEC's original proposal. Hydrogeological testing was not carried out on any additional boreholes and was not carried out in the salt horizon after discussion with Atlas. A total of eleven (11) packer tests were attempted, including six (6) in borehole CC#6 and five (5) in borehole CC#7. Several approaches were used to isolate the desired packer test intervals, including:

- Single packer testing to isolate a discrete interval as the hole was advanced with the bottom of the test interval bounded by the bottom of the hole; and,
- Double packer testing to isolate a discrete interval in the hole following completion of drilling.

The packer tests were conducted using a standard wireline packer system (SWiPS) with water inflatable bladders) and were performed using a constant head (Lugeon) packer injection test method. The packer test system is owned by Terrane and was operated on site by Terrane personnel.

Single packer tests were conducted as follows:

- The borehole was flushed with clean water through the drill rod for approximately 1 hour. Ideally flushing should be carried out until the return water is visibly clear; however, for all tests the return water still contained a high content of formational fines. The water used for packer testing was obtained from nearby surface water sources and was pumped into an on-site water tank for use during testing.
- The drill rods were then withdrawn to the desired test depth, and a single-element packer assembly was lowered inside the drill rods to the top of the test interval with the wireline. The packer bladder was then inflated (using pressurized water) to isolate the test interval; the bottom of which was bounded by the bottom of the drilled section of the borehole. Two single packer tests were completed in CC#6, with test interval lengths of 34.8 m (PT1) and 57.3 m (PT3).
- Once a successful seal was established, water was pumped into the isolated test interval through the injection pipe until a constant differential head and inflow rate were established. A total of three ascending and two descending water pressure steps were applied for each interval with regulated constant head achieved by controlling the injection flow rate using a bypass valve.
- For each test step, the water injection rate was observed until it had stabilized (generally up to 10 minutes). During this observation period, the pressure and injected quantity of water was recorded at one-minute intervals. The stabilized flow rate was used to calculate

the bulk hydraulic conductivity of the rock mass over the tested interval. Pressure was measured using a 10 psi or 100 psi gauge, depending on the required test pressures, and the water injection rate was measured using a flow meter totalizer and stopwatch.

Double packer tests were conducted as follows: the test interval was sealed at either end with a hydraulically inflated packer bladder, and water was injected through a section of perforated pipe located between the two packers. The same constant head injection test procedures were applied to the double packer test section as that described above for single packer testing. Double packer test interval lengths varied from 2.6 m to 4.6 m in length, depending on the length of the zone of interest.

The packer test results were analyzed by GEMTEC using a licensed copy of Waterloo Hydrogeologic, Inc.'s AquiferTest® Version 10 computer software program to derive an estimate of hydraulic conductivity for the bedrock in each tested interval.

Detailed geotechnical logging of the drilled core was completed in the field for all boreholes. Logging was carried out in accordance with directives provided by SLR in document titled "Appendix A – Standard Operating Procedure Geotechnical Logging of Core" (SLR, 2022). Draft geotechnical and lithological logs were provided to Atlas. Details on the methodology of the geotechnical logging scope are presented in Terrane's technical memorandum, provided in Appendix X, along with the final geotechnical logs.

At the request of Atlas and in accordance with GEMTEC proposal dated February 18, 2022 for sample collection and shipment, GEMTEC and Terrane personnel shipped samples obtained from boreholes CC#6 and CC#7. Sample selection was based on a list of selected sample intervals provided by SLR. Samples were shipped to SGS Canada Inc. (SGS) in Quebec City, QC. Sampling was carried out in accordance with the SGS Canada Inc. (SGS) document titled "Proposal #19031-PR1 for Geomechanical characterization of 227 drill core samples" dated January 7, 2022 (SGS, 2022). Sampling was later carried out by Atlas personnel for remaining boreholes.

Borehole collar coordinates were provided by Atlas to GEMTEC and Terrane by the Client for inclusion on the logs.

Table 1 summarizes the completed scope of work by borehole.

Table 1 Summary of Scope of Work

Borehole	Lithology Unit	Geotechnical Logging	Geophysics Survey	Hydrogological Testing (Packer Testing)
CC#4 (from previous program)	Sandstone / Mudstone	9 m to 186 m	Not Surveyed	Not Tested
CC#6	Sandstone / Mudstone	24 m to 296 m	22.18 m to 262.6 m	6 intervals
CC#7	Sandstone / Mudstone	14 m to 335 m	1 m to 348.4 m	5 intervals
	Salt	335 m to 347 m		
CC#8	Sandstone / Mudstone	34.8 m to 257 m	34.5 m to 263 m	Not Tested
	Salt	257 m to 263 m		
CC#9	Sandstone / Mudstone	28 m to 160 m	Not Surveyed	Not Tested
CC#9a	Not Logged	Not Logged	Not Surveyed	Not Tested
CC#9b	Sandstone / Mudstone	37.2 m to 242.5 m	1 m to 580 m	Not Tested
	Salt	242.5 m to 576.25 m		
	Anhydrite	576.25 m to 580 m		

3.0 RESULTS

The results of the geophysical surveys and a summary of the geotechnical logging and rock mass conditions are presented in Terrane's technical memorandum, dated March 10, 2023, provided in Appendix B, along with the final geophysical and geotechnical logs.

A summary table of the packer testing analytical results is presented in Table 2. The results of the packer testing analyses are presented in detail in Appendix C.

Table 2 Summary of Packer Testing Completed on Boreholes CC#6 and CC#7

Borehole	Packer Test	Test Interval (m)			Lithology	Hydraulic Conductivity (K) (m/s)
		From	To	Length		
CC#6	Failed test; unable to isolate zone	33.3	35.9	2.6	Sandstone	-
	Failed test; unable to isolate zone	81.3	84.9	3.6	Mudstone	-
	PT-2	99.3	103.9	4.6	Conglomerate	1.36E-07
	PT-3	111.3	168.6	57.3	Interbedded Sandstone/Conglomerate	4.98E-08
	Failed test; unable to isolate zone	180.3	184.9	4.6	Mudstone	-
	PT-1	261.3	296.1	34.8	Sandstone with Mudstone Interbeds	1.96E-08
CC#7	Failed test; unable to isolate zone	45.3	47.9	2.6	Mudstone	-
	Failed test; unable to isolate zone	63.3	66.9	3.6	Mudstone with Sandstone Interbeds	-
	PT-1	87.3	90.9	3.6	Sandstone/Conglomerate (bottom 1 m)	7.47E-07
	Failed test; interval obstructed (caved material)	95	99.5	4.5	Mudstone with Sandstone Interbeds	-
	PT-2	141.3	144.9	3.6	Sandstone	2.10E-06

A total of 11 packer tests were attempted, including six in borehole CC#6 and five in CC#7. Of these, five packer tests were successfully completed and hydraulic conductivity (K) values ranging from 5E-08 m/s to 2E-06 m/s were calculated. The geometric mean for all the packer tests was 1.84E-07 m/s. Packer tests could not be performed in the other six selected test intervals either

due to obstruction (caving) of the interval or more often due to the instability of the borehole wall that resulted in poor packer seating and improper isolation of the test zone. Calculated K values in the tested intervals are within the typical range of values for similar siliceous sedimentary rock types; however, all values should be regarded with caution given the large amount of fines in the holes during testing that could not be fully flushed resulting in potential for formational and fracture clogging in the test intervals

4.0 CLOSURE

We trust the information provided herein suits your current needs. If you have any questions concerning this report, please do not hesitate to contact the undersigned.

Leanne Stein, P.Eng.
Geotechnical Engineer

Candice Williams, P.Eng.
Hydrogeology / Geological Engineer

REGISTERED PROFESSIONAL GEOSCIENTIST
CAROLYN ANSTEY-MOORE
SIGNATURE
10/03/2023
DATE
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pegnl
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PERMIT N0563
GEMTEC Consulting
Engineers and Scientists Limited
Signature or Member Number
(Member-in-Responsible Charge)

Reviewed by,
Carolyn Anstey-Moore, M.Sc., M.A.Sc., P.Geo.
Hydrogeology / Senior Environmental Geologist

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Reviewed by,
Shawn Russell, P.Eng.
Geotechnical / Senior Engineer

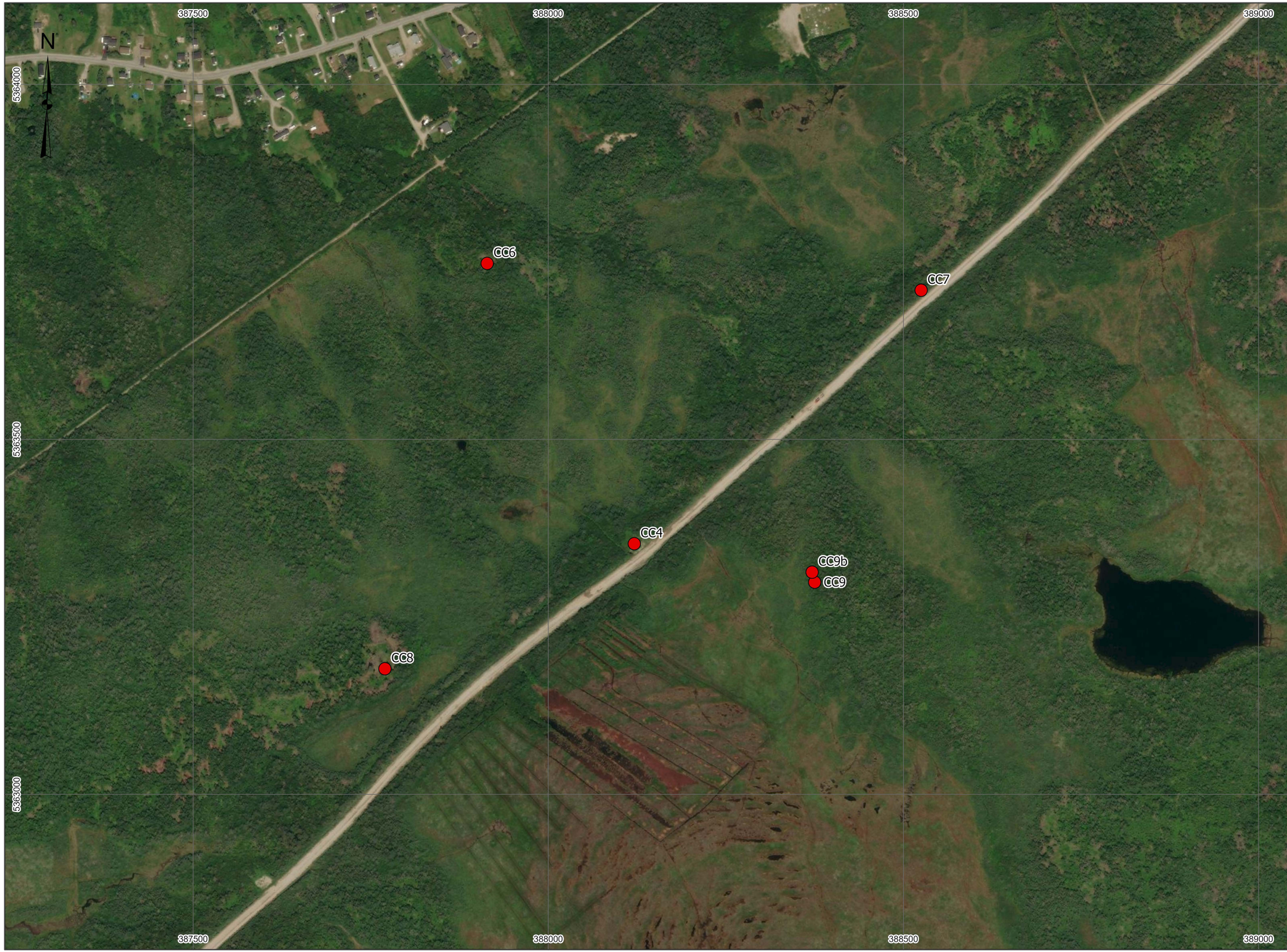
REFERENCES

(SGS, 2022). Proposal #19031-PR1 for Geomechanical characterization of 227 drill core samples. January 7, 2022.

(SLR, 2022). Appendix A – Standard Operating Procedure Geotechnical Logging of Core. January 13, 2022.

APPENDIX A

Figure 1 – Client Borehole Layout



ATLAS SALT

GEMTEC
Consulting Engineers and Scientists

DRILL HOLE LOCATION

0 50 100 150 200 m

NAD 1983 UTM Zone 21N

Notes
1. Drill Hole Locations Provided by Atlas Salt

Project:
SALT DRILLING PROGRAM SUPPORT

Drawing:
CLIENT BOREHOLE LAYOUT

CLIENT:	ATLAS SALT
DESIGNED/ PREPARED:	MATTHEW CLARKE
YYYY-MM-DD	2023-02-22
PROJECT NUMBER:	101556.001
DRAWING NUMBER:	FIGURE 1

Rev.01

APPENDIX B

Terrane Geoscience Inc. Memorandum

TERRANE
GEOSCIENCE INC.

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TO: Leanne Stein, P.Eng. – Geotechnical and Mining Engineer

FROM: Andrew Guest, B.Sc., P.Eng. – Intermediate Rock Mechanics Engineer

REVIEW: Tony Gilman, M.Sc., P.Geo, P.Eng – Senior Rock Mechanics Engineer

DATE: March 10th, 2023

RE: Downhole Geophysics Data Acquisition and Interpretation & Geotechnical Logging – Atlas Salt – Great Atlantic Salt Deposit – Near Turf Point, NL

1.0 INTRODUCTION

Terrane Geoscience Inc. (Terrane) has prepared this memorandum for Gemtec Consulting Engineers and Scientists (Gemtec) to summarize the results of geotechnical core logging, televiewer data acquisition and interpretation, and in-situ hydraulic conductivity testing for the Atlas Salt Great Atlantic Salt Deposit project near Turf Point, Newfoundland and Labrador (Figure 1).

2.0 SCOPE OF WORK

Terrane completed the following Scope of Work as part of this investigation:

- Geotechnical core logging and rock mass characterization,
- In-situ hydraulic conductivity testing (packer testing),
- Geomechanical sample collection,
- Televiewer data acquisition using an optical, acoustic, and gamma televiewer probe,
- Televiewer data interpretation to measure and record select structures,
- Geotechnical drillhole log preparation and reporting.

3.0 GEOLOGY

3.1. Regional Geology

The Carboniferous Bay St. George Sub-Basin, located in southwestern Newfoundland, is the northeastern extension of sub-basins that make up the Maritimes Carboniferous basin. The Maritimes Carboniferous Basin encompasses a large area under the Gulf of St. Lawrence and neighboring land.

The Bay St. George Sub-Basin is believed to have started forming in the middle to late Devonian into the Early Carboniferous due to strike-slip movement within the Cabot Fault system. The sub-basin formed west of the Long Range Fault, a northeast trending major strike-slip fault structure,

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as a pull-apart trough (Figure 2). The sub-basin was filled by Carboniferous sedimentary rocks that include the Namurian-Westphalian Barachois Group, Visean Codroy Group and the Famennian-Tournaisian Anguille Group.

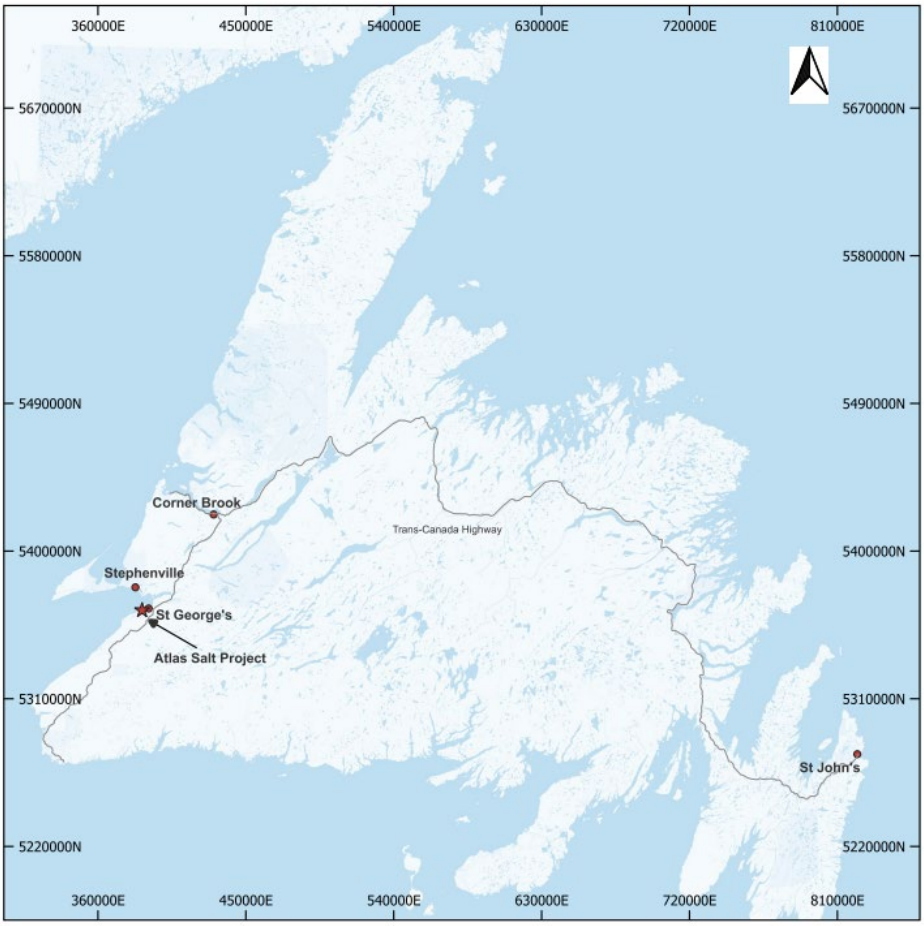

Figure 1 – Project Location Map

The Anguille Group is made up of non-marine siliclastic rocks and is separated into four sub-formations: Kennels Brook Formation red beds; Snakes Bight Formation lacustrine black shales, mudstones and deltaic sandstones; Friars Cove Formation grey fluvial-deltaic sandstones and shales; and Spout Falls Formation conglomerate (Knight, 1983). The Anguille group overlies a pre-Carboniferous basement complex and is the oldest strata in the sub-basin.

The Codroy Group overlies the Anguille Group conformably and is made up of a sequence of marine and non-marine strata. Knight (1983) separates the group into four formations: Ship Cove

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limestones; Codroy Road marine siliclastic and evaporitic rocks; Robinsons River sandstones and evaporites; and Woody Cape deltaic siliclastic sedimentary rocks.

The Barachois Group overlies the Codroy Group and consists of deltaic grey sandstone, red siltstone, grey to black mudstone and minor coal. The Barachois Group represents the youngest rock unit in the Bay St. George Sub-Basin.

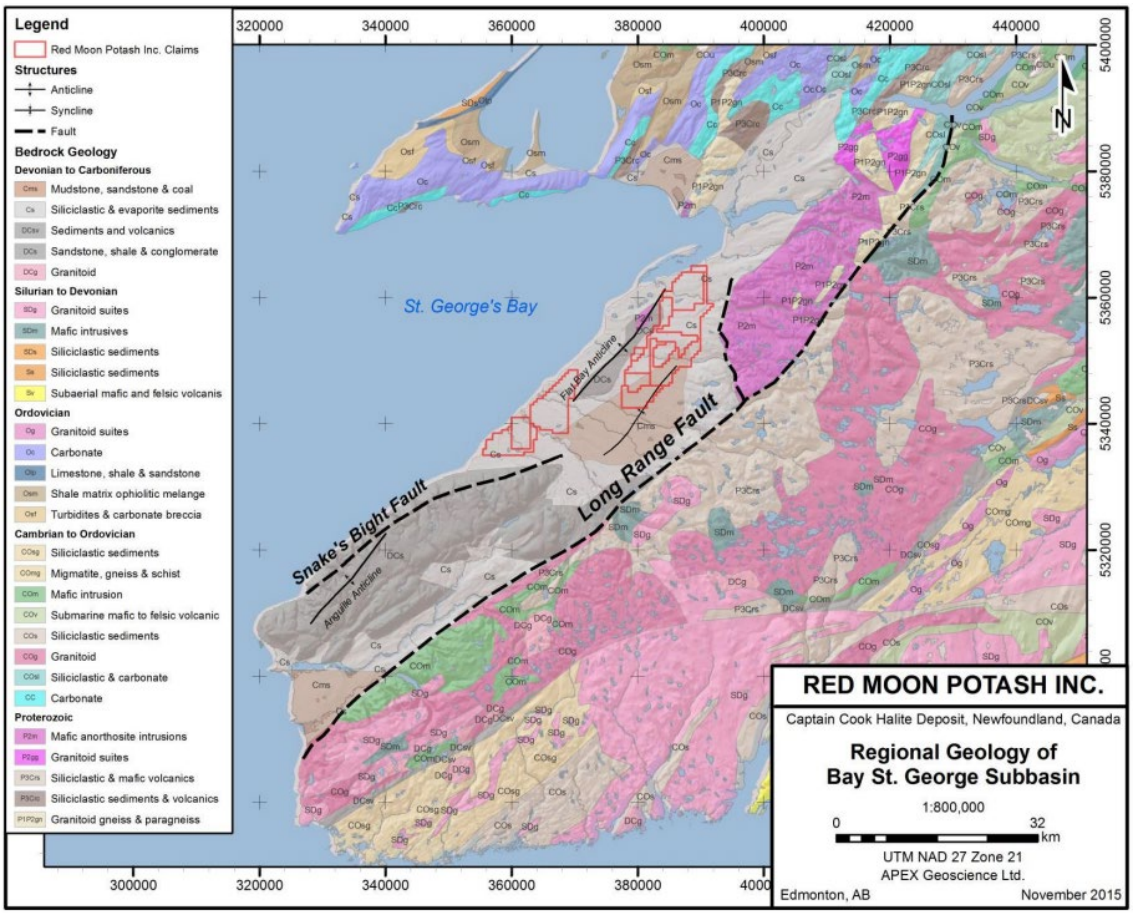

Figure 2 - Regional Geology Map (Adapted from APEX Geoscience, 2015)

3.2. Local Geology

The Great Atlantic Salt halite deposit occurs within the Robinsons River Formation of the Codroy Group. Figure 3 presents the lithologies in the vicinity of the project area. The halite unit is estimated to be 68 m to 347 m thick at depths ranging from 183 m to 394 m. The halite unit is overlain by fine grained, grey to red, siliclastic rocks and underlain by blue-grey, massive anhydrite. Within the halite unit are four discrete interbeds of potash and/or mudstone with an

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average thickness of 10 m. The two upper interbeds are interpreted to occur locally whereas the two lower interbeds are interpreted to occur continuously throughout the resource area. Figure 4 is a representative cross-section through the main resource area showing both stratigraphy and mineralization.

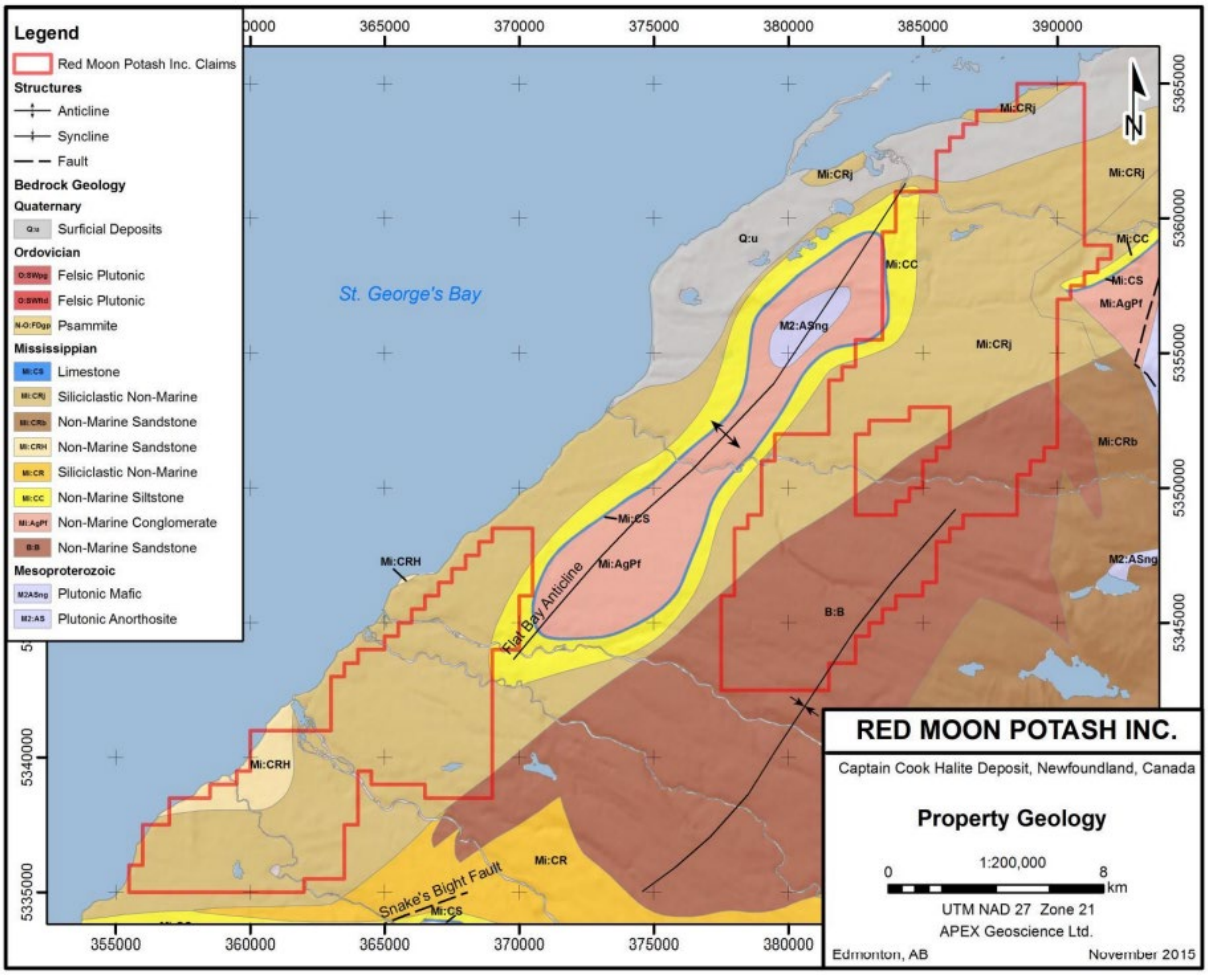

Figure 3 – The Great Atlantic Salt Deposit Local Geology. (Adapted from APEX Geoscience, 2016)

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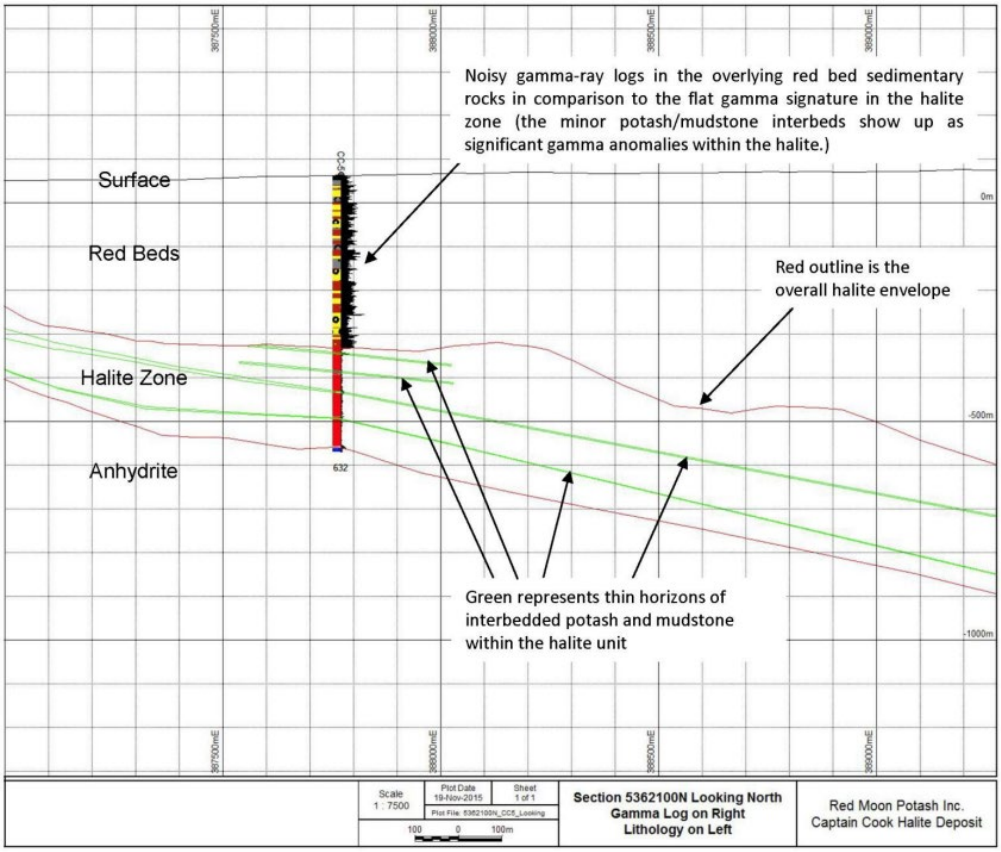

Figure 4 – Representative Cross Section of the Great Atlantic Salt deposit. (Adapted from APEX Geoscience, 2016)

4.0 FIELD DATA COLLECTION

A total of four site visits were completed by Terrane between February, 2022 and January, 2023. Table 1 summarizes the duration of each visit. Preliminary data was sent to Gemtec as it was collected throughout the project.

Table 1 – Summary of Site Visits Completed by Terrane

	From Date	To Date
Site Visit 1	February 6, 2022	February 28, 2022
Site Visit 2	March 28, 2022	April 11, 2022
Site Visit 3	August 16, 2022	August 21, 2022
Site Visit 4	December 16, 2022	December 18, 2022
Site Visit 5	January 19, 2023	January 23, 2023

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4.1. Geotechnical Core Logging

All core was logged at the Atlas Salt core logging facility in Stephenville, NL. Geotechnical core logging was completed by a junior or intermediate geotechnical engineer from Terrane, with the assistance of a junior Gemtec employee.

All core logging was completed in accordance with accepted geotechnical logging standards and following the SLR Consulting Ltd. geotechnical logging manual. Geotechnical logging included the collection of the required parameters to calculate RMR_{76} (Bieniawski, 1974) and Q (Barton, 1974) for each run. The logging consisted of interval logging of each core run. Each core run was 3 m long using a standard core barrel. For interval logging, data was collected on core recovery, RQD, discontinuity characteristics (e.g., alteration, weathering, and infill) and fracture counts.

Geotechnical logging consisted of 6 drillholes totaling 1,853 m (Figure 5). Collar locations, azimuth, dip and total length for each hole is summarized in Table 2. Detailed geotechnical drillhole logs are provided in Appendix A.

Table 2 – Summary of Geotechnical Drill Holes Logged

Drill hole ID[1.]	Easting[2.]	Northing[2.]	Elevation (m)	Collar Azimuth (º)	Collar Dip (º)	From Depth (m)	To Depth (m)
CC-22-04	388121	5363353	47	N/A	90	9	186
CC-22-06	387914	5363748	25	N/A	90	24	296
CC-22-07	388525	5363710	38	N/A	90	14.4	374
CC-22-08	387770	5363177	55	N/A	90	34.8	257
CC-22-09	388375	5363299	48	N/A	90	28.8	160.2
CC-22-09B	388361[3.]	5363312[3.]	48[4.]	N/A	90	37.2	580

Notes:
1. CC – Captain Cook.
2. NAD83 UTM Zone 21 North.
3. Coordinates were originally provided in NAD27 and have been converted to NAD83.
4. The elevation is an estimate provided by Atlas Salt.

4.2. Optical, Acoustic and Gamma Televiewer Surveying

Terrane completed acoustic televiewer (ATV) downhole surveys in two holes, and natural gamma televiewer (GTV) downhole surveys in four drillholes. Optical televiewer (OBI) surveys were also attempted, however, excess sediment within the water column prevented image collection. Table 3 summarizes the ATV and GTV data collection. Detailed televiewer logs displaying the raw imagery and structure picks are provided in Appendix B.

Table 3 - Acoustic and Gamma Televiewer Surveying Summary

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Drill hole ID[1.]	Easting[2]	Northing[2]	Elevation (m)	Acoustic Surveyed (m)	Gamma Surveyed (m)
CC-22-06	387914	5363748	25	168.1	262.6
CC-22-07	388525	5363710	38	200.0	348.0
CC-22-08	387770	5363177	55	N/A	260.0
CC-22-09B	388361[3.]	5363312[3.]	48[4.]	N/A	580.0

Notes:
1. CC – Captain Cook.
2. NAD83 UTM Zone 21 North.
3. Coordinates provided in NAD27, converted to NAD83.
4. The elevation is an estimate provided by Atlas Salt.

The total number of meters drilled differs from the amount of televiewer surveying completed on the project due to obstructions blocking the downhole tools.

4.3. In-Situ Hydraulic Conductivity Testing (Packer Testing)

Terrane completed packer testing on two drill holes. Details regarding packer testing methodology and results are presented under separate cover by Gemtec, titled *Factual Summary Report of Geotechnical Logging, Packer Testing and Down-Hole Geophysical Surveys, Salt Drilling Program, Great Atlantic Salt Deposit, St. George's, NL*.

4.4. Geomechanical Sample Collection

Terrane completed collection of geomechanical samples at locations provided by SLR Consulting Ltd. Details regarding geomechanical sample collection are presented under separate cover by Gemtec, titled *Factual Summary Report of Geotechnical Logging, Packer Testing and Down-Hole Geophysical Surveys, Salt Drilling Program, Great Atlantic Salt Deposit, St. George's, NL*.

5.0 ROCK MASS CLASSIFICATION

5.1. Methodology

The rock mass rating system (RMR_{76}) and the Q-system (Q') were used to evaluate the rock mass conditions on an interval basis (i.e. every 3 m).

5.1.1. Rock Mass Rating (RMR_{76})

RMR_{76} was developed by Bieniawski (1974) and is calculated using five (5) variables:

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Eq 1: $RMR_{76} = RMR_{RQD} + RMR_{IRS} + RMR_{JS} + RMR_{JC} + RMR_{GW}$

Where,

RMR_{RQD} = Rock quality designation (3 to 20)
RMR_{IRS} = Intact rock strength (0 to 15)
RMR_{JS} = Dominant joint spacing (5 to 30)
RMR_{JC} = Joint condition (0 to 25)
RMR_{GW} = Groundwater (0 to 10)

For the purposes of this assessment, RMR_{76} is assumed to be equal to $RMR_{76'}$ as an orientation factor was not considered. Table 4 shows the intervals of RMR_{76} and associated classification.

Table 4 - RMR_{76} Rock Mass Classification System

RMR_{76} Value (Range)	Classification
100 - 80	Very Good
80 – 60	Good
60 – 40	Fair
40 – 20	Poor
20 – 0	Very Poor

5.1.2. Q-system

The Q-system was developed by Barton (1974) with respect to the stability of underground openings. The Q-system is calculated using six (6) variables:

Eq 2: $$Q = \frac{RQD}{J_n} \times \frac{J_r}{J_a} \times \frac{J_w}{SRF}$$

Where,

RQD = Rock quality designation (10 to 100)
J_n = Joint set number (0.5 to 20)
J_r = Joint roughness number (0.5 to 4)
J_a = Joint alteration number (0.75 to 20)
J_w = Joint water reduction factor (1 to 4)
SRF = Stress reduction factor (0.5 to 400)

It should be noted that the data collected and presented as part of this memo is Q' (i.e. the final term J_w/SRF = 1 has been assumed). Table 5 shows the intervals of the Q-system (Q') and the associated qualitative classification.

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Table 5 – Q-system Classification System

Q' Value (Range)	Classification
1000 - 400	Exceptionally Good
400 - 100	Extremely Good
100 - 40	Verry Good
40 - 10	Good
10 - 4	Fair
4 - 1	Poor
1 – 0.1	Very Poor
0.1 – 0.01	Extremely Poor
0.01 – 0.001	Exceptionally Poor

5.2. Rock Mass Classification Results

For discussion purposes, Terrane has summarized the rock mass conditions (Table 6) based on two (2) areas relative to the halite zone. These areas are:

1. Red Beds (defined by upper halite contacts)
2. Salt (halite zone)

Table 6 - Summary of Rock Mass Classification for Each Area

Area	RMR_{76}			Q'			Classification
	Mean	Minimum	Maximum	Geomean[1.]	Minimum	Maximum	
Red Beds	35	18	67	1.5	0.1	32.1	Poor
Salt	61	32	75	27.0	1.7	66.6	Good

Notes: 1. Geomean – The geometric mean from a set of logarithmic values.

A detailed summary of the rock mass conditions is provided in Appendix C.

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6.0 CLOSURE

We trust that this memorandum meets the needs of Gemtec. Should you have any questions please do not hesitate to contact us.

Yours sincerely,

Terrane Geoscience Inc.

Prepared By:

Andrew Guest, P.Eng.
Intermediate Rock Mechanics Engineer

Josh Taningco, EIT
Junior Geotechnical Engineer

Reviewed By:

Tony L. Gilman, M.Sc., P.Eng., P.Geo.
Senior Rock Mechanics Engineer

2089 Maitland Street
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7.0 REFERENCES

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APPENDIX A – BOREHOLE LOGS

TERRANE GEOSCIENCE INC.

GEOTECHNICAL ROCK CORE LOG

BOREHOLE: CC4

TOTAL DEPTH: 186.00 m
N: 5363353 **E:** 388121
ELEVATION: 47.00 m
UTM ZONE: Geodetic

DATE STARTED: JUN 26, 2014
DATE COMPLETED: JUL 17, 2014
INCLINATION: 90°
AZIMUTH: N/A°

PROJECT NO.: 21-005-H
CLIENT: Atlas Salt
PROJECT NAME: Gemtec Atlas Salt Televiewer Packer Testing

Legend of Major Structures: Gouge, Sheared, Jointed, Broken — Definitions

IRS: Estimated Intact Rock Strength
UCS: Unconfined Compressive Strength
PLT: Point Load Test
FF/m: Fracture Frequency per m
TCR: Total Core Recovery
RQD: Rock Quality Designation
RMR: Rock Mass Rating (1976)
JCR: Joint Condition Rating
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DEPTH (m)	DEPTH (ft)	STRATA PLOT	LITHOLOGICAL DESCRIPTION	ALPHA	STRUCTURE	IRS (est.) / UCS / PLT (est.) (MPa)	FF/m	FF/m (10–30) / TCR / RQD (%)	Weathering	JCR	RMR 1976	OTHER TESTS
0	0		OVERBURDEN									
5	25											
10			MUDSTONE. Fine grained, red, hematite alteration.				50.0		3	0	18	
							50.0		3	0	19	
15	50		SANDSTONE WITH CONGLOMERATE INTERBEDS. Coarse to medium grained, light red to pale grey, hematite alteration.				5.0		2	6	42	
							4.3		2	6	42	
20							6.3		2	6	39	
	75						4.7		2	6	40	
25							4.0		2	6	44	
							5.3		2	6	37	
30	100						11.3		2	12	43	
							7.0		2	12	47	
35							2.3		2	12	43	
	125						5.7		2	12	49	
40							8.7		3	0	31	
			CONGLOMERATE. Coarse to medium grained, light red to grey, hematite alteration.									
45	150		MUDSTONE. Very fine with coarse grained, red, hematite alteration. Local clasts.				3.7		2	12	52	
			SANDSTONE. Medium to coarse grained, light red to grey, hematite alteration.									
50							13.3		3	6	28	

LOGGED: AG

CHECKED: TLG

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50		MUDSTONE. Very fine with coarse grained, red brown with grey, hematite alteration. Calcite clasts throughout up to 1 cm in size, subrounded. *(continued...)*				13.3		3	6	28	
						12.8		3	0	22	
	175	SANDSTONE. Fine to medium grained, grey with brown.				7.3		2	12	48	
55		MUDSTONE WITH INTERBEDDED SANDSTONE. Very fine to medium grained, red to red brown with grey, hematite alteration. Calcite clasts throughout.				8.7		2	0	26	
						6.0		2	0	32	
60	200					9.0		2	0	27	
						10.7		2	0	22	
65						35.3		3	0	21	
	225					4.7		2	6	42	
70						107.1	>>	3	0	19	
						50.0		3	0	19	
75	250	SANDSTONE. Fine grained, red brown, hematite alteration. Calcite clasts throughout.				5.0		2	6	44	
		MUDSTONE. Very fine with coarse grained, red to red brown, hematite alteration. Local calcite clasts, pitted.				2.0		2	12	53	
80						41.7		3	0	19	
	275					50.0		3	0	18	
85		SANDSTONE WITH MUDSTONE INTERBEDS. Medium to very fine grained. Red to red brown, hematite alteration.				6.0		2	6	40	
						5.0		2	6	36	
90	300					5.0		2	0	31	
		MUDSTONE WITH INTERBEDDED SANDSTONE. Very fine to fine grained, red to red brown with grey, hematite alteration.				6.0		2	6	40	
95						8.0		3	0	22	
	325										
100											

LOGGED: AG

CHECKED: TLG

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DEPTH (m)	DEPTH (ft)	LITHOLOGICAL DESCRIPTION	FF/m	Weathering	JCR	RMR 1976	OTHER TESTS
100		MUDSTONE. Very fine with medium grained, grey.	8.0	3	0	22	
		SANDSTONE WITH MUDSTONE INTERBEDS. Very fine to fine grained. Red brown with grey, hematite alteration.	7.0	2	6	29	
105	350	MUDSTONE. Very fine with medium grained, red with grey, hematite alteration.	50.0	3	0	18	
			50.0	3	0	19	
110		MUDSTONE WITH INTERBEDDED SANDSTONE. Very fine to coarse grained, red to red brown with grey, hematite alteration.	6.7	2	0	24	
115	375		9.3	2	0	30	
			7.3	2	6	33	
120			8.0	2	6	33	
	400		10.7	2	0	24	
125			8.7	2	6	32	
		SANDSTONE. Fine grained to medium, red with red brown, hematite alteration.					
130	425	MUDSTONE. Very fine with coarse grained, red, hematite alteration. Calcite clasts.	21.7	2	6	27	
		SANDSTONE. Medium to coarse grained, red with pale brown, hematite alteration.	14.3	2	0	24	
135		MUDSTONE. Very fine with coarse grained, red with grey, hematite alteration. Calcite clasts.	10.7	2	0	27	
	450		50.0	3	0	19	
140			50.0	4	0	19	
		SANDSTONE. Coarse, red with pale grey.	3.8	2	12	52	
145	475	MUDSTONE WITH INTERBEDDED SANDSTONE. Very fine to medium grained, red with brown and grey, hematite alteration. Calcite clasts up to 5 cm in size, sub rounded.	67.6	3	0	18	
			50.0	3	0	18	
150							

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150	500		MUDSTONE WITH INTERBEDDED SANDSTONE. Very fine to medium grained, red with brown and grey, hematite alteration. Calcite clasts up to 5 cm in size, sub rounded. *(continued...)*				5.3		2	6	34	
155							38.3		3	0	22	
							50.0		3	0	19	
160	525						50.0		3	0	19	
			MUDSTONE. Very fine grained, Grey with red brown. Crumbles in hands when picked up.				45.0		3	0	20	
165							50.0		2	0	19	
	550						50.0		2	0	19	
170							50.0		3	0	19	
							50.0		3	0	19	
175	575						50.0		3	0	18	
							35.3		2	6.0	30	
180			SALT.									
	600											
185			End of Borehole at 186 m.									
190	625											
195												
200	650											

LOGGED: AG

CHECKED: TLG

23-2-24 11:30:15 AM

TERRANE GEOSCIENCE INC.

GEOTECHNICAL ROCK CORE LOG

BOREHOLE: CC6

TOTAL DEPTH: 296.00 m
N: 5363748 **E:** 387914
ELEVATION: 25.00 m
UTM ZONE: Geodetic

DATE STARTED: MAR 23, 2022
DATE COMPLETED: APR 21, 2022
INCLINATION: 90°
AZIMUTH: N/A°

PROJECT NO.: 21-005-H
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DEPTH (m)	DEPTH (ft)	STRATA PLOT	LITHOLOGICAL DESCRIPTION	ALPHA	STRUCTURE	IRS (est.) / UCS / PLT (est.) (MPa)	FF/m	FF/m / TCR / RQD (%)	Weathering	JCR	RMR 1976	OTHER TESTS
0	0		OVERBURDEN									
25	100		SANDSTONE. Medium to coarse grained, grey with red brown, hematite alteration.				6.5		3	12	48	
							5.0		2	12	44	
							5.3		2	12	48	
			SANDSTONE WITH MUDSTONE INTERBEDS. Medium to coarse grained, red brown with grey, hematite alteration.				5.3		2	12	47	PT Test 1 A 33.30 to 35.80 m
			SANDSTONE. Medium to coarse grained, grey with red brown, hematite alteration.				5.3		2	12	52	
40	125		MUDSTONE WITH SANDSTONE INTERBEDS. Very fine and medium grained, Red brown, hematite alteration. Swelling clay from 43 to 45 m.				3.3		2	6	33	
							7.5		2	6	35	
							50.0		3	0	19	
							50.0		3	0	18	
45	150		SANDSTONE. Medium to coarse grained, grey with red brown, hematite alteration.				2.0		2	12	59	
50			MUDSTONE WITH SANDSTONE INTERBEDS. Very fine and medium grained, Red brown, hematite alteration.				43.3		3	0	20	

LOGGED: AG

CHECKED: TLG

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50											
		SANDSTONE. Medium to coarse grained, grey with red brown, hematite alteration.				8.3		3	12	43	
	175										
55		MUDSTONE WITH SANDSTONE INTERBEDS. Very fine and coarse grained, light brown to red brown and grey, hematite alteration. Some sand to up course grained within unit				6.3		2	6	41	
						50.0		3	0	19	
60	200					50.0		4	0	18	
						50.0		4	0	18	
65						50.0		4	0	18	
	225					50.0		3	6	26	
70						50.0		4	0	18	
						50.0		4	0	18	
75		MUDSTONE. Very fine to fine grained, brown, hematite alteration.				7.6		2	6	31	
	250					4.0		2	6	37	
80		MUDSTONE WITH SANDSTONE INTERBEDS. Very fine and fine grained, Red brown with grey, hematite alteration.				6.0		2	6	42	
		MUDSTONE. Very fine with coarse grained, grey to red brown, hematite alteration. Swelling clay with local, coarse clasts.				50.0		4	0	18	PT Test 2A 81.30 to 84.80 m
	275					49.4		4	0	18	
85		MUDSTONE WITH SANDSTONE INTERBEDS. Very fine and fine grained, Red brown with grey, hematite alteration.				8.4		2	6	32	
		MUDSTONE. Very fine grained, Dark grey with red brown, hematite alteration.				6.3		2	12	44	
90		SANDSTONE WITH MUDSTONE INTERBEDS. Very coarse to very fine grained. Red brown and grey to light grey, hematite alteration. Local conglomerate, pebbles up to 3 cm in size, sub-rounded				2.7		2	12	53	
	300					3.0		2	12	50	
95						2.3		2	12	56	
		CONGLOMERATE. Medium to very coarse grained, light red with grey.				2.7		2	12	53	PT Test 3 99.30
	325										
100											

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CHECKED: TLG

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DEPTH (m)	DEPTH (ft)	LITHOLOGICAL DESCRIPTION	ALPHA	STRUCTURE	IRS (est.) / UCS / PLT (est.) (MPa)	FF/m	TCR / RQD (%)	Weathering	JCR	RMR 1976	OTHER TESTS
100		CONGLOMERATE. Medium to very coarse grained, light red with grey. *(continued...)*				2.7		2	12	53	to 103.80 m
						5.0		2	12	48	
105	350					3.0		2	6	45	
						1.7		2	12	56	
110						2.3		2	12	55	PT 111.30 to m
		SANDSTONE. Medium to coarse grained, grey, hematite alteration.				3.0		2	12	51	
115	375	CONGLOMERATE. Medium to very coarse grained, grey with red brown, hematite alteration.				2.0		2	12	54	
		SANDSTONE. Fine to medium grained, grey with red brown, hematite alteration.				3.0		2	12	50	
120		SANDSTONE WITH CONGLOMERATE INTERBEDS. Medium to coarse grained, brown, hematite alteration. Local clast up to 5 cm in size, sub-rounded				1.3		2	12	58	
	400					1.0		2	12	61	
125						9.0		2	6	40	
		CONGLOMERATE WITH SANDSTONE INTERBEDS. Medium to coarse grained, brown with grey, hematite alteration. Rock mass is pitted, with clasts up to 8 cm in size, subrounded. Mud seem at 139 m, 80 cm thick				1.3		2	12	58	
130	425					0.3		2	12	67	
						50.0		4	0	19	
135						3.3		2	12	51	
	450					1.0		2	12	59	
140						1.0		2	6	55	
		SANDSTONE WITH CONGLOMERATE INTERBEDS. Very coarse with medium grained, brown grey, hematite alteration. Gradational lower contact, increasing conglomerate lenses at depth				2.0		2	12	55	
145	475										
150											

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150		CONGLOMERATE. Medium to very coarse grained, light grey with brown, hematite alteration. Locally pitted and local mud clasts of weaker strength. Clasts up to 10 cm in size. *(continued...)*				2.0		2	12	55	
	500					1.7		2	12	56	
155						2.7		2	12	52	
		SANDSTONE. Fine to medium grained, grey with brown, hematite alteration.				0.3		2	12	67	
160	525					0.7		2	12	64	
165						2.0		2	12	56	
	550					1.3		2	12	54	
		COAL. Very fine grained, black. Sulphide mineral present.									
170		SANDSTONE. Coarse grained, pale grey with pink, hematite alteration.				5.3		2	12	44	
		MUDSTONE WITH SANDSTONE INTERBEDS. Very fine and fine grained, Red brown with grey, hematite alteration.				50.0		3	0	19	
175	575					37.7		3	0	23	
180						2.1		2	12	51	PT Test 2 180.30 to 184.80 m
		MUDSTONE. Very fine grained to coarse grained, grey to dark grey and brown, hematite alteration locally. Local calcite clasts and calcite within matrix, highly reactive to HCL				50.0		3	0	18	
	600					50.0		3	0	18	
185						50.0		3	0	18	
						50.0		3	0	18	
190	625					6.5		3	6	34	
						50.0		3	0	18	
195						50.0		3	0	19	
	650					50.0		3	0	19	
200											

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200						19.3		3	0	23	
205	675	MUDSTONE WITH SANDSTONE INTERBEDS. Very fine and fine grained, Red brown with grey, hematite alteration.				2.0		2	12	52	
		MUDSTONE. Very fine grained to medium grained, red brown, hematite alteration.				50.0		3	0	18	
210						34.3		3	6	26	
	700	SANDSTONE WITH MUDSTONE INTERBEDS. Very fine to medium grained, red brown with grey, hematite alteration.				5.7		2	12	50	
215		MUDSTONE. Very fine grained to medium grained, red brown to grey, hematite alteration.				50.0		2	0	18	
						2.5		2	12	48	
220						7.0		2	6	40	
	725	SANDSTONE. Fine to medium grained, red brown, hematite alteration.				3.0		2	12	53	
225		CONGLOMERATE WITH SANDSTONE INTERBEDS. Medium to coarse grained, light brown to light grey, hematite alteration.				0.7		2	12	63	
	750					0.3		2	12	67	
230						1.7		2	12	57	
		MUDSTONE WITH SANDSTONE INTERBEDS. Very fine and fine grained, grey.				9.2		2	6	32	
		SANDSTONE WITH MUDSTONE INTERBEDS. Very fine to medium grained, grey with red brown, hematite alteration.				7.0		2	0	26	
235	775	MUDSTONE WITH SANDSTONE INTERBEDS. Very fine and fine grained, red brown, hematite alteration.				10.7		2	6	31	
240		SANDSTONE. Fine to coarse grained, red brown to pale grey, hematite alteration. Local mudstone and very course sandstone interbeds throughout.				3.0		2	12	53	
	800					4.7		2	6	46	
245						7.3		2	12	44	
250						10.0		2	6	33	

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RQD: Rock Quality Designation
RMR: Rock Mass Rating (1976)
JCR: Joint Condition Rating
PT: Packer Test

DEPTH (m)	DEPTH (ft)	LITHOLOGICAL DESCRIPTION	ALPHA	STRUCTURE	FF/m	Weathering	JCR	RMR 1976	OTHER TESTS
250	825	SANDSTONE. Fine to coarse grained, red brown to pale grey, hematite alteration. Local mudstone and very course sandstone interbeds throughout. *(continued...)*		Near vertical Shear Zone	10.0	2	6	33	
					2.3	2	6	47	
255					4.0	2	6	44	
	850				15.0	2	6	36	
260					10.7	2	6	41	PT Test 1 261.30 to 296.00 m
265					6.7	2	6	37	
	875				10.0	2	6	38	
270					4.0	2	6	38	
					6.0	2	0	31	
275	900	SANDSTONE WITH MUDSTONE INTERBEDS. Very fine to coarse grained, red brown with grey, hematite alteration.			31.0	3	0	20	
280		MUDSTONE. Very fine grained to medium grained, red brown to grey, hematite alteration.			45.0	3	0	19	
	925				50.0	3	0	18	
285					50.0	4	0	18	
					50.0	4	0	18	
290	950				50.0	4	0	18	
					50.0	4	0	18	
295									
	975	End of Borehole at 296 m.							
300									

LOGGED: AG

CHECKED: TLG

TERRANE GEOSCIENCE INC.

GEOTECHNICAL ROCK CORE LOG

BOREHOLE: CC7

TOTAL DEPTH: 374.00 m
N: 5363709 **E:** 388525
ELEVATION: 38.00 m
UTM ZONE: Geodetic

DATE STARTED: JAN 28, 2022
DATE COMPLETED: MAR 16, 2022
INCLINATION: 90°
AZIMUTH: N/A°

PROJECT NO.: 21-005-H
CLIENT: Atlas Salt
PROJECT NAME: Gemtec Atlas Salt Televiewer Packer Testing

Legend of Major Structures: Gouge, Sheared, Jointed, Broken — Definitions

IRS: Estimated Intact Rock Strength
UCS: Unconfined Compressive Strength
PLT: Point Load Test
FF/m: Fracture Frequency per m
TCR: Total Core Recovery
RQD: Rock Quality Designation
RMR: Rock Mass Rating (1976)
JCR: Joint Condition Rating
PT: Packer Test

DEPTH (m)	DEPTH (ft)	LITHOLOGICAL DESCRIPTION	STRUCTURE	Weathering	JCR	RMR 1976	OTHER TESTS
0	0	OVERBURDEN.					
15	50	MUDSTONE. Very fine grained, red brown to dark grey, hematite alteration.		3	0	18	
		SANDSTONE. Very fined to coarse grained, grey.					
		MUDSTONE. Very fine grained to medium, red brown, hematite alteration.		4	0	18	
20		MUDSTONE WITH SANDSTONE INTERBEDS. Very fine grained to medium, red brown with grey, hematite alteration.		4	6	24	
	75	SANDSTONE WITH MUDSTONE INTERBEDS. Very fine to fine grained, grey with red brown, hematite alteration.		3	6	24	
25		MUDSTONE WITH SANDSTONE INTERBEDS. Very fine grained to medium, red brown with grey, hematite alteration.		3	0	18	
		SANDSTONE. Very fined to coarse grained, dark grey to light grey.					
30	100	MUDSTONE WITH SANDSTONE INTERBEDS. Very fine grained, coarse grained locally, red brown with grey, hematite alteration.	Crushed rocks. Clay	3	0	18	
				3	0	18	
35		SANDSTONE WITH MUDSTONE INTERBEDS. Very fine to coarse grained, grey with red brown, hematite alteration.		3	6	39	
	125	CONGLOMERATE. Fine to coarse, grey.	~~Clay~~ ~~Clay~~	3	6	44	
40				2	12	51	
		MUDSTONE. Very fine grained, grey brown, hematite alteration.		2	12	43	
45	150	SANDSTONE WITH MUDSTONE INTERBEDS. Very fine to fine grained, grey with brown.		5	0	18	
		MUDSTONE. Very fine grained to medium, grey to red brown, hematite alteration.	Soft clay	5	0	18	
50				2	6	41	

LOGGED: AG

CHECKED: TLG

TERRANE GEOSCIENCE INC.

GEOTECHNICAL ROCK CORE LOG

BOREHOLE: CC7

TOTAL DEPTH: 374.00 m
N: 5363709 **E:** 388525
ELEVATION: 38.00 m
UTM ZONE: Geodetic

DATE STARTED: JAN 28, 2022
DATE COMPLETED: MAR 16, 2022
INCLINATION: 90°
AZIMUTH: N/A°

PROJECT NO.: 21-005-H
CLIENT: Atlas Salt
PROJECT NAME: Gemtec Atlas Salt Televiewer Packer Testing

Legend of Major Structures: Gouge, Sheared, Jointed, Broken — Definitions

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PLT: Point Load Test
FF/m: Fracture Frequency per m

TCR: Total Core Recovery
RQD: Rock Quality Designation
RMR: Rock Mass Rating (1976)
JCR: Joint Condition Rating

PT: Packer Test

DEPTH (m)	DEPTH (ft)	LITHOLOGICAL DESCRIPTION	ALPHA	STRUCTURE	IRS (est.) UCS PLT (est.) (MPa)	FF/m	FF/m 10 20 30 / TCR RQD (%)	Weathering	JCR	RMR 1976	OTHER TESTS
50		SANDSTONE. Fined to coarse grained, pale grey to green grey.						3	6	28	
		SANDSTONE WITH MUDSTONE INTERBEDS. Very fine to medium grained, grey with red brown, hematite alteration. *(continued...)*		Clay				2	12	58	
	175										
55		MUDSTONE. Very fine grained, red brown with grey, hematite alteration.						3	0	18	
		SANDSTONE. Fined to medium grained, light grey to grey.						4	0	18	
		MUDSTONE WITH SANDSTONE INTERBEDS. Very fine to medium grained, pebbles locally, red brown with grey, hematite alteration. Anhydrite clasts at upper contact.						4	0	18	
60		SANDSTONE. Fined to medium grained, grey to dark grey.						2	12	54	
	200							2	12	49	
		MUDSTONE WITH SANDSTONE INTERBEDS. Very fine to medium grained, grey with red brown, hematite alteration.						3	6	49	
65								2	6	38	
	225							3	6	34	
70		MUDSTONE. Very fine grained with coarse, light brown to red brown.						5	0	18	
								6	0	18	
75								6	0	18	
	250							2	12	54	
		CONGLOMERATE. Medium to coarse grained, light grey to grey with brown, hematite alteration.						5	0	18	
80		MUDSTONE. Very fine grained with coarse, red brown to grey.						5	0	18	
	275							5	0	18	
85								2	12	53	
		SANDSTONE. Fined to very coarse grained, grey green to brown, chlorite alteration.						2	12	56	PT Test 2 87.30 to 90.80 m
90		CONGLOMERATE. Fine to coarse grained, brown to light grey, hematite alteration.						2	6	46	
	300	SANDSTONE WITH MUDSTONE INTERBEDS. Very fine to fine grained, grey to red brown, hematite alteration.						2	12	51	
		MUDSTONE. Very fine to medium grained, dark brown to grey, hematite alteration.						3	0	18	
95		MUDSTONE WITH SANDSTONE INTERBEDS. Very fine grained with coarse grained, red brown and grey, hematite alteration.						2	12	51	
								4	0	18	
	325							4	0	18	
100								3	6	29	

LOGGED: AG

CHECKED: TLG

TERRANE GEOSCIENCE INC.

GEOTECHNICAL ROCK CORE LOG

BOREHOLE: CC7

TOTAL DEPTH: 374.00 m
N: 5363709 **E:** 388525
ELEVATION: 38.00 m
UTM ZONE: Geodetic

DATE STARTED: JAN 28, 2022
DATE COMPLETED: MAR 16, 2022
INCLINATION: 90°
AZIMUTH: N/A°

PROJECT NO.: 21-005-H
CLIENT: Atlas Salt
PROJECT NAME: Gemtec Atlas Salt Televiewer Packer Testing

Legend of Major Structures: Gouge, Sheared, Jointed, Broken — Definitions

IRS: Estimated Intact Rock Strength
UCS: Unconfined Compressive Strength
PLT: Point Load Test
FF/m: Fracture Frequency per m

TCR: Total Core Recovery
RQD: Rock Quality Designation
RMR: Rock Mass Rating (1976)
JCR: Joint Condition Rating

PT: Packer Test

DEPTH (m)	DEPTH (ft)	LITHOLOGICAL DESCRIPTION	ALPHA	STRUCTURE	Weathering	JCR	RMR 1976	OTHER TESTS
100		MUDSTONE WITH SANDSTONE INTERBEDS. Very fine grained with coarse grained, red brown and grey, hematite alteration. *(continued...)*			3	6	29	
					3	6	24	
105	350				3	6	38	
					3	6	38	
110					3	6	24	
					2	12	39	
		MUDSTONE. Very fine with coarse grained, dark brown to grey, hematite alteration.			5	0	18	
115	375				5	0	18	
					5	0	18	
120					5	0	18	
	400				5	0	18	
125					5	0	18	
					5	0	18	
130	425				5	0	18	
					4	0	18	
135		SANDSTONE WITH MUDSTONE INTERBEDS. Fine to medium grained, light grey with brown, hematite alteration.			2	6	35	
	450				2	12	47	
140		MUDSTONE. Very fine grained, red brown, hematite alteration.			2	12	43	
		SANDSTONE. Fined to very coarse grained, grey with brown, hematite alteration.		Shear zone with clay	2	12	47	PT Test 1 144.80 to 148.30 m
145	475				2	12	57	
		MUDSTONE WITH SANDSTONE INTERBEDS. Very fine grained with medium grained, red brown with grey, hematite alteration.			2	6	38	
150					4	0	18	

LOGGED: AG

CHECKED: TLG

TERRANE GEOSCIENCE INC.

GEOTECHNICAL ROCK CORE LOG

BOREHOLE: CC7

TOTAL DEPTH: 374.00 m
N: 5363709 **E:** 388525
ELEVATION: 38.00 m
UTM ZONE: Geodetic

DATE STARTED: JAN 28, 2022
DATE COMPLETED: MAR 16, 2022
INCLINATION: 90°
AZIMUTH: N/A°

PROJECT NO.: 21-005-H
CLIENT: Atlas Salt
PROJECT NAME: Gemtec Atlas Salt Televiewer Packer Testing

Legend of Major Structures: Gouge, Sheared, Jointed, Broken — Definitions

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TCR: Total Core Recovery
RQD: Rock Quality Designation
RMR: Rock Mass Rating (1976)
JCR: Joint Condition Rating
PT: Packer Test

DEPTH (m)	DEPTH (ft)	LITHOLOGICAL DESCRIPTION	ALPHA	STRUCTURE	IRS (est.) / UCS / PLT (est.) (MPa)	FF/m	TCR / RQD (%)	Weathering	JCR	RMR 1976	OTHER TESTS
150	500	MUDSTONE WITH SANDSTONE INTERBEDS. Very fine grained with medium grained, red brown with grey, hematite alteration. *(continued...)*						3	6	40	
								2	6	39	
155		MUDSTONE. Very fine grained with medium, red brown with grey, hematite alteration.						4	0	18	
								4	0	18	
								2	12	55	
160	525	SANDSTONE WITH MUDSTONE INTERBEDS. Fine grained to pebble, light grey with brown, hematite alteration.						2	12	56	
								2	12	52	
165		MUDSTONE. Very fine grained with coarse, red brown, hematite alteration.						5	0	18	
	550							4	0	18	
		SANDSTONE. Fined to medium grained, light grey to grey.						2	12	53	
170		SANDSTONE WITH MUDSTONE INTERBEDS. Very fine to medium grained, red brown with grey, hematite alteration.						3	0	25	
				Clay				2	6	36	
175	575							3	0	23	
		MUDSTONE WITH SANDSTONE INTERBEDS. Very fine to fine grained, red brown with grey, hematite alteration.									
180		SANDSTONE WITH MUDSTONE INTERBEDS. Very fine to coarse grained, grey with light grey, hematite alteration.						2	6	34	
	600							2	12	44	
185		MUDSTONE WITH SANDSTONE INTERBEDS. Very fine to fine grained, red brown with grey, hematite alteration.						3	0	28	
								2	6	39	
190	625							3	0	18	
								2	6	42	
195		SANDSTONE. Fined to medium grained, green grey, chlorite alteration.						2	12	56	
	650	MUDSTONE. Very fine grained with coarse, grey to dark grey. Pebbled sand particles subrounded in matrix.						4	0	18	
200											

LOGGED: AG

CHECKED: TLG

TERRANE GEOSCIENCE INC.

GEOTECHNICAL ROCK CORE LOG

BOREHOLE: CC7

TOTAL DEPTH: 374.00 m
N: 5363709 **E:** 388525
ELEVATION: 38.00 m
UTM ZONE: Geodetic

DATE STARTED: JAN 28, 2022
DATE COMPLETED: MAR 16, 2022
INCLINATION: 90°
AZIMUTH: N/A°

PROJECT NO.: 21-005-H
CLIENT: Atlas Salt
PROJECT NAME: Gemtec Atlas Salt Televiewer Packer Testing

Legend of Major Structures: Gouge, Sheared, Jointed, Broken — Definitions

IRS: Estimated Intact Rock Strength
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PLT: Point Load Test
FF/m: Fracture Frequency per m

TCR: Total Core Recovery
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RMR: Rock Mass Rating (1976)
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DEPTH (m)	DEPTH (ft)	LITHOLOGICAL DESCRIPTION	ALPHA	STRUCTURE	Weathering	JCR	RMR 1976	OTHER TESTS
200		MUDSTONE WITH SANDSTONE INTERBEDS. Very fine to medium grained, grey to red brown, hematite alteration. Local anhydrite clasts.			2	6	35	
205	675	SANDSTONE WITH MUDSTONE INTERBEDS. Very fine to coarse grained, grey with brown, hematite alteration.		Fault with sandy infill.	2	12	47	
		MUDSTONE WITH SANDSTONE INTERBEDS. Very fine to coarse grained, red brown with grey, hematite alteration.			3	0	23	
210		SANDSTONE. Fined to medium grained, grey.			2	12	52	
	700	MUDSTONE WITH SANDSTONE INTERBEDS. Very fine to fine grained, red brown with grey, hematite alteration.			2	6	37	
215		SANDSTONE WITH MUDSTONE INTERBEDS. Very fine to coarse grained, grey with red brown, hematite alteration.			3	0	18	
		MUDSTONE WITH SANDSTONE INTERBEDS. Very fine to coarse grained, red brown with grey, hematite alteration. Pebbled sand particles subrounded in matrix locally.			2	12	50	
220	725				3	0	28	
					4	0	19	
225					4	0	19	
	750				4	0	18	
230					4	0	18	
		SANDSTONE WITH MUDSTONE INTERBEDS. Very fine to coarse grained, grey to red brown, hematite alteration.			3	0	25	
235		MUDSTONE WITH SANDSTONE INTERBEDS. Very fine to coarse grained, red brown with grey, hematite alteration.			3	0	20	
	775				4	0	18	
240					4	0	18	
					4	0	18	
	800	SANDSTONE WITH MUDSTONE INTERBEDS. Very fine to medium grained, grey to red brown, hematite alteration.			2	6	39	
245					3	6	32	
		MUDSTONE. Very fine to fine grained, red brown, hematite alteration.			3	0	25	
250								

LOGGED: AG

CHECKED: TLG

TERRANE GEOSCIENCE INC.

GEOTECHNICAL ROCK CORE LOG

BOREHOLE: CC7

TOTAL DEPTH: 374.00 m
N: 5363709 **E:** 388525
ELEVATION: 38.00 m
UTM ZONE: Geodetic

DATE STARTED: JAN 28, 2022
DATE COMPLETED: MAR 16, 2022
INCLINATION: 90°
AZIMUTH: N/A°

PROJECT NO.: 21-005-H
CLIENT: Atlas Salt
PROJECT NAME: Gemtec Atlas Salt Televiewer Packer Testing

Legend of Major Structures: Gouge, Sheared, Jointed, Broken — Definitions

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DEPTH (m)	DEPTH (ft)	LITHOLOGICAL DESCRIPTION	ALPHA	STRUCTURE	IRS (est.) / UCS / PLT (est.) (MPa)	FF/m	FF/m / TCR / RQD (%)	Weathering	JCR	RMR 1976	OTHER TESTS
250	825	SANDSTONE WITH MUDSTONE INTERBEDS. Very fine to medium grained, grey with red brown, hematite alteration. *(continued...)*						3	0	25	
								2	12	38	
		MUDSTONE WITH SANDSTONE INTERBEDS. Very fine to coarse grained, red brown with grey, hematite alteration. Local calcite infill.						4	0	18	
255								4	0	18	
								3	12	45	
	850							2	6	29	
260		MUDSTONE. Very fine to coarse grained, grey to red brown, hematite alteration. Some calcite clasts in unit.						4	0	18	
								4	0	18	
265								4	0	18	
	875							4	0	18	
270								4	0	18	
		MUDSTONE WITH SANDSTONE INTERBEDS. Very fine to coarse grained, red brown with grey, hematite alteration. Local calcite infill.						4	0	20	
275	900							4	0	19	
		SANDSTONE WITH MUDSTONE INTERBEDS. Very fine to fine grained, grey with red brown, hematite alteration.						2	12	41	
		MUDSTONE WITH SANDSTONE INTERBEDS. Very fine to fine grained, red brown with grey, hematite alteration.						3	6	29	
280								2	12	35	
	925							2	12	41	
285		MUDSTONE. Very fine, grey to red brown, hematite alteration.						4	0	18	
								4	0	18	
290	950							4	0	18	
								4	0	18	
295								4	0	18	
	975							4	0	19	
300		SANDSTONE. Fined to medium grained, grey.						4	0	18	

LOGGED: AG

CHECKED: TLG

23-2-24 11:30:26 AM

TERRANE GEOSCIENCE INC.

GEOTECHNICAL ROCK CORE LOG

BOREHOLE: CC7

TOTAL DEPTH: 374.00 m
N: 5363709 **E:** 388525
ELEVATION: 38.00 m
UTM ZONE: Geodetic

DATE STARTED: JAN 28, 2022
DATE COMPLETED: MAR 16, 2022
INCLINATION: 90°
AZIMUTH: N/A°

PROJECT NO.: 21-005-H
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PT: Packer Test

DEPTH (m)	DEPTH (ft)	STRATA PLOT	LITHOLOGICAL DESCRIPTION	ALPHA	STRUCTURE	IRS (est.) / UCS / PLT (est.) (MPa)	FF/m	TCR / RQD (%)	Weathering	JCR	RMR 1976	OTHER TESTS
300			MUDSTONE CONGLOMERATE WITH SANDSTONE INTERBEDS. Very fine to coarse grained, grey to red brown. Matrix mudstone. Clasts increase with depth. *(continued...)*						4	0	18	
305	1000								4	0	18	
310									4	0	18	
	1025								4	0	18	
315									4	0	18	
320	1050								4	0	18	
325									4	0	18	
	1075								4	0	18	
330									4	0	19	
335	1100		SALT. Course grained crystals, clear to opaque with some grey.						1	12	36	
340									1	12	44	
	1125								1	12	55	
345			SALT. Very fine to coarse grained crystals, very dark brown with champagne.						1	12	44	
350									1	6	46	

LOGGED: AG

CHECKED: TLG

TERRANE GEOSCIENCE INC.

GEOTECHNICAL ROCK CORE LOG

BOREHOLE: CC7

TOTAL DEPTH: 374.00 m
N: 5363709 **E:** 388525
ELEVATION: 38.00 m
UTM ZONE: Geodetic

DATE STARTED: JAN 28, 2022
DATE COMPLETED: MAR 16, 2022
INCLINATION: 90°
AZIMUTH: N/A°

PROJECT NO.: 21-005-H
CLIENT: Atlas Salt
PROJECT NAME: Gemtec Atlas Salt Televiewer Packer Testing

Legend of Major Structures: Gouge, Sheared, Jointed, Broken — Definitions

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PLT: Point Load Test
FF/m: Fracture Frequency per m
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RMR: Rock Mass Rating (1976)
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PT: Packer Test

DEPTH (m)	DEPTH (ft)	STRATA PLOT	LITHOLOGICAL DESCRIPTION	ALPHA	STRUCTURE	IRS (est.) / UCS / PLT (est.) (MPa) 50 100 150 200	FF/m	FF/m 10 20 30 / TCR / RQD (%) 25 50 75	Weathering	JCR	RMR 1976 20 40 60 80	OTHER TESTS
350	1150		LOST CORE.									
355												
	1175											
360												
365												
	1200											
370												
	1225											
375			End of Borehole at 374 m.									
380												
	1250											
385												
	1275											
390												
395												
	1300											
400												

LOGGED: AG

CHECKED: TLG

23-2-24 11:30:26 AM

TERRANE GEOSCIENCE INC.

GEOTECHNICAL ROCK CORE LOG

BOREHOLE: CC8

TOTAL DEPTH: 263.00 m
N: 5363177 **E:** 387770
ELEVATION: 55.00 m
UTM ZONE: Geodetic

DATE STARTED: JUL 17, 2022
DATE COMPLETED: AUG 20, 2022
INCLINATION: 90°
AZIMUTH: N/A°

PROJECT NO.: 21-005-H
CLIENT: Atlas Salt
PROJECT NAME: Gemtec Atlas Salt Televiewer Packer Testing

Legend of Major Structures: Gouge, Sheared, Jointed, Broken — Definitions

IRS: Estimated Intact Rock Strength
UCS: Unconfined Compressive Strength
PLT: Point Load Test
FF/m: Fracture Frequency per m
TCR: Total Core Recovery
RQD: Rock Quality Designation
RMR: Rock Mass Rating (1976)
JCR: Joint Condition Rating
PT: Packer Test

DEPTH (m)	DEPTH (ft)	STRATA PLOT	LITHOLOGICAL DESCRIPTION	ALPHA	STRUCTURE	IRS (est.) / UCS / PLT (est.) (MPa)	FF/m	FF/m / TCR / RQD (%)	Weathering	JCR	RMR 1976	OTHER TESTS
0	0		OVERBURDEN.									
30	100		MUDSTONE WITH SANDSTONE INTERBEDS. Very fine to fine, red brown, hematite alteration.						3	6	42	
40	125								3	12	42	
45	150								3	12	48	
50									3	12	42	
									3	6	40	

LOGGED: MM

CHECKED: TLG

23-2-24 11:30:31 AM

TERRANE GEOSCIENCE INC.

GEOTECHNICAL ROCK CORE LOG

BOREHOLE: CC8

TOTAL DEPTH: 263.00 m
N: 5363177 **E:** 387770
ELEVATION: 55.00 m
UTM ZONE: Geodetic

DATE STARTED: JUL 17, 2022
DATE COMPLETED: AUG 20, 2022
INCLINATION: 90°
AZIMUTH: N/A°

PROJECT NO.: 21-005-H
CLIENT: Atlas Salt
PROJECT NAME: Gemtec Atlas Salt Televiewer Packer Testing

Legend of Major Structures: Gouge, Sheared, Jointed, Broken — Definitions

IRS: Estimated Intact Rock Strength
UCS: Unconfined Compressive Strength
PLT: Point Load Test
FF/m: Fracture Frequency per m
TCR: Total Core Recovery
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DEPTH (m)	DEPTH (ft)	LITHOLOGICAL DESCRIPTION	ALPHA	STRUCTURE	IRS (est.) UCS PLT (est.) (MPa)	FF/m	FF/m TCR RQD (%)	Weathering	JCR	RMR 1976	OTHER TESTS
50		MUDSTONE. Very fine, red brown, hematite alteration. *(continued...)*						3	6	42	
	175							3	6	37	
55								3	12	49	
60	200							3	12	48	
								4	0	21	
65		SANDSTONE CONGLOMERATE. Fine to coarse, red brown with grey, hematite alteration.						2	12	54	
	225							2	12	50	
70								2	12	47	
75								2	12	44	
	250	MUDSTONE. Very fine to medium, red brown, hematite alteration.						2	20	50	
		MUDSTONE WITH SANDSTONE INTERBEDS. Fine to medium, red brown, hematite alteration.						2	12	49	
80								2	6	43	
	275	SANDSTONE CONGLOMERATE. Medium to coarse, red brown with grey, hematite alteration.						2	12	51	
85								2	20	48	
90		MUDSTONE. Very fine to medium, red brown, hematite alteration.						2	6	37	
	300							2	12	50	
95								2	12	47	
	325	CONGLOMERATE. Medium to coarse, red brown with grey, hematite alteration.						2	12	44	
100											

LOGGED: MM

CHECKED: TLG

TERRANE GEOSCIENCE INC.

GEOTECHNICAL ROCK CORE LOG

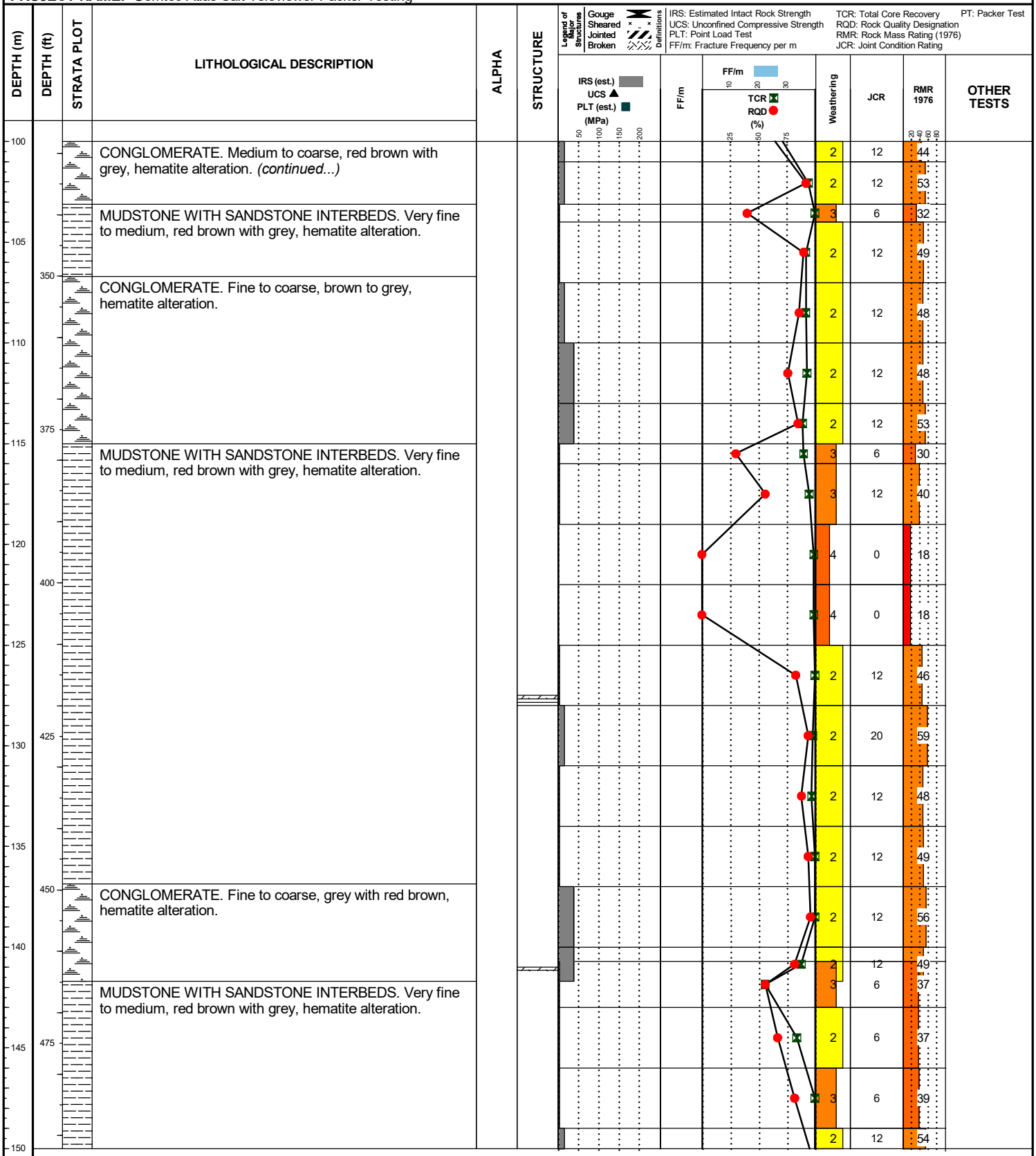
BOREHOLE: CC8

TOTAL DEPTH: 263.00 m
N: 5363177 **E:** 387770
ELEVATION: 55.00 m
UTM ZONE: Geodetic

DATE STARTED: JUL 17, 2022
DATE COMPLETED: AUG 20, 2022
INCLINATION: 90°
AZIMUTH: N/A°

PROJECT NO.: 21-005-H
CLIENT: Atlas Salt
PROJECT NAME: Gemtec Atlas Salt Televiewer Packer Testing

DEPTH (m)	DEPTH (ft)	LITHOLOGICAL DESCRIPTION
100		CONGLOMERATE. Medium to coarse, red brown with grey, hematite alteration. *(continued...)*
105		MUDSTONE WITH SANDSTONE INTERBEDS. Very fine to medium, red brown with grey, hematite alteration.
110	350	CONGLOMERATE. Fine to coarse, brown to grey, hematite alteration.
115	375	MUDSTONE WITH SANDSTONE INTERBEDS. Very fine to medium, red brown with grey, hematite alteration.
120		
125	400	
130	425	
135		
140	450	CONGLOMERATE. Fine to coarse, grey with red brown, hematite alteration.
145	475	MUDSTONE WITH SANDSTONE INTERBEDS. Very fine to medium, red brown with grey, hematite alteration.
150		



LOGGED: MM

CHECKED: TLG

GEOTECHNICAL ROCK CORE LOG

BOREHOLE: CC8

TERRANE GEOSCIENCE INC.

TOTAL DEPTH: 263.00 m
N: 5363177 **E:** 387770
ELEVATION: 55.00 m
UTM ZONE: Geodetic

DATE STARTED: JUL 17, 2022
DATE COMPLETED: AUG 20, 2022
INCLINATION: 90°
AZIMUTH: N/A°

PROJECT NO.: 21-005-H
CLIENT: Atlas Salt
PROJECT NAME: Gemtec Atlas Salt Televiewer Packer Testing

Legend of Major Structures: Gouge, Sheared, Jointed, Broken — Definitions

IRS: Estimated Intact Rock Strength
UCS: Unconfined Compressive Strength
PLT: Point Load Test
FF/m: Fracture Frequency per m
TCR: Total Core Recovery
RQD: Rock Quality Designation
RMR: Rock Mass Rating (1976)
JCR: Joint Condition Rating
PT: Packer Test

DEPTH (m)	DEPTH (ft)	LITHOLOGICAL DESCRIPTION	ALPHA	STRUCTURE	IRS (est.) / UCS / PLT (est.) (MPa)	FF/m	FF/m / TCR / RQD (%)	Weathering	JCR	RMR 1976	OTHER TESTS
150	500	MUDSTONE WITH SANDSTONE INTERBEDS. Very fine to medium, red brown with grey, hematite alteration. *(continued...)*						2	12	54	
155								2	12	47	
								2	12	47	
160	525							2	12	52	
								3	12	55	
								3	12	42	
165								2	12	46	
	550							2	12	49	
170								3	6	41	
								2	12	49	
175	575							2	12	48	
								2	12	53	
180								2	12	52	
	600	CONGLOMERATE. Medium to very coarse, red brown to grey, hematite alteration.						2	12	49	
185								3	12	39	
								2	12	49	
190	625							3	12	30	
		SANDSTONE. Very fine, grey. Rock slightly reactive to HCL.						3	6	36	
195		MUDSTONE. Very fine to coarse, red brown to grey, hematite alteration.									
	650										
200											

LOGGED: MM

CHECKED: TLG

TERRANE GEOSCIENCE INC.

GEOTECHNICAL ROCK CORE LOG

BOREHOLE: CC8

TOTAL DEPTH: 263.00 m
N: 5363177 **E:** 387770
ELEVATION: 55.00 m
UTM ZONE: Geodetic

DATE STARTED: JUL 17, 2022
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INCLINATION: 90°
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PROJECT NO.: 21-005-H
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PROJECT NAME: Gemtec Atlas Salt Televiewer Packer Testing

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RMR: Rock Mass Rating (1976)
JCR: Joint Condition Rating
PT: Packer Test

DEPTH (m)	DEPTH (ft)	LITHOLOGICAL DESCRIPTION	ALPHA	STRUCTURE	IRS (est.) UCS PLT (est.) (MPa) 50 100 150 200	FF/m 10 20 30	TCR RQD (%) 25 50 75	Weathering	JCR	RMR 1976 20 40 60 80	OTHER TESTS
200		MUDSTONE. Very fine to coarse, red brown to grey, hematite alteration. *(continued...)*						3	12	43	
205	675	CONGLOMERATE. Fine to coarse, red brown to grey, hematite alteration.						2	12	55	
								2	12	36	
210								2	12	36	
	700							2	12	31	
215		MUDSTONE. Very fine to medium, red brown to dark grey, hematite alteration.						5	0	25	
220	725							4	6	32	
								3	6	39	
225								2	12	46	
	750							3	0	26	
230								3	6	35	
								2	12	43	
235	775							2	12	48	
								4	0	18	
240								2	12	50	
								3	0	33	
245	800							2	12	49	
								3	6	33	
250											

LOGGED: MM

CHECKED: TLG

TERRANE GEOSCIENCE INC.

GEOTECHNICAL ROCK CORE LOG

BOREHOLE: CC8

TOTAL DEPTH: 263.00 m
N: 5363177 **E:** 387770
ELEVATION: 55.00 m
UTM ZONE: Geodetic

DATE STARTED: JUL 17, 2022
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PROJECT NO.: 21-005-H
CLIENT: Atlas Salt
PROJECT NAME: Gemtec Atlas Salt Televiewer Packer Testing

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PT: Packer Test

DEPTH (m)	DEPTH (ft)	STRATA PLOT	LITHOLOGICAL DESCRIPTION	ALPHA	STRUCTURE	IRS (est.) / UCS / PLT (est.) (MPa)	FF/m	FF/m / TCR / RQD (%)	Weathering	JCR	RMR 1976	OTHER TESTS
250												
	825		MUDSTONE. Very fine to medium, red brown to dark grey, hematite alteration. *(continued...)*						3	6	33	
255									2	12	41	
									4	0	18	
									4	6	24	
260	850		SALT. Fine coarse grained crystal, clear/pale.									
			End of Borehole at 263 m.									
265												
	875											
270												
	900											
275												
280												
	925											
285												
290	950											
295												
	975											
300												

LOGGED: MM

CHECKED: TLG

TERRANE GEOSCIENCE INC.

GEOTECHNICAL ROCK CORE LOG

BOREHOLE: CC9

TOTAL DEPTH: 160.20 m
N: 5363299 **E:** 388375
ELEVATION: 48.00 m
UTM ZONE: Geodetic

DATE STARTED: JUN 09, 2022
DATE COMPLETED: JUN 18, 2022
INCLINATION: 90°
AZIMUTH: N/A°

PROJECT NO.: 21-005-H
CLIENT: Atlas Salt
PROJECT NAME: Gemtec Atlas Salt Televiewer Packer Testing

Legend of Major Structures: Gouge, Sheared, Jointed, Broken — Definitions

IRS: Estimated Intact Rock Strength
UCS: Unconfined Compressive Strength
PLT: Point Load Test
FF/m: Fracture Frequency per m
TCR: Total Core Recovery
RQD: Rock Quality Designation
RMR: Rock Mass Rating (1976)
JCR: Joint Condition Rating
PT: Packer Test

DEPTH (m)	DEPTH (ft)	STRATA PLOT	LITHOLOGICAL DESCRIPTION	ALPHA	STRUCTURE	IRS (est.) UCS PLT (est.) (MPa) 50 100 150 200	FF/m 10 20 30	TCR RQD (%) 25 50 75	Weathering	JCR	RMR 1976 20 40 60 80	OTHER TESTS
0	0		OVERBURDEN.									
30	100		MUDSTONE. Very fine to medium, red brown, hematite alteration.						4	12	36	
			CARBONATE. Very fine, grey.									
			MUDSTONE WITH SANDSTONE INTERBEDS. Fine to coarse, red brown with grey, hematite alteration.						3	12	43	
35									3	6	30	
	125								4	12	30	
40									4	6	31	
45	150		CONGLOMERATE. Very fine to very coarse, red brown with grey, hematite.						5	12	31	
50									5	12	31	

LOGGED: MM

CHECKED: TLG

TERRANE GEOSCIENCE INC.

GEOTECHNICAL ROCK CORE LOG

BOREHOLE: CC9

TOTAL DEPTH: 160.20 m
N: 5363299 **E:** 388375
ELEVATION: 48.00 m
UTM ZONE: Geodetic

DATE STARTED: JUN 09, 2022
DATE COMPLETED: JUN 18, 2022
INCLINATION: 90°
AZIMUTH: N/A°

PROJECT NO.: 21-005-H
CLIENT: Atlas Salt
PROJECT NAME: Gemtec Atlas Salt Televiewer Packer Testing

Legend of Major Structures: Gouge, Sheared, Jointed, Broken — Definitions

IRS: Estimated Intact Rock Strength
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DEPTH (m)	DEPTH (ft)	LITHOLOGICAL DESCRIPTION	ALPHA	STRUCTURE	IRS (est.) / UCS / PLT (est.) (MPa)	FF/m	TCR / RQD (%)	Weathering	JCR	RMR 1976	OTHER TESTS
50		CONGLOMERATE. Very fine to very coarse, red brown with grey, hematite. *(continued...)*						5	12	31	
	175	MUDSTONE. Fine to medium, red brown, hematite alteration.						3	12	47	
55		COARSE SANDSTONE TO CONGLOMERATE. Medium to coarse, red brown with grey, hematite alteration.						3	12	40	
60	200	MUDSTONE WITH CONGLOMERATE INTERBEDS. Very fine to coarse, red brown with grey, hematite alteration.						3	12	42	
		MUDSTONE WITH SANDSTONE INTERBEDS. Very fine to medium, red brown with grey, hematite alteration.						3	12	47	
65								3	6	27	
	225							4	6	24	
70								3	12	43	
75								2	12	47	
	250							2	12	47	
80								2	12	49	
	275							2	12	48	
85								3	6	24	
90								3	6	24	
	300							3	12	36	
95								3	12	48	
	325							3	6	24	
100											

LOGGED: MM

CHECKED: TLG

TERRANE GEOSCIENCE INC.

GEOTECHNICAL ROCK CORE LOG

BOREHOLE: CC9

TOTAL DEPTH: 160.20 m
N: 5363299 **E:** 388375
ELEVATION: 48.00 m
UTM ZONE: Geodetic

DATE STARTED: JUN 09, 2022
DATE COMPLETED: JUN 18, 2022
INCLINATION: 90°
AZIMUTH: N/A°

PROJECT NO.: 21-005-H
CLIENT: Atlas Salt
PROJECT NAME: Gemtec Atlas Salt Televiewer Packer Testing

Legend of Major Structures: Gouge, Sheared, Jointed, Broken — Definitions

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RMR: Rock Mass Rating (1976)
JCR: Joint Condition Rating
PT: Packer Test

DEPTH (m)	DEPTH (ft)	LITHOLOGICAL DESCRIPTION	ALPHA	STRUCTURE	IRS (est.) / UCS / PLT (est.) (MPa)	FF/m	TCR / RQD (%)	Weathering	JCR	RMR 1976	OTHER TESTS
100								3	6	24	
		CONGLOMERATE. Very fine to coarse, grey with red brown, hematite alteration.						2	12	42	
105	350							3	12	48	
								3	12	39	
110								3	12	40	
		MUDSTONE WITH INTERBEDDED SANDSTONE. Fine to coarse, brown to grey, hematite alteration.						3	12	30	
115	375							2	12	49	
								2	12	49	
120								2	12	49	
	400							2	12	49	
125								2	12	49	
								2	12	48	
130	425							2	12	47	
								2	12	43	
135								2	12	48	
	450							3	6	24	
140		CONGLOMERATE. Fine to coarse, red with grey, hematite alteration.						3	12	35	
								3	12	33	
145	475							3	12	37	
								3	12	41	
150											

LOGGED: MM

CHECKED: TLG

TERRANE GEOSCIENCE INC.

GEOTECHNICAL ROCK CORE LOG

BOREHOLE: CC9

TOTAL DEPTH: 160.20 m
N: 5363299 **E:** 388375
ELEVATION: 48.00 m
UTM ZONE: Geodetic

DATE STARTED: JUN 09, 2022
DATE COMPLETED: JUN 18, 2022
INCLINATION: 90°
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PROJECT NO.: 21-005-H
CLIENT: Atlas Salt
PROJECT NAME: Gemtec Atlas Salt Televiewer Packer Testing

Legend of Major Structures: Gouge, Sheared, Jointed, Broken — Definitions

IRS: Estimated Intact Rock Strength
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PT: Packer Test

DEPTH (m)	DEPTH (ft)	STRATA PLOT	LITHOLOGICAL DESCRIPTION	ALPHA	STRUCTURE	IRS (est.) / UCS / PLT (est.) (MPa)	FF/m	FF/m / TCR / RQD (%)	Weathering	JCR	RMR 1976	OTHER TESTS
150												
	500		MUDSTONE WITH SANDSTONE INTERBEDS. Very fine to coarse, red brown with grey, hematite alteration.						3	6	24	
155									2	12	44	
									3	12	30	
160	525								3	6	24	
			End of Borehole at 160.2 m.									
165												
	550											
170												
175	575											
180												
	600											
185												
190	625											
195												
	650											
200												

LOGGED: MM

CHECKED: TLG

23-2-24 11:30:34 AM

TERRANE GEOSCIENCE INC.

GEOTECHNICAL ROCK CORE LOG

BOREHOLE: CC9B

TOTAL DEPTH: 580.00 m
N: 5363312 **E:** 388361
ELEVATION: 47.50 m
UTM ZONE: Geodetic

DATE STARTED: DEC 04, 2022
DATE COMPLETED: DEC 20, 2022
INCLINATION: 90°
AZIMUTH: N/A°

PROJECT NO.: 21-005-H
CLIENT: Atlas Salt
PROJECT NAME: Gemtec Atlas Salt Televiewer Packer Testing

Legend of Major Structures: Gouge, Sheared, Jointed, Broken — Definitions

IRS: Estimated Intact Rock Strength
UCS: Unconfined Compressive Strength
PLT: Point Load Test
FF/m: Fracture Frequency per m
TCR: Total Core Recovery
RQD: Rock Quality Designation
RMR: Rock Mass Rating (1976)
JCR: Joint Condition Rating
PT: Packer Test

DEPTH (m)	DEPTH (ft)	STRATA PLOT	LITHOLOGICAL DESCRIPTION	ALPHA	STRUCTURE	IRS (est.) UCS PLT (est.) (MPa) 50 100 150 200	FF/m 10 20 30	TCR RQD (%) 25 50 75	Weathering	JCR	RMR 1976 20 40 60 80	OTHER TESTS
0	0		OVERBURDEN									
30	100		SANDSTONE. Fine to medium grained, red brown, hematite alteration.						2	12	49	
40	125		SANDSTONE WITH MUDSTONE INTERBEDS. Very fine to medium grained, red brown with grey, hematite alteration. Some calcite clasts throughout unit.						3	0	25	
45	150								3	6	42	
									4	0	23	
50									4	0	18	

LOGGED: PR/DR

CHECKED: TLG

TERRANE GEOSCIENCE INC.

GEOTECHNICAL ROCK CORE LOG

BOREHOLE: CC9B

TOTAL DEPTH: 580.00 m
N: 5363312 **E:** 388361
ELEVATION: 47.50 m
UTM ZONE: Geodetic

DATE STARTED: DEC 04, 2022
DATE COMPLETED: DEC 20, 2022
INCLINATION: 90°
AZIMUTH: N/A°

PROJECT NO.: 21-005-H
CLIENT: Atlas Salt
PROJECT NAME: Gemtec Atlas Salt Televiewer Packer Testing

Legend of Major Structures: Gouge, Sheared, Jointed, Broken — Definitions

IRS: Estimated Intact Rock Strength
UCS: Unconfined Compressive Strength
PLT: Point Load Test
FF/m: Fracture Frequency per m
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RQD: Rock Quality Designation
RMR: Rock Mass Rating (1976)
JCR: Joint Condition Rating
PT: Packer Test

DEPTH (m)	DEPTH (ft)	LITHOLOGICAL DESCRIPTION	ALPHA	STRUCTURE	IRS (est.) / UCS / PLT (est.) (MPa)	FF/m	TCR / RQD (%)	Weathering	JCR	RMR 1976	OTHER TESTS
50		MUDSTONE WITH SANDSTONE INTERBEDS. Very fine to medium grained, red brown with grey, hematite alteration. *(continued...)*						4	0	18	
								2	12	50	
	175	CONGLOMERATE WITH MUDSTONE INTERBEDS. Very fine to coarse grained, red brown with grey, hematite alteration.						4	6	24	
55		SANDSTONE. Fine to coarse grained, red brown with grey, hematite alteration.						3	12	44	
		CONGLOMERATE WITH MUDSTONE INTERBEDS. Very fine to coarse grained, red brown with grey, hematite alteration.						4	12	35	
60	200	SANDSTONE. Very fine to medium grained, red brown with grey, hematite alteration.						3	12	41	
		MUDSTONE. Very fine grained, red brown, hematite alteration.						3	0	18	
65		SANDSTONE WITH MUDSTONE INTERBEDS. Very fine to medium grained, red brown with grey, hematite alteration.						4	12	47	
	225	MUDSTONE. Very fine to fine grained, red brown with grey, hematite alteration.						3	0	18	
70								4	0	18	
		MUDSTONE WITH SANDSTONE INTERBEDS. Very fine to medium grained, red brown with grey, hematite alteration.						5	6	33	
75	250							3	0	35	
								3	0	38	
80		SANDSTONE WITH MUDSTONE INTERBEDS. Very fine to medium grained, red brown to grey, hematite alteration.						2	12	47	
	275							3	0	37	
85		MUDSTONE WITH SANDSTONE INTERBEDS. Very fine to medium grained, red brown with grey, hematite alteration.						3	6	39	
90	300	SANDSTONE WITH MUDSTONE INTERBEDS. Very fine to coarse grained, red brown with grey, hematite alteration. Calcite occasionally throughout unit.						2	6	40	
								2	6	43	
95								3	6	44	
	325										
100											

LOGGED: PR/DR CHECKED: TLG

TERRANE GEOSCIENCE INC.

GEOTECHNICAL ROCK CORE LOG

BOREHOLE: CC9B

TOTAL DEPTH: 580.00 m
N: 5363312 **E:** 388361
ELEVATION: 47.50 m
UTM ZONE: Geodetic

DATE STARTED: DEC 04, 2022
DATE COMPLETED: DEC 20, 2022
INCLINATION: 90°
AZIMUTH: N/A°

PROJECT NO.: 21-005-H
CLIENT: Atlas Salt
PROJECT NAME: Gemtec Atlas Salt Televiewer Packer Testing

Legend of Major Structures: Gouge, Sheared, Jointed, Broken — Definitions

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DEPTH (m)	DEPTH (ft)	LITHOLOGICAL DESCRIPTION	ALPHA	STRUCTURE	IRS (est.) / UCS / PLT (est.) (MPa)	FF/m	TCR / RQD (%)	Weathering	JCR	RMR 1976	OTHER TESTS
100		SANDSTONE WITH MUDSTONE INTERBEDS. Very fine to coarse grained, red brown with grey, hematite alteration. Calcite occasionally throughout unit. *(continued...)*						3	6	44	
105	350	MUDSTONE. Very fine to fine grained, red brown, hematite alteration.						4	0	18	
								3	6	40	
110		MUDSTONE WITH SANDSTONE INTERBEDS. Very fine to medium grained, red brown with grey, hematite alteration.						3	12	45	
		CONGLOMERATE. Medium to coarse, red brown with grey, hematite alteration.						3	12	45	
115	375	MUDSTONE. Very fine to fine grained, red brown, hematite alteration.						5	0	18	
		CONGLOMERATE. Medium to coarse, red brown with grey, hematite alteration.						5	12	30	
		SANDSTONE. Coarsed grained, brown with red, hematite alteration.						4	12	37	
120		MUDSTONE. Very fine to coarse grained, red brown with grey, hematite alteration. Some calcite calsts in unit.						4	0	18	
	400	MUDSTONE WITH SANDSTONE INTERBEDS. Very fine to medium grained, red brown with grey, hematite alteration. Rip up clasts throughout.						4	6	35	
125								3	6	41	
								3	6	40	
		SANDSTONE WITH MUDSTONE INTERBEDS. Very fine to coarse grained, red brown with grey, hematite alteration. Rip up clasts throughout unit.						3	6	46	
130	425							3	12	50	
								4	6	42	
135								4	6	41	
	450							4	0	34	
140								4	6	39	
								4	6	38	
145	475	MUDSTONE WITH SANDSTONE INTERBEDS. Very fine to medium grained, red brown with grey, hematite alteration. Rip up clasts throughout.						5	0	28	
150											

LOGGED: PR/DR

CHECKED: TLG

TERRANE GEOSCIENCE INC.

GEOTECHNICAL ROCK CORE LOG

BOREHOLE: CC9B

TOTAL DEPTH: 580.00 m
N: 5363312 **E:** 388361
ELEVATION: 47.50 m
UTM ZONE: Geodetic

DATE STARTED: DEC 04, 2022
DATE COMPLETED: DEC 20, 2022
INCLINATION: 90°
AZIMUTH: N/A°

PROJECT NO.: 21-005-H
CLIENT: Atlas Salt
PROJECT NAME: Gemtec Atlas Salt Televiewer Packer Testing

Legend of Major Structures: Gouge, Sheared, Jointed, Broken — Definitions

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JCR: Joint Condition Rating

PT: Packer Test

DEPTH (m)	DEPTH (ft)	LITHOLOGICAL DESCRIPTION	ALPHA	STRUCTURE	Weathering	JCR	RMR 1976	OTHER TESTS
150					5	0	28	
	500	MUDSTONE CONGLOMERATE. Very fine grained to coarse, red brown with grey, hematite alteration.			4	12	42	
155		CONGLOMERATE. Fine to coarse, red brown to grey, hematite alteration.			4	6	37	
		MUDSTONE WITH SANDSTONE INTERBEDS. Very fine to coarse grained, red brown with grey, hematite alteration.			4	12	48	
160	525	MUDSTONE. Very fine to coarse grained, red brown to grey, hematite alteration. Some calcite calsts in unit.			4	6	43	
165					4	0	18	
		MUDSTONE WITH SANDSTONE INTERBEDS. Very fine to coarse grained, red brown with grey, hematite alteration.			4	6	41	
170					4	6	38	
		MUDSTONE. Very fine to fine grained, red brown with grey, hematite alteration. Some calcite calsts in unit.			5	0	18	
175	575				5	0	18	
		MUDSTONE WITH SANDSTONE INTERBEDS. Very fine to medium grained, red brown with grey, hematite alteration.			4	12	43	
180		SANDSTONE WITH MUDSTONE INTERBEDS. Very fine to coarse grained, red brown with grey, hematite alteration. Rip up clasts throughout unit.			3	12	50	
					3	12	48	
185					4	6	40	
	600				3	12	48	
190	625				5	0	18	
		MUDSTONE WITH SANDSTONE INTERBEDS. Very fine to coarse grained, grey to red brown, hematite alteration.			3	12	47	
195		SANDSTONE WITH MUDSTONE INTERBEDS. Very fine to coarse grained, grey to red brown, hematite alteration. Rip up clasts throughout unit.			4	0	18	
	650							
200								

LOGGED: PR/DR

CHECKED: TLG

GEOTECHNICAL ROCK CORE LOG

BOREHOLE: CC9B

TERRANE GEOSCIENCE INC.

TOTAL DEPTH: 580.00 m
N: 5363312 **E:** 388361
ELEVATION: 47.50 m
UTM ZONE: Geodetic

DATE STARTED: DEC 04, 2022
DATE COMPLETED: DEC 20, 2022
INCLINATION: 90°
AZIMUTH: N/A°

PROJECT NO.: 21-005-H
CLIENT: Atlas Salt
PROJECT NAME: Gemtec Atlas Salt Televiewer Packer Testing

DEPTH (m)	DEPTH (ft)	LITHOLOGICAL DESCRIPTION
200		MUDSTONE. Very fine to medium grained, grey to medium, hematite alteration. Some calcite calsts in unit. *(continued...)*
205	675	MUDSTONE WITH SANDSTONE INTERBEDS. Very fine to medium grained, grey with red brown, hematite alteration.
210		
	700	MUDSTONE. Very fine to medium grained, grey to medium, hematite alteration. Some calcite calsts in unit.
215		MUDSTONE CONGLOMERATE. Very fine grained to coarse, grey with red brown, hematite alteration localised.
220	725	
225		
	750	
230		
235	775	
240		
	800	SALT. Medium to coarse, pale grey to pale white.
245		SALT. Medium to coarse, pale grey to pale grey.
250		

ALPHA | STRUCTURE

Legend of Major Structures: Gouge, Sheared, Jointed, Broken — Definitions

IRS: Estimated Intact Rock Strength
UCS: Unconfined Compressive Strength
PLT: Point Load Test
FF/m: Fracture Frequency per m
TCR: Total Core Recovery
RQD: Rock Quality Designation
RMR: Rock Mass Rating (1976)
JCR: Joint Condition Rating
PT: Packer Test

IRS (est.) / UCS / PLT (est.) (MPa) 50 100 150 200
FF/m 10 20 30
TCR / RQD (%) 25 50 75

Weathering	JCR	RMR 1976	OTHER TESTS
4	0	18	
4	0	18	
4	6	24	
4	0	18	
4	0	18	
5	0	18	
5	6	24	
5	6	24	
4	6	43	
4	6	45	
3	12	51	
3	6	44	
3	12	48	
5	0	18	
5	0	18	
2	20	53	
2	20	57	
1	20	50	

LOGGED: PR/DR

CHECKED: TLG

TERRANE GEOSCIENCE INC.

GEOTECHNICAL ROCK CORE LOG

BOREHOLE: CC9B

TOTAL DEPTH: 580.00 m
N: 5363312 **E:** 388361
ELEVATION: 47.50 m
UTM ZONE: Geodetic

DATE STARTED: DEC 04, 2022
DATE COMPLETED: DEC 20, 2022
INCLINATION: 90°
AZIMUTH: N/A°

PROJECT NO.: 21-005-H
CLIENT: Atlas Salt
PROJECT NAME: Gemtec Atlas Salt Televiewer Packer Testing

Legend of Major Structures: Gouge, Sheared, Jointed, Broken — Definitions

IRS: Estimated Intact Rock Strength
UCS: Unconfined Compressive Strength
PLT: Point Load Test
FF/m: Fracture Frequency per m
TCR: Total Core Recovery
RQD: Rock Quality Designation
RMR: Rock Mass Rating (1976)
JCR: Joint Condition Rating
PT: Packer Test

DEPTH (m)	DEPTH (ft)	LITHOLOGICAL DESCRIPTION	ALPHA	STRUCTURE	IRS (est.) / UCS / PLT (est.) (MPa)	FF/m	FF/m / TCR / RQD (%)	Weathering	JCR	RMR 1976	OTHER TESTS
250	825	SALT. Medium to coarse, pale grey to pale grey. *(continued...)*						1	20	61	
255								1	20	64	
								1	20	62	
260	850	SALT. Medium to coarse, pale grey to pale white.						1	20	61	
								1	20	71	
265	875							1	12	44	
		SALT. Medium to coarse, pale grey to opaque.						1	20	65	
270								1	20	70	
	900							1	20	74	
275								1	20	72	
280								2	20	59	
	925	SALT. Medium to coarse, dark grey to Pale grey.						1	20	71	
285								1	20	71	
		SALT. Medium to coarse, pale white to opaque.						1	20	71	
290	950							1	20	68	
								1	20	63	
295		SALT. Medium to coarse, dark grey to black.						3	6	41	
	975										
300		SALT. Medium to coarse, dark grey to Pale grey.									

LOGGED: PR/DR

CHECKED: TLG

TERRANE GEOSCIENCE INC.

GEOTECHNICAL ROCK CORE LOG

BOREHOLE: CC9B

TOTAL DEPTH: 580.00 m
N: 5363312 **E:** 388361
ELEVATION: 47.50 m
UTM ZONE: Geodetic

DATE STARTED: DEC 04, 2022
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INCLINATION: 90°
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PROJECT NO.: 21-005-H
CLIENT: Atlas Salt
PROJECT NAME: Gemtec Atlas Salt Televiewer Packer Testing

Legend of Major Structures: Gouge, Sheared, Jointed, Broken — Definitions

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DEPTH (m)	DEPTH (ft)	STRATA PLOT	LITHOLOGICAL DESCRIPTION	ALPHA	STRUCTURE	IRS (est.) / UCS / PLT (est.) (MPa)	FF/m	FF/m / TCR / RQD (%)	Weathering	JCR	RMR 1976	OTHER TESTS
300			SALT. Medium to coarse, dark grey to Pale grey. *(continued...)*						3	6	41	
									3	12	43	
305	1000								3	12	50	
			SALT. Medium to coarse, opaque to dark grey. Soft clay from beginning of interval to 306.20 m. Orange colour alteration can be seen throughout interval.						1	20	61	
310									1	20	57	
	1025								1	20	58	
315									1	20	55	
									1	20	74	
320	1050								1	20	75	
									1	20	74	
325									1	20	74	
	1075								1	20	75	
330									1	20	75	
									1	20	75	
335	1100								1	20	75	
									1	20	68	
340									1	20	65	
	1125								1	20	65	
345									1	20	68	
350												

LOGGED: PR/DR

CHECKED: TLG

TERRANE GEOSCIENCE INC.

GEOTECHNICAL ROCK CORE LOG

BOREHOLE: CC9B

TOTAL DEPTH: 580.00 m
N: 5363312 **E:** 388361
ELEVATION: 47.50 m
UTM ZONE: Geodetic

DATE STARTED: DEC 04, 2022
DATE COMPLETED: DEC 20, 2022
INCLINATION: 90°
AZIMUTH: N/A°

PROJECT NO.: 21-005-H
CLIENT: Atlas Salt
PROJECT NAME: Gemtec Atlas Salt Televiewer Packer Testing

Legend of Major Structures: Gouge, Sheared, Jointed, Broken — Definitions

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PLT: Point Load Test
FF/m: Fracture Frequency per m
TCR: Total Core Recovery
RQD: Rock Quality Designation
RMR: Rock Mass Rating (1976)
JCR: Joint Condition Rating
PT: Packer Test

DEPTH (m)	DEPTH (ft)	STRATA PLOT	LITHOLOGICAL DESCRIPTION	ALPHA	STRUCTURE	IRS (est.) / UCS / PLT (est.) (MPa)	FF/m	TCR / RQD (%)	Weathering	JCR	RMR 1976	OTHER TESTS
350	1150		SALT. Medium to coarse, opaque to dark grey. Soft clay from beginning of interval to 306.20 m. Orange colour alteration can be seen throughout interval. *(continued...)*						1	20	68	
355									1	20	68	
									1	20	68	
	1175								1	20	68	
360									1	20	66	
365									1	20	68	
	1200								1	20	75	
370									1	20	75	
	1225								1	20	74	
375									1	20	71	
380	1250								1	20	75	
									1	20	71	
385									1	20	74	
	1275								1	20	75	
390									2	20	68	
									1	20	62	
395	1300								1	20	61	
400												

LOGGED: PR/DR

CHECKED: TLG

TERRANE GEOSCIENCE INC.

GEOTECHNICAL ROCK CORE LOG

BOREHOLE: CC9B

TOTAL DEPTH: 580.00 m
N: 5363312 **E:** 388361
ELEVATION: 47.50 m
UTM ZONE: Geodetic

DATE STARTED: DEC 04, 2022
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RQD: Rock Quality Designation
RMR: Rock Mass Rating (1976)
JCR: Joint Condition Rating
PT: Packer Test

DEPTH (m)	DEPTH (ft)	LITHOLOGICAL DESCRIPTION	ALPHA	STRUCTURE	IRS (est.) / UCS / PLT (est.) (MPa)	FF/m	TCR / RQD (%)	Weathering	JCR	RMR 1976	OTHER TESTS
400		SALT. Medium to coarse, opaque to dark grey. Soft clay from beginning of interval to 306.20 m. Orange colour alteration can be seen throughout interval. *(continued...)*						1	20	61	
405	1325							1	20	62	
		SALT. Medium to coarse, orange brown with grey. Clay present in interval.						1	12	50	
410	1350							1	12	51	
		MUDSTONE WITH SANDSTONE INTERBEDS AND SALT. Very fine to medium grained, grey with red brown.						1	12	42	
415								1	12	51	
	1375							1	12	37	
420								1	12	47	
425	1400							1	12	49	
		SALT. Medium to coarse, opaque to dark grey.						1	20	64	
430								1	20	67	
	1425							1	20	65	
435		SALT. Medium to coarse, grey with brown. Clay present in interval.						1	12	48	
								1	20	64	
440								1	20	74	
	1450	SALT. Medium to coarse, opaque to dark grey.						1	20	57	
445								1	12	52	
	1475										
450											

LOGGED: PR/DR

CHECKED: TLG

TERRANE GEOSCIENCE INC.

GEOTECHNICAL ROCK CORE LOG

BOREHOLE: CC9B

TOTAL DEPTH: 580.00 m
N: 5363312 **E:** 388361
ELEVATION: 47.50 m
UTM ZONE: Geodetic

DATE STARTED: DEC 04, 2022
DATE COMPLETED: DEC 20, 2022
INCLINATION: 90°
AZIMUTH: N/A°

PROJECT NO.: 21-005-H
CLIENT: Atlas Salt
PROJECT NAME: Gemtec Atlas Salt Televiewer Packer Testing

Legend of Major Structures: Gouge, Sheared, Jointed, Broken — Definitions

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PLT: Point Load Test
FF/m: Fracture Frequency per m
TCR: Total Core Recovery
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RMR: Rock Mass Rating (1976)
JCR: Joint Condition Rating
PT: Packer Test

DEPTH (m)	DEPTH (ft)	STRATA PLOT	LITHOLOGICAL DESCRIPTION	ALPHA	STRUCTURE	IRS (est.) / UCS / PLT (est.) (MPa)	FF/m	FF/m / TCR / RQD (%)	Weathering	JCR	RMR 1976	OTHER TESTS
450			SALT. Medium to coarse, opaque to dark grey. *(continued...)*						1	12	52	
									1	12	50	
455									1	20	61	
	1500								1	20	61	
460									1	20	62	
									1	20	64	
465	1525								1	20	64	
									1	12	52	
470			MUDSTONE INTERBEDED SANDSTONE AND SALT. Very fine to coarse, orange brown with grey. Clay present in interval.						1	12	32	
	1550								1	12	52	
475									1	12	49	
									1	12	54	
480	1575								1	12	55	
									1	12	55	
485									1	12	52	
	1600								1	12	48	
490									1	12	53	
									1	20	64	
495	1625											
500												

LOGGED: PR/DR CHECKED: TLG

TERRANE GEOSCIENCE INC.

GEOTECHNICAL ROCK CORE LOG

BOREHOLE: CC9B

TOTAL DEPTH: 580.00 m
N: 5363312 **E:** 388361
ELEVATION: 47.50 m
UTM ZONE: Geodetic

DATE STARTED: DEC 04, 2022
DATE COMPLETED: DEC 20, 2022
INCLINATION: 90°
AZIMUTH: N/A°

PROJECT NO.: 21-005-H
CLIENT: Atlas Salt
PROJECT NAME: Gemtec Atlas Salt Televiewer Packer Testing

Legend of Major Structures: Gouge, Sheared, Jointed, Broken — Definitions

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PLT: Point Load Test
FF/m: Fracture Frequency per m
TCR: Total Core Recovery
RQD: Rock Quality Designation
RMR: Rock Mass Rating (1976)
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DEPTH (m)	DEPTH (ft)	STRATA PLOT	LITHOLOGICAL DESCRIPTION	ALPHA	STRUCTURE	IRS (est.) / UCS / PLT (est.) (MPa)	FF/m	FF/m / TCR / RQD (%)	Weathering	JCR	RMR 1976	OTHER TESTS
500			SALT. Medium to coarse, dark grey to Pale grey.						1	20	64	
	1650								1	20	74	
505									1	20	64	
									1	20	61	
510	1675								1	20	59	
									1	20	65	
515									1	20	61	
	1700								1	20	55	
520									1	20	58	
									1	12	49	
525	1725		SALT. Medium to coarse, grey to orange brown. Some alteration observed. Crystal more elongated and coarser.						1	20	65	
									1	20	65	
530									1	20	62	
	1750		SALT. Medium to coarse, dark grey to pale grey.						1	20	55	
535									1	20	64	
									1	20	61	
540	1775								1	20	62	
545												
	1800											
550												

LOGGED: PR/DR

CHECKED: TLG

TERRANE GEOSCIENCE INC.

GEOTECHNICAL ROCK CORE LOG

BOREHOLE: CC9B

TOTAL DEPTH: 580.00 m
N: 5363312 **E:** 388361
ELEVATION: 47.50 m
UTM ZONE: Geodetic

DATE STARTED: DEC 04, 2022
DATE COMPLETED: DEC 20, 2022
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AZIMUTH: N/A°

PROJECT NO.: 21-005-H
CLIENT: Atlas Salt
PROJECT NAME: Gemtec Atlas Salt Televiewer Packer Testing

Legend of Major Structures: Gouge, Sheared, Jointed, Broken — Definitions

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TCR: Total Core Recovery
RQD: Rock Quality Designation
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PT: Packer Test

DEPTH (m)	DEPTH (ft)	STRATA PLOT	LITHOLOGICAL DESCRIPTION	ALPHA	STRUCTURE	IRS (est.) / UCS / PLT (est.) (MPa)	FF/m	FF/m / TCR / RQD (%)	Weathering	JCR	RMR 1976	OTHER TESTS
550			SALT. Medium to coarse, dark grey to pale grey. *(continued...)*						1	20	62	
555	1825								1	20	66	
									1	20	70	
560									1	20	71	
	1850								1	20	70	
565									1	20	71	
									1	20	65	
570	1875								1	20	65	
									1	20	61	
575									1	12	59	
			ANHYDRITE. Fine grained, grey.						1	20	62	
	1900											
580			End of Borehole at 580 m.									
585												
	1925											
590												
595	1950											
600												

LOGGED: PR/DR

CHECKED: TLG

2089 Maitland Street
Halifax, NS, B3K 2Z8
terranegeoscience.com

APPENDIX B – TELEVIEWER LOGS

Client: ATLAS SALT

TERRANE GEOSCIENCE INC.

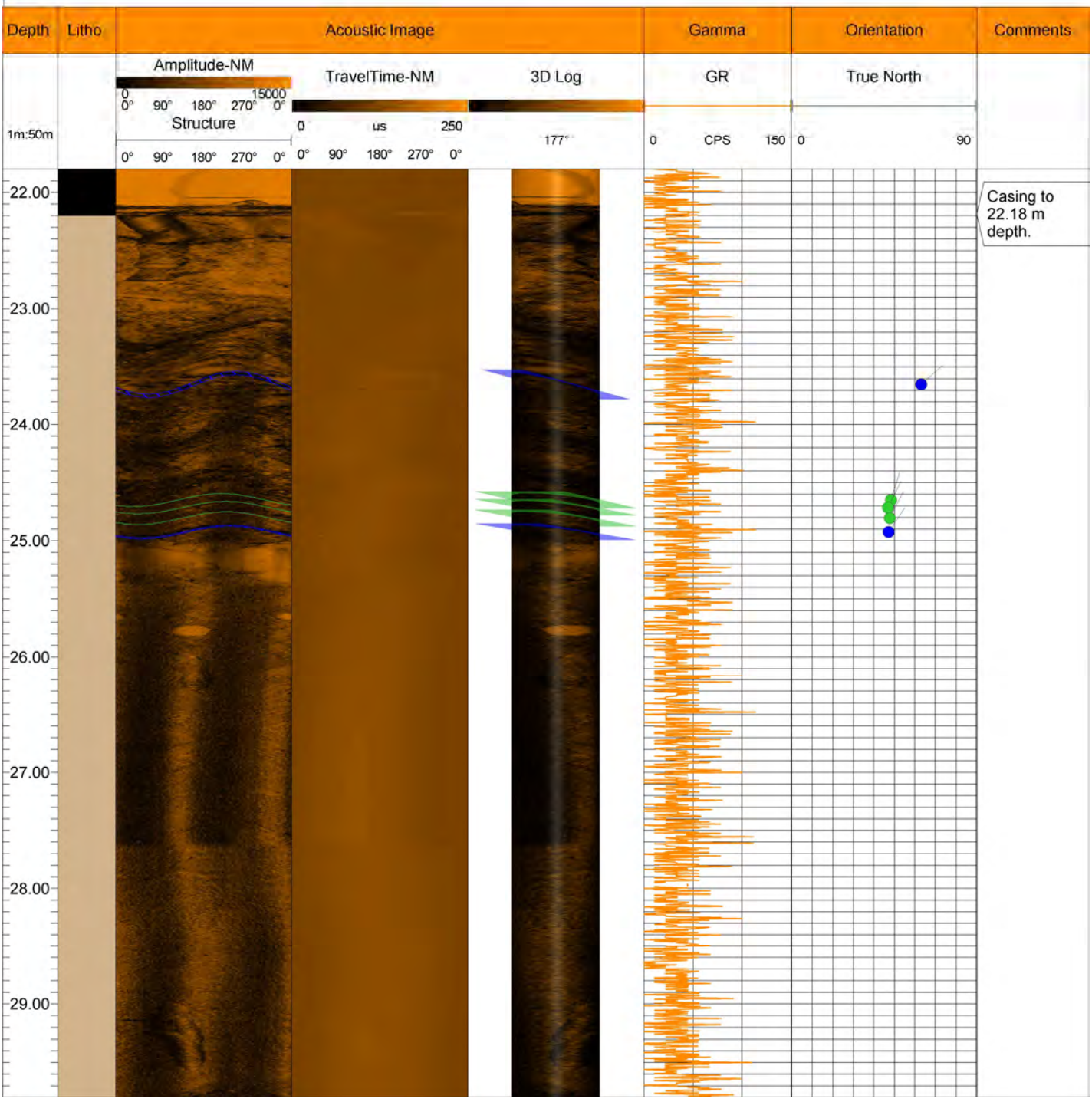
GEMTEC Consulting Engineers and Scientists

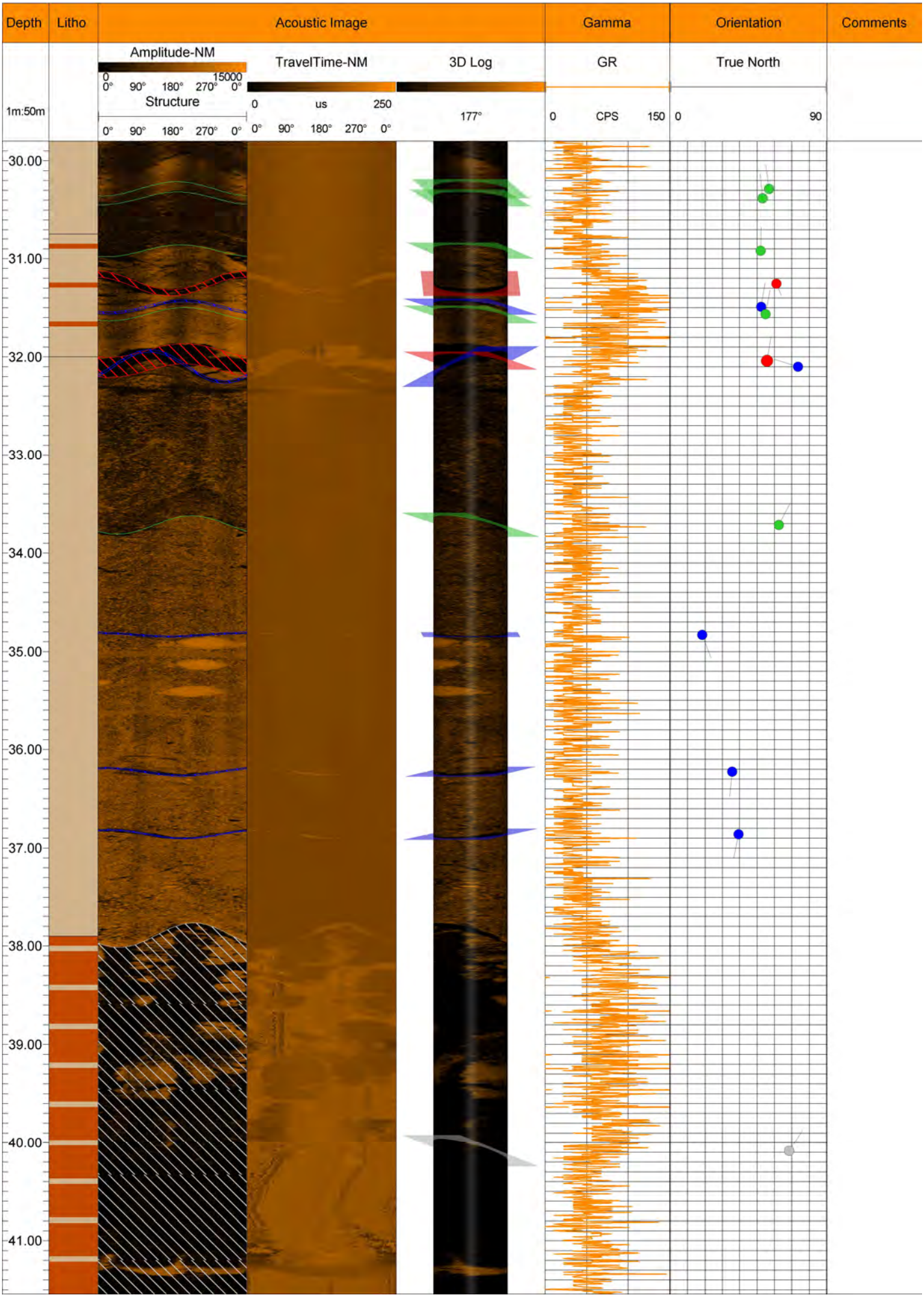
Project: 22-005-H
Atlas Salt Televiewer

Structure: Minor Fault (<10 cm) · Major Fault (>10 cm) · Bedding · Wash Out · Joint

Hole ID:	Area:		
CC6	Flat Bay		
Location:		**Azimuth:**	**Dip:**
N: 5363747.7 E: 387914.1 Z: 24.8		0	-90
Hole Depth (m):	**Log Depth (m):**	**Logged By:**	**Logged Date:**
296	262.5	P.Ramlochund	12/04/22

Lithology: Overburden · Mudstone · Sandstone · Mudstone w/ Sandstone Interbeds · Sandstone w/ Mudstone Interbeds · Conglomerate · Sandstone w/ Conglomerate Interbeds · Coal · Conglomerate w/ Sandstone Interbeds

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TravelTime-NM
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us
250
0° 90° 180° 270° 0°
3D Log
177°
GR
0
CPS
150
True North
0
90
1m:50m
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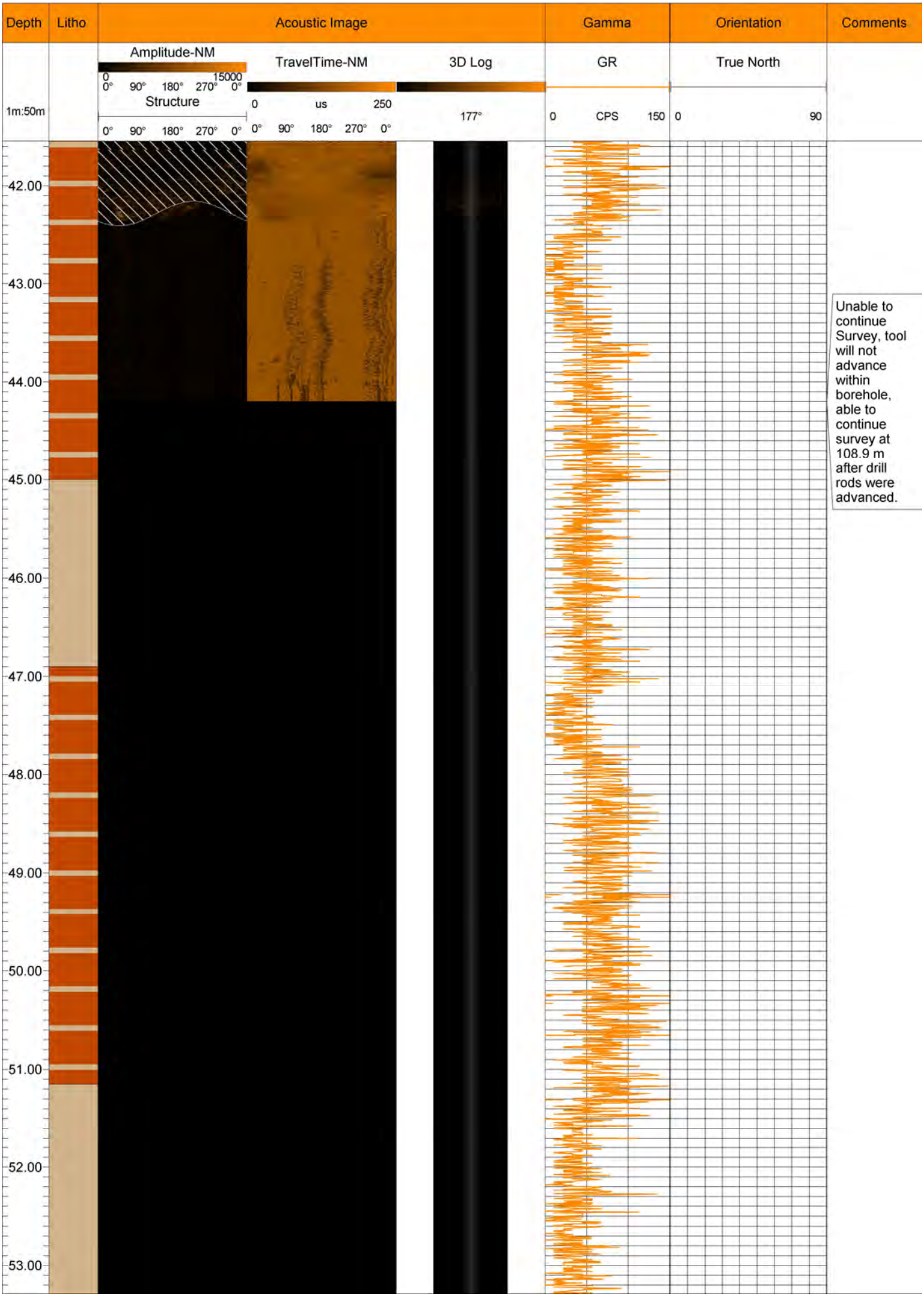
41.00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Orientation
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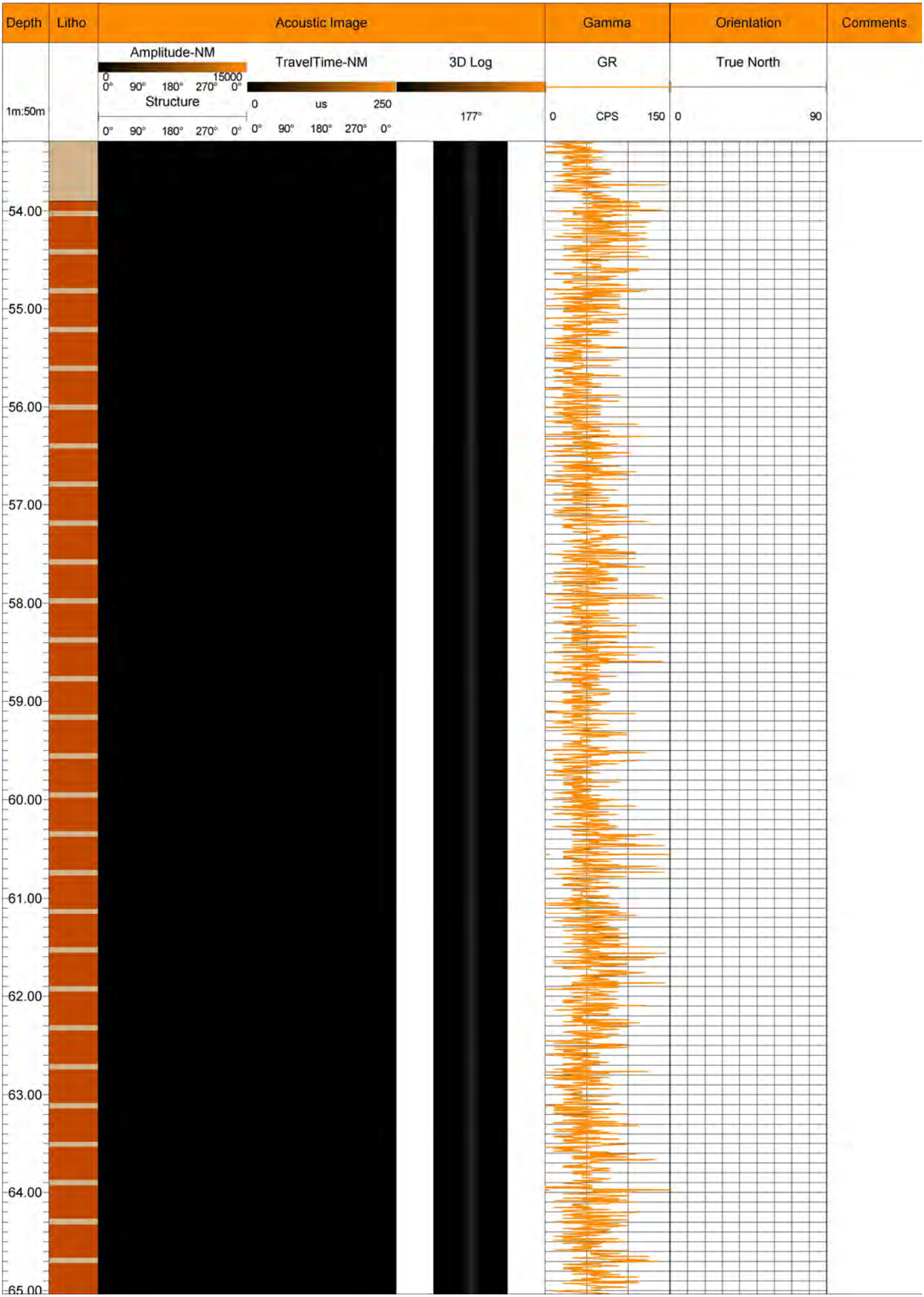
15000
0° 90° 180° 270° 0°
Structure
0° 90° 180° 270° 0°
TravelTime-NM
0
us
250
0° 90° 180° 270° 0°
3D Log
177°
GR
0
CPS
150
True North
0
90
1m:50m
42.00
43.00
44.00
45.00
46.00
47.00
48.00
49.00
50.00
51.00
52.00
53.00
Unable to continue Survey, tool will not advance within borehole, able to continue survey at 108.9 m after drill rods were advanced.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Acoustic Image
Gamma
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Structure
0° 90° 180° 270° 0°
TravelTime-NM
0
us
250
0° 90° 180° 270° 0°
3D Log
177°
GR
0
CPS
150
True North
0
90
1m:50m
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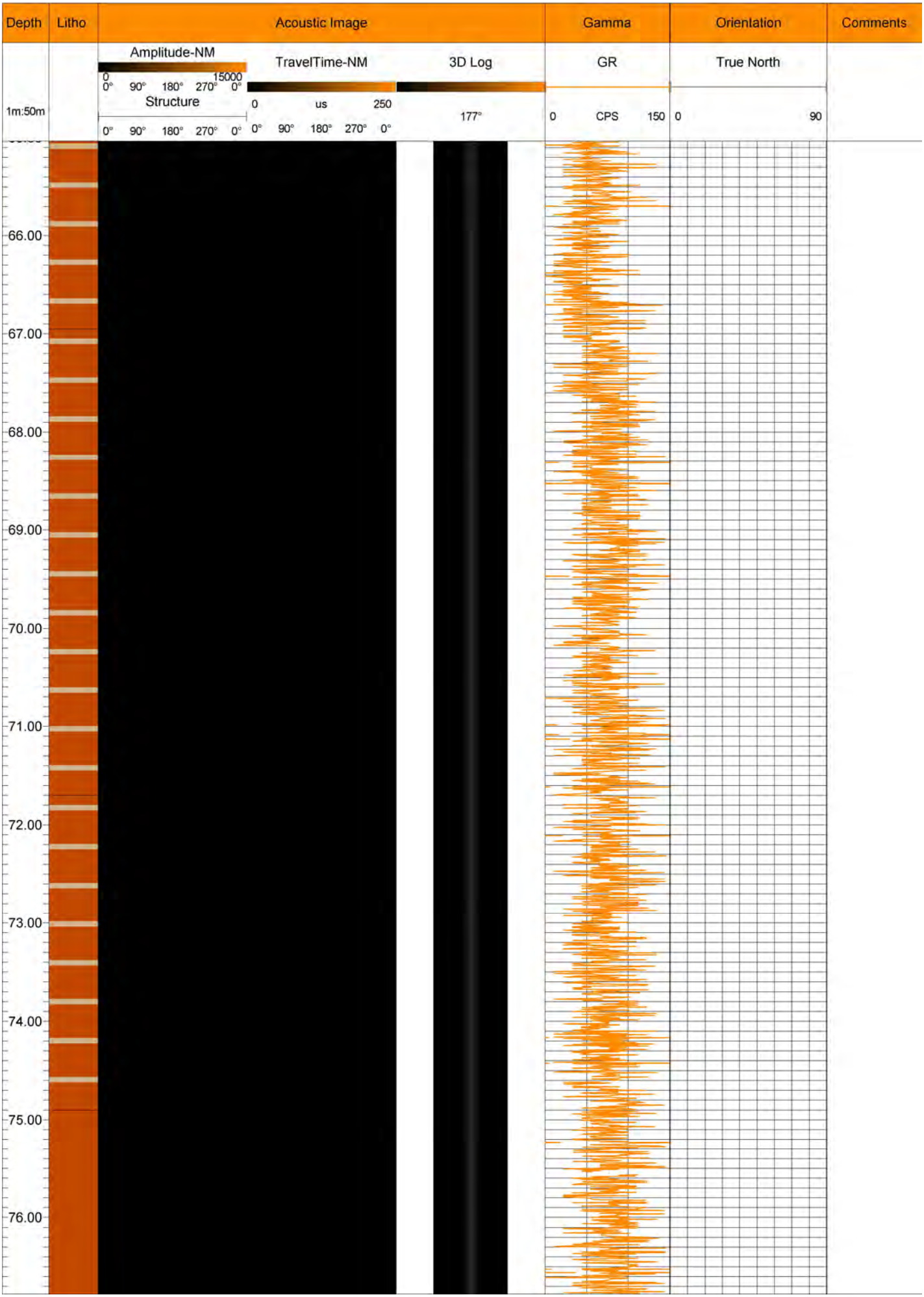
62.00
63.00
64.00
65.00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Gamma
Orientation
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Amplitude-NM
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Structure
0° 90° 180° 270° 0°
TravelTime-NM
0
us
250
0° 90° 180° 270° 0°
3D Log
177°
GR
0
CPS
150
True North
0
90
1m:50m
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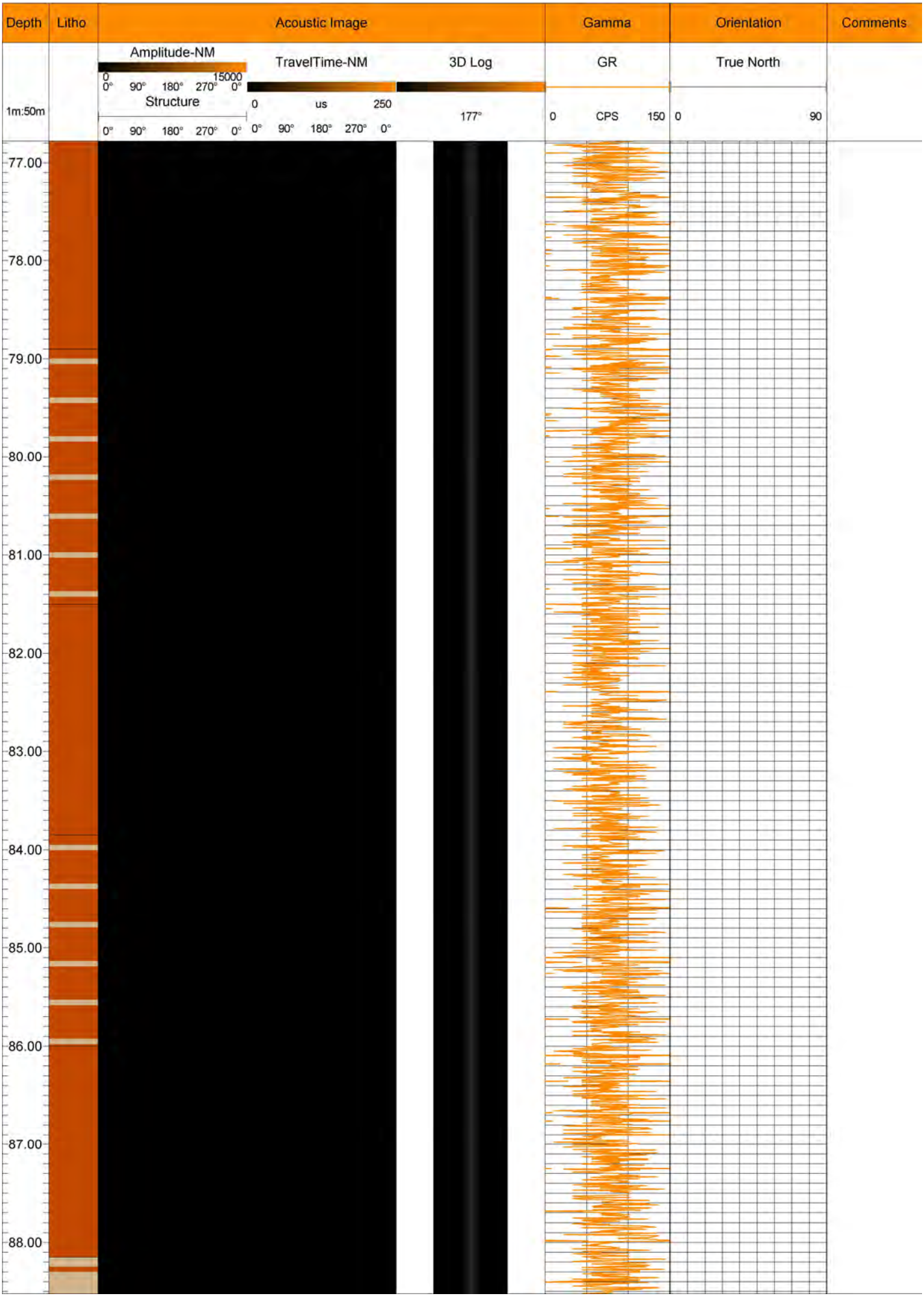
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0° 90° 180° 270° 0°
Structure
0° 90° 180° 270° 0°
TravelTime-NM
0
us
250
0° 90° 180° 270° 0°
3D Log
177°
GR
0
CPS
150
True North
0
90
1m:50m
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86.00
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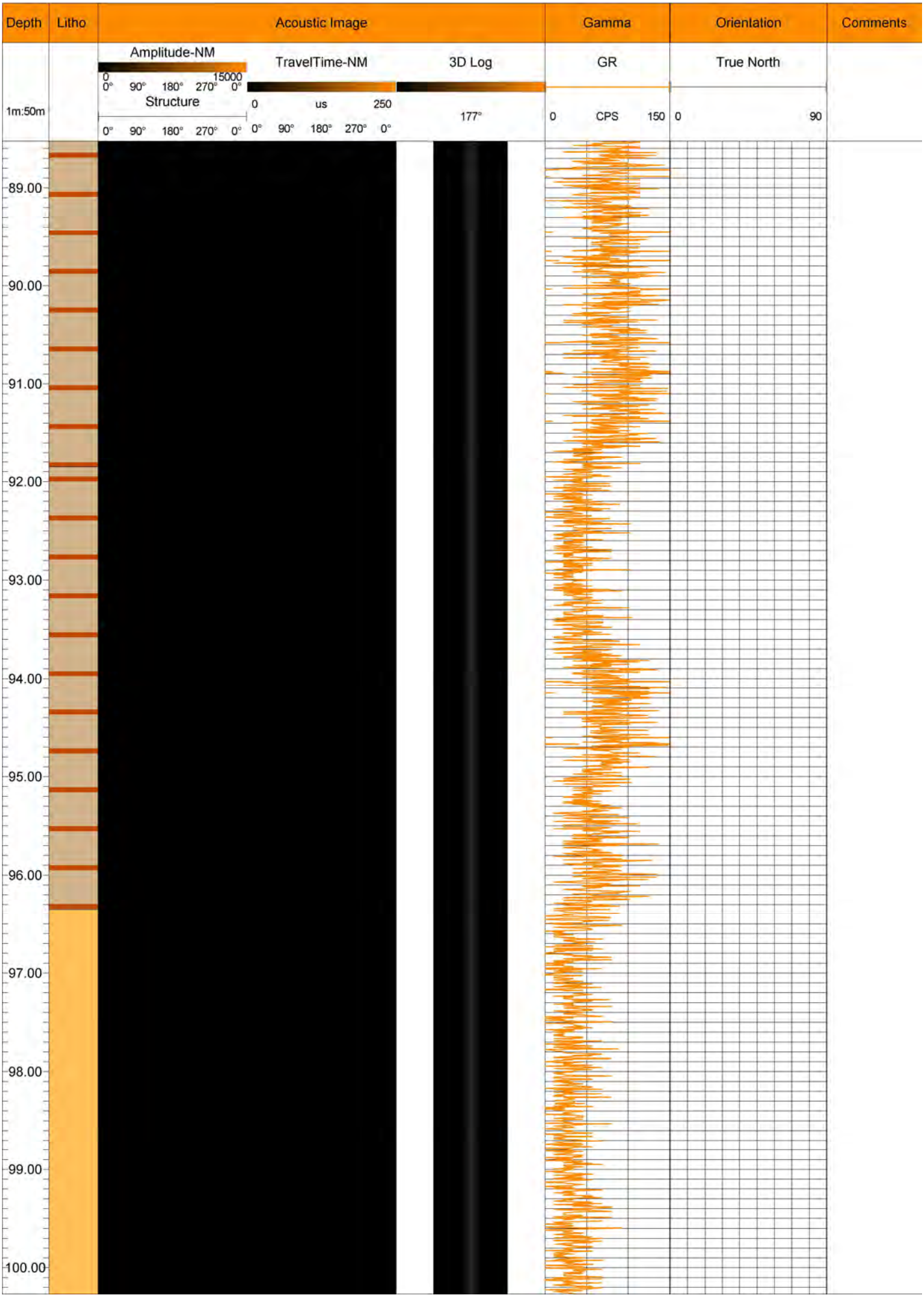
88.00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0° 90° 180° 270° 0°
TravelTime-NM
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us
250
0° 90° 180° 270° 0°
3D Log
177°
GR
0
CPS
150
True North
0
90
1m:50m
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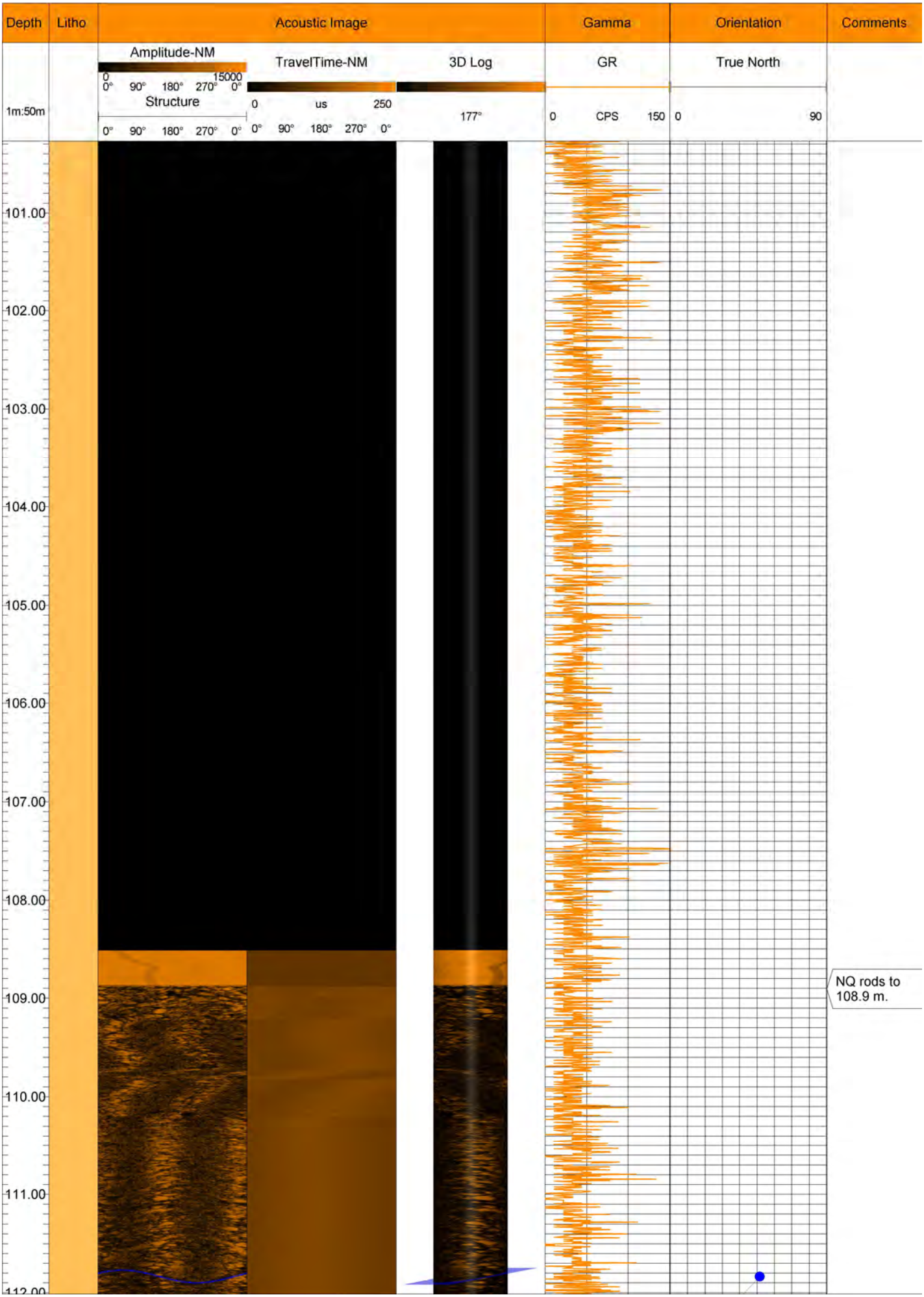
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0° 90° 180° 270° 0°
Structure
0° 90° 180° 270° 0°
TravelTime-NM
0
us
250
0° 90° 180° 270° 0°
3D Log
177°
GR
0
CPS
150
True North
0
90
1m:50m
101.00
102.00
103.00
104.00
105.00
106.00
107.00
108.00
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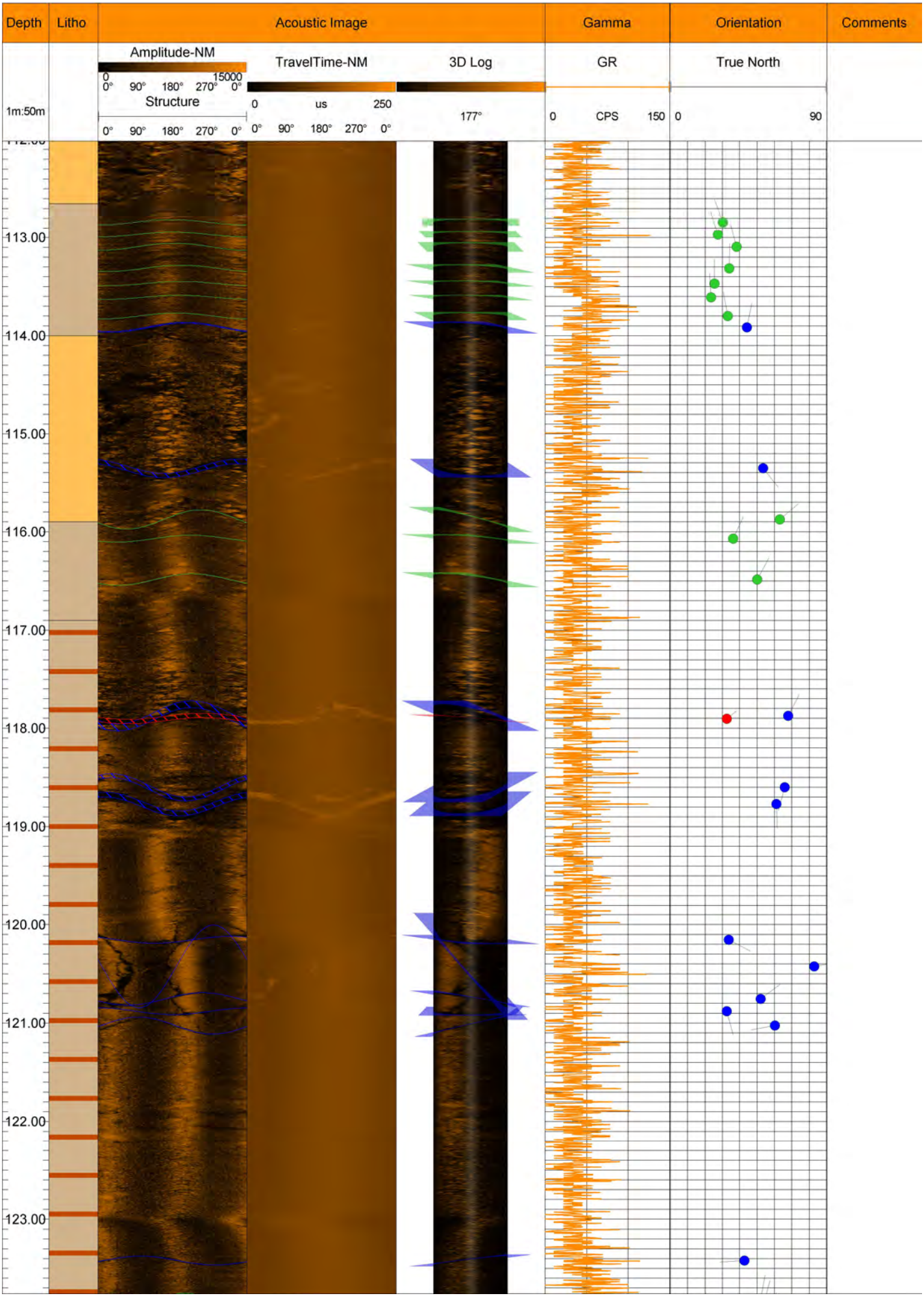
110.00
111.00
112.00
NQ rods to
108.9 m.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Gamma
Orientation
Comments
Amplitude-NM
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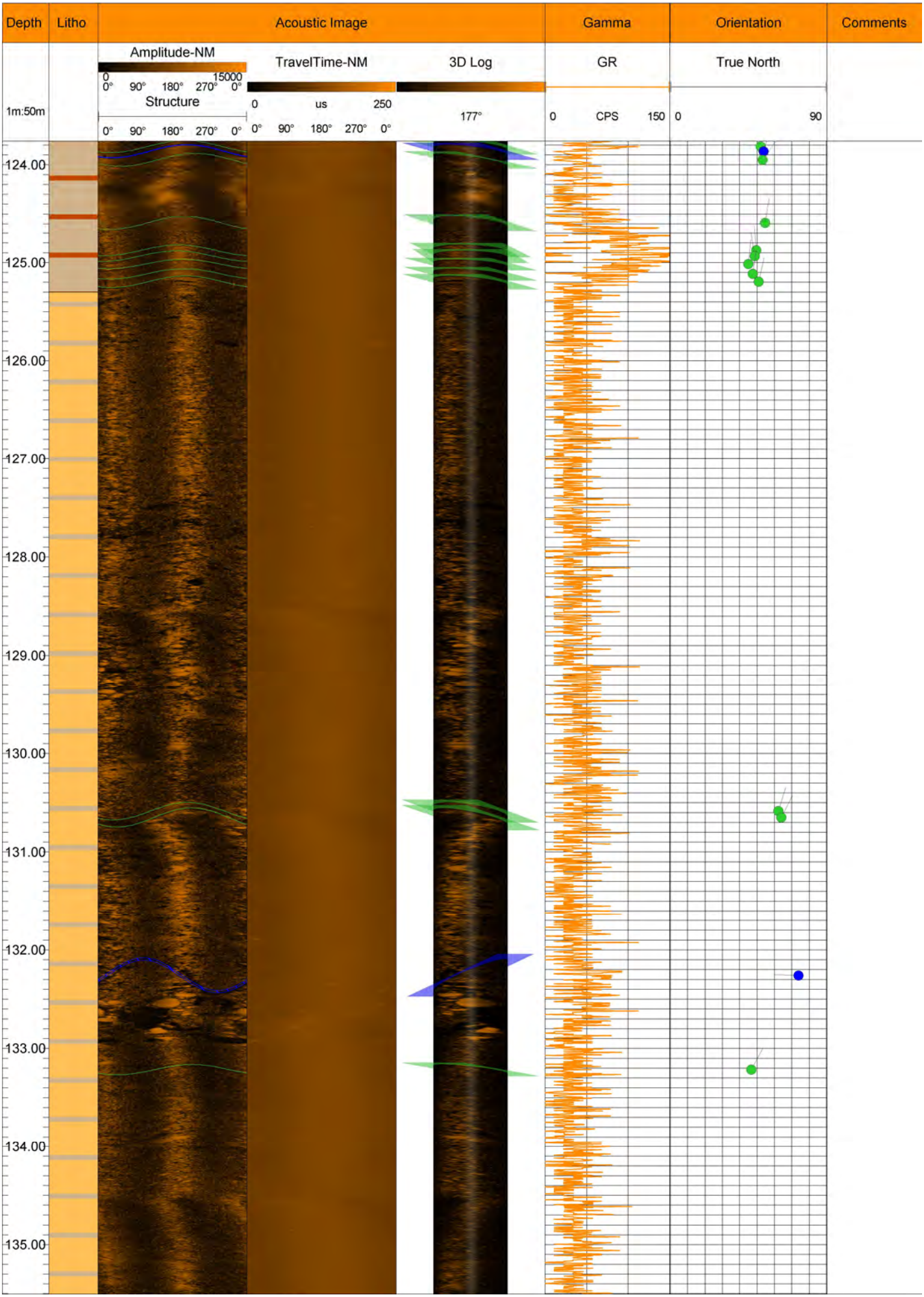
15000
0° 90° 180° 270° 0°
Structure
0° 90° 180° 270° 0°
TravelTime-NM
0
us
250
0° 90° 180° 270° 0°
3D Log
177°
GR
0
CPS
150
True North
0
90
1m:50m
113.00
114.00
115.00
116.00
117.00
118.00
119.00
120.00
121.00
122.00
123.00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Structure
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0° 90° 180° 270° 0°
3D Log
177°
GR
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CPS
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True North
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1m:50m
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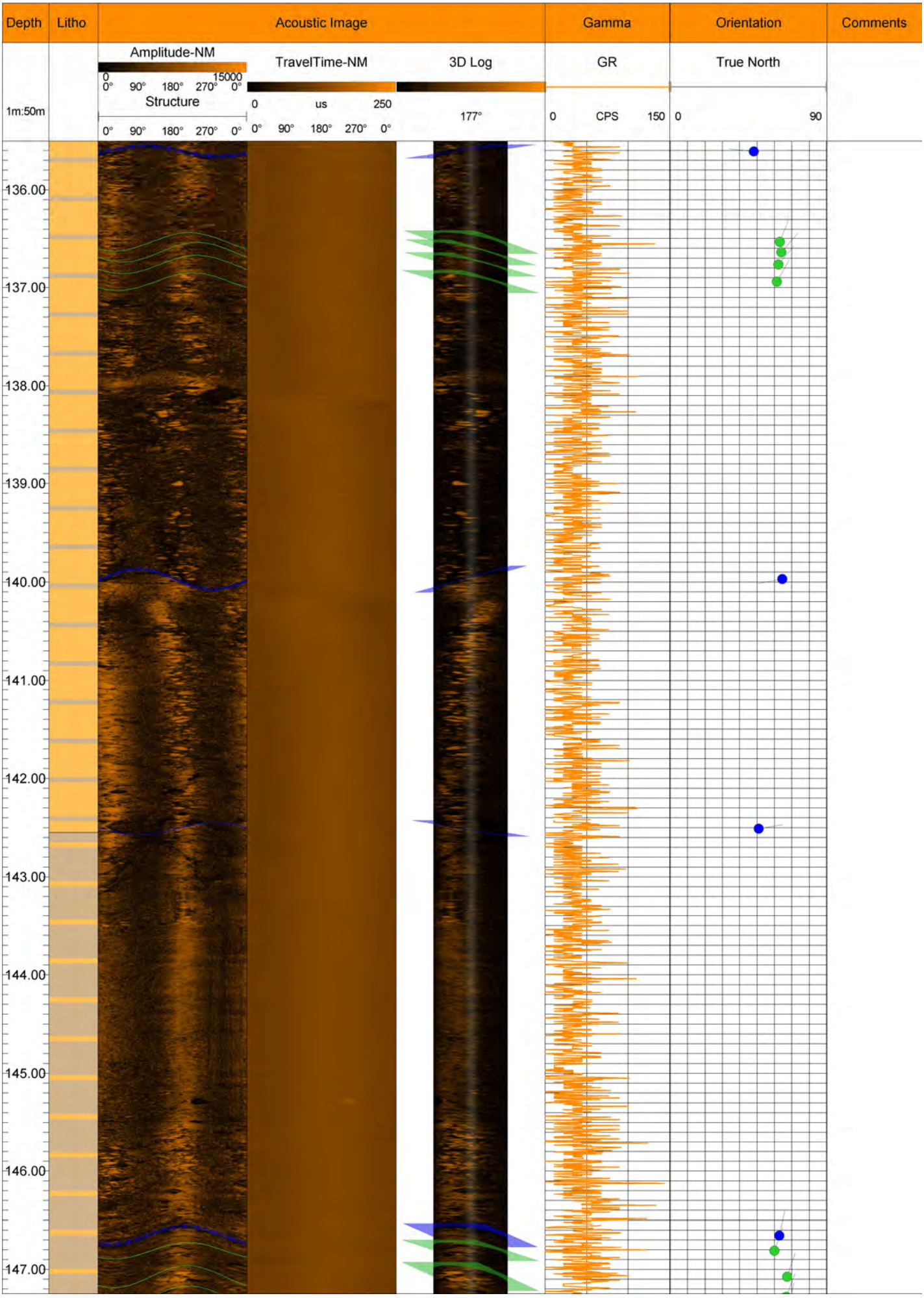
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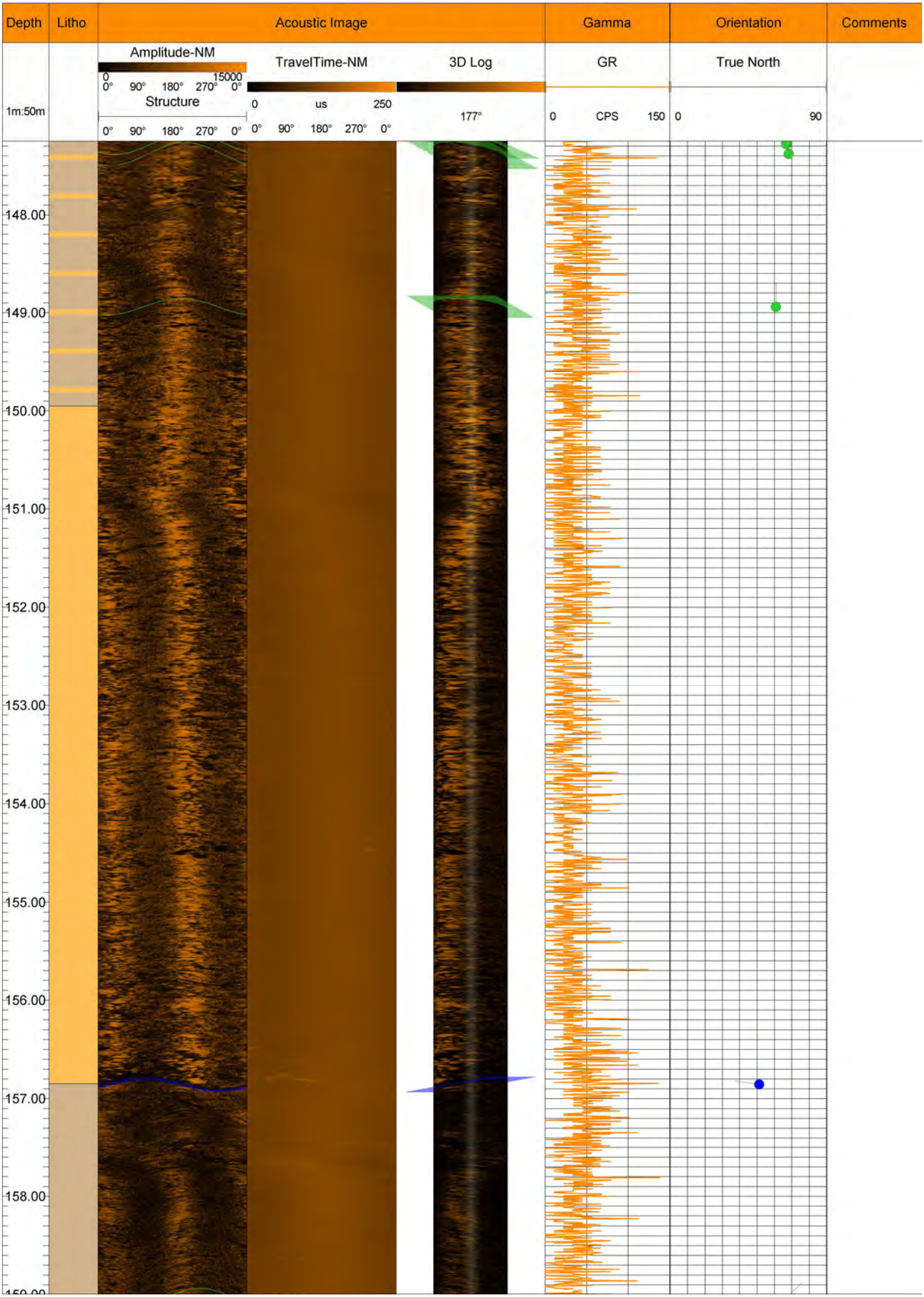
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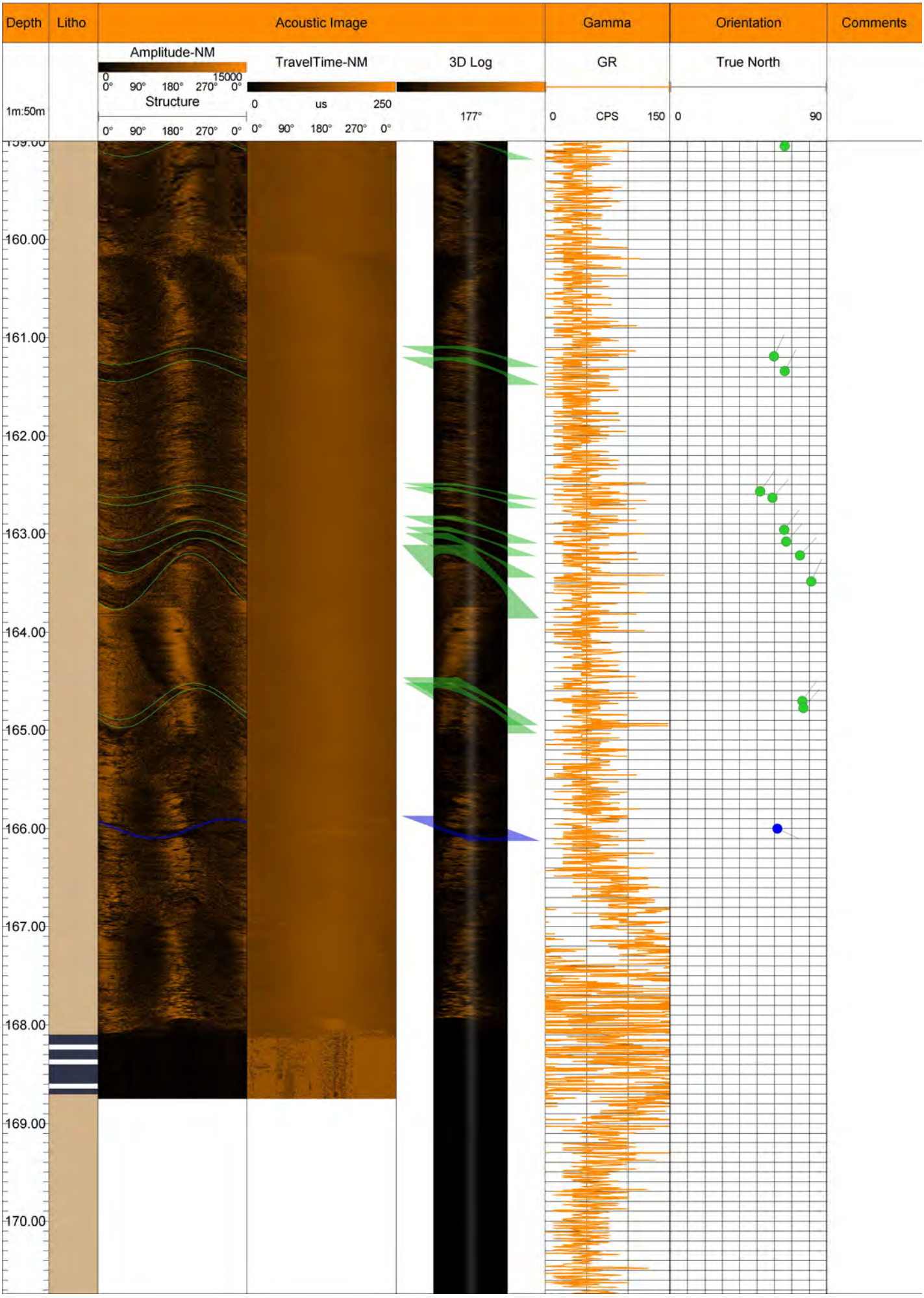
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GR
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True North
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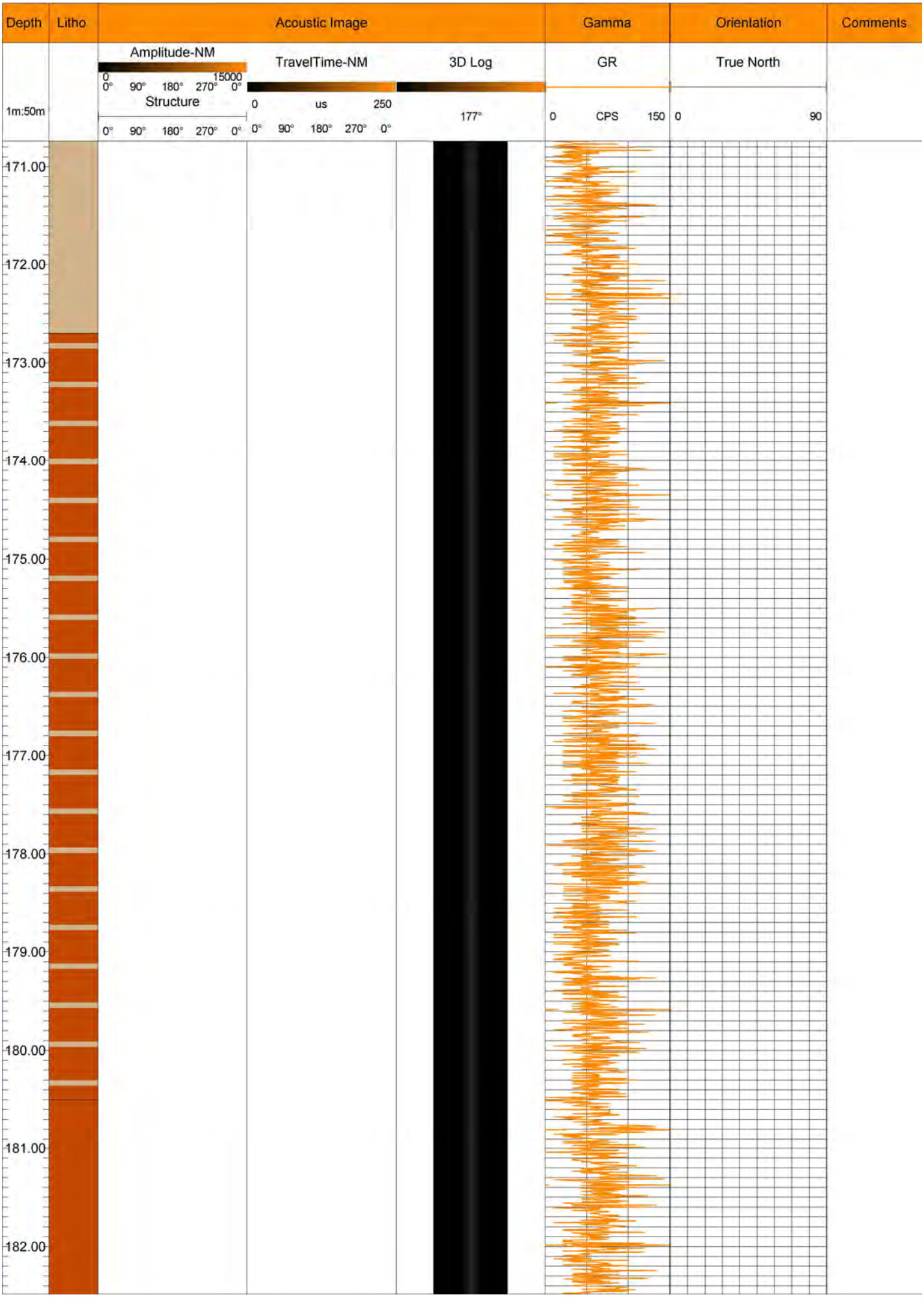
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3D Log
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GR
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CPS
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True North
0
90
1m:50m
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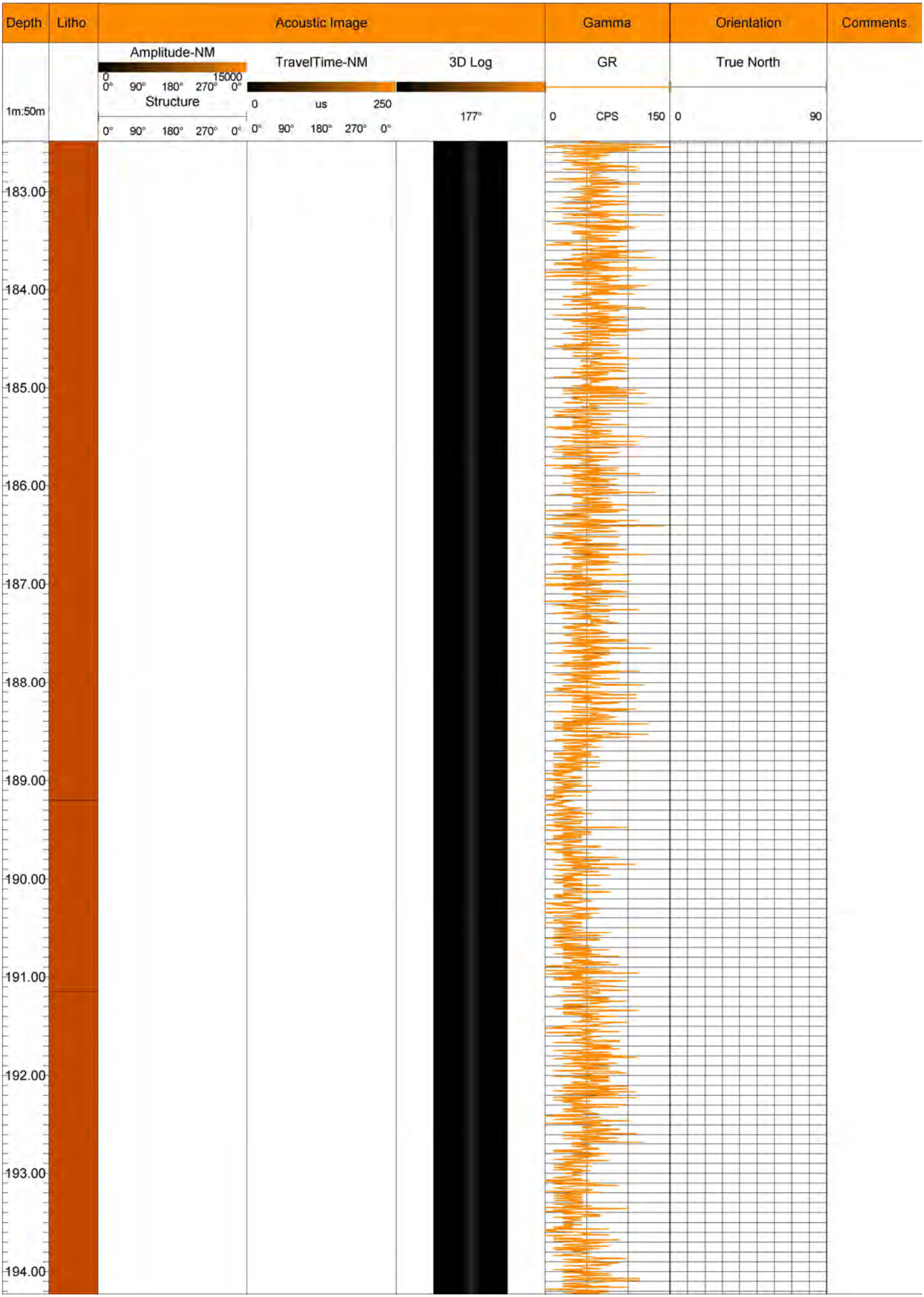
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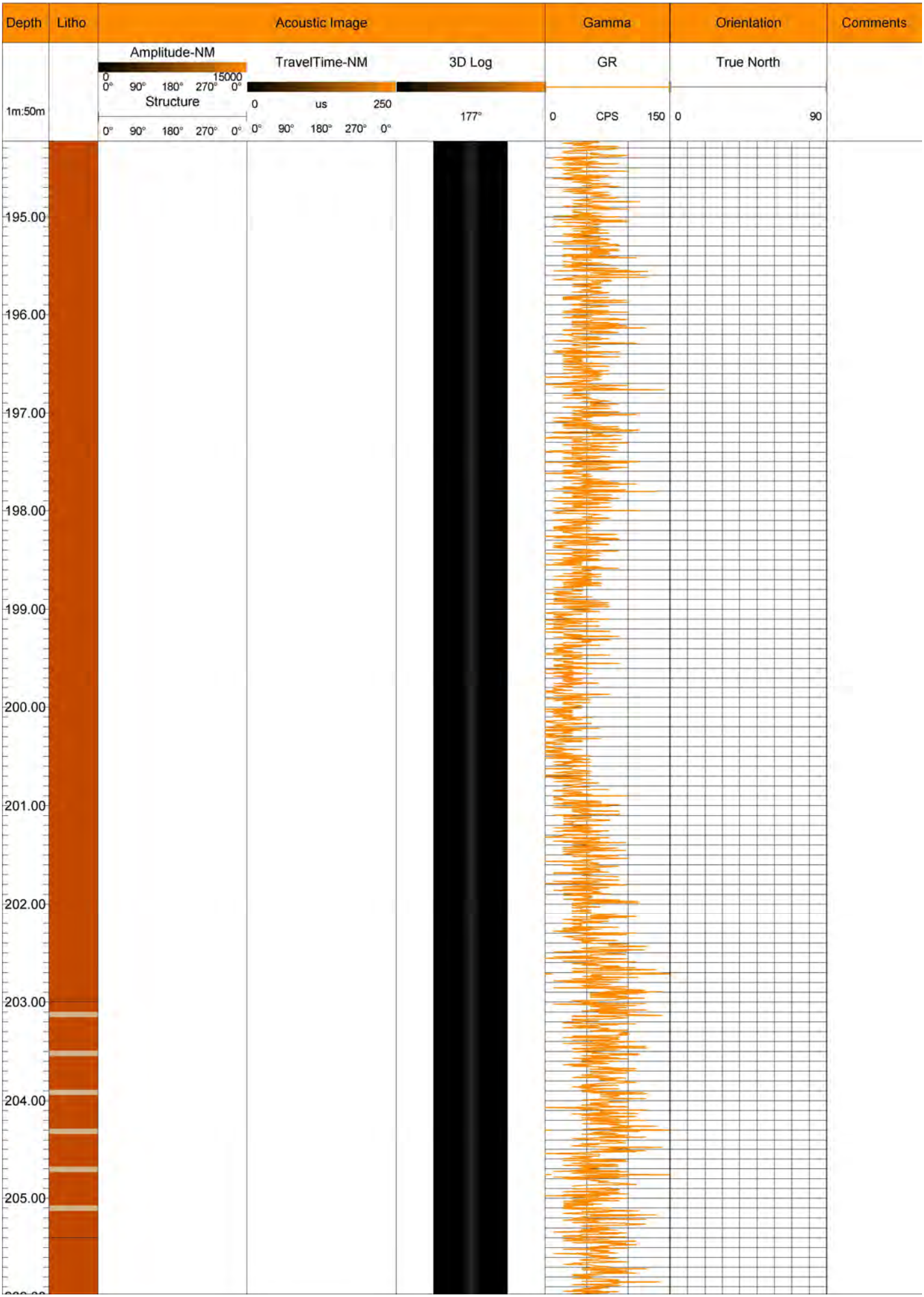
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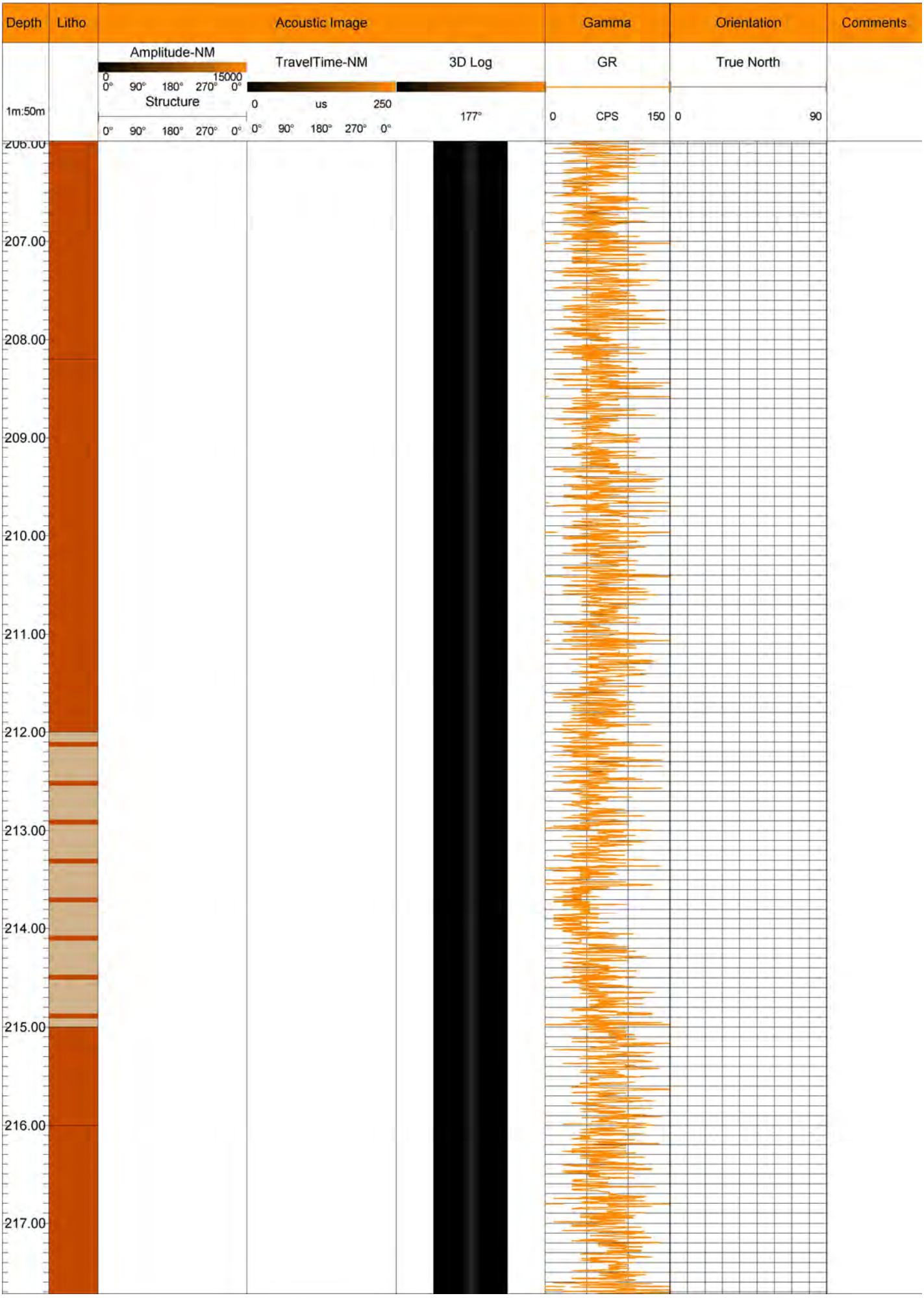
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1m:50m
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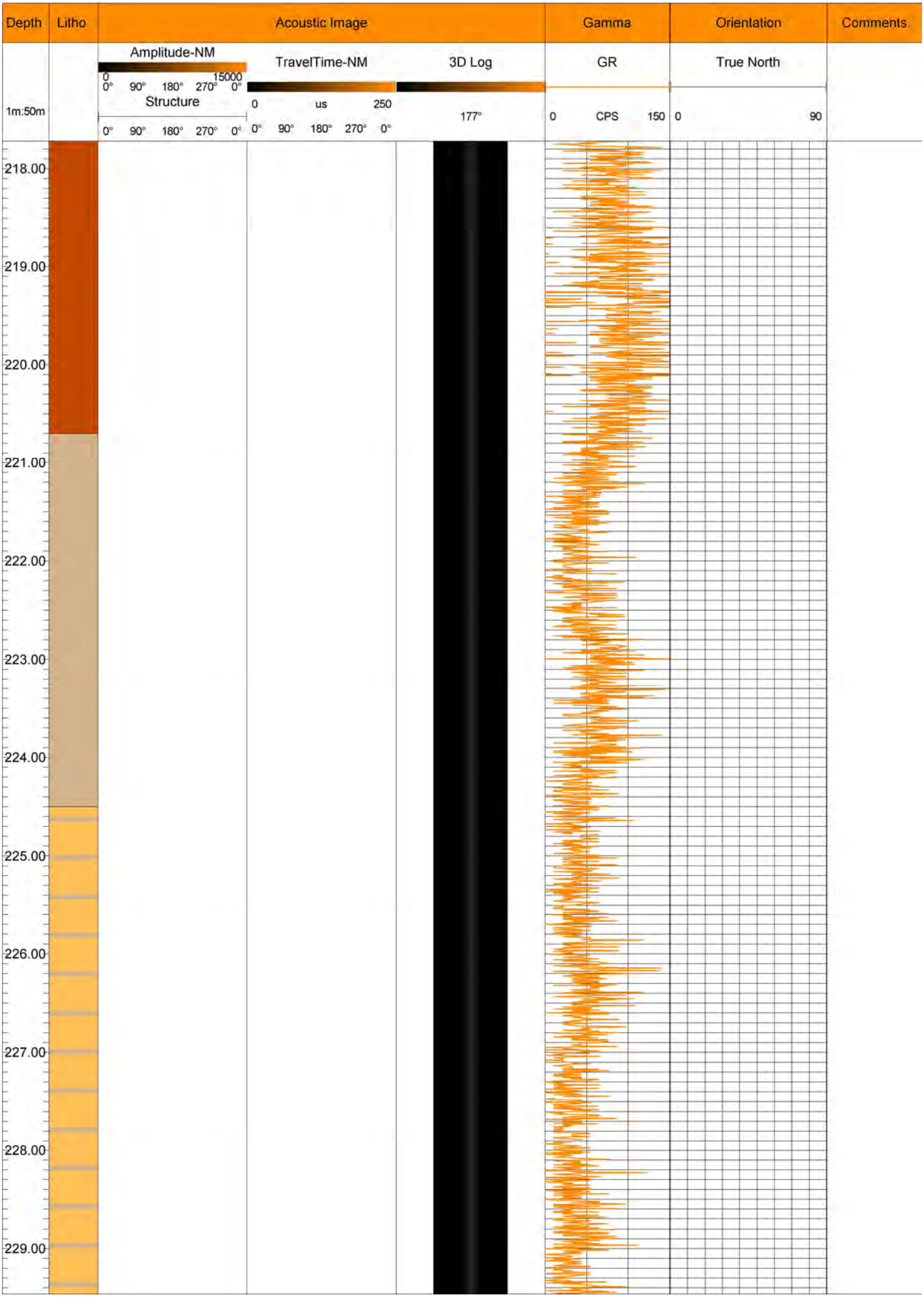
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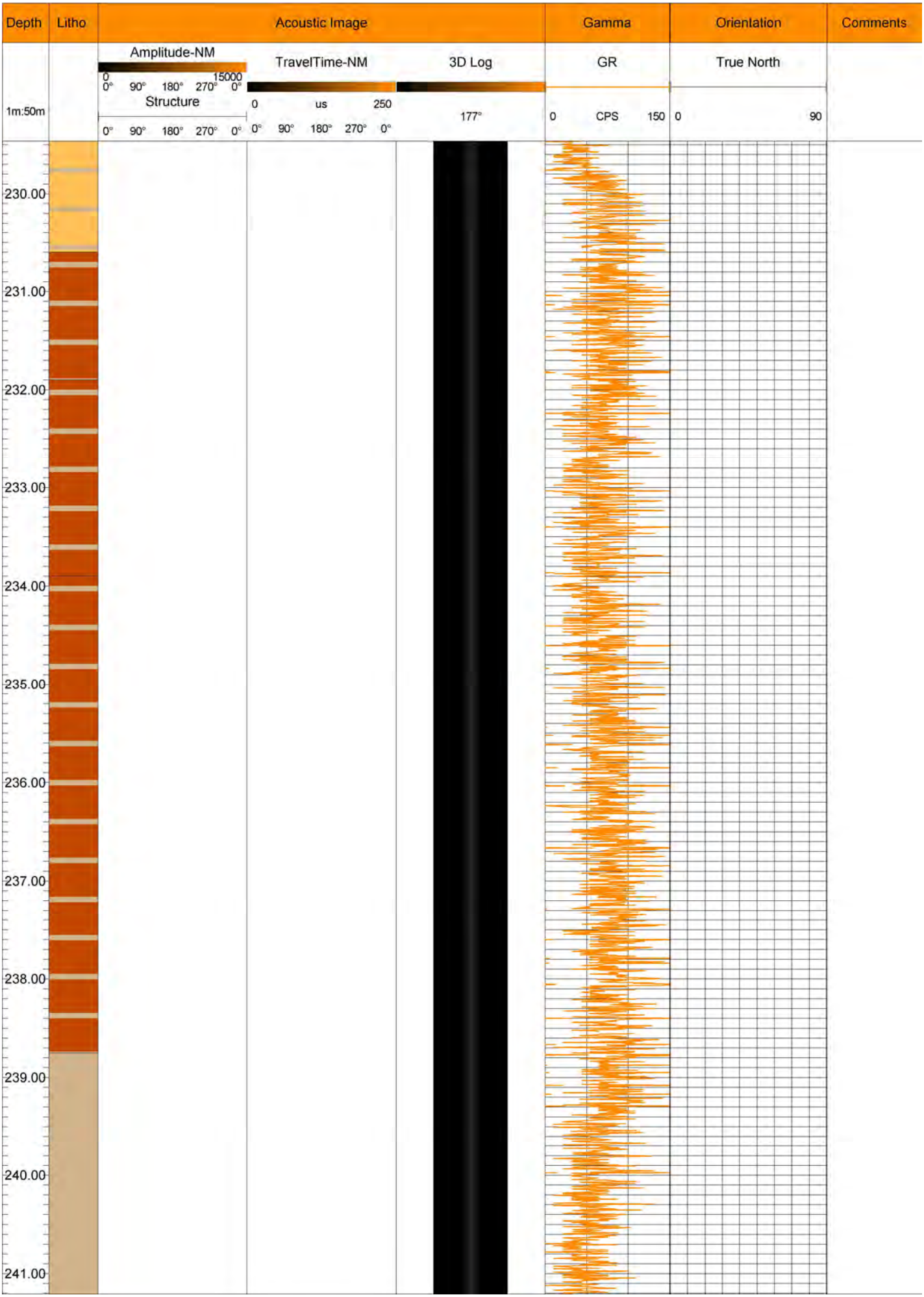
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GR
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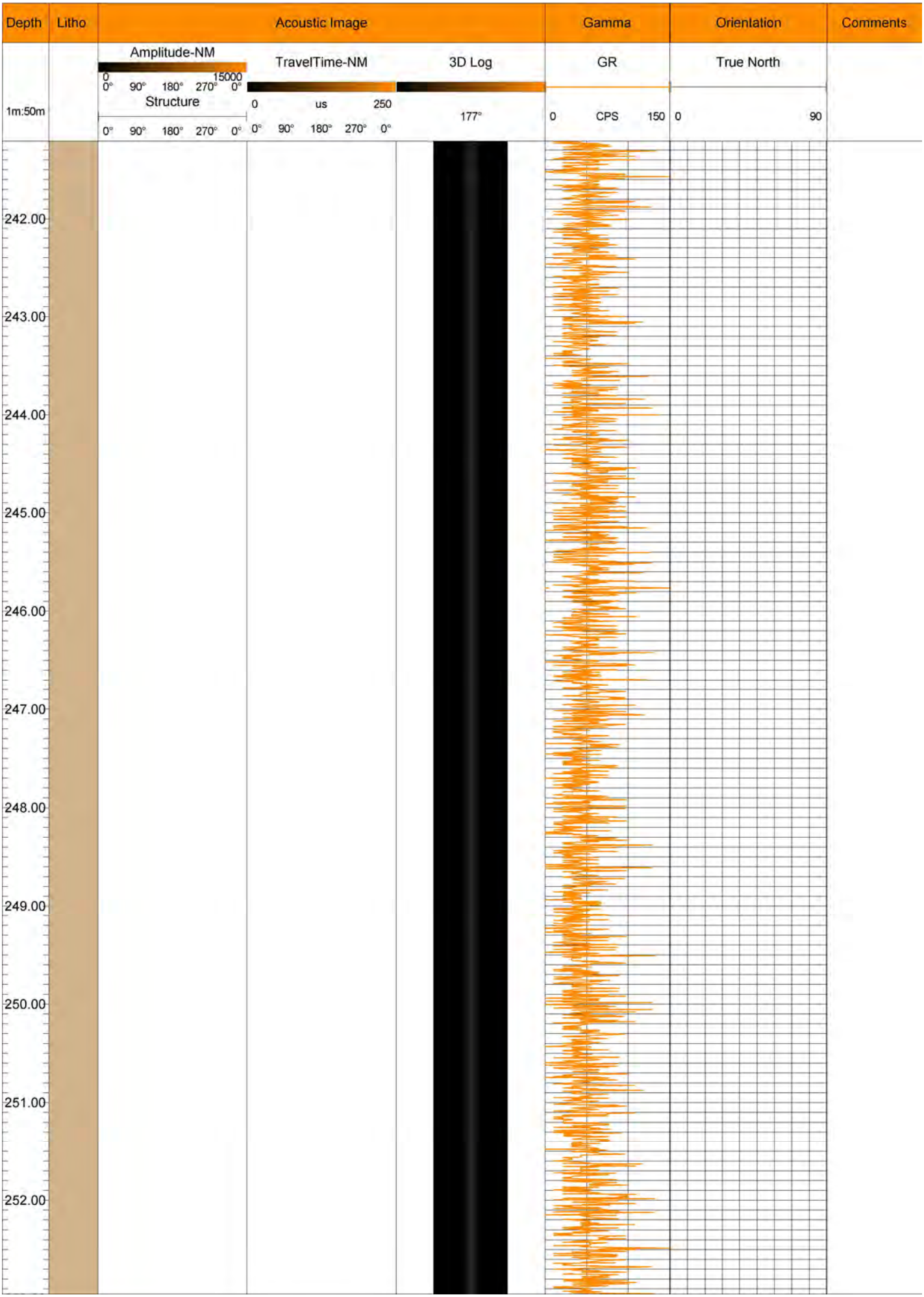
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TravelTime-NM
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3D Log
177°
GR
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True North
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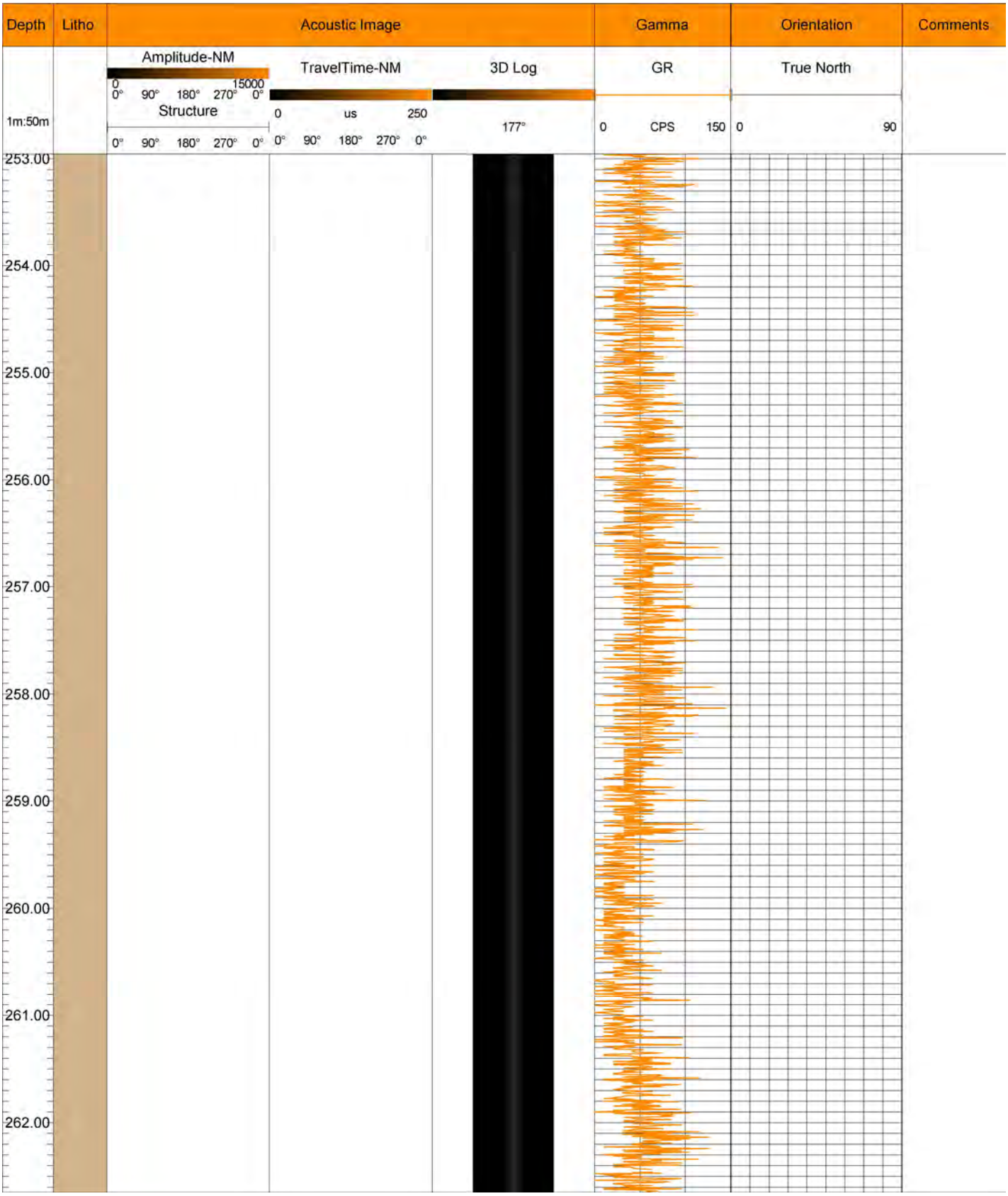
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3D Log
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GR
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CPS
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True North
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1m:50m
253.00
254.00
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257.00
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260.00
261.00
262.00

Client: ATLAS SALT

TERRANE GEOSCIENCE INC.

GEMTEC Consulting Engineers and Scientists

Project: 22-005-H
Atlas Salt Televiewer

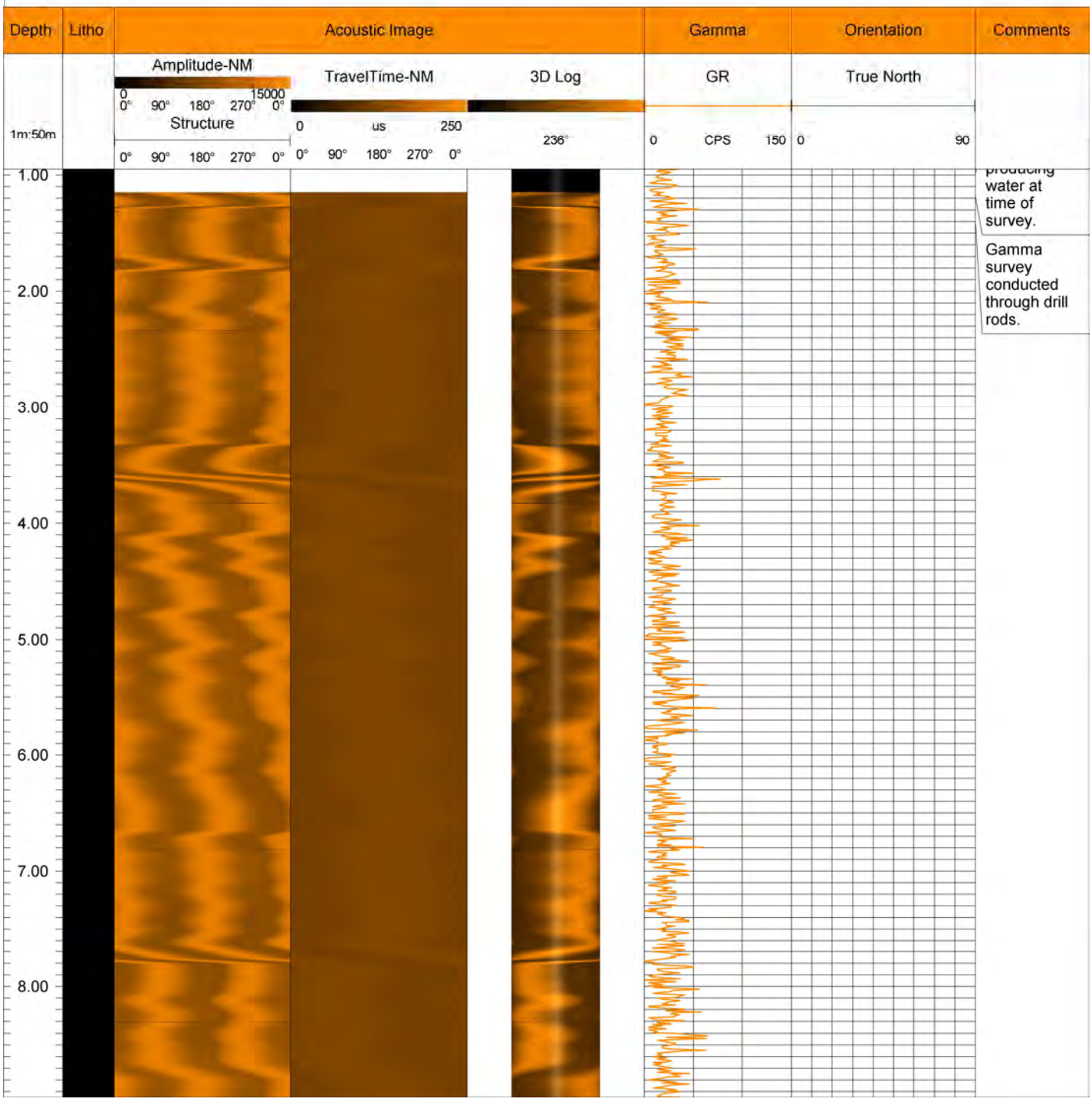
Hole ID:	Area:
CC7	Flat Bay

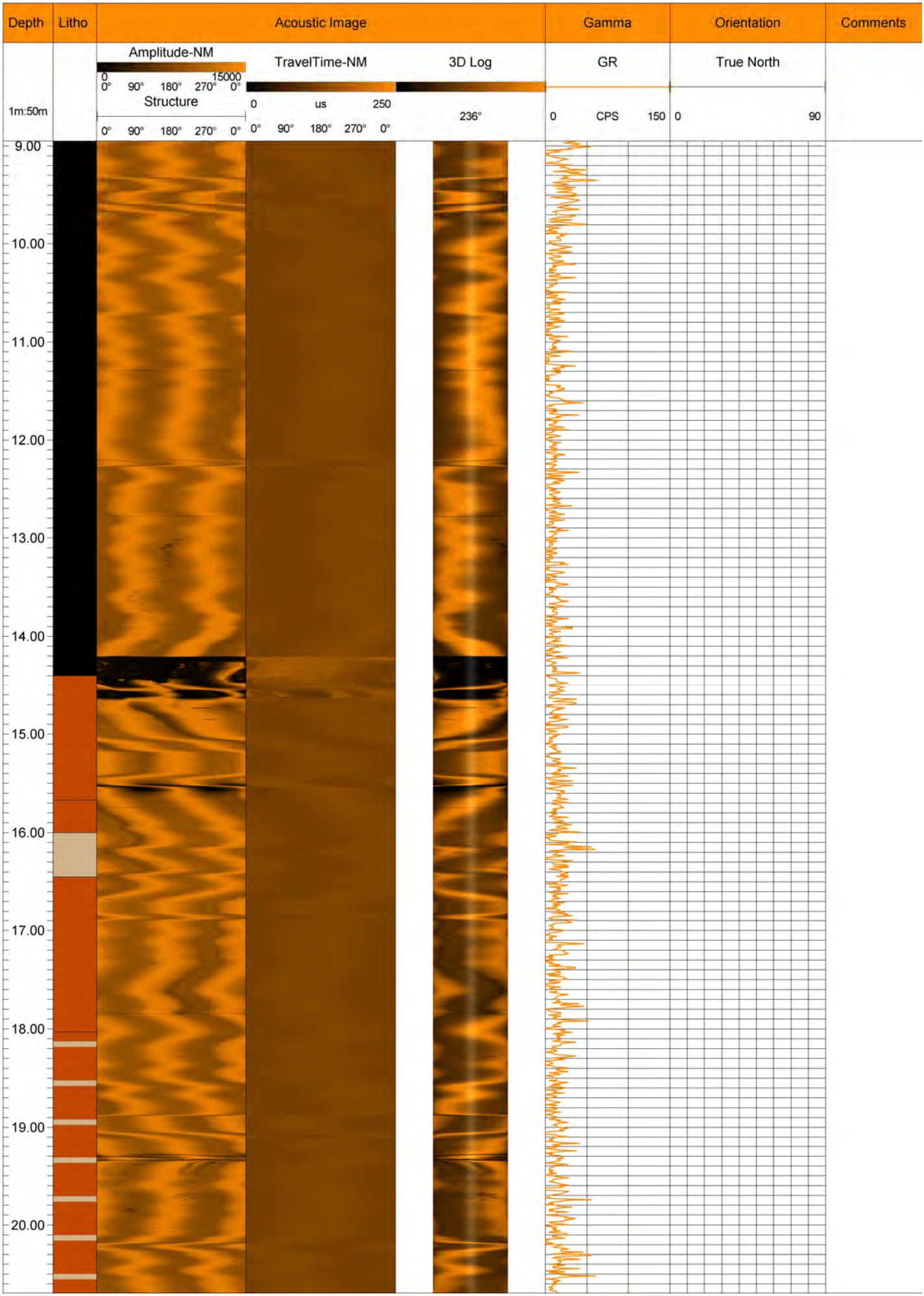
Location:	Azimuth:	Dip:
N: 5363709.5 E: 388525 Z: 38.1	0	-90

Hole Depth (m):	Log Depth (m):	Logged By:	Logged Date:
348.45	348.45	M. Matthews	14/03/22

Structure: Minor Fault (<10 cm); Major Fault (>10 cm); Bedding; Wash Out; Joint

Lithology: Overburden; Mudstone; Sandstone; Mudstone Conglomerate w/ Sandstone Interbeds; Mudstone w/ Sandstone Interbeds; Sandstone w/ Mudstone Interbeds; Conglomerate; Salt

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Acoustic Image
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Structure
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TravelTime-NM
0
us
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0° 90° 180° 270° 0°
3D Log
236°
GR
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CPS
150
True North
0
90
1m:50m
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11.00
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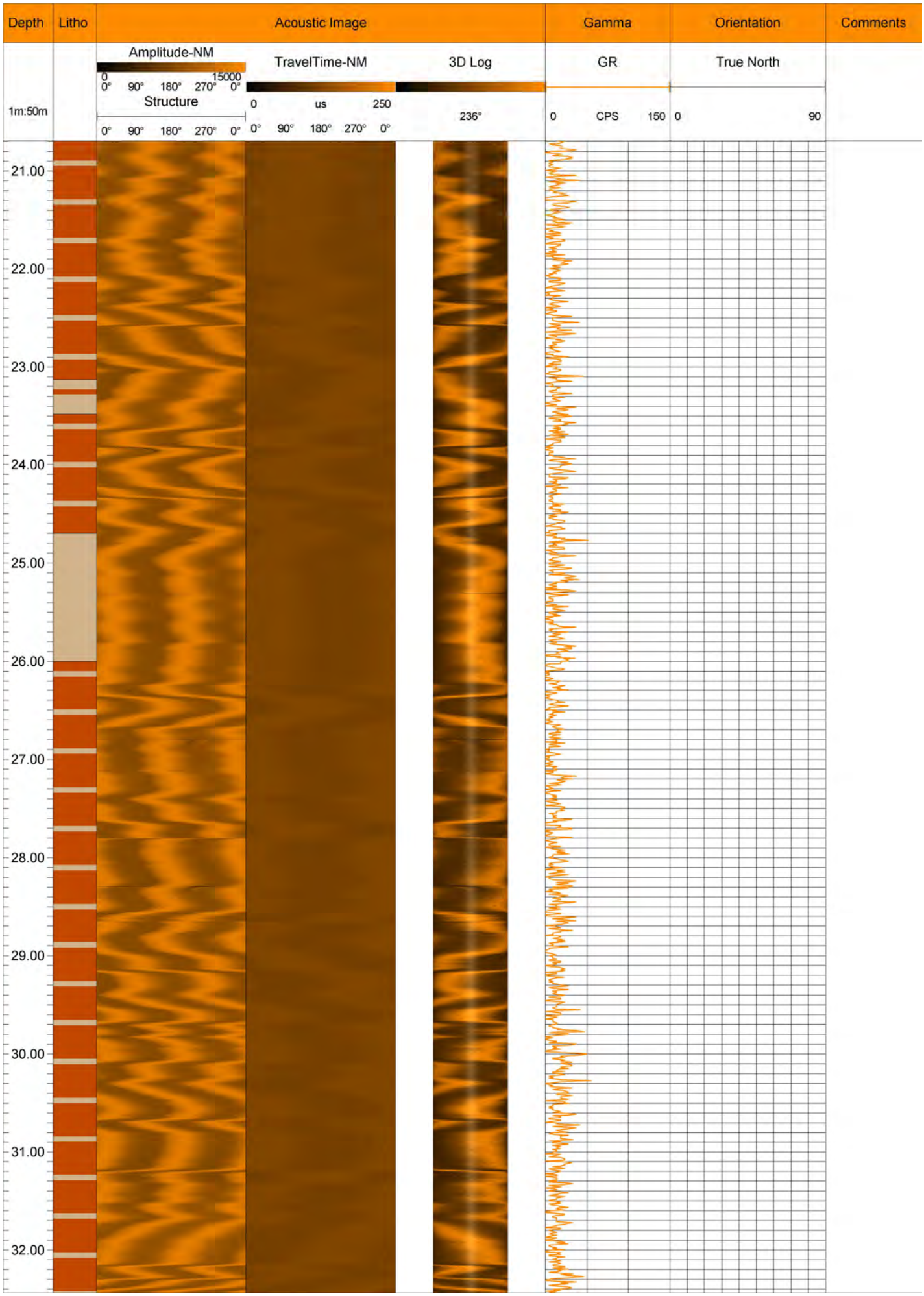
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TravelTime-NM
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3D Log
236°
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0 CPS 150
True North
0 90
1m:50m
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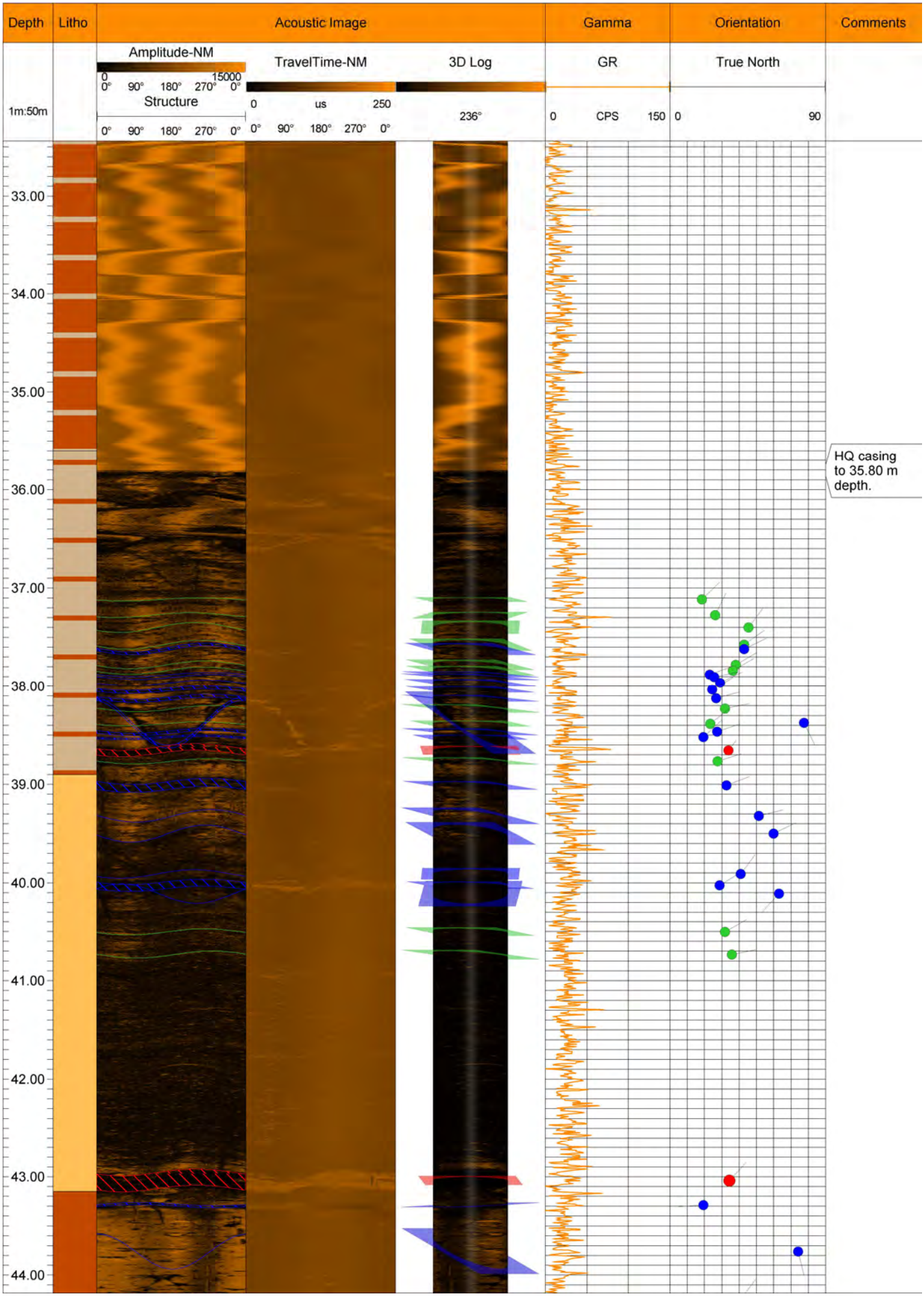
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TravelTime-NM
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0° 90° 180° 270° 0°
3D Log
236°
GR
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CPS
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True North
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90
1m:50m
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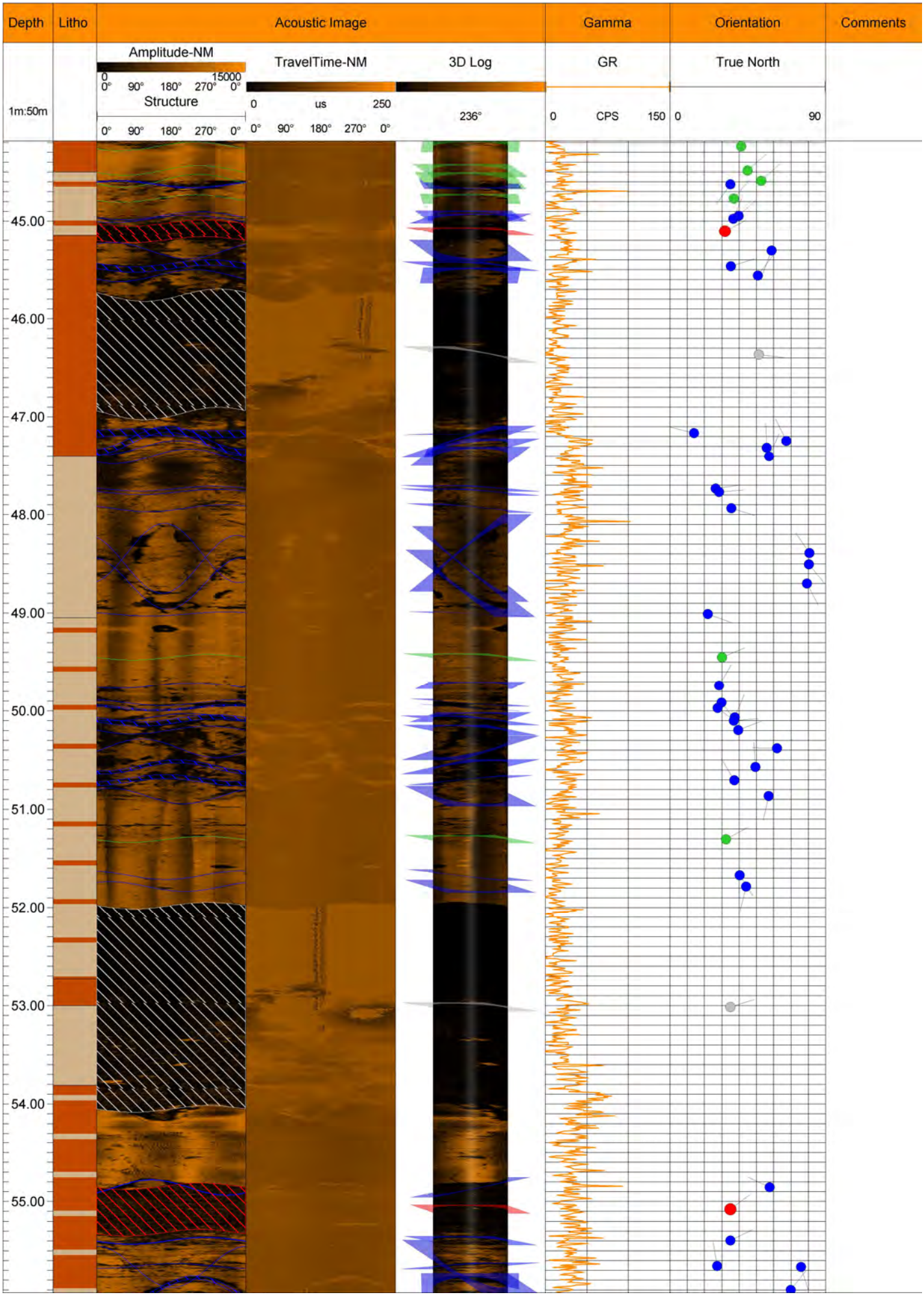
HQ casing to 35.80 m depth.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TravelTime-NM
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0° 90° 180° 270° 0°
3D Log
236°
GR
0 CPS 150
True North
0 90
1m:50m
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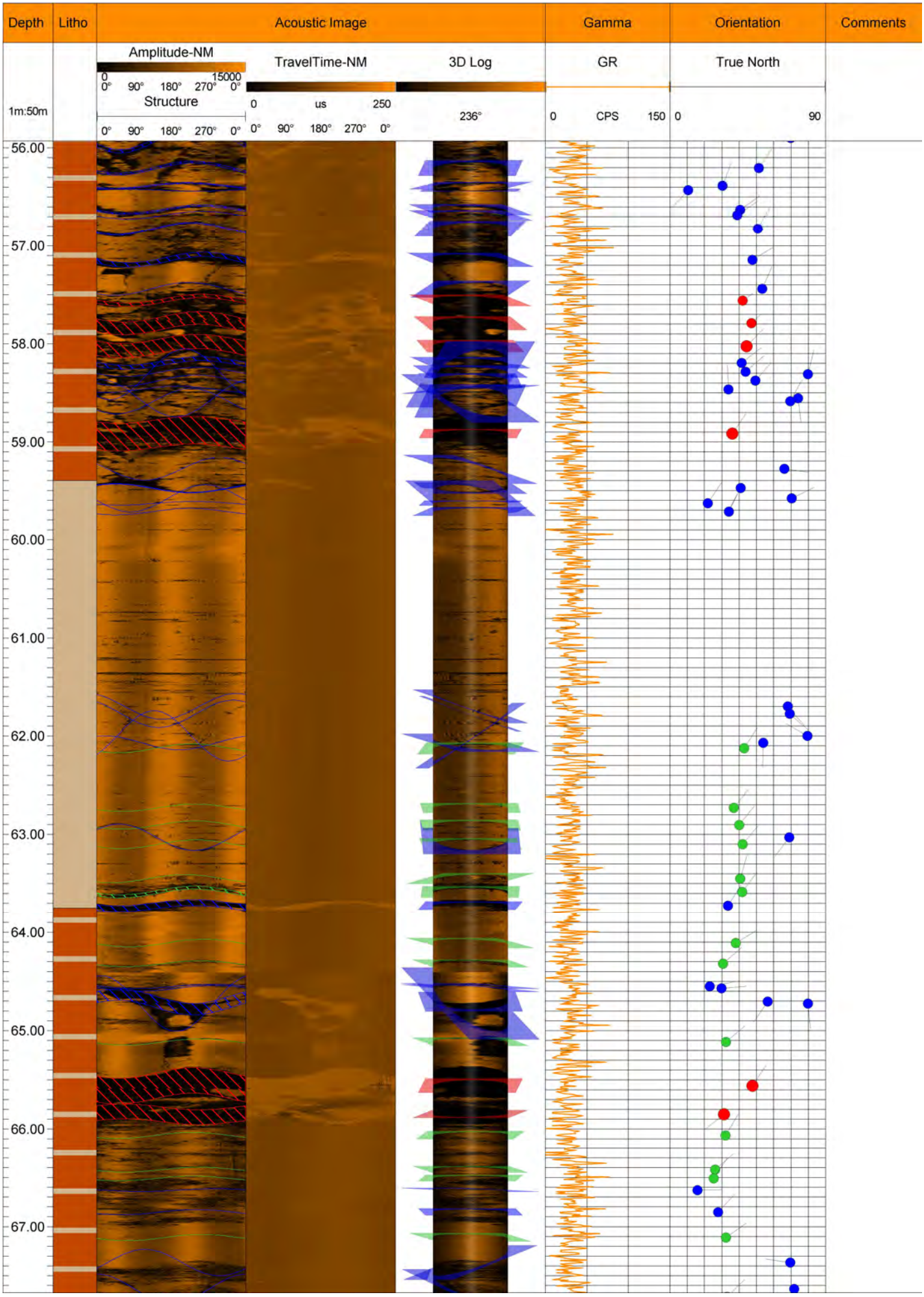
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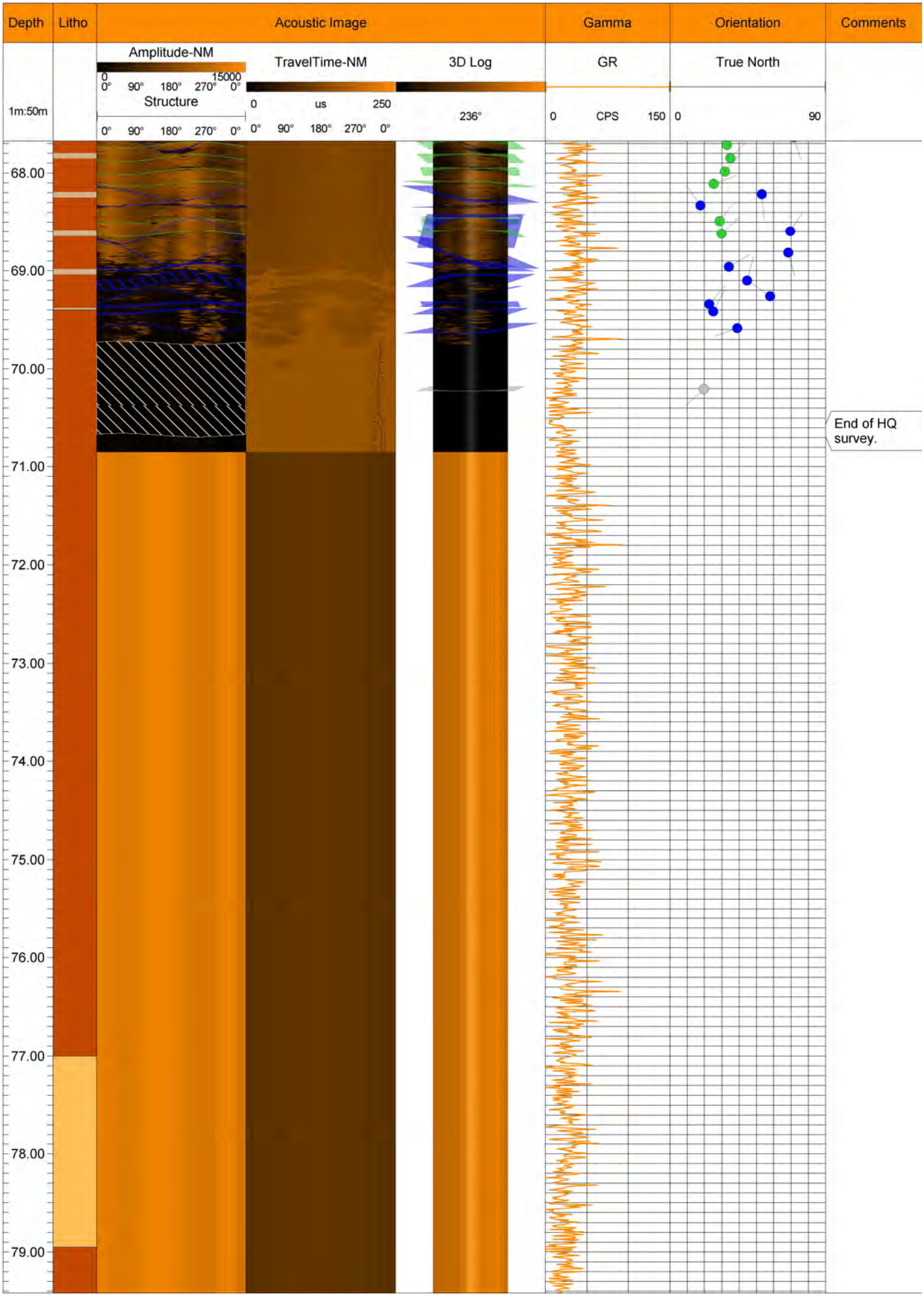
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3D Log
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CPS
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True North
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90
1m:50m
68.00
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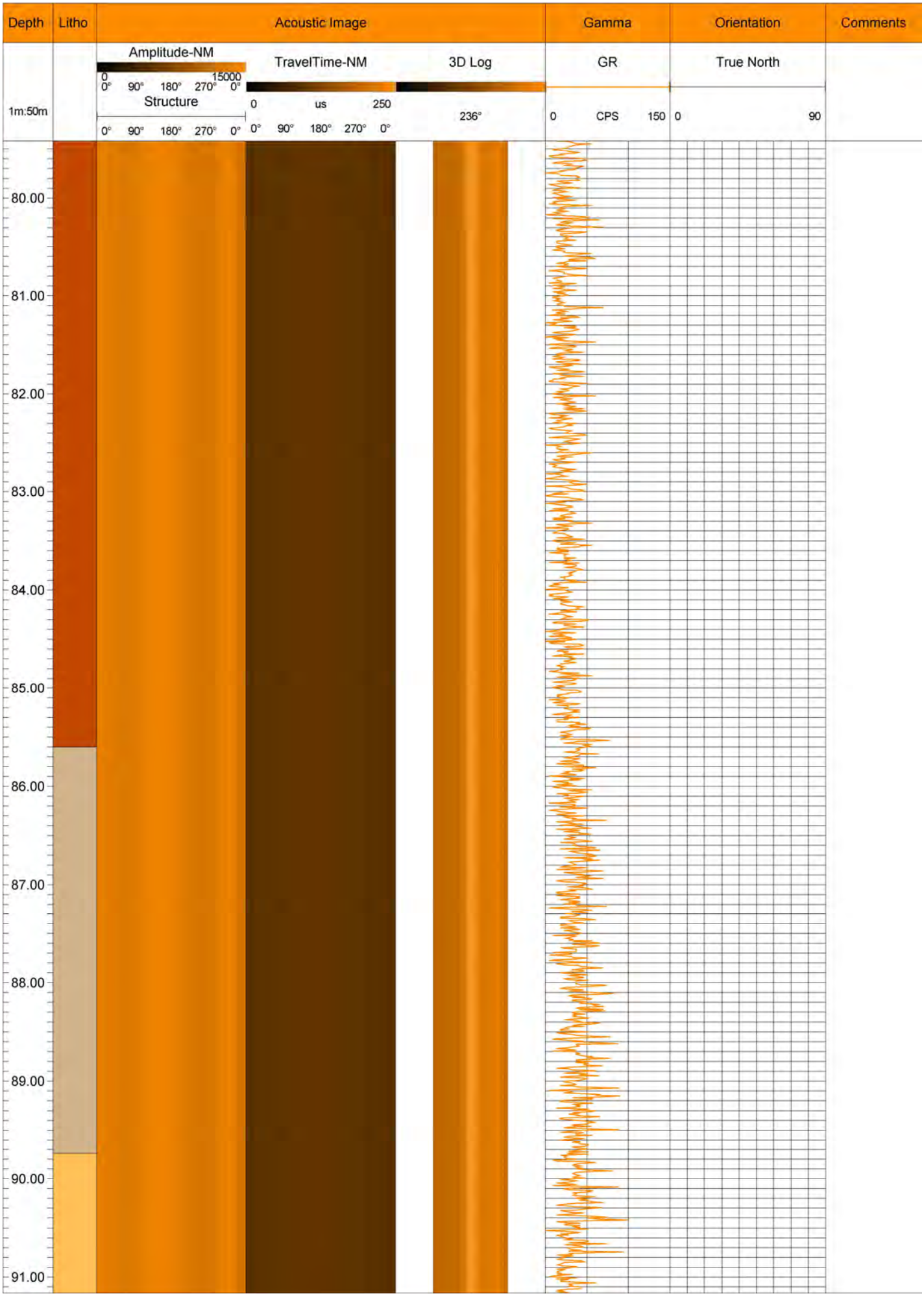
End of HQ survey.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CPS
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True North
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1m:50m
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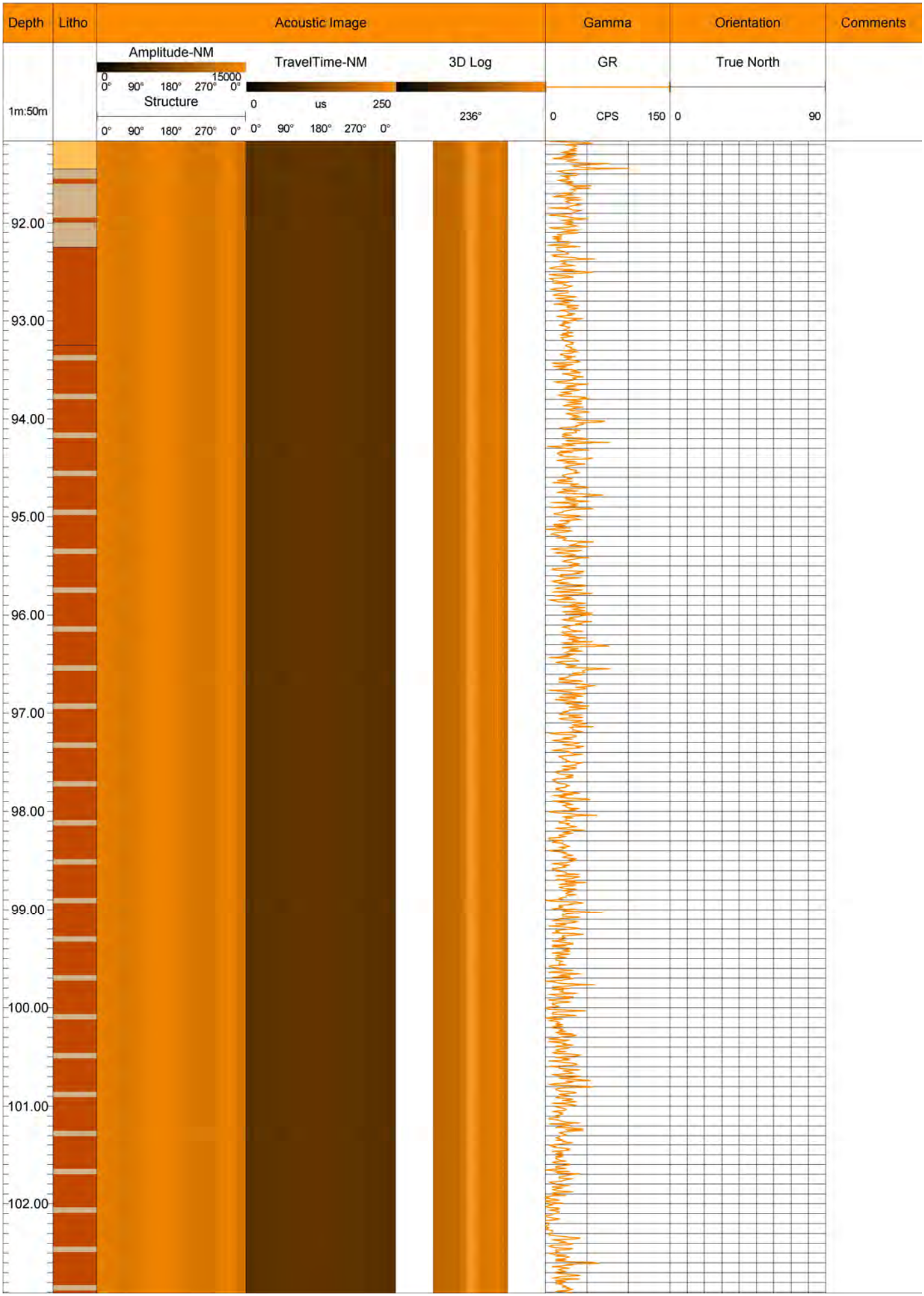
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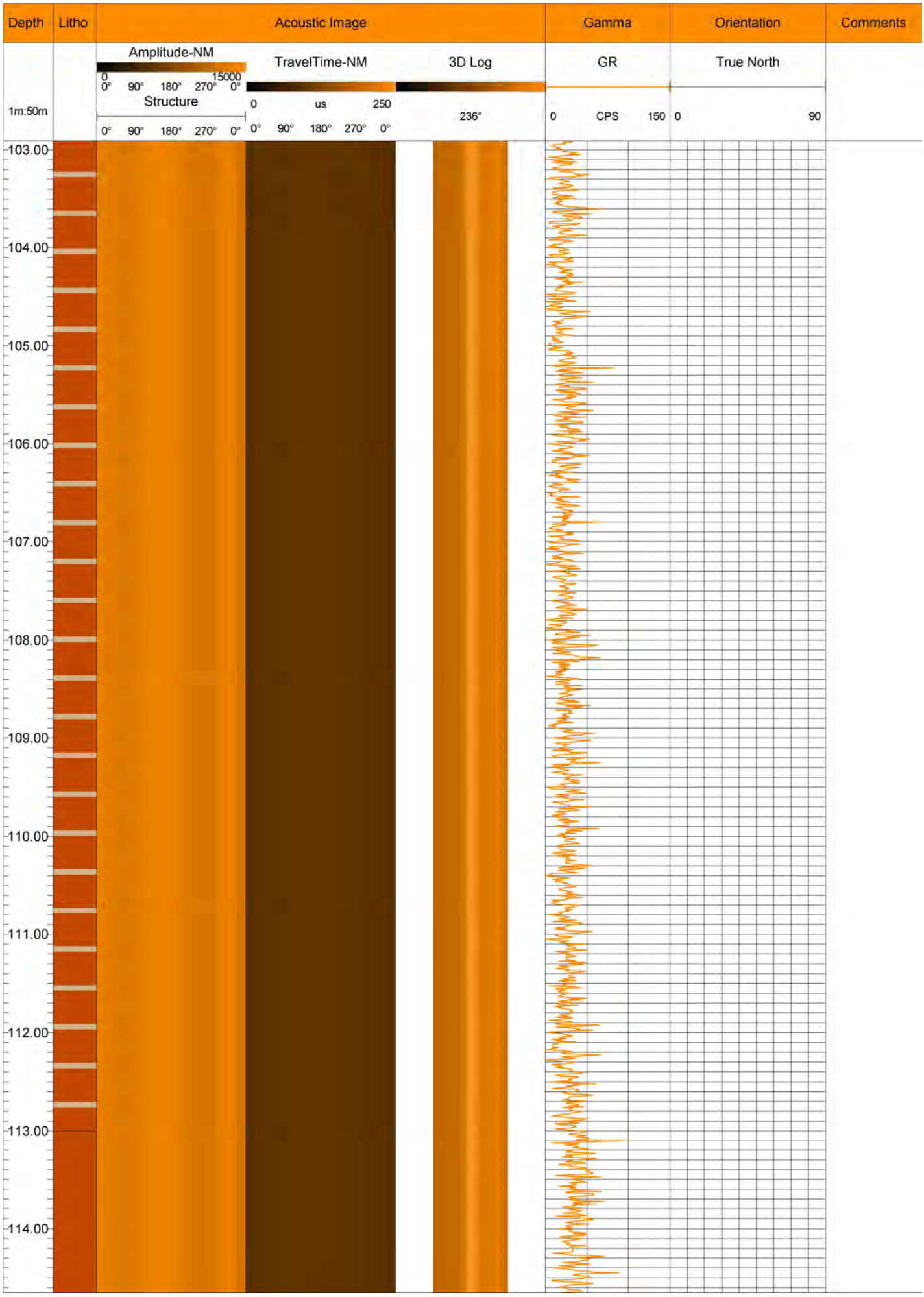
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TravelTime-NM
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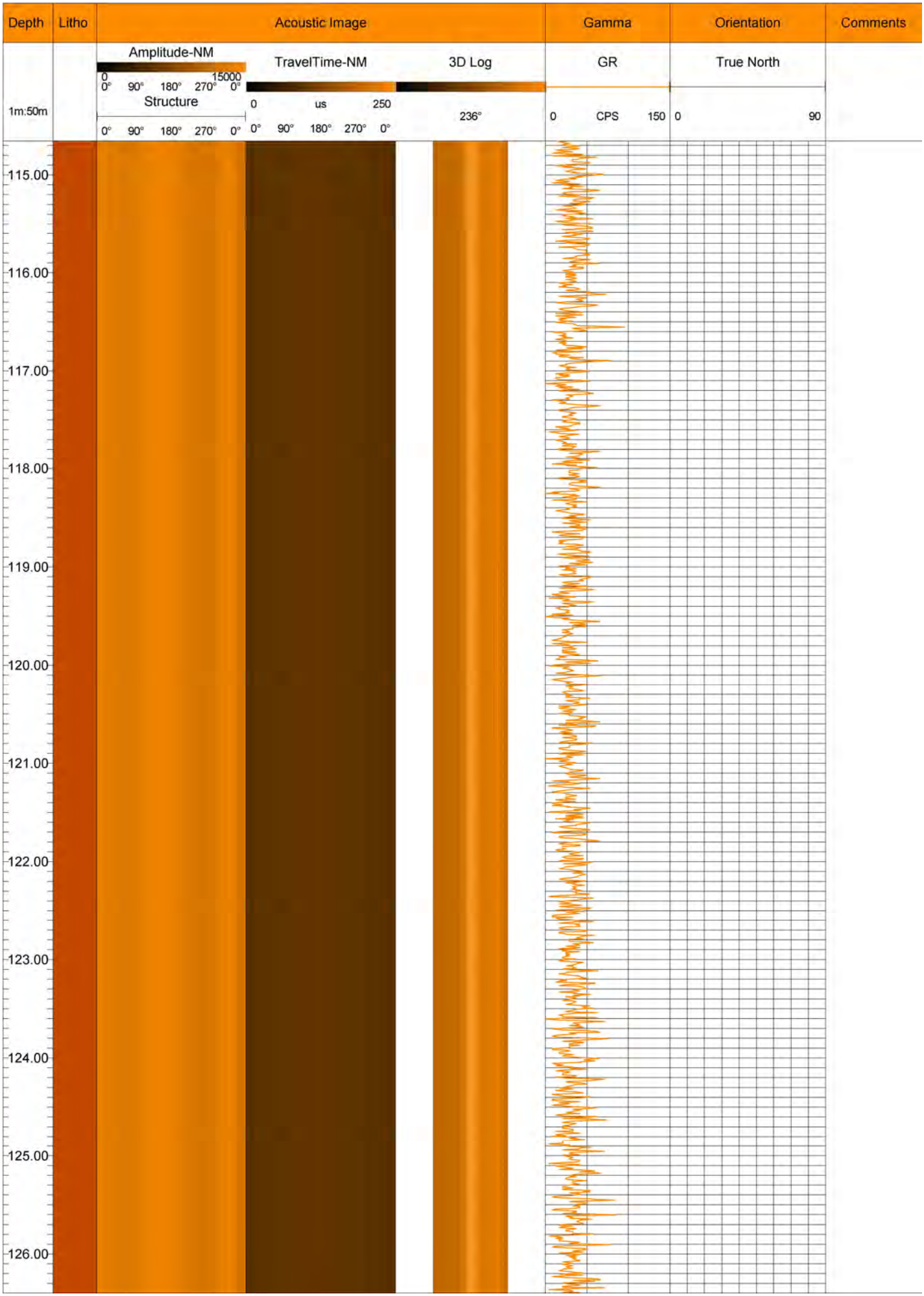
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TravelTime-NM
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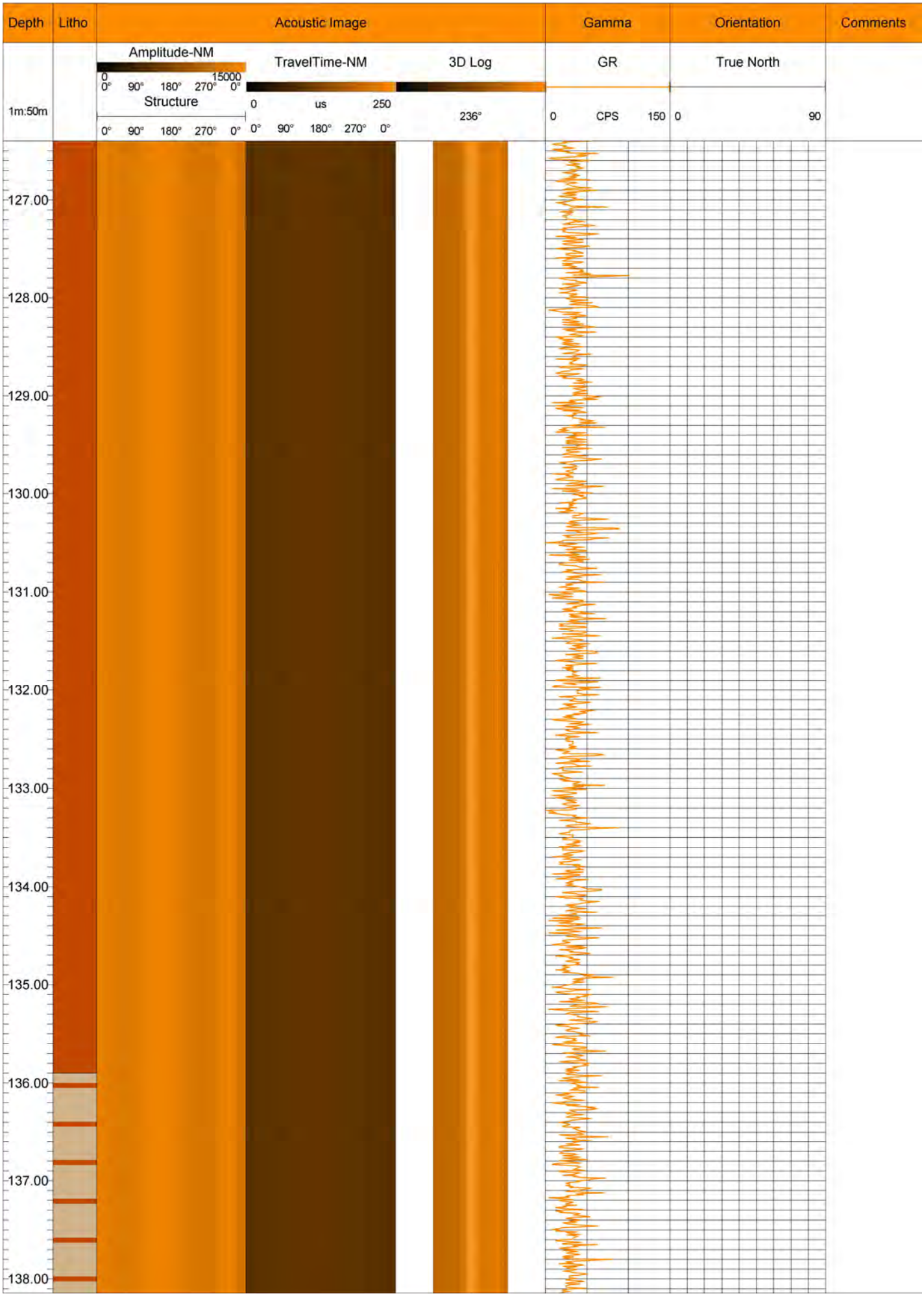
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1m:50m
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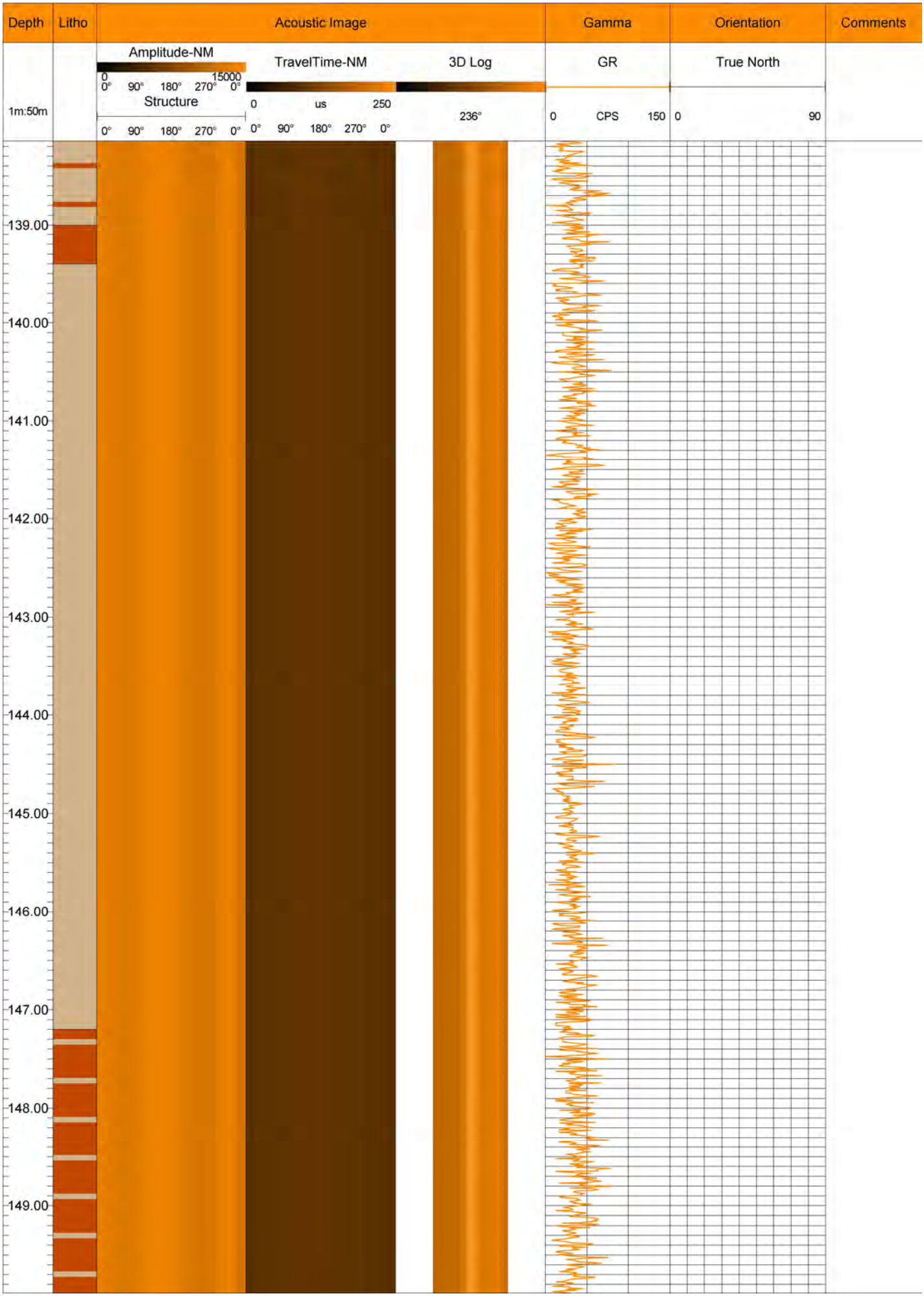
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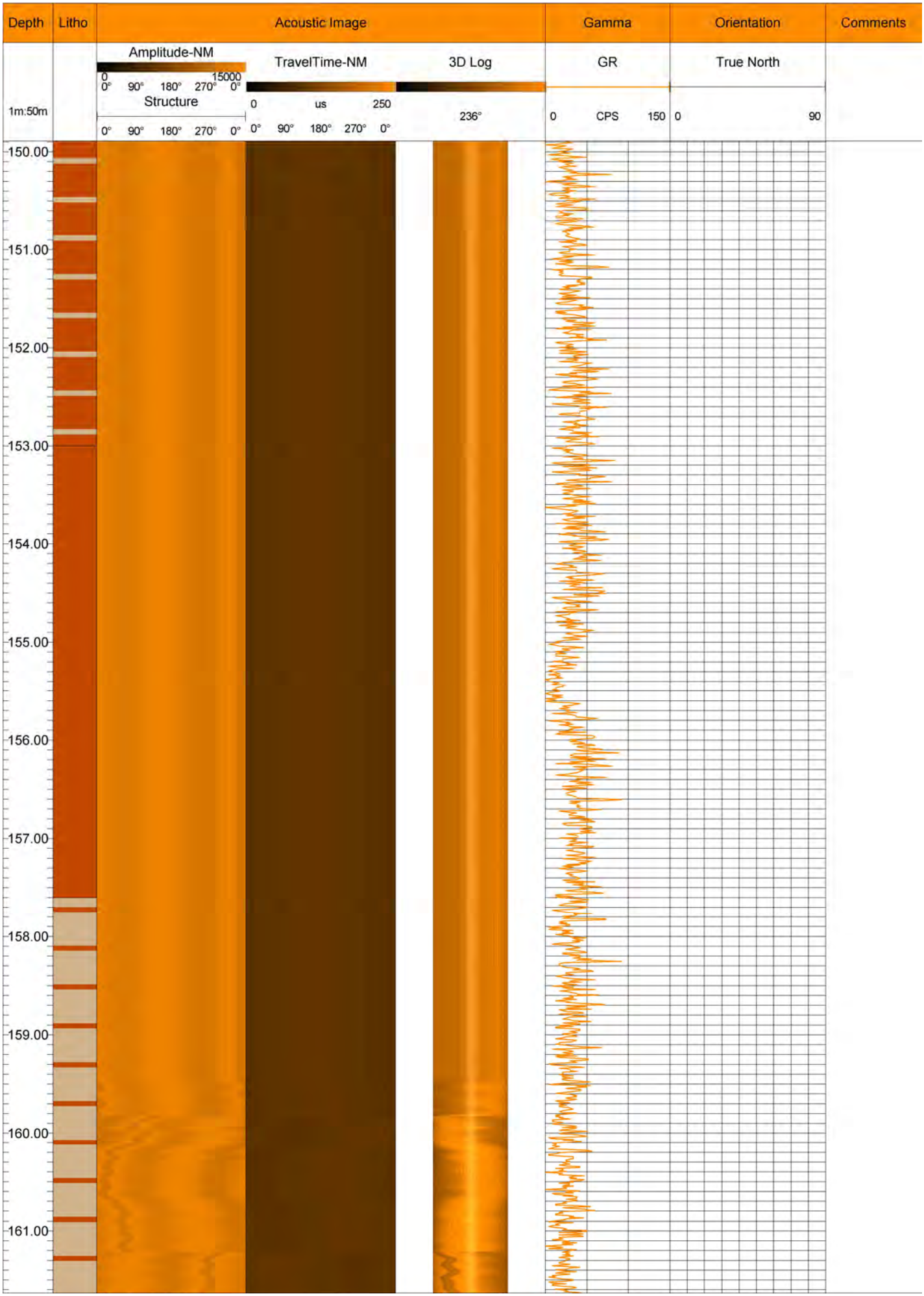
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TravelTime-NM
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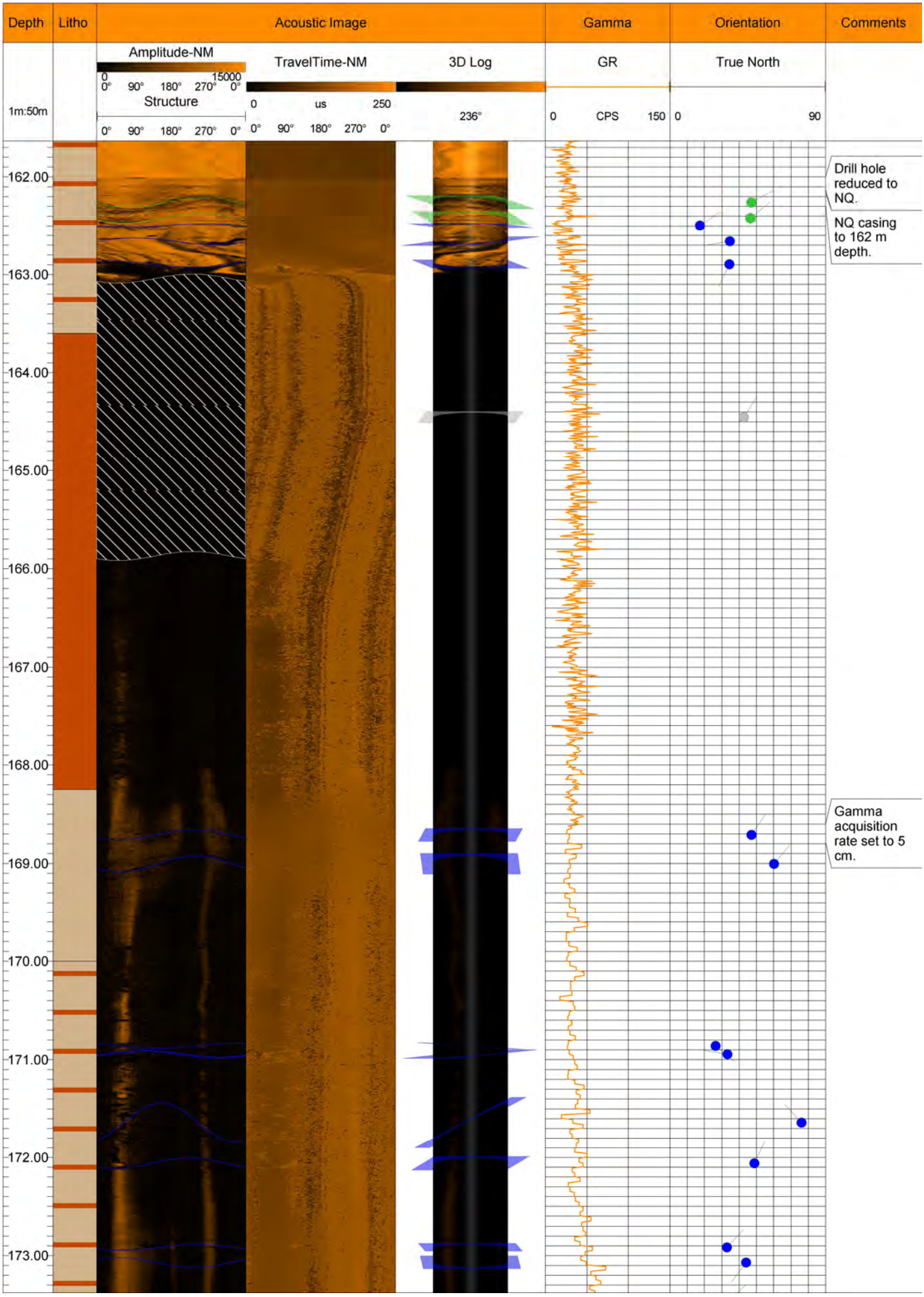
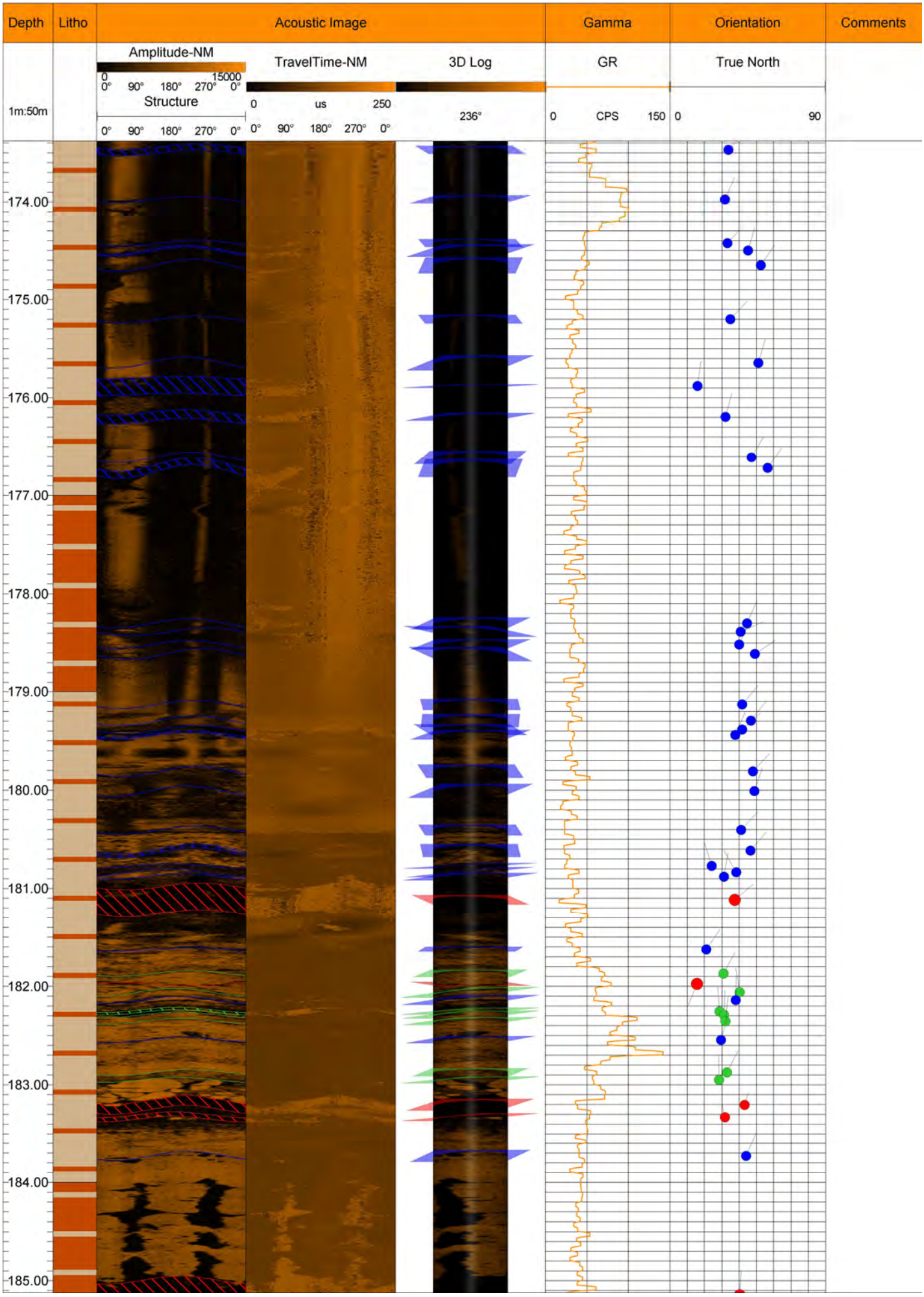
161.00


Depth
Litho
Acoustic Image
Gamma
Orientation
Comments
Amplitude-NM
0
15000
0° 90° 180° 270° 0°
Structure
0° 90° 180° 270° 0°
TravelTime-NM
0 us 250
0° 90° 180° 270° 0°
3D Log
236°
GR
0 CPS 150
True North
0 90
1m:50m
162.00
163.00
164.00
165.00
166.00
167.00
168.00
169.00
170.00
171.00
172.00
173.00
Drill hole reduced to NQ.
NQ casing to 162 m depth.
Gamma acquisition rate set to 5 cm.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Litho
Acoustic Image
Gamma
Orientation
Comments
Amplitude-NM
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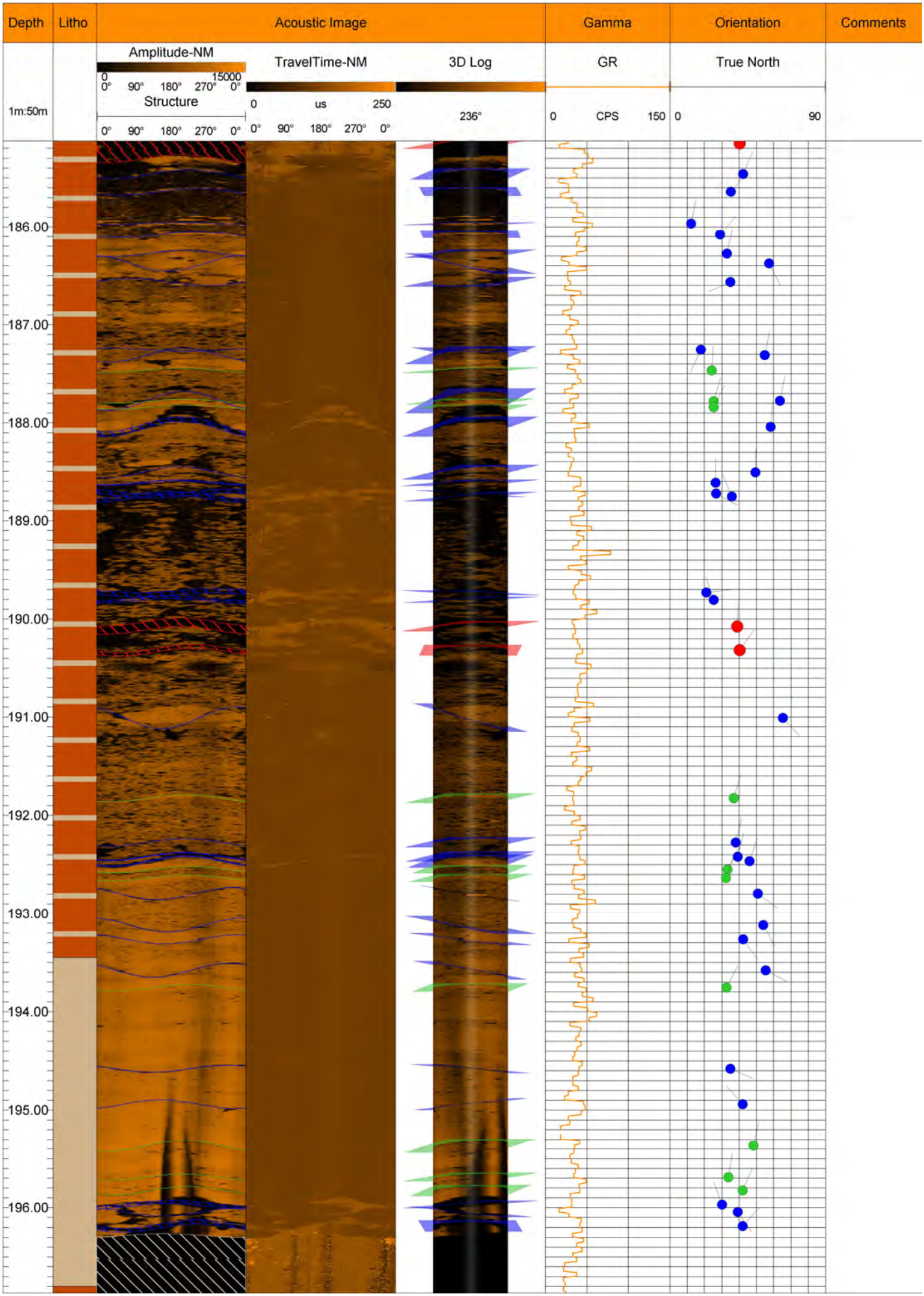
15000
0° 90° 180° 270° 0°
Structure
0° 90° 180° 270° 0°
TravelTime-NM
0
us
250
0° 90° 180° 270° 0°
3D Log
236°
GR
0
CPS
150
True North
0
90
1m:50m
174.00
175.00
176.00
177.00
178.00
179.00
180.00
181.00
182.00
183.00
184.00
185.00


Depth
Litho
Acoustic Image
Gamma
Orientation
Comments
Amplitude-NM
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15000
0° 90° 180° 270° 0°
Structure
0° 90° 180° 270° 0°
TravelTime-NM
0
us
250
0° 90° 180° 270° 0°
3D Log
236°
GR
0
CPS
150
True North
0
90
1m:50m
186.00
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188.00
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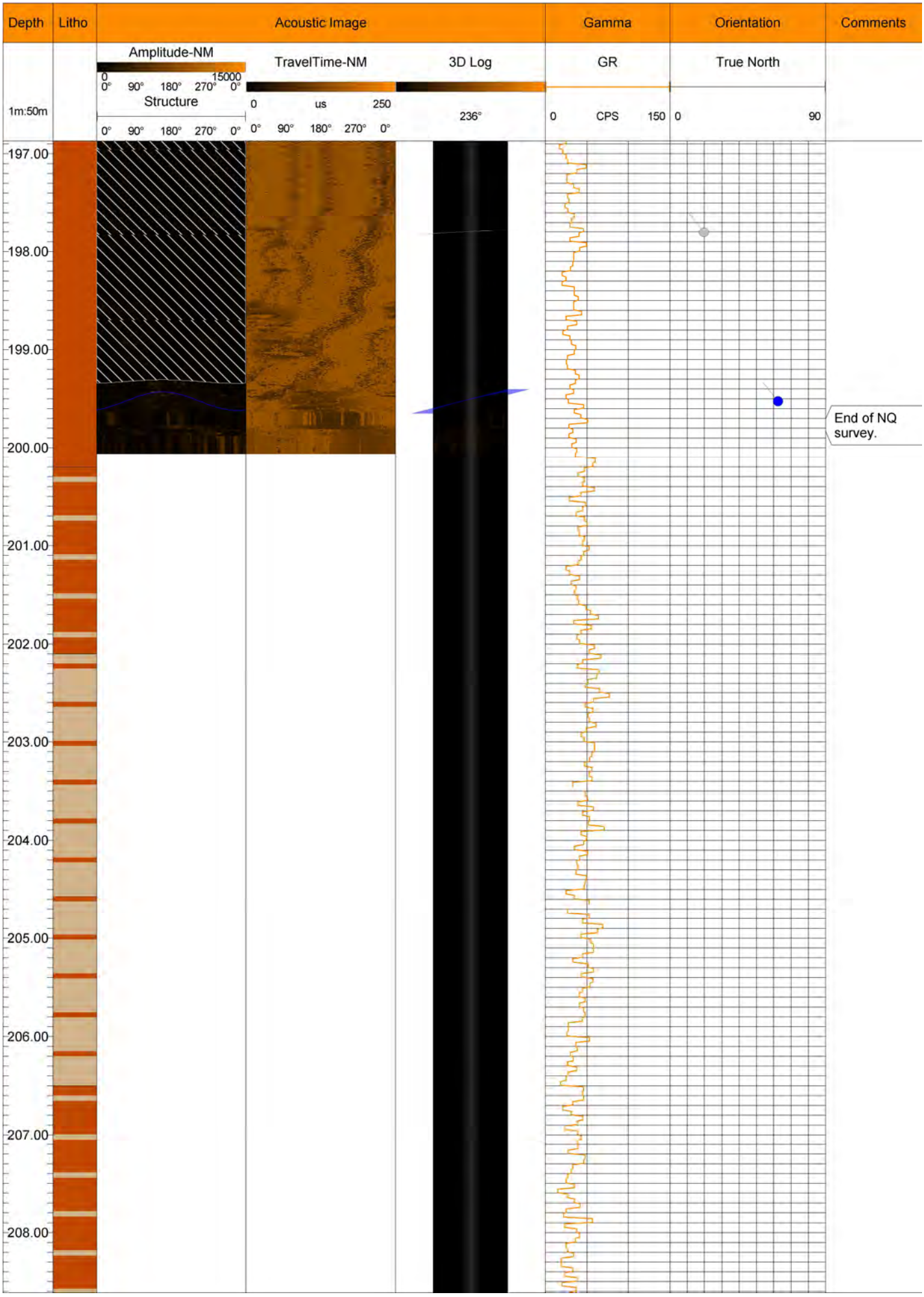
192.00
193.00
194.00
195.00
196.00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Litho
Acoustic Image
Gamma
Orientation
Comments
Amplitude-NM
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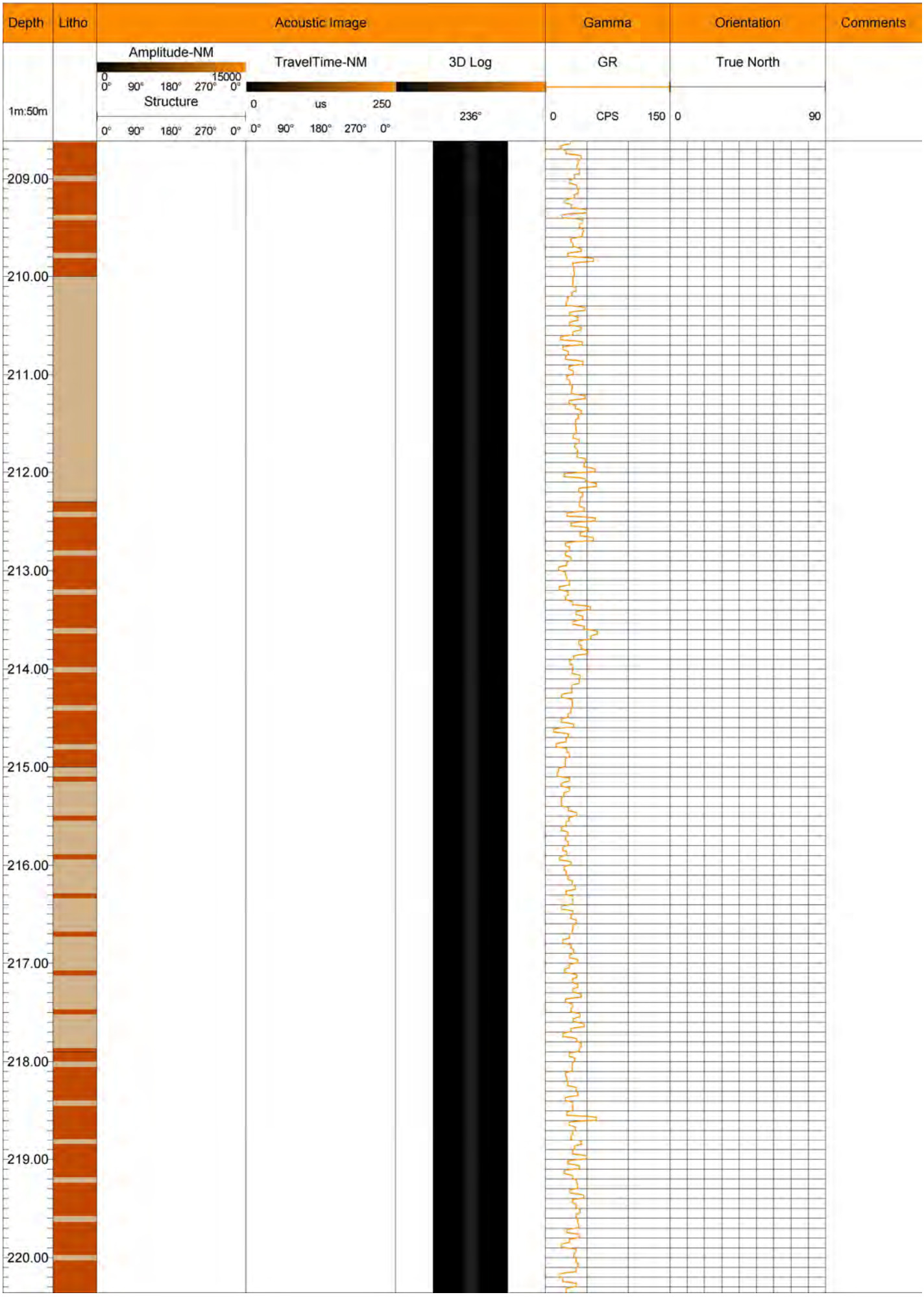
15000
0° 90° 180° 270° 0°
Structure
0° 90° 180° 270° 0°
TravelTime-NM
0 us 250
0° 90° 180° 270° 0°
3D Log
236°
GR
0 CPS 150
True North
0 90
1m:50m
197.00
198.00
199.00
200.00
201.00
202.00
203.00
204.00
205.00
206.00
207.00
208.00
End of NQ survey.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Structure
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TravelTime-NM
0
us
250
0° 90° 180° 270° 0°
3D Log
236°
GR
0
CPS
150
True North
0
90
1m:50m
209.00
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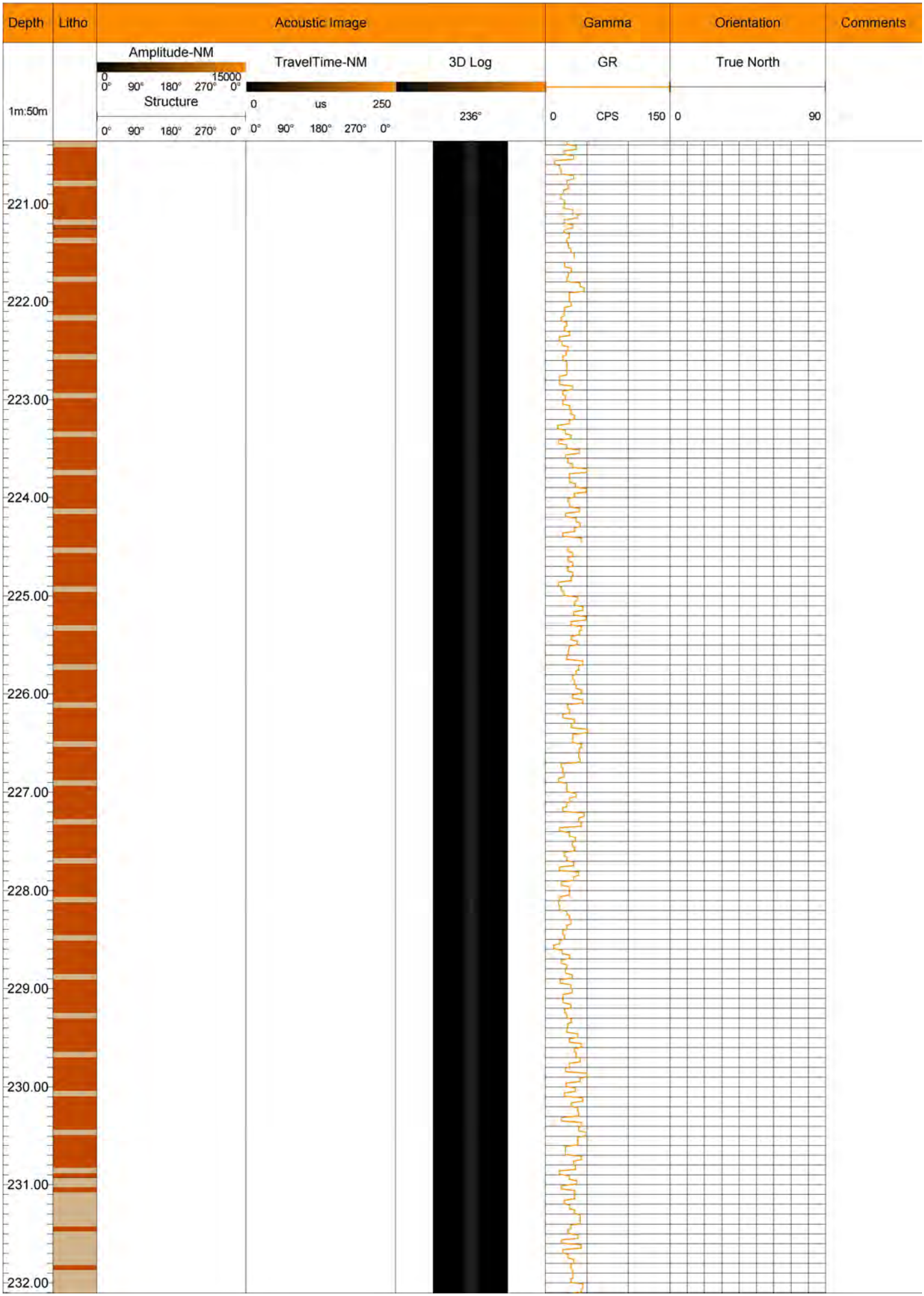
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Acoustic Image
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Structure
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TravelTime-NM
0
us
250
0° 90° 180° 270° 0°
3D Log
236°
GR
0
CPS
150
True North
0
90
1m:50m
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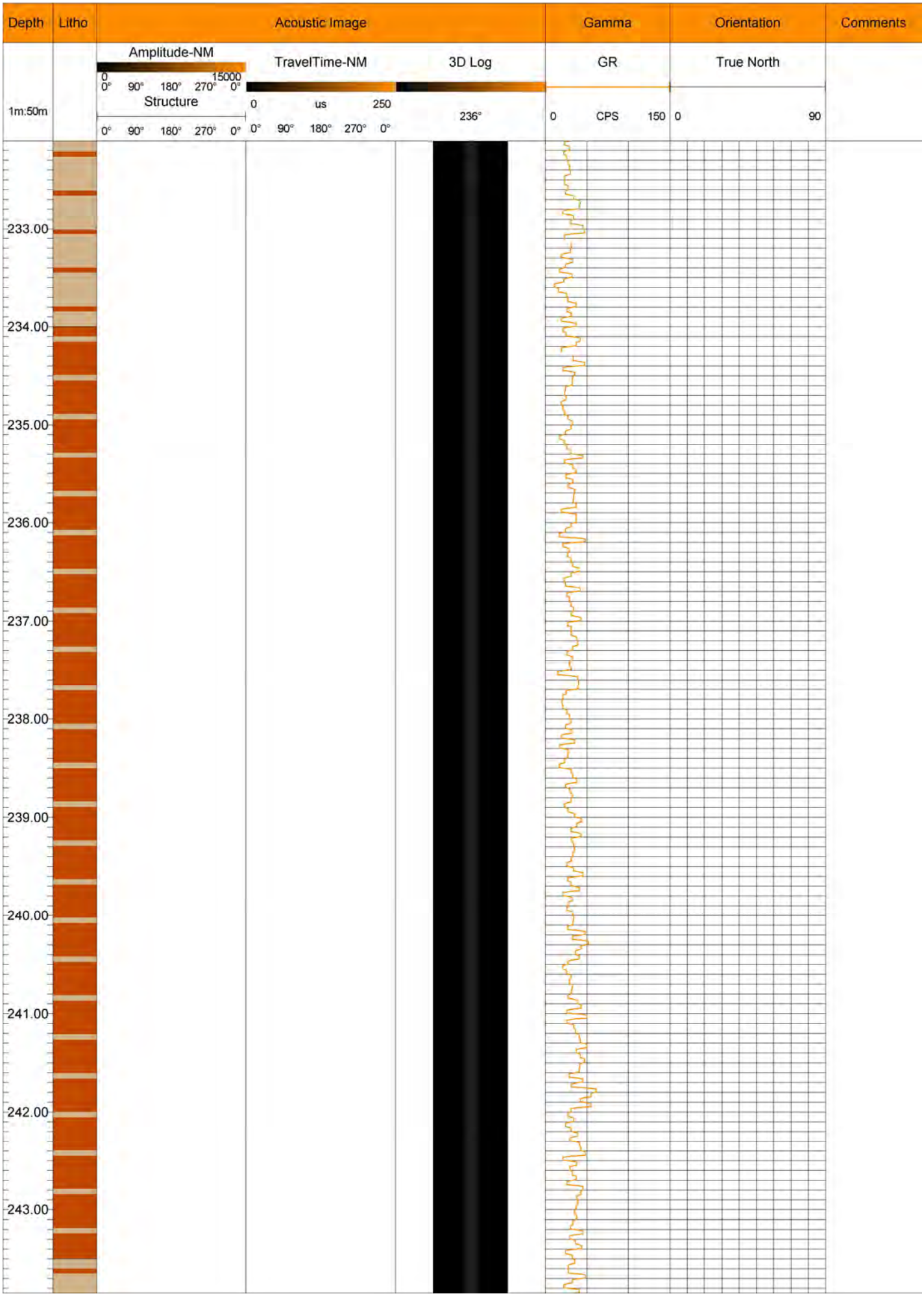
232.00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Acoustic Image
Gamma
Orientation
Comments
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Structure
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TravelTime-NM
0
us
250
0° 90° 180° 270° 0°
3D Log
236°
GR
0
CPS
150
True North
0
90
1m:50m
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235.00
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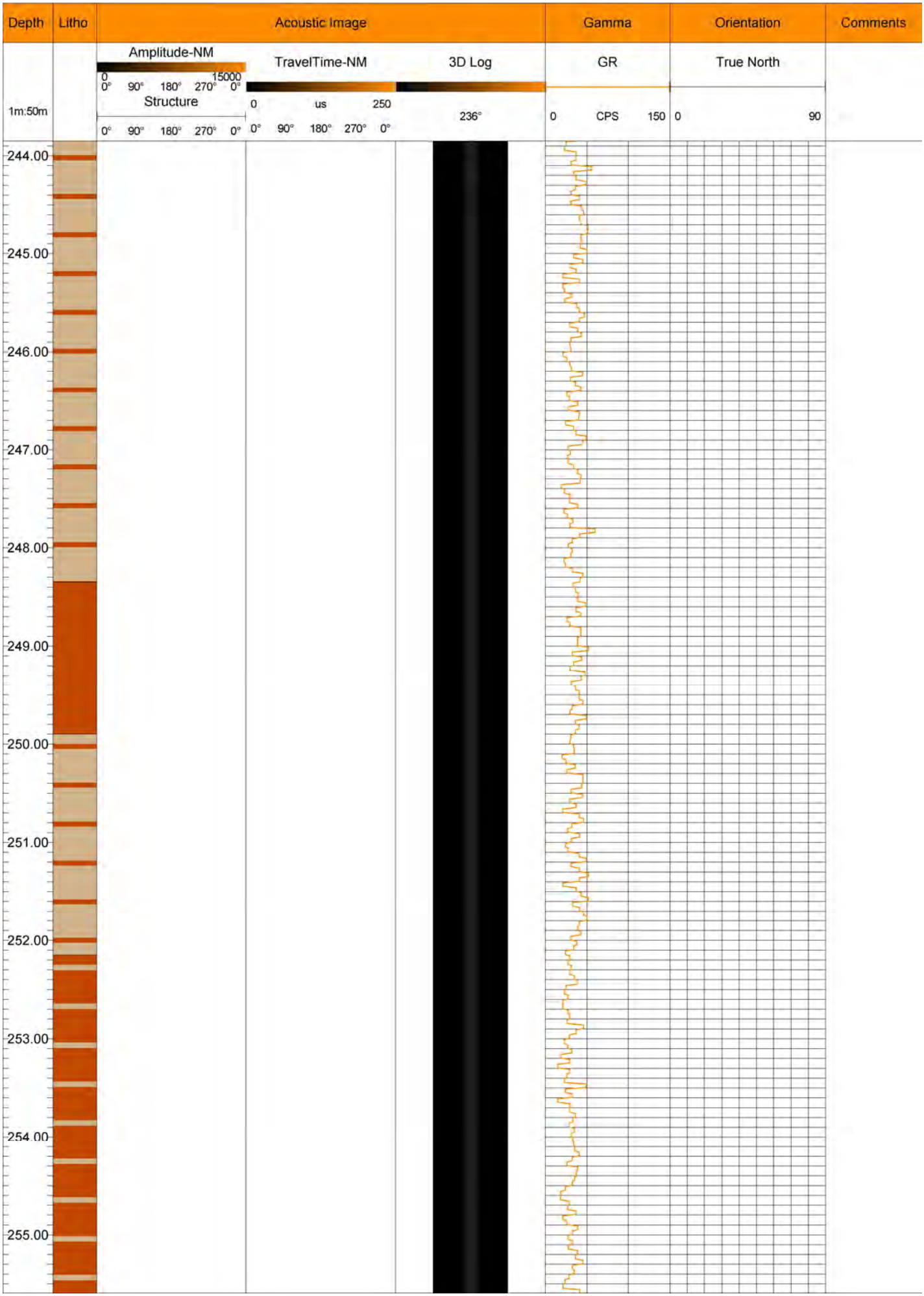
242.00
243.00


Depth
Litho
Acoustic Image
Gamma
Orientation
Comments
Amplitude-NM
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0° 90° 180° 270° 0°
Structure
0° 90° 180° 270° 0°
TravelTime-NM
0
us
250
0° 90° 180° 270° 0°
3D Log
236°
GR
0
CPS
150
True North
0
90
1m:50m
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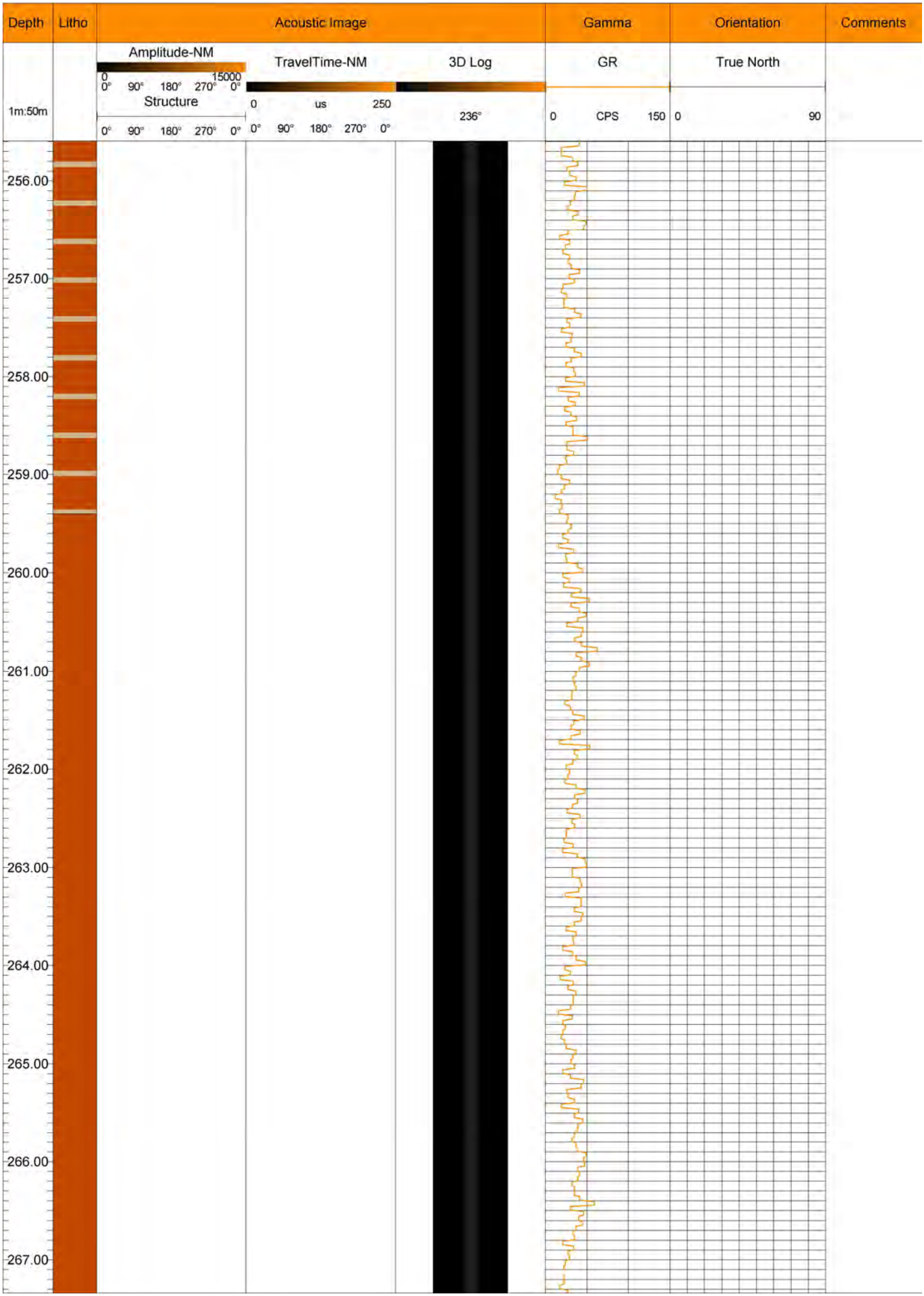
Depth
Litho
Acoustic Image
Gamma
Orientation
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Structure
0° 90° 180° 270° 0°
TravelTime-NM
0
us
250
0° 90° 180° 270° 0°
3D Log
236°
GR
0
CPS
150
True North
0
90
1m:50m
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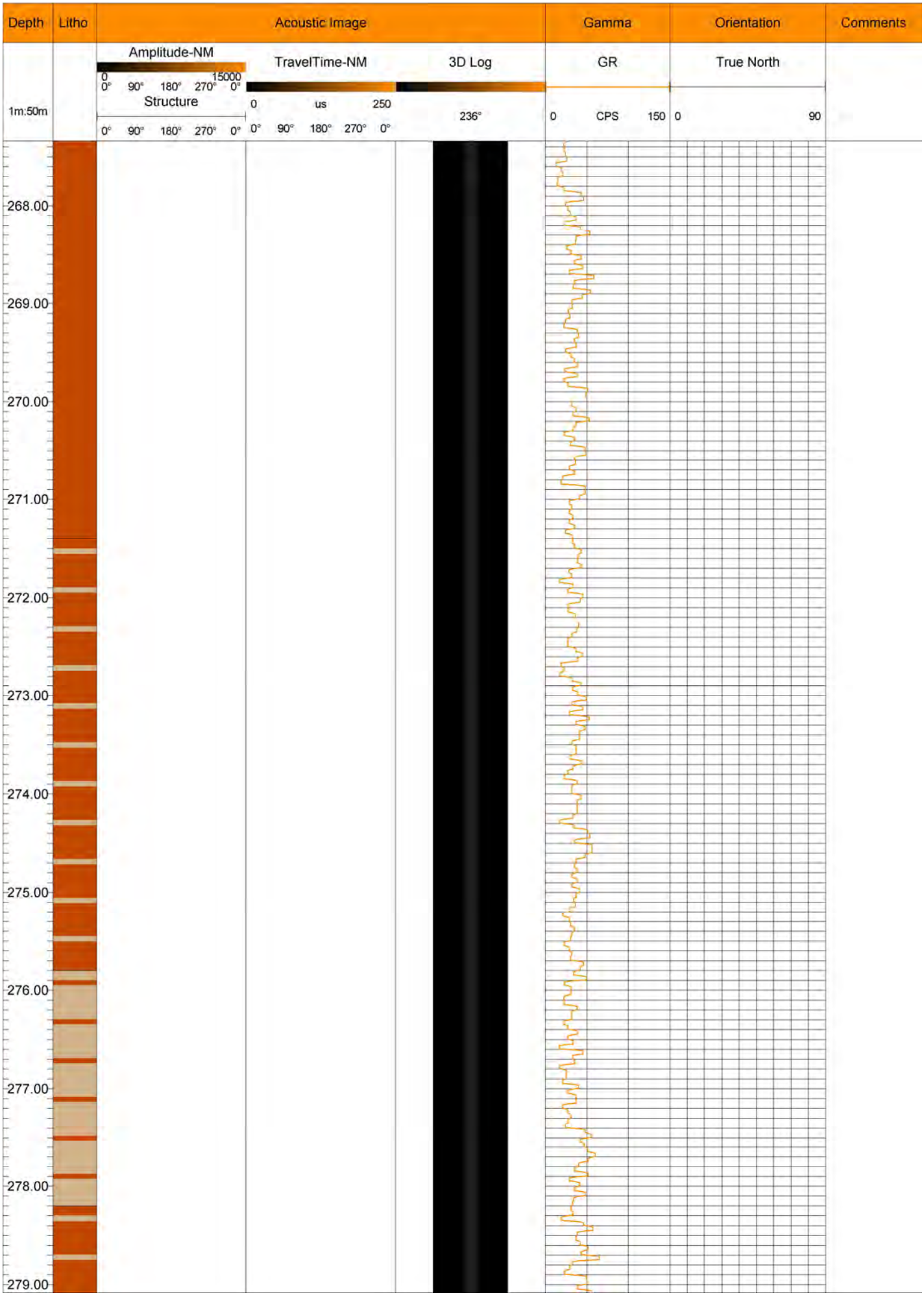
266.00
267.00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Acoustic Image
Gamma
Orientation
Comments
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Structure
0° 90° 180° 270° 0°
TravelTime-NM
0
us
250
0° 90° 180° 270° 0°
3D Log
236°
GR
0
CPS
150
True North
0
90
1m:50m
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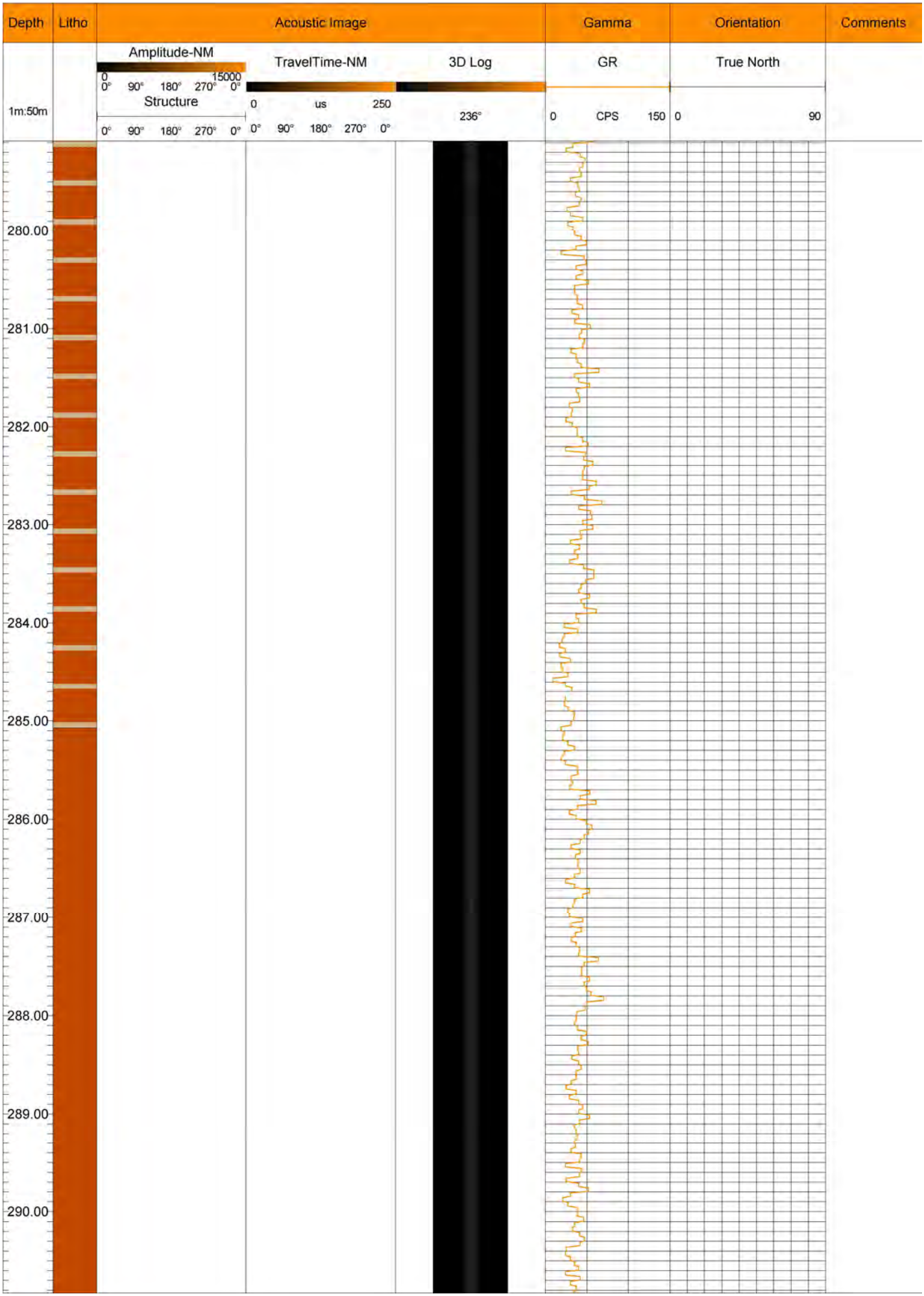
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Acoustic Image
Gamma
Orientation
Comments
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Structure
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TravelTime-NM
0
us
250
0° 90° 180° 270° 0°
3D Log
236°
GR
0
CPS
150
True North
0
90
1m:50m
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282.00
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286.00
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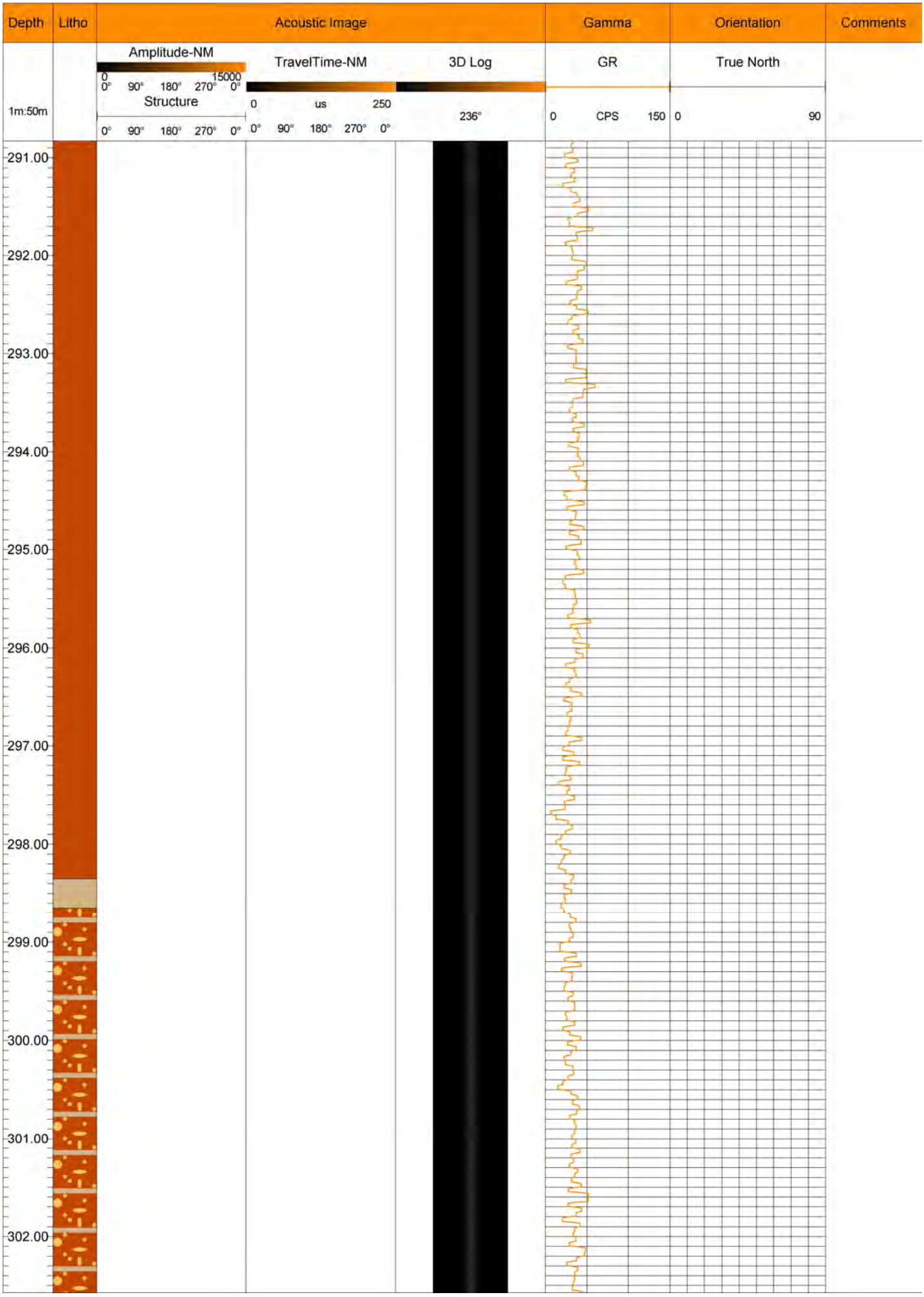
289.00
290.00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Acoustic Image
Gamma
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Structure
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TravelTime-NM
0
us
250
0° 90° 180° 270° 0°
3D Log
236°
GR
0
CPS
150
True North
0
90
1m:50m
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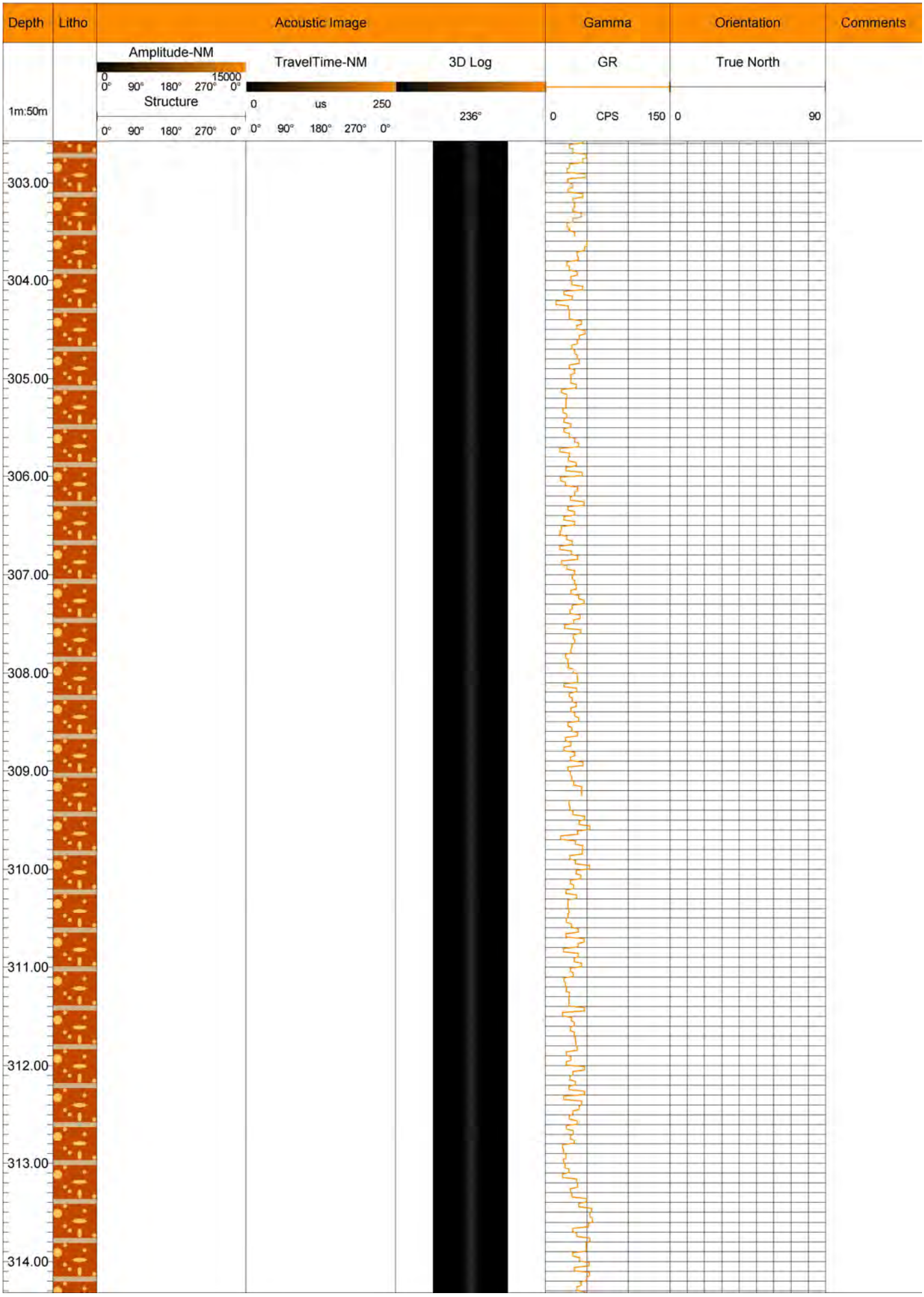
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Gamma
Orientation
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Structure
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TravelTime-NM
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us
250
0° 90° 180° 270° 0°
3D Log
236°
GR
0
CPS
150
True North
0
90
1m:50m
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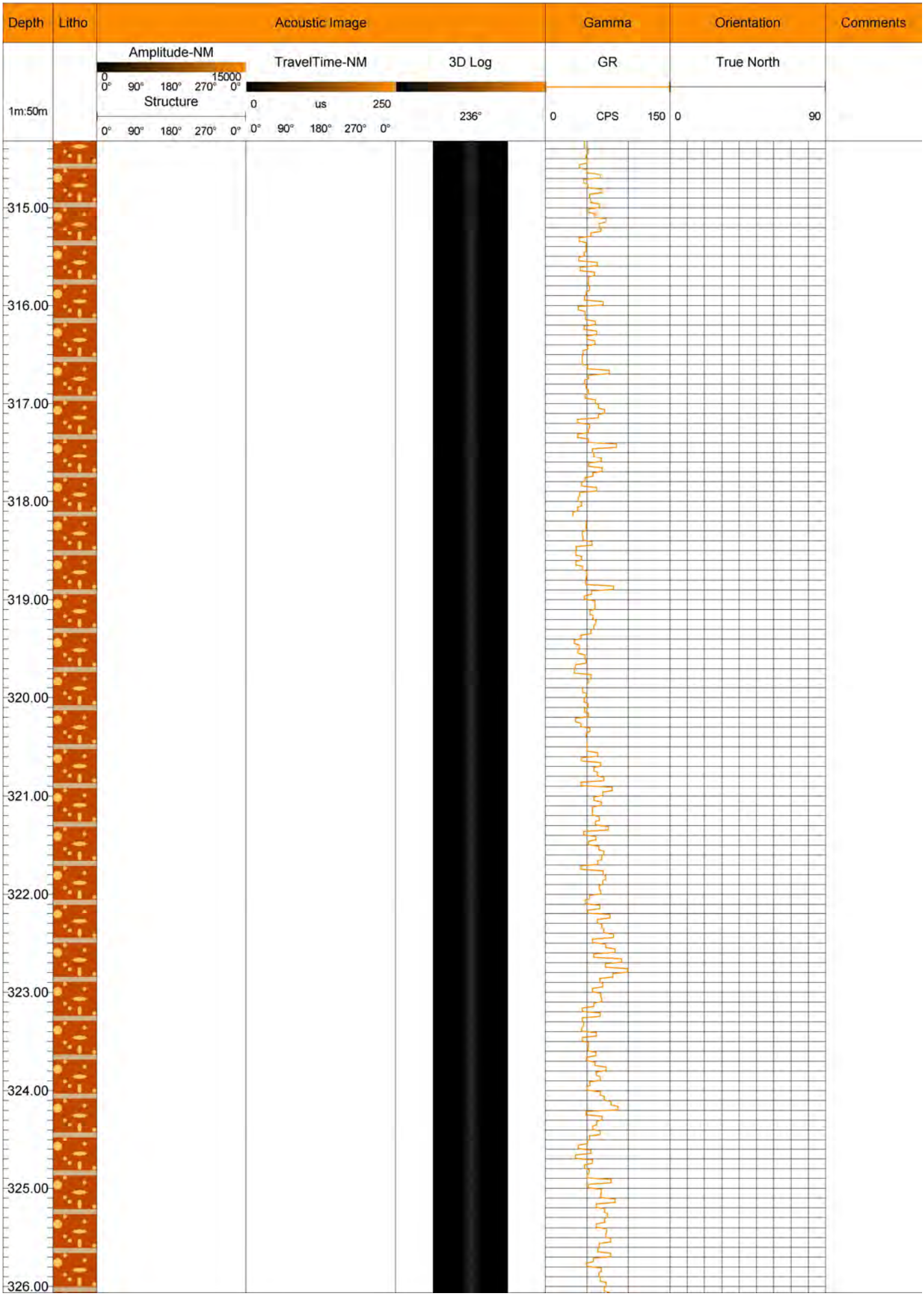
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Acoustic Image
Gamma
Orientation
Comments
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Structure
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TravelTime-NM
0
us
250
0° 90° 180° 270° 0°
3D Log
236°
GR
0
CPS
150
True North
0
90
1m:50m
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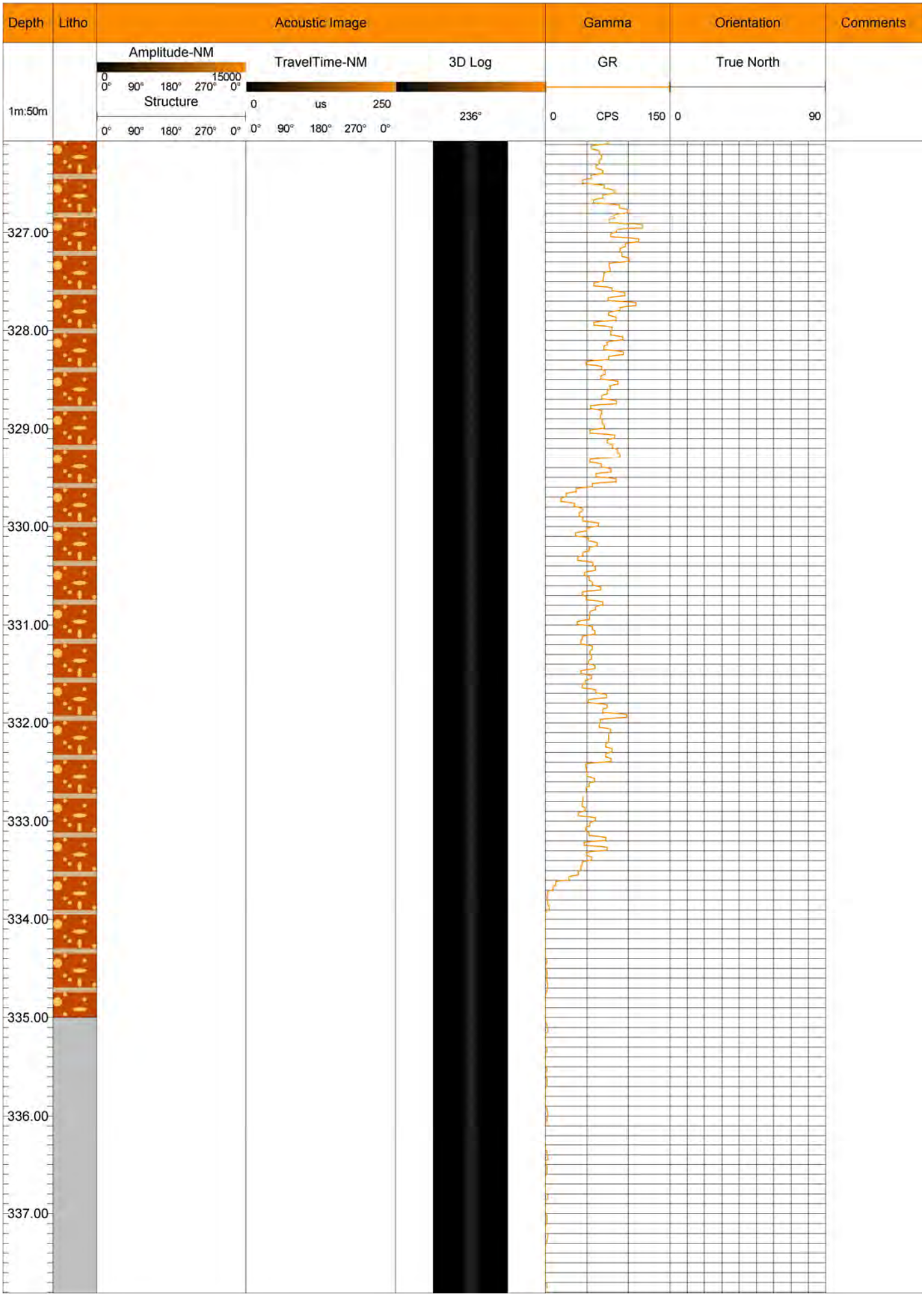
Depth
Litho
Acoustic Image
Gamma
Orientation
Comments
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Structure
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TravelTime-NM
0
us
250
0° 90° 180° 270° 0°
3D Log
236°
GR
0
CPS
150
True North
0
90
1m:50m
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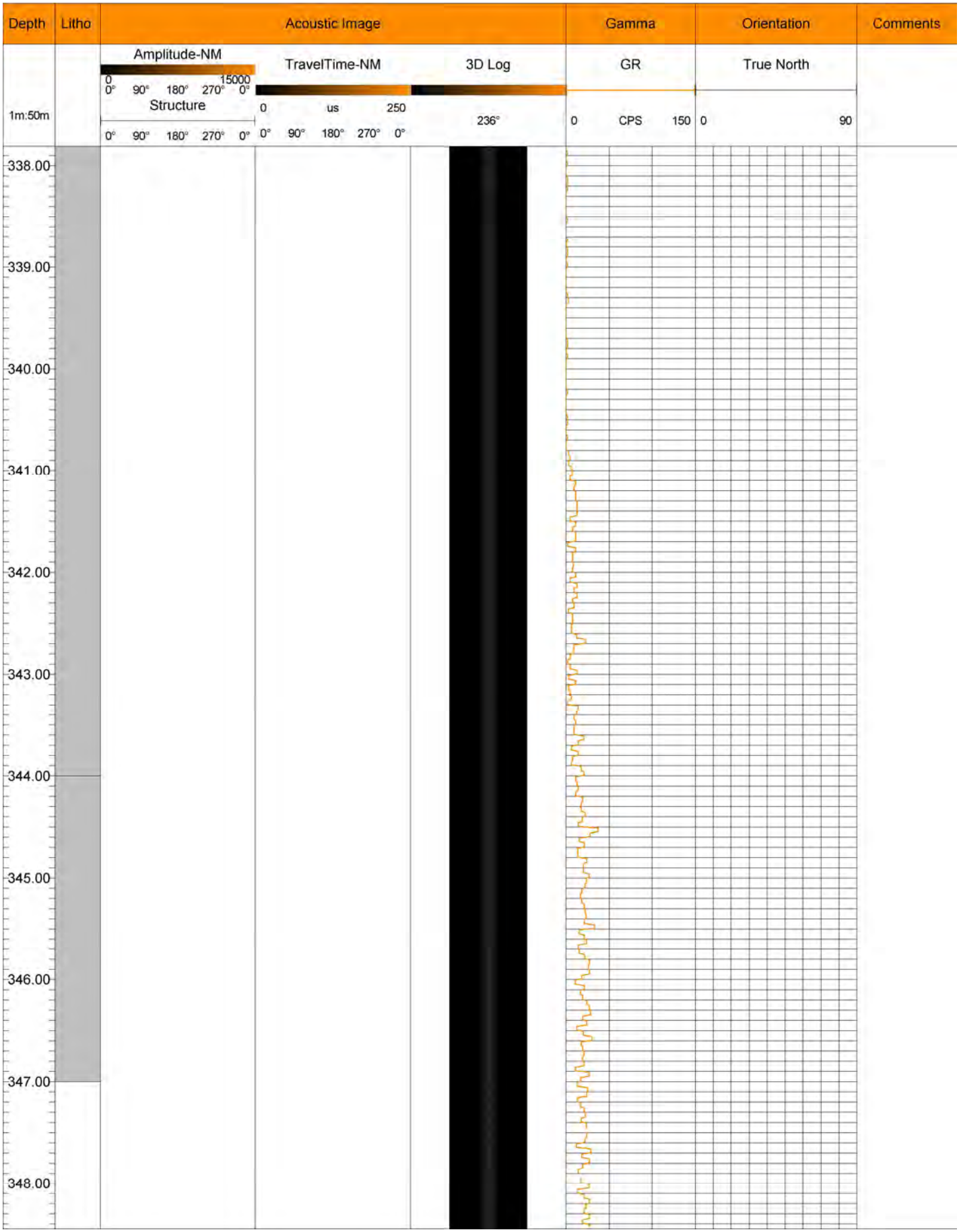
Depth
Litho
Acoustic Image
Gamma
Orientation
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Amplitude-NM
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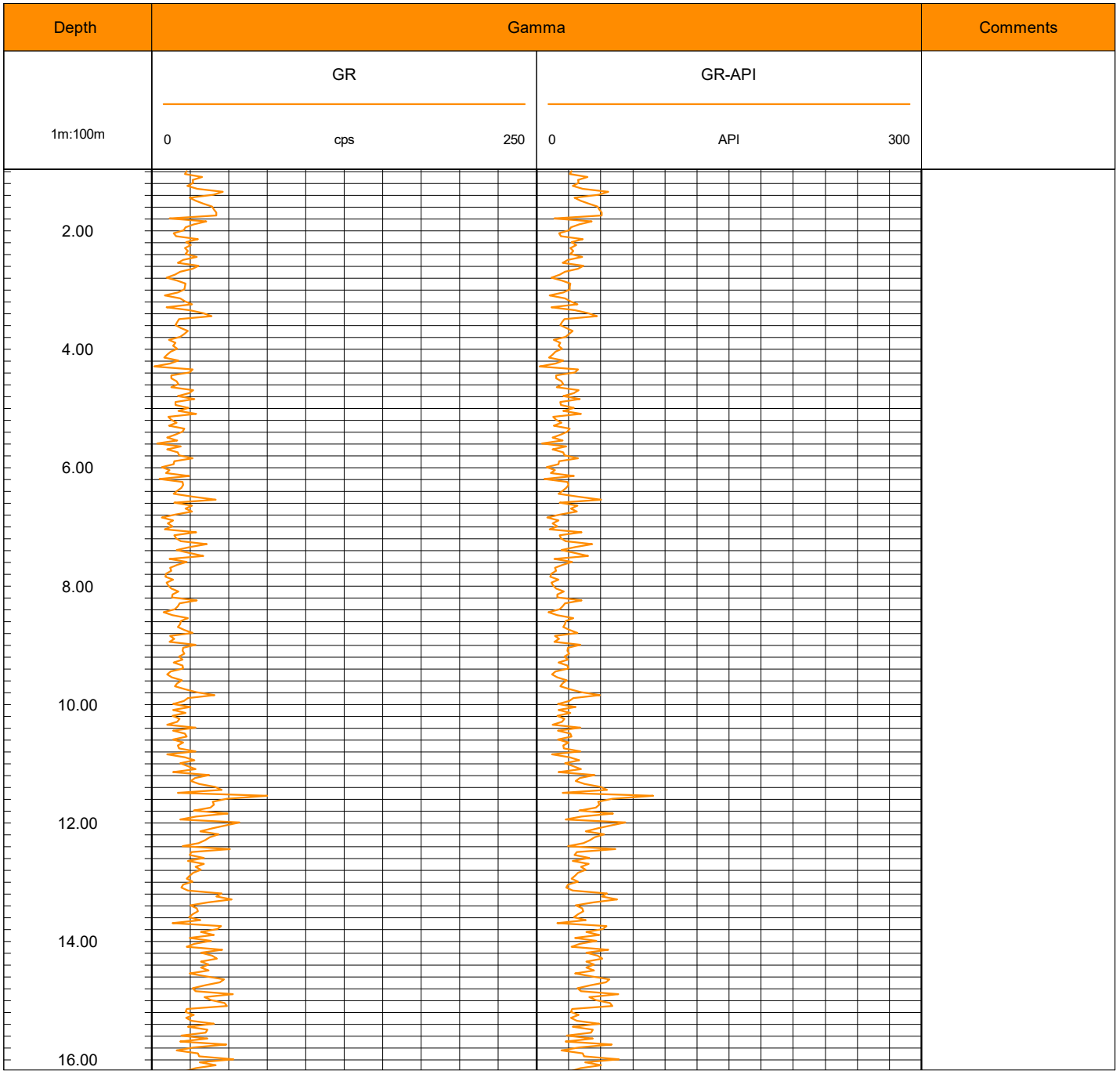
Structure
0° 90° 180° 270° 0°
TravelTime-NM
0
us
250
0° 90° 180° 270° 0°
3D Log
236°
GR
0
CPS
150
True North
0
90
1m:50m
338.00
339.00
340.00
341.00
342.00
343.00
344.00
345.00
346.00
347.00
348.00

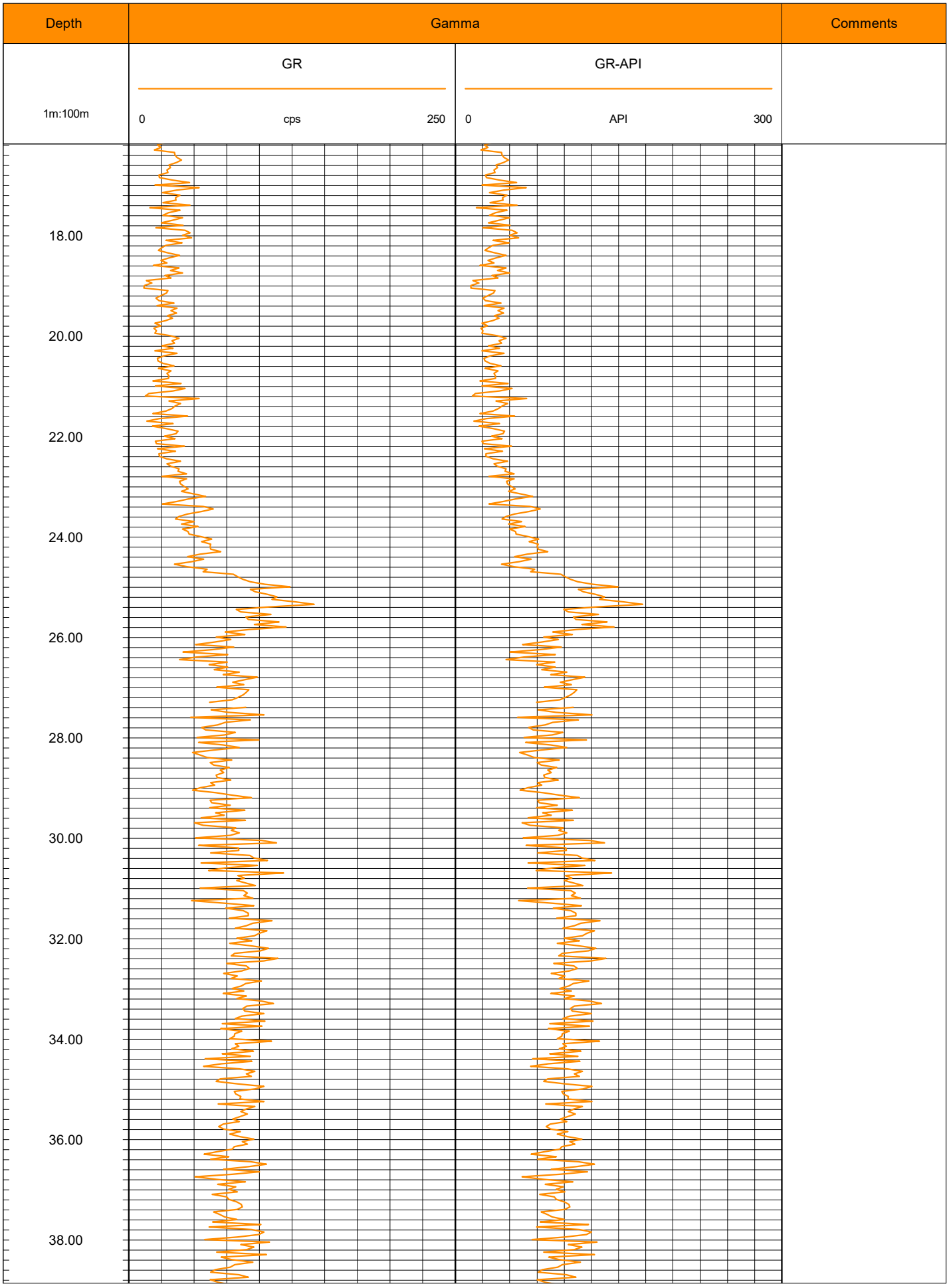
Client:	ATLAS SALT	TERRANE GEOSCIENCE INC.	GEMTEC Consulting Engineers and Scientists

Project: 22-005-H
Atlas Salt Gamma Survey

Hole ID:		Area:		Location:					
CC8		Flat Bay		N:	5363176.9	E:	387770.384	Z:	54.6
Hole Depth (m):	**Log Depth (m):**	**Logged By:**	**Logged Date:**	**Azimuth:**	0	**Dip:**	-90		
263.0	261.60	PR	20/12/22						

Note :




Depth
Gamma
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GR
GR-API
1m:100m
0
cps
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0
API
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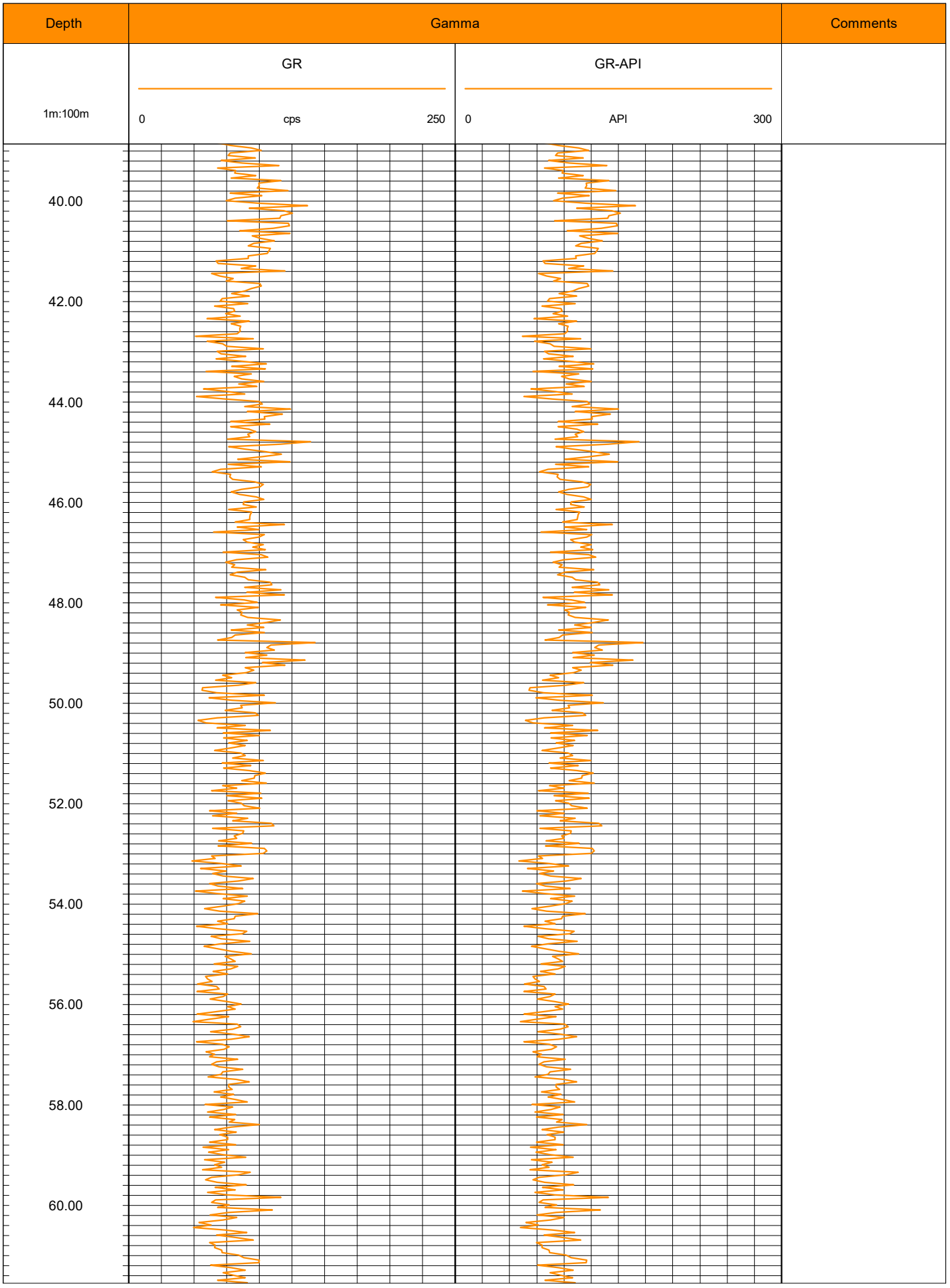
36.00
38.00


Depth
Gamma
Comments
GR
GR-API
1m:100m
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cps
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0
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56.00
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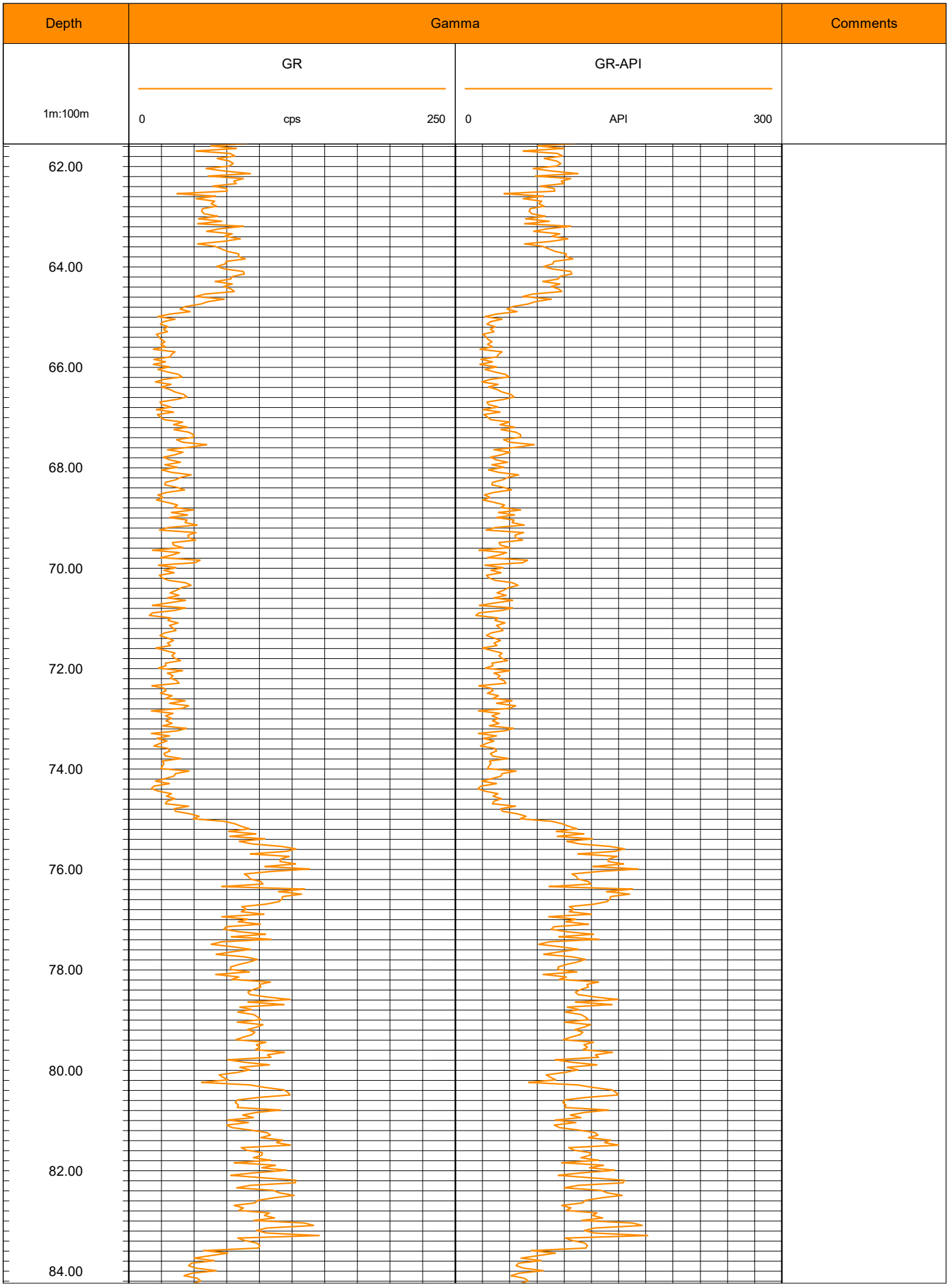
60.00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Gamma
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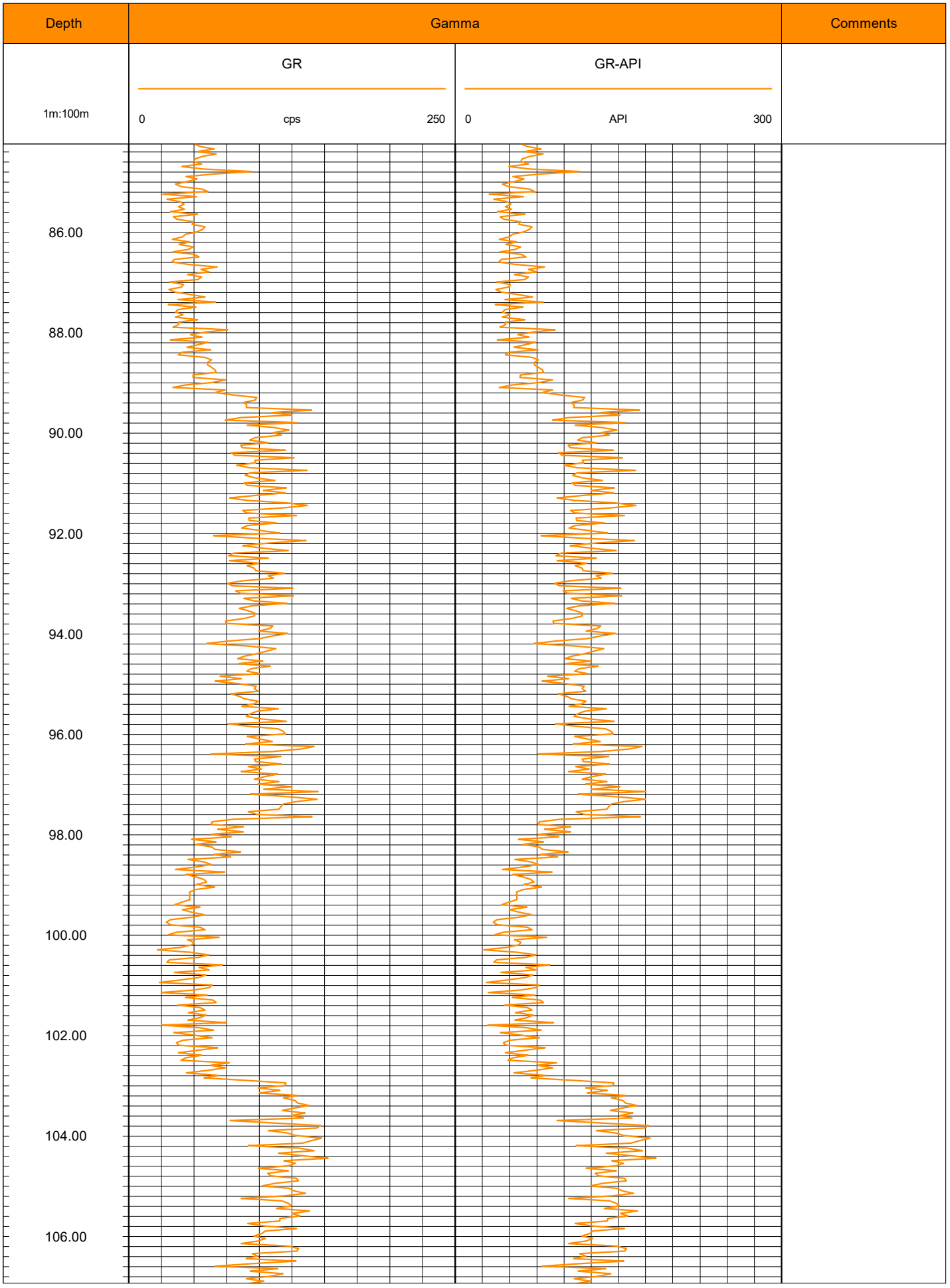
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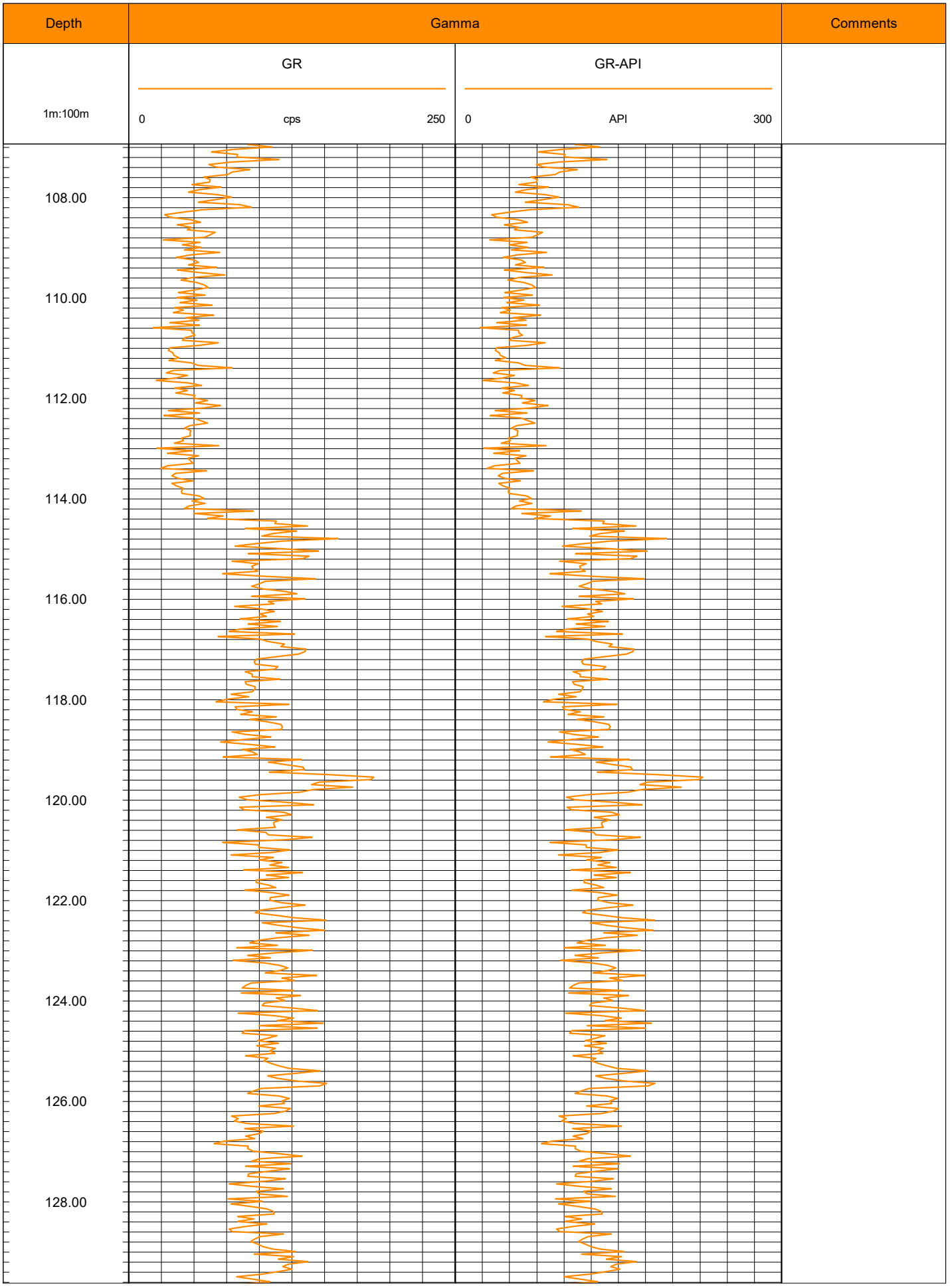
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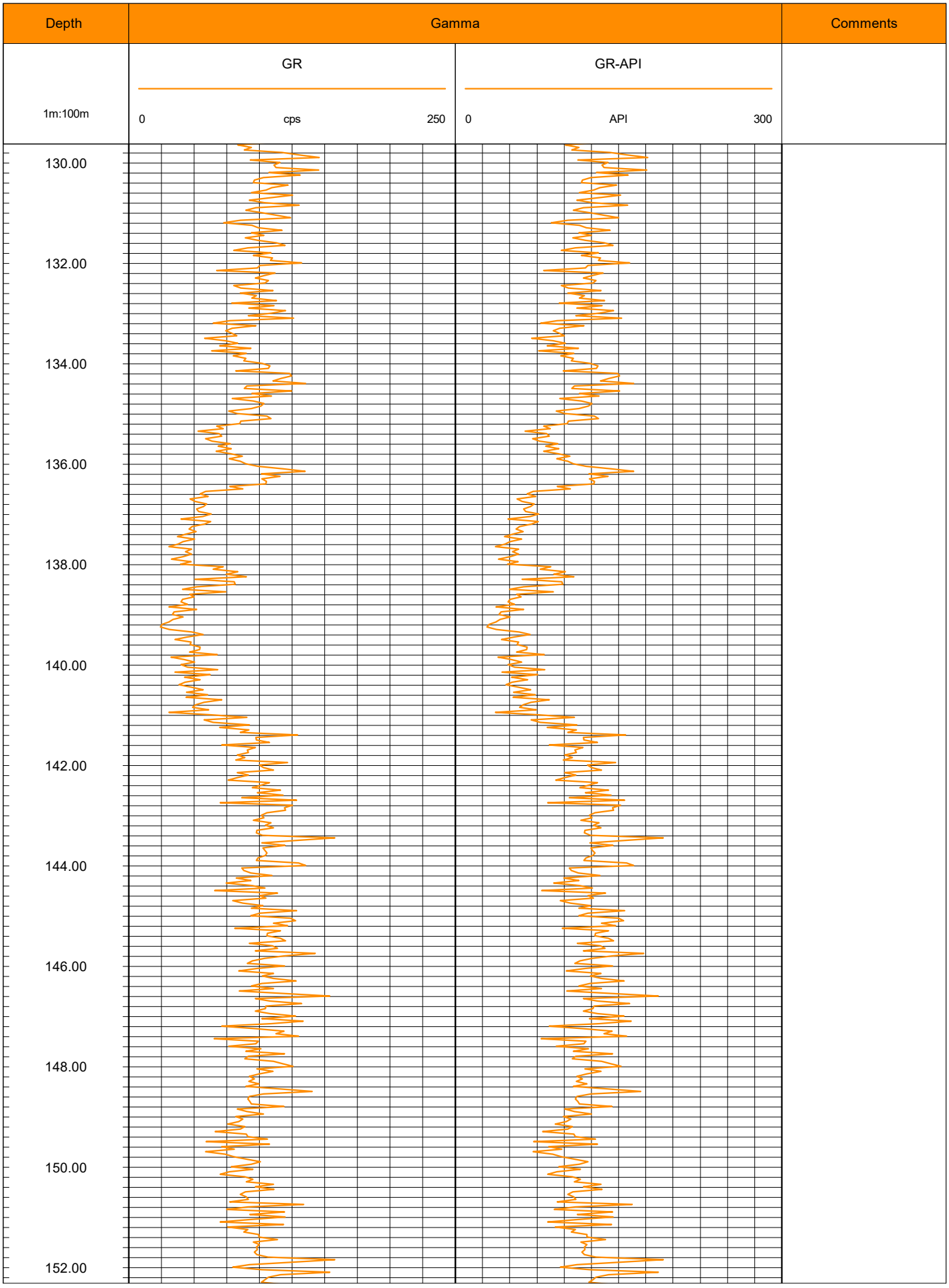
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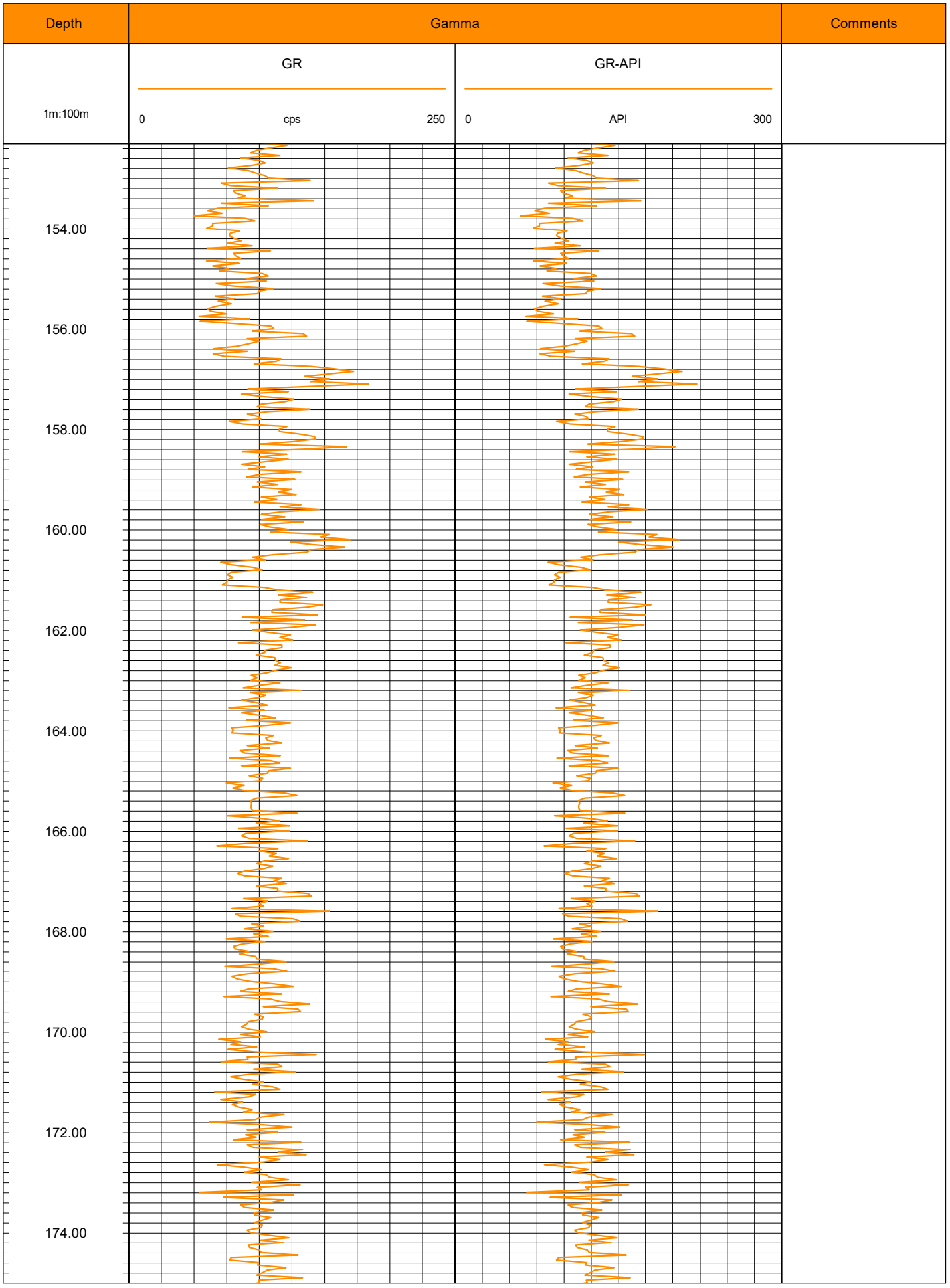
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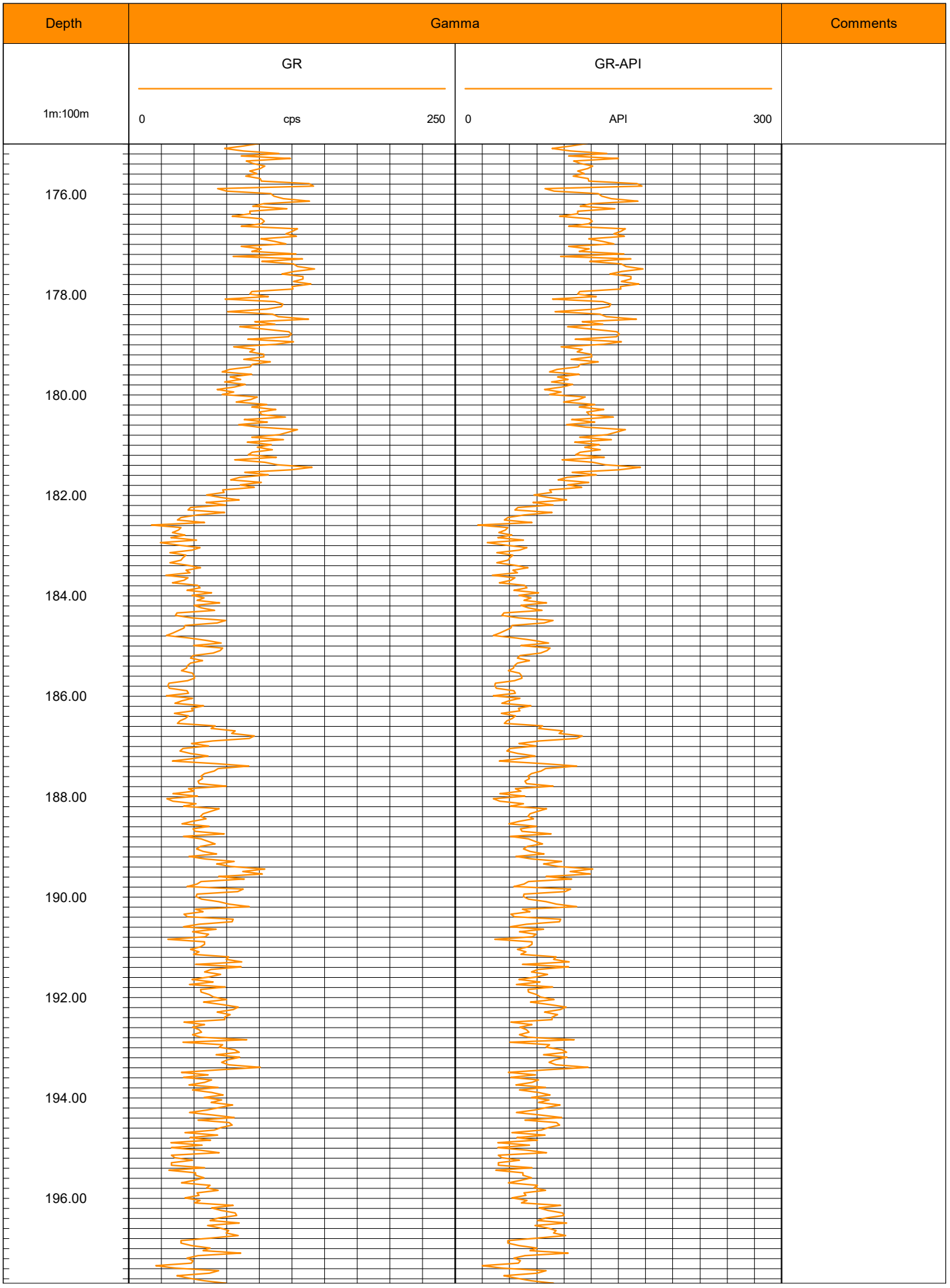
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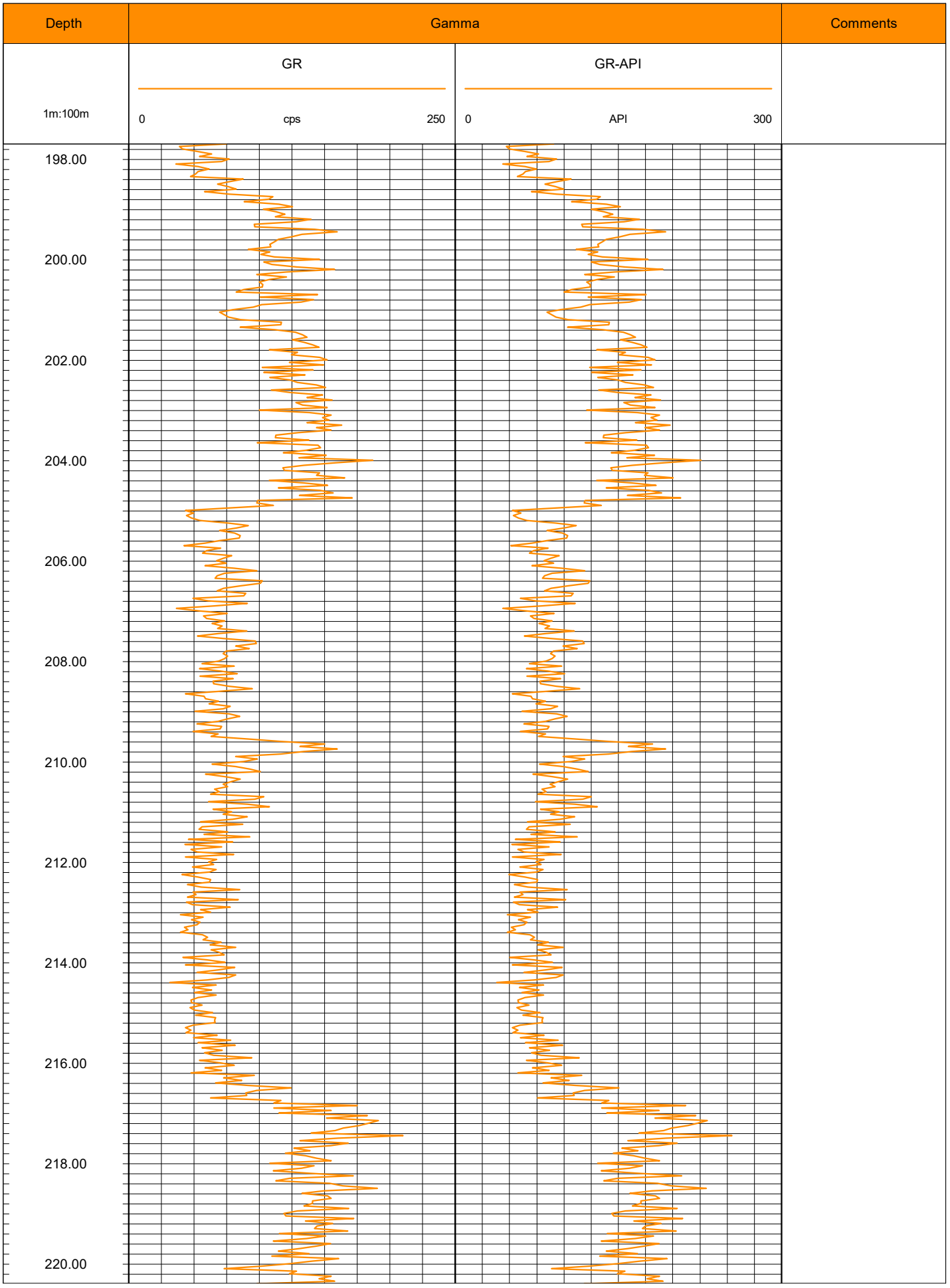
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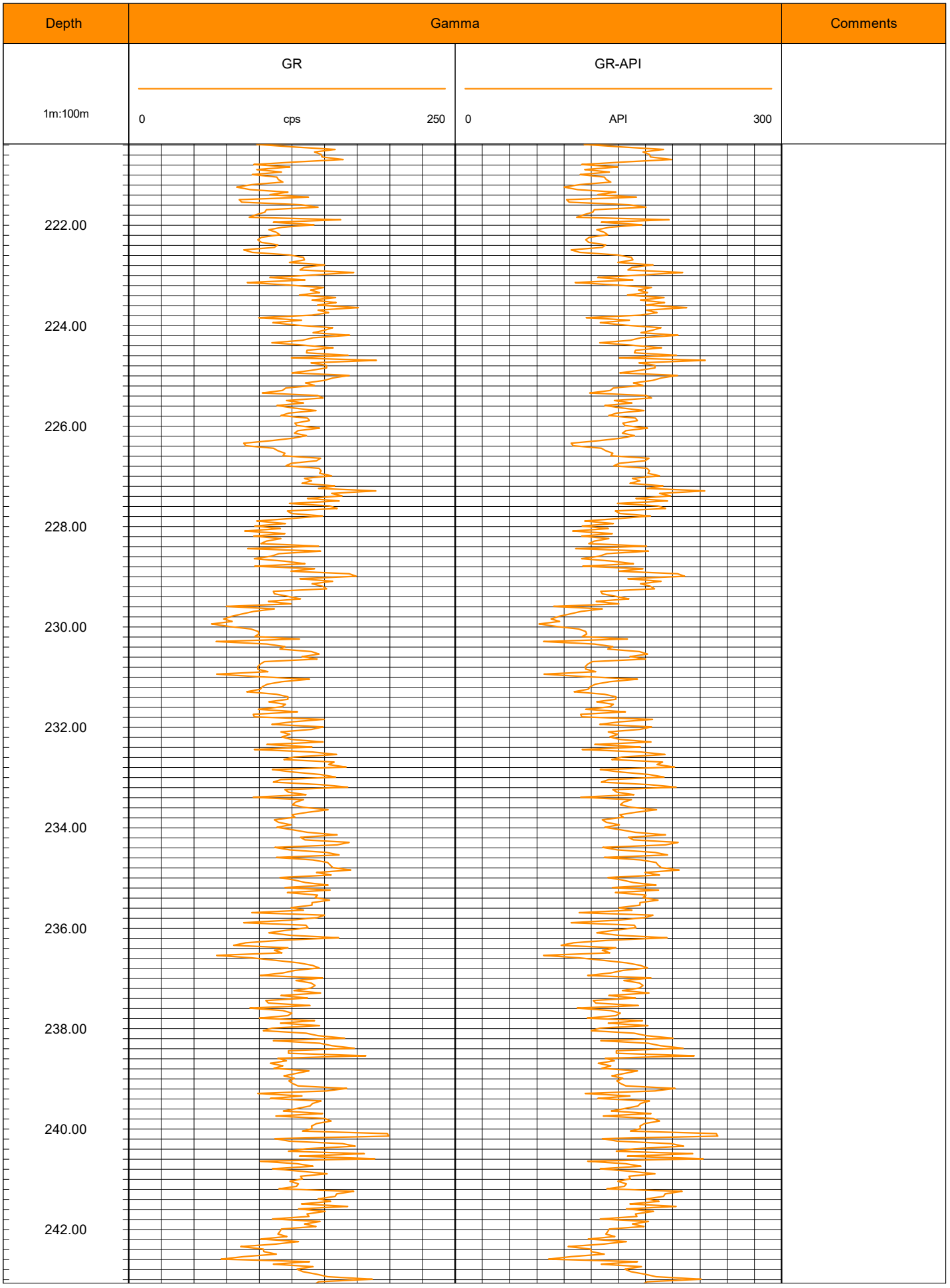
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GR-API
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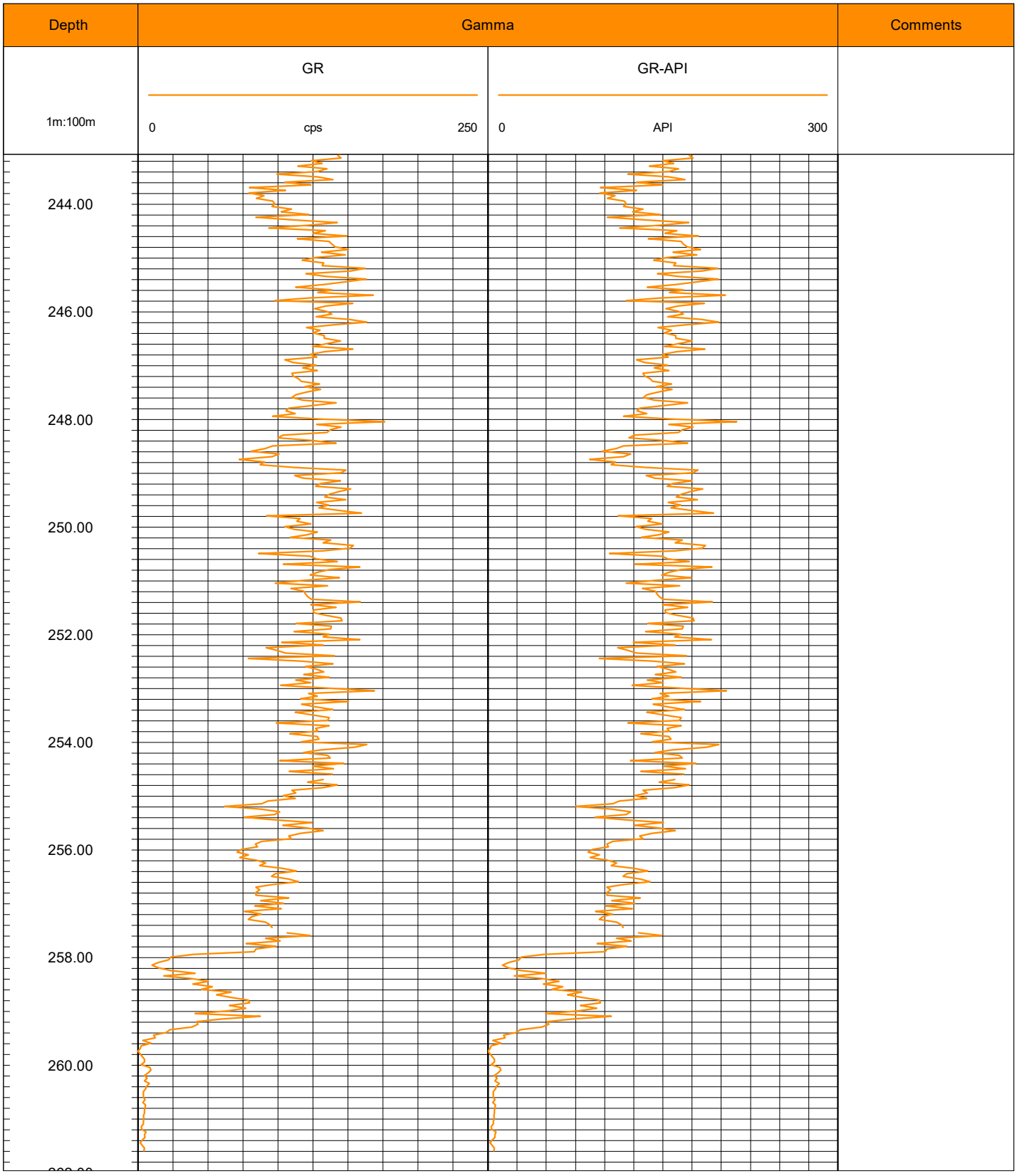
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cps
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0
API
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250.00
252.00
254.00
256.00
258.00
260.00

Client:	ATLAS SALT	TERRANE GEOSCIENCE INC.	GEMTEC Consulting Engineers and Scientists

Project: 22-005-H
Atlas Salt Gamma Survey

Hole ID:	**Area:**	**Location:**				
CC9B	Flat Bay	N: 388361	E: 5363312	Z: 47.5		
Hole Depth (m): 580.80	**Log Depth (m):** 580.80	**Logged By:** PR	**Logged Date:** 20/12/22	**Azimuth:** 0	**Dip:** -90	

Note :

Depth	Gamma		Comments
	GR	GR-API	
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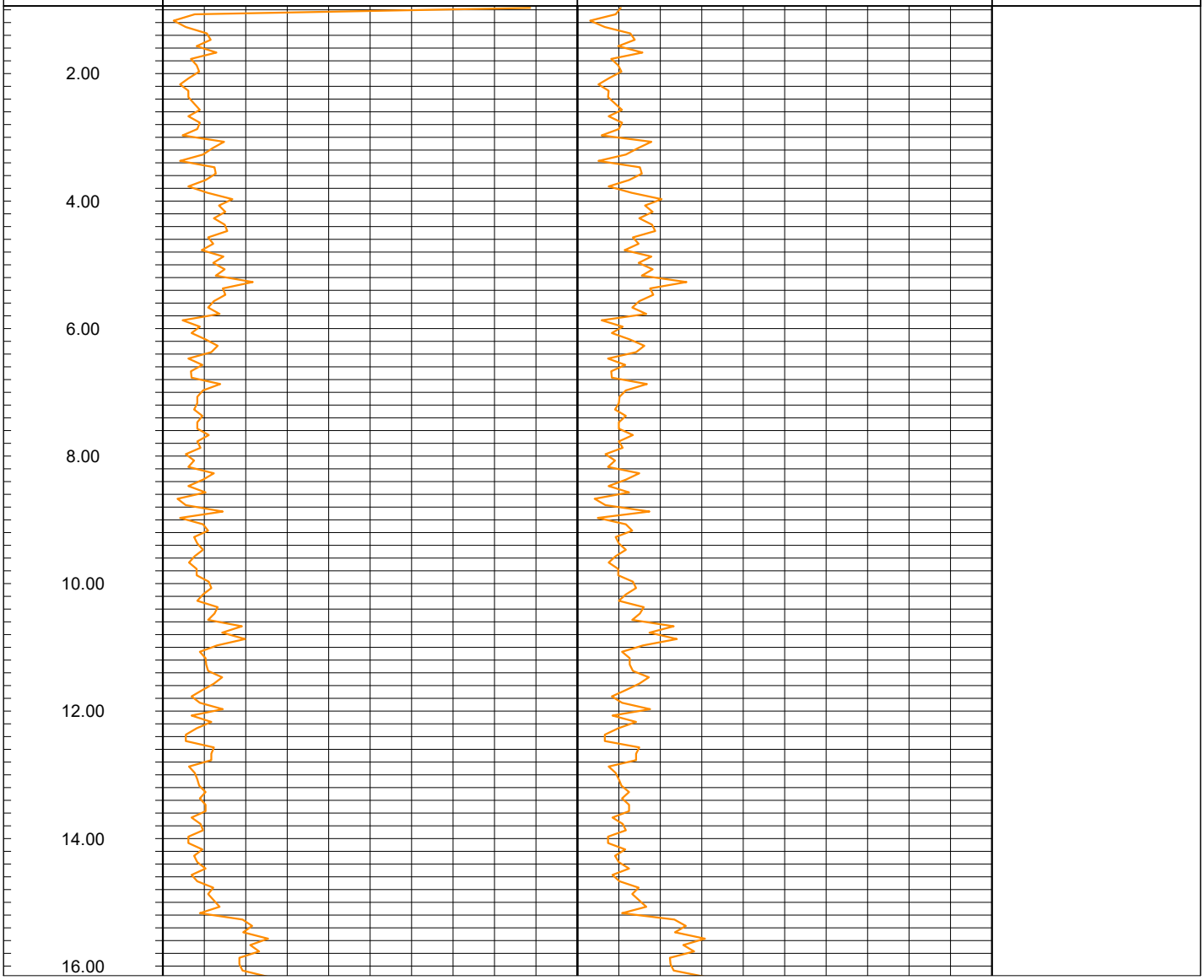

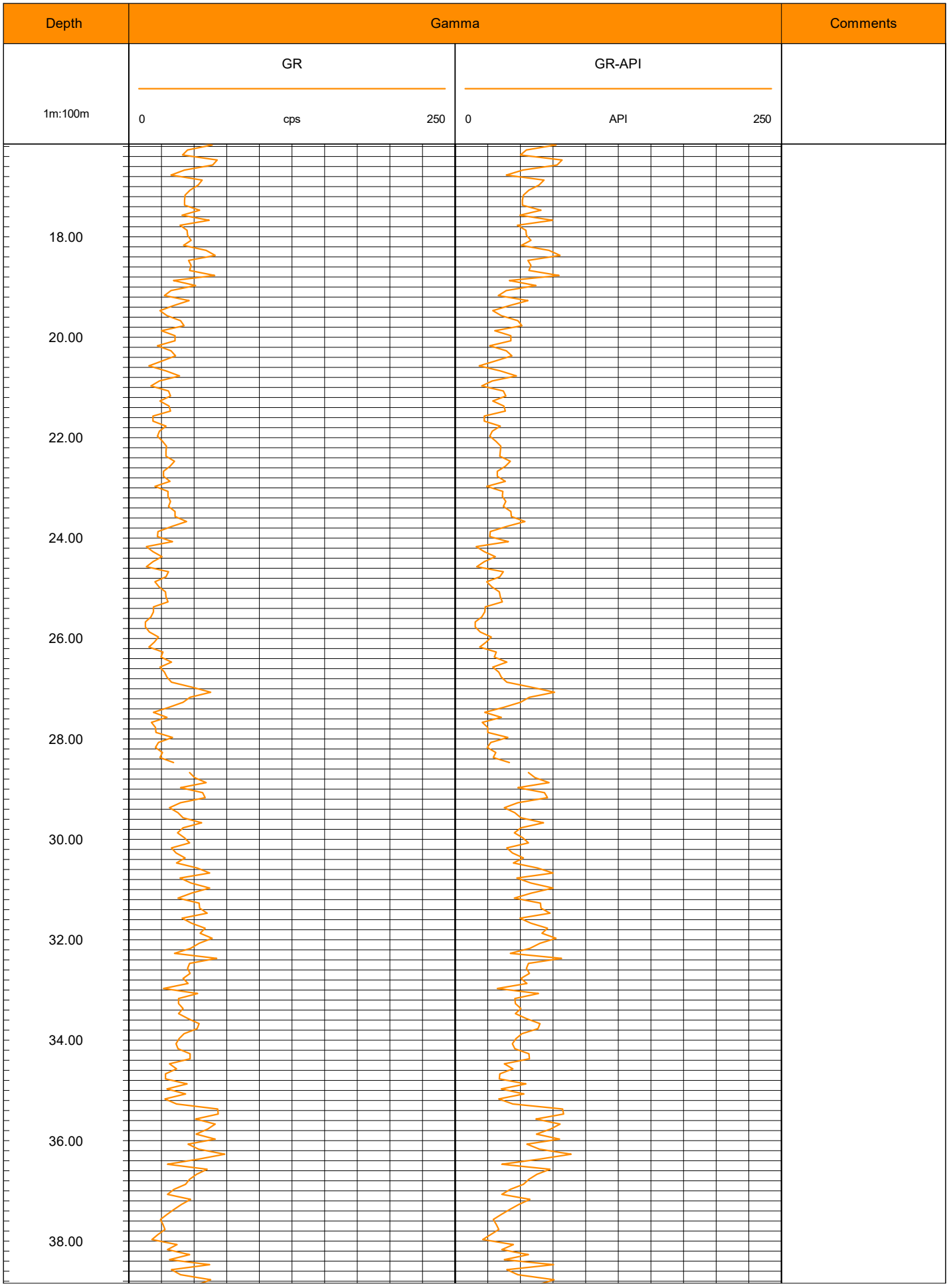
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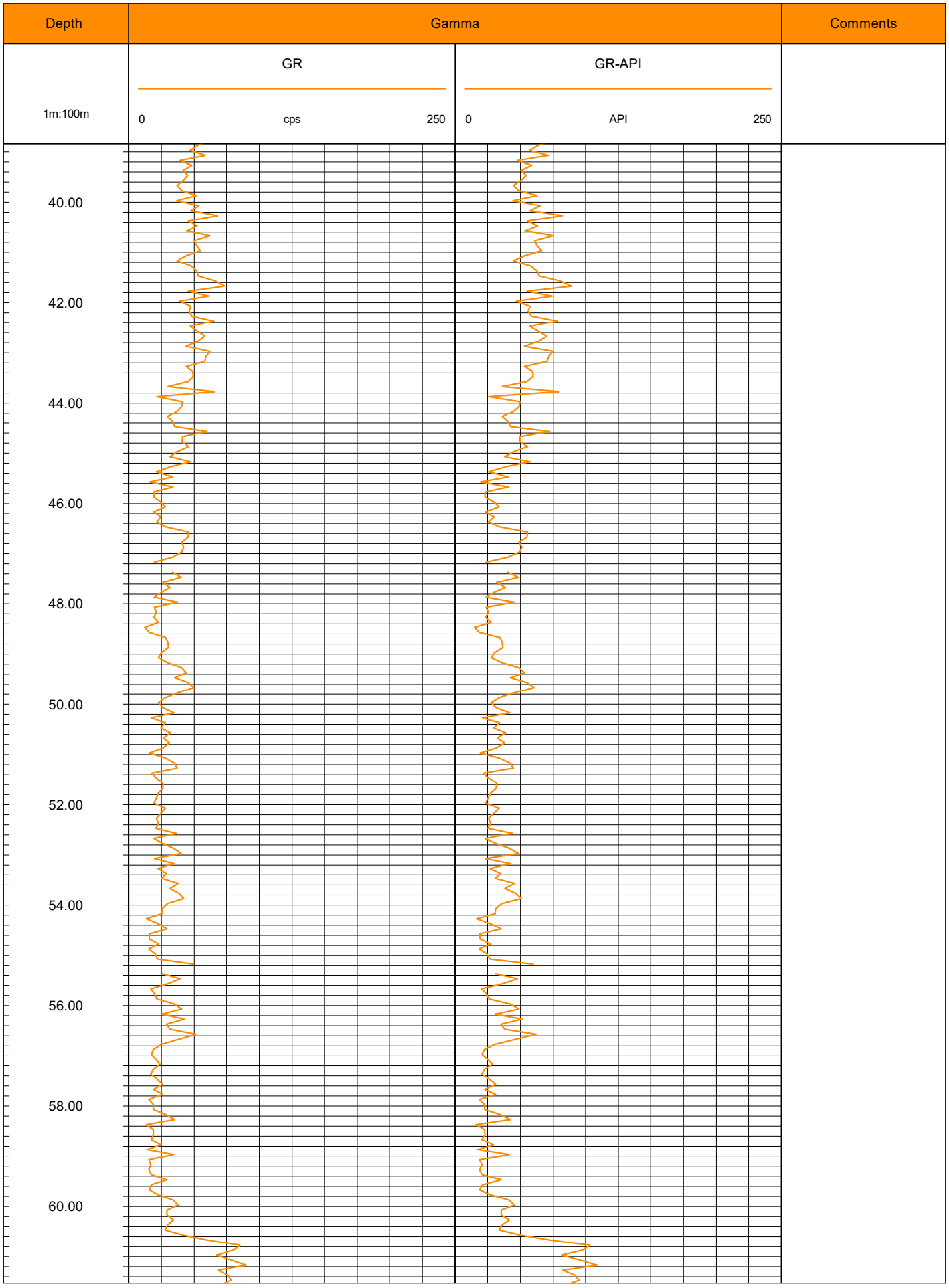
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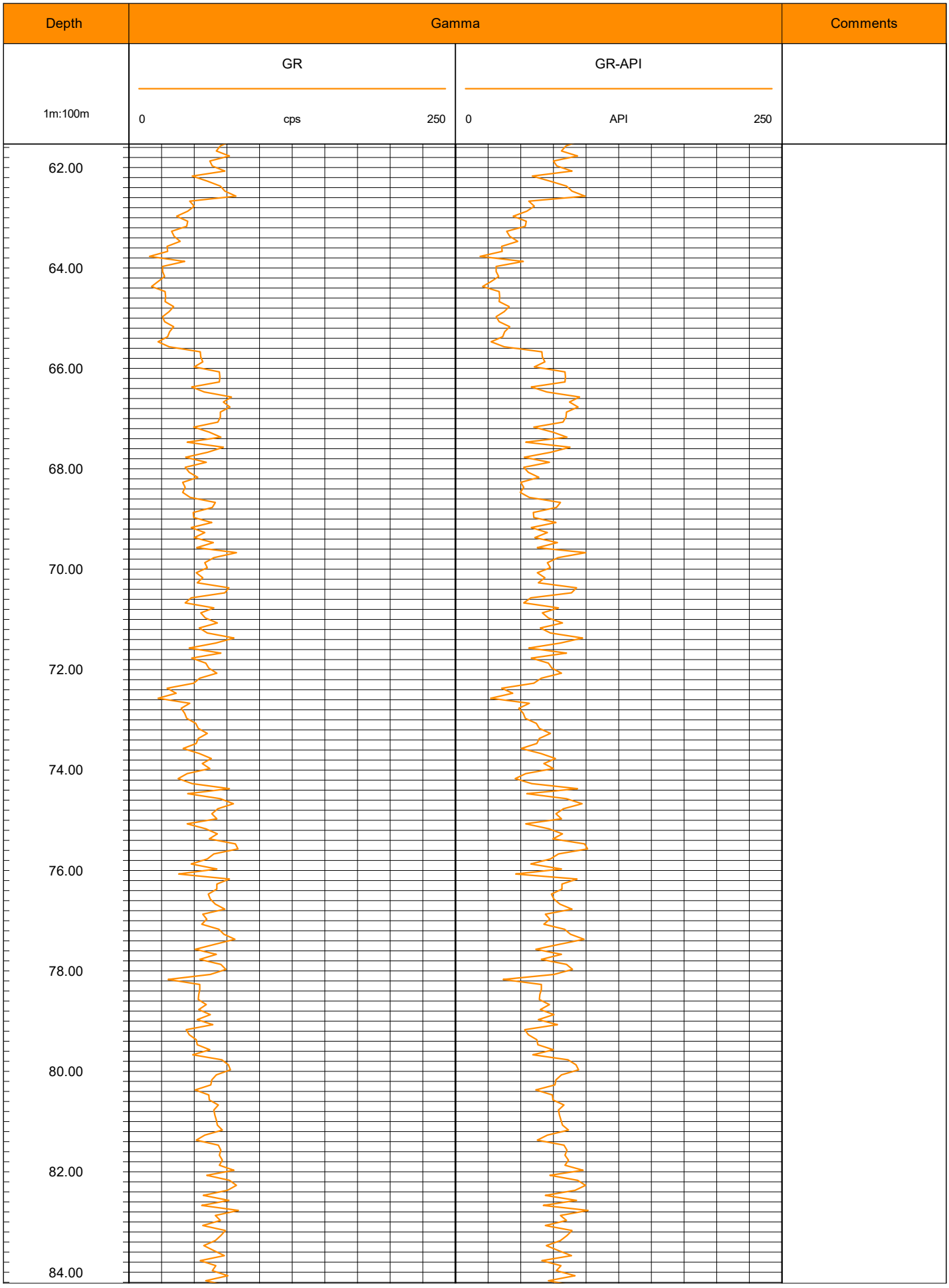
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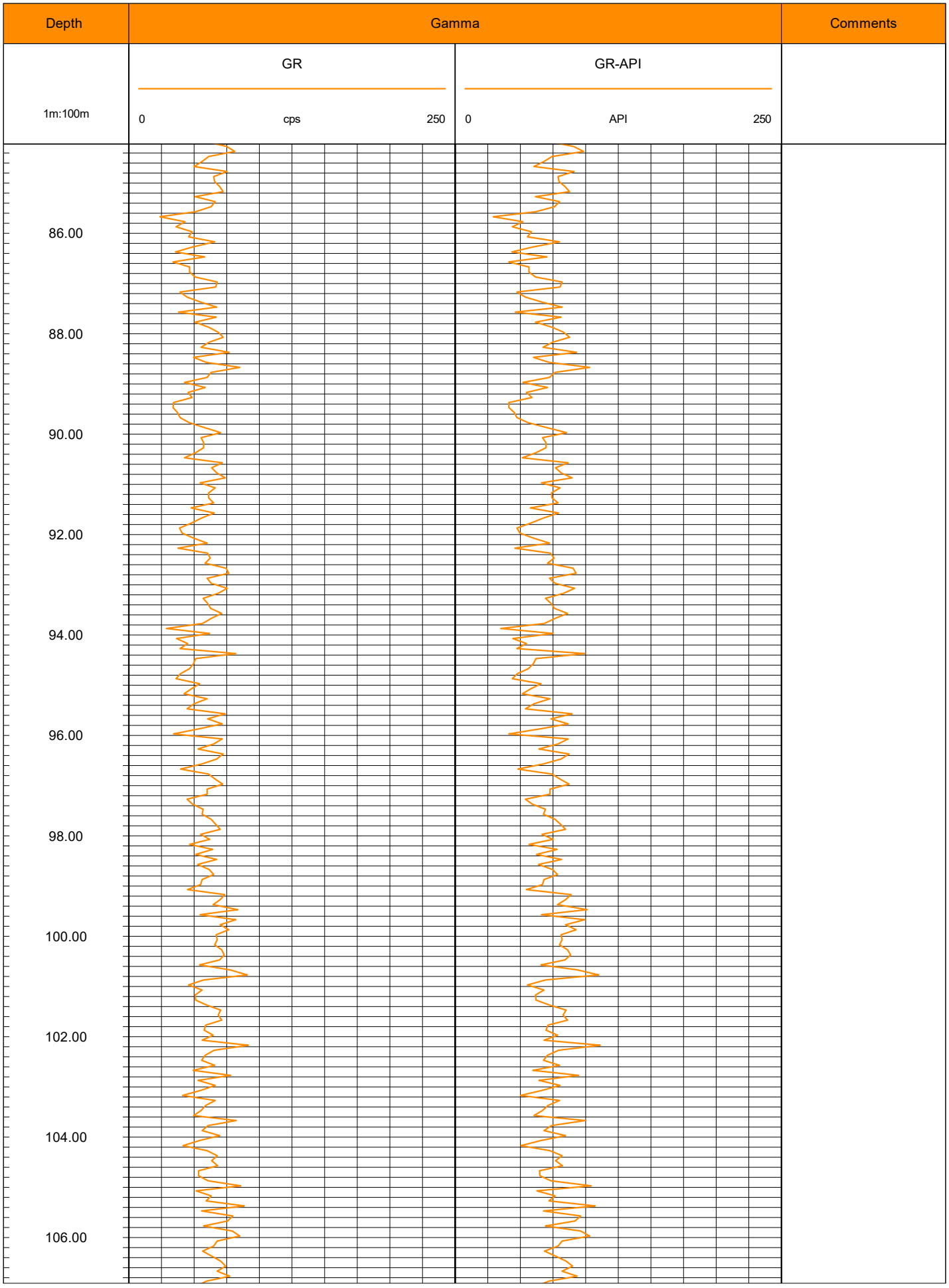
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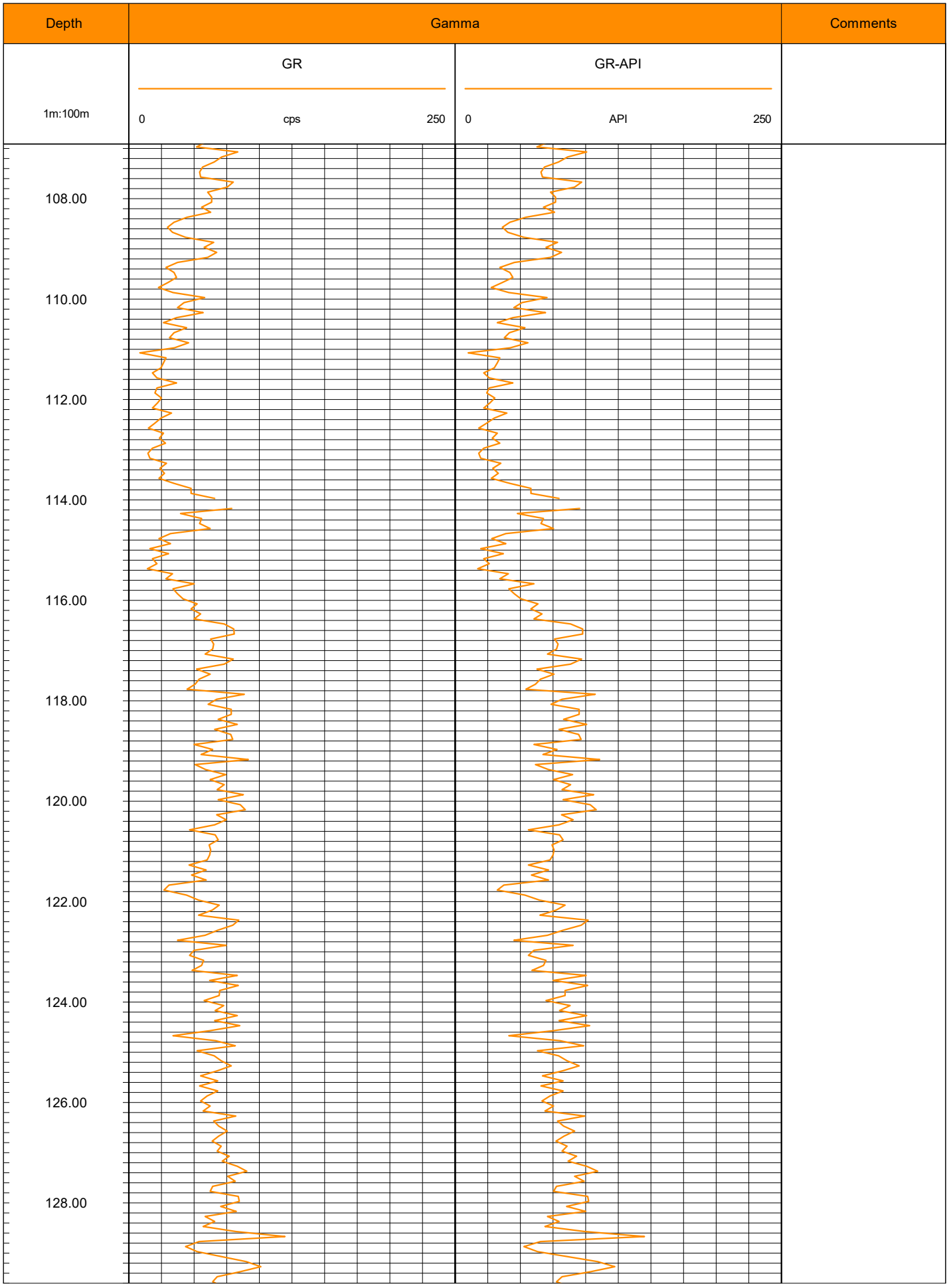
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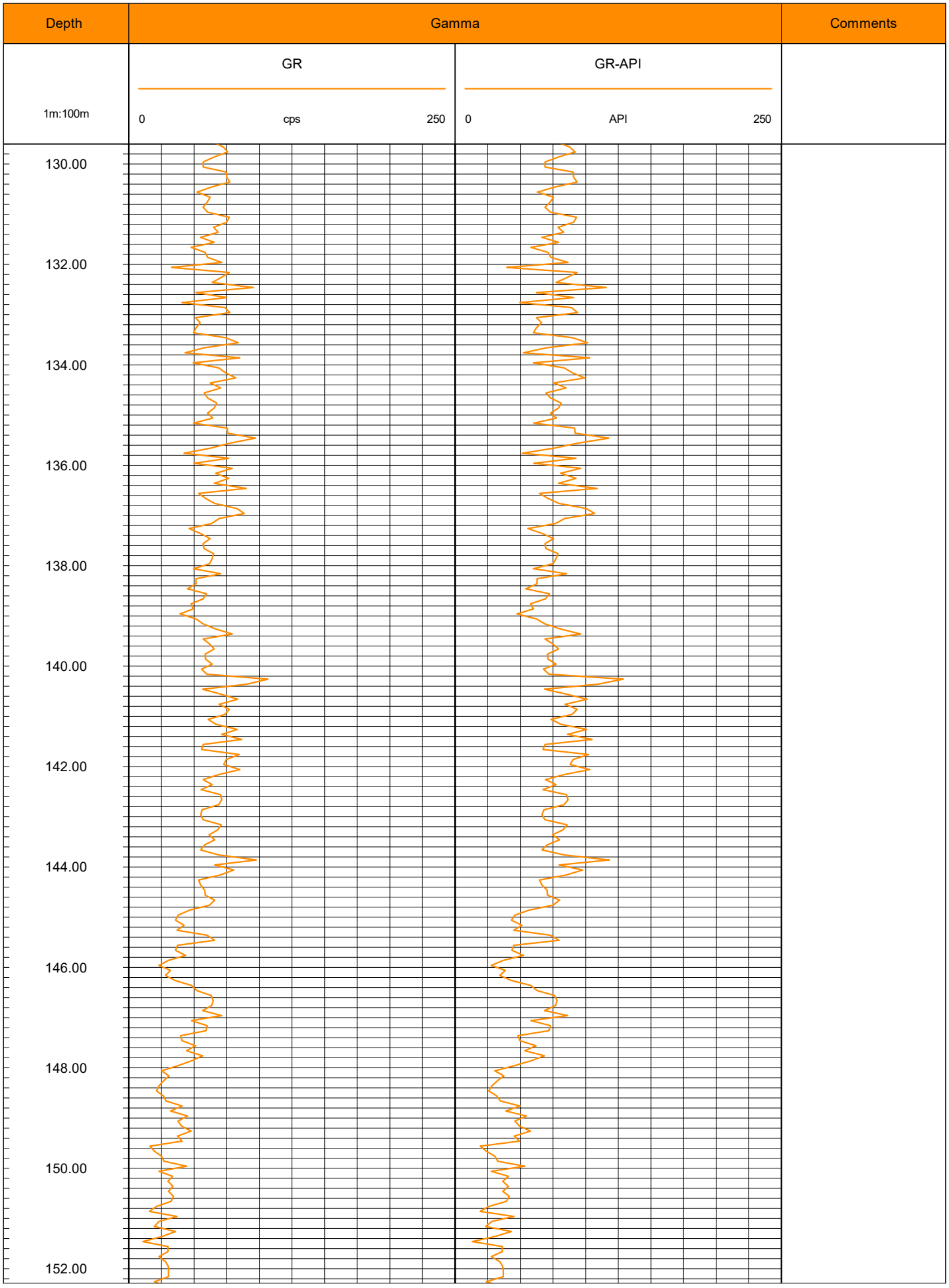
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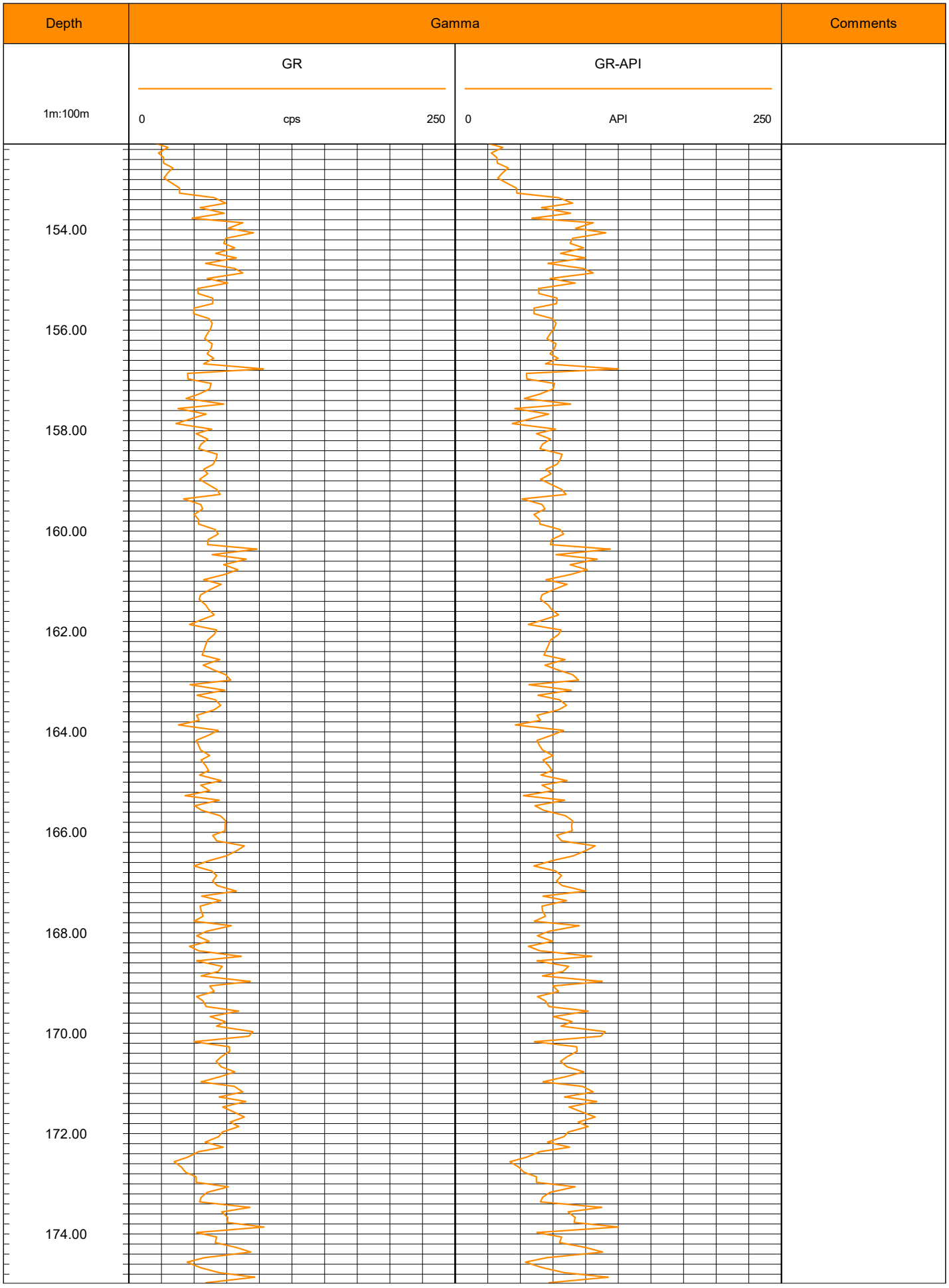
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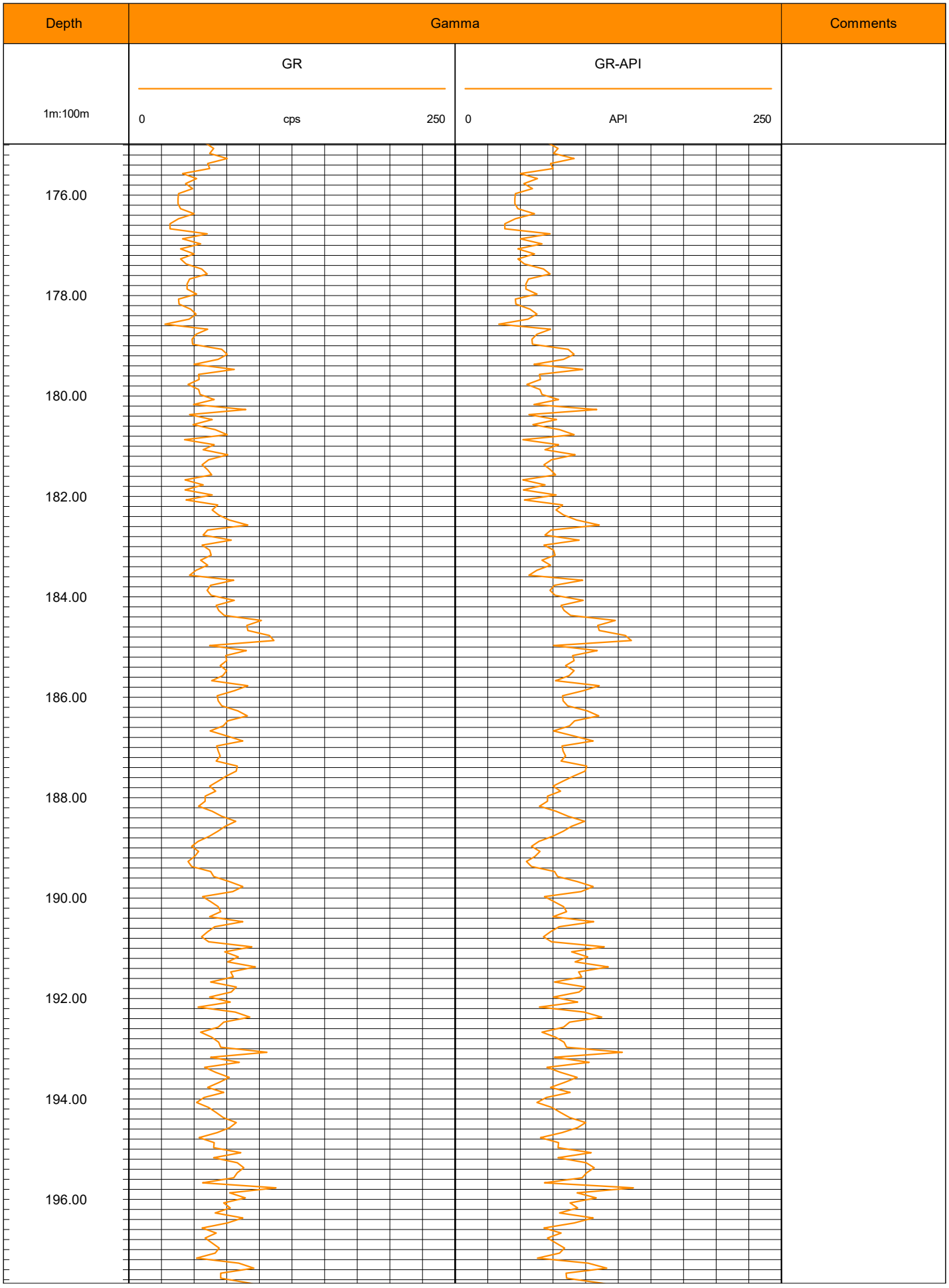
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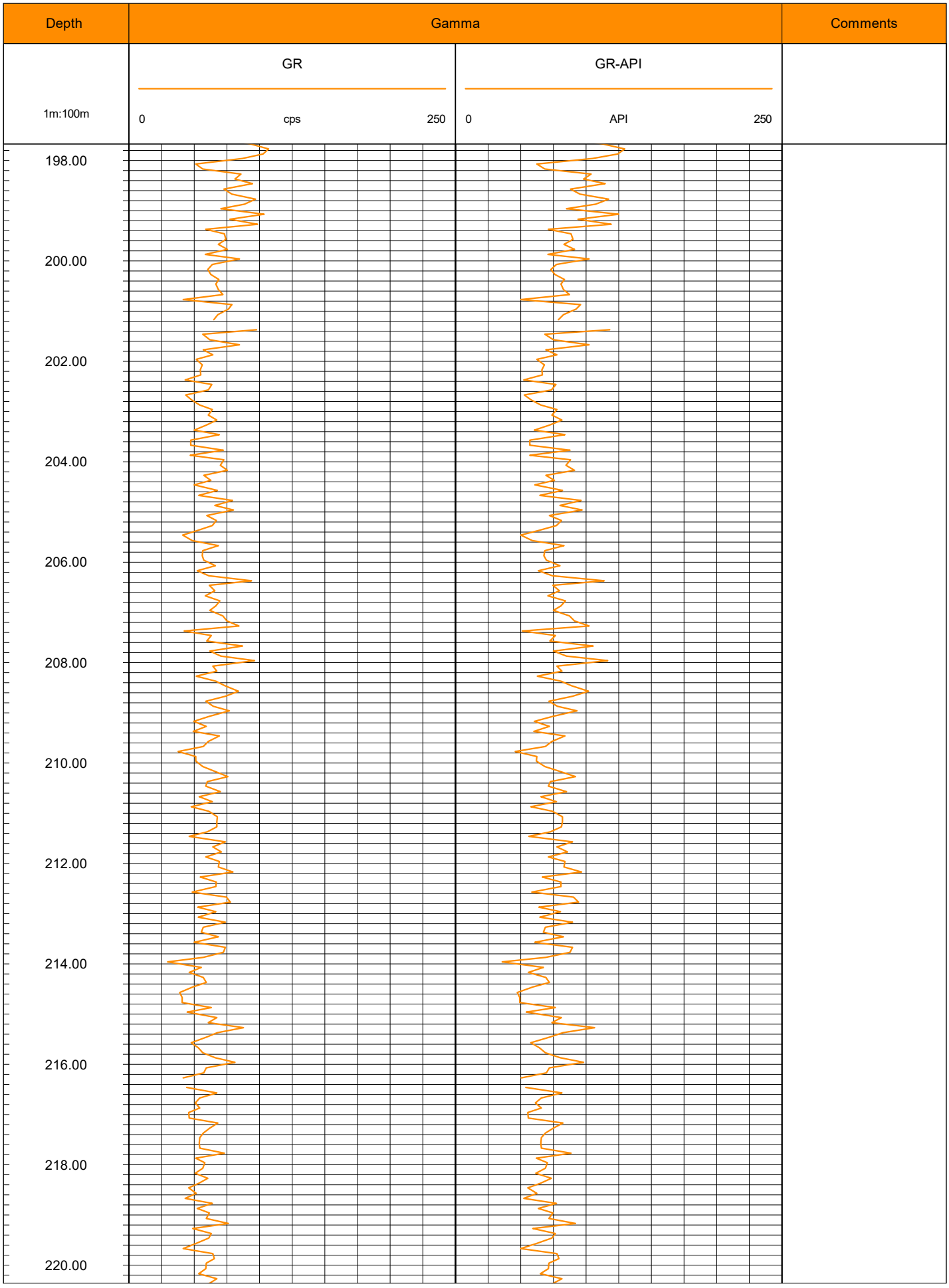
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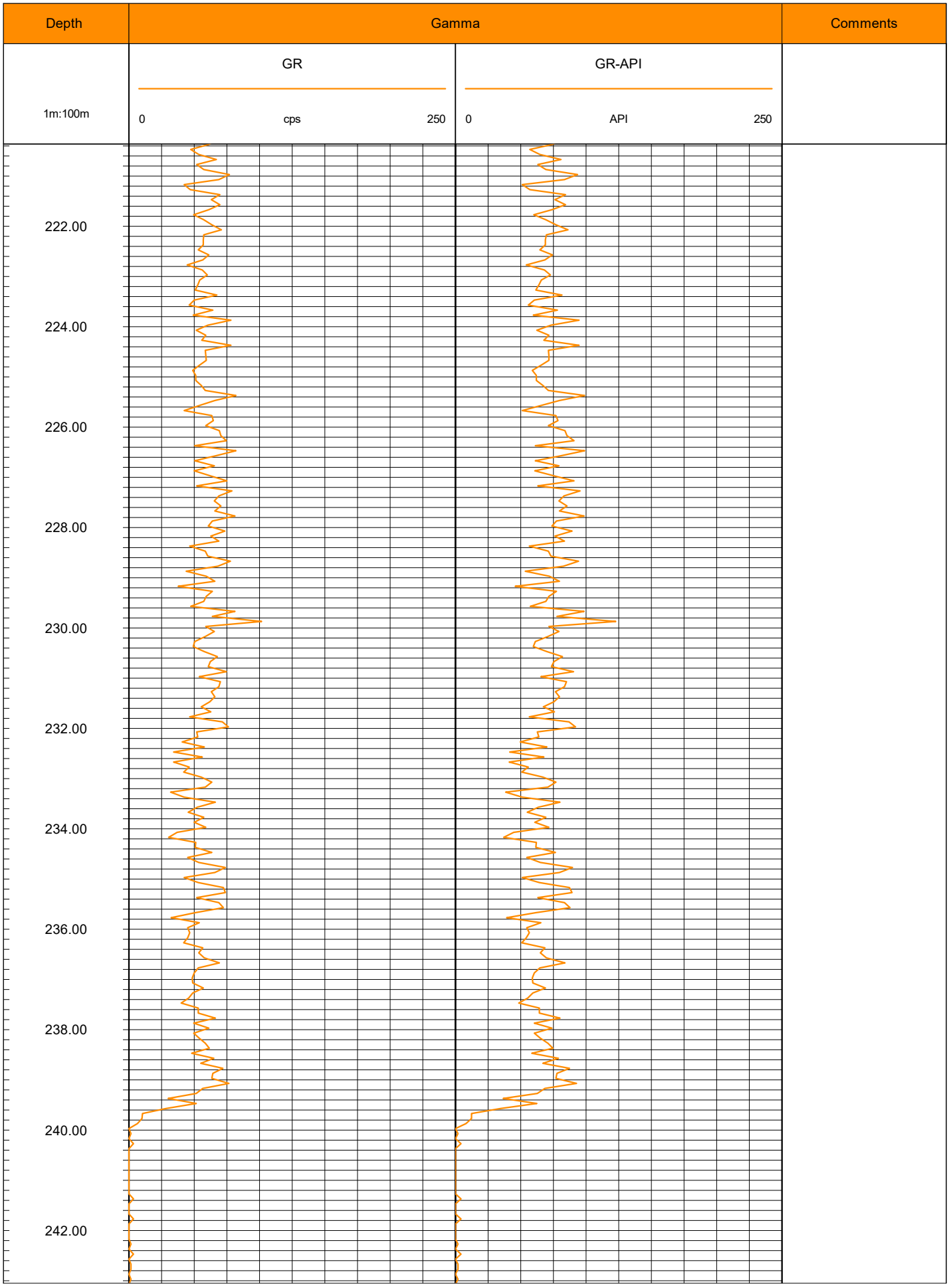
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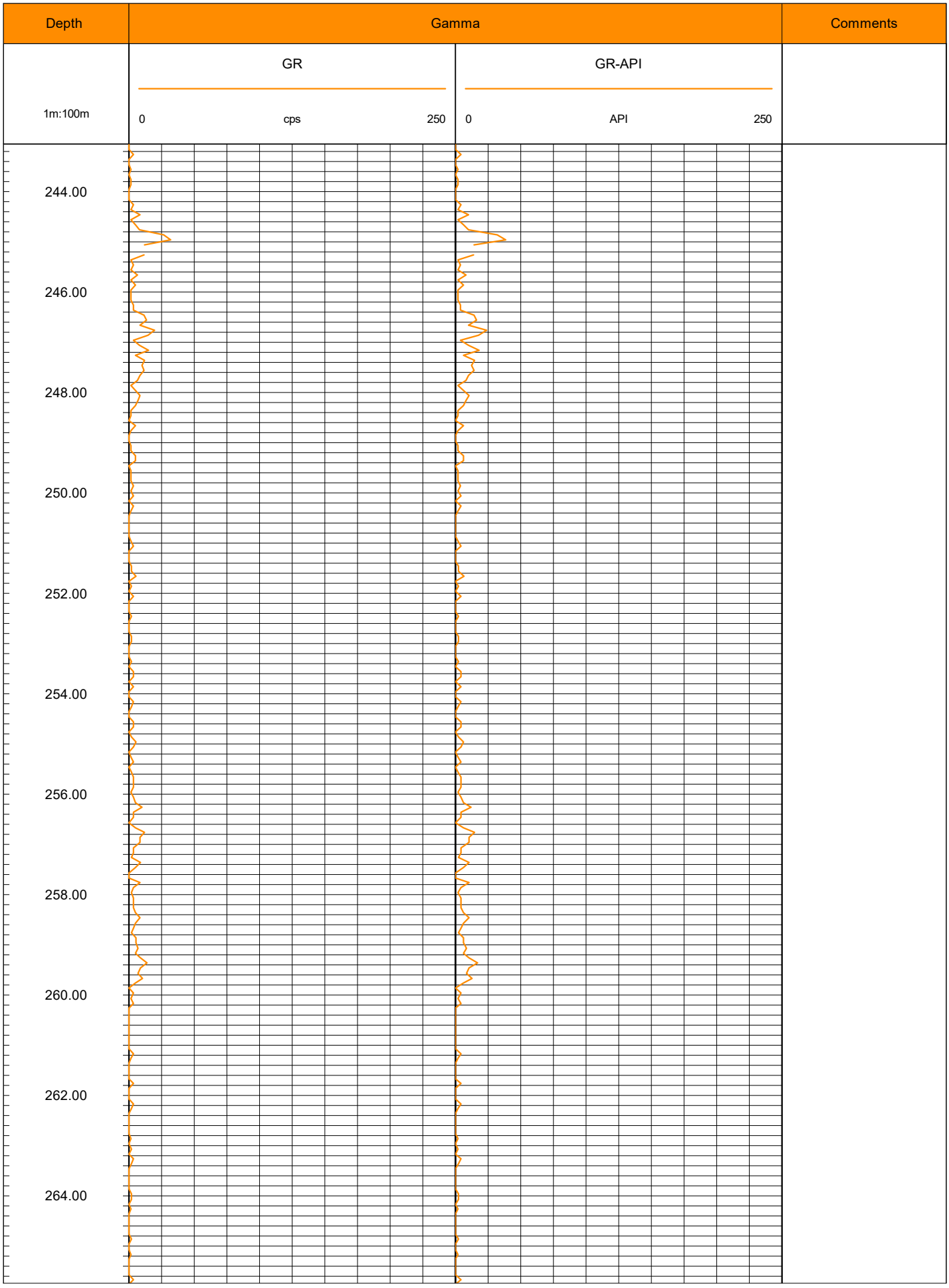
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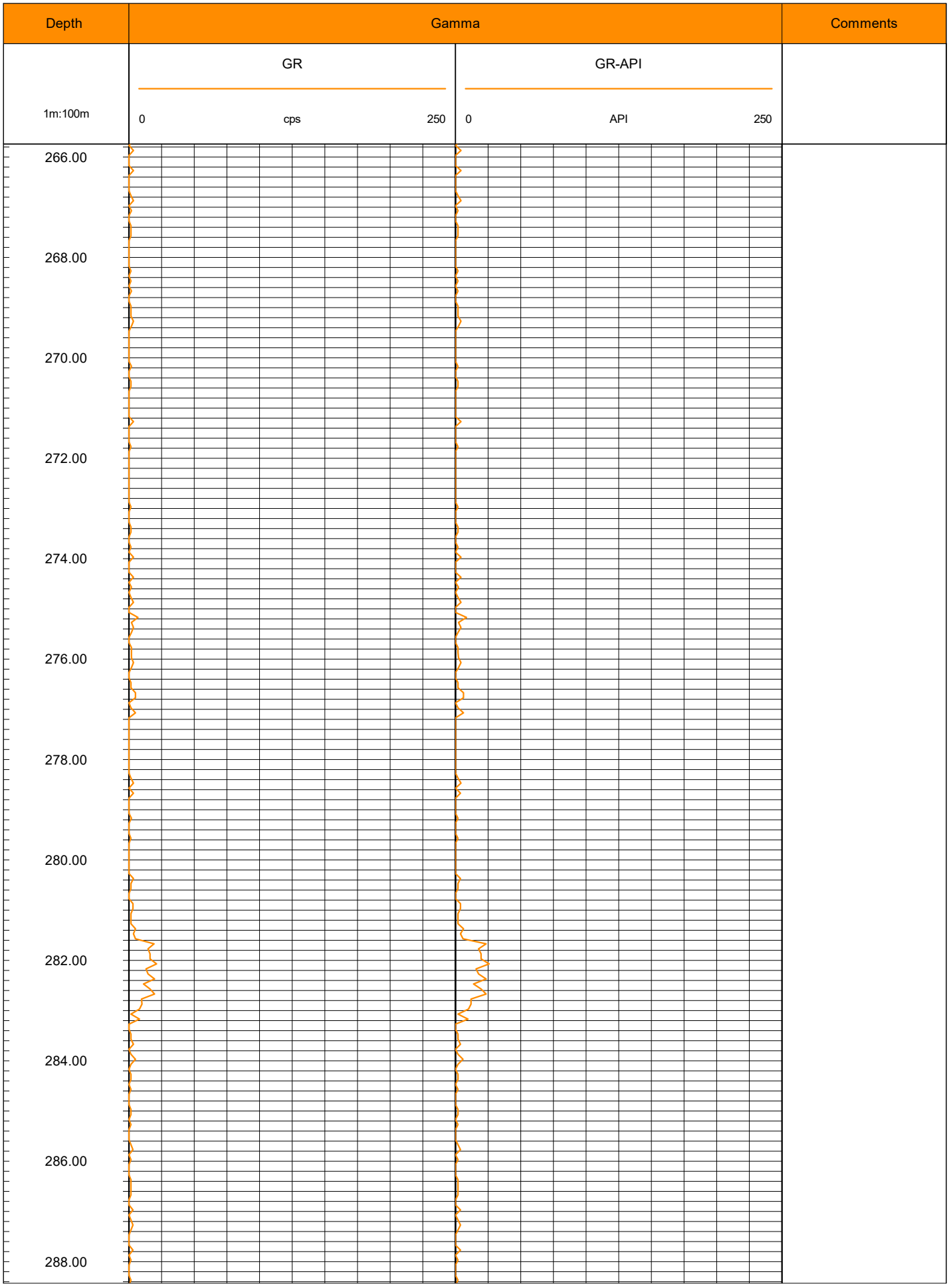
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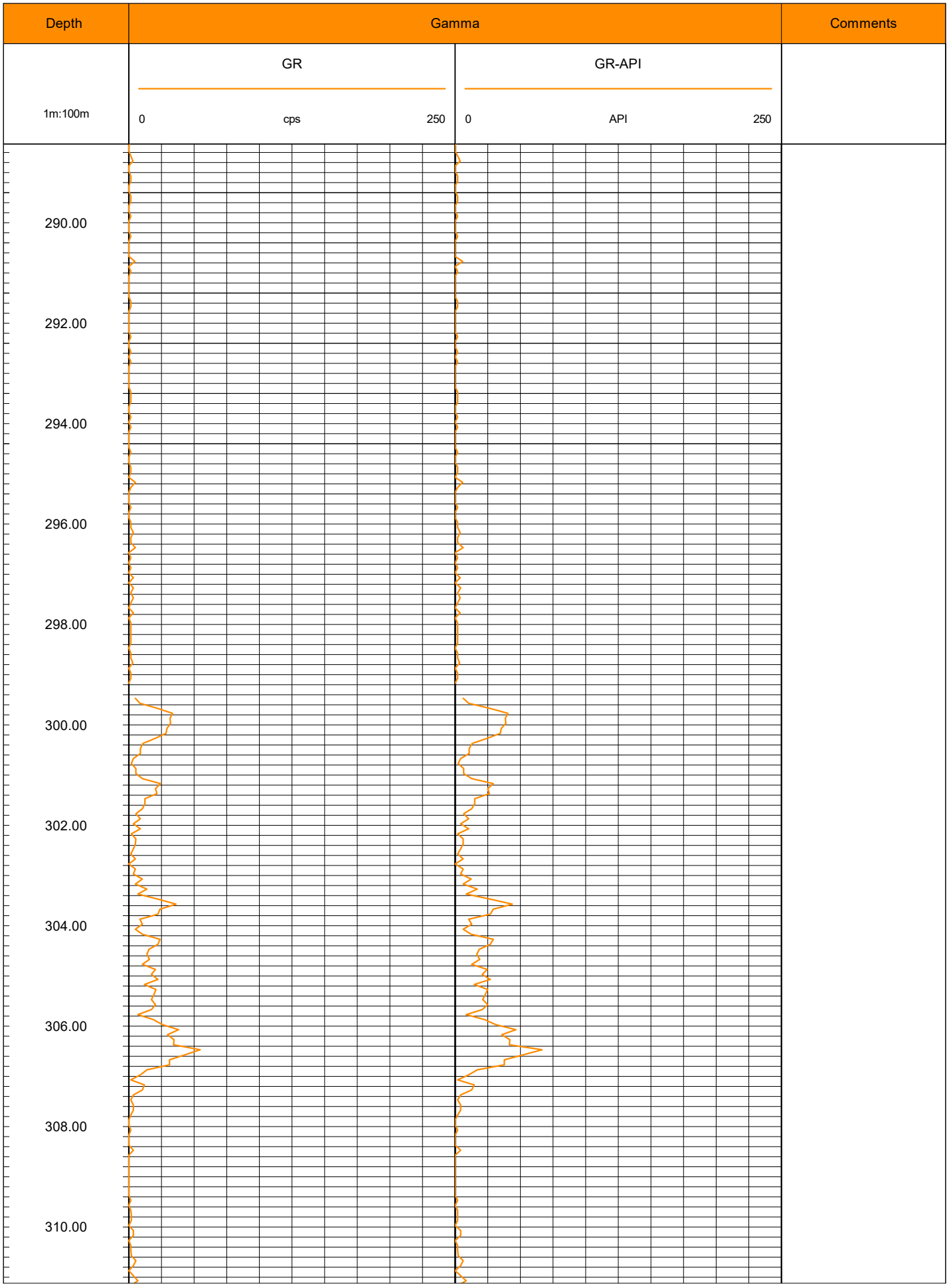
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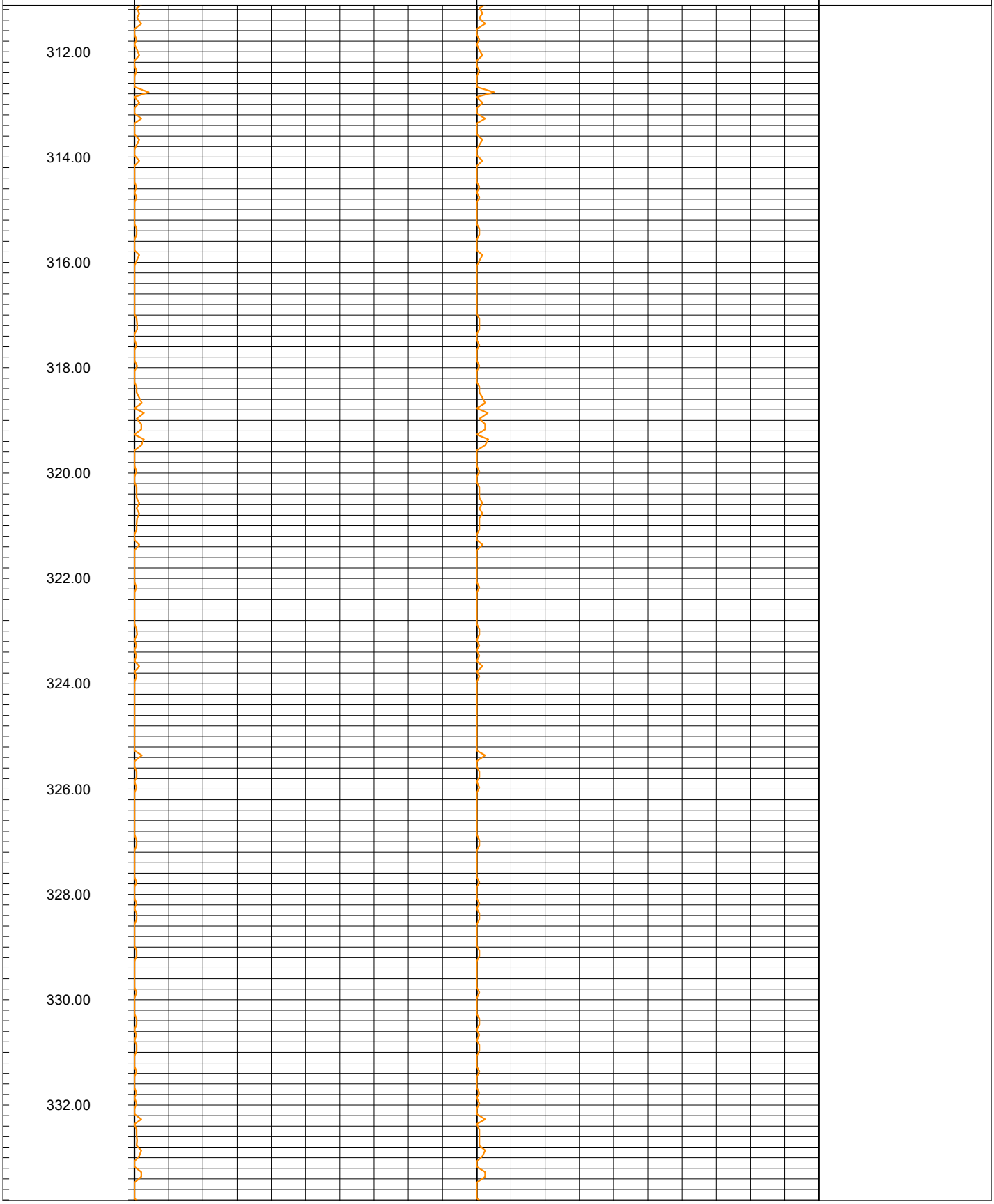

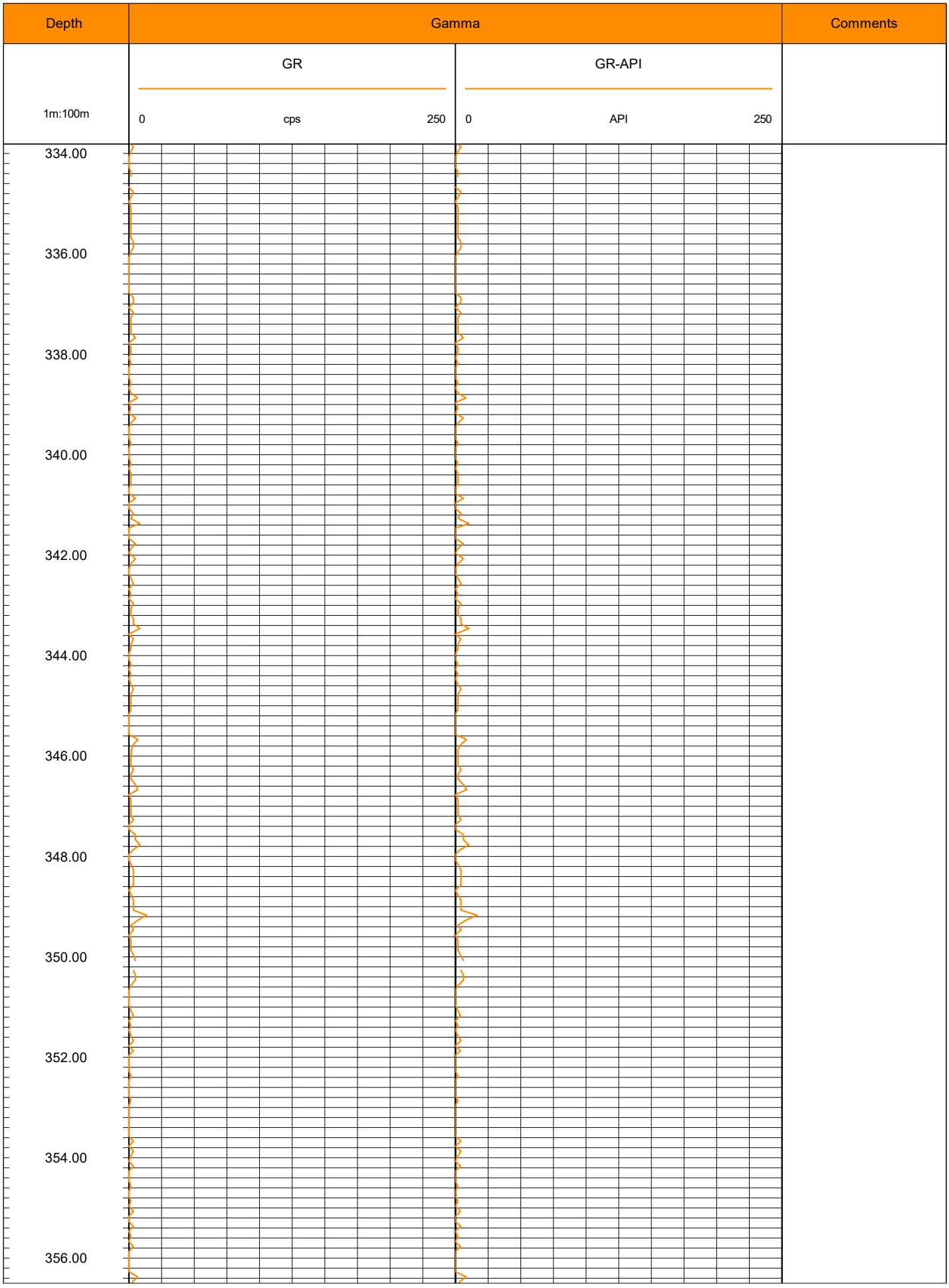
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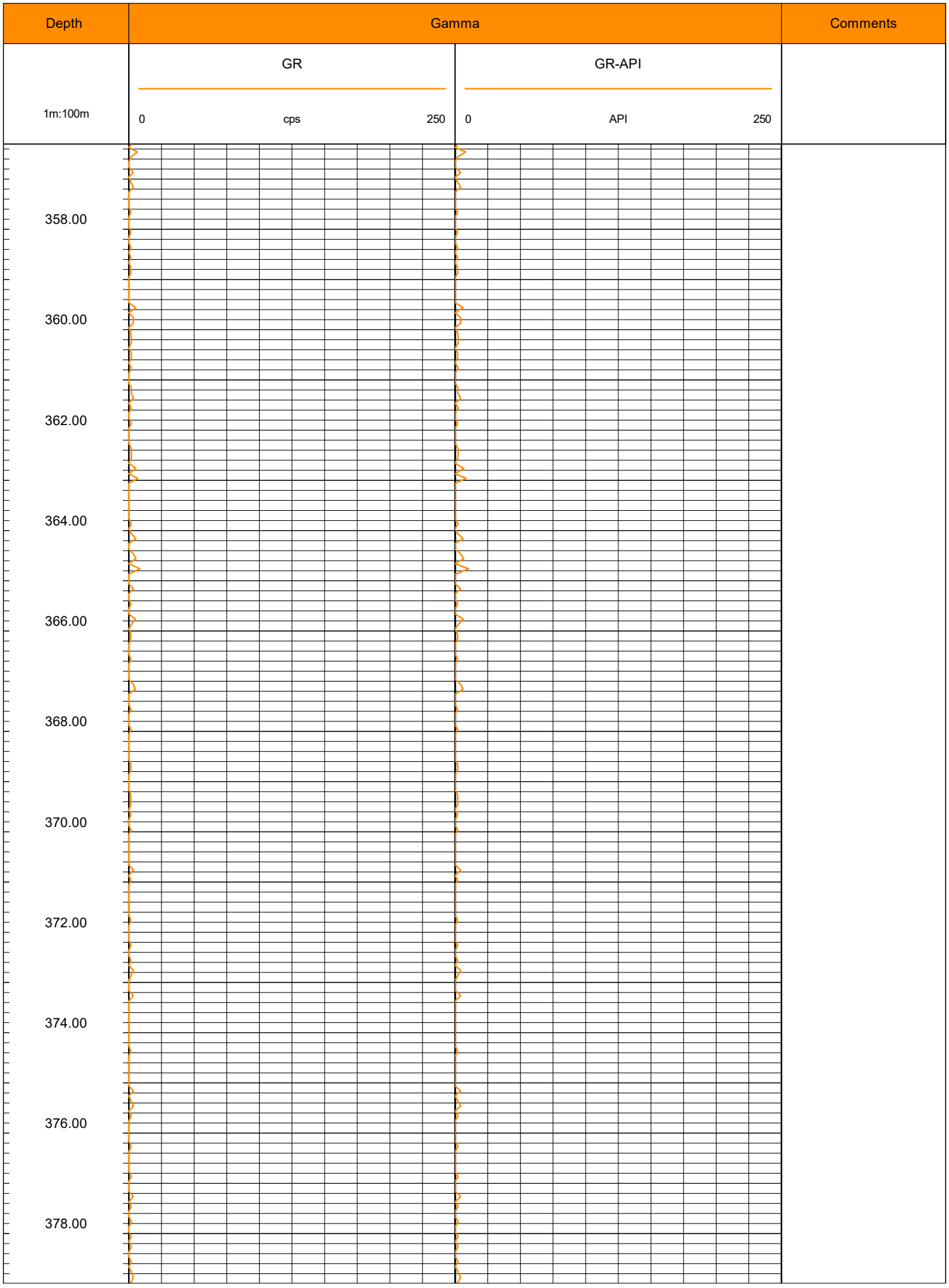
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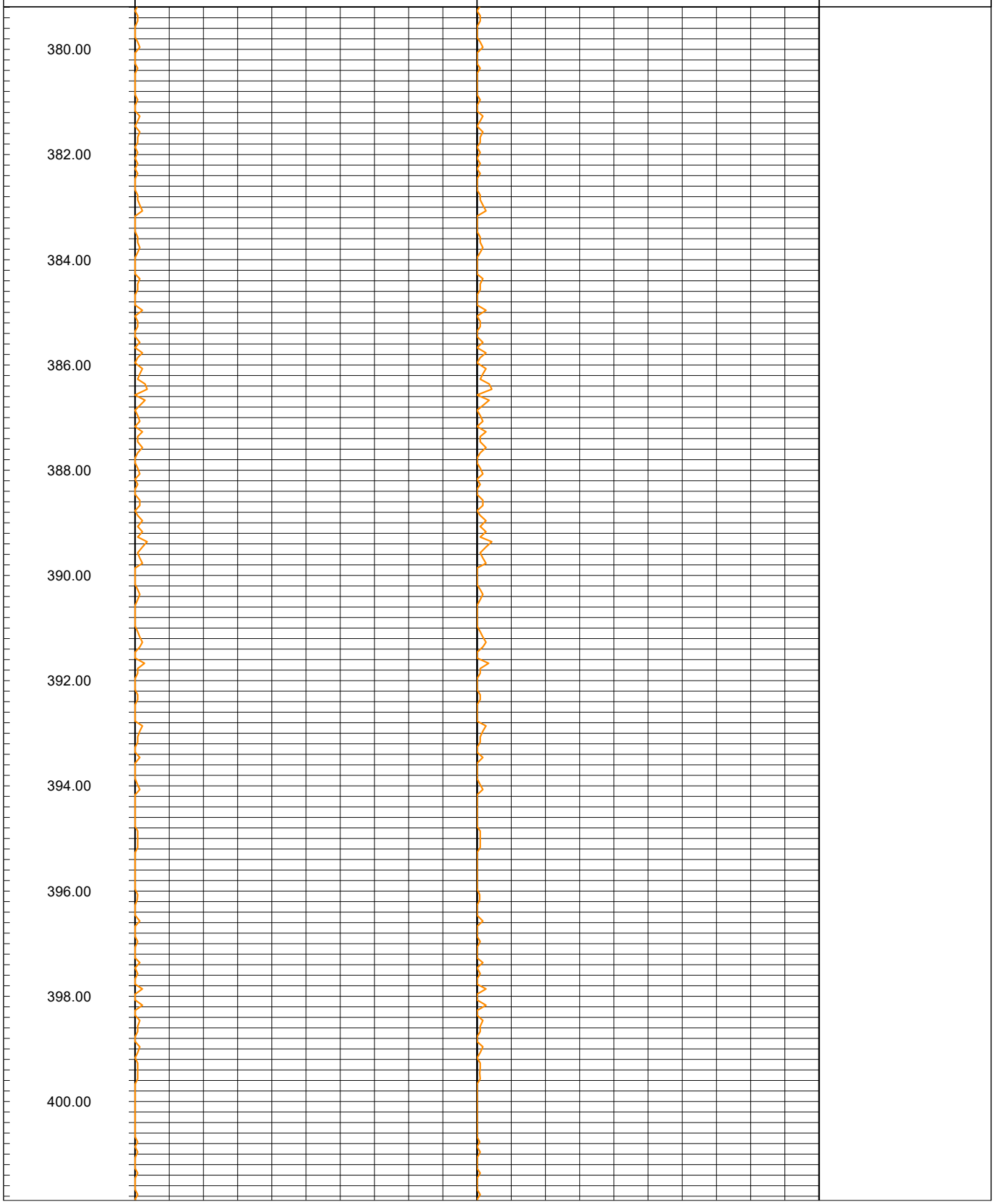

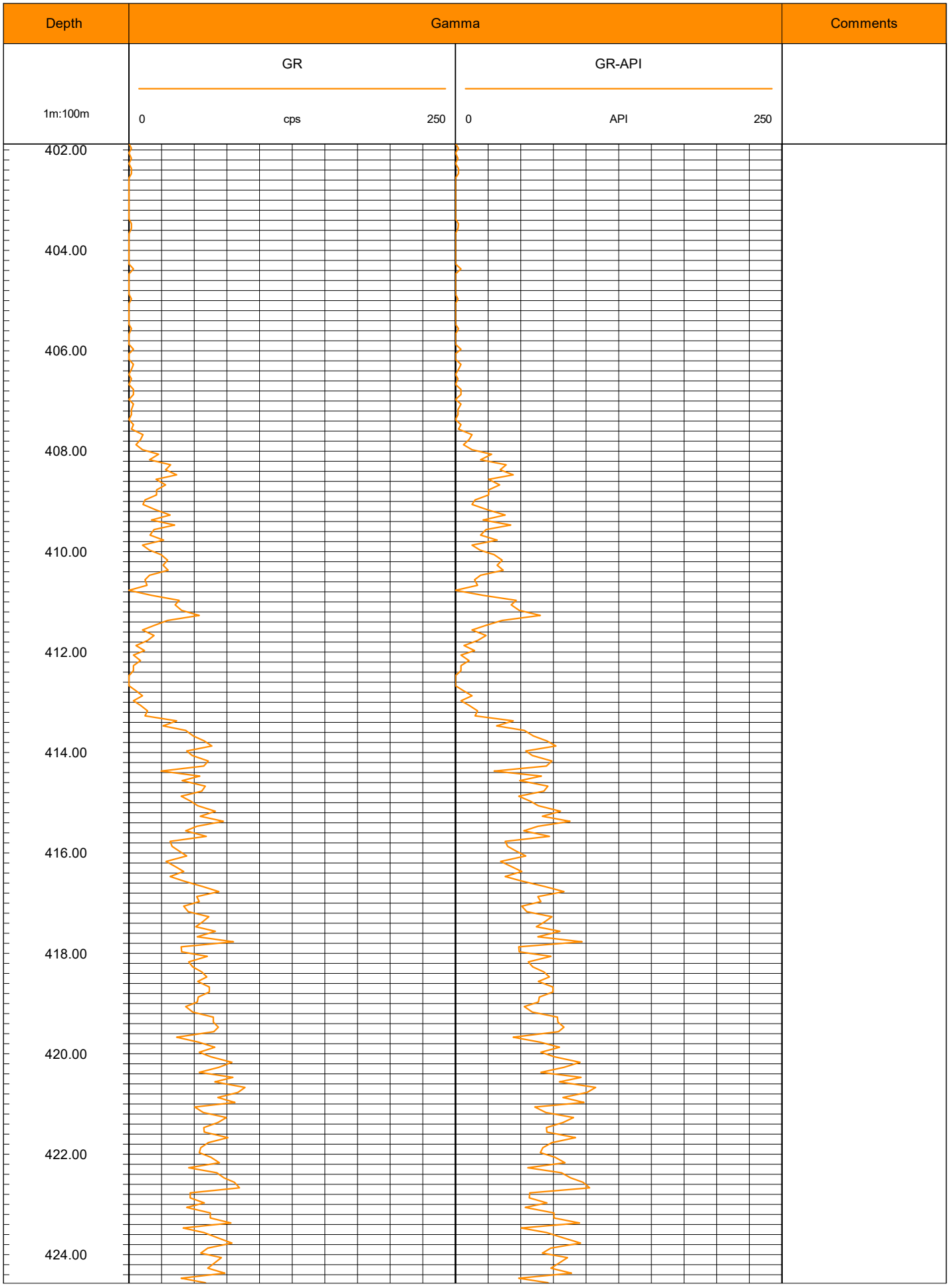
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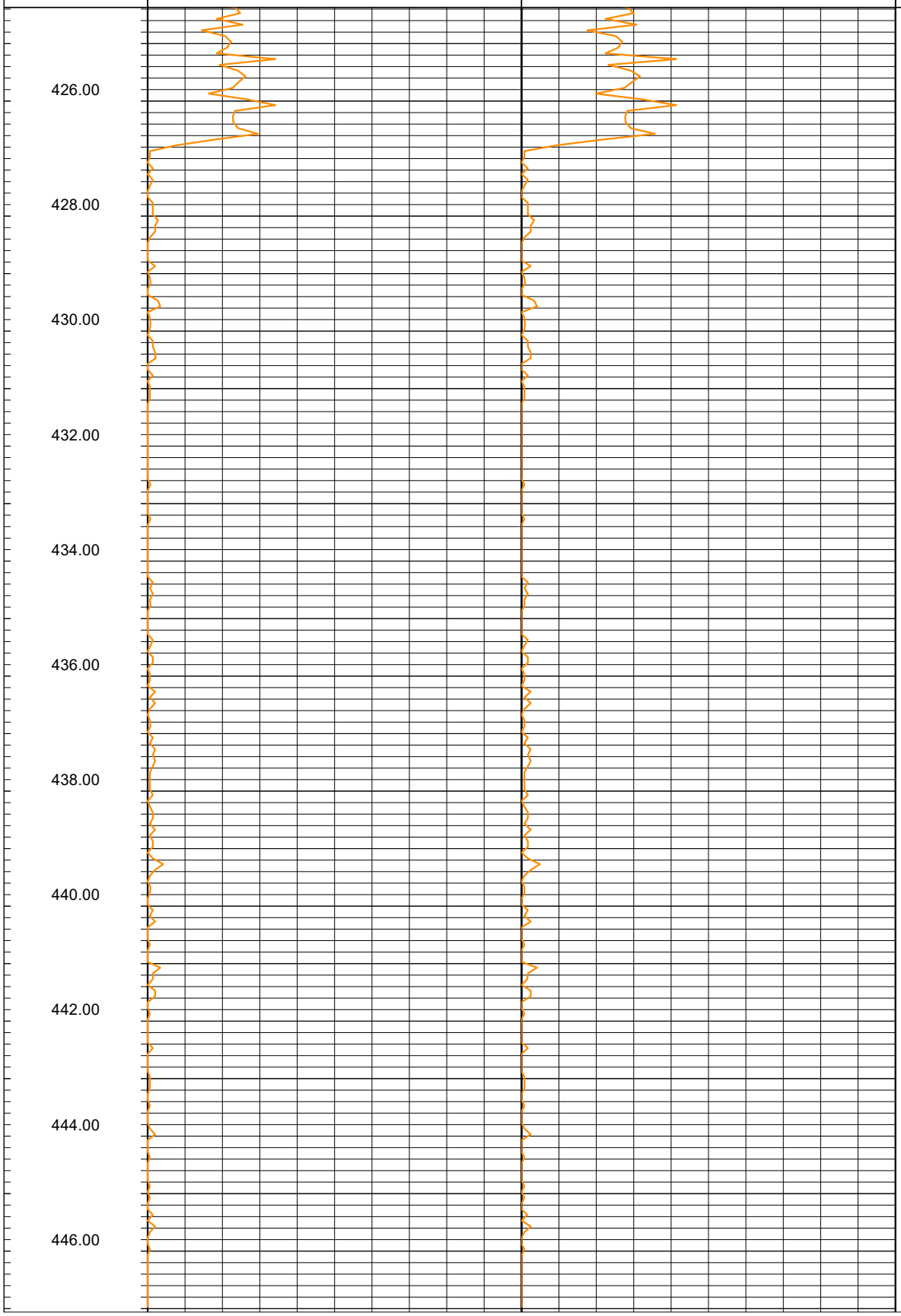

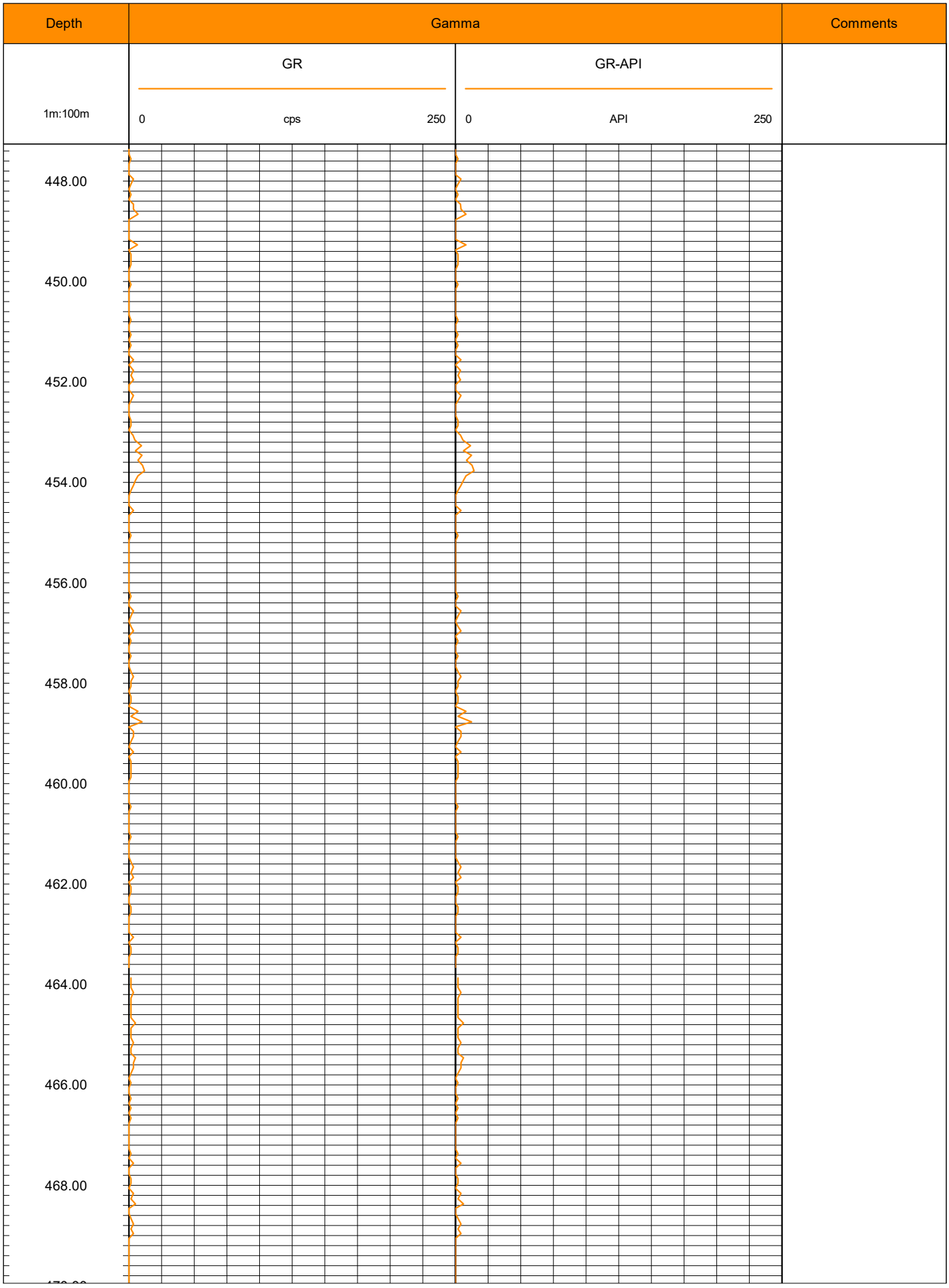
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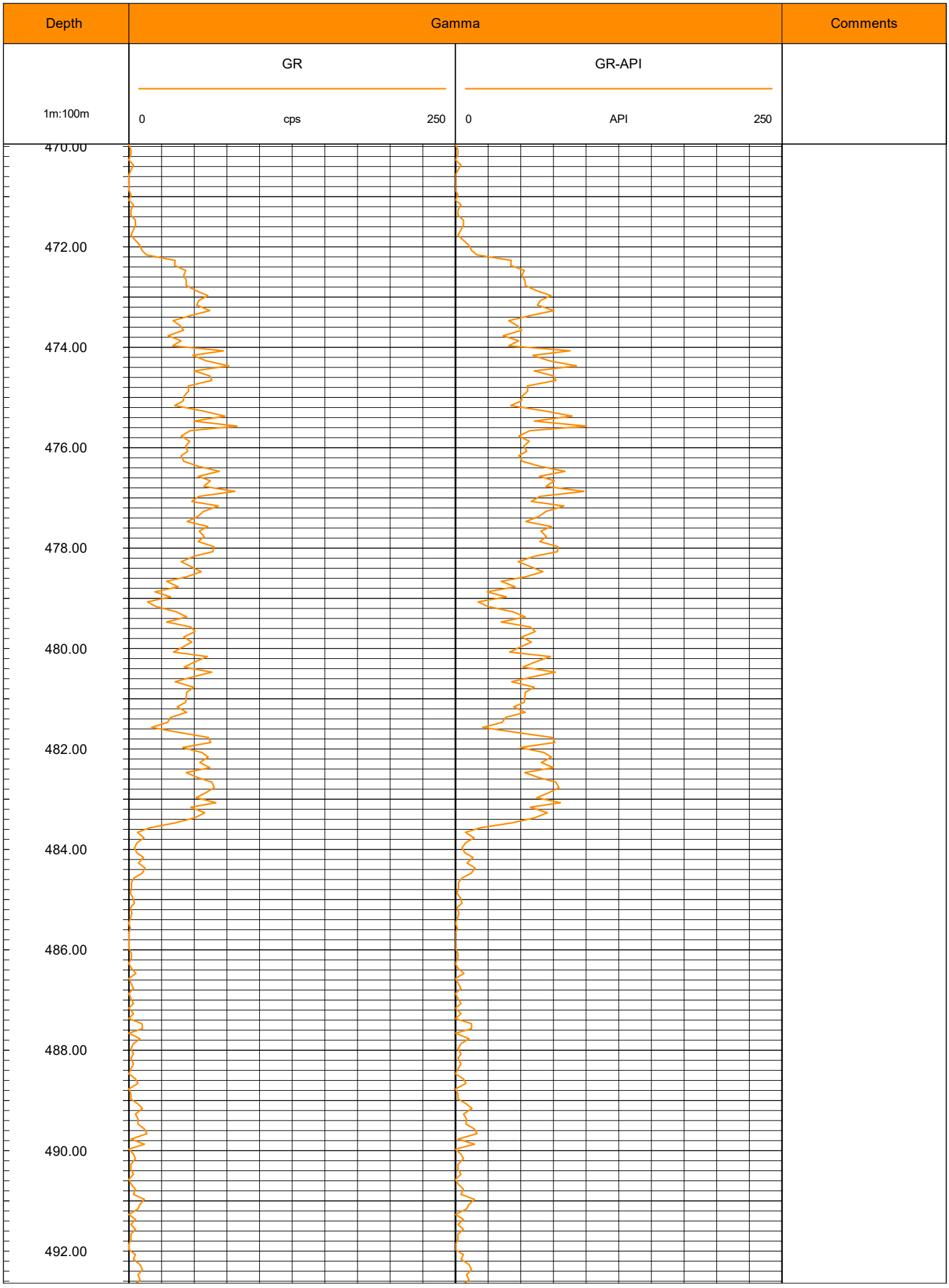
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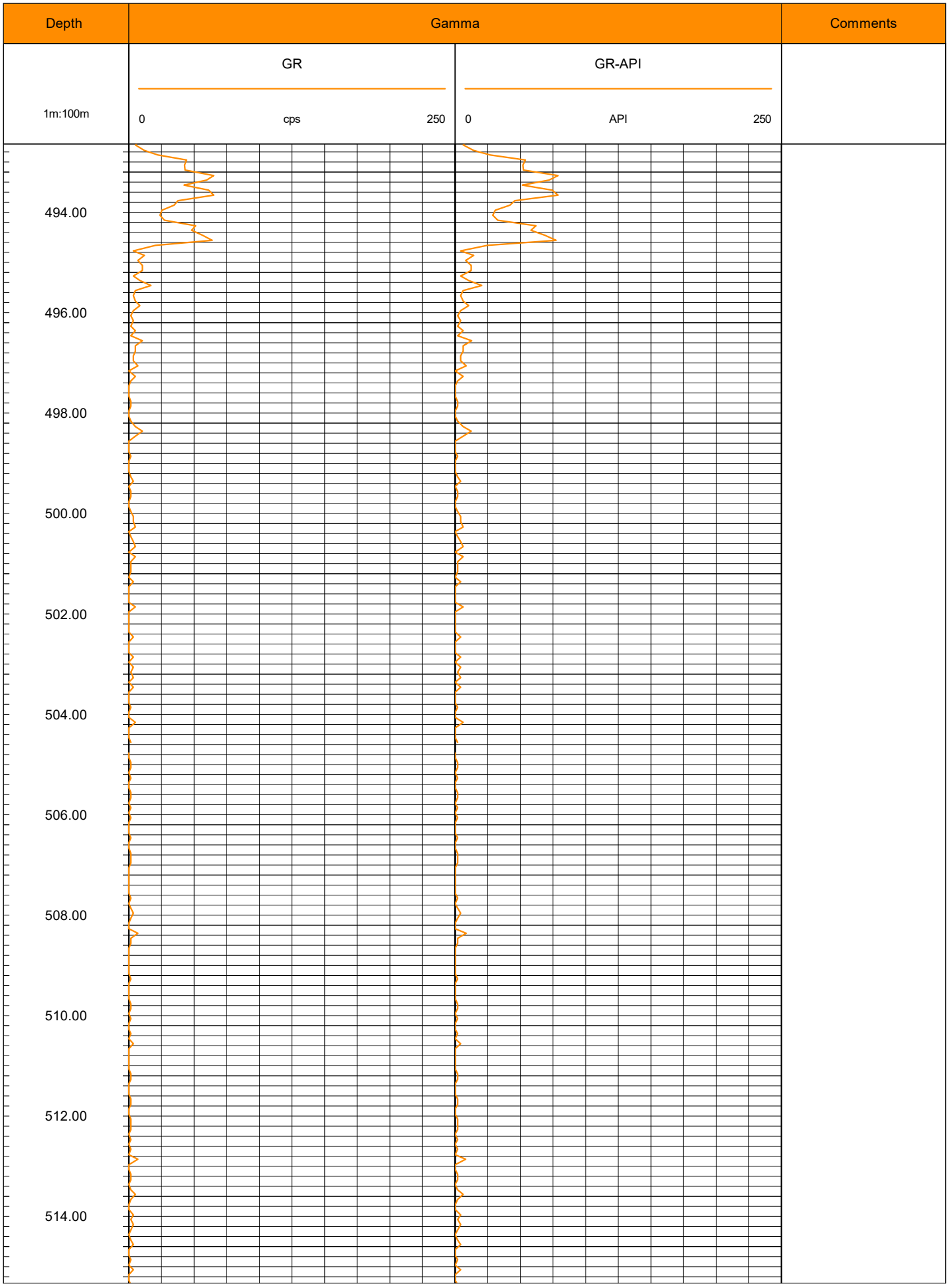
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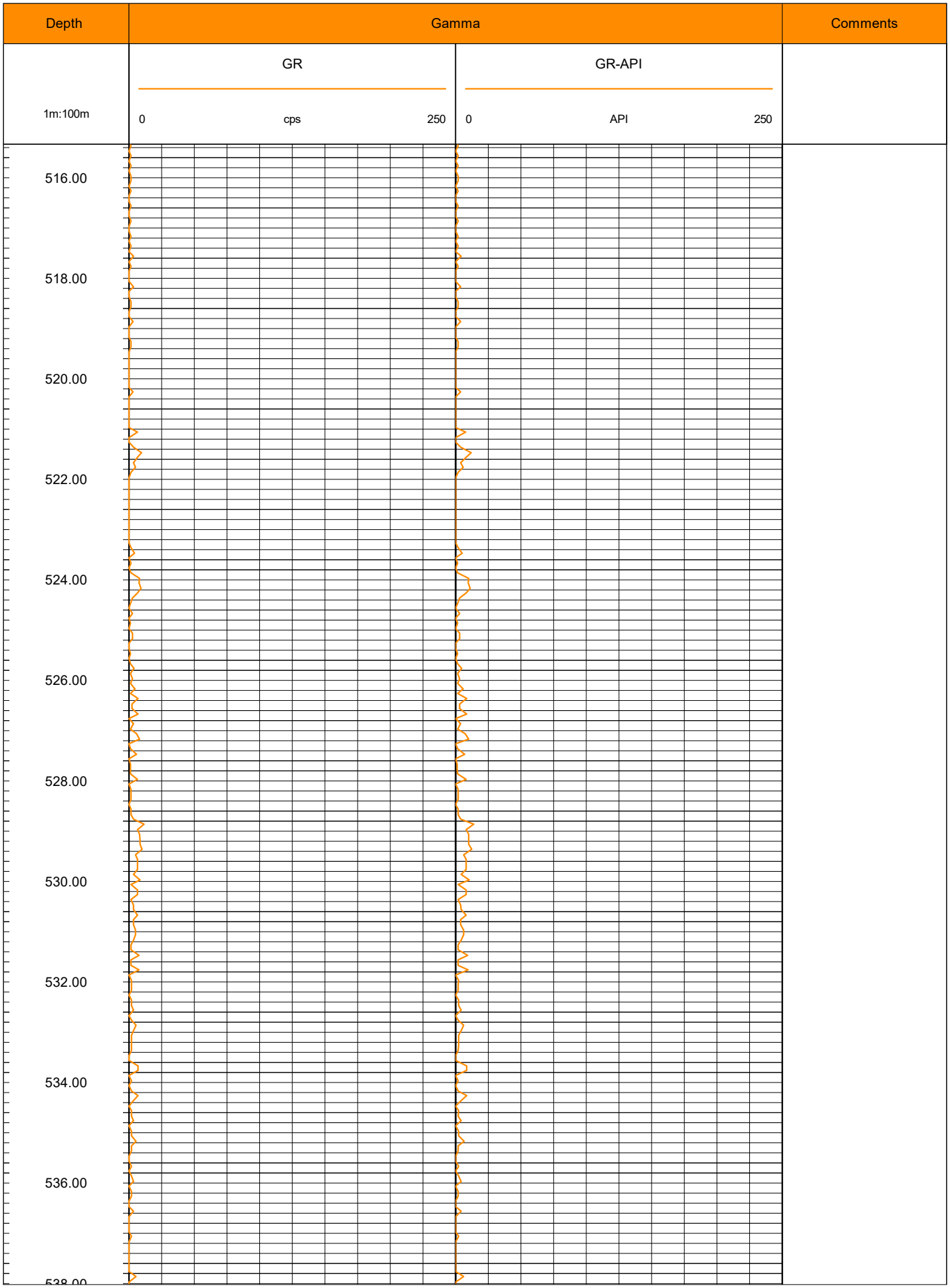
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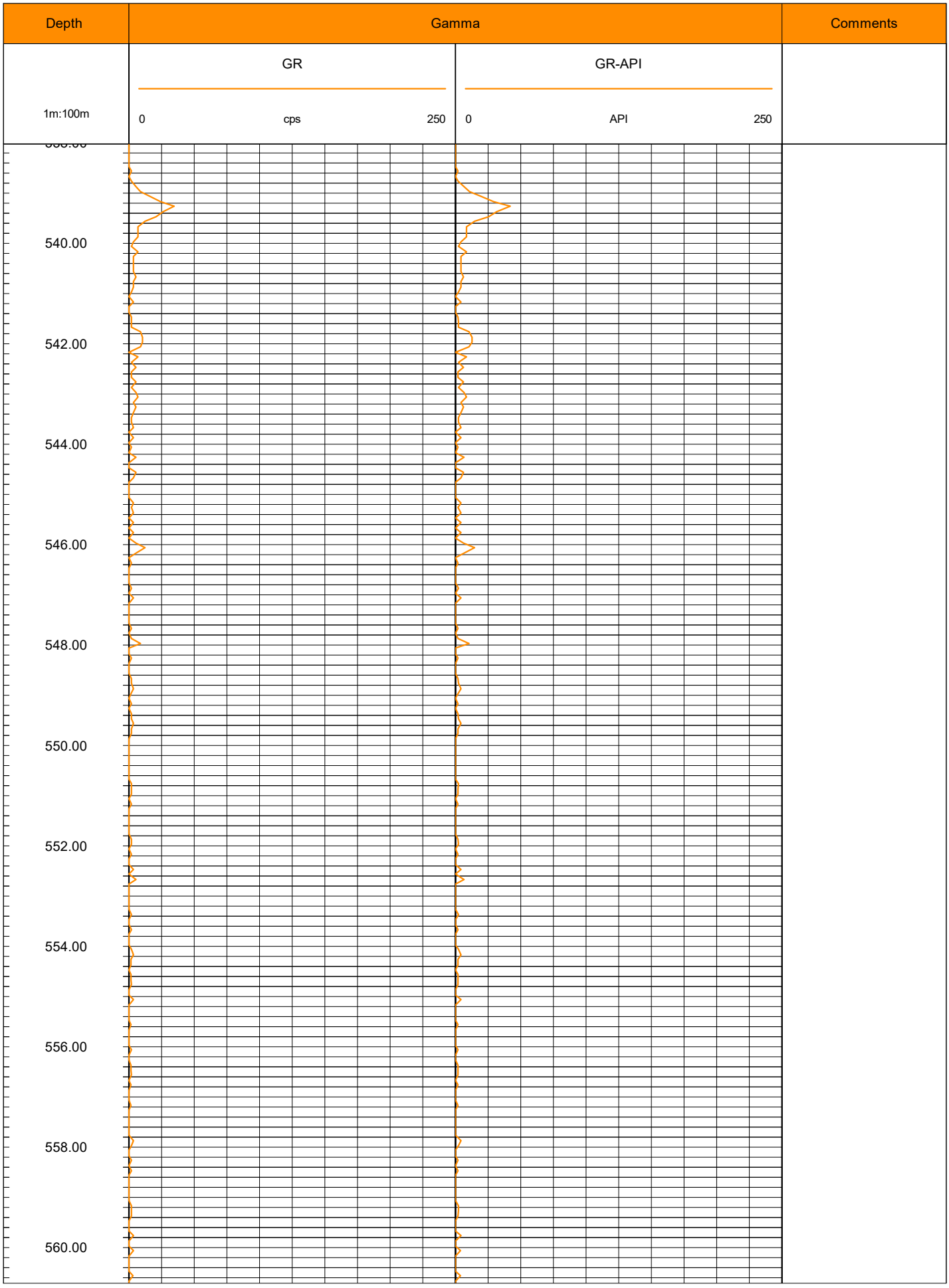
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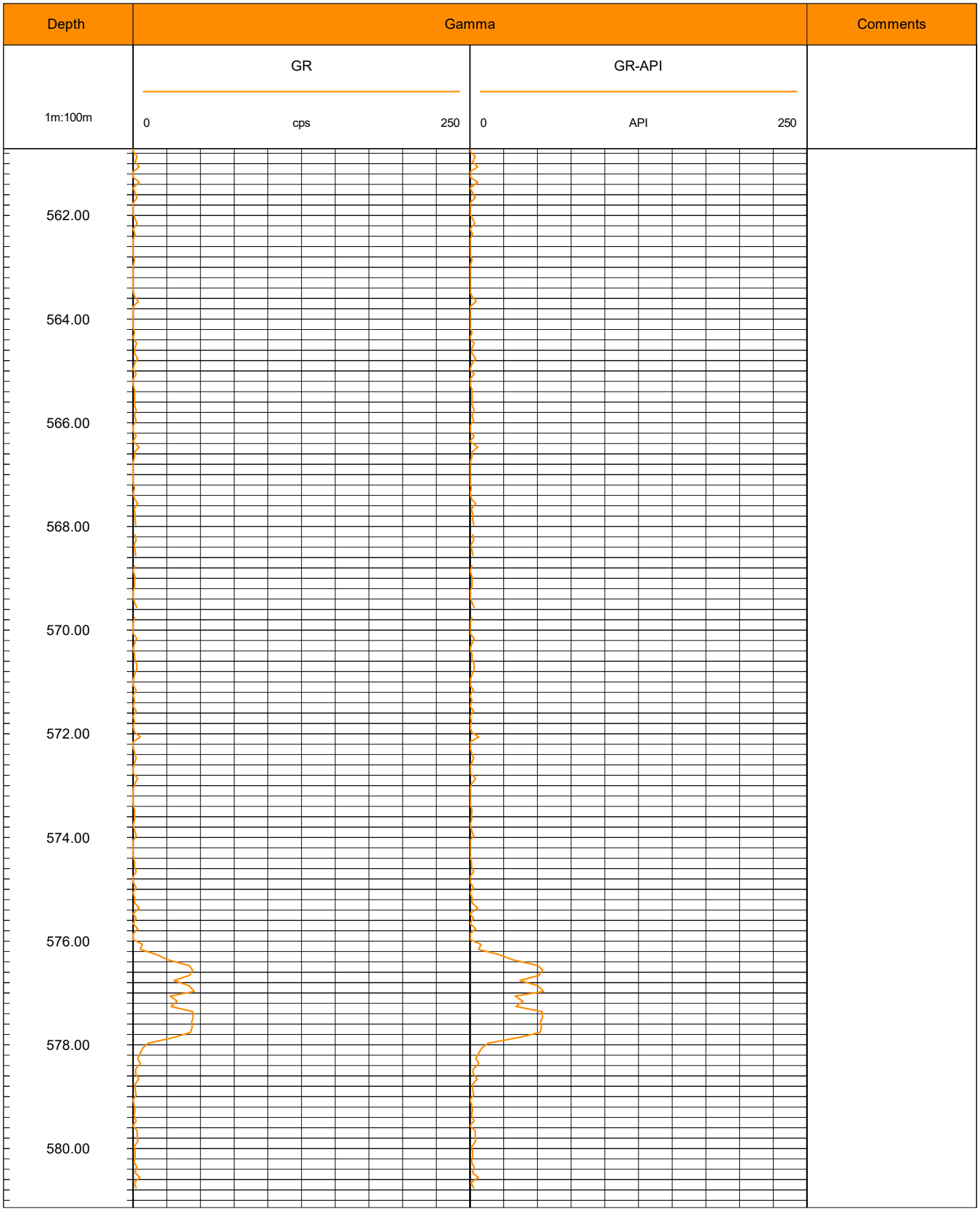
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APPENDIX C – ROCK MASS SUMMARY

GREAT ATLANTIC SALT PROJECT - GEOTECHNICAL DATA COLLECTION

PROJECT: **Great Atlantic Salt Project - Geotechnical Data Collection**
DATE: 15-Feb-23
PROJECT No: 22-005-H
SUBJECT: ROCK MASS ANALYSIS - GREAT ATLANTIC SALT PROJECT - PAGE 1 of 4
Prepared by: Joshua Taningco, E.I.T.
Checked by: T. Gilman M. Sc., P. Geo., P. Eng.

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Figure C1 - Collar Location - 2022 Geotechnical Drilling

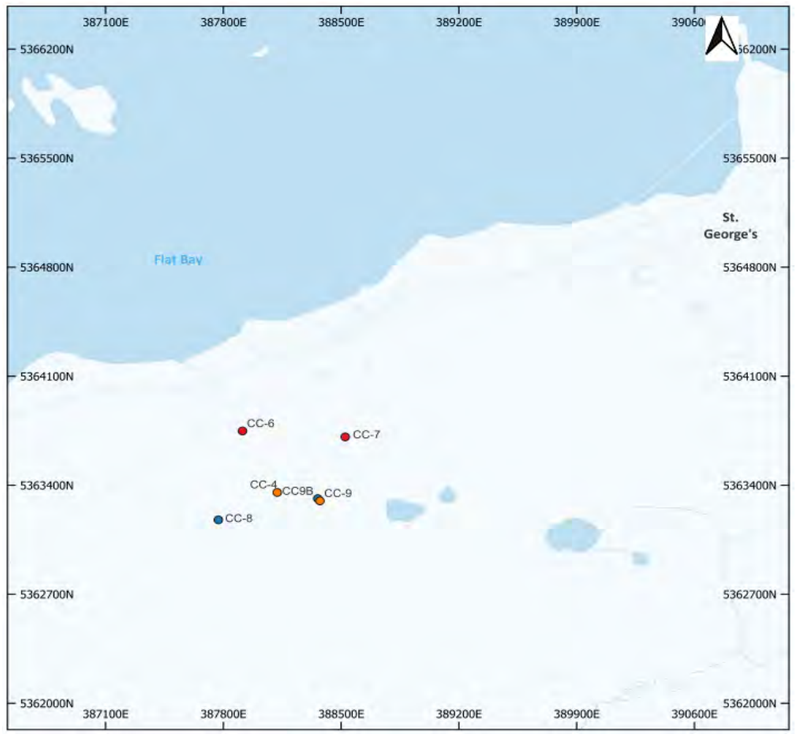

Table C1 - Terrane 2022 Geotechnical Drillholes

Drill Hole ID	Easting[1]	Northing[1]	Elevation (m)	Azimuth (°)	Dip (°)	Logged From (m)	Logged To (m)
CC-22-04	388120.8	5363353.0	47.4	N/A	-90	9.0	186.0
CC-22-06	387914.1	5363747.8	24.9	N/A	-90	24.0	296.0
CC-22-07	388525.0	5363709.5	38.1	N/A	-90	14.4	374.0
CC-22-08	387770.4	5363177.0	54.7	N/A	-90	34.8	257.0
CC-22-09	388374.8	5363298.8	47.5	N/A	-90	28.8	160.2
CC-22-09 B	388361.3[2]	5363312.4[2]	47.5[3]	N/A	-90	37.2	580.0

Notes:
1. NAD83 UTM Zone 21 North
2. Converted from NAD27 UTM Zone 21 North (Easting: 388303, Northing: 5363095).
3. The elevation is an estimate provided by Atlas Salt.

GREAT ATLANTIC SALT PROJECT - GEOTECHNICAL DATA COLLECTION

PROJECT: **Great Atlantic Salt Project - Geotechnical Data Collection**
DATE: 15-Feb-23
PROJECT No: 22-005-H
SUBJECT: ROCK MASS ANALYSIS - GREAT ATLANTIC SALT PROJECT - PAGE 2 of 4
Prepared by: Joshua Taningco, E.I.T.
Checked by: T. Gilman M. Sc., P. Geo., P. Eng.

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Figure C2 : CC-22-04 - RMR_{76} , RQD% and Q' vs. Downhole Depth

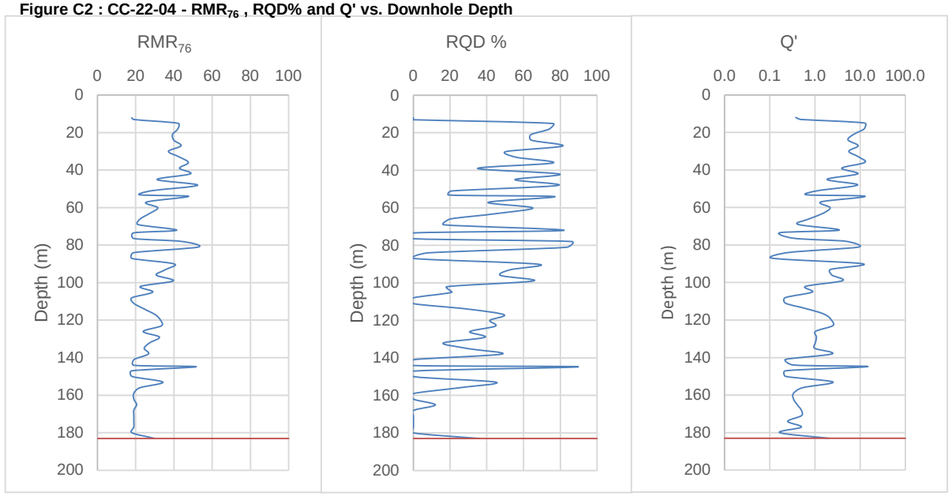


Figure C3 : CC-22-07 - RMR_{76} , RQD% and Q' vs. Downhole Depth

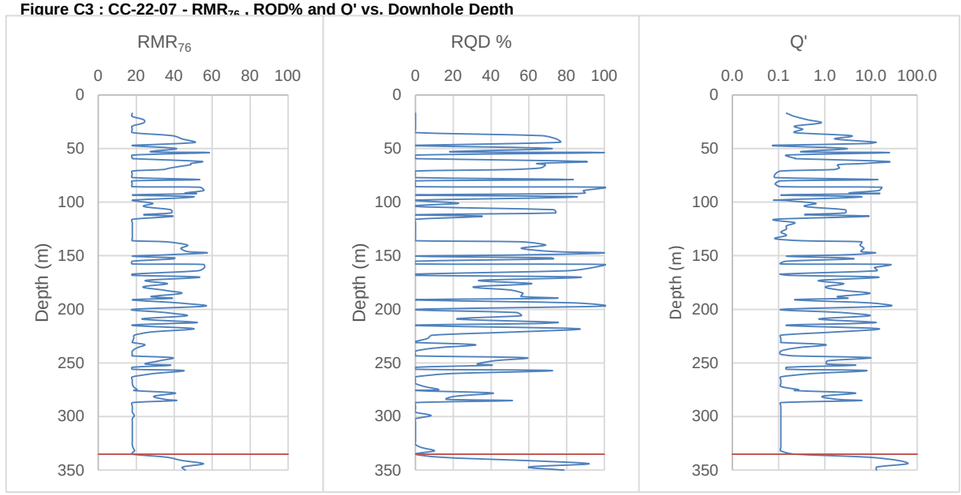


Figure C4 : CC-22-06 - RMR_{76} , RQD% and Q' vs. Downhole Depth

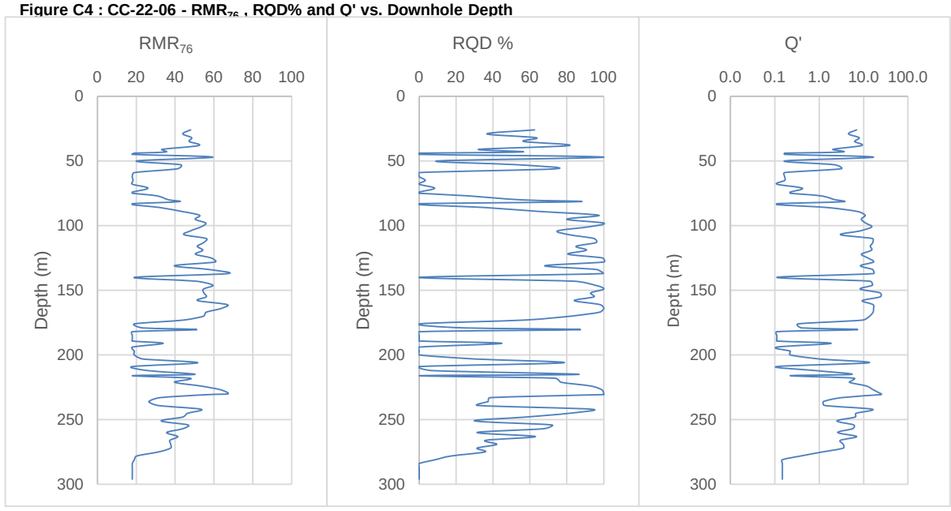
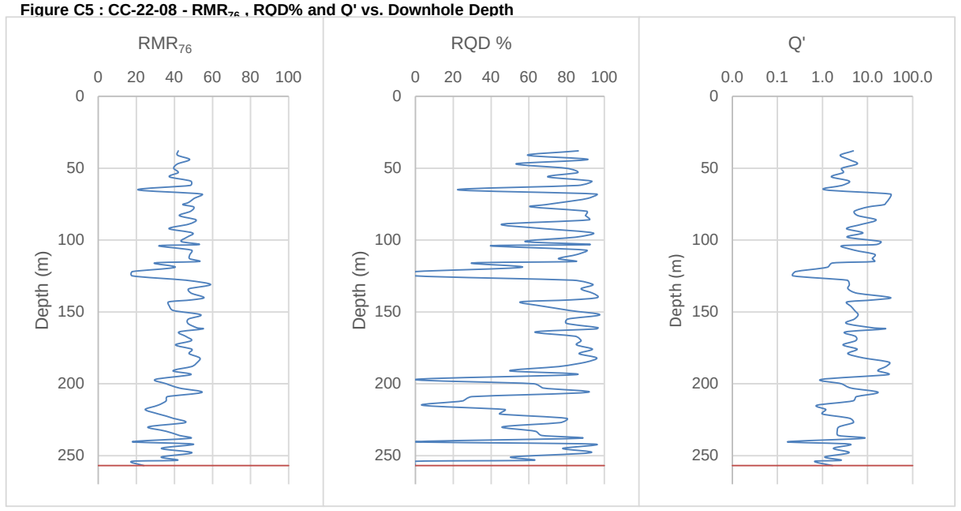


Figure C5 : CC-22-08 - RMR_{76} , RQD% and Q' vs. Downhole Depth



Notes: 1) Red line denotes start of halite zone.

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Figure C6 : CC-22-09 - RMR_{76} , RQD% and Q' vs. Downhole Depth

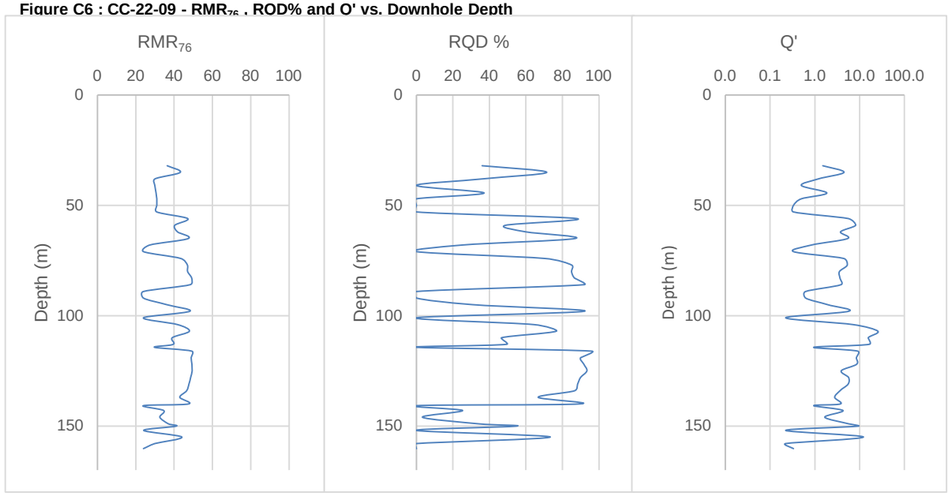
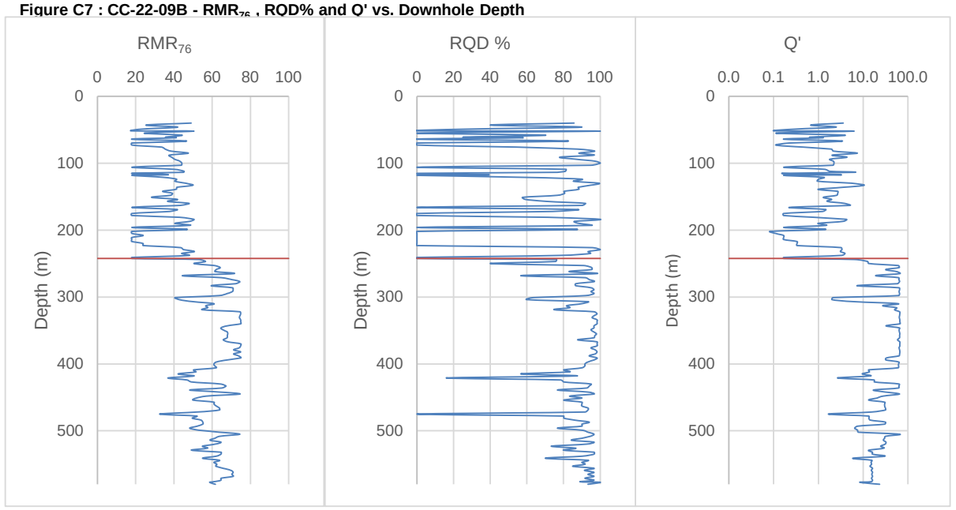


Figure C7 : CC-22-09B - RMR_{76} , RQD% and Q' vs. Downhole Depth



Notes: 1) Red line denotes start of halite zone.

GREAT ATLANTIC SALT PROJECT - GEOTECHNICAL DATA COLLECTION

PROJECT: **Great Atlantic Salt Project - Geotechnical Data Collection**
DATE: 15-Feb-23
PROJECT No: 22-005-H
SUBJECT: ROCK MASS ANALYSIS - GREAT ATLANTIC SALT PROJECT - PAGE 4 of 4
Prepared by: Joshua Taningco, E.I.T.
Checked by: T. Gilman M. Sc., P. Geo., P. Eng.

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Table C2 - Rock Mass Summary by Area - RMR_{76}

Area	RMR_{76}			
	Min	Average	Max	S.Dev[1.]
Red Beds	18	35	67	13
Salt	32	61	75	10

Table C3 - Rock Mass Summary by Area - Q'

Area	Q'		
	Min	GeoMean[2.]	Max
Red Beds	0.1	1.5	32.1
Salt	1.7	27.0	65.6

Table C4 - RQD% Summary by Area

Area	RQD (%[3.])			
	Min	Average	Max	S.Dev[1.]
Red Beds	0	46	100	38
Salt	0	87	90	16

Table C5 - Intact Rock Strength Summary by Area

Area	Intact Rock Strength (%[3.])						
	R0	R1	R2	R3	R4	R5	R6
Red Beds	28%	33%	17%	15%	6%	1%	0%
Salt	0%	0%	7%	93%	0%	0%	0%

Table C6 - Joint Alteration Number Summary by Area

Area	Joint Alteration Number (%[3.])									
	1	2	3	4	6	8	10	12	15	20
Red Beds	0%	5%	20%	3%	6%	19%	17%	<1%	16%	15%
Salt	50%	27%	5%	15%	0%	<1%	3%	0%	0%	0%

Table C7 - Dominate Joint Spacing Summary by Area

Area	Joint Spacing RMR_{76}			
	Min	Average	Max	S.Dev[1.]
Red Beds	5	7	21	2
Salt	6	12	21	5

Table C8 - Joint Condition Summary by Area

Area	Joint Condition (%[3.])				
	JC1	JC2	JC3	JC4	JC5
Red Beds	0%	1%	38%	26%	35%
Salt	0%	0%	74%	24%	2%

Table C9 - Joint Set Number Summary by Area

Area	Joint Set Number (%[3.])					
	2	3	4	6	9	12
Red Beds	1%	5%	13%	55%	20%	5%
Salt	0%	71%	<1%	29%	0%	0%

Table C10 - Joint Roughness Number by Area

Area	Joint Roughness Number (%[3.])			
	1	1.5	2	3
Red Beds	<1%	8%	74%	18%
Salt	0%	<1%	99%	0%

Notes: 1. S.Dev = Standard Deviation.
2. GeoMean = The geometric mean of logarithmic values.
3. Reported to the nearest percent.

APPENDIX C

Packer Test Results

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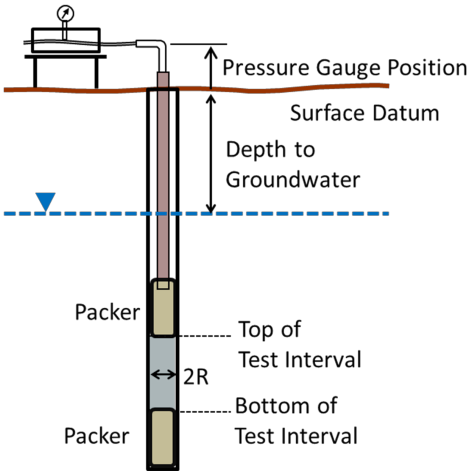
Lugeon Test Analysis Report

Project: Great Atlantic Salt Project

Number: 101556.001

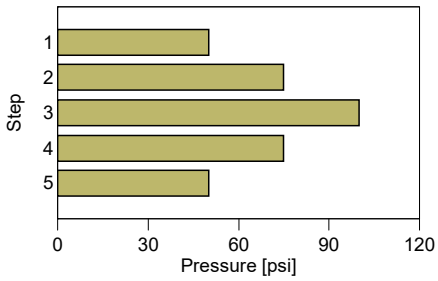
Client: Atlas Salt

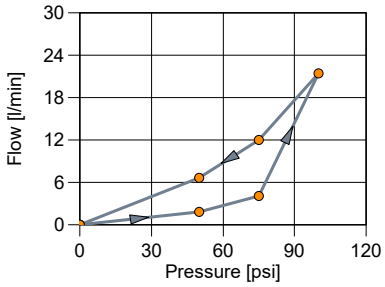
Location: St. George's, NL	Lugeon Test: PT-2	Tested bore: CC-22-6
Test Conducted by: Terrane Geosciences Inc.		Test Date: 2022-04-05
Analysis Performed by: C. Pearce		Analysis Date: 2022-04-25
Lithology: Conglomerate		

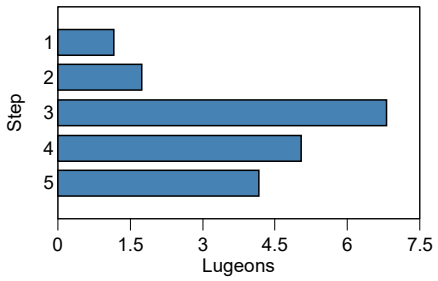


Top of Test Interval: 99.3 m
Bottom of Test Interval: 103.8 m
Length of Test Interval: 4.5 m
Gauge Position: 1.12 m
Depth to Groundwater: 0.00 m
Radius of Test Section: 0.05 m

Step	Pressure [psi]	Flow Meter Readings [l]										Average Flow Rate [l/min]	Hydraulic Conductivity		
		1	2	3	4	5	6	7	8	9	10		[m/s]	[m/d]	Lugeon
1	50	6.45	8.49	10.47	12.43	14.26	16.06	17.90	19.70	21.37	23.14	1.85	1.36×10^{-7}	0.01	1.2
2	75	29.50	33.71	37.63	41.60	45.46	49.20	52.83	56.60	61.37	66.56	4.12	2.03×10^{-7}	0.02	1.7
3	100	191.80	212.90	232.90	253.15	274.40	296.10	318.00	340.10	362.40	384.80	21.44	7.96×10^{-7}	0.07	6.8
4	75	433.50	444.85	456.40	468.50	480.90	492.78	504.35	516.30	528.75	541.40	11.99	5.91×10^{-7}	0.05	5.0
5	50	599.74	606.37	612.97	619.62	626.24	632.89	639.65	646.39	653.08	659.80	6.67	4.88×10^{-7}	0.04	4.2







Performed using a straddle double packer test assembly to isolate test interval.

No leaks were detected during packer inflation or testing. Flowing artesian conditions. Static water level not determined, estimated 0 m below ground surface for purposes of analysis.

A large amount of drill cuttings/drilling mud and formational fines were present in the hole that could not be fully flushed prior to testing.

Hydraulic conductivity value for test interval derived based on flow classification: Dilation (Step 1) - **K = 1.36E-7 m/s**.

While a decrease in K values over the duration of the test (related to clogging) was not observed, this K value should be regarded with caution.

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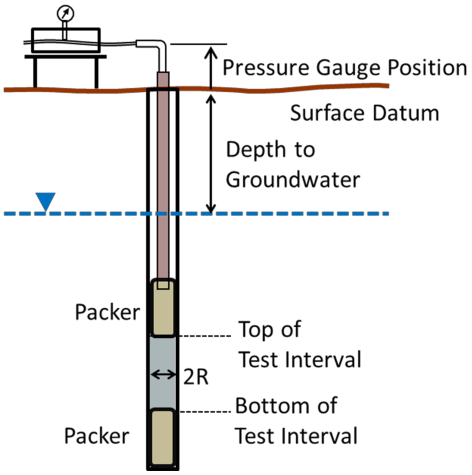
Lugeon Test Analysis Report

Project: Great Atlantic Salt Project

Number: 101556.001

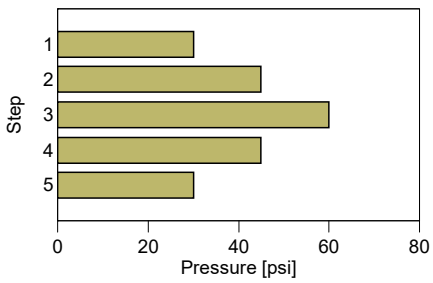
Client: Atlas Salt

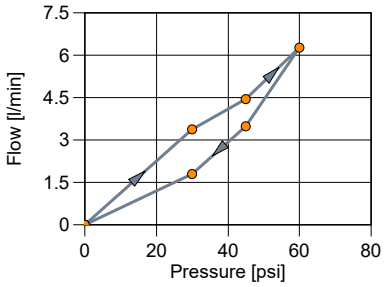
Location: St. George's, NL	Lugeon Test: PT-3	Tested bore: CC-22-6
Test Conducted by: Terrane Geosciences Inc.		Test Date: 2022-04-07
Analysis Performed by: C. Pearce		Analysis Date: 2022-04-25
Lithology: Interbedded Sandstone/Conglomerate; several rubble zones throughout		

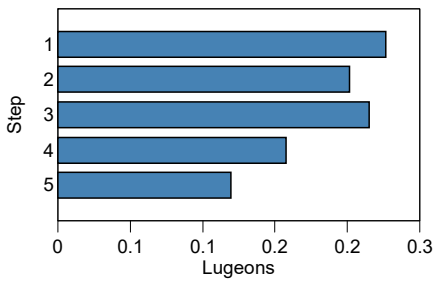


Top of Test Interval: 111.3 m
Bottom of Test Interval: 168.5 m
Length of Test Interval: 57.2 m
Gauge Position: 1.12 m
Depth to Groundwater: 0.00 m
Radius of Test Section: 0.05 m

Step	Pressure [psi]	Flow Meter Readings [l]										Average Flow Rate [l/min]	Hydraulic Conductivity		
		1	2	3	4	5	6	7	8	9	10		[m/s]	[m/d]	Lugeon
1	30	742.00	746.05	749.70	753.25	756.67	760.00	763.23	766.40	769.47	772.49	3.39	4.98×10^{-8}	0.004	0.3
2	45	785.99	791.81	795.56	799.93	804.31	808.70	813.00	817.24	821.00	825.99	4.44	4.43×10^{-8}	0.004	0.2
3	60	849.69	856.37	863.08	869.45	875.80	882.01	888.17	894.20	900.15	906.07	6.26	4.72×10^{-8}	0.004	0.3
4	45	916.00	919.61	923.18	926.77	930.34	933.82	937.21	940.56	943.91	947.24	3.47	3.46×10^{-8}	0.003	0.2
5	30	952.90	954.67	956.46	958.26	960.04	961.84	963.60	965.38	967.17	968.97	1.79	2.63×10^{-8}	0.002	0.1







Performed using a single packer test assembly as the borehole was advanced. Note the drilled bottom of the hole was 296 m at the time of testing but the hole had experienced significant caving/collapse and was obstructed below a depth of 168.5 m. This obstruction depth was used as the bottom of the test interval for analysis.

No leaks were detected during packer inflation or testing. Flowing artesian conditions. Static water level not determined, estimated 0 m below ground surface for purposes of analysis.

Although the pressure-flow step profile suggests a Void Filling classification, the test interval was below the water table and assumed to have been fully saturated prior to testing. The observed decrease in hydraulic conductivity (K) over the duration of the test is inferred to be due to the large amount of drill cuttings/drilling mud and formational fines that could not be fully flushed prior to testing and may have clogged fractures and intergranular flow paths within the test section.

The K value determined for Step 1 is considered to be most representative K value for the test interval – **K = 4.98E-8 m/s**.

This K estimate should be regarded with caution given the potential for clogging and the uncertainty of the depth to the bottom of the test interval.

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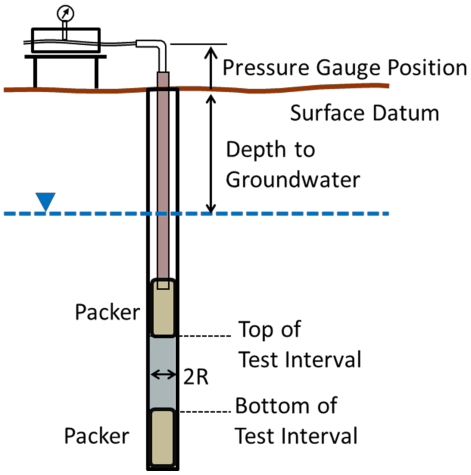
Lugeon Test Analysis Report

Project: Great Atlantic Salt Project

Number: 101556.001

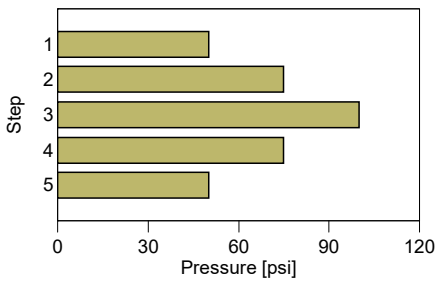
Client: Atlas Salt

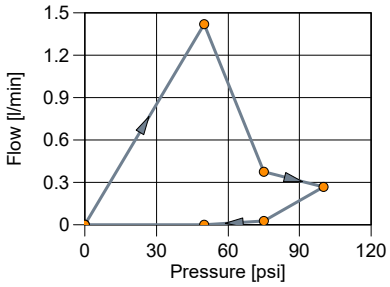
Location: St. George's, NL	Lugeon Test: PT-1	Tested bore: CC-22-6
Test Conducted by: Terrane Geosciences Inc.		Test Date: 2022-04-04
Analysis Performed by: C. Pearce		Analysis Date: 2022-04-25
Lithology: Sandstone/Sandstone with Mudstone interbeds; disintegrated crushed rock/clay from 272 - 275 m		

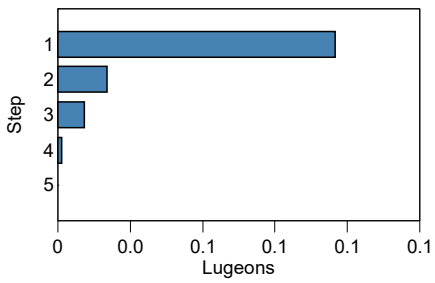


Top of Test Interval: 261.3 m
Bottom of Test Interval: 296.0 m
Length of Test Interval: 34.7 m
Gauge Position: 1.12 m
Depth to Groundwater: 0.00 m
Radius of Test Section: 0.05 m

Step	Pressure [psi]	Flow Meter Readings [l]										Average Flow Rate [l/min]	Hydraulic Conductivity		
		1	2	3	4	5	6	7	8	9	10		[m/s]	[m/d]	Lugeon
1	50	764.87	767.05	768.97	770.71	772.25	773.60	774.80	775.86	776.81	777.65	1.42	1.96×10^{-8}	0.00169	0.115
2	75	783.49	784.02	784.49	784.93	785.32	785.69	786.03	786.33	786.61	786.87	0.38	3.49×10^{-9}	0.00030	0.020
3	100	787.35	787.74	788.02	788.22	788.43	788.68					0.27	1.86×10^{-9}	0.00016	0.011
4	75	789.17	789.19	789.23	789.26	789.30	789.31	789.35	789.37	789.40	789.43	0.03	2.68×10^{-10}	0.00002	0.002
5	50	789.38	789.38	789.38	789.38	789.38						0.00	0.00×10^{-1}	0.00000	0.000







Performed using a single packer test assembly as the borehole was advanced, with the bottom of the test interval bounded by the bottom of the drilled section of the borehole.

No leaks were detected during packer inflation or testing. Flowing artesian conditions. Static water level not determined, estimated 0 m below ground surface for purposes of analysis.

Although the pressure-flow step profile suggests a Void Filling classification, the test interval was below the water table and assumed to have been fully saturated prior to testing. The observed decrease in hydraulic conductivity (K) over the duration of the test is inferred to be due to the large amount of drill cuttings/drilling mud and formational fines that could not be fully flushed prior to testing and may have clogged fractures and intergranular flow paths within the test section.

The K value determined for Step 1 is considered to be most representative K value for the test interval – **K = 1.96E-8 m/s**.

This K estimate should be regarded with caution given the potential for clogging.

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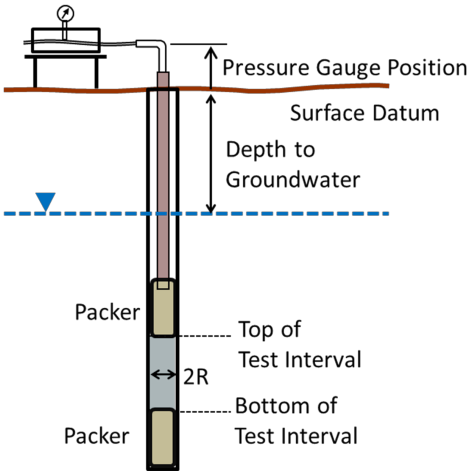
Lugeon Test Analysis Report

Project: Great Atlantic Salt Project

Number: 101556.001

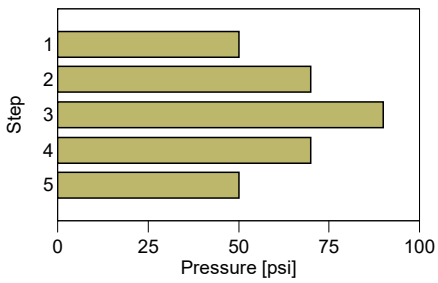
Client: Atlas Salt

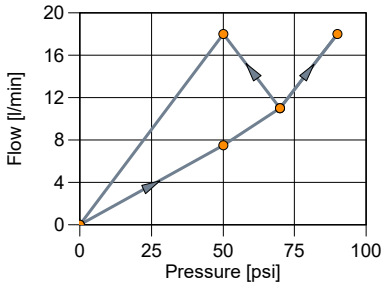
Location: St. George's, NL	Lugeon Test: PT-1	Tested bore: CC-22-7
Test Conducted by: Terrane Geosciences Inc.		Test Date: 2022-02-12
Analysis Performed by: C. Pearce		Analysis Date: 2022-04-25
Lithology: Sandstone; Conglomerate over lower 1 m of interval		

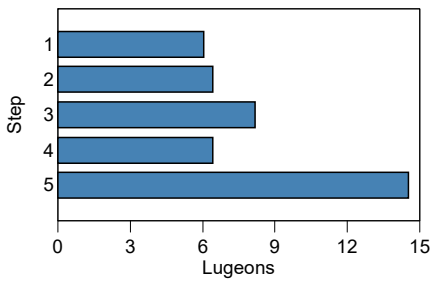


Top of Test Interval: 87.3 m
Bottom of Test Interval: 90.8 m
Length of Test Interval: 3.5 m
Gauge Position: 0.90 m
Depth to Groundwater: 0.00 m
Radius of Test Section: 0.05 m

Step	Pressure [psi]	Flow Meter Readings [l]										Average Flow Rate [l/min]	Hydraulic Conductivity		
		1	2	3	4	5	6	7	8	9	10		[m/s]	[m/d]	Lugeon
1	50	302.5	310.1	317.6	325.0	332.5	339.9	347.3	354.8	362.3	369.8	7.5	6.68×10^{-7}	5.77×10^{-2}	6.0
2	70	405.7	416.8	427.7	438.8	449.7	460.7	471.6	482.7	493.8	505.0	11.0	7.09×10^{-7}	6.12×10^{-2}	6.4
3	90	619.6	637.1	654.7	672.5	690.3	708.7	726.4	744.6	763.0	781.5	18.0	9.03×10^{-7}	7.80×10^{-2}	8.2
4	70	405.7	416.8	427.7	438.8	449.7	460.7	471.6	482.7	493.8	505.0	11.0	7.09×10^{-7}	6.12×10^{-2}	6.4
5	50	619.6	637.1	654.7	672.5	690.3	708.7	726.4	744.6	763.0	781.5	18.0	1.61×10^{-6}	1.39×10^{-1}	14.5







Performed using a straddle double packer test assembly to isolate test interval.

No leaks were detected during packer inflation or testing. Flowing artesian conditions. Static water level not determined, estimated 0 m below ground surface for purposes of analysis.

A large amount of drill cuttings/drilling mud and formational fines were present in the hole that could not be fully flushed prior to testing.

Hydraulic conductivity (K) value determined for Step 5 considered spurious. The arithmetic mean (average) of the K values determined for steps 1, 2, 3, and 4 used to calculate the representative K value for the test interval **K = 7.47E-7 m/s**.

While a decrease in K values over the duration of the test (related to clogging) was not observed, this K value should be regarded with caution.

GEMTEC
CONSULTING ENGINEERS AND SCIENTISTS

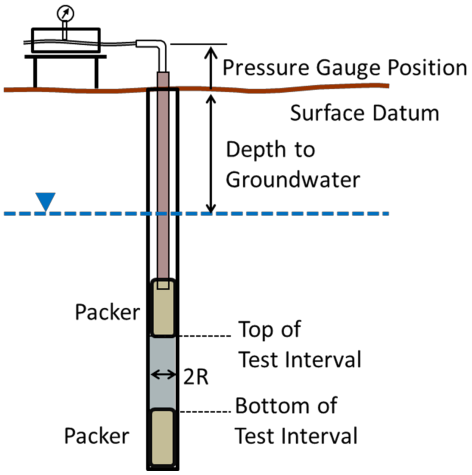
Lugeon Test Analysis Report

Project: Great Atlantic Salt Project

Number: 101556.001

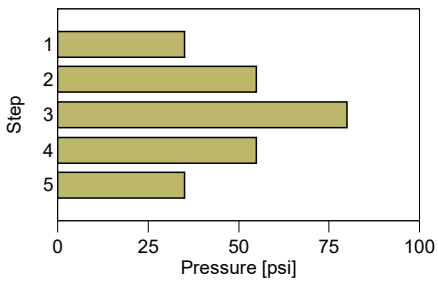
Client: Atlas Salt

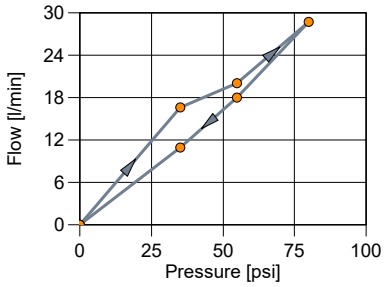
Location: St. George's, NL	Lugeon Test: PT-2	Tested bore: CC-22-7
Test Conducted by: Terrane Geosciences Inc.		Test Date: 2022-02-13
Analysis Performed by: C. Pearce		Analysis Date: 2022-04-25
Lithology: Fine to coarse-grained Sandstone		

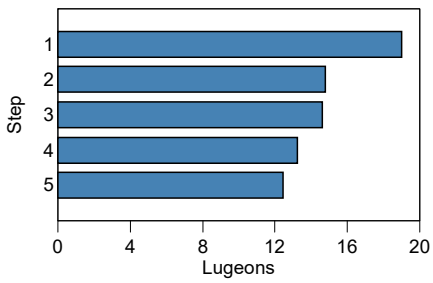


Top of Test Interval: 141.3 m
Bottom of Test Interval: 144.8 m
Length of Test Interval: 3.5 m
Gauge Position: 0.90 m
Depth to Groundwater: 0.00 m
Radius of Test Section: 0.05 m

Step	Pressure [psi]	Flow Meter Readings [l]										Average Flow Rate [l/min]	Hydraulic Conductivity		
		1	2	3	4	5	6	7	8	9	10		[m/s]	[m/d]	Lugeon
1	35	306.2	322.4	338.6	355.0	371.9	388.7	405.5	422.3	439.1	455.9	16.6	2.10×10^{-6}	0.18	19.0
2	55	521.8	542.6	563.6	584.6	605.0	624.5	643.8	663.4	683.0	702.5	20.1	1.63×10^{-6}	0.14	14.8
3	80	966.1	994.1	1022.2	1050.5	1078.8	1107.5	1136.4	1165.5	1194.9	1224.4	28.7	1.62×10^{-6}	0.14	14.6
4	55	326.8	344.6	362.5	380.7	398.6	416.6	434.5	452.6			18.0	1.46×10^{-6}	0.13	13.2
5	35	508.7	519.6	530.4	541.3	552.2	563.2	574.2	585.0	595.8	606.6	10.9	1.37×10^{-6}	0.12	12.4







Performed using a straddle double packer test assembly to isolate test interval.

No leaks were detected during packer inflation or testing. Flowing artesian conditions. Static water level not determined, estimated 0 m below ground surface for purposes of analysis.

Although the pressure-flow step profile suggests a Void Filling classification, the test interval was below the water table and assumed to have been fully saturated prior to testing. The observed decrease in hydraulic conductivity (K) over the duration of the test is inferred to be due to the large amount of drill cuttings/drill muds and formational fines that could not be fully flushed prior to testing and may have clogged fractures and intergranular flow paths within the test section.

The K value determined for Step 1 is considered to be most representative K value for the test interval – **K = 2.10E-6 m/s**.

This K estimate should be regarded with caution given the potential for clogging.

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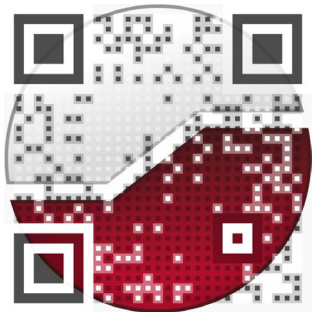

civil	civil
geotechnical	géotechnique
environmental	environnement
structural	structures
field services	surveillance de chantier
materials testing	service de laboratoire des matériaux

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