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Date: October 20, 2022
Our Ref: 30135605
Subject: Marinette High School Irrigation Well Profiling Results
Tyco Fire Technology Center, Marinette, WI
BRRTS# 02-38-580694

Dear Ms. Sellwood,

This letter describes work completed by Tyco Fire Products LP (Tyco) from May to August 2022 to evaluate the characteristics of the deep bedrock aquifer system through testing of two existing non-drinking, irrigation-only wells located on the grounds of Marinette High School, at 2135 Pierce Avenue in Marinette, Wisconsin. This work is a component of ongoing investigations associated with per- and poly-fluoroalkyl substances (PFAS) related to the Fire Technology Center (FTC) located at 2700 Industrial Parkway South in Marinette, Wisconsin (the Site). The location of the Site and irrigation wells (identified IRR-01 and IRR-02) are shown on **Figure 1**.

The irrigation wells were selected for evaluation because each is completed in the deep bedrock aquifer system that underlies eastern Marinette County. Tyco is evaluating this aquifer as an alternative drinking water supply for areas where PFAS is present in shallow groundwater. The initial testing completed at IRR-01 and IRR-02 included geophysical logging and groundwater sampling to help refine the current understanding of the bedrock, including the depths of aquitards and water-producing zones, and groundwater quality at different depths within the rock. Results of the sampling for naturally occurring constituents were previously reported in the *Potable Well Sampling Area Drinking Water Update*[1].

Tyco had previously collected samples for PFAS analysis from IRR-01 and IRR-02 in 2019. The results indicated that PFAS was not present in samples collected from either well (**Table 1**). When PFAS was detected in samples collected at IRR-02 in May 2022, Tyco undertook additional work to determine the source. The additional work, completed in August 2022, included packer testing and additional groundwater sampling.

The findings of the second phase of work, described in the body of this letter, show that the steel surface casing of IRR-02 is faulty, allowing a small amount of water from the shallow aquifer system to leak into the well. The volume of the shallow groundwater input is insignificant relative to the high quantities of water produced from the deep aquifer. Therefore, under normal operating conditions, PFAS concentrations in samples from the well may be low or below reporting levels; however, relatively higher concentrations may be detected after periods when the well is not being pumped. Note that downward flow from the shallow aquifer into deep bedrock is normally

[1] Arcadis 2022. PWSA Drinking Water Update. Tyco Fire Technology Center, 2700 Industrial Parkway South, Marinette, Wisconsin 54143. BRRTS# 02-38-580694. September 28, 2022.

prevented by an aquitard in shallow bedrock. The leakage of shallow groundwater into IRR-02 occurs only because of a flaw in the well construction that creates a pathway within the well for water to cross the aquitard.

A temporary packer has been installed in IRR-02 to prevent downward flow until the well can be repaired with a permanent liner pipe. After the liner is installed, Tyco will conduct additional tests to verify the repair, and then IRR-02 can be returned to service for irrigation.

The sections below describe how the specific tasks were completed and present the study results.

Existing Information

The two wells evaluated in this study are seasonal-use wells used by Marinette High School for irrigation of athletic fields. A well construction record exists for IRR-01. No records for IRR-02 have been found in Wisconsin state well databases. The table below summarizes the well construction details based on well records and the logging completed for this study.

Irrigation Well Construction Details

	IRR-01	IRR-02
Wisconsin Unique Well ID	GC744	Not listed
Year Installed	1994	Unknown
Well Use	Seasonal irrigation of baseball fields	Seasonal irrigation of football fields
Borehole/casing diameter*	6-inches	8-inches
Depth of surface casing*	44 feet below ground surface (bgs)	62 feet bgs
Total Depth*	415 feet bgs	584 feet bgs
Open borehole length*	371 feet	522 feet

* Information as determined by geophysical logging.

Each well is fitted with a permanent submersible pump that feeds directly into their respective irrigation systems. Neither well is used as a drinking water source. Based on available high-capacity well reports, irrigation typically is performed May through October. The wells are normally inactive November through April.

Work Completed

Geophysical Logging and Dynamic Profiling

Geophysical logging was performed at IRR-01 and IRR-02 from May 18 to May 21, 2022 by COLOG, Inc., of Lakewood, Colorado. Prior to testing, neither well had been put into service for the 2022 irrigation season. The week prior to testing, the pump in each well was disconnected and removed from the well by Luisier Drilling of Oconto Falls, Wisconsin.

The geophysical logging suite included tools to assess both the geology and hydraulic characteristics of the formations at each borehole. The initial suite of logs was performed under ambient (non-pumping) conditions, consisting of the following:

- Tools to evaluate geology, fractures, and borehole condition: 3-arm caliper, natural gamma, normal resistivity, single-point resistivity, spontaneous potential, acoustic televiewer, and optical televiewer.

- Tools to assess groundwater flow entering or exiting the borehole under ambient conditions: fluid-temperature, fluid conductivity, and flow meter logging using an electromagnetic Corehole Dynamic Flowmeter (CDFM).

After the initial suite of tests, COLOG performed dynamic logging. At each well, a submersible pump was deployed near the top of the water column inside of the well casing and then operated at approximately 20 to 25 gallons per minute (gpm). By pumping from the top of water column, flow is induced to enter the borehole and flow upward to the pump. COLOG repeated flow logging using the CDFM tool while pumping. This dynamic flow logging is used to identify fractures or permeable zones in the bedrock contributing groundwater to the well based on increases in the upward flow rate of water moving toward the pump.

After dynamic flow logging was complete, COLOG continued pumping to purge the well ahead of dynamic point sampling. Dynamic point sampling is completed by collecting samples at multiple depths within a well while that well is continuously pumped from the top of the water column. The premise of the method is that changes in water quality between samples must reflect an input of groundwater with different characteristics than what entered the well deeper. Combining the results of the dynamic flow logging and the dynamic point sampling allows estimation of the volume and groundwater quality of water entering the well from different portions of the open well bore (i.e., a dynamic profile).

Dynamic point samples were collected using either a stainless-steel piston point-sampler or a peristaltic pump with the tubing intake at the target depths. Sample depths were selected based on observations from the flow-meter logging targeting depths above and below zones observed to be contributing groundwater into the well. At each well, the shallowest sample was collected inside the casing. Sample depths and approximate purge volumes are summarized below.

Dynamic Sampling Intervals

	IRR-01	IRR-02
Static water-level (day of logging)	11.4 feet bgs	11.3 feet bgs
Volume of water in well	590 gallons	1,500 gallons
Point sample depths (feet bgs)	42*, 170, 374 feet bgs	50*, 180, 392, 444, 540 feet bgs
Volume purged at start of sampling	8,200 gallons	4,400 gallons
Volume purged at end of sampling	11,800 gallons	10,100 gallons

* Sample interval inside well casing

Groundwater samples were collected for the following analyses:

- PFAS (USEPA Method 537 Modified)
- Metals (USEPA Methods 6020 & 7470)
- Major Ions (USEPA Method 9056)
- Alkalinity (USEPA Method 2320)
- Hardness (USEPA Method SM2340)
- Sulfur & Sulfides (USEPA Method 6010 & SM4500)
- Radium 226 + 228 (USEPA Method 903.0 & 904.0)
- Uranium (USEPA Method 6020)

Figure 2 illustrates the dynamic profiling results. Analytical results for PFAS are summarized in **Table 2.** The results of other analyses were provided in the *Potable Well Sampling Area Drinking Water Update*. Laboratory

reports are included in **Attachment 1**. Logs depicting borehole geophysics and flow logging are included in **Attachment 2.**

After geophysical logging and dynamic profiling were complete, Luisier Drilling reinstalled the permanent well-pumps and reconnected the wells to the irrigation systems.

Total-Well Sampling and IRR-02 Disconnection

After receipt of analytical results from dynamic profiling that included PFAS detections in IRR-02, Tyco collected confirmation samples from both irrigation wells, and worked with Marinette High School to take IRR-02 out-of-service. The profiling analytical results (**Table 2**) included PFAS detections in the initial samples collected from IRR-02 during profiling. The final profiling sample collected at IRR-02 (August 6, 2022) and all samples collected at IRR-01 contained no PFAS above laboratory reporting limits.

Confirmation samples were collected from both irrigation wells on July 1, 2022. At that time, both wells were in normal service for seasonal irrigation. Samples were collected using the permanent pumps from sample ports at the wellheads. When samples were collected, irrigation was not currently in progress. Samples were collected after turning on the pumps and running them for 5 to 10 minutes.

Groundwater samples were shipped under appropriate chain-of-custody procedures to the project laboratory for PFAS analysis by USEPA Method 537 Modified. Analytical results are provided in **Table 3**. Laboratory reports are included in **Attachment 1**.

IRR-02 was taken out of service as of July 1, 2022. The football field irrigation system was reconfigured to use City of Marinette municipal water supply until further testing of IRR-02 could determine the source of PFAS in the well and whether well repairs were feasible. The well pump and all associated electrical and plumbing components were removed from IRR-02 by Luisier Drilling on July 29, 2022.

IRR-02 Packer Testing and K-Packer Installation

Tyco completed a series of packer tests at IRR-02 August 3 to 6, 2022 to assess the source of PFAS entering the well. Analytical results of the July total well samples (**Table 3**) had confirmed that PFAS was present in IRR-02. The concentrations of PFAS at IRR-02 detected in the July sample were much lower than the highest concentrations detected in the May profile samples, but the data confirmed that a pathway for PFAS to enter IRR-02 exists.

The testing program consisted of the following:

- A downhole video log was completed to evaluate the well casing for potential leaks (e.g., corrosion, incompletely welded joints, or other indications of a potential leak).
- Four drawdown-recovery tests were completed with a single packer inflated at 60, 64, 100, and then 150 feet bgs to evaluate whether the portion of the borehole and/or casing above the packer recovered after the zone was purged. These tests were conducted to attempt to isolate where, if anywhere, groundwater was entering the shallow portion of the borehole.
- Upper borehole sampling was conducted with the packer installed at 100 feet bgs. After inflation, the zone above the packer was purged. An initial sample was collected August 4, 2022, immediately after purging. A

second sample was collected the following day after the borehole had been allowed to recover approximately 17 hours.

- Lower borehole purging and sampling was completed with the packer installed at 150 feet bgs. This zone tested the open borehole from the bottom of packer to the bottom of the well at 584 feet bgs, including the primary water producing zone present from approximately 420 to 470 feet bgs. The zone below the packer was pumped for 7.5 hours at approximately 25 gpm (removing a total of 11,000 gallons) before the sample was collected.

Video logging and packer-testing were performed by COLOG, Inc. Water generated during testing was pumped directly to a frac tank located on the FTC for storage and eventual treatment by the new Groundwater Extraction and Treatment System water treatment plant. Samples collected during packer tests were submitted for PFAS analysis by USEPA Method 537 Modified. Sample results are summarized in **Table 4**.

A temporary packer was installed August 19, 2022 to prevent downward flow from the shallow to deep portions of the borehole. The temporary packer, a 3-flanged rubber K-packer, was installed in the well at 147 feet bgs.

Results and Interpretation

Geology and Hydrogeology

Both irrigation wells IRR-01 and IRR-02 are completed in sedimentary rock comprised mostly of dolomite, interbedded with shale and sandstone. Geophysical logging results were compared to available regional literature[2] and well-driller and lithologic descriptions available in State of Wisconsin databases. A generalized geologic column for IRR-01 and IRR-02 based on this assessment is illustrated on **Figure 2.** The interpreted sequence of stratigraphic units and their hydrogeologic characteristics at the irrigation wells is as follows:

- **Unconsolidated Glacial Deposits**, zone is 40 to 60 feet thick at IRR-01 and IRR-02. At both wells this interval is concealed by steel surface casings.
- **Ordovician Sinnipee Group,** comprised of dolomite and shale and spanning approximately the shallowest 110 feet of bedrock at IRR-01 and IRR-02. The unit is very sparsely fractured with no fractures that produced measurable flow.
- **Ordovician Ancell Group**, comprised of sandstone with shale and dolomite and estimated to about 50 feet thick. Like the Sinnippee Group above it, the unit is very sparsely fractured with no fractures that produced measurable flow.
- **Ordovician Prairie du Chien Group**, consisting mostly of dolomite, with lesser shale and sandstone. The unit is estimated to be approximately 200 feet thick in the irrigation wells, though the exact depth of the contact with the underlying Cambrian Trempealeau Group is uncertain. The unit is more intensely fractured than the overlying rock, with some fractures in the upper two-thirds of the unit contributing small quantities of groundwater to the well. The rock becomes pitted and vuggy near its base (starting at 403 feet in IRR-01, and 419 feet bgs in IRR-02). A 40-foot thick highly transmissive zone of large vugs is present in IRR-02 from 428

[2] Oakes, E. L., & Hamilton, L. J. 1973. Water resources of Wisconsin: Menominee-Oconto-Peshtigo River basin (No. 470). US Geological Survey

to 468 feet bgs. Well IRR-01 appears to just reach the top of this zone at the base of the well. In both wells, this is the dominant interval of groundwater production.

- **Cambrian Bedrock (undifferentiated)**, comprising dolomite, sandstone and shale. Portions of the Trempealeau and Tunnel City Groups may be present in the base of IRR-02. The portion of the Cambrian section in IRR-02 is moderately fractured and produces a small quantity of water to the well.

The results of drawdown-recovery packer testing confirm that the Sinnipee Group is an aquitard. The sequence of tests and recovery hydrographs are shown on **Figure 3**. In each test, after the zone above the packer was pumped-down, water-levels began recovering at a very low rate, as summarized in the table below.

Drawdown-Recovery Packer Testing Results for IRR-02

Test	Depth to Top of Packer	Initial Drawdown	Water-Level Recovery Rate		Specific Capacity of Recovery
	feet bgs	feet	feet/min	gpm	gpm/feet
A	60 (inside casing)	10.8	0.02	0.06	0.006
B	64 (just below casing)	25.5	0.05	0.13	0.005
C	70	25.5	0.03	0.09	0.003
D	100	63.5	0.08	0.20	0.003
E	150	30.1	0.04	0.11	0.004

Notes: 1) Recovery rate in gpm based on approximate borehole volume of 2.6 gallons per foot; 2) Specific capacity calculated as recovery rate divided by initial drawdown.

The water-level recovery rate was similar in all zones, including the top-most test performed with the packer set inside the base of the casing. This observation indicates the presence of a leak in or at the base the casing where it rests on bedrock. Importantly, the rate of water-level recovery (when normalized to initial drawdown) was no greater for tests with the packer placed just below the casing than with the packer placed at 150 feet below bgs. This indicates that no additional zones of water production were encountered from the bottom of the casing to 150 feet bgs, confirming the low permeability of the dolomite and shale layers of the aquitard present in the Sinnipee Group.

PFAS Sampling Results

IRR-01 Results

Sample results from IRR-01 show that PFAS is not present in the deep bedrock aquifer. No PFAS were detected above laboratory reporting limits in any of the profiling samples (**Table 1**), or in the total well sample except one compound, perfluorooctanesulfonamide (FOSA) (**Table 2**). FOSA was detected only in the total-well sample (using the permanent pump) at an estimated concentration of 1.5 nanograms per liter (ng/L). The compound is not associated with Tyco products, nor is it a significant constituent in shallow groundwater. The compound is present in a number of consumer and industrial products, and its frequent presence at low concentrations in residential well samples is likely the result of FOSA-containing components in the well pump or plumbing system.

IRR-02 Results

The May 2022 sample results from IRR-02 indicate that a pathway exists for PFAS to enter the well as it is currently constructed. The highest concentrations detected in IRR-02 were in the initial samples collected during profiling, after the well had been sitting idle over the winter (**Table 2**). PFAS concentrations were highest in the deepest samples, taken below the transmissive zone at the base of the well, a nearly stagnant zone that could not be effectively flushed during the purging conducted prior to sampling. Subsequent samples collected at shallower depths and after additional purging had progressively lower PFAS concentrations. The final sample (collected last and after 9,400 gallons had been purged) had no detectable PFAS. The July 2022 sample collected from the well's dedicated pump contained low concentrations of PFAS (**Table 3**). That sample was collected from the open borehole with minimal purging before collection. Packer testing provided the most conclusive results (**Table 4**). When isolated from the shallow zone and thoroughly purged, groundwater from deep bedrock aquifer contains no PFAS above laboratory detection limits. PFAS was present, however, in groundwater collected from the shallow part of the well.

Collectively, these sample results indicate that the deep bedrock aquifer at IRR-02 is not impacted by PFAS, but that a minor leak in the surface casing or inflow from very shallow bedrock had allowed PFAS from the shallow aquifer system into the well. Geophysical logging and packer test data show that the rate of the shallow groundwater input is insignificant relative to the high quantities of water produced from the deep aquifer. Under normal operating conditions, nearly all water is derived from the deep aquifer, and as such PFAS concentrations in samples from the well are low or below reporting levels. Higher concentrations may be detected, however, after periods when the well is not being pumped. During the winter and spring months when the well is idle, the slow input of shallow groundwater leaking into the well from the shallow zone gradually mixes with or displaces the clean groundwater present in the deeper parts of the well. As shown by the dynamic profiling (**Table 2**), samples collected throughout the well's water column may contain PFAS until renewed pumping sufficiently purges the borehole of any shallow groundwater that entered while the well was offline.

Conclusions and Next Steps

The investigations of IRR-01 and IRR-02 reported above show that the deep bedrock aquifer is a viable drinking water source. The first significant water producing zone in the deep aquifer is 40 to 50-foot-thick zone of pitted and vuggy dolomite, starting at a depth of 400 to 420 feet bgs. This transmissive zone is protected from the shallow aquifer system by an aquitard present in the Sinnipee Group, the shallowest bedrock unit present.

The presence of PFAS in IRR-02 highlights the risks of wells constructed with insufficiently deep or improperly sealed surface casings. Based on these results, Tyco is recommending that new deep bedrock wells completed in this area have surface casings that extend at least 75 feet below the bedrock surface and are sealed in place with cement grout.

The packer test results at IRR-02 also suggest that this particular well may be rehabilitated by installation of a well liner, installed to approximately 140 feet bgs. This repair will be completed consistent with Wisconsin Administrative Code NR 812.21. Work is scheduled for late October 2022. After installation Tyco will collect additional samples to verify the repair was successful, including sampling in the Spring, prior to the well being used, to verify that the well may be return to use for irrigation.

Sincerely,
Arcadis U.S., Inc.

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Enclosures:
Tables
Figures
Attachment 1
Attachment 2

Tables

Table 1
Irrigation Well 2019 PFAS Sampling Results
Tyco Fire Products LP
Marinette, Wisconsin

Analyte		June 2019 DHS (Not Adopted by DNR Board) (1)	November 2020 DHS (Not Yet Proposed for Rulemaking by DNR) (2)	Location Sample ID Parent Sample ID Sample Date Sample Type	IRR-01 DUP-01 (051619) IRR-01 (051619) 05/16/2019 FD	IRR-01 IRR-01 (051619) 05/16/2019 N	IRR-02 DUP-02 (060319) IRR-02 (060319) 06/03/2019 FD	IRR-02 IRR-02 (060319) 06/03/2019 N
				Unit				
PFHxA	307-24-4	--	150,000	ng/l	< 2.0 U	< 1.9 U	< 2.0 U	< 2.0 U
PFHpA	375-85-9	--	--	ng/l	< 2.0 U	< 1.9 U	< 2.0 U	< 2.0 U
PFOA	335-67-1	20	--	ng/l	< 2.0 U	< 1.9 U	< 2.0 U	< 2.0 U
PFNA	375-95-1	--	30	ng/l	< 2.0 U	< 1.9 U	< 2.0 U	< 2.0 U
PFDA	335-76-2	--	300	ng/l	< 2.0 U	< 1.9 U	< 2.0 U	< 2.0 U
PFUnA	2058-94-8	--	3,000	ng/l	< 2.0 U	< 1.9 U	< 2.0 U	< 2.0 U
PFDoA	307-55-1	--	500	ng/l	< 2.0 U	< 1.9 U	< 2.0 U	< 2.0 U
PFTriA	72629-94-8	--	--	ng/l	< 2.0 U	< 1.9 U	< 2.0 U	< 2.0 U
PFTeA	376-06-7	--	10,000	ng/l	**0.32 J**	**0.33 J**	**0.36 J**	**0.30 J**
PFBS	375-73-5	--	450,000	ng/l	< 2.0 U	< 1.9 U	< 2.0 U	< 2.0 U
PFHxS	355-46-4	--	40	ng/l	< 2.0 UB	< 1.9 UB	< 2.0 UB	< 2.0 UB
PFOS	1763-23-1	20	--	ng/l	< 2.0 U	< 1.9 U	< 2.0 U	< 2.0 U
NMeFOSAA	2355-31-9	--	--	ng/l	< 20 U	< 19 U	< 20 U	< 20 U
NEtFOSAA	2991-50-6	--	20 (2)	ng/l	< 20 U	< 19 U	< 20 U	< 20 U

Notes:
(1) = In June 2019 the Wisconsin Department of Health Services (DHS) recommended individual groundwater standards of 20 ng/L for PFOA and PFOS. The WDNR proposed those standards through the state rulemaking process. In February 2022, the Wisconsin Natural Resources Board did not approve the proposed rulemaking for groundwater. In August 2022, WDNR promulgated a drinking water standard of 70 ng/L for PFOA and PFOS, individually and combined, for public water systems. This standard does not apply to private drinking water wells.
(2) = In November 2020 the Wisconsin DHS recommended a combined groundwater standard of 20 ng/L for: FOSA, NEtFOSE, NEtFOSA, NEtFOSAA, PFOS and PFOA. DHS also recommended individual standards for FOSA, NEtFOSE, NEtFOSA, NEtFOSAA, PFBS, PFHxS, PFNA, PFDA, PFDoA, PFHxA, PFTeA, PFUnA, PFBA, PFODA, DONA, and GenX. In March 2021, The Wisconsin Natural Resources Board approved a Statement of Scope to initiate a rulemaking for this recommendation. The WDNR has not yet proposed rules to initiate the rulemaking process to implement this recommendation; the agency's authority to do so under the Statement of Scope will expire in September 2023.

J = The analyte was positively identified; however the associated numerical value is an estimated concentration only

U = The analyte was analyzed for but the result was not detected above the method detection limit.

< = Compound not detected at reporting detection limit.

-- = No standard

N = Normal sample

ng/L = nanograms per liter

FD = Field duplicate sample

Chemical Abbreviations

PFHxA = Perfluorohexanoic acid (C6)
PFHpA = Perfluoroheptanoic acid (C7)
PFOA = Perfluorooctanoic acid (C8)
PFNA = Perfluorononanoic acid (C9)
PFDA = Perfluorodecanoic acid (C10)
PFUnA = Perfluoroundecanoic acid (C11)
PFDoA = Perfluorododecanoic acid (C12)
PFTriA = Perfluorotridecanoic acid (C13)
PFTeA = Perfluorotetradecanoic acid (C14)
PFBS = Perfluorobutanesulfonic acid (C4)
PFHxS = Perfluorohexanesulfonic acid (C6)
PFOS = Perfluorooctanesulfonic acid (C8)
NMeFOSA = N-methylperfluorooctanesulfonamide (C9)
NEtFOSA = N-ethylperfluorooctanesulfonamide (C10)

Table 2
Irrigation Well May 2022 Profile Sampling Results
Tyco Fire Products LP
Marinette, Wisconsin

Analyte	June 2019 DHS (Not Adopted by DNR Board) [1]	November 2020 DHS (Not Yet Proposed for Rulemaking by DNR) [2]	Location / Sample ID / Sample Depth (ft bgs) / Sample Time / Purge Volume (gal) / Sample Date / Sample Type	IRR-01 IRR-01-42 (20220519) 42 17:30 2,600 05/19/2022 N	IRR-01 IRR-01-170 (20220519) 170 19:40 10,600 05/19/2022 N	IRR-01 DUP-01 (20220519) 170 19:40 10,600 05/19/2022 FD	IRR-01 IRR-01-374 (20220519) 374 13:15 8,900 05/19/2022 N	IRR-02 IRR-02-50 (20220521) 50 16:30 9,400 05/21/2022 N	IRR-02 IRR-02-180 (20220521) 180 15:15 7,600 05/21/2022 N	IRR-02 DUP-02 (20220521) 180 15:15 7,600 05/21/2022 FD	IRR-02 IRR-02-392 (20220521) 392 14:45 6,900 05/21/2022 N	IRR-02 IRR-02-444 (20220521) 444 14:00 5,800 05/21/2022 N	IRR-02 IRR-02-540 (20220521) 540 13:00 4,400 05/21/2022 N
			Unit										
PFBA	--	10,000	ng/l	< 4.4 U	< 4.7 U	< 4.8 U	< 4.5 U	< 4.8 U	< 5 U	< 4.8 U	14	16	23
PFPeA	--	--	ng/l	< 1.8 U	< 1.9 U	< 1.9 U	< 1.8 U	< 1.9 U	2.9	3.1	32	40	57
PFHxA	--	150,000	ng/l	< 1.8 U	< 1.9 U	< 1.9 U	< 1.8 U	< 1.9 U	3.7	4.8	50	60	78
PFHpA	--	--	ng/l	< 1.8 U	< 1.9 U	< 1.9 U	< 1.8 U	< 1.9 U	4.6	5.6	54	65	87
PFOA	20	--	ng/l	< 1.8 U	< 1.9 U	< 1.9 U	< 1.8 U	< 1.9 U	33	41	350	440 D	600 D
PFNA	--	30	ng/l	< 1.8 U	< 1.9 U	< 1.9 U	< 1.8 U	< 1.9 U	< 2 UB	< 1.9 UB	12	15	20
PFDA	--	300	ng/l	< 1.8 U	< 1.9 U	< 1.9 U	< 1.8 U	< 1.9 U	< 2 U	< 1.9 U	< 2 U	< 2 U	< 2 U
PFUnA	--	3,000	ng/l	< 1.8 U	< 1.9 U	< 1.9 U	< 1.8 U	< 1.9 U	< 2 U	< 1.9 U	< 2 U	< 2 U	< 2 U
PFDoA	--	500	ng/l	< 1.8 U	< 1.9 U	< 1.9 U	< 1.8 U	< 1.9 U	< 2 U	< 1.9 U	< 2 U	< 2 U	< 2 U
PFTriA	--	--	ng/l	< 1.8 U	< 1.9 U	< 1.9 U	< 1.8 U	< 1.9 U	< 2 U	< 1.9 U	< 2 U	< 2 U	< 2 U
PFTeA	--	10,000	ng/l	< 1.8 U	< 1.9 U	< 1.9 U	< 1.8 U	< 1.9 U	< 2 U	< 1.9 U	< 2 U	< 2 U	< 2 U
PFHxDA	--	--	ng/l	< 1.8 U	< 1.9 U	< 1.9 U	< 1.8 U	< 1.9 U	< 2 U	< 1.9 U	< 2 U	< 2 U	< 2 U
PFODA	--	400,000	ng/l	< 1.8 U	< 1.9 U	< 1.9 U	< 1.8 U	< 1.9 U	< 2 U	< 1.9 U	< 2 U	< 2 U	< 2 U
PFBS	--	450,000	ng/l	< 1.8 U	< 1.9 U	< 1.9 U	< 1.8 U	< 1.9 U	0.45 J	< 1.9 U	0.52 J	0.64 J	0.89 J
PFPeS	--	--	ng/l	< 1.8 U	< 1.9 U	< 1.9 U	< 1.8 U	< 1.9 U	< 2 U	< 1.9 U	0.51 J	0.62 J	0.76 J
PFHxS	--	40	ng/l	< 1.8 U	< 1.9 U	< 1.9 U	< 1.8 U	< 1.9 U	< 2 U	0.6 J	4	4.6	5.9
PFHpS	--	--	ng/l	< 1.8 U	< 1.9 U	< 1.9 U	< 1.8 U	< 1.9 U	< 2 U	< 1.9 U	< 2 U	< 2 U	< 2 U
PFOS	20	--	ng/l	< 1.8 U	< 1.9 U	< 1.9 U	< 1.8 U	< 1.9 U	< 2 U	< 1.9 U	< 2 U	< 2 UB	< 2 UB
PFNS	--	--	ng/l	< 1.8 U	< 1.9 U	< 1.9 U	< 1.8 U	< 1.9 U	< 2 U	< 1.9 U	< 2 U	< 2 U	< 2 U
PFDS	--	--	ng/l	< 1.8 U	< 1.9 U	< 1.9 U	< 1.8 U	< 1.9 U	< 2 U	< 1.9 U	< 2 U	< 2 U	< 2 U
PFDoS	--	--	ng/l	< 1.8 U	< 1.9 U	< 1.9 U	< 1.8 U	< 1.9 U	< 2 U	< 1.9 U	< 2 U	< 2 U	< 2 U
4:2 FTS	--	--	ng/l	< 1.8 U	< 1.9 U	< 1.9 U	< 1.8 U	< 1.9 U	0.36 J	0.55 J	4.1	4.6	6.8
6:2 FTS	--	--	ng/l	< 4.4 U	< 4.7 U	< 4.8 U	< 4.5 U	< 4.8 U	8.2	9.8	90	110	150
8:2 FTS	--	--	ng/l	< 1.8 U	< 1.9 U	< 1.9 U	< 1.8 U	< 1.9 U	< 2 U	< 1.9 U	0.91 J	1 J	1.6 J
10:2 FTS	--	--	ng/l	< 1.8 U	< 1.9 U	< 1.9 U	< 1.8 U	< 1.9 U	< 2 U	< 1.9 U	< 2 U	< 2 U	< 2 U
FOSA	--	20 [2]	ng/l	< 1.8 U	< 1.9 U	< 1.9 U	< 1.8 U	< 1.9 U	< 2 U	< 1.9 U	< 2 U	< 2 U	< 2 U
NMeFOSA	--	--	ng/l	< 1.8 U	< 1.9 U	< 1.9 U	< 1.8 U	< 1.9 U	< 2 U	< 1.9 U	< 2 U	< 2 U	< 2 U
NEtFOSA	--	20 [2]	ng/l	< 1.8 U	< 1.9 U	< 1.9 U	< 1.8 U	< 1.9 U	< 2 U	< 1.9 U	< 2 U	< 2 U	< 2 U
NMeFOSAA	--	--	ng/l	< 4.4 U	< 4.7 U	< 4.8 U	< 4.5 U	< 4.8 U	< 5 U	< 4.8 U	< 5 U	< 4.9 U	< 4.9 U
NEtFOSAA	--	20 [2]	ng/l	< 4.4 U	< 4.7 U	< 4.8 U	< 4.5 U	< 4.8 U	< 5 U	< 4.8 U	< 5 U	< 4.9 U	< 4.9 U
NMeFOSE	--	--	ng/l	< 3.5 U	< 3.7 U	< 3.8 U	< 3.6 U	< 3.9 U	< 4 U	< 3.9 U	< 4 U	< 4 U	< 4 U
NEtFOSE	--	20 [2]	ng/l	< 1.8 U	< 1.9 U	< 1.9 U	< 1.8 U	< 1.9 U	< 2 U	< 1.9 U	< 2 U	< 2 U	< 2 U
HFPO-DA	--	300	ng/l	< 3.5 U	< 3.7 U	< 3.8 U	< 3.6 U	< 3.9 U	< 4 U	< 3.9 U	< 4 U	< 4 U	< 4 U
DONA	--	3,000	ng/l	< 1.8 U	< 1.9 U	< 1.9 U	< 1.8 U	< 1.9 U	< 2 U	< 1.9 U	< 2 U	< 2 U	< 2 U
9Cl-PF3ONS	--	--	ng/l	< 1.8 U	< 1.9 U	< 1.9 U	< 1.8 U	< 1.9 U	< 2 U	< 1.9 U	< 2 U	< 2 U	< 2 U
11Cl-PF3OUdS	--	--	ng/l	< 1.8 U	< 1.9 U	< 1.9 U	< 1.8 U	< 1.9 U	< 2 U	< 1.9 U	< 2 U	< 2 U	< 2 U

Notes on Page 2.

Table 2
Irrigation Well May 2022 Profile Sampling Results
Tyco Fire Products LP
Marinette, Wisconsin

Notes:
< = Compound not detected at reporting detection limit.
(1) = In June 2019 the Wisconsin Department of Health Services (DHS) recommended individual groundwater standards of 20 ng/L for PFOA and PFOS. The WDNR proposed those standards through the state rulemaking process. In February 2022, the Wisconsin Natural Resources Board did not approve the proposed rulemaking for groundwater. In August 2022, WDNR promulgated a drinking water standard of 70 ng/L for PFOA and PFOS, individually and combined, for public water systems. This standard does not apply to private drinking water wells.
(2) = In November 2020 the Wisconsin DHS recommended a combined groundwater standard of 20 ng/L for: FOSA, NEtFOSE, NEtFOSA, NEtFOSAA, PFOS and PFOA. DHS also recommended individual standards for FOSA, NEtFOSE, NEtFOSA, NEtFOSAA, PFBS, PFHxS, PFNA, PFDA, PFDoA, PFHxA, PFTeA, PFUnA, PFBA, PFODA, DONA, and GenX. In March 2021, The Wisconsin Natural Resources Board approved a Statement of Scope to initiate a rulemaking for this recommendation. The WDNR has not yet proposed rules to initiate the rulemaking process to implement this recommendation; the agency's authority to do so under the Statement of Scope will expire in September 2023.
-- = No standard
N = Normal sample
ng/L = nanograms per liter
FD = Field duplicate sample

J = The analyte was positively identified; however the associated numerical value is an estimated concentration only

U = The analyte was analyzed for but the result was not detected above the method detection limit.

Chemical Abbreviations

PFBA = Perfluorobutanoic acid (C4)
PFPeA = Perfluoropentanoic acid (C5)
PFHxA = Perfluorohexanoic acid (C6)
PFHpA = Perfluoroheptanoic acid (C7)
PFOA = Perfluorooctanoic acid (C8)
PFNA = Perfluorononanoic acid (C9)
PFDA = Perfluorodecanoic acid (C10)
PFUnA = Perfluoroundecanoic acid (C11)
PFDoA = Perfluorododecanoic acid (C12)
PFTriA = Perfluorotridecanoic acid (C13)
PFTeA = Perfluorotetradecanoic acid (C14)
PFHxDA = Perfluoro-n-hexadecanoic acid (C16)
PFODA = Perfluoro-n-octadecanoic acid (C18)
PFBS = Perfluorobutanesulfonic acid (C4)
PFPeS = Perfluoropentanesulfonic acid (C5)
PFHxS = Perfluorohexanesulfonic acid (C6)
PFHpS = Perfluoroheptanesulfonic acid (C7)
PFOS = Perfluorooctanesulfonic acid (C8)
PFNS = Perfluorononanesulfonic acid (C9)
PFDS = Perfluorodecanesulfonic acid (C10)
PFDoS = Perfluorododecanesulfonic acid (C12)
4:2 FTS = 4:2 fluorotelomer sulfonate (C6)
6:2 FTS = 6:2 fluorotelomer sulfonate (C8)
8:2 FTS = 8:2 fluorotelomer sulfonate (C10)
10:2 FTS = 10:2 fluorotelomer sulfonate (C12)
FOSA = Perfluorooctanesulfonamide (C8)
NMeFOSA = N-methylperfluorooctanesulfonamide (C9)
NEtFOSA = N-ethylperfluorooctanesulfonamide (C10)
NMeFOSAA = N-methylperfluorooctanesulfonamidoacetic acid (C11)
NEtFOSAA = N-ethylperfluorooctanesulfonamidoacetic acid (C12)
NMeFOSE = N-methylperfluorooctanesulfonamidoethanol (C11)
NEtFOSE = N-ethylperfluorooctanesulfonamidoethanol (C12)
HFPO-DA = Hexafluoropropylene oxide dimer acid (C6)
DONA = 4,8-Dioxa-3H-perfluorononanoic acid (C7)
9Cl-PF3ONS = 9-chlorohexadecafluoro-3-oxanonane-1-sulfonic acid (C8)
11Cl-PF3OUdS = 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (C10)

Table 3
Total Well Sample Confirmation Results
Tyco Fire Products LP
Marinette, Wisconsin

	June 2019 DHS (Not Adopted by DNR Board) [1]	November 2020 DHS (Not Yet Proposed for Rulemaking by DNR) [2]	Location Sample ID Depth Sample Date Sample Type	IRR-01 IRR-01 (070122) Composite Well 07/01/2022 N	IRR-02 IRR-02 (070122) Composite Well 07/01/2022 N
Analyte			**Units**		
PFBA	--	10,000	ng/l	< 5.3 U	< 5.1 U
PFPeA	--	--	ng/l	< 2.1 U	0.62 J
PFHxA	--	150,000	ng/l	< 2.1 U	1 J
PFHpA	--	--	ng/l	< 2.1 U	0.4 J
PFOA	20	--	ng/l	< 2.1 U	5.8
PFNA	--	30	ng/l	< 2.1 U	< 2 U
PFDA	--	300	ng/l	< 2.1 U	< 2 U
PFUnA	--	3,000	ng/l	< 2.1 U	< 2 U
PFDoA	--	500	ng/l	< 2.1 U	< 2 U
PFTriA	--	--	ng/l	< 2.1 U	< 2 U
PFTeA	--	10,000	ng/l	< 2.1 U	< 2 U
PFHxDA	--	--	ng/l	< 2.1 U	< 2 U
PFODA	--	400,000	ng/l	< 2.1 U	< 2 U
PFBS	--	450,000	ng/l	< 2.1 U	< 2 U
PFPeS	--	--	ng/l	< 2.1 U	< 2 U
PFHxS	--	40	ng/l	< 2.1 U	< 2 U
PFHpS	--	--	ng/l	< 2.1 U	< 2 U
PFOS	20	--	ng/l	< 2.1 U	< 2 U
PFNS	--	--	ng/l	< 2.1 U	< 2 U
PFDS	--	--	ng/l	< 2.1 U	< 2 U
PFDoS	--	--	ng/l	< 2.1 U	< 2 U
4:2 FTS	--	--	ng/l	< 2.1 U	< 2 U
6:2 FTS	--	--	ng/l	< 5.3 U	< 5.1 U
8:2 FTS	--	--	ng/l	< 2.1 U	< 2 U
10:2 FTS	--	--	ng/l	< 2.1 U	< 2 U
FOSA	--	20 [2]	ng/l	1.5 J	2.7
NMeFOSA	--	--	ng/l	< 2.1 U	< 2 U
NEtFOSA	--	20 [2]	ng/l	< 2.1 U	< 2 U
NMeFOSAA	--	--	ng/l	< 5.3 U	< 5.1 U
NEtFOSAA	--	20 [2]	ng/l	< 5.3 U	< 5.1 U
NMeFOSE	--	--	ng/l	< 4.2 U	< 4.1 U
NEtFOSE	--	20 [2]	ng/l	< 2.1 U	< 2 U
HFPO-DA	--	300	ng/l	< 4.2 U	< 4.1 U
DONA	--	3,000	ng/l	< 2.1 U	< 2 U
9Cl-PF3ONS	--	--	ng/l	< 2.1 U	< 2 U
11Cl-PF3OUdS	--	--	ng/l	< 2.1 U	< 2 U

Notes on Page 2.

Table 3
Total Well Sample Confirmation Results
Tyco Fire Products LP
Marinette, Wisconsin

Notes:
< = Compound not detected at reporting detection limit.
(1) = In June 2019 the Wisconsin Department of Health Services (DHS) recommended individual groundwater standards of 20 ng/L for PFOA and PFOS. The WDNR proposed those standards through the state rulemaking process. In February 2022, the Wisconsin Natural Resources Board did not approve the proposed rulemaking for groundwater. In August 2022, WDNR promulgated a drinking water standard of 70 ng/L for PFOA and PFOS, individually and combined, for public water systems. This standard does not apply to private drinking water wells.
(2) = In November 2020 the Wisconsin DHS recommended a combined groundwater standard of 20 ng/L for: FOSA, NEtFOSE, NEtFOSA, NEtFOSAA, PFOS and PFOA. DHS also recommended individual standards for FOSA, NEtFOSE, NEtFOSA, NEtFOSAA, PFBS, PFHxS, PFNA, PFDA, PFDoA, PFHxA, PFTeA, PFUnA, PFBA, PFODA, DONA, and GenX. In March 2021, The Wisconsin Natural Resources Board approved a Statement of Scope to initiate a rulemaking for this recommendation. The WDNR has not yet proposed rules to initiate the rulemaking process to implement this recommendation; the agency's authority to do so under the Statement of Scope will expire in September 2023.
-- = No standard
N = Normal sample
ng/L = nanograms per liter
FD = Field duplicate sample

J = The analyte was positively identified; however the associated numerical value is an estimated concentration only

U = The analyte was analyzed for but the result was not detected above the method detection limit.

Chemical Abbreviations

PFBA = Perfluorobutanoic acid (C4)
PFPeA = Perfluoropentanoic acid (C5)
PFHxA = Perfluorohexanoic acid (C6)
PFHpA = Perfluoroheptanoic acid (C7)
PFOA = Perfluorooctanoic acid (C8)
PFNA = Perfluorononanoic acid (C9)
PFDA = Perfluorodecanoic acid (C10)
PFUnA = Perfluoroundecanoic acid (C11)
PFDoA = Perfluorododecanoic acid (C12)
PFTriA = Perfluorotridecanoic acid (C13)
PFTeA = Perfluorotetradecanoic acid (C14)
PFHxDA = Perfluoro-n-hexadecanoic acid (C16)
PFODA = Perfluoro-n-octadecanoic acid (C18)
PFBS = Perfluorobutanesulfonic acid (C4)
PFPeS = Perfluoropentanesulfonic acid (C5)
PFHxS = Perfluorohexanesulfonic acid (C6)
PFHpS = Perfluoroheptanesulfonic acid (C7)
PFOS = Perfluorooctanesulfonic acid (C8)
PFNS = Perfluorononanesulfonic acid (C9)
PFDS = Perfluorodecanesulfonic acid (C10)
PFDoS = Perfluorododecanesulfonic acid (C12)
4:2 FTS = 4:2 fluorotelomer sulfonate (C6)
6:2 FTS = 6:2 fluorotelomer sulfonate (C8)
8:2 FTS = 8:2 fluorotelomer sulfonate (C10)
10:2 FTS = 10:2 fluorotelomer sulfonate (C12)
FOSA = Perfluorooctanesulfonamide (C8)
NMeFOSA = N-methylperfluorooctanesulfonamide (C9)
NEtFOSA = N-ethylperfluorooctanesulfonamide (C10)
NMeFOSAA = N-methylperfluorooctanesulfonamidoacetic acid (C11)
NEtFOSAA = N-ethylperfluorooctanesulfonamidoacetic acid (C12)
NMeFOSE = N-methylperfluorooctanesulfonamidoethanol (C11)
NEtFOSE = N-ethylperfluorooctanesulfonamidoethanol (C12)
HFPO-DA = Hexafluoropropylene oxide dimer acid (C6)
DONA = 4,8-Dioxa-3H-perfluorononanoic acid (C7)
9Cl-PF3ONS = 9-chlorohexadecafluoro-3-oxanonane-1-sulfonic acid (C8)
11Cl-PF3OUdS = 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (C10)

Table 4
Discrete-zone Packer Results
Tyco Fire Products LP
Marinette, Wisconsin

Analyte	June 2019 DHS (Not Adopted by DNR Board) [1]	November 2020 DHS (Not Yet Proposed for Rulemaking by DNR) [2]	Test Interval	Borehole above 100 ft bgs, after purging well dry		Borehole above 100 ft bgs, after recovery	Borehole below 150 feet, after 10x well volume purge	
			Location	IRR-02	IRR-02	IRR-02	IRR-02	IRR-02
			Sample ID	IRR-02_100 (20220804)	DUP-01 (20220804)	IRR-02_65 (20220805)	IRR-02_150 (20220806)	DUP-02 (20220806)
			Sample Date	08/04/2022	08/04/2022	08/05/2022	08/06/2022	08/06/2022
			Sample Type	N	FD	N	N	FD
			Unit					
PFBA	--	10,000	ng/l	4.1 J	4.1 J	< 4.5 U	< 4.6 U	< 4.4 U
PFPeA	--	--	ng/l	7.2	7	0.67 J	< 1.8 U	< 1.8 U
PFHxA	--	150,000	ng/l	14	13	1.5 J	< 1.8 U	< 1.8 U
PFHpA	--	--	ng/l	7.8	8	0.85 J	< 1.8 U	< 1.8 U
PFOA	20	--	ng/l	94	93	11	< 1.8 U	< 1.8 U
PFNA	--	30	ng/l	2	1.8	0.37 J	< 1.8 U	< 1.8 U
PFDA	--	300	ng/l	< 1.8 U	< 1.8 U	< 1.8 U	< 1.8 U	< 1.8 U
PFUnA	--	3,000	ng/l	< 1.8 U	< 1.8 U	< 1.8 U	< 1.8 U	< 1.8 U
PFDoA	--	500	ng/l	< 1.8 U	< 1.8 U	< 1.8 U	< 1.8 U	< 1.8 U
PFTriA	--	--	ng/l	< 1.8 U	< 1.8 U	< 1.8 U	< 1.8 U	< 1.8 U
PFTeA	--	10,000	ng/l	< 1.8 U	< 1.8 U	< 1.8 U	< 1.8 U	< 1.8 U
PFHxDA	--	--	ng/l	< 1.8 U	< 1.8 U	< 1.8 U	< 1.8 U	< 1.8 U
PFODA	--	400,000	ng/l	< 1.8 U	< 1.8 U	< 1.8 U	< 1.8 U	< 1.8 U
PFBS	--	450,000	ng/l	0.26 J	0.24 J	< 1.8 U	< 1.8 U	< 1.8 U
PFPeS	--	--	ng/l	< 1.8 U	< 1.8 U	< 1.8 U	< 1.8 U	< 1.8 U
PFHxS	--	40	ng/l	1.4 J	1.2 J	< 1.8 U	< 1.8 U	< 1.8 U
PFHpS	--	--	ng/l	< 1.8 U	< 1.8 U	< 1.8 U	< 1.8 U	< 1.8 U
PFOS	20	--	ng/l	< 1.8 U	< 1.8 U	< 1.8 U	< 1.8 U	< 1.8 U
PFNS	--	--	ng/l	< 1.8 U	< 1.8 U	< 1.8 U	< 1.8 U	< 1.8 U
PFDS	--	--	ng/l	< 1.8 U	< 1.8 U	< 1.8 U	< 1.8 U	< 1.8 U
PFDoS	--	--	ng/l	< 1.8 U	< 1.8 U	< 1.8 U	< 1.8 U	< 1.8 U
4:2 FTS	--	--	ng/l	0.9 J	0.95 J	< 1.8 U	< 1.8 U	< 1.8 U
6:2 FTS	--	--	ng/l	27	28	3.2 J	< 4.6 U	< 4.4 U
8:2 FTS	--	--	ng/l	< 1.8 U	< 1.8 U	< 1.8 U	< 1.8 U	< 1.8 U
10:2 FTS	--	--	ng/l	< 1.8 U	< 1.8 U	< 1.8 U	< 1.8 U	< 1.8 U
FOSA	--	20 [2]	ng/l	< 1.8 U	< 1.8 U	< 1.8 U	< 1.8 U	< 1.8 U
NMeFOSA	--	--	ng/l	< 1.8 U	< 1.8 U	< 1.8 U	< 1.8 U	< 1.8 U
NEtFOSA	--	20 [2]	ng/l	< 1.8 U	< 1.8 U	< 1.8 U	< 1.8 U	< 1.8 U
NMeFOSAA	--	--	ng/l	< 4.5 U	< 4.5 U	< 4.5 U	< 4.6 U	< 4.4 U
NEtFOSAA	--	20 [2]	ng/l	< 4.5 U	< 4.5 U	< 4.5 U	< 4.6 U	< 4.4 U
NMeFOSE	--	--	ng/l	< 3.6 U	< 3.6 U	< 3.6 U	< 3.7 U	< 3.6 U
NEtFOSE	--	20 [2]	ng/l	< 1.8 U	< 1.8 U	< 1.8 U	< 1.8 U	< 1.8 U
HFPO-DA	--	300	ng/l	< 3.6 U	< 3.6 U	< 3.6 U	< 3.7 U	< 3.6 U
DONA	--	3,000	ng/l	< 1.8 U	< 1.8 U	< 1.8 U	< 1.8 U	< 1.8 U
9Cl-PF3ONS	--	--	ng/l	< 1.8 U	< 1.8 U	< 1.8 U	< 1.8 U	< 1.8 U
11Cl-PF3OUdS	--	--	ng/l	< 1.8 U	< 1.8 U	< 1.8 U	< 1.8 U	< 1.8 U

Notes:

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ng/L = nanograms per liter

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PFDoA = Perfluorododecanoic acid (C12)
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PFHpS = Perfluoroheptanesulfonic acid (C7)
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PFDoS = Perfluorododecanesulfonic acid (C12)
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6:2 FTS = 6:2 fluorotelomer sulfonate (C8)
8:2 FTS = 8:2 fluorotelomer sulfonate (C10)
10:2 FTS = 10:2 fluorotelomer sulfonate (C12)
FOSA = Perfluorooctanesulfonamide (C8)
NMeFOSA = N-methylperfluorooctanesulfonamide (C9)
NEtFOSA = N-ethylperfluorooctanesulfonamide (C10)
NMeFOSAA = N-methylperfluorooctanesulfonamidoacetic acid (C11)
NEtFOSAA = N-ethylperfluorooctanesulfonamidoacetic acid (C12)
NMeFOSE = N-methylperfluorooctanesulfonamidoethanol (C11)
NEtFOSE = N-ethylperfluorooctanesulfonamidoethanol (C12)
HFPO-DA = Hexafluoropropylene oxide dimer acid (C6)
DONA = 4,8-Dioxa-3H-perfluorononanoic acid (C7)
9Cl-PF3ONS = 9-chlorohexadecafluoro-3-oxanonane-1-sulfonic acid (C8)
11Cl-PF3OUdS = 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (C10)

Figures

IRR-01
IRR-02
FIRE TECHNOLOGY CENTER PROPERTY
DITCH A
DITCH A-D
DITCH B
DITCH D
Carney Avenue
Merchant Street
Ridge Street
State Street
Alice Lane
Georgia Street
Armstrong Street
Ocker Street
Elizabeth Avenue
Garfield Avenue
Wells Street
Colfax Street
Logan Avenue
Santon Street
Church Street
Permin Street
Parnell Street
Daggett Street
Hosmer Street
Mary Street
Marinette Avenue
Badger Parkway
Industrial Parkway North
West Cleveland Avenue
Cleveland Avenue
Old Peshtigo Road
Biehl Road
Stearns Drive
Lake Park Drive
Mallard Way
Jordan Drive
Kati Lane
Tori Lane
Prairie Street
Pierce Avenue
Woleske Road
Industrial Parkway South
West Frontage Road
Aerial Drive
Roosevelt Road
Edwin Street
Cahill Road
Oak View Road
Shore Drive
James Street
Richard Street
Paul Street
Florence Street
Northland Terrace Lane
Cheri Boulevard
Gallagher Road
Murray Street
Angwall Drive
Parsek Street
University Drive
County Road B
Green Gable Road

LEGEND:

- IRRIGATION WELL
- APPROXIMATE SITE PROPERTY BOUNDARY
- APPROXIMATE MARINETTE CITY BOUNDARY
- DITCH OR STREAM

0 1,000 2,000

SCALE IN FEET

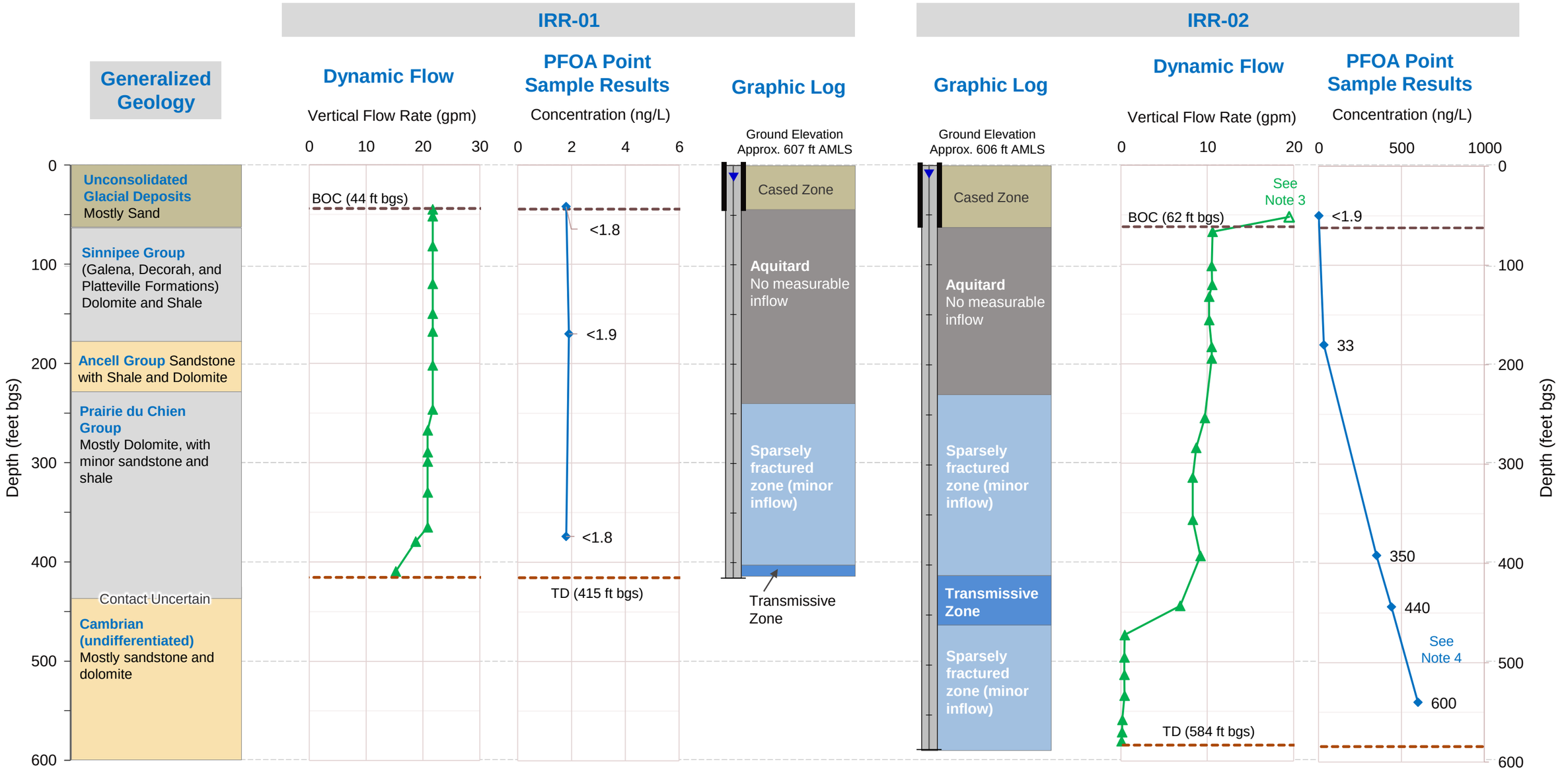
TYCO FIRE PRODUCTS LP
MARINETTE, WISCONSIN

WELL PROFILING LOCATIONS

ARCADIS

FIGURE
1

T:_ENVTYCO\MXD\FTC\RemedialActionDesignReport\Fig_2_Well_Profiling_Locations.mxd 10/3/2022 1:16:49 PM



Dynamic Sampling Conditions

	IRR-01	IRR-02
Initial Water-Level (ft bgs)	12.6	11.0
Avg. Extraction Rate (gpm)	22	24
Observed Drawdown (ft)	3.9	3.1
Specific Capacity (gpm/ft)	5.5	7.7

Notes:

1) Acronyms/Abbreviations: bgs – below ground surface; AMSL – above mean sea level; BOC – bottom of casing; ft – feet; gpm – gallons per minute; TD – total depth; PFOA - Perfluorooctanoic acid (C8), µg/L – micrograms per liter
2) Point samples were collected while pumping from top of water column to create upward flow conditions.
3) Dynamic flow log skewed by meter bypass below casing. Apparent inflow at bottom of casing shown by dynamic flow meter was shown by packer testing to be instrument error.
4) Concentration trend in IRR-02 interpreted to reflect incomplete flushing of borehole storage from the sparsely fractured zone below transmissive zone.

TYCO FIRE PRODUCTS LP
MARINETTE, WISCONSIN

IRRIGATION WELL AQUIFER PROFILE RESULTS

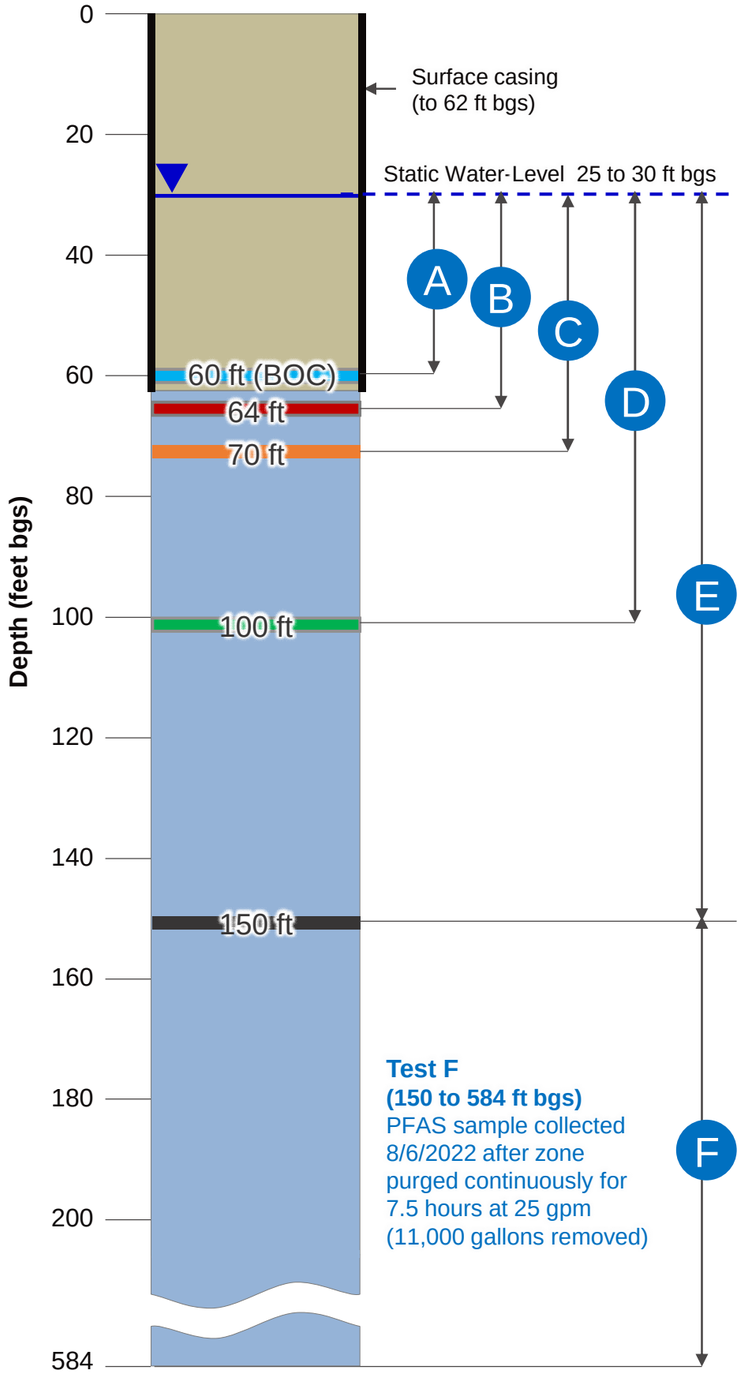
ARCADIS

FIGURE 2

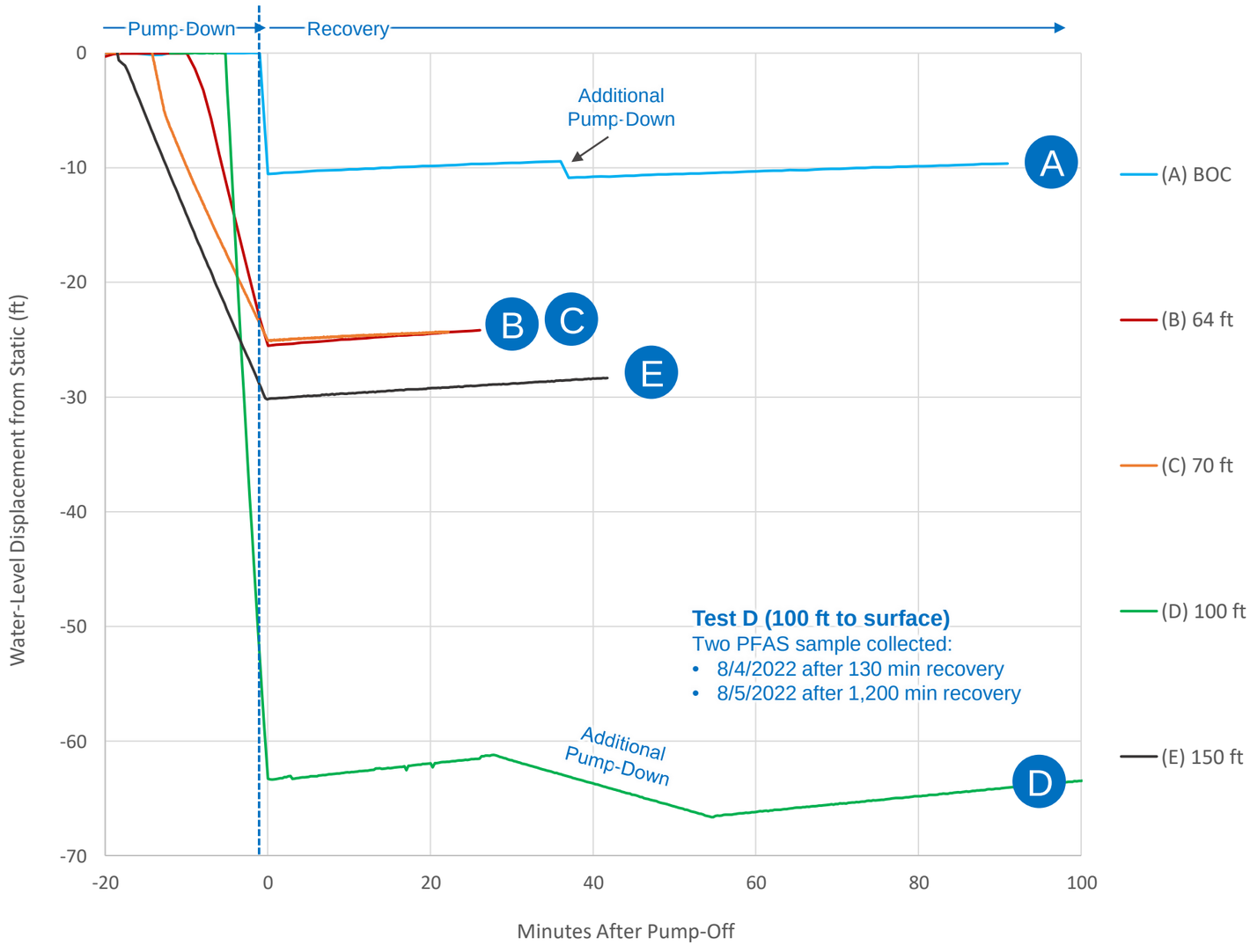
10/20/2022 9:56:59 AM

IRR-02 Well Diagram

Packer Placement and Test Intervals



Drawdown-Recovery Packer Tests A to E (See Note 2)



Notes:

1) Acronyms/Abbreviations: bgs – below ground surface; AMSL – above mean sea level; ft – feet; gpm – gallons per minute; BOC – bottom of casing; PFAS - per-and-poly-fluoroalkyl substances
2) Drawdown-recovery tests (A to E) completed by evacuating the zone above the packer to draw water level down; then shutting off pump and monitoring the rate of water-level recovery.
3) Test-F completed by continuous pumping zone below packer (set at 150 ft bgs).

TYCO FIRE PRODUCTS LP
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IRR-02 PACKER TESTS

ARCADIS

FIGURE
3

10/20/2022 9:57:00 AM

Attachment 1

Laboratory Reports

eurofins | Environment Testing TestAmerica

ANALYTICAL REPORT

Eurofins TestAmerica, Sacramento
880 Riverside Parkway
West Sacramento, CA 95605
Tel: (916)373-5600

Laboratory Job ID: 320-50383-1
Client Project/Site: Marinette, WI WI001605.0009

For:
ARCADIS U.S., Inc.
126 North Jefferson Street
Suite 400
Milwaukee, Wisconsin 53202

Attn: Lisa Rutkowski

Sandie Fredrick

Authorized for release by:
5/30/2019 7:03:37 AM

Sandie Fredrick, Project Manager II
(920)261-1660
sandie.fredrick@testamericainc.com

Table of Contents

Definitions/Glossary

Client: ARCADIS U.S., Inc.
Project/Site: Marinette, WI WI001605.0009

Job ID: 320-50383-1

Qualifiers

LCMS

Qualifier	Qualifier Description
B	Compound was found in the blank and sample.
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Case Narrative

Client: ARCADIS U.S., Inc.
Project/Site: Marinette, WI WI001605.0009

Job ID: 320-50383-1

Job ID: 320-50383-1

Laboratory: Eurofins TestAmerica, Sacramento

Narrative

Job Narrative
320-50383-1

Comments
No additional comments.

Receipt
The samples were received on 5/17/2019 9:35 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 0.8º C.

LCMS
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Organic Prep
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Client: ARCADIS U.S., Inc.
Project/Site: Marinette, WI WI001605.0009

Job ID: 320-50383-1

Client Sample ID: IRR-01

Date Collected: 05/16/19 13:15
Date Received: 05/17/19 09:35

Lab Sample ID: 320-50383-1

Matrix: Water

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	<1.8		19	1.8	ng/L		05/24/19 06:11	05/26/19 07:50	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	<2.9		19	2.9	ng/L		05/24/19 06:11	05/26/19 07:50	1
Perfluorobutanesulfonic acid (PFBS)	<0.19		1.9	0.19	ng/L		05/24/19 06:11	05/26/19 07:50	1
Perfluorodecanoic acid (PFDA)	<0.29		1.9	0.29	ng/L		05/24/19 06:11	05/26/19 07:50	1
Perfluorododecanoic acid (PFDoA)	<0.52		1.9	0.52	ng/L		05/24/19 06:11	05/26/19 07:50	1
Perfluoroheptanoic acid (PFHpA)	<0.23		1.9	0.23	ng/L		05/24/19 06:11	05/26/19 07:50	1
Perfluorohexanesulfonic acid (PFHxS)	**0.32**	**J B**	1.9	0.16	ng/L		05/24/19 06:11	05/26/19 07:50	1
Perfluorohexanoic acid (PFHxA)	<0.54		1.9	0.54	ng/L		05/24/19 06:11	05/26/19 07:50	1
Perfluorononanoic acid (PFNA)	<0.25		1.9	0.25	ng/L		05/24/19 06:11	05/26/19 07:50	1
Perfluorooctanesulfonic acid (PFOS)	<0.51		1.9	0.51	ng/L		05/24/19 06:11	05/26/19 07:50	1
Perfluorooctanoic acid (PFOA)	<0.80		1.9	0.80	ng/L		05/24/19 06:11	05/26/19 07:50	1
Perfluorotetradecanoic acid (PFTeA)	**0.33**	**J**	1.9	0.27	ng/L		05/24/19 06:11	05/26/19 07:50	1
Perfluorotridecanoic acid (PFTriA)	<1.2		1.9	1.2	ng/L		05/24/19 06:11	05/26/19 07:50	1
Perfluoroundecanoic acid (PFUnA)	<1.0		1.9	1.0	ng/L		05/24/19 06:11	05/26/19 07:50	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C3 PFBS	*100*		*25 - 150*	*05/24/19 06:11*	*05/26/19 07:50*	*1*
13C2 PFDA	*101*		*25 - 150*	*05/24/19 06:11*	*05/26/19 07:50*	*1*
13C2 PFDoA	*101*		*25 - 150*	*05/24/19 06:11*	*05/26/19 07:50*	*1*
13C4 PFHpA	*92*		*25 - 150*	*05/24/19 06:11*	*05/26/19 07:50*	*1*
13C2 PFHxA	*93*		*25 - 150*	*05/24/19 06:11*	*05/26/19 07:50*	*1*
13C5 PFNA	*97*		*25 - 150*	*05/24/19 06:11*	*05/26/19 07:50*	*1*
13C4 PFOA	*100*		*25 - 150*	*05/24/19 06:11*	*05/26/19 07:50*	*1*
13C4 PFOS	*94*		*25 - 150*	*05/24/19 06:11*	*05/26/19 07:50*	*1*
13C2 PFTeDA	*110*		*25 - 150*	*05/24/19 06:11*	*05/26/19 07:50*	*1*
18O2 PFHxS	*91*		*25 - 150*	*05/24/19 06:11*	*05/26/19 07:50*	*1*
13C2 PFUnA	*100*		*25 - 150*	*05/24/19 06:11*	*05/26/19 07:50*	*1*
d3-NMeFOSAA	*104*		*25 - 150*	*05/24/19 06:11*	*05/26/19 07:50*	*1*
d5-NEtFOSAA	*109*		*25 - 150*	*05/24/19 06:11*	*05/26/19 07:50*	*1*

Client Sample ID: DUP-01

Date Collected: 05/16/19 00:00
Date Received: 05/17/19 09:35

Lab Sample ID: 320-50383-2

Matrix: Water

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	<1.9		20	1.9	ng/L		05/24/19 06:11	05/26/19 07:58	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	<3.1		20	3.1	ng/L		05/24/19 06:11	05/26/19 07:58	1
Perfluorobutanesulfonic acid (PFBS)	<0.20		2.0	0.20	ng/L		05/24/19 06:11	05/26/19 07:58	1
Perfluorodecanoic acid (PFDA)	<0.31		2.0	0.31	ng/L		05/24/19 06:11	05/26/19 07:58	1
Perfluorododecanoic acid (PFDoA)	<0.55		2.0	0.55	ng/L		05/24/19 06:11	05/26/19 07:58	1
Perfluoroheptanoic acid (PFHpA)	<0.25		2.0	0.25	ng/L		05/24/19 06:11	05/26/19 07:58	1
Perfluorohexanesulfonic acid (PFHxS)	**0.28**	**J B**	2.0	0.17	ng/L		05/24/19 06:11	05/26/19 07:58	1
Perfluorohexanoic acid (PFHxA)	<0.58		2.0	0.58	ng/L		05/24/19 06:11	05/26/19 07:58	1
Perfluorononanoic acid (PFNA)	<0.27		2.0	0.27	ng/L		05/24/19 06:11	05/26/19 07:58	1
Perfluorooctanesulfonic acid (PFOS)	<0.54		2.0	0.54	ng/L		05/24/19 06:11	05/26/19 07:58	1
Perfluorooctanoic acid (PFOA)	<0.85		2.0	0.85	ng/L		05/24/19 06:11	05/26/19 07:58	1
Perfluorotetradecanoic acid (PFTeA)	**0.32**	**J**	2.0	0.29	ng/L		05/24/19 06:11	05/26/19 07:58	1
Perfluorotridecanoic acid (PFTriA)	<1.3		2.0	1.3	ng/L		05/24/19 06:11	05/26/19 07:58	1
Perfluoroundecanoic acid (PFUnA)	<1.1		2.0	1.1	ng/L		05/24/19 06:11	05/26/19 07:58	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C3 PFBS	*91*		*25 - 150*	*05/24/19 06:11*	*05/26/19 07:58*	*1*
13C2 PFDA	*100*		*25 - 150*	*05/24/19 06:11*	*05/26/19 07:58*	*1*
13C2 PFDoA	*96*		*25 - 150*	*05/24/19 06:11*	*05/26/19 07:58*	*1*
13C4 PFHpA	*90*		*25 - 150*	*05/24/19 06:11*	*05/26/19 07:58*	*1*
13C2 PFHxA	*91*		*25 - 150*	*05/24/19 06:11*	*05/26/19 07:58*	*1*
13C5 PFNA	*93*		*25 - 150*	*05/24/19 06:11*	*05/26/19 07:58*	*1*
13C4 PFOA	*98*		*25 - 150*	*05/24/19 06:11*	*05/26/19 07:58*	*1*
13C4 PFOS	*94*		*25 - 150*	*05/24/19 06:11*	*05/26/19 07:58*	*1*
13C2 PFTeDA	*106*		*25 - 150*	*05/24/19 06:11*	*05/26/19 07:58*	*1*
18O2 PFHxS	*91*		*25 - 150*	*05/24/19 06:11*	*05/26/19 07:58*	*1*
13C2 PFUnA	*101*		*25 - 150*	*05/24/19 06:11*	*05/26/19 07:58*	*1*
d3-NMeFOSAA	*99*		*25 - 150*	*05/24/19 06:11*	*05/26/19 07:58*	*1*
d5-NEtFOSAA	*103*		*25 - 150*	*05/24/19 06:11*	*05/26/19 07:58*	*1*

Isotope Dilution Summary

Client: ARCADIS U.S., Inc.
Project/Site: Marinette, WI WI001605.0009

Job ID: 320-50383-1

Method: 537 (modified) - Fluorinated Alkyl Substances

Matrix: Water

Prep Type: Total/NA

		Percent Isotope Dilution Recovery (Acceptance Limits)							
Lab Sample ID	Client Sample ID	3C3-PFBS (25-150)	PFDA (25-150)	PFDoA (25-150)	PFHpA (25-150)	PFHxA (25-150)	PFNA (25-150)	PFOA (25-150)	PFOS (25-150)
320-50383-1	IRR-01	100	101	101	92	93	97	100	94
320-50383-2	DUP-01	91	100	96	90	91	93	98	94
LCS 320-296695/2-A	Lab Control Sample	101	106	108	98	99	107	103	104
MB 320-296695/1-A	Method Blank	96	100	104	94	92	101	99	102

		Percent Isotope Dilution Recovery (Acceptance Limits)							
Lab Sample ID	Client Sample ID	PFTDA (25-150)	PFHxS (25-150)	PFUnA (25-150)	-NMeFOS/ (25-150)	-NEtFOSA (25-150)			
320-50383-1	IRR-01	110	91	100	104	109			
320-50383-2	DUP-01	106	91	101	99	103			
LCS 320-296695/2-A	Lab Control Sample	117	96	114	112	112			
MB 320-296695/1-A	Method Blank	113	95	104	97	103			

Surrogate Legend

13C3-PFBS = 13C3 PFBS
PFDA = 13C2 PFDA
PFDoA = 13C2 PFDoA
PFHpA = 13C4 PFHpA
PFHxA = 13C2 PFHxA
PFNA = 13C5 PFNA
PFOA = 13C4 PFOA
PFOS = 13C4 PFOS
PFTDA = 13C2 PFTeDA
PFHxS = 18O2 PFHxS
PFUnA = 13C2 PFUnA
d3-NMeFOSAA = d3-NMeFOSAA
d5-NEtFOSAA = d5-NEtFOSAA

Method: 537 (modified) - Fluorinated Alkyl Substances

Lab Sample ID: MB 320-296695/1-A
Matrix: Water
Analysis Batch: 297006

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 296695

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	<1.9		20	1.9	ng/L		05/24/19 06:11	05/26/19 05:25	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	<3.1		20	3.1	ng/L		05/24/19 06:11	05/26/19 05:25	1
Perfluorobutanesulfonic acid (PFBS)	<0.20		2.0	0.20	ng/L		05/24/19 06:11	05/26/19 05:25	1
Perfluorodecanoic acid (PFDA)	<0.31		2.0	0.31	ng/L		05/24/19 06:11	05/26/19 05:25	1
Perfluorododecanoic acid (PFDoA)	<0.55		2.0	0.55	ng/L		05/24/19 06:11	05/26/19 05:25	1
Perfluoroheptanoic acid (PFHpA)	<0.25		2.0	0.25	ng/L		05/24/19 06:11	05/26/19 05:25	1
Perfluorohexanesulfonic acid (PFHxS)	0.284	J	2.0	0.17	ng/L		05/24/19 06:11	05/26/19 05:25	1
Perfluorohexanoic acid (PFHxA)	<0.58		2.0	0.58	ng/L		05/24/19 06:11	05/26/19 05:25	1
Perfluorononanoic acid (PFNA)	<0.27		2.0	0.27	ng/L		05/24/19 06:11	05/26/19 05:25	1
Perfluorooctanesulfonic acid (PFOS)	<0.54		2.0	0.54	ng/L		05/24/19 06:11	05/26/19 05:25	1
Perfluorooctanoic acid (PFOA)	<0.85		2.0	0.85	ng/L		05/24/19 06:11	05/26/19 05:25	1
Perfluorotetradecanoic acid (PFTeA)	<0.29		2.0	0.29	ng/L		05/24/19 06:11	05/26/19 05:25	1
Perfluorotridecanoic acid (PFTriA)	<1.3		2.0	1.3	ng/L		05/24/19 06:11	05/26/19 05:25	1
Perfluoroundecanoic acid (PFUnA)	<1.1		2.0	1.1	ng/L		05/24/19 06:11	05/26/19 05:25	1

Isotope Dilution	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C3 PFBS	*96*		*25 - 150*	*05/24/19 06:11*	*05/26/19 05:25*	*1*
13C2 PFDA	*100*		*25 - 150*	*05/24/19 06:11*	*05/26/19 05:25*	*1*
13C2 PFDoA	*104*		*25 - 150*	*05/24/19 06:11*	*05/26/19 05:25*	*1*
13C4 PFHpA	*94*		*25 - 150*	*05/24/19 06:11*	*05/26/19 05:25*	*1*
13C2 PFHxA	*92*		*25 - 150*	*05/24/19 06:11*	*05/26/19 05:25*	*1*
13C5 PFNA	*101*		*25 - 150*	*05/24/19 06:11*	*05/26/19 05:25*	*1*
13C4 PFOA	*99*		*25 - 150*	*05/24/19 06:11*	*05/26/19 05:25*	*1*
13C4 PFOS	*102*		*25 - 150*	*05/24/19 06:11*	*05/26/19 05:25*	*1*
13C2 PFTeDA	*113*		*25 - 150*	*05/24/19 06:11*	*05/26/19 05:25*	*1*
18O2 PFHxS	*95*		*25 - 150*	*05/24/19 06:11*	*05/26/19 05:25*	*1*
13C2 PFUnA	*104*		*25 - 150*	*05/24/19 06:11*	*05/26/19 05:25*	*1*
d3-NMeFOSAA	*97*		*25 - 150*	*05/24/19 06:11*	*05/26/19 05:25*	*1*
d5-NEtFOSAA	*103*		*25 - 150*	*05/24/19 06:11*	*05/26/19 05:25*	*1*

Lab Sample ID: LCS 320-296695/2-A
Matrix: Water
Analysis Batch: 297006

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 296695

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	40.0	39.4		ng/L		98	65 - 125
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	40.0	38.5		ng/L		96	67 - 127
Perfluorobutanesulfonic acid (PFBS)	35.4	35.5		ng/L		100	73 - 133
Perfluorodecanoic acid (PFDA)	40.0	42.5		ng/L		106	69 - 129
Perfluorododecanoic acid (PFDoA)	40.0	40.6		ng/L		102	71 - 131
Perfluoroheptanoic acid (PFHpA)	40.0	42.0		ng/L		105	66 - 126
Perfluorohexanesulfonic acid (PFHxS)	36.4	35.3		ng/L		97	63 - 123
Perfluorohexanoic acid (PFHxA)	40.0	38.8		ng/L		97	66 - 126

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Lab Sample ID: LCS 320-296695/2-A
Matrix: Water
Analysis Batch: 297006

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 296695

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Perfluorononanoic acid (PFNA)	40.0	41.0		ng/L		103	68 - 128
Perfluorooctanesulfonic acid (PFOS)	37.1	35.9		ng/L		97	67 - 127
Perfluorooctanoic acid (PFOA)	40.0	40.6		ng/L		102	64 - 124
Perfluorotetradecanoic acid (PFTeA)	40.0	37.6		ng/L		94	68 - 128
Perfluorotridecanoic acid (PFTriA)	40.0	45.6		ng/L		114	72 - 132
Perfluoroundecanoic acid (PFUnA)	40.0	37.4		ng/L		93	60 - 120

Isotope Dilution	*LCS %Recovery*	*LCS Qualifier*	*Limits*
13C3 PFBS	*101*		*25 - 150*
13C2 PFDA	*106*		*25 - 150*
13C2 PFDoA	*108*		*25 - 150*
13C4 PFHpA	*98*		*25 - 150*
13C2 PFHxA	*99*		*25 - 150*
13C5 PFNA	*107*		*25 - 150*
13C4 PFOA	*103*		*25 - 150*
13C4 PFOS	*104*		*25 - 150*
13C2 PFTeDA	*117*		*25 - 150*
18O2 PFHxS	*96*		*25 - 150*
13C2 PFUnA	*114*		*25 - 150*
d3-NMeFOSAA	*112*		*25 - 150*
d5-NEtFOSAA	*112*		*25 - 150*

QC Association Summary

Client: ARCADIS U.S., Inc.
Project/Site: Marinette, WI WI001605.0009

Job ID: 320-50383-1

LCMS

Prep Batch: 296695

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-50383-1	IRR-01	Total/NA	Water	3535	
320-50383-2	DUP-01	Total/NA	Water	3535	
MB 320-296695/1-A	Method Blank	Total/NA	Water	3535	
LCS 320-296695/2-A	Lab Control Sample	Total/NA	Water	3535	

Analysis Batch: 297006

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-50383-1	IRR-01	Total/NA	Water	537 (modified)	296695
320-50383-2	DUP-01	Total/NA	Water	537 (modified)	296695
MB 320-296695/1-A	Method Blank	Total/NA	Water	537 (modified)	296695
LCS 320-296695/2-A	Lab Control Sample	Total/NA	Water	537 (modified)	296695

Lab Chronicle

Client: ARCADIS U.S., Inc.
Project/Site: Marinette, WI WI001605.0009

Job ID: 320-50383-1

Client Sample ID: IRR-01

Date Collected: 05/16/19 13:15
Date Received: 05/17/19 09:35

Lab Sample ID: 320-50383-1

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			266.5 mL	10.00 mL	296695	05/24/19 06:11	SK	TAL SAC
Total/NA	Analysis	537 (modified)		1			297006	05/26/19 07:50	P1N	TAL SAC

Client Sample ID: DUP-01

Date Collected: 05/16/19 00:00
Date Received: 05/17/19 09:35

Lab Sample ID: 320-50383-2

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			250.1 mL	10.00 mL	296695	05/24/19 06:11	SK	TAL SAC
Total/NA	Analysis	537 (modified)		1			297006	05/26/19 07:58	P1N	TAL SAC

Laboratory References:

TAL SAC = Eurofins TestAmerica, Sacramento, 880 Riverside Parkway, West Sacramento, CA 95605, TEL (916)373-5600

Accreditation/Certification Summary

Client: ARCADIS U.S., Inc.
Job ID: 320-50383-1
Project/Site: Marinette, WI WI001605.0009

Laboratory: Eurofins TestAmerica, Sacramento

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	EPA Region	Identification Number	Expiration Date
Alaska (UST)	State Program	10	17-020	01-20-21
ANAB	DoD		L2468	01-20-21
ANAB	DOE		L2468.01	01-20-21
Arizona	State Program	9	AZ0708	08-11-19
Arkansas DEQ	State Program	6	88-0691	06-17-19
California	State Program	9	2897	01-31-20
Colorado	State Program	8	CA00044	08-31-19
Connecticut	State Program	1	PH-0691	06-30-19
Florida	NELAP	4	E87570	06-30-19
Georgia	State Program	4	N/A	01-28-19 *
Hawaii	State Program	9	N/A	01-29-20
Illinois	NELAP	5	200060	03-17-19 *
Kansas	NELAP	7	E-10375	10-31-19
Louisiana	NELAP	6	30612	06-30-19
Maine	State Program	1	CA0004	04-14-20
Michigan	State Program	5	9947	01-31-20
Nevada	State Program	9	CA00044	07-31-19
New Hampshire	NELAP	1	2997	04-20-20
New Jersey	NELAP	2	CA005	06-30-19
New York	NELAP	2	11666	04-01-20
Oregon	NELAP	10	4040	01-29-20
Pennsylvania	NELAP	3	68-01272	03-31-20
Texas	NELAP	6	T104704399	05-31-19
US Fish & Wildlife	Federal		LE148388-0	07-31-19
USDA	Federal		P330-18-00239	01-17-21
USEPA UCMR	Federal	1	CA00044	12-31-20
Utah	NELAP	8	CA00044	02-29-20
Vermont	State Program	1	VT-4040	04-16-20
Virginia	NELAP	3	460278	03-14-20 *
Washington	State Program	10	C581	05-05-19 *
West Virginia (DW)	State Program	3	9930C	12-31-19
Wyoming	State Program	8	8TMS-L	01-28-19 *

Laboratory: Eurofins TestAmerica, Chicago

The accreditations/certifications listed below are applicable to this report.

Authority	Program	EPA Region	Identification Number	Expiration Date
Wisconsin	State Program	5	999580010	08-31-19 *

* Accreditation/Certification renewal pending - accreditation/certification considered valid.

Method Summary

Client: ARCADIS U.S., Inc.
Project/Site: Marinette, WI WI001605.0009

Job ID: 320-50383-1

Method	Method Description	Protocol	Laboratory
537 (modified)	Fluorinated Alkyl Substances	EPA	TAL SAC
3535	Solid-Phase Extraction (SPE)	SW846	TAL SAC

Protocol References:

EPA = US Environmental Protection Agency

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL SAC = Eurofins TestAmerica, Sacramento, 880 Riverside Parkway, West Sacramento, CA 95605, TEL (916)373-5600

Sample Summary

Client: ARCADIS U.S., Inc.
Project/Site: Marinette, WI WI001605.0009

Job ID: 320-50383-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
320-50383-1	IRR-01	Water	05/16/19 13:15	05/17/19 09:35	
320-50383-2	DUP-01	Water	05/16/19 00:00	05/17/19 09:35	

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

2417 Bond Street, University Park, IL 60484
Phone: 708.534.5200 Fax: 708.534.5211

Chain of Custody Record

Report To (optional)		Bill To (optional)	
Contact:	LISA RUTKOWSKI	Contact:	
Company:	ARCADIS	Company:	
Address:		Address:	
Address:		Address:	
Phone:		Phone:	
Fax:		Fax:	
E-Mail:		PO#/Reference#	

Lab Job #:

Chain of Custody Number:

Page 1 of 1

Temperature °C of Cooler: 0.5C

Client	Client Project #	Preservative	B
Arcadis	WI001605.0009		
Project Name		Parameter	SPA-537 modified
Marinette, WI			
Project Location/State	Lab Project #		
Marinette, WI			
Sampler	Lab PM		
GVV	S. Fredrick		

Preservative Key
1. HCL, Cool to 4°
2. H2SO4, Cool to 4°
3. HNO3, Cool to 4°
4. NaOH, Cool to 4°
5. NaOH/Zn, Cool to 4°
6. NaHSO4
7. Cool to 4°
8. None
9. Other

Lab ID	MS/MSD	Sample ID	Sampling Date	Sampling Time	# of Containers	Matrix		Comments
		IRR-01	5/16/19	1315	2	W	✓	
		DUP-01	5/16/19	—	2	W	✓	

320-50383 Chain of Custody

Turnaround Time Required (Business Days)
___ 1 Day ___ 2 Days X 5 Days ___ 7 Days ___ 10 Days ___ 15 Days _____ Other
Requested Due Date _____

Sample Disposal
☐ Return to Client ☒ Disposal by Lab ☐ Archive for _____ Months (A fee may be assessed if samples are retained longer than 1 month)

Relinquished By	Company	Date	Time	Received By	Company	Date	Time
G. VANDER VELDEN	ARCADIS	5/16/19	1530		GTAWS	5/17/19	9:35
Relinquished By	Company	Date	Time	Received By	Company	Date	Time
Relinquished By	Company	Date	Time	Received By	Company	Date	Time

Lab Courier
Shipped Fedex
Hand Delivered

Matrix Key
WW – Wastewater
W – Water
S – Soil
SL – Sludge
M – Miscellaneous
O – Oil
A – Air
SE – Sediment
SO – Soil
L – Leachate
WI – Wipe
DW – Drinking Water
O – Other

Client Comments: Questions call L. Rutkowski
5-day TAT

Lab Comments:

TAL-4124-500 (1209)

5/30/2019

Login Sample Receipt Checklist

Client: ARCADIS U.S., Inc.

Job Number: 320-50383-1

Login Number: 50383
List Number: 1
Creator: Rosas, Jaime

List Source: Eurofins TestAmerica, Sacramento

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	136379
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

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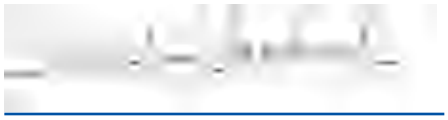
ANALYTICAL REPORT

Eurofins TestAmerica, Sacramento
880 Riverside Parkway
West Sacramento, CA 95605
Tel: (916)373-5600

Laboratory Job ID: 320-50884-1
Client Project/Site: Marinette, WI WI001605.0009.00005

For:
ARCADIS U.S., Inc.
126 North Jefferson Street
Suite 400
Milwaukee, Wisconsin 53202

Attn: Lisa Rutkowski



Authorized for release by:
6/10/2019 4:38:37 PM

Sandie Fredrick, Project Manager II
(920)261-1660
sandie.fredrick@testamericainc.com

Table of Contents

Definitions/Glossary

Client: ARCADIS U.S., Inc. Job ID: 320-50884-1
Project/Site: Marinette, WI WI001605.0009.00005

Qualifiers

LCMS

Qualifier	Qualifier Description
B	Compound was found in the blank and sample.
I	Value is EMPC (estimated maximum possible concentration).
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Job ID: 320-50884-1

Laboratory: Eurofins TestAmerica, Sacramento

Narrative

Job Narrative
320-50884-1

Comments
No additional comments.

Receipt
The samples were received on 6/4/2019 9:10 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 2.8º C.

LCMS
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Organic Prep
Method(s) 3535: Insufficient sample volume was available to perform a matrix spike duplicate (MSD) associated with preparation batch 320-299496. Method: 3535_PFC preparation batch 320-299496

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Client Sample ID: IRR-02
Date Collected: 06/03/19 13:20
Date Received: 06/04/19 09:10

Lab Sample ID: 320-50884-1
Matrix: Water

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	<1.9		20	1.9	ng/L		06/06/19 06:06	06/07/19 08:06	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	<3.0		20	3.0	ng/L		06/06/19 06:06	06/07/19 08:06	1
Perfluorobutanesulfonic acid (PFBS)	<0.20		2.0	0.20	ng/L		06/06/19 06:06	06/07/19 08:06	1
Perfluorodecanoic acid (PFDA)	<0.30		2.0	0.30	ng/L		06/06/19 06:06	06/07/19 08:06	1
Perfluorododecanoic acid (PFDoA)	<0.54		2.0	0.54	ng/L		06/06/19 06:06	06/07/19 08:06	1
Perfluoroheptanoic acid (PFHpA)	<0.24		2.0	0.24	ng/L		06/06/19 06:06	06/07/19 08:06	1
Perfluorohexanesulfonic acid (PFHxS)	**0.34**	**J B**	2.0	0.17	ng/L		06/06/19 06:06	06/07/19 08:06	1
Perfluorohexanoic acid (PFHxA)	<0.57		2.0	0.57	ng/L		06/06/19 06:06	06/07/19 08:06	1
Perfluorononanoic acid (PFNA)	<0.26		2.0	0.26	ng/L		06/06/19 06:06	06/07/19 08:06	1
Perfluorooctanesulfonic acid (PFOS)	<0.53		2.0	0.53	ng/L		06/06/19 06:06	06/07/19 08:06	1
Perfluorooctanoic acid (PFOA)	<0.83		2.0	0.83	ng/L		06/06/19 06:06	06/07/19 08:06	1
Perfluorotetradecanoic acid (PFTeA)	**0.30**	**J**	2.0	0.28	ng/L		06/06/19 06:06	06/07/19 08:06	1
Perfluorotridecanoic acid (PFTriA)	<1.3		2.0	1.3	ng/L		06/06/19 06:06	06/07/19 08:06	1
Perfluoroundecanoic acid (PFUnA)	<1.1		2.0	1.1	ng/L		06/06/19 06:06	06/07/19 08:06	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C3 PFBS	*94*		*25 - 150*	*06/06/19 06:06*	*06/07/19 08:06*	*1*
13C2 PFDA	*96*		*25 - 150*	*06/06/19 06:06*	*06/07/19 08:06*	*1*
13C2 PFDoA	*92*		*25 - 150*	*06/06/19 06:06*	*06/07/19 08:06*	*1*
13C4 PFHpA	*94*		*25 - 150*	*06/06/19 06:06*	*06/07/19 08:06*	*1*
13C2 PFHxA	*89*		*25 - 150*	*06/06/19 06:06*	*06/07/19 08:06*	*1*
13C5 PFNA	*96*		*25 - 150*	*06/06/19 06:06*	*06/07/19 08:06*	*1*
13C4 PFOA	*94*		*25 - 150*	*06/06/19 06:06*	*06/07/19 08:06*	*1*
13C4 PFOS	*94*		*25 - 150*	*06/06/19 06:06*	*06/07/19 08:06*	*1*
13C2 PFTeDA	*103*		*25 - 150*	*06/06/19 06:06*	*06/07/19 08:06*	*1*
18O2 PFHxS	*97*		*25 - 150*	*06/06/19 06:06*	*06/07/19 08:06*	*1*
13C2 PFUnA	*93*		*25 - 150*	*06/06/19 06:06*	*06/07/19 08:06*	*1*
d3-NMeFOSAA	*92*		*25 - 150*	*06/06/19 06:06*	*06/07/19 08:06*	*1*
d5-NEtFOSAA	*92*		*25 - 150*	*06/06/19 06:06*	*06/07/19 08:06*	*1*

Client Sample ID: DUP-02 (060319)
Lab Sample ID: 320-50884-2

Date Collected: 06/03/19 00:00
Matrix: Water

Date Received: 06/04/19 09:10

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	<1.9		20	1.9	ng/L		06/06/19 06:06	06/07/19 08:14	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	<3.1		20	3.1	ng/L		06/06/19 06:06	06/07/19 08:14	1
Perfluorobutanesulfonic acid (PFBS)	<0.20		2.0	0.20	ng/L		06/06/19 06:06	06/07/19 08:14	1
Perfluorodecanoic acid (PFDA)	<0.31		2.0	0.31	ng/L		06/06/19 06:06	06/07/19 08:14	1
Perfluorododecanoic acid (PFDoA)	<0.55		2.0	0.55	ng/L		06/06/19 06:06	06/07/19 08:14	1
Perfluoroheptanoic acid (PFHpA)	<0.25		2.0	0.25	ng/L		06/06/19 06:06	06/07/19 08:14	1
Perfluorohexanesulfonic acid (PFHxS)	**0.31**	**J B**	2.0	0.17	ng/L		06/06/19 06:06	06/07/19 08:14	1
Perfluorohexanoic acid (PFHxA)	<0.58		2.0	0.58	ng/L		06/06/19 06:06	06/07/19 08:14	1
Perfluorononanoic acid (PFNA)	<0.27		2.0	0.27	ng/L		06/06/19 06:06	06/07/19 08:14	1
Perfluorooctanesulfonic acid (PFOS)	<0.54		2.0	0.54	ng/L		06/06/19 06:06	06/07/19 08:14	1
Perfluorooctanoic acid (PFOA)	<0.86		2.0	0.86	ng/L		06/06/19 06:06	06/07/19 08:14	1
Perfluorotetradecanoic acid (PFTeA)	**0.36**	**J**	2.0	0.29	ng/L		06/06/19 06:06	06/07/19 08:14	1
Perfluorotridecanoic acid (PFTriA)	<1.3		2.0	1.3	ng/L		06/06/19 06:06	06/07/19 08:14	1
Perfluoroundecanoic acid (PFUnA)	<1.1		2.0	1.1	ng/L		06/06/19 06:06	06/07/19 08:14	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C3 PFBS	*102*		*25 - 150*	*06/06/19 06:06*	*06/07/19 08:14*	*1*
13C2 PFDA	*105*		*25 - 150*	*06/06/19 06:06*	*06/07/19 08:14*	*1*
13C2 PFDoA	*97*		*25 - 150*	*06/06/19 06:06*	*06/07/19 08:14*	*1*
13C4 PFHpA	*104*		*25 - 150*	*06/06/19 06:06*	*06/07/19 08:14*	*1*
13C2 PFHxA	*98*		*25 - 150*	*06/06/19 06:06*	*06/07/19 08:14*	*1*
13C5 PFNA	*96*		*25 - 150*	*06/06/19 06:06*	*06/07/19 08:14*	*1*
13C4 PFOA	*101*		*25 - 150*	*06/06/19 06:06*	*06/07/19 08:14*	*1*
13C4 PFOS	*95*		*25 - 150*	*06/06/19 06:06*	*06/07/19 08:14*	*1*
13C2 PFTeDA	*104*		*25 - 150*	*06/06/19 06:06*	*06/07/19 08:14*	*1*
18O2 PFHxS	*103*		*25 - 150*	*06/06/19 06:06*	*06/07/19 08:14*	*1*
13C2 PFUnA	*101*		*25 - 150*	*06/06/19 06:06*	*06/07/19 08:14*	*1*
d3-NMeFOSAA	*98*		*25 - 150*	*06/06/19 06:06*	*06/07/19 08:14*	*1*
d5-NEtFOSAA	*99*		*25 - 150*	*06/06/19 06:06*	*06/07/19 08:14*	*1*

Client: ARCADIS U.S., Inc.
Project/Site: Marinette, WI WI001605.0009.00005

Job ID: 320-50884-1

Client Sample ID: FIELD-BLANK-06-03-2019

Date Collected: 06/03/19 13:25
Date Received: 06/04/19 09:10

Lab Sample ID: 320-50884-3

Matrix: Water

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	<1.8		19	1.8	ng/L		06/06/19 06:06	06/07/19 08:22	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	<2.9		19	2.9	ng/L		06/06/19 06:06	06/07/19 08:22	1
Perfluorobutanesulfonic acid (PFBS)	<0.19		1.9	0.19	ng/L		06/06/19 06:06	06/07/19 08:22	1
Perfluorodecanoic acid (PFDA)	<0.29		1.9	0.29	ng/L		06/06/19 06:06	06/07/19 08:22	1
Perfluorododecanoic acid (PFDoA)	<0.51		1.9	0.51	ng/L		06/06/19 06:06	06/07/19 08:22	1
Perfluoroheptanoic acid (PFHpA)	<0.23		1.9	0.23	ng/L		06/06/19 06:06	06/07/19 08:22	1
Perfluorohexanesulfonic acid (PFHxS)	**0.35**	**J I B**	1.9	0.16	ng/L		06/06/19 06:06	06/07/19 08:22	1
Perfluorohexanoic acid (PFHxA)	<0.54		1.9	0.54	ng/L		06/06/19 06:06	06/07/19 08:22	1
Perfluorononanoic acid (PFNA)	<0.25		1.9	0.25	ng/L		06/06/19 06:06	06/07/19 08:22	1
Perfluorooctanesulfonic acid (PFOS)	<0.50		1.9	0.50	ng/L		06/06/19 06:06	06/07/19 08:22	1
Perfluorooctanoic acid (PFOA)	<0.79		1.9	0.79	ng/L		06/06/19 06:06	06/07/19 08:22	1
Perfluorotetradecanoic acid (PFTeA)	<0.27		1.9	0.27	ng/L		06/06/19 06:06	06/07/19 08:22	1
Perfluorotridecanoic acid (PFTriA)	<1.2		1.9	1.2	ng/L		06/06/19 06:06	06/07/19 08:22	1
Perfluoroundecanoic acid (PFUnA)	<1.0		1.9	1.0	ng/L		06/06/19 06:06	06/07/19 08:22	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C3 PFBS	*95*		*25 - 150*	*06/06/19 06:06*	*06/07/19 08:22*	*1*
13C2 PFDA	*104*		*25 - 150*	*06/06/19 06:06*	*06/07/19 08:22*	*1*
13C2 PFDoA	*98*		*25 - 150*	*06/06/19 06:06*	*06/07/19 08:22*	*1*
13C4 PFHpA	*96*		*25 - 150*	*06/06/19 06:06*	*06/07/19 08:22*	*1*
13C2 PFHxA	*92*		*25 - 150*	*06/06/19 06:06*	*06/07/19 08:22*	*1*
13C5 PFNA	*98*		*25 - 150*	*06/06/19 06:06*	*06/07/19 08:22*	*1*
13C4 PFOA	*99*		*25 - 150*	*06/06/19 06:06*	*06/07/19 08:22*	*1*
13C4 PFOS	*97*		*25 - 150*	*06/06/19 06:06*	*06/07/19 08:22*	*1*
13C2 PFTeDA	*105*		*25 - 150*	*06/06/19 06:06*	*06/07/19 08:22*	*1*
18O2 PFHxS	*99*		*25 - 150*	*06/06/19 06:06*	*06/07/19 08:22*	*1*
13C2 PFUnA	*94*		*25 - 150*	*06/06/19 06:06*	*06/07/19 08:22*	*1*
d3-NMeFOSAA	*96*		*25 - 150*	*06/06/19 06:06*	*06/07/19 08:22*	*1*
d5-NEtFOSAA	*91*		*25 - 150*	*06/06/19 06:06*	*06/07/19 08:22*	*1*

Isotope Dilution Summary

Client: ARCADIS U.S., Inc.
Project/Site: Marinette, WI WI001605.0009.00005

Job ID: 320-50884-1

Method: 537 (modified) - Fluorinated Alkyl Substances

Matrix: Water

Prep Type: Total/NA

		Percent Isotope Dilution Recovery (Acceptance Limits)							
Lab Sample ID	Client Sample ID	3C3-PFBS (25-150)	PFDA (25-150)	PFDoA (25-150)	PFHpA (25-150)	PFHxA (25-150)	PFNA (25-150)	PFOA (25-150)	PFOS (25-150)
320-50884-1	IRR-02	94	96	92	94	89	96	94	94
320-50884-2	DUP-02 (060319)	102	105	97	104	98	96	101	95
320-50884-3	FIELD-BLANK-06-03-2019	95	104	98	96	92	98	99	97
LCS 320-299496/2-A	Lab Control Sample	100	100	91	98	89	100	95	96
LCSD 320-299496/3-A	Lab Control Sample Dup	96	105	97	96	89	100	97	97
MB 320-299496/1-A	Method Blank	96	102	95	90	92	95	99	93

		Percent Isotope Dilution Recovery (Acceptance Limits)							
Lab Sample ID	Client Sample ID	PFTDA (25-150)	PFHxS (25-150)	PFUnA (25-150)	-NMeFOS/ (25-150)	-NEtFOSA (25-150)			
320-50884-1	IRR-02	103	97	93	92	92			
320-50884-2	DUP-02 (060319)	104	103	101	98	99			
320-50884-3	FIELD-BLANK-06-03-2019	105	99	94	96	91			
LCS 320-299496/2-A	Lab Control Sample	100	100	96	101	93			
LCSD 320-299496/3-A	Lab Control Sample Dup	102	97	93	100	95			
MB 320-299496/1-A	Method Blank	104	93	96	94	91			

Surrogate Legend

13C3-PFBS = 13C3 PFBS
PFDA = 13C2 PFDA
PFDoA = 13C2 PFDoA
PFHpA = 13C4 PFHpA
PFHxA = 13C2 PFHxA
PFNA = 13C5 PFNA
PFOA = 13C4 PFOA
PFOS = 13C4 PFOS
PFTDA = 13C2 PFTeDA
PFHxS = 18O2 PFHxS
PFUnA = 13C2 PFUnA
d3-NMeFOSAA = d3-NMeFOSAA
d5-NEtFOSAA = d5-NEtFOSAA

Method: 537 (modified) - Fluorinated Alkyl Substances

Lab Sample ID: MB 320-299496/1-A
Matrix: Water
Analysis Batch: 299710

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 299496

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	<1.9		20	1.9	ng/L		06/06/19 06:06	06/07/19 07:42	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	<3.1		20	3.1	ng/L		06/06/19 06:06	06/07/19 07:42	1
Perfluorobutanesulfonic acid (PFBS)	<0.20		2.0	0.20	ng/L		06/06/19 06:06	06/07/19 07:42	1
Perfluorodecanoic acid (PFDA)	0.324	J	2.0	0.31	ng/L		06/06/19 06:06	06/07/19 07:42	1
Perfluorododecanoic acid (PFDoA)	<0.55		2.0	0.55	ng/L		06/06/19 06:06	06/07/19 07:42	1
Perfluoroheptanoic acid (PFHpA)	<0.25		2.0	0.25	ng/L		06/06/19 06:06	06/07/19 07:42	1
Perfluorohexanesulfonic acid (PFHxS)	0.326	J	2.0	0.17	ng/L		06/06/19 06:06	06/07/19 07:42	1
Perfluorohexanoic acid (PFHxA)	<0.58		2.0	0.58	ng/L		06/06/19 06:06	06/07/19 07:42	1
Perfluorononanoic acid (PFNA)	0.328	J I	2.0	0.27	ng/L		06/06/19 06:06	06/07/19 07:42	1
Perfluorooctanesulfonic acid (PFOS)	<0.54		2.0	0.54	ng/L		06/06/19 06:06	06/07/19 07:42	1
Perfluorooctanoic acid (PFOA)	<0.85		2.0	0.85	ng/L		06/06/19 06:06	06/07/19 07:42	1
Perfluorotetradecanoic acid (PFTeA)	<0.29		2.0	0.29	ng/L		06/06/19 06:06	06/07/19 07:42	1
Perfluorotridecanoic acid (PFTriA)	<1.3		2.0	1.3	ng/L		06/06/19 06:06	06/07/19 07:42	1
Perfluoroundecanoic acid (PFUnA)	<1.1		2.0	1.1	ng/L		06/06/19 06:06	06/07/19 07:42	1

Isotope Dilution	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C3 PFBS	*94*		*25 - 150*	*06/06/19 04:04*	*06/07/19 07:42*	*1*
13C2 PF8D	*102*		*25 - 150*	*06/06/19 04:04*	*06/07/19 07:42*	*1*
13C2 PF8AD	*95*		*25 - 150*	*06/06/19 04:04*	*06/07/19 07:42*	*1*
13C7 PFoHD	*90*		*25 - 150*	*06/06/19 04:04*	*06/07/19 07:42*	*1*
13C2 PFopD	*92*		*25 - 150*	*06/06/19 04:04*	*06/07/19 07:42*	*1*
13C5 PFxD	*95*		*25 - 150*	*06/06/19 04:04*	*06/07/19 07:42*	*1*
13C7 PFND	*99*		*25 - 150*	*06/06/19 04:04*	*06/07/19 07:42*	*1*
13C7 PFNS	*93*		*25 - 150*	*06/06/19 04:04*	*06/07/19 07:42*	*1*
13C2 PFOT8D	*107*		*25 - 150*	*06/06/19 04:04*	*06/07/19 07:42*	*1*
1eN2 PFopS	*93*		*25 - 150*	*06/06/19 04:04*	*06/07/19 07:42*	*1*
13C2 PFUnD	*94*		*25 - 150*	*06/06/19 04:04*	*06/07/19 07:42*	*1*
d3-x MTFNSDD	*97*		*25 - 150*	*06/06/19 04:04*	*06/07/19 07:42*	*1*
d5-x EtFNSDD	*91*		*25 - 150*	*06/06/19 04:04*	*06/07/19 07:42*	*1*

Lab Sample ID: LCS 320-299496/2-A
Matrix: Water
Analysis Batch: 299710

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 299496

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	40.0	36.8		ng/L		92	65 - 125
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	40.0	37.3		ng/L		93	67 - 127
Perfluorobutanesulfonic acid (PFBS)	35.4	35.9		ng/L		101	73 - 133
Perfluorodecanoic acid (PFDA)	40.0	40.8		ng/L		102	69 - 129
Perfluorododecanoic acid (PFDoA)	40.0	44.2		ng/L		111	71 - 131
Perfluoroheptanoic acid (PFHpA)	40.0	41.7		ng/L		104	66 - 126
Perfluorohexanesulfonic acid (PFHxS)	36.4	33.0		ng/L		91	63 - 123
Perfluorohexanoic acid (PFHxA)	40.0	43.7		ng/L		109	66 - 126

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Lab Sample ID: LCS 320-299496/2-A
Matrix: Water
Analysis Batch: 299710

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 299496

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Perfluorononanoic acid (PFNA)			40.0	40.7		ng/L		102	68 - 128		
Perfluorooctanesulfonic acid (PFOS)			37.1	37.6		ng/L		101	67 - 127		
Perfluorooctanoic acid (PFOA)			40.0	40.3		ng/L		101	64 - 124		
Perfluorotetradecanoic acid (PFTeA)			40.0	42.4		ng/L		106	68 - 128		
Perfluorotridecanoic acid (PFTriA)			40.0	39.1		ng/L		98	72 - 132		
Perfluoroundecanoic acid (PFUnA)			40.0	39.3		ng/L		98	60 - 120		

Isotope Dilution	*LCS %Recovery*	*LCS Qualifier*	*Limits*
13C3 PFBS	*100*		*25 - 150*
13C2 PF8D	*100*		*25 - 150*
13C2 PF8AD	*91*		*25 - 150*
13C7 PFoHD	*9e*		*25 - 150*
13C2 PFopD	*e9*		*25 - 150*
13C5 PFxD	*100*		*25 - 150*
13C7 PFND	*95*		*25 - 150*
13C7 PFNS	*94*		*25 - 150*
13C2 PFOT8D	*100*		*25 - 150*
1eN2 PFopS	*100*		*25 - 150*
13C2 PFUnD	*94*		*25 - 150*
d3-x MTFNSDD	*101*		*25 - 150*
d5-x EtFNSDD	*93*		*25 - 150*

Lab Sample ID: LCSD 320-299496/3-A
Matrix: Water
Analysis Batch: 299710

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 299496

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)			40.0	39.4		ng/L		98	65 - 125	7	30
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)			40.0	37.7		ng/L		94	67 - 127	1	30
Perfluorobutanesulfonic acid (PFBS)			35.4	36.2		ng/L		102	73 - 133	1	30
Perfluorodecanoic acid (PFDA)			40.0	40.2		ng/L		100	69 - 129	2	30
Perfluorododecanoic acid (PFDoA)			40.0	42.5		ng/L		106	71 - 131	4	30
Perfluoroheptanoic acid (PFHpA)			40.0	41.8		ng/L		104	66 - 126	0	30
Perfluorohexanesulfonic acid (PFHxS)			36.4	33.2		ng/L		91	63 - 123	1	30
Perfluorohexanoic acid (PFHxA)			40.0	42.5		ng/L		106	66 - 126	3	30
Perfluorononanoic acid (PFNA)			40.0	42.6		ng/L		106	68 - 128	4	30
Perfluorooctanesulfonic acid (PFOS)			37.1	37.4		ng/L		101	67 - 127	0	30
Perfluorooctanoic acid (PFOA)			40.0	41.9		ng/L		105	64 - 124	4	30
Perfluorotetradecanoic acid (PFTeA)			40.0	40.6		ng/L		101	68 - 128	4	30
Perfluorotridecanoic acid (PFTriA)			40.0	39.1		ng/L		98	72 - 132	0	30

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Lab Sample ID: LCSD 320-299496/3-A
Matrix: Water
Analysis Batch: 299710

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 299496

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Perfluoroundecanoic acid (PFUnA)			40.0	40.2		ng/L		101	60 - 120	2	30

Isotope Dilution	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
13C3 PFBS	*94*		*25 - 150*
13C2 PF8D	*105*		*25 - 150*
13C2 PF8AD	*9/*		*25 - 150*
13C7 PFoHD	*94*		*25 - 150*
13C2 PFopD	*e9*		*25 - 150*
13C5 PFxD	*100*		*25 - 150*
13C7 PFND	*9/*		*25 - 150*
13C7 PFNS	*9/*		*25 - 150*
13C2 PFOT8D	*102*		*25 - 150*
1eN2 PFopS	*9/*		*25 - 150*
13C2 PFUnD	*93*		*25 - 150*
d3-x MTFNSDD	*100*		*25 - 150*
d5-x EtFNSDD	*95*		*25 - 150*

QC Association Summary

Client: ARCADIS U.S., Inc.
Job ID: 320-50884-1
Project/Site: Marinette, WI WI001605.0009.00005

LCMS

Prep Batch: 299496

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-50884-1	IRR-02	Total/NA	Water	3535	
320-50884-2	DUP-02 (060319)	Total/NA	Water	3535	
320-50884-3	FIELD-BLANK-06-03-2019	Total/NA	Water	3535	
MB 320-299496/1-A	Method Blank	Total/NA	Water	3535	
LCS 320-299496/2-A	Lab Control Sample	Total/NA	Water	3535	
LCSD 320-299496/3-A	Lab Control Sample Dup	Total/NA	Water	3535	

Analysis Batch: 299710

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-50884-1	IRR-02	Total/NA	Water	537 (modified)	299496
320-50884-2	DUP-02 (060319)	Total/NA	Water	537 (modified)	299496
320-50884-3	FIELD-BLANK-06-03-2019	Total/NA	Water	537 (modified)	299496
MB 320-299496/1-A	Method Blank	Total/NA	Water	537 (modified)	299496
LCS 320-299496/2-A	Lab Control Sample	Total/NA	Water	537 (modified)	299496
LCSD 320-299496/3-A	Lab Control Sample Dup	Total/NA	Water	537 (modified)	299496

Lab Chronicle

Client: ARCADIS U.S., Inc.
Project/Site: Marinette, WI WI001605.0009.00005

Job ID: 320-50884-1

Client Sample ID: IRR-02

Lab Sample ID: 320-50884-1

Date Collected: 06/03/19 13:20

Matrix: Water

Date Received: 06/04/19 09:10

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			256.2 mL	10.00 mL	299496	06/06/19 06:06	KJP	TAL SAC
Total/NA	Analysis	537 (modified)		1			299710	06/07/19 08:06	S1M	TAL SAC

Client Sample ID: DUP-02 (060319)

Lab Sample ID: 320-50884-2

Date Collected: 06/03/19 00:00

Matrix: Water

Date Received: 06/04/19 09:10

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			248 mL	10.00 mL	299496	06/06/19 06:06	KJP	TAL SAC
Total/NA	Analysis	537 (modified)		1			299710	06/07/19 08:14	S1M	TAL SAC

Client Sample ID: FIELD-BLANK-06-03-2019

Lab Sample ID: 320-50884-3

Date Collected: 06/03/19 13:25

Matrix: Water

Date Received: 06/04/19 09:10

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			268.4 mL	10.00 mL	299496	06/06/19 06:06	KJP	TAL SAC
Total/NA	Analysis	537 (modified)		1			299710	06/07/19 08:22	S1M	TAL SAC

Laboratory References:

TAL SAC = Eurofins TestAmerica, Sacramento, 880 Riverside Parkway, West Sacramento, CA 95605, TEL (916)373-5600

Accreditation/Certification Summary

Client: ARCADIS U.S., Inc.
Job ID: 320-50884-1
Project/Site: Marinette, WI WI001605.0009.00005

Laboratory: Eurofins TestAmerica, Sacramento

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	EPA Region	Identification Number	Expiration Date
Alaska (UST)	State Program	10	17-020	01-20-21
ANAB	DoD		L2468	01-20-21
ANAB	DOE		L2468.01	01-20-21
Arizona	State Program	9	AZ0708	08-11-19
Arkansas DEQ	State Program	6	88-0691	06-17-20
California	State Program	9	2897	01-31-20
Colorado	State Program	8	CA00044	08-31-19
Connecticut	State Program	1	PH-0691	06-30-19
Florida	NELAP	4	E87570	06-30-19
Hawaii	State Program	9	N/A	01-29-20
Illinois	NELAP	5	200060	03-17-19 *
Kansas	NELAP	7	E-10375	10-31-19
Louisiana	NELAP	6	30612	06-30-19
Maine	State Program	1	CA0004	04-14-20
Michigan	State Program	5	9947	01-31-20
Nevada	State Program	9	CA00044	07-31-19
New Hampshire	NELAP	1	2997	04-20-20
New Jersey	NELAP	2	CA005	06-30-19
New York	NELAP	2	11666	04-01-20
Oregon	NELAP	10	4040	01-29-20
Pennsylvania	NELAP	3	68-01272	03-31-20
Texas	NELAP	6	T104704399	05-31-20
US Fish & Wildlife	Federal		LE148388-0	07-31-19
USDA	Federal		P330-18-00239	01-17-21
USEPA UCMR	Federal	1	CA00044	12-31-20
Utah	NELAP	8	CA00044	02-29-20
Vermont	State Program	1	VT-4040	04-16-20
Virginia	NELAP	3	460278	03-14-20
Washington	State Program	10	C581	05-05-20
West Virginia (DW)	State Program	3	9930C	12-31-19
Wyoming	State Program	8	8TMS-L	01-28-19 *

Laboratory: Eurofins TestAmerica, Chicago

The accreditations/certifications listed below are applicable to this report.

Authority	Program	EPA Region	Identification Number	Expiration Date
Wisconsin	State Program	5	999580010	08-31-19 *

* Accreditation/Certification renewal pending - accreditation/certification considered valid.

Method Summary

Client: ARCADIS U.S., Inc.
Job ID: 320-50884-1
Project/Site: Marinette, WI WI001605.0009.00005

Method	Method Description	Protocol	Laboratory
537 (modified)	Fluorinated Alkyl Substances	EPA	TAL SAC
3535	Solid-Phase Extraction (SPE)	SW846	TAL SAC

Protocol References:

EPA = US Environmental Protection Agency

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL SAC = Eurofins TestAmerica, Sacramento, 880 Riverside Parkway, West Sacramento, CA 95605, TEL (916)373-5600

Sample Summary

Client: ARCADIS U.S., Inc.
Job ID: 320-50884-1
Project/Site: Marinette, WI WI001605.0009.00005

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
320-50884-1	IRR-02	Water	06/03/19 13:20	06/04/19 09:10	
320-50884-2	DUP-02 (060319)	Water	06/03/19 00:00	06/04/19 09:10	
320-50884-3	FIELD-BLANK-06-03-2019	Water	06/03/19 13:25	06/04/19 09:10	

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

2417 Bond Street, University Park, IL 60484
Phone: 708.534.5200 Fax: 708.534.5211

Chain of Custody Record

Report To (optional)	Bill To (optional)
Contact: LISA RUTKOWSKI	Contact:
Company: ARCADIS	Company:
Address:	Address:
Address:	Address:
Phone:	Phone:
Fax:	Fax:
E-Mail:	PO#/Reference#

Lab Job #:

Chain of Custody Number:

Page 1 of 1

Temperature °C of Cooler: 2.8°C

Client	Client Project #	Preservative	8
Arcadis	WI001605.0007.00001	Parameter	Modified 537 14 compounds
Project Name: Marinette, WI			
Project Location/State: Marinette, WI	Lab Project #		
Sampler: GVV, LR	Lab PM: S. Frednick		

Preservative Key
1. HCL, Cool to 4°
2. H2SO4, Cool to 4°
3. HNO3, Cool to 4°
4. NaOH, Cool to 4°
5. NaOH/Zn, Cool to 4°
6. NaHSO4
7. Cool to 4°
8. None
9. Other

Lab ID	MS/MSD	Sample ID	Sampling Date	Sampling Time	# of Containers	Matrix	Modified 537 14 compounds	Comments
		IRR-02	6/3/19	1320	2	W	✓	
		DUP-01	↓	—	↓	↓	✓	Duplicate
		FIELD-BLANK-060319	↓	1325	↓	↓	✓	Field blank

320-50884 Chain of Custody

Turnaround Time Required (Business Days)
___ 1 Day ___ 2 Days ___ 5 Days ___ 7 Days X 10 Days ___ 15 Days _____ Other
Requested Due Date:

Sample Disposal
☐ Return to Client ☒ Disposal by Lab ☐ Archive for _____ Months (A fee may be assessed if samples are retained longer than 1 month)

Relinquished By	Company	Date	Time	Received By	Company	Date	Time
G. VANDER VEEN	Arcadis	6/3/19	1500		ETA-SAC	6/4/19	910
Relinquished By	Company	Date	Time	Received By	Company	Date	Time
Relinquished By	Company	Date	Time	Received By	Company	Date	Time

Lab Courier:
Shipped: Fedex
Hand Delivered:

Matrix Key
WW – Wastewater
W – Water
S – Soil
SL – Sludge
MS – Miscellaneous
OL – Oil
A – Air
SE – Sediment
SO – Soil
L – Leachate
WI – Wipe
DW – Drinking Water
O – Other

Client Comments
Level 4 QA/QC
Questions call Lisa Rutkowski

Lab Comments:

TAL-4124-500 (1209)

Fredrick, Sandie

From: Rutkowski, Lisa [redacted]
Sent: Wednesday, June 05, 2019 9:52 AM
To: Fredrick, Sandie
Cc: Henry, Erin; Wheeler, Allison
Subject: FW: Eurofins TestAmerica Sample Login Confirmation files from 320-50884 Marinette, WI WI001605.0006.00001
Attachments: Std_Tal_Login_Ack for 320-50884-1.pdf; COC 320-50884 (201906041756).pdf; Std_Tal_Login_Limits for 320-50884-1.pdf

-External Email-

Hi Sandie,

The project number is actually WI001605.0009.00005 for this one and the method should be 537 Modified.

Can you please update the following sample ID?

- Change DUP-01 to DUP-02 (060319)

If you can run for 5 day TAT, that would be great, with the understanding that may not be possible.

Thanks!
Lisa

From: Sandie Fredrick <sandie.fredrick@testamericainc.com>
Sent: Tuesday, June 4, 2019 8:51 PM
[redacted]
Subject: Eurofins TestAmerica Sample Login Confirmation files from 320-50884 Marinette, WI WI001605.0006.00001

Hello Ladies,

Attached, please find the Sample Confirmation files for job 320-50884; Marinette, WI WI001605.0006.00001

Please feel free to contact me if you have any questions.

Thank you.

Sandie Fredrick
Project Manager

TestAmerica Laboratories, Inc.
Phone: 920-261-1660

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Reference: [320-198409]
Attachments: 3

Please let us know if we met your expectations by rating the service you received from Eurofins TestAmerica on this project by visiting our website at: Project Feedback

Login Sample Receipt Checklist

Client: ARCADIS U.S., Inc.

Job Number: 320-50884-1

Login Number: 50884
List Number: 1
Creator: Oropeza, Salvador

List Source: Eurofins TestAmerica, Sacramento

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	136390
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Client: ARCADIS U.S., Inc.
Project/Site: Marinette, WI Deep Well 30135605.03

Job ID: 500-216998-1

Client Sample ID: IRR-01-374 (20220519)
Date Collected: 05/19/22 13:15
Date Received: 05/21/22 10:15

Lab Sample ID: 500-216998-1
Matrix: Water

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	<4.5		4.5	2.2	ng/L		06/10/22 05:33	06/15/22 03:14	1
Perfluoropentanoic acid (PFPeA)	<1.8		1.8	0.44	ng/L		06/10/22 05:33	06/15/22 03:14	1
Perfluorohexanoic acid (PFHxA)	<1.8		1.8	0.52	ng/L		06/10/22 05:33	06/15/22 03:14	1
Perfluoroheptanoic acid (PFHpA)	<1.8		1.8	0.22	ng/L		06/10/22 05:33	06/15/22 03:14	1
Perfluorooctanoic acid (PFOA)	<1.8		1.8	0.76	ng/L		06/10/22 05:33	06/15/22 03:14	1
Perfluorononanoic acid (PFNA)	<1.8		1.8	0.24	ng/L		06/10/22 05:33	06/15/22 03:14	1
Perfluorodecanoic acid (PFDA)	<1.8		1.8	0.28	ng/L		06/10/22 05:33	06/15/22 03:14	1
Perfluoroundecanoic acid (PFUnA)	<1.8		1.8	0.99	ng/L		06/10/22 05:33	06/15/22 03:14	1
Perfluorododecanoic acid (PFDoA)	<1.8		1.8	0.49	ng/L		06/10/22 05:33	06/15/22 03:14	1
Perfluorotridecanoic acid (PFTrDA)	<1.8		1.8	1.2	ng/L		06/10/22 05:33	06/15/22 03:14	1
Perfluorotetradecanoic acid (PFTeA)	<1.8		1.8	0.66	ng/L		06/10/22 05:33	06/15/22 03:14	1
Perfluoro-n-hexadecanoic acid (PFHxDA)	<1.8		1.8	0.80	ng/L		06/10/22 05:33	06/15/22 03:14	1
Perfluoro-n-octadecanoic acid (PFODA)	<1.8		1.8	0.85	ng/L		06/10/22 05:33	06/15/22 03:14	1
Perfluorobutanesulfonic acid (PFBS)	<1.8		1.8	0.18	ng/L		06/10/22 05:33	06/15/22 03:14	1
Perfluoropentanesulfonic acid (PFPeS)	<1.8		1.8	0.27	ng/L		06/10/22 05:33	06/15/22 03:14	1
Perfluorohexanesulfonic acid (PFHxS)	<1.8		1.8	0.51	ng/L		06/10/22 05:33	06/15/22 03:14	1
Perfluoroheptanesulfonic acid (PFHpS)	<1.8		1.8	0.17	ng/L		06/10/22 05:33	06/15/22 03:14	1
Perfluorooctanesulfonic acid (PFOS)	<1.8		1.8	0.49	ng/L		06/10/22 05:33	06/15/22 03:14	1
Perfluorononanesulfonic acid (PFNS)	<1.8		1.8	0.33	ng/L		06/10/22 05:33	06/15/22 03:14	1
Perfluorodecanesulfonic acid (PFDS)	<1.8		1.8	0.29	ng/L		06/10/22 05:33	06/15/22 03:14	1
Perfluorododecanesulfonic acid (PFDoS)	<1.8		1.8	0.87	ng/L		06/10/22 05:33	06/15/22 03:14	1
Perfluorooctanesulfonamide (FOSA)	<1.8		1.8	0.88	ng/L		06/10/22 05:33	06/15/22 03:14	1
NEtFOSA	<1.8		1.8	0.78	ng/L		06/10/22 05:33	06/15/22 03:14	1
NMeFOSA	<1.8		1.8	0.39	ng/L		06/10/22 05:33	06/15/22 03:14	1
NMeFOSAA	<4.5		4.5	1.1	ng/L		06/10/22 05:33	06/15/22 03:14	1
NEtFOSAA	<4.5		4.5	1.2	ng/L		06/10/22 05:33	06/15/22 03:14	1
NMeFOSE	<3.6		3.6	1.3	ng/L		06/10/22 05:33	06/15/22 03:14	1
NEtFOSE	<1.8		1.8	0.76	ng/L		06/10/22 05:33	06/15/22 03:14	1
4:2 FTS	<1.8		1.8	0.22	ng/L		06/10/22 05:33	06/15/22 03:14	1
6:2 FTS	<4.5		4.5	2.2	ng/L		06/10/22 05:33	06/15/22 03:14	1
8:2 FTS	<1.8		1.8	0.41	ng/L		06/10/22 05:33	06/15/22 03:14	1
10:2 FTS	<1.8		1.8	0.60	ng/L		06/10/22 05:33	06/15/22 03:14	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	<1.8		1.8	0.36	ng/L		06/10/22 05:33	06/15/22 03:14	1
HFPO-DA (GenX)	<3.6		3.6	1.3	ng/L		06/10/22 05:33	06/15/22 03:14	1
9Cl-PF3ONS	<1.8		1.8	0.22	ng/L		06/10/22 05:33	06/15/22 03:14	1
11Cl-PF3OUdS	<1.8		1.8	0.29	ng/L		06/10/22 05:33	06/15/22 03:14	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFBA	*97*		*25 - 150*	*06/10/22 05:33*	*06/15/22 03:14*	*1*
13C5 PFPeA	*94*		*25 - 150*	*06/10/22 05:33*	*06/15/22 03:14*	*1*
13C2 PFHxA	*90*		*25 - 150*	*06/10/22 05:33*	*06/15/22 03:14*	*1*
13C4 PFHpA	*108*		*25 - 150*	*06/10/22 05:33*	*06/15/22 03:14*	*1*
13C4 PFOA	*93*		*25 - 150*	*06/10/22 05:33*	*06/15/22 03:14*	*1*
13C5 PFNA	*93*		*25 - 150*	*06/10/22 05:33*	*06/15/22 03:14*	*1*
13C2 PFDA	*91*		*25 - 150*	*06/10/22 05:33*	*06/15/22 03:14*	*1*
13C2 PFUnA	*92*		*25 - 150*	*06/10/22 05:33*	*06/15/22 03:14*	*1*

Client Sample ID: IRR-01-374 (20220519)
Date Collected: 05/19/22 13:15
Date Received: 05/21/22 10:15

Lab Sample ID: 500-216998-1
Matrix: Water

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFDoA	92		25 - 150	06/10/22 05:33	06/15/22 03:14	1
13C2 PFTeDA	89		25 - 150	06/10/22 05:33	06/15/22 03:14	1
13C2 PFHxDA	88		25 - 150	06/10/22 05:33	06/15/22 03:14	1
13C3 PFBS	89		25 - 150	06/10/22 05:33	06/15/22 03:14	1
18O2 PFHxS	91		25 - 150	06/10/22 05:33	06/15/22 03:14	1
13C4 PFOS	87		25 - 150	06/10/22 05:33	06/15/22 03:14	1
13C8 FOSA	94		10 - 150	06/10/22 05:33	06/15/22 03:14	1
d3-NMeFOSAA	89		25 - 150	06/10/22 05:33	06/15/22 03:14	1
d5-NEtFOSAA	91		25 - 150	06/10/22 05:33	06/15/22 03:14	1
d-N-MeFOSA-M	74		10 - 150	06/10/22 05:33	06/15/22 03:14	1
d-N-EtFOSA-M	76		10 - 150	06/10/22 05:33	06/15/22 03:14	1
d7-N-MeFOSE-M	79		10 - 150	06/10/22 05:33	06/15/22 03:14	1
d9-N-EtFOSE-M	80		10 - 150	06/10/22 05:33	06/15/22 03:14	1
M2-4:2 FTS	102		25 - 150	06/10/22 05:33	06/15/22 03:14	1
M2-6:2 FTS	104		25 - 150	06/10/22 05:33	06/15/22 03:14	1
M2-8:2 FTS	108		25 - 150	06/10/22 05:33	06/15/22 03:14	1
13C3 HFPO-DA	102		25 - 150	06/10/22 05:33	06/15/22 03:14	1
13C2 10:2 FTS	102		25 - 150	06/10/22 05:33	06/15/22 03:14	1

Method: 6010D - Metales (ICP) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfur	**150**		0.20	0.056	mg/L		06/21/22 17:30	06/22/22 13:20	2

Method: 6020A - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	<100		100	25	ug/L		05/25/22 08:39	05/25/22 20:47	1
Antimony	<3.0		3.0	1.3	ug/L		05/25/22 08:39	05/25/22 20:47	1
Arsenic	**0.36**	**J**	1.0	0.23	ug/L		05/25/22 08:39	05/25/22 20:47	1
Barium	**9.5**		2.5	0.73	ug/L		05/25/22 08:39	05/25/22 20:47	1
Beryllium	<1.0		1.0	0.53	ug/L		05/25/22 08:39	05/26/22 14:42	1
Boron	**250**		50	13	ug/L		05/25/22 08:39	05/25/22 20:47	1
Cadmium	<0.50		0.50	0.17	ug/L		05/25/22 08:39	05/25/22 20:47	1
Calcium	**140000**		200	44	ug/L		05/25/22 08:39	05/25/22 20:47	1
Chromium	<5.0		5.0	1.1	ug/L		05/25/22 08:39	05/25/22 20:47	1
Cobalt	<1.0		1.0	0.40	ug/L		05/25/22 08:39	05/25/22 20:47	1
Copper	**1.2**	**J B**	2.0	0.50	ug/L		05/25/22 08:39	05/25/22 20:47	1
Iron	**470**		100	47	ug/L		05/25/22 08:39	05/25/22 20:47	1
Lead	**0.26**	**J**	0.50	0.19	ug/L		05/25/22 08:39	05/25/22 20:47	1
Magnesium	**53000**		200	49	ug/L		05/25/22 08:39	05/25/22 20:47	1
Manganese	**23**		2.5	0.79	ug/L		05/25/22 08:39	05/25/22 20:47	1
Nickel	<2.0		2.0	0.63	ug/L		05/25/22 08:39	05/25/22 20:47	1
Potassium	**5400**		500	110	ug/L		05/25/22 08:39	05/25/22 20:47	1
Selenium	<2.5		2.5	0.98	ug/L		05/25/22 08:39	05/25/22 20:47	1
Silver	<0.50		0.50	0.12	ug/L		05/25/22 08:39	05/25/22 20:47	1
Sodium	**50000**		200	77	ug/L		05/25/22 08:39	05/26/22 14:42	1
Strontium	**6400**	**^6+**	20	3.2	ug/L		05/25/22 08:39	05/26/22 14:45	5
Thallium	<2.0		2.0	0.57	ug/L		05/25/22 08:39	05/25/22 20:47	1
Vanadium	<5.0		5.0	2.2	ug/L		05/25/22 08:39	05/25/22 20:47	1
Zinc	**20**		20	6.9	ug/L		05/25/22 08:39	05/25/22 20:47	1

Client Sample ID: IRR-01-374 (20220519)
Lab Sample ID: 500-216998-1

Date Collected: 05/19/22 13:15
Matrix: Water
Date Received: 05/21/22 10:15

Method: 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Uranium	<1.0		1.0	0.40	ug/L		05/27/22 11:18	05/31/22 22:28	2

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.20		0.20	0.098	ug/L		05/27/22 09:40	05/31/22 12:44	1

Method: SM 2340B - Total Hardness (as CaCO3) by calculation - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Hardness as calcium carbonate	**560**		0.91	0.46	mg/L		05/25/22 08:39	05/27/22 11:06	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Bromide	**0.51**		0.25	0.050	mg/L			05/21/22 13:42	1
Chloride	**72**		4.0	3.4	mg/L			05/21/22 14:58	20
Fluoride	**1.7**		0.20	0.067	mg/L			05/21/22 13:42	1
Nitrate as N	<0.20	H	0.20	0.068	mg/L			05/21/22 13:42	1
Nitrite as N	<0.20	H	0.20	0.050	mg/L			05/21/22 13:42	1
Orthophosphate as P	<0.20	H	0.20	0.065	mg/L			05/21/22 13:42	1
Sulfate	**440**		20	9.5	mg/L			05/21/22 15:11	100
Alkalinity	**110**		5.0	3.7	mg/L			05/26/22 14:22	1
Bicarbonate Alkalinity as CaCO3	**110**		5.0	3.7	mg/L			05/26/22 14:22	1
Carbonate Alkalinity as CaCO3	<5.0		5.0	3.7	mg/L			05/26/22 14:22	1
Sulfide	<1.0		1.0	0.23	mg/L			05/23/22 04:32	1

Method: 903.0 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	**32.9**		1.59	3.36	1.00	0.289	pCi/L	05/25/22 14:50	06/16/22 07:56	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Ba Carrier	*90.5*		*40 - 110*	*05/25/22 14:50*	*06/16/22 07:56*	*1*

Method: 904.0 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	**0.972**		0.498	0.506	1.00	0.692	pCi/L	05/25/22 15:23	06/14/22 16:00	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Ba Carrier	*89.8*		*40 - 110*	*05/25/22 15:23*	*06/14/22 16:00*	*1*
Y Carrier	*85.6*		*40 - 110*	*05/25/22 15:23*	*06/14/22 16:00*	*1*

Method: Ra226_Ra228 Pos - Combined Radium-226 and Radium-228

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium 226 and 228	**33.9**		1.67	3.40	5.00	0.692	pCi/L		06/16/22 17:43	1

Client: ARCADIS U.S., Inc.
Job ID: 500-216998-1
Project/Site: Marinette, WI Deep Well 30135605.03

Client Sample ID: IRR-01-42 (20220519)
Date Collected: 05/19/22 17:30
Date Received: 05/21/22 10:15

Lab Sample ID: 500-216998-2
Matrix: Water

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	<4.4		4.4	2.1	ng/L		06/10/22 05:33	06/15/22 03:24	1
Perfluoropentanoic acid (PFPeA)	<1.8		1.8	0.43	ng/L		06/10/22 05:33	06/15/22 03:24	1
Perfluorohexanoic acid (PFHxA)	<1.8		1.8	0.51	ng/L		06/10/22 05:33	06/15/22 03:24	1
Perfluoroheptanoic acid (PFHpA)	<1.8		1.8	0.22	ng/L		06/10/22 05:33	06/15/22 03:24	1
Perfluorooctanoic acid (PFOA)	<1.8		1.8	0.75	ng/L		06/10/22 05:33	06/15/22 03:24	1
Perfluorononanoic acid (PFNA)	<1.8		1.8	0.24	ng/L		06/10/22 05:33	06/15/22 03:24	1
Perfluorodecanoic acid (PFDA)	<1.8		1.8	0.27	ng/L		06/10/22 05:33	06/15/22 03:24	1
Perfluoroundecanoic acid (PFUnA)	<1.8		1.8	0.98	ng/L		06/10/22 05:33	06/15/22 03:24	1
Perfluorododecanoic acid (PFDoA)	<1.8		1.8	0.49	ng/L		06/10/22 05:33	06/15/22 03:24	1
Perfluorotridecanoic acid (PFTrDA)	<1.8		1.8	1.2	ng/L		06/10/22 05:33	06/15/22 03:24	1
Perfluorotetradecanoic acid (PFTeA)	<1.8		1.8	0.65	ng/L		06/10/22 05:33	06/15/22 03:24	1
Perfluoro-n-hexadecanoic acid (PFHxDA)	<1.8		1.8	0.79	ng/L		06/10/22 05:33	06/15/22 03:24	1
Perfluoro-n-octadecanoic acid (PFODA)	<1.8		1.8	0.83	ng/L		06/10/22 05:33	06/15/22 03:24	1
Perfluorobutanesulfonic acid (PFBS)	<1.8		1.8	0.18	ng/L		06/10/22 05:33	06/15/22 03:24	1
Perfluoropentanesulfonic acid (PFPeS)	<1.8		1.8	0.27	ng/L		06/10/22 05:33	06/15/22 03:24	1
Perfluorohexanesulfonic acid (PFHxS)	<1.8		1.8	0.51	ng/L		06/10/22 05:33	06/15/22 03:24	1
Perfluoroheptanesulfonic acid (PFHpS)	<1.8		1.8	0.17	ng/L		06/10/22 05:33	06/15/22 03:24	1
Perfluorooctanesulfonic acid (PFOS)	<1.8		1.8	0.48	ng/L		06/10/22 05:33	06/15/22 03:24	1
Perfluorononanesulfonic acid (PFNS)	<1.8		1.8	0.33	ng/L		06/10/22 05:33	06/15/22 03:24	1
Perfluorodecanesulfonic acid (PFDS)	<1.8		1.8	0.28	ng/L		06/10/22 05:33	06/15/22 03:24	1
Perfluorododecanesulfonic acid (PFDoS)	<1.8		1.8	0.86	ng/L		06/10/22 05:33	06/15/22 03:24	1
Perfluorooctanesulfonamide (FOSA)	<1.8		1.8	0.87	ng/L		06/10/22 05:33	06/15/22 03:24	1
NEtFOSA	<1.8		1.8	0.77	ng/L		06/10/22 05:33	06/15/22 03:24	1
NMeFOSA	<1.8		1.8	0.38	ng/L		06/10/22 05:33	06/15/22 03:24	1
NMeFOSAA	<4.4		4.4	1.1	ng/L		06/10/22 05:33	06/15/22 03:24	1
NEtFOSAA	<4.4		4.4	1.2	ng/L		06/10/22 05:33	06/15/22 03:24	1
NMeFOSE	<3.5		3.5	1.2	ng/L		06/10/22 05:33	06/15/22 03:24	1
NEtFOSE	<1.8		1.8	0.75	ng/L		06/10/22 05:33	06/15/22 03:24	1
4:2 FTS	<1.8		1.8	0.21	ng/L		06/10/22 05:33	06/15/22 03:24	1
6:2 FTS	<4.4		4.4	2.2	ng/L		06/10/22 05:33	06/15/22 03:24	1
8:2 FTS	<1.8		1.8	0.41	ng/L		06/10/22 05:33	06/15/22 03:24	1
10:2 FTS	<1.8		1.8	0.59	ng/L		06/10/22 05:33	06/15/22 03:24	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	<1.8		1.8	0.35	ng/L		06/10/22 05:33	06/15/22 03:24	1
HFPO-DA (GenX)	<3.5		3.5	1.3	ng/L		06/10/22 05:33	06/15/22 03:24	1
9Cl-PF3ONS	<1.8		1.8	0.21	ng/L		06/10/22 05:33	06/15/22 03:24	1
11Cl-PF3OUdS	<1.8		1.8	0.28	ng/L		06/10/22 05:33	06/15/22 03:24	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFBA	*96*		*25 - 150*	*06/10/22 05:33*	*06/15/22 03:24*	*1*
13C5 PFPeA	*98*		*25 - 150*	*06/10/22 05:33*	*06/15/22 03:24*	*1*
13C2 PFHxA	*95*		*25 - 150*	*06/10/22 05:33*	*06/15/22 03:24*	*1*
13C4 PFHpA	*99*		*25 - 150*	*06/10/22 05:33*	*06/15/22 03:24*	*1*
13C4 PFOA	*94*		*25 - 150*	*06/10/22 05:33*	*06/15/22 03:24*	*1*
13C5 PFNA	*95*		*25 - 150*	*06/10/22 05:33*	*06/15/22 03:24*	*1*
13C2 PFDA	*92*		*25 - 150*	*06/10/22 05:33*	*06/15/22 03:24*	*1*
13C2 PFUnA	*91*		*25 - 150*	*06/10/22 05:33*	*06/15/22 03:24*	*1*

Client Sample ID: IRR-01-42 (20220519)
Date Collected: 05/19/22 17:30
Date Received: 05/21/22 10:15

Lab Sample ID: 500-216998-2
Matrix: Water

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFDoA	91		25 - 150	06/10/22 05:33	06/15/22 03:24	1
13C2 PFTeDA	87		25 - 150	06/10/22 05:33	06/15/22 03:24	1
13C2 PFHxDA	82		25 - 150	06/10/22 05:33	06/15/22 03:24	1
13C3 PFBS	91		25 - 150	06/10/22 05:33	06/15/22 03:24	1
18O2 PFHxS	93		25 - 150	06/10/22 05:33	06/15/22 03:24	1
13C4 PFOS	87		25 - 150	06/10/22 05:33	06/15/22 03:24	1
13C8 FOSA	92		10 - 150	06/10/22 05:33	06/15/22 03:24	1
d3-NMeFOSAA	91		25 - 150	06/10/22 05:33	06/15/22 03:24	1
d5-NEtFOSAA	86		25 - 150	06/10/22 05:33	06/15/22 03:24	1
d-N-MeFOSA-M	72		10 - 150	06/10/22 05:33	06/15/22 03:24	1
d-N-EtFOSA-M	75		10 - 150	06/10/22 05:33	06/15/22 03:24	1
d7-N-MeFOSE-M	83		10 - 150	06/10/22 05:33	06/15/22 03:24	1
d9-N-EtFOSE-M	79		10 - 150	06/10/22 05:33	06/15/22 03:24	1
M2-4:2 FTS	106		25 - 150	06/10/22 05:33	06/15/22 03:24	1
M2-6:2 FTS	100		25 - 150	06/10/22 05:33	06/15/22 03:24	1
M2-8:2 FTS	103		25 - 150	06/10/22 05:33	06/15/22 03:24	1
13C3 HFPO-DA	101		25 - 150	06/10/22 05:33	06/15/22 03:24	1
13C2 10:2 FTS	87		25 - 150	06/10/22 05:33	06/15/22 03:24	1

Method: 6010D - Metales (ICP) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfur	**150**		0.20	0.056	mg/L		06/21/22 17:30	06/22/22 13:24	2

Method: 6020A - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	<100		100	25	ug/L		05/25/22 08:39	05/25/22 20:51	1
Antimony	<3.0		3.0	1.3	ug/L		05/25/22 08:39	05/25/22 20:51	1
Arsenic	**0.53**	**J**	1.0	0.23	ug/L		05/25/22 08:39	05/25/22 20:51	1
Barium	**9.4**		2.5	0.73	ug/L		05/25/22 08:39	05/25/22 20:51	1
Beryllium	<1.0		1.0	0.53	ug/L		05/25/22 08:39	05/26/22 14:49	1
Boron	**250**		50	13	ug/L		05/25/22 08:39	05/25/22 20:51	1
Cadmium	<0.50		0.50	0.17	ug/L		05/25/22 08:39	05/25/22 20:51	1
Calcium	**140000**		200	44	ug/L		05/25/22 08:39	05/25/22 20:51	1
Chromium	**6.6**		5.0	1.1	ug/L		05/25/22 08:39	05/25/22 20:51	1
Cobalt	<1.0		1.0	0.40	ug/L		05/25/22 08:39	05/25/22 20:51	1
Copper	**1.2**	**J B**	2.0	0.50	ug/L		05/25/22 08:39	05/25/22 20:51	1
Iron	**260**		100	47	ug/L		05/25/22 08:39	05/25/22 20:51	1
Lead	<0.50		0.50	0.19	ug/L		05/25/22 08:39	05/25/22 20:51	1
Magnesium	**54000**		200	49	ug/L		05/25/22 08:39	05/25/22 20:51	1
Manganese	**23**		2.5	0.79	ug/L		05/25/22 08:39	05/25/22 20:51	1
Nickel	**1.7**	**J**	2.0	0.63	ug/L		05/25/22 08:39	05/25/22 20:51	1
Potassium	**5400**		500	110	ug/L		05/25/22 08:39	05/25/22 20:51	1
Selenium	<2.5		2.5	0.98	ug/L		05/25/22 08:39	05/25/22 20:51	1
Silver	<0.50		0.50	0.12	ug/L		05/25/22 08:39	05/25/22 20:51	1
Sodium	**50000**		200	77	ug/L		05/25/22 08:39	05/26/22 14:49	1
Strontium	**5900**	**^6+**	20	3.2	ug/L		05/25/22 08:39	05/26/22 14:52	5
Thallium	<2.0		2.0	0.57	ug/L		05/25/22 08:39	05/25/22 20:51	1
Vanadium	<5.0		5.0	2.2	ug/L		05/25/22 08:39	05/25/22 20:51	1
Zinc	**12**	**J**	20	6.9	ug/L		05/25/22 08:39	05/25/22 20:51	1

Client Sample ID: IRR-01-42 (20220519)
Lab Sample ID: 500-216998-2

Date Collected: 05/19/22 17:30
Matrix: Water
Date Received: 05/21/22 10:15

Method: 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Uranium	<1.0		1.0	0.40	ug/L		05/27/22 11:18	05/31/22 22:32	2

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.20		0.20	0.098	ug/L		05/27/22 09:40	05/31/22 12:46	1

Method: SM 2340B - Total Hardness (as CaCO3) by calculation - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Hardness as calcium carbonate	**570**		0.91	0.46	mg/L		05/25/22 08:39	05/27/22 11:06	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Bromide	**0.56**		0.25	0.050	mg/L			05/21/22 13:55	1
Chloride	**73**		4.0	3.4	mg/L			05/21/22 15:23	20
Fluoride	**1.7**		0.20	0.067	mg/L			05/21/22 13:55	1
Nitrate as N	<0.20		0.20	0.068	mg/L			05/21/22 13:55	1
Nitrite as N	<0.20		0.20	0.050	mg/L			05/21/22 13:55	1
Orthophosphate as P	<0.20		0.20	0.065	mg/L			05/21/22 13:55	1
Sulfate	**440**		20	9.5	mg/L			05/21/22 15:36	100
Alkalinity	**100**		5.0	3.7	mg/L			05/26/22 14:29	1
Bicarbonate Alkalinity as CaCO3	**100**		5.0	3.7	mg/L			05/26/22 14:29	1
Carbonate Alkalinity as CaCO3	<5.0		5.0	3.7	mg/L			05/26/22 14:29	1
Sulfide	**0.89**	**J**	1.0	0.23	mg/L			05/23/22 04:38	1

Method: 903.0 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	**31.7**		1.35	3.16	1.00	0.228	pCi/L	05/25/22 14:50	06/16/22 07:57	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Ba Carrier	*90.0*		*40 - 110*	*05/25/22 14:50*	*06/16/22 07:57*	*1*

Method: 904.0 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	**1.97**		0.517	0.548	1.00	0.546	pCi/L	05/25/22 15:23	06/14/22 16:00	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Ba Carrier	*89.5*		*40 - 110*	*05/25/22 15:23*	*06/14/22 16:00*	*1*
Y Carrier	*81.5*		*40 - 110*	*05/25/22 15:23*	*06/14/22 16:00*	*1*

Method: Ra226_Ra228 Pos - Combined Radium-226 and Radium-228

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium 226 and 228	**33.7**		1.45	3.21	5.00	0.546	pCi/L		06/16/22 17:43	1

Client: ARCADIS U.S., Inc.
Project/Site: Marinette, WI Deep Well 30135605.03

Job ID: 500-216998-1

Client Sample ID: IRR-01-170 (20220519)
Date Collected: 05/19/22 19:40
Date Received: 05/21/22 10:15

Lab Sample ID: 500-216998-3
Matrix: Water

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	<4.7		4.7	2.2	ng/L		06/10/22 05:33	06/15/22 03:35	1
Perfluoropentanoic acid (PFPeA)	<1.9		1.9	0.46	ng/L		06/10/22 05:33	06/15/22 03:35	1
Perfluorohexanoic acid (PFHxA)	<1.9		1.9	0.54	ng/L		06/10/22 05:33	06/15/22 03:35	1
Perfluoroheptanoic acid (PFHpA)	<1.9		1.9	0.23	ng/L		06/10/22 05:33	06/15/22 03:35	1
Perfluorooctanoic acid (PFOA)	<1.9		1.9	0.79	ng/L		06/10/22 05:33	06/15/22 03:35	1
Perfluorononanoic acid (PFNA)	<1.9		1.9	0.25	ng/L		06/10/22 05:33	06/15/22 03:35	1
Perfluorodecanoic acid (PFDA)	<1.9		1.9	0.29	ng/L		06/10/22 05:33	06/15/22 03:35	1
Perfluoroundecanoic acid (PFUnA)	<1.9		1.9	1.0	ng/L		06/10/22 05:33	06/15/22 03:35	1
Perfluorododecanoic acid (PFDoA)	<1.9		1.9	0.51	ng/L		06/10/22 05:33	06/15/22 03:35	1
Perfluorotridecanoic acid (PFTrDA)	<1.9		1.9	1.2	ng/L		06/10/22 05:33	06/15/22 03:35	1
Perfluorotetradecanoic acid (PFTeA)	<1.9		1.9	0.68	ng/L		06/10/22 05:33	06/15/22 03:35	1
Perfluoro-n-hexadecanoic acid (PFHxDA)	<1.9		1.9	0.83	ng/L		06/10/22 05:33	06/15/22 03:35	1
Perfluoro-n-octadecanoic acid (PFODA)	<1.9		1.9	0.88	ng/L		06/10/22 05:33	06/15/22 03:35	1
Perfluorobutanesulfonic acid (PFBS)	<1.9		1.9	0.19	ng/L		06/10/22 05:33	06/15/22 03:35	1
Perfluoropentanesulfonic acid (PFPeS)	<1.9		1.9	0.28	ng/L		06/10/22 05:33	06/15/22 03:35	1
Perfluorohexanesulfonic acid (PFHxS)	<1.9		1.9	0.53	ng/L		06/10/22 05:33	06/15/22 03:35	1
Perfluoroheptanesulfonic acid (PFHpS)	<1.9		1.9	0.18	ng/L		06/10/22 05:33	06/15/22 03:35	1
Perfluorooctanesulfonic acid (PFOS)	<1.9		1.9	0.50	ng/L		06/10/22 05:33	06/15/22 03:35	1
Perfluorononanesulfonic acid (PFNS)	<1.9		1.9	0.35	ng/L		06/10/22 05:33	06/15/22 03:35	1
Perfluorodecanesulfonic acid (PFDS)	<1.9		1.9	0.30	ng/L		06/10/22 05:33	06/15/22 03:35	1
Perfluorododecanesulfonic acid (PFDoS)	<1.9		1.9	0.91	ng/L		06/10/22 05:33	06/15/22 03:35	1
Perfluorooctanesulfonamide (FOSA)	<1.9		1.9	0.92	ng/L		06/10/22 05:33	06/15/22 03:35	1
NEtFOSA	<1.9		1.9	0.81	ng/L		06/10/22 05:33	06/15/22 03:35	1
NMeFOSA	<1.9		1.9	0.40	ng/L		06/10/22 05:33	06/15/22 03:35	1
NMeFOSAA	<4.7		4.7	1.1	ng/L		06/10/22 05:33	06/15/22 03:35	1
NEtFOSAA	<4.7		4.7	1.2	ng/L		06/10/22 05:33	06/15/22 03:35	1
NMeFOSE	<3.7		3.7	1.3	ng/L		06/10/22 05:33	06/15/22 03:35	1
NEtFOSE	<1.9		1.9	0.79	ng/L		06/10/22 05:33	06/15/22 03:35	1
4:2 FTS	<1.9		1.9	0.22	ng/L		06/10/22 05:33	06/15/22 03:35	1
6:2 FTS	<4.7		4.7	2.3	ng/L		06/10/22 05:33	06/15/22 03:35	1
8:2 FTS	<1.9		1.9	0.43	ng/L		06/10/22 05:33	06/15/22 03:35	1
10:2 FTS	<1.9		1.9	0.63	ng/L		06/10/22 05:33	06/15/22 03:35	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	<1.9		1.9	0.37	ng/L		06/10/22 05:33	06/15/22 03:35	1
HFPO-DA (GenX)	<3.7		3.7	1.4	ng/L		06/10/22 05:33	06/15/22 03:35	1
9Cl-PF3ONS	<1.9		1.9	0.22	ng/L		06/10/22 05:33	06/15/22 03:35	1
11Cl-PF3OUdS	<1.9		1.9	0.30	ng/L		06/10/22 05:33	06/15/22 03:35	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFBA	*95*		*25 - 150*	*06/10/22 05:33*	*06/15/22 03:35*	*1*
13C5 PFPeA	*95*		*25 - 150*	*06/10/22 05:33*	*06/15/22 03:35*	*1*
13C2 PFHxA	*95*		*25 - 150*	*06/10/22 05:33*	*06/15/22 03:35*	*1*
13C4 PFHpA	*100*		*25 - 150*	*06/10/22 05:33*	*06/15/22 03:35*	*1*
13C4 PFOA	*94*		*25 - 150*	*06/10/22 05:33*	*06/15/22 03:35*	*1*
13C5 PFNA	*94*		*25 - 150*	*06/10/22 05:33*	*06/15/22 03:35*	*1*
13C2 PFDA	*91*		*25 - 150*	*06/10/22 05:33*	*06/15/22 03:35*	*1*
13C2 PFUnA	*87*		*25 - 150*	*06/10/22 05:33*	*06/15/22 03:35*	*1*

Client Sample ID: IRR-01-170 (20220519)
Lab Sample ID: 500-216998-3
Date Collected: 05/19/22 19:40
Matrix: Water
Date Received: 05/21/22 10:15

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFDoA	91		25 - 150	06/10/22 05:33	06/15/22 03:35	1
13C2 PFTeDA	85		25 - 150	06/10/22 05:33	06/15/22 03:35	1
13C2 PFHxDA	88		25 - 150	06/10/22 05:33	06/15/22 03:35	1
13C3 PFBS	92		25 - 150	06/10/22 05:33	06/15/22 03:35	1
18O2 PFHxS	92		25 - 150	06/10/22 05:33	06/15/22 03:35	1
13C4 PFOS	89		25 - 150	06/10/22 05:33	06/15/22 03:35	1
13C8 FOSA	91		10 - 150	06/10/22 05:33	06/15/22 03:35	1
d3-NMeFOSAA	86		25 - 150	06/10/22 05:33	06/15/22 03:35	1
d5-NEtFOSAA	84		25 - 150	06/10/22 05:33	06/15/22 03:35	1
d-N-MeFOSA-M	68		10 - 150	06/10/22 05:33	06/15/22 03:35	1
d-N-EtFOSA-M	69		10 - 150	06/10/22 05:33	06/15/22 03:35	1
d7-N-MeFOSE-M	79		10 - 150	06/10/22 05:33	06/15/22 03:35	1
d9-N-EtFOSE-M	78		10 - 150	06/10/22 05:33	06/15/22 03:35	1
M2-4:2 FTS	107		25 - 150	06/10/22 05:33	06/15/22 03:35	1
M2-6:2 FTS	99		25 - 150	06/10/22 05:33	06/15/22 03:35	1
M2-8:2 FTS	99		25 - 150	06/10/22 05:33	06/15/22 03:35	1
13C3 HFPO-DA	97		25 - 150	06/10/22 05:33	06/15/22 03:35	1
13C2 10:2 FTS	92		25 - 150	06/10/22 05:33	06/15/22 03:35	1

Method: 6010D - Metales (ICP) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfur	**150**		0.20	0.056	mg/L		06/21/22 17:30	06/22/22 13:28	2

Method: 6020A - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	<100		100	25	ug/L		05/25/22 08:39	05/25/22 20:55	1
Antimony	<3.0		3.0	1.3	ug/L		05/25/22 08:39	05/25/22 20:55	1
Arsenic	**0.57**	**J**	1.0	0.23	ug/L		05/25/22 08:39	05/25/22 20:55	1
Barium	**9.3**		2.5	0.73	ug/L		05/25/22 08:39	05/25/22 20:55	1
Beryllium	<1.0		1.0	0.53	ug/L		05/25/22 08:39	05/26/22 14:56	1
Boron	**250**		50	13	ug/L		05/25/22 08:39	05/25/22 20:55	1
Cadmium	<0.50		0.50	0.17	ug/L		05/25/22 08:39	05/25/22 20:55	1
Calcium	**140000**		200	44	ug/L		05/25/22 08:39	05/25/22 20:55	1
Chromium	<5.0		5.0	1.1	ug/L		05/25/22 08:39	05/25/22 20:55	1
Cobalt	<1.0		1.0	0.40	ug/L		05/25/22 08:39	05/25/22 20:55	1
Copper	<2.0		2.0	0.50	ug/L		05/25/22 08:39	05/25/22 20:55	1
Iron	**210**		100	47	ug/L		05/25/22 08:39	05/25/22 20:55	1
Lead	**0.28**	**J**	0.50	0.19	ug/L		05/25/22 08:39	05/25/22 20:55	1
Magnesium	**54000**		200	49	ug/L		05/25/22 08:39	05/25/22 20:55	1
Manganese	**23**		2.5	0.79	ug/L		05/25/22 08:39	05/25/22 20:55	1
Nickel	<2.0		2.0	0.63	ug/L		05/25/22 08:39	05/25/22 20:55	1
Potassium	**5400**		500	110	ug/L		05/25/22 08:39	05/25/22 20:55	1
Selenium	<2.5		2.5	0.98	ug/L		05/25/22 08:39	05/25/22 20:55	1
Silver	<0.50		0.50	0.12	ug/L		05/25/22 08:39	05/25/22 20:55	1
Sodium	**49000**		200	77	ug/L		05/25/22 08:39	05/26/22 14:56	1
Strontium	**5800**	**^6+**	20	3.2	ug/L		05/25/22 08:39	05/26/22 15:01	5
Thallium	<2.0		2.0	0.57	ug/L		05/25/22 08:39	05/25/22 20:55	1
Vanadium	<5.0		5.0	2.2	ug/L		05/25/22 08:39	05/25/22 20:55	1
Zinc	<20		20	6.9	ug/L		05/25/22 08:39	05/25/22 20:55	1

Client Sample ID: IRR-01-170 (20220519)
Lab Sample ID: 500-216998-3

Date Collected: 05/19/22 19:40
Matrix: Water
Date Received: 05/21/22 10:15

Method: 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Uranium	<1.0		1.0	0.40	ug/L		05/27/22 11:18	05/31/22 22:35	2

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.20		0.20	0.098	ug/L		05/27/22 09:40	05/31/22 12:49	1

Method: SM 2340B - Total Hardness (as CaCO3) by calculation - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Hardness as calcium carbonate	**560**		0.91	0.46	mg/L		05/25/22 08:39	05/27/22 11:06	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Bromide	**0.54**		0.25	0.050	mg/L			05/21/22 14:08	1
Chloride	**72**		4.0	3.4	mg/L			05/21/22 16:14	20
Fluoride	**1.7**		0.20	0.067	mg/L			05/21/22 14:08	1
Nitrate as N	<0.20		0.20	0.068	mg/L			05/21/22 14:08	1
Nitrite as N	<0.20		0.20	0.050	mg/L			05/21/22 14:08	1
Orthophosphate as P	<0.20		0.20	0.065	mg/L			05/21/22 14:08	1
Sulfate	**420**		20	9.5	mg/L			05/21/22 16:26	100
Alkalinity	**100**		5.0	3.7	mg/L			05/26/22 14:36	1
Bicarbonate Alkalinity as CaCO3	**100**		5.0	3.7	mg/L			05/26/22 14:36	1
Carbonate Alkalinity as CaCO3	<5.0		5.0	3.7	mg/L			05/26/22 14:36	1
Sulfide	<2.0		2.0	0.47	mg/L			05/23/22 04:44	1

Method: 903.0 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	**33.5**		1.62	3.42	1.00	0.249	pCi/L	05/25/22 14:50	06/16/22 07:58	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Ba Carrier	*89.8*		*40 - 110*	*05/25/22 14:50*	*06/16/22 07:58*	*1*

Method: 904.0 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	**1.02**		0.509	0.517	1.00	0.701	pCi/L	05/25/22 15:23	06/14/22 16:00	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Ba Carrier	*89.0*		*40 - 110*	*05/25/22 15:23*	*06/14/22 16:00*	*1*
Y Carrier	*84.5*		*40 - 110*	*05/25/22 15:23*	*06/14/22 16:00*	*1*

Method: Ra226_Ra228 Pos - Combined Radium-226 and Radium-228

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium 226 and 228	**34.5**		1.70	3.46	5.00	0.701	pCi/L		06/16/22 17:43	1

Client: ARCADIS U.S., Inc.
Job ID: 500-216998-1
Project/Site: Marinette, WI Deep Well 30135605.03

Client Sample ID: DUP-01 (20220519)
Date Collected: 05/19/22 23:59
Date Received: 05/21/22 10:15

Lab Sample ID: 500-216998-4
Matrix: Water

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	<4.8		4.8	2.3	ng/L		06/10/22 05:33	06/15/22 03:45	1
Perfluoropentanoic acid (PFPeA)	<1.9		1.9	0.47	ng/L		06/10/22 05:33	06/15/22 03:45	1
Perfluorohexanoic acid (PFHxA)	<1.9		1.9	0.56	ng/L		06/10/22 05:33	06/15/22 03:45	1
Perfluoroheptanoic acid (PFHpA)	<1.9		1.9	0.24	ng/L		06/10/22 05:33	06/15/22 03:45	1
Perfluorooctanoic acid (PFOA)	<1.9		1.9	0.82	ng/L		06/10/22 05:33	06/15/22 03:45	1
Perfluorononanoic acid (PFNA)	<1.9		1.9	0.26	ng/L		06/10/22 05:33	06/15/22 03:45	1
Perfluorodecanoic acid (PFDA)	<1.9		1.9	0.30	ng/L		06/10/22 05:33	06/15/22 03:45	1
Perfluoroundecanoic acid (PFUnA)	<1.9		1.9	1.1	ng/L		06/10/22 05:33	06/15/22 03:45	1
Perfluorododecanoic acid (PFDoA)	<1.9		1.9	0.53	ng/L		06/10/22 05:33	06/15/22 03:45	1
Perfluorotridecanoic acid (PFTrDA)	<1.9		1.9	1.3	ng/L		06/10/22 05:33	06/15/22 03:45	1
Perfluorotetradecanoic acid (PFTeA)	<1.9		1.9	0.70	ng/L		06/10/22 05:33	06/15/22 03:45	1
Perfluoro-n-hexadecanoic acid (PFHxDA)	<1.9		1.9	0.86	ng/L		06/10/22 05:33	06/15/22 03:45	1
Perfluoro-n-octadecanoic acid (PFODA)	<1.9		1.9	0.90	ng/L		06/10/22 05:33	06/15/22 03:45	1
Perfluorobutanesulfonic acid (PFBS)	<1.9		1.9	0.19	ng/L		06/10/22 05:33	06/15/22 03:45	1
Perfluoropentanesulfonic acid (PFPeS)	<1.9		1.9	0.29	ng/L		06/10/22 05:33	06/15/22 03:45	1
Perfluorohexanesulfonic acid (PFHxS)	<1.9		1.9	0.55	ng/L		06/10/22 05:33	06/15/22 03:45	1
Perfluoroheptanesulfonic acid (PFHpS)	<1.9		1.9	0.18	ng/L		06/10/22 05:33	06/15/22 03:45	1
Perfluorooctanesulfonic acid (PFOS)	<1.9		1.9	0.52	ng/L		06/10/22 05:33	06/15/22 03:45	1
Perfluorononanesulfonic acid (PFNS)	<1.9		1.9	0.36	ng/L		06/10/22 05:33	06/15/22 03:45	1
Perfluorodecanesulfonic acid (PFDS)	<1.9		1.9	0.31	ng/L		06/10/22 05:33	06/15/22 03:45	1
Perfluorododecanesulfonic acid (PFDoS)	<1.9		1.9	0.93	ng/L		06/10/22 05:33	06/15/22 03:45	1
Perfluorooctanesulfonamide (FOSA)	<1.9		1.9	0.94	ng/L		06/10/22 05:33	06/15/22 03:45	1
NEtFOSA	<1.9		1.9	0.84	ng/L		06/10/22 05:33	06/15/22 03:45	1
NMeFOSA	<1.9		1.9	0.41	ng/L		06/10/22 05:33	06/15/22 03:45	1
NMeFOSAA	<4.8		4.8	1.2	ng/L		06/10/22 05:33	06/15/22 03:45	1
NEtFOSAA	<4.8		4.8	1.3	ng/L		06/10/22 05:33	06/15/22 03:45	1
NMeFOSE	<3.8		3.8	1.3	ng/L		06/10/22 05:33	06/15/22 03:45	1
NEtFOSE	<1.9		1.9	0.82	ng/L		06/10/22 05:33	06/15/22 03:45	1
4:2 FTS	<1.9		1.9	0.23	ng/L		06/10/22 05:33	06/15/22 03:45	1
6:2 FTS	<4.8		4.8	2.4	ng/L		06/10/22 05:33	06/15/22 03:45	1
8:2 FTS	<1.9		1.9	0.44	ng/L		06/10/22 05:33	06/15/22 03:45	1
10:2 FTS	<1.9		1.9	0.64	ng/L		06/10/22 05:33	06/15/22 03:45	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	<1.9		1.9	0.38	ng/L		06/10/22 05:33	06/15/22 03:45	1
HFPO-DA (GenX)	<3.8		3.8	1.4	ng/L		06/10/22 05:33	06/15/22 03:45	1
9Cl-PF3ONS	<1.9		1.9	0.23	ng/L		06/10/22 05:33	06/15/22 03:45	1
11Cl-PF3OUdS	<1.9		1.9	0.31	ng/L		06/10/22 05:33	06/15/22 03:45	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFBA	*93*		*25 - 150*	*06/10/22 05:33*	*06/15/22 03:45*	*1*
13C5 PFPeA	*89*		*25 - 150*	*06/10/22 05:33*	*06/15/22 03:45*	*1*
13C2 PFHxA	*92*		*25 - 150*	*06/10/22 05:33*	*06/15/22 03:45*	*1*
13C4 PFHpA	*101*		*25 - 150*	*06/10/22 05:33*	*06/15/22 03:45*	*1*
13C4 PFOA	*92*		*25 - 150*	*06/10/22 05:33*	*06/15/22 03:45*	*1*
13C5 PFNA	*90*		*25 - 150*	*06/10/22 05:33*	*06/15/22 03:45*	*1*
13C2 PFDA	*88*		*25 - 150*	*06/10/22 05:33*	*06/15/22 03:45*	*1*
13C2 PFUnA	*83*		*25 - 150*	*06/10/22 05:33*	*06/15/22 03:45*	*1*

Client Sample ID: DUP-01 (20220519)
Lab Sample ID: 500-216998-4
Date Collected: 05/19/22 23:59
Matrix: Water
Date Received: 05/21/22 10:15

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFDoA	86		25 - 150	06/10/22 05:33	06/15/22 03:45	1
13C2 PFTeDA	83		25 - 150	06/10/22 05:33	06/15/22 03:45	1
13C2 PFHxDA	83		25 - 150	06/10/22 05:33	06/15/22 03:45	1
13C3 PFBS	93		25 - 150	06/10/22 05:33	06/15/22 03:45	1
18O2 PFHxS	87		25 - 150	06/10/22 05:33	06/15/22 03:45	1
13C4 PFOS	80		25 - 150	06/10/22 05:33	06/15/22 03:45	1
13C8 FOSA	89		10 - 150	06/10/22 05:33	06/15/22 03:45	1
d3-NMeFOSAA	87		25 - 150	06/10/22 05:33	06/15/22 03:45	1
d5-NEtFOSAA	84		25 - 150	06/10/22 05:33	06/15/22 03:45	1
d-N-MeFOSA-M	72		10 - 150	06/10/22 05:33	06/15/22 03:45	1
d-N-EtFOSA-M	73		10 - 150	06/10/22 05:33	06/15/22 03:45	1
d7-N-MeFOSE-M	78		10 - 150	06/10/22 05:33	06/15/22 03:45	1
d9-N-EtFOSE-M	77		10 - 150	06/10/22 05:33	06/15/22 03:45	1
M2-4:2 FTS	101		25 - 150	06/10/22 05:33	06/15/22 03:45	1
M2-6:2 FTS	90		25 - 150	06/10/22 05:33	06/15/22 03:45	1
M2-8:2 FTS	92		25 - 150	06/10/22 05:33	06/15/22 03:45	1
13C3 HFPO-DA	101		25 - 150	06/10/22 05:33	06/15/22 03:45	1
13C2 10:2 FTS	85		25 - 150	06/10/22 05:33	06/15/22 03:45	1

Method: 6010D - Metales (ICP) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfur	**150**		0.20	0.056	mg/L		06/21/22 17:30	06/22/22 13:32	2

Method: 6020A - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	<100		100	25	ug/L		05/25/22 08:39	05/25/22 20:58	1
Antimony	<3.0		3.0	1.3	ug/L		05/25/22 08:39	05/25/22 20:58	1
Arsenic	**0.55**	**J**	1.0	0.23	ug/L		05/25/22 08:39	05/25/22 20:58	1
Barium	**9.4**		2.5	0.73	ug/L		05/25/22 08:39	05/25/22 20:58	1
Beryllium	<1.0		1.0	0.53	ug/L		05/25/22 08:39	05/26/22 15:05	1
Boron	**250**		50	13	ug/L		05/25/22 08:39	05/25/22 20:58	1
Cadmium	<0.50		0.50	0.17	ug/L		05/25/22 08:39	05/25/22 20:58	1
Calcium	**140000**		200	44	ug/L		05/25/22 08:39	05/25/22 20:58	1
Chromium	<5.0		5.0	1.1	ug/L		05/25/22 08:39	05/25/22 20:58	1
Cobalt	<1.0		1.0	0.40	ug/L		05/25/22 08:39	05/25/22 20:58	1
Copper	**0.85**	**J B**	2.0	0.50	ug/L		05/25/22 08:39	05/25/22 20:58	1
Iron	**310**		100	47	ug/L		05/25/22 08:39	05/25/22 20:58	1
Lead	**0.22**	**J**	0.50	0.19	ug/L		05/25/22 08:39	05/25/22 20:58	1
Magnesium	**53000**		200	49	ug/L		05/25/22 08:39	05/25/22 20:58	1
Manganese	**23**		2.5	0.79	ug/L		05/25/22 08:39	05/25/22 20:58	1
Nickel	<2.0		2.0	0.63	ug/L		05/25/22 08:39	05/25/22 20:58	1
Potassium	**5400**		500	110	ug/L		05/25/22 08:39	05/25/22 20:58	1
Selenium	<2.5		2.5	0.98	ug/L		05/25/22 08:39	05/25/22 20:58	1
Silver	<0.50		0.50	0.12	ug/L		05/25/22 08:39	05/25/22 20:58	1
Sodium	**49000**		200	77	ug/L		05/25/22 08:39	05/26/22 15:05	1
Strontium	**6700**	**^6+**	20	3.2	ug/L		05/25/22 08:39	05/26/22 15:08	5
Thallium	<2.0		2.0	0.57	ug/L		05/25/22 08:39	05/25/22 20:58	1
Vanadium	<5.0		5.0	2.2	ug/L		05/25/22 08:39	05/25/22 20:58	1
Zinc	**13**	**J**	20	6.9	ug/L		05/25/22 08:39	05/25/22 20:58	1

Client Sample ID: DUP-01 (20220519)
Lab Sample ID: 500-216998-4

Date Collected: 05/19/22 23:59
Matrix: Water
Date Received: 05/21/22 10:15

Method: 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Uranium	<1.0		1.0	0.40	ug/L		05/27/22 11:18	05/31/22 22:38	2

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.20		0.20	0.098	ug/L		05/27/22 09:40	05/31/22 12:51	1

Method: SM 2340B - Total Hardness (as CaCO3) by calculation - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Hardness as calcium carbonate	**560**		0.91	0.46	mg/L		05/25/22 08:39	05/27/22 11:06	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Bromide	**0.54**		0.25	0.050	mg/L			05/21/22 14:20	1
Chloride	**73**		4.0	3.4	mg/L			05/21/22 16:39	20
Fluoride	**1.7**		0.20	0.067	mg/L			05/21/22 14:20	1
Nitrate as N	<0.20	H3	0.20	0.068	mg/L			05/21/22 14:20	1
Nitrite as N	<0.20	H3	0.20	0.050	mg/L			05/21/22 14:20	1
Orthophosphate as P	<0.20	H3	0.20	0.065	mg/L			05/21/22 14:20	1
Sulfate	**440**		20	9.5	mg/L			05/21/22 16:52	100
Alkalinity	**100**		5.0	3.7	mg/L			06/02/22 13:46	1
Bicarbonate Alkalinity as CaCO3	**100**		5.0	3.7	mg/L			06/02/22 13:46	1
Carbonate Alkalinity as CaCO3	<5.0		5.0	3.7	mg/L			06/02/22 13:46	1
Sulfide	<1.8		1.8	0.42	mg/L			05/23/22 04:50	1

Method: 903.0 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	**31.9**		1.33	3.17	1.00	0.173	pCi/L	05/25/22 14:50	06/16/22 07:58	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Ba Carrier	*93.5*		*40 - 110*	*05/25/22 14:50*	*06/16/22 07:58*	*1*

Method: 904.0 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	**1.53**		0.456	0.477	1.00	0.517	pCi/L	05/25/22 15:23	06/14/22 16:01	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Ba Carrier	*94.5*		*40 - 110*	*05/25/22 15:23*	*06/14/22 16:01*	*1*
Y Carrier	*82.6*		*40 - 110*	*05/25/22 15:23*	*06/14/22 16:01*	*1*

Method: Ra226_Ra228 Pos - Combined Radium-226 and Radium-228

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium 226 and 228	**33.4**		1.41	3.21	5.00	0.517	pCi/L		06/16/22 17:43	1

Client: ARCADIS U.S., Inc.
Job ID: 500-216998-1
Project/Site: Marinette, WI Deep Well 30135605.03

Client Sample ID: EB-01 (20220519)
Date Collected: 05/19/22 20:20
Date Received: 05/21/22 10:15

Lab Sample ID: 500-216998-5
Matrix: Water

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	<4.4		4.4	2.1	ng/L		06/10/22 05:33	06/15/22 03:55	1
Perfluoropentanoic acid (PFPeA)	<1.8		1.8	0.44	ng/L		06/10/22 05:33	06/15/22 03:55	1
Perfluorohexanoic acid (PFHxA)	<1.8		1.8	0.52	ng/L		06/10/22 05:33	06/15/22 03:55	1
Perfluoroheptanoic acid (PFHpA)	<1.8		1.8	0.22	ng/L		06/10/22 05:33	06/15/22 03:55	1
Perfluorooctanoic acid (PFOA)	<1.8		1.8	0.76	ng/L		06/10/22 05:33	06/15/22 03:55	1
Perfluorononanoic acid (PFNA)	<1.8		1.8	0.24	ng/L		06/10/22 05:33	06/15/22 03:55	1
Perfluorodecanoic acid (PFDA)	<1.8		1.8	0.28	ng/L		06/10/22 05:33	06/15/22 03:55	1
Perfluoroundecanoic acid (PFUnA)	<1.8		1.8	0.98	ng/L		06/10/22 05:33	06/15/22 03:55	1
Perfluorododecanoic acid (PFDoA)	<1.8		1.8	0.49	ng/L		06/10/22 05:33	06/15/22 03:55	1
Perfluorotridecanoic acid (PFTrDA)	<1.8		1.8	1.2	ng/L		06/10/22 05:33	06/15/22 03:55	1
Perfluorotetradecanoic acid (PFTeA)	<1.8		1.8	0.65	ng/L		06/10/22 05:33	06/15/22 03:55	1
Perfluoro-n-hexadecanoic acid (PFHxDA)	<1.8		1.8	0.79	ng/L		06/10/22 05:33	06/15/22 03:55	1
Perfluoro-n-octadecanoic acid (PFODA)	<1.8		1.8	0.84	ng/L		06/10/22 05:33	06/15/22 03:55	1
Perfluorobutanesulfonic acid (PFBS)	<1.8		1.8	0.18	ng/L		06/10/22 05:33	06/15/22 03:55	1
Perfluoropentanesulfonic acid (PFPeS)	<1.8		1.8	0.27	ng/L		06/10/22 05:33	06/15/22 03:55	1
Perfluorohexanesulfonic acid (PFHxS)	<1.8		1.8	0.51	ng/L		06/10/22 05:33	06/15/22 03:55	1
Perfluoroheptanesulfonic acid (PFHpS)	<1.8		1.8	0.17	ng/L		06/10/22 05:33	06/15/22 03:55	1
Perfluorooctanesulfonic acid (PFOS)	<1.8		1.8	0.48	ng/L		06/10/22 05:33	06/15/22 03:55	1
Perfluorononanesulfonic acid (PFNS)	<1.8		1.8	0.33	ng/L		06/10/22 05:33	06/15/22 03:55	1
Perfluorodecanesulfonic acid (PFDS)	<1.8		1.8	0.28	ng/L		06/10/22 05:33	06/15/22 03:55	1
Perfluorododecanesulfonic acid (PFDoS)	<1.8		1.8	0.86	ng/L		06/10/22 05:33	06/15/22 03:55	1
Perfluorooctanesulfonamide (FOSA)	<1.8		1.8	0.87	ng/L		06/10/22 05:33	06/15/22 03:55	1
NEtFOSA	<1.8		1.8	0.77	ng/L		06/10/22 05:33	06/15/22 03:55	1
NMeFOSA	<1.8		1.8	0.38	ng/L		06/10/22 05:33	06/15/22 03:55	1
NMeFOSAA	<4.4		4.4	1.1	ng/L		06/10/22 05:33	06/15/22 03:55	1
NEtFOSAA	<4.4		4.4	1.2	ng/L		06/10/22 05:33	06/15/22 03:55	1
NMeFOSE	<3.6		3.6	1.2	ng/L		06/10/22 05:33	06/15/22 03:55	1
NEtFOSE	<1.8		1.8	0.76	ng/L		06/10/22 05:33	06/15/22 03:55	1
4:2 FTS	<1.8		1.8	0.21	ng/L		06/10/22 05:33	06/15/22 03:55	1
6:2 FTS	<4.4		4.4	2.2	ng/L		06/10/22 05:33	06/15/22 03:55	1
8:2 FTS	<1.8		1.8	0.41	ng/L		06/10/22 05:33	06/15/22 03:55	1
10:2 FTS	<1.8		1.8	0.60	ng/L		06/10/22 05:33	06/15/22 03:55	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	<1.8		1.8	0.36	ng/L		06/10/22 05:33	06/15/22 03:55	1
HFPO-DA (GenX)	<3.6		3.6	1.3	ng/L		06/10/22 05:33	06/15/22 03:55	1
9Cl-PF3ONS	<1.8		1.8	0.21	ng/L		06/10/22 05:33	06/15/22 03:55	1
11Cl-PF3OUdS	<1.8		1.8	0.28	ng/L		06/10/22 05:33	06/15/22 03:55	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFBA	*93*		*25 - 150*	*06/10/22 05:33*	*06/15/22 03:55*	*1*
13C5 PFPeA	*92*		*25 - 150*	*06/10/22 05:33*	*06/15/22 03:55*	*1*
13C2 PFHxA	*94*		*25 - 150*	*06/10/22 05:33*	*06/15/22 03:55*	*1*
13C4 PFHpA	*99*		*25 - 150*	*06/10/22 05:33*	*06/15/22 03:55*	*1*
13C4 PFOA	*92*		*25 - 150*	*06/10/22 05:33*	*06/15/22 03:55*	*1*
13C5 PFNA	*94*		*25 - 150*	*06/10/22 05:33*	*06/15/22 03:55*	*1*
13C2 PFDA	*91*		*25 - 150*	*06/10/22 05:33*	*06/15/22 03:55*	*1*
13C2 PFUnA	*88*		*25 - 150*	*06/10/22 05:33*	*06/15/22 03:55*	*1*

Client: ARCADIS U.S., Inc.
Job ID: 500-216998-1
Project/Site: Marinette, WI Deep Well 30135605.03

Client Sample ID: EB-01 (20220519)
Lab Sample ID: 500-216998-5
Date Collected: 05/19/22 20:20
Matrix: Water
Date Received: 05/21/22 10:15

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFDoA	91		25 - 150	06/10/22 05:33	06/15/22 03:55	1
13C2 PFTeDA	87		25 - 150	06/10/22 05:33	06/15/22 03:55	1
13C2 PFHxDA	84		25 - 150	06/10/22 05:33	06/15/22 03:55	1
13C3 PFBS	89		25 - 150	06/10/22 05:33	06/15/22 03:55	1
18O2 PFHxS	88		25 - 150	06/10/22 05:33	06/15/22 03:55	1
13C4 PFOS	83		25 - 150	06/10/22 05:33	06/15/22 03:55	1
13C8 FOSA	86		10 - 150	06/10/22 05:33	06/15/22 03:55	1
d3-NMeFOSAA	91		25 - 150	06/10/22 05:33	06/15/22 03:55	1
d5-NEtFOSAA	85		25 - 150	06/10/22 05:33	06/15/22 03:55	1
d-N-MeFOSA-M	76		10 - 150	06/10/22 05:33	06/15/22 03:55	1
d-N-EtFOSA-M	76		10 - 150	06/10/22 05:33	06/15/22 03:55	1
d7-N-MeFOSE-M	81		10 - 150	06/10/22 05:33	06/15/22 03:55	1
d9-N-EtFOSE-M	79		10 - 150	06/10/22 05:33	06/15/22 03:55	1
M2-4:2 FTS	105		25 - 150	06/10/22 05:33	06/15/22 03:55	1
M2-6:2 FTS	95		25 - 150	06/10/22 05:33	06/15/22 03:55	1
M2-8:2 FTS	98		25 - 150	06/10/22 05:33	06/15/22 03:55	1
13C3 HFPO-DA	99		25 - 150	06/10/22 05:33	06/15/22 03:55	1
13C2 10:2 FTS	89		25 - 150	06/10/22 05:33	06/15/22 03:55	1

Client: ARCADIS U.S., Inc.
Project/Site: Marinette, WI Deep Well 30135605.03

Job ID: 500-216998-1

Client Sample ID: FB-01 (20220519)
Date Collected: 05/19/22 20:30
Date Received: 05/21/22 10:15

Lab Sample ID: 500-216998-6
Matrix: Water

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	<5.0		5.0	2.4	ng/L		06/10/22 05:33	06/15/22 04:05	1
Perfluoropentanoic acid (PFPeA)	<2.0		2.0	0.49	ng/L		06/10/22 05:33	06/15/22 04:05	1
Perfluorohexanoic acid (PFHxA)	<2.0		2.0	0.57	ng/L		06/10/22 05:33	06/15/22 04:05	1
Perfluoroheptanoic acid (PFHpA)	<2.0		2.0	0.25	ng/L		06/10/22 05:33	06/15/22 04:05	1
Perfluorooctanoic acid (PFOA)	<2.0		2.0	0.84	ng/L		06/10/22 05:33	06/15/22 04:05	1
Perfluorononanoic acid (PFNA)	<2.0		2.0	0.27	ng/L		06/10/22 05:33	06/15/22 04:05	1
Perfluorodecanoic acid (PFDA)	<2.0		2.0	0.31	ng/L		06/10/22 05:33	06/15/22 04:05	1
Perfluoroundecanoic acid (PFUnA)	<2.0		2.0	1.1	ng/L		06/10/22 05:33	06/15/22 04:05	1
Perfluorododecanoic acid (PFDoA)	<2.0		2.0	0.54	ng/L		06/10/22 05:33	06/15/22 04:05	1
Perfluorotridecanoic acid (PFTrDA)	<2.0		2.0	1.3	ng/L		06/10/22 05:33	06/15/22 04:05	1
Perfluorotetradecanoic acid (PFTeA)	<2.0		2.0	0.72	ng/L		06/10/22 05:33	06/15/22 04:05	1
Perfluoro-n-hexadecanoic acid (PFHxDA)	<2.0		2.0	0.88	ng/L		06/10/22 05:33	06/15/22 04:05	1
Perfluoro-n-octadecanoic acid (PFODA)	<2.0		2.0	0.93	ng/L		06/10/22 05:33	06/15/22 04:05	1
Perfluorobutanesulfonic acid (PFBS)	<2.0		2.0	0.20	ng/L		06/10/22 05:33	06/15/22 04:05	1
Perfluoropentanesulfonic acid (PFPeS)	<2.0		2.0	0.30	ng/L		06/10/22 05:33	06/15/22 04:05	1
Perfluorohexanesulfonic acid (PFHxS)	<2.0		2.0	0.56	ng/L		06/10/22 05:33	06/15/22 04:05	1
Perfluoroheptanesulfonic acid (PFHpS)	<2.0		2.0	0.19	ng/L		06/10/22 05:33	06/15/22 04:05	1
Perfluorooctanesulfonic acid (PFOS)	<2.0		2.0	0.53	ng/L		06/10/22 05:33	06/15/22 04:05	1
Perfluorononanesulfonic acid (PFNS)	<2.0		2.0	0.37	ng/L		06/10/22 05:33	06/15/22 04:05	1
Perfluorodecanesulfonic acid (PFDS)	<2.0		2.0	0.32	ng/L		06/10/22 05:33	06/15/22 04:05	1
Perfluorododecanesulfonic acid (PFDoS)	<2.0		2.0	0.96	ng/L		06/10/22 05:33	06/15/22 04:05	1
Perfluorooctanesulfonamide (FOSA)	<2.0		2.0	0.97	ng/L		06/10/22 05:33	06/15/22 04:05	1
NEtFOSA	<2.0		2.0	0.86	ng/L		06/10/22 05:33	06/15/22 04:05	1
NMeFOSA	<2.0		2.0	0.43	ng/L		06/10/22 05:33	06/15/22 04:05	1
NMeFOSAA	<5.0		5.0	1.2	ng/L		06/10/22 05:33	06/15/22 04:05	1
NEtFOSAA	<5.0		5.0	1.3	ng/L		06/10/22 05:33	06/15/22 04:05	1
NMeFOSE	<4.0		4.0	1.4	ng/L		06/10/22 05:33	06/15/22 04:05	1
NEtFOSE	<2.0		2.0	0.84	ng/L		06/10/22 05:33	06/15/22 04:05	1
4:2 FTS	<2.0		2.0	0.24	ng/L		06/10/22 05:33	06/15/22 04:05	1
6:2 FTS	<5.0		5.0	2.5	ng/L		06/10/22 05:33	06/15/22 04:05	1
8:2 FTS	<2.0		2.0	0.46	ng/L		06/10/22 05:33	06/15/22 04:05	1
10:2 FTS	<2.0		2.0	0.66	ng/L		06/10/22 05:33	06/15/22 04:05	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	<2.0		2.0	0.40	ng/L		06/10/22 05:33	06/15/22 04:05	1
HFPO-DA (GenX)	<4.0		4.0	1.5	ng/L		06/10/22 05:33	06/15/22 04:05	1
9Cl-PF3ONS	<2.0		2.0	0.24	ng/L		06/10/22 05:33	06/15/22 04:05	1
11Cl-PF3OUdS	<2.0		2.0	0.32	ng/L		06/10/22 05:33	06/15/22 04:05	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFBA	*92*		*25 - 150*	*06/10/22 05:33*	*06/15/22 04:05*	*1*
13C5 PFPeA	*85*		*25 - 150*	*06/10/22 05:33*	*06/15/22 04:05*	*1*
13C2 PFHxA	*89*		*25 - 150*	*06/10/22 05:33*	*06/15/22 04:05*	*1*
13C4 PFHpA	*94*		*25 - 150*	*06/10/22 05:33*	*06/15/22 04:05*	*1*
13C4 PFOA	*88*		*25 - 150*	*06/10/22 05:33*	*06/15/22 04:05*	*1*
13C5 PFNA	*87*		*25 - 150*	*06/10/22 05:33*	*06/15/22 04:05*	*1*
13C2 PFDA	*83*		*25 - 150*	*06/10/22 05:33*	*06/15/22 04:05*	*1*
13C2 PFUnA	*80*		*25 - 150*	*06/10/22 05:33*	*06/15/22 04:05*	*1*

Client: ARCADIS U.S., Inc.
Job ID: 500-216998-1
Project/Site: Marinette, WI Deep Well 30135605.03

Client Sample ID: FB-01 (20220519)
Lab Sample ID: 500-216998-6
Date Collected: 05/19/22 20:30
Matrix: Water
Date Received: 05/21/22 10:15

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFDoA	80		25 - 150	06/10/22 05:33	06/15/22 04:05	1
13C2 PFTeDA	75		25 - 150	06/10/22 05:33	06/15/22 04:05	1
13C2 PFHxDA	77		25 - 150	06/10/22 05:33	06/15/22 04:05	1
13C3 PFBS	87		25 - 150	06/10/22 05:33	06/15/22 04:05	1
18O2 PFHxS	89		25 - 150	06/10/22 05:33	06/15/22 04:05	1
13C4 PFOS	80		25 - 150	06/10/22 05:33	06/15/22 04:05	1
13C8 FOSA	81		10 - 150	06/10/22 05:33	06/15/22 04:05	1
d3-NMeFOSAA	80		25 - 150	06/10/22 05:33	06/15/22 04:05	1
d5-NEtFOSAA	76		25 - 150	06/10/22 05:33	06/15/22 04:05	1
d-N-MeFOSA-M	66		10 - 150	06/10/22 05:33	06/15/22 04:05	1
d-N-EtFOSA-M	68		10 - 150	06/10/22 05:33	06/15/22 04:05	1
d7-N-MeFOSE-M	71		10 - 150	06/10/22 05:33	06/15/22 04:05	1
d9-N-EtFOSE-M	71		10 - 150	06/10/22 05:33	06/15/22 04:05	1
M2-4:2 FTS	98		25 - 150	06/10/22 05:33	06/15/22 04:05	1
M2-6:2 FTS	92		25 - 150	06/10/22 05:33	06/15/22 04:05	1
M2-8:2 FTS	90		25 - 150	06/10/22 05:33	06/15/22 04:05	1
13C3 HFPO-DA	93		25 - 150	06/10/22 05:33	06/15/22 04:05	1
13C2 10:2 FTS	80		25 - 150	06/10/22 05:33	06/15/22 04:05	1

Client: ARCADIS U.S., Inc.
Project/Site: Marinette, WI Deep Well 30135605.03

Job ID: 500-217045-1

Client Sample ID: IRR-02-50 (20220521)
Date Collected: 05/21/22 16:30
Date Received: 05/24/22 09:15

Lab Sample ID: 500-217045-1
Matrix: Water

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	<4.8		4.8	2.3	ng/L		06/15/22 19:14	06/21/22 21:31	1
Perfluoropentanoic acid (PFPeA)	<1.9		1.9	0.47	ng/L		06/15/22 19:14	06/21/22 21:31	1
Perfluorohexanoic acid (PFHxA)	<1.9		1.9	0.56	ng/L		06/15/22 19:14	06/21/22 21:31	1
Perfluoroheptanoic acid (PFHpA)	<1.9		1.9	0.24	ng/L		06/15/22 19:14	06/21/22 21:31	1
Perfluorooctanoic acid (PFOA)	<1.9		1.9	0.82	ng/L		06/15/22 19:14	06/21/22 21:31	1
Perfluorononanoic acid (PFNA)	<1.9		1.9	0.26	ng/L		06/15/22 19:14	06/21/22 21:31	1
Perfluorodecanoic acid (PFDA)	<1.9		1.9	0.30	ng/L		06/15/22 19:14	06/21/22 21:31	1
Perfluoroundecanoic acid (PFUnA)	<1.9		1.9	1.1	ng/L		06/15/22 19:14	06/21/22 21:31	1
Perfluorododecanoic acid (PFDoA)	<1.9		1.9	0.53	ng/L		06/15/22 19:14	06/21/22 21:31	1
Perfluorotridecanoic acid (PFTrDA)	<1.9		1.9	1.3	ng/L		06/15/22 19:14	06/21/22 21:31	1
Perfluorotetradecanoic acid (PFTeA)	<1.9		1.9	0.70	ng/L		06/15/22 19:14	06/21/22 21:31	1
Perfluoro-n-hexadecanoic acid (PFHxDA)	<1.9		1.9	0.86	ng/L		06/15/22 19:14	06/21/22 21:31	1
Perfluoro-n-octadecanoic acid (PFODA)	<1.9		1.9	0.90	ng/L		06/15/22 19:14	06/21/22 21:31	1
Perfluorobutanesulfonic acid (PFBS)	<1.9		1.9	0.19	ng/L		06/15/22 19:14	06/21/22 21:31	1
Perfluoropentanesulfonic acid (PFPeS)	<1.9		1.9	0.29	ng/L		06/15/22 19:14	06/21/22 21:31	1
Perfluorohexanesulfonic acid (PFHxS)	<1.9		1.9	0.55	ng/L		06/15/22 19:14	06/21/22 21:31	1
Perfluoroheptanesulfonic acid (PFHpS)	<1.9		1.9	0.18	ng/L		06/15/22 19:14	06/21/22 21:31	1
Perfluorooctanesulfonic acid (PFOS)	<1.9		1.9	0.52	ng/L		06/15/22 19:14	06/21/22 21:31	1
Perfluorononanesulfonic acid (PFNS)	<1.9		1.9	0.36	ng/L		06/15/22 19:14	06/21/22 21:31	1
Perfluorodecanesulfonic acid (PFDS)	<1.9		1.9	0.31	ng/L		06/15/22 19:14	06/21/22 21:31	1
Perfluorododecanesulfonic acid (PFDoS)	<1.9		1.9	0.93	ng/L		06/15/22 19:14	06/21/22 21:31	1
Perfluorooctanesulfonamide (FOSA)	<1.9		1.9	0.94	ng/L		06/15/22 19:14	06/21/22 21:31	1
NEtFOSA	<1.9		1.9	0.84	ng/L		06/15/22 19:14	06/21/22 21:31	1
NMeFOSA	<1.9		1.9	0.41	ng/L		06/15/22 19:14	06/21/22 21:31	1
NMeFOSAA	<4.8		4.8	1.2	ng/L		06/15/22 19:14	06/21/22 21:31	1
NEtFOSAA	<4.8		4.8	1.3	ng/L		06/15/22 19:14	06/21/22 21:31	1
NMeFOSE	<3.9		3.9	1.3	ng/L		06/15/22 19:14	06/21/22 21:31	1
NEtFOSE	<1.9		1.9	0.82	ng/L		06/15/22 19:14	06/21/22 21:31	1
4:2 FTS	<1.9		1.9	0.23	ng/L		06/15/22 19:14	06/21/22 21:31	1
6:2 FTS	<4.8		4.8	2.4	ng/L		06/15/22 19:14	06/21/22 21:31	1
8:2 FTS	<1.9		1.9	0.44	ng/L		06/15/22 19:14	06/21/22 21:31	1
10:2 FTS	<1.9		1.9	0.64	ng/L		06/15/22 19:14	06/21/22 21:31	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	<1.9		1.9	0.39	ng/L		06/15/22 19:14	06/21/22 21:31	1
HFPO-DA (GenX)	<3.9		3.9	1.4	ng/L		06/15/22 19:14	06/21/22 21:31	1
9Cl-PF3ONS	<1.9		1.9	0.23	ng/L		06/15/22 19:14	06/21/22 21:31	1
11Cl-PF3OUdS	<1.9		1.9	0.31	ng/L		06/15/22 19:14	06/21/22 21:31	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFBA	*101*		*25 - 150*	*06/15/22 19:14*	*06/21/22 21:31*	*1*
13C5 PFPeA	*102*		*25 - 150*	*06/15/22 19:14*	*06/21/22 21:31*	*1*
13C2 PFHxA	*107*		*25 - 150*	*06/15/22 19:14*	*06/21/22 21:31*	*1*
13C4 PFHpA	*114*		*25 - 150*	*06/15/22 19:14*	*06/21/22 21:31*	*1*
13C4 PFOA	*100*		*25 - 150*	*06/15/22 19:14*	*06/21/22 21:31*	*1*
13C5 PFNA	*102*		*25 - 150*	*06/15/22 19:14*	*06/21/22 21:31*	*1*
13C2 PFDA	*102*		*25 - 150*	*06/15/22 19:14*	*06/21/22 21:31*	*1*
13C2 PFUnA	*99*		*25 - 150*	*06/15/22 19:14*	*06/21/22 21:31*	*1*

Client Sample ID: IRR-02-50 (20220521)
Lab Sample ID: 500-217045-1
Date Collected: 05/21/22 16:30
Matrix: Water
Date Received: 05/24/22 09:15

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFDoA	96		25 - 150	06/15/22 19:14	06/21/22 21:31	1
13C2 PFTeDA	93		25 - 150	06/15/22 19:14	06/21/22 21:31	1
13C2 PFHxDA	92		25 - 150	06/15/22 19:14	06/21/22 21:31	1
13C3 PFBS	104		25 - 150	06/15/22 19:14	06/21/22 21:31	1
18O2 PFHxS	98		25 - 150	06/15/22 19:14	06/21/22 21:31	1
13C4 PFOS	99		25 - 150	06/15/22 19:14	06/21/22 21:31	1
13C8 FOSA	106		10 - 150	06/15/22 19:14	06/21/22 21:31	1
d3-NMeFOSAA	106		25 - 150	06/15/22 19:14	06/21/22 21:31	1
d5-NEtFOSAA	109		25 - 150	06/15/22 19:14	06/21/22 21:31	1
d-N-MeFOSA-M	76		10 - 150	06/15/22 19:14	06/21/22 21:31	1
d-N-EtFOSA-M	75		10 - 150	06/15/22 19:14	06/21/22 21:31	1
d7-N-MeFOSE-M	90		10 - 150	06/15/22 19:14	06/21/22 21:31	1
d9-N-EtFOSE-M	92		10 - 150	06/15/22 19:14	06/21/22 21:31	1
M2-4:2 FTS	106		25 - 150	06/15/22 19:14	06/21/22 21:31	1
M2-6:2 FTS	112		25 - 150	06/15/22 19:14	06/21/22 21:31	1
M2-8:2 FTS	136		25 - 150	06/15/22 19:14	06/21/22 21:31	1
13C3 HFPO-DA	106		25 - 150	06/15/22 19:14	06/21/22 21:31	1
13C2 10:2 FTS	124		25 - 150	06/15/22 19:14	06/21/22 21:31	1

Method: 6010D - Metals (ICP) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfur	**130**		0.20	0.056	mg/L		06/21/22 17:30	06/22/22 13:37	2

Method: 6020A - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	<100		100	25	ug/L		06/02/22 08:57	06/06/22 15:22	1
Antimony	<3.0		3.0	1.3	ug/L		06/02/22 08:57	06/06/22 15:22	1
Arsenic	<1.0		1.0	0.23	ug/L		06/02/22 08:57	06/06/22 15:22	1
Barium	**9.1**		2.5	0.73	ug/L		06/02/22 08:57	06/06/22 15:22	1
Beryllium	<1.0	^+	1.0	0.53	ug/L		06/02/22 08:57	06/06/22 15:22	1
Boron	**270**		50	13	ug/L		06/02/22 08:57	06/06/22 15:22	1
Cadmium	<0.50		0.50	0.17	ug/L		06/02/22 08:57	06/06/22 15:22	1
Calcium	**130000**		200	44	ug/L		06/02/22 08:57	06/06/22 15:22	1
Chromium	<5.0		5.0	1.1	ug/L		06/02/22 08:57	06/06/22 15:22	1
Cobalt	<1.0		1.0	0.40	ug/L		06/02/22 08:57	06/06/22 15:22	1
Copper	<2.0		2.0	0.50	ug/L		06/02/22 08:57	06/06/22 15:22	1
Iron	**260**		100	47	ug/L		06/02/22 08:57	06/06/22 15:22	1
Lead	**0.20**	**J**	0.50	0.19	ug/L		06/02/22 08:57	06/06/22 15:22	1
Magnesium	**50000**		200	49	ug/L		06/02/22 08:57	06/06/22 15:22	1
Manganese	**18**		2.5	0.79	ug/L		06/02/22 08:57	06/06/22 15:22	1
Nickel	<2.0		2.0	0.63	ug/L		06/02/22 08:57	06/06/22 15:22	1
Potassium	**5400**		500	110	ug/L		06/02/22 08:57	06/06/22 15:22	1
Selenium	<2.5		2.5	0.98	ug/L		06/02/22 08:57	06/06/22 15:22	1
Silver	<0.50		0.50	0.12	ug/L		06/02/22 08:57	06/06/22 15:22	1
Sodium	**52000**		200	77	ug/L		06/02/22 08:57	06/06/22 15:22	1
Strontium	**6300**	**^6+**	40	6.4	ug/L		06/02/22 08:57	06/07/22 18:30	10
Thallium	<2.0		2.0	0.57	ug/L		06/02/22 08:57	06/06/22 15:22	1
Vanadium	<5.0		5.0	2.2	ug/L		06/02/22 08:57	06/06/22 15:22	1
Zinc	**21**		20	6.9	ug/L		06/02/22 08:57	06/06/22 15:22	1

Client Sample ID: IRR-02-50 (20220521)
Lab Sample ID: 500-217045-1

Date Collected: 05/21/22 16:30
Matrix: Water
Date Received: 05/24/22 09:15

Method: 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Uranium	<1.0		1.0	0.40	ug/L		05/27/22 11:18	05/31/22 22:42	2

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.20		0.20	0.098	ug/L		06/02/22 15:10	06/03/22 08:36	1

Method: SM 2340B - Total Hardness (as CaCO3) by calculation - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Hardness as calcium carbonate	**520**		0.91	0.46	mg/L		06/02/22 08:57	06/09/22 12:34	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Bromide	**0.57**		0.25	0.050	mg/L			05/24/22 11:13	1
Chloride	**71**		4.0	3.4	mg/L			05/24/22 16:32	20
Fluoride	**1.7**		0.20	0.067	mg/L			05/24/22 11:13	1
Nitrate as N	**0.30**	**H3**	0.20	0.068	mg/L			05/24/22 11:13	1
Nitrite as N	<4.0	H3	4.0	1.0	mg/L			05/24/22 16:32	20
Orthophosphate as P	<0.20	F1 H3	0.20	0.065	mg/L			05/24/22 11:13	1
Sulfate	**410**		20	9.5	mg/L			05/24/22 17:12	100
Alkalinity	**100**		5.0	3.7	mg/L			06/02/22 13:53	1
Bicarbonate Alkalinity as CaCO3	**100**		5.0	3.7	mg/L			06/02/22 13:53	1
Carbonate Alkalinity as CaCO3	<5.0		5.0	3.7	mg/L			06/02/22 13:53	1
Sulfide	<1.0		1.0	0.23	mg/L			05/25/22 03:28	1

Method: 903.0 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	**13.2**		0.806	1.43	1.00	0.170	pCi/L	05/26/22 13:15	06/17/22 09:03	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Ba Carrier	*89.0*		*40 - 110*	*05/26/22 13:15*	*06/17/22 09:03*	*1*

Method: 904.0 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	<0.556	U	0.353	0.355	1.00	0.556	pCi/L	05/26/22 14:49	06/14/22 16:07	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Ba Carrier	*89.0*		*40 - 110*	*05/26/22 14:49*	*06/14/22 16:07*	*1*
Y Carrier	*89.7*		*40 - 110*	*05/26/22 14:49*	*06/14/22 16:07*	*1*

Method: Ra226_Ra228 Pos - Combined Radium-226 and Radium-228

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium 226 and 228	**13.6**		0.880	1.47	5.00	0.556	pCi/L		06/17/22 17:24	1

Client: ARCADIS U.S., Inc.
Project/Site: Marinette, WI Deep Well 30135605.03

Job ID: 500-217045-1

Client Sample ID: IRR-02-180 (20220521)
Date Collected: 05/21/22 15:15
Date Received: 05/24/22 09:15

Lab Sample ID: 500-217045-2
Matrix: Water

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	<5.0		5.0	2.4	ng/L		06/15/22 19:14	06/21/22 22:02	1
Perfluoropentanoic acid (PFPeA)	**2.9**		2.0	0.49	ng/L		06/15/22 19:14	06/21/22 22:02	1
Perfluorohexanoic acid (PFHxA)	**3.7**		2.0	0.58	ng/L		06/15/22 19:14	06/21/22 22:02	1
Perfluoroheptanoic acid (PFHpA)	**4.6**		2.0	0.25	ng/L		06/15/22 19:14	06/21/22 22:02	1
Perfluorooctanoic acid (PFOA)	**33**		2.0	0.84	ng/L		06/15/22 19:14	06/21/22 22:02	1
Perfluorononanoic acid (PFNA)	**1.3**	**J**	2.0	0.27	ng/L		06/15/22 19:14	06/21/22 22:02	1
Perfluorodecanoic acid (PFDA)	<2.0		2.0	0.31	ng/L		06/15/22 19:14	06/21/22 22:02	1
Perfluoroundecanoic acid (PFUnA)	<2.0		2.0	1.1	ng/L		06/15/22 19:14	06/21/22 22:02	1
Perfluorododecanoic acid (PFDoA)	<2.0		2.0	0.55	ng/L		06/15/22 19:14	06/21/22 22:02	1
Perfluorotridecanoic acid (PFTrDA)	<2.0		2.0	1.3	ng/L		06/15/22 19:14	06/21/22 22:02	1
Perfluorotetradecanoic acid (PFTeA)	<2.0		2.0	0.72	ng/L		06/15/22 19:14	06/21/22 22:02	1
Perfluoro-n-hexadecanoic acid (PFHxDA)	<2.0		2.0	0.88	ng/L		06/15/22 19:14	06/21/22 22:02	1
Perfluoro-n-octadecanoic acid (PFODA)	<2.0		2.0	0.93	ng/L		06/15/22 19:14	06/21/22 22:02	1
Perfluorobutanesulfonic acid (PFBS)	**0.45**	**J**	2.0	0.20	ng/L		06/15/22 19:14	06/21/22 22:02	1
Perfluoropentanesulfonic acid (PFPeS)	<2.0		2.0	0.30	ng/L		06/15/22 19:14	06/21/22 22:02	1
Perfluorohexanesulfonic acid (PFHxS)	<2.0		2.0	0.57	ng/L		06/15/22 19:14	06/21/22 22:02	1
Perfluoroheptanesulfonic acid (PFHpS)	<2.0		2.0	0.19	ng/L		06/15/22 19:14	06/21/22 22:02	1
Perfluorooctanesulfonic acid (PFOS)	<2.0		2.0	0.54	ng/L		06/15/22 19:14	06/21/22 22:02	1
Perfluorononanesulfonic acid (PFNS)	<2.0		2.0	0.37	ng/L		06/15/22 19:14	06/21/22 22:02	1
Perfluorodecanesulfonic acid (PFDS)	<2.0		2.0	0.32	ng/L		06/15/22 19:14	06/21/22 22:02	1
Perfluorododecanesulfonic acid (PFDoS)	<2.0		2.0	0.96	ng/L		06/15/22 19:14	06/21/22 22:02	1
Perfluorooctanesulfonamide (FOSA)	<2.0		2.0	0.97	ng/L		06/15/22 19:14	06/21/22 22:02	1
NEtFOSA	<2.0		2.0	0.86	ng/L		06/15/22 19:14	06/21/22 22:02	1
NMeFOSA	<2.0		2.0	0.43	ng/L		06/15/22 19:14	06/21/22 22:02	1
NMeFOSAA	<5.0		5.0	1.2	ng/L		06/15/22 19:14	06/21/22 22:02	1
NEtFOSAA	<5.0		5.0	1.3	ng/L		06/15/22 19:14	06/21/22 22:02	1
NMeFOSE	<4.0		4.0	1.4	ng/L		06/15/22 19:14	06/21/22 22:02	1
NEtFOSE	<2.0		2.0	0.84	ng/L		06/15/22 19:14	06/21/22 22:02	1
4:2 FTS	**0.36**	**J**	2.0	0.24	ng/L		06/15/22 19:14	06/21/22 22:02	1
6:2 FTS	**8.2**		5.0	2.5	ng/L		06/15/22 19:14	06/21/22 22:02	1
8:2 FTS	<2.0		2.0	0.46	ng/L		06/15/22 19:14	06/21/22 22:02	1
10:2 FTS	<2.0		2.0	0.67	ng/L		06/15/22 19:14	06/21/22 22:02	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	<2.0		2.0	0.40	ng/L		06/15/22 19:14	06/21/22 22:02	1
HFPO-DA (GenX)	<4.0		4.0	1.5	ng/L		06/15/22 19:14	06/21/22 22:02	1
9Cl-PF3ONS	<2.0		2.0	0.24	ng/L		06/15/22 19:14	06/21/22 22:02	1
11Cl-PF3OUdS	<2.0		2.0	0.32	ng/L		06/15/22 19:14	06/21/22 22:02	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFBA	*101*		*25 - 150*	*06/15/22 19:14*	*06/21/22 22:02*	*1*
13C5 PFPeA	*91*		*25 - 150*	*06/15/22 19:14*	*06/21/22 22:02*	*1*
13C2 PFHxA	*102*		*25 - 150*	*06/15/22 19:14*	*06/21/22 22:02*	*1*
13C4 PFHpA	*101*		*25 - 150*	*06/15/22 19:14*	*06/21/22 22:02*	*1*
13C4 PFOA	*100*		*25 - 150*	*06/15/22 19:14*	*06/21/22 22:02*	*1*
13C5 PFNA	*105*		*25 - 150*	*06/15/22 19:14*	*06/21/22 22:02*	*1*
13C2 PFDA	*99*		*25 - 150*	*06/15/22 19:14*	*06/21/22 22:02*	*1*

Client Sample ID: IRR-02-180 (20220521)
Date Collected: 05/21/22 15:15
Date Received: 05/24/22 09:15

Lab Sample ID: 500-217045-2
Matrix: Water

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFUnA	90		25 - 150	06/15/22 19:14	06/21/22 22:02	1
13C2 PFDoA	95		25 - 150	06/15/22 19:14	06/21/22 22:02	1
13C2 PFTeDA	77		25 - 150	06/15/22 19:14	06/21/22 22:02	1
13C2 PFHxDA	84		25 - 150	06/15/22 19:14	06/21/22 22:02	1
13C3 PFBS	97		25 - 150	06/15/22 19:14	06/21/22 22:02	1
18O2 PFHxS	92		25 - 150	06/15/22 19:14	06/21/22 22:02	1
13C4 PFOS	93		25 - 150	06/15/22 19:14	06/21/22 22:02	1
13C8 FOSA	100		10 - 150	06/15/22 19:14	06/21/22 22:02	1
d3-NMeFOSAA	97		25 - 150	06/15/22 19:14	06/21/22 22:02	1
d5-NEtFOSAA	100		25 - 150	06/15/22 19:14	06/21/22 22:02	1
d-N-MeFOSA-M	63		10 - 150	06/15/22 19:14	06/21/22 22:02	1
d-N-EtFOSA-M	67		10 - 150	06/15/22 19:14	06/21/22 22:02	1
d7-N-MeFOSE-M	77		10 - 150	06/15/22 19:14	06/21/22 22:02	1
d9-N-EtFOSE-M	75		10 - 150	06/15/22 19:14	06/21/22 22:02	1
M2-4:2 FTS	101		25 - 150	06/15/22 19:14	06/21/22 22:02	1
M2-6:2 FTS	109		25 - 150	06/15/22 19:14	06/21/22 22:02	1
M2-8:2 FTS	125		25 - 150	06/15/22 19:14	06/21/22 22:02	1
13C3 HFPO-DA	98		25 - 150	06/15/22 19:14	06/21/22 22:02	1
13C2 10:2 FTS	102		25 - 150	06/15/22 19:14	06/21/22 22:02	1

Method: 6010D - Metals (ICP) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfur	**130**		0.20	0.056	mg/L		06/21/22 17:30	06/22/22 14:09	2

Method: 6020A - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**45**	**J**	100	25	ug/L		06/02/22 08:57	06/06/22 15:40	1
Antimony	<3.0		3.0	1.3	ug/L		06/02/22 08:57	06/06/22 15:40	1
Arsenic	**0.60**	**J**	1.0	0.23	ug/L		06/02/22 08:57	06/06/22 15:40	1
Barium	**11**		2.5	0.73	ug/L		06/02/22 08:57	06/06/22 15:40	1
Beryllium	<1.0	^+	1.0	0.53	ug/L		06/02/22 08:57	06/06/22 15:40	1
Boron	**270**		50	13	ug/L		06/02/22 08:57	06/06/22 15:40	1
Cadmium	<0.50		0.50	0.17	ug/L		06/02/22 08:57	06/06/22 15:40	1
Calcium	**120000**		200	44	ug/L		06/02/22 08:57	06/06/22 15:40	1
Chromium	<5.0		5.0	1.1	ug/L		06/02/22 08:57	06/06/22 15:40	1
Cobalt	<1.0		1.0	0.40	ug/L		06/02/22 08:57	06/06/22 15:40	1
Copper	**1.8**	**J**	2.0	0.50	ug/L		06/02/22 08:57	06/06/22 15:40	1
Iron	**1300**		100	47	ug/L		06/02/22 08:57	06/06/22 15:40	1
Lead	**0.49**	**J**	0.50	0.19	ug/L		06/02/22 08:57	06/06/22 15:40	1
Magnesium	**49000**		200	49	ug/L		06/02/22 08:57	06/06/22 15:40	1
Manganese	**48**		2.5	0.79	ug/L		06/02/22 08:57	06/06/22 15:40	1
Nickel	**0.85**	**J**	2.0	0.63	ug/L		06/02/22 08:57	06/06/22 15:40	1
Potassium	**5300**		500	110	ug/L		06/02/22 08:57	06/06/22 15:40	1
Selenium	<2.5		2.5	0.98	ug/L		06/02/22 08:57	06/06/22 15:40	1
Silver	<0.50		0.50	0.12	ug/L		06/02/22 08:57	06/06/22 15:40	1
Sodium	**51000**		200	77	ug/L		06/02/22 08:57	06/06/22 15:40	1
Strontium	**6000**	**^6+**	40	6.4	ug/L		06/02/22 08:57	06/07/22 18:54	10
Thallium	<2.0		2.0	0.57	ug/L		06/02/22 08:57	06/06/22 15:40	1
Vanadium	<5.0		5.0	2.2	ug/L		06/02/22 08:57	06/06/22 15:40	1
Zinc	**970**		20	6.9	ug/L		06/02/22 08:57	06/06/22 15:40	1

Client: ARCADIS U.S., Inc.
Job ID: 500-217045-1
Project/Site: Marinette, WI Deep Well 30135605.03

Client Sample ID: IRR-02-180 (20220521)
Lab Sample ID: 500-217045-2
Date Collected: 05/21/22 15:15
Matrix: Water
Date Received: 05/24/22 09:15

Method: 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Uranium	<1.0		1.0	0.40	ug/L		05/27/22 11:18	05/31/22 23:09	2

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.20		0.20	0.098	ug/L		06/02/22 15:10	06/03/22 08:44	1

Method: SM 2340B - Total Hardness (as CaCO3) by calculation - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Hardness as calcium carbonate	**510**		0.91	0.46	mg/L		06/02/22 08:57	06/09/22 12:34	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Bromide	**0.51**		0.25	0.050	mg/L			05/24/22 12:07	1
Chloride	**70**		4.0	3.4	mg/L			05/24/22 17:53	20
Fluoride	**1.7**		0.20	0.067	mg/L			05/24/22 12:07	1
Nitrate as N	**1.3**	**H3**	0.20	0.068	mg/L			05/24/22 12:07	1
Nitrite as N	<0.20	H3	0.20	0.050	mg/L			05/24/22 12:07	1
Orthophosphate as P	<0.20	H3	0.20	0.065	mg/L			05/24/22 12:07	1
Sulfate	**400**		20	9.5	mg/L			05/24/22 18:07	100
Alkalinity	**110**		5.0	3.7	mg/L			06/02/22 14:07	1
Bicarbonate Alkalinity as CaCO3	**110**		5.0	3.7	mg/L			06/02/22 14:07	1
Carbonate Alkalinity as CaCO3	<5.0		5.0	3.7	mg/L			06/02/22 14:07	1
Sulfide	<1.6		1.6	0.36	mg/L			05/25/22 03:41	1

Method: 903.0 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	**13.2**		0.837	1.45	1.00	0.239	pCi/L	05/26/22 13:15	06/17/22 09:05	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Ba Carrier	*89.3*		*40 - 110*	*05/26/22 13:15*	*06/17/22 09:05*	*1*

Method: 904.0 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	<0.562	U	0.355	0.357	1.00	0.562	pCi/L	05/26/22 14:49	06/14/22 16:07	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Ba Carrier	*89.3*		*40 - 110*	*05/26/22 14:49*	*06/14/22 16:07*	*1*
Y Carrier	*84.1*		*40 - 110*	*05/26/22 14:49*	*06/14/22 16:07*	*1*

Method: Ra226_Ra228 Pos - Combined Radium-226 and Radium-228

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium 226 and 228	**13.6**		0.909	1.49	5.00	0.562	pCi/L		06/17/22 17:24	1

Client: ARCADIS U.S., Inc.
Project/Site: Marinette, WI Deep Well 30135605.03

Job ID: 500-217045-1

Client Sample ID: IRR-02-392 (20220521)
Date Collected: 05/21/22 14:45
Date Received: 05/24/22 09:15

Lab Sample ID: 500-217045-3
Matrix: Water

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	**14**		5.0	2.4	ng/L		06/15/22 19:14	06/21/22 22:12	1
Perfluoropentanoic acid (PFPeA)	**32**		2.0	0.49	ng/L		06/15/22 19:14	06/21/22 22:12	1
Perfluorohexanoic acid (PFHxA)	**50**		2.0	0.58	ng/L		06/15/22 19:14	06/21/22 22:12	1
Perfluoroheptanoic acid (PFHpA)	**54**		2.0	0.25	ng/L		06/15/22 19:14	06/21/22 22:12	1
Perfluorooctanoic acid (PFOA)	**350**		2.0	0.86	ng/L		06/15/22 19:14	06/21/22 22:12	1
Perfluorononanoic acid (PFNA)	**12**		2.0	0.27	ng/L		06/15/22 19:14	06/21/22 22:12	1
Perfluorodecanoic acid (PFDA)	<2.0		2.0	0.31	ng/L		06/15/22 19:14	06/21/22 22:12	1
Perfluoroundecanoic acid (PFUnA)	<2.0		2.0	1.1	ng/L		06/15/22 19:14	06/21/22 22:12	1
Perfluorododecanoic acid (PFDoA)	<2.0		2.0	0.55	ng/L		06/15/22 19:14	06/21/22 22:12	1
Perfluorotridecanoic acid (PFTrDA)	<2.0		2.0	1.3	ng/L		06/15/22 19:14	06/21/22 22:12	1
Perfluorotetradecanoic acid (PFTeA)	<2.0		2.0	0.73	ng/L		06/15/22 19:14	06/21/22 22:12	1
Perfluoro-n-hexadecanoic acid (PFHxDA)	<2.0		2.0	0.90	ng/L		06/15/22 19:14	06/21/22 22:12	1
Perfluoro-n-octadecanoic acid (PFODA)	<2.0		2.0	0.95	ng/L		06/15/22 19:14	06/21/22 22:12	1
Perfluorobutanesulfonic acid (PFBS)	**0.52**	**J**	2.0	0.20	ng/L		06/15/22 19:14	06/21/22 22:12	1
Perfluoropentanesulfonic acid (PFPeS)	**0.51**	**J**	2.0	0.30	ng/L		06/15/22 19:14	06/21/22 22:12	1
Perfluorohexanesulfonic acid (PFHxS)	**4.0**		2.0	0.57	ng/L		06/15/22 19:14	06/21/22 22:12	1
Perfluoroheptanesulfonic acid (PFHpS)	<2.0		2.0	0.19	ng/L		06/15/22 19:14	06/21/22 22:12	1
Perfluorooctanesulfonic acid (PFOS)	<2.0		2.0	0.54	ng/L		06/15/22 19:14	06/21/22 22:12	1
Perfluorononanesulfonic acid (PFNS)	<2.0		2.0	0.37	ng/L		06/15/22 19:14	06/21/22 22:12	1
Perfluorodecanesulfonic acid (PFDS)	<2.0		2.0	0.32	ng/L		06/15/22 19:14	06/21/22 22:12	1
Perfluorododecanesulfonic acid (PFDoS)	<2.0		2.0	0.98	ng/L		06/15/22 19:14	06/21/22 22:12	1
Perfluorooctanesulfonamide (FOSA)	<2.0		2.0	0.99	ng/L		06/15/22 19:14	06/21/22 22:12	1
NEtFOSA	<2.0		2.0	0.88	ng/L		06/15/22 19:14	06/21/22 22:12	1
NMeFOSA	<2.0		2.0	0.43	ng/L		06/15/22 19:14	06/21/22 22:12	1
NMeFOSAA	<5.0		5.0	1.2	ng/L		06/15/22 19:14	06/21/22 22:12	1
NEtFOSAA	<5.0		5.0	1.3	ng/L		06/15/22 19:14	06/21/22 22:12	1
NMeFOSE	<4.0		4.0	1.4	ng/L		06/15/22 19:14	06/21/22 22:12	1
NEtFOSE	<2.0		2.0	0.86	ng/L		06/15/22 19:14	06/21/22 22:12	1
4:2 FTS	**4.1**		2.0	0.24	ng/L		06/15/22 19:14	06/21/22 22:12	1
6:2 FTS	**90**		5.0	2.5	ng/L		06/15/22 19:14	06/21/22 22:12	1
8:2 FTS	**0.91**	**J**	2.0	0.46	ng/L		06/15/22 19:14	06/21/22 22:12	1
10:2 FTS	<2.0		2.0	0.67	ng/L		06/15/22 19:14	06/21/22 22:12	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	<2.0		2.0	0.40	ng/L		06/15/22 19:14	06/21/22 22:12	1
HFPO-DA (GenX)	<4.0		4.0	1.5	ng/L		06/15/22 19:14	06/21/22 22:12	1
9Cl-PF3ONS	<2.0		2.0	0.24	ng/L		06/15/22 19:14	06/21/22 22:12	1
11Cl-PF3OUdS	<2.0		2.0	0.32	ng/L		06/15/22 19:14	06/21/22 22:12	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFBA	*91*		*25 - 150*	*06/15/22 19:14*	*06/21/22 22:12*	*1*
13C5 PFPeA	*90*		*25 - 150*	*06/15/22 19:14*	*06/21/22 22:12*	*1*
13C2 PFHxA	*94*		*25 - 150*	*06/15/22 19:14*	*06/21/22 22:12*	*1*
13C4 PFHpA	*99*		*25 - 150*	*06/15/22 19:14*	*06/21/22 22:12*	*1*
13C4 PFOA	*92*		*25 - 150*	*06/15/22 19:14*	*06/21/22 22:12*	*1*
13C5 PFNA	*90*		*25 - 150*	*06/15/22 19:14*	*06/21/22 22:12*	*1*

Client Sample ID: IRR-02-392 (20220521)
Date Collected: 05/21/22 14:45
Date Received: 05/24/22 09:15

Lab Sample ID: 500-217045-3
Matrix: Water

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFDA	90		25 - 150	06/15/22 19:14	06/21/22 22:12	1
13C2 PFUnA	92		25 - 150	06/15/22 19:14	06/21/22 22:12	1
13C2 PFDoA	90		25 - 150	06/15/22 19:14	06/21/22 22:12	1
13C2 PFTeDA	75		25 - 150	06/15/22 19:14	06/21/22 22:12	1
13C2 PFHxDA	81		25 - 150	06/15/22 19:14	06/21/22 22:12	1
13C3 PFBS	93		25 - 150	06/15/22 19:14	06/21/22 22:12	1
18O2 PFHxS	88		25 - 150	06/15/22 19:14	06/21/22 22:12	1
13C4 PFOS	83		25 - 150	06/15/22 19:14	06/21/22 22:12	1
13C8 FOSA	89		10 - 150	06/15/22 19:14	06/21/22 22:12	1
d3-NMeFOSAA	96		25 - 150	06/15/22 19:14	06/21/22 22:12	1
d5-NEtFOSAA	96		25 - 150	06/15/22 19:14	06/21/22 22:12	1
d-N-MeFOSA-M	68		10 - 150	06/15/22 19:14	06/21/22 22:12	1
d-N-EtFOSA-M	63		10 - 150	06/15/22 19:14	06/21/22 22:12	1
d7-N-MeFOSE-M	72		10 - 150	06/15/22 19:14	06/21/22 22:12	1
d9-N-EtFOSE-M	74		10 - 150	06/15/22 19:14	06/21/22 22:12	1
M2-4:2 FTS	101		25 - 150	06/15/22 19:14	06/21/22 22:12	1
M2-6:2 FTS	96		25 - 150	06/15/22 19:14	06/21/22 22:12	1
M2-8:2 FTS	105		25 - 150	06/15/22 19:14	06/21/22 22:12	1
13C3 HFPO-DA	90		25 - 150	06/15/22 19:14	06/21/22 22:12	1
13C2 10:2 FTS	93		25 - 150	06/15/22 19:14	06/21/22 22:12	1

Method: 6010D - Metals (ICP) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfur	**120**		0.20	0.056	mg/L		06/21/22 17:30	06/22/22 14:13	2

Method: 6020A - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	<100		100	25	ug/L		06/02/22 08:57	06/06/22 15:43	1
Antimony	<3.0		3.0	1.3	ug/L		06/02/22 08:57	06/06/22 15:43	1
Arsenic	**0.42**	**J**	1.0	0.23	ug/L		06/02/22 08:57	06/06/22 15:43	1
Barium	**12**		2.5	0.73	ug/L		06/02/22 08:57	06/06/22 15:43	1
Beryllium	<1.0	^+	1.0	0.53	ug/L		06/02/22 08:57	06/06/22 15:43	1
Boron	**270**		50	13	ug/L		06/02/22 08:57	06/06/22 15:43	1
Cadmium	<0.50		0.50	0.17	ug/L		06/02/22 08:57	06/06/22 15:43	1
Calcium	**120000**		200	44	ug/L		06/02/22 08:57	06/06/22 15:43	1
Chromium	<5.0		5.0	1.1	ug/L		06/02/22 08:57	06/06/22 15:43	1
Cobalt	<1.0		1.0	0.40	ug/L		06/02/22 08:57	06/06/22 15:43	1
Copper	**1.0**	**J**	2.0	0.50	ug/L		06/02/22 08:57	06/06/22 15:43	1
Iron	**770**		100	47	ug/L		06/02/22 08:57	06/06/22 15:43	1
Lead	**0.44**	**J**	0.50	0.19	ug/L		06/02/22 08:57	06/06/22 15:43	1
Magnesium	**49000**		200	49	ug/L		06/02/22 08:57	06/06/22 15:43	1
Manganese	**35**		2.5	0.79	ug/L		06/02/22 08:57	06/06/22 15:43	1
Nickel	<2.0		2.0	0.63	ug/L		06/02/22 08:57	06/06/22 15:43	1
Potassium	**5300**		500	110	ug/L		06/02/22 08:57	06/06/22 15:43	1
Selenium	<2.5		2.5	0.98	ug/L		06/02/22 08:57	06/06/22 15:43	1
Silver	<0.50		0.50	0.12	ug/L		06/02/22 08:57	06/06/22 15:43	1
Sodium	**52000**		200	77	ug/L		06/02/22 08:57	06/06/22 15:43	1
Strontium	**6100**	**^6+**	40	6.4	ug/L		06/02/22 08:57	06/07/22 18:57	10
Thallium	<2.0		2.0	0.57	ug/L		06/02/22 08:57	06/06/22 15:43	1
Vanadium	<5.0		5.0	2.2	ug/L		06/02/22 08:57	06/06/22 15:43	1

Client Sample ID: IRR-02-392 (20220521)
Lab Sample ID: 500-217045-3

Date Collected: 05/21/22 14:45
Matrix: Water
Date Received: 05/24/22 09:15

Method: 6020A - Metals (ICP/MS) - Total Recoverable (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Zinc	**480**		20	6.9	ug/L		06/02/22 08:57	06/06/22 15:43	1

Method: 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Uranium	<1.0		1.0	0.40	ug/L		05/27/22 11:18	05/31/22 23:13	2

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.20		0.20	0.098	ug/L		06/02/22 15:10	06/03/22 08:46	1

Method: SM 2340B - Total Hardness (as CaCO3) by calculation - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Hardness as calcium carbonate	**510**		0.91	0.46	mg/L		06/02/22 08:57	06/09/22 12:34	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Bromide	**0.44**		0.25	0.050	mg/L			05/24/22 12:21	1
Chloride	**72**		4.0	3.4	mg/L			05/24/22 18:20	20
Fluoride	**1.6**		0.20	0.067	mg/L			05/24/22 12:21	1
Nitrate as N	<0.20	H3	0.20	0.068	mg/L			05/24/22 12:21	1
Nitrite as N	<0.20	H3	0.20	0.050	mg/L			05/24/22 12:21	1
Orthophosphate as P	<0.20	H3	0.20	0.065	mg/L			05/24/22 12:21	1
Sulfate	**380**		20	9.5	mg/L			05/24/22 18:34	100
Alkalinity	**100**		5.0	3.7	mg/L			06/02/22 14:13	1
Bicarbonate Alkalinity as CaCO3	**100**		5.0	3.7	mg/L			06/02/22 14:13	1
Carbonate Alkalinity as CaCO3	<5.0		5.0	3.7	mg/L			06/02/22 14:13	1
Sulfide	<1.4		1.4	0.32	mg/L			05/25/22 03:46	1

Method: 903.0 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	**11.9**		0.842	1.36	1.00	0.197	pCi/L	05/26/22 13:15	06/17/22 09:05	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Ba Carrier	*97.5*		*40 - 110*	*05/26/22 13:15*	*06/17/22 09:05*	*1*

Method: 904.0 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	<0.511	U	0.330	0.331	1.00	0.511	pCi/L	05/26/22 14:49	06/14/22 16:08	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Ba Carrier	*97.5*		*40 - 110*	*05/26/22 14:49*	*06/14/22 16:08*	*1*
Y Carrier	*90.5*		*40 - 110*	*05/26/22 14:49*	*06/14/22 16:08*	*1*

Method: Ra226_Ra228 Pos - Combined Radium-226 and Radium-228

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium 226 and 228	**12.2**		0.904	1.40	5.00	0.511	pCi/L		06/17/22 17:24	1

Client: ARCADIS U.S., Inc.
Project/Site: Marinette, WI Deep Well 30135605.03

Job ID: 500-217045-1

Client Sample ID: IRR-02-444 (20220521)
Date Collected: 05/21/22 14:00
Date Received: 05/24/22 09:15

Lab Sample ID: 500-217045-4
Matrix: Water

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	**16**		4.9	2.4	ng/L		06/15/22 19:14	06/21/22 22:22	1
Perfluoropentanoic acid (PFPeA)	**40**		2.0	0.48	ng/L		06/15/22 19:14	06/21/22 22:22	1
Perfluorohexanoic acid (PFHxA)	**60**		2.0	0.57	ng/L		06/15/22 19:14	06/21/22 22:22	1
Perfluoroheptanoic acid (PFHpA)	**65**		2.0	0.25	ng/L		06/15/22 19:14	06/21/22 22:22	1
Perfluorooctanoic acid (PFOA)	**440**	**E**	2.0	0.84	ng/L		06/15/22 19:14	06/21/22 22:22	1
Perfluorononanoic acid (PFNA)	**15**		2.0	0.27	ng/L		06/15/22 19:14	06/21/22 22:22	1
Perfluorodecanoic acid (PFDA)	<2.0		2.0	0.31	ng/L		06/15/22 19:14	06/21/22 22:22	1
Perfluoroundecanoic acid (PFUnA)	<2.0		2.0	1.1	ng/L		06/15/22 19:14	06/21/22 22:22	1
Perfluorododecanoic acid (PFDoA)	<2.0		2.0	0.54	ng/L		06/15/22 19:14	06/21/22 22:22	1
Perfluorotridecanoic acid (PFTrDA)	<2.0		2.0	1.3	ng/L		06/15/22 19:14	06/21/22 22:22	1
Perfluorotetradecanoic acid (PFTeA)	<2.0		2.0	0.72	ng/L		06/15/22 19:14	06/21/22 22:22	1
Perfluoro-n-hexadecanoic acid (PFHxDA)	<2.0		2.0	0.88	ng/L		06/15/22 19:14	06/21/22 22:22	1
Perfluoro-n-octadecanoic acid (PFODA)	<2.0		2.0	0.93	ng/L		06/15/22 19:14	06/21/22 22:22	1
Perfluorobutanesulfonic acid (PFBS)	**0.64**	**J**	2.0	0.20	ng/L		06/15/22 19:14	06/21/22 22:22	1
Perfluoropentanesulfonic acid (PFPeS)	**0.62**	**J**	2.0	0.30	ng/L		06/15/22 19:14	06/21/22 22:22	1
Perfluorohexanesulfonic acid (PFHxS)	**4.6**		2.0	0.56	ng/L		06/15/22 19:14	06/21/22 22:22	1
Perfluoroheptanesulfonic acid (PFHpS)	<2.0		2.0	0.19	ng/L		06/15/22 19:14	06/21/22 22:22	1
Perfluorooctanesulfonic acid (PFOS)	**1.4**	**J**	2.0	0.53	ng/L		06/15/22 19:14	06/21/22 22:22	1
Perfluorononanesulfonic acid (PFNS)	<2.0		2.0	0.37	ng/L		06/15/22 19:14	06/21/22 22:22	1
Perfluorodecanesulfonic acid (PFDS)	<2.0		2.0	0.32	ng/L		06/15/22 19:14	06/21/22 22:22	1
Perfluorododecanesulfonic acid (PFDoS)	<2.0		2.0	0.96	ng/L		06/15/22 19:14	06/21/22 22:22	1
Perfluorooctanesulfonamide (FOSA)	<2.0		2.0	0.97	ng/L		06/15/22 19:14	06/21/22 22:22	1
NEtFOSA	<2.0		2.0	0.86	ng/L		06/15/22 19:14	06/21/22 22:22	1
NMeFOSA	<2.0		2.0	0.42	ng/L		06/15/22 19:14	06/21/22 22:22	1
NMeFOSAA	<4.9		4.9	1.2	ng/L		06/15/22 19:14	06/21/22 22:22	1
NEtFOSAA	<4.9		4.9	1.3	ng/L		06/15/22 19:14	06/21/22 22:22	1
NMeFOSE	<4.0		4.0	1.4	ng/L		06/15/22 19:14	06/21/22 22:22	1
NEtFOSE	<2.0		2.0	0.84	ng/L		06/15/22 19:14	06/21/22 22:22	1
4:2 FTS	**4.6**		2.0	0.24	ng/L		06/15/22 19:14	06/21/22 22:22	1
6:2 FTS	**110**		4.9	2.5	ng/L		06/15/22 19:14	06/21/22 22:22	1
8:2 FTS	**1.0**	**J**	2.0	0.45	ng/L		06/15/22 19:14	06/21/22 22:22	1
10:2 FTS	<2.0		2.0	0.66	ng/L		06/15/22 19:14	06/21/22 22:22	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	<2.0		2.0	0.40	ng/L		06/15/22 19:14	06/21/22 22:22	1
HFPO-DA (GenX)	<4.0		4.0	1.5	ng/L		06/15/22 19:14	06/21/22 22:22	1
9Cl-PF3ONS	<2.0		2.0	0.24	ng/L		06/15/22 19:14	06/21/22 22:22	1
11Cl-PF3OUdS	<2.0		2.0	0.32	ng/L		06/15/22 19:14	06/21/22 22:22	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFBA	*100*		*25 - 150*	*06/15/22 19:14*	*06/21/22 22:22*	*1*
13C5 PFPeA	*89*		*25 - 150*	*06/15/22 19:14*	*06/21/22 22:22*	*1*
13C2 PFHxA	*97*		*25 - 150*	*06/15/22 19:14*	*06/21/22 22:22*	*1*
13C4 PFHpA	*101*		*25 - 150*	*06/15/22 19:14*	*06/21/22 22:22*	*1*
13C4 PFOA	*96*		*25 - 150*	*06/15/22 19:14*	*06/21/22 22:22*	*1*

Client Sample ID: IRR-02-444 (20220521)
Lab Sample ID: 500-217045-4

Date Collected: 05/21/22 14:00
Matrix: Water
Date Received: 05/24/22 09:15

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C5 PFNA	102		25 - 150	06/15/22 19:14	06/21/22 22:22	1
13C2 PFDA	99		25 - 150	06/15/22 19:14	06/21/22 22:22	1
13C2 PFUnA	97		25 - 150	06/15/22 19:14	06/21/22 22:22	1
13C2 PFDoA	98		25 - 150	06/15/22 19:14	06/21/22 22:22	1
13C2 PFTeDA	84		25 - 150	06/15/22 19:14	06/21/22 22:22	1
13C2 PFHxDA	85		25 - 150	06/15/22 19:14	06/21/22 22:22	1
13C3 PFBS	91		25 - 150	06/15/22 19:14	06/21/22 22:22	1
18O2 PFHxS	97		25 - 150	06/15/22 19:14	06/21/22 22:22	1
13C4 PFOS	93		25 - 150	06/15/22 19:14	06/21/22 22:22	1
13C8 FOSA	97		10 - 150	06/15/22 19:14	06/21/22 22:22	1
d3-NMeFOSAA	103		25 - 150	06/15/22 19:14	06/21/22 22:22	1
d5-NEtFOSAA	101		25 - 150	06/15/22 19:14	06/21/22 22:22	1
d-N-MeFOSA-M	73		10 - 150	06/15/22 19:14	06/21/22 22:22	1
d-N-EtFOSA-M	74		10 - 150	06/15/22 19:14	06/21/22 22:22	1
d7-N-MeFOSE-M	79		10 - 150	06/15/22 19:14	06/21/22 22:22	1
d9-N-EtFOSE-M	82		10 - 150	06/15/22 19:14	06/21/22 22:22	1
M2-4:2 FTS	106		25 - 150	06/15/22 19:14	06/21/22 22:22	1
M2-6:2 FTS	95		25 - 150	06/15/22 19:14	06/21/22 22:22	1
M2-8:2 FTS	131		25 - 150	06/15/22 19:14	06/21/22 22:22	1
13C3 HFPO-DA	103		25 - 150	06/15/22 19:14	06/21/22 22:22	1
13C2 10:2 FTS	108		25 - 150	06/15/22 19:14	06/21/22 22:22	1

Method: 537 (modified) - Fluorinated Alkyl Substances - DL

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	**19**	**J**	25	12	ng/L		06/15/22 19:14	06/23/22 22:48	5
Perfluoropentanoic acid (PFPeA)	**40**		9.9	2.4	ng/L		06/15/22 19:14	06/23/22 22:48	5
Perfluorohexanoic acid (PFHxA)	**53**		9.9	2.9	ng/L		06/15/22 19:14	06/23/22 22:48	5
Perfluoroheptanoic acid (PFHpA)	**67**		9.9	1.2	ng/L		06/15/22 19:14	06/23/22 22:48	5
Perfluorooctanoic acid (PFOA)	**440**		9.9	4.2	ng/L		06/15/22 19:14	06/23/22 22:48	5
Perfluorononanoic acid (PFNA)	**16**		9.9	1.3	ng/L		06/15/22 19:14	06/23/22 22:48	5
Perfluorodecanoic acid (PFDA)	<9.9		9.9	1.5	ng/L		06/15/22 19:14	06/23/22 22:48	5
Perfluoroundecanoic acid (PFUnA)	<9.9		9.9	5.4	ng/L		06/15/22 19:14	06/23/22 22:48	5
Perfluorododecanoic acid (PFDoA)	<9.9		9.9	2.7	ng/L		06/15/22 19:14	06/23/22 22:48	5
Perfluorotridecanoic acid (PFTrDA)	<9.9		9.9	6.4	ng/L		06/15/22 19:14	06/23/22 22:48	5
Perfluorotetradecanoic acid (PFTeA)	<9.9		9.9	3.6	ng/L		06/15/22 19:14	06/23/22 22:48	5
Perfluoro-n-hexadecanoic acid (PFHxDA)	<9.9		9.9	4.4	ng/L		06/15/22 19:14	06/23/22 22:48	5
Perfluoro-n-octadecanoic acid (PFODA)	<9.9		9.9	4.6	ng/L		06/15/22 19:14	06/23/22 22:48	5
Perfluorobutanesulfonic acid (PFBS)	<9.9		9.9	0.99	ng/L		06/15/22 19:14	06/23/22 22:48	5
Perfluoropentanesulfonic acid (PFPeS)	<9.9		9.9	1.5	ng/L		06/15/22 19:14	06/23/22 22:48	5
Perfluorohexanesulfonic acid (PFHxS)	**4.7**	**J**	9.9	2.8	ng/L		06/15/22 19:14	06/23/22 22:48	5
Perfluoroheptanesulfonic acid (PFHpS)	<9.9		9.9	0.94	ng/L		06/15/22 19:14	06/23/22 22:48	5
Perfluorooctanesulfonic acid (PFOS)	<9.9		9.9	2.7	ng/L		06/15/22 19:14	06/23/22 22:48	5
Perfluorononanesulfonic acid (PFNS)	<9.9		9.9	1.8	ng/L		06/15/22 19:14	06/23/22 22:48	5
Perfluorodecanesulfonic acid (PFDS)	<9.9		9.9	1.6	ng/L		06/15/22 19:14	06/23/22 22:48	5
Perfluorododecanesulfonic acid (PFDoS)	<9.9		9.9	4.8	ng/L		06/15/22 19:14	06/23/22 22:48	5

Client Sample ID: IRR-02-444 (20220521)
Lab Sample ID: 500-217045-4
Date Collected: 05/21/22 14:00
Matrix: Water
Date Received: 05/24/22 09:15

Method: 537 (modified) - Fluorinated Alkyl Substances - DL (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanesulfonamide (FOSA)	<9.9		9.9	4.8	ng/L		06/15/22 19:14	06/23/22 22:48	5
NEtFOSA	<9.9		9.9	4.3	ng/L		06/15/22 19:14	06/23/22 22:48	5
NMeFOSA	<9.9		9.9	2.1	ng/L		06/15/22 19:14	06/23/22 22:48	5
NMeFOSAA	<25		25	5.9	ng/L		06/15/22 19:14	06/23/22 22:48	5
NEtFOSAA	<25		25	6.4	ng/L		06/15/22 19:14	06/23/22 22:48	5
NMeFOSE	<20		20	6.9	ng/L		06/15/22 19:14	06/23/22 22:48	5
NEtFOSE	<9.9		9.9	4.2	ng/L		06/15/22 19:14	06/23/22 22:48	5
4:2 FTS	**5.7**	**J**	9.9	1.2	ng/L		06/15/22 19:14	06/23/22 22:48	5
6:2 FTS	**210**		25	12	ng/L		06/15/22 19:14	06/23/22 22:48	5
8:2 FTS	<9.9		9.9	2.3	ng/L		06/15/22 19:14	06/23/22 22:48	5
10:2 FTS	<9.9		9.9	3.3	ng/L		06/15/22 19:14	06/23/22 22:48	5
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	<9.9		9.9	2.0	ng/L		06/15/22 19:14	06/23/22 22:48	5
HFPO-DA (GenX)	<20		20	7.4	ng/L		06/15/22 19:14	06/23/22 22:48	5
9Cl-PF3ONS	<9.9		9.9	1.2	ng/L		06/15/22 19:14	06/23/22 22:48	5
11Cl-PF3OUdS	<9.9		9.9	1.6	ng/L		06/15/22 19:14	06/23/22 22:48	5

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFBA	*92*		*25 - 150*	*06/15/22 19:14*	*06/23/22 22:48*	*5*
13C5 PFPeA	*94*		*25 - 150*	*06/15/22 19:14*	*06/23/22 22:48*	*5*
13C2 PFHxA	*98*		*25 - 150*	*06/15/22 19:14*	*06/23/22 22:48*	*5*
13C4 PFHpA	*99*		*25 - 150*	*06/15/22 19:14*	*06/23/22 22:48*	*5*
13C4 PFOA	*96*		*25 - 150*	*06/15/22 19:14*	*06/23/22 22:48*	*5*
13C5 PFNA	*88*		*25 - 150*	*06/15/22 19:14*	*06/23/22 22:48*	*5*
13C2 PFDA	*93*		*25 - 150*	*06/15/22 19:14*	*06/23/22 22:48*	*5*
13C2 PFUnA	*91*		*25 - 150*	*06/15/22 19:14*	*06/23/22 22:48*	*5*
13C2 PFDoA	*87*		*25 - 150*	*06/15/22 19:14*	*06/23/22 22:48*	*5*
13C2 PFTeDA	*76*		*25 - 150*	*06/15/22 19:14*	*06/23/22 22:48*	*5*
13C2 PFHxDA	*78*		*25 - 150*	*06/15/22 19:14*	*06/23/22 22:48*	*5*
13C3 PFBS	*94*		*25 - 150*	*06/15/22 19:14*	*06/23/22 22:48*	*5*
18O2 PFHxS	*88*		*25 - 150*	*06/15/22 19:14*	*06/23/22 22:48*	*5*
13C4 PFOS	*86*		*25 - 150*	*06/15/22 19:14*	*06/23/22 22:48*	*5*
13C8 FOSA	*87*		*10 - 150*	*06/15/22 19:14*	*06/23/22 22:48*	*5*
d3-NMeFOSAA	*90*		*25 - 150*	*06/15/22 19:14*	*06/23/22 22:48*	*5*
d5-NEtFOSAA	*90*		*25 - 150*	*06/15/22 19:14*	*06/23/22 22:48*	*5*
d-N-MeFOSA-M	*69*		*10 - 150*	*06/15/22 19:14*	*06/23/22 22:48*	*5*
d-N-EtFOSA-M	*67*		*10 - 150*	*06/15/22 19:14*	*06/23/22 22:48*	*5*
d7-N-MeFOSE-M	*66*		*10 - 150*	*06/15/22 19:14*	*06/23/22 22:48*	*5*
d9-N-EtFOSE-M	*71*		*10 - 150*	*06/15/22 19:14*	*06/23/22 22:48*	*5*
M2-4:2 FTS	*108*		*25 - 150*	*06/15/22 19:14*	*06/23/22 22:48*	*5*
M2-6:2 FTS	*93*		*25 - 150*	*06/15/22 19:14*	*06/23/22 22:48*	*5*
M2-8:2 FTS	*111*		*25 - 150*	*06/15/22 19:14*	*06/23/22 22:48*	*5*
13C3 HFPO-DA	*97*		*25 - 150*	*06/15/22 19:14*	*06/23/22 22:48*	*5*
13C2 10:2 FTS	*102*		*25 - 150*	*06/15/22 19:14*	*06/23/22 22:48*	*5*

Method: 6010D - Metals (ICP) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfur	**140**		0.20	0.056	mg/L		06/21/22 17:30	06/22/22 14:17	2

Client: ARCADIS U.S., Inc.
Job ID: 500-217045-1
Project/Site: Marinette, WI Deep Well 30135605.03

Client Sample ID: IRR-02-444 (20220521)
Lab Sample ID: 500-217045-4
Date Collected: 05/21/22 14:00
Matrix: Water
Date Received: 05/24/22 09:15

Method: 6020A - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**34**	**J**	100	25	ug/L		06/02/22 08:57	06/06/22 15:47	1
Antimony	<3.0		3.0	1.3	ug/L		06/02/22 08:57	06/06/22 15:47	1
Arsenic	**0.45**	**J**	1.0	0.23	ug/L		06/02/22 08:57	06/06/22 15:47	1
Barium	**12**		2.5	0.73	ug/L		06/02/22 08:57	06/06/22 15:47	1
Beryllium	<1.0	^+	1.0	0.53	ug/L		06/02/22 08:57	06/06/22 15:47	1
Boron	**260**		50	13	ug/L		06/02/22 08:57	06/06/22 15:47	1
Cadmium	<0.50		0.50	0.17	ug/L		06/02/22 08:57	06/06/22 15:47	1
Calcium	**120000**		200	44	ug/L		06/02/22 08:57	06/06/22 15:47	1
Chromium	**1.1**	**J**	5.0	1.1	ug/L		06/02/22 08:57	06/06/22 15:47	1
Cobalt	<1.0		1.0	0.40	ug/L		06/02/22 08:57	06/06/22 15:47	1
Copper	**4.7**		2.0	0.50	ug/L		06/02/22 08:57	06/06/22 15:47	1
Iron	**1400**		100	47	ug/L		06/02/22 08:57	06/06/22 15:47	1
Lead	**1.2**		0.50	0.19	ug/L		06/02/22 08:57	06/06/22 15:47	1
Magnesium	**48000**		200	49	ug/L		06/02/22 08:57	06/06/22 15:47	1
Manganese	**47**		2.5	0.79	ug/L		06/02/22 08:57	06/06/22 15:47	1
Nickel	**7.6**		2.0	0.63	ug/L		06/02/22 08:57	06/06/22 15:47	1
Potassium	**5100**		500	110	ug/L		06/02/22 08:57	06/06/22 15:47	1
Selenium	<2.5		2.5	0.98	ug/L		06/02/22 08:57	06/06/22 15:47	1
Silver	<0.50		0.50	0.12	ug/L		06/02/22 08:57	06/06/22 15:47	1
Sodium	**51000**		200	77	ug/L		06/02/22 08:57	06/06/22 15:47	1
Strontium	**5900**	**^6+**	40	6.4	ug/L		06/02/22 08:57	06/07/22 19:01	10
Thallium	<2.0		2.0	0.57	ug/L		06/02/22 08:57	06/06/22 15:47	1
Vanadium	<5.0		5.0	2.2	ug/L		06/02/22 08:57	06/06/22 15:47	1
Zinc	**500**		20	6.9	ug/L		06/02/22 08:57	06/06/22 15:47	1

Method: 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Uranium	<1.0		1.0	0.40	ug/L		05/27/22 11:18	05/31/22 23:16	2

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.20		0.20	0.098	ug/L		06/02/22 15:10	06/03/22 08:48	1

Method: SM 2340B - Total Hardness (as CaCO3) by calculation - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Hardness as calcium carbonate	**510**		0.91	0.46	mg/L		06/02/22 08:57	06/09/22 12:34	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Bromide	**0.56**		0.25	0.050	mg/L			05/24/22 12:34	1
Chloride	**70**		4.0	3.4	mg/L			05/24/22 19:15	20
Fluoride	**1.6**		0.20	0.067	mg/L			05/24/22 12:34	1
Nitrate as N	<0.20	H3	0.20	0.068	mg/L			05/24/22 12:34	1
Nitrite as N	<0.20	H3	0.20	0.050	mg/L			05/24/22 12:34	1
Orthophosphate as P	<0.20	H3	0.20	0.065	mg/L			05/24/22 12:34	1
Sulfate	**390**		20	9.5	mg/L			05/24/22 19:28	100
Alkalinity	**100**		5.0	3.7	mg/L			06/02/22 14:20	1
Bicarbonate Alkalinity as CaCO3	**100**		5.0	3.7	mg/L			06/02/22 14:20	1
Carbonate Alkalinity as CaCO3	<5.0		5.0	3.7	mg/L			06/02/22 14:20	1
Sulfide	**0.84**	**J**	1.1	0.25	mg/L			05/25/22 03:50	1

Client Sample ID: IRR-02-444 (20220521)
Lab Sample ID: 500-217045-4

Date Collected: 05/21/22 14:00
Matrix: Water
Date Received: 05/24/22 09:15

Method: 903.0 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	**12.7**		0.891	1.45	1.00	0.254	pCi/L	05/26/22 13:15	06/17/22 09:06	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Ba Carrier	*93.5*		*40 - 110*	*05/26/22 13:15*	*06/17/22 09:06*	*1*

Method: 904.0 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	<0.549	U	0.335	0.336	1.00	0.549	pCi/L	05/26/22 14:49	06/14/22 16:08	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Ba Carrier	*93.5*		*40 - 110*	*05/26/22 14:49*	*06/14/22 16:08*	*1*
Y Carrier	*87.9*		*40 - 110*	*05/26/22 14:49*	*06/14/22 16:08*	*1*

Method: Ra226_Ra228 Pos - Combined Radium-226 and Radium-228

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium 226 and 228	**13.0**		0.952	1.49	5.00	0.549	pCi/L		06/17/22 17:24	1

Client: ARCADIS U.S., Inc.
Project/Site: Marinette, WI Deep Well 30135605.03

Job ID: 500-217045-1

Client Sample ID: IRR-02-540 (20220521)
Date Collected: 05/21/22 13:00
Date Received: 05/24/22 09:15

Lab Sample ID: 500-217045-5
Matrix: Water

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	**23**		4.9	2.4	ng/L		06/15/22 19:14	06/21/22 22:32	1
Perfluoropentanoic acid (PFPeA)	**57**		2.0	0.48	ng/L		06/15/22 19:14	06/21/22 22:32	1
Perfluorohexanoic acid (PFHxA)	**78**		2.0	0.57	ng/L		06/15/22 19:14	06/21/22 22:32	1
Perfluoroheptanoic acid (PFHpA)	**87**		2.0	0.25	ng/L		06/15/22 19:14	06/21/22 22:32	1
Perfluorooctanoic acid (PFOA)	**570**	**E**	2.0	0.84	ng/L		06/15/22 19:14	06/21/22 22:32	1
Perfluorononanoic acid (PFNA)	**20**		2.0	0.27	ng/L		06/15/22 19:14	06/21/22 22:32	1
Perfluorodecanoic acid (PFDA)	<2.0		2.0	0.31	ng/L		06/15/22 19:14	06/21/22 22:32	1
Perfluoroundecanoic acid (PFUnA)	<2.0		2.0	1.1	ng/L		06/15/22 19:14	06/21/22 22:32	1
Perfluorododecanoic acid (PFDoA)	<2.0		2.0	0.54	ng/L		06/15/22 19:14	06/21/22 22:32	1
Perfluorotridecanoic acid (PFTrDA)	<2.0		2.0	1.3	ng/L		06/15/22 19:14	06/21/22 22:32	1
Perfluorotetradecanoic acid (PFTeA)	<2.0		2.0	0.72	ng/L		06/15/22 19:14	06/21/22 22:32	1
Perfluoro-n-hexadecanoic acid (PFHxDA)	<2.0		2.0	0.88	ng/L		06/15/22 19:14	06/21/22 22:32	1
Perfluoro-n-octadecanoic acid (PFODA)	<2.0		2.0	0.93	ng/L		06/15/22 19:14	06/21/22 22:32	1
Perfluorobutanesulfonic acid (PFBS)	**0.89**	**J**	2.0	0.20	ng/L		06/15/22 19:14	06/21/22 22:32	1
Perfluoropentanesulfonic acid (PFPeS)	**0.76**	**J**	2.0	0.30	ng/L		06/15/22 19:14	06/21/22 22:32	1
Perfluorohexanesulfonic acid (PFHxS)	**5.9**		2.0	0.56	ng/L		06/15/22 19:14	06/21/22 22:32	1
Perfluoroheptanesulfonic acid (PFHpS)	<2.0		2.0	0.19	ng/L		06/15/22 19:14	06/21/22 22:32	1
Perfluorooctanesulfonic acid (PFOS)	**1.3**	**J**	2.0	0.53	ng/L		06/15/22 19:14	06/21/22 22:32	1
Perfluorononanesulfonic acid (PFNS)	<2.0		2.0	0.37	ng/L		06/15/22 19:14	06/21/22 22:32	1
Perfluorodecanesulfonic acid (PFDS)	<2.0		2.0	0.32	ng/L		06/15/22 19:14	06/21/22 22:32	1
Perfluorododecanesulfonic acid (PFDoS)	<2.0		2.0	0.96	ng/L		06/15/22 19:14	06/21/22 22:32	1
Perfluorooctanesulfonamide (FOSA)	<2.0		2.0	0.97	ng/L		06/15/22 19:14	06/21/22 22:32	1
NEtFOSA	<2.0		2.0	0.86	ng/L		06/15/22 19:14	06/21/22 22:32	1
NMeFOSA	<2.0		2.0	0.42	ng/L		06/15/22 19:14	06/21/22 22:32	1
NMeFOSAA	<4.9		4.9	1.2	ng/L		06/15/22 19:14	06/21/22 22:32	1
NEtFOSAA	<4.9		4.9	1.3	ng/L		06/15/22 19:14	06/21/22 22:32	1
NMeFOSE	<4.0		4.0	1.4	ng/L		06/15/22 19:14	06/21/22 22:32	1
NEtFOSE	<2.0		2.0	0.84	ng/L		06/15/22 19:14	06/21/22 22:32	1
4:2 FTS	**6.8**		2.0	0.24	ng/L		06/15/22 19:14	06/21/22 22:32	1
6:2 FTS	**150**		4.9	2.5	ng/L		06/15/22 19:14	06/21/22 22:32	1
8:2 FTS	**1.6**	**J**	2.0	0.45	ng/L		06/15/22 19:14	06/21/22 22:32	1
10:2 FTS	<2.0		2.0	0.66	ng/L		06/15/22 19:14	06/21/22 22:32	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	<2.0		2.0	0.40	ng/L		06/15/22 19:14	06/21/22 22:32	1
HFPO-DA (GenX)	<4.0		4.0	1.5	ng/L		06/15/22 19:14	06/21/22 22:32	1
9Cl-PF3ONS	<2.0		2.0	0.24	ng/L		06/15/22 19:14	06/21/22 22:32	1
11Cl-PF3OUdS	<2.0		2.0	0.32	ng/L		06/15/22 19:14	06/21/22 22:32	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFBA	*94*		*25 - 150*	*06/15/22 19:14*	*06/21/22 22:32*	*1*
13C5 PFPeA	*95*		*25 - 150*	*06/15/22 19:14*	*06/21/22 22:32*	*1*
13C2 PFHxA	*101*		*25 - 150*	*06/15/22 19:14*	*06/21/22 22:32*	*1*
13C4 PFHpA	*107*		*25 - 150*	*06/15/22 19:14*	*06/21/22 22:32*	*1*
13C4 PFOA	*96*		*25 - 150*	*06/15/22 19:14*	*06/21/22 22:32*	*1*

Client: ARCADIS U.S., Inc.
Project/Site: Marinette, WI Deep Well 30135605.03

Job ID: 500-217045-1

Client Sample ID: IRR-02-540 (20220521)
Date Collected: 05/21/22 13:00
Date Received: 05/24/22 09:15

Lab Sample ID: 500-217045-5
Matrix: Water

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C5 PFNA	104		25 - 150	06/15/22 19:14	06/21/22 22:32	1
13C2 PFDA	103		25 - 150	06/15/22 19:14	06/21/22 22:32	1
13C2 PFUnA	93		25 - 150	06/15/22 19:14	06/21/22 22:32	1
13C2 PFDoA	94		25 - 150	06/15/22 19:14	06/21/22 22:32	1
13C2 PFTeDA	85		25 - 150	06/15/22 19:14	06/21/22 22:32	1
13C2 PFHxDA	91		25 - 150	06/15/22 19:14	06/21/22 22:32	1
13C3 PFBS	102		25 - 150	06/15/22 19:14	06/21/22 22:32	1
18O2 PFHxS	98		25 - 150	06/15/22 19:14	06/21/22 22:32	1
13C4 PFOS	100		25 - 150	06/15/22 19:14	06/21/22 22:32	1
13C8 FOSA	101		10 - 150	06/15/22 19:14	06/21/22 22:32	1
d3-NMeFOSAA	101		25 - 150	06/15/22 19:14	06/21/22 22:32	1
d5-NEtFOSAA	107		25 - 150	06/15/22 19:14	06/21/22 22:32	1
d-N-MeFOSA-M	83		10 - 150	06/15/22 19:14	06/21/22 22:32	1
d-N-EtFOSA-M	83		10 - 150	06/15/22 19:14	06/21/22 22:32	1
d7-N-MeFOSE-M	81		10 - 150	06/15/22 19:14	06/21/22 22:32	1
d9-N-EtFOSE-M	87		10 - 150	06/15/22 19:14	06/21/22 22:32	1
M2-4:2 FTS	108		25 - 150	06/15/22 19:14	06/21/22 22:32	1
M2-6:2 FTS	103		25 - 150	06/15/22 19:14	06/21/22 22:32	1
M2-8:2 FTS	133		25 - 150	06/15/22 19:14	06/21/22 22:32	1
13C3 HFPO-DA	98		25 - 150	06/15/22 19:14	06/21/22 22:32	1
13C2 10:2 FTS	121		25 - 150	06/15/22 19:14	06/21/22 22:32	1

Method: 537 (modified) - Fluorinated Alkyl Substances - DL

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	**27**		25	12	ng/L		06/15/22 19:14	06/23/22 22:58	5
Perfluoropentanoic acid (PFPeA)	**54**		9.9	2.4	ng/L		06/15/22 19:14	06/23/22 22:58	5
Perfluorohexanoic acid (PFHxA)	**82**		9.9	2.9	ng/L		06/15/22 19:14	06/23/22 22:58	5
Perfluoroheptanoic acid (PFHpA)	**89**		9.9	1.2	ng/L		06/15/22 19:14	06/23/22 22:58	5
Perfluorooctanoic acid (PFOA)	**600**		9.9	4.2	ng/L		06/15/22 19:14	06/23/22 22:58	5
Perfluorononanoic acid (PFNA)	**22**		9.9	1.3	ng/L		06/15/22 19:14	06/23/22 22:58	5
Perfluorodecanoic acid (PFDA)	<9.9		9.9	1.5	ng/L		06/15/22 19:14	06/23/22 22:58	5
Perfluoroundecanoic acid (PFUnA)	<9.9		9.9	5.4	ng/L		06/15/22 19:14	06/23/22 22:58	5
Perfluorododecanoic acid (PFDoA)	<9.9		9.9	2.7	ng/L		06/15/22 19:14	06/23/22 22:58	5
Perfluorotridecanoic acid (PFTrDA)	<9.9		9.9	6.4	ng/L		06/15/22 19:14	06/23/22 22:58	5
Perfluorotetradecanoic acid (PFTeA)	<9.9		9.9	3.6	ng/L		06/15/22 19:14	06/23/22 22:58	5
Perfluoro-n-hexadecanoic acid (PFHxDA)	<9.9		9.9	4.4	ng/L		06/15/22 19:14	06/23/22 22:58	5
Perfluoro-n-octadecanoic acid (PFODA)	<9.9		9.9	4.6	ng/L		06/15/22 19:14	06/23/22 22:58	5
Perfluorobutanesulfonic acid (PFBS)	<9.9		9.9	0.99	ng/L		06/15/22 19:14	06/23/22 22:58	5
Perfluoropentanesulfonic acid (PFPeS)	<9.9		9.9	1.5	ng/L		06/15/22 19:14	06/23/22 22:58	5
Perfluorohexanesulfonic acid (PFHxS)	**6.7**	**J**	9.9	2.8	ng/L		06/15/22 19:14	06/23/22 22:58	5
Perfluoroheptanesulfonic acid (PFHpS)	<9.9		9.9	0.94	ng/L		06/15/22 19:14	06/23/22 22:58	5
Perfluorooctanesulfonic acid (PFOS)	<9.9		9.9	2.7	ng/L		06/15/22 19:14	06/23/22 22:58	5
Perfluorononanesulfonic acid (PFNS)	<9.9		9.9	1.8	ng/L		06/15/22 19:14	06/23/22 22:58	5
Perfluorodecanesulfonic acid (PFDS)	<9.9		9.9	1.6	ng/L		06/15/22 19:14	06/23/22 22:58	5
Perfluorododecanesulfonic acid (PFDoS)	<9.9		9.9	4.8	ng/L		06/15/22 19:14	06/23/22 22:58	5

Client: ARCADIS U.S., Inc.
Project/Site: Marinette, WI Deep Well 30135605.03

Job ID: 500-217045-1

Client Sample ID: IRR-02-540 (20220521)
Date Collected: 05/21/22 13:00
Date Received: 05/24/22 09:15

Lab Sample ID: 500-217045-5
Matrix: Water

Method: 537 (modified) - Fluorinated Alkyl Substances - DL (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanesulfonamide (FOSA)	<9.9		9.9	4.8	ng/L		06/15/22 19:14	06/23/22 22:58	5
NEtFOSA	<9.9		9.9	4.3	ng/L		06/15/22 19:14	06/23/22 22:58	5
NMeFOSA	<9.9		9.9	2.1	ng/L		06/15/22 19:14	06/23/22 22:58	5
NMeFOSAA	<25		25	5.9	ng/L		06/15/22 19:14	06/23/22 22:58	5
NEtFOSAA	<25		25	6.4	ng/L		06/15/22 19:14	06/23/22 22:58	5
NMeFOSE	<20		20	6.9	ng/L		06/15/22 19:14	06/23/22 22:58	5
NEtFOSE	<9.9		9.9	4.2	ng/L		06/15/22 19:14	06/23/22 22:58	5
4:2 FTS	**7.2**	**J**	9.9	1.2	ng/L		06/15/22 19:14	06/23/22 22:58	5
6:2 FTS	**210**		25	12	ng/L		06/15/22 19:14	06/23/22 22:58	5
8:2 FTS	<9.9		9.9	2.3	ng/L		06/15/22 19:14	06/23/22 22:58	5
10:2 FTS	<9.9		9.9	3.3	ng/L		06/15/22 19:14	06/23/22 22:58	5
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	<9.9		9.9	2.0	ng/L		06/15/22 19:14	06/23/22 22:58	5
HFPO-DA (GenX)	<20		20	7.4	ng/L		06/15/22 19:14	06/23/22 22:58	5
9Cl-PF3ONS	<9.9		9.9	1.2	ng/L		06/15/22 19:14	06/23/22 22:58	5
11Cl-PF3OUdS	<9.9		9.9	1.6	ng/L		06/15/22 19:14	06/23/22 22:58	5

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFBA	*90*		*25 - 150*	*06/15/22 19:14*	*06/23/22 22:58*	*5*
13C5 PFPeA	*88*		*25 - 150*	*06/15/22 19:14*	*06/23/22 22:58*	*5*
13C2 PFHxA	*92*		*25 - 150*	*06/15/22 19:14*	*06/23/22 22:58*	*5*
13C4 PFHpA	*95*		*25 - 150*	*06/15/22 19:14*	*06/23/22 22:58*	*5*
13C4 PFOA	*96*		*25 - 150*	*06/15/22 19:14*	*06/23/22 22:58*	*5*
13C5 PFNA	*91*		*25 - 150*	*06/15/22 19:14*	*06/23/22 22:58*	*5*
13C2 PFDA	*88*		*25 - 150*	*06/15/22 19:14*	*06/23/22 22:58*	*5*
13C2 PFUnA	*87*		*25 - 150*	*06/15/22 19:14*	*06/23/22 22:58*	*5*
13C2 PFDoA	*82*		*25 - 150*	*06/15/22 19:14*	*06/23/22 22:58*	*5*
13C2 PFTeDA	*74*		*25 - 150*	*06/15/22 19:14*	*06/23/22 22:58*	*5*
13C2 PFHxDA	*78*		*25 - 150*	*06/15/22 19:14*	*06/23/22 22:58*	*5*
13C3 PFBS	*93*		*25 - 150*	*06/15/22 19:14*	*06/23/22 22:58*	*5*
18O2 PFHxS	*86*		*25 - 150*	*06/15/22 19:14*	*06/23/22 22:58*	*5*
13C4 PFOS	*80*		*25 - 150*	*06/15/22 19:14*	*06/23/22 22:58*	*5*
13C8 FOSA	*85*		*10 - 150*	*06/15/22 19:14*	*06/23/22 22:58*	*5*
d3-NMeFOSAA	*84*		*25 - 150*	*06/15/22 19:14*	*06/23/22 22:58*	*5*
d5-NEtFOSAA	*91*		*25 - 150*	*06/15/22 19:14*	*06/23/22 22:58*	*5*
d-N-MeFOSA-M	*72*		*10 - 150*	*06/15/22 19:14*	*06/23/22 22:58*	*5*
d-N-EtFOSA-M	*71*		*10 - 150*	*06/15/22 19:14*	*06/23/22 22:58*	*5*
d7-N-MeFOSE-M	*65*		*10 - 150*	*06/15/22 19:14*	*06/23/22 22:58*	*5*
d9-N-EtFOSE-M	*66*		*10 - 150*	*06/15/22 19:14*	*06/23/22 22:58*	*5*
M2-4:2 FTS	*102*		*25 - 150*	*06/15/22 19:14*	*06/23/22 22:58*	*5*
M2-6:2 FTS	*106*		*25 - 150*	*06/15/22 19:14*	*06/23/22 22:58*	*5*
M2-8:2 FTS	*103*		*25 - 150*	*06/15/22 19:14*	*06/23/22 22:58*	*5*
13C3 HFPO-DA	*91*		*25 - 150*	*06/15/22 19:14*	*06/23/22 22:58*	*5*
13C2 10:2 FTS	*104*		*25 - 150*	*06/15/22 19:14*	*06/23/22 22:58*	*5*

Method: 6010D - Metals (ICP) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfur	**130**		0.20	0.056	mg/L		06/21/22 17:30	06/22/22 14:21	2

Client: ARCADIS U.S., Inc.
Job ID: 500-217045-1
Project/Site: Marinette, WI Deep Well 30135605.03

Client Sample ID: IRR-02-540 (20220521)
Lab Sample ID: 500-217045-5
Date Collected: 05/21/22 13:00
Matrix: Water
Date Received: 05/24/22 09:15

Method: 6020A - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**53**	**J**	100	25	ug/L		06/02/22 08:57	06/06/22 15:57	1
Antimony	<3.0		3.0	1.3	ug/L		06/02/22 08:57	06/06/22 15:57	1
Arsenic	**0.29**	**J**	1.0	0.23	ug/L		06/02/22 08:57	06/06/22 15:57	1
Barium	**20**		2.5	0.73	ug/L		06/02/22 08:57	06/06/22 15:57	1
Beryllium	<1.0	^+	1.0	0.53	ug/L		06/02/22 08:57	06/06/22 15:57	1
Boron	**250**		50	13	ug/L		06/02/22 08:57	06/06/22 15:57	1
Cadmium	<0.50		0.50	0.17	ug/L		06/02/22 08:57	06/06/22 15:57	1
Calcium	**120000**		200	44	ug/L		06/02/22 08:57	06/06/22 15:57	1
Chromium	<5.0		5.0	1.1	ug/L		06/02/22 08:57	06/06/22 15:57	1
Cobalt	<1.0		1.0	0.40	ug/L		06/02/22 08:57	06/06/22 15:57	1
Copper	**2.7**		2.0	0.50	ug/L		06/02/22 08:57	06/06/22 15:57	1
Iron	**1400**		100	47	ug/L		06/02/22 08:57	06/06/22 15:57	1
Lead	**1.1**		0.50	0.19	ug/L		06/02/22 08:57	06/06/22 15:57	1
Magnesium	**47000**		200	49	ug/L		06/02/22 08:57	06/06/22 15:57	1
Manganese	**55**		2.5	0.79	ug/L		06/02/22 08:57	06/06/22 15:57	1
Nickel	**1.1**	**J**	2.0	0.63	ug/L		06/02/22 08:57	06/06/22 15:57	1
Potassium	**5200**		500	110	ug/L		06/02/22 08:57	06/06/22 15:57	1
Selenium	<2.5		2.5	0.98	ug/L		06/02/22 08:57	06/06/22 15:57	1
Silver	<0.50		0.50	0.12	ug/L		06/02/22 08:57	06/06/22 15:57	1
Sodium	**51000**		200	77	ug/L		06/02/22 08:57	06/06/22 15:57	1
Strontium	**5700**	**^6+**	40	6.4	ug/L		06/02/22 08:57	06/07/22 19:04	10
Thallium	<2.0		2.0	0.57	ug/L		06/02/22 08:57	06/06/22 15:57	1
Vanadium	<5.0		5.0	2.2	ug/L		06/02/22 08:57	06/06/22 15:57	1
Zinc	**300**		20	6.9	ug/L		06/02/22 08:57	06/06/22 15:57	1

Method: 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Uranium	<1.0		1.0	0.40	ug/L		05/27/22 11:18	05/31/22 23:20	2

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.20		0.20	0.098	ug/L		06/02/22 15:10	06/03/22 08:55	1

Method: SM 2340B - Total Hardness (as CaCO3) by calculation - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Hardness as calcium carbonate	**500**		0.91	0.46	mg/L		06/02/22 08:57	06/09/22 12:34	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Bromide	**0.45**		0.25	0.050	mg/L			05/24/22 12:48	1
Chloride	**73**		4.0	3.4	mg/L			05/24/22 19:42	20
Fluoride	**1.6**		0.20	0.067	mg/L			05/24/22 12:48	1
Nitrate as N	<0.20	H3	0.20	0.068	mg/L			05/24/22 12:48	1
Nitrite as N	<0.20	H3	0.20	0.050	mg/L			05/24/22 12:48	1
Orthophosphate as P	<0.20	H3	0.20	0.065	mg/L			05/24/22 12:48	1
Sulfate	**370**		20	9.5	mg/L			05/24/22 19:56	100
Alkalinity	**98**		5.0	3.7	mg/L			06/02/22 14:26	1
Bicarbonate Alkalinity as CaCO3	**98**		5.0	3.7	mg/L			06/02/22 14:26	1
Carbonate Alkalinity as CaCO3	<5.0		5.0	3.7	mg/L			06/02/22 14:26	1
Sulfide	<1.0		1.0	0.23	mg/L			05/25/22 03:55	1

Client Sample Results

Client: ARCADIS U.S., Inc.
Job ID: 500-217045-1
Project/Site: Marinette, WI Deep Well 30135605.03

Client Sample ID: IRR-02-540 (20220521)
Lab Sample ID: 500-217045-5
Date Collected: 05/21/22 13:00
Matrix: Water
Date Received: 05/24/22 09:15

Method: 903.0 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	**14.9**		1.00	1.67	1.00	0.239	pCi/L	05/26/22 13:15	06/17/22 09:06	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Ba Carrier	*85.8*		*40 - 110*	*05/26/22 13:15*	*06/17/22 09:06*	*1*

Method: 904.0 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	<0.695	U	0.455	0.459	1.00	0.695	pCi/L	05/26/22 14:49	06/14/22 16:08	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Ba Carrier	*85.8*		*40 - 110*	*05/26/22 14:49*	*06/14/22 16:08*	*1*
Y Carrier	*91.2*		*40 - 110*	*05/26/22 14:49*	*06/14/22 16:08*	*1*

Method: Ra226_Ra228 Pos - Combined Radium-226 and Radium-228

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium 226 and 228	**15.5**		1.10	1.73	5.00	0.695	pCi/L		06/17/22 17:24	1

Client: ARCADIS U.S., Inc.
Job ID: 500-217045-1
Project/Site: Marinette, WI Deep Well 30135605.03

Client Sample ID: DUP-02 (20220521)
Lab Sample ID: 500-217045-6

Date Collected: 05/21/22 00:00
Matrix: Water
Date Received: 05/24/22 09:15

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	<4.8		4.8	2.3	ng/L		06/15/22 19:14	06/21/22 22:42	1
Perfluoropentanoic acid (PFPeA)	**3.1**		1.9	0.47	ng/L		06/15/22 19:14	06/21/22 22:42	1
Perfluorohexanoic acid (PFHxA)	**4.8**		1.9	0.56	ng/L		06/15/22 19:14	06/21/22 22:42	1
Perfluoroheptanoic acid (PFHpA)	**5.6**		1.9	0.24	ng/L		06/15/22 19:14	06/21/22 22:42	1
Perfluorooctanoic acid (PFOA)	**41**		1.9	0.82	ng/L		06/15/22 19:14	06/21/22 22:42	1
Perfluorononanoic acid (PFNA)	**1.6**	**J**	1.9	0.26	ng/L		06/15/22 19:14	06/21/22 22:42	1
Perfluorodecanoic acid (PFDA)	<1.9		1.9	0.30	ng/L		06/15/22 19:14	06/21/22 22:42	1
Perfluoroundecanoic acid (PFUnA)	<1.9		1.9	1.1	ng/L		06/15/22 19:14	06/21/22 22:42	1
Perfluorododecanoic acid (PFDoA)	<1.9		1.9	0.53	ng/L		06/15/22 19:14	06/21/22 22:42	1
Perfluorotridecanoic acid (PFTrDA)	<1.9		1.9	1.3	ng/L		06/15/22 19:14	06/21/22 22:42	1
Perfluorotetradecanoic acid (PFTeA)	<1.9		1.9	0.70	ng/L		06/15/22 19:14	06/21/22 22:42	1
Perfluoro-n-hexadecanoic acid (PFHxDA)	<1.9		1.9	0.86	ng/L		06/15/22 19:14	06/21/22 22:42	1
Perfluoro-n-octadecanoic acid (PFODA)	<1.9		1.9	0.91	ng/L		06/15/22 19:14	06/21/22 22:42	1
Perfluorobutanesulfonic acid (PFBS)	<1.9		1.9	0.19	ng/L		06/15/22 19:14	06/21/22 22:42	1
Perfluoropentanesulfonic acid (PFPeS)	<1.9		1.9	0.29	ng/L		06/15/22 19:14	06/21/22 22:42	1
Perfluorohexanesulfonic acid (PFHxS)	**0.60**	**J**	1.9	0.55	ng/L		06/15/22 19:14	06/21/22 22:42	1
Perfluoroheptanesulfonic acid (PFHpS)	<1.9		1.9	0.18	ng/L		06/15/22 19:14	06/21/22 22:42	1
Perfluorooctanesulfonic acid (PFOS)	<1.9		1.9	0.52	ng/L		06/15/22 19:14	06/21/22 22:42	1
Perfluorononanesulfonic acid (PFNS)	<1.9		1.9	0.36	ng/L		06/15/22 19:14	06/21/22 22:42	1
Perfluorodecanesulfonic acid (PFDS)	<1.9		1.9	0.31	ng/L		06/15/22 19:14	06/21/22 22:42	1
Perfluorododecanesulfonic acid (PFDoS)	<1.9		1.9	0.93	ng/L		06/15/22 19:14	06/21/22 22:42	1
Perfluorooctanesulfonamide (FOSA)	<1.9		1.9	0.94	ng/L		06/15/22 19:14	06/21/22 22:42	1
NEtFOSA	<1.9		1.9	0.84	ng/L		06/15/22 19:14	06/21/22 22:42	1
NMeFOSA	<1.9		1.9	0.41	ng/L		06/15/22 19:14	06/21/22 22:42	1
NMeFOSAA	<4.8		4.8	1.2	ng/L		06/15/22 19:14	06/21/22 22:42	1
NEtFOSAA	<4.8		4.8	1.3	ng/L		06/15/22 19:14	06/21/22 22:42	1
NMeFOSE	<3.9		3.9	1.3	ng/L		06/15/22 19:14	06/21/22 22:42	1
NEtFOSE	<1.9		1.9	0.82	ng/L		06/15/22 19:14	06/21/22 22:42	1
4:2 FTS	**0.55**	**J**	1.9	0.23	ng/L		06/15/22 19:14	06/21/22 22:42	1
6:2 FTS	**9.8**		4.8	2.4	ng/L		06/15/22 19:14	06/21/22 22:42	1
8:2 FTS	<1.9		1.9	0.44	ng/L		06/15/22 19:14	06/21/22 22:42	1
10:2 FTS	<1.9		1.9	0.65	ng/L		06/15/22 19:14	06/21/22 22:42	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	<1.9		1.9	0.39	ng/L		06/15/22 19:14	06/21/22 22:42	1
HFPO-DA (GenX)	<3.9		3.9	1.4	ng/L		06/15/22 19:14	06/21/22 22:42	1
9Cl-PF3ONS	<1.9		1.9	0.23	ng/L		06/15/22 19:14	06/21/22 22:42	1
11Cl-PF3OUdS	<1.9		1.9	0.31	ng/L		06/15/22 19:14	06/21/22 22:42	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFBA	*91*		*25 - 150*	*06/15/22 19:14*	*06/21/22 22:42*	*1*
13C5 PFPeA	*98*		*25 - 150*	*06/15/22 19:14*	*06/21/22 22:42*	*1*
13C2 PFHxA	*95*		*25 - 150*	*06/15/22 19:14*	*06/21/22 22:42*	*1*
13C4 PFHpA	*103*		*25 - 150*	*06/15/22 19:14*	*06/21/22 22:42*	*1*
13C4 PFOA	*97*		*25 - 150*	*06/15/22 19:14*	*06/21/22 22:42*	*1*
13C5 PFNA	*98*		*25 - 150*	*06/15/22 19:14*	*06/21/22 22:42*	*1*
13C2 PFDA	*99*		*25 - 150*	*06/15/22 19:14*	*06/21/22 22:42*	*1*

Client Sample ID: DUP-02 (20220521)
Lab Sample ID: 500-217045-6

Date Collected: 05/21/22 00:00
Matrix: Water

Date Received: 05/24/22 09:15

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFUnA	92		25 - 150	06/15/22 19:14	06/21/22 22:42	1
13C2 PFDoA	96		25 - 150	06/15/22 19:14	06/21/22 22:42	1
13C2 PFTeDA	87		25 - 150	06/15/22 19:14	06/21/22 22:42	1
13C2 PFHxDA	85		25 - 150	06/15/22 19:14	06/21/22 22:42	1
13C3 PFBS	94		25 - 150	06/15/22 19:14	06/21/22 22:42	1
18O2 PFHxS	96		25 - 150	06/15/22 19:14	06/21/22 22:42	1
13C4 PFOS	100		25 - 150	06/15/22 19:14	06/21/22 22:42	1
13C8 FOSA	102		10 - 150	06/15/22 19:14	06/21/22 22:42	1
d3-NMeFOSAA	102		25 - 150	06/15/22 19:14	06/21/22 22:42	1
d5-NEtFOSAA	106		25 - 150	06/15/22 19:14	06/21/22 22:42	1
d-N-MeFOSA-M	74		10 - 150	06/15/22 19:14	06/21/22 22:42	1
d-N-EtFOSA-M	74		10 - 150	06/15/22 19:14	06/21/22 22:42	1
d7-N-MeFOSE-M	80		10 - 150	06/15/22 19:14	06/21/22 22:42	1
d9-N-EtFOSE-M	82		10 - 150	06/15/22 19:14	06/21/22 22:42	1
M2-4:2 FTS	93		25 - 150	06/15/22 19:14	06/21/22 22:42	1
M2-6:2 FTS	109		25 - 150	06/15/22 19:14	06/21/22 22:42	1
M2-8:2 FTS	121		25 - 150	06/15/22 19:14	06/21/22 22:42	1
13C3 HFPO-DA	94		25 - 150	06/15/22 19:14	06/21/22 22:42	1
13C2 10:2 FTS	116		25 - 150	06/15/22 19:14	06/21/22 22:42	1

Method: 6010D - Metals (ICP) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfur	**130**		0.20	0.056	mg/L		06/21/22 17:30	06/22/22 14:25	2

Method: 6020A - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**62**	**J**	100	25	ug/L		06/02/22 08:57	06/06/22 16:01	1
Antimony	<3.0		3.0	1.3	ug/L		06/02/22 08:57	06/06/22 16:01	1
Arsenic	**0.78**	**J**	1.0	0.23	ug/L		06/02/22 08:57	06/06/22 16:01	1
Barium	**11**		2.5	0.73	ug/L		06/02/22 08:57	06/06/22 16:01	1
Beryllium	<1.0	^+	1.0	0.53	ug/L		06/02/22 08:57	06/06/22 16:01	1
Boron	**270**		50	13	ug/L		06/02/22 08:57	06/06/22 16:01	1
Cadmium	<0.50		0.50	0.17	ug/L		06/02/22 08:57	06/06/22 16:01	1
Calcium	**120000**		200	44	ug/L		06/02/22 08:57	06/06/22 16:01	1
Chromium	**1.1**	**J**	5.0	1.1	ug/L		06/02/22 08:57	06/06/22 16:01	1
Cobalt	<1.0		1.0	0.40	ug/L		06/02/22 08:57	06/06/22 16:01	1
Copper	**2.8**		2.0	0.50	ug/L		06/02/22 08:57	06/06/22 16:01	1
Iron	**1600**		100	47	ug/L		06/02/22 08:57	06/06/22 16:01	1
Lead	**1.4**		0.50	0.19	ug/L		06/02/22 08:57	06/06/22 16:01	1
Magnesium	**49000**		200	49	ug/L		06/02/22 08:57	06/06/22 16:01	1
Manganese	**52**		2.5	0.79	ug/L		06/02/22 08:57	06/06/22 16:01	1
Nickel	**0.98**	**J**	2.0	0.63	ug/L		06/02/22 08:57	06/06/22 16:01	1
Potassium	**5300**		500	110	ug/L		06/02/22 08:57	06/06/22 16:01	1
Selenium	<2.5		2.5	0.98	ug/L		06/02/22 08:57	06/06/22 16:01	1
Silver	<0.50		0.50	0.12	ug/L		06/02/22 08:57	06/06/22 16:01	1
Sodium	**52000**		200	77	ug/L		06/02/22 08:57	06/06/22 16:01	1
Strontium	**5900**	**^6+**	40	6.4	ug/L		06/02/22 08:57	06/07/22 19:08	10
Thallium	<2.0		2.0	0.57	ug/L		06/02/22 08:57	06/06/22 16:01	1
Vanadium	<5.0		5.0	2.2	ug/L		06/02/22 08:57	06/06/22 16:01	1
Zinc	**1200**		20	6.9	ug/L		06/02/22 08:57	06/06/22 16:01	1

Client Sample ID: DUP-02 (20220521)
Lab Sample ID: 500-217045-6

Date Collected: 05/21/22 00:00
Matrix: Water
Date Received: 05/24/22 09:15

Method: 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Uranium	<1.0		1.0	0.40	ug/L		05/27/22 11:18	05/31/22 23:23	2

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.20		0.20	0.098	ug/L		06/02/22 15:10	06/03/22 08:57	1

Method: SM 2340B - Total Hardness (as CaCO3) by calculation - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Hardness as calcium carbonate	**510**		0.91	0.46	mg/L		06/02/22 08:57	06/09/22 12:34	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Bromide	**0.57**		0.25	0.050	mg/L			05/24/22 13:01	1
Chloride	**75**		4.0	3.4	mg/L			05/24/22 20:09	20
Fluoride	**1.7**		0.20	0.067	mg/L			05/24/22 13:01	1
Nitrate as N	**0.081**	**J H3**	0.20	0.068	mg/L			05/24/22 13:01	1
Nitrite as N	<0.20	H3	0.20	0.050	mg/L			05/24/22 13:01	1
Orthophosphate as P	<0.20	H3	0.20	0.065	mg/L			05/24/22 13:01	1
Sulfate	**380**		20	9.5	mg/L			05/24/22 20:23	100
Alkalinity	**100**		5.0	3.7	mg/L			06/02/22 14:33	1
Bicarbonate Alkalinity as CaCO3	**100**		5.0	3.7	mg/L			06/02/22 14:33	1
Carbonate Alkalinity as CaCO3	<5.0		5.0	3.7	mg/L			06/02/22 14:33	1
Sulfide	<1.5		1.5	0.36	mg/L			05/25/22 03:59	1

Method: 903.0 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	**13.3**		0.912	1.51	1.00	0.276	pCi/L	05/26/22 13:15	06/17/22 09:06	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Ba Carrier	*94.0*		*40 - 110*	*05/26/22 13:15*	*06/17/22 09:06*	*1*

Method: 904.0 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	**1.12**		0.478	0.489	1.00	0.626	pCi/L	05/26/22 14:49	06/14/22 16:04	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Ba Carrier	*94.0*		*40 - 110*	*05/26/22 14:49*	*06/14/22 16:04*	*1*
Y Carrier	*90.5*		*40 - 110*	*05/26/22 14:49*	*06/14/22 16:04*	*1*

Method: Ra226_Ra228 Pos - Combined Radium-226 and Radium-228

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium 226 and 228	**14.5**		1.03	1.59	5.00	0.626	pCi/L		06/17/22 17:24	1

Client: ARCADIS U.S., Inc.
Project/Site: Marinette, WI Deep Well 30135605.03

Job ID: 500-217045-1

Client Sample ID: EB-02 (20220521)
Date Collected: 05/21/22 17:00
Date Received: 05/24/22 09:15

Lab Sample ID: 500-217045-7
Matrix: Water

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	<4.9		4.9	2.3	ng/L		06/15/22 19:14	06/21/22 23:23	1
Perfluoropentanoic acid (PFPeA)	<1.9		1.9	0.48	ng/L		06/15/22 19:14	06/21/22 23:23	1
Perfluorohexanoic acid (PFHxA)	<1.9		1.9	0.56	ng/L		06/15/22 19:14	06/21/22 23:23	1
Perfluoroheptanoic acid (PFHpA)	<1.9		1.9	0.24	ng/L		06/15/22 19:14	06/21/22 23:23	1
Perfluorooctanoic acid (PFOA)	**1.2**	**J**	1.9	0.82	ng/L		06/15/22 19:14	06/21/22 23:23	1
Perfluorononanoic acid (PFNA)	**0.36**	**J**	1.9	0.26	ng/L		06/15/22 19:14	06/21/22 23:23	1
Perfluorodecanoic acid (PFDA)	<1.9		1.9	0.30	ng/L		06/15/22 19:14	06/21/22 23:23	1
Perfluoroundecanoic acid (PFUnA)	<1.9		1.9	1.1	ng/L		06/15/22 19:14	06/21/22 23:23	1
Perfluorododecanoic acid (PFDoA)	<1.9		1.9	0.53	ng/L		06/15/22 19:14	06/21/22 23:23	1
Perfluorotridecanoic acid (PFTrDA)	<1.9		1.9	1.3	ng/L		06/15/22 19:14	06/21/22 23:23	1
Perfluorotetradecanoic acid (PFTeA)	<1.9		1.9	0.71	ng/L		06/15/22 19:14	06/21/22 23:23	1
Perfluoro-n-hexadecanoic acid (PFHxDA)	<1.9		1.9	0.86	ng/L		06/15/22 19:14	06/21/22 23:23	1
Perfluoro-n-octadecanoic acid (PFODA)	<1.9		1.9	0.91	ng/L		06/15/22 19:14	06/21/22 23:23	1
Perfluorobutanesulfonic acid (PFBS)	<1.9		1.9	0.19	ng/L		06/15/22 19:14	06/21/22 23:23	1
Perfluoropentanesulfonic acid (PFPeS)	<1.9		1.9	0.29	ng/L		06/15/22 19:14	06/21/22 23:23	1
Perfluorohexanesulfonic acid (PFHxS)	<1.9		1.9	0.55	ng/L		06/15/22 19:14	06/21/22 23:23	1
Perfluoroheptanesulfonic acid (PFHpS)	<1.9		1.9	0.18	ng/L		06/15/22 19:14	06/21/22 23:23	1
Perfluorooctanesulfonic acid (PFOS)	**0.67**	**J**	1.9	0.52	ng/L		06/15/22 19:14	06/21/22 23:23	1
Perfluorononanesulfonic acid (PFNS)	<1.9		1.9	0.36	ng/L		06/15/22 19:14	06/21/22 23:23	1
Perfluorodecanesulfonic acid (PFDS)	<1.9		1.9	0.31	ng/L		06/15/22 19:14	06/21/22 23:23	1
Perfluorododecanesulfonic acid (PFDoS)	<1.9		1.9	0.94	ng/L		06/15/22 19:14	06/21/22 23:23	1
Perfluorooctanesulfonamide (FOSA)	<1.9		1.9	0.95	ng/L		06/15/22 19:14	06/21/22 23:23	1
NEtFOSA	<1.9		1.9	0.84	ng/L		06/15/22 19:14	06/21/22 23:23	1
NMeFOSA	<1.9		1.9	0.42	ng/L		06/15/22 19:14	06/21/22 23:23	1
NMeFOSAA	<4.9		4.9	1.2	ng/L		06/15/22 19:14	06/21/22 23:23	1
NEtFOSAA	<4.9		4.9	1.3	ng/L		06/15/22 19:14	06/21/22 23:23	1
NMeFOSE	<3.9		3.9	1.4	ng/L		06/15/22 19:14	06/21/22 23:23	1
NEtFOSE	<1.9		1.9	0.82	ng/L		06/15/22 19:14	06/21/22 23:23	1
4:2 FTS	<1.9		1.9	0.23	ng/L		06/15/22 19:14	06/21/22 23:23	1
6:2 FTS	<4.9		4.9	2.4	ng/L		06/15/22 19:14	06/21/22 23:23	1
8:2 FTS	<1.9		1.9	0.45	ng/L		06/15/22 19:14	06/21/22 23:23	1
10:2 FTS	<1.9		1.9	0.65	ng/L		06/15/22 19:14	06/21/22 23:23	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	<1.9		1.9	0.39	ng/L		06/15/22 19:14	06/21/22 23:23	1
HFPO-DA (GenX)	<3.9		3.9	1.5	ng/L		06/15/22 19:14	06/21/22 23:23	1
9Cl-PF3ONS	<1.9		1.9	0.23	ng/L		06/15/22 19:14	06/21/22 23:23	1
11Cl-PF3OUdS	<1.9		1.9	0.31	ng/L		06/15/22 19:14	06/21/22 23:23	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFBA	*83*		*25 - 150*	*06/15/22 19:14*	*06/21/22 23:23*	*1*
13C5 PFPeA	*88*		*25 - 150*	*06/15/22 19:14*	*06/21/22 23:23*	*1*
13C2 PFHxA	*94*		*25 - 150*	*06/15/22 19:14*	*06/21/22 23:23*	*1*
13C4 PFHpA	*98*		*25 - 150*	*06/15/22 19:14*	*06/21/22 23:23*	*1*
13C4 PFOA	*95*		*25 - 150*	*06/15/22 19:14*	*06/21/22 23:23*	*1*
13C5 PFNA	*98*		*25 - 150*	*06/15/22 19:14*	*06/21/22 23:23*	*1*
13C2 PFDA	*101*		*25 - 150*	*06/15/22 19:14*	*06/21/22 23:23*	*1*

Client: ARCADIS U.S., Inc.
Job ID: 500-217045-1
Project/Site: Marinette, WI Deep Well 30135605.03

Client Sample ID: EB-02 (20220521)
Lab Sample ID: 500-217045-7
Date Collected: 05/21/22 17:00
Matrix: Water
Date Received: 05/24/22 09:15

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFUnA	98		25 - 150	06/15/22 19:14	06/21/22 23:23	1
13C2 PFDoA	97		25 - 150	06/15/22 19:14	06/21/22 23:23	1
13C2 PFTeDA	85		25 - 150	06/15/22 19:14	06/21/22 23:23	1
13C2 PFHxDA	95		25 - 150	06/15/22 19:14	06/21/22 23:23	1
13C3 PFBS	88		25 - 150	06/15/22 19:14	06/21/22 23:23	1
18O2 PFHxS	92		25 - 150	06/15/22 19:14	06/21/22 23:23	1
13C4 PFOS	92		25 - 150	06/15/22 19:14	06/21/22 23:23	1
13C8 FOSA	97		10 - 150	06/15/22 19:14	06/21/22 23:23	1
d3-NMeFOSAA	103		25 - 150	06/15/22 19:14	06/21/22 23:23	1
d5-NEtFOSAA	110		25 - 150	06/15/22 19:14	06/21/22 23:23	1
d-N-MeFOSA-M	67		10 - 150	06/15/22 19:14	06/21/22 23:23	1
d-N-EtFOSA-M	65		10 - 150	06/15/22 19:14	06/21/22 23:23	1
d7-N-MeFOSE-M	76		10 - 150	06/15/22 19:14	06/21/22 23:23	1
d9-N-EtFOSE-M	84		10 - 150	06/15/22 19:14	06/21/22 23:23	1
M2-4:2 FTS	100		25 - 150	06/15/22 19:14	06/21/22 23:23	1
M2-6:2 FTS	114		25 - 150	06/15/22 19:14	06/21/22 23:23	1
M2-8:2 FTS	125		25 - 150	06/15/22 19:14	06/21/22 23:23	1
13C3 HFPO-DA	90		25 - 150	06/15/22 19:14	06/21/22 23:23	1
13C2 10:2 FTS	121		25 - 150	06/15/22 19:14	06/21/22 23:23	1

Client: ARCADIS U.S., Inc.
Project/Site: Marinette, WI Deep Well 30135605.03

Job ID: 500-217045-1

Client Sample ID: FB-02 (20220521)

Date Collected: 05/21/22 14:10
Date Received: 05/24/22 09:15

Lab Sample ID: 500-217045-8

Matrix: Water

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	<4.1		4.1	2.0	ng/L		06/15/22 19:14	06/21/22 23:33	1
Perfluoropentanoic acid (PFPeA)	<1.6		1.6	0.40	ng/L		06/15/22 19:14	06/21/22 23:33	1
Perfluorohexanoic acid (PFHxA)	<1.6		1.6	0.47	ng/L		06/15/22 19:14	06/21/22 23:33	1
Perfluoroheptanoic acid (PFHpA)	<1.6		1.6	0.20	ng/L		06/15/22 19:14	06/21/22 23:33	1
Perfluorooctanoic acid (PFOA)	<1.6		1.6	0.69	ng/L		06/15/22 19:14	06/21/22 23:33	1
Perfluorononanoic acid (PFNA)	<1.6		1.6	0.22	ng/L		06/15/22 19:14	06/21/22 23:33	1
Perfluorodecanoic acid (PFDA)	<1.6		1.6	0.25	ng/L		06/15/22 19:14	06/21/22 23:33	1
Perfluoroundecanoic acid (PFUnA)	<1.6		1.6	0.89	ng/L		06/15/22 19:14	06/21/22 23:33	1
Perfluorododecanoic acid (PFDoA)	<1.6		1.6	0.45	ng/L		06/15/22 19:14	06/21/22 23:33	1
Perfluorotridecanoic acid (PFTrDA)	<1.6		1.6	1.1	ng/L		06/15/22 19:14	06/21/22 23:33	1
Perfluorotetradecanoic acid (PFTeA)	<1.6		1.6	0.59	ng/L		06/15/22 19:14	06/21/22 23:33	1
Perfluoro-n-hexadecanoic acid (PFHxDA)	<1.6		1.6	0.72	ng/L		06/15/22 19:14	06/21/22 23:33	1
Perfluoro-n-octadecanoic acid (PFODA)	<1.6		1.6	0.76	ng/L		06/15/22 19:14	06/21/22 23:33	1
Perfluorobutanesulfonic acid (PFBS)	<1.6		1.6	0.16	ng/L		06/15/22 19:14	06/21/22 23:33	1
Perfluoropentanesulfonic acid (PFPeS)	<1.6		1.6	0.24	ng/L		06/15/22 19:14	06/21/22 23:33	1
Perfluorohexanesulfonic acid (PFHxS)	<1.6		1.6	0.46	ng/L		06/15/22 19:14	06/21/22 23:33	1
Perfluoroheptanesulfonic acid (PFHpS)	<1.6		1.6	0.15	ng/L		06/15/22 19:14	06/21/22 23:33	1
Perfluorooctanesulfonic acid (PFOS)	<1.6		1.6	0.44	ng/L		06/15/22 19:14	06/21/22 23:33	1
Perfluorononanesulfonic acid (PFNS)	<1.6		1.6	0.30	ng/L		06/15/22 19:14	06/21/22 23:33	1
Perfluorodecanesulfonic acid (PFDS)	<1.6		1.6	0.26	ng/L		06/15/22 19:14	06/21/22 23:33	1
Perfluorododecanesulfonic acid (PFDoS)	<1.6		1.6	0.79	ng/L		06/15/22 19:14	06/21/22 23:33	1
Perfluorooctanesulfonamide (FOSA)	<1.6		1.6	0.80	ng/L		06/15/22 19:14	06/21/22 23:33	1
NEtFOSA	<1.6		1.6	0.71	ng/L		06/15/22 19:14	06/21/22 23:33	1
NMeFOSA	<1.6		1.6	0.35	ng/L		06/15/22 19:14	06/21/22 23:33	1
NMeFOSAA	<4.1		4.1	0.98	ng/L		06/15/22 19:14	06/21/22 23:33	1
NEtFOSAA	<4.1		4.1	1.1	ng/L		06/15/22 19:14	06/21/22 23:33	1
NMeFOSE	<3.3		3.3	1.1	ng/L		06/15/22 19:14	06/21/22 23:33	1
NEtFOSE	<1.6		1.6	0.69	ng/L		06/15/22 19:14	06/21/22 23:33	1
4:2 FTS	<1.6		1.6	0.20	ng/L		06/15/22 19:14	06/21/22 23:33	1
6:2 FTS	<4.1		4.1	2.0	ng/L		06/15/22 19:14	06/21/22 23:33	1
8:2 FTS	<1.6		1.6	0.37	ng/L		06/15/22 19:14	06/21/22 23:33	1
10:2 FTS	<1.6		1.6	0.54	ng/L		06/15/22 19:14	06/21/22 23:33	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	<1.6		1.6	0.33	ng/L		06/15/22 19:14	06/21/22 23:33	1
HFPO-DA (GenX)	<3.3		3.3	1.2	ng/L		06/15/22 19:14	06/21/22 23:33	1
9Cl-PF3ONS	<1.6		1.6	0.20	ng/L		06/15/22 19:14	06/21/22 23:33	1
11Cl-PF3OUdS	<1.6		1.6	0.26	ng/L		06/15/22 19:14	06/21/22 23:33	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFBA	*90*		*25 - 150*	*06/15/22 19:14*	*06/21/22 23:33*	*1*
13C5 PFPeA	*94*		*25 - 150*	*06/15/22 19:14*	*06/21/22 23:33*	*1*
13C2 PFHxA	*87*		*25 - 150*	*06/15/22 19:14*	*06/21/22 23:33*	*1*
13C4 PFHpA	*91*		*25 - 150*	*06/15/22 19:14*	*06/21/22 23:33*	*1*
13C4 PFOA	*97*		*25 - 150*	*06/15/22 19:14*	*06/21/22 23:33*	*1*
13C5 PFNA	*103*		*25 - 150*	*06/15/22 19:14*	*06/21/22 23:33*	*1*
13C2 PFDA	*98*		*25 - 150*	*06/15/22 19:14*	*06/21/22 23:33*	*1*
13C2 PFUnA	*98*		*25 - 150*	*06/15/22 19:14*	*06/21/22 23:33*	*1*

Client: ARCADIS U.S., Inc.
Job ID: 500-217045-1
Project/Site: Marinette, WI Deep Well 30135605.03

Client Sample ID: FB-02 (20220521)
Lab Sample ID: 500-217045-8
Date Collected: 05/21/22 14:10
Matrix: Water
Date Received: 05/24/22 09:15

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFDoA	93		25 - 150	06/15/22 19:14	06/21/22 23:33	1
13C2 PFTeDA	78		25 - 150	06/15/22 19:14	06/21/22 23:33	1
13C2 PFHxDA	80		25 - 150	06/15/22 19:14	06/21/22 23:33	1
13C3 PFBS	94		25 - 150	06/15/22 19:14	06/21/22 23:33	1
18O2 PFHxS	95		25 - 150	06/15/22 19:14	06/21/22 23:33	1
13C4 PFOS	97		25 - 150	06/15/22 19:14	06/21/22 23:33	1
13C8 FOSA	92		10 - 150	06/15/22 19:14	06/21/22 23:33	1
d3-NMeFOSAA	98		25 - 150	06/15/22 19:14	06/21/22 23:33	1
d5-NEtFOSAA	111		25 - 150	06/15/22 19:14	06/21/22 23:33	1
d-N-MeFOSA-M	52		10 - 150	06/15/22 19:14	06/21/22 23:33	1
d-N-EtFOSA-M	57		10 - 150	06/15/22 19:14	06/21/22 23:33	1
d7-N-MeFOSE-M	73		10 - 150	06/15/22 19:14	06/21/22 23:33	1
d9-N-EtFOSE-M	74		10 - 150	06/15/22 19:14	06/21/22 23:33	1
M2-4:2 FTS	113		25 - 150	06/15/22 19:14	06/21/22 23:33	1
M2-6:2 FTS	112		25 - 150	06/15/22 19:14	06/21/22 23:33	1
M2-8:2 FTS	122		25 - 150	06/15/22 19:14	06/21/22 23:33	1
13C3 HFPO-DA	94		25 - 150	06/15/22 19:14	06/21/22 23:33	1
13C2 10:2 FTS	110		25 - 150	06/15/22 19:14	06/21/22 23:33	1

Client: ARCADIS U.S., Inc.
Job ID: 500-218928-1
Project/Site: Marinette, WI Deep Well 30135605.03

Client Sample ID: IRR-01 (070122)
Lab Sample ID: 500-218928-1
Date Collected: 07/01/22 14:00
Matrix: Water
Date Received: 07/02/22 09:00

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	<5.3		5.3	2.5	ng/L		07/07/22 04:47	07/12/22 05:08	1
Perfluoropentanoic acid (PFPeA)	<2.1		2.1	0.52	ng/L		07/07/22 04:47	07/12/22 05:08	1
Perfluorohexanoic acid (PFHxA)	<2.1		2.1	0.61	ng/L		07/07/22 04:47	07/12/22 05:08	1
Perfluoroheptanoic acid (PFHpA)	<2.1		2.1	0.26	ng/L		07/07/22 04:47	07/12/22 05:08	1
Perfluorooctanoic acid (PFOA)	<2.1		2.1	0.90	ng/L		07/07/22 04:47	07/12/22 05:08	1
Perfluorononanoic acid (PFNA)	<2.1		2.1	0.29	ng/L		07/07/22 04:47	07/12/22 05:08	1
Perfluorodecanoic acid (PFDA)	<2.1		2.1	0.33	ng/L		07/07/22 04:47	07/12/22 05:08	1
Perfluoroundecanoic acid (PFUnA)	<2.1		2.1	1.2	ng/L		07/07/22 04:47	07/12/22 05:08	1
Perfluorododecanoic acid (PFDoA)	<2.1		2.1	0.58	ng/L		07/07/22 04:47	07/12/22 05:08	1
Perfluorotridecanoic acid (PFTrDA)	<2.1		2.1	1.4	ng/L		07/07/22 04:47	07/12/22 05:08	1
Perfluorotetradecanoic acid (PFTeA)	<2.1		2.1	0.77	ng/L		07/07/22 04:47	07/12/22 05:08	1
Perfluoro-n-hexadecanoic acid (PFHxDA)	<2.1		2.1	0.94	ng/L		07/07/22 04:47	07/12/22 05:08	1
Perfluoro-n-octadecanoic acid (PFODA)	<2.1		2.1	1.0	ng/L		07/07/22 04:47	07/12/22 05:08	1
Perfluorobutanesulfonic acid (PFBS)	<2.1		2.1	0.21	ng/L		07/07/22 04:47	07/12/22 05:08	1
Perfluoropentanesulfonic acid (PFPeS)	<2.1		2.1	0.32	ng/L		07/07/22 04:47	07/12/22 05:08	1
Perfluorohexanesulfonic acid (PFHxS)	<2.1		2.1	0.60	ng/L		07/07/22 04:47	07/12/22 05:08	1
Perfluoroheptanesulfonic acid (PFHpS)	<2.1		2.1	0.20	ng/L		07/07/22 04:47	07/12/22 05:08	1
Perfluorooctanesulfonic acid (PFOS)	<2.1		2.1	0.57	ng/L		07/07/22 04:47	07/12/22 05:08	1
Perfluorononanesulfonic acid (PFNS)	<2.1		2.1	0.39	ng/L		07/07/22 04:47	07/12/22 05:08	1
Perfluorodecanesulfonic acid (PFDS)	<2.1		2.1	0.34	ng/L		07/07/22 04:47	07/12/22 05:08	1
Perfluorododecanesulfonic acid (PFDoS)	<2.1		2.1	1.0	ng/L		07/07/22 04:47	07/12/22 05:08	1
Perfluorooctanesulfonamide (FOSA)	**1.5**	**J**	2.1	1.0	ng/L		07/07/22 04:47	07/12/22 05:08	1
NEtFOSA	<2.1		2.1	0.92	ng/L		07/07/22 04:47	07/12/22 05:08	1
NMeFOSA	<2.1		2.1	0.46	ng/L		07/07/22 04:47	07/12/22 05:08	1
NMeFOSAA	<5.3		5.3	1.3	ng/L		07/07/22 04:47	07/12/22 05:08	1
NEtFOSAA	<5.3		5.3	1.4	ng/L		07/07/22 04:47	07/12/22 05:08	1
NMeFOSE	<4.2		4.2	1.5	ng/L		07/07/22 04:47	07/12/22 05:08	1
NEtFOSE	<2.1		2.1	0.90	ng/L		07/07/22 04:47	07/12/22 05:08	1
4:2 FTS	<2.1		2.1	0.25	ng/L		07/07/22 04:47	07/12/22 05:08	1
6:2 FTS	<5.3		5.3	2.6	ng/L		07/07/22 04:47	07/12/22 05:08	1
8:2 FTS	<2.1		2.1	0.49	ng/L		07/07/22 04:47	07/12/22 05:08	1
10:2 FTS	<2.1		2.1	0.71	ng/L		07/07/22 04:47	07/12/22 05:08	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	<2.1		2.1	0.42	ng/L		07/07/22 04:47	07/12/22 05:08	1
HFPO-DA (GenX)	<4.2		4.2	1.6	ng/L		07/07/22 04:47	07/12/22 05:08	1
9Cl-PF3ONS	<2.1		2.1	0.25	ng/L		07/07/22 04:47	07/12/22 05:08	1
11Cl-PF3OUdS	<2.1		2.1	0.34	ng/L		07/07/22 04:47	07/12/22 05:08	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFBA	*97*		*25 - 150*	*07/07/22 04:47*	*07/12/22 05:08*	*1*
13C5 PFPeA	*92*		*25 - 150*	*07/07/22 04:47*	*07/12/22 05:08*	*1*
13C2 PFHxA	*94*		*25 - 150*	*07/07/22 04:47*	*07/12/22 05:08*	*1*
13C4 PFHpA	*98*		*25 - 150*	*07/07/22 04:47*	*07/12/22 05:08*	*1*
13C4 PFOA	*97*		*25 - 150*	*07/07/22 04:47*	*07/12/22 05:08*	*1*
13C5 PFNA	*99*		*25 - 150*	*07/07/22 04:47*	*07/12/22 05:08*	*1*
13C2 PFDA	*95*		*25 - 150*	*07/07/22 04:47*	*07/12/22 05:08*	*1*

Client: ARCADIS U.S., Inc.
Job ID: 500-218928-1
Project/Site: Marinette, WI Deep Well 30135605.03

Client Sample ID: IRR-01 (070122)
Lab Sample ID: 500-218928-1
Date Collected: 07/01/22 14:00
Matrix: Water
Date Received: 07/02/22 09:00

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFUnA	99		25 - 150	07/07/22 04:47	07/12/22 05:08	1
13C2 PFDoA	93		25 - 150	07/07/22 04:47	07/12/22 05:08	1
13C2 PFTeDA	92		25 - 150	07/07/22 04:47	07/12/22 05:08	1
13C2 PFHxDA	89		25 - 150	07/07/22 04:47	07/12/22 05:08	1
13C3 PFBS	84		25 - 150	07/07/22 04:47	07/12/22 05:08	1
18O2 PFHxS	92		25 - 150	07/07/22 04:47	07/12/22 05:08	1
13C4 PFOS	89		25 - 150	07/07/22 04:47	07/12/22 05:08	1
13C8 FOSA	95		10 - 150	07/07/22 04:47	07/12/22 05:08	1
d3-NMeFOSAA	85		25 - 150	07/07/22 04:47	07/12/22 05:08	1
d5-NEtFOSAA	90		25 - 150	07/07/22 04:47	07/12/22 05:08	1
d-N-MeFOSA-M	78		10 - 150	07/07/22 04:47	07/12/22 05:08	1
d-N-EtFOSA-M	74		10 - 150	07/07/22 04:47	07/12/22 05:08	1
d7-N-MeFOSE-M	86		10 - 150	07/07/22 04:47	07/12/22 05:08	1
d9-N-EtFOSE-M	82		10 - 150	07/07/22 04:47	07/12/22 05:08	1
M2-4:2 FTS	97		25 - 150	07/07/22 04:47	07/12/22 05:08	1
M2-6:2 FTS	100		25 - 150	07/07/22 04:47	07/12/22 05:08	1
M2-8:2 FTS	95		25 - 150	07/07/22 04:47	07/12/22 05:08	1
13C3 HFPO-DA	89		25 - 150	07/07/22 04:47	07/12/22 05:08	1
13C2 10:2 FTS	91		25 - 150	07/07/22 04:47	07/12/22 05:08	1

Client: ARCADIS U.S., Inc.
Job ID: 500-218928-1
Project/Site: Marinette, WI Deep Well 30135605.03

Client Sample ID: IRR-02 (070122)
Lab Sample ID: 500-218928-2

Date Collected: 07/01/22 15:00
Matrix: Water
Date Received: 07/02/22 09:00

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	<5.1		5.1	2.4	ng/L		07/07/22 04:47	07/12/22 05:18	1
Perfluoropentanoic acid (PFPeA)	**0.62**	**J**	2.0	0.50	ng/L		07/07/22 04:47	07/12/22 05:18	1
Perfluorohexanoic acid (PFHxA)	**1.0**	**J**	2.0	0.59	ng/L		07/07/22 04:47	07/12/22 05:18	1
Perfluoroheptanoic acid (PFHpA)	**0.40**	**J**	2.0	0.25	ng/L		07/07/22 04:47	07/12/22 05:18	1
Perfluorooctanoic acid (PFOA)	**5.8**		2.0	0.86	ng/L		07/07/22 04:47	07/12/22 05:18	1
Perfluorononanoic acid (PFNA)	<2.0		2.0	0.27	ng/L		07/07/22 04:47	07/12/22 05:18	1
Perfluorodecanoic acid (PFDA)	<2.0		2.0	0.31	ng/L		07/07/22 04:47	07/12/22 05:18	1
Perfluoroundecanoic acid (PFUnA)	<2.0		2.0	1.1	ng/L		07/07/22 04:47	07/12/22 05:18	1
Perfluorododecanoic acid (PFDoA)	<2.0		2.0	0.56	ng/L		07/07/22 04:47	07/12/22 05:18	1
Perfluorotridecanoic acid (PFTrDA)	<2.0		2.0	1.3	ng/L		07/07/22 04:47	07/12/22 05:18	1
Perfluorotetradecanoic acid (PFTeA)	<2.0		2.0	0.74	ng/L		07/07/22 04:47	07/12/22 05:18	1
Perfluoro-n-hexadecanoic acid (PFHxDA)	<2.0		2.0	0.90	ng/L		07/07/22 04:47	07/12/22 05:18	1
Perfluoro-n-octadecanoic acid (PFODA)	<2.0		2.0	0.95	ng/L		07/07/22 04:47	07/12/22 05:18	1
Perfluorobutanesulfonic acid (PFBS)	<2.0		2.0	0.20	ng/L		07/07/22 04:47	07/12/22 05:18	1
Perfluoropentanesulfonic acid (PFPeS)	<2.0		2.0	0.30	ng/L		07/07/22 04:47	07/12/22 05:18	1
Perfluorohexanesulfonic acid (PFHxS)	<2.0		2.0	0.58	ng/L		07/07/22 04:47	07/12/22 05:18	1
Perfluoroheptanesulfonic acid (PFHpS)	<2.0		2.0	0.19	ng/L		07/07/22 04:47	07/12/22 05:18	1
Perfluorooctanesulfonic acid (PFOS)	<2.0		2.0	0.55	ng/L		07/07/22 04:47	07/12/22 05:18	1
Perfluorononanesulfonic acid (PFNS)	<2.0		2.0	0.38	ng/L		07/07/22 04:47	07/12/22 05:18	1
Perfluorodecanesulfonic acid (PFDS)	<2.0		2.0	0.32	ng/L		07/07/22 04:47	07/12/22 05:18	1
Perfluorododecanesulfonic acid (PFDoS)	<2.0		2.0	0.98	ng/L		07/07/22 04:47	07/12/22 05:18	1
Perfluorooctanesulfonamide (FOSA)	**2.7**		2.0	1.0	ng/L		07/07/22 04:47	07/12/22 05:18	1
NEtFOSA	<2.0		2.0	0.88	ng/L		07/07/22 04:47	07/12/22 05:18	1
NMeFOSA	<2.0		2.0	0.44	ng/L		07/07/22 04:47	07/12/22 05:18	1
NMeFOSAA	<5.1		5.1	1.2	ng/L		07/07/22 04:47	07/12/22 05:18	1
NEtFOSAA	<5.1		5.1	1.3	ng/L		07/07/22 04:47	07/12/22 05:18	1
NMeFOSE	<4.1		4.1	1.4	ng/L		07/07/22 04:47	07/12/22 05:18	1
NEtFOSE	<2.0		2.0	0.86	ng/L		07/07/22 04:47	07/12/22 05:18	1
4:2 FTS	<2.0		2.0	0.24	ng/L		07/07/22 04:47	07/12/22 05:18	1
6:2 FTS	<5.1		5.1	2.5	ng/L		07/07/22 04:47	07/12/22 05:18	1
8:2 FTS	<2.0		2.0	0.47	ng/L		07/07/22 04:47	07/12/22 05:18	1
10:2 FTS	<2.0		2.0	0.68	ng/L		07/07/22 04:47	07/12/22 05:18	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	<2.0		2.0	0.41	ng/L		07/07/22 04:47	07/12/22 05:18	1
HFPO-DA (GenX)	<4.1		4.1	1.5	ng/L		07/07/22 04:47	07/12/22 05:18	1
9Cl-PF3ONS	<2.0		2.0	0.24	ng/L		07/07/22 04:47	07/12/22 05:18	1
11Cl-PF3OUdS	<2.0		2.0	0.32	ng/L		07/07/22 04:47	07/12/22 05:18	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFBA	*95*		*25 - 150*	*07/07/22 04:47*	*07/12/22 05:18*	*1*
13C5 PFPeA	*92*		*25 - 150*	*07/07/22 04:47*	*07/12/22 05:18*	*1*
13C2 PFHxA	*91*		*25 - 150*	*07/07/22 04:47*	*07/12/22 05:18*	*1*
13C4 PFHpA	*98*		*25 - 150*	*07/07/22 04:47*	*07/12/22 05:18*	*1*
13C4 PFOA	*100*		*25 - 150*	*07/07/22 04:47*	*07/12/22 05:18*	*1*
13C5 PFNA	*99*		*25 - 150*	*07/07/22 04:47*	*07/12/22 05:18*	*1*
13C2 PFDA	*94*		*25 - 150*	*07/07/22 04:47*	*07/12/22 05:18*	*1*

Client: ARCADIS U.S., Inc.
Job ID: 500-218928-1
Project/Site: Marinette, WI Deep Well 30135605.03

Client Sample ID: IRR-02 (070122)
Lab Sample ID: 500-218928-2
Date Collected: 07/01/22 15:00
Matrix: Water
Date Received: 07/02/22 09:00

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFUnA	92		25 - 150	07/07/22 04:47	07/12/22 05:18	1
13C2 PFDoA	88		25 - 150	07/07/22 04:47	07/12/22 05:18	1
13C2 PFTeDA	85		25 - 150	07/07/22 04:47	07/12/22 05:18	1
13C2 PFHxDA	92		25 - 150	07/07/22 04:47	07/12/22 05:18	1
13C3 PFBS	86		25 - 150	07/07/22 04:47	07/12/22 05:18	1
18O2 PFHxS	92		25 - 150	07/07/22 04:47	07/12/22 05:18	1
13C4 PFOS	87		25 - 150	07/07/22 04:47	07/12/22 05:18	1
13C8 FOSA	94		10 - 150	07/07/22 04:47	07/12/22 05:18	1
d3-NMeFOSAA	78		25 - 150	07/07/22 04:47	07/12/22 05:18	1
d5-NEtFOSAA	81		25 - 150	07/07/22 04:47	07/12/22 05:18	1
d-N-MeFOSA-M	78		10 - 150	07/07/22 04:47	07/12/22 05:18	1
d-N-EtFOSA-M	71		10 - 150	07/07/22 04:47	07/12/22 05:18	1
d7-N-MeFOSE-M	85		10 - 150	07/07/22 04:47	07/12/22 05:18	1
d9-N-EtFOSE-M	81		10 - 150	07/07/22 04:47	07/12/22 05:18	1
M2-4:2 FTS	101		25 - 150	07/07/22 04:47	07/12/22 05:18	1
M2-6:2 FTS	100		25 - 150	07/07/22 04:47	07/12/22 05:18	1
M2-8:2 FTS	88		25 - 150	07/07/22 04:47	07/12/22 05:18	1
13C3 HFPO-DA	92		25 - 150	07/07/22 04:47	07/12/22 05:18	1
13C2 10:2 FTS	86		25 - 150	07/07/22 04:47	07/12/22 05:18	1

Client: ARCADIS U.S., Inc.
Project/Site: Marinette, WI Deep Well 30135605 Task 6

Job ID: 500-220648-1
SDG: Marinette High School

Client Sample ID: IRR-02_65 (20220805)

Date Collected: 08/05/22 08:15
Date Received: 08/10/22 09:40

Lab Sample ID: 500-220648-1

Matrix: Water

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	<4.5		4.5	2.2	ng/L		08/17/22 19:43	08/22/22 07:03	1
Perfluoropentanoic acid (PFPeA)	**0.67**	**J**	1.8	0.44	ng/L		08/17/22 19:43	08/22/22 07:03	1
Perfluorohexanoic acid (PFHxA)	**1.5**	**J**	1.8	0.52	ng/L		08/17/22 19:43	08/22/22 07:03	1
Perfluoroheptanoic acid (PFHpA)	**0.85**	**J**	1.8	0.23	ng/L		08/17/22 19:43	08/22/22 07:03	1
Perfluorooctanoic acid (PFOA)	**11**		1.8	0.77	ng/L		08/17/22 19:43	08/22/22 07:03	1
Perfluorononanoic acid (PFNA)	**0.37**	**J**	1.8	0.24	ng/L		08/17/22 19:43	08/22/22 07:03	1
Perfluorodecanoic acid (PFDA)	<1.8		1.8	0.28	ng/L		08/17/22 19:43	08/22/22 07:03	1
Perfluoroundecanoic acid (PFUnA)	<1.8		1.8	0.99	ng/L		08/17/22 19:43	08/22/22 07:03	1
Perfluorododecanoic acid (PFDoA)	<1.8		1.8	0.50	ng/L		08/17/22 19:43	08/22/22 07:03	1
Perfluorotridecanoic acid (PFTrDA)	<1.8		1.8	1.2	ng/L		08/17/22 19:43	08/22/22 07:03	1
Perfluorotetradecanoic acid (PFTeA)	<1.8		1.8	0.66	ng/L		08/17/22 19:43	08/22/22 07:03	1
Perfluoro-n-hexadecanoic acid (PFHxDA)	<1.8		1.8	0.80	ng/L		08/17/22 19:43	08/22/22 07:03	1
Perfluoro-n-octadecanoic acid (PFODA)	<1.8		1.8	0.85	ng/L		08/17/22 19:43	08/22/22 07:03	1
Perfluorobutanesulfonic acid (PFBS)	<1.8		1.8	0.18	ng/L		08/17/22 19:43	08/22/22 07:03	1
Perfluoropentanesulfonic acid (PFPeS)	<1.8		1.8	0.27	ng/L		08/17/22 19:43	08/22/22 07:03	1
Perfluorohexanesulfonic acid (PFHxS)	<1.8		1.8	0.51	ng/L		08/17/22 19:43	08/22/22 07:03	1
Perfluoroheptanesulfonic acid (PFHpS)	<1.8		1.8	0.17	ng/L		08/17/22 19:43	08/22/22 07:03	1
Perfluorooctanesulfonic acid (PFOS)	<1.8		1.8	0.49	ng/L		08/17/22 19:43	08/22/22 07:03	1
Perfluorononanesulfonic acid (PFNS)	<1.8		1.8	0.33	ng/L		08/17/22 19:43	08/22/22 07:03	1
Perfluorodecanesulfonic acid (PFDS)	<1.8		1.8	0.29	ng/L		08/17/22 19:43	08/22/22 07:03	1
Perfluorododecanesulfonic acid (PFDoS)	<1.8		1.8	0.87	ng/L		08/17/22 19:43	08/22/22 07:03	1
Perfluorooctanesulfonamide (FOSA)	<1.8		1.8	0.88	ng/L		08/17/22 19:43	08/22/22 07:03	1
NEtFOSA	<1.8		1.8	0.78	ng/L		08/17/22 19:43	08/22/22 07:03	1
NMeFOSA	<1.8		1.8	0.39	ng/L		08/17/22 19:43	08/22/22 07:03	1
NMeFOSAA	<4.5		4.5	1.1	ng/L		08/17/22 19:43	08/22/22 07:03	1
NEtFOSAA	<4.5		4.5	1.2	ng/L		08/17/22 19:43	08/22/22 07:03	1
NMeFOSE	<3.6		3.6	1.3	ng/L		08/17/22 19:43	08/22/22 07:03	1
NEtFOSE	<1.8		1.8	0.77	ng/L		08/17/22 19:43	08/22/22 07:03	1
4:2 FTS	<1.8		1.8	0.22	ng/L		08/17/22 19:43	08/22/22 07:03	1
6:2 FTS	**3.2**	**J**	4.5	2.3	ng/L		08/17/22 19:43	08/22/22 07:03	1
8:2 FTS	<1.8		1.8	0.41	ng/L		08/17/22 19:43	08/22/22 07:03	1
10:2 FTS	<1.8		1.8	0.60	ng/L		08/17/22 19:43	08/22/22 07:03	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	<1.8		1.8	0.36	ng/L		08/17/22 19:43	08/22/22 07:03	1
HFPO-DA (GenX)	<3.6		3.6	1.4	ng/L		08/17/22 19:43	08/22/22 07:03	1
9Cl-PF3ONS	<1.8		1.8	0.22	ng/L		08/17/22 19:43	08/22/22 07:03	1
11Cl-PF3OUdS	<1.8		1.8	0.29	ng/L		08/17/22 19:43	08/22/22 07:03	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFBA	*95*		*25 - 150*	*08/17/22 19:43*	*08/22/22 07:03*	*1*
13C5 PFPeA	*102*		*25 - 150*	*08/17/22 19:43*	*08/22/22 07:03*	*1*
13C2 PFHxA	*93*		*25 - 150*	*08/17/22 19:43*	*08/22/22 07:03*	*1*
13C4 PFHpA	*95*		*25 - 150*	*08/17/22 19:43*	*08/22/22 07:03*	*1*
13C4 PFOA	*98*		*25 - 150*	*08/17/22 19:43*	*08/22/22 07:03*	*1*
13C5 PFNA	*91*		*25 - 150*	*08/17/22 19:43*	*08/22/22 07:03*	*1*
13C2 PFDA	*81*		*25 - 150*	*08/17/22 19:43*	*08/22/22 07:03*	*1*
13C2 PFUnA	*81*		*25 - 150*	*08/17/22 19:43*	*08/22/22 07:03*	*1*

Client: ARCADIS U.S., Inc.
Project/Site: Marinette, WI Deep Well 30135605 Task 6

Job ID: 500-220648-1
SDG: Marinette High School

Client Sample ID: IRR-02_65 (20220805)
Date Collected: 08/05/22 08:15
Date Received: 08/10/22 09:40

Lab Sample ID: 500-220648-1
Matrix: Water

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFDoA	76		25 - 150	08/17/22 19:43	08/22/22 07:03	1
13C2 PFTeDA	78		25 - 150	08/17/22 19:43	08/22/22 07:03	1
13C2 PFHxDA	84		25 - 150	08/17/22 19:43	08/22/22 07:03	1
13C3 PFBS	100		25 - 150	08/17/22 19:43	08/22/22 07:03	1
18O2 PFHxS	101		25 - 150	08/17/22 19:43	08/22/22 07:03	1
13C4 PFOS	90		25 - 150	08/17/22 19:43	08/22/22 07:03	1
13C8 FOSA	81		10 - 150	08/17/22 19:43	08/22/22 07:03	1
d3-NMeFOSAA	75		25 - 150	08/17/22 19:43	08/22/22 07:03	1
d5-NEtFOSAA	81		25 - 150	08/17/22 19:43	08/22/22 07:03	1
d-N-MeFOSA-M	70		10 - 150	08/17/22 19:43	08/22/22 07:03	1
d-N-EtFOSA-M	69		10 - 150	08/17/22 19:43	08/22/22 07:03	1
d7-N-MeFOSE-M	70		10 - 150	08/17/22 19:43	08/22/22 07:03	1
d9-N-EtFOSE-M	69		10 - 150	08/17/22 19:43	08/22/22 07:03	1
M2-4:2 FTS	85		25 - 150	08/17/22 19:43	08/22/22 07:03	1
M2-6:2 FTS	91		25 - 150	08/17/22 19:43	08/22/22 07:03	1
M2-8:2 FTS	98		25 - 150	08/17/22 19:43	08/22/22 07:03	1
13C3 HFPO-DA	90		25 - 150	08/17/22 19:43	08/22/22 07:03	1
13C2 10:2 FTS	80		25 - 150	08/17/22 19:43	08/22/22 07:03	1

Client Sample ID: DUP-01 (20220804)
Date Collected: 08/04/22 12:00
Date Received: 08/10/22 09:40

Lab Sample ID: 500-220648-2
Matrix: Water

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	**4.1**	**J**	4.5	2.1	ng/L		08/17/22 19:43	08/22/22 07:13	1
Perfluoropentanoic acid (PFPeA)	**7.0**		1.8	0.44	ng/L		08/17/22 19:43	08/22/22 07:13	1
Perfluorohexanoic acid (PFHxA)	**13**		1.8	0.52	ng/L		08/17/22 19:43	08/22/22 07:13	1
Perfluoroheptanoic acid (PFHpA)	**8.0**		1.8	0.22	ng/L		08/17/22 19:43	08/22/22 07:13	1
Perfluorooctanoic acid (PFOA)	**93**		1.8	0.76	ng/L		08/17/22 19:43	08/22/22 07:13	1
Perfluorononanoic acid (PFNA)	**1.8**		1.8	0.24	ng/L		08/17/22 19:43	08/22/22 07:13	1
Perfluorodecanoic acid (PFDA)	<1.8		1.8	0.28	ng/L		08/17/22 19:43	08/22/22 07:13	1
Perfluoroundecanoic acid (PFUnA)	<1.8		1.8	0.98	ng/L		08/17/22 19:43	08/22/22 07:13	1
Perfluorododecanoic acid (PFDoA)	<1.8		1.8	0.49	ng/L		08/17/22 19:43	08/22/22 07:13	1
Perfluorotridecanoic acid (PFTrDA)	<1.8		1.8	1.2	ng/L		08/17/22 19:43	08/22/22 07:13	1
Perfluorotetradecanoic acid (PFTeA)	<1.8		1.8	0.65	ng/L		08/17/22 19:43	08/22/22 07:13	1
Perfluoro-n-hexadecanoic acid (PFHxDA)	<1.8		1.8	0.79	ng/L		08/17/22 19:43	08/22/22 07:13	1
Perfluoro-n-octadecanoic acid (PFODA)	<1.8		1.8	0.84	ng/L		08/17/22 19:43	08/22/22 07:13	1
Perfluorobutanesulfonic acid (PFBS)	**0.24**	**J**	1.8	0.18	ng/L		08/17/22 19:43	08/22/22 07:13	1
Perfluoropentanesulfonic acid (PFPeS)	<1.8		1.8	0.27	ng/L		08/17/22 19:43	08/22/22 07:13	1
Perfluorohexanesulfonic acid (PFHxS)	**1.2**	**J**	1.8	0.51	ng/L		08/17/22 19:43	08/22/22 07:13	1
Perfluoroheptanesulfonic acid (PFHpS)	<1.8		1.8	0.17	ng/L		08/17/22 19:43	08/22/22 07:13	1
Perfluorooctanesulfonic acid (PFOS)	<1.8		1.8	0.48	ng/L		08/17/22 19:43	08/22/22 07:13	1
Perfluorononanesulfonic acid (PFNS)	<1.8		1.8	0.33	ng/L		08/17/22 19:43	08/22/22 07:13	1
Perfluorodecanesulfonic acid (PFDS)	<1.8		1.8	0.29	ng/L		08/17/22 19:43	08/22/22 07:13	1
Perfluorododecanesulfonic acid (PFDoS)	<1.8		1.8	0.87	ng/L		08/17/22 19:43	08/22/22 07:13	1
Perfluorooctanesulfonamide (FOSA)	<1.8		1.8	0.87	ng/L		08/17/22 19:43	08/22/22 07:13	1
NEtFOSA	<1.8		1.8	0.78	ng/L		08/17/22 19:43	08/22/22 07:13	1
NMeFOSA	<1.8		1.8	0.38	ng/L		08/17/22 19:43	08/22/22 07:13	1
NMeFOSAA	<4.5		4.5	1.1	ng/L		08/17/22 19:43	08/22/22 07:13	1
NEtFOSAA	<4.5		4.5	1.2	ng/L		08/17/22 19:43	08/22/22 07:13	1
NMeFOSE	<3.6		3.6	1.2	ng/L		08/17/22 19:43	08/22/22 07:13	1
NEtFOSE	<1.8		1.8	0.76	ng/L		08/17/22 19:43	08/22/22 07:13	1
4:2 FTS	**0.95**	**J**	1.8	0.21	ng/L		08/17/22 19:43	08/22/22 07:13	1
6:2 FTS	**28**		4.5	2.2	ng/L		08/17/22 19:43	08/22/22 07:13	1
8:2 FTS	<1.8		1.8	0.41	ng/L		08/17/22 19:43	08/22/22 07:13	1
10:2 FTS	<1.8		1.8	0.60	ng/L		08/17/22 19:43	08/22/22 07:13	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	<1.8		1.8	0.36	ng/L		08/17/22 19:43	08/22/22 07:13	1
HFPO-DA (GenX)	<3.6		3.6	1.3	ng/L		08/17/22 19:43	08/22/22 07:13	1
9Cl-PF3ONS	<1.8		1.8	0.21	ng/L		08/17/22 19:43	08/22/22 07:13	1
11Cl-PF3OUdS	<1.8		1.8	0.29	ng/L		08/17/22 19:43	08/22/22 07:13	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFBA	*93*		*25 - 150*	*08/17/22 19:43*	*08/22/22 07:13*	*1*
13C5 PFPeA	*90*		*25 - 150*	*08/17/22 19:43*	*08/22/22 07:13*	*1*
13C2 PFHxA	*91*		*25 - 150*	*08/17/22 19:43*	*08/22/22 07:13*	*1*
13C4 PFHpA	*91*		*25 - 150*	*08/17/22 19:43*	*08/22/22 07:13*	*1*
13C4 PFOA	*95*		*25 - 150*	*08/17/22 19:43*	*08/22/22 07:13*	*1*
13C5 PFNA	*93*		*25 - 150*	*08/17/22 19:43*	*08/22/22 07:13*	*1*

Client: ARCADIS U.S., Inc.
Project/Site: Marinette, WI Deep Well 30135605 Task 6

Job ID: 500-220648-1
SDG: Marinette High School

Client Sample ID: DUP-01 (20220804)
Date Collected: 08/04/22 12:00
Date Received: 08/10/22 09:40

Lab Sample ID: 500-220648-2
Matrix: Water

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFDA	84		25 - 150	08/17/22 19:43	08/22/22 07:13	1
13C2 PFUnA	82		25 - 150	08/17/22 19:43	08/22/22 07:13	1
13C2 PFDoA	77		25 - 150	08/17/22 19:43	08/22/22 07:13	1
13C2 PFTeDA	82		25 - 150	08/17/22 19:43	08/22/22 07:13	1
13C2 PFHxDA	91		25 - 150	08/17/22 19:43	08/22/22 07:13	1
13C3 PFBS	90		25 - 150	08/17/22 19:43	08/22/22 07:13	1
18O2 PFHxS	98		25 - 150	08/17/22 19:43	08/22/22 07:13	1
13C4 PFOS	84		25 - 150	08/17/22 19:43	08/22/22 07:13	1
13C8 FOSA	84		10 - 150	08/17/22 19:43	08/22/22 07:13	1
d3-NMeFOSAA	75		25 - 150	08/17/22 19:43	08/22/22 07:13	1
d5-NEtFOSAA	75		25 - 150	08/17/22 19:43	08/22/22 07:13	1
d-N-MeFOSA-M	66		10 - 150	08/17/22 19:43	08/22/22 07:13	1
d-N-EtFOSA-M	66		10 - 150	08/17/22 19:43	08/22/22 07:13	1
d7-N-MeFOSE-M	70		10 - 150	08/17/22 19:43	08/22/22 07:13	1
d9-N-EtFOSE-M	68		10 - 150	08/17/22 19:43	08/22/22 07:13	1
M2-4:2 FTS	73		25 - 150	08/17/22 19:43	08/22/22 07:13	1
M2-6:2 FTS	81		25 - 150	08/17/22 19:43	08/22/22 07:13	1
M2-8:2 FTS	94		25 - 150	08/17/22 19:43	08/22/22 07:13	1
13C3 HFPO-DA	91		25 - 150	08/17/22 19:43	08/22/22 07:13	1
13C2 10:2 FTS	80		25 - 150	08/17/22 19:43	08/22/22 07:13	1

Client Sample ID: FB-01 (20220804)
Date Collected: 08/04/22 14:55
Date Received: 08/10/22 09:40

Lab Sample ID: 500-220648-3
Matrix: Water

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	<4.4		4.4	2.1	ng/L		08/17/22 19:43	08/22/22 07:23	1
Perfluoropentanoic acid (PFPeA)	<1.8		1.8	0.43	ng/L		08/17/22 19:43	08/22/22 07:23	1
Perfluorohexanoic acid (PFHxA)	<1.8		1.8	0.51	ng/L		08/17/22 19:43	08/22/22 07:23	1
Perfluoroheptanoic acid (PFHpA)	<1.8		1.8	0.22	ng/L		08/17/22 19:43	08/22/22 07:23	1
Perfluorooctanoic acid (PFOA)	<1.8		1.8	0.75	ng/L		08/17/22 19:43	08/22/22 07:23	1
Perfluorononanoic acid (PFNA)	<1.8		1.8	0.24	ng/L		08/17/22 19:43	08/22/22 07:23	1
Perfluorodecanoic acid (PFDA)	<1.8		1.8	0.27	ng/L		08/17/22 19:43	08/22/22 07:23	1
Perfluoroundecanoic acid (PFUnA)	<1.8		1.8	0.97	ng/L		08/17/22 19:43	08/22/22 07:23	1
Perfluorododecanoic acid (PFDoA)	<1.8		1.8	0.49	ng/L		08/17/22 19:43	08/22/22 07:23	1
Perfluorotridecanoic acid (PFTrDA)	<1.8		1.8	1.1	ng/L		08/17/22 19:43	08/22/22 07:23	1
Perfluorotetradecanoic acid (PFTeA)	<1.8		1.8	0.64	ng/L		08/17/22 19:43	08/22/22 07:23	1
Perfluoro-n-hexadecanoic acid (PFHxDA)	<1.8		1.8	0.79	ng/L		08/17/22 19:43	08/22/22 07:23	1
Perfluoro-n-octadecanoic acid (PFODA)	<1.8		1.8	0.83	ng/L		08/17/22 19:43	08/22/22 07:23	1
Perfluorobutanesulfonic acid (PFBS)	<1.8		1.8	0.18	ng/L		08/17/22 19:43	08/22/22 07:23	1
Perfluoropentanesulfonic acid (PFPeS)	<1.8		1.8	0.26	ng/L		08/17/22 19:43	08/22/22 07:23	1
Perfluorohexanesulfonic acid (PFHxS)	<1.8		1.8	0.50	ng/L		08/17/22 19:43	08/22/22 07:23	1
Perfluoroheptanesulfonic acid (PFHpS)	<1.8		1.8	0.17	ng/L		08/17/22 19:43	08/22/22 07:23	1
Perfluorooctanesulfonic acid (PFOS)	<1.8		1.8	0.48	ng/L		08/17/22 19:43	08/22/22 07:23	1
Perfluorononanesulfonic acid (PFNS)	<1.8		1.8	0.33	ng/L		08/17/22 19:43	08/22/22 07:23	1
Perfluorodecanesulfonic acid (PFDS)	<1.8		1.8	0.28	ng/L		08/17/22 19:43	08/22/22 07:23	1
Perfluorododecanesulfonic acid (PFDoS)	<1.8		1.8	0.86	ng/L		08/17/22 19:43	08/22/22 07:23	1
Perfluorooctanesulfonamide (FOSA)	<1.8		1.8	0.87	ng/L		08/17/22 19:43	08/22/22 07:23	1
NEtFOSA	<1.8		1.8	0.77	ng/L		08/17/22 19:43	08/22/22 07:23	1
NMeFOSA	<1.8		1.8	0.38	ng/L		08/17/22 19:43	08/22/22 07:23	1
NMeFOSAA	<4.4		4.4	1.1	ng/L		08/17/22 19:43	08/22/22 07:23	1
NEtFOSAA	<4.4		4.4	1.1	ng/L		08/17/22 19:43	08/22/22 07:23	1
NMeFOSE	<3.5		3.5	1.2	ng/L		08/17/22 19:43	08/22/22 07:23	1
NEtFOSE	<1.8		1.8	0.75	ng/L		08/17/22 19:43	08/22/22 07:23	1
4:2 FTS	<1.8		1.8	0.21	ng/L		08/17/22 19:43	08/22/22 07:23	1
6:2 FTS	<4.4		4.4	2.2	ng/L		08/17/22 19:43	08/22/22 07:23	1
8:2 FTS	<1.8		1.8	0.41	ng/L		08/17/22 19:43	08/22/22 07:23	1
10:2 FTS	<1.8		1.8	0.59	ng/L		08/17/22 19:43	08/22/22 07:23	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	<1.8		1.8	0.35	ng/L		08/17/22 19:43	08/22/22 07:23	1
HFPO-DA (GenX)	<3.5		3.5	1.3	ng/L		08/17/22 19:43	08/22/22 07:23	1
9Cl-PF3ONS	<1.8		1.8	0.21	ng/L		08/17/22 19:43	08/22/22 07:23	1
11Cl-PF3OUdS	<1.8		1.8	0.28	ng/L		08/17/22 19:43	08/22/22 07:23	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFBA	*96*		*25 - 150*	*08/17/22 19:43*	*08/22/22 07:23*	*1*
13C5 PFPeA	*97*		*25 - 150*	*08/17/22 19:43*	*08/22/22 07:23*	*1*
13C2 PFHxA	*100*		*25 - 150*	*08/17/22 19:43*	*08/22/22 07:23*	*1*
13C4 PFHpA	*92*		*25 - 150*	*08/17/22 19:43*	*08/22/22 07:23*	*1*
13C4 PFOA	*104*		*25 - 150*	*08/17/22 19:43*	*08/22/22 07:23*	*1*
13C5 PFNA	*100*		*25 - 150*	*08/17/22 19:43*	*08/22/22 07:23*	*1*
13C2 PFDA	*102*		*25 - 150*	*08/17/22 19:43*	*08/22/22 07:23*	*1*
13C2 PFUnA	*96*		*25 - 150*	*08/17/22 19:43*	*08/22/22 07:23*	*1*

Client: ARCADIS U.S., Inc.
Project/Site: Marinette, WI Deep Well 30135605 Task 6

Job ID: 500-220648-1
SDG: Marinette High School

Client Sample ID: FB-01 (20220804)
Date Collected: 08/04/22 14:55
Date Received: 08/10/22 09:40

Lab Sample ID: 500-220648-3
Matrix: Water

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFDoA	92		25 - 150	08/17/22 19:43	08/22/22 07:23	1
13C2 PFTeDA	89		25 - 150	08/17/22 19:43	08/22/22 07:23	1
13C2 PFHxDA	88		25 - 150	08/17/22 19:43	08/22/22 07:23	1
13C3 PFBS	99		25 - 150	08/17/22 19:43	08/22/22 07:23	1
18O2 PFHxS	102		25 - 150	08/17/22 19:43	08/22/22 07:23	1
13C4 PFOS	97		25 - 150	08/17/22 19:43	08/22/22 07:23	1
13C8 FOSA	92		10 - 150	08/17/22 19:43	08/22/22 07:23	1
d3-NMeFOSAA	89		25 - 150	08/17/22 19:43	08/22/22 07:23	1
d5-NEtFOSAA	90		25 - 150	08/17/22 19:43	08/22/22 07:23	1
d-N-MeFOSA-M	85		10 - 150	08/17/22 19:43	08/22/22 07:23	1
d-N-EtFOSA-M	83		10 - 150	08/17/22 19:43	08/22/22 07:23	1
d7-N-MeFOSE-M	82		10 - 150	08/17/22 19:43	08/22/22 07:23	1
d9-N-EtFOSE-M	83		10 - 150	08/17/22 19:43	08/22/22 07:23	1
M2-4:2 FTS	84		25 - 150	08/17/22 19:43	08/22/22 07:23	1
M2-6:2 FTS	91		25 - 150	08/17/22 19:43	08/22/22 07:23	1
M2-8:2 FTS	101		25 - 150	08/17/22 19:43	08/22/22 07:23	1
13C3 HFPO-DA	93		25 - 150	08/17/22 19:43	08/22/22 07:23	1
13C2 10:2 FTS	89		25 - 150	08/17/22 19:43	08/22/22 07:23	1

Client Sample ID: IRR-02_100 (20220804)
Date Collected: 08/04/22 14:40
Date Received: 08/10/22 09:40

Lab Sample ID: 500-220648-4
Matrix: Water

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	**4.1**	**J**	4.5	2.1	ng/L		08/17/22 19:43	08/22/22 07:33	1
Perfluoropentanoic acid (PFPeA)	**7.2**		1.8	0.44	ng/L		08/17/22 19:43	08/22/22 07:33	1
Perfluorohexanoic acid (PFHxA)	**14**		1.8	0.52	ng/L		08/17/22 19:43	08/22/22 07:33	1
Perfluoroheptanoic acid (PFHpA)	**7.8**		1.8	0.22	ng/L		08/17/22 19:43	08/22/22 07:33	1
Perfluorooctanoic acid (PFOA)	**94**		1.8	0.76	ng/L		08/17/22 19:43	08/22/22 07:33	1
Perfluorononanoic acid (PFNA)	**2.0**		1.8	0.24	ng/L		08/17/22 19:43	08/22/22 07:33	1
Perfluorodecanoic acid (PFDA)	<1.8		1.8	0.28	ng/L		08/17/22 19:43	08/22/22 07:33	1
Perfluoroundecanoic acid (PFUnA)	<1.8		1.8	0.99	ng/L		08/17/22 19:43	08/22/22 07:33	1
Perfluorododecanoic acid (PFDoA)	<1.8		1.8	0.49	ng/L		08/17/22 19:43	08/22/22 07:33	1
Perfluorotridecanoic acid (PFTrDA)	<1.8		1.8	1.2	ng/L		08/17/22 19:43	08/22/22 07:33	1
Perfluorotetradecanoic acid (PFTeA)	<1.8		1.8	0.65	ng/L		08/17/22 19:43	08/22/22 07:33	1
Perfluoro-n-hexadecanoic acid (PFHxDA)	<1.8		1.8	0.80	ng/L		08/17/22 19:43	08/22/22 07:33	1
Perfluoro-n-octadecanoic acid (PFODA)	<1.8		1.8	0.84	ng/L		08/17/22 19:43	08/22/22 07:33	1
Perfluorobutanesulfonic acid (PFBS)	**0.26**	**J**	1.8	0.18	ng/L		08/17/22 19:43	08/22/22 07:33	1
Perfluoropentanesulfonic acid (PFPeS)	<1.8		1.8	0.27	ng/L		08/17/22 19:43	08/22/22 07:33	1
Perfluorohexanesulfonic acid (PFHxS)	**1.4**	**J**	1.8	0.51	ng/L		08/17/22 19:43	08/22/22 07:33	1
Perfluoroheptanesulfonic acid (PFHpS)	<1.8		1.8	0.17	ng/L		08/17/22 19:43	08/22/22 07:33	1
Perfluorooctanesulfonic acid (PFOS)	<1.8		1.8	0.48	ng/L		08/17/22 19:43	08/22/22 07:33	1
Perfluorononanesulfonic acid (PFNS)	<1.8		1.8	0.33	ng/L		08/17/22 19:43	08/22/22 07:33	1
Perfluorodecanesulfonic acid (PFDS)	<1.8		1.8	0.29	ng/L		08/17/22 19:43	08/22/22 07:33	1
Perfluorododecanesulfonic acid (PFDoS)	<1.8		1.8	0.87	ng/L		08/17/22 19:43	08/22/22 07:33	1
Perfluorooctanesulfonamide (FOSA)	<1.8		1.8	0.88	ng/L		08/17/22 19:43	08/22/22 07:33	1
NEtFOSA	<1.8		1.8	0.78	ng/L		08/17/22 19:43	08/22/22 07:33	1
NMeFOSA	<1.8		1.8	0.39	ng/L		08/17/22 19:43	08/22/22 07:33	1
NMeFOSAA	<4.5		4.5	1.1	ng/L		08/17/22 19:43	08/22/22 07:33	1
NEtFOSAA	<4.5		4.5	1.2	ng/L		08/17/22 19:43	08/22/22 07:33	1
NMeFOSE	<3.6		3.6	1.3	ng/L		08/17/22 19:43	08/22/22 07:33	1
NEtFOSE	<1.8		1.8	0.76	ng/L		08/17/22 19:43	08/22/22 07:33	1
4:2 FTS	**0.90**	**J**	1.8	0.21	ng/L		08/17/22 19:43	08/22/22 07:33	1
6:2 FTS	**27**		4.5	2.2	ng/L		08/17/22 19:43	08/22/22 07:33	1
8:2 FTS	<1.8		1.8	0.41	ng/L		08/17/22 19:43	08/22/22 07:33	1
10:2 FTS	<1.8		1.8	0.60	ng/L		08/17/22 19:43	08/22/22 07:33	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	<1.8		1.8	0.36	ng/L		08/17/22 19:43	08/22/22 07:33	1
HFPO-DA (GenX)	<3.6		3.6	1.3	ng/L		08/17/22 19:43	08/22/22 07:33	1
9Cl-PF3ONS	<1.8		1.8	0.21	ng/L		08/17/22 19:43	08/22/22 07:33	1
11Cl-PF3OUdS	<1.8		1.8	0.29	ng/L		08/17/22 19:43	08/22/22 07:33	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFBA	*105*		*25 - 150*	*08/17/22 19:43*	*08/22/22 07:33*	*1*
13C5 PFPeA	*102*		*25 - 150*	*08/17/22 19:43*	*08/22/22 07:33*	*1*
13C2 PFHxA	*102*		*25 - 150*	*08/17/22 19:43*	*08/22/22 07:33*	*1*
13C4 PFHpA	*104*		*25 - 150*	*08/17/22 19:43*	*08/22/22 07:33*	*1*
13C4 PFOA	*102*		*25 - 150*	*08/17/22 19:43*	*08/22/22 07:33*	*1*
13C5 PFNA	*100*		*25 - 150*	*08/17/22 19:43*	*08/22/22 07:33*	*1*

Client: ARCADIS U.S., Inc.
Project/Site: Marinette, WI Deep Well 30135605 Task 6

Job ID: 500-220648-1
SDG: Marinette High School

Client Sample ID: IRR-02_100 (20220804)
Date Collected: 08/04/22 14:40
Date Received: 08/10/22 09:40

Lab Sample ID: 500-220648-4
Matrix: Water

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFDA	94		25 - 150	08/17/22 19:43	08/22/22 07:33	1
13C2 PFUnA	88		25 - 150	08/17/22 19:43	08/22/22 07:33	1
13C2 PFDoA	88		25 - 150	08/17/22 19:43	08/22/22 07:33	1
13C2 PFTeDA	87		25 - 150	08/17/22 19:43	08/22/22 07:33	1
13C2 PFHxDA	91		25 - 150	08/17/22 19:43	08/22/22 07:33	1
13C3 PFBS	100		25 - 150	08/17/22 19:43	08/22/22 07:33	1
18O2 PFHxS	100		25 - 150	08/17/22 19:43	08/22/22 07:33	1
13C4 PFOS	96		25 - 150	08/17/22 19:43	08/22/22 07:33	1
13C8 FOSA	92		10 - 150	08/17/22 19:43	08/22/22 07:33	1
d3-NMeFOSAA	81		25 - 150	08/17/22 19:43	08/22/22 07:33	1
d5-NEtFOSAA	85		25 - 150	08/17/22 19:43	08/22/22 07:33	1
d-N-MeFOSA-M	80		10 - 150	08/17/22 19:43	08/22/22 07:33	1
d-N-EtFOSA-M	81		10 - 150	08/17/22 19:43	08/22/22 07:33	1
d7-N-MeFOSE-M	78		10 - 150	08/17/22 19:43	08/22/22 07:33	1
d9-N-EtFOSE-M	77		10 - 150	08/17/22 19:43	08/22/22 07:33	1
M2-4:2 FTS	91		25 - 150	08/17/22 19:43	08/22/22 07:33	1
M2-6:2 FTS	100		25 - 150	08/17/22 19:43	08/22/22 07:33	1
M2-8:2 FTS	102		25 - 150	08/17/22 19:43	08/22/22 07:33	1
13C3 HFPO-DA	93		25 - 150	08/17/22 19:43	08/22/22 07:33	1
13C2 10:2 FTS	81		25 - 150	08/17/22 19:43	08/22/22 07:33	1

Client Sample ID: IRR-02_150 (20220806)
Lab Sample ID: 500-220648-5

Date Collected: 08/06/22 15:40
Matrix: Water
Date Received: 08/10/22 09:40

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	<4.6		4.6	2.2	ng/L		08/17/22 19:43	08/22/22 08:34	1
Perfluoropentanoic acid (PFPeA)	<1.8		1.8	0.45	ng/L		08/17/22 19:43	08/22/22 08:34	1
Perfluorohexanoic acid (PFHxA)	<1.8		1.8	0.53	ng/L		08/17/22 19:43	08/22/22 08:34	1
Perfluoroheptanoic acid (PFHpA)	<1.8		1.8	0.23	ng/L		08/17/22 19:43	08/22/22 08:34	1
Perfluorooctanoic acid (PFOA)	<1.8		1.8	0.78	ng/L		08/17/22 19:43	08/22/22 08:34	1
Perfluorononanoic acid (PFNA)	<1.8		1.8	0.25	ng/L		08/17/22 19:43	08/22/22 08:34	1
Perfluorodecanoic acid (PFDA)	<1.8		1.8	0.29	ng/L		08/17/22 19:43	08/22/22 08:34	1
Perfluoroundecanoic acid (PFUnA)	<1.8		1.8	1.0	ng/L		08/17/22 19:43	08/22/22 08:34	1
Perfluorododecanoic acid (PFDoA)	<1.8		1.8	0.51	ng/L		08/17/22 19:43	08/22/22 08:34	1
Perfluorotridecanoic acid (PFTrDA)	<1.8		1.8	1.2	ng/L		08/17/22 19:43	08/22/22 08:34	1
Perfluorotetradecanoic acid (PFTeA)	<1.8		1.8	0.67	ng/L		08/17/22 19:43	08/22/22 08:34	1
Perfluoro-n-hexadecanoic acid (PFHxDA)	<1.8		1.8	0.82	ng/L		08/17/22 19:43	08/22/22 08:34	1
Perfluoro-n-octadecanoic acid (PFODA)	<1.8		1.8	0.86	ng/L		08/17/22 19:43	08/22/22 08:34	1
Perfluorobutanesulfonic acid (PFBS)	<1.8		1.8	0.18	ng/L		08/17/22 19:43	08/22/22 08:34	1
Perfluoropentanesulfonic acid (PFPeS)	<1.8		1.8	0.28	ng/L		08/17/22 19:43	08/22/22 08:34	1
Perfluorohexanesulfonic acid (PFHxS)	<1.8		1.8	0.52	ng/L		08/17/22 19:43	08/22/22 08:34	1
Perfluoroheptanesulfonic acid (PFHpS)	<1.8		1.8	0.17	ng/L		08/17/22 19:43	08/22/22 08:34	1
Perfluorooctanesulfonic acid (PFOS)	<1.8		1.8	0.50	ng/L		08/17/22 19:43	08/22/22 08:34	1
Perfluorononanesulfonic acid (PFNS)	<1.8		1.8	0.34	ng/L		08/17/22 19:43	08/22/22 08:34	1
Perfluorodecanesulfonic acid (PFDS)	<1.8		1.8	0.29	ng/L		08/17/22 19:43	08/22/22 08:34	1
Perfluorododecanesulfonic acid (PFDoS)	<1.8		1.8	0.89	ng/L		08/17/22 19:43	08/22/22 08:34	1
Perfluorooctanesulfonamide (FOSA)	<1.8		1.8	0.90	ng/L		08/17/22 19:43	08/22/22 08:34	1
NEtFOSA	<1.8		1.8	0.80	ng/L		08/17/22 19:43	08/22/22 08:34	1
NMeFOSA	<1.8		1.8	0.40	ng/L		08/17/22 19:43	08/22/22 08:34	1
NMeFOSAA	<4.6		4.6	1.1	ng/L		08/17/22 19:43	08/22/22 08:34	1
NEtFOSAA	<4.6		4.6	1.2	ng/L		08/17/22 19:43	08/22/22 08:34	1
NMeFOSE	<3.7		3.7	1.3	ng/L		08/17/22 19:43	08/22/22 08:34	1
NEtFOSE	<1.8		1.8	0.78	ng/L		08/17/22 19:43	08/22/22 08:34	1
4:2 FTS	<1.8		1.8	0.22	ng/L		08/17/22 19:43	08/22/22 08:34	1
6:2 FTS	<4.6		4.6	2.3	ng/L		08/17/22 19:43	08/22/22 08:34	1
8:2 FTS	<1.8		1.8	0.42	ng/L		08/17/22 19:43	08/22/22 08:34	1
10:2 FTS	<1.8		1.8	0.62	ng/L		08/17/22 19:43	08/22/22 08:34	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	<1.8		1.8	0.37	ng/L		08/17/22 19:43	08/22/22 08:34	1
HFPO-DA (GenX)	<3.7		3.7	1.4	ng/L		08/17/22 19:43	08/22/22 08:34	1
9Cl-PF3ONS	<1.8		1.8	0.22	ng/L		08/17/22 19:43	08/22/22 08:34	1
11Cl-PF3OUdS	<1.8		1.8	0.29	ng/L		08/17/22 19:43	08/22/22 08:34	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFBA	*96*		*25 - 150*	*08/17/22 19:43*	*08/22/22 08:34*	*1*
13C5 PFPeA	*101*		*25 - 150*	*08/17/22 19:43*	*08/22/22 08:34*	*1*
13C2 PFHxA	*101*		*25 - 150*	*08/17/22 19:43*	*08/22/22 08:34*	*1*
13C4 PFHpA	*101*		*25 - 150*	*08/17/22 19:43*	*08/22/22 08:34*	*1*
13C4 PFOA	*105*		*25 - 150*	*08/17/22 19:43*	*08/22/22 08:34*	*1*
13C5 PFNA	*100*		*25 - 150*	*08/17/22 19:43*	*08/22/22 08:34*	*1*
13C2 PFDA	*103*		*25 - 150*	*08/17/22 19:43*	*08/22/22 08:34*	*1*
13C2 PFUnA	*102*		*25 - 150*	*08/17/22 19:43*	*08/22/22 08:34*	*1*

Client: ARCADIS U.S., Inc.
Project/Site: Marinette, WI Deep Well 30135605 Task 6

Job ID: 500-220648-1
SDG: Marinette High School

Client Sample ID: IRR-02_150 (20220806)
Date Collected: 08/06/22 15:40
Date Received: 08/10/22 09:40

Lab Sample ID: 500-220648-5
Matrix: Water

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFDoA	95		25 - 150	08/17/22 19:43	08/22/22 08:34	1
13C2 PFTeDA	92		25 - 150	08/17/22 19:43	08/22/22 08:34	1
13C2 PFHxDA	89		25 - 150	08/17/22 19:43	08/22/22 08:34	1
13C3 PFBS	100		25 - 150	08/17/22 19:43	08/22/22 08:34	1
18O2 PFHxS	97		25 - 150	08/17/22 19:43	08/22/22 08:34	1
13C4 PFOS	98		25 - 150	08/17/22 19:43	08/22/22 08:34	1
13C8 FOSA	97		10 - 150	08/17/22 19:43	08/22/22 08:34	1
d3-NMeFOSAA	94		25 - 150	08/17/22 19:43	08/22/22 08:34	1
d5-NEtFOSAA	95		25 - 150	08/17/22 19:43	08/22/22 08:34	1
d-N-MeFOSA-M	86		10 - 150	08/17/22 19:43	08/22/22 08:34	1
d-N-EtFOSA-M	88		10 - 150	08/17/22 19:43	08/22/22 08:34	1
d7-N-MeFOSE-M	85		10 - 150	08/17/22 19:43	08/22/22 08:34	1
d9-N-EtFOSE-M	83		10 - 150	08/17/22 19:43	08/22/22 08:34	1
M2-4:2 FTS	90		25 - 150	08/17/22 19:43	08/22/22 08:34	1
M2-6:2 FTS	93		25 - 150	08/17/22 19:43	08/22/22 08:34	1
M2-8:2 FTS	117		25 - 150	08/17/22 19:43	08/22/22 08:34	1
13C3 HFPO-DA	98		25 - 150	08/17/22 19:43	08/22/22 08:34	1
13C2 10:2 FTS	100		25 - 150	08/17/22 19:43	08/22/22 08:34	1

Client Sample ID: FB-03 (20220806)
Date Collected: 08/06/22 15:10
Date Received: 08/10/22 09:40

Lab Sample ID: 500-220648-6
Matrix: Water

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	<4.3		4.3	2.1	ng/L		08/17/22 19:43	08/22/22 08:44	1
Perfluoropentanoic acid (PFPeA)	<1.7		1.7	0.42	ng/L		08/17/22 19:43	08/22/22 08:44	1
Perfluorohexanoic acid (PFHxA)	<1.7		1.7	0.50	ng/L		08/17/22 19:43	08/22/22 08:44	1
Perfluoroheptanoic acid (PFHpA)	<1.7		1.7	0.22	ng/L		08/17/22 19:43	08/22/22 08:44	1
Perfluorooctanoic acid (PFOA)	<1.7		1.7	0.74	ng/L		08/17/22 19:43	08/22/22 08:44	1
Perfluorononanoic acid (PFNA)	<1.7		1.7	0.23	ng/L		08/17/22 19:43	08/22/22 08:44	1
Perfluorodecanoic acid (PFDA)	<1.7		1.7	0.27	ng/L		08/17/22 19:43	08/22/22 08:44	1
Perfluoroundecanoic acid (PFUnA)	<1.7		1.7	0.95	ng/L		08/17/22 19:43	08/22/22 08:44	1
Perfluorododecanoic acid (PFDoA)	<1.7		1.7	0.48	ng/L		08/17/22 19:43	08/22/22 08:44	1
Perfluorotridecanoic acid (PFTrDA)	<1.7		1.7	1.1	ng/L		08/17/22 19:43	08/22/22 08:44	1
Perfluorotetradecanoic acid (PFTeA)	<1.7		1.7	0.63	ng/L		08/17/22 19:43	08/22/22 08:44	1
Perfluoro-n-hexadecanoic acid (PFHxDA)	<1.7		1.7	0.77	ng/L		08/17/22 19:43	08/22/22 08:44	1
Perfluoro-n-octadecanoic acid (PFODA)	<1.7		1.7	0.81	ng/L		08/17/22 19:43	08/22/22 08:44	1
Perfluorobutanesulfonic acid (PFBS)	<1.7		1.7	0.17	ng/L		08/17/22 19:43	08/22/22 08:44	1
Perfluoropentanesulfonic acid (PFPeS)	<1.7		1.7	0.26	ng/L		08/17/22 19:43	08/22/22 08:44	1
Perfluorohexanesulfonic acid (PFHxS)	<1.7		1.7	0.49	ng/L		08/17/22 19:43	08/22/22 08:44	1
Perfluoroheptanesulfonic acid (PFHpS)	<1.7		1.7	0.16	ng/L		08/17/22 19:43	08/22/22 08:44	1
Perfluorooctanesulfonic acid (PFOS)	<1.7		1.7	0.47	ng/L		08/17/22 19:43	08/22/22 08:44	1
Perfluorononanesulfonic acid (PFNS)	<1.7		1.7	0.32	ng/L		08/17/22 19:43	08/22/22 08:44	1
Perfluorodecanesulfonic acid (PFDS)	<1.7		1.7	0.28	ng/L		08/17/22 19:43	08/22/22 08:44	1
Perfluorododecanesulfonic acid (PFDoS)	<1.7		1.7	0.84	ng/L		08/17/22 19:43	08/22/22 08:44	1
Perfluorooctanesulfonamide (FOSA)	<1.7		1.7	0.85	ng/L		08/17/22 19:43	08/22/22 08:44	1
NEtFOSA	<1.7		1.7	0.75	ng/L		08/17/22 19:43	08/22/22 08:44	1
NMeFOSA	<1.7		1.7	0.37	ng/L		08/17/22 19:43	08/22/22 08:44	1
NMeFOSAA	<4.3		4.3	1.0	ng/L		08/17/22 19:43	08/22/22 08:44	1
NEtFOSAA	<4.3		4.3	1.1	ng/L		08/17/22 19:43	08/22/22 08:44	1
NMeFOSE	<3.5		3.5	1.2	ng/L		08/17/22 19:43	08/22/22 08:44	1
NEtFOSE	<1.7		1.7	0.74	ng/L		08/17/22 19:43	08/22/22 08:44	1
4:2 FTS	<1.7		1.7	0.21	ng/L		08/17/22 19:43	08/22/22 08:44	1
6:2 FTS	<4.3		4.3	2.2	ng/L		08/17/22 19:43	08/22/22 08:44	1
8:2 FTS	<1.7		1.7	0.40	ng/L		08/17/22 19:43	08/22/22 08:44	1
10:2 FTS	<1.7		1.7	0.58	ng/L		08/17/22 19:43	08/22/22 08:44	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	<1.7		1.7	0.35	ng/L		08/17/22 19:43	08/22/22 08:44	1
HFPO-DA (GenX)	<3.5		3.5	1.3	ng/L		08/17/22 19:43	08/22/22 08:44	1
9Cl-PF3ONS	<1.7		1.7	0.21	ng/L		08/17/22 19:43	08/22/22 08:44	1
11Cl-PF3OUdS	<1.7		1.7	0.28	ng/L		08/17/22 19:43	08/22/22 08:44	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFBA	*98*		*25 - 150*	*08/17/22 19:43*	*08/22/22 08:44*	*1*
13C5 PFPeA	*107*		*25 - 150*	*08/17/22 19:43*	*08/22/22 08:44*	*1*
13C2 PFHxA	*110*		*25 - 150*	*08/17/22 19:43*	*08/22/22 08:44*	*1*
13C4 PFHpA	*107*		*25 - 150*	*08/17/22 19:43*	*08/22/22 08:44*	*1*
13C4 PFOA	*106*		*25 - 150*	*08/17/22 19:43*	*08/22/22 08:44*	*1*
13C5 PFNA	*104*		*25 - 150*	*08/17/22 19:43*	*08/22/22 08:44*	*1*
13C2 PFDA	*116*		*25 - 150*	*08/17/22 19:43*	*08/22/22 08:44*	*1*
13C2 PFUnA	*115*		*25 - 150*	*08/17/22 19:43*	*08/22/22 08:44*	*1*

Client: ARCADIS U.S., Inc.
Project/Site: Marinette, WI Deep Well 30135605 Task 6

Job ID: 500-220648-1
SDG: Marinette High School

Client Sample ID: FB-03 (20220806)
Date Collected: 08/06/22 15:10
Date Received: 08/10/22 09:40

Lab Sample ID: 500-220648-6
Matrix: Water

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFDoA	108		25 - 150	08/17/22 19:43	08/22/22 08:44	1
13C2 PFTeDA	103		25 - 150	08/17/22 19:43	08/22/22 08:44	1
13C2 PFHxDA	102		25 - 150	08/17/22 19:43	08/22/22 08:44	1
13C3 PFBS	108		25 - 150	08/17/22 19:43	08/22/22 08:44	1
18O2 PFHxS	109		25 - 150	08/17/22 19:43	08/22/22 08:44	1
13C4 PFOS	109		25 - 150	08/17/22 19:43	08/22/22 08:44	1
13C8 FOSA	114		10 - 150	08/17/22 19:43	08/22/22 08:44	1
d3-NMeFOSAA	102		25 - 150	08/17/22 19:43	08/22/22 08:44	1
d5-NEtFOSAA	125		25 - 150	08/17/22 19:43	08/22/22 08:44	1
d-N-MeFOSA-M	95		10 - 150	08/17/22 19:43	08/22/22 08:44	1
d-N-EtFOSA-M	103		10 - 150	08/17/22 19:43	08/22/22 08:44	1
d7-N-MeFOSE-M	96		10 - 150	08/17/22 19:43	08/22/22 08:44	1
d9-N-EtFOSE-M	102		10 - 150	08/17/22 19:43	08/22/22 08:44	1
M2-4:2 FTS	115		25 - 150	08/17/22 19:43	08/22/22 08:44	1
M2-6:2 FTS	108		25 - 150	08/17/22 19:43	08/22/22 08:44	1
M2-8:2 FTS	123		25 - 150	08/17/22 19:43	08/22/22 08:44	1
13C3 HFPO-DA	99		25 - 150	08/17/22 19:43	08/22/22 08:44	1
13C2 10:2 FTS	123		25 - 150	08/17/22 19:43	08/22/22 08:44	1

Client Sample ID: FB-02 (20220805)
Date Collected: 08/05/22 08:25
Date Received: 08/10/22 09:40

Lab Sample ID: 500-220648-7
Matrix: Water

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	<4.6		4.6	2.2	ng/L		08/17/22 19:43	08/22/22 08:54	1
Perfluoropentanoic acid (PFPeA)	<1.8		1.8	0.45	ng/L		08/17/22 19:43	08/22/22 08:54	1
Perfluorohexanoic acid (PFHxA)	<1.8		1.8	0.53	ng/L		08/17/22 19:43	08/22/22 08:54	1
Perfluoroheptanoic acid (PFHpA)	<1.8		1.8	0.23	ng/L		08/17/22 19:43	08/22/22 08:54	1
Perfluorooctanoic acid (PFOA)	<1.8		1.8	0.78	ng/L		08/17/22 19:43	08/22/22 08:54	1
Perfluorononanoic acid (PFNA)	<1.8		1.8	0.25	ng/L		08/17/22 19:43	08/22/22 08:54	1
Perfluorodecanoic acid (PFDA)	<1.8		1.8	0.29	ng/L		08/17/22 19:43	08/22/22 08:54	1
Perfluoroundecanoic acid (PFUnA)	<1.8		1.8	1.0	ng/L		08/17/22 19:43	08/22/22 08:54	1
Perfluorododecanoic acid (PFDoA)	<1.8		1.8	0.51	ng/L		08/17/22 19:43	08/22/22 08:54	1
Perfluorotridecanoic acid (PFTrDA)	<1.8		1.8	1.2	ng/L		08/17/22 19:43	08/22/22 08:54	1
Perfluorotetradecanoic acid (PFTeA)	<1.8		1.8	0.67	ng/L		08/17/22 19:43	08/22/22 08:54	1
Perfluoro-n-hexadecanoic acid (PFHxDA)	<1.8		1.8	0.82	ng/L		08/17/22 19:43	08/22/22 08:54	1
Perfluoro-n-octadecanoic acid (PFODA)	<1.8		1.8	0.87	ng/L		08/17/22 19:43	08/22/22 08:54	1
Perfluorobutanesulfonic acid (PFBS)	<1.8		1.8	0.18	ng/L		08/17/22 19:43	08/22/22 08:54	1
Perfluoropentanesulfonic acid (PFPeS)	<1.8		1.8	0.28	ng/L		08/17/22 19:43	08/22/22 08:54	1
Perfluorohexanesulfonic acid (PFHxS)	<1.8		1.8	0.53	ng/L		08/17/22 19:43	08/22/22 08:54	1
Perfluoroheptanesulfonic acid (PFHpS)	<1.8		1.8	0.18	ng/L		08/17/22 19:43	08/22/22 08:54	1
Perfluorooctanesulfonic acid (PFOS)	<1.8		1.8	0.50	ng/L		08/17/22 19:43	08/22/22 08:54	1
Perfluorononanesulfonic acid (PFNS)	<1.8		1.8	0.34	ng/L		08/17/22 19:43	08/22/22 08:54	1
Perfluorodecanesulfonic acid (PFDS)	<1.8		1.8	0.29	ng/L		08/17/22 19:43	08/22/22 08:54	1
Perfluorododecanesulfonic acid (PFDoS)	<1.8		1.8	0.89	ng/L		08/17/22 19:43	08/22/22 08:54	1
Perfluorooctanesulfonamide (FOSA)	<1.8		1.8	0.90	ng/L		08/17/22 19:43	08/22/22 08:54	1
NEtFOSA	<1.8		1.8	0.80	ng/L		08/17/22 19:43	08/22/22 08:54	1
NMeFOSA	<1.8		1.8	0.40	ng/L		08/17/22 19:43	08/22/22 08:54	1
NMeFOSAA	<4.6		4.6	1.1	ng/L		08/17/22 19:43	08/22/22 08:54	1
NEtFOSAA	<4.6		4.6	1.2	ng/L		08/17/22 19:43	08/22/22 08:54	1
NMeFOSE	<3.7		3.7	1.3	ng/L		08/17/22 19:43	08/22/22 08:54	1
NEtFOSE	<1.8		1.8	0.78	ng/L		08/17/22 19:43	08/22/22 08:54	1
4:2 FTS	<1.8		1.8	0.22	ng/L		08/17/22 19:43	08/22/22 08:54	1
6:2 FTS	<4.6		4.6	2.3	ng/L		08/17/22 19:43	08/22/22 08:54	1
8:2 FTS	<1.8		1.8	0.42	ng/L		08/17/22 19:43	08/22/22 08:54	1
10:2 FTS	<1.8		1.8	0.62	ng/L		08/17/22 19:43	08/22/22 08:54	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	<1.8		1.8	0.37	ng/L		08/17/22 19:43	08/22/22 08:54	1
HFPO-DA (GenX)	<3.7		3.7	1.4	ng/L		08/17/22 19:43	08/22/22 08:54	1
9Cl-PF3ONS	<1.8		1.8	0.22	ng/L		08/17/22 19:43	08/22/22 08:54	1
11Cl-PF3OUdS	<1.8		1.8	0.29	ng/L		08/17/22 19:43	08/22/22 08:54	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFBA	*102*		*25 - 150*	*08/17/22 19:43*	*08/22/22 08:54*	*1*
13C5 PFPeA	*106*		*25 - 150*	*08/17/22 19:43*	*08/22/22 08:54*	*1*
13C2 PFHxA	*108*		*25 - 150*	*08/17/22 19:43*	*08/22/22 08:54*	*1*
13C4 PFHpA	*110*		*25 - 150*	*08/17/22 19:43*	*08/22/22 08:54*	*1*
13C4 PFOA	*109*		*25 - 150*	*08/17/22 19:43*	*08/22/22 08:54*	*1*
13C5 PFNA	*105*		*25 - 150*	*08/17/22 19:43*	*08/22/22 08:54*	*1*
13C2 PFDA	*107*		*25 - 150*	*08/17/22 19:43*	*08/22/22 08:54*	*1*
13C2 PFUnA	*104*		*25 - 150*	*08/17/22 19:43*	*08/22/22 08:54*	*1*

Client: ARCADIS U.S., Inc.
Project/Site: Marinette, WI Deep Well 30135605 Task 6

Job ID: 500-220648-1
SDG: Marinette High School

Client Sample ID: FB-02 (20220805)
Date Collected: 08/05/22 08:25
Date Received: 08/10/22 09:40

Lab Sample ID: 500-220648-7
Matrix: Water

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFDoA	100		25 - 150	08/17/22 19:43	08/22/22 08:54	1
13C2 PFTeDA	102		25 - 150	08/17/22 19:43	08/22/22 08:54	1
13C2 PFHxDA	99		25 - 150	08/17/22 19:43	08/22/22 08:54	1
13C3 PFBS	110		25 - 150	08/17/22 19:43	08/22/22 08:54	1
18O2 PFHxS	115		25 - 150	08/17/22 19:43	08/22/22 08:54	1
13C4 PFOS	107		25 - 150	08/17/22 19:43	08/22/22 08:54	1
13C8 FOSA	103		10 - 150	08/17/22 19:43	08/22/22 08:54	1
d3-NMeFOSAA	104		25 - 150	08/17/22 19:43	08/22/22 08:54	1
d5-NEtFOSAA	107		25 - 150	08/17/22 19:43	08/22/22 08:54	1
d-N-MeFOSA-M	97		10 - 150	08/17/22 19:43	08/22/22 08:54	1
d-N-EtFOSA-M	94		10 - 150	08/17/22 19:43	08/22/22 08:54	1
d7-N-MeFOSE-M	92		10 - 150	08/17/22 19:43	08/22/22 08:54	1
d9-N-EtFOSE-M	92		10 - 150	08/17/22 19:43	08/22/22 08:54	1
M2-4:2 FTS	104		25 - 150	08/17/22 19:43	08/22/22 08:54	1
M2-6:2 FTS	105		25 - 150	08/17/22 19:43	08/22/22 08:54	1
M2-8:2 FTS	118		25 - 150	08/17/22 19:43	08/22/22 08:54	1
13C3 HFPO-DA	99		25 - 150	08/17/22 19:43	08/22/22 08:54	1
13C2 10:2 FTS	106		25 - 150	08/17/22 19:43	08/22/22 08:54	1

Client Sample ID: EB-01 (20220806)
Date Collected: 08/06/22 17:00
Date Received: 08/10/22 09:40

Lab Sample ID: 500-220648-8
Matrix: Water

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	<4.4		4.4	2.1	ng/L		08/17/22 19:43	08/22/22 09:04	1
Perfluoropentanoic acid (PFPeA)	<1.7		1.7	0.43	ng/L		08/17/22 19:43	08/22/22 09:04	1
Perfluorohexanoic acid (PFHxA)	<1.7		1.7	0.51	ng/L		08/17/22 19:43	08/22/22 09:04	1
Perfluoroheptanoic acid (PFHpA)	<1.7		1.7	0.22	ng/L		08/17/22 19:43	08/22/22 09:04	1
Perfluorooctanoic acid (PFOA)	<1.7		1.7	0.74	ng/L		08/17/22 19:43	08/22/22 09:04	1
Perfluorononanoic acid (PFNA)	<1.7		1.7	0.24	ng/L		08/17/22 19:43	08/22/22 09:04	1
Perfluorodecanoic acid (PFDA)	<1.7		1.7	0.27	ng/L		08/17/22 19:43	08/22/22 09:04	1
Perfluoroundecanoic acid (PFUnA)	<1.7		1.7	0.96	ng/L		08/17/22 19:43	08/22/22 09:04	1
Perfluorododecanoic acid (PFDoA)	<1.7		1.7	0.48	ng/L		08/17/22 19:43	08/22/22 09:04	1
Perfluorotridecanoic acid (PFTrDA)	<1.7		1.7	1.1	ng/L		08/17/22 19:43	08/22/22 09:04	1
Perfluorotetradecanoic acid (PFTeA)	<1.7		1.7	0.64	ng/L		08/17/22 19:43	08/22/22 09:04	1
Perfluoro-n-hexadecanoic acid (PFHxDA)	<1.7		1.7	0.78	ng/L		08/17/22 19:43	08/22/22 09:04	1
Perfluoro-n-octadecanoic acid (PFODA)	<1.7		1.7	0.82	ng/L		08/17/22 19:43	08/22/22 09:04	1
Perfluorobutanesulfonic acid (PFBS)	<1.7		1.7	0.17	ng/L		08/17/22 19:43	08/22/22 09:04	1
Perfluoropentanesulfonic acid (PFPeS)	<1.7		1.7	0.26	ng/L		08/17/22 19:43	08/22/22 09:04	1
Perfluorohexanesulfonic acid (PFHxS)	<1.7		1.7	0.50	ng/L		08/17/22 19:43	08/22/22 09:04	1
Perfluoroheptanesulfonic acid (PFHpS)	<1.7		1.7	0.17	ng/L		08/17/22 19:43	08/22/22 09:04	1
Perfluorooctanesulfonic acid (PFOS)	<1.7		1.7	0.47	ng/L		08/17/22 19:43	08/22/22 09:04	1
Perfluorononanesulfonic acid (PFNS)	<1.7		1.7	0.32	ng/L		08/17/22 19:43	08/22/22 09:04	1
Perfluorodecanesulfonic acid (PFDS)	<1.7		1.7	0.28	ng/L		08/17/22 19:43	08/22/22 09:04	1
Perfluorododecanesulfonic acid (PFDoS)	<1.7		1.7	0.85	ng/L		08/17/22 19:43	08/22/22 09:04	1
Perfluorooctanesulfonamide (FOSA)	<1.7		1.7	0.85	ng/L		08/17/22 19:43	08/22/22 09:04	1
NEtFOSA	<1.7		1.7	0.76	ng/L		08/17/22 19:43	08/22/22 09:04	1
NMeFOSA	<1.7		1.7	0.37	ng/L		08/17/22 19:43	08/22/22 09:04	1
NMeFOSAA	<4.4		4.4	1.0	ng/L		08/17/22 19:43	08/22/22 09:04	1
NEtFOSAA	<4.4		4.4	1.1	ng/L		08/17/22 19:43	08/22/22 09:04	1
NMeFOSE	<3.5		3.5	1.2	ng/L		08/17/22 19:43	08/22/22 09:04	1
NEtFOSE	<1.7		1.7	0.74	ng/L		08/17/22 19:43	08/22/22 09:04	1
4:2 FTS	<1.7		1.7	0.21	ng/L		08/17/22 19:43	08/22/22 09:04	1
6:2 FTS	<4.4		4.4	2.2	ng/L		08/17/22 19:43	08/22/22 09:04	1
8:2 FTS	<1.7		1.7	0.40	ng/L		08/17/22 19:43	08/22/22 09:04	1
10:2 FTS	<1.7		1.7	0.58	ng/L		08/17/22 19:43	08/22/22 09:04	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	<1.7		1.7	0.35	ng/L		08/17/22 19:43	08/22/22 09:04	1
HFPO-DA (GenX)	<3.5		3.5	1.3	ng/L		08/17/22 19:43	08/22/22 09:04	1
9Cl-PF3ONS	<1.7		1.7	0.21	ng/L		08/17/22 19:43	08/22/22 09:04	1
11Cl-PF3OUdS	<1.7		1.7	0.28	ng/L		08/17/22 19:43	08/22/22 09:04	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFBA	*87*		*25 - 150*	*08/17/22 19:43*	*08/22/22 09:04*	*1*
13C5 PFPeA	*94*		*25 - 150*	*08/17/22 19:43*	*08/22/22 09:04*	*1*
13C2 PFHxA	*100*		*25 - 150*	*08/17/22 19:43*	*08/22/22 09:04*	*1*
13C4 PFHpA	*95*		*25 - 150*	*08/17/22 19:43*	*08/22/22 09:04*	*1*
13C4 PFOA	*105*		*25 - 150*	*08/17/22 19:43*	*08/22/22 09:04*	*1*
13C5 PFNA	*98*		*25 - 150*	*08/17/22 19:43*	*08/22/22 09:04*	*1*
13C2 PFDA	*102*		*25 - 150*	*08/17/22 19:43*	*08/22/22 09:04*	*1*
13C2 PFUnA	*105*		*25 - 150*	*08/17/22 19:43*	*08/22/22 09:04*	*1*

Client: ARCADIS U.S., Inc.
Project/Site: Marinette, WI Deep Well 30135605 Task 6

Job ID: 500-220648-1
SDG: Marinette High School

Client Sample ID: EB-01 (20220806)
Date Collected: 08/06/22 17:00
Date Received: 08/10/22 09:40

Lab Sample ID: 500-220648-8
Matrix: Water

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFDoA	94		25 - 150	08/17/22 19:43	08/22/22 09:04	1
13C2 PFTeDA	84		25 - 150	08/17/22 19:43	08/22/22 09:04	1
13C2 PFHxDA	87		25 - 150	08/17/22 19:43	08/22/22 09:04	1
13C3 PFBS	95		25 - 150	08/17/22 19:43	08/22/22 09:04	1
18O2 PFHxS	97		25 - 150	08/17/22 19:43	08/22/22 09:04	1
13C4 PFOS	96		25 - 150	08/17/22 19:43	08/22/22 09:04	1
13C8 FOSA	100		10 - 150	08/17/22 19:43	08/22/22 09:04	1
d3-NMeFOSAA	88		25 - 150	08/17/22 19:43	08/22/22 09:04	1
d5-NEtFOSAA	103		25 - 150	08/17/22 19:43	08/22/22 09:04	1
d-N-MeFOSA-M	69		10 - 150	08/17/22 19:43	08/22/22 09:04	1
d-N-EtFOSA-M	83		10 - 150	08/17/22 19:43	08/22/22 09:04	1
d7-N-MeFOSE-M	80		10 - 150	08/17/22 19:43	08/22/22 09:04	1
d9-N-EtFOSE-M	83		10 - 150	08/17/22 19:43	08/22/22 09:04	1
M2-4:2 FTS	93		25 - 150	08/17/22 19:43	08/22/22 09:04	1
M2-6:2 FTS	101		25 - 150	08/17/22 19:43	08/22/22 09:04	1
M2-8:2 FTS	124		25 - 150	08/17/22 19:43	08/22/22 09:04	1
13C3 HFPO-DA	88		25 - 150	08/17/22 19:43	08/22/22 09:04	1
13C2 10:2 FTS	125		25 - 150	08/17/22 19:43	08/22/22 09:04	1

Client: ARCADIS U.S., Inc.
Project/Site: Marinette, WI Deep Well 30135605 Task 6

Job ID: 500-220648-1
SDG: Marinette High School

Client Sample ID: DUP-02 (20220806)

Date Collected: 08/06/22 12:00
Date Received: 08/10/22 09:40

Lab Sample ID: 500-220648-9

Matrix: Water

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	<4.4		4.4	2.1	ng/L		08/17/22 19:43	08/22/22 09:14	1
Perfluoropentanoic acid (PFPeA)	<1.8		1.8	0.44	ng/L		08/17/22 19:43	08/22/22 09:14	1
Perfluorohexanoic acid (PFHxA)	<1.8		1.8	0.52	ng/L		08/17/22 19:43	08/22/22 09:14	1
Perfluoroheptanoic acid (PFHpA)	<1.8		1.8	0.22	ng/L		08/17/22 19:43	08/22/22 09:14	1
Perfluorooctanoic acid (PFOA)	<1.8		1.8	0.76	ng/L		08/17/22 19:43	08/22/22 09:14	1
Perfluorononanoic acid (PFNA)	<1.8		1.8	0.24	ng/L		08/17/22 19:43	08/22/22 09:14	1
Perfluorodecanoic acid (PFDA)	<1.8		1.8	0.28	ng/L		08/17/22 19:43	08/22/22 09:14	1
Perfluoroundecanoic acid (PFUnA)	<1.8		1.8	0.98	ng/L		08/17/22 19:43	08/22/22 09:14	1
Perfluorododecanoic acid (PFDoA)	<1.8		1.8	0.49	ng/L		08/17/22 19:43	08/22/22 09:14	1
Perfluorotridecanoic acid (PFTrDA)	<1.8		1.8	1.2	ng/L		08/17/22 19:43	08/22/22 09:14	1
Perfluorotetradecanoic acid (PFTeA)	<1.8		1.8	0.65	ng/L		08/17/22 19:43	08/22/22 09:14	1
Perfluoro-n-hexadecanoic acid (PFHxDA)	<1.8		1.8	0.79	ng/L		08/17/22 19:43	08/22/22 09:14	1
Perfluoro-n-octadecanoic acid (PFODA)	<1.8		1.8	0.84	ng/L		08/17/22 19:43	08/22/22 09:14	1
Perfluorobutanesulfonic acid (PFBS)	<1.8		1.8	0.18	ng/L		08/17/22 19:43	08/22/22 09:14	1
Perfluoropentanesulfonic acid (PFPeS)	<1.8		1.8	0.27	ng/L		08/17/22 19:43	08/22/22 09:14	1
Perfluorohexanesulfonic acid (PFHxS)	<1.8		1.8	0.51	ng/L		08/17/22 19:43	08/22/22 09:14	1
Perfluoroheptanesulfonic acid (PFHpS)	<1.8		1.8	0.17	ng/L		08/17/22 19:43	08/22/22 09:14	1
Perfluorooctanesulfonic acid (PFOS)	<1.8		1.8	0.48	ng/L		08/17/22 19:43	08/22/22 09:14	1
Perfluorononanesulfonic acid (PFNS)	<1.8		1.8	0.33	ng/L		08/17/22 19:43	08/22/22 09:14	1
Perfluorodecanesulfonic acid (PFDS)	<1.8		1.8	0.28	ng/L		08/17/22 19:43	08/22/22 09:14	1
Perfluorododecanesulfonic acid (PFDoS)	<1.8		1.8	0.86	ng/L		08/17/22 19:43	08/22/22 09:14	1
Perfluorooctanesulfonamide (FOSA)	<1.8		1.8	0.87	ng/L		08/17/22 19:43	08/22/22 09:14	1
NEtFOSA	<1.8		1.8	0.77	ng/L		08/17/22 19:43	08/22/22 09:14	1
NMeFOSA	<1.8		1.8	0.38	ng/L		08/17/22 19:43	08/22/22 09:14	1
NMeFOSAA	<4.4		4.4	1.1	ng/L		08/17/22 19:43	08/22/22 09:14	1
NEtFOSAA	<4.4		4.4	1.2	ng/L		08/17/22 19:43	08/22/22 09:14	1
NMeFOSE	<3.6		3.6	1.2	ng/L		08/17/22 19:43	08/22/22 09:14	1
NEtFOSE	<1.8		1.8	0.76	ng/L		08/17/22 19:43	08/22/22 09:14	1
4:2 FTS	<1.8		1.8	0.21	ng/L		08/17/22 19:43	08/22/22 09:14	1
6:2 FTS	<4.4		4.4	2.2	ng/L		08/17/22 19:43	08/22/22 09:14	1
8:2 FTS	<1.8		1.8	0.41	ng/L		08/17/22 19:43	08/22/22 09:14	1
10:2 FTS	<1.8		1.8	0.60	ng/L		08/17/22 19:43	08/22/22 09:14	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	<1.8		1.8	0.36	ng/L		08/17/22 19:43	08/22/22 09:14	1
HFPO-DA (GenX)	<3.6		3.6	1.3	ng/L		08/17/22 19:43	08/22/22 09:14	1
9Cl-PF3ONS	<1.8		1.8	0.21	ng/L		08/17/22 19:43	08/22/22 09:14	1
11Cl-PF3OUdS	<1.8		1.8	0.28	ng/L		08/17/22 19:43	08/22/22 09:14	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFBA	*98*		*25 - 150*	*08/17/22 19:43*	*08/22/22 09:14*	*1*
13C5 PFPeA	*101*		*25 - 150*	*08/17/22 19:43*	*08/22/22 09:14*	*1*
13C2 PFHxA	*102*		*25 - 150*	*08/17/22 19:43*	*08/22/22 09:14*	*1*
13C4 PFHpA	*98*		*25 - 150*	*08/17/22 19:43*	*08/22/22 09:14*	*1*
13C4 PFOA	*106*		*25 - 150*	*08/17/22 19:43*	*08/22/22 09:14*	*1*
13C5 PFNA	*100*		*25 - 150*	*08/17/22 19:43*	*08/22/22 09:14*	*1*
13C2 PFDA	*101*		*25 - 150*	*08/17/22 19:43*	*08/22/22 09:14*	*1*
13C2 PFUnA	*104*		*25 - 150*	*08/17/22 19:43*	*08/22/22 09:14*	*1*

Client: ARCADIS U.S., Inc.
Project/Site: Marinette, WI Deep Well 30135605 Task 6

Job ID: 500-220648-1
SDG: Marinette High School

Client Sample ID: DUP-02 (20220806)
Date Collected: 08/06/22 12:00
Date Received: 08/10/22 09:40

Lab Sample ID: 500-220648-9
Matrix: Water

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFDoA	96		25 - 150	08/17/22 19:43	08/22/22 09:14	1
13C2 PFTeDA	95		25 - 150	08/17/22 19:43	08/22/22 09:14	1
13C2 PFHxDA	89		25 - 150	08/17/22 19:43	08/22/22 09:14	1
13C3 PFBS	106		25 - 150	08/17/22 19:43	08/22/22 09:14	1
18O2 PFHxS	107		25 - 150	08/17/22 19:43	08/22/22 09:14	1
13C4 PFOS	103		25 - 150	08/17/22 19:43	08/22/22 09:14	1
13C8 FOSA	103		10 - 150	08/17/22 19:43	08/22/22 09:14	1
d3-NMeFOSAA	93		25 - 150	08/17/22 19:43	08/22/22 09:14	1
d5-NEtFOSAA	100		25 - 150	08/17/22 19:43	08/22/22 09:14	1
d-N-MeFOSA-M	93		10 - 150	08/17/22 19:43	08/22/22 09:14	1
d-N-EtFOSA-M	90		10 - 150	08/17/22 19:43	08/22/22 09:14	1
d7-N-MeFOSE-M	90		10 - 150	08/17/22 19:43	08/22/22 09:14	1
d9-N-EtFOSE-M	88		10 - 150	08/17/22 19:43	08/22/22 09:14	1
M2-4:2 FTS	88		25 - 150	08/17/22 19:43	08/22/22 09:14	1
M2-6:2 FTS	92		25 - 150	08/17/22 19:43	08/22/22 09:14	1
M2-8:2 FTS	130		25 - 150	08/17/22 19:43	08/22/22 09:14	1
13C3 HFPO-DA	96		25 - 150	08/17/22 19:43	08/22/22 09:14	1
13C2 10:2 FTS	119		25 - 150	08/17/22 19:43	08/22/22 09:14	1

Attachment 2

Geophysical Logging Results

Geophysical Summary Plot

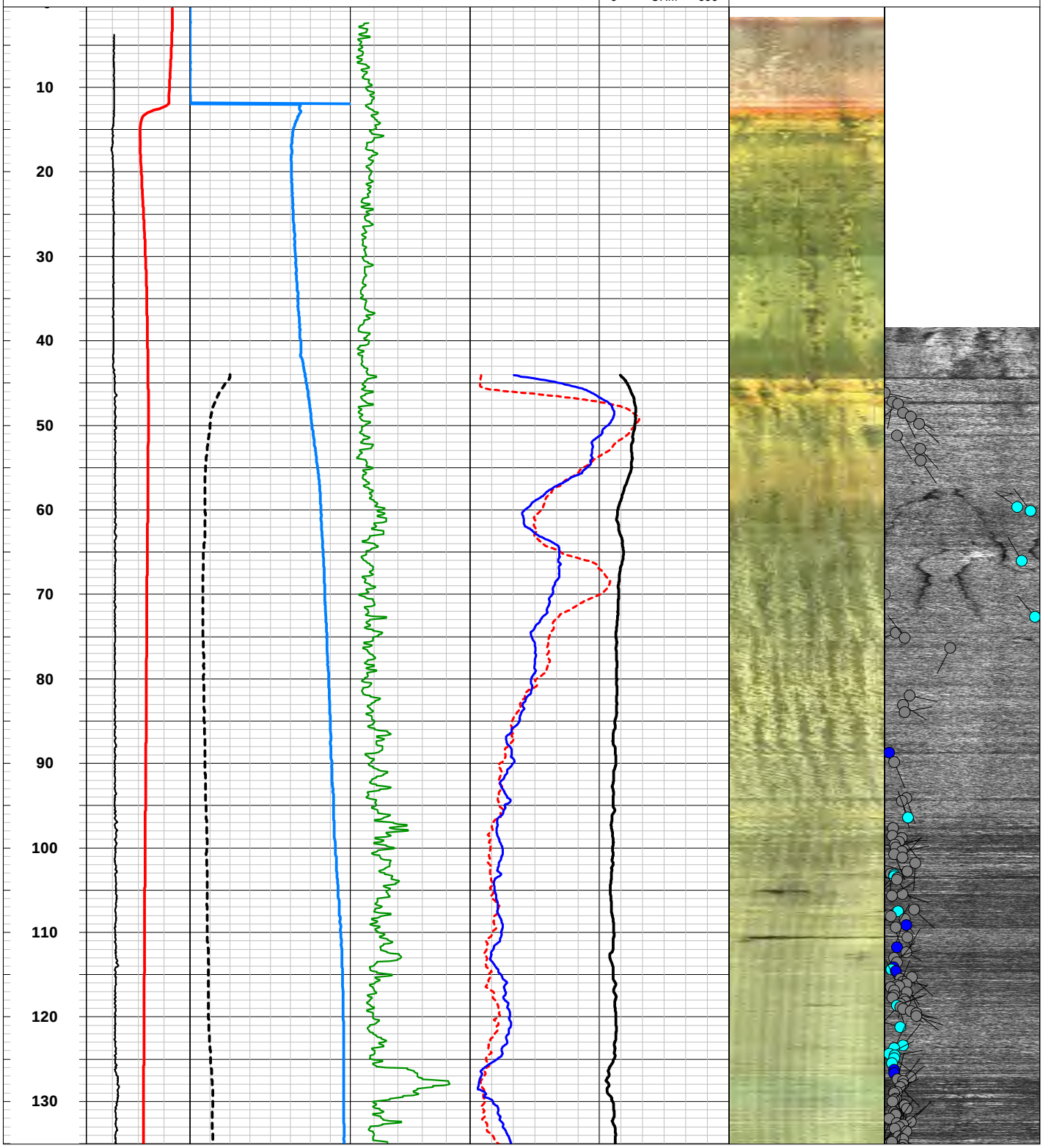
COLOG
borehole geophysics / hydrophysics

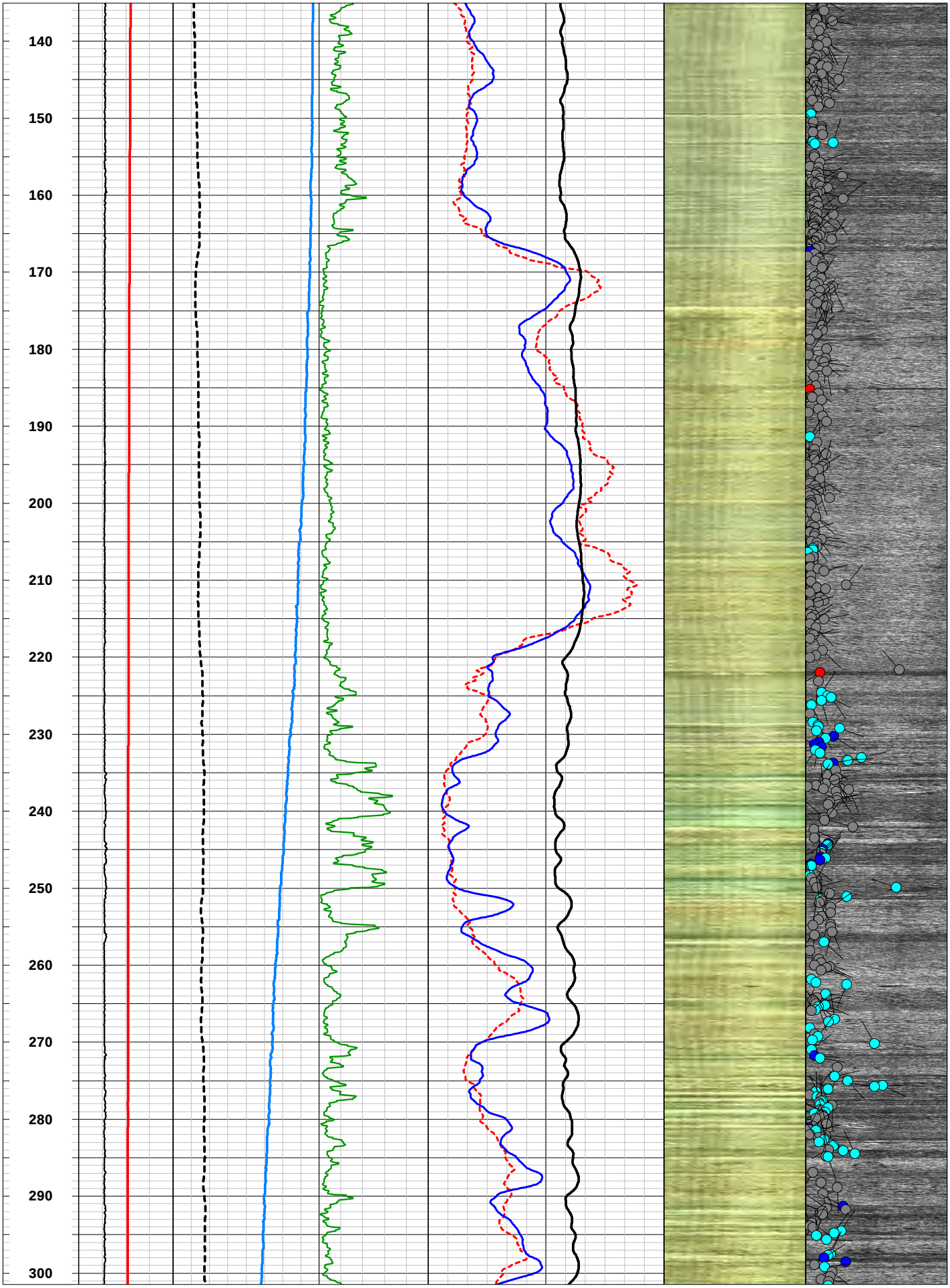
COMPANY: Arcadis | **PROJECT:** Marinette

DATE LOGGED: 18 May 2022 | **WELL:** IRR-01

Colog, Inc.
810 Quail St., Suite E, Lakewood, CO 80215
Phone: (303) 279-0171, Fax: (303) 278-0135
www.colog.com

Depth	Temp	Cond	Natural Gamma	64" Normal Resistivity	Image-NM	Amplitude-NM
1ft:200ft	0 ℃ 20	600 uS/cm 1200	0 CPS 250	0 OHMM 1200	0° 90° 180° 270° 0°	0° 90° 180° 270° 0°
	Caliper	**Spont. Potential**		**16" Normal Resistivity**		**Tadpoles**
	4 Inch 12	-400 mV 400		0 OHMM 1200		0 90
				SPR 0 OHM 600		

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220
230
240
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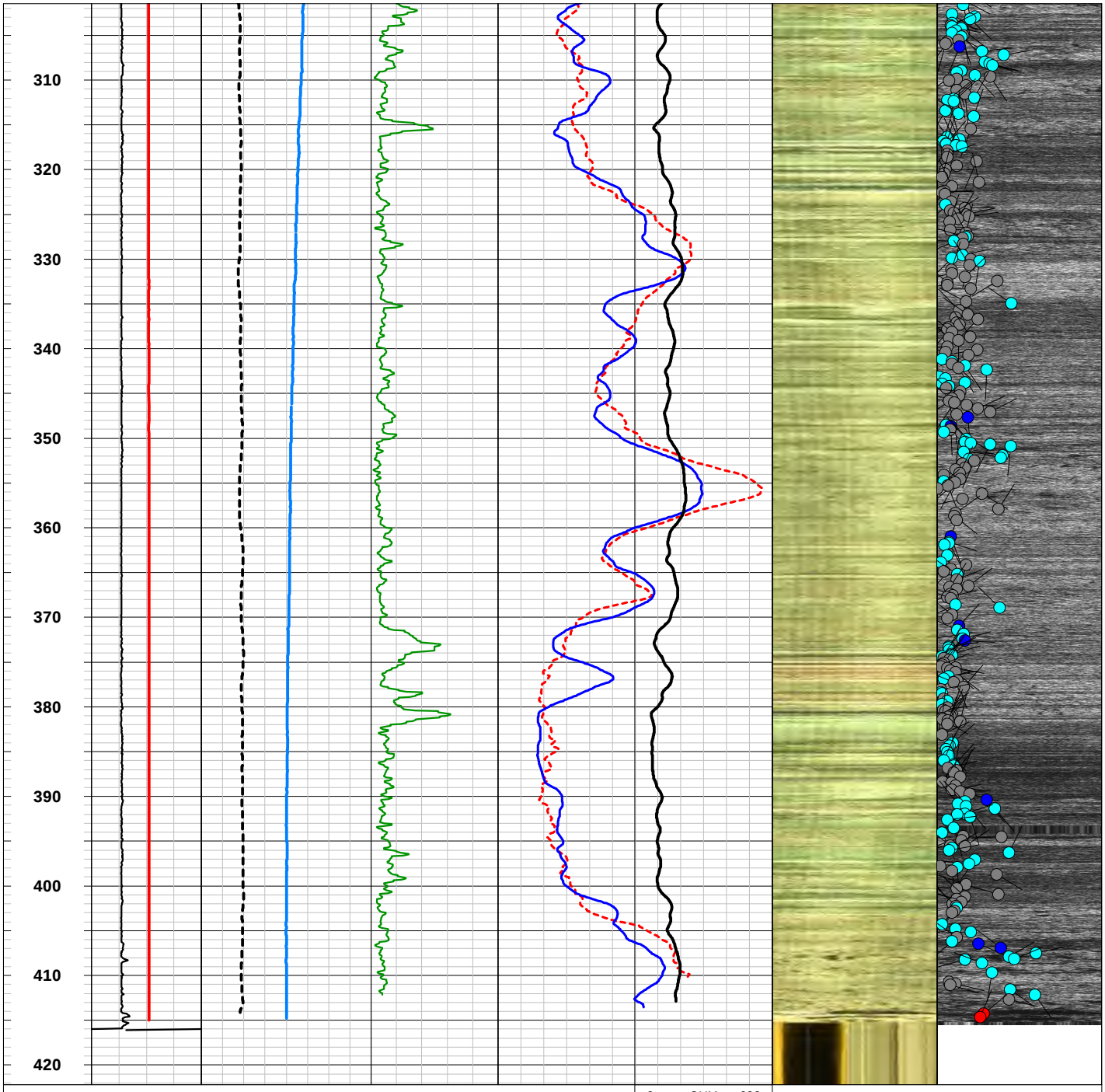
270
280
290
300


310
320
330
340
350
360
370
380
390
400
410
420
0 OHM 600
SPR
4 Inch 12
Caliper
-400 mV 400
Spont. Potential
0 OHMM 1200
16" Normal Resistivity
0 90
Tadpoles
1ft:200ft
Depth
0 ℃ 20
Temp
600 uS/cm 1200
Cond
0 CPS 250
Natural Gamma
0 OHMM 1200
64" Normal Resistivity
0° 90° 180° 270° 0°
Image-NM
0° 90° 180° 270° 0°
Amplitude-NM

Optical & Acoustic Televiewer

borehole geophysics / hydrophysics

COMPANY: Arcadis

PROJECT: Marinette

DATE LOGGED: 18 May 2022

WELL: IRR-01

Colog, Inc.
810 Quail St, Unit E, Lakewood, CO 80215
Office: (303) 279-0171
www.colog.com

LOCATION: Marinette, WI

FIELD ENGINEER(S): M. Cullum

WITNESSED BY: NA

DEPTH DRILLER: NA

DEPTH LOGGER: 415.5 ft

LOG MEASURED FROM: Ground Surface

TOP & BOTTOM OF CASING: 0 ft - 44 ft

BOREHOLE DIAMETER: 6 in.

FLUID LEVEL DEPTH: 12.5 ft

ORIENTATION REFERENCE: Magnetic North

COMMENTS:

STRUCTURE LEGEND:

0 - Healed Fracture/Bedding Plane | 1 - Partial Fracture | 2 - Complete Fracture | 3 - Open Fracture

Caliper
0 inch 12

Tadpoles-MN
0 90

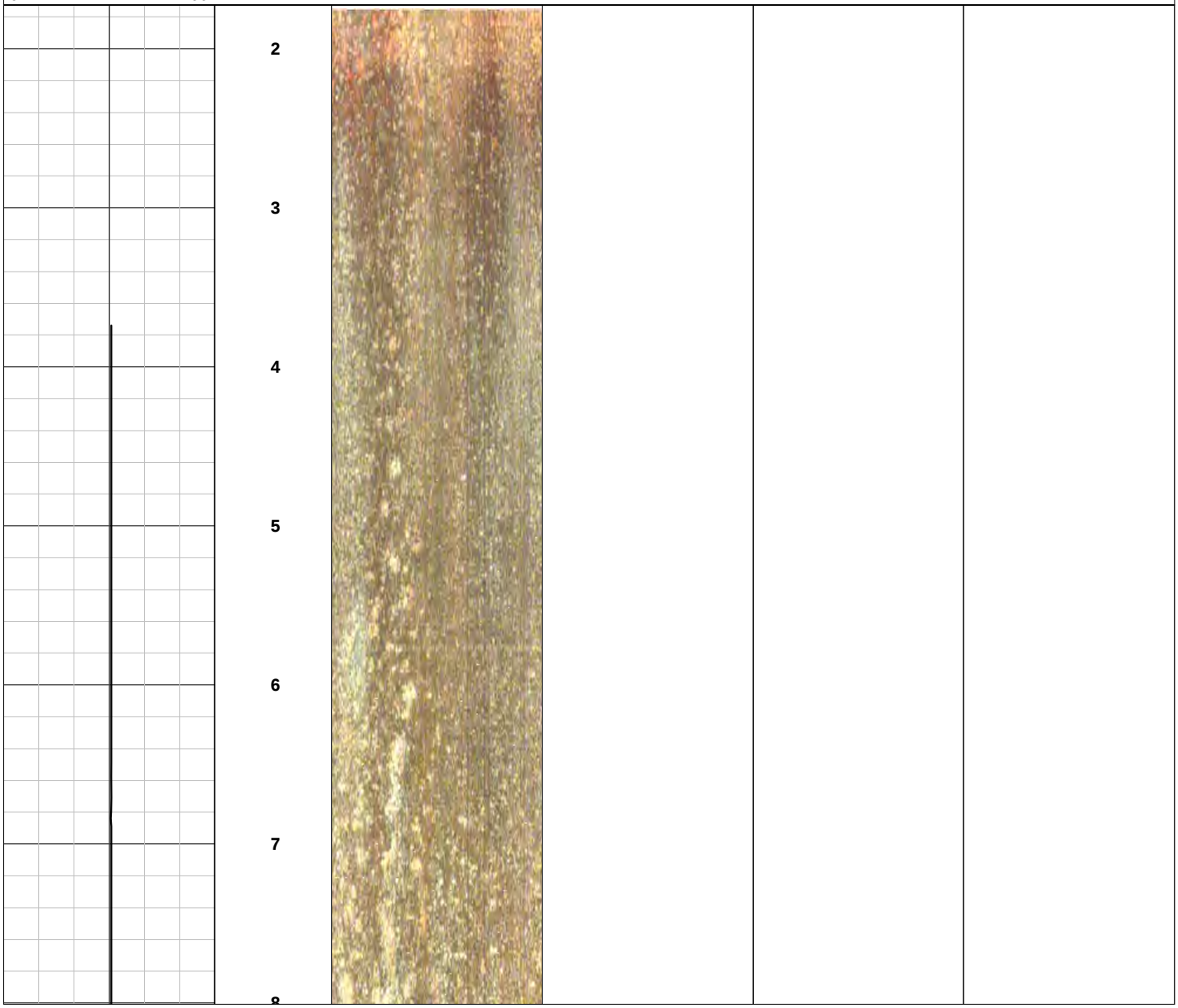
Depth
1in:1ft

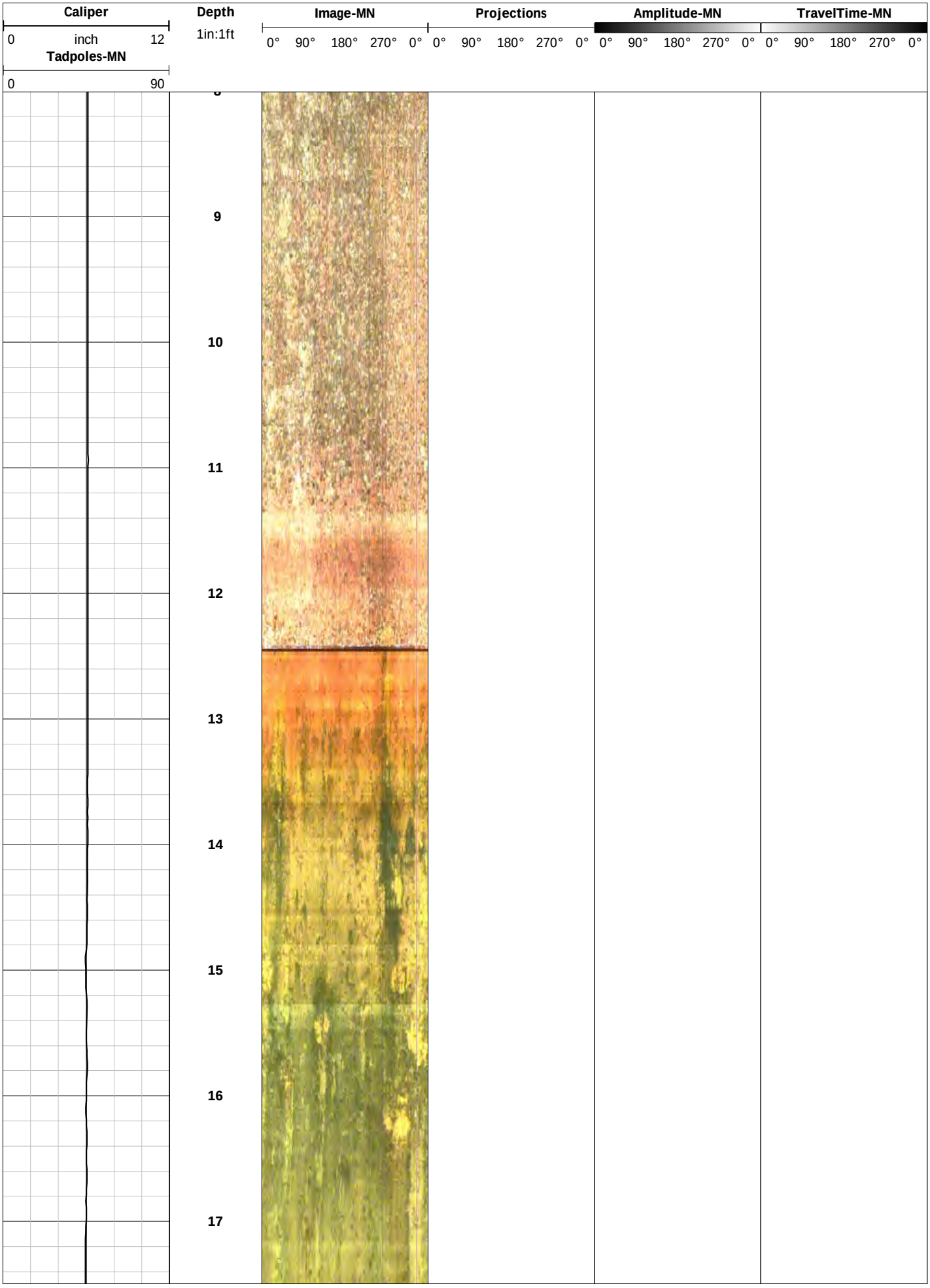
Image-MN
0° 90° 180° 270° 0°

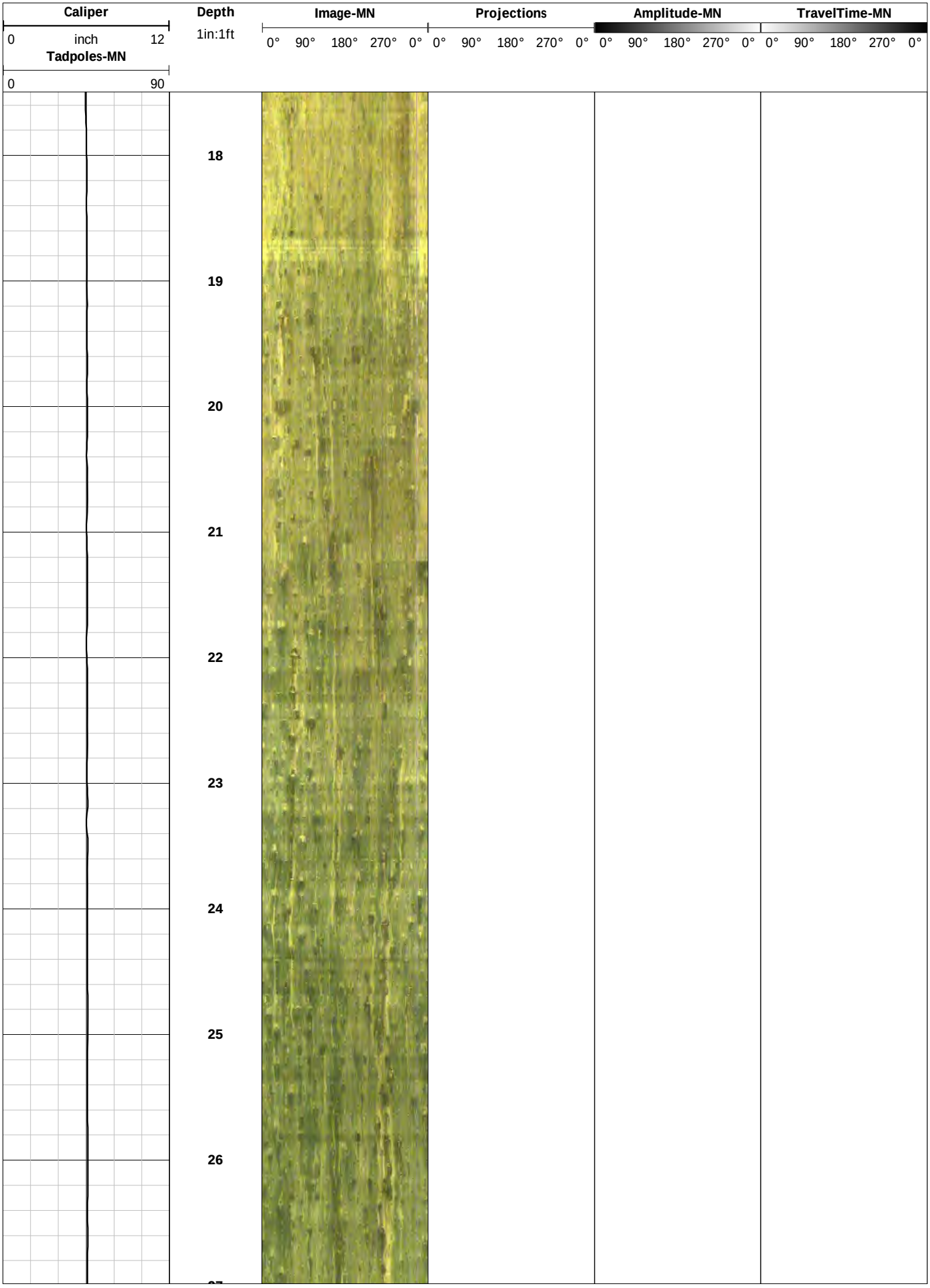
Projections
0° 90° 180° 270° 0°

Amplitude-MN
0° 90° 180° 270° 0°

TravelTime-MN
0° 90° 180° 270° 0°




Caliper
0
inch
12
Tadpoles-MN
0
90
Depth
1in:1ft
9
10
11
12
13
14
15
16
17
Image-MN
0° 90° 180° 270° 0°
Projections
0° 90° 180° 270° 0°
Amplitude-MN
0° 90° 180° 270° 0°
TravelTime-MN
0° 90° 180° 270° 0°


Caliper
0
inch
12
Tadpoles-MN
0
90
Depth
1in:1ft
Image-MN
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Projections
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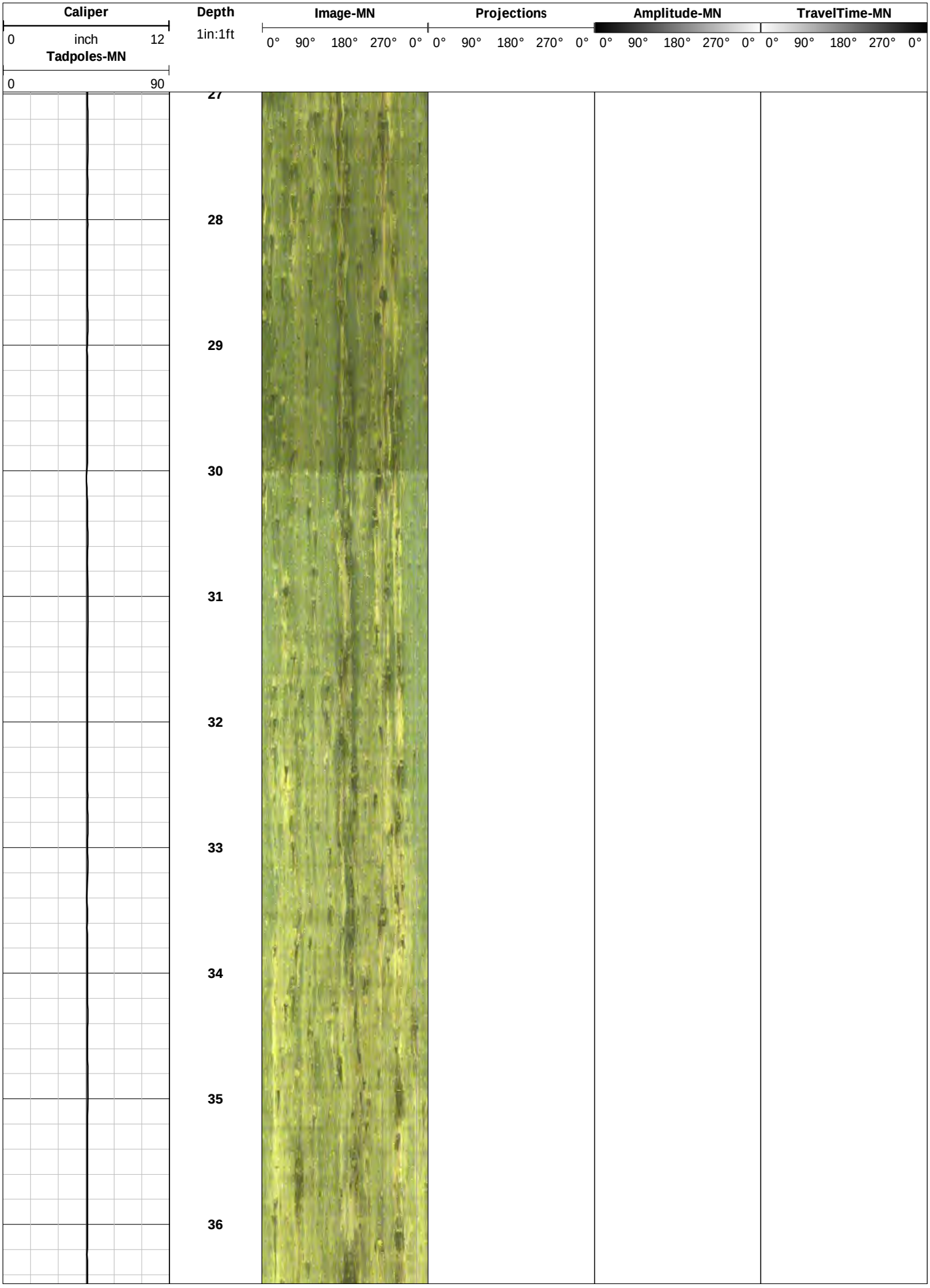
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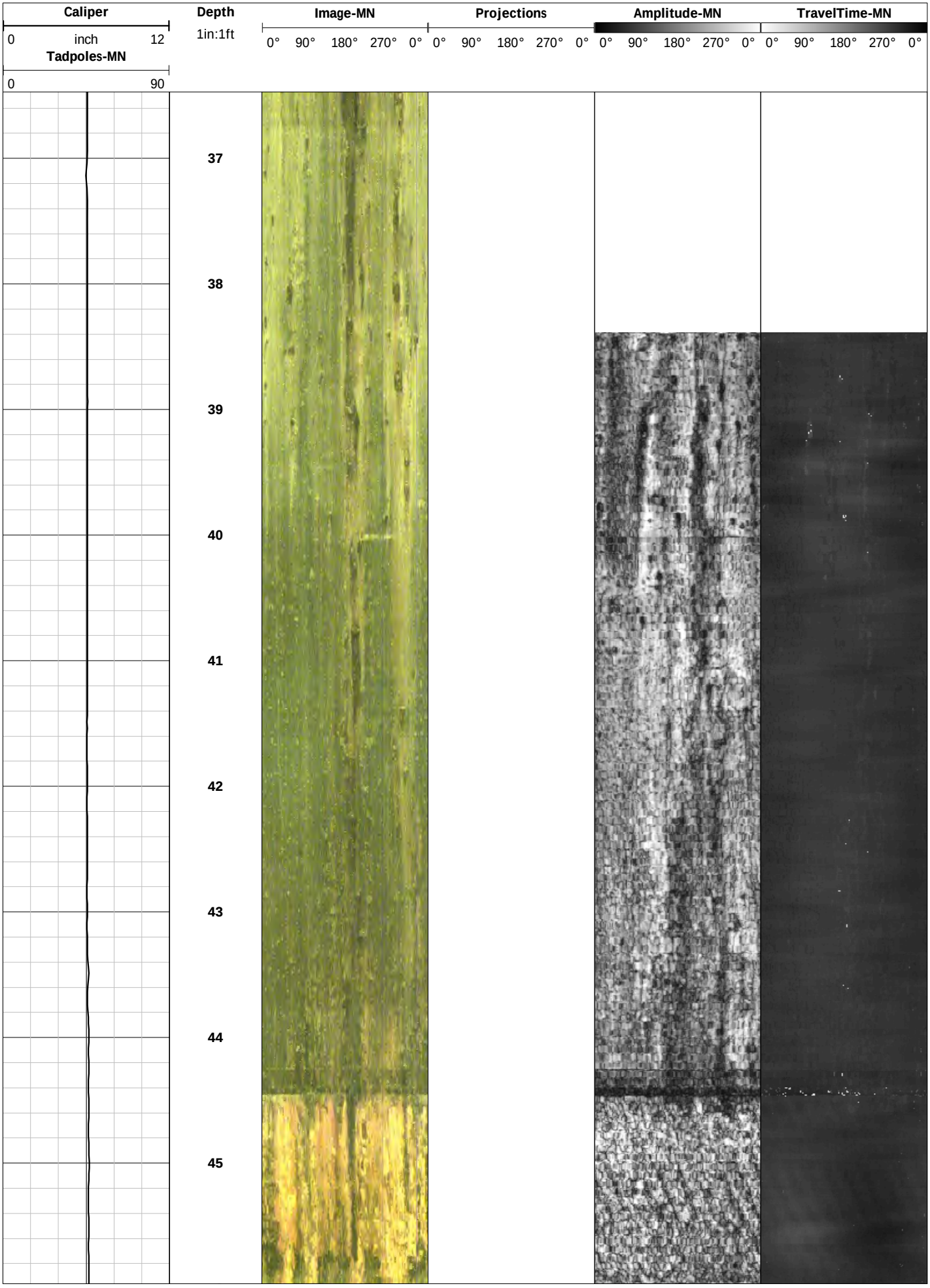
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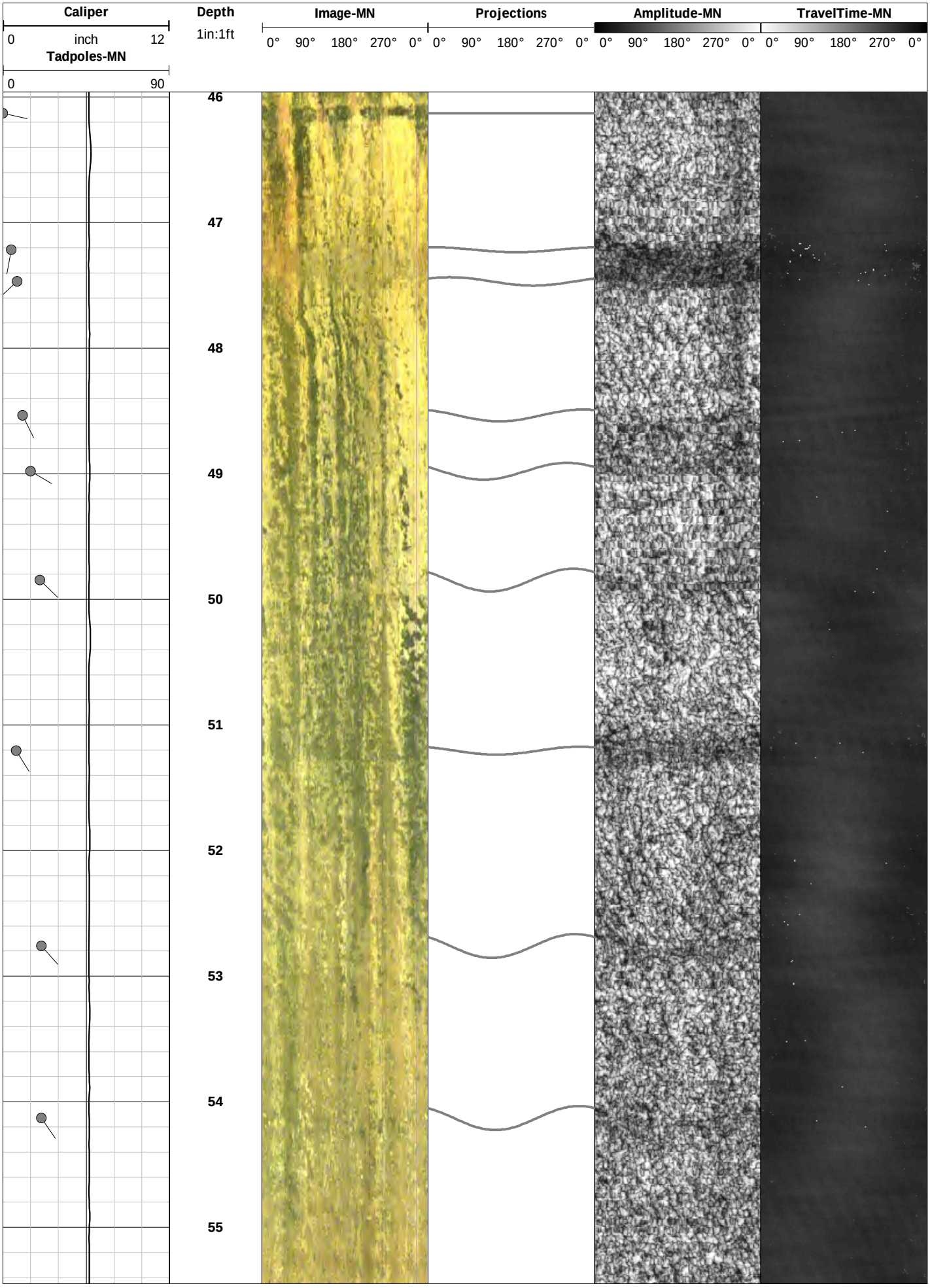
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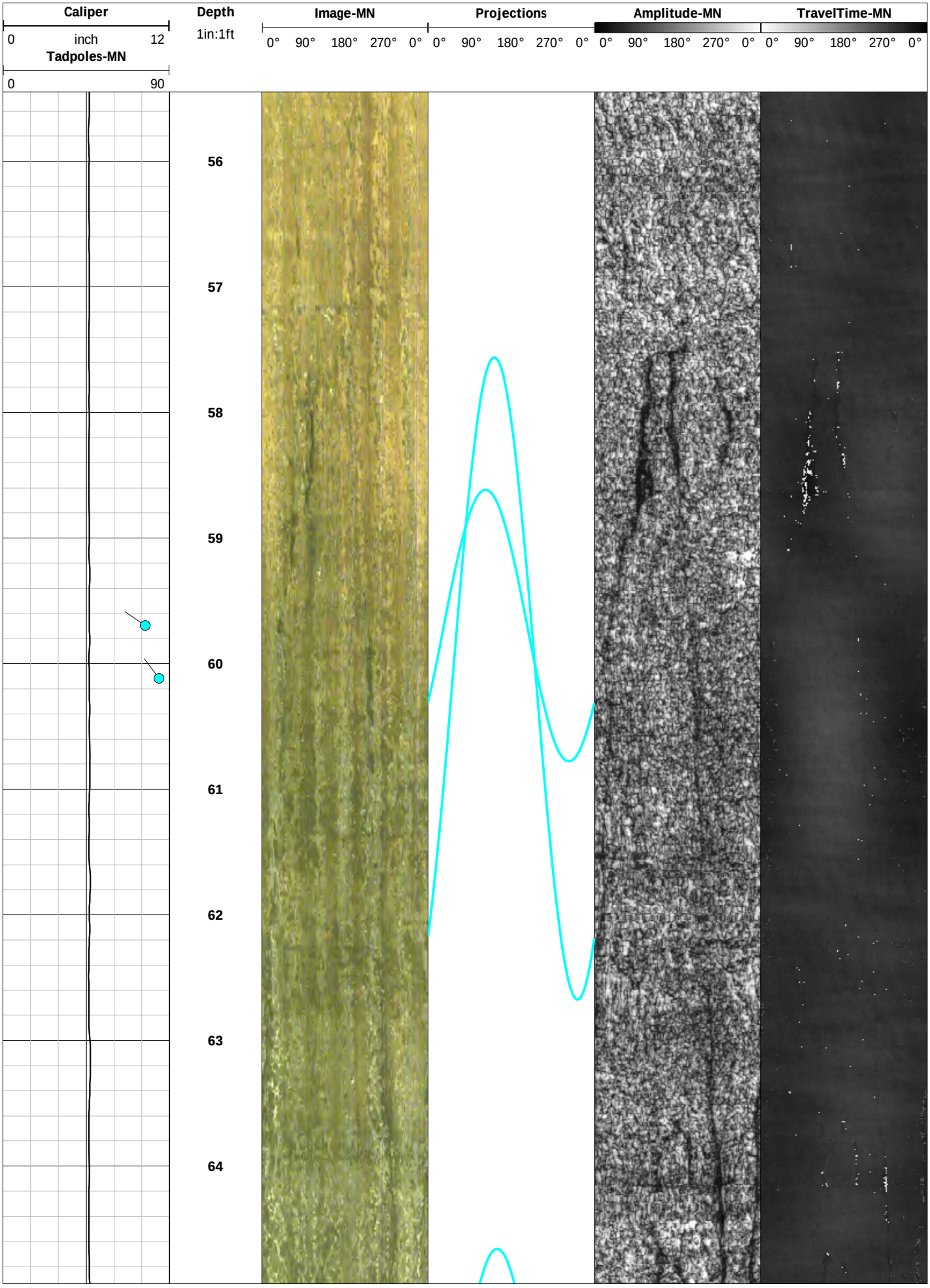
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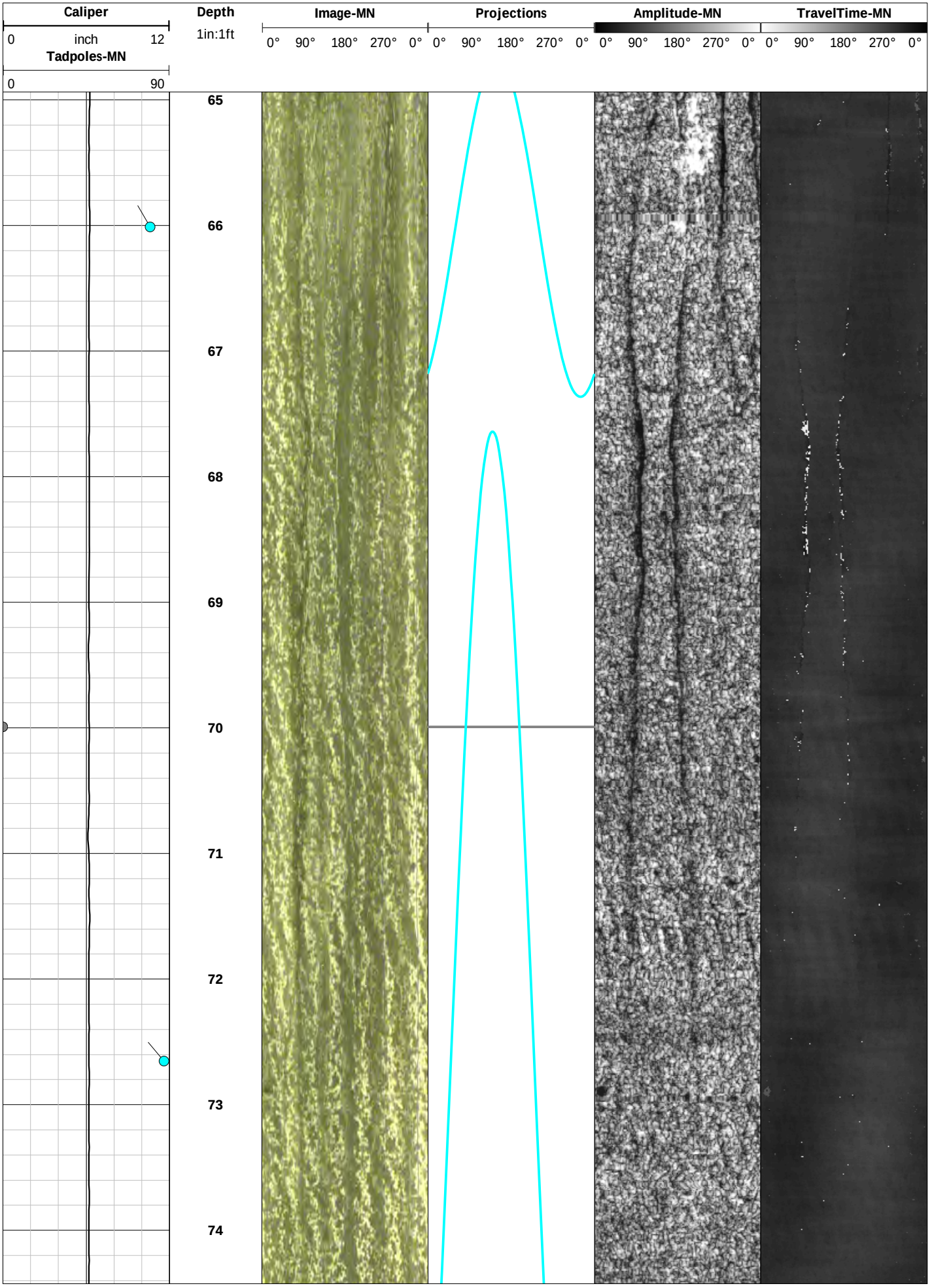
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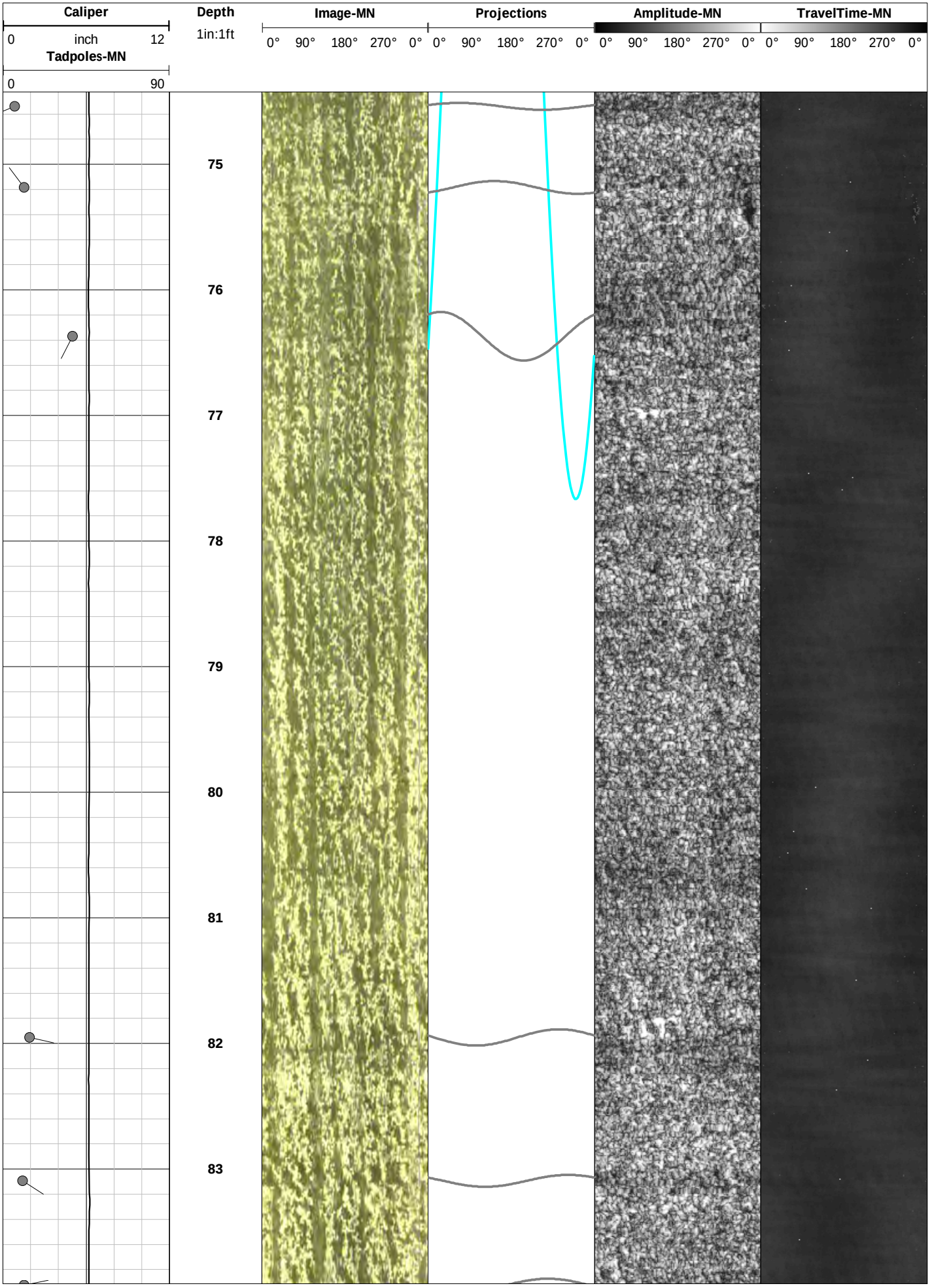
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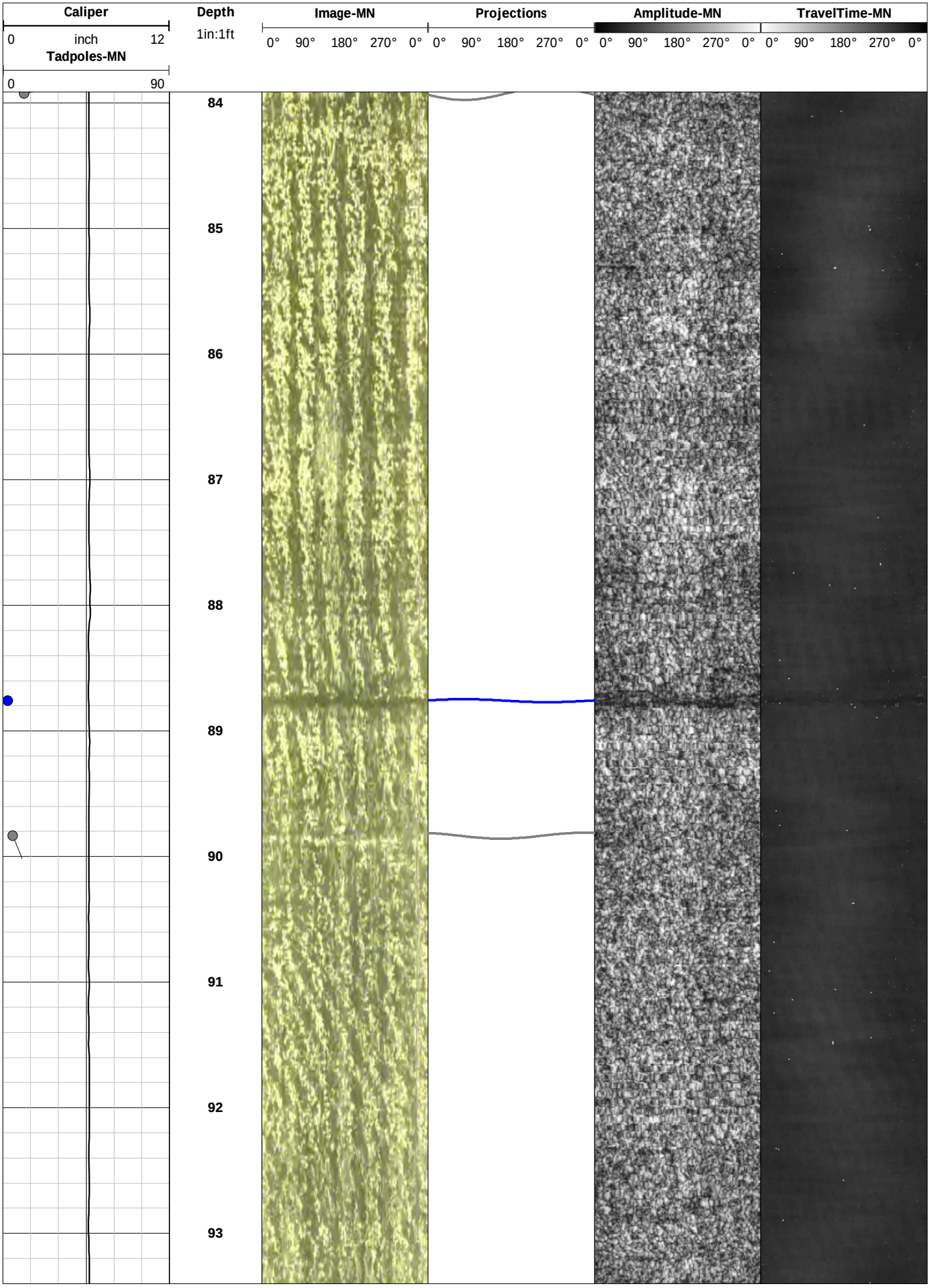
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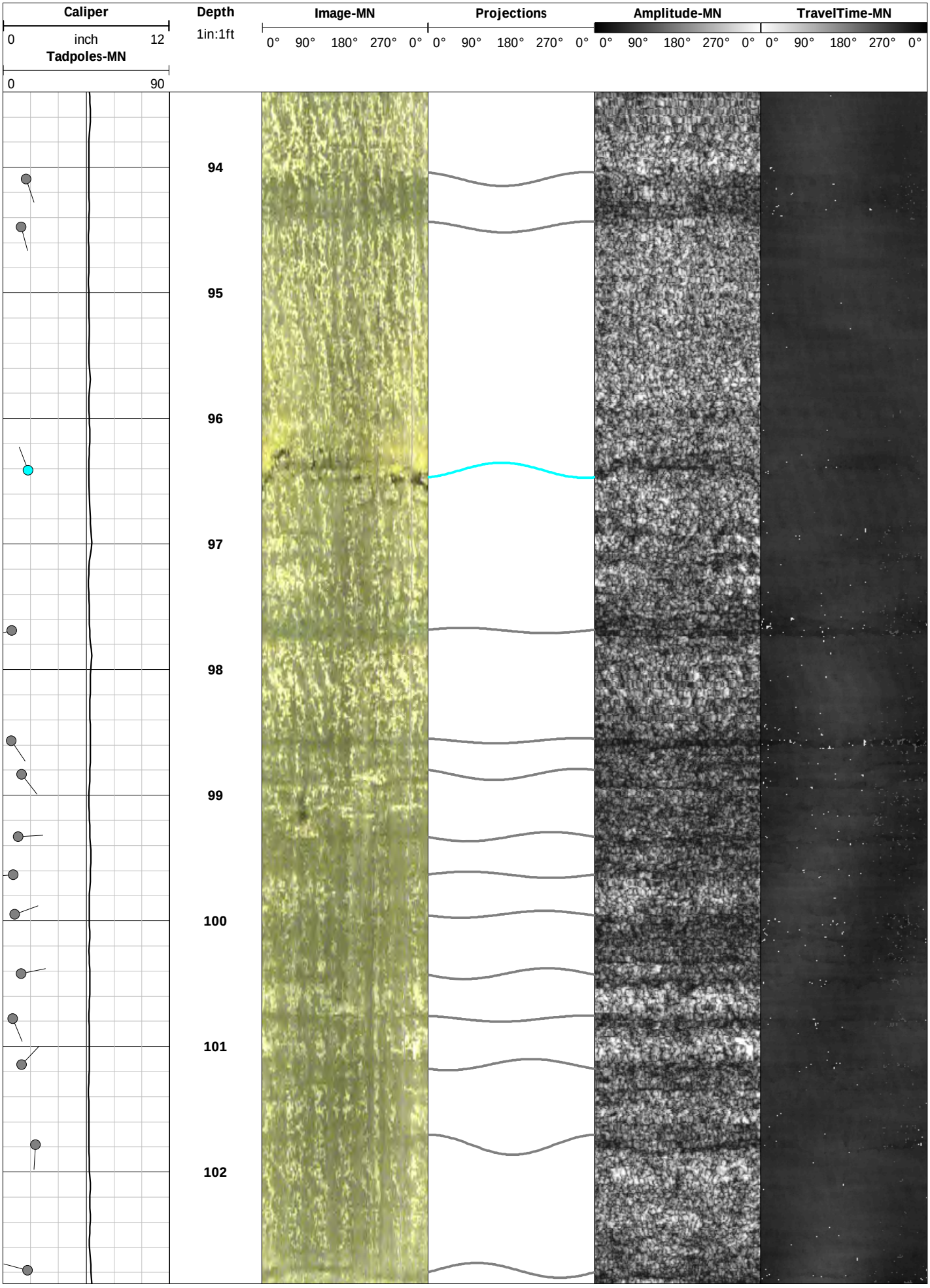
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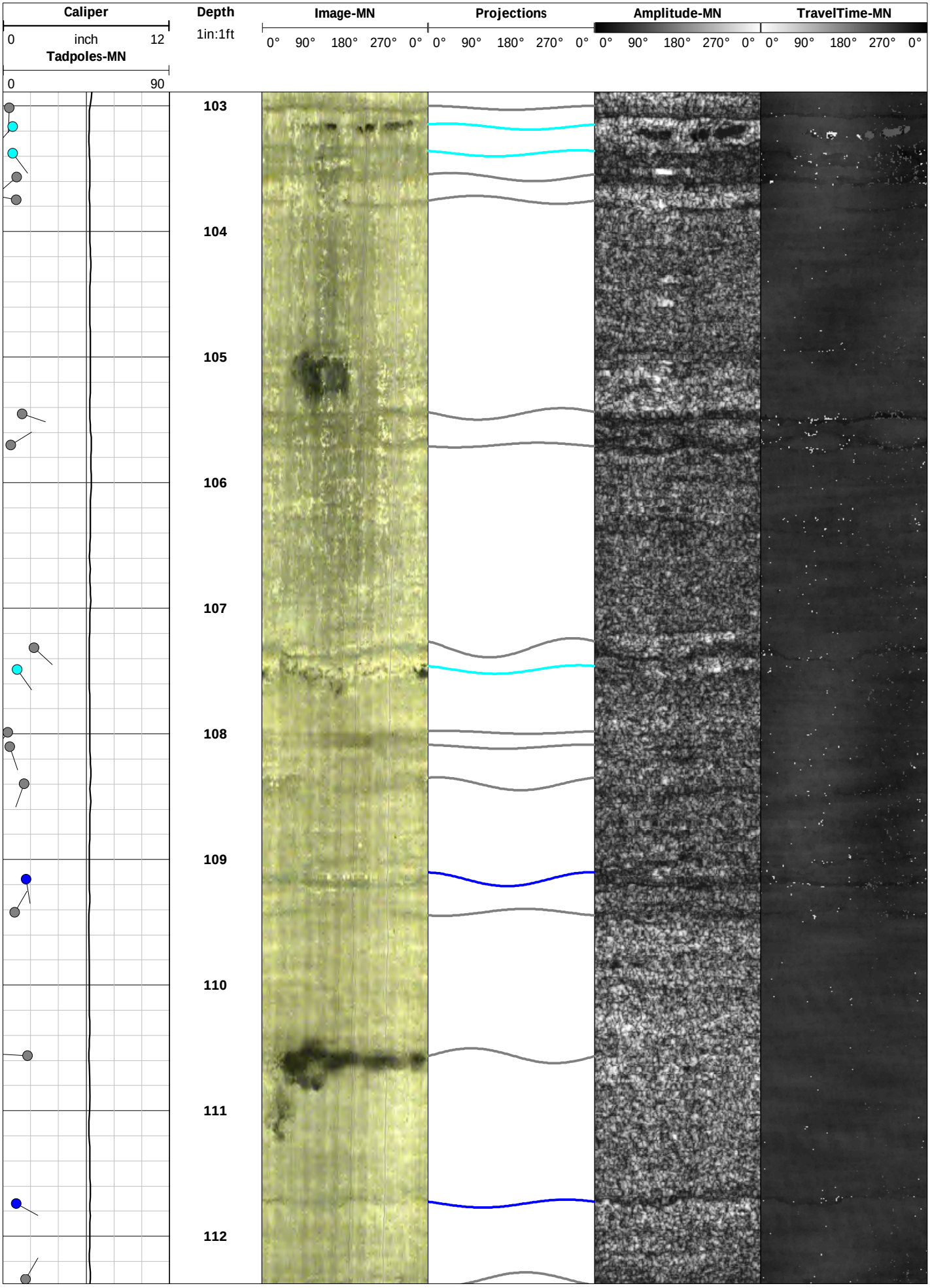
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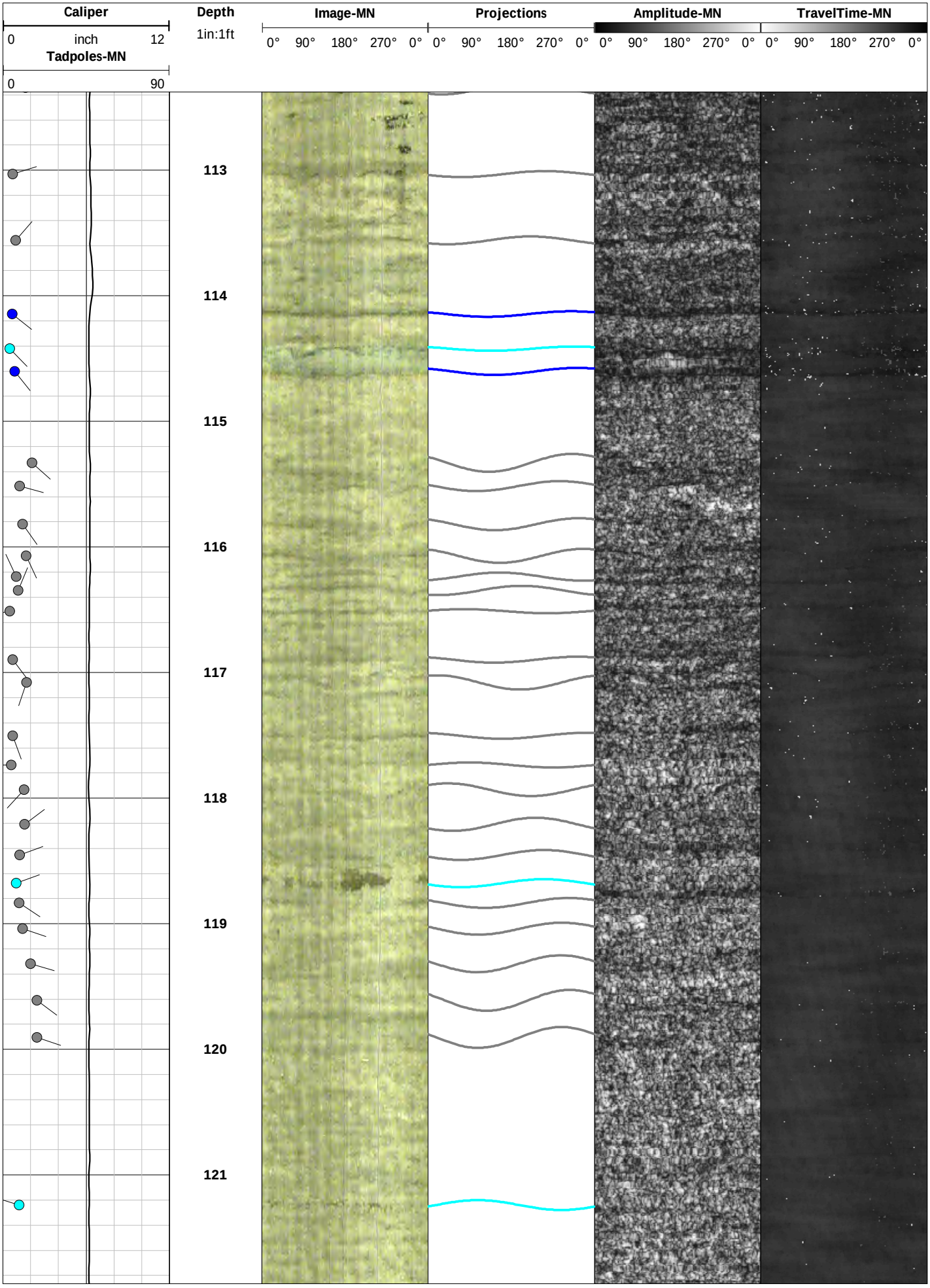
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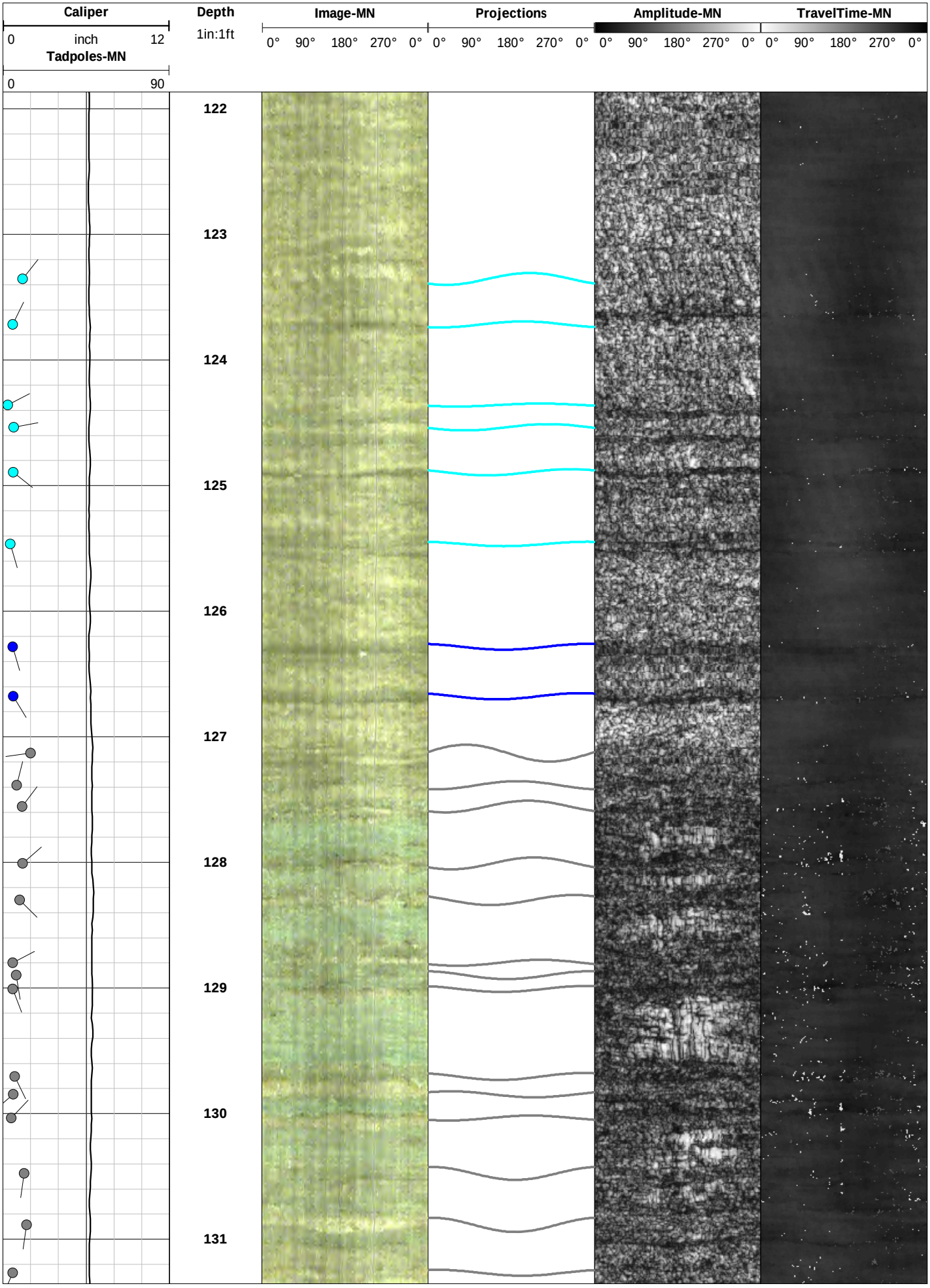
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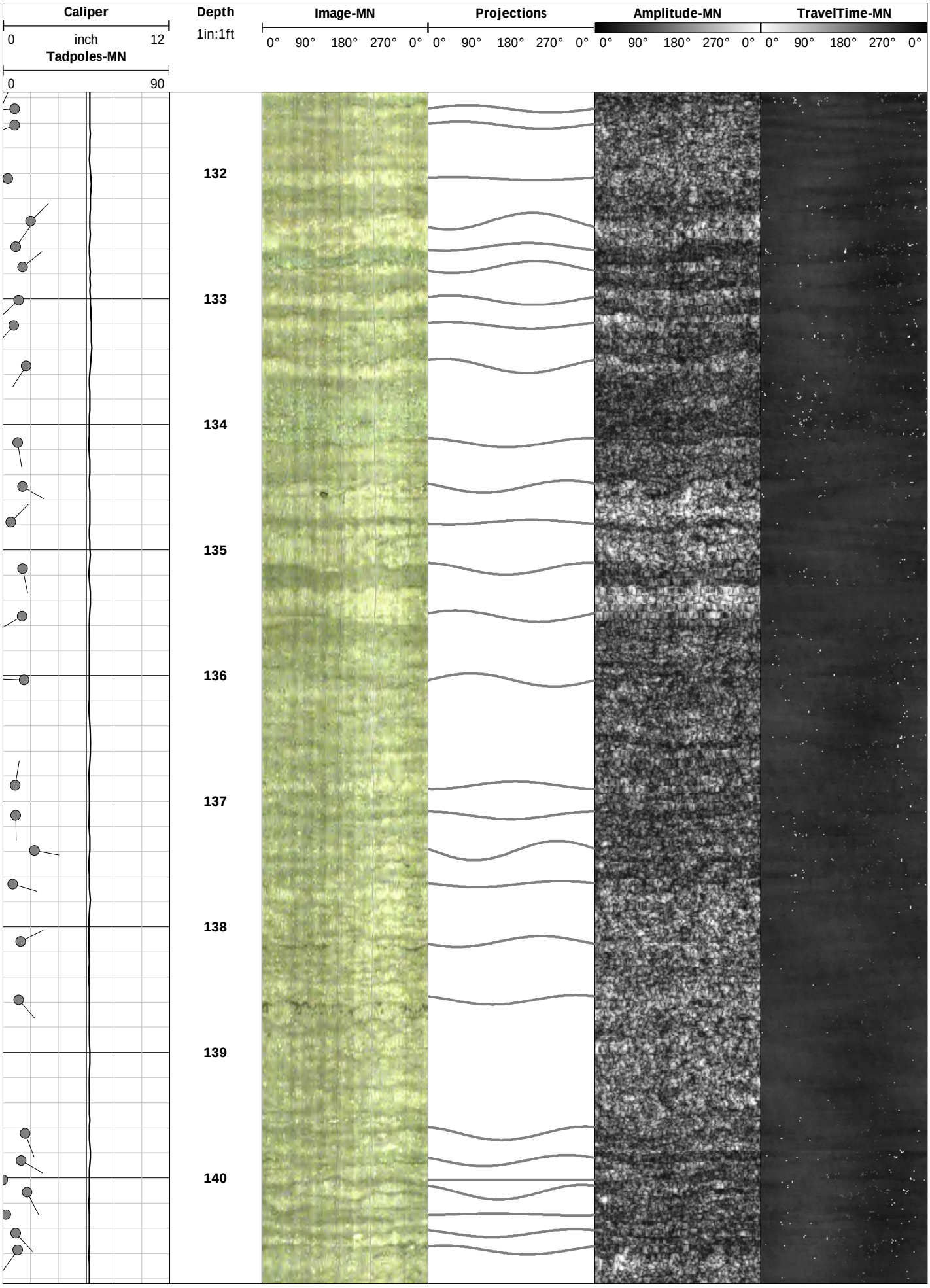
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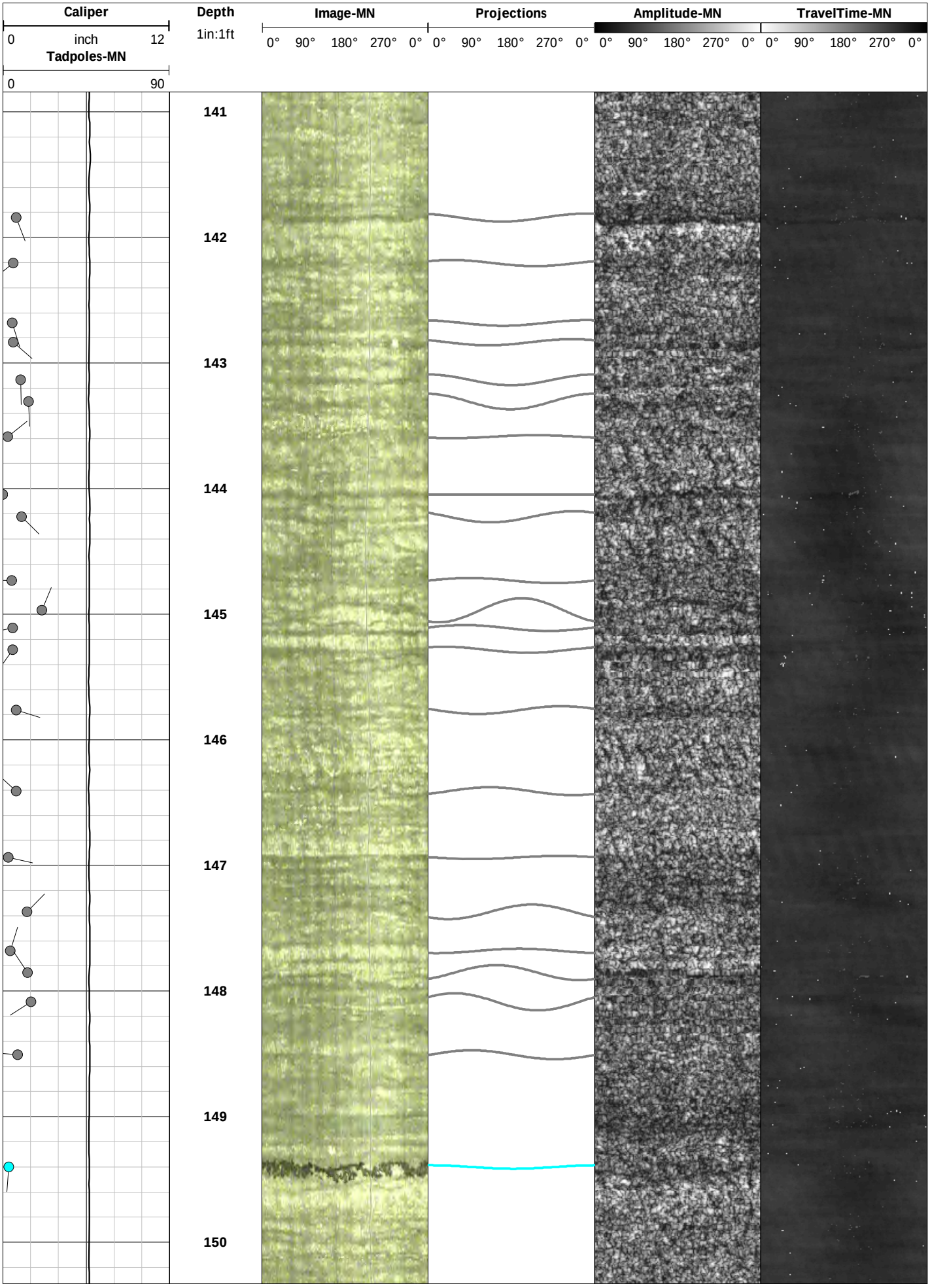
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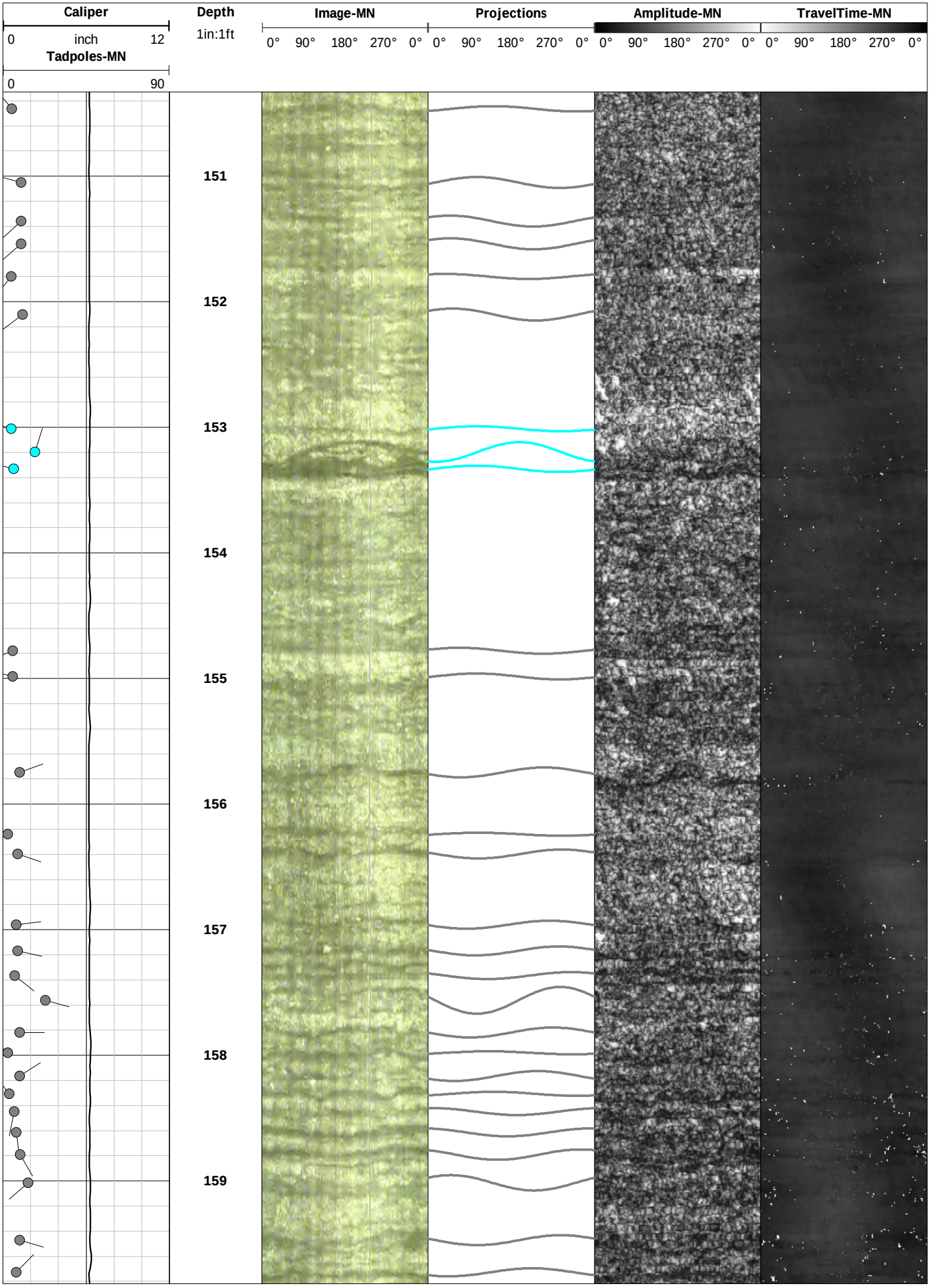
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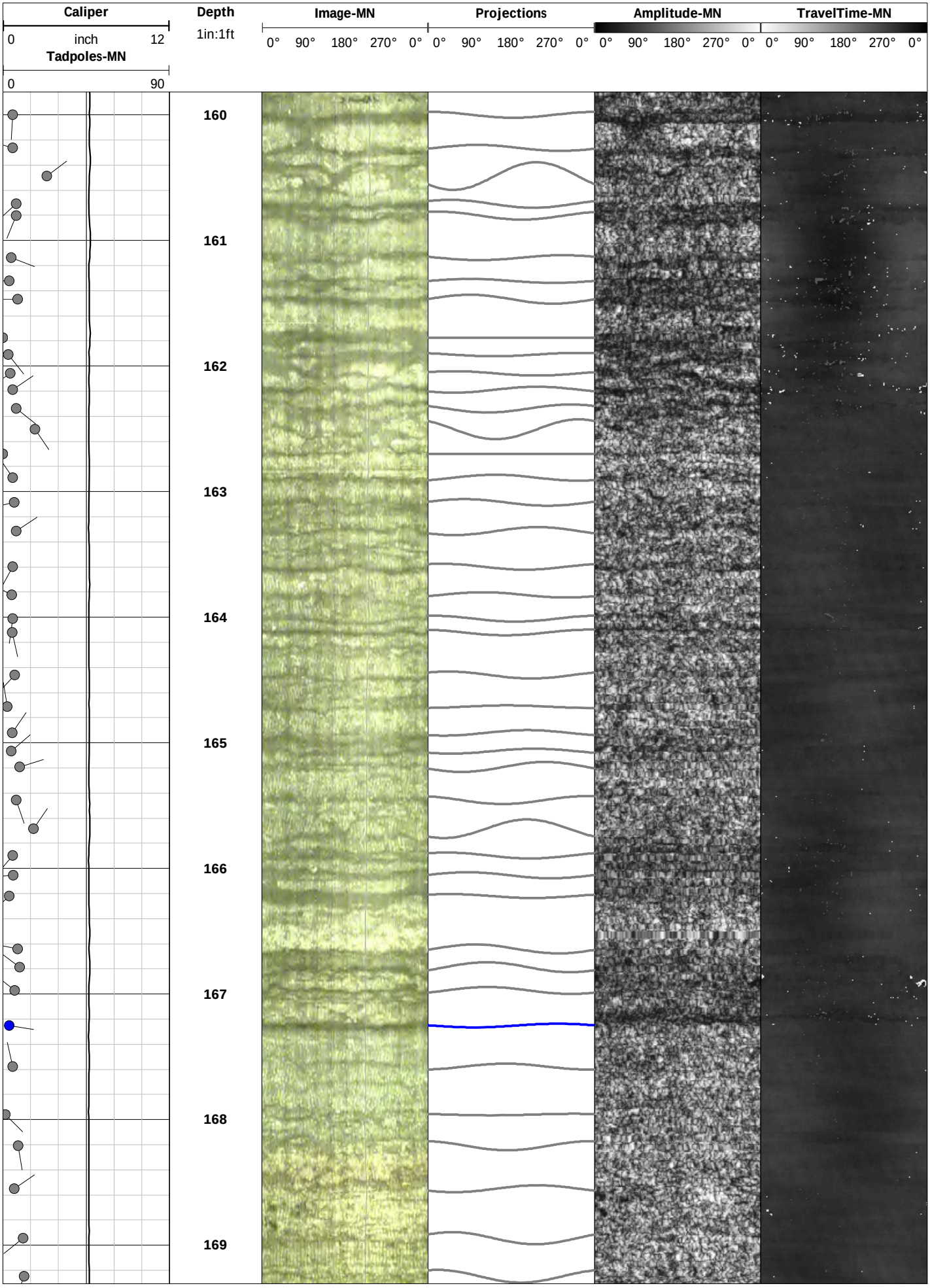
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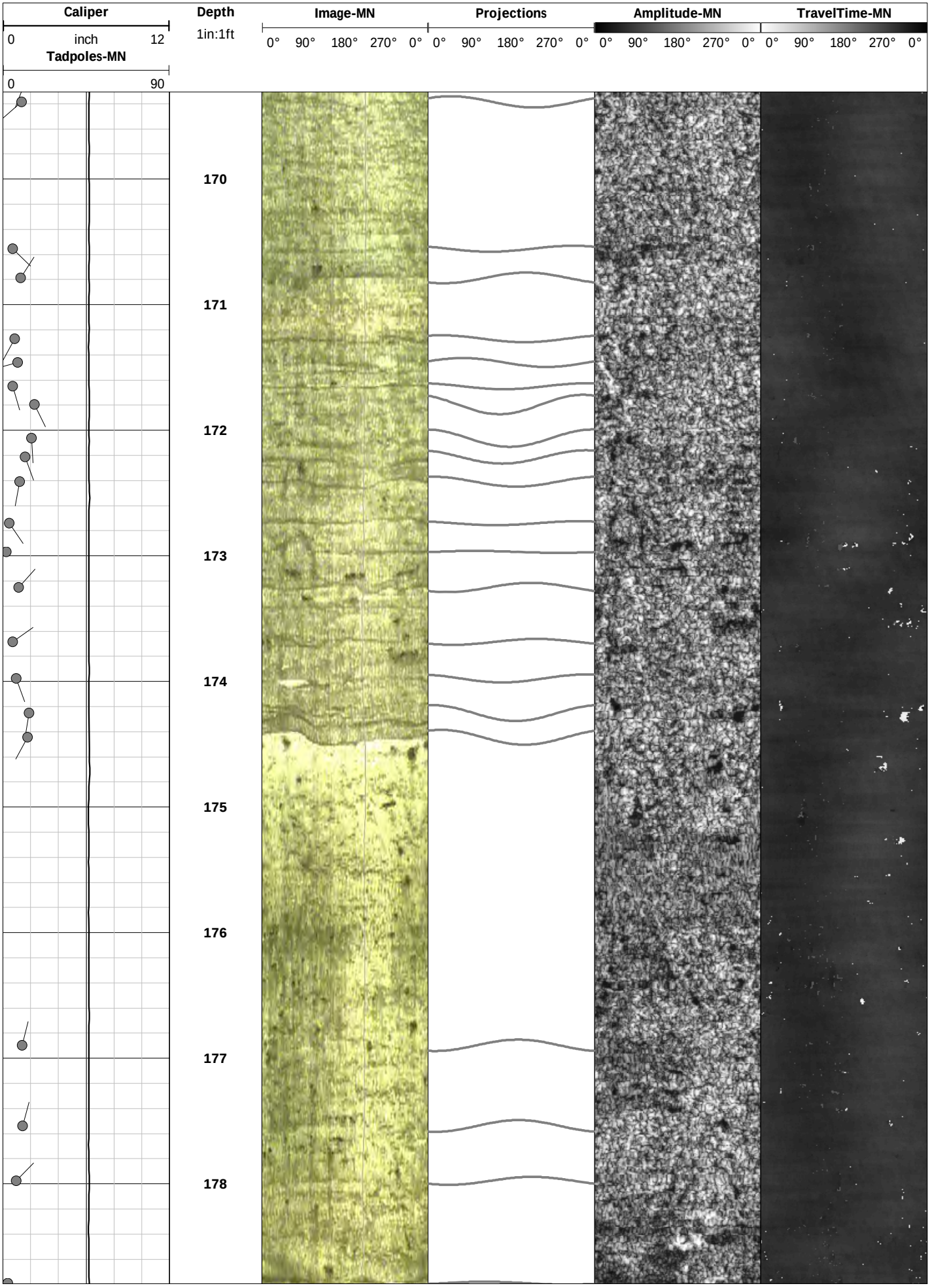
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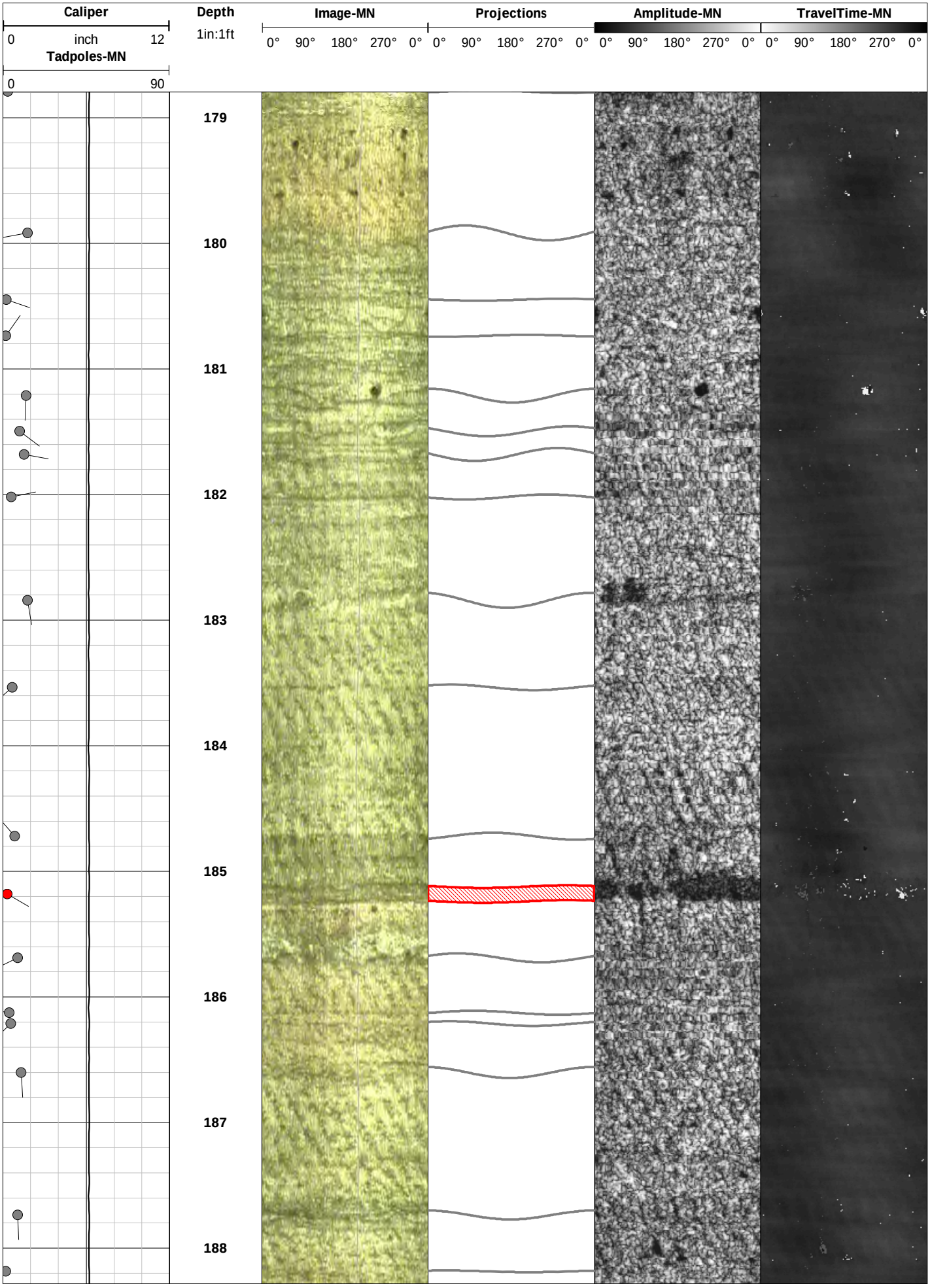
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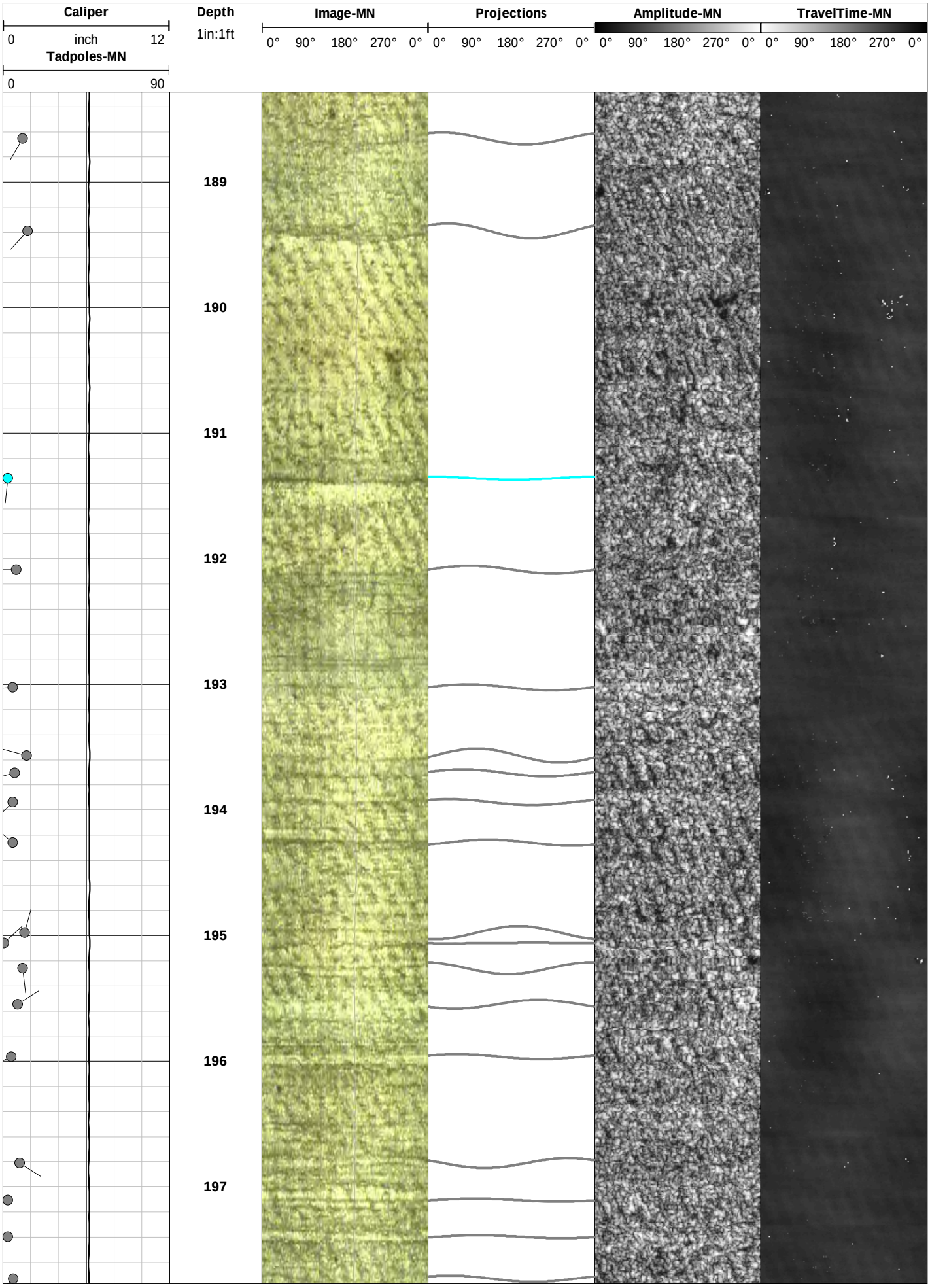
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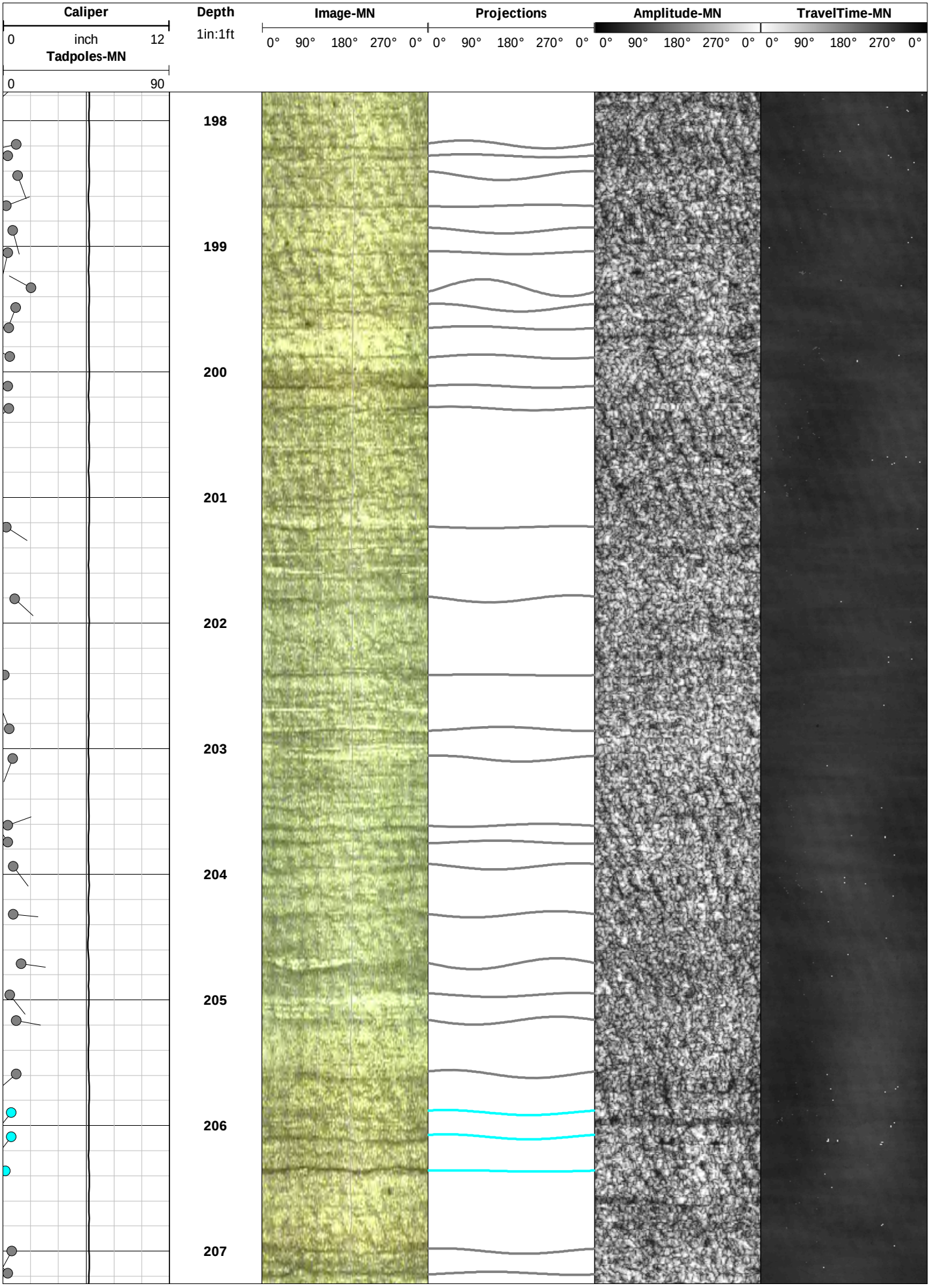
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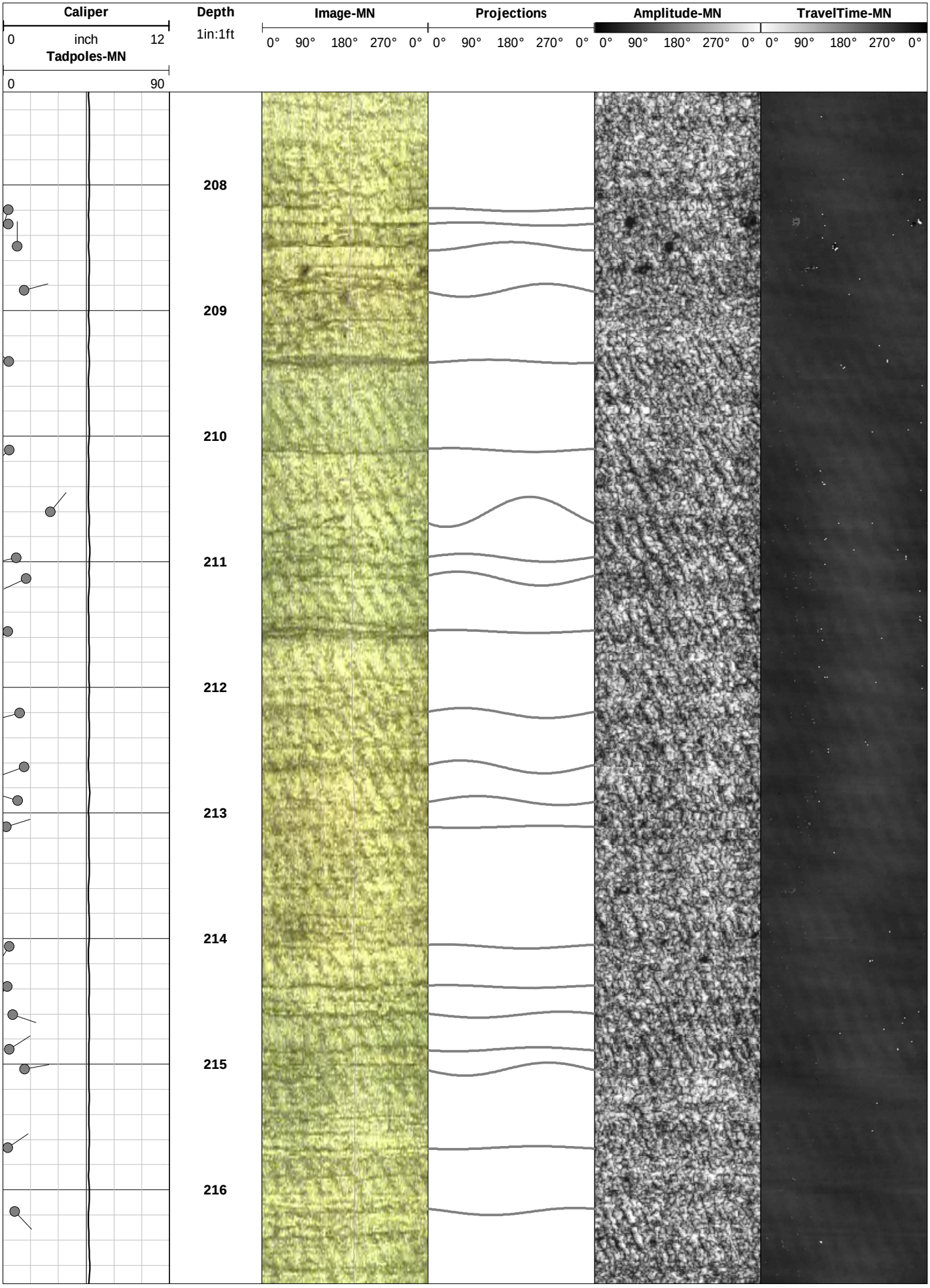
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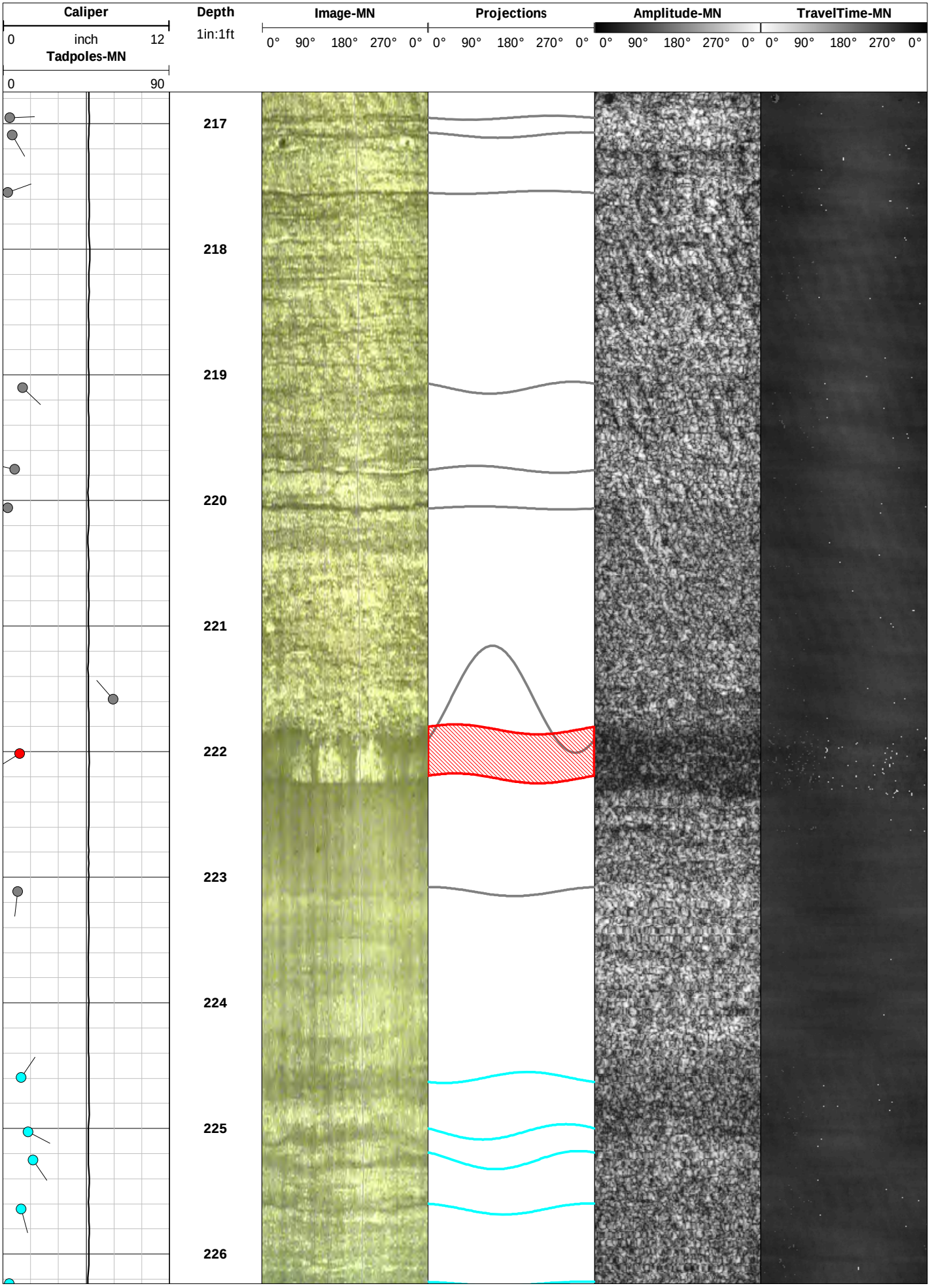
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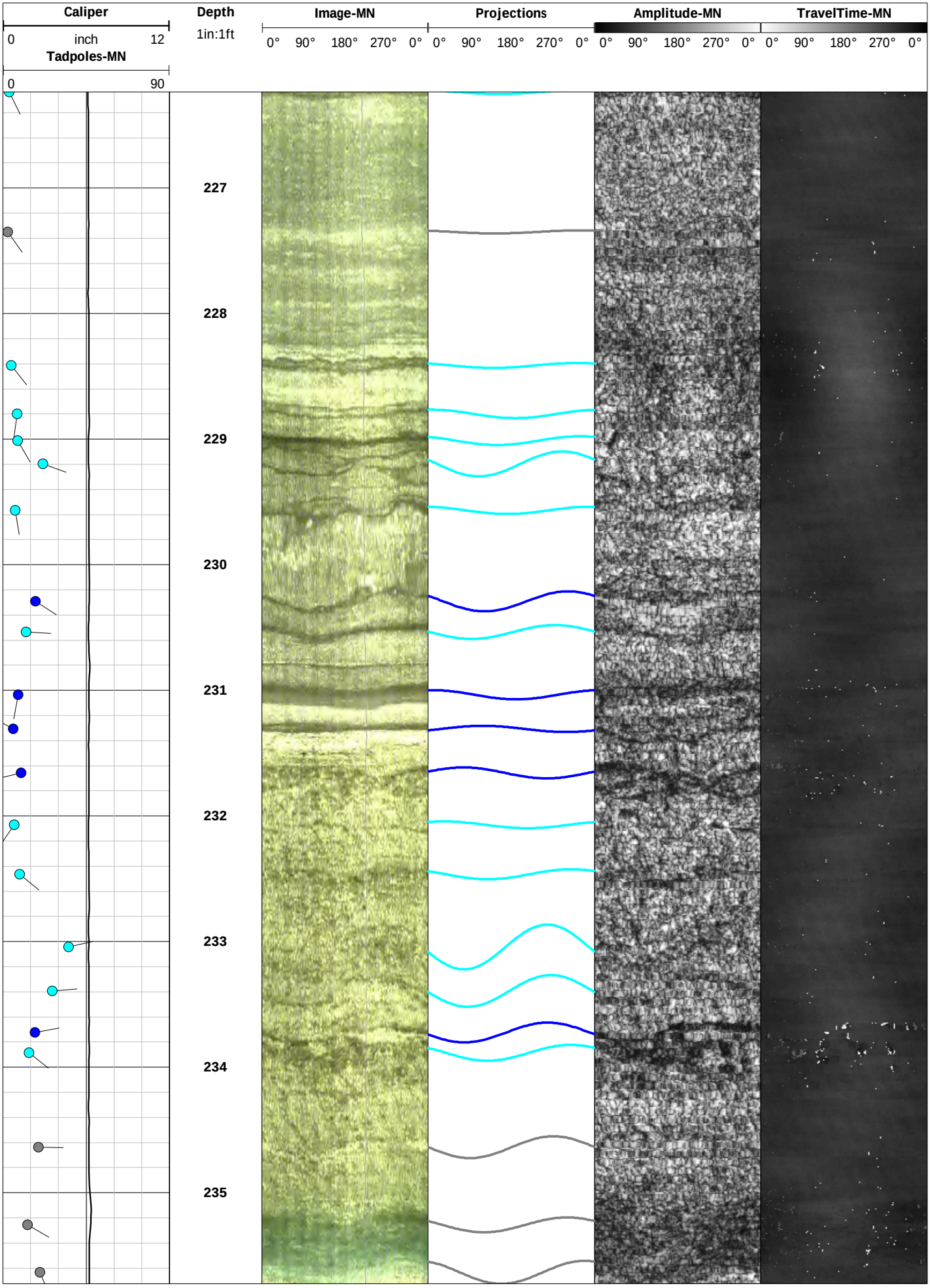
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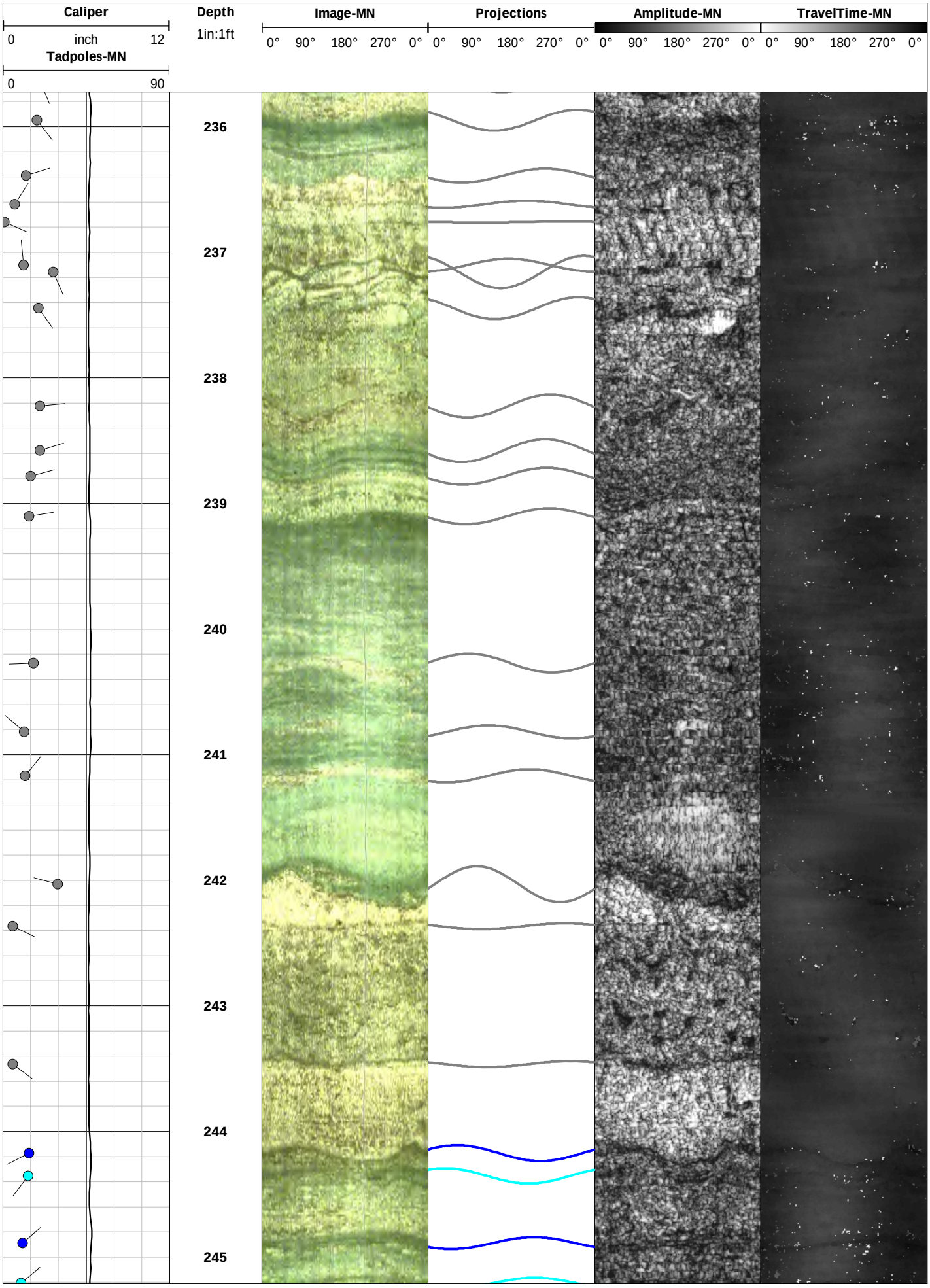
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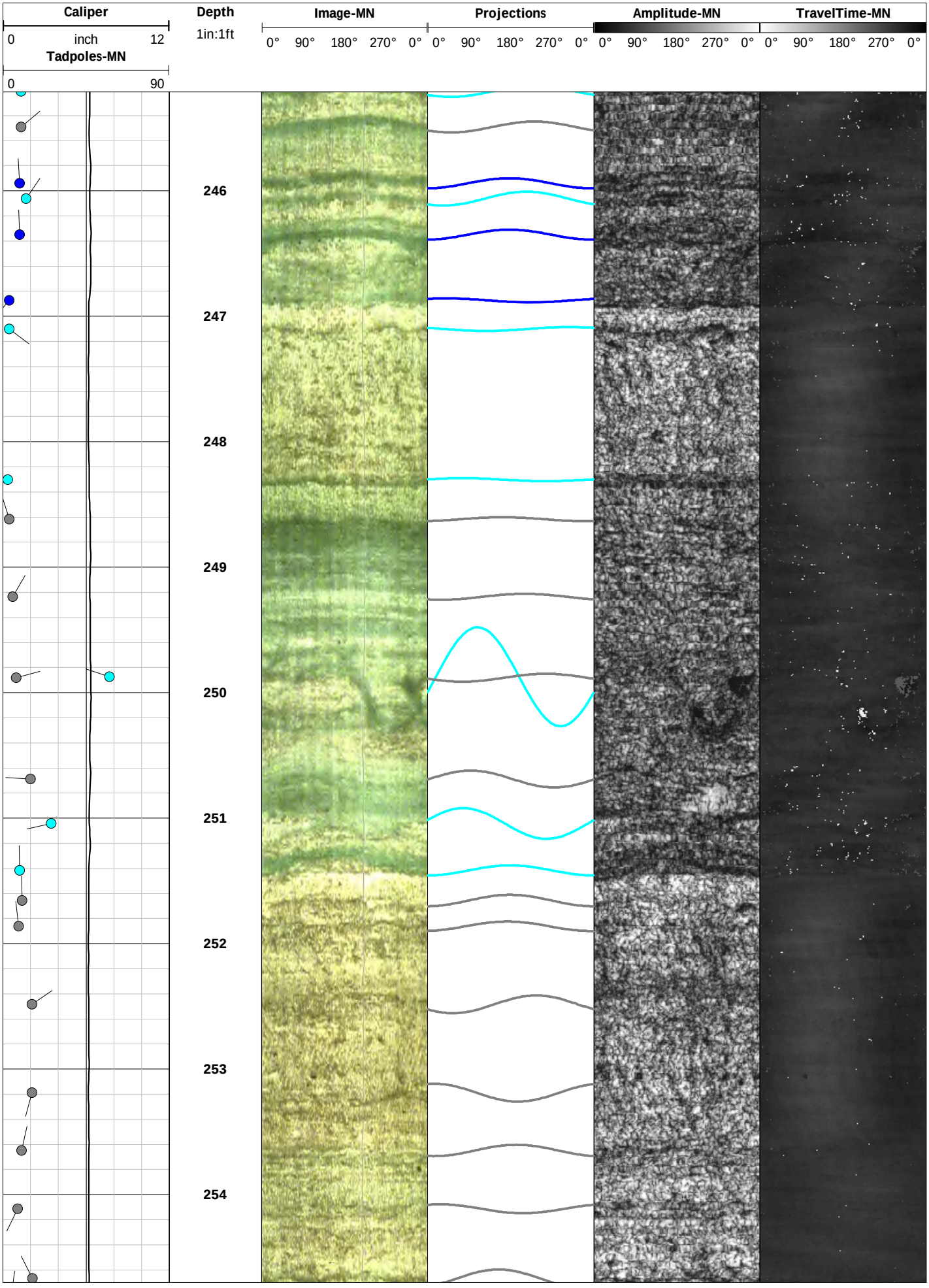
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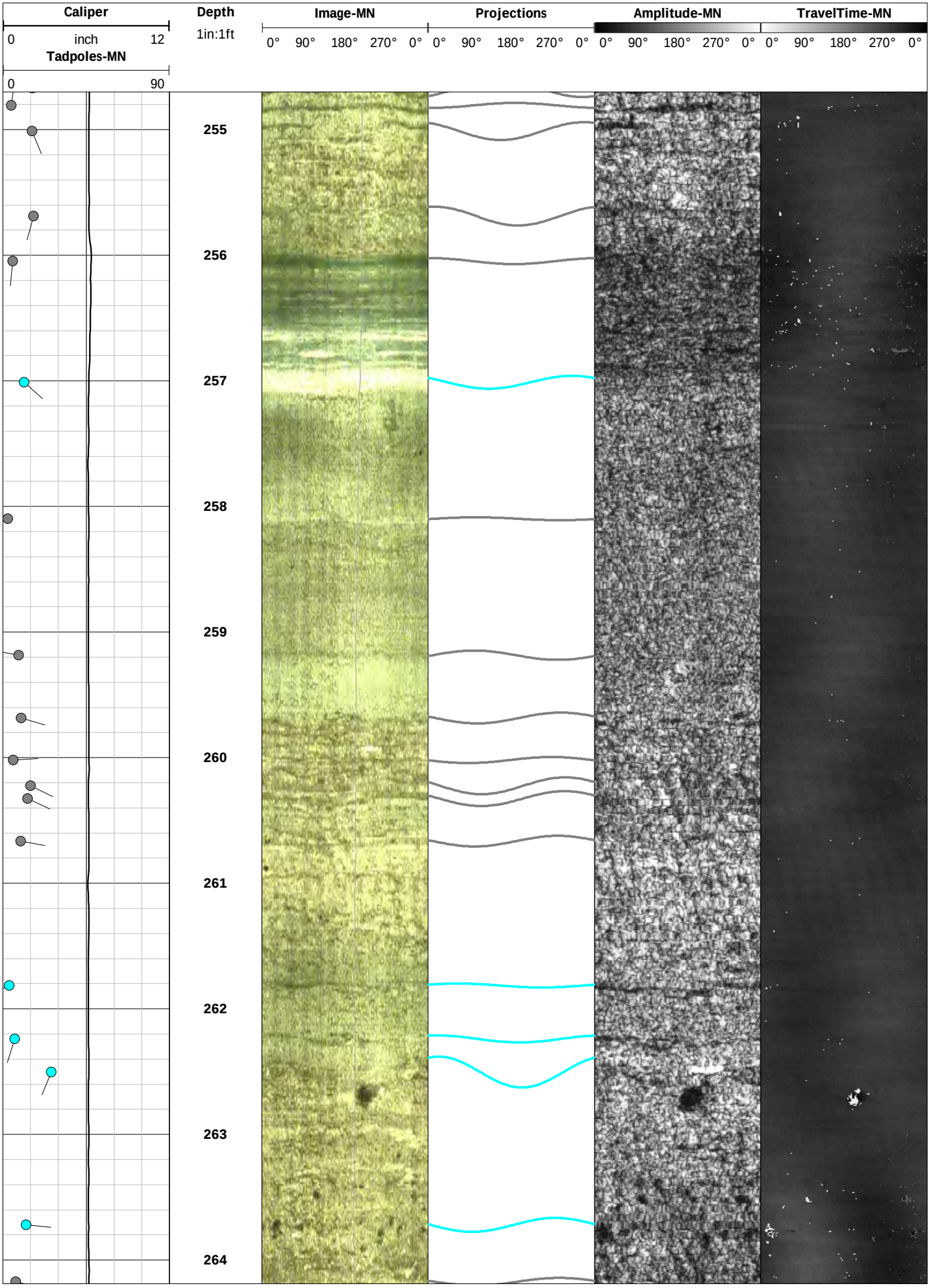
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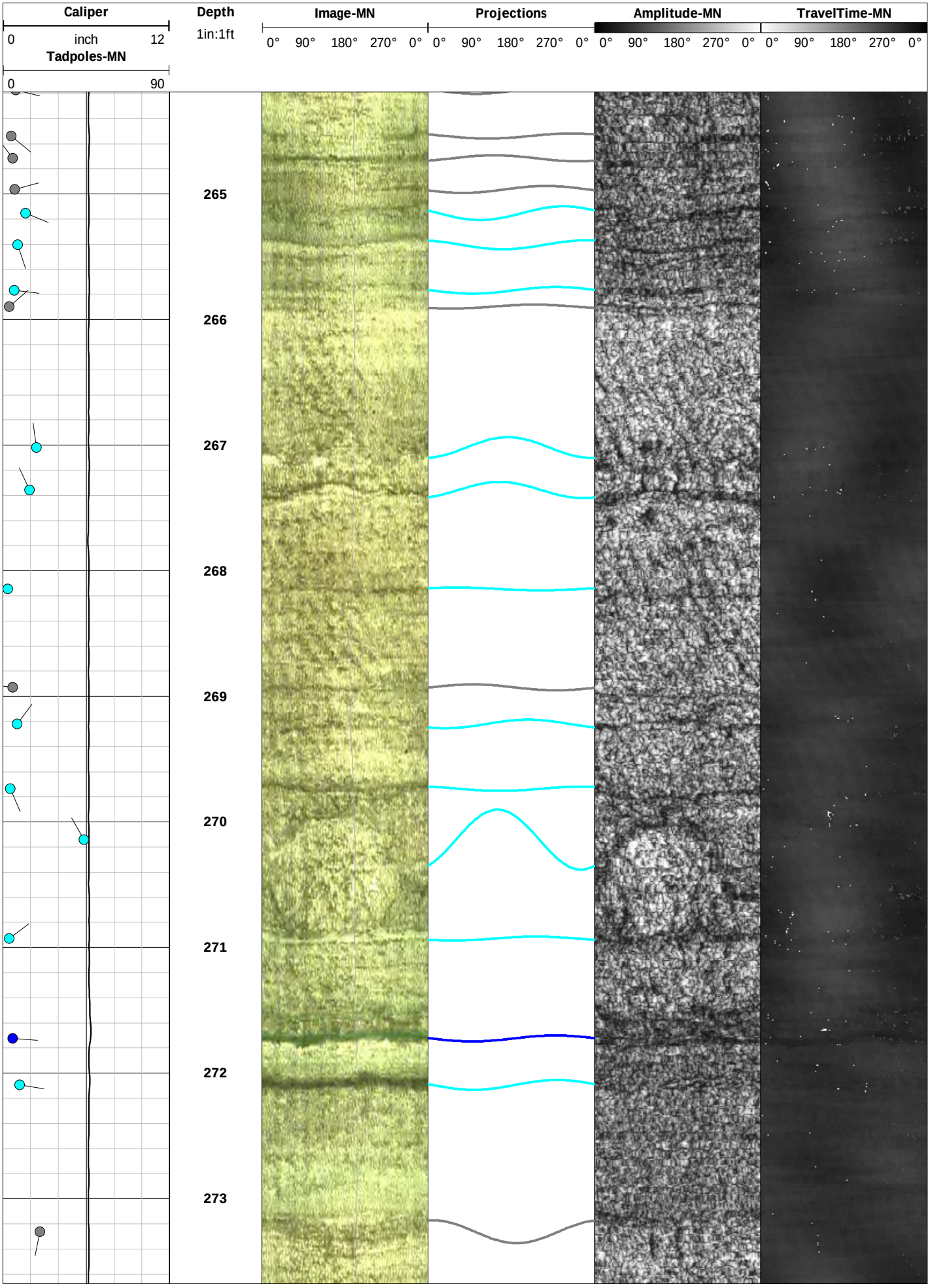
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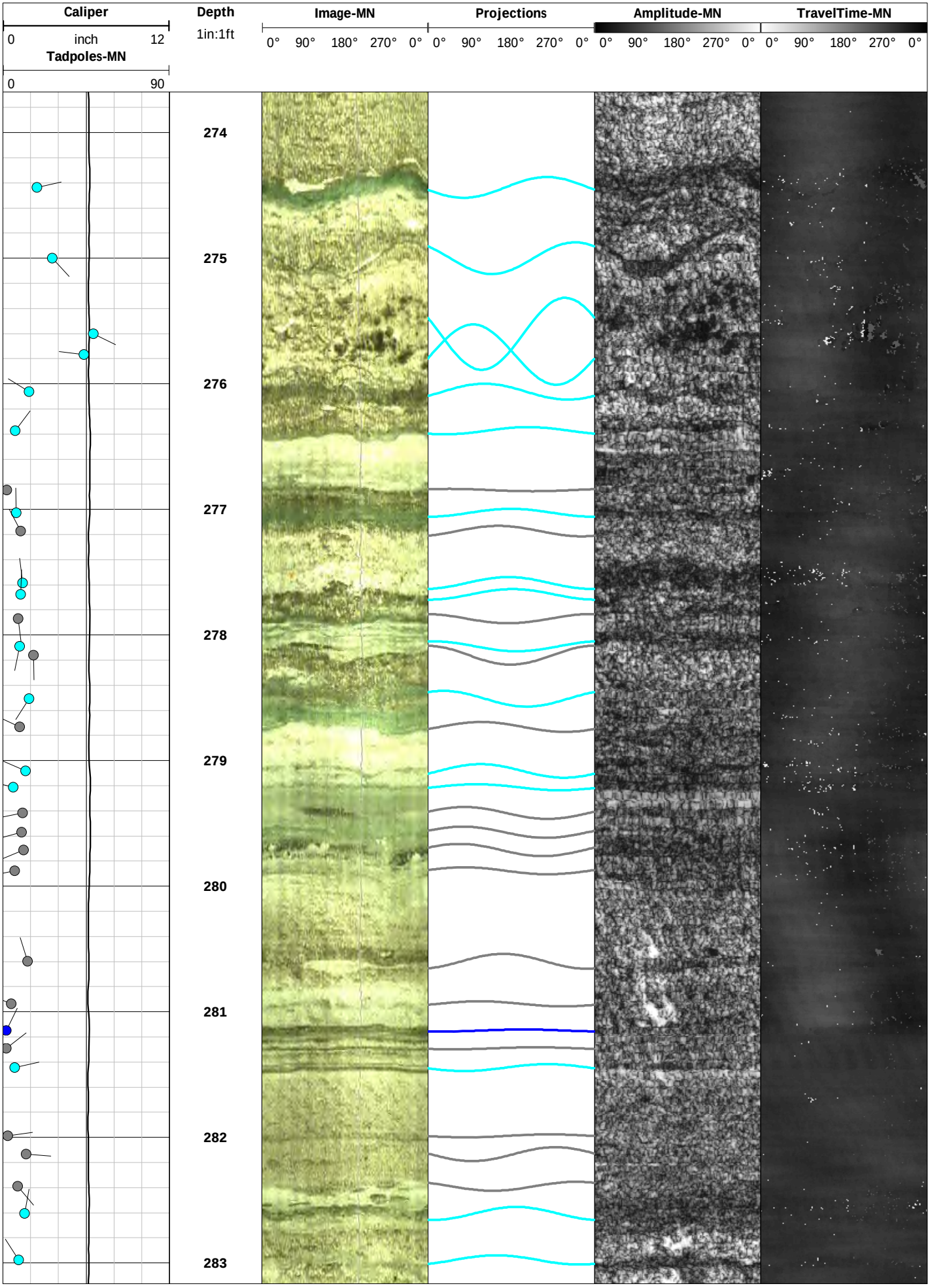
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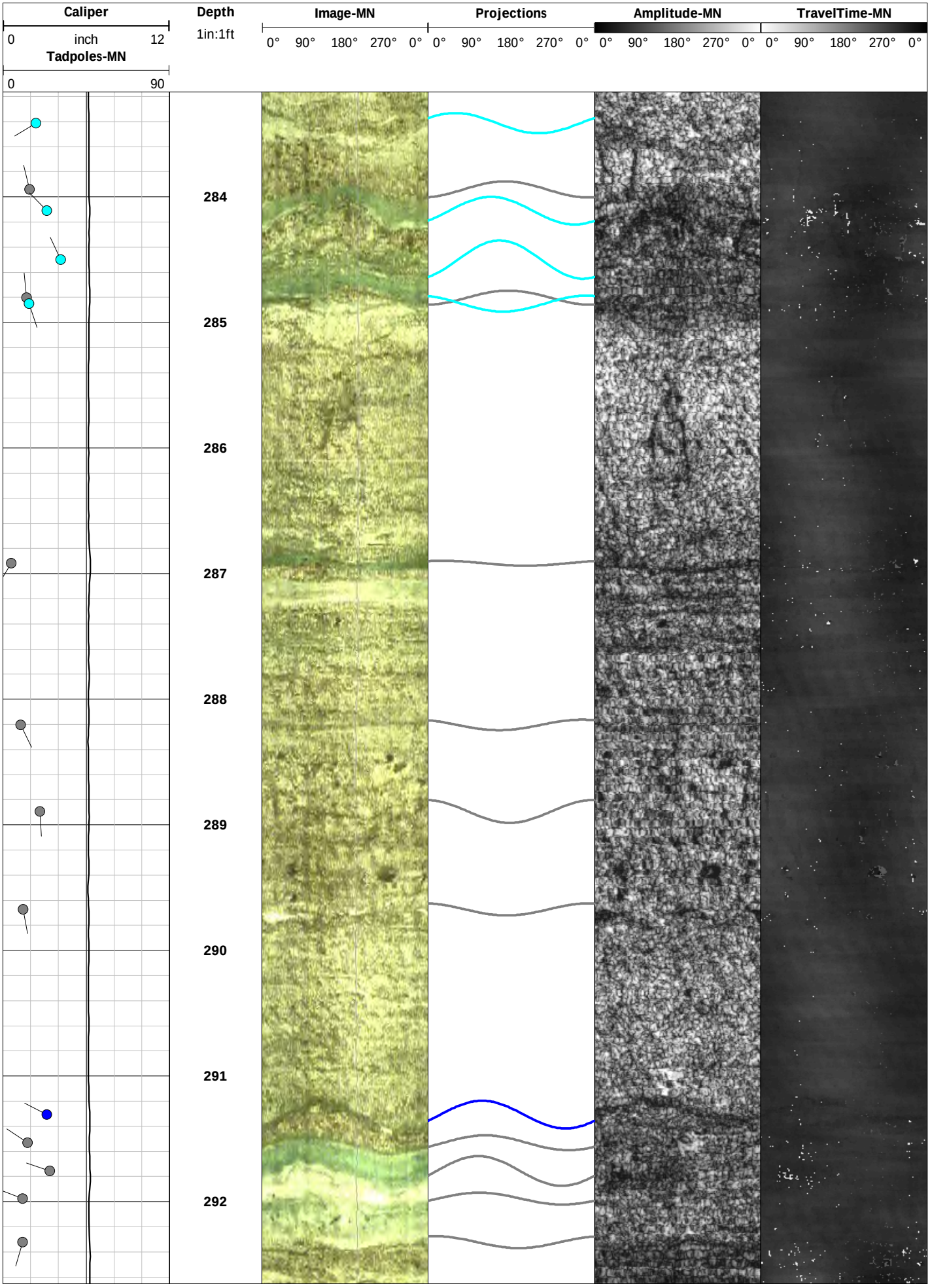
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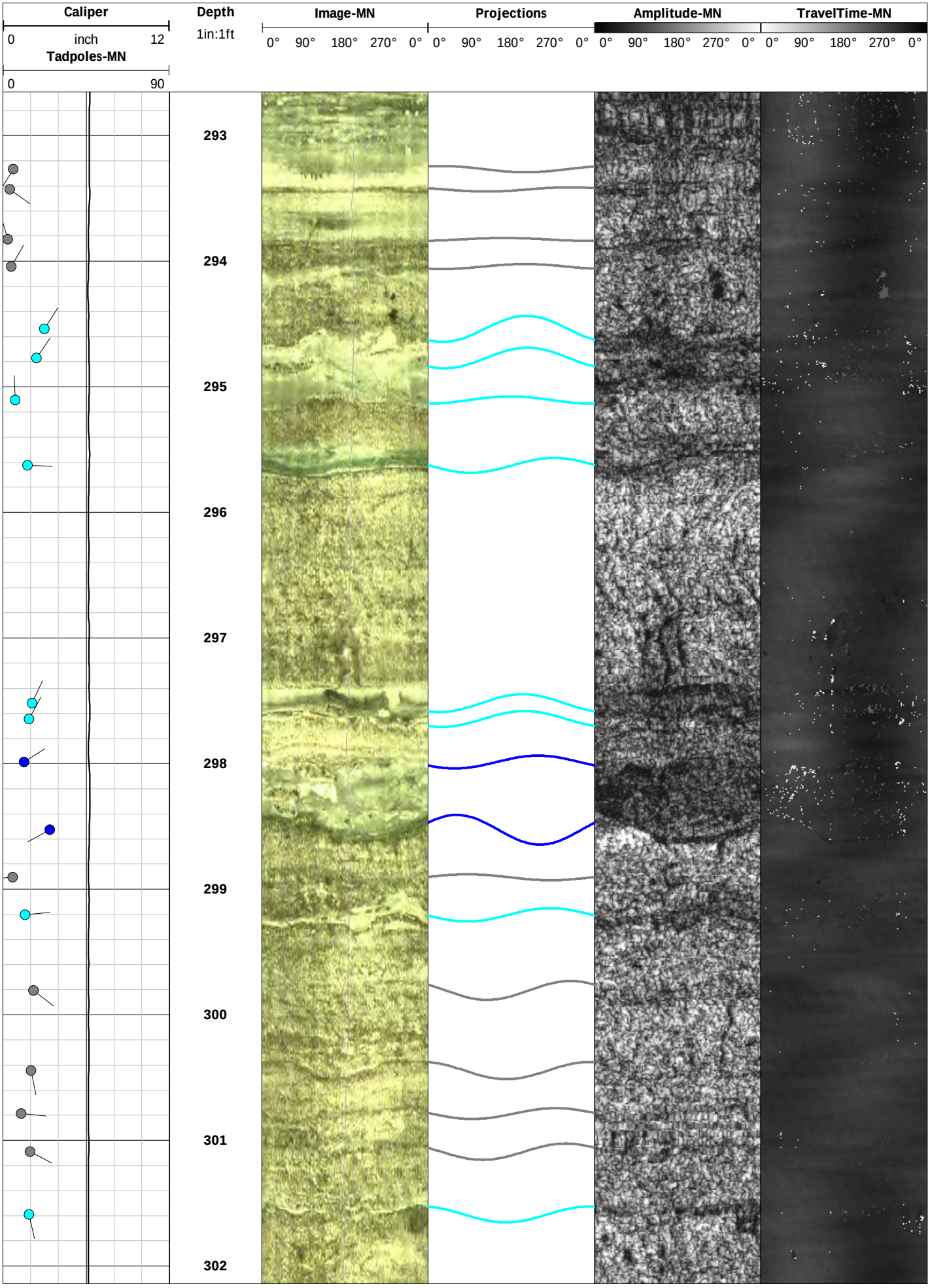
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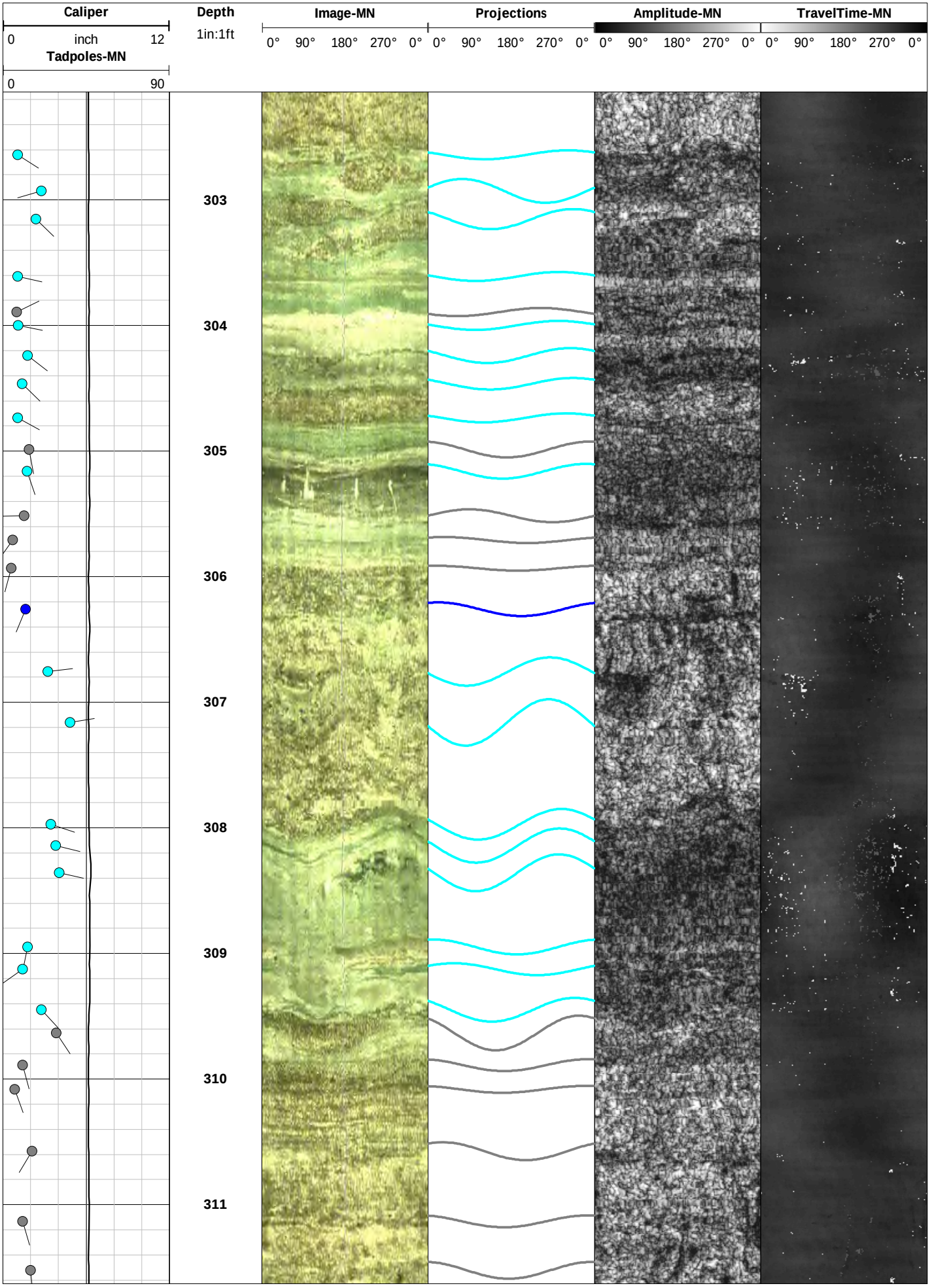
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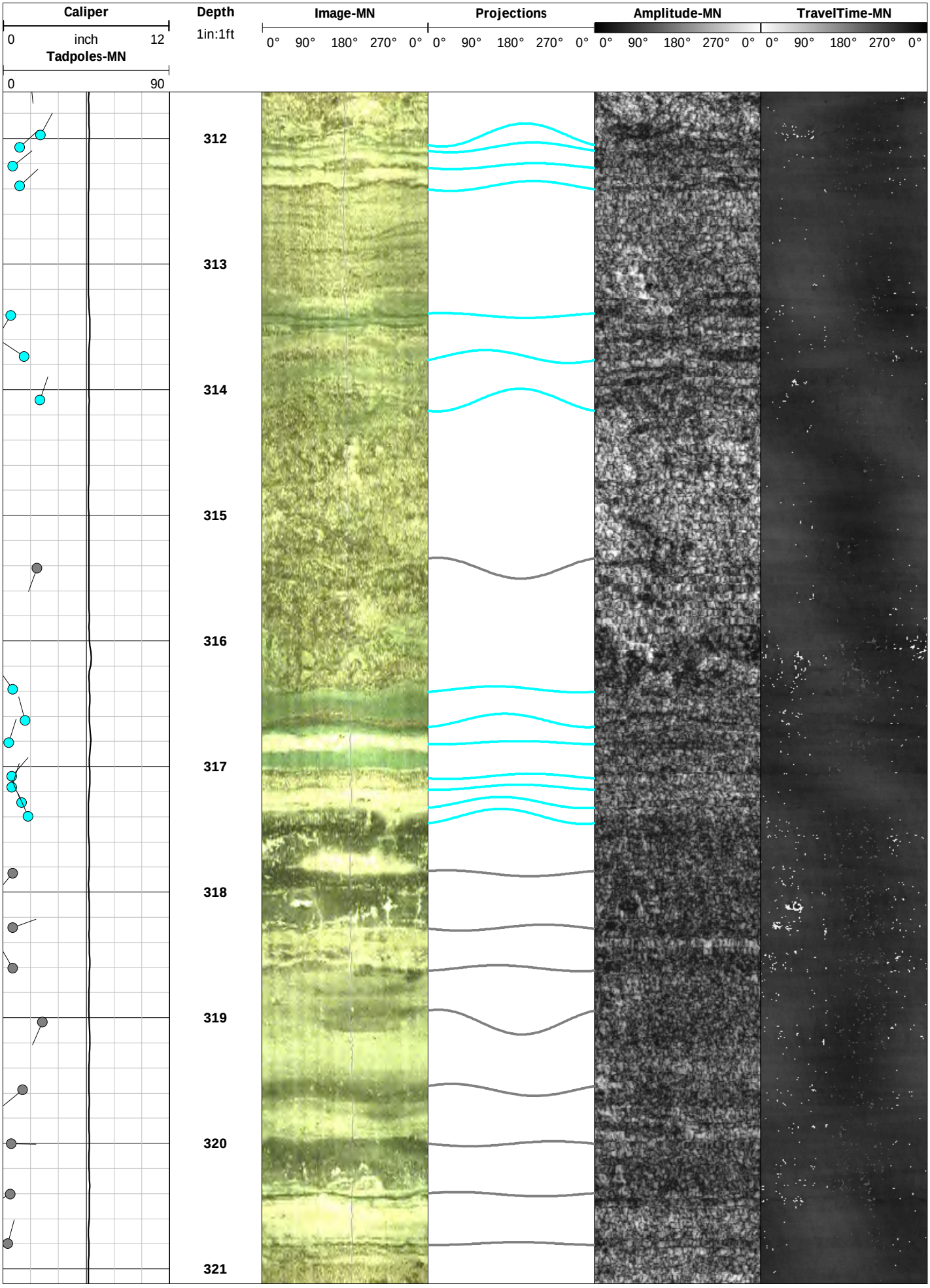
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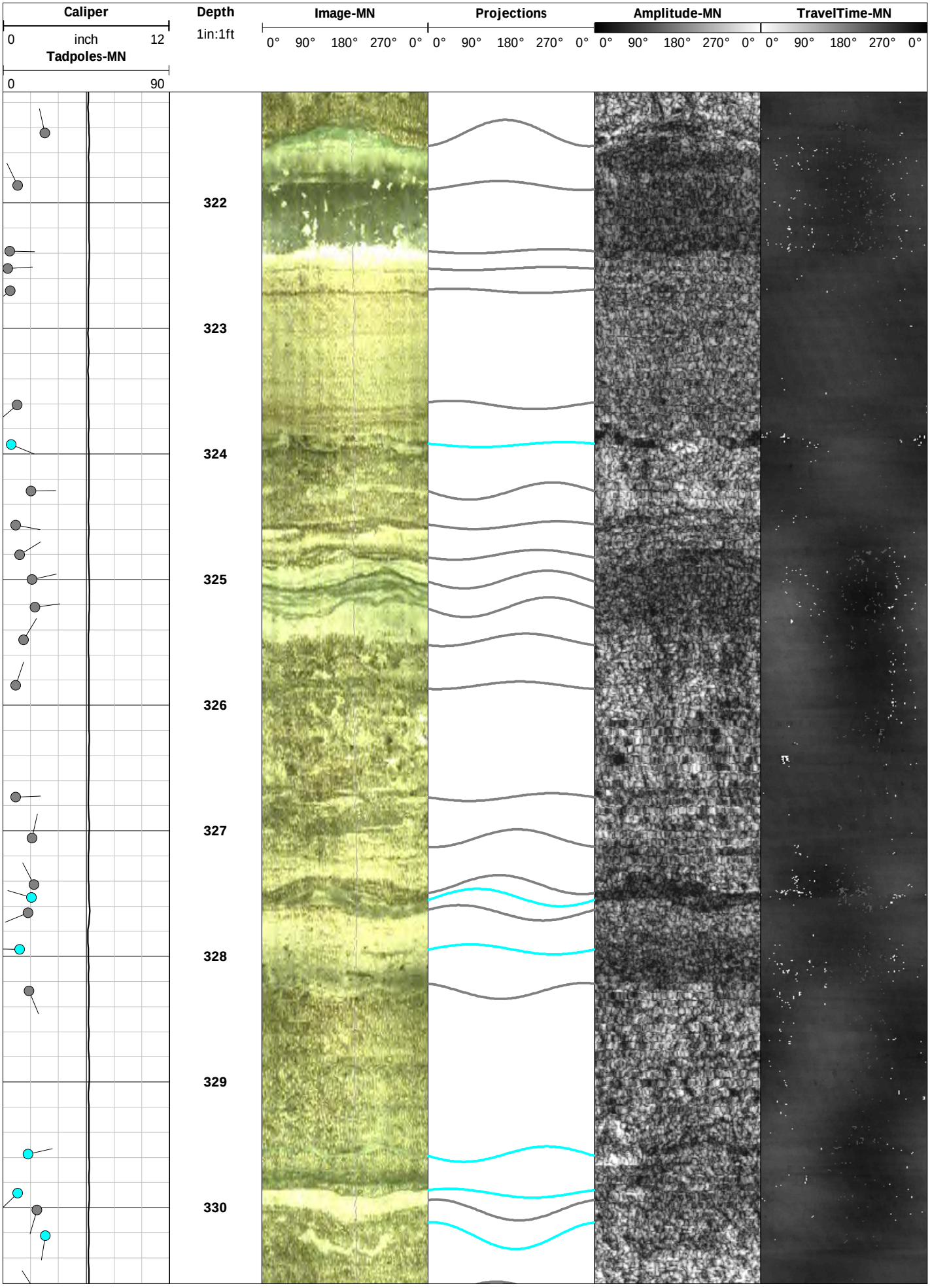
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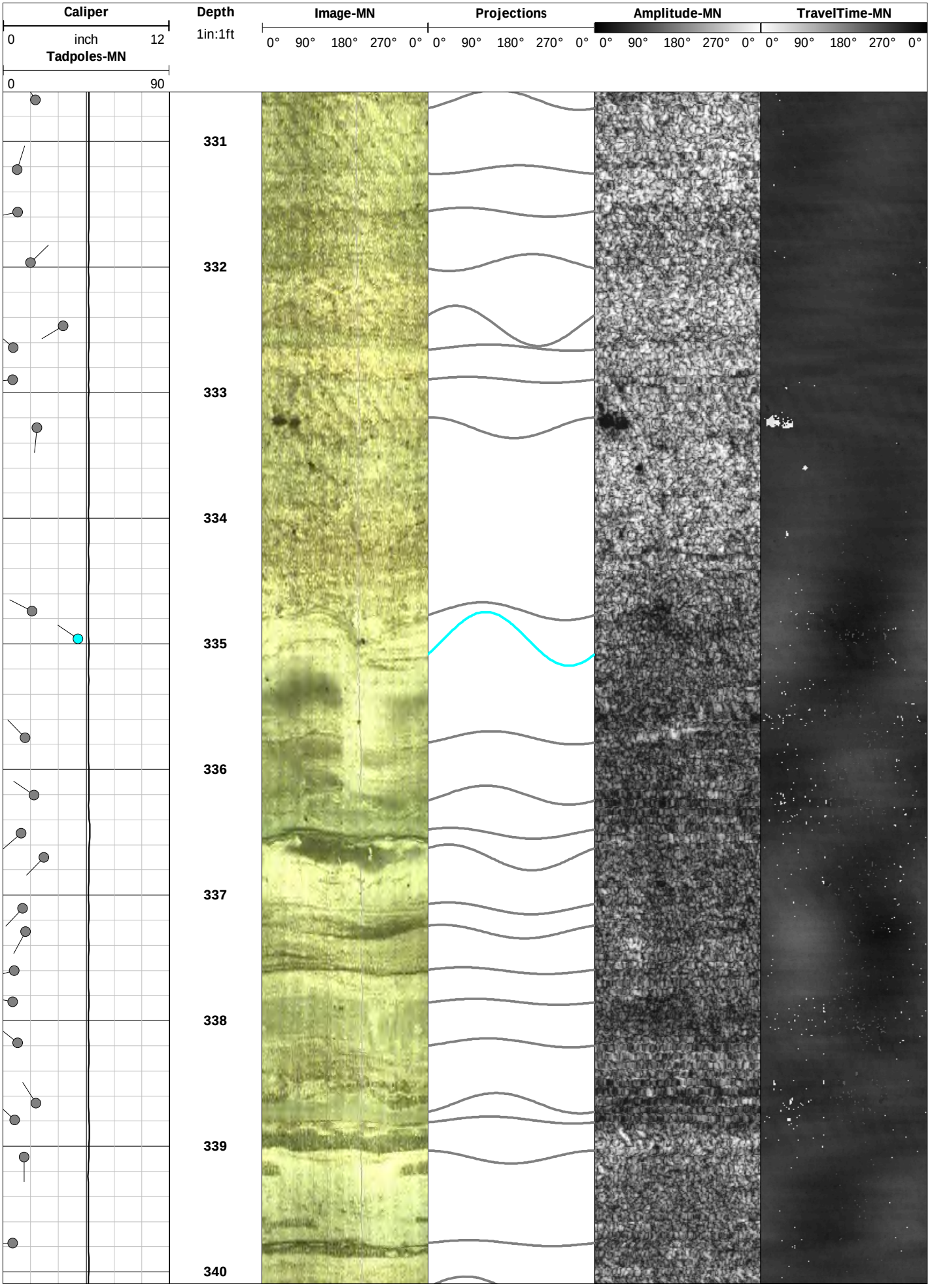
0
inch
12
Tadpoles-MN
0
90
Depth
1in:1ft
Image-MN
0° 90° 180° 270° 0°
Projections
0° 90° 180° 270° 0°
Amplitude-MN
0° 90° 180° 270° 0°
TravelTime-MN
0° 90° 180° 270° 0°
322
323
324
325
326
327
328
329
330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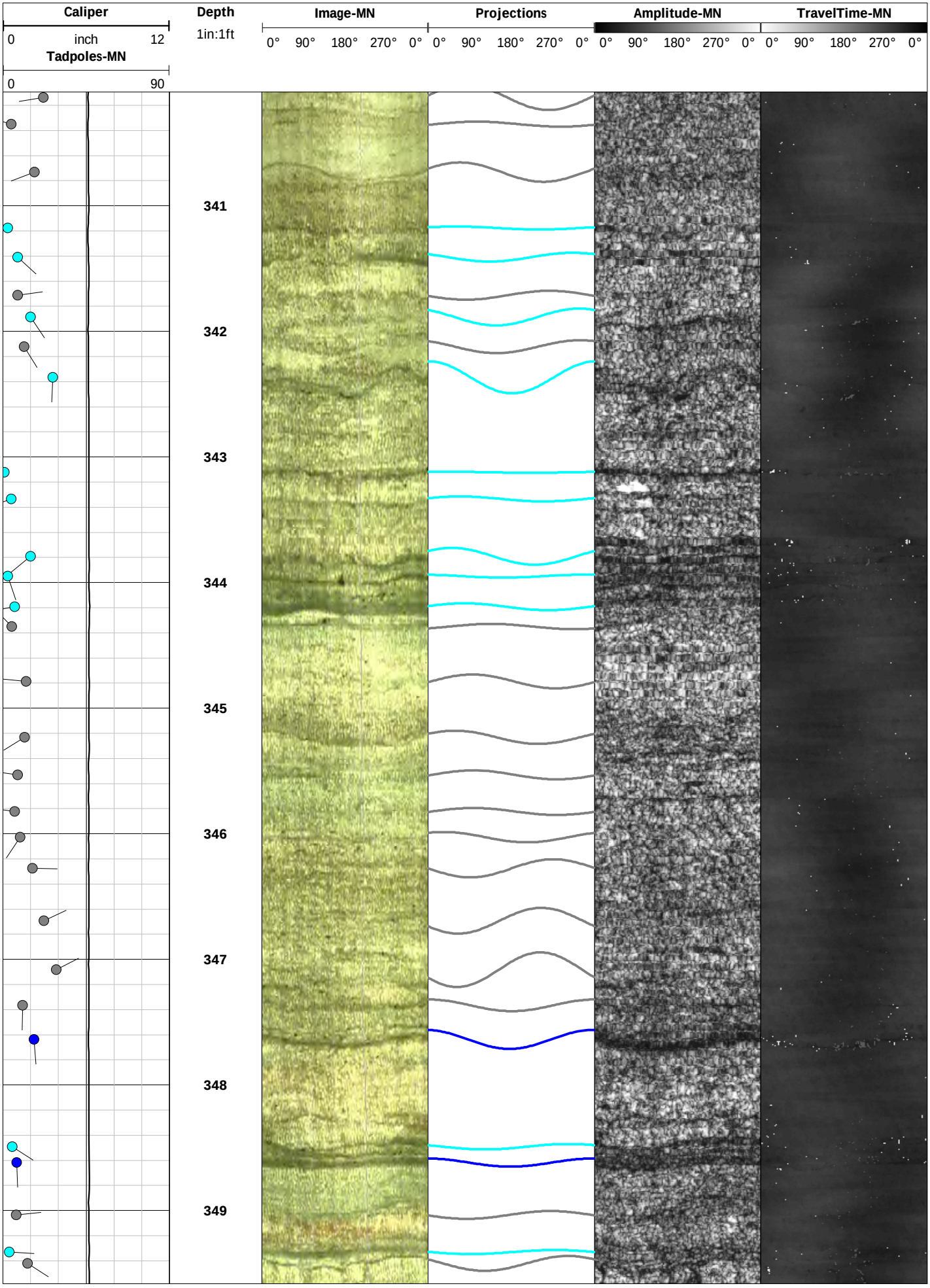
inch
12
Tadpoles-MN
0
90
Depth
1in:1ft
Image-MN
0° 90° 180° 270° 0°
Projections
0° 90° 180° 270° 0°
Amplitude-MN
0° 90° 180° 270° 0°
TravelTime-MN
0° 90° 180° 270° 0°
331
332
333
334
335
336
337
338
339
340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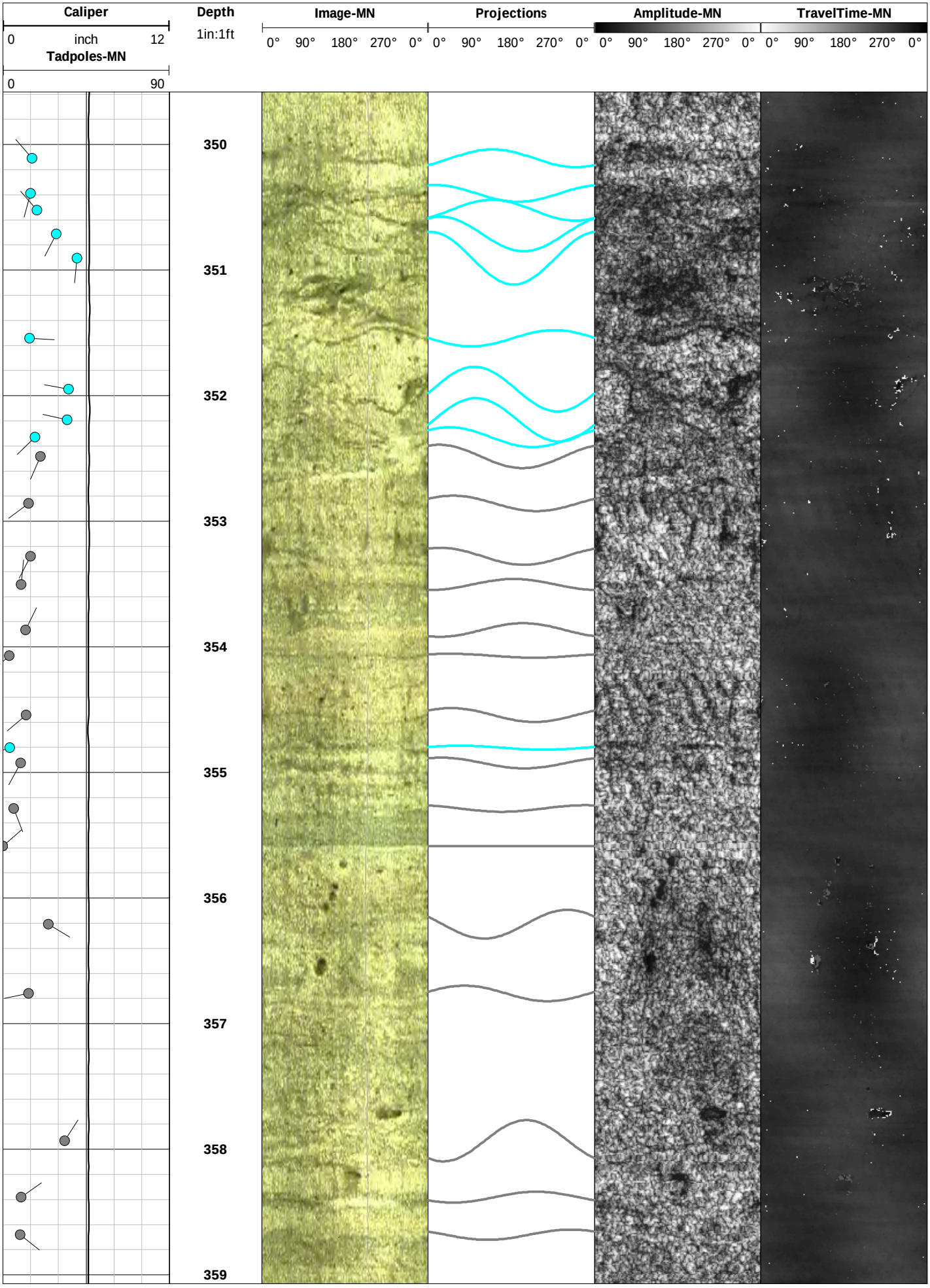
inch
12
Tadpoles-MN
0
90
Depth
1in:1ft
Image-MN
0° 90° 180° 270° 0°
Projections
0° 90° 180° 270° 0°
Amplitude-MN
0° 90° 180° 270° 0°
TravelTime-MN
0° 90° 180° 270° 0°
341
342
343
344
345
346
347
348
349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inch
12
Tadpoles-MN
0
90
Depth
1in:1ft
Image-MN
0° 90° 180° 270° 0°
Projections
0° 90° 180° 270° 0°
Amplitude-MN
0° 90° 180° 270° 0°
TravelTime-MN
0° 90° 180° 270° 0°
350
351
352
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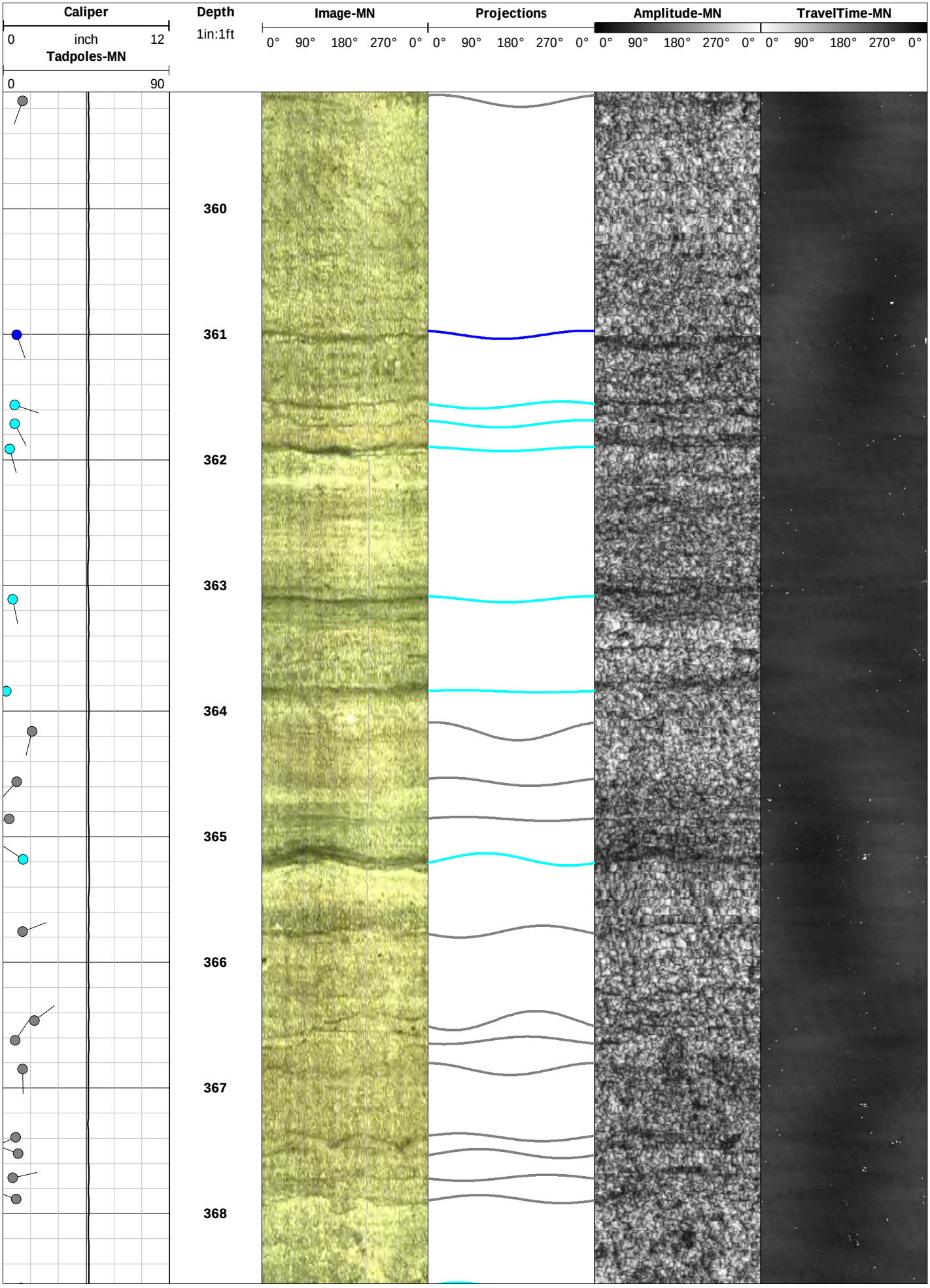
358
359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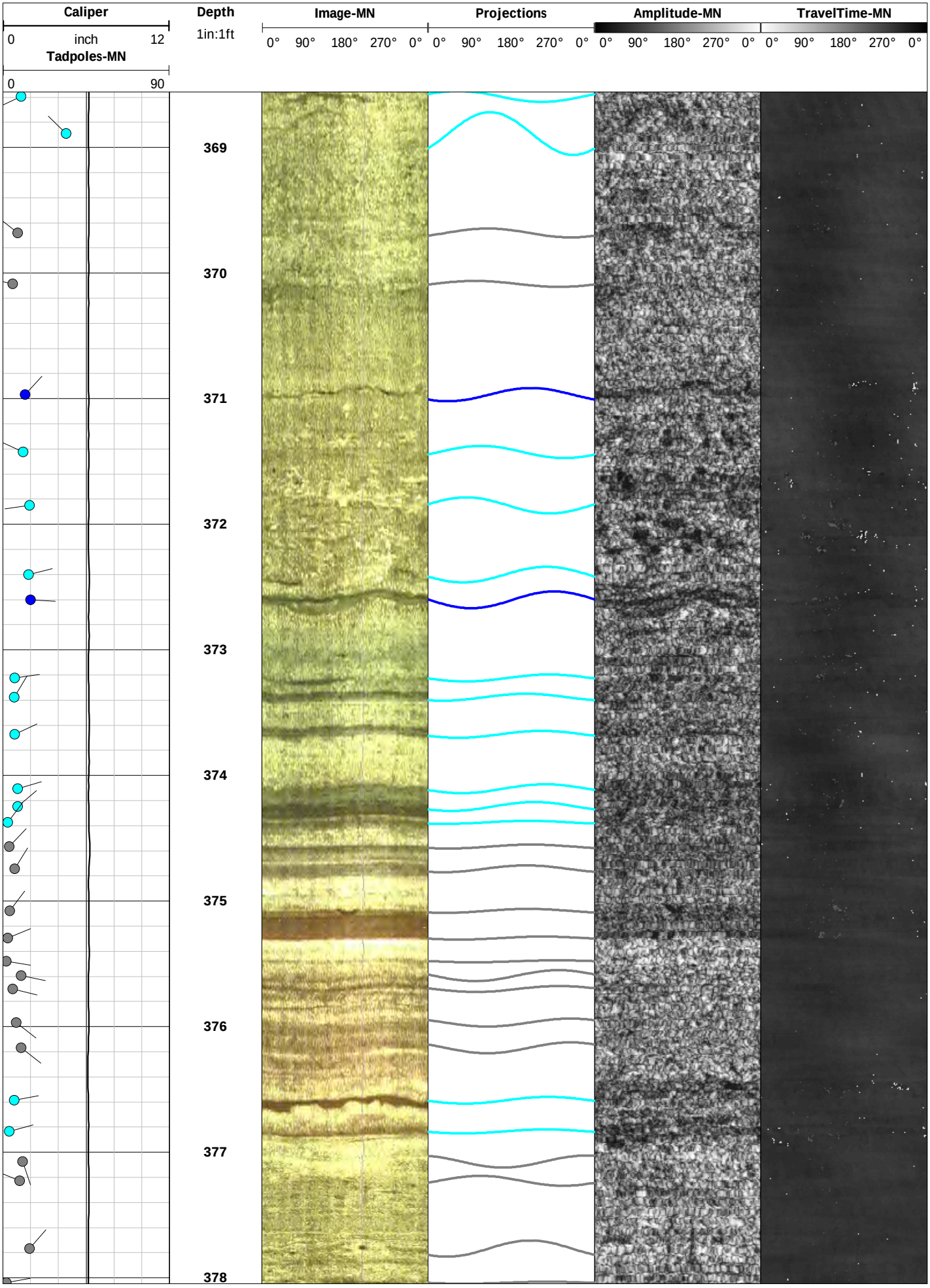
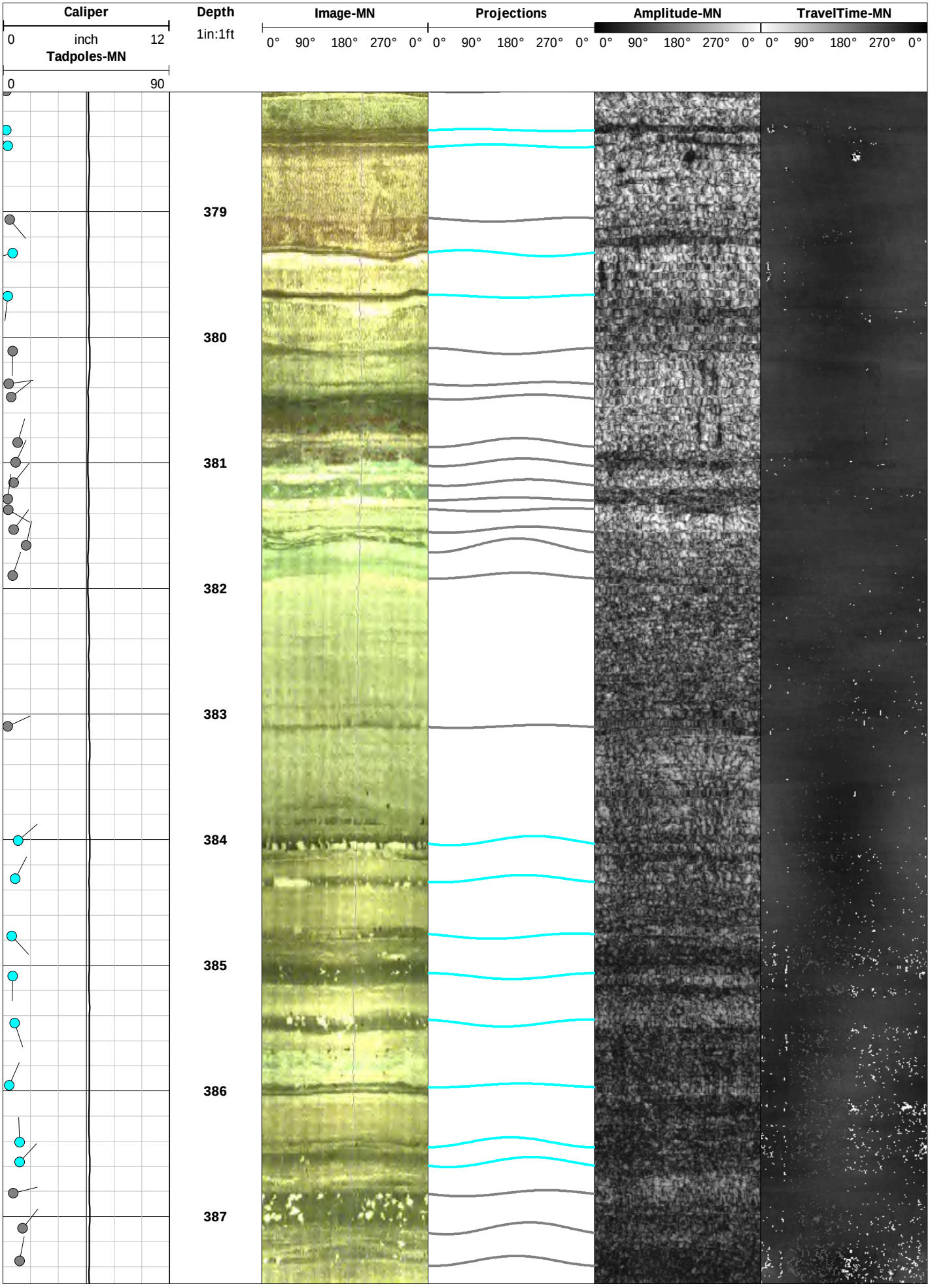
0
inch
12
Tadpoles-MN
0
90
Depth
1in:1ft
Image-MN
0° 90° 180° 270° 0°
Projections
0° 90° 180° 270° 0°
Amplitude-MN
0° 90° 180° 270° 0°
TravelTime-MN
0° 90° 180° 270° 0°
360
361
362
363
364
365
366
367
368


Caliper
0
inch
12
Tadpoles-MN
0
90
Depth
1in:1ft
Image-MN
0° 90° 180° 270° 0°
Projections
0° 90° 180° 270° 0°
Amplitude-MN
0° 90° 180° 270° 0°
TravelTime-MN
0° 90° 180° 270° 0°
369
370
371
372
373
374
375
376
377
378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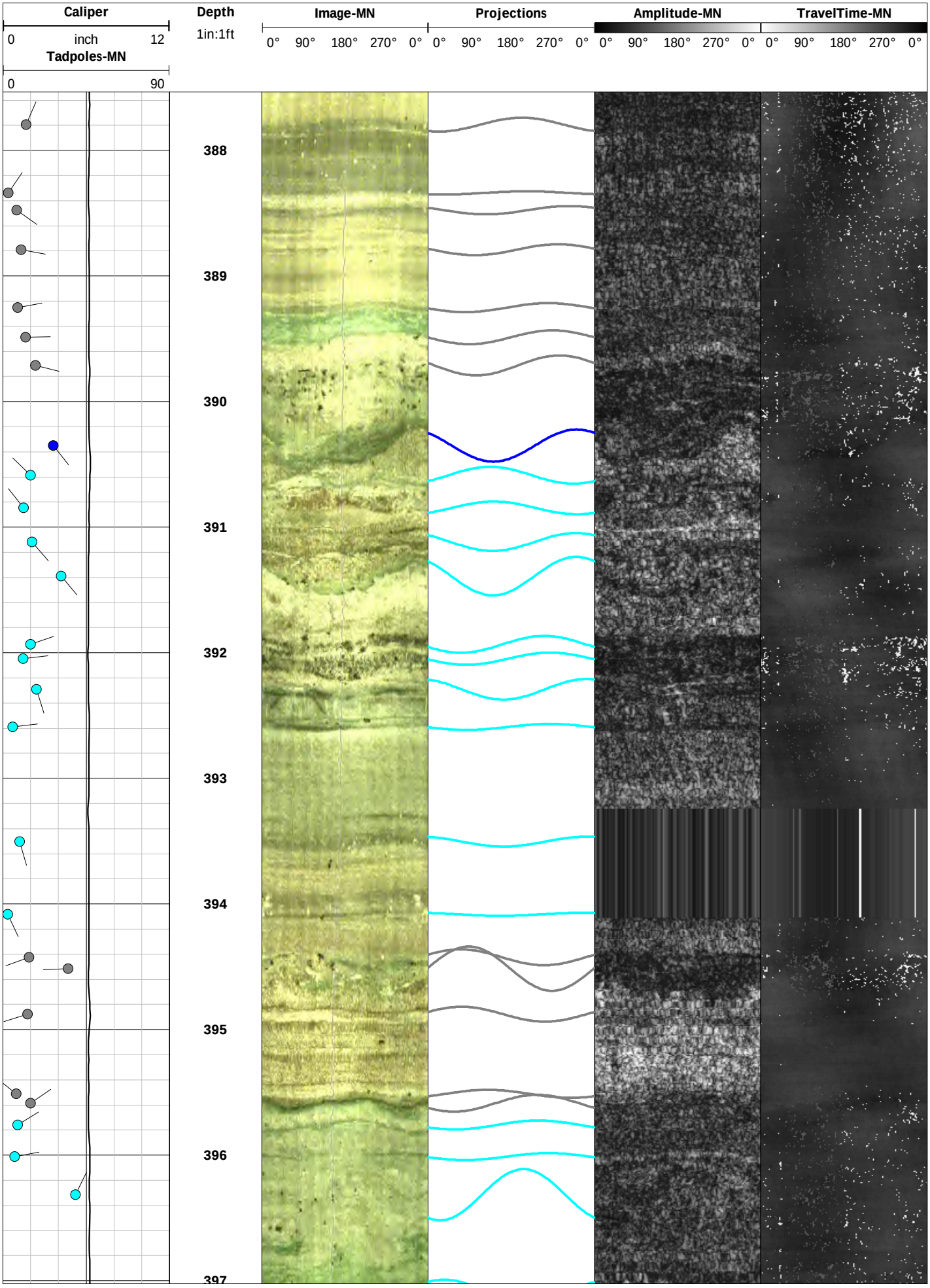
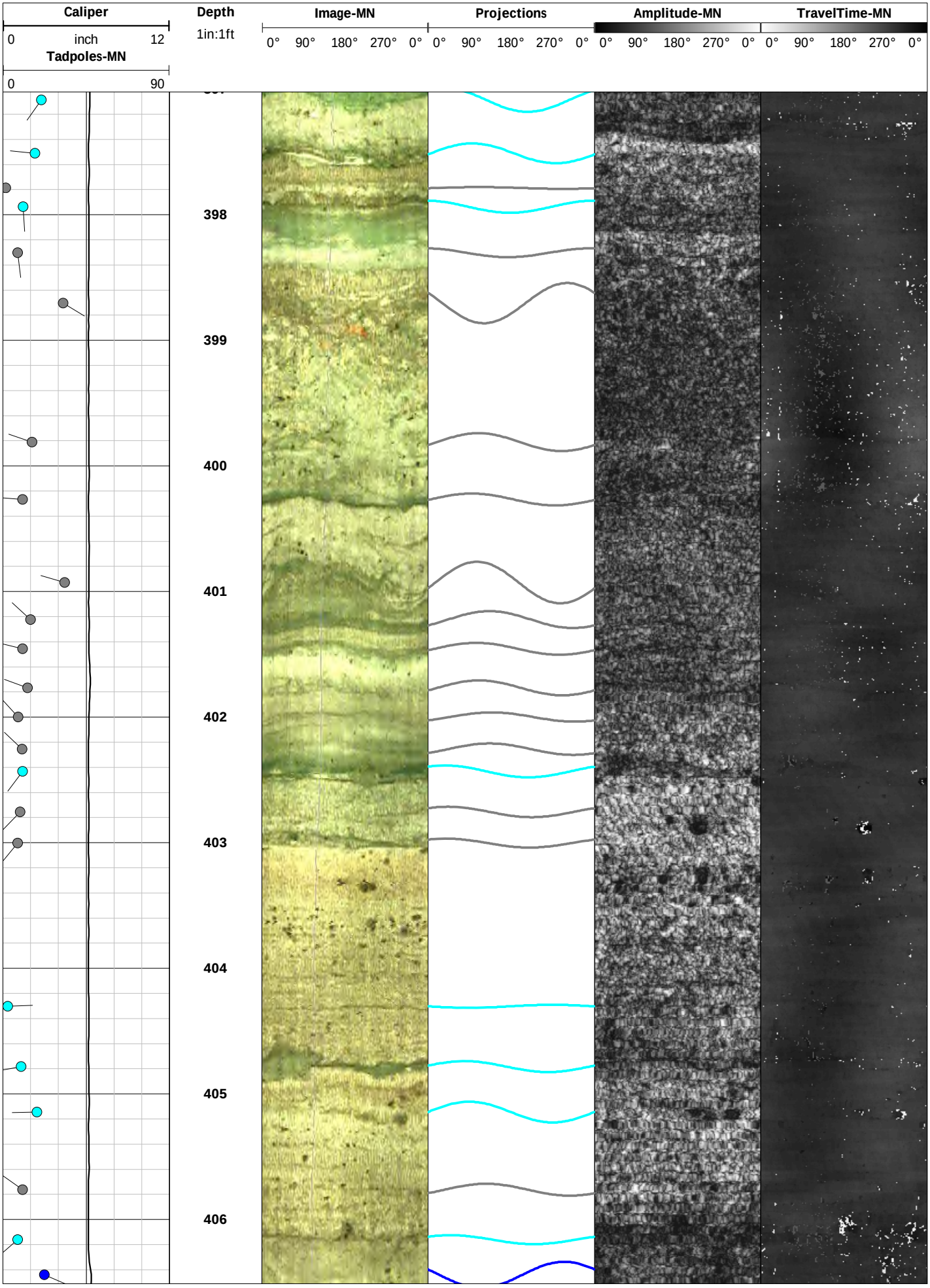
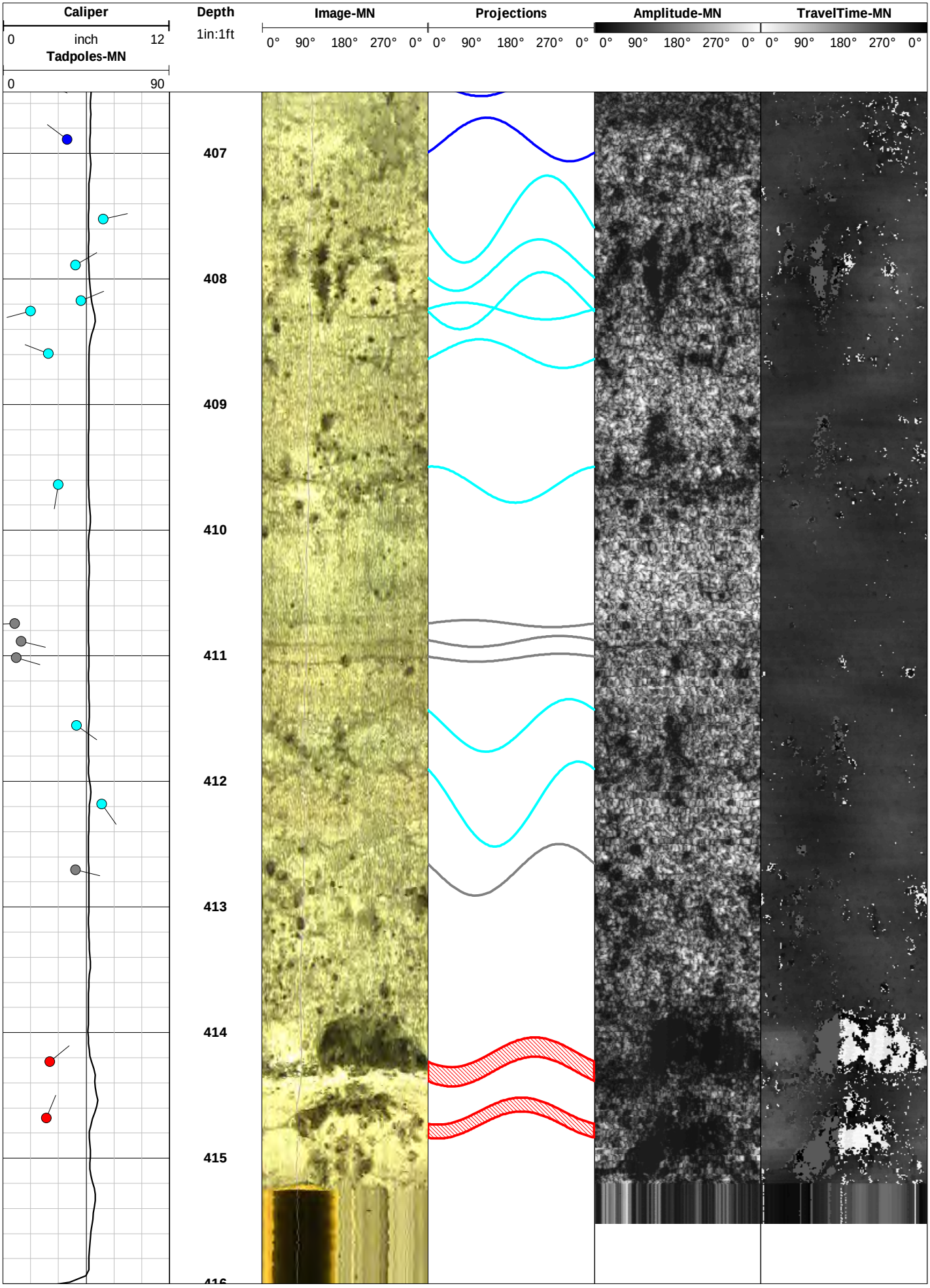
0
inch
12
Tadpoles-MN
0
90
Depth
1in:1ft
Image-MN
0° 90° 180° 270° 0°
Projections
0° 90° 180° 270° 0°
Amplitude-MN
0° 90° 180° 270° 0°
TravelTime-MN
0° 90° 180° 270° 0°
379
380
381
382
383
384
385
386
387


Caliper
0
inch
12
Tadpoles-MN
0
90
Depth
1in:1ft
Image-MN
0° 90° 180° 270° 0°
Projections
0° 90° 180° 270° 0°
Amplitude-MN
0° 90° 180° 270° 0°
TravelTime-MN
0° 90° 180° 270° 0°
388
389
390
391
392
393
394
395
396
397


Caliper
0
inch
12
Tadpoles-MN
0
90
Depth
1in:1ft
Image-MN
0° 90° 180° 270° 0°
Projections
0° 90° 180° 270° 0°
Amplitude-MN
0° 90° 180° 270° 0°
TravelTime-MN
0° 90° 180° 270° 0°
398
399
400
401
402
403
404
405
406


Caliper
0
inch
12
Tadpoles-MN
0
90
Depth
1in:1ft
Image-MN
0° 90° 180° 270° 0°
Projections
0° 90° 180° 270° 0°
Amplitude-MN
0° 90° 180° 270° 0°
TravelTime-MN
0° 90° 180° 270° 0°
407
408
409
410
411
412
413
414
415
416

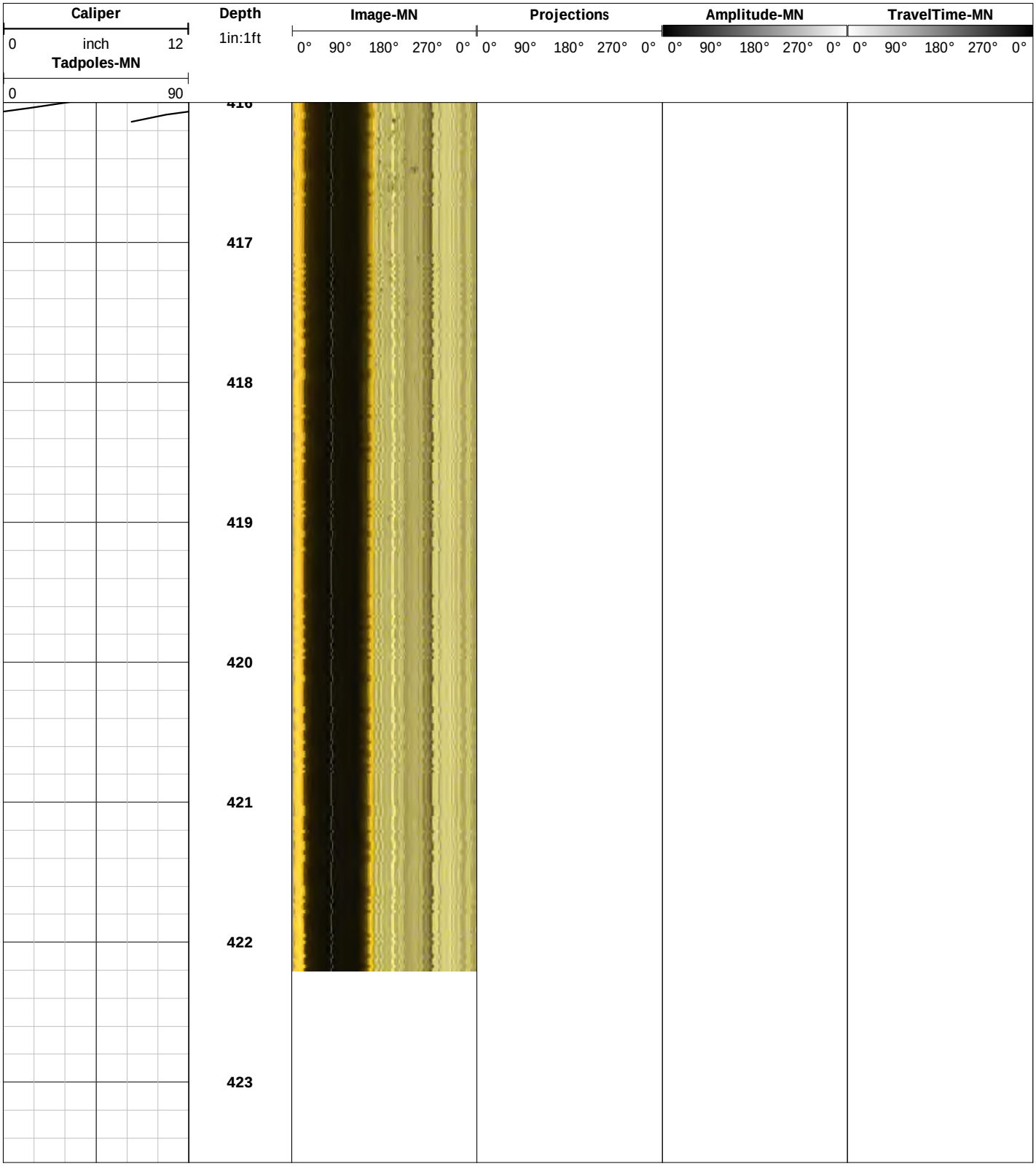
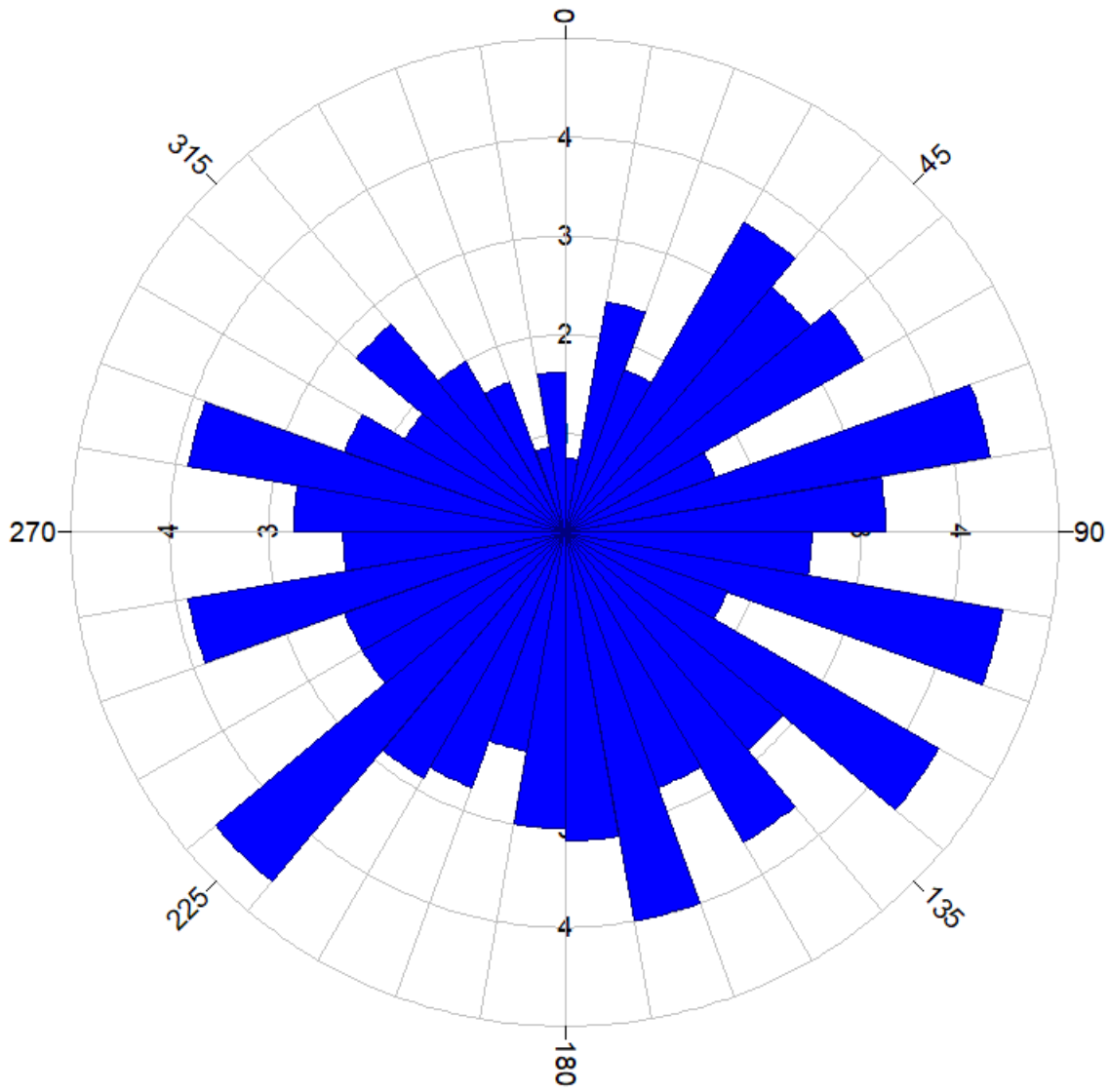

Caliper
0 inch 12
Tadpoles-MN
0 90
Depth
1in:1ft
Image-MN
0° 90° 180° 270° 0°
Projections
0° 90° 180° 270° 0°
Amplitude-MN
0° 90° 180° 270° 0°
TravelTime-MN
0° 90° 180° 270° 0°
417
418
419
420
421
422
423

Figure IRR-01:1 Rose Diagram – Dip Directions
Televiewer Image Features
Arcadis
Marinette
IRR-01
18 May 2022



All directions are with respect to Magnetic North.

Figure IRR-01:2 Rose Diagram – Dip Angles
Televiewer Image Features
Arcadis
Marinette
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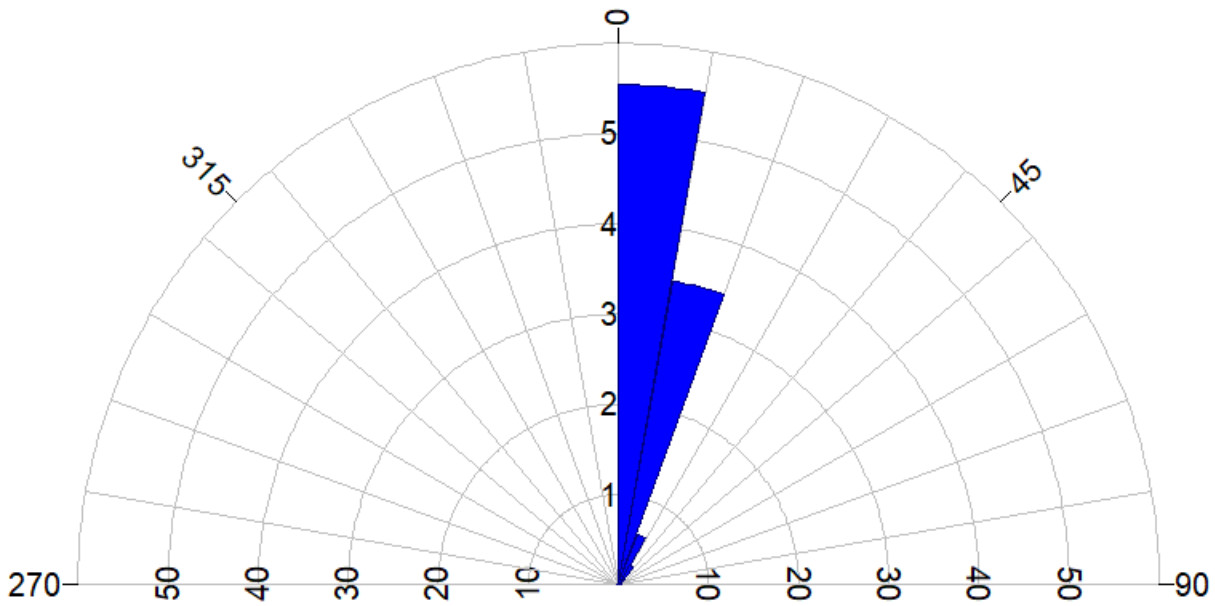
18 May 2022



All directions are with respect to Magnetic North.

Figure IRR-01:3 Stereonet Diagram – Schmidt Projection
Televiewer Image Features
Arcadis
Marinette
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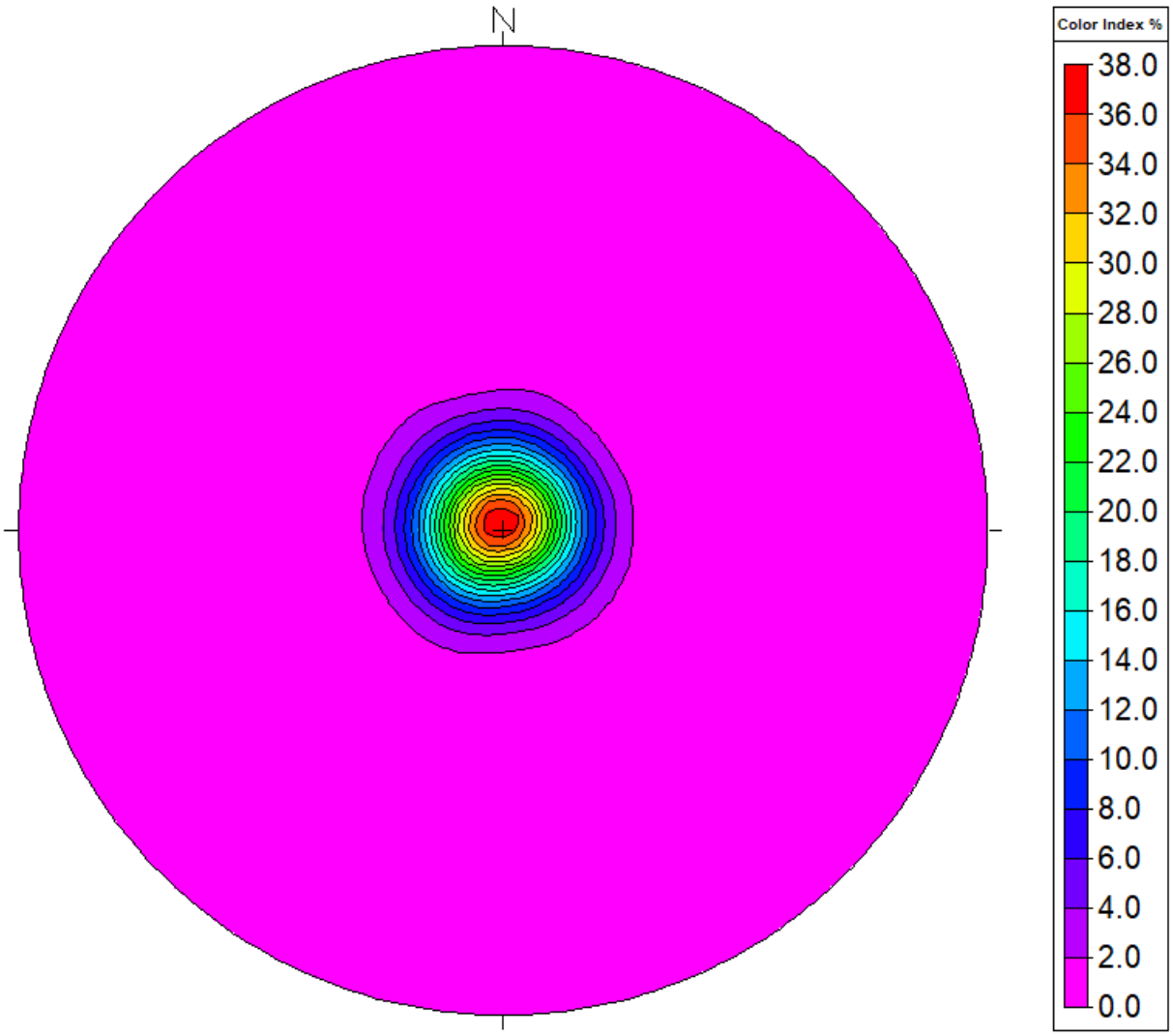
18 May 2022



All directions are with respect to Magnetic North.

Figure IRR-01:4 Stereonet Diagram – Schmidt Projection
Televiewer Image Features
Arcadis
Marinette
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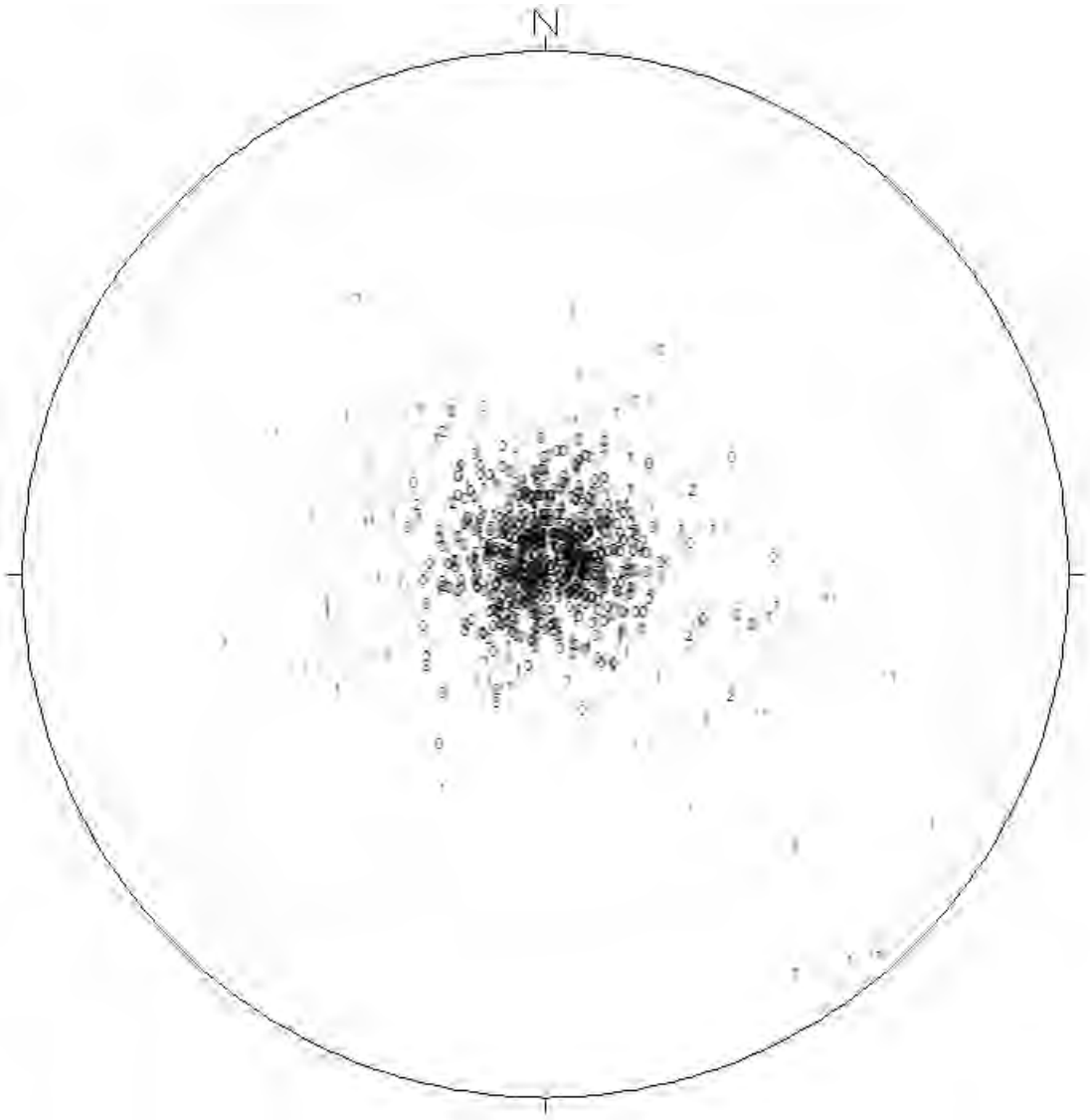
18 May 2022



All directions are with respect to Magnetic North.

Table IRR-01:1 Orientation Summary Table
Televiewer Image Features
Arcadis
Marinette
IRR-01
18 May 2022

Feature No.	Depth (meters)	Depth (feet)	Dip Direction (degrees)	Dip Angle (degrees)	Feature Aperture (mm)	Feature Rank (0 to 5)
1	14.06	46.1	103	0	0	0
2	14.39	47.2	190	5	0	0
3	14.47	47.5	227	8	0	0
4	14.79	48.5	154	11	0	0
5	14.93	49.0	120	15	0	0
6	15.19	49.9	134	20	0	0
7	15.61	51.2	148	7	0	0
8	16.08	52.8	138	21	0	0
9	16.50	54.1	146	21	0	0
10	18.20	59.7	304	77	0	1
11	18.32	60.1	323	84	0	1
12	20.12	66.0	329	80	0	1
13	21.33	70.0	180	0	0	0
14	22.14	72.7	320	87	0	1
15	22.72	74.5	247	6	0	0
16	22.92	75.2	324	11	0	0
17	23.28	76.4	207	38	0	0
18	24.98	82.0	103	14	0	0
19	25.33	83.1	123	11	0	0
20	25.58	83.9	79	12	0	0
21	27.05	88.8	258	3	0	2
22	27.38	89.8	157	5	0	0
23	28.68	94.1	161	12	0	0
24	28.80	94.5	165	10	0	0
25	29.39	96.4	339	14	0	1
26	29.78	97.7	255	5	0	0
27	30.04	98.6	146	5	0	0
28	30.12	98.8	142	10	0	0
29	30.28	99.3	86	8	0	0
30	30.37	99.6	266	6	0	0
31	30.46	100.0	71	6	0	0
32	30.61	100.4	78	10	0	0
33	30.72	100.8	157	5	0	0
34	30.83	101.1	43	10	0	0
35	31.02	101.8	183	18	0	0
36	31.33	102.8	285	13	0	0
37	31.40	103.0	182	4	0	0

All directions are with respect to Magnetic North.

Table IRR-01:1 Orientation Summary Table
Televiewer Image Features
Arcadis
Marinette
IRR-01
18 May 2022

Feature No.	Depth (meters)	Depth (feet)	Dip Direction (degrees)	Dip Angle (degrees)	Feature Aperture (mm)	Feature Rank (0 to 5)
38	31.45	103.2	221	5	0	1
39	31.51	103.4	144	5	0	1
40	31.57	103.6	229	7	0	0
41	31.62	103.8	281	7	0	0
42	32.14	105.5	109	10	0	0
43	32.22	105.7	58	4	0	0
44	32.71	107.3	133	17	0	0
45	32.76	107.5	145	8	0	1
46	32.92	108.0	216	3	0	0
47	32.95	108.1	162	4	0	0
48	33.04	108.4	200	12	0	0
49	33.27	109.2	171	12	0	2
50	33.35	109.4	30	6	0	0
51	33.70	110.6	273	13	0	0
52	34.06	111.7	118	7	0	2
53	34.24	112.3	30	12	0	0
54	34.45	113.0	73	5	0	0
55	34.61	113.6	41	7	0	0
56	34.79	114.1	128	5	0	2
57	34.88	114.4	136	4	0	1
58	34.93	114.6	142	6	0	2
59	35.15	115.3	132	16	0	0
60	35.21	115.5	105	9	0	0
61	35.30	115.8	144	11	0	0
62	35.38	116.1	155	12	0	0
63	35.43	116.2	335	7	0	0
64	35.46	116.3	22	8	0	0
65	35.51	116.5	258	4	0	0
66	35.63	116.9	143	5	0	0
67	35.69	117.1	199	13	0	0
68	35.81	117.5	160	5	0	0
69	35.89	117.7	270	5	0	0
70	35.95	117.9	223	11	0	0
71	36.03	118.2	53	12	0	0
72	36.10	118.5	70	9	0	0
73	36.17	118.7	71	7	0	1
74	36.22	118.8	123	9	0	0

All directions are with respect to Magnetic North.

Table IRR-01:1 Orientation Summary Table
Televiewer Image Features
Arcadis
Marinette
IRR-01
18 May 2022

Feature No.	Depth (meters)	Depth (feet)	Dip Direction (degrees)	Dip Angle (degrees)	Feature Aperture (mm)	Feature Rank (0 to 5)
75	36.28	119.0	109	11	0	0
76	36.37	119.3	107	15	0	0
77	36.46	119.6	127	18	0	0
78	36.55	119.9	108	18	0	0
79	36.95	121.2	287	9	0	1
80	37.60	123.4	39	11	0	1
81	37.71	123.7	26	5	0	1
82	37.90	124.4	62	3	0	1
83	37.96	124.5	80	6	0	1
84	38.07	124.9	128	6	0	1
85	38.24	125.5	164	4	0	1
86	38.49	126.3	163	5	0	2
87	38.61	126.7	148	6	0	2
88	38.75	127.1	262	15	0	0
89	38.83	127.4	14	8	0	0
90	38.88	127.6	37	10	0	0
91	39.02	128.0	49	11	0	0
92	39.11	128.3	135	9	0	0
93	39.26	128.8	63	5	0	0
94	39.29	128.9	171	7	0	0
95	39.32	129.0	159	5	0	0
96	39.53	129.7	154	6	0	0
97	39.58	129.8	229	6	0	0
98	39.64	130.0	43	5	0	0
99	39.77	130.5	188	12	0	0
100	39.89	130.9	188	13	0	0
101	40.01	131.3	203	5	0	0
102	40.08	131.5	265	7	0	0
103	40.12	131.6	249	6	0	0
104	40.25	132.0	234	3	0	0
105	40.35	132.4	45	15	0	0
106	40.41	132.6	35	7	0	0
107	40.46	132.8	52	11	0	0
108	40.54	133.0	228	8	0	0
109	40.60	133.2	222	6	0	0
110	40.70	133.5	213	12	0	0
111	40.89	134.1	170	8	0	0

All directions are with respect to Magnetic North.

Table IRR-01:1 Orientation Summary Table
Televiewer Image Features
Arcadis
Marinette
IRR-01
18 May 2022

Feature No.	Depth (meters)	Depth (feet)	Dip Direction (degrees)	Dip Angle (degrees)	Feature Aperture (mm)	Feature Rank (0 to 5)
112	41.00	134.5	120	11	0	0
113	41.08	134.8	44	4	0	0
114	41.19	135.2	169	11	0	0
115	41.31	135.5	239	10	0	0
116	41.46	136.0	273	12	0	0
117	41.72	136.9	9	7	0	0
118	41.79	137.1	179	7	0	0
119	41.88	137.4	100	17	0	0
120	41.96	137.7	107	5	0	0
121	42.10	138.1	64	10	0	0
122	42.24	138.6	139	9	0	0
123	42.56	139.6	159	12	0	0
124	42.63	139.9	120	10	0	0
125	42.68	140.0	279	0	0	0
126	42.71	140.1	153	13	0	0
127	42.76	140.3	322	2	0	0
128	42.81	140.4	138	7	0	0
129	42.85	140.6	215	8	0	0
130	43.23	141.8	159	7	0	0
131	43.34	142.2	231	6	0	0
132	43.49	142.7	163	5	0	0
133	43.53	142.8	131	6	0	0
134	43.63	143.1	179	10	0	0
135	43.68	143.3	177	14	0	0
136	43.77	143.6	51	3	0	0
137	43.91	144.1	213	0	0	0
138	43.96	144.2	135	10	0	0
139	44.11	144.7	271	5	0	0
140	44.19	145.0	23	21	0	0
141	44.23	145.1	259	5	0	0
142	44.28	145.3	216	5	0	0
143	44.43	145.8	108	7	0	0
144	44.63	146.4	313	7	0	0
145	44.79	146.9	102	3	0	0
146	44.92	147.4	44	13	0	0
147	45.01	147.7	17	4	0	0
148	45.06	147.9	327	13	0	0

All directions are with respect to Magnetic North.

Table IRR-01:1 Orientation Summary Table
Televiewer Image Features
Arcadis
Marinette
IRR-01
18 May 2022

Feature No.	Depth (meters)	Depth (feet)	Dip Direction (degrees)	Dip Angle (degrees)	Feature Aperture (mm)	Feature Rank (0 to 5)
149	45.14	148.1	237	15	0	0
150	45.27	148.5	274	8	0	0
151	45.54	149.4	185	3	0	1
152	45.86	150.5	321	5	0	0
153	46.04	151.1	285	10	0	0
154	46.13	151.4	227	10	0	0
155	46.19	151.5	229	10	0	0
156	46.27	151.8	218	5	0	0
157	46.36	152.1	233	11	0	0
158	46.64	153.0	286	5	0	1
159	46.70	153.2	17	17	0	1
160	46.73	153.3	284	6	0	1
161	47.18	154.8	248	5	0	0
162	47.24	155.0	284	5	0	0
163	47.47	155.8	71	9	0	0
164	47.62	156.2	289	3	0	0
165	47.67	156.4	109	8	0	0
166	47.84	157.0	83	7	0	0
167	47.91	157.2	102	8	0	0
168	47.97	157.4	128	6	0	0
169	48.02	157.6	105	23	0	0
170	48.10	157.8	90	9	0	0
171	48.15	158.0	311	3	0	0
172	48.21	158.2	57	9	0	0
173	48.25	158.3	321	4	0	0
174	48.30	158.5	192	6	0	0
175	48.34	158.6	172	7	0	0
176	48.40	158.8	150	9	0	0
177	48.47	159.0	229	14	0	0
178	48.61	159.5	107	9	0	0
179	48.69	159.7	45	7	0	0
180	48.77	160.0	184	5	0	0
181	48.85	160.3	286	5	0	0
182	48.92	160.5	54	24	0	0
183	48.98	160.7	227	7	0	0
184	49.01	160.8	203	7	0	0
185	49.12	161.1	111	5	0	0

All directions are with respect to Magnetic North.

Table IRR-01:1 Orientation Summary Table
Televiewer Image Features
Arcadis
Marinette
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18 May 2022

Feature No.	Depth (meters)	Depth (feet)	Dip Direction (degrees)	Dip Angle (degrees)	Feature Aperture (mm)	Feature Rank (0 to 5)
186	49.17	161.3	271	4	0	0
187	49.22	161.5	270	8	0	0
188	49.31	161.8	271	0	0	0
189	49.35	161.9	142	3	0	0
190	49.40	162.1	236	4	0	0
191	49.44	162.2	56	5	0	0
192	49.48	162.3	128	7	0	0
193	49.53	162.5	146	17	0	0
194	49.59	162.7	312	0	0	0
195	49.65	162.9	325	5	0	0
196	49.71	163.1	258	6	0	0
197	49.78	163.3	56	7	0	0
198	49.87	163.6	209	5	0	0
199	49.93	163.8	298	5	0	0
200	49.99	164.0	188	5	0	0
201	50.02	164.1	167	5	0	0
202	50.13	164.5	223	6	0	0
203	50.20	164.7	350	2	0	0
204	50.27	164.9	35	5	0	0
205	50.31	165.1	49	5	0	0
206	50.35	165.2	73	9	0	0
207	50.43	165.5	161	7	0	0
208	50.50	165.7	34	16	0	0
209	50.57	165.9	220	5	0	0
210	50.61	166.1	265	6	0	0
211	50.66	166.2	227	4	0	0
212	50.79	166.6	282	8	0	0
213	50.84	166.8	307	9	0	0
214	50.89	167.0	309	6	0	0
215	50.98	167.3	99	3	0	2
216	51.08	167.6	348	5	0	0
217	51.19	168.0	135	1	0	0
218	51.27	168.2	171	8	0	0
219	51.37	168.6	56	6	0	0
220	51.49	168.9	232	11	0	0
221	51.59	169.3	201	11	0	0
222	51.63	169.4	229	10	0	0

All directions are with respect to Magnetic North.

Table IRR-01:1 Orientation Summary Table
Televiewer Image Features
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Feature No.	Depth (meters)	Depth (feet)	Dip Direction (degrees)	Dip Angle (degrees)	Feature Aperture (mm)	Feature Rank (0 to 5)
223	51.98	170.6	134	5	0	0
224	52.06	170.8	32	10	0	0
225	52.20	171.3	209	6	0	0
226	52.26	171.5	255	8	0	0
227	52.32	171.7	164	5	0	0
228	52.36	171.8	154	17	0	0
229	52.44	172.1	176	15	0	0
230	52.49	172.2	160	12	0	0
231	52.55	172.4	190	9	0	0
232	52.65	172.7	146	4	0	0
233	52.72	173.0	282	2	0	0
234	52.81	173.3	42	8	0	0
235	52.94	173.7	54	5	0	0
236	53.03	174.0	160	7	0	0
237	53.11	174.3	189	14	0	0
238	53.17	174.4	209	13	0	0
239	53.92	176.9	14	10	0	0
240	54.11	177.5	15	11	0	0
241	54.25	178.0	45	7	0	0
242	54.50	178.8	302	3	0	0
243	54.84	179.9	260	13	0	0
244	55.00	180.5	109	2	0	0
245	55.09	180.7	35	2	0	0
246	55.23	181.2	183	12	0	0
247	55.32	181.5	127	9	0	0
248	55.38	181.7	100	12	0	0
249	55.48	182.0	79	5	0	0
250	55.73	182.8	171	13	0	0
251	55.94	183.5	229	5	0	0
252	56.30	184.7	319	6	0	0
253	56.44	185.2	120	2	36	3
254	56.60	185.7	244	8	0	0
255	56.73	186.1	279	4	0	0
256	56.76	186.2	226	4	0	0
257	56.88	186.6	176	10	0	0
258	57.22	187.7	178	8	0	0
259	57.36	188.2	219	2	0	0

All directions are with respect to Magnetic North.

Table IRR-01:1 Orientation Summary Table
Televiewer Image Features
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Feature No.	Depth (meters)	Depth (feet)	Dip Direction (degrees)	Dip Angle (degrees)	Feature Aperture (mm)	Feature Rank (0 to 5)
260	57.50	188.7	210	11	0	0
261	57.73	189.4	223	13	0	0
262	58.33	191.4	186	3	0	1
263	58.55	192.1	271	7	0	0
264	58.83	193.0	266	5	0	0
265	59.00	193.6	285	13	0	0
266	59.04	193.7	255	6	0	0
267	59.11	193.9	225	5	0	0
268	59.21	194.3	310	5	0	0
269	59.43	195.0	15	12	0	0
270	59.45	195.1	47	1	0	0
271	59.52	195.3	173	11	0	0
272	59.60	195.6	58	8	0	0
273	59.73	196.0	244	5	0	0
274	59.99	196.8	123	9	0	0
275	60.08	197.1	283	3	0	0
276	60.17	197.4	289	3	0	0
277	60.27	197.7	228	6	0	0
278	60.41	198.2	258	7	0	0
279	60.44	198.3	264	3	0	0
280	60.48	198.4	160	8	0	0
281	60.56	198.7	69	2	0	0
282	60.62	198.9	165	5	0	0
283	60.67	199.1	193	3	0	0
284	60.76	199.3	298	15	0	0
285	60.80	199.5	201	7	0	0
286	60.85	199.7	274	3	0	0
287	60.92	199.9	296	4	0	0
288	60.99	200.1	258	3	0	0
289	61.05	200.3	228	3	0	0
290	61.33	201.2	123	2	0	0
291	61.51	201.8	133	6	0	0
292	61.69	202.4	294	1	0	0
293	61.83	202.8	338	4	0	0
294	61.90	203.1	201	5	0	0
295	62.06	203.6	70	3	0	0
296	62.10	203.7	328	3	0	0

All directions are with respect to Magnetic North.

Table IRR-01:1 Orientation Summary Table
Televiewer Image Features
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Feature No.	Depth (meters)	Depth (feet)	Dip Direction (degrees)	Dip Angle (degrees)	Feature Aperture (mm)	Feature Rank (0 to 5)
297	62.16	203.9	144	6	0	0
298	62.28	204.3	96	6	0	0
299	62.40	204.7	98	10	0	0
300	62.47	205.0	142	4	0	0
301	62.54	205.2	100	7	0	0
302	62.66	205.6	229	7	0	0
303	62.76	205.9	218	5	0	1
304	62.82	206.1	218	5	0	1
305	62.90	206.4	242	1	0	1
306	63.09	207.0	209	5	0	0
307	63.15	207.2	317	3	0	0
308	63.46	208.2	198	3	0	0
309	63.49	208.3	261	3	0	0
310	63.55	208.5	0	8	0	0
311	63.65	208.8	75	12	0	0
312	63.83	209.4	311	3	0	0
313	64.04	210.1	228	3	0	0
314	64.19	210.6	40	26	0	0
315	64.30	211.0	258	7	0	0
316	64.35	211.1	245	12	0	0
317	64.48	211.6	231	3	0	0
318	64.68	212.2	255	9	0	0
319	64.81	212.6	250	12	0	0
320	64.89	212.9	287	8	0	0
321	64.96	213.1	73	2	0	0
322	65.25	214.1	214	4	0	0
323	65.34	214.4	220	2	0	0
324	65.41	214.6	109	5	0	0
325	65.50	214.9	58	4	0	0
326	65.54	215.0	79	12	0	0
327	65.74	215.7	56	3	0	0
328	65.89	216.2	137	6	0	0
329	66.13	217.0	88	4	0	0
330	66.17	217.1	150	5	0	0
331	66.31	217.6	71	3	0	0
332	66.78	219.1	133	11	0	0
333	66.98	219.8	283	6	0	0

All directions are with respect to Magnetic North.

Table IRR-01:1 Orientation Summary Table
Televiewer Image Features
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Feature No.	Depth (meters)	Depth (feet)	Dip Direction (degrees)	Dip Angle (degrees)	Feature Aperture (mm)	Feature Rank (0 to 5)
334	67.07	220.1	293	3	0	0
335	67.54	221.6	319	60	0	0
336	67.67	222.0	238	9	118	3
337	68.00	223.1	187	8	0	0
338	68.46	224.6	35	10	0	1
339	68.59	225.0	118	14	0	1
340	68.66	225.3	146	16	0	1
341	68.78	225.6	164	10	0	1
342	68.96	226.2	154	4	0	1
343	69.30	227.4	145	3	0	0
344	69.62	228.4	141	5	0	1
345	69.74	228.8	188	8	0	1
346	69.80	229.0	149	8	0	1
347	69.86	229.2	110	22	0	1
348	69.97	229.6	171	7	0	1
349	70.19	230.3	123	18	0	2
350	70.27	230.5	94	12	0	1
351	70.42	231.0	191	8	0	2
352	70.50	231.3	299	6	0	2
353	70.61	231.7	256	10	0	2
354	70.73	232.1	214	6	0	1
355	70.85	232.5	129	9	0	1
356	71.03	233.0	78	36	0	1
357	71.14	233.4	86	27	0	1
358	71.24	233.7	79	17	0	2
359	71.29	233.9	128	14	0	1
360	71.52	234.6	91	19	0	0
361	71.71	235.3	120	13	0	0
362	71.82	235.6	158	20	0	0
363	71.92	236.0	142	18	0	0
364	72.05	236.4	73	12	0	0
365	72.12	236.6	33	6	0	0
366	72.16	236.8	114	1	0	0
367	72.27	237.1	354	11	0	0
368	72.29	237.2	157	27	0	0
369	72.37	237.4	145	19	0	0
370	72.61	238.2	84	20	0	0

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Table IRR-01:1 Orientation Summary Table
Televiewer Image Features
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Feature No.	Depth (meters)	Depth (feet)	Dip Direction (degrees)	Dip Angle (degrees)	Feature Aperture (mm)	Feature Rank (0 to 5)
371	72.72	238.6	73	20	0	0
372	72.78	238.8	75	15	0	0
373	72.88	239.1	81	14	0	0
374	73.23	240.3	268	17	0	0
375	73.40	240.8	311	12	0	0
376	73.51	241.2	40	12	0	0
377	73.77	242.0	285	30	0	0
378	73.87	242.4	116	5	0	0
379	74.21	243.5	127	5	0	0
380	74.42	244.2	243	14	0	2
381	74.48	244.4	217	14	0	1
382	74.64	244.9	49	11	0	2
383	74.74	245.2	50	10	0	1
384	74.83	245.5	50	10	0	0
385	74.96	245.9	357	9	0	2
386	75.00	246.1	34	12	0	1
387	75.09	246.4	357	9	0	2
388	75.25	246.9	221	4	0	2
389	75.32	247.1	126	4	0	1
390	75.68	248.3	256	3	0	1
391	75.78	248.6	343	4	0	0
392	75.97	249.2	30	5	0	0
393	76.16	249.9	288	58	0	1
394	76.16	249.9	75	7	0	0
395	76.41	250.7	274	15	0	0
396	76.52	251.0	257	26	0	1
397	76.63	251.4	359	9	0	1
398	76.71	251.7	358	10	0	0
399	76.77	251.9	353	9	0	0
400	76.96	252.5	55	16	0	0
401	77.17	253.2	195	16	0	0
402	77.31	253.7	13	10	0	0
403	77.45	254.1	206	8	0	0
404	77.62	254.7	333	16	0	0
405	77.67	254.8	8	5	0	0
406	77.73	255.0	157	16	0	0
407	77.93	255.7	195	17	0	0

All directions are with respect to Magnetic North.

Table IRR-01:1 Orientation Summary Table
Televiewer Image Features
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Feature No.	Depth (meters)	Depth (feet)	Dip Direction (degrees)	Dip Angle (degrees)	Feature Aperture (mm)	Feature Rank (0 to 5)
408	78.04	256.1	186	5	0	0
409	78.34	257.0	132	12	0	1
410	78.67	258.1	284	3	0	0
411	79.00	259.2	280	8	0	0
412	79.15	259.7	106	10	0	0
413	79.25	260.0	87	5	0	0
414	79.32	260.2	116	15	0	0
415	79.35	260.3	115	13	0	0
416	79.45	260.7	101	10	0	0
417	79.80	261.8	245	4	0	1
418	79.93	262.2	197	6	0	1
419	80.01	262.5	203	26	0	1
420	80.38	263.7	95	12	0	1
421	80.52	264.2	104	7	0	0
422	80.63	264.5	129	5	0	0
423	80.69	264.7	323	5	0	0
424	80.76	265.0	75	6	0	0
425	80.82	265.2	113	12	0	1
426	80.90	265.4	162	8	0	1
427	81.01	265.8	97	6	0	1
428	81.05	265.9	49	4	0	0
429	81.39	267.0	352	18	0	1
430	81.49	267.4	335	14	0	1
431	81.73	268.1	242	3	0	1
432	81.97	268.9	277	5	0	0
433	82.06	269.2	37	8	0	1
434	82.21	269.7	156	4	0	1
435	82.34	270.1	330	44	0	1
436	82.58	270.9	54	4	0	1
437	82.82	271.7	95	5	0	2
438	82.93	272.1	99	9	0	1
439	83.29	273.3	192	20	0	0
440	83.65	274.4	77	18	0	1
441	83.82	275.0	138	27	0	1
442	84.00	275.6	116	49	0	1
443	84.05	275.8	277	44	0	1
444	84.14	276.1	302	14	0	1

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Table IRR-01:1 Orientation Summary Table
Televiewer Image Features
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Feature No.	Depth (meters)	Depth (feet)	Dip Direction (degrees)	Dip Angle (degrees)	Feature Aperture (mm)	Feature Rank (0 to 5)
445	84.24	276.4	36	7	0	1
446	84.38	276.8	225	2	0	0
447	84.44	277.0	359	7	0	1
448	84.48	277.2	332	9	0	0
449	84.61	277.6	353	11	0	1
450	84.64	277.7	3	10	0	1
451	84.69	277.9	173	8	0	0
452	84.76	278.1	192	9	0	1
453	84.78	278.2	179	17	0	0
454	84.89	278.5	213	14	0	1
455	84.96	278.7	295	9	0	0
456	85.06	279.1	294	12	0	1
457	85.10	279.2	284	5	0	1
458	85.17	279.4	258	11	0	0
459	85.21	279.6	255	10	0	0
460	85.26	279.7	248	11	0	0
461	85.31	279.9	258	6	0	0
462	85.53	280.6	343	13	0	0
463	85.63	280.9	292	5	0	0
464	85.69	281.2	26	2	0	2
465	85.74	281.3	52	2	0	0
466	85.78	281.4	78	6	0	1
467	85.95	282.0	82	3	0	0
468	85.99	282.1	95	12	0	0
469	86.07	282.4	140	8	0	0
470	86.14	282.6	10	12	0	1
471	86.25	283.0	327	8	0	1
472	86.38	283.4	239	18	0	1
473	86.54	283.9	347	14	0	0
474	86.60	284.1	316	24	0	1
475	86.72	284.5	335	31	0	1
476	86.81	284.8	354	13	0	0
477	86.82	284.9	162	14	0	1
478	87.45	286.9	211	5	0	0
479	87.84	288.2	153	9	0	0
480	88.05	288.9	176	20	0	0
481	88.29	289.7	170	11	0	0

All directions are with respect to Magnetic North.

Table IRR-01:1 Orientation Summary Table
Televiewer Image Features
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Feature No.	Depth (meters)	Depth (feet)	Dip Direction (degrees)	Dip Angle (degrees)	Feature Aperture (mm)	Feature Rank (0 to 5)
482	88.79	291.3	297	24	0	2
483	88.86	291.5	303	13	0	0
484	88.93	291.8	289	25	0	0
485	89.00	292.0	291	11	0	0
486	89.10	292.3	196	11	0	0
487	89.39	293.3	211	6	0	0
488	89.44	293.4	126	4	0	0
489	89.56	293.8	344	3	0	0
490	89.62	294.0	30	5	0	0
491	89.78	294.5	32	22	0	1
492	89.85	294.8	35	18	0	1
493	89.95	295.1	358	7	0	1
494	90.11	295.6	92	13	0	1
495	90.68	297.5	25	16	0	1
496	90.72	297.7	29	14	0	1
497	90.83	298.0	58	11	0	2
498	90.99	298.5	242	25	0	2
499	91.11	298.9	265	5	0	0
500	91.20	299.2	84	12	0	1
501	91.38	299.8	128	17	0	0
502	91.57	300.4	169	15	0	0
503	91.68	300.8	96	10	0	0
504	91.77	301.1	118	15	0	0
505	91.92	301.6	168	14	0	1
506	92.24	302.6	123	8	0	1
507	92.33	302.9	254	21	0	1
508	92.40	303.2	134	18	0	1
509	92.54	303.6	103	8	0	1
510	92.63	303.9	64	7	0	0
511	92.66	304.0	102	8	0	1
512	92.73	304.2	128	13	0	1
513	92.80	304.5	134	10	0	1
514	92.88	304.7	119	8	0	1
515	92.96	305.0	170	14	0	0
516	93.01	305.2	161	13	0	1
517	93.12	305.5	269	12	0	0
518	93.18	305.7	215	5	0	0

All directions are with respect to Magnetic North.

Table IRR-01:1 Orientation Summary Table
Televiewer Image Features
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Feature No.	Depth (meters)	Depth (feet)	Dip Direction (degrees)	Dip Angle (degrees)	Feature Aperture (mm)	Feature Rank (0 to 5)
519	93.25	305.9	195	5	0	0
520	93.35	306.3	202	12	0	2
521	93.50	306.8	83	24	0	1
522	93.62	307.2	81	36	0	1
523	93.87	308.0	108	26	0	1
524	93.92	308.1	104	29	0	1
525	93.99	308.4	103	30	0	1
526	94.17	309.0	192	13	0	1
527	94.22	309.1	235	11	0	1
528	94.32	309.5	137	21	0	1
529	94.38	309.6	147	29	0	0
530	94.45	309.9	165	11	0	0
531	94.51	310.1	160	6	0	0
532	94.66	310.6	211	16	0	0
533	94.83	311.1	164	11	0	0
534	94.95	311.5	174	15	0	0
535	95.09	312.0	29	20	0	1
536	95.12	312.1	47	9	0	1
537	95.16	312.2	52	5	0	1
538	95.21	312.4	47	9	0	1
539	95.53	313.4	211	4	0	1
540	95.63	313.7	303	12	0	1
541	95.73	314.1	19	20	0	1
542	96.14	315.4	200	18	0	0
543	96.44	316.4	325	5	0	1
544	96.51	316.6	345	12	0	1
545	96.56	316.8	17	3	0	1
546	96.65	317.1	41	5	0	1
547	96.67	317.2	18	5	0	1
548	96.71	317.3	337	10	0	1
549	96.74	317.4	337	14	0	1
550	96.88	317.9	220	5	0	0
551	97.01	318.3	70	5	0	0
552	97.11	318.6	330	5	0	0
553	97.24	319.0	203	21	0	0
554	97.40	319.6	231	11	0	0
555	97.54	320.0	91	5	0	0

All directions are with respect to Magnetic North.

Table IRR-01:1 Orientation Summary Table
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Feature No.	Depth (meters)	Depth (feet)	Dip Direction (degrees)	Dip Angle (degrees)	Feature Aperture (mm)	Feature Rank (0 to 5)
556	97.66	320.4	243	4	0	0
557	97.78	320.8	15	3	0	0
558	97.98	321.5	348	23	0	0
559	98.10	321.9	334	8	0	0
560	98.26	322.4	91	4	0	0
561	98.30	322.5	86	3	0	0
562	98.36	322.7	232	4	0	0
563	98.64	323.6	230	8	0	0
564	98.73	323.9	113	5	0	1
565	98.84	324.3	89	15	0	0
566	98.93	324.6	100	7	0	0
567	99.00	324.8	58	9	0	0
568	99.06	325.0	78	16	0	0
569	99.13	325.2	82	17	0	0
570	99.21	325.5	31	11	0	0
571	99.32	325.8	19	7	0	0
572	99.59	326.7	88	7	0	0
573	99.69	327.1	13	16	0	0
574	99.80	327.4	333	17	0	0
575	99.83	327.5	286	16	0	1
576	99.87	327.7	247	14	0	0
577	99.96	327.9	271	9	0	1
578	100.06	328.3	158	14	0	0
579	100.45	329.6	77	14	0	1
580	100.55	329.9	226	8	0	1
581	100.59	330.0	197	18	0	0
582	100.65	330.2	189	23	0	1
583	100.79	330.7	327	18	0	0
584	100.96	331.2	17	8	0	0
585	101.06	331.6	258	8	0	0
586	101.18	332.0	46	15	0	0
587	101.34	332.5	239	33	0	0
588	101.39	332.6	311	6	0	0
589	101.47	332.9	265	5	0	0
590	101.58	333.3	186	18	0	0
591	102.03	334.7	297	16	0	0
592	102.10	335.0	305	41	0	1

All directions are with respect to Magnetic North.

Table IRR-01:1 Orientation Summary Table
Televiewer Image Features
Arcadis
Marinette
IRR-01
18 May 2022

Feature No.	Depth (meters)	Depth (feet)	Dip Direction (degrees)	Dip Angle (degrees)	Feature Aperture (mm)	Feature Rank (0 to 5)
593	102.34	335.8	316	12	0	0
594	102.47	336.2	305	17	0	0
595	102.57	336.5	229	10	0	0
596	102.63	336.7	224	22	0	0
597	102.75	337.1	223	11	0	0
598	102.81	337.3	209	12	0	0
599	102.90	337.6	255	6	0	0
600	102.98	337.9	282	5	0	0
601	103.08	338.2	308	8	0	0
602	103.22	338.7	328	18	0	0
603	103.26	338.8	313	6	0	0
604	103.35	339.1	180	11	0	0
605	103.56	339.8	268	5	0	0
606	103.67	340.1	261	22	0	0
607	103.74	340.4	286	5	0	0
608	103.85	340.7	249	17	0	0
609	103.99	341.2	240	3	0	1
610	104.06	341.4	133	8	0	1
611	104.15	341.7	82	8	0	0
612	104.21	341.9	147	15	0	1
613	104.28	342.1	148	12	0	0
614	104.35	342.4	182	27	0	1
615	104.58	343.1	221	1	0	1
616	104.65	343.3	250	5	0	1
617	104.79	343.8	231	15	0	1
618	104.84	344.0	162	3	0	1
619	104.91	344.2	259	6	0	1
620	104.96	344.4	316	5	0	0
621	105.09	344.8	276	12	0	0
622	105.23	345.2	238	12	0	0
623	105.32	345.5	278	8	0	0
624	105.41	345.8	278	6	0	0
625	105.47	346.0	214	9	0	0
626	105.55	346.3	91	16	0	0
627	105.67	346.7	65	22	0	0
628	105.79	347.1	63	29	0	0
629	105.88	347.4	181	11	0	0

All directions are with respect to Magnetic North.

Table IRR-01:1 Orientation Summary Table
Televiewer Image Features
Arcadis
Marinette
IRR-01
18 May 2022

Feature No.	Depth (meters)	Depth (feet)	Dip Direction (degrees)	Dip Angle (degrees)	Feature Aperture (mm)	Feature Rank (0 to 5)
630	105.96	347.6	176	17	0	2
631	106.22	348.5	123	5	0	1
632	106.26	348.6	178	7	0	2
633	106.38	349.0	84	7	0	0
634	106.48	349.3	93	4	0	1
635	106.50	349.4	123	13	0	0
636	106.71	350.1	319	16	0	1
637	106.80	350.4	194	15	0	1
638	106.84	350.5	319	18	0	1
639	106.90	350.7	207	29	0	1
640	106.95	350.9	185	40	0	1
641	107.15	351.5	93	15	0	1
642	107.27	352.0	280	36	0	1
643	107.35	352.2	283	35	0	1
644	107.39	352.3	226	17	0	1
645	107.44	352.5	204	20	0	0
646	107.55	352.9	234	14	0	0
647	107.68	353.3	207	15	0	0
648	107.75	353.5	5	10	0	0
649	107.86	353.9	26	12	0	0
650	107.92	354.1	228	4	0	0
651	108.06	354.5	230	12	0	0
652	108.14	354.8	250	4	0	1
653	108.18	354.9	208	10	0	0
654	108.29	355.3	159	6	0	0
655	108.38	355.6	49	0	0	0
656	108.57	356.2	121	25	0	0
657	108.74	356.8	258	14	0	0
658	109.10	357.9	32	33	0	0
659	109.23	358.4	54	10	0	0
660	109.33	358.7	128	9	0	0
661	109.47	359.1	200	11	0	0
662	110.03	361.0	160	7	0	2
663	110.20	361.6	108	6	0	1
664	110.25	361.7	153	6	0	1
665	110.31	361.9	165	4	0	1
666	110.68	363.1	168	5	0	1

All directions are with respect to Magnetic North.

Table IRR-01:1 Orientation Summary Table
Televiewer Image Features
Arcadis
Marinette
IRR-01
18 May 2022

Feature No.	Depth (meters)	Depth (feet)	Dip Direction (degrees)	Dip Angle (degrees)	Feature Aperture (mm)	Feature Rank (0 to 5)
667	110.90	363.8	248	2	0	1
668	111.00	364.2	194	16	0	0
669	111.12	364.6	222	7	0	0
670	111.21	364.9	257	4	0	0
671	111.31	365.2	304	11	0	1
672	111.48	365.8	69	11	0	0
673	111.70	366.5	53	17	0	0
674	111.75	366.6	34	7	0	0
675	111.82	366.9	179	11	0	0
676	111.98	367.4	247	7	0	0
677	112.02	367.5	291	8	0	0
678	112.08	367.7	77	5	0	0
679	112.13	367.9	290	7	0	0
680	112.35	368.6	245	10	0	1
681	112.44	368.9	314	34	0	1
682	112.68	369.7	308	8	0	0
683	112.80	370.1	282	5	0	0
684	113.07	371.0	42	12	0	2
685	113.21	371.4	294	11	0	1
686	113.34	371.9	262	14	0	1
687	113.51	372.4	76	14	0	1
688	113.57	372.6	93	15	0	2
689	113.76	373.2	82	6	0	1
690	113.81	373.4	31	6	0	1
691	113.89	373.7	65	6	0	1
692	114.03	374.1	73	8	0	1
693	114.07	374.3	50	8	0	1
694	114.11	374.4	36	3	0	1
695	114.17	374.6	44	4	0	0
696	114.22	374.7	32	6	0	0
697	114.32	375.1	36	4	0	0
698	114.39	375.3	68	3	0	0
699	114.45	375.5	99	2	0	0
700	114.48	375.6	102	10	0	0
701	114.51	375.7	104	5	0	0
702	114.60	376.0	128	7	0	0
703	114.66	376.2	128	10	0	0

All directions are with respect to Magnetic North.

Table IRR-01:1 Orientation Summary Table
Televiewer Image Features
Arcadis
Marinette
IRR-01
18 May 2022

Feature No.	Depth (meters)	Depth (feet)	Dip Direction (degrees)	Dip Angle (degrees)	Feature Aperture (mm)	Feature Rank (0 to 5)
704	114.78	376.6	79	6	0	1
705	114.86	376.8	75	4	0	1
706	114.93	377.1	161	11	0	0
707	114.98	377.2	293	9	0	0
708	115.14	377.8	41	15	0	0
709	115.23	378.0	79	2	0	0
710	115.32	378.4	277	2	0	1
711	115.36	378.5	315	3	0	1
712	115.54	379.1	140	4	0	0
713	115.62	379.3	255	5	0	1
714	115.72	379.7	187	3	0	1
715	115.86	380.1	181	5	0	0
716	115.94	380.4	82	3	0	0
717	115.97	380.5	52	5	0	0
718	116.08	380.8	17	8	0	0
719	116.13	381.0	25	7	0	0
720	116.18	381.2	38	6	0	0
721	116.22	381.3	7	3	0	0
722	116.24	381.4	120	3	0	0
723	116.29	381.5	37	6	0	0
724	116.33	381.7	13	13	0	0
725	116.40	381.9	19	5	0	0
726	116.77	383.1	65	3	0	0
727	117.05	384.0	49	8	0	1
728	117.14	384.3	27	7	0	1
729	117.28	384.8	138	5	0	1
730	117.38	385.1	181	5	0	1
731	117.49	385.5	162	6	0	1
732	117.64	386.0	23	3	0	1
733	117.78	386.4	358	9	0	1
734	117.83	386.6	43	9	0	1
735	117.90	386.8	76	6	0	0
736	117.99	387.1	38	11	0	0
737	118.06	387.4	10	9	0	0
738	118.20	387.8	23	12	0	0
739	118.37	388.3	34	3	0	0
740	118.41	388.5	125	8	0	0

All directions are with respect to Magnetic North.

Table IRR-01:1 Orientation Summary Table
Televiewer Image Features
Arcadis
Marinette
IRR-01
18 May 2022

Feature No.	Depth (meters)	Depth (feet)	Dip Direction (degrees)	Dip Angle (degrees)	Feature Aperture (mm)	Feature Rank (0 to 5)
741	118.50	388.8	101	10	0	0
742	118.64	389.3	80	8	0	0
743	118.72	389.5	89	12	0	0
744	118.78	389.7	104	18	0	0
745	118.98	390.4	141	27	0	2
746	119.05	390.6	314	15	0	1
747	119.13	390.8	322	11	0	1
748	119.21	391.1	139	16	0	1
749	119.30	391.4	140	32	0	1
750	119.46	391.9	71	15	0	1
751	119.50	392.1	84	11	0	1
752	119.57	392.3	162	18	0	1
753	119.66	392.6	83	5	0	1
754	119.94	393.5	163	9	0	1
755	120.12	394.1	155	3	0	1
756	120.22	394.4	250	14	0	0
757	120.25	394.5	268	35	0	0
758	120.36	394.9	253	13	0	0
759	120.55	395.5	308	7	0	0
760	120.58	395.6	56	15	0	0
761	120.63	395.8	58	8	0	1
762	120.70	396.0	80	6	0	1
763	120.80	396.3	26	39	0	1
764	121.03	397.1	216	21	0	1
765	121.16	397.5	276	17	0	1
766	121.25	397.8	291	2	0	0
767	121.29	397.9	177	11	0	1
768	121.40	398.3	173	8	0	0
769	121.53	398.7	121	33	0	0
770	121.86	399.8	289	16	0	0
771	122.00	400.3	275	11	0	0
772	122.20	400.9	286	33	0	0
773	122.29	401.2	313	15	0	0
774	122.37	401.5	284	11	0	0
775	122.46	401.8	290	13	0	0
776	122.53	402.0	318	8	0	0
777	122.61	402.3	313	10	0	0

All directions are with respect to Magnetic North.

Table IRR-01:1 Orientation Summary Table
Televiewer Image Features
Arcadis
Marinette
IRR-01
18 May 2022

Feature No.	Depth (meters)	Depth (feet)	Dip Direction (degrees)	Dip Angle (degrees)	Feature Aperture (mm)	Feature Rank (0 to 5)
778	122.66	402.4	217	11	0	1
779	122.76	402.8	224	9	0	0
780	122.83	403.0	219	8	0	0
781	123.23	404.3	88	3	0	1
782	123.38	404.8	259	10	0	1
783	123.49	405.2	269	18	0	1
784	123.68	405.8	306	11	0	0
785	123.80	406.2	229	8	0	1
786	123.88	406.4	114	23	0	2
787	124.02	406.9	306	35	0	2
788	124.21	407.5	77	54	0	1
789	124.32	407.9	60	39	0	1
790	124.41	408.2	68	42	0	1
791	124.44	408.3	255	15	0	1
792	124.54	408.6	291	25	0	1
793	124.86	409.6	189	30	0	1
794	125.19	410.7	268	6	0	0
795	125.24	410.9	104	10	0	0
796	125.28	411.0	106	7	0	0
797	125.44	411.6	126	40	0	1
798	125.63	412.2	144	53	0	1
799	125.79	412.7	103	39	0	0
800	126.26	414.2	51	25	42	3
801	126.39	414.7	22	23	31	3

All directions are with respect to Magnetic North.

Table IRR-01:2. Summary of Corehole Dynamic Flowmeter Test-Station Results; Arcadis; Marrinette, WI; Wellbore: IRR-01

IRR-01					
Depth (feet)	**Flow in Borehole During Ambient Testing (GPM)**	**Ambient Flow Direction in Borehole**	**Flow in Borehole During Pumping as Measured by CDFM (GPM)**	**Flow in Borehole During Pumping Normalized to Pumping Rate Max (GPM)**	**Comments**
45.0	0.05	↑	22.30	21.7	Test station just outside casing. 0.05 gpm of ambient upflow is observed, indicating this ambient flow **exits** the borehole between 45.0 - 44.4 feet (bottom of casing). No change in flow is observed in the pumping data, suggesting the outflow zone was reversed to a "no-flow" zone, however, a small amount of inflow would be difficult to discern with so much background flow (~21.7 gpm) already present.
52.0	0.05	↑	21.50	21.7	No observed change in flow under ambient or pumping conditions between 52.0 - 82.0 feet, based on normalized values during pumping.
82.0	0.05	↑	21.60	21.7	No observed change in flow under ambient or pumping conditions between 82.0 - 120.0 feet, based on normalized values during pumping.
120.0	0.05	↑	22.90	21.7	No observed change in flow under ambient or pumping conditions between 120.0 - 150.0 feet, based on normalized values during pumping.
150.0	0.05	↑	22.20	21.7	No observed change in flow under ambient or pumping conditions between 150.0 - 168.0 feet, based on normalized values during pumping.
168.0	0.05	↑	22.15	21.7	No observed change in flow under ambient or pumping conditions between 168.0 - 202.0 feet, based on normalized values during pumping.
202.0	0.05	↑	23.20	21.7	No observed change in flow under ambient or pumping conditions between 202.0 - 246.5 feet, based on normalized values during pumping.
246.5	0.05	↑	23.00	21.7	0.01 gpm **exits** the borehole under ambient conditions likely between 246.5 - 267.5 feet, likely through solution openings in the host rock. During pumping, 0.9 gpm **enters** the borehole.
267.5	x	↑	21.80	20.8	No observed change in flow under ambient or pumping conditions between 267.5 - 289.5 feet, based on normalized values during pumping.
289.5	x	↑	22.60	20.8	No observed change in flow under ambient or pumping conditions between 289.5 - 299.0 feet, based on normalized values during pumping.
299.0	0.06	↑	22.10	20.8	No observed change in flow under ambient or pumping conditions between 299.0 - 330.0 feet, based on normalized values during pumping.
330.0	0.06	↑	22.55	20.8	No observed change in flow under ambient or pumping conditions between 330.0 - 365.0 feet, based on normalized values during pumping.

Table IRR-01:2. Summary of Corehole Dynamic Flowmeter Test-Station Results; Arcadis; Marrinette, WI; Wellbore: IRR-01

365.0	0.06	↑	22.21	20.8	No observed change in flow under ambient conditions betweem 365.0 - 379.5 feet. During pumping, 2.1 gpm **enters** the borehole at this interval, based on normalized values.
379.5	0.06	↑	20.00	18.7	0.02 gpm **exits** the borehole under ambient conditions between 379.5 - 409.5 feet, likely through solution openings in the host rock. During pumping, 3.5 gpm **enters** the borehole.
409.5	0.08	↑	16.26	15.2	0.08 gpm **enters** the borehole under ambient conditions between 409.5 - 415.5 feet (TD) and migrates upward. During pumping, 15.2 gpm **enters** the borehole and mirates upward toward the pump inside casing. This represents the dominant inflow zone in the borehole.

Ambient WL (ftbgs)	11.40
Bottom of casing (ftbgs)	44.4
Total Depth (TD) (ftbgs)	415.5
Avg. Extraction Rate (gpm)	21.7
Observed Drawdown (ft)	3.93
Specific Capacity (gpm/ft-dd)	5.52

Note: Negative flow is downflow in the borehole. Positive flow is upflow in the borehole.

Additional note: Pumping was conducted at a relatively constant, time-averaged rate of 21.7 gpm. The CDFM flowmeter registered a maximum flow rate of 23.0 gpm. The observed values reported by the CDFM have been normalized to 21.7 gpm maximum registered flow.

Geophysical Summary Plot

COLOG
borehole geophysics / hydrophysics

COMPANY: Arcadis | PROJECT: Marinette

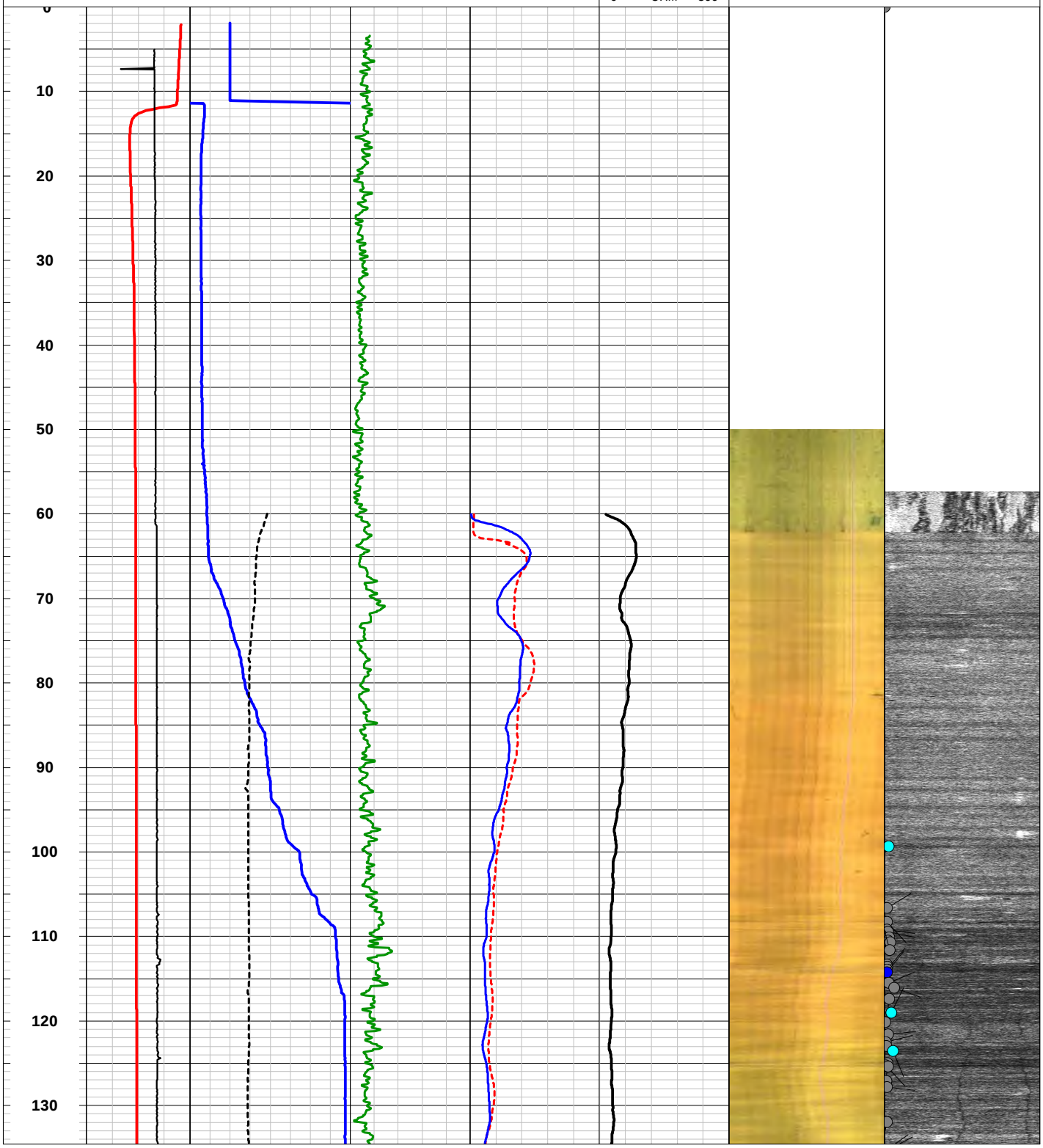
DATE LOGGED: 20 May 2022 | WELL: IRR-02

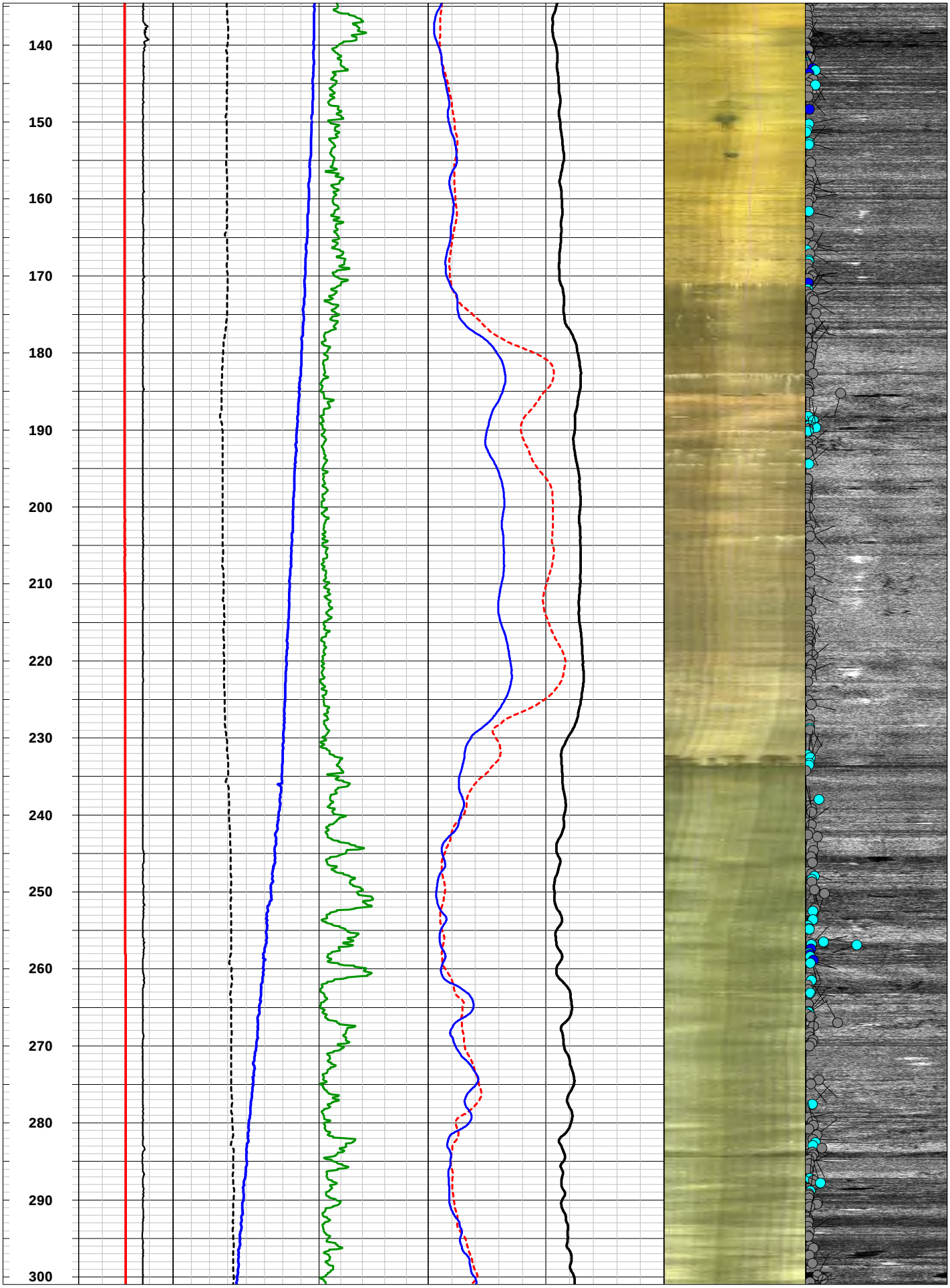
Colog, Inc.
810 Quail St., Suite E, Lakewood, CO 80215
Phone: (303) 279-0171, Fax: (303) 278-0135
www.colog.com

Depth 1ft:200ft

Temp	Cond	Natural Gamma	64" Normal Resistivity	Image-NM	Amplitude-NM
0 ℃ 20	600 uS/cm 1400	0 CPS 250	0 OHMM 2000	0° 90° 180° 270° 0°	0° 90° 180° 270° 0°

Caliper	Spont. Potential	16" Normal Resistivity	SPR	Tadpoles
0 Inch 12	-400 mV 400	0 OHMM 2000	0 OHM 500	0 90

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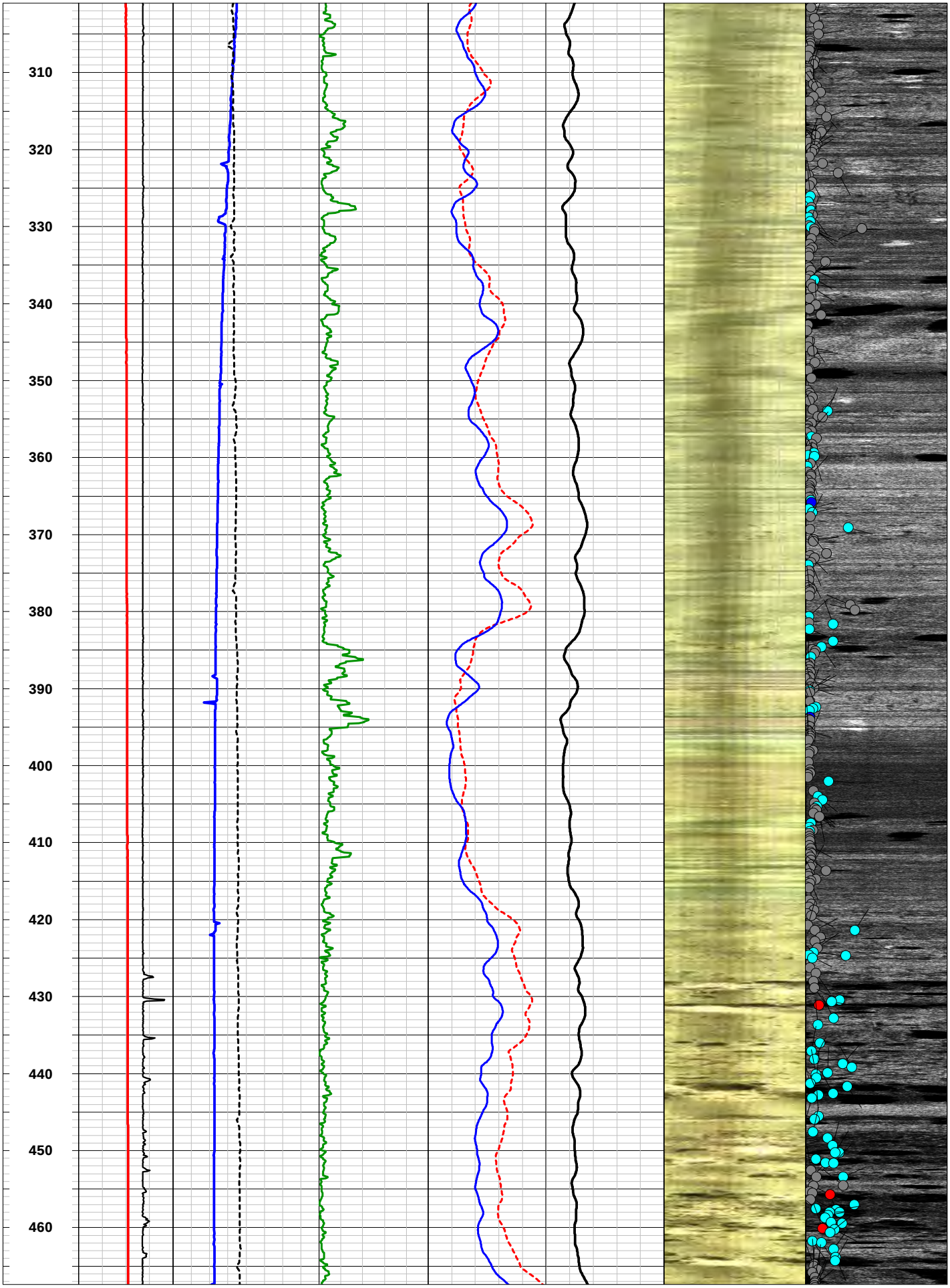
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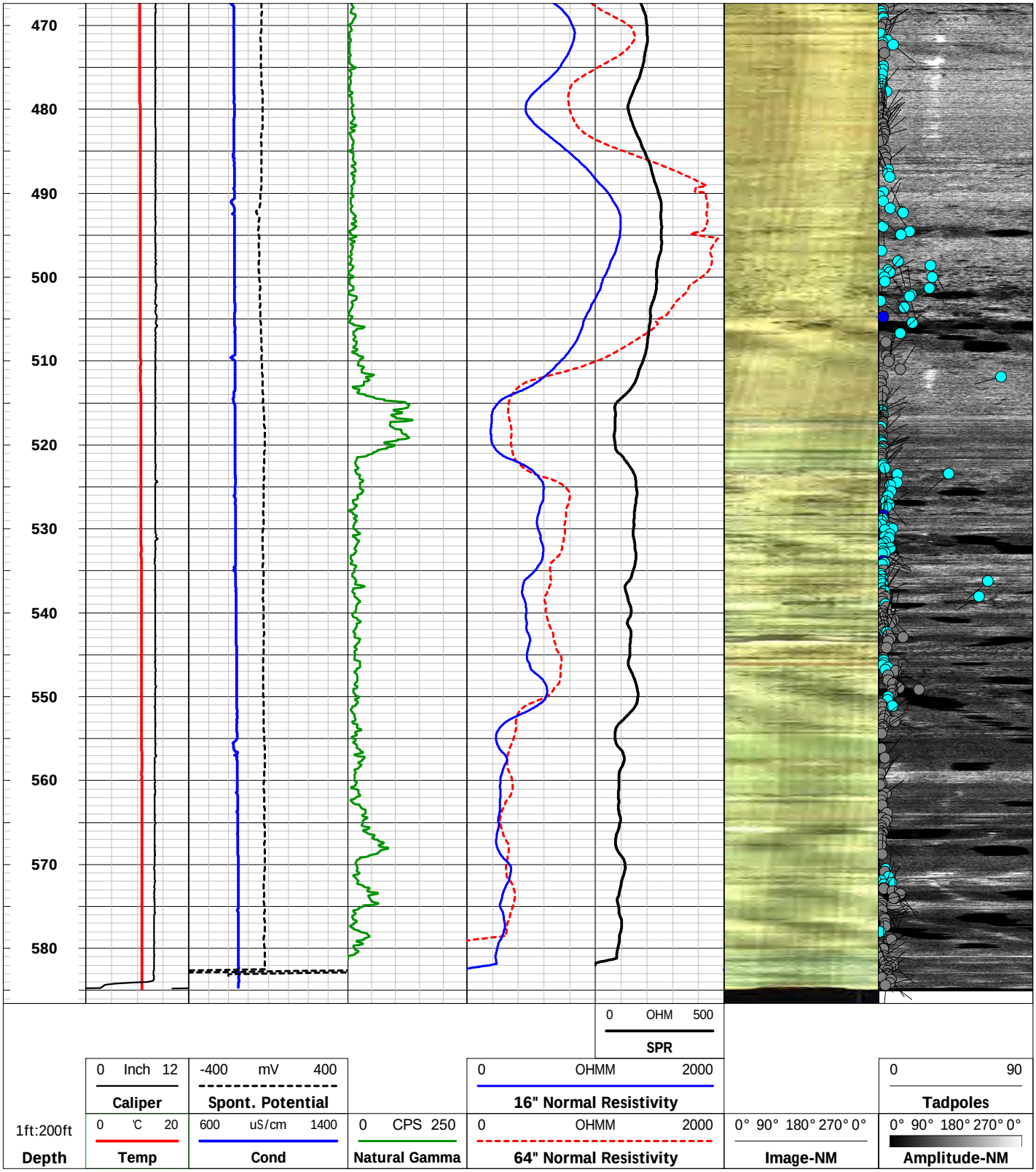
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Spont. Potential
0 OHMM 2000
16" Normal Resistivity
0 90
Tadpoles
1ft:200ft
Depth
0 ℃ 20
Temp
600 uS/cm 1400
Cond
0 CPS 250
Natural Gamma
0 OHMM 2000
64" Normal Resistivity
0° 90° 180° 270° 0°
Image-NM
0° 90° 180° 270° 0°
Amplitude-NM

borehole geophysics / hydrophysics

Geophysical Summary Plot

Colog, Inc.
810 Quail St, Unit E, Lakewood, CO 80215
Office: (303) 279-0171
www.colog.com

COMPANY: Arcadis	PROJECT: Marinette
DATE LOGGED: 20 May 2022	WELL: IRR-02

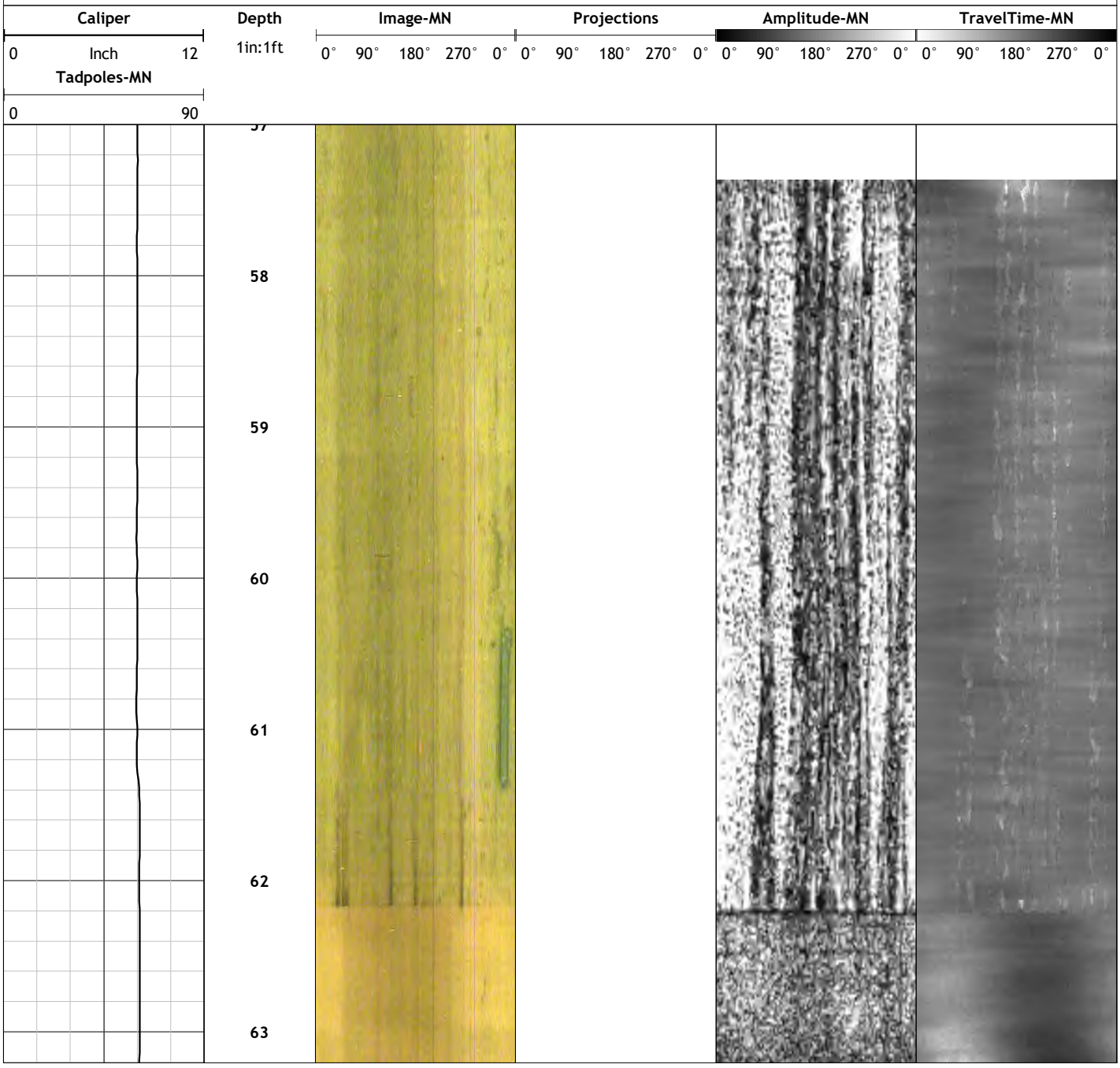
LOCATION: Marinette, WI
FIELD ENGINEER(S): M. Cullum
WITNESSED BY: NA
DEPTH DRILLER: NA
DEPTH LOGGER: 584.3 ft

LOG MEASURED FROM: Ground Surface
TOP & BOTTOM OF CASING: 0 ft - 62 ft
BOREHOLE DIAMETER: 8 in.
FLUID LEVEL DEPTH: 12 ft
ORIENTATION REFERENCE: Magnetic North

COMMENTS:

STRUCTURE LEGEND:

0 - Healed Fracture/Bedding Plane
1 - Partial Fracture
2 - Complete Fracture
3 - Open Fracture



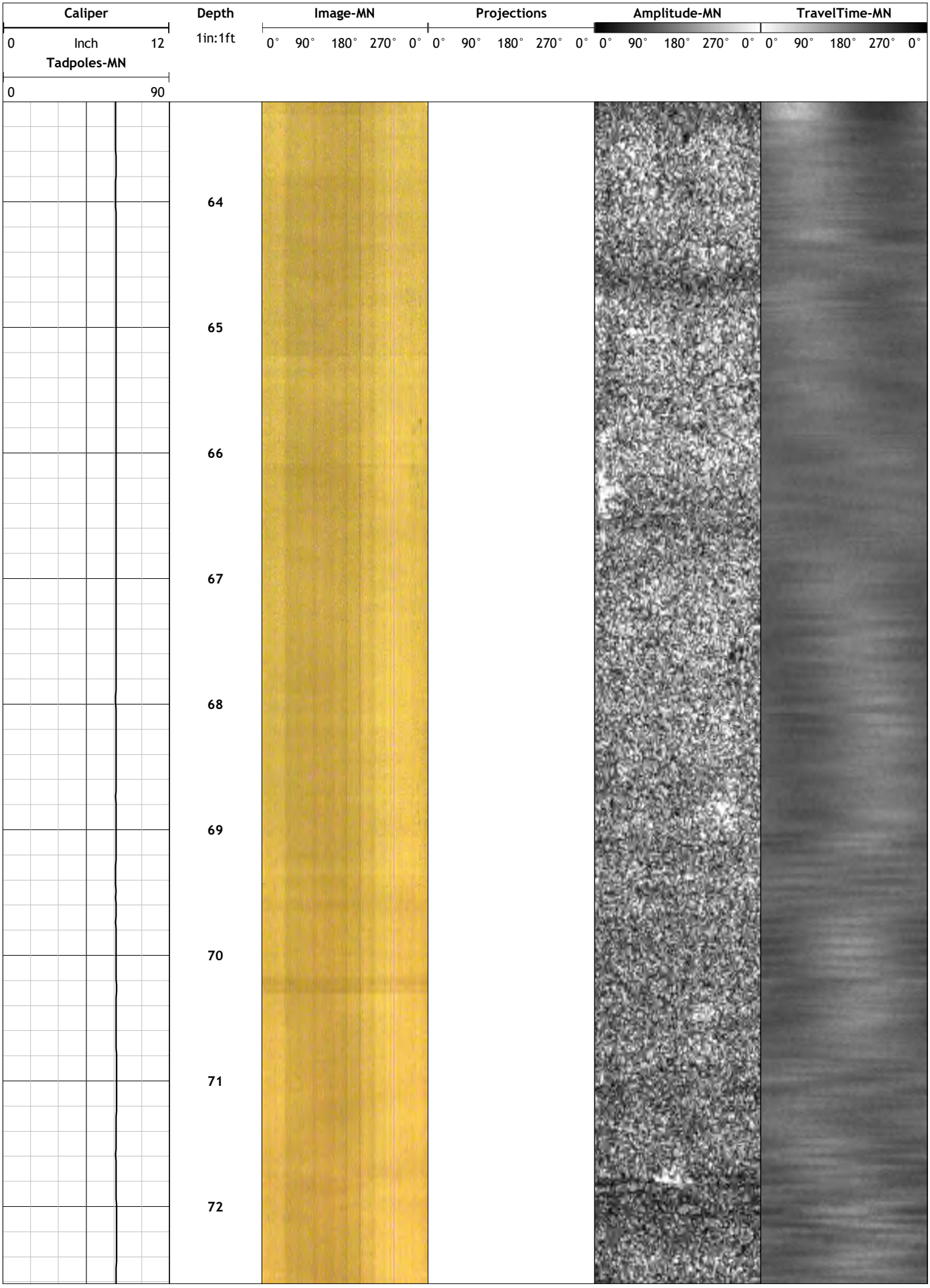

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Image-MN
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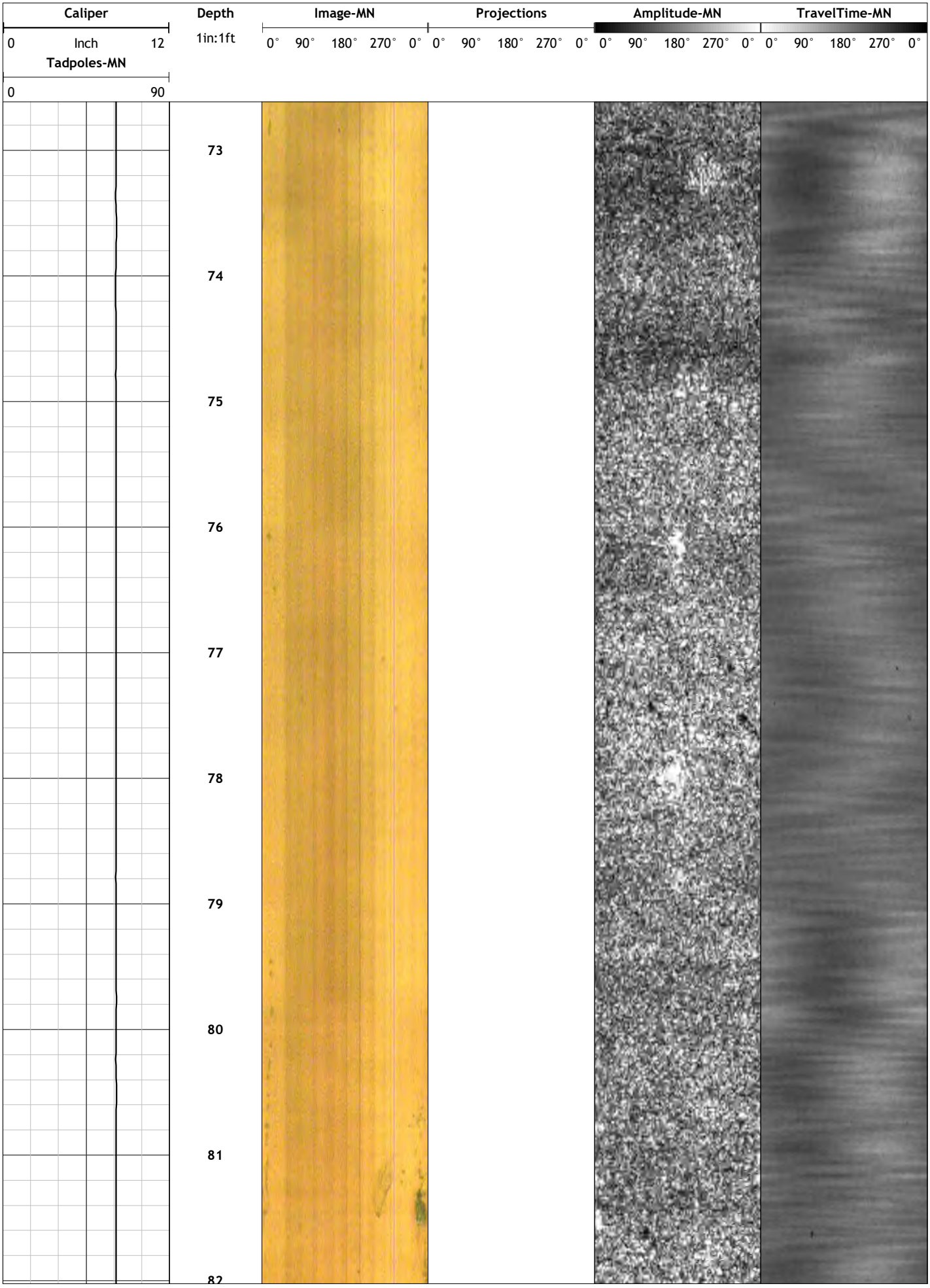
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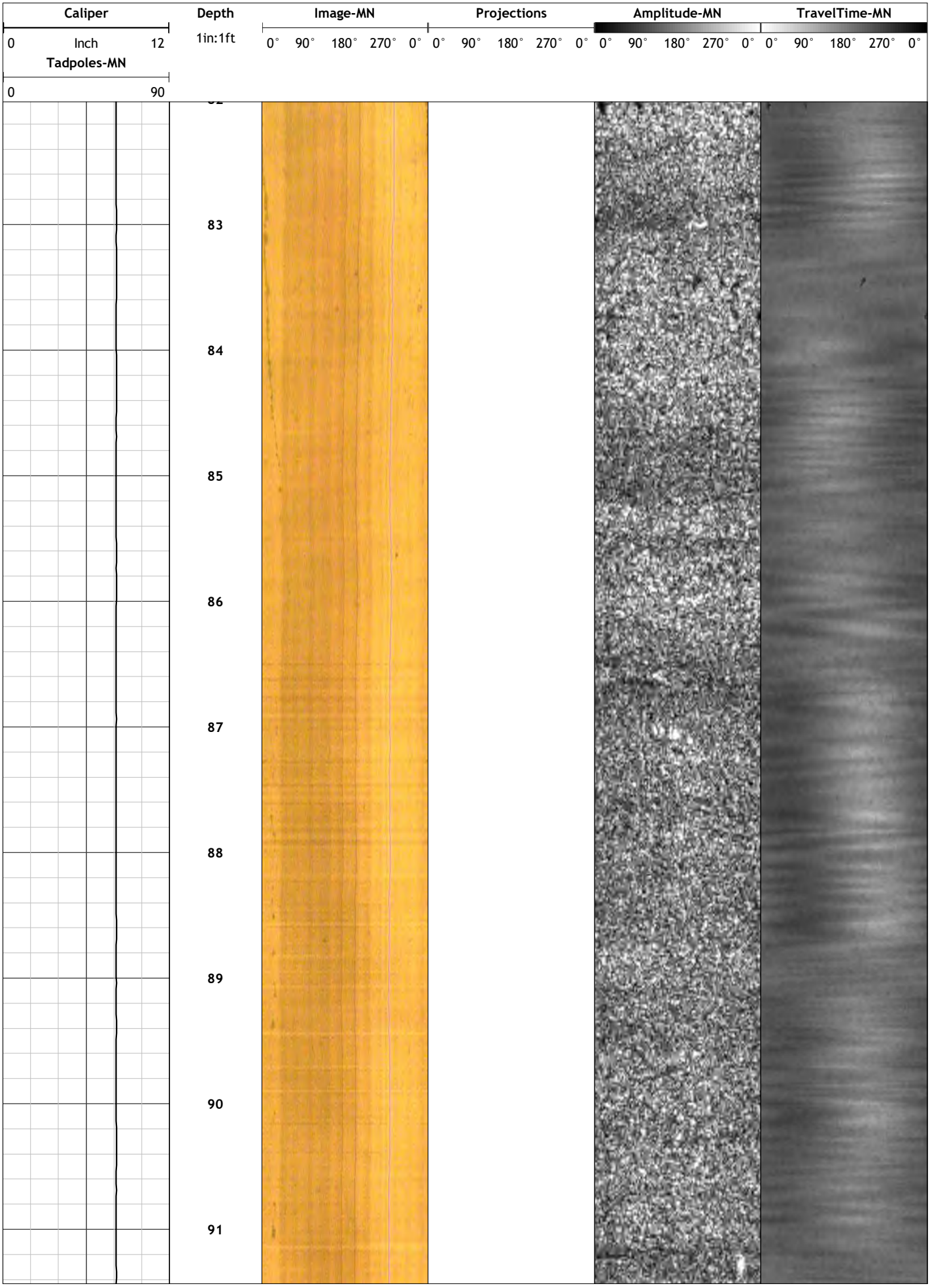
80
81
82
Image-MN
0° 90° 180° 270° 0°
Projections
0° 90° 180° 270° 0°
Amplitude-MN
0° 90° 180° 270° 0°
TravelTime-MN
0° 90° 180° 270° 0°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Inch
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90
Depth
1in:1ft
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90
91
Image-MN
Projections
Amplitude-MN
TravelTime-MN
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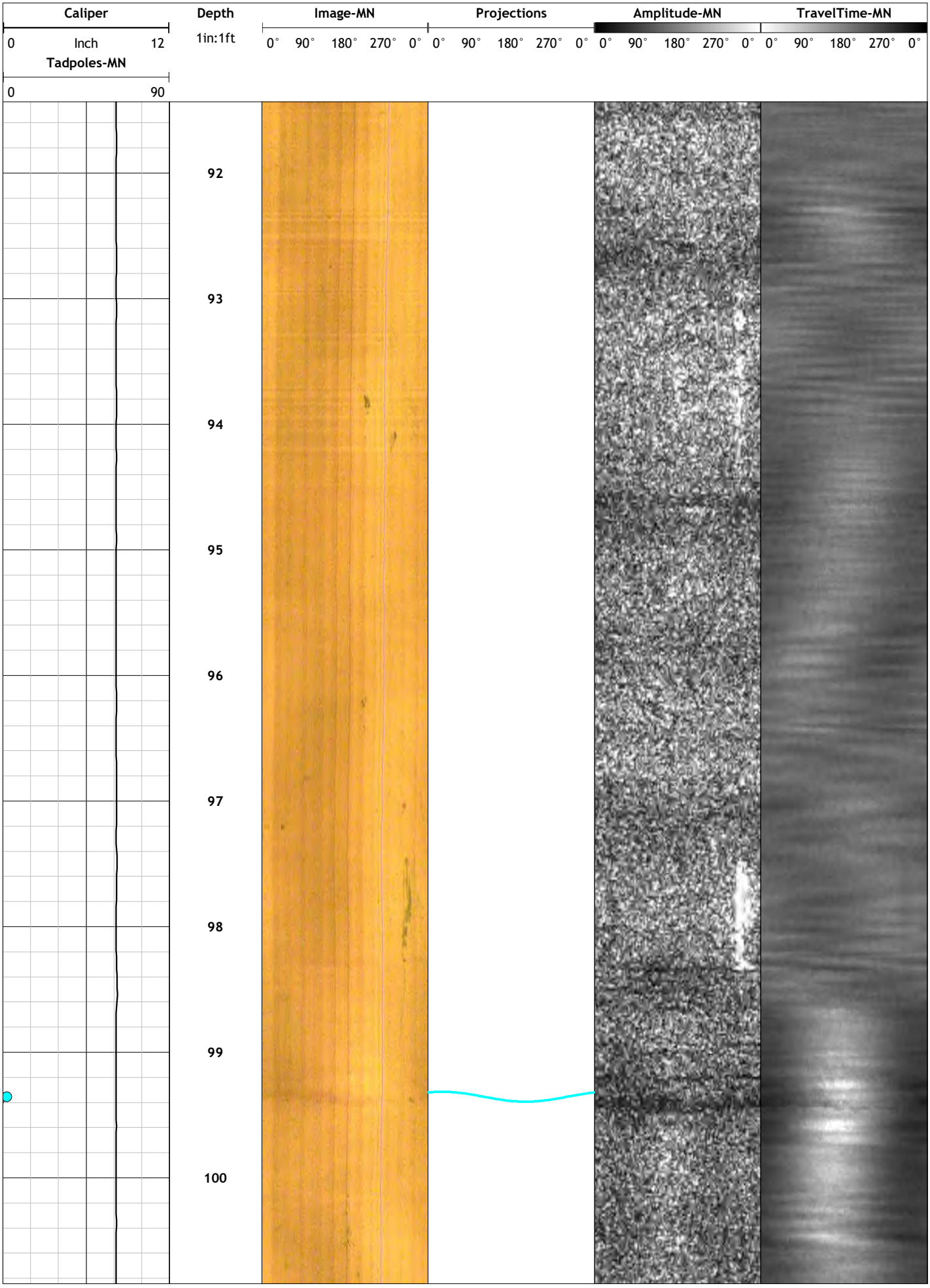
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Inch
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90
Depth
1in:1ft
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96
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98
99
100
Image-MN
0° 90° 180° 270° 0°
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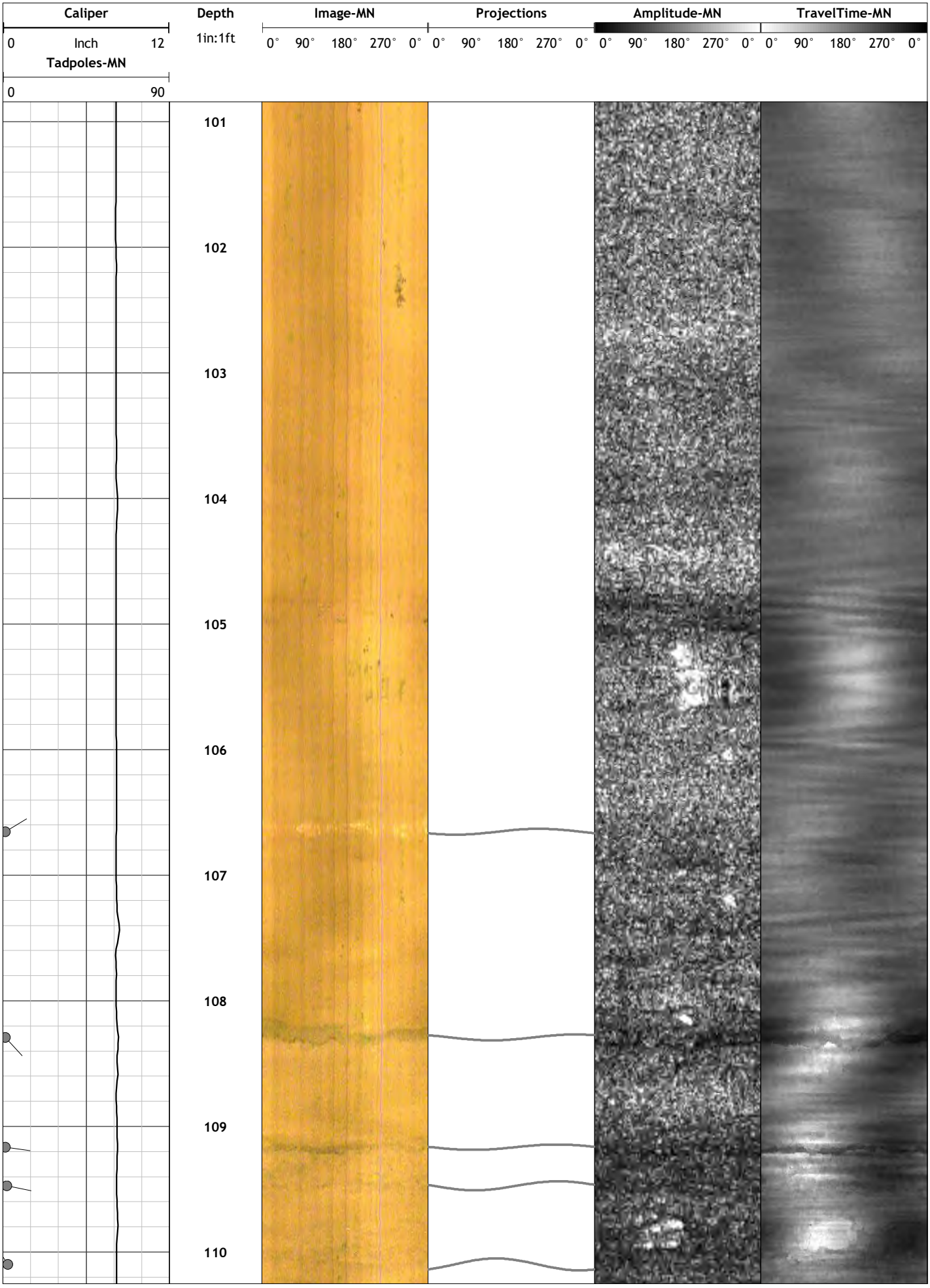
Amplitude-MN
0° 90° 180° 270° 0°
TravelTime-MN
0° 90° 180° 270° 0°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Depth
1in:1ft
Image-MN
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Projections
0° 90° 180° 270° 0°
Amplitude-MN
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TravelTime-MN
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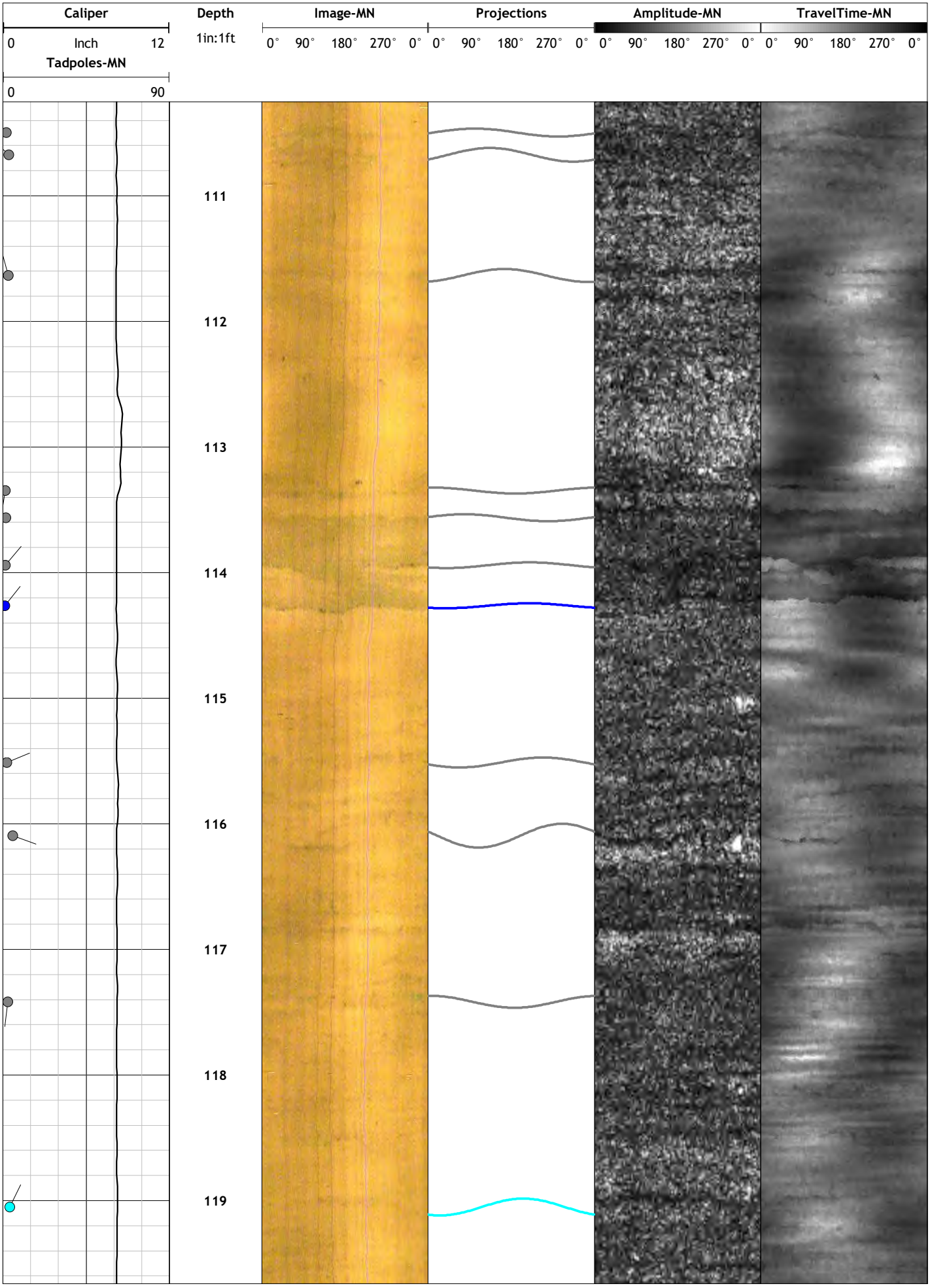
108
109
110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Depth
1in:1ft
Image-MN
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Projections
0° 90° 180° 270° 0°
Amplitude-MN
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TravelTime-MN
0° 90° 180° 270° 0°
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116
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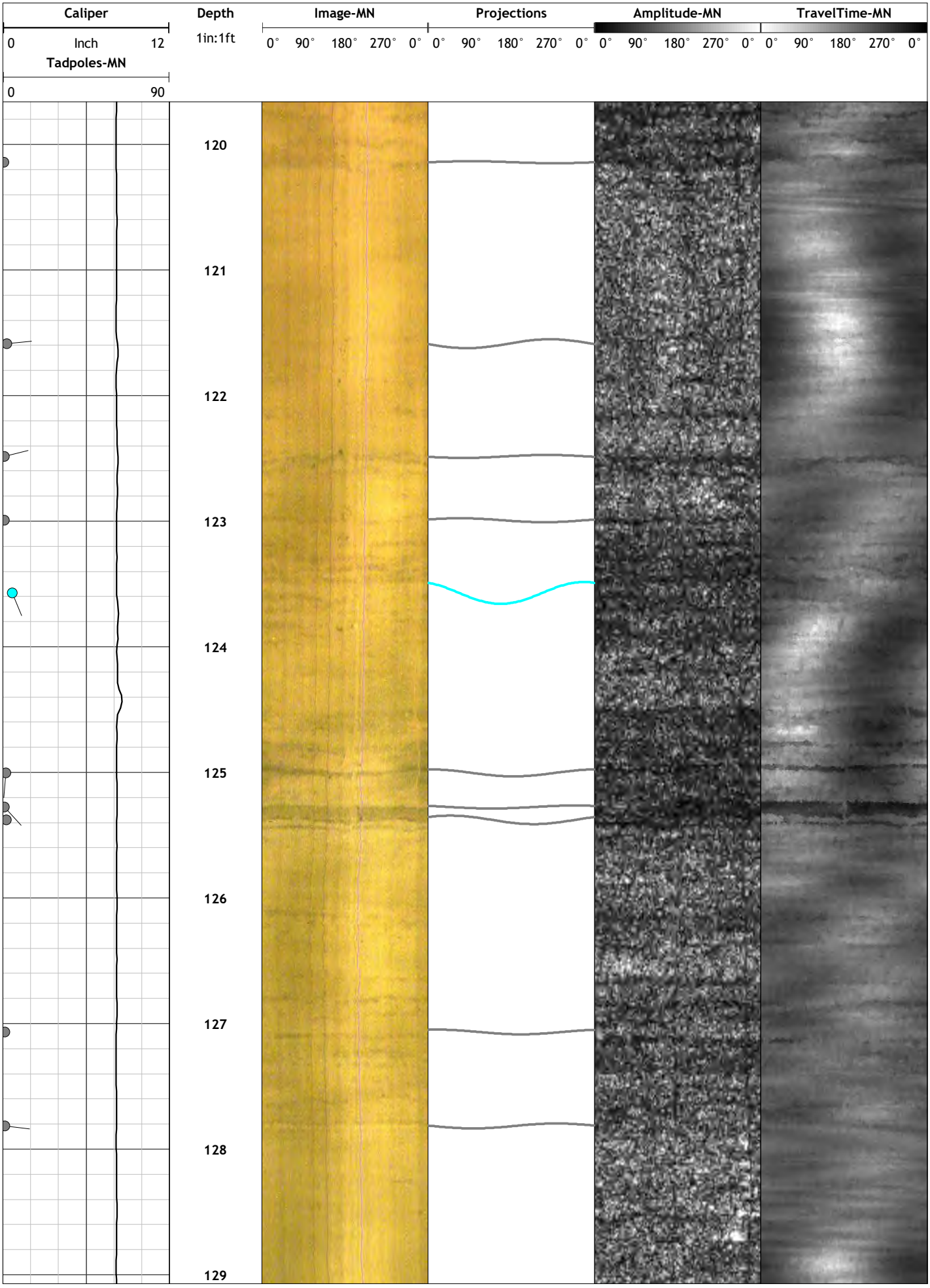
119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Depth
1in:1ft
Image-MN
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Projections
0° 90° 180° 270° 0°
Amplitude-MN
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TravelTime-MN
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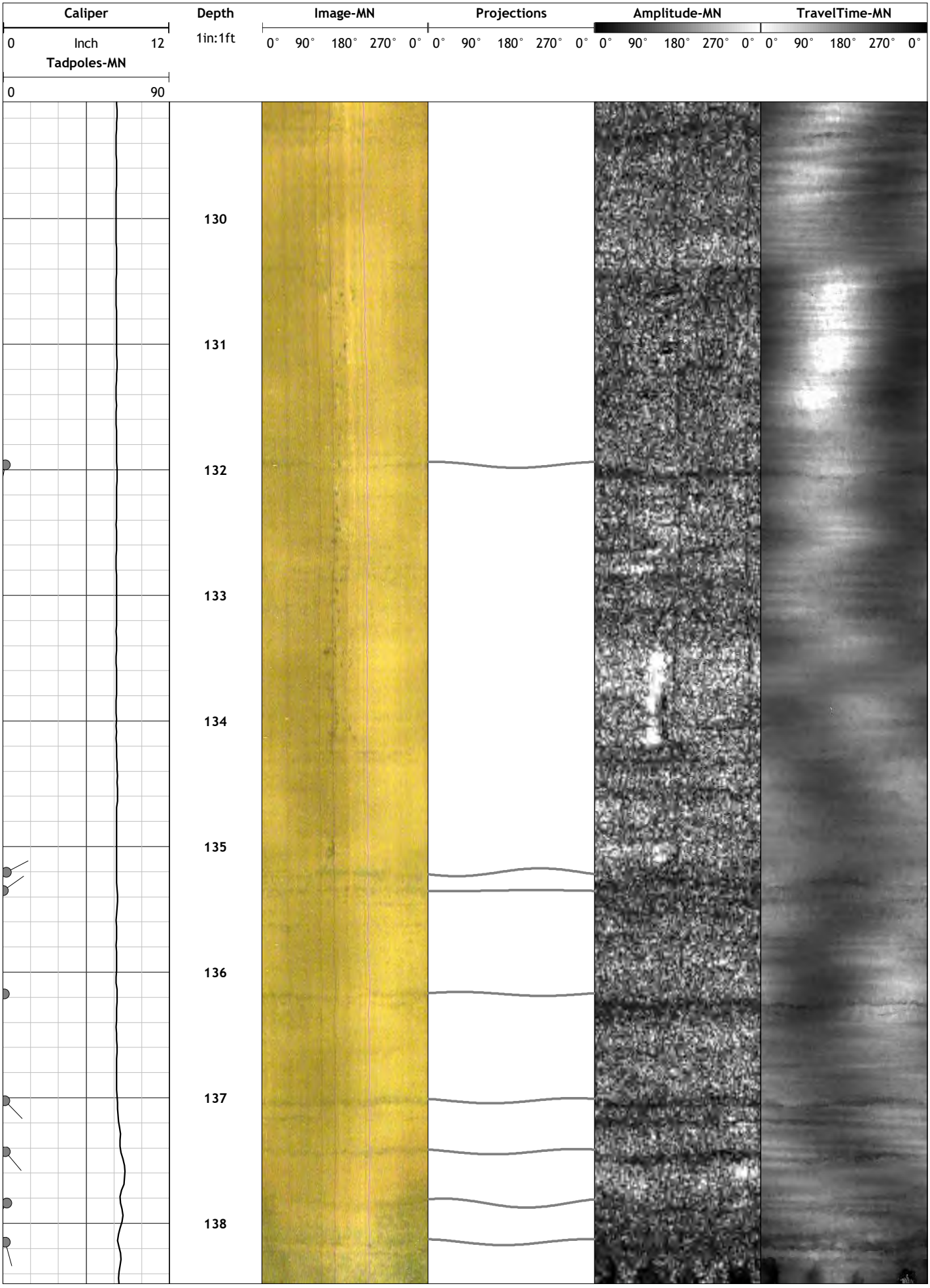
128
129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90
Depth
1in:1ft
130
131
132
133
134
135
136
137
138
Image-MN
0° 90° 180° 270° 0°
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Amplitude-MN
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TravelTime-MN
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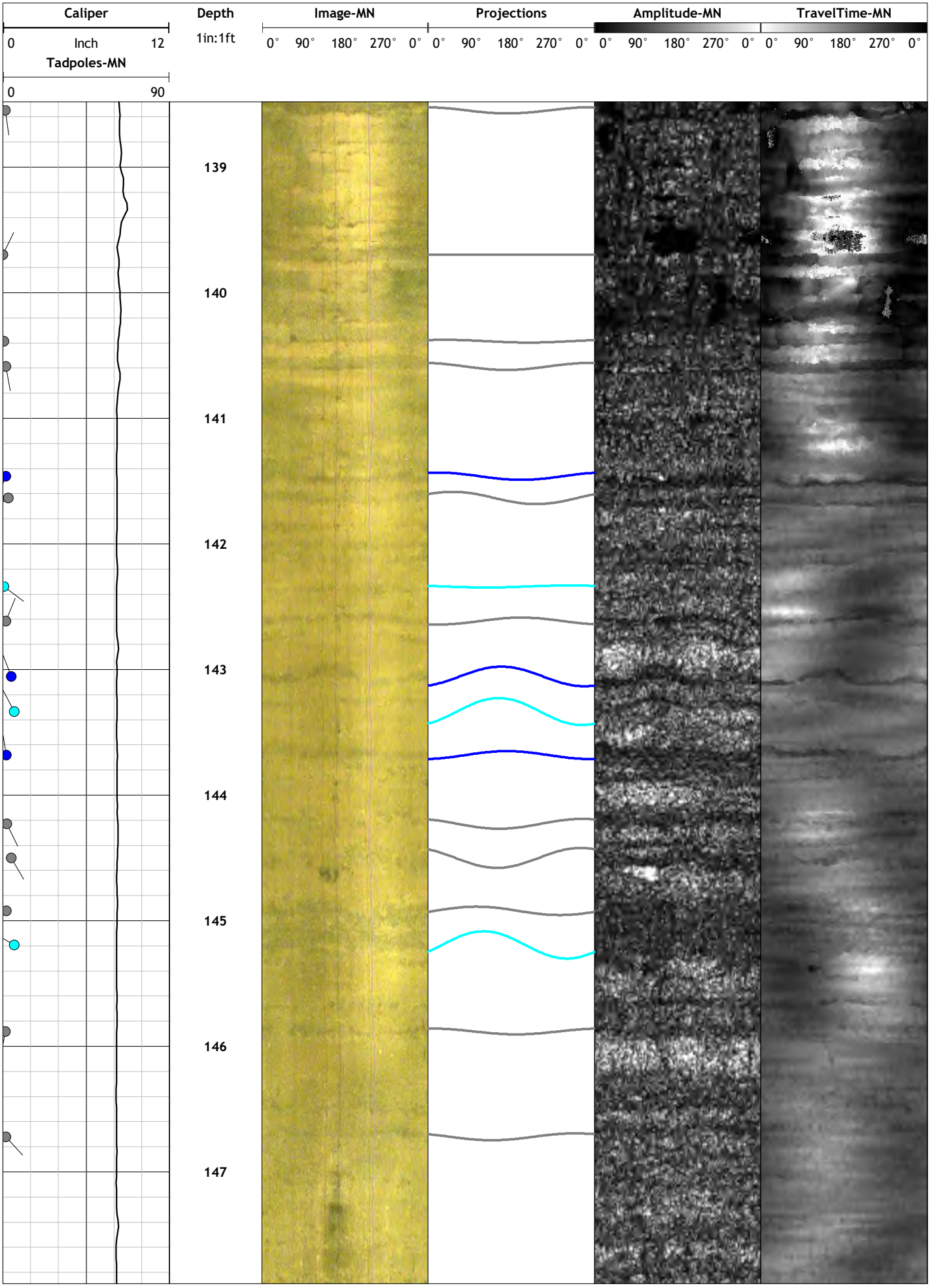
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90
Depth
1in:1ft
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142
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144
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146
147
Image-MN
0° 90° 180° 270° 0°
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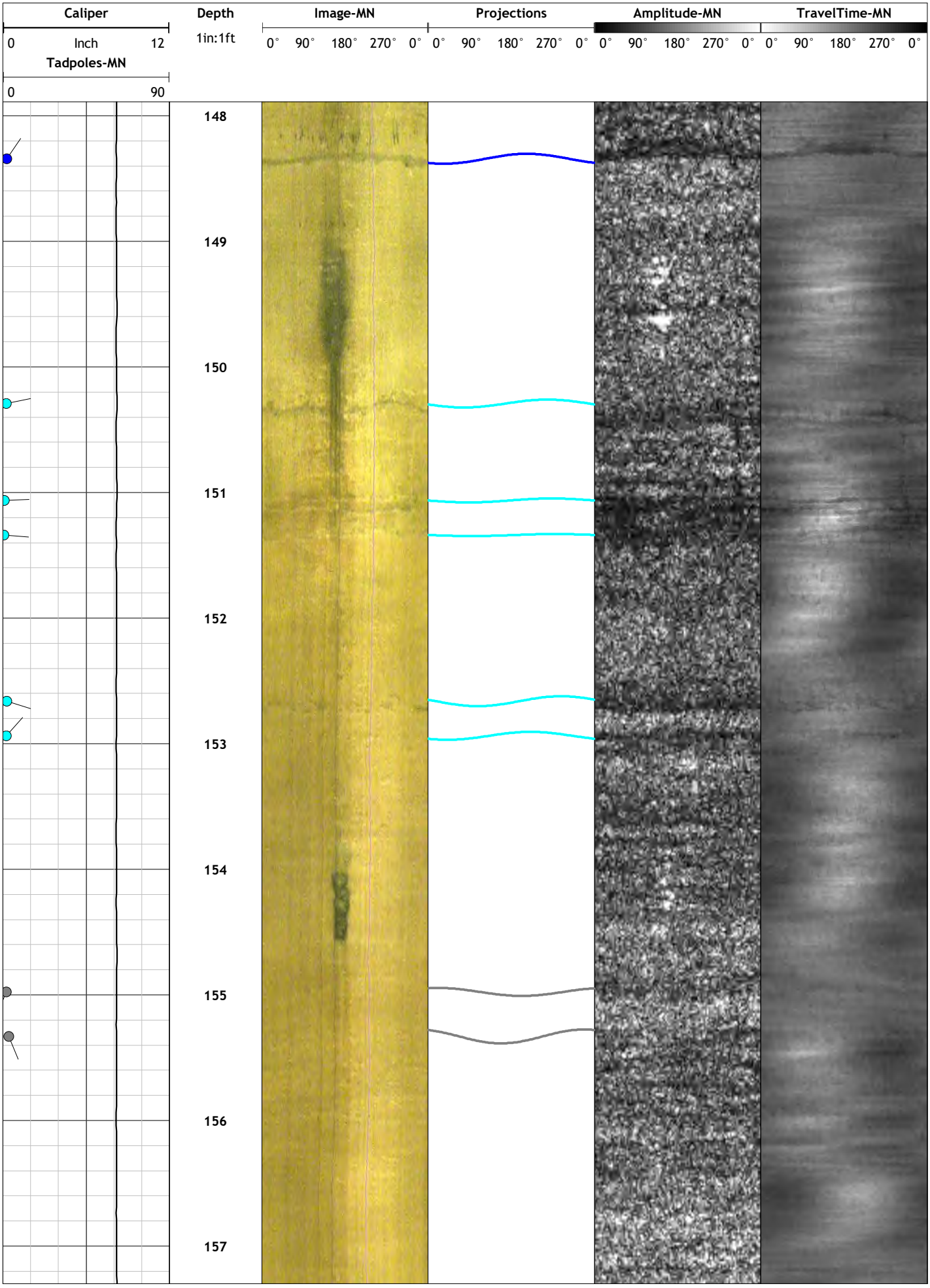
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Depth
1in:1ft
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157
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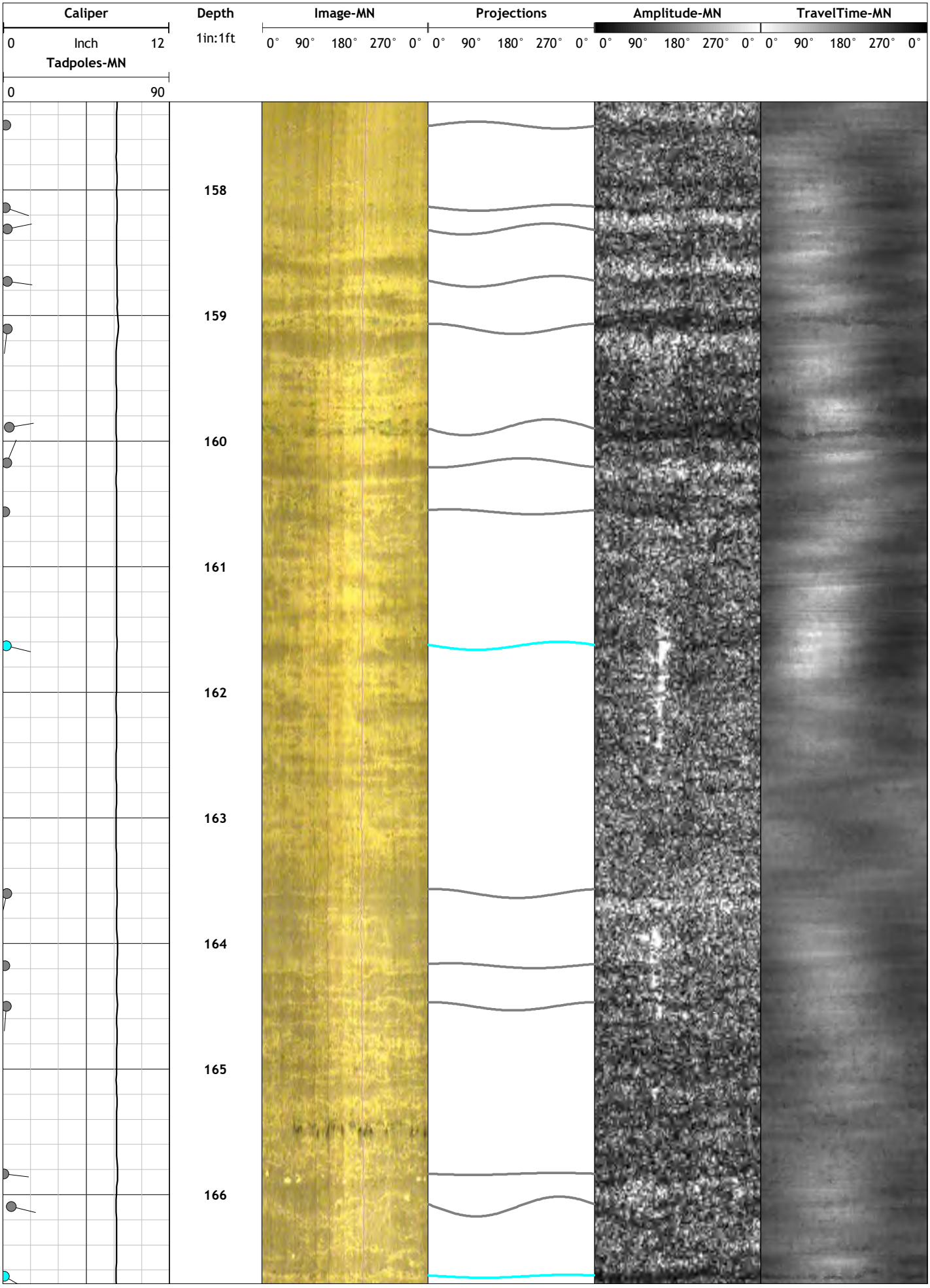
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Inch
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90
Depth
1in:1ft
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159
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161
162
163
164
165
166
Image-MN
0° 90° 180° 270° 0°
Projections
0° 90° 180° 270° 0°
Amplitude-MN
0° 90° 180° 270° 0°
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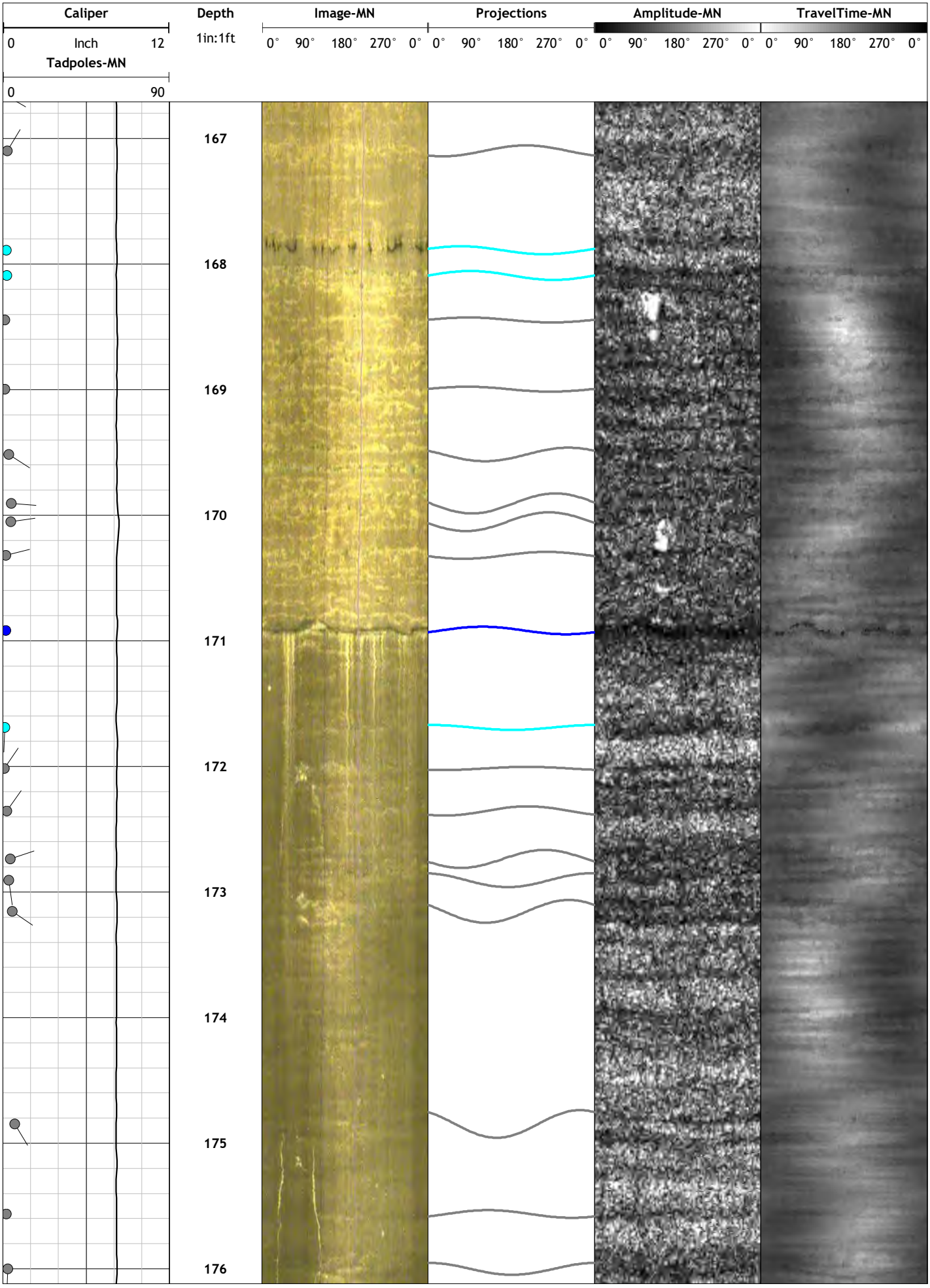
0° 90° 180° 270° 0°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Inch
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Tadpoles-MN
0
90
Depth
1in:1ft
Image-MN
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Projections
0° 90° 180° 270° 0°
Amplitude-MN
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TravelTime-MN
0° 90° 180° 270° 0°
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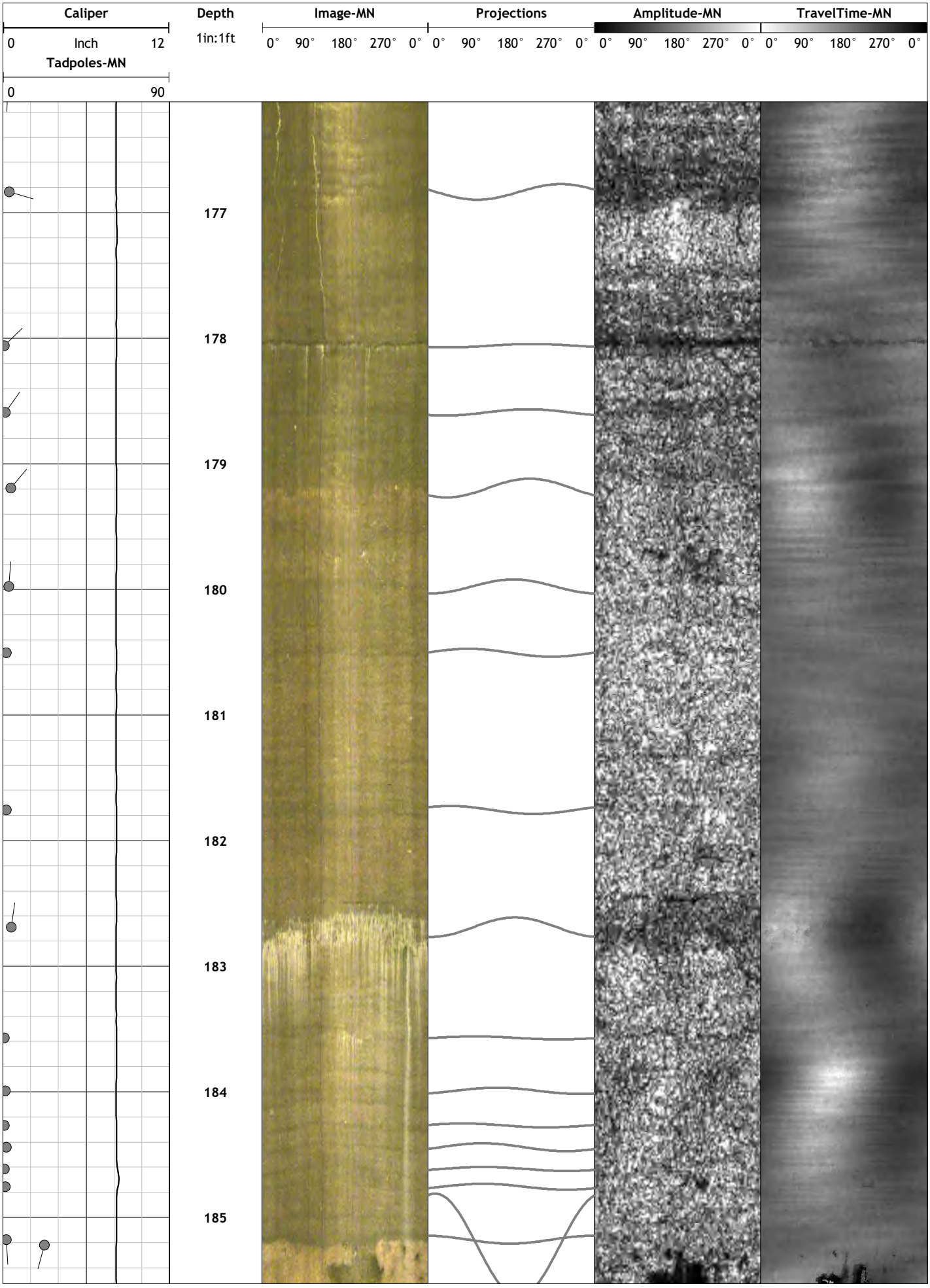
168
169
170
171
172
173
174
175
176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Inch
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Depth
1in:1ft
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179
180
181
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183
184
185
Image-MN
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Amplitude-MN
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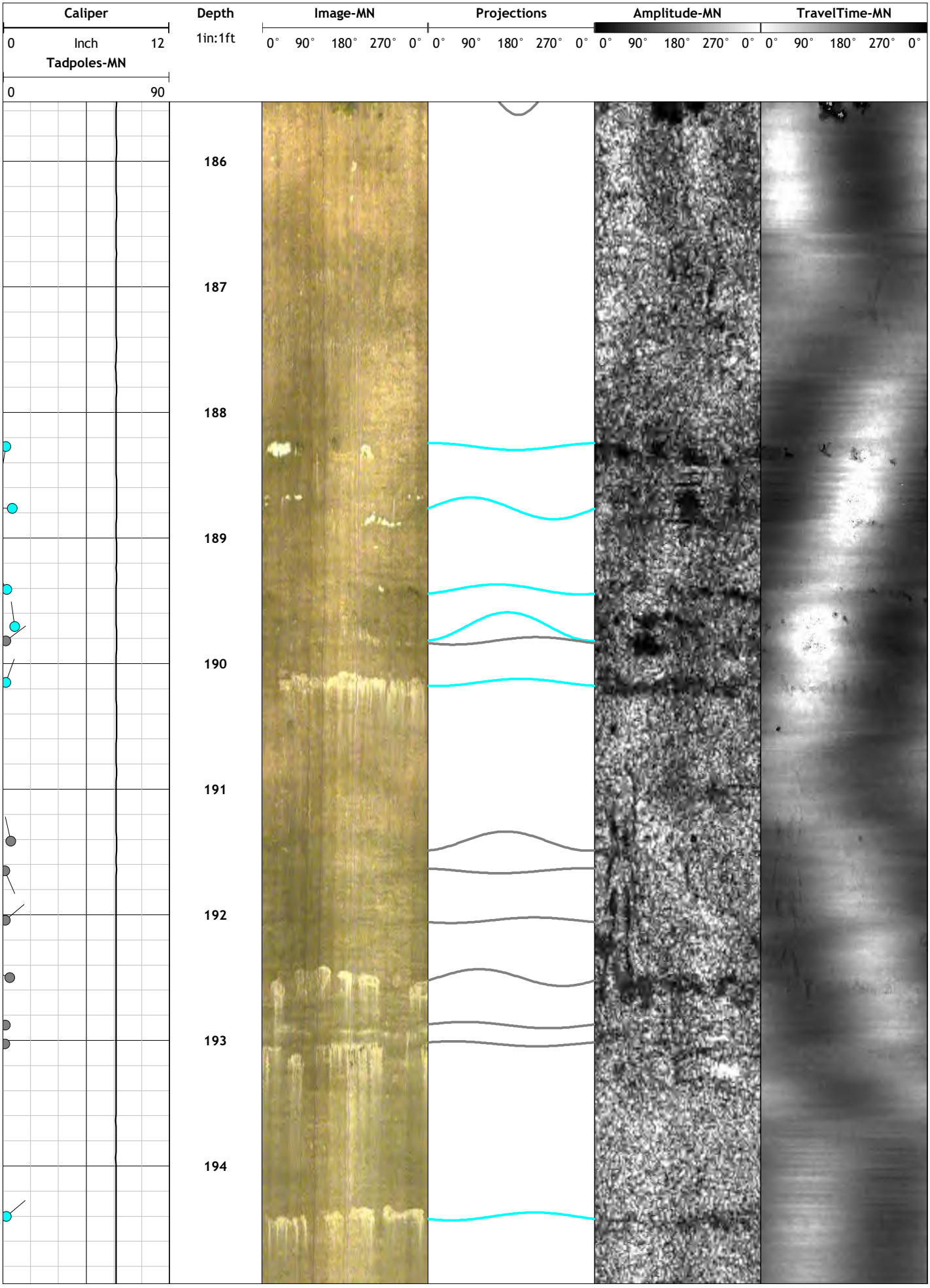
0° 90° 180° 270° 0°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Inch
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Tadpoles-MN
0
90
Depth
1in:1ft
Image-MN
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Projections
0° 90° 180° 270° 0°
Amplitude-MN
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TravelTime-MN
0° 90° 180° 270° 0°
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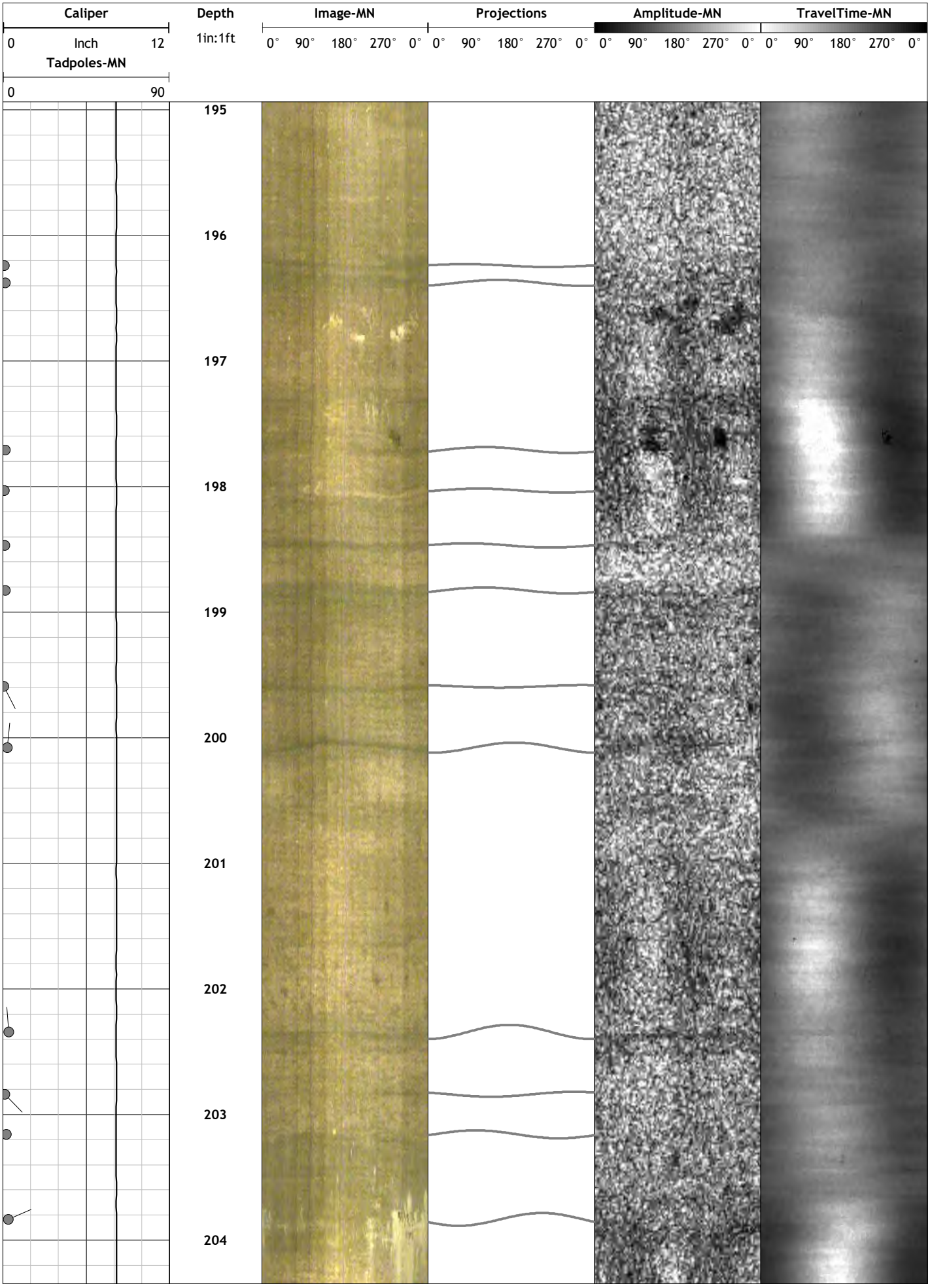
193
194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Inch
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90
Depth
1in:1ft
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197
198
199
200
201
202
203
204
Image-MN
0° 90° 180° 270° 0°
Projections
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Amplitude-MN
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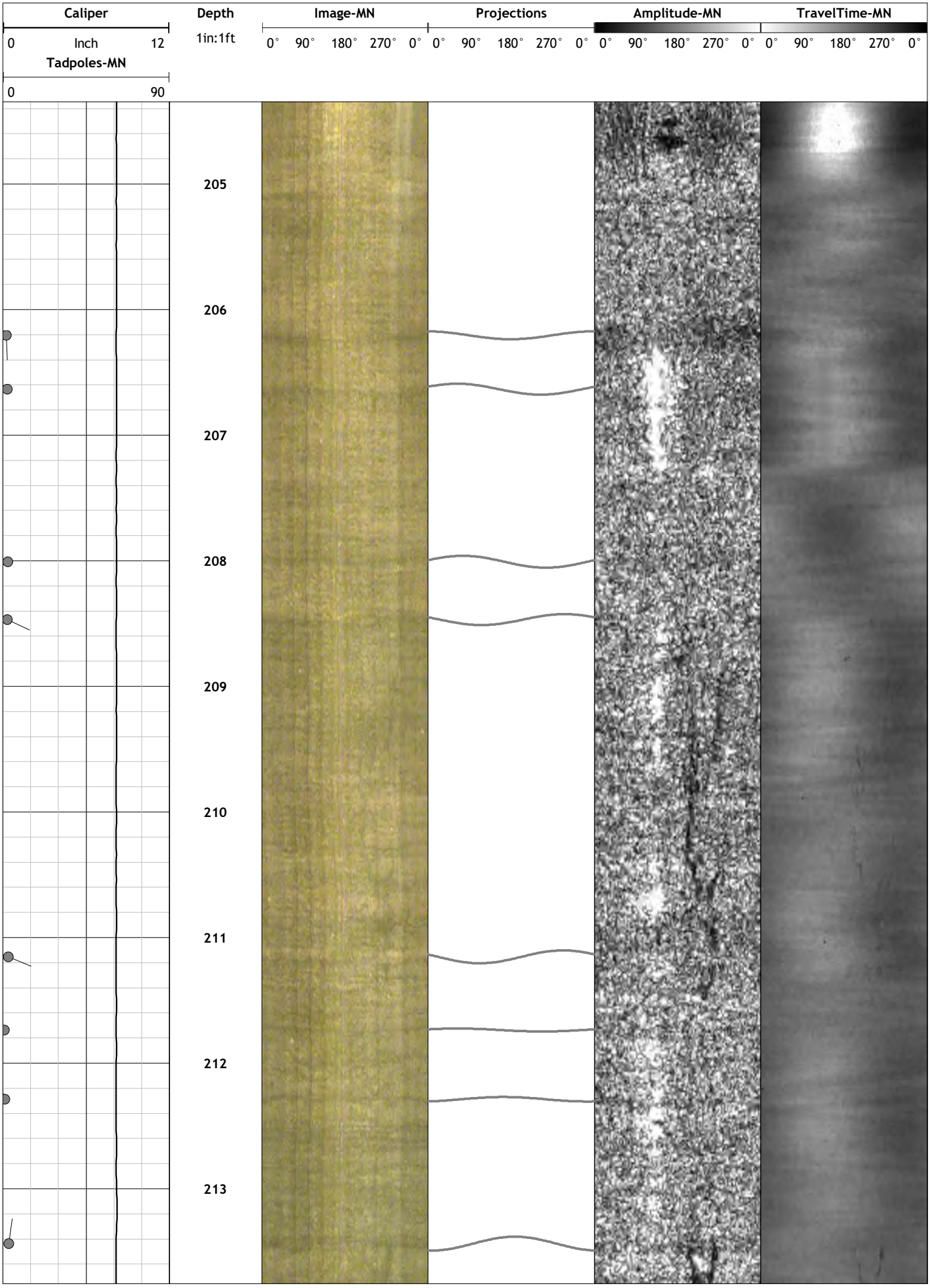
0° 90° 180° 270° 0°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Inch
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Depth
1in:1ft
Image-MN
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Projections
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Amplitude-MN
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TravelTime-MN
0° 90° 180° 270° 0°
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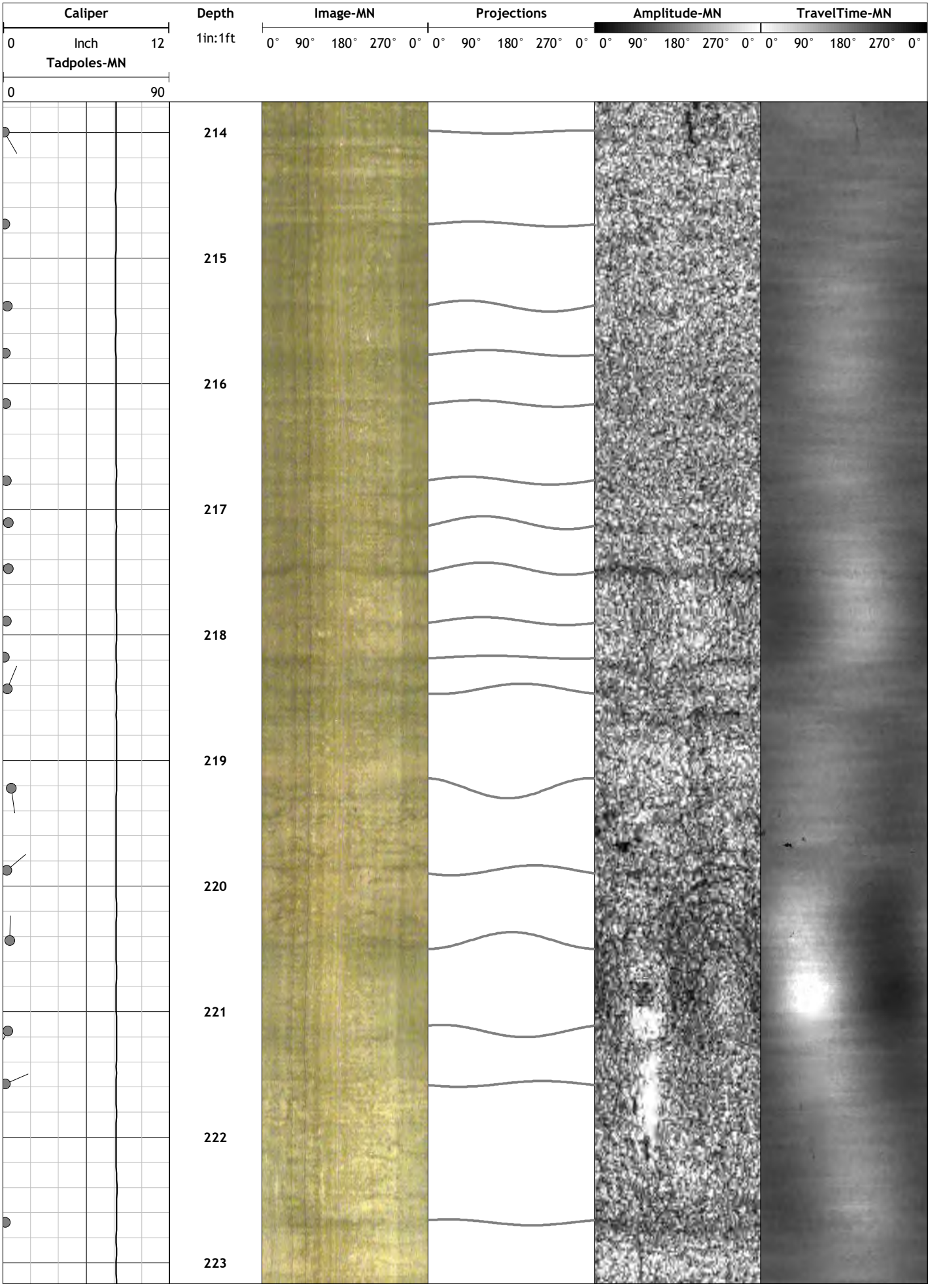
212
213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Inch
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Depth
1in:1ft
Image-MN
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Projections
0° 90° 180° 270° 0°
Amplitude-MN
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TravelTime-MN
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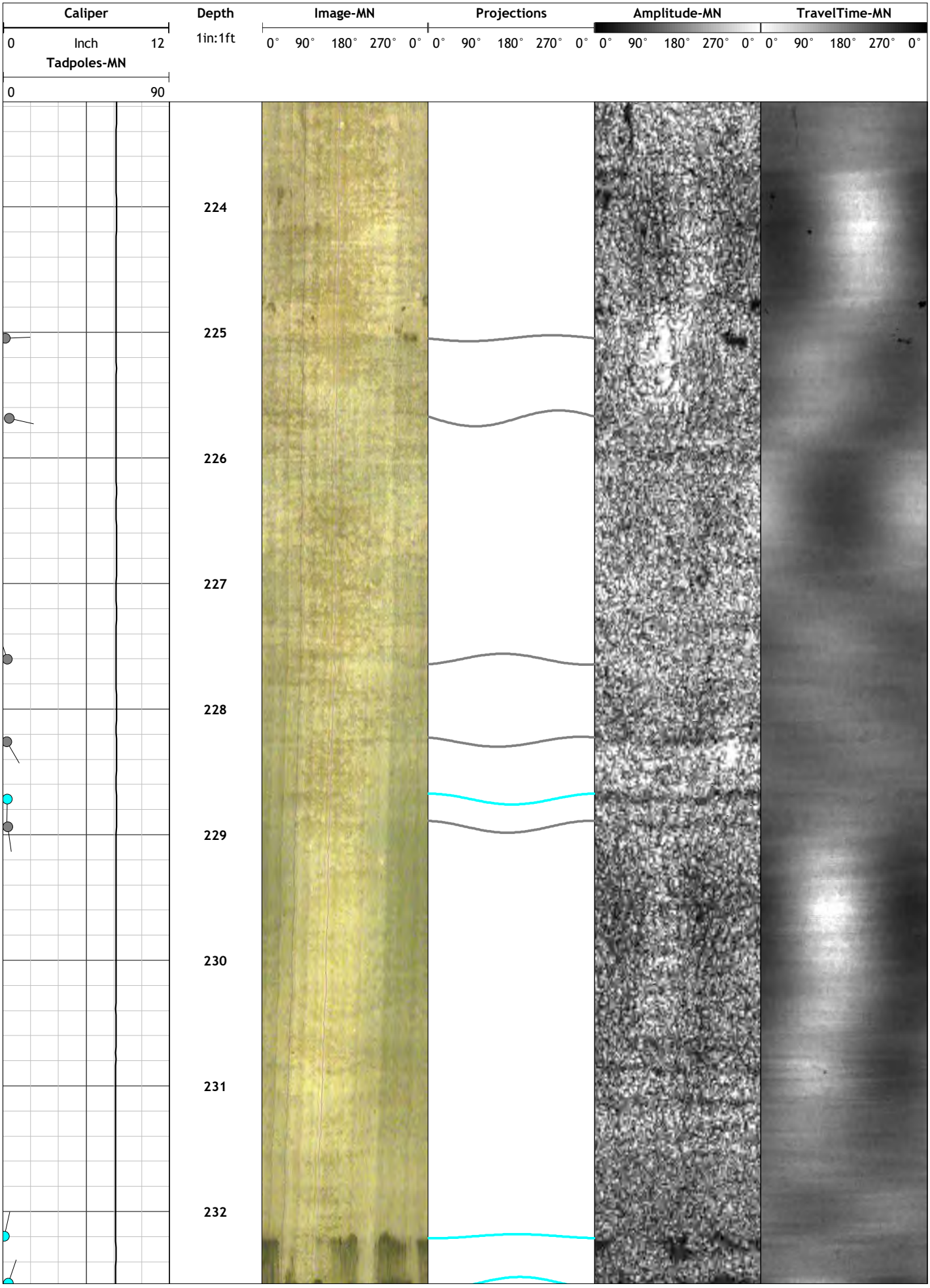
220
221
222
223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Inch
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Tadpoles-MN
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90
Depth
1in:1ft
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227
228
229
230
231
232
Image-MN
0° 90° 180° 270° 0°
Projections
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Amplitude-MN
0° 90° 180° 270° 0°
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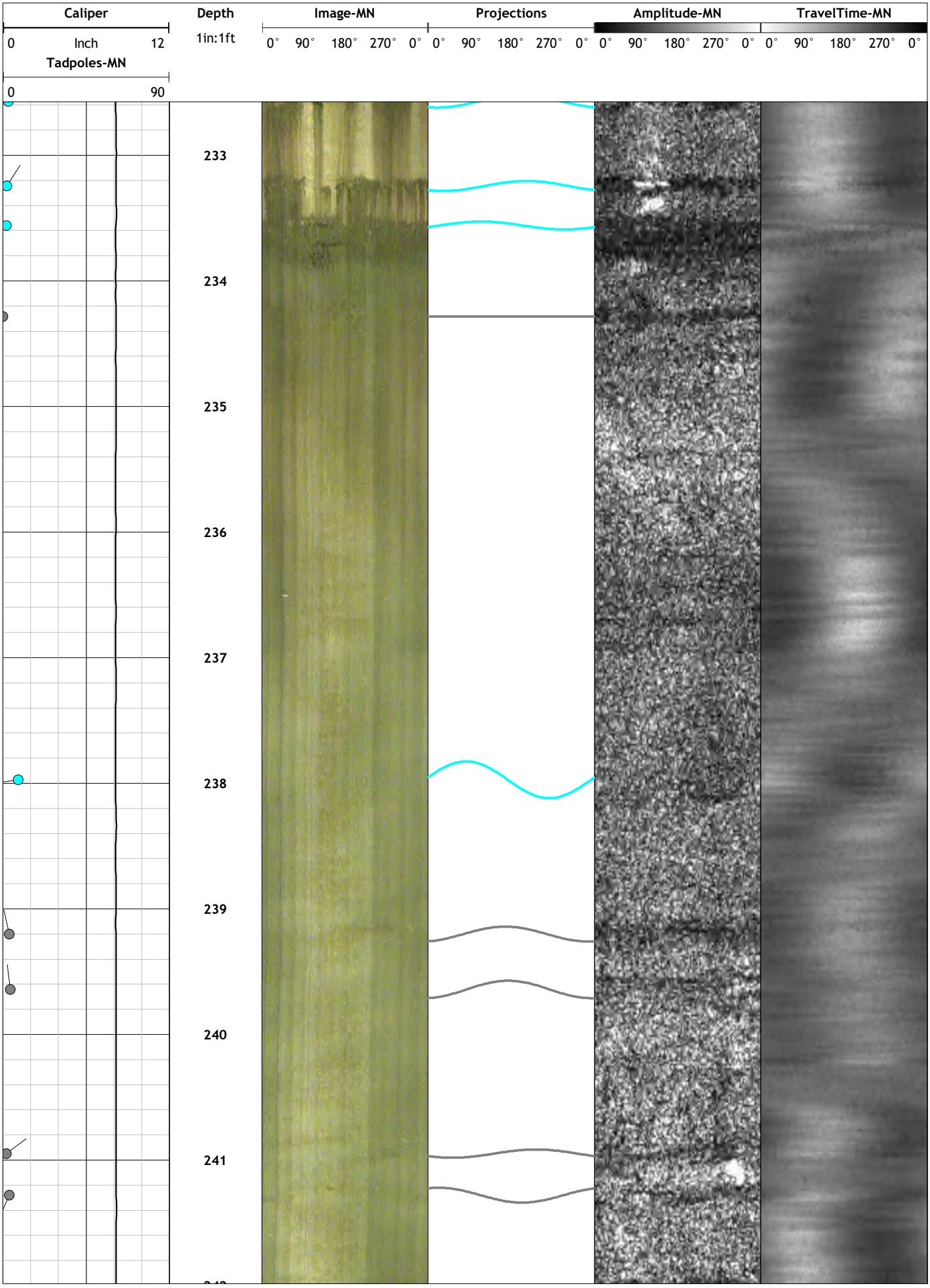
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Inch
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Tadpoles-MN
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90
Depth
1in:1ft
Image-MN
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Projections
0° 90° 180° 270° 0°
Amplitude-MN
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TravelTime-MN
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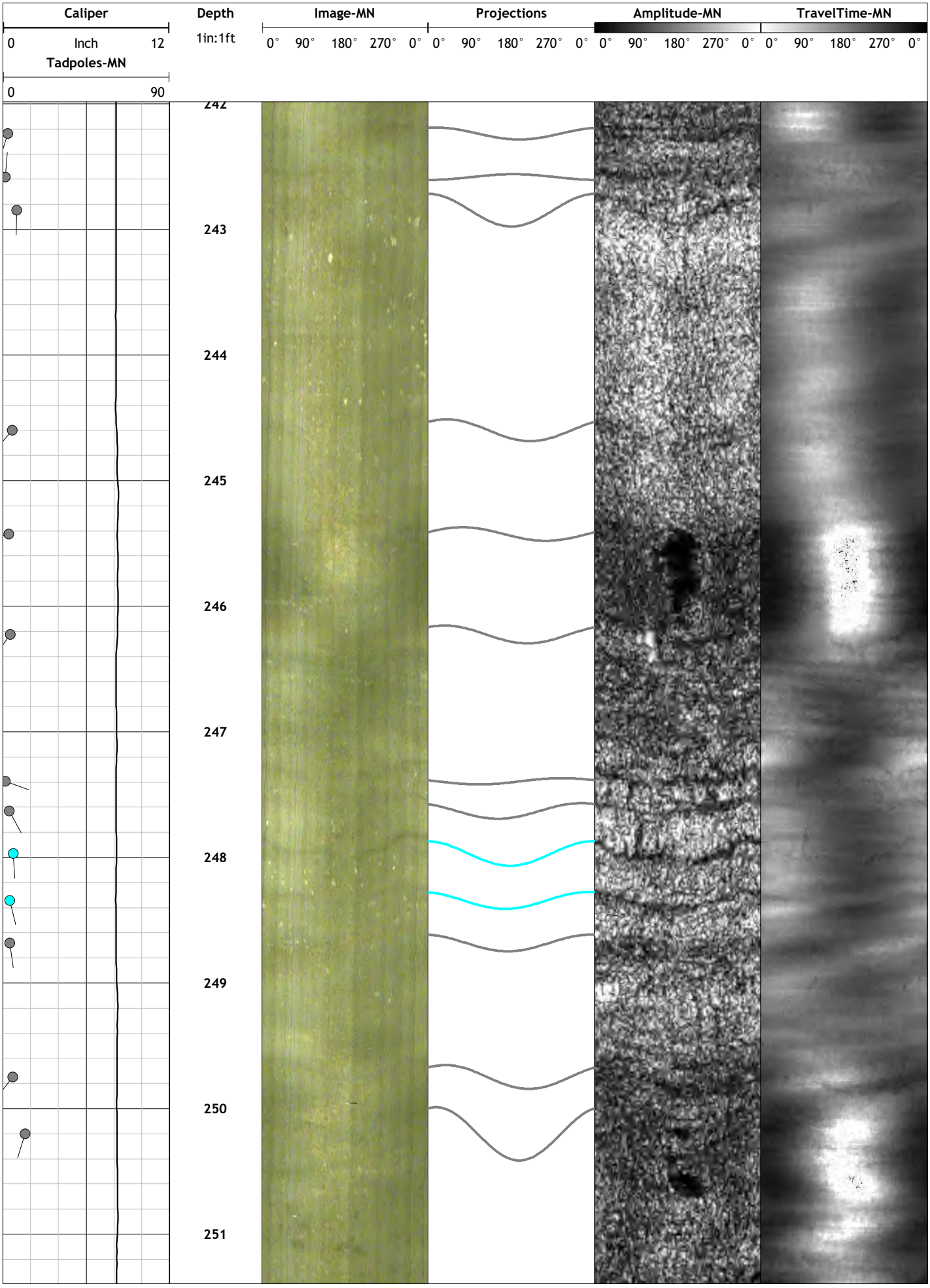
241


Caliper
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Inch
12
Tadpoles-MN
0
90
Depth
1in:1ft
Image-MN
0° 90° 180° 270° 0°
Projections
0° 90° 180° 270° 0°
Amplitude-MN
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TravelTime-MN
0° 90° 180° 270° 0°
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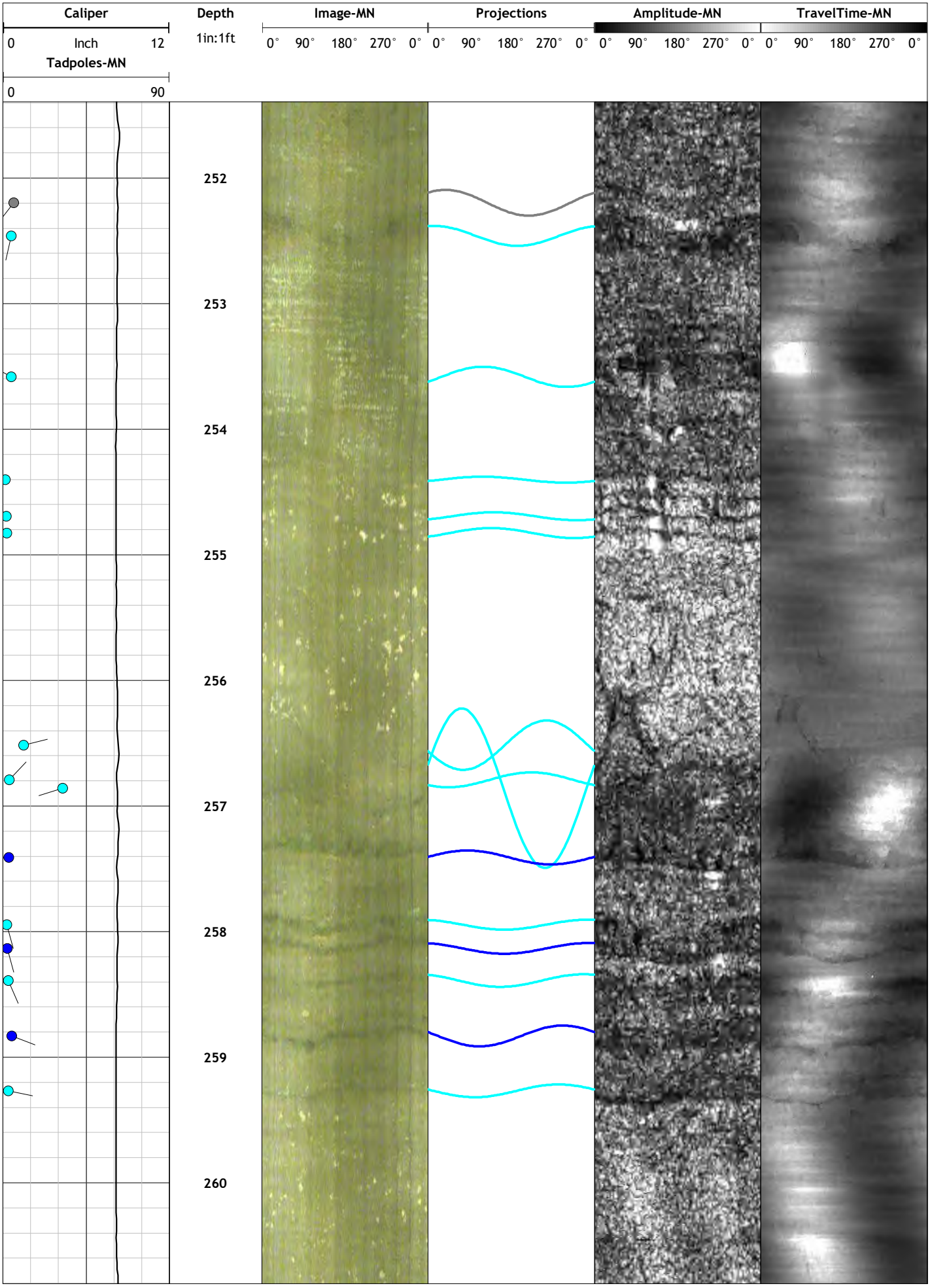
248
249
250
251


Caliper
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Inch
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Tadpoles-MN
0
90
Depth
1in:1ft
Image-MN
0° 90° 180° 270° 0°
Projections
0° 90° 180° 270° 0°
Amplitude-MN
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TravelTime-MN
0° 90° 180° 270° 0°
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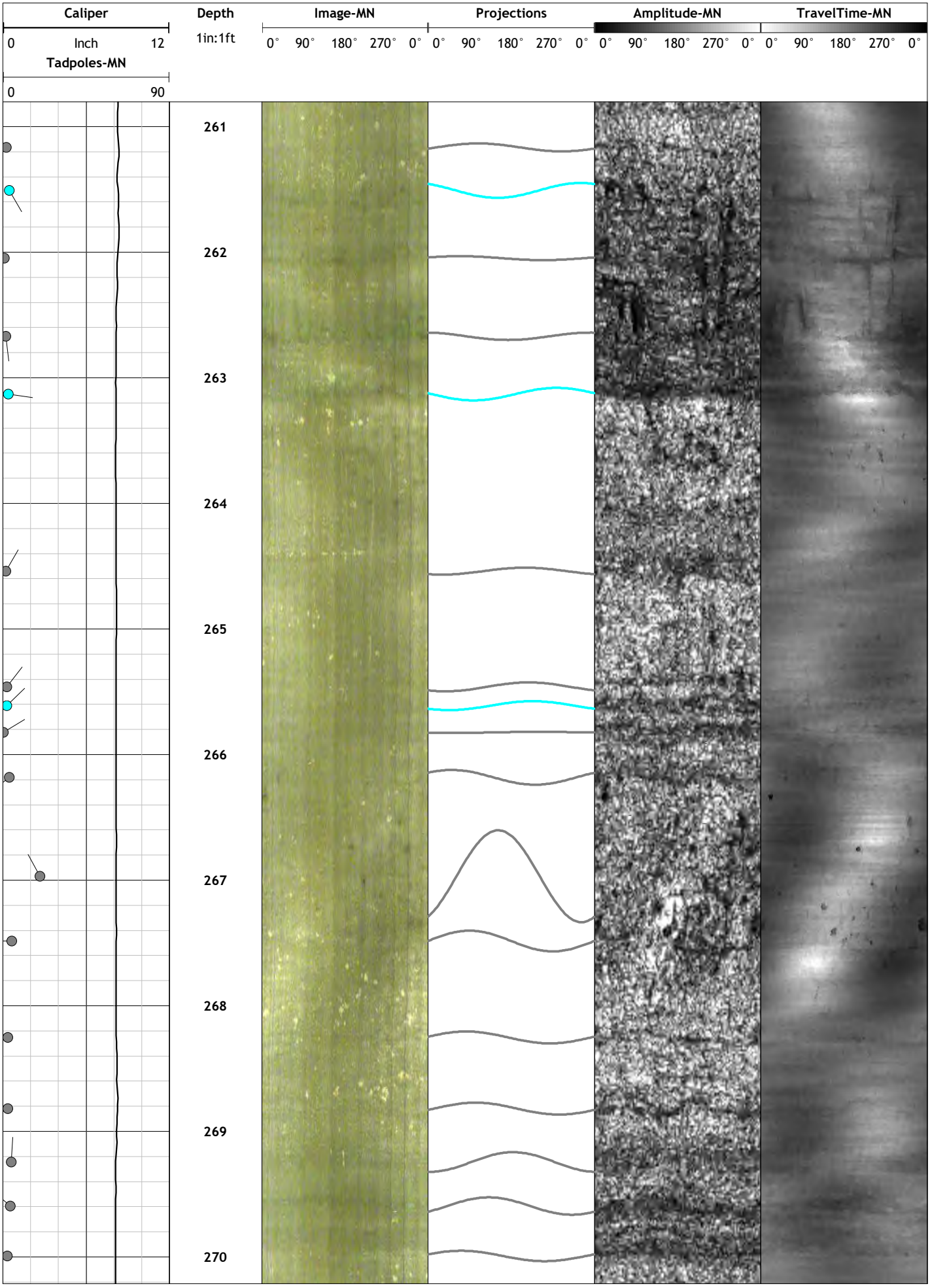
259
260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Inch
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Tadpoles-MN
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90
Depth
1in:1ft
Image-MN
0° 90° 180° 270° 0°
Projections
0° 90° 180° 270° 0°
Amplitude-MN
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TravelTime-MN
0° 90° 180° 270° 0°
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269
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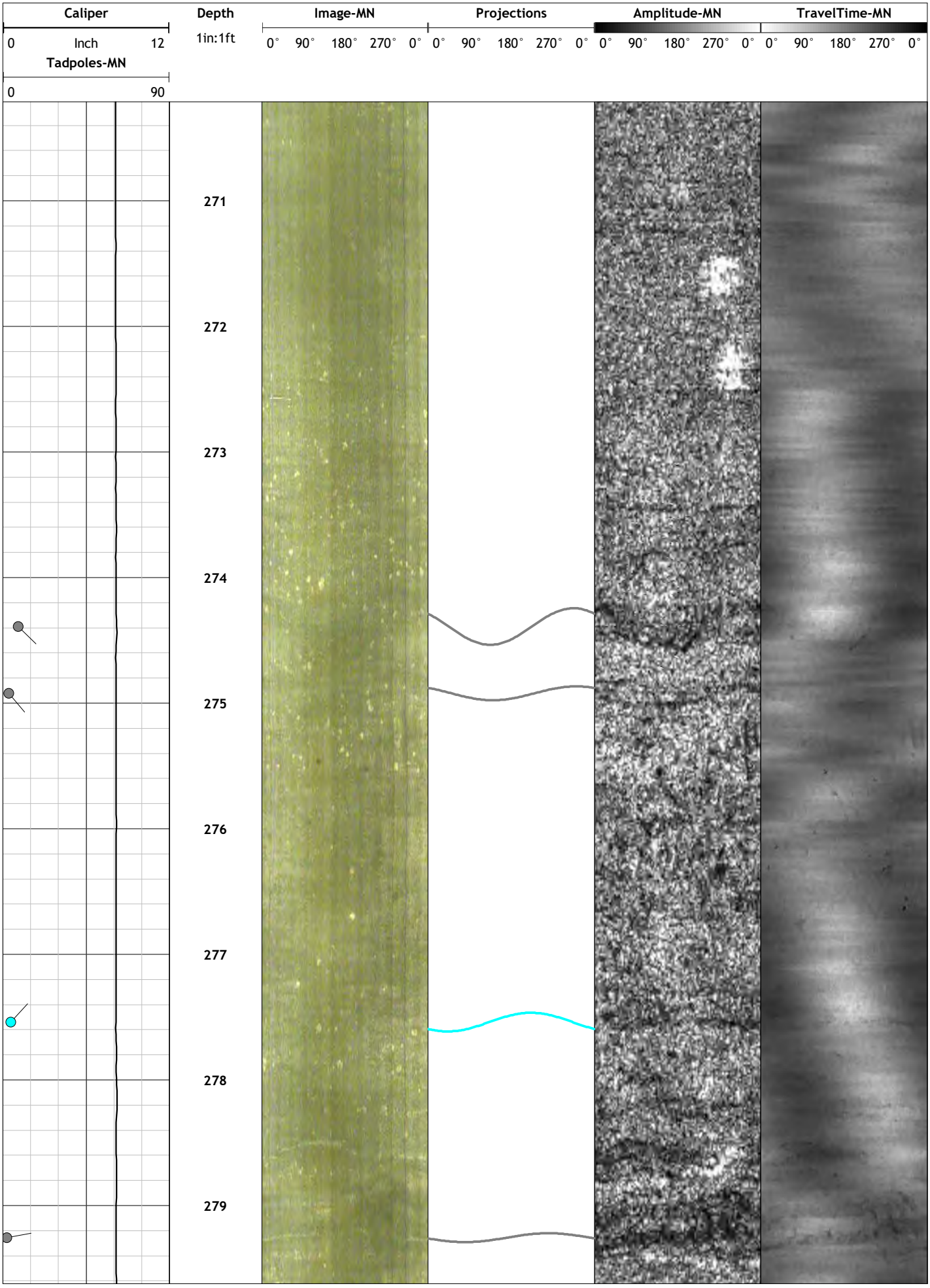
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Inch
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Tadpoles-MN
0
90
Depth
1in:1ft
Image-MN
0° 90° 180° 270° 0°
Projections
0° 90° 180° 270° 0°
Amplitude-MN
0° 90° 180° 270° 0°
TravelTime-MN
0° 90° 180° 270° 0°
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276
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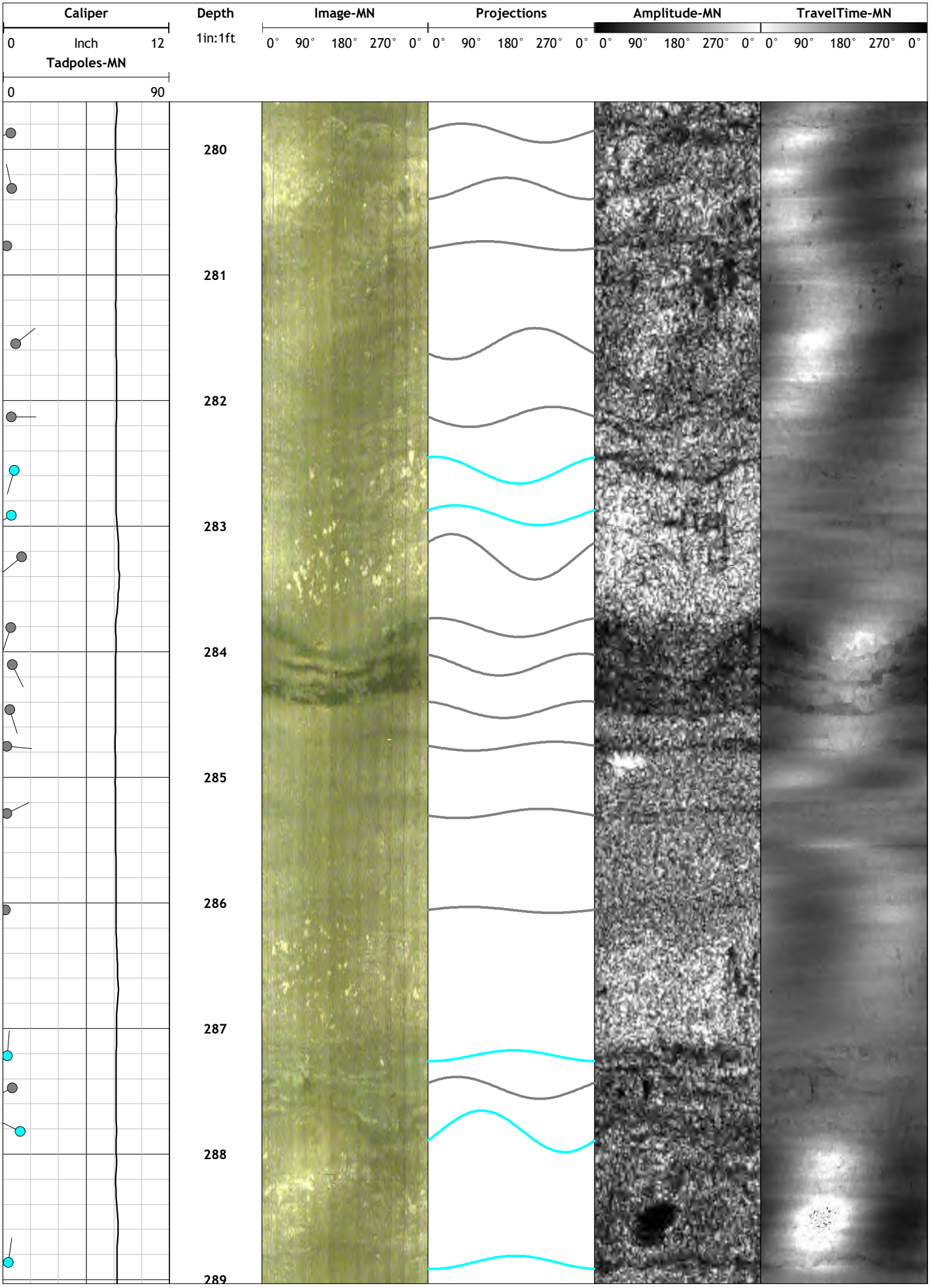
278
279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Inch
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Tadpoles-MN
0
90
Depth
1in:1ft
Image-MN
0° 90° 180° 270° 0°
Projections
0° 90° 180° 270° 0°
Amplitude-MN
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TravelTime-MN
0° 90° 180° 270° 0°
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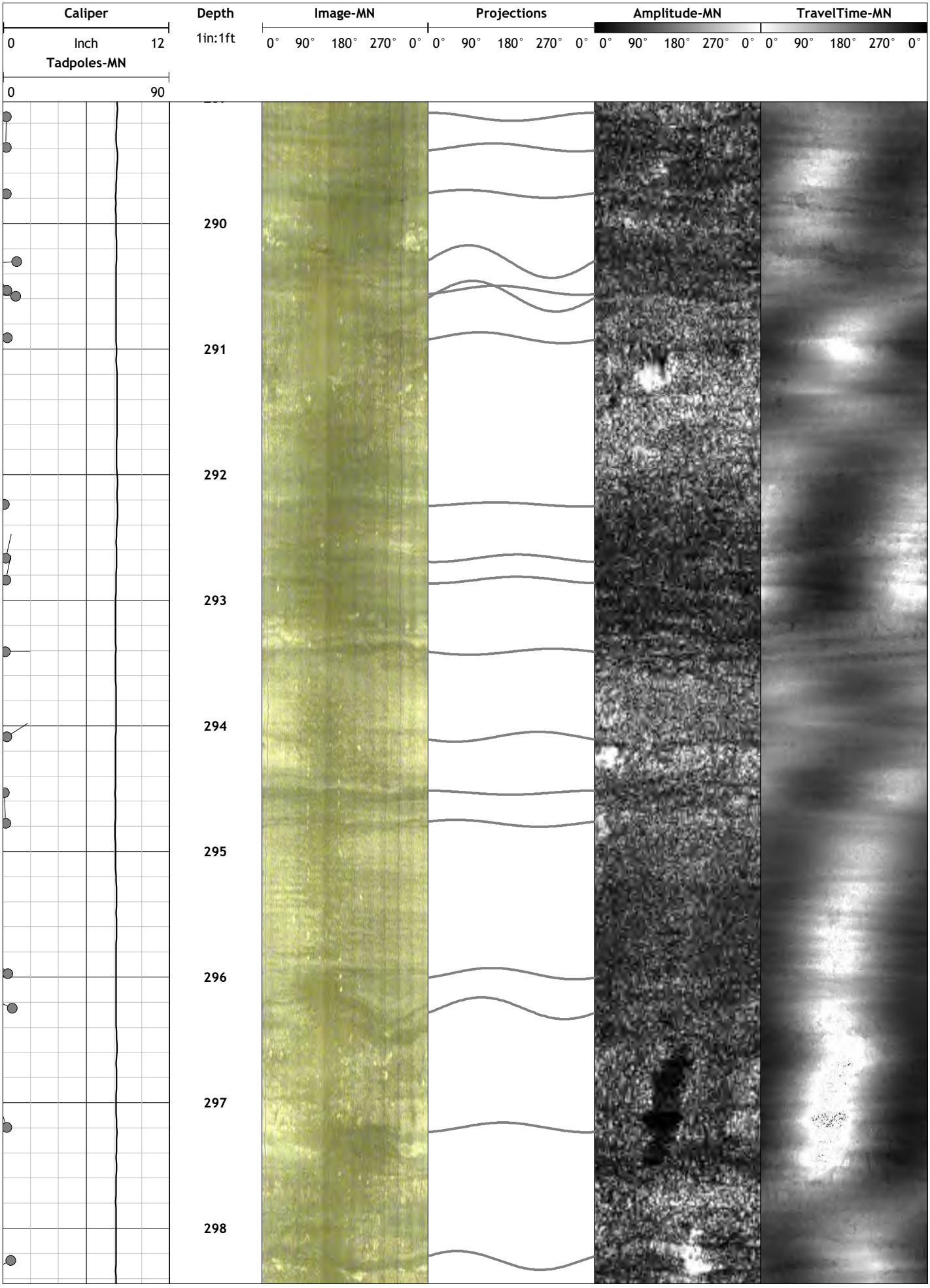
288
289


Caliper
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Inch
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Tadpoles-MN
0
90
Depth
1in:1ft
290
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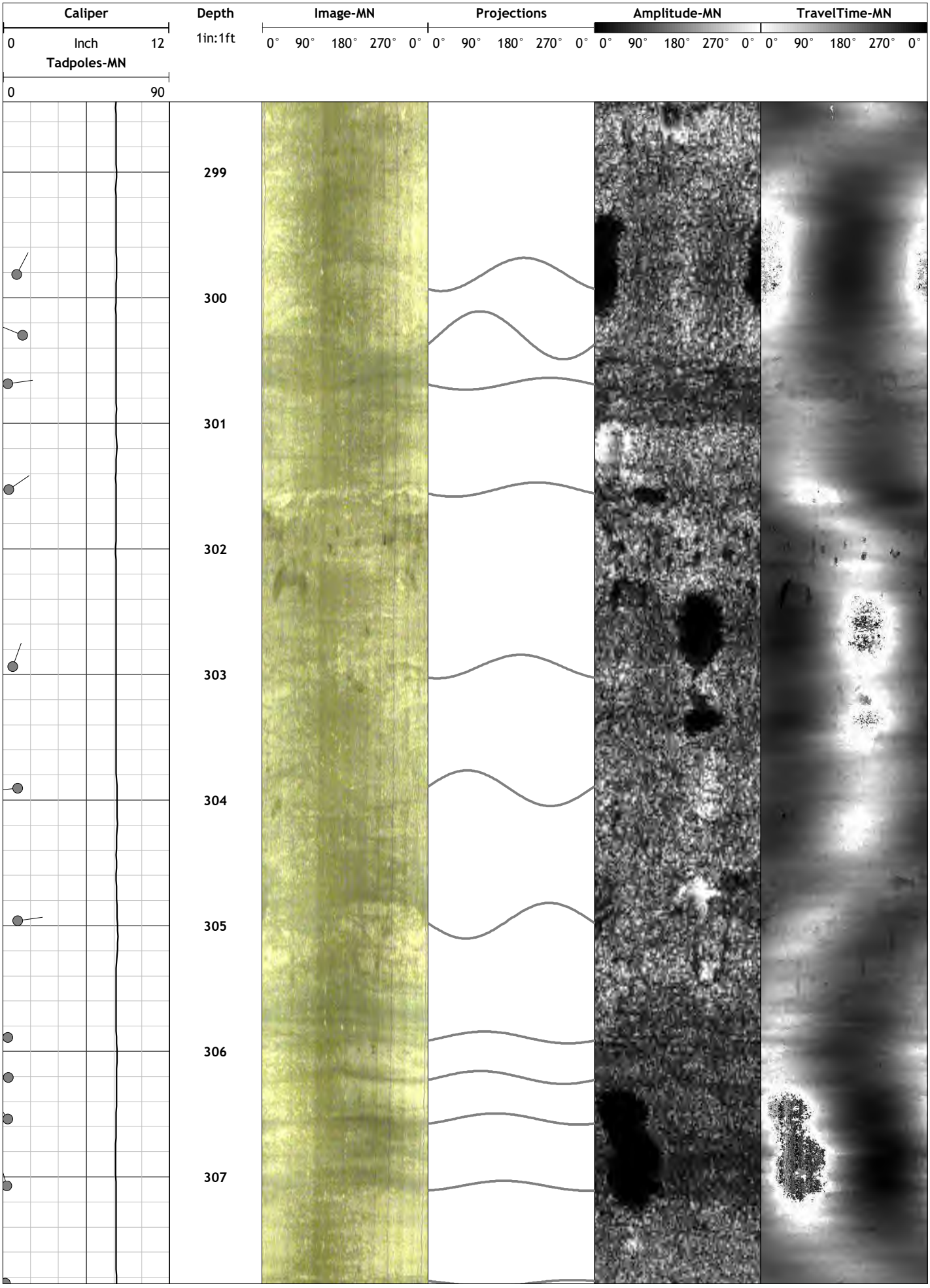
292
293
294
295
296
297
298
Image-MN
0° 90° 180° 270° 0°
Projections
0° 90° 180° 270° 0°
Amplitude-MN
0° 90° 180° 270° 0°
TravelTime-MN
0° 90° 180° 270° 0°


Caliper
0
Inch
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Tadpoles-MN
0
90
Depth
1in:1ft
Image-MN
0° 90° 180° 270° 0°
Projections
0° 90° 180° 270° 0°
Amplitude-MN
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TravelTime-MN
0° 90° 180° 270° 0°
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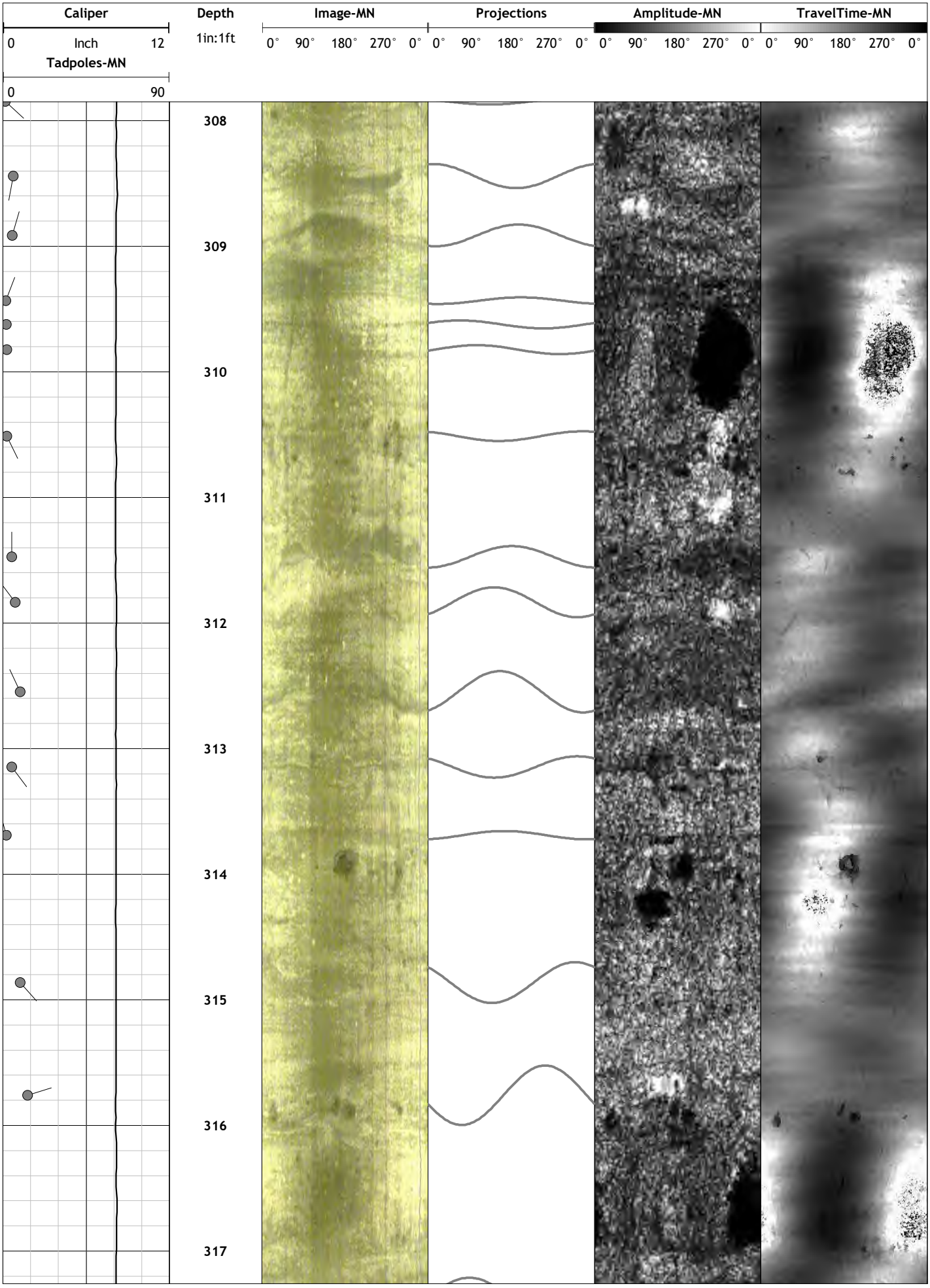
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Inch
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Depth
1in:1ft
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315
316
317
Image-MN
0° 90° 180° 270° 0°
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Amplitude-MN
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TravelTime-MN
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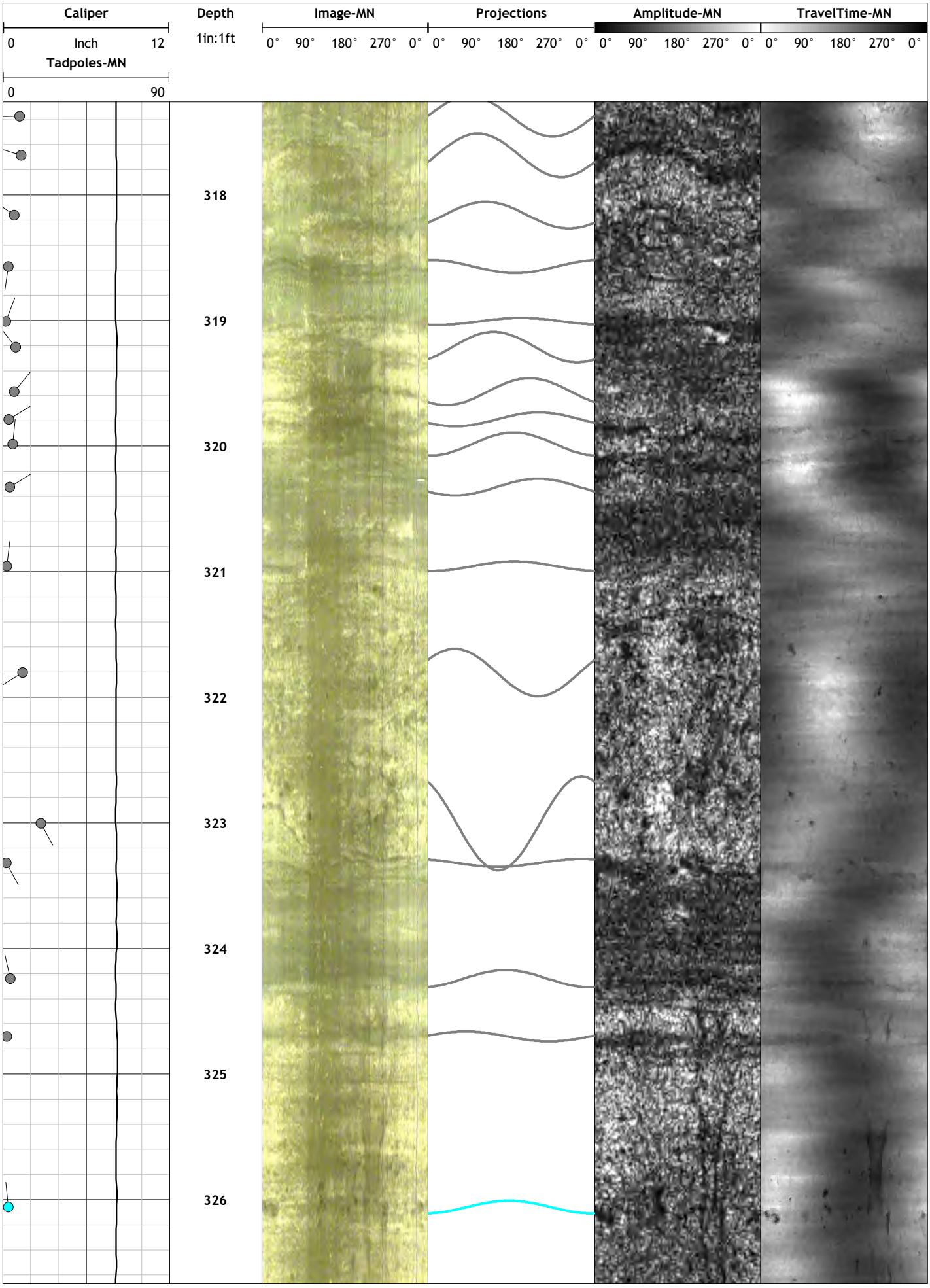
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Inch
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Tadpoles-MN
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Depth
1in:1ft
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319
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325
326
Image-MN
0° 90° 180° 270° 0°
Projections
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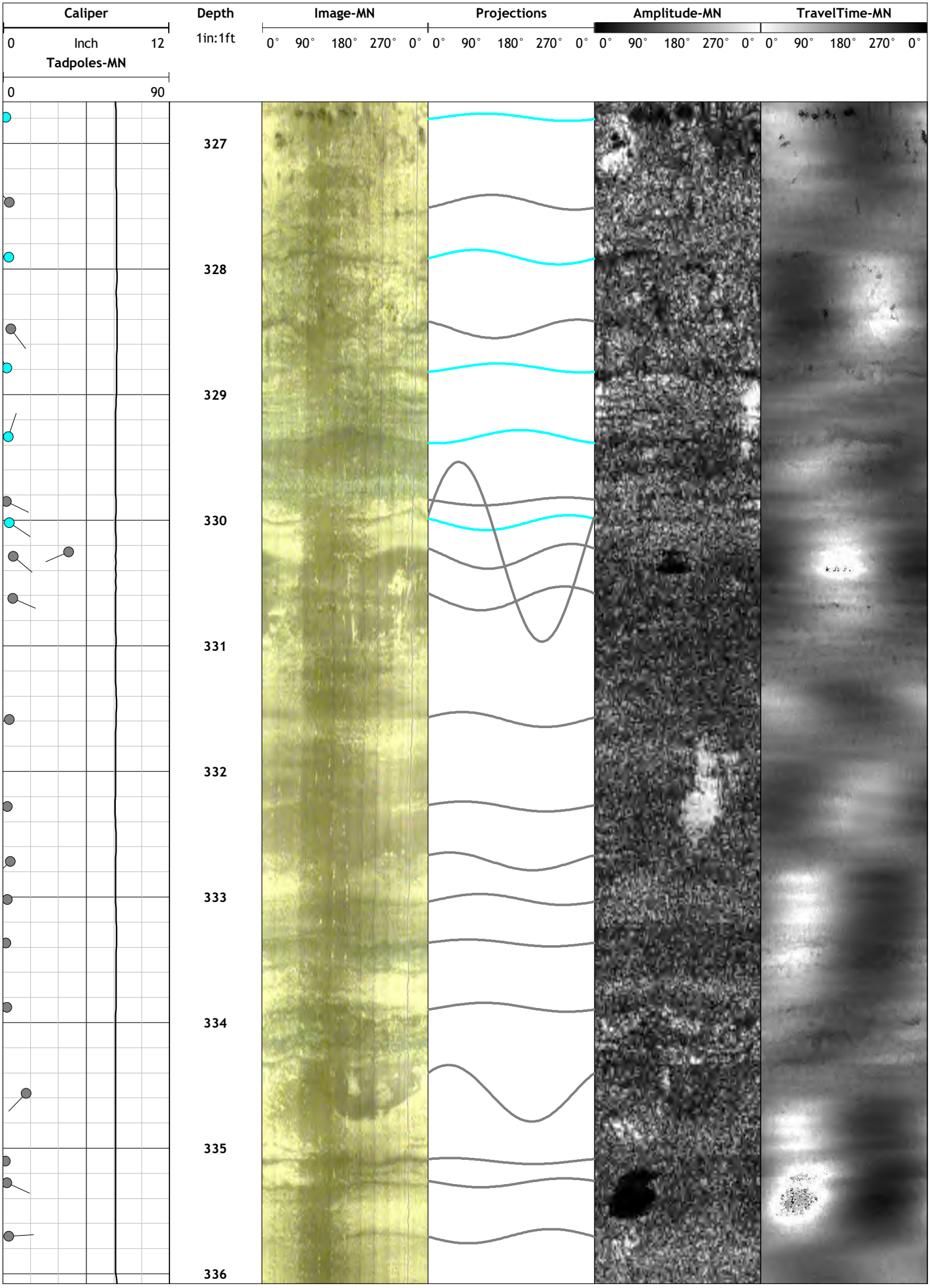
Amplitude-MN
0° 90° 180° 270° 0°
TravelTime-MN
0° 90° 180° 270° 0°


Caliper
0
Inch
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Tadpoles-MN
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90
Depth
1in:1ft
Image-MN
0° 90° 180° 270° 0°
Projections
0° 90° 180° 270° 0°
Amplitude-MN
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TravelTime-MN
0° 90° 180° 270° 0°
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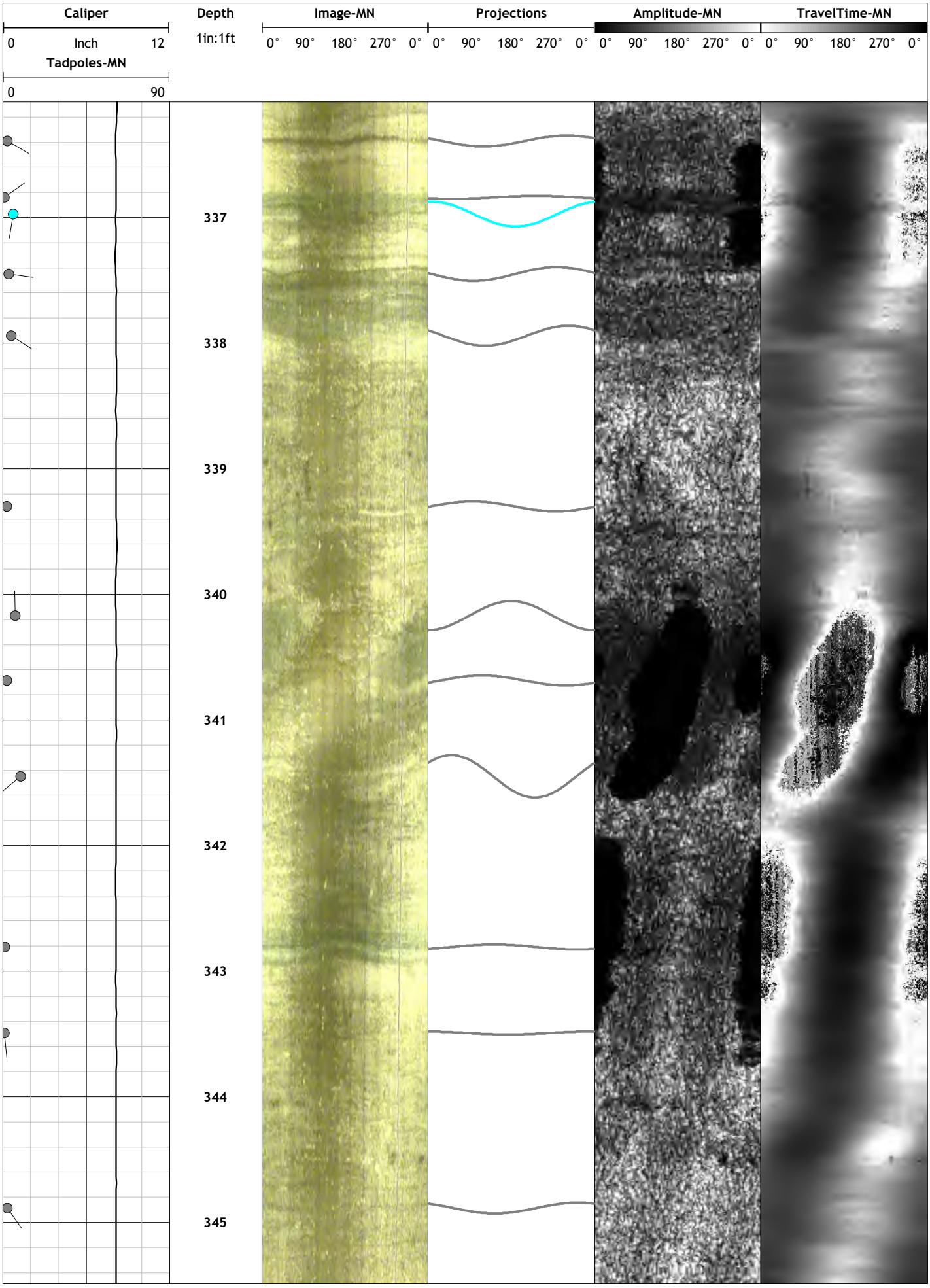
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0
Inch
12
Tadpoles-MN
0
90
Depth
1in:1ft
Image-MN
0° 90° 180° 270° 0°
Projections
0° 90° 180° 270° 0°
Amplitude-MN
0° 90° 180° 270° 0°
TravelTime-MN
0° 90° 180° 270° 0°
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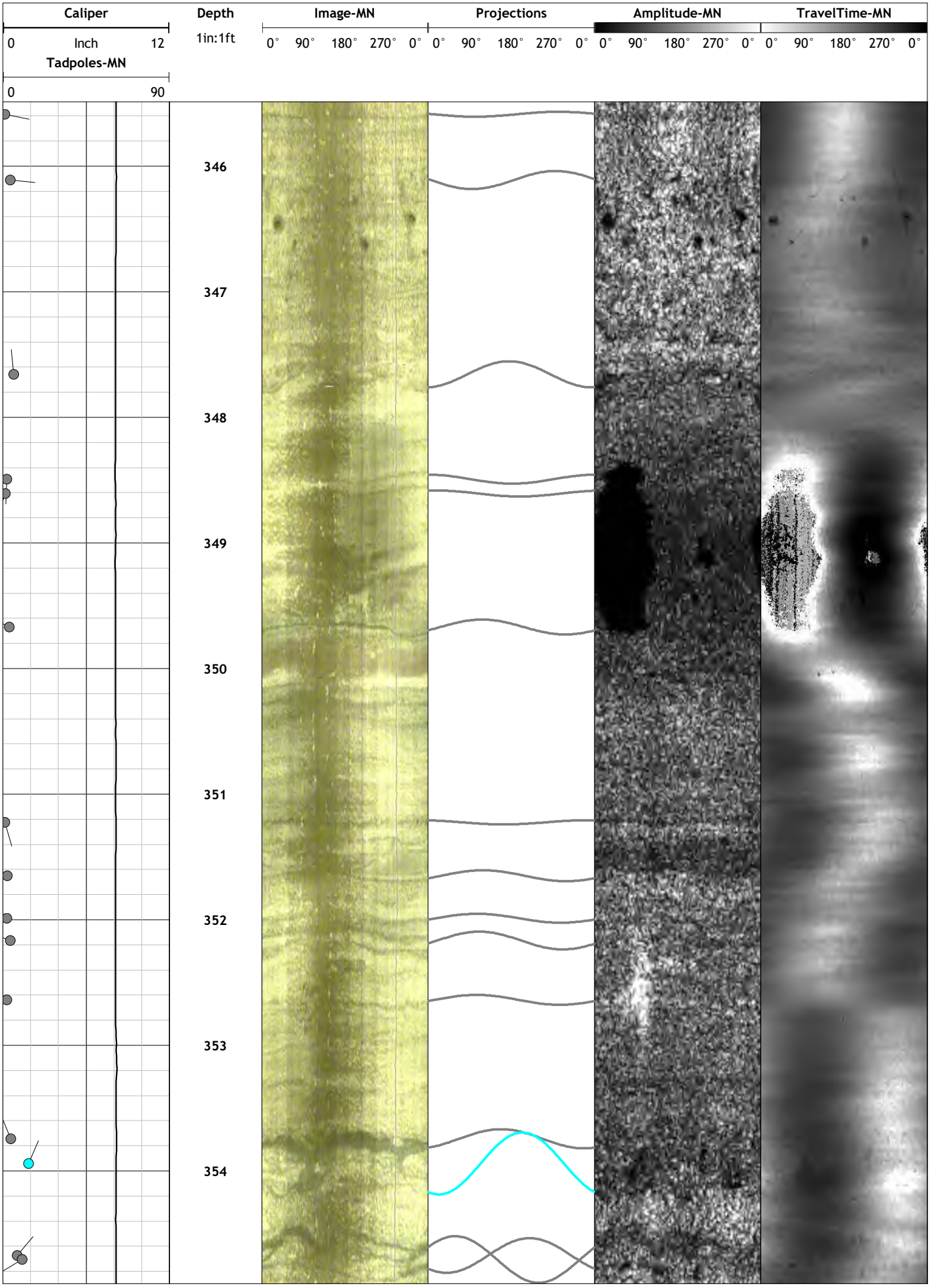
344
345


Caliper
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Inch
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Tadpoles-MN
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90
Depth
1in:1ft
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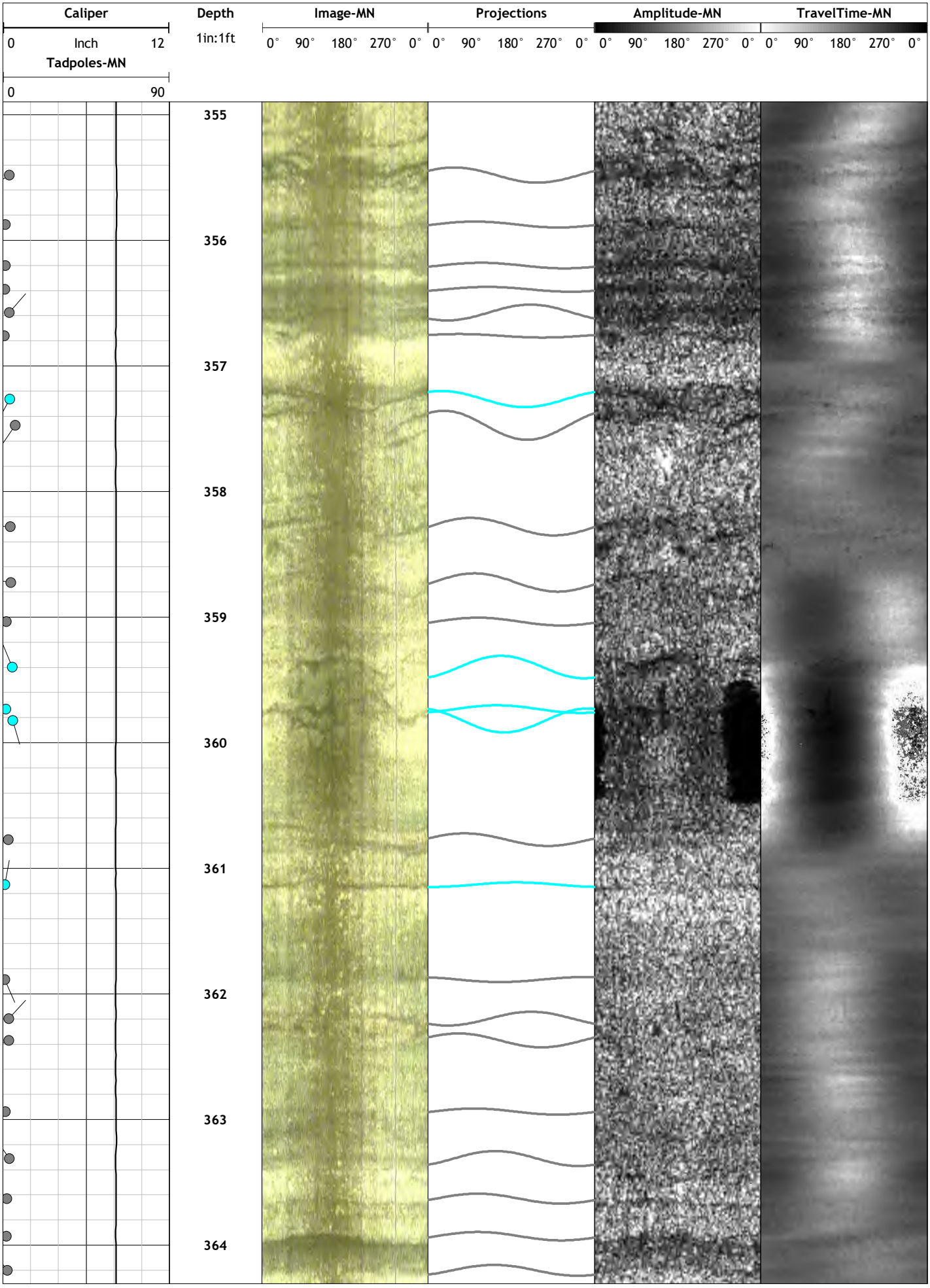
348
349
350
351
352
353
354
Image-MN
0° 90° 180° 270° 0°
Projections
0° 90° 180° 270° 0°
Amplitude-MN
0° 90° 180° 270° 0°
TravelTime-MN
0° 90° 180° 270° 0°


Caliper
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Inch
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Tadpoles-MN
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90
Depth
1in:1ft
355
356
357
358
359
360
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362
363
364
Image-MN
0° 90° 180° 270° 0°
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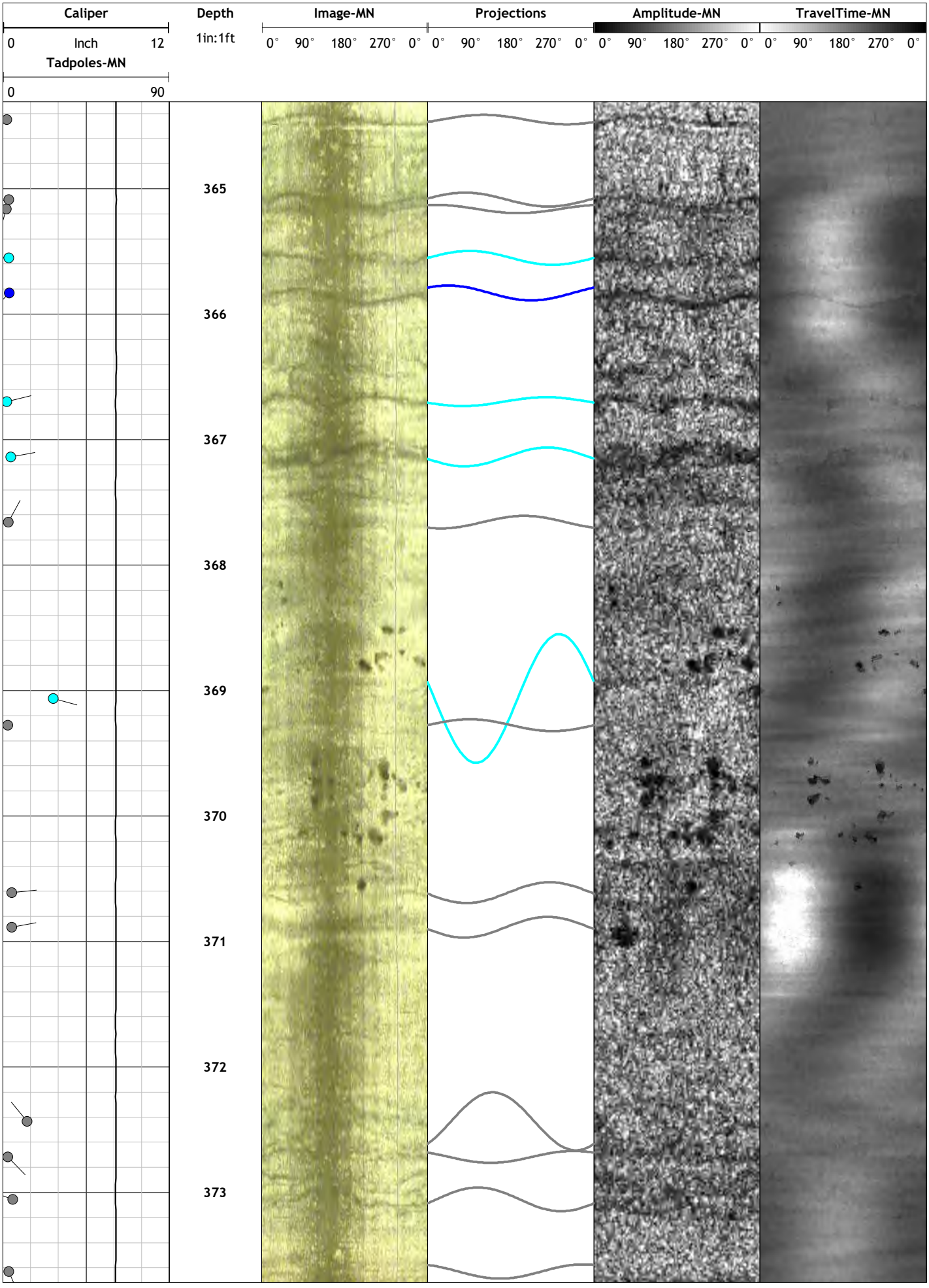
0° 90° 180° 270° 0°
Amplitude-MN
0° 90° 180° 270° 0°
TravelTime-MN
0° 90° 180° 270° 0°


Caliper
0
Inch
12
Tadpoles-MN
0
90
Depth
1in:1ft
Image-MN
0° 90° 180° 270° 0°
Projections
0° 90° 180° 270° 0°
Amplitude-MN
0° 90° 180° 270° 0°
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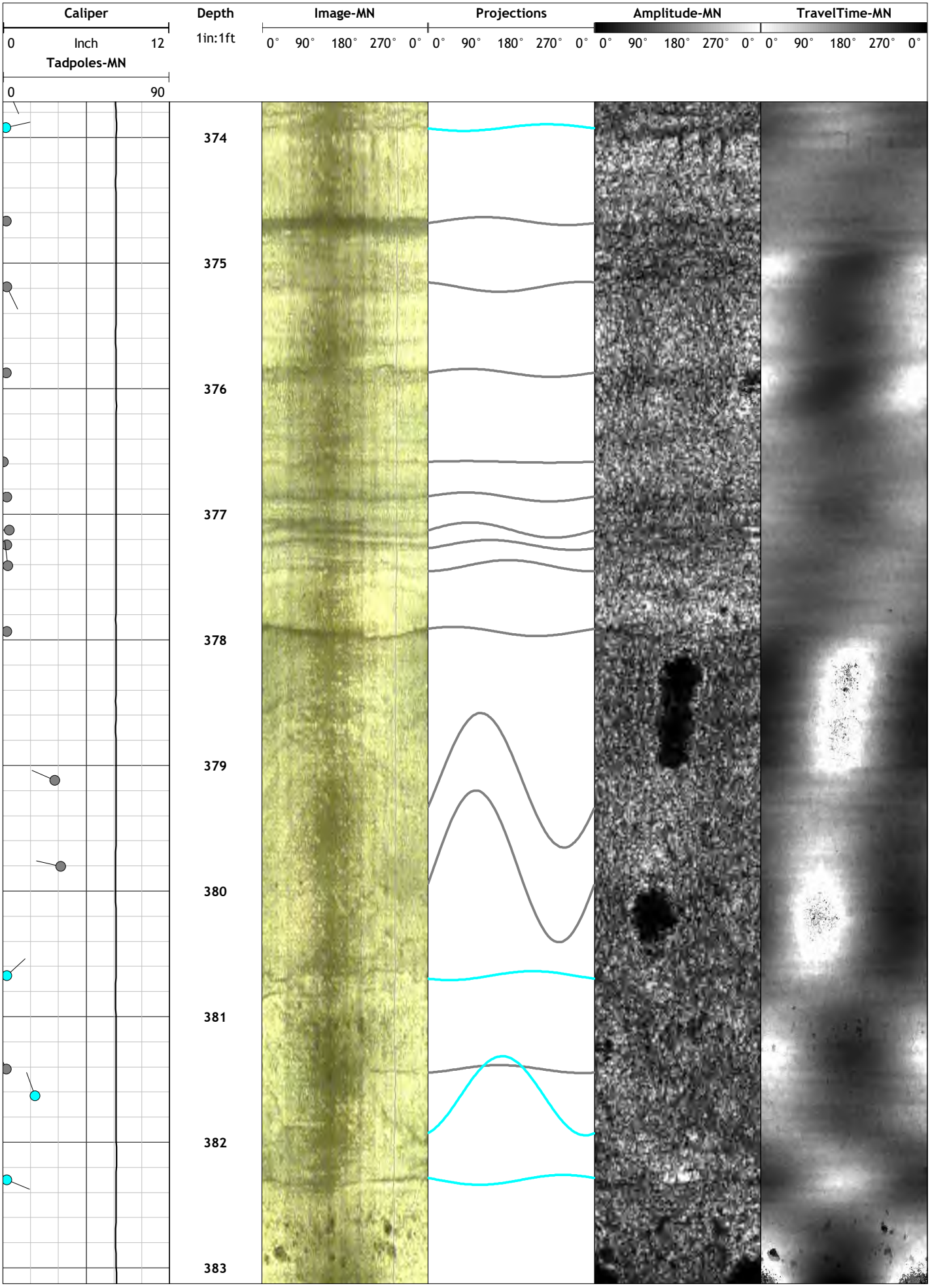
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Depth
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Image-MN
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Amplitude-MN
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TravelTime-MN
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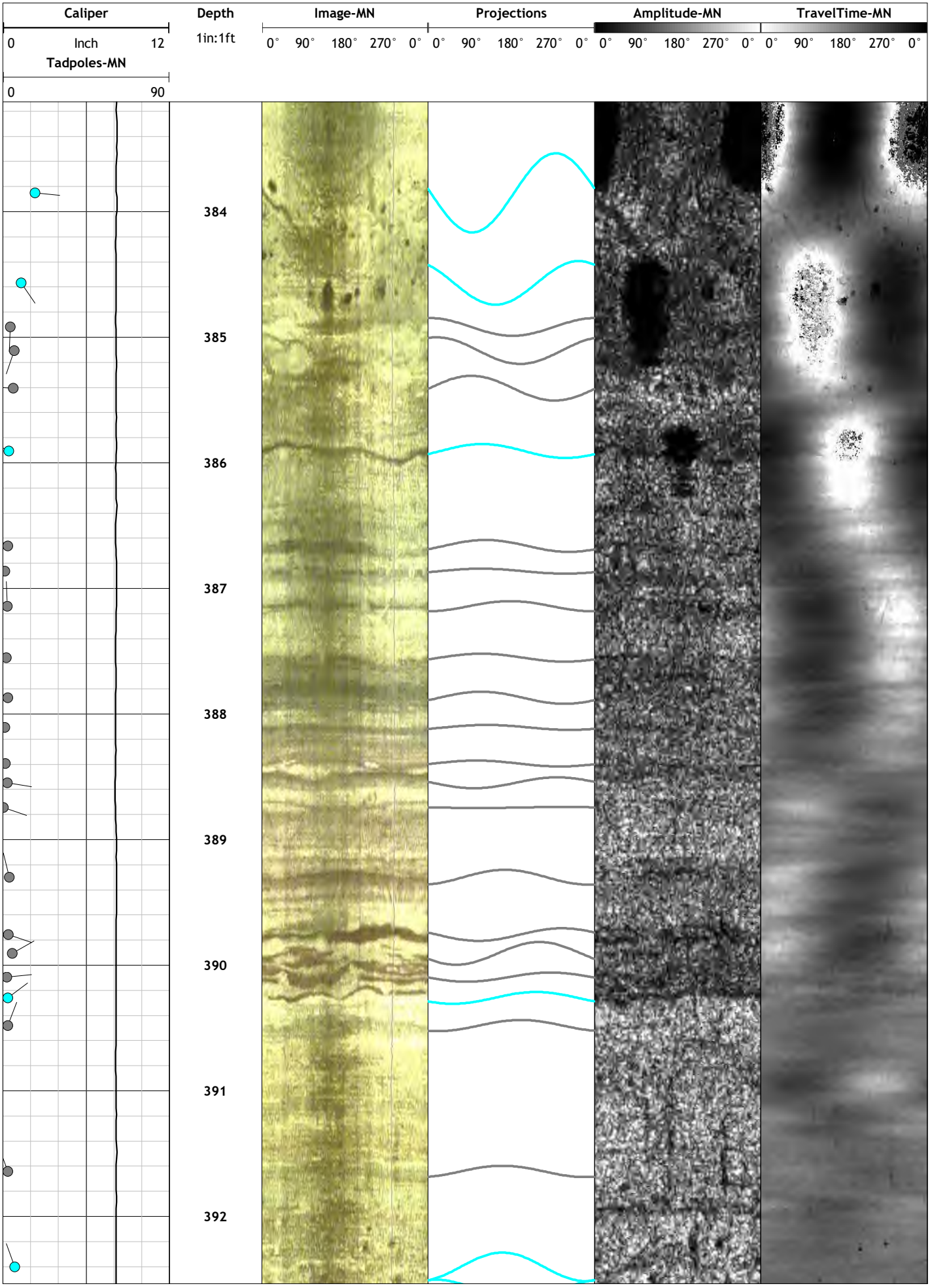
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Amplitude-MN
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TravelTime-MN
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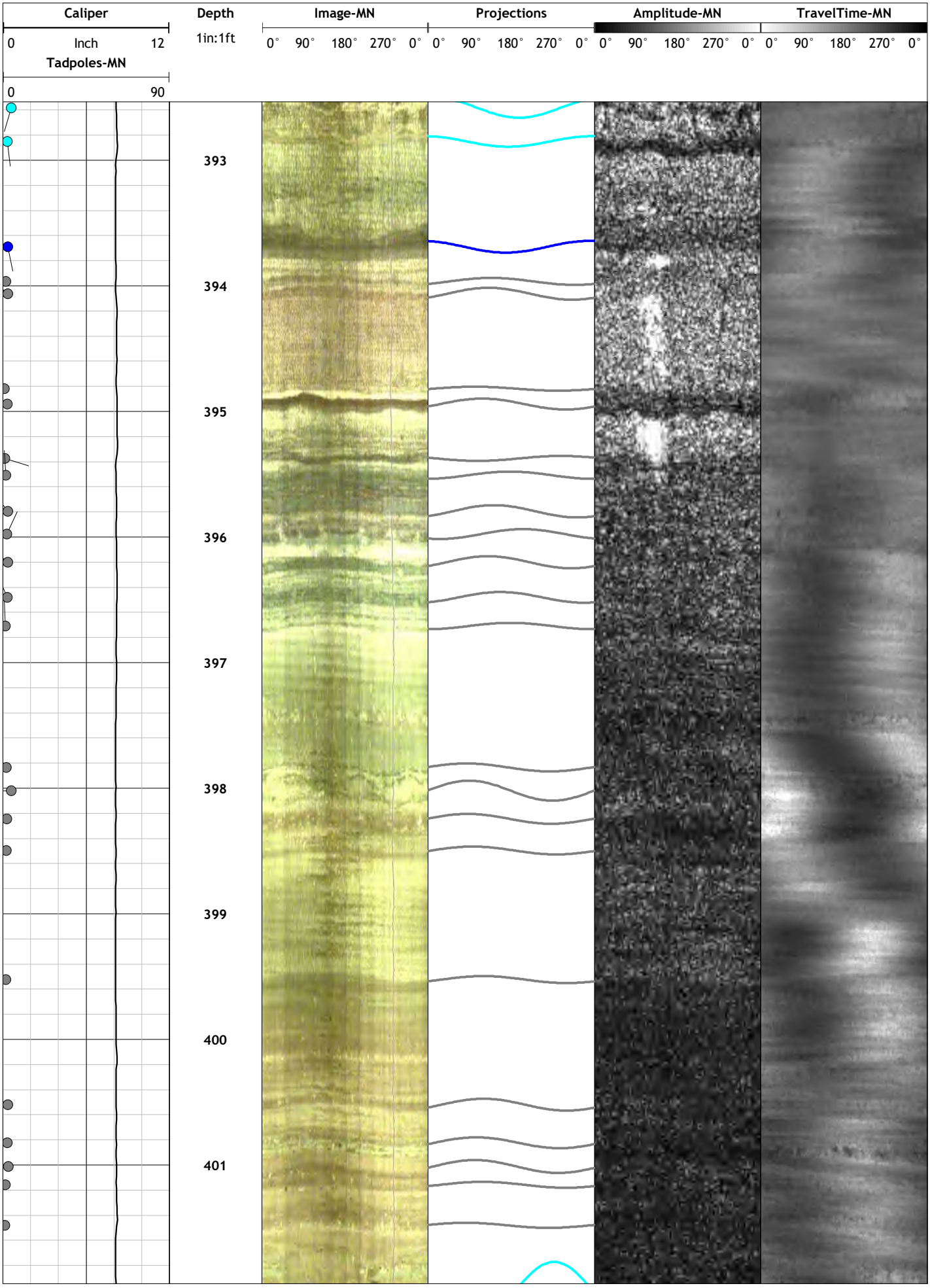
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Depth
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Projections
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Amplitude-MN
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TravelTime-MN
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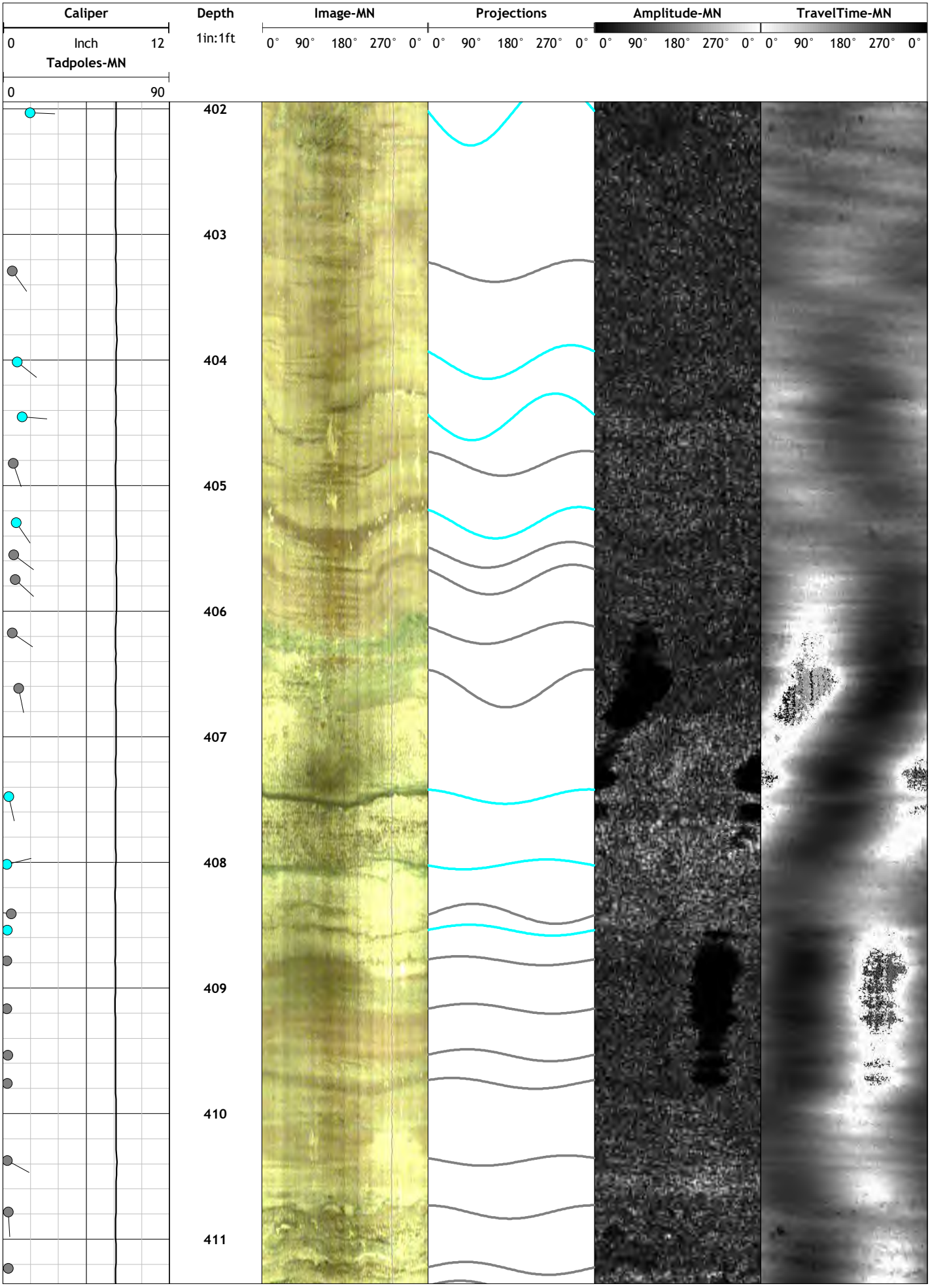
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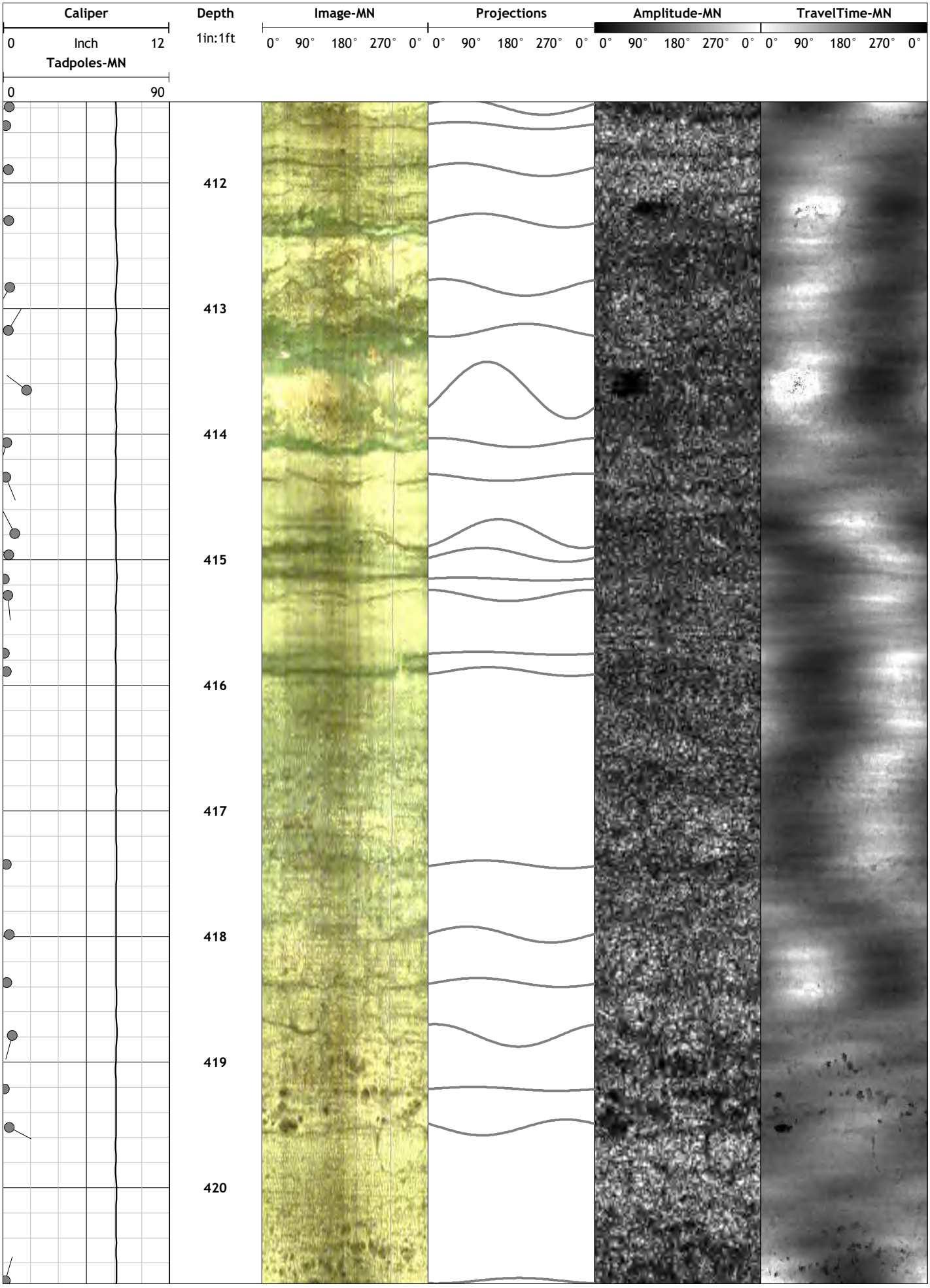
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420
Image-MN
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Amplitude-MN
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TravelTime-MN
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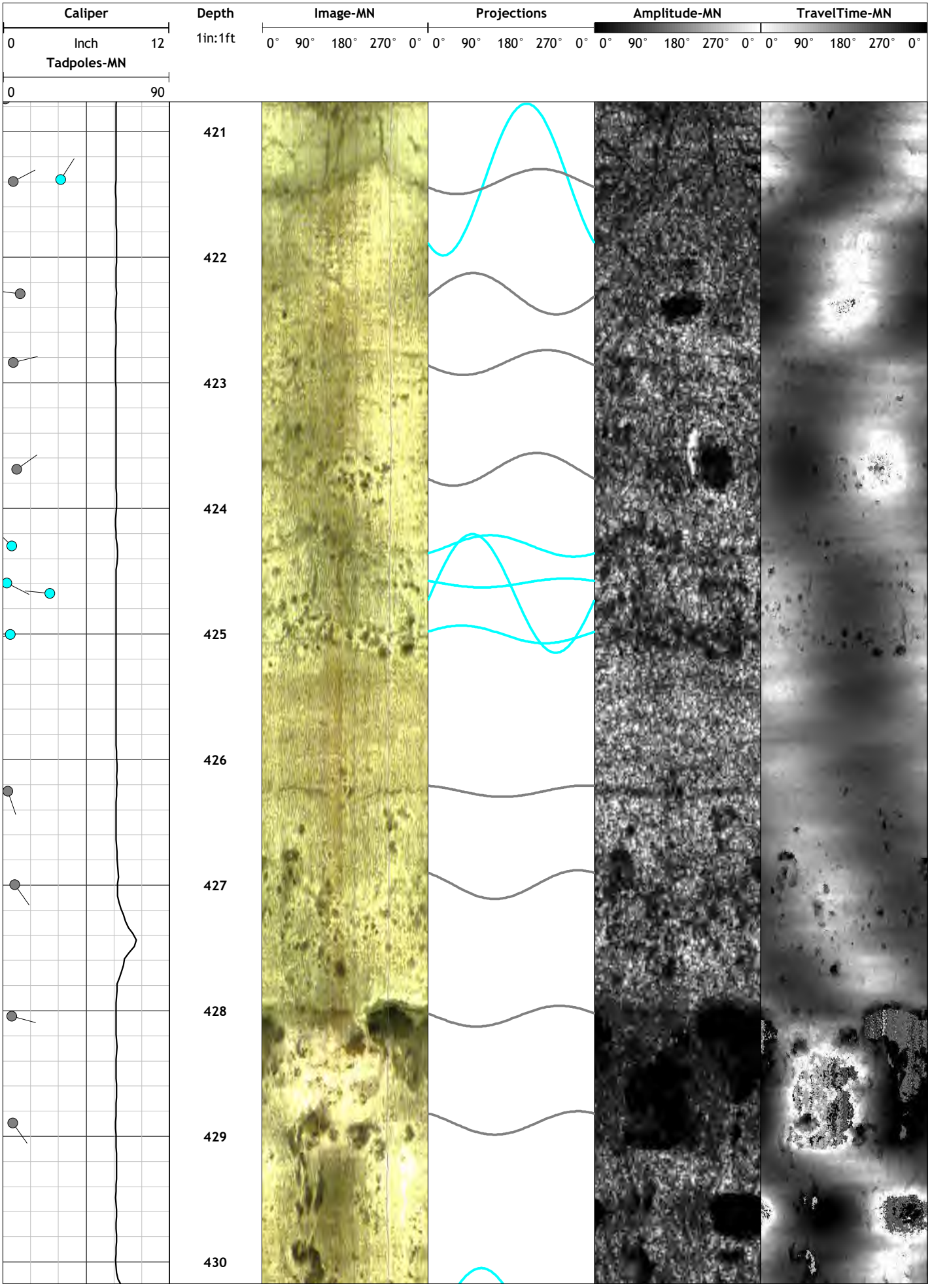
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Depth
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Image-MN
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Projections
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Amplitude-MN
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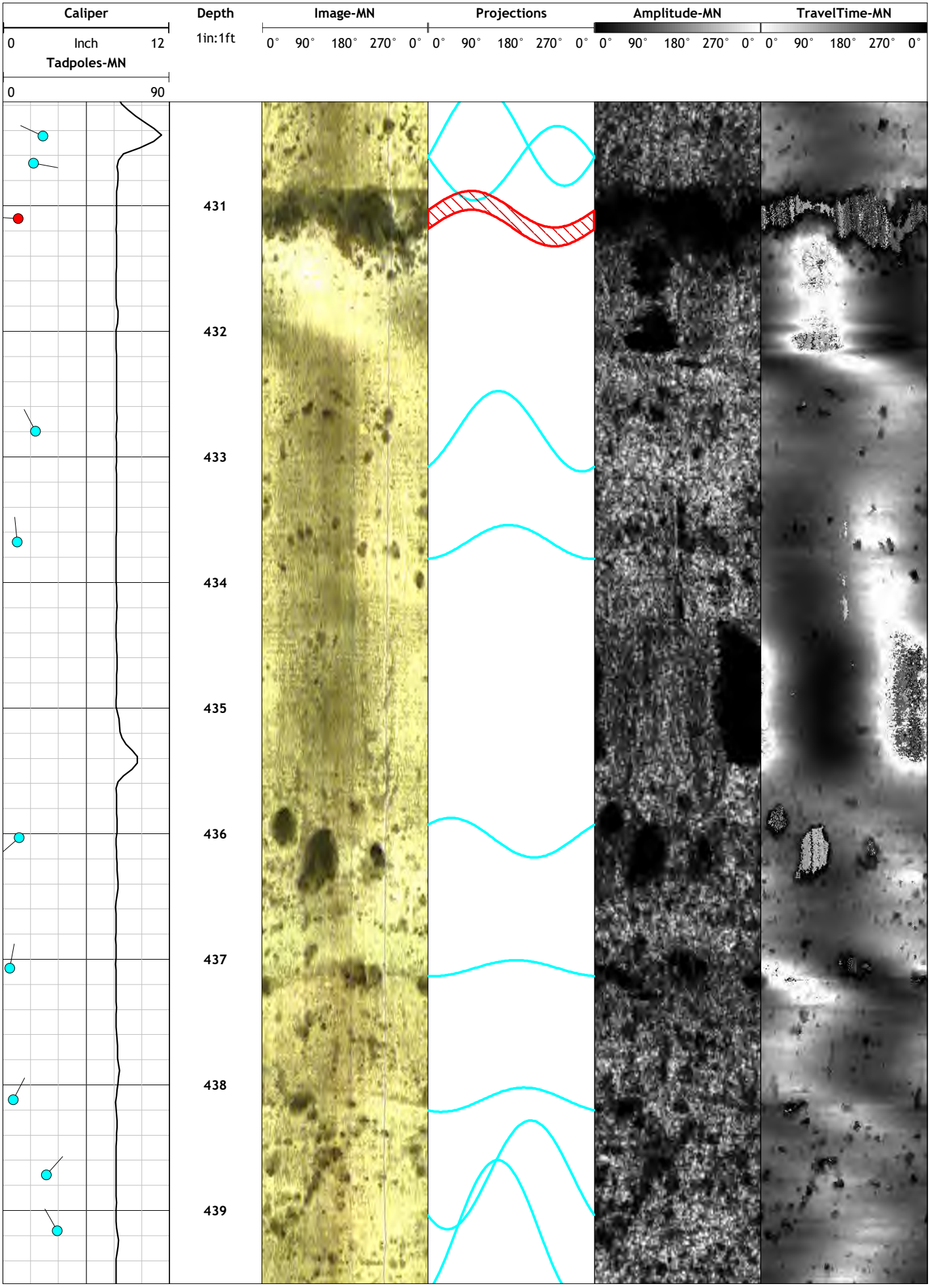
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Projections
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Amplitude-MN
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TravelTime-MN
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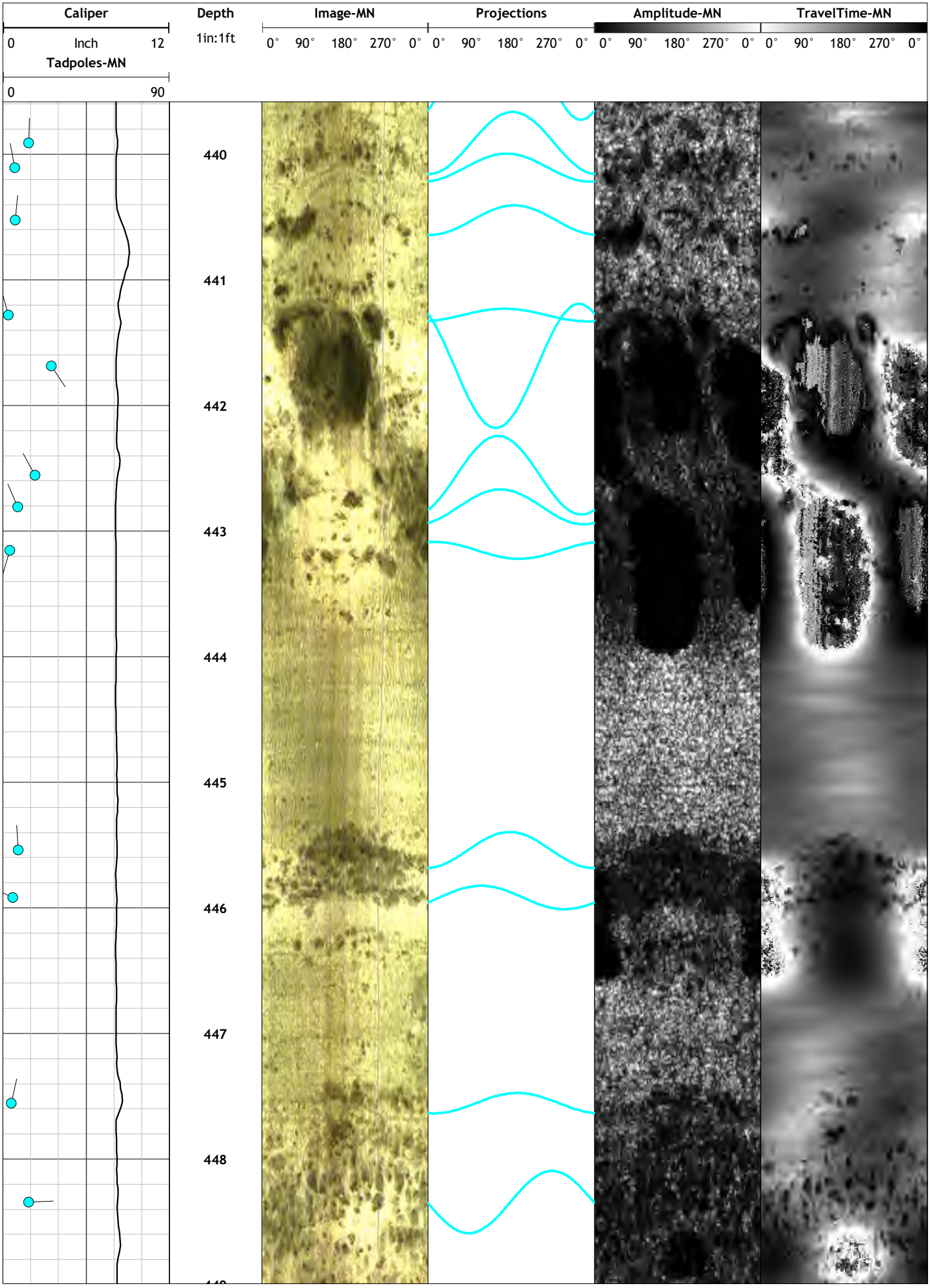
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Depth
1in:1ft
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Projections
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Amplitude-MN
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TravelTime-MN
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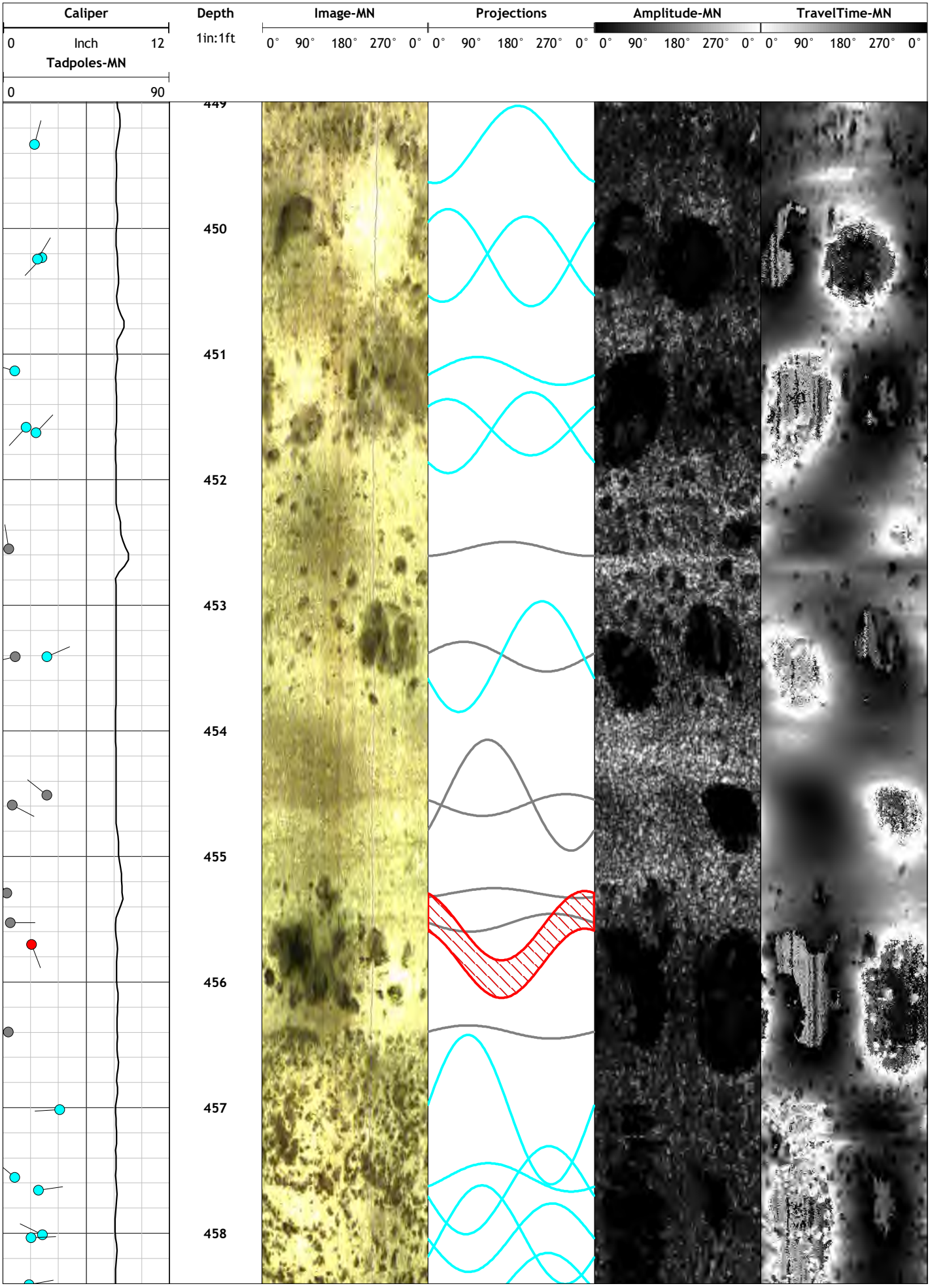
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Depth
1in:1ft
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452
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458
Image-MN
0° 90° 180° 270° 0°
Projections
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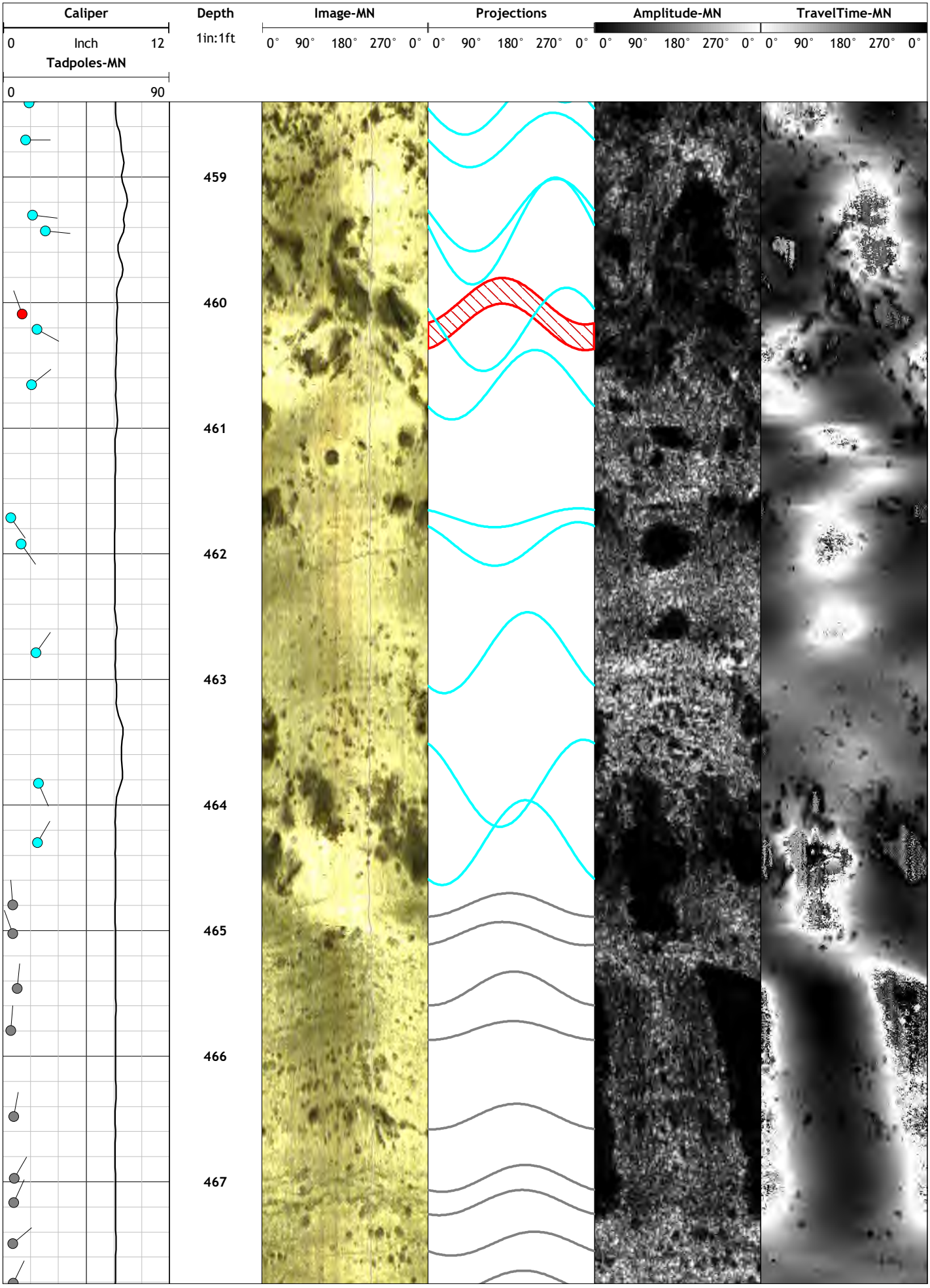
Amplitude-MN
0° 90° 180° 270° 0°
TravelTime-MN
0° 90° 180° 270° 0°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Depth
1in:1ft
Image-MN
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Projections
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Amplitude-MN
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TravelTime-MN
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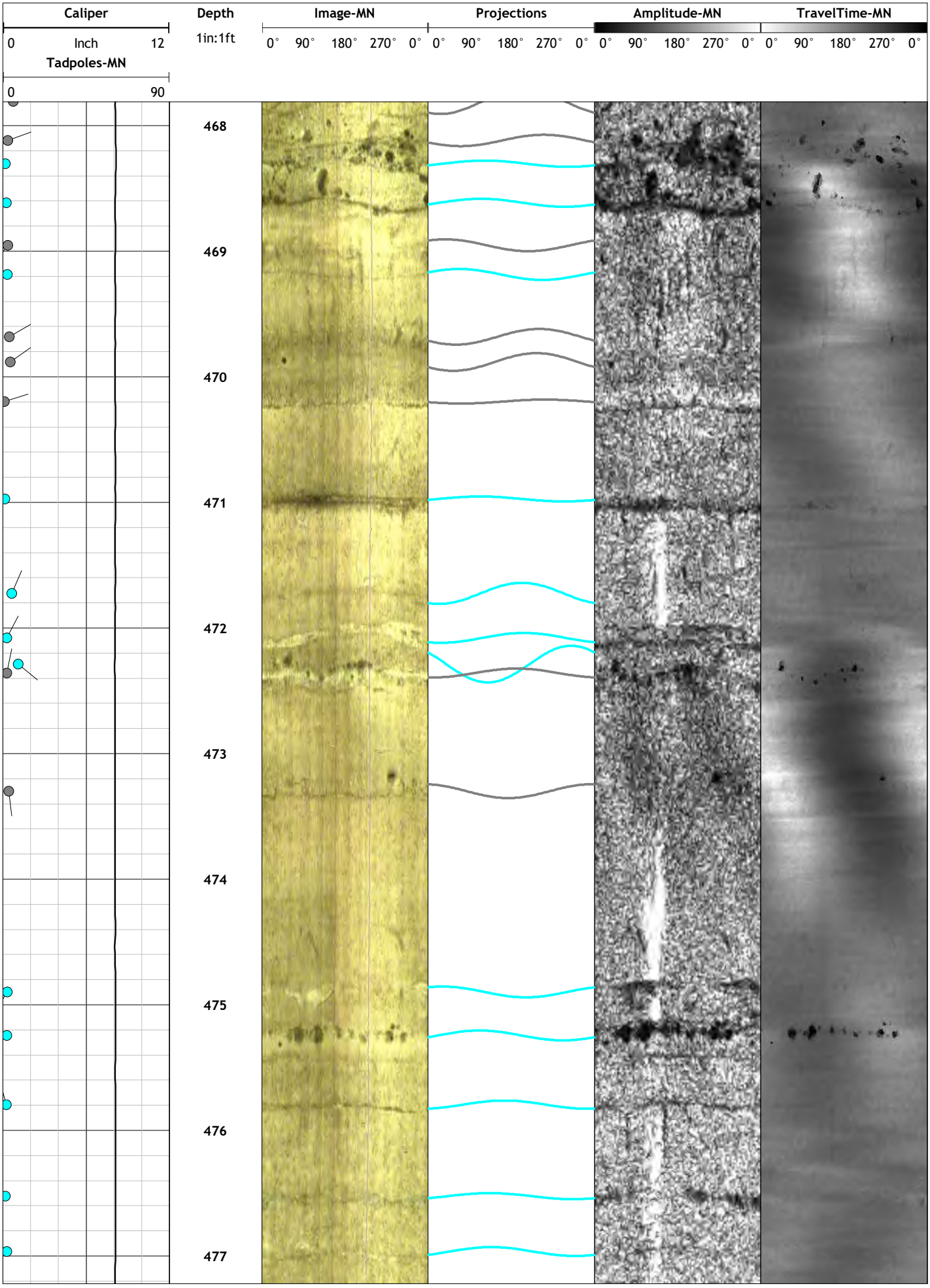
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Projections
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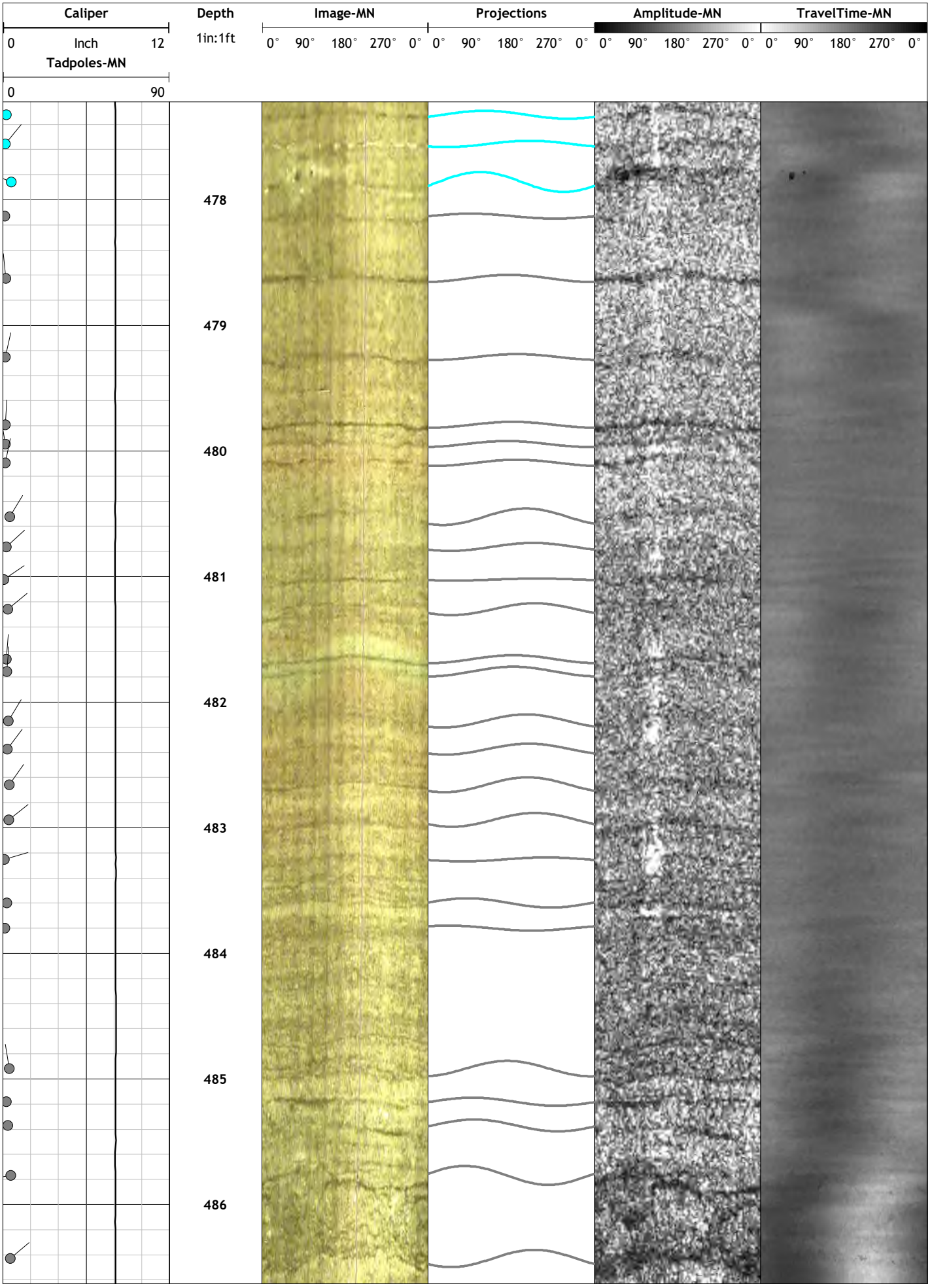
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Projections
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Amplitude-MN
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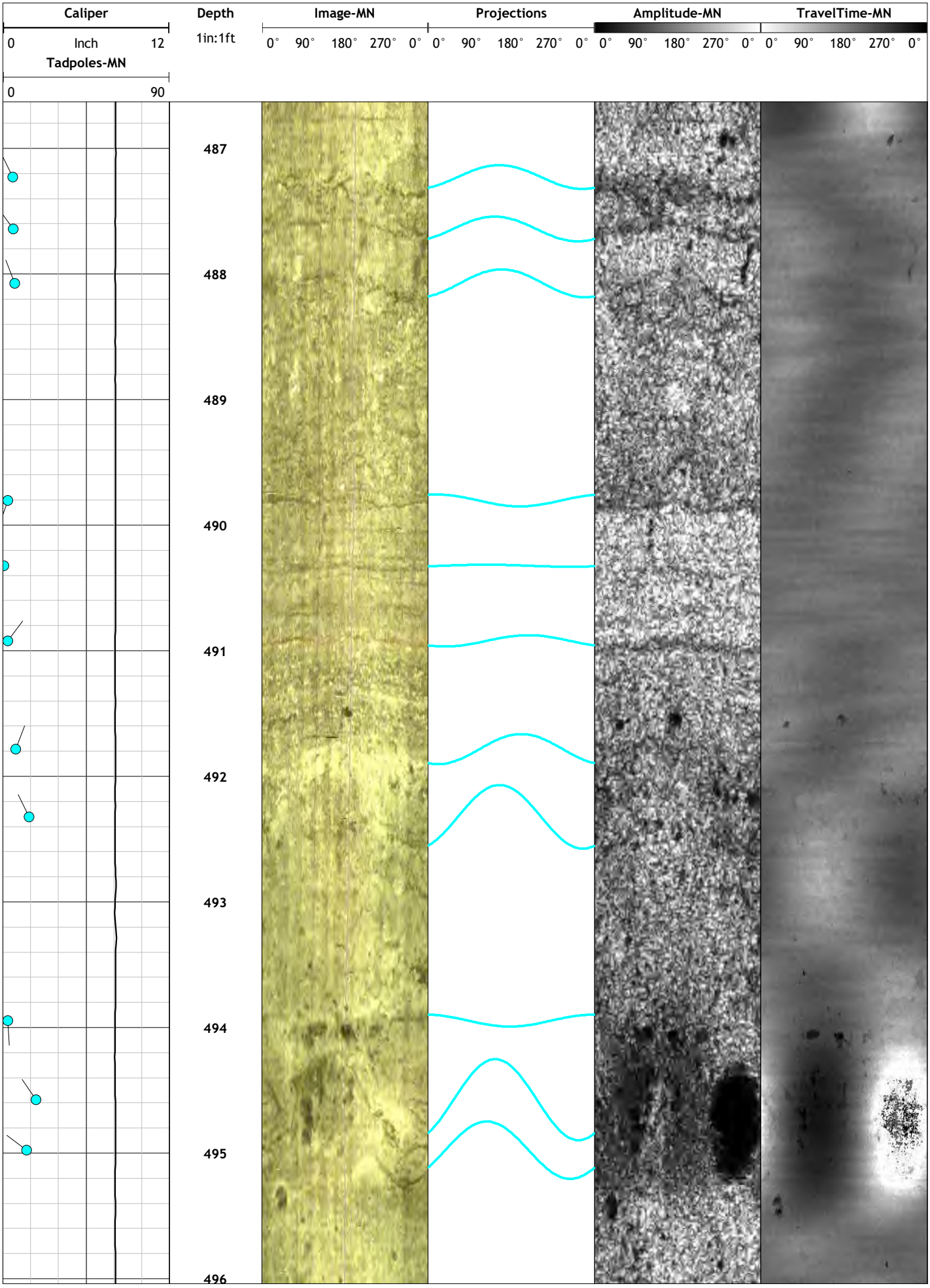
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TravelTime-MN
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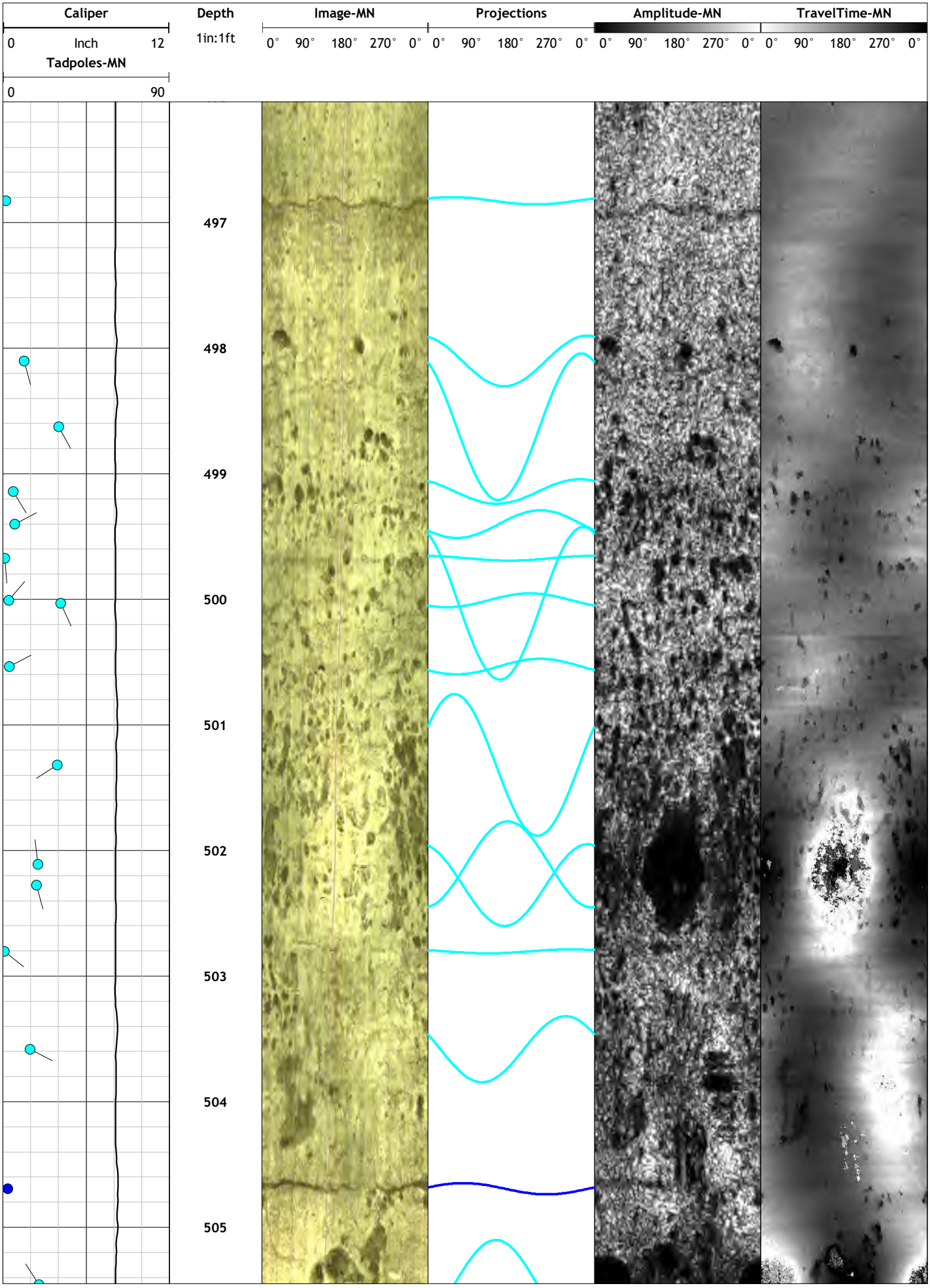
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505
Image-MN
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Projections
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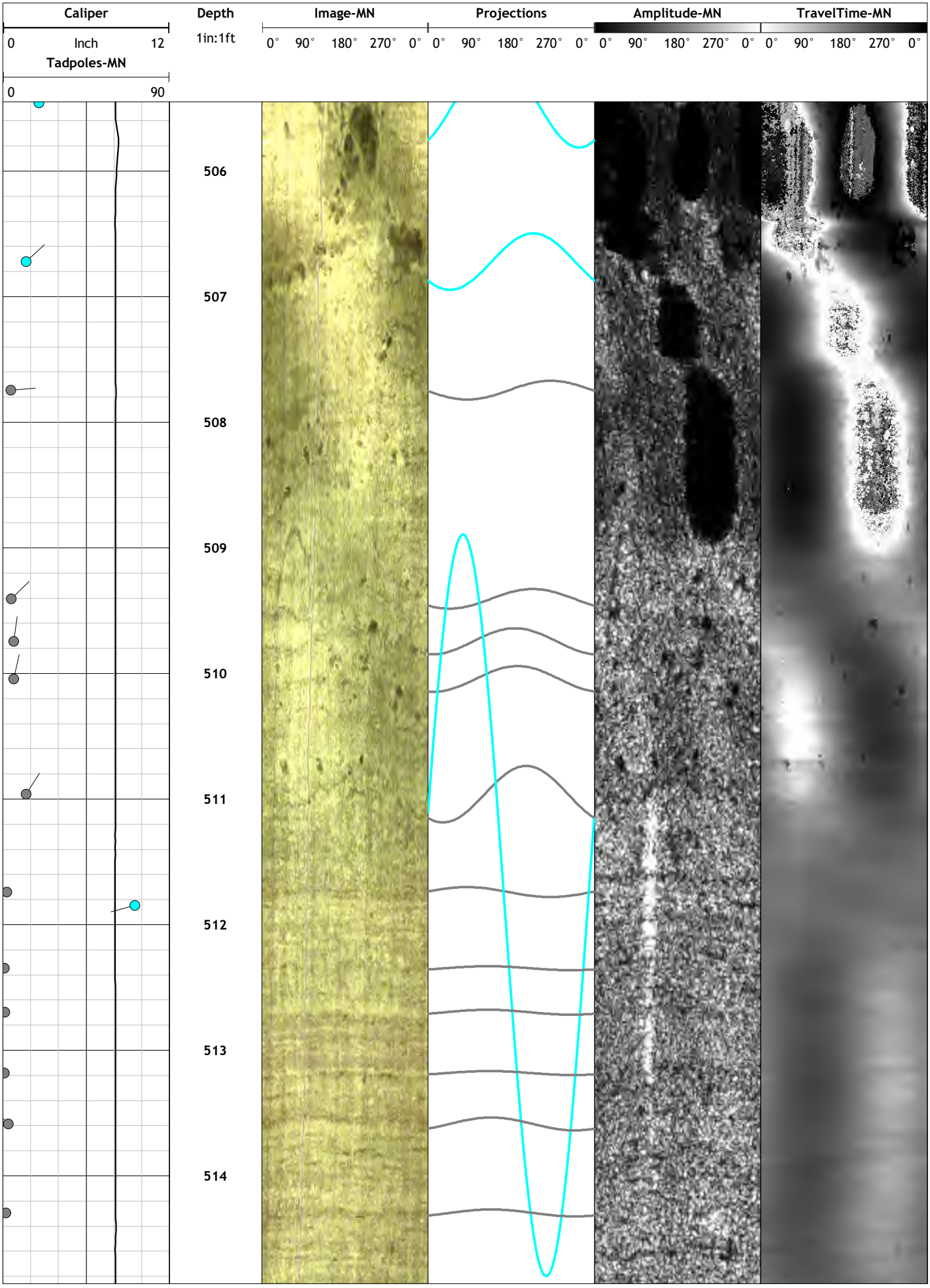
Amplitude-MN
0° 90° 180° 270° 0°
TravelTime-MN
0° 90° 180° 270° 0°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Depth
1in:1ft
Image-MN
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Projections
0° 90° 180° 270° 0°
Amplitude-MN
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TravelTime-MN
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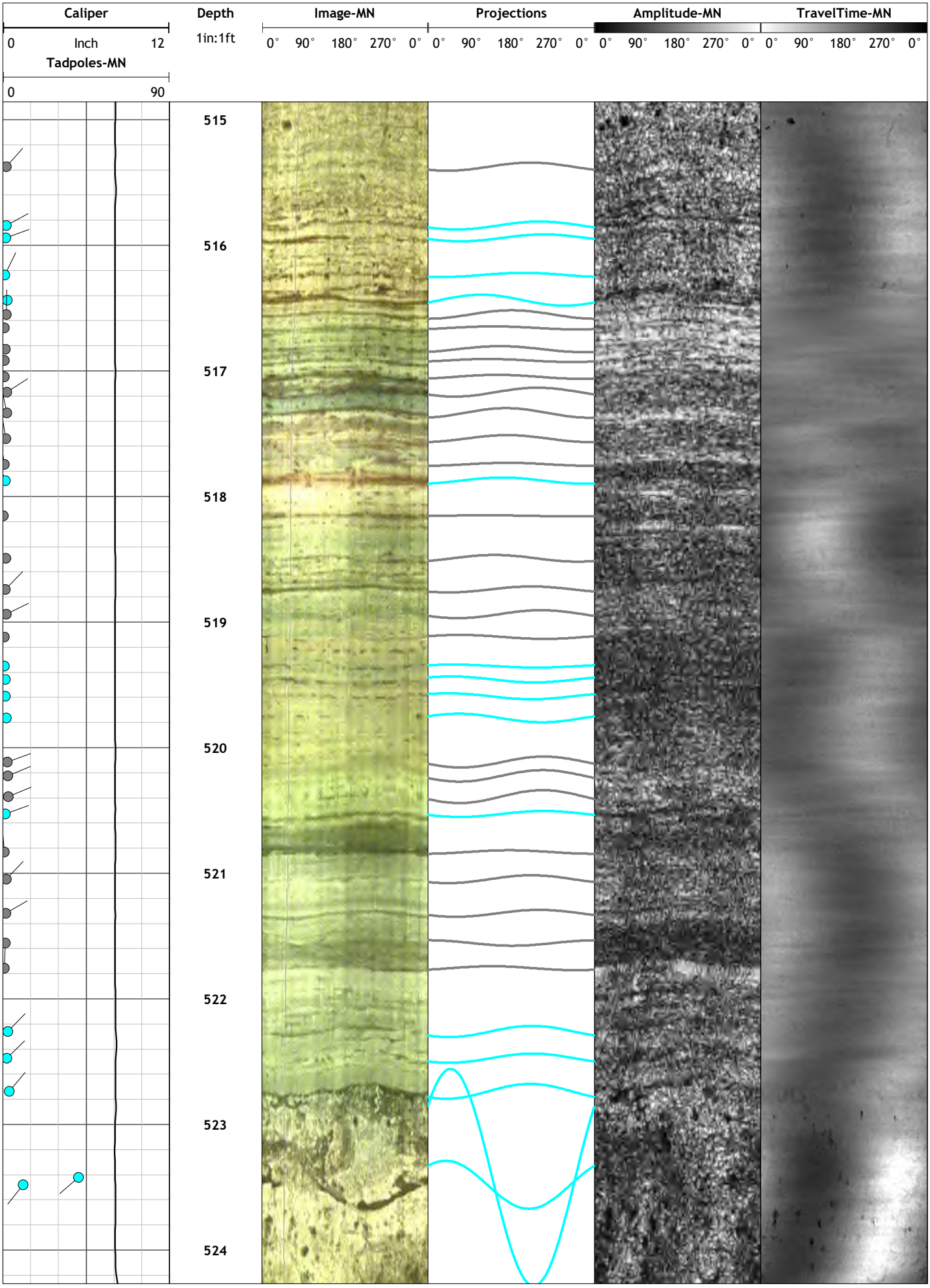
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Depth
1in:1ft
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Projections
0° 90° 180° 270° 0°
Amplitude-MN
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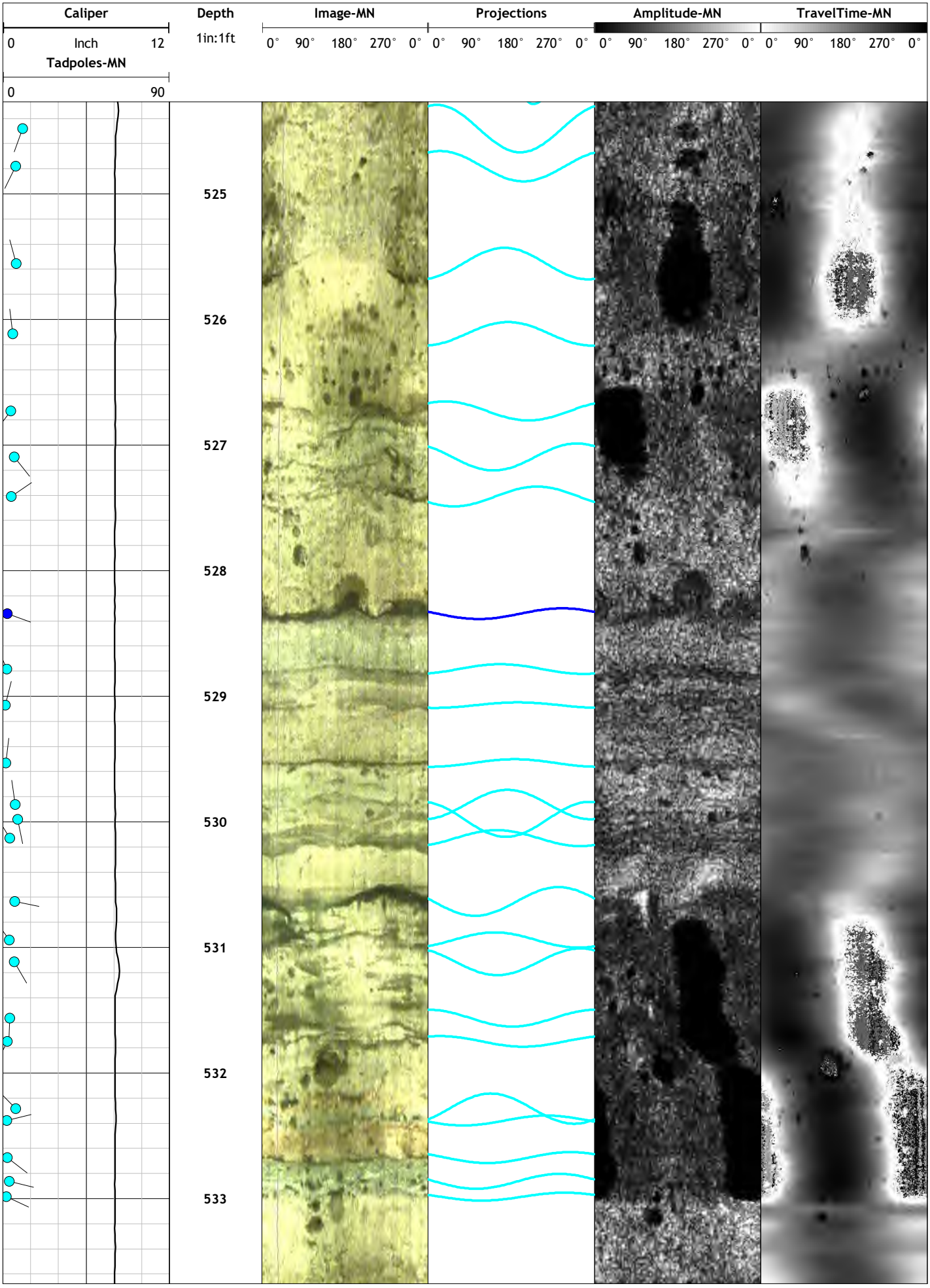
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Inch
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Depth
1in:1ft
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Projections
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Amplitude-MN
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TravelTime-MN
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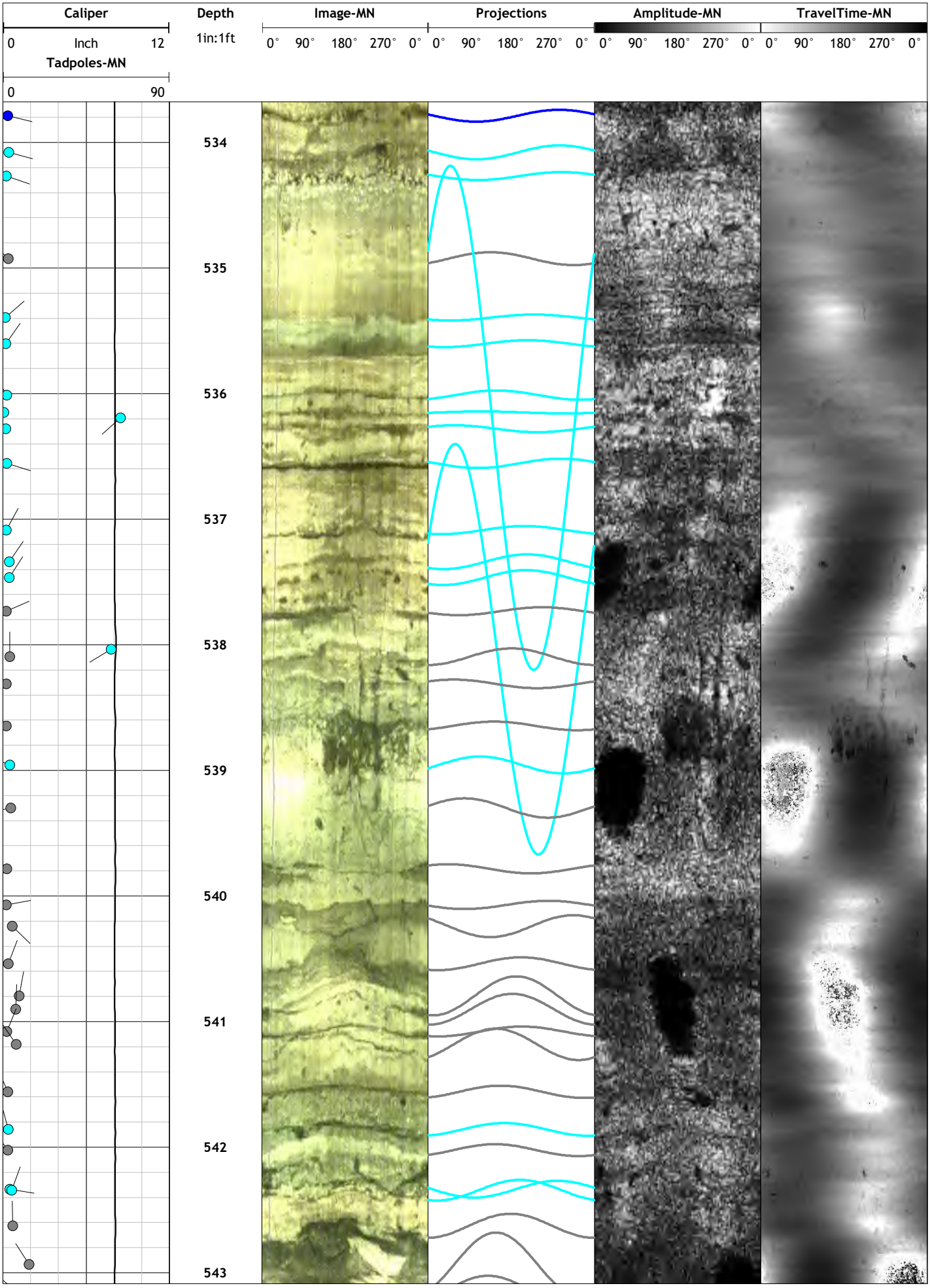
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Depth
1in:1ft
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Image-MN
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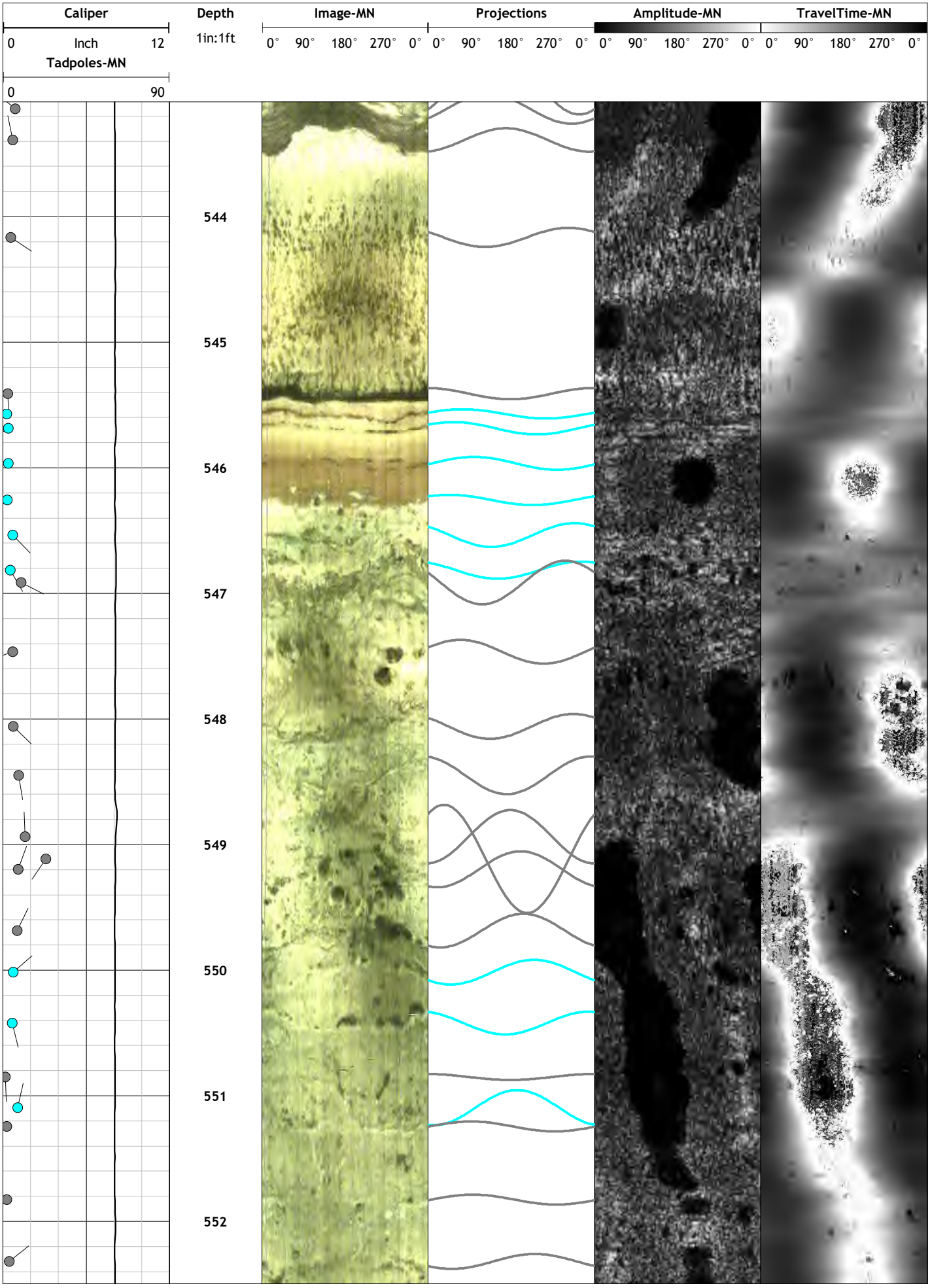
TravelTime-MN
0° 90° 180° 270° 0°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Depth
1in:1ft
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Image-MN
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Amplitude-MN
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TravelTime-MN
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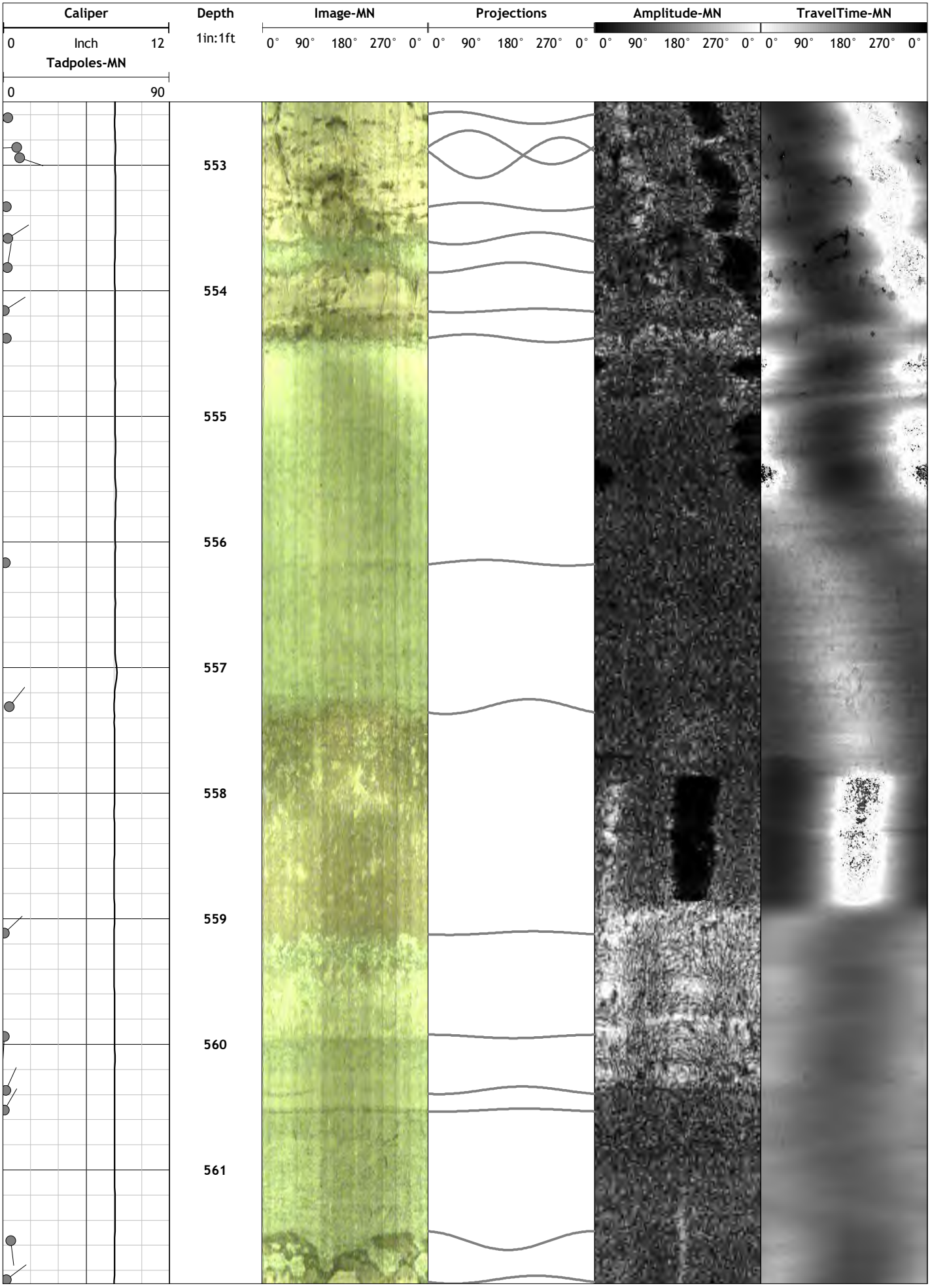
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Inch
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Tadpoles-MN
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Depth
1in:1ft
Image-MN
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Projections
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Amplitude-MN
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TravelTime-MN
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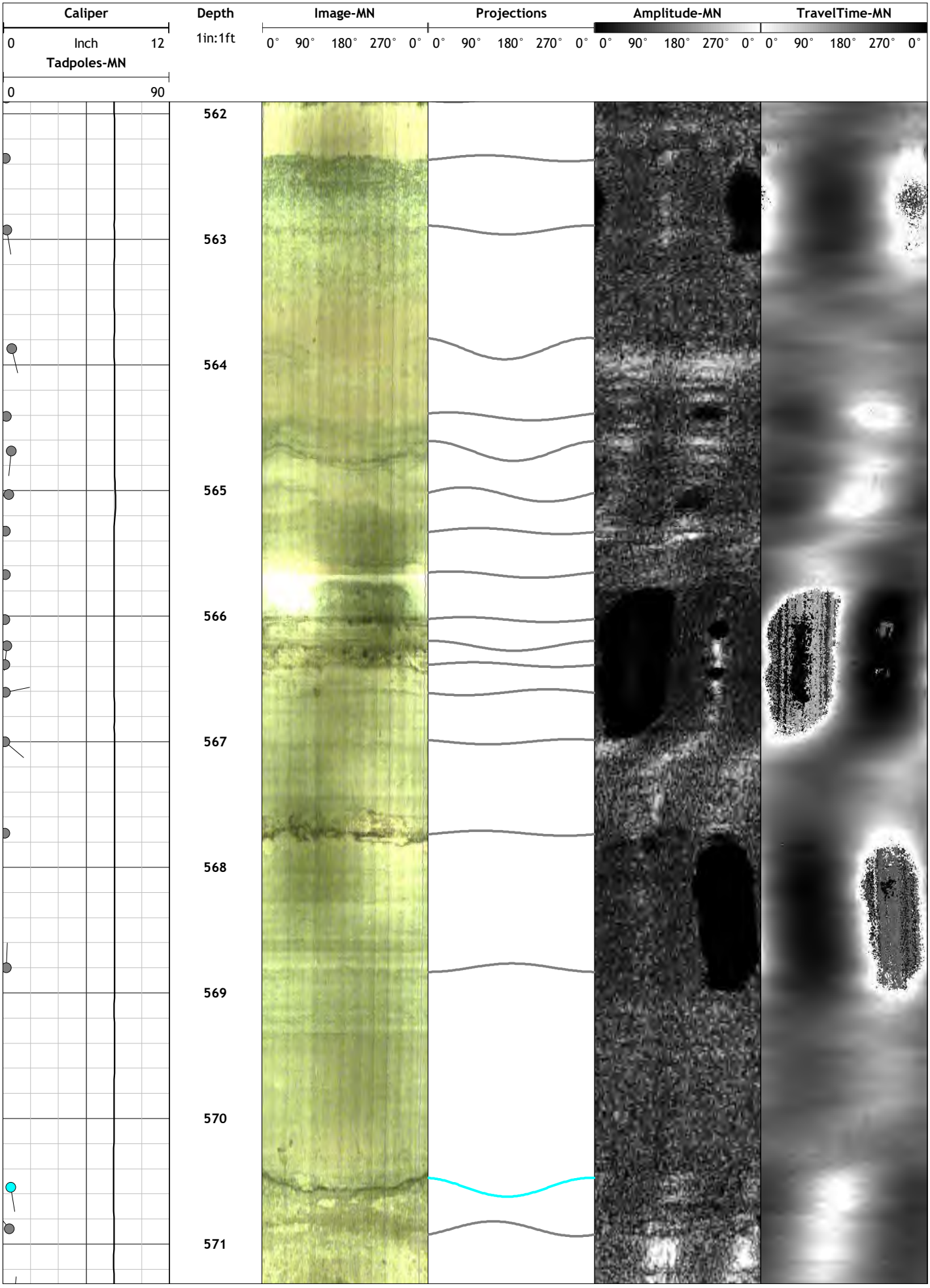
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Inch
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Depth
1in:1ft
Image-MN
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Projections
0° 90° 180° 270° 0°
Amplitude-MN
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0° 90° 180° 270° 0°
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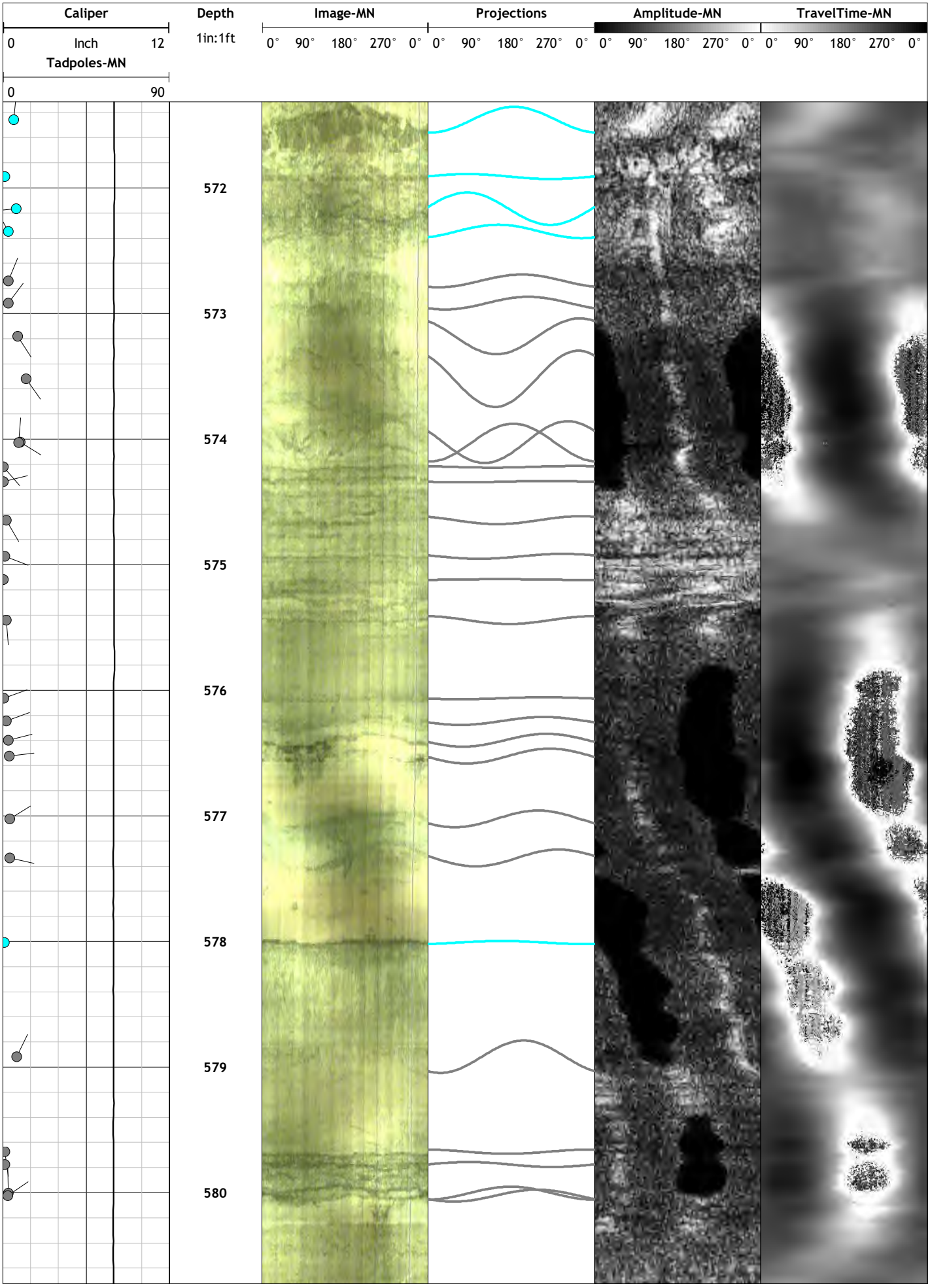
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Inch
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Depth
1in:1ft
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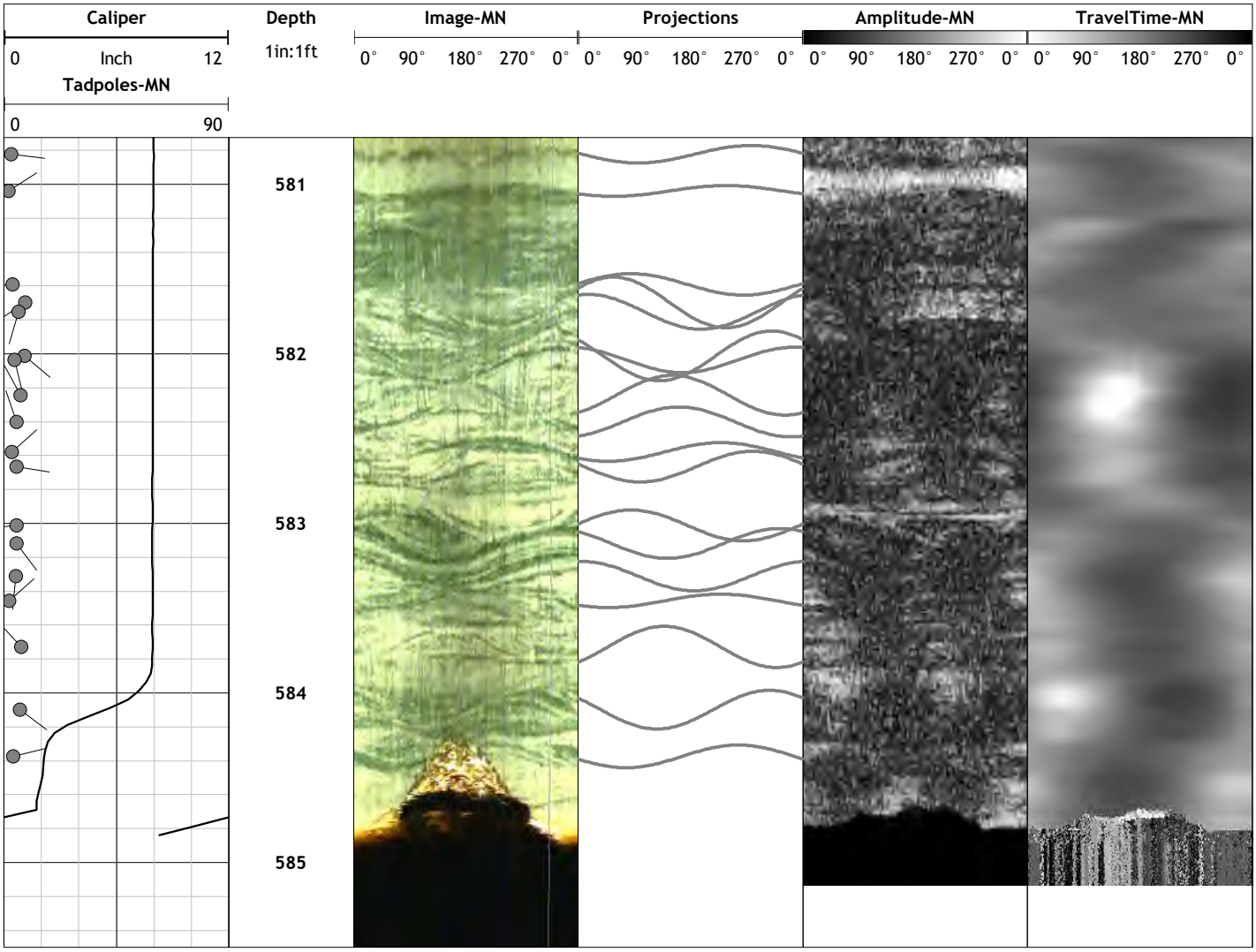
576
577
578
579
580
Image-MN
0° 90° 180° 270° 0°
Projections
0° 90° 180° 270° 0°
Amplitude-MN
0° 90° 180° 270° 0°
TravelTime-MN
0° 90° 180° 270° 0°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Inch
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90
Depth
1in:1ft
581
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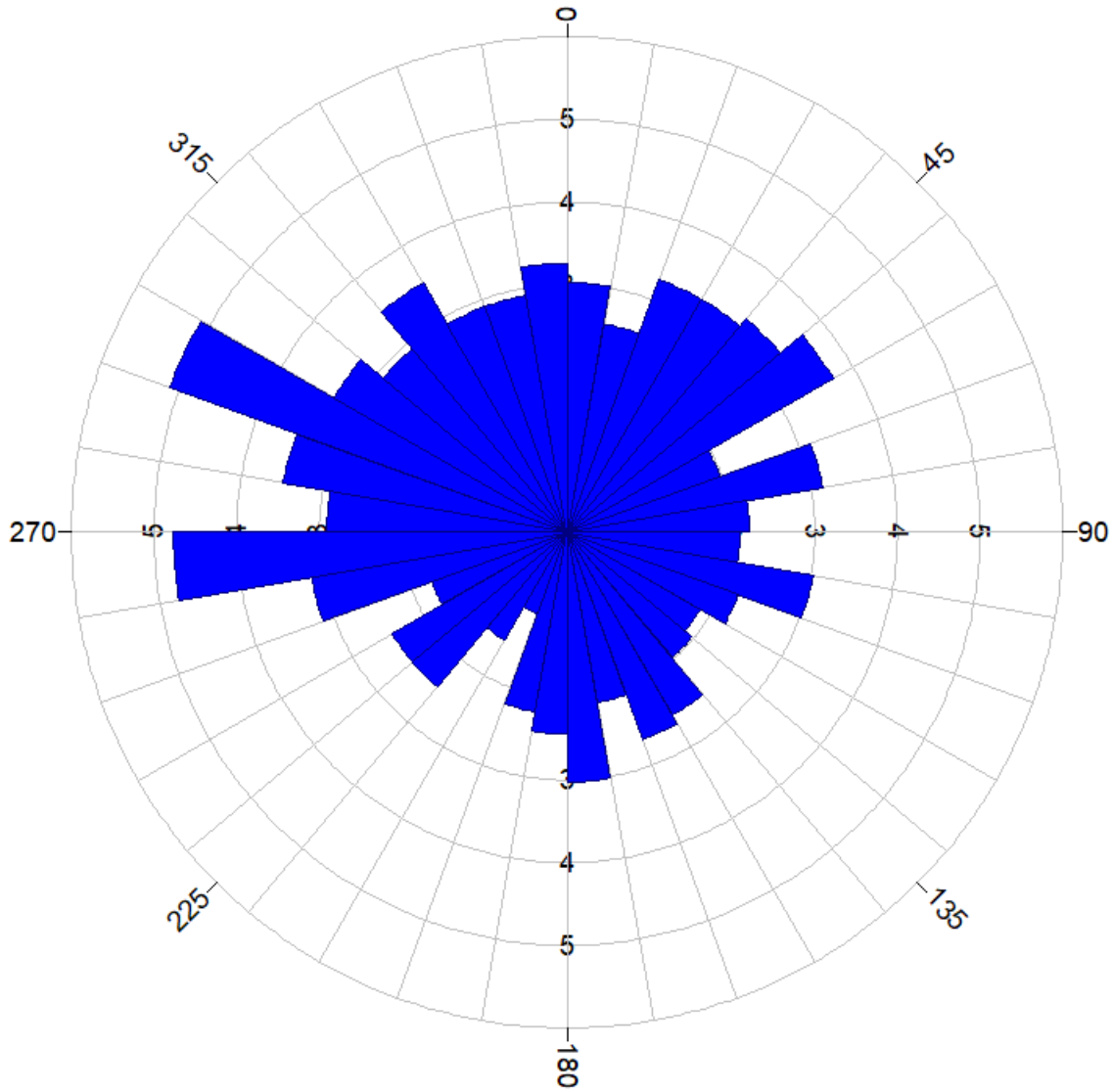
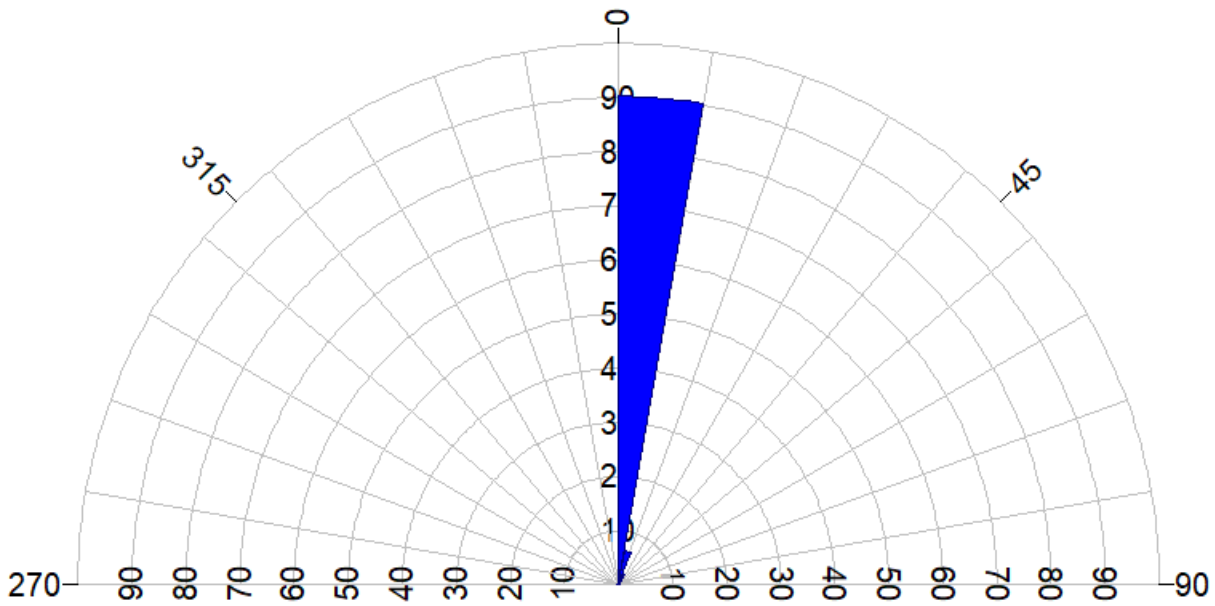
583
584
585
Image-MN
0° 90° 180° 270° 0°
Projections
0° 90° 180° 270° 0°
Amplitude-MN
0° 90° 180° 270° 0°
TravelTime-MN
0° 90° 180° 270° 0°

Figure IRR-02:1. Rose Diagram – Dip Directions
Televiewer Image Features
Arcadis
Marinette
IRR-02
20 May 2022



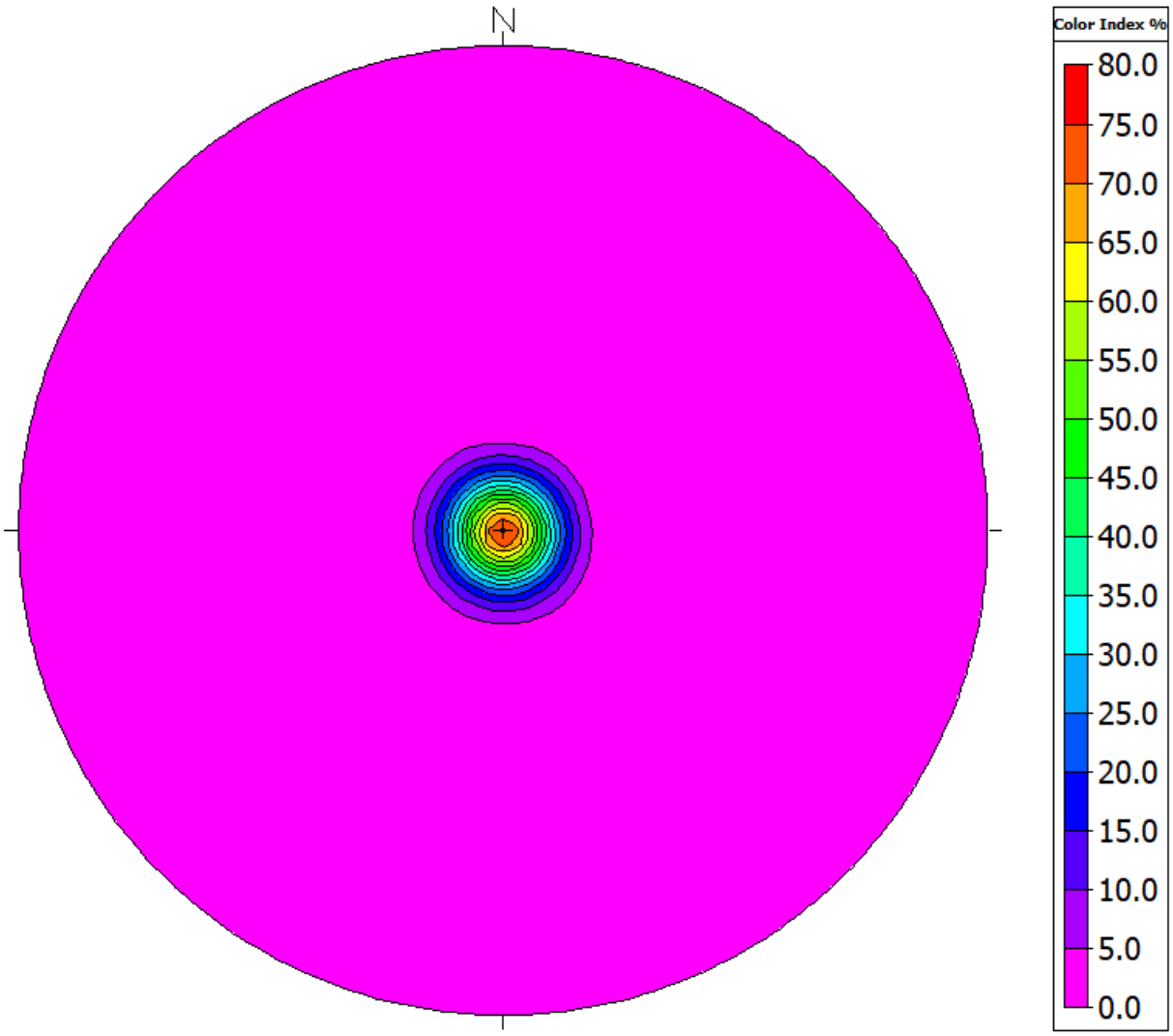
All directions are with respect to Magnetic North.

Figure IRR-02:2. Rose Diagram – Dip Angles
Televiewer Image Features
Arcadis
Marinette
IRR-02
20 May 2022



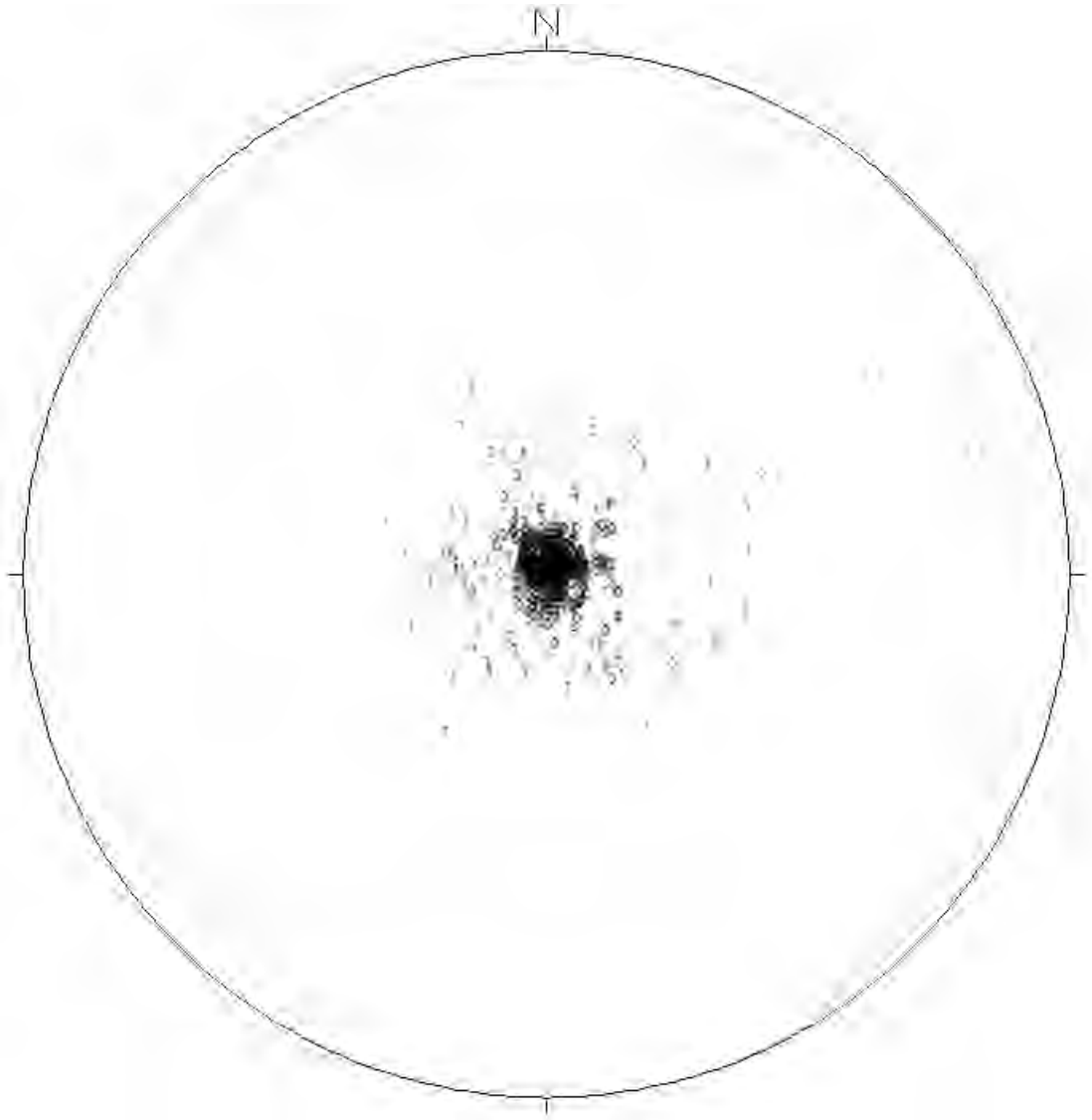
All directions are with respect to Magnetic North.

Figure IRR-02:3. Stereonet Diagram – Schmidt Projection
Televiewer Image Features
Arcadis
Marinette
IRR-02
20 May 2022



All directions are with respect to Magnetic North.

Figure IRR-02:4. Stereonet Diagram – Schmidt Projection
Televiewer Image Features
Arcadis
Marinette
IRR-02
20 May 2022



All directions are with respect to Magnetic North.

Table IRR-02:1. Orientation Summary Table
Televiewer Image Features
Arcadis
Marinette
IRR-02
20 May 2022

Feature No.	Depth (meters)	Depth (feet)	Dip Direction (degrees)	Dip Angle (degrees)	Feature Aperture (mm)	Feature Rank (0 to 5)
1	30.28	99.4	211	2	0	1
2	32.51	106.7	59	1	0	0
3	33.01	108.3	138	1	0	0
4	33.28	109.2	98	1	0	0
5	33.37	109.5	102	2	0	0
6	33.56	110.1	327	3	0	0
7	33.68	110.5	281	2	0	0
8	33.73	110.7	314	3	0	0
9	34.02	111.6	345	3	0	0
10	34.55	113.4	189	1	0	0
11	34.61	113.6	259	2	0	0
12	34.73	113.9	40	1	0	0
13	34.83	114.3	38	1	0	2
14	35.21	115.5	68	2	0	0
15	35.38	116.1	110	5	0	0
16	35.79	117.4	187	3	0	0
17	36.29	119.1	26	4	0	1
18	36.62	120.1	273	0	0	0
19	37.06	121.6	84	2	0	0
20	37.33	122.5	76	1	0	0
21	37.49	123.0	250	1	0	0
22	37.66	123.6	157	5	0	1
23	38.10	125.0	185	2	0	0
24	38.18	125.3	138	1	0	0
25	38.22	125.4	228	2	0	0
26	38.73	127.1	200	1	0	0
27	38.96	127.8	97	1	0	0
28	40.22	132.0	192	1	0	0
29	41.21	135.2	62	2	0	0
30	41.25	135.4	54	0	0	0
31	41.50	136.2	248	1	0	0
32	41.76	137.0	135	1	0	0
33	41.89	137.4	140	1	0	0
34	42.01	137.8	213	2	0	0
35	42.11	138.2	164	1	0	0
36	42.23	138.6	172	1	0	0
37	42.58	139.7	26	0	0	0

All directions are with respect to Magnetic North.

Table IRR-02:1. Orientation Summary Table
Televiewer Image Features
Arcadis
Marinette
IRR-02
20 May 2022

Feature No.	Depth (meters)	Depth (feet)	Dip Direction (degrees)	Dip Angle (degrees)	Feature Aperture (mm)	Feature Rank (0 to 5)
38	42.79	140.4	218	1	0	0
39	42.85	140.6	170	2	0	0
40	43.12	141.5	201	2	0	2
41	43.17	141.6	233	3	0	0
42	43.39	142.3	126	0	0	1
43	43.47	142.6	22	2	0	0
44	43.60	143.1	338	4	0	2
45	43.69	143.3	332	6	0	1
46	43.79	143.7	351	2	0	2
47	43.96	144.2	154	2	0	0
48	44.04	144.5	149	5	0	0
49	44.17	144.9	285	2	0	0
50	44.25	145.2	300	6	0	1
51	44.46	145.9	191	1	0	0
52	44.72	146.7	138	2	0	0
53	45.21	148.3	34	2	0	2
54	45.81	150.3	78	2	0	1
55	46.04	151.1	87	1	0	1
56	46.13	151.3	95	0	0	1
57	46.53	152.7	107	2	0	1
58	46.62	152.9	42	2	0	1
59	47.24	155.0	202	2	0	0
60	47.34	155.3	158	3	0	0
61	48.00	157.5	285	2	0	0
62	48.20	158.1	108	1	0	0
63	48.25	158.3	78	2	0	0
64	48.38	158.7	98	2	0	0
65	48.50	159.1	187	2	0	0
66	48.73	159.9	80	4	0	0
67	48.82	160.2	23	2	0	0
68	48.94	160.6	227	1	0	0
69	49.26	161.6	104	2	0	1
70	49.87	163.6	192	2	0	0
71	50.04	164.2	228	1	0	0
72	50.14	164.5	185	2	0	0
73	50.54	165.8	97	0	0	0
74	50.62	166.1	104	5	0	0

All directions are with respect to Magnetic North.

Table IRR-02:1. Orientation Summary Table
Televiewer Image Features
Arcadis
Marinette
IRR-02
20 May 2022

Feature No.	Depth (meters)	Depth (feet)	Dip Direction (degrees)	Dip Angle (degrees)	Feature Aperture (mm)	Feature Rank (0 to 5)
75	50.79	166.7	120	1	0	1
76	50.93	167.1	32	2	0	0
77	51.17	167.9	250	2	0	1
78	51.23	168.1	271	2	0	1
79	51.34	168.4	267	1	0	0
80	51.51	169.0	265	1	0	0
81	51.67	169.5	123	3	0	0
82	51.79	169.9	95	5	0	0
83	51.83	170.1	82	4	0	0
84	51.91	170.3	76	2	0	0
85	52.10	170.9	298	2	0	2
86	52.33	171.7	183	1	0	1
87	52.43	172.0	34	1	0	0
88	52.53	172.4	35	2	0	0
89	52.65	172.7	72	4	0	0
90	52.70	172.9	172	3	0	0
91	52.78	173.2	124	5	0	0
92	53.29	174.8	148	6	0	0
93	53.51	175.6	310	2	0	0
94	53.64	176.0	182	3	0	0
95	53.90	176.8	107	4	0	0
96	54.27	178.1	46	1	0	0
97	54.43	178.6	36	1	0	0
98	54.62	179.2	40	4	0	0
99	54.86	180.0	5	3	0	0
100	55.02	180.5	267	2	0	0
101	55.40	181.8	228	2	0	0
102	55.68	182.7	8	4	0	0
103	55.95	183.6	281	1	0	0
104	56.08	184.0	328	1	0	0
105	56.17	184.3	256	1	0	0
106	56.22	184.4	297	2	0	0
107	56.27	184.6	301	1	0	0
108	56.31	184.8	299	1	0	0
109	56.44	185.2	177	2	0	0
110	56.46	185.2	196	22	0	0
111	57.38	188.3	189	2	0	1

All directions are with respect to Magnetic North.

Table IRR-02:1. Orientation Summary Table
Televiewer Image Features
Arcadis
Marinette
IRR-02
20 May 2022

Feature No.	Depth (meters)	Depth (feet)	Dip Direction (degrees)	Dip Angle (degrees)	Feature Aperture (mm)	Feature Rank (0 to 5)
112	57.53	188.8	271	5	0	1
113	57.73	189.4	329	2	0	1
114	57.82	189.7	352	6	0	1
115	57.86	189.8	53	2	0	0
116	57.96	190.2	19	2	0	1
117	58.34	191.4	347	4	0	0
118	58.41	191.7	156	1	0	0
119	58.53	192.0	50	1	0	0
120	58.67	192.5	291	4	0	0
121	58.79	192.9	259	1	0	0
122	58.84	193.0	234	1	0	0
123	59.25	194.4	50	2	0	1
124	59.81	196.2	260	1	0	0
125	59.86	196.4	332	1	0	0
126	60.26	197.7	303	1	0	0
127	60.36	198.0	291	1	0	0
128	60.49	198.5	265	1	0	0
129	60.60	198.8	302	1	0	0
130	60.84	199.6	153	1	0	0
131	60.98	200.1	6	2	0	0
132	61.67	202.3	356	3	0	0
133	61.83	202.8	136	1	0	0
134	61.92	203.2	283	2	0	0
135	62.13	203.8	66	3	0	0
136	62.85	206.2	178	2	0	0
137	62.98	206.6	243	2	0	0
138	63.40	208.0	255	3	0	0
139	63.54	208.5	115	2	0	0
140	64.36	211.2	112	3	0	0
141	64.54	211.7	245	1	0	0
142	64.71	212.3	343	1	0	0
143	65.06	213.4	8	3	0	0
144	65.23	214.0	150	1	0	0
145	65.45	214.7	278	1	0	0
146	65.65	215.4	263	2	0	0
147	65.76	215.8	305	1	0	0
148	65.89	216.2	280	2	0	0

All directions are with respect to Magnetic North.

Table IRR-02:1. Orientation Summary Table
Televiewer Image Features
Arcadis
Marinette
IRR-02
20 May 2022

Feature No.	Depth (meters)	Depth (feet)	Dip Direction (degrees)	Dip Angle (degrees)	Feature Aperture (mm)	Feature Rank (0 to 5)
149	66.07	216.8	265	2	0	0
150	66.18	217.1	299	3	0	0
151	66.28	217.5	301	3	0	0
152	66.41	217.9	297	2	0	0
153	66.50	218.2	317	1	0	0
154	66.58	218.4	23	2	0	0
155	66.82	219.2	172	5	0	0
156	67.02	219.9	50	2	0	0
157	67.19	220.4	1	4	0	0
158	67.41	221.2	209	3	0	0
159	67.54	221.6	67	1	0	0
160	67.87	222.7	224	1	0	0
161	68.60	225.1	88	1	0	0
162	68.79	225.7	102	4	0	0
163	69.37	227.6	341	2	0	0
164	69.57	228.3	150	2	0	0
165	69.71	228.7	182	2	0	1
166	69.78	228.9	172	3	0	0
167	70.77	232.2	13	1	0	1
168	70.89	232.6	19	3	0	1
169	71.09	233.2	33	2	0	1
170	71.19	233.6	294	2	0	1
171	71.41	234.3	313	0	0	0
172	72.53	238.0	262	8	0	1
173	72.91	239.2	347	3	0	0
174	73.04	239.6	353	4	0	0
175	73.44	241.0	53	2	0	0
176	73.54	241.3	203	3	0	0
177	73.83	242.2	197	3	0	0
178	73.94	242.6	5	1	0	0
179	74.02	242.9	181	7	0	0
180	74.55	244.6	220	5	0	0
181	74.80	245.4	254	3	0	0
182	75.05	246.2	215	4	0	0
183	75.41	247.4	110	1	0	0
184	75.48	247.6	151	4	0	0
185	75.58	248.0	177	6	0	1

All directions are with respect to Magnetic North.

Table IRR-02:1. Orientation Summary Table
Televiewer Image Features
Arcadis
Marinette
IRR-02
20 May 2022

Feature No.	Depth (meters)	Depth (feet)	Dip Direction (degrees)	Dip Angle (degrees)	Feature Aperture (mm)	Feature Rank (0 to 5)
186	75.69	248.3	166	4	0	1
187	75.80	248.7	172	4	0	0
188	76.12	249.8	218	5	0	0
189	76.26	250.2	197	12	0	0
190	76.87	252.2	218	6	0	0
191	76.95	252.5	193	5	0	1
192	77.29	253.6	299	5	0	1
193	77.54	254.4	298	1	0	1
194	77.63	254.7	322	2	0	1
195	77.67	254.8	316	2	0	1
196	78.19	256.5	76	11	0	1
197	78.27	256.8	43	3	0	1
198	78.29	256.9	253	32	0	1
199	78.46	257.4	265	3	0	2
200	78.62	257.9	165	2	0	1
201	78.68	258.1	165	2	0	2
202	78.76	258.4	156	3	0	1
203	78.89	258.8	111	5	0	2
204	79.03	259.3	101	3	0	1
205	79.60	261.2	288	2	0	0
206	79.71	261.5	150	3	0	1
207	79.87	262.1	249	1	0	0
208	80.06	262.7	173	2	0	0
209	80.20	263.1	98	3	0	1
210	80.63	264.5	30	2	0	0
211	80.91	265.5	38	2	0	0
212	80.96	265.6	46	2	0	1
213	81.02	265.8	59	0	0	0
214	81.13	266.2	231	3	0	0
215	81.37	267.0	332	20	0	0
216	81.53	267.5	270	5	0	0
217	81.76	268.3	263	3	0	0
218	81.94	268.8	283	3	0	0
219	82.06	269.2	4	4	0	0
220	82.17	269.6	311	4	0	0
221	82.29	270.0	252	2	0	0
222	83.63	274.4	134	8	0	0

All directions are with respect to Magnetic North.

Table IRR-02:1. Orientation Summary Table
Televiewer Image Features
Arcadis
Marinette
IRR-02
20 May 2022

Feature No.	Depth (meters)	Depth (feet)	Dip Direction (degrees)	Dip Angle (degrees)	Feature Aperture (mm)	Feature Rank (0 to 5)
223	83.80	274.9	140	3	0	0
224	84.59	277.5	42	4	0	1
225	85.12	279.3	80	2	0	0
226	85.30	279.9	253	4	0	0
227	85.44	280.3	348	5	0	0
228	85.58	280.8	304	2	0	0
229	85.82	281.6	52	7	0	0
230	85.99	282.1	90	5	0	0
231	86.12	282.6	197	6	0	1
232	86.23	282.9	239	5	0	1
233	86.33	283.2	231	10	0	0
234	86.51	283.8	198	4	0	0
235	86.59	284.1	154	5	0	0
236	86.70	284.5	163	4	0	0
237	86.79	284.8	95	2	0	0
238	86.96	285.3	64	2	0	0
239	87.19	286.1	269	1	0	0
240	87.54	287.2	5	2	0	1
241	87.62	287.5	242	5	0	0
242	87.73	287.8	296	9	0	1
243	88.04	288.9	8	3	0	1
244	88.13	289.2	181	2	0	0
245	88.21	289.4	321	2	0	0
246	88.32	289.8	259	2	0	0
247	88.48	290.3	267	7	0	0
248	88.55	290.5	328	2	0	0
249	88.57	290.6	276	7	0	0
250	88.67	290.9	291	2	0	0
251	89.07	292.2	327	1	0	0
252	89.21	292.7	13	2	0	0
253	89.26	292.8	12	2	0	0
254	89.43	293.4	89	1	0	0
255	89.64	294.1	58	2	0	0
256	89.77	294.5	178	1	0	0
257	89.85	294.8	240	2	0	0
258	90.21	296.0	317	3	0	0
259	90.30	296.3	295	5	0	0

All directions are with respect to Magnetic North.

Table IRR-02:1. Orientation Summary Table
Televiewer Image Features
Arcadis
Marinette
IRR-02
20 May 2022

Feature No.	Depth (meters)	Depth (feet)	Dip Direction (degrees)	Dip Angle (degrees)	Feature Aperture (mm)	Feature Rank (0 to 5)
260	90.59	297.2	342	2	0	0
261	90.91	298.3	243	4	0	0
262	91.38	299.8	28	8	0	0
263	91.53	300.3	292	11	0	0
264	91.65	300.7	82	3	0	0
265	91.91	301.5	56	3	0	0
266	92.34	302.9	20	5	0	0
267	92.63	303.9	265	8	0	0
268	92.95	305.0	82	8	0	0
269	93.24	305.9	302	3	0	0
270	93.33	306.2	293	3	0	0
271	93.43	306.5	326	3	0	0
272	93.59	307.1	343	2	0	0
273	93.83	307.9	132	1	0	0
274	94.01	308.4	190	5	0	0
275	94.16	308.9	16	5	0	0
276	94.31	309.4	21	2	0	0
277	94.37	309.6	249	2	0	0
278	94.43	309.8	285	2	0	0
279	94.64	310.5	154	2	0	0
280	94.94	311.5	1	5	0	0
281	95.05	311.8	323	7	0	0
282	95.27	312.6	335	9	0	0
283	95.45	313.2	143	5	0	0
284	95.61	313.7	345	2	0	0
285	95.97	314.9	138	9	0	0
286	96.24	315.8	73	13	0	0
287	96.73	317.4	269	9	0	0
288	96.83	317.7	288	10	0	0
289	96.98	318.2	305	6	0	0
290	97.10	318.6	188	3	0	0
291	97.23	319.0	21	2	0	0
292	97.30	319.2	322	7	0	0
293	97.40	319.6	39	6	0	0
294	97.47	319.8	59	3	0	0
295	97.53	320.0	5	5	0	0
296	97.64	320.3	58	4	0	0

All directions are with respect to Magnetic North.

Table IRR-02:1. Orientation Summary Table
Televiewer Image Features
Arcadis
Marinette
IRR-02
20 May 2022

Feature No.	Depth (meters)	Depth (feet)	Dip Direction (degrees)	Dip Angle (degrees)	Feature Aperture (mm)	Feature Rank (0 to 5)
297	97.83	321.0	7	2	0	0
298	98.08	321.8	238	11	0	0
299	98.45	323.0	152	20	0	0
300	98.55	323.3	151	2	0	0
301	98.83	324.2	348	4	0	0
302	98.97	324.7	261	2	0	0
303	99.38	326.1	355	3	0	1
304	99.61	326.8	301	2	0	1
305	99.81	327.5	317	3	0	0
306	99.95	327.9	281	3	0	1
307	100.12	328.5	143	4	0	0
308	100.22	328.8	331	2	0	1
309	100.38	329.3	19	3	0	1
310	100.54	329.9	116	2	0	0
311	100.59	330.0	124	3	0	1
312	100.66	330.3	246	36	0	0
313	100.67	330.3	130	6	0	0
314	100.77	330.6	114	5	0	0
315	101.07	331.6	253	3	0	0
316	101.28	332.3	255	2	0	0
317	101.41	332.7	226	4	0	0
318	101.50	333.0	293	2	0	0
319	101.61	333.4	266	2	0	0
320	101.77	333.9	301	2	0	0
321	101.97	334.6	224	13	0	0
322	102.14	335.1	228	1	0	0
323	102.19	335.3	114	2	0	0
324	102.32	335.7	87	3	0	0
325	102.53	336.4	120	2	0	0
326	102.67	336.8	54	1	0	0
327	102.71	337.0	189	6	0	1
328	102.85	337.5	98	3	0	0
329	103.00	337.9	123	5	0	0
330	103.42	339.3	276	2	0	0
331	103.68	340.2	359	7	0	0
332	103.84	340.7	297	2	0	0
333	104.07	341.5	231	10	0	0

All directions are with respect to Magnetic North.

Table IRR-02:1. Orientation Summary Table
Televiewer Image Features
Arcadis
Marinette
IRR-02
20 May 2022

Feature No.	Depth (meters)	Depth (feet)	Dip Direction (degrees)	Dip Angle (degrees)	Feature Aperture (mm)	Feature Rank (0 to 5)
334	104.49	342.8	322	1	0	0
335	104.70	343.5	174	1	0	0
336	105.12	344.9	144	2	0	0
337	105.34	345.6	102	1	0	0
338	105.49	346.1	95	4	0	0
339	105.97	347.7	355	6	0	0
340	106.22	348.5	182	2	0	0
341	106.26	348.6	198	1	0	0
342	106.58	349.7	297	3	0	0
343	107.05	351.2	164	1	0	0
344	107.18	351.7	299	2	0	0
345	107.29	352.0	286	2	0	0
346	107.34	352.2	291	4	0	0
347	107.48	352.6	285	2	0	0
348	107.82	353.7	338	4	0	0
349	107.88	353.9	24	14	0	1
350	108.10	354.7	40	8	0	0
351	108.11	354.7	239	10	0	0
352	108.35	355.5	237	3	0	0
353	108.47	355.9	281	1	0	0
354	108.57	356.2	295	1	0	0
355	108.63	356.4	309	1	0	0
356	108.68	356.6	41	4	0	0
357	108.74	356.8	247	1	0	0
358	108.90	357.3	209	4	0	1
359	108.96	357.5	214	7	0	0
360	109.20	358.3	272	4	0	0
361	109.34	358.7	280	4	0	0
362	109.44	359.0	288	2	0	0
363	109.55	359.4	338	5	0	1
364	109.65	359.7	329	2	0	1
365	109.67	359.8	164	5	0	1
366	109.96	360.8	259	3	0	0
367	110.07	361.1	10	1	0	1
368	110.30	361.9	156	1	0	0
369	110.40	362.2	43	3	0	0
370	110.45	362.4	245	3	0	0

All directions are with respect to Magnetic North.

Table IRR-02:1. Orientation Summary Table
Televiewer Image Features
Arcadis
Marinette
IRR-02
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Feature No.	Depth (meters)	Depth (feet)	Dip Direction (degrees)	Dip Angle (degrees)	Feature Aperture (mm)	Feature Rank (0 to 5)
371	110.62	362.9	280	1	0	0
372	110.74	363.3	325	3	0	0
373	110.83	363.6	287	2	0	0
374	110.93	363.9	288	2	0	0
375	111.01	364.2	322	2	0	0
376	111.08	364.5	301	2	0	0
377	111.28	365.1	261	3	0	0
378	111.30	365.2	197	2	0	0
379	111.42	365.6	271	3	0	1
380	111.50	365.8	224	3	0	2
381	111.77	366.7	76	2	0	1
382	111.90	367.1	79	4	0	1
383	112.06	367.7	29	3	0	0
384	112.49	369.1	105	27	0	1
385	112.56	369.3	271	3	0	0
386	112.96	370.6	84	5	0	0
387	113.05	370.9	79	5	0	0
388	113.52	372.4	321	13	0	0
389	113.61	372.7	136	3	0	0
390	113.71	373.1	289	5	0	0
391	113.88	373.6	156	3	0	0
392	113.97	373.9	77	2	0	1
393	114.20	374.7	301	2	0	0
394	114.36	375.2	154	2	0	0
395	114.57	375.9	266	2	0	0
396	114.78	376.6	262	0	0	0
397	114.87	376.9	263	2	0	0
398	114.95	377.1	271	3	0	0
399	114.98	377.2	313	2	0	0
400	115.03	377.4	354	3	0	0
401	115.19	377.9	235	2	0	0
402	115.56	379.1	294	28	0	0
403	115.76	379.8	283	31	0	0
404	116.03	380.7	47	2	0	1
405	116.26	381.4	335	2	0	0
406	116.32	381.6	341	17	0	1
407	116.53	382.3	112	2	0	1

All directions are with respect to Magnetic North.

Table IRR-02:1. Orientation Summary Table
Televiewer Image Features
Arcadis
Marinette
IRR-02
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Feature No.	Depth (meters)	Depth (feet)	Dip Direction (degrees)	Dip Angle (degrees)	Feature Aperture (mm)	Feature Rank (0 to 5)
408	117.00	383.9	96	17	0	1
409	117.22	384.6	146	10	0	1
410	117.32	384.9	183	4	0	0
411	117.38	385.1	199	6	0	0
412	117.47	385.4	273	6	0	0
413	117.63	385.9	297	3	0	1
414	117.85	386.7	304	3	0	0
415	117.91	386.9	295	1	0	0
416	118.00	387.1	358	2	0	0
417	118.13	387.6	295	2	0	0
418	118.22	387.9	295	3	0	0
419	118.30	388.1	307	1	0	0
420	118.38	388.4	284	1	0	0
421	118.43	388.6	100	2	0	0
422	118.49	388.7	108	0	0	0
423	118.66	389.3	346	3	0	0
424	118.80	389.8	109	3	0	0
425	118.84	389.9	61	5	0	0
426	118.90	390.1	84	2	0	0
427	118.95	390.3	54	3	0	1
428	119.02	390.5	21	3	0	0
429	119.37	391.6	341	3	0	0
430	119.60	392.4	341	6	0	1
431	119.66	392.6	196	5	0	1
432	119.74	392.9	174	2	0	1
433	120.00	393.7	168	3	0	2
434	120.08	394.0	317	2	0	0
435	120.11	394.1	311	3	0	0
436	120.34	394.8	281	1	0	0
437	120.38	394.9	297	2	0	0
438	120.51	395.4	107	1	0	0
439	120.55	395.5	357	2	0	0
440	120.64	395.8	322	3	0	0
441	120.69	396.0	25	2	0	0
442	120.76	396.2	310	3	0	0
443	120.85	396.5	336	2	0	0
444	120.92	396.7	358	1	0	0

All directions are with respect to Magnetic North.

Table IRR-02:1. Orientation Summary Table
Televiewer Image Features
Arcadis
Marinette
IRR-02
20 May 2022

Feature No.	Depth (meters)	Depth (feet)	Dip Direction (degrees)	Dip Angle (degrees)	Feature Aperture (mm)	Feature Rank (0 to 5)
445	121.26	397.8	263	2	0	0
446	121.32	398.0	269	5	0	0
447	121.38	398.2	266	2	0	0
448	121.46	398.5	277	2	0	0
449	121.77	399.5	299	2	0	0
450	122.08	400.5	299	3	0	0
451	122.17	400.8	284	2	0	0
452	122.23	401.0	281	3	0	0
453	122.27	401.2	297	1	0	0
454	122.37	401.5	261	1	0	0
455	122.54	402.0	92	15	0	1
456	122.92	403.3	144	5	0	0
457	123.15	404.0	128	8	0	1
458	123.28	404.5	95	10	0	1
459	123.39	404.8	161	6	0	0
460	123.54	405.3	146	7	0	1
461	123.61	405.6	126	6	0	0
462	123.67	405.8	133	7	0	0
463	123.80	406.2	124	5	0	0
464	123.93	406.6	168	9	0	0
465	124.20	407.5	167	3	0	1
466	124.36	408.0	76	2	0	1
467	124.48	408.4	276	5	0	0
468	124.52	408.5	268	2	0	1
469	124.60	408.8	250	2	0	0
470	124.72	409.2	268	2	0	0
471	124.83	409.5	265	3	0	0
472	124.89	409.8	232	2	0	0
473	125.08	410.4	119	2	0	0
474	125.21	410.8	176	3	0	0
475	125.34	411.2	260	3	0	0
476	125.39	411.4	249	4	0	0
477	125.44	411.5	247	2	0	0
478	125.54	411.9	251	3	0	0
479	125.67	412.3	293	3	0	0
480	125.83	412.8	210	4	0	0
481	125.93	413.2	32	3	0	0

All directions are with respect to Magnetic North.

Table IRR-02:1. Orientation Summary Table
Televiewer Image Features
Arcadis
Marinette
IRR-02
20 May 2022

Feature No.	Depth (meters)	Depth (feet)	Dip Direction (degrees)	Dip Angle (degrees)	Feature Aperture (mm)	Feature Rank (0 to 5)
482	126.08	413.7	307	13	0	0
483	126.21	414.1	196	2	0	0
484	126.29	414.3	158	2	0	0
485	126.43	414.8	333	7	0	0
486	126.48	415.0	297	3	0	0
487	126.54	415.2	255	1	0	0
488	126.58	415.3	174	3	0	0
489	126.72	415.7	289	1	0	0
490	126.76	415.9	309	2	0	0
491	127.23	417.4	297	2	0	0
492	127.40	418.0	265	4	0	0
493	127.52	418.4	287	2	0	0
494	127.65	418.8	195	5	0	0
495	127.78	419.2	278	1	0	0
496	127.87	419.5	118	4	0	0
497	128.24	420.7	17	1	0	0
498	128.44	421.4	33	31	0	1
499	128.44	421.4	62	6	0	0
500	128.71	422.3	277	9	0	0
501	128.88	422.8	76	6	0	0
502	129.14	423.7	54	7	0	0
503	129.33	424.3	314	5	0	1
504	129.42	424.6	117	2	0	1
505	129.44	424.7	276	25	0	1
506	129.54	425.0	252	4	0	1
507	129.92	426.3	161	3	0	0
508	130.15	427.0	144	7	0	0
509	130.47	428.0	105	5	0	0
510	130.73	428.9	145	5	0	0
511	131.20	430.4	295	22	0	1
512	131.27	430.7	100	16	0	1
513	131.40	431.1	273	8	45	3
514	131.91	432.8	332	18	0	1
515	132.19	433.7	354	8	0	1
516	132.90	436.0	229	9	0	1
517	133.22	437.1	11	4	0	1
518	133.54	438.1	28	6	0	1

All directions are with respect to Magnetic North.

Table IRR-02:1. Orientation Summary Table
Televiewer Image Features
Arcadis
Marinette
IRR-02
20 May 2022

Feature No.	Depth (meters)	Depth (feet)	Dip Direction (degrees)	Dip Angle (degrees)	Feature Aperture (mm)	Feature Rank (0 to 5)
519	133.72	438.7	42	23	0	1
520	133.86	439.2	330	29	0	1
521	134.08	439.9	3	14	0	1
522	134.15	440.1	350	6	0	1
523	134.27	440.5	6	7	0	1
524	134.50	441.3	345	3	0	1
525	134.63	441.7	147	26	0	1
526	134.89	442.6	332	17	0	1
527	134.97	442.8	336	8	0	1
528	135.07	443.2	196	4	0	1
529	135.80	445.5	357	8	0	1
530	135.92	445.9	295	5	0	1
531	136.41	447.6	13	5	0	1
532	136.65	448.3	88	14	0	1
533	136.96	449.3	15	17	0	1
534	137.23	450.2	223	21	0	1
535	137.23	450.2	31	19	0	1
536	137.50	451.1	287	6	0	1
537	137.64	451.6	222	13	0	1
538	137.66	451.6	43	18	0	1
539	137.94	452.6	351	3	0	0
540	138.20	453.4	257	7	0	0
541	138.20	453.4	66	24	0	1
542	138.53	454.5	309	24	0	0
543	138.56	454.6	118	5	0	0
544	138.77	455.3	323	2	0	0
545	138.85	455.5	89	4	0	0
546	138.90	455.7	159	15	88	3
547	139.11	456.4	267	3	0	0
548	139.30	457.0	266	31	0	1
549	139.46	457.6	310	6	0	1
550	139.49	457.7	82	19	0	1
551	139.60	458.0	296	21	0	1
552	139.61	458.0	88	15	0	1
553	139.72	458.4	79	14	0	1
554	139.81	458.7	90	12	0	1
555	139.99	459.3	97	16	0	1

All directions are with respect to Magnetic North.

Table IRR-02:1. Orientation Summary Table
Televiewer Image Features
Arcadis
Marinette
IRR-02
20 May 2022

Feature No.	Depth (meters)	Depth (feet)	Dip Direction (degrees)	Dip Angle (degrees)	Feature Aperture (mm)	Feature Rank (0 to 5)
556	140.03	459.4	95	23	0	1
557	140.24	460.1	341	10	61	3
558	140.27	460.2	119	18	0	1
559	140.41	460.7	51	15	0	1
560	140.73	461.7	144	4	0	1
561	140.79	461.9	144	10	0	1
562	141.06	462.8	35	18	0	1
563	141.38	463.8	156	19	0	1
564	141.52	464.3	31	19	0	1
565	141.67	464.8	356	5	0	0
566	141.74	465.0	341	5	0	0
567	141.87	465.5	6	8	0	0
568	141.97	465.8	4	4	0	0
569	142.18	466.5	11	6	0	0
570	142.33	467.0	30	6	0	0
571	142.39	467.2	24	6	0	0
572	142.49	467.5	50	5	0	0
573	142.59	467.8	27	6	0	0
574	142.68	468.1	70	3	0	0
575	142.74	468.3	303	1	0	1
576	142.83	468.6	295	2	0	1
577	142.94	469.0	217	3	0	0
578	143.01	469.2	247	2	0	1
579	143.16	469.7	60	4	0	0
580	143.22	469.9	54	4	0	0
581	143.32	470.2	73	1	0	0
582	143.55	471.0	293	1	0	1
583	143.78	471.7	23	5	0	1
584	143.89	472.1	27	2	0	1
585	143.95	472.3	129	8	0	1
586	143.98	472.4	12	2	0	0
587	144.26	473.3	173	3	0	0
588	144.75	474.9	212	2	0	1
589	144.85	475.2	291	2	0	1
590	145.02	475.8	345	2	0	1
591	145.24	476.5	313	1	0	1
592	145.38	477.0	317	2	0	1

All directions are with respect to Magnetic North.

Table IRR-02:1. Orientation Summary Table
Televiewer Image Features
Arcadis
Marinette
IRR-02
20 May 2022

Feature No.	Depth (meters)	Depth (feet)	Dip Direction (degrees)	Dip Angle (degrees)	Feature Aperture (mm)	Feature Rank (0 to 5)
593	145.49	477.3	302	2	0	1
594	145.56	477.6	40	1	0	1
595	145.65	477.9	292	5	0	1
596	145.73	478.1	273	1	0	0
597	145.89	478.6	355	2	0	0
598	146.08	479.3	13	1	0	0
599	146.24	479.8	3	1	0	0
600	146.29	479.9	350	1	0	0
601	146.33	480.1	12	1	0	0
602	146.46	480.5	32	4	0	0
603	146.54	480.8	47	2	0	0
604	146.61	481.0	56	0	0	0
605	146.69	481.3	51	3	0	0
606	146.81	481.7	5	2	0	0
607	146.84	481.8	4	2	0	0
608	146.96	482.2	32	3	0	0
609	147.03	482.4	38	2	0	0
610	147.11	482.7	35	3	0	0
611	147.20	482.9	51	3	0	0
612	147.29	483.3	74	1	0	0
613	147.40	483.6	265	2	0	0
614	147.46	483.8	224	1	0	0
615	147.80	484.9	351	4	0	0
616	147.88	485.2	276	2	0	0
617	147.94	485.4	280	3	0	0
618	148.06	485.8	260	4	0	0
619	148.26	486.4	50	4	0	0
620	148.51	487.2	334	5	0	1
621	148.63	487.6	324	6	0	1
622	148.76	488.1	339	6	0	1
623	149.29	489.8	198	3	0	1
624	149.45	490.3	305	0	0	1
625	149.63	490.9	37	3	0	1
626	149.89	491.8	21	7	0	1
627	150.06	492.3	334	14	0	1
628	150.55	493.9	177	3	0	1
629	150.74	494.6	325	18	0	1

All directions are with respect to Magnetic North.

Table IRR-02:1. Orientation Summary Table
Televiewer Image Features
Arcadis
Marinette
IRR-02
20 May 2022

Feature No.	Depth (meters)	Depth (feet)	Dip Direction (degrees)	Dip Angle (degrees)	Feature Aperture (mm)	Feature Rank (0 to 5)
630	150.87	495.0	307	13	0	1
631	151.43	496.8	231	2	0	1
632	151.82	498.1	164	11	0	1
633	151.98	498.6	152	30	0	1
634	152.14	499.1	148	6	0	1
635	152.22	499.4	63	6	0	1
636	152.30	499.7	175	1	0	1
637	152.40	500.0	40	3	0	1
638	152.41	500.0	156	31	0	1
639	152.56	500.5	62	4	0	1
640	152.80	501.3	237	29	0	1
641	153.04	502.1	353	19	0	1
642	153.09	502.3	165	18	0	1
643	153.25	502.8	129	1	0	1
644	153.49	503.6	117	15	0	1
645	153.83	504.7	257	3	0	2
646	154.06	505.5	327	20	0	1
647	154.45	506.7	48	13	0	1
648	154.76	507.7	85	4	0	0
649	155.27	509.4	46	4	0	0
650	155.37	509.7	8	6	0	0
651	155.46	510.0	13	6	0	0
652	155.74	511.0	32	13	0	0
653	155.98	511.7	264	2	0	0
654	156.01	511.8	255	71	0	1
655	156.16	512.4	309	1	0	0
656	156.27	512.7	309	1	0	0
657	156.42	513.2	312	1	0	0
658	156.54	513.6	317	3	0	0
659	156.76	514.3	317	2	0	0
660	157.09	515.4	42	2	0	0
661	157.23	515.8	61	2	0	1
662	157.26	515.9	71	2	0	1
663	157.35	516.2	27	1	0	1
664	157.41	516.4	295	2	0	1
665	157.44	516.6	1	2	0	0
666	157.48	516.7	321	1	0	0

All directions are with respect to Magnetic North.

Table IRR-02:1. Orientation Summary Table
Televiewer Image Features
Arcadis
Marinette
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Feature No.	Depth (meters)	Depth (feet)	Dip Direction (degrees)	Dip Angle (degrees)	Feature Aperture (mm)	Feature Rank (0 to 5)
667	157.53	516.8	335	1	0	0
668	157.56	516.9	310	1	0	0
669	157.60	517.1	330	1	0	0
670	157.63	517.2	57	2	0	0
671	157.68	517.3	348	2	0	0
672	157.75	517.5	351	2	0	0
673	157.81	517.7	352	1	0	0
674	157.85	517.9	341	1	0	1
675	157.93	518.2	303	0	0	0
676	158.04	518.5	323	2	0	0
677	158.11	518.7	44	1	0	0
678	158.17	518.9	64	2	0	0
679	158.23	519.1	250	1	0	0
680	158.30	519.4	234	1	0	1
681	158.33	519.5	230	1	0	1
682	158.37	519.6	224	1	0	1
683	158.43	519.8	246	2	0	1
684	158.53	520.1	71	2	0	0
685	158.56	520.2	68	3	0	0
686	158.61	520.4	68	3	0	0
687	158.66	520.5	70	1	0	1
688	158.75	520.8	355	1	0	0
689	158.82	521.1	43	2	0	0
690	158.90	521.3	60	2	0	0
691	158.97	521.6	183	1	0	0
692	159.03	521.8	318	1	0	0
693	159.18	522.3	45	3	0	1
694	159.25	522.5	46	2	0	1
695	159.33	522.7	40	3	0	1
696	159.54	523.4	229	41	0	1
697	159.56	523.5	218	11	0	1
698	159.86	524.5	200	11	0	1
699	159.95	524.8	206	7	0	1
700	160.19	525.6	345	7	0	1
701	160.36	526.1	353	5	0	1
702	160.55	526.7	217	4	0	1
703	160.66	527.1	142	6	0	1

All directions are with respect to Magnetic North.

Table IRR-02:1. Orientation Summary Table
Televiewer Image Features
Arcadis
Marinette
IRR-02
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Feature No.	Depth (meters)	Depth (feet)	Dip Direction (degrees)	Dip Angle (degrees)	Feature Aperture (mm)	Feature Rank (0 to 5)
704	160.75	527.4	56	5	0	1
705	161.04	528.3	110	2	0	2
706	161.17	528.8	336	2	0	1
707	161.26	529.1	14	1	0	1
708	161.40	529.5	7	2	0	1
709	161.50	529.9	352	7	0	1
710	161.54	530.0	169	8	0	1
711	161.58	530.1	329	4	0	1
712	161.74	530.6	102	7	0	1
713	161.83	530.9	324	3	0	1
714	161.88	531.1	149	6	0	1
715	162.02	531.6	182	4	0	1
716	162.08	531.8	206	2	0	1
717	162.24	532.3	316	7	0	1
718	162.27	532.4	76	2	0	1
719	162.36	532.7	128	2	0	1
720	162.42	532.9	104	3	0	1
721	162.45	533.0	115	2	0	1
722	162.70	533.8	103	3	0	2
723	162.79	534.1	105	3	0	1
724	162.85	534.3	108	2	0	1
725	163.05	534.9	315	3	0	0
726	163.19	535.4	49	1	0	1
727	163.25	535.6	35	2	0	1
728	163.38	536.0	328	2	0	1
729	163.42	536.2	295	0	0	1
730	163.43	536.2	228	64	0	1
731	163.46	536.3	237	2	0	1
732	163.54	536.6	107	2	0	1
733	163.71	537.1	29	2	0	1
734	163.78	537.3	34	3	0	1
735	163.82	537.5	33	3	0	1
736	163.90	537.7	66	2	0	0
737	163.99	538.0	239	59	0	1
738	164.01	538.1	360	4	0	0
739	164.08	538.3	236	2	0	0
740	164.18	538.7	323	2	0	0

All directions are with respect to Magnetic North.

Table IRR-02:1. Orientation Summary Table
Televiewer Image Features
Arcadis
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Feature No.	Depth (meters)	Depth (feet)	Dip Direction (degrees)	Dip Angle (degrees)	Feature Aperture (mm)	Feature Rank (0 to 5)
741	164.28	539.0	293	4	0	1
742	164.38	539.3	259	4	0	0
743	164.52	539.8	222	2	0	0
744	164.61	540.1	80	2	0	0
745	164.67	540.2	134	5	0	0
746	164.76	540.5	21	3	0	0
747	164.83	540.8	11	9	0	0
748	164.87	540.9	2	7	0	0
749	164.92	541.1	23	2	0	0
750	164.95	541.2	326	7	0	0
751	165.07	541.6	337	3	0	0
752	165.16	541.9	345	3	0	1
753	165.21	542.0	325	3	0	0
754	165.30	542.3	100	4	0	1
755	165.31	542.3	19	5	0	1
756	165.39	542.6	358	5	0	0
757	165.49	542.9	327	14	0	0
758	165.55	543.1	310	7	0	0
759	165.63	543.4	349	5	0	0
760	165.86	544.2	124	4	0	0
761	166.24	545.4	178	3	0	0
762	166.29	545.6	254	2	0	1
763	166.32	545.7	235	3	0	1
764	166.41	546.0	279	3	0	1
765	166.50	546.3	226	2	0	1
766	166.59	546.5	136	5	0	1
767	166.67	546.8	150	4	0	1
768	166.70	546.9	117	10	0	0
769	166.87	547.5	250	5	0	0
770	167.05	548.1	134	6	0	0
771	167.17	548.5	170	9	0	0
772	167.32	548.9	358	12	0	0
773	167.37	549.1	214	23	0	0
774	167.40	549.2	20	8	0	0
775	167.55	549.7	26	8	0	0
776	167.65	550.0	49	6	0	1
777	167.77	550.4	167	5	0	1

All directions are with respect to Magnetic North.

Table IRR-02:1. Orientation Summary Table
Televiewer Image Features
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Feature No.	Depth (meters)	Depth (feet)	Dip Direction (degrees)	Dip Angle (degrees)	Feature Aperture (mm)	Feature Rank (0 to 5)
778	167.90	550.9	178	1	0	0
779	167.97	551.1	13	8	0	1
780	168.02	551.2	273	2	0	0
781	168.20	551.8	277	2	0	0
782	168.35	552.3	51	3	0	0
783	168.44	552.6	234	3	0	0
784	168.51	552.9	268	8	0	0
785	168.54	552.9	109	9	0	0
786	168.65	553.3	272	2	0	0
787	168.73	553.6	58	3	0	0
788	168.80	553.8	10	2	0	0
789	168.91	554.2	57	1	0	0
790	168.98	554.4	267	2	0	0
791	169.52	556.2	302	1	0	0
792	169.87	557.3	38	3	0	0
793	170.42	559.1	47	1	0	0
794	170.67	559.9	184	1	0	0
795	170.80	560.4	24	2	0	0
796	170.85	560.5	30	1	0	0
797	171.16	561.6	173	4	0	0
798	171.26	561.9	53	2	0	0
799	171.40	562.4	304	1	0	0
800	171.58	562.9	170	2	0	0
801	171.87	563.9	166	5	0	0
802	172.03	564.4	224	2	0	0
803	172.12	564.7	185	5	0	0
804	172.22	565.0	256	3	0	0
805	172.31	565.3	288	1	0	0
806	172.42	565.7	229	1	0	0
807	172.53	566.0	258	1	0	0
808	172.59	566.2	186	2	0	0
809	172.64	566.4	279	1	0	0
810	172.70	566.6	79	1	0	0
811	172.82	567.0	130	1	0	0
812	173.04	567.7	295	1	0	0
813	173.37	568.8	2	2	0	0
814	173.90	570.6	171	4	0	1

All directions are with respect to Magnetic North.

Table IRR-02:1. Orientation Summary Table
Televiewer Image Features
Arcadis
Marinette
IRR-02
20 May 2022

Feature No.	Depth (meters)	Depth (feet)	Dip Direction (degrees)	Dip Angle (degrees)	Feature Aperture (mm)	Feature Rank (0 to 5)
815	174.00	570.9	321	3	0	0
816	174.18	571.5	6	6	0	1
817	174.32	571.9	265	1	0	1
818	174.40	572.2	264	7	0	1
819	174.45	572.3	331	3	0	1
820	174.57	572.7	23	3	0	0
821	174.63	572.9	37	3	0	0
822	174.71	573.2	148	8	0	0
823	174.81	573.5	145	13	0	0
824	174.96	574.0	122	9	0	0
825	174.96	574.0	4	9	0	0
826	175.02	574.2	139	0	0	0
827	175.06	574.3	76	0	0	0
828	175.15	574.7	149	2	0	0
829	175.24	574.9	111	1	0	0
830	175.30	575.1	335	0	0	0
831	175.39	575.4	175	2	0	0
832	175.58	576.1	70	0	0	0
833	175.64	576.2	70	2	0	0
834	175.69	576.4	76	3	0	0
835	175.72	576.5	83	3	0	0
836	175.88	577.0	58	4	0	0
837	175.97	577.3	102	4	0	0
838	176.18	578.0	340	1	0	1
839	176.45	578.9	26	7	0	0
840	176.68	579.7	172	1	0	0
841	176.72	579.8	268	1	0	0
842	176.78	580.0	358	3	0	0
843	176.79	580.0	55	3	0	0
844	177.03	580.8	96	3	0	0
845	177.10	581.0	57	2	0	0
846	177.27	581.6	265	4	0	0
847	177.30	581.7	236	8	0	0
848	177.32	581.8	196	6	0	0
849	177.40	582.0	130	8	0	0
850	177.41	582.0	167	4	0	0
851	177.47	582.3	331	7	0	0

All directions are with respect to Magnetic North.

Table IRR-02:1. Orientation Summary Table
Televiewer Image Features
Arcadis
Marinette
IRR-02
20 May 2022

Feature No.	Depth (meters)	Depth (feet)	Dip Direction (degrees)	Dip Angle (degrees)	Feature Aperture (mm)	Feature Rank (0 to 5)
852	177.52	582.4	341	5	0	0
853	177.57	582.6	49	3	0	0
854	177.60	582.7	100	5	0	0
855	177.70	583.0	265	5	0	0
856	177.73	583.1	143	5	0	0
857	177.79	583.3	186	5	0	0
858	177.84	583.5	48	2	0	0
859	177.92	583.7	318	7	0	0
860	178.03	584.1	126	7	0	0
861	178.12	584.4	76	4	0	0

All directions are with respect to Magnetic North.

Table IRR-02:2. Summary of Corehole Dynamic Flowmeter Test-Station Results; Arcadis; Marrinette, WI; Wellbore: IRR-02

IRR-02					
Depth (feet)	**Flow in Borehole During Ambient Testing (GPM)**	**Ambient Flow Direction in Borehole**	**Flow in Borehole During Pumping as Measured by CDFM (GPM)**	**Flow in Borehole During Pumping Normalized to Pumping Rate Max (GPM)**	**Comments**
67.0	0.05	↑	10.60	21.7	Test station just outside casing. 0.05 gpm of ambient upflow is observed, indicating no change in ambient flow between 67.0 - 101.0 feet. This ambient upflow of 0.05 gpm **exits** the borehole between 62.2 feet (bottom of casing) and 67.0 feet. During pumping, 0.10 gpm **enters** the borehole between 67.0 - 101.0 feet. Based on the pumping rate of 23.7 gpm and a test station inside casing at 55 feet that registered ~20 gpm (difficult seal inside casing), it is our assumption that approximately 13.1 gpm **enters** the borehole near the base of casing, suggesting a poor cement seal behind casing.
101.0	0.05	↑	10.50	21.7	No observed change in flow under ambient or pumping conditions between 101.0 - 120.5 feet.
120.5	0.05	↑	10.50	21.7	No observed change in flow under ambient or pumping conditions between 120.5 - 132.0 feet.
132.0	0.05	↑	10.50	21.7	No observed change in flow under ambient or pumping conditions between 132.0 - 156.0 feet.
156.0	0.05	↑	10.50	21.7	No observed change in flow under ambient or pumping conditions between 156.0 - 183.0 feet.
183.0	0.05	↑	10.50	21.7	No observed change in flow under ambient or pumping conditions between 183.0 - 194.0 feet.
194.0	0.05	↑	10.50	21.7	No observable change in flow under ambient conditions between 194.0 - 254.5 feet. During pumping, 0.80 gpm **enters** the borehole at this same interval.
254.5	0.05	↑	9.70	21.7	No observable change in flow under ambient conditions between 254.5 - 284.5 feet. During pumping, 1.00 gpm **enters** the borehole at this same interval.
284.5	0.05	↑	8.70	20.8	No observable change in flow under ambient conditions between 284.5 - 314.5 feet. During pumping, 0.41 gpm **enters** the borehole at this same interval.
314.5	0.05	↑	8.31	20.8	No observed change in flow under ambient or pumping conditions between 314.5 - 357.0 feet.
357.0	0.05	↑	8.31	20.8	No observed change in flow under ambient or pumping conditions between 357.0 - 393.5 feet.

Table IRR-02:2. Summary of Corehole Dynamic Flowmeter Test-Station Results; Arcadis; Marrinette, WI; Wellbore: IRR-02

393.5	0.05	↑	8.31	20.8	0.01 gpm **enters** the borehole under ambient conditions between 393.5 - 443.7 feet. During pumping, 1.46 gpm **enters** the borehole, likely through solution openings.
443.7	0.04	↑	6.85	20.8	0.05 gpm **enters** the borehole under ambient conditions between 443.7 - 473.0 feet: 0.04 gpm migrates up the botrehole while 0.01 gpm migrates down the borehole. During pumping, 6.43 gpm **enters** the borehole.
473.0	-0.01	↓	0.42	18.7	No observable change in flow under ambient conditions between 473.0 - 495.5 feet. During pumping, 0.04 gpm **enters** the borehole at this same interval.
495.5	-0.01	↓	0.38	15.2	No observed change in flow under ambient or pumping conditions between 495.5 - 513.0 feet.
513.0	-0.01	↓	0.38		0.02 gpm **exits** the borehole under ambient conditions between 513.0 - 534.0 feet. During pumping, 0.01 gpm **exits** the borehole.
534.0	-0.03	↓	0.39	15.2	0.05 gpm **exits** the borehole under ambient conditions between 534.0 - 558.5 feet. 0.03 gpm came from above 534.0 feet while 0.02 gpm came from below 558.5 feet. During pumping, 0.24 gpm **enters** the borehole.
558.5	0.02	↑	0.15		0.01 gpm **exits** the borehole under ambient conditions between 558.5 - 571.0 feet, likely through fractures along bedding planes, with aperture. During pumping, 0.03 gpm **enters** the borehole.
571.0	0.03	↑	0.12	15.2	No observable change in flow under ambient conditions between 571.0 - 580.0 feet. During pumping, 0.07 gpm **enters** the borehole at this same interval.
580.0	0.03	↑	0.05	15.2	0.03 gpm **enters** the borehole under ambient conditions between 580.0 - 584.5 feet (TD) and migrates upward. During pumping, 0.05 gpm **enters** the borehole and mirates upward toward the pump inside casing.

Ambient WL (ftbgs)	11.33
Bottom of casing (ftbgs)	62.2
Total Depth (TD) (ftbgs)	584.5
Avg. Extraction Rate (gpm)	23.7
Observed Drawdown (ft)	2.79
Specific Capacity (gpm/ft-dd)	8.49

Note: Negative flow is downflow in the borehole. Positive flow is upflow in the borehole.