APPENDIX E

TDCS PIEZOMETER INSTALLATION

Contents of Appendix E

Multi-level Piezometer Installation

Five Multi-Level Vibrating Wire Piezometers (PZ-201, PZ-301, PZ-302, PZ-303 and PZ-304) were installed in the TDCS tunnels 2 and 3 during February-March 2009. An automated data acquisition system was installed in May 2009 and included a multiplexer (MUX-1) in Workroom 1-1, MUX signal cable to the top of the shaft which terminated in a data logger. The installation of an additional multi-level piezometer, PZ-202, in the existing probe hole, PH-2, at the end of Tunnel 2 was approved by NYSDEC (verbal 2-12-10) and completed on March 2 and 3, 2010. The PZ-202 installation included a second multiplexer (MUX-2) and signal cable to the data logger. With the addition of PZ-202, the TDCS piezometer system consists of six multi-level vibrating wire piezometers, fully grouted, with an automated data acquisition system. The multi-level piezometers and data acquisition system were manufactured by Geokon and incorporates three pressure transducers in each hole and one pressure transducer installed at the new top casing for HF-303 in Workroom 1-1. The transducer signals are sent via shielded cables to two multiplexer boxes (MUX-1 and MUX-2) in Workroom 1-1 and then via two shielded multiplexer cables to a data logger at the electrical shed at the top of the shaft collar. The data logger is programmed to record the transducer readings once every hour. Installation information regarding the multi-level piezometers is contained herein. For installation information on all TDCS piezometers refer to Table PZ-1, Figures PZ-201 through PZ-304, borehole drilling core logs and geophysical logs. For information on the automated data acquisition system refer to Figures PZ-1 through PZ-5. For survey data of elevations of the Hudson River bed along the alignment of PZ-201 refer to River Bathymetric transect survey.

The piezometer pressure transducers are located in the boreholes: near the collar; near the midpoint and; near the end of the borehole. The location of pressure transducers was selected to correspond with open fractures and fractures with indications of flowing water where possible.

The work performed for the installation of PZ-202 included: review and evaluation of discontinuities in the rock core and core logs for PH-2; selection of open fractures for transducer sensor locations in the borehole; ordering and manufacturing of transducers with custom length signal cables; retrofitting stainless steel flange with grout vent tube and adding stainless steel seal assembly for piezometer cables; testing of transducers before installation; splicing and installation of shielded cables to multiplexer box MUX-2 and to data logger and; backfilling the borehole and encapsulation of transducers with cement-bentonite grout.

The grouting of all the piezometers included injecting cement-bentonite grout (a homogeneous mixture of 2.5 parts water, 1 part cement, and 0.3 parts bentonite) through the 3-inch diameter pipe coupler on the side of the collar casing, up the hole, into the vent tube at the back of the hole and returning out the vent tube at the permanent stainless steel flange. When undiluted grout was observed flowing out the vent tube pipe nipple, the vent tube valve was closed and grouting completed.

Data was obtained before and after grouting using a hand-held readout instrument and by the automated data acquisition system multiplexer after cables were installed. Piezometer readings were recorded hourly and data downloaded weekly to laptop computer or data card. The data was entered into spreadsheets and plotted weekly.

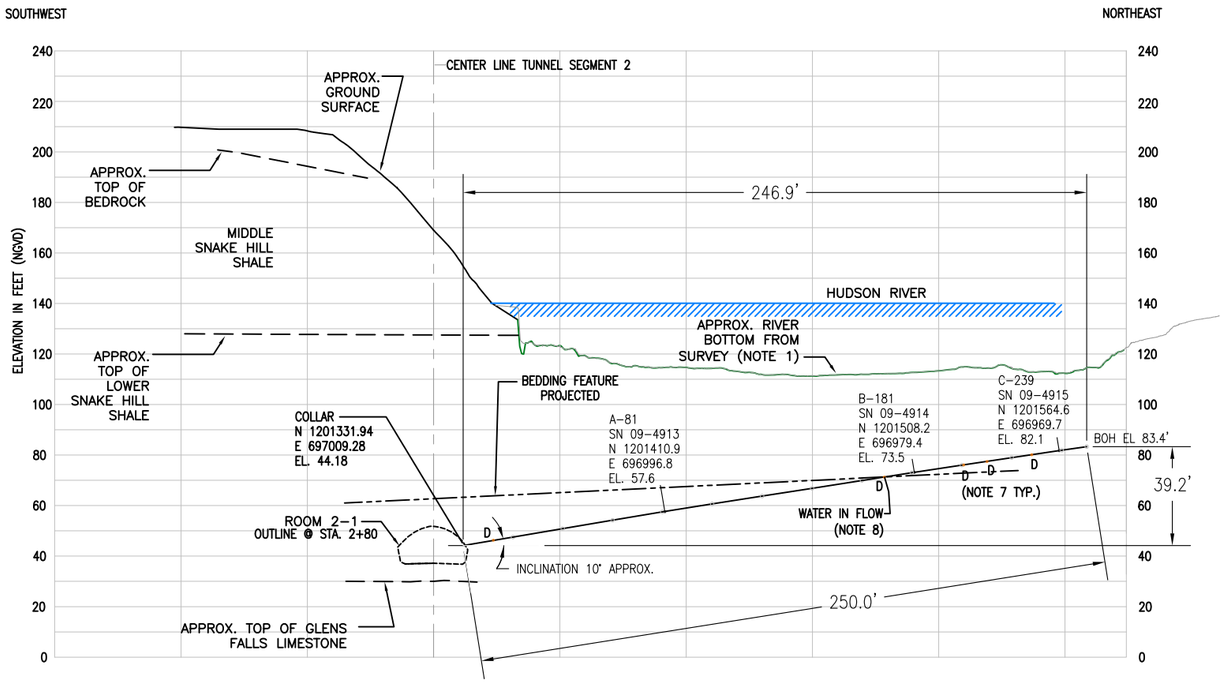
The data from PZ-202 became unusable from the second week of July 2010 (four and one-half months after installation) through September 2010. During the planned TDCS Entry the multiplexer, MUX-2, was found to be defective and was replaced. The data since September 2010 through December 2010 has been valid.

Table PZ-1 TDCS Multi Level Vibrating Wire Piezometer Data

Piezometer/Sensor ID/(Serial#)	Location Tunnel: Station	Azimuth (Grid)	Inclination Up From Horizontal	Drilled Length (ft)	Depth (ft)	Elevation (ft. NGVD)	Rock Unit	Remarks
PZ-201/	2:2+74	350°	20°	250	0	44.18	LSHS	Water inflow 100 gpm at 181 ft, grouted with 10 bags cement & reduced inflow to 30 gpm
A-81 / (09-4913)					81	57.6	LSHS	
B-181 / (09-4914)					181	73.5	LSHS	
C-239 / (09-4915)					239	82.1	LSHS	
PZ-202/	2:2+92	220°	5°	300	0	44.12	LSHS	Water inflow less than 0.01 at end of drilling
A-53 / (1000331)					53	48.5	LSHS	
B-190 / (1000332)					190	58.9	LSHS	
C-287 / (1000329)					287	65.5	LSHS	
PZ-301/	3:1+74	340°	60°	100	0	51.52	LSHS	Water inflow 20 gpm at end of drilling
A-31 / (09-4920)					31	78.3	LSHS	
B-69 / (09-4921)					69	111.2	LSHS	
C-80 / (09-4922)					80	120.7	LSHS	
PZ-302/	3:3+44	340°	60°	85	0	62.07	LSHS	Water inflow 1 gpm at end of drilling
A-20 / (093108)					20	79.4	LSHS	
B-53 / (09-3109)					53	107.9	LSHS	
C-78 / (09-3110)					78	129.5	LSHS	
PZ-303/	3:3+28	220°	15°	250	0	55.62	LSHS	Water inflow 1.6 gpm at end of drilling
A-45 / (09-3098)					45	66.1	LSHS	
B-114 / (09-3099)					114	82.5	LSHS	
C-222 / (09-3100)					222	109.2	LSHS	
PZ-304/	3:3+38	80°	20°	318	0	56.88	LSHS	Water inflow 10.5 gpm at end of drilling
A-30 / (09-3107)					30	67.2	LSHS	
B-168 / (09-3106)					168	116.7	LSHS	
C-313 / (09-3105)					313	169.9	MSHS	

Notes:

1. All Multilevel piezometers were installed fully grouted with cement-bentonite grout mixture of, 1 cement : 2.5 water : 0.3 bentonite (by weight).



SECTION AT PZ-201

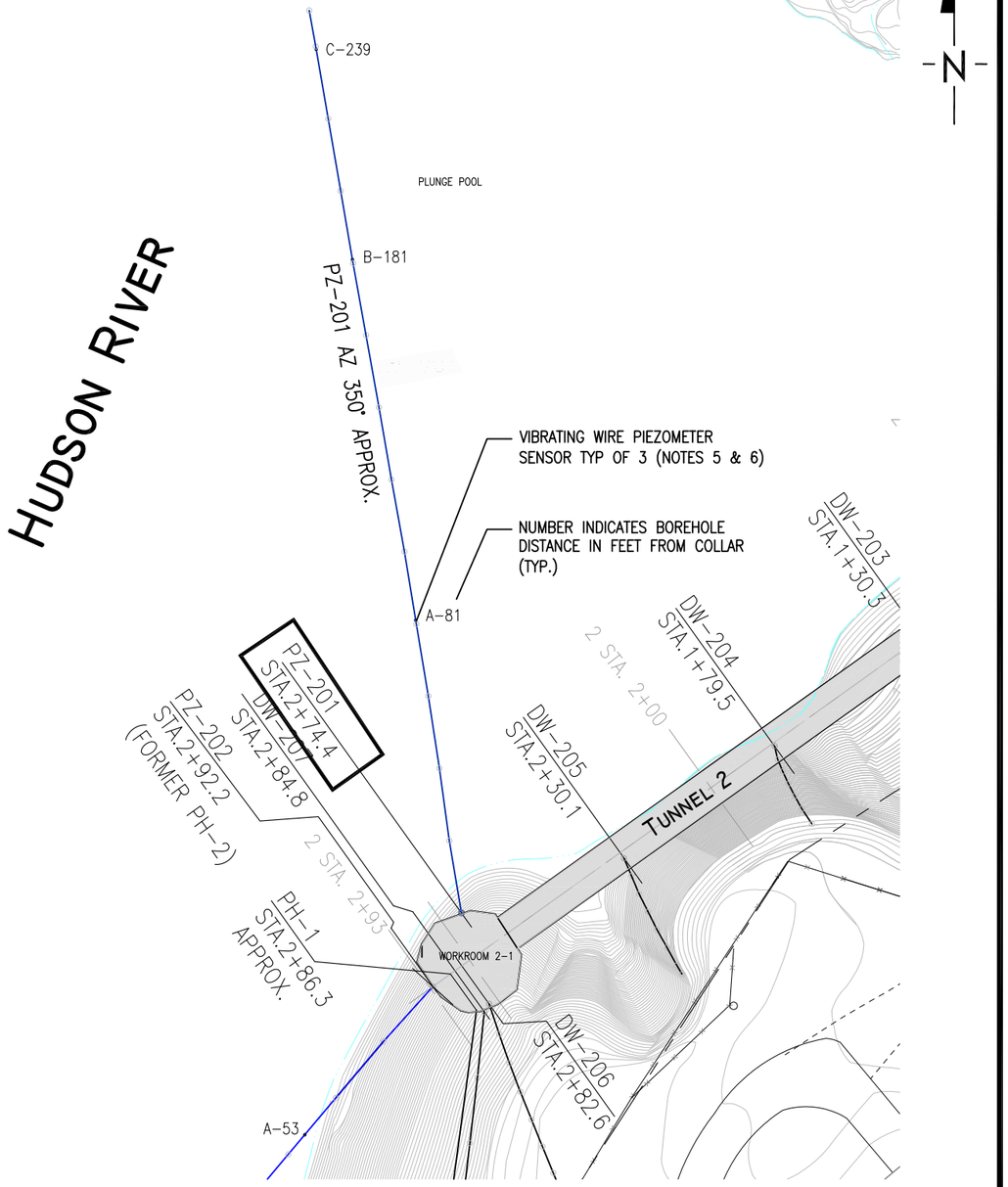
SCALE 1"=60'

0 60

Scale in feet

NOTE:

1. RIVER TRANSECT SURVEY ALONG ALIGNMENT OF PZ-201 CONDUCTED ON 3/10/2009
2. PIEZOMETER COLLAR LOCATION FROM SURVEY SUBMITTED MAY 2009 BY MERCO/OBAYASHI
3. PIEZOMETER ALIGNMENT AND INCLINATION BASED ON FIELD MEASUREMENTS OF DRILL RODS AT INITIAL SET UP AND BOREHOLE DEVIATION SURVEY SUBMITTED MAY 2009 BY MERCO/OBAYASHI
4. PZ-2 CORED DRILLED, HQ SIZE REFER TO CORE BORING REPORT
5. PZ-201, MULTI LEVEL VIBRATING WIRE PIEZOMETER FULLY GROUTED, WITH 3 SENSORS (A, B, C, AT DEPTHS INDICATED) INSTALLED ON 3/20/2009
6. SENSOR DEPTHS IN BOREHOLE WERE DETERMINED IN FIELD BY GEOLOGIST BASED ON LOCATION OF OPEN FRACTURES OBSERVED IN ROCK CORE
7. DNAPL (D) OBSERVED ON ROCK CORE A2: 12.2', 163.85', 200.8', 210.4'; AND 227.9'
8. WATER IN FLOW AT 181.1' 110 GPM REDUCED TO 30 GPM BY GROUTING 158' TO 198' (REFER TO BORING REPORT)
9. WATER FLOW RATE: 30 GPM AT THE END OF DRILLING (3/18/2009



PLAN VIEW

SCALE 1"=40'

0 40

Scale in feet

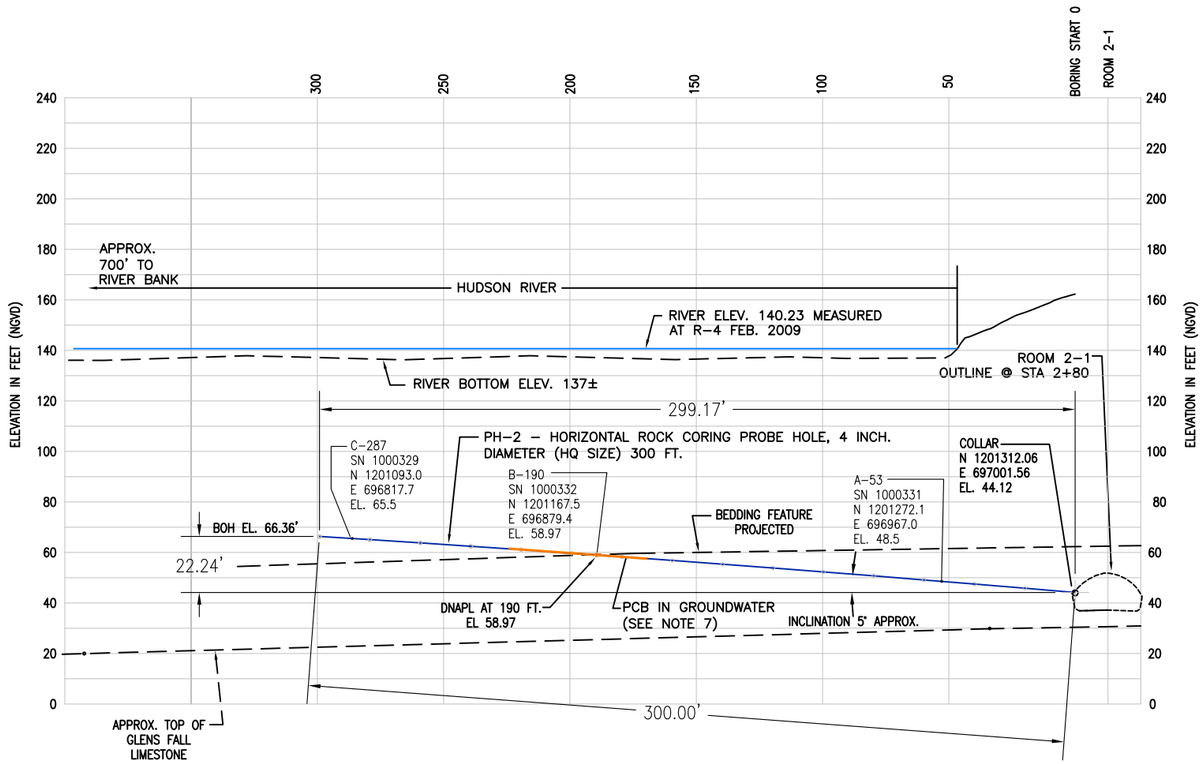
TITLE:	PIEZOMETER PZ-201 TUNNEL DRAIN COLLECTION SYSTEM
LOCATION:	GE HUDSON FALLS, NEW YORK

TETRA TECH GEO

APPROVED	JFB
DRAFTED	RMK
PROJECT#	117-2204
DATE	APRIL 2011

FIGURE PZ-201

G:\GE_HUDS\2011\4-11_HYRO_MON_RPT_AS-BUILS-FINAL_DRAIN\PIEZPH.DWG

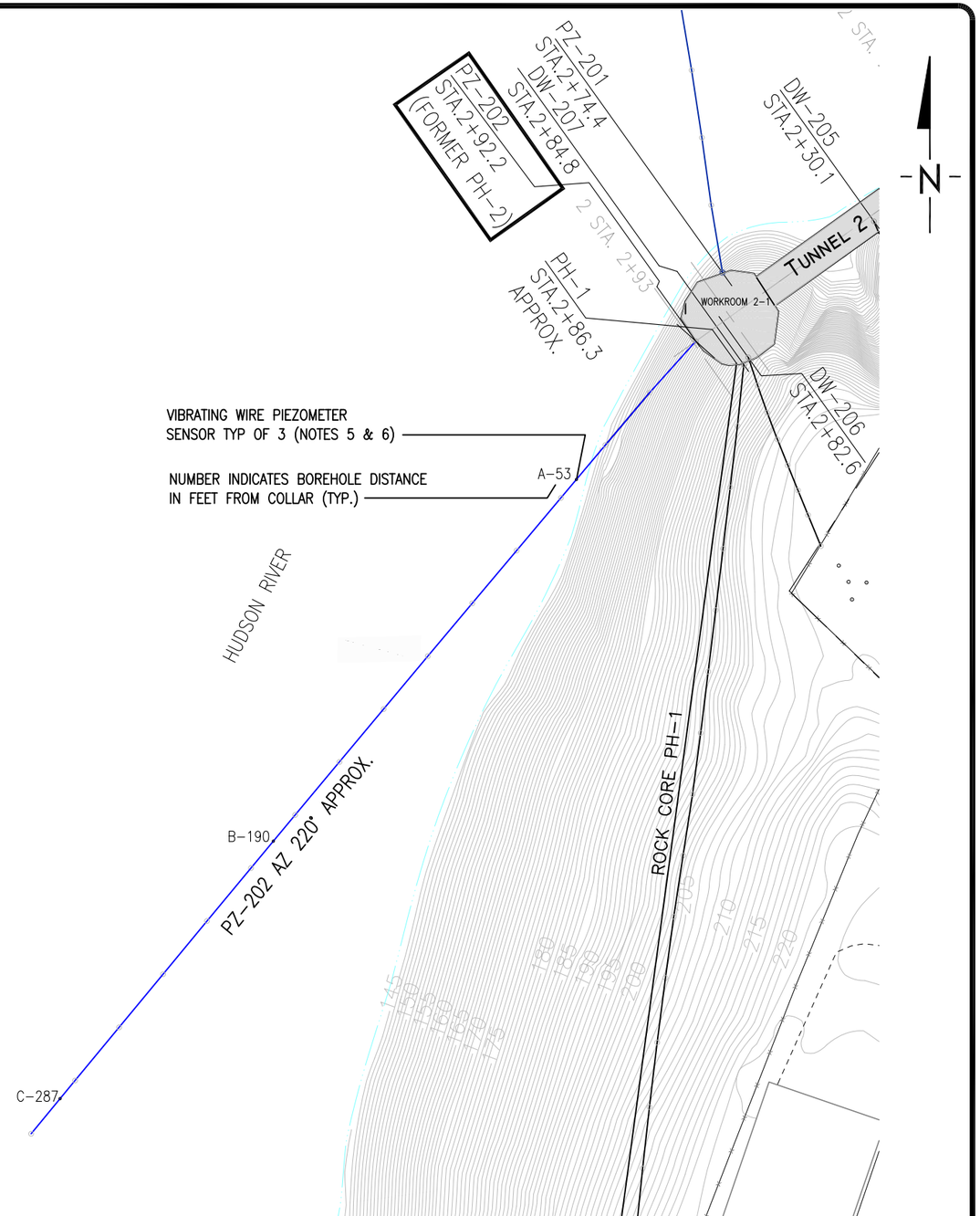


SECTION AT PZ-202

0 60
Scale in feet

NOTE:

1. PZ-202 INSTALLED IN PROBE HOLE PH-2
2. PROBE HOLE COLLAR LOCATION FROM SURVEY SUBMITTED MAY 2009 BY MERCO/OBAYASHI
3. PROBE HOLE ALIGNMENT AND INCLINATION BASED ON FIELD MEASUREMENTS OF DRILL RODS AT INITIAL SET UP AND BOREHOLE DEVIATION SURVEY SUBMITTED MAY 2009 BY MERCO/OBAYASHI
4. PH-2 CORED DRILLED, HQ SIZE REFER TO CORE BORING REPORT
5. PZ-202, MULTI LEVEL VIBRATING WIRE PIEZOMETER FULLY GROUTED, WITH 3 SENSORS (A, B, C, AT DEPTHS INDICATED) INSTALLED ON 3/3/2009
6. SENSOR DEPTHS IN BOREHOLE WERE DETERMINED IN FIELD BY GEOLOGIST BASED ON LOCATION OF OPEN FRACTURES OBSERVED IN ROCK CORE
7. PCB ENCOUNTER IN GROUNDWATER SAMPLES COLLECTED FROM DEPTH DEPTH 170' TO 225' ON 5/29/2009 . DNAPL (D) OBSERVED ON ROCK CORE AT: 190'
8. WATER IN FLOW RATE: NIL (LESS THAN 0.01 GPM) AT END OF DRILLING 5/11/2009 AND AT TIME OF PZ-202 INSTALLATION 3/3/2010



PLAN VIEW

0 40
Scale in feet

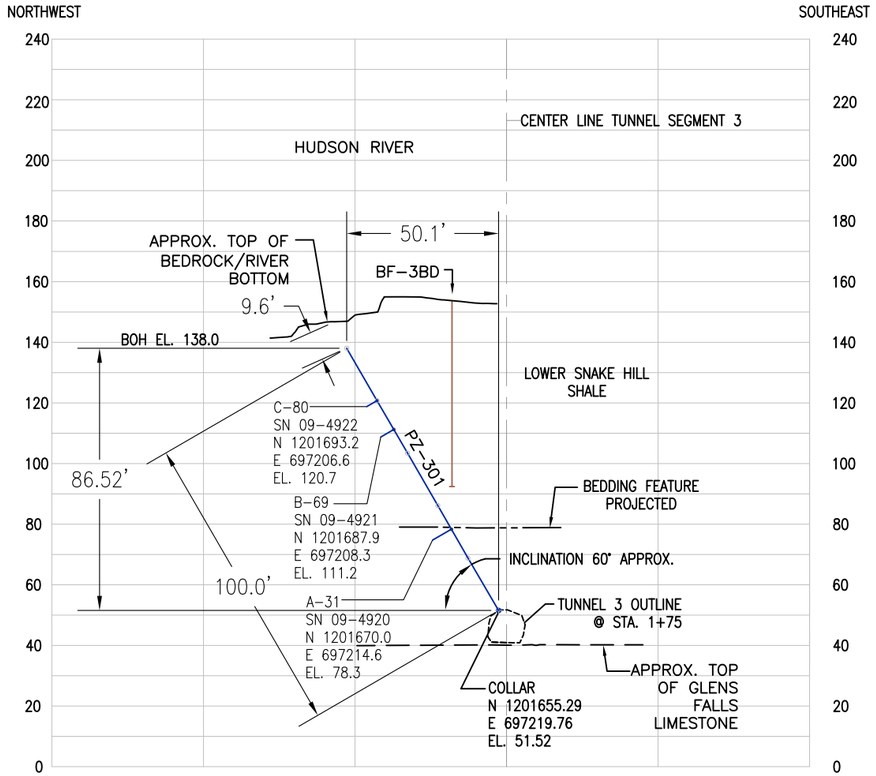
TITLE:	PIEZOMETER PZ-202 TUNNEL DRAIN COLLECTION SYSTEM
LOCATION:	GE HUDSON FALLS, NEW YORK

TETRA TECH GEO

APPROVED	JFB
DRAFTED	RMK
PROJECT#	117-2204
DATE	APRIL 2011

FIGURE
PZ-202

G:\GE_HUDS\2011\4-11_HYRO_MON_RPT_AS-BUILS-FINAL_DRAIN\PIEZPH.DWG



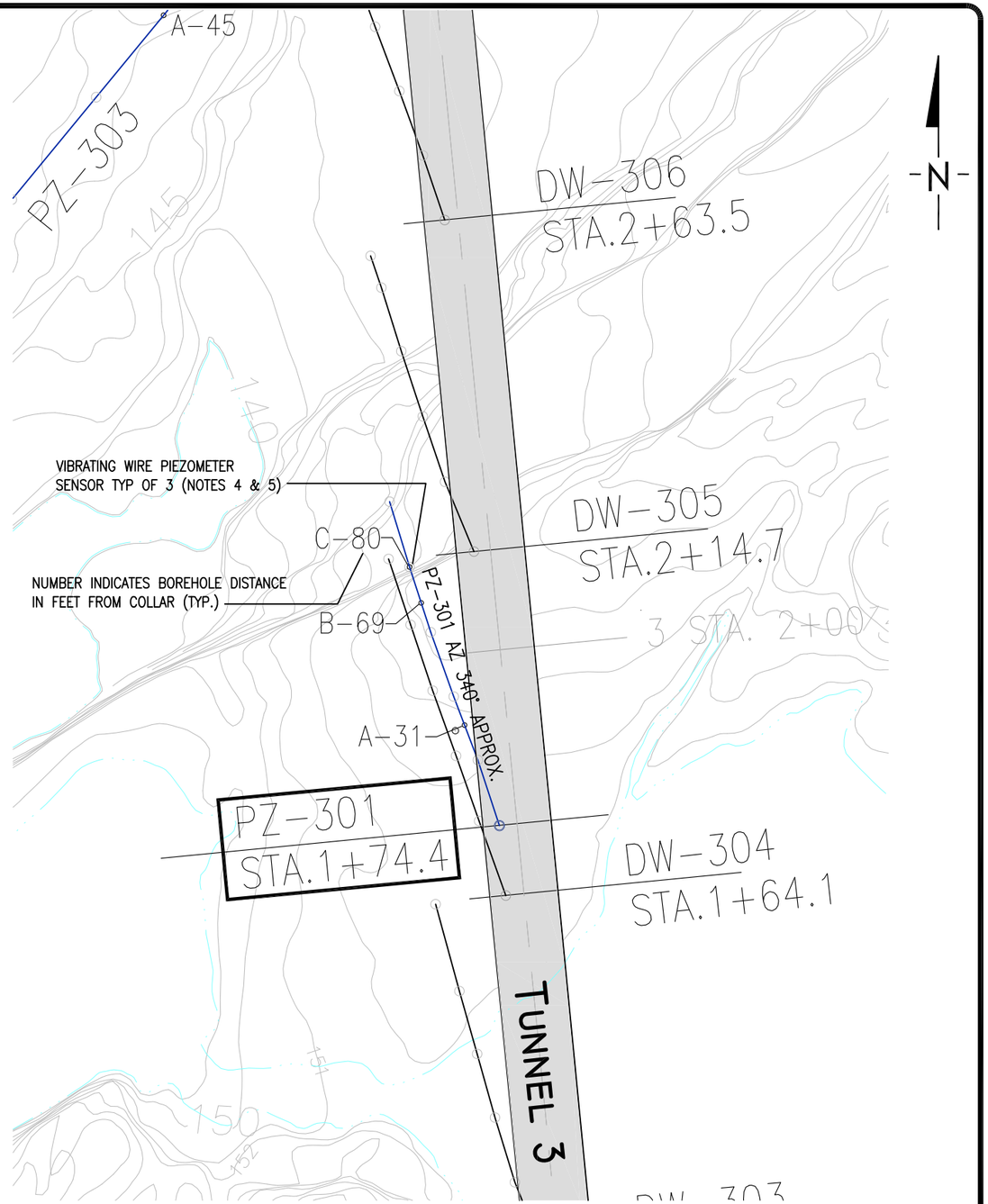
SECTION AT PZ-301

0 50

Scale in feet

NOTE:

1. PIEZOMETER COLLAR LOCATION FROM SURVEY SUBMITTED MAY 2009 BY MERCO/OBAYASHI
2. PIEZOMETER ALIGNMENT AND INCLINATION BASED ON FIELD MEASUREMENTS OF DRILL RODS AT INITIAL SET UP AND BOREHOLE DEVIATION SURVEY SUBMITTED MAY 2009 BY MERCO/OBAYASHI
3. PZ-301 DRILLED BY AIR ROTARY, 4" DIA., REFER TO CORE BORING REPORT AND OPTICAL TELEVIEWER (OTV) BOREHOLE GEOPHYSICAL SURVEY LOG
4. PZ-301, MULTI LEVEL VIBRATING WIRE PIEZOMETER FULLY GROUTED, WITH 3 SENSORS (A, B, C, AT DEPTHS INDICATED) INSTALLED ON 3/26/2009
5. SENSOR DEPTHS IN BOREHOLE WERE DETERMINED IN FIELD BY GEOLOGIST BASED ON LOCATION OF OPEN FRACTURES OBSERVED ON OTV IMAGE (NOTE 3)
6. WATER FLOW RATE: 1 GPM @ 0' - 69'; 10 GPM @ 70'; 20 GPM @ 90'; AND 20 GPM AT THE END OF DRILLING (3/17/2009)



PLAN VIEW

0 20

Scale in feet

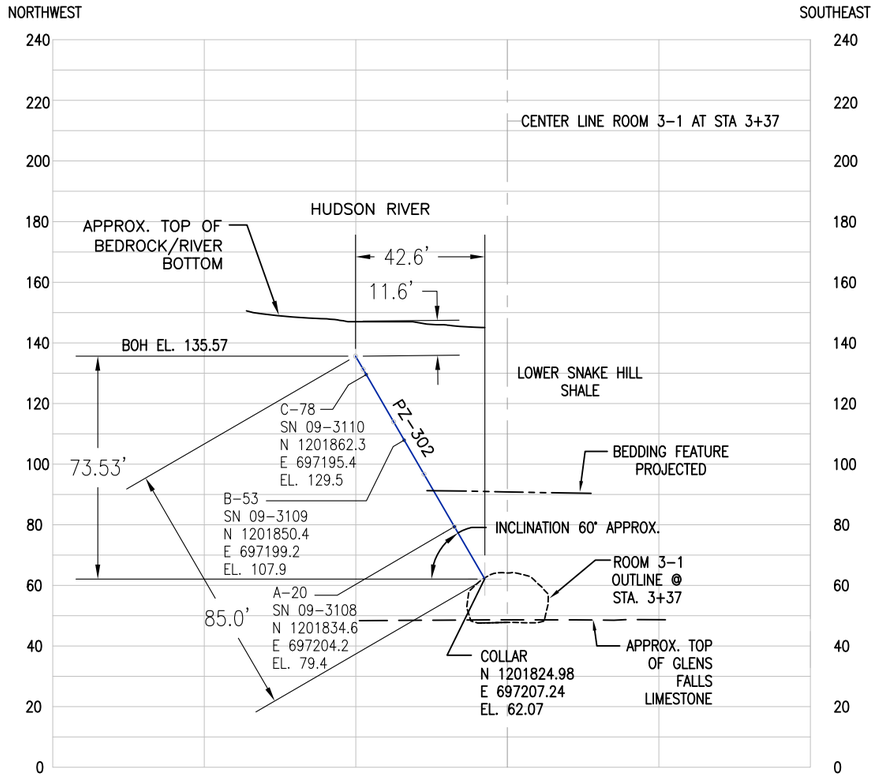
TITLE:	PIEZOMETER PZ-301 TUNNEL DRAIN COLLECTION SYSTEM
LOCATION:	GE HUDSON FALLS, NEW YORK

TETRA TECH GEO

APPROVED	JFB
DRAFTED	RMK
PROJECT#	117-2204
DATE	APRIL 2011

FIGURE
PZ-301

G:\GE_HUDS\2010\01-10_DW-ASBLTS\AS-BUILS-FINAL_DRAIN\PIEZPH.DWG

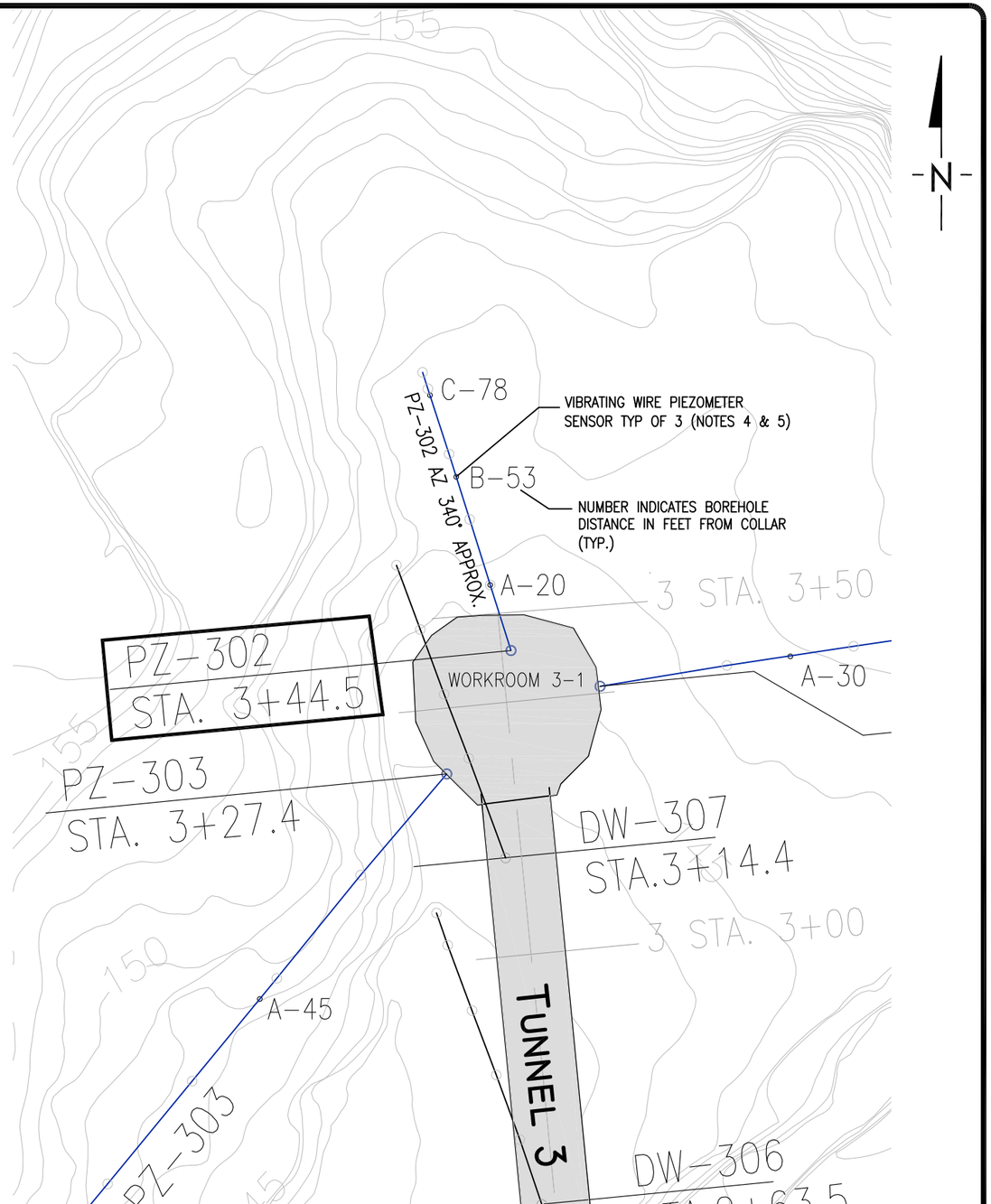


SECTION AT PZ-302

0 50
Scale in feet

NOTE:

1. PIEZOMETER COLLAR LOCATION FROM SURVEY SUBMITTED MAY 2009 BY MERCO/OBAYASHI
2. PIEZOMETER ALIGNMENT AND INCLINATION BASED ON FIELD MEASUREMENTS OF DRILL RODS AT INITIAL SET UP AND BOREHOLE DEVIATION SURVEY SUBMITTED MAY 2009 BY MERCO/OBAYASHI
3. PZ-302 CORE DRILLED HQ SIZE, REFER TO CORE BORING REPORT
4. PZ-302, MULTI LEVEL VIBRATING WIRE PIEZOMETER FULLY GROUTED, WITH 3 SENSORS (A, B, C, AT DEPTHS INDICATED) INSTALLED ON 3/14/2009
5. SENSOR DEPTHS IN BOREHOLE WERE DETERMINED IN FIELD BY GEOLOGIST BASED ON LOCATION OF OPEN FRACTURES OBSERVED IN ROCK CORE
6. WATER IN FLOW RATE: 1.5 GPM AT END OF DRILLING (3/6/2009)



PLAN VIEW

0 20
Scale in feet

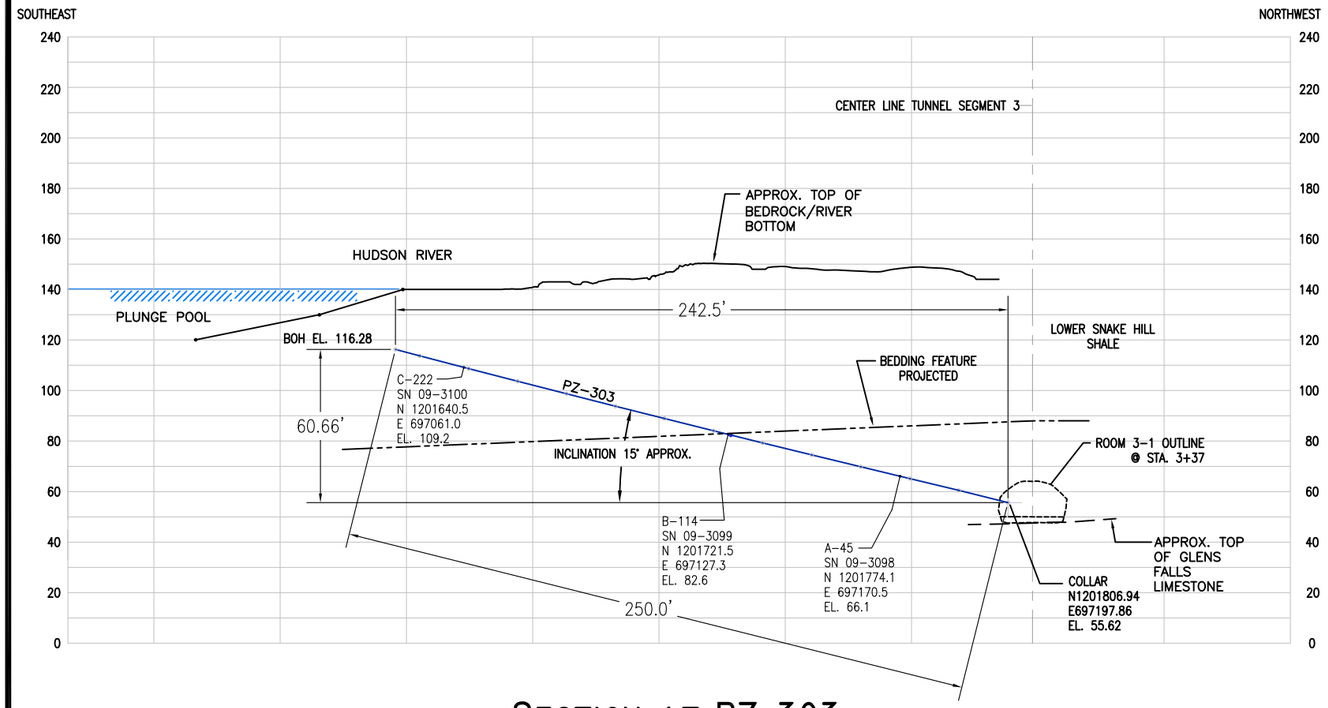
TITLE:	PIEZOMETER PZ-302 TUNNEL DRAIN COLLECTION SYSTEM
LOCATION:	GE HUDSON FALLS, NEW YORK

TETRA TECH GEO

APPROVED	JFB
DRAFTED	RMK
PROJECT#	117-2204
DATE	APRIL 2011

FIGURE
PZ-302

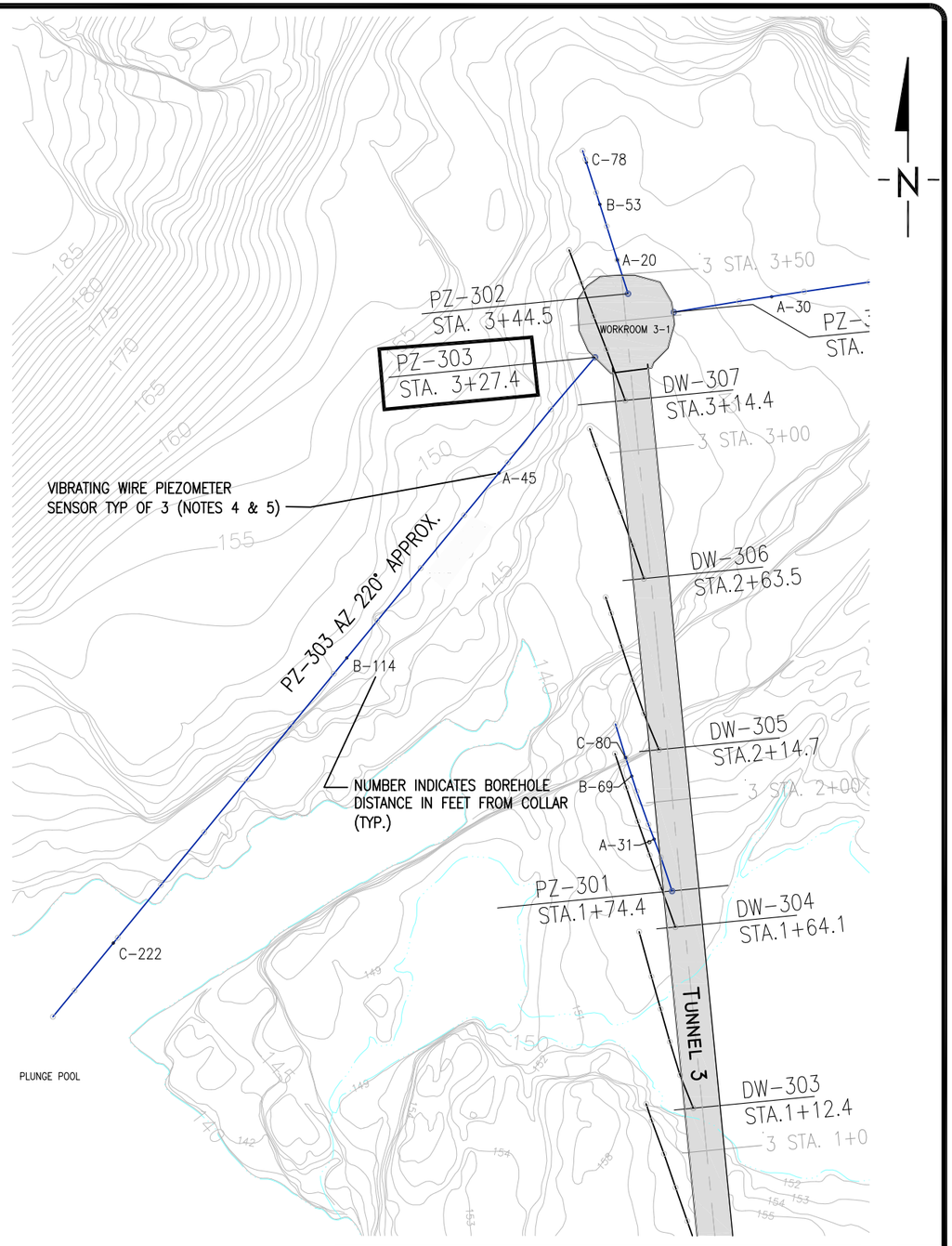
G:\GE_HUDSY_2010\01-10_DW-ASBLTS\AS-BUILS-FINAL_DRAIN\PIEZPH.DWG



SECTION AT PZ-303

0 60

Scale in feet



PLAN VIEW

0 40

Scale in feet

NOTE:

1. PIEZOMETER COLLAR LOCATION FROM SURVEY SUBMITTED MAY 2009 BY MERCO/OBAYASHI
2. PIEZOMETER ALIGNMENT AND INCLINATION BASED ON FIELD MEASUREMENTS OF DRILL RODS AT INITIAL SET UP AND BOREHOLE DEVIATION SURVEY SUBMITTED MAY 2009 BY MERCO/OBAYASHI
3. PZ-303 CORE DRILLED HQ SIZE, REFER TO CORE BORING REPORT AND OPTICAL TELEVIEWER (OTV) BOREHOLE GEOPHYSICAL SURVEY LOG
4. PZ-303, MULTI LEVEL VIBRATING WIRE PIEZOMETER FULLY GROUTED, WITH 3 SENSORS (A, B, C, AT DEPTHS INDICATED-SEE NOTE 7) INSTALLED ON 3/13/2009
5. SENSOR DEPTHS IN BOREHOLE WERE DETERMINED IN FIELD BY GEOLOGIST BASED ON LOCATION OF OPEN FRACTURES OBSERVED ON OTV IMAGE (NOTE 3)
6. WATER IN FLOW RATE: 2.5 GPM @ 114'; AND 2.5 GPM AT END OF DRILLING (3/13/2009)

TITLE: PIEZOMETER PZ-303
TUNNEL DRAIN COLLECTION SYSTEM

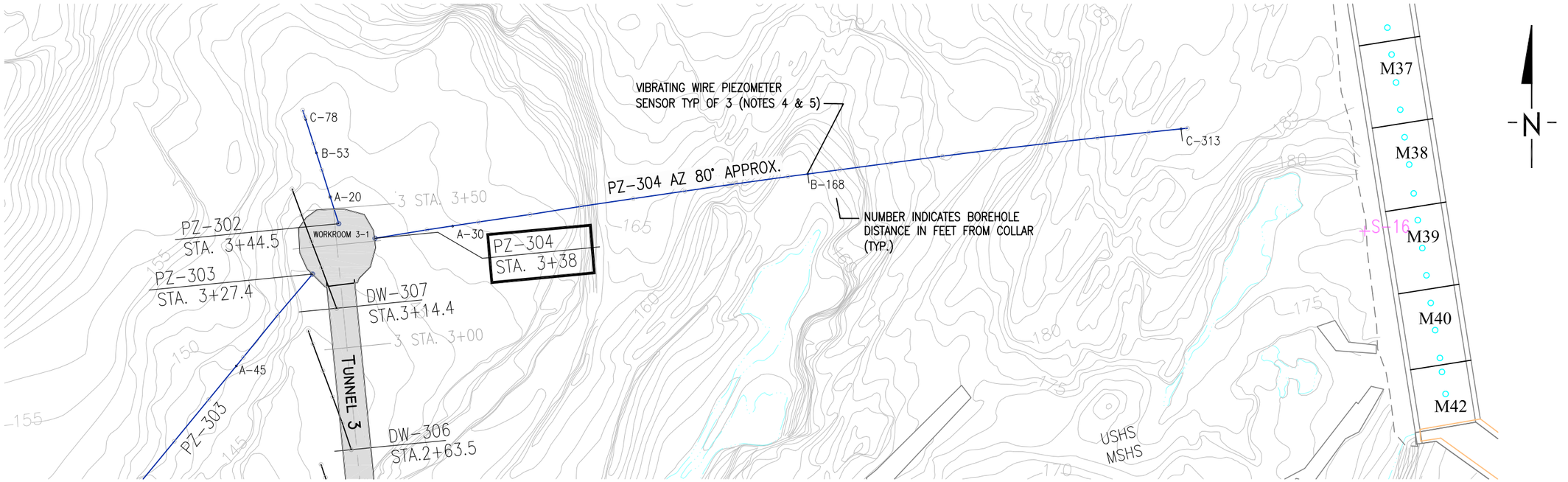
LOCATION: GE HUDSON FALLS, NEW YORK

TETRA TECH GEO

APPROVED	JFB
DRAFTED	RMK
PROJECT#	117-2204
DATE	APRIL 2011

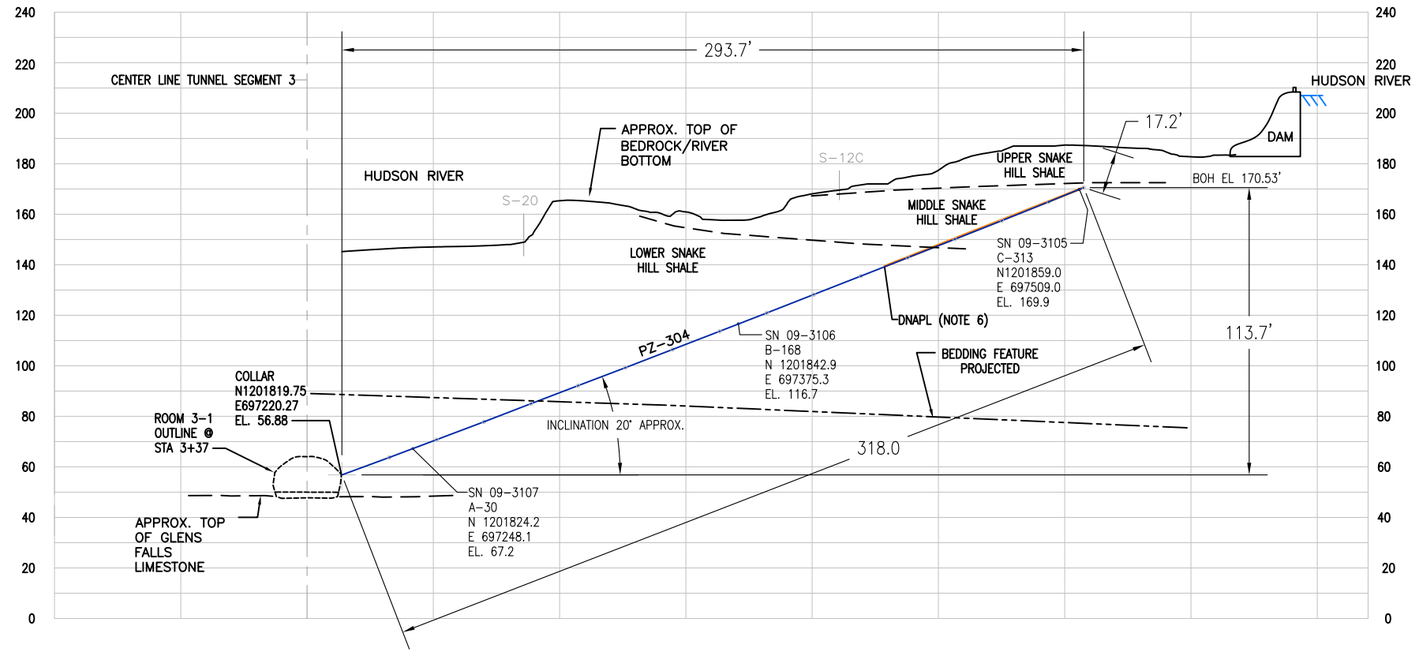
FIGURE PZ-303

G:\GE_HUDS\2010\01-10_DW-ASBLTS\XS-BUILS-FINAL_DRAINPIEZPH.DWG



PLAN VIEW

0 40
Scale in feet



SECTION AT PZ-304

0 60
Scale in feet

NOTE:

1. PIEZOMETER COLLAR LOCATION FROM SURVEY SUBMITTED MAY 2009 BY MERCO/OBAYASHI
2. PIEZOMETER ALIGNMENT AND INCLINATION BASED ON FIELD MEASUREMENTS OF DRILL RODS AT INITIAL SET UP AND BOREHOLE DEVIATION SURVEY SUBMITTED MAY 2009 BY MERCO/OBAYASHI
3. PZ-304 CORE DRILLED HQ SIZE, REFER TO CORE BORING REPORT
4. PZ-304, MULTI LEVEL VIBRATING WIRE PIEZOMETER FULLY GROUTED, WITH 3 SENSORS (A, B, C, AT DEPTHS INDICATED) INSTALLED ON 3/18/2009
5. SENSOR DEPTHS IN BOREHOLE WERE DETERMINED IN FIELD BY GEOLOGIST BASED ON LOCATION OF OPEN FRACTURES OBSERVED IN ROCK CORE
6. DNAPL OBSERVED ON ROCK CORE AT: 230' TO THE END OF HOLE
7. WATER IN FLOW RATE: 10.5 GPM @ END OF DRILLING (3/3/2009)

TITLE: PIEZOMETER PZ-304
TUNNEL DRAIN COLLECTION SYSTEM

LOCATION: GE HUDSON FALLS, NEW YORK

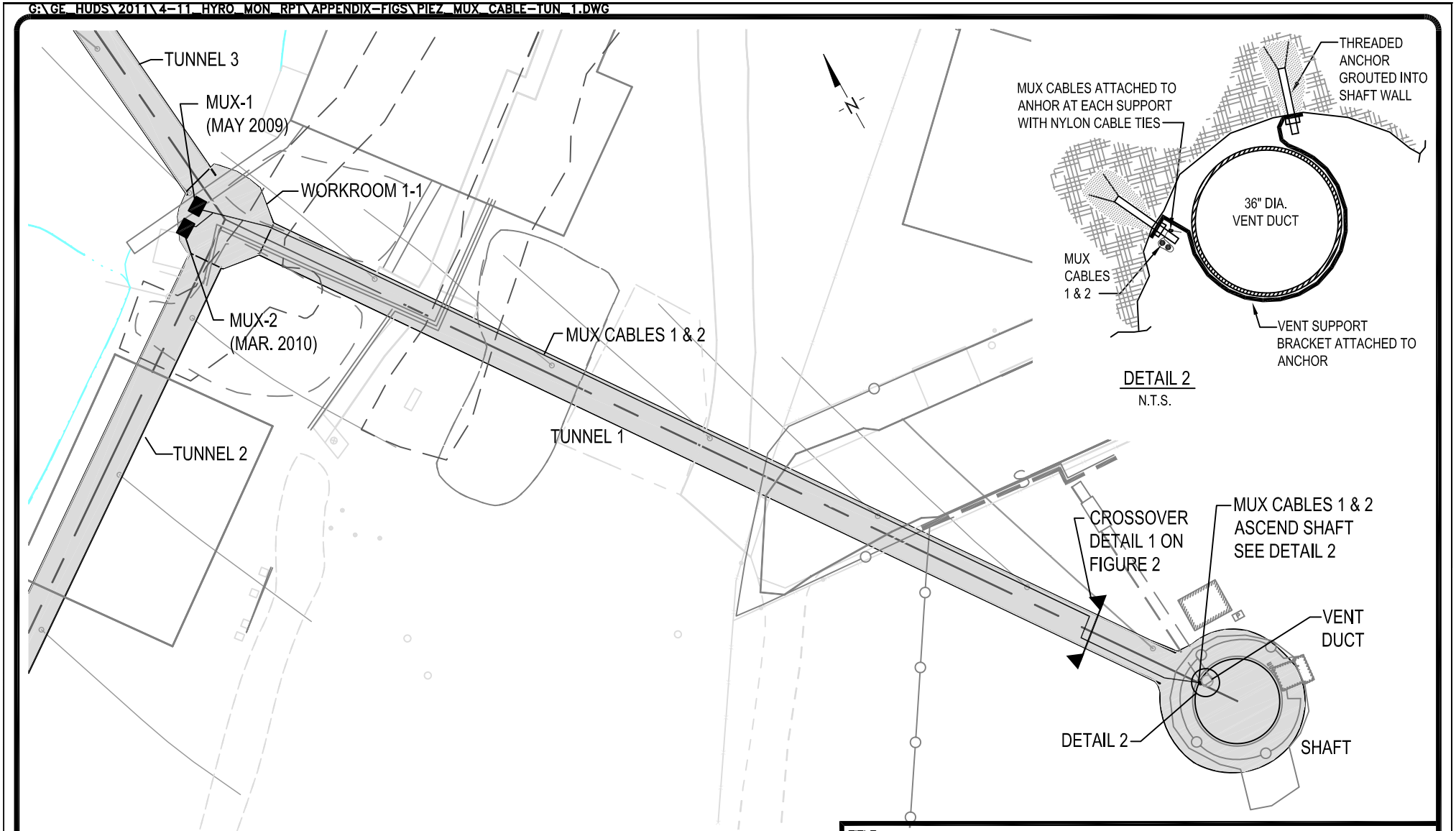
TETRA TECH GEO

APPROVED	JFB
DRAFTED	RMK
PROJECT#	117-2204
DATE	APRIL 2011

FIGURE PZ-304

G:\GE_HUDS\2011\4-11_HYRO_MON_RPT_AS-BUILS-FINAL_DRAIN\PIEZPH.DWG

G:\GE_HUDS\2011\4-11_HYRO_MON_RPT\APPENDIX-FIGS\PIEZ_MUX_CABLE-TUN_1.DWG



NOTE:
HF-303, PZ-201, PZ-301, PZ-302, PZ-303 AND PZ-304 CONNECTED TO MUX-1

PZ-202 CONNECTED TO MUX-2

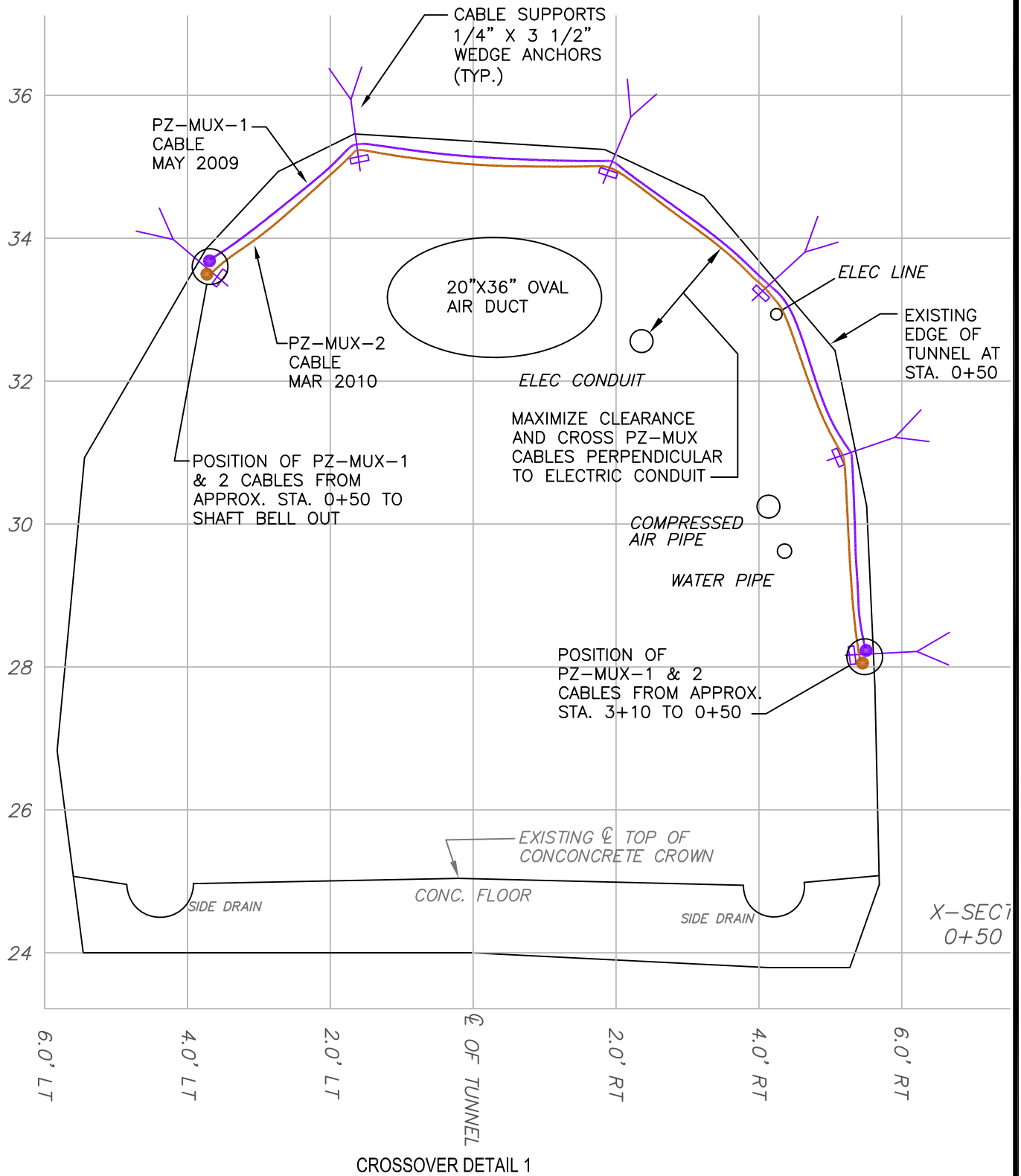
TITLE: **MUX CABLE PLAN**

LOCATION: **GE Hudson Falls, New York**

TETRA TECH GEO

APPROVED	JFB
DRAFTED	RMK
PROJECT#	117-2204
DATE	APRIL 2011

FIGURE **PZ-1**



CROSSOVER DETAIL 1

TITLE: **MUX CABLE - TYPICAL TUNNEL SECTION**

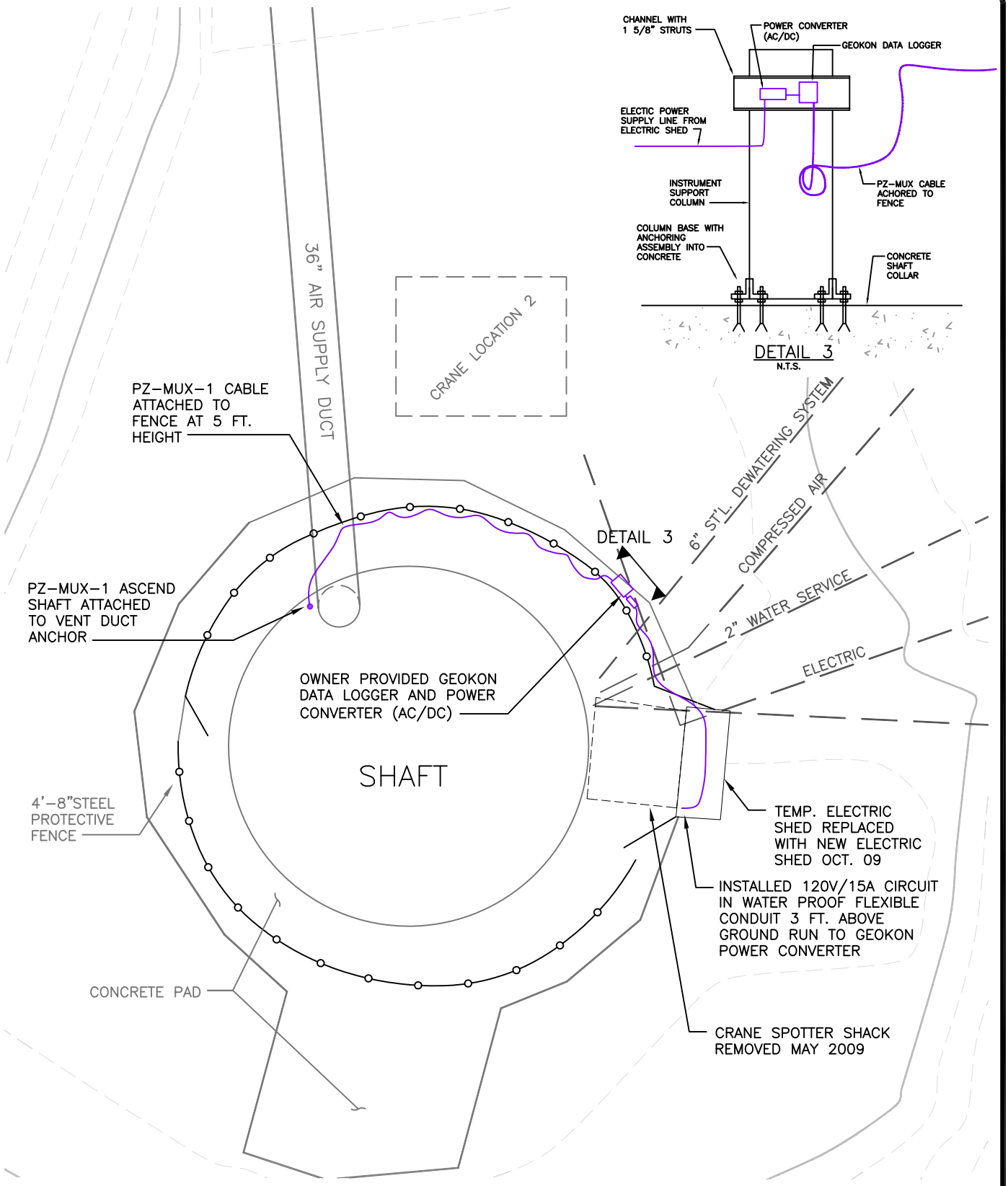
LOCATION: **GE Hudson Falls, New York**

TETRA TECH GEO

APPROVED	JFB
DRAFTED	RMK
PROJECT#	117-2204
DATE	APRIL 2011

FIGURE **PZ-2**

G:\GE_HUDS\2011\4-11_HYRO_MON_RPT\APPENDIX-FIGS\PIEZ_MUX_CABLE_SECT-COLLAR-PLANS.DWG



SHAFT AT GROUND SURFACE DETAIL PLAN VIEW

G:\GE_HUDSY_2011\4-11_HYRO_MON_RPT\APPENDIX-FIGS\PIEZ_MUX_CABLE_SECT-COLLAR-PLANS.DWG

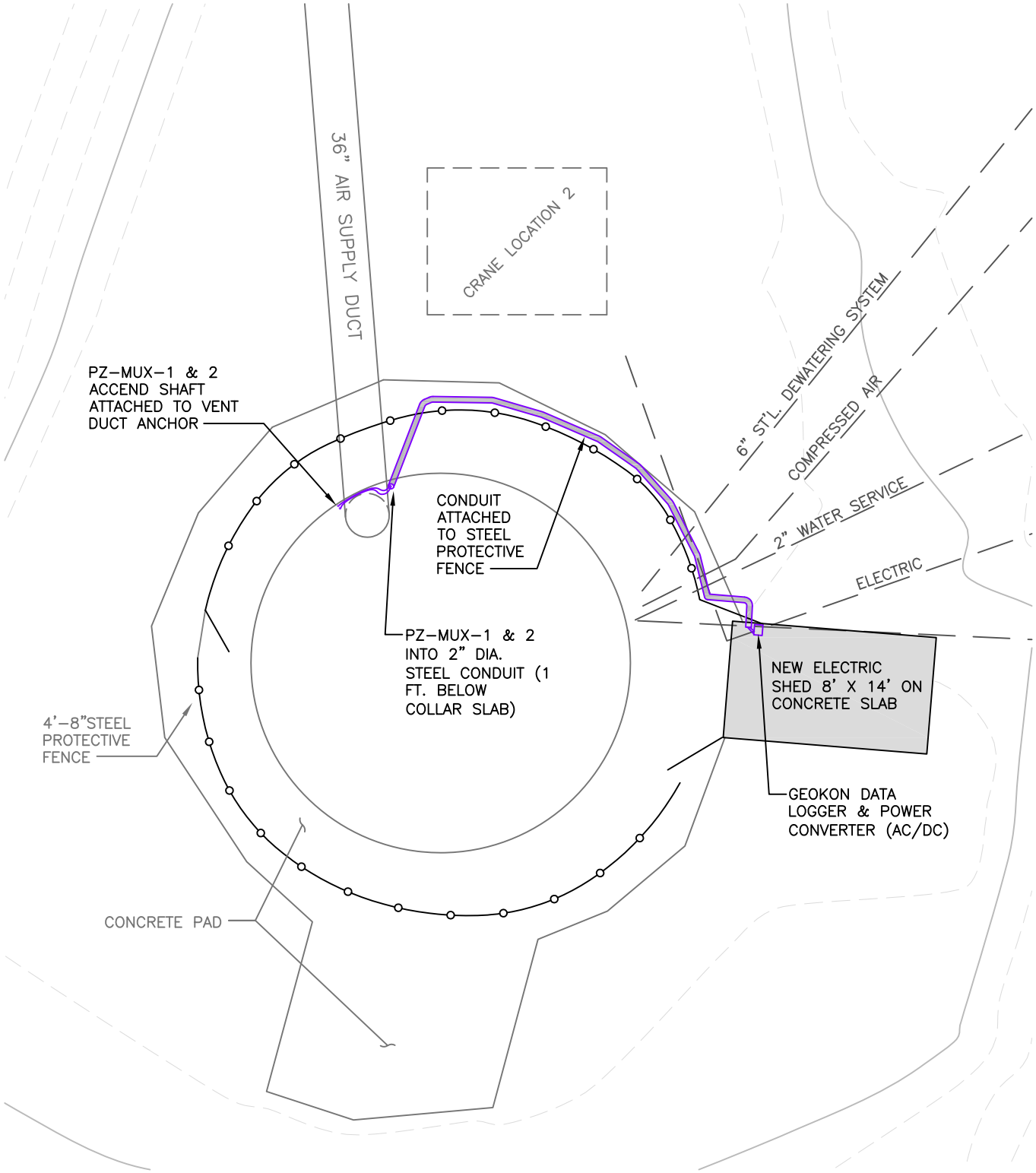
TITLE: **MUX CABLE - SHAFT COLLAR PLAN, APRIL 2009**

LOCATION: **GE Hudson Falls, New York**

TETRA TECH GEO

APPROVED	JFB
DRAFTED	RMK
PROJECT#	117-2204
DATE	APRIL 2011

FIGURE **PZ-3**



SHAFT AT GROUND SURFACE DETAIL PLAN VIEW

TITLE: **MUX CABLE - SHAFT COLLAR PLAN, MARCH 2010**

LOCATION: **GE Hudson Falls, New York**

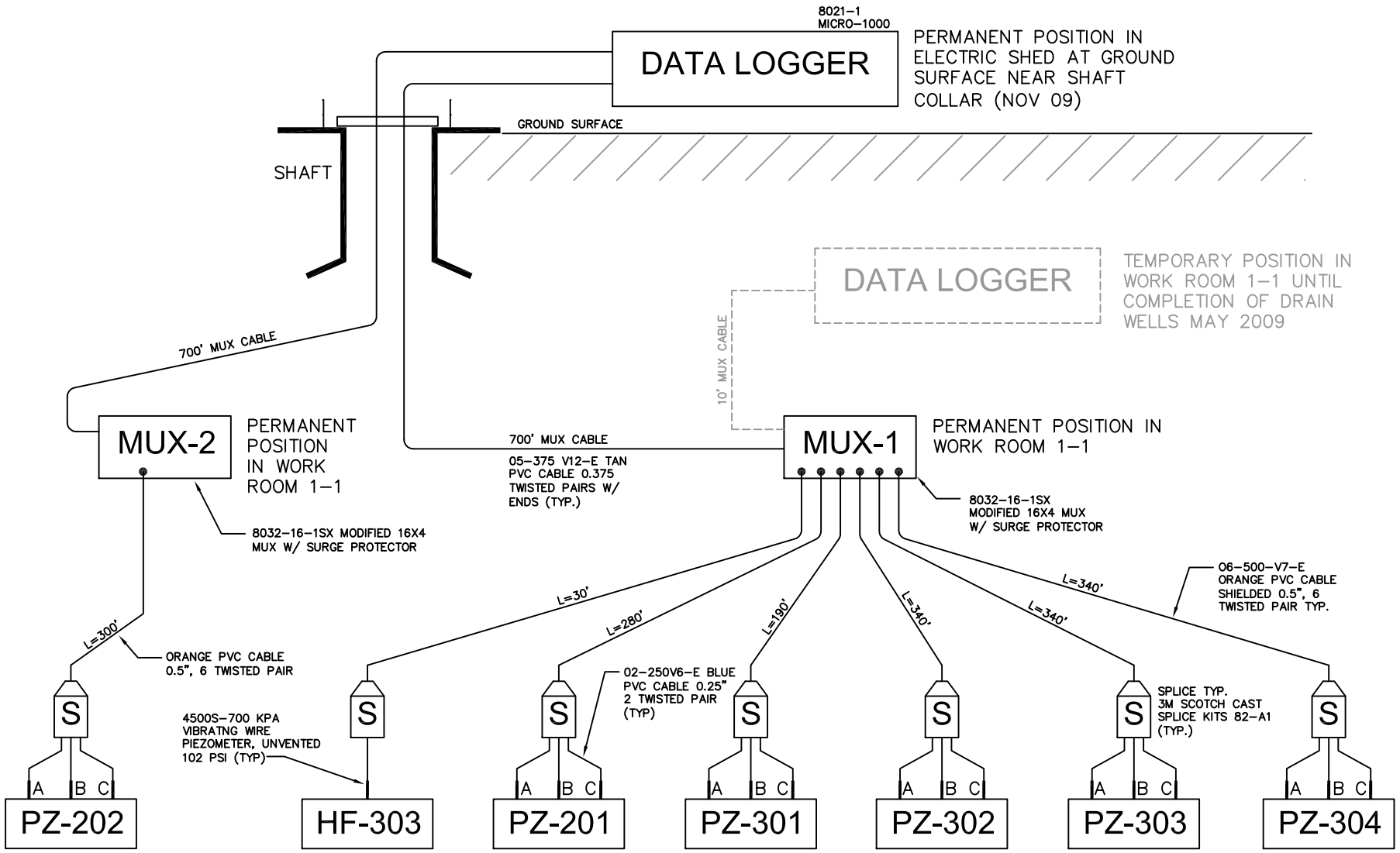
TETRA TECH GEO

APPROVED	JFB
DRAFTED	RMK
PROJECT#	117-2204
DATE	APRIL 2011

FIGURE **PZ-4**

G:_GE_HUDSY_2011\4-11_HYRO_MON_RPT\APPENDIX-FIGS\PIEZ_MUX_CABLE_SECT-COLLAR-PLANS.DWG

G:\GE_HUDS\2011\4-11_HYRO_MON_RPT\APPENDIX-FIGS\PIEZ_SYS_SCHEMATIC.DWG



PIEZOMETER SYSTEM
MANUFACTURE: GEOKON

TITLE:

DATA ACQUISITION SYSTEM SCHEMATIC

LOCATION:

GE Hudson Falls, New York

TETRA TECH GEO

APPROVED	JFB
DRAFTED	RMK
PROJECT#	117-2204
DATE	APRIL 2011

FIGURE

PZ-5

GeoTrans, Inc.
A TETRA TECH COMPANY

CORE BORING REPORT

BORING NO. PZ-201

PROJECT: TDCS, Hudson Falls, NY
CLIENT: General Electric
CONTRACTOR: Merco
EQUIPMENT USED: Beretta T43

JOB NO.: 117-2204189
PAGE NO.: 1 of 5
ELEVATION:
DATE START: 3/7/2009
DATE FINISH: 3/18/2009
DRILLER: Crux
PREPARED BY: JAL & SL
LOCATION: Workroom 2-1

GROUND WATER		DEPTH TO:			ORIENTATION		CORE BARREL	
DATE	HRS AFT COMP	WATER	BOT. OF CASING	BOT. OF HOLE	X	VERTICAL / HORIZONTAL	TYPE / SIZE	HQ 5.2 feet
						INCLINED	Bit (ft)	
						BEARING	Barrel (ft)	
					100	ANG. FROM VERT.	Total (ft)	

DEPTH IN FEET	DRILL RATE MIN/FT	CORE NO. DEPTH RANGE	SAMPLE NUMBER	RECOVERY FT	RECOVERY %	RQD (%)	FIELD CLASSIFICATION AND REMARKS
		0-2.1	1	n/a	0	n/a	8" Collar Core; 0.5' shotcrete; Grout 2.1'-2.6'. Mod. hard, black SHALE; few calcite veins, < 1mm, mid-angle (30°-40°); possible joint, fresh, tight, smooth; near vertical.
5		2.1-5.9	2	3.8	100	97	Mod. hard, fresh black, SHALE, ocassional calcite veins, moderate spacing, mostly mid-angle to vertical (30° to 90°), < 1mm to 2mm thick. Shale, similar to above, except high angle open fracture at 2.75 ft, fresh, smooth, slightly open to tight, possible DI, near sub-angle (30° to 40°).
10		5.9-10.1	3	4.3	102	100	
		10.1-15.1	4	5.1	102	100	Shale, similar to above, except high angle open fractures at 10.4 ft, smooth, slightly open, near sub-angle (40°); high angle open fracture at 12.2 feet, rough, open to slightly open, slicks, striations, sub-vertical (60° to 70°), slightly weathered, marble calcite zone; pyrite. LBSF.
15		15.1-20.1	5	5	100	100	Mod. hard, fresh black, SHALE, ocassional calcite and pyrite veins and stringers, mostly mid-angle (30° to 50°), 1mm to 3mm thick; healed fractures, come calcite filled, near vertical at (70° to 90°). Shale, similar to above, except possible joint, open, smooth to rough, <10° undulating, striations, and slicks at 17.80.
20		20.1-25.1	6	5.2	104	100	
25		25.1-30.1	7	5	100	100	Shale, similar to above, except possible low angle open joint (<10°), open, smooth to rough at 23.75. Mod. hard, fresh black, SHALE, ocassional calcite veins, mid-angle (30° to 60°), <1mm to 2mm thick; ocassional pyrite nodule, 1/4" thick.
30		30.1-35.1	8	5.2	104	96	Shale, similar to above, except high angle open fracture, slightly open, pyrite, smooth, mid-angle (40° to 50°) at 29.4-29.5.
35		35.1-40.1	9	5	100	100	Mod. hard, fresh black, SHALE, ocassional calcite and pyrite veins and stringers, mid-angle (30° to 60°), mostly <1mm to 2mm thick; trace cc and pyrite fossils; healed fractures, some calcite and pyrite filled, near vertical at (60° to 90°).
40		40.1-45.1	10	5.05	101	100	
45		45.1-50.1	11	5.25	105	100	

(Continued)

FIELD HARDNESS		BEDDING		ATTITUDE AND ANGLE	JOINTS / SHEAR / FRACTURE		WEATHERING
V. HARD	- KNIFE CAN'T SCRATCH	V. THIN	<2"	HORIZONTAL (0-5°)	V. CLOSE	<2"	FRESH
HARD	- SCRATCHES DIFFICULT	THIN	2"-12"	SHALLOW OR LOW ANGLE (5-35°)	CLOSE	2"-12"	V. SLIGHT
MOD. HARD	- SCRATCHES EASILY	MEDIUM	12"-36"	MODERATELY DIPPING (35-55°)	MOD. CLOSE	12"-36"	SLIGHT
SOFT	- GROVES	THICK	36"-120"	STEEP OR HIGH ANGLE (55-85°)	WIDE	36"-120"	MODERATE
V. SOFT	- CARVES	V. THICK	>120"	VERTICAL (85-90°)	V. WIDE	>120"	MOD. SEVERE
							V. SEVERE
							COMPLETE

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DEPTH IN FEET	DRILL RATE MIN/FT	CORE NO. DEPTH RANGE	SAMPLE NUMBER	RECOVERY FT	RECOVERY %	RQD (%)	FIELD CLASSIFICATION AND REMARKS
		50.1-55.1	12	5.05	101	100	Mod. hard, fresh black, SHALE, ocassional calcite and pyrite veins and stringers, mid-angle (30° to 60°), mostly <1mm to 2mm thick; trace cc and pyrite fossils; healed fractures, some calcite and pyrite filled, near vertical at (60° to 90°). *(continued)*
55		55.1-60.1	13	4.9	98	100	
60		60.1-65.1	14	5.1	102	100	
65		65.1-70.1	15	5.25	105	100	
70		70.1-75.1	16	5.05	101	100	
75		75.1-80.1	17	5.05	101	100	Shale, similar to above, except open joint (<10°), smooth to rough at 77.9.
80		80.1-85.1	18	4.95	99	100	Shale, similar to above, except high angle open fracture, slightly open to tight, smooth, slicks, slight striations, calcite, (40° to 50°) at 81.45.
85		85.1-90.1	19	5.2	104	100	
90		90.1-95.1	20	5	100	100	
95		95.1-100.1	21	5	100	100	
100		100.1-105.1	22	5.15	103	100	Mod. hard, fresh black, SHALE, ocassional calcite and pyrite veins and stringers, mostly mid-angle (30° to 60°), <1mm to 2mm thick; ocassional pyrite nodules, 1/4"-3/4"; healed fractures, some calcite and pyrite filled, pyrite crystals, near vertical at (60° to 90°).
105		105.1-110.1	23	5	100	100	
110							Shale, similar to above, except high angle open fracture 109.15-110.0 feet,

(Continued)

FIELD HARDNESS		BEDDING		ATTITUDE AND ANGLE	JOINTS / SHEAR / FRACTURE		WEATHERING
V. HARD	- KNIFE CAN'T SCRATCH	V. THIN	<2"	HORIZONTAL (0-5°)	V. CLOSE	<2"	FRESH
HARD	- SCRATCHES DIFFICULT	THIN	2"-12"	SHALLOW OR LOW ANGLE (5-35°)	CLOSE	2"-12"	V. SLIGHT
MOD. HARD	- SCRATCHES EASILY	MEDIUM	12"-36"	MODERATELY DIPPING (35-55°)	MOD. CLOSE	12"-36"	SLIGHT
SOFT	- GROVES	THICK	36"-120"	STEEP OR HIGH ANGLE (55-85°)	WIDE	36"-120"	MODERATE
V. SOFT	- CARVES	V. THICK	>120"	VERTICAL (85-90°)	V. WIDE	>120"	MOD. SEVERE
							V. SEVERE
							COMPLETE

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DEPTH IN FEET	DRILL RATE MIN/FT	CORE NO. DEPTH RANGE	SAMPLE NUMBER	RECOVERY FT	RECOVERY %	RQD (%)	FIELD CLASSIFICATION AND REMARKS
		110.1-115.1	24	5.2	104	100	tight, smooth, pyrite, possible DI, (90°). Mod. hard, fresh black, SHALE, ocassional calcite and pyrite veins and stringers, mostly mid-angle (30° to 60°), <1mm to 2mm thick; ocassional pyrite nodules, 1/4"-3/4"; healed fractures, some calcite and pyrite filled, pyrite crystals, near vertical at (60° to 90°).*(continued)*
115		115.1-120.1	25	5.05	101	100	Shale, similar to above, except high angle open fracture, slightly open at 115.6-115-.75, smooth, calcite and pyrite, (40°); joint at 118.6 feet tight to slightly open, rough, calcite and pyrite, (40°).
120		120.1-125.1	26	5.2	104	100	Mod. hard, fresh black, SHALE, ocassional calcite veins and stringers, mid-angle (30° to 60°), <1mm to 2mm thick; ocassional pyrite nodules, 1/4"-1"; trace cc and pyrite fossils thoughout; healed fractures, some calcite and pyrite filled, near vertical at (60° to 80°).
125		125.1-130.1	27	5.05	101	100	
130		130.1-135.1	28	4.9	98	100	
135		135.1-140.1	29	5.25	105	100	
140		140.1-145.1	30	5	100	100	
145		145.1-150.1	31	4.9	98	100	
150		150.1-155.1	32	5.15	103	100	
155		155.1-160.1	33	5.15	103	100	Shale, similar to above, except high angle open fracture, tight, smooth, near vertical (80° to 90°) at 154.65-155.1. Shale, similar to above, except a few high angle slightly open fractures 156.8 to 164.2 feet, and pyrite, smooth, calcite , near vertical (60° to 80°), slightly open to tight, slightly weathered.
160		160.1-165.1	34	5.05	101	92	
165		165.1-170.1	35	4.8	96	100	Shale, similar to above, except high angle slightly open fracture 163.85 to 165.1 feet slightly open to tight, DNAPL, tight, near vertical.
170							Shale, similar to above, except high angle slightly open fracture, smooth, calcite, pyrite, fossils, near vertical (80° to 90°) at 168.4-168.7.

(Continued)

FIELD HARDNESS		BEDDING		ATTITUDE AND ANGLE	JOINTS / SHEAR / FRACTURE		WEATHERING
V. HARD	- KNIFE CAN'T SCRATCH	V. THIN	<2"	HORIZONTAL (0-5°)	V. CLOSE	<2"	FRESH
HARD	- SCRATCHES DIFFICULT	THIN	2"-12"	SHALLOW OR LOW ANGLE (5-35°)	CLOSE	2"-12"	V. SLIGHT
MOD. HARD	- SCRATCHES EASILY	MEDIUM	12"-36"	MODERATELY DIPPING (35-55°)	MOD. CLOSE	12"-36"	SLIGHT
SOFT	- GROVES	THICK	36"-120"	STEEP OR HIGH ANGLE (55-85°)	WIDE	36"-120"	MODERATE
V. SOFT	- CARVES	V. THICK	>120"	VERTICAL (85-90°)	V. WIDE	>120"	MOD. SEVERE
							V. SEVERE
							COMPLETE

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DEPTH IN FEET	DRILL RATE MIN/FT	CORE NO. DEPTH RANGE	SAMPLE NUMBER	RECOVERY FT	RECOVERY %	RQD (%)	FIELD CLASSIFICATION AND REMARKS
175		170.1-175.1	36	5.25	105	100	Mod. hard, fresh black, SHALE, ocassional calcite veins and stringers, mid-angle (30° to 60°), <1mm to 2mm thick; ocassional pyrite nodules, 1/4"-1"; trace fossils thoughout; healed fractures, some calcite and pyrite filled, near vertical at (60° to 80°); high angle open fractures, smooth to rough, mid-angle to near vertical (40° to 80°) pyrite, st, sl, so-t, undulating. *(continued)*
180		175.1-180.1	37	4.85	97	100	
185		180.1-185.1	38	4.8	96	89	
190		185.1-190.1	39	4.8	96	100	
		190.1-192.9	40	2.8	100	100	
195		192.9-197.9	41	5.25	105	100	Mod. hard to hard, fresh black to grey, SHALE, ocassional calcite veins and stringers, mostly mid-angle (30° to 60°), <1mm to 2mm thick; occasional pyrite (2"); healed fractures, some calcite filled, near vertical at (60° to 80°); high angle open fractures, smooth, mid-angle to near vertical (40° to 90°), cc, pyrite. DNAPL observed along core.
200		197.9-202.9	42	5	100	100	
		202.9-205.4	43	2.7	108	100	
205		205.4-210.4	44	5.25	105	100	
210		210.4-215.4	45	5.25	105	100	Shale, similar to above, except joints, smooth to rough, open to slightly open mid-angle (40°-50°).
215		215.4-220.4	46	5	100	100	
220		220.4-222.9	47	2.5	100	100	
225		222.9-227.9	48	5	100	100	
230		227.9-232.9	49	5.05	101	100	*(Continued)*

FIELD HARDNESS		BEDDING		ATTITUDE AND ANGLE	JOINTS / SHEAR / FRACTURE		WEATHERING
V. HARD	- KNIFE CAN'T SCRATCH	V. THIN	<2"	HORIZONTAL (0-5°)	V. CLOSE	<2"	FRESH
HARD	- SCRATCHES DIFFICULT	THIN	2"-12"	SHALLOW OR LOW ANGLE (5-35°)	CLOSE	2"-12"	V. SLIGHT
MOD. HARD	- SCRATCHES EASILY	MEDIUM	12"-36"	MODERATELY DIPPING (35-55°)	MOD. CLOSE	12"-36"	SLIGHT
SOFT	- GROVES	THICK	36"-120"	STEEP OR HIGH ANGLE (55-85°)	WIDE	36"-120"	MODERATE
V. SOFT	- CARVES	V. THICK	>120"	VERTICAL (85-90°)	V. WIDE	>120"	MOD. SEVERE
							V. SEVERE
							COMPLETE

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BORING NO. **PZ-201**
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DEPTH IN FEET	DRILL RATE MIN/FT	CORE NO. DEPTH RANGE	SAMPLE NUMBER	RECOVERY FT	RECOVERY %	RQD (%)	FIELD CLASSIFICATION AND REMARKS
235		232.9-235.4	50	2.7	108	100	Mod. hard to hard, fresh black to grey, SHALE, ocassional calcite veins and stringers, mostly mid-angle (30° to 60°), <1mm to 2mm thick; occasional pyrite (2"); healed fractures, some calcite filled, near vertical at (60° to 80°); high angle open fractures, smooth, mid-angle to near vertical (40° to 90°), cc, pyrite. DNAPL observed along core.*(continued)*
		235.4-237.9	51	2.45	98	100	
240		237.9-242.9	52	4.2	84	100	
245		242.9-247.9	53	4.35	87	100	
250		247.9-250.9	54	4.2	140	100	
							Bottom of boring at 251.9 feet.
255							
260							
265							
270							
275							
280							
285							
290							

FIELD HARDNESS		BEDDING		ATTITUDE AND ANGLE	JOINTS / SHEAR / FRACTURE		WEATHERING
V. HARD	- KNIFE CAN'T SCRATCH	V. THIN	<2"	HORIZONTAL (0-5°)	V. CLOSE	<2"	FRESH
HARD	- SCRATCHES DIFFICULT	THIN	2"-12"	SHALLOW OR LOW ANGLE (5-35°)	CLOSE	2"-12"	V. SLIGHT
MOD. HARD	- SCRATCHES EASILY	MEDIUM	12"-36"	MODERATELY DIPPING (35-55°)	MOD. CLOSE	12"-36"	SLIGHT
SOFT	- GROVES	THICK	36"-120"	STEEP OR HIGH ANGLE (55-85°)	WIDE	36"-120"	MODERATE
V. SOFT	- CARVES	V. THICK	>120"	VERTICAL (85-90°)	V. WIDE	>120"	MOD. SEVERE
							V. SEVERE
							COMPLETE

GeoTrans, Inc.
A TETRA TECH COMPANY

CORE BORING REPORT

BORING NO. PH-2

PROJECT:	TDCS, Hudson Falls, NY								JOB NO.:	117-2204189	
CLIENT:	General Electric								PAGE NO.:	1 of 6	
CONTRACTOR:	Merco								ELEVATION:		
EQUIPMENT USED:	Beretta T43								DATE START:	5/6/2009	
GROUND WATER		DEPTH TO:			ORIENTATION		CORE BARREL		DATE FINISH:	5/11/2009	
DATE	HRS AFT COMP	WATER	BOT. OF CASING	BOT. OF HOLE	X	VERTICAL	TYPE	HQ	DRILLER:	Crux	
						HORIZONTAL	SIZE	5.2 feet			
						INCLINED	Bit (ft)		PREPARED BY:	SL & JL	
						BEARING	Barrel (ft)		LOCATION:	TDCS	
					95	ANG. FROM VERT.	Total (ft)		Workroom 2-1		

DEPTH IN FEET	DRILL RATE MIN/FT	CORE NO. DEPTH RANGE	SAMPLE NUMBER	RECOVERY FT	RECOVERY %	RQD (%)	FIELD CLASSIFICATION AND REMARKS
		0-2.5	1	n/a	0	n/a	8" Core Collar; Grout 2.5-2.95'
5		2.5-5.7	2	3.5	109	100	Mod. hard, black, SHALE; occasional calcite veins with some marbelization, mostly near horizontal and mid-angle (<10° - 50°), <1 mm to 1mm thick; high angle open fractures, tight, smooth, fresh, near vertical (80° - 90°); occasionall healed fractures, calcite filled, near vertical (80° - 90°).
		5.7-10	3	4.35	101	100	
10		10-15	4	5	100	100	Mod. hard, black, SHALE; occasional calcite veins and stringers with some marbelization, mostly near horizontal and mid-angle (<10° - 50°), <1 mm to 1mm thick; occasional pyrite nodules, 1" to 2.5" thick; high angle open fractures, calcite, slicks, striations, undulating (70°-80°); occasional healed fractures, calcite filled, near vertical (80° - 90°).
15		15-20	5	5.15	103	100	Mod. hard, black, SHALE; occasional calcite veins and stringers with some marbelization, mostly near horizontal (<10° - 40°), <1 mm to 1mm thick; high angle open fractures, tight, smooth, fresh, mid-angle to near vertical (40° - 90°); occasional healed fractures, calcite and pyrite filled, near vertical (80° - 90°).
20		20-25	6	5	100	100	
25		25-30	7	5	100	100	Mod. hard, black, SHALE; occasional calcite veins and stringers, mostly near horizontal (<10° - 40°), <1 mm to 1mm thick; occasional healed fractures, calcite filled, near vertical (70° - 90°).
30		30-35	8	5.05	101	100	
35		35-40	9	5.15	103	100	Mod. hard, black, SHALE; occasional calcite veins and stringers, mostly near horizontal (<10° - 30°), <1 mm to 1mm thick; trace fossils, calcite; occasional healed fractures, calcite filled, near vertical (80° - 90°).
40		40-45	10	5.05	101	100	
45		45-50	11	5	100	100	
							(Continued)

FIELD HARDNESS		BEDDING		ATTITUDE AND ANGLE	JOINTS / SHEAR / FRACTURE		WEATHERING
V. HARD	- KNIFE CAN'T SCRATCH	V. THIN	<2"	HORIZONTAL (0-5°)	V. CLOSE	<2"	FRESH
HARD	- SCRATCHES DIFFICULT	THIN	2"-12"	SHALLOW OR LOW ANGLE (5-35°)	CLOSE	2"-12"	V. SLIGHT
MOD. HARD	- SCRATCHES EASILY	MEDIUM	12"-36"	MODERATELY DIPPING (35-55°)	MOD. CLOSE	12"-36"	SLIGHT
SOFT	- GROVES	THICK	36"-120"	STEEP OR HIGH ANGLE (55-85°)	WIDE	36"-120"	MODERATE
V. SOFT	- CARVES	V. THICK	>120"	VERTICAL (85-90°)	V. WIDE	>120"	MOD. SEVERE
							V. SEVERE
							COMPLETE

BORING NO. **PH-2**
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DEPTH IN FEET	DRILL RATE MIN/FT	CORE NO. DEPTH RANGE	SAMPLE NUMBER	RECOVERY FT	RECOVERY %	RQD (%)	FIELD CLASSIFICATION AND REMARKS
55		50-55	12	5.15	103	100	Mod. hard, black, SHALE; occasional calcite veins and stringers, near horizontal to mid-angle(10° - 50°), <1 mm to 1mm thick; calcite, trace fossils; high angle open fractures, rough, fresh to slightly weathered, mid-angle to near vertical (50° - 80°); occasional healed fractures, calcite and pyrite filled, near vertical (70° - 90°).
60		55-60	13	4.95	99	100	
65		60-65	14	5	100	100	Mod. hard, black, SHALE; occasional calcite veins and stringers, mostly near horizontal (<10° - 30°), <1 mm to 1mm thick; pyrite, trace fossils, calcite; occasional healed fractures, calcite and pyrite filled, near vertical (70° - 90°).
70		65-70	15	5.25	105	100	
75		70-75	16	5.05	101	100	SHALE, similar to above, except low angle open fracture, slightly open, rough, fresh, horizontal (0°).
80		75-80	17	5.1	102	100	
85		80-85	18	5.1	102	100	
90		85-90	19	5	100	100	
95		90-95	20	5	100	100	Mod. hard, black, SHALE; occasional calcite veins, near horizontal to mid-angle (<10° - 30°), <1 mm to 1mm thick; trace fossils throughout, calcite and pyrite; high angle open fractures, tight, fresh, mid-angle to near vertical (50° - 80°); ocassional healed fractures, some calcite and pyrite filled, near vertical (60° - 70°); pyrite nodules, 1/2".
100		95-100	21	5.2	104	100	
105		100-105	22	5.15	103	100	Mod. hard, black, SHALE; occasional calcite veins, near horizontal to mid-angle (<10° - 50°), <1 mm to 1mm thick; trace fossils throughout, calcite and pyrite; occasional healed fractures, some calcite and pyrite filled, near vertical (70° - 90°).
110		105-110	23	5.05	101	100	

(Continued)

FIELD HARDNESS		BEDDING		ATTITUDE AND ANGLE	JOINTS / SHEAR / FRACTURE		WEATHERING
V. HARD	- KNIFE CAN'T SCRATCH	V. THIN	<2"	HORIZONTAL (0-5°)	V. CLOSE	<2"	FRESH
HARD	- SCRATCHES DIFFICULT	THIN	2"-12"	SHALLOW OR LOW ANGLE (5-35°)	CLOSE	2"-12"	V. SLIGHT
MOD. HARD	- SCRATCHES EASILY	MEDIUM	12"-36"	MODERATELY DIPPING (35-55°)	MOD. CLOSE	12"-36"	SLIGHT
SOFT	- GROVES	THICK	36"-120"	STEEP OR HIGH ANGLE (55-85°)	WIDE	36"-120"	MODERATE
V. SOFT	- CARVES	V. THICK	>120"	VERTICAL (85-90°)	V. WIDE	>120"	MOD. SEVERE
							V. SEVERE
							COMPLETE

BORING NO. **PH-2**
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DEPTH IN FEET	DRILL RATE MIN/FT	CORE NO. DEPTH RANGE	SAMPLE NUMBER	RECOVERY FT	RECOVERY %	RQD (%)	FIELD CLASSIFICATION AND REMARKS
		110-115	24	5.1	102	100	Mod. hard, black, SHALE; occasional calcite veins, near horizontal to mid-angle (<10° - 50°), <1 mm to 1mm thick; trace fossils throughout, calcite and pyrite; occasional healed fractures, some calcite and pyrite filled, near vertical (70° - 90°). *(continued)*
115		115-120	25	5	100	100	
120		120-125	26	5.15	103	100	
125		125-130	27	5.3	106	100	
130		130-135	28	5	100	100	
135		135-140	29	5	100	100	SHALE, similiar to above, except high angle open fracture, near vertical, tight to slightly open, fresh to slightly weatherd, smooth, @ 134.1-135'.
140		140-145	30	4.9	98	100	SHALE, similiar to above, except high angle (80°-90°) open fracture, tight, smooth, fresh, @ 138.6'.
145		145-150	31	5.1	102	100	SHALE, similiar to above, except high angle (90°) open fracture, tight to slightly open, fresh to slightly weathered, smooth, @ 147.4-150'.
150		150-155	32	5.1	102	100	
155		155-160	33	4.85	97	100	Mod. hard, black, SHALE; occasional calcite veins and stringers, near horizontal to mid-angle (<10° - 50°), <1 mm to 2mm thick; trace fossils throughout, calcite and pyrite; high angle open fractures, tight to open, fresh to slightly weathered, some graphite coating, calcite and pyrite, mid-angle to near vertical (70° - 90°); occasional healed fractures, some calcite and pyrite filled, near vertical (60° - 90°).
160		160-165	34	5.25	105	100	
165		165-170	35	5.1	102	100	
170							*(Continued)*

FIELD HARDNESS		BEDDING		ATTITUDE AND ANGLE	JOINTS / SHEAR / FRACTURE		WEATHERING
V. HARD	- KNIFE CAN'T SCRATCH	V. THIN	<2"	HORIZONTAL (0-5°)	V. CLOSE	<2"	FRESH
HARD	- SCRATCHES DIFFICULT	THIN	2"-12"	SHALLOW OR LOW ANGLE (5-35°)	CLOSE	2"-12"	V. SLIGHT
MOD. HARD	- SCRATCHES EASILY	MEDIUM	12"-36"	MODERATELY DIPPING (35-55°)	MOD. CLOSE	12"-36"	SLIGHT
SOFT	- GROVES	THICK	36"-120"	STEEP OR HIGH ANGLE (55-85°)	WIDE	36"-120"	MODERATE
V. SOFT	- CARVES	V. THICK	>120"	VERTICAL (85-90°)	V. WIDE	>120"	MOD. SEVERE
							V. SEVERE
							COMPLETE

BORING NO. **PH-2**
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DEPTH IN FEET	DRILL RATE MIN/FT	CORE NO. DEPTH RANGE	SAMPLE NUMBER	RECOVERY FT	RECOVERY %	RQD (%)	FIELD CLASSIFICATION AND REMARKS
		170-175	36	5	100	100	Mod. hard, black, SHALE; occasional calcite veins and stringers, near horizontal to mid-angle (<10° - 50°), <1 mm to 2mm thick; trace fossils throughout, calcite and pyrite; high angle open fractures, tight to open, fresh to slightly weathered, some graphite coating, calcite and pyrite, mid-angle to near vertical (70° - 90°); occasional healed fractures, some calcite and pyrite filled, near vertical (60° - 90°). *(continued)*
175		175-180	37	4.9	98	100	
180		180-185	38	5.25	105	100	
185		185-190	39	5.2	104	100	
190		190-195	40	5.1	102	100	
195		195-200	41	5	100	100	
200		200-205	42	5.05	101	100	
205		205-210	43	5	100	100	
210		210-215	44	5	100	100	Shale, similar to above, except high angle open fracture along bedding plane, smooth fresh, near vertical (70° - 90°).
215		215-220	45	5	100	100	
220		220-225	46	5.1	102	100	
225		225-230	47	5.1	102	100	Mod. hard to hard, black, SHALE; occasional calcite veins, near horizontal to mid-angle (<10° - 60°), <1 mm to 1mm thick; trace fossils, calcite and pyrite; pyrite nodules, 1/2" thick; occasional healed fractures, some calcite filled, near vertical (40° - 90°).
230							*(Continued)*

FIELD HARDNESS		BEDDING		ATTITUDE AND ANGLE	JOINTS / SHEAR / FRACTURE		WEATHERING
V. HARD	- KNIFE CAN'T SCRATCH	V. THIN	<2"	HORIZONTAL (0-5°)	V. CLOSE	<2"	FRESH
HARD	- SCRATCHES DIFFICULT	THIN	2"-12"	SHALLOW OR LOW ANGLE (5-35°)	CLOSE	2"-12"	V. SLIGHT
MOD. HARD	- SCRATCHES EASILY	MEDIUM	12"-36"	MODERATELY DIPPING (35-55°)	MOD. CLOSE	12"-36"	SLIGHT
SOFT	- GROVES	THICK	36"-120"	STEEP OR HIGH ANGLE (55-85°)	WIDE	36"-120"	MODERATE
V. SOFT	- CARVES	V. THICK	>120"	VERTICAL (85-90°)	V. WIDE	>120"	MOD. SEVERE
							V. SEVERE
							COMPLETE

BORING NO. **PH-2**
PAGE 5 OF 6

DEPTH IN FEET	DRILL RATE MIN/FT	CORE NO. DEPTH RANGE	SAMPLE NUMBER	RECOVERY FT	RECOVERY %	RQD (%)	FIELD CLASSIFICATION AND REMARKS
235		230-235	48	5.1	102	100	Mod. hard to hard, black, SHALE; occasional calcite veins, near horizontal to mid-angle (<10° - 60°), <1 mm to 1mm thick; trace fossils, calcite and pyrite; pyrite nodules, 1/2" thick; occasional healed fractures, some calcite filled, near vertical (40° - 90°). *(continued)*
240		235-240	49	5.15	103	100	
245		240-245	50	5.1	102	100	
250		245-250	51	4.95	99	100	Shale, similar to above, except high angle open fracture, tight, smooth, fresh, pyrite, near vertical (80° - 90°).
255		250-255	52	4.85	97	100	
260		255-260	53	5.2	104	100	
265		260-265	54	5	100	100	Mod. hard, black, SHALE; occasional calcite veins, some clustering and displacement, near horizontal to mid-angle (<10° - 50°), <1 mm to 1mm thick; trace fossils, calcite and pyrite; occasional healed fractures, some calcite filled, near vertical (60° - 90°).
270		265-270	55	5	100	100	
275		270-274.9	56	4.9	100	100	
280		274.9-280.1	57	5.2	100	100	
285		280.1-285.1	58	5	100	100	Hard, black, SHALE; occasional calcite veins, some clustering and displacement, near horizontal to mid-angle (<10° - 60°), <1 mm to 1mm thick; occasional healed fractures, some calcite filled, near vertical (60° - 90°); bedding planes, spaced 0.4 - 0.6 feet, near vertical (60° - 80°).
290		285.1-290.1	59	5	100	100	SHALE, similiar to above, except high angle open fracture, tight, fresh to slighly weathered, smooth, (50°-90°), @ 287.55-288.55'.
							(Continued)

FIELD HARDNESS		BEDDING		ATTITUDE AND ANGLE	JOINTS / SHEAR / FRACTURE		WEATHERING
V. HARD	- KNIFE CAN'T SCRATCH	V. THIN	<2"	HORIZONTAL (0-5°)	V. CLOSE	<2"	FRESH
HARD	- SCRATCHES DIFFICULT	THIN	2"-12"	SHALLOW OR LOW ANGLE (5-35°)	CLOSE	2"-12"	V. SLIGHT
MOD. HARD	- SCRATCHES EASILY	MEDIUM	12"-36"	MODERATELY DIPPING (35-55°)	MOD. CLOSE	12"-36"	SLIGHT
SOFT	- GROVES	THICK	36"-120"	STEEP OR HIGH ANGLE (55-85°)	WIDE	36"-120"	MODERATE
V. SOFT	- CARVES	V. THICK	>120"	VERTICAL (85-90°)	V. WIDE	>120"	MOD. SEVERE
							V. SEVERE
							COMPLETE

GeoTrans, Inc.
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BORING NO. **PH-2**
PAGE 6 OF 6

DEPTH IN FEET	DRILL RATE MIN/FT	CORE NO. DEPTH RANGE	SAMPLE NUMBER	RECOVERY FT	RECOVERY %	RQD (%)	FIELD CLASSIFICATION AND REMARKS
295		290.1-295.1	60	5	100	100	Hard, black, SHALE; occasional calcite veins, some clustering and displacement, near horizontal to mid-angle (<10° - 60°), <1 mm to 1mm thick; occasional healed fractures, some calcite filled, near vertical (60° - 90°); bedding planes, spaced 0.4 - 0.6 feet, near vertical (60° - 80°)*(continued)*
		295.1-300.1	61	5	100	100	
300							Bottom of boring at 300.1 feet. PH-2 converted to PZ-202 on 3/2/10-3/3/10.
305							
310							
315							
320							
325							
330							
335							
340							
345							
350							

FIELD HARDNESS		BEDDING		ATTITUDE AND ANGLE	JOINTS / SHEAR / FRACTURE		WEATHERING
V. HARD	- KNIFE CAN'T SCRATCH	V. THIN	<2"	HORIZONTAL (0-5°)	V. CLOSE	<2"	FRESH
HARD	- SCRATCHES DIFFICULT	THIN	2"-12"	SHALLOW OR LOW ANGLE (5-35°)	CLOSE	2"-12"	V. SLIGHT
MOD. HARD	- SCRATCHES EASILY	MEDIUM	12"-36"	MODERATELY DIPPING (35-55°)	MOD. CLOSE	12"-36"	SLIGHT
SOFT	- GROVES	THICK	36"-120"	STEEP OR HIGH ANGLE (55-85°)	WIDE	36"-120"	MODERATE
V. SOFT	- CARVES	V. THICK	>120"	VERTICAL (85-90°)	V. WIDE	>120"	MOD. SEVERE
							V. SEVERE
							COMPLETE

GeoTrans, Inc.
A TETRA TECH COMPANY

CORE BORING REPORT

BORING NO. PZ-301

PROJECT: TDCS, Hudson Falls, NY
CLIENT: General Electric
CONTRACTOR: Merco
EQUIPMENT USED: Crux designed/built Beretta

JOB NO.: 117-2204189
PAGE NO.: 1 of 1
ELEVATION:
DATE START: 3/13/2009
DATE FINISH: 3/17/2009
DRILLER: Crux
PREPARED BY: JAL
LOCATION: Tunnel 3

GROUND WATER		DEPTH TO:			ORIENTATION		CORE BARREL	
DATE	HRS AFT COMP	WATER	BOT. OF CASING	BOT. OF HOLE	X	VERTICAL / HORIZONTAL	TYPE / SIZE	HQ
						INCLINED	Bit (ft)	
						BEARING	Barrel (ft)	5.2
					150	ANG. FROM VERT.	Total (ft)	

DEPTH IN FEET	DRILL RATE MIN/FT	CORE NO. DEPTH RANGE	SAMPLE NUMBER	RECOVERY FT	RECOVERY %	RQD (%)	FIELD CLASSIFICATION AND REMARKS
5							PZ-301 was not cored with the exception of the first 2.5 feet. In its place Crux completed a Optical Televiewer (OTV) log on March 17, 2009.
10							
15							
20							
25							
30							
35							
40							
45							
50							
55							
60							
65							
70							
75							
80							
85							
90							
95							
100							Bottom of boring at 100 feet

FIELD HARDNESS		BEDDING		ATTITUDE AND ANGLE	JOINTS / SHEAR / FRACTURE		WEATHERING
V. HARD	- KNIFE CAN'T SCRATCH	V. THIN	<2"	HORIZONTAL (0-5°)	V. CLOSE	<2"	FRESH
HARD	- SCRATCHES DIFFICULT	THIN	2"-12"	SHALLOW OR LOW ANGLE (5-35°)	CLOSE	2"-12"	V. SLIGHT
MOD. HARD	- SCRATCHES EASILY	MEDIUM	12"-36"	MODERATELY DIPPING (35-55°)	MOD. CLOSE	12"-36"	SLIGHT
SOFT	- GROVES	THICK	36"-120"	STEEP OR HIGH ANGLE (55-85°)	WIDE	36"-120"	MODERATE
V. SOFT	- CARVES	V. THICK	>120"	VERTICAL (85-90°)	V. WIDE	>120"	MOD. SEVERE
							V. SEVERE
							COMPLETE

GeoTrans, Inc.
A TETRA TECH COMPANY

CORE BORING REPORT

BORING NO. PZ-302

PROJECT: TDCS, Hudson Falls, NY
CLIENT: General Electric
CONTRACTOR: Merco
EQUIPMENT USED: Beretta T43

JOB NO.: 117-2204
PAGE NO.: 1 of 2
ELEVATION:
DATE START: 3/3/2009
DATE FINISH: 3/6/2009
DRILLER: Crux
PREPARED BY: JAL & SL
LOCATION: Workroom 3-1

GROUND WATER		DEPTH TO:			ORIENTATION		CORE BARREL	
DATE	HRS AFT COMP	WATER	BOT. OF CASING	BOT. OF HOLE	X	VERTICAL / HORIZONTAL	TYPE / SIZE	HQ
						INCLINED	Bit (ft)	
						BEARING	Barrel (ft)	5.2
					150	ANG. FROM VERT.	Total (ft)	

DEPTH IN FEET	DRILL RATE MIN/FT	CORE NO. DEPTH RANGE	SAMPLE NUMBER	RECOVERY FT	RECOVERY %	RQD (%)	FIELD CLASSIFICATION AND REMARKS
		0-2	1	n/a	0	n/a	Mod. hard, fresh black SHALE, fractured pieces. Ocassional pyrite nodules and crystal up to 1/2"; shotcrete layer 0.35' thick.
5		2-5.7	2	3.7	100	100	Mod. hard, fresh black SHALE; Grout @ 2-2.35. Joint (possible drill induced), smooth, fresh, tight at 3-3.2, subvertical (50° to 60°) at 3-3.2 ft.; occasional pyrite veins, midangle (30° to 40°), <1 mm thick.
10		5.7-10.7	3	4.7	94	100	Mod. hard, fresh black SHALE, occasional calcite and pyrite veins, mostly mid-angle to subvertical (50° to 70°), <1mm to 1mm thick; smooth joint (30° to 40°) at 5.85 ft. SHALE, similar to above, except low angle to high angle open fractures, smooth to rough, horizontal to subvertical (0° to 60°), occasional calcite and weathering..
15		10.7-15.7	4	4.7	94	100	SHALE, similar to above, except open joint, smooth to rough, weathered, horizontal at 0° at 9.85. Mod. hard, fresh black SHALE, occasional calcite veins and pyrite, close to moderate spacing, mostly mid-angle to subvertical (20° to 70°), <1mm to 2mm thick.
20		15.7-20.7	5	4.9	98	85	SHALE, similar to above, except high angle open fracture, undulating, smooth, slightly open, near vertical (80° to 90°) at 14.5-14.9'. SHALE, similar to above, except smooth to rough slightly open fracture, midangle at 60° at 17.1-17.35.
		20.7-23.9	6	3.1	97	100	SHALE, similar to above, except tight slightly open joints, smooth, undulating, near horizontal and near vertical; smooth to rough, slightly open, high angle fracture (60° to 70°) at 19.6-20' - undulating.
25		23.9-28.9	7	5.2	104	100	Mod. hard, fresh black SHALE; occasional calcite and pyrite veins and stringers, mid-angle to subvertical (20° to 70°), <1mm to 1" thick; occasional open fractures, mid-angle (30°-50°), occassional pyrite nodules (up to 1-1/2" thick), trace fossils throughout.
30		28.9-33.9	8	5	100	100	
35		33.9-38.9	9	4.95	99	100	SHALE, similar to above, except slicks, calcite, slightly weatheredhigh angle slightly open to open fracture, smooth to rough, mid-angle (30° to 40°) at 34.8. SHALE, similar to above, except healed fractures, near vertical (70° to 90°).
40		38.9-44	10	5.25	103	100	
45		44-49	11	5	100	100	SHALE, similar to above, except possible joint, smooth, slightly open, 30° at 43.05.
							SHALE, similar to above, except calcite and pyrite Fossil, ~1.5" thick; slightly open to tight joints, smooth, midangle to subvertical (50° to 90°) at 49.15 to

(Continued)

FIELD HARDNESS		BEDDING		ATTITUDE AND ANGLE	JOINTS / SHEAR / FRACTURE		WEATHERING
V. HARD	- KNIFE CAN'T SCRATCH	V. THIN	<2"	HORIZONTAL (0-5°)	V. CLOSE	<2"	FRESH
HARD	- SCRATCHES DIFFICULT	THIN	2"-12"	SHALLOW OR LOW ANGLE (5-35°)	CLOSE	2"-12"	V. SLIGHT
MOD. HARD	- SCRATCHES EASILY	MEDIUM	12"-36"	MODERATELY DIPPING (35-55°)	MOD. CLOSE	12"-36"	SLIGHT
SOFT	- GROVES	THICK	36"-120"	STEEP OR HIGH ANGLE (55-85°)	WIDE	36"-120"	MODERATE
V. SOFT	- CARVES	V. THICK	>120"	VERTICAL (85-90°)	V. WIDE	>120"	MOD. SEVERE
							V. SEVERE
							COMPLETE

GeoTrans, Inc.
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BORING NO. **PZ-302**
PAGE 2 OF 2

DEPTH IN FEET	DRILL RATE MIN/FT	CORE NO. DEPTH RANGE	SAMPLE NUMBER	RECOVERY FT	RECOVERY %	RQD (%)	FIELD CLASSIFICATION AND REMARKS
		49-54	12	5.1	102	100	52.8 ft; pyrite nodule at 50.8 ft., 2" thick. Mod. hard, fresh black SHALE; occasional calcite and pyrite veins and stringers, mid-angle to subvertical (20° to 70°), <1mm to 1" thick; occasional open fractures, mid-angle (30°-50°), occassional pyrite nodules (up to 1-1/2" thick), trace fossils throughout.*(continued)*
55		54-59	13	5.1	102	100	
60		59-64	14	4.95	99	100	
65		64-69	15	5.1	102	100	Mod. hard, fresh black SHALE, calcite stringers and pyrite veins throughout, sparse to dense, some displacement, mostly near horizontal to mid-angle (20° to 40°); occasional pyrite nodules, 1/4" to 1" thick, trace fossils throughout; low angle calcite and pyrite open fracture, rough, near mid-angle (20° to 30°) slightly weathered at 78.3 ft.
70		69-74	16	5	100	100	
75		74-79	17	5.25	105	100	
80		79-84	18	5	100	100	
85		84-85.3	19	1.45	112	100	SHALE, similar to above except high angle open fracture, tight, smooth, fresh, possibly drill induced, near horizontal (40°-50°) at 84.9-85.05'. Bottom of boring at 85.3 feet
90							
95							
100							
105							
110							

FIELD HARDNESS		BEDDING		ATTITUDE AND ANGLE	JOINTS / SHEAR / FRACTURE		WEATHERING
V. HARD	- KNIFE CAN'T SCRATCH	V. THIN	<2"	HORIZONTAL (0-5°)	V. CLOSE	<2"	FRESH
HARD	- SCRATCHES DIFFICULT	THIN	2"-12"	SHALLOW OR LOW ANGLE (5-35°)	CLOSE	2"-12"	V. SLIGHT
MOD. HARD	- SCRATCHES EASILY	MEDIUM	12"-36"	MODERATELY DIPPING (35-55°)	MOD. CLOSE	12"-36"	SLIGHT
SOFT	- GROVES	THICK	36"-120"	STEEP OR HIGH ANGLE (55-85°)	WIDE	36"-120"	MODERATE
V. SOFT	- CARVES	V. THICK	>120"	VERTICAL (85-90°)	V. WIDE	>120"	MOD. SEVERE
							V. SEVERE
							COMPLETE

GeoTrans, Inc.
A TETRA TECH COMPANY

CORE BORING REPORT

BORING NO. PZ-303

PROJECT: TDCS, Hudson Falls, NY
CLIENT: General Electric
CONTRACTOR: Merco
EQUIPMENT USED: Beretta T-43

JOB NO.: 117-2204189
PAGE NO.: 1 of 3
ELEVATION:
DATE START: 2/7/2009
DATE FINISH: 2/13/2009
DRILLER: Crux
PREPARED BY: JAL & SL
LOCATION: Workroom 3-1

GROUND WATER		DEPTH TO:			ORIENTATION		CORE BARREL	
DATE	HRS AFT COMP	WATER	BOT. OF CASING	BOT. OF HOLE	X	VERTICAL / HORIZONTAL	TYPE / SIZE	HQ
						INCLINED	Bit (ft)	
						BEARING	Barrel (ft)	5.2
					105	ANG. FROM VERT.	Total (ft)	

DEPTH IN FEET	DRILL RATE MIN/FT	CORE NO. DEPTH RANGE	SAMPLE NUMBER	RECOVERY FT	RECOVERY %	RQD (%)	FIELD CLASSIFICATION AND REMARKS
		0-2.5	1	NA	0	NA	Hard, fresh black, SHALE, fractured pieces; near vertical break, smooth to rough face, no infilling (80° to 90°); shotcrete layer approximately 0.3 ft thick.
5		2.5-5.5	2	3.1	103	100	
		5.5-10	3	4.55	101	100	
10		10-15	4	5	100	100	SHALE, similiar to above except high angle open fracture (60°-70°), marble, calcite, striations, slicks, 10.1-11.0'. SHALE, similiar to above except high angle open fracture (60°-70°), marble, calcite, smooth to rough, undulating, 10.9-11.3'.
15		15-20	5	5	100	100	
20		20-25	6	5	100	100	Mod. hard to hard, fresh black, SHALE, ocassional calcite and pyrite veins and stringers, close to moderate spacing, mid-angle to vertical (20° to 90°), <1mm to 7mm thick; ocassional trace fossils and pyrite nodules <1/4" to 2" thick; healed fractures at 7.5 ft and 9.8 ft, slight calcite filling, near vertical (80° to 90°).
25		25-30	7	4.95	99	100	
30		30-35	8	5	100	100	SHALE, similar to above, except a few healed fractures with calcite and pyrite stringers, near vertical (60° to 80°).
35		35-40	9	5.1	102	100	SHALE, similar to above, except pyrite band, mid angle at 40°, < 1mm thick.
40		40-45	10	4.85	97	100	
45		45-50	11	5.15	103	100	SHALE, similar to above, except healed fractures with calcite and pyrite stringers, near vertical (60° to 70°). SHALE, similar to above, except high angle open fracture, slicks and striations, calcite, near vertical (70° to 80°) @ 45.4'.
50		50-55	12	5	100	100	Mod. hard, fresh black, SHALE, occasional calcite and pyrite veins and stringers, near horizontal to mid-angle (20° to 50°), <1" thick; ocassional trace fossils and pyrite nodules <1/4" to 1/2" thick; numerous healed fractures, calcite and pyrite filling, mid-angle to sub-vertical (40° to 70°).
55		55-60	13	5	100	100	
60		60-65	14	5	100	100	
65		65-70	15	5.05	101	100	
70		70-75	16	5.2	104	100	
							(Continued)

FIELD HARDNESS		BEDDING		ATTITUDE AND ANGLE	JOINTS / SHEAR / FRACTURE		WEATHERING
V. HARD	- KNIFE CAN'T SCRATCH	V. THIN	<2"	HORIZONTAL (0-5°)	V. CLOSE	<2"	FRESH
HARD	- SCRATCHES DIFFICULT	THIN	2"-12"	SHALLOW OR LOW ANGLE (5-35°)	CLOSE	2"-12"	V. SLIGHT
MOD. HARD	- SCRATCHES EASILY	MEDIUM	12"-36"	MODERATELY DIPPING (35-55°)	MOD. CLOSE	12"-36"	SLIGHT
SOFT	- GROVES	THICK	36"-120"	STEEP OR HIGH ANGLE (55-85°)	WIDE	36"-120"	MODERATE
V. SOFT	- CARVES	V. THICK	>120"	VERTICAL (85-90°)	V. WIDE	>120"	MOD. SEVERE
							V. SEVERE
							COMPLETE

BORING NO. **PZ-303**
PAGE 2 OF 3

DEPTH IN FEET	DRILL RATE MIN/FT	CORE NO. DEPTH RANGE	SAMPLE NUMBER	RECOVERY FT	RECOVERY %	RQD (%)	FIELD CLASSIFICATION AND REMARKS
		75-80	17	4.9	98	100	Mod. hard, fresh black, SHALE, occasional calcite veins, close to moderate spacing, near horizontal to mid-anglular (10° to 40°), <1mm to 7mm thick; joint at 78.85', rough, calcite lining, <1" thick, (20° to 30°).
80		80-85	18	5.05	101	100	Mod. hard, fresh black, SHALE, ocassional calcite and pyrite veins and stringers, near horizontal to sub-vertical (10° to 80°), <1mm to 2mm thick; ocassional trace fossils and pyrite nodules 1/2" to 1 1/2" thick; numerous healed fractures, calcite and pyrite filling, sub-vertical (60° to 80°).
85		85-90	19	5.2	104	100	
90		90-95	20	4.95	99	100	
95		95-100	21	5	100	100	
100		100-105	22	4.9	98	100	
105		105-110	23	5.05	101	100	
110		110-115	24	5.1	102	100	
115		115-120	25	5.15	103	100	SHALE, similiar to above, except high angle (70°) open fracture, pyrite nodule, calcite, striations, @ 113.3-113.9'. Shale, similar to above, except high angle open fracture114.5'-115.1, rough, some calcite lining, vertical (110°).
120		120-125	26	5	100	100	Mod. hard, fresh black, SHALE, ocassional calcite and stringers, near horizontal to midangular(10° to 60°), <1mm to 3mm thick; ocassional trace fossils and pyrite nodules <2".
125		125-130	27	5.05	101	100	
130		130-135	28	5.05	101	100	
135		135-140	29	5	100	100	
140		140-145	30	5	100	100	
145		145-150	31	5.1	102	100	
150		150-155	32	5.2	104	100	Mod. hard, fresh black, SHALE, ocassional calcite veins, near horizontal to mid-angular (10° to 40°), <1mm to 2mm thick; ocassional trace fossils and pyrite nodules <1/2-2"; numerous healed fractures, some calcite filling, sub-vertical (70° to 80°).
155		155-160	33	5	100	100	
160		160-165	34	5	100	100	
165							

(Continued)

FIELD HARDNESS		BEDDING		ATTITUDE AND ANGLE	JOINTS / SHEAR / FRACTURE		WEATHERING
V. HARD	- KNIFE CAN'T SCRATCH	V. THIN	<2"	HORIZONTAL (0-5°)	V. CLOSE	<2"	FRESH
HARD	- SCRATCHES DIFFICULT	THIN	2"-12"	SHALLOW OR LOW ANGLE (5-35°)	CLOSE	2"-12"	V. SLIGHT
MOD. HARD	- SCRATCHES EASILY	MEDIUM	12"-36"	MODERATELY DIPPING (35-55°)	MOD. CLOSE	12"-36"	SLIGHT
SOFT	- GROVES	THICK	36"-120"	STEEP OR HIGH ANGLE (55-85°)	WIDE	36"-120"	MODERATE
V. SOFT	- CARVES	V. THICK	>120"	VERTICAL (85-90°)	V. WIDE	>120"	MOD. SEVERE
							V. SEVERE
							COMPLETE

GeoTrans, Inc.
A TETRA TECH COMPANY

BORING NO. **PZ-303**
PAGE 3 OF 3

DEPTH IN FEET	DRILL RATE MIN/FT	CORE NO. DEPTH RANGE	SAMPLE NUMBER	RECOVERY FT	RECOVERY %	RQD (%)	FIELD CLASSIFICATION AND REMARKS
		165-170	35	5.25	105	100	
170		170-175	36	5.1	102	100	Mod. hard, fresh black, SHALE, ocassional calcite and pyrite veins and stringers, mostly near horizontal to mid-angular (10° to 40°), <1mm to 2mm thick; ocassional trace fossils, calcite and pyrite; possible high angle open fracture 170.9-171.4', rough, may have broken along cleavage (70°).
175		175-180	37	5	100	100	SHALE, similar to above, mutiple joints, 175'-180', smooth, near vertical (70° to 90°), occassional pyrite nodule; healed fracture at 175.6'-176.55', no mineralization, near vertical (80° to 90°).
180		180-185	38	5.25	105	100	
185		185-190	39	5.05	101	100	
190		190-195	40	4.9	98	100	
195		195-200	41	5.15	103	100	Shale, similar to above, joint at 197.1-198.3, smooth, pyrite, near vertical (80°).
200		200-205	42	5.1	102	100	Mod. hard, fresh black, SHALE, ocassional calcite and pyrite veins and stringers, near horizontal to mid-angular (10° to 40°), <1mm to 2mm thick; ocassional trace fossils and pyrite nodules <1/2-1"; healed fractures, some calcite filling, mid-angle to sub-vertical (40° to 80°).
205		205-210	43	5	100	100	
210		210-215	44	4.95	99	100	
215		215-220	45	5.1	102	100	
220		220-225	46	4.9	98	100	
225		225-230	47	5.1	102	100	
230		230-235	48	5	100	100	
235		235-240	49	5.1	102	100	Mod. hard, fresh black, SHALE, ocassional calcite and pyrite veins and stringers, near horizontal to mid-angular (20° to 70°), <1mm to 1mm thick; ocassional trace fossils and pyrite nodules, 1".
240		240-245	50	5.05	101	100	
245		245-250	51	5.05	101	100	
250							Bottom of boring at 250 feet
255							

FIELD HARDNESS		BEDDING		ATTITUDE AND ANGLE	JOINTS / SHEAR / FRACTURE		WEATHERING
V. HARD	- KNIFE CAN'T SCRATCH	V. THIN	<2"	HORIZONTAL (0-5°)	V. CLOSE	<2"	FRESH
HARD	- SCRATCHES DIFFICULT	THIN	2"-12"	SHALLOW OR LOW ANGLE (5-35°)	CLOSE	2"-12"	V. SLIGHT
MOD. HARD	- SCRATCHES EASILY	MEDIUM	12"-36"	MODERATELY DIPPING (35-55°)	MOD. CLOSE	12"-36"	SLIGHT
SOFT	- GROVES	THICK	36"-120"	STEEP OR HIGH ANGLE (55-85°)	WIDE	36"-120"	MODERATE
V. SOFT	- CARVES	V. THICK	>120"	VERTICAL (85-90°)	V. WIDE	>120"	MOD. SEVERE
							V. SEVERE
							COMPLETE

GeoTrans, Inc.
A TETRA TECH COMPANY

CORE BORING REPORT

BORING NO. PZ-304

PROJECT:	TDCS, Hudson Falls, NY								JOB NO.:	117-2204189
CLIENT:	General Electric								PAGE NO.:	1 of 6
CONTRACTOR:	Merco								ELEVATION:	
EQUIPMENT USED:	Beretta T 43								DATE START:	2/14/2009
GROUND WATER		DEPTH TO:			ORIENTATION		CORE BARREL		DATE FINISH:	3/3/2009
DATE	HRS AFT COMP	WATER	BOT. OF CASING	BOT. OF HOLE	X	VERTICAL / HORIZONTAL	TYPE / SIZE	HQ / 5.2 feet	DRILLER:	Crux
						INCLINED	Bit (ft)		PREPARED BY:	JAL & SL
						BEARING	Barrel (ft)		LOCATION:	GE-TDCS-HF
					110	ANG. FROM VERT.	Total (ft)		Workroom 3-1	

DEPTH IN FEET	DRILL RATE MIN/FT	CORE NO. DEPTH RANGE	SAMPLE NUMBER	RECOVERY FT	RECOVERY %	RQD (%)	FIELD CLASSIFICATION AND REMARKS
		0-2.5	1	2.9	116	100	8" Collar Core; 0-0.4' shotcrete.
		2.5-5.7	2	2.8	88	89	Hard, black SHALE; few calcite veins, < 1mm, mid-angle (50°-60°); healed fracture, calcite filled, near vertical (80°).
5							Mod. hard, fresh black, SHALE; high angle open fractures, striations and slicks, marbelized calcite (1mm to 2"), sub-vertical (70°-80°) some graphite coating.
		5.7-10	3	4.2	98	100	Mod. hard, fresh black, SHALE; ocassional calcite veins, mostly near horizontal and mid-angle (<10°- 60°), <1mm to 1mm thick; ocassional pyrite nodules, 1/2" to 1" thick; ocassional healed fractures, some calcite and pyrite filled, mid-angel to sub-vertical (50°-70°).
10							
		10-15	4	5.25	105	100	
15							SHALE, similar to above, possible joints at 13.75 and 14.7 feet, smooth, near horizontal to mid-angle (10°-40°).
		15-20	5	5.1	102	100	
20							
		20-25	6	5	100	100	
25							
		25-30	7	5.1	102	100	
30							
		30-35	8	5	100	100	SHALE, similar to above, high angle open fracture, slicks and striations, marbelized calcite and pyrite, near vertical, mid-angle (70°-80°) at 30.3'.
35							SHALE, similar to above, possible joint, smooth, mid to < (50°).
		35-40	9	5.1	102	100	Mod. hard, fresh black, SHALE; ocassional calcite and pyrite veins and stringers, mostly near mid-angle (50°- 70°), <1mm to 2mm thick; ocassional pyrite nodules, 1/4" thick; trace fossils, calcite and pyrite; healed fractures, pyrite filled, calcite and pyrite stringers.
40							
		40-45	10	5.15	103	100	
45							
		45-50	11	5	100	100	
							(Continued)

FIELD HARDNESS		BEDDING		ATTITUDE AND ANGLE	JOINTS / SHEAR / FRACTURE		WEATHERING
V. HARD	- KNIFE CAN'T SCRATCH	V. THIN	<2"	HORIZONTAL (0-5°)	V. CLOSE	<2"	FRESH
HARD	- SCRATCHES DIFFICULT	THIN	2"-12"	SHALLOW OR LOW ANGLE (5-35°)	CLOSE	2"-12"	V. SLIGHT
MOD. HARD	- SCRATCHES EASILY	MEDIUM	12"-36"	MODERATELY DIPPING (35-55°)	MOD. CLOSE	12"-36"	SLIGHT
SOFT	- GROVES	THICK	36"-120"	STEEP OR HIGH ANGLE (55-85°)	WIDE	36"-120"	MODERATE
V. SOFT	- CARVES	V. THICK	>120"	VERTICAL (85-90°)	V. WIDE	>120"	MOD. SEVERE
							V. SEVERE
							COMPLETE

BORING NO. **PZ-304**
PAGE 2 OF 6

DEPTH IN FEET	DRILL RATE MIN/FT	CORE NO. DEPTH RANGE	SAMPLE NUMBER	RECOVERY FT	RECOVERY %	RQD (%)	FIELD CLASSIFICATION AND REMARKS
		50-55	12	4.95	99	100	Mod. hard, fresh black, SHALE; ocassional calcite and pyrite veins and stringers, mostly near mid-angle (50°- 70°), <1mm to 2mm thick; ocassional pyrite nodules, 1/4" thick; trace fossils, calcite and pyrite; healed fractures, pyrite filled, calcite and pyrite stringers *(continued)*
55		55-60	13	5.25	105	100	Mod. hard, fresh black, SHALE; ocassional calcite veins and stringers, mostly near mid-angle (30°- 60°), <1mm to 2mm thick; ocassional pyrite nodules, 1/2" to 1.5" thick; trace fossils, calcite and pyrite; ocassional healed fractures, some calcite and pyrite filled, calcite and pyrite stringers, mid-angel to sub-vertical (50°-70°).
60		60-65	14	5	100	100	SHALE, similar to above, except joint, smooth, mid-angle (40°) at 58.25'.
65		65-70	15	5	100	100	
70		70-75	16	5.1	102	98	Mod. hard, fresh black, SHALE; ocassional calcite veins and stringers, mostly near mid-angle (30°- 60°), <1mm to 6mm thick; trace fossils, calcite and pyrite; ocassional healed fractures, some calcite and pyrite filled, mid-angel to sub-vertical (40°-80°); ocassional joint, smooth, near horizontal to sub-vertical (10°-70°).
75		75-80	17	4.9	98	98	
80		80-85	18	5	100	86	
85		85-90	19	5.2	104	100	
90		90-95	20	5.1	102	98	SHALE, similar to above, except, high angle slightly open fractures at 90.85 and 92.7 feet, smooth to rough, tight, some calcite, mid-angle (30°-50°), slightly weathered.
95		95-100	21	4.95	99	100	Mod. hard, fresh black, SHALE; ocassional calcite veins and stringers, mostly near mid-angle (50°- 60°), 1mm to 5mm thick; trace fossils, calcite and pyrite; ocassional pyrite and clacite nodules, 1/2" to 1" thick; ocassional healed fractures, some calcite filled, mid-angle to sub-vertical (40°-50°).
100		100-105	22	5	100	98	
105		105-110	23	5.2	104	96	SHALE, similar to above, except high angle open fracture, slightly open, smooth to rough, some calcite, pyrite nodule, mid-angle (40°) @ 104.9'. SHALE, similar to above, except low to high angle open fracture, slightly open, smooth, graphite coating, calcite, mid-angle (30°) @ 105.95'.
110							

(Continued)

FIELD HARDNESS		BEDDING		ATTITUDE AND ANGLE	JOINTS / SHEAR / FRACTURE		WEATHERING
V. HARD	- KNIFE CAN'T SCRATCH	V. THIN	<2"	HORIZONTAL (0-5°)	V. CLOSE	<2"	FRESH
HARD	- SCRATCHES DIFFICULT	THIN	2"-12"	SHALLOW OR LOW ANGLE (5-35°)	CLOSE	2"-12"	V. SLIGHT
MOD. HARD	- SCRATCHES EASILY	MEDIUM	12"-36"	MODERATELY DIPPING (35-55°)	MOD. CLOSE	12"-36"	SLIGHT
SOFT	- GROVES	THICK	36"-120"	STEEP OR HIGH ANGLE (55-85°)	WIDE	36"-120"	MODERATE
V. SOFT	- CARVES	V. THICK	>120"	VERTICAL (85-90°)	V. WIDE	>120"	MOD. SEVERE
							V. SEVERE
							COMPLETE

BORING NO. **PZ-304**
PAGE 3 OF 6

DEPTH IN FEET	DRILL RATE MIN/FT	CORE NO. DEPTH RANGE	SAMPLE NUMBER	RECOVERY FT	RECOVERY %	RQD (%)	FIELD CLASSIFICATION AND REMARKS
115		110-115	24	5.1	102	100	Mod. hard, fresh black, SHALE; ocassional calcite veins and stringers, mostly near mid-angle (50°- 60°), 1mm to 5mm thick; trace fossils, calcite and pyrite; ocassional pyrite and clacite nodules, 1/2" to 1" thick; ocassional healed fractures, some calcite filled, mid-angle to sub-vertical (40°-50°).
120		115-120	25	4.95	99	100	SHALE, similar to above, except possible high angle open fracture, slightly open, smooth, polished, some calcite, mid-angle (40° - 50°) @ 111.6'.
125		120-125	26	5.1	102	100	
130		125-130	27	5	100	100	SHALE, similar to above, except high angle open fracture, slightly open, rough, some calcite, mid-angle (50° - 60°), at 124.5-124.7'. Mod. hard, fresh black, SHALE; ocassional calcite and pyrite veins and stringers, mostly near mid-angle (50°- 60°), <1mm to 4mm thick; trace fossils, calcite and pyrite; ocassional pyrite nodules, 1/4" to 1.5" thick; ocassional healed fractures, some calcite, mid-angel to sub-vertical (60°-70°).
135		130-135	28	5.15	103	94	SHALE, similar to above, except joint, smooth, fresh, tight, near vertical (70° - 80°), @ 131.7-132.15'.
140		135-140	29	5	100	92	SHALE, similar to above, except low to high angle open fracture, slightly open, smooth to rough, some calcite, mid-angle (30° - 40°) @ 133.95'. SHALE, similar to above, except set of joints, tight to slightly open, smooth to rough, pyrite coating, some calcite, sub-vertical (60° - 70°) @ 135.2, 135.55, and 135.4-135.8.
145		140-145	30	5	100	100	
150		145-150	31	5	100	93	Shale, similiar to above, except high angle open fracture, sub-vertical (60°-70°), calcite stringers, slighly open, pyrite slicks, @ 145.8-146.2'.
155		150-155	32	5	100	100	Mod. hard, fresh black, SHALE; ocassional calcite and pyrite veins and stringers, mostly mid-angle to sub-vertical (30°- 70°), <1mm to 2mm thick; trace fossils, calcite and pyrite; pyrite nodules, 1/2" to 1.5" thick; ocassional healed fractures, some calcite and pyrite filled, mid-angel to sub-vertical (40°-70°).
160		155-160	33	5.05	101	100	SHALE, similar to above, except joint, tight to slightly open, smooth, near vertical (70°), @ 152.1'. SHALE, similar to above, except low angle open fracture, tight, smooth to rough, slicks, calcite, possible graphite coating, near horizontal (10° - 20°), @ 153.65'.
165		160-165	34	5.2	104	100	Mod. hard, fresh black, SHALE; ocassional calcite and pyrite veins and stringers, mostly mid-angle to sub-vertical (30°- 70°), <1mm to 3mm thick; trace fossils, calcite and pyrite; ocassional pyrite nodules, 1/4" to 1" thick.
170		165-170	35	5	100	100	SHALE, similar to above, except high angle open fracture, slightly open, smooth, calcite and pyrite, sub-vertical (70°), @ 168.5-168.75'.

(Continued)

FIELD HARDNESS		BEDDING		ATTITUDE AND ANGLE	JOINTS / SHEAR / FRACTURE		WEATHERING
V. HARD	- KNIFE CAN'T SCRATCH	V. THIN	<2"	HORIZONTAL (0-5°)	V. CLOSE	<2"	FRESH
HARD	- SCRATCHES DIFFICULT	THIN	2"-12"	SHALLOW OR LOW ANGLE (5-35°)	CLOSE	2"-12"	V. SLIGHT
MOD. HARD	- SCRATCHES EASILY	MEDIUM	12"-36"	MODERATELY DIPPING (35-55°)	MOD. CLOSE	12"-36"	SLIGHT
SOFT	- GROVES	THICK	36"-120"	STEEP OR HIGH ANGLE (55-85°)	WIDE	36"-120"	MODERATE
V. SOFT	- CARVES	V. THICK	>120"	VERTICAL (85-90°)	V. WIDE	>120"	MOD. SEVERE
							V. SEVERE
							COMPLETE

BORING NO. **PZ-304**
PAGE 4 OF 6

DEPTH IN FEET	DRILL RATE MIN/FT	CORE NO. DEPTH RANGE	SAMPLE NUMBER	RECOVERY FT	RECOVERY %	RQD (%)	FIELD CLASSIFICATION AND REMARKS
		170-175	36	5.1	102	100	Mod. hard, fresh black, SHALE; ocassional calcite and pyrite veins and stringers, mostly mid-angle to sub-vertical (30°- 70°), <1mm to 3mm thick; trace fossils, calcite and pyrite; ocassional pyrite nodules, 1/4" to 1" thick. *(continued)*
175		175-180	37	5.05	101	100	SHALE, similar to above, except low angle open fracture, smooth, calcite, near horizontal (<10°) @ 174.35'. SHALE, similar to above, except low angle open fracture, smooth to rough, striations, calcite, horizontal (0°) @ 175.75.
180		180-185	38	5.1	102	100	
185		185-190	39	5	100	100	SHALE, similar to above, except high angle open fracture, slightly open, smooth, calcite, mid-angle (40°) @ 184.45'.
190		190-195	40	5	100	100	SHALE, similar to above, except low-high angle open fracture, smooth to rough, calcite, mid-angle (30°), @ 188.45. SHALE, similar to above, except low angle open fracture, smooth to rough, calcite and pyrite, near horizontal (<10°), @ 189.4. SHALE, similar to above, except high angle open fracture, smooth to rough, calcite, pyrite, mid-angle (60° - 70°) @ 191.7-192.05'.
195		195-200	41	5.15	103	100	SHALE, similar to above, except low angle open fracture, smooth to rough, calcite, some graphite coating, near horizontal (20° - 30°) @ 192.2-192.35. Mod. hard, fresh black, SHALE; ocassional calcite veins, mid-angle to near vertical (30°- 80°), 1mm to 4mm thick; ocassional pyrite nodules, 1" to 1.5" thick; ocassional healed fractures, some calcite filled, mid-angle (30°- 60°).
200		200-205	42	5.1	102	100	SHALE, similar to above, except set of low and high angle fractures 195.5 to 199 feet, smooth to rough, tight, near horizontal to mid-angle (10°- 60°).
205		205-210	43	5.2	104	100	Mod. hard, fresh black, SHALE; ocassional calcite and pyrite veins and stringers, mid-angle (20°- 60°), mostly <1mm to 5mm thick; trace fossils, calcite and pyrite; ocassional pyrite nodules, 1/2" thick.
210		210-215	44	5.05	101	100	SHALE, similar to above, except set of low and high angle fractures 210 to 211.25 feet, smooth, calcite, mid-angle to near vertical (60°- 80°).
215		215-220	45	5.2	104	100	
220		220-225	46	5.05	101	100	
225		225-230	47	5.05	101	98	
230							SHALE, similar to above, except set of joints, slightly open, smooth to rough, mid-angle (40°) @ 228.4-229.35'. Calcite.

(Continued)

FIELD HARDNESS		BEDDING		ATTITUDE AND ANGLE	JOINTS / SHEAR / FRACTURE		WEATHERING
V. HARD	- KNIFE CAN'T SCRATCH	V. THIN	<2"	HORIZONTAL (0-5°)	V. CLOSE	<2"	FRESH
HARD	- SCRATCHES DIFFICULT	THIN	2"-12"	SHALLOW OR LOW ANGLE (5-35°)	CLOSE	2"-12"	V. SLIGHT
MOD. HARD	- SCRATCHES EASILY	MEDIUM	12"-36"	MODERATELY DIPPING (35-55°)	MOD. CLOSE	12"-36"	SLIGHT
SOFT	- GROVES	THICK	36"-120"	STEEP OR HIGH ANGLE (55-85°)	WIDE	36"-120"	MODERATE
V. SOFT	- CARVES	V. THICK	>120"	VERTICAL (85-90°)	V. WIDE	>120"	MOD. SEVERE
							V. SEVERE
							COMPLETE

BORING NO. **PZ-304**
PAGE 5 OF 6

DEPTH IN FEET	DRILL RATE MIN/FT	CORE NO. DEPTH RANGE	SAMPLE NUMBER	RECOVERY FT	RECOVERY %	RQD (%)	FIELD CLASSIFICATION AND REMARKS
		230-235	48	5.25	105	94	Mod. hard, fresh black, SHALE; ocassional calcite and pyrite veins and stringers, mid-angle (20°- 60°), mostly <1mm to 5mm thick; trace fossils, calcite and pyrite; ocassional pyrite nodules, 1/2" thick*(continued)*
235		235-240	49	5.15	103	100	SHALE, similar to above, except high angle fracture, smooth, slicks, striations, calcite and pyrite, slighly weathered, near vertical (70°) @ 234.95-235'.
240		240-245	50	5	100	96	Mod. hard, fresh black, SHALE; ocassional calcite and pyrite veins and stringers, mid-angle to near vertical (30°- 80°), <1mm to 3mm thick; trace fossils, calcite and pyrite. SHALE, similar to above, except high angle fracture, tight, smooth to rough, calcite, mid-angle (40°) @243.3'.
245		245-250	51	5	100	100	SHALE, similar to above, except high angle fracture, slightly open, tight, smooth, slicks, striations, mid-angle (50°) 248.5'.
250		250-255	52	5.2	104	100	SHALE, similar to above, except set of joints, undulating, slightly open, tight, smooth to rough, mid-angle to near vertical (30°- 80°), @ 251.3-253.9.
255		255-260	53	5	100	100	Mod. hard, fresh black, SHALE; ocassional calcite and pyrite veins and stringers, some marbelization, mostly mid-angle (20°- 60°), <1mm to 5mm thick; ocassional pyrite nodules, 1/2" to 1" thick; many low to high angle open fractures, smooth to rough, slicks, calcite, mid-angle to near vertical (30°- 80°), DNAPL observed on some.
260		260-264.3	54	3.9	91	37	
265		264.3-267.5	55	3.3	103	88	
270		267.5-272.3	56	5	104	85	
275		272.3-277.1	57	4.9	102	93	
280		277.1-281.7	58	4.6	100	100	
		281.7-284.8	59	3.25	105	100	
285		284.8-289.2	60	3.6	82	51	Mod. hard, fresh black, SHALE; ocassional calcite and pyrite veins and stringers, some marbelization, mid-angle (20°- 60°), <1mm to 3mm thick; trace fossils, calcite and pyrite; ocassional pyrite nodules, 1/4" thick; many low to high angle open fractures, smooth to rough, slicks, calcite, striations, slighly open, pyrite, mid-angle to near vertical (20°- 80°); ocassional joints, smooth to rough, calcite, pyrite, open, mid-angle (40°- 70°). DNAPL observed along core in many places.
290		289.2-291.7	61	2.7	108	97	*(Continued)*

FIELD HARDNESS		BEDDING		ATTITUDE AND ANGLE	JOINTS / SHEAR / FRACTURE		WEATHERING
V. HARD	- KNIFE CAN'T SCRATCH	V. THIN	<2"	HORIZONTAL (0-5°)	V. CLOSE	<2"	FRESH
HARD	- SCRATCHES DIFFICULT	THIN	2"-12"	SHALLOW OR LOW ANGLE (5-35°)	CLOSE	2"-12"	V. SLIGHT
MOD. HARD	- SCRATCHES EASILY	MEDIUM	12"-36"	MODERATELY DIPPING (35-55°)	MOD. CLOSE	12"-36"	SLIGHT
SOFT	- GROVES	THICK	36"-120"	STEEP OR HIGH ANGLE (55-85°)	WIDE	36"-120"	MODERATE
V. SOFT	- CARVES	V. THICK	>120"	VERTICAL (85-90°)	V. WIDE	>120"	MOD. SEVERE
							V. SEVERE
							COMPLETE

GeoTrans, Inc.
A TETRA TECH COMPANY

BORING NO. **PZ-304**
PAGE 6 OF 6

DEPTH IN FEET	DRILL RATE MIN/FT	CORE NO. DEPTH RANGE	SAMPLE NUMBER	RECOVERY FT	RECOVERY %	RQD (%)	FIELD CLASSIFICATION AND REMARKS
295		291.7-296.8	62	5.1	100	100	SHALE, simialr to above, except bedding plane 285.4 to 286.05 feet, calcite crystals, smooth, striations, near vertical (70°- 80°). Mod. hard, fresh black, SHALE; ocassional calcite and pyrite veins and stringers, some marbelization, mid-angle (20°- 60°), <1mm to 3mm thick; trace fossils, calcite and pyrite; ocassional pyrite nodules, 1/4" thick; many low to high angle open fractures, smooth to rough, slicks, calcite, striations, slighly open, pyrite, mid-angle to near vertical (20°- 80°); ocassional joints, smooth to rough, calcite, pyrite, open, mid-angle (40°- 70°). DNAPL observed along core in many places *(continued)*
300		296.8-301.65	63	4.7	97	88	
305		301.65-306.25	64	4.8	104	100	
310		306.25-311.05	65	4.8	100	100	
315		311.05-315.25	66	4.5	107	87	
		315.25-318.85	67	3.4	94	97	
320							Bottom of boring at 318.85 feet
325							
330							
335							
340							
345							
350							

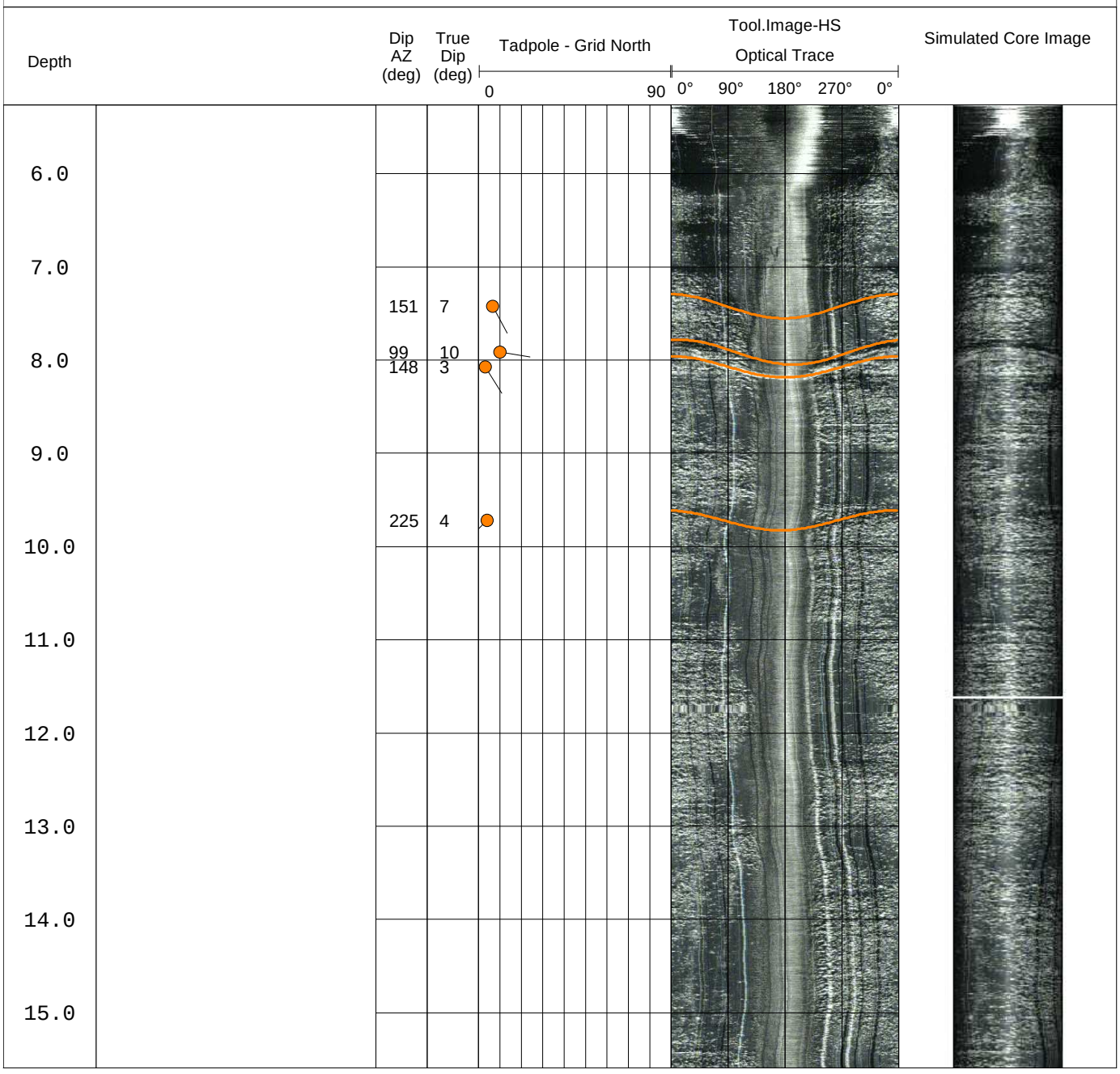
FIELD HARDNESS		BEDDING		ATTITUDE AND ANGLE	JOINTS / SHEAR / FRACTURE		WEATHERING
V. HARD	- KNIFE CAN'T SCRATCH	V. THIN	<2"	HORIZONTAL (0-5°)	V. CLOSE	<2"	FRESH
HARD	- SCRATCHES DIFFICULT	THIN	2"-12"	SHALLOW OR LOW ANGLE (5-35°)	CLOSE	2"-12"	V. SLIGHT
MOD. HARD	- SCRATCHES EASILY	MEDIUM	12"-36"	MODERATELY DIPPING (35-55°)	MOD. CLOSE	12"-36"	SLIGHT
SOFT	- GROVES	THICK	36"-120"	STEEP OR HIGH ANGLE (55-85°)	WIDE	36"-120"	MODERATE
V. SOFT	- CARVES	V. THICK	>120"	VERTICAL (85-90°)	V. WIDE	>120"	MOD. SEVERE
							V. SEVERE
							COMPLETE

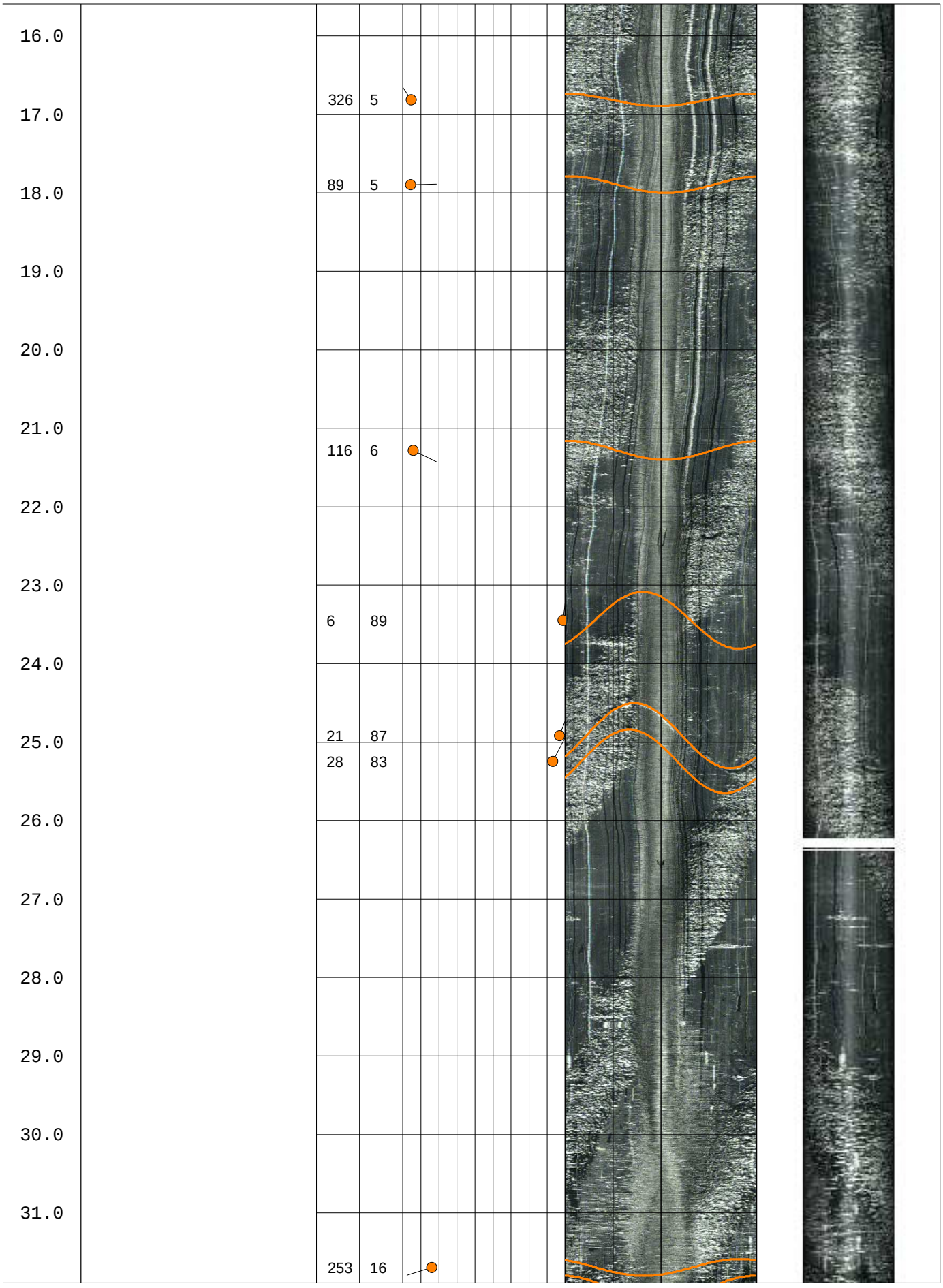
COBL CRUX Oriented Borehole Logging	Company MERCO, Inc.
	Location: Hudson Falls, NY
	Project: Hudson Falls TDCS

Date Logged:	March 17, 2009	Borehole ID: PZ-301
File Name:	PZ301-1M.wcl	Logged By: F G Kruger

Notes:

1) Azimuths reference Grid North. Magnetic declination of -14.7 degrees applied.
2) 2.5x Horizontal Exaggeration on Televiewer Images.
3) Dip values presented in degrees from horizontal.
4) Dip direction presented in degrees of azimuth.

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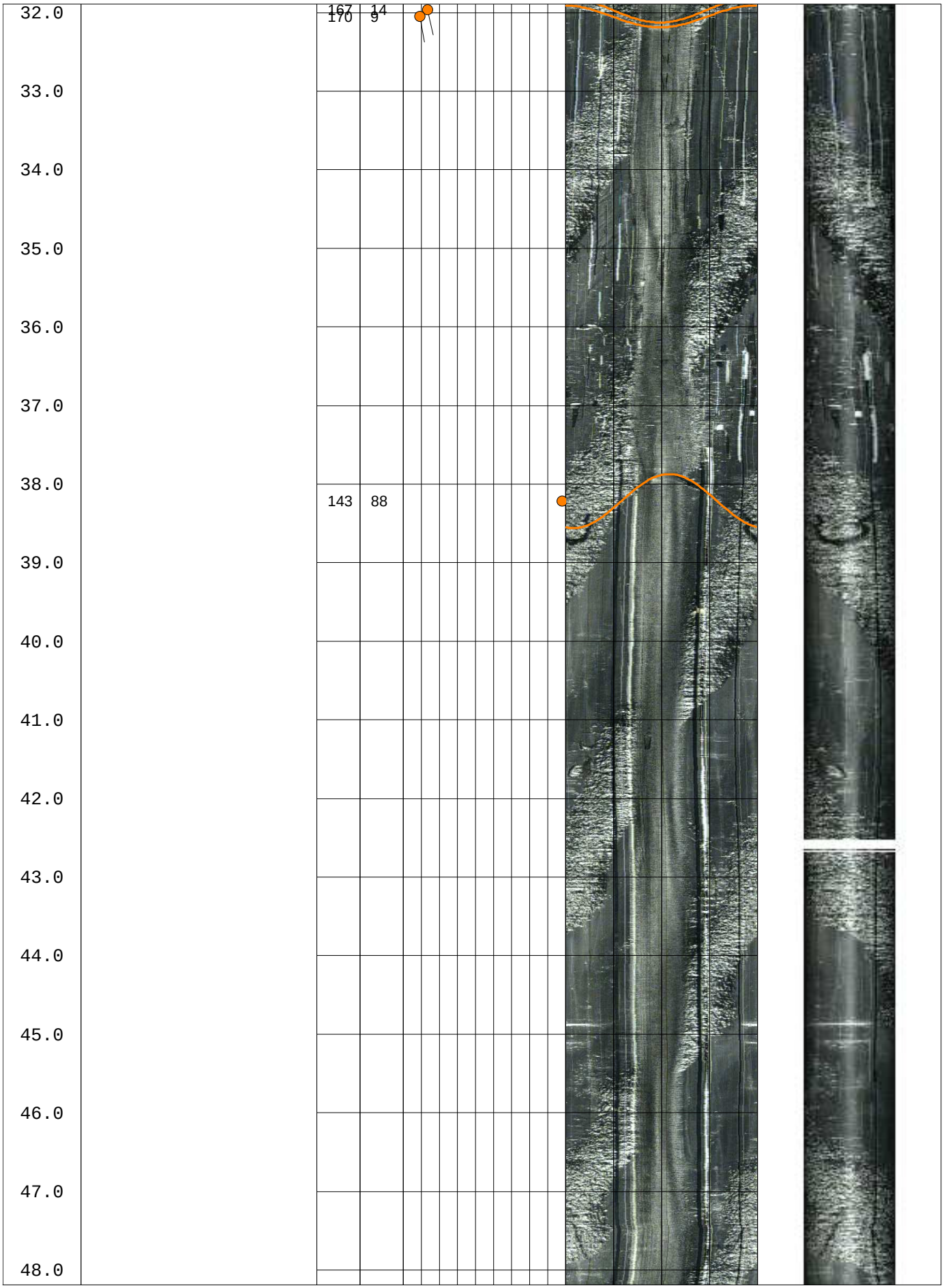
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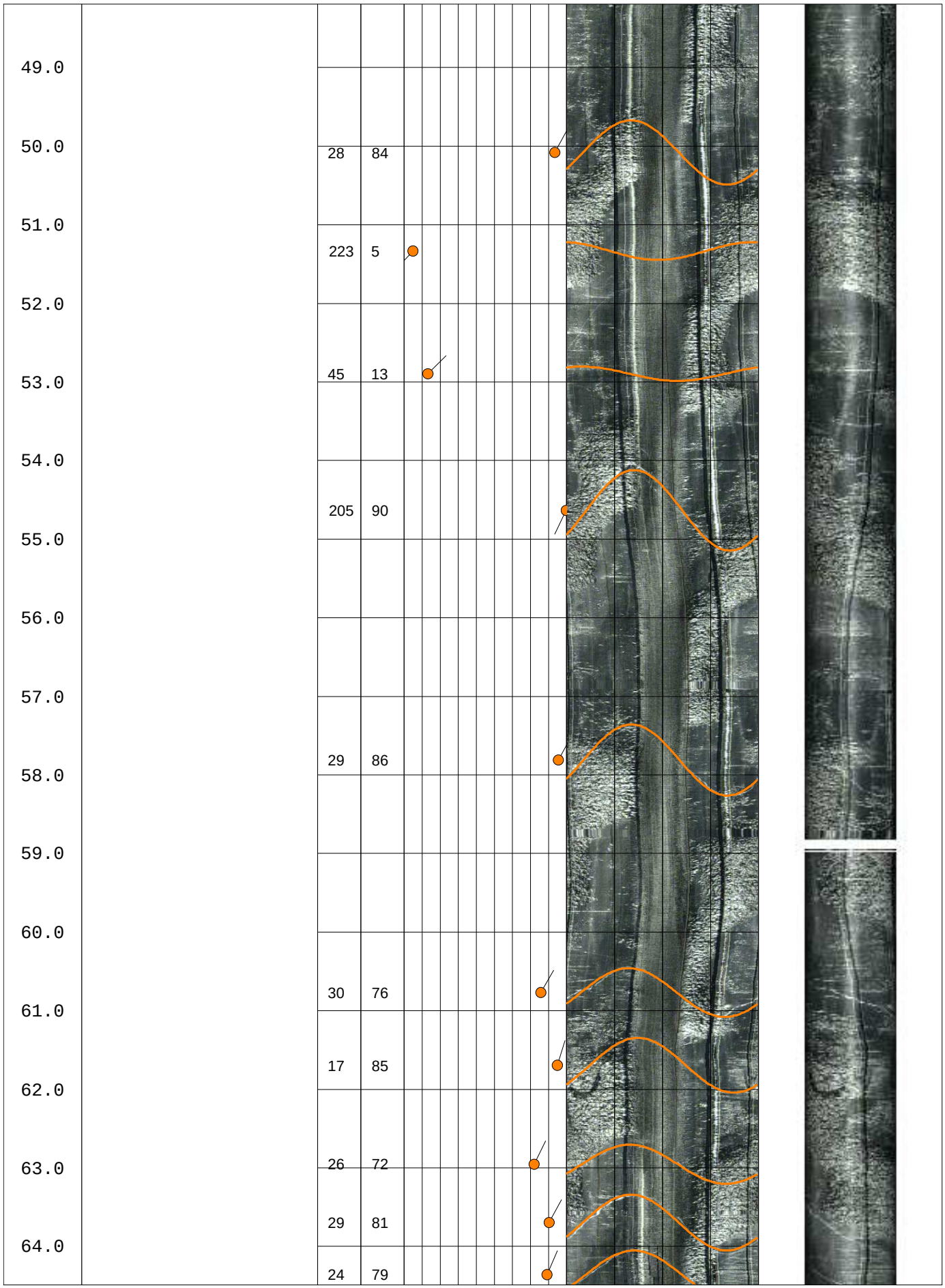
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17 85
26 72
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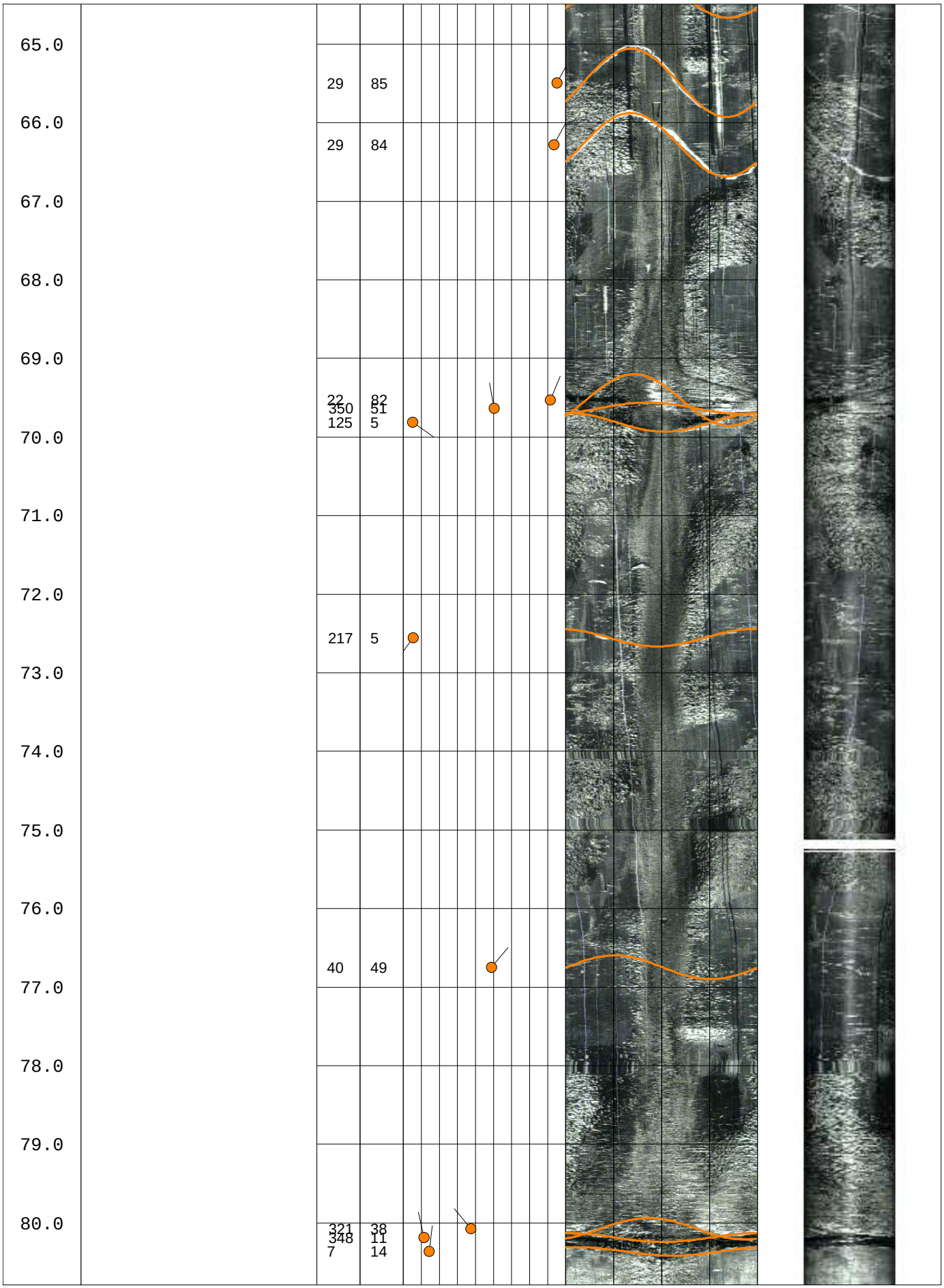
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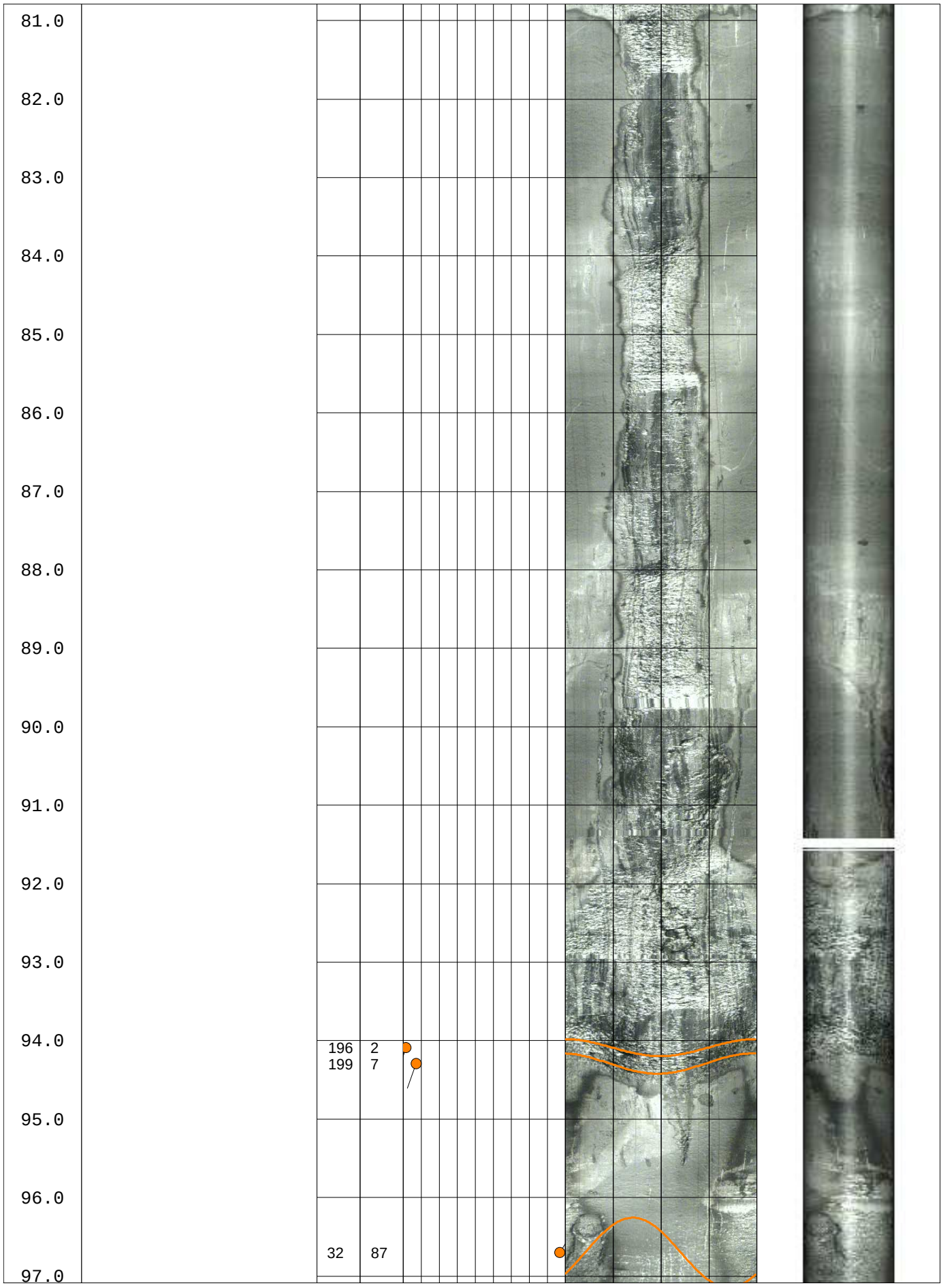
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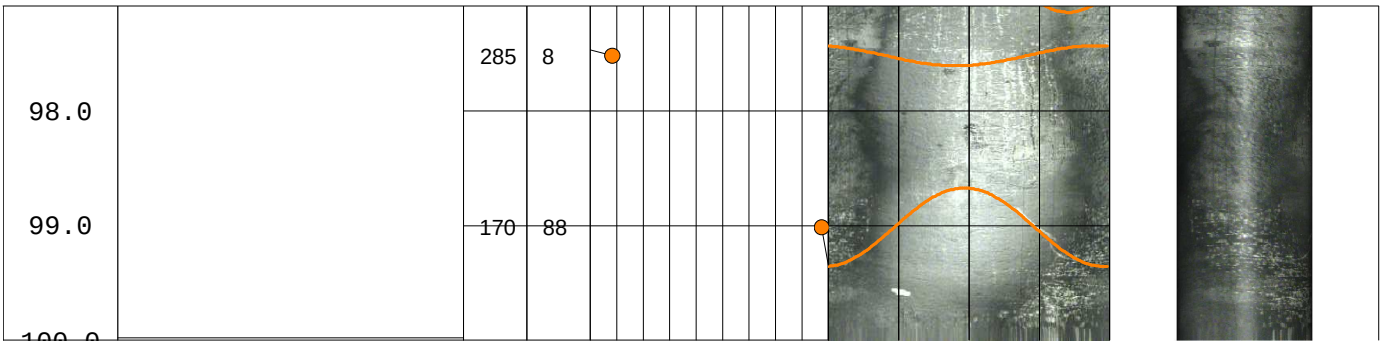
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Log	Depth	Azimuth	Dip
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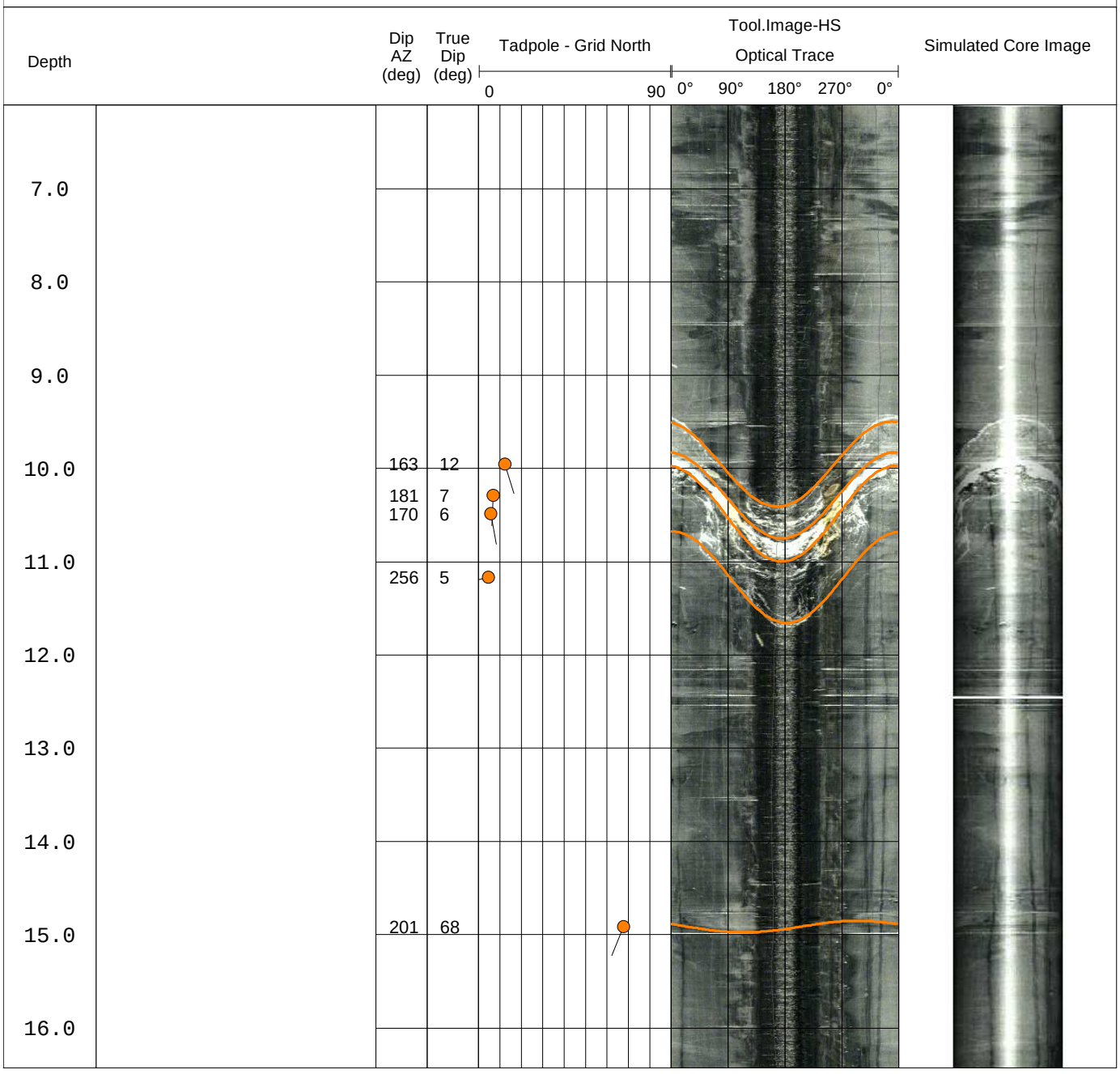
PZ301	7.9	99	10
PZ301	8.1	148	3
PZ301	9.7	225	4
PZ301	16.8	326	5
PZ301	17.9	89	5
PZ301	21.3	116	6
PZ301	23.5	6	89
PZ301	24.9	21	87
PZ301	25.2	28	83
PZ301	31.7	253	16
PZ301	32.0	167	14
PZ301	32.1	170	9
PZ301	38.2	143	88
PZ301	50.1	28	84
PZ301	51.3	223	5
PZ301	52.9	45	13
PZ301	54.6	205	90
PZ301	57.8	29	86
PZ301	60.8	30	76
PZ301	61.7	17	85
PZ301	63.0	26	72
PZ301	63.7	29	81
PZ301	64.4	24	79
PZ301	65.5	29	85
PZ301	66.3	29	84
PZ301	69.5	23	82
PZ301	69.6	350	51
PZ301	69.8	125	5
PZ301	72.6	217	6
PZ301	76.8	40	49
PZ301	80.1	321	38
PZ301	80.2	348	11
PZ301	80.4	7	14
PZ301	94.1	196	2
PZ301	94.3	199	7
PZ301	96.7	32	87
PZ301	97.5	285	8
PZ301	99.0	170	88

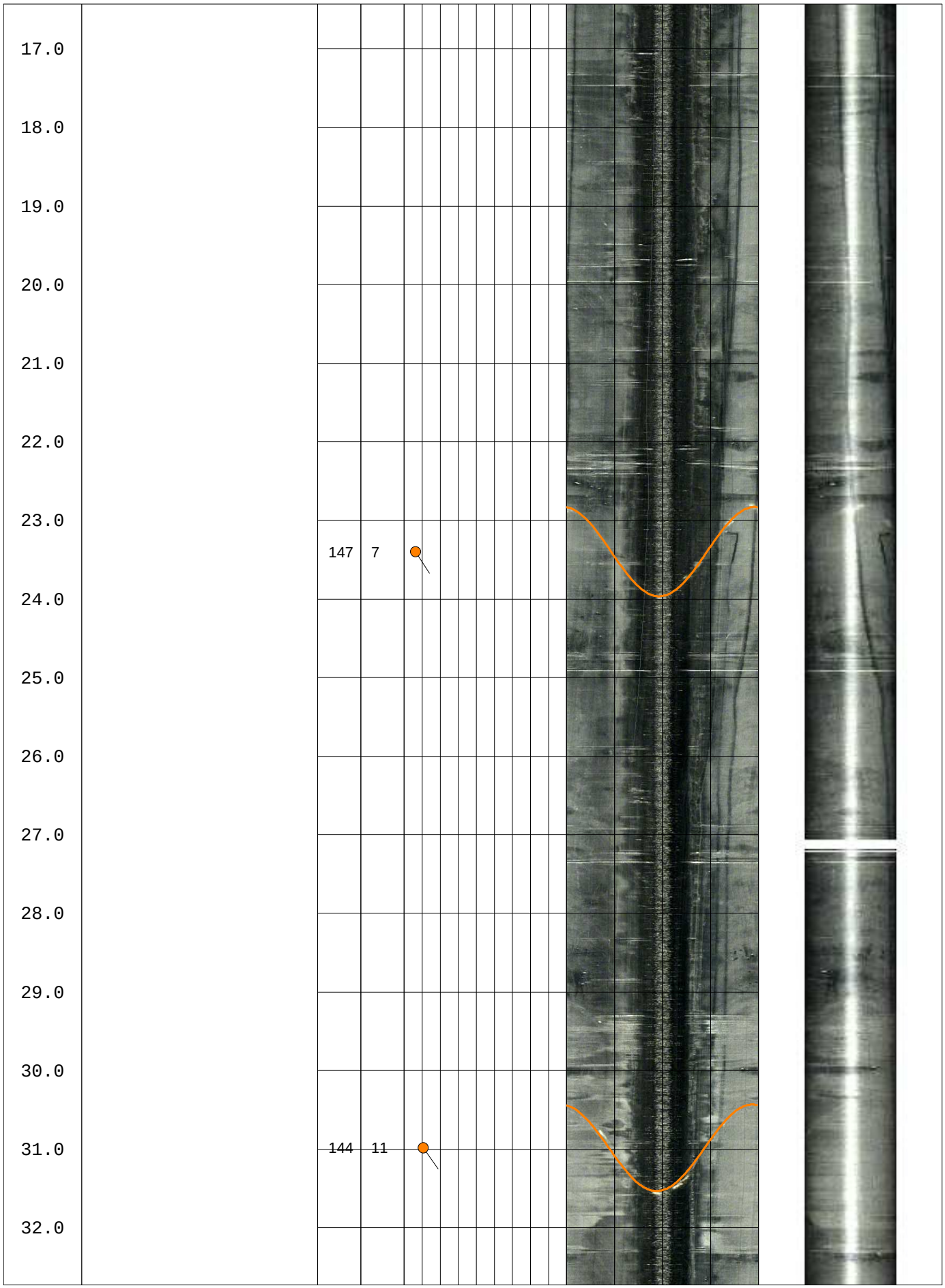
COBL CRUX Oriented Borehole Logging	Company MERCO
	Location: Hudson Falls, NY
	Project: Hudson Falls TDCS

Date Logged:	February 18, 2009	Borehole ID: PZ-303
File Name:	PZ303-1M.wcl	Logged By: F G Kruger

Notes:

1) Azimuths reference Grid North. Magnetic declination of -14.7 degrees applied.
2) 2.5x Horizontal Exaggeration on Televiewer Images.
3) Dip values presented in degrees from horizontal.
4) Dip direction presented in degrees of azimuth.

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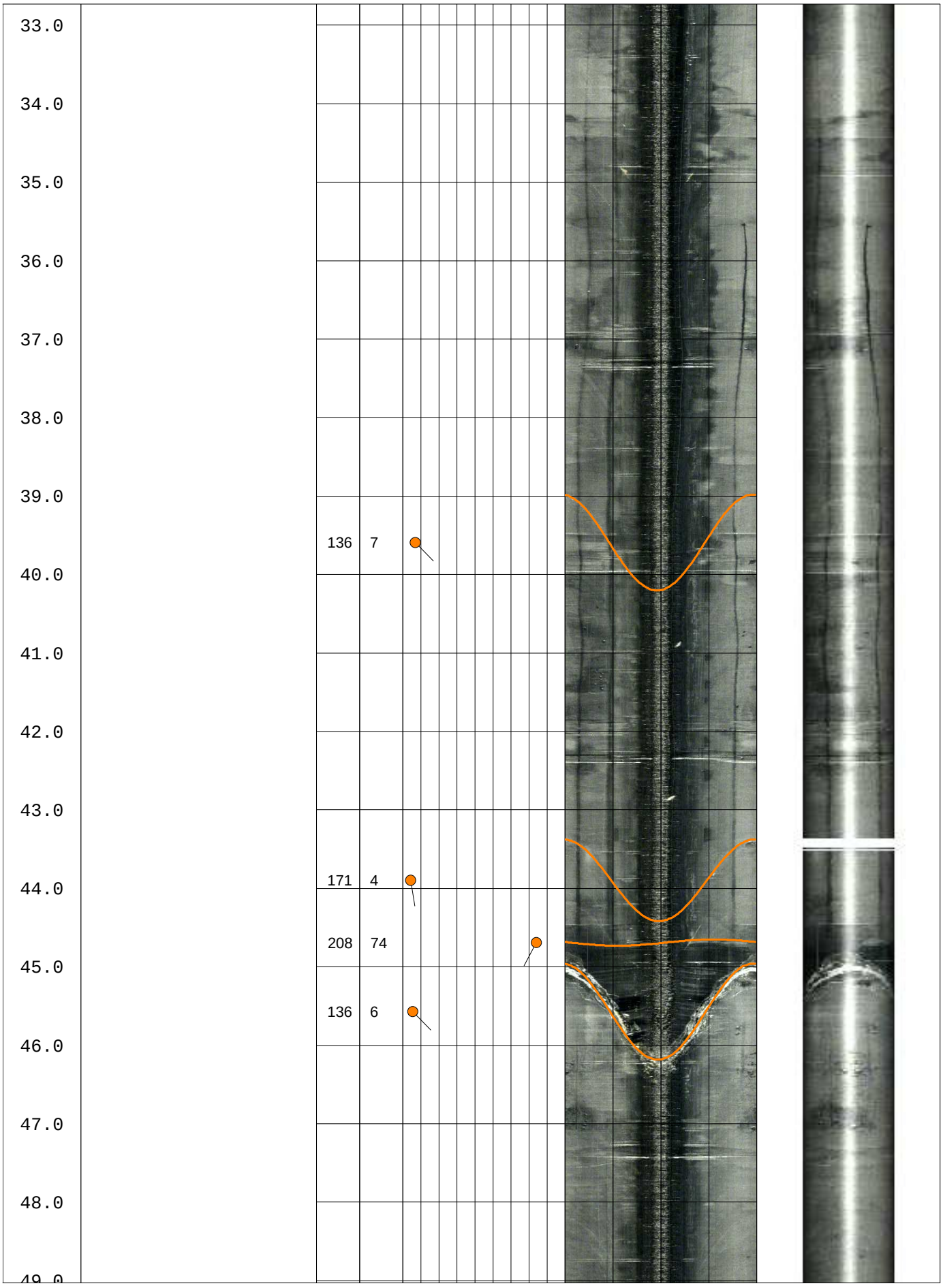
32.0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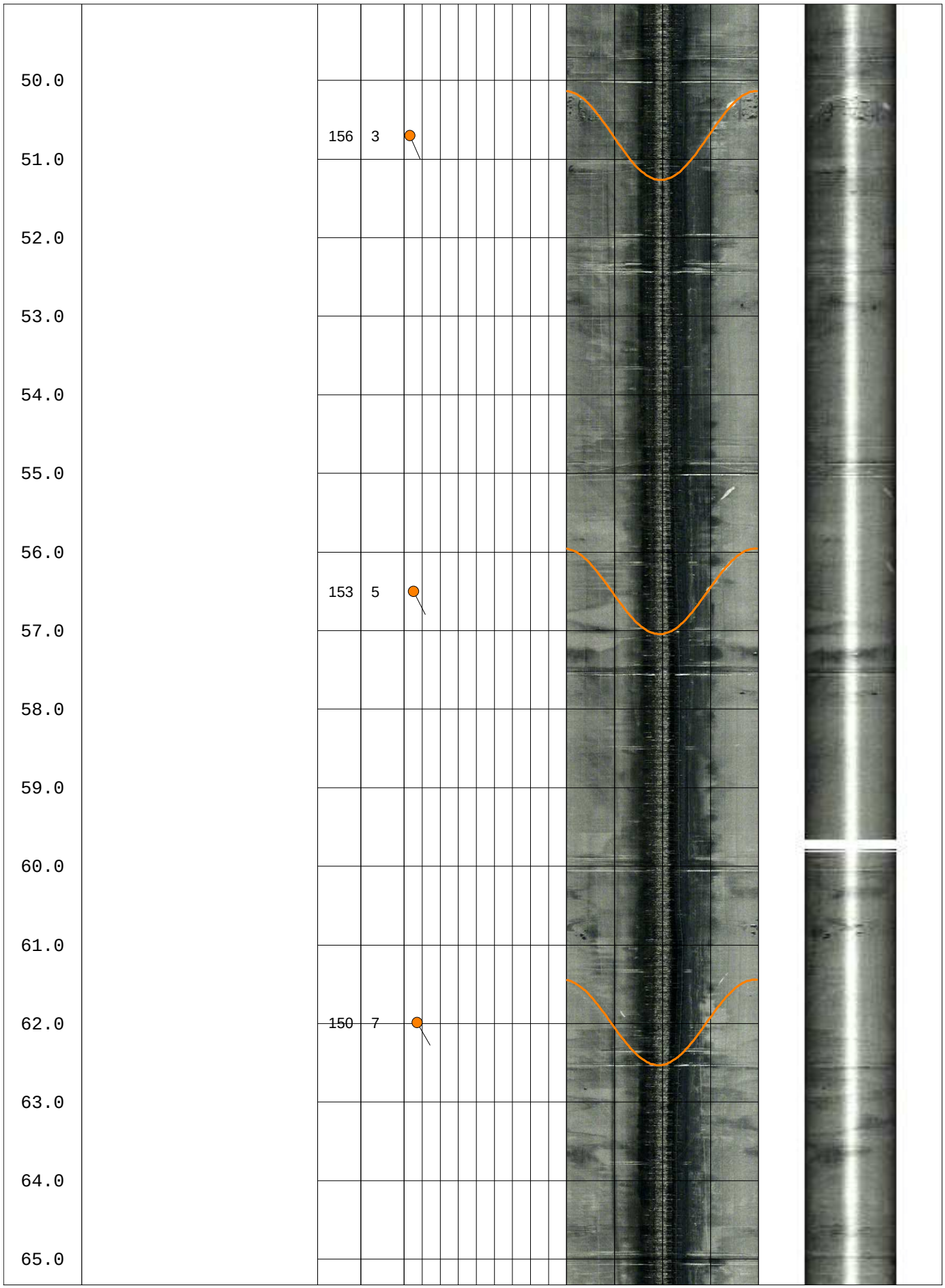
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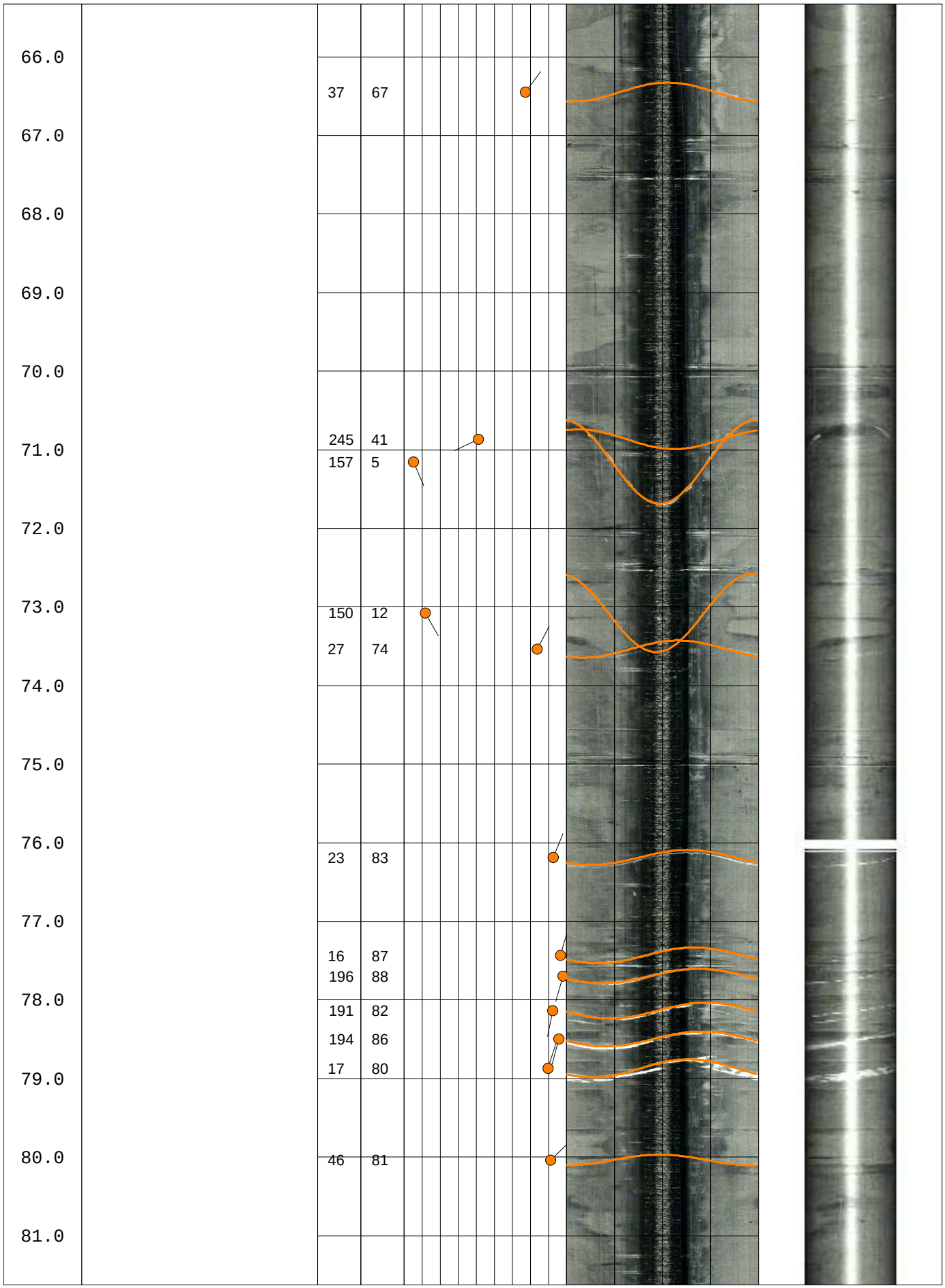
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16 87
196 88
191 82
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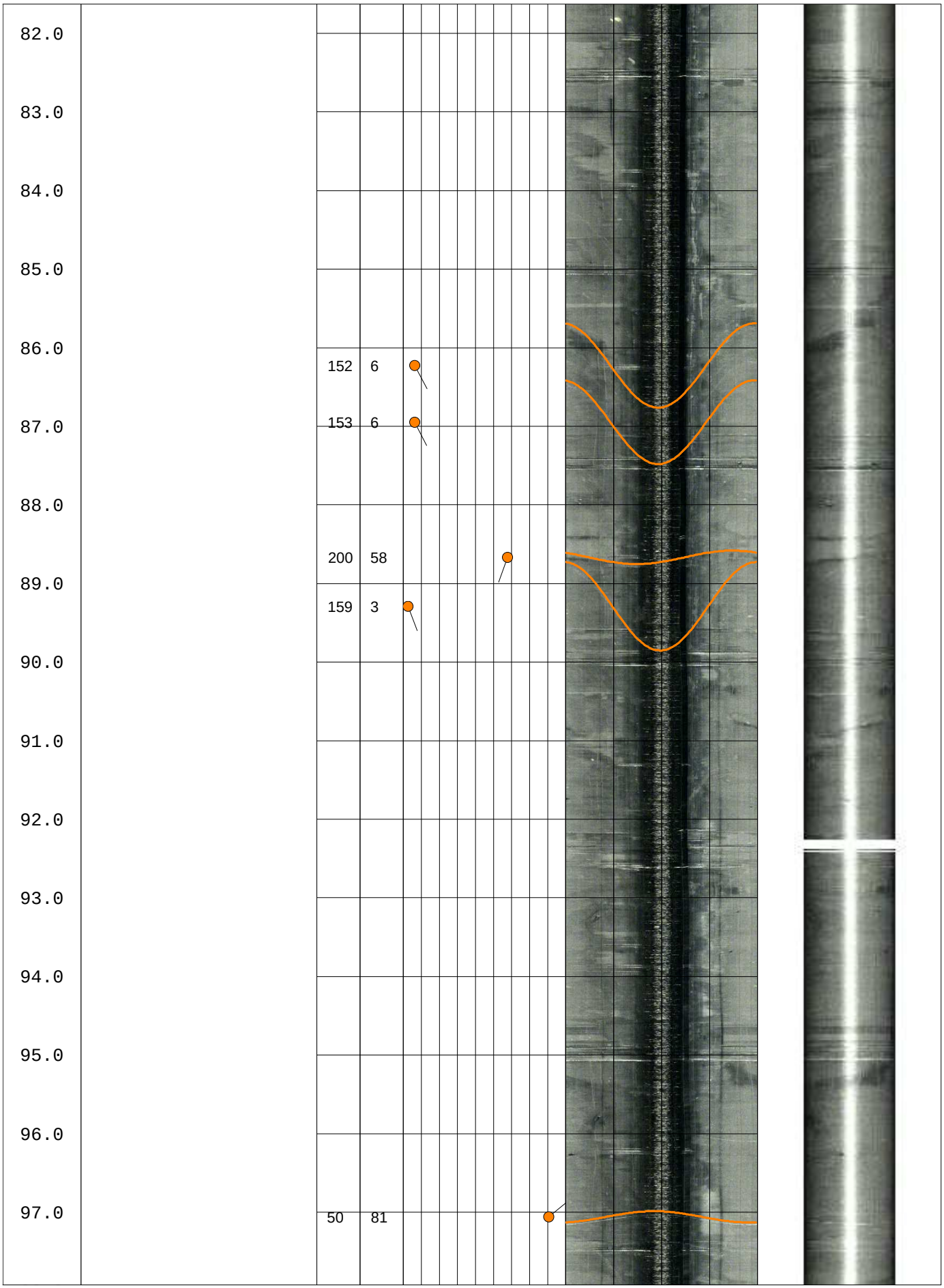
17 80
46 81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200 58
159 3
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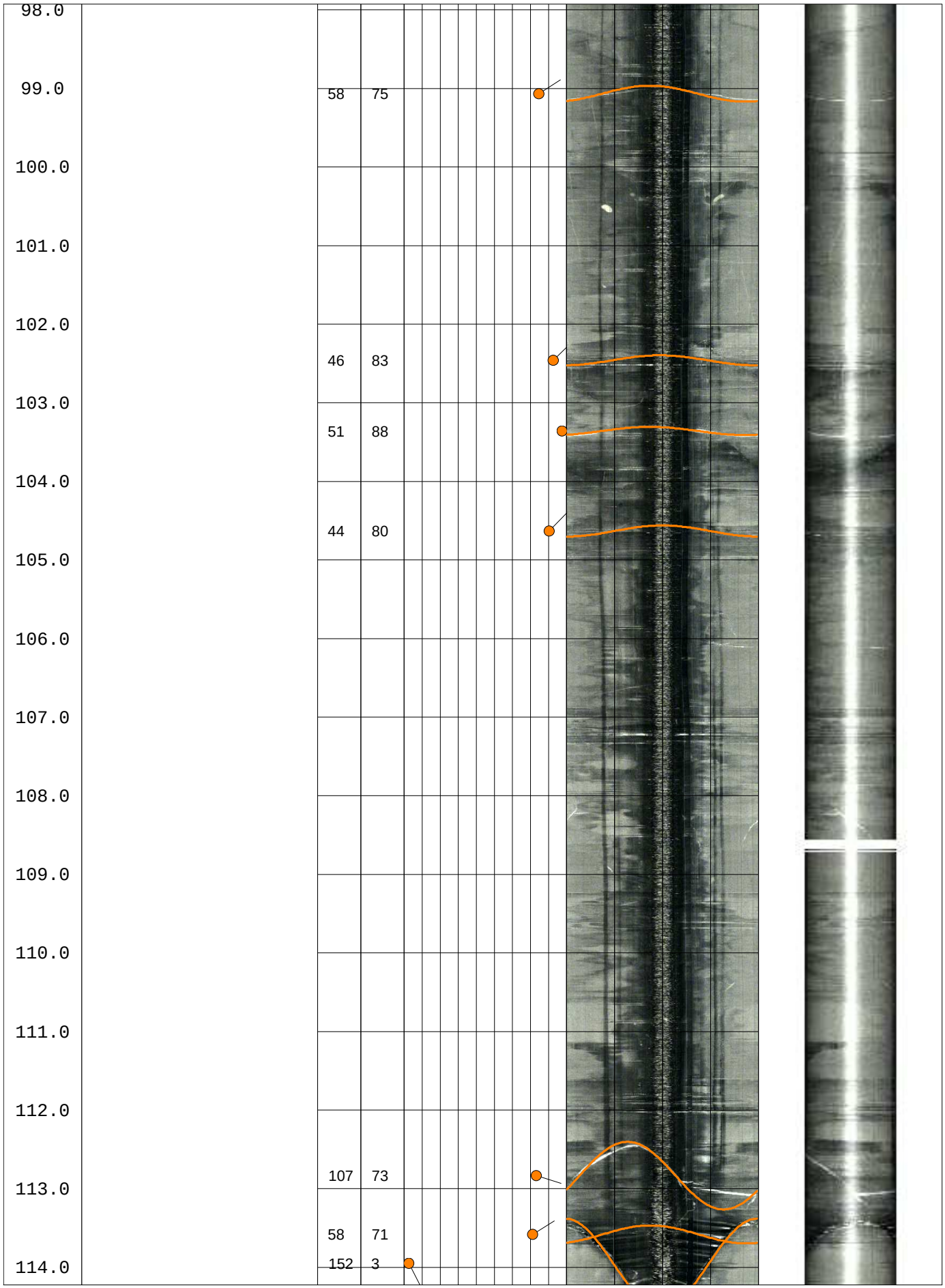
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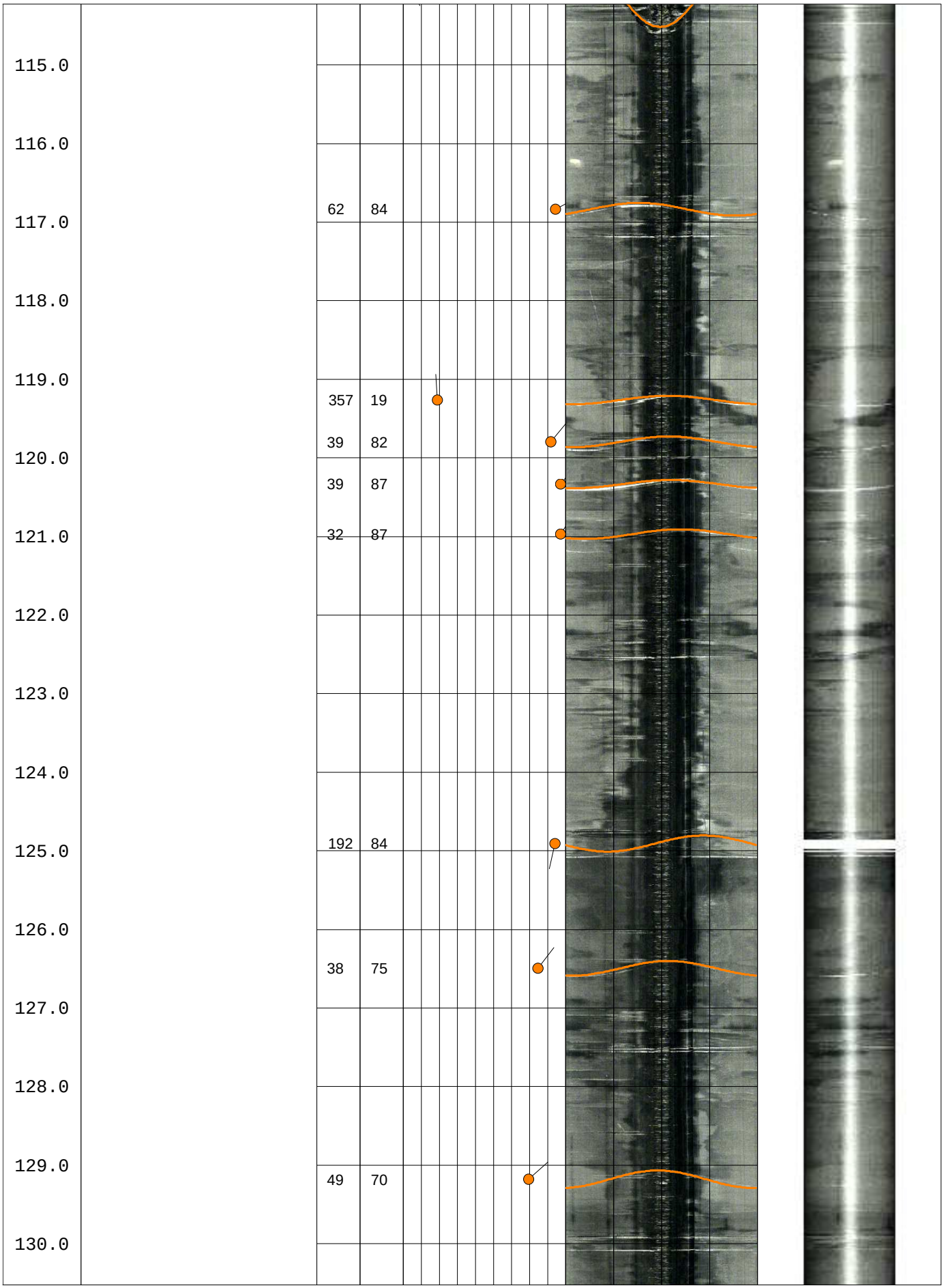
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192 84
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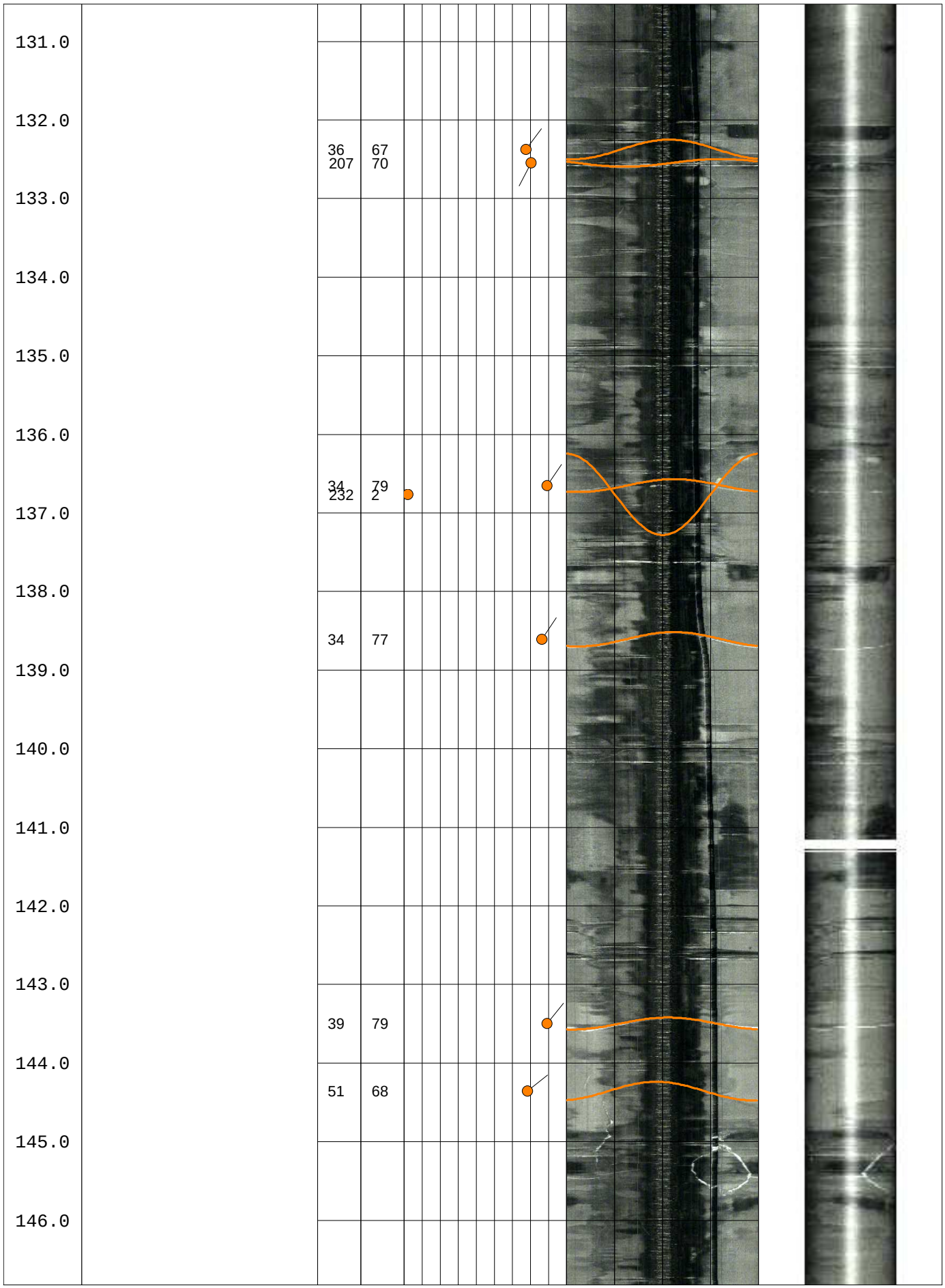
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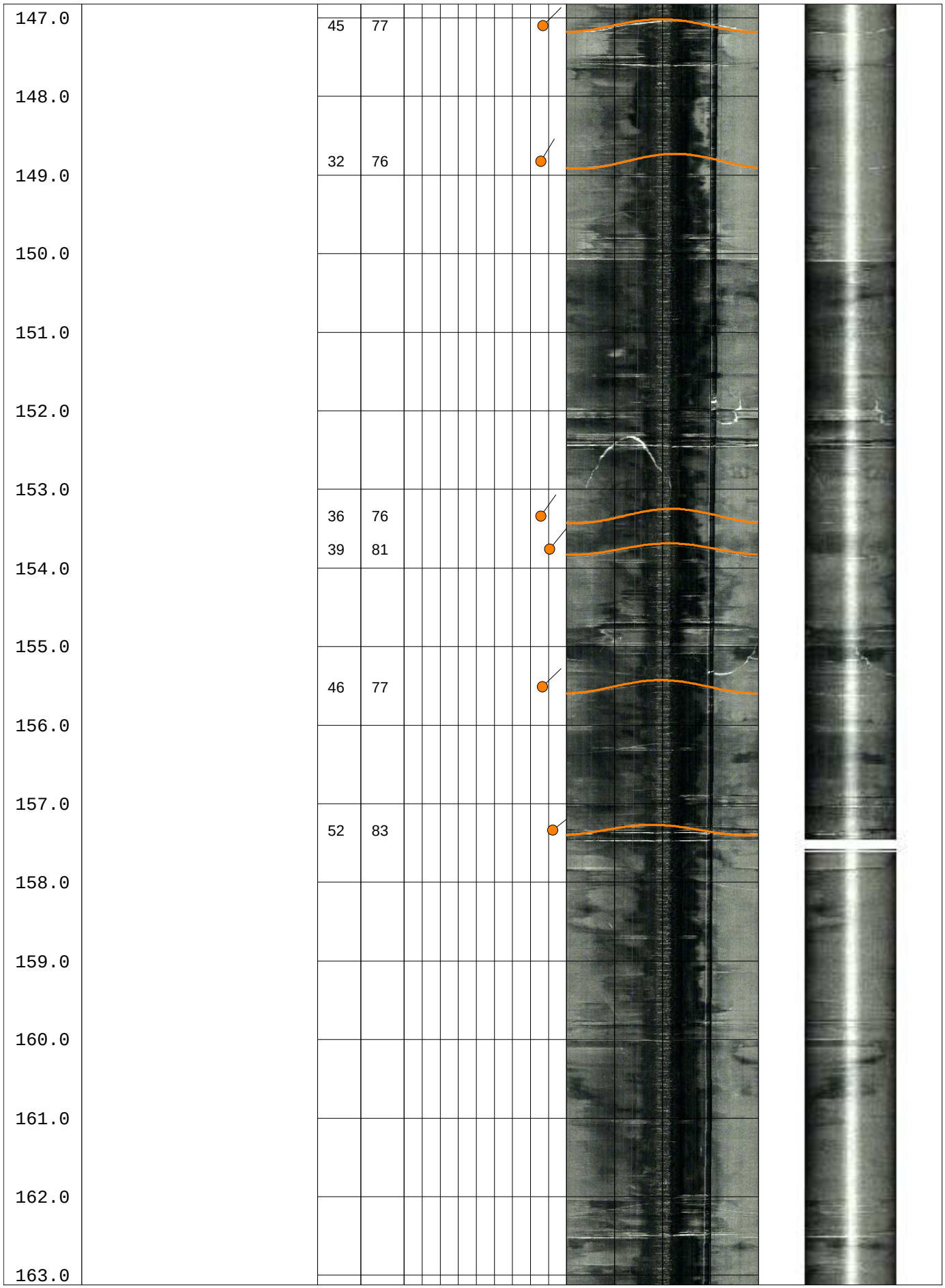
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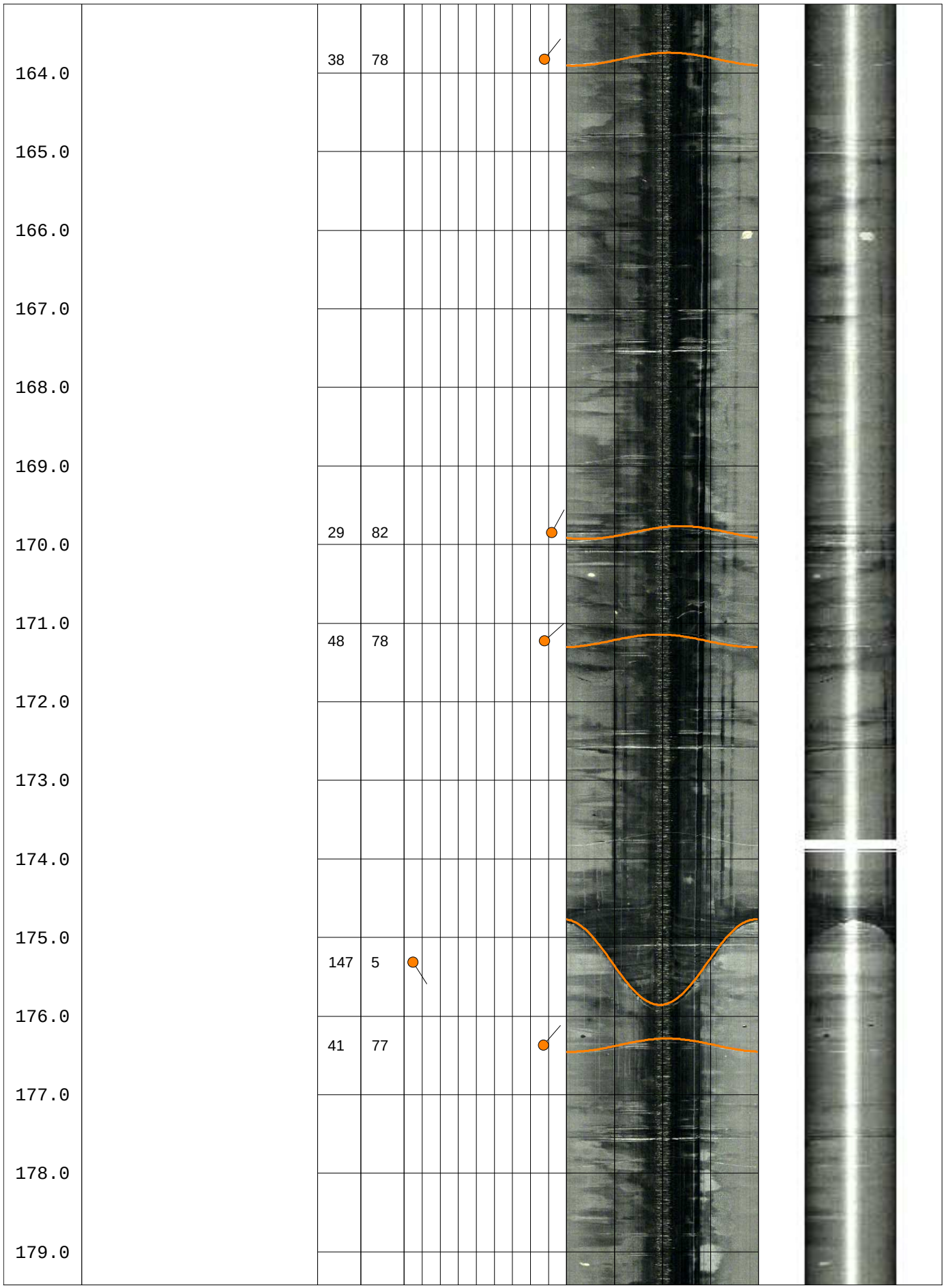
46 77
52 83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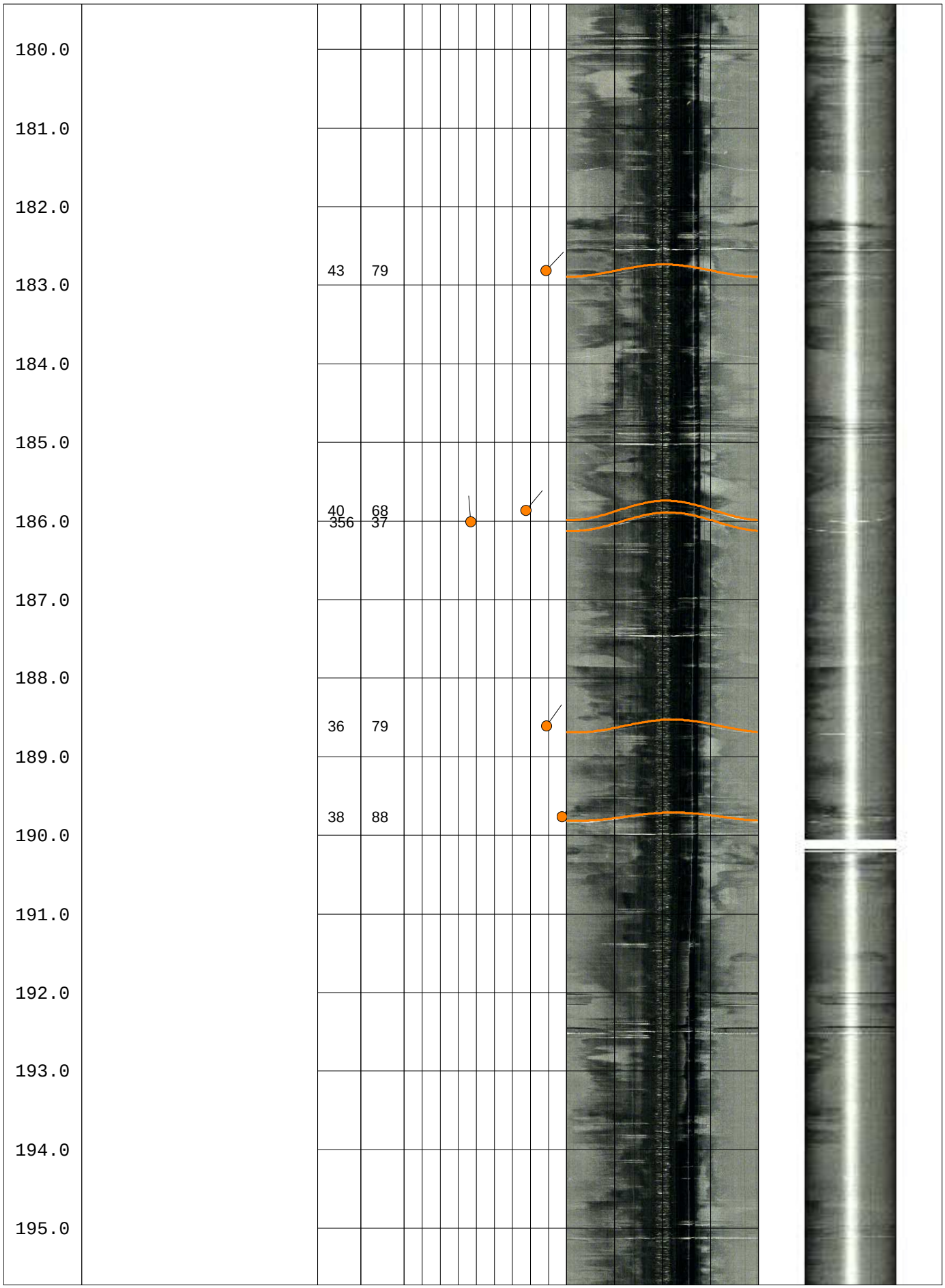
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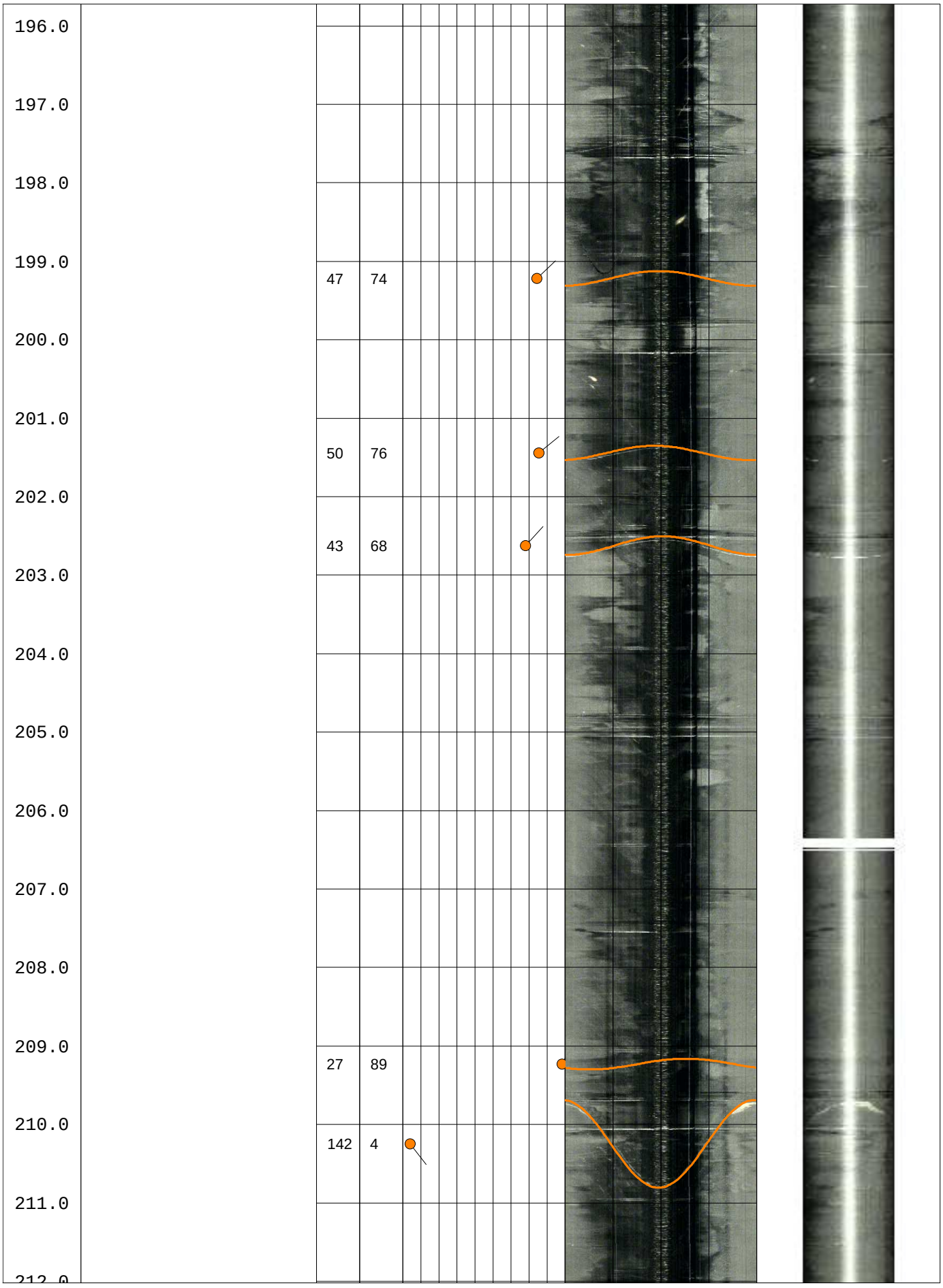
38 88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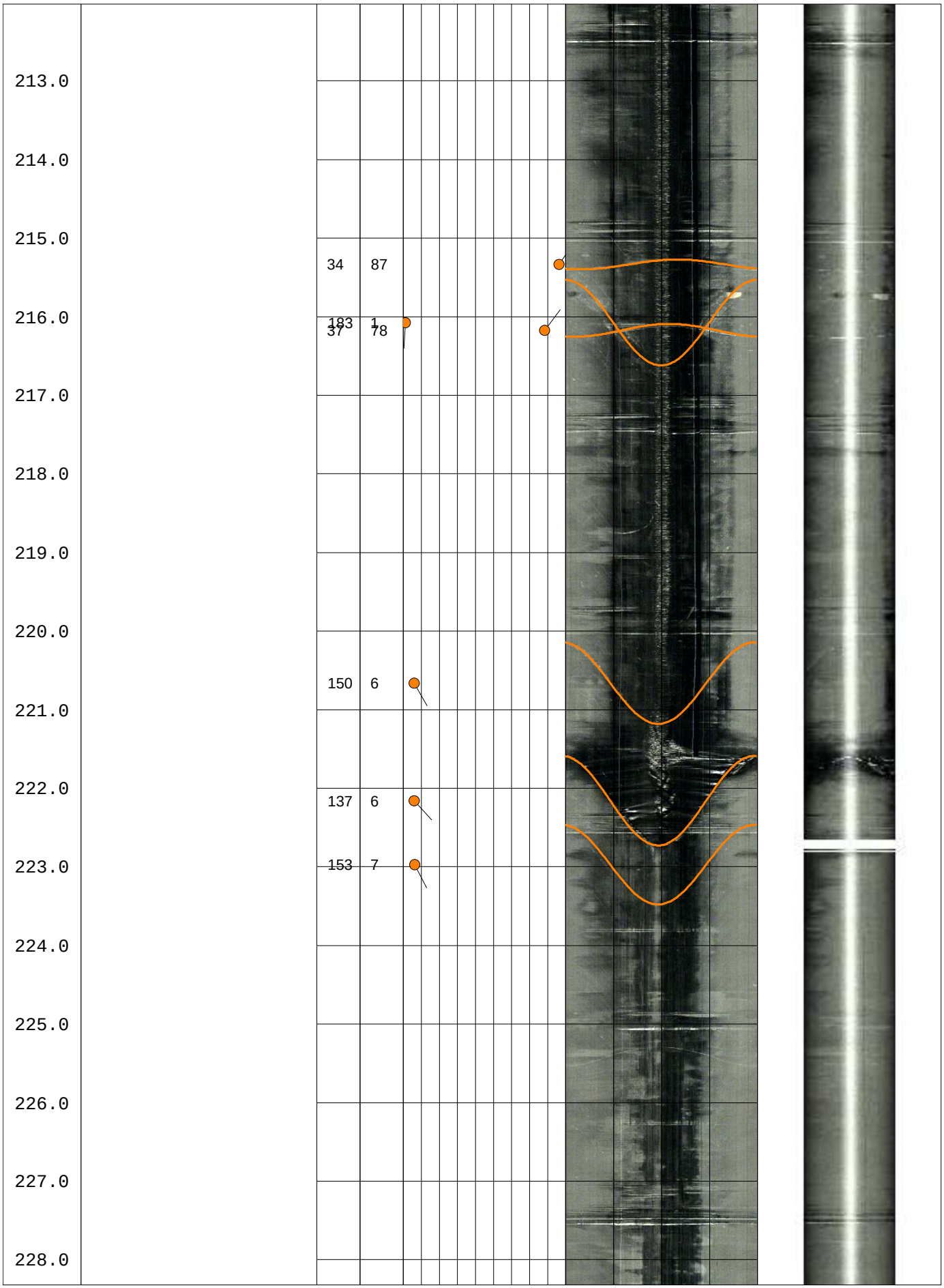
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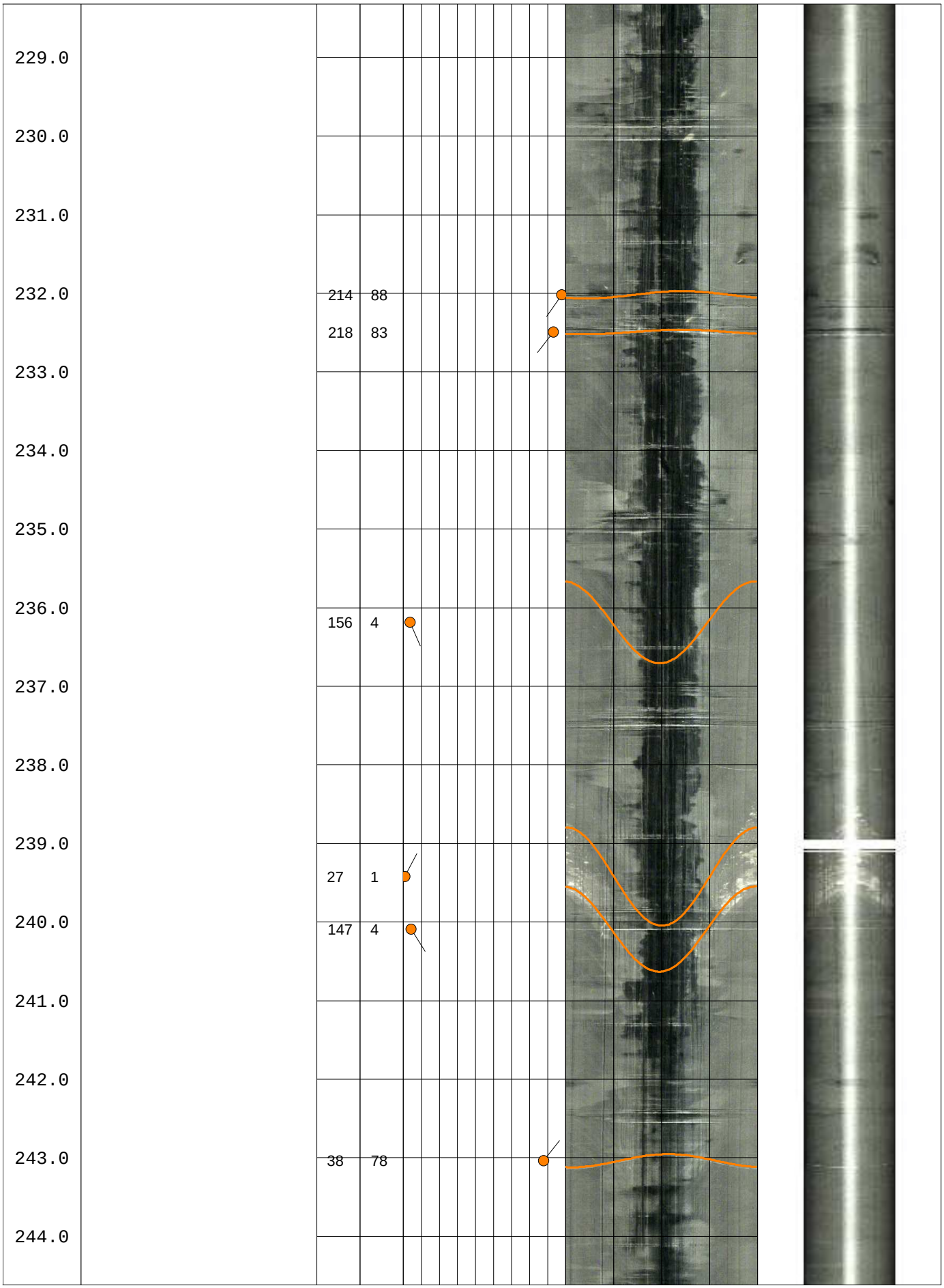
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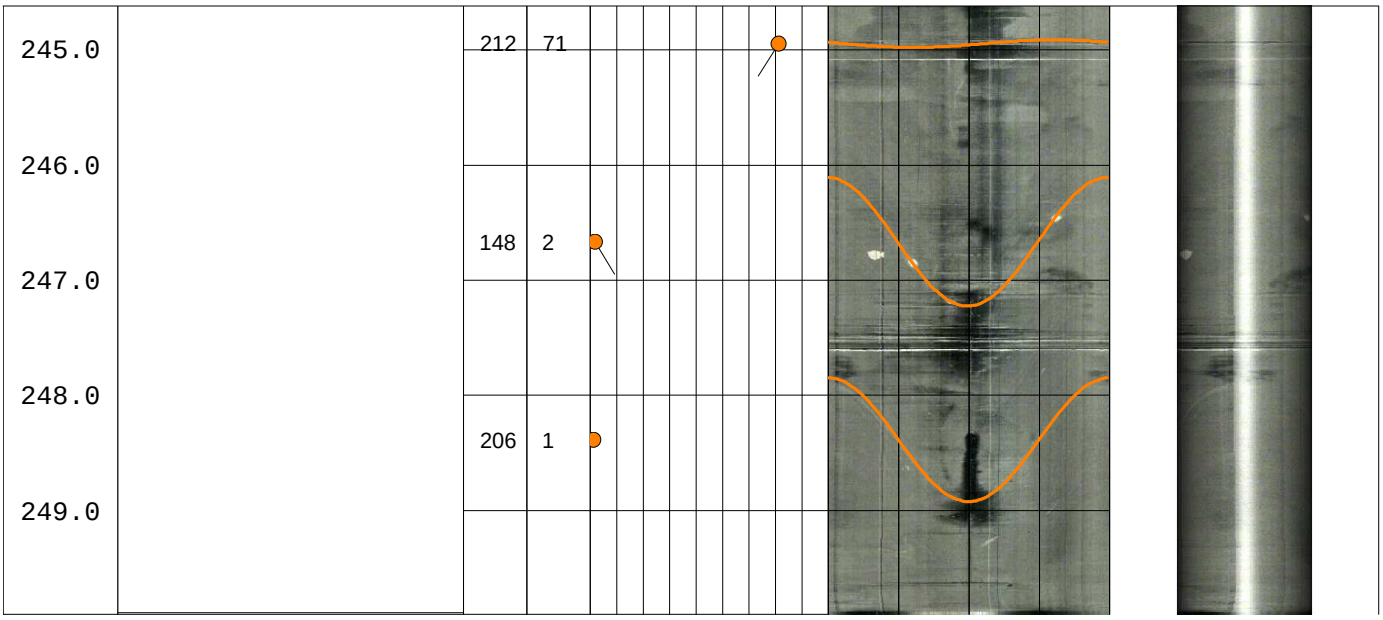
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Log	Depth	Azimuth	Dip
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PZ303	10.3	181	7
PZ303	10.5	170	6
PZ303	11.2	256	5
PZ303	14.9	201	68
PZ303	23.4	147	7
PZ303	31.0	144	11
PZ303	39.6	136	7
PZ303	43.9	171	4
PZ303	44.7	208	74
PZ303	45.6	136	6
PZ303	50.7	156	3
PZ303	56.5	153	5
PZ303	62.0	150	7
PZ303	66.5	37	67
PZ303	70.9	245	41
PZ303	71.2	157	5
PZ303	73.1	150	12
PZ303	73.5	27	74
PZ303	76.2	23	83
PZ303	77.4	16	87
PZ303	77.7	196	88
PZ303	78.1	191	82
PZ303	78.5	194	86
PZ303	78.9	17	80
PZ303	80.0	46	81
PZ303	86.2	152	6
PZ303	87.0	153	6
PZ303	88.7	200	58
PZ303	89.3	159	3
PZ303	97.1	50	81
PZ303	99.1	58	75
PZ303	102.5	46	83
PZ303	103.4	51	88
PZ303	104.6	44	80
PZ303	112.8	107	73
PZ303	113.6	58	71
PZ303	114.0	152	3
PZ303	116.8	62	84
PZ303	119.3	357	19
PZ303	119.8	39	82
PZ303	120.3	39	87
PZ303	121.0	32	87
PZ303	124.9	192	84
PZ303	126.5	38	75
PZ303	129.2	49	70
PZ303	132.4	36	67
PZ303	132.5	207	70
PZ303	136.7	34	79
PZ303	136.8	232	2
PZ303	138.6	34	77

Log	Depth	Azimuth	Dip
PZ303	143.5	39	79
PZ303	144.4	51	68
PZ303	147.1	45	77
PZ303	148.8	32	76
PZ303	153.3	36	76
PZ303	153.8	39	81
PZ303	155.5	46	77
PZ303	157.3	52	83
PZ303	163.8	38	78
PZ303	169.9	29	82
PZ303	171.2	48	78
PZ303	175.3	147	5
PZ303	176.4	41	77
PZ303	182.8	43	79
PZ303	185.9	40	68
PZ303	186.0	356	37
PZ303	188.6	36	79
PZ303	189.8	38	88
PZ303	199.2	47	74
PZ303	201.4	50	76
PZ303	202.6	43	68
PZ303	209.2	27	89
PZ303	210.3	142	4
PZ303	215.3	34	87
PZ303	216.1	183	1
PZ303	216.2	37	78
PZ303	220.7	150	6
PZ303	222.2	137	6
PZ303	223.0	153	7
PZ303	232.0	214	88
PZ303	232.5	218	83
PZ303	236.2	156	4
PZ303	239.4	27	1
PZ303	240.1	147	4
PZ303	243.0	38	78
PZ303	245.0	212	71
PZ303	246.7	148	2
PZ303	248.4	206	1

Table SU-1 River Transect at PZ-201

GE Hudson Falls Tunnel Drain Collection System
By: Ocean Surveys Inc. 3-10-2009

Easting	Northing	Elevation
696950.24	1201629.43	136.78
696951.23	1201629.14	136.54
696953.01	1201628.47	136.08
696954.65	1201627.76	135.78
696955.82	1201626.95	135.58
696956.50	1201626.02	135.38
696956.99	1201625.12	135.08
696957.54	1201624.17	134.78
696958.00	1201623.26	134.68
696958.42	1201622.33	134.38
696958.83	1201621.29	134.28
696959.18	1201620.39	134.08
696959.57	1201619.43	133.98
696959.84	1201618.46	133.78
696960.15	1201617.50	133.68
696960.56	1201616.55	133.48
696960.80	1201615.63	133.28
696961.07	1201614.68	133.08
696961.31	1201613.66	132.78
696961.55	1201612.62	132.58
696961.73	1201611.64	132.18
696961.94	1201610.73	131.98
696962.13	1201609.74	131.78
696962.25	1201608.78	131.18
696962.42	1201607.70	130.98
696962.61	1201606.70	129.68
696962.74	1201605.74	128.78
696962.88	1201604.83	127.68
696963.01	1201603.74	127.38
696963.10	1201602.74	127.28
696963.17	1201601.80	126.88
696963.27	1201600.72	126.58
696963.34	1201599.79	126.38
696963.41	1201598.76	126.28
696963.46	1201597.70	126.08
696963.51	1201596.82	125.88
696963.42	1201595.68	125.38
696963.49	1201594.77	125.38
696963.50	1201593.75	124.98

Table SU-1 River Transect at PZ-201

GE Hudson Falls Tunnel Drain Collection System
By: Ocean Surveys Inc. 3-10-2009

Easting	Northing	Elevation
696963.56	1201592.78	124.78
696963.64	1201591.71	124.58
696963.72	1201590.78	123.68
696963.74	1201589.67	122.68
696963.77	1201588.75	121.98
696963.89	1201587.71	121.18
696963.97	1201586.74	120.88
696964.07	1201585.66	120.58
696964.10	1201584.72	119.68
696964.21	1201583.74	119.58
696964.35	1201582.60	118.08
696964.52	1201581.72	117.78
696964.59	1201580.74	116.58
696964.69	1201579.76	115.38
696964.82	1201578.65	114.78
696964.91	1201577.73	114.68
696965.01	1201576.75	114.68
696965.14	1201575.77	114.68
696965.31	1201574.63	114.68
696965.43	1201573.68	114.43
696965.57	1201572.70	113.98
696965.75	1201571.75	113.68
696965.89	1201570.75	113.58
696966.08	1201569.81	113.48
696966.27	1201568.81	113.28
696966.45	1201567.76	112.78
696966.60	1201566.91	112.68
696966.75	1201565.82	112.48
696966.85	1201564.91	112.48
696967.07	1201563.87	112.48
696967.21	1201562.86	112.48
696967.37	1201561.85	112.38
696967.57	1201560.83	112.98
696967.76	1201559.84	113.08
696967.97	1201558.95	113.08
696968.17	1201557.93	113.08
696968.36	1201556.95	113.08
696968.56	1201555.98	112.98
696968.75	1201554.98	112.98

Table SU-1 River Transect at PZ-201

GE Hudson Falls Tunnel Drain Collection System
By: Ocean Surveys Inc. 3-10-2009

Easting	Northing	Elevation
696968.95	1201554.00	112.88
696969.19	1201553.08	112.98
696969.40	1201552.09	112.98
696969.60	1201551.12	112.98
696969.82	1201550.17	113.18
696970.03	1201549.19	113.68
696970.21	1201548.20	113.88
696970.44	1201547.17	113.88
696970.59	1201546.24	113.98
696970.83	1201545.23	114.08
696971.10	1201544.21	114.58
696971.34	1201543.36	114.78
696971.57	1201542.35	115.38
696971.84	1201541.33	115.58
696972.08	1201540.39	115.68
696972.31	1201539.38	115.58
696972.54	1201538.37	114.88
696972.79	1201537.45	114.58
696973.04	1201536.46	114.38
696973.27	1201535.45	114.48
696973.47	1201534.61	114.38
696973.71	1201533.62	114.38
696973.97	1201532.56	114.58
696974.20	1201531.56	114.58
696974.44	1201530.63	114.58
696974.67	1201529.58	114.58
696974.87	1201528.72	114.78
696975.08	1201527.71	114.88
696975.29	1201526.65	114.98
696975.49	1201525.79	114.88
696975.72	1201524.81	114.88
696976.00	1201523.87	114.58
696976.23	1201522.86	114.08
696976.47	1201521.86	113.88
696976.71	1201520.95	113.88
696976.96	1201519.94	113.78
696977.22	1201518.97	113.68
696977.51	1201517.87	113.58
696977.72	1201517.00	113.38

Table SU-1 River Transect at PZ-201

GE Hudson Falls Tunnel Drain Collection System
By: Ocean Surveys Inc. 3-10-2009

Easting	Northing	Elevation
696977.97	1201516.05	113.28
696978.24	1201515.04	113.28
696978.50	1201514.05	113.18
696978.70	1201513.18	113.18
696978.93	1201512.23	113.08
696979.21	1201511.21	112.98
696979.50	1201510.20	112.88
696979.77	1201509.20	112.88
696979.99	1201508.25	112.78
696980.21	1201507.35	112.68
696980.48	1201506.33	112.68
696980.74	1201505.36	112.68
696980.93	1201504.29	112.58
696981.11	1201503.44	112.58
696981.33	1201502.45	112.38
696981.52	1201501.48	112.38
696981.74	1201500.47	112.38
696981.95	1201499.47	112.28
696982.14	1201498.53	112.28
696982.35	1201497.47	112.28
696982.54	1201496.52	112.28
696982.72	1201495.58	112.28
696982.91	1201494.54	112.18
696983.04	1201493.54	112.18
696983.21	1201492.56	112.18
696983.43	1201491.54	112.18
696983.55	1201490.70	112.18
696983.66	1201489.67	112.08
696983.86	1201488.56	111.98
696984.00	1201487.69	111.98
696984.14	1201486.70	111.98
696984.43	1201485.75	111.98
696984.59	1201484.70	111.88
696984.71	1201483.69	111.78
696984.83	1201482.70	111.88
696984.97	1201481.68	111.88
696985.12	1201480.83	111.88
696985.28	1201479.73	111.88
696985.36	1201478.82	111.78

Table SU-1 River Transect at PZ-201

GE Hudson Falls Tunnel Drain Collection System
By: Ocean Surveys Inc. 3-10-2009

Easting	Northing	Elevation
696985.50	1201477.78	111.78
696985.69	1201476.78	111.78
696985.82	1201475.77	111.68
696985.88	1201474.87	111.68
696986.01	1201473.87	111.68
696986.12	1201472.78	111.58
696986.20	1201471.86	111.58
696986.30	1201470.87	111.48
696986.44	1201469.88	111.48
696986.58	1201468.74	111.38
696986.66	1201467.88	111.28
696986.71	1201466.79	111.38
696986.83	1201465.77	111.28
696986.93	1201464.78	111.28
696987.00	1201463.78	111.28
696987.07	1201462.78	111.28
696987.22	1201461.80	111.28
696987.31	1201460.79	111.28
696987.39	1201459.79	111.48
696987.53	1201458.77	111.58
696987.65	1201457.78	111.78
696987.82	1201456.87	111.88
696987.91	1201455.88	111.98
696988.02	1201454.91	111.98
696988.17	1201453.83	111.88
696988.26	1201452.82	111.78
696988.38	1201451.84	111.78
696988.56	1201450.84	111.68
696988.65	1201449.82	111.68
696988.79	1201448.84	111.68
696988.96	1201447.93	111.68
696989.14	1201446.93	111.98
696989.25	1201445.94	111.98
696989.37	1201444.97	112.28
696989.60	1201444.00	112.58
696989.78	1201443.00	112.68
696990.03	1201441.99	112.78
696990.19	1201440.98	112.68
696990.37	1201440.03	112.78

Table SU-1 River Transect at PZ-201

GE Hudson Falls Tunnel Drain Collection System
By: Ocean Surveys Inc. 3-10-2009

Easting	Northing	Elevation
696990.57	1201439.04	112.88
696990.73	1201437.99	113.08
696990.76	1201437.09	113.18
696990.74	1201436.06	113.28
696990.95	1201435.13	113.48
696991.17	1201434.13	113.58
696991.35	1201433.15	114.08
696991.53	1201432.19	114.28
696991.82	1201431.19	114.48
696992.05	1201430.22	114.48
696992.16	1201429.15	114.48
696992.38	1201428.17	114.38
696992.62	1201427.22	114.28
696992.89	1201426.24	114.28
696993.14	1201425.35	114.28
696993.37	1201424.34	114.38
696994.10	1201423.50	114.38
696994.38	1201422.53	114.28
696994.60	1201421.57	114.28
696994.81	1201420.58	114.28
696995.14	1201419.63	114.38
696995.43	1201418.65	114.48
696995.77	1201417.60	114.68
696996.02	1201416.59	114.68
696996.25	1201415.76	114.78
696996.54	1201414.78	114.78
696996.74	1201413.83	114.68
696997.00	1201412.69	114.68
696997.23	1201411.75	114.88
696997.46	1201410.80	114.78
696997.68	1201409.83	114.78
696997.92	1201408.88	114.68
696998.15	1201407.87	114.58
696998.34	1201406.90	114.58
696998.32	1201405.81	114.48
696998.33	1201404.83	114.48
696998.52	1201403.86	114.58
696998.73	1201402.89	114.88
696998.91	1201401.91	114.78

Table SU-1 River Transect at PZ-201

GE Hudson Falls Tunnel Drain Collection System
By: Ocean Surveys Inc. 3-10-2009

Easting	Northing	Elevation
696999.05	1201400.94	114.98
696999.22	1201399.97	114.98
696999.37	1201399.02	115.18
696999.51	1201398.07	115.38
696999.69	1201396.94	115.28
696999.83	1201396.01	115.08
696999.99	1201395.07	115.08
697000.16	1201394.07	115.08
697000.35	1201393.11	115.38
697000.47	1201392.00	115.68
697000.59	1201391.02	116.18
697000.75	1201390.11	116.38
697000.94	1201389.07	116.38
697001.06	1201388.16	116.48
697001.17	1201387.19	117.08
697001.39	1201386.14	117.68
697001.57	1201385.17	117.98
697001.70	1201384.14	118.18
697001.78	1201383.20	118.28
697001.97	1201382.20	118.38
697002.11	1201381.24	118.48
697002.27	1201380.22	118.48
697002.39	1201379.24	118.48
697002.58	1201378.29	119.28
697002.76	1201377.30	119.38
697002.91	1201376.25	119.48
697003.08	1201375.33	119.98
697003.23	1201374.34	121.68
697003.92	1201373.41	122.08
697004.04	1201372.46	121.98
697004.09	1201371.45	121.88
697004.22	1201370.41	121.78
697004.28	1201369.38	122.68
697004.36	1201368.42	123.38
697004.48	1201367.44	123.18
697004.45	1201366.40	123.28
697004.36	1201365.40	123.48
697004.35	1201364.37	123.48
697004.15	1201363.34	123.18

Table SU-1 River Transect at PZ-201

GE Hudson Falls Tunnel Drain Collection System
By: Ocean Surveys Inc. 3-10-2009

Easting	Northing	Elevation
697004.05	1201362.29	123.48
697003.97	1201361.27	123.48
697003.86	1201360.23	123.38
697003.36	1201359.11	123.28
697003.11	1201357.99	124.08
697002.94	1201356.99	124.78
697002.85	1201355.93	124.43
697002.89	1201354.93	124.16
697002.74	1201353.77	124.51
697002.52	1201352.85	125.83
697002.48	1201351.82	138.18

HUDSON FALLS HYDROELECTRIC PROJECT SPILLWAY

BAKERS FALLS

N

M1 M2 M3 M4 M5 M6

M38 M39 M40 M42

3 STA. 3+50

3 STA. 3+00

3 STA. 2+00

3 STA. 1+00

ROOM 3-I

TUNNEL 3

ROOM 1-I

NORTH TRANSECT
LINE END POINT
N 1201629
E 696950
ELEV. 136.78'

RIVER TRANSECT
BATHYMETRIC SURVEY
LINE ALONG ALIGNMENT
OF PZ-201 (APPROX.)
NOTE 2

RIVER ELEVATION
MEASURED NOV. 2008 AT
LOCATION R4=133.34

2 STA. 0+00

1 STA. 3+25

3 STA. 0+00

3 STA. 1+00

2 STA. 1+00

2 STA. 2+00

1 STA. 2+00

BATHYMETERIC CONTOURS
FROM VARIOUS SOURCES
AND ARE APPROXIMATE

SOUTH TRANSECT
LINE END POINT
N 1201351
E 697002
ELEV. 138.18'

2 STA. 2+93

TUNNEL 2

TUNNEL 1

1 STA. 1+00

1 STA. 0+00

HUDSON RIVER

HUDSON RIVER
WATER LINE

ROOM 2-I

SHAFT

ALLEN STREET

JOHN STREET

PROJECT BENCHMARK
BL_BBL_GE-02
CONCRETE MONUMENT W/ REBAR
ELEV. 234.38
N 1201572.62
E 697745.06

PROJECT BENCHMARK
BL_BBL_GE-03
CONCRETE MONUMENT W/ REBAR
ELEV. 286.70
N 1201280.47
E 697653.53

0 80'
Scale in feet

NOTE:

1. RIVER TRANSECT SURVEY PERFORMED BY OCEAN SURVEYS, INC. ON 3/10/2009
2. REFER TO PIEZOMETER INSTALLATION FIGURE PZ-201
3. REFER TO TABLE SU-1 FOR SPECIFIC COORDINATE DATA OF SURVEY

TITLE: RIVER TRANSECT SURVEY AT PZ-201

LOCATION: TDCS GE Hudson Falls, New York

TETRA TECH GEO

APPROVED	JFB JRB
DRAFTED	RMK
PROJECT#	117-2204
DATE	FEB 2011

FIGURE SU-1

G:\GE_HUDS\2010\12-10_TDCS-EVAL-RPT\RIVER-TRANSECT.DWG