RECORD OF BOREHOLE GS-AP-MW-25H

PROJECT: Gorgas Ash Pond
PROJECT NUMBER: 18114896
DRILLED DEPTH: 170.00 ft
LOCATION: West of AP under powerline

DRILL RIG: TSI Track Rig
DATE STARTED: 1/23/19
DATE COMPLETED: 1/2/19

NORTHING: 1,322,710.44
EASTING: 2,061,621.52
GS ELEVATION: 458.66
TOC ELEVATION: 461.79 ft

DEPTH W.L.:
DATE W.L.:
TIME W.L.:
GW ELEVATION:

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE: DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	SAMPLES: SAMPLE NO.	TYPE	REC	MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES	WELL CONSTRUCTION DETAILS
40		36.00 - 47.00 Fresh; light gray; medium to coarse grained; SANDSTONE with occasional interbeds of laminated SHALE. *(Continued)*								
	415									
45						5		9.00 / 10.00		
		46.50: Iron staining.			411.66					
		47.00 - 50.00 Fresh; strong; dark gray; interbedded laminated SHALE and very to thinly bedded SANDSTONE.			47.00					
	410									
50					408.66					
		50.00 - 70.00 Fresh; strong; dark gray; laminated SHALE with occasional interbeds of thinly bedded to laminated SANDSTONE.			50.00					
	405									
55						6		9.50 / 10.00		
	400									
60		60.00 - 70.00 Broken core.								
	395									
65						7		5.00 / 10.00		
	390									
70					388.66					
		70.00 - 99.25 Fresh; strong; dark gray; some bioturbation; interbedded laminated SHALE and fine to medium grained, thinly to thickly laminated SANDSTONE.			70.00					
	385									
75						8		10.00 / 10.00		
	380									
80		Log continued on next page								

WELL CASING
Interval: 0' - 155'
Material: Schedule 40 PVC
Diameter: 2"
Joint Type: Flush

WELL SCREEN
Interval: 155' - 165'
Material: Schedule 40 PVC U-Pack
Diameter: 2"
Slot Size: 0.010"
End Cap: 6", 2"-diameter, Sump

FILTER PACK
Interval: 153' - 170'
Type: Filter Media #10 Sand

FILTER PACK SEAL
Interval: 148' - 153'
Type: Bentonite Pellets

ANNULUS SEAL
Interval: 0' - 148'
Type: Aquaguard Bentonite Grout

WELL COMPLETION
Pad: 4'x4' Concrete Pad
Protective Casing: 3' Stick-Ups

DRILLING METHODS
Soil Drill: Sonic
Rock Drill: Sonic

DRAFT

LOG SCALE: 1 in = 5 ft
DRILLING COMPANY: Cascade Drilling, L.P.
DRILLER: J. Asua

GA INSPECTOR: David Hannam
CHECKED BY: Tim Richards
DATE: 4/5/19

Golder Associates

RECORD OF BOREHOLE GS-AP-MW-25H

PROJECT: Gorgas Ash Pond
PROJECT NUMBER: 18114896
DRILLED DEPTH: 170.00 ft
LOCATION: West of AP under powerline

DRILL RIG: TSI Track Rig
DATE STARTED: 1/23/19
DATE COMPLETED: 1/2/19

NORTHING: 1,322,710.44
EASTING: 2,061,621.52
GS ELEVATION: 458.66
TOC ELEVATION: 461.79 ft

DEPTH W.L.:
DATE W.L.:
TIME W.L.:
GW ELEVATION:

DEPTH (ft)	ELEVATION (ft)	DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	SAMPLE NO.	TYPE	REC
80		70.00 - 99.25 Fresh; strong; dark gray; some bioturbation; interbedded laminated SHALE and fine to medium grained, thinly to thickly laminated SANDSTONE. *(Continued)*						
	375							
85						9		10.00 / 10.00
	370							
90								
	365							
95						10		9.00 / 10.00
	360				359.41			
100		99.25 - 102.00 Fresh; strong; light gray; SANDSTONE with occastional thin beds or laminations of SILTSTONE and SHALE.			99.25			
					356.66			
	355	102.00 - 107.00 Fresh; strong; dark gray; interbedded/interlaminated SILTSTONE, SANDSTONE, and SHALE.			102.00			
105						11		9.50 / 10.00
					351.66			
		107.00 - 113.00 Fresh; strong; light gray; SANDSTONE with occastional thin beds and laminates of SILTSTONE and SHALE.			107.00			
	350							
110								
					345.66			
	345	113.00 - 116.00 Fresh; strong; dark gray; laminated SHALE with occastional interbeds of SANDSTONE and SILTSTONE.			113.00			
115						12		8.00 / 10.00
					342.66			
		116.00 - 120.00 Fresh; strong; dark gray; interbedded SILTSTONE and SANDSTONE.			116.00			
	340							
120					338.66			

Log continued on next page

WELL CASING
Interval: 0' - 155'
Material: Schedule 40 PVC
Diameter: 2"
Joint Type: Flush

WELL SCREEN
Interval: 155' - 165'
Material: Schedule 40 PVC U-Pack
Diameter: 2"
Slot Size: 0.010"
End Cap: 6", 2"-diameter, Sump

FILTER PACK
Interval: 153' - 170'
Type: Filter Media #10 Sand

FILTER PACK SEAL
Interval: 148' - 153'
Type: Bentonite Pellets

ANNULUS SEAL
Interval: 0' - 148'
Type: Aquaguard Bentonite Grout

WELL COMPLETION
Pad: 4'x4' Concrete Pad
Protective Casing: 3' Stick-Ups

DRILLING METHODS
Soil Drill: Sonic
Rock Drill: Sonic

DRAFT

LOG SCALE: 1 in = 5 ft
DRILLING COMPANY: Cascade Drilling, L.P.
DRILLER: J. Asua

GA INSPECTOR: David Hannam
CHECKED BY: Tim Richards
DATE: 4/5/19

Golder Associates

RECORD OF BOREHOLE GS-AP-MW-25H

PROJECT: Gorgas Ash Pond
PROJECT NUMBER: 18114896
DRILLED DEPTH: 170.00 ft
LOCATION: West of AP under powerline

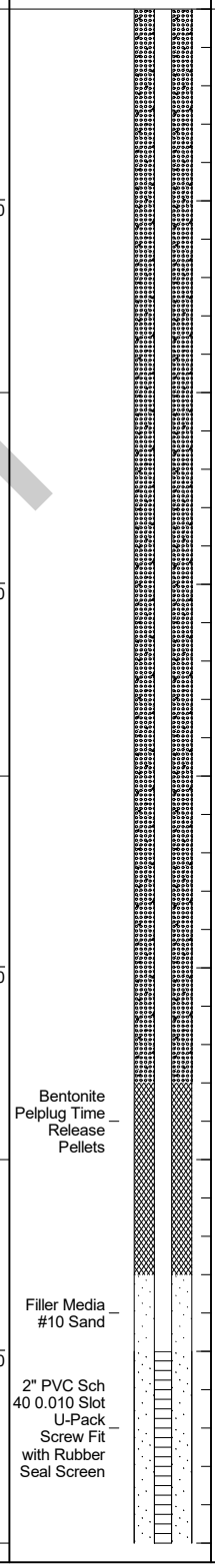
DRILL RIG: TSI Track Rig
DATE STARTED: 1/23/19
DATE COMPLETED: 1/2/19

NORTHING: 1,322,710.44
EASTING: 2,061,621.52
GS ELEVATION: 458.66
TOC ELEVATION: 461.79 ft

DEPTH W.L.:
DATE W.L.:
TIME W.L.:
GW ELEVATION:

DEPTH (ft)	ELEVATION (ft)	DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	SAMPLE NO.	TYPE	REC
120		120.00 - 122.00 Fresh; strong; dark gray; laminated SHALE.			120.00 336.66			
		122.00 - 148.00 Fresh; strong; dark gray; SILTSTONE with interbeds of laminated SHALE.			122.00			
	335							
125						13		8.00 10.00
	330							
130								
	325							
135						14		6.50 10.00
	320							
140								
	315							
145						15		6.50 10.00
					310.66			
	310	148.00 - 158.00 Fresh; strong; light gray; SANDSTONE with SHALE partings.			148.00			
150								
	305							
155						16		6.50 10.00
					300.66			
	300	158.00 - 159.00 COAL.			158.00 299.66			
					159.00			
160		Log continued on next page						

MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES



WELL CONSTRUCTION DETAILS

WELL CASING
Interval: 0' - 155'
Material: Schedule 40 PVC
Diameter: 2"
Joint Type: Flush

WELL SCREEN
Interval: 155' - 165'
Material: Schedule 40 PVC U-Pack
Diameter: 2"
Slot Size: 0.010"
End Cap: 6", 2"-diameter, Sump

FILTER PACK
Interval: 153' - 170'
Type: Filter Media #10 Sand

FILTER PACK SEAL
Interval: 148' - 153'
Type: Bentonite Pellets

ANNULUS SEAL
Interval: 0' - 148'
Type: Aquaguard Bentonite Grout

WELL COMPLETION
Pad: 4'x4' Concrete Pad
Protective Casing: 3' Stick-Ups

DRILLING METHODS
Soil Drill: Sonic
Rock Drill: Sonic

DRAFT

LOG SCALE: 1 in = 5 ft
DRILLING COMPANY: Cascade Drilling, L.P.
DRILLER: J. Asua

GA INSPECTOR: David Hannam
CHECKED BY: Tim Richards
DATE: 4/5/19

Golder Associates

RECORD OF BOREHOLE GS-AP-MW-25H

SHEET 5 of 5

PROJECT: Gorgas Ash Pond
PROJECT NUMBER: 18114896
DRILLED DEPTH: 170.00 ft
LOCATION: West of AP under powerline

DRILL RIG: TSI Track Rig
DATE STARTED: 1/23/19
DATE COMPLETED: 1/2/19

NORTHING: 1,322,710.44
EASTING: 2,061,621.52
GS ELEVATION: 458.66
TOC ELEVATION: 461.79 ft

DEPTH W.L.:
DATE W.L.:
TIME W.L.:
GW ELEVATION:

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE: DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	SAMPLES: SAMPLE NO.	TYPE	REC	MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES	WELL CONSTRUCTION DETAILS
160		159.00 - 170.00 Fresh; strong; gray; medium grained; SANDSTONE with COAL partings. *(Continued)* 161.00: 4" vertical fracture, 90 degree, planar, smooth, calcite traces.								
165	295					17		10.00	Sand filter pack	
170	290	167.00: 4" vertical fracture, 90 degree, planar, smooth, calcite traces.			288.66					
175	285	Boring completed at 170.00 ft								
180	280									
185	275									
190	270									
195	265									
200	260									

WELL CASING
Interval: 0' - 155'
Material: Schedule 40 PVC
Diameter: 2"
Joint Type: Flush

WELL SCREEN
Interval: 155' - 165'
Material: Schedule 40 PVC U-Pack
Diameter: 2"
Slot Size: 0.010"
End Cap: 6", 2"-diameter, Sump

FILTER PACK
Interval: 153' - 170'
Type: Filter Media #10 Sand

FILTER PACK SEAL
Interval: 148' - 153'
Type: Bentonite Pellets

ANNULUS SEAL
Interval: 0' - 148'
Type: Aquaguard Bentonite Grout

WELL COMPLETION
Pad: 4'x4' Concrete Pad
Protective Casing: 3' Stick-Ups

DRILLING METHODS
Soil Drill: Sonic
Rock Drill: Sonic

DRAFT

LOG SCALE: 1 in = 5 ft
DRILLING COMPANY: Cascade Drilling, L.P.
DRILLER: J. Asua

GA INSPECTOR: David Hannam
CHECKED BY: Tim Richards
DATE: 4/5/19

Golder Associates

RECORD OF BOREHOLE GS-AP-MW-26H

SHEET 1 of 6

PROJECT: Gorgas Ash Pond
PROJECT NUMBER: 18114896
DRILLED DEPTH: 210.00 ft
LOCATION:

DRILL RIG: TSI 150CC
DATE STARTED: 1/10/19
DATE COMPLETED: 1/22/19

NORTHING: 1,321,144.11
EASTING: 2,061,189.28
GS ELEVATION: 391.68
TOC ELEVATION: 394.68 ft

DEPTH W.L.:
DATE W.L.:
TIME W.L.:
GW ELEVATION:

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	SAMPLES SAMPLE NO.	SAMPLES TYPE	SAMPLES REC	MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES	WELL CONSTRUCTION DETAILS
0	390	0.00 - 10.00 (GP), sandy GRAVEL, some silt, some clay; fine to coarse gravel, fine to coarse sand; brown with orange yellow; non-cohesive, moist to dry.	GP		381.68 10.00	1		9.90 10.00	Grout (Portland Cement Type – I) and Bentonite	**WELL CASING** Interval: 0' - 180' Material: Schedule 40 PVC Diameter: 2" Joint Type: Flush **WELL SCREEN** Interval: 180' - 190' Material: Schedule 40 PVC U-Pack Diameter: 2" Slot Size: 0.010" End Cap: 6", 2"-diameter, Sump **FILTER PACK** Interval: 177' - 192' Type: Filter Media #10 Sand **FILTER PACK SEAL** Interval: 172.5' - 177' Type: Bentonite Pellets **ANNULUS SEAL** Interval: 0' - 172.5' Type: Grout (Portland Cement Type I) and bentonite **WELL COMPLETION** Pad: 4'x4' Concrete Pad Protective Casing: 3' Stick-Ups **DRILLING METHODS** Soil Drill: Sonic Rock Drill: Sonic
5	385									
10	380	10.00 - 15.00 (GP), sandy GRAVEL, gravel of completely weathered shale/siltstone/sandstone; brown to gray; non-cohesive, dry. [SAPROLITE]	GP		376.68 15.00	2		10.00 10.00		
15	375	15.00 - 30.00 Slightly to highly weathered; weak to strong; dark gray to light gray; interbedded SHALE and SILTSTONE. 15.01 - 50.00 Iron staining. Highly fractured along bedding planes at 0 degrees, smooth, undulating fractures; fractures possibly drilling induced.								
20	370	20.00 - 30.00 Fractures mostly at 0 degrees; smooth, undulating; possibly driling induced				3		6.50 10.00		
25	365	25.50 - 26.00 Crushed zone.			365.68					
		29.00 - 29.70 Crushed zone.			361.98 361.68					
30	360	30.10 - 35.00 Crushed zone.								
35	355	35.00 - 40.00 0 degree, smooth, undulating to stepped fractures along bedding planes; possibly drilling induced.			356.68 35.00	4		6.50 10.00		
40					351.68					

Log continued on next page

DRAFT

LOG SCALE: 1 in = 5 ft
DRILLING COMPANY: Cascade Drilling, L.P.
DRILLER: T. Taylor

GA INSPECTOR: Chris Tidwell
CHECKED BY: David Hannam
DATE: 4/5/19

Golder Associates

RECORD OF BOREHOLE GS-AP-MW-26H

PROJECT: Gorgas Ash Pond
PROJECT NUMBER: 18114896
DRILLED DEPTH: 210.00 ft
LOCATION:

DRILL RIG: TSI 150CC
DATE STARTED: 1/10/19
DATE COMPLETED: 1/22/19

NORTHING: 1,321,144.11
EASTING: 2,061,189.28
GS ELEVATION: 391.68
TOC ELEVATION: 394.68 ft

DEPTH W.L.:
DATE W.L.:
TIME W.L.:
GW ELEVATION:

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	SAMPLES SAMPLE NO.	SAMPLES TYPE	SAMPLES REC	MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES
40		15.01 - 50.00 Iron staining. Highly fractured along bedding planes at 0 degrees, smooth, undulating fractures; fractures possibly drilling induced. *(Continued)* 40.10 - 80.00 0 degree, smooth, stepped, fractures. Possibly driling induced.							
	350								
45						5		9.00 / 10.00	
	345								
		48.00 - 50.00 Crushed zone.							
50					341.68				
		50.00 - 60.00 Slightly weathered; medium strong to strong; light gray to dark gray; interbedded SANDSTONE, SILTSTONE, and SHALE.			50.00				
	340								
55						6		10.00	
	335								
60					331.68				
		60.00 - 65.00 Moderately weathered; weak to medium strong; dark gray; SHALE with thinly laminated interbeds of SANDSTONE and SILTSTONE.			60.00				
	330								
65					326.68	7		7.50 / 10.00	
		65.00 - 70.00 Moderately weathered; medium strong to strong; light gray to gray; SANDSTONE with thin interbeds of SHALE and SILTSTONE.			65.00				
	325								
70					321.68				
		70.00 - 100.00 Slightly weathered; medium strong to strong; light gray to dark gray; thinly laminated and interbedded SANDSTONE, SILTSTONE, and SHALE.			70.00				
	320								
75						8		10.00 / 10.00	
	315								
80					311.68				

Log continued on next page

WELL CASING
Interval: 0' - 180'
Material: Schedule 40 PVC
Diameter: 2"
Joint Type: Flush

WELL SCREEN
Interval: 180' - 190'
Material: Schedule 40 PVC U-Pack
Diameter: 2"
Slot Size: 0.010"
End Cap: 6", 2"-diameter, Sump

FILTER PACK
Interval: 177' - 192'
Type: Filter Media #10 Sand

FILTER PACK SEAL
Interval: 172.5' - 177'
Type: Bentonite Pellets

ANNULUS SEAL
Interval: 0' - 172.5'
Type: Grout (Portland Cement Type I) and bentonite

WELL COMPLETION
Pad: 4'x4' Concrete Pad
Protective Casing: 3' Stick-Ups

DRILLING METHODS
Soil Drill: Sonic
Rock Drill: Sonic

DRAFT

LOG SCALE: 1 in = 5 ft
DRILLING COMPANY: Cascade Drilling, L.P.
DRILLER: T. Taylor

GA INSPECTOR: Chris Tidwell
CHECKED BY: David Hannam
DATE: 4/5/19

Golder Associates

RECORD OF BOREHOLE GS-AP-MW-26H

PROJECT: Gorgas Ash Pond
PROJECT NUMBER: 18114896
DRILLED DEPTH: 210.00 ft
LOCATION:

DRILL RIG: TSI 150CC
DATE STARTED: 1/10/19
DATE COMPLETED: 1/22/19

NORTHING: 1,321,144.11
EASTING: 2,061,189.28
GS ELEVATION: 391.68
TOC ELEVATION: 394.68 ft

DEPTH W.L.:
DATE W.L.:
TIME W.L.:
GW ELEVATION:

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE: DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	SAMPLES: SAMPLE NO.	TYPE	REC	MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES	WELL CONSTRUCTION DETAILS
80		70.00 - 100.00 Slightly weathered; medium strong to strong; light gray to dark gray; thinly laminated and interbedded SANDSTONE, SILTSTONE, and SHALE. *(Continued)* 80.00 - 100.00 0 degree, smooth, stepped, fractures. Possibly driling induced.			80.00					
	310									
85						9		10.00 / 10.00		
	305									
90										
	300									
95						10		9.00 / 10.00		
	295									
100					291.68					
	290	100.00 - 120.00 Slightly weathered to fresh; medium strong; light gray to dark gray; SANDSTONE with thin interbeds of SHALE and SILTSTONE. Fractures at 0 degrees at bedding planes/partings, smooth, stepped to undulating, clean, possibly drilling induced.			100.00					
105						11		9.00 / 10.00		
	285									
110										
	280									
115						12		5.00 / 10.00		
	275									
120					271.68					

Log continued on next page

WELL CASING
Interval: 0' - 180'
Material: Schedule 40 PVC
Diameter: 2"
Joint Type: Flush

WELL SCREEN
Interval: 180' - 190'
Material: Schedule 40 PVC U-Pack
Diameter: 2"
Slot Size: 0.010"
End Cap: 6", 2"-diameter, Sump

FILTER PACK
Interval: 177' - 192'
Type: Filter Media #10 Sand

FILTER PACK SEAL
Interval: 172.5' - 177'
Type: Bentonite Pellets

ANNULUS SEAL
Interval: 0' - 172.5'
Type: Grout (Portland Cement Type I) and bentonite

WELL COMPLETION
Pad: 4'x4' Concrete Pad
Protective Casing: 3' Stick-Ups

DRILLING METHODS
Soil Drill: Sonic
Rock Drill: Sonic

DRAFT

LOG SCALE: 1 in = 5 ft
DRILLING COMPANY: Cascade Drilling, L.P.
DRILLER: T. Taylor

GA INSPECTOR: Chris Tidwell
CHECKED BY: David Hannam
DATE: 4/5/19

Golder Associates

RECORD OF BOREHOLE GS-AP-MW-26H

PROJECT: Gorgas Ash Pond
PROJECT NUMBER: 18114896
DRILLED DEPTH: 210.00 ft
LOCATION:

DRILL RIG: TSI 150CC
DATE STARTED: 1/10/19
DATE COMPLETED: 1/22/19

NORTHING: 1,321,144.11
EASTING: 2,061,189.28
GS ELEVATION: 391.68
TOC ELEVATION: 394.68 ft

DEPTH W.L.:
DATE W.L.:
TIME W.L.:
GW ELEVATION:

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE: DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	SAMPLES: SAMPLE NO.	TYPE	REC	MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES	WELL CONSTRUCTION DETAILS
120		120.00 - 150.00 Moderately weathered; weak to strong; light gray to dark gray; interbedded SHALE, SILTSTONE, and SANDSTONE. 0 degree, smooth, stepped, clean, fractures. Possibly drilling induced.			120.00					
125	270					13		5.00 / 10.00		
130	265									
135	260					14		6.50 / 10.00		
140	255									
145	250					15		6.00 / 10.00		
150	245				241.68					
		150.00 - 160.00 Fresh to slightly weathered; medium strong to strong; gray; SANDSTONE with large 6-12" beds of thinly laminated SHALE and SILTSTONE interbeds. 0 degree, smooth, stepped, clean, fractures. Possibly drilling induced.			150.00					
155	240					16		8.50 / 10.00		
160	235				231.68					
		Log continued on next page								

WELL CASING
Interval: 0' - 180'
Material: Schedule 40 PVC
Diameter: 2"
Joint Type: Flush

WELL SCREEN
Interval: 180' - 190'
Material: Schedule 40 PVC U-Pack
Diameter: 2"
Slot Size: 0.010"
End Cap: 6", 2"-diameter, Sump

FILTER PACK
Interval: 177' - 192'
Type: Filter Media #10 Sand

FILTER PACK SEAL
Interval: 172.5' - 177'
Type: Bentonite Pellets

ANNULUS SEAL
Interval: 0' - 172.5'
Type: Grout (Portland Cement Type I) and bentonite

WELL COMPLETION
Pad: 4'x4' Concrete Pad
Protective Casing: 3' Stick-Ups

DRILLING METHODS
Soil Drill: Sonic
Rock Drill: Sonic

DRAFT

LOG SCALE: 1 in = 5 ft
DRILLING COMPANY: Cascade Drilling, L.P.
DRILLER: T. Taylor

GA INSPECTOR: Chris Tidwell
CHECKED BY: David Hannam
DATE: 4/5/19

Golder Associates

RECORD OF BOREHOLE GS-AP-MW-26H

PROJECT: Gorgas Ash Pond
PROJECT NUMBER: 18114896
DRILLED DEPTH: 210.00 ft
LOCATION:

DRILL RIG: TSI 150CC
DATE STARTED: 1/10/19
DATE COMPLETED: 1/22/19

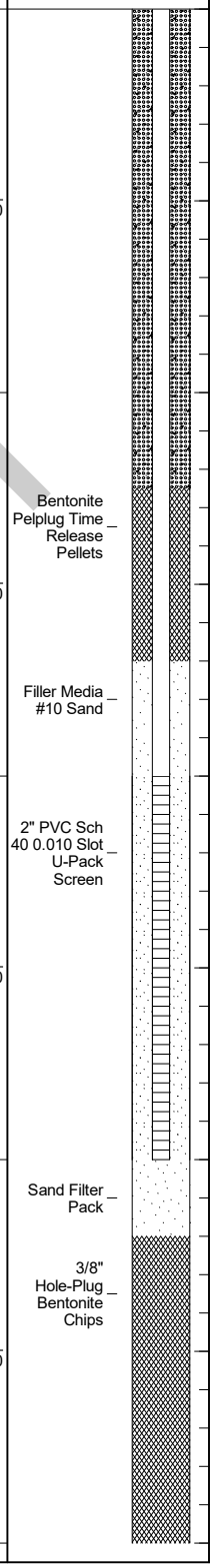
NORTHING: 1,321,144.11
EASTING: 2,061,189.28
GS ELEVATION: 391.68
TOC ELEVATION: 394.68 ft

DEPTH W.L.:
DATE W.L.:
TIME W.L.:
GW ELEVATION:

DEPTH (ft)	ELEVATION (ft)	DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	SAMPLE NO.	TYPE	REC
160		160.00 - 180.00 Fresh to moderately weathered; weak to medium strong; gray to dark gray; interbedded SHALE and SILTSTONE and trace to some thin beds of SANDSTONE. Highly fractured at all angles, predominantly at 0 degrees along partings/planes, smooth, undulating, possibly drilling induced.			160.00			
	230							
		164.00 - 164.50 Crushed zone.			227.18	17		8.00 / 10.00
165								
	225							
		168.00 - 169.00 Crushed zone.			222.68			
170								
	220							
175						18		6.50 / 10.00
	215							
					211.68			
180		180.00 - 190.00 Light to dark gray; weak; interbedded very thinly laminated to thinly bedded SHALE and SILTSTONE; smooth; undulating beds and partings. Crushed zone.			180.00			
	210							
185						19		4.50 / 10.00
	205							
					201.68			
190		190.00 - 210.00 Light gray to dark gray; medium strong to strong; SANDSTONE with thin interbeds of SHALE and SILTSTONE.			190.00			
	200							
195						20		9.50 / 10.00
	195							
200								

Log continued on next page

MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES



WELL CONSTRUCTION DETAILS

WELL CASING
Interval: 0' - 180'
Material: Schedule 40 PVC
Diameter: 2"
Joint Type: Flush

WELL SCREEN
Interval: 180' - 190'
Material: Schedule 40 PVC U-Pack
Diameter: 2"
Slot Size: 0.010"
End Cap: 6", 2"-diameter, Sump

FILTER PACK
Interval: 177' - 192'
Type: Filter Media #10 Sand

FILTER PACK SEAL
Interval: 172.5' - 177'
Type: Bentonite Pellets

ANNULUS SEAL
Interval: 0' - 172.5'
Type: Grout (Portland Cement Type I) and bentonite

WELL COMPLETION
Pad: 4'x4' Concrete Pad
Protective Casing: 3' Stick-Ups

DRILLING METHODS
Soil Drill: Sonic
Rock Drill: Sonic

DRAFT

LOG SCALE: 1 in = 5 ft
DRILLING COMPANY: Cascade Drilling, L.P.
DRILLER: T. Taylor

GA INSPECTOR: Chris Tidwell
CHECKED BY: David Hannam
DATE: 4/5/19

Golder Associates

RECORD OF BOREHOLE GS-AP-MW-26H

PROJECT: Gorgas Ash Pond
PROJECT NUMBER: 18114896
DRILLED DEPTH: 210.00 ft
LOCATION:

DRILL RIG: TSI 150CC
DATE STARTED: 1/10/19
DATE COMPLETED: 1/22/19

NORTHING: 1,321,144.11
EASTING: 2,061,189.28
GS ELEVATION: 391.68
TOC ELEVATION: 394.68 ft

DEPTH W.L.:
DATE W.L.:
TIME W.L.:
GW ELEVATION:

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE: DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	SAMPLES: SAMPLE NO.	SAMPLES: TYPE	SAMPLES: REC	MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES	WELL CONSTRUCTION DETAILS
200		190.00 - 210.00 Light gray to dark gray; medium strong to strong; SANDSTONE with thin interbeds of SHALE and SILTSTONE. *(Continued)* 200.00: SANDSTONE becomes more prominant downhole with less interbeds of SHALE and SILTSTONE.								
	190									
205						21		10.00 / 10.00		
	185									
210					181.68					
		Boring completed at 210.00 ft								
	180									
215										
	175									
220										
	170									
225										
	165									
230										
	160									
235										
	155									
240										

WELL CASING
Interval: 0' - 180'
Material: Schedule 40 PVC
Diameter: 2"
Joint Type: Flush

WELL SCREEN
Interval: 180' - 190'
Material: Schedule 40 PVC U-Pack
Diameter: 2"
Slot Size: 0.010"
End Cap: 6", 2"-diameter, Sump

FILTER PACK
Interval: 177' - 192'
Type: Filter Media #10 Sand

FILTER PACK SEAL
Interval: 172.5' - 177'
Type: Bentonite Pellets

ANNULUS SEAL
Interval: 0' - 172.5'
Type: Grout (Portland Cement Type I) and bentonite

WELL COMPLETION
Pad: 4'x4' Concrete Pad
Protective Casing: 3' Stick-Ups

DRILLING METHODS
Soil Drill: Sonic
Rock Drill: Sonic

DRAFT

LOG SCALE: 1 in = 5 ft
DRILLING COMPANY: Cascade Drilling, L.P.
DRILLER: T. Taylor

GA INSPECTOR: Chris Tidwell
CHECKED BY: David Hannam
DATE: 4/5/19

Golder Associates

RECORD OF BOREHOLE GS-AP-MW-27H

SHEET 1 of 7

PROJECT: Gorgas Ash Pond
PROJECT NUMBER: 18114896
DRILLED DEPTH: 265.00 ft
LOCATION: On track from Bankhead Road to overhead poully, southwest of pond

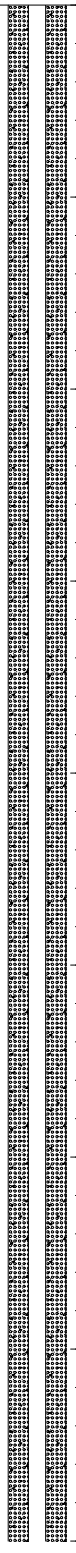
DRILL RIG: TSI Truck Rig
DATE STARTED: 1/31/19
DATE COMPLETED: 2/12/19

NORTHING: 1,317,251.09
EASTING: 2,063,507.76
GS ELEVATION: 532.08
TOC ELEVATION: 535.03 ft

DEPTH W.L.:
DATE W.L.:
TIME W.L.:
GW ELEVATION:

DEPTH (ft)	ELEVATION (ft)	DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	SAMPLE NO.	TYPE	REC
0		0.00 - 2.00 (CL), CLAY; orange brown; cohesive, moist; rootlets. [RESIDUUM]	CL		530.08			
	530	2.00 - 19.00 (ML), SILT, trace sand, trace gravel; brown; non-cohesive, dry, w < PL; structure destroyed by drilling. [SAPROLITE]			2.00	1		5.00 5.00
5								
	525							
10			ML			2		10.00 10.00
	520							
15					513.08			
	515	19.00 - 20.50 Highly weathered; very weak; gray; SHALE with interbedded SANDSTONE and SILTSTONE.			19.00 511.58	3		4.50 10.00
20		20.50 - 23.00 Fresh; strong; gray; SHALE with interbedded SANDSTONE and SILTSTONE. 21.00: 0 degree fracture, smooth, straight, iron staining. 21.50: 0 degree fracture, undulating, smooth, iron staining.			20.50 509.08			
	510	23.00 - 26.00 Fresh; strong; dark gray; laminated SHALE.			23.00 506.08			
25		26.00 - 29.00 Fresh; very strong; bioturbation; interbedded SANDSTONE and SILTSTONE. 27.50: 60 degree fracture, stepped, rough, iron staining.			26.00 503.08			
	505	29.00 - 69.00 Fresh; very strong; dark gray; bioturbation; interbedded laminated SANDSTONE, SILTSTONE, and SHALE.			29.00	4		9.50 10.00
30								
	500							
35						5		10.00 10.00
	495	38.50: 60 degree fracture, planar, rough, iron staining.						
40		Log continued on next page						

MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES



WELL CONSTRUCTION DETAILS

WELL CASING
Interval: 0' - 232'
Material: Schedule 40 PVC
Diameter: 2"
Joint Type: Flush

WELL SCREEN
Interval: 232' - 242'
Material: Schedule 40 PVC U-Pack
Diameter: 2"
Slot Size: 0.010"
End Cap: 6", 2"-diameter, Sump

FILTER PACK
Interval: 226' - 244'
Type: GP #10 Sand

FILTER PACK SEAL
Interval: 222' - 226'
Type: Bentonite Pellets

ANNULUS SEAL
Interval: 0' - 222'
Type: Grout (Bentonite Grout, Premix Aquaguard)

WELL COMPLETION
Pad: 4'x4' Concrete Pad
Protective Casing: 3' Stick-Ups

DRILLING METHODS
Soil Drill: Sonic
Rock Drill: Sonic

DRAFT

LOG SCALE: 1 in = 5 ft
DRILLING COMPANY: Cascade Drilling, L.P.
DRILLER: T. Taylor

GA INSPECTOR: David Hannam
CHECKED BY: Tim Richards
DATE: 4/5/19

Golder Associates

RECORD OF BOREHOLE GS-AP-MW-27H

PROJECT: Gorgas Ash Pond
PROJECT NUMBER: 18114896
DRILLED DEPTH: 265.00 ft
LOCATION: On track from Bankhead Road to overhead poully, southwest of pond
DRILL RIG: TSI Truck Rig
DATE STARTED: 1/31/19
DATE COMPLETED: 2/12/19
NORTHING: 1,317,251.09
EASTING: 2,063,507.76
GS ELEVATION: 532.08
TOC ELEVATION: 535.03 ft
DEPTH W.L.:
DATE W.L.:
TIME W.L.:
GW ELEVATION:

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE: DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	SAMPLES: SAMPLE NO.	TYPE	REC	MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES	WELL CONSTRUCTION DETAILS
40		29.00 - 69.00 Fresh; very strong; dark gray; bioturbation; interbedded laminated SANDSTONE, SILTSTONE, and SHALE. *(Continued)*								
	490					5		10.00 / 10.00		
45										
	485									
50						6		10.00 / 10.00		
	480									
55										
	475									
60						7		9.00 / 10.00		
	470									
65										
	465				463.08					
		69.00 - 70.00 Fresh; very strong; gray; SANDSTONE. 69.10: 30 degree fracture, undulating, rough, clean. 69.30: 60 degree fracture, stepped, rough, clean, 6" long.			69.00 462.08 70.00	8		8.00 / 10.00		
70		70.00 - 74.30 Fresh; very strong; dark gray; interbedded laminated SANDSTONE, SILTSTONE, and SHALE.								
	460									
					457.78					
		74.30 - 95.50 Fresh; very strong; light gray; massive; SANDSTONE with SHALE partings.			74.30					
75										
	455					9		10.00 / 10.00		
80		Log continued on next page								

WELL CASING
Interval: 0' - 232'
Material: Schedule 40 PVC
Diameter: 2"
Joint Type: Flush

WELL SCREEN
Interval: 232' - 242'
Material: Schedule 40 PVC U-Pack
Diameter: 2"
Slot Size: 0.010"
End Cap: 6", 2"-diameter, Sump

FILTER PACK
Interval: 226' - 244'
Type: GP #10 Sand

FILTER PACK SEAL
Interval: 222' - 226'
Type: Bentonite Pellets

ANNULUS SEAL
Interval: 0' - 222'
Type: Grout (Bentonite Grout, Premix Aquaguard)

WELL COMPLETION
Pad: 4'x4' Concrete Pad
Protective Casing: 3' Stick-Ups

DRILLING METHODS
Soil Drill: Sonic
Rock Drill: Sonic

DRAFT

LOG SCALE: 1 in = 5 ft
DRILLING COMPANY: Cascade Drilling, L.P.
DRILLER: T. Taylor
GA INSPECTOR: David Hannam
CHECKED BY: Tim Richards
DATE: 4/5/19

Golder Associates

RECORD OF BOREHOLE GS-AP-MW-27H

PROJECT: Gorgas Ash Pond
PROJECT NUMBER: 18114896
DRILLED DEPTH: 265.00 ft
LOCATION: On track from Bankhead Road to overhead poully, southwest of pond
DRILL RIG: TSI Truck Rig
DATE STARTED: 1/31/19
DATE COMPLETED: 2/12/19
NORTHING: 1,317,251.09
EASTING: 2,063,507.76
GS ELEVATION: 532.08
TOC ELEVATION: 535.03 ft
DEPTH W.L.:
DATE W.L.:
TIME W.L.:
GW ELEVATION:

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE: DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	SAMPLES: SAMPLE NO.	TYPE	REC	MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES	WELL CONSTRUCTION DETAILS
80		74.30 - 95.50 Fresh; very strong; light gray; massive; SANDSTONE with SHALE partings. *(Continued)*								
	450					9		10.00 10.00		
85										
	445									
90						10		10.00 10.00		
	440									
95					436.58 95.50					
		95.50 - 97.00 Fresh; strong; dark gray; bioturbation; thickly to thinly bedded SANDSTONE.			435.08					
	435	97.00 - 100.00 Fresh; strong; dark gray; thinly bedded SANDSTONE with interbeds of SHALE and SILTSTONE.			97.00 432.08					
100		100.00 - 103.00 Fresh; strong; light gray; massive; SANDSTONE.			100.00	11		9.00 10.00		
	430				429.08					
		103.00 - 105.00 Fresh; strong; gray; thinly bedded SANDSTONE with interbeds of SILTSTONE and SHALE.			103.00 427.08					
105		105.00 - 115.00 Fresh; very strong; gray; thickly laminated to medium bedded SANDSTONE with interbedded laminated SHALE and laminated SILTSTONE, beds up to 4" thick.			105.00					
	425									
		109.00: Bioturbation.								
110						12		10.00 10.00		
	420									
115					417.08 115.00					
		115.00 - 130.00 Fresh; very strong; gray; massive; bioturbation; SANDSTONE with occasional interbeds of SILTSTONE.								
	415					13		9.50 10.00		
		119.00: 30 degree fracture, undulating, routh, iron staining.								
120		Log continued on next page								

WELL CASING
Interval: 0' - 232'
Material: Schedule 40 PVC
Diameter: 2"
Joint Type: Flush

WELL SCREEN
Interval: 232' - 242'
Material: Schedule 40 PVC U-Pack
Diameter: 2"
Slot Size: 0.010"
End Cap: 6", 2"-diameter, Sump

FILTER PACK
Interval: 226' - 244'
Type: GP #10 Sand

FILTER PACK SEAL
Interval: 222' - 226'
Type: Bentonite Pellets

ANNULUS SEAL
Interval: 0' - 222'
Type: Grout (Bentonite Grout, Premix Aquaguard)

WELL COMPLETION
Pad: 4'x4' Concrete Pad
Protective Casing: 3' Stick-Ups

DRILLING METHODS
Soil Drill: Sonic
Rock Drill: Sonic

DRAFT

LOG SCALE: 1 in = 5 ft
DRILLING COMPANY: Cascade Drilling, L.P.
DRILLER: T. Taylor
GA INSPECTOR: David Hannam
CHECKED BY: Tim Richards
DATE: 4/5/19

Golder Associates

RECORD OF BOREHOLE GS-AP-MW-27H

PROJECT: Gorgas Ash Pond
PROJECT NUMBER: 18114896
DRILLED DEPTH: 265.00 ft
LOCATION: On track from Bankhead Road to overhead poully, southwest of pond

DRILL RIG: TSI Truck Rig
DATE STARTED: 1/31/19
DATE COMPLETED: 2/12/19

NORTHING: 1,317,251.09
EASTING: 2,063,507.76
GS ELEVATION: 532.08
TOC ELEVATION: 535.03 ft

DEPTH W.L.:
DATE W.L.:
TIME W.L.:
GW ELEVATION:

DEPTH (ft)	ELEVATION (ft)	DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	SAMPLE NO.	TYPE	REC
120		115.00 - 130.00 Fresh; very strong; gray; massive; bioturbation; SANDSTONE with occasional interbeds of SILTSTONE. *(Continued)*						
	410					13		9.50 10.00
125								
		126.00: 30 degree fracture, undulating, smooth, clean, coincides with bioturbation.						
	405							
					402.08			
130		130.00 - 136.00 Fresh; strong; dark gray; laminated SHALE with interbeds of SANDSTONE and SILTSTONE.			130.00	14		10.00
	400							
135								
					396.08			
		136.00 - 145.00 Fresh; strong; light gray; interbeded SHALE, SILTSTONE, and SANDSTONE.			136.00			
	395							
140						15		10.00 10.00
	390							
					387.08			
145		145.00 - 156.00 Fresh; strong; dark gray; massive to thinly bedded SILTSTONE with occastional very thin interbeds of SANDSTONE and SHALE.			145.00			
	385							
150						16		10.00 10.00
	380							
155								
					376.08			
		156.00 - 158.00 Fresh; strong; light gray; massive; SANDSTONE.			156.00			
	375					17		9.00 10.00
					374.08			
		158.00 - 159.00 Fresh; strong; dark gray; interbedded SANDSTONE and SILTSTONE.			158.00 373.08			
		159.00 - 160.00			159.00 372.08			
160		Log continued on next page						

MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES

WELL CONSTRUCTION DETAILS

WELL CASING
Interval: 0' - 232'
Material: Schedule 40 PVC
Diameter: 2"
Joint Type: Flush

WELL SCREEN
Interval: 232' - 242'
Material: Schedule 40 PVC U-Pack
Diameter: 2"
Slot Size: 0.010"
End Cap: 6", 2"-diameter, Sump

FILTER PACK
Interval: 226' - 244'
Type: GP #10 Sand

FILTER PACK SEAL
Interval: 222' - 226'
Type: Bentonite Pellets

ANNULUS SEAL
Interval: 0' - 222'
Type: Grout (Bentonite Grout, Premix Aquaguard)

WELL COMPLETION
Pad: 4'x4' Concrete Pad
Protective Casing: 3' Stick-Ups

DRILLING METHODS
Soil Drill: Sonic
Rock Drill: Sonic

DRAFT

LOG SCALE: 1 in = 5 ft
DRILLING COMPANY: Cascade Drilling, L.P.
DRILLER: T. Taylor

GA INSPECTOR: David Hannam
CHECKED BY: Tim Richards
DATE: 4/5/19

Golder Associates

RECORD OF BOREHOLE GS-AP-MW-27H

PROJECT: Gorgas Ash Pond
PROJECT NUMBER: 18114896
DRILLED DEPTH: 265.00 ft
LOCATION: On track from Bankhead Road to overhead poully, southwest of pond
DRILL RIG: TSI Truck Rig
DATE STARTED: 1/31/19
DATE COMPLETED: 2/12/19
NORTHING: 1,317,251.09
EASTING: 2,063,507.76
GS ELEVATION: 532.08
TOC ELEVATION: 535.03 ft
DEPTH W.L.:
DATE W.L.:
TIME W.L.:
GW ELEVATION:

DEPTH (ft)	ELEVATION (ft)	DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	SAMPLE NO.	TYPE	REC	MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES	WELL CONSTRUCTION DETAILS
160		Fresh; strong; dark gray; massive; SILTSTONE.			160.00					
		160.00 - 162.00 Fresh; strong; gray; interbedded SANDSTONE and SILTSTONE.			370.08					
	370	162.00 - 168.00 Fresh; strong; light gray; bioturbation; massive; SANDSTONE.			162.00	17		9.00 10.00		
165										
	365	167.50: 30 degree fracture, planar, smooth, clean, coincides with bioturbation.			364.08 168.00					
		168.00 - 226.00 Fresh; strong; dark gray; interbedded SILTSTONE and SANDSTONE.				18		9.50 10.00		
170										
	360									
175										
	355									
180						19		9.50 10.00		
		181.00 - 184.00 Surface iron staining.								
	350				348.08					
185										
	345									
190						20		9.50 10.00		
	340									
195										
	335					21		10.00 10.00		
200		Log continued on next page								

WELL CASING
Interval: 0' - 232'
Material: Schedule 40 PVC
Diameter: 2"
Joint Type: Flush

WELL SCREEN
Interval: 232' - 242'
Material: Schedule 40 PVC U-Pack
Diameter: 2"
Slot Size: 0.010"
End Cap: 6", 2"-diameter, Sump

FILTER PACK
Interval: 226' - 244'
Type: GP #10 Sand

FILTER PACK SEAL
Interval: 222' - 226'
Type: Bentonite Pellets

ANNULUS SEAL
Interval: 0' - 222'
Type: Grout (Bentonite Grout, Premix Aquaguard)

WELL COMPLETION
Pad: 4'x4' Concrete Pad
Protective Casing: 3' Stick-Ups

DRILLING METHODS
Soil Drill: Sonic
Rock Drill: Sonic

DRAFT

LOG SCALE: 1 in = 5 ft
DRILLING COMPANY: Cascade Drilling, L.P.
DRILLER: T. Taylor
GA INSPECTOR: David Hannam
CHECKED BY: Tim Richards
DATE: 4/5/19

Golder Associates

RECORD OF BOREHOLE GS-AP-MW-27H

PROJECT: Gorgas Ash Pond
PROJECT NUMBER: 18114896
DRILLED DEPTH: 265.00 ft
LOCATION: On track from Bankhead Road to overhead poully, southwest of pond
DRILL RIG: TSI Truck Rig
DATE STARTED: 1/31/19
DATE COMPLETED: 2/12/19
NORTHING: 1,317,251.09
EASTING: 2,063,507.76
GS ELEVATION: 532.08
TOC ELEVATION: 535.03 ft
DEPTH W.L.:
DATE W.L.:
TIME W.L.:
GW ELEVATION:

DEPTH (ft)	ELEVATION (ft)	DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	SAMPLE NO.	TYPE	REC
200		168.00 - 226.00 Fresh; strong; dark gray; interbedded SILTSTONE and SANDSTONE. *(Continued)*						
	330					21		10.00 / 10.00
205								
	325							
210						22		10.00
	320							
215								
	315							
220						23		10.00 / 10.00
	310	222.00 - 223.00 Iron staining on surface of bedding.			309.08			
225					306.08			
		226.00 - 228.00 Fresh; medium strong; dark gray; laminated SHALE.			226.00			
	305				304.08			
		228.00 - 240.00 Fresh; strong; dark gray; interbedded laminated to medium bedded SANDSTONE, SILTSTONE, and SHALE.			228.00			
230						24		9.50 / 10.00
	300							
235								
	295					25		9.00 / 10.00
240					292.08			

Log continued on next page

MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES



WELL CONSTRUCTION DETAILS

WELL CASING
Interval: 0' - 232'
Material: Schedule 40 PVC
Diameter: 2"
Joint Type: Flush

WELL SCREEN
Interval: 232' - 242'
Material: Schedule 40 PVC U-Pack
Diameter: 2"
Slot Size: 0.010"
End Cap: 6", 2"-diameter, Sump

FILTER PACK
Interval: 226' - 244'
Type: GP #10 Sand

FILTER PACK SEAL
Interval: 222' - 226'
Type: Bentonite Pellets

ANNULUS SEAL
Interval: 0' - 222'
Type: Grout (Bentonite Grout, Premix Aquaguard)

WELL COMPLETION
Pad: 4'x4' Concrete Pad
Protective Casing: 3' Stick-Ups

DRILLING METHODS
Soil Drill: Sonic
Rock Drill: Sonic

DRAFT

LOG SCALE: 1 in = 5 ft
DRILLING COMPANY: Cascade Drilling, L.P.
DRILLER: T. Taylor
GA INSPECTOR: David Hannam
CHECKED BY: Tim Richards
DATE: 4/5/19

Golder Associates

RECORD OF BOREHOLE GS-AP-MW-27H

SHEET 7 of 7

PROJECT: Gorgas Ash Pond
PROJECT NUMBER: 18114896
DRILLED DEPTH: 265.00 ft
LOCATION: On track from Bankhead Road to overhead poully, southwest of pond

DRILL RIG: TSI Truck Rig
DATE STARTED: 1/31/19
DATE COMPLETED: 2/12/19

NORTHING: 1,317,251.09
EASTING: 2,063,507.76
GS ELEVATION: 532.08
TOC ELEVATION: 535.03 ft

DEPTH W.L.:
DATE W.L.:
TIME W.L.:
GW ELEVATION:

DEPTH (ft)	ELEVATION (ft)	DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	SAMPLE NO.	TYPE	REC
240		240.00 - 243.00 Fresh; very strong; gray; massive; SILTSTONE.			240.00			
	290				289.08	25		9.00 10.00
		243.00 - 245.00 Fresh; medium strong; gray; laminated to medium bedded SHALE.			243.00			
245					287.08			
		245.00 - 245.50 Fresh; very strong; orange-brown; crystalline, fossiliferous; SANDSTONE recovered as coarse angular gravel.			286.58 245.50			
	285	245.50 - 256.00 Fresh; strong; dark gray; interbedded laminated to medium bedded SANDSTONE, SHALE, and SILTSTONE.						
250						26		8.00 10.00
	280							
255					276.08			
		256.00 - 260.50 Fresh; medium strong; dark gray; laminated SHALE.			256.00			
	275							
260					271.58	27		9.00 10.00
		260.50 - 263.00 Fresh; very strong; gray; bioturbation; massive; SANDSTONE with SHALE partings.			260.50			
	270				269.08			
		263.00 - 265.00 Fresh; medium strong; dark gray; laminated SHALE.			263.00			
265					267.08			
		Boring completed at 265.00 ft						
	265							
270								
	260							
275								
	255							
280								

MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES



WELL CONSTRUCTION DETAILS

WELL CASING
Interval: 0' - 232'
Material: Schedule 40 PVC
Diameter: 2"
Joint Type: Flush

WELL SCREEN
Interval: 232' - 242'
Material: Schedule 40 PVC U-Pack
Diameter: 2"
Slot Size: 0.010"
End Cap: 6", 2"-diameter, Sump

FILTER PACK
Interval: 226' - 244'
Type: GP #10 Sand

FILTER PACK SEAL
Interval: 222' - 226'
Type: Bentonite Pellets

ANNULUS SEAL
Interval: 0' - 222'
Type: Grout (Bentonite Grout, Premix Aquaguard)

WELL COMPLETION
Pad: 4'x4' Concrete Pad
Protective Casing: 3' Stick-Ups

DRILLING METHODS
Soil Drill: Sonic
Rock Drill: Sonic

DRAFT

LOG SCALE: 1 in = 5 ft
DRILLING COMPANY: Cascade Drilling, L.P.
DRILLER: T. Taylor

GA INSPECTOR: David Hannam
CHECKED BY: Tim Richards
DATE: 4/5/19

Golder Associates

RECORD OF BOREHOLE GS-AP-MW-28H

SHEET 1 of 7

PROJECT: Gorgas Ash Pond
PROJECT NUMBER: 18114896
DRILLED DEPTH: 245.00 ft
LOCATION: South end of ash pond next to South entrace on side of Bankhead Rd.

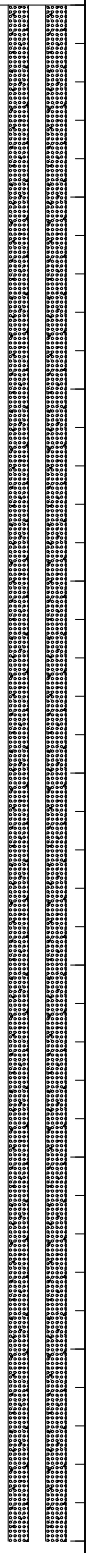
DRILL RIG: TSI Track Rig
DATE STARTED: 2/3/19
DATE COMPLETED: 2/26/19

NORTHING: 1,314,721.29
EASTING: 2,066,153.32
GS ELEVATION: 513.84
TOC ELEVATION: 513.82 ft

DEPTH W.L.:
DATE W.L.:
TIME W.L.:
GW ELEVATION:

DEPTH (ft)	ELEVATION (ft)	DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	SAMPLE NO.	TYPE	REC
0		0.00 - 12.50 (SP), gravelly SAND, some silt; tan; non-cohesive, dry. [SAPROLITE]	SP			1		5.00 / 5.00
	510							
5								
	505					2		10.00 / 10.00
10					501.34			
		12.50 - 13.50 (CL), CLAY; red brown; cohesive, w < PL, moist; stiff. [SAPROLITE]	CL		12.50 500.34			
	500	13.50 - 15.00 Two relic COAL beds, ~ 4' thick each, separated by relic siltstone. Recovered as silty clay gravels.	GM		13.50 498.84			
15		15.00 - 17.50 COAL, RECOVERED AS, (GP), GRAVEL, coarse angular.	GP		15.00 496.34			
		17.50 - 25.00 Slightly weathered; very weak; gray; SANDSTONE with COAL partings. 18.50: COAL, black. 19.00 - 21.00 Crushed zone, vertical 90 degree fractures (undulating, rough, iron staining) and horizontal 0 degree fractures (undulating, rough, clean) and some coal partings at 30 degrees coinciding with drilling induced discontinuity. 19.80: COAL, black.			17.50 492.84	3		7.50 / 10.00
	495							
20								
	490				488.84			
25		25.00 - 26.00 Fresh; strong; gray; coarse grained; plant fossils; some cross-bedded laminations; SANDSTONE.			25.00 487.84			
		26.00 - 27.00 Fresh; strong; dark gray; plant fossils; laminated SHALE.			26.00 486.84			
	485	27.00 - 27.50 Fresh; strong; gray; coarse grained; plant and shell fossils; SANDSTONE. Vertical 90 degree fracture, planar, rough, iron stained.			486.34 27.50			
30		27.50 - 32.00 Fresh; strong; laminated SILTSTONE with interbeds of SHALE and ~0.5" interbeds of SANDSTONE.			481.84	4		9.00 / 10.00
		32.00 - 35.00 Fresh; strong; gray; medium bedded to laminated SANDSTONE with occasional interbeds of SILTSTONE.			32.00 478.84			
	480							
35		35.00 - 48.00 Fresh; strong; dark gray; interbedded laminated to thinly bedded SILTSTONE and SHALE.			35.00			
		37.50 - 38.00 Bioturbation.			475.84	5		9.00 / 10.00
	475							
40		Log continued on next page						

MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES



WELL CONSTRUCTION DETAILS

WELL CASING
Interval: 0' - 219.5'
Material: Schedule 40 PVC
Diameter: 2"
Joint Type: Flush

WELL SCREEN
Interval: 219.5' - 229.5'
Material: Schedule 40 PVC U-Pack
Diameter: 2"
Slot Size: 0.010"
End Cap: 6", 2"-diameter, Sump

FILTER PACK
Interval: 216' - 230'
Type: #10 Silica Sand

FILTER PACK SEAL
Interval: 213' - 216'
Type: Bentonite Pellets

ANNULUS SEAL
Interval: 0' - 213'
Type: Grout (Premix Bentonite Grout Aquaguard Powdered)

WELL COMPLETION
Pad: Flush Cover
Protective Casing: NA

DRILLING METHODS
Soil Drill: Sonic
Rock Drill: Sonic

DRAFT

LOG SCALE: 1 in = 5 ft
DRILLING COMPANY: Cascade Drilling, L.P.
DRILLER: T. Taylor

GA INSPECTOR: David Hannam
CHECKED BY: Tim Richards
DATE: 4/5/19

Golder Associates

RECORD OF BOREHOLE GS-AP-MW-28H

PROJECT: Gorgas Ash Pond
PROJECT NUMBER: 18114896
DRILLED DEPTH: 245.00 ft
LOCATION: South end of ash pond next to South entrace on side of Bankhead Rd.
DRILL RIG: TSI Track Rig
DATE STARTED: 2/3/19
DATE COMPLETED: 2/26/19
NORTHING: 1,314,721.29
EASTING: 2,066,153.32
GS ELEVATION: 513.84
TOC ELEVATION: 513.82 ft
DEPTH W.L.:
DATE W.L.:
TIME W.L.:
GW ELEVATION:

DEPTH (ft)	ELEVATION (ft)	DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	SAMPLE NO.	TYPE	REC
40		35.00 - 48.00 Fresh; strong; dark gray; interbedded laminated to thinly bedded SILTSTONE and SHALE. *(Continued)*				5		9.00 10.00
45	470				465.84			
	465	48.00 - 53.00 Fresh; strong; light gray; medium to coarse grained; bioturbation; SANDSTONE.			48.00	6		9.00 10.00
50					460.84			
	460	53.00 - 55.00 Fresh; strong; dark gray; interbedded laminated SHALE and thinly bedded SILTSTONE.			53.00			
55					458.84			
		55.00 - 57.00 Fresh; strong; light gray; bioturbation; massive; SANDSTONE.			55.00			
	455				456.84			
		57.00 - 67.50 Fresh; strong; interbedded thickly laminated to thickly bedded SILTSTONE and laminated SHALE.			57.00	7		8.50 10.00
60								
	450							
65					446.34			
		67.50 - 73.50 Fresh; strong; light gray; some plant fossils; laminated to thickly bedded SANDSTONE with SILTSTONE partings.			67.50			
	445							
70						8		9.50 10.00
		72.30: Horizontal 0 degree fracture, undulating, part smooth part rough, possible calcite and iron stains.						
					440.34			
	440	73.50 - 75.00 Fresh; strong; gray; interbedded thinly bedded to laminated SHALE, SILTSTONE, and SANDSTONE.			73.50			
75					438.84			
		75.00 - 85.00 Fresh; strong; dark gray; bioturbation; massive to laminated SILTSTONE.			75.00	9		8.50 10.00
	435	78.00 - 78.10 SANDSTONE.						
80		Log continued on next page						

MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES

WELL CONSTRUCTION DETAILS

WELL CASING
Interval: 0' - 219.5'
Material: Schedule 40 PVC
Diameter: 2"
Joint Type: Flush

WELL SCREEN
Interval: 219.5' - 229.5'
Material: Schedule 40 PVC U-Pack
Diameter: 2"
Slot Size: 0.010"
End Cap: 6", 2"-diameter, Sump

FILTER PACK
Interval: 216' - 230'
Type: #10 Silica Sand

FILTER PACK SEAL
Interval: 213' - 216'
Type: Bentonite Pellets

ANNULUS SEAL
Interval: 0' - 213'
Type: Grout (Premix Bentonite Grout Aquaguard Powdered)

WELL COMPLETION
Pad: Flush Cover
Protective Casing: NA

DRILLING METHODS
Soil Drill: Sonic
Rock Drill: Sonic

DRAFT

LOG SCALE: 1 in = 5 ft
DRILLING COMPANY: Cascade Drilling, L.P.
DRILLER: T. Taylor
GA INSPECTOR: David Hannam
CHECKED BY: Tim Richards
DATE: 4/5/19

Golder Associates

RECORD OF BOREHOLE GS-AP-MW-28H

PROJECT: Gorgas Ash Pond
PROJECT NUMBER: 18114896
DRILLED DEPTH: 245.00 ft
LOCATION: South end of ash pond next to South entrace on side of Bankhead Rd.

DRILL RIG: TSI Track Rig
DATE STARTED: 2/3/19
DATE COMPLETED: 2/26/19

NORTHING: 1,314,721.29
EASTING: 2,066,153.32
GS ELEVATION: 513.84
TOC ELEVATION: 513.82 ft

DEPTH W.L.:
DATE W.L.:
TIME W.L.:
GW ELEVATION:

DEPTH (ft)	ELEVATION (ft)	DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	SAMPLE NO.	TYPE	REC
80		75.00 - 85.00 Fresh; strong; dark gray; bioturbation; massive to laminated SILTSTONE. *(Continued)*				9		8.50 / 10.00
	430	84.00 - 84.10 SANDSTONE.			428.84			
85		85.00 - 90.00 Fresh; strong; dark gray; bioturbation; SILTSTONE with interbeds of fine grained, laminated to medium bedded SANDSTONE.			85.00			
	425				423.84	10		9.00 / 10.00
90		90.00 - 95.00 Fresh; strong; light gray; bioturbation; SANDSTONE with interbedded laminate partings to thinnly bedded SILTSTONE.			90.00			
	420				418.84			
95		95.00 - 115.00 Fresh; extremely strong; dark gray; bioturbations and cross bedding laminations; interlaminated SILTSTONE, SANDSTONE, and SHALE. Mostly siltstone.			95.00			
	415							
100						11		9.50 / 10.00
	410							
105								
	405							
110						12		9.50 / 10.00
	400							
115					398.84			
		115.00 - 135.00 Fresh; extremely strong; gray; bioturbated; laminated SILTSTONE with interbedded SANDSTONE.			115.00			
	395					13		10.00 / 10.00
120		Log continued on next page						

MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES

WELL CONSTRUCTION DETAILS

WELL CASING
Interval: 0' - 219.5'
Material: Schedule 40 PVC
Diameter: 2"
Joint Type: Flush

WELL SCREEN
Interval: 219.5' - 229.5'
Material: Schedule 40 PVC U-Pack
Diameter: 2"
Slot Size: 0.010"
End Cap: 6", 2"-diameter, Sump

FILTER PACK
Interval: 216' - 230'
Type: #10 Silica Sand

FILTER PACK SEAL
Interval: 213' - 216'
Type: Bentonite Pellets

ANNULUS SEAL
Interval: 0' - 213'
Type: Grout (Premix Bentonite Grout Aquaguard Powdered)

WELL COMPLETION
Pad: Flush Cover
Protective Casing: NA

DRILLING METHODS
Soil Drill: Sonic
Rock Drill: Sonic

DRAFT

LOG SCALE: 1 in = 5 ft
DRILLING COMPANY: Cascade Drilling, L.P.
DRILLER: T. Taylor

GA INSPECTOR: David Hannam
CHECKED BY: Tim Richards
DATE: 4/5/19

Golder Associates

RECORD OF BOREHOLE GS-AP-MW-28H

PROJECT: Gorgas Ash Pond
PROJECT NUMBER: 18114896
DRILLED DEPTH: 245.00 ft
LOCATION: South end of ash pond next to South entrace on side of Bankhead Rd.

DRILL RIG: TSI Track Rig
DATE STARTED: 2/3/19
DATE COMPLETED: 2/26/19

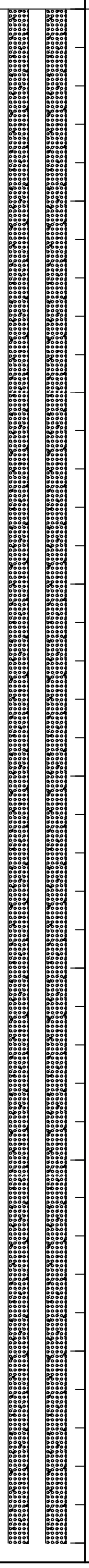
NORTHING: 1,314,721.29
EASTING: 2,066,153.32
GS ELEVATION: 513.84
TOC ELEVATION: 513.82 ft

DEPTH W.L.:
DATE W.L.:
TIME W.L.:
GW ELEVATION:

DEPTH (ft)	ELEVATION (ft)	DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	SAMPLE NO.	TYPE	REC
120		115.00 - 135.00 Fresh; extremely strong; gray; bioturbated; laminated SILTSTONE with interbedded SANDSTONE. *(Continued)*				13		10.00 / 10.00
125	390							
130	385					14		10.00 / 10.00
135	380				378.84			
		135.00 - 142.00 Fresh; strong; dark gray; interbedded laminated SILTSTONE, SANDSTONE, and SHALE. 136.00: Plant fossils.			135.00			
140	375					15		7.50 / 10.00
					371.84			
		142.00 - 142.50 Fresh; extremely strong; light gray; medium grained; SANDSTONE.			371.34 142.50			
		142.50 - 147.50 Fresh; extremely strong; dark gray; interbedded laminated SILTSTONE, SHALE, and SANDSTONE.						
145	370				366.34			
		147.50 - 150.50 Fresh; extremely strong; bioturbated; laminated to medium bedded SILTSTONE with discontinuous < 1" beds of SANDSTONE.			147.50			
150	365				363.34	16		9.50 / 10.00
		150.50 - 151.00 Fresh; extremely strong; light gray; SANDSTONE.			362.84 151.00			
		151.00 - 152.00 Fresh; extremely strong; dark gray; interlaminated SILTSTONE, SHALE, and SANDSTONE.			361.84 152.00			
		152.00 - 155.00 Fresh; extremely strong; dark gray; laminated to medium bedded SILTSTONE.						
155	360				358.84			
		155.00 - 205.00 Fresh; extremely strong; bioturbated; interbedded laminated SILTSTONE, SANDSTONE, and possible SHALE. Mostly siltstone.			155.00			
						17		8.50 / 10.00
160	355							

Log continued on next page

MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES



WELL CONSTRUCTION DETAILS

WELL CASING
Interval: 0' - 219.5'
Material: Schedule 40 PVC
Diameter: 2"
Joint Type: Flush

WELL SCREEN
Interval: 219.5' - 229.5'
Material: Schedule 40 PVC U-Pack
Diameter: 2"
Slot Size: 0.010"
End Cap: 6", 2"-diameter, Sump

FILTER PACK
Interval: 216' - 230'
Type: #10 Silica Sand

FILTER PACK SEAL
Interval: 213' - 216'
Type: Bentonite Pellets

ANNULUS SEAL
Interval: 0' - 213'
Type: Grout (Premix Bentonite Grout Aquaguard Powdered)

WELL COMPLETION
Pad: Flush Cover
Protective Casing: NA

DRILLING METHODS
Soil Drill: Sonic
Rock Drill: Sonic

DRAFT

LOG SCALE: 1 in = 5 ft
DRILLING COMPANY: Cascade Drilling, L.P.
DRILLER: T. Taylor

GA INSPECTOR: David Hannam
CHECKED BY: Tim Richards
DATE: 4/5/19

Golder Associates

RECORD OF BOREHOLE GS-AP-MW-28H

PROJECT: Gorgas Ash Pond
PROJECT NUMBER: 18114896
DRILLED DEPTH: 245.00 ft
LOCATION: South end of ash pond next to South entrace on side of Bankhead Rd.

DRILL RIG: TSI Track Rig
DATE STARTED: 2/3/19
DATE COMPLETED: 2/26/19

NORTHING: 1,314,721.29
EASTING: 2,066,153.32
GS ELEVATION: 513.84
TOC ELEVATION: 513.82 ft

DEPTH W.L.:
DATE W.L.:
TIME W.L.:
GW ELEVATION:

DEPTH (ft)	ELEVATION (ft)	DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	SAMPLE NO.	TYPE	REC	MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES	WELL CONSTRUCTION DETAILS
160		155.00 - 205.00 Fresh; extremely strong; bioturbated; interbedded laminated SILTSTONE, SANDSTONE, and possible SHALE. Mostly siltstone. *(Continued)*				17		8.50/10.00		
165	350									
170	345					18		9.50/10.00		
175	340									
180	335					19		9.00/10.00		
185	330									
190	325					20		9.00/10.00		
195	320									
200	315	198.20: Thin, 0 degree < 0.5" bed of iron staining. Log continued on next page				21		9.50/10.00		

WELL CASING
Interval: 0' - 219.5'
Material: Schedule 40 PVC
Diameter: 2"
Joint Type: Flush

WELL SCREEN
Interval: 219.5' - 229.5'
Material: Schedule 40 PVC U-Pack
Diameter: 2"
Slot Size: 0.010"
End Cap: 6", 2"-diameter, Sump

FILTER PACK
Interval: 216' - 230'
Type: #10 Silica Sand

FILTER PACK SEAL
Interval: 213' - 216'
Type: Bentonite Pellets

ANNULUS SEAL
Interval: 0' - 213'
Type: Grout (Premix Bentonite Grout Aquaguard Powdered)

WELL COMPLETION
Pad: Flush Cover
Protective Casing: NA

DRILLING METHODS
Soil Drill: Sonic
Rock Drill: Sonic

DRAFT

LOG SCALE: 1 in = 5 ft
DRILLING COMPANY: Cascade Drilling, L.P.
DRILLER: T. Taylor

GA INSPECTOR: David Hannam
CHECKED BY: Tim Richards
DATE: 4/5/19

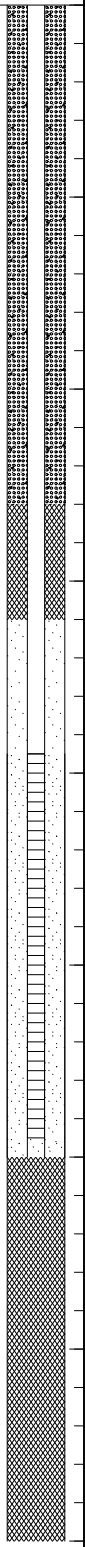
Golder Associates

RECORD OF BOREHOLE GS-AP-MW-28H

PROJECT: Gorgas Ash Pond
PROJECT NUMBER: 18114896
DRILLED DEPTH: 245.00 ft
LOCATION: South end of ash pond next to South entrace on side of Bankhead Rd.
DRILL RIG: TSI Track Rig
DATE STARTED: 2/3/19
DATE COMPLETED: 2/26/19
NORTHING: 1,314,721.29
EASTING: 2,066,153.32
GS ELEVATION: 513.84
TOC ELEVATION: 513.82 ft
DEPTH W.L.:
DATE W.L.:
TIME W.L.:
GW ELEVATION:

DEPTH (ft)	ELEVATION (ft)	DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	SAMPLE NO.	TYPE	REC
200		155.00 - 205.00 Fresh; extremely strong; bioturbated; interbedded laminated SILTSTONE, SANDSTONE, and possible SHALE. Mostly siltstone. *(Continued)* 201.70: Thin, 0 degree < 0.5" bed of iron staining. 202.00: Thin, 0 degree < 0.5" bed of iron staining. 202.50: Thin, 0 degree < 0.5" bed of iron staining.						
	310	203.70: Thin, 0 degree < 0.5" bed of iron staining. 204.20: Thin, 0 degree < 0.5" bed of iron staining.			308.84	21		9.50 / 10.00
205		205.00 - 208.10 Fresh; extremely strong; dark gray; interbedded SILTSTONE, SANDSTONE, and SHALE.			205.00 305.74			
	305	208.10 - 215.00 Fresh; extremely strong; medium bedded SANDSTONE with < 1" interbeds of SILTSTONE and SHALE.			208.10			
210		210.00 - 212.50 Bioturbation.			301.34	22		9.00 / 10.00
	300				298.84			
215		215.00 - 218.50 Fresh; extremely strong; light gray; medium bioturbated; medium bedded SANDSTONE. 217.30: Bioturbation coincides with possible 0 degree fracture, undulating, rough, clean.			215.00 295.34			
	295	218.50 - 220.90 Fresh; extremely strong; gray; interbedded thinly bedded SANDSTONE and laminated SILTSTONE and SHALE.			218.50			
220					292.94	23		9.00 / 10.00
		220.90 - 224.00 Fresh; extremely strong; light gray; medium grained; medium bedded SANDSTONE. 222.30 - 222.50 SILTSTONE.			220.90 289.84			
	290	224.00 - 235.00 Fresh; exremely strong; dark gray to gray; laminated to thinly bedded SILTSTONE.			224.00			
225								
	285							
230						24		3.00 / 10.00
	280							
		234.00 - 234.25 SANDSTONE. 234.50: ~ 0.5" calcite nodule.			278.84			
235		235.00 - 237.10 Slightly weathered; medium strong; orange brown; iron staining; SILTSTONE; recovered as subangular gravels. 235-245: Driller reports possible mine workings during run 237.00 - 237.10 Iron staining.			235.00 276.74 237.10	25		6.00 / 10.00
	275	237.10 - 245.00 Fresh; extremely strong; interbedded SILTSTONE and SHALE. 237.50: Possible vertical 90 degree fracture, stepped, very rough,						
240		Log continued on next page						

MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES



WELL CONSTRUCTION DETAILS

WELL CASING
Interval: 0' - 219.5'
Material: Schedule 40 PVC
Diameter: 2"
Joint Type: Flush

WELL SCREEN
Interval: 219.5' - 229.5'
Material: Schedule 40 PVC U-Pack
Diameter: 2"
Slot Size: 0.010"
End Cap: 6", 2"-diameter, Sump

FILTER PACK
Interval: 216' - 230'
Type: #10 Silica Sand

FILTER PACK SEAL
Interval: 213' - 216'
Type: Bentonite Pellets

ANNULUS SEAL
Interval: 0' - 213'
Type: Grout (Premix Bentonite Grout Aquaguard Powdered)

WELL COMPLETION
Pad: Flush Cover
Protective Casing: NA

DRILLING METHODS
Soil Drill: Sonic
Rock Drill: Sonic

DRAFT

LOG SCALE: 1 in = 5 ft
DRILLING COMPANY: Cascade Drilling, L.P.
DRILLER: T. Taylor
GA INSPECTOR: David Hannam
CHECKED BY: Tim Richards
DATE: 4/5/19

Golder Associates

RECORD OF BOREHOLE GS-AP-MW-28H

PROJECT: Gorgas Ash Pond
PROJECT NUMBER: 18114896
DRILLED DEPTH: 245.00 ft
LOCATION: South end of ash pond next to South entrace on side of Bankhead Rd.

DRILL RIG: TSI Track Rig
DATE STARTED: 2/3/19
DATE COMPLETED: 2/26/19

NORTHING: 1,314,721.29
EASTING: 2,066,153.32
GS ELEVATION: 513.84
TOC ELEVATION: 513.82 ft

DEPTH W.L.:
DATE W.L.:
TIME W.L.:
GW ELEVATION:

DEPTH (ft)	ELEVATION (ft)	DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	SAMPLE NO.	TYPE	REC
240		calcite mineralization. 239.50: Recovered as angular medium gravels of SHALE, calcite mineralization. 237.10 - 245.00 Fresh; extremely strong; interbedded SILTSTONE and SHALE. *(Continued)* 242.50: Recovered as angular medium gravels of SHALE, calcite mineralization. 243.00: Iron staining. 244.50 - 244.80 4" vertical fracture, rough, stepped, calcite mineralization. Boring completed at 245.00 ft			268.84	25		6.00 10.00
245	270							
250	265							
255	260							
260	255							
265	250							
270	245							
275	240							
280	235							

MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES

WELL CONSTRUCTION DETAILS

WELL CASING
Interval: 0' - 219.5'
Material: Schedule 40 PVC
Diameter: 2"
Joint Type: Flush

WELL SCREEN
Interval: 219.5' - 229.5'
Material: Schedule 40 PVC U-Pack
Diameter: 2"
Slot Size: 0.010"
End Cap: 6", 2"-diameter, Sump

FILTER PACK
Interval: 216' - 230'
Type: #10 Silica Sand

FILTER PACK SEAL
Interval: 213' - 216'
Type: Bentonite Pellets

ANNULUS SEAL
Interval: 0' - 213'
Type: Grout (Premix Bentonite Grout Aquaguard Powdered)

WELL COMPLETION
Pad: Flush Cover
Protective Casing: NA

DRILLING METHODS
Soil Drill: Sonic
Rock Drill: Sonic

DRAFT

LOG SCALE: 1 in = 5 ft
DRILLING COMPANY: Cascade Drilling, L.P.
DRILLER: T. Taylor

GA INSPECTOR: David Hannam
CHECKED BY: Tim Richards
DATE: 4/5/19

Golder Associates

RECORD OF BOREHOLE GS-AP-MW-29H

PROJECT: Gorgas Ash Pond
PROJECT NUMBER: 18114896
DRILLED DEPTH: 170.00 ft
LOCATION: Off Bankhead Road, by track to Prescott Creek Tunnel inlet from ash pond

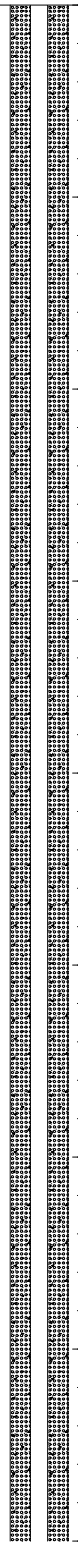
DRILL RIG: TSI Track Rig
DATE STARTED: 1/30/19
DATE COMPLETED: 2/5/19

NORTHING: 1,314,844.80
EASTING: 2,066,948.77
GS ELEVATION: 440.71
TOC ELEVATION: 440.95 ft

DEPTH W.L.:
DATE W.L.:
TIME W.L.:
GW ELEVATION:

DEPTH (ft)	ELEVATION (ft)	DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	SAMPLE NO.	TYPE	REC
0	440	0.00 - 5.00 (CL), sandy CLAY; dark brown to tan; cohesive, w > PL, wet. [RESIDUUM]	CL		435.71	1		9.00 10.00
5	435	5.00 - 7.00 (CL), sandy CLAY; tan; non-cohesive, w < PL, dry. [RESIDUUM]	CL		5.00 433.71			
		7.00 - 13.00 (CL), sandy CLAY; tan; non-cohesive, w < PL, moist; relic structure stiff to very stiff. [SAPROLITE]			7.00			
10	430		CL		427.71			
		13.00 - 22.00 (CL), CLAY, some sand, trace gravel; dark gray; cohesive, w < PL, moist; relic structure stiff. [SAPROLITE]			13.00	2		10.00 10.00
15	425		CL					
20	420				418.71			
		22.00 - 42.50 Highly weathered; very weak; dark gray; SILTSTONE. Recovered as rock flour and subangular gravels.		× × ×	22.00	3		8.00 10.00
25	415			× × ×				
30	410			× × ×		4		10.00 10.00
35	405			× × ×				
40		Log continued on next page		× × ×				

MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES



WELL CONSTRUCTION DETAILS

WELL CASING
Interval: 0' - 120'
Material: Schedule 40 PVC
Diameter: 2"
Joint Type: Flush

WELL SCREEN
Interval: 120' - 130'
Material: Schedule 40 PVC U-Pack
Diameter: 2"
Slot Size: 0.010"
End Cap: 6", 2"-diameter, Sump

FILTER PACK
Interval: 118' - 132'
Type: #2 Sand

FILTER PACK SEAL
Interval: 114' - 118'
Type: Bentonite Pellets

ANNULUS SEAL
Interval: 0' - 114'
Type: Grout (Enviroplug-Bentonite Slurry 30% solids)

WELL COMPLETION
Pad: Flush Cover
Protective Casing: NA

DRILLING METHODS
Soil Drill: Sonic
Rock Drill: Sonic

DRAFT

LOG SCALE: 1 in = 5 ft
DRILLING COMPANY: GSE
DRILLER: T. Herod

GA INSPECTOR: David Hannam
CHECKED BY: Tim Richards
DATE: 4/5/19

Golder Associates

RECORD OF BOREHOLE GS-AP-MW-29H

PROJECT: Gorgas Ash Pond
PROJECT NUMBER: 18114896
DRILLED DEPTH: 170.00 ft
LOCATION: Off Bankhead Road, by track to Prescott Creek Tunnel inlet from ash pond
DRILL RIG: TSI Track Rig
DATE STARTED: 1/30/19
DATE COMPLETED: 2/5/19
NORTHING: 1,314,844.80
EASTING: 2,066,948.77
GS ELEVATION: 440.71
TOC ELEVATION: 440.95 ft
DEPTH W.L.:
DATE W.L.:
TIME W.L.:
GW ELEVATION:

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE: DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	SAMPLES: SAMPLE NO.	SAMPLES: TYPE	SAMPLES: REC	MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES
40	400	22.00 - 42.50 Highly weathered; very weak; dark gray; SILTSTONE. Recovered as rock flour and subangular gravels. *(Continued)*			398.21	5a		2.50 / 2.50	
		42.50 - 74.00 Fresh; strong; dark gray; thickly laminated interbeds of SILTSTONE, SANDSTONE, and laminated SHALE. 43.00 - 50.00 Pyrite burrow structures.			42.50				
45	395					5b		2.00 / 7.50	
50	390				390.71				
		52.00: 60 degree fracture, undulating, rough, clean.				6		7.00 / 10.00	
55	385								
		58.00: Burrow structures.							
60	380								
		62.50: 60 degree fracture, undulating, rough, clean.				7		8.00 / 10.00	
65	375								
70	370				366.71				
		74.00 - 75.00 Fresh; extremely strong; light gray; medium grained; SANDSTONE.			74.00 365.71	8		9.00 / 10.00	
75	365	75.00 - 80.00 Fresh; extremely strong; light gray; interbedded SILTSTONE, SHALE, and medium grained SANDSTONE.			75.00				
80					360.71				

Log continued on next page

WELL CONSTRUCTION DETAILS

WELL CASING
Interval: 0' - 120'
Material: Schedule 40 PVC
Diameter: 2"
Joint Type: Flush

WELL SCREEN
Interval: 120' - 130'
Material: Schedule 40 PVC U-Pack
Diameter: 2"
Slot Size: 0.010"
End Cap: 6", 2"-diameter, Sump

FILTER PACK
Interval: 118' - 132'
Type: #2 Sand

FILTER PACK SEAL
Interval: 114' - 118'
Type: Bentonite Pellets

ANNULUS SEAL
Interval: 0' - 114'
Type: Grout (Enviroplug-Bentonite Slurry 30% solids)

WELL COMPLETION
Pad: Flush Cover
Protective Casing: NA

DRILLING METHODS
Soil Drill: Sonic
Rock Drill: Sonic

DRAFT

LOG SCALE: 1 in = 5 ft
DRILLING COMPANY: GSE
DRILLER: T. Herod
GA INSPECTOR: David Hannam
CHECKED BY: Tim Richards
DATE: 4/5/19

Golder Associates

RECORD OF BOREHOLE GS-AP-MW-29H

PROJECT: Gorgas Ash Pond
PROJECT NUMBER: 18114896
DRILLED DEPTH: 170.00 ft
LOCATION: Off Bankhead Road, by track to Prescott Creek Tunnel inlet from ash pond

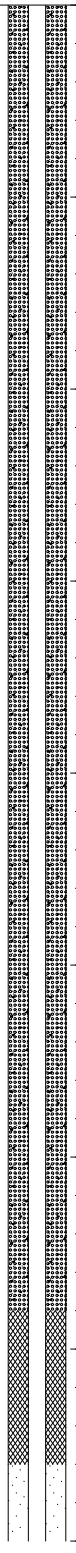
DRILL RIG: TSI Track Rig
DATE STARTED: 1/30/19
DATE COMPLETED: 2/5/19

NORTHING: 1,314,844.80
EASTING: 2,066,948.77
GS ELEVATION: 440.71
TOC ELEVATION: 440.95 ft

DEPTH W.L.:
DATE W.L.:
TIME W.L.:
GW ELEVATION:

DEPTH (ft)	ELEVATION (ft)	DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	SAMPLE NO.	TYPE	REC
80	360	80.00 - 95.00 Fresh; strong; gray; SANDSTONE with interbedded SILTSTONE And SHALE. More sandstone than previous run.			80.00			
85	355					9		10.00 / 10.00
90	350	90.00 - 100.00 Driller notes lots of fluid						
95	345	95.00 - 112.00 Fresh; strong; dark gray; interbedded thickly laminated SILTSTONE and laminated SHALE.			345.71 95.00	10		6.00 / 10.00
100	340				340.71			
105	335	106.00 - 106.50 6" vertical 90 degree fracture, planar, rough, with calcite.			334.21	11		6.00 / 10.00
110	330	109.00 - 109.50 6" vertical 90 degree fracture, planar, rough, with calcite. 110.50 - 110.80 4" vertical 90 degree fracture, planar, smooth, with calcite veins.			331.21 328.71			
115	325	112.00 - 119.00 Fresh; strong; light gray; medium grained; massive; SANDSTONE.			112.00 321.71	12		7.50 / 10.00
120		119.00 - 120.00 Fresh; strong; dark gray; laminated SANDSTONE.			119.00 320.71			
		Log continued on next page						

MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES



WELL CONSTRUCTION DETAILS

WELL CASING
Interval: 0' - 120'
Material: Schedule 40 PVC
Diameter: 2"
Joint Type: Flush

WELL SCREEN
Interval: 120' - 130'
Material: Schedule 40 PVC U-Pack
Diameter: 2"
Slot Size: 0.010"
End Cap: 6", 2"-diameter, Sump

FILTER PACK
Interval: 118' - 132'
Type: #2 Sand

FILTER PACK SEAL
Interval: 114' - 118'
Type: Bentonite Pellets

ANNULUS SEAL
Interval: 0' - 114'
Type: Grout (Enviroplug-Bentonite Slurry 30% solids)

WELL COMPLETION
Pad: Flush Cover
Protective Casing: NA

DRILLING METHODS
Soil Drill: Sonic
Rock Drill: Sonic

DRAFT

LOG SCALE: 1 in = 5 ft
DRILLING COMPANY: GSE
DRILLER: T. Herod

GA INSPECTOR: David Hannam
CHECKED BY: Tim Richards
DATE: 4/5/19

Golder Associates

RECORD OF BOREHOLE GS-AP-MW-29H

PROJECT: Gorgas Ash Pond
PROJECT NUMBER: 18114896
DRILLED DEPTH: 170.00 ft
LOCATION: Off Bankhead Road, by track to Prescott Creek Tunnel inlet from ash pond
DRILL RIG: TSI Track Rig
DATE STARTED: 1/30/19
DATE COMPLETED: 2/5/19
NORTHING: 1,314,844.80
EASTING: 2,066,948.77
GS ELEVATION: 440.71
TOC ELEVATION: 440.95 ft
DEPTH W.L.:
DATE W.L.:
TIME W.L.:
GW ELEVATION:

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE: DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	SAMPLES: SAMPLE NO.	TYPE	REC	MONITORING WELL / PIEZOMETER DIAGRAM and NOTES	WELL CONSTRUCTION DETAILS
120	320	120.00 - 125.00 Fresh; extremely strong; light gray; thinly bedded SANDSTONE with 1-2" of laminated SHALE.			120.00				2" PVC Sch 40 0.010 Slot U-Pack	**WELL CASING** Interval: 0' - 120' Material: Schedule 40 PVC Diameter: 2" Joint Type: Flush
125	315	125.00 - 130.00 Fresh; strong; dark gray; interbedded SANDSTONE, SILTSTONE, and SHALE.			315.71 125.00	13		5.00 10.00		**WELL SCREEN** Interval: 120' - 130' Material: Schedule 40 PVC U-Pack Diameter: 2" Slot Size: 0.010" End Cap: 6", 2"-diameter, Sump
130	310	130.00 - 150.00 Fresh; weak to medium strong; laminated SHALE with rare thick laminations of SANDSTONE.			310.71 130.00				Sand Filter Pack Bentonite Chips	**FILTER PACK** Interval: 118' - 132' Type: #2 Sand **FILTER PACK SEAL** Interval: 114' - 118' Type: Bentonite Pellets **ANNULUS SEAL** Interval: 0' - 114' Type: Grout (Enviroplug-Bentonite Slurry 30% solids)
135	305					14		5.00 10.00		**WELL COMPLETION** Pad: Flush Cover Protective Casing: NA
140	300									**DRILLING METHODS** Soil Drill: Sonic Rock Drill: Sonic
145	295					15		10.00 10.00		
150	290	150.00 - 159.50 Fresh; strong; dark gray; plant fossils and burrow structures; laminated SHALE with interbeds of SILTSTONE.			290.71 150.00					
155	285					16		8.50 10.00		
160		Log continued on next page			281.21 159.50					

DRAFT

LOG SCALE: 1 in = 5 ft
DRILLING COMPANY: GSE
DRILLER: T. Herod
GA INSPECTOR: David Hannam
CHECKED BY: Tim Richards
DATE: 4/5/19

Golder Associates

RECORD OF BOREHOLE GS-AP-MW-29H

PROJECT: Gorgas Ash Pond
PROJECT NUMBER: 18114896
DRILLED DEPTH: 170.00 ft
LOCATION: Off Bankhead Road, by track to Prescott Creek Tunnel inlet from ash pond

DRILL RIG: TSI Track Rig
DATE STARTED: 1/30/19
DATE COMPLETED: 2/5/19

NORTHING: 1,314,844.80
EASTING: 2,066,948.77
GS ELEVATION: 440.71
TOC ELEVATION: 440.95 ft

DEPTH W.L.:
DATE W.L.:
TIME W.L.:
GW ELEVATION:

DEPTH (ft)	ELEVATION (ft)	DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	SAMPLE NO.	TYPE	REC
160	280	159.50 - 165.00 Fresh; extremely strong; light gray; medium grained; common bioturbation; SANDSTONE. *(Continued)*						
165	275	165.00 - 169.00 Fresh; strong; dark gray; interbedded SANDSTONE, SILTSTONE, and SHALE.			275.71 / 165.00	17		8.00 / 10.00
170	270	168.50 - 170.00 Driller reports soft drilling. 169.00 - 170.00 Fresh; extremely strong; light gray; common bioturbation; SANDSTONE. Boring completed at 170.00 ft			271.71 / 169.00 / 270.71			
175	265							
180	260							
185	255							
190	250							
195	245							
200								

MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES

WELL CONSTRUCTION DETAILS

WELL CASING
Interval: 0' - 120'
Material: Schedule 40 PVC
Diameter: 2"
Joint Type: Flush

WELL SCREEN
Interval: 120' - 130'
Material: Schedule 40 PVC U-Pack
Diameter: 2"
Slot Size: 0.010"
End Cap: 6", 2"-diameter, Sump

FILTER PACK
Interval: 118' - 132'
Type: #2 Sand

FILTER PACK SEAL
Interval: 114' - 118'
Type: Bentonite Pellets

ANNULUS SEAL
Interval: 0' - 114'
Type: Grout (Enviroplug-Bentonite Slurry 30% solids)

WELL COMPLETION
Pad: Flush Cover
Protective Casing: NA

DRILLING METHODS
Soil Drill: Sonic
Rock Drill: Sonic

DRAFT

LOG SCALE: 1 in = 5 ft
DRILLING COMPANY: GSE
DRILLER: T. Herod

GA INSPECTOR: David Hannam
CHECKED BY: Tim Richards
DATE: 4/5/19

Golder Associates

RECORD OF BOREHOLE GS-AP-MW-30H

SHEET 1 of 8

PROJECT: Gorgas Ash Pond
PROJECT NUMBER: 18114896
DRILLED DEPTH: 305.00 ft
LOCATION: SE of ash pond off Bank Head Road

DRILL RIG: TSI Truck Mounted Sonic
DATE STARTED: 1/3/19
DATE COMPLETED: 1/8/19

NORTHING: 1,318,714.64
EASTING: 2,069,028.11
GS ELEVATION: 579.62
TOC ELEVATION: 582.49 ft

DEPTH W.L.:
DATE W.L.:
TIME W.L.:
GW ELEVATION:

DEPTH (ft)	ELEVATION (ft)	DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	SAMPLE NO.	TYPE	REC
0		0.00 - 0.50 Soft top soil and asphalt.			579.12 0.50			
		0.50 - 5.00 (CL), silty CLAY; orange brown, relic structure; cohesive, moist, stiff. [SAPROLITE]	CL			1		5.00 5.00
5	575				574.62			
		5.00 - 24.00 Fresh; weak to medium strong; light gray; massive SANDSTONE.			5.00			
10	570					2		10.00 10.00
15	565							
20	560					3		10.00 10.00
					555.62			
25	555	24.00 - 28.00 Highly weathered; laminated SHALE, RECOVERED AS, (CL), CLAY, trace gravel; brown, relic structure.	CL		24.00			
					551.62			
		28.00 - 34.00 Fresh; medium strong; dark gray black; laminated to finely laminated SHALE.			28.00			
30	550					4		8.00 10.00
					545.62			
		34.00 - 34.50	CL		545.12			
35	545	(CL), CLAY; light gray; cohesive, w ~ PL, wet, soft.			34.50			
		34.50 - 37.50 COAL, RECOVERED AS, (GP), GRAVEL, angular. Poor recovery; likely not 34.5 - 37.5 foot thick coal bed.	GP					
					542.12	5		8.00
		37.50 - 42.50 Fresh; medium strong; light to dark gray; interbedded thinly bedded to cross bedded laminations SANDSTONE, thickly laminated SILTSTONE, and laminated SHALE.			37.50			10.00
40	540							

Log continued on next page

MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES

Grout –

WELL CONSTRUCTION DETAILS

WELL CASING
Interval: 0' - 283'
Material: Schedule 40 PVC
Diameter: 2"
Joint Type: Flush

WELL SCREEN
Interval: 283' - 293'
Material: Schedule 40 PVC U-Pack
Diameter: 2"
Slot Size: 0.010"
End Cap: 6", 2"-diameter, Sump

FILTER PACK
Interval: 280.5' - 295'
Type: GP #2 Silica Sand

FILTER PACK SEAL
Interval: 270' - 280.5'
Type: Bentonite Pellets

ANNULUS SEAL
Interval: 0' - 270'
Type: Grout

WELL COMPLETION
Pad: 4'x4' Concrete Pad
Protective Casing: 3' Stick-Ups

DRILLING METHODS
Soil Drill: Sonic
Rock Drill: Sonic

DRAFT

LOG SCALE: 1 in = 5 ft
DRILLING COMPANY: Cascade Drilling, L.P.
DRILLER: T. Taylor

GA INSPECTOR: David Hannam
CHECKED BY: Tim Richards
DATE: 4/5/19

Golder Associates

RECORD OF BOREHOLE GS-AP-MW-30H

PROJECT: Gorgas Ash Pond
PROJECT NUMBER: 18114896
DRILLED DEPTH: 305.00 ft
LOCATION: SE of ash pond off Bank Head Road

DRILL RIG: TSI Truck Mounted Sonic
DATE STARTED: 1/3/19
DATE COMPLETED: 1/8/19

NORTHING: 1,318,714.64
EASTING: 2,069,028.11
GS ELEVATION: 579.62
TOC ELEVATION: 582.49 ft

DEPTH W.L.:
DATE W.L.:
TIME W.L.:
GW ELEVATION:

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	SAMPLES SAMPLE NO.	TYPE	REC	MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES	WELL CONSTRUCTION DETAILS
40		37.50 - 42.50 Fresh; medium strong; light to dark gray; interbedded thinly bedded to cross bedded laminations SANDSTONE, thickly laminated SILTSTONE, and laminated SHALE. *(Continued)*			537.12					
		42.50 - 48.00 Fresh; strong; light gray; fine to coarse grained; massive; SANDSTONE.			42.50	5		8.00 / 10.00		
45	535	45.00 - 48.00 Occasional plant fossils.			531.62					
		48.00 - 55.00 Fresh; strong; gray; interbedded laminated SHALE with thinly bedded SILTSTONE.			48.00					
50	530	48.10 - 49.50 Crossbedding.			530.12	6		7.50 / 10.00		
	525				524.62					
55		55.00 - 58.50 Fresh; medium strong to strong; gray; fine to medium grained; SANDSTONE.			55.00					
		56.50 - 57.50 Vertical 90 degree discontinuities, rough, iron staining.			522.12					
					521.12					
		58.50 - 62.50 Fresh; medium strong; dark gray; laminated SHALE.			58.50					
60	520					7		8.50 / 10.00		
					517.12					
		62.50 - 65.00 Fresh; strong; dark gray; SILTSTONE.			62.50					
65	515				514.62					
		65.00 - 79.00 Fresh; strong; gray; interbedded SILTSTONE and laminated SHALE.			65.00					
70	510					8		9.00 / 10.00		
75	505					9		10.00 / 10.00		
					500.62					
80	500				79.00					

Log continued on next page

WELL CASING
Interval: 0' - 283'
Material: Schedule 40 PVC
Diameter: 2"
Joint Type: Flush

WELL SCREEN
Interval: 283' - 293'
Material: Schedule 40 PVC U-Pack
Diameter: 2"
Slot Size: 0.010"
End Cap: 6", 2"-diameter, Sump

FILTER PACK
Interval: 280.5' - 295'
Type: GP #2 Silica Sand

FILTER PACK SEAL
Interval: 270' - 280.5'
Type: Bentonite Pellets

ANNULUS SEAL
Interval: 0' - 270'
Type: Grout

WELL COMPLETION
Pad: 4'x4' Concrete Pad
Protective Casing: 3' Stick-Ups

DRILLING METHODS
Soil Drill: Sonic
Rock Drill: Sonic

DRAFT

LOG SCALE: 1 in = 5 ft
DRILLING COMPANY: Cascade Drilling, L.P.
DRILLER: T. Taylor

GA INSPECTOR: David Hannam
CHECKED BY: Tim Richards
DATE: 4/5/19

Golder Associates

RECORD OF BOREHOLE GS-AP-MW-30H

PROJECT: Gorgas Ash Pond
PROJECT NUMBER: 18114896
DRILLED DEPTH: 305.00 ft
LOCATION: SE of ash pond off Bank Head Road

DRILL RIG: TSI Truck Mounted Sonic
DATE STARTED: 1/3/19
DATE COMPLETED: 1/8/19

NORTHING: 1,318,714.64
EASTING: 2,069,028.11
GS ELEVATION: 579.62
TOC ELEVATION: 582.49 ft

DEPTH W.L.:
DATE W.L.:
TIME W.L.:
GW ELEVATION:

DEPTH (ft)	ELEVATION (ft)	DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	SAMPLE NO.	TYPE	REC
80		79.00 - 85.00 Fresh; strong; gray; medium bedded SANDSTONE with 1-2" interbeds of laminated SHALE. Shale and siltstone partings in sandstone. *(Continued)*				9		10.00 / 10.00
85	495				494.62			
		85.00 - 105.00 Fresh; strong; gray; interlaminated SHALE, SILTSTONE, and SANDSTONE.			85.00	10		9.50 / 10.00
90	490							
95	485					11		10.00 / 10.00
100	480							
105	475				474.62			
		105.00 - 115.00 Fresh; strong; gray; interbedded laminated SHALE and interlaminated to thinly bedded SILTSTONE.			105.00	12		9.00 / 10.00
110	470							
115	465				464.62			
		115.00 - 125.00 Fresh; strong; gray; interlaminated SHALE and SILTSTONE with occasional laminations or thin beds of SANDSTONE.			115.00	13		9.00 / 10.00
120	460							

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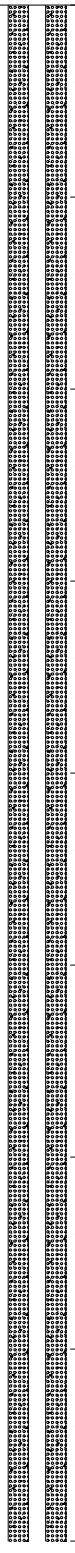
MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES



WELL CONSTRUCTION DETAILS

WELL CASING
Interval: 0' - 283'
Material: Schedule 40 PVC
Diameter: 2"
Joint Type: Flush

WELL SCREEN
Interval: 283' - 293'
Material: Schedule 40 PVC U-Pack
Diameter: 2"
Slot Size: 0.010"
End Cap: 6", 2"-diameter, Sump

FILTER PACK
Interval: 280.5' - 295'
Type: GP #2 Silica Sand

FILTER PACK SEAL
Interval: 270' - 280.5'
Type: Bentonite Pellets

ANNULUS SEAL
Interval: 0' - 270'
Type: Grout

WELL COMPLETION
Pad: 4'x4' Concrete Pad
Protective Casing: 3' Stick-Ups

DRILLING METHODS
Soil Drill: Sonic
Rock Drill: Sonic

DRAFT

LOG SCALE: 1 in = 5 ft
DRILLING COMPANY: Cascade Drilling, L.P.
DRILLER: T. Taylor

GA INSPECTOR: David Hannam
CHECKED BY: Tim Richards
DATE: 4/5/19

Golder Associates

RECORD OF BOREHOLE GS-AP-MW-30H

PROJECT: Gorgas Ash Pond
PROJECT NUMBER: 18114896
DRILLED DEPTH: 305.00 ft
LOCATION: SE of ash pond off Bank Head Road

DRILL RIG: TSI Truck Mounted Sonic
DATE STARTED: 1/3/19
DATE COMPLETED: 1/8/19

NORTHING: 1,318,714.64
EASTING: 2,069,028.11
GS ELEVATION: 579.62
TOC ELEVATION: 582.49 ft

DEPTH W.L.:
DATE W.L.:
TIME W.L.:
GW ELEVATION:

DEPTH (ft)	ELEVATION (ft)	DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	SAMPLE NO.	TYPE	REC	MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES	WELL CONSTRUCTION DETAILS
120		115.00 - 125.00 Fresh; strong; gray; interlaminated SHALE and SILTSTONE with occasional laminations or thin beds of SANDSTONE. *(Continued)*				13		9.00 / 10.00		
	455	124.00 - 124.20 Iron staining on 2" thick SANDSTONE bed.			454.62					
125		125.00 - 203.00 Fresh; strong; gray; interlaminated SILTSTONE and SHALE with thick laminations of SANDSTONE.			125.00					
	450					14		7.00 / 10.00		
130										
	445									
135										
	440					15		10.00 / 10.00		
140										
	435									
145										
	430					16		10.00 / 10.00		
150										
	425									
155						17		9.00 / 10.00		
	420									
160		Log continued on next page								

WELL CASING
Interval: 0' - 283'
Material: Schedule 40 PVC
Diameter: 2"
Joint Type: Flush

WELL SCREEN
Interval: 283' - 293'
Material: Schedule 40 PVC U-Pack
Diameter: 2"
Slot Size: 0.010"
End Cap: 6", 2"-diameter, Sump

FILTER PACK
Interval: 280.5' - 295'
Type: GP #2 Silica Sand

FILTER PACK SEAL
Interval: 270' - 280.5'
Type: Bentonite Pellets

ANNULUS SEAL
Interval: 0' - 270'
Type: Grout

WELL COMPLETION
Pad: 4'x4' Concrete Pad
Protective Casing: 3' Stick-Ups

DRILLING METHODS
Soil Drill: Sonic
Rock Drill: Sonic

DRAFT

LOG SCALE: 1 in = 5 ft
DRILLING COMPANY: Cascade Drilling, L.P.
DRILLER: T. Taylor

GA INSPECTOR: David Hannam
CHECKED BY: Tim Richards
DATE: 4/5/19

Golder Associates

RECORD OF BOREHOLE GS-AP-MW-30H

PROJECT: Gorgas Ash Pond
PROJECT NUMBER: 18114896
DRILLED DEPTH: 305.00 ft
LOCATION: SE of ash pond off Bank Head Road

DRILL RIG: TSI Truck Mounted Sonic
DATE STARTED: 1/3/19
DATE COMPLETED: 1/8/19

NORTHING: 1,318,714.64
EASTING: 2,069,028.11
GS ELEVATION: 579.62
TOC ELEVATION: 582.49 ft

DEPTH W.L.:
DATE W.L.:
TIME W.L.:
GW ELEVATION:

DEPTH (ft)	ELEVATION (ft)	DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	SAMPLE NO.	TYPE	REC	MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES	WELL CONSTRUCTION DETAILS
160		125.00 - 203.00 Fresh; strong; gray; interlaminated SILTSTONE and SHALE with thick laminations of SANDSTONE. *(Continued)*				17		9.00 / 10.00		
165	415									
170	410					18		10.00 / 10.00		
175	405					19		40.00 / 10.00		
180	400									
185	395					20		10.00 / 10.00		
190	390									
195	385					21		10.00 / 10.00		
200	380	Log continued on next page								

WELL CASING
Interval: 0' - 283'
Material: Schedule 40 PVC
Diameter: 2"
Joint Type: Flush

WELL SCREEN
Interval: 283' - 293'
Material: Schedule 40 PVC U-Pack
Diameter: 2"
Slot Size: 0.010"
End Cap: 6", 2"-diameter, Sump

FILTER PACK
Interval: 280.5' - 295'
Type: GP #2 Silica Sand

FILTER PACK SEAL
Interval: 270' - 280.5'
Type: Bentonite Pellets

ANNULUS SEAL
Interval: 0' - 270'
Type: Grout

WELL COMPLETION
Pad: 4'x4' Concrete Pad
Protective Casing: 3' Stick-Ups

DRILLING METHODS
Soil Drill: Sonic
Rock Drill: Sonic

DRAFT

LOG SCALE: 1 in = 5 ft
DRILLING COMPANY: Cascade Drilling, L.P.
DRILLER: T. Taylor

GA INSPECTOR: David Hannam
CHECKED BY: Tim Richards
DATE: 4/5/19

Golder Associates

RECORD OF BOREHOLE GS-AP-MW-30H

PROJECT: Gorgas Ash Pond
PROJECT NUMBER: 18114896
DRILLED DEPTH: 305.00 ft
LOCATION: SE of ash pond off Bank Head Road

DRILL RIG: TSI Truck Mounted Sonic
DATE STARTED: 1/3/19
DATE COMPLETED: 1/8/19

NORTHING: 1,318,714.64
EASTING: 2,069,028.11
GS ELEVATION: 579.62
TOC ELEVATION: 582.49 ft

DEPTH W.L.:
DATE W.L.:
TIME W.L.:
GW ELEVATION:

DEPTH (ft)	ELEVATION (ft)	DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	SAMPLE NO.	TYPE	REC
200		125.00 - 203.00 Fresh; strong; gray; interlaminated SILTSTONE and SHALE with thick laminations of SANDSTONE. *(Continued)*			376.62	21		10.00 10.00
		203.00 - 205.00 Fresh; strong; gray; interbedded SILTSTONE, SANDSTONE, and laminated SHALE.			203.00 374.62			
205	375	205.00 - 265.00 Fresh; strong; gray; interlaminated to very thinly bedded SILTSTONE, SHALE, and SANDSTONE.			205.00			
210	370					22		10.00 10.00
215	365							
220	360					23		10.00 10.00
		223.00 - 223.50 Vertical ~80 degree fracture, rough, straight.			356.12			
225	355							
230	350					24		10.00 10.00
235	345							
						25		10.00 10.00
240	340	Log continued on next page						

MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES

WELL CONSTRUCTION DETAILS

WELL CASING
Interval: 0' - 283'
Material: Schedule 40 PVC
Diameter: 2"
Joint Type: Flush

WELL SCREEN
Interval: 283' - 293'
Material: Schedule 40 PVC U-Pack
Diameter: 2"
Slot Size: 0.010"
End Cap: 6", 2"-diameter, Sump

FILTER PACK
Interval: 280.5' - 295'
Type: GP #2 Silica Sand

FILTER PACK SEAL
Interval: 270' - 280.5'
Type: Bentonite Pellets

ANNULUS SEAL
Interval: 0' - 270'
Type: Grout

WELL COMPLETION
Pad: 4'x4' Concrete Pad
Protective Casing: 3' Stick-Ups

DRILLING METHODS
Soil Drill: Sonic
Rock Drill: Sonic

DRAFT

LOG SCALE: 1 in = 5 ft
DRILLING COMPANY: Cascade Drilling, L.P.
DRILLER: T. Taylor

GA INSPECTOR: David Hannam
CHECKED BY: Tim Richards
DATE: 4/5/19

Golder Associates

RECORD OF BOREHOLE GS-AP-MW-30H

PROJECT: Gorgas Ash Pond
PROJECT NUMBER: 18114896
DRILLED DEPTH: 305.00 ft
LOCATION: SE of ash pond off Bank Head Road

DRILL RIG: TSI Truck Mounted Sonic
DATE STARTED: 1/3/19
DATE COMPLETED: 1/8/19

NORTHING: 1,318,714.64
EASTING: 2,069,028.11
GS ELEVATION: 579.62
TOC ELEVATION: 582.49 ft

DEPTH W.L.:
DATE W.L.:
TIME W.L.:
GW ELEVATION:

DEPTH (ft)	ELEVATION (ft)	DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	SAMPLE NO.	TYPE	REC
240		205.00 - 265.00 Fresh; strong; gray; interlaminated to very thinly bedded SILTSTONE, SHALE, and SANDSTONE. *(Continued)*						
		240.50 - 241.50 SANDSTONE with SHALE partings.			338.12	25		10.00 / 10.00
245	335	245.00 - 245.80 SANDSTONE with SHALE partings.			333.82			
250	330					26		10.00 / 10.00
255	325	254.50 - 255.00 SANDSTONE with SHALE partings.			324.62			
		256.00 - 256.50 SANDSTONE bed.			323.12			
260	320					27		10.00 / 10.00
		263.50 - 264.00 SANDSTONE bed.			315.62			
265	315				314.62			
		265.00 - 275.00 Fresh; strong; dark gray; laminated SHALE.			265.00			
270	310					28		10.00 / 10.00
		272.50 - 273.00 SANDSTONE bed.			306.62			
275	305				304.62			
		275.00 - 287.00 Fresh; strong; gray; interlaminated SANDSTONE and SHALE.			275.00			
						29		9.00 / 10.00
280	300	Log continued on next page						

MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES



WELL CONSTRUCTION DETAILS

WELL CASING
Interval: 0' - 283'
Material: Schedule 40 PVC
Diameter: 2"
Joint Type: Flush

WELL SCREEN
Interval: 283' - 293'
Material: Schedule 40 PVC U-Pack
Diameter: 2"
Slot Size: 0.010"
End Cap: 6", 2"-diameter, Sump

FILTER PACK
Interval: 280.5' - 295'
Type: GP #2 Silica Sand

FILTER PACK SEAL
Interval: 270' - 280.5'
Type: Bentonite Pellets

ANNULUS SEAL
Interval: 0' - 270'
Type: Grout

WELL COMPLETION
Pad: 4'x4' Concrete Pad
Protective Casing: 3' Stick-Ups

DRILLING METHODS
Soil Drill: Sonic
Rock Drill: Sonic

DRAFT

LOG SCALE: 1 in = 5 ft
DRILLING COMPANY: Cascade Drilling, L.P.
DRILLER: T. Taylor

GA INSPECTOR: David Hannam
CHECKED BY: Tim Richards
DATE: 4/5/19

Golder Associates

RECORD OF BOREHOLE GS-AP-MW-30H

PROJECT: Gorgas Ash Pond
PROJECT NUMBER: 18114896
DRILLED DEPTH: 305.00 ft
LOCATION: SE of ash pond off Bank Head Road

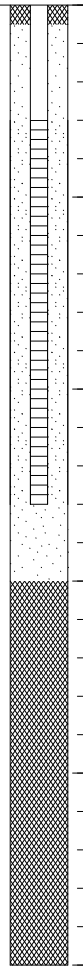
DRILL RIG: TSI Truck Mounted Sonic
DATE STARTED: 1/3/19
DATE COMPLETED: 1/8/19

NORTHING: 1,318,714.64
EASTING: 2,069,028.11
GS ELEVATION: 579.62
TOC ELEVATION: 582.49 ft

DEPTH W.L.:
DATE W.L.:
TIME W.L.:
GW ELEVATION:

DEPTH (ft)	ELEVATION (ft)	DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	SAMPLE NO.	TYPE	REC
280		275.00 - 287.00 Fresh; strong; gray; interlaminated SANDSTONE and SHALE. *(Continued)*				29		9.00 10.00
285	295				292.62			
		287.00 - 289.00 Fresh; medium strong; dark gray; laminated SHALE.			287.00 290.62			
290	290	289.00 - 293.00 Fresh; strong; gray; interlaminated SHALE, SILTSTONE, and SANDSTONE.			289.00 286.62	30		7.00 10.00
		293.00 - 299.00 Fresh; strong; light gray; massive; SANDSTONE with SHALE partings.			293.00 280.62			
295	285							
300	280	299.00 - 304.00 Fresh; medium strong; dark gray; laminated SHALE.			299.00 275.62	31		8.00 10.00
		304.00 - 305.00 Fresh; strong; gray; thickly bedded SILTSTONE.			304.00 274.62			
305	275	Boring completed at 305.00 ft						
310	270							
315	265							
320	260							

MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES



WELL CONSTRUCTION DETAILS

WELL CASING
Interval: 0' - 283'
Material: Schedule 40 PVC
Diameter: 2"
Joint Type: Flush

WELL SCREEN
Interval: 283' - 293'
Material: Schedule 40 PVC U-Pack
Diameter: 2"
Slot Size: 0.010"
End Cap: 6", 2"-diameter, Sump

FILTER PACK
Interval: 280.5' - 295'
Type: GP #2 Silica Sand

FILTER PACK SEAL
Interval: 270' - 280.5'
Type: Bentonite Pellets

ANNULUS SEAL
Interval: 0' - 270'
Type: Grout

WELL COMPLETION
Pad: 4'x4' Concrete Pad
Protective Casing: 3' Stick-Ups

DRILLING METHODS
Soil Drill: Sonic
Rock Drill: Sonic

DRAFT

LOG SCALE: 1 in = 5 ft
DRILLING COMPANY: Cascade Drilling, L.P.
DRILLER: T. Taylor

GA INSPECTOR: David Hannam
CHECKED BY: Tim Richards
DATE: 4/5/19

Golder Associates

RECORD OF BOREHOLE GS-AP-MW-30SH

PROJECT: Gorgas Ash Pond
PROJECT NUMBER: 18114896
DRILLED DEPTH: 45.00 ft
LOCATION: Off Bankhead Road, off-set MW-30H

DRILL RIG: TSI Truck Mounted Sonic
DATE STARTED: 1/9/19
DATE COMPLETED: 1/10/19

NORTHING: 1,318,721.10
EASTING: 2,069,023.99
GS ELEVATION: 579.84
TOC ELEVATION: 582.53 ft

DEPTH W.L.:
DATE W.L.:
TIME W.L.:
GW ELEVATION:

DEPTH (ft)	ELEVATION (ft)	DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	SAMPLE NO.	TYPE	REC
0		0.00 - 15.00 (SM), silty SAND, trace clay; red brown; cohesive, w < PL, moist; structure not observed. [RESIDUUM]	SM			1		5.00 / 5.00
5	575							
10	570					2		10.00 / 10.00
15	565				564.84			
		15.00 - 25.00 Moderately weathered; very weak; tan brown; medium grained; laminated SANDSTONE.			15.00	3		2.00 / 10.00
20	560							
25	555				554.84			
		25.00 - 34.00 Fresh; strong; dark gray; laminated SHALE.			25.00	4		7.00 / 10.00
30	550							
		34.00 - 35.00 COAL, RECOVERED AS, (CL), sandy CLAY, trace coal gravel; black; wet, w > PL, soft.	CL		545.84 34.00 544.84			
35	545				35.00			
		35.00 - 45.00 Fresh; strong; light gray; interlaminated SHALE, SANDSTONE, and SILTSTONE.				5		4.00 / 10.00
40	540							

Log continued on next page

MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES



WELL CONSTRUCTION DETAILS

WELL CASING
Interval: 0' - 35'
Material: Schedule 40 PVC
Diameter: 2"
Joint Type: Flush

WELL SCREEN
Interval: 34.5' - 44.5'
Material: Schedule 40 PVC U-Pack
Diameter: 2"
Slot Size: 0.010"
End Cap: 6", 2"-diameter, Sump

FILTER PACK
Interval: 33' - 45'
Type: GP #1 Silica Sand

FILTER PACK SEAL
Interval: 29' - 33'
Type: Bentonite Pellets

ANNULUS SEAL
Interval: 0' - 29'
Type: Bentonite Cement Grout

WELL COMPLETION
Pad: 4'x4' Concrete Pad
Protective Casing: 3' Stick-Ups

DRILLING METHODS
Soil Drill: Sonic
Rock Drill: Sonic

DRAFT

LOG SCALE: 1 in = 5 ft
DRILLING COMPANY: Cascade Drilling, L.P.
DRILLER: T. Taylor

GA INSPECTOR: David Hannam
CHECKED BY: Tim Richards
DATE: 4/5/19

Golder Associates

RECORD OF BOREHOLE GS-AP-MW-30SH

SHEET 2 of 2

PROJECT: Gorgas Ash Pond
PROJECT NUMBER: 18114896
DRILLED DEPTH: 45.00 ft
LOCATION: Off Bankhead Road, off-set MW-30H

DRILL RIG: TSI Truck Mounted Sonic
DATE STARTED: 1/9/19
DATE COMPLETED: 1/10/19

NORTHING: 1,318,721.10
EASTING: 2,069,023.99
GS ELEVATION: 579.84
TOC ELEVATION: 582.53 ft

DEPTH W.L.:
DATE W.L.:
TIME W.L.:
GW ELEVATION:

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE: DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	SAMPLES: SAMPLE NO.	SAMPLES: TYPE	SAMPLES: REC	MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES
40		35.00 - 45.00 Fresh; strong; light gray; interlaminated SHALE, SANDSTONE, and SILTSTONE. *(Continued)*				5		4.00 / 10.00	Sand Filter Pack
45	535				534.84				
		Boring completed at 45.00 ft							
50	530								
55	525								
60	520								
65	515								
70	510								
75	505								
80	500								

WELL CONSTRUCTION DETAILS

WELL CASING
Interval: 0' - 35'
Material: Schedule 40 PVC
Diameter: 2"
Joint Type: Flush

WELL SCREEN
Interval: 34.5' - 44.5'
Material: Schedule 40 PVC U-Pack
Diameter: 2"
Slot Size: 0.010"
End Cap: 6", 2"-diameter, Sump

FILTER PACK
Interval: 33' - 45'
Type: GP #1 Silica Sand

FILTER PACK SEAL
Interval: 29' - 33'
Type: Bentonite Pellets

ANNULUS SEAL
Interval: 0' - 29'
Type: Bentonite Cement Grout

WELL COMPLETION
Pad: 4'x4' Concrete Pad
Protective Casing: 3' Stick-Ups

DRILLING METHODS
Soil Drill: Sonic
Rock Drill: Sonic

DRAFT

LOG SCALE: 1 in = 5 ft
DRILLING COMPANY: Cascade Drilling, L.P.
DRILLER: T. Taylor

GA INSPECTOR: David Hannam
CHECKED BY: Tim Richards
DATE: 4/5/19

Golder Associates

RECORD OF BOREHOLE GS-GSA-MW-10H

SHEET 1 of 2

PROJECT: Gorgas Ash Pond
PROJECT NUMBER: 18114896
DRILLED DEPTH: 60.00 ft
LOCATION:

DRILL RIG: TSI 150CC
DATE STARTED: 2/4/19
DATE COMPLETED: 2/4/19

NORTHING: 1,328,612.73
EASTING: 2,055,441.67
GS ELEVATION: 336.56
TOC ELEVATION: 339.52 ft

DEPTH W.L.:
DATE W.L.:
TIME W.L.:
GW ELEVATION:

DEPTH (ft)	ELEVATION (ft)	DESCRIPTION	USCS	ELEV. / DEPTH (ft)	SAMPLE NO.	TYPE	REC
0	335	0.00 - 2.00 (GP), coarse GRAVEL of shale; highly weathered; non-cohesive, moist. [FILL]	GP	334.56 2.00			
		2.00 - 10.00 (SP), gravelly SAND, some silt, fine to coarse; dark gray to light gray; non-cohesive, dry. [FILL] 2.50 - 5.00 Trace COAL.	SP	331.56	1		9.00 10.00
10	325	10.00 - 15.00 (SM), gravelly silty SAND; light gray; non-cohesive, dry; possible concrete. [FILL]		326.56 10.00			
15	320	15.00 - 20.00 Moderately weathered; very weak to weak; gray; thinly laminated SHALE with interbeds of SILTSTONE. 19-20: Vertical fracture		321.56 15.00	2		9.50 10.00
20	315	20.00 - 30.00 Slightly weathered; weak to medium strong; gray to dark gray; interbedded SHALE and SILTSTONE. 20.10 - 25.00 Trace COAL. Iron staining.		316.56 20.00			
25	310			311.56	3		6.00 10.00
30	305	30.00 - 40.00 Medium strong; gray to dark gray; crossbedded and bedding structures; interbedded SILTSTONE, SHALE, and SANDSTONE. 0 degree fractures along interbedding planes.		306.56 30.00			
35	300				4		9.50 10.00
40		Log continued on next page		296.56			

MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES

Grout (Aquaguard Bentonite Grout)
Bentonite Pel-Plug Time Release Pellets
Filter Media #10 Sand
2" PVC Sch 40 0.010 Slot U-Pack Screw Fit with Rubber Seal Screen
Sand Filter Pack
3/8" Holeplug Bentonite Chips

WELL CONSTRUCTION DETAILS

WELL CASING
Interval: 0' - 16'
Material: Schedule 40 PVC
Diameter: 2"
Joint Type: Flush

WELL SCREEN
Interval: 16' - 26'
Material: Schedule 40 PVC U-Pack
Diameter: 2"
Slot Size: 0.010"
End Cap: 6", 2"-diameter, Sump

FILTER PACK
Interval: 13.5' - 27'
Type: Filter Media #10 Sand

FILTER PACK SEAL
Interval: 9.5' - 13.5'
Type: Bentonite Pellets

ANNULUS SEAL
Interval: 0' - 9.5'
Type: Grout (Aquaguard Bentonite Grout)

WELL COMPLETION
Pad: 4'x4' Concrete Pad
Protective Casing: 3' Stick-Ups

DRILLING METHODS
Soil Drill: Sonic
Rock Drill: Sonic

DRAFT

LOG SCALE: 1 in = 5 ft
DRILLING COMPANY: Cascade Drilling, L.P.
DRILLER: T. Vanardo

GA INSPECTOR: Chris Tidwell
CHECKED BY: David Hannam
DATE: 4/5/19

Golder Associates

RECORD OF BOREHOLE GS-GSA-MW-10H

PROJECT: Gorgas Ash Pond
PROJECT NUMBER: 18114896
DRILLED DEPTH: 60.00 ft
LOCATION:

DRILL RIG: TSI 150CC
DATE STARTED: 2/4/19
DATE COMPLETED: 2/4/19

NORTHING: 1,328,612.73
EASTING: 2,055,441.67
GS ELEVATION: 336.56
TOC ELEVATION: 339.52 ft

DEPTH W.L.:
DATE W.L.:
TIME W.L.:
GW ELEVATION:

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE: DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	SAMPLES: SAMPLE NO.	TYPE	REC	MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES	WELL CONSTRUCTION DETAILS
40	295	40.00 - 60.00 Medium strong; gray to dark gray; interbedded SHALE, SILTSTONE, and SANDSTONE.			40.00	5		10.00 / 10.00		**WELL CASING** Interval: 0' - 16' Material: Schedule 40 PVC Diameter: 2" Joint Type: Flush **WELL SCREEN** Interval: 16' - 26' Material: Schedule 40 PVC U-Pack Diameter: 2" Slot Size: 0.010" End Cap: 6", 2"-diameter, Sump **FILTER PACK** Interval: 13.5' - 27' Type: Filter Media #10 Sand **FILTER PACK SEAL** Interval: 9.5' - 13.5' Type: Bentonite Pellets **ANNULUS SEAL** Interval: 0' - 9.5' Type: Grout (Aquaguard Bentonite Grout) **WELL COMPLETION** Pad: 4'x4' Concrete Pad Protective Casing: 3' Stick-Ups **DRILLING METHODS** Soil Drill: Sonic Rock Drill: Sonic
45	290									
50	285					6		9.50 / 10.00		
55	280									
60	275	Boring completed at 60.00 ft			276.56					
65	270									
70	265									
75	260									
80										

DRAFT

LOG SCALE: 1 in = 5 ft
DRILLING COMPANY: Cascade Drilling, L.P.
DRILLER: T. Vanardo

GA INSPECTOR: Chris Tidwell
CHECKED BY: David Hannam
DATE: 4/5/19

Golder Associates

RECORD OF BOREHOLE GS-GSA-MW-11H

SHEET 1 of 2

PROJECT: Gorgas Ash Pond
PROJECT NUMBER: 18114896
DRILLED DEPTH: 60.00 ft
LOCATION:

DRILL RIG: TSI 150CC
DATE STARTED: 2/5/19
DATE COMPLETED: 2/6/19

NORTHING: 1,327,162.44
EASTING: 2,056,243.50
GS ELEVATION: 260.13
TOC ELEVATION: 263.02 ft

DEPTH W.L.:
DATE W.L.:
TIME W.L.:
GW ELEVATION:

DEPTH (ft)	ELEVATION (ft)	DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	SAMPLE NO.	TYPE	REC
0	260	0.00 - 5.00 (ML), gravelly sandy SILT, trace organics, gravels of weathered shale/siltstone/sandstone; dark brown to black. Low Recovery. [ALLUVIUM]	ML					
					255.13 / 5.00	1		3.00 / 10.00
5	255	5.00 - 10.00 Weak to medium strong, fine grained, SANDSTONE with interbedded SHALE and SILTSTONE. Poor recovery.						
					250.13 / 10.00			
10	250	10.00 - 20.00 Weight of rod pushed through. Sample not recorded.						
						2		0.00 / 10.00
15	245							
					240.13 / 20.00			
20	240	20.00 - 25.00 (CL), CLAY, some silt; brown-gray; cohesive, wet, w > PL, soft to firm. [ALLUVIUM]	CL					
					235.13 / 25.00	3		7.50 / 10.00
25	235	25.00 - 28.90 (CL), gravelly CLAY, trace COAL fragments, fine to coarse gravels; brown with orange streaks; cohesive, w <~ PL, stiff. [ALLUVIUM]	CL					
					231.23			
		28.90 - 30.00 (GC), clayey GRAVEL, gravels of weathered shale; brown with orange mottling; non-cohesive, dry. [ALLUVIUM]	GC		28.90 / 230.13			
30	230	30.00 - 40.00 (CL), sandy CLAY, some rounded gravels of weathered shale, trace COAL fragments; light brown-orange with orange mottling; cohesive, w ~ PL, soft. [ALLUVIUM]			30.00			
			CL			4		10.00 / 10.00
35	225							
					220.13			
40		Log continued on next page						

MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES

Grout (Aquaguard Bentonite Grout)

Bentonite Pel-Plug Time Release Pellets

Filter Media #10 Sand

2" PVC Sch 40 0.010 Slot U-Pack Screw Fit with Rubber Seal Screen

WELL CONSTRUCTION DETAILS

WELL CASING
Interval: 0' - 36'
Material: Schedule 40 PVC
Diameter: 2"
Joint Type: Flush

WELL SCREEN
Interval: 36' - 46'
Material: Schedule 40 PVC U-Pack
Diameter: 2"
Slot Size: 0.010"
End Cap: 6", 2"-diameter, Sump

FILTER PACK
Interval: 33.5' - 46.5'
Type: Filter Media #10 Sand

FILTER PACK SEAL
Interval: 29' - 33.5'
Type: Bentonite Pellets

ANNULUS SEAL
Interval: 0' - 29'
Type: Grout (Aquaguard Bentonite Grout)

WELL COMPLETION
Pad: 4'x4' Concrete Pad
Protective Casing: 3' Stick-Ups

DRILLING METHODS
Soil Drill: Sonic
Rock Drill: Sonic

DRAFT

LOG SCALE: 1 in = 5 ft
DRILLING COMPANY: Cascade Drilling, L.P.
DRILLER: T. Vanardo

GA INSPECTOR: Chris Tidwell
CHECKED BY: David Hannam
DATE: 4/5/19

Golder Associates

RECORD OF BOREHOLE GS-GSA-MW-11H

SHEET 2 of 2

PROJECT: Gorgas Ash Pond
PROJECT NUMBER: 18114896
DRILLED DEPTH: 60.00 ft
LOCATION:

DRILL RIG: TSI 150CC
DATE STARTED: 2/5/19
DATE COMPLETED: 2/6/19

NORTHING: 1,327,162.44
EASTING: 2,056,243.50
GS ELEVATION: 260.13
TOC ELEVATION: 263.02 ft

DEPTH W.L.:
DATE W.L.:
TIME W.L.:
GW ELEVATION:

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE: DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	SAMPLES: SAMPLE NO.	SAMPLES: TYPE	SAMPLES: REC	MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES	WELL CONSTRUCTION DETAILS
40	220	40.00 - 50.00 Medium strong; dark gray to gray; burrow structures; interbedded SHALE, SILTSTONE, and SANDSTONE.			40.00					
45	215					5		7.50 / 10.00	Sand Filter Pack 3/8" Holeplug Bentonite Chips	
50	210				210.13					
		50.00 - 60.00 Medium strong; dark gray-black to gray; SHALE with interbedded SILTSTONE and SANDSTONE.			50.00					
55	205					6		9.00 / 10.00		
60	200	Boring completed at 60.00 ft			200.13					
65	195									
70	190									
75	185									
80										

WELL CASING
Interval: 0' - 36'
Material: Schedule 40 PVC
Diameter: 2"
Joint Type: Flush

WELL SCREEN
Interval: 36' - 46'
Material: Schedule 40 PVC U-Pack
Diameter: 2"
Slot Size: 0.010"
End Cap: 6", 2"-diameter, Sump

FILTER PACK
Interval: 33.5' - 46.5'
Type: Filter Media #10 Sand

FILTER PACK SEAL
Interval: 29' - 33.5'
Type: Bentonite Pellets

ANNULUS SEAL
Interval: 0' - 29'
Type: Grout (Aquaguard Bentonite Grout)

WELL COMPLETION
Pad: 4'x4' Concrete Pad
Protective Casing: 3' Stick-Ups

DRILLING METHODS
Soil Drill: Sonic
Rock Drill: Sonic

DRAFT

LOG SCALE: 1 in = 5 ft
DRILLING COMPANY: Cascade Drilling, L.P.
DRILLER: T. Vanardo

GA INSPECTOR: Chris Tidwell
CHECKED BY: David Hannam
DATE: 4/5/19

Golder Associates

RECORD OF BOREHOLE GS-GSA-MW-3V

SHEET 1 of 6

PROJECT: Gorgas Ash Pond
PROJECT NUMBER: 18114896
DRILLED DEPTH: 230.00 ft
LOCATION:

DRILL RIG: TSI 150CC
DATE STARTED: 2/18/19
DATE COMPLETED: 2/25/19

NORTHING: 1,329,100.49
EASTING: 2,054,755.12
GS ELEVATION: 439.60
TOC ELEVATION: 442.68 ft

DEPTH W.L.:
DATE W.L.:
TIME W.L.:
GW ELEVATION:

DEPTH (ft)	ELEVATION (ft)	DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	SAMPLE NO.	TYPE	REC	MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES	WELL CONSTRUCTION DETAILS
0		0.00 - 10.00 (GP), sandy GRAVEL, trace clay/silt; fine to coarse; black-brown with some orange; non-cohesive, moist. [FILL]							Grout (Aquaguard _ Bentonite Grout)	**WELL CASING** Interval: 0' - 178' Material: Schedule 40 PVC Diameter: 2" Joint Type: Flush **WELL SCREEN** Interval: 178' - 188' Material: Schedule 40 PVC U-Pack Diameter: 2" Slot Size: 0.010" End Cap: 6", 2"-diameter, Sump **FILTER PACK** Interval: 175' - 189' Type: Filter Media #10 Sand **FILTER PACK SEAL** Interval: 170' - 175' Type: Bentonite Pellets **ANNULUS SEAL** Interval: 0' - 170' Type: Grout (Aquaguard Bentonite Grout) **WELL COMPLETION** Pad: 4'x4' Concrete Pad Protective Casing: 3' Stick-Ups **DRILLING METHODS** Soil Drill: Sonic Rock Drill: Sonic
5	435		GP			1		5.00 / 10.00		
10	430				429.6 / 10.00					
		10.00 - 40.00 (GC), sandy clayey GRAVEL, some silt; fine to coarse; black/brown/orange; non-cohesive, moist to wet. [FILL]				2		8.50 / 10.00		
15	425									
20	420					3		6.50 / 10.00		
25	415		GC							
30	410					4		4.50 / 10.00		
35	405									
40	400				399.6					
		Log continued on next page								

DRAFT

LOG SCALE: 1 in = 5 ft
DRILLING COMPANY: Cascade Drilling, L.P.
DRILLER: J. Asua

GA INSPECTOR: Chris Tidwell
CHECKED BY: David Hannam
DATE: 4/5/19

Golder Associates

RECORD OF BOREHOLE GS-GSA-MW-3V

PROJECT: Gorgas Ash Pond
PROJECT NUMBER: 18114896
DRILLED DEPTH: 230.00 ft
LOCATION:

DRILL RIG: TSI 150CC
DATE STARTED: 2/18/19
DATE COMPLETED: 2/25/19

NORTHING: 1,329,100.49
EASTING: 2,054,755.12
GS ELEVATION: 439.60
TOC ELEVATION: 442.68 ft

DEPTH W.L.:
DATE W.L.:
TIME W.L.:
GW ELEVATION:

DEPTH (ft)	ELEVATION (ft)	DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	SAMPLE NO.	TYPE	REC
40		40.00 - 50.00 (GP), sandy GRAVEL, trace clay, trace silt; fine to coarse; brown-black. [FILL]			40.00			
45	395		GP			5		5.50 / 10.00
50	390				389.6			
		50.00 - 60.00 (GP), GRAVEL, trace sand, trace silt, trace clay; fine to coarse; black to brown-black. [FILL]			50.00			
55	385		GP			6		6.50 / 10.00
60	380				379.6			
		60.00 - 69.00 (GC), clayey GRAVEL, trace sand, some silt; fine to coarse; black; non-cohesive, moist to wet; trace COAL. [FILL]			60.00			
65	375		GC			7		6.00 / 10.00
					370.6			
		69.00 - 70.00 (GP), GRAVEL, trace sand; fine to coarse; black to black/gray; non-cohesive, moist to dry; trace COAL. [FILL]	GP		69.00 369.6			
70	370	70.00 - 120.00 (GP), GRAVEL, trace sand, trace silt, trace clay; fine to coarse; black to brown-black; non-cohesive, moist to wet; trace COAL. [FILL]			70.00			
75	365		GP			8		5.00 / 10.00
80	360							

Log continued on next page

MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES

WELL CONSTRUCTION DETAILS

WELL CASING
Interval: 0' - 178'
Material: Schedule 40 PVC
Diameter: 2"
Joint Type: Flush

WELL SCREEN
Interval: 178' - 188'
Material: Schedule 40 PVC U-Pack
Diameter: 2"
Slot Size: 0.010"
End Cap: 6", 2"-diameter, Sump

FILTER PACK
Interval: 175' - 189'
Type: Filter Media #10 Sand

FILTER PACK SEAL
Interval: 170' - 175'
Type: Bentonite Pellets

ANNULUS SEAL
Interval: 0' - 170'
Type: Grout (Aquaguard Bentonite Grout)

WELL COMPLETION
Pad: 4'x4' Concrete Pad
Protective Casing: 3' Stick-Ups

DRILLING METHODS
Soil Drill: Sonic
Rock Drill: Sonic

DRAFT

LOG SCALE: 1 in = 5 ft
DRILLING COMPANY: Cascade Drilling, L.P.
DRILLER: J. Asua

GA INSPECTOR: Chris Tidwell
CHECKED BY: David Hannam
DATE: 4/5/19

Golder Associates

RECORD OF BOREHOLE GS-GSA-MW-3V

PROJECT: Gorgas Ash Pond
PROJECT NUMBER: 18114896
DRILLED DEPTH: 230.00 ft
LOCATION:

DRILL RIG: TSI 150CC
DATE STARTED: 2/18/19
DATE COMPLETED: 2/25/19

NORTHING: 1,329,100.49
EASTING: 2,054,755.12
GS ELEVATION: 439.60
TOC ELEVATION: 442.68 ft

DEPTH W.L.:
DATE W.L.:
TIME W.L.:
GW ELEVATION:

DEPTH (ft)	ELEVATION (ft)	DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	SAMPLE NO.	TYPE	REC
80		70.00 - 120.00 (GP), GRAVEL, trace sand, trace silt, trace clay; fine to coarse; black to brown-black; non-cohesive, moist to wet; trace COAL. [FILL] *(Continued)*						
85	355					9		3.00 / 10.00
90	350							
95	345					10		6.00 / 10.00
100	340	100.00 - 120.00 Ash, recovered as: GRAVEL with some sand, some silt, black to black brown, trace coal	GP					
105	335					11		8.00 / 10.00
110	330							
115	325					12		3.00 / 10.00
120	320	Log continued on next page			319.6			

MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES

WELL CONSTRUCTION DETAILS

WELL CASING
Interval: 0' - 178'
Material: Schedule 40 PVC
Diameter: 2"
Joint Type: Flush

WELL SCREEN
Interval: 178' - 188'
Material: Schedule 40 PVC U-Pack
Diameter: 2"
Slot Size: 0.010"
End Cap: 6", 2"-diameter, Sump

FILTER PACK
Interval: 175' - 189'
Type: Filter Media #10 Sand

FILTER PACK SEAL
Interval: 170' - 175'
Type: Bentonite Pellets

ANNULUS SEAL
Interval: 0' - 170'
Type: Grout (Aquaguard Bentonite Grout)

WELL COMPLETION
Pad: 4'x4' Concrete Pad
Protective Casing: 3' Stick-Ups

DRILLING METHODS
Soil Drill: Sonic
Rock Drill: Sonic

DRAFT

LOG SCALE: 1 in = 5 ft
DRILLING COMPANY: Cascade Drilling, L.P.
DRILLER: J. Asua

GA INSPECTOR: Chris Tidwell
CHECKED BY: David Hannam
DATE: 4/5/19

Golder Associates

RECORD OF BOREHOLE GS-GSA-MW-3V

SHEET 4 of 6

PROJECT: Gorgas Ash Pond
PROJECT NUMBER: 18114896
DRILLED DEPTH: 230.00 ft
LOCATION:

DRILL RIG: TSI 150CC
DATE STARTED: 2/18/19
DATE COMPLETED: 2/25/19

NORTHING: 1,329,100.49
EASTING: 2,054,755.12
GS ELEVATION: 439.60
TOC ELEVATION: 442.68 ft

DEPTH W.L.:
DATE W.L.:
TIME W.L.:
GW ELEVATION:

DEPTH (ft)	ELEVATION (ft)	DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	SAMPLE NO.	TYPE	REC
120		120.00 - 142.50 (SM), Ash recovered as: SILT and SAND with some gravel; black; non-cohesive, w < PL, soft to firm. ASH. [FILL]			120.00			
125	315					13		7.50 / 10.00
130	310		SM					
135	305					14		10.00 / 10.00
140	300				297.1			
		142.50 - 161.00 (ML/CL), sandy SILT/CLAY, trace to some gravel; gray-brown with orange mottling; cohesive, w < PL, soft to firm. [FILL]			142.50			
145	295	143.00 - 150.00 Trace organic material (wood).				15		10.00 / 10.00
150	290		ML		289.6			
155	285					16		10.00 / 10.00
160	280	Log continued on next page						

MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES

WELL CONSTRUCTION DETAILS

WELL CASING
Interval: 0' - 178'
Material: Schedule 40 PVC
Diameter: 2"
Joint Type: Flush

WELL SCREEN
Interval: 178' - 188'
Material: Schedule 40 PVC U-Pack
Diameter: 2"
Slot Size: 0.010"
End Cap: 6", 2"-diameter, Sump

FILTER PACK
Interval: 175' - 189'
Type: Filter Media #10 Sand

FILTER PACK SEAL
Interval: 170' - 175'
Type: Bentonite Pellets

ANNULUS SEAL
Interval: 0' - 170'
Type: Grout (Aquaguard Bentonite Grout)

WELL COMPLETION
Pad: 4'x4' Concrete Pad
Protective Casing: 3' Stick-Ups

DRILLING METHODS
Soil Drill: Sonic
Rock Drill: Sonic

DRAFT

LOG SCALE: 1 in = 5 ft
DRILLING COMPANY: Cascade Drilling, L.P.
DRILLER: J. Asua

GA INSPECTOR: Chris Tidwell
CHECKED BY: David Hannam
DATE: 4/5/19

Golder Associates

RECORD OF BOREHOLE GS-GSA-MW-3V

PROJECT: Gorgas Ash Pond
PROJECT NUMBER: 18114896
DRILLED DEPTH: 230.00 ft
LOCATION:

DRILL RIG: TSI 150CC
DATE STARTED: 2/18/19
DATE COMPLETED: 2/25/19

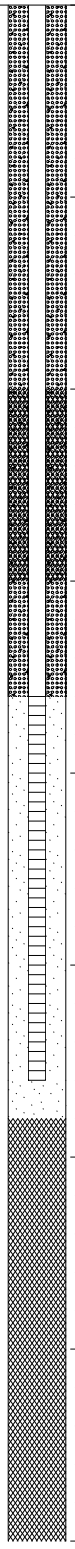
NORTHING: 1,329,100.49
EASTING: 2,054,755.12
GS ELEVATION: 439.60
TOC ELEVATION: 442.68 ft

DEPTH W.L.:
DATE W.L.:
TIME W.L.:
GW ELEVATION:

DEPTH (ft)	ELEVATION (ft)	DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	SAMPLE NO.	TYPE	REC
160			ML		278.6			
		161.00 - 166.00 (GP), GRAVEL, some silt; fine to coarse; light gray gravels of weathered shale.	GP		161.00			
165	275				273.6	17		7.00 / 10.00
		166.00 - 170.00 Highly weathered; medium strong; thinly laminated; SHALE.			166.00			
170	270				269.6			
		170.00 - 182.00 Moderately weathered; medium strong; gray to light gray; bioturbation; SHALE interbedded with SILTSTONE.			170.00			
175	265					18		6.50 / 10.00
180	260				257.6			
		182.00 - 220.00 Moderately weathered to fresh; strong; gray to light gray; fossiliferous, bioturbated; interbedded SANDSTONE and SILTSTONE with small interbeds of SHALE.			182.00	19		7.00 / 10.00
185	255							
190	250					20		6.00 / 10.00
195	245							
200	240							

Log continued on next page

MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES



WELL CONSTRUCTION DETAILS

WELL CASING
Interval: 0' - 178'
Material: Schedule 40 PVC
Diameter: 2"
Joint Type: Flush

WELL SCREEN
Interval: 178' - 188'
Material: Schedule 40 PVC U-Pack
Diameter: 2"
Slot Size: 0.010"
End Cap: 6", 2"-diameter, Sump

FILTER PACK
Interval: 175' - 189'
Type: Filter Media #10 Sand

FILTER PACK SEAL
Interval: 170' - 175'
Type: Bentonite Pellets

ANNULUS SEAL
Interval: 0' - 170'
Type: Grout (Aquaguard Bentonite Grout)

WELL COMPLETION
Pad: 4'x4' Concrete Pad
Protective Casing: 3' Stick-Ups

DRILLING METHODS
Soil Drill: Sonic
Rock Drill: Sonic

DRAFT

LOG SCALE: 1 in = 5 ft
DRILLING COMPANY: Cascade Drilling, L.P.
DRILLER: J. Asua

GA INSPECTOR: Chris Tidwell
CHECKED BY: David Hannam
DATE: 4/5/19

Golder Associates

RECORD OF BOREHOLE GS-GSA-MW-3V

SHEET 6 of 6

PROJECT: Gorgas Ash Pond
PROJECT NUMBER: 18114896
DRILLED DEPTH: 230.00 ft
LOCATION:

DRILL RIG: TSI 150CC
DATE STARTED: 2/18/19
DATE COMPLETED: 2/25/19

NORTHING: 1,329,100.49
EASTING: 2,054,755.12
GS ELEVATION: 439.60
TOC ELEVATION: 442.68 ft

DEPTH W.L.:
DATE W.L.:
TIME W.L.:
GW ELEVATION:

DEPTH (ft)	ELEVATION (ft)	DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	SAMPLE NO.	TYPE	REC
200		182.00 - 220.00 Moderately weathered to fresh; strong; gray to light gray; fossiliferous, bioturbated; interbedded SANDSTONE and SILTSTONE with small interbeds of SHALE. *(Continued)*						
205	235					21		8.00 / 10.00
210	230							
215	225					22		9.50 / 10.00
220	220				219.6			
		220.00 - 230.00 Fresh; strong; light gray; SANDSTONE.			220.00			
		223.50 - 227.00 Vertical ~90 degree fracture, possibly drilling induced.				23		10.00 / 10.00
225	215				212.6			
230	210				209.6			
		Boring completed at 230.00 ft						
235	205							
240	200							

MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES

WELL CONSTRUCTION DETAILS

WELL CASING
Interval: 0' - 178'
Material: Schedule 40 PVC
Diameter: 2"
Joint Type: Flush

WELL SCREEN
Interval: 178' - 188'
Material: Schedule 40 PVC U-Pack
Diameter: 2"
Slot Size: 0.010"
End Cap: 6", 2"-diameter, Sump

FILTER PACK
Interval: 175' - 189'
Type: Filter Media #10 Sand

FILTER PACK SEAL
Interval: 170' - 175'
Type: Bentonite Pellets

ANNULUS SEAL
Interval: 0' - 170'
Type: Grout (Aquaguard Bentonite Grout)

WELL COMPLETION
Pad: 4'x4' Concrete Pad
Protective Casing: 3' Stick-Ups

DRILLING METHODS
Soil Drill: Sonic
Rock Drill: Sonic

DRAFT

LOG SCALE: 1 in = 5 ft
DRILLING COMPANY: Cascade Drilling, L.P.
DRILLER: J. Asua

GA INSPECTOR: Chris Tidwell
CHECKED BY: David Hannam
DATE: 4/5/19

Golder Associates

RECORD OF BOREHOLE GS-GSA-MW-4V

SHEET 1 of 4

PROJECT: Gorgas Ash Pond
PROJECT NUMBER: 18114896
DRILLED DEPTH: 158.50 ft
LOCATION: Gypsum Pond

DRILL RIG: TSI 150CC
DATE STARTED: 2/14/19
DATE COMPLETED: 2/25/19

NORTHING: 1,329,256.83
EASTING: 2,054,882.74
GS ELEVATION: 439.29
TOC ELEVATION: 442.18 ft

DEPTH W.L.:
DATE W.L.:
TIME W.L.:
GW ELEVATION:

DEPTH (ft)	ELEVATION (ft)	DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	SAMPLE NO.	TYPE	REC
0		0.00 - 37.00 (GP), sandy GRAVEL, fine to coarse gravel, fine to coarse sand; brown to black; non-cohesive, moist to wet. [FILL]						
5	435					1		4.00 / 10.00
10	430	10.00 - 37.00 Trace clay, trace silt, trace COAL fragments.						
15	425					2		5.00 / 10.00
20	420		GP					
25	415					3		7.00 / 10.00
30	410							
35	405					4		6.00 / 10.00
					402.29 / 37.00			
		37.00 - 38.60 (GP), sandy GRAVEL, fine to coarse; light brown orange; non-cohesive. [FILL]	GP		400.69 / 38.60			
40	400	39.00 - 40.00 Trace COAL fragments.	GP		399.29			
		Log continued on next page						

MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES

Grout (Aquaguard _ Bentonite Grout)

WELL CONSTRUCTION DETAILS

WELL CASING
Interval: 0' - 131'
Material: Schedule 40 PVC
Diameter: 2"
Joint Type: Flush

WELL SCREEN
Interval: 131' - 151'
Material: Schedule 40 PVC U-Pack
Diameter: 2"
Slot Size: 0.010"
End Cap: 6", 2"-diameter, Sump

FILTER PACK
Interval: 129' - 153'
Type: Filter Media #10 Sand

FILTER PACK SEAL
Interval: 124.5' - 129'
Type: Bentonite Pellets

ANNULUS SEAL
Interval: 0' - 124.5'
Type: Grout (Aquaguard Bentonite Grout)

WELL COMPLETION
Pad: 4'x4' Concrete Pad
Protective Casing: 3' Stick-Ups

DRILLING METHODS
Soil Drill: Sonic
Rock Drill: Sonic

DRAFT

LOG SCALE: 1 in = 5 ft
DRILLING COMPANY: Cascade Drilling, L.P.
DRILLER: J. Asua

GA INSPECTOR: Chris Tidwell
CHECKED BY: David Hannam
DATE: 4/5/19

Golder Associates

RECORD OF BOREHOLE GS-GSA-MW-4V

PROJECT: Gorgas Ash Pond
PROJECT NUMBER: 18114896
DRILLED DEPTH: 158.50 ft
LOCATION: Gypsum Pond

DRILL RIG: TSI 150CC
DATE STARTED: 2/14/19
DATE COMPLETED: 2/25/19

NORTHING: 1,329,256.83
EASTING: 2,054,882.74
GS ELEVATION: 439.29
TOC ELEVATION: 442.18 ft

DEPTH W.L.:
DATE W.L.:
TIME W.L.:
GW ELEVATION:

DEPTH (ft)	ELEVATION (ft)	DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	SAMPLE NO.	TYPE	REC
40		38.60 - 50.00 (GP), GRAVEL, fine to coarse, some fine to coarse sand, trace to some clay/silt; brown to dark gray to black; non-cohesive, moist to wet. [FILL] *(Continued)*						
45	395		GP			5		2.50 / 10.00
50	390				389.29			
		50.00 - 60.00 (GC), clayey GRAVEL, fine to coarse, some COAL fragments; dark gray to black with some orange mottling; non-cohesive, moist to wet. [FILL]			50.00			
55	385		GC			6		2.00 / 10.00
60	380				379.29			
		60.00 - 95.00 (GP), GRAVEL, fine to coarse, trace sand to sandy, trace silt, trace clay; dark brown to gray-black mottled orange; non-cohesive, moist to wet. [FILL]			60.00			
65	375					7		3.50 / 10.00
70	370		GP					
75	365					8		4.50 / 10.00
80	360							

Log continued on next page

MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES

WELL CONSTRUCTION DETAILS

WELL CASING
Interval: 0' - 131'
Material: Schedule 40 PVC
Diameter: 2"
Joint Type: Flush

WELL SCREEN
Interval: 131' - 151'
Material: Schedule 40 PVC U-Pack
Diameter: 2"
Slot Size: 0.010"
End Cap: 6", 2"-diameter, Sump

FILTER PACK
Interval: 129' - 153'
Type: Filter Media #10 Sand

FILTER PACK SEAL
Interval: 124.5' - 129'
Type: Bentonite Pellets

ANNULUS SEAL
Interval: 0' - 124.5'
Type: Grout (Aquaguard Bentonite Grout)

WELL COMPLETION
Pad: 4'x4' Concrete Pad
Protective Casing: 3' Stick-Ups

DRILLING METHODS
Soil Drill: Sonic
Rock Drill: Sonic

DRAFT

LOG SCALE: 1 in = 5 ft
DRILLING COMPANY: Cascade Drilling, L.P.
DRILLER: J. Asua

GA INSPECTOR: Chris Tidwell
CHECKED BY: David Hannam
DATE: 4/5/19

Golder Associates

RECORD OF BOREHOLE GS-GSA-MW-4V

PROJECT: Gorgas Ash Pond
PROJECT NUMBER: 18114896
DRILLED DEPTH: 158.50 ft
LOCATION: Gypsum Pond

DRILL RIG: TSI 150CC
DATE STARTED: 2/14/19
DATE COMPLETED: 2/25/19

NORTHING: 1,329,256.83
EASTING: 2,054,882.74
GS ELEVATION: 439.29
TOC ELEVATION: 442.18 ft

DEPTH W.L.:
DATE W.L.:
TIME W.L.:
GW ELEVATION:

DEPTH (ft)	ELEVATION (ft)	DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	SAMPLE NO.	TYPE	REC
80		60.00 - 95.00 (GP), GRAVEL, fine to coarse, trace sand to sandy, trace silt, trace clay; dark brown to gray-black mottled orange; non-cohesive, moist to wet. [FILL] *(Continued)*						
85	355		GP			9		3.00 10.00
90	350							
95	345				344.29 95.00	10		9.00 10.00
		95.00 - 97.60 (GC/GM), clayey/silty GRAVEL, some sand, gravels of weathered shale and sandstone, trace COAL fragments; gray-brown with some orange mottling; non-cohesive, moist. [FILL]	GC/GM		341.69			
		97.60 - 100.00 (GP), GRAVEL; dark gray to black; non-cohesive, dry, possible mine spoilings, possible ash. [FILL]	GP		97.60 339.29			
100	340	100.00 - 105.00 Fresh; medium strong; gray; fossiliferous, mineralization; thinly laminated SANDSTONE with thin interbeds of SHALE.			100.00			
105	335	105.00 - 110.00 Fresh; medium strong; gray; fossiliferous; thinly laminated SHALE with interbeds of SANDSTONE.			334.29 105.00	11		10.00
110	330	110.00 - 111.00 Weak to medium strong; dark gray to black; SHALE with thinly interbedded SANDSTONE.			329.29 110.00 328.29			
		111.00 - 120.00 Medium strong; dark gray to black; iron staining; interbedded SANDSTONE, SHALE, and SILTSTONE.			111.00			
115	325					12		9.00 10.00
120	320				319.29			

Log continued on next page

MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES

WELL CONSTRUCTION DETAILS

WELL CASING
Interval: 0' - 131'
Material: Schedule 40 PVC
Diameter: 2"
Joint Type: Flush

WELL SCREEN
Interval: 131' - 151'
Material: Schedule 40 PVC U-Pack
Diameter: 2"
Slot Size: 0.010"
End Cap: 6", 2"-diameter, Sump

FILTER PACK
Interval: 129' - 153'
Type: Filter Media #10 Sand

FILTER PACK SEAL
Interval: 124.5' - 129'
Type: Bentonite Pellets

ANNULUS SEAL
Interval: 0' - 124.5'
Type: Grout (Aquaguard Bentonite Grout)

WELL COMPLETION
Pad: 4'x4' Concrete Pad
Protective Casing: 3' Stick-Ups

DRILLING METHODS
Soil Drill: Sonic
Rock Drill: Sonic

DRAFT

LOG SCALE: 1 in = 5 ft
DRILLING COMPANY: Cascade Drilling, L.P.
DRILLER: J. Asua

GA INSPECTOR: Chris Tidwell
CHECKED BY: David Hannam
DATE: 4/5/19

Golder Associates

RECORD OF BOREHOLE GS-GSA-MW-4V

PROJECT: Gorgas Ash Pond
PROJECT NUMBER: 18114896
DRILLED DEPTH: 158.50 ft
LOCATION: Gypsum Pond

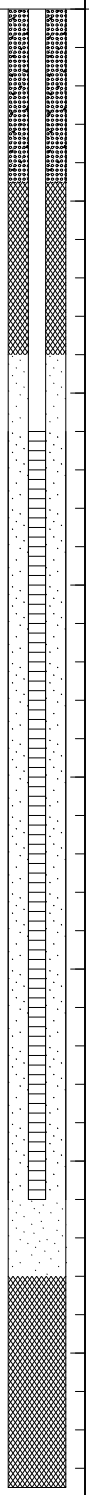
DRILL RIG: TSI 150CC
DATE STARTED: 2/14/19
DATE COMPLETED: 2/25/19

NORTHING: 1,329,256.83
EASTING: 2,054,882.74
GS ELEVATION: 439.29
TOC ELEVATION: 442.18 ft

DEPTH W.L.:
DATE W.L.:
TIME W.L.:
GW ELEVATION:

DEPTH (ft)	ELEVATION (ft)	DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	SAMPLE NO.	TYPE	REC
120		120.00 - 123.10 Medium strong; SANDSTONE with interbeds of SHALE and SILTSTONE.			120.00			
					316.19			
		123.10 - 128.00 Weak to medium strong; SHALE with interbeds of SILTSTONE and SANDSTONE.			123.10			
125	315					13		6.50 / 10.00
					311.29			
		128.00 - 130.00 Medium strong; iron staining; SANDSTONE with interbeds of SHALE and SILTSTONE.			128.00			
130	310				309.29			
		130.00 - 140.00 Medium strong; dark gray to gray; burrow structures; interbedded SILTSTONE and SHALE with thin interbeds of SANDSTONE.			130.00	14A		0.00 / 5.00
135	305					14B		5.00 / 5.00
	300				299.29			
140		140.00 - 150.00 Weak to medium strong; dark gray to gray; SHALE with interbedded SILTSTONE/SANDSTONE.			140.00			
	295					15		8.50 / 10.00
145								
	290				289.29			
150		150.00 - 158.50 Medium strong; dark gray to gray; burrow structures; crossbedding; interbedded SILTSTONE, SANDSTONE, and SHALE.			150.00			
	285					16		7.65 / 8.50
155								
					280.79			
	280	Boring completed at 158.50 ft						
160								

MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES



WELL CONSTRUCTION DETAILS

WELL CASING
Interval: 0' - 131'
Material: Schedule 40 PVC
Diameter: 2"
Joint Type: Flush

WELL SCREEN
Interval: 131' - 151'
Material: Schedule 40 PVC U-Pack
Diameter: 2"
Slot Size: 0.010"
End Cap: 6", 2"-diameter, Sump

FILTER PACK
Interval: 129' - 153'
Type: Filter Media #10 Sand

FILTER PACK SEAL
Interval: 124.5' - 129'
Type: Bentonite Pellets

ANNULUS SEAL
Interval: 0' - 124.5'
Type: Grout (Aquaguard Bentonite Grout)

WELL COMPLETION
Pad: 4'x4' Concrete Pad
Protective Casing: 3' Stick-Ups

DRILLING METHODS
Soil Drill: Sonic
Rock Drill: Sonic

DRAFT

LOG SCALE: 1 in = 5 ft
DRILLING COMPANY: Cascade Drilling, L.P.
DRILLER: J. Asua

GA INSPECTOR: Chris Tidwell
CHECKED BY: David Hannam
DATE: 4/5/19

Golder Associates

RECORD OF BOREHOLE GS-GSA-MW-9H

SHEET 1 of 2

PROJECT: Gorgas Ash Pond
PROJECT NUMBER: 18114896
DRILLED DEPTH: 60.00 ft
LOCATION:

DRILL RIG: TSI 150CC
DATE STARTED: 2/2/19
DATE COMPLETED: 2/3/19

NORTHING: 1,328,157.96
EASTING: 2,054,972.56
GS ELEVATION: 333.04
TOC ELEVATION: 335.83 ft

DEPTH W.L.:
DATE W.L.:
TIME W.L.:
GW ELEVATION:

DEPTH (ft)	ELEVATION (ft)	DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	SAMPLE NO.	TYPE	REC
0		0.00 - 7.50 (SP), gravelly SAND, fine to coarse sand, fine to coarse gravel; non-cohesive, dry. [RESIDUUM]	SP			1		10.00 / 10.00
	330				325.54 / 7.50			
5		7.50 - 16.00 Highly to moderately weathered; medium strong to strong; brown and gray; iron staining; SANDSTONE with interbeds of SILTSTONE crossbedded.						
	325							
10								
	320					2		8.50 / 10.00
15					317.04 / 16.00			
	315	16.00 - 20.00 Moderately weathered; weak to medium strong; gray; SHALE with thin interbeds of SILTSTONE/SANDSTONE.						
20					313.04 / 20.00			
	310	20.00 - 50.00 Moderately weathered; medium strong; interbedded SHALE, SANDSTONE, and SILTSTONE.				3		10.00 / 10.00
25								
	305							
30								
	300	32.80 - 33.20 Crushed zone + 1x4 " vertical fracture.			299.84	4		8.50 / 10.00
35								
	295							
40		Log continued on next page						

MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES

Grout (Aquaguard _ Bentonite Grout)

Bentonite Pel-Plug _

WELL CONSTRUCTION DETAILS

WELL CASING
Interval: 0' - 47'
Material: Schedule 40 PVC
Diameter: 2"
Joint Type: Flush

WELL SCREEN
Interval: 47' - 57'
Material: Schedule 40 PVC U-Pack
Diameter: 2"
Slot Size: 0.010"
End Cap: 6", 2"-diameter, Sump

FILTER PACK
Interval: 44.5' - 60'
Type: Filter Media #10 Sand

FILTER PACK SEAL
Interval: 39' - 44.5'
Type: Bentonite Pellets

ANNULUS SEAL
Interval: 0' - 39'
Type: Grout (Aquaguard Bentonite Grout)

WELL COMPLETION
Pad: 4'x4' Concrete Pad
Protective Casing: 3' Stick-Ups

DRILLING METHODS
Soil Drill: Sonic
Rock Drill: Sonic

DRAFT

LOG SCALE: 1 in = 5 ft
DRILLING COMPANY: Cascade Drilling, L.P.
DRILLER: T. Vanardo

GA INSPECTOR: Chris Tidwell
CHECKED BY: David Hannam
DATE: 4/5/19

Golder Associates

RECORD OF BOREHOLE GS-GSA-MW-9H

SHEET 2 of 2

PROJECT: Gorgas Ash Pond
PROJECT NUMBER: 18114896
DRILLED DEPTH: 60.00 ft
LOCATION:

DRILL RIG: TSI 150CC
DATE STARTED: 2/2/19
DATE COMPLETED: 2/3/19

NORTHING: 1,328,157.96
EASTING: 2,054,972.56
GS ELEVATION: 333.04
TOC ELEVATION: 335.83 ft

DEPTH W.L.:
DATE W.L.:
TIME W.L.:
GW ELEVATION:

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE: DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	SAMPLES: SAMPLE NO.	TYPE	REC	MONITORING WELL / PIEZOMETER DIAGRAM and NOTES	WELL CONSTRUCTION DETAILS
40		20.00 - 50.00 Moderately weathered; medium strong; interbedded SHALE, SANDSTONE, and SILTSTONE. *(Continued)* 40.00 - 43.00 SHALE more prominant.			290.04				Time Release Pellets	**WELL CASING** Interval: 0' - 47' Material: Schedule 40 PVC Diameter: 2" Joint Type: Flush
	290									
45						5		9.00 / 10.00	Filter Media _ #10 Sand	**WELL SCREEN** Interval: 47' - 57' Material: Schedule 40 PVC U-Pack Diameter: 2" Slot Size: 0.010" End Cap: 6", 2"-diameter, Sump
		46.60 - 50.00 Iron staining.							2" PVC Sch 40 0.010 Slot U-Pack _ Screw Fit with Rubber Seal Screen	**FILTER PACK** Interval: 44.5' - 60' Type: Filter Media #10 Sand
	285									
50					283.04					**FILTER PACK SEAL** Interval: 39' - 44.5' Type: Bentonite Pellets
		50.00 - 60.00 Moderately weathered; dark gray to gray; iron staining; interbedded SHALE, SANDSTONE, and SILTSTONE.			50.00					**ANNULUS SEAL** Interval: 0' - 39' Type: Grout (Aquaguard Bentonite Grout)
		52.40 - 52.90 Crushed zone.			280.14					
	280	53.10 - 53.60 Vertical fracture. Iron staining on fracture.			279.44					**WELL COMPLETION** Pad: 4'x4' Concrete Pad Protective Casing: 3' Stick-Ups
55						6		8.00 / 10.00		**DRILLING METHODS** Soil Drill: Sonic Rock Drill: Sonic
		56.80 - 57.00 Crushed zone.							Sand Filter _ Pack	
	275									
60					273.04					
		Boring completed at 60.00 ft								
	270									
65										
	265									
70										
	260									
75										
	255									
80										

DRAFT

LOG SCALE: 1 in = 5 ft
DRILLING COMPANY: Cascade Drilling, L.P.
DRILLER: T. Vanardo

GA INSPECTOR: Chris Tidwell
CHECKED BY: David Hannam
DATE: 4/5/19

Golder Associates

RECORD OF BOREHOLE GS-LF-MW-12V

PROJECT: Gorgas Ash Pond
PROJECT NUMBER: 18114896
DRILLED DEPTH: 230.00 ft
LOCATION: Gorgas Landfill

DRILL RIG: TSI 150CC
DATE STARTED: 2/27/19
DATE COMPLETED: 3/1/19

NORTHING: 1,328,481.68
EASTING: 2,063,196.25
GS ELEVATION: 478.64
TOC ELEVATION: 481.32 ft

DEPTH W.L.:
DATE W.L.:
TIME W.L.:
GW ELEVATION:

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	SAMPLES SAMPLE NO.	SAMPLES TYPE	SAMPLES REC	MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES
0		0.00 - 0.10 Note: Retrieved silt/clay-sized material throughout is considered to be mostly rock flour induced by the drilling process.			0.10				Grout (Aquaguard)
		0.10 - 20.00 (GP), GRAVEL, some silt, trace sand, gravels of highly weathered shale, fine to coarse; light gray to brown; non-cohesive, dry. [FILL]							
	475								
5						1		4.50 / 10.00	
	470								
10			GP						
	465								
15						2		6.50 / 10.00	
	460								
20					458.64 / 20.00				
		20.00 - 90.00 (GM), silty GRAVEL, fine to coarse, trace COAL, trace sand, some cobbles of highly weathered shale; gray to brown with some orange mottling; non-cohesive, moist to dry; possible ash. [FILL]							
	455								
25						3		6.00 / 10.00	
	450								
30			GM						
	445								
35						4		7.00 / 10.00	
	440								
40		Log continued on next page							

WELL CASING
Interval: 0' - 193'
Material: Schedule 40 PVC
Diameter: 2"
Joint Type: Flush

WELL SCREEN
Interval: 193' - 203'
Material: Schedule 40 PVC U-Pack
Diameter: 2"
Slot Size: 0.010"
End Cap: 6", 2"-diameter, Sump

FILTER PACK
Interval: 191' - 204.5'
Type: Filter Media #10 Sand

FILTER PACK SEAL
Interval: 187' - 191'
Type: Bentonite Pellets

ANNULUS SEAL
Interval: 0' - 187'
Type: Grout (Aquaguard)

WELL COMPLETION
Pad: 4'x4' Concrete Pad
Protective Casing: 3' Stick-Ups

DRILLING METHODS
Soil Drill: Sonic
Rock Drill: Sonic

DRAFT

LOG SCALE: 1 in = 5 ft
DRILLING COMPANY: Cascade Drilling, L.P.
DRILLER: J. Asua

GA INSPECTOR: Chris Tidwell
CHECKED BY: David Hannam
DATE: 4/5/19

Golder Associates

RECORD OF BOREHOLE GS-LF-MW-12V

PROJECT: Gorgas Ash Pond
PROJECT NUMBER: 18114896
DRILLED DEPTH: 230.00 ft
LOCATION: Gorgas Landfill

DRILL RIG: TSI 150CC
DATE STARTED: 2/27/19
DATE COMPLETED: 3/1/19

NORTHING: 1,328,481.68
EASTING: 2,063,196.25
GS ELEVATION: 478.64
TOC ELEVATION: 481.32 ft

DEPTH W.L.:
DATE W.L.:
TIME W.L.:
GW ELEVATION:

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE: DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	SAMPLES: SAMPLE NO.	TYPE	REC	MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES	WELL CONSTRUCTION DETAILS
40		20.00 - 90.00 (GM), silty GRAVEL, fine to coarse, trace COAL, trace sand, some cobbles of highly weathered shale; gray to brown with some orange mottling; non-cohesive, moist to dry; possible ash. [FILL] *(Continued)*								
	435									
45						5		8.50/10.00		
	430									
50										
	425									
55						6		8.50/10.00		
	420									
60			GM							
	415									
65						7		4.50/10.00		
	410									
70										
	405									
75						8		6.50/10.00		
	400									
80		Log continued on next page								

WELL CASING
Interval: 0' - 193'
Material: Schedule 40 PVC
Diameter: 2"
Joint Type: Flush

WELL SCREEN
Interval: 193' - 203'
Material: Schedule 40 PVC U-Pack
Diameter: 2"
Slot Size: 0.010"
End Cap: 6", 2"-diameter, Sump

FILTER PACK
Interval: 191' - 204.5'
Type: Filter Media #10 Sand

FILTER PACK SEAL
Interval: 187' - 191'
Type: Bentonite Pellets

ANNULUS SEAL
Interval: 0' - 187'
Type: Grout (Aquaguard)

WELL COMPLETION
Pad: 4'x4' Concrete Pad
Protective Casing: 3' Stick-Ups

DRILLING METHODS
Soil Drill: Sonic
Rock Drill: Sonic

DRAFT

LOG SCALE: 1 in = 5 ft
DRILLING COMPANY: Cascade Drilling, L.P.
DRILLER: J. Asua

GA INSPECTOR: Chris Tidwell
CHECKED BY: David Hannam
DATE: 4/5/19

Golder Associates

RECORD OF BOREHOLE GS-LF-MW-12V

PROJECT: Gorgas Ash Pond
PROJECT NUMBER: 18114896
DRILLED DEPTH: 230.00 ft
LOCATION: Gorgas Landfill

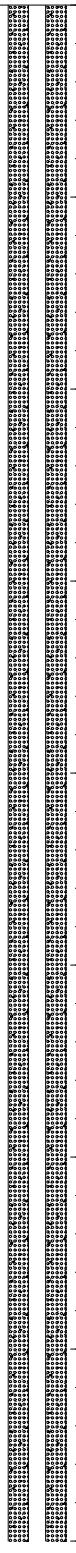
DRILL RIG: TSI 150CC
DATE STARTED: 2/27/19
DATE COMPLETED: 3/1/19

NORTHING: 1,328,481.68
EASTING: 2,063,196.25
GS ELEVATION: 478.64
TOC ELEVATION: 481.32 ft

DEPTH W.L.:
DATE W.L.:
TIME W.L.:
GW ELEVATION:

DEPTH (ft)	ELEVATION (ft)	DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	SAMPLE NO.	TYPE	REC
80		20.00 - 90.00 (GM), silty GRAVEL, fine to coarse, trace COAL, trace sand, some cobbles of highly weathered shale; gray to brown with some orange mottling; non-cohesive, moist to dry; possible ash. [FILL] *(Continued)*						
	395							
85			GM			9		7.50 10.00
	390							
90					388.64			
		90.00 - 100.00 (GC), silty clayey GRAVEL, some sand, fine to coarse; brown-gray with orange; cohesive, w < PL, soft to firm; possible ash/coal. [FILL]			90.00			
	385							
95			GC			10		4.50 10.00
	380							
100					378.64			
		100.00 - 110.00 (GM), clayey silty GRAVEL, some sand, fine to coarse; brown-gray to gray; non-cohesive, moist to dry; possible ash/coal. [FILL]			100.00			
	375							
105			GM			11		6.50 10.00
	370							
110					368.64			
		110.00 - 116.00 (CL), gravelly sandy CLAY, some silt, fine to coarse sand, fine to coarse gravel; orange-brown; cohesive, w ~ PL, soft to firm. [FILL]			110.00			
	365		CL					
115						12		6.00 10.00
					362.64			
		116.00 - 160.00 (GM), silty GRAVEL, fine to coarse; gray to gray-brown, some orange mottling; non-cohesive, dry to wet; possible ash/coal. [FILL]			116.00			
	360		GM					
120		Log continued on next page						

MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES



WELL CONSTRUCTION DETAILS

WELL CASING
Interval: 0' - 193'
Material: Schedule 40 PVC
Diameter: 2"
Joint Type: Flush

WELL SCREEN
Interval: 193' - 203'
Material: Schedule 40 PVC U-Pack
Diameter: 2"
Slot Size: 0.010"
End Cap: 6", 2"-diameter, Sump

FILTER PACK
Interval: 191' - 204.5'
Type: Filter Media #10 Sand

FILTER PACK SEAL
Interval: 187' - 191'
Type: Bentonite Pellets

ANNULUS SEAL
Interval: 0' - 187'
Type: Grout (Aquaguard)

WELL COMPLETION
Pad: 4'x4' Concrete Pad
Protective Casing: 3' Stick-Ups

DRILLING METHODS
Soil Drill: Sonic
Rock Drill: Sonic

DRAFT

LOG SCALE: 1 in = 5 ft
DRILLING COMPANY: Cascade Drilling, L.P.
DRILLER: J. Asua

GA INSPECTOR: Chris Tidwell
CHECKED BY: David Hannam
DATE: 4/5/19

Golder Associates

RECORD OF BOREHOLE GS-LF-MW-12V

PROJECT: Gorgas Ash Pond
PROJECT NUMBER: 18114896
DRILLED DEPTH: 230.00 ft
LOCATION: Gorgas Landfill

DRILL RIG: TSI 150CC
DATE STARTED: 2/27/19
DATE COMPLETED: 3/1/19

NORTHING: 1,328,481.68
EASTING: 2,063,196.25
GS ELEVATION: 478.64
TOC ELEVATION: 481.32 ft

DEPTH W.L.:
DATE W.L.:
TIME W.L.:
GW ELEVATION:

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE: DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	SAMPLES: SAMPLE NO.	TYPE	REC	MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES	WELL CONSTRUCTION DETAILS
120		116.00 - 160.00 (GM), silty GRAVEL, fine to coarse; gray to gray-brown, some orange mottling; non-cohesive, dry to wet; possible ash/coal. [FILL] *(Continued)*								
	355									
125						13		7.00 10.00		
	350									
130		130.00 - 140.00 Some clay, some sand.								
	345									
135						14		7.00 10.00		
	340									
140		140.00 - 160.00 Some cobbles of weathered shale/siltstone.	GM		338.64 140.00					
	335									
145						15		7.50 10.00		
	330									
150										
	325									
155						16		7.00 10.00		
	320									
160		Log continued on next page			318.64					

WELL CASING
Interval: 0' - 193'
Material: Schedule 40 PVC
Diameter: 2"
Joint Type: Flush

WELL SCREEN
Interval: 193' - 203'
Material: Schedule 40 PVC U-Pack
Diameter: 2"
Slot Size: 0.010"
End Cap: 6", 2"-diameter, Sump

FILTER PACK
Interval: 191' - 204.5'
Type: Filter Media #10 Sand

FILTER PACK SEAL
Interval: 187' - 191'
Type: Bentonite Pellets

ANNULUS SEAL
Interval: 0' - 187'
Type: Grout (Aquaguard)

WELL COMPLETION
Pad: 4'x4' Concrete Pad
Protective Casing: 3' Stick-Ups

DRILLING METHODS
Soil Drill: Sonic
Rock Drill: Sonic

DRAFT

LOG SCALE: 1 in = 5 ft
DRILLING COMPANY: Cascade Drilling, L.P.
DRILLER: J. Asua

GA INSPECTOR: Chris Tidwell
CHECKED BY: David Hannam
DATE: 4/5/19

Golder Associates

RECORD OF BOREHOLE GS-LF-MW-12V

PROJECT: Gorgas Ash Pond
PROJECT NUMBER: 18114896
DRILLED DEPTH: 230.00 ft
LOCATION: Gorgas Landfill

DRILL RIG: TSI 150CC
DATE STARTED: 2/27/19
DATE COMPLETED: 3/1/19

NORTHING: 1,328,481.68
EASTING: 2,063,196.25
GS ELEVATION: 478.64
TOC ELEVATION: 481.32 ft

DEPTH W.L.:
DATE W.L.:
TIME W.L.:
GW ELEVATION:

DEPTH (ft)	ELEVATION (ft)	DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	SAMPLE NO.	TYPE	REC
160		160.00 - 170.00 (GP), GRAVEL, some sand, trace silt, gravels and cobbles of moderately weathered shale/siltstone; gray to gray-brown with some orange mottling; non-cohesive, moist to wet. [FILL]	GP		160.00 308.64	17		8.50 10.00
170		170.00 - 174.20 (GC), clayey GRAVEL, some silt, some sand; dark gray; cohesive, w ~ PL, soft to firm; possible coal/ash. [FILL]	GC		170.00 304.44			
175		174.20 - 180.00 (GM), silty GRAVEL, fine to coarse, some COAL fragments; light gray; non-cohesive, moist to dry; possible ash. [FILL]	GM		174.20 298.64	18		7.50 10.00
180		180.00 - 204.00 Fresh; medium strong; gray to light gray; interbedded SANDSTONE and SILTSTONE. 181.00 - 190.00 Burrow structures.			180.00 288.64	19		10.00 10.00
190						20		8.50 10.00
200		Log continued on next page						

MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES

Bentonite Pel-Plug _ Time Release Pellets

Filter Media _ #10 Sand

2" PVC Sch 40 0.010 Slot – U-Pack

WELL CONSTRUCTION DETAILS

WELL CASING
Interval: 0' - 193'
Material: Schedule 40 PVC
Diameter: 2"
Joint Type: Flush

WELL SCREEN
Interval: 193' - 203'
Material: Schedule 40 PVC U-Pack
Diameter: 2"
Slot Size: 0.010"
End Cap: 6", 2"-diameter, Sump

FILTER PACK
Interval: 191' - 204.5'
Type: Filter Media #10 Sand

FILTER PACK SEAL
Interval: 187' - 191'
Type: Bentonite Pellets

ANNULUS SEAL
Interval: 0' - 187'
Type: Grout (Aquaguard)

WELL COMPLETION
Pad: 4'x4' Concrete Pad
Protective Casing: 3' Stick-Ups

DRILLING METHODS
Soil Drill: Sonic
Rock Drill: Sonic

DRAFT

LOG SCALE: 1 in = 5 ft
DRILLING COMPANY: Cascade Drilling, L.P.
DRILLER: J. Asua

GA INSPECTOR: Chris Tidwell
CHECKED BY: David Hannam
DATE: 4/5/19

Golder Associates

RECORD OF BOREHOLE GS-LF-MW-12V

PROJECT: Gorgas Ash Pond
PROJECT NUMBER: 18114896
DRILLED DEPTH: 230.00 ft
LOCATION: Gorgas Landfill

DRILL RIG: TSI 150CC
DATE STARTED: 2/27/19
DATE COMPLETED: 3/1/19

NORTHING: 1,328,481.68
EASTING: 2,063,196.25
GS ELEVATION: 478.64
TOC ELEVATION: 481.32 ft

DEPTH W.L.:
DATE W.L.:
TIME W.L.:
GW ELEVATION:

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE: DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	SAMPLES: SAMPLE NO.	TYPE	REC	MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES	WELL CONSTRUCTION DETAILS
200		180.00 - 204.00 Fresh; medium strong; gray to light gray; interbedded SANDSTONE and SILTSTONE. *(Continued)* 200.00 - 204.00 Possible iron staining; fossiliferous, burrows.								
	275				274.64				Sand Filter Pack	
		204.00 - 230.00 Fresh to slightly weathered; weak to medium strong; gray to dark gray; some burrow structures; SILTSTONE and SHALE interbeds. 205.00 - 210.00 Some SANDSTONE partings.			204.00	21		8.50 / 10.00	3/8" Hole-Plug Bentonite Chips	
205										
	270				268.64					
210		210.00 - 212.00 Crushed/Fractured zone, fractures at all angles.			210.00					
		212.10: Possible 2" vertical fracture.			266.64					
	265									
215		215.00 - 216.00 Crushed/Fractured zone, fractures at all angles.			262.64	22		8.50 / 10.00		
	260									
		219.00 - 220.00 Crushed/Fractured zone, fractures at all angles.			258.64					
220										
	255									
225						23		6.50 / 10.00		
	250									
230					248.64					
		Boring completed at 230.00 ft								
	245									
235										
	240									
240										

WELL CASING
Interval: 0' - 193'
Material: Schedule 40 PVC
Diameter: 2"
Joint Type: Flush

WELL SCREEN
Interval: 193' - 203'
Material: Schedule 40 PVC U-Pack
Diameter: 2"
Slot Size: 0.010"
End Cap: 6", 2"-diameter, Sump

FILTER PACK
Interval: 191' - 204.5'
Type: Filter Media #10 Sand

FILTER PACK SEAL
Interval: 187' - 191'
Type: Bentonite Pellets

ANNULUS SEAL
Interval: 0' - 187'
Type: Grout (Aquaguard)

WELL COMPLETION
Pad: 4'x4' Concrete Pad
Protective Casing: 3' Stick-Ups

DRILLING METHODS
Soil Drill: Sonic
Rock Drill: Sonic

DRAFT

LOG SCALE: 1 in = 5 ft
DRILLING COMPANY: Cascade Drilling, L.P.
DRILLER: J. Asua

GA INSPECTOR: Chris Tidwell
CHECKED BY: David Hannam
DATE: 4/5/19

Golder Associates

RECORD OF BOREHOLE MW-12SV

SHEET 1 of 4

PROJECT: Gorgas Ash Pond
PROJECT NUMBER: 18114896
DRILLED DEPTH: 140.00 ft
LOCATION: Gorgas Landfill

DRILL RIG: TSI Truck Mounted Sonic
DATE STARTED: 2/25/19
DATE COMPLETED: 2/28/19

not surveyed
GS ELEVATION:
TOC ELEVATION:

DEPTH W.L.:
DATE W.L.:
TIME W.L.:
GW ELEVATION:

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	SAMPLES SAMPLE NO.	SAMPLES TYPE	SAMPLES REC	MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES	WELL CONSTRUCTION DETAILS
0		0.00 - 0.10 Retrieved silt/clay-sized material throughout is mostly rock flour induced by the drilling process.			0.10					**WELL CASING** Interval: N/A Material: Diameter: Joint Type:
		0.10 - 4.00 (GP), sandy GRAVEL; trace fines; gray brown; non-cohesive, dry. [FILL]	GP			1		4.00 / 5.00		**WELL SCREEN** Interval: NA Material: Diameter: Slot Size: End Cap:
		4.00 - 5.00 (CL), CLAY, some gravel, trace sand; light gray; non-cohesive, dry. [FILL]	CL		4.00					
5		5.00 - 15.00 (CL), gravelly CLAY, some sand; red brown mottled gray; cohesive, w < PL; possible ash inclusions. [FILL]			5.00					**FILTER PACK** Interval: NA Type: **FILTER PACK SEAL** Interval: NA Type: **ANNULUS SEAL** Interval: NA Type: **WELL COMPLETION** Pad: Protective Casing: **DRILLING METHODS** Soil Drill: Sonic Rock Drill: Sonic
10			CL			2		4.00 / 10.00		
15		15.00 - 25.00 (GP), sandy GRAVEL, some clay/silt; gray brown; non-cohesive, dry. [FILL]			15.00					
20			GP			3		5.00 / 10.00		
25		25.00 - 41.00 (GC), sandy clayey GRAVEL; gray brown to light gray; non-cohesive, moist. [FILL]			25.00					
30			GC			4		5.50 / 10.00		
35						5		6.50 / 10.00		
40		Log continued on next page								

DRAFT

LOG SCALE: 1 in = 5 ft
DRILLING COMPANY: Cascade Drilling, L.P.
DRILLER: T. Taylor

GA INSPECTOR: David Hannam
CHECKED BY: Tim Richards
DATE: 4/5/19

Golder Associates

RECORD OF BOREHOLE MW-12SV

PROJECT: Gorgas Ash Pond
PROJECT NUMBER: 18114896
DRILLED DEPTH: 140.00 ft
LOCATION: Gorgas Landfill

DRILL RIG: TSI Truck Mounted Sonic
DATE STARTED: 2/25/19
DATE COMPLETED: 2/28/19

not surveyed
GS ELEVATION:
TOC ELEVATION:

DEPTH W.L.:
DATE W.L.:
TIME W.L.:
GW ELEVATION:

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	SAMPLES SAMPLE NO.	SAMPLES TYPE	SAMPLES REC	MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES	WELL CONSTRUCTION DETAILS
40			GC							**WELL CASING** Interval: N/A Material: Diameter: Joint Type:
		41.00 - 55.00 (ML), gravelly SILT; light gray to dark gray; non-cohesive, dry. [FILL]			41.00	5		6.50 / 10.00		**WELL SCREEN** Interval: NA Material: Diameter: Slot Size: End Cap:
45			ML							**FILTER PACK** Interval: NA Type:
										FILTER PACK SEAL Interval: NA Type:
50						6		5.00 / 10.00		**ANNULUS SEAL** Interval: NA Type:
		54.00 - 54.50 Gray COAL fragments.								**WELL COMPLETION** Pad: Protective Casing:
55		55.00 - 65.00 (GP-ML), GRAVEL and SILT, some sand; non-cohesive, moist. [FILL]			55.00					**DRILLING METHODS** Soil Drill: Sonic Rock Drill: Sonic
60			GP-ML			7		5.50 / 10.00		
65		65.00 - 75.00 (ML), gravelly sandy SILT; gray brown; non-cohesive, dry. [FILL]			65.00					
70			ML			8		5.00 / 10.00		
75		75.00 - 85.00 (CL), gravelly CLAY, some sand; tan mottled gray brown; non-cohesive, moist. [FILL]			75.00					
			CL			9		7.00 / 10.00		
80		Log continued on next page								

DRAFT

LOG SCALE: 1 in = 5 ft
DRILLING COMPANY: Cascade Drilling, L.P.
DRILLER: T. Taylor

GA INSPECTOR: David Hannam
CHECKED BY: Tim Richards
DATE: 4/5/19

Golder Associates

RECORD OF BOREHOLE MW-12SV

PROJECT: Gorgas Ash Pond
PROJECT NUMBER: 18114896
DRILLED DEPTH: 140.00 ft
LOCATION: Gorgas Landfill

DRILL RIG: TSI Truck Mounted Sonic
DATE STARTED: 2/25/19
DATE COMPLETED: 2/28/19

not surveyed
GS ELEVATION:
TOC ELEVATION:

DEPTH W.L.:
DATE W.L.:
TIME W.L.:
GW ELEVATION:

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE: DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	SAMPLES: SAMPLE NO.	TYPE	REC	MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES	WELL CONSTRUCTION DETAILS
80		75.00 - 85.00 (CL), gravelly CLAY, some sand; tan mottled gray brown; non-cohesive, moist. [FILL] *(Continued)*	CL			9		7.00 10.00		
85		85.00 - 95.00 (CL), gravelly CLAY, some sand; gray; non-cohesive, dry. [FILL]	CL		85.00	10		4.50 10.00		
90		93.50 - 93.80 Charcoal fragments.								
95		95.00 - 140.00 (ML/CL), gravelly SILT/CLAY, some sand to sandy; gray to gray brown to light gray; non-cohesive, dry to moist. [FILL]	ML/CL		95.00	11		7.50 10.00		
100										
105						12		6.50 10.00		
110		114.00 - 115.00 Ash inclusions.								
115						13		4.50 10.00		
120		Log continued on next page								

WELL CASING
Interval: N/A
Material:
Diameter:
Joint Type:

WELL SCREEN
Interval: NA
Material:
Diameter:
Slot Size:
End Cap:

FILTER PACK
Interval: NA
Type:

FILTER PACK SEAL
Interval: NA
Type:

ANNULUS SEAL
Interval: NA
Type:

WELL COMPLETION
Pad:
Protective Casing:

DRILLING METHODS
Soil Drill: Sonic
Rock Drill: Sonic

DRAFT

LOG SCALE: 1 in = 5 ft
DRILLING COMPANY: Cascade Drilling, L.P.
DRILLER: T. Taylor

GA INSPECTOR: David Hannam
CHECKED BY: Tim Richards
DATE: 4/5/19

Golder Associates

RECORD OF BOREHOLE MW-12SV

PROJECT: Gorgas Ash Pond
PROJECT NUMBER: 18114896
DRILLED DEPTH: 140.00 ft
LOCATION: Gorgas Landfill

DRILL RIG: TSI Truck Mounted Sonic
DATE STARTED: 2/25/19
DATE COMPLETED: 2/28/19

not surveyed
GS ELEVATION:
TOC ELEVATION:

DEPTH W.L.:
DATE W.L.:
TIME W.L.:
GW ELEVATION:

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE: DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	SAMPLES: SAMPLE NO.	TYPE	REC	MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES	WELL CONSTRUCTION DETAILS
120		95.00 - 140.00 (ML/CL), gravelly SILT/CLAY, some sand to sandy; gray to gray brown to light gray; non-cohesive, dry to moist. [FILL] *(Continued)*				13		4.50/10.00		
		123.00 - 124.00 Ash inclutions.								
125										
130			ML/CL			14		5.50/10.00		
135						15		5.00/5.00		
140		Boring completed at 140.00 ft								
145										
150										
155										
160										

WELL CASING
Interval: N/A
Material:
Diameter:
Joint Type:

WELL SCREEN
Interval: NA
Material:
Diameter:
Slot Size:
End Cap:

FILTER PACK
Interval: NA
Type:

FILTER PACK SEAL
Interval: NA
Type:

ANNULUS SEAL
Interval: NA
Type:

WELL COMPLETION
Pad:
Protective Casing:

DRILLING METHODS
Soil Drill: Sonic
Rock Drill: Sonic

DRAFT

LOG SCALE: 1 in = 5 ft
DRILLING COMPANY: Cascade Drilling, L.P.
DRILLER: T. Taylor

GA INSPECTOR: David Hannam
CHECKED BY: Tim Richards
DATE: 4/5/19

Golder Associates

GEOPHYSICAL RECORD OF BOREHOLE: 1

Miller & Gorgas Ash Pond Investigation

Client: Southern Company Services

Project Number: 1302371

Date: November 2013

Location: Gorgas Plant	TOC Elev msl: na
Easting: 2065409 ft NAD 83	Casing Stick-up: -0.33 ft
Northing: 1324810 ft NAD 83	Casing Diameter: 6.25 inches
Ground Elev msl: 490 ft	Casing Material: Steel
Borehole Dip: vertical	Water Level: 62.25 ft bgs
Borehole Az: na	Logged By: B. Abernathy
Borehole Size: 6" AH	Log Depth Ref: GS
Drilled Depth: 320 ft	Log Date: 11-14-13
Drill Comp Date: 10-31-13	Image Plot(s) Ref: na
Casing Depth: 27.0 ft bgs	Dip Referenced to Horizontal



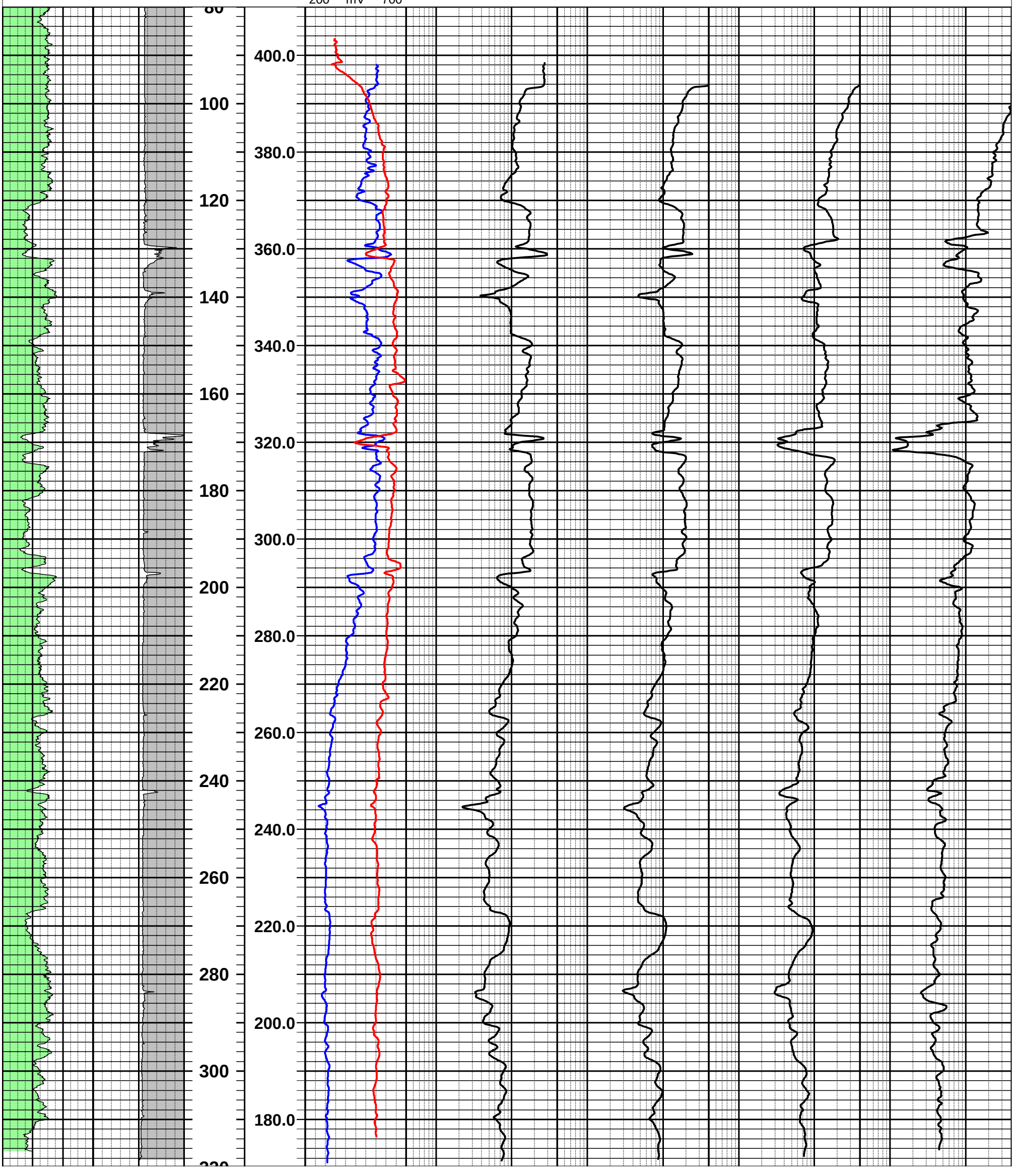
TOOL DETAILS

Elog SN5521 + Bridle - Tool Length = 32.71 ft Chshifts for SPR, N8, N16, N32, N64, and SP = 0.21, 0.54, 0.87, 1.54, 2.87, and 5.54 ft



Gamma	Caliper	Depth	Elev.	SPR	N8	N16	N32	N64
0 CPS 300	5 in 7	1ft:240ft	ft msl	0 Ohm 500	4 Ohm.m 400	4 Ohm.m 400	4 Ohm.m 400	4 Ohm.m 400

SP: 200 mV 700



GEOPHYSICAL RECORD OF BOREHOLE: 1

Miller & Gorgas Ash Pond Investigation

Client: Southern Company Services

Project Number: 1302371

Date: November 2013

Location: Gorgas Plant	TOC Elev msl: na
Easting: 2065409 ft NAD 83	Casing Stick-up: -0.33 ft
Northing: 1324810 ft NAD 83	Casing Diameter: 6.25 inches
Ground Elev msl: 490 ft	Casing Material: Steel
Borehole Dip: vertical	Water Level: 62.25 ft bgs
Borehole Az: na	Logged By: B. Abernathy
Borehole Size: 6" AH	Log Depth Ref: GS
Drilled Depth: 320 ft	Log Date: 11-14-13
Drill Comp Date: 10-31-13	Image Plot(s) Ref: na
Casing Depth: 27.0 ft bgs	Dip Referenced to Horizontal

TOOL DETAILS

Caliper SN5521 - Tool Length = 6.82 ft

Caliper Chshift = 0.93 ft

FTC SN5518 + Gamma SN5499 - Tool Length = 6.38 ft

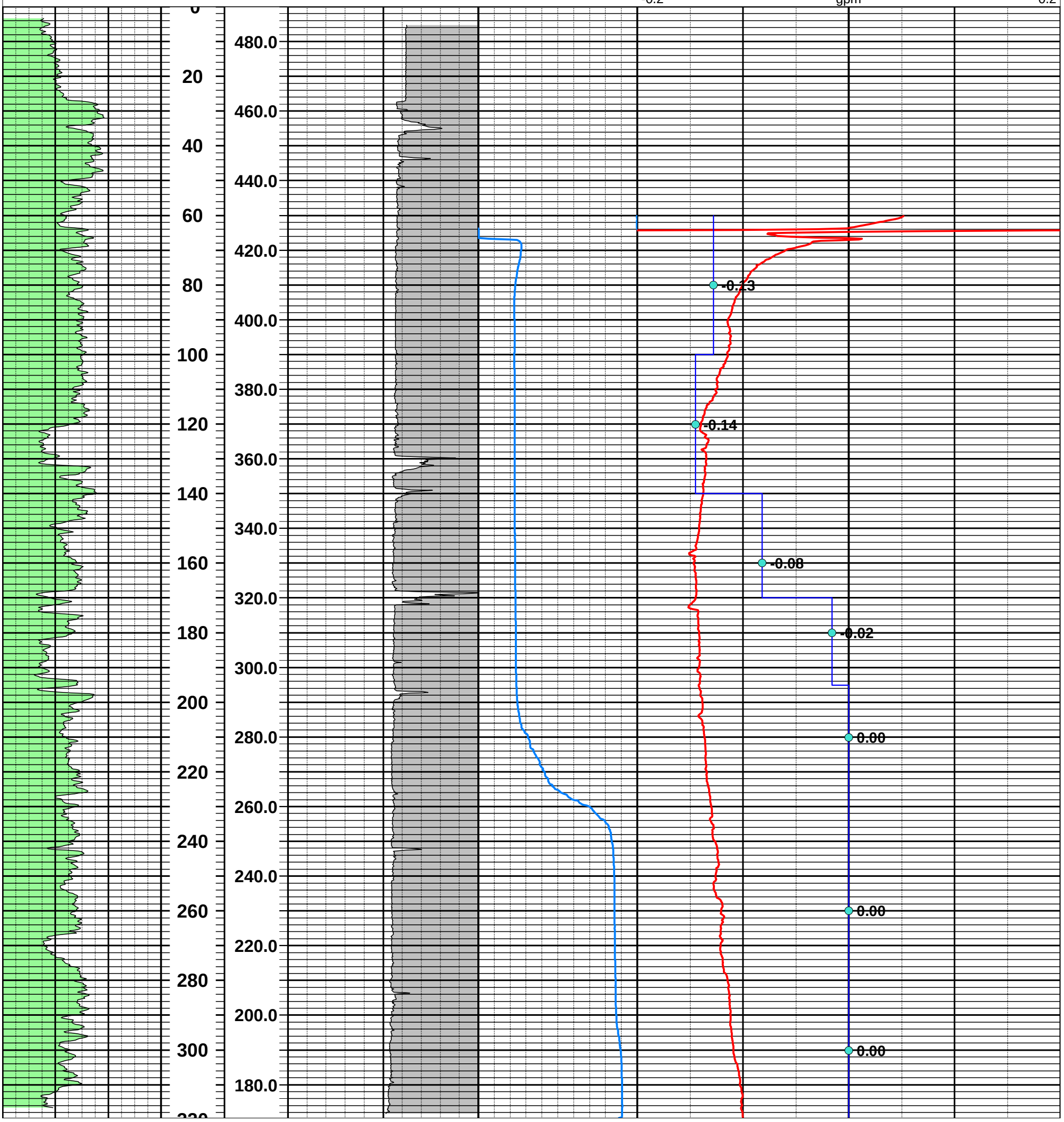
Temperature Chshift = 0.289 ft

Conductivity Chshift = 0.21 ft





Gamma 0 CPS 300 | Depth 1ft:350ft | Elev. ft msl | Caliper 5 in 7 | Fluid Conductivity 0 uS/cm 500 | Fluid Temperature 16 'C 20 | Ambient Down Flow HPFM -0.2 gpm 0.2



GEOPHYSICAL RECORD OF BOREHOLE: 2

Miller & Gorgas Ash Pond Investigation

Client: Southern Company Services

Project Number: 1302371

Date: November 2013

Location: Gorgas Plant	TOC Elev msl: na
Easting: 2062726 ft NAD83	Casing Stick-up: -0.27 ft
Northing: 1322443 ft NAD83	Casing Diameter: 6.25 inches
Ground Elev msl: 432 ft	Casing Material: Steel
Borehole Dip: vertical	Water Level: 37.1 ft bgs
Borehole Az: na	Logged By: B. Abernathy
Borehole Size: 6" AH	Log Depth Ref: GS
Drilled Depth: 320 ft	Log Date: 11-14-13
Drill Comp Date: 10-30-13	Image Plot(s) Ref: na
Casing Depth: 20.0 ft bgs	Dip Referenced to Horizontal



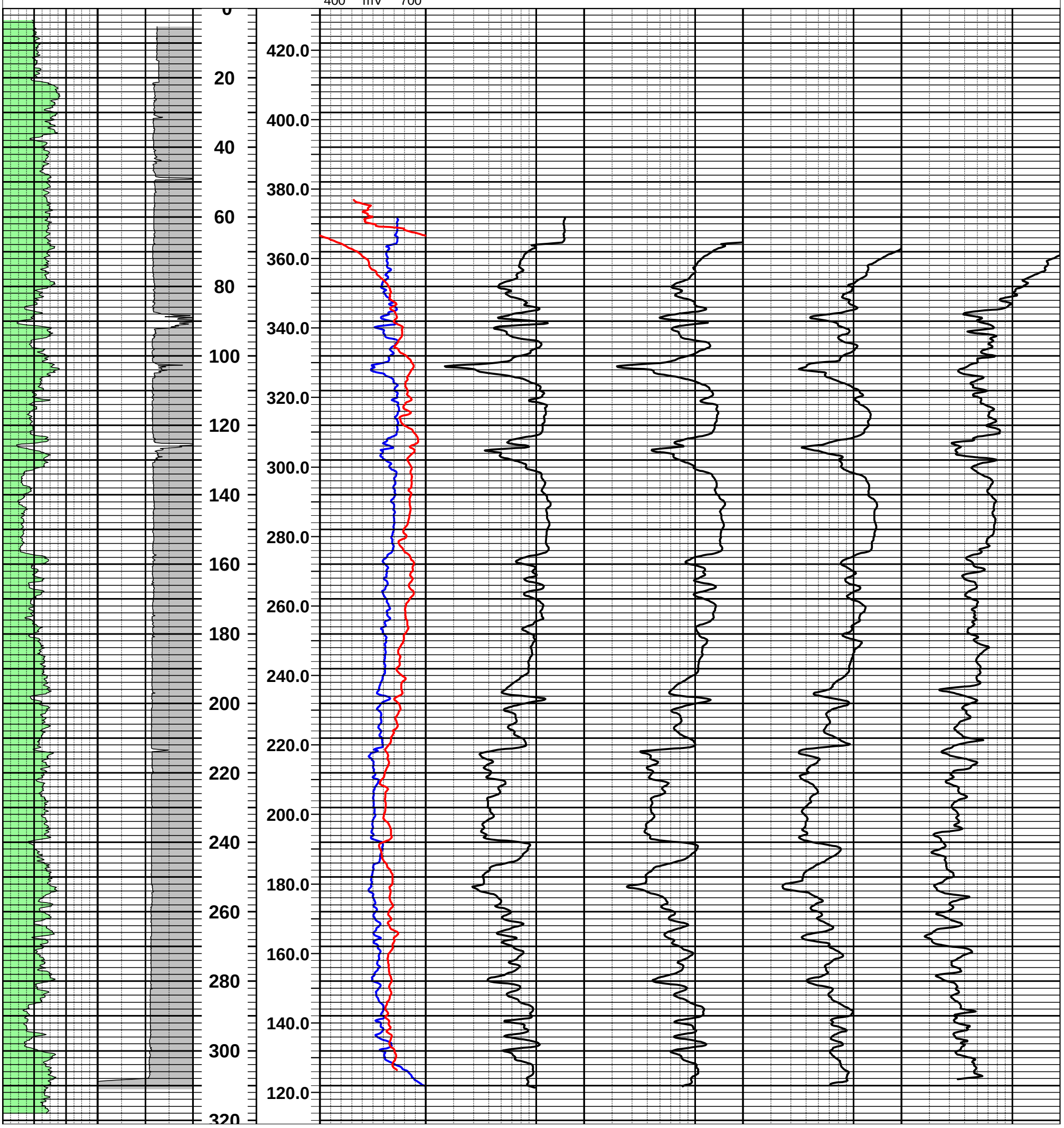
TOOL DETAILS

Elog SN5521 + Bridle - Tool Length = 32.71 ft Chshifts for SPR, N8, N16, N32, N64, and SP = 0.21, 0.54, 0.87, 1.54, 2.87, and 5.54 ft



Gamma	Caliper	Depth	Elev.	SPR	N8	N16	N32	N64
0 CPS 300	5 in 7	1ft:350ft	ft msl	0 Ohm 200	20 Ohm.m 200	20 Ohm.m 200	20 Ohm.m 200	20 Ohm.m 200

SP: 400 mV 700



GEOPHYSICAL RECORD OF BOREHOLE: 2

Miller & Gorgas Ash Pond Investigation

Client: Southern Company Services

Project Number: 1302371

Date: November 2013

Location: Gorgas Plant	TOC Elev msl: na
Easting: 2062726 ft NAD83	Casing Stick-up: -0.27 ft
Northing: 1322443 ft NAD83	Casing Diameter: 6.25 inches
Ground Elev msl: 432 ft	Casing Material: Steel
Borehole Dip: vertical	Water Level: 37.1 ft bgs
Borehole Az: na	Logged By: B. Abernathy
Borehole Size: 6" AH	Log Depth Ref: GS
Drilled Depth: 320 ft	Log Date: 11-14-13
Drill Comp Date: 10-30-13	Image Plot(s) Ref: na
Casing Depth: 20.0 ft bgs	Dip Referenced to Horizontal

TOOL DETAILS

Caliper SN5521 - Tool Length = 6.82 ft

Caliper Chshift = 0.93 ft

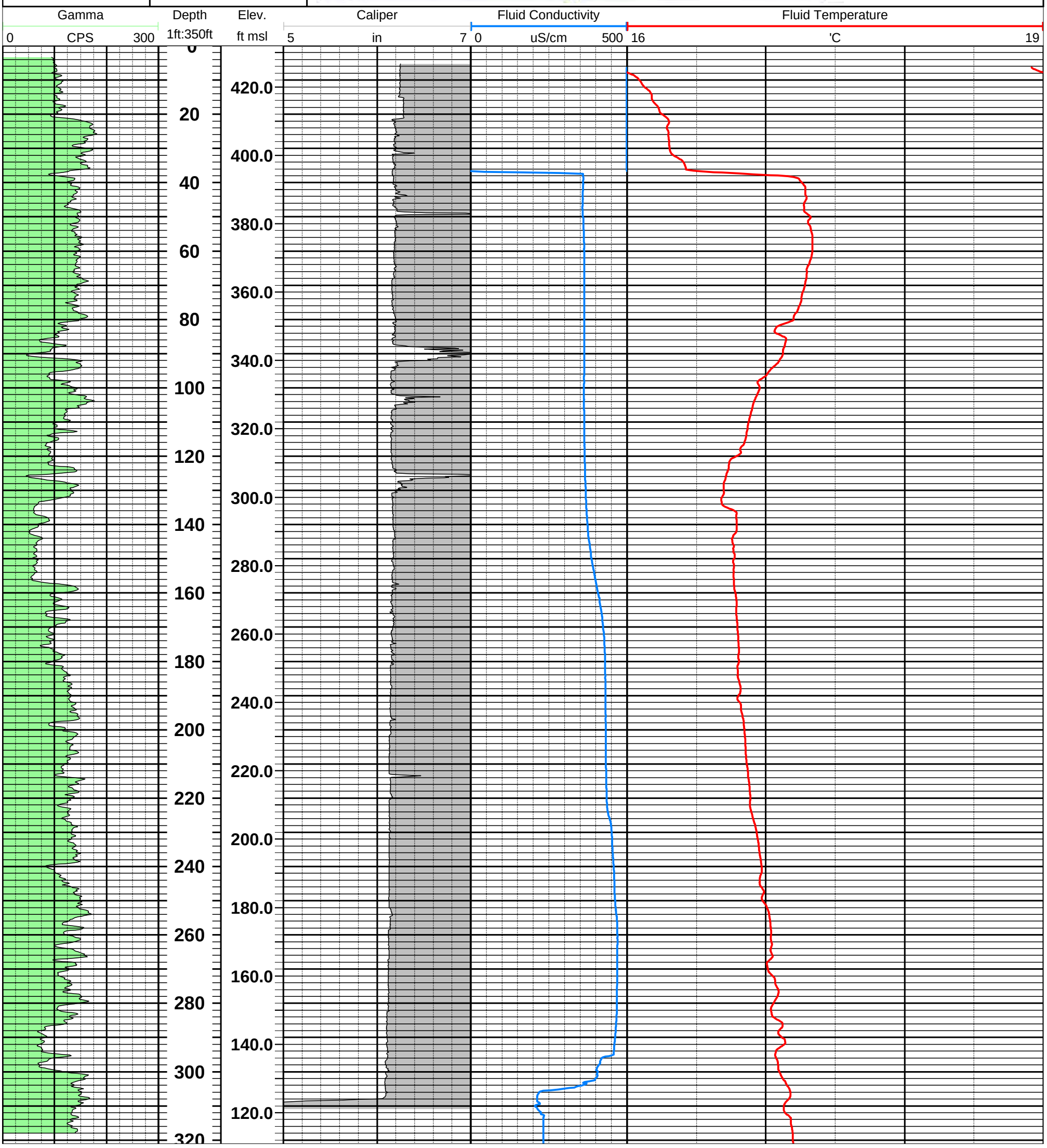
FTC SN5518 + Gamma SN5499 - Tool Length = 6.38 ft

Temperature Chshift = 0.289 ft

Conductivity Chshift = 0.21 ft







GEOPHYSICAL RECORD OF BOREHOLE: 3

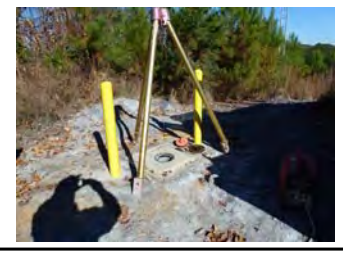
Miller & Gorgas Ash Pond Investigation

Client: Southern Company Services

Project Number: 1302371

Date: November 2013

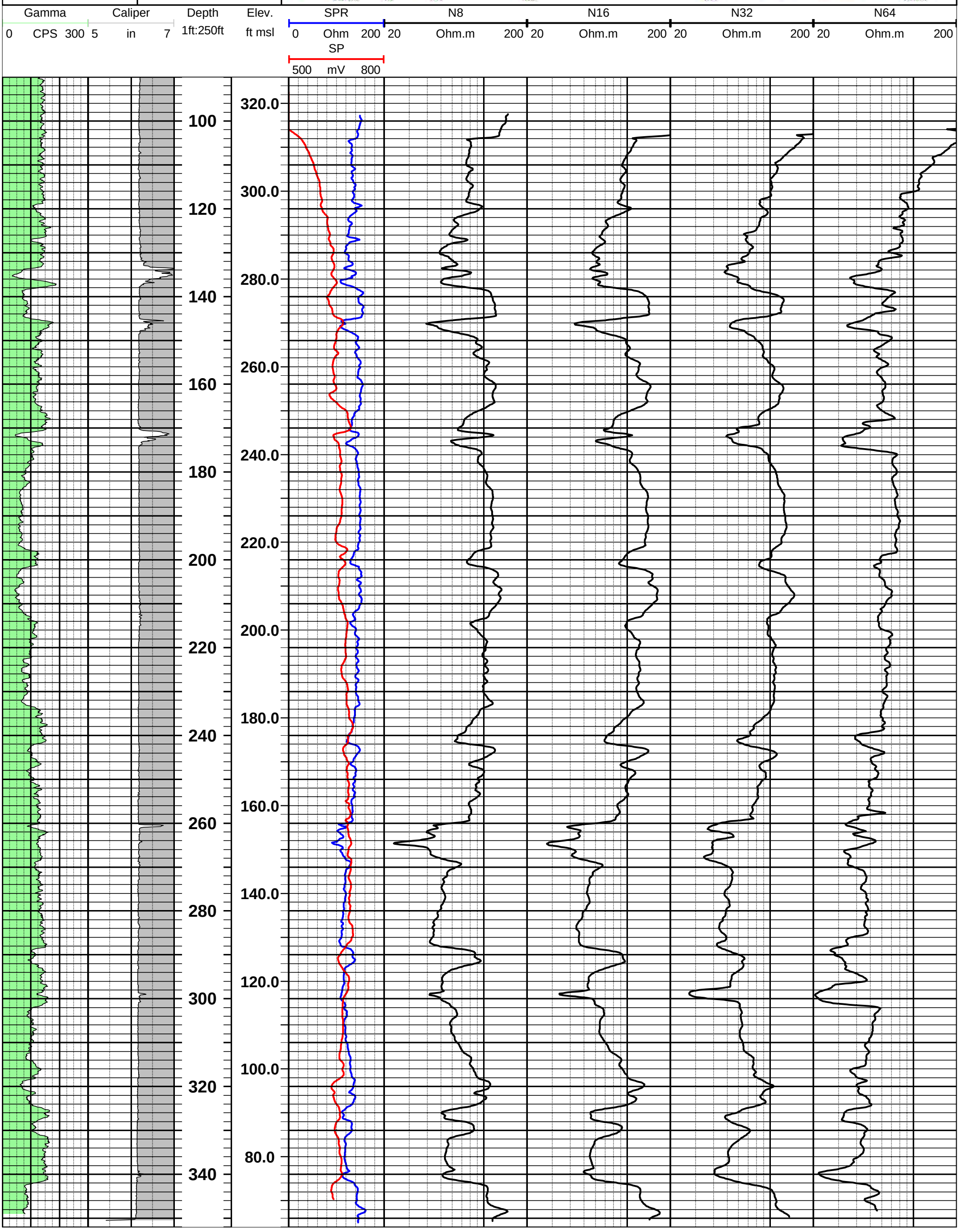
Location: Gorgas Plant	TOC Elev msl: na
Easting: 2063837 ft NAD 83	Casing Stick-up: -0.29 ft
Northing: 1320368 ft NAD 83	Casing Diameter: 6.25 inches
Ground Elev msl: 416 ft	Casing Material: Steel
Borehole Dip: vertical	Water Level: 74.1 ft bgs
Borehole Az: na	Logged By: B. Abernathy
Borehole Size: 6" AH	Log Depth Ref: GS
Drilled Depth: 350 ft	Log Date: 11-14-13
Drill Comp Date: 10-30-13	Image Plot(s) Ref: na
Casing Depth: 23.0 ft bgs	Dip Referenced to Horizontal



TOOL DETAILS

Elog SN5521 + Bridle - Tool Length = 32.71 ft Chshifts for SPR, N8, N16, N32, N64, and SP = 0.21, 0.54, 0.87, 1.54, 2.87, and 5.54 ft





GEOPHYSICAL RECORD OF BOREHOLE: 3

Miller & Gorgas Ash Pond Investigation

Client: Southern Company Services

Project Number: 1302371

Date: November 2013

Location: Gorgas Plant	TOC Elev msl: na
Easting: 2063837 ft NAD 83	Casing Stick-up: -0.29 ft
Northing: 1320368 ft NAD 83	Casing Diameter: 6.25 inches
Ground Elev msl: 416 ft	Casing Material: Steel
Borehole Dip: vertical	Water Level: 74.1 ft bgs
Borehole Az: na	Logged By: B. Abernathy
Borehole Size: 6" AH	Log Depth Ref: GS
Drilled Depth: 350 ft	Log Date: 11-14-13
Drill Comp Date: 10-30-13	Image Plot(s) Ref: na
Casing Depth: 23.0 ft bgs	Dip Referenced to Horizontal

TOOL DETAILS

Caliper SN5521 - Tool Length = 6.82 ft

Caliper Chshift = 0.93 ft

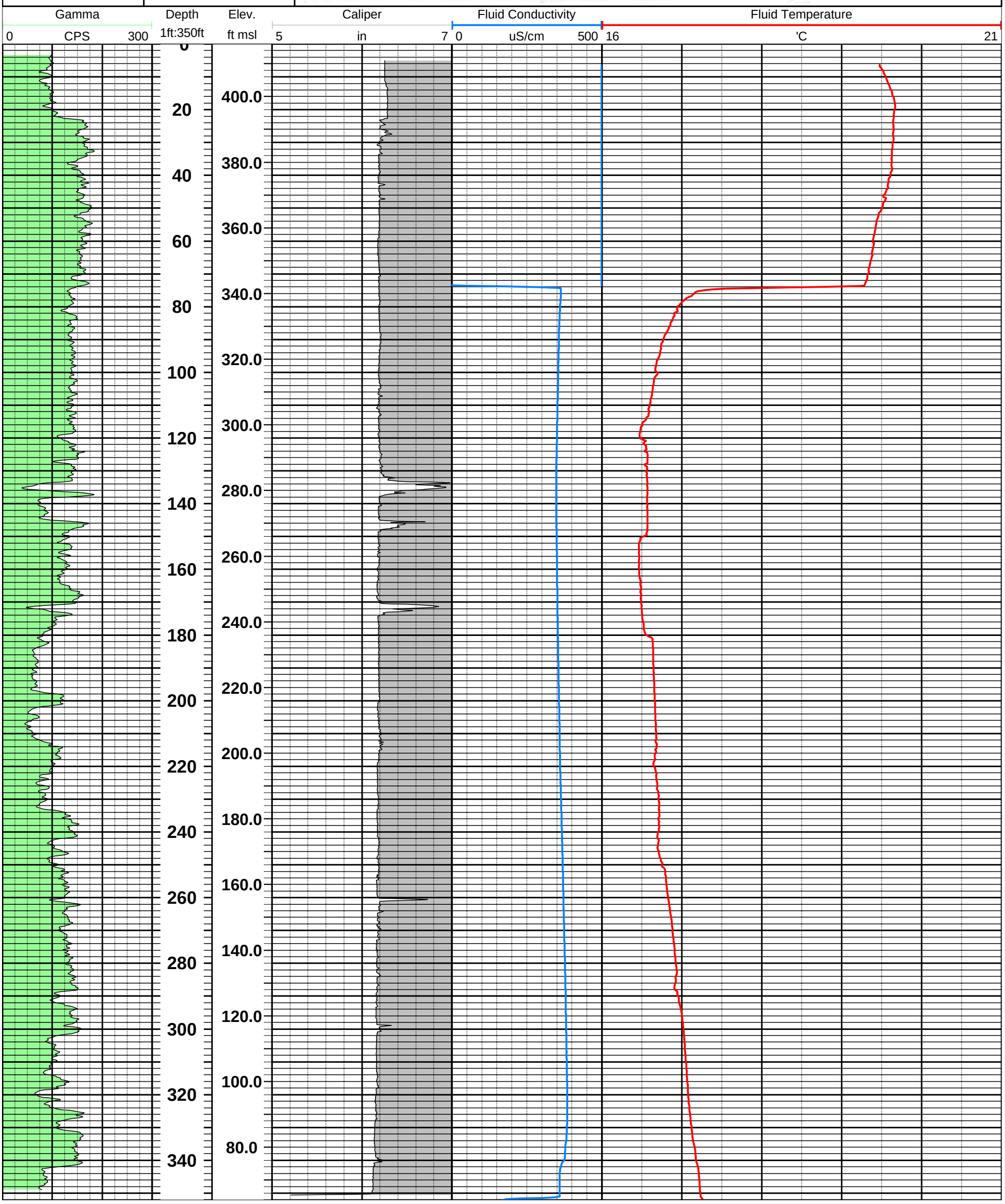
FTC SN5518 + Gamma SN5499 - Tool Length = 6.38 ft

Temperature Chshift = 0.289 ft

Conductivity Chshift = 0.21 ft







GEOPHYSICAL RECORD OF BOREHOLE: GS-AP-MW-02

Ash Pond Hydrogeologic Investigation
Gorgas Electric Generating Plant

Client: Southern Company Services

Project: 1544912

Date: 03-28-2016

Datum:	AL West NAD27	Drill Comp. Date:	2-29-16	Log Depth Ref.:	Ground Surface	Location:	Parrish, AL
Easting:	598987.39 ft	Drilling Method:	Sonic Core	Casing Stick-up:	2.5 ft		
Northing:	1322053.1 ft	Borehole Diameter:	6"	Casing Diameter:	8 inch		
Elevation:	458.2 ft-amsl	Drilled Depth:	217 ft & 317 ft	Casing Depth:	25.8 ft bgs	Log Date:	3-4-2016, 3-18-16
		Water Level:	124.3 & 134.5 ft bgs	Casing Material:	PVC	Logged By:	Abernathy

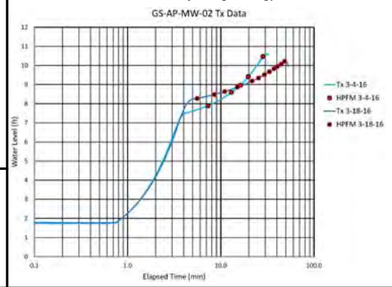


Tool Specs:

HFP2293 SN5517 - Tool Length = 4 ft, and 3.18 ft to heat grid/diverter

FTC SN5518, Caliper SN5521, Gamma-SPR-SP SN5809

TRANSDUCER DATA: Injecting 0.25 gpm



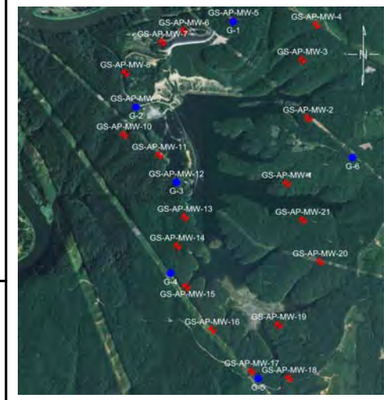
HPFM MEASUREMENTS: Injecting 0.25 gpm 3-4-16 & 3-18-16

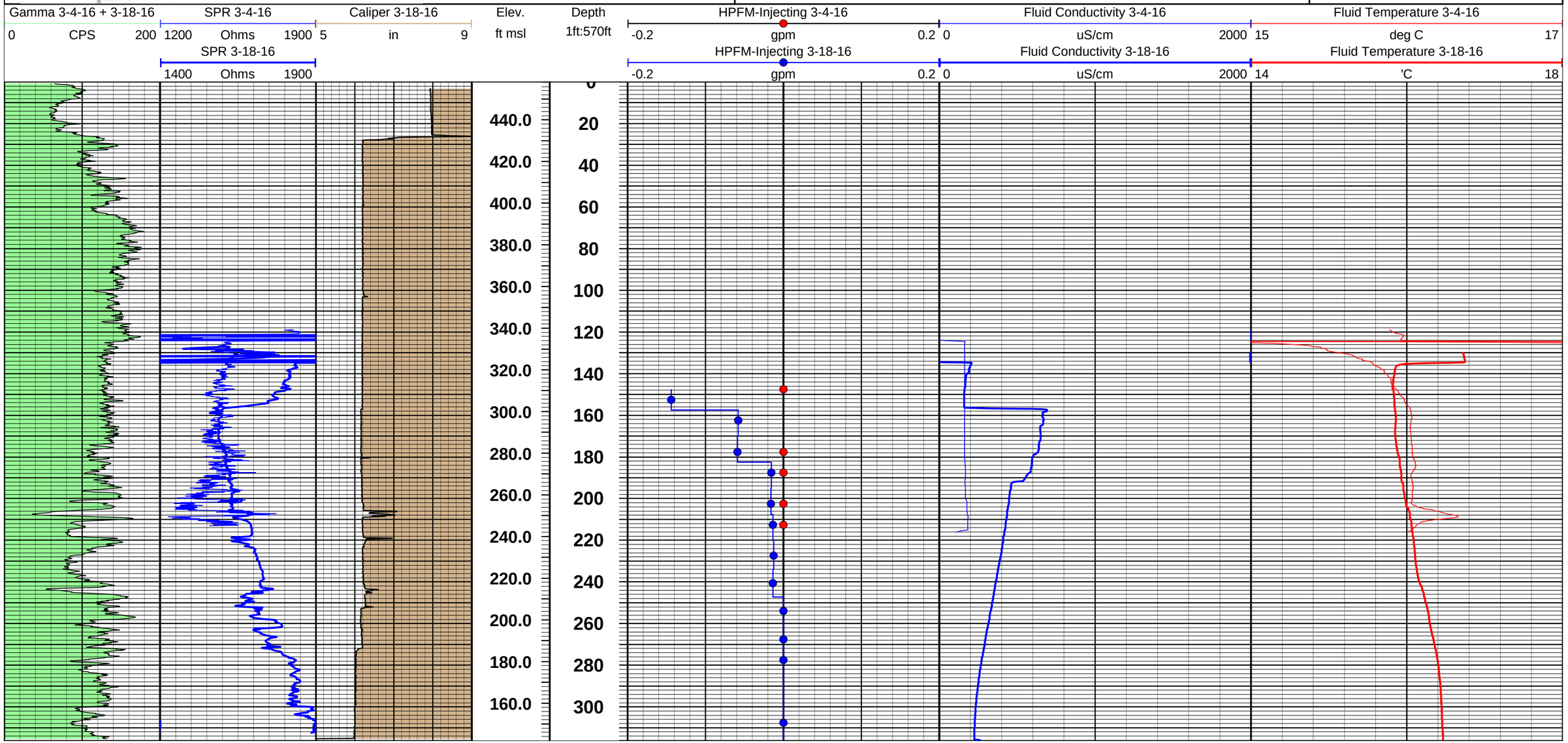
Depth_ft	AcqDateTime	PickTime_s	Flow_gpm
147.6	4/3/2016 11:54:15	0.00	0.00
177.6	4/3/2016 11:59:56	0.00	0.00
187.5	4/3/2016 12:03:16	0.00	0.00
202.5	4/3/2016 12:06:40	0.00	0.00
212.7	4/3/2016 12:15:14	0.00	0.00
155.1	18/03/2016 10:27:06	3.575	-0.144
165.0	18/03/2016 10:30:03	7.456	-0.058
180.2	18/03/2016 10:32:30	7.325	-0.059
190.1	18/03/2016 10:36:35	24.425	-0.016
205.1	18/03/2016 10:43:11	23.600	-0.016
215.1	18/03/2016 10:46:55	27.847	-0.014
230.0	18/03/2016 10:50:54	29.650	-0.013
243.2	18/03/2016 10:54:44	27.850	-0.014
256.4	18/03/2016 10:58:45	0.000	0.000
270.1	18/03/2016 11:02:02	0.000	0.000
280.0	18/03/2016 11:05:57	0.000	0.000
310.1	18/03/2016 11:09:54	0.000	0.000

Notes:

The HPFM was run while injecting at 0.25 gpm. The transducer was placed at 122.6 ft bgs. The borehole was deepened to 317 ft and re-logged on 03-18-16. The HPFM was run while injecting at 0.25 gpm. The transducer was placed at 132.8 ft bgs.

Well Location Map





GEOPHYSICAL RECORD OF BOREHOLE: GS-AP-MW-03

Ash Pond Hydrogeologic Investigation
Gorgas Electric Generating Plant

Client: Southern Company Services

Project: 1544912

Date: 03-29-2016

Datum:	AL West NAD27	Drill Comp. Date:	3-4-16	Log Depth Ref.:	Ground Surface	Location:	Parrish, AL
Easting:	598826.36 ft	Drilling Method:	Sonic Core	Casing Stick-up:	1.5 ft		
Northing:	1323661.58 ft	Borehole Diameter:	6"	Casing Diameter:	8 inch		
Elevation:	506.9 ft-amsl	Drilled Depth:	187 ft	Casing Depth:	23.3 ft bgs	Log Date:	3/9-10/2016
		Water Level:	46.2 ft bgs	Casing Material:	PVC	Logged By:	Abernathy



Tool Specs:

HFP2293 SN5517 - Tool Length = 4 ft, and 3.18 ft to heat grid/diverter

FTC SN5518, Caliper SN5521, Gamma-SPR-SP SN5809

TRANSDUCER DATA: none

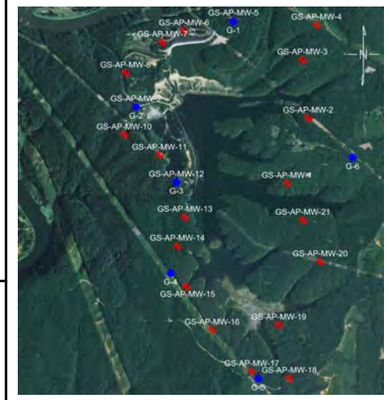
HPFM MEASUREMENTS: Ambient & Injecting 0.25 gpm

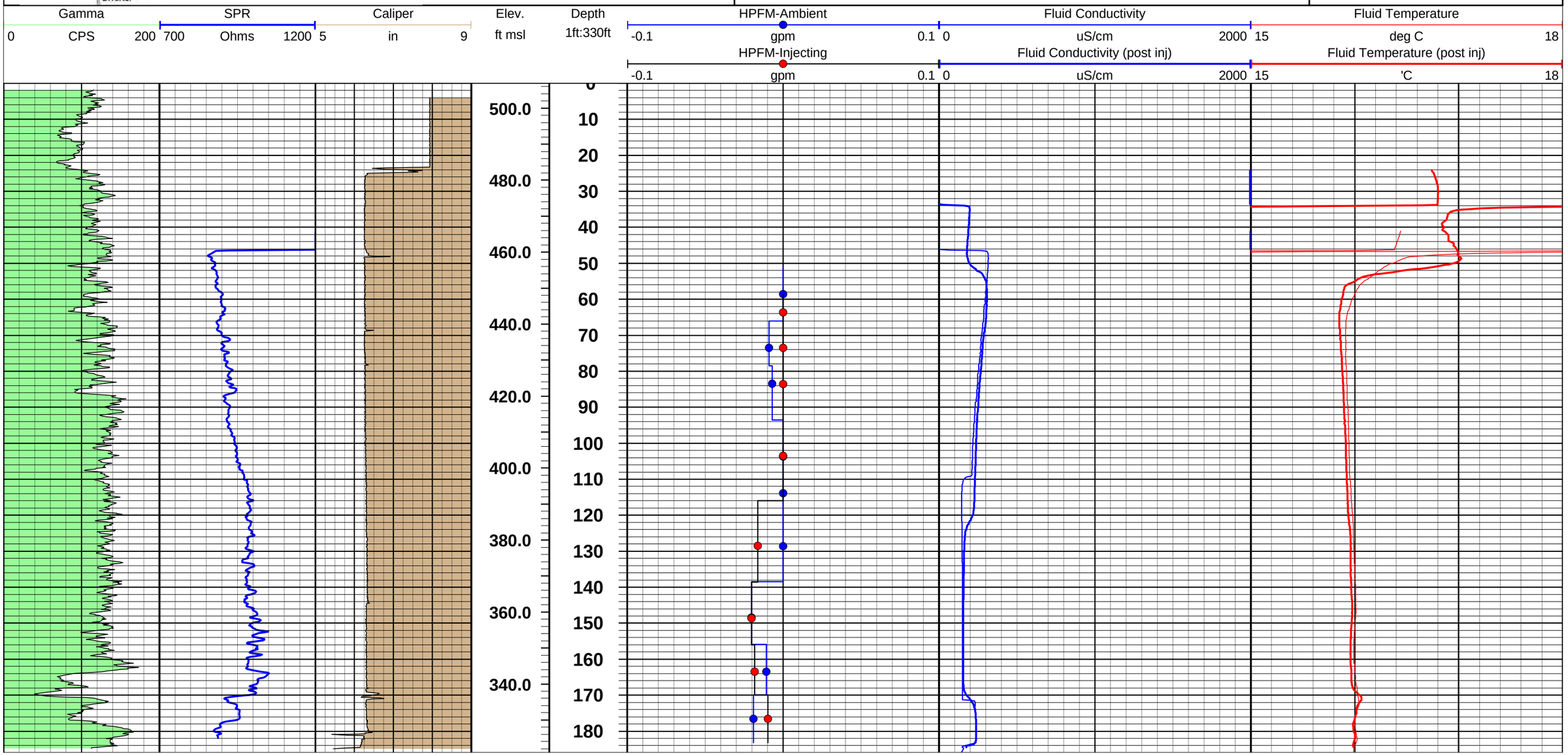
Depth_ft	AcqDateTime	PickTime_s	Flow_gpm
60.1	9/3/2016 14:55:39	0.000	0.000
75.0	9/3/2016 15:05:25	22.876	-0.009
85.0	9/3/2016 15:12:27	28.702	-0.007
105.2	9/3/2016 15:20:30	0.000	0.000
115.4	9/3/2016 15:27:19	0.000	0.000
130.1	9/3/2016 15:30:09	0.000	0.000
150.0	9/3/2016 15:50:34	11.303	-0.020
165.0	9/3/2016 15:59:00	19.425	-0.011
178.0	9/3/2016 16:07:50	12.050	-0.019
65.1	10/3/2016 8:16:21	0.000	0.000
75.1	10/3/2016 8:20:34	0.000	0.000
85.1	10/3/2016 8:28:28	0.000	0.000
105.0	10/3/2016 8:34:28	0.000	0.000
130.0	10/3/2016 8:47:24	13.773	-0.016
150.2	10/3/2016 8:59:14	11.300	-0.020
165.0	10/3/2016 9:09:18	12.400	-0.018
178.1	10/3/2016 9:21:01	21.600	-0.010

Notes:

The HPFM was run on 3-10-16 under ambient conditions and while injecting at 0.25 gpm. Fluid temperature/conductivity was run after the HPFM injecting test.

Well Location Map





GEOPHYSICAL RECORD OF BOREHOLE: GS-AP-MW-04

Ash Pond Hydrogeologic Investigation
Gorgas Electric Generating Plant

Client: Southern Company Services

Project: 1544912

Date: 03-28-2016

Datum:	AL West NAD27	Drill Comp. Date:	2-5-16	Log Depth Ref.:	Ground Surface	Location:	Parrish, AL
Easting:	599218.16 ft	Drilling Method:	Sonic Core	Casing Stick-up:	0.25 ft		
Northing:	1324626.54 ft	Borehole Diameter:	6"	Casing Diameter:	8 inch		
Elevation:	455.3 ft-amsl	Drilled Depth:	135 ft & 235 ft	Casing Depth:	18.5 ft bgs	Log Date:	3-4-2016, 3-17-16
		Water Level:	21.85 & 124.8 ft bgs	Casing Material:	PVC	Logged By:	Abernathy

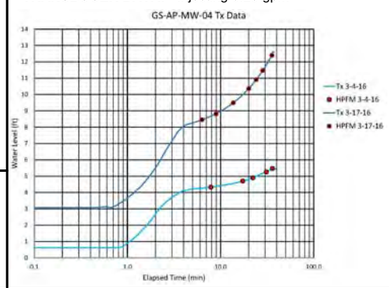


Tool Specs:

HFP2293 SN5517 - Tool Length = 4 ft, and 3.18 ft to heat grid/diverter

FTC SN5518, Caliper SN5521, Gamma-SPR-SP SN5809

TRANSDUCER DATA: Injecting 0.25 gpm



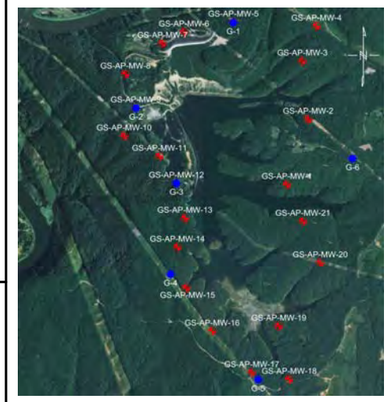
HPFM MEASUREMENTS: Injecting 0.25 gpm 3-4-16 & 3-17-16

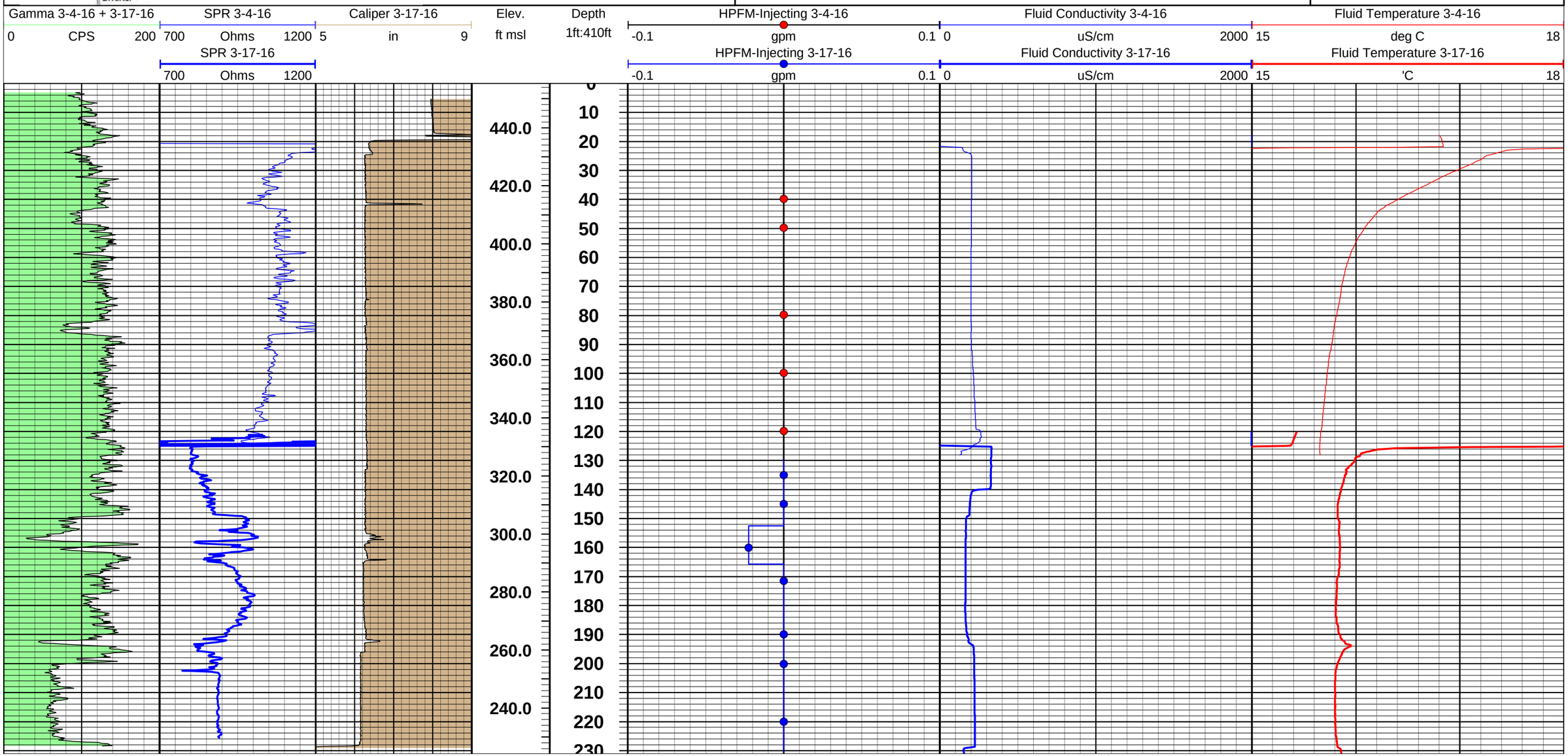
Depth_ft	AcqDateTime	PickTime_s	Flow_gpm
39.77	4/3/2016 14:36:56	0.00	0.00
49.79	4/3/2016 14:46:21	0.00	0.00
79.83	4/3/2016 14:51:17	0.00	0.00
99.78	4/3/2016 15:00:02	0.00	0.00
119.90	4/3/2016 15:05:04	0.00	0.00
135.1	17/03/2016 15:53:36	0.00	0.00
145.0	17/03/2016 15:56:14	0.00	0.00
160.1	17/03/2016 16:00:57	17.67	-0.02
171.5	17/03/2016 16:07:21	0.00	0.00
190.0	17/03/2016 16:11:24	0.00	0.00
200.2	17/03/2016 16:15:35	0.00	0.00
220.1	17/03/2016 16:22:52	0.00	0.00

Notes:

The HPFM was run while injecting at 0.25 gpm. The transducer was placed at 22.5 ft bgs. The borehole was deepened to 235 ft and re-logged on 03-17-16. The HPFM was run while injecting at 0.25 gpm. The transducer was placed at 127.9 ft bgs.

Well Location Map





Gamma
0 CPS 200

Depth
1ft:90ft

Caliper
5 in 8

Fluid Conductivity
0 uS/cm 500

Fluid Temperature
13 deg C 17

10
20
30
40
50
60
70
80
90
100

GEOPHYSICAL RECORD OF BOREHOLE: GS-AP-MW-07

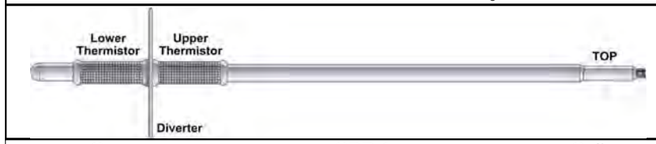
Ash Pond Hydrogeologic Investigation
Gorgas Electric Generating Plant

Client: Southern Company Services

Project: 1544912

Date: 03-29-2016

Datum:	AL West NAD27	Drill Comp. Date:	1-21-16	Log Depth Ref.:	Ground Surface	Location:	Parrish, AL
Easting:	594962.56 ft	Drilling Method:	Sonic Core	Casing Stick-up:	2.5 ft		
Northing:	1324150.66 ft	Borehole Diameter:	6"	Casing Diameter:	8 inch		
Elevation:	297.3 ft-amsl	Drilled Depth:	157 ft	Casing Depth:	27.8 ft bgs	Log Date:	2/2-3/2016
		Water Level:	3.4 ft bgs	Casing Material:	PVC	Logged By:	Abernathy

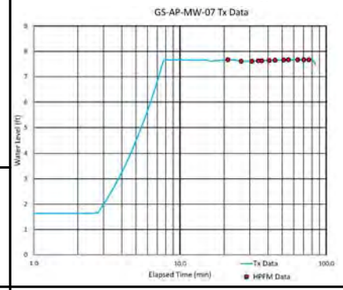


Tool Specs:

HFP2293 SN5517 - Tool Length = 4 ft, and 3.18 ft to heat grid/diverter

FTC SN5518, Caliper SN5521, Gamma-SPR-SP SN5809

TRANSDUCER DATA: Injecting 2.7 gpm



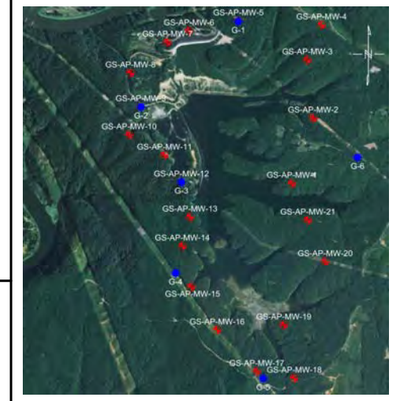
HPFM MEASUREMENTS: Injecting 2.7 gpm

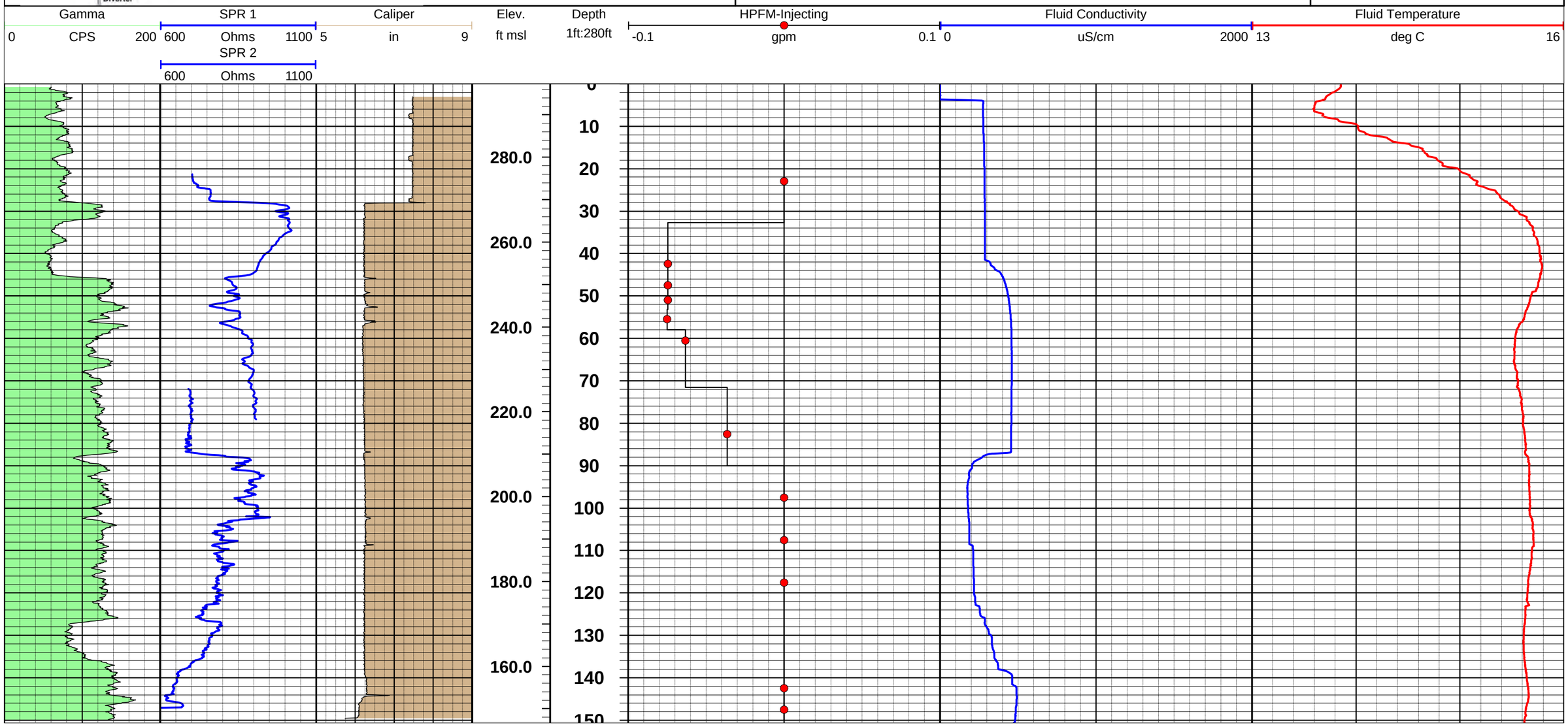
Depth_ft	AcqDateTime	PickTime_s	Flow_gpm
23.0	3/2/2016 9:42:47	0.000	0.000
42.5	3/2/2016 9:47:44	4.084	-0.075
47.5	3/2/2016 9:52:30	4.084	-0.075
51.0	3/2/2016 9:55:48	4.084	-0.075
55.5	3/2/2016 9:57:43	4.069	-0.075
60.5	3/2/2016 10:02:11	4.600	-0.063
82.6	3/2/2016 10:06:10	7.000	-0.037
97.5	3/2/2016 10:12:39	0.000	0.000
107.5	3/2/2016 10:16:38	0.000	0.000
117.6	3/2/2016 10:25:16	0.000	0.000
142.5	3/2/2016 10:31:47	0.000	0.000
147.5	3/2/2016 10:37:34	0.000	0.000

Notes:

The HPFM was run on 2-3-16 while injecting at 2.7 gpm to raise the head 5.9 ft to overflowing the TOC.

Well Location Map





GEOPHYSICAL RECORD OF BOREHOLE: GS-AP-MW-7V

PLANT GORGAS ASH POND DELINEATION WELLS

GOLDER

Project Number: 18114896

Client: Southern Company Services

Southern Company

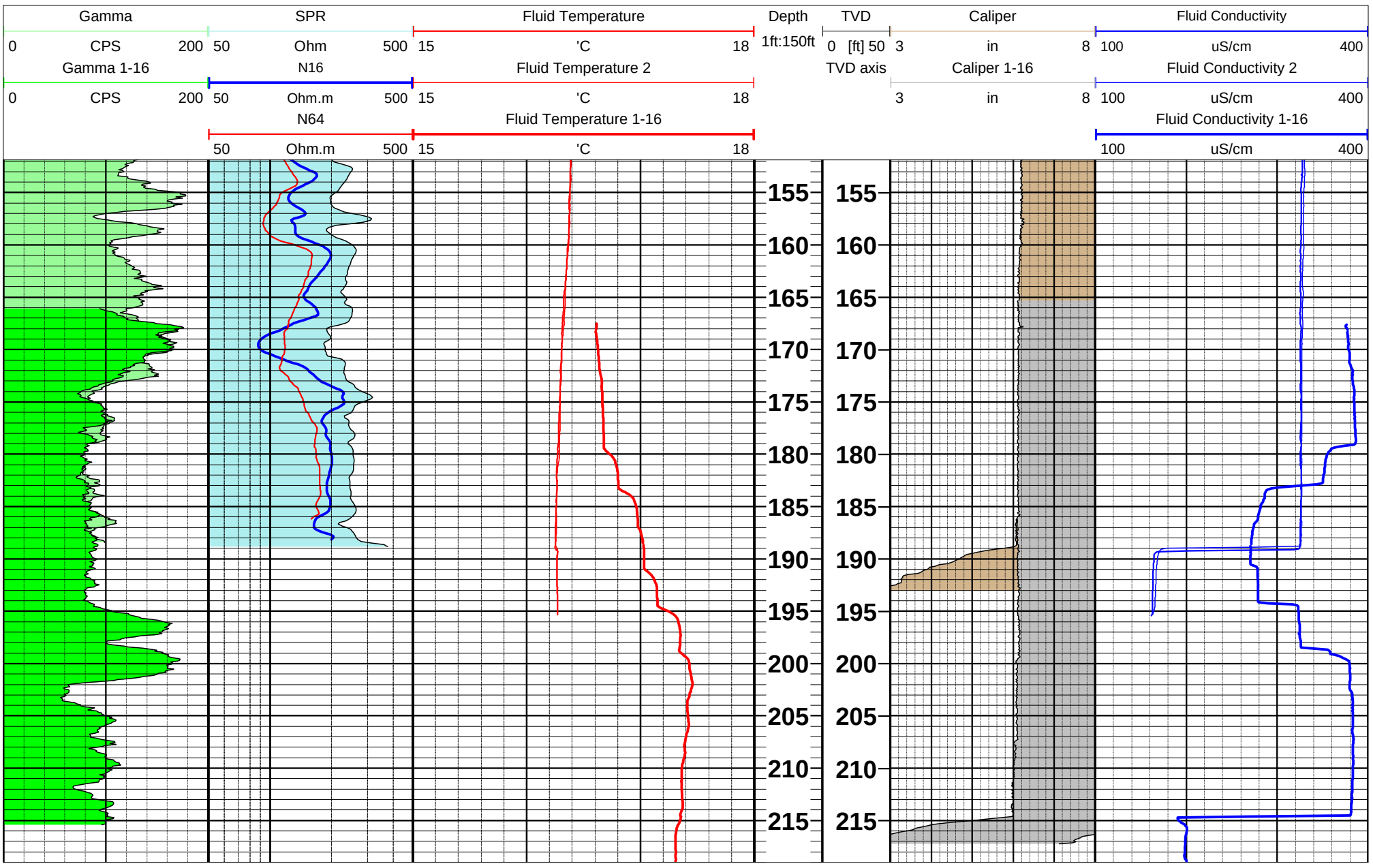
Date: 1-16-2019

Location: Parrish, Al	TOC Elev msl: na
Easting: na	Casing Stick-up: 2.42 ft ags
Northing: na	Casing Diameter: 5.4 in ID
Ground Elev msl: na	Casing Material: Steel
Borehole Dip: vertical	Water Level: 5.98 ft bgs
Borehole Az: na	Logged By: Abernathy
Borehole Size: 6" Sonic	Log Depth Ref: Ground
Drilled Depth: 210& 220 ft	Log Date: 1-11&16-19
Drill Comp Date: 1-11&16-19	Image Plot(s) Ref: MN
Casing Depth: 30.9 ft bgs	Dip Referenced to Horizontal

Notes: The FTC run was made under static conditions, the WL was 5.98 ft bgs at setup on the hole, the second FTC run was made under pumping conditions, pump at 30 ft TOC and pumping at 1 gpm, the WL was 8.8 ft at end of the run.
Hole cleanned & drilled to 220 on 1-16 & re-logged.
The deviation data was recorded with our OBI sn163404.
Closure Distance = 3.1 ft, Closure Angle = 159.5 deg & Tilt at BOH = 1.2 deg
Tools used were Decatur's QL40 set:
FTC sn5518
Caliper sn5521
Gamma sn5499
SPR + Normal Res QL40 sn5512
Deviation OBI sn163404



Gamma: 0 CPS 200
Gamma 1-16: 0 CPS 200
SPR: 50 Ohm 500
N16: 50 Ohm.m 500
N64: 50 Ohm.m 500
Fluid Temperature: 15 'C 18
Fluid Temperature 2: 15 'C 18
Fluid Temperature 1-16: 15 'C 18
Depth: 1ft:150ft
TVD: 0 [ft] 50
TVD axis
Caliper: 3 in 8
Caliper 1-16: 3 in 8
Fluid Conductivity: 100 uS/cm 400
Fluid Conductivity 2: 100 uS/cm 400
Fluid Conductivity 1-16: 100 uS/cm 400


Gamma
0 CPS 200
Gamma 1-16
0 CPS 200
SPR
50 Ohm 500
N16
50 Ohm.m 500
N64
50 Ohm.m 500
Fluid Temperature
15 'C 18
Fluid Temperature 2
15 'C 18
Fluid Temperature 1-16
15 'C 18
Depth
1ft:150ft
TVD
0 [ft] 50
TVD axis
Caliper
3 in 8
Caliper 1-16
3 in 8
Fluid Conductivity
100 uS/cm 400
Fluid Conductivity 2
100 uS/cm 400
Fluid Conductivity 1-16
100 uS/cm 400
155
160
165
170
175
180
185
190
195
200
205
210
215

GEOPHYSICAL RECORD OF BOREHOLE: GS-AP-MW-7V

PLANT GORGAS ASH POND DELINEATION WELLS

GOLDER

Project Number: 18114896

Client: Southern Company Services

Southern Company

Date: 1-11-2019

Location: Parrish, Al	TOC Elev msl: na
Easting: na	Casing Stick-up: 2.42 ft ags
Northing: na	Casing Diameter: 5.4 in ID
Ground Elev msl: na	Casing Material: Steel
Borehole Dip: vertical	Water Level: 5.98 ft bgs
Borehole Az: na	Logged By: Abernathy
Borehole Size: 6" Sonic	Log Depth Ref: Ground
Drilled Depth: 210 ft	Log Date: 1-11-19
Drill Comp Date: 1-11-19	Image Plot(s) Ref: MN
Casing Depth: 30.9 ft bgs	Dip Referenced to Horizontal

Notes:

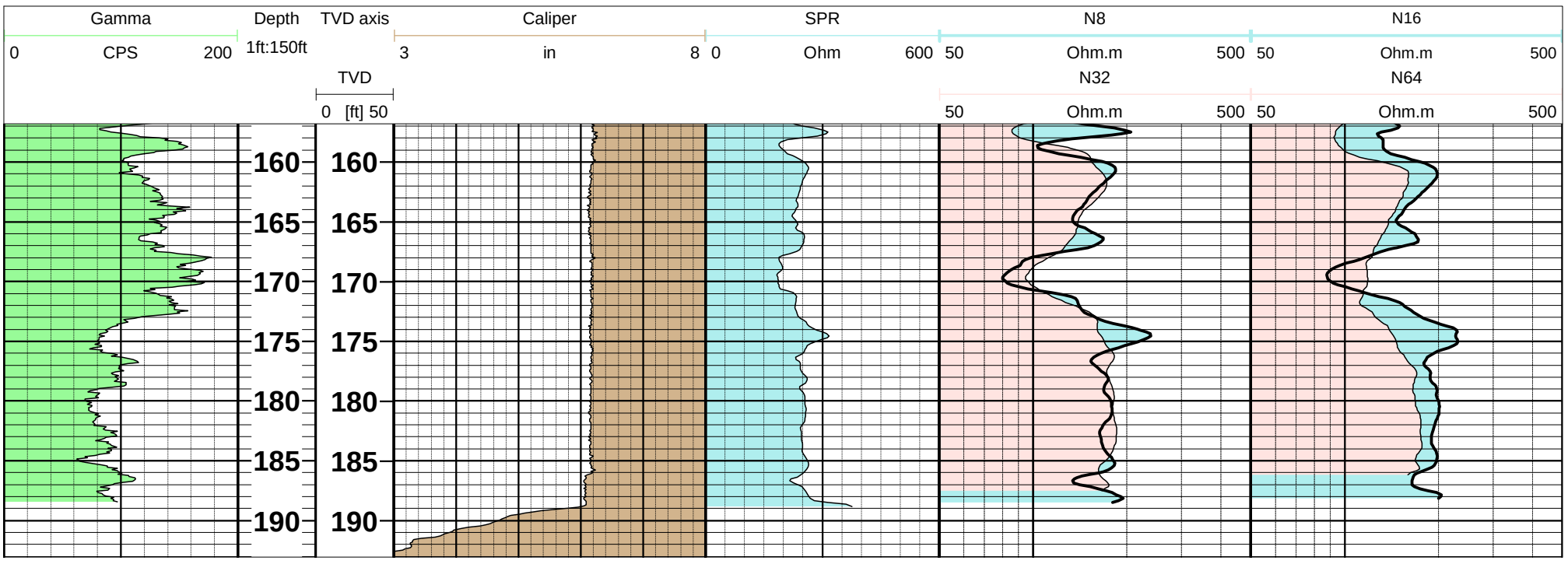
The FTC run was made under static conditions, the WL was 5.98 ft bgs at setup on the hole, the second FTC run was made under pumping conditions, pump at 30 ft TOC and pumping at 1 gpm, the WL was 8.8 ft at end of the run.

The deviation data was recorded with our OBI sn163404.
Closure Distance = 3.1 ft, Closure Angle = 159.5 deg & Tilt at BOH = 1.2 deg

Tools used were Decatur's QL40 set:
FTC sn5518
Caliper sn5521
Gamma sn5499
SPR + Normal Res QL40 sn5512
Deviation OBI sn163404



Gamma 0 CPS 200 | Depth 1ft:150ft | TVD axis TVD 0 [ft] 50 | Caliper 3 in 8 | SPR 0 Ohm 600 | N8 50 Ohm.m 500 | N16 50 Ohm.m 500 | N32 50 Ohm.m 500 | N64 50 Ohm.m 500


Gamma
0
CPS
200
Depth
1ft:150ft
TVD axis
TVD
0 [ft] 50
Caliper
3
in
8
SPR
0
Ohm
600
N8
50
Ohm.m
500
N16
50
Ohm.m
500
N32
50
Ohm.m
500
N64
50
Ohm.m
500
160
165
170
175
180
185
190

GEOPHYSICAL RECORD OF BOREHOLE: GS-AP-MW-7V

PLANT GORGAS ASH POND DELINEATION WELLS

GOLDER

Project Number: 18114896

Client: Southern Company Services

Southern Company

Date: 1-11-2019

Location: Parrish, Al	TOC Elev msl: na
Easting: na	Casing Stick-up: 2.42 ft ags
Northing: na	Casing Diameter: 5.4 in ID
Ground Elev msl: na	Casing Material: Steel
Borehole Dip: vertical	Water Level: 5.98 ft bgs
Borehole Az: na	Logged By: Abernathy
Borehole Size: 6" Sonic	Log Depth Ref: Ground
Drilled Depth: 210 ft	Log Date: 1-11-19
Drill Comp Date: 1-11-19	Image Plot(s) Ref: MN
Casing Depth: 30.9 ft bgs	Dip Referenced to Horizontal

Notes: The FTC run was made under static conditions, the WL was 5.98 ft bgs at setup on the hole, the second FTC run was made under pumping conditions, pump at 30 ft TOC and pumping at 1 gpm, the WL was 8.8 ft at end of the run.

The deviation data was recorded with our OBI sn163404.
Closure Distance = 3.1 ft, Closure Angle = 159.5 deg & Tilt at BOH = 1.2 deg

Tools used were Decatur's QL40 set:
FTC sn5518
Caliper sn5521
Gamma sn5499
SPR + Normal Res QL40 sn5512
Deviation OBI sn163404



Gamma: 0 CPS 200

SPR: 50 Ohm 500

N16: 50 Ohm.m 500

N64: 50 Ohm.m 500

Fluid Temperature: 15 'C 17

Fluid Temperature 2: 15 'C 17

Depth: 1ft:150ft

TVD: 0 [ft] 50

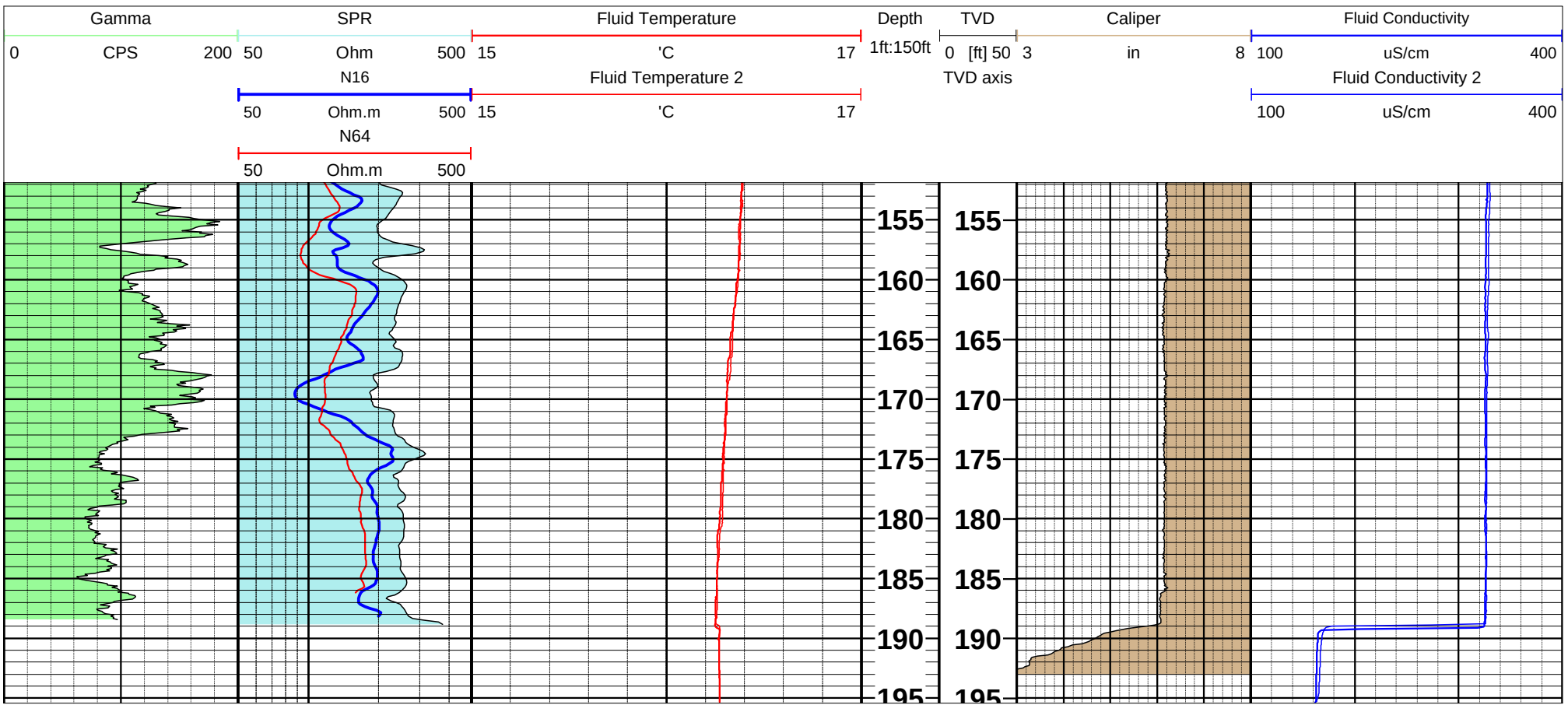
TVD axis

Caliper: 3 in 8

Fluid Conductivity: 100 uS/cm 400

Fluid Conductivity 2: 100 uS/cm 400

1/11/2019 2:18:10 PM


Gamma
0
CPS
200
SPR
50
Ohm
500
N16
50
Ohm.m
500
N64
50
Ohm.m
500
Fluid Temperature
15
'C
17
Fluid Temperature 2
15
'C
17
Depth
1ft:150ft
TVD
0 [ft] 50
TVD axis
Caliper
3
in
8
Fluid Conductivity
100
uS/cm
400
Fluid Conductivity 2
100
uS/cm
400
155
160
165
170
175
180
185
190
195

GEOPHYSICAL RECORD OF BOREHOLE: GS-AP-MW-08

Ash Pond Hydrogeologic Investigation
Gorgas Electric Generating Plant

Client: Southern Company Services

Project: 1544912

Date: 03-23-2016

Datum:	AL West NAD27	Drill Comp. Date:	1-28-16 & 2-26-16	Log Depth Ref.:	Ground Surface	Location:	Parrish, AL
Easting:	593940.95 ft	Drilling Method:	Sonic Core	Casing Stick-up:	1.67 ft		
Northing:	1323300.03 ft	Borehole Diameter:	6"	Casing Diameter:	8 inch		
Elevation:	398 ft-amsl	Drilled Depth:	80 ft & 125 ft	Casing Depth:	15.67 ft bgs	Log Date:	2-9, 2-19, 3-6-16
		Water Level:	30.43, 33.4, & 35 ft bgs	Casing Material:	PVC	Logged By:	Abernathy

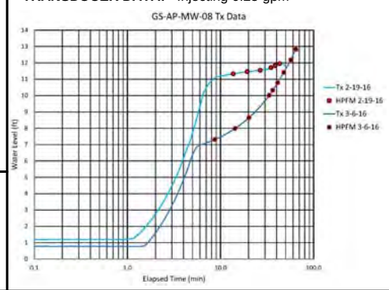


Tool Specs:

HFP2293 SN5517 - Tool Length = 4 ft, and 3.18 ft to heat grid/diverter

FTC SN5518, Caliper SN5521, Gamma-SPR-SP SN5809

TRANSDUCER DATA: Injecting 0.25 gpm



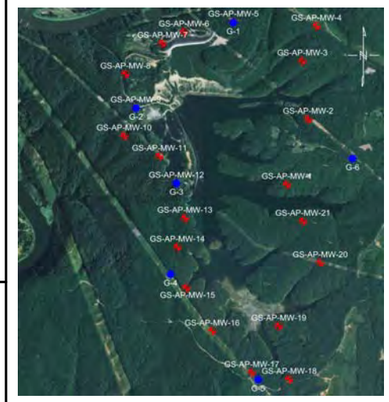
HPFM MEASUREMENTS: Injecting 0.25 gpm 2-19-16 & 3-6-16

Depth_ft	AcqDateTime	PickTime_s	Flow_gpm
40.54	19/02/2016 09:33:02	0.000	0.000
43.31	19/02/2016 09:38:38	2.433	-0.174
47.30	19/02/2016 09:45:59	7.125	-0.036
53.41	19/02/2016 09:54:01	11.950	-0.019
56.44	19/02/2016 09:57:51	7.300	-0.035
64.37	19/02/2016 10:02:26	0.000	0.000
42.5	6/3/2016 10:26:40	0.000	0.000
53.3	6/3/2016 10:32:19	13.875	-0.016
56.5	6/3/2016 10:38:10	17.415	-0.013
64.3	6/3/2016 10:51:19	0.000	0.000
73.4	6/3/2016 10:54:16	8.250	-0.030
80.6	6/3/2016 10:58:56	25.350	-0.008
90.3	6/3/2016 11:05:45	0.000	0.000
103.4	6/3/2016 11:14:52	0.000	0.000
113.4	6/3/2016 11:22:22	0.000	0.000

Notes:

The caliper, gamma, SPR, and SP logs were run on 02-09-16 (water level = 30.43 ft bgs). The HPFM were run on 02-19-16, water level = 33.4 ft bgs. The HPFM was run while injecting at 0.25 gpm. The transducer was placed at 34.6 ft bgs. Fluid temperature was run after the HPFM on 02-19-16. The borehole was deepened to 125 ft on 02-26-16 and HPFM and fluid temperature were run on 03-06-16.

Well Location Map



Gamma 3-6-16: 0 CPS 200

SPR 3-6-16: 600 Ohms 1100

Caliper 3-6-16: 5 in 9

Elev. ft msl

Depth 1ft:240ft

HPFM-Injecting 2-19-16: -0.2 gpm 0.2

HPFM-Injecting 3-6-16: -0.2 gpm 0.2

Fluid Conductivity 2-9-16: 0 uS/cm 2000

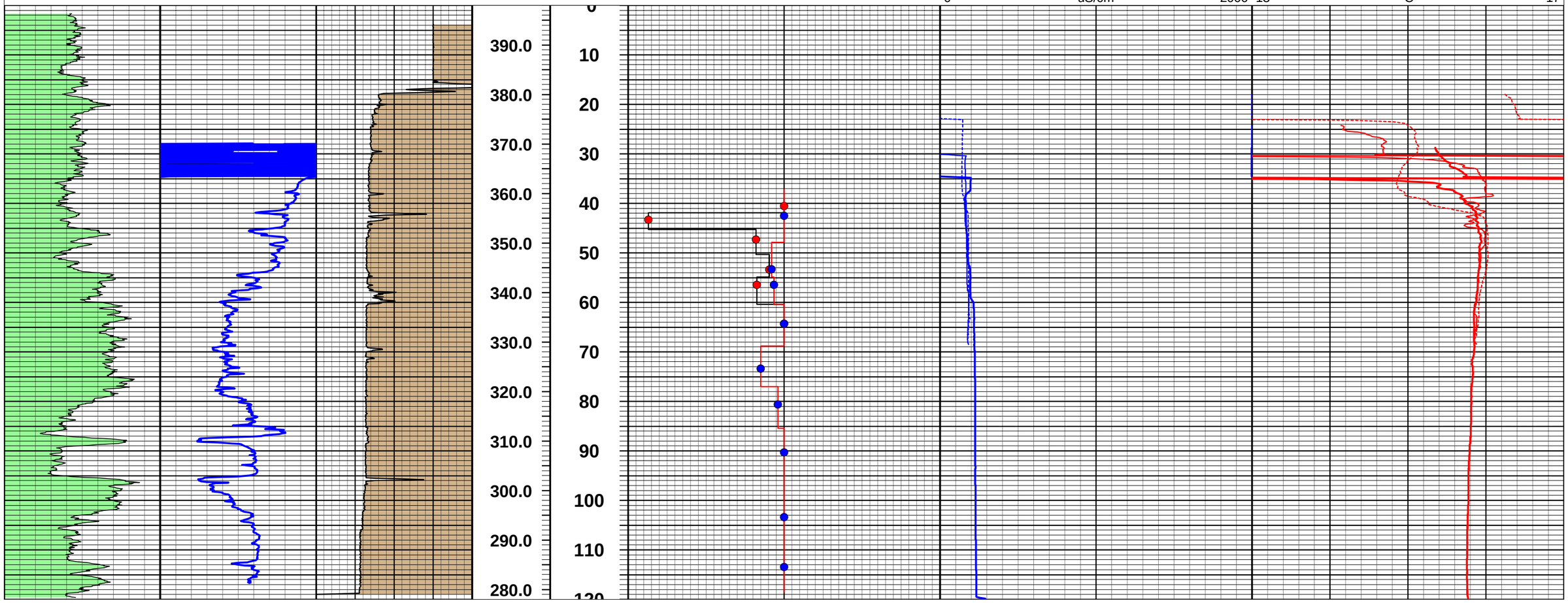
Fluid Conductivity - 2-19-16: 0 uS/cm 2000

Fluid Conductivity 3-6-16: 0 uS/cm 2000

Fluid Temperature 2-9-16: 13 deg C 17

Fluid Temperature - 2-19-16: 13 'C 17

Fluid Temperature 3-6-16: 13 'C 17



GEOPHYSICAL RECORD OF BOREHOLE: GSAP-MW9V

Plant Gorgas - CCR Delineation Wells

GOLDER

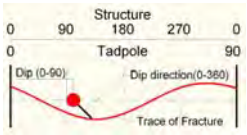
Project Number: 19131304

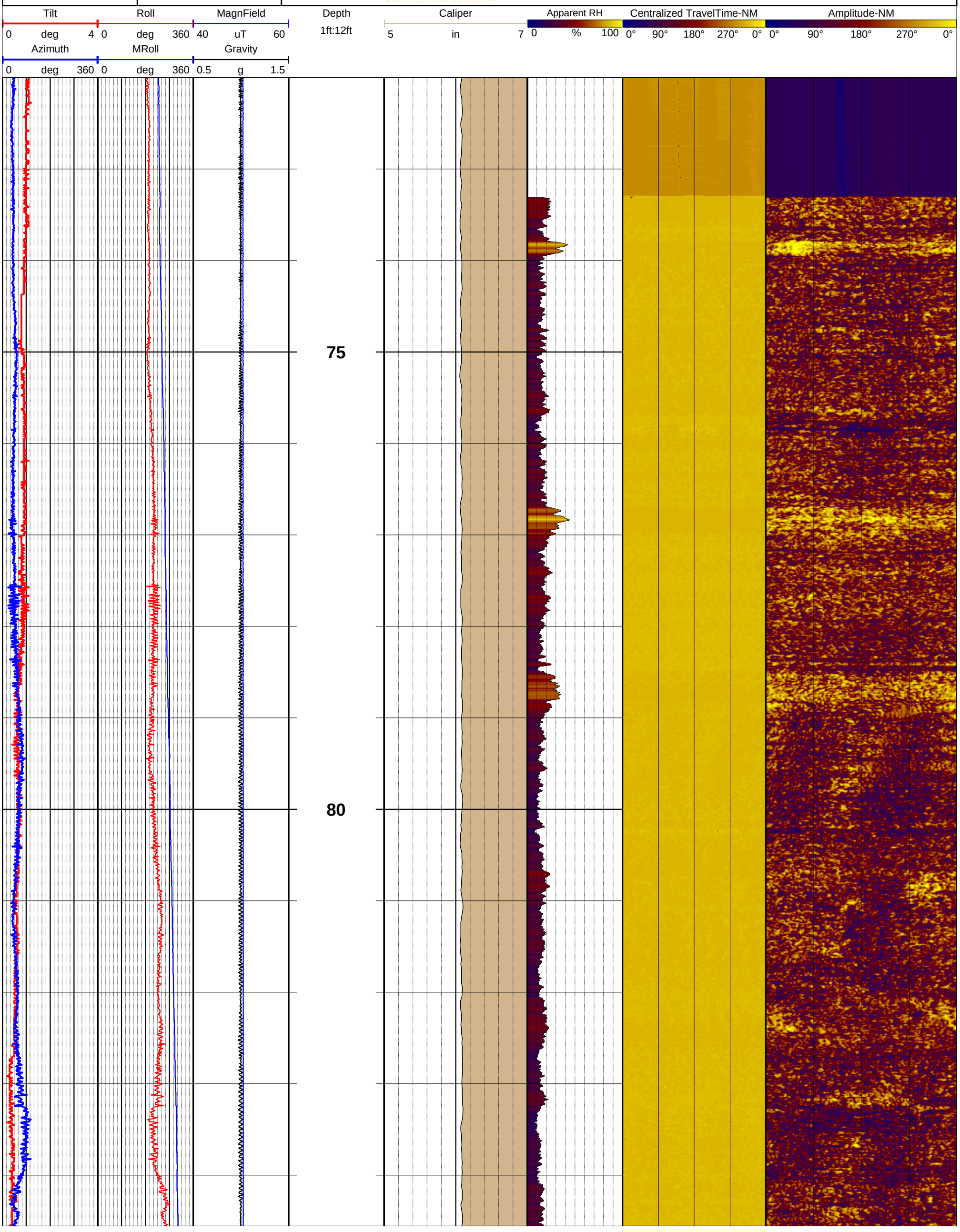
Client: Southern Company Services

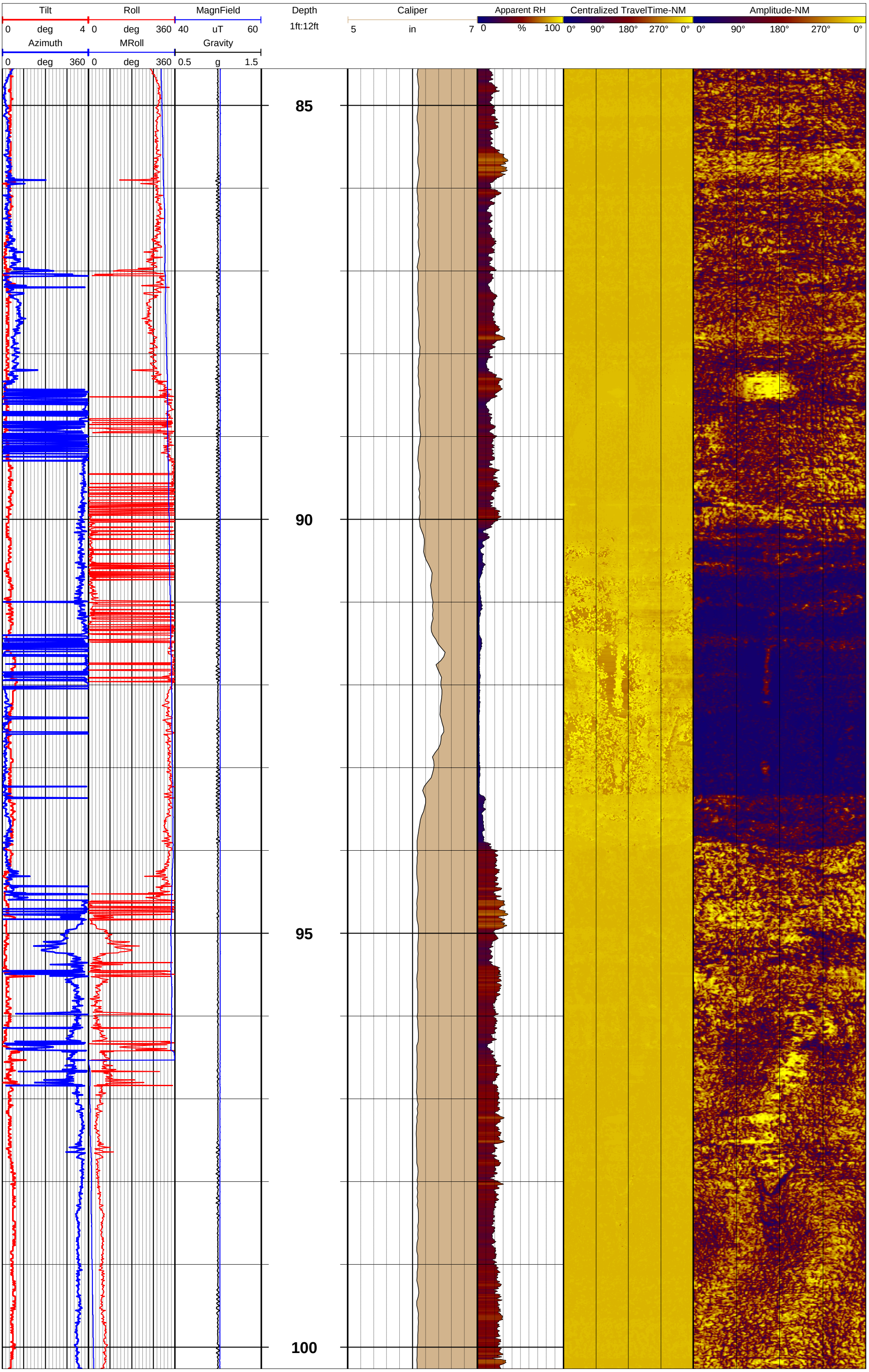
Southern Company

Date: 10-31-2019

Location: Parrish, Al	TOC Elev msl: na	Notes: 200.31' from toc @ 10:56
Easting: na	Casing Stick-up: 1.6 ft ags	Tools used were: QL40-FTC sn 5518 QL40 Caliper sn 5521 40-LGR-Gamma & SPR sn 5809 ATV ABI40 sn162305
Northing: na	Casing Diameter: 6 in ID	
Ground Elev msl: na	Casing Material: Steel	
Borehole Dip: vertical	Water Level: rising	
Borehole Az: na	Logged By: CAB	
Borehole Size: 6" AH	Log Depth Ref: Ground Surface	
Drilled Depth: 300.5 ft BGS	Log Date: 10/29/2019	
Drill Comp Date: 10-29-19	Image Plot(s) Ref: MN	
Casing Depth: 38 ft bgs	Dip Referenced to Horizontal	



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Roll
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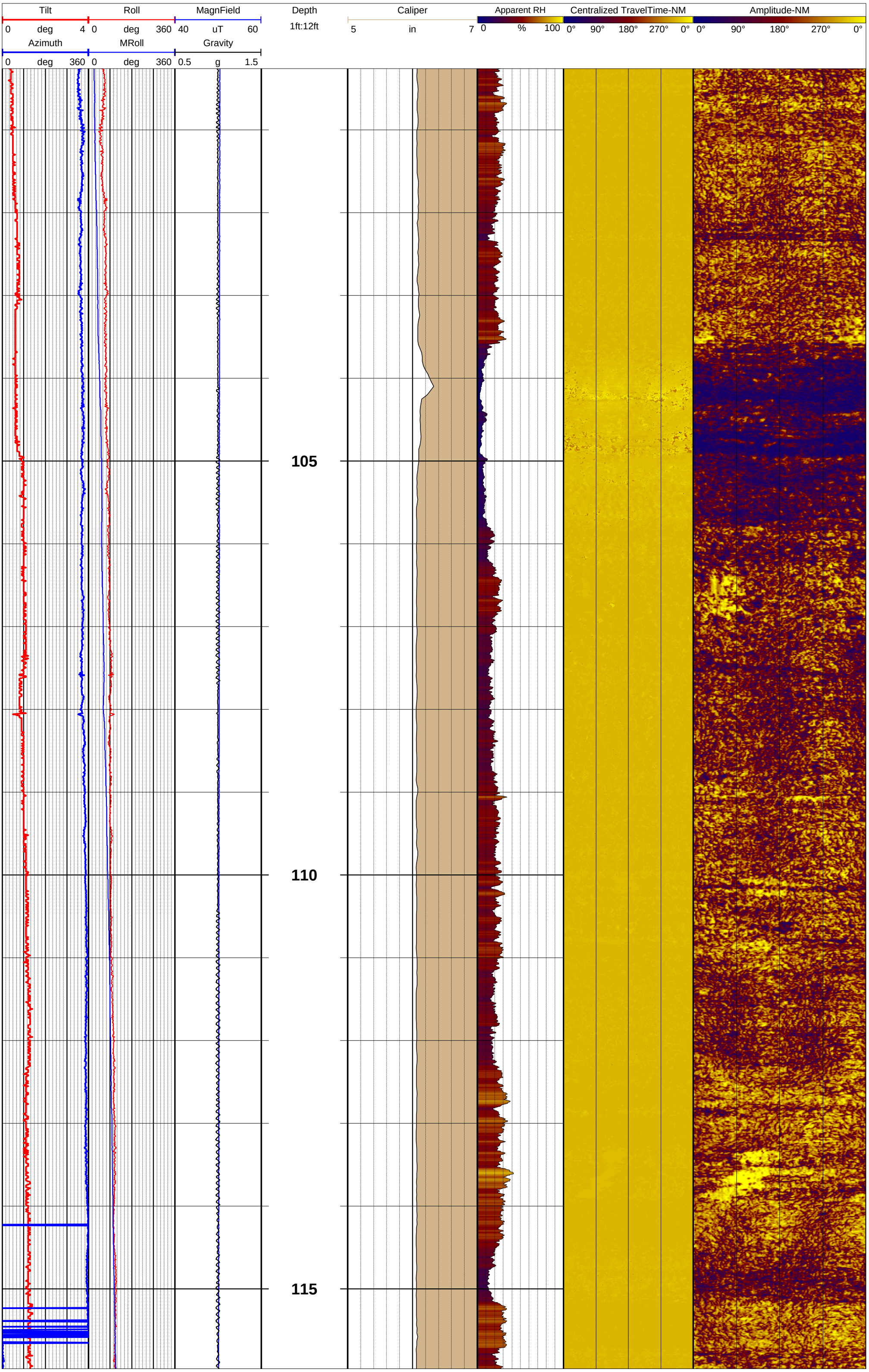
MagnField
40 uT 60
Azimuth
0 deg 360
MRoll
0 deg 360
Gravity
0.5 g 1.5
Depth
1ft:12ft
Caliper
5 in 7
Apparent RH
0 % 100
Centralized TravelTime-NM
0° 90° 180° 270° 0°
Amplitude-NM
0° 90° 180° 270° 0°
85
90
95
100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MRoll
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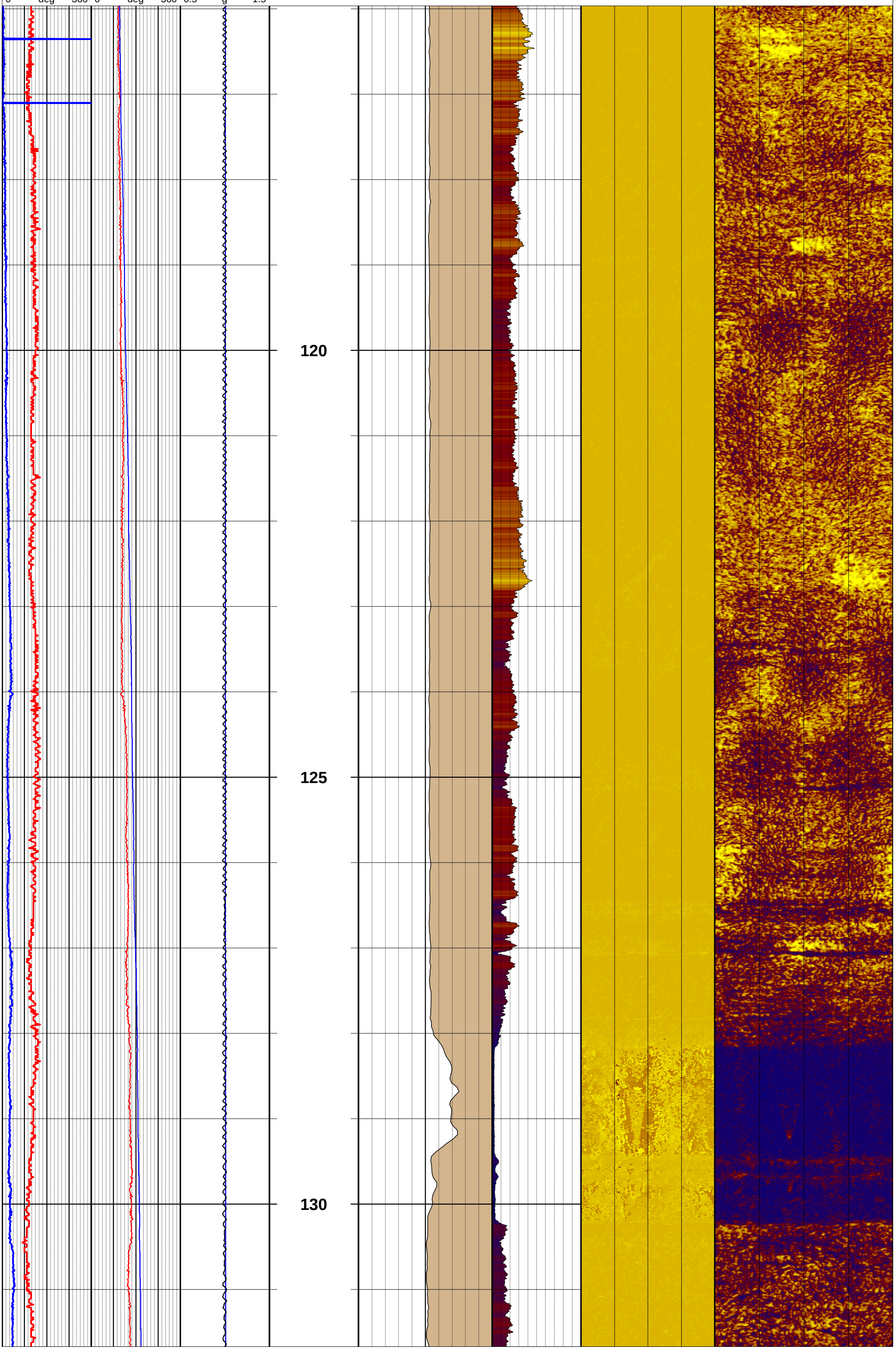
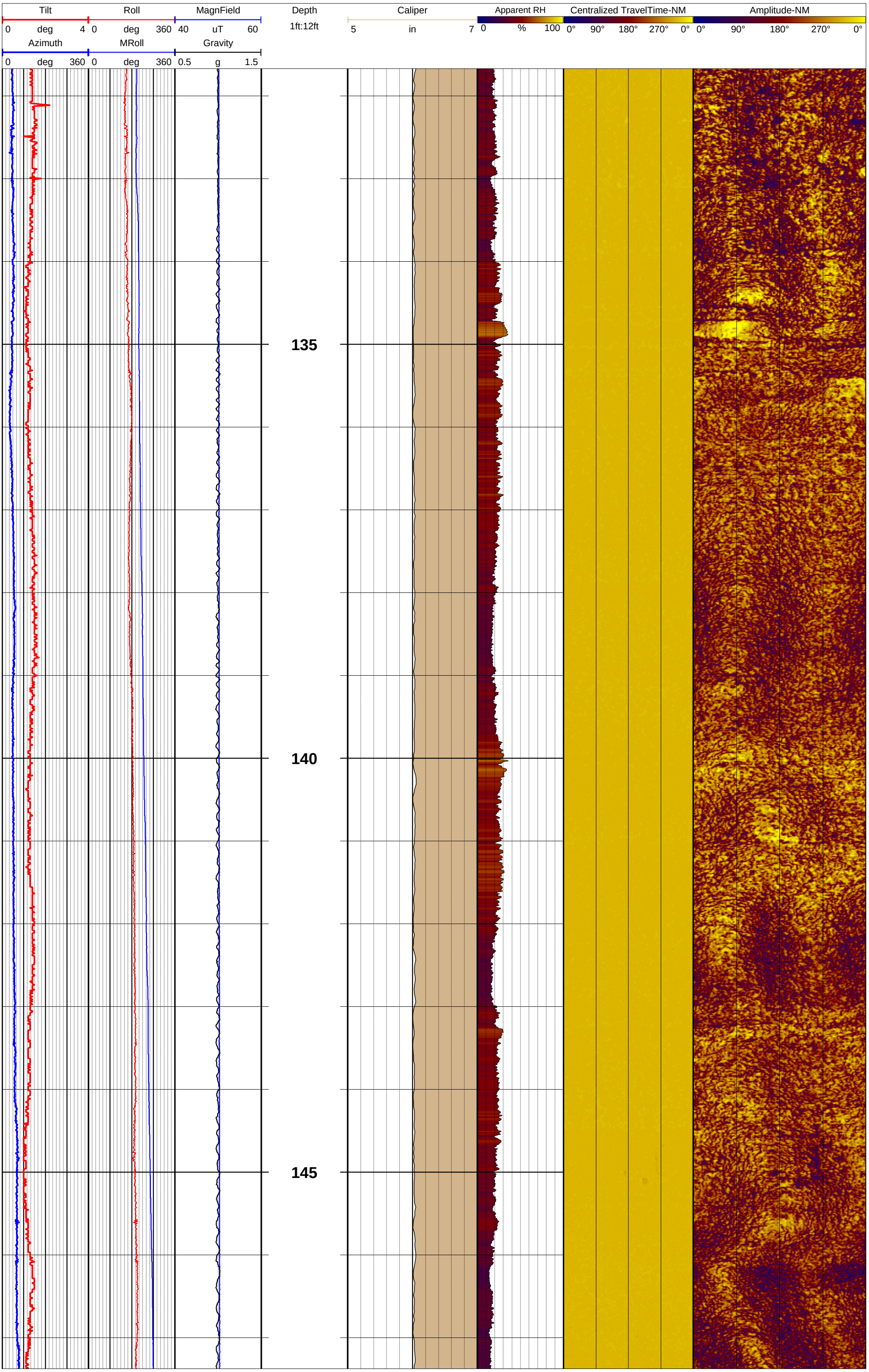
0.5 g 1.5
Depth
1ft:12ft
Caliper
5 in 7
Apparent RH
0 % 100
Centralized TravelTime-NM
0° 90° 180° 270° 0°
Amplitude-NM
0° 90° 180° 270° 0°
105
110
115

Tilt 0 deg 4 | Roll 0 deg 360 | MagnField 40 uT 60 | Depth 1ft:12ft | Caliper 5 in 7 | Apparent RH 0 % 100 | Centralized TravelTime-NM 0° 90° 180° 270° 0° | Amplitude-NM 0° 90° 180° 270° 0°

Azimuth 0 deg 360 | MRoll 0 deg 360 | Gravity 0.5 g 1.5

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MRoll
0 deg 360
Gravity
0.5 g 1.5
Depth
1ft:12ft
Caliper
5 in 7
Apparent RH
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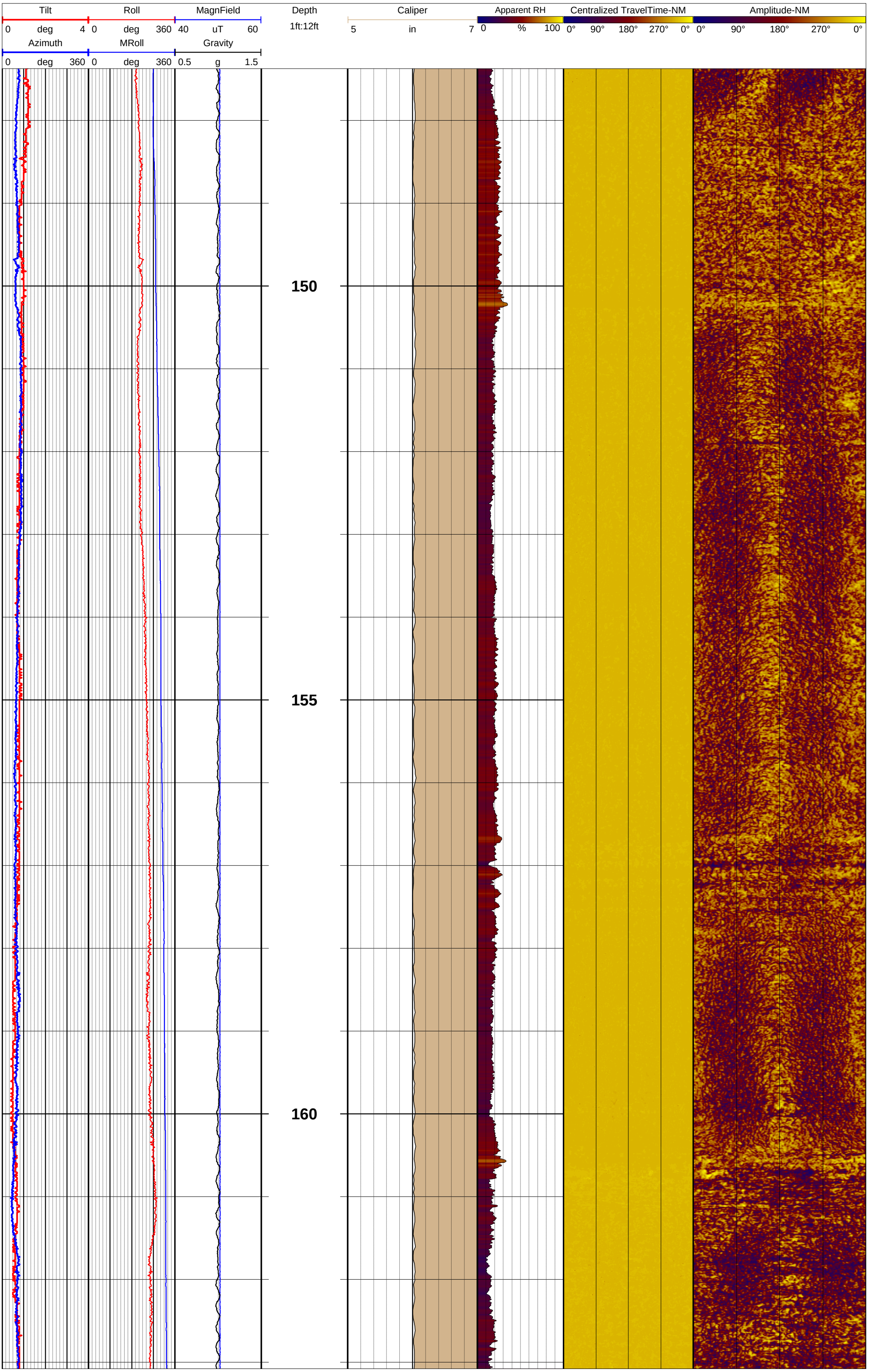
0° 90° 180° 270° 0°
Amplitude-NM
0° 90° 180° 270° 0°
135
140
145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MRoll
0 deg 360
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0.5 g 1.5
Depth
1ft:12ft
150
155
160
Caliper
5 in 7
Apparent RH
0 % 100
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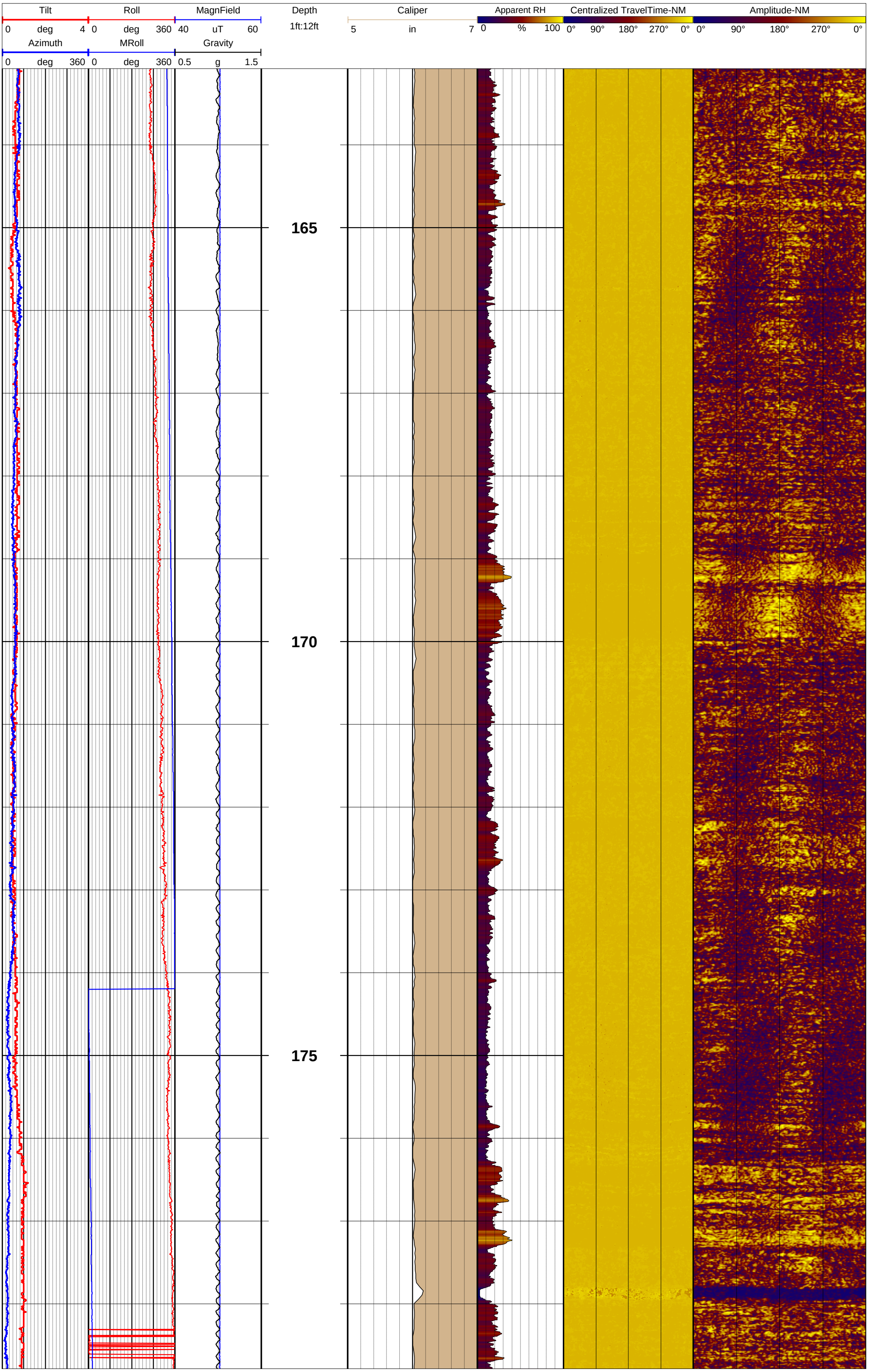
Amplitude-NM
0° 90° 180° 270° 0°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MRoll
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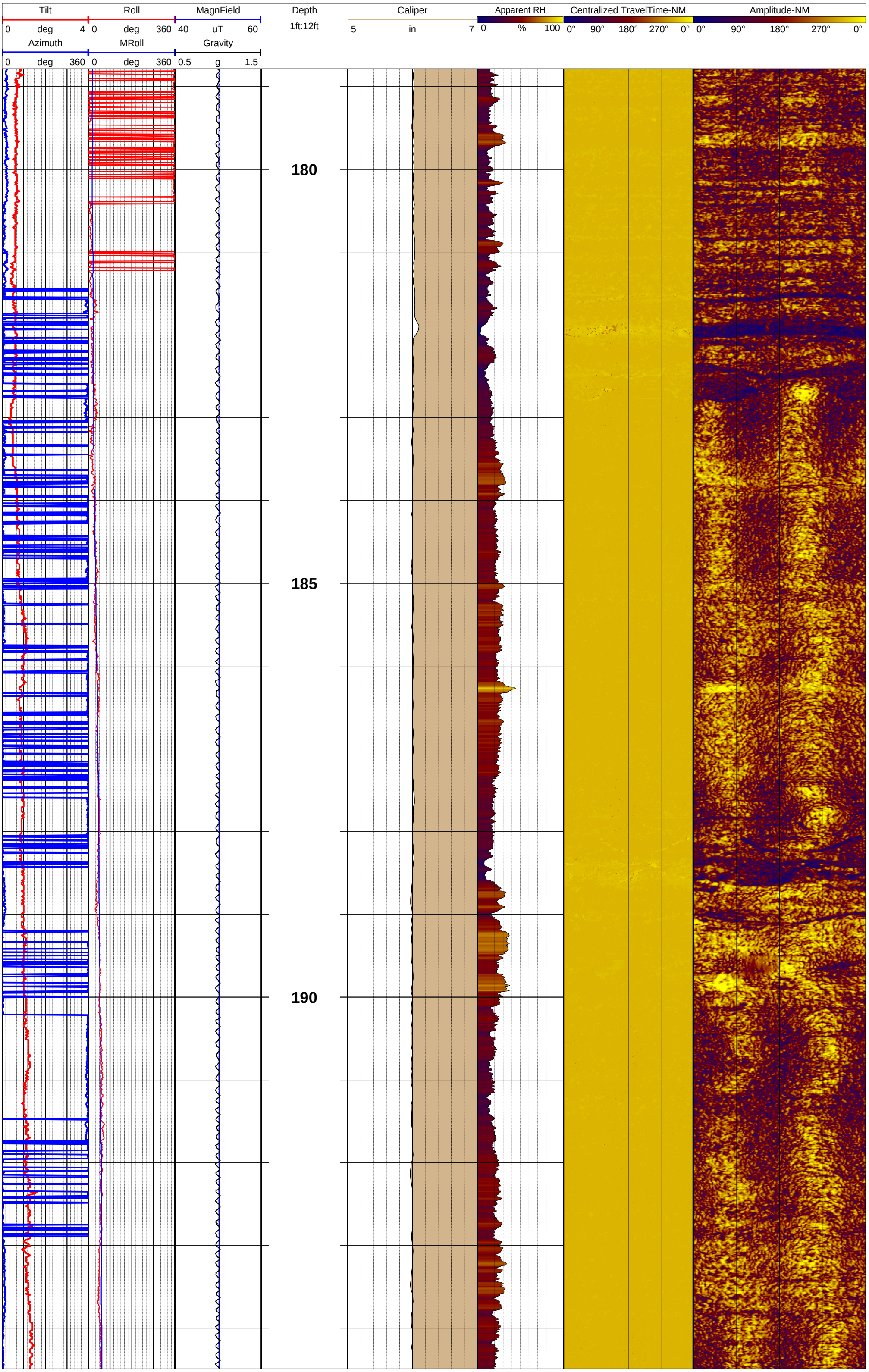
0.5 g 1.5
Depth
1ft:12ft
Caliper
5 in 7
Apparent RH
0 % 100
Centralized TravelTime-NM
0° 90° 180° 270° 0°
Amplitude-NM
0° 90° 180° 270° 0°
165
170
175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MagnField
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Azimuth
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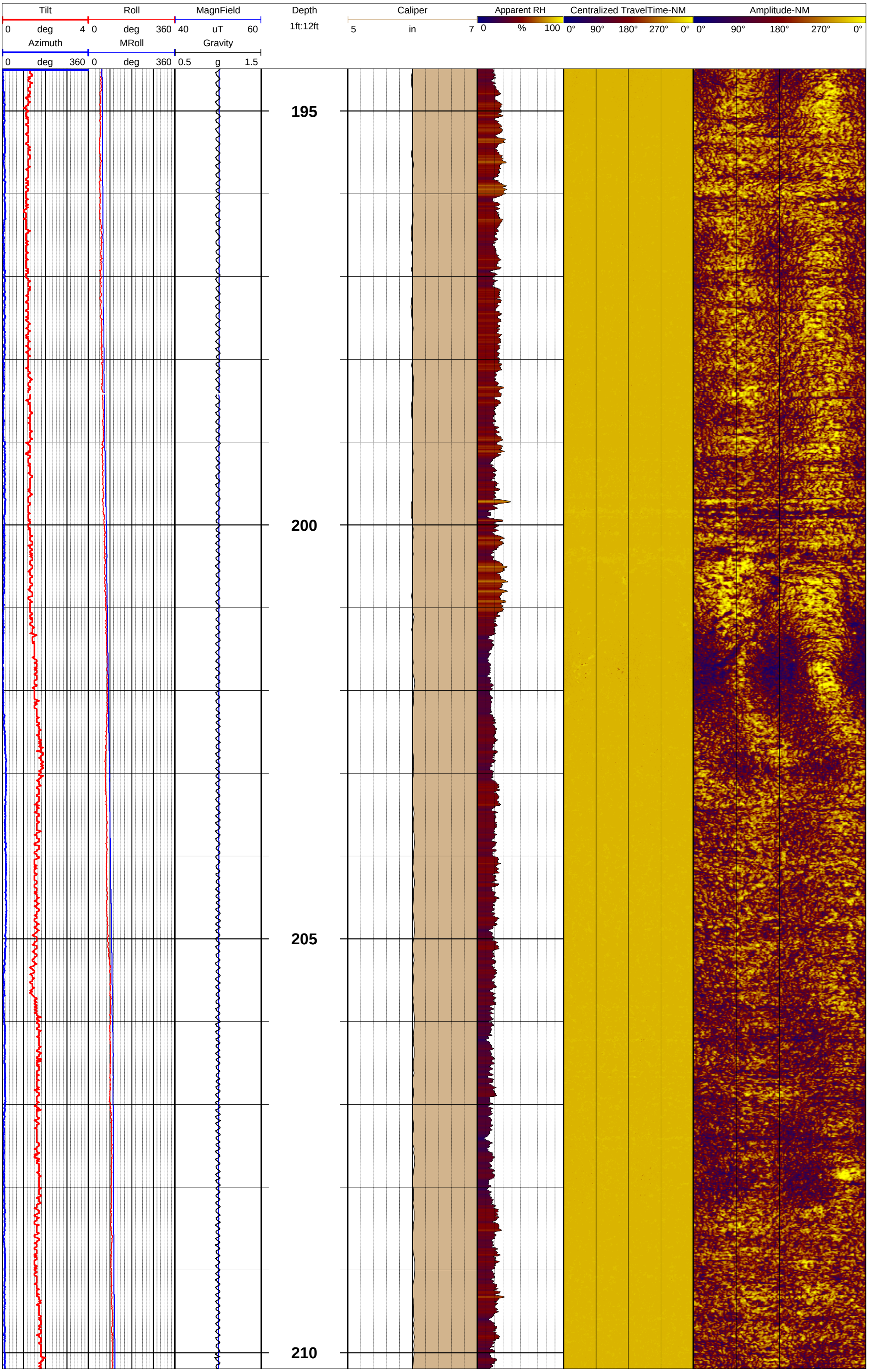
MRoll
0 deg 360
Gravity
0.5 g 1.5
Depth
1ft:12ft
Caliper
5 in 7
Apparent RH
0 % 100
Centralized TravelTime-NM
0° 90° 180° 270° 0°
Amplitude-NM
0° 90° 180° 270° 0°
180
185
190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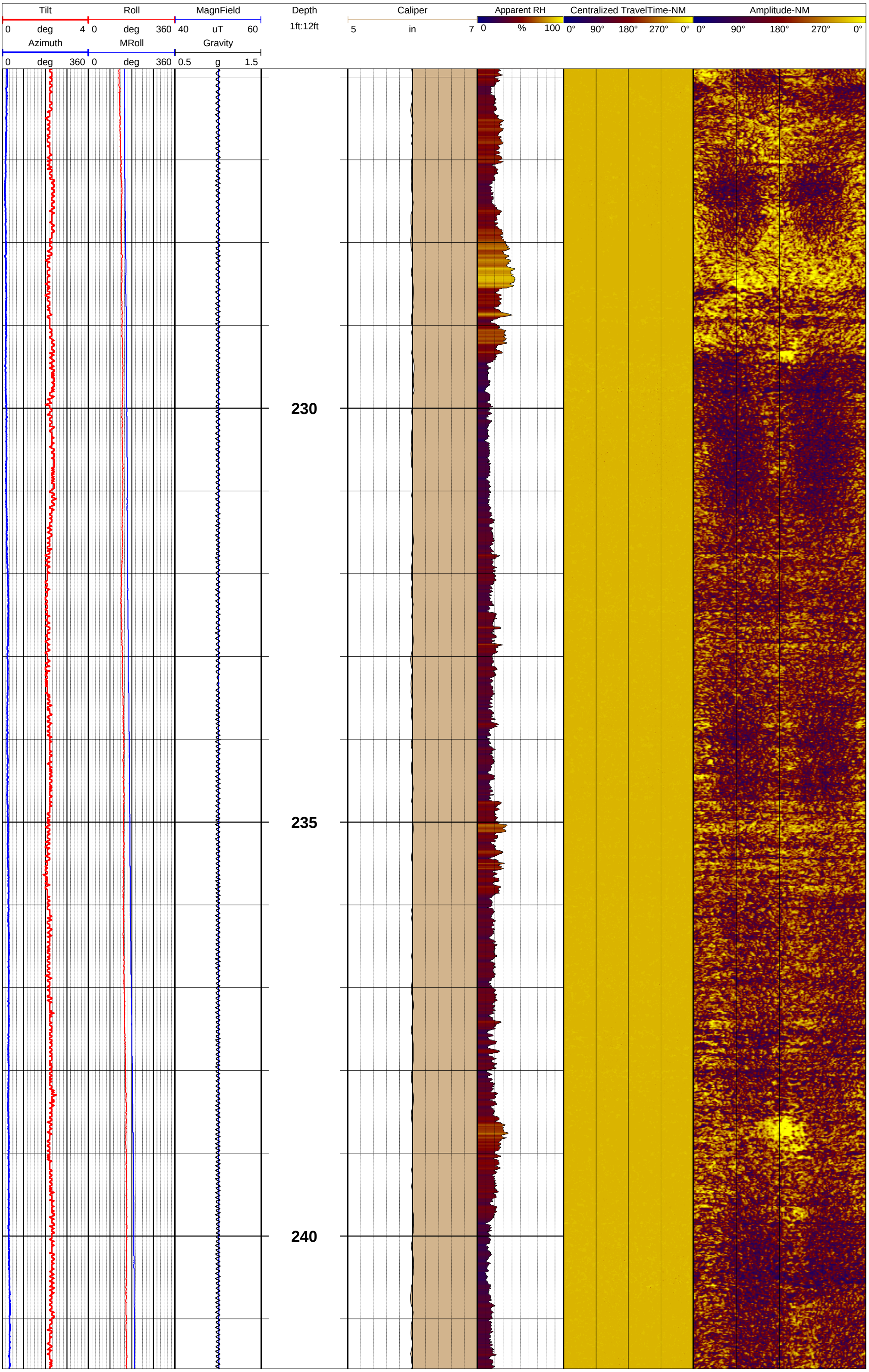
MagnField
40 uT 60
Azimuth
0 deg 360
MRoll
0 deg 360
Gravity
0.5 g 1.5
Depth
1ft:12ft
Caliper
5 in 7
Apparent RH
0 % 100
Centralized TravelTime-NM
0° 90° 180° 270° 0°
Amplitude-NM
0° 90° 180° 270° 0°
195
200
205
210

Tilt 0 deg 4
Roll 0 deg 360
MagnField 40 uT 60
Azimuth 0 deg 360
MRoll 0 deg 360
Gravity 0.5 g 1.5
Depth 1ft:12ft
Caliper 5 in 7
Apparent RH 0 % 100
Centralized TravelTime-NM 0° 90° 180° 270° 0°
Amplitude-NM 0° 90° 180° 270° 0°

215

220

225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MRoll
0 deg 360
Gravity
0.5 g 1.5
Depth
1ft:12ft
Caliper
5 in 7
Apparent RH
0 % 100
Centralized TravelTime-NM
0° 90° 180° 270° 0°
Amplitude-NM
0° 90° 180° 270° 0°
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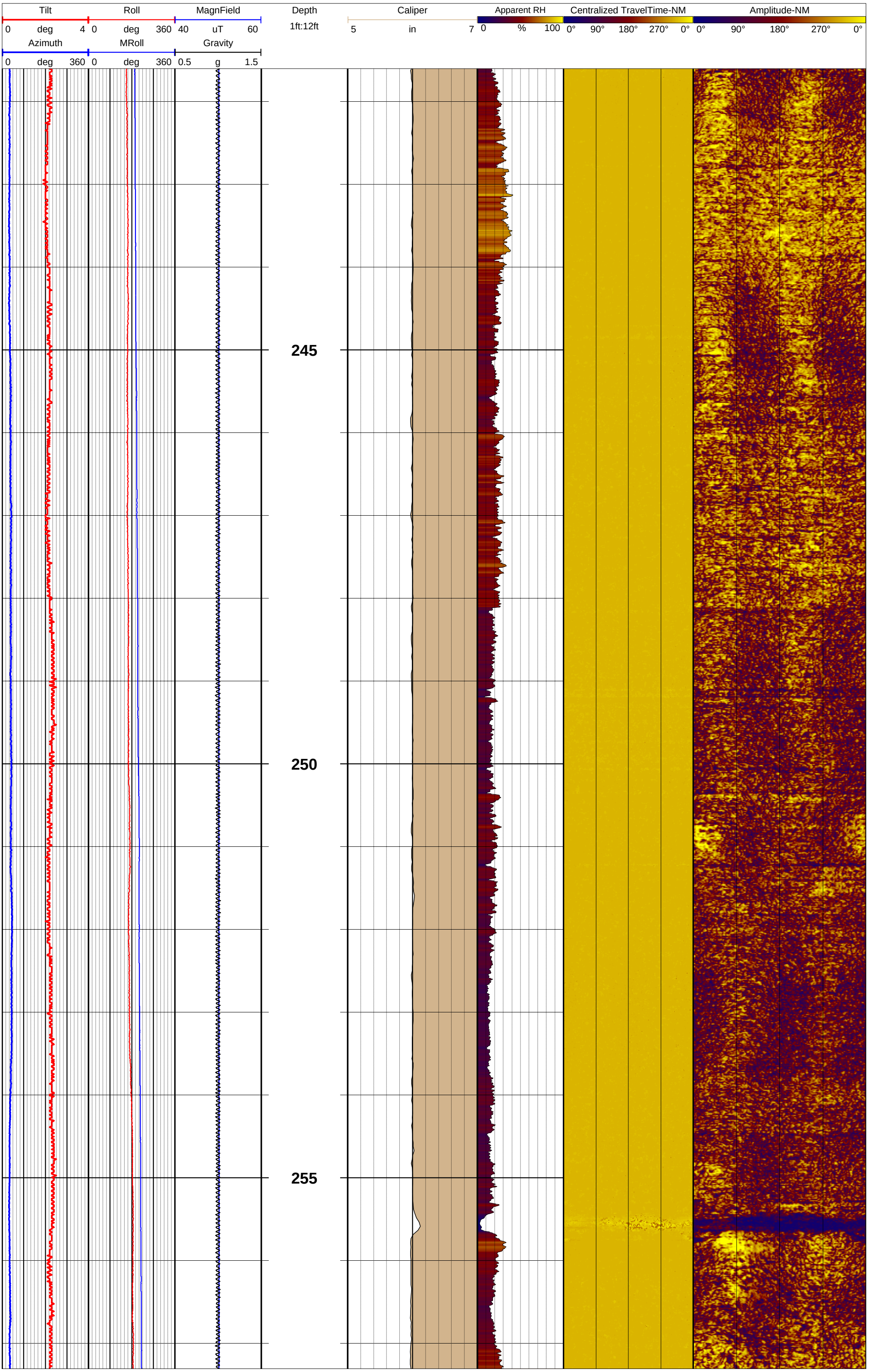
235
240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MRoll
0 deg 360
Gravity
0.5 g 1.5
Depth
1ft:12ft
Caliper
5 in 7
Apparent RH
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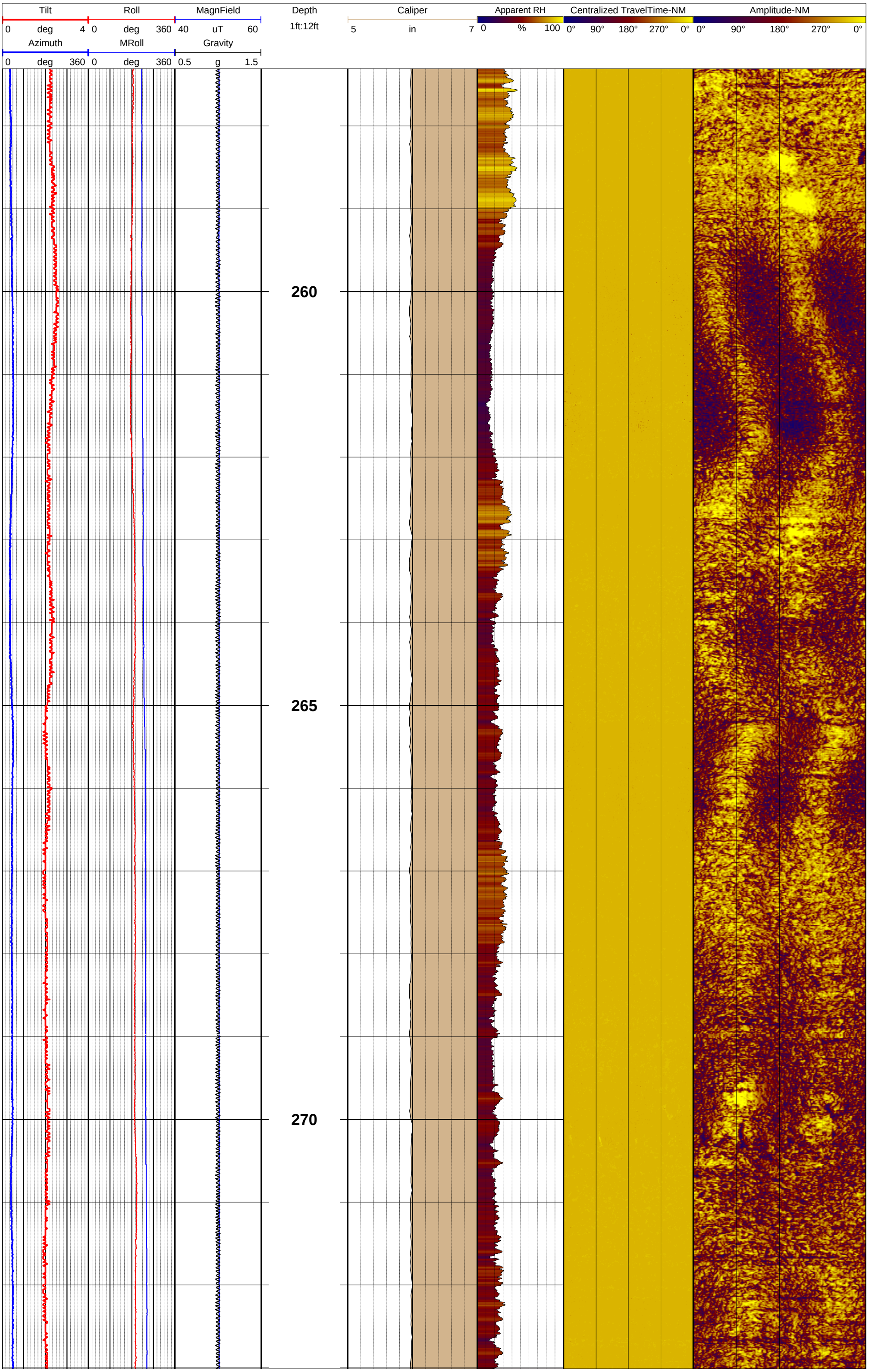
Centralized TravelTime-NM
0° 90° 180° 270° 0°
Amplitude-NM
0° 90° 180° 270° 0°
245
250
255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Roll
0 deg 360
MagnField
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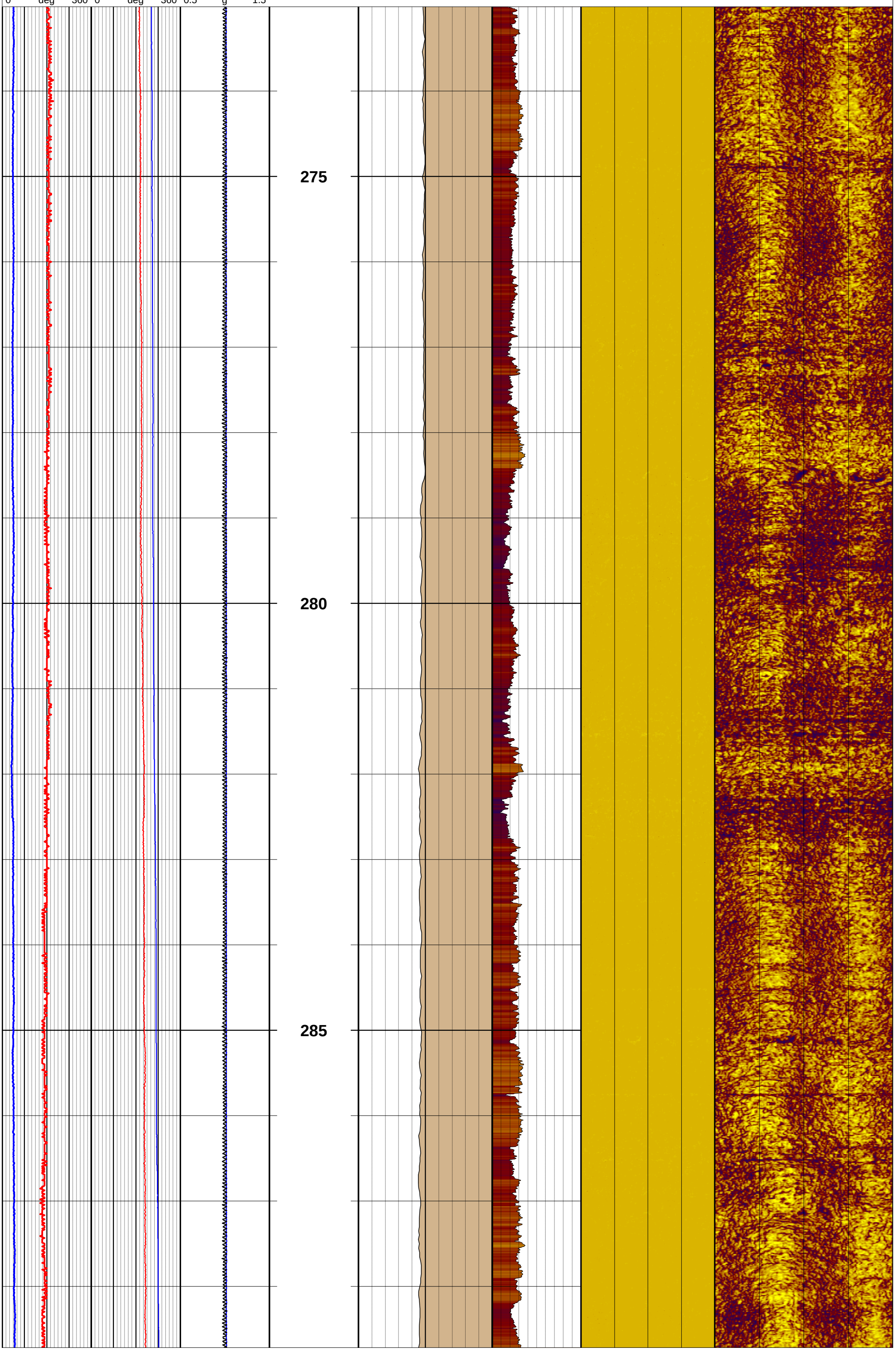
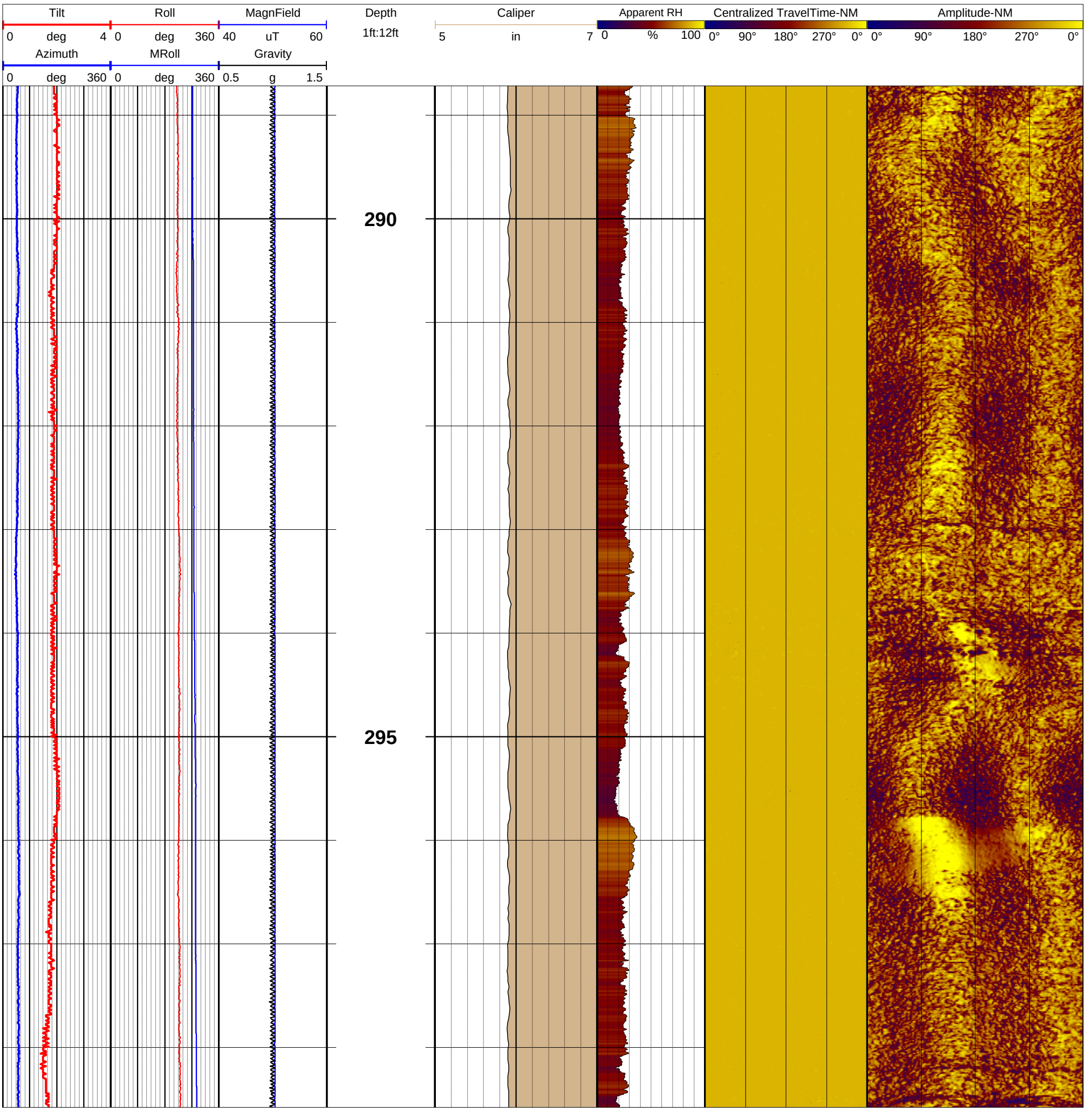
Azimuth
0 deg 360
MRoll
0 deg 360
Gravity
0.5 g 1.5
Depth
1ft:12ft
Caliper
5 in 7
Apparent RH
0 % 100
Centralized TravelTime-NM
0° 90° 180° 270° 0°
Amplitude-NM
0° 90° 180° 270° 0°
260
265
270

Tilt 0 deg 4 | Roll 0 deg 360 | MagnField 40 uT 60 | Depth 1ft:12ft | Caliper 5 in 7 | Apparent RH 0 % 100 | Centralized TravelTime-NM 0° 90° 180° 270° 0° | Amplitude-NM 0° 90° 180° 270° 0°

Azimuth 0 deg 360 | MRoll 0 deg 360 | Gravity 0.5 g 1.5

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Roll
0 deg 360
MagnField
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Azimuth
0 deg 360
MRoll
0 deg 360
Gravity
0.5 g 1.5
Depth
1ft:12ft
290
295
Caliper
5 in 7
Apparent RH
0 % 100
Centralized TravelTime-NM
0° 90° 180° 270° 0°
Amplitude-NM
0° 90° 180° 270° 0°

GEOPHYSICAL RECORD OF BOREHOLE: GSAP-MW9V

Plant Gorgas - CCR Delineation Wells

GOLDER

Project Number: 19131304

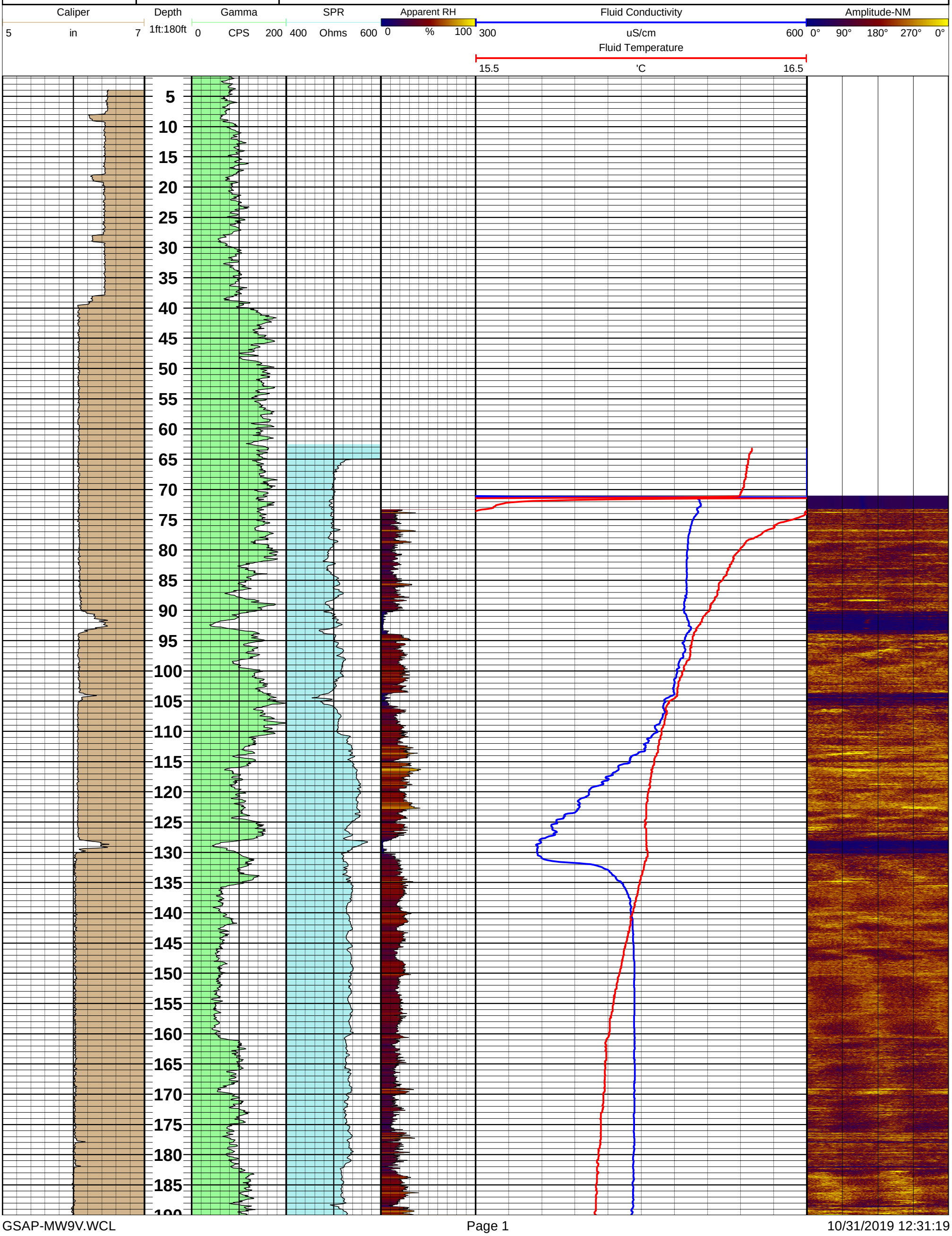
Client: Southern Company Services

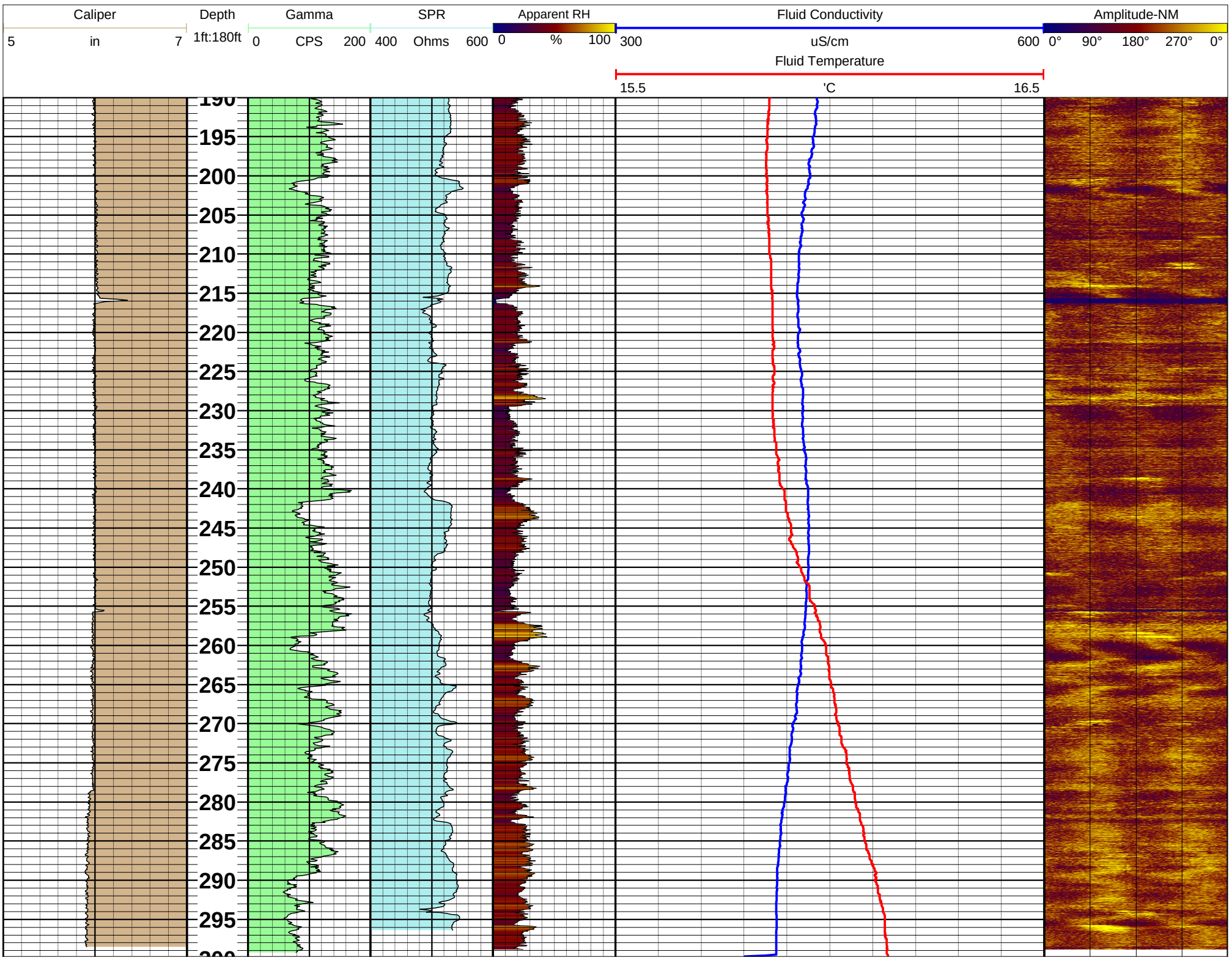
Southern Company

Date: 10-31-2019

Location: Parrish, Al	TOC Elev msl: na	Notes: 200.31' from toc @ 10:56
Easting: na	Casing Stick-up: 1.6 ft ags	Tools used were:
Northing: na	Casing Diameter: 6.625 in ID	QL40-FTC sn 5518
Ground Elev msl: na	Casing Material: Steel	QL40 Caliper sn 5521
Borehole Dip: vertical	Water Level: rising	40-LGR-Gamma & SPR sn 5809
Borehole Az: na	Logged By: CAB	ATV ABI40 sn162305
Borehole Size: 6" AH	Log Depth Ref: Ground Surface	
Drilled Depth: 300.5 ft BGS	Log Date: 10/29/2019	
Drill Comp Date: 10-29-19	Image Plot(s) Ref: MN	
Casing Depth: 38 ft bgs	Dip Referenced to Horizontal	






Caliper
5
in
7
Depth
1ft:180ft
Gamma
0
CPS
200
SPR
400
Ohms
600
Apparent RH
0
%
100
Fluid Conductivity
300
uS/cm
600
Amplitude-NM
0°
90°
180°
270°
0°
Fluid Temperature
15.5
'C
16.5
190
195
200
205
210
215
220
225
230
235
240
245
250
255
260
265
270
275
280
285
290
295

GEOPHYSICAL RECORD OF BOREHOLE: GS-AP-MW-10

Ash Pond Hydrogeologic Investigation
Gorgas Electric Generating Plant

Client: Southern Company Services

Project: 1544912

Date: 03-03-2016

Datum:	AL West NAD27	Drill Comp. Date:	01/21/2016	Log Depth Ref.:	Ground Surface	Location:	Parrish, AL
Easting:	593904.92 ft	Drilling Method:	Sonic Core	Casing Stick-up:	1.67 ft		
Northing:	1321590.4 ft	Borehole Diameter:	6"	Casing Diameter:	8 inch		
Elevation:	391.7 ft-amsl	Drilled Depth:	80 ft	Casing Depth:	14 ft bgs	Log Date:	02/18&19/2016
		Water Level:	25.8 & 26.3 ft bgs	Casing Material:	PVC	Logged By:	Abernathy

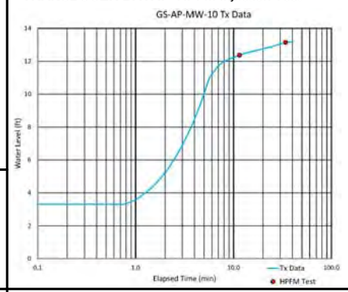


Tool Specs:

HFP2293 SN5517 - Tool Length = 4 ft, and 3.18 ft to heat grid/diverter

FTC SN5518, Caliper SN5521, Gamma-SPR-SP SN5809

TRANSDUCER DATA: HPFM Injection Test



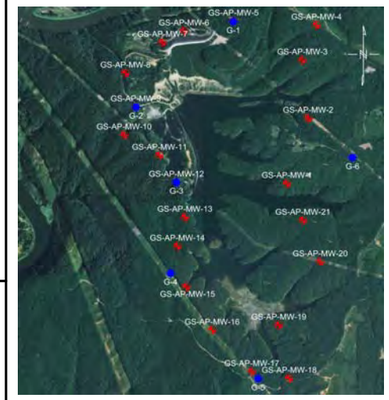
HPFM MEASUREMENTS:

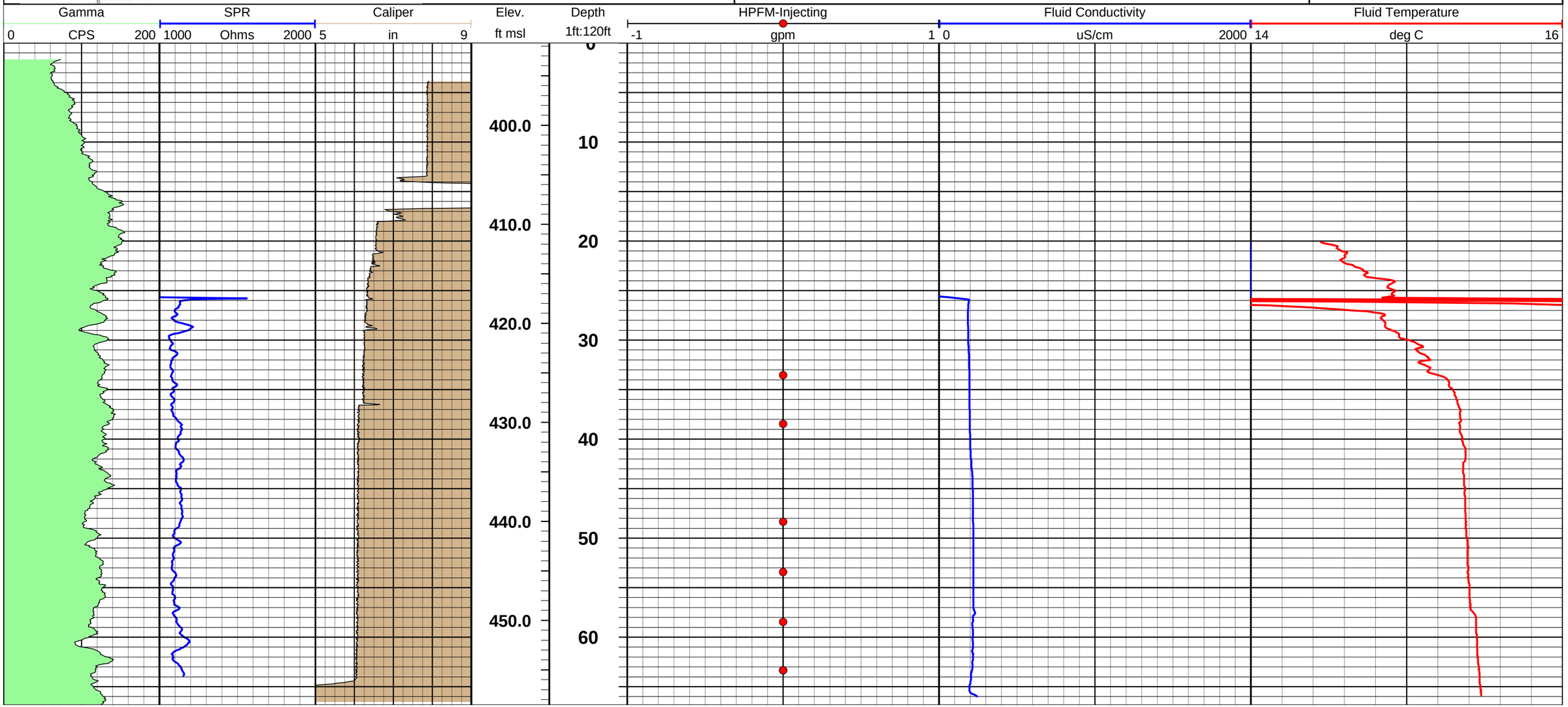
Depth_ft	AcqDateTime	PickTime_s	Flow_gpm
33.5484	19/02/2016 11:25:17	0	0
38.4588	19/02/2016 11:32:35	0	0
48.3314	19/02/2016 11:36:47	0	0
53.4167	19/02/2016 11:40:57	0	0
58.4733	19/02/2016 11:43:46	0	0
63.3644	19/02/2016 11:46:24	0	0
63.3658	19/02/2016 11:47:49	0	0

Notes:

The caliper, gamma, SPR, SP and FTC logs were run on 02-18-16 (water level = 25.8 ft bgs). The HPFM was run on 02-19-16 and the water level was 26.3 ft bgs. The HPFM was run while injecting at 0.3 gpm. The transducer was placed at 30 ft bgs.

Well Location Map





GEOPHYSICAL RECORD OF BOREHOLE: GS-AP-MW-11

Ash Pond Hydrogeologic Investigation
Gorgas Electric Generating Plant

Client: Southern Company Services

Project: 1544912

Date: 03-02-2016

Datum:	AL West NAD27	Drill Comp. Date:	02/04/2016	Log Depth Ref.:	Ground Surface	Location:	Parrish, AL
Easting:	594881.75 ft	Drilling Method:	Sonic Core	Casing Stick-up:	1.84 ft		
Northing:	1321028.82 ft	Borehole Diameter:	6"	Casing Diameter:	8 inch		
Elevation:	438.5 ft-amsl	Drilled Depth:	137 ft	Casing Depth:	17.9 ft bgs	Log Date:	02/9&19/2016
		Water Level:	39 & 57.4 ft bgs	Casing Material:	Steel	Logged By:	Abernathy

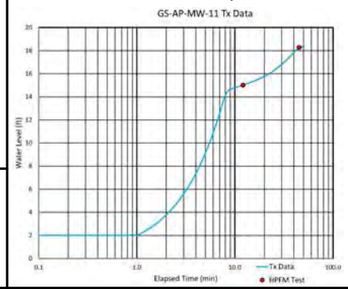


Tool Specs:

HFP2293 SN5517 - Tool Length = 4 ft, and 3.18 ft to heat grid/diverter

FTC SN5518, Caliper SN5521, Gamma-SPR-SP SN5809

TRANSDUCER DATA: HPFM Injection Test



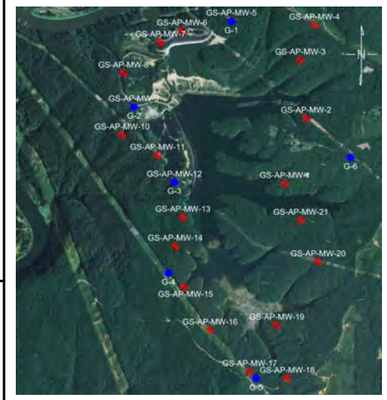
HPFM MEASUREMENTS:

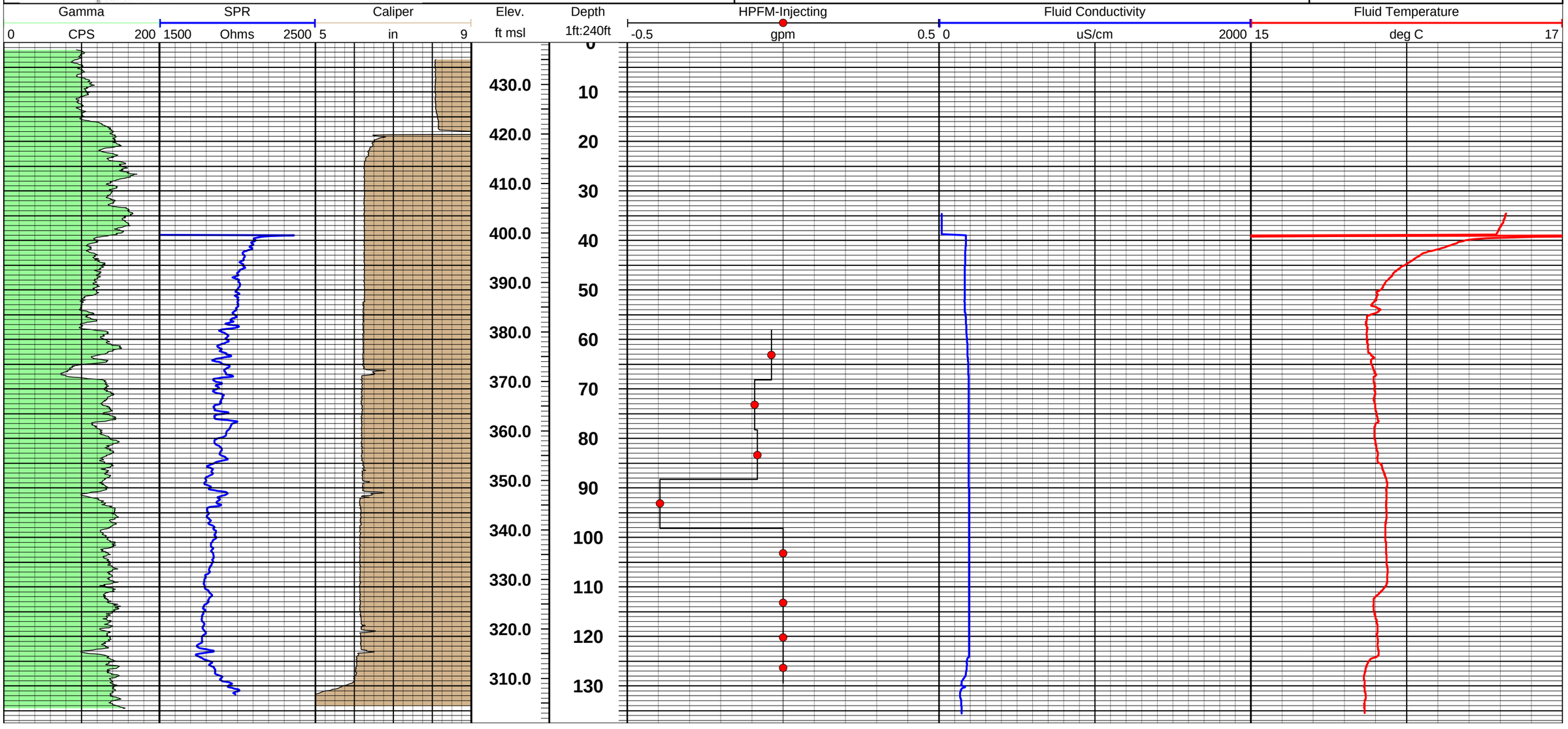
Depth_ft	AcqDateTime	PickTime_s	Flow_gpm
63.17	19/02/2016 13:15:42	6.94	-0.04
73.27	19/02/2016 13:21:27	3.55	-0.09
83.36	19/02/2016 13:26:42	3.81	-0.08
93.17	19/02/2016 13:32:15	1.37	-0.39
103.25	19/02/2016 13:39:26	0.00	0.00
113.21	19/02/2016 13:42:15	0.00	0.00
120.21	19/02/2016 13:45:19	0.00	0.00
126.39	19/02/2016 13:48:45	0.00	0.00

Notes:

The caliper, gamma, SPR, SP, and FTC logs were run on 02-09-16 (water level = 39 ft bgs). The HPFM was run on 02-19-16, the water level was 57.4 ft bgs. The HPFM was run while injecting at 0.3 gpm. The transducer was placed at 62 ft bgs.

Well Location Map





GEOPHYSICAL RECORD OF BOREHOLE: GS-AP-MW-12V

PLANT GORGAS ASH POND DELINEATION WELLS

GOLDER

Project Number: 18114896

Client: Southern Company Services

Southern Company

Date: 1-08-2019

Location: Parrish, Al	TOC Elev msl: na
Easting: na	Casing Stick-up: 2 ft ags
Northing: na	Casing Diameter: 5.4 in ID
Ground Elev msl: na	Casing Material: Steel
Borehole Dip: vertical	Water Level: 135.75 ft bgs
Borehole Az: na	Logged By: Abernathy
Borehole Size: 6" Sonic	Log Depth Ref: Ground
Drilled Depth: 190 ft	Log Date: 1-08-19
Drill Comp Date: 1-08-19	Image Plot(s) Ref: MN
Casing Depth: 29 ft bgs	Dip Referenced to Horizontal

Notes:

The FTC run was made under recovery conditions, the WL was 135.75 ft bgs at setup on the hole, and 131 ft at FTC start & 128 ft bgs at end of FTC run.
WL continued to rise to 100 ft by end of SPR run.
Coal residue was noted covering the caliper tool, and other tools.

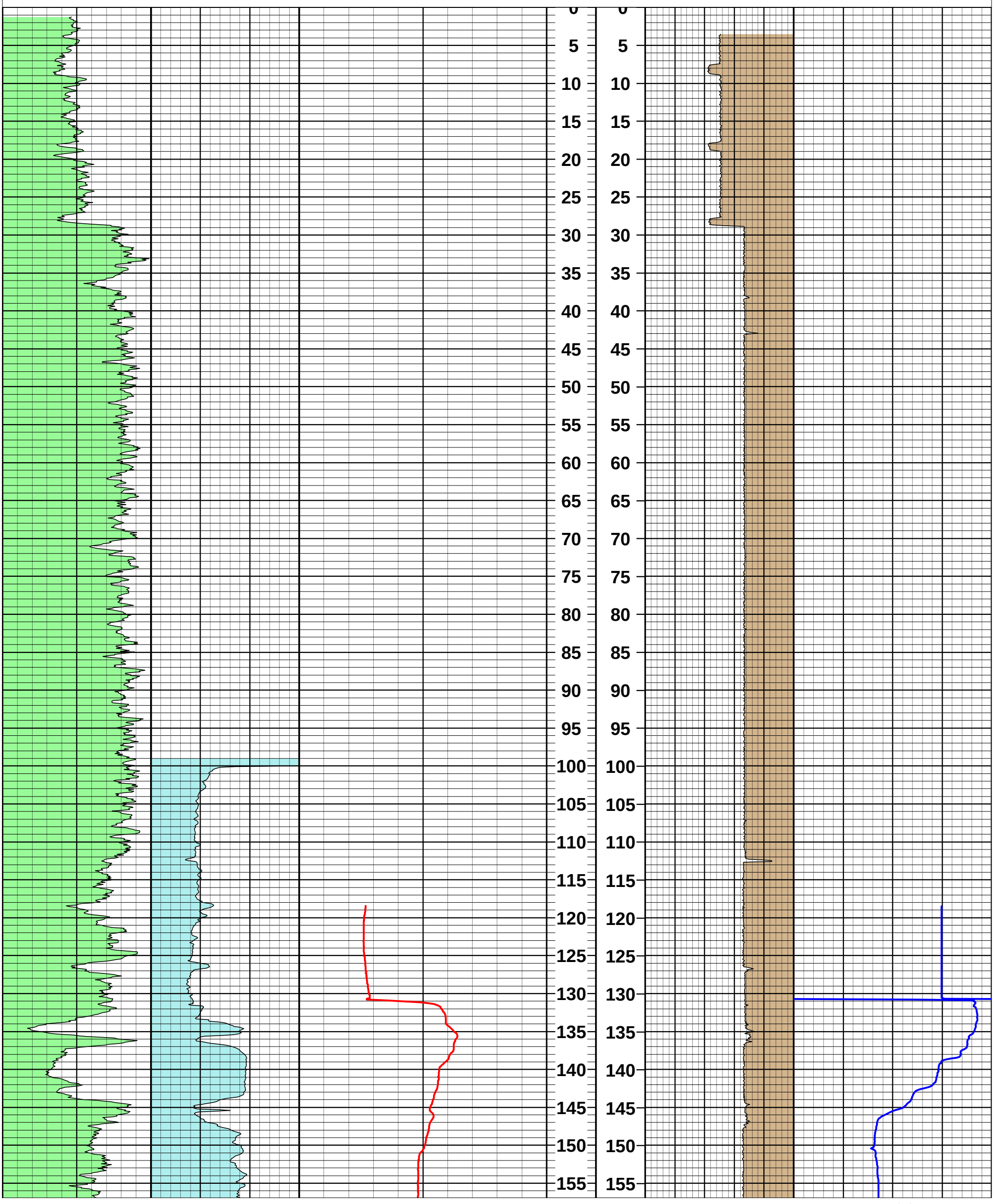
The deviation data was recorded with our OBI sn163404.
Closure Distance = 5.1 ft, Closure Angle = 57.1 deg & Tilt at BOH = 1.9 deg

Tools used were Decatur's QL40 set:
FTC sn5518
Caliper sn5521
Gamma sn5499
SPR 40-LGR sn5809
Deviation OBI sn163404

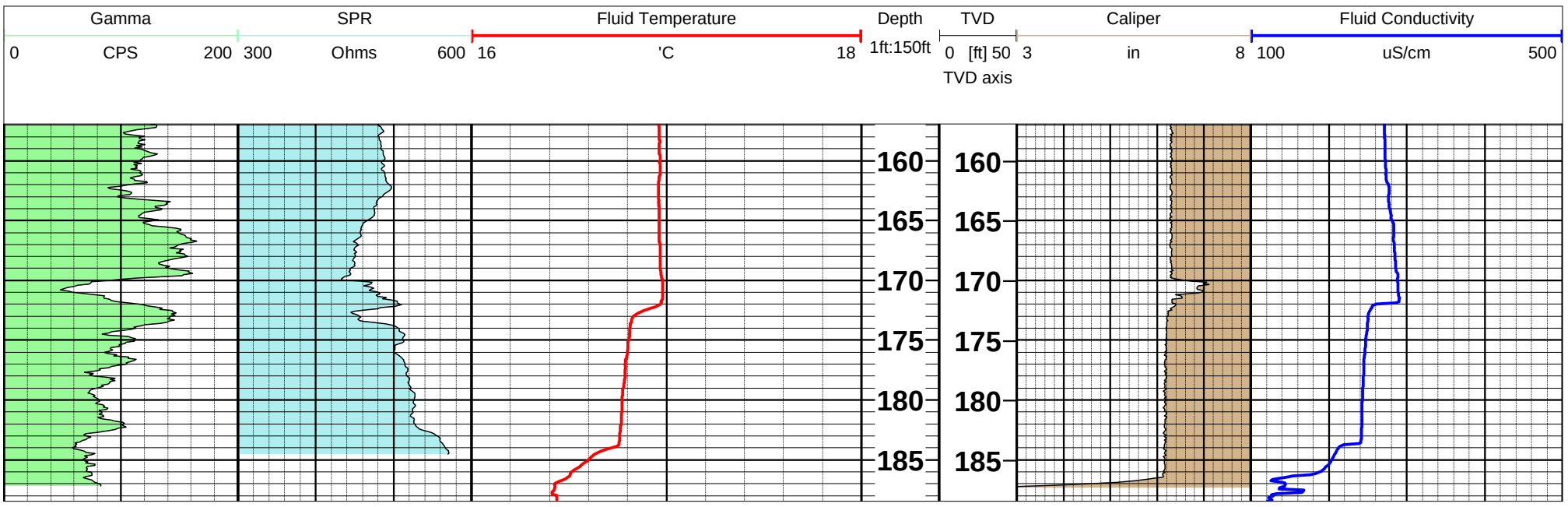


Gamma 0 CPS 200 | SPR 300 Ohms 600 | Fluid Temperature 16 'C 18 | Depth 1ft:150ft | TVD 0 [ft] 50 | Caliper 3 in 8 | Fluid Conductivity 100 uS/cm 500

TVD axis



1/8/2019 1:14:57 PM


Gamma
0
CPS
200
SPR
300
Ohms
600
Fluid Temperature
16
'C
18
Depth
1ft:150ft
TVD
0
[ft]
50
TVD axis
Caliper
3
in
8
Fluid Conductivity
100
uS/cm
500
160
165
170
175
180
185

GEOPHYSICAL RECORD OF BOREHOLE: GS-AP-MW-13

Ash Pond Hydrogeologic Investigation
Gorgas Electric Generating Plant

Client: Southern Company Services

Project: 1544912

Date: 02-19-2016

Datum:	AL West NAD27	Drill Comp. Date:	01/20-21/2016	Log Depth Ref.:	Ground Surface	Location:	Parrish, AL
Easting:	595582.01 ft	Drilling Method:	Sonic Core	Casing Stick-up:	1.67 ft		
Northing:	1319316.96 ft	Borehole Diameter:	6"	Casing Diameter:	8 inch		
Elevation:	469.5 ft-amsl	Drilled Depth:	80 ft	Casing Depth:	15.39.5 ft	Log Date:	02/9&19/2016
		Water Level:	30.43 ft & 33.3 ft	Casing Material:	PVC	Logged By:	Abernathy



Tool Specs:

HFP2293 SN5517 - Tool Length = 4 ft, and 3.18 ft to heat grid/diverter

FTC SN5518, Caliper SN5521, Gamma-SPR-SP SN5809

TRANSDUCER DATA: HPFM Injection Test

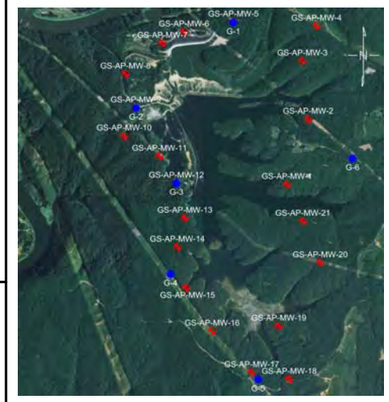
HPFM MEASUREMENTS:

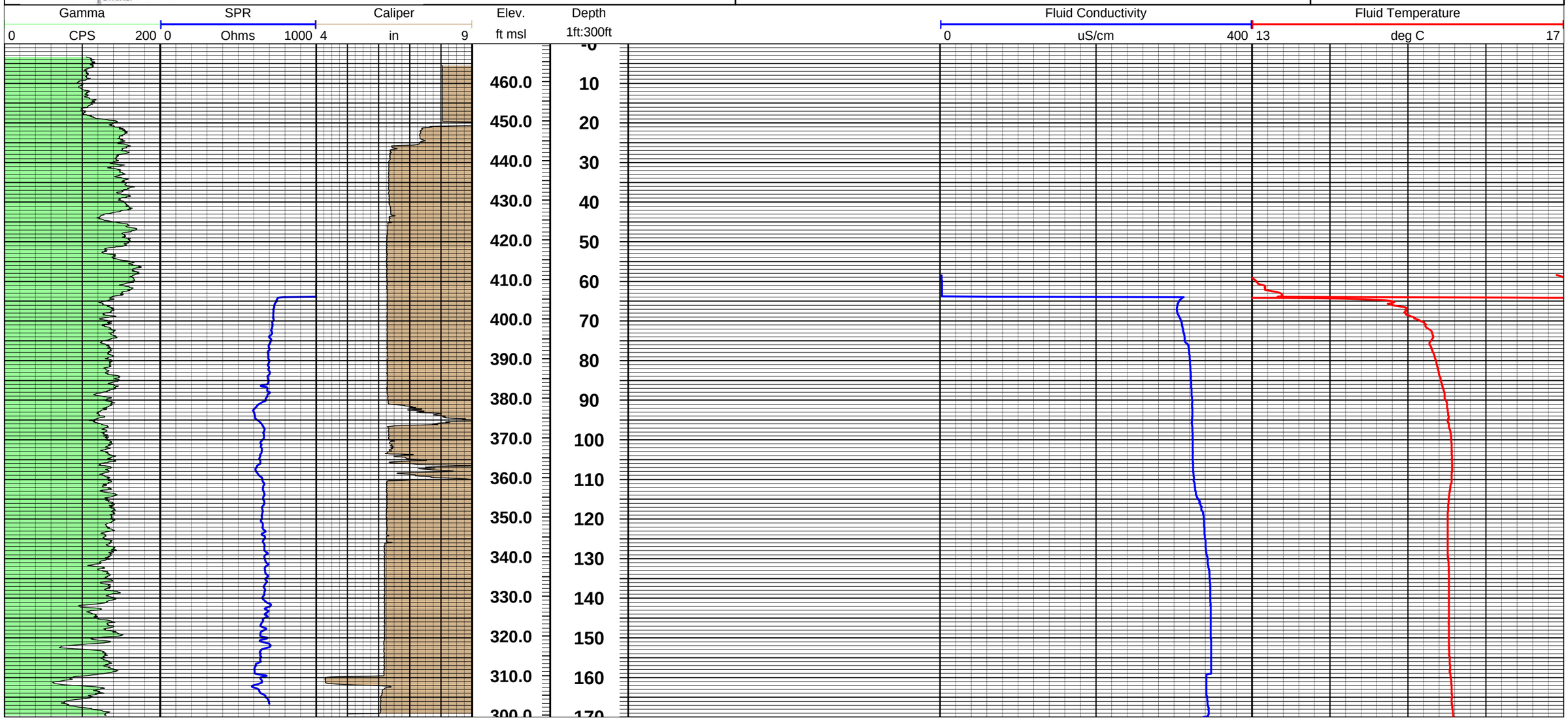
Depth_ft	AcqTime	PickTime_s	Flow_gpm	ElapsedTime_m	WaterLevel_ft

Notes:

The caliper, gamma, SPR, and SP logs were run on 02-09-16 (water level = 30.43 ft bgs). The HPFM were run on 02-19-16 (water level = 33.3 ft bgs).
The HPFM was run while injecting at 0.3 gpm. The transducer was placed at 35 ft bgs.

Well Location Map





GEOPHYSICAL RECORD OF BOREHOLE: GS-AP-MW-14

Ash Pond Hydrogeologic Investigation
Gorgas Electric Generating Plant

Client: Southern Company Services

Project: 1544912

Date: 02-19-2016

Datum:	AL West NAD27	Drill Comp. Date:	01/20-21/2016	Log Depth Ref.:	Ground Surface	Location:	Parrish, AL
Easting:	595374.49 ft	Drilling Method:	Sonic Core	Casing Stick-up:	1.67 ft		
Northing:	1318517.89 ft	Borehole Diameter:	6"	Casing Diameter:	8 inch		
Elevation:	465 ft-amsl	Drilled Depth:	80 ft	Casing Depth:	15.39.5 ft	Log Date:	02/9&19/2016
		Water Level:	30.43 ft & 33.3 ft	Casing Material:	PVC	Logged By:	Abernathy



Tool Specs:

HFP2293 SN5517 - Tool Length = 4 ft, and 3.18 ft to heat grid/diverter

FTC SN5518, Caliper SN5521, Gamma-SPR-SP SN5809

TRANSDUCER DATA: HPFM Injection Test

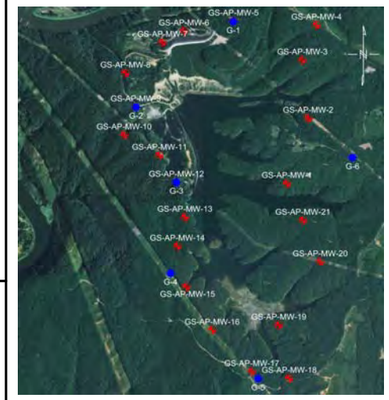
HPFM MEASUREMENTS:

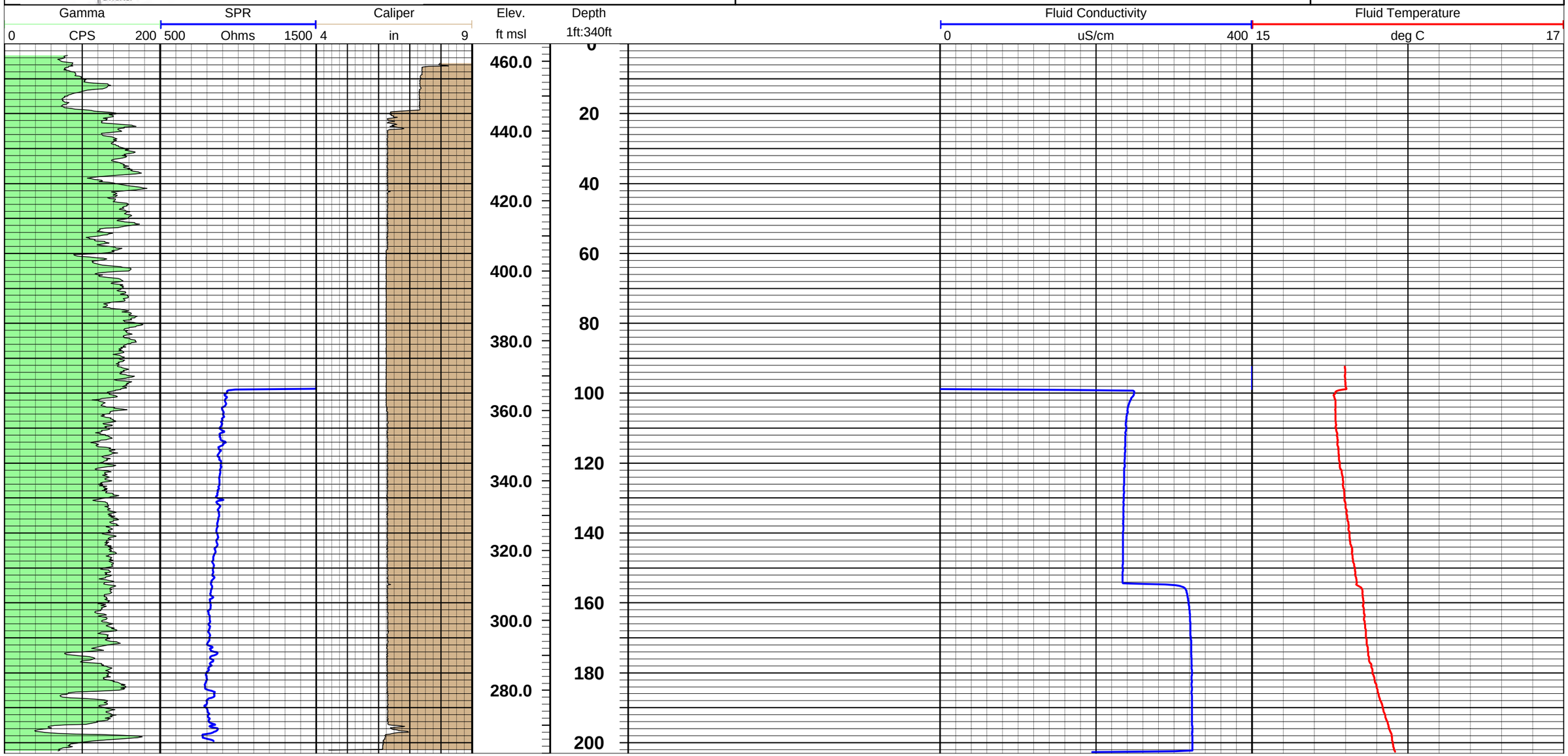
Depth_ft	AcqTime	PickTime_s	Flow_gpm	ElapsedTime_m	WaterLevel_ft

Notes:

The caliper, gamma, SPR, and SP logs were run on 02-09-16 (water level = 30.43 ft bgs). The HPFM were run on 02-19-16 (water level = 33.3 ft bgs).
The HPFM was run while injecting at 0.3 gpm. The transducer was placed at 35 ft bgs.

Well Location Map





GEOPHYSICAL RECORD OF BOREHOLE: GS-AP-MW-15

Ash Pond Hydrogeologic Investigation
Gorgas Electric Generating Plant

Client: Southern Company Services

Project: 1544912

Date: 02-19-2016

Datum:	AL West NAD27	Drill Comp. Date:	01/20-21/2016	Log Depth Ref.:	Ground Surface	Location:	Parrish, AL
Easting:	593940.95 ft	Drilling Method:	Sonic Core	Casing Stick-up:	1.67 ft		
Northing:	1323300.03 ft	Borehole Diameter:	6"	Casing Diameter:	8 inch		
Elevation:	394.8 ft-amsl	Drilled Depth:	80 ft	Casing Depth:	15.39.5 ft	Log Date:	02/9&19/2016
		Water Level:	30.43 ft & 33.3 ft	Casing Material:	PVC	Logged By:	Abernathy



Tool Specs:

HFP2293 SN5517 - Tool Length = 4 ft, and 3.18 ft to heat grid/diverter

FTC SN5518, Caliper SN5521, Gamma-SPR-SP SN5809

TRANSDUCER DATA: HPFM Injection Test

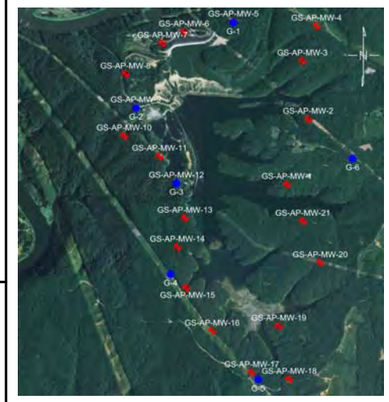
HPFM MEASUREMENTS:

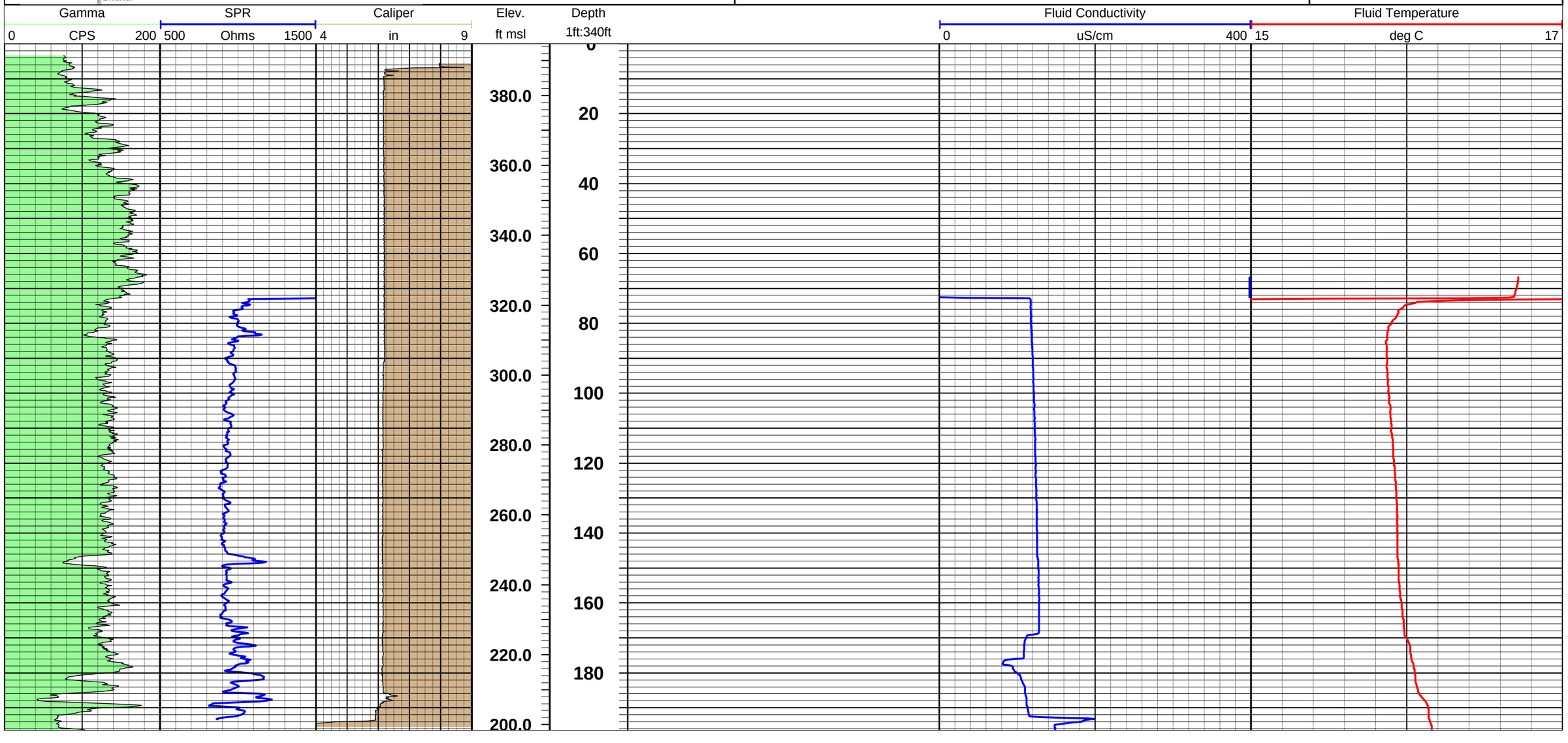
Depth_ft	AcqTime	PickTime_s	Flow_gpm	ElapsedTime_m	WaterLevel_ft

Notes:

The caliper, gamma, SPR, and SP logs were run on 02-09-16 (water level = 30.43 ft bgs). The HPFM were run on 02-19-16 (water level = 33.3 ft bgs).
The HPFM was run while injecting at 0.3 gpm. The transducer was placed at 35 ft bgs.

Well Location Map





GEOPHYSICAL RECORD OF BOREHOLE: GSAP-MW15V

Plant Gorgas - CCR Delineation Wells

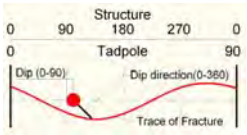
GOLDER

Project Number: 19131304

Client: Southern Company Services

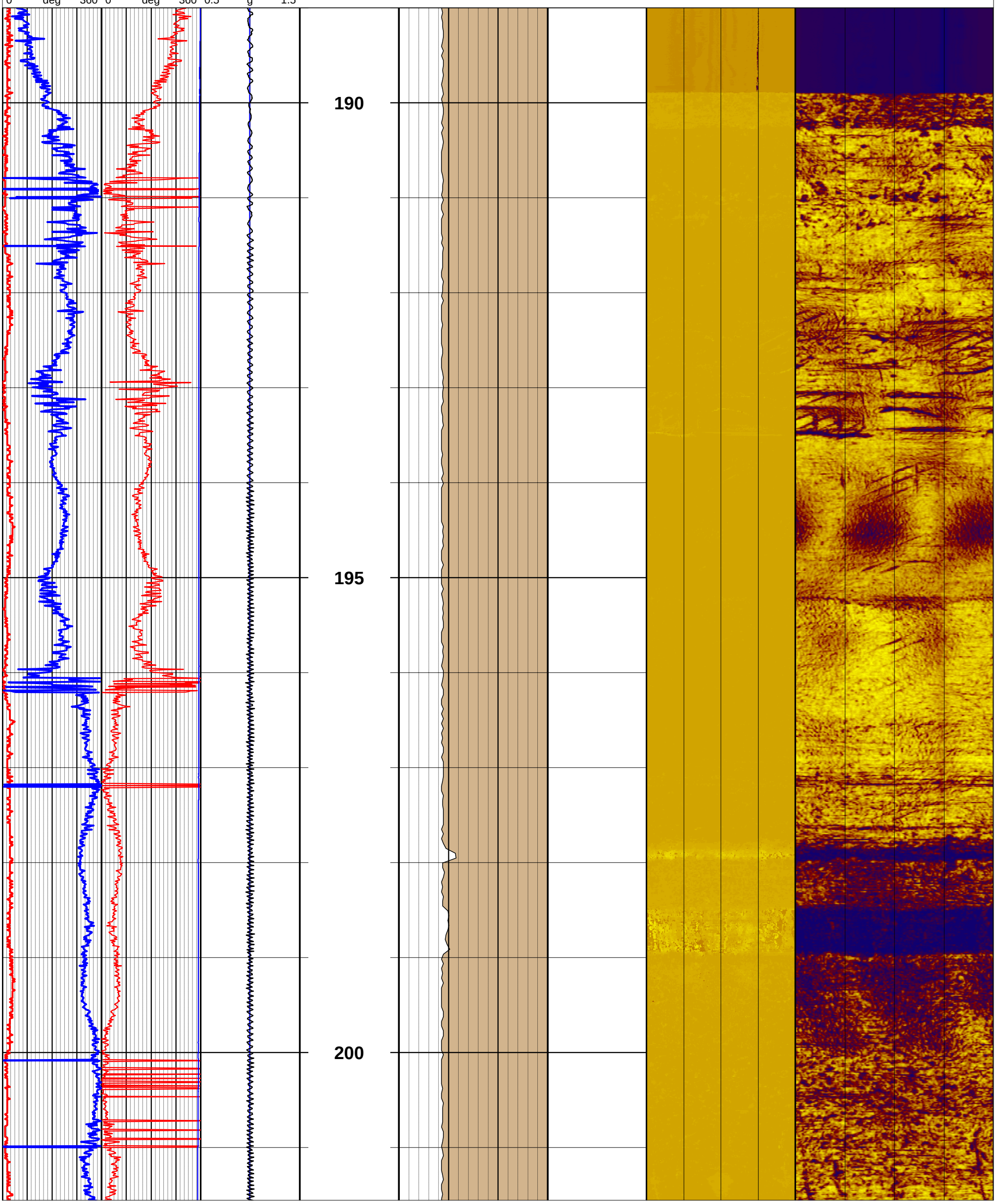
Date: 10-27-2019

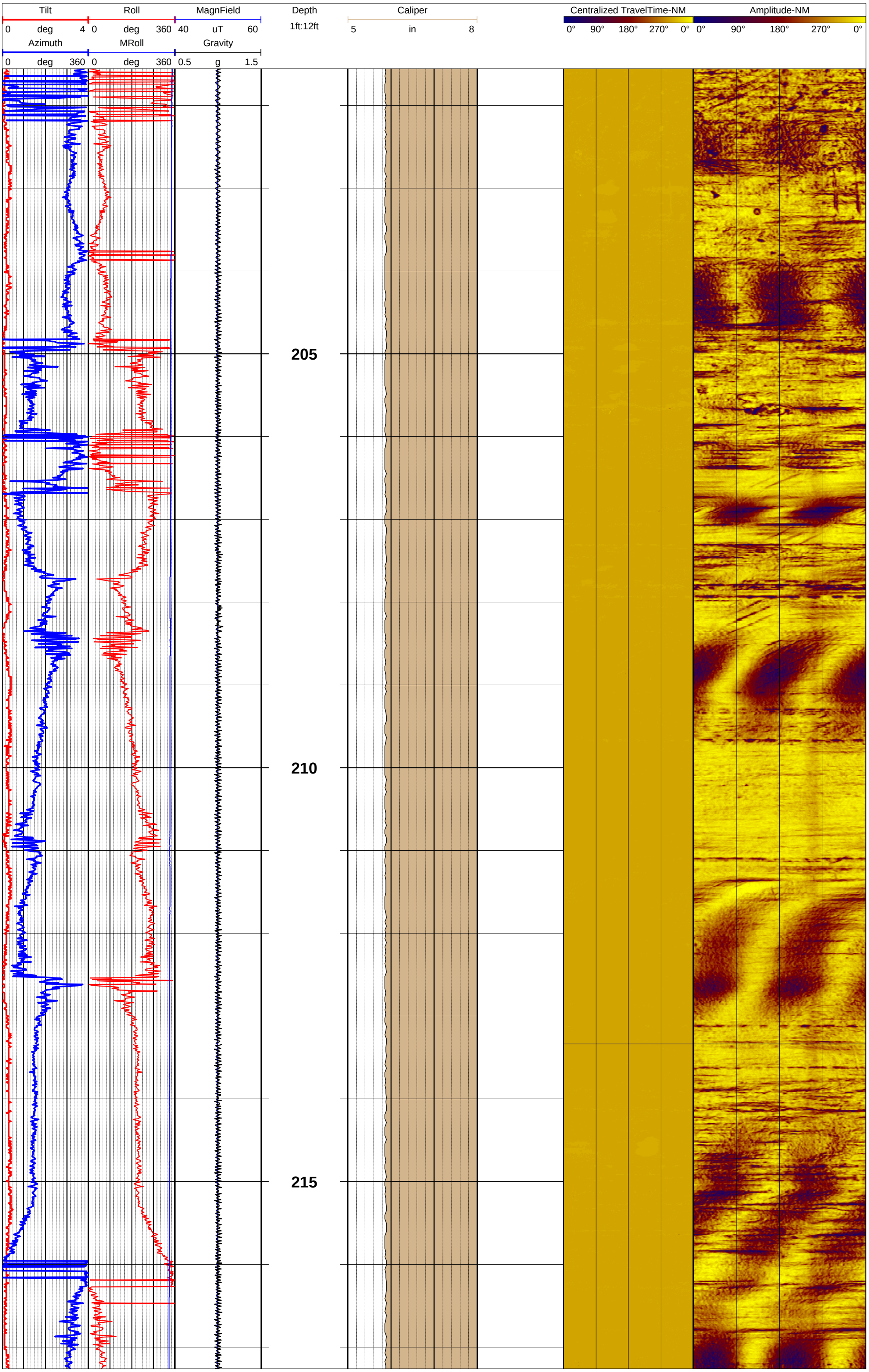
Location: Parrish, Al	TOC Elev msl: na	Notes: 227.38' from toc @ 9:58
Easting: na	Casing Stick-up: 1.5 ft ags	Tools used were: QL40-FTC sn 5518 QL40 Caliper sn 5521 40-LGR-Gamma & SPR sn 5809 ATV ABI40 sn162305
Northing: na	Casing Diameter: 6.625 in ID	
Ground Elev msl: na	Casing Material: Steel HSA	
Borehole Dip: vertical	Water Level: rising	
Borehole Az: na	Logged By: CAB	
Borehole Size: 6" AH	Log Depth Ref: Ground Surface	
Drilled Depth: 252 ft BGS	Log Date: 10-27-2019	
Drill Comp Date: 10-27-19	Image Plot(s) Ref: MN	
Casing Depth: 3.5 ft bgs	Dip Referenced to Horizontal	



Tilt 0 deg 4 | Roll 0 deg 360 | MagnField 40 uT 60 | Depth 1ft:12ft | Caliper 5 in 8 | Centralized TravelTime-NM 0° 90° 180° 270° 0° | Amplitude-NM 0° 90° 180° 270° 0°

Azimuth 0 deg 360 | MRoll 0 deg 360 | Gravity 0.5 g 1.5



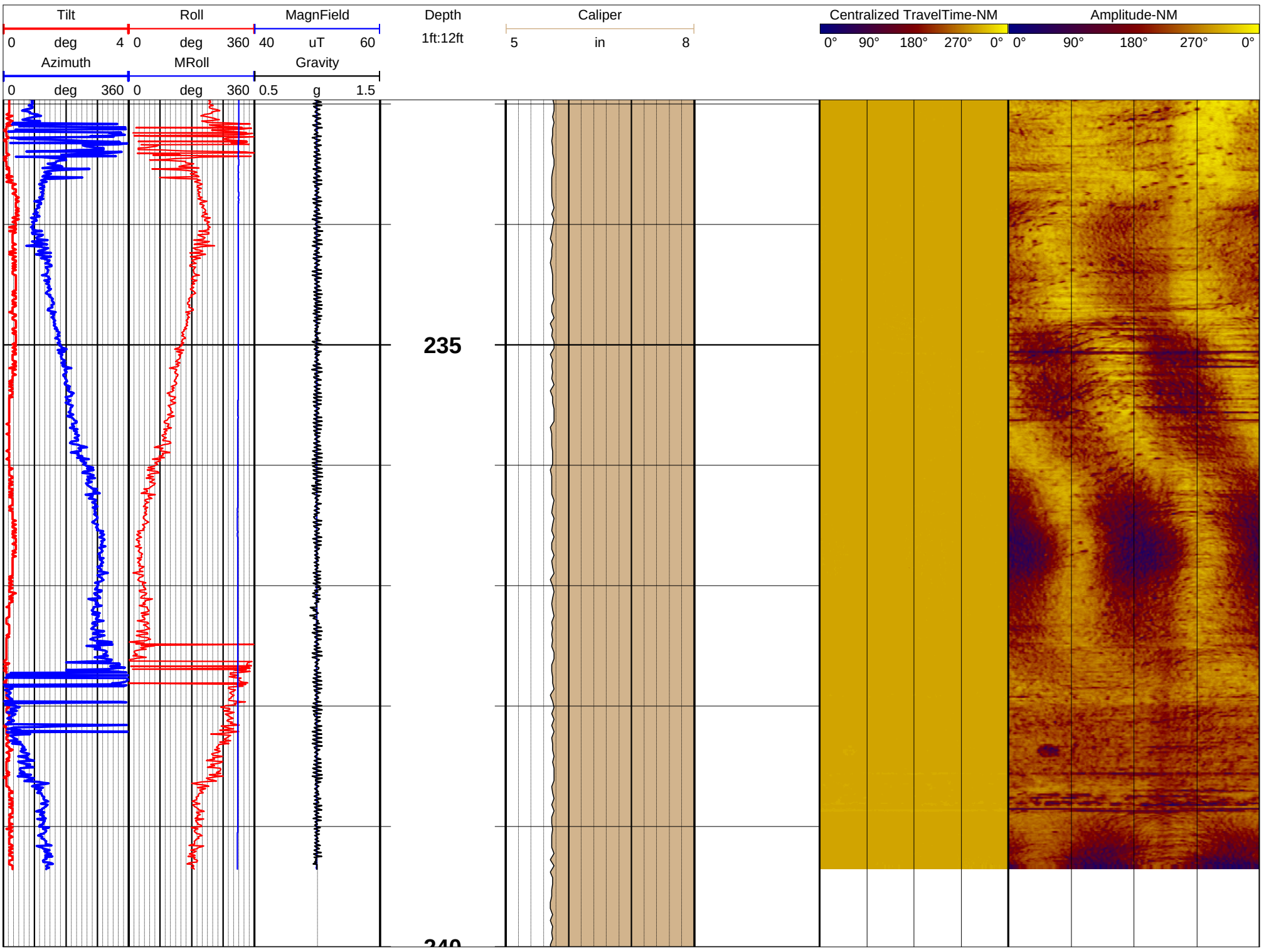

Tilt
0 deg 4
Roll
0 deg 360
MagnField
40 uT 60
Azimuth
0 deg 360
MRoll
0 deg 360
Gravity
0.5 g 1.5
Depth
1ft:12ft
205
210
215
Caliper
5 in 8
Centralized TravelTime-NM
0° 90° 180° 270° 0°
Amplitude-NM
0° 90° 180° 270° 0°

Tilt
0 deg 4
Roll
0 deg 360
MagnField
40 uT 60
Azimuth
0 deg 360
MRoll
0 deg 360
Gravity
0.5 g 1.5
Depth
1ft:12ft
Caliper
5 in 8
Centralized TravelTime-NM
0° 90° 180° 270° 0°
Amplitude-NM
0° 90° 180° 270° 0°

220

225

230


Tilt
0 deg 4
Roll
0 deg 360
MagnField
40 uT 60
Azimuth
0 deg 360
MRoll
0 deg 360
Gravity
0.5 g 1.5
Depth
1ft:12ft
Caliper
5 in 8
Centralized TravelTime-NM
0° 90° 180° 270° 0°
Amplitude-NM
0° 90° 180° 270° 0°
235
240

GEOPHYSICAL RECORD OF BOREHOLE: GSAP-MW15V

Plant Gorgas - CCR Delineation Wells

GOLDER

Project Number: 19131304

Client: Southern Company Services

Southern Company

Date: 10-27-2019

Location: Parrish, Al	TOC Elev msl: na	Notes: 227.38' from toc @ 9:58
Easting: na	Casing Stick-up: 1.5 ft ags	Tools used were:
Northing: na	Casing Diameter: 6.625 in ID	QL40-FTC sn 5518
Ground Elev msl: na	Casing Material: Steel HSA	QL40 Caliper sn 5521
Borehole Dip: vertical	Water Level: rising	40-LGR-Gamma & SPR sn 5809
Borehole Az: na	Logged By: CAB	ATV ABI40 sn162305
Borehole Size: 6" AH	Log Depth Ref: Ground Surface	
Drilled Depth: 252 ft BGS	Log Date: 10-27-2019	
Drill Comp Date: 10-27-19	Image Plot(s) Ref: MN	
Casing Depth: 3.5 ft bgs	Dip Referenced to Horizontal	



Caliper: 5 in 8

Depth: 1ft:120ft

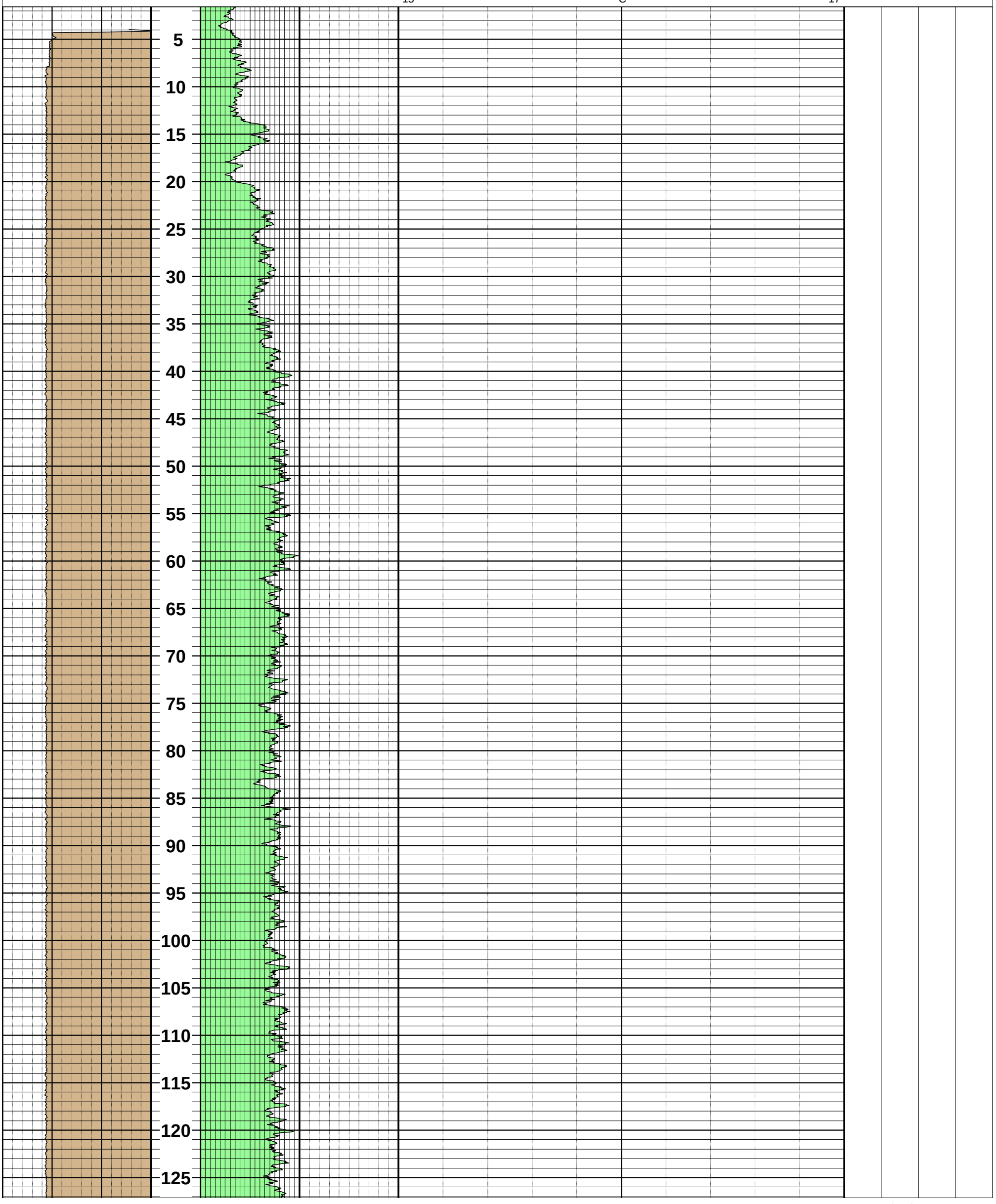
Gamma: 0 CPS 200

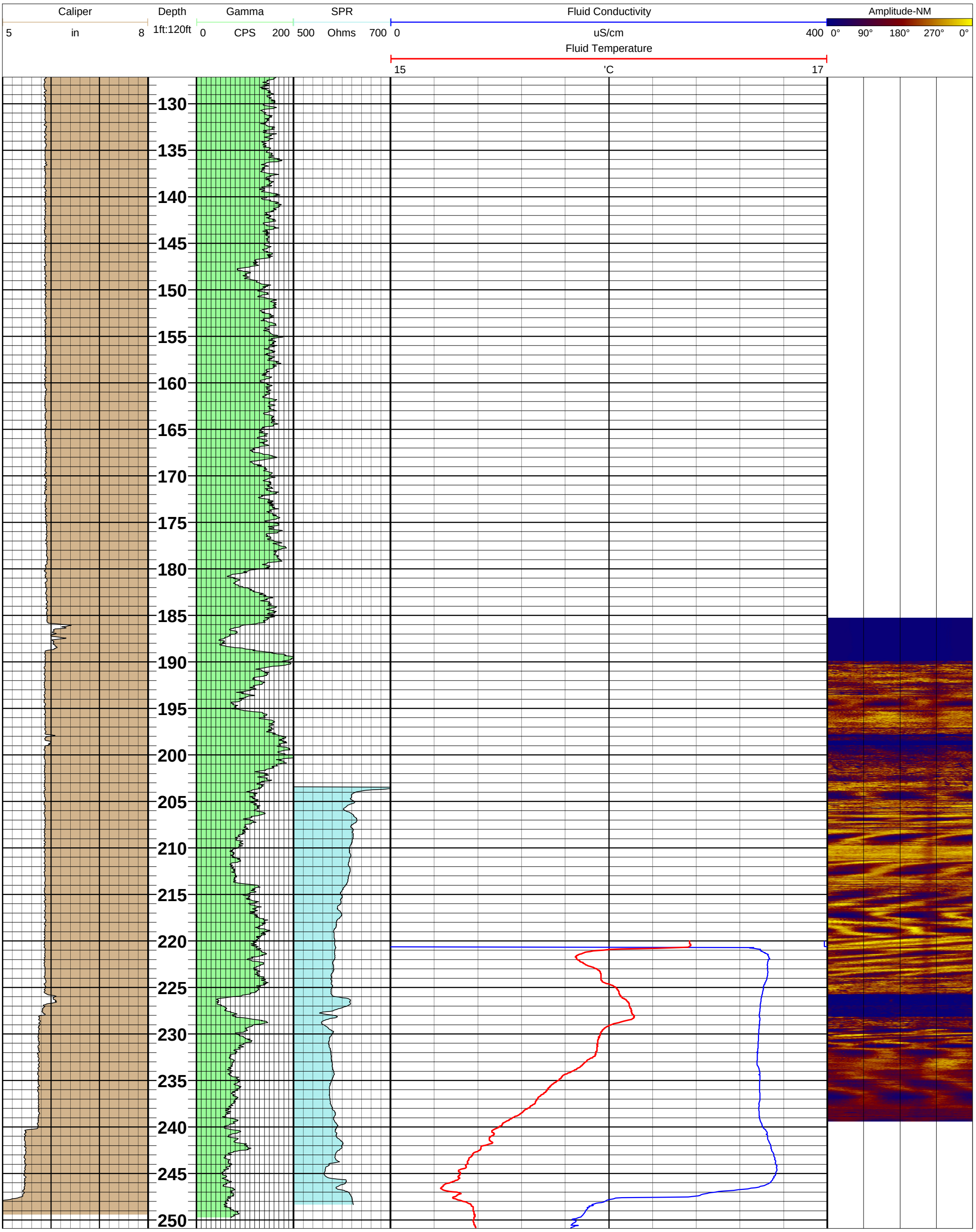
SPR: 500 Ohms 700

Fluid Conductivity: 0 uS/cm 400

Amplitude-NM: 0° 90° 180° 270° 0°

Fluid Temperature: 15 'C 17




Caliper
5
in
8
Depth
1ft:120ft
Gamma
0
CPS
200
SPR
500
Ohms
700
Fluid Conductivity
0
uS/cm
400
Amplitude-NM
0°
90°
180°
270°
0°
Fluid Temperature
15
'C
17
130
135
140
145
150
155
160
165
170
175
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245
250

GEOPHYSICAL RECORD OF BOREHOLE: GS-AP-MW-16

Ash Pond Hydrogeologic Investigation
Gorgas Electric Generating Plant

Client: Southern Company Services

Project: 1544912

Date: 03-23-2016

Datum:	AL West NAD27	Drill Comp. Date:	02/16/2016	Log Depth Ref.:	Ground Surface	Location:	Parrish, AL
Easting:	596335.48 ft	Drilling Method:	Sonic Core	Casing Stick-up:	2 ft		
Northing:	1316197.11 ft	Borehole Diameter:	6"	Casing Diameter:	8 inch		
Elevation:	459.4 ft-amsl	Drilled Depth:	217 ft then to 317 ft	Casing Depth:	8 ft bgs	Log Date:	2/26&3/22/2016
		Water Level:	43.3 & 164 ft bgs	Casing Material:	PVC	Logged By:	Abernathy

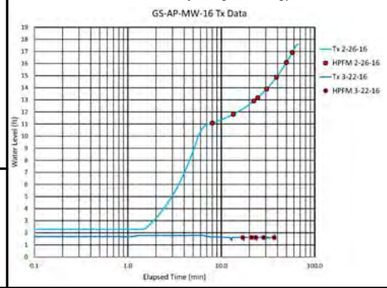


Tool Specs:

HFP2293 SN5517 - Tool Length = 4 ft, and 3.18 ft to heat grid/diverter

FTC SN5518, Caliper SN5521, Gamma-SPR-SP SN5809

TRANSDUCER DATA: Injecting at 0.25 gpm & ambient



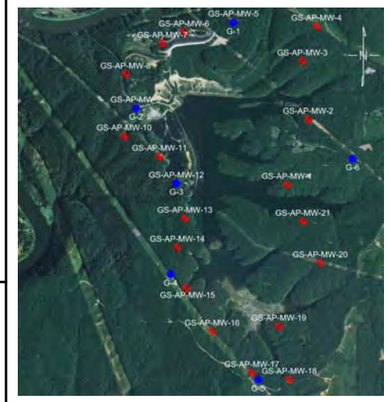
HPFM MEASUREMENTS: HPFM Injecting at 0.25 gpm & ambient

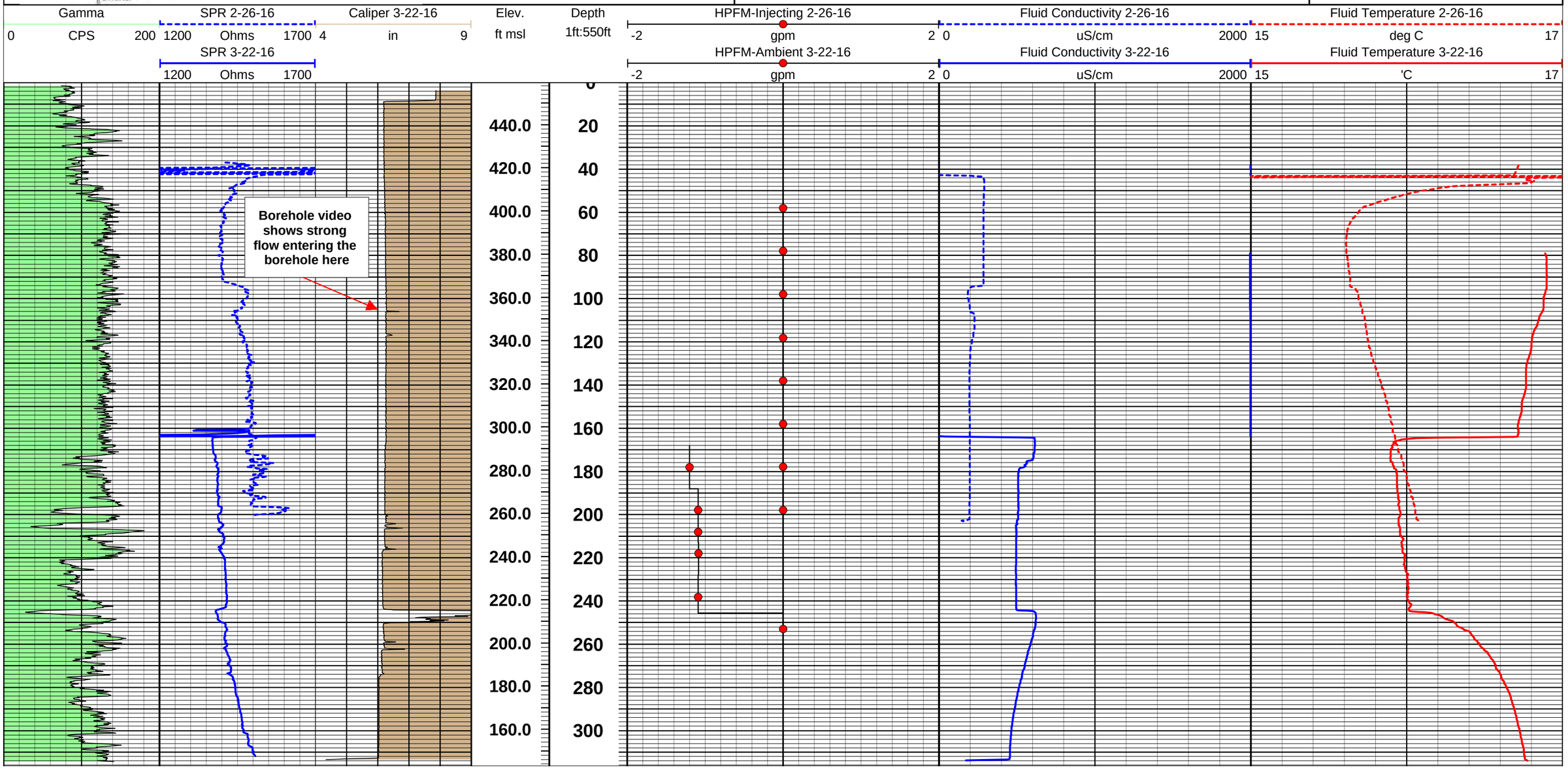
Depth_ft	AcqDateTime	PickTime_s	Flow_gpm
58.1	26/02/2016 15:02:09	0.0	0.0
78.0	26/02/2016 15:07:36	0.0	0.0
98.0	26/02/2016 15:16:25	0.0	0.0
118.1	26/02/2016 15:18:44	0.0	0.0
138.0	26/02/2016 15:24:49	0.0	0.0
158.0	26/02/2016 15:33:01	0.0	0.0
178.0	26/02/2016 15:43:57	0.0	0.0
198.0	26/02/2016 15:51:45	0.0	0.0
178.0	22/03/2016 14:17:46	0.850	-1.200
198.0	22/03/2016 13:35:23	0.900	-1.092
208.0	22/03/2016 13:39:35	0.900	-1.092
218.1	22/03/2016 13:41:53	0.902	-1.087
238.1	22/03/2016 13:46:39	0.900	-1.092
253.1	22/03/2016 13:55:14	0.000	0.000

Notes:

The HPFM was run while injecting at 0.25 gpm on 2-26-16 and no flow measured. The borehole was drilled deeper, to 317 ft.
The borehole was re-logged on 3-22-16. The flow was too high for pumping or injection so only ambient HPFM data was recorded.
The Laval borehole video was run 0n 3-23-16 and indicated strong flow from a fracture at 106 ft bgs.

Well Location Map





GEOPHYSICAL RECORD OF BOREHOLE: GS-AP-MW-17

Ash Pond Hydrogeologic Investigation
Gorgas Electric Generating Plant

Client: Southern Company Services

Project: 1544912

Date: 03-22-2016

Datum:	AL West NAD27	Drill Comp. Date:	02/11/2016	Log Depth Ref.:	Ground Surface	Location:	Parrish, AL
Easting:	597429.43 ft	Drilling Method:	Sonic Core	Casing Stick-up:	0.4 ft		
Northing:	1315050.47 ft	Borehole Diameter:	6"	Casing Diameter:	8 inch		
Elevation:	531.7 ft-amsl	Drilled Depth:	295 ft	Casing Depth:	22.9 ft bgs	Log Date:	02/26/2016
		Water Level:	158.6 ft bgs	Casing Material:	PVC	Logged By:	Abernathy

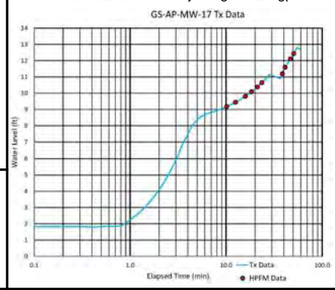


Tool Specs:

HFP2293 SN5517 - Tool Length = 4 ft, and 3.18 ft to heat grid/diverter

FTC SN5518, Caliper SN5521, Gamma-SPR-SP SN5809

TRANSDUCER DATA: Injecting at 0.25 gpm



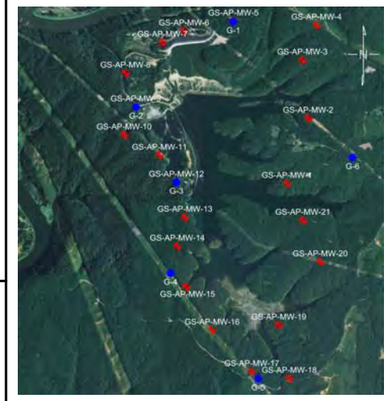
HPFM MEASUREMENTS: HPFM Injecting at 0.25 gpm

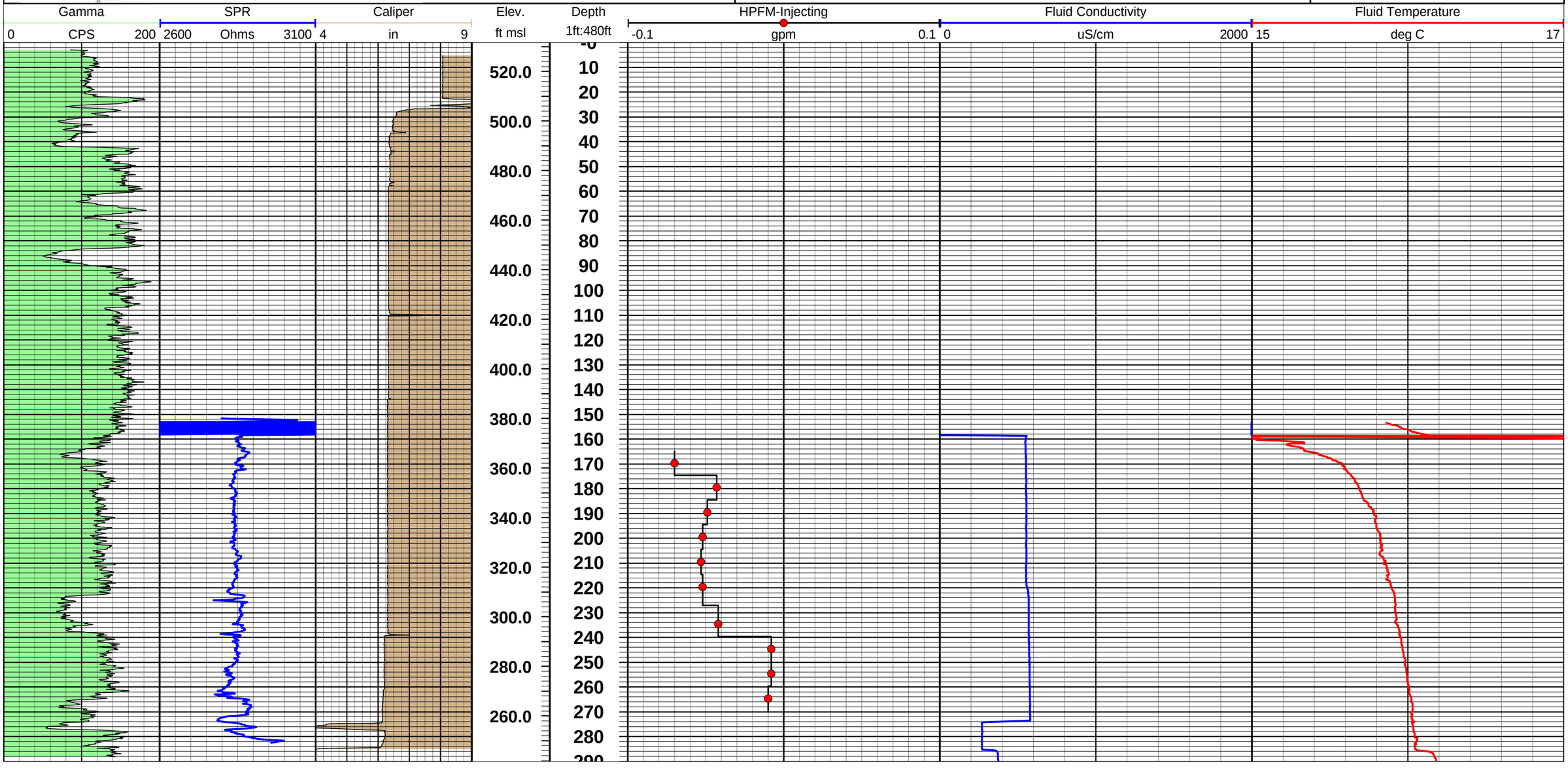
Depth_ft	AcqDateTime	PickTime_s	Flow_gpm
169.7	26/02/2016 10:55:20	4.259	-0.070
179.6	26/02/2016 10:57:42	6.142	-0.043
189.6	26/02/2016 11:01:04	5.538	-0.049
199.6	26/02/2016 11:03:34	5.351	-0.052
209.6	26/02/2016 11:06:21	5.250	-0.053
219.7	26/02/2016 11:08:46	5.300	-0.052
234.6	26/02/2016 11:23:43	6.316	-0.042
244.7	26/02/2016 11:26:18	26.700	-0.008
254.7	26/02/2016 11:31:59	25.754	-0.008
264.7	26/02/2016 11:35:51	22.136	-0.010

Notes:

The HPFM was run while injecting at 0.25 gpm. The transducer was placed at 160.4 ft bgs.

Well Location Map





GEOPHYSICAL RECORD OF BOREHOLE: GS-AP-MW-17V

PLANT GORGAS ASH POND DELINEATION WELLS

GOLDER

Project Number: 18114896

Client: Southern Company Services

Southern Company

Date: 1-21-2019

Location: Parrish, Al	TOC Elev msl: na
Easting: na	Casing Stick-up: 5.92 ft ags
Northing: na	Casing Diameter: 5.4 in ID
Ground Elev msl: na	Casing Material: Steel
Borehole Dip: vertical	Water Level: 117.4 ft bgs
Borehole Az: na	Logged By: DH & BA
Borehole Size: 6" Sonic	Log Depth Ref: Ground
Drilled Depth: 275 ft	Log Date: 1-21-19
Drill Comp Date: 1-20-19	Image Plot(s) Ref: MN
Casing Depth: 24.0 ft bgs	Dip Referenced to Horizontal

Notes: Probable collapsed American seam mine workings encountered between 255 ft - 275 ft. WL at end of FTC run = 117.4 ft bgs, & 115.18 ft bgs at end of gamma run.

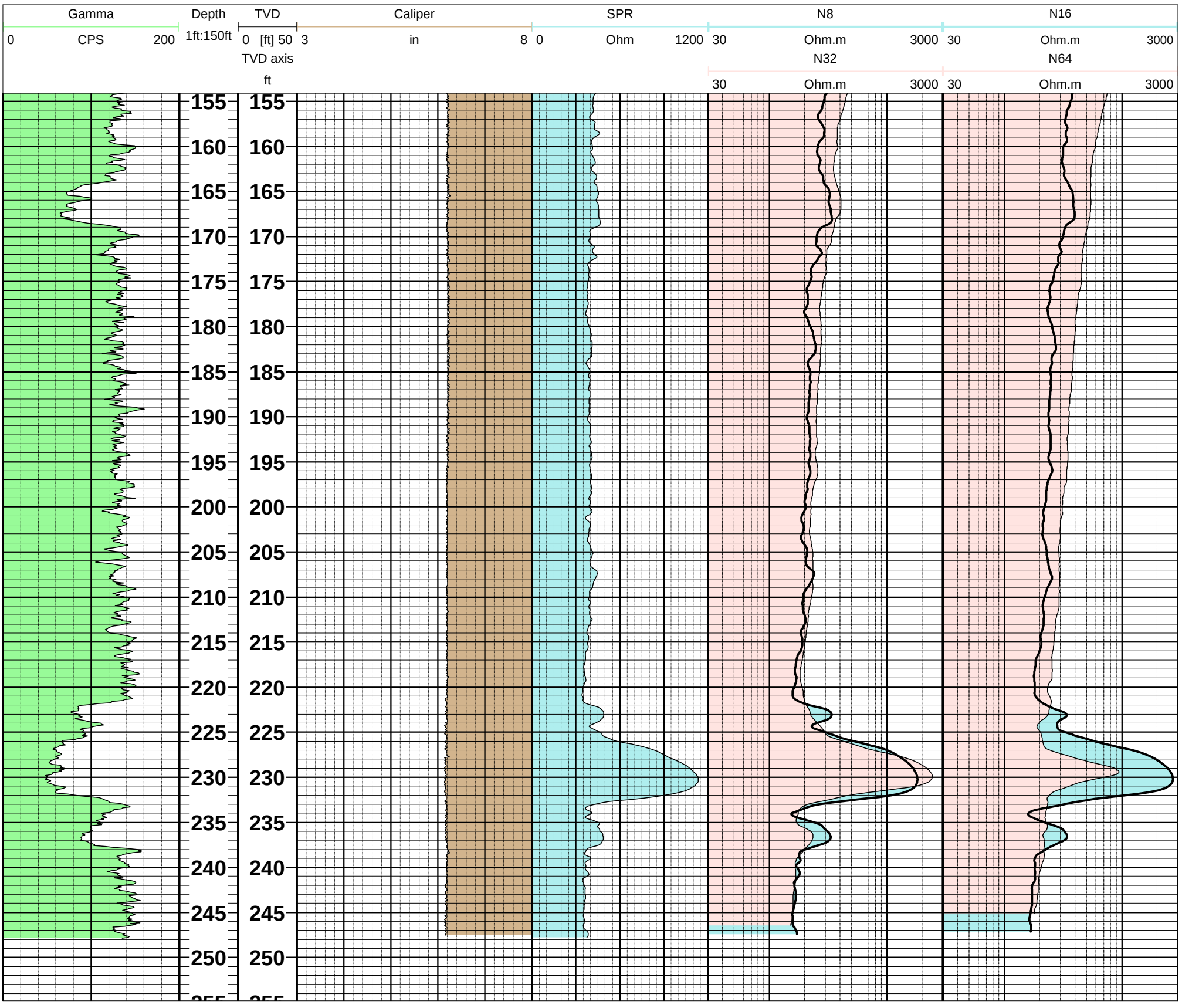
The deviation data was recorded with our OBI sn163404.
Closure Distance = 0.75 ft, Closure Angle = 226.6 deg & Tilt at BOH = 0.12 deg

Tools used were Decatur's QL40 set:
FTC sn5518
Caliper sn5521
Gamma sn5499
SPR + Normal Res QL40 sn5512
Deviation OBI sn163404



Gamma 0 CPS 200 | Depth 1ft:150ft | TVD 0 [ft] 50 TVD axis ft | Caliper 3 in 8 | SPR 0 Ohm 1200 | N8 30 Ohm.m 3000 | N16 30 Ohm.m 3000 | N32 30 Ohm.m 3000 | N64 30 Ohm.m 3000

1/21/2019 1:49:28 PM


Gamma
0
CPS
200
Depth
1ft:150ft
TVD
0
[ft]
50
TVD axis
ft
Caliper
3
in
8
SPR
0
Ohm
1200
N8
30
Ohm.m
3000
N16
30
Ohm.m
3000
N32
30
Ohm.m
3000
N64
30
Ohm.m
3000
155
160
165
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175
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185
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220
225
230
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240
245
250

GEOPHYSICAL RECORD OF BOREHOLE: GS-AP-MW-17V

PLANT GORGAS ASH POND DELINEATION WELLS

GOLDER

Project Number: 18114896

Client: Southern Company Services

Southern Company

Date: 1-21-2019

Location: Parrish, Al	TOC Elev msl: na
Easting: na	Casing Stick-up: 5.92 ft ags
Northing: na	Casing Diameter: 5.4 in ID
Ground Elev msl: na	Casing Material: Steel
Borehole Dip: vertical	Water Level: 117.4 ft bgs
Borehole Az: na	Logged By: DH & BA
Borehole Size: 6" Sonic	Log Depth Ref: Ground
Drilled Depth: 275 ft	Log Date: 1-21-19
Drill Comp Date: 1-20-19	Image Plot(s) Ref: MN
Casing Depth: 24.0 ft bgs	Dip Referenced to Horizontal

Notes:

Probable collapsed American seam mine workings encountered between 255 ft - 275 ft. WL at end of FTC run = 117.4 ft bgs, & 115.18 ft bgs at end of gamma run.

The deviation data was recorded with our OBI sn163404.
Closure Distance = 0.75 ft, Closure Angle = 226.6 deg & Tilt at BOH = 0.12 deg

Tools used were Decatur's QL40 set:
FTC sn5518
Caliper sn5521
Gamma sn5499
SPR + Normal Res QL40 sn5512
Deviation OBI sn163404



Gamma: 0 CPS 200

SPR: 30 Ohm 3000

N16: 30 Ohm.m 3000

N64: 30 Ohm.m 3000

Fluid Temperature: 15 'C 17

Depth: 1ft:150ft

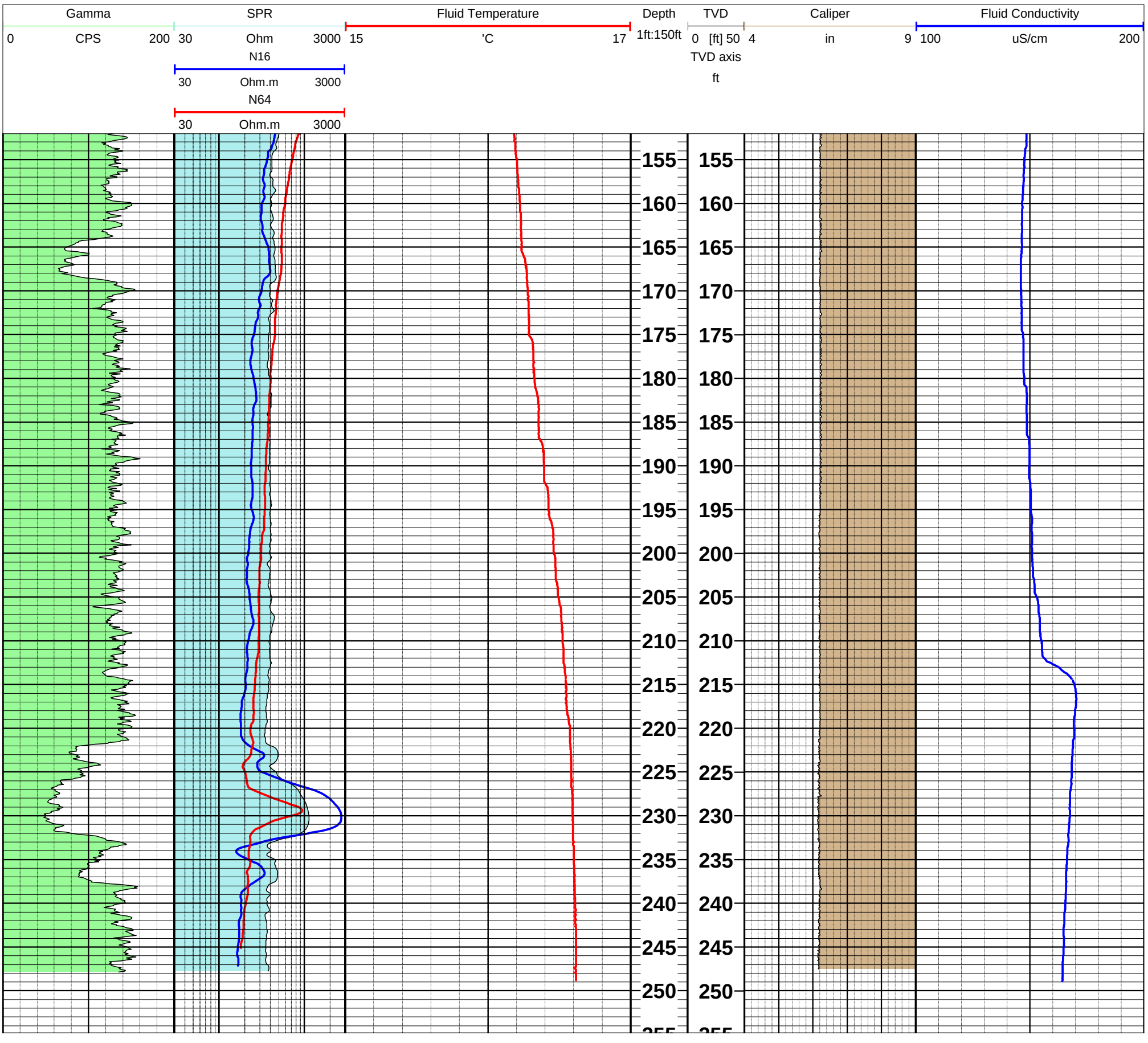
TVD: 0 [ft] 50

TVD axis: ft

Caliper: 4 in 9

Fluid Conductivity: 100 uS/cm 200

1/21/2019 1:59:13 PM


Gamma
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CPS
200
SPR
30
Ohm
3000
N16
30
Ohm.m
3000
N64
30
Ohm.m
3000
Fluid Temperature
15
'C
17
Depth
1ft:150ft
TVD
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[ft]
50
TVD axis
ft
Caliper
4
in
9
Fluid Conductivity
100
uS/cm
200
155
160
165
170
175
180
185
190
195
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GEOPHYSICAL RECORD OF BOREHOLE: GS-AP-MW-18

Ash Pond Hydrogeologic Investigation
Gorgas Electric Generating Plant

Client: Southern Company Services

Project: 1544912

Date: 03-20-2016

Datum:	AL West NAD27	Drill Comp. Date:	02/25/2016	Log Depth Ref.:	Ground Surface	Location:	Parrish, AL
Easting:	598463.67 ft	Drilling Method:	Sonic Core	Casing Stick-up:	2 ft		
Northing:	1314866.28 ft	Borehole Diameter:	6"	Casing Diameter:	8 inch		
Elevation:	434.9 ft-amsl	Drilled Depth:	181 ft	Casing Depth:	6 ft bgs	Log Date:	02/29/2016
		Water Level:	102.5 ft bgs	Casing Material:	PVC	Logged By:	Abernathy

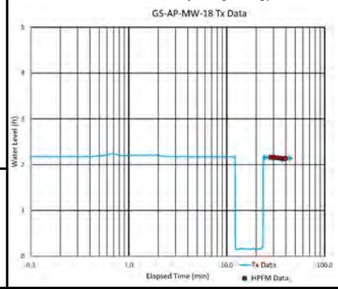


Tool Specs:

HFP2293 SN5517 - Tool Length = 4 ft, and 3.18 ft to heat grid/diverter

FTC SN5518, Caliper SN5521, Gamma-SPR-SP SN5809

TRANSDUCER DATA: Injecting at 3 gpm



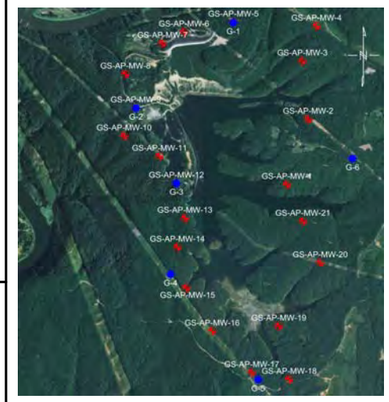
HPFM MEASUREMENTS: HPFM Injecting at 3 gpm

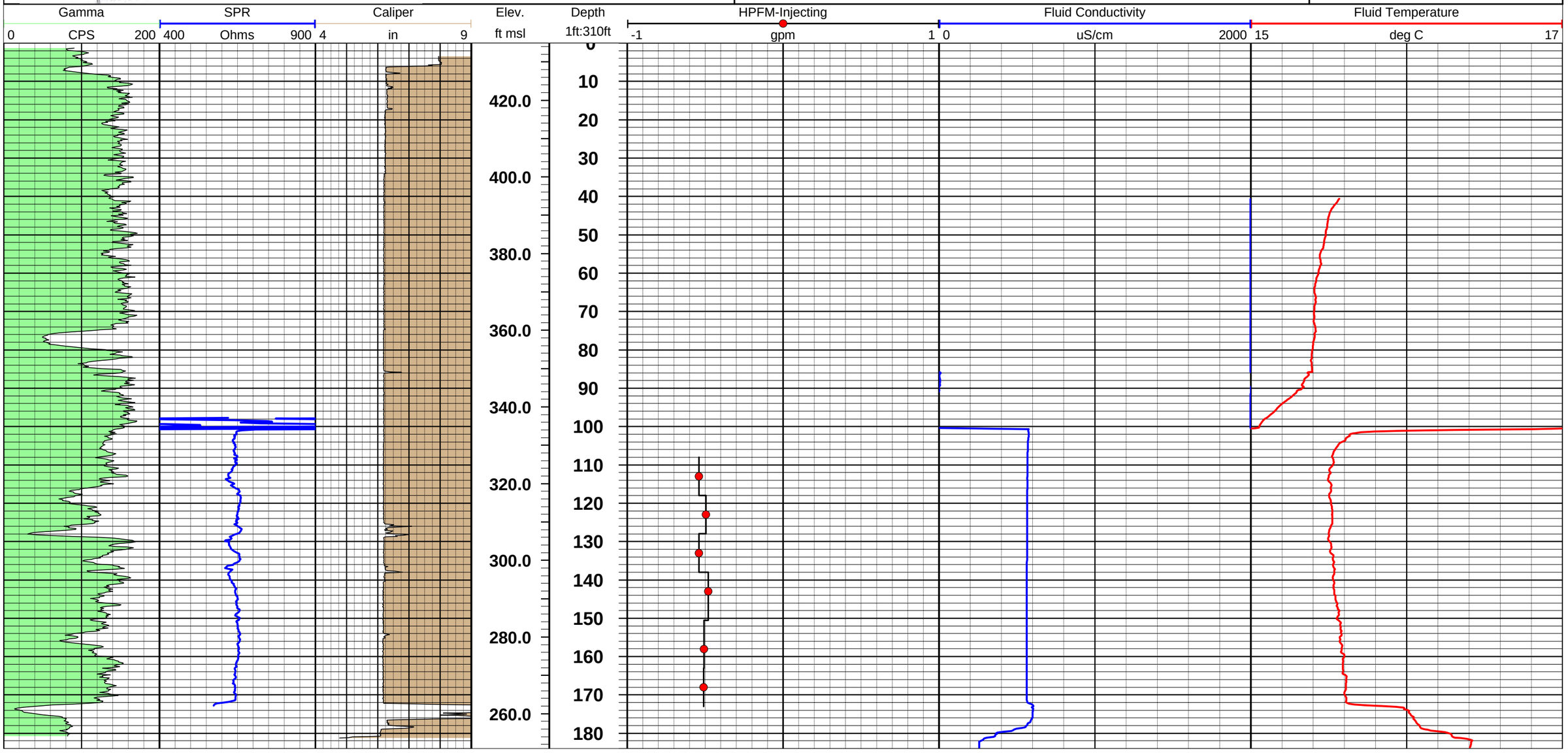
Depth_ft	AcqDateTime	PickTime_s	Flow_gpm
113.01	29/02/2016 15:31:14	1.134	-0.540
123.01	29/02/2016 15:33:32	1.190	-0.494
133.03	29/02/2016 15:36:15	1.133	-0.541
143.04	29/02/2016 15:38:45	1.211	-0.481
158.02	29/02/2016 15:41:21	1.182	-0.508
167.99	29/02/2016 15:43:15	1.177	-0.509

Notes:

The HPFM was run while injecting at 3 gpm. The transducer was placed at 102.64 ft bgs.
The 5 inch diverter was used to allow identification of flow beyond the calibration range. These measurements are not calibrated.

Well Location Map





GEOPHYSICAL RECORD OF BOREHOLE: GS-AP-MW-18V

PLANT GORGAS ASH POND DELINEATION WELLS

GOLDER

Project Number: 18114896

Client: Southern Company Services

Southern Company

Date: 1-22-2019

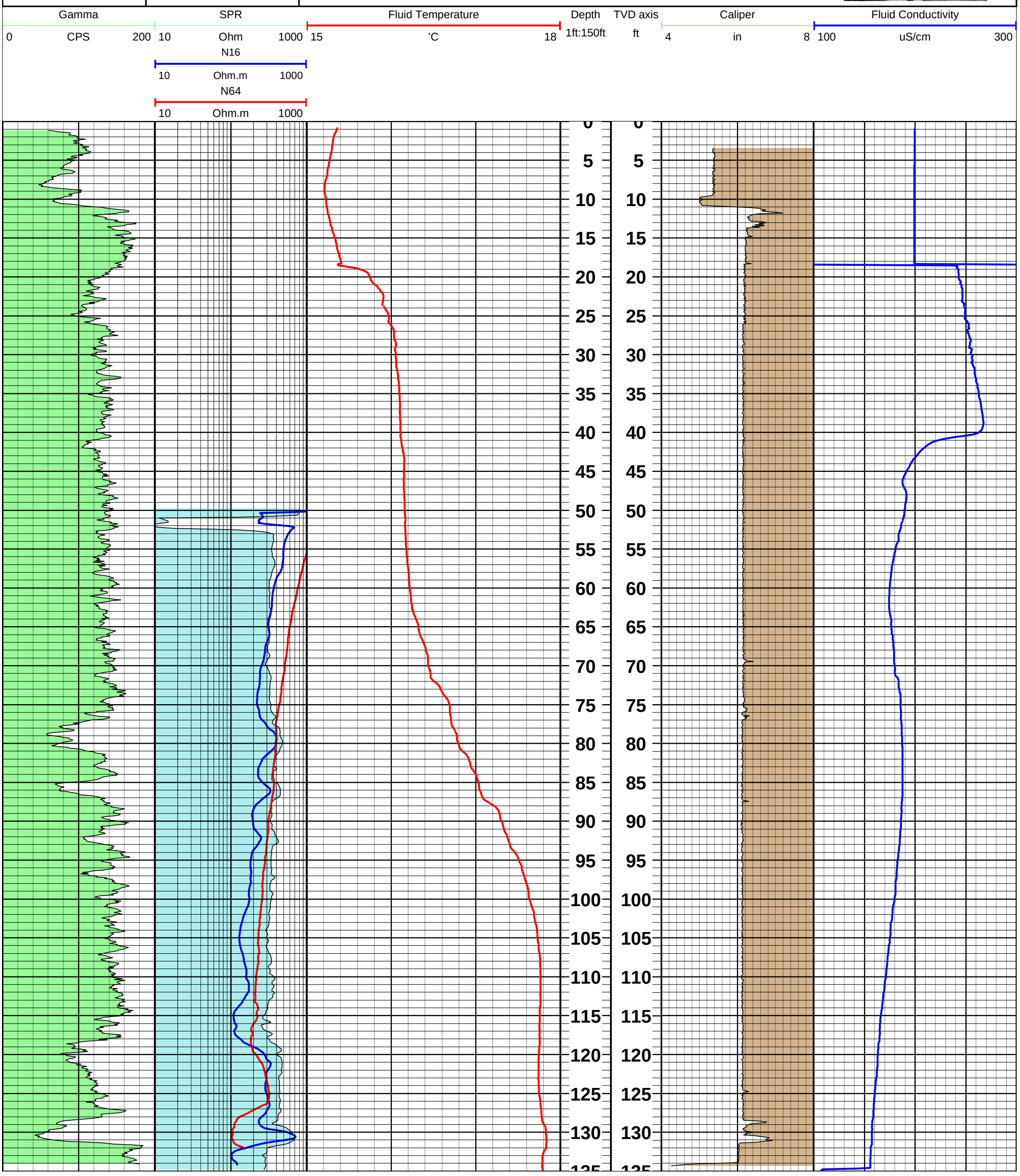
Location: Parrish, Al	TOC Elev msl: na
Easting: na	Casing Stick-up: 2 ft ags
Northing: na	Casing Diameter: 5.4 in ID
Ground Elev msl: na	Casing Material: Steel
Borehole Dip: vertical	Water Level: 18.46 ft bgs
Borehole Az: na	Logged By: Dave H
Borehole Size: 6" Sonic	Log Depth Ref: Ground
Drilled Depth: 140 ft	Log Date: 1-22-19
Drill Comp Date: 1-22-19	Image Plot(s) Ref: MN
Casing Depth: 11 ft bgs	Dip Referenced to Horizontal

Notes:

Deviation data recorded with QL40-DEV rental tool.
Closure Distance = 0.75 ft, Closure Angle = 226.6 deg & Tilt at BOH = 0.12 deg

Tools used were Decatur's QL40 set:
FTC sn5518
Caliper sn5521
Gamma sn5499
SPR + Normal Res QL40 sn5512
Deviation QL40-DEV sn182909





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GEOPHYSICAL RECORD OF BOREHOLE: GS-AP-MW-19

Ash Pond Hydrogeologic Investigation
Gorgas Electric Generating Plant

Client: Southern Company Services

Project: 1544912

Date: 03-20-2016

Datum:	AL West NAD27	Drill Comp. Date:	02/22/2016	Log Depth Ref.:	Ground Surface	Location:	Parrish, AL
Easting:	598177.49 ft	Drilling Method:	Sonic Core	Casing Stick-up:	1.1 ft		
Northing:	1316335.19 ft	Borehole Diameter:	6"	Casing Diameter:	8 inch		
Elevation:	478.2 ft-amsl	Drilled Depth:	237 ft	Casing Depth:	37 ft bgs	Log Date:	03/1/2016
		Water Level:	29.11 & 35 ft bgs	Casing Material:	PVC	Logged By:	Abernathy

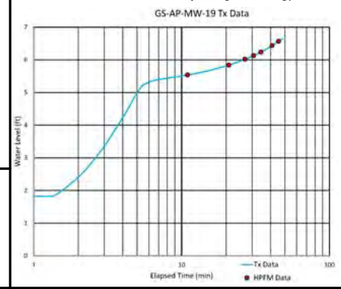


Tool Specs:

HFP2293 SN5517 - Tool Length = 4 ft, and 3.18 ft to heat grid/diverter

FTC SN5518, Caliper SN5521, Gamma-SPR-SP SN5809

TRANSDUCER DATA: Injecting at 0.25 gpm



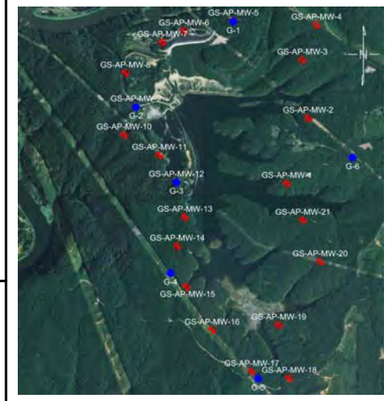
HPFM MEASUREMENTS: HPFM Data From Injecting at 0.25 gpm

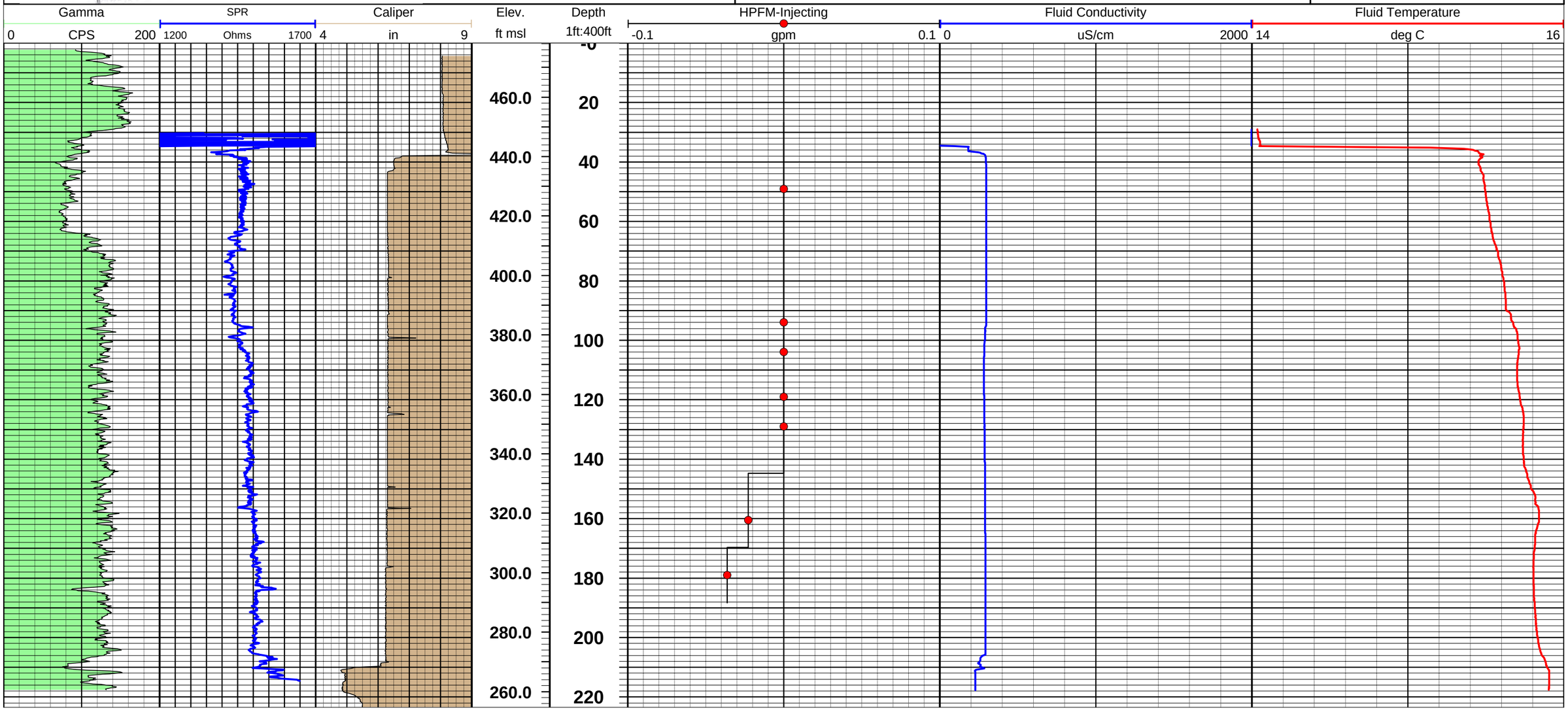
Depth_ft	AcqDateTime	PickTime_s	Flow_gpm
49.1	1/3/2016 9:48:01	0.000	0.000
93.9	1/3/2016 9:57:53	0.000	0.000
104.0	1/3/2016 10:03:54	0.000	0.000
119.0	1/3/2016 10:07:45	0.000	0.000
129.0	1/3/2016 10:11:26	0.000	0.000
160.4	1/3/2016 10:17:55	10.250	-0.023
179.0	1/3/2016 10:22:17	7.049	-0.036

Notes:

The HPFM was run while injecting at 0.25 gpm. The transducer was placed at 36.9 ft bgs.

Well Location Map





GEOPHYSICAL RECORD OF BOREHOLE: GS-AP-MW-20

Ash Pond Hydrogeologic Investigation
Gorgas Electric Generating Plant

Client: Southern Company Services

Project: 1544912

Date: 03-02-2016

Datum:	AL West NAD27	Drill Comp. Date:	02/17/2016	Log Depth Ref.:	Ground Surface	Location:	Parrish, AL
Easting:	599318.98 ft	Drilling Method:	Sonic Core	Casing Stick-up:	GS		
Northing:	1318084.32 ft	Borehole Diameter:	6"	Casing Diameter:	8 inch		
Elevation:	487.1 ft-amsl	Drilled Depth:	275 ft	Casing Depth:	22.4 ft bgs	Log Date:	03/1-2/2016
		Water Level:	125.6 & 125.4 ft bgs	Casing Material:	PVC	Logged By:	Abernathy

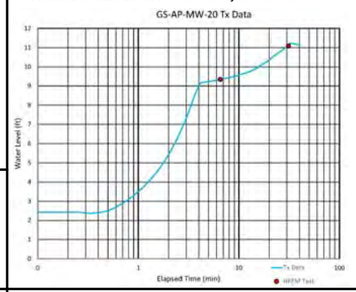


Tool Specs:

HFP2293 SN5517 - Tool Length = 4 ft, and 3.18 ft to heat grid/diverter

FTC SN5518, Caliper SN5521, Gamma-SPR-SP SN5809

TRANSDUCER DATA: HPFM Injection Test



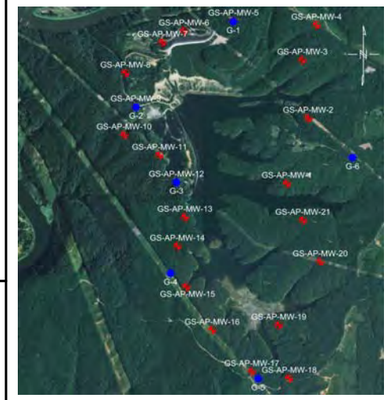
HPFM MEASUREMENTS:

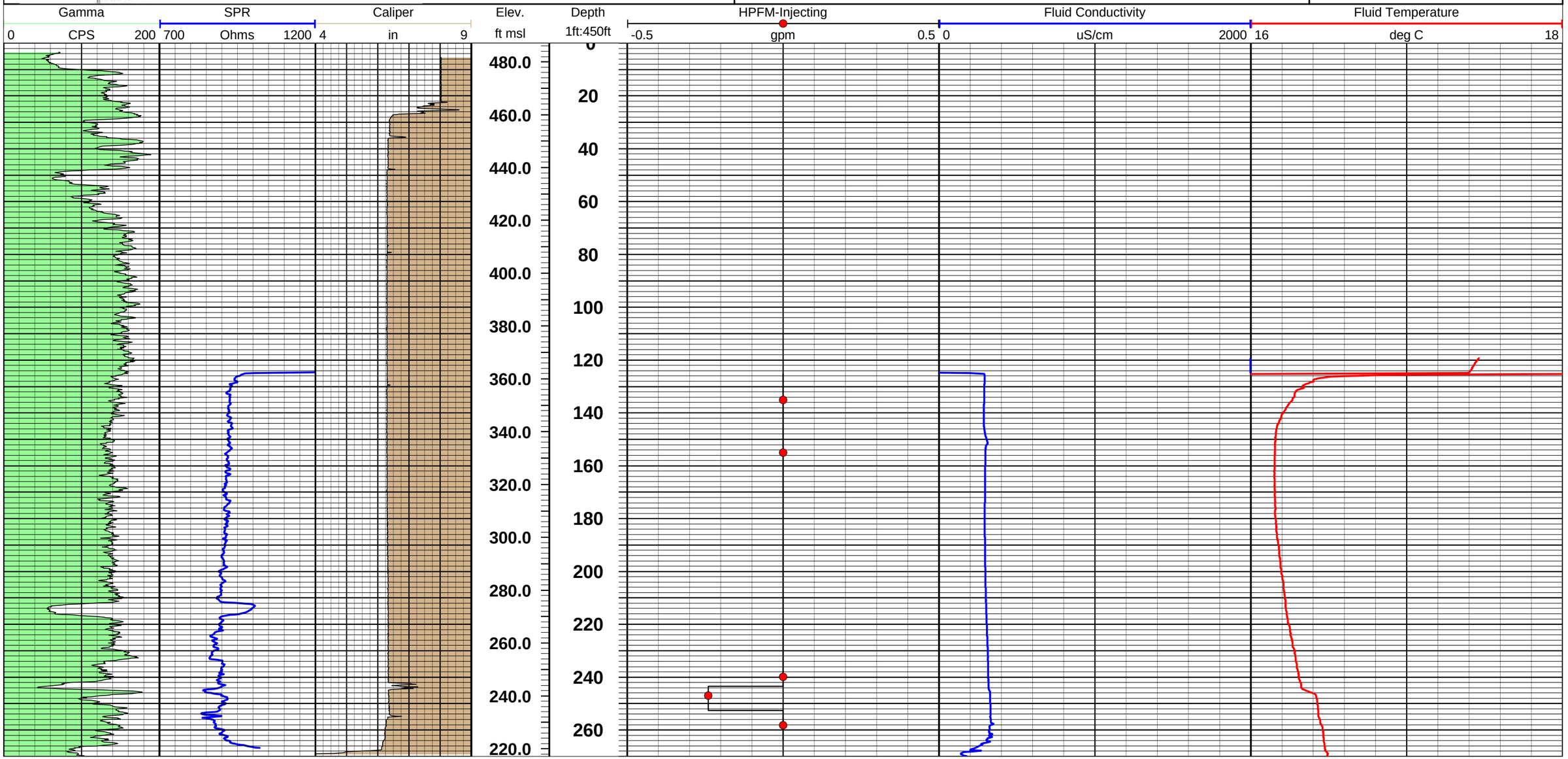
Depth_ft	AcqDateTime	PickTime_s	Flow_gpm
135.13	2/3/2016 8:02:04	0.00	0.00
155.03	2/3/2016 8:08:01	0.00	0.00
239.91	2/3/2016 8:15:30	0.00	0.00
247.06	2/3/2016 8:19:07	1.85	-0.24
258.16	2/3/2016 8:26:39	0.00	0.00

Notes:

The caliper, gamma, SPR, and SP logs were run on 03-01-16 (water level = 125.6 ft bgs). The HPFM were run on 03-02-16 (water level = 125.4 ft bgs).
The HPFM was run while injecting at 0.3 gpm. The transducer was placed at 127 ft bgs.

Well Location Map





GEOPHYSICAL RECORD OF BOREHOLE: GS-AP-MW-21

Ash Pond Hydrogeologic Investigation
Gorgas Electric Generating Plant

Client: Southern Company Services

Project: 1544912

Date: 02-19-2016

Datum:	AL West NAD27	Drill Comp. Date:	02/20/2016	Log Depth Ref.:	Ground Surface	Location:	Parrish, AL
Easting:	598840.25 ft	Drilling Method:	Sonic Core	Casing Stick-up:	0.25 ft		
Northing:	1319234.93 ft	Borehole Diameter:	6"	Casing Diameter:	8 inch		
Elevation:	504 ft-amsl	Drilled Depth:	235 ft	Casing Depth:	14.4 ft	Log Date:	03/02/2016
		Water Level:	106 ft bgs	Casing Material:	PVC	Logged By:	Abernathy



Tool Specs:

HFP2293 SN5517 - Tool Length = 4 ft, and 3.18 ft to heat grid/diverter

FTC SN5518, Caliper SN5521, Gamma-SPR-SP SN5809

TRANSDUCER DATA: HPFM Injection Test

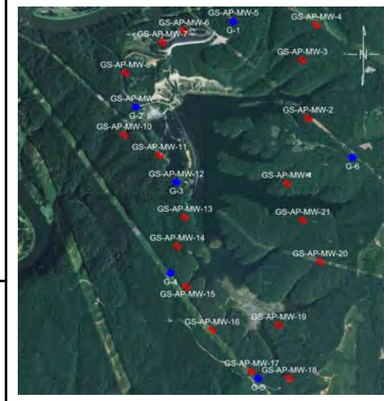
HPFM MEASUREMENTS:

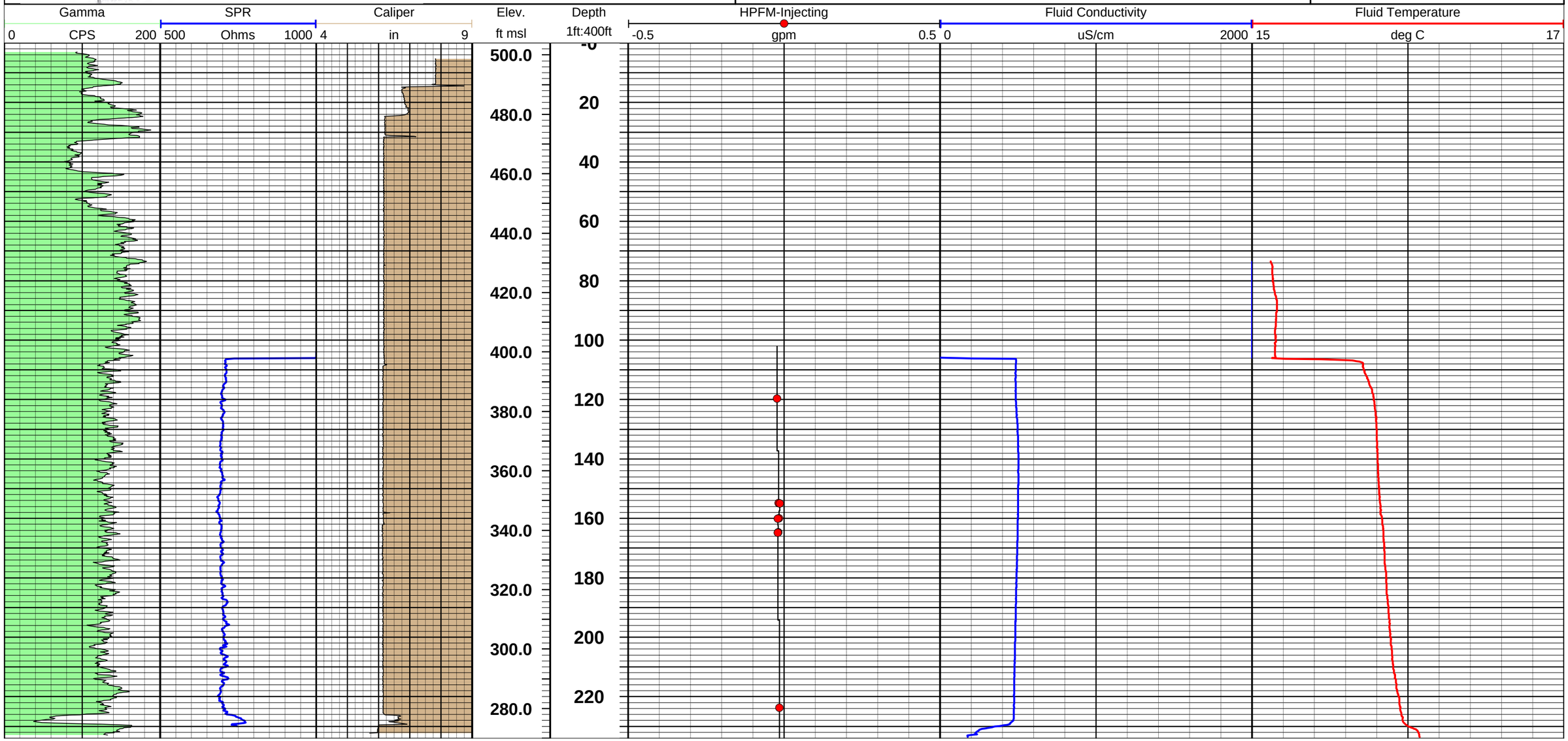
Depth_ft	AcqDateTime	PickTime_s	Flow_gpm
119.95	2/3/2016 12:52:56	10.87	-0.02
155.07	2/3/2016 12:23:27	13.23	-0.02
155.25	2/3/2016 13:01:22	15.49	-0.01
160.19	2/3/2016 13:04:31	13.61	-0.02
160.41	2/3/2016 12:26:44	11.48	-0.02
164.94	2/3/2016 12:30:00	12.39	-0.02
165.11	2/3/2016 13:08:07	11.43	-0.02
223.95	2/3/2016 12:38:12	14.68	-0.02

Notes:

The HPFM was run while injecting at 0.3 gpm. The transducer was placed at 110 ft bgs.

Well Location Map





GEOPHYSICAL RECORD OF BOREHOLE: GSAP-MW21V

Plant Gorgas - CCR Delineation Wells

GOLDER

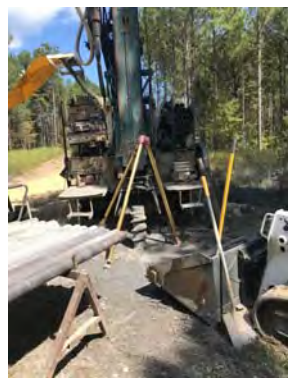
Project Number: 19131304

Client: Southern Company Services

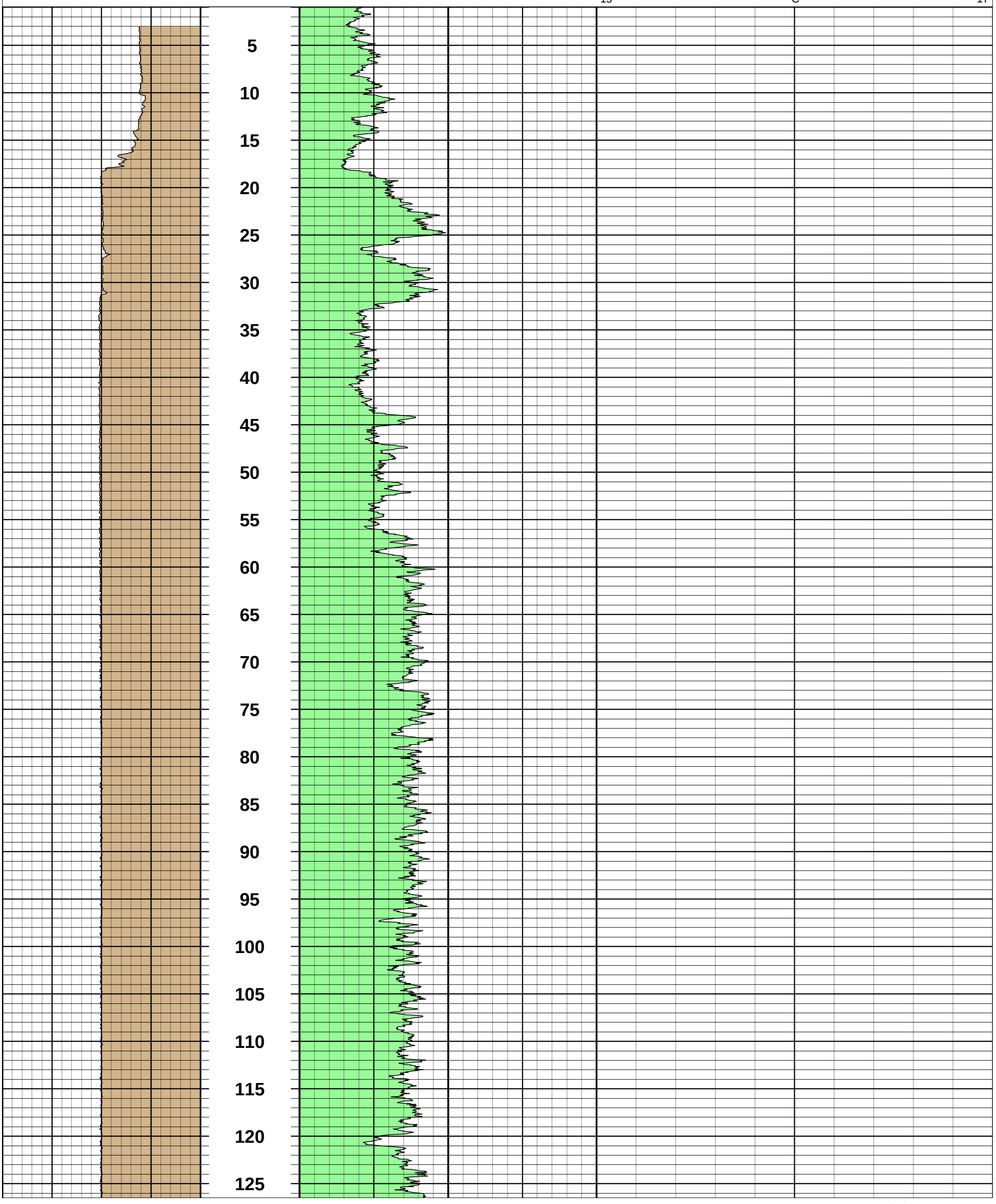
Southern Company

Date: 9-25-2019

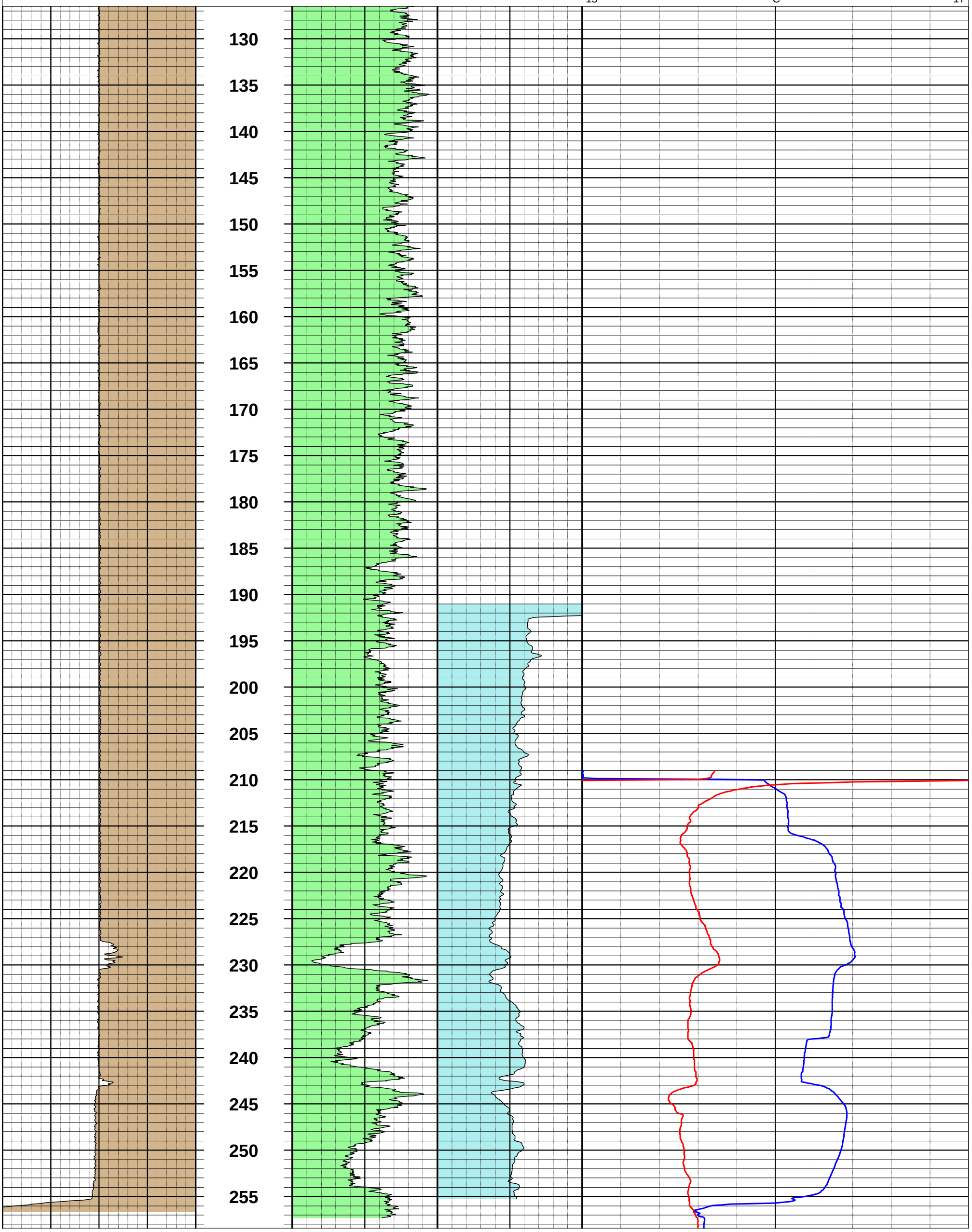
Location: Parrish, Al	TOC Elev msl: na	Notes: FTC under recovery conditions, drilling just finished.
Easting: na	Casing Stick-up: 2.23 ft ags	Tools used were:
Northing: na	Casing Diameter: 6.625 in ID	QL40-FTC sn 5518
Ground Elev msl: na	Casing Material: Steel HSA	QL40 Caliper sn 5521
Borehole Dip: vertical	Water Level: 210 ft BGS	40-LGR-Gamma & SPR sn 5809
Borehole Az: na	Logged By: CAB	
Borehole Size: 5.5" AH	Log Depth Ref: Ground Surface	
Drilled Depth: 262 ft BGS	Log Date: 9-25-19	
Drill Comp Date: 9-25-19	Image Plot(s) Ref: MN	
Casing Depth: 17 ft bgs	Dip Referenced to Horizontal	



Caliper: 4 in 8 | Depth: 1ft:120ft | Gamma: 0 CPS 200 | SPR: 300 Ohms 500 | Fluid Conductivity: 0 uS/cm 1000 | Fluid Temperature: 15 'C 17



Caliper	Depth	Gamma	SPR	Fluid Conductivity
4 in 8	1ft:120ft	0 CPS 200	300 Ohms 500	0 uS/cm 1000
				Fluid Temperature
				15 'C 17



GEOPHYSICAL RECORD OF BOREHOLE: GS-AP-MW-24H

PLANT GORGAS ASH POND DELINEATION WELLS

GOLDER

Project Number: 18114896

Client: Southern Company Services

Southern Company

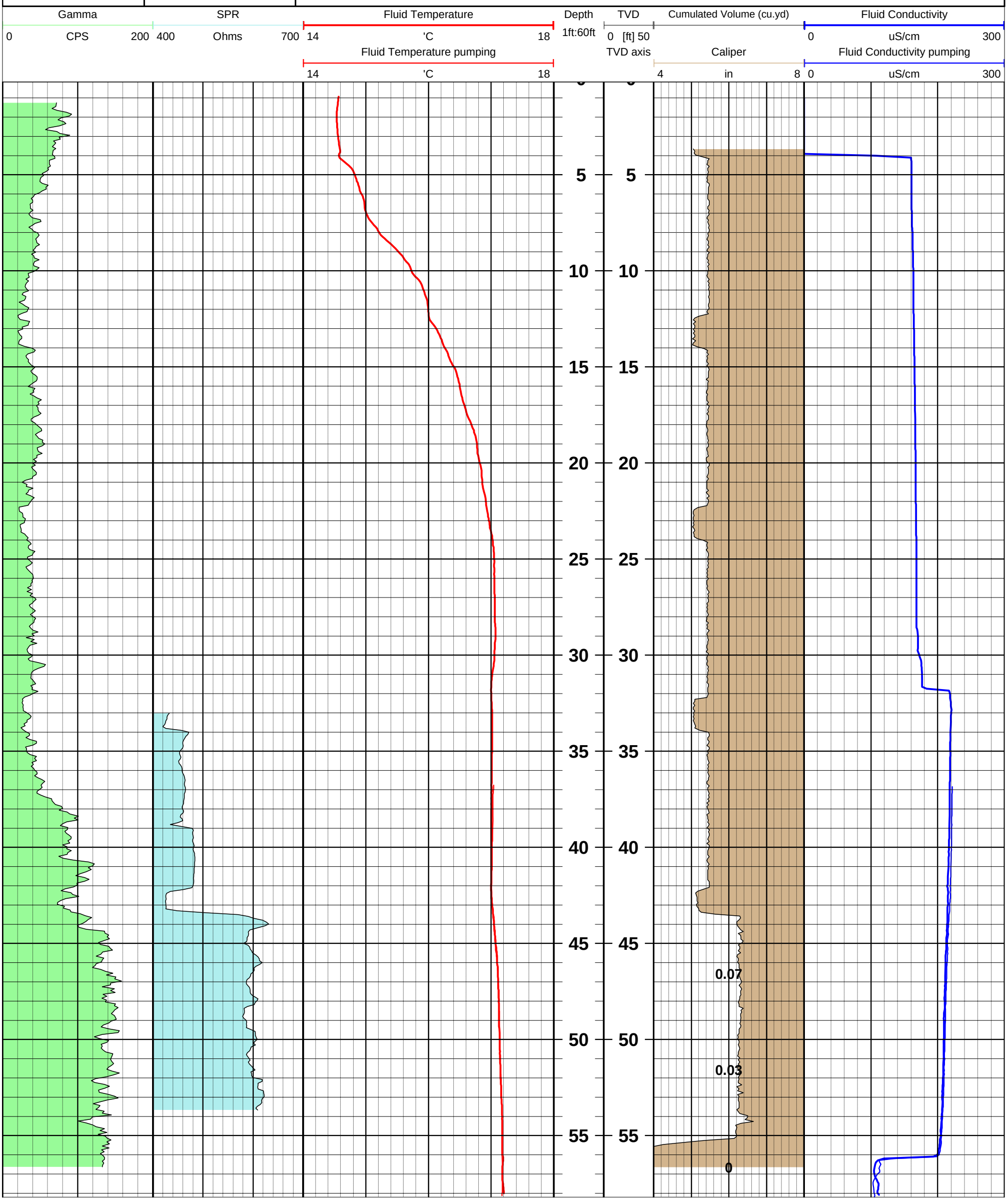
Date: 1-06-2019

Location: Parrish, Al	TOC Elev msl: na
Easting: na	Casing Stick-up: 1.9 ft ags
Northing: na	Casing Diameter: 5.4 in ID
Ground Elev msl: na	Casing Material: Steel
Borehole Dip: vertical	Water Level: 3.8 ft bgs
Borehole Az: na	Logged By: Abernathy
Borehole Size: 6" Sonic	Log Depth Ref: Ground
Drilled Depth: 60 ft	Log Date: 1-06-19
Drill Comp Date: 1-06-19	Image Plot(s) Ref: MN
Casing Depth: 43.5 ft bgs	Dip Referenced to Horizontal

Notes: The first FTC run was made under ambient conditions, and second FTC run made under pumping conditions, pump at 20 ft, pumping 1 gpm.

The deviation data was recorded with our OBI sn163404.
Closure Distance = 0.16 ft, Closure Angle = 91 deg & Tilt at BOH = 0.14 deg

Tools used were Decatur's QL40 set:
FTC sn5518
Caliper sn5521
Gamma sn5499
SPR 40-LGR sn5809
Deviation OBI sn163404



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GEOPHYSICAL RECORD OF BOREHOLE: GS-AP-MW-25H

PLANT GORGAS ASH POND DELINEATION WELLS

GOLDER

Project Number: 18114896

Client: Southern Company Services

Southern Company

Date: 1-31-2019

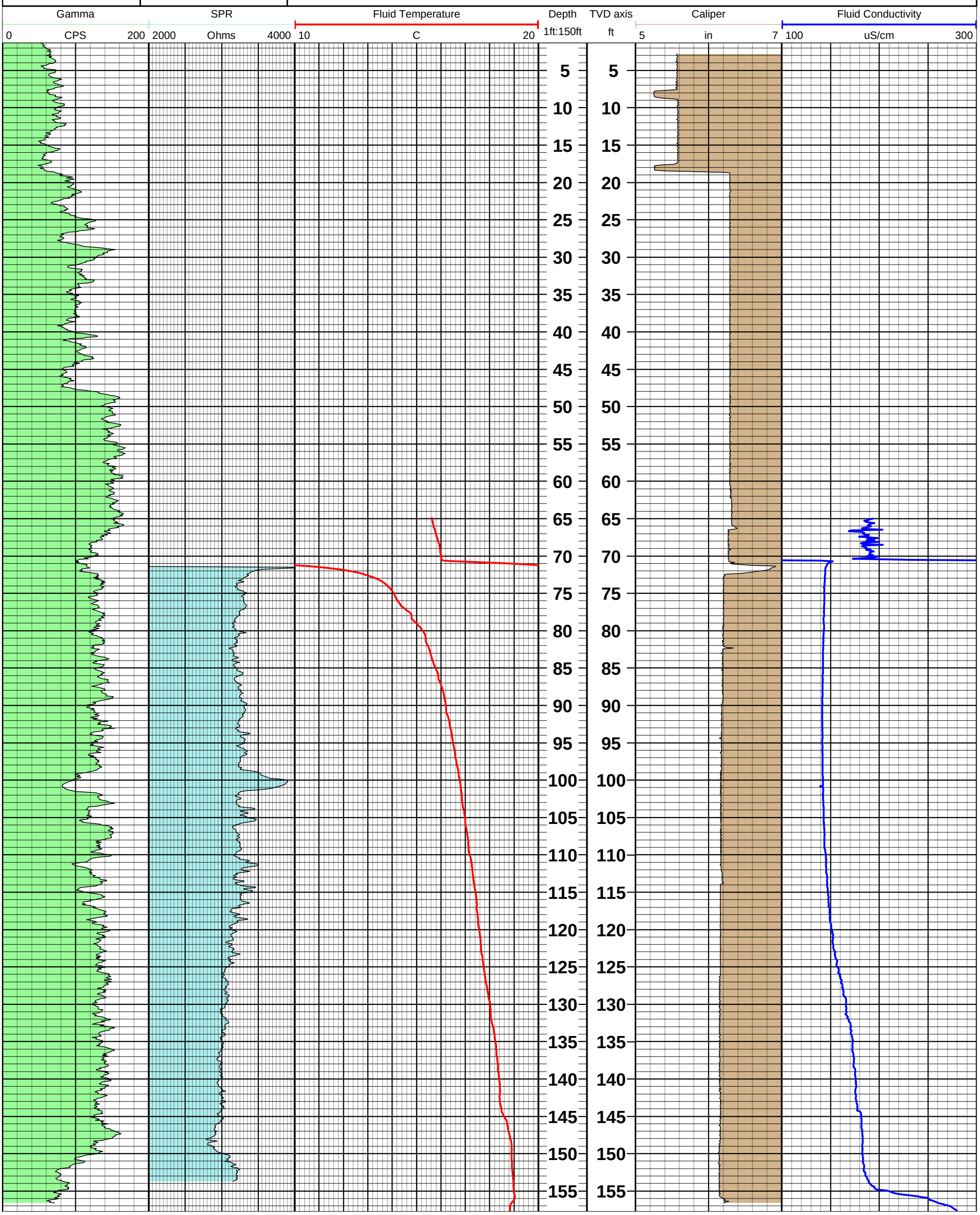
Location: Parrish, Al	TOC Elev msl: na
Easting: na	Casing Stick-up: 2 ft ags
Northing: na	Casing Diameter: 5.4 in ID
Ground Elev msl: na	Casing Material: Steel
Borehole Dip: vertical	Water Level: 70.3 ft bgs
Borehole Az: na	Logged By: BA
Borehole Size: 6" Sonic	Log Depth Ref: Ground
Drilled Depth: 170 ft	Log Date: 1-31-19
Drill Comp Date: 1-31-19	Image Plot(s) Ref: MN
Casing Depth: 20 ft bgs	Dip Referenced to Horizontal

Notes:

Deviation data recorded with QL40-DEV rental tool.
Closure Distance = 0.53 ft, Closure Angle = 21.3 deg & Tilt at BOH = 0.82 deg

Tools used were:
FTC sn6103 MSI rental
Caliper 2PCA-1000 sn4824 MSI rental
Gamma 40-LGR sn5809
Deviation QL40-DEV sn182909





GEOPHYSICAL RECORD OF BOREHOLE: GSAP-MW25HA

Plant Gorgas - CCR Delineation Wells

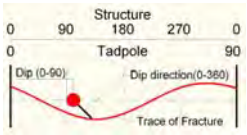
GOLDER

Project Number: 19131304

Client: Southern Company Services

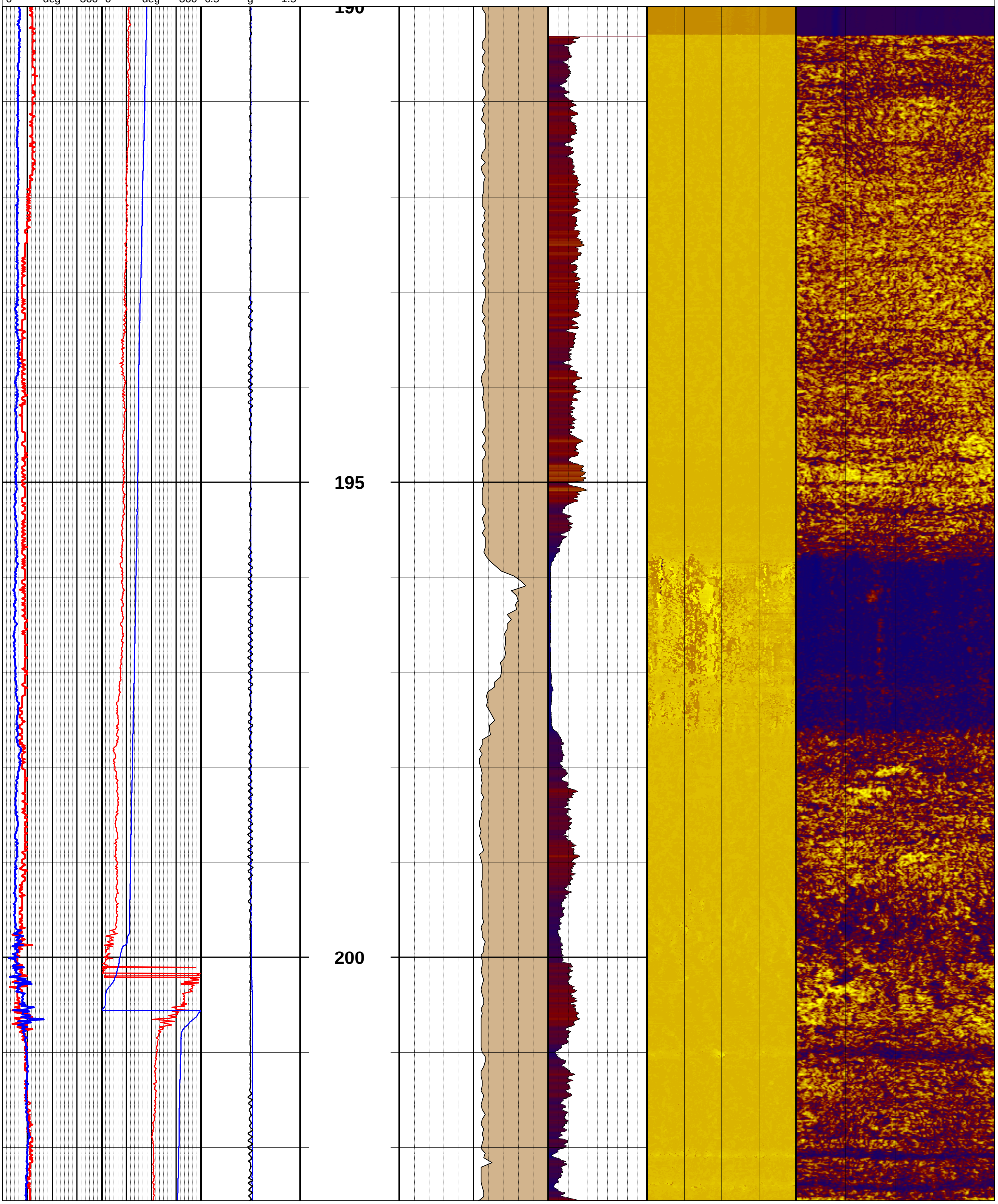
Date: 11-5-2019

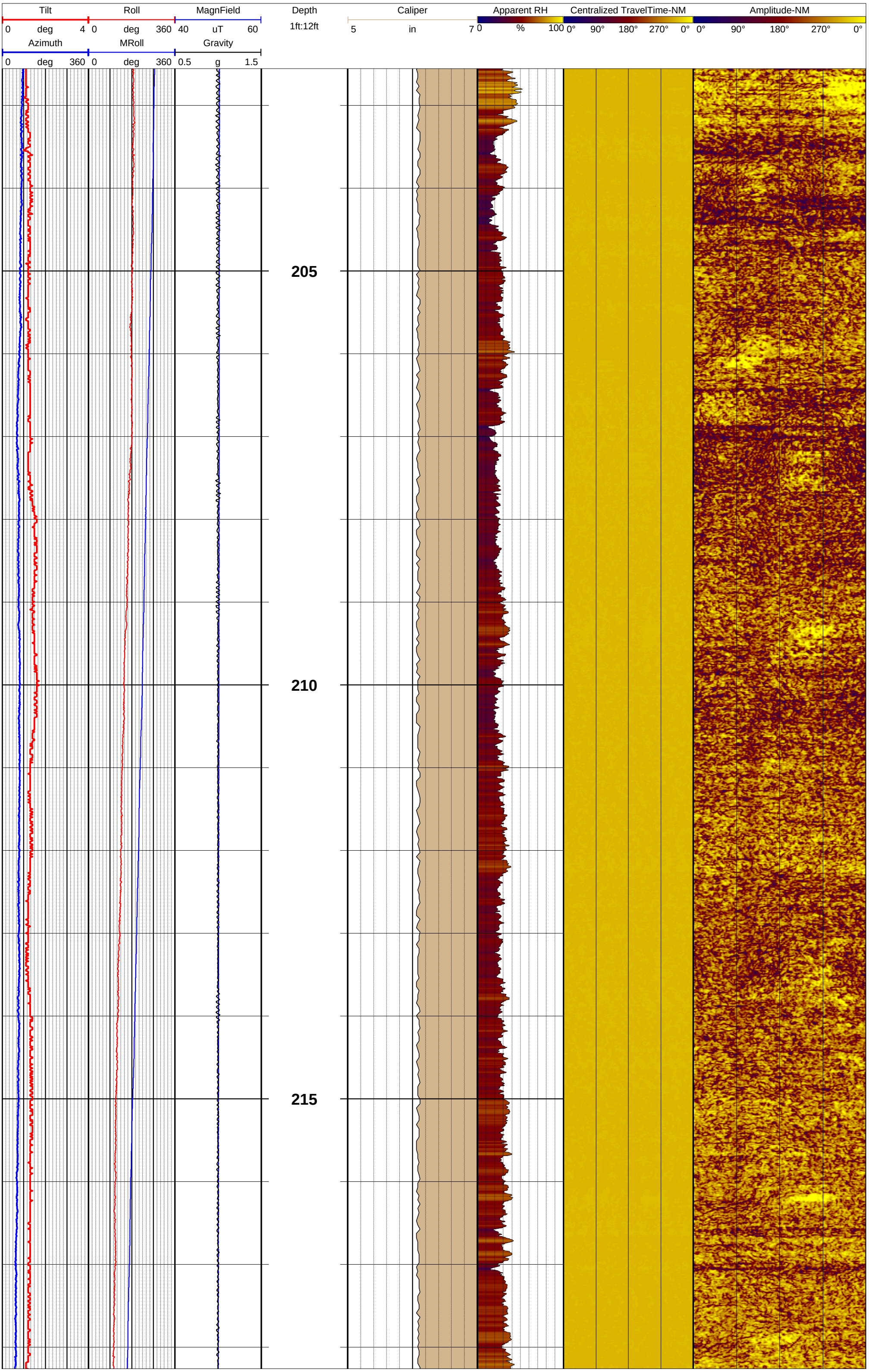
Location: Parrish, Al	TOC Elev msl: na	Notes: 117.295' BGS @ 7:45 am rods in hole Crew pulled out rods at 11/05 8:45 am Tools used were: QL40-FTC sn 5518 QL40 Caliper sn 5521 40-LGR-Gamma & SPR sn 5809 ATV ABI40 sn162305
Easting: na	Casing Stick-up: 1.83 ft ags	
Northing: na	Casing Diameter: 6.625 in ID	
Ground Elev msl: na	Casing Material: Steel	
Borehole Dip: vertical	Water Level: rising	
Borehole Az: na	Logged By: CM & CAB	
Borehole Size: 6" AH	Log Depth Ref: Ground Surface	
Drilled Depth: 350 ft BGS	Log Date: 11/05/2019	
Drill Comp Date: 10-29-19	Image Plot(s) Ref: MN	
Casing Depth: 38 ft bgs	Dip Referenced to Horizontal	

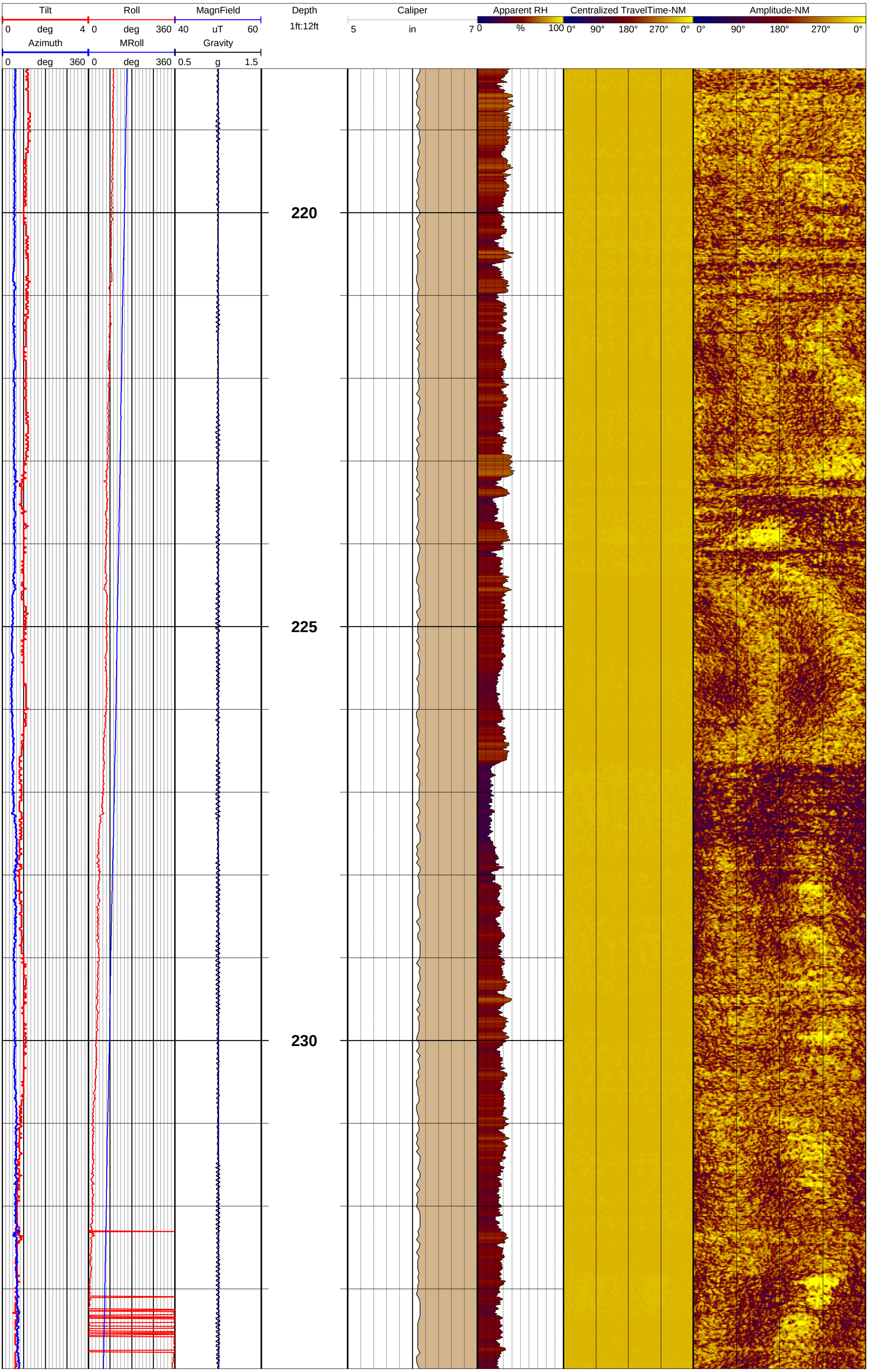


Tilt 0 deg 4 | Roll 0 deg 360 | MagnField 40 uT 60 | Depth 1ft:12ft | Caliper 5 in 7 | Apparent RH 0 % 100 | Centralized TravelTime-NM 0° 90° 180° 270° 0° | Amplitude-NM 0° 90° 180° 270° 0°

Azimuth 0 deg 360 | MRoll 0 deg 360 | Gravity 0.5 g 1.5




Tilt
0 deg 4
Roll
0 deg 360
MagnField
40 uT 60
Azimuth
0 deg 360
MRoll
0 deg 360
Gravity
0.5 g 1.5
Depth
1ft:12ft
Caliper
5 in 7
Apparent RH
0 % 100
Centralized TravelTime-NM
0° 90° 180° 270° 0°
Amplitude-NM
0° 90° 180° 270° 0°
205
210
215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Gravity
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Depth
1ft:12ft
220
225
230
Caliper
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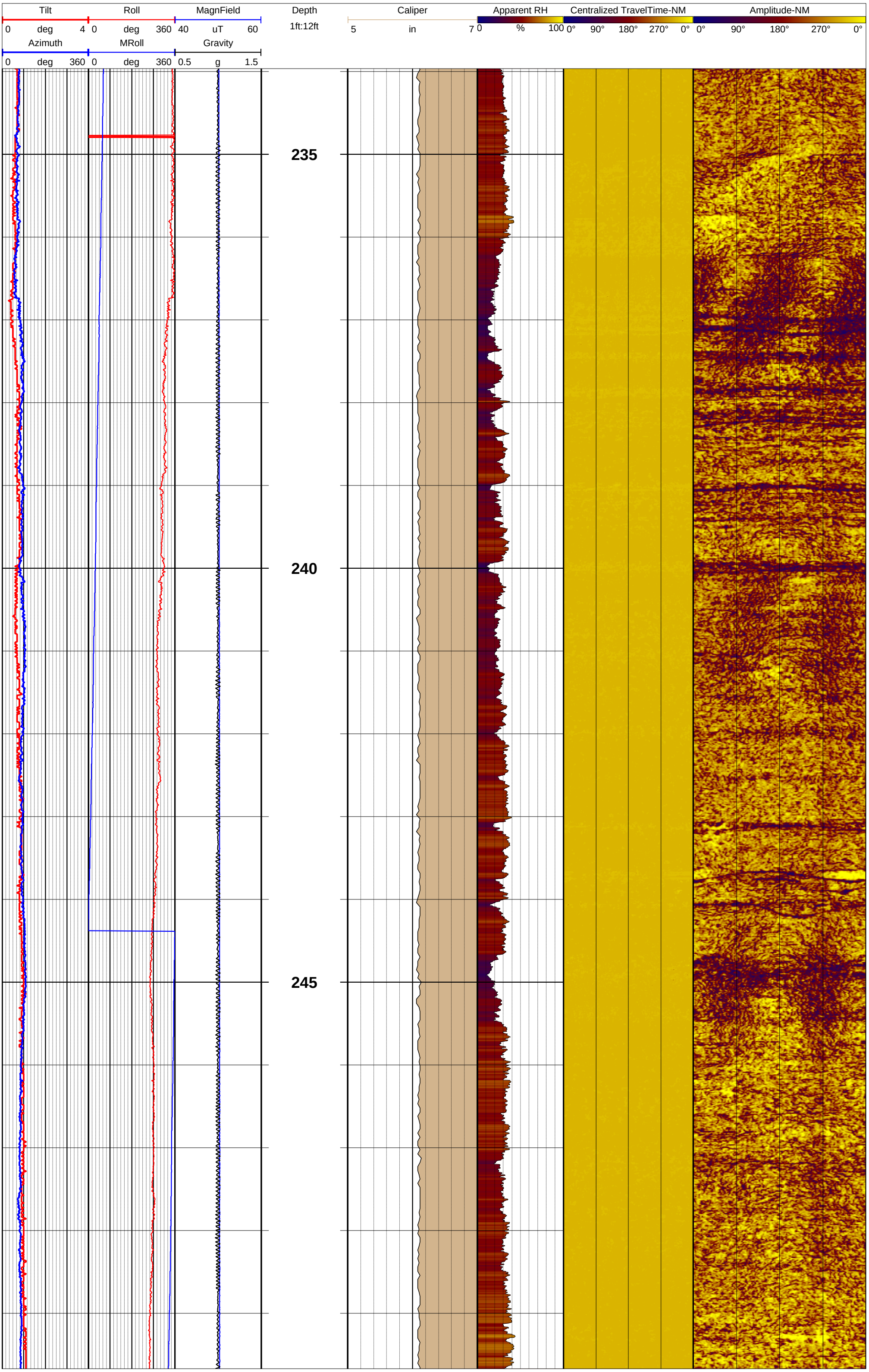
Amplitude-NM
0° 90° 180° 270° 0°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Roll
0 deg 360
MagnField
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Azimuth
0 deg 360
MRoll
0 deg 360
Gravity
0.5 g 1.5
Depth
1ft:12ft
Caliper
5 in 7
Apparent RH
0 % 100
Centralized TravelTime-NM
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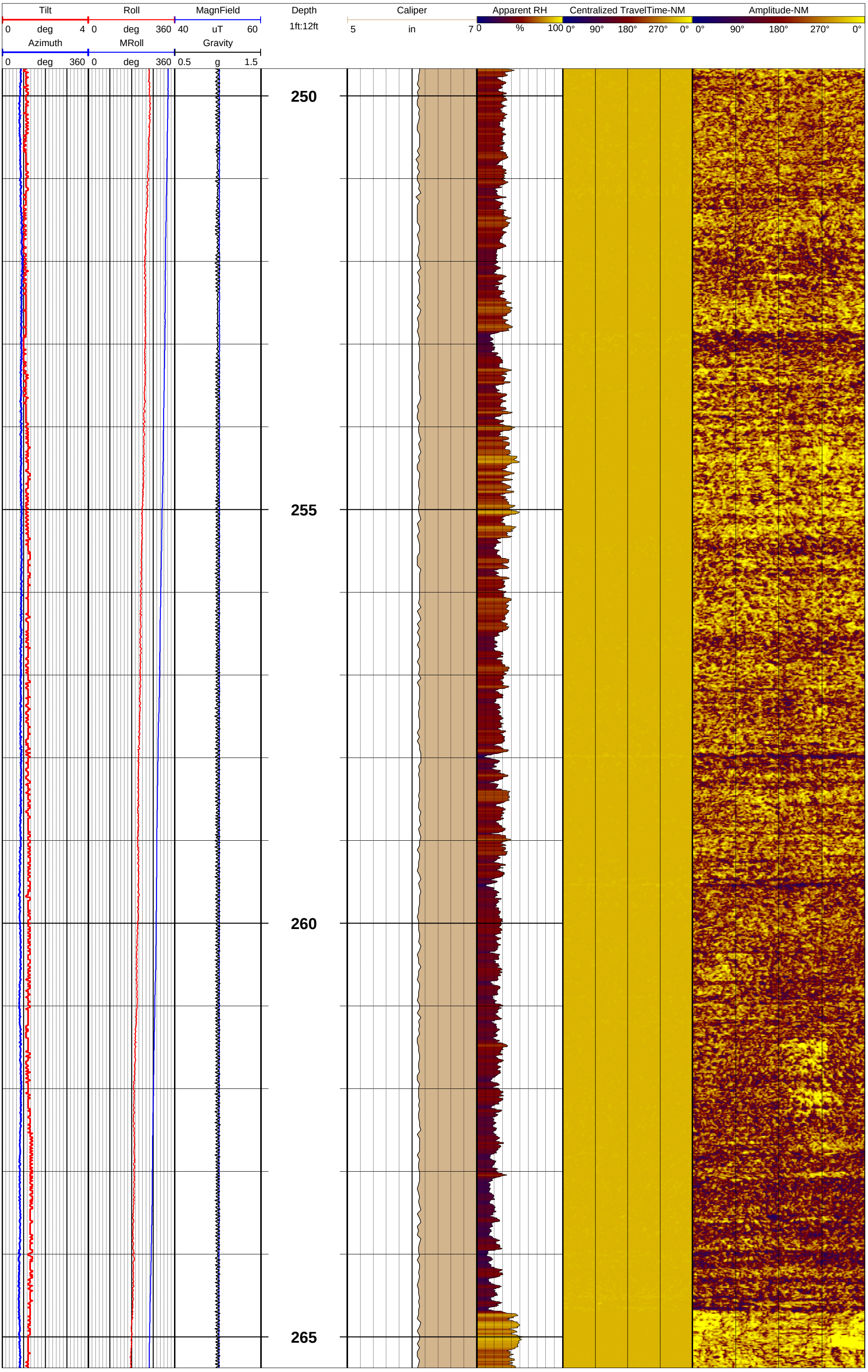
Amplitude-NM
0° 90° 180° 270° 0°
235
240
245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Caliper
5 in 7
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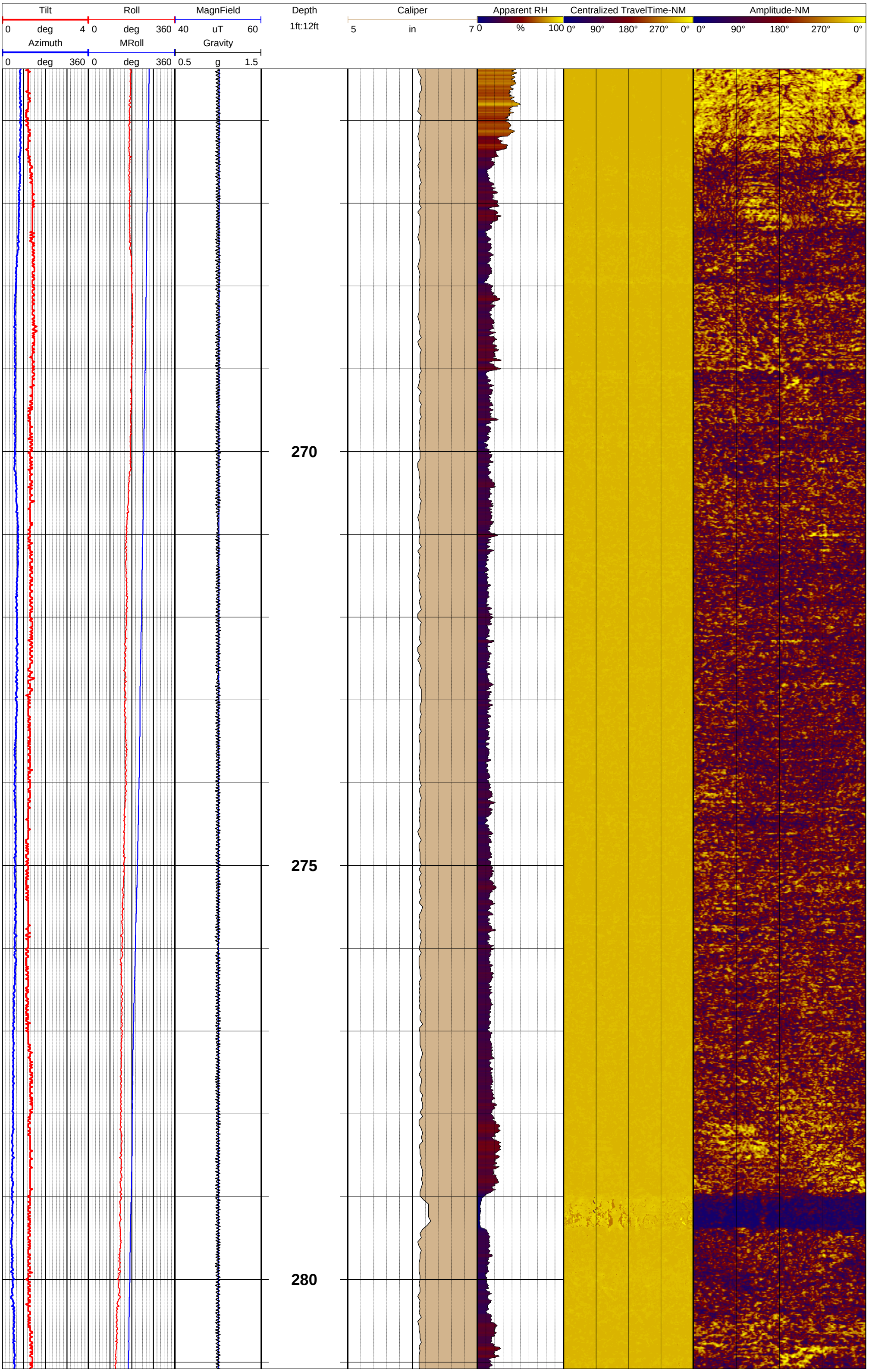
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Depth
1ft:12ft
Caliper
5 in 7
Apparent RH
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Centralized TravelTime-NM
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Amplitude-NM
0° 90° 180° 270° 0°
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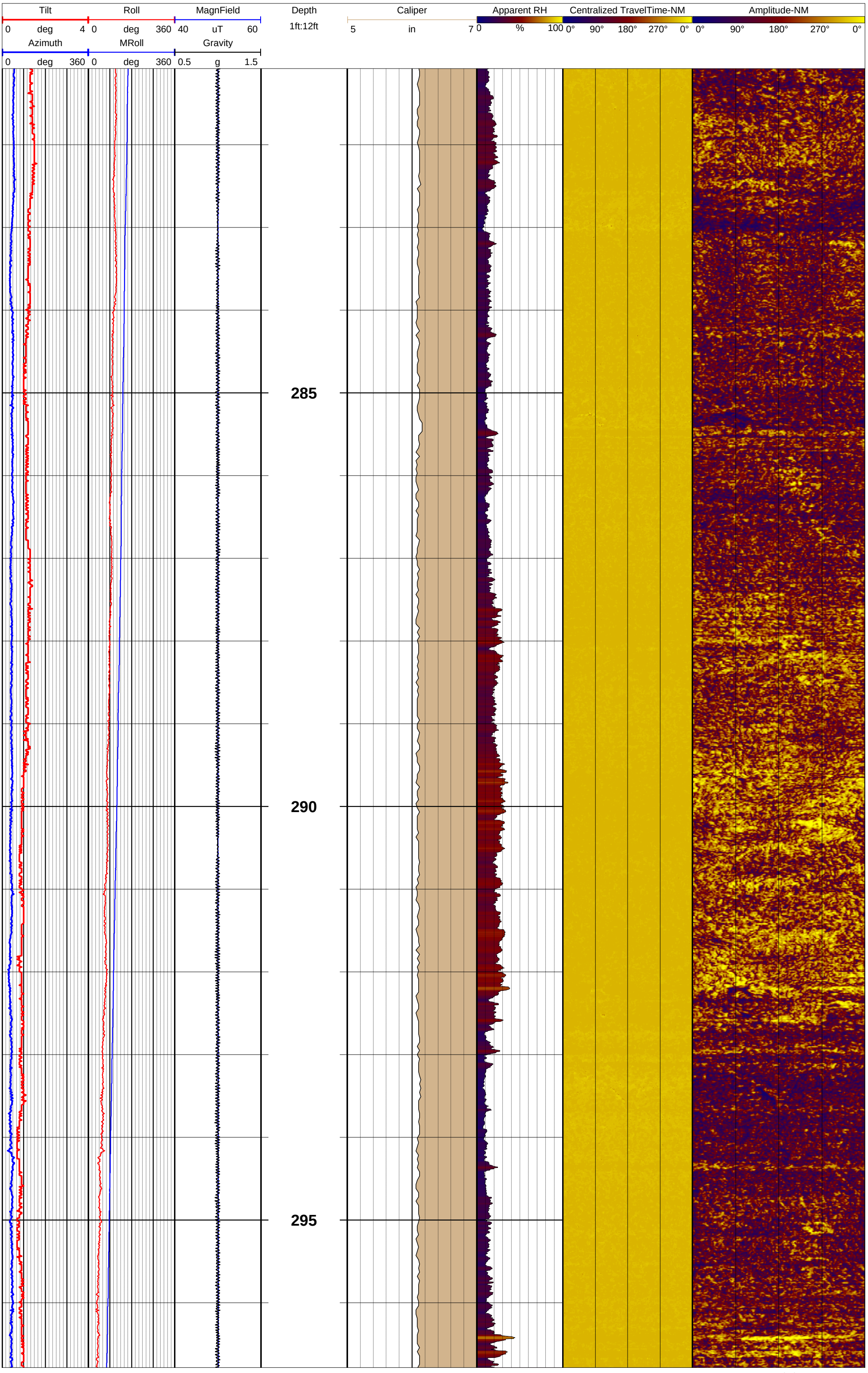
275
280


Tilt
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0 deg 360
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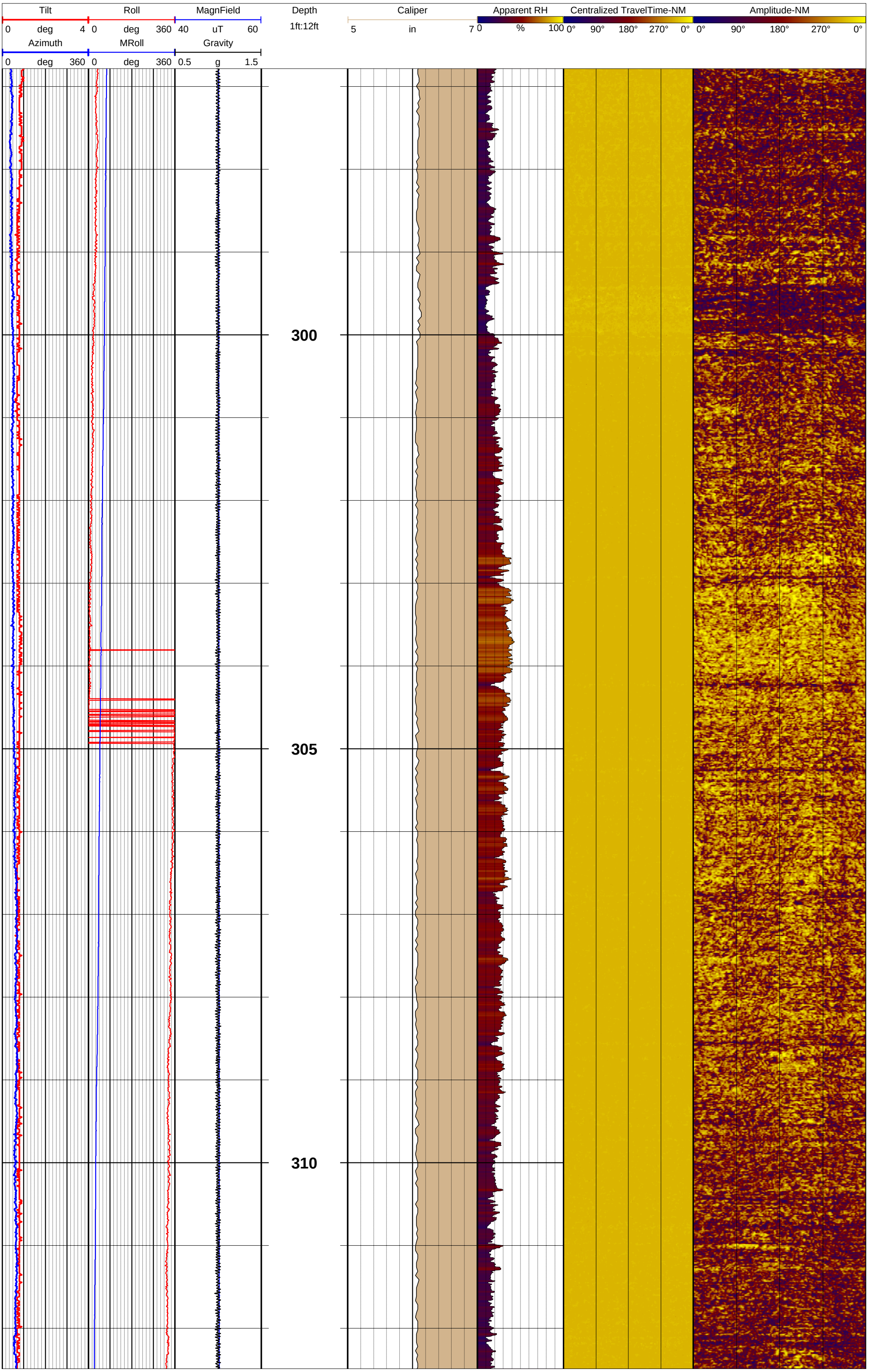
Gravity
0.5 g 1.5
Depth
1ft:12ft
Caliper
5 in 7
Apparent RH
0 % 100
Centralized TravelTime-NM
0° 90° 180° 270° 0°
Amplitude-NM
0° 90° 180° 270° 0°
285
290
295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Azimuth
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MRoll
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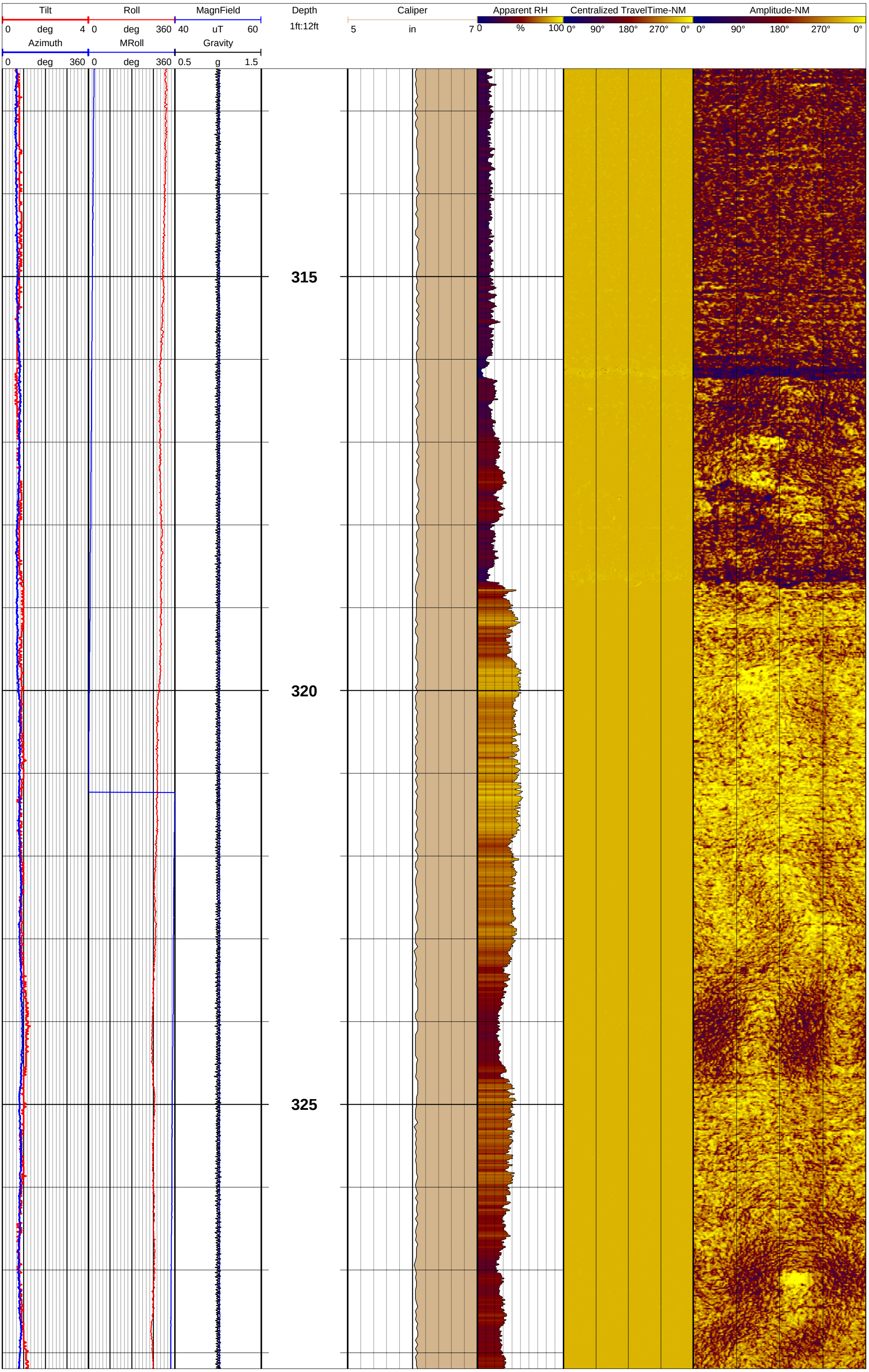
Gravity
0.5 g 1.5
Depth
1ft:12ft
Caliper
5 in 7
Apparent RH
0 % 100
Centralized TravelTime-NM
0° 90° 180° 270° 0°
Amplitude-NM
0° 90° 180° 270° 0°
300
305
310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Depth
1ft:12ft
315
320
325
Caliper
5 in 7
Apparent RH
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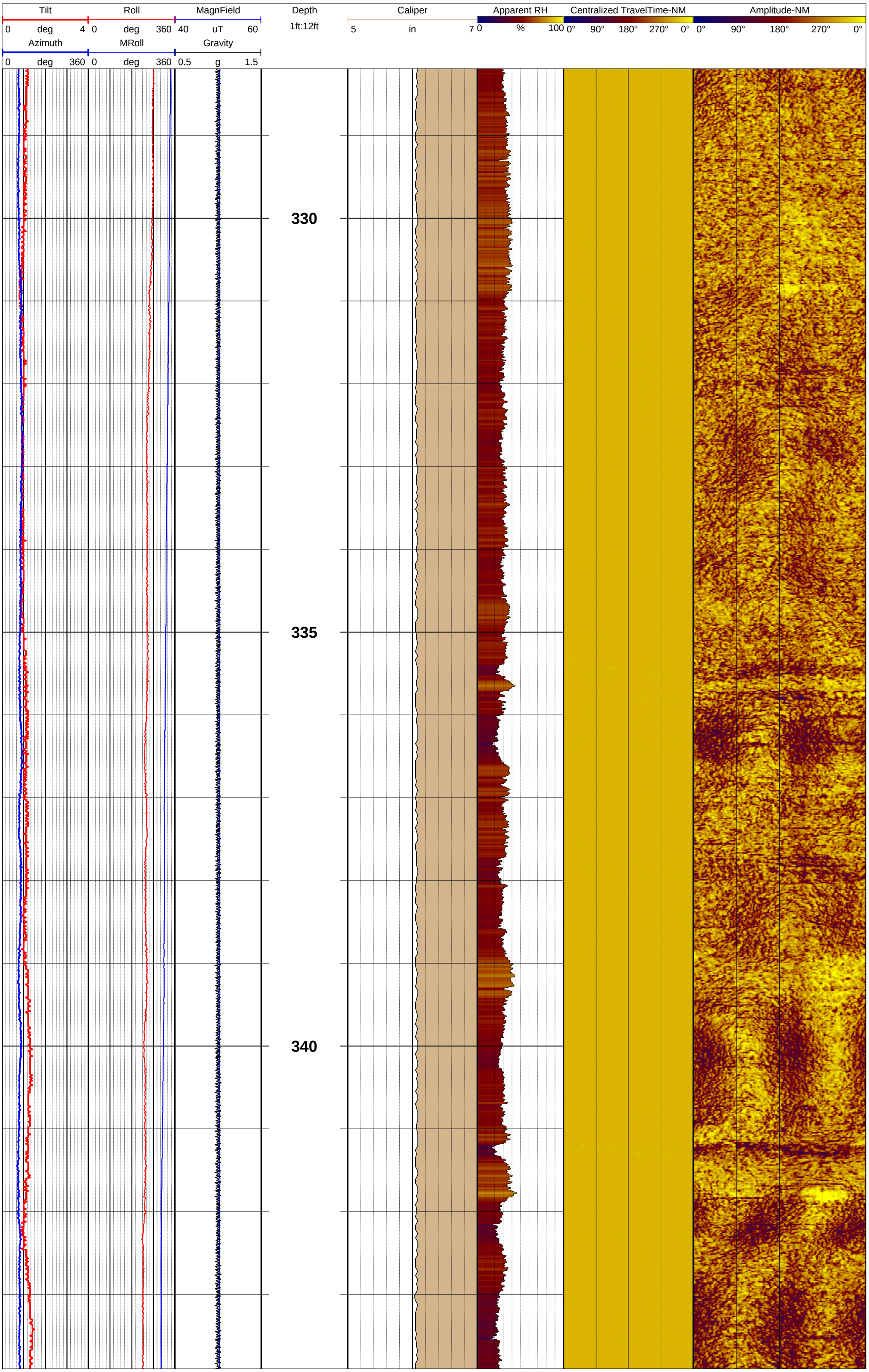
Amplitude-NM
0° 90° 180° 270° 0°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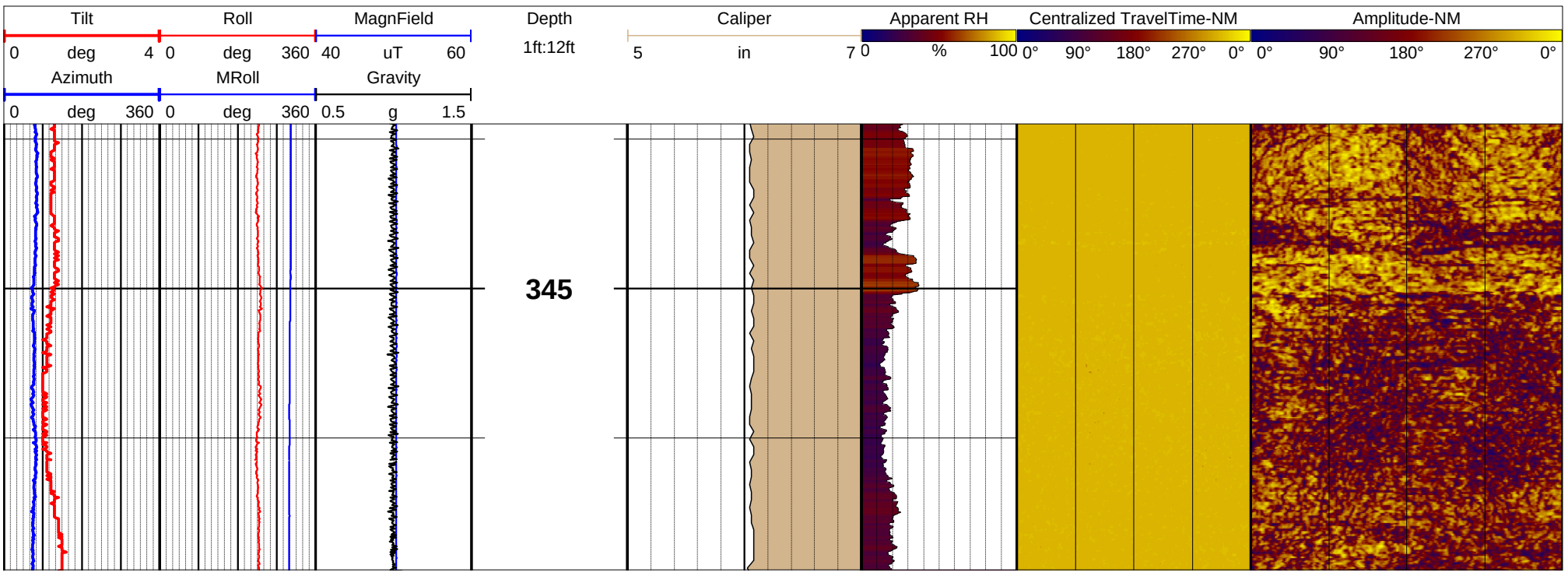
MagnField
40 uT 60
Azimuth
0 deg 360
MRoll
0 deg 360
Gravity
0.5 g 1.5
Depth
1ft:12ft
330
335
340
Caliper
5 in 7
Apparent RH
0 % 100
Centralized TravelTime-NM
0° 90° 180° 270° 0°
Amplitude-NM
0° 90° 180° 270° 0°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Roll
0 deg 360
MagnField
40 uT 60
Azimuth
0 deg 360
MRoll
0 deg 360
Gravity
0.5 g 1.5
Depth
1ft:12ft
345
Caliper
5 in 7
Apparent RH
0 % 100
Centralized TravelTime-NM
0° 90° 180° 270° 0°
Amplitude-NM
0° 90° 180° 270° 0°

GEOPHYSICAL RECORD OF BOREHOLE: GSAP-MW25HA

Plant Gorgas - CCR Delineation Wells

GOLDER

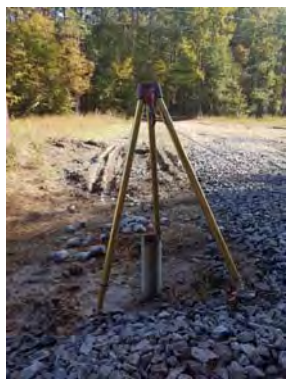
Project Number: 19131304

Client: Southern Company Services

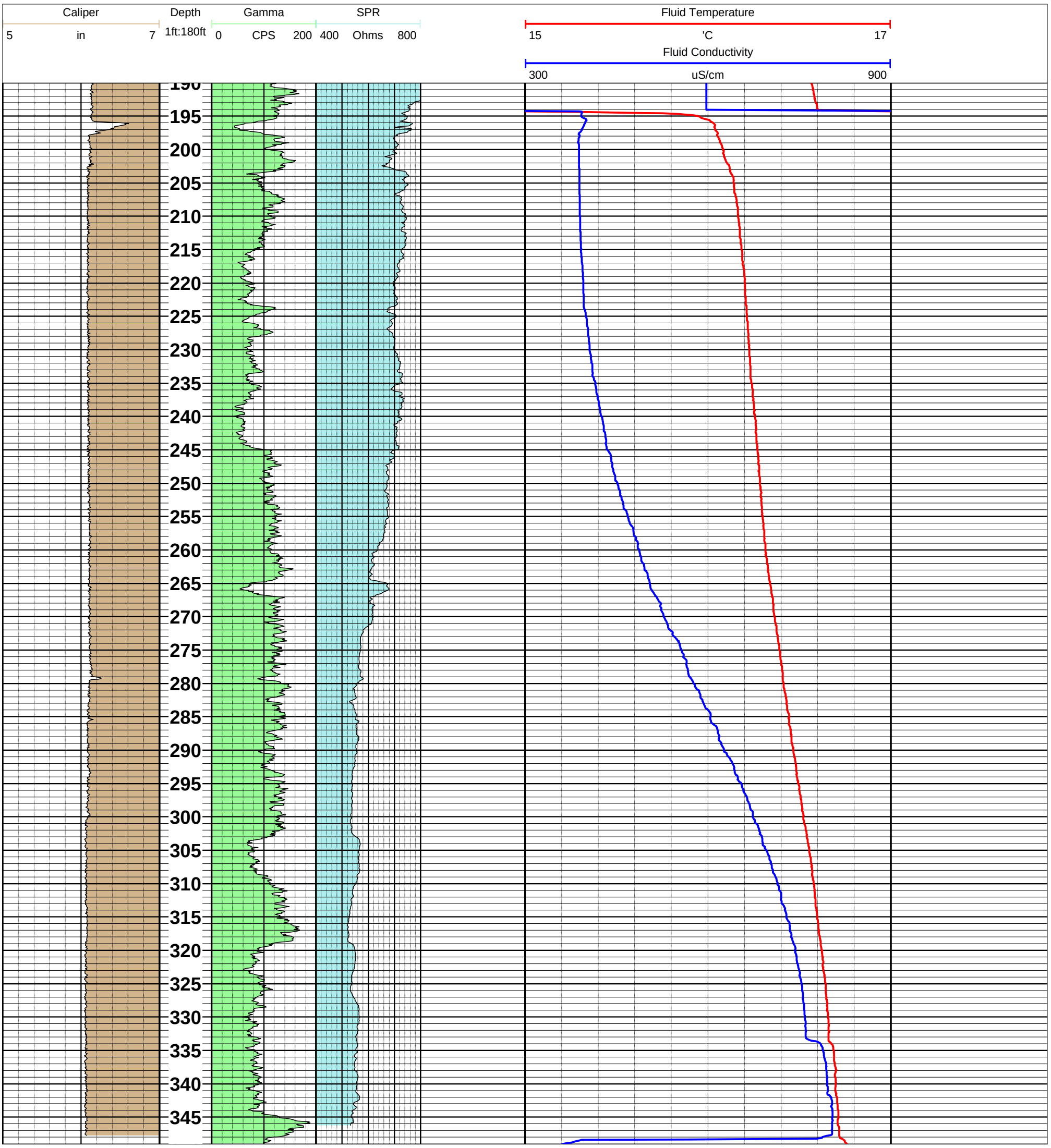
Southern Company

Date: 11-05-2019

Location: Parrish, Al	TOC Elev msl: na	Notes: 117.295' BGS @ 7:45 am rods in hole Crew pulled out rods at 11/05 8:45 am Tools used were: QL40-FTC sn 5518 QL40 Caliper sn 5521 40-LGR-Gamma & SPR sn 5809 ATV ABI40 sn162305
Easting: na	Casing Stick-up: 1.83 ft ags	
Northing: na	Casing Diameter: 6.625 in ID	
Ground Elev msl: na	Casing Material: Steel	
Borehole Dip: vertical	Water Level: rising	
Borehole Az: na	Logged By: CM & CAB	
Borehole Size: 6" AH	Log Depth Ref: Ground Surface	
Drilled Depth: 350 ft BGS	Log Date: 11/05/2019	
Drill Comp Date: 10-29-19	Image Plot(s) Ref: MN	
Casing Depth: 38 ft bgs	Dip Referenced to Horizontal	



Caliper: 5 in 7 | Depth: 1ft:180ft | Gamma: 0 CPS 200 | SPR: 400 Ohms 800 | Fluid Temperature: 15 'C 17 | Fluid Conductivity: 300 uS/cm 900


Caliper
5
in
7
Depth
1ft:180ft
Gamma
0
CPS
200
SPR
400
Ohms
800
Fluid Temperature
15
'C
17
Fluid Conductivity
300
uS/cm
900
190
195
200
205
210
215
220
225
230
235
240
245
250
255
260
265
270
275
280
285
290
295
300
305
310
315
320
325
330
335
340
345

GEOPHYSICAL RECORD OF BOREHOLE: GS-AP-MW-26H

PLANT GORGAS ASH POND DELINEATION WELLS

GOLDER

Project Number: 18114896

Client: Southern Company Services

Southern Company

Date: 1-19-2019

Location: Parrish, Al	TOC Elev msl: na
Easting: na	Casing Stick-up: 1.5 ft ags
Northing: na	Casing Diameter: 5.4 in ID
Ground Elev msl: na	Casing Material: Steel
Borehole Dip: vertical	Water Level: 52.5 ft bgs
Borehole Az: na	Logged By: BA & DH
Borehole Size: 6" Sonic	Log Depth Ref: Ground
Drilled Depth: 210 ft	Log Date: 1-18-19
Drill Comp Date: 1-18-19	Image Plot(s) Ref: MN
Casing Depth: 29.0 ft bgs	Dip Referenced to Horizontal

Notes: The FTC run was made under static conditions.

The deviation data was recorded with our OBI sn163404.
Closure Distance = 7.1 ft, Closure Angle = 67.1 deg & Tilt at BOH = 3.9 deg

Tools used were Decatur's QL40 set:
FTC sn5518
Caliper sn5521
Gamma sn5499
SPR + Normal Res QL40 sn5512
Deviation OBI sn163404



Gamma	Depth	TVD axis	Caliper	SPR	N8	N16	N32	N64
0 CPS 200	1ft:150ft	ft	3 in 8	0 Ohm 700	70 Ohm.m 700	70 Ohm.m 700	70 Ohm.m 700	70 Ohm.m 700

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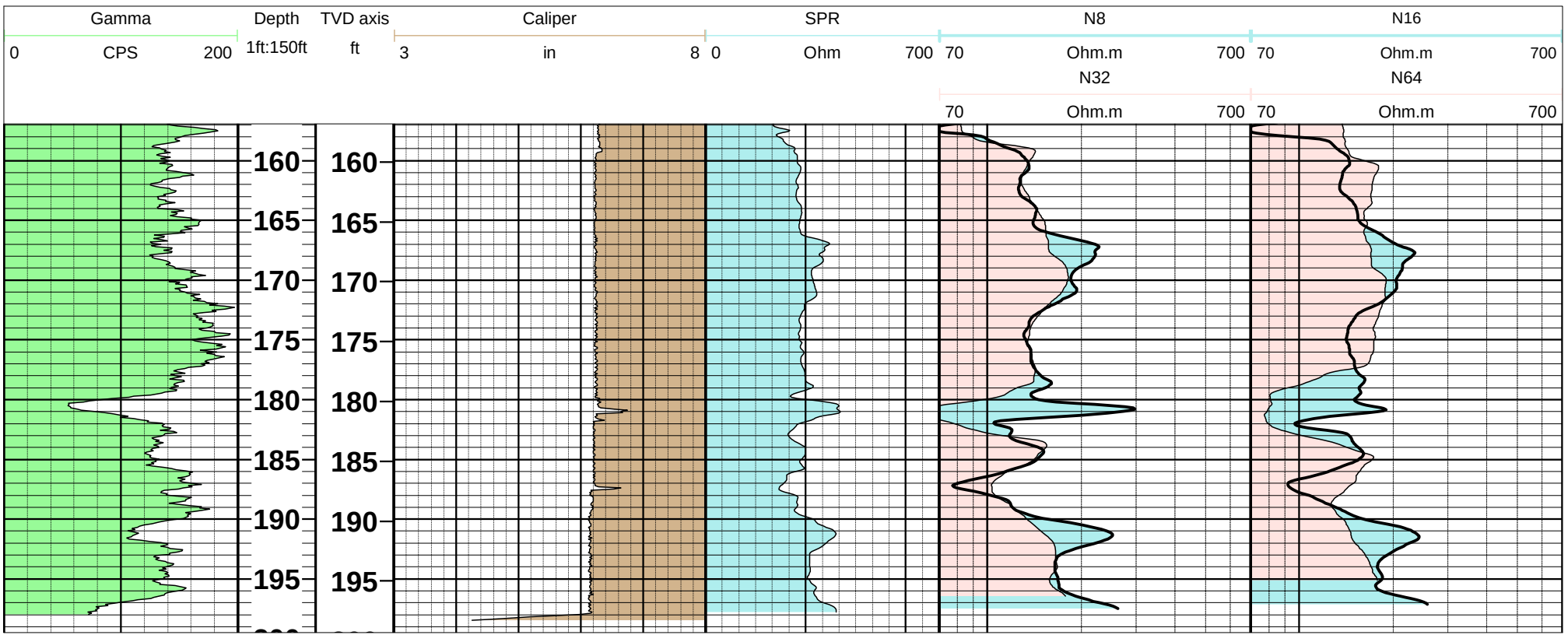
Gamma
0
CPS
200
Depth
1ft:150ft
TVD axis
ft
Caliper
3
in
8
SPR
0
Ohm
700
N8
70
Ohm.m
700
N16
70
Ohm.m
700
N32
70
Ohm.m
700
N64
70
Ohm.m
700
160
165
170
175
180
185
190
195

GEOPHYSICAL RECORD OF BOREHOLE: GS-AP-MW-26H

PLANT GORGAS ASH POND DELINEATION WELLS

GOLDER

Project Number: 18114896

Client: Southern Company Services

Southern Company

Date: 1-19-2019

Location: Parrish, Al	TOC Elev msl: na
Easting: na	Casing Stick-up: 1.5 ft ags
Northing: na	Casing Diameter: 5.4 in ID
Ground Elev msl: na	Casing Material: Steel
Borehole Dip: vertical	Water Level: 52.5 ft bgs
Borehole Az: na	Logged By: BA & DH
Borehole Size: 6" Sonic	Log Depth Ref: Ground
Drilled Depth: 210 ft	Log Date: 1-18-19
Drill Comp Date: 1-18-19	Image Plot(s) Ref: MN
Casing Depth: 29.0 ft bgs	Dip Referenced to Horizontal

Notes:

The FTC run was made under static conditions.

The deviation data was recorded with our OBI sn163404.
Closure Distance = 7.1 ft, Closure Angle = 67.1 deg & Tilt at BOH = 3.9 deg

Tools used were Decatur's QL40 set:
FTC sn5518
Caliper sn5521
Gamma sn5499
SPR + Normal Res QL40 sn5512
Deviation OBI sn163404



Gamma	SPR	Fluid Temperature	Depth	TVD axis	Caliper	Fluid Conductivity
0 CPS 200	70 Ohm 700	16 'C 19	1ft:150ft	ft	3 in 8	100 uS/cm 300
	N16: 70 Ohm.m 700					
	N64: 70 Ohm.m 700					

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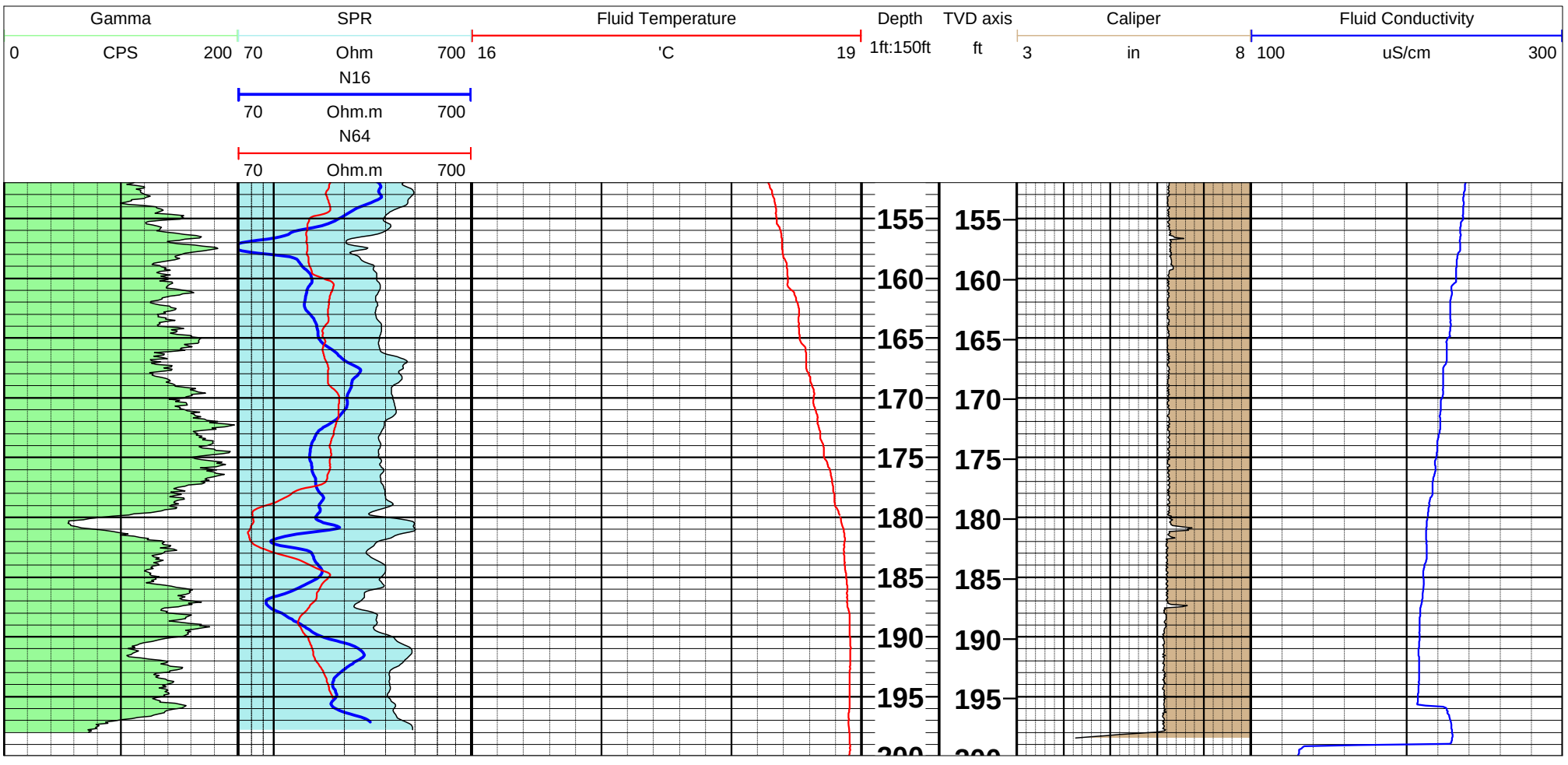

Gamma
0
CPS
200
SPR
70
Ohm
700
N16
70
Ohm.m
700
N64
70
Ohm.m
700
Fluid Temperature
16
'C
19
Depth
1ft:150ft
TVD axis
ft
Caliper
3
in
8
Fluid Conductivity
100
uS/cm
300
155
160
165
170
175
180
185
190
195

GEOPHYSICAL RECORD OF BOREHOLE: GS-AP-MW-27H

PLANT GORGAS ASH POND DELINEATION WELLS

GOLDER

Project Number: 18114896

Client: Southern Company Services

Southern Company

Date: 2-6-2019

Location: Parrish, Al	TOC Elev msl: na
Easting: na	Casing Stick-up: 5.5 ft ags
Northing: na	Casing Diameter: 5.4 in ID
Ground Elev msl: na	Casing Material: Steel
Borehole Dip: vertical	Water Level: 65 ft bgs
Borehole Az: na	Logged By: CM
Borehole Size: 6" Sonic	Log Depth Ref: Ground
Drilled Depth: 264 ft	Log Date: 2-6-19
Drill Comp Date: 2-6-19	Image Plot(s) Ref: MN
Casing Depth: 35 ft bgs	Dip Referenced to Horizontal

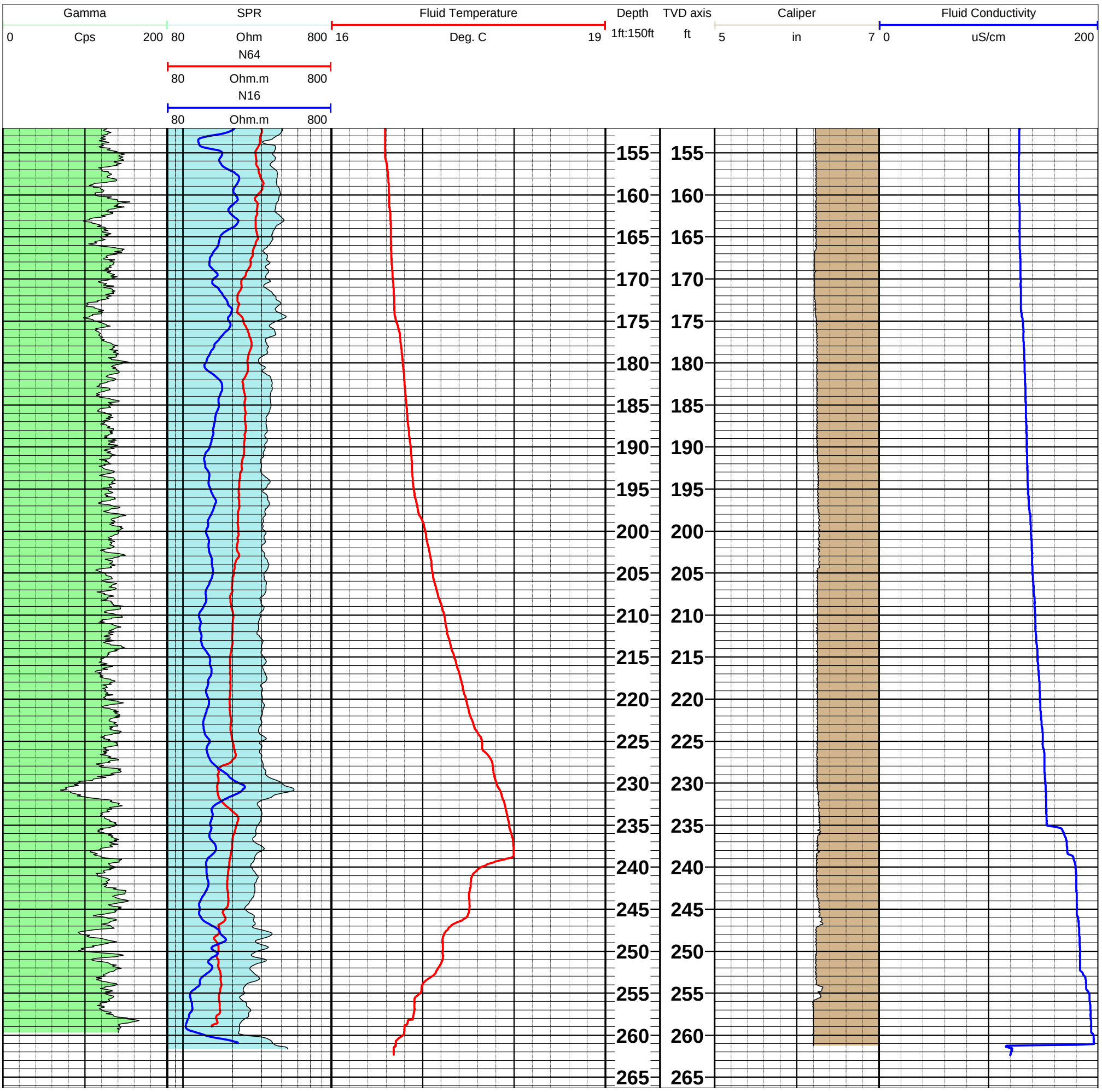
Notes:

Deviation data recorded with QL40-ABI sn162305.
Closure Distance = 2.1 ft, Closure Angle = 194.5 deg & Tilt at BOH = 0.32 deg

Tools used were:
FTC sn6103 MSI rental
Caliper 2PCA-1000 sn4824 MSI rental
Gamma QL40-GRP sn5515
SPR+ Normal Res QL40-GRP sn5515



Gamma	SPR	Fluid Temperature	Depth	TVD axis	Caliper	Fluid Conductivity
0 Cps 200	80 Ohm 800	16 Deg. C 19	1ft:150ft	ft	5 in 7	0 uS/cm 200
	N64 80 Ohm.m 800					
	N16 80 Ohm.m 800					


Gamma
0
Cps
200
SPR
80
Ohm
800
N64
80
Ohm.m
800
N16
80
Ohm.m
800
Fluid Temperature
16
Deg. C
19
Depth
1ft:150ft
TVD axis
ft
Caliper
5
in
7
Fluid Conductivity
0
uS/cm
200
155
160
165
170
175
180
185
190
195
200
205
210
215
220
225
230
235
240
245
250
255
260
265

GEOPHYSICAL RECORD OF BOREHOLE: GS-AP-MW-28H

PLANT GORGAS ASH POND DELINEATION WELLS

GOLDER

Project Number: 18114896

Client: Southern Company Services

Southern Company

Date: 2-18-2019

Location: Parrish, Al	TOC Elev msl: na
Easting: na	Casing Stick-up: 5.8 ft ags
Northing: na	Casing Diameter: 5.4 in ID
Ground Elev msl: na	Casing Material: Steel
Borehole Dip: vertical	Water Level: 144.1 ft bgs
Borehole Az: na	Logged By: CM
Borehole Size: 6" Sonic	Log Depth Ref: Ground
Drilled Depth: 245 ft	Log Date: 2-18-19
Drill Comp Date: 2-18-19	Image Plot(s) Ref: MN
Casing Depth: 25 ft bgs	Dip Referenced to Horizontal

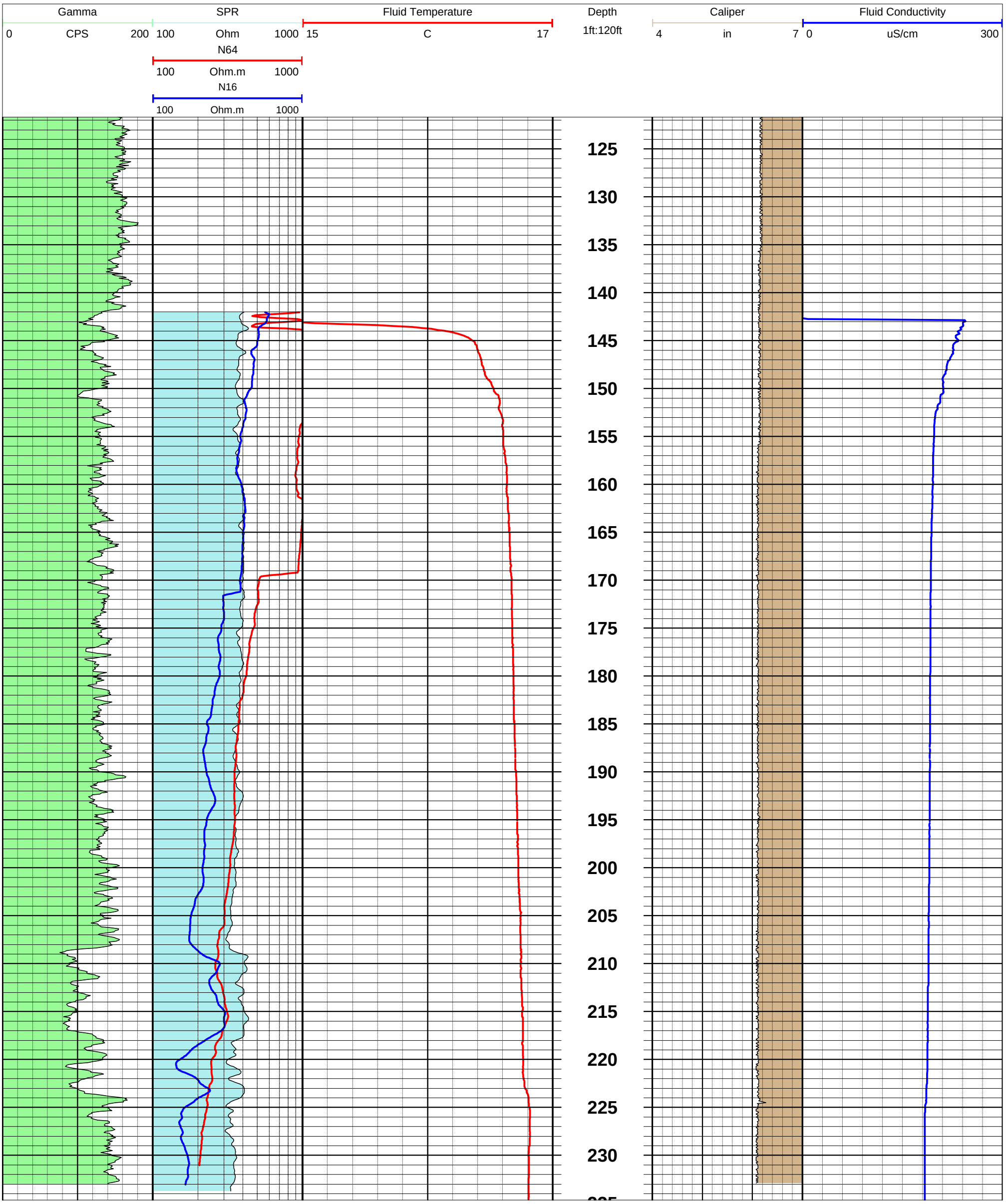
Notes:

Deviation data recorded with MSI rental QL40-DEV sn182909.
Tilt at BOH = 0.5 deg

Tools used were:
QL40 FTC sn5518
QL40 Caliper sn5521
QL40 Gamma sn5499
SPR 40-LGR sn5809



Gamma	SPR	Fluid Temperature	Depth	Caliper	Fluid Conductivity
0 CPS 200	100 Ohm 1000	15 C 17	1ft:120ft	4 in 7	0 uS/cm 300
	N64: 100 Ohm.m 1000				
	N16: 100 Ohm.m 1000				


Gamma
0
CPS
200
SPR
100
Ohm
1000
N64
100
Ohm.m
1000
N16
100
Ohm.m
1000
Fluid Temperature
15
C
17
Depth
1ft:120ft
Caliper
4
in
7
Fluid Conductivity
0
uS/cm
300
125
130
135
140
145
150
155
160
165
170
175
180
185
190
195
200
205
210
215
220
225
230

GEOPHYSICAL RECORD OF BOREHOLE: GS-AP-MW-29H

PLANT GORGAS ASH POND DELINEATION WELLS

GOLDER

Project Number: 18114896

Client: Southern Company Services

Southern Company

Date: 2-3-2019

Location: Parrish, Al	TOC Elev msl: na
Easting: na	Casing Stick-up: 2.4 ft ags
Northing: na	Casing Diameter: 5.4 in ID
Ground Elev msl: na	Casing Material: Steel
Borehole Dip: vertical	Water Level: 24.7 ft bgs
Borehole Az: na	Logged By: BA
Borehole Size: 6" Sonic	Log Depth Ref: Ground
Drilled Depth: 170 ft	Log Date: 2-3-19
Drill Comp Date: 2-3-19	Image Plot(s) Ref: MN
Casing Depth: 60 ft bgs	Dip Referenced to Horizontal

Notes:

Deviation data recorded with QL40-DEV rental tool.
Closure Distance = 0.64 ft, Closure Angle = 172.4 deg & Tilt at BOH = 0.5 deg

Tools used were:
FTC sn6103 MSI rental
Caliper 2PCA-1000 sn4824 MSI rental
Gamma 40-LGR sn5809
Deviation QL40-DEV sn182909
Gamma +SPR+Normal Res QL40-GRP sn5515



Gamma: 0 CPS 200

SPR: 100 Ohm 1000

N64: 100 Ohm.m 1000

N16: 100 Ohm.m 1000

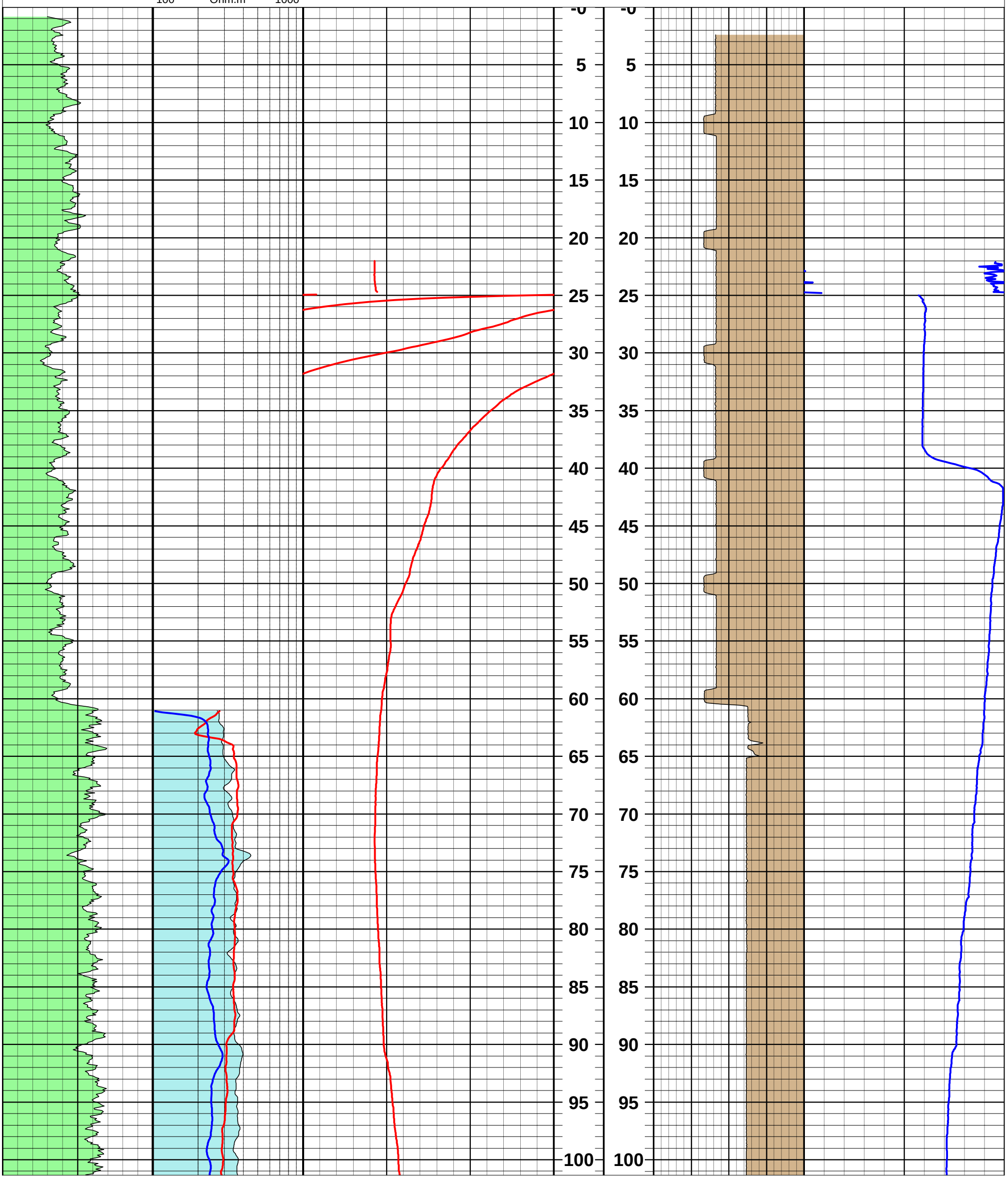
Fluid Temperature: 16 Deg. C 19

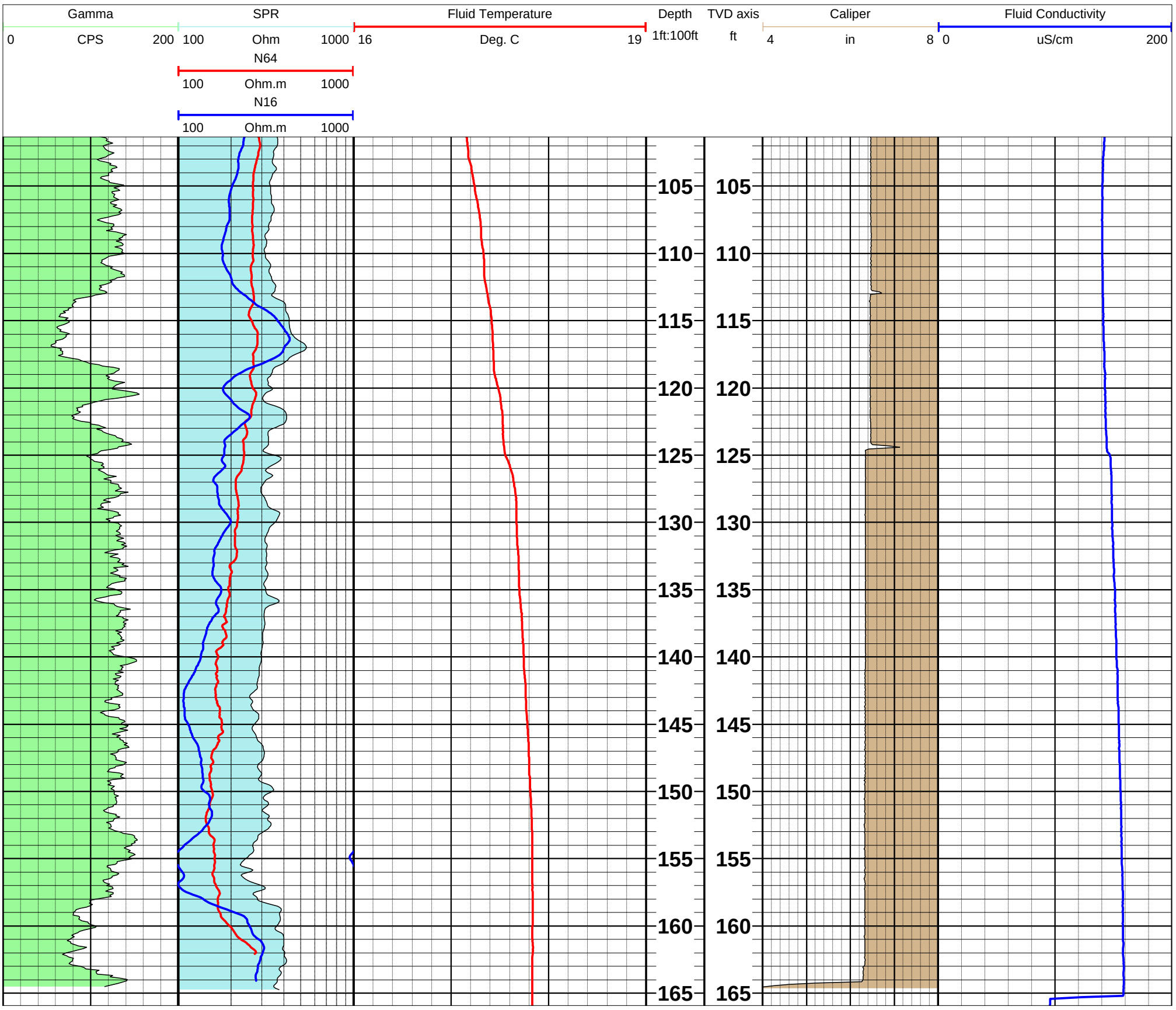
Depth: 1ft:100ft

TVD axis: ft

Caliper: 4 in 8

Fluid Conductivity: 0 uS/cm 200

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CPS
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SPR
100
Ohm
1000
N64
100
Ohm.m
1000
N16
100
Ohm.m
1000
Fluid Temperature
16
Deg. C
19
Depth
1ft:100ft
TVD axis
ft
Caliper
4
in
8
Fluid Conductivity
0
uS/cm
200
105
110
115
120
125
130
135
140
145
150
155
160
165

GEOPHYSICAL RECORD OF BOREHOLE: GS-AP-MW-30H

PLANT GORGAS ASH POND DELINEATION WELLS

GOLDER

Project Number: 18114896

Client: Southern Company Services

Southern Company

Date: 1-07-2019

Location: Parrish, Al	TOC Elev msl: na
Easting: na	Casing Stick-up: 6.5 ft ags
Northing: na	Casing Diameter: 5.4 in ID
Ground Elev msl: na	Casing Material: Steel
Borehole Dip: vertical	Water Level: 41.9 ft bgs
Borehole Az: na	Logged By: Abernathy
Borehole Size: 6" Sonic	Log Depth Ref: Ground
Drilled Depth: 305 ft	Log Date: 1-07-19
Drill Comp Date: 1-07-19	Image Plot(s) Ref: MN
Casing Depth: 3.9 ft bgs	Dip Referenced to Horizontal

Notes: The first FTC run was made under ambient conditions, and second FTC run made under injecting conditions, water level raised to ft.

The deviation data was recorded with our OBI sn163404.
Closure Distance = 3.2 ft, Closure Angle = 272.9 deg & Tilt at BOH = 1.8 deg

Tools used were Decatur's QL40 set:
FTC sn5518
Caliper sn5521
Gamma sn5499
SPR + Normal Res QL40 sn5512
Deviation OBI sn163404



Gamma 0 CPS 200

SPR 100 Ohm 600

Fluid Temperature 15 'C 18

Fluid Temperature pumping 4 15 'C 18

Fluid Temperature pumping 2 15 'C 18

Depth 1ft:150ft

TVD 0 [ft] 50

TVD axis

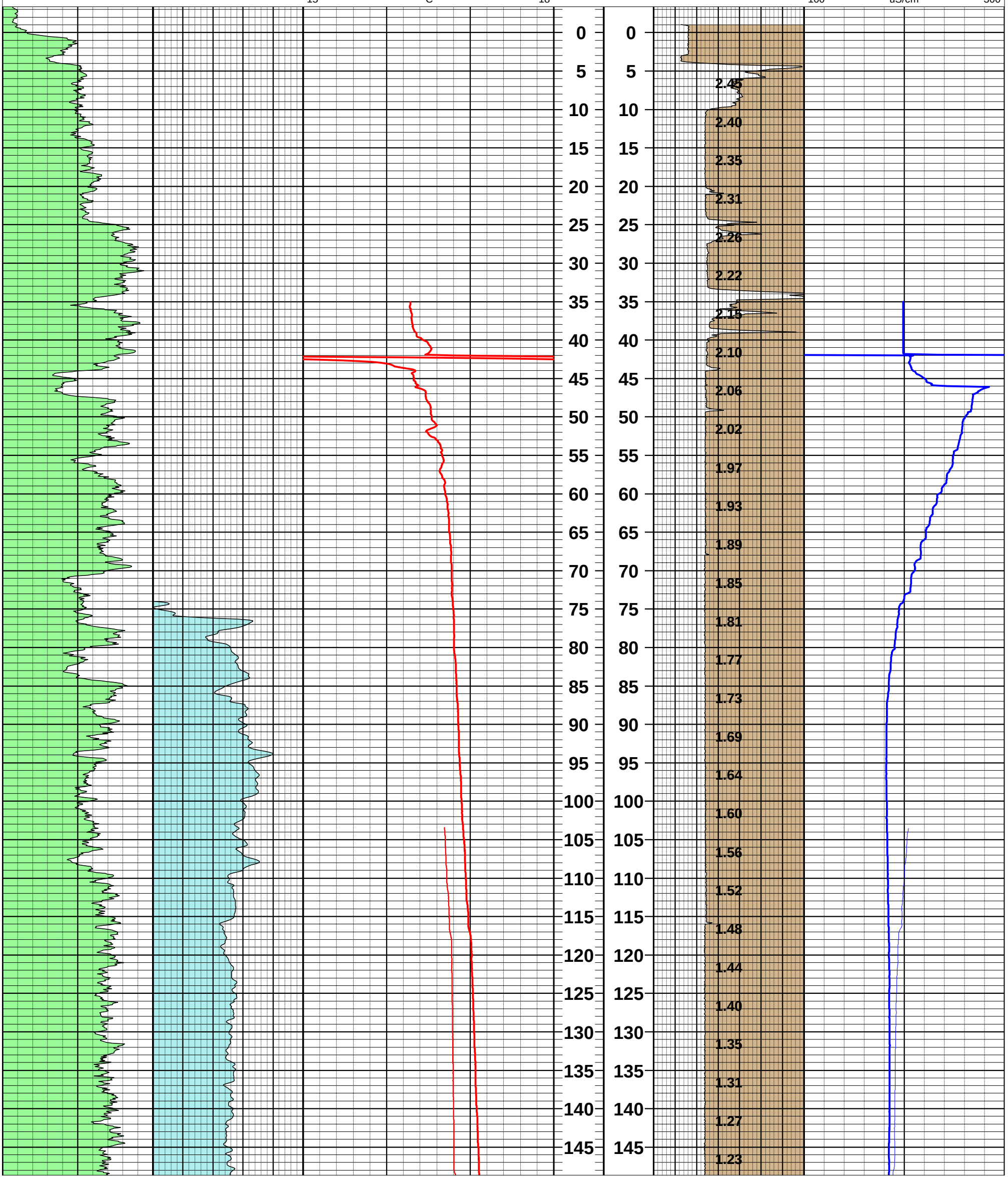
Cumulated Volume (cu.yd)

Caliper 4 in 11

Fluid Conductivity 100 uS/cm 300

Fluid Conductivity pumping 4 100 uS/cm 300

Fluid Conductivity pumping 2 100 uS/cm 300



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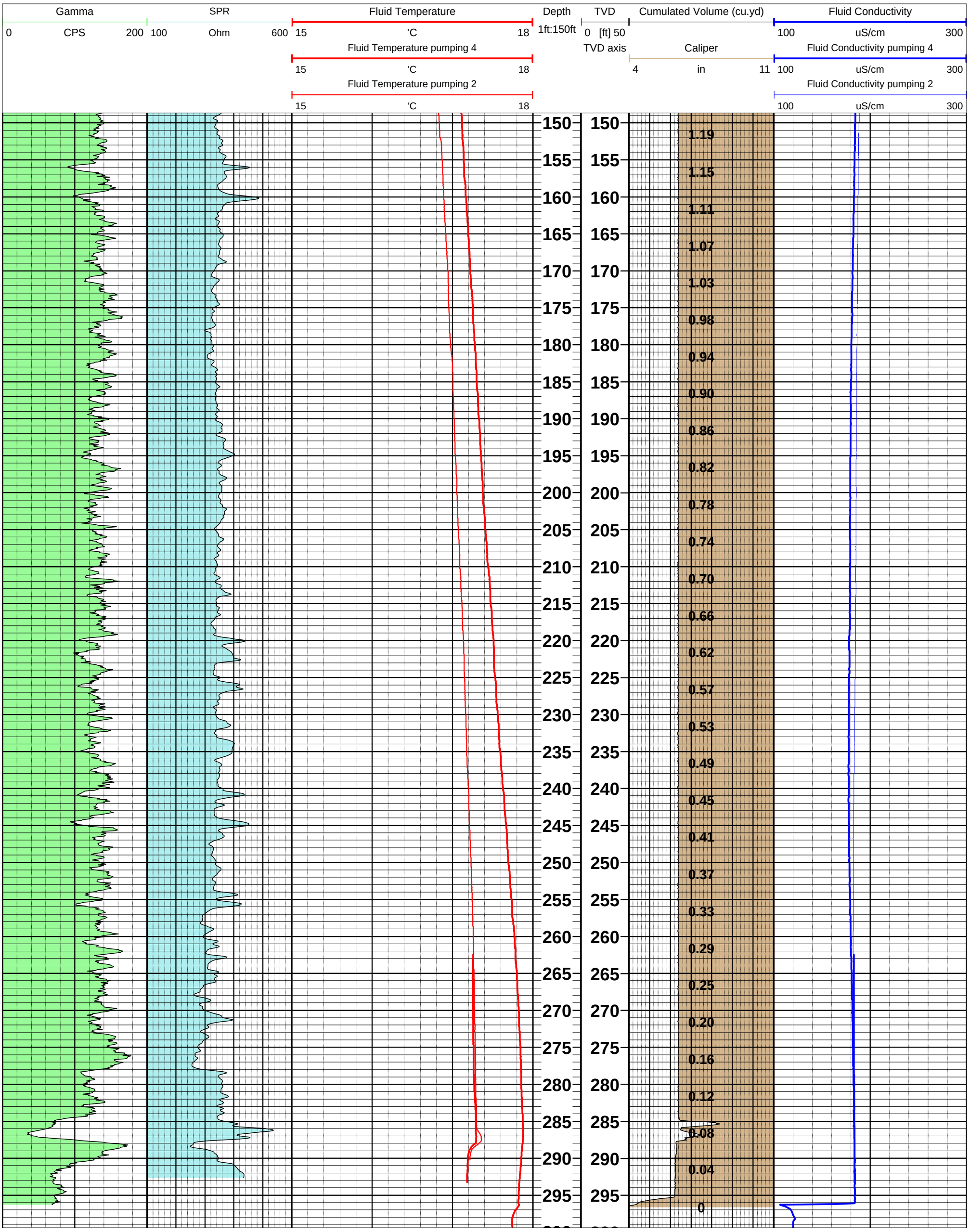

Gamma
0 CPS 200
SPR
100 Ohm 600
Fluid Temperature
15 'C 18
Fluid Temperature pumping 4
15 'C 18
Fluid Temperature pumping 2
15 'C 18
Depth
1ft:150ft
TVD
0 [ft] 50
TVD axis
Cumulated Volume (cu.yd)
Caliper
4 in 11
Fluid Conductivity
100 uS/cm 300
Fluid Conductivity pumping 4
100 uS/cm 300
Fluid Conductivity pumping 2
100 uS/cm 300
150 155 160 165 170 175 180 185 190 195 200 205 210 215 220 225 230 235 240 245 250 255 260 265 270 275 280 285 290 295
1.19 1.15 1.11 1.07 1.03 0.98 0.94 0.90 0.86 0.82 0.78 0.74 0.70 0.66 0.62 0.57 0.53 0.49 0.45 0.41 0.37 0.33 0.29 0.25 0.20 0.16 0.12 0.08 0.04 0

GEOPHYSICAL RECORD OF BOREHOLE: GSAP-MW30HA

Plant Gorgas - CCR Delineation Wells

GOLDER

Project Number: 19131304

Client: Southern Company Services

Southern Company

Date: 9-26-2019

Location: Parrish, Al	TOC Elev msl: na
Easting: na	Casing Stick-up: 0.75 ft ags
Northing: na	Casing Diameter: 6.625 in ID
Ground Elev msl: na	Casing Material: Steel HSA
Borehole Dip: vertical	Water Level: 302.5 ft BGS
Borehole Az: na	Logged By: CAB
Borehole Size: 5.5" AH	Log Depth Ref: Ground Surface
Drilled Depth: 350 ft BGS	Log Date: 9/25-26/19
Drill Comp Date: 9-25-19	Image Plot(s) Ref: MN
Casing Depth: 29 ft bgs	Dip Referenced to Horizontal

Notes:

FTC run 9-26-19.

Tools used were:
QL40-FTC sn 5518
QL40 Caliper sn 5521
40-LGR-Gamma & SPR sn 5809



Caliper: 4 in 8

Depth: 1ft:120ft

Gamma: 0 CPS 200

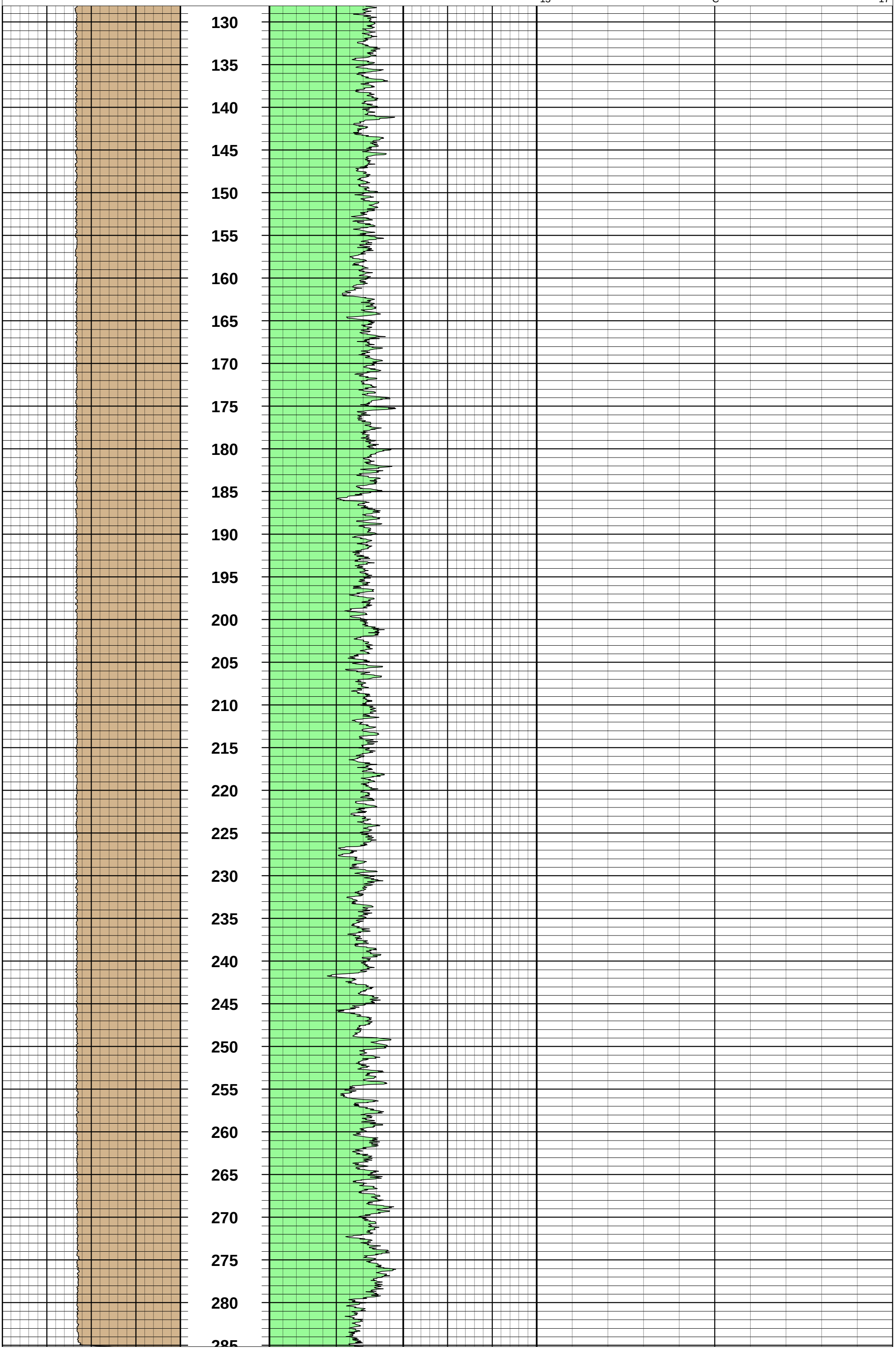
SPR: 300 Ohms 600

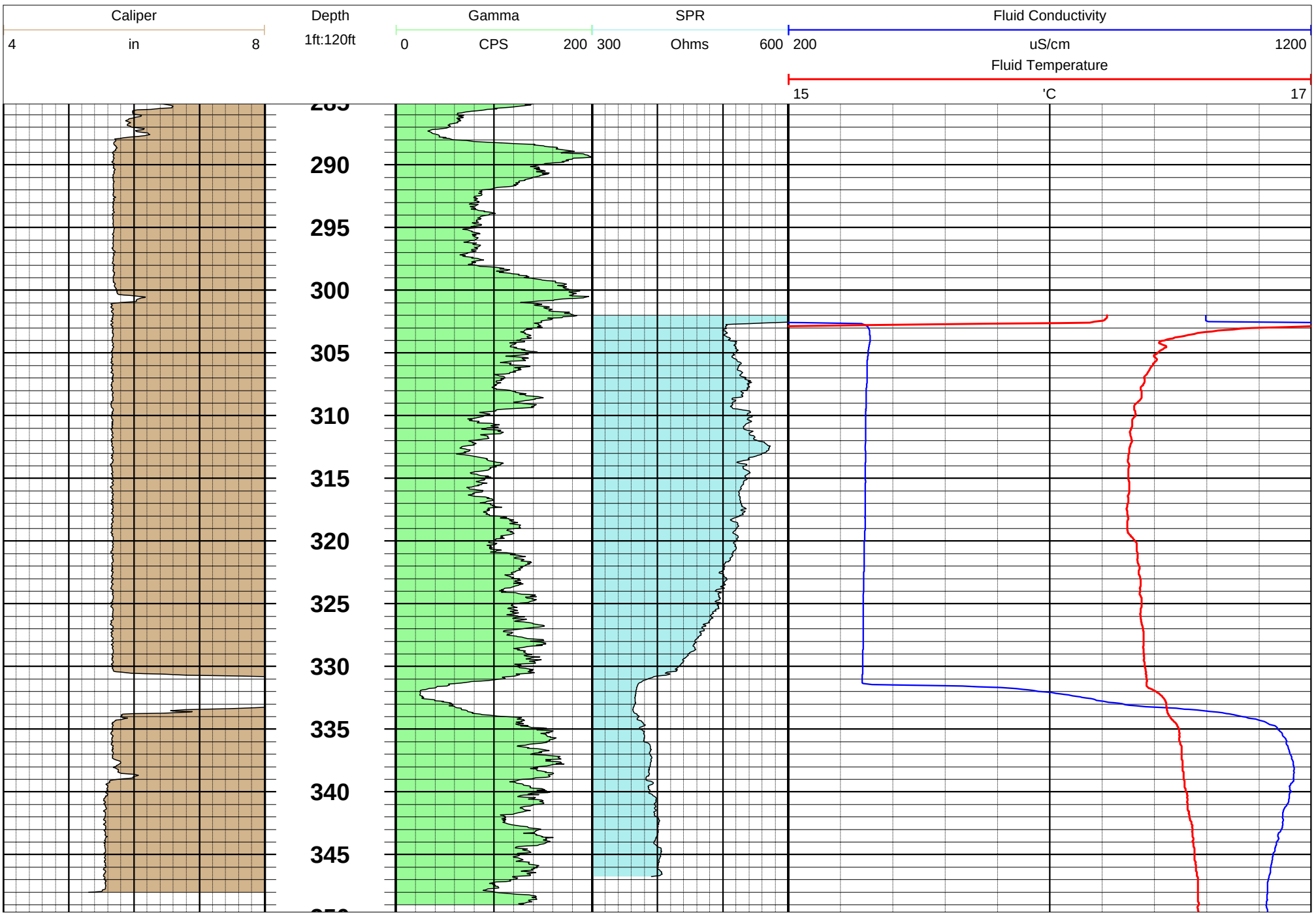
Fluid Conductivity: 200 uS/cm 1200

Fluid Temperature: 15 'C 17

5 10 15 20 25 30 35 40 45 50 55 60 65 70 75 80 85 90 95 100 105 110 115 120 125

Caliper	Depth	Gamma	SPR	Fluid Conductivity	Fluid Temperature
4 in 8	1ft:120ft	0 CPS 200	300 Ohms 600	200 uS/cm 1200	15 'C 17




Caliper
4
in
8
Depth
1ft:120ft
Gamma
0
CPS
200
SPR
300
Ohms
600
Fluid Conductivity
200
uS/cm
1200
Fluid Temperature
15
'C
17
290
295
300
305
310
315
320
325
330
335
340
345

GEOPHYSICAL RECORD OF BOREHOLE: GSAP-MW31H

Plant Gorgas - CCR Delineation Wells

GOLDER

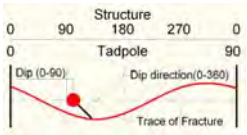
Project Number: 19131304

Client: Southern Company Services

Southern Company

Date: 10-10-2019

Location: Parrish, Al	TOC Elev msl: na	Notes: Water level 61.42' BTC @ 9:07am
Easting: na	Casing Stick-up: 5.67 ft ags	
Northing: na	Casing Diameter: 7 in ID	Tools used were: QL40-FTC sn 5518 QL40 Caliper sn 5521 40-LGR-Gamma & SPR sn 5809 ATV ABI40 sn162305
Ground Elev msl: na	Casing Material: Steel	
Borehole Dip: vertical	Water Level: 55.75 ft BGS	
Borehole Az: na	Logged By: CAB	
Borehole Size: 6" AH	Log Depth Ref: Ground Surface	
Drilled Depth: 305 ft BGS	Log Date: 10-10-2019	
Drill Comp Date: 10-9-19	Image Plot(s) Ref: MN	
Casing Depth: 29 ft bgs	Dip Referenced to Horizontal	



Tilt 0 deg 4 | Roll 0 deg 360 | MagnField 40 uT 60 | Depth 1ft:12ft | Caliper 5 in 8 | Apparent RH 0 % 100 | Centralized TravelTime-NM 0° 90° 180° 270° 0° | Amplitude-NM 0° 90° 180° 270° 0°

Azimuth 0 deg 360 | MRoll 0 deg 360 | Gravity 0.5 g 1.5

55

60

65

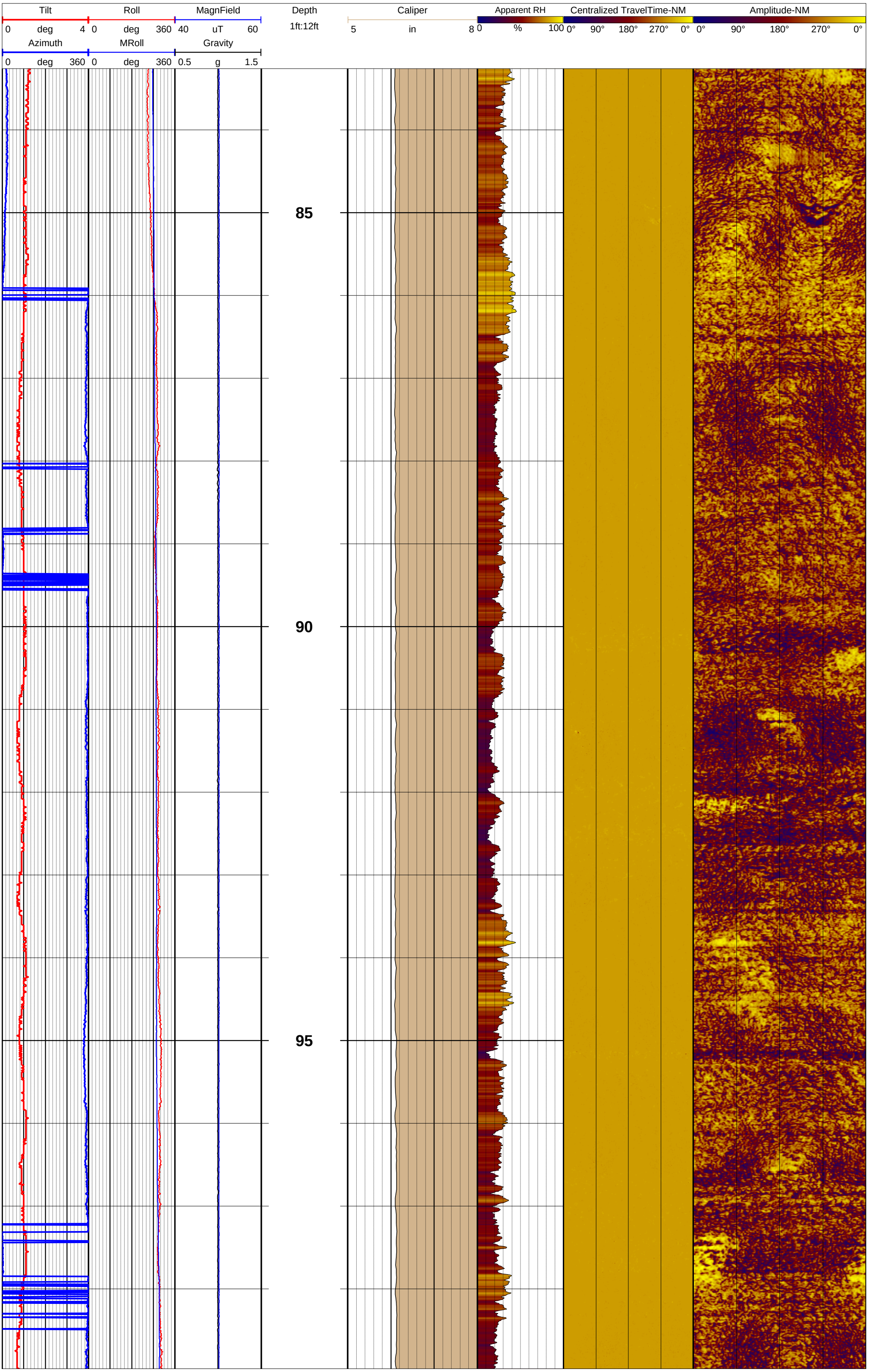
Tilt 0 deg 4 | Roll 0 deg 360 | MagnField 40 uT 60 | Depth 1ft:12ft | Caliper 5 in 8 | Apparent RH 0 % 100 | Centralized TravelTime-NM 0° 90° 180° 270° 0° | Amplitude-NM 0° 90° 180° 270° 0°

Azimuth 0 deg 360 | MRoll 0 deg 360 | Gravity 0.5 g 1.5

70

75

80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Roll
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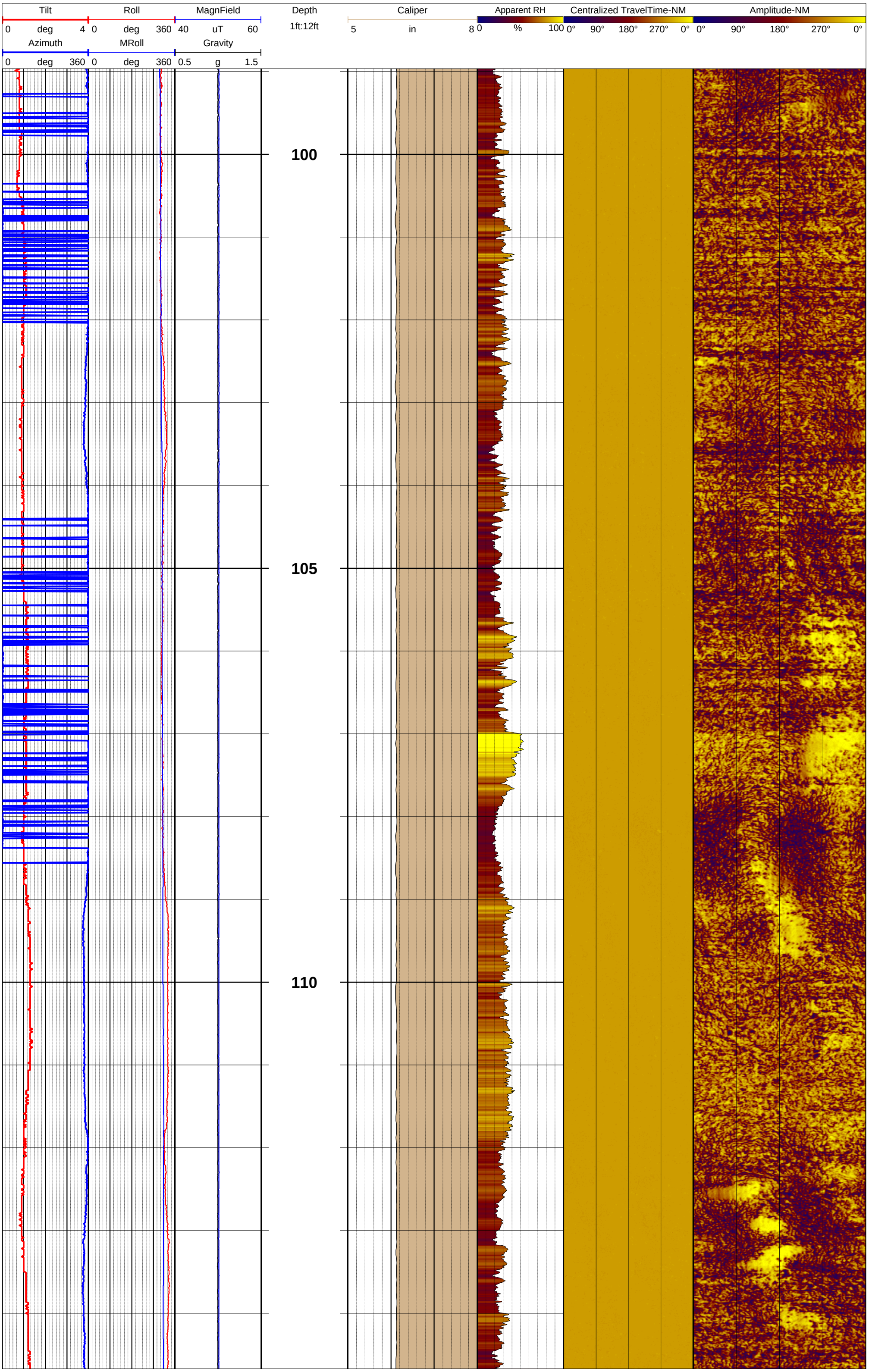
MagnField
40 uT 60
Azimuth
0 deg 360
MRoll
0 deg 360
Gravity
0.5 g 1.5
Depth
1ft:12ft
Caliper
5 in 8
Apparent RH
0 % 100
Centralized TravelTime-NM
0° 90° 180° 270° 0°
Amplitude-NM
0° 90° 180° 270° 0°
85
90
95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MagnField
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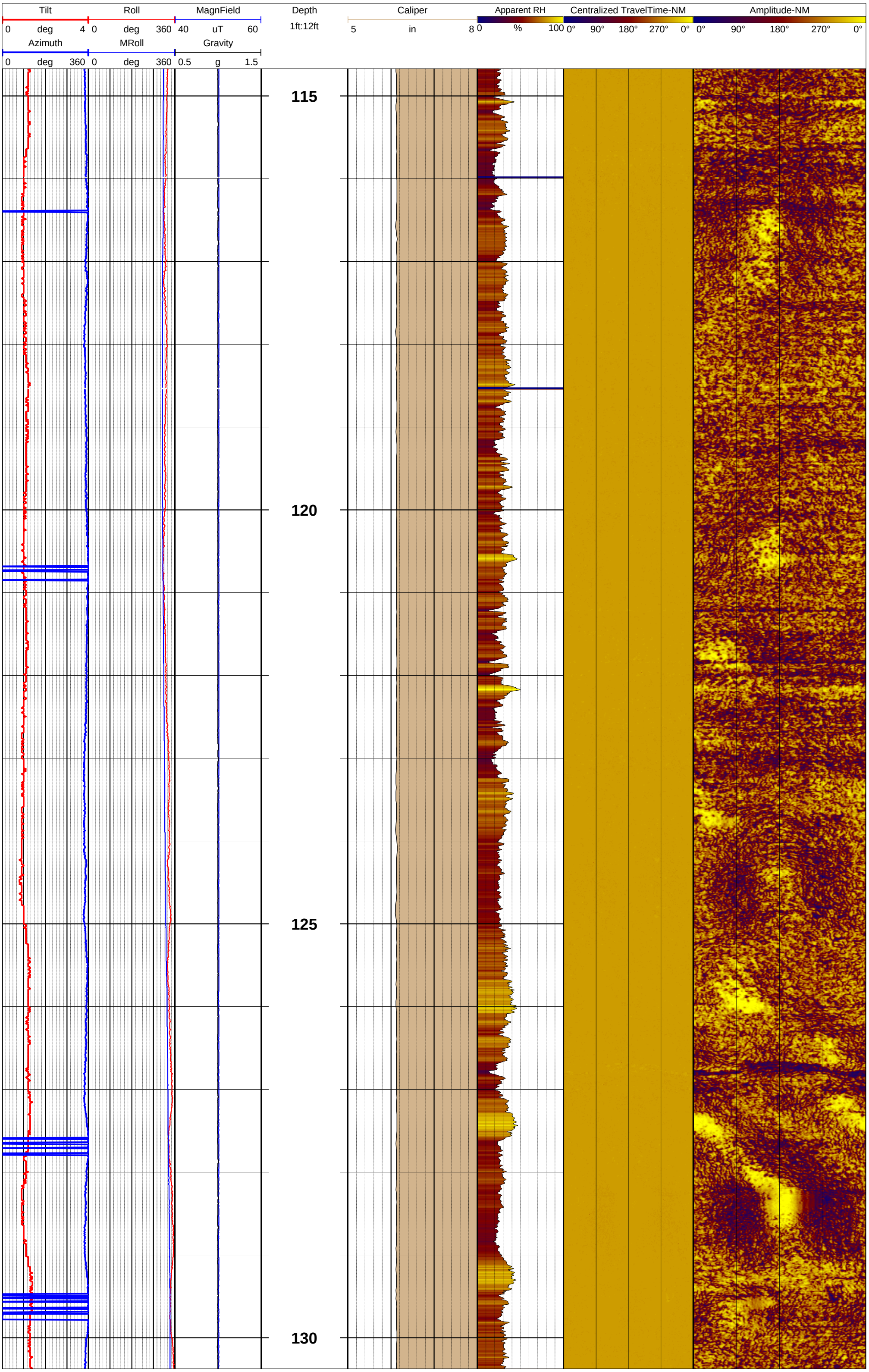
Azimuth
0 deg 360
MRoll
0 deg 360
Gravity
0.5 g 1.5
Depth
1ft:12ft
Caliper
5 in 8
Apparent RH
0 % 100
Centralized TravelTime-NM
0° 90° 180° 270° 0°
Amplitude-NM
0° 90° 180° 270° 0°
100
105
110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MagnField
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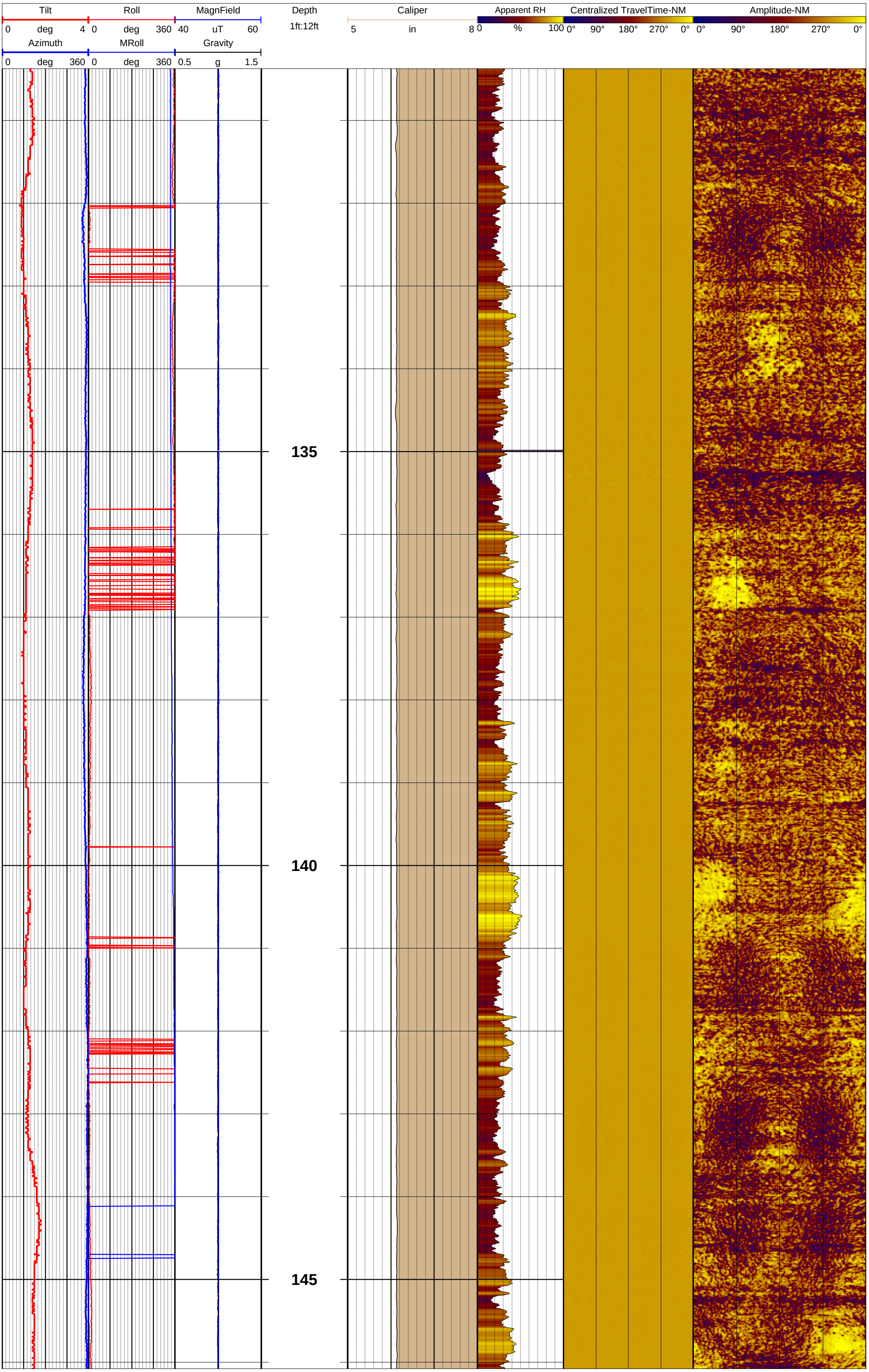
Azimuth
0 deg 360
MRoll
0 deg 360
Gravity
0.5 g 1.5
Depth
1ft:12ft
Caliper
5 in 8
Apparent RH
0 % 100
Centralized TravelTime-NM
0° 90° 180° 270° 0°
Amplitude-NM
0° 90° 180° 270° 0°
115
120
125
130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MagnField
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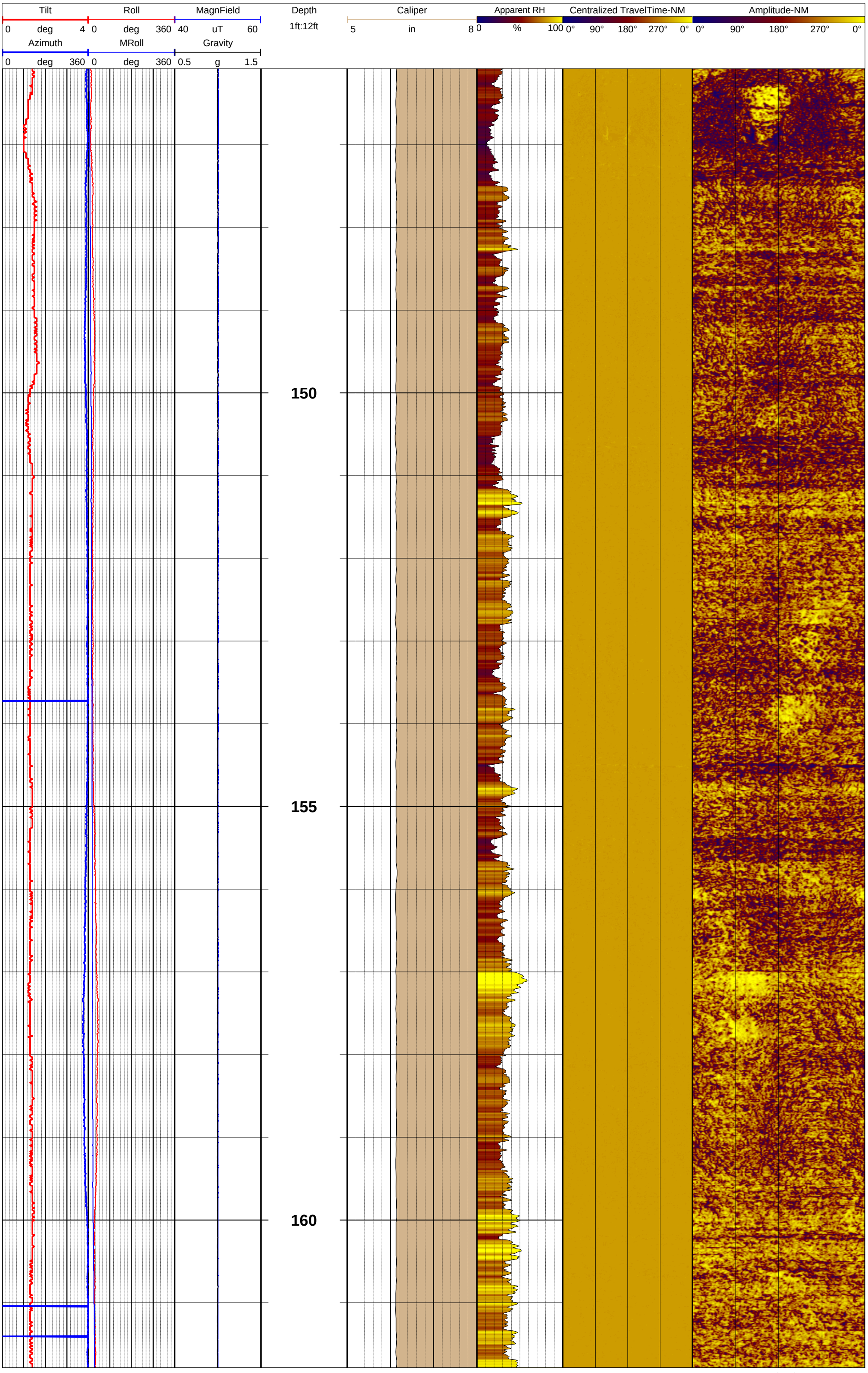
Azimuth
0 deg 360
MRoll
0 deg 360
Gravity
0.5 g 1.5
Depth
1ft:12ft
Caliper
5 in 8
Apparent RH
0 % 100
Centralized TravelTime-NM
0° 90° 180° 270° 0°
Amplitude-NM
0° 90° 180° 270° 0°
135
140
145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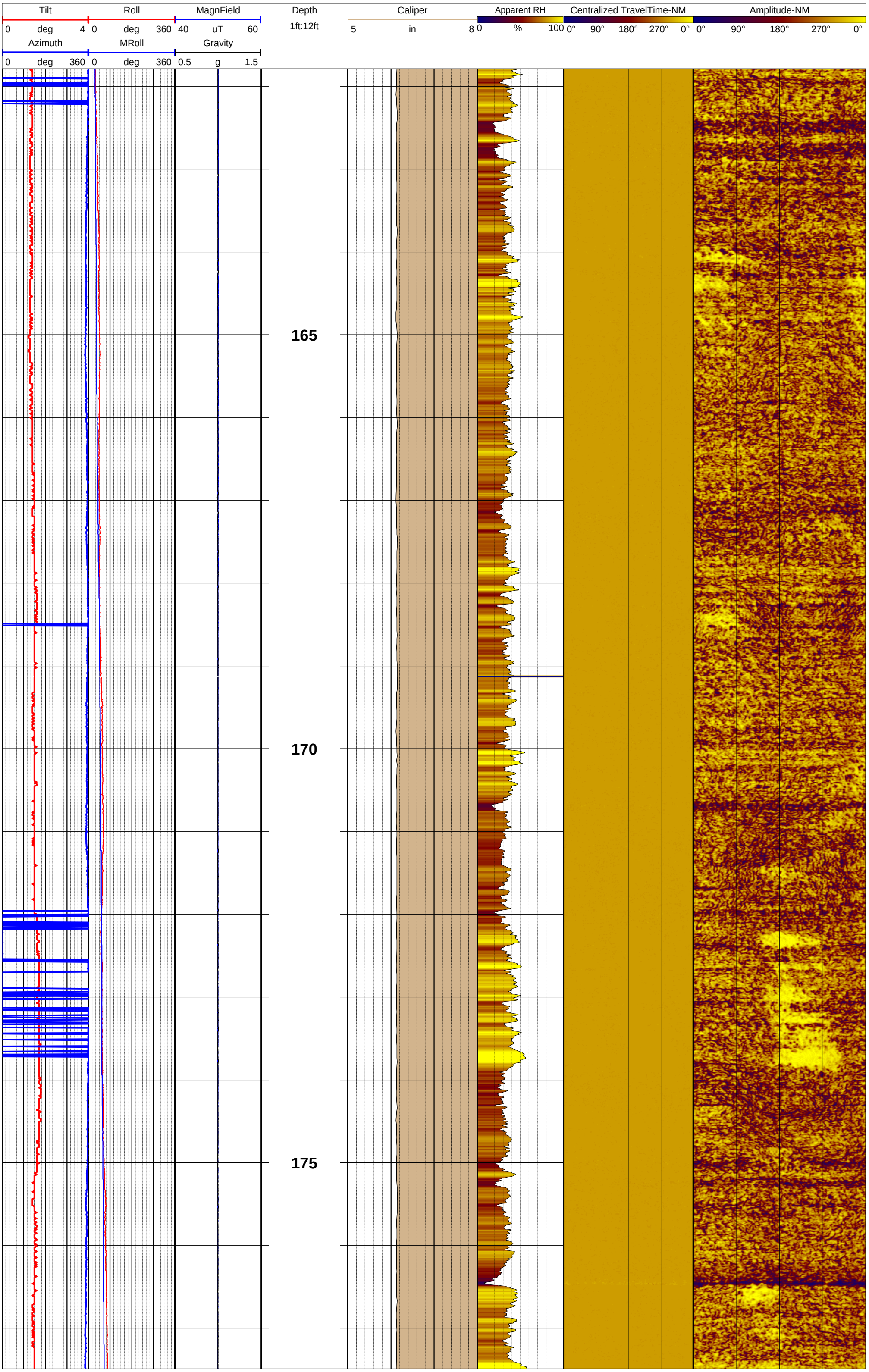
Azimuth
0 deg 360
MRoll
0 deg 360
Gravity
0.5 g 1.5
Depth
1ft:12ft
Caliper
5 in 8
Apparent RH
0 % 100
Centralized TravelTime-NM
0° 90° 180° 270° 0°
Amplitude-NM
0° 90° 180° 270° 0°
150
155
160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Roll
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MagnField
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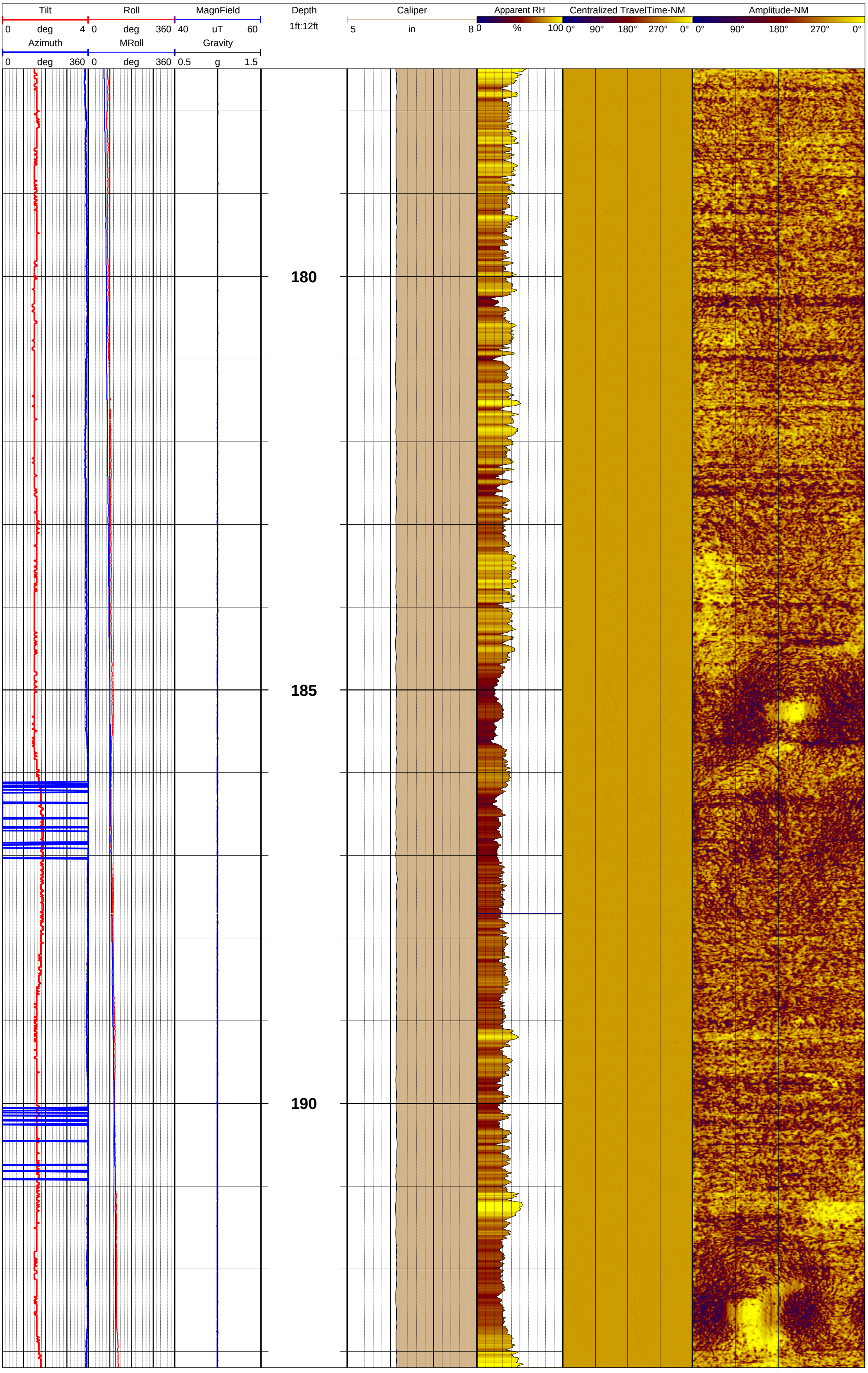
Azimuth
0 deg 360
MRoll
0 deg 360
Gravity
0.5 g 1.5
Depth
1ft:12ft
Caliper
5 in 8
Apparent RH
0 % 100
Centralized TravelTime-NM
0° 90° 180° 270° 0°
Amplitude-NM
0° 90° 180° 270° 0°
165
170
175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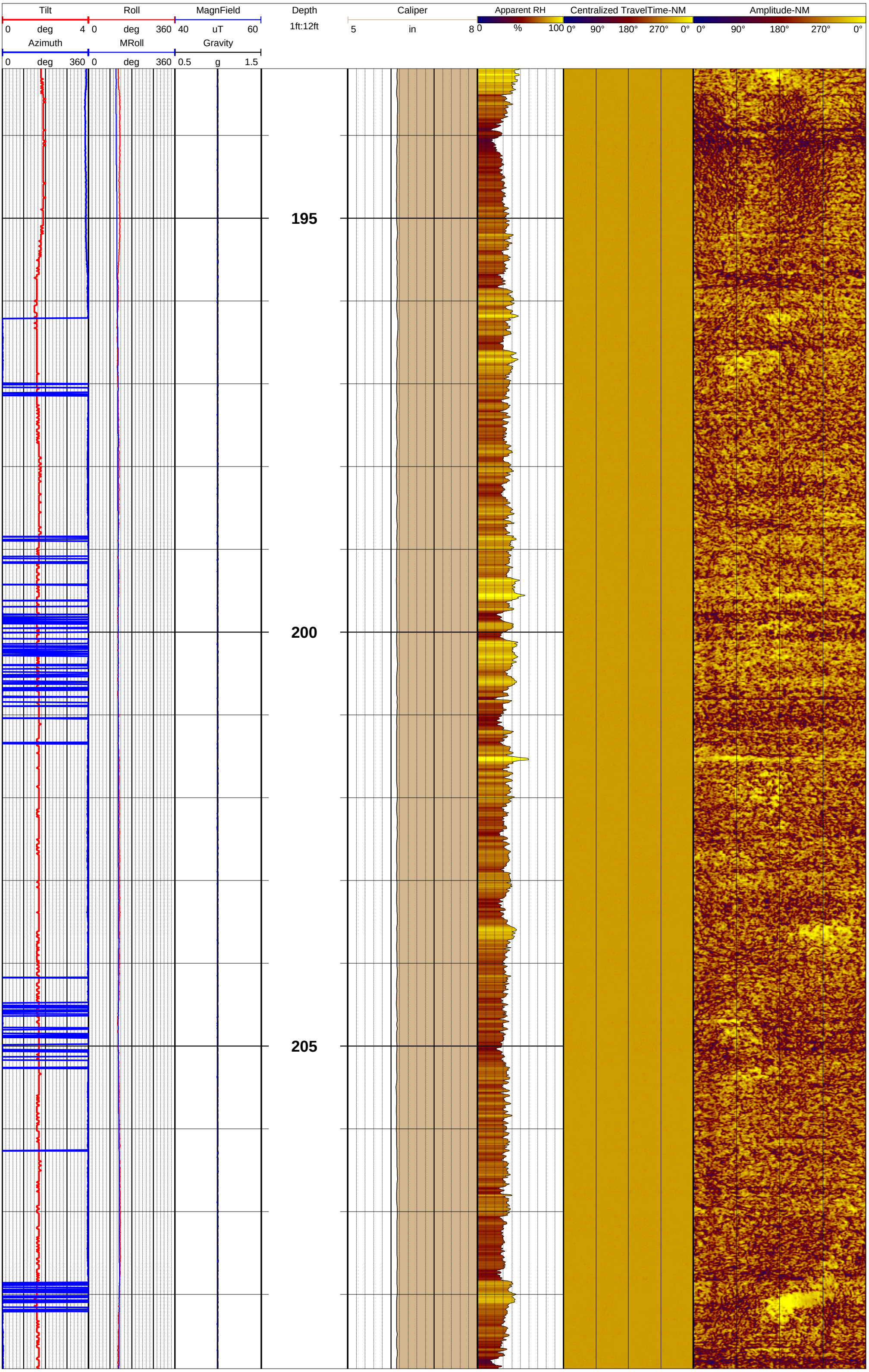
Roll
0 deg 360
MagnField
40 uT 60
Azimuth
0 deg 360
MRoll
0 deg 360
Gravity
0.5 g 1.5
Depth
1ft:12ft
Caliper
5 in 8
Apparent RH
0 % 100
Centralized TravelTime-NM
0° 90° 180° 270° 0°
Amplitude-NM
0° 90° 180° 270° 0°
180
185
190


Tilt
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Roll
0 deg 360
MagnField
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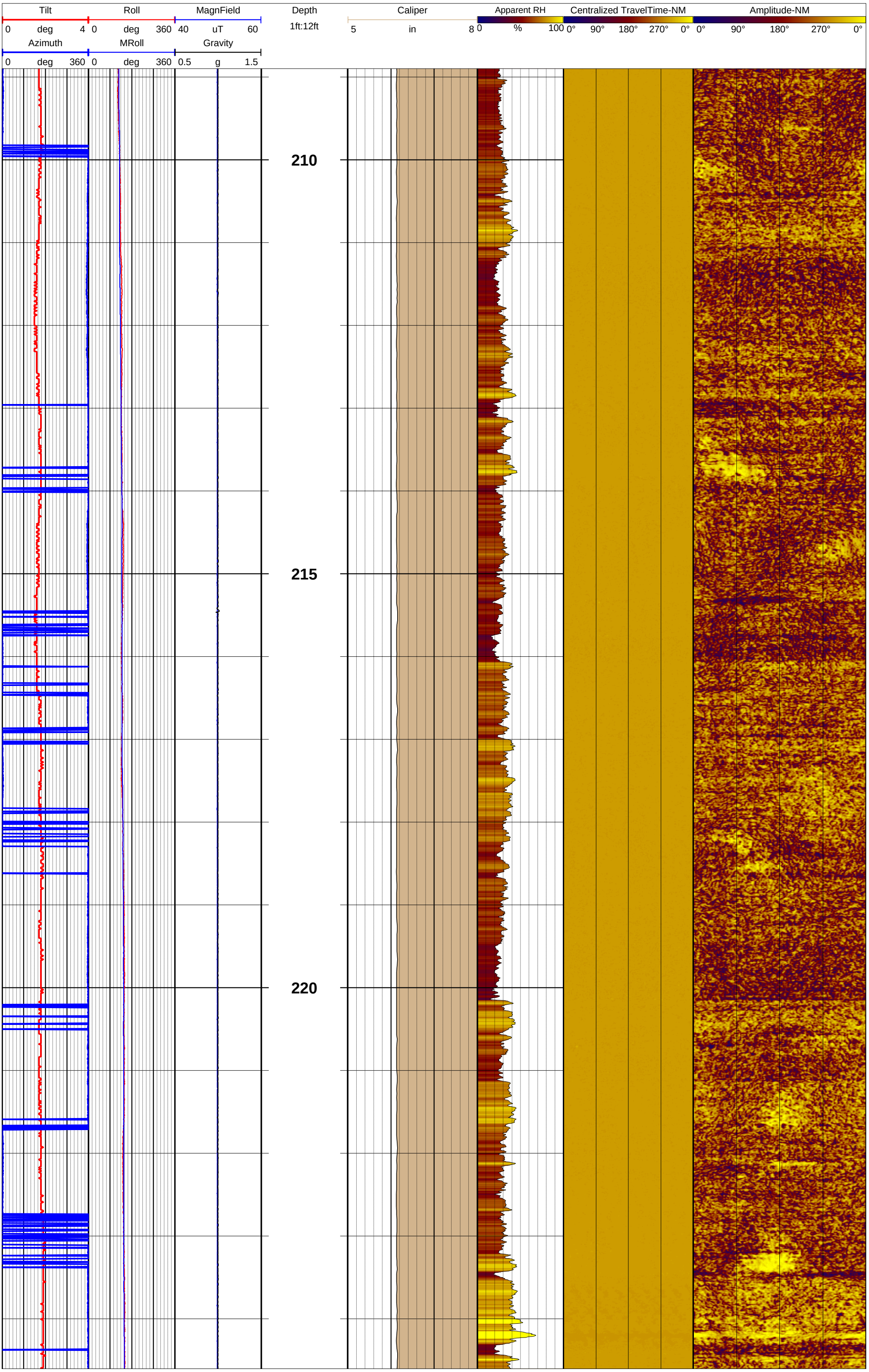
Azimuth
0 deg 360
MRoll
0 deg 360
Gravity
0.5 g 1.5
Depth
1ft:12ft
195
200
205
Caliper
5 in 8
Apparent RH
0 % 100
Centralized TravelTime-NM
0° 90° 180° 270° 0°
Amplitude-NM
0° 90° 180° 270° 0°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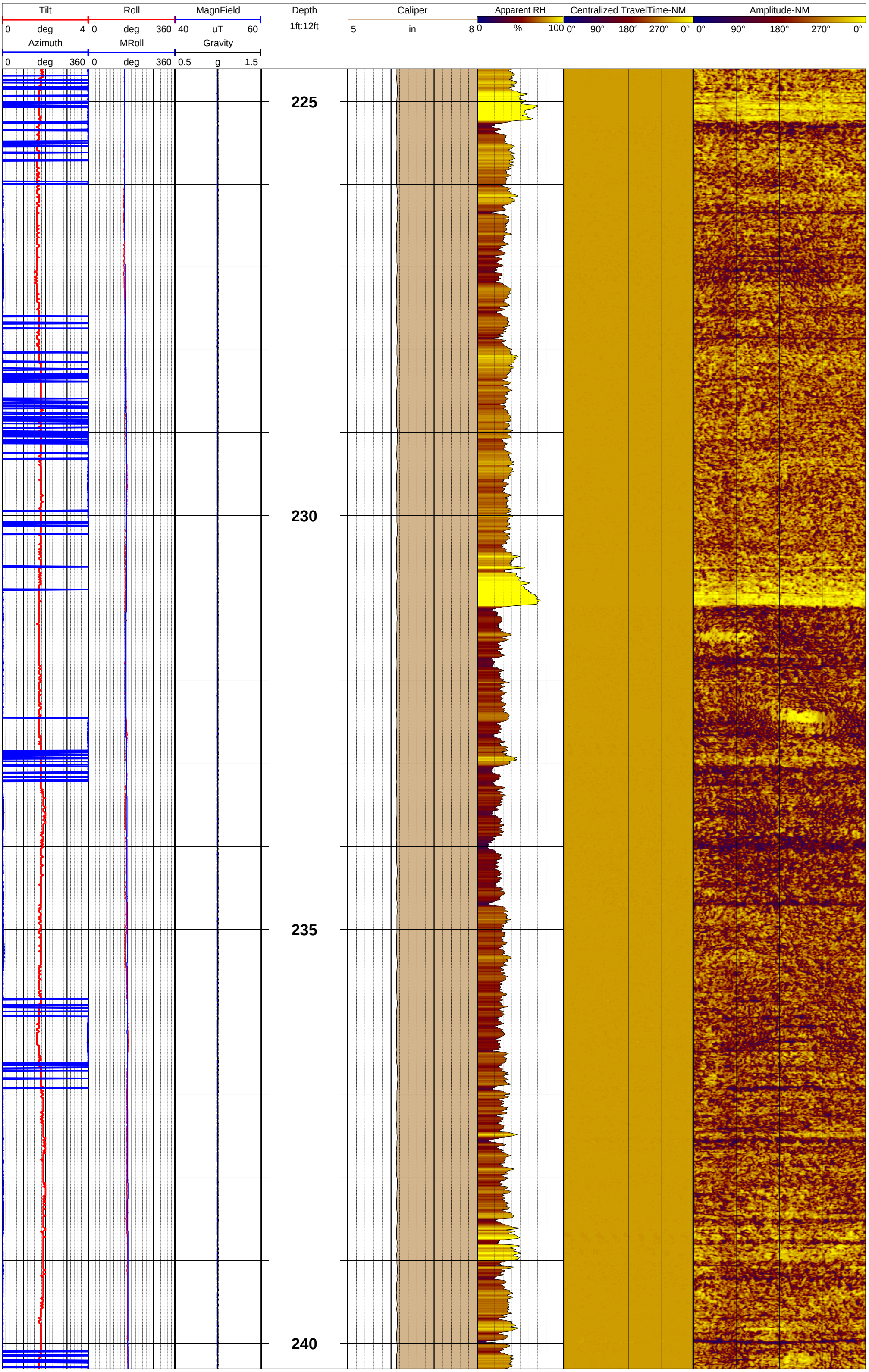
Roll
0 deg 360
MagnField
40 uT 60
Azimuth
0 deg 360
MRoll
0 deg 360
Gravity
0.5 g 1.5
Depth
1ft:12ft
Caliper
5 in 8
Apparent RH
0 % 100
Centralized TravelTime-NM
0° 90° 180° 270° 0°
Amplitude-NM
0° 90° 180° 270° 0°
210
215
220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Roll
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MagnField
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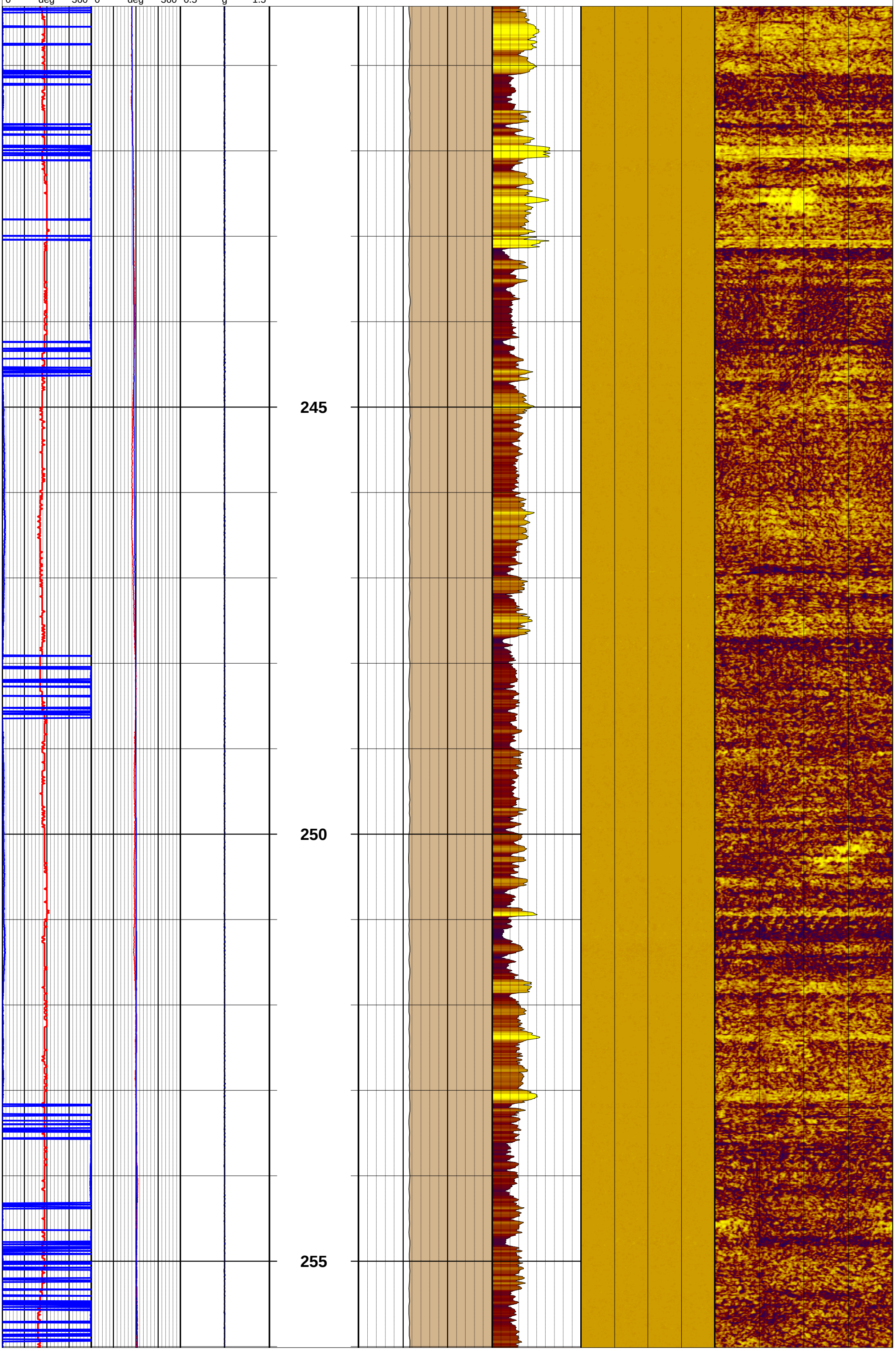
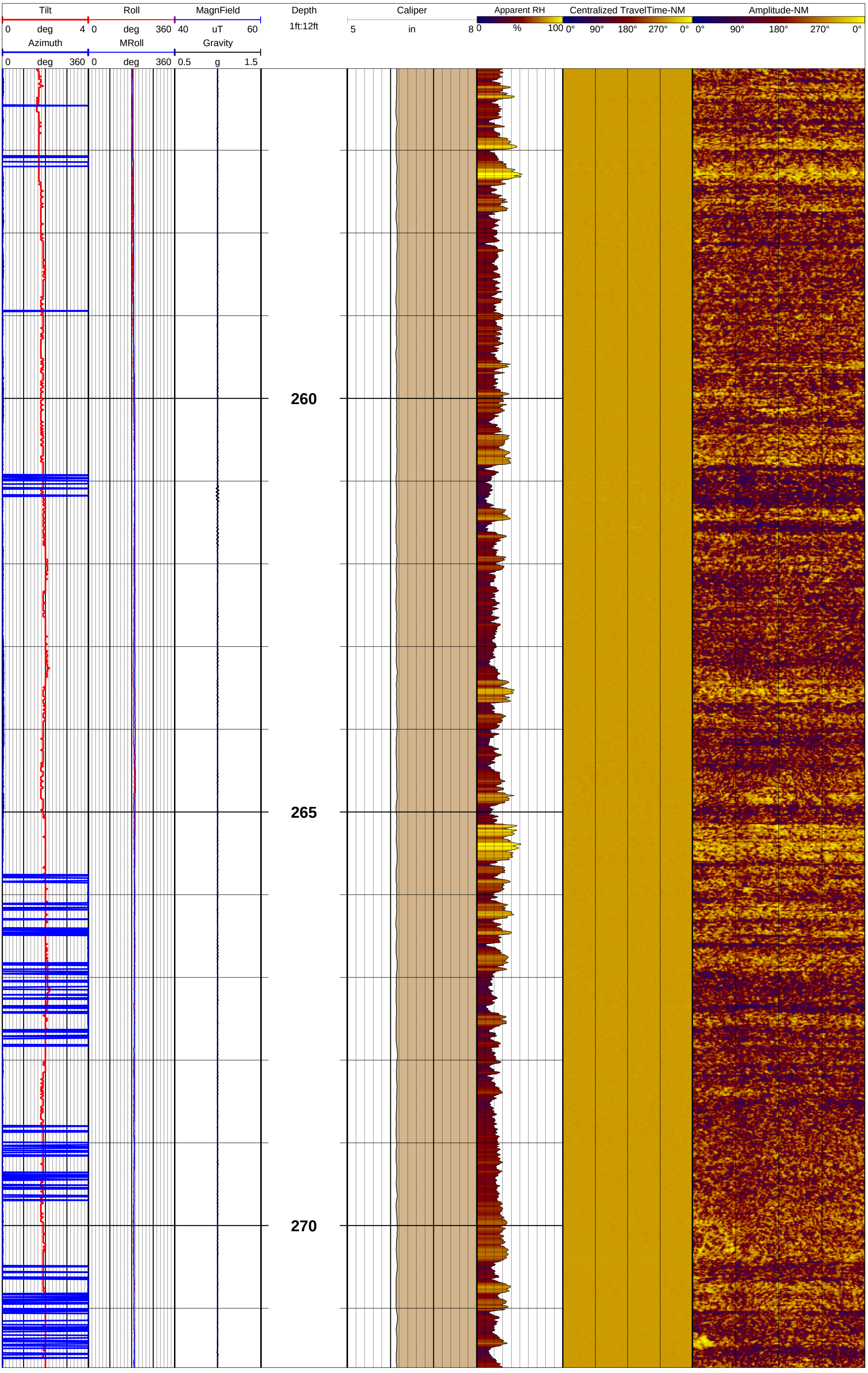
Azimuth
0 deg 360
MRoll
0 deg 360
Gravity
0.5 g 1.5
Depth
1ft:12ft
225
230
235
240
Caliper
5 in 8
Apparent RH
0 % 100
Centralized TravelTime-NM
0° 90° 180° 270° 0°
Amplitude-NM
0° 90° 180° 270° 0°

Tilt 0 deg 4 | Roll 0 deg 360 | MagnField 40 uT 60 | Depth 1ft:12ft | Caliper 5 in 8 | Apparent RH 0 % 100 | Centralized TravelTime-NM 0° 90° 180° 270° 0° | Amplitude-NM 0° 90° 180° 270° 0°

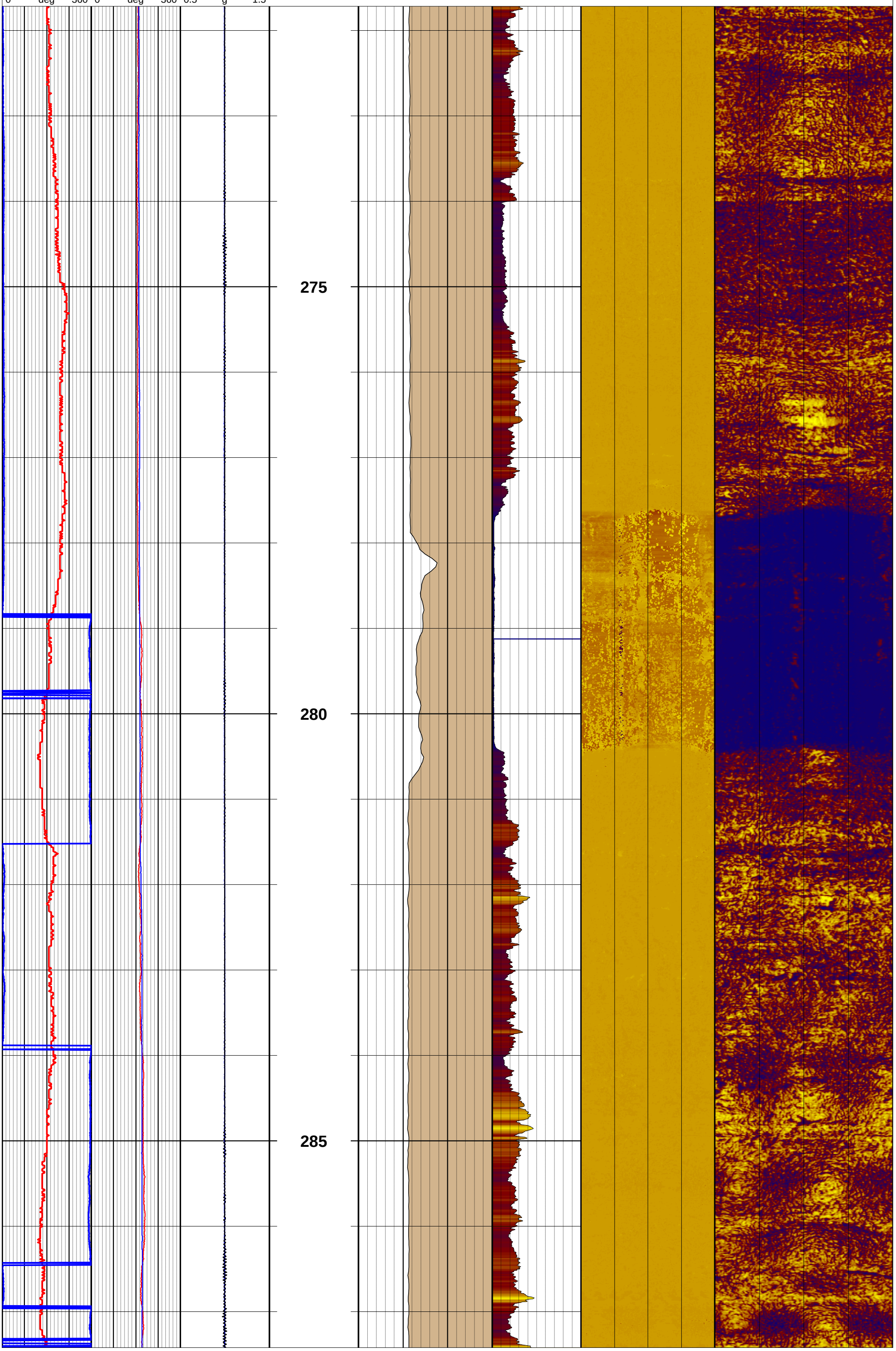
Azimuth 0 deg 360 | MRoll 0 deg 360 | Gravity 0.5 g 1.5

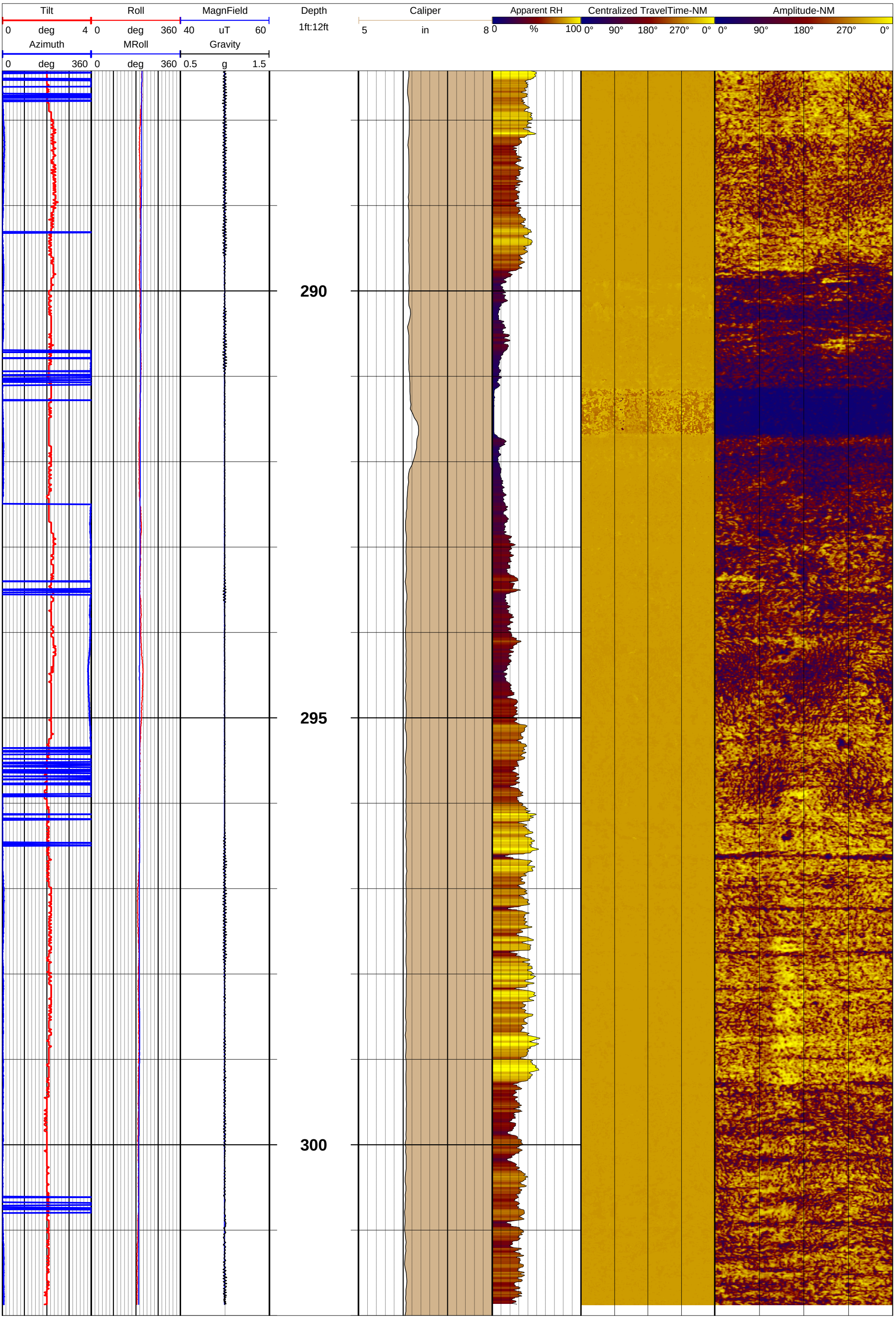



Tilt
0 deg 4
Roll
0 deg 360
MagnField
40 uT 60
Azimuth
0 deg 360
MRoll
0 deg 360
Gravity
0.5 g 1.5
Depth
1ft:12ft
Caliper
5 in 8
Apparent RH
0 % 100
Centralized TravelTime-NM
0° 90° 180° 270° 0°
Amplitude-NM
0° 90° 180° 270° 0°
260
265
270

Tilt 0 deg 4 | Roll 0 deg 360 | MagnField 40 uT 60 | Depth 1ft:12ft | Caliper 5 in 8 | Apparent RH 0 % 100 | Centralized TravelTime-NM 0° 90° 180° 270° 0° | Amplitude-NM 0° 90° 180° 270° 0°

Azimuth 0 deg 360 | MRoll 0 deg 360 | Gravity 0.5 g 1.5




Tilt
0 deg 4
Roll
0 deg 360
MagnField
40 uT 60
Azimuth
0 deg 360
MRoll
0 deg 360
Gravity
0.5 g 1.5
Depth
1ft:12ft
Caliper
5 in 8
Apparent RH
0 % 100
Centralized TravelTime-NM
0° 90° 180° 270° 0°
Amplitude-NM
0° 90° 180° 270° 0°
290
295
300

GEOPHYSICAL RECORD OF BOREHOLE: GSAP-MW31H

Plant Gorgas - CCR Delineation Wells

GOLDER

Project Number: 19131304

Client: Southern Company Services

Southern Company

Date: 10-10-2019

Location: Parrish, Al	TOC Elev msl: na	Notes: Water level 61.42' BTC @ 9:07am
Easting: na	Casing Stick-up: 5.67 ft ags	
Northing: na	Casing Diameter: 7 in ID	Tools used were:
Ground Elev msl: na	Casing Material: Steel	QL40-FTC sn 5518
Borehole Dip: vertical	Water Level: 55.75 ft BGS	QL40 Caliper sn 5521
Borehole Az: na	Logged By: CAB	40-LGR-Gamma & SPR sn 5809
Borehole Size: 6" AH	Log Depth Ref: Ground Surface	
Drilled Depth: 305 ft BGS	Log Date: 10/10/19	
Drill Comp Date: 10-9-19	Image Plot(s) Ref: MN	
Casing Depth: 29 ft bgs	Dip Referenced to Horizontal	



Caliper: 4 in 8

Depth: 1ft:120ft

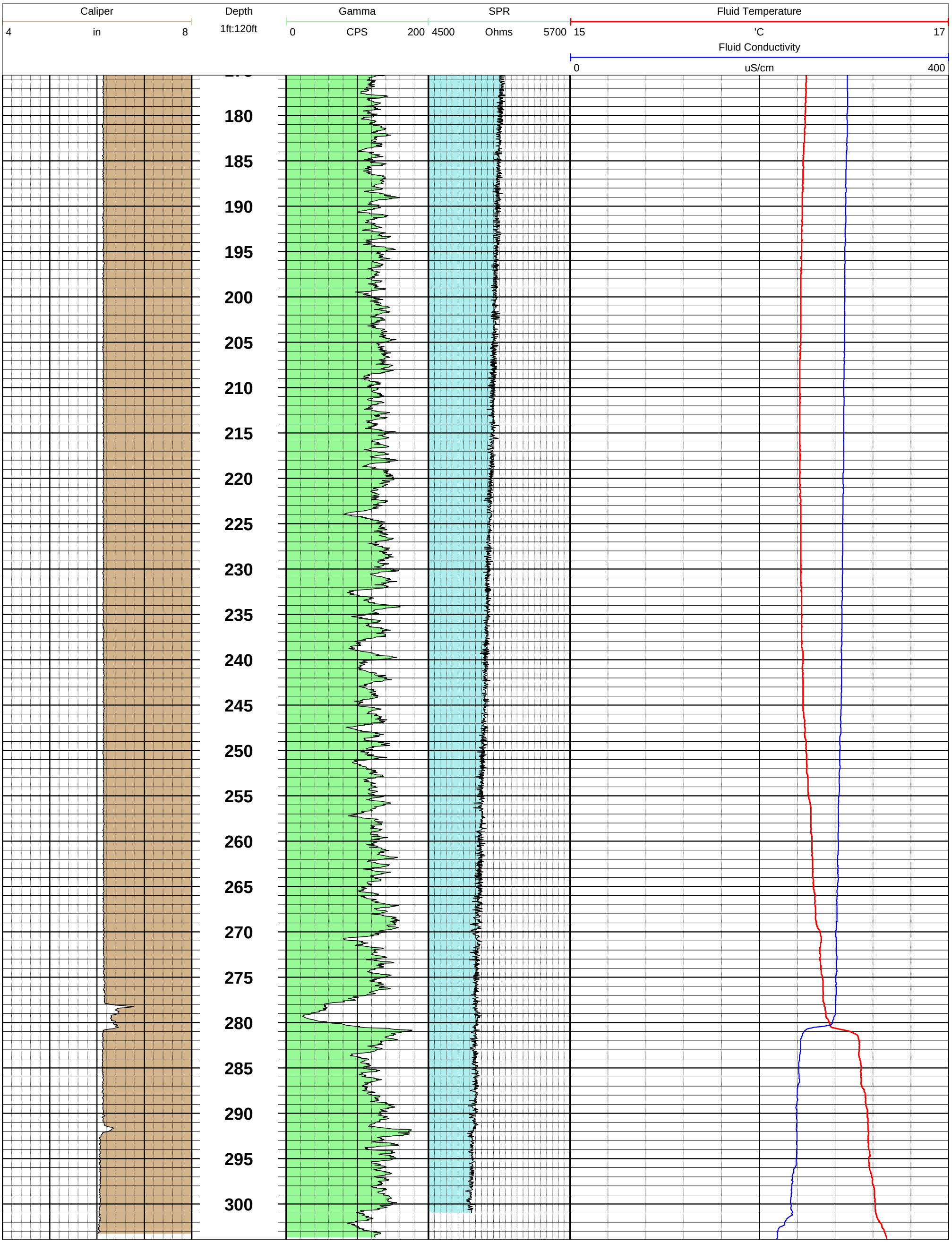
Gamma: 0 CPS 200

SPR: 4500 Ohms 5700

Fluid Temperature: 15 'C 17

Fluid Conductivity: 0 uS/cm 400

50 55 60 65 70 75 80 85 90 95 100 105 110 115 120 125 130 135 140 145 150 155 160 165 170 175


Caliper
4
in
8
Depth
1ft:120ft
Gamma
0
CPS
200
SPR
4500
Ohms
5700
Fluid Temperature
15
'C
17
Fluid Conductivity
0
uS/cm
400
180
185
190
195
200
205
210
215
220
225
230
235
240
245
250
255
260
265
270
275
280
285
290
295
300

GEOPHYSICAL RECORD OF BOREHOLE: GSAP-MW32H

Plant Gorgas - CCR Delineation Wells

GOLDER

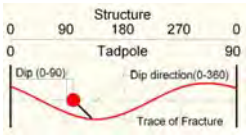
Project Number: 19131304

Client: Southern Company Services

Southern Company

Date: 10-13-2019

Location: Parrish, Al	TOC Elev msl: na	Notes: Water level 263.32@8:15, 261.88@8:57 all gs
Easting: na	Casing Stick-up: 6.33 ft ags	
Northing: na	Casing Diameter: 7 in ID	Tools used were: QL40-FTC sn 5518 QL40 Caliper sn 5521 40-LGR-Gamma & SPR sn 5809 ATV ABI40 sn162305
Ground Elev msl: na	Casing Material: Steel	
Borehole Dip: vertical	Water Level: 261.9 ft BGS	
Borehole Az: na	Logged By: CAB	
Borehole Size: 6" AH	Log Depth Ref: Ground Surface	
Drilled Depth: 301 ft BGS	Log Date: 10-13-2019	
Drill Comp Date: 10-12-19	Image Plot(s) Ref: MN	
Casing Depth: 39 ft bgs	Dip Referenced to Horizontal	



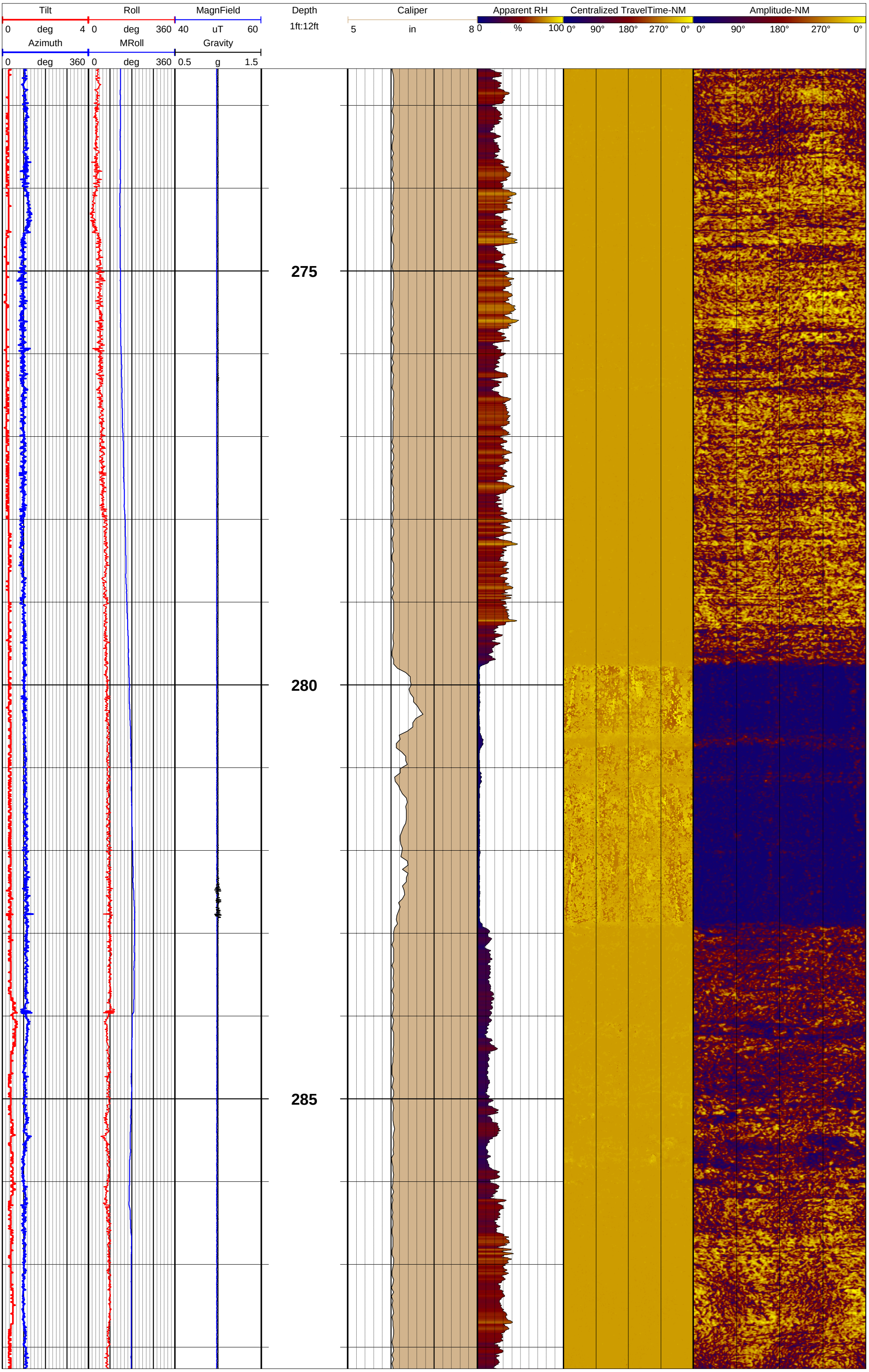
Tilt 0 deg 4 | Roll 0 deg 360 | MagnField 40 uT 60 | Depth 1ft:12ft | Caliper 5 in 8 | Apparent RH 0 % 100 | Centralized TravelTime-NM 0° 90° 180° 270° 0° | Amplitude-NM 0° 90° 180° 270° 0°

Azimuth 0 deg 360 | MRoll 0 deg 360 | Gravity 0.5 g 1.5

260

265

270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Roll
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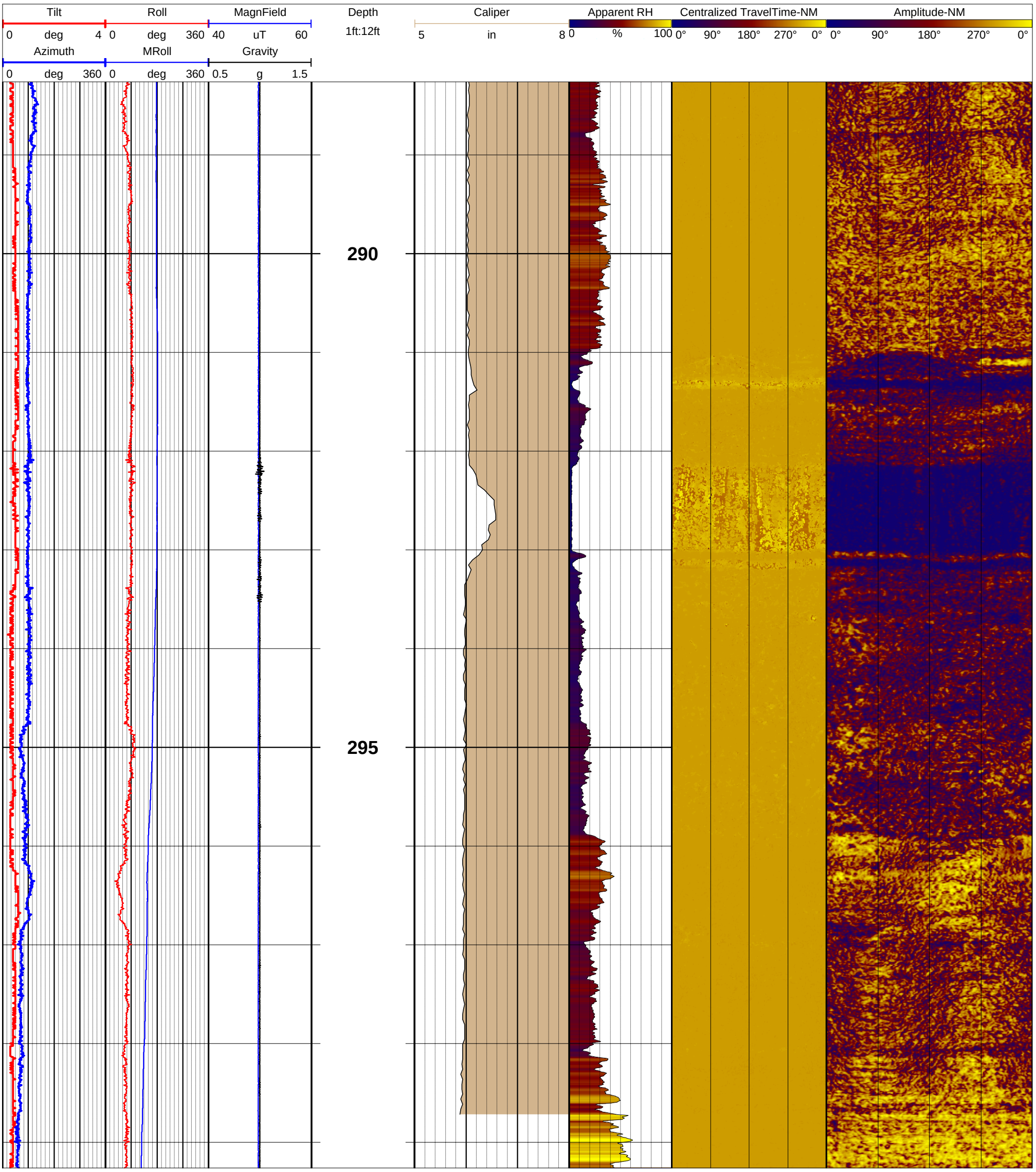
MagnField
40 uT 60
Azimuth
0 deg 360
MRoll
0 deg 360
Gravity
0.5 g 1.5
Depth
1ft:12ft
Caliper
5 in 8
Apparent RH
0 % 100
Centralized TravelTime-NM
0° 90° 180° 270° 0°
Amplitude-NM
0° 90° 180° 270° 0°
275
280
285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Roll
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MagnField
40 uT 60
Azimuth
0 deg 360
MRoll
0 deg 360
Gravity
0.5 g 1.5
Depth
1ft:12ft
290
295
Caliper
5 in 8
Apparent RH
0 % 100
Centralized TravelTime-NM
0° 90° 180° 270° 0°
Amplitude-NM
0° 90° 180° 270° 0°

GEOPHYSICAL RECORD OF BOREHOLE: GSAP-MW32H

Plant Gorgas - CCR Delineation Wells

GOLDER

Project Number: 19131304

Client: Southern Company Services

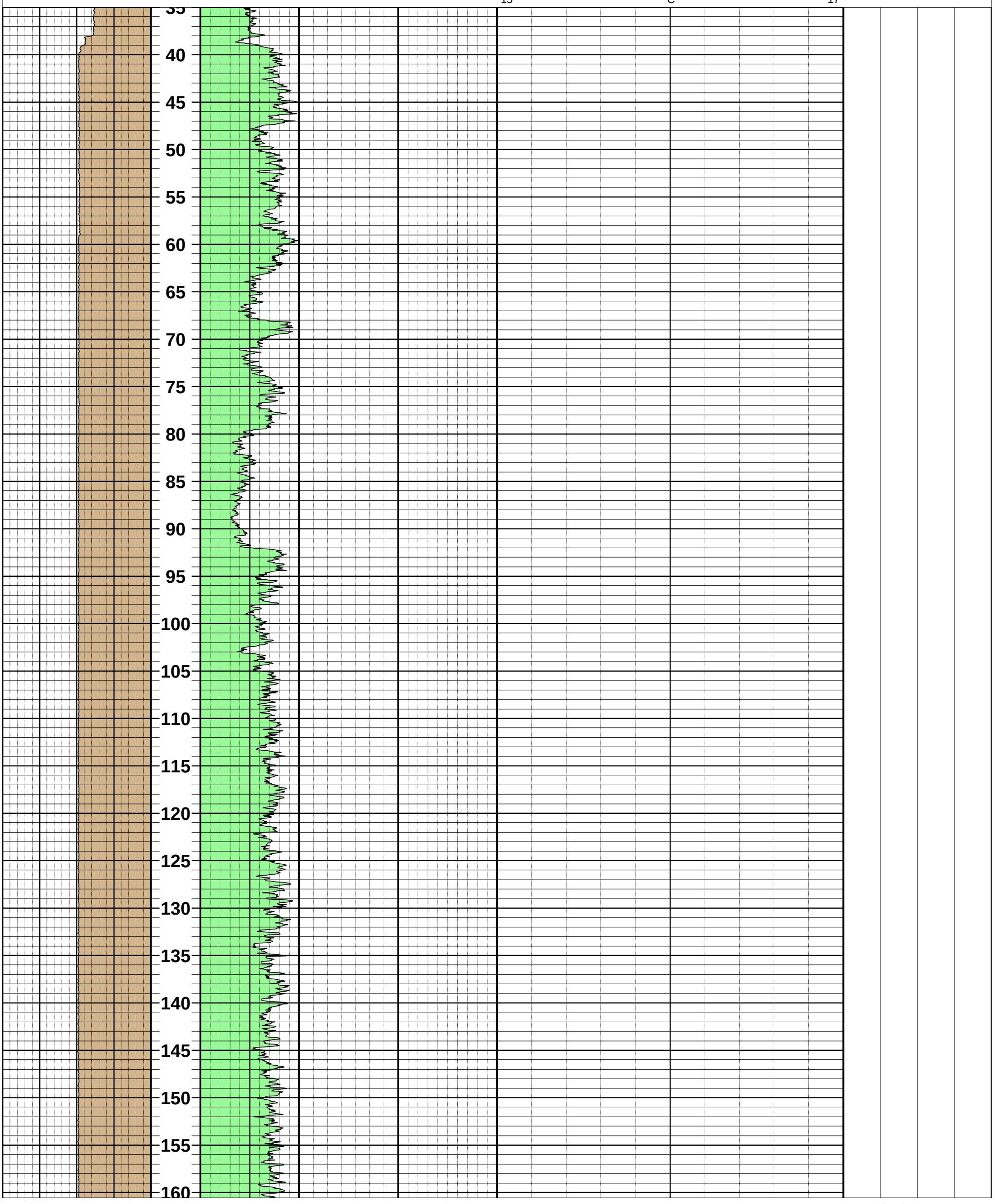
Southern Company

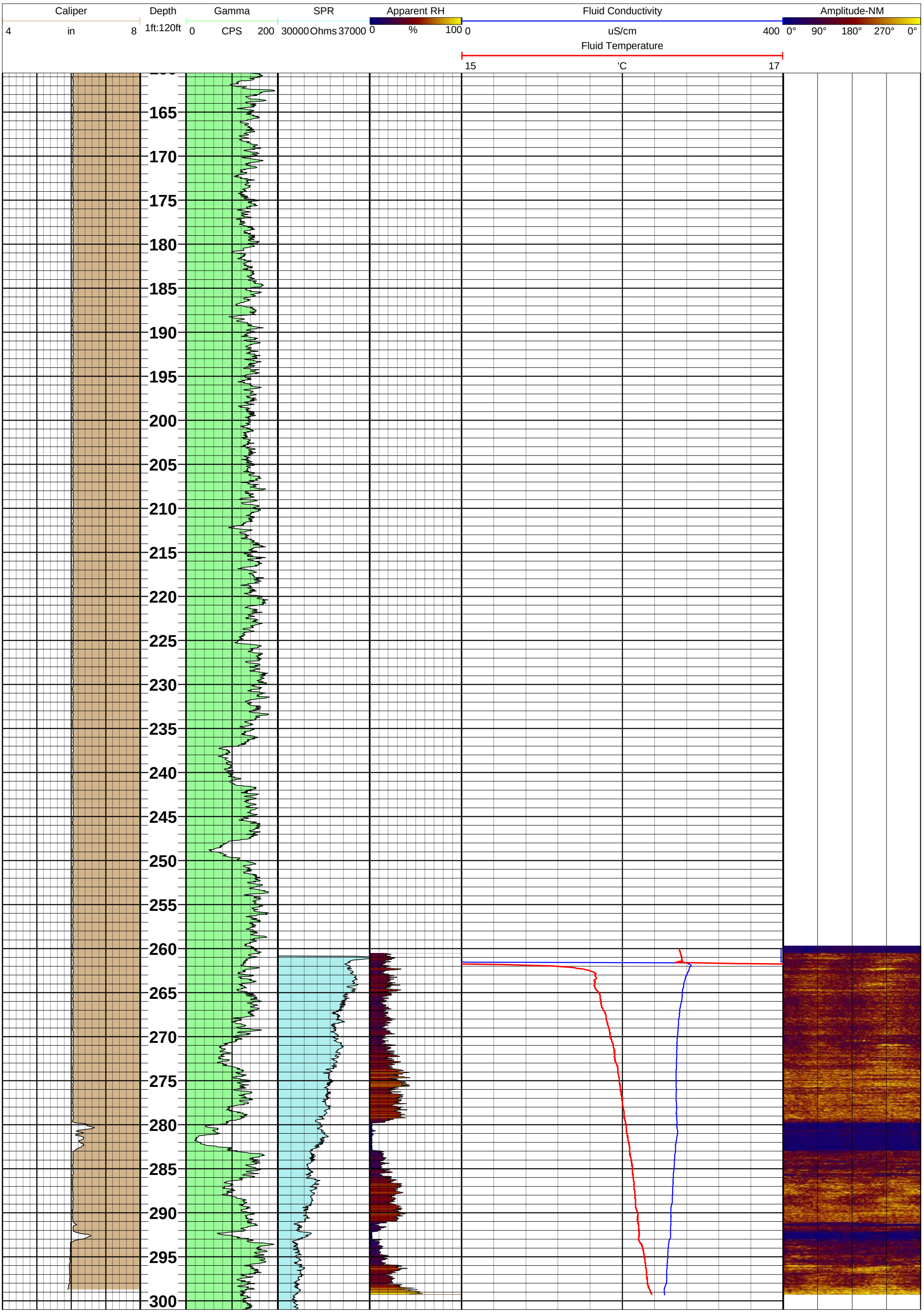
Date: 10-13-2019

Location: Parrish, Al	TOC Elev msl: na	Notes: Water level 263.32@8:15, 261.88@8:57 all gs
Easting: na	Casing Stick-up: 6.33 ft ags	
Northing: na	Casing Diameter: 7 in ID	Tools used were:
Ground Elev msl: na	Casing Material: Steel	QL40-FTC sn 5518
Borehole Dip: vertical	Water Level: 261.9 ft BGS	QL40 Caliper sn 5521
Borehole Az: na	Logged By: CAB	40-LGR-Gamma & SPR sn 5809
Borehole Size: 6" AH	Log Depth Ref: Ground Surface	ATV ABI40 sn162305
Drilled Depth: 301 ft BGS	Log Date: 10/13/19	
Drill Comp Date: 10-12-19	Image Plot(s) Ref: MN	
Casing Depth: 39 ft bgs	Dip Referenced to Horizontal	



Caliper: 4 in 8 | Depth: 1ft:120ft | Gamma: 0 CPS 200 | SPR: 30000 Ohms 37000 | Apparent RH: 0 % 100 | Fluid Conductivity: 0 uS/cm 400 | Amplitude-NM: 0° 90° 180° 270° 0° | Fluid Temperature: 15 'C 17




Caliper
4
in
8
Depth
1ft:120ft
Gamma
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CPS
200
SPR
30000 Ohms 37000
Apparent RH
0
%
100
Fluid Conductivity
0
uS/cm
400
Fluid Temperature
15
'C
17
Amplitude-NM
0°
90°
180°
270°
0°
165
170
175
180
185
190
195
200
205
210
215
220
225
230
235
240
245
250
255
260
265
270
275
280
285
290
295
300

GEOPHYSICAL RECORD OF BOREHOLE: GSAP-MW33HO

Plant Gorgas - CCR Delineation Wells

GOLDER

Project Number: 19131304

Client: Southern Company Services

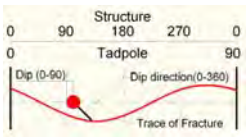
Southern Company

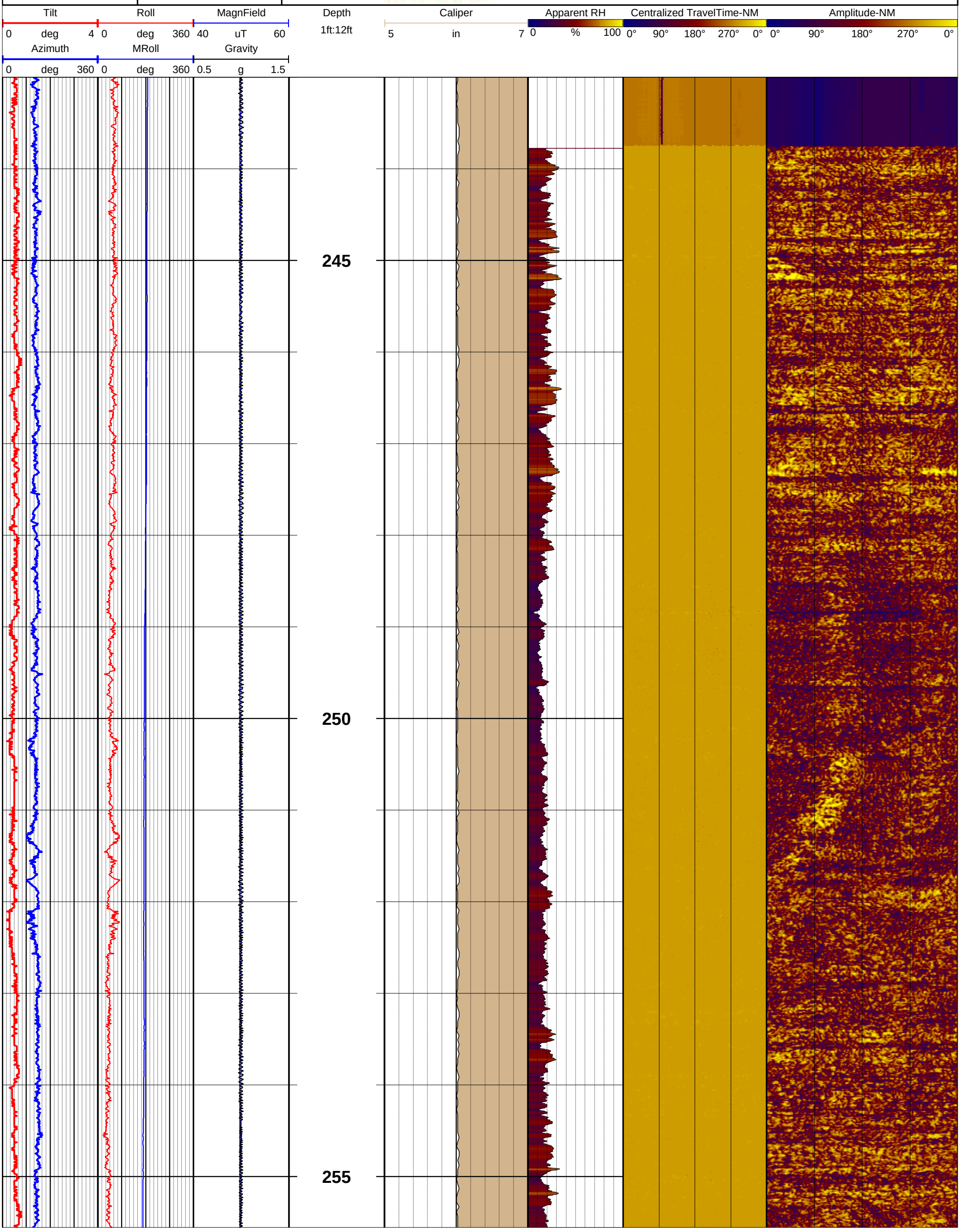
Date: 11-9-2019

Location: Parrish, Al	TOC Elev msl: na
Easting: na	Casing Stick-up: 1.25 ft ags
Northing: na	Casing Diameter: 6.625 in ID
Ground Elev msl: na	Casing Material: Steel
Borehole Dip: vertical	Water Level: 246 ft bgs 11-8
Borehole Az: na	Logged By: CM
Borehole Size: 6" AH	Log Depth Ref: Ground Surface
Drilled Depth: 300.5 ft BGS	Log Date: 11/8-9/2019
Drill Comp Date: 11-7-19	Image Plot(s) Ref: MN
Casing Depth: 25 ft bgs	Dip Referenced to Horizontal

Notes: 299.65' Below top of Casing @ 12:24, 11/08 248.95 @ 7:16 11/09
Drilling was complete EOD 11/07/2019. Hole blown out 11/08/2019
Drillers noted water at 260 ft

Tools used were:
QL40-FTC sn 5518
QL40 Caliper sn 5521
40-LGR-Gamma & SPR sn 5809
ATV ABI40 sn162305



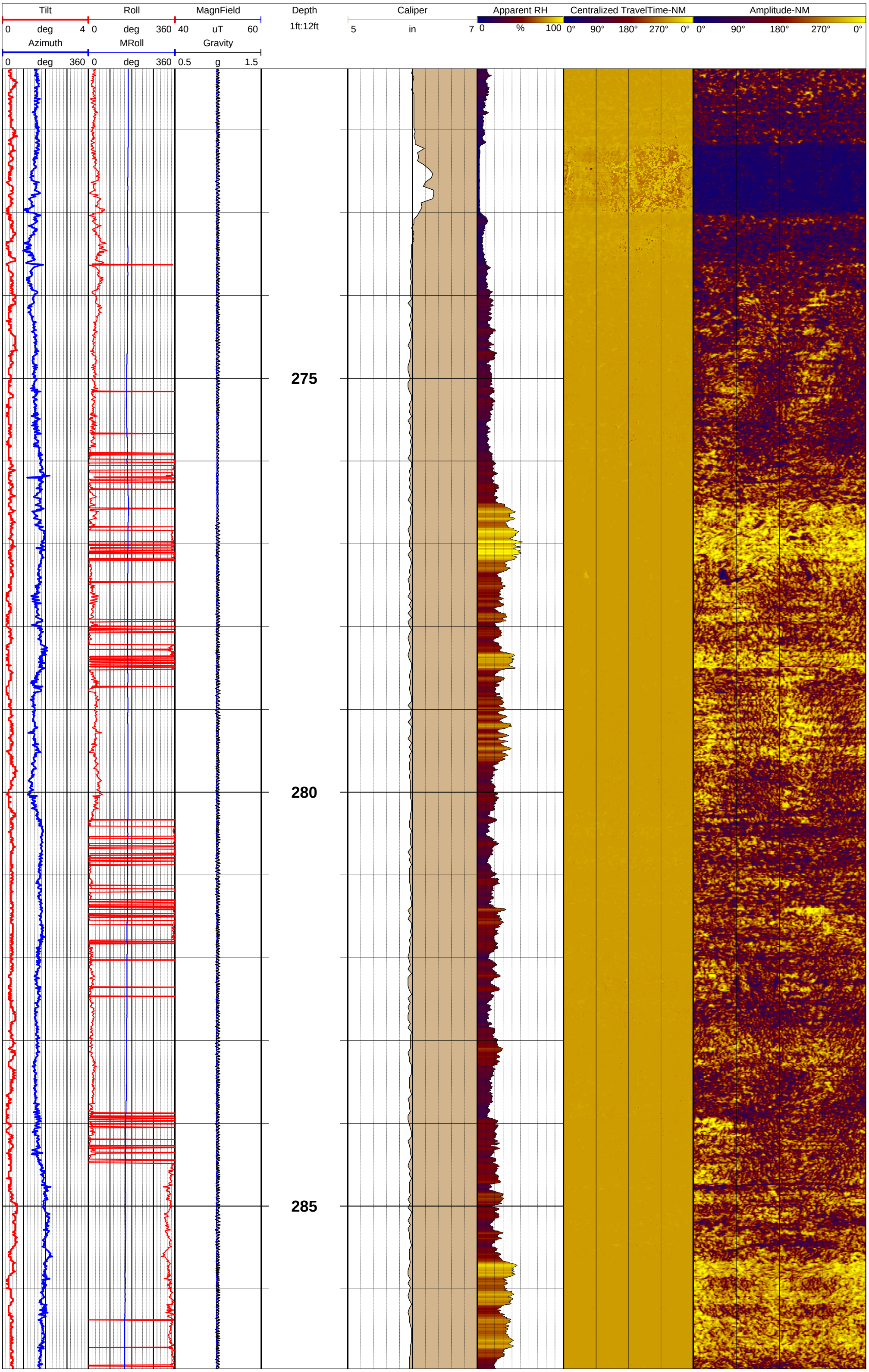


Tilt
0 deg 4
Roll
0 deg 360
MagnField
40 uT 60
Azimuth
0 deg 360
MRoll
0 deg 360
Gravity
0.5 g 1.5
Depth
1ft:12ft
Caliper
5 in 7
Apparent RH
0 % 100
Centralized TravelTime-NM
0° 90° 180° 270° 0°
Amplitude-NM
0° 90° 180° 270° 0°

260

265

270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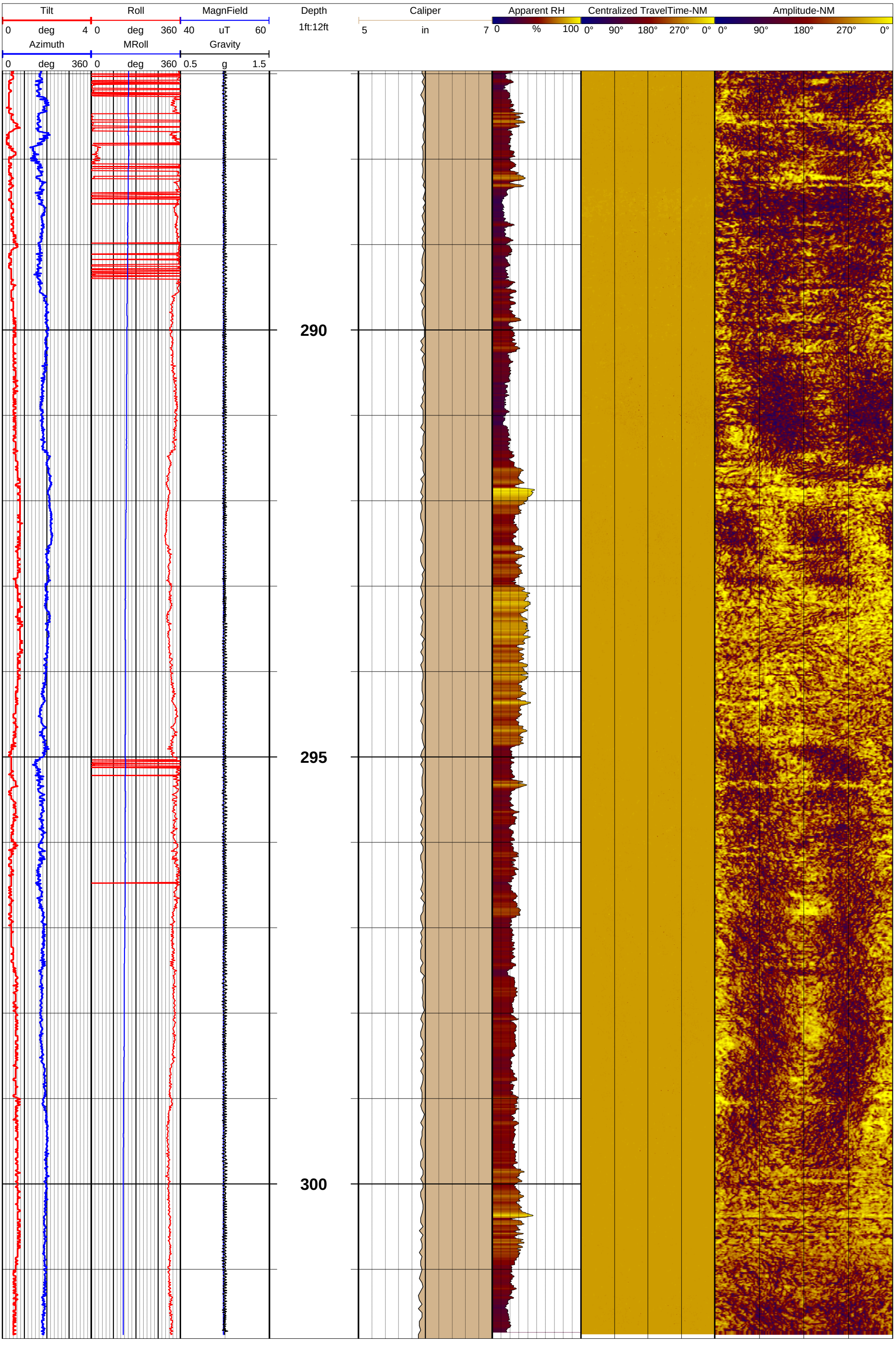
0 deg 4
Roll
0 deg 360
MagnField
40 uT 60
Azimuth
0 deg 360
MRoll
0 deg 360
Gravity
0.5 g 1.5
Depth
1ft:12ft
Caliper
5 in 7
Apparent RH
0 % 100
Centralized TravelTime-NM
0° 90° 180° 270° 0°
Amplitude-NM
0° 90° 180° 270° 0°
275
280
285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Roll
0 deg 360
MagnField
40 uT 60
Azimuth
0 deg 360
MRoll
0 deg 360
Gravity
0.5 g 1.5
Depth
1ft:12ft
Caliper
5 in 7
Apparent RH
0 % 100
Centralized TravelTime-NM
0° 90° 180° 270° 0°
Amplitude-NM
0° 90° 180° 270° 0°
290
295
300

GEOPHYSICAL RECORD OF BOREHOLE: GSAP-MW33HO

Plant Gorgas - CCR Delineation Wells

GOLDER

Project Number: 19131304

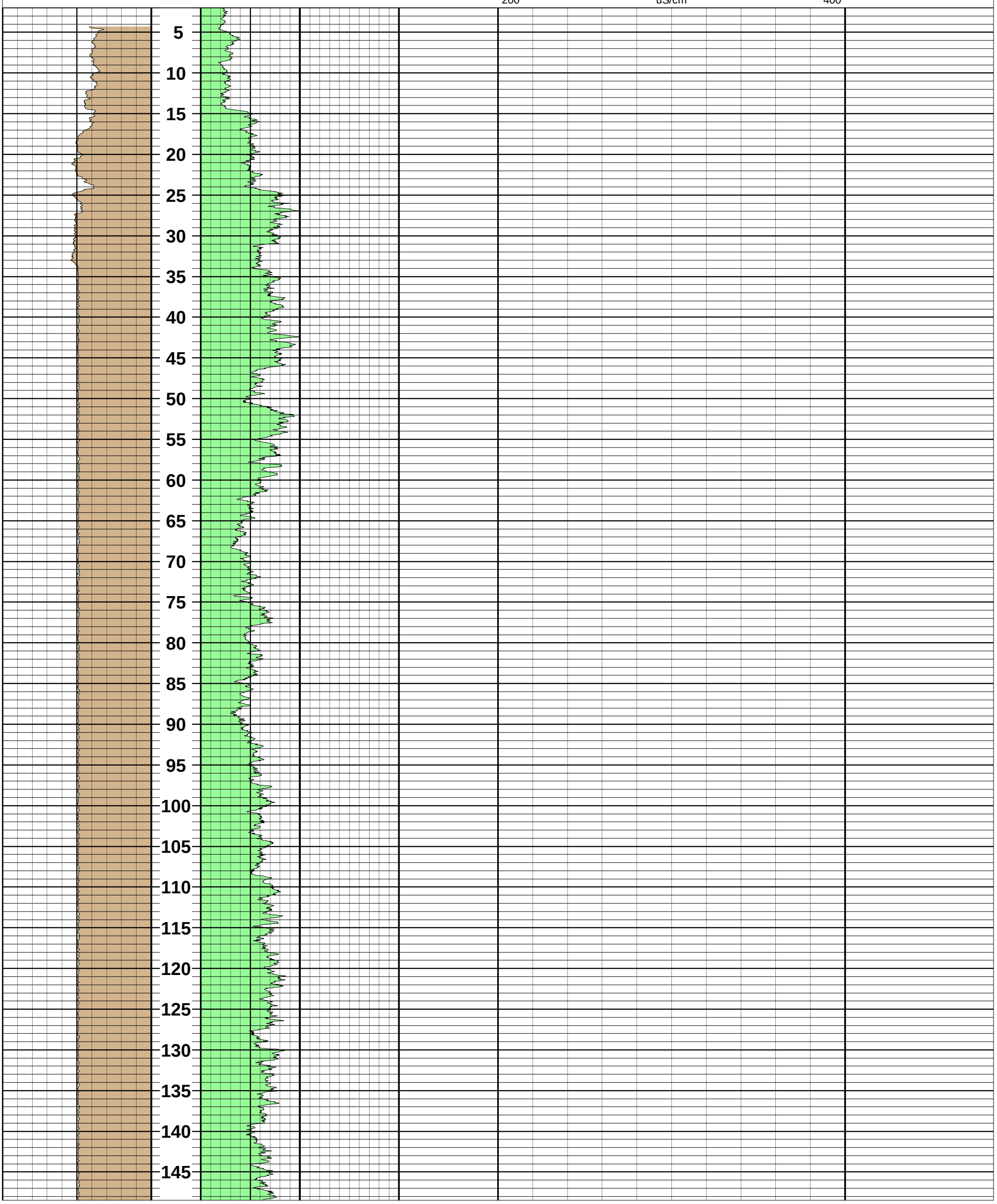
Client: Southern Company Services

Date: 11-9-2019

Location: Parrish, Al	TOC Elev msl: na	Notes: 299.65' Below top of Casing @ 12:24, 11/08 248.95 @ 7:16 11/09
Easting: na	Casing Stick-up: 1.25 ft ags	Drilling was complete EOD 11/07/2019. Hole blown out 11/08/2019
Northing: na	Casing Diameter: 6.625 in ID	Drillers noted water at 260 ft
Ground Elev msl: na	Casing Material: Steel	
Borehole Dip: vertical	Water Level: 246 ft bgs 11-8	Tools used were:
Borehole Az: na	Logged By: CM	QL40-FTC sn 5518
Borehole Size: 6" AH	Log Depth Ref: Ground Surface	QL40 Caliper sn 5521
Drilled Depth: 300.5 ft BGS	Log Date: 11/8-9/2019	40-LGR-Gamma & SPR sn 5809
Drill Comp Date: 11-7-19	Image Plot(s) Ref: MN	ATV ABI40 sn162305
Casing Depth: 25 ft bgs	Dip Referenced to Horizontal	



Caliper: 5 in 7 | Depth: 1ft:140ft | Gamma: 0 CPS 200 | SPR: 1200 Ohms 1700 | Fluid Temperature: 16 'C 17 | Fluid Conductivity: 200 uS/cm 400



Caliper
5 in 7

Depth
1ft:140ft

Gamma
0 CPS 200

SPR
1200 Ohms 1700

Fluid Temperature
16 'C 17

Fluid Conductivity
200 uS/cm 400

150
155
160
165
170
175
180
185
190
195
200
205
210
215
220
225
230
235
240
245
250
255
260
265
270
275
280
285
290
295
300

GEOPHYSICAL RECORD OF BOREHOLE: GSAP-MW33HO

Plant Gorgas - CCR Delineation Wells

GOLDER

Project Number: 19131304

Client: Southern Company Services

Southern Company

Date: 11-9-2019

Location: Parrish, Al	TOC Elev msl: na
Easting: na	Casing Stick-up: 1.25 ft ags
Northing: na	Casing Diameter: 6.625 in ID
Ground Elev msl: na	Casing Material: Steel
Borehole Dip: vertical	Water Level: 246 ft bgs 11-8
Borehole Az: na	Logged By: CM
Borehole Size: 6" AH	Log Depth Ref: Ground Surface
Drilled Depth: 300.5 ft BGS	Log Date: 11/8-9/2019
Drill Comp Date: 11-7-19	Image Plot(s) Ref: MN
Casing Depth: 25 ft bgs	Dip Referenced to Horizontal

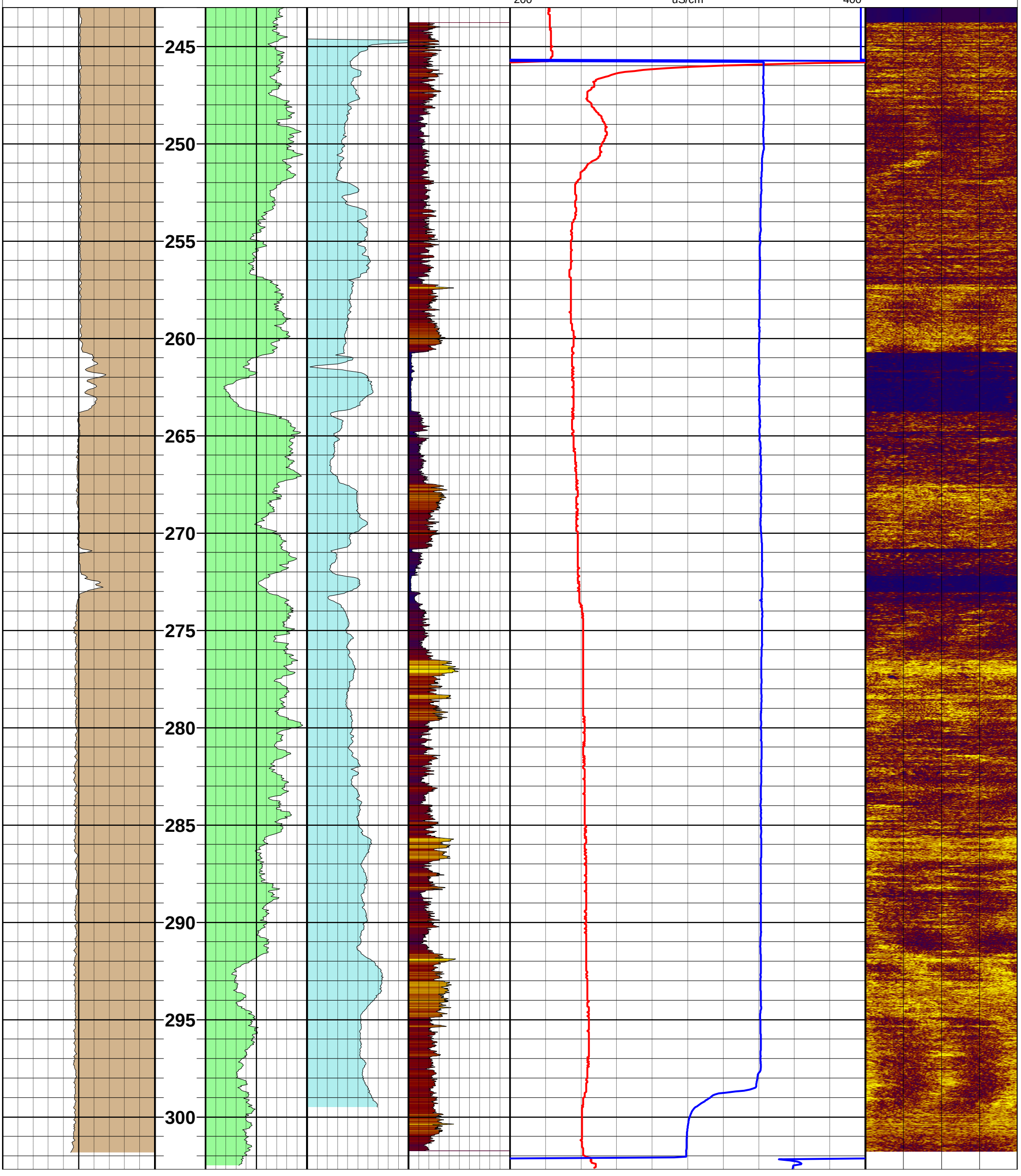
Notes:
299.65' Below top of Casing @ 12:24, 11/08 248.95 @ 7:16 11/09
Drilling was complete EOD 11/07/2019. Hole blown out 11/08/2019
Drillers noted water at 260 ft

Tools used were:
QL40-FTC sn 5518
QL40 Caliper sn 5521
40-LGR-Gamma & SPR sn 5809
ATV ABI40 sn162305



Caliper 5 in 7 | Depth 1ft:60ft | Gamma 0 CPS 200 | SPR 1200 Ohms 1700 | Apparent RH 0 % 100 | Fluid Temperature 16 'C 17 | Amplitude-NM 0° 90° 180° 270° 0°

Fluid Conductivity 200 uS/cm 400



GEOPHYSICAL RECORD OF BOREHOLE: GSAP-MW34HO

Plant Gorgas - CCR Delineation Wells

GOLDER

Project Number: 19131304

Client: Southern Company Services

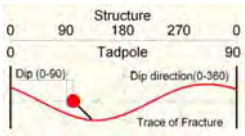
Southern Company

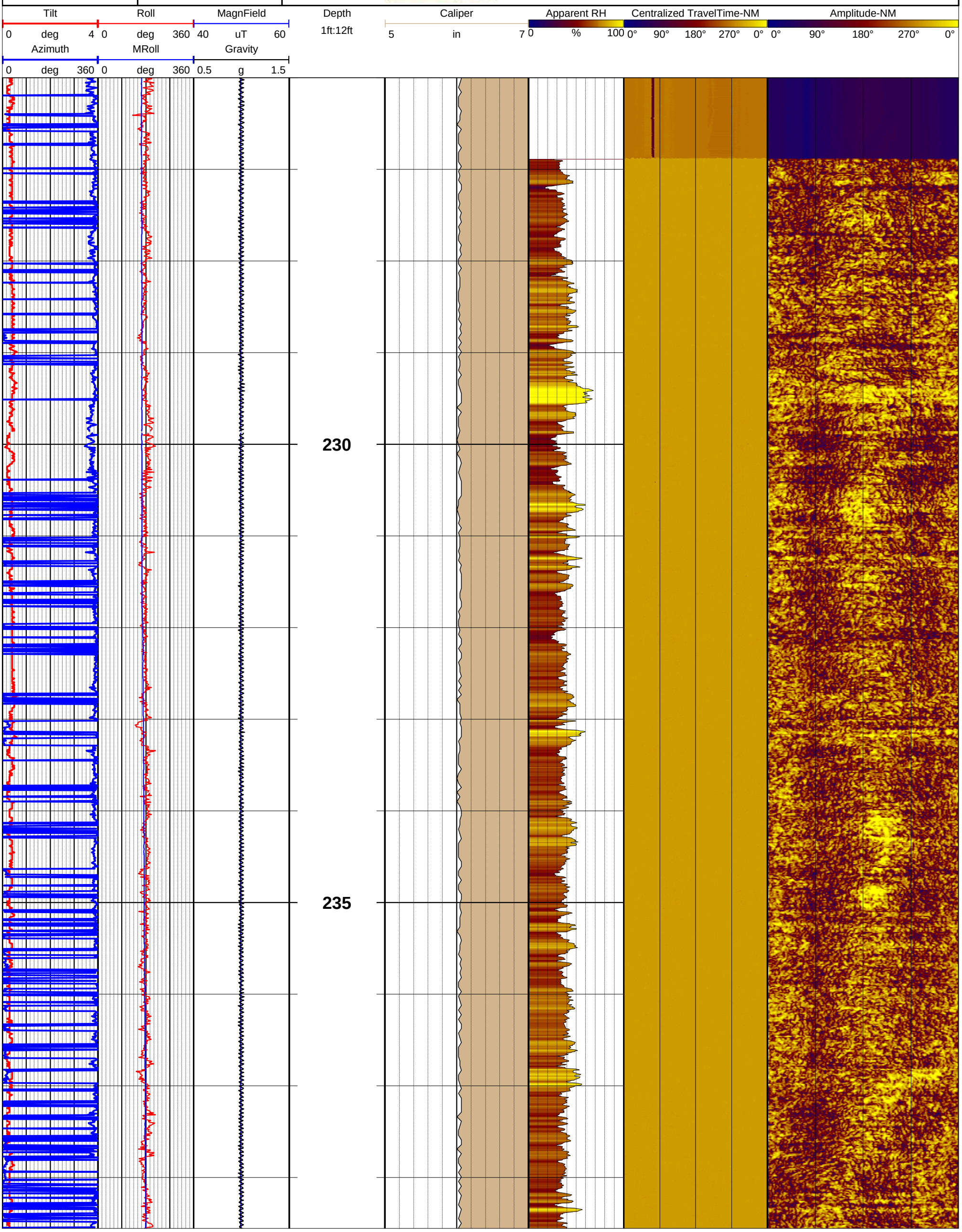
Date: 11-10-2019

Location: Parrish, Al	TOC Elev msl: na
Easting: na	Casing Stick-up: 0.77 ft ags
Northing: na	Casing Diameter: 6.625 in ID
Ground Elev msl: na	Casing Material: Steel
Borehole Dip: vertical	Water Level: 229.8 ft bgs
Borehole Az: na	Logged By: CM
Borehole Size: 6" AH	Log Depth Ref: Ground Surface
Drilled Depth: 350.5 ft BGS	Log Date: 11/10/2019
Drill Comp Date: 11-9-19	Image Plot(s) Ref: MN
Casing Depth: 28 ft bgs	Dip Referenced to Horizontal

Notes: 230.55 @ 7:00
Drilling was complete 11/09/2019. Drillers encountered water at ~ 230'

Tools used were:
QL40-FTC sn 5518
QL40 Caliper sn 5521
40-LGR-Gamma & SPR sn 5809
ATV ABI40 sn162305





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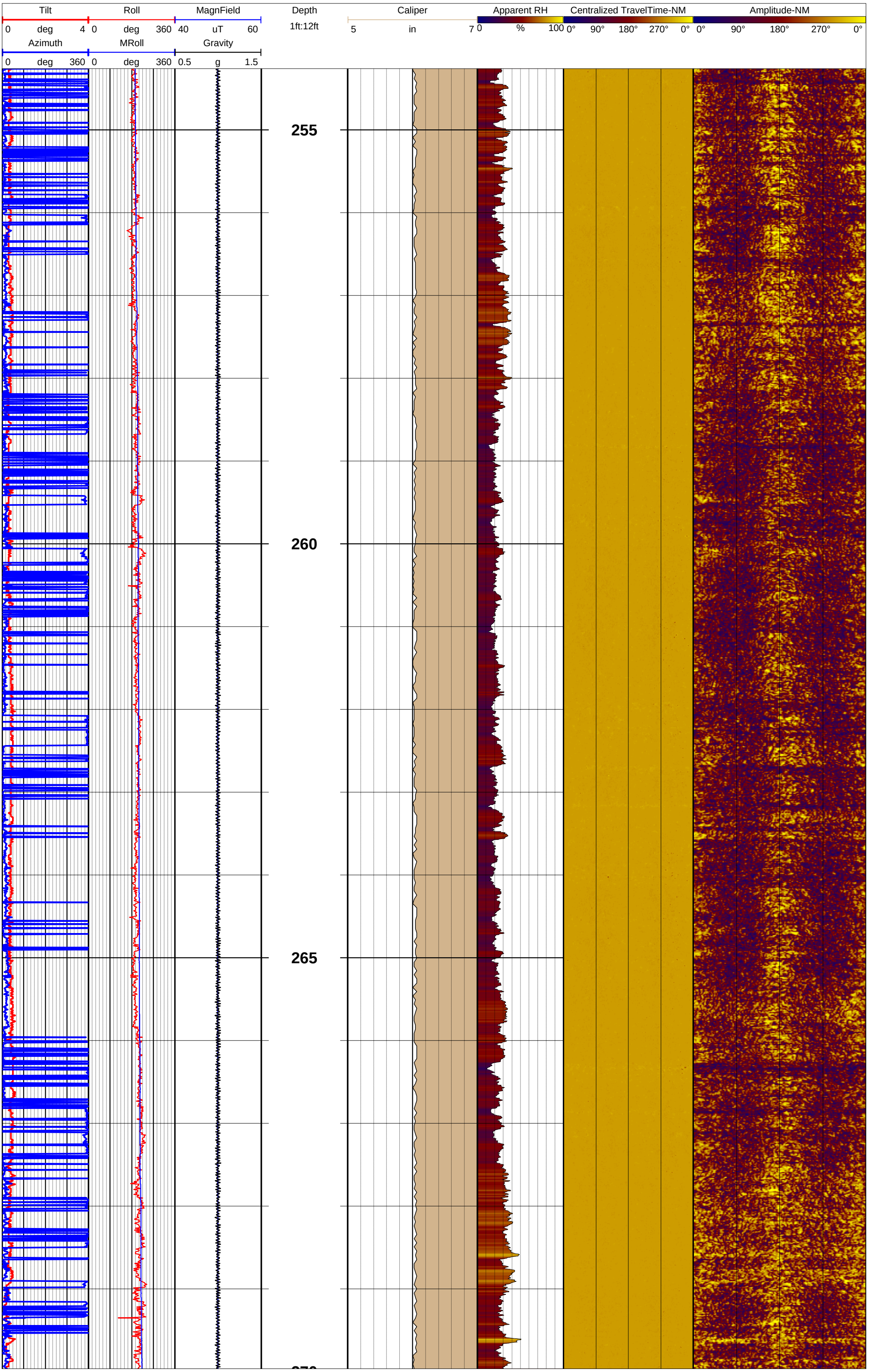
Roll 0 deg 360
MagnField 40 uT 60
Azimuth 0 deg 360
MRoll 0 deg 360
Gravity 0.5 g 1.5
Depth 1ft:12ft
Caliper 5 in 7
Apparent RH 0 % 100
Centralized TravelTime-NM 0° 90° 180° 270° 0°
Amplitude-NM 0° 90° 180° 270° 0°

240

245

250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0 deg 4
Roll
0 deg 360
MagnField
40 uT 60
Azimuth
0 deg 360
MRoll
0 deg 360
Gravity
0.5 g 1.5
Depth
1ft:12ft
255
260
265
Caliper
5 in 7
Apparent RH
0 % 100
Centralized TravelTime-NM
0° 90° 180° 270° 0°
Amplitude-NM
0° 90° 180° 270° 0°

Tilt 0 deg 4 | Roll 0 deg 360 | MagnField 40 uT 60 | Depth 1ft:12ft | Caliper 5 in 7 | Apparent RH 0 % 100 | Centralized TravelTime-NM 0° 90° 180° 270° 0° | Amplitude-NM 0° 90° 180° 270° 0°

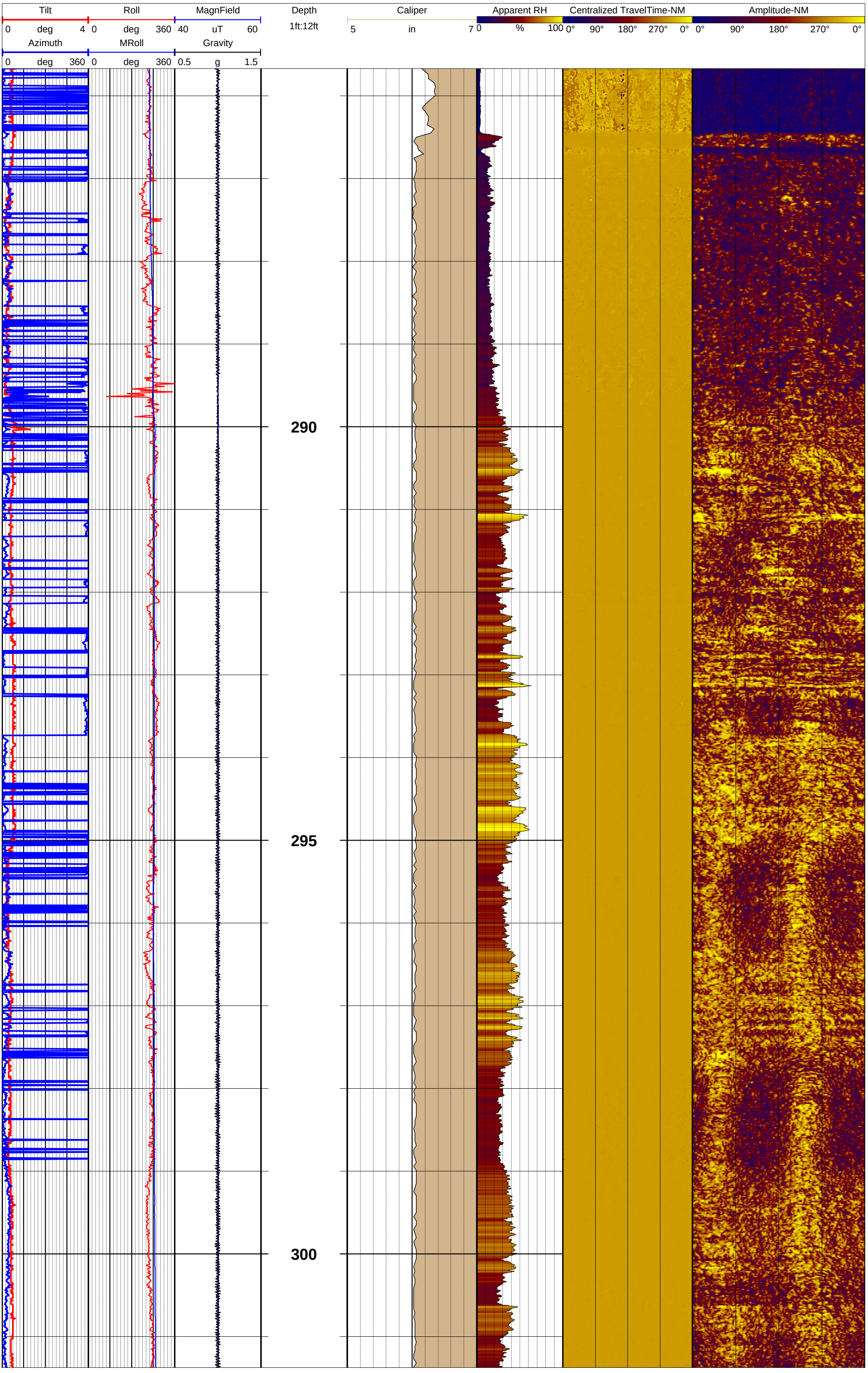
Azimuth 0 deg 360 | MRoll 0 deg 360 | Gravity 0.5 g 1.5

270

275

280

285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MagnField
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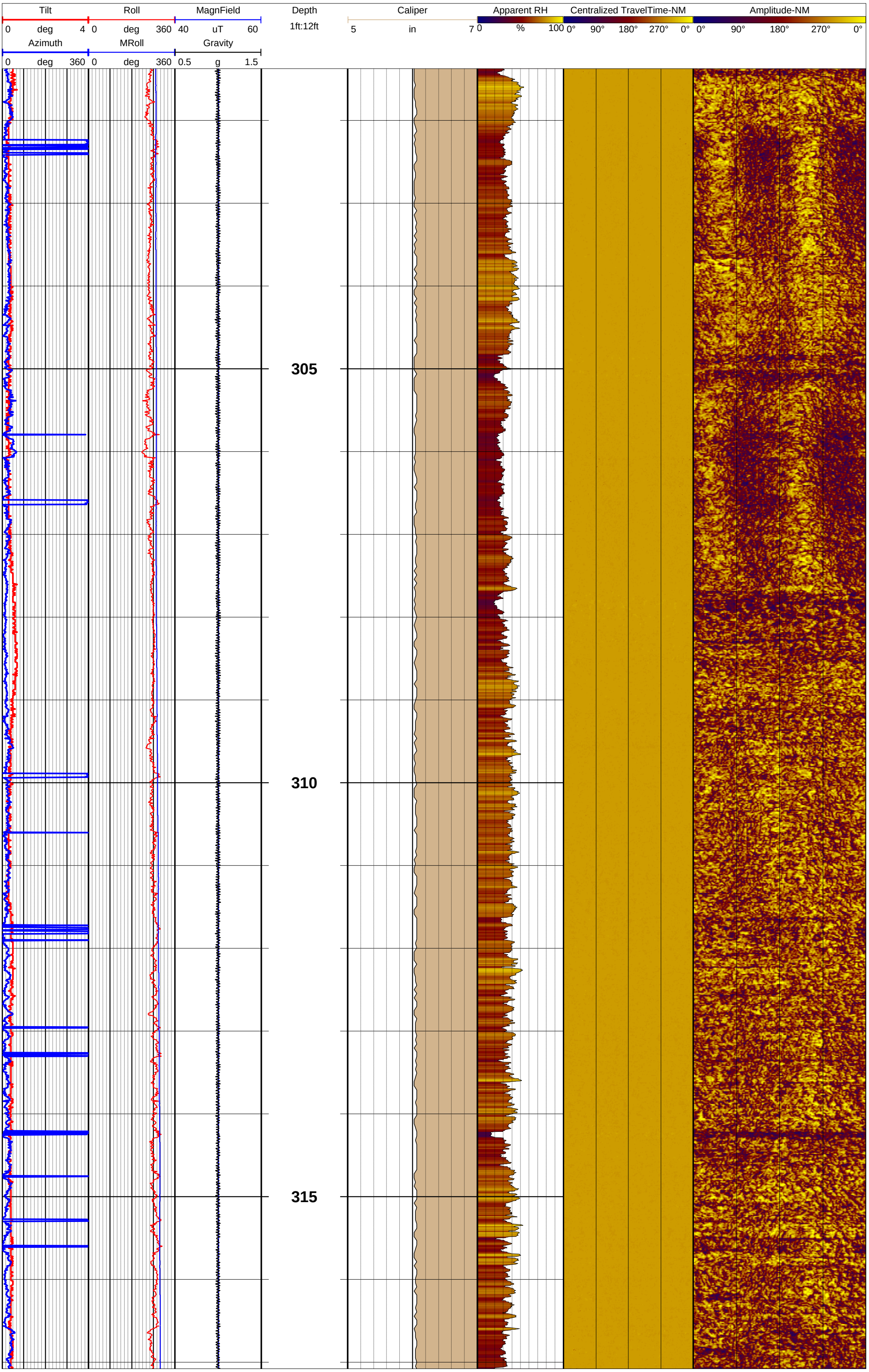
Azimuth
0 deg 360
MRoll
0 deg 360
Gravity
0.5 g 1.5
Depth
1ft:12ft
Caliper
5 in 7
Apparent RH
0 % 100
Centralized TravelTime-NM
0° 90° 180° 270° 0°
Amplitude-NM
0° 90° 180° 270° 0°
290
295
300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MagnField
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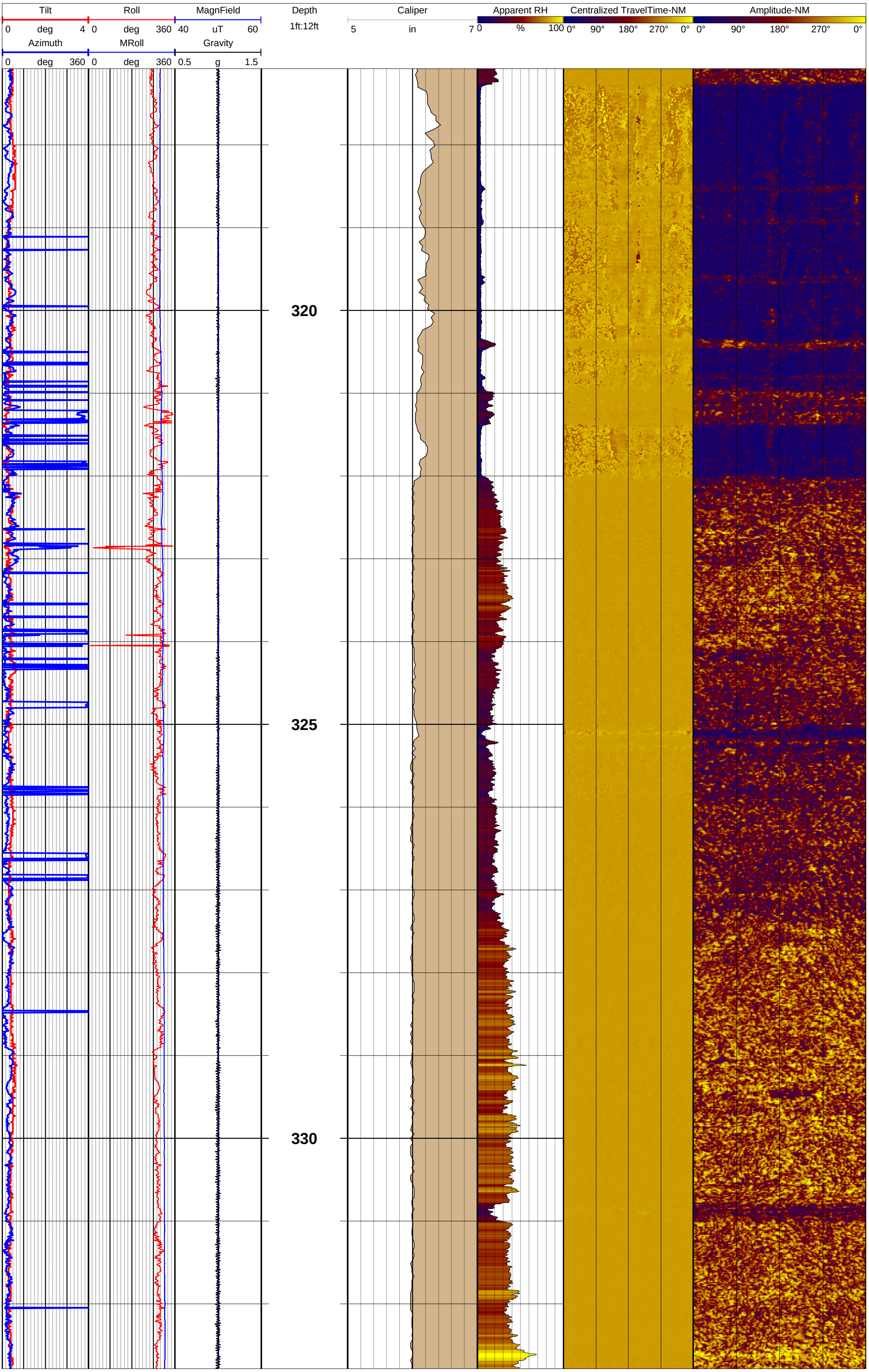
Azimuth
0 deg 360
MRoll
0 deg 360
Gravity
0.5 g 1.5
Depth
1ft:12ft
Caliper
5 in 7
Apparent RH
0 % 100
Centralized TravelTime-NM
0° 90° 180° 270° 0°
Amplitude-NM
0° 90° 180° 270° 0°
305
310
315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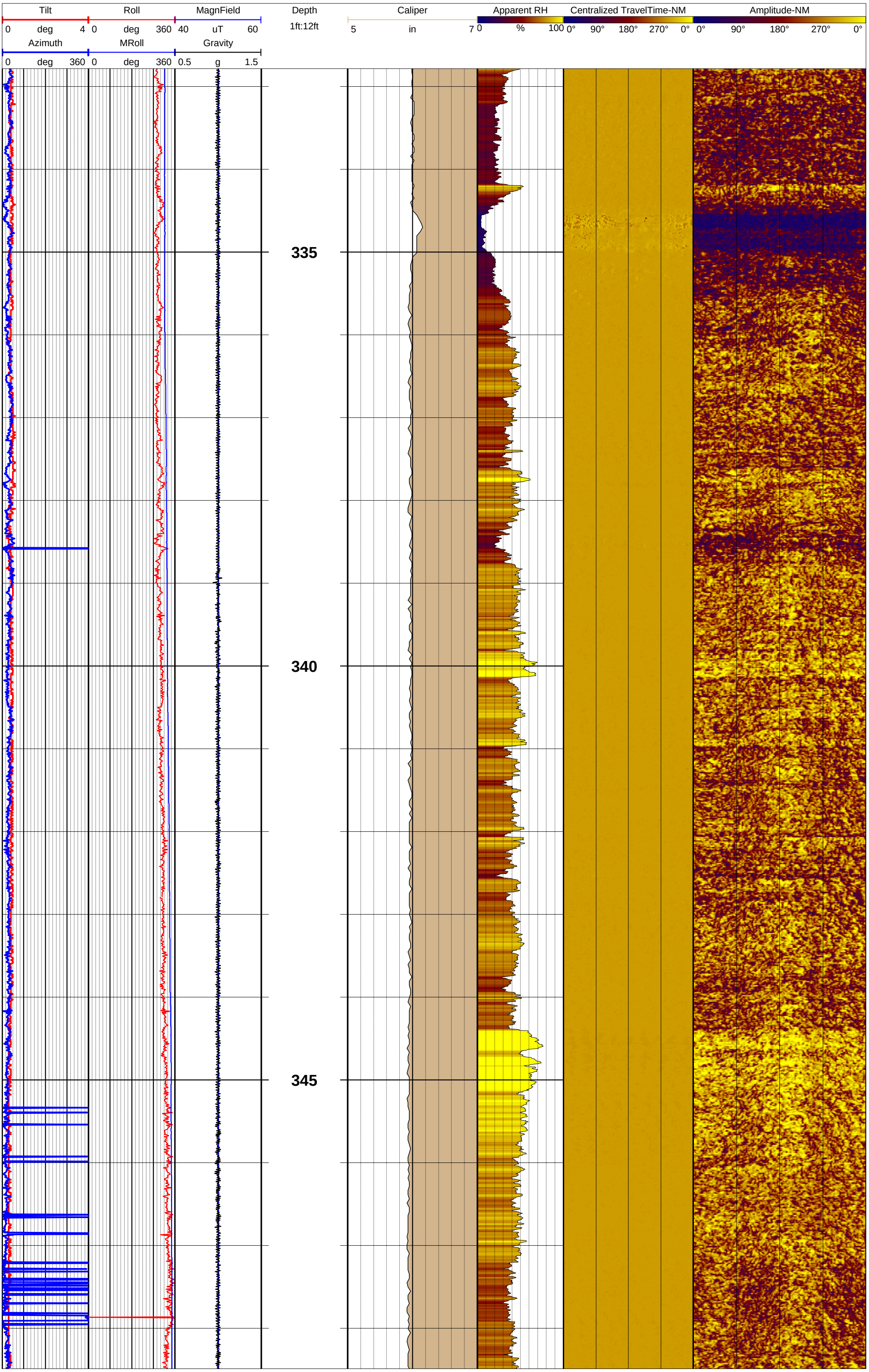
MagnField
40 uT 60
Azimuth
0 deg 360
MRoll
0 deg 360
Gravity
0.5 g 1.5
Depth
1ft:12ft
Caliper
5 in 7
Apparent RH
0 % 100
Centralized TravelTime-NM
0° 90° 180° 270° 0°
Amplitude-NM
0° 90° 180° 270° 0°
320
325
330


Tilt
0 deg 4
Roll
0 deg 360
MagnField
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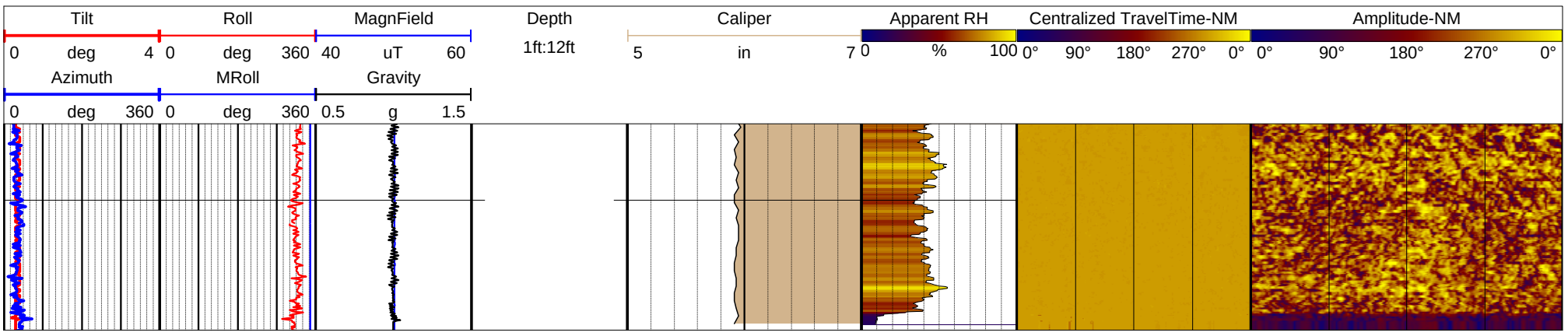
Azimuth
0 deg 360
MRoll
0 deg 360
Gravity
0.5 g 1.5
Depth
1ft:12ft
335
340
345
Caliper
5 in 7
Apparent RH
0 % 100
Centralized TravelTime-NM
0° 90° 180° 270° 0°
Amplitude-NM
0° 90° 180° 270° 0°


Tilt
0 deg 4
Roll
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MagnField
40 uT 60
Depth
1ft:12ft
Caliper
5 in 7
Apparent RH
0 % 100
Centralized TravelTime-NM
0° 90° 180° 270° 0°
Amplitude-NM
0° 90° 180° 270° 0°
Azimuth
0 deg 360
MRoll
0 deg 360
Gravity
0.5 g 1.5

GEOPHYSICAL RECORD OF BOREHOLE: GSAP-MW34HO

Plant Gorgas - CCR Delineation Wells

GOLDER

Project Number: 19131304

Client: Southern Company Services

Southern Company

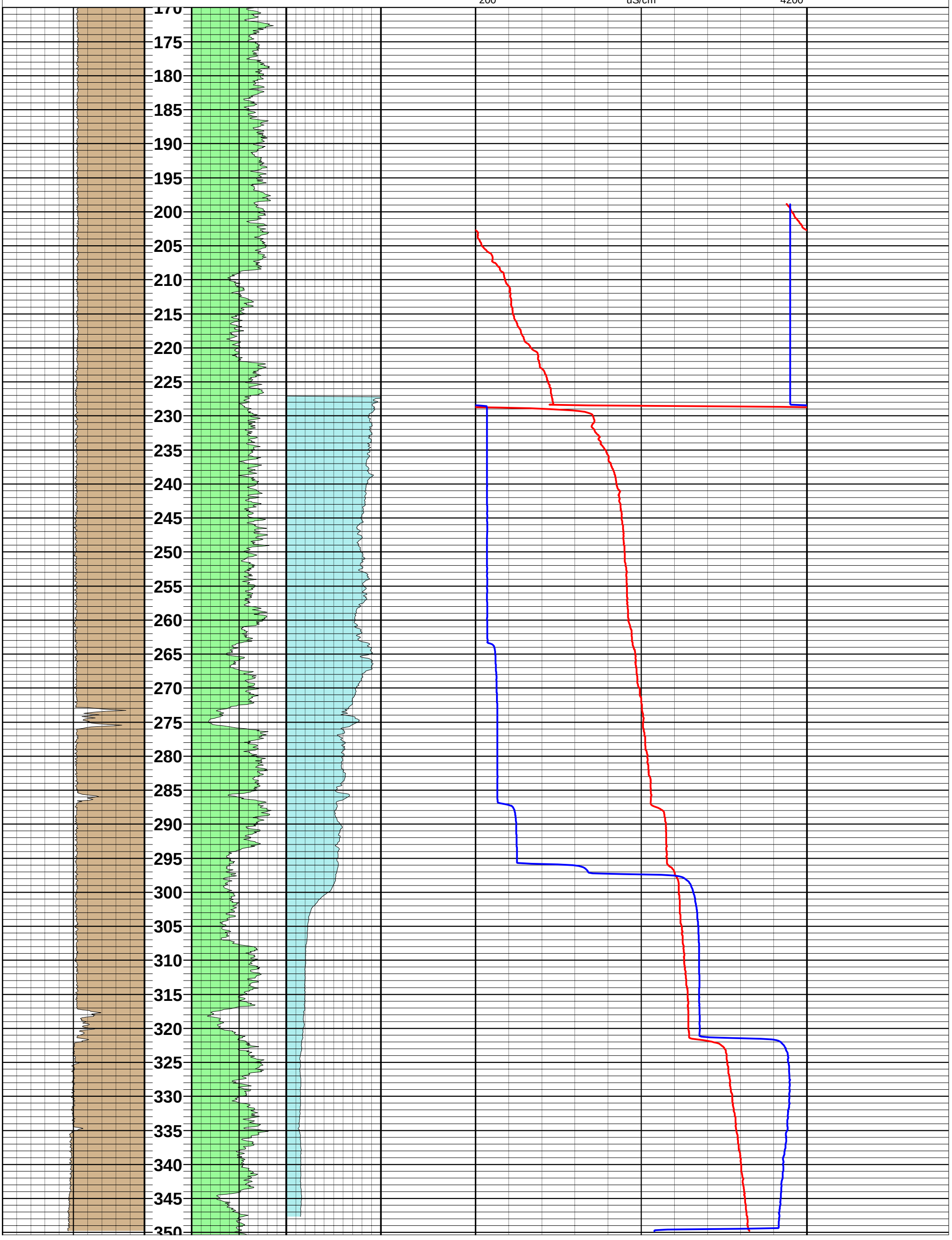
Date: 11-10-2019

Location: Parrish, Al	TOC Elev msl: na	Notes: 230.55 @ 7:00
Easting: na	Casing Stick-up: 0.77 ft ags	Drilling was complete 11/09/2019. Drillers encountered water at ~ 230'
Northing: na	Casing Diameter: 6.625 in ID	
Ground Elev msl: na	Casing Material: Steel	Tools used were:
Borehole Dip: vertical	Water Level: 229.8 ft bgs	QL40-FTC sn 5518
Borehole Az: na	Logged By: CM	QL40 Caliper sn 5521
Borehole Size: 6" AH	Log Depth Ref: Ground Surface	40-LGR-Gamma & SPR sn 5809
Drilled Depth: 350.5 ft BGS	Log Date: 11/10/2019	ATV ABI40 sn162305
Drill Comp Date: 11-9-19	Image Plot(s) Ref: MN	
Casing Depth: 28 ft bgs	Dip Referenced to Horizontal	



Caliper: 5 in 7 | Depth: 1ft:160ft | Gamma: 0 CPS 200 | SPR: 1200 Ohms 1800 | Fluid Temperature: 15 'C 17 | Fluid Conductivity: 200 uS/cm 4200

Caliper 5 in 7 | Depth 1ft:160ft | Gamma 0 CPS 200 | SPR 1200 Ohms 1800 | Fluid Temperature 15 'C 17 | Fluid Conductivity 200 uS/cm 4200



GEOPHYSICAL RECORD OF BOREHOLE: GSAP-MW34HO

Plant Gorgas - CCR Delineation Wells

GOLDER

Project Number: 19131304

Client: Southern Company Services

Southern Company

Date: 11-10-2019

Location: Parrish, Al	TOC Elev msl: na
Easting: na	Casing Stick-up: 0.77 ft ags
Northing: na	Casing Diameter: 6.625 in ID
Ground Elev msl: na	Casing Material: Steel
Borehole Dip: vertical	Water Level: 229.8 ft bgs
Borehole Az: na	Logged By: CM
Borehole Size: 6" AH	Log Depth Ref: Ground Surface
Drilled Depth: 350.5 ft BGS	Log Date: 11/10/2019
Drill Comp Date: 11-9-19	Image Plot(s) Ref: MN
Casing Depth: 28 ft bgs	Dip Referenced to Horizontal

Notes: 230.55 @ 7:00
Drilling was complete 11/09/2019. Drillers encountered water at ~ 230'

Tools used were:
QL40-FTC sn 5518
QL40 Caliper sn 5521
40-LGR-Gamma & SPR sn 5809
ATV ABI40 sn162305



Caliper 5 in 7 | Depth 1ft:120ft | Gamma 0 CPS 200 | SPR 1200 Ohms 1800 | Apparent RH 0 % 100 | Fluid Temperature 15 'C 17 | Amplitude-NM 0° 90° 180° 270° 0°

Fluid Conductivity 200 uS/cm 4200

GEOPHYSICAL RECORD OF BOREHOLE: GSAP-MW35HO

Plant Gorgas - CCR Delineation Wells

GOLDER

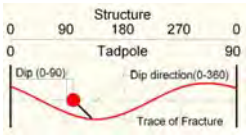
Project Number: 19131304

Client: Southern Company Services

Southern Company

Date: 11-22-2019

Location: Parrish, Al	TOC Elev msl: na	Notes: 243.6' @ 7:55am 11/21/2019
Easting: na	Casing Stick-up: 0.88 ft ags	Tools used were: QL40-FTC sn 5518 QL40 Caliper sn 5521 40-LGR-Gamma & SPR sn 5809 ATV ABI40 sn162305
Northing: na	Casing Diameter: 6.625 in ID	
Ground Elev msl: na	Casing Material: PVC	
Borehole Dip: vertical	Water Level: 242.7 ft bgs rising	
Borehole Az: na	Logged By: CM	
Borehole Size: 6" AH	Log Depth Ref: Ground Surface	
Drilled Depth: 340.5 ft BGS	Log Date: 11/21/2019	
Drill Comp Date: 11-21-19	Image Plot(s) Ref: MN	
Casing Depth: 19 ft bgs	Dip Referenced to Horizontal	



Tilt 0 deg 4 | Roll 0 deg 360 | MagnField 40 uT 60 | Depth 1ft:12ft | Caliper 5 in 7 | Apparent RH 0 % 100 | Centralized TravelTime-NM 0° 90° 180° 270° 0° | Amplitude-NM 0° 90° 180° 270° 0°

Azimuth 0 deg 360 | MRoll 0 deg 360 | Gravity 0.5 g 1.5

235

240

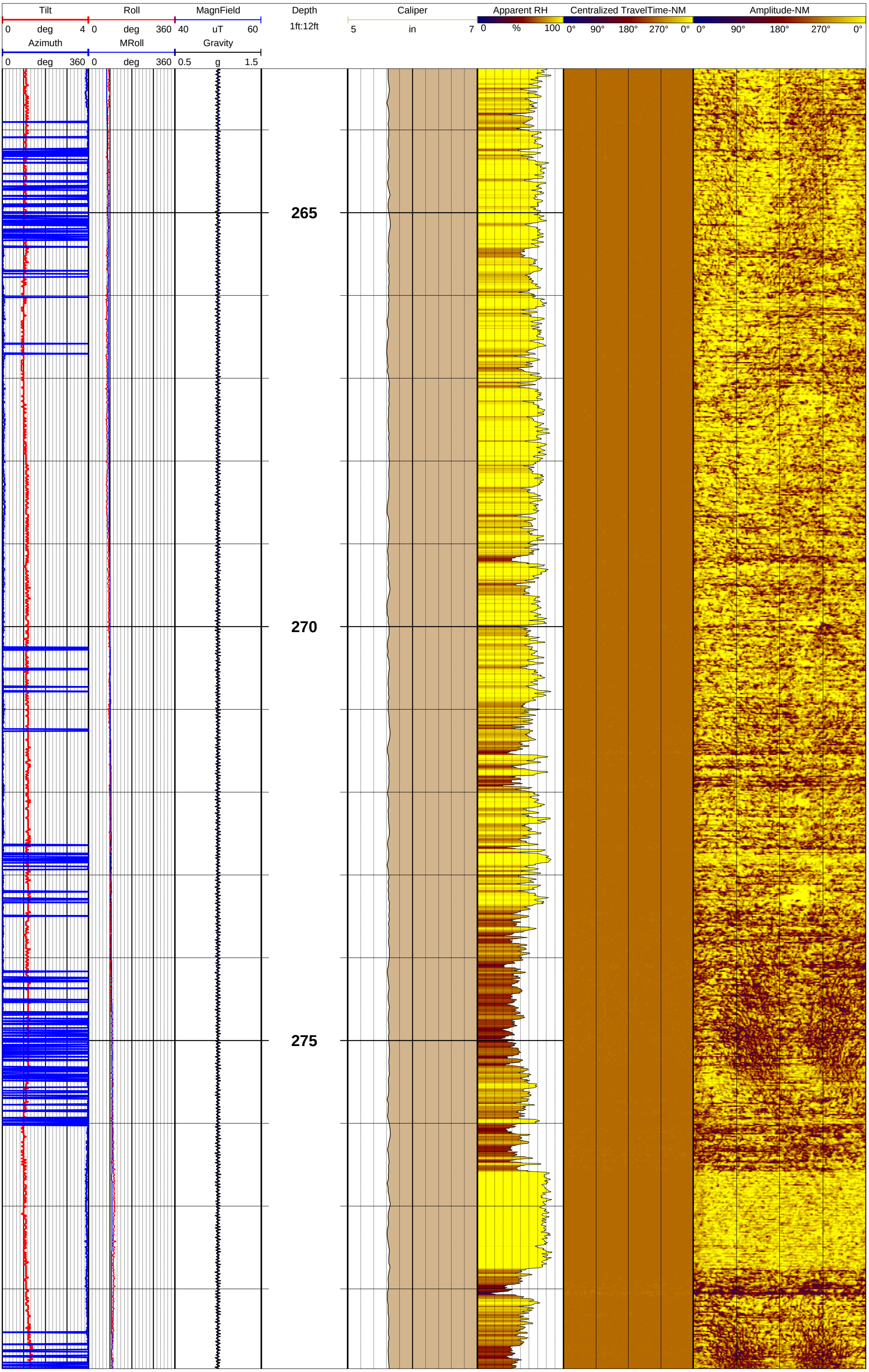
245

Tilt 0 deg 4
Roll 0 deg 360
MagnField 40 uT 60
Azimuth 0 deg 360
MRoll 0 deg 360
Gravity 0.5 g 1.5
Depth 1ft:12ft
Caliper 5 in 7
Apparent RH 0 % 100
Centralized TravelTime-NM 0° 90° 180° 270° 0°
Amplitude-NM 0° 90° 180° 270° 0°

250

255

260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Roll
0 deg 360
MagnField
40 uT 60
Depth
1ft:12ft
Caliper
5 in 7
Apparent RH
0 % 100
Centralized TravelTime-NM
0° 90° 180° 270° 0°
Amplitude-NM
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Azimuth
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MRoll
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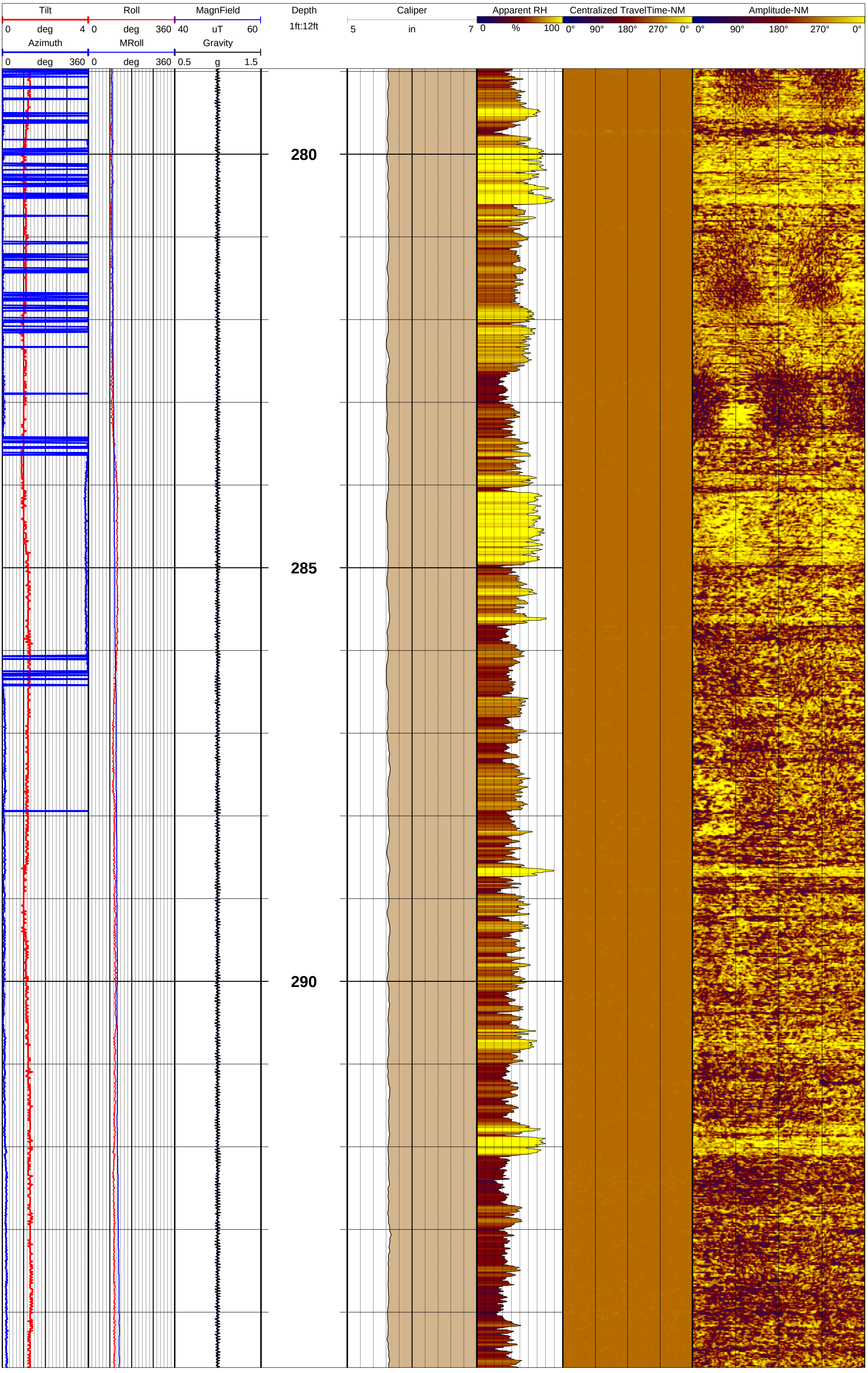
Gravity
0.5 g 1.5
265
270
275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0 deg 360
MagnField
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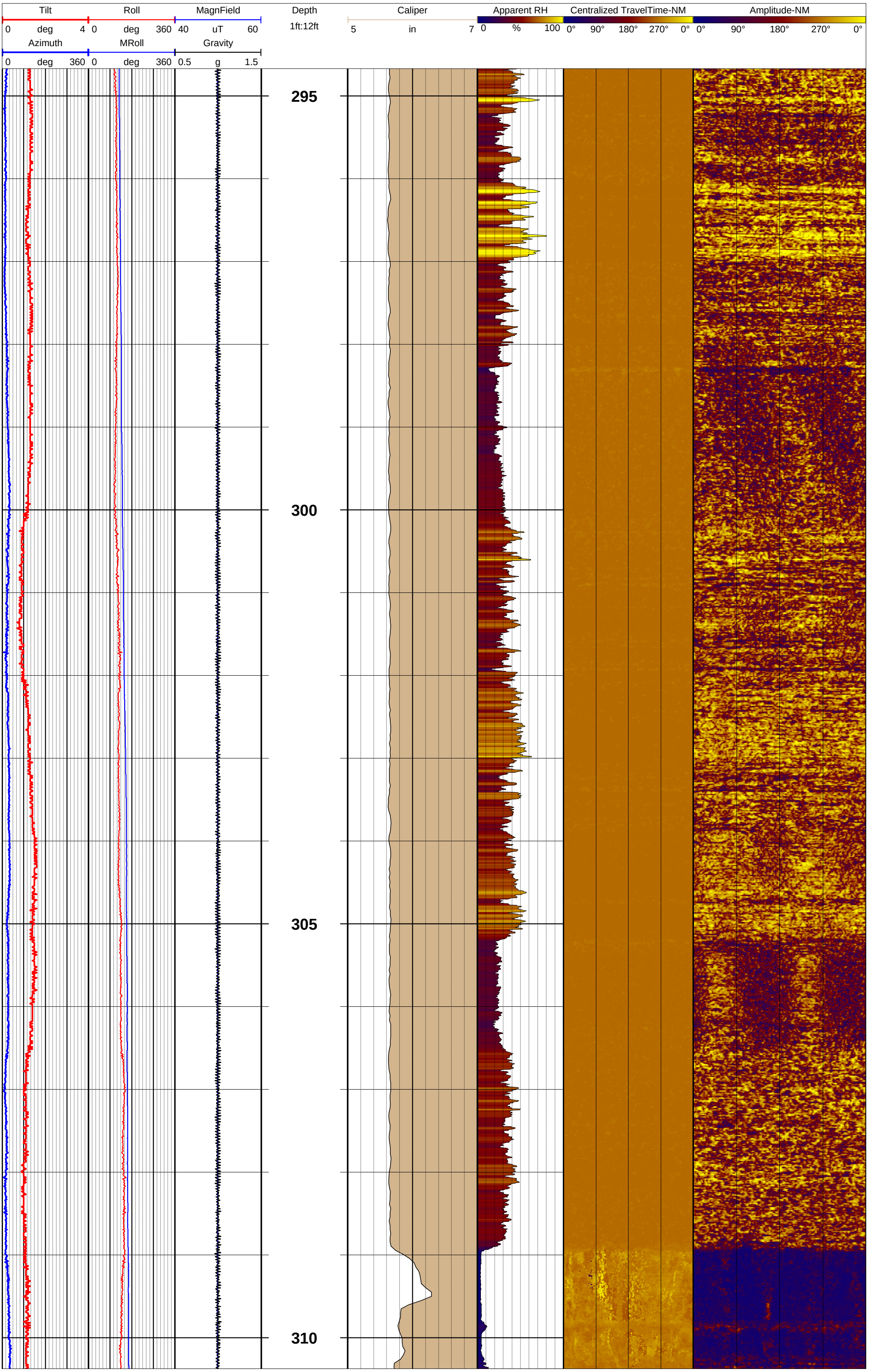
Azimuth
0 deg 360
MRoll
0 deg 360
Gravity
0.5 g 1.5
Depth
1ft:12ft
Caliper
5 in 7
Apparent RH
0 % 100
Centralized TravelTime-NM
0° 90° 180° 270° 0°
Amplitude-NM
0° 90° 180° 270° 0°
280
285
290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Roll
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MagnField
40 uT 60
Azimuth
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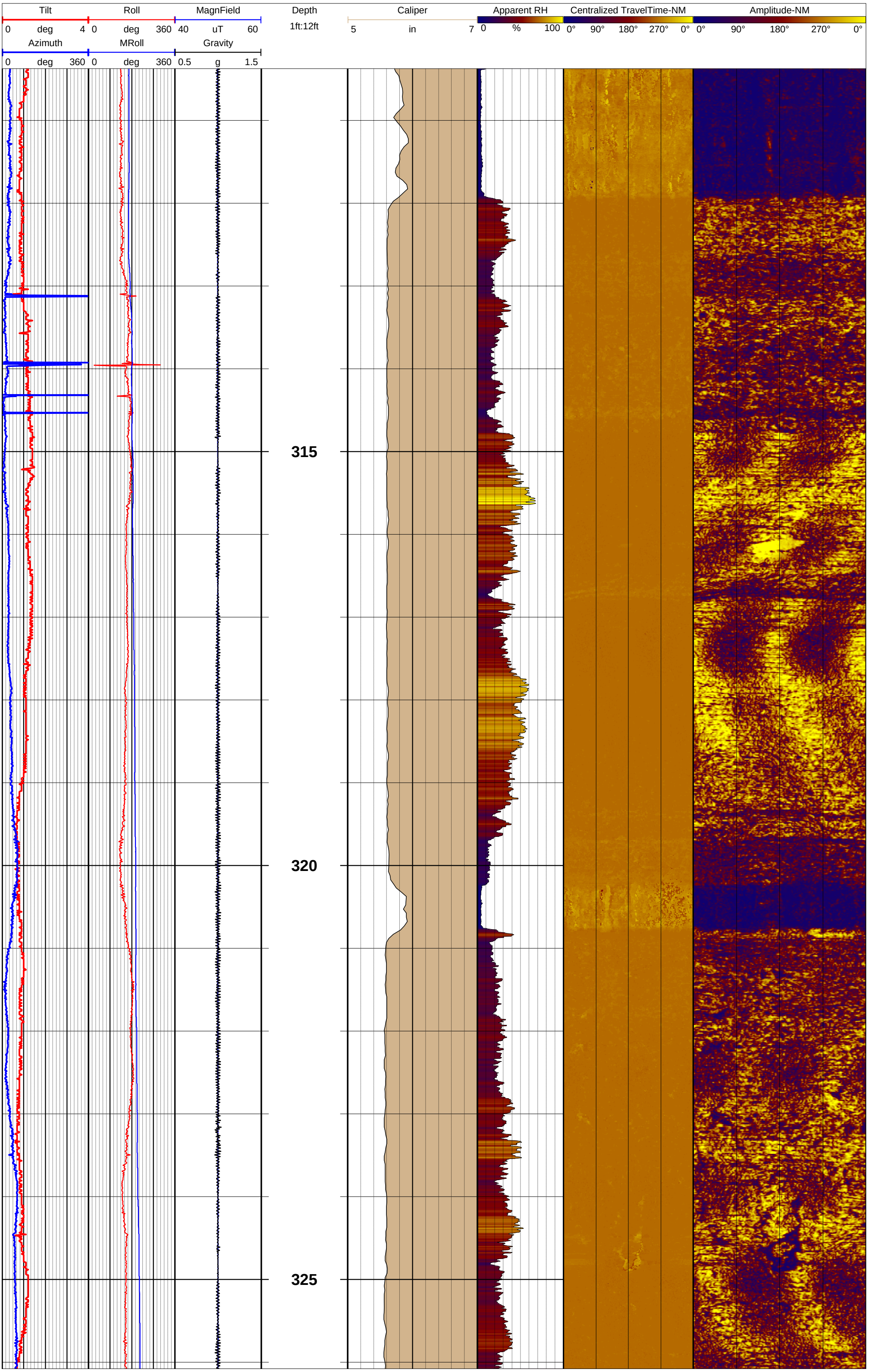
MRoll
0 deg 360
Gravity
0.5 g 1.5
Depth
1ft:12ft
Caliper
5 in 7
Apparent RH
0 % 100
Centralized TravelTime-NM
0° 90° 180° 270° 0°
Amplitude-NM
0° 90° 180° 270° 0°
295
300
305
310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Roll
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MagnField
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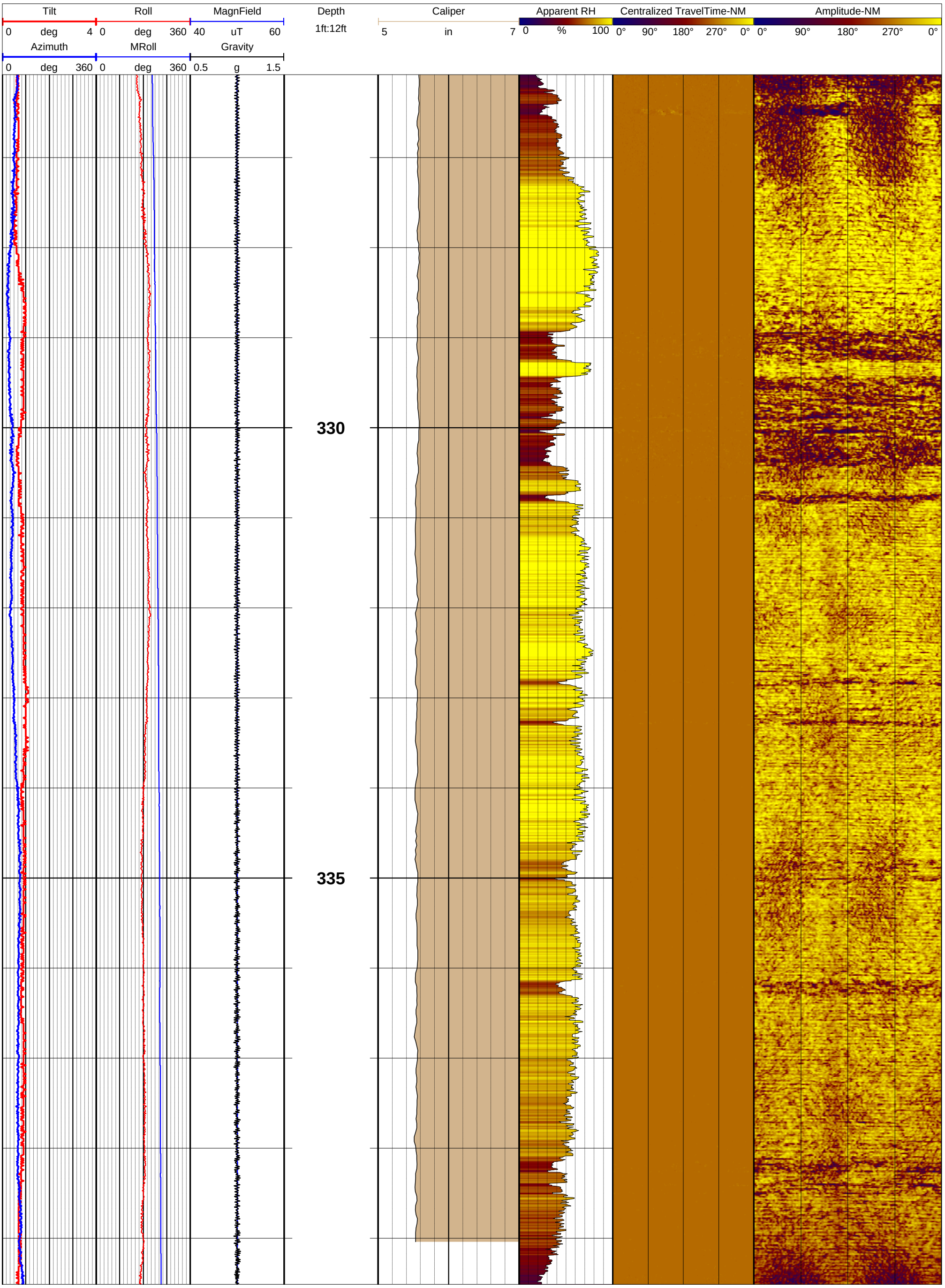
Azimuth
0 deg 360
MRoll
0 deg 360
Gravity
0.5 g 1.5
Depth
1ft:12ft
Caliper
5 in 7
Apparent RH
0 % 100
Centralized TravelTime-NM
0° 90° 180° 270° 0°
Amplitude-NM
0° 90° 180° 270° 0°
315
320
325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MagnField
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Azimuth
0 deg 360
MRoll
0 deg 360
Gravity
0.5 g 1.5
Depth
1ft:12ft
330
335
Caliper
5 in 7
Apparent RH
0 % 100
Centralized TravelTime-NM
0° 90° 180° 270° 0°
Amplitude-NM
0° 90° 180° 270° 0°

GEOPHYSICAL RECORD OF BOREHOLE: GSAP-MW35HO

Plant Gorgas - CCR Delineation Wells

GOLDER

Project Number: 19131304

Client: Southern Company Services

Southern Company

Date: 11-21-2019

Location: Parrish, Al	TOC Elev msl: na	Notes: 243.6' @ 7:55am 11/21/2019
Easting: na	Casing Stick-up: 0.88 ft ags	Tools used were:
Northing: na	Casing Diameter: 6.625 in ID	QL40-FTC sn 5518
Ground Elev msl: na	Casing Material: PVC	QL40 Caliper sn 5521
Borehole Dip: vertical	Water Level: 242.7 ft bgs rising	40-LGR-Gamma & SPR sn 5809
Borehole Az: na	Logged By: CM	ATV ABI40 sn162305
Borehole Size: 6" AH	Log Depth Ref: Ground Surface	
Drilled Depth: 340.5 ft BGS	Log Date: 11/21/2019	
Drill Comp Date: 11-21-19	Image Plot(s) Ref: MN	
Casing Depth: 19 ft bgs	Dip Referenced to Horizontal	



Caliper: 5 in 7

Depth: 1ft:160ft

Gamma: 0 CPS 200

SPR: 800 Ohms 1000

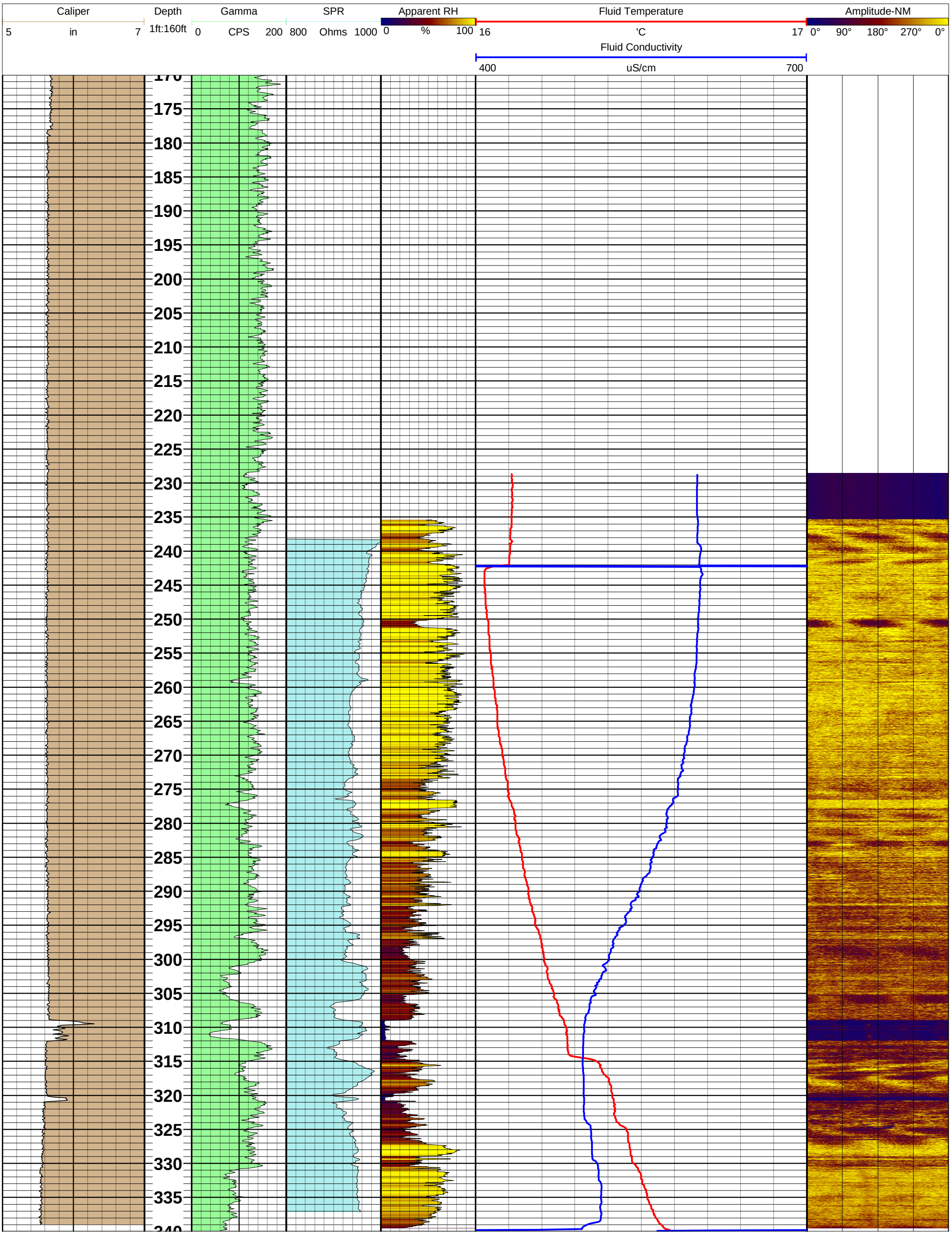
Apparent RH: 0 % 100

Fluid Temperature: 16 'C 17

Amplitude-NM: 0° 90° 180° 270° 0°

Fluid Conductivity: 400 uS/cm 700

5 10 15 20 25 30 35 40 45 50 55 60 65 70 75 80 85 90 95 100 105 110 115 120 125 130 135 140 145 150 155 160 165 170


Caliper
5
in
7
Depth
1ft:160ft
Gamma
0
CPS
200
SPR
800
Ohms
1000
Apparent RH
0
%
100
Fluid Temperature
16
'C
17
Amplitude-NM
0°
90°
180°
270°
0°
Fluid Conductivity
400
uS/cm
700
170
175
180
185
190
195
200
205
210
215
220
225
230
235
240
245
250
255
260
265
270
275
280
285
290
295
300
305
310
315
320
325
330
335

GEOPHYSICAL RECORD OF BOREHOLE: GSAP-MW36H

Plant Gorgas - CCR Delineation Wells

GOLDER

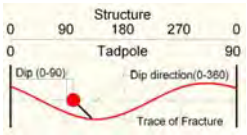
Project Number: 19131304

Client: Southern Company Services

Southern Company

Date: 10-29-2019

Location: Parrish, Al	TOC Elev msl: na	Notes: 290.7' @ 11:55 am 10-28-19 239.74' @ 6:56 10-29-19 Tools used were: QL40-FTC sn 5518 QL40 Caliper sn 5521 40-LGR-Gamma & SPR sn 5809 ATV ABI40 sn162305
Easting: na	Casing Stick-up: 1.82 ft ags	
Northing: na	Casing Diameter: 6 in ID	
Ground Elev msl: na	Casing Material: PVC	
Borehole Dip: vertical	Water Level: rising	
Borehole Az: na	Logged By: CAB	
Borehole Size: 6" AH	Log Depth Ref: Ground Surface	
Drilled Depth: 300 ft BGS	Log Date: 10/28-29/2019	
Drill Comp Date: 10-28-19	Image Plot(s) Ref: MN	
Casing Depth: 18 ft bgs	Dip Referenced to Horizontal	

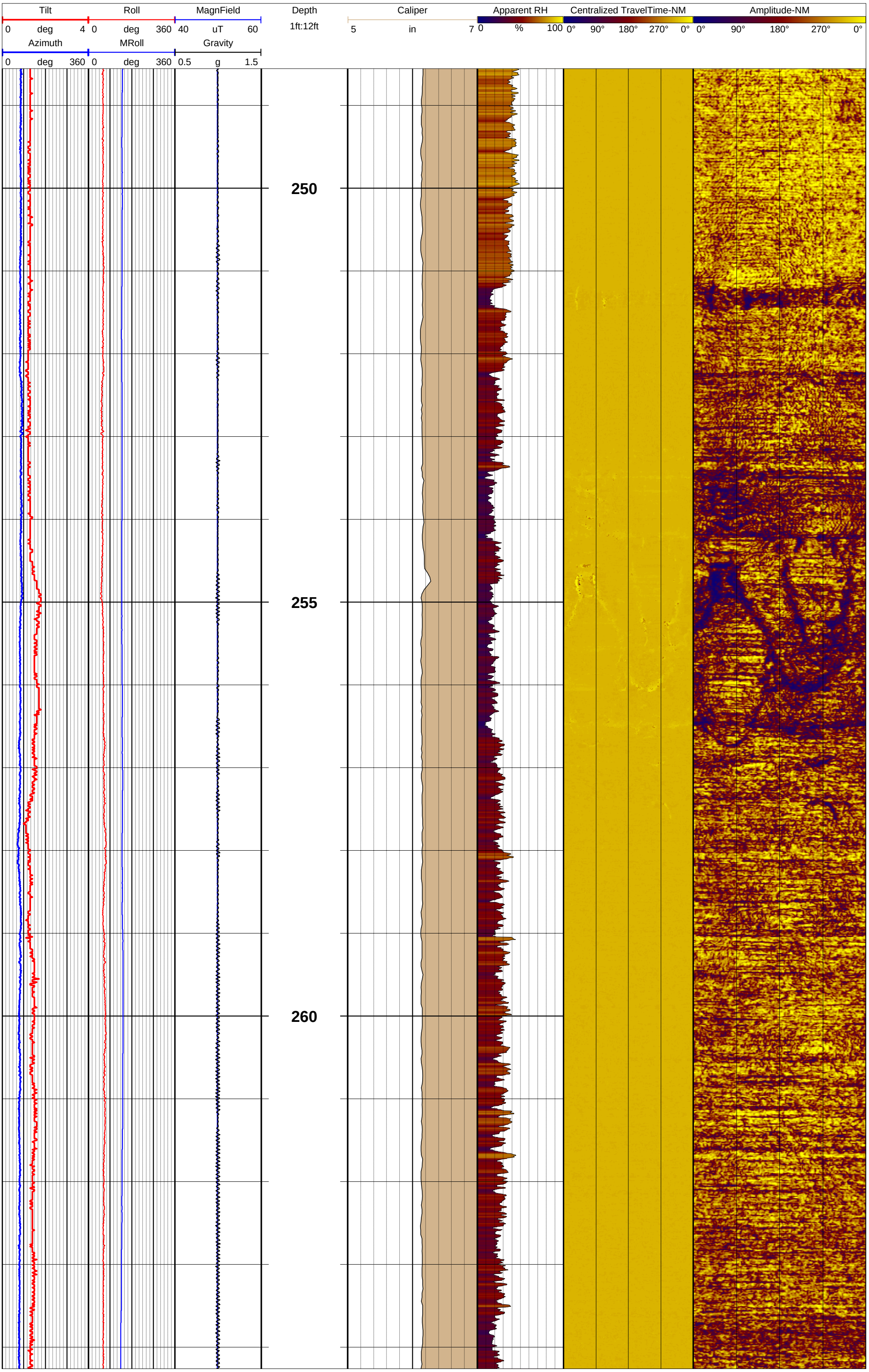


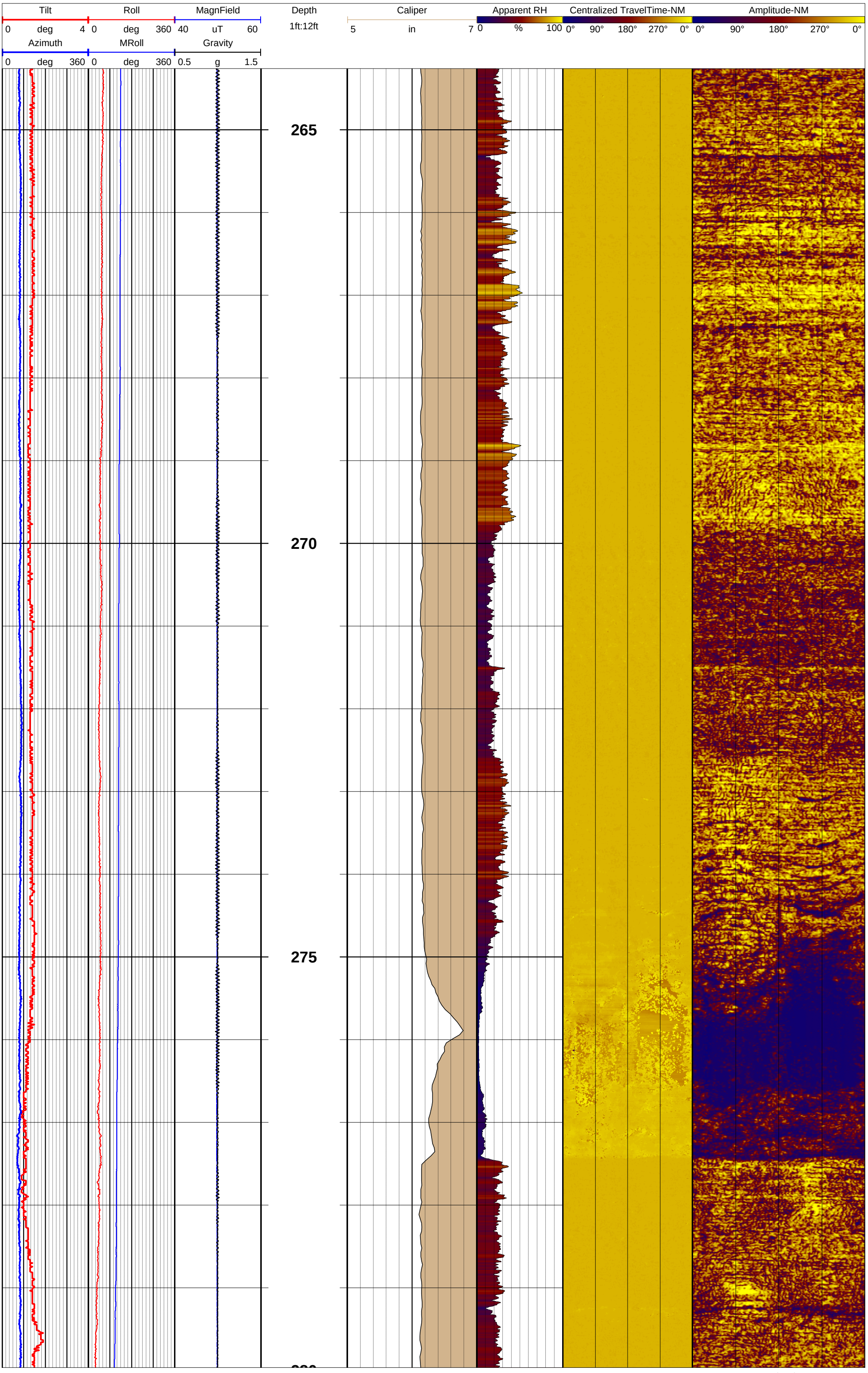
Tilt 0 deg 4 | Roll 0 deg 360 | MagnField 40 uT 60 | Depth 1ft:12ft | Caliper 5 in 7 | Apparent RH 0 % 100 | Centralized TravelTime-NM 0° 90° 180° 270° 0° | Amplitude-NM 0° 90° 180° 270° 0°

Azimuth 0 deg 360 | MRoll 0 deg 360 | Gravity 0.5 g 1.5

240

245


Tilt
0 deg 4
Roll
0 deg 360
MagnField
40 uT 60
Azimuth
0 deg 360
MRoll
0 deg 360
Gravity
0.5 g 1.5
Depth
1ft:12ft
Caliper
5 in 7
Apparent RH
0 % 100
Centralized TravelTime-NM
0° 90° 180° 270° 0°
Amplitude-NM
0° 90° 180° 270° 0°
250
255
260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Roll
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MagnField
40 uT 60
Azimuth
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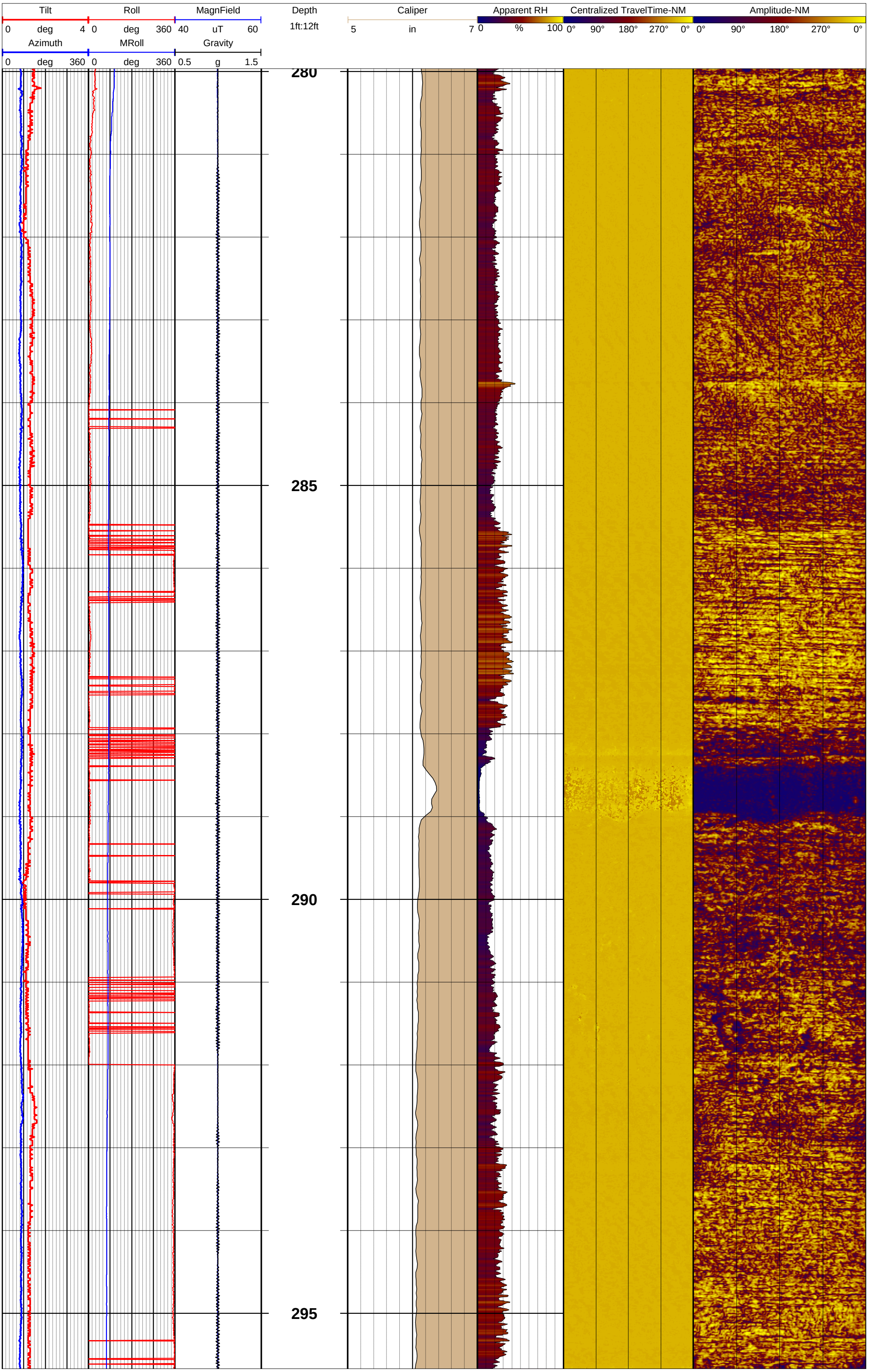
MRoll
0 deg 360
Gravity
0.5 g 1.5
Depth
1ft:12ft
265
270
275
Caliper
5 in 7
Apparent RH
0 % 100
Centralized TravelTime-NM
0° 90° 180° 270° 0°
Amplitude-NM
0° 90° 180° 270° 0°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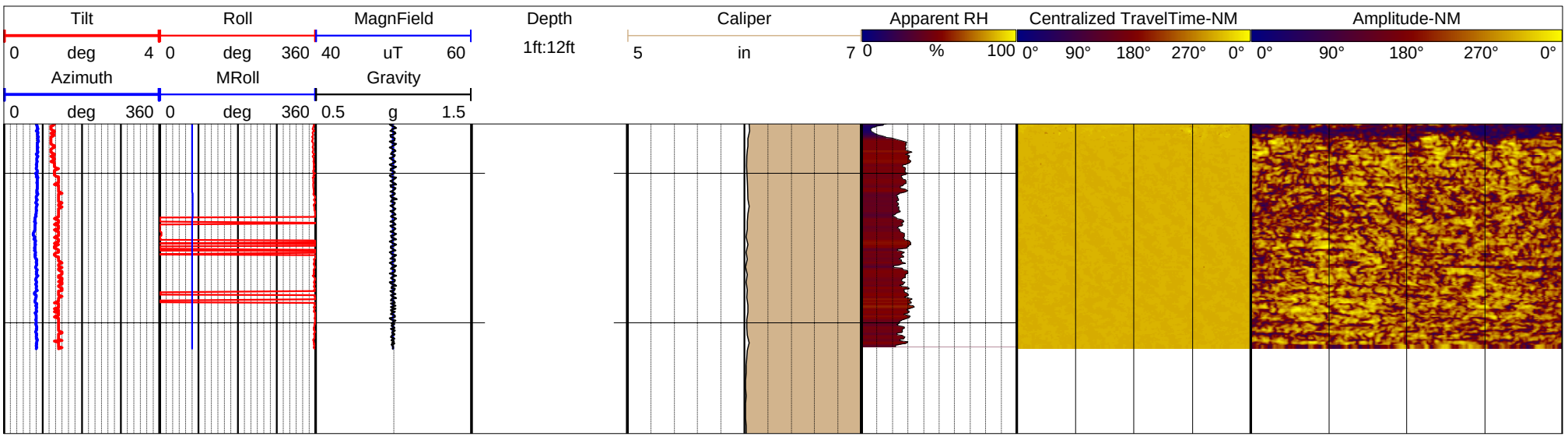
MRoll
0 deg 360
Gravity
0.5 g 1.5
Depth
1ft:12ft
Caliper
5 in 7
Apparent RH
0 % 100
Centralized TravelTime-NM
0° 90° 180° 270° 0°
Amplitude-NM
0° 90° 180° 270° 0°
280
285
290
295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Roll
0 deg 360
MagnField
40 uT 60
Depth
1ft:12ft
Caliper
5 in 7
Apparent RH
0 % 100
Centralized TravelTime-NM
0° 90° 180° 270° 0°
Amplitude-NM
0° 90° 180° 270° 0°
Azimuth
0 deg 360
MRoll
0 deg 360
Gravity
0.5 g 1.5

GEOPHYSICAL RECORD OF BOREHOLE: GSAP-MW36H

Plant Gorgas - CCR Delineation Wells

GOLDER

Project Number: 19131304

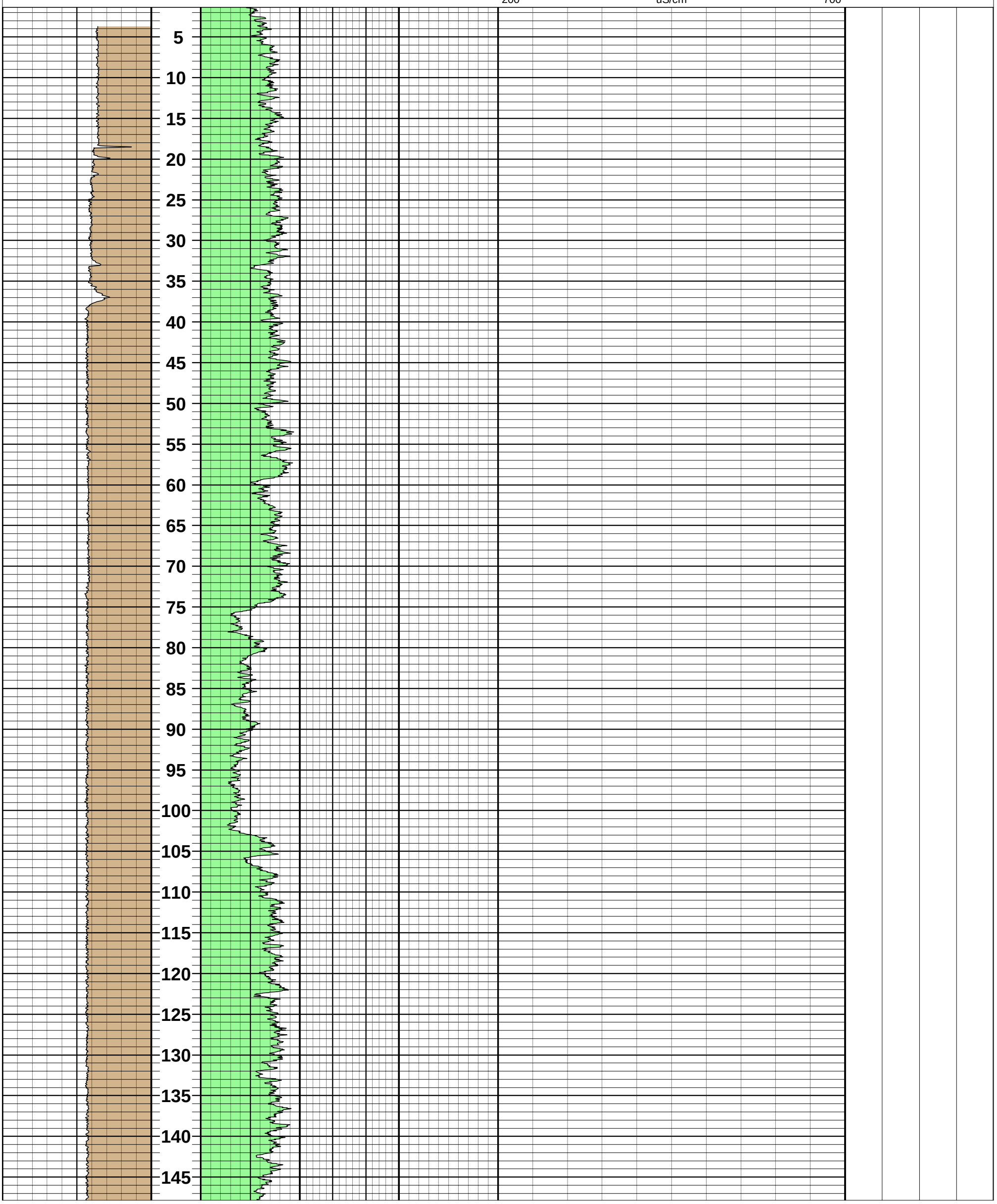
Client: Southern Company Services

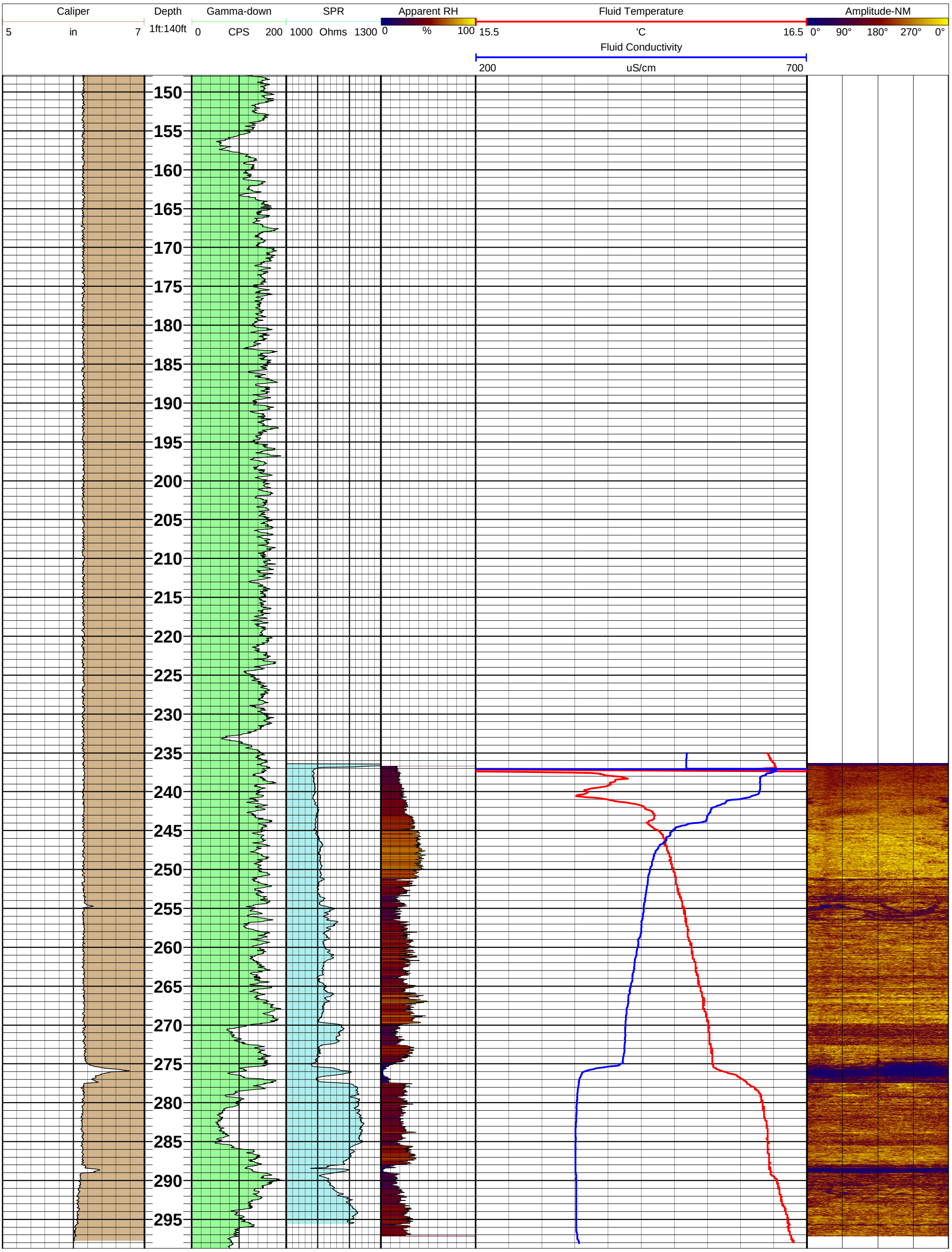
Date: 10-29-2019

Location: Parrish, Al	TOC Elev msl: na	Notes: 290.7' @ 11:55 am 10-28-19
Easting: na	Casing Stick-up: 1.82 ft ags	239.74' @ 6:56 10-29-19
Northing: na	Casing Diameter: 6 in ID	Tools used were:
Ground Elev msl: na	Casing Material: PVC	QL40-FTC sn 5518
Borehole Dip: vertical	Water Level: rising	QL40 Caliper sn 5521
Borehole Az: na	Logged By: CAB	40-LGR-Gamma & SPR sn 5809
Borehole Size: 6" AH	Log Depth Ref: Ground Surface	ATV ABI40 sn162305
Drilled Depth: 300 ft BGS	Log Date: 10/28-29/2019	
Drill Comp Date: 10-28-19	Image Plot(s) Ref: MN	
Casing Depth: 18 ft bgs	Dip Referenced to Horizontal	



Caliper: 5 in 7 | Depth: 1ft:140ft | Gamma-down: 0 CPS 200 | SPR: 1000 Ohms 1300 | Apparent RH: 0 % 100 | Fluid Temperature: 15.5 'C 16.5 | Amplitude-NM: 0° 90° 180° 270° 0° | Fluid Conductivity: 200 uS/cm 700




Caliper
5
in
7
Depth
1ft:140ft
Gamma-down
0
CPS
200
SPR
1000
Ohms
1300
Apparent RH
0
%
100
Fluid Temperature
15.5
'C
16.5
Amplitude-NM
0°
90°
180°
270°
0°
Fluid Conductivity
200
uS/cm
700
150
155
160
165
170
175
180
185
190
195
200
205
210
215
220
225
230
235
240
245
250
255
260
265
270
275
280
285
290
295

GEOPHYSICAL RECORD OF BOREHOLE: GSAP-MW37H

Plant Gorgas - CCR Delineation Wells

GOLDER

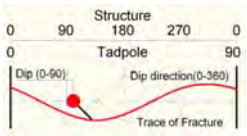
Project Number: 19131304

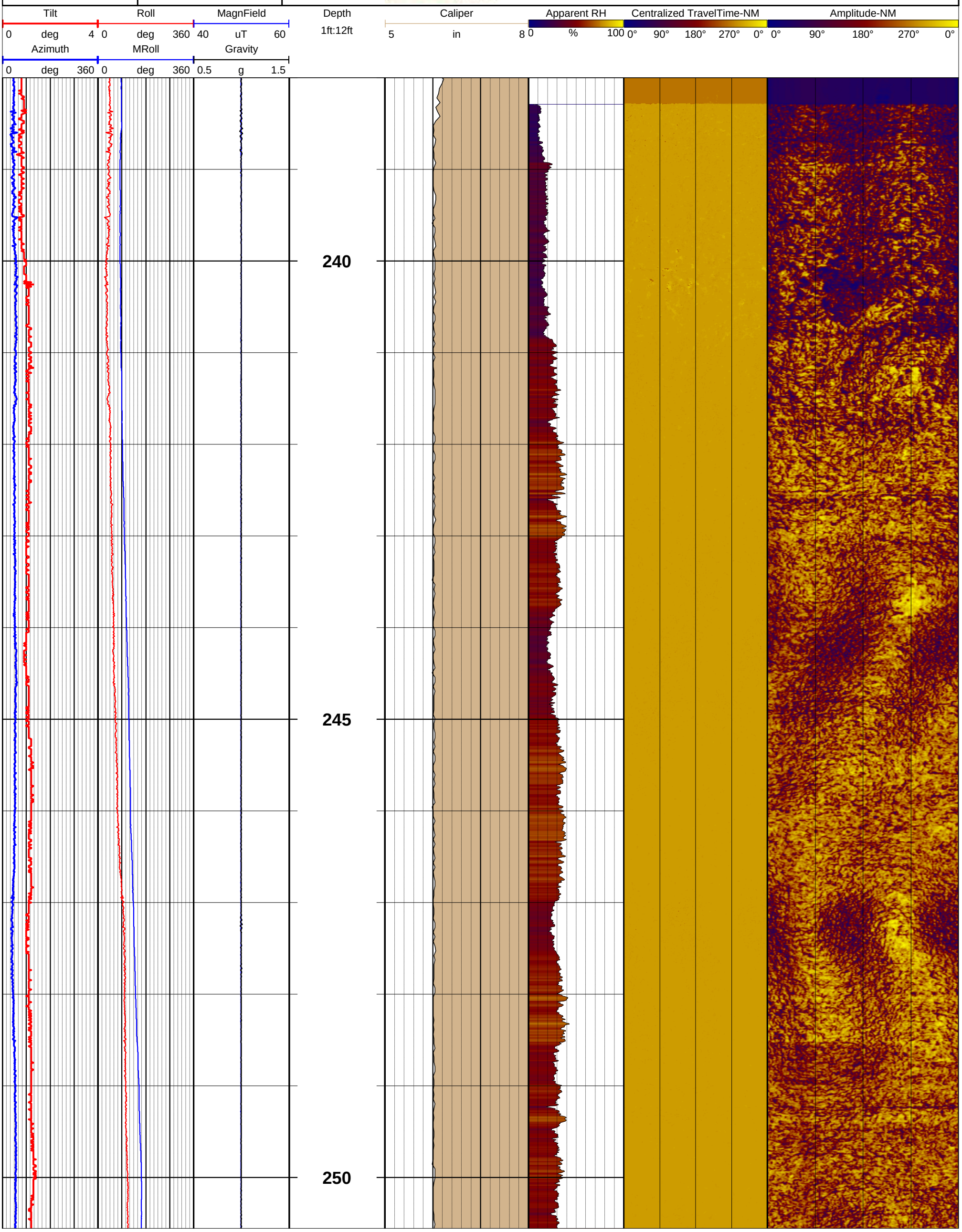
Client: Southern Company Services

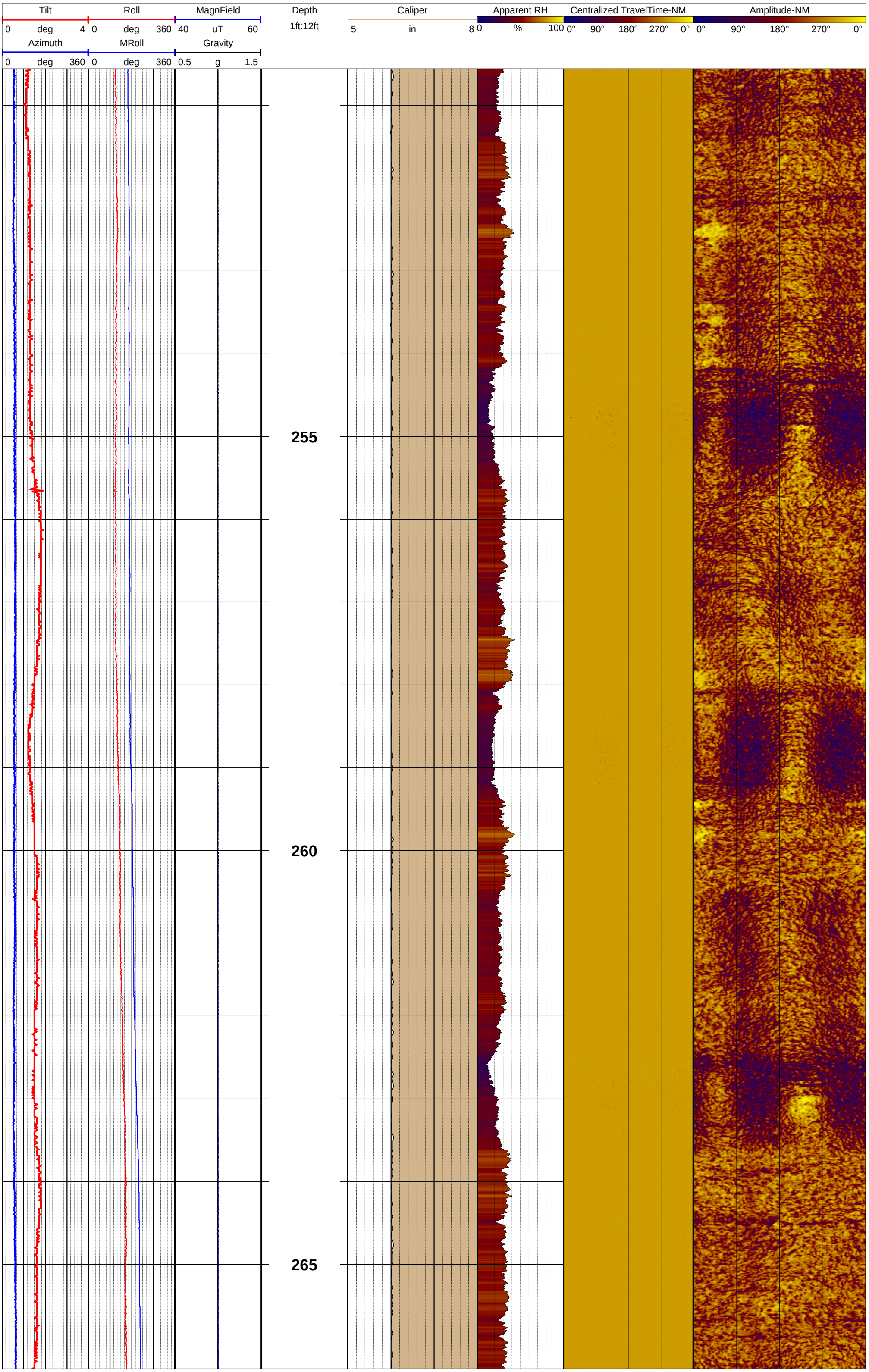
Southern Company

Date: 10-22-2019

Location: Parrish, Al	TOC Elev msl: na	Notes: 283.85' TOC @ 8:46, 259.4 @10:45
Easting: na	Casing Stick-up: 4.77 ft ags	Tools used were: QL40-FTC sn 5518 QL40 Caliper sn 5521 40-LGR-Gamma & SPR sn 5809 ATV ABI40 sn162305
Northing: na	Casing Diameter: 7 in ID	
Ground Elev msl: na	Casing Material: Steel	
Borehole Dip: vertical	Water Level: rising	
Borehole Az: na	Logged By: CAB	
Borehole Size: 6" AH	Log Depth Ref: Ground Surface	
Drilled Depth: 300.5 ft BGS	Log Date: 10-22-2019	
Drill Comp Date: 10-15-19	Image Plot(s) Ref: MN	
Casing Depth: 34 ft bgs	Dip Referenced to Horizontal	

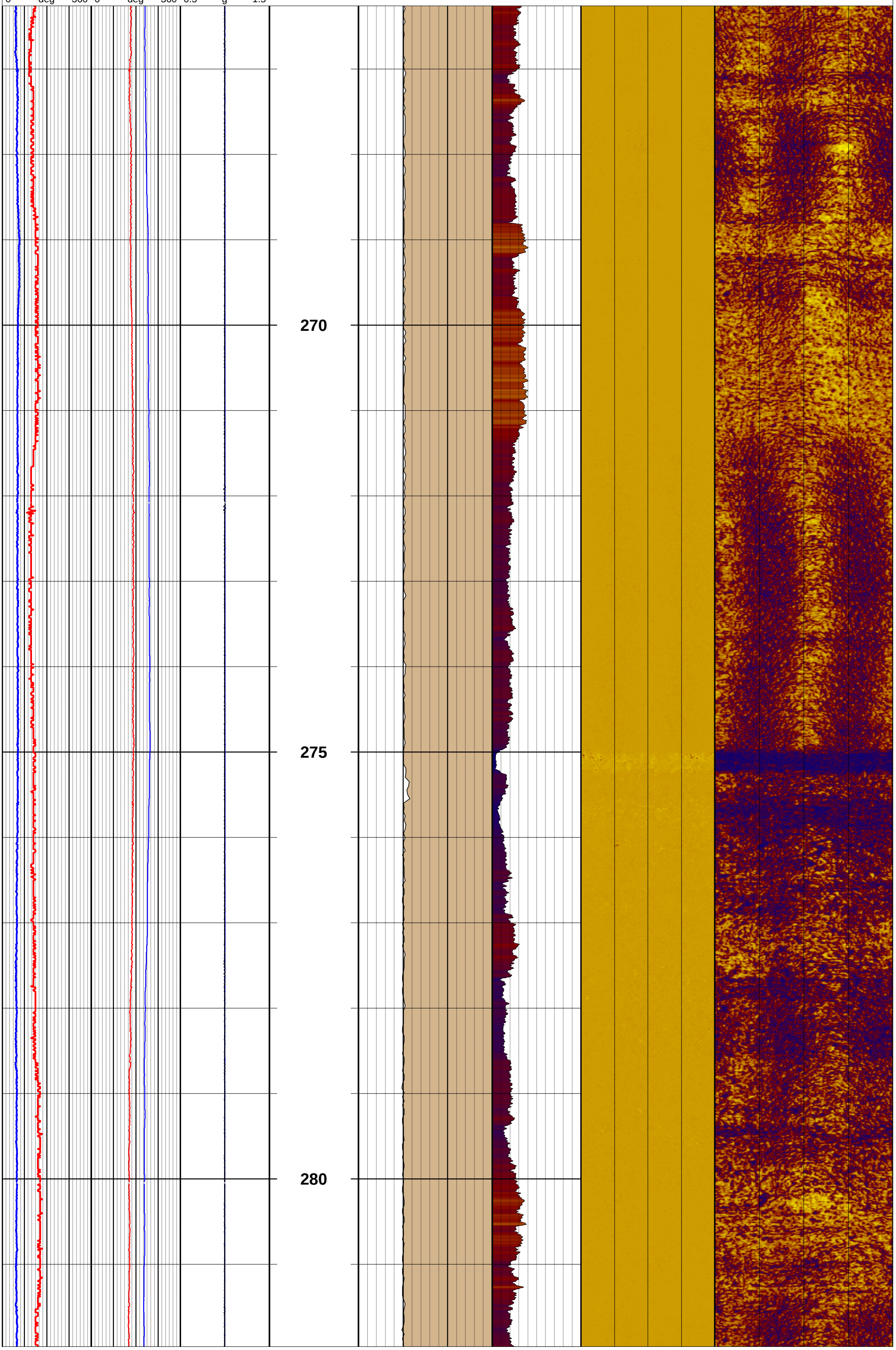


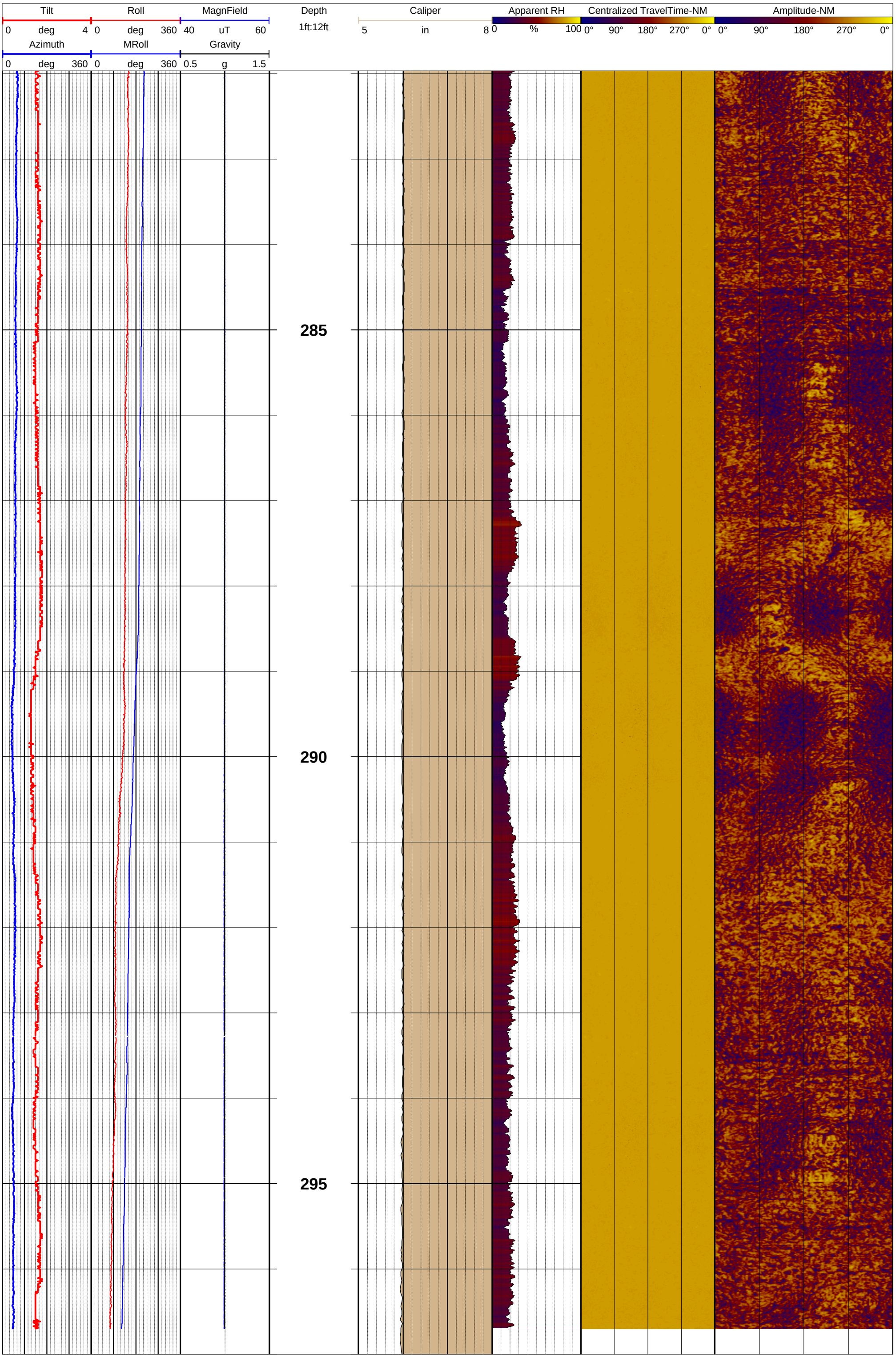



Tilt
0 deg 4
Roll
0 deg 360
MagnField
40 uT 60
Azimuth
0 deg 360
MRoll
0 deg 360
Gravity
0.5 g 1.5
Depth
1ft:12ft
Caliper
5 in 8
Apparent RH
0 % 100
Centralized TravelTime-NM
0° 90° 180° 270° 0°
Amplitude-NM
0° 90° 180° 270° 0°
255
260
265

Tilt 0 deg 4 | Roll 0 deg 360 | MagnField 40 uT 60 | Depth 1ft:12ft | Caliper 5 in 8 | Apparent RH 0 % 100 | Centralized TravelTime-NM 0° 90° 180° 270° 0° | Amplitude-NM 0° 90° 180° 270° 0°

Azimuth 0 deg 360 | MRoll 0 deg 360 | Gravity 0.5 g 1.5

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Roll
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MagnField
40 uT 60
Azimuth
0 deg 360
MRoll
0 deg 360
Gravity
0.5 g 1.5
Depth
1ft:12ft
Caliper
5 in 8
Apparent RH
0 % 100
Centralized TravelTime-NM
0° 90° 180° 270° 0°
Amplitude-NM
0° 90° 180° 270° 0°
285
290
295

GEOPHYSICAL RECORD OF BOREHOLE: GSAP-MW37H

Plant Gorgas - CCR Delineation Wells

GOLDER

Project Number: 19131304

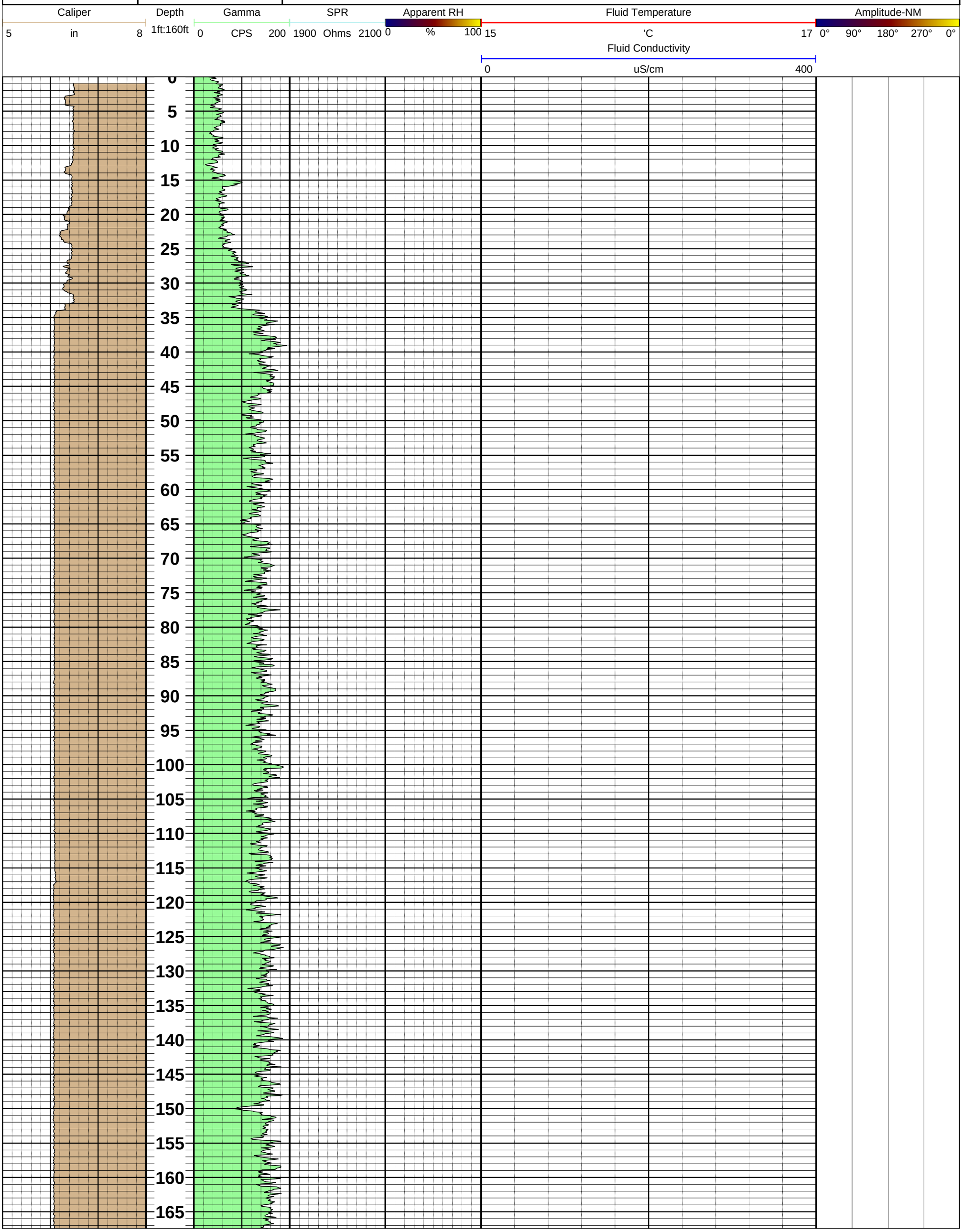
Client: Southern Company Services

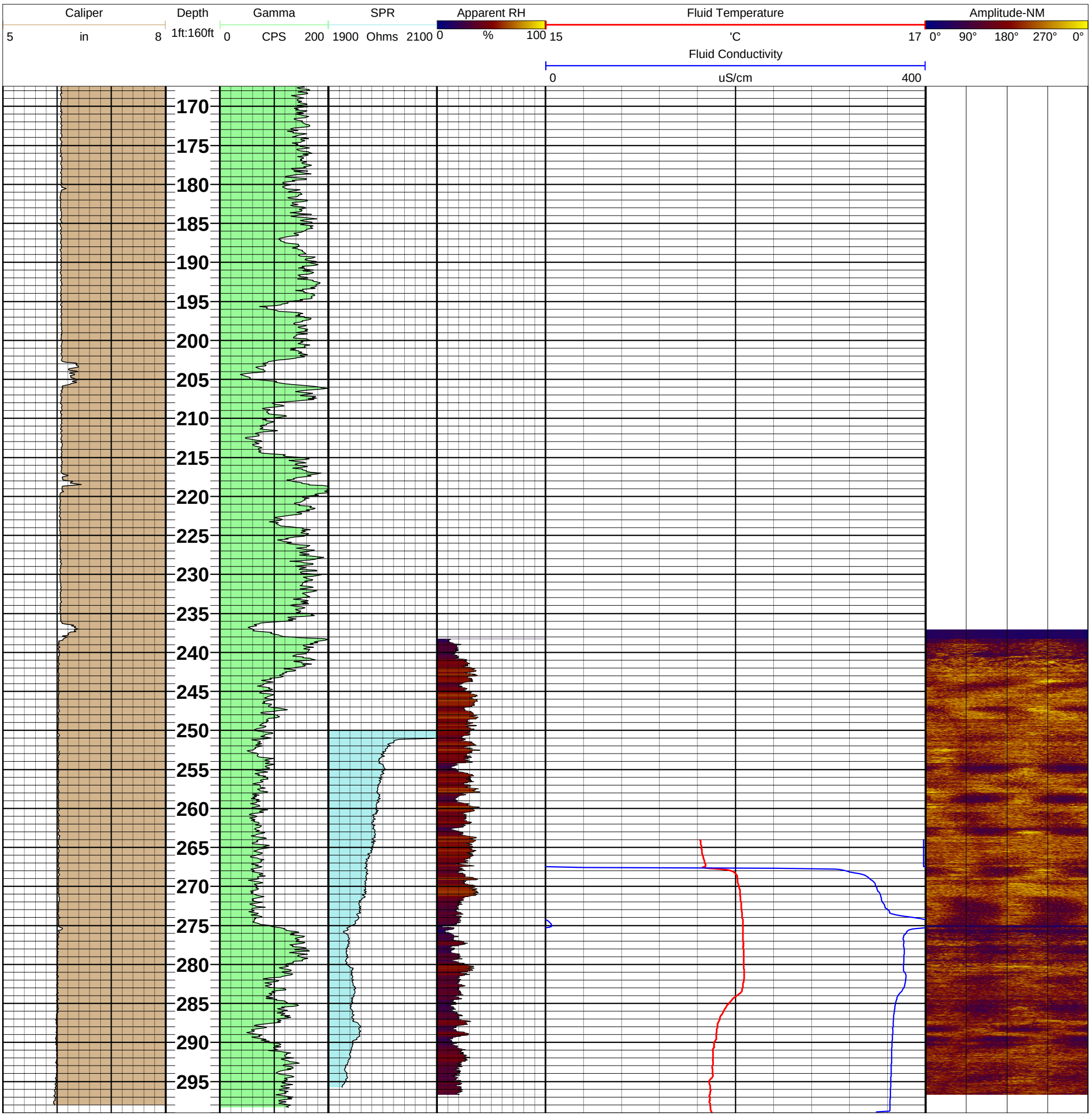
Southern Company

Date: 10-22-2019

Location: Parrish, Al	TOC Elev msl: na	Notes: 283.85' TOC @ 8:46, 259.4 @10:45
Easting: na	Casing Stick-up: 4.77 ft ags	Tools used were:
Northing: na	Casing Diameter: 7 in ID	QL40-FTC sn 5518
Ground Elev msl: na	Casing Material: Steel	QL40 Caliper sn 5521
Borehole Dip: vertical	Water Level: rising	40-LGR-Gamma & SPR sn 5809
Borehole Az: na	Logged By: CAB	ATV ABI40 sn162305
Borehole Size: 6" AH	Log Depth Ref: Ground Surface	
Drilled Depth: 300.5 ft BGS	Log Date: 10-22-2019	
Drill Comp Date: 10-15-19	Image Plot(s) Ref: MN	
Casing Depth: 34 ft bgs	Dip Referenced to Horizontal	






Caliper
5
in
8
Depth
1ft:160ft
Gamma
0
CPS
200
SPR
1900
Ohms
2100
Apparent RH
0
%
100
Fluid Temperature
15
'C
17
Amplitude-NM
0°
90°
180°
270°
0°
Fluid Conductivity
0
uS/cm
400
170
175
180
185
190
195
200
205
210
215
220
225
230
235
240
245
250
255
260
265
270
275
280
285
290
295

GEOPHYSICAL RECORD OF BOREHOLE: GSAP-MW38H

Plant Gorgas - CCR Delineation Wells

GOLDER

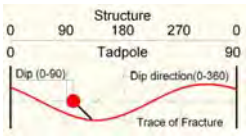
Project Number: 19131304

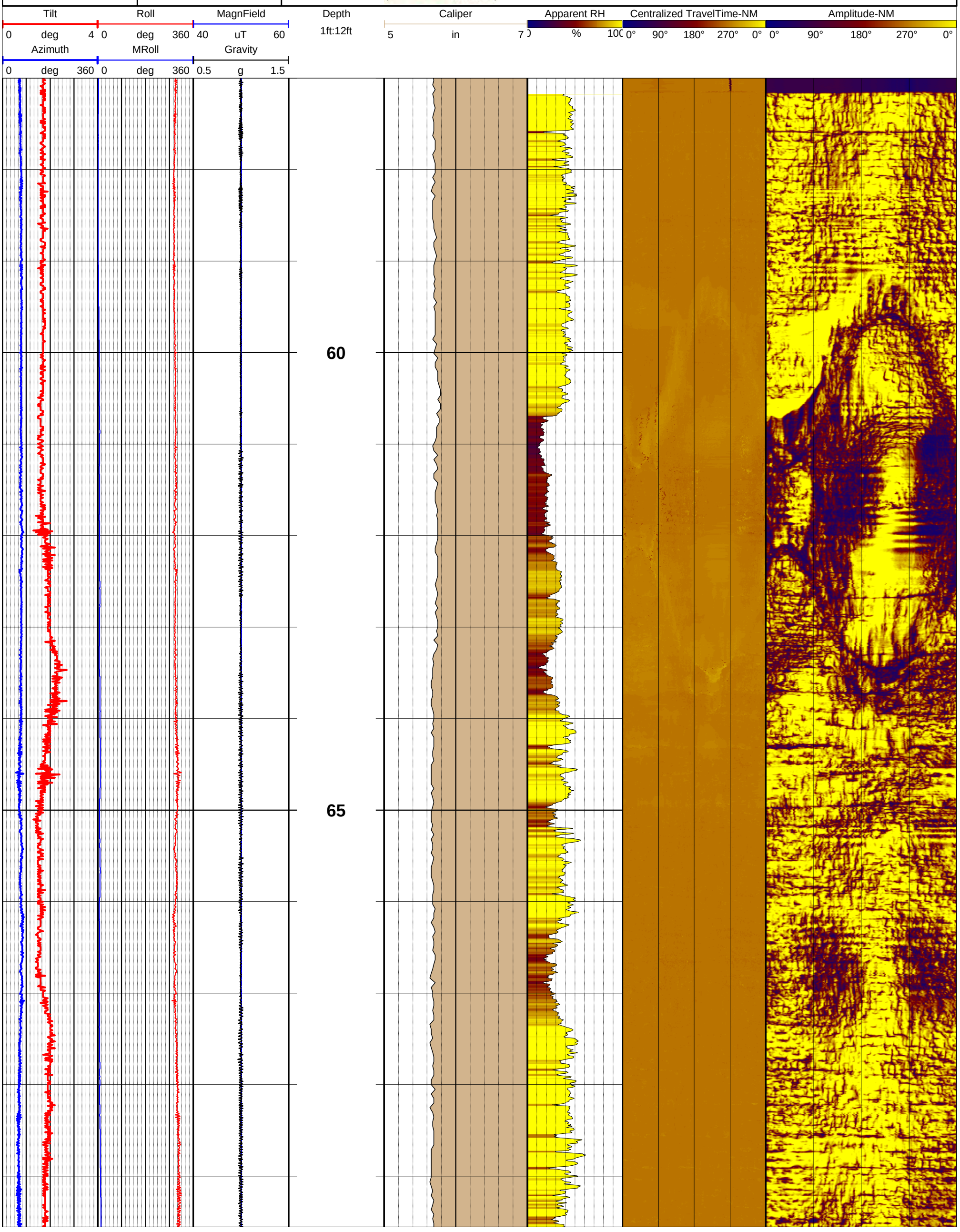
Client: Southern Company Services

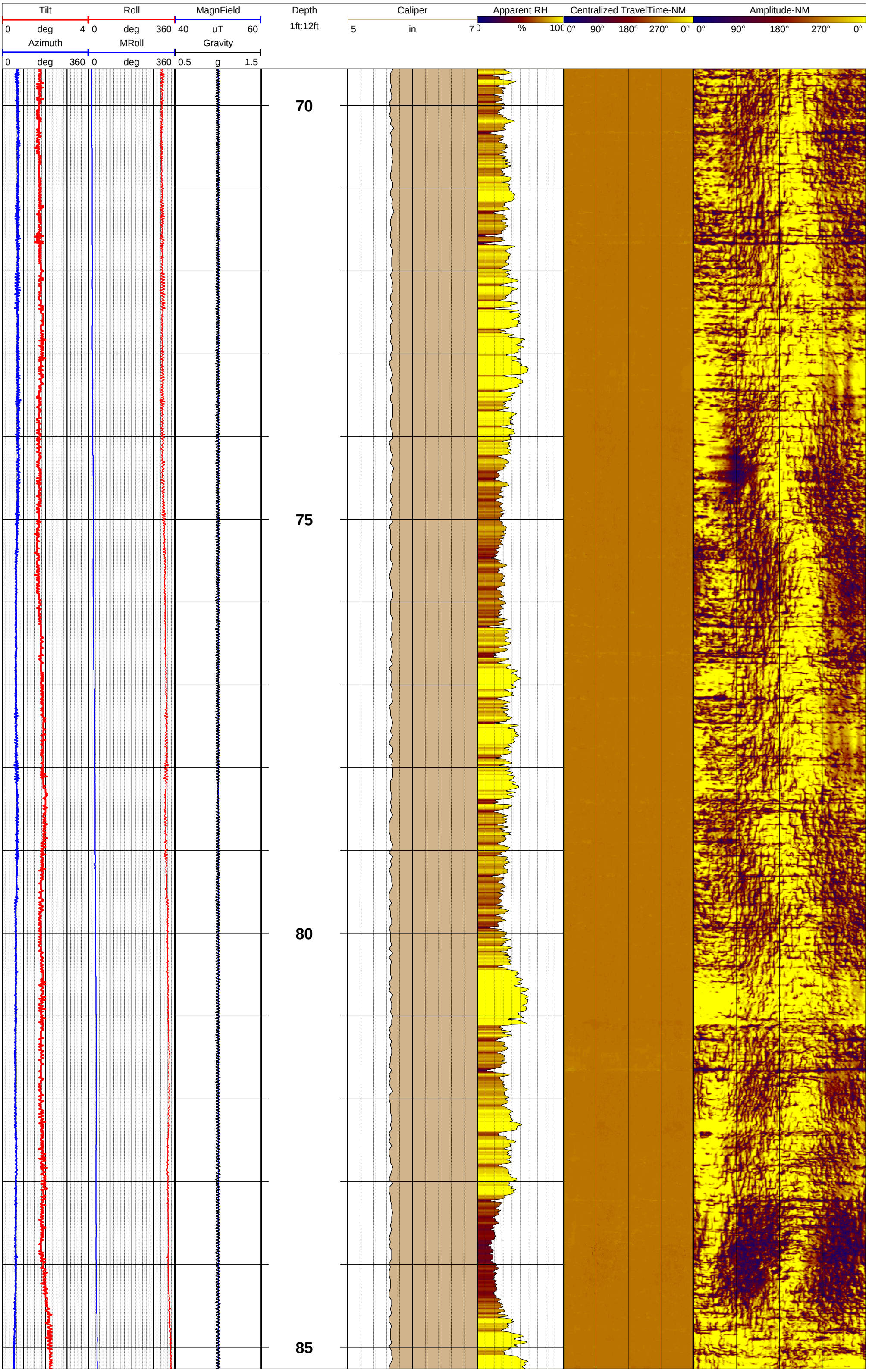
Southern Company

Date: 11-8-2019

Location: Parrish, Al	TOC Elev msl: na	Notes: 59.41' Below top of Casing @ 15:00 11-7-19 Drilling was complete at 9:00 am/ Rods pulled by 11 am Tools used were: QL40-FTC sn 5518 QL40 Caliper sn 5521 40-LGR-Gamma & SPR sn 5809 ATV ABI40 sn162305
Easting: na	Casing Stick-up: 1.1 ft ags	
Northing: na	Casing Diameter: 6.625 in ID	
Ground Elev msl: na	Casing Material: Steel HSA	
Borehole Dip: vertical	Water Level: 58.3 ft bgs 11-7	
Borehole Az: na	Logged By: CM	
Borehole Size: 6" AH	Log Depth Ref: Ground Surface	
Drilled Depth: 303 ft BGS	Log Date: 11/7-8/2019	
Drill Comp Date: 11-7-19	Image Plot(s) Ref: MN	
Casing Depth: 24 ft bgs	Dip Referenced to Horizontal	



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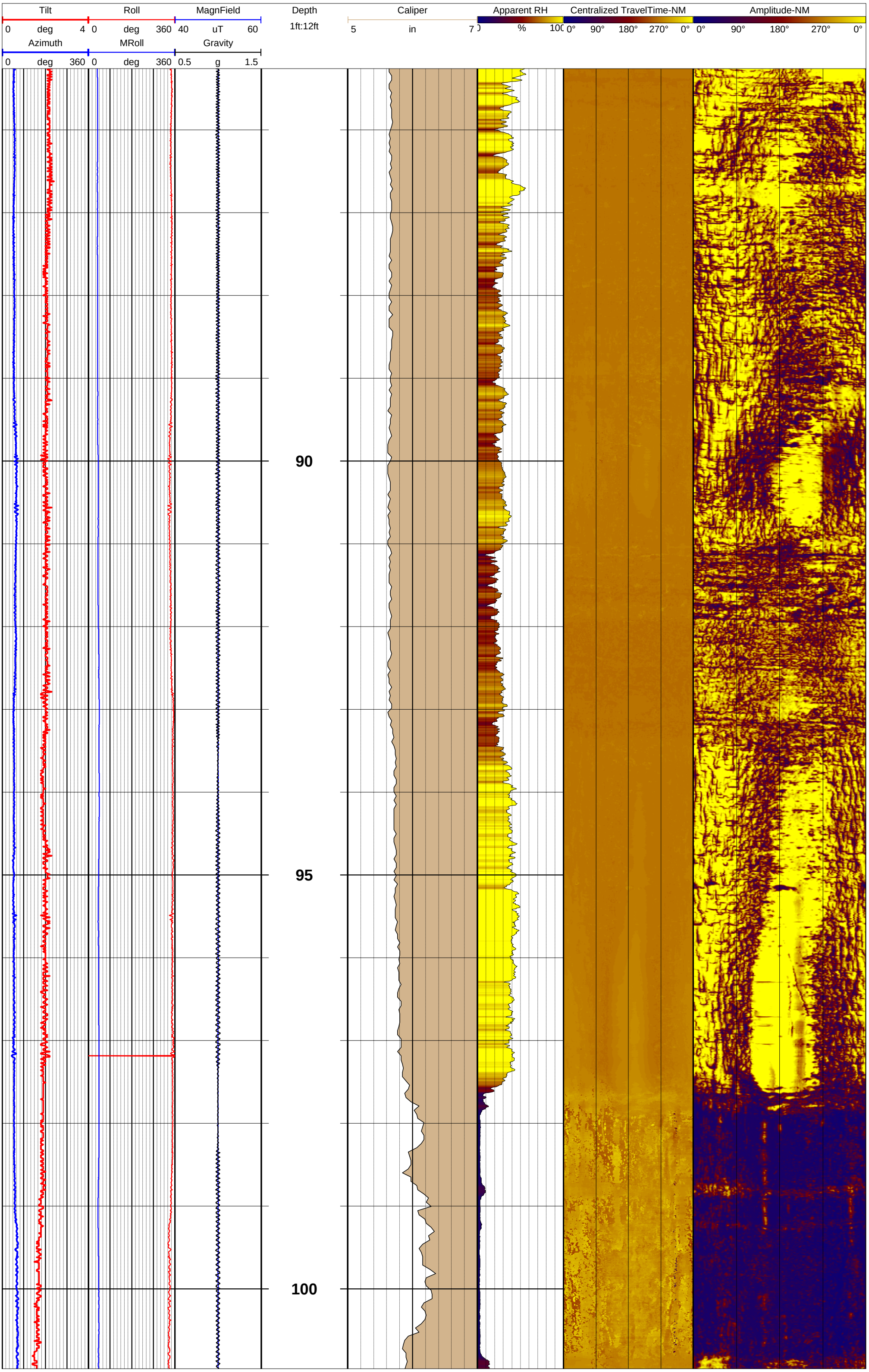
0 deg 4
Roll
0 deg 360
MagnField
40 uT 60
Azimuth
0 deg 360
MRoll
0 deg 360
Gravity
0.5 g 1.5
Depth
1ft:12ft
70
75
80
85
Caliper
5 in 7
Apparent RH
0 % 100
Centralized TravelTime-NM
0° 90° 180° 270° 0°
Amplitude-NM
0° 90° 180° 270° 0°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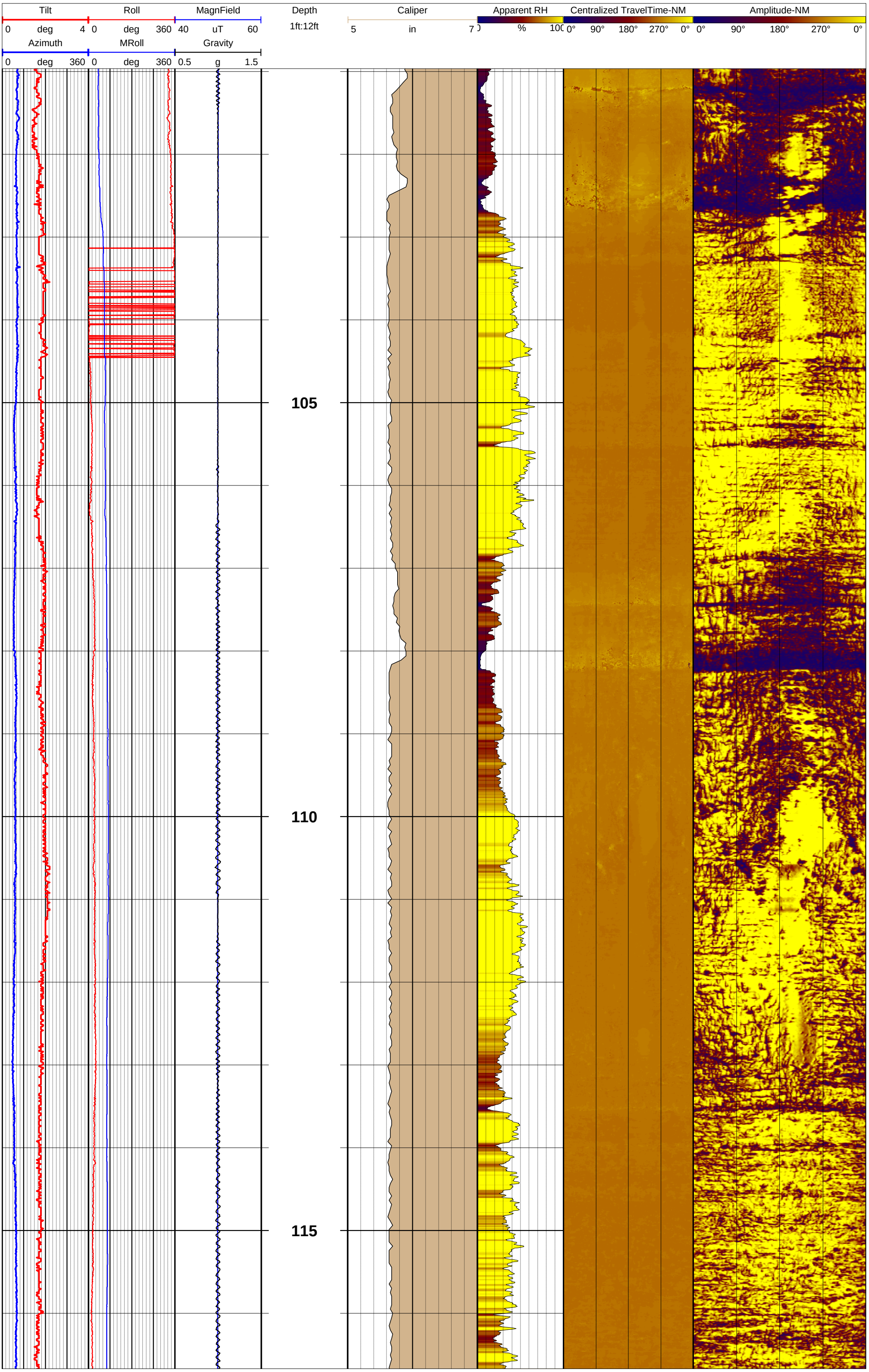
Roll
0 deg 360
MagnField
40 uT 60
Azimuth
0 deg 360
MRoll
0 deg 360
Gravity
0.5 g 1.5
Depth
1ft:12ft
Caliper
5 in 7
Apparent RH
0 % 100
Centralized TravelTime-NM
0° 90° 180° 270° 0°
Amplitude-NM
0° 90° 180° 270° 0°
90
95
100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MagnField
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MRoll
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Gravity
0.5 g 1.5
Depth
1ft:12ft
Caliper
5 in 7
Apparent RH
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Centralized TravelTime-NM
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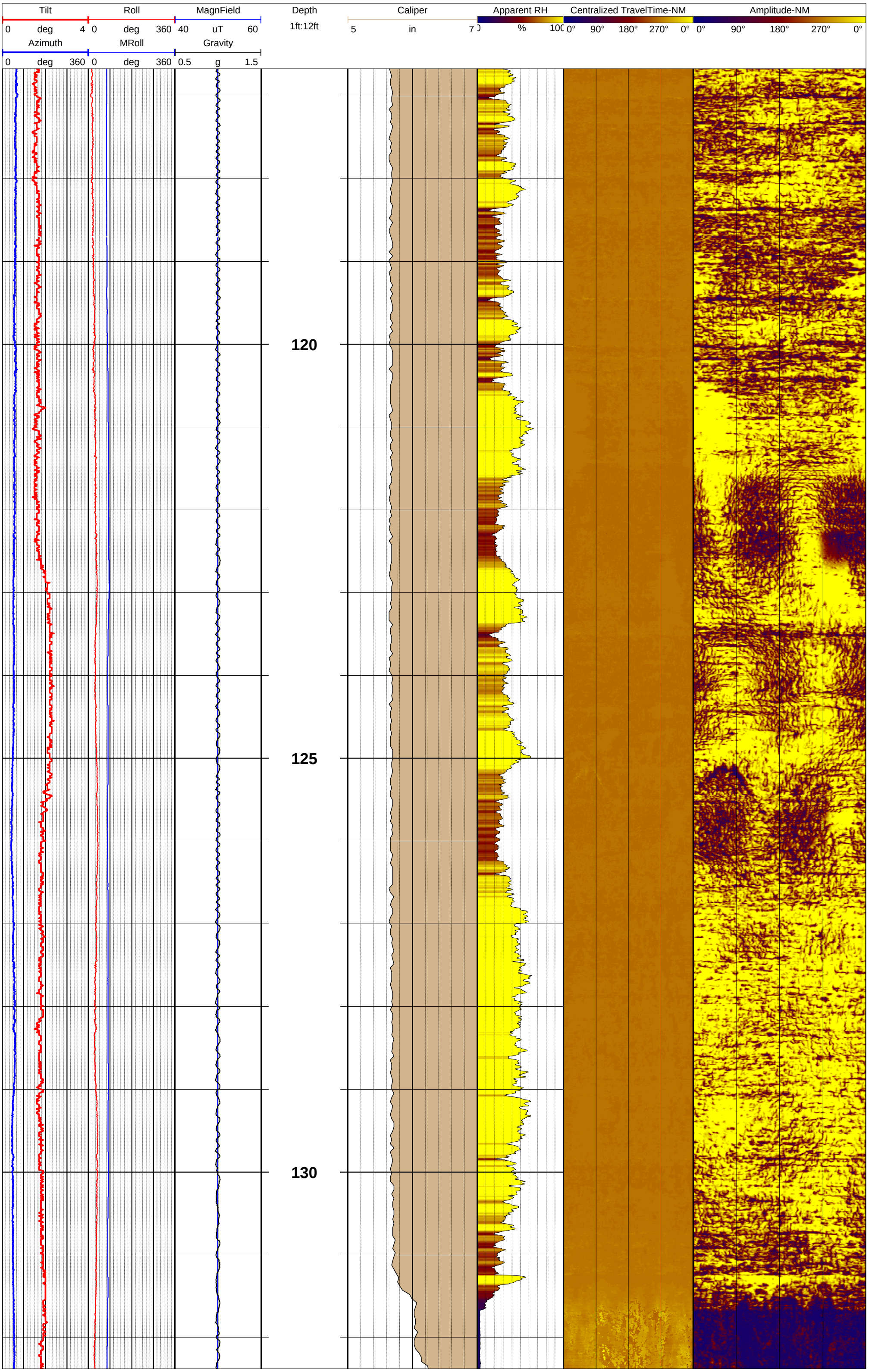
Amplitude-NM
0° 90° 180° 270° 0°
105
110
115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Roll
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MagnField
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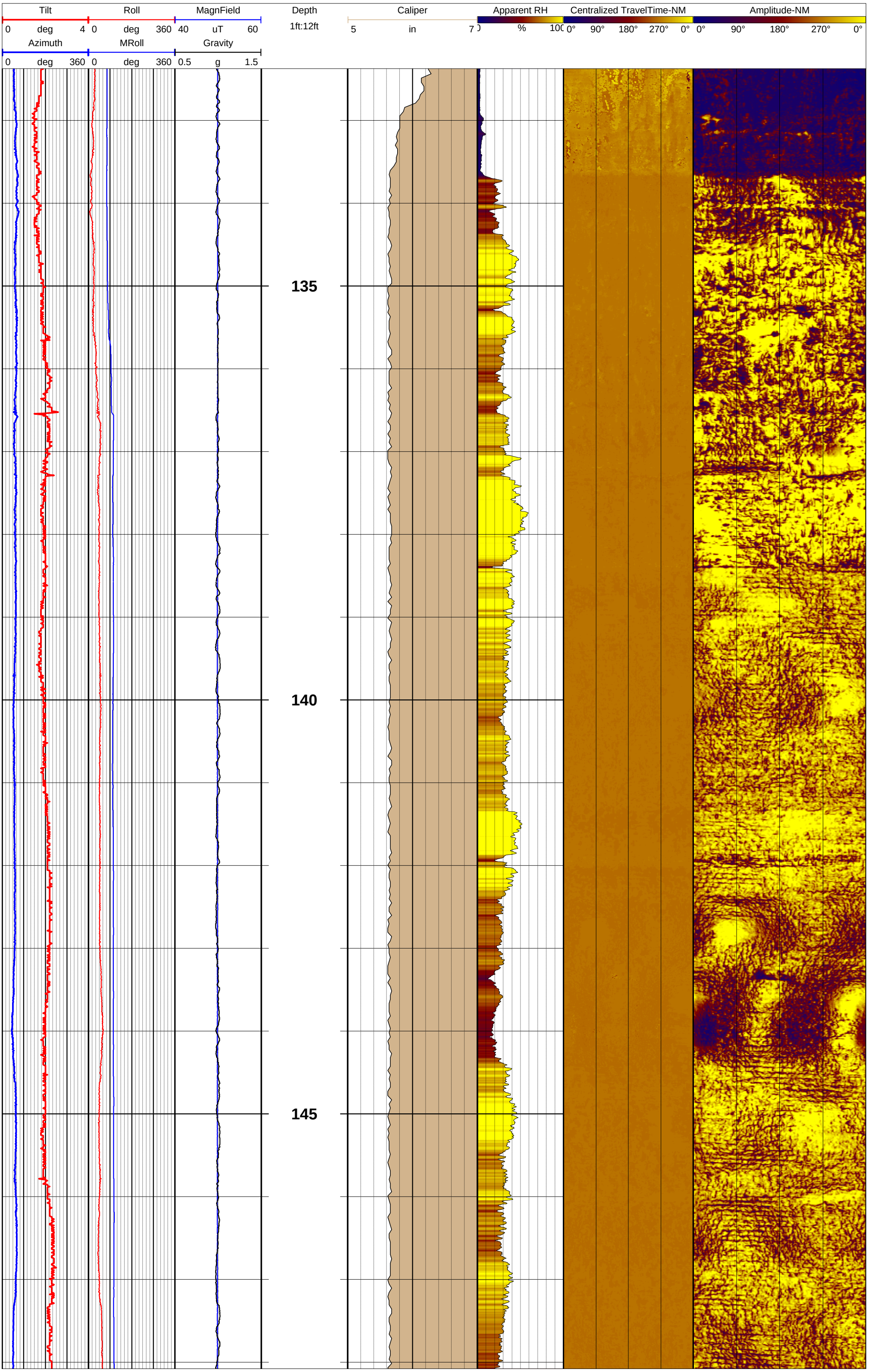
Azimuth
0 deg 360
MRoll
0 deg 360
Gravity
0.5 g 1.5
Depth
1ft:12ft
Caliper
5 in 7
Apparent RH
0 % 100
Centralized TravelTime-NM
0° 90° 180° 270° 0°
Amplitude-NM
0° 90° 180° 270° 0°
120
125
130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MagnField
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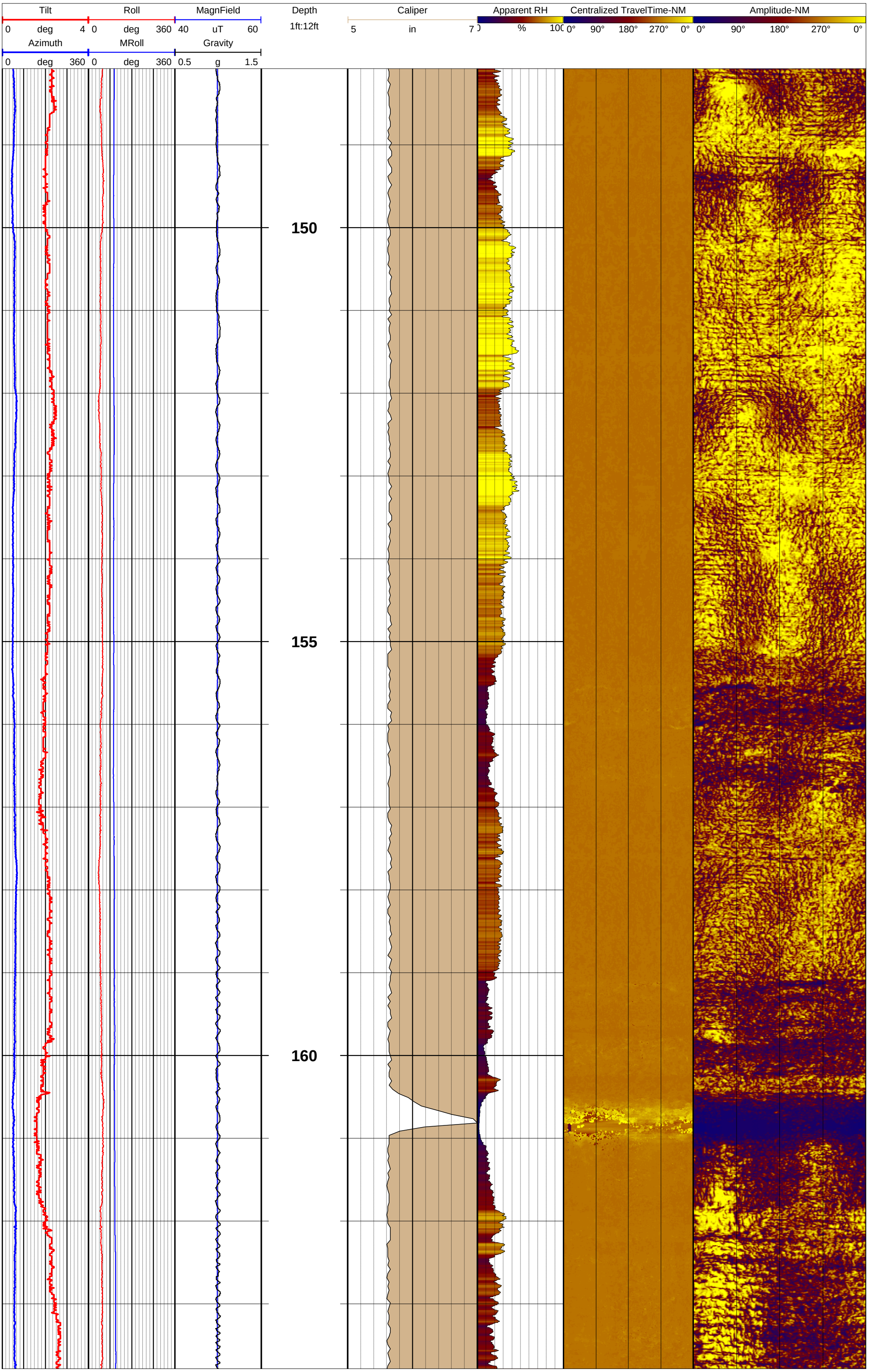
Azimuth
0 deg 360
MRoll
0 deg 360
Gravity
0.5 g 1.5
Depth
1ft:12ft
135
140
145
Caliper
5 in 7
Apparent RH
0 % 100
Centralized TravelTime-NM
0° 90° 180° 270° 0°
Amplitude-NM
0° 90° 180° 270° 0°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MagnField
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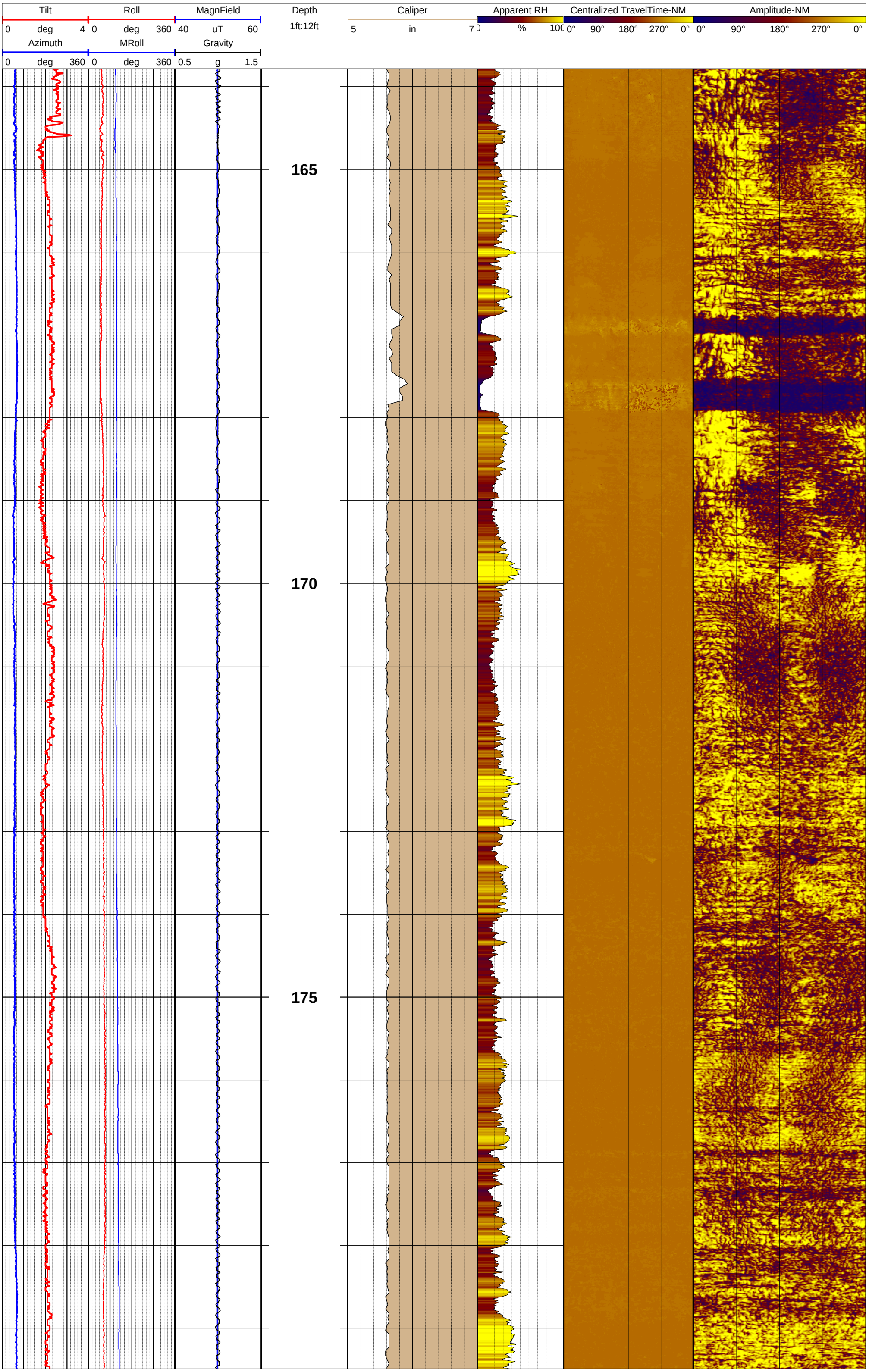
Azimuth
0 deg 360
MRoll
0 deg 360
Gravity
0.5 g 1.5
Depth
1ft:12ft
150
155
160
Caliper
5 in 7
Apparent RH
0 % 100
Centralized TravelTime-NM
0° 90° 180° 270° 0°
Amplitude-NM
0° 90° 180° 270° 0°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MagnField
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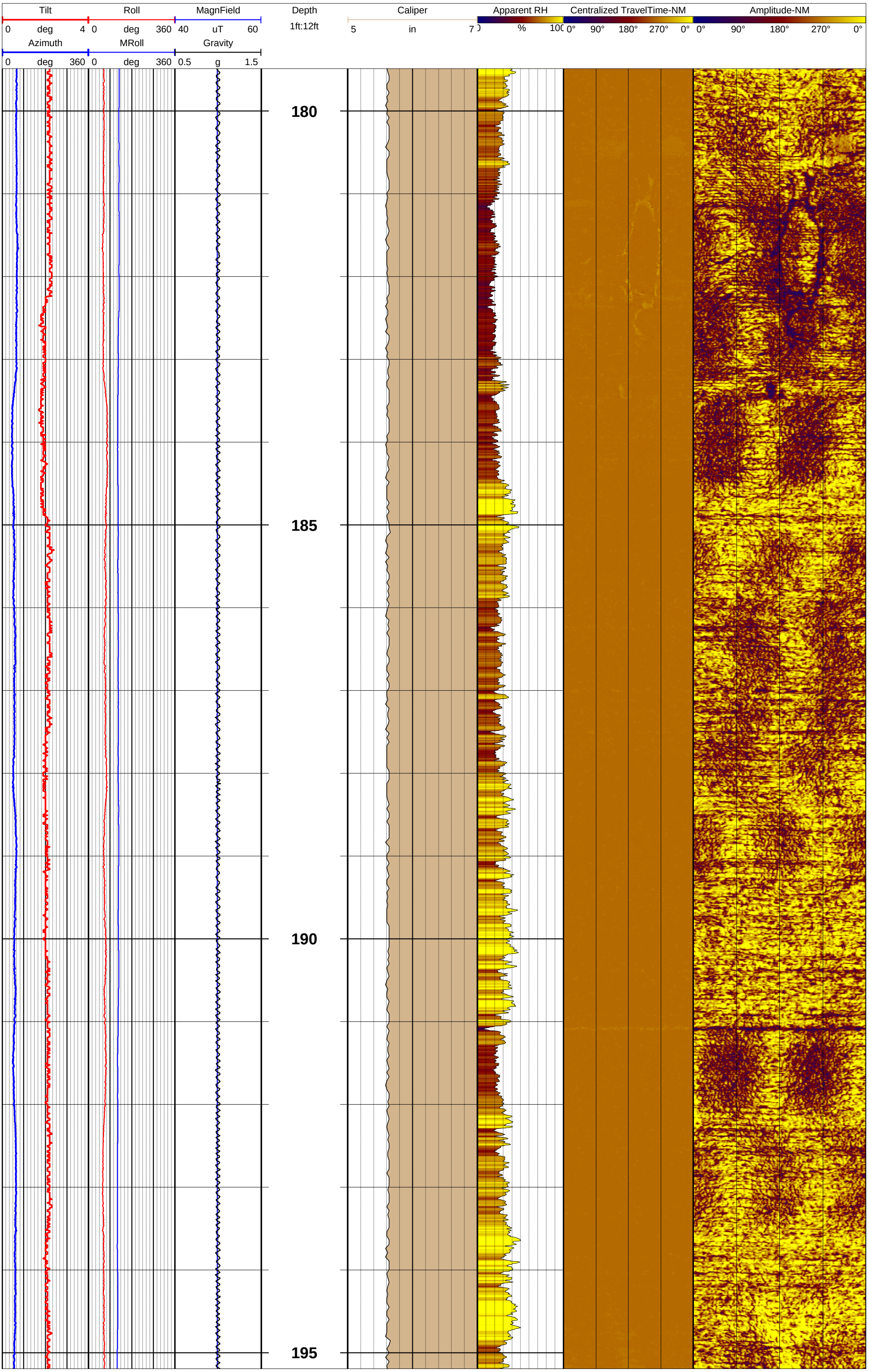
Azimuth
0 deg 360
MRoll
0 deg 360
Gravity
0.5 g 1.5
Depth
1ft:12ft
165
170
175
Caliper
5 in 7
Apparent RH
0 % 100
Centralized TravelTime-NM
0° 90° 180° 270° 0°
Amplitude-NM
0° 90° 180° 270° 0°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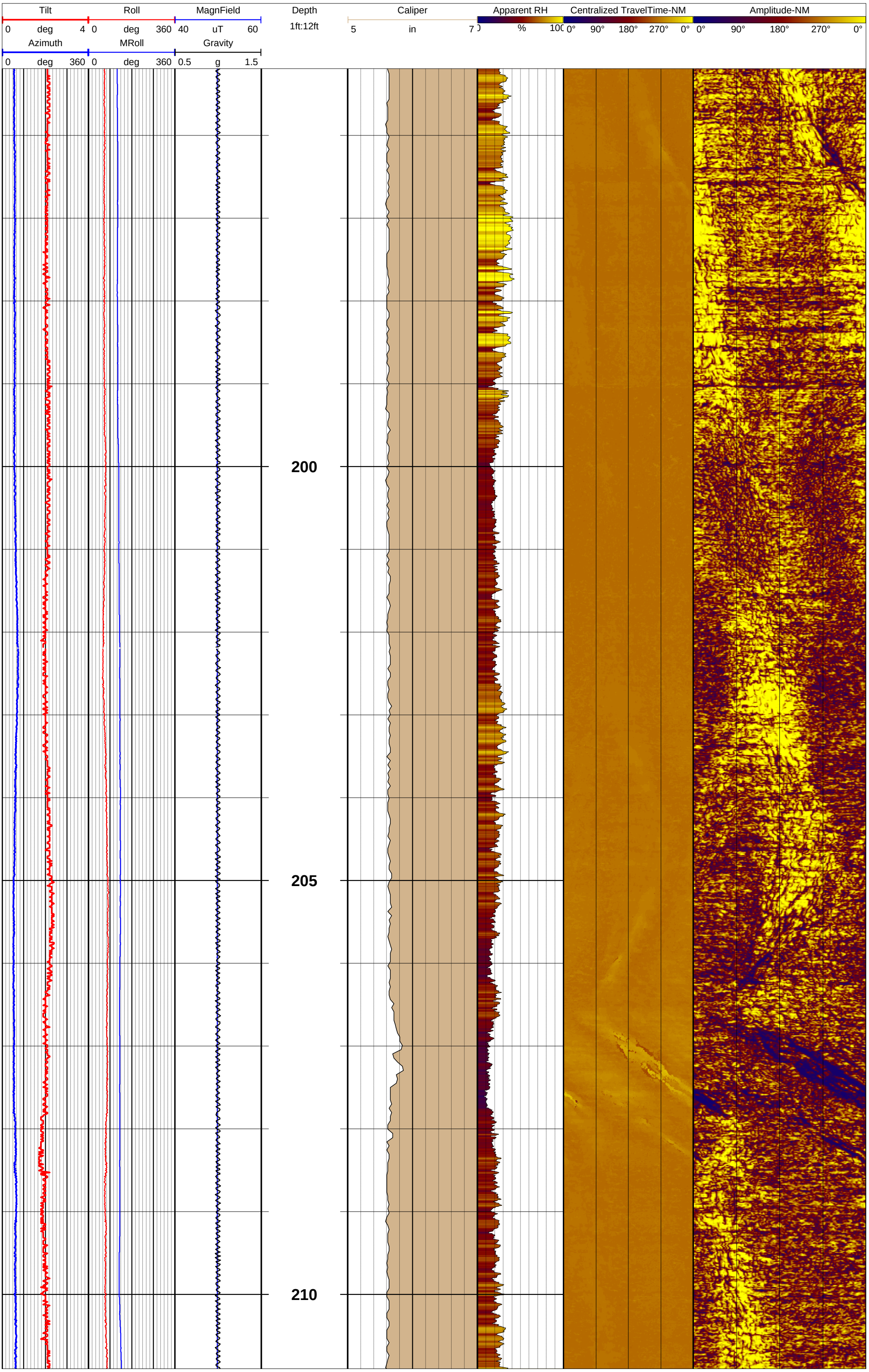
Azimuth
0 deg 360
MRoll
0 deg 360
Gravity
0.5 g 1.5
Depth
1ft:12ft
Caliper
5 in 7
Apparent RH
0 % 100
Centralized TravelTime-NM
0° 90° 180° 270° 0°
Amplitude-NM
0° 90° 180° 270° 0°
180
185
190
195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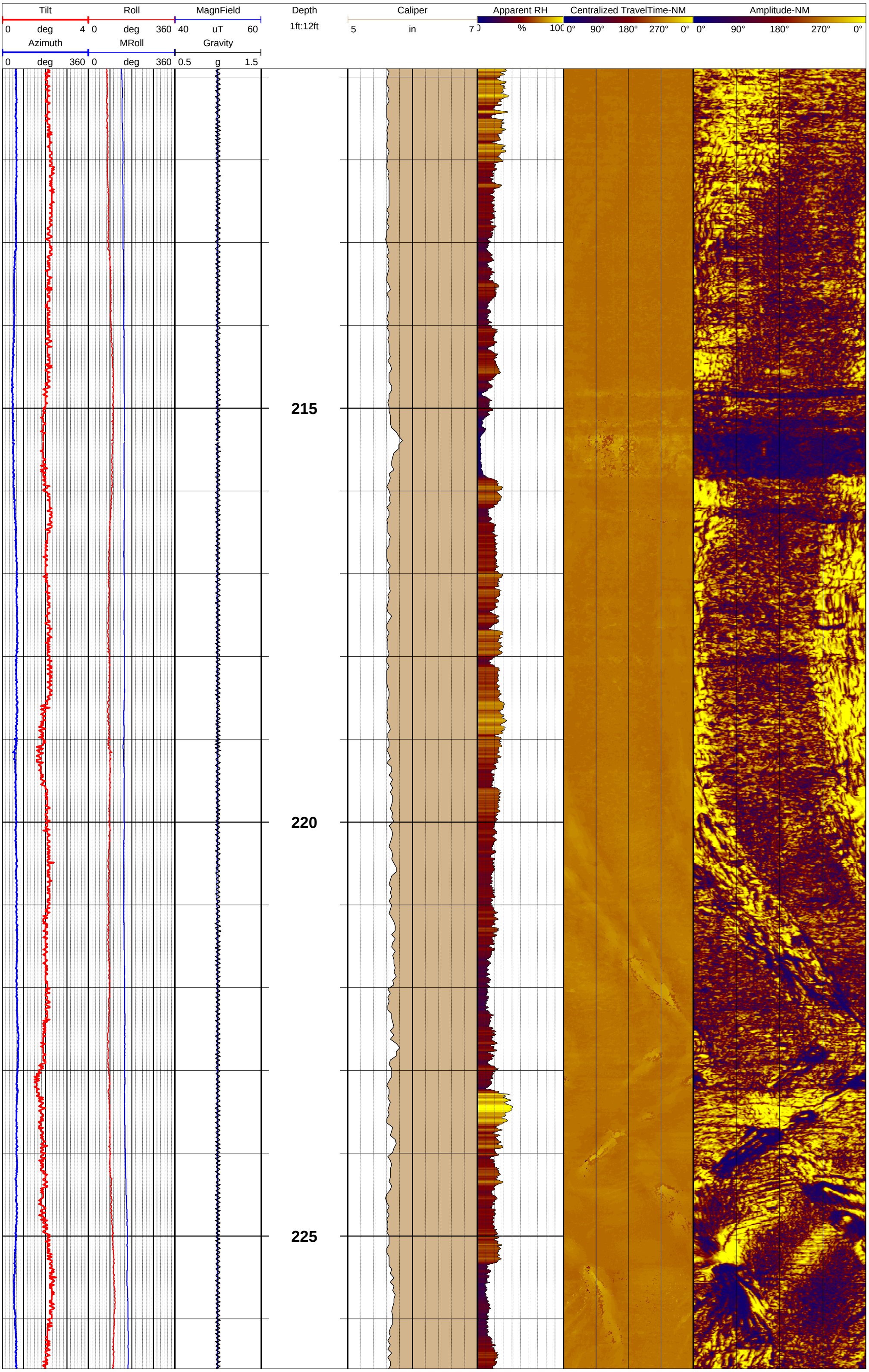
Azimuth
0 deg 360
MRoll
0 deg 360
Gravity
0.5 g 1.5
Depth
1ft:12ft
Caliper
5 in 7
Apparent RH
0 % 100
Centralized TravelTime-NM
0° 90° 180° 270° 0°
Amplitude-NM
0° 90° 180° 270° 0°
200
205
210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Roll
0 deg 360
MagnField
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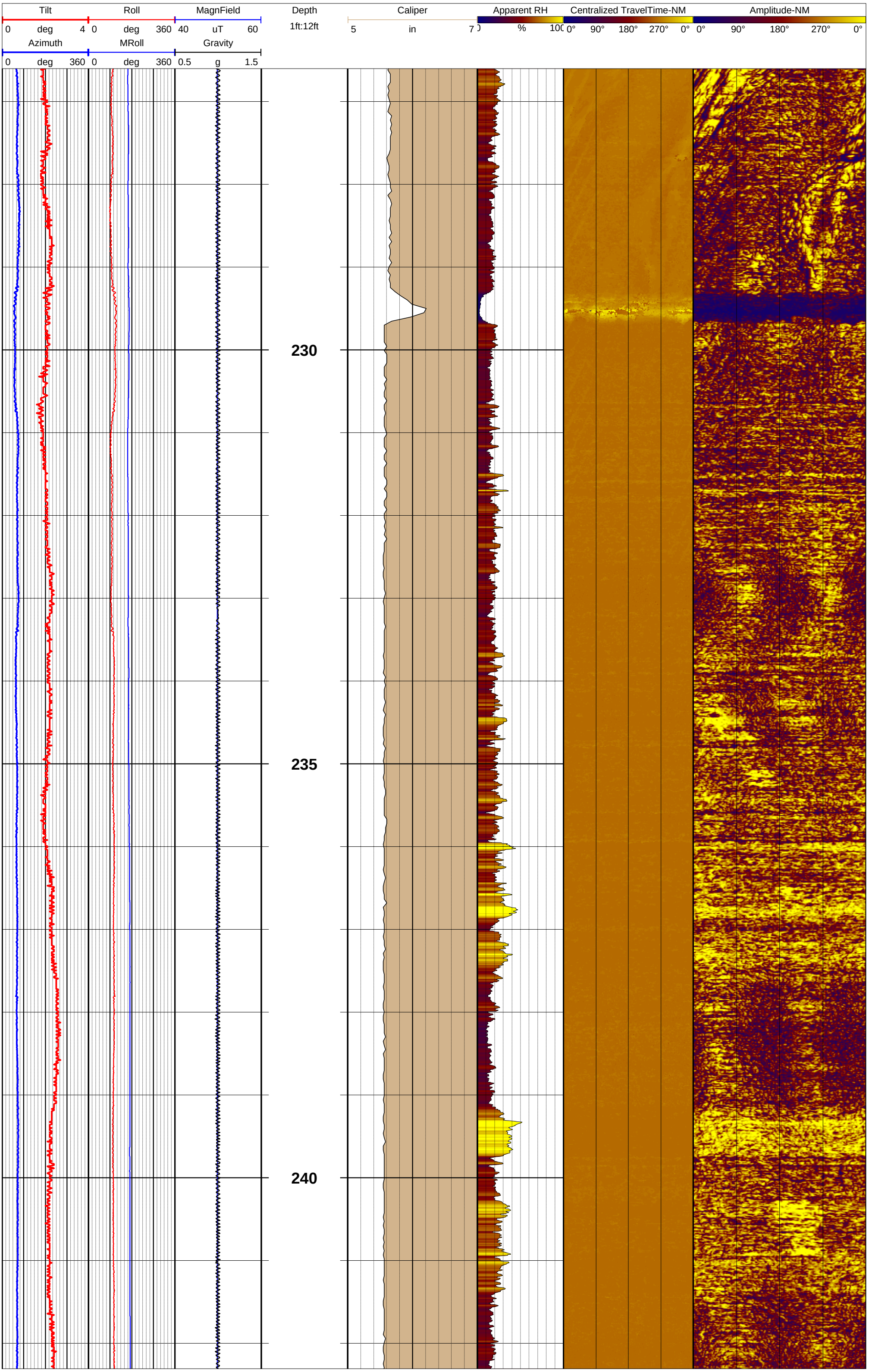
Azimuth
0 deg 360
MRoll
0 deg 360
Gravity
0.5 g 1.5
Depth
1ft:12ft
Caliper
5 in 7
Apparent RH
0 % 100
Centralized TravelTime-NM
0° 90° 180° 270° 0°
Amplitude-NM
0° 90° 180° 270° 0°
215
220
225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Roll
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MagnField
40 uT 60
Azimuth
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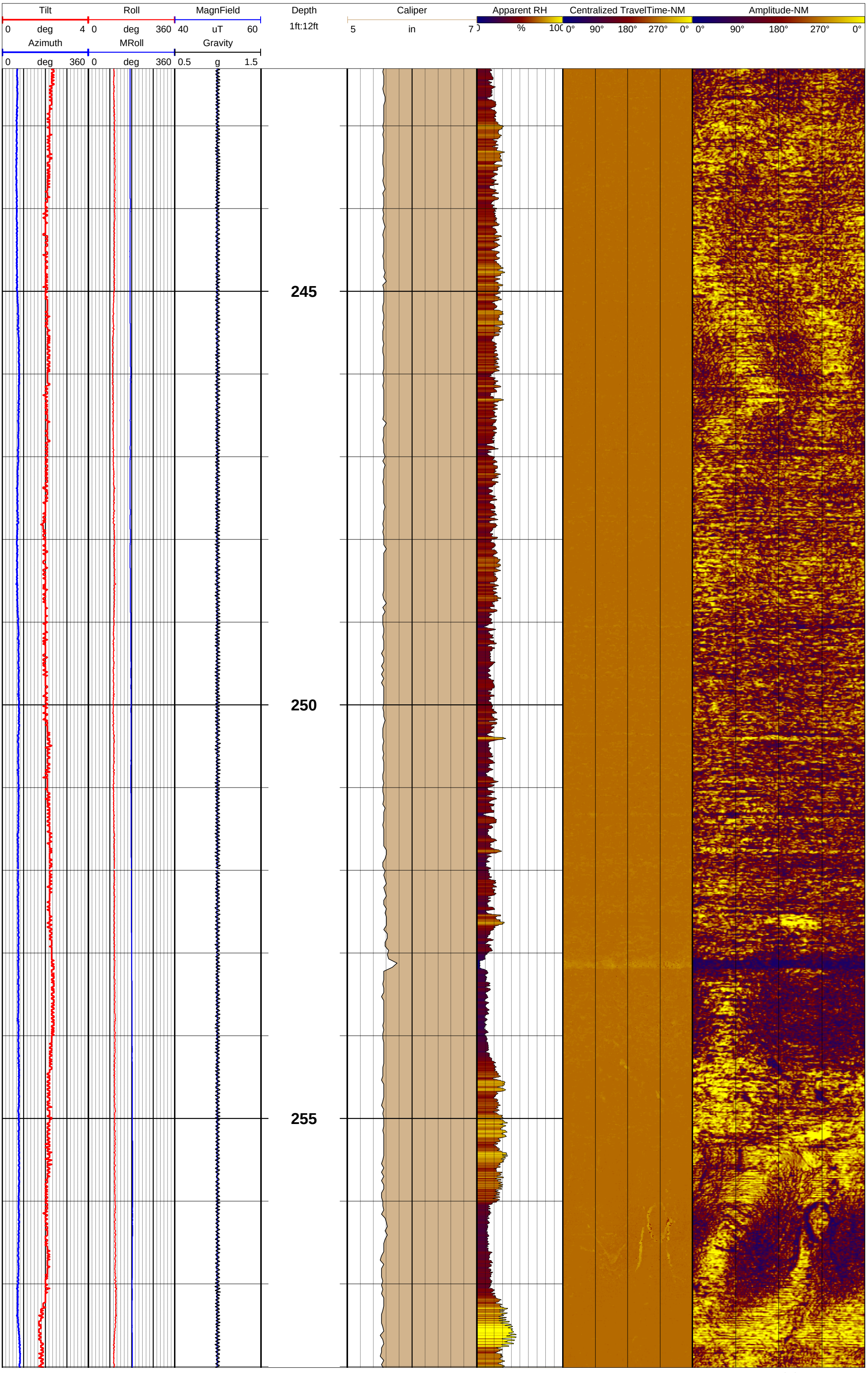
MRoll
0 deg 360
Gravity
0.5 g 1.5
Depth
1ft:12ft
Caliper
5 in 7
Apparent RH
0 % 100
Centralized TravelTime-NM
0° 90° 180° 270° 0°
Amplitude-NM
0° 90° 180° 270° 0°
230
235
240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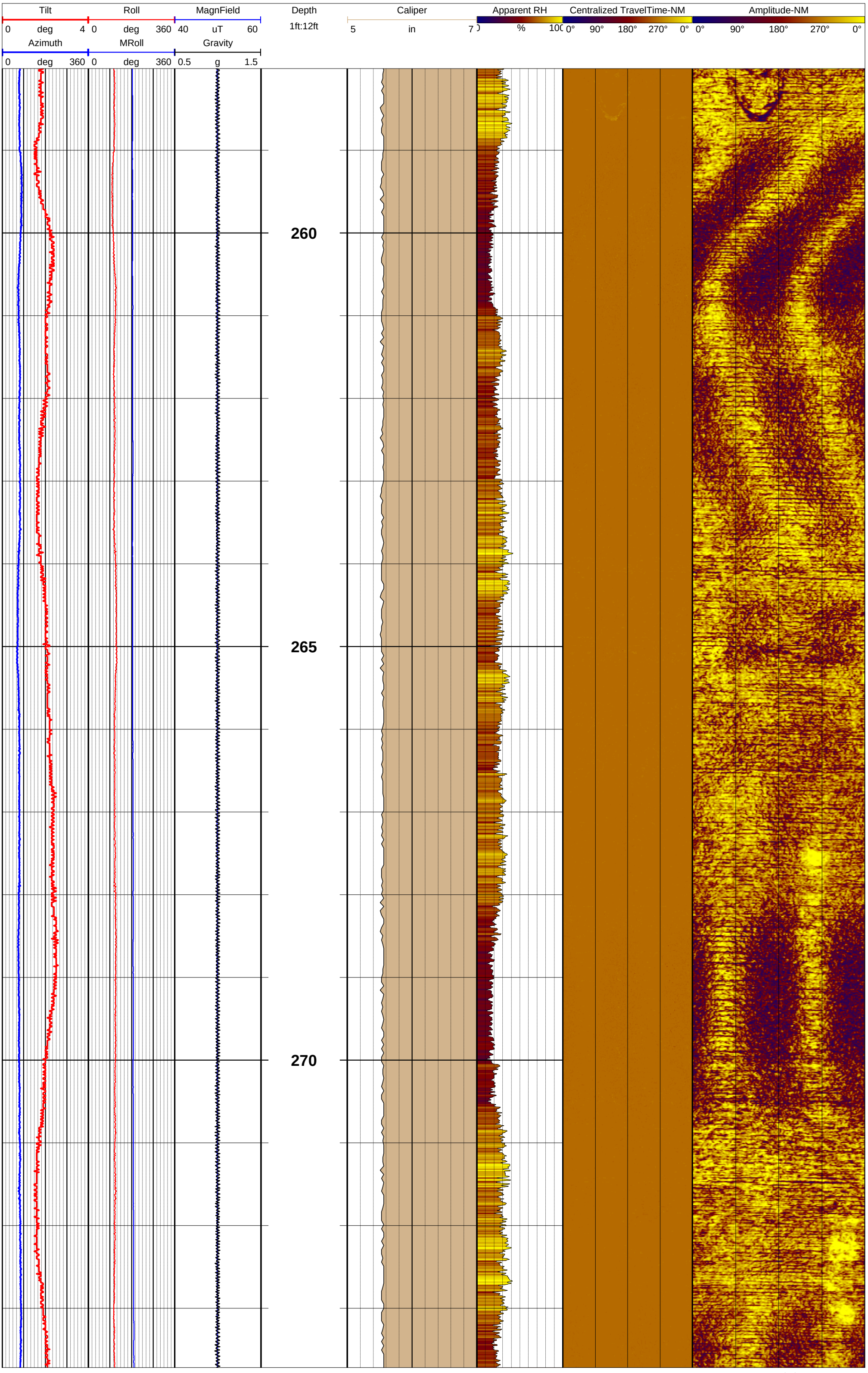
MagnField
40 uT 60
Azimuth
0 deg 360
MRoll
0 deg 360
Gravity
0.5 g 1.5
Depth
1ft:12ft
Caliper
5 in 7
Apparent RH
0 % 100
Centralized TravelTime-NM
0° 90° 180° 270° 0°
Amplitude-NM
0° 90° 180° 270° 0°
245
250
255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Roll
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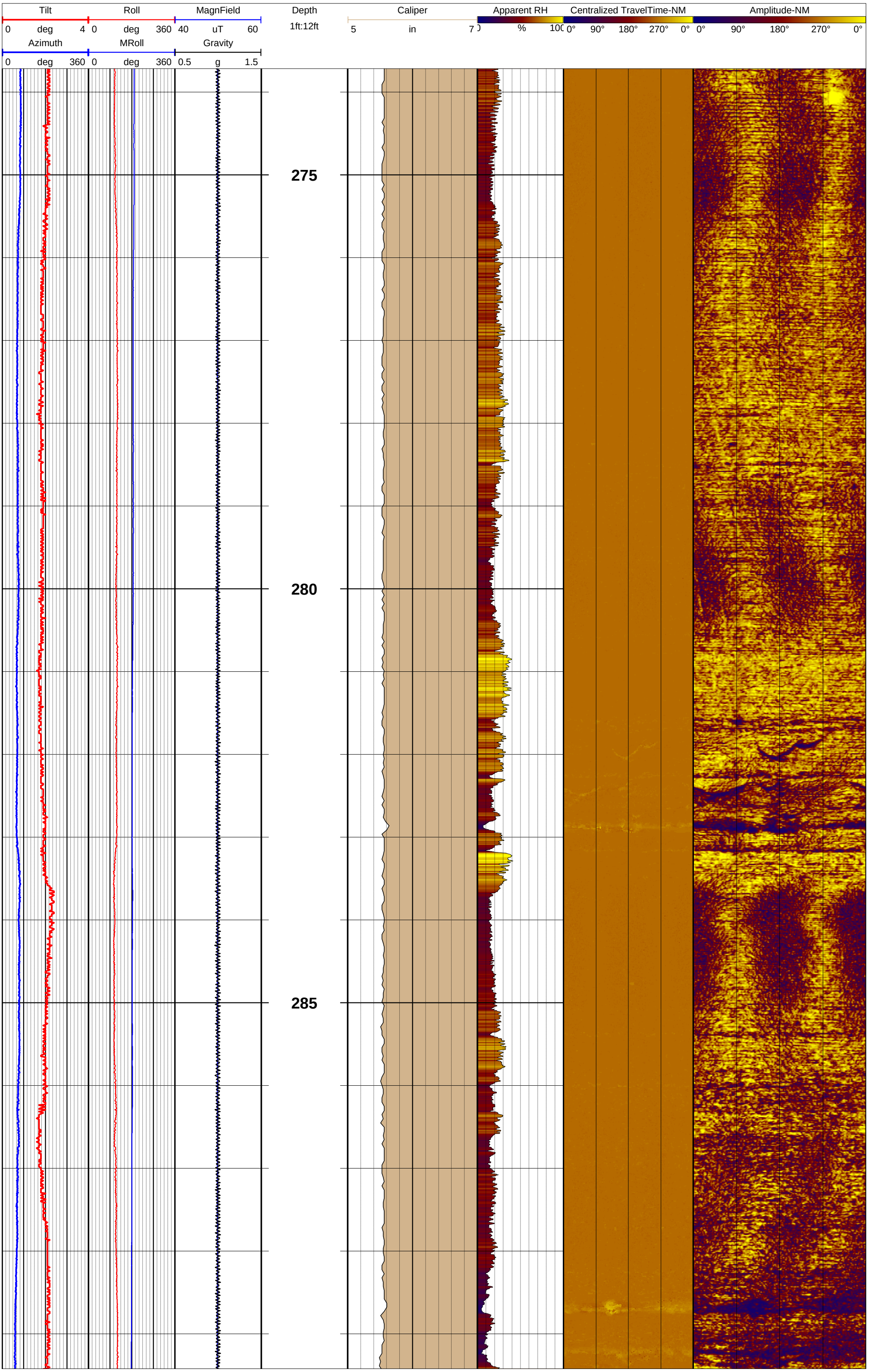
MagnField
40 uT 60
Azimuth
0 deg 360
MRoll
0 deg 360
Gravity
0.5 g 1.5
Depth
1ft:12ft
Caliper
5 in 7
Apparent RH
0 % 100
Centralized TravelTime-NM
0° 90° 180° 270° 0°
Amplitude-NM
0° 90° 180° 270° 0°
260
265
270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Roll
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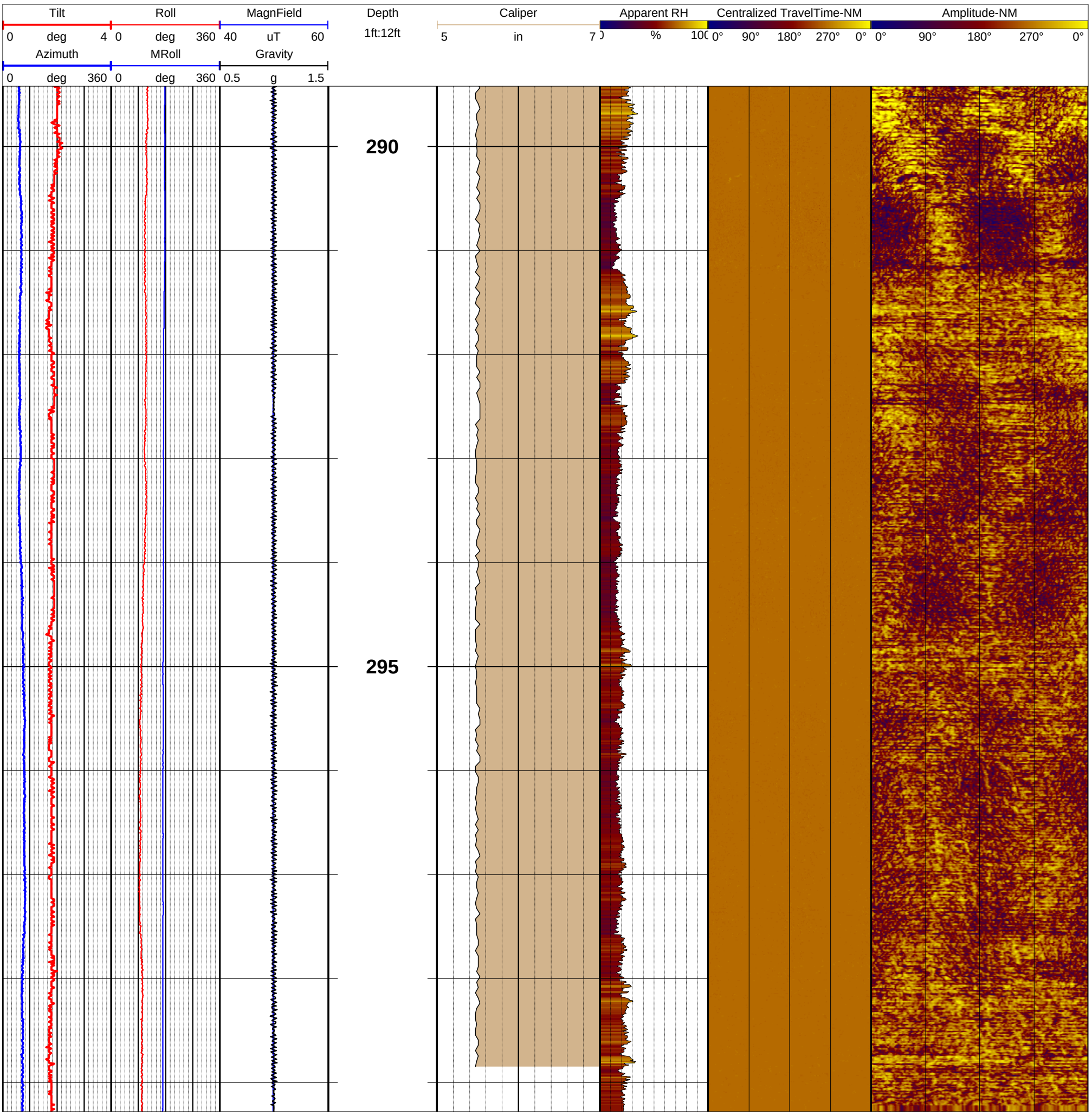
MagnField
40 uT 60
Azimuth
0 deg 360
MRoll
0 deg 360
Gravity
0.5 g 1.5
Depth
1ft:12ft
Caliper
5 in 7
Apparent RH
0 % 100
Centralized TravelTime-NM
0° 90° 180° 270° 0°
Amplitude-NM
0° 90° 180° 270° 0°
275
280
285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0.5 g 1.5
Depth
1ft:12ft
290
295
Caliper
5 in 7
Apparent RH
0 % 100
Centralized TravelTime-NM
0° 90° 180° 270° 0°
Amplitude-NM
0° 90° 180° 270° 0°

GEOPHYSICAL RECORD OF BOREHOLE: GSAP-MW38H

Plant Gorgas - CCR Delineation Wells

GOLDER

Project Number: 19131304

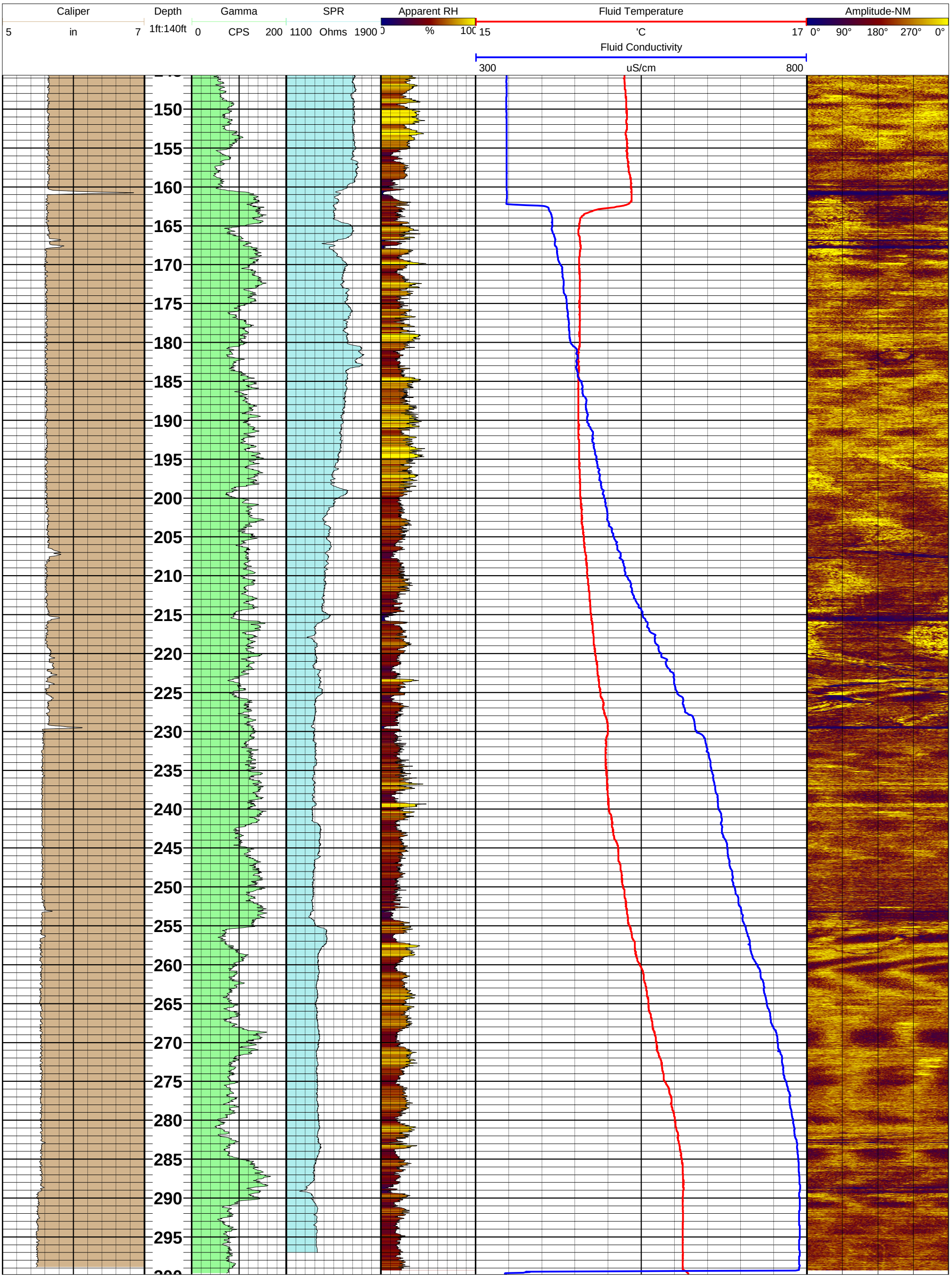
Client: Southern Company Services

Date: 11-8-2019

Location: Parrish, Al	TOC Elev msl: na	Notes: 59.41' Below top of Casing @ 15:00 11-7-19
Easting: na	Casing Stick-up: 1.1 ft ags	Drilling was complete at 9:00 am/ Rods pulled by 11 am
Northing: na	Casing Diameter: 6.625 in ID	Tools used were:
Ground Elev msl: na	Casing Material: Steel-HSA	QL40-FTC sn 5518
Borehole Dip: vertical	Water Level: 58.3 ft bgs 11-7	QL40 Caliper sn 5521
Borehole Az: na	Logged By: CM	40-LGR-Gamma & SPR sn 5809
Borehole Size: 6" AH	Log Depth Ref: Ground Surface	ATV ABI40 sn162305
Drilled Depth: 303 ft BGS	Log Date: 11/7-8/2019	
Drill Comp Date: 11-7-19	Image Plot(s) Ref: MN	
Casing Depth: 24 ft bgs	Dip Referenced to Horizontal	



Caliper: 5 in 7 | Depth: 1ft:140ft | Gamma: 0 CPS 200 | SPR: 1100 Ohms 1900 | Apparent RH: 0 % 100 | Fluid Temperature: 15 'C 17 | Fluid Conductivity: 300 uS/cm 800 | Amplitude-NM: 0° 90° 180° 270° 0°


Caliper
5
in
7
Depth
1ft:140ft
Gamma
0
CPS
200
SPR
1100
Ohms
1900
Apparent RH
0
%
100
Fluid Temperature
15
'C
17
Amplitude-NM
0°
90°
180°
270°
0°
Fluid Conductivity
300
uS/cm
800
150
155
160
165
170
175
180
185
190
195
200
205
210
215
220
225
230
235
240
245
250
255
260
265
270
275
280
285
290
295

GEOPHYSICAL RECORD OF BOREHOLE: GSAP-MW39H

Plant Gorgas - CCR Delineation Wells

GOLDER

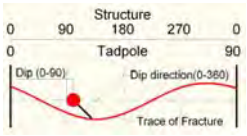
Project Number: 19131304

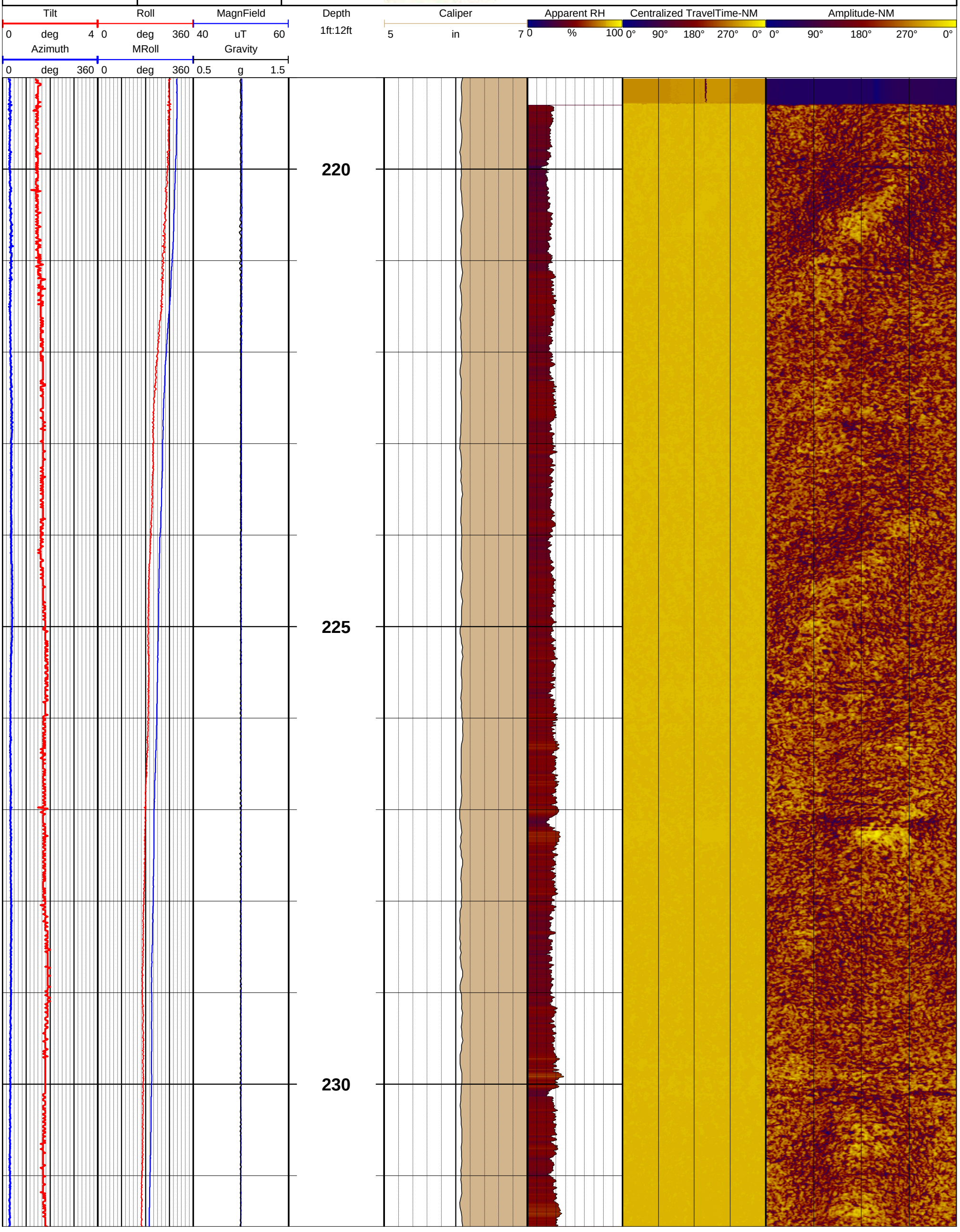
Client: Southern Company Services

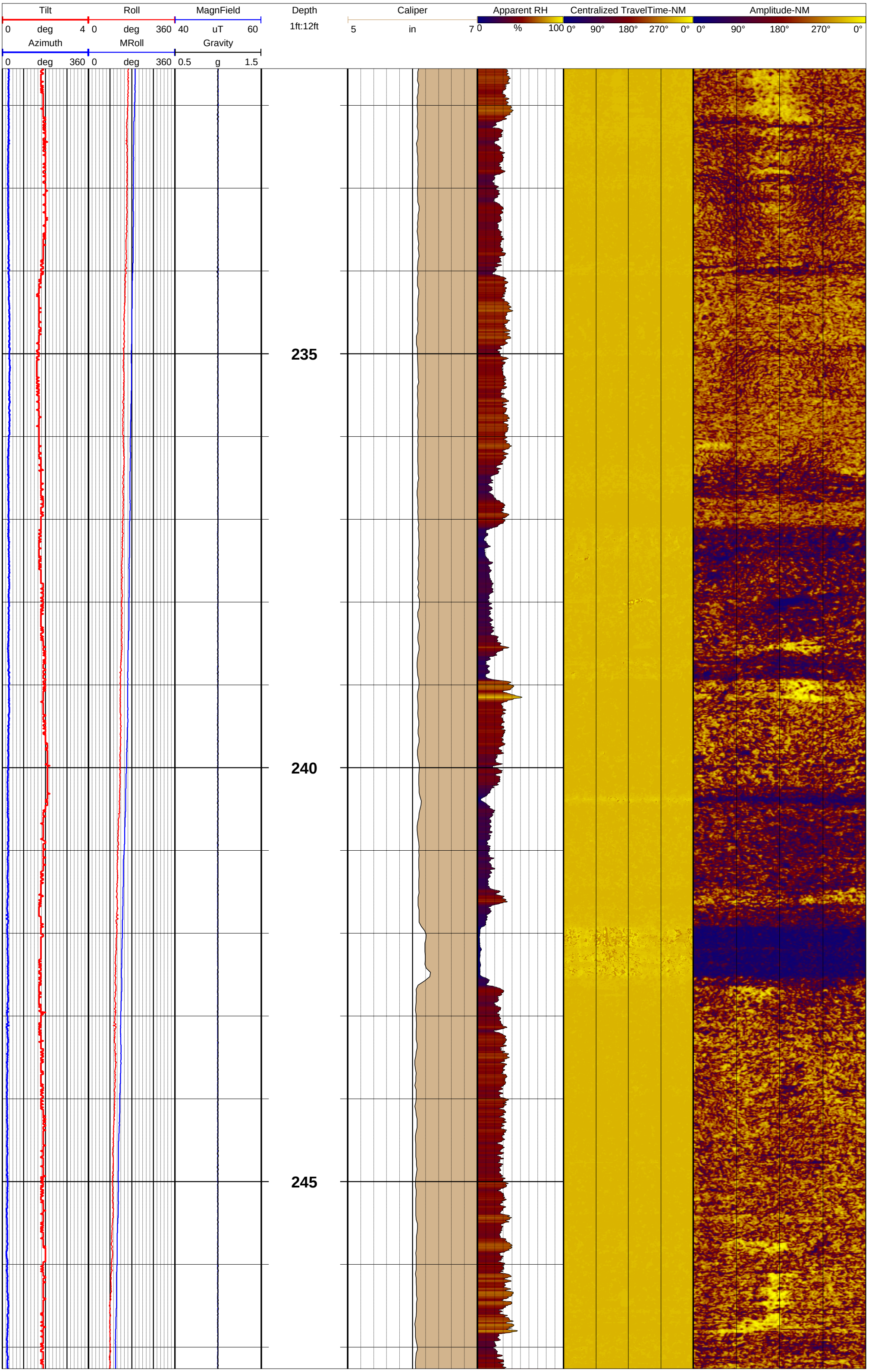
Southern Company

Date: 10-28-2019

Location: Parrish, Al	TOC Elev msl: na	Notes: +302 @ 14:45 239 @7:08 10-28-2019 Tools used were: QL40-FTC sn 5518 QL40 Caliper sn 5521 40-LGR-Gamma & SPR sn 5809 ATV ABI40 sn162305
Easting: na	Casing Stick-up: 1.58 ft ags	
Northing: na	Casing Diameter: 6.625 in ID	
Ground Elev msl: na	Casing Material: Steel HSA	
Borehole Dip: vertical	Water Level: rising	
Borehole Az: na	Logged By: CAB	
Borehole Size: 6" AH	Log Depth Ref: Ground Surface	
Drilled Depth: 350.5 ft BGS	Log Date: 10/27-28/2019	
Drill Comp Date: 10-27-19	Image Plot(s) Ref: MN	
Casing Depth: 38 ft bgs	Dip Referenced to Horizontal	



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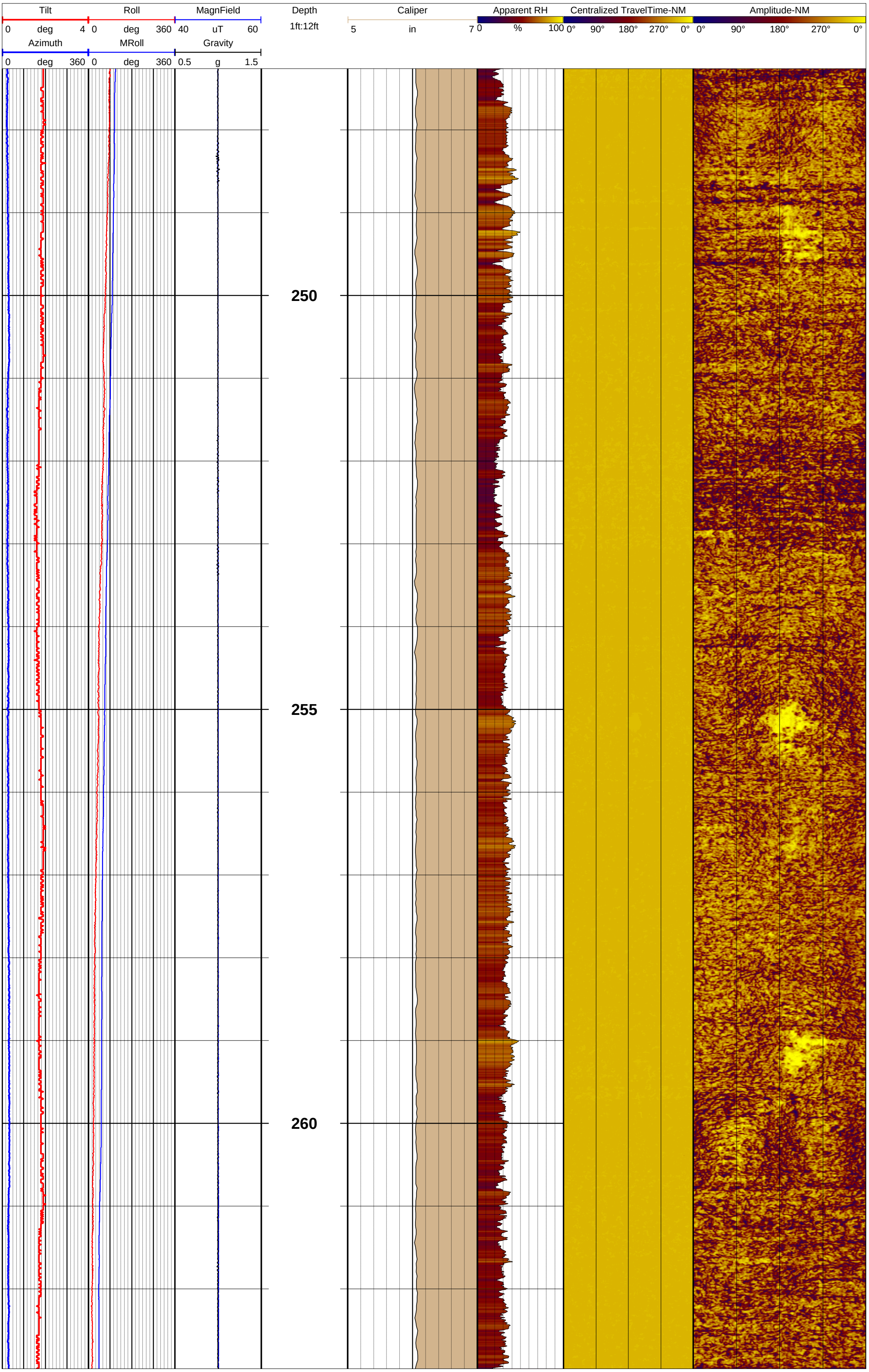
Roll
0 deg 360
MagnField
40 uT 60
Azimuth
0 deg 360
MRoll
0 deg 360
Gravity
0.5 g 1.5
Depth
1ft:12ft
Caliper
5 in 7
Apparent RH
0 % 100
Centralized TravelTime-NM
0° 90° 180° 270° 0°
Amplitude-NM
0° 90° 180° 270° 0°
235
240
245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MagnField
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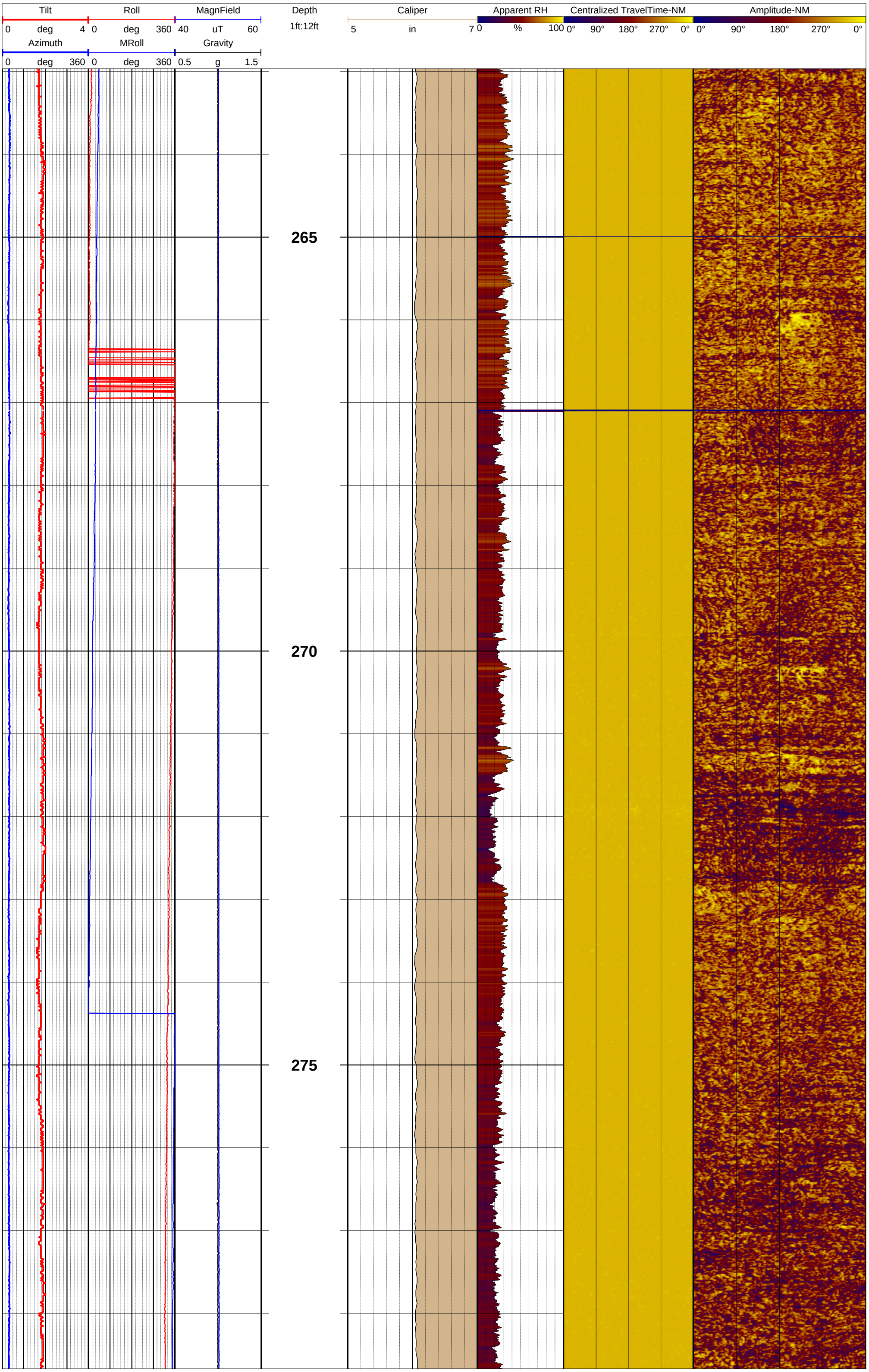
Azimuth
0 deg 360
MRoll
0 deg 360
Gravity
0.5 g 1.5
Depth
1ft:12ft
Caliper
5 in 7
Apparent RH
0 % 100
Centralized TravelTime-NM
0° 90° 180° 270° 0°
Amplitude-NM
0° 90° 180° 270° 0°
250
255
260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Azimuth
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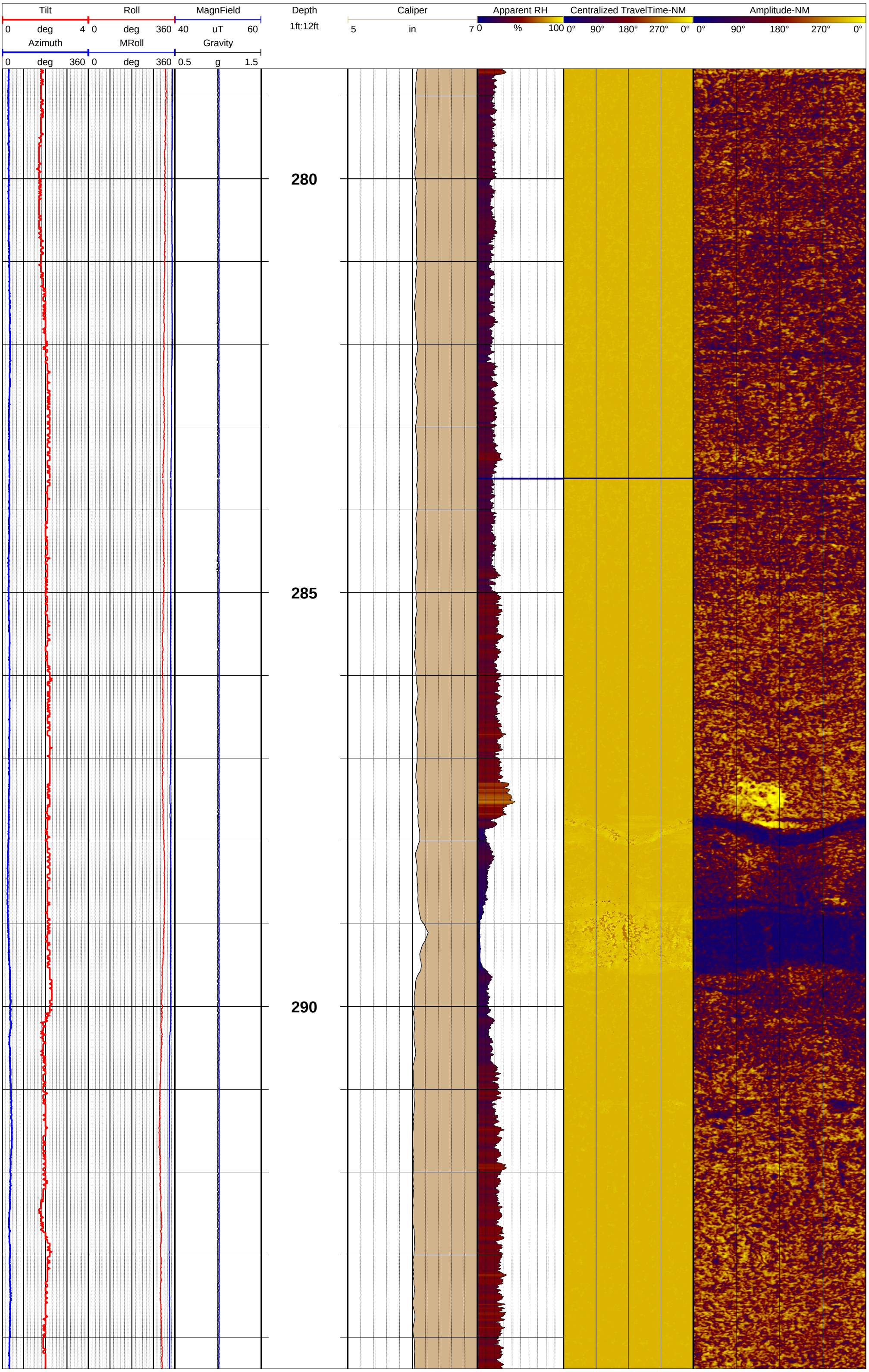
MRoll
0 deg 360
Gravity
0.5 g 1.5
Depth
1ft:12ft
Caliper
5 in 7
Apparent RH
0 % 100
Centralized TravelTime-NM
0° 90° 180° 270° 0°
Amplitude-NM
0° 90° 180° 270° 0°
265
270
275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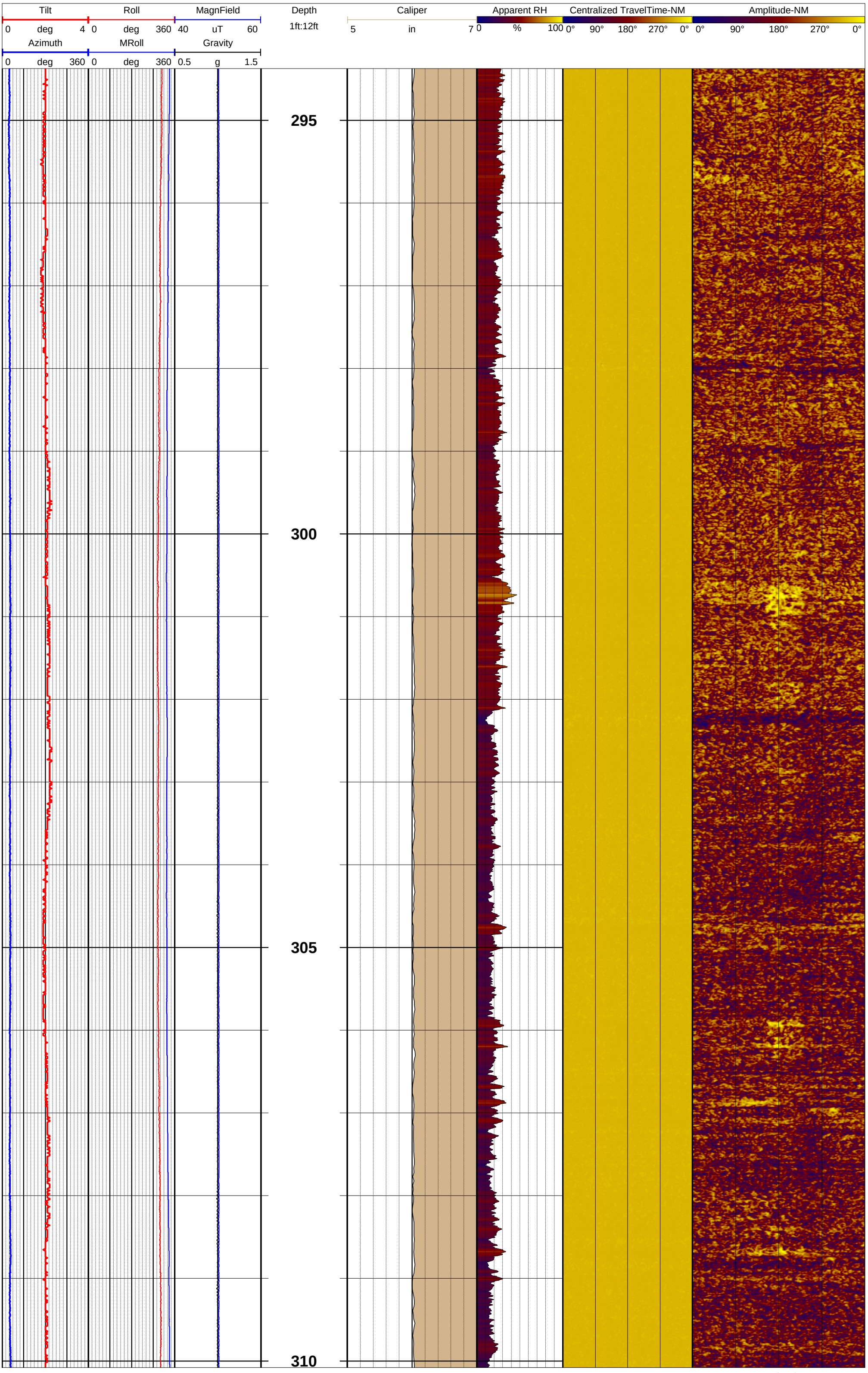
MRoll
0 deg 360
Gravity
0.5 g 1.5
Depth
1ft:12ft
Caliper
5 in 7
Apparent RH
0 % 100
Centralized TravelTime-NM
0° 90° 180° 270° 0°
Amplitude-NM
0° 90° 180° 270° 0°
280
285
290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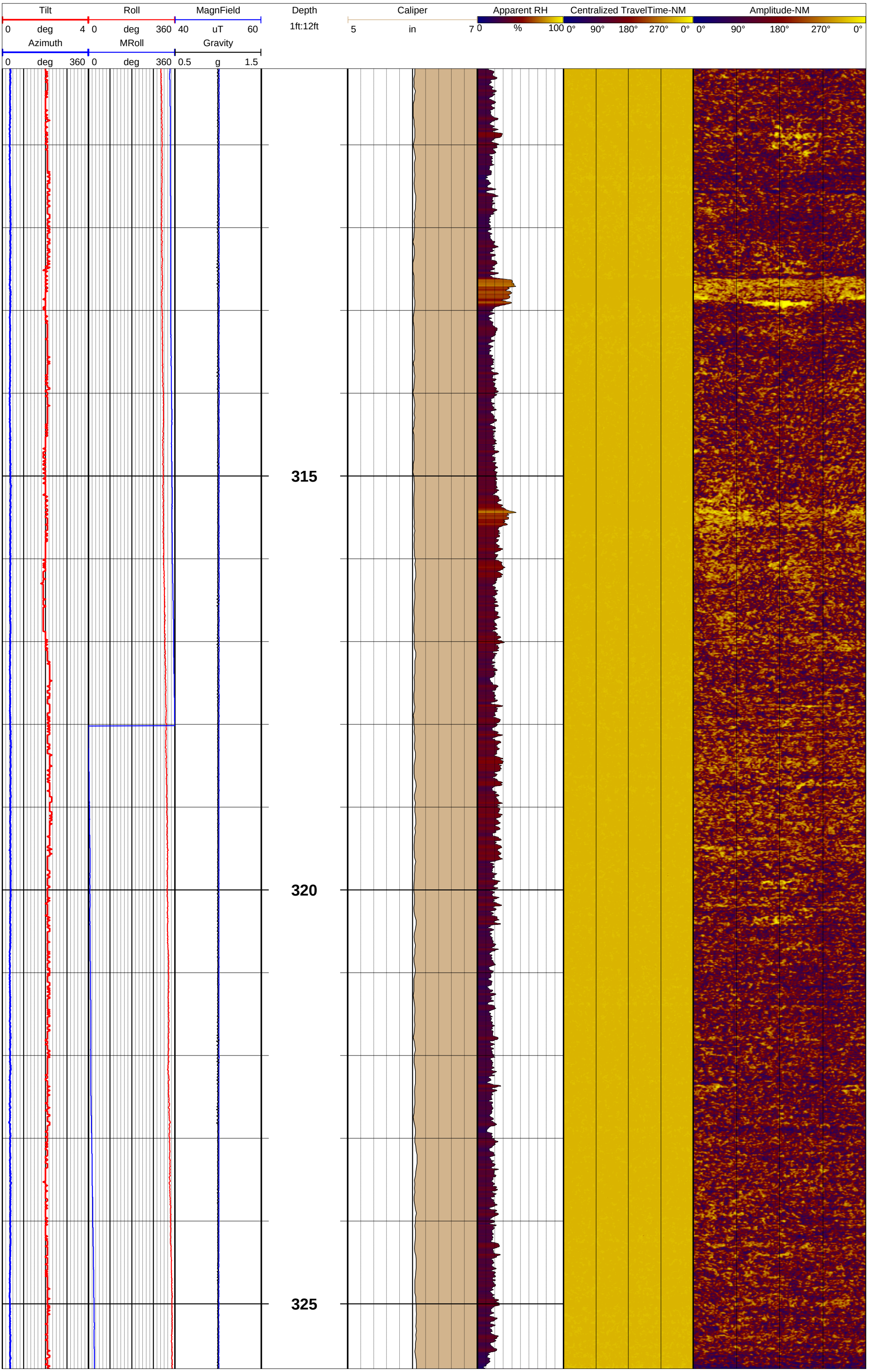
Roll
0 deg 360
MagnField
40 uT 60
Azimuth
0 deg 360
MRoll
0 deg 360
Gravity
0.5 g 1.5
Depth
1ft:12ft
Caliper
5 in 7
Apparent RH
0 % 100
Centralized TravelTime-NM
0° 90° 180° 270° 0°
Amplitude-NM
0° 90° 180° 270° 0°
295
300
305
310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Roll
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MagnField
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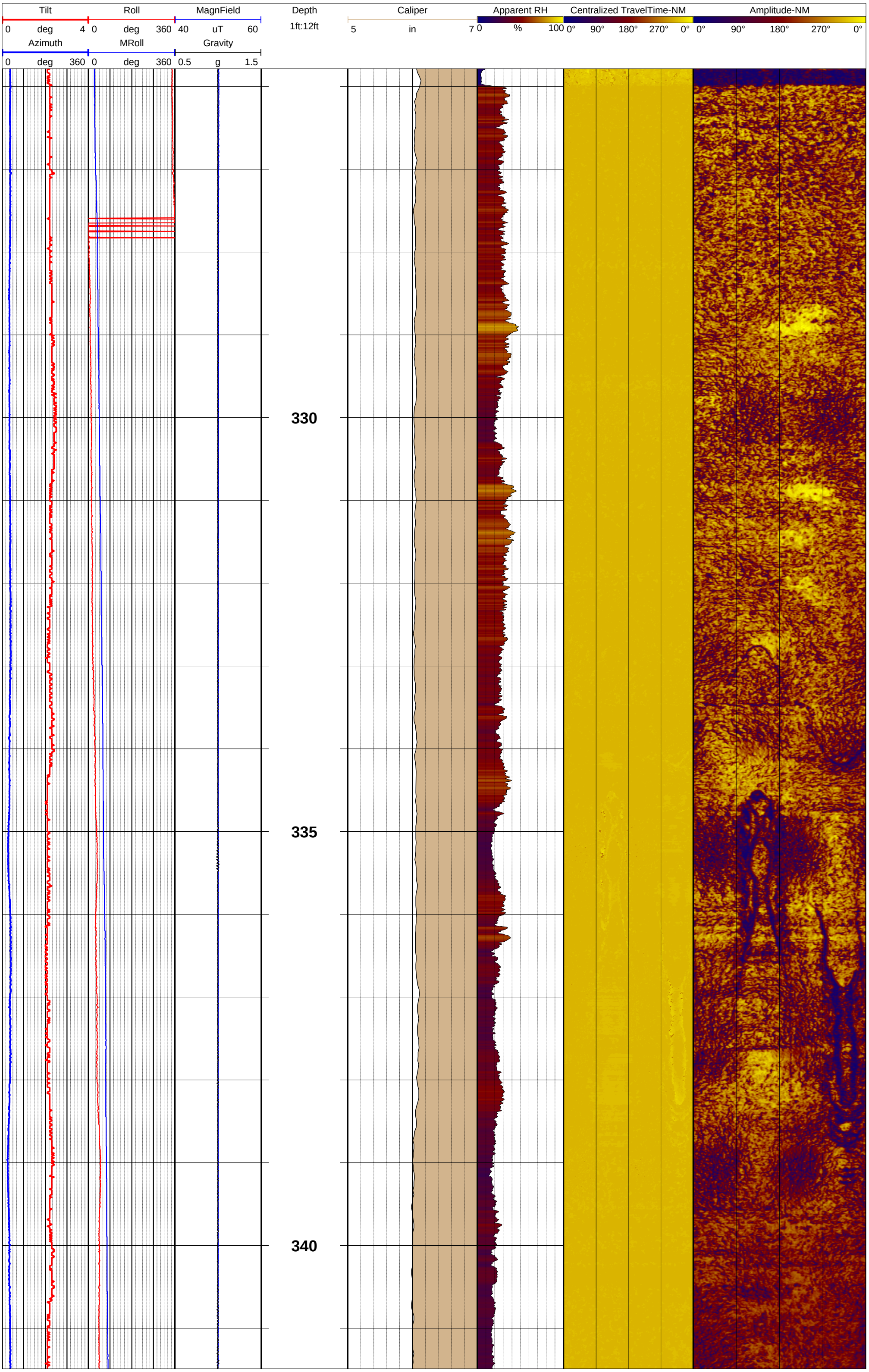
Azimuth
0 deg 360
MRoll
0 deg 360
Gravity
0.5 g 1.5
Depth
1ft:12ft
315
320
325
Caliper
5 in 7
Apparent RH
0 % 100
Centralized TravelTime-NM
0° 90° 180° 270° 0°
Amplitude-NM
0° 90° 180° 270° 0°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Roll
0 deg 360
MagnField
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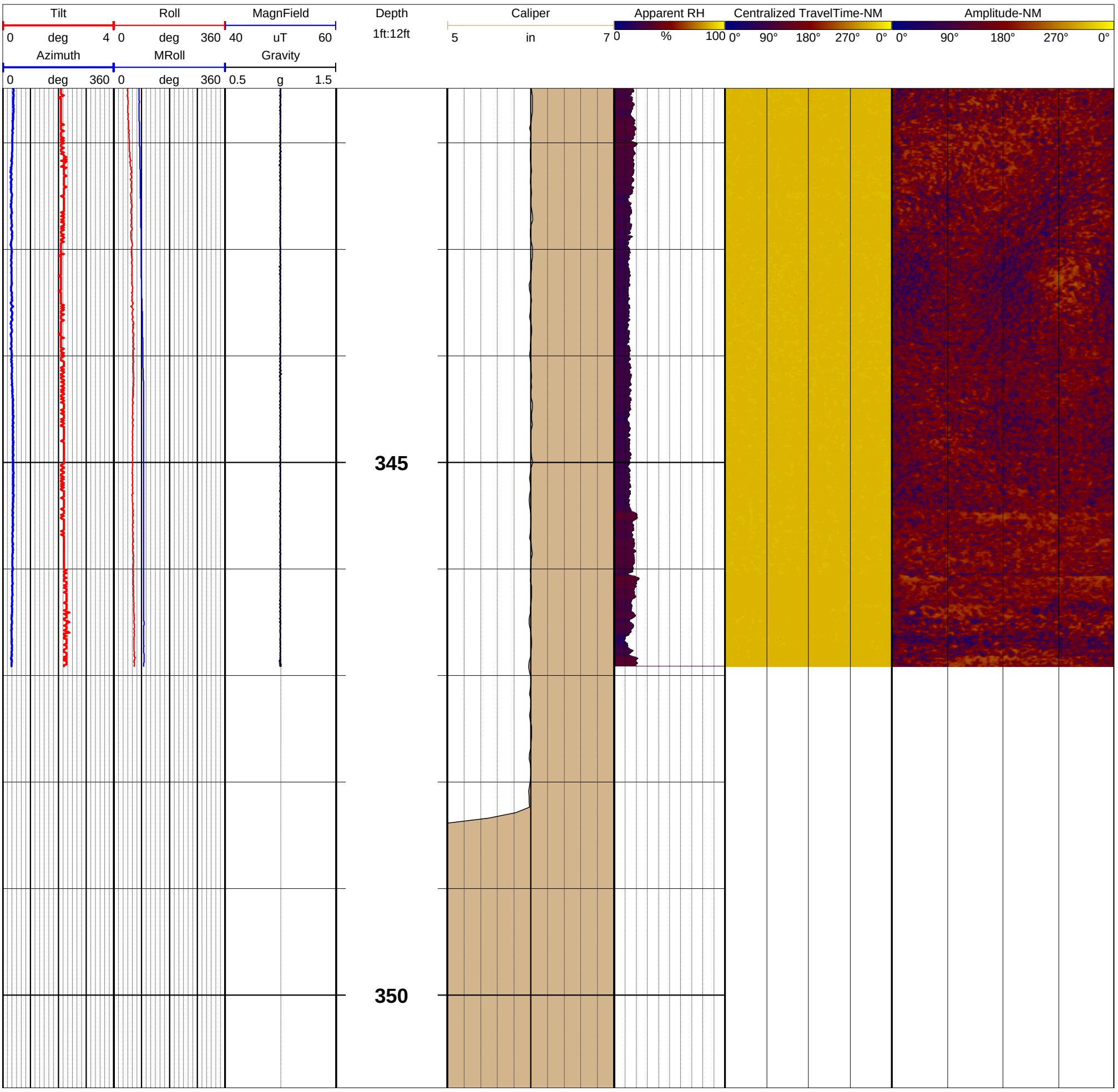
Azimuth
0 deg 360
MRoll
0 deg 360
Gravity
0.5 g 1.5
Depth
1ft:12ft
Caliper
5 in 7
Apparent RH
0 % 100
Centralized TravelTime-NM
0° 90° 180° 270° 0°
Amplitude-NM
0° 90° 180° 270° 0°
330
335
340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0 deg 4
Roll
0 deg 360
MagnField
40 uT 60
Azimuth
0 deg 360
MRoll
0 deg 360
Gravity
0.5 g 1.5
Depth
1ft:12ft
345
350
Caliper
5 in 7
Apparent RH
0 % 100
Centralized TravelTime-NM
0° 90° 180° 270° 0°
Amplitude-NM
0° 90° 180° 270° 0°

GEOPHYSICAL RECORD OF BOREHOLE: GSAP-MW39H

Plant Gorgas - CCR Delineation Wells

GOLDER

Project Number: 19131304

Client: Southern Company Services

Southern Company

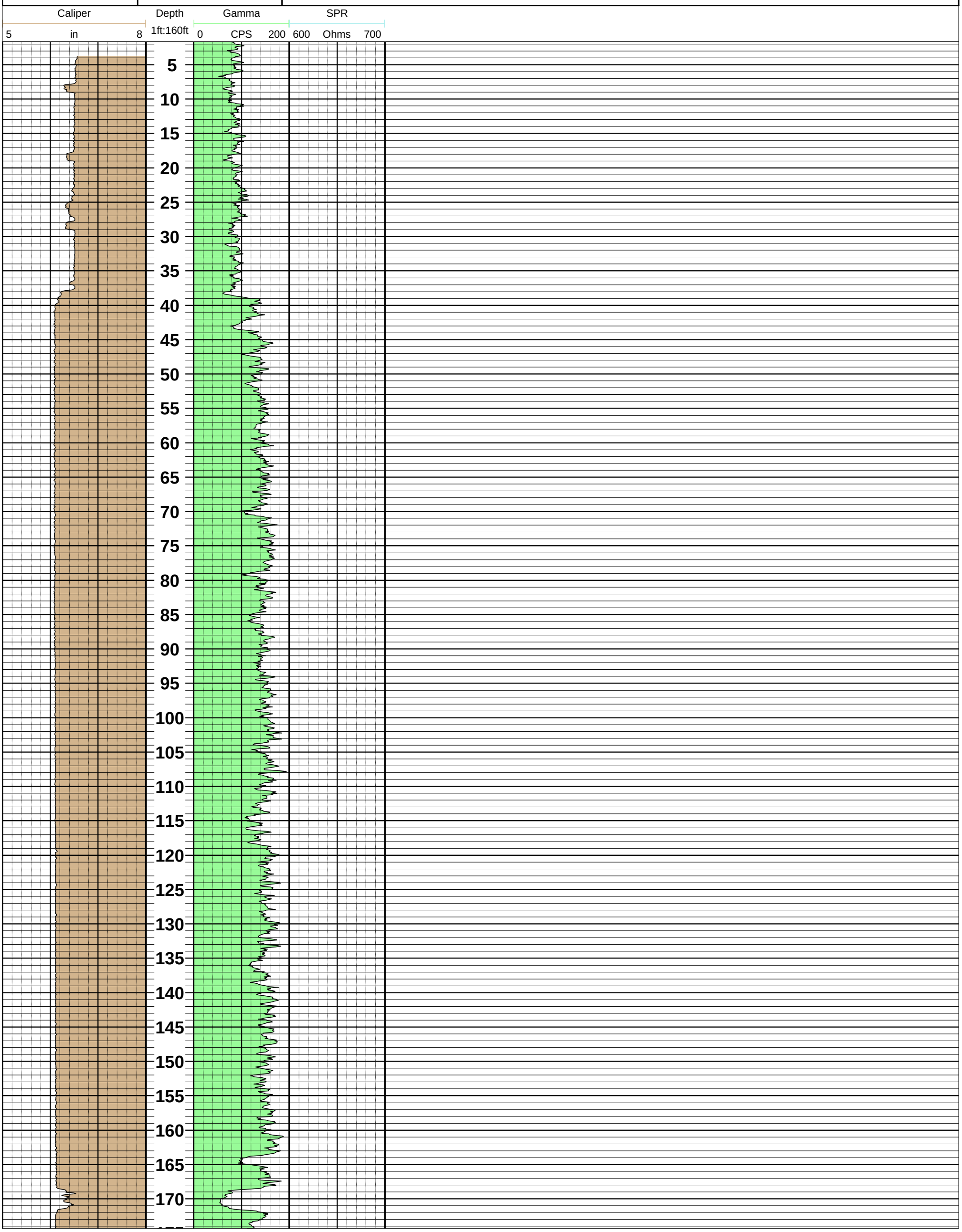
Date: 10-27-2019

Location: Parrish, Al	TOC Elev msl: na
Easting: na	Casing Stick-up: 1.58 ft ags
Northing: na	Casing Diameter: 6.625 in ID
Ground Elev msl: na	Casing Material: Steel HSA
Borehole Dip: vertical	Water Level: rising
Borehole Az: na	Logged By: CAB
Borehole Size: 6" AH	Log Depth Ref: Ground Surface
Drilled Depth: 350.5 ft BGS	Log Date: 10-27-2019
Drill Comp Date: 10-27-19	Image Plot(s) Ref: MN
Casing Depth: 38 ft bgs	Dip Referenced to Horizontal

Notes: +302 @ 14:45

Tools used were:
QL40-FTC sn 5518
QL40 Caliper sn 5521
40-LGR-Gamma & SPR sn 5809
ATV ABI40 sn162305






Caliper
5
in
8
Depth
1ft:160ft
Gamma
0
CPS
200
SPR
600
Ohms
700
175
180
185
190
195
200
205
210
215
220
225
230
235
240
245
250
255
260
265
270
275
280
285
290
295
300
305
310
315
320
325
330
335
340
345
350

GEOPHYSICAL RECORD OF BOREHOLE: GSAP-MW41H

Plant Gorgas - CCR Delineation Wells

GOLDER

Project Number: 19131304

Client: Southern Company Services

Southern Company

Date: 10-23-2019

Location: Parrish, Al	TOC Elev msl: na	Notes: 79.89' btc @ 12:45 10-23
Easting: na	Casing Stick-up: 1.5 ft ags	10/24 24.94' toc @ 10:17
Northing: na	Casing Diameter: 7 in ID	Tools used were:
Ground Elev msl: na	Casing Material: Steel-HSA	QL40-FTC sn 5518
Borehole Dip: vertical	Water Level: 23.44 ft bgs 10-24	QL40 Caliper sn 5521
Borehole Az: na	Logged By: CAB	40-LGR-Gamma & SPR sn 5809
Borehole Size: 6" AH	Log Depth Ref: Ground Surface	ATV ABI40 sn162305
Drilled Depth: 303 ft BGS	Log Date: 10/23-24/2019	
Drill Comp Date: 10-23-19	Image Plot(s) Ref: MN	
Casing Depth: 24 ft bgs	Dip Referenced to Horizontal	



Caliper: 5 in 8

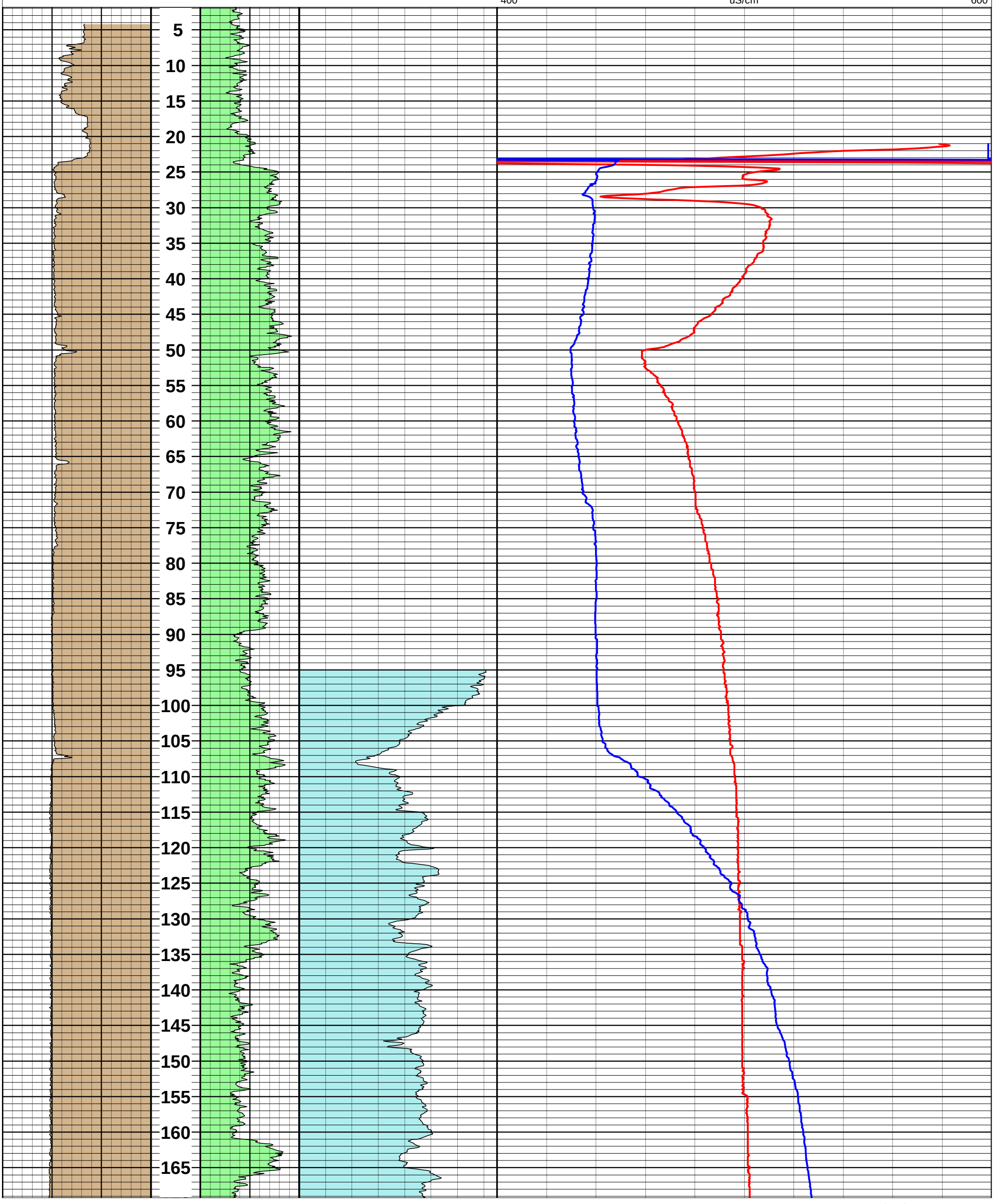
Depth: 1ft:160ft

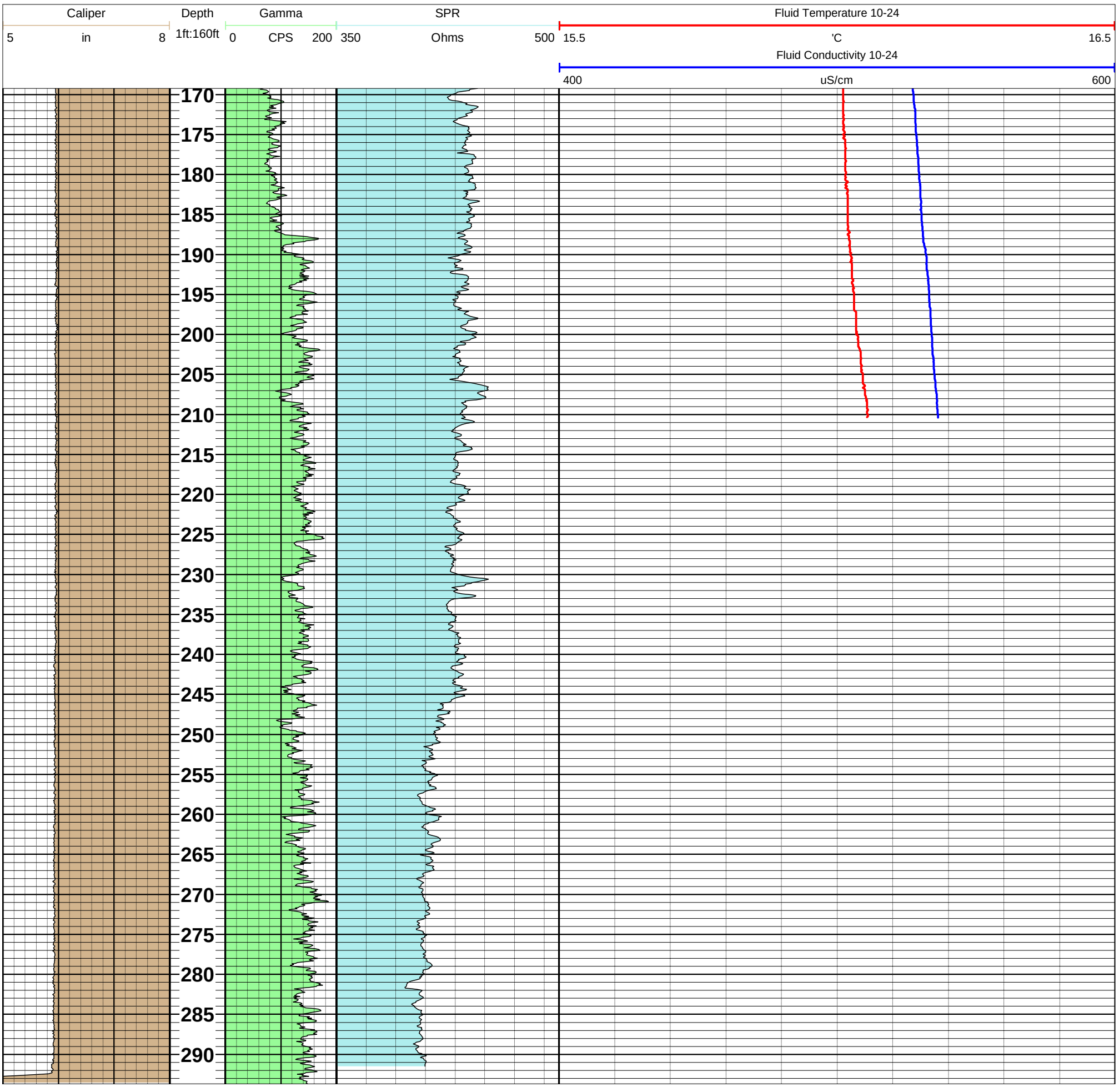
Gamma: 0 CPS 200

SPR: 350 Ohms 500

Fluid Temperature 10-24: 15.5 'C 16.5

Fluid Conductivity 10-24: 400 uS/cm 600




Caliper
5
in
8
Depth
1ft:160ft
Gamma
0
CPS
200
SPR
350
Ohms
500
Fluid Temperature 10-24
15.5
'C
16.5
Fluid Conductivity 10-24
400
uS/cm
600
170
175
180
185
190
195
200
205
210
215
220
225
230
235
240
245
250
255
260
265
270
275
280
285
290

GEOPHYSICAL RECORD OF BOREHOLE: GSAP-MW42H

Plant Gorgas - CCR Delineation Wells

GOLDER

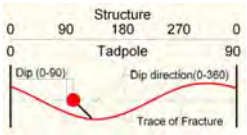
Project Number: 19131304

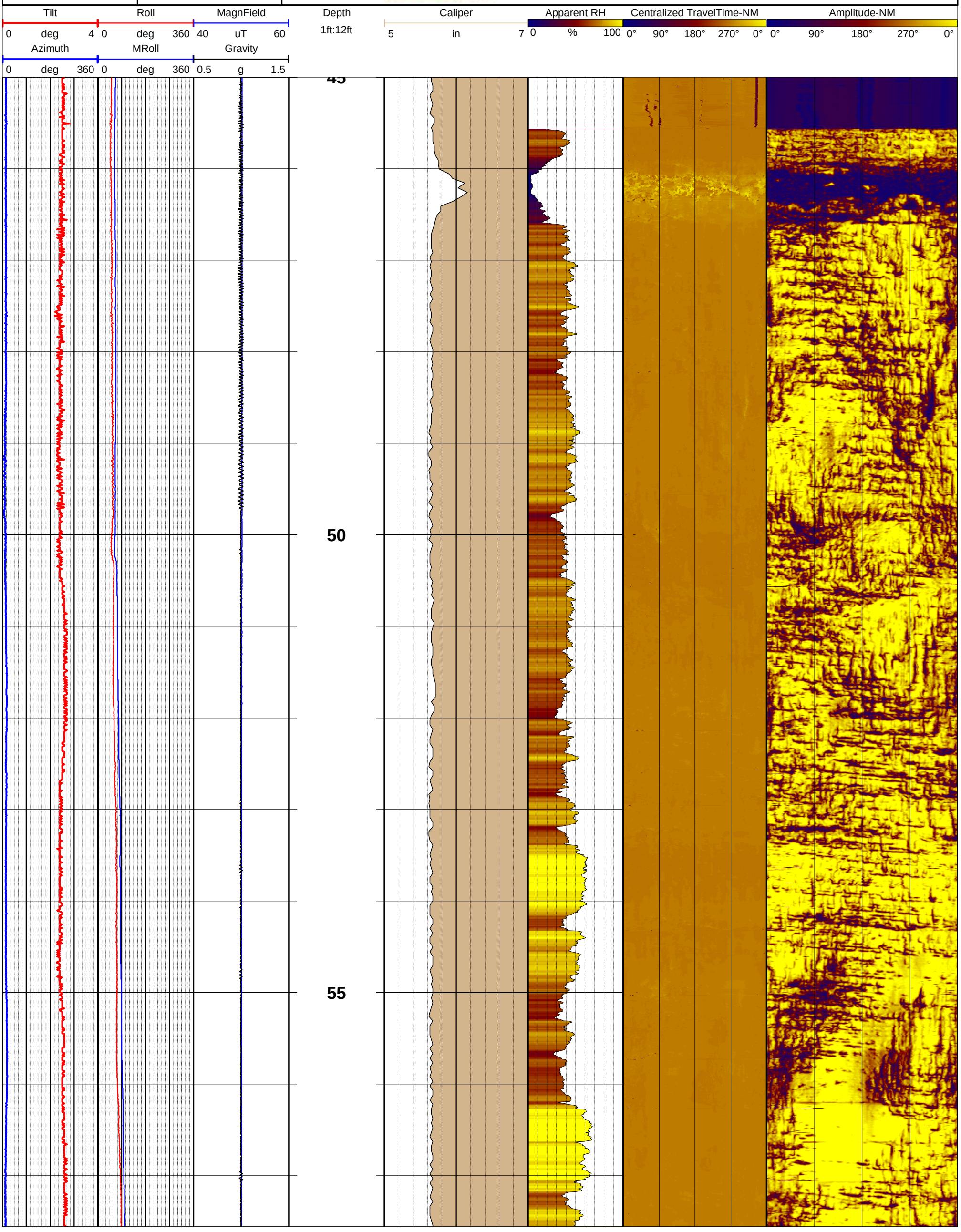
Client: Southern Company Services

Southern Company

Date: 11-6-2019

Location: Parrish, Al	TOC Elev msl: na	Notes: 46.25' Below top of Casing @ 15:00 11-5-2019
Easting: na	Casing Stick-up: 0.875 ft ags	
Northing: na	Casing Diameter: 6.625 in ID	Tools used were: QL40-FTC sn 5518 QL40 Caliper sn 5521 40-LGR-Gamma & SPR sn 5809 ATV ABI40 sn162305
Ground Elev msl: na	Casing Material: Steel HSA	
Borehole Dip: vertical	Water Level: 45.4 ft bgs 11-5	
Borehole Az: na	Logged By: CM	
Borehole Size: 6" AH	Log Depth Ref: Ground Surface	
Drilled Depth: 303 ft BGS	Log Date: 11/5-6/2019	
Drill Comp Date: 10-29-19	Image Plot(s) Ref: MN	
Casing Depth: 13 ft bgs	Dip Referenced to Horizontal	





Tilt
0 deg 4
Roll
0 deg 360
MagnField
40 uT 60
Azimuth
0 deg 360
MRoll
0 deg 360
Gravity
0.5 g 1.5

Depth
1ft:12ft

Caliper
5 in 7

Apparent RH
0 % 100

Centralized TravelTime-NM
0° 90° 180° 270° 0°

Amplitude-NM
0° 90° 180° 270° 0°

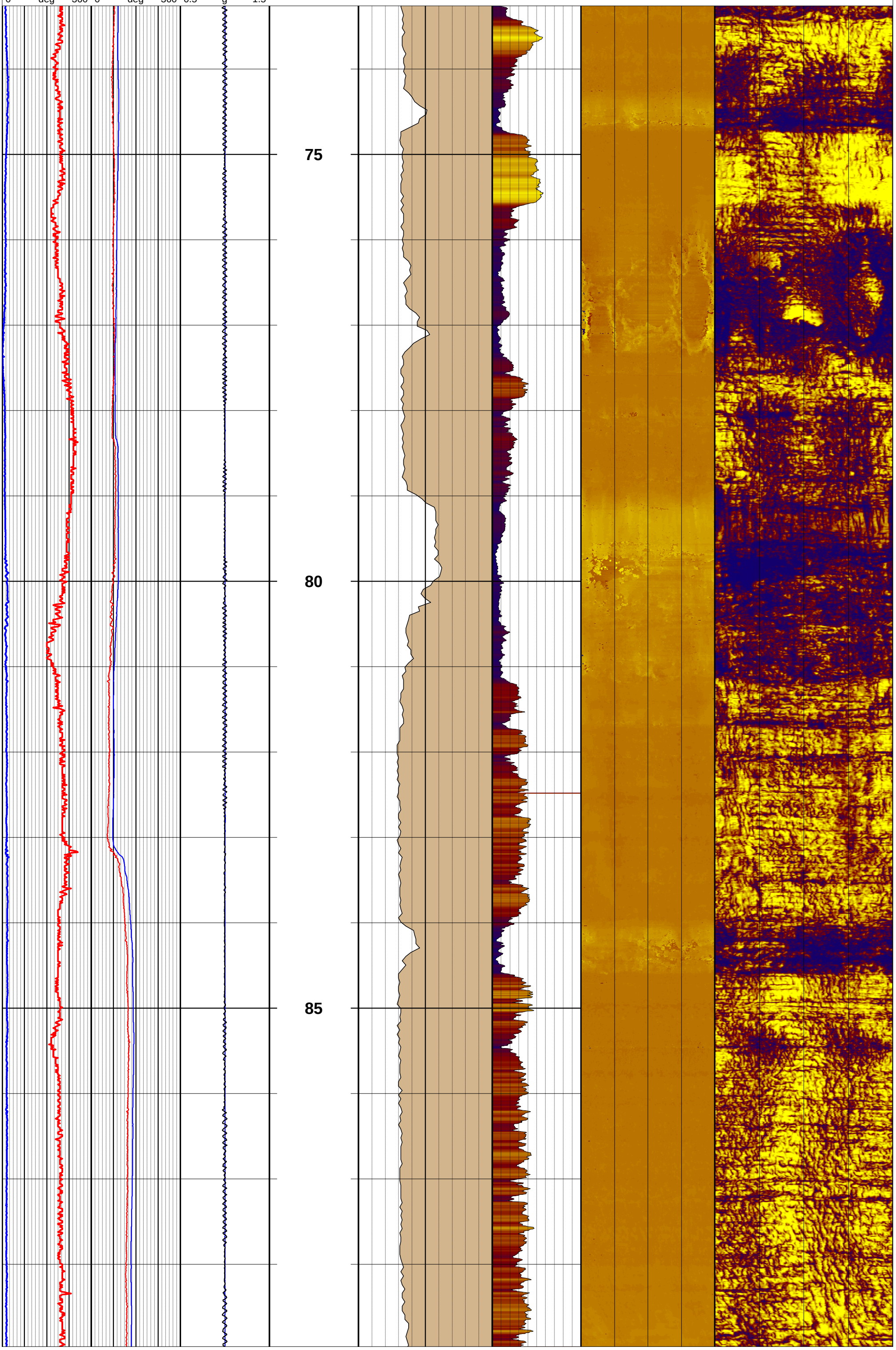
60

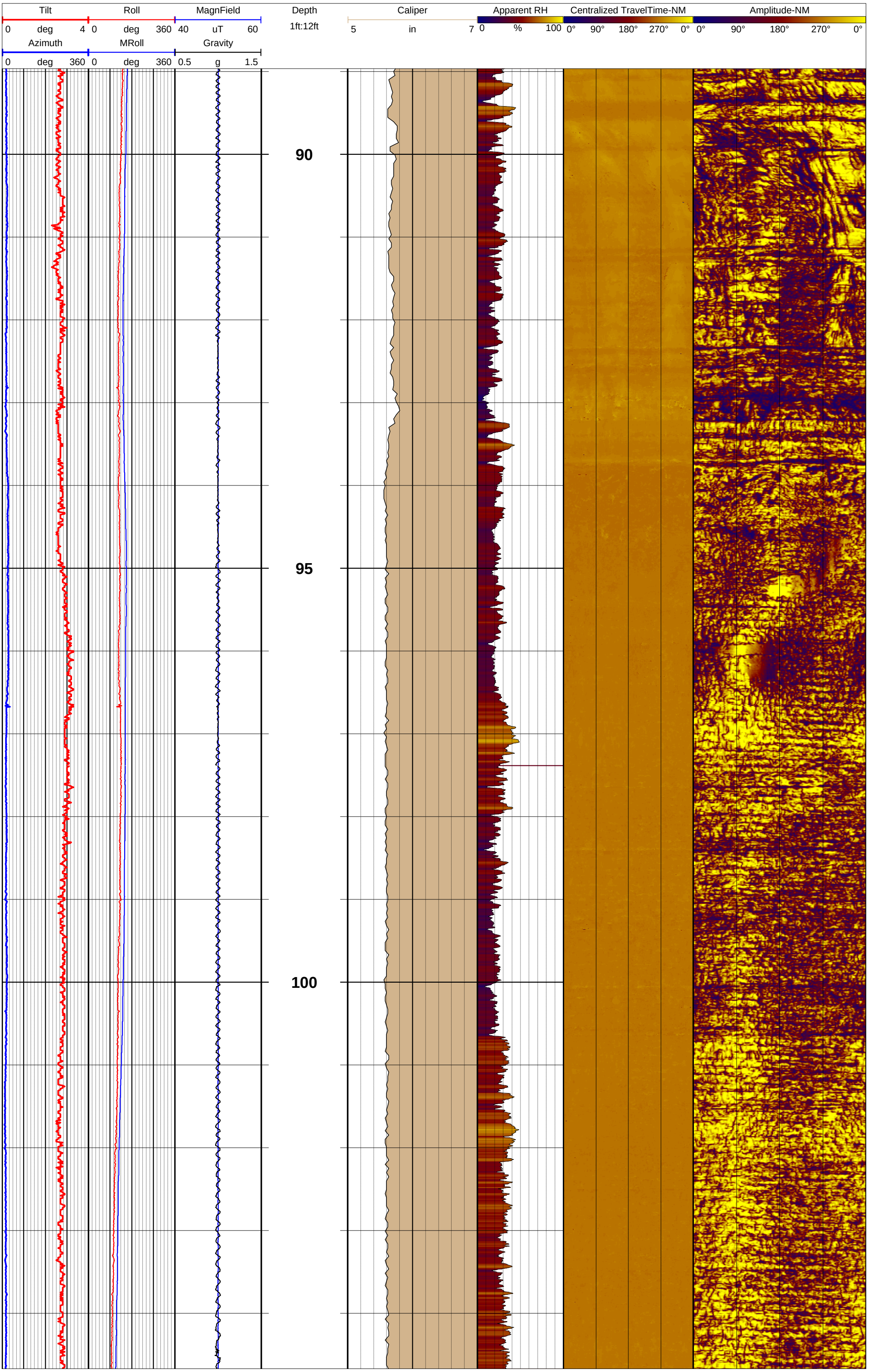
65

70

Tilt 0 deg 4 | Roll 0 deg 360 | MagnField 40 uT 60 | Depth 1ft:12ft | Caliper 5 in 7 | Apparent RH 0 % 100 | Centralized TravelTime-NM 0° 90° 180° 270° 0° | Amplitude-NM 0° 90° 180° 270° 0°

Azimuth 0 deg 360 | MRoll 0 deg 360 | Gravity 0.5 g 1.5

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MagnField
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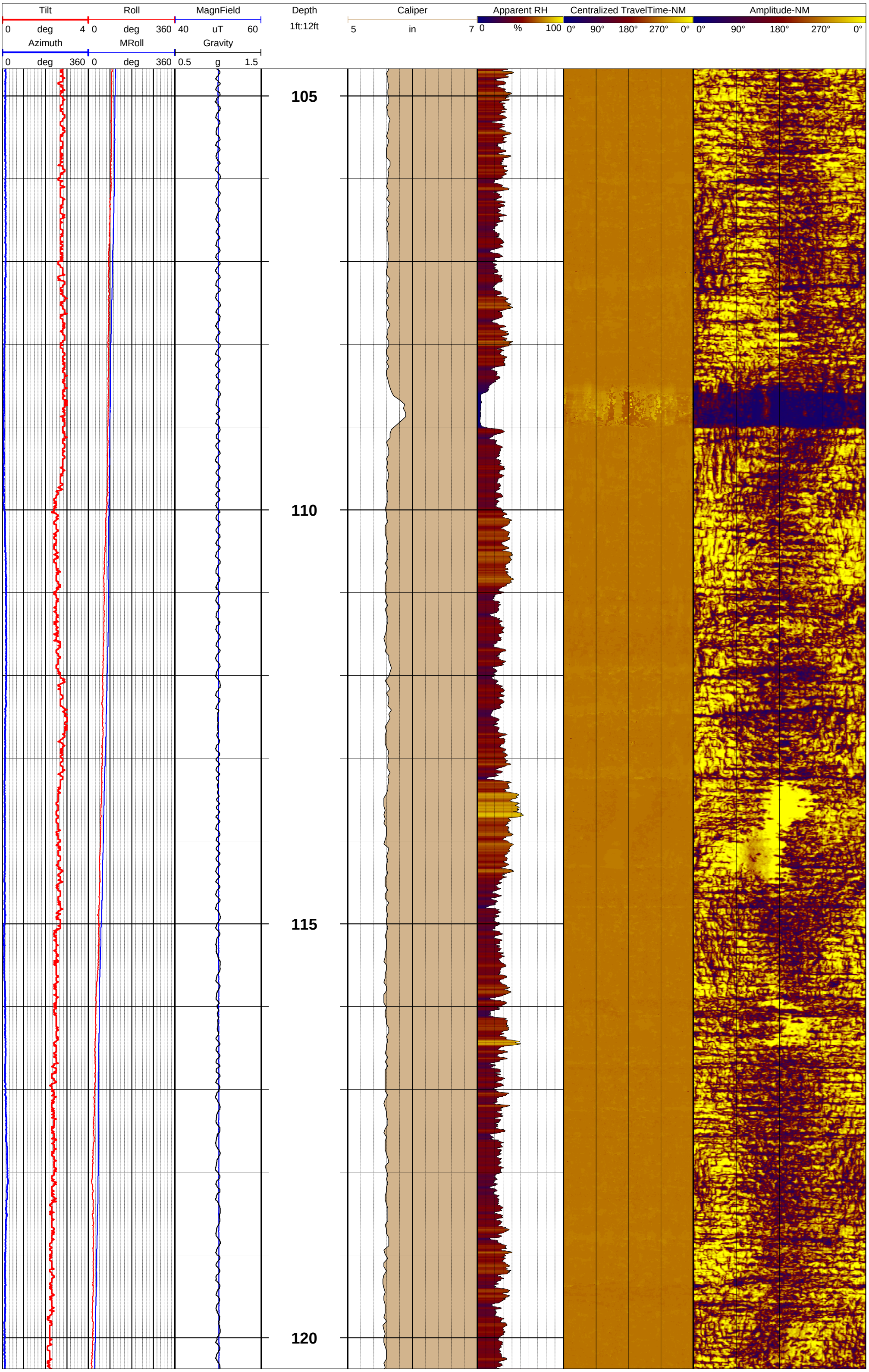
Azimuth
0 deg 360
MRoll
0 deg 360
Gravity
0.5 g 1.5
Depth
1ft:12ft
90
95
100
Caliper
5 in 7
Apparent RH
0 % 100
Centralized TravelTime-NM
0° 90° 180° 270° 0°
Amplitude-NM
0° 90° 180° 270° 0°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MRoll
0 deg 360
Gravity
0.5 g 1.5
Depth
1ft:12ft
105
110
115
120
Caliper
5 in 7
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0 % 100
Centralized TravelTime-NM
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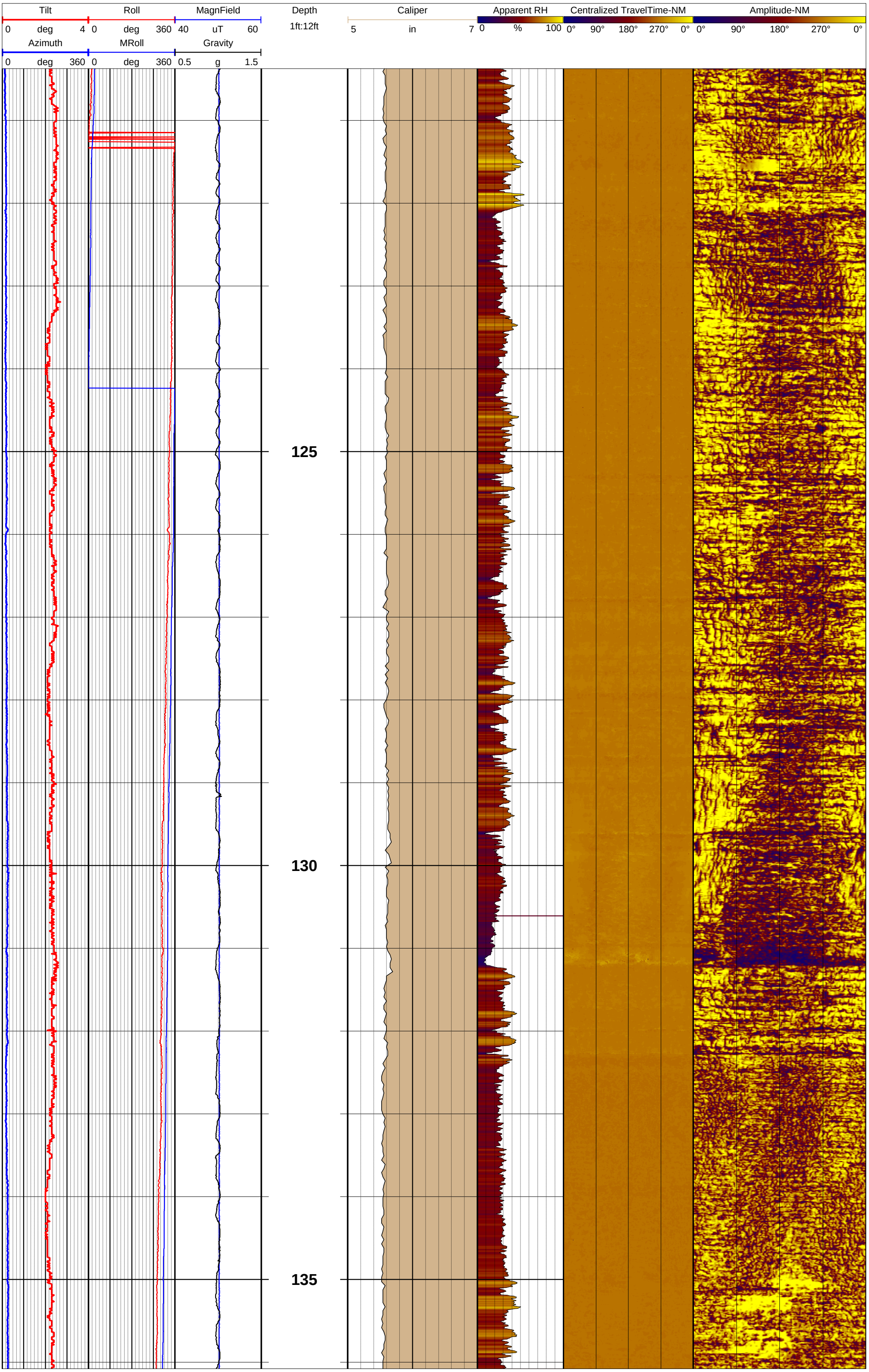
Amplitude-NM
0° 90° 180° 270° 0°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MagnField
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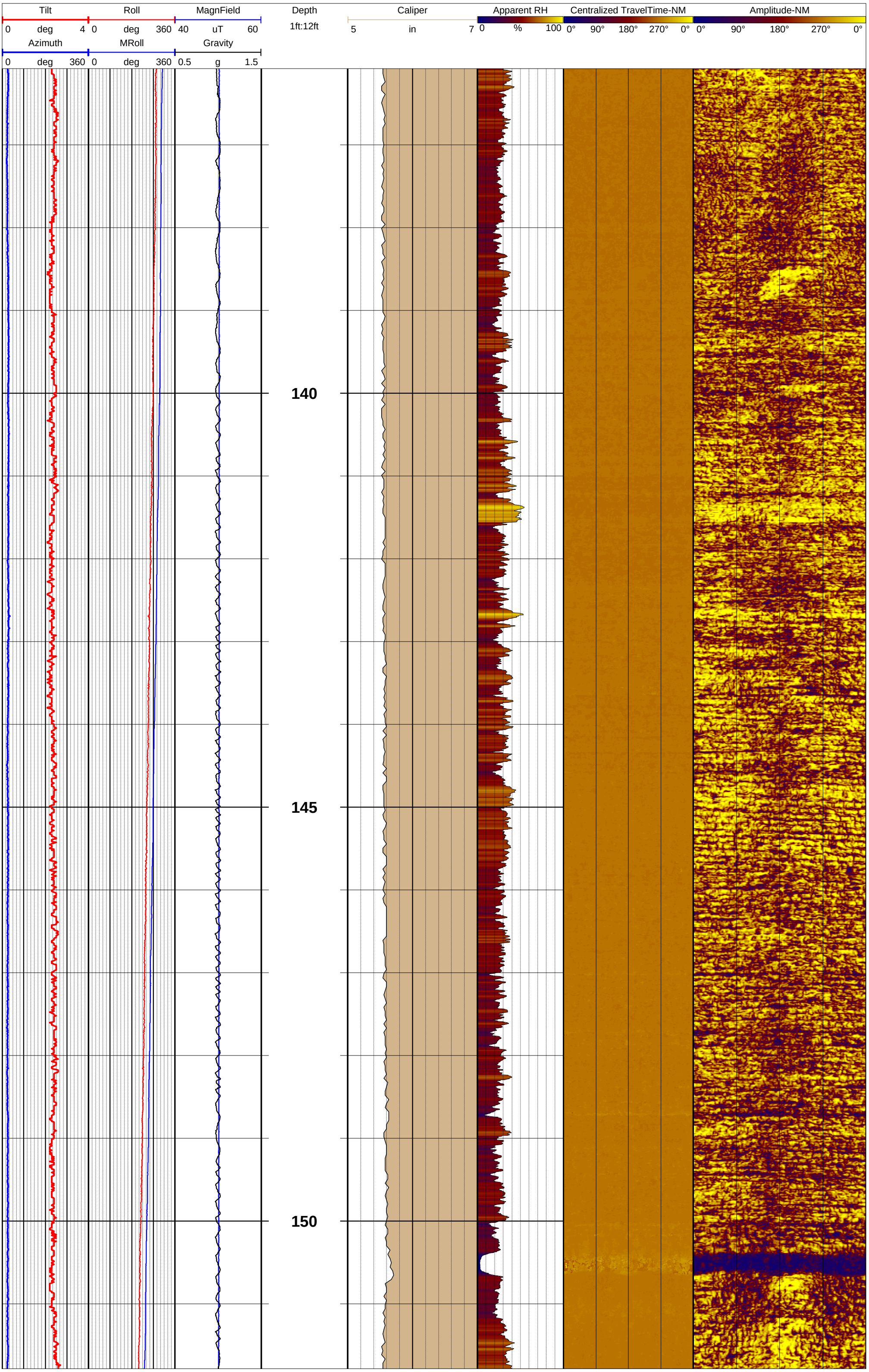
Azimuth
0 deg 360
MRoll
0 deg 360
Gravity
0.5 g 1.5
Depth
1ft:12ft
125
130
135
Caliper
5 in 7
Apparent RH
0 % 100
Centralized TravelTime-NM
0° 90° 180° 270° 0°
Amplitude-NM
0° 90° 180° 270° 0°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MRoll
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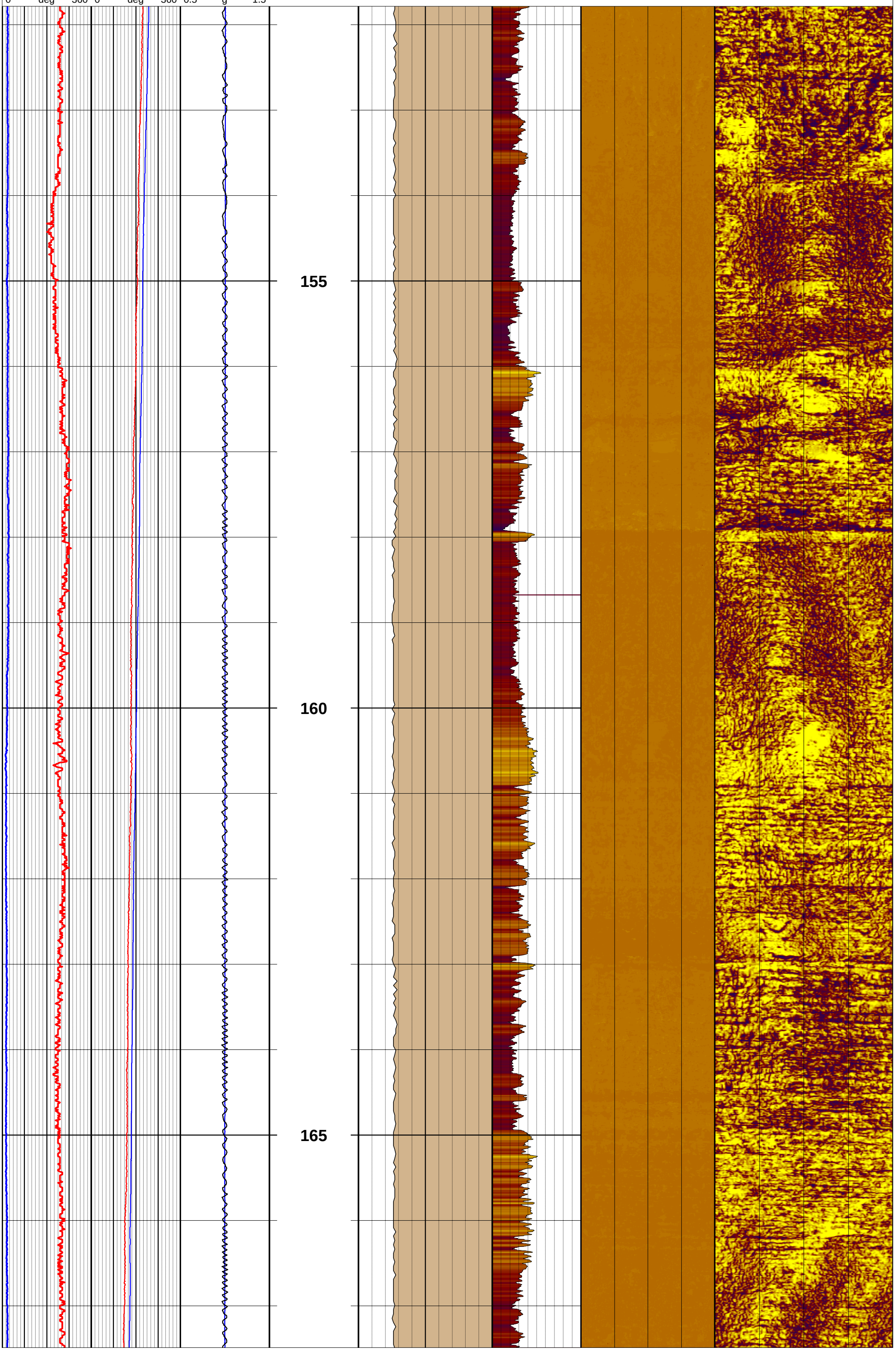
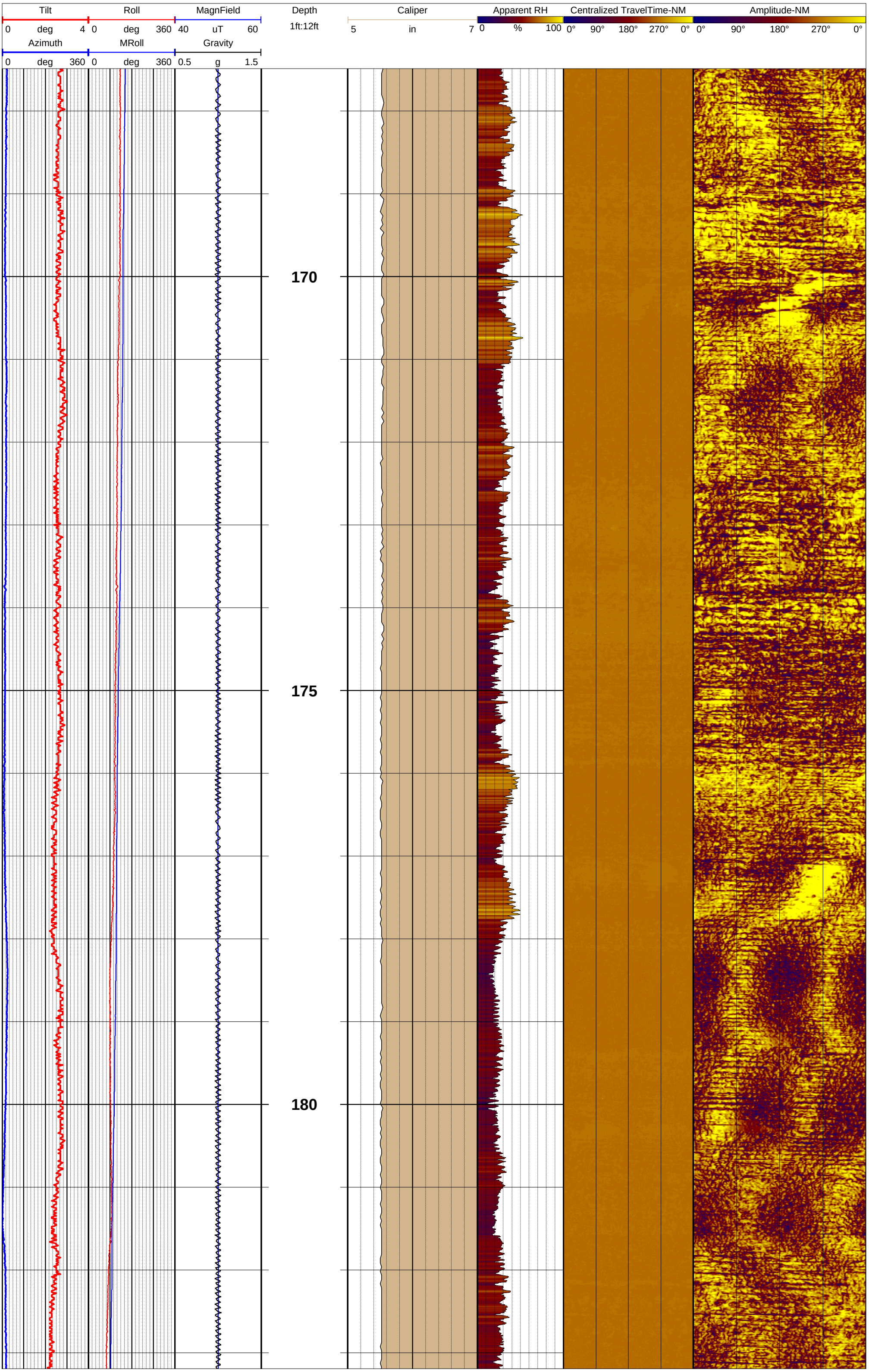
Gravity
0.5 g 1.5
Depth
1ft:12ft
Caliper
5 in 7
Apparent RH
0 % 100
Centralized TravelTime-NM
0° 90° 180° 270° 0°
Amplitude-NM
0° 90° 180° 270° 0°
140
145
150

Tilt 0 deg 4 | Roll 0 deg 360 | MagnField 40 uT 60 | Depth 1ft:12ft | Caliper 5 in 7 | Apparent RH 0 % 100 | Centralized TravelTime-NM 0° 90° 180° 270° 0° | Amplitude-NM 0° 90° 180° 270° 0°

Azimuth 0 deg 360 | MRoll 0 deg 360 | Gravity 0.5 g 1.5

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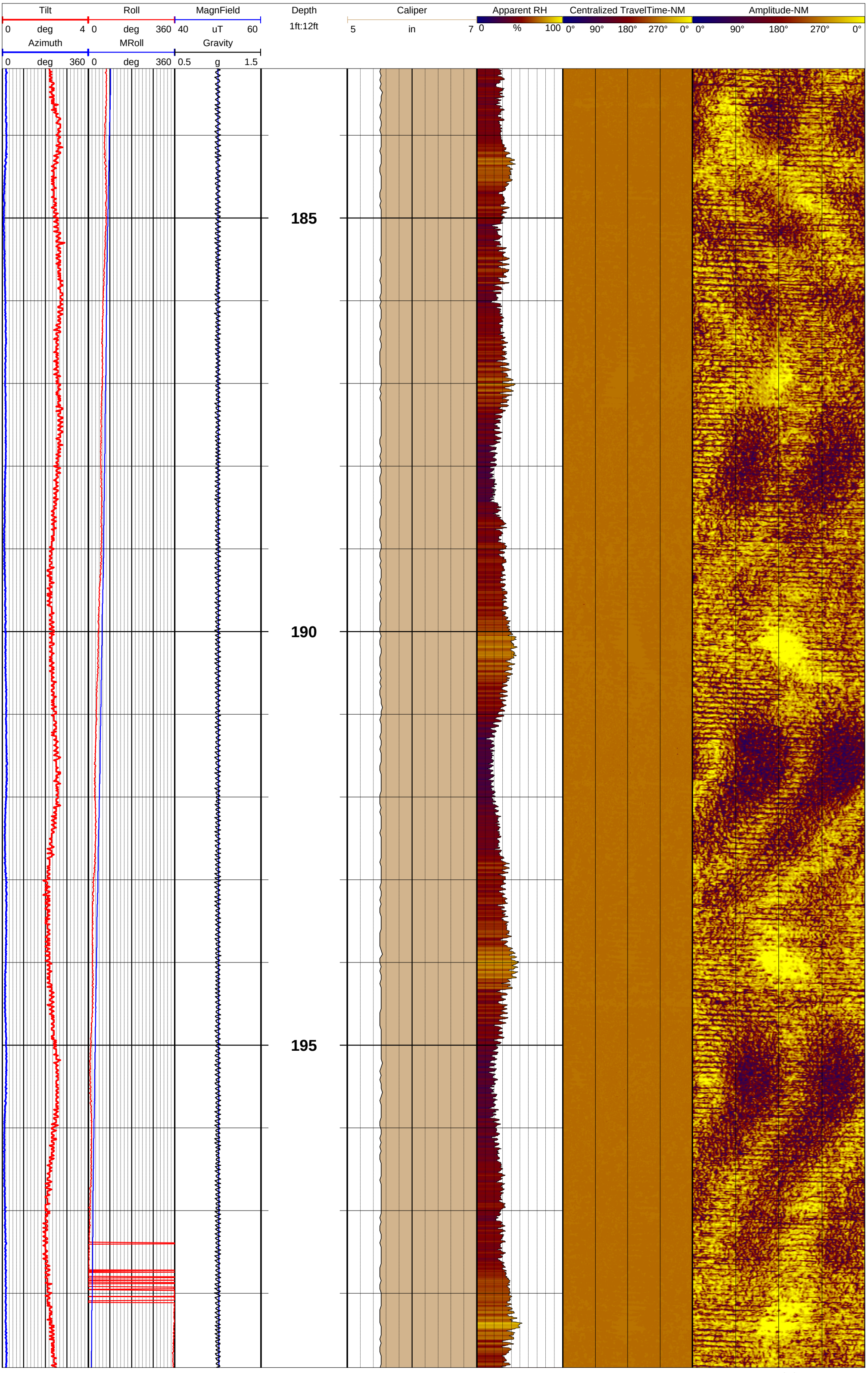
Roll
0 deg 360
MagnField
40 uT 60
Azimuth
0 deg 360
MRoll
0 deg 360
Gravity
0.5 g 1.5
Depth
1ft:12ft
Caliper
5 in 7
Apparent RH
0 % 100
Centralized TravelTime-NM
0° 90° 180° 270° 0°
Amplitude-NM
0° 90° 180° 270° 0°
170
175
180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MagnField
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Azimuth
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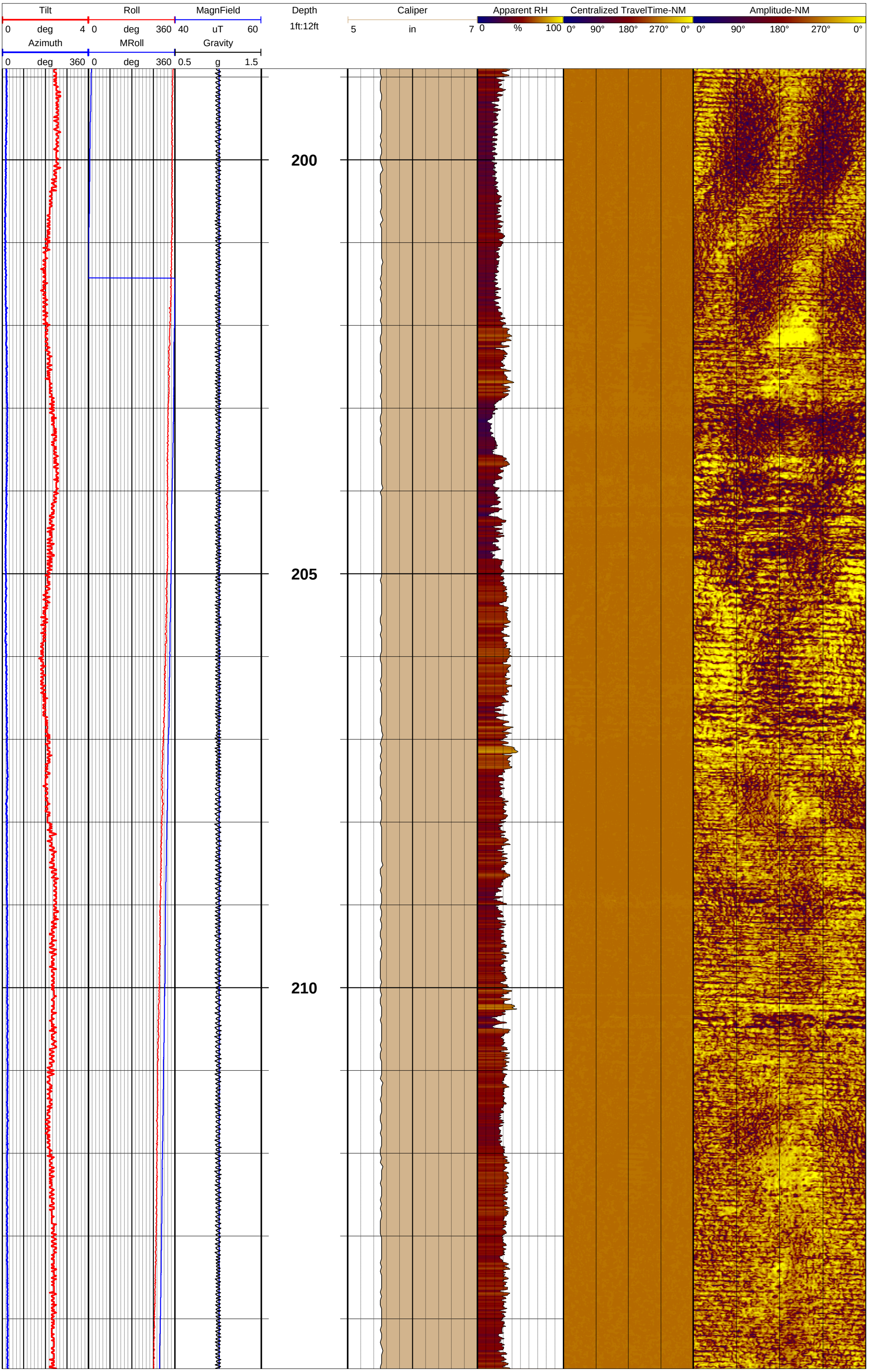
MRoll
0 deg 360
Gravity
0.5 g 1.5
Depth
1ft:12ft
185
190
195
Caliper
5 in 7
Apparent RH
0 % 100
Centralized TravelTime-NM
0° 90° 180° 270° 0°
Amplitude-NM
0° 90° 180° 270° 0°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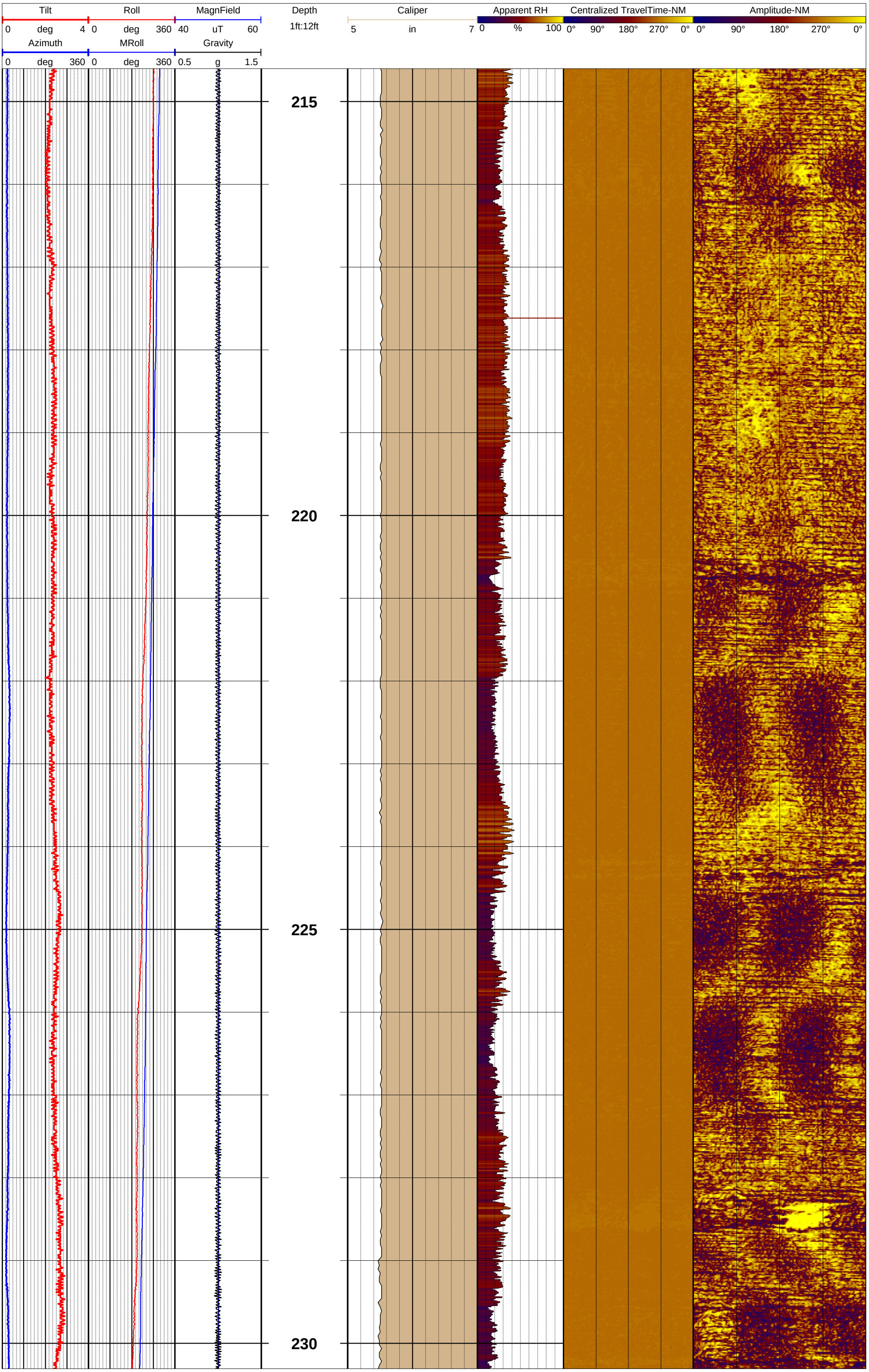
Depth
1ft:12ft
Caliper
5 in 7
Apparent RH
0 % 100
Centralized TravelTime-NM
0° 90° 180° 270° 0°
Amplitude-NM
0° 90° 180° 270° 0°
200
205
210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MRoll
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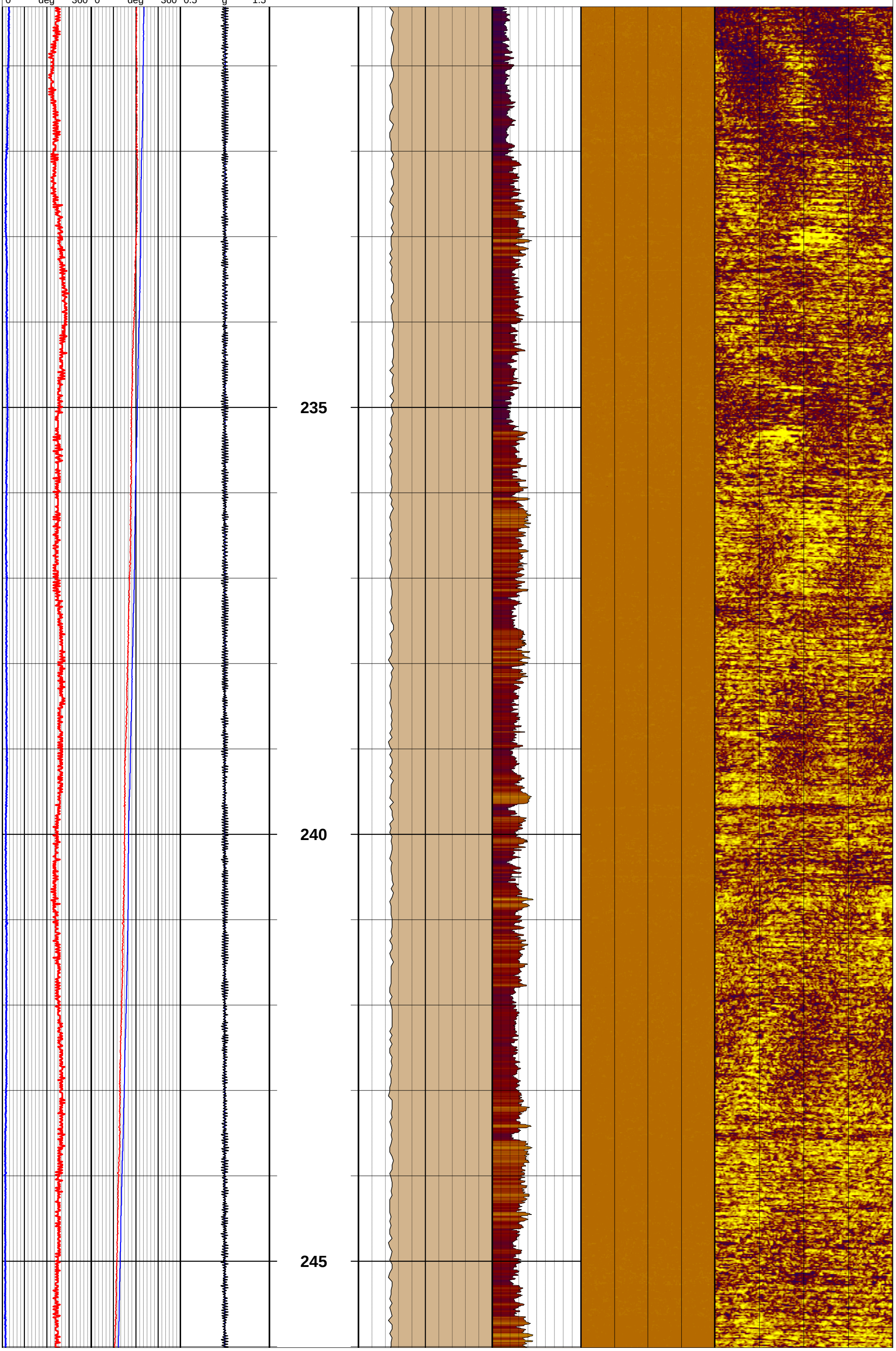
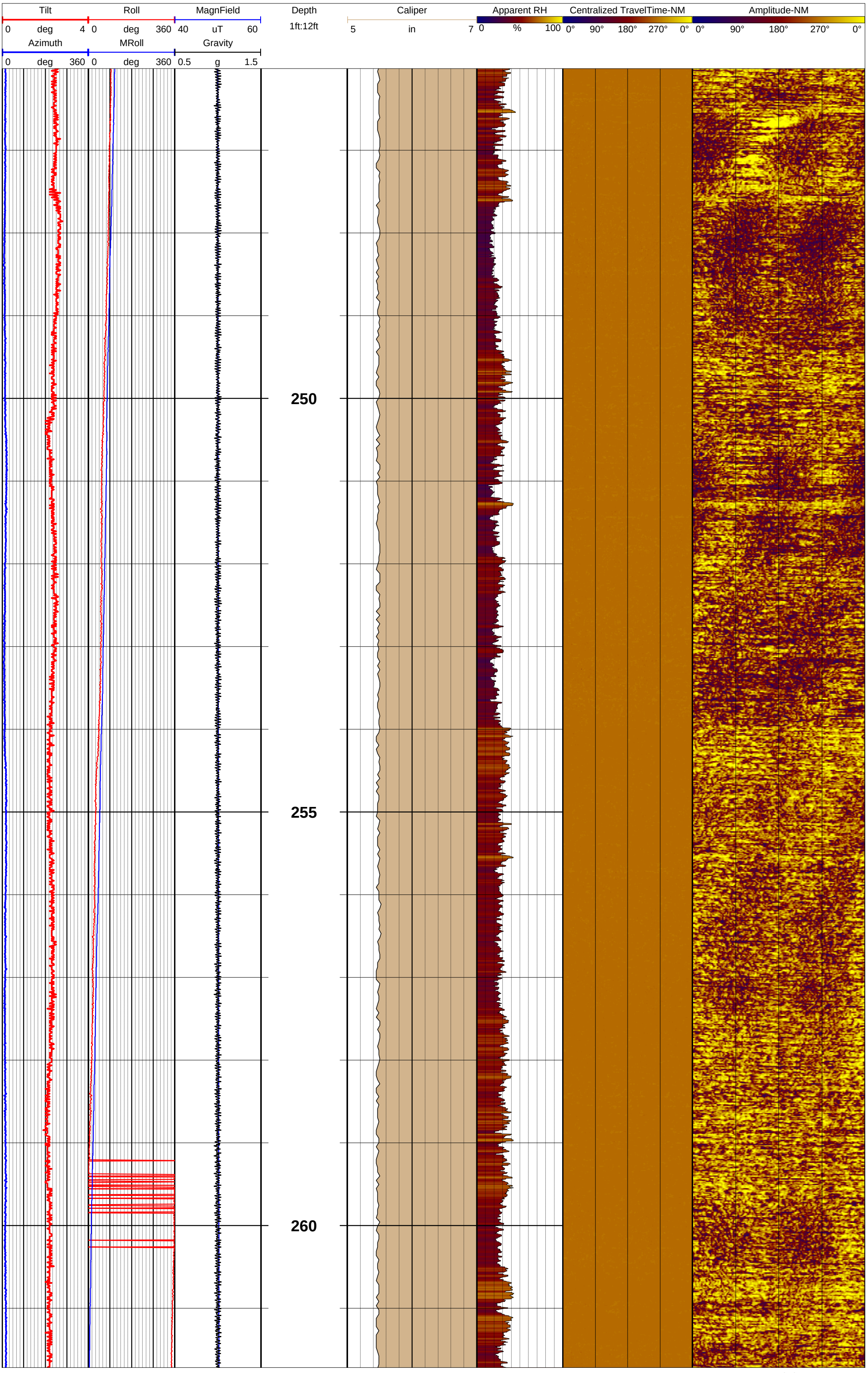
Depth
1ft:12ft
215
220
225
230
Caliper
5 in 7
Apparent RH
0 % 100
Centralized TravelTime-NM
0° 90° 180° 270° 0°
Amplitude-NM
0° 90° 180° 270° 0°

Tilt 0 deg 4 | Roll 0 deg 360 | MagnField 40 uT 60 | Depth 1ft:12ft | Caliper 5 in 7 | Apparent RH 0 % 100 | Centralized TravelTime-NM 0° 90° 180° 270° 0° | Amplitude-NM 0° 90° 180° 270° 0°

Azimuth 0 deg 360 | MRoll 0 deg 360 | Gravity 0.5 g 1.5

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Azimuth
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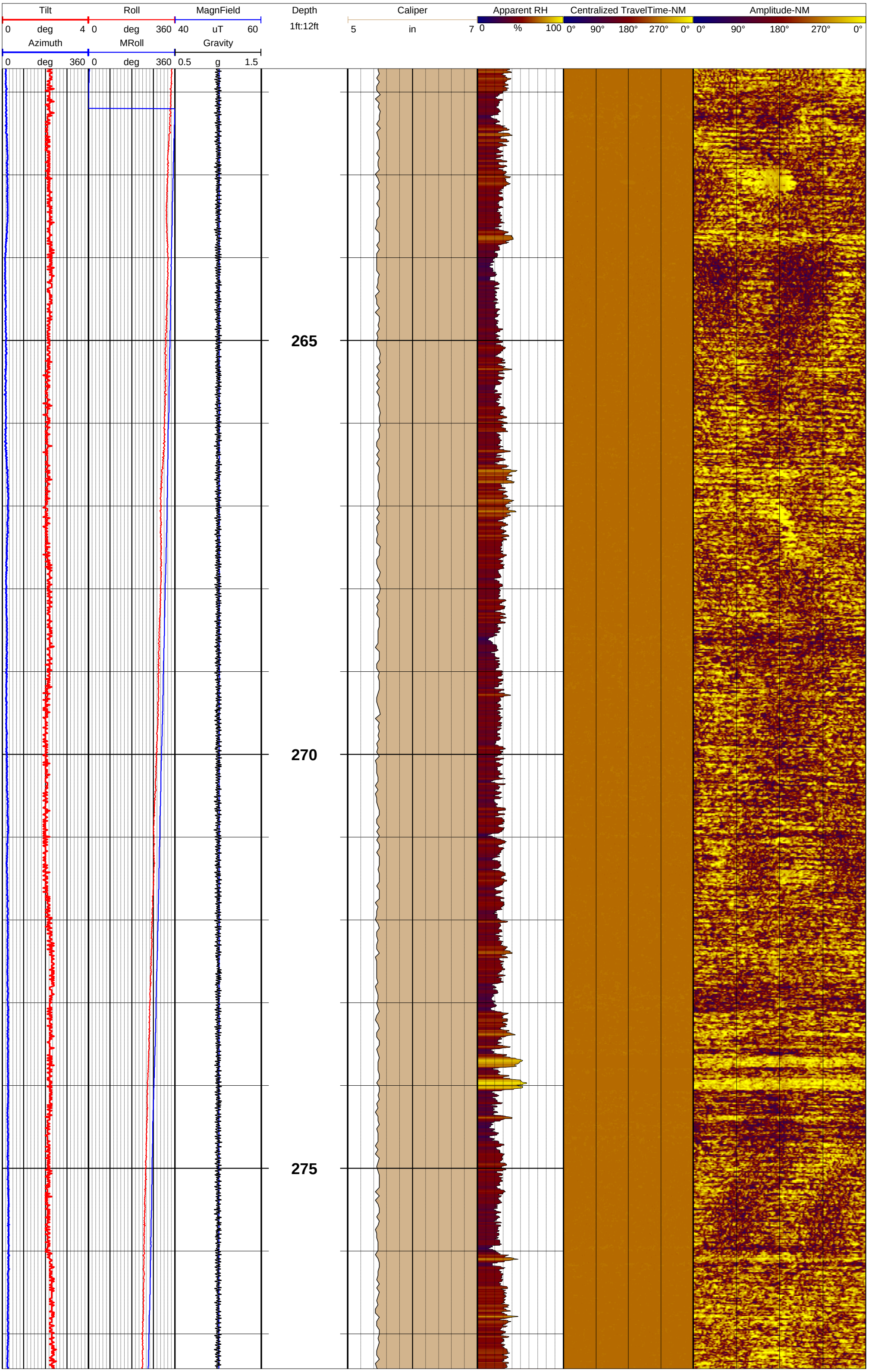
MRoll
0 deg 360
Gravity
0.5 g 1.5
Depth
1ft:12ft
Caliper
5 in 7
Apparent RH
0 % 100
Centralized TravelTime-NM
0° 90° 180° 270° 0°
Amplitude-NM
0° 90° 180° 270° 0°
250
255
260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Azimuth
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MRoll
0 deg 360
Gravity
0.5 g 1.5
Depth
1ft:12ft
Caliper
5 in 7
Apparent RH
0 % 100
Centralized TravelTime-NM
0° 90° 180° 270° 0°
Amplitude-NM
0° 90° 180° 270° 0°
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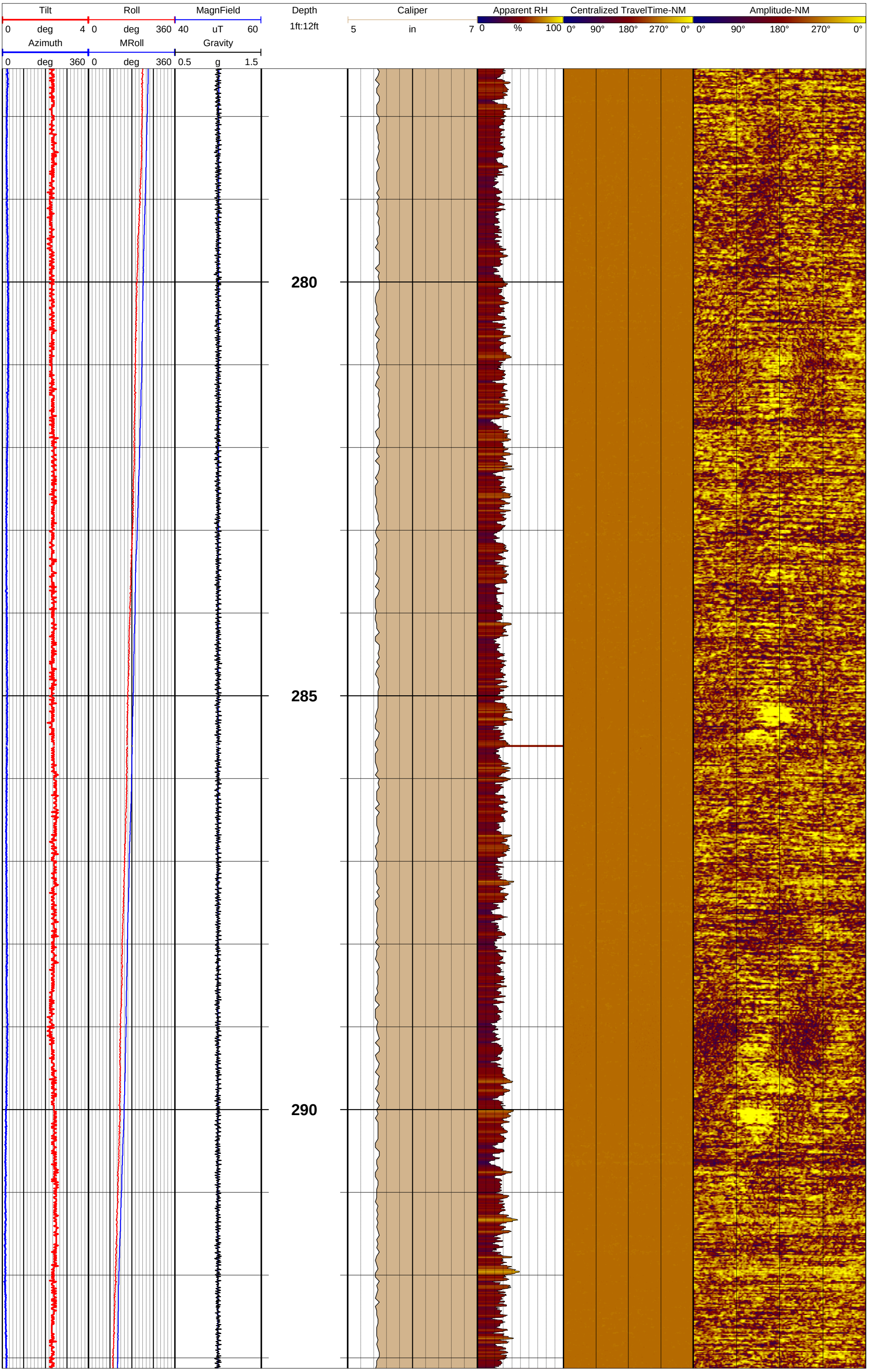
270
275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MagnField
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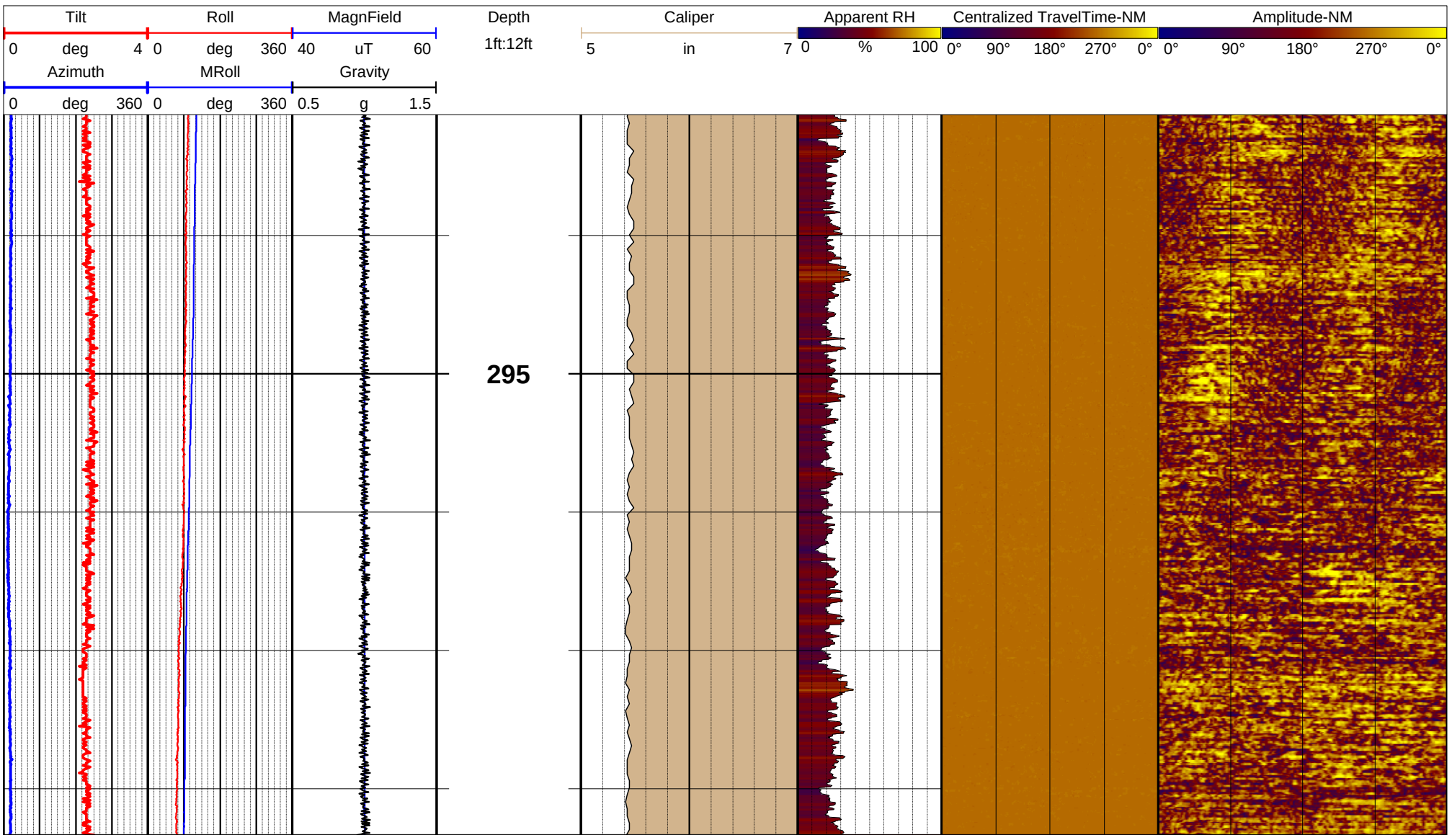
Azimuth
0 deg 360
MRoll
0 deg 360
Gravity
0.5 g 1.5
Depth
1ft:12ft
Caliper
5 in 7
Apparent RH
0 % 100
Centralized TravelTime-NM
0° 90° 180° 270° 0°
Amplitude-NM
0° 90° 180° 270° 0°
280
285
290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Roll
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Azimuth
0 deg 360
MRoll
0 deg 360
Gravity
0.5 g 1.5
Depth
1ft:12ft
295
Caliper
5 in 7
Apparent RH
0 % 100
Centralized TravelTime-NM
0° 90° 180° 270° 0°
Amplitude-NM
0° 90° 180° 270° 0°

GEOPHYSICAL RECORD OF BOREHOLE: GSAP-MW42H

Plant Gorgas - CCR Delineation Wells

GOLDER

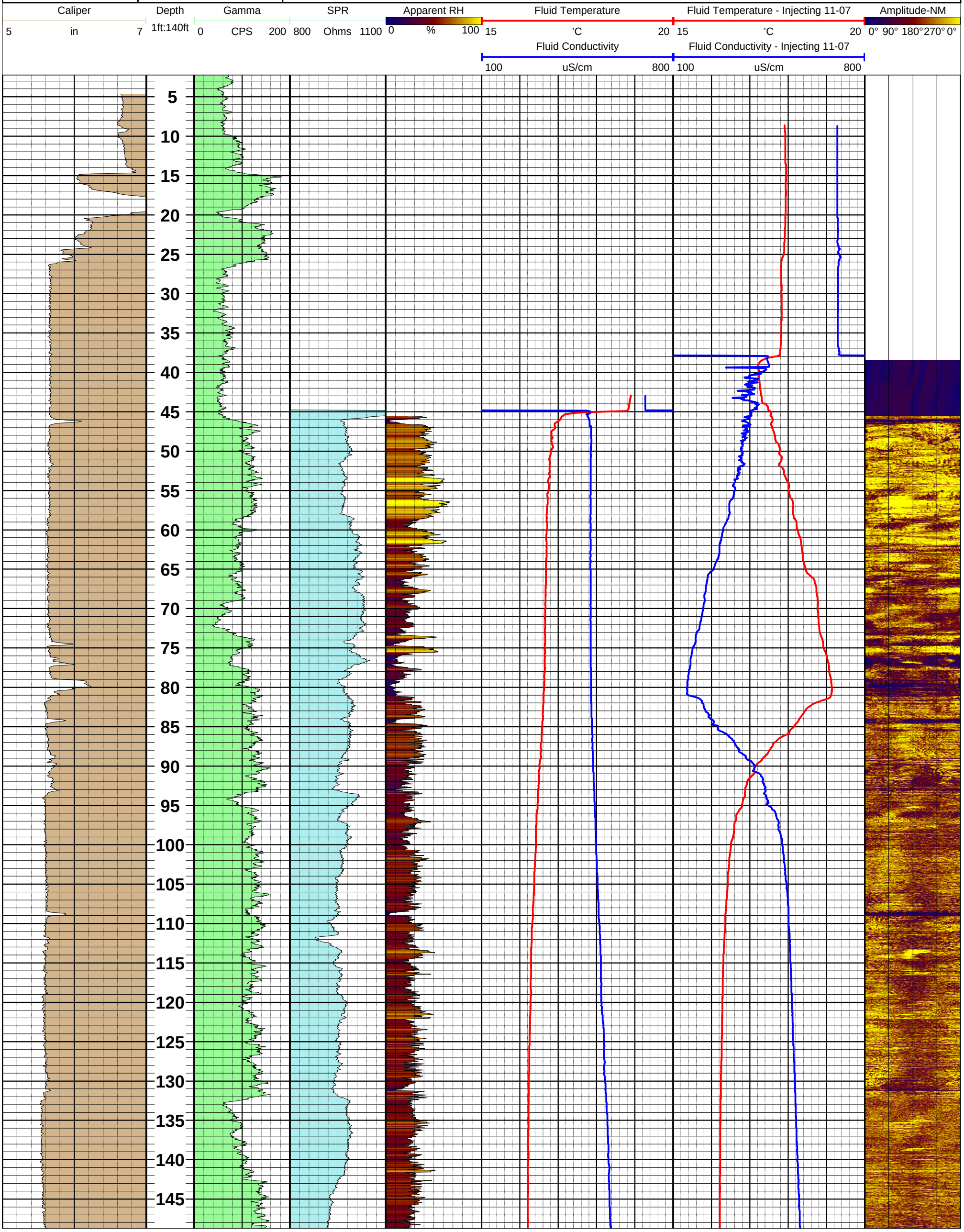
Project Number: 19131304

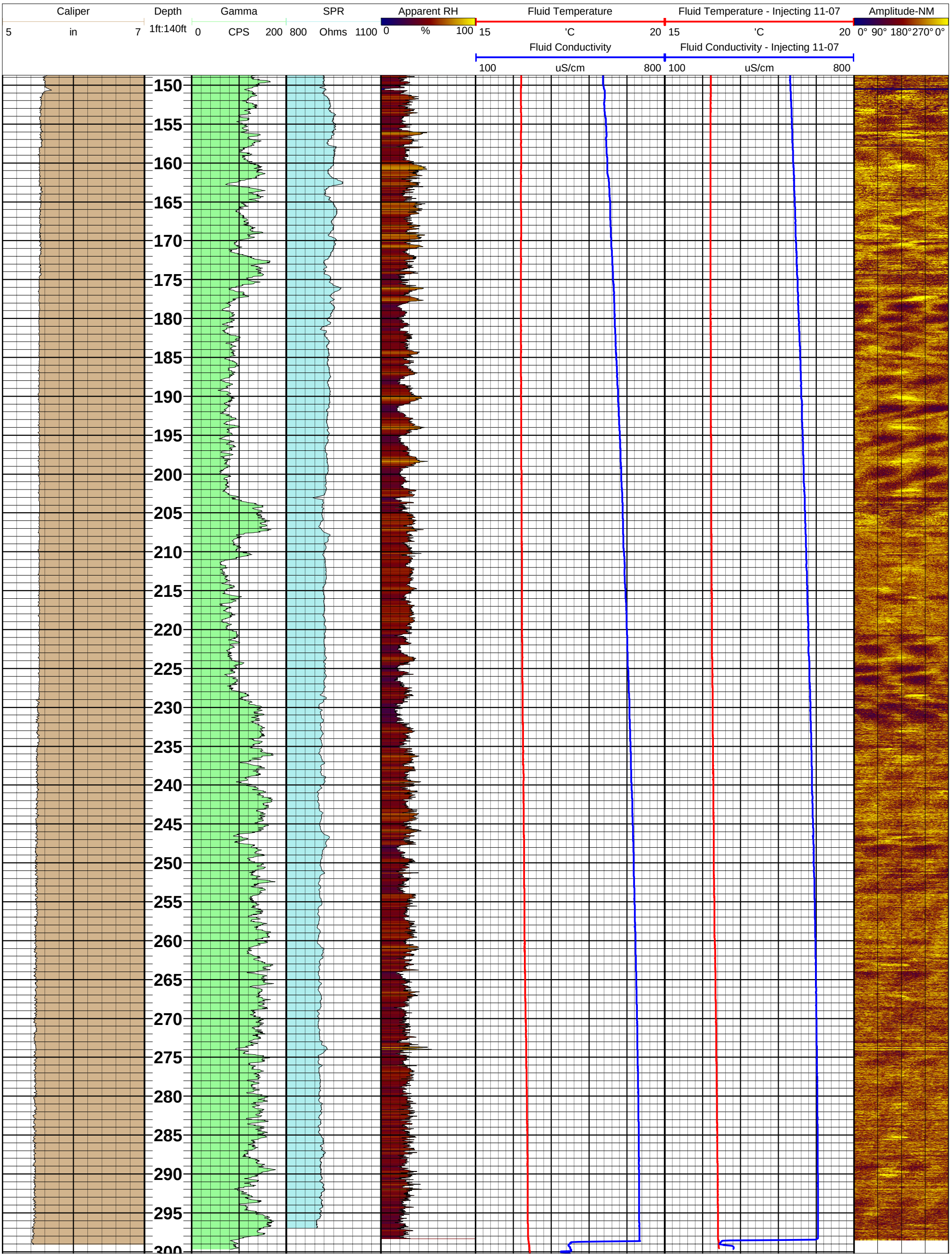
Client: Southern Company Services

Date: 11-7-2019

Location: Parrish, Al	TOC Elev msl: na	Notes: 46.25' Below top of Casing @ 15:00 11-5-2019
Easting: na	Casing Stick-up: 0.875 ft ags	Tools used were:
Northing: na	Casing Diameter: 6.625 in ID	QL40-FTC sn 5518
Ground Elev msl: na	Casing Material: Steel-HSA	QL40 Caliper sn 5521
Borehole Dip: vertical	Water Level: 45.4 ft bgs 11-5	40-LGR-Gamma & SPR sn 5809
Borehole Az: na	Logged By: CM	ATV ABI40 sn162305
Borehole Size: 6" AH	Log Depth Ref: Ground Surface	
Drilled Depth: 303 ft BGS	Log Date: 11/5-7/2019	
Drill Comp Date: 10-29-19	Image Plot(s) Ref: MN	
Casing Depth: 13 ft bgs	Dip Referenced to Horizontal	






Caliper
5
in
7
Depth
1ft:140ft
Gamma
0
CPS
200
SPR
800
Ohms
1100
Apparent RH
0
%
100
Fluid Temperature
15
'C
20
Fluid Temperature - Injecting 11-07
15
'C
20
Amplitude-NM
0° 90° 180° 270° 0°
Fluid Conductivity
100
uS/cm
800
Fluid Conductivity - Injecting 11-07
100
uS/cm
800
150
155
160
165
170
175
180
185
190
195
200
205
210
215
220
225
230
235
240
245
250
255
260
265
270
275
280
285
290
295
300

GEOPHYSICAL RECORD OF BOREHOLE: GSAP-MW43HO

Plant Gorgas - CCR Delineation Wells

GOLDER

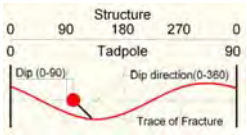
Project Number: 19131304

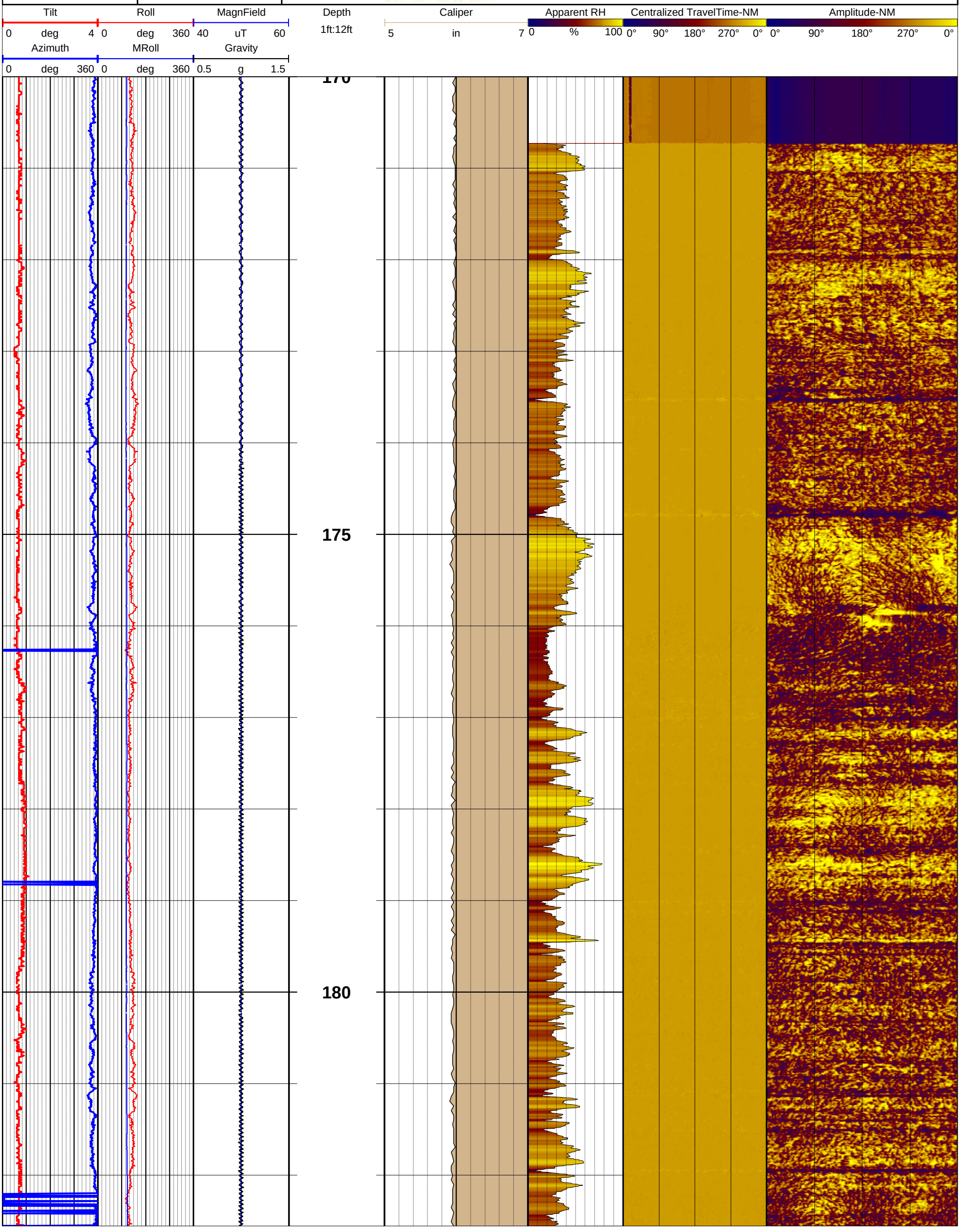
Client: Southern Company Services

Southern Company

Date: 11-12-2019

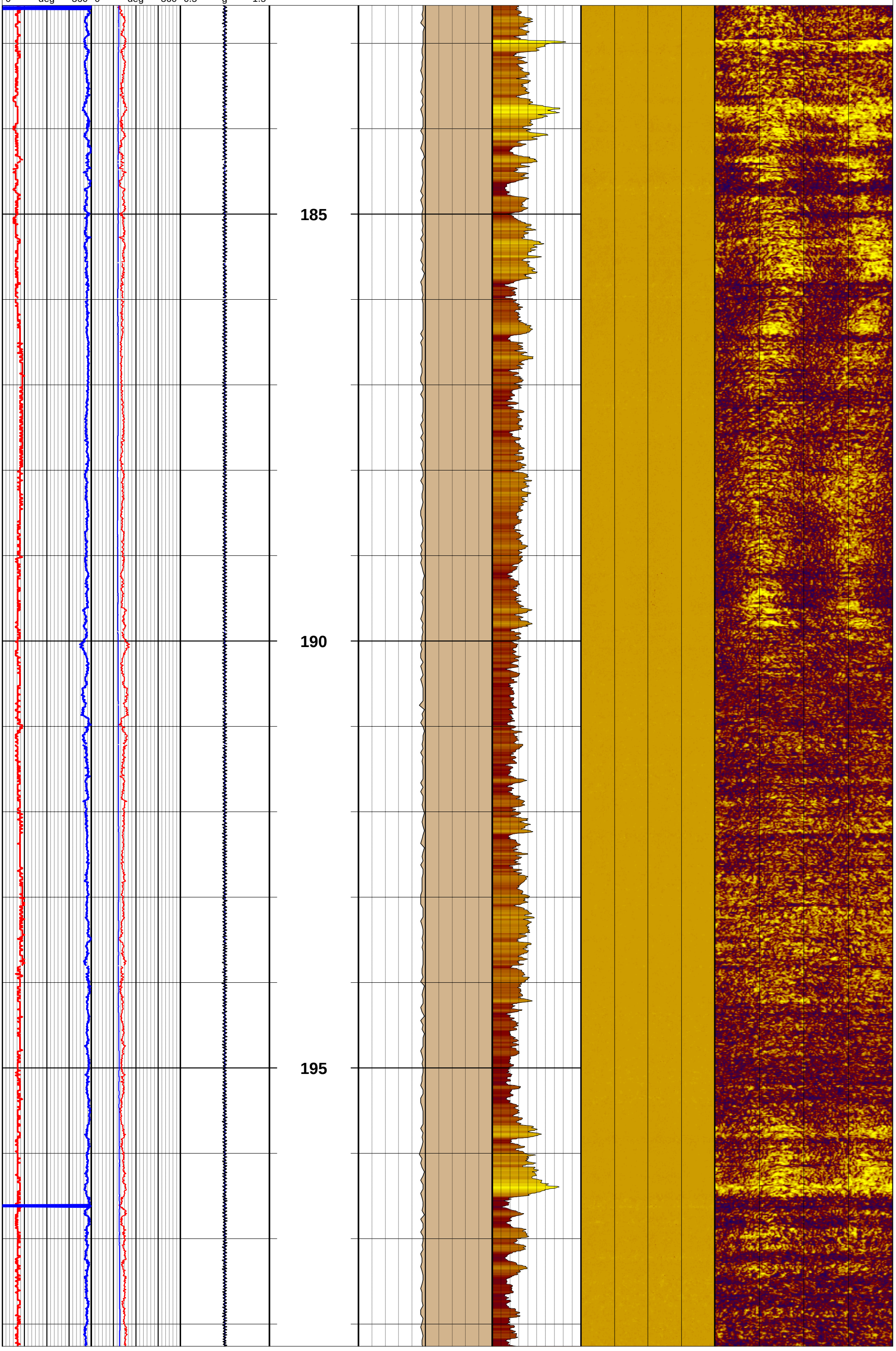
Location: Parrish, Al	TOC Elev msl: na	Notes: 182.87' @ 8:30 11/12/2019 rising
Easting: na	Casing Stick-up: 1.6 ft ags	
Northing: na	Casing Diameter: 6.625 in ID	Tools used were: QL40-FTC sn 5518 QL40 Caliper sn 5521 40-LGR-Gamma & SPR sn 5809 ATV ABI40 sn162305
Ground Elev msl: na	Casing Material: Steel	
Borehole Dip: vertical	Water Level: 181.3 ft bgs	
Borehole Az: na	Logged By: CM	
Borehole Size: 6" AH	Log Depth Ref: Ground Surface	
Drilled Depth: 300.5 ft BGS	Log Date: 11/12/2019	
Drill Comp Date: 11-11-19	Image Plot(s) Ref: MN	
Casing Depth: 18 ft bgs	Dip Referenced to Horizontal	





Tilt 0 deg 4 | Roll 0 deg 360 | MagnField 40 uT 60 | Depth 1ft:12ft | Caliper 5 in 7 | Apparent RH 0 % 100 | Centralized TravelTime-NM 0° 90° 180° 270° 0° | Amplitude-NM 0° 90° 180° 270° 0°

Azimuth 0 deg 360 | MRoll 0 deg 360 | Gravity 0.5 g 1.5



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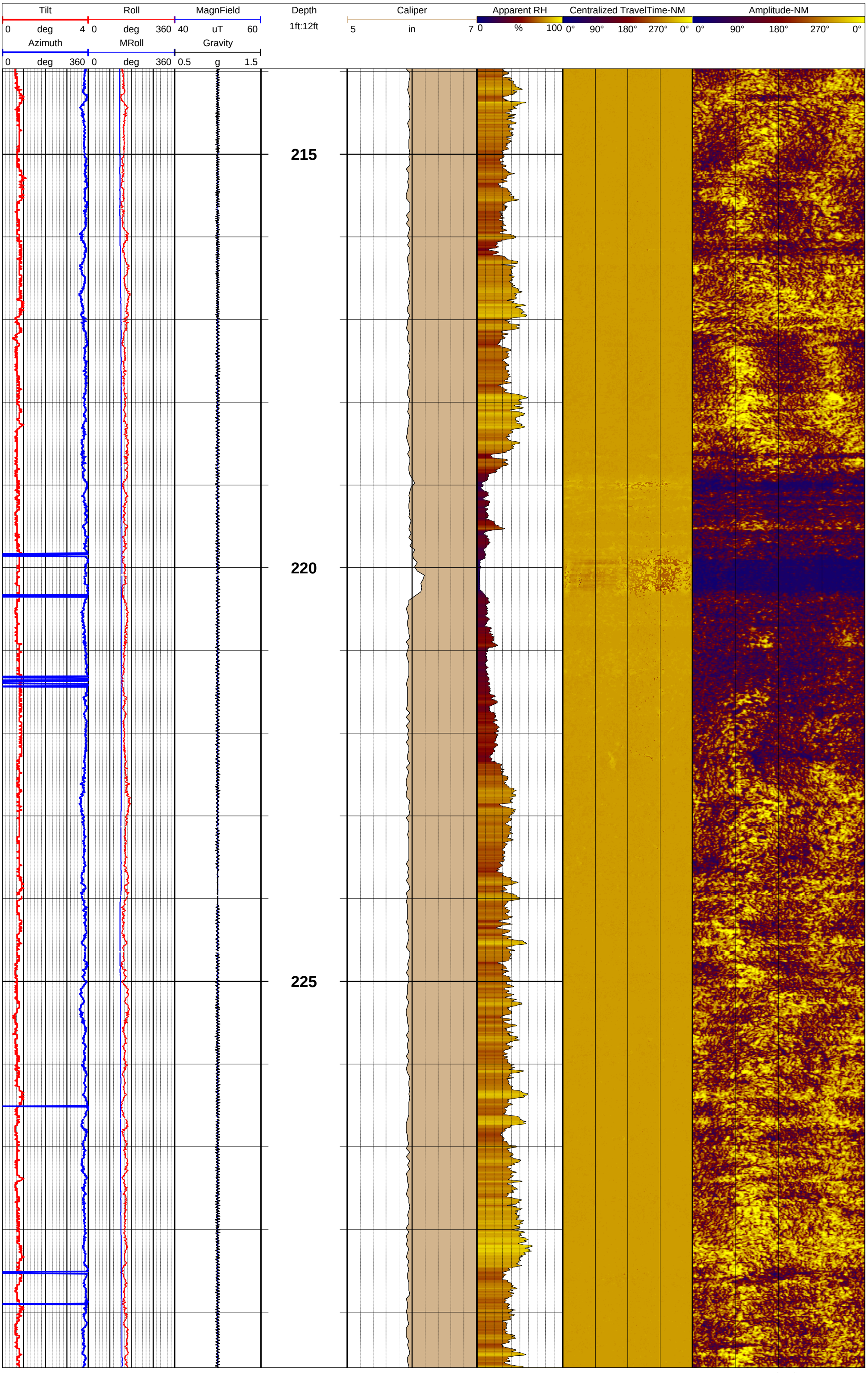
Roll
0 deg 360
MagnField
40 uT 60
Azimuth
0 deg 360
MRoll
0 deg 360
Gravity
0.5 g 1.5

Depth
1ft:12ft

Caliper
5 in 7
Apparent RH
0 % 100
Centralized TravelTime-NM
0° 90° 180° 270° 0°
Amplitude-NM
0° 90° 180° 270° 0°

200
205
210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Roll
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Azimuth
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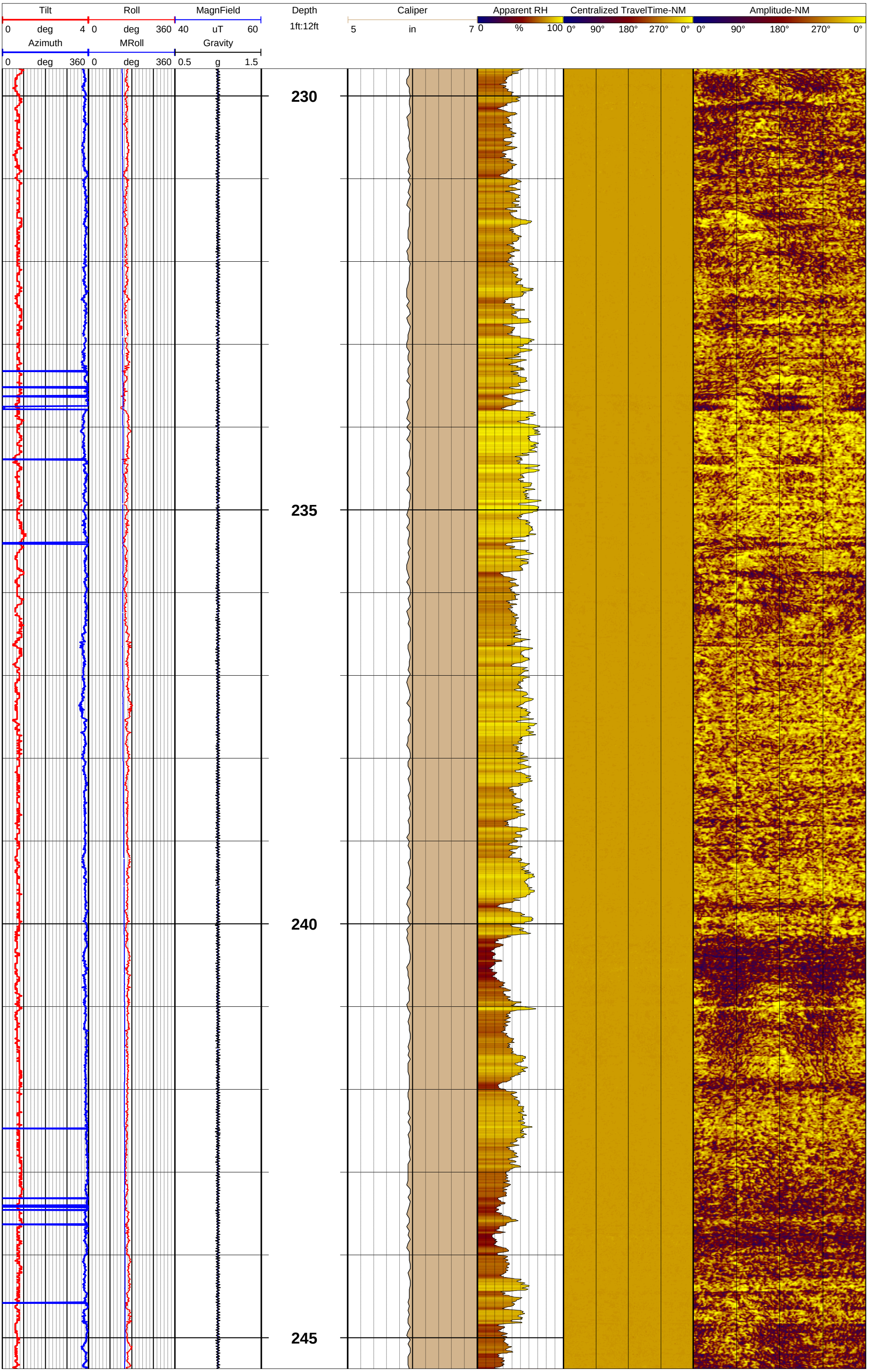
MRoll
0 deg 360
Gravity
0.5 g 1.5
Depth
1ft:12ft
215
220
225
Caliper
5 in 7
Apparent RH
0 % 100
Centralized TravelTime-NM
0° 90° 180° 270° 0°
Amplitude-NM
0° 90° 180° 270° 0°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MRoll
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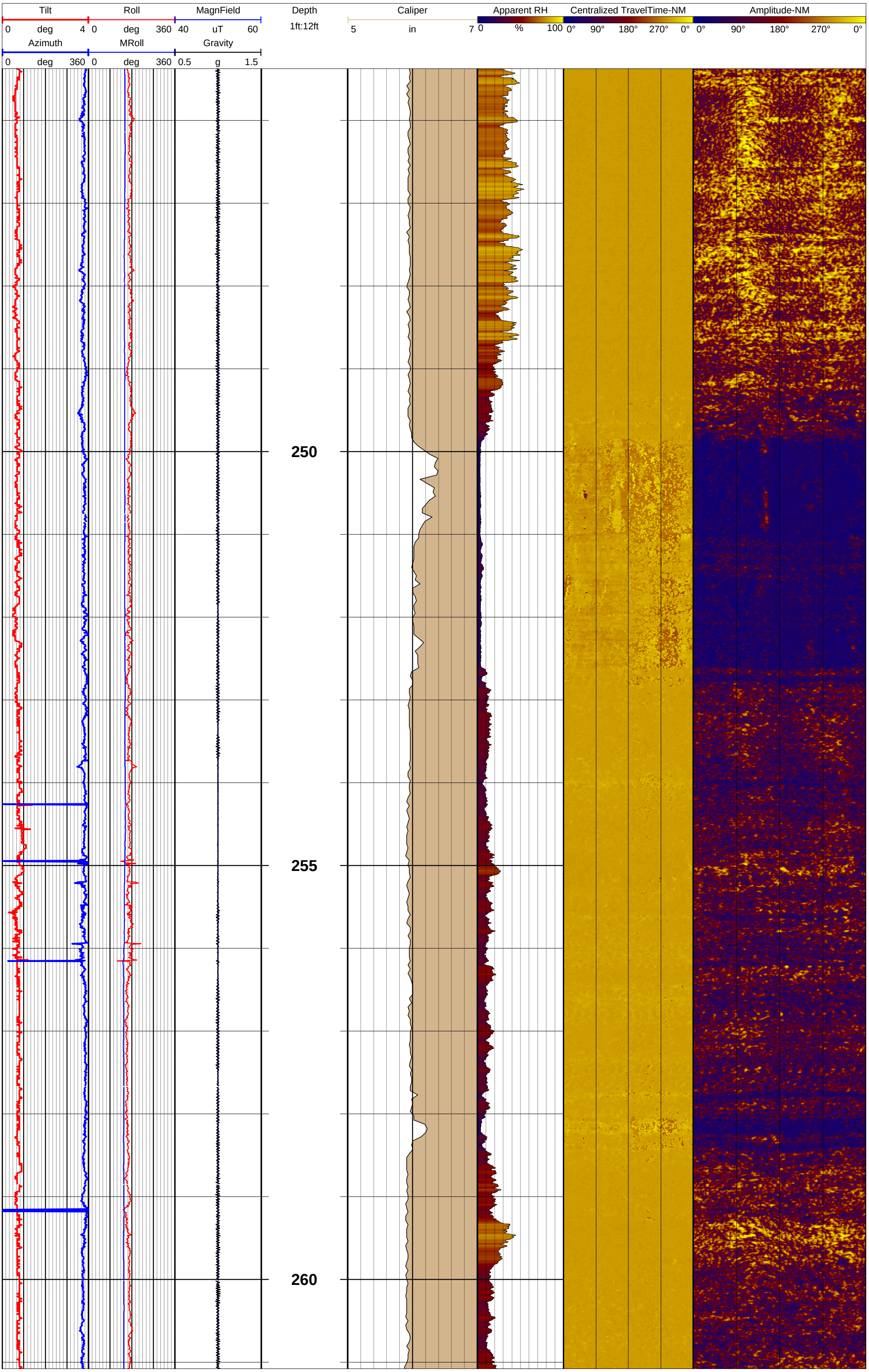
Gravity
0.5 g 1.5
Depth
1ft:12ft
230
235
240
245
Caliper
5 in 7
Apparent RH
0 % 100
Centralized TravelTime-NM
0° 90° 180° 270° 0°
Amplitude-NM
0° 90° 180° 270° 0°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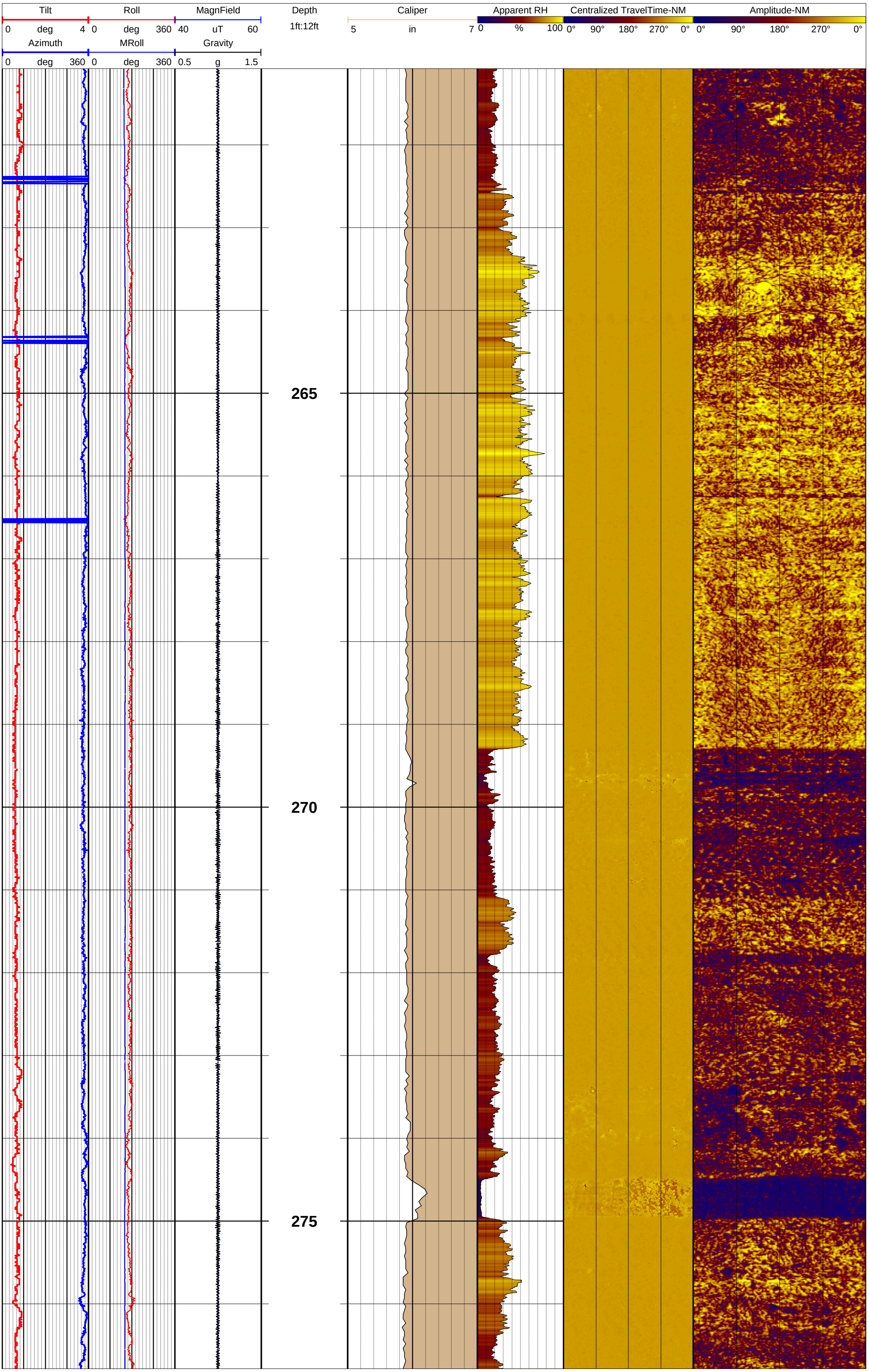
Roll
0 deg 360
MagnField
40 uT 60
Azimuth
0 deg 360
MRoll
0 deg 360
Gravity
0.5 g 1.5
Depth
1ft:12ft
250
255
260
Caliper
5 in 7
Apparent RH
0 % 100
Centralized TravelTime-NM
0° 90° 180° 270° 0°
Amplitude-NM
0° 90° 180° 270° 0°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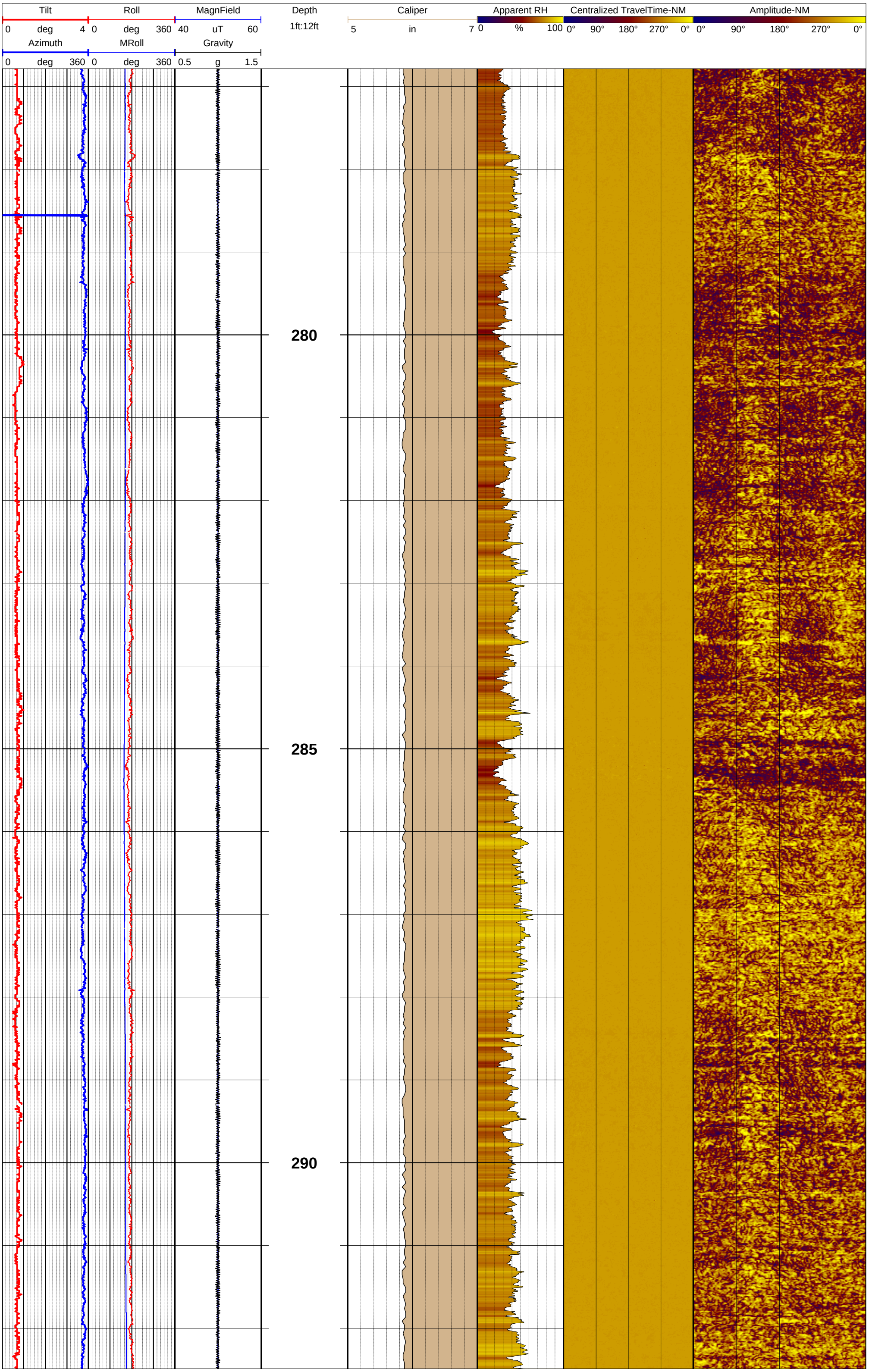
Roll
0 deg 360
MagnField
40 uT 60
Azimuth
0 deg 360
MRoll
0 deg 360
Gravity
0.5 g 1.5
Depth
1ft:12ft
Caliper
5 in 7
Apparent RH
0 % 100
Centralized TravelTime-NM
0° 90° 180° 270° 0°
Amplitude-NM
0° 90° 180° 270° 0°
265
270
275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Depth
1ft:12ft
Caliper
5 in 7
Apparent RH
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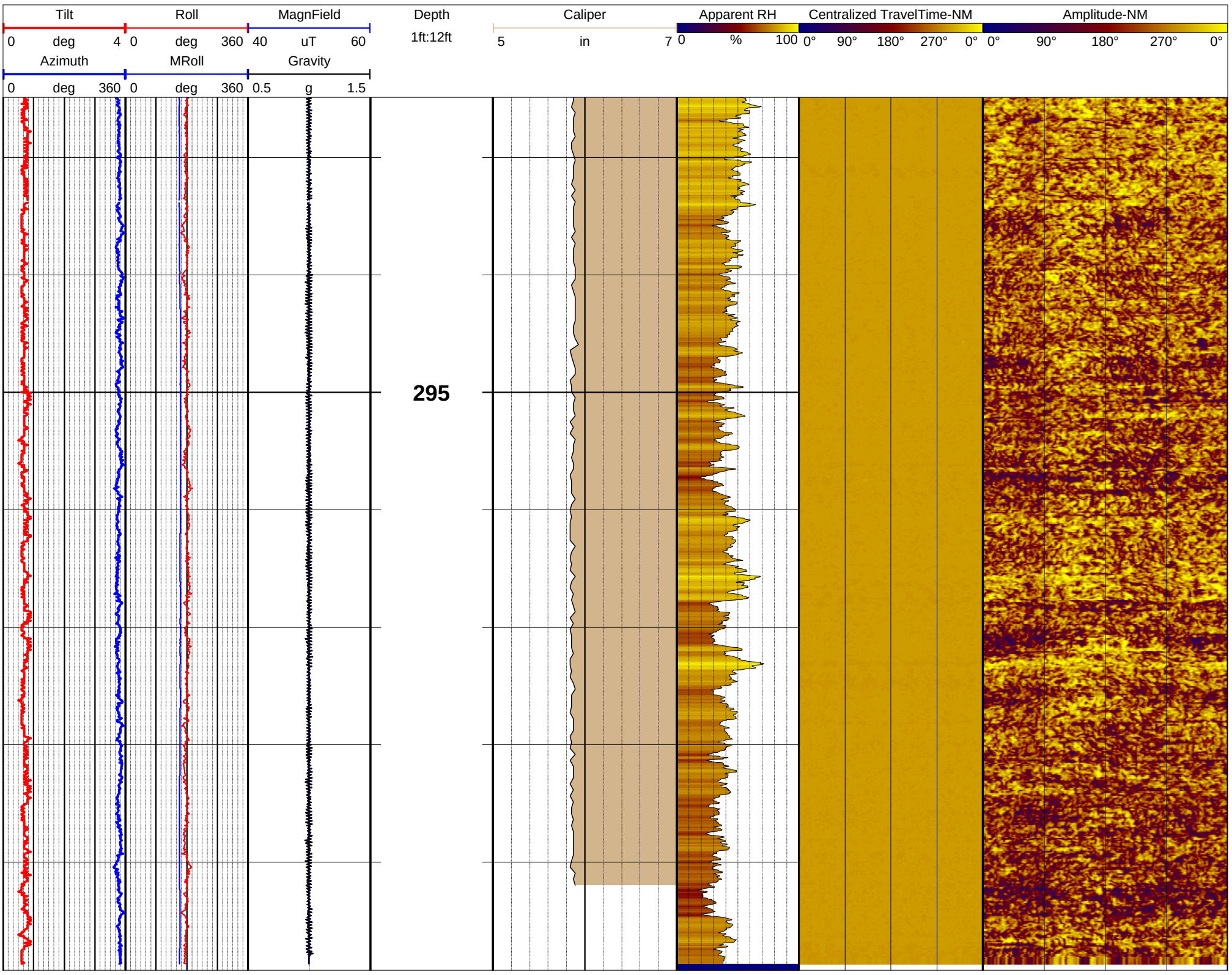
Centralized TravelTime-NM
0° 90° 180° 270° 0°
Amplitude-NM
0° 90° 180° 270° 0°
280
285
290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Roll
0 deg 360
MagnField
40 uT 60
Azimuth
0 deg 360
MRoll
0 deg 360
Gravity
0.5 g 1.5
Depth
1ft:12ft
295
Caliper
5 in 7
Apparent RH
0 % 100
Centralized TravelTime-NM
0° 90° 180° 270° 0°
Amplitude-NM
0° 90° 180° 270° 0°

GEOPHYSICAL RECORD OF BOREHOLE: GSAP-MW43HO

Plant Gorgas - CCR Delineation Wells

GOLDER

Project Number: 19131304

Client: Southern Company Services

Southern Company

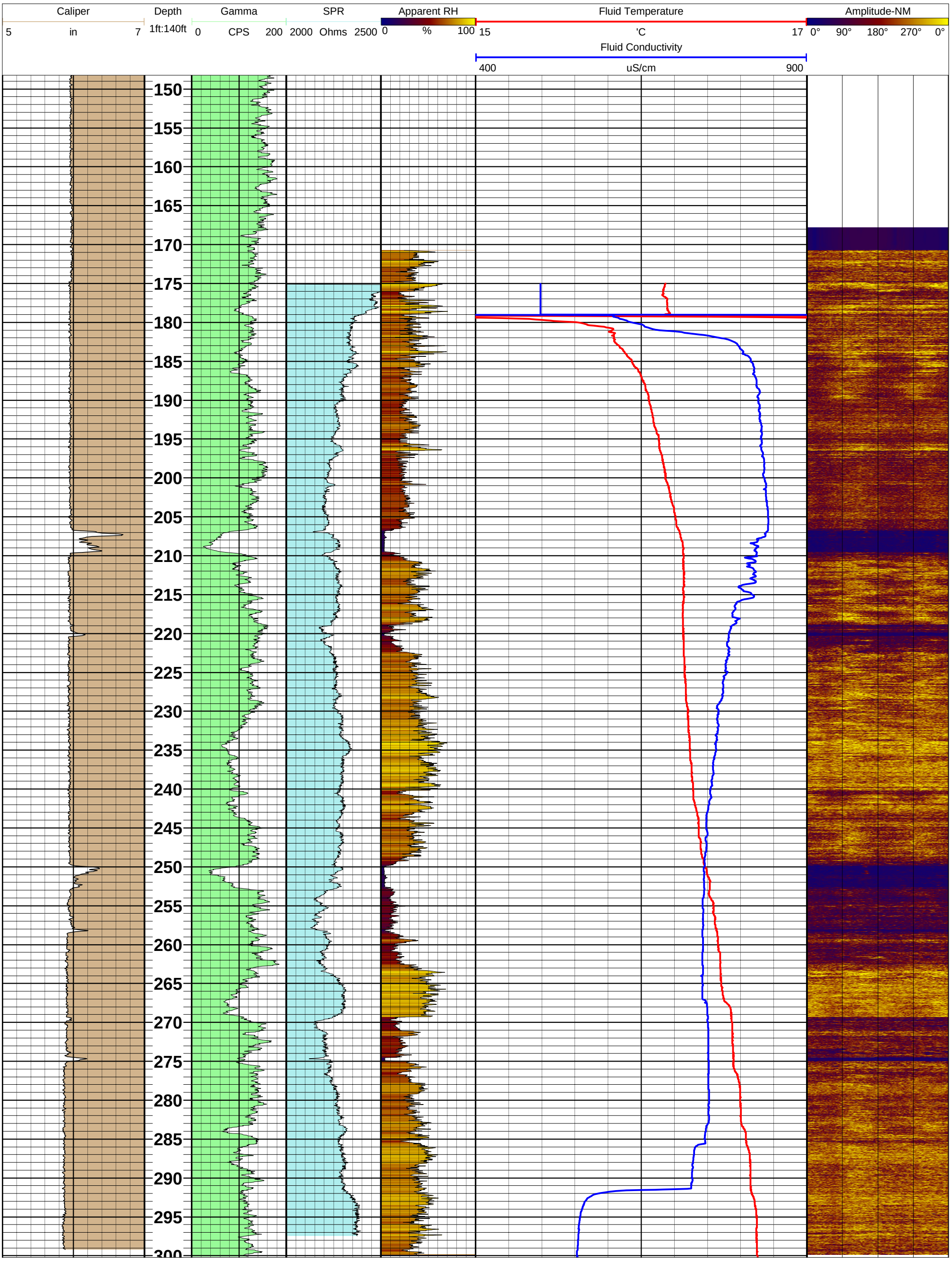
Date: 11-12-2019

Location: Parrish, Al	TOC Elev msl: na	Notes: 182.87' @ 8:30 11/12/2019 rising
Easting: na	Casing Stick-up: 1.6 ft ags	Tools used were:
Northing: na	Casing Diameter: 6.625 in ID	QL40-FTC sn 5518
Ground Elev msl: na	Casing Material: Steel	QL40 Caliper sn 5521
Borehole Dip: vertical	Water Level: 181.3 ft bgs	40-LGR-Gamma & SPR sn 5809
Borehole Az: na	Logged By: CM	ATV ABI40 sn162305
Borehole Size: 6" AH	Log Depth Ref: Ground Surface	
Drilled Depth: 300.5 ft BGS	Log Date: 11/12/2019	
Drill Comp Date: 11-11-19	Image Plot(s) Ref: MN	
Casing Depth: 18 ft bgs	Dip Referenced to Horizontal	



Caliper 5 in 7 | Depth 1ft:140ft | Gamma 0 CPS 200 | SPR 2000 Ohms 2500 | Apparent RH 0 % 100 | Fluid Temperature 15 'C 17 | Amplitude-NM 0° 90° 180° 270° 0°

Fluid Conductivity 400 uS/cm 900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7
Depth
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Gamma
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CPS
200
SPR
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Ohms
2500
Apparent RH
0
%
100
Fluid Temperature
15
'C
17
Fluid Conductivity
400
uS/cm
900
Amplitude-NM
0°
90°
180°
270°
0°
150
155
160
165
170
175
180
185
190
195
200
205
210
215
220
225
230
235
240
245
250
255
260
265
270
275
280
285
290
295
300

GEOPHYSICAL RECORD OF BOREHOLE: GS-AP-MW-18V

PLANT GORGAS ASH POND DELINEATION WELLS

GOLDER

Project Number: 18114896

Client: Southern Company Services

Southern Company

Date: 1-22-2019

Location: Parrish, Al	TOC Elev msl: na
Easting: na	Casing Stick-up: 2 ft ags
Northing: na	Casing Diameter: 5.4 in ID
Ground Elev msl: na	Casing Material: Steel
Borehole Dip: vertical	Water Level: 18.46 ft bgs
Borehole Az: na	Logged By: Dave H
Borehole Size: 6" Sonic	Log Depth Ref: Ground
Drilled Depth: 140 ft	Log Date: 1-22-19
Drill Comp Date: 1-22-19	Image Plot(s) Ref: MN
Casing Depth: 11 ft bgs	Dip Referenced to Horizontal

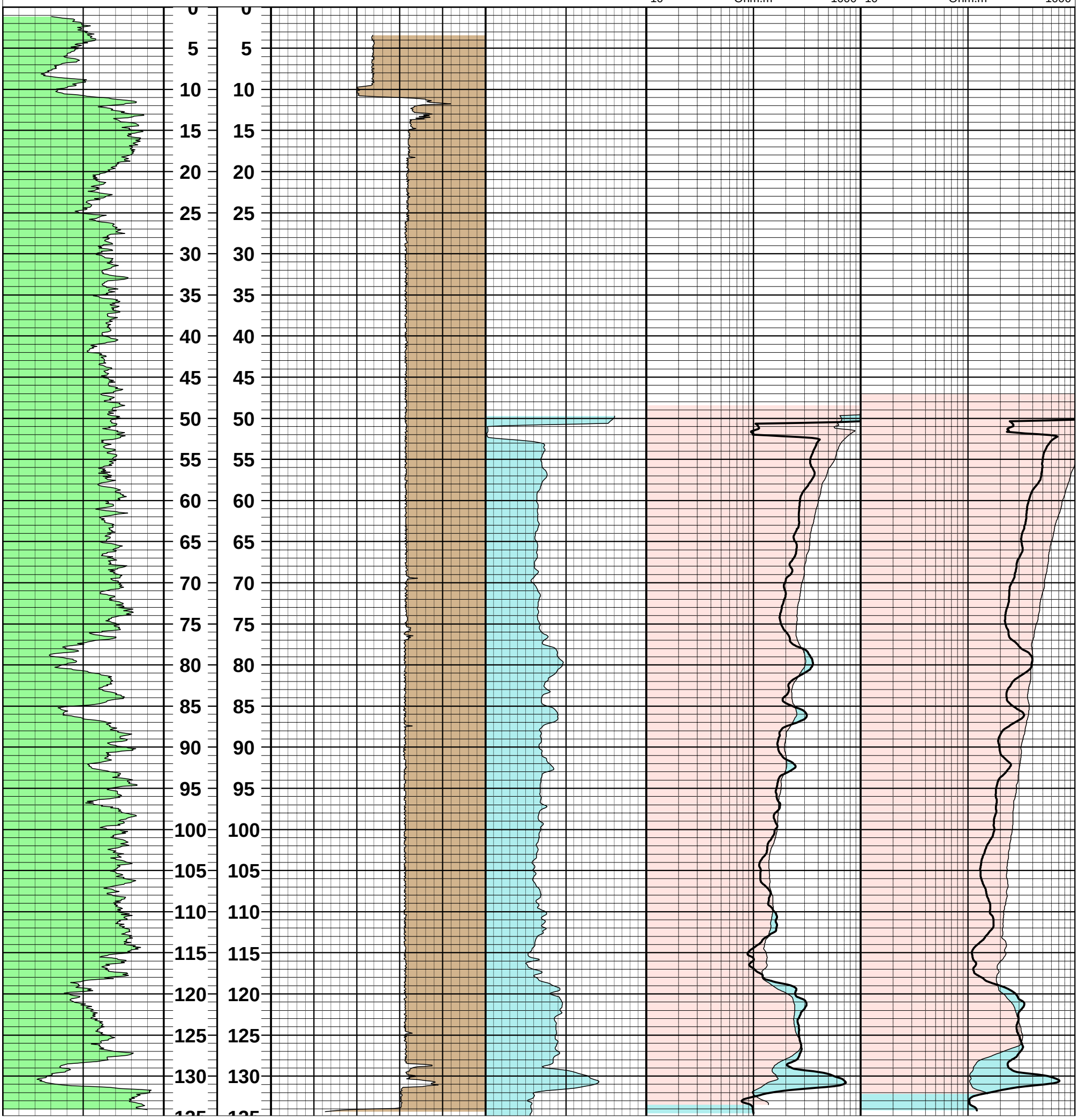
Notes:

Deviation data recorded with QL40-DEV rental tool.
Closure Distance = 0.53 ft, Closure Angle = 21.3 deg & Tilt at BOH = 0.82 deg

Tools used were Decatur's QL40 set:
FTC sn5518
Caliper sn5521
Gamma sn5499
SPR + Normal Res QL40 sn5512
Deviation QL40-DEV sn182909



Gamma	Depth	TVD axis	Caliper	SPR	N8	N16
0 CPS 200	1ft:150ft	ft	3 in 8	0 Ohm 1000	10 Ohm.m 1000	10 Ohm.m 1000
					N32	N64
					10 Ohm.m 1000	10 Ohm.m 1000



1/22/2019 8:10:44 PM

GEOPHYSICAL RECORD OF BOREHOLE: GS-AP-MW-23H

PLANT GORGAS ASH POND DELINEATION WELLS

GOLDER

Project Number: 18114896

Client: Southern Company Services

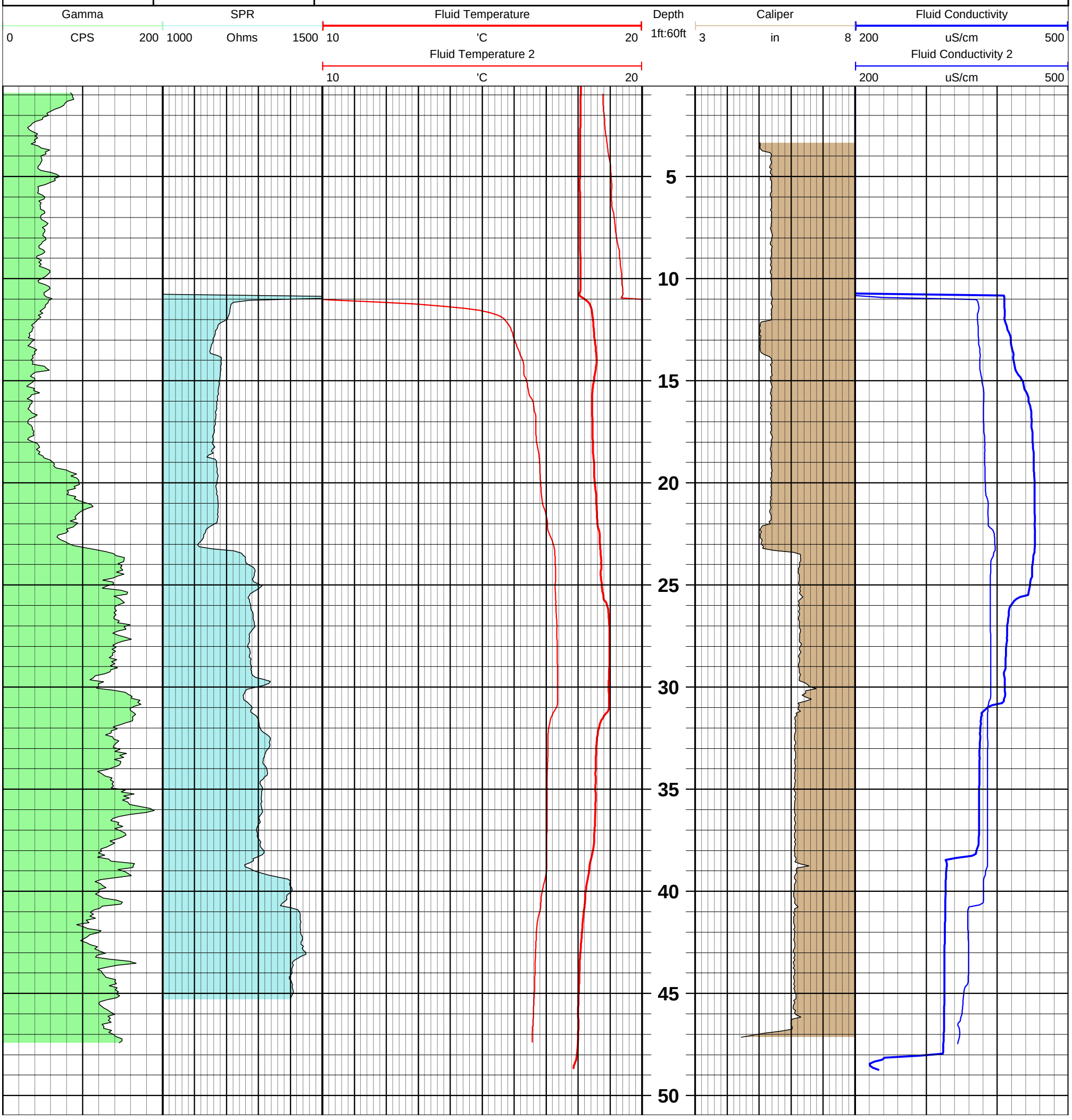
Southern Company

Date: 1-04-2019

Location: Parrish, Al	TOC Elev msl: na
Easting: na	Casing Stick-up: 2.2 ft ags
Northing: na	Casing Diameter: 5.4 in ID
Ground Elev msl: na	Casing Material: Steel
Borehole Dip: vertical	Water Level: 11.15 ft bgs
Borehole Az: na	Logged By: Abernathy
Borehole Size: 6" Sonic	Log Depth Ref: Ground
Drilled Depth: 50 ft	Log Date: 1/4-5/19
Drill Comp Date: 1-04-19	Image Plot(s) Ref: MN
Casing Depth: 23 ft bgs	Dip Referenced to Horizontal

Notes: The first FTC run was made on 1-4, under recovery, WL at end of run was11.15 ft. The casing fell to the bottom of the hole after the run. The casing was re-set 1-5 & FTC was re-run, WL was still at 11.15 ft.





1/5/2019 10:53:04 AM

GEOPHYSICAL RECORD OF BOREHOLE: GS-AP-MW-30H

PLANT GORGAS ASH POND DELINEATION WELLS

GOLDER

Project Number: 18114896

Client: Southern Company Services

Southern Company

Date: 1-08-2019

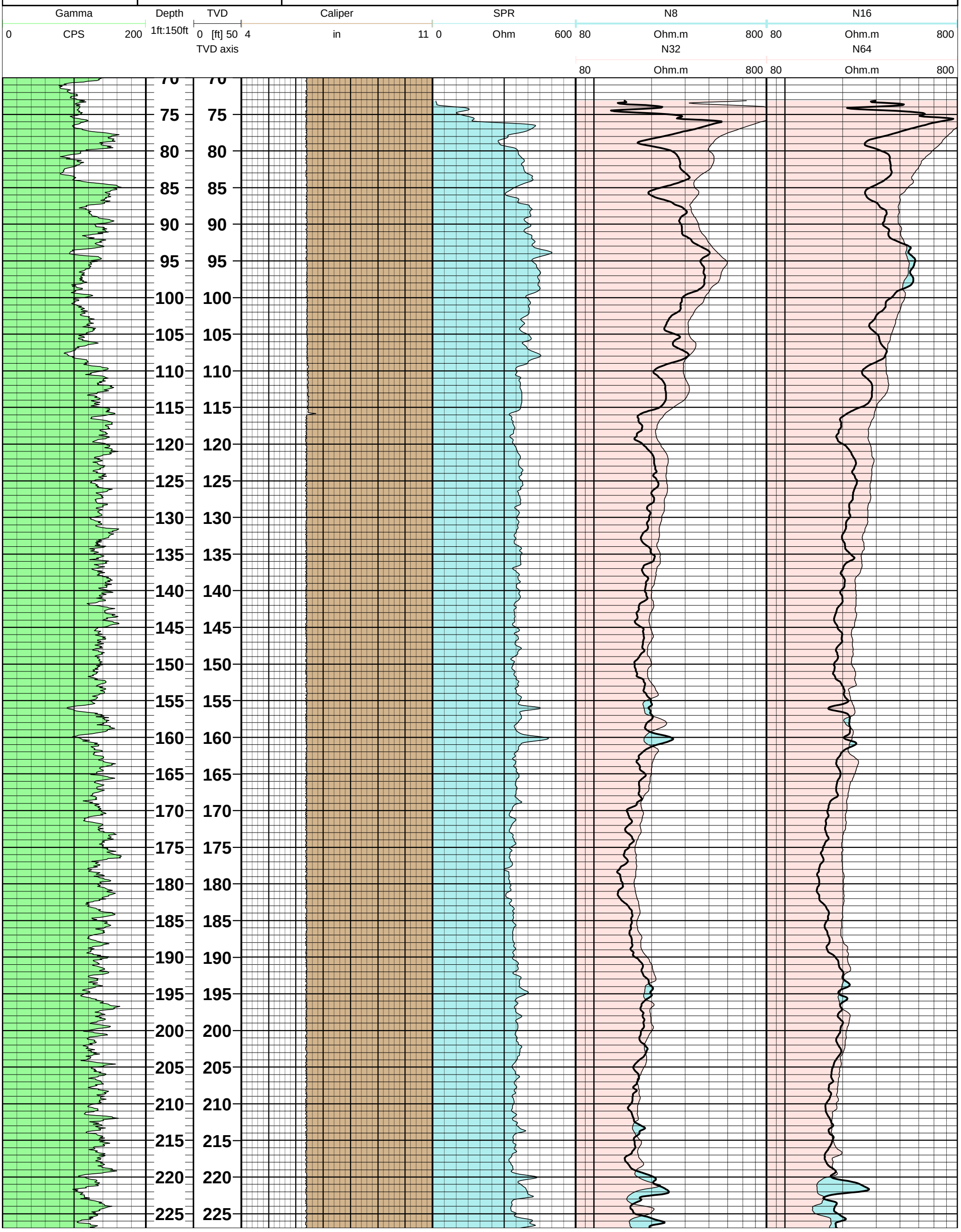
Location: Parrish, Al	TOC Elev msl: na
Easting: na	Casing Stick-up: 6.5 ft ags
Northing: na	Casing Diameter: 5.4 in ID
Ground Elev msl: na	Casing Material: Steel
Borehole Dip: vertical	Water Level: 41.9 ft bgs
Borehole Az: na	Logged By: Abernathy
Borehole Size: 6" Sonic	Log Depth Ref: Ground
Drilled Depth: 305 ft	Log Date: 1-07-19
Drill Comp Date: 1-07-19	Image Plot(s) Ref: MN
Casing Depth: 3.9 ft bgs	Dip Referenced to Horizontal

Notes: The first FTC run was made under ambient conditions, and second FTC run made under injecting conditions, water level raised to ft.

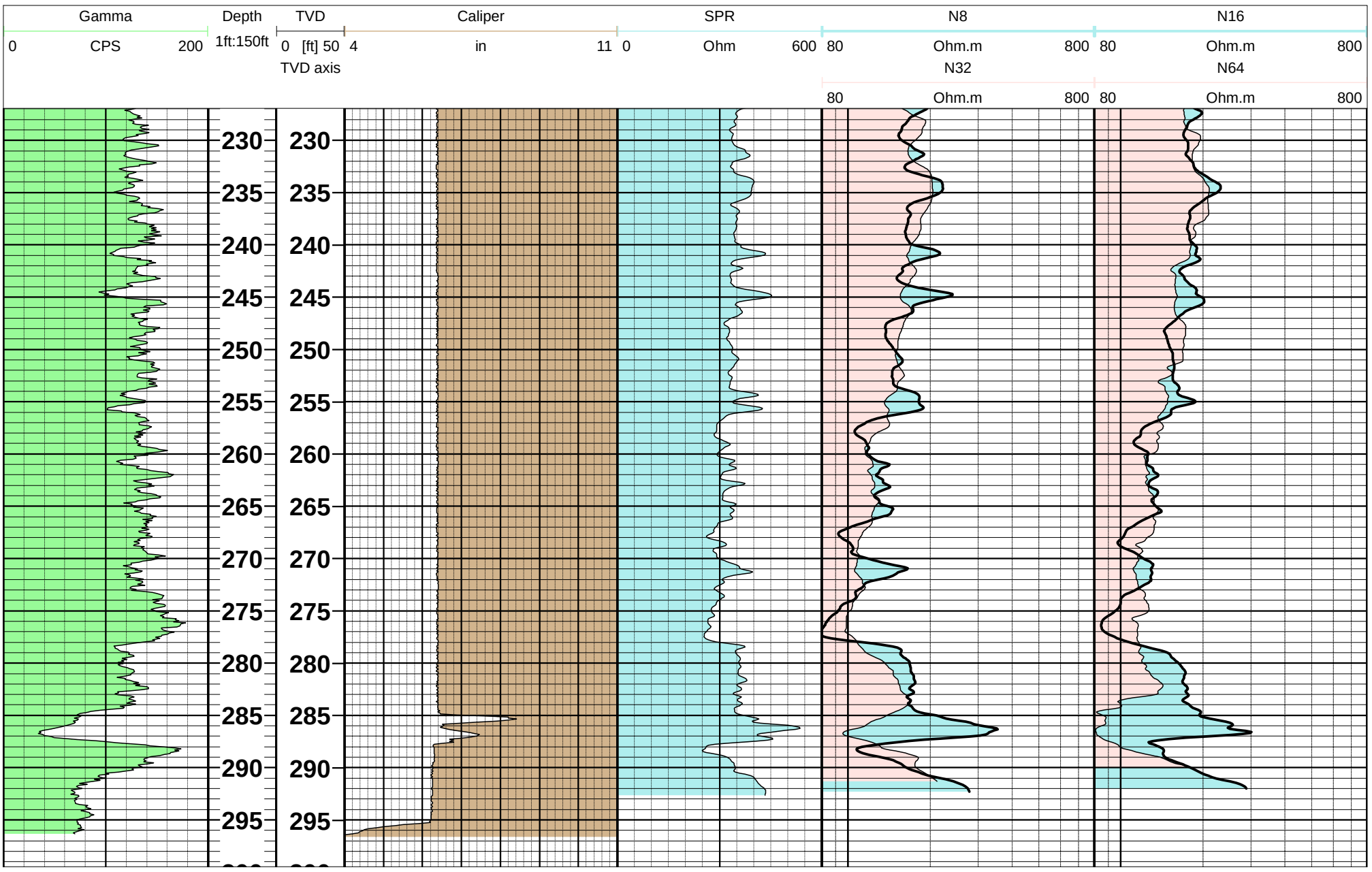
The deviation data was recorded with our OBI sn163404.
Closure Distance = 3.2 ft, Closure Angle = 272.9 deg & Tilt at BOH = 1.8 deg

Tools used were Decatur's QL40 set:
FTC sn5518
Caliper sn5521
Gamma sn5499
SPR + Normal Res QL40 sn5512
Deviation OBI sn163404





1/8/2019 8:43:56 AM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0
CPS
200
Depth
1ft:150ft
TVD
0
[ft]
50
TVD axis
Caliper
4
in
11
SPR
0
Ohm
600
N8
80
Ohm.m
800
N16
80
Ohm.m
800
N32
80
Ohm.m
800
N64
80
Ohm.m
800
230
235
240
245
250
255
260
265
270
275
280
285
290
295

Well Installation Field Log

Project Name:	Plant Gorgas Ash Pond CCR Delineation Phase II	Date Started:	10/24/2019	Date Completed:	11/6/2019
Borehole/Well No:	GS-AP-MW-09V	Northing (ft):	1322441.98	Easting (ft):	2062677.69
Plant Name:	Plant Gorgas	Latitude:	33.6350224	Longitude:	-87.19058108
Plant Address:	460 Gorgas Road Parrish, AL	Location Datum:	AL NAD 83	Elevation Datum:	MSL
Project & Task Number:	APC716264	Surface/ Ground Elevation:	418.25	Stickup (ft, ags):	2.6
Goals/Task:	Delineation Well Installation	Borehole Diameter (in):	6	Borehole Depth (ft, bgs):	300.5
Drilling Company:	Cascade	Well Casing Diameter (in):	2	Well Depth (ft, bgs):	135.5
Drilling Equipment/Rig Type:	Truck Mounted Sonic	Top of Casing elev (ft):	420.86	Screen length (ft):	10
Drilling Method:	Air Hammer	DTW at Completion (ft, bgs):	280.0		
Sampling Method:	NA				
Prepared By:	Scott Baxter				
Review By:	Brandon Coates				

*Not to Scale

Depth (feet)

Well Construction

Stick up 2.6 ft, ags — 6 Inch Diameter Protective Cover with Locking Lid

Ground surface - 0.0'

Grout 118.3 ft , bgs

2 inch casing

Bentonite 122.9 ft , bgs

Filter Media Filter pack

Top of Screen 125.0 ft , bgs

0.010 Slot screen

Bottom of screen 135.0 ft , bgs

135.5 ft , bgs Sump/end cap

Top of Backfill below Filter Pack 140.0 ft , bgs

140.0 ft , bgs Base of filter pack

Terminus of borehole 300.5 ft , bgs

Materials Inventory

Stick up: 2.6 ft, ags

Casing Type (steel or PVC, schedule 40 or 80):
PVC schedule 40

Casing
Top: 2.6 ft, ags Bottom: 125.0 ft, bgs

Screen Type:
4"ID x 2"ID U-pack

Screen Slot Size:
0.010

Screen
Top: 125.0 ft, bgs Bottom: 135.0 ft, bgs

Sump/end cap
Top: 135.0 ft, bgs Bottom: 135.5 ft, bgs

Grout Quantity:
160 gallons

Grout Type:
BAROID AQUA GARD

Grout
Top: 0.5 ft, bgs Bottom: 118.3 ft, bgs

Density
Initial: 10.1 lbs/gal Return: 10.1 lbs/gal

Bentonite Type:
1/4" PDS TR30 pellets

Bentonite Seal
Top: 118.3 ft, bgs Bottom: 122.9 ft, bgs

Filter Pack - Pre-pack and Annular Space
Type (manufacturer, size):
20/40 Mesh (Global #7)

Filter Pack:
Top: 122.9 ft, bgs Bottom: 140.0 ft, bgs

Notes: Bentonite seal hydrated 4-hours prior to grout backfill placed.

NS = No samples were collected

Backfill below sand pack: Boring backfilled with 160.5 feet of Baroid 3/8" Chip Bentonite

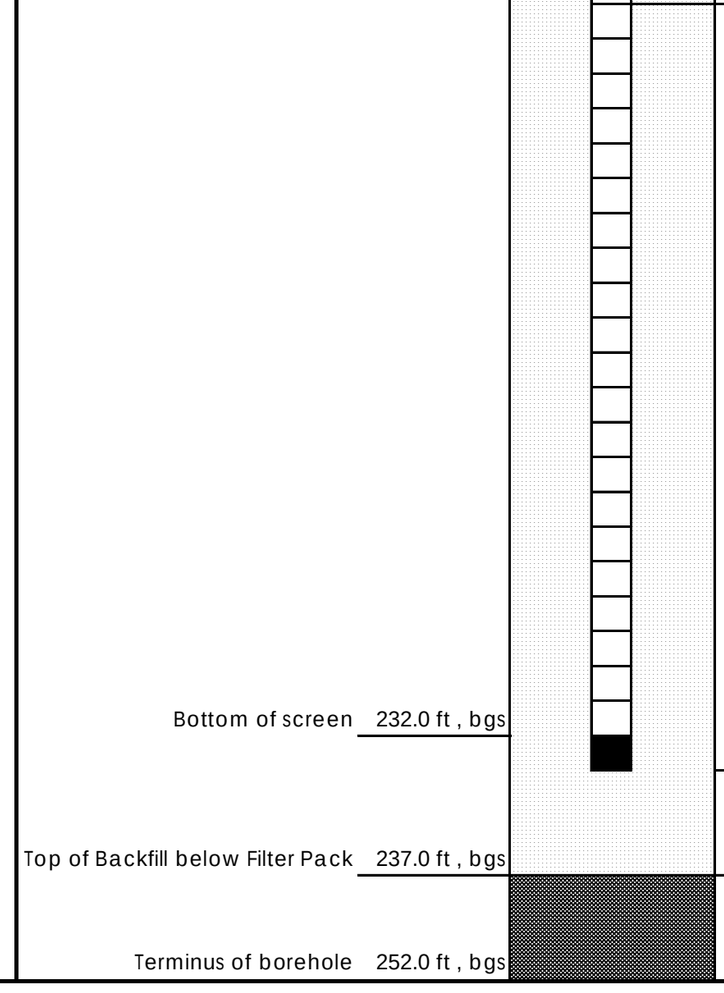
Well Installation Field Log

Project Name:	Plant Gorgas Ash Pond CCR Delineation	Date Started:	10/24/2019	Date Completed:	10/28/2019
Borehole/Well No:	GS-AP-MW-15V	Northing (ft):	1317266.29	Easting (ft):	2063940.18
Plant Name:	Plant Gorgas	Latitude:	33.6207882	Longitude:	-87.1864848
Plant Address:	460 Gorgas Road Parrish, AL	Location Datum:	AL NAD83	Elevation Datum:	MSL
Project & Task Number:	APC716264	Surface/ Ground Elevation:	452.91	Stickup (ft, ags):	3.0
Goals/Task:	Delineation Well Installation	Borehole Diameter (in):	6.0	Borehole Depth (ft, bgs):	252.0
Drilling Company:	SAEDACCO	Well Casing Diameter (in):	2.0	Well Depth (ft, bgs):	232.5
Drilling Equipment/Rig Type:	Truck Mounted Sonic Rig	Top of Casing elev (ft):	455.89	Screen length (ft):	10
Drilling Method:	Air Hammer	DTW at Completion (ft, bgs):	198.0		
Sampling Method:	NS				
Prepared By:	Scott Baxter				
Reviewed By:	Brandon Coates				

*Not to Scale

Depth (feet)

Well Construction



Materials Inventory

Stick up: 3.0 ft, ags

Casing Type (steel or PVC, schedule 40 or 80):
PVC schedule 40

Casing
Top: 3.0 ft, ags Bottom: 222.0 ft, bgs

Screen Type:
4"ID x 2"ID U-pack

Screen Slot Size:
0.010

Screen
Top: 222.0 ft, bgs Bottom: 232.0 ft, bgs

Sump/end cap
Top: 232.0 ft, bgs Bottom: 232.5 ft, bgs

Grout Quantity:
240 gallons

Grout Type:
BAROID AQUA GARD

Grout
Top: 0.5 ft, bgs Bottom: 215.2 ft, bgs

Density
Initial: 10.1 lbs/gal Return: 10.1 lbs/gal

Bentonite Type:
1/4" PDS TR30 pellets

Bentonite Seal
Top: 215.2 ft, bgs Bottom: 219.7 ft, bgs

Filter Pack - Pre-pack and Annular Space
Type (manufacturer, size):
20/40 Mesh (Global #7)

Filter Pack:
Top: 219.7 ft, bgs Bottom: 252.0 ft, bgs

Notes: Bentonite seal hydrated 4-hours prior to grout backfill placed.
NS = No samples were collected

Backfill below sand pack: Boring backfilled with 15 feet of Baroid 3/8" Chip Bentonite

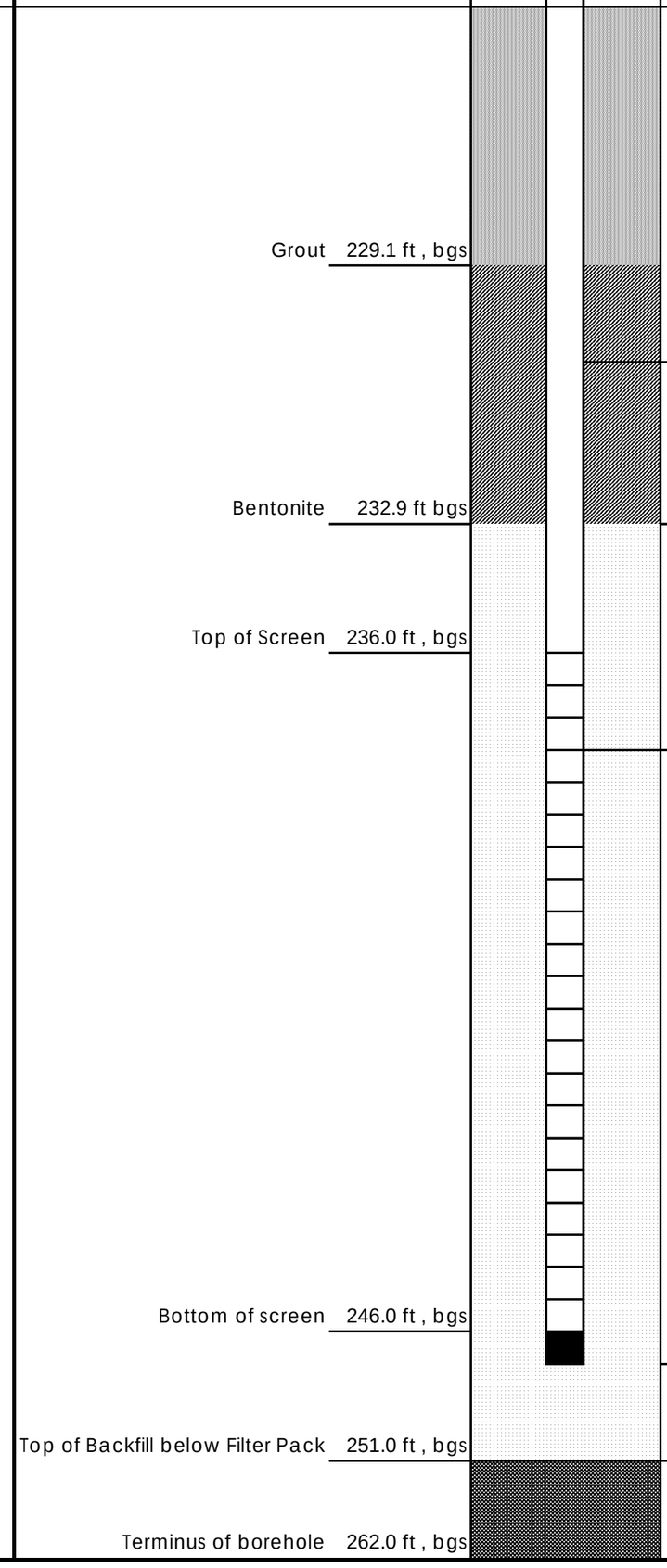
Well Installation Field Log

Project Name:	Plant Gorgas Ash Pond CCR Delineation	Date Started:	9/24/2019	Date Completed:	9/25/2019
Borehole/Well No:	GS-AP-MW-21V	Northing (ft):	1319131.76	Easting (ft):	2067250.33
Plant Name:	Plant Gorgas	Latitude:	33.62588683	Longitude:	-87.17559206
Plant Address:	460 Gorgas Road Parrish, AL	Location Datum:	AL NAD 83	Elevation Datum:	MSL
Project & Task Number:	APC716264	Surface/ Ground Elevation:	507.59	Stickup (ft, ags):	2.3
Goals/Task:	Delineation Well Installation	Borehole Diameter (in):	6	Borehole Depth (ft, bgs):	262.0
Drilling Company:	SAEDACCO	Well Casing Diameter (in):	2	Well Depth (ft, bgs):	246.4
Drilling Equipment/Rig Type:	Truck Mounted Sonic Rig	Top of Casing elev (ft):	509.84	Screen length (ft):	10
Drilling Method:	Air Hammer	DTW at Completion (ft, bgs):	60.2		
Sampling Method:	NS				
Prepared By:	Scott Baxter				
Reviewed By:	Brandon Coates				

*Not to Scale

Depth (feet)

Well Construction



Materials Inventory

Stick up: 2.3 ft, ags

Casing Type (steel or PVC, schedule 40 or 80): PVC schedule 40

Casing Top: 2.3 ft, ags Bottom: 236.0 ft, bgs

Screen Type: 4"ID x 2"ID U-pack

Screen Slot Size: 0.010

Screen Top: 236.0 ft, bgs Bottom: 246.0 ft, bgs

Sump/end cap Top: 246.0 ft, bgs Bottom: 246.4 ft, bgs

Grout Quantity: 300 gallons

Grout Type: BAROID AQUA GARD

Grout Top: 0.5 ft, bgs Bottom: 229.1 ft, bgs

Bentonite Type: 1/4" PDS TR30 pellets

Bentonite Seal Top: 229.1 ft, bgs Bottom: 232.9 ft, bgs

Filter Pack - Pre-pack and Annular Space Type (manufacturer, size): 20/40 Mesh (Global #7)

Filter Pack: Top: 232.9 ft, bgs Bottom: 262.0 ft, bgs

Notes: Bentonite seal hydrated 4-hours prior to grout backfill placed.

NS = No samples were collected

Backfill below sand pack: Boring backfilled with 11 feet of Baroid 3/8" Chip Bentonite

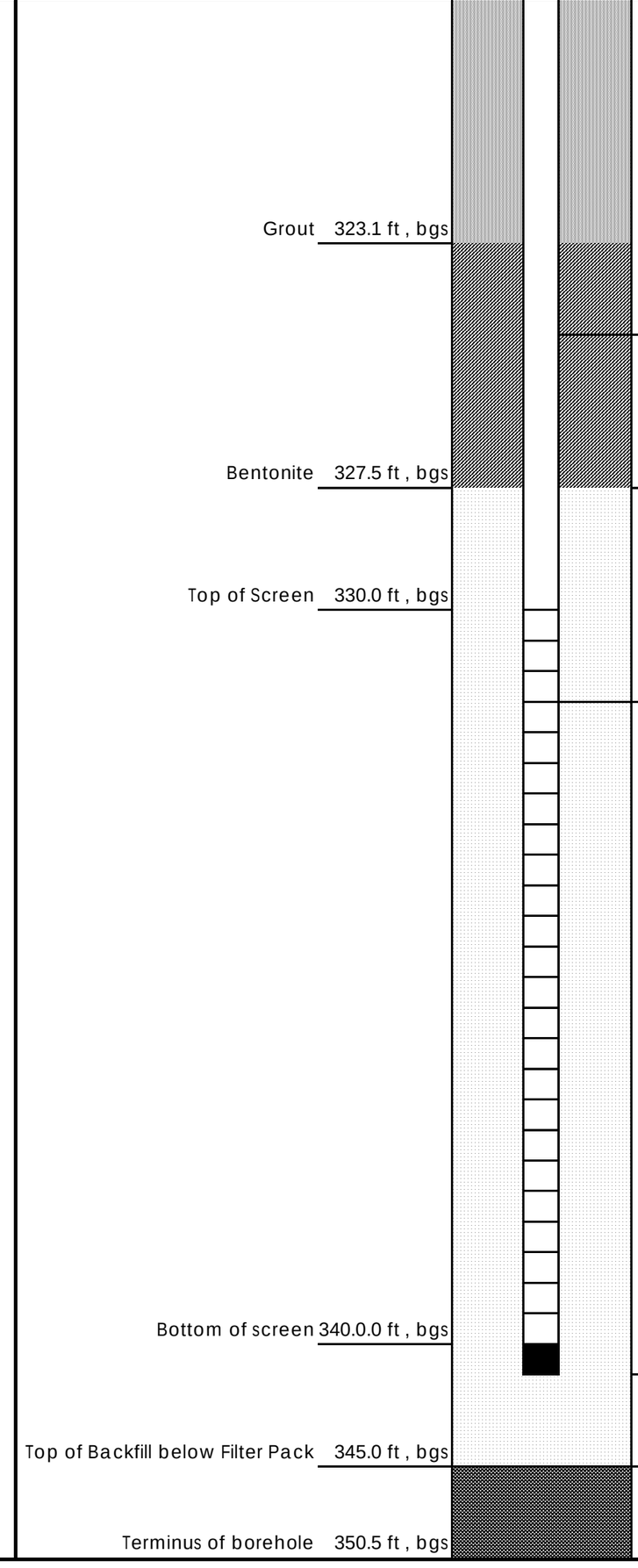
Well Installation Field Log

Project Name:	Plant Gorgas Ash Pond CCR Delineation	Date Started:	10/22/2019	Date Completed:	11/7/2019
Borehole/Well No:	GS-AP-MW-25HA	Northing (ft):	1322704.819	Easting (ft):	2061627.522
Plant Name:	Plant Gorgas	Latitude:	33.63575332	Longitude:	-87.19402877
Plant Address:	460 Gorgas Road Parrish, AL	Location Datum:	AL NAD 83	Elevation Datum:	MSL
Project & Task Number:	APC716264	Surface/ Ground Elevation:	458.98	Stickup (ft, ags):	3.3
Goals/Task:	Delineation Well Installation	Borehole Diameter (in):	6	Borehole Depth (ft, bgs):	350.5
Drilling Company:	Cascade	Well Casing Diameter (in):	2	Well Depth (ft, bgs):	340.5
Drilling Equipment/Rig Type:	Truck Mounted Sonic Rig	Top of Casing elev (ft):	462.27	Screen length (ft):	10
Drilling Method:	Air Hammer	DTW at Completion (ft, bgs):	160.0		
Sampling Method:	NS				
Prepared By:	Scott Baxter				
Reviewed By:	Brandon Coates				

*Not to Scale

Depth (feet)

Well Construction



Materials Inventory

Stick up: 3.3 ft, ags

Casing Type (steel or PVC, schedule 40 or 80):
PVC schedule 40

Casing
Top: 3.3 ft, ags Bottom: 330.0 ft, bgs

Screen Type:
4"ID x 2"ID U-pack

Screen Slot Size:
0.010

Screen
Top: 330.0 ft, bgs Bottom: 340.0 ft, bgs

Sump/end cap
Top: 340.0 ft, bgs Bottom: 340.5 ft, bgs

Grout Quantity:
420 gallons

Grout Type:
BAROID AQUA GARD

Grout
Top: 0.5 ft, bgs Bottom: 323.1 ft, bgs

Density
Initial: 10.1 lbs/gal Return: 10.1 lbs/gal

Bentonite Type:
1/4" PDS TR30 pellets

Bentonite Seal
Top: 323.1 ft, bgs Bottom: 327.5 ft, bgs

Filter Pack - Pre-pack and Annular Space
Type (manufacturer, size):
20/40 Mesh (Global #7)

Filter Pack:
Top: 327.5 ft, bgs Bottom: 350.0 ft, bgs

Notes: Bentonite seal hydrated 4-hours prior to grout backfill placed.
NS = No samples were collected

Backfill below sand pack: Boring backfilled with 5 feet of
Baroid 3/8" Chip Bentonite

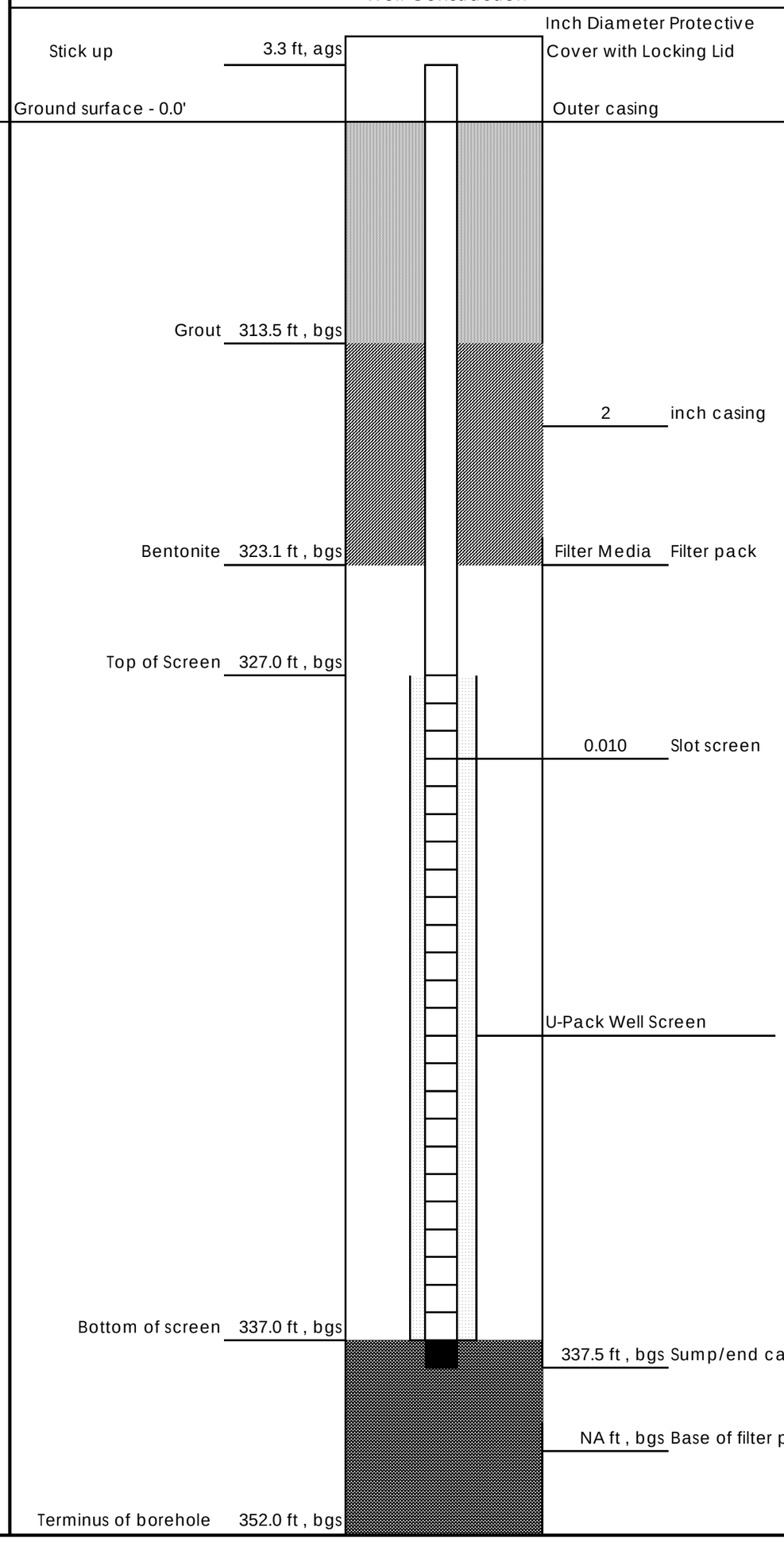
Well Installation Field Log

Project Name:	Plant Gorgas Ash Pond CCR Delineation	Date Started:	9/24/2019	Date Completed:	9/25/2019
Borehole/Well No:	GS-AP-MW-30HA	Northing (ft):	1318730.117	Easting (ft):	2069017.195
Plant Name:	Plant Gorgas	Latitude:	33.62476769	Longitude:	-87.16979196
Plant Address:	460 Gorgas Road Parrish, AL	Location Datum:	AL NAD 83	Elevation Datum:	MSL
Project & Task Number:	APC716264	Surface/ Ground Elevation:	579.99	Stickup (ft, ags):	2.4
Goals/Task:	Delineation Well Installation	Borehole Diameter (in):	6	Borehole Depth (ft, bgs):	352.0
Drilling Company:	SAEDACCO	Well Casing Diameter (in):	2	Well Depth (ft, bgs):	337.5
Drilling Equipment/Rig Type:	Truck Mounted Sonic Rig	Top of Casing elev (ft):	582.4	Screen length (ft):	10
Drilling Method:	Air Hammer	DTW at Completion (ft, bgs):	299.1		
Sampling Method:	NS				
Prepared By:	Scott Baxter				
Reviewed By:	Brandon Coates				

*Not to Scale

Depth (feet)

Well Construction



Materials Inventory

Stick up: 2.4 ft, ags

Casing Type (steel or PVC, schedule 40 or 80):
PVC schedule 40

Casing
Top: 2.4 ft, ags Bottom: 327.0 ft, bgs

Screen Type:
4"ID x 2"ID U-pack

Screen Slot Size:
0.010

Screen
Top: 327.0 ft, bgs Bottom: 337.0 ft, bgs

Sump/end cap
Top: 337.0 ft, bgs Bottom: 337.5 ft, bgs

Grout Quantity:
360 gallons

Grout Type:
BAROID AQUA GARD

Grout
Top: 0.5 ft, bgs Bottom: 313.5 ft, bgs

Density
Initial: 10.1 lbs/gal Return: 10.1 lbs/gal

Bentonite Type:
1/4" PDS TR30 pellets

Bentonite Seal
Top: 313.5 ft, bgs Bottom: 323.1 ft, bgs

Filter Pack - Pre-pack and Annular Space
Type (manufacturer, size):
20/40 Mesh (Global #7)

Filter Pack:
Top: NA ft, bgs Bottom: NA ft, bgs

Notes: NO FILTER PACK outside of U-Pack, set in open formation.

Grout Basket at 313.5 ft bgs.

Bentonite seal hydrated 4-hours prior to grout backfill placed.

NS = No samples were collected

Backfill below sand pack: Boring backfilled with 14.5 feet of Natural Cuttings

Well Installation Field Log

Project Name:	Plant Gorgas Ash Pond CCR Delineation Phase II	Date Started:	10/8/2019	Date Completed:	10/9/2019
Borehole/Well No:	GS-AP-MW-31H	Northing (ft):	1321029.58	Easting (ft):	2068711.01
Plant Name:	Plant Gorgas	Latitude:	33.63108969	Longitude:	-87.17077376
Plant Address:	460 Gorgas Road Parrish, AL	Location Datum:	AL NAD 83	Elevation Datum:	MSL
Project & Task Number:	APC716264	Surface/ Ground Elevation:	584.48	Stickup (ft, ags):	2.9
Goals/Task:	Delineation Well Installation	Borehole Diameter (in):	6	Borehole Depth (ft, bgs):	305.0
Drilling Company:	Cascade	Well Casing Diameter (in):	2	Well Depth (ft, bgs):	285.0
Drilling Equipment/Rig Type:	Truck Mounted Sonic	Top of Casing elev (ft):	587.39	Screen length (ft):	10
Drilling Method:	Air Hammer	DTW at Completion (ft, bgs):	56.0		
Sampling Method:	NS				
Prepared By:	Scott Baxter				
Review By:	Brandon Coates				

*Not to Scale

Depth (feet)

Well Construction

Stick up 2.9 ft, ags — 6 Inch Diameter Protective Cover with Locking Lid

Ground surface - 0.0'

Outer casing

Grout 266.1 ft , bgs

2 inch casing

Bentonite 270.1 ft , bgs

Filter Media Filter pack

Top of Screen 274.5 ft , bgs

0.010 Slot screen

Bottom of screen 284.5 ft , bgs

285.0 ft , bgs Sump/end cap

Top of Backfill below Filter Pack 290.0 ft , bgs

290.0 ft , bgs Base of filter pack

Terminus of borehole 305.0 ft , bgs

Materials Inventory

Stick up: 2.9 ft, ags

Casing Type (steel or PVC, schedule 40 or 80): PVC schedule 40

Casing Top: 2.9 ft, ags Bottom: 274.5 ft, bgs

Screen Type: 4"ID x 2"ID U-pack

Screen Slot Size: 0.010

Screen Top: 274.5 ft, bgs Bottom: 284.5 ft, bgs

Sump/end cap Top: 285.0 ft, bgs Bottom: 285.0 ft, bgs

Grout Quantity: 349 gallons

Grout Type: BAROID AQUA GARD

Grout Top: 0.5 ft, bgs Bottom: 266.1 ft, bgs

Bentonite Type: 1/4" PDS TR30 pellets

Bentonite Seal Top: 266.1 ft, bgs Bottom: 270.1 ft, bgs

Filter Pack - Pre-pack and Annular Space Type (manufacturer, size): 20/40 Mesh (Global #7)

Filter Pack: Top: 270.1 ft, bgs Bottom: 290.0 ft, bgs

Notes: Bentonite seal hydrated 4-hours prior to grout backfill placed.

NS = No samples were collected

Backfill below sand pack: Boring backfilled with 15 feet of Baroid 3/8" Chip Bentonite

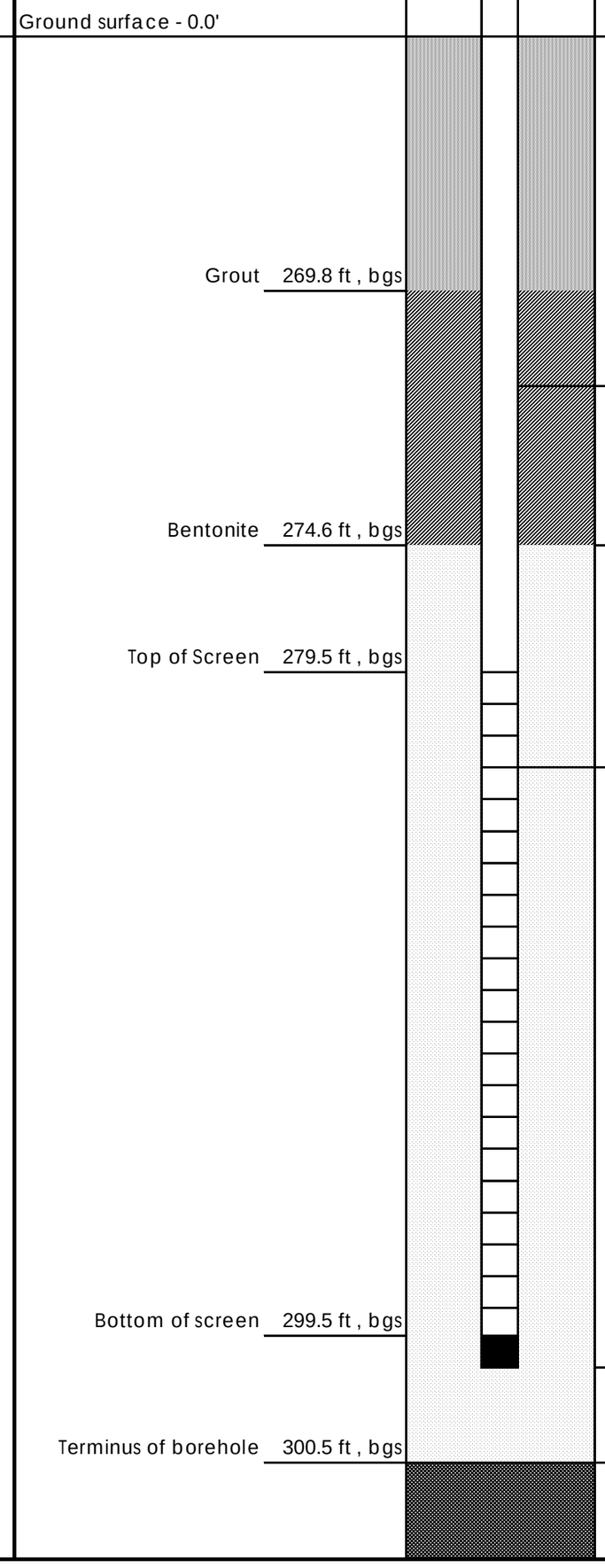
Well Installation Field Log

Project Name:	Plant Gorgas Ash Pond CCR Delineation Phase	Date Started:	10/11/2019	Date Completed:	10/12/2019
Borehole/Well No:	GS-AP-MW-32H	Northing (ft):	1316042.76	Easting (ft):	2068381.85
Plant Name:	Plant Gorgas	Latitude:	33.61738789	Longitude:	-87.17190709
Plant Address:	460 Gorgas Road Parrish, AL	Location Datum:	AL NAD 83	Elevation Datum:	MSL
Project & Task Number:	APC716264	Surface/ Ground Elevation:	547.43	Stickup (ft, ags):	2.6
Goals/Task:	Delineation Well Installation	Borehole Diameter (in):	6	Borehole Depth (ft, bgs):	300.5
Drilling Company:	Cascade	Well Casing Diameter (in):	2	Well Depth (ft, bgs):	300.0
Drilling Equipment/Rig Type:	Truck Mounted Sonic	Top of Casing elev (ft):	550.03	Screen length (ft):	20
Drilling Method:	Air Hammer	DTW at Completion (ft, bgs):	243.1		
Sampling Method:	NS				
Prepared By:	Scott Baxter				
Review By:	Brandon Coates				

*Not to Scale

Depth (feet)

Well Construction



Materials Inventory

Stick up: 2.6 ft, ags

Casing Type (steel or PVC, schedule 40 or 80):
PVC schedule 40

Casing
Top: 2.6 ft, ags Bottom: 279.5 ft, bgs

Screen Type:
4"ID x 2"ID U-pack

Screen Slot Size:
0.010

Screen
Top: 279.5 ft, bgs Bottom: 284.5 ft, bgs

Sump/end cap
Top: 299.5 ft, bgs Bottom: 300.0 ft, bgs

Grout Quantity:
320 gallons

Grout Type:
BAROID AQUA GARD

Grout
Top: 0.5 ft, bgs Bottom: 269.8 ft, bgs

Bentonite Type:
1/4" PDS TR30 pellets

Bentonite Seal
Top: 269.8 ft, bgs Bottom: 274.6 ft, bgs

Filter Pack - Pre-pack and Annular Space
Type (manufacturer, size):
20/40 Mesh (Global #7)

Filter Pack:
Top: 274.6 ft, bgs Bottom: 300.5 ft, bgs

Notes: Bentonite seal hydrated 4-hours prior to grout backfill placed.

NS = No samples were collected

Backfill below sand pack: NA

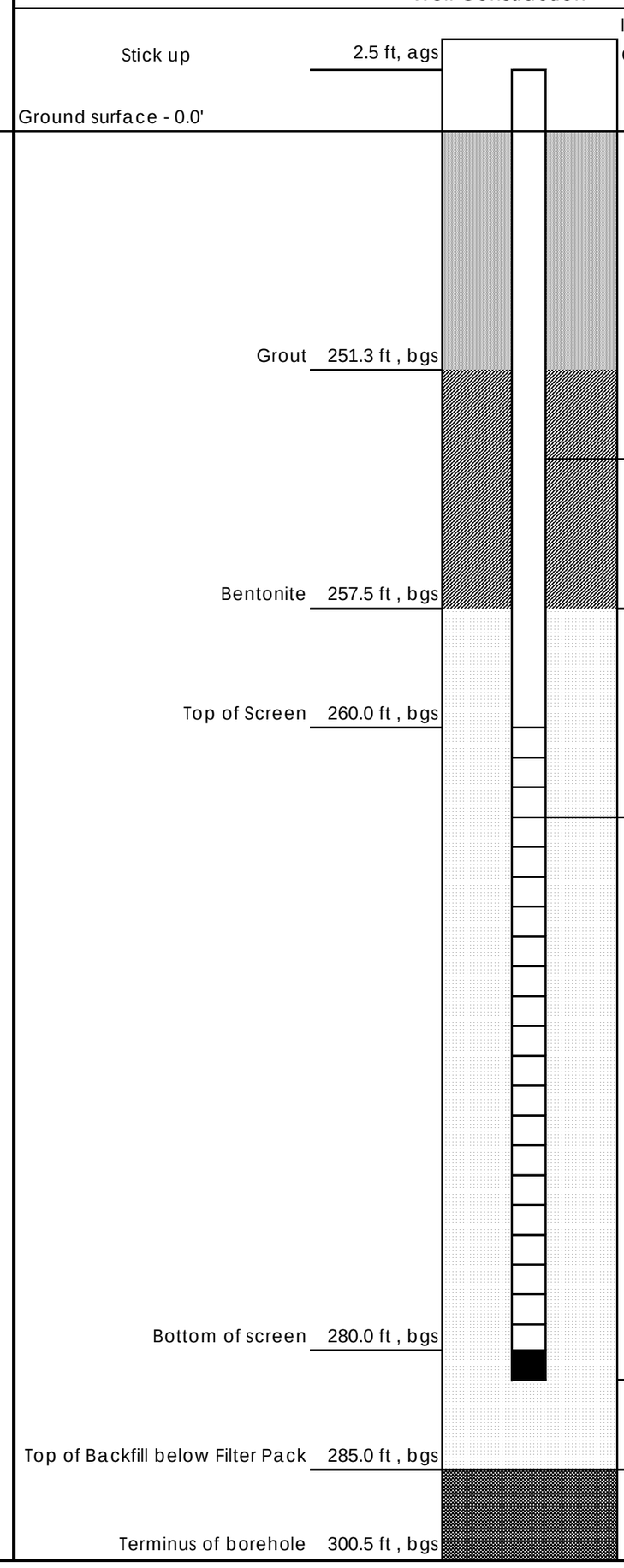
Well Installation Field Log

Project Name:	Plant Gorgas Ash Pond CCR Delineation Phase II	Date Started:	11/7/2019	Date Completed:	11/10/2019
Borehole/Well No:	GS-AP-MW-33HO	Northing (ft):	1314683.64	Easting (ft):	2068381.85
Plant Name:	Plant Gorgas	Latitude:	33.61365567	Longitude:	-87.17300865
Plant Address:	460 Gorgas Road Parrish, AL	Location Datum:	AL NAD 83	Elevation Datum:	MSL
Project & Task Number:	APC716264	Surface/ Ground Elevation:	524.08	Stickup (ft, ags):	2.5
Goals/Task:	Delineation Well Installation	Borehole Diameter (in):	6	Borehole Depth (ft, bgs):	300.5
Drilling Company:	Cascade	Well Casing Diameter (in):	2	Well Depth (ft, bgs):	280.5
Drilling Equipment/Rig Type:	Truck Mounted Sonic	Top of Casing elev (ft):	526.79	Screen length (ft):	20
Drilling Method:	Air Hammer	DTW at Completion (ft, bgs):	248.0		
Sampling Method:	NS				
Prepared By:	Scott Baxter				
Review By:	Brandon Coates				

*Not to Scale

Depth (feet)

Well Construction



Materials Inventory

Stick up: 2.5 ft, ags

Casing Type (steel or PVC, schedule 40 or 80):
PVC schedule 40

Casing
Top: 2.5 ft, ags Bottom: 260.0 ft, bgs

Screen Type:
4"ID x 2"ID U-pack

Screen Slot Size:
0.010

Screen
Top: 260.0 ft, bgs Bottom: 280.0 ft, bgs

Sump/end cap
Top: 280.0 ft, bgs Bottom: 280.5 ft, bgs

Grout Quantity:
320 gallons

Grout Type:
BAROID AQUA GARD

Grout
Top: 0.5 ft, bgs Bottom: 251.3 ft, bgs

Bentonite Type:
1/4" PDS TR30 pellets

Bentonite Seal
Top: 251.3 ft, bgs Bottom: 257.7 ft, bgs

Filter Pack - Pre-pack and Annular Space
Type (manufacturer, size):
20/40 Mesh (Global #7)

Filter Pack:
Top: 257.5 ft, bgs Bottom: 285.0 ft, bgs

Notes: Bentonite seal hydrated 4-hours prior to grout backfill placed.
NS = No samples were collected

Backfill below sand pack: Boring backfilled with 15.5 feet of Baroid 3/8" Chip Bentonite

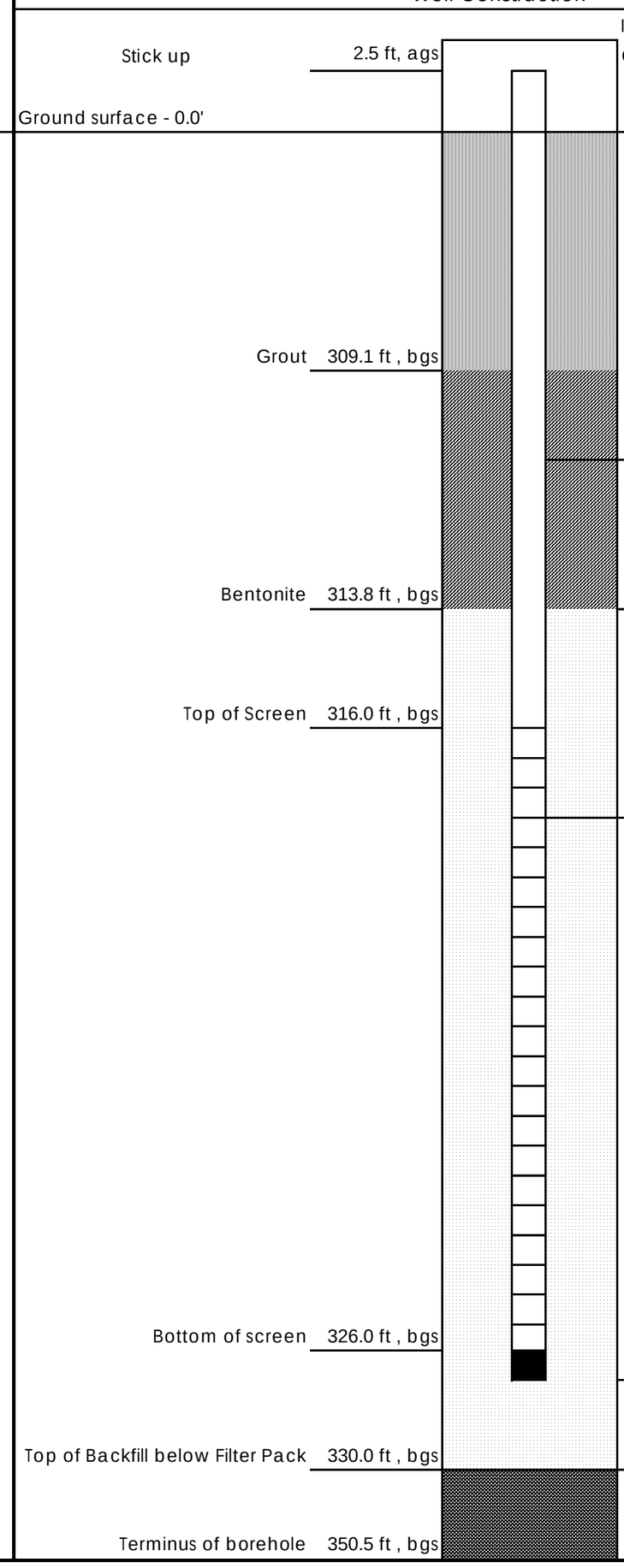
Well Installation Field Log

Project Name:	Plant Gorgas Ash Pond CCR Delineation Phase II	Date Started:	11/8/2019	Date Completed:	11/12/2019
Borehole/Well No:	GS-AP-MW-34HO	Northing (ft):	1314144.24	Easting (ft):	2066527.09
Plant Name:	Plant Gorgas	Latitude:	33.61365567	Longitude:	-87.17801894
Plant Address:	460 Gorgas Road Parrish, AL	Location Datum:	AL NAD 83	Elevation Datum:	MSL
Project & Task Number:	APC716264	Surface/ Ground Elevation:	521.18	Stickup (ft, ags):	2.5
Goals/Task:	Delineation Well Installation	Borehole Diameter (in):	6	Borehole Depth (ft, bgs):	350.5
Drilling Company:	Cascade	Well Casing Diameter (in):	2	Well Depth (ft, bgs):	326.5
Drilling Equipment/Rig Type:	Truck Mounted Sonic	Top of Casing elev (ft):	523.82	Screen length (ft):	10
Drilling Method:	Air Hammer	DTW at Completion (ft, bgs):	280.0		
Sampling Method:	NS				
Prepared By:	Scott Baxter				
Review By:	Brandon Coates				

*Not to Scale

Depth (feet)

Well Construction



Materials Inventory

Stick up: 2.5 ft, ags

Casing Type (steel or PVC, schedule 40 or 80):
PVC schedule 40

Casing
Top: 2.5 ft, ags Bottom: 316.0 ft, bgs

Screen Type:
4"ID x 2"ID U-pack

Screen Slot Size:
0.010

Screen
Top: 316.0 ft, bgs Bottom: 326.0 ft, bgs

Sump/end cap
Top: 326.0 ft, bgs Bottom: 326.5 ft, bgs

Grout Quantity:
405 gallons

Grout Type:
BAROID AQUA GARD

Grout
Top: 0.5 ft, bgs Bottom: 309.1 ft, bgs

Bentonite Type:
1/4" PDS TR30 pellets

Bentonite Seal
Top: 309.1 ft, bgs Bottom: 313.8 ft, bgs

Filter Pack - Pre-pack and Annular Space
Type (manufacturer, size):
20/40 Mesh (Global #7)

Filter Pack:
Top: 313.8 ft, bgs Bottom: 330.0 ft, bgs

Notes: Bentonite seal hydrated 4-hours prior to grout backfill placed.
NS = No samples were collected

Backfill below sand pack: Boring backfilled with 20.5 feet of Baroid 3/8" Chip Bentonite

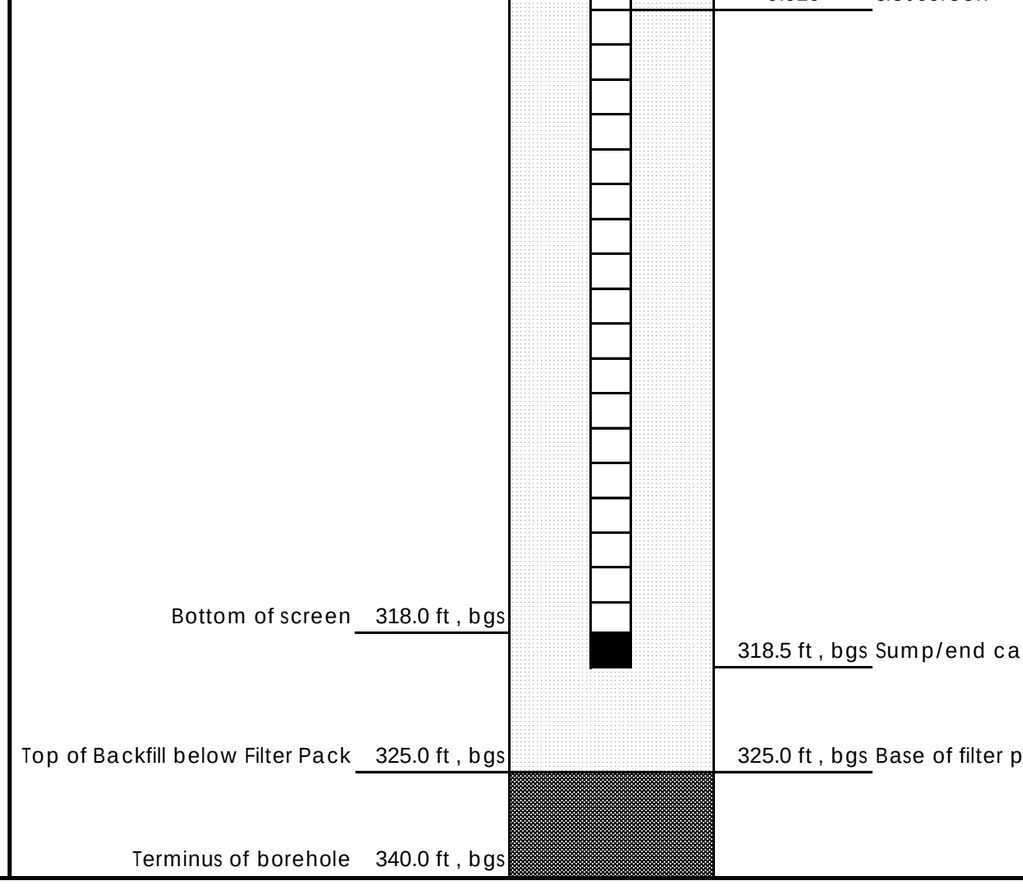
Well Installation Field Log

Project Name:	Plant Gorgas Ash Pond CCR Delineation Phase II	Date Started:	11/8/2019	Date Completed:	11/20/2019
Borehole/Well No:	GS-AP-MW-35HO	Northing (ft):	1315127.10	Easting (ft):	2064800.69
Plant Name:	Plant Gorgas	Latitude:	33.61490214	Longitude:	-87.18367956
Plant Address:	460 Gorgas Road Parrish, AL	Location Datum:	AL NAD 83	Elevation Datum:	MSL
Project & Task Number:	APC716264	Surface/ Ground Elevation:	550.6	Stickup (ft, ags):	2.5
Goals/Task:	Delineation Well Installation	Borehole Diameter (in):	6	Borehole Depth (ft, bgs):	340.0
Drilling Company:	Cascade	Well Casing Diameter (in):	2	Well Depth (ft, bgs):	318.5
Drilling Equipment/Rig Type:	Truck Mounted Sonic	Top of Casing elev (ft):	553.35	Screen length (ft):	10
Drilling Method:	Air Hammer	DTW at Completion (ft, bgs):	249.49 (SeeNotes)		
Sampling Method:	NS				
Prepared By:	Scott Baxter				
Review By:	Brandon Coates				

*Not to Scale

Depth (feet)

Well Construction



Materials Inventory

Stick up: 2.5 ft, ags

Casing Type (steel or PVC, schedule 40 or 80):
PVC schedule 40

Casing
Top: 2.5 ft, ags Bottom: 308.0 ft, bgs

Screen Type:
4"ID x 2"ID U-pack

Screen Slot Size:
0.010

Screen
Top: 308.0 ft, bgs Bottom: 318.0 ft, bgs

Sump/end cap
Top: 318.0 ft, bgs Bottom: 318.5 ft, bgs

Grout Quantity:
395 gallons

Grout Type:
BAROID AQUA GARD

Grout
Top: 0.5 ft, bgs Bottom: 301.8 ft, bgs

Bentonite Type:
1/4" PDS TR30 pellets

Bentonite Seal
Top: 301.8 ft, bgs Bottom: 305.5 ft, bgs

Filter Pack - Pre-pack and Annular Space
Type (manufacturer, size):
20/40 Mesh (Global #7)

Filter Pack:
Top: 305.5 ft, bgs Bottom: 325.0 ft, bgs

Notes: Bentonite seal hydrated 4-hours prior to grout backfill placed.
NS = No samples were collected
DTW = 1-22-2020 at the time of development

Backfill below sand pack: Boring backfilled with 20.5 feet of Baroid 3/8" Chip Bentonite

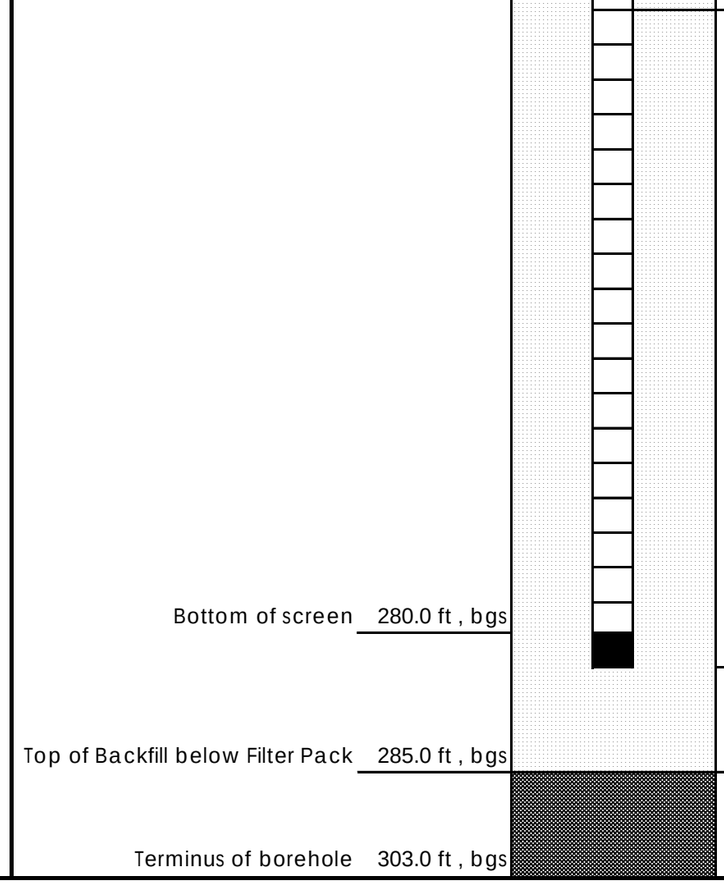
Well Installation Field Log

Project Name:	Plant Gorgas Ash Pond CCR Delineation Phase II	Date Started:	10/27/2019	Date Completed:	10/28/2019
Borehole/Well No:	GS-AP-MW-36H	Northing (ft):	1316518.20	Easting (ft):	2063698.16
Plant Name:	Plant Gorgas	Latitude:	33.61873434	Longitude:	-87.18728721
Plant Address:	460 Gorgas Road Parrish, AL	Location Datum:	AL NAD 83	Elevation Datum:	MSL
Project & Task Number:	APC716264	Surface/ Ground Elevation:	533.67	Stickup (ft, ags):	2.9
Goals/Task:	Delineation Well Installation	Borehole Diameter (in):	6	Borehole Depth (ft, bgs):	303.0
Drilling Company:	Cascade	Well Casing Diameter (in):	2	Well Depth (ft, bgs):	280.5
Drilling Equipment/Rig Type:	Truck Mounted Sonic	Top of Casing elev (ft):	536.61	Screen length (ft):	10
Drilling Method:	Air Hammer	DTW at Completion (ft, bgs):	240.0		
Sampling Method:	NS				
Prepared By:	Scott Baxter				
Review By:	Brandon Coates				

*Not to Scale

Depth (feet)

Well Construction



Materials Inventory

Stick up: 2.9 ft, ags

Casing Type (steel or PVC, schedule 40 or 80):
PVC schedule 40

Casing
Top: 2.9 ft, ags Bottom: 270.0 ft, bgs

Screen Type:
4"ID x 2"ID U-pack

Screen Slot Size:
0.010

Screen
Top: 270.0 ft, bgs Bottom: 280.0 ft, bgs

Sump/end cap
Top: 280.0 ft, bgs Bottom: 280.5 ft, bgs

Grout Quantity:
340 gallons

Grout Type:
BAROID AQUA GARD

Grout
Top: 0.5 ft, bgs Bottom: 261.1 ft, bgs

Bentonite Type:
1/4" PDS TR30 pellets

Bentonite Seal
Top: 261.1 ft, bgs Bottom: 267.7 ft, bgs

Filter Pack - Pre-pack and Annular Space
Type (manufacturer, size):
20/40 Mesh (Global #7)

Filter Pack:
Top: 267.7 ft, bgs Bottom: 285.0 ft, bgs

Notes: Bentonite seal hydrated 4-hours prior to grout backfill placed.
NS = No samples were collected

Backfill below sand pack: Boring backfilled with 18 feet of Baroid 3/8" Chip Bentonite

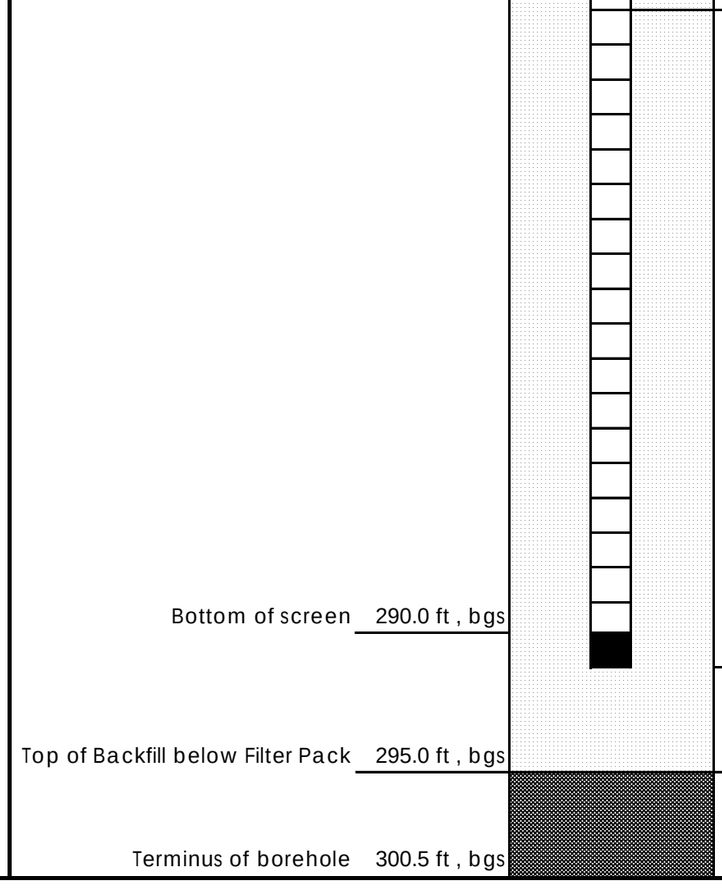
Well Installation Field Log

Project Name:	Plant Gorgas Ash Pond CCR Delineation Phase II	Date Started:	10/14/2019	Date Completed:	10/23/2019
Borehole/Well No:	GS-AP-MW-37H	Northing (ft):	1319199.34	Easting (ft):	2062581.05
Plant Name:	Plant Gorgas	Latitude:	33.62611184	Longitude:	-87.19093039
Plant Address:	460 Gorgas Road Parrish, AL	Location Datum:	AL NAD 83	Elevation Datum:	MSL
Project & Task Number:	APC716264	Surface/ Ground Elevation:	456.12	Stickup (ft, ags):	3.1
Goals/Task:	Delineation Well Installation	Borehole Diameter (in):	6	Borehole Depth (ft, bgs):	300.5
Drilling Company:	Cascade	Well Casing Diameter (in):	2	Well Depth (ft, bgs):	290.5
Drilling Equipment/Rig Type:	Truck Mounted Sonic	Top of Casing elev (ft):	459.28	Screen length (ft):	20
Drilling Method:	Air Hammer	DTW at Completion (ft, bgs):	270.0		
Sampling Method:	NS				
Prepared By:	Scott Baxter				
Review By:	Brandon Coates				

*Not to Scale

Depth (feet)

Well Construction



Materials Inventory

Stick up: 3.1 ft, ags

Casing Type (steel or PVC, schedule 40 or 80):
PVC schedule 40

Casing
Top: 3.1 ft, ags Bottom: 270.0 ft, bgs

Screen Type:
4"ID x 2"ID U-pack

Screen Slot Size:
0.010

Screen
Top: 270.0 ft, bgs Bottom: 290.0 ft, bgs

Sump/end cap
Top: 290.0 ft, bgs Bottom: 290.5 ft, bgs

Grout Quantity:
340 gallons

Grout Type:
BAROID AQUA GARD

Grout
Top: 0.5 ft, bgs Bottom: 260.4 ft, bgs

Bentonite Type:
1/4" PDS TR30 pellets

Bentonite Seal
Top: 260.4 ft, bgs Bottom: 266.8 ft, bgs

Filter Pack - Pre-pack and Annular Space
Type (manufacturer, size):
20/40 Mesh (Global #7)

Filter Pack:
Top: 266.8 ft, bgs Bottom: 295.0 ft, bgs

Notes: Bentonite seal hydrated 4-hours prior to grout backfill placed.
NS = No samples were collected

Backfill below sand pack: Boring backfilled with 5.5 feet of Baroid 3/8" Chip Bentonite

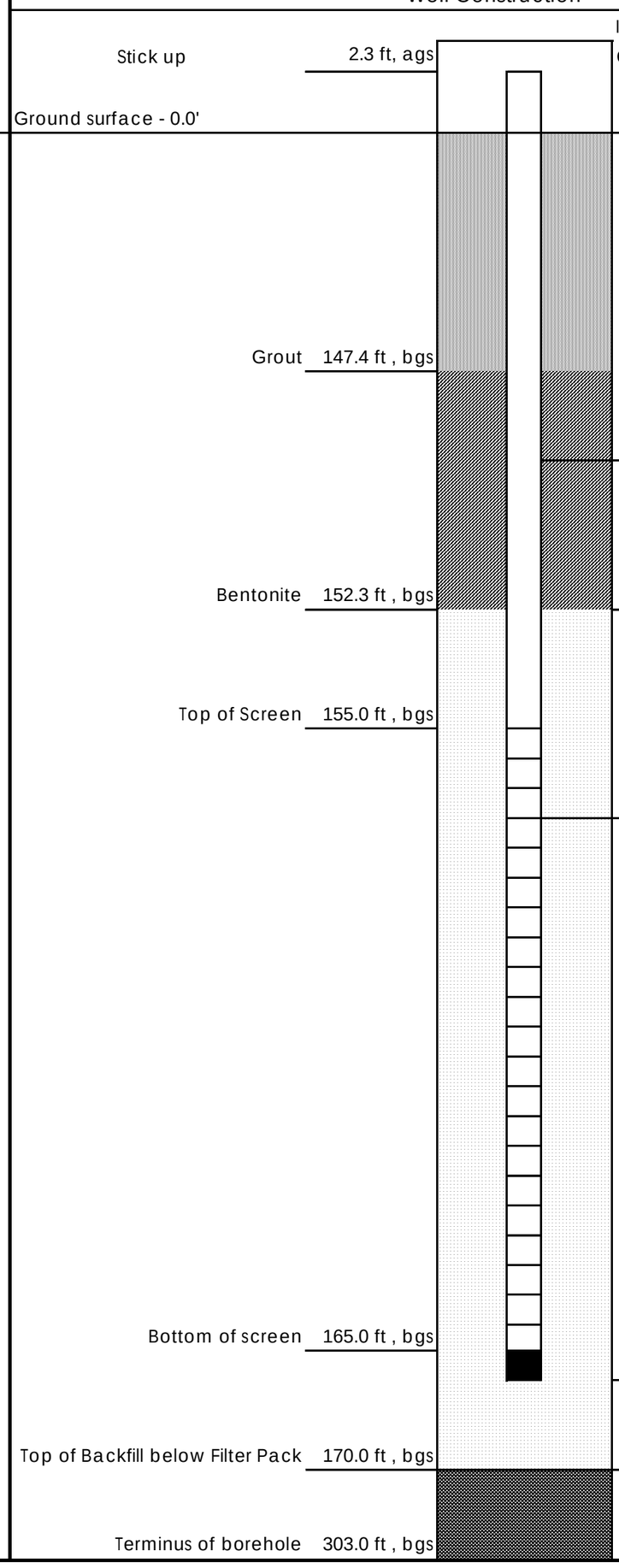
Well Installation Field Log

Project Name:	Plant Gorgas Ash Pond CCR Delineation Phase II	Date Started:	11/7/2019	Date Completed:	11/22/2019
Borehole/Well No:	GS-AP-MW-38H	Northing (ft):	1320575.44	Easting (ft):	2061610.67
Plant Name:	Plant Gorgas	Latitude:	33.62990155	Longitude:	-87.19410481
Plant Address:	460 Gorgas Road Parrish, AL	Location Datum:	AL NAD 83	Elevation Datum:	MSL
Project & Task Number:	APC716264	Surface/ Ground Elevation:	343.41	Stickup (ft, ags):	2.3
Goals/Task:	Delineation Well Installation	Borehole Diameter (in):	6	Borehole Depth (ft, bgs):	303.0
Drilling Company:	SAEDACO	Well Casing Diameter (in):	2	Well Depth (ft, bgs):	165.5
Drilling Equipment/Rig Type:	Truck Mounted Sonic	Top of Casing elev (ft):	345.74	Screen length (ft):	10
Drilling Method:	Air Hammer	DTW at Completion (ft, bgs):	168.15 (See Note)		
Sampling Method:	NS				
Prepared By:	Scott Baxter				
Review By:	Brandon Coates				

*Not to Scale

Depth (feet)

Well Construction



Materials Inventory

Stick up: 2.3 ft, ags

Casing Type (steel or PVC, schedule 40 or 80):
PVC schedule 40

Casing
Top: 2.3 ft, ags Bottom: 155.0 ft, bgs

Screen Type:
4"ID x 2"ID U-pack

Screen Slot Size:
0.010

Screen
Top: 155.0 ft, bgs Bottom: 165.0 ft, bgs

Sump/end cap
Top: 165.0 ft, bgs Bottom: 165.5 ft, bgs

Grout Quantity:
190 gallons

Grout Type:
BAROID AQUA GARD

Grout
Top: 0.5 ft, bgs Bottom: 147.4 ft, bgs

Bentonite Type:
1/4" PDS TR30 pellets

Bentonite Seal
Top: 147.4 ft, bgs Bottom: 152.3 ft, bgs

Filter Pack - Pre-pack and Annular Space
Type (manufacturer, size):
20/40 Mesh (Global #7)

Filter Pack:
Top: 152.3 ft, bgs Bottom: 170.0 ft, bgs

Notes: Bentonite seal hydrated 4-hours prior to grout backfill placed.
NS = No samples were collected
DTW = 12-3-19 at the time of development

Backfill below sand pack: Boring backfilled with 133 feet of
Pel Plug 1/4" coated bentonite pellets.

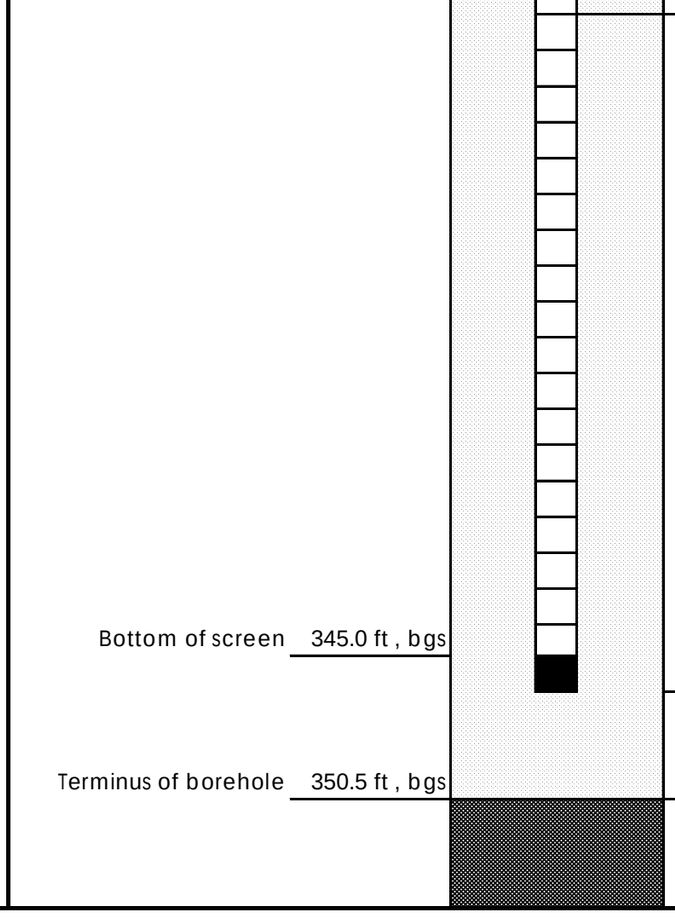
Well Installation Field Log

Project Name:	Plant Gorgas Ash Pond CCR Delineation Phase	Date Started:	10/23/2019	Date Completed:	10/29/2019
Borehole/Well No:	GS-AP-MW-39H	Northing (ft):	1321072.42	Easting (ft):	2062371.29
Plant Name:	Plant Gorgas	Latitude:	33.61738789	Longitude:	-87.19160114
Plant Address:	460 Gorgas Road Parrish, AL	Location Datum:	AL NAD 83	Elevation Datum:	MSL
Project & Task Number:	APC716264	Surface/ Ground Elevation:	448.47	Stickup (ft, ags):	2.7
Goals/Task:	Delineation Well Installation	Borehole Diameter (in):	6	Borehole Depth (ft, bgs):	350.5
Drilling Company:	Cascade	Well Casing Diameter (in):	2	Well Depth (ft, bgs):	345.5
Drilling Equipment/Rig Type:	Truck Mounted Sonic	Top of Casing elev (ft):	451.13	Screen length (ft):	20
Drilling Method:	Air Hammer	DTW at Completion (ft, bgs):	280.1		
Sampling Method:	NS				
Prepared By:	Scott Baxter				
Review By:	Brandon Coates				

*Not to Scale

Depth (feet)

Well Construction



Materials Inventory

Stick up: 2.7 ft, ags

Casing Type (steel or PVC, schedule 40 or 80):
PVC schedule 40

Casing
Top: 2.7 ft, ags Bottom: 325.0 ft, bgs

Screen Type:
4"ID x 2"ID U-pack

Screen Slot Size:
0.010

Screen
Top: 325.0 ft, bgs Bottom: 345.0 ft, bgs

Sump/end cap
Top: 345.0 ft, bgs Bottom: 345.5 ft, bgs

Grout Quantity:
417 gallons

Grout Type:
BAROID AQUA GARD

Grout
Top: 0.5 ft, bgs Bottom: 317.5 ft, bgs

Bentonite Type:
1/4" PDS TR30 pellets

Bentonite Seal
Top: 317.5 ft, bgs Bottom: 322.1 ft, bgs

Filter Pack - Pre-pack and Annular Space
Type (manufacturer, size):
20/40 Mesh (Global #7)

Filter Pack:
Top: 322.1 ft, bgs Bottom: 345.5 ft, bgs

Notes: Bentonite seal hydrated 4-hours prior to grout backfill placed.

NS = No samples were collected

Backfill below sand pack: NA

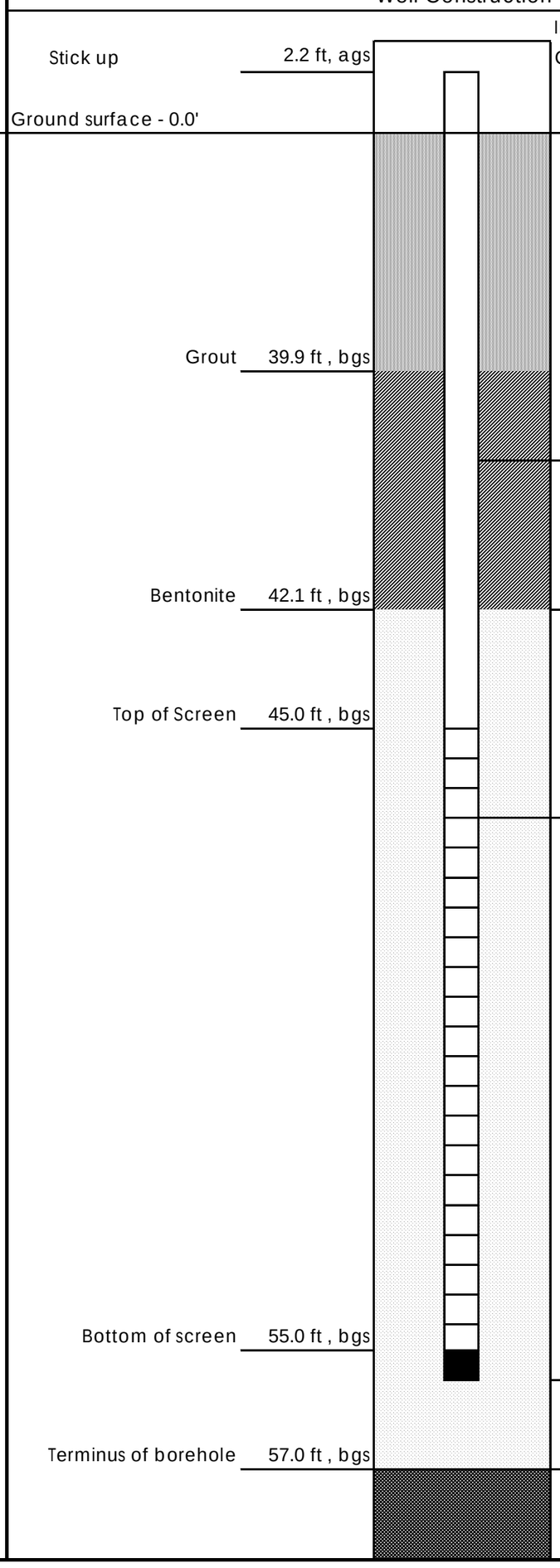
Well Installation Field Log

Project Name:	Plant Gorgas Ash Pond CCR Delineation Phase	Date Started:	10/24/2019	Date Completed:	10/27/2019
Borehole/Well No:	GS-AP-MW-41HD	Northing (ft):	1324683.42	Easting (ft):	2063283.86
Plant Name:	Plant Gorgas	Latitude:	33.64117727	Longitude:	-87.18856735
Plant Address:	460 Gorgas Road Parrish, AL	Location Datum:	AL NAD 83	Elevation Datum:	MSL
Project & Task Number:	APC716264	Surface/ Ground Elevation:	282.32	Stickup (ft, ags):	2.2
Goals/Task:	Delineation Well Installation	Borehole Diameter (in):	6	Borehole Depth (ft, bgs):	57.0
Drilling Company:	SAEDACO	Well Casing Diameter (in):	2	Well Depth (ft, bgs):	55.5
Drilling Equipment/Rig Type:	Truck Mounted Sonic	Top of Casing elev (ft):	284.54	Screen length (ft):	10
Drilling Method:	Air Hammer	DTW at Completion (ft, bgs):	29.3		
Sampling Method:	NS				
Prepared By:	Scott Baxter				
Review By:	Brandon Coates				

*Not to Scale

Depth (feet)

Well Construction



Materials Inventory

Stick up: 2.2 ft, ags

Casing Type (steel or PVC, schedule 40 or 80):
PVC schedule 40

Casing
Top: 2.2 ft, ags Bottom: 45.0 ft, bgs

Screen Type:
4"ID x 2"ID U-pack

Screen Slot Size:
0.010

Screen
Top: 45.0 ft, bgs Bottom: 55.0 ft, bgs

Sump/end cap
Top: 55.0 ft, bgs Bottom: 55.5 ft, bgs

Grout Quantity:
120 gallons

Grout Type:
BAROID AQUA GARD

Grout
Top: 0.5 ft, bgs Bottom: 39.9 ft, bgs

Bentonite Type:
1/4" PDS TR30 pellets

Bentonite Seal
Top: 39.9 ft, bgs Bottom: 42.1 ft, bgs

Filter Pack - Pre-pack and Annular Space
Type (manufacturer, size):
20/40 Mesh (Global #7)

Filter Pack:
Top: 42.1 ft, bgs Bottom: 57.0 ft, bgs

Notes: Bentonite seal hydrated 4-hours prior to grout backfill placed.

NS = No samples were collected

Backfill below sand pack: NA

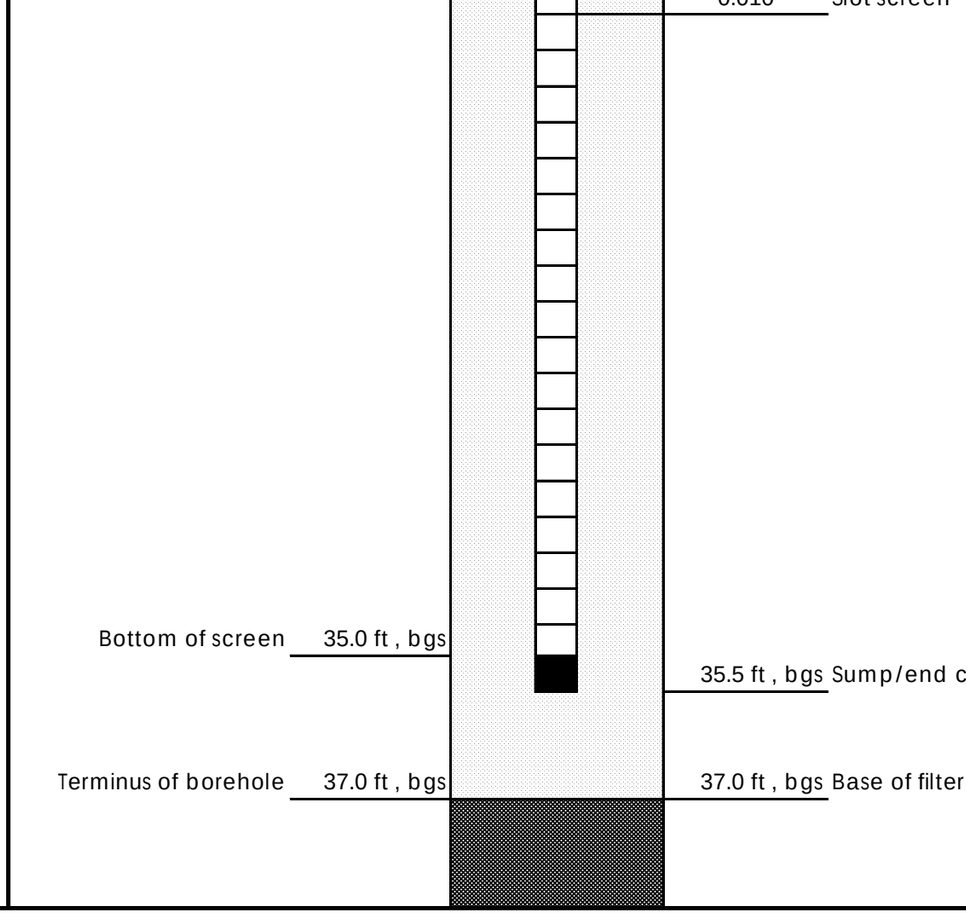
Well Installation Field Log

Project Name:	Plant Gorgas Ash Pond CCR Delineation Phase	Date Started:	10/27/2019	Date Completed:	10/28/2019
Borehole/Well No:	GS-AP-MW-41HS	Northing (ft):	1324686.47	Easting (ft):	2063278.88
Plant Name:	Plant Gorgas	Latitude:	33.6411857	Longitude:	-87.18858368
Plant Address:	460 Gorgas Road Parrish, AL	Location Datum:	AL NAD 83	Elevation Datum:	MSL
Project & Task Number:	APC716264	Surface/ Ground Elevation:	281.75	Stickup (ft, ags):	2.9
Goals/Task:	Delineation Well Installation	Borehole Diameter (in):	6	Borehole Depth (ft, bgs):	37.0
Drilling Company:	SAEDACO	Well Casing Diameter (in):	2	Well Depth (ft, bgs):	35.5
Drilling Equipment/Rig Type:	Truck Mounted Sonic	Top of Casing elev (ft):	284.65	Screen length (ft):	10
Drilling Method:	Air Hammer	DTW at Completion (ft, bgs):	29.3		
Sampling Method:	NS				
Prepared By:	Scott Baxter				
Review By:	Brandon Coates				

*Not to Scale

Depth (feet)

Well Construction



Materials Inventory

Stick up: 2.9 ft, ags

Casing Type (steel or PVC, schedule 40 or 80):
PVC schedule 40

Casing
Top: 2.9 ft, ags Bottom: 25.0 ft, bgs

Screen Type:
4"ID x 2"ID U-pack

Screen Slot Size:
0.010

Screen
Top: 25.0 ft, bgs Bottom: 35.0 ft, bgs

Sump/end cap
Top: 35.0 ft, bgs Bottom: 35.5 ft, bgs

Grout Quantity:
30 gallons

Grout Type:
BAROID AQUA GARD

Grout
Top: 0.5 ft, bgs Bottom: 19.9 ft, bgs

Bentonite Type:
1/4" PDS TR30 pellets

Bentonite Seal
Top: 19.9 ft, bgs Bottom: 22.6 ft, bgs

Filter Pack - Pre-pack and Annular Space
Type (manufacturer, size):
20/40 Mesh (Global #7)

Filter Pack:
Top: 22.6 ft, bgs Bottom: 37.0 ft, bgs

Notes: Bentonite seal hydrated 4-hours prior to grout backfill placed.

NS = No samples were collected

Backfill below sand pack: NA

Well Installation Field Log

Project Name:	Plant Gorgas Ash Pond CCR Delineation Phase II	Date Started:	10/28/2019	Date Completed:	10/29/2019
Borehole/Well No:	GS-AP-MW-42H	Northing (ft):	1325082.88	Easting (ft):	2064034.21
Plant Name:	Plant Gorgas	Latitude:	33.64226884	Longitude:	-87.18609797
Plant Address:	460 Gorgas Road Parrish, AL	Location Datum:	AL NAD 83	Elevation Datum:	MSL
Project & Task Number:	APC716264	Surface/ Ground Elevation:	338.61	Stickup (ft, ags):	2.0
Goals/Task:	Delineation Well Installation	Borehole Diameter (in):	6	Borehole Depth (ft, bgs):	303.0
Drilling Company:	SAEDACO	Well Casing Diameter (in):	2	Well Depth (ft, bgs):	85.5
Drilling Equipment/Rig Type:	Truck Mounted Sonic	Top of Casing elev (ft):	340.62	Screen length (ft):	10
Drilling Method:	Air Hammer	DTW at Completion (ft, bgs):	17.0		
Sampling Method:	NS				
Prepared By:	Scott Baxter				
Review By:	Brandon Coates				

*Not to Scale

Depth (feet)

Well Construction



Materials Inventory

Stick up: 2.0 ft, ags

Casing Type (steel or PVC, schedule 40 or 80):
PVC schedule 40

Casing
Top: 2.0 ft, ags Bottom: 75.0 ft, bgs

Screen Type:
4"ID x 2"ID U-pack

Screen Slot Size:
0.010

Screen
Top: 75.0 ft, bgs Bottom: 85.0 ft, bgs

Sump/end cap
Top: 85.0 ft, bgs Bottom: 85.5 ft, bgs

Grout Quantity:
90 gallons

Grout Type:
BAROID AQUA GARD

Grout
Top: 0.5 ft, bgs Bottom: 67.8 ft, bgs

Bentonite Type:
1/4" PDS TR30 pellets

Bentonite Seal
Top: 67.8 ft, bgs Bottom: 72.5 ft, bgs

Filter Pack - Pre-pack and Annular Space
Type (manufacturer, size):
20/40 Mesh (Global #7)

Filter Pack:
Top: 72.5 ft, bgs Bottom: 90.0 ft, bgs

Notes: Bentonite seal hydrated 4-hours prior to grout backfill placed.
NS = No samples were collected

Backfill below sand pack: Boring backfilled with 213 feet of Baroid 3/8" Chip Bentonite

Well Installation Field Log

Project Name:	Plant Gorgas Ash Pond CCR Delineation Phase II	Date Started:	11/10/2019	Date Completed:	11/12/2019
Borehole/Well No:	GS-AP-MW-43HO	Northing (ft):	1321244.07	Easting (ft):	2067672.16
Plant Name:	Plant Gorgas	Latitude:	33.6316882	Longitude:	-87.17418445
Plant Address:	460 Gorgas Road Parrish, AL	Location Datum:	AL NAD 83	Elevation Datum:	MSL
Project & Task Number:	APC716264	Surface/ Ground Elevation:	511.87	Stickup (ft, ags):	2.8
Goals/Task:	Delineation Well Installation	Borehole Diameter (in):	6	Borehole Depth (ft, bgs):	301.0
Drilling Company:	Cascade	Well Casing Diameter (in):	2	Well Depth (ft, bgs):	220.5
Drilling Equipment/Rig Type:	Truck Mounted Sonic	Top of Casing elev (ft):	514.62	Screen length (ft):	20
Drilling Method:	Air Hammer	DTW at Completion (ft, bgs):	187.0		
Sampling Method:	NS				
Prepared By:	Scott Baxter				
Review By:	Brandon Coates				

*Not to Scale

Depth (feet)

Well Construction



Materials Inventory

Stick up: 2.8 ft, ags

Casing Type (steel or PVC, schedule 40 or 80):
PVC schedule 40

Casing
Top: 2.8 ft, ags Bottom: 200.0 ft, bgs

Screen Type:
4"ID x 2"ID U-pack

Screen Slot Size:
0.010

Screen
Top: 200.0 ft, bgs Bottom: 220.0 ft, bgs

Sump/end cap
Top: 220.0 ft, bgs Bottom: 220.5 ft, bgs

Grout Quantity:
250 gallons

Grout Type:
BAROID AQUA GARD

Grout
Top: 0.5 ft, bgs Bottom: 191.1 ft, bgs

Bentonite Type:
1/4" PDS TR30 pellets

Bentonite Seal
Top: 191.1 ft, bgs Bottom: 198.1 ft, bgs

Filter Pack - Pre-pack and Annular Space
Type (manufacturer, size):
20/40 Mesh (Global #7)

Filter Pack:
Top: 198.1 ft, bgs Bottom: 230.0 ft, bgs

Notes: Bentonite seal hydrated 4-hours prior to grout backfill placed.
NS = No samples were collected

Backfill below sand pack: Boring backfilled with 71 feet of
Baroid 3/8" Chip Bentonite

Appendix B

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING



ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica Pensacola
3355 McLemore Drive
Pensacola, FL 32514
Tel: (850)474-1001

TestAmerica Job ID: 400-151981-2
TestAmerica SDG: Gorgas Ash Pond 1141 (ASD)
Client Project/Site: CCR Plant Gorgas

For:
Alabama Power General Test Laboratory
744 County Rd 87
GSC #8
Calera, Alabama 35040

Attn: Sarah Copeland

Cheyenne Whitmire

Authorized for release by:
7/16/2018 10:31:38 AM

Cheyenne Whitmire, Project Manager II
(850)471-6222
cheyenne.whitmire@testamericainc.com

LINKS

Review your project results through TotalAccess

Have a Question? Ask The Expert

Visit us at: www.testamericainc.com

The test results in this report meet all 2003 NELAC and 2009 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Receipt Checklists 6
Certification Summary 7
Subcontract Data 8

Sample Summary

Client: Alabama Power General Test Laboratory
Project/Site: CCR Plant Gorgas

TestAmerica Job ID: 400-151981-2
SDG: Gorgas Ash Pond 1141 (ASD)

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
400-151981-1	AY08286 MW-6S	Water	04/02/18 11:48	04/10/18 09:24
400-151981-2	AY08287 MW-6S DUP	Water	04/02/18 11:48	04/10/18 09:24
400-151981-3	AY08288 MW-6D	Water	04/02/18 12:51	04/10/18 09:24
400-151981-4	AY08289 MW-7	Water	04/02/18 14:00	04/10/18 09:24
400-151981-5	AY08290 MW-8	Water	04/02/18 15:20	04/10/18 09:24
400-151981-6	AY08291 FB-1	Water	04/02/18 15:48	04/10/18 09:24
400-151981-7	AY08292 MW-2	Water	04/03/18 09:57	04/10/18 09:24
400-151981-11	AY08296 MW-18	Water	04/03/18 14:44	04/10/18 09:24
400-151981-15	AY08300 MW-9	Water	04/04/18 14:55	04/10/18 09:24
400-151981-18	AY08303 MW-12	Water	04/05/18 10:00	04/10/18 09:24
400-151981-19	AY08304 MW-13	Water	04/05/18 11:13	04/10/18 09:24
400-151981-21	AY08306 EB-1	Water	04/05/18 13:15	04/10/18 09:24

TestAmerica Pensacola
3355 McLemore Drive
Pensacola, FL 32514
Phone (850) 474-1001 Fax (850) 478-2671

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information	Sampler: Nick Pitts	Lab PM: Whitmire, Cheyenne R	Carrier Tracking No(s):	COC No: 400-56525-24537.1
Client Contact: Sarah Copeland	Phone:	E-Mail: cheyenne.whitmire@testamericainc.com		Page: Page 1 of 2
Company: Alabama Power General Test Laboratory		Analysis Requested		Job #: 151981
Address: 744 County Rd 87 GSC #8	Due Date Requested:			Preservation Codes: A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2O3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - ph 4-5, Z - other (specify), Other:
City: Calera	TAT Requested (days): Routine			
State, Zip: AL, 35040				
Phone: 205-664-6121(Tel)	PO #:			
Email: sgcopela@southernco.com	WO #:			
Project Name: CCR	Project #: 40007143			
Site: Gorgas Ash Pond 1141 (ASD)	SSOW#:			

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	Tritium EPA 906	SM 4500 Cl_E	SM 4500 SO4_E	8260 (CFC-11, CFC-12, CFS-113)	Boron-11	Total Number of containers	Special Instructions/Note:
			Preservation Code:				N						
AY08286	4/2/18	1148	G	Water			X	X	X	X	X	6	MW-6S
AY08287	4/2/18	1148	G	Water			X	X	X	X	X	6	MW-6S Dup (Sample Duplicate)
AY08288	4/2/18	1251	G	Water			X	X	X	X	X	6	MW-6D
AY08289	4/2/18	1400	G	Water			X	X	X	X	X	6	MW-7
AY08290	4/2/18	1520	G	Water			X	X	X	X	X	6	MW-8
AY08291	4/2/18	1548	G	Water			X	X	X	X	X	6	FB-1 (Field Blank)
AY08292	4/3/18	0957	G	Water			X	X	X	X	X	6	MW-2
AY08293	4/3/18	1234	G	Water			X	X	X	X		5	MW-21
AY08294	4/3/18	1345	G	Water			X	X	X	X		5	MW-19
AY08295	4/3/18	1332	G	Water			X	X	X	X		5	FB-2 (Field Blank)
AY08296	4/3/18	1444	G	Water			X	X	X	X	X	6	MW-18
AY08297	4/3/18	1810	G	Water			X	X	X	X		5	MW-15
AY08298	4/4/18	1132	G	Water			X	X	X	X		5	MW-17
AY08299	4/4/18	1322	G	Water				X	X			1	MW-16D
AY08300	4/4/18	1455	G	Water			X	X	X	X	X	6	MW-9
AY08301	4/4/18	1625	G	Water			X	X	X	X		5	MW-11

400-151981 COC

☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Relinquished by: Sarah Copeland	Date/Time: 4/9/2018; 1445	Company APC	Received by:	Date/Time: 4/10/18 0924	Company TA Pen
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: Δ Yes Δ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks: 0.0°C IR8 15.3°C IR8

7/16/2018

TestAmerica Pensacola
3355 McLemore Drive
Pensacola, FL 32514
Phone (850) 474-1001 Fax (850) 478-2671

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information	Sampler: Nick Pitts	Lab PM: Whitmire, Cheyenne R	Carrier Tracking No(s):	COC No: 400-56525-24537.1
Client Contact: Sarah Copeland	Phone:	E-Mail: cheyenne.whitmire@testamericainc.com		Page: Page 2 of 2
Company: Alabama Power General Test Laboratory				Job #: 151981
Address: 744 County Rd 87 GSC #8	Due Date Requested:			
City: Calera	TAT Requested (days): Routine			
State, Zip: AL, 35040				
Phone: 205-664-6121(Tel)	PO #:			
Email: sgcopela@southernco.com	WO #:			
Project Name: CCR	Project #: 40007143			
Site: Gorgas Ash Pond 1141 (ASD)	SSOW#:			

Analysis Requested

Preservation Codes:
A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2O3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - ph 4-5, Z - other (specify)
Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	Tritium EPA 906	SM 4500 Cl_E	SM 4500 SO4_E	8260 (CFC-11, CFC-12, CFB-113)	Boron-11	Total Number of containers	Special Instructions/Note:
			Preservation Code:				N						
AY08302	4/4/18	1625	G	Water			X	X	X	X		5	MW-11 Dup (Sample Duplicate)
AY08303	4/5/18	1000	G	Water			X	X	X	X	X	6	MW-12
AY08304	4/5/18	1113	G	Water		Y	X	X	X	X	X	8	MW-13
AY08305	4/5/18	1235	G	Water			X	X	X	X		5	MW-14
AY08306	4/5/18	1315	G	Water			X	X	X	X	X	6	EB-1 (Equipment Blank)

☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

	Relinquished by: Sarah Copeland	Date/Time: 4/9/2018; 1445	Company APC	Received by:	Date/Time: 4/10/18 0924	Company TAL Pen
	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: Δ Yes Δ No | Custody Seal No.: | Cooler Temperature(s) °C and Other Remarks: 0.0°C IR8 15.3°C IR8

7/16/2018

Login Sample Receipt Checklist

Client: Alabama Power General Test Laboratory

Job Number: 400-151981-2
SDG Number: Gorgas Ash Pond 1141 (ASD)

Login Number: 151981
List Source: TestAmerica Pensacola
List Number: 1
Creator: Whitmire, Cheyenne R

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	0.0°C IR8, 15.3°C IR8
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Accreditation/Certification Summary

Client: Alabama Power General Test Laboratory
Project/Site: CCR Plant Gorgas

TestAmerica Job ID: 400-151981-2
SDG: Gorgas Ash Pond 1141 (ASD)

Laboratory: TestAmerica Pensacola

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

Authority	Program	EPA Region	Identification Number	Expiration Date
Alabama	State Program	4	40150	06-30-19
ANAB	ISO/IEC 17025		L2471	02-22-20
Arizona	State Program	9	AZ0710	01-12-19
Arkansas DEQ	State Program	6	88-0689	09-01-18
California	State Program	9	2510	06-30-19
Florida	NELAP	4	E81010	06-30-19
Georgia	State Program	4	E81010 (FL)	06-30-19
Illinois	NELAP	5	200041	10-09-18
Iowa	State Program	7	367	08-01-18
Kansas	NELAP	7	E-10253	10-31-18
Kentucky (UST)	State Program	4	53	06-30-19
Kentucky (WW)	State Program	4	98030	12-31-18
Louisiana	NELAP	6	30976	06-30-19
Louisiana (DW)	NELAP	6	LA170005	12-31-18
Maryland	State Program	3	233	09-30-18
Massachusetts	State Program	1	M-FL094	06-30-19
Michigan	State Program	5	9912	06-30-19
New Jersey	NELAP	2	FL006	06-30-19
North Carolina (WW/SW)	State Program	4	314	12-31-18
Oklahoma	State Program	6	9810	08-31-18
Pennsylvania	NELAP	3	68-00467	01-31-19
Rhode Island	State Program	1	LAO00307	12-30-18
South Carolina	State Program	4	96026	06-30-18 *
Tennessee	State Program	4	TN02907	06-30-19
Texas	NELAP	6	T104704286-18-14	09-30-18
US Fish & Wildlife	Federal		LE058448-0	07-31-18
USDA	Federal		P330-16-00172	05-24-19
Virginia	NELAP	3	460166	06-14-19
Washington	State Program	10	C915	05-15-19
West Virginia DEP	State Program	3	136	06-30-19

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

ISOTOPE TRACER TECHNOLOGIES INC

Isotope Analyses for: TestAmerica Pensacola

IT2 FILE # 180097

2018-07-13

Approved by:

Orfan SStash

Orfan Shouakar-Stash, PhD
Director
Isotope Tracer Technologies Inc.
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Tel: 519-886-5555 | Fax: 519-886-5575
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Client: TestAmerica Pensacola
Address: 3355 McLemore Drive
Pensacola, FL 32514
USA
Tel: 850-474-1001
Fax: 850-478-2671
Attn.: Cheyenne R Whitmire
E-mail: cheyenne.whitmire@testamericainc.com

File Number: **180097**
Project Number: **40007143**
Project Name: **CCR**

#	Sample ID	Sample Collection		Sample #	$\delta^{11}B$	Result	Repeat
		Date	Time			per mil	
1	AY08286 MW-6S (400-151981-1)	4-2-18	11:48	50275	X	-6.2	-5.7
2	AY08287 MW-6S DUP (400-151981-2)	4-2-18	11:48	50276	X	-2.7	
3	AY08288 MW-6D (400-151981-3)	4-2-18	12:51	50277	X	-1.7	-1.8
4	AY08289 MW-7 (400-151981-4)	4-2-18	14:00	50278	X	-12.8	
5	AY08290 MW-8 (400-151981-5)	4-2-18	15:20	50279	X	13.7	
6	AY08291 FB-1 (400-151981-6)	4-2-18	15:48	50280	X	BQL	
7	AY08292 MW-2 (400-151981-7)	4-3-18	09:57	50281	X	4.5	
8	AY08296 MW-18 (400-151981-11)	4-3-18	14:44	50282	X	-0.8	
9	AY08300 MW-9 (400-151981-15)	4-4-18	14:55	50283	X	4.6	
10	AY08303 MW-12 (400-151981-18)	4-5-18	10:00	50284	X	-0.8	
11	AY08304 MW-13 (400-151981-19)	4-5-18	11:13	50285	X	15.6	
12	AY08306 EB-1 (400-151981-21)	4-5-18	13:15	50286	X	BQL	

Notes:
BQL: Below Quantification Limits - Intensity is very small.

11B Analyses

Instrument Used:
Thermal Ionization Mass Spectrometry (TIMS), TI-Box, spectromat, Germany

Standard Used:
120 ratios are taken for each sample and the average is used to calculate the delta value.
Delta values are calculated with respect to NIST SRM951a.
A secondary standard of sea water (SB1) is ran with each carousel.

Typical Standard deviation:
+/- 2 permil

Approved by:

Orfan SStash

Orfan Shouakar-Stash, PhD
Director
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Tel: 519-886-5555 | Fax: 519-886-5575
Email: orfan@it2isotopes.com
Website: www.it2isotopes.com

Appendix C

ALABAMA POWER COMPANY
PLANT GORGAS
ASH POND
STATISTICAL ANALYSIS PLAN

Prepared for

Alabama Power Company
Birmingham, Alabama

Prepared by

Groundwater Stats Consulting
Mobile, Alabama

Revised August 2020



ALABAMA POWER COMPANY
PLANT GORGAS
ASH POND
STATISTICAL ANALYSIS PLAN

Kristina L. Rayner
Groundwater Stats Consulting, LLC
Originator

Gregory T. Whetstone, P.E.
Southern Company Services, Inc.
Reviewer

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APPENDICES

Appendix A Background Screening and Compliance Evaluation

1.0 INTRODUCTION

This updated Statistical Analysis Plan (SAP) describes the site-specific statistical analysis approach that is typically used to evaluate groundwater pursuant to ADEM Admin. Code r. 335-13-15-.06 and 40 CFR Part 257. 90 through 95 under detection and assessment monitoring programs. Note, however, that interwell prediction limits will be used at Alabama Power Company's Plant Gorgas Ash Pond for Appendix III Detection Monitoring parameters in accordance with Alabama Department of Environmental Management (ADEM) guidelines. Future changes in the statistical analysis approach require approval from ADEM.

A compliance groundwater monitoring well system was installed pursuant to requirements of 40 CFR 257.91(e)(1). A background well network is installed upgradient of the CCR unit. Downgradient monitoring wells were installed along the downgradient waste boundary pursuant to 40 CFR 257.91(a)(2). The compliance monitoring well network is described in the site-specific groundwater monitoring plan and summarized in the attached Table 1.

Alabama Power Company conducted 8 background monitoring sample events beginning in 2016. Samples were collected from the compliance monitoring wells and analyzed for CCR Appendix III and IV parameters pursuant to 40 CFR 257.91 Appendix III and IV parameters are as follows:

1) Appendix III (Detection Monitoring) - boron, calcium, chloride, fluoride, pH, sulfate, and TDS
2) Appendix IV (Assessment Monitoring) – antimony, arsenic, barium, beryllium, cadmium, chromium, cobalt, combined radium 226 + 228, fluoride, lead, lithium, mercury, molybdenum, selenium, and thallium

This updated SAP has been developed based upon the characteristics of the groundwater quality data collected since groundwater monitoring was implemented in 2016 following the requirements in 40 CFR 257.91[1], and the United States Environmental Protection Agency (USEPA) Unified Guidance (March 2009)[2]. The plan describes:

[1] Final Rule: Disposal of Coal Combustion Residuals from Electric Utilities, 2015.
[2] U.S. EPA, March 2009. *Unified Guidance*, Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities. Office of Solid Waste Management Division, U.S. Environmental Protection Agency, Washington, D.C.

1) Background data collection, management, and updates;
2) Statistical concepts applicable to detection and assessment monitoring programs;
3) Site-specific statistical analysis methods for Detection Monitoring; and
4) Statistical approach for Assessment Monitoring and Corrective Action.

As part of ongoing site activities, installation of additional wells may be necessary to characterize site conditions or supplement the assessment monitoring well network. The disposition of these additional wells will be described in the site groundwater monitoring plan. Procedures for statistically evaluating additional wells are described in this SAP.

Any change to the statistical analysis plan (e.g. statistical analysis method, background period, background data set, well network, screening method, etc.) will only be implemented upon receipt of approval from the Alabama Department of Environmental Management (Department).

2.0 BACKGROUND

This section describes the establishment, screening, update, and management of the background data sets used for detection, assessment and corrective action phases of groundwater monitoring. Included are descriptions of the tests that are used to determine whether the potential background data represent site-specific conditions and the procedures used to update (expand or truncate) the background data set. Also described are procedures that will be used to update the data set with more current monitoring data or as new background monitoring wells are installed.

Changes or updates to background updates will only be made after Department approval.

2.1 Background Screening

Background is determined based on site-specific conditions such upgradient wells, wells not in the groundwater flow path of the unit, or wells determined to not be affected by the disposal unit. Once background wells are selected based on site-specific conditions, the data are screened as follows:

2.1.1 Outlier Testing

An outlier is defined as an observation that is unlikely to have come from the same distribution as the rest of the data. A statistical outlier test, such as the 1989 EPA Outlier Test [3]or Tukey's Outlier Test as discussed in the USEPA Guidance, will be performed on the monitoring well data when time series plots or box and whiskers plots indicate the presence of extreme observations relative to other observations. The outlier test will serve as a data quality check to help identify errors from data entry and other sources.

Statistical outliers in the background data will be deselected unless it can be proven that the data point is not an anomalous value and does represent naturally occurring variation. This is conservative from a regulatory perspective in that it ensures that the background limits are not artificially elevated. When outliers are identified, they are flagged in the data set and the values excluded from background limit calculations. Re-testing for outliers will be performed when background updates are proposed.

2.1.2 Testing and Adjusting for Seasonal Effects

Testing and adjusting data for seasonal factors ensures that seasonal effects will not affect the test results. When seasonal effects are suspected, the Kruskal-Wallis seasonality test will be used to determine whether the seasonal effects are statistically significant when there are sufficient data to test for seasonality. When seasonal effects are confirmed, the data will be de-seasonalized prior to calculating a statistical limit. Data are de-seasonalized by subtracting the seasonal mean and adding back the grand mean to each observation. Background data will be re-tested when there are at least four new values available and a background update is proposed.

[3] 1953, "Processing data for outliers", *Biometrics,* Vol. 9, pp.74-89.

2.1.3 Temporal Trend Testing

The Sen's Slope/Mann-Kendall statistical analysis will be performed on all well/constituent pairs to evaluate concentrations over time. The Sen's Slope Estimator will be used to estimate the rate of change (increasing, no change, or decreasing) for each constituent at each well. The Mann Kendall statistic will be used to determine whether each of those trends is statistically significant. The Sen's Slope/Mann Kendall analysis requires at least five observations.

When a significant trend is present, older historical values may be deselected from the background data prior to computing background limits in cases where groundwater is presumed not to be impacted by the unit. The resulting limits will reflect more current conditions and will not be influenced by older, historical conditions that are no longer relevant. If upgradient concentration levels are changing over time (i.e. trending upward or downward), the prospective background data set may need to be truncated, removing older data to ensure that the resulting limits continue to represent current natural conditions.

For instance, when background concentration levels are increasing over time due to upgradient water quality changes, if the background data sets are not adjusted, the established PLs could result in increased false positive or false negative risk. In some cases, including older historical data in the background data set may result in overly sensitive limits and an increased chance of false positive readings. In other cases, using all background data when there are temporal changes in background levels may artificially elevate limits. This scenario may occur even when there is a decreasing trend in background concentration levels. An elevated limit under these circumstances is a direct result of an inflated standard deviation that is used in the computation of the parametric limit, which in turn will increase the risk of false negative test outcomes.

Well/constituent pairs that have increasing or decreasing concentration levels over time will be evaluated to determine if earlier data are no longer representative of present-day groundwater quality. In those cases, earlier data may be deselected prior to construction of limits to reduce variation as well as to provide limits that are conservative from a regulatory perspective that will detect future changes in groundwater quality.

Background limits also need to allow for random variation in groundwater concentration levels that are naturally present at a site. The availability of multiple background wells can give an indication of the natural variability in groundwater constituent levels across a site.

2.1.4 Sample Size

While a parametric prediction limit may be constructed with as little as four samples per well, the CCR Rule and the EPA Unified Guidance recommend that a minimum of at least 8 independent background observations be collected for constructing statistical limits. The reliability of the statistical results is greatly enhanced by increasing the sample size to eight or more. An increased sample size tends to more accurately characterize the variation and typically reduce the probability of erroneous conclusions. Furthermore, if a nonparametric prediction limit is required, the confidence level associated with the test will be dependent on the number of background data available as well as the number of comparisons to the statistical limit.

2.1.5 Non-Detect Data

When data contain <15% nondetects in background, simple substitution of one-half the reporting limit is utilized in the statistical analysis. The reporting limit (RL) utilized for nondetects is the practical quantification limit (PQL) used by the laboratory.

When data contain between 15-50% nondetects, the Kaplan-Meier nondetect adjustment is applied to the background data. This technique adjusts the mean and standard deviation of the historical concentrations to account for concentrations below the reporting limit. Trace (or estimated) values which are reported above the method detection limit (MDL) and below the PQL/RL are used in the statistical analysis as reported by the laboratory. These values are flagged with "J" to distinguish between estimated values and values reported above the PQL.

If detection limits change over a period of analysis, then a statistically significant trend could be the result of increasing or decreasing laboratory precision and not an actual change in water quality. Under those circumstances, an appropriate substitution of the detection limit will be considered, such as the median or most recent detection limit.

2.2 Updating Interwell Background

The following describes the process that will be used to update interwell background data sets. Background updates described below will only be performed after Department approval.

Interwell statistical methods are constructed by pooling upgradient well data from 2 or more upgradient wells. For the Detection Monitoring program, background-derived Prediction Limits will be updated during each semi-annual event by incorporating the most recent sampling results from the existing background well network into the background data set. New background data will be screened for any new outliers as described above.

For the Assessment and Corrective Action program, background-derived tolerance limits are used to construct background limits using pooled upgradient well data for comparison against established standards. The tolerance limits will be updated every 2 years after screening as described above.

Once background has been established, the background well network may be updated by (1) adding wells to the background well network, or (2) removing wells and data from the background well network. The following describes the additional statistical screening steps that will be taken to update the background after a site-specific determination is made that the wells meet the hydraulic and geochemical requirements of a background location.

2.2.1 Adding to the Background Well Network

The background data set may be updated or adjusted by incorporating new wells into the network or installing new background monitoring wells. When new wells are installed, the following process will be used to statistically evaluate the results and incorporate them into the background data set upon receipt of ADEM approval.

Prior to incorporating new upgradient well data for construction of statistical limits, Tukey's outlier test and visual screening are used to evaluate data. Any confirmed outliers are flagged as such in the database and deselected prior to construction of interwell prediction limits. Any flagged data are displayed in a lighter font and as a disconnected symbol on the time series reports, as well as in a lighter font on the accompanying data

pages. A summary of Tukey's test results and flagged values will be provided with the report.

Upgradient well data will be further tested for trends as described earlier. When no statistically significant trends are identified, all new well data will be incorporated into the background. Any records with trending data will be evaluated on a case by case basis, and records may require deselection if historical data are no longer representative of present-day groundwater quality conditions. Interwell prediction limits using all upgradient well data are re-calculated as a result of this screening.

2.2.2 Removing Wells and Data from Background

As additional background data are collected, or site conditions change, a recommendation may be made to remove a well from the background network for any number of reasons (e.g. removal, change in groundwater flow conditions, change in chemistry, vandalism, etc.). If an upgradient well will no longer be part of the background network, the historical data from that well will no longer be included in the construction of interwell limits (which pool upgradient well data) without Department approval.

When wells are proposed for removal from the network, a site-specific statistical and geochemical evaluation will be made to identify the population(s) of data that may not represent background conditions. A proposal will be submitted to the Department for approval identifying the recommended use or disuse of historical data from the well(s) proposed for removal. The proposal will include statistical data screening and will explain the rationale for the proposed use of the data.

In the case where an upgradient well is no longer sampled (i.e. due to well damage, etc.), but historical data are still representative of upgradient water quality, an evaluation will be conducted as described below to determine whether data are still representative of background and should continue to be included in the background data set. When demonstration shows that groundwater quality from a well is still representative of naturally occurring groundwater quality upgradient of the facility, this data will be used in construction of statistical limits with ADEM approval. In cases where data from upgradient wells removed from the network do not represent upgradient groundwater quality, a proposal will be made for ADEM approval whereby interwell prediction limits will be re-calculated using data from only those upgradient wells in the network.

When preparing a background data evaluation for Department approval, the statistical portion of the evaluation will be accomplished by:

i. Using the ANOVA to determine whether significant variation exists among upgradient wells which would prevent the well's data from being included in construction of interwell prediction limits;
ii. Visual screening using Time Series and Box Plots to determine whether measurements are similar to neighboring upgradient wells;
iii. Screening the background data set for outliers as described above; and
iv. Performing trend tests to identify statistically significant increasing or decreasing trends which may require adjustment of the record to eliminate trending data and reduce variation.

2.3 Updating Intrawell Background

Intrawell statistical methods may be used at well locations that have not been impacted by a release from the unit being monitored. When using intrawell methods, once the background limits are established, data will not be evaluated again for updating until a minimum of 4 new samples are available, or every 2 years[4]. Data will be screened for outliers and trends as described above.

When updating an intra-well background, data are tested for suitability of updating by consolidating new sampling observations with the screened background data. Before updating the data for intrawell testing, it is necessary to verify that the most recent observations represent an unimpacted state as compared with the existing background. Data are first screened for outliers and, when confirmed, flagged as such in the database and deselected prior to constructing statistical limits. This step results in statistical limits that are conservative from a regulatory perspective.

The Mann-Whitney (Wilcoxon Rank Sum) two-sample test is then used to compare the median of the first group of background observations to the median of the more recent 4 or more observations. If the most recent data group is not found to be statistically

[4] US EPA Unified Guidance, March 2009. *Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities – Section 5.3*. Office of Solid Waste Management Division, U.S. Environmental Protection Agency, Washington, D.C.

different than the older data, the background data set may be updated and the prediction limits will be reconstructed to include the more recent background samples. When statistical differences are identified by the Mann Whitney test, statistical limits may not be eligible for updating. When more samples are available, data will be tested again for suitability of updating background data sets. In the event it is determined that the historical data are no longer representative of present-day groundwater quality in the absence of suspected impacts, only the more recent 8 or more measurements will be used to update the prediction limits.

3.0 STATISTICAL APPROACH FOR DETECTION MONITORING

The following sections describe the concepts related to developing a site-specific SAP for detection monitoring. The statistical evaluation includes screening upgradient well data to characterize groundwater upgradient of the facility and determine whether intrawell or interwell methods are recommended as the most appropriate statistical method for each Appendix III constituent.

3.1 Statistical Method

When data from multiple upgradient wells are available, a determination will be made as to whether the upgradient well data appear to come from the same population or whether there is evidence of spatial variation upgradient of the facility. Data for each constituent are plotted using box and whisker plots to assist in making this determination, providing visual representation of concentrations within and across wells. Analysis of Variance (ANOVA) may be used initially to statistically evaluate whether significant spatial variation exists at each unit.

Interwell prediction limits (PLs) pool upgradient well data to construct statistical limits which are used to evaluate data at downgradient wells. These tests are appropriate when the ANOVA determines that no significant spatial variation exists among the background wells.

In the event the ANOVA determines:

1) evidence of significant spatial variation upgradient of the facility, or

2) that there are insufficient upgradient well data, or
3) that interwell methods will not adequately address the question of a change in groundwater quality at any of the downgradient wells,

the USEPA Unified Guidance recommends switching from interwell methods to intrawell methods when it can be reasonably demonstrated that no impact from the CCR unit is present for well/constituent pairs in detection monitoring.

Intrawell PLs, which compare the most recent sample from a given well to statistical limits constructed from historical measurements at the same well, are extremely useful for rapidly detecting changes over time at a given location. Intrawell methods remove the influence of on-site spatial variation in well-to-well concentration levels. Site monitoring data are evaluated for the appropriateness of intrawell methods, including screening of background data from within each well for trends, seasonality when sufficient data are available, and outliers.

3.2 Prediction Limits

The use of PL tests is restricted to Appendix III parameters recently sampled at groundwater monitoring wells to represent *current* conditions. Background stability will be tested using temporal and seasonal trend tests, utilizing de-seasonalizing adjustments when seasonal trends are present. Moreover, statistical conditions including background sample size requirements as specified in USEPA guidance and regulations will be verified prior to the use of each statistical approach.

3.3 Criteria for Using the Interwell Statistical Methodology

There are a number of conditions that need to be met before an interwell statistical analysis can be considered appropriate for a specific site. These conditions are described in this section.

1. Ensuring that the aquifer underlying the site is continuous and that all monitoring wells are screened in the same level;
2. Ensuring that limits will be adequately sensitive in detecting a facility release;
3. Ensuring that limits reflect current background conditions; and
4. Ensuring that confounding factors will not confuse the results.

3.3.1 Aquifer Designation and Monitoring Wells

Where the uppermost aquifer underlying a site is discontinuous, where downgradient monitoring wells are screened in differing levels, or where the upgradient monitoring well network is limited, EPA recommends performing intrawell analyses, to avoid confusing an impact caused by a release from the facility with a difference between wells caused by heterogeneous hydrogeology.

The statistical approach for constituents of concern is typically based on interwell or intrawell PLs, and in some cases a combination of both methods, as a result of evaluation of spatial variation at the site. Box and whisker plots may be provided to demonstrate concentration levels within each well and across wells. When significant differences exist in concentration levels, particularly between upgradient wells, this indicates spatial variation in the groundwater quality. Spatial variation and/or limited upgradient well data would tend to create statistical limits that are:

1) not conservative from a regulatory perspective; or
2) not representative of background water quality.

3.4 Criteria for Using an Intrawell Statistical Methodology

The following is a description of the criteria that a site must meet to use an intrawell statistical methodology if it is determined that interwell methods are not appropriate.

3.4.1 Screening of Prospective Historical Background Data

Prior to using an intrawell analysis, it will be necessary to demonstrate that there have been no potential prior impacts at downgradient wells on the prospective historical background data as a result of the current practices at the Site. In addition to an independent investigation for prior impacts, prospective background data for intrawell tests will be screened for trends, seasonality and outliers as described above. If intrawell analyses are not feasible due to elevated concentrations in downgradient wells relative to concentrations upgradient of the facility, as determined during the screening process, interwell analyses will initially be utilized until further evidence supports the use of intrawell testing.

3.4.2 Stable Naturally Occurring Concentrations

The background data screening procedure described here is designed to check for stable background conditions, and account for existing groundwater quality from past or present activities in the area. While having pre-waste data is ideal for characterization of groundwater quality prior to waste placement, these facilities do not have pre-waste data.

The Sen's Slope/Mann-Kendall test for increasing or decreasing temporal trends will be used to test prospective background data when time series plots indicate the possibility of either increasing or decreasing trends over time. In the case where significant trends are found, unrepresentative values will be deselected only when it is clear that the trend is not the result of contamination. Assuming no alternative source, if similar trends and/or concentration levels are noted upgradient of the unit for the same parameters, it will be assumed that concentration levels represent natural variation in groundwater, and thus, earlier data will be removed so that compliance limits reflect current groundwater conditions upgradient of the unit.

3.5 Site-Wide False Positive Rates (SWFPR) and Statistical Power

The USEPA Unified Guidance recommends an annual site-wide false positive rate of 10%, which is distributed equally among the total number of sampling events. A site-wide false positive rate of 5% is targeted for each semi-annual sampling event. USEPA also requires demonstration that the statistical methodology selected for a facility will provide adequate statistical power, as discussed in Section 3.7 to detect a release, should one occur.

3.6 Determination of Future Compliance Observations Falling Within Background Limits

Intrawell or interwell upper PL are constructed with a test-specific alpha based on the overall site-wide false positive rate (SWFPR) of 5% for each sampling event. Any compliance observation that exceeds the background prediction limit will be followed with one or two independent resamples, depending on the resample plan, to determine whether the initial exceedance is verified.

The following pretests are used to ensure that the statistical test criteria are met:

1) *Data Distribution.* The distribution of the data will be tested using either the Shapiro-Wilk test (for background sample sizes of 50 or less) or the Shapiro-Francia test (for background sample sizes greater than 50). Non-normally distributed data will be transformed using the ladder of powers[5] to normalize the data prior to construction of background limits. When background data cannot be normalized, nonparametric PL will be calculated.

2) *Handling Non-Detects.* Simple substitution per USEPA Guidance[6] will be used when non-detects comprise less than or equal to 15% of the individual well data. Simple substitution refers to the practice of substituting one-half the reporting or detection limit for non-detects. When the proportion of non-detects (NDs) in background falls between 16 and 50%, a non-detect adjustment such as the Kaplan-Meier or Regression on Order Statistics (ROS) method for adjustment of the mean and standard deviation will be used prior to constructing a parametric prediction limit. When the proportion of non-detects exceeds 50%, or when the data cannot be normalized, a nonparametric prediction limit will be used.

3.7 Statistical Power

The USEPA Unified Guidance also requires that facilities achieve adequate statistical power to detect a release, even if only at one facility well and involving a single constituent. More specifically, EPA recommends power of approximately 55% when concentration levels are 3 standard deviations above the background mean, or approximately 80% power at 4 standard deviations above the background mean.

The performance of a given testing strategy is displayed in Power Curves which are based on the particular statistical method chosen combined with the resampling plan, the false positive rate associated with the statistical test, as well as the number of background samples available and the size and configuration of the monitoring network.

Power Curves for the PLs following this report demonstrate that the specified plan has the power to detect a release in downgradient wells and meet or exceed at least one of the power recommendations. As more data are collected during routine semi-annual

[5] 1992, *Statistical Methods In Water Resources,* Elsevier, Helsel, D. R., & Hirsch, R. M.
[6] June 1992, *Addendum to Interim Final Guidance, Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities.* Office of Solid Waste Management Division, U.S. Environmental Protection Agency, Washington, D.C.

sampling events and the background sets are expanded, the power requirements will exceed recommended power requirements.

4.0 STATISTICAL APPROACH FOR ASSESSMENT MONITORING & CORRECTIVE ACTION

The following describes the general statistical procedures that will be used if a facility enters Assessment or Corrective Action monitoring because of SSIs in the Detection monitoring program. Site-specific and event-specific SAPs may be developed at that time according to permit or regulatory requirements.

4.1 Assessment Monitoring

Assessment Monitoring may be initiated when there is a confirmed SSI over background in one or more wells for any of the Appendix III parameters. Wells are sampled for Appendix IV parameters semiannually concurrent with Appendix III constituents.

When in assessment monitoring, Appendix IV constituent concentrations are compared to Groundwater Protection Standards (GWPS), or other applicable standards, using Confidence Intervals. Upgradient well data are screened for outliers and trends as described above and tolerance limits are used to develop background limits. GWPS may be based on background limits when background concentrations are higher than the established Maximum Contaminant Levels (MCLs) or other rule-specified GWPS.

Parametric confidence intervals around the population mean will be constructed at the 99% confidence level when data follow a normal distribution, and around the geometric mean (or population median) when data follow a transformed-normal distribution.

Non-parametric confidence intervals will be constructed when data do not pass a normality test and cannot be normalized via a transformation. The confidence level associated with the non-parametric tests is dependent on the number of values used to construct the interval. Confidence intervals require a minimum of four samples; however, a minimum of eight samples are recommended. When non-parametric confidence intervals are constructed, a maximum of eight of the most recent samples will be used in the comparison. When a well/constituent pair does not have the minimum sample requirement, the well/constituent pair will continue to be reported and tracked using time series plots and/or trend tests until such time that enough data are available.

In Assessment Monitoring, when the Lower Confidence Limit (LCL), or the entire interval, exceeds the GWPS as discussed in the USEPA Unified Guidance (2009), the result is recorded as an SSI.

4.2 Corrective Action

If groundwater corrective action is triggered, semi-annual sampling of the assessment monitoring wells will continue and Confidence Intervals will monitor the progress of remediation efforts. Confidence Intervals are compared to GWPS and the entire interval must fall below a specified limit (i.e. the Upper Confidence Limit [UCL] must be below the limit) to demonstrate compliance. A site-specific monitoring program will be developed based on the final corrective action plan and points-of-compliance.

5.0 SITE-SPECIFIC STATISTICAL ANALYSIS METHODS

A site-specific statistical analysis approach was developed after applying the screening criteria described previously. Results of the site-specific screening are presented in Appendix A, Background Screening and Compliance Evaluation. The following is a detailed description of the statistical analysis methodology that will be used for groundwater quality analysis at the site when monitored constituents are present in any of the downgradient wells.

Background sampling began in February 2016. The monitoring well network is described on Table 1.

For the statistical analysis of analytical results obtained from the existing monitoring well network, (1) the number of samples collected will be consistent with the appropriate statistical procedures as recommended by the CCR Rule and the USEPA Unified Guidance; (2) the statistical method will comply with the EPA-recommended performance standards; and (3) determination of whether or not there is a statistically significant increase (SSI) over background values in the future will be completed per the above-mentioned regulations.

5.1 Detection Monitoring Program

Based on the background screening that was conducted by Groundwater Stats Consulting in the Fall 2017 and approved by Dr. Kirk Cameron, PhD Statistician with MacStat Consulting, primary author of the USEPA Unified Guidance, and Senior Advisor to Groundwater Stats Consulting, interwell methods are used for all Appendix III parameters. Groundwater quality data will be evaluated through use of interwell prediction limits, combined with a 1-of-2 resampling strategy for boron, calcium, chloride, fluoride, pH, sulfate and TDS. If a statistical exceedance is found, one independent resample will be collected to determine whether the initial exceedance is verified.

If the initial finding is not verified by resampling, the resampled value will replace the initial finding. When the resample confirms the initial finding, the exceedance will be reported. The Sen's Slope/Mann Kendall trend test will be used, in addition to PL, to statistically evaluate concentration levels over time and determine whether concentrations are increasing, decreasing, or stabilizing.

The chance of false positive results increases with increasing numbers of statistical tests. The total number of statistical tests for a facility is the number of parameters tested multiplied by the number of monitoring wells. In an effort to reduce the overall number of statistical tests performed at each semi-annual sampling event, thereby lowering the chance of a false exceedance while maintaining a high degree of statistical confidence that a release will be detected, Plant Gorgas Ash Pond will:

1) Monitor constituents in wells with detections (i.e. excluding well/constituent pairs with 100% nondetects); and
2) Incorporate a 1-of-2 retesting strategy

The following statistical methods will be used:

5.1.1 Parametric Prediction Limits

These limits will be computed per USEPA Unified Guidance when data can be normalized, possibly via transformation. The test alpha will be calculated based on the following configuration:

Annual SWFPR = 0.10
1-of-2 resampling plan with a minimum of 8 background samples for interwell tests
w= 11 (number of compliance wells)
c= 7 constituents

5.1.2 Nonparametric Prediction Limits

The highest background value will be used to set the upper nonparametric prediction limit. The associated confidence level takes into account the prospect of additional future compliance values (retests) when there is an initial exceedance. The achieved confidence level is determined based on the background sample size, the number of monitoring wells in the network, and the number of proposed retests, using tables provided in the USEPA Unified Guidance[7].

5.1.3 Retesting Strategy

When the prediction limit analyses indicate initial exceedances, discrete verification resamples from the indicating well(s) will be collected within 90 days and prior to the next regularly scheduled sampling event. If the initial exceedance is verified, a confirmed SSI will be reported. For the test to be valid, the resample needs to be statistically independent which requires that sufficient time elapse between the initial sample and resample. A minimum time interval between samples will be established to ensure that separate volumes of groundwater are being sampled.

5.1.4 Background Data Set

Interwell tests, which compare downgradient well data to statistical limits constructed from all pooled upgradient well data after careful screening, are appropriate when average concentrations are similar across upgradient wells. Intrawell tests, which compare compliance data from a single well to screened historical data within the same well, are appropriate when upgradient wells exhibit spatial variation; when statistical limits constructed from upgradient wells would not be conservative from a regulatory perspective; and when downgradient water quality is unimpacted compared to upgradient water quality for the same parameter. When upgradient well data represent

[7] USEPA Unified Guidance, March 2009. *Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities*. Office of Solid Waste Management Division, U.S. Environmental Protection Agency, Washington, D.C.

natural groundwater quality upgradient of the facility, intrawell prediction limits are also constructed on these wells. A minimum of 8 background samples are required for both interwell and intrawell tests.

The background data set will be managed, screened and updated as described previously after receipt of Department approval.

5.2 Assessment Monitoring Program

Assessment monitoring will be performed following the procedures described in Section 4.0. When assessment monitoring is initiated, Appendix IV constituents are sampled semi-annually, and concentrations in downgradient wells are statistically compared as described below to GWPS. Following the Unified Guidance, the Maximum Contaminant Level (MCL) is used as the GWPS. When reported concentrations in upgradient wells are higher than the established MCLs, background limits may be developed as described below from an interwell tolerance limit using the pool of all approved upgradient well data (see Chapter 7 of the Unified Guidance).

Parametric tolerance limits, which are used when pooled upgradient well data follow a normal or transformed-normal distribution, may be constructed on upgradient well or wells with the highest average concentrations with Department approval. This step serves to reduce the effect of spatial variation on the standard deviation in the parametric case when calculating a GWPS. Non-parametric tolerance limits will be constructed when data do not follow a normal or transformed-normal distribution or when a parametric tolerance limit is not approved.

For constituents without established MCLs, the CCR-rule specified limits will be used as the GWPS unless Department-approved background is higher as calculated from interwell tolerance limit as described above. Appendix IV background data are screened for outliers and extreme trending patterns that would lead to artificially elevated statistical limits.

Confidence Intervals are then constructed using a maximum of 8 of the most recent assessment measurements from a given downgradient well for comparison to the GWPS to determine compliance.

Parametric tolerance limits (i.e. UTLs) are calculated when data follow a normal or transformed-normal distribution using pooled upgradient well data as described above for Appendix IV parameters with a target of 95% confidence and 95% coverage. When data sets contain greater than 50% nondetects or do not follow a normal or transformed-normal distribution, the confidence and coverage levels for nonparametric tolerance limits are dependent upon the number of background samples. The UTLs are then used as background levels for establishing the GWPS under case 3 below.

As described in 40 CFR § 257.95(h)(1)-(3) the GWPS is:

1. The maximum contaminant level (MCL) established under 40 CFR § 141.62 and 141.66.
2. Where an MCL has not been established:
   (i) Cobalt 0.006 mg/L;
   (ii) Lead 0.015 mg/L;
   (iii) Lithium 0.040 mg/L; and
   (iv) Molybdenum 0.100 mg/L.
3. Background levels for constituents where the background level is higher than the MCL or rule-specified GWPS.

In assessment monitoring, when the Lower Confidence Limit (LCL), or the entire confidence interval, exceeds the GWPS as discussed in the USEPA Unified Guidance (2009), the result is recorded as an SSL.

With Department approval, the background limits will be updated and compared to the MCLs and CCR-rule specified limits for Appendix IV constituents every two years to determine whether the established limit or background will be used as the GWPS in the confidence interval comparisons, as discussed above.

5.3 Corrective Action Monitoring Program

When implemented, groundwater corrective action will include a remedy monitoring program. The remedy monitoring program will be prepared under separate cover and include details regarding statistical analysis of results.

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Figures

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Table 1.
Groundwater Monitoring Well Network Details

Well Name	Purpose	Installation Completion Date	Northing	Easting	Ground Elevation	Top of Casing Elevation	Well Depth (ft.) Below Top of Casing	Top of Screen Elevation (ft MSL)	Bottom of Screen Elevation (ft MSL)	Screen Length	Pottsville Flow System Designation
GS-AP-MW-1	Piezometer	2/24/2016	1320292.58	2066945.10	487.30	490.68	148.38	362.30	342.30	20	Pratt Strata
GS-AP-MW-2	Downgradient	3/10/2016	1321951.86	2067629.25	518.77	522.03	214.22	327.81	307.81	20	Pratt Strata
GS-AP-MW-3	Piezometer	3/4/2016	1323690.18	2067314.13	508.77	512.29	180.52	341.77	331.77	10	Pratt Strata
GS-AP-MW-4	Piezometer	3/7/2016	1324779.03	2067957.03	504.61	507.90	163.29	354.61	344.61	10	Pratt Strata
GS-AP-MW-5	ABANDONED	4/2/2016	1324811.04	2065409.73	483.80	487.17	149.37	347.80	337.80	10	Pratt Strata
GS-AP-MW-6S	Downgradient	1/19/2016	1324533.13	2063864.63	271.57	274.67	46.55	238.12	228.12	10	Upper Water Table
GS-AP-MW-6D	Downgradient	1/18/2016	1324547.48	2063881.96	271.39	274.50	64.48	220.02	210.02	10	Upper Water Table
GS-AP-MW-7	Downgradient	1/26/2016	1324250.98	2063518.48	310.05	313.45	100.49	222.96	212.96	10	Gillespy Transition
GS-AP-MW-8	Upgradient	2/26/2016	1323405.23	2062398.47	431.63	434.61	64.59	390.02	370.02	20	Upper Water Table
GS-AP-MW-9	ABANDONED	4/22/2016	1322446.73	2062720.10	417.06	420.04	111.38	328.66	308.66	20	Pratt Strata
GS-AP-MW-10	ABANDONED	1/21/2016	1321310.86	2062441.08	464.94	468.41	144.87	343.54	323.54	20	Pratt Strata
GS-AP-MW-11	ABANDONED	2/4/2016	1320953.14	2063257.73	465.34	468.34	139.90	348.44	328.44	20	Pratt Strata
GS-AP-MW-12	Downgradient	4/20/2016	1320369.19	2063836.90	447.48	450.67	153.98	306.69	296.69	10	Pratt Strata
GS-AP-MW-13	ABANDONED	2/4/2016	1319377.84	2064083.37	461.03	464.20	113.57	370.63	350.63	20	Upper Water Table
GS-AP-MW-14	ABANDONED	1/30/2016	1318393.75	2063787.88	469.60	472.40	203.20	279.20	269.20	10	Pratt Strata
GS-AP-MW-15	Downgradient	2/8/2016	1317267.07	2063959.21	452.21	454.89	200.08	264.81	254.81	10	Pratt Strata
GS-AP-PZ-16 [7]	Vertical Delineation	3/16/2016	1316157.31	2064852.10	458.83	462.29	252.66	219.63	209.63	10	American Strata
GS-AP-MW-16S [3]	Proposed Upgradient	4/18/2016	1316149.55	2064844.29	459.04	462.42	133.38	349.04	329.04	20	Upper Water Table
GS-AP-MW-16D	Downgradient	4/20/2016	1316152.70	2064850.23	459.09	462.27	224.23	258.04	238.04	20	Pratt Strata - Nickel Plate
GS-AP-MW-17	Downgradient	2/11/2016	1314955.86	2066094.14	528.78	531.88	248.85	293.03	283.03	10	Pratt Strata
GS-AP-PZ-18 [7]	Vertical Delineation	2/25/2016	1315069.22	2066821.51	399.77	402.38	183.79	228.59	218.59	10	American Strata
GS-AP-MW-18	Downgradient	3/29/2016	1315052.82	2066824.84	400.17	403.39	98.68	324.71	304.71	20	Pratt Strata
GS-AP-MW-19	Downgradient	4/29/2016	1316325.43	2066775.98	492.60	495.58	179.19	336.39	316.39	20	Pratt Strata
GS-AP-MW-21	Downgradient	2/20/2016	1319122.82	2067233.10	506.51	509.48	236.45	283.03	273.03	10	Pratt Strata
GS-AP-MW-7V [3,5]	Piezometer	1/18/2019	1324251.90	2063504.32	309.46	312.14	202.68	119.46	109.46	10	Gillespy - Curry
GS-AP-MW-12V [6]	Vertical Delineation	1/9/2019	1320383.14	2063813.29	446.54	449.74	179.10	312.22	302.22	10	American Strata
GS-AP-MW-17V	Proposed Upgradient	1/20/2019	1314967.05	2066096.42	528.57	531.45	151.40	400.05	380.05	20	Upper Water Table
GS-AP-MW-18V	Vertical Delineation	1/30/2019	1315045.44	2066833.22	401.81	404.61	137.71	276.90	266.90	10	American Strata
GS-AP-MW-20	Piezometer	2/1/2019	1318122.87	2068319.23	525.18	528.15	249.97	288.18	278.18	10	Pratt Strata
GS-AP-PZ-22 [7]	Vertical Delineation	4/11/2016	1314941.40	2066094.05	529.31	532.38	328.07	214.31	204.31	10	American Strata
GS-AP-MW-23H	Horizontal Delineation	1/4/2019	1324901.11	2063751.19	301.9	304.98	42.50	272.48	262.48	10	Gillespy Transition
GS-AP-MW-24H	Horizontal Delineation	1/3/2019	1325034.25	2062579.09	258.38	261.35	62.80	208.55	198.55	10	Upper Water Table
GS-AP-MW-25H [3,5]	Piezometer	1/2/2019	1322710.44	2061621.52	458.66	461.79	168.13	303.66	293.66	10	Pratt Strata
GS-AP-MW-26H	Horizontal Delineation	1/22/2019	1321144.11	2061189.28	391.68	394.68	193.60	211.08	201.08	10	American Strata

Notes:

1. Northing and easting are in feet relative to the State Plane Alabama West North America Datum of 1983.
2. Elevations are in feet relative to the North American vertical Datum of 1988.
3. Piezometers are utilized for water level readings only; current piezometer MW-16S is being evaluated for potential as a site upgradient well
4. Top of screen and bottom of screen elevations are calculated relative to Top of Casing elevation and less the well sump length of 0.4'.
5. Delineation wells GS-AP-MW-7V, GS-AP-MW-7VR, GS-AP-MW-25H, GS-AP-MW-27H, GS-AP-MW-30H, and GS-AP-MW-30HS will be utilized for water level data only in future events.
6. Survey for MW-12V is incorrect and will be updated upon re-survey
7. Maxine Mine screened piezometer converted to vertical delineation location

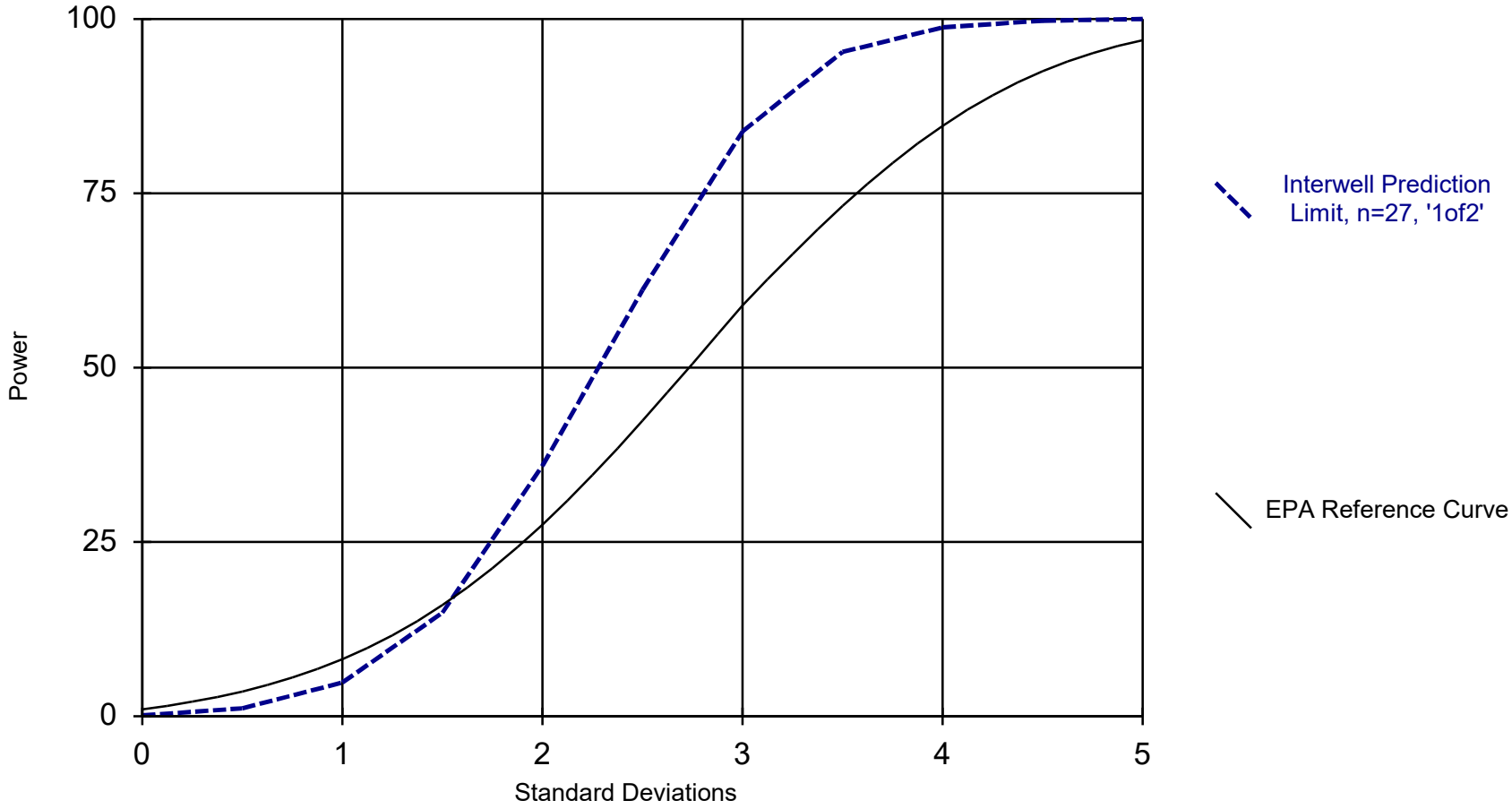
Table 1.
Groundwater Monitoring Well Network Details

Well Name	Purpose	Installation Completion Date	Northing	Easting	Ground Elevation	Top of Casing Elevation	Well Depth (ft.) Below Top of Casing	Top of Screen Elevation (ft MSL)	Bottom of Screen Elevation (ft MSL)	Screen Length	Pottsville Flow System Designation
GS-AP-MW-27H [3,5]	Piezometer	2/12/2019	1317251.09	2063507.76	532.08	535.03	244.95	300.08	290.08	10	American Strata
GS-AP-MW-28H	Horizontal Delineation	2/26/2019	1314721.29	2066153.32	513.84	513.82	229.70	294.12	284.12	10	Pratt Strata
GS-AP-MW-29H	Horizontal Delineation	2/5/2019	1314844.80	2066948.77	440.71	440.95	130.64	320.31	310.31	10	Pratt Strata
GS-AP-MW-30H [3,5]	Piezometer	1/8/2019	1318714.64	2069028.11	579.62	582.49	295.87	296.62	286.62	10	Pratt Strata
GS-AP-MW-30HS [3,5]	Piezometer	1/10/2019	1318721.10	2069023.99	579.84	582.53	47.19	545.34	535.34	10	Upper Water Table
GS-AP-MW-9V	Vertical Delineation	11/6/2019	1322441.98	2062677.69	418.25	420.86	138.05	292.81	282.81	10	American Strata
GS-AP-MW-15V	Vertical Delineation	10/28/2019	1317266.29	2063940.18	452.91	455.89	235.38	230.51	220.51	10	American Strata
GS-AP-MW-21V	Vertical Delineation	9/26/2019	1319131.76	2067250.33	507.59	509.84	248.95	270.89	260.89	10	American Strata
GS-AP-MW-25HA	Horizontal Delineation	11/7/2019	1322704.82	2061627.52	458.98	462.27	342.90	129.37	119.37	10	Gillespy - Curry
GS-AP-MW-30HA	Horizontal Delineation	10/23/2019	1318730.12	2069017.20	579.99	582.40	337.95	254.45	244.45	10	American Strata
GS-AP-MW-31H	Horizontal Delineation	10/11/2019	1321029.58	2068711.01	584.48	587.39	287.58	309.81	299.81	10	Pratt Strata
GS-AP-MW-32H	Horizontal Delineation	10/12/2019	1316042.76	2068381.85	547.43	550.03	304.05	265.98	245.98	20	Pratt Strata
GS-AP-MW-33HO[9]	Horizontal Delineation	11/7/2019	1314683.64	2068050.79	524.08	526.79	282.91	263.88	243.88	20	Pratt Strata
GS-AP-MW-34HO[9]	Horizontal Delineation	11/9/2019	1314144.24	2066527.09	521.18	523.82	327.60	206.22	196.22	10	American Strata
GS-AP-MW-35HO[9]	Horizontal Delineation	11/20/2019	1315127.10	2064800.69	550.60	553.35	320.48	242.87	232.87	10	Pratt Strata
GS-AP-MW-36H	Horizontal Delineation	10/28/2019	1316518.20	2063698.16	533.67	536.61	283.10	263.51	253.51	10	Pratt Strata
GS-AP-MW-37H	Piezometer	10/23/2019	1319199.34	2062581.05	456.12	459.28	293.45	185.83	165.83	20	Pratt Strata
GS-AP-MW-38H	Horizontal Delineation	11/22/2019	1320575.44	2061610.67	343.41	345.74	168.20	187.54	177.54	10	American Strata
GS-AP-MW-39H	Piezometer	10/29/2019	1321072.42	2062371.29	448.47	451.13	348.50	122.63	102.63	20	Gillespy - Curry
GS-AP-MW-41HS	Piezometer	10/28/2019	1324686.47	2063278.88	281.75	284.65	37.65	257.00	247.00	10	Upper Water Table
GS-AP-MW-41HD	Horizontal Delineation	10/27/2019	1324683.42	2063283.86	282.32	284.54	58.30	236.24	226.24	10	Gillespy Transition
GS-AP-MW-42H	Horizontal Delineation	10/29/2019	1325082.88	2064034.21	338.61	340.62	87.51	263.11	253.11	10	Gillespy Transition
GS-AP-MW-43H	Horizontal Delineation	11/11/2019	1321244.07	2067672.16	511.87	514.62	222.75	311.87	291.87	20	Pratt Strata
GS-AP-MW-7VR [3,5]	Piezometer	4/18/2020	1324242.41	2063512.64	311.04	313.89	150.30	171.74	161.74	10	Gillespy Transition
GS-AP-MW-6V (VR)	Vertical Delineation	6/23/2020	1324568.11	2063915.62	272.84	275.44	98.5	184.34	174.34	10	Gillespy Transition
GS-AP-MW-40H (HO) [8]	Horizontal Delineation	5/1/2020	1320858.03	2060018.89	355.07	357.91	90.30	274.77	264.77	10	American Strata
GS-AP-MW-44HO[9]	Horizontal Delineation	8/16/2020	1321163.745	2067488.902	503.33	506.21	208.48	307.23	297.23	10	Pratt Strata

Notes:

1. Northing and easting are in feet relative to the State Plane Alabama West North America Datum of 1983.
2. Elevations are in feet relative to the North American vertical Datum of 1988.
3. Piezometers are utilized for water level readings only
4. Top of screen and bottom of screen elevations are calculated relative to Top of Casing elevation and less the well sump length of 0.4’ or 0.5'.
5. Delineation wells GS-AP-MW-7V, GS-AP-MW-7VR, GS-AP-MW-25H, GS-AP-MW-27H, GS-AP-MW-30H, and GS-AP-MW-30HS will be utilized for water level data only in future events.
6. Survey for MW-12V is incorrect and will be updated upon re-survey
7. Maxine Mine screened piezometer converted to vertical delineation location
8. GS-AP-MW-40H when planned was an off-site well, but land was purchased by APC & was installed as an on-site delineation well
9.GS-AP-MW-33HO through GS-AP-MW-35HO and GS-AP-MW-44HO are off-site well locations.

Power Curve



Kappa = 2.187, based on 11 compliance wells and 7 constituents, evaluated semi-annually (this report reflects annual total).

Analysis Run 4/8/2020 11:04 AM View: Descriptive

Plant William C Gorgas Client: Southern Company Data: Gorgas AP

Appendix A
Background Screening and Compliance Evaluation

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GROUNDWATER STATS CONSULTING

April 13, 2020

Southern Company Services
Attn: Mr. Greg Dyer
3535 Colonnade Parkway
Birmingham, AL 35243

Re: Plant Gorgas Ash Pond
Background Update – 2020

Dear Mr. Dyer,

Groundwater Stats Consulting, formerly the statistical consulting division of Sanitas Technologies, is pleased to provide the screening for the proposed background update of the prediction limits with data through April 2019 for Alabama Power Company's Plant Gorgas Ash Pond. The analysis complies with the federal rule for the Disposal of Coal Combustion Residuals from Electric Utilities (CCR Rule, 2015) as well as with the USEPA Unified Guidance (2009).

Sampling began at site for the CCR program in 2016. The monitoring well network, as provided by Southern Company Services, consists of the following:

- **Upgradient wells:** GS-AP-MW-8, GS-AP-MW-13 and GS-AP-MW-17V
- **Downgradient wells:** GS-AP-MW-2; GS-AP-MW-6S, GS-AP-MW-6D, GS-AP-MW-7, GS-AP-MW-12, GS-AP-MW-15, GS-AP-MW-16D, GS-AP-MW-17, GS-AP-MW-18, GS-AP-MW-19, and GS-AP-MW-21.

Data were sent electronically to Groundwater Stats Consulting, and the statistical analysis was prepared according to the methods recommended in the Fall 2017 Statistical Analysis Plan approved by Dr. Kirk Cameron, PhD Statistician with MacStat Consulting, primary author of the USEPA Unified Guidance, and Senior Advisor to Groundwater Stats Consulting. The analysis was reviewed by Dr. Jim Loftis, Civil & Environmental Engineering

professor emeritus at Colorado State University and Senior Advisor to Groundwater Stats Consulting.

The CCR program consists of the following constituents:

- **Appendix III** (Detection Monitoring) **-** boron, calcium, chloride, fluoride, pH, sulfate, and TDS

Time series plots for these parameters are provided for all wells and constituents are used to evaluate concentrations over the entire record for the purpose of screening background data for outliers and trends as discussed below (Figure A). Box and whisker plots are also provided and are used to evaluate the variation within a given well and among all wells (Figure B).

For regulatory comparison of current observations against statistical limits, the annual site-wide false positive rate is based on the USEPA Unified Guidance (2009) recommendation of 10% (5% for each semi-annual sample event). A power curve is provided to demonstrate that the selected statistical methods for Appendix III parameters provide sufficient power to detect a change at any of the downgradient wells which complies with the USEPA Unified Guidance recommendation. The EPA suggests that the selected statistical method should provide at least 55% power at 3 standard deviations or at least 80% power at 4 standard deviations.

Prediction Limits

Parametric prediction limits are utilized when the screened historical data follow a normal or transformed-normal distribution. When data cannot be normalized or the majority of data are nondetects, a nonparametric test is utilized. While the false positive rate associated with the parametric limits is based on an annual 10% as recommended by the EPA Unified Guidance (2009), the false positive rate associated with the nonparametric limits is dependent upon the available background sample size, number of future comparisons, and verification resample plan. The distribution of data is tested using the Shapiro-Wilk/Shapiro-Francia test for normality. After testing for normality and performing any adjustments as discussed below (US EPA, 2009), data are analyzed using either parametric or non-parametric prediction limits.

- No statistical analyses are required on wells and analytes containing 100% nondetects (USEPA Unified Guidance, 2009, Chapter 6).
- When data contain <15% nondetects in background, simple substitution of one-half the reporting limit is utilized in the statistical analysis. The reporting limit

utilized for nondetects is the practical quantification limit (PQL) as reported by the laboratory.

- When data contain between 15-50% nondetects, the Kaplan-Meier nondetect adjustment is applied to the background data. This technique adjusts the mean and standard deviation of the historical concentrations to account for concentrations below the reporting limit.
- Nonparametric prediction limits are used on data containing greater than 50% nondetects.

Background Update Summary Conducted in the Fall 2019

Interwell prediction limits, which compare the most recent sample from each downgradient well to statistical limits constructed from pooled upgradient well data, are updated during each sample event after careful screening for any new outliers. Data were last screened during the Fall 2019, but since that time upgradient well GS-AP-MW-17V has been added to the network. Two samples have been collected at this time and are pooled with all upgradient well data in this report for construction of statistical limits. Because upgradient well GS-AP-MW-17V only has two samples, no formal outlier or trend tests could be performed. Time series were used to evaluate the data, and none of the values were suspected to be outliers.

Data from upgradient wells will be periodically re-screened for newly developing trends, which may require adjustment of the background period to eliminate the trend, as well as for outliers over the entire record. A summary of the background screening conducted in the Fall 2019 is provided below. Interwell prediction limits are used to evaluate boron, calcium, chloride, fluoride, sulfate, pH, and TDS.

Outlier Testing

Prior to performing prediction limits, proposed background data through April 2019 were reviewed to identify any newly suspected outliers at upgradient wells for boron, calcium, chloride, fluoride, pH, sulfate, and TDS (Figure C). Both Tukey's Test and visual screening are used to identify potential outliers. When identified, values were flagged with "o" and excluded to reduce variation, better represent background conditions, and provide limits that are conservative from a regulatory perspective. Potential outliers that are identified by Tukey's test but are not greatly different from the rest of the data are not flagged. Also, outliers that are not identified as important by Tukey's test may be identified visually. As mentioned above, flagged data are displayed in a lighter font and as a disconnected symbol on the time series reports, as well as in a lighter font on the accompanying data pages. A summary of Tukey's test results was submitted with the screening. No outliers

were flagged in any of the upgradient wells. A boron value in downgradient well GS-AP-MW-21 had previously been flagged as outlier and is shown on the outlier summary that follows this letter.

The Sen's Slope/Mann Kendall trend test was used to evaluate the entire record of data from upgradient wells for all parameters which utilize interwell prediction limits (Figure D). When statistically significant increasing trends are identified in upgradient wells, the earlier portion of data may require deselection prior to construction of interwell statistical limits if the trending data would result in statistical limits that are not conservative from a regulatory perspective. No statistically significant trends were noted in upgradient wells except for fluoride in upgradient well GS-AP-MW-13. However, this data set required no adjustment at this time because the period of record is short and the magnitude of the trend was low relative to the average concentrations in background.

Evaluation of Appendix III Parameters

Interwell prediction limits combined with a 1-of-2 verification strategy were constructed for boron, calcium, chloride, fluoride, sulfate, pH, and TDS (Figure E). Future samples from compliance wells will be compared against these prediction limits. In the event of an initial exceedance of compliance well data, the 1-of-2 resample plan allows for collection of one additional sample to determine whether the initial exceedance is confirmed. When the resample confirms the initial exceedance, a statistically significant increase (SSI) is identified, and further research would be required to identify the cause of the exceedance (i.e. impact from the site, natural variation, or an off-site source). If a resample falls within the statistical limit, the initial exceedance is considered to be a false positive result; therefore, no further action is necessary. A summary of the updated prediction limits may be found in the Prediction Limit Summary tables following this letter.

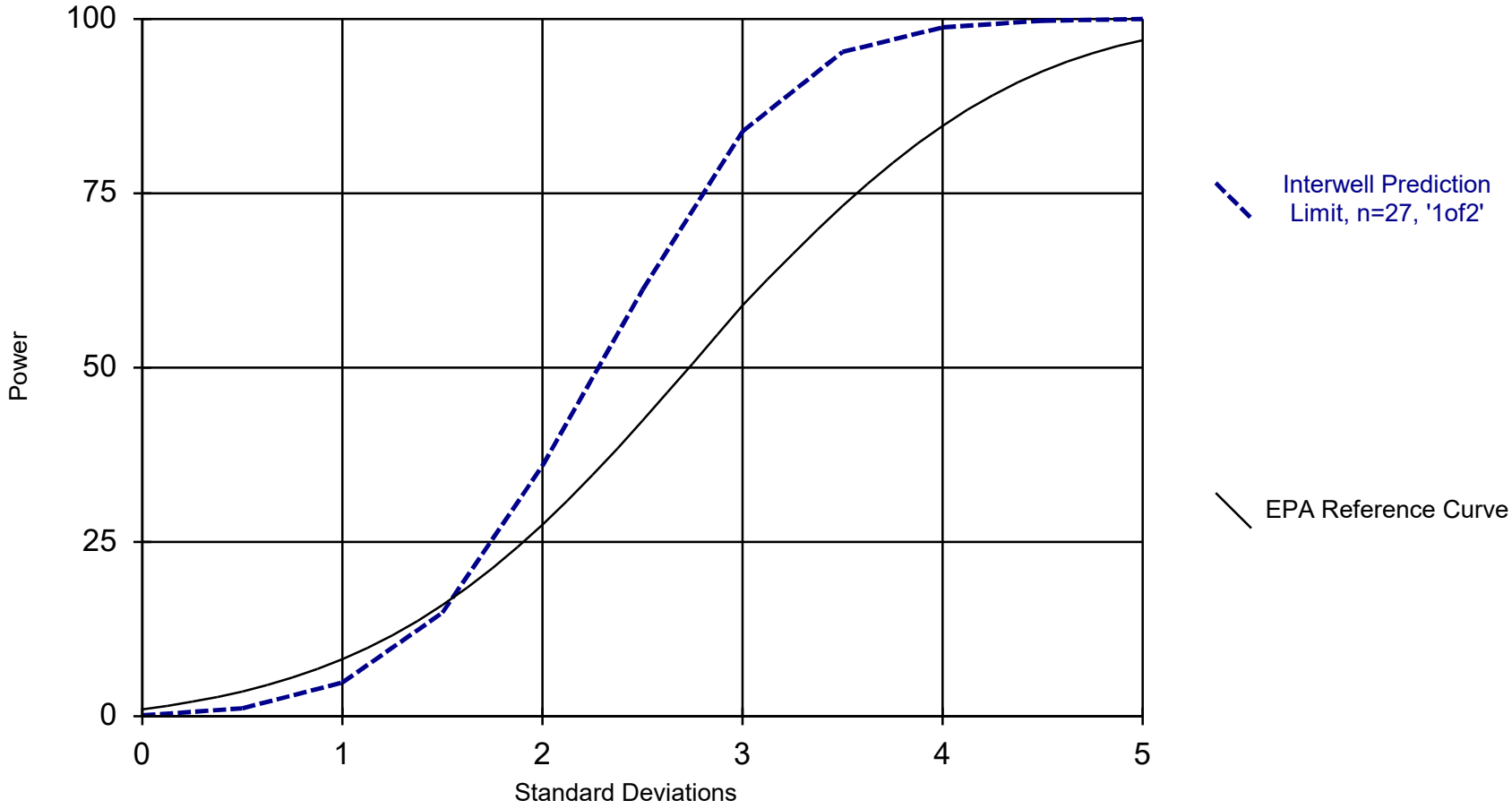
Thank you for the opportunity to assist you in the statistical analysis of groundwater quality for Gorgas Ash Pond. If you have any questions or comments, please feel free to contact us.

For Groundwater Stats Consulting,



Kristina L. Rayner
Groundwater Statistician

Power Curve



Kappa = 2.187, based on 11 compliance wells and 7 constituents, evaluated semi-annually (this report reflects annual total).

Analysis Run 4/8/2020 11:04 AM View: Descriptive

Plant William C Gorgas Client: Southern Company Data: Gorgas AP

Figures

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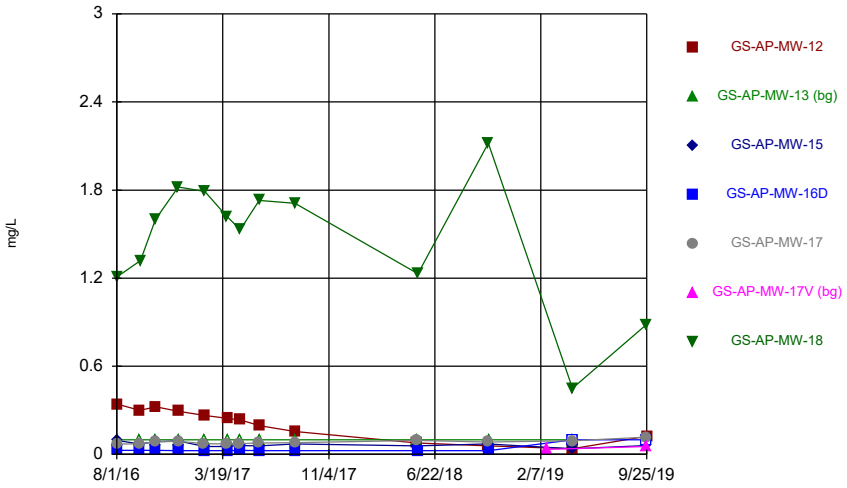
FIGURE A.

Sanitas™ v.9.6.25f Sanitas software utilized by Groundwater Stats Consulting. UG
Hollow symbols indicate censored values.

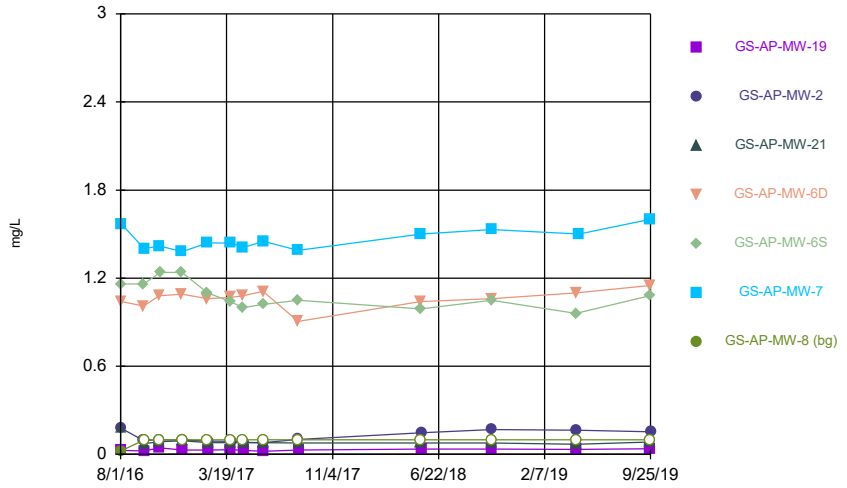
Time Series



Constituent: Boron Analysis Run 4/8/2020 11:08 AM View: Descriptive
Plant William C Gorgas Client: Southern Company Data: Gorgas AP

Sanitas™ v.9.6.25f Sanitas software utilized by Groundwater Stats Consulting. UG
Hollow symbols indicate censored values.

Time Series



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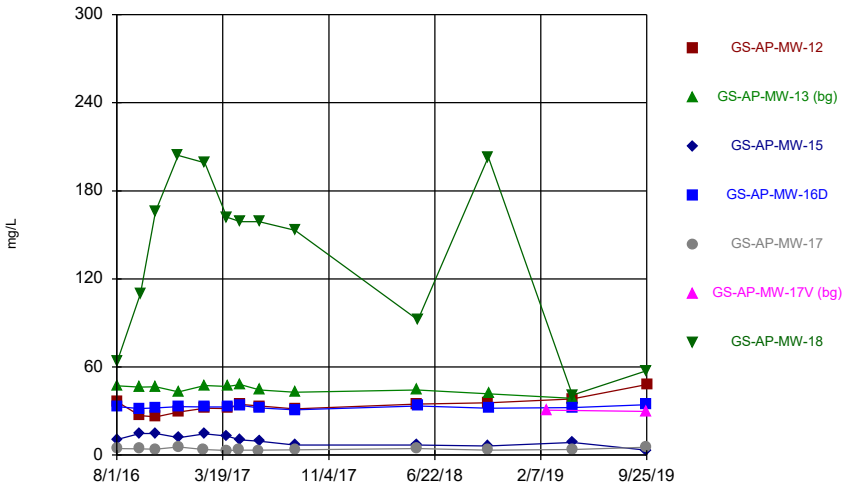
Plant William C Gorgas Client: Southern Company Data: Gorgas AP

Sanitas™ v.9.6.25f Sanitas software utilized by Groundwater Stats Consulting. UG

Time Series



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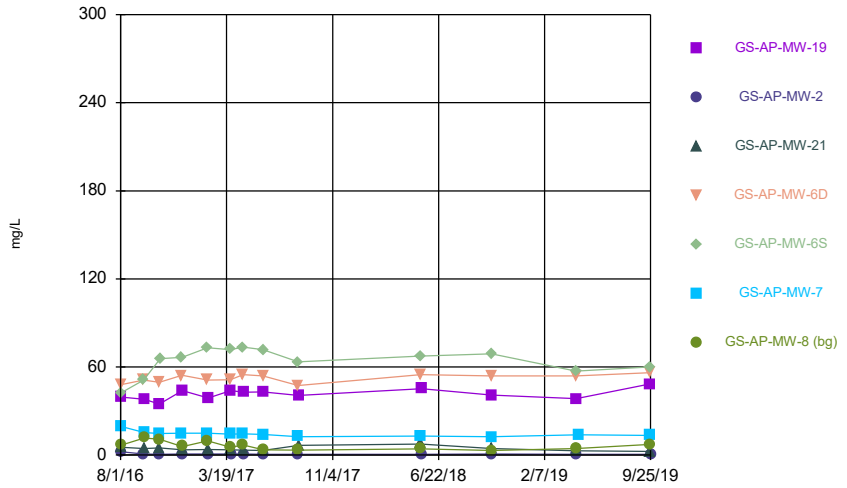
Plant William C Gorgas Client: Southern Company Data: Gorgas AP

Sanitas™ v.9.6.25f Sanitas software utilized by Groundwater Stats Consulting. UG

Time Series



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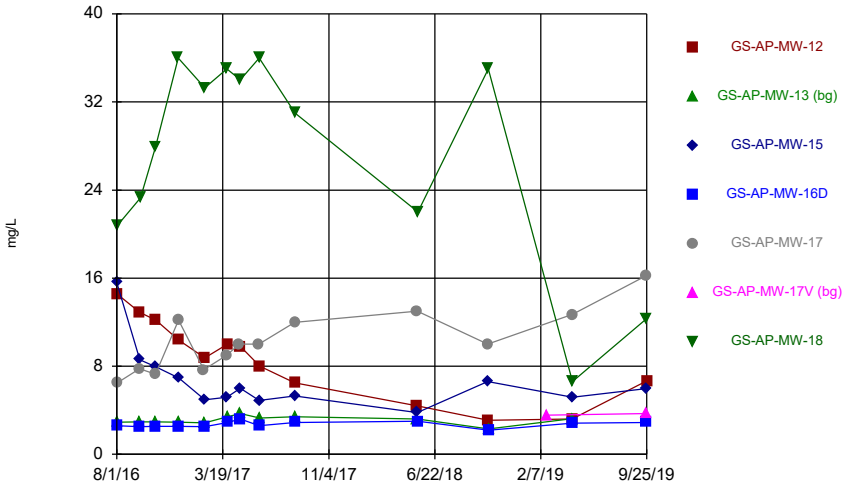
Plant William C Gorgas Client: Southern Company Data: Gorgas AP

Sanitas™ v.9.6.25f Sanitas software utilized by Groundwater Stats Consulting. UG

Time Series



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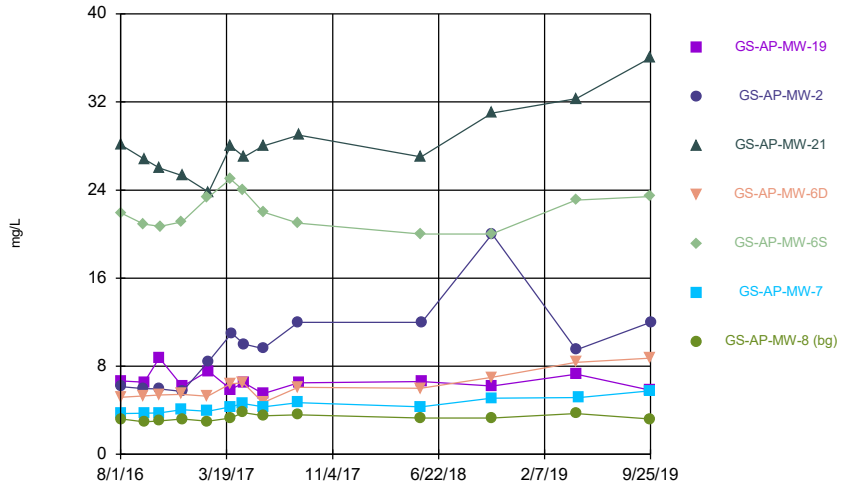
Plant William C Gorgas Client: Southern Company Data: Gorgas AP

Sanitas™ v.9.6.25f Sanitas software utilized by Groundwater Stats Consulting. UG

Time Series



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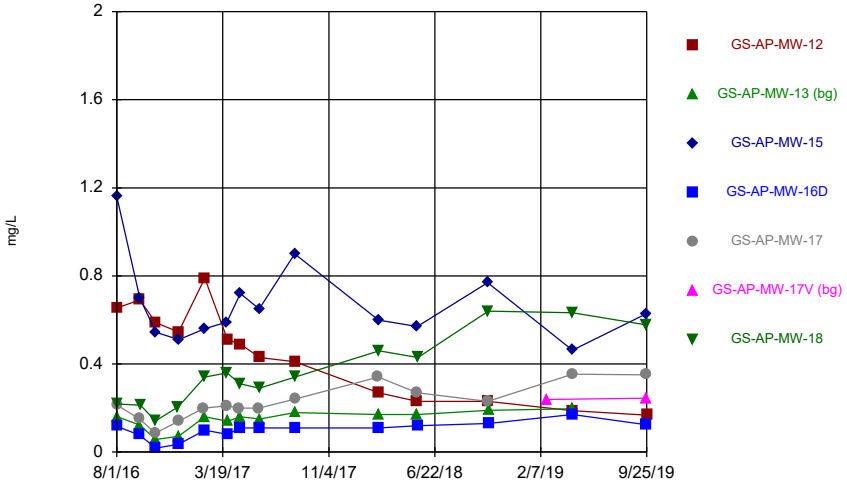
Sanitas™ v.9.6.25f Sanitas software utilized by Groundwater Stats Consulting. UG

Time Series



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Plant William C Gorgas Client: Southern Company Data: Gorgas AP

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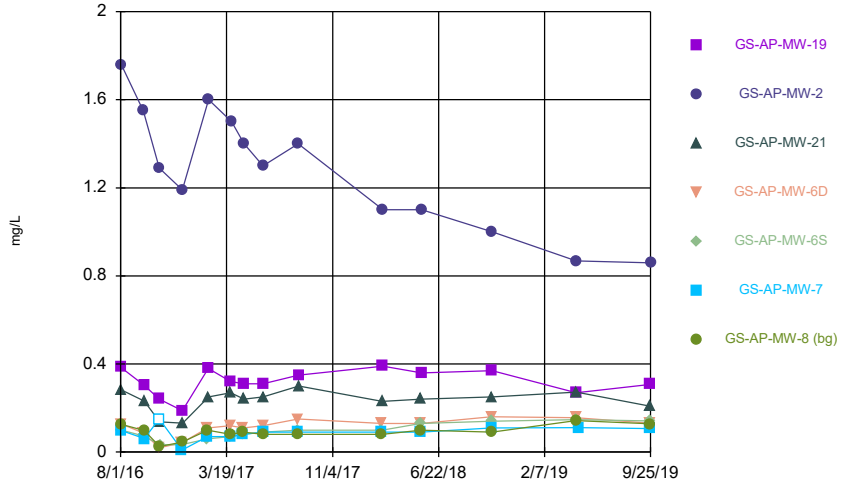
Hollow symbols indicate censored values.

Time Series



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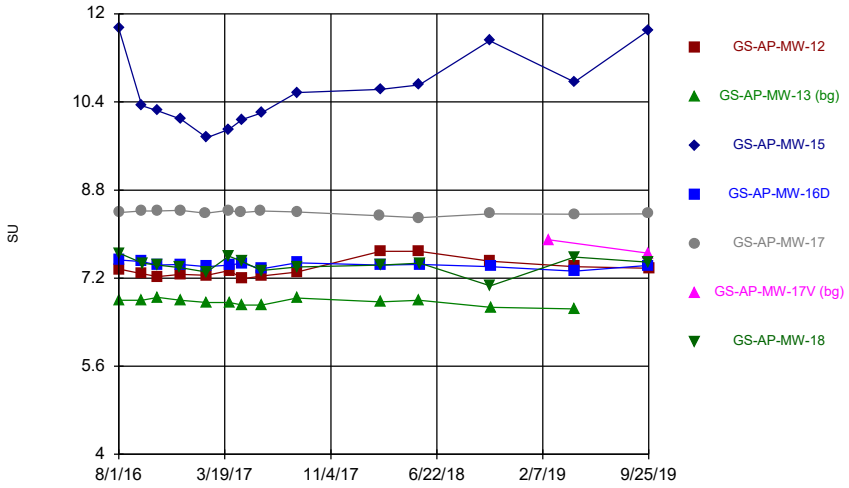
Time Series



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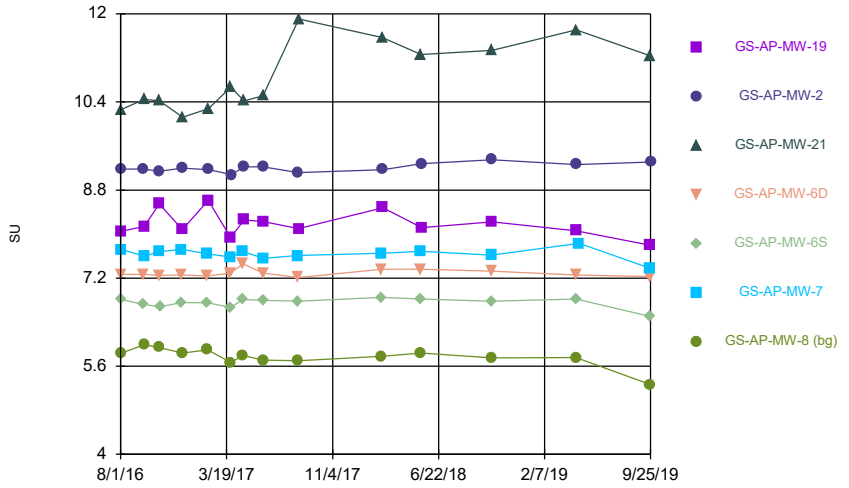
Sanitas™ v.9.6.25f Sanitas software utilized by Groundwater Stats Consulting. UG

Time Series



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Plant William C Gorgas Client: Southern Company Data: Gorgas AP

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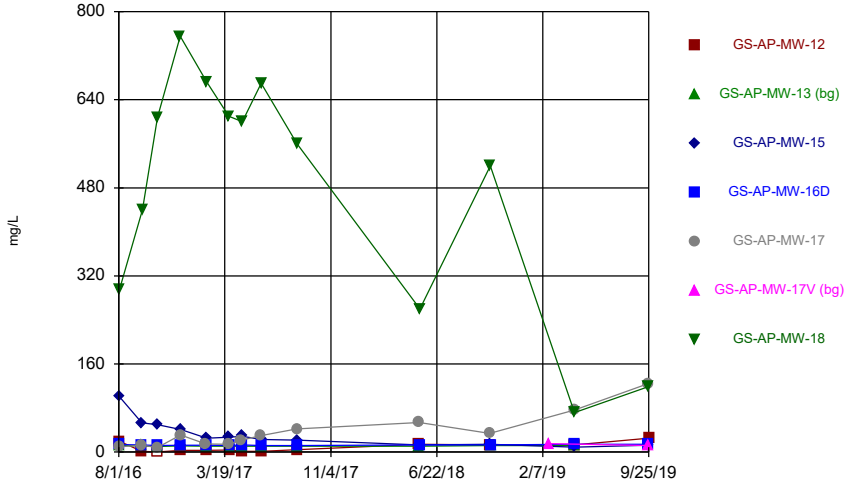
Hollow symbols indicate censored values.

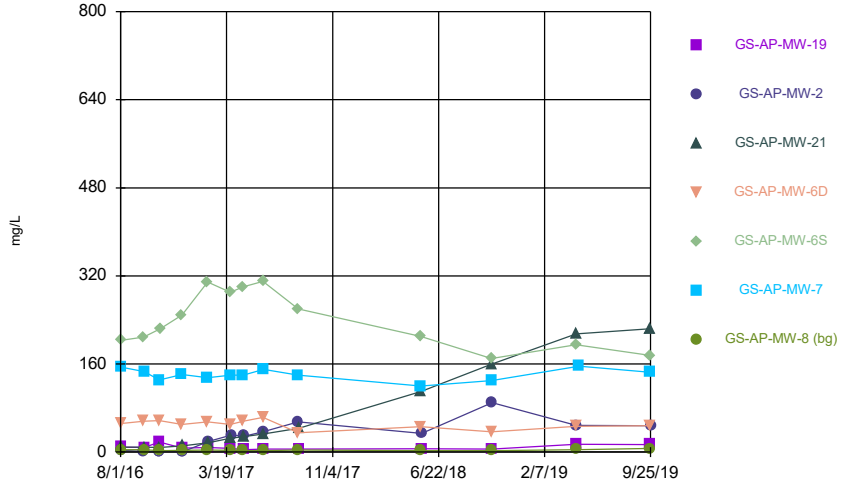
Time Series



Constituent: Sulfate Analysis Run 4/8/2020 11:08 AM View: Descriptive
Plant William C Gorgas Client: Southern Company Data: Gorgas AP

Sanitas™ v.9.6.25f Sanitas software utilized by Groundwater Stats Consulting. UG
Hollow symbols indicate censored values.

Time Series



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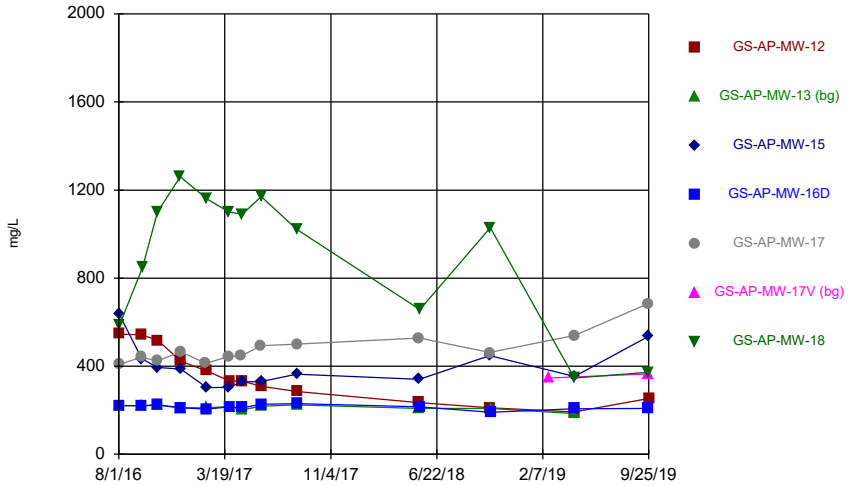
Plant William C Gorgas Client: Southern Company Data: Gorgas AP

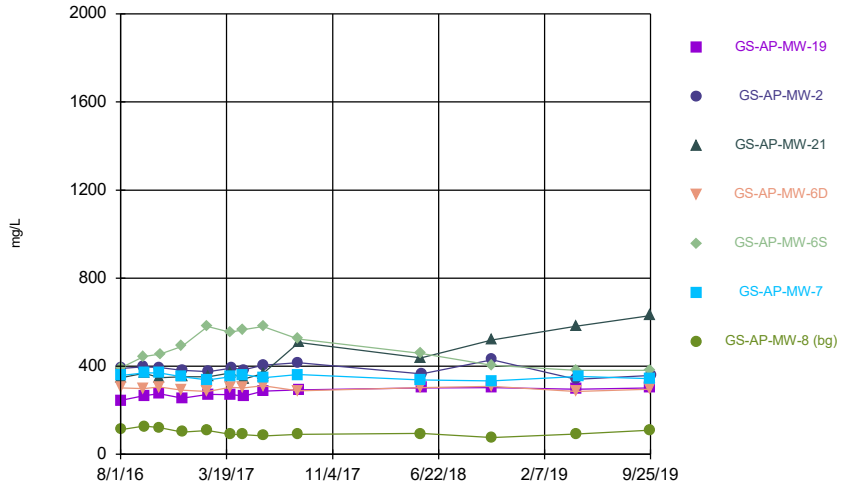
Time Series



Constituent: TDS Analysis Run 4/8/2020 11:08 AM View: Descriptive
Plant William C Gorgas Client: Southern Company Data: Gorgas AP

Sanitas™ v.9.6.25f Sanitas software utilized by Groundwater Stats Consulting. UG

Time Series



Constituent: TDS Analysis Run 4/8/2020 11:08 AM View: Descriptive
Plant William C Gorgas Client: Southern Company Data: Gorgas AP

Time Series

Constituent: Boron (mg/L) Analysis Run 4/8/2020 11:12 AM View: Descriptive

Plant William C Gorgas Client: Southern Company Data: Gorgas AP

	GS-AP-MW-12	GS-AP-MW-13 (bg)	GS-AP-MW-15	GS-AP-MW-16D	GS-AP-MW-17	GS-AP-MW-17V ...	GS-AP-MW-18
8/1/2016			0.0955 (J)	0.0266 (J)	0.0712 (J)		
8/2/2016		<0.1					1.21
8/3/2016	0.34						
9/19/2016				0.0262 (J)	0.0716 (J)		
9/20/2016	0.299	<0.1	0.0706 (J)				
9/21/2016							1.32
10/24/2016					0.0858 (J)		1.6
10/25/2016	0.323	<0.1	0.0849 (J)	0.0273 (J)			
12/12/2016							1.82
12/13/2016	0.294	<0.1		0.0258 (J)	0.0875 (J)		
12/14/2016			0.0914 (J)				
2/6/2017					0.0729 (J)		
2/8/2017	0.264	<0.1	0.0524 (J)	0.0249 (J)			1.79
3/27/2017					0.0706 (J)		
3/28/2017			0.0532 (J)				1.62
3/29/2017	0.246	<0.1		0.0247 (J)			
4/24/2017					0.0737 (J)		
4/26/2017	0.234	<0.1	0.0598 (J)	0.0264 (J)			1.53
6/5/2017					0.0767 (J)		
6/6/2017			0.0576 (J)	0.0247 (J)			1.73
6/7/2017	0.194	<0.1					
8/22/2017	0.156	<0.1	0.0702 (J)	0.0246 (J)	0.0786 (J)		
8/23/2017							1.71
5/15/2018	0.0781 (J)	<0.1	0.0567 (J)		0.0953 (J)		
5/16/2018				0.0247 (J)			1.23
10/15/2018			0.07 (J)		0.0842 (J)		
10/16/2018	0.057 (J)						2.12
10/17/2018		<0.1		0.0251 (J)			
2/20/2019						0.0337 (J)	
4/16/2019	0.0385 (J)	<0.1					
4/17/2019			0.0388 (J)	<0.1	0.0916 (J)		0.449
9/23/2019					0.116		
9/24/2019			0.0607 (J)	<0.1		0.0532 (J)	0.883
9/25/2019	0.122						

Time Series

Constituent: Boron (mg/L) Analysis Run 4/8/2020 11:12 AM View: Descriptive

Plant William C Gorgas Client: Southern Company Data: Gorgas AP

	GS-AP-MW-19	GS-AP-MW-2	GS-AP-MW-21	GS-AP-MW-6D	GS-AP-MW-6S	GS-AP-MW-7	GS-AP-MW-8 (bg)
8/1/2016	0.0279 (J)						
8/2/2016		0.178	0.176 (o)			1.57	
8/3/2016				1.04	1.16		0.0239 (J)
9/19/2016		0.0937 (J)					
9/20/2016				1.01	1.16		
9/21/2016	0.0235 (J)		0.0723 (J)			1.4	<0.1
10/24/2016	0.0444 (J)	0.0986 (J)		1.08		1.42	
10/25/2016			0.0867 (J)				<0.1
10/26/2016					1.24		
12/12/2016				1.09	1.24	1.38	
12/13/2016	0.0285 (J)	0.0965 (J)					<0.1
12/14/2016			0.092 (J)				
2/6/2017				1.06	1.1	1.44	<0.1
2/7/2017	0.03 (J)						
2/8/2017		0.0896 (J)	0.0803 (J)				
3/27/2017				1.07	1.04		
3/28/2017	0.0309 (J)		0.0804 (J)			1.44	<0.1
3/30/2017		0.0871 (J)					
4/24/2017				1.08	1	1.41	<0.1
4/26/2017	0.0273 (J)	0.0818 (J)	0.0801 (J)				
6/6/2017	0.0212 (J)	0.0805 (J)	0.0795 (J)	1.11	1.02		
6/7/2017						1.45	<0.1
8/21/2017		0.102		0.906	1.05	1.39	<0.1
8/22/2017	0.0294 (J)						
8/23/2017			0.0764 (J)				
5/14/2018				1.04	0.99		
5/15/2018			0.0769 (J)			1.5	<0.1
5/16/2018	0.0356 (J)	0.147					
10/15/2018				1.06	1.05	1.53	
10/16/2018	0.0363 (J)	0.169	0.0764 (J)				<0.1
4/16/2019				1.1	0.961		<0.1
4/17/2019	0.0336 (J)	0.165	0.0675 (J)				
4/23/2019						1.5	
9/23/2019				1.15	1.08		
9/24/2019	0.0375 (J)		0.0843 (J)			1.6	<0.1
9/25/2019		0.153					

Time Series

Constituent: Calcium (mg/L) Analysis Run 4/8/2020 11:12 AM View: Descriptive

Plant William C Gorgas Client: Southern Company Data: Gorgas AP

	GS-AP-MW-12	GS-AP-MW-13 (bg)	GS-AP-MW-15	GS-AP-MW-16D	GS-AP-MW-17	GS-AP-MW-17V ...	GS-AP-MW-18
8/1/2016			10.5	33	4.52		
8/2/2016		47.2					64.2
8/3/2016	36.1						
9/19/2016				31.7	4.3		
9/20/2016	27	46.3	14.7				
9/21/2016							110
10/24/2016					4.02		166
10/25/2016	26.1	46.6	14.7	32.2			
12/12/2016							204
12/13/2016	29.4	43.1		33.1	5.5		
12/14/2016			11.9				
2/6/2017					3.79		
2/8/2017	31.9	47.5	14.4	32.7			199
3/27/2017					3.13		
3/28/2017			12.9				162
3/29/2017	31.8	46.8		32.7			
4/24/2017					3.41		
4/26/2017	34.6	48.1	10.4	33.8			159
6/5/2017					3.32		
6/6/2017			9.41	32.2			159
6/7/2017	33.4	44.4					
8/22/2017	31.5	42.9	6.89	30.9	3.52		
8/23/2017							153
5/15/2018	34.8	44.3	6.86		4.53		
5/16/2018				33.5			92.1
10/15/2018			6.28		3.38		
10/16/2018	35.6						203
10/17/2018		41.8		32			
2/20/2019						30.6	
4/16/2019	38.3	38.6					
4/17/2019			8.53	32.3	3.86		40.9
9/23/2019					5.43		
9/24/2019			3.26	34.3		29.7	57.4
9/25/2019	48.1						

Time Series

Constituent: Calcium (mg/L) Analysis Run 4/8/2020 11:12 AM View: Descriptive

Plant William C Gorgas Client: Southern Company Data: Gorgas AP

	GS-AP-MW-19	GS-AP-MW-2	GS-AP-MW-21	GS-AP-MW-6D	GS-AP-MW-6S	GS-AP-MW-7	GS-AP-MW-8 (bg)
8/1/2016	39.6						
8/2/2016		2.25	5.29			19.4	
8/3/2016				48.1	42.5		6.85
9/19/2016		0.724					
9/20/2016				51.2	51.1		
9/21/2016	38.1		4.51			15.4	11.7
10/24/2016	34.7	0.635		49.5		14.8	
10/25/2016			4.92				10.8
10/26/2016					65.6		
12/12/2016				54.3	66.5	15	
12/13/2016	44	0.714					5.86
12/14/2016			3.5				
2/6/2017				51.2	73.1	14.9	9.76
2/7/2017	39						
2/8/2017		0.722	3.75				
3/27/2017				51.4	71.9		
3/28/2017	43.9		3.63			14.3	5.28
3/30/2017		0.686					
4/24/2017				54.7	73.5	14.5	6.89
4/26/2017	42.8	0.646	3.3				
6/6/2017	43.1	0.569	3.24	53.9	71.8		
6/7/2017						14.1	3.58
8/21/2017		0.634		47.3	63.5	12.6	3.38
8/22/2017	40.7						
8/23/2017			6.6				
5/14/2018				54.8	67.5		
5/15/2018			7.57			12.9	4.25
5/16/2018	45.3	0.588					
10/15/2018				53.9	68.9	12.5	
10/16/2018	40.9	0.714	4.4				3.21
4/16/2019				54	57.1		4.43
4/17/2019	38.4	0.511	2.88				
4/23/2019						13.8	
9/23/2019				56.1	60 (D)		
9/24/2019	48.4 (D)		2.47			13.4	7.24
9/25/2019		0.581					

Time Series

Constituent: Chloride (mg/L) Analysis Run 4/8/2020 11:12 AM View: Descriptive

Plant William C Gorgas Client: Southern Company Data: Gorgas AP

	GS-AP-MW-12	GS-AP-MW-13 (bg)	GS-AP-MW-15	GS-AP-MW-16D	GS-AP-MW-17	GS-AP-MW-17V ...	GS-AP-MW-18
8/1/2016			15.6	2.6	6.47		
8/2/2016		2.91					20.8
8/3/2016	14.5						
9/19/2016				2.51	7.78		
9/20/2016	12.9	2.94	8.6				
9/21/2016							23.3
10/24/2016					7.29		27.9
10/25/2016	12.2	2.94	7.96	2.53			
12/12/2016							36
12/13/2016	10.4	2.93		2.53	12.2		
12/14/2016			6.94				
2/6/2017					7.68		
2/8/2017	8.77	2.85	4.96	2.5			33.3
3/27/2017					9 (D)		
3/28/2017			5.2 (D)				35 (D)
3/29/2017	10 (D)	3.4 (D)		2.9 (D)			
4/24/2017					10 (D)		
4/26/2017	9.8 (D)	3.7 (D)	6 (D)	3.2 (D)			34 (D)
6/5/2017					10		
6/6/2017			4.9	2.6			36
6/7/2017	8	3.3					
8/22/2017	6.5	3.4	5.3	2.9	12		
8/23/2017							31
5/15/2018	4.4	3.2	3.8		13		
5/16/2018				3			22
10/15/2018			6.6		10		
10/16/2018	3.1						35
10/17/2018		2.3		2.2			
2/20/2019						3.56	
4/16/2019	3.22	3.23					
4/17/2019			5.2	2.82	12.7		6.61
9/23/2019					16.2		
9/24/2019			5.96	2.9		3.69	12.3
9/25/2019	6.68						

Time Series

Constituent: Chloride (mg/L) Analysis Run 4/8/2020 11:12 AM View: Descriptive

Plant William C Gorgas Client: Southern Company Data: Gorgas AP

	GS-AP-MW-19	GS-AP-MW-2	GS-AP-MW-21	GS-AP-MW-6D	GS-AP-MW-6S	GS-AP-MW-7	GS-AP-MW-8 (bg)
8/1/2016	6.67						
8/2/2016		6.15	28.1			3.7	
8/3/2016				5.2	21.9		3.21
9/19/2016		5.98					
9/20/2016				5.31	20.9		
9/21/2016	6.54		26.8			3.74	2.95
10/24/2016	8.77	5.93		5.4		3.75	
10/25/2016			26				3.03
10/26/2016					20.7		
12/12/2016				5.46	21.1	4.06	
12/13/2016	6.16	5.7					3.21
12/14/2016			25.3				
2/6/2017				5.28	23.3	3.92	3
2/7/2017	7.57						
2/8/2017		8.44	23.8				
3/27/2017				6.4 (D)	25 (D)		
3/28/2017	5.9 (D)		28 (D)			4.3 (D)	3.3 (D)
3/30/2017		11 (D)					
4/24/2017				6.5 (D)	24 (D)	4.6 (D)	3.8 (D)
4/26/2017	6.5 (D)	10 (D)	27 (D)				
6/6/2017	5.5	9.6	28	4.7	22		
6/7/2017						4.3	3.5
8/21/2017		12		6.1	21	4.7	3.6
8/22/2017	6.5						
8/23/2017			29				
5/14/2018				6	20		
5/15/2018			27			4.3	3.3
5/16/2018	6.6	12					
10/15/2018				7	20	5.1	
10/16/2018	6.2	20	31				3.3
4/16/2019				8.36	23.1		3.69
4/17/2019	7.27	9.5	32.3				
4/23/2019						5.16	
9/23/2019				8.72	23.4 (D)		
9/24/2019	5.83 (D)		36			5.76	3.21
9/25/2019		12					

Time Series

Constituent: Fluoride (mg/L) Analysis Run 4/8/2020 11:12 AM View: Descriptive

Plant William C Gorgas Client: Southern Company Data: Gorgas AP

	GS-AP-MW-12	GS-AP-MW-13 (bg)	GS-AP-MW-15	GS-AP-MW-16D	GS-AP-MW-17	GS-AP-MW-17V ...	GS-AP-MW-18
8/1/2016			1.16	0.117 (J)	0.214 (J)		
8/2/2016		0.161 (J)					0.219 (J)
8/3/2016	0.656						
9/19/2016				0.078 (J)	0.151 (J)		
9/20/2016	0.691	0.122 (J)	0.7				
9/21/2016							0.213 (J)
10/24/2016					0.086 (J)		0.141 (J)
10/25/2016	0.588	0.058 (J)	0.544	0.018 (J)			
12/12/2016							0.206 (J)
12/13/2016	0.545	0.072 (J)		0.035 (J)	0.14 (J)		
12/14/2016			0.51				
2/6/2017					0.2 (D)		
2/8/2017	0.79 (D)	0.16 (D)	0.56 (D)	0.1 (D)			0.34 (D)
3/27/2017					0.21 (D)		
3/28/2017			0.59 (D)				0.36 (D)
3/29/2017	0.51 (D)	0.14 (D)		0.08 (JD)			
4/24/2017					0.2 (D)		
4/26/2017	0.49 (D)	0.16 (D)	0.72 (D)	0.11 (D)			0.31 (D)
6/5/2017					0.2		
6/6/2017			0.65	0.11			0.29
6/7/2017	0.43	0.15					
8/22/2017	0.41	0.18	0.9	0.11	0.24		
8/23/2017							0.34
2/19/2018					0.34		
2/20/2018	0.27	0.17	0.6				
2/21/2018				0.11			0.46
5/15/2018	0.23	0.17	0.57		0.27		
5/16/2018				0.12			0.43
10/15/2018			0.77		0.23		
10/16/2018	0.23						0.64
10/17/2018		0.19		0.13			
2/20/2019						0.239	
4/16/2019	0.188	0.197					
4/17/2019			0.463	0.171	0.354		0.632
9/23/2019					0.351		
9/24/2019			0.628	0.124		0.245	0.578
9/25/2019	0.168						

Time Series

Constituent: Fluoride (mg/L) Analysis Run 4/8/2020 11:12 AM View: Descriptive

Plant William C Gorgas Client: Southern Company Data: Gorgas AP

	GS-AP-MW-19	GS-AP-MW-2	GS-AP-MW-21	GS-AP-MW-6D	GS-AP-MW-6S	GS-AP-MW-7	GS-AP-MW-8 (bg)
8/1/2016	0.385						
8/2/2016		1.76	0.282 (J)			0.098 (J)	
8/3/2016				0.127 (J)	0.099 (J)		0.125 (J)
9/19/2016		1.55					
9/20/2016				0.087 (J)	0.074 (J)		
9/21/2016	0.303		0.231 (J)			0.061 (J)	0.098 (J)
10/24/2016	0.24 (J)	1.29		0.019 (J)		<0.3	
10/25/2016			0.137 (J)				0.025 (J)
10/26/2016					0.032 (J)		
12/12/2016				0.043 (J)	0.034 (J)	0.01 (J)	
12/13/2016	0.188 (J)	1.19					0.045 (J)
12/14/2016			0.131 (J)				
2/6/2017				0.11 (D)	0.06 (JD)	0.07 (JD)	0.1 (D)
2/7/2017	0.38 (D)						
2/8/2017		1.6 (D)	0.25 (D)				
3/27/2017				0.12 (D)	0.07 (JD)		
3/28/2017	0.32 (D)		0.27 (D)			0.07 (JD)	0.08 (JD)
3/30/2017		1.5 (D)					
4/24/2017				0.11 (D)	0.08 (JD)	0.08 (JD)	0.09 (JD)
4/26/2017	0.31 (D)	1.4 (D)	0.24 (D)				
6/6/2017	0.31	1.3	0.25	0.12	0.09 (J)		
6/7/2017						0.09 (J)	0.08 (J)
8/21/2017		1.4		0.15	0.1	0.09 (J)	0.08 (J)
8/22/2017	0.35						
8/23/2017			0.3				
2/19/2018				0.13	0.1	0.09 (J)	0.08 (J)
2/20/2018			0.23				
2/21/2018	0.39	1.1					
5/14/2018				0.13	0.13		
5/15/2018			0.24			0.09 (J)	0.1
5/16/2018	0.36	1.1					
10/15/2018				0.16	0.14	0.11	
10/16/2018	0.37	1	0.25				0.09 (J)
4/16/2019				0.156	0.147		0.143
4/17/2019	0.27	0.868	0.272				
4/23/2019						0.111	
9/23/2019				0.132	0.142 (D)		
9/24/2019	0.307 (D)		0.209			0.106	0.128
9/25/2019		0.86					

Time Series

Constituent: pH (SU) Analysis Run 4/8/2020 11:12 AM View: Descriptive

Plant William C Gorgas Client: Southern Company Data: Gorgas AP

	GS-AP-MW-12	GS-AP-MW-13 (bg)	GS-AP-MW-15	GS-AP-MW-16D	GS-AP-MW-17	GS-AP-MW-17V ...	GS-AP-MW-18
8/1/2016			11.74	7.53	8.39		
8/2/2016		6.8					7.65
8/3/2016	7.36						
9/19/2016				7.5	8.42		
9/20/2016	7.28	6.8	10.33				
9/21/2016							7.47
10/24/2016					8.42		7.44
10/25/2016	7.23	6.85	10.24	7.44			
12/12/2016							7.39
12/13/2016	7.27	6.8		7.45	8.43		
12/14/2016			10.09				
2/6/2017					8.38		
2/8/2017	7.25	6.76	9.75	7.41			7.31
3/27/2017					8.43		
3/28/2017			9.9				7.6
3/29/2017	7.34	6.76		7.44			
4/24/2017					8.39		
4/26/2017	7.19	6.71	10.08	7.47			7.5
6/5/2017					8.42		
6/6/2017			10.2	7.37			7.34
6/7/2017	7.24	6.71					
8/22/2017	7.31	6.84	10.57	7.48	8.4		
8/23/2017							7.4
2/19/2018					8.33		
2/20/2018	7.69	6.77	10.63				
2/21/2018				7.44			7.44
5/15/2018	7.69	6.8	10.71		8.3		
5/16/2018				7.45			7.47
10/15/2018			11.51		8.37		
10/16/2018	7.51						7.06
10/17/2018		6.67		7.41			
2/20/2019						7.895 (D)	
4/16/2019	7.41	6.64					
4/17/2019			10.76	7.33	8.36		7.58
9/23/2019					8.37		
9/24/2019			11.7	7.43		7.65	7.49
9/25/2019	7.38						

Time Series

Constituent: pH (SU) Analysis Run 4/8/2020 11:12 AM View: Descriptive

Plant William C Gorgas Client: Southern Company Data: Gorgas AP

	GS-AP-MW-19	GS-AP-MW-2	GS-AP-MW-21	GS-AP-MW-6D	GS-AP-MW-6S	GS-AP-MW-7	GS-AP-MW-8 (bg)
8/1/2016	8.05						
8/2/2016		9.18	10.26			7.72	
8/3/2016				7.27	6.81		5.84
9/19/2016		9.18					
9/20/2016				7.27	6.72		
9/21/2016	8.14		10.45			7.6	5.99
10/24/2016	8.55	9.14		7.25		7.68	
10/25/2016			10.42				5.94
10/26/2016					6.68		
12/12/2016				7.26	6.76	7.72	
12/13/2016	8.08	9.2					5.84
12/14/2016			10.12				
2/6/2017				7.24	6.75	7.64	5.9
2/7/2017	8.61						
2/8/2017		9.17	10.28				
3/27/2017				7.29	6.67		
3/28/2017	7.94		10.67			7.58	5.67
3/30/2017		9.08					
4/24/2017				7.46	6.81	7.68	5.79
4/26/2017	8.26	9.22	10.42				
6/6/2017	8.23	9.22	10.51	7.29	6.8		
6/7/2017						7.56	5.71
8/21/2017		9.12		7.21	6.78	7.61	5.7
8/22/2017	8.1						
8/23/2017			11.91				
2/19/2018				7.36	6.85	7.65	5.78
2/20/2018			11.57				
2/21/2018	8.48	9.17					
5/14/2018				7.36	6.82		
5/15/2018			11.26			7.69	5.84
5/16/2018	8.12	9.28					
10/15/2018				7.33	6.78	7.62	
10/16/2018	8.22	9.35	11.34				5.75
4/16/2019				7.26	6.82		5.76
4/17/2019	8.06	9.26	11.71				
4/23/2019						7.83	
9/23/2019				7.23	6.51		
9/24/2019	7.8		11.24			7.38	5.27
9/25/2019		9.31					

Time Series

Constituent: Sulfate (mg/L) Analysis Run 4/8/2020 11:12 AM View: Descriptive

Plant William C Gorgas Client: Southern Company Data: Gorgas AP

	GS-AP-MW-12	GS-AP-MW-13 (bg)	GS-AP-MW-15	GS-AP-MW-16D	GS-AP-MW-17	GS-AP-MW-17V ...	GS-AP-MW-18
8/1/2016			102	13.4	9.56		
8/2/2016		12					295
8/3/2016	19.2						
9/19/2016				12.9	12.7		
9/20/2016	1.42	11.2	53.3				
9/21/2016							440
10/24/2016					8.58		608
10/25/2016	<1	10.1	49.8	11.6			
12/12/2016							755
12/13/2016	3.21	11.4		12.7	31		
12/14/2016			40.9				
2/6/2017					14.7		
2/8/2017	3.3	10.9	25	12.2			672
3/27/2017					14 (D)		
3/28/2017			27 (D)				610 (D)
3/29/2017	3.8 (JD)	11 (D)		12 (D)			
4/24/2017					22 (D)		
4/26/2017	1.4 (JD)	11 (D)	29 (D)	13 (D)			600 (D)
6/5/2017					30		
6/6/2017			23	12			670
6/7/2017	1.7 (J)	11					
8/22/2017	4.2 (J)	11	22	12	42		
8/23/2017							560
5/15/2018	14	11	13		54		
5/16/2018				13			260
10/15/2018			14		34		
10/16/2018	13						520
10/17/2018		12		13			
2/20/2019						15.2	
4/16/2019	13.3	12.1					
4/17/2019			9.02	14.1	76.6		71.6
9/23/2019					124		
9/24/2019			12.4	14.1		11.8	119
9/25/2019	25.5						

Time Series

Constituent: Sulfate (mg/L) Analysis Run 4/8/2020 11:12 AM View: Descriptive

Plant William C Gorgas Client: Southern Company Data: Gorgas AP

	GS-AP-MW-19	GS-AP-MW-2	GS-AP-MW-21	GS-AP-MW-6D	GS-AP-MW-6S	GS-AP-MW-7	GS-AP-MW-8 (bg)
8/1/2016	9.02						
8/2/2016		2.87	9.14			154	
8/3/2016				52	203		4.2
9/19/2016		1.22					
9/20/2016				56	209		
9/21/2016	8.38		8.71			146	4.27
10/24/2016	18.5	<1		57.5		131	
10/25/2016			8.54				2.78
10/26/2016					224		
12/12/2016				50	249	141	
12/13/2016	7.4	<1					3.18
12/14/2016			11.5				
2/6/2017				54.9	309	135	3.74
2/7/2017	8.16						
2/8/2017		19.4	17				
3/27/2017				50 (D)	290 (D)		
3/28/2017	6.4 (D)		25 (D)			140 (D)	3.4 (JD)
3/30/2017		31 (D)					
4/24/2017				56 (D)	300 (D)	140 (D)	2.7 (JD)
4/26/2017	4.6 (JD)	29 (D)	28 (D)				
6/6/2017	5.2	37	33	63	310		
6/7/2017						150	2.7 (J)
8/21/2017		55		35	260	140	3.9 (J)
8/22/2017	5.3						
8/23/2017			43				
5/14/2018				46	210		
5/15/2018			110			120	2.5 (J)
5/16/2018	6	34					
10/15/2018				37	170	130	
10/16/2018	5.6	90	160				2.4 (J)
4/16/2019				46.8	195		4.53
4/17/2019	14.3	48.6	215				
4/23/2019						156	
9/23/2019				47.9	176 (D)		
9/24/2019	13.8 (D)		224			145	6.61
9/25/2019		47.7					

Time Series

Constituent: TDS (mg/L) Analysis Run 4/8/2020 11:12 AM View: Descriptive
Plant William C Gorgas Client: Southern Company Data: Gorgas AP

	GS-AP-MW-12	GS-AP-MW-13 (bg)	GS-AP-MW-15	GS-AP-MW-16D	GS-AP-MW-17	GS-AP-MW-17V ...	GS-AP-MW-18
8/1/2016			640	222	408		
8/2/2016		221					586
8/3/2016	546						
9/19/2016				220	441		
9/20/2016	542	221	434				
9/21/2016							848
10/24/2016					424		1100
10/25/2016	518	226	394	223			
12/12/2016							1260
12/13/2016	424	211		211	466		
12/14/2016			387				
2/6/2017					414		
2/8/2017	379	212	303	206			1160
3/27/2017					444		
3/28/2017			305				1100
3/29/2017	334	217		215			
4/24/2017					446		
4/26/2017	332	202	329	212			1090
6/5/2017					493		
6/6/2017			331	227			1170
6/7/2017	308	218					
8/22/2017	286	224	364	230	500		
8/23/2017							1020
5/15/2018	235	209	340		528		
5/16/2018				216			658
10/15/2018			448 (D)		462 (D)		
10/16/2018	211 (D)						1030 (D)
10/17/2018		208 (D)		191 (D)			
2/20/2019						346	
4/16/2019	193	185					
4/17/2019			354	207	540		347
9/23/2019					684		
9/24/2019			536	208		365	372
9/25/2019	253						

Time Series

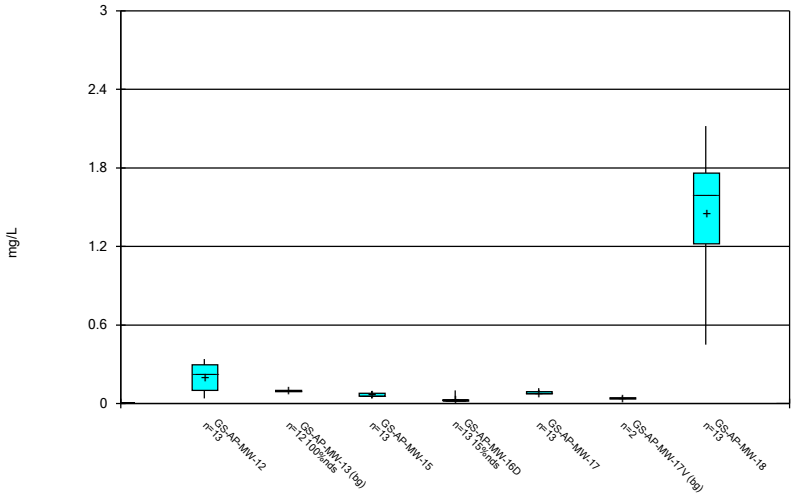
Constituent: TDS (mg/L) Analysis Run 4/8/2020 11:12 AM View: Descriptive

Plant William C Gorgas Client: Southern Company Data: Gorgas AP

	GS-AP-MW-19	GS-AP-MW-2	GS-AP-MW-21	GS-AP-MW-6D	GS-AP-MW-6S	GS-AP-MW-7	GS-AP-MW-8 (bg)
8/1/2016	245						
8/2/2016		390	348			358	
8/3/2016				302	394		113
9/19/2016		398					
9/20/2016				298	444		
9/21/2016	267		368			370	128
10/24/2016	275	395		306		370	
10/25/2016			348				121
10/26/2016					456		
12/12/2016				291	491	353	
12/13/2016	255	381					101
12/14/2016			352				
2/6/2017				285	580	338	108
2/7/2017	272						
2/8/2017		376	352				
3/27/2017				305	554		
3/28/2017	271		370			352	91
3/30/2017		391					
4/24/2017				301	566	362	89.3
4/26/2017	265	384	342				
6/6/2017	287	404	367	311	580		
6/7/2017						348	84
8/21/2017		416		289	524	362	91.3
8/22/2017	293						
8/23/2017			508				
5/14/2018				303	458		
5/15/2018			438			338	94.7
5/16/2018	301	365					
10/15/2018				309 (D)	404 (D)	333 (D)	
10/16/2018	303 (D)	430 (D)	520 (D)				76.7 (D)
4/16/2019				285	382		92
4/17/2019	296	341	582				
4/23/2019						354	
9/23/2019				296	381		
9/24/2019	302		630			344	109
9/25/2019		358					

FIGURE B.

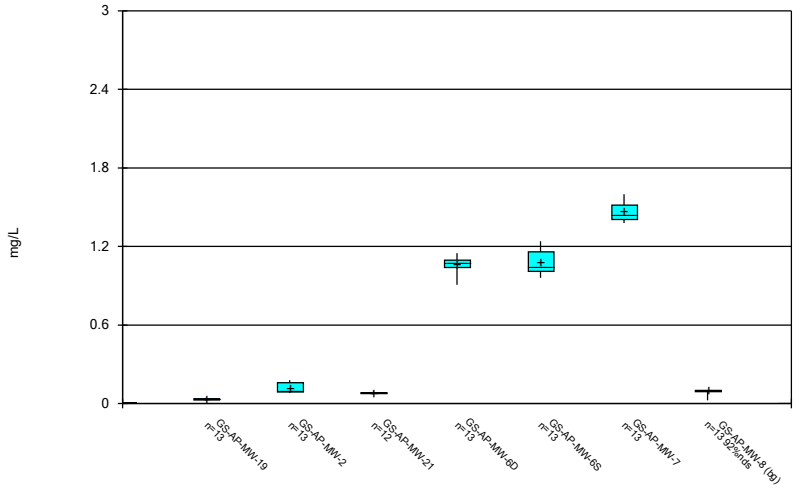
Box & Whiskers Plot



Constituent: Boron Analysis Run 4/8/2020 11:23 AM View: Descriptive
Plant William C Gorgas Client: Southern Company Data: Gorgas AP

Sanitas™ v.9.6.25f Sanitas software utilized by Groundwater Stats Consulting. UG

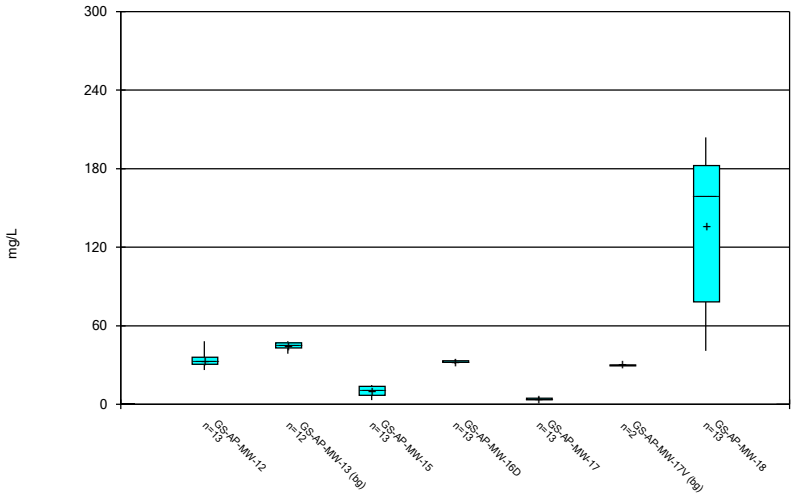
Box & Whiskers Plot



Constituent: Boron Analysis Run 4/8/2020 11:23 AM View: Descriptive
Plant William C Gorgas Client: Southern Company Data: Gorgas AP

Sanitas™ v.9.6.25f Sanitas software utilized by Groundwater Stats Consulting. UG

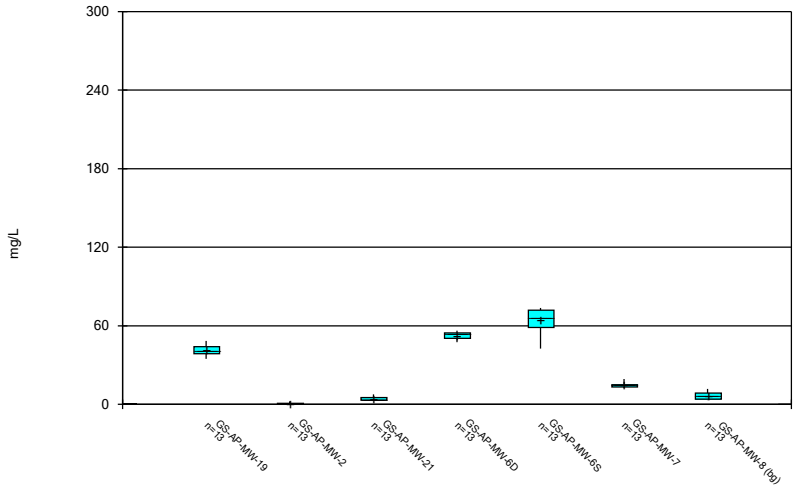
Box & Whiskers Plot



Constituent: Calcium Analysis Run 4/8/2020 11:23 AM View: Descriptive
Plant William C Gorgas Client: Southern Company Data: Gorgas AP

Sanitas™ v.9.6.25f Sanitas software utilized by Groundwater Stats Consulting. UG

Box & Whiskers Plot



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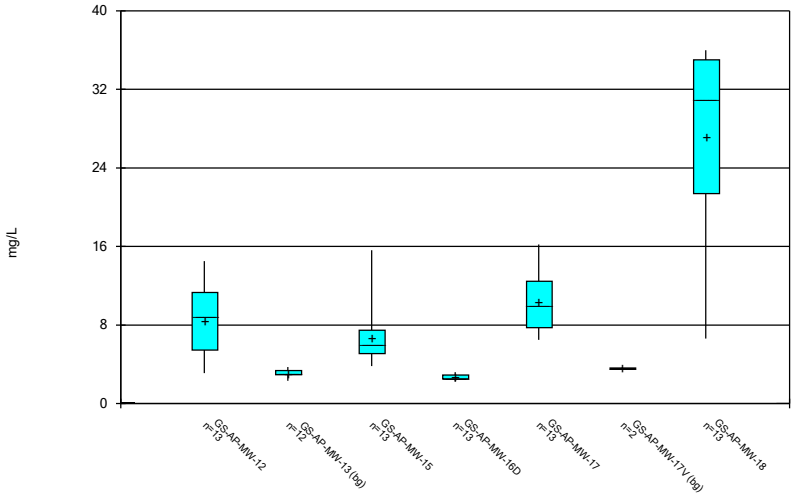
Plant William C Gorgas Client: Southern Company Data: Gorgas AP

Box & Whiskers Plot



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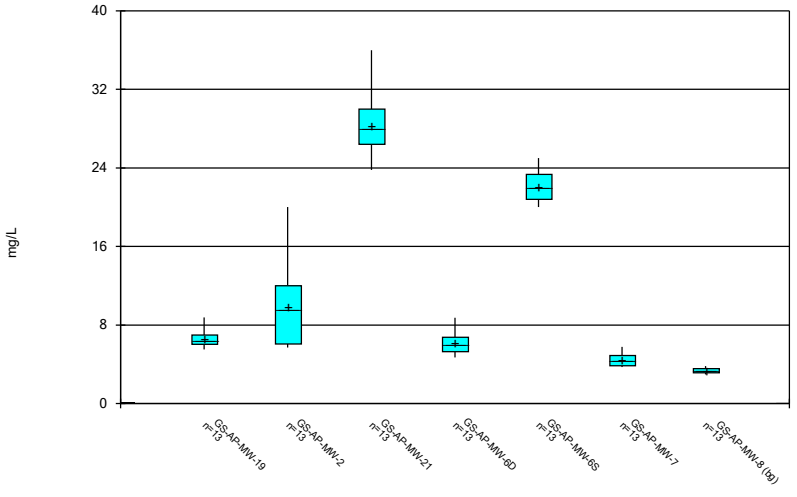
Plant William C Gorgas Client: Southern Company Data: Gorgas AP

Sanitas™ v.9.6.25f Sanitas software utilized by Groundwater Stats Consulting. UG

Box & Whiskers Plot



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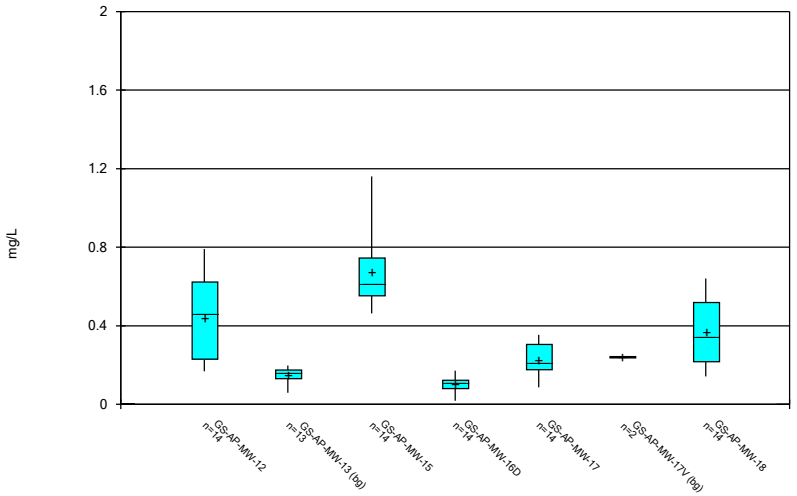
Plant William C Gorgas Client: Southern Company Data: Gorgas AP

Sanitas™ v.9.6.25f Sanitas software utilized by Groundwater Stats Consulting. UG

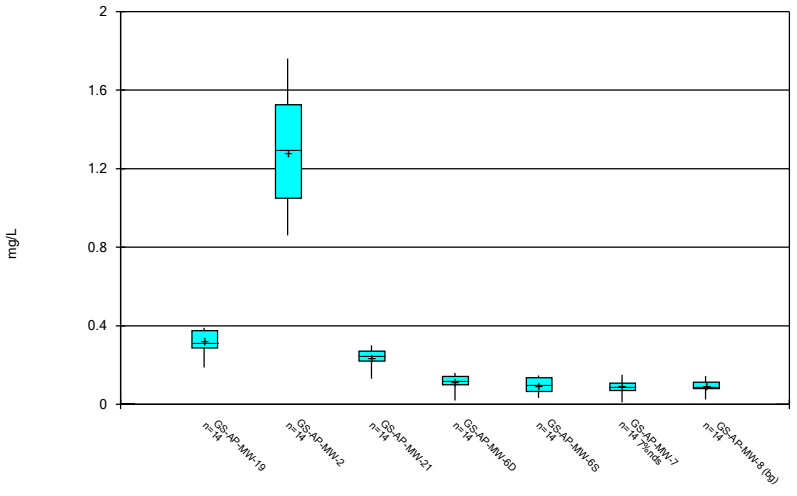
Box & Whiskers Plot



Constituent: Fluoride Analysis Run 4/8/2020 11:23 AM View: Descriptive
Plant William C Gorgas Client: Southern Company Data: Gorgas AP

Sanitas™ v.9.6.25f Sanitas software utilized by Groundwater Stats Consulting. UG

Box & Whiskers Plot



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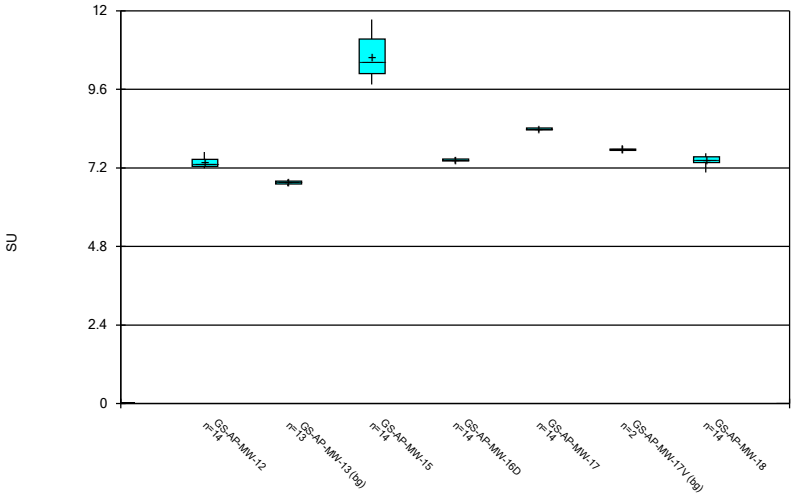
Plant William C Gorgas Client: Southern Company Data: Gorgas AP

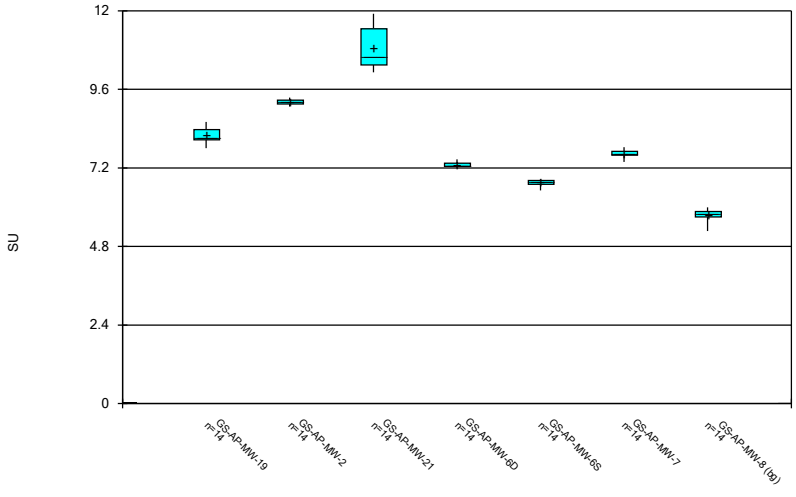
Box & Whiskers Plot



Constituent: pH Analysis Run 4/8/2020 11:23 AM View: Descriptive
Plant William C Gorgas Client: Southern Company Data: Gorgas AP

Sanitas™ v.9.6.25f Sanitas software utilized by Groundwater Stats Consulting. UG

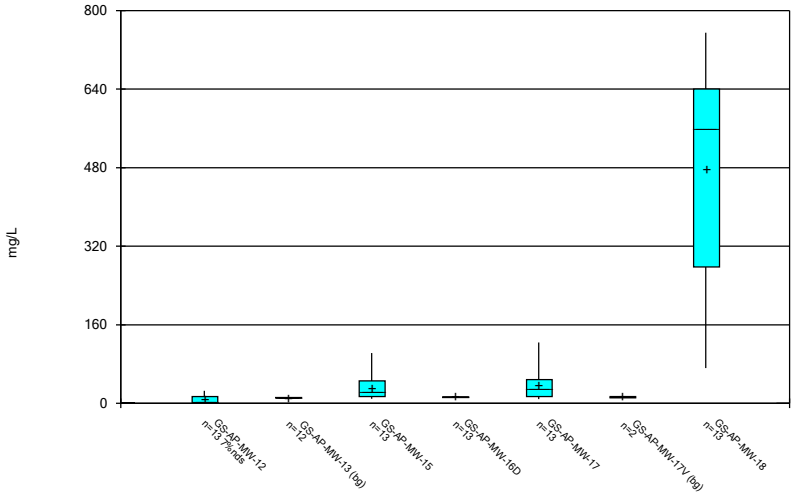
Box & Whiskers Plot



Constituent: pH Analysis Run 4/8/2020 11:23 AM View: Descriptive
Plant William C Gorgas Client: Southern Company Data: Gorgas AP

Sanitas™ v.9.6.25f Sanitas software utilized by Groundwater Stats Consulting. UG

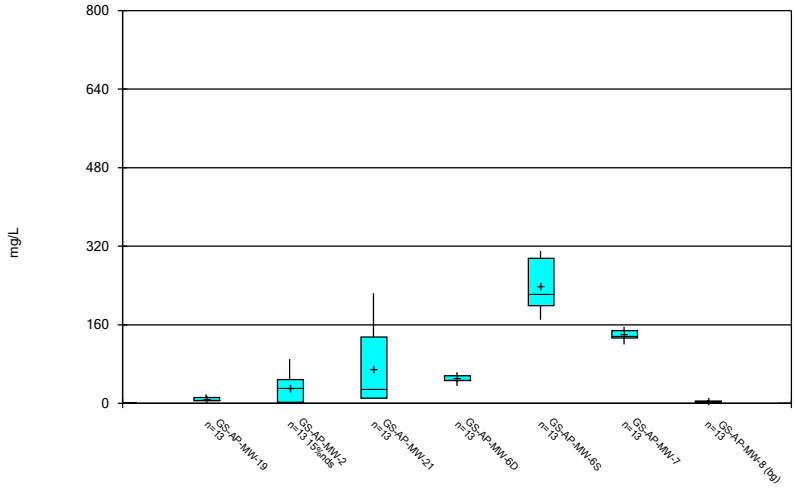
Box & Whiskers Plot



Constituent: Sulfate Analysis Run 4/8/2020 11:23 AM View: Descriptive
Plant William C Gorgas Client: Southern Company Data: Gorgas AP

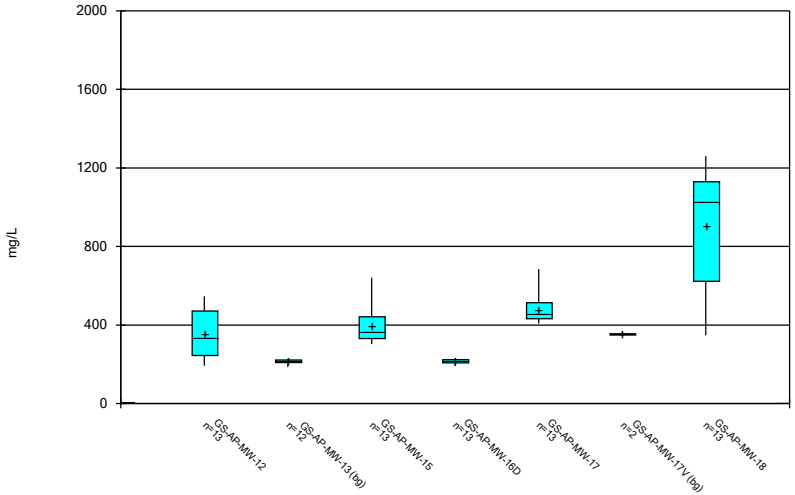
Sanitas™ v.9.6.25f Sanitas software utilized by Groundwater Stats Consulting. UG

Box & Whiskers Plot



Constituent: Sulfate Analysis Run 4/8/2020 11:23 AM View: Descriptive
Plant William C Gorgas Client: Southern Company Data: Gorgas AP

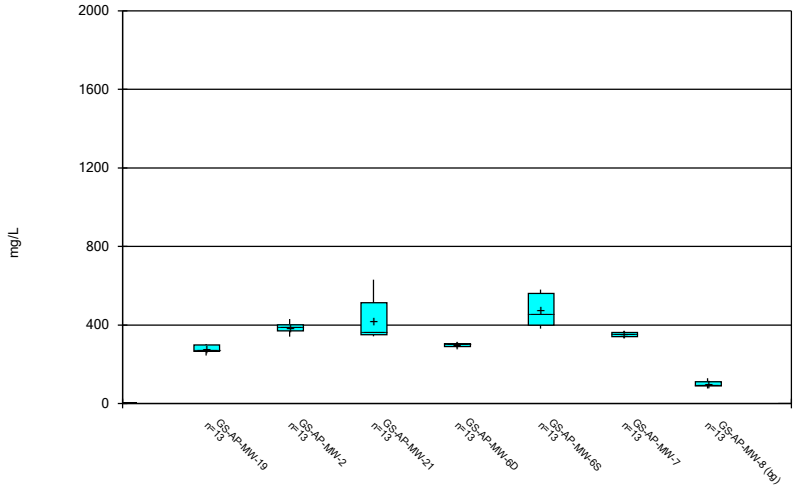
Box & Whiskers Plot



Constituent: TDS Analysis Run 4/8/2020 11:23 AM View: Descriptive
Plant William C Gorgas Client: Southern Company Data: Gorgas AP

Sanitas™ v.9.6.25f Sanitas software utilized by Groundwater Stats Consulting. UG

Box & Whiskers Plot



Constituent: TDS Analysis Run 4/8/2020 11:23 AM View: Descriptive
Plant William C Gorgas Client: Southern Company Data: Gorgas AP

FIGURE C.

Outlier Summary

Plant William C Gorgas Client: Southern Company Data: Gorgas AP Printed 4/8/2020, 11:13 AM

	GS-AP-MW-21 Boron (mg/L)
8/2/2016	0.176 (o)

FIGURE D.

Trend Test Summary - All Results

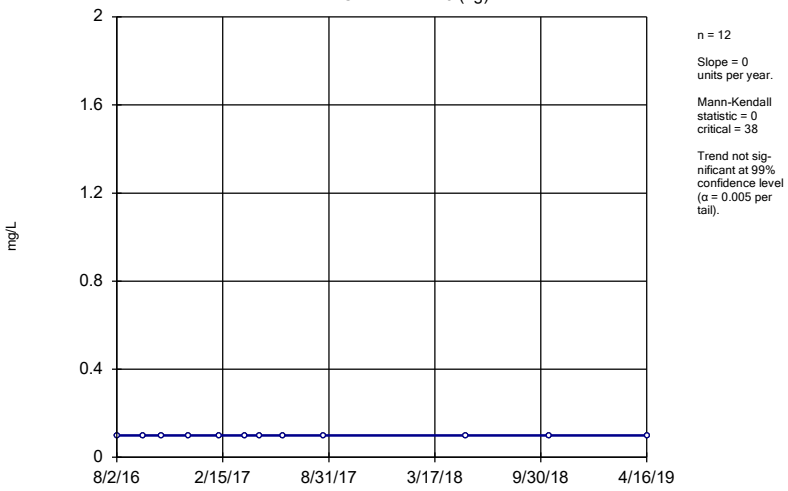
Plant William C Gorgas Client: Southern Company Data: Gorgas AP Printed 4/13/2020, 12:44 PM

Constituent	Well	Slope	Calc.	Critical	Sig.	N	%NDs	Normality	Xform	Alpha	Method
Boron (mg/L)	GS-AP-MW-13 (bg)	0	0	38	No	12	100	n/a	n/a	0.01	NP
Boron (mg/L)	GS-AP-MW-8 (bg)	0	12	43	No	13	92.31	n/a	n/a	0.01	NP
Calcium (mg/L)	GS-AP-MW-13 (bg)	-2.607	-32	-38	No	12	0	n/a	n/a	0.01	NP
Calcium (mg/L)	GS-AP-MW-8 (bg)	-2.217	-34	-43	No	13	0	n/a	n/a	0.01	NP
Chloride (mg/L)	GS-AP-MW-13 (bg)	0.1178	10	38	No	12	0	n/a	n/a	0.01	NP
Chloride (mg/L)	GS-AP-MW-8 (bg)	0.1539	30	43	No	13	0	n/a	n/a	0.01	NP
Fluoride (mg/L)	**GS-AP-MW-13 (bg)**	**0.02914**	**48**	**43**	**Yes**	**13**	**0**	**n/a**	**n/a**	**0.01**	**NP**
Fluoride (mg/L)	GS-AP-MW-8 (bg)	0.009456	23	48	No	14	0	n/a	n/a	0.01	NP
pH (SU)	GS-AP-MW-13 (bg)	-0.05825	-34	-43	No	13	0	n/a	n/a	0.01	NP
pH (SU)	GS-AP-MW-8 (bg)	-0.0911	-44	-48	No	14	0	n/a	n/a	0.01	NP
Sulfate (mg/L)	GS-AP-MW-13 (bg)	0.01849	11	38	No	12	0	n/a	n/a	0.01	NP
Sulfate (mg/L)	GS-AP-MW-8 (bg)	-0.1847	-7	-43	No	13	0	n/a	n/a	0.01	NP
TDS (mg/L)	GS-AP-MW-13 (bg)	-7.182	-29	-38	No	12	0	n/a	n/a	0.01	NP
TDS (mg/L)	GS-AP-MW-8 (bg)	-12.19	-30	-43	No	13	0	n/a	n/a	0.01	NP

Sanitas™ v.9.6.25f Sanitas software utilized by Groundwater Stats Consulting. UG
Hollow symbols indicate censored values.

Sen's Slope Estimator

GS-AP-MW-13 (bg)



n = 12

Slope = 0 units per year.

Mann-Kendall statistic = 0 critical = 38

Trend not significant at 99% confidence level (α = 0.005 per tail).

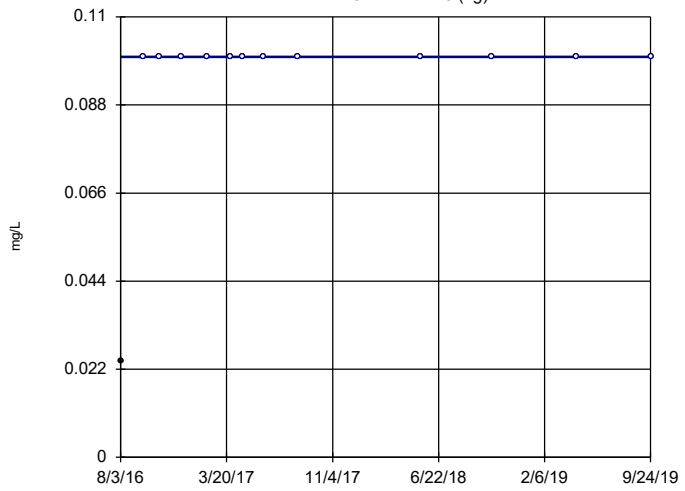
Constituent: Boron Analysis Run 4/13/2020 12:42 PM View: PL's Interwell

Plant William C Gorgas Client: Southern Company Data: Gorgas AP

Sanitas™ v.9.6.25f Sanitas software utilized by Groundwater Stats Consulting. UG
Hollow symbols indicate censored values.

Sen's Slope Estimator

GS-AP-MW-8 (bg)



n = 13

Slope = 0 units per year.

Mann-Kendall statistic = 12 critical = 43

Trend not significant at 99% confidence level (α = 0.005 per tail).

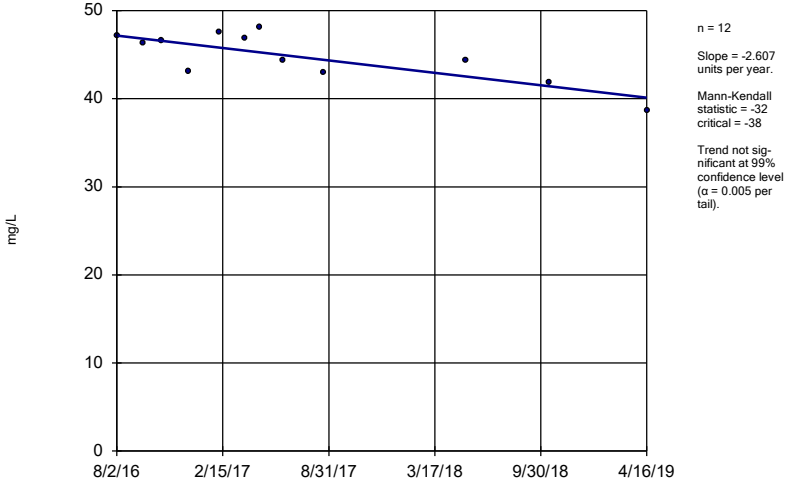
Constituent: Boron Analysis Run 4/13/2020 12:42 PM View: PL's Interwell

Plant William C Gorgas Client: Southern Company Data: Gorgas AP

Sanitas™ v.9.6.25f Sanitas software utilized by Groundwater Stats Consulting. UG

Sen's Slope Estimator

GS-AP-MW-13 (bg)



n = 12

Slope = -2.607 units per year.

Mann-Kendall statistic = -32 critical = -38

Trend not significant at 99% confidence level (α = 0.005 per tail).

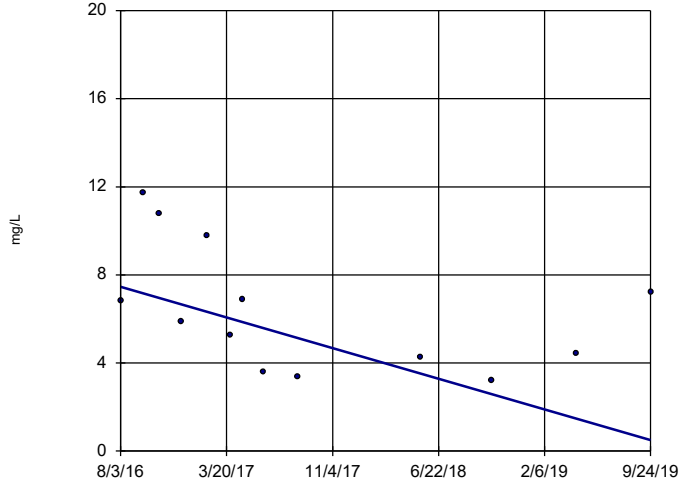
Constituent: Calcium Analysis Run 4/13/2020 12:42 PM View: PL's Interwell

Plant William C Gorgas Client: Southern Company Data: Gorgas AP

Sanitas™ v.9.6.25f Sanitas software utilized by Groundwater Stats Consulting. UG

Sen's Slope Estimator

GS-AP-MW-8 (bg)



n = 13

Slope = -2.217 units per year.

Mann-Kendall statistic = -34 critical = -43

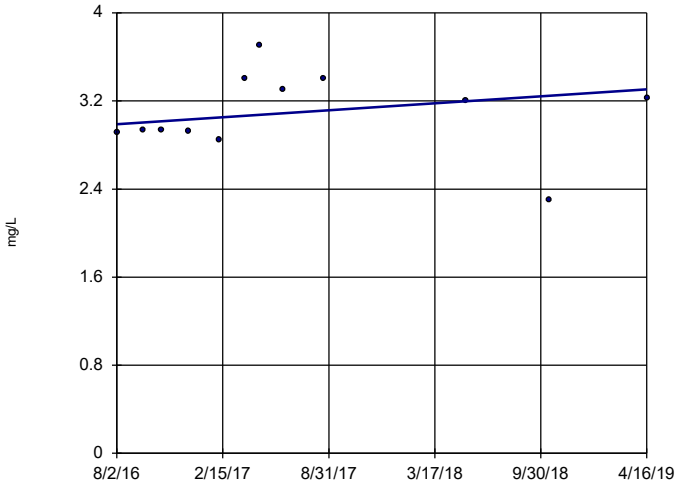
Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Calcium Analysis Run 4/13/2020 12:42 PM View: PL's Interwell

Plant William C Gorgas Client: Southern Company Data: Gorgas AP

Sen's Slope Estimator

GS-AP-MW-13 (bg)



n = 12

Slope = 0.1178 units per year.

Mann-Kendall statistic = 10 critical = 38

Trend not significant at 99% confidence level (α = 0.005 per tail).

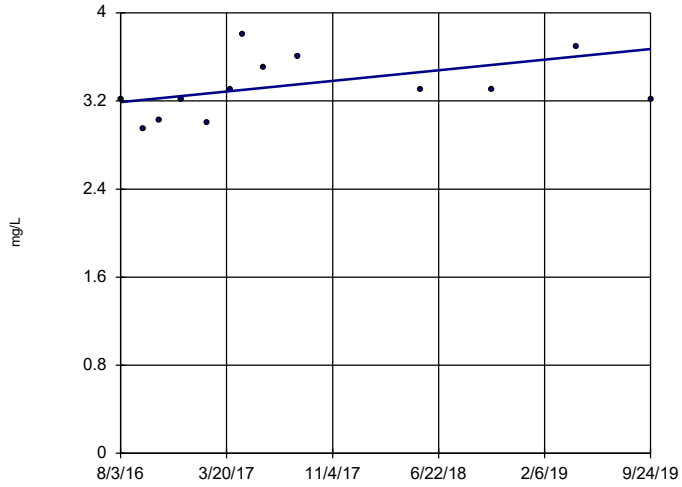
Constituent: Chloride Analysis Run 4/13/2020 12:42 PM View: PL's Interwell

Plant William C Gorgas Client: Southern Company Data: Gorgas AP

Sanitas™ v.9.6.25f Sanitas software utilized by Groundwater Stats Consulting. UG

Sen's Slope Estimator

GS-AP-MW-8 (bg)



n = 13

Slope = 0.1539 units per year.

Mann-Kendall statistic = 30 critical = 43

Trend not significant at 99% confidence level (α = 0.005 per tail).

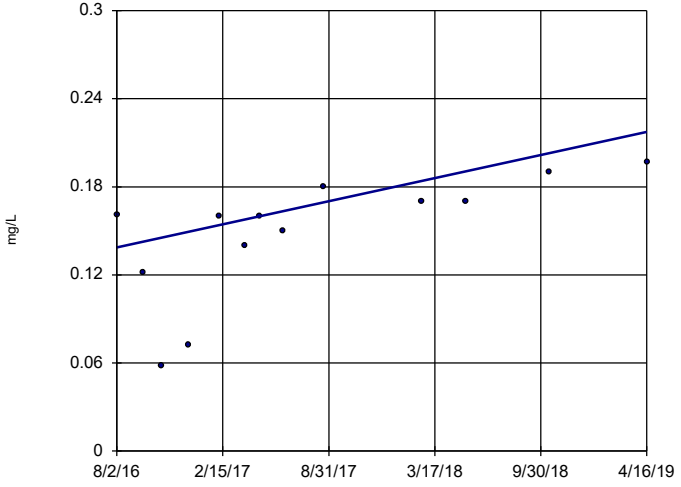
Constituent: Chloride Analysis Run 4/13/2020 12:42 PM View: PL's Interwell

Plant William C Gorgas Client: Southern Company Data: Gorgas AP

Sanitas™ v.9.6.25f Sanitas software utilized by Groundwater Stats Consulting. UG

Sen's Slope Estimator

GS-AP-MW-13 (bg)



n = 13

Slope = 0.02914 units per year.

Mann-Kendall statistic = 48 critical = 43

Increasing trend significant at 99% confidence level (α = 0.005 per tail).

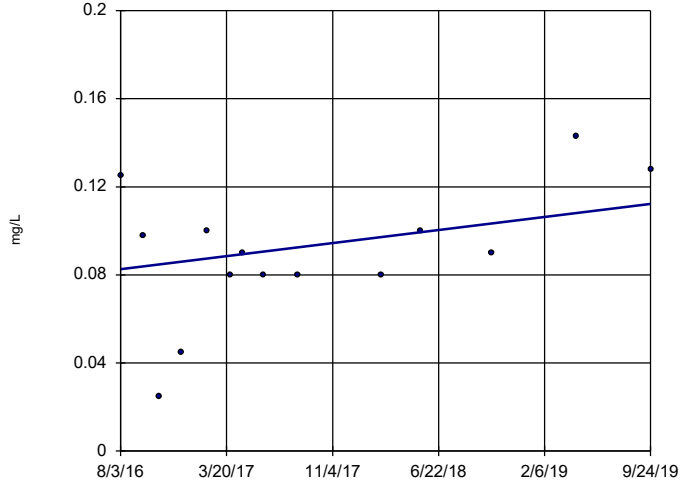
Constituent: Fluoride Analysis Run 4/13/2020 12:42 PM View: PL's Interwell

Plant William C Gorgas Client: Southern Company Data: Gorgas AP

Sanitas™ v.9.6.25f Sanitas software utilized by Groundwater Stats Consulting. UG

Sen's Slope Estimator

GS-AP-MW-8 (bg)



n = 14

Slope = 0.009456 units per year.

Mann-Kendall statistic = 23 critical = 48

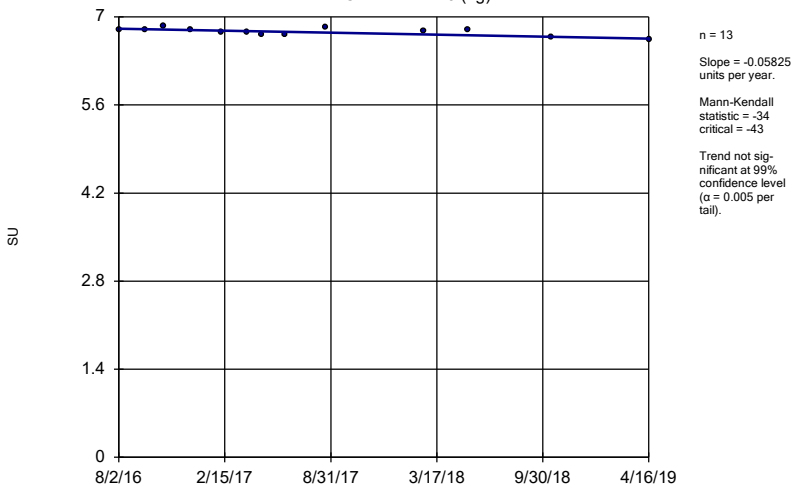
Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Fluoride Analysis Run 4/13/2020 12:42 PM View: PL's Interwell

Plant William C Gorgas Client: Southern Company Data: Gorgas AP

Sen's Slope Estimator

GS-AP-MW-13 (bg)



n = 13

Slope = -0.05825 units per year.

Mann-Kendall statistic = -34
critical = -43

Trend not significant at 99% confidence level (α = 0.005 per tail).

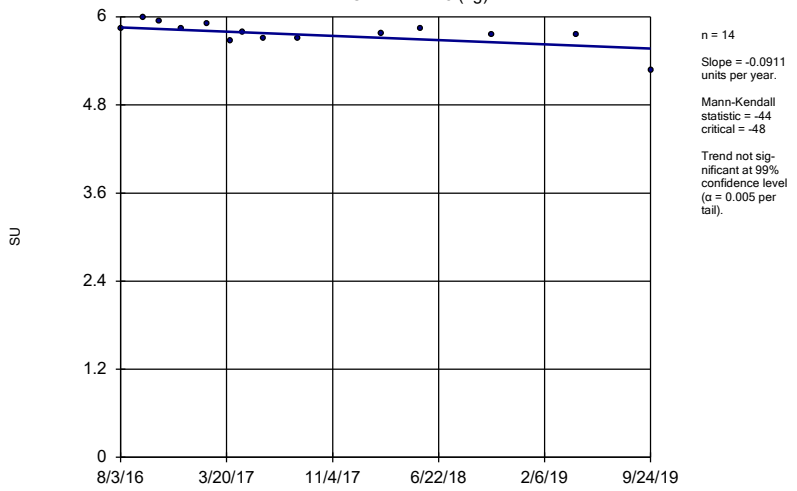
Constituent: pH Analysis Run 4/13/2020 12:42 PM View: PL's Interwell

Plant William C Gorgas Client: Southern Company Data: Gorgas AP

Sanitas™ v.9.6.25f Sanitas software utilized by Groundwater Stats Consulting. UG

Sen's Slope Estimator

GS-AP-MW-8 (bg)



n = 14

Slope = -0.0911 units per year.

Mann-Kendall statistic = -44
critical = -48

Trend not significant at 99% confidence level (α = 0.005 per tail).

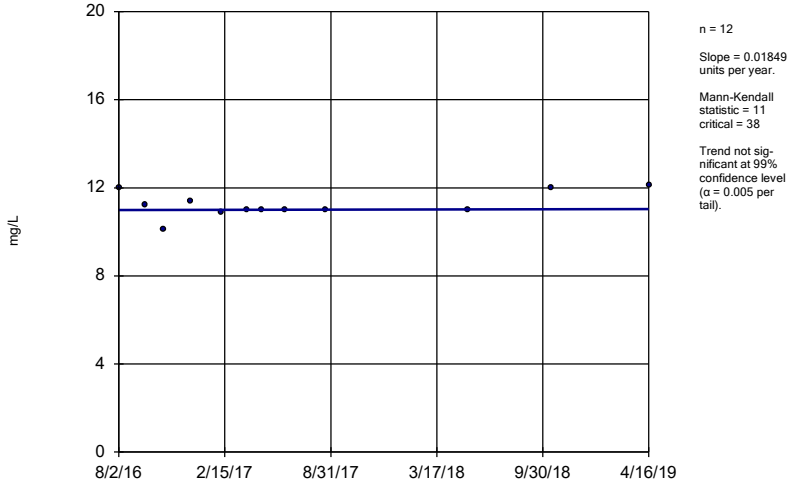
Constituent: pH Analysis Run 4/13/2020 12:42 PM View: PL's Interwell

Plant William C Gorgas Client: Southern Company Data: Gorgas AP

Sanitas™ v.9.6.25f Sanitas software utilized by Groundwater Stats Consulting. UG

Sen's Slope Estimator

GS-AP-MW-13 (bg)



n = 12

Slope = 0.01849 units per year.

Mann-Kendall statistic = 11
critical = 38

Trend not significant at 99% confidence level (α = 0.005 per tail).

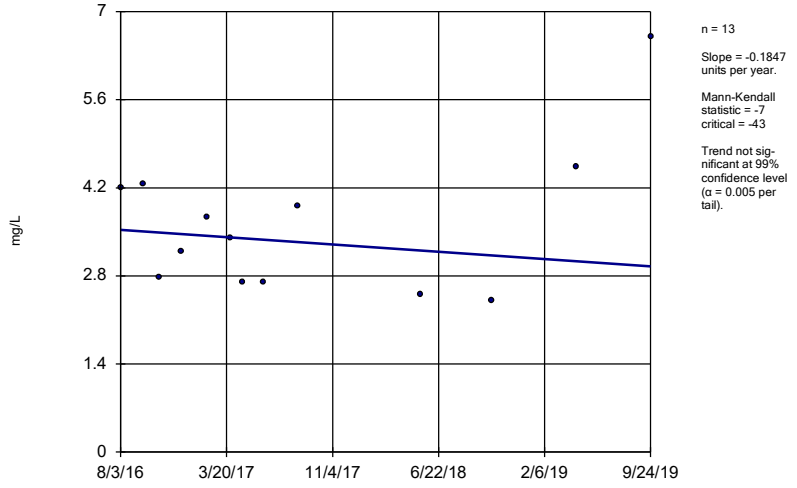
Constituent: Sulfate Analysis Run 4/13/2020 12:42 PM View: PL's Interwell

Plant William C Gorgas Client: Southern Company Data: Gorgas AP

Sanitas™ v.9.6.25f Sanitas software utilized by Groundwater Stats Consulting. UG

Sen's Slope Estimator

GS-AP-MW-8 (bg)



n = 13

Slope = -0.1847 units per year.

Mann-Kendall statistic = -7
critical = -43

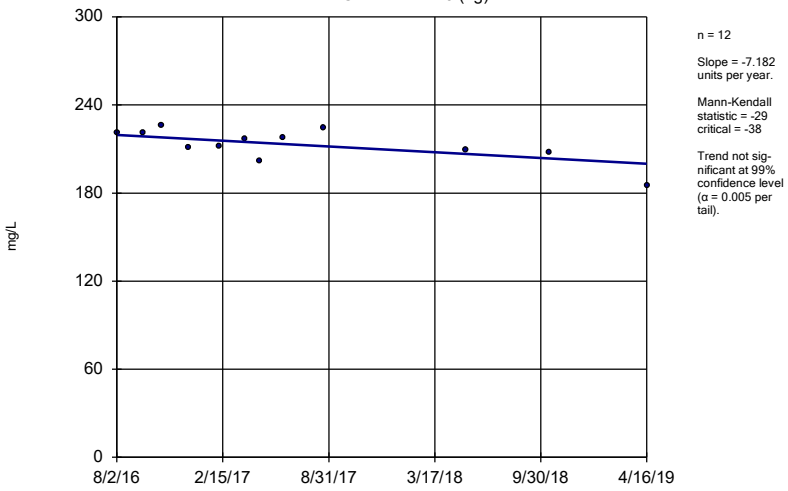
Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Sulfate Analysis Run 4/13/2020 12:42 PM View: PL's Interwell

Plant William C Gorgas Client: Southern Company Data: Gorgas AP

Sen's Slope Estimator

GS-AP-MW-13 (bg)



n = 12

Slope = -7.182 units per year.

Mann-Kendall statistic = -29
critical = -38

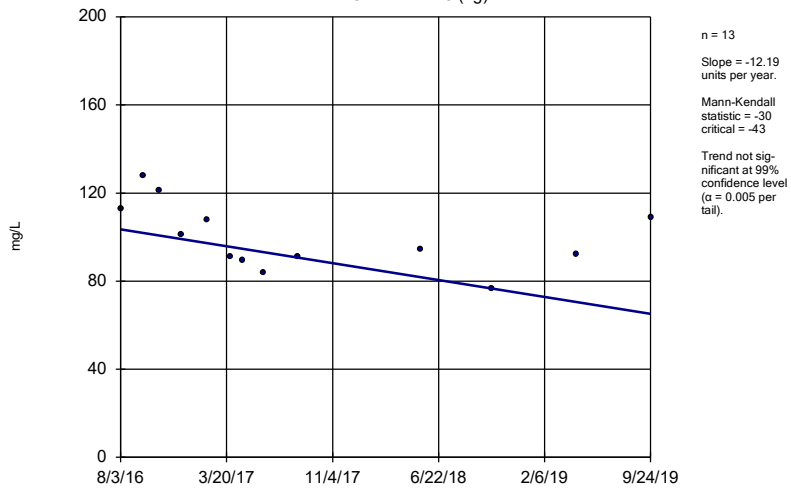
Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: TDS Analysis Run 4/13/2020 12:42 PM View: PL's Interwell
Plant William C Gorgas Client: Southern Company Data: Gorgas AP

Sanitas™ v.9.6.25f Sanitas software utilized by Groundwater Stats Consulting. UG

Sen's Slope Estimator

GS-AP-MW-8 (bg)



n = 13

Slope = -12.19 units per year.

Mann-Kendall statistic = -30
critical = -43

Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: TDS Analysis Run 4/13/2020 12:42 PM View: PL's Interwell
Plant William C Gorgas Client: Southern Company Data: Gorgas AP

FIGURE E.

Interwell Prediction Limits

Plant William C Gorgas Client: Southern Company Data: Gorgas AP Printed 4/8/2020, 11:04 AM

Constituent	Well	Upper Lim.	Bg N	Bg Mean	Std. Dev.	%NDs	ND Adj.	Transform	Alpha	Method
Boron (mg/L)	n/a	0.1	27	n/a	n/a	88.89	n/a	n/a	0.002268	NP Inter (NDs) 1 of 2
Calcium (mg/L)	n/a	48.1	27	n/a	n/a	0	n/a	n/a	0.002268	NP Inter (normality) 1 of 2
Chloride (mg/L)	n/a	3.97	27	3.239	0.3343	0	None	No	0.0006839	Param Inter 1 of 2
Fluoride (mg/L)	n/a	0.2462	29	0.1268	0.05508	0	None	No	0.0006839	Param Inter 1 of 2
pH (SU)	n/a	7.895	29	n/a	n/a	0	n/a	n/a	0.003983	NP Inter (normality) 1 of 2
Sulfate (mg/L)	n/a	15.2	27	n/a	n/a	0	n/a	n/a	0.002268	NP Inter (normality) 1 of 2
TDS (mg/L)	n/a	365	27	n/a	n/a	0	n/a	n/a	0.002268	NP Inter (normality) 1 of 2

Appendix D

WFG Low-Flow Groundwater Sampling TSOP

1. Purpose

1.1. The purpose of this Technical SOP (TSOP) is to discuss the process and requirements associated with conducting Low-Flow groundwater sampling.

1.2. This TSOP specifically describes using bladder pumps and peristaltic pumps to obtain groundwater samples collected for laboratory analysis by the Alabama Power Company (APC) Environmental Affairs (EA), Water Field Group (WFG).

2. Scope

2.1. This procedure is to be used by field personnel when collecting and handling groundwater samples using the Low-Flow groundwater collection method in the field.

2.2. The sampling equipment covered in this TSOP may be portable (well-to-well) or well-dedicated.

2.3. The sampling of SVOCs and VOCs should not be collected with the use of peristaltic pumps unless prior written customer approval is attained.

2.4. The procedure is designed to ensure that the samples collected are representative of the aquifer or target formation and that sample cross-contamination is eliminated during the sampling and handling process.

2.5. This procedure cannot replace education and experience. Professional judgment should be used in conjunction with this procedure.

3. Definitions/Abbreviations

3.1. Low-Flow (or micropurge) - Refers to the velocity with which water is withdrawn from the well. The objective of low-flow sampling is to extract fresh samples of the ambient groundwater from within the screened interval of the well with minimal impact to the zone of influence of the well.

3.2. Drawdown - Lowering of the water column within a well due to pumping. Typically associated with high-flow purging of a well for water sampling.

3.3. DI water – De-ionized water. Water that has been passed through a standard deionizing resin column. Water used for decontamination of field equipment.

3.4. Ultra-pure DI water- Water that is filtered and treated to the highest levels of purity. This water is used for the filling of blanks.

3.5. Phosphate-free soap or cleaner – A cleaner which contains, by weight, 0.5% or less of phosphates or derivatives of phosphates (Liquinox® or Luminox®).

3.6. Potable water- Water that is safe to consume. Can be used in detergent solution and first rinse during decontamination. Can be replaced by DI water.

3.7. PPE - Personal Protective Equipment.

3.8. NTU - Nephelometeric Turbidity Units. The unit of measure used when measuring the turbidity of water.

3.9. COC - Chain of Custody. A controlled document used to record sample information and transfer the samples to the laboratory after collection.

3.10. SVOCs and VOCs- Semi-volatile organic compounds and volatile organic compounds.

3.11. DO - Dissolved Oxygen

3.12. ORP - Oxidation Reduction Potential

3.13. SAP - Sampling and Analysis Plan

3.14. EDAS- Environmental Data Acquisition System

3.15. Artesian well- A well in which water rises under pressure from a permeable stratum overlaid by impermeable rock.

4. References

4.1. Internal Documents

4.1.1. WFG Groundwater Equipment Decontamination TSOP
4.1.2. WFG Groundwater Water Level and Total Depth Measurements TSOP
4.1.3. WFG General Water Sampling and Field Measurement TSOP
4.1.4. WFG Deployment and Maintenance of Dedicated Groundwater Equipment TSOP
4.1.5. WFG Turbidity TSOP
4.1.6. WFG Temperature TSOP
4.1.7. WFG Conductivity TSOP
4.1.8. WFG Luminescent Dissolved Oxygen (LDO) TSOP
4.1.9. WFG Oxidation-Reduction Potential (ORP) TSOP
4.1.10. WFG pH (TSOP-SM-4500H) TSOP
4.1.11. WFG Electronic Calibration Form
4.1.12. Groundwater Electronic Chain of Custody

4.1.13. Site specific SAP

4.2. External Documents

4.2.1. United States Environmental Protection Agency (U.S. EPA). Region 4, Groundwater Sampling. Document # SESDPROC-301-R4.

4.2.2. Florida Department of Environmental Protection (DEP). FS 2200 Groundwater Sampling. Document # DEP-SOP-001/01.

4.2.3. United States Environmental Protection Agency (U.S. EPA). Low-Flow (Minimal Drawdown) Ground-Water Sampling Procedures. Document # EPA/540/S-95/504.

4.2.4. ASTM Standard D6771-18- Low-Flow Purging and Sampling for Wells and Devices Used for Ground-Water Quality Investigations

5. Method Overview

5.1. Low flow sampling of groundwater from within the screened interval is accomplished by maintaining a low pump rate that minimizes drawdown of the water column while leaving the more stagnant water above the screened interval undisturbed.

5.2. Indicator parameters and water levels are measured at the beginning of and while micro-purging the well. Stabilization acceptance criteria for turbidity, pH, specific conductance and DO are found in the site specific SAP. Stabilization of these parameters indicates that the water is representative of ambient conditions and sample collection can begin. ORP and temperature measurements should also be collected but will not be used as indicators of stability.

5.3. Non-dedicated sampling equipment must be decontaminated prior to next use in a well to avoid cross contamination. Refer to and understand the Groundwater Equipment Decontamination TSOP prior to performing groundwater sampling.

6. Detection Limit

6.1. Some of the indicator parameter methods used to show equilibrium of the well water have minimum detection limits or other quality control requirements. Refer to the latest version of the TSOPs associated with these procedures (turbidity, pH, specific conductance, and DO).

6.2. Users of this procedure must study and be familiar with the applicable data acceptance criteria and required field measurements. Refer to the SAP for information on these parameters and other information.

7. Safety

7.1. Appropriate PPE should be worn and utilized when sampling groundwater wells in accordance with APC policies. Generally this includes safety glasses, hard hats, gloves and safety-toed boots. Plant-specific requirements may also apply and should be determined/known prior to arriving at the work location.

7.2. Refer to the WFG General Water Sampling and Field Measurement TSOP procedure for general safety requirements.

7.3. If using compressed Nitrogen gas for deep wells, always secure tanks when transporting and ensure protective cap is secured over valve. Take care to avoid exceeding the max pressure rating of the controller, air hose and pump.

8. Equipment and Materials

The following is a basic listing of the necessary reusable and expendable items that are required to complete this procedure.

8.1. Reusable Items

8.1.1. Field Book
8.1.2. Appropriate installation diagram and/or well construction data
8.1.3. Keys for well locks
8.1.4. Water level meter
8.1.5. Pump with parts (tubing grab plates, bladders, O-rings, etc.)
8.1.6. Pump controller
8.1.7. Peristaltic pump
8.1.8. Flow-through cell
8.1.9. iPad
8.1.10. InSitu™ multi-parameter probe
8.1.11. Handheld turbidity meter
8.1.12. Generator (min. 2,000 kW)
8.1.13. Air compressor and hose
8.1.14. Graduated cylinder
8.1.15. Tubing Weight (for peristaltic application)
8.1.16. Tubing caddy with counter unit or other measurement device
8.1.17. Decon/wash containers w/ lids (3)
8.1.18. Coolers for samples
8.1.19. Procedures & SAPs

8.2. Consumable/Disposable Items

8.2.1. Tubing (estimated for number of wells x well depths with extra)
8.2.2. Silicone tubing for peristaltic pump head
8.2.3. COCs (if electronic format is not suitable)
8.2.4. Plastic sheeting
8.2.5. Gasoline (in approved container)
8.2.6. Ice for samples
8.2.7. Sample Bottles
8.2.8. DI water (For decon)
8.2.9. Ultra-Pure DI water (For blanks collection)
8.2.10. Potable water (for decon)
8.2.11. Phosphate free detergent (e.g. Liquinox or Luminox®)
8.2.12. Support rope or coated safety cable
8.2.13. Calibration Standards
8.2.14. Disposal sample bags & trash bags
8.2.15. Paper towels

9. Reagents & Standards

9.1. This document describes the Low-Flow purging and sampling procedure and does not include method calibration procedures. Calibration procedures may be found in the associated method TSOP on the APC Qualtrax site. The instrument(s) used to measure indicator parameters must be verified daily using the below appropriate calibration standards (or equivalent).

9.1.1. ORP- ZoBell's ORP Solution
9.1.2. pH- 3-point calibration

9.1.2.1. 2.00 buffer standard for pH
9.1.2.2. 4.00 buffer standard for pH
9.1.2.3. 7.00 buffer standard for pH
9.1.2.4. 10.00 buffer standard for pH
9.1.2.5. 12.00 buffer standard for pH

9.1.3. DO - NA
9.1.4. Specific Conductance - 1,412 µS/cm, or appropriate conductivity standard
9.1.5. Turbidity – Zeroed with 0.00 standard and calibrated with 10.00 NTU standard

10. Calibration

10.1. Calibration and/or verification of water quality measurement equipment shall be performed at the start of each day and should be specific to the manufacturer's calibration instructions. A verification check of the instrument calibration will be performed after the calibration and at the end of each day with a standard of the same value but different lot number or manufacturer.

10.2. All calibration data, and initial and final LCS data, should be recorded electronically in the calibration log on EDAS.

10.3. Refer to the APC TSOP for each method to complete the instrument calibration (TSOPs: turbidity, pH, temperature, specific conductance, DO and ORP).

11. Procedure

General Note

At the start of each sampling event, a round of water levels from each well should be collected for use in generating a potentiometric surface map. This should be completed on the first day of the sampling event. Refer to the Groundwater Water Level and Total Depth Measurement TSOP for guidance.

11.1. Well lock keys are maintained by the plant compliance contact and must be obtained from the compliance office, if not already assigned a key, prior to beginning work

11.2. Inspect the well for any damage or tampering. If there is evidence of damage or tampering, immediately notify the Technical Manager or the Water Field Services Supervisor. Take photos of the site as documentation and make sure not to disturb the well. The damage/tampering and any discussions about a response should also be documented in the field logbook or electronically in the iPad.

11.3. If the well is in good condition, open the well head and if the well is non-dedicated and non-vented, remove the inner casing cap to allow for atmospheric equilibration. Begin setting up to sample by arranging/organizing the work zone.

11.4. Designate a clean work space or work surface used to provide a contaminant-free area to place sampling equipment during assembly.

11.5. Calibrate or verify all field parameter measurement equipment at the start of each day (this typically includes an InSitu multi-meter probe and a handheld turbidity meter if an inline turbidity sensor is not used). Refer to the appropriate method TSOP and calibration procedure for each instrument used.

11.6. All non-dedicated equipment that will, or could come into contact with groundwater (e.g. pump and water level meter) in the well must be decontaminated prior to each use. Refer to the Groundwater Equipment Decontamination TSOP for more details.

11.7. Using a properly functioning water level indicator, lower the probe into the well and obtain an initial water level measurement for the well (Refer to WFG Groundwater Water Level and Total Depth Measurements TSOP).

11.8. Measure and record all water levels to the nearest hundredth (0.01) foot at the reference point or survey mark on the well casing.

11.9. Refer to the WFG Deployment and Maintenance of Dedicated Groundwater Equipment TSOP for initial or re-deployment of dedicated pumps and for performing maintenance activities.

11.10. Dedicated Low-Flow – Bladder Pump

11.10.1. Connect the external compressor hose to the pump controller intake port using the quick-connect.

11.10.2. Connect the pump air supply line to the “Air Out” quick connect on the control box. Connect the other end of the air supply line to the air connection on the dedicated well cap.

11.10.3. Connect a short piece of tubing to the existing sample line on the dedicated well cap and then connect to the bottom of the flow-through cell for the InSitu multi-probe. Use care to ensure proper connection of the tubing.

11.10.4. Using data from the Field Logbook, SAP, or associated well construction data (See Section 15), determine the total well depth and the intake screen mid-point depth. Ensure that the dedicated pump is still located below the water table, and at a suitable sampling depth.

11.10.5. Insert the InSitu multi-parameter probe into the flow-through cell and press the power button

11.10.6. Turn on the iPad and open the InSitu Low-Flow application (iSitu® or VuSitu® app). Enter the initial data needed to initiate the program or if a template is available, open the well specific template. Refer to the manufacturer’s instructions for a step-by-step explanation of the Low-Flow app and the data input required.

11.10.7. Continue to fill in all appropriate information in the InSitu program using the parameter stabilization criteria set forth in the site-specific SAP. Always confirm with the Technical Manager that the current SAP is being used.

11.10.8. Place the generator as far away as possible from the well, preferable downwind. Start the generator and the air compressor to

begin pumping. If the well is too deep for a traditional air compressor, use of compressed Nitrogen gas, high pressure controller and pressure regulator may be required.

11.10.9. Monitor the water level and adjust the flow rate on the pump controller to provide a constant water level in the well. Pump rates should not exceed three tenths of a foot (0.3) water level drawdown when sampling. During initial pump start-up, drawdown may exceed three tenths of a foot (0.3) while flow rate adjustments are being made or while water level stabilization occurs.

11.10.10. Use a graduated cylinder (or similar) to measure the flow rate in milliliters per minute (ml/min). Purge rates must fall between 100 and 500 ml/min or meet the specific requirements provided in the project SAP. If the minimum flow rate requirement of 100 ml/min cannot be achieved without water level drawdown exceeding three tenths of a foot (0.3), refer to section 16.1.

11.10.10.1. If the well has been previously purged and sampled, refer back to the most recent well record and make an effort to target that purge rate for consistency.

11.10.11. When a stable purge rate is attained, enter that flow rate in the InSitu program and set the measurement frequency to every 5 minutes. The Low-Flow application (iSitu® or VuSitu® app) will now be used to determine when groundwater samples can be taken. The Low-Flow app uses the previously entered SAP acceptance criteria and applies them to each measurement. When the criteria are met, the indicator parameter will be highlighted in green on the iPad screen, indicating equilibration.

11.10.12. Note the start time and other well information in the field log book and start the program.

11.10.13. Turbidity measurements may be taken with an inline turbidity sensor or with an external handheld unit. If using an external turbidity meter, readings must collected as close as possible to the time as the readings acquired from the InSitu meter.

11.10.14. Continue to measure water level and turbidity at the same measurement frequency as the indicator parameters, entering the values in the iPad InSitu application.

11.10.15. Once the water level and all field parameters have stabilized and turbidity is less than 10 NTU according to the criteria in the SAP, the well is considered equilibrated and sampling may take place. Refer to the site-specific SAP and Sections 16.2 and 16.3 of this procedure for direction on wells where 10 NTU are unattainable.

11.10.16. Tap the "**Finish Test**" button on the iPad and enter any relevant notes such as time sampled in the comment section. Email the data file to a secure company email address for storage and use. In the event that there is no data service to email the file and the iPad is damaged or lost before the field report can be sent, the well will be re-sampled.

11.10.17. **DO NOT** turn off the pump. Complete the labeling for all sample bottles and also record the same information for each sample in the field log book, and all electronic forms.

11.10.18. Put on nitrile or latex gloves and make sure that all bottles are preserved with the appropriate acid.

11.10.19. Carefully remove the sample line from the bottom of the flow-through cell. Cut the end off of the sample tubing and begin filling up the sample containers.

11.10.20. Do not adjust the flow rate when sampling.

11.10.21. Fill up the containers by placing the tubing in the mouth of the bottle, using care not to touch the mouth or sides of the container. Do not overfill sample bottles. Bottle should be filled to the top leaving a small amount of headspace, unless otherwise directed by the customer or lab.

11.10.22. Upon filling and capping all sample containers, place the samples in the sample cooler and ensure that the samples with temperature requirements are placed on ice.

11.10.23. Turn off the controller, air compressor and generator.

11.10.24. Remove the water level indicator from the well, making sure to decontaminate the wetted tape and probe portion.

11.10.25. Disconnect the airline tubing from the controller and make sure the sample line tubing is disconnected. Secure the dedicated tubing within the wellhead in such manner that the tubing stays clean and does not fall into the well. Close and secure the well.

11.11. Non- Dedicated Low Flow- Bladder Pump

11.11.1. Complete Steps 11.1 – 11.9 from the above procedure.

11.11.2. Assemble a clean pump system with a bladder, and connect the support rope or cable, sample line, and air line to the top of the pump assembly. Use care to ensure proper connection and positioning. Never lower a pump in a well without a support rope attached.

11.11.3. Using data from the Field Logbook, SAP, or associated well construction data (See Section 15), determine the total well depth and the intake screen mid-point depth.

11.11.4. Slowly lower the pump assembly into the well, using care to minimize disturbance once the groundwater interface is reached. The tubing counter or other depth measurement devices can be used to aid in determining appropriate depth.

11.11.5. Recharge characteristics may dictate the need to place the pump intake slightly lower than the mid-screen depth if drawdown historically is unavoidable.

11.11.6. With the pump intake lowered to approximately mid-screen depth, secure the support rope or cable so that the pump is fixed and stationary in the well.

11.11.7. Cut the air line to an appropriate length and attach to the air hose on the pump controller. Next, cut the water line to an appropriate length and attach to the bottom of the flow-through cell.

11.11.8. Re-lower the water level meter into the well.

11.11.9. Follow above Steps 11.10.5 – 11.10.23.

11.11.10. Remove the pump and tubing from the well. Discard the used tubing and pump bladder. Never re-use disposable sampling equipment or tubing.

11.11.11. Place the well cap back on the well and close and lock the well lid.

11.12. Low Flow –Peristaltic Pumps

11.12.1. Complete steps 11.1 – 11.9 from the above procedures.

11.12.2. Peristaltic- Dedicated Well Tubing

11.12.2.1. Prepare an adequate length of clean silicon tubing that has the correct outside and inside dimensions to allow proper fit in the pump head. Insert into the pump head rollers and secure (refer to pump user manual for additional information).

11.12.2.2. Connect the vacuum end of the silicone tubing to the barb fitting on the dedicated well cap.

11.12.2.3. Attach the discharge end of the silicone tubing to the bottom of the flow through cell.

11.12.3. Peristaltic- Non-Dedicated Well Tubing

11.12.3.1. Attach the tubing weight to the end of clean polyethylene tubing.

11.12.3.2. Using data from the Field Logbook, SAP, or associated well construction data (See Section 15), determine the total well depth and the intake screen mid-point depth.

11.12.3.3. Using the tubing caddy or another tubing depth measurement device, slowly lower the tubing and weight to the mid-screen depth.

11.12.3.4. Once the tubing intake is at the correct depth, allow for excess tubing at the surface and insert into the pump head rollers and secure.

11.12.3.5. Allow for a short section (one to three feet) of tubing from the discharge side of the pump head. This may be used for both the purge discharge and to fill sample bottles upon stabilization.

11.12.3.6. Attach the discharge tubing to the intake (lower) port of the flow-through cell.

11.12.4. Insert the InSitu multi-parameter probe into the flow-through cell and press the power button on the battery pack.

11.12.5. Turn on the iPad and open the InSitu Low-Flow application (iSitu® or VuSitu® app). Enter the initial data needed to initiate the program or if a template is available, open the well-specific template. Refer to the manufacturer's instructions for a step-by-step explanation of the Low-Flow app and the data input required.

11.12.6. Make the necessary preparations to provide power to the pump. Turn on the peristaltic pump to produce a vacuum on the well side of the pump head and begin purging. Observe pump direction to ensure that the pump operation is applying a vacuum to the sample line (down-hole) tubing.

11.12.7. Monitor the water level and adjust the flow rate to provide a constant water level in the well. The pump rate will initially require adjustment based on the site and well properties. Pump rates should not exceed three tenths of a foot (0.3) water level drawdown when sampling. During initial pump start-up, drawdown may exceed three tenths of a foot (0.3) while flow rate adjustments are being made or while water level stabilization occurs. If the minimum flow rate requirement of 100 ml/min cannot be achieved without water level drawdown exceeding three tenths of a foot (0.3), refer to section 16.1.

11.12.8. Continue to fill in all appropriate information in the InSitu program using the parameter stabilization criteria set forth in the site-specific SAP. Always confirm with the Technical Manager that the current SAP data are being used.

11.12.9. Use a graduated cylinder (or similar) to measure the flow rate in milliliters per minute (ml/min). Purge rates must fall between 100 and 500 ml/min or meet the specific requirements provided in the project SAP.

11.12.9.1. If the well has been previously purged and sampled, refer back to the most recent well record and make an effort to match the purge rate for consistency.

11.12.10. When a stable purge rate is attained, enter that flow rate in the InSitu program and set the measurement frequency to 5 minutes. The Low-Flow application (iSitu® or VuSitu® app) will now be used to determine when groundwater samples can be taken. The Low-Flow app uses the previously entered SAP acceptance criteria and compares them to each measurement. When the criteria are met, the indicator parameter will be highlighted in green on the iPad screen, indicating equilibration.

11.12.11. Note the start time and other well information in the field log book and start the program.

11.12.12. Turbidity measurements may be taken with an inline turbidity sensor or with an external handheld unit. If using an external turbidity meter, readings must be collected as close as possible to the time as the readings acquired from the InSitu meter.

11.12.13. Continue to measure water level and turbidity at the same measurement frequency as the indicator parameters, entering the values in the iPad SmarTROLL™ application.

11.12.14. Once the water level and all field parameters have stabilized and turbidity is less than 10 NTU according to the criteria in the SAP, the well is considered equilibrated and sampling may take place. Refer to the site-specific SAP and Sections 16.2 and 16.3 of this procedure for wells where 10 NTU is unattainable.

11.12.15. Tap the "**Finish Test**" button on the iPad and enter any relevant notes such as time sampled in the comment section. Email the data file to a secure company email address for storage and use. In the event that there is no data service to email the file and the iPad is damaged or lost before the field report can be sent, the well will be re-sampled.

11.12.16. **DO NOT** turn off the pump. Complete the labeling for all sample bottles and also record the same information for each sample in the field log book and associated electronic forms.

11.12.17. Make sure that all bottles are preserved with the appropriate acid.

11.12.18. Carefully remove the sample line from the bottom of the flow-through cell. Cut the end off of the sample tubing and begin filling up the sample containers.

11.12.19. Do not adjust the flow rate when sampling.

11.12.20. Fill up the containers by placing the tubing in the mouth of the bottle, using care not to touch the mouth or sides of the container. Do not overfill sample bottles. Bottles should be filled to the top leaving a

small amount of headspace unless otherwise directed by the customer or lab.

11.12.21. Upon filling and capping all sample containers, place the samples in the sample cooler and ensure that the samples with temperature requirements are placed on ice.

11.12.22. Stop the pump and reverse the flow direction so that the sample line is emptied of water.

11.12.23. Turn off the peristaltic pump and generator.

11.12.24. Remove the water level indicator from the well, making sure to decontaminate the wetted tape and probe.

11.12.25. For dedicated tubing, disconnect the silicone tubing piece from the pump and dedicated well cap and throw away. Close and secure the well. For non-dedicated tubing, disconnect the tubing from the pump and throw away.

11.13. Decontamination and Clean-Up – For all Reusable Components

11.13.1. Decontamination of any reusable components can be completed as a separate task at a later time but must not be re-used until decontaminated according to the WFG Groundwater Equipment Decontamination TSOP.

11.13.2. Do not re-use any disposable sampling equipment and throw away all non-dedicated tubing and bladders after use.

11.13.3. Pack up and secure all equipment and complete all sample information on the COC.

11.13.4. Reattach well cap (as appropriate) and close and lock the wellhead.

12. Calculations and Reports

12.1. Sample reports should be emailed in the field using the InSitu iPad application to a secure company email address.

13. Data Interpretation, Recording and Reporting

13.1. Data interpretation and reporting will be completed by personnel with Southern Company Services (SCS) and will subsequently be used to produce the compliance report per the Coal Combustion Residuals Rule [80 FR 21301] and respective state agency requirements.

13.2. Recording of field data used to support the interpretation and reporting process will be completed using field log books and/or sample reports that will be filled out each time groundwater monitoring activities are conducted. The field log book or sample report should contain the following information:

13.2.1. Well identification number
13.2.2. Well depth
13.2.3. Static water level depth, date & time
13.2.4. Pumping rate, drawdown, indicator parameter values, time at five minute intervals; calculated or measured total volume pumped
13.2.5. Time of sample collection
13.2.6. Field observations
13.2.7. Name of sample collectors
13.2.8. Weather conditions
13.2.9. QA/QC data for blanks (sample time and location)

13.3. Information on sample times, dates, analytical methods, personnel, etc. should be filled out on the COC for each sample and turned in with the samples to the proper lab.

14. Quality Control Acceptance Criteria and Corrective Actions for Failed QC

14.1. Any deviations or issues related to the well sampling process should be documented in the field log book or sample report.

14.2. One sample duplicate and one field blank shall be collected per every group of 10 wells sampled as specified in the SAP. An equipment rinsate blank should also be collected at a rate of 1 per every CCR storage unit. Refer to the site specific SAP for guidance. Ultra-pure DI water shall be used as the control water for all blanks.

14.3. Calibration acceptance criteria for field parameters may be found in the individual TSOP documents. Refer to individual TSOPs for guidance on initial and final LCS failures.

15. Diagrams

15.1. Well construction logs are maintained by SCS Earth Sciences and may be consulted to confirm total well depth and screened interval.

16. Deviations/Exceptions

16.1. The low-flow sampling method is not always feasible in some wells due to very slow recharge rates. Depending on the geology and conditions of water bearing zones, water levels may decline at rates greater than the accepted minimum drawdown limit of three tenths of a foot (0.3 ft) even with minimal flow rates. If this is the case, and the well has a dedicated pump, minimum

purge sampling may be necessary. Follow the below steps for minimum purge sampling:

16.1.1. Calculate the total system volume (bladder, tubing & flow through cell) by inputting the necessary information in the InSitu program.
16.1.2. Purge 1-3 times the system volume, depending on the volume of the overhead water column.
16.1.3. Purge rates should occur at rates less than 100 ml/min.
16.1.4. Collect field readings after at least 1 system volume has been purged.
16.1.5. Commence sampling once system volume(s) have been purged.
16.1.6. Document field methodology, data, calculations and observations.

16.2. The target for monitoring turbidity is readings less than or equal to 5 NTUs, however this value is not mandatory (EPA, July 1996). In some instances, turbidity levels may exceed the recommended turbidity level due to natural aquifer conditions, changes in aquifer recharge, or other well characteristics. When these conditions are encountered, the following guidelines shall be considered:

16.2.1. If turbidity readings are greater than 5 NTU but less than 10 NTU and all other parameter criteria has been met, sampling can commence.
16.2.2. If turbidity readings are slightly above 10 NTU, but are trending downward, purging and monitoring shall continue.
16.2.3. If turbidity readings are greater than 10 NTUs and are stable within 10% for the final 3 consecutive readings and pumping has occurred for at least 2 hours, well sampling shall be based upon stabilization of critical indicator parameters (pH, Specific Conductance and DO).

16.2.3.1. In situations described in the above section, first collect a preserved sample set followed by an additional preserved sample set to be field filtered.
16.2.3.2. After the first sample set is collected, attach a 0.45 micron field filter to the end of the sample line. Allow for about 300 ml of sample water to pass through the filter prior to sample collection. Once filtered bottles have been filled, dispose of the filter. Ensure that the filtered sample set is properly denoted on the label.

16.3. Artesian Wells

16.3.1. For wells that are artesian, water may free flow out of the well casing before it reaches equilibrium. In such cases, a dedicated pump is not required. It is acceptable to collect the sample using traditional low flow criteria utilizing a special well cap fitted with control valve routed directly to the flow through cell. A minimum of 1 well volume should be purged before sample collection.

17. Client-Defined Specifications/Observations/Specialized Analysis

17.1. A project SAP is required on a groundwater sampling project and is available for review in the groundwater folder on EDAS. This document provides project-specific information regarding regulatory, sampling, containerization, chemical analysis, and data acceptance criteria requirements.

*****END OF DOCUMENT*****

APPENDIX 11

WRITTEN CLOSURE PLAN

&

POST-CLOSURE CARE PLAN

AMENDED CLOSURE PLAN FOR ASH POND

Plant Gorgas
Alabama Power Company
Parrish, Alabama

Revision 1 April 2020

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1.0 INTRODUCTION

This Amended Closure Plan has been prepared to support the permit application previously submitted to the Alabama Department of Environmental Management (ADEM) for the CCR Surface Impoundment known as the Plant Gorgas Ash Pond, located near Parrish, Walker County, Alabama. The permit application was submitted in accordance with ADEM Admin. Code r. 335-13-15-.09(1)(c). This Amended Closure Plan, along with other documents, is intended to supplement the previous submittal in response to the ADEM letter dated May 24, 2019 which provided response comments to the original application.

2.0 GENERAL

The Plant Gorgas Ash Pond was designed to receive and store coal combustion residuals produced during the electric generating process at Plant Gorgas, as well as serve as a low-volume waste treatment pond. CCR products were sluiced from the plant to the Ash Pond. The pond covers approximately 420 acres, and currently stores about 25,000,000 cubic yards of CCR.

The Ash Pond is formed by a cross-valley dam which was originally constructed as a rockfill structure across Rattlesnake Creek in 1953 using local borrow and quarried materials. The crest elevation of the original dam was 320 feet. In the mid-1970's, the dam was raised to an elevation of 375 feet. During this construction, a relatively impervious blanket was constructed on the upstream face of the original dam. In addition to the blanket, additional rockfill was added on both the upstream and downstream sides of the dam, as well as the inclusion of a relatively impervious core and filter zone near the interior of the dike raise.

In 2007, the dam was raised to an elevation of 395 feet. During this project, a 10-foot wide roller-compacted concrete upstream facing block designed with a slope of 0.75H:1V; a 30-foot thick clay core section; a 10-foot thick fine and coarse filter section; and additional downstream rockfill were used to accommodate the raising of the dam. The original weir flow intake structure was removed and a new overflow structure of comparable design was constructed near the east abutment. Also, an auxiliary spillway was added at an elevation of 385 feet. During the 2007 augmentation, a diversion dike was added within the ash pond for water management purposes. It is near the midpoint of the surface impoundment and extends from the east side of the pond to a point very close to the west bank.

The Plant Gorgas Ash Pond will be closed by leaving CCR in place, with consolidation of ash to reduce the closure footprint to approximately 274 acres. The Ash Pond will be dewatered sufficiently to begin removal of the free liquids and to an extent to provide a stable base for the construction of an ash containment structure for the consolidated footprint, removal of ash outside the consolidated footprint and, construction of the final cover system. CCR will be dredged or excavated from the area outside the consolidated footprint, transported, and placed in the consolidated footprint to create a subgrade for the final cover system. Excavation will include removing all visible ash and over excavating into the subgrade soils. Additional details about the dewatering and construction methods to be used can be found within this Amended Closure Plan.

The final cover will be constructed to control, minimize or eliminate, to the maximum extent feasible, post closure infiltration of liquids into the waste and potential releases of CCR from the unit. This will be prevented by providing sufficient grades and slopes to: 1) preclude the probability of future impoundment of water, slurry, or sediment; 2) ensure slope and cover system stability; 3) minimize the

need for further maintenance; and 4) be completed in the shortest amount of time consistent with recognized and generally accepted good engineering practices.

3.0 NOTIFICATION – INTENT TO CLOSE

Notification of intent to close the Plant Gorgas Ash Pond was placed in the plant's Operating Record on April 15, 2019. The notice of intent was subsequently submitted directly to ADEM. The surface impoundment is closing under the requirements of § 257.101(a)(1) and r. 335-13-15-.07(2)(a)1. Closure of the surface impoundment will be conducted under § 257.102(d) and r. 335-13-15-.07(3)(d), *closure performance standard when leaving CCR in place*. As described below, the surface impoundment will be closed in a manner that will control, minimize or eliminate, to the maximum extent feasible, post-closure infiltration of liquids into the waste and releases of CCR, leachate, or contaminated runoff to the ground or surface waters or to the atmosphere. Closure will also preclude the probability of future impoundment of water, sediment or slurry. Measures will be taken during design and construction of the closure system that provide for major slope stability to prevent the sloughing or movement of the final cover system. Closure will also minimize the need for further maintenance of the CCR unit.

Major closure activities will commence following receipt of a CCR permit from ADEM pursuant to r. 335-13-15-.09.

4.0 WRITTEN CLOSURE PLAN– § 257.102(B)(1)(I),(III) AND R. 335-13-15-.07(3)(B)1.(I),(III)

4.1 Overview

A written closure plan to comply with § 257.102(b) was posted to the Plant Gorgas Operating Record on October 17, 2016. A revised written closure plan incorporating reference to applicable ADEM Administrative Codes was submitted as a part of the original CCR Permit application.

As required by § 257.102(b)(3)(ii) and r. 335-13-15-.07(3)(b)3.(ii), the written closure plan must be amended whenever (i) there is a change in the operation of the CCR unit that would substantially affect the written closure plan or (ii) before or after closure activities have commenced when unanticipated events necessitate a revision of the written closure plan. The time frames for amendment to the written closure plan is in accordance with those specified in § 257.102(b)(3)(iii) and r. 335-13-15-.07(3)(b)3.(iii).

The Gorgas Ash Pond is being consolidated and closed in place in accordance with § 257.102(d) and r. 335-13-15-.07(3)(d).

The ash pond contains approximately 25 MCY of CCR materials with a current pond footprint of 420 acres (taken at the existing dam elevation of 395 ft-MSL). The selected closure option consolidates ash into a smaller footprint in the upland reaches of the site to the south and consolidated behind a new dam for permanent stability and containment, into the reaches of fingers F1 to F7, F12 and Middle areas M3 and M4 (see the current 30 percent design drawings for key features and naming conventions).

Final management of stormwater is provided by a newly designed capping and stormwater control system culminating in two new spillways at the eastern and western abutments of the final containment

area. The existing dam will be substantially removed down to Elevation 295 ft-MSL to provide for a stormwater management attenuation pond in front of the engineered ash closure area.

The closure consists of dredging and/or excavation of CCR from the northern portions of the ash pond (Fingers F8 to F11 and M1 and M2) for consolidation within the southern upland portions of the unit. During closure, the ash pond will be progressively dewatered as required to facilitate closure. CCR will be graded within a reduced footprint of the existing impoundment unit to create a stable subgrade for the final engineered cover system.

4.2 Closure Steps

As indicated in Section 4.1, the engineered closure configuration for the Gorgas Ash Pond consolidates CCR into a reduced footprint (a post closure CCR waste limit of 274 acres) in the southern upland reaches of the site. Closure of the Plant Gorgas Ash Pond will occur in a series of phases / steps to achieve the closure design configurations, including:

- site preparation,
- dewatering of CCR,
- excavation of CCR from the closure by removal areas,
- placement and stabilization of CCR within the consolidation area
- final grading of the consolidation area for capping,
- construction of a final cover and stormwater management system

The closure design is currently in progress and as such may be subject to changes as the design continues to develop. The closure sequence progresses from initial dredge and ash thickening plant commissioning, through removal of low-lying ash and construction of the new containment dam and closure cover system.

Initial stages of construction and dewatering will include lowering of the pond levels through pumping and treatment at the onsite water treatment facility to optimize dredge performance. Once the desired initial free water depth is achieved in the pond, further dewatering will occur incrementally in response to storm events in order to maintain the free water at a relatively constant depth that will lower as ash removal from the designated areas progresses.

A full series of construction phasing schematics outlining the currently anticipated construction sequence for the closure are presented in Appendix A. The 30 percent design level figures are presented in Appendix B to provide additional details regarding the existing and proposed post-closure configurations. A more detailed description of the closure sequence follows in Section 4.3.

4.2.1 Site Preparation

Preparatory efforts for the closure of the ash pond consist of the preparation and submittal of required permits, survey of the Plant Gorgas Ash Pond and adjacent properties, review of mineral rights on those properties, and site infrastructure assessments and upgrades necessary to facilitate closure. The Ash Pond ceased to receive CCR materials and other waste streams from the Plant's electric generation processes on April 15, 2019 and began initial closure activities.

4.2.1.1 Contractor Mobilization and Early Site Works

As required the Contractors will mobilize equipment, personnel, trailers, etc. to complete the construction of their work packages and ultimately to achieve closure of the ash pond. All required plans and permits will be prepared and approved, prior to initiation of the major portions of closure construction.

Select contractors will be mobilized to begin with site preparation works prior to the main closure construction activities. The early site preparation works include upgrades to general site infrastructure and establishment of the closure water treatment and ash dewatering facilities. Site access will be restricted and monitored via security at access gates and site video surveillance.

Site infrastructure will largely be developed as part of the early site preparatory works. Temporary site infrastructure (such as access roads, security gates, temporary offices and shelters, etc.) will be developed through the construction period as needed.

Some aspects of the closure construction will require activities in areas of existing groundwater monitoring wells. To avoid conflicts between closure construction and groundwater monitoring activities, a few isolated groundwater wells will be abandoned and relocated as part of the early site preparatory works.

4.2.1.2 Vegetation Management

No significant vegetation exists above the pre-closure pond water levels within the limits of the ash pond as the majority of the ash pond limits exist under a water cover. The extent of vegetation below CCR in closure by removal areas is uncertain prior to exposure of such areas during closure, and the needs for clearing and vegetation management in such areas will be progressively assessed during closure. Vegetative materials encountered within the ash pond limits as closure progresses will at a minimum be washed of any contacting CCR materials prior to further processing and handling onsite via approved means such as mulching, controlled burning, etc.

Vegetative management will also be required in a number of areas outside and surrounding the pond limits (non CCR areas) to support closure. Vegetation management in these non CCR areas will generally include timber and topsoil harvesting where applicable and mulching and/or burning of vegetative matter onsite for use in erosion control efforts, on-site compositing for topsoil generation / enhancement, or other approved means.

4.2.1.3 Clearing / Grading

The Plant Gorgas Ash Pond generally has a water cover over the majority of the pond in the pre-closure condition and as such, no significant clearing and grading within the pond limits is required ahead of primary construction.

Clearing and grading will be required in a number of areas outside the pond limits to support closure, such as in the following general areas:

- Contractor’s camp(s),
- Laydown areas,
- Stockpile areas,
- Borrow areas,

- Water treatment facility area,
- Ash thickening plant area,
- Temporary access road routes, and
- Perimeter buffer corridors

4.2.1.4 Construction of the Water Treatment and Ash Thickening Plants

The Plant Gorgas Ash Pond is a large and complex ash pond with a large contributing watershed (1300 acres) draining into the pond. As such, conventional dewatering followed by excavation and ash handling via trucking is not an optimum closure strategy. A closure strategy that incorporates a large water treatment facility and initially uses hydraulic handling of CCR for closure via dredging, mechanical dewatering in an ash thickening plant, and thickened ash deposition was chosen to optimize a number of closure factors, such as:

- Improved worker safety
- Improved schedule
- Reduced dusting
- Reduced personnel working on ash areas

During closure, CCR contact water will be treated in a newly constructed 12,000 gpm nominal capacity water treatment facility allowing for adequate water management capabilities to maintain safety, schedule, and compliance during closure. Additionally, the majority of CCR removal from the northern pond areas will be completed by hydraulic dredging of CCR to an ash thickening facility for thickening / dewatering and subsequent deposition. The ash thickening facility will remove water from the ash in high rate thickeners and dewatering screens before being pumped for final placement within the closure areas in the southern portions of the pond.

4.2.2 Removal of free water and in situ dewatering

Initial stages of construction and dewatering will include initial lowering of the pond levels through pumping and treatment at the onsite water treatment facility to optimize dredge performance. Once the desired free water depth is achieved in the pond, further dewatering will occur incrementally in response to storm events in order to maintain the free water at a relatively constant depth that will lower as ash removal from the designated areas progresses.

Free and interstitial water in contact with CCR will be pumped to the water treatment facility for treatment to established regulatory limits prior to discharging off site through the existing NPDES discharge point.

4.2.3 Excavation of CCR from the closure by removal areas

The ash pond closure consists of removal of CCR from the northern portions of the Ash Pond for consolidation within the southern upland portions of the unit. CCR material from the closure by removal areas will be moved / handled by either hydraulic dredging or mechanical excavation.

Following bulk removal of CCR from the dredging and excavation areas, final removal actions such as fine excavation, pond wall washing or scaling, etc. will be used to removal all visible CCR materials

from these areas. Once the CCR removal process has reached the estimated bottom of CCR elevations for a given area, the surface will be visually inspected and the CCR removal verification procedures (described in more detail later in this Amended Closure Plan) completed.

4.2.4 Placement and stabilization of the CCR within the consolidation area

The closure design includes a combination of ash and soil slopes, embankments, and earthen buttresses to achieve stable closure. Final slopes comprised of compacted ash will be a maximum of 4H:1V, and the northern limit of the consolidated footprint will be supported by a newly constructed containment structure.

The final placement and stabilization of ash will be achieved by two primary methods, namely:

- Deposition of Ash from the Thickening Plant: Hydraulically dredged ash will be delivered to and mechanically thickened and dewatered by the ash thickening plant. Thickened ash will be delivered to the final deposition areas by two positive displacement (PD) pumps via a series of pipelines and spigots. Although the thickened deposition is a controlled process, the final cap profile will not be fully achieved by deposition from spigots alone. In certain areas, mechanically constructed berms will be required to support and control the footprint and shape the deposition to achieve final grades.
- Placement of Trucked Ash: Some portion of the CCR removal will not be practically achieved via direct dredging and will therefore have to be mechanically excavated and conveyed to the storage areas using haul trucks. Ash will be dewatered using a combination of in-situ and ex-situ dewatering techniques prior to final placement, grading and compaction in the closure area.

All final closure slopes and conditions will be designed to meet the stability requirements for each loading case outlined in § 257.73(e) and r. 335-13-15-.04(4)(e).

4.2.5 New Containment Structures

The Plant Gorgas Ash Pond was originally formed by construction of a series of incremental raises to the original cross-valley dam which was originally constructed as a rockfill structure across Rattlesnake Creek in 1953 using local borrow and quarried materials. The closure design configuration removes CCR from the northern portions of the site adjacent to the existing containment dam and as such necessitates the design and construction of a new containment structure.

The closure design is based on the containment of CCR with the construction of a new containment structure at the northern end of the capped area. This containment structure will provide long term stability to the ash stack and will be constructed of a combination of engineered earth and rock fills. The structure will be designed to meet the stability requirements for each loading case outlined in § 257.73(e) and r. 335-13-15-.04(4)(e).

The closure incorporates a leachate control and collection system consisting of a sump and conveyance system at the downgradient limit of the closure. Leachate waters within the closed CCR unit that find their way to the downgradient northern end of the closure will be captured in the constructed leachate collection system above the low lying backfill and upstream toe of the containment dam and conveyed to a treatment system via a sump and lift station.

4.2.6 Final Grading of Consolidation Area for Capping

In accordance with § 257.102(d) and r. 335-13-15-.07(3)(d), the final cover will be constructed to control, minimize or eliminate, to the maximum extent feasible, post closure infiltration of liquids into the waste and potential releases of CCR from the unit. This will be achieved by providing sufficient grades and slopes to: 1) preclude the probability of future impoundment of water, slurry, or sediment; 2) ensure slope and cover system stability; 3) minimize the need for further maintenance; and 4) be completed in the shortest amount of time consistent with recognized and generally accepted good engineering practices.

4.2.7 Installation of the Cover and Stormwater Management Systems

Once the final grades have been achieved, a cover system will be installed to limit the infiltration of surface run-off into the closed CCR unit, and stormwater will be managed in a series of channels and spillways. Managing water is a critical aspect of this closure due to the size of the watershed, the magnitude of annual rainfall, and the significant volumes and flow rates of water involved. Due to the general topography of the site, diverting stormwater from the adjacent drainage areas away from the cap is not feasible and these flows will have to be managed through the construction areas during closure and on the cap in post closure.

4.2.8 Restoration of CCR Removal Areas

The restoration areas will be graded to be free draining to the proposed attenuation pond to be located at the northern limits of the site. Typical natural channel restoration techniques, such as stream meander and rock vanes, will be employed to establish drainage and waterways through the restoration areas and to reduce erosion potential.

To control the surface run-off leaving the site, a portion of the existing dam will be retained to create a new attenuation pond in the closure-by-removal area. The existing rockfill dam will be lowered to elevation 295 ft-MSL (to be confirmed / adjusted as design progresses). Where possible, material from the dam will be reused. The demolition will be performed with both fill requirements and dam safety considerations in mind so that the required storm events can be managed during construction without unregulated discharges.

4.2.9 Demobilization / Monitoring

Demobilization of the equipment from site will be phased as key activities are completed i.e. it is expected the dredging and ash thickening plant activities will be completed first followed by the water treatment and general civil closure activities. Prior to completion of closure and final demobilization, all above grade temporary infrastructure will be demolished and removed from site and the post closure monitoring systems will be fully installed and functional.

4.3 Procedures During Closure

4.3.1 Dewatering

This conceptual dewatering plan was developed to provide a summary of the removal of free water, interstitial water, contact water, and surface water as defined below.

- Free water – water contained in the CCR unit above the surface of CCR material
- Interstitial water – water within the pore space of CCR material

- Contact water – surface or ground water that comes in contact with CCR material
- Surface water – non-contact surface water at the site that requires management

In addition to dewatering, Alabama Power developed and implemented a plan for water treatment at the site during closure consisting of a range of treatment technologies, compliance sampling (constituents, frequency, and locations) for compliance with the site's National Pollutant Discharge Elimination System (NPDES) permit to provide treatment and management of discharge of free, interstitial, and contact water from the units.

The free water in the northern portion of the pond will be decanted by pumping to a water treatment facility prior to discharge off-site. The management of the free water levels in the pond are important for site water management controls including coordination with the proposed dredging and other construction processes. Interstitial water levels will be monitored in critical areas to allow for safe excavation and working on ash as needed to facilitate construction activities.

The main pond free water management pumps will deliver water to the water treatment plant for treatment and discharge up to a treatment rate of 12,000 gpm. The pumping system will be equipped with a floating intake, including a sediment curtain around the intake.

Removal of contact water will be completed within the limits of the Ash Pond using both in-situ (in place prior to excavation / handling) and ex-situ (after initial handling / excavation) techniques. Dewatering of ash during closure activities includes removing water using a variety of methods, including but not limited to passive, gravity-based methods (e.g. trench drains, rim ditching, wick points) and/or active dewatering methods (e.g. use of the ash thickening plant, and in-situ pumps or well points) as needed to allow for CCR removal and transportation. Ex-situ dewatering techniques consist of but are not limited to the following: gravity dewatering (settling basins and/or lateral trenching), racking and windrowing, mechanical thickening, and absorbent desiccation.

The Dewatering Plan provides the generic framework for these activities during relocation and consolidation of CCRs during the Plant Gorgas Ash Pond closure project. Variations in site conditions, construction means and methods, weather conditions, and other factors impact the dewatering sequencing and/or approach to the project. During the closure project, specific means and methods will be reviewed and approved by the construction management and oversight team.

4.3.1.1 Safe Dewatering Rates and Stability

During closure construction, the integrity of the existing dam, and all significant temporary and permanent slopes and stacks will be evaluated to ensure stability.

Pond levels adjacent to the existing dam will be managed such that pond level lowering does not occur at a rate faster than a maximum of 2 feet per week in accordance with Southern Company's dam safety protocols. Dewatering at this rate will be supported by daily inspections and visual assessment as to the integrity of the slopes of the dam. Free and interstitial water levels adjacent to and within other critical slopes and stacks will be monitored as required by the site instrumentation and monitoring plan to allow evaluation of stability and adjustment of controls and conditions as necessary to maintain stability.

4.3.2 Liquid Management

4.3.2.1 Contact Water

During closure construction, run-on stormwater and run-off contact water (e.g. stormwater that has come into contact with CCR) will be controlled with best management practices such as channels, diversion berms, and pumps and managed in accordance with the applicable NPDES Construction Storm Water, Industrial Storm Water and Industrial Wastewater Discharge permit(s).

Due to the general topography of the site, diverting stormwater from the contributing drainage areas away from the unit during and post closure is not feasible and hence these flows will have to be managed throughout construction. The existing dam will be retained in part until after all CCR is placed within the final cover limits. This will allow for stormwater generated from the contributing drainage areas and the pond surface to be contained. Contact water will in general be allowed to drain to the northern end of the pond from where it will be abstracted and treated at the on-site water treatment facility.

Interstitial water generated from the ash dewatering process will be pumped by either well or surface pumps to the northern end of the pond for storage prior to abstraction and treatment.

If construction activities result in the ponding of water, these areas will be equipped with surface pumps and the contact water will be transferred to the northern end of the pond for treatment and discharge at the NPDES discharge point.

4.3.2.2 Non-Contact Water

Non-contact water is expected to be generated in areas with final or temporary covers installed, and/or in areas with stormwater diversion and/or management systems installed upgradient of the CCR areas. These areas will be isolated and will have some temporary storage capacity (typically by constructing temporary containment berms). Non-contact storage areas will be equipped with pumps to convey the non-contact water directly to the NPDES discharge points once areas have been confirmed to be free of CCR and CCR contact water.

4.3.3 Dredging and CCR Removal Activities

The existing ash pond footprint includes low-lying areas in the northern reaches of the pond, and higher elevation areas in the southern portions of the site. As part of the overall closure strategy it was decided that CCR removal would occur in the low-lying areas closest to the river with final storage of CCR in the further upland southern portions of the site to provide for the creation of an increased buffer between CCR materials and the Mulberry Fork of the Black Warrior River.

The CCR closure strategy includes the removal of all CCR from the low-lying site areas below elevation 270 ft-MSL, even the zones that extend back beyond the extents of the permanent closure footprint, such as the natural low-lying topographic area between zones M1 and M2 (see Figures 2 and 3). This “over-excavation” of the low-lying areas within the permanent closure footprint is followed by backfilling with non-CCR fill materials to create a buffer between the permanent CCR storage and estimated post-closure groundwater levels in these areas. CCR will then be placed over the non-CCR. This sequence therefore requires CCR to be temporarily stored in the southern sections of the pond while the non-CCR fill is being placed.

Two primary methods of ash handling are proposed, namely hydraulic dredging and mechanical excavation as described in Section 4.2.

4.3.3.1.1 Dredging and Surge Pond Operations

Hydraulic dredging will be the main method for CCR removal during closure. The dredge will sluice CCR to a surge pond to be constructed within the limits of finger F7 adjacent to the ash thickening plant. The surge pond will be equipped with a pumping system which will deliver CCR material to the thickening plant feed tanks. During dredging the water levels in the main northern portions of the pond will be managed and incrementally lowered via feed to the water treatment facility.

The dredge feed to the surge pond will include a trash rack / rock screen for removal of oversized material. The maximum feed particle size to the paste plant is set at 0.5 inches or less. Oversized material will be screened by the dredge and surge operations with any retained oversized material being assessed for onsite or offsite permanent disposal / storage. Organic screened material will be disposed by being burnt on-site by the civil contractor and inorganic material will be disposed of within the closure limits.

4.3.3.1.2 Ash Thickening "Paste" Plant

Dredged CCR material will be conveyed to the ash thickening plant via the surge pond for dewatering and thickening. The ash thickening plant is designed to handle the known range of ash particle size distribution (PSD) feeds within the Plant Gorgas Ash Pond which can be roughly grouped into two process streams (namely bottom ash / coarse and fly ash / fine) that will produce a thickened ash. The split between the coarse and fine material handling streams within the plant will be a function of the PSD of the ash entering the plant.

The plant will be equipped with the following key equipment:

- Cyclones – The cyclones will split the CCR slurry into the coarse and fine streams,
- Screens – The coarse stream from the cyclones will be conveyed under gravity to the mechanical screens for dewatering,
- Thickeners – The fine stream from the cyclones will be dewatered / thickened in the thickeners. Flocculant will be added to the feed into thickeners to assist with the thickening process,
- Positive Displacement Pumps – The dewatered and thickened streams from the screening and thickeners will combine in a holding tank before being pumped to the final deposition area via a pair of positive displacement pumps.

The CCR material will be dewatered / thickened in the thickening plant to a solids content suitable for deposition, with further drying, densification, and consolidation occurring following placement through a combination of natural drying, desiccation, and consolidation processes and further active dewatering as required.

4.3.3.1.3 Mechanical Excavation

It is known that some percentage of material will not be economically or practically handled via direct dredging. This material will have to be either hydraulically transferred to the dredge or mechanically excavated and transported to the storage areas using haul trucks. The actual amount of this material will likely not be known until well into construction.

Excavation will be undertaken using conventional excavators, loading directly into off-road articulated dump trucks (ADTs). These operations will generally consist of the lowest elevation ash within each

given area and ash removal from restricted areas around remnant trees and other materials that could restrict or impact dredging.

Once the required water level in the ash has been reached, the ash will be excavated and placed in windrows for further drying if needed. Once sufficiently dried, the ash will be loaded into ADTs and transported to the final placement area (within the capped area). Temporary access roads and ramps will have to be constructed to allow for access into the closure-by-removal area. This section of the works will also include CCR removal verification and the six inches of over excavation.

4.3.3.2 Depth of CCR to be removed

On average the depth of the CCR in the closure by removal areas is 35 feet.

4.3.4 CCR removal verification protocol

"CCR removal" refers to the process of verifying and documenting that the CCR has been removed from the applicable dredging and excavation areas of the ash pond. The pond is known to contain a mixture of fly ash and bottom ash collectively referred to as CCR.

The procedure for closure by removal of CCR within identified limits will involve the following steps for each area identified as a Closure by CCR removal area:

1) Identification and demarcation of the area (or portion of the area) subject to removal verification. It is noted that the verification and documentation of removal procedures may be completed in phases.
2) Removal of accumulated CCR such that no CCR remains visible.
3) Visual inspection and documentation of the area by qualified person.
    a. For areas where the accumulated CCR and natural ground are difficult to distinguish, a hand lens or other visual aid may be used by the qualified person to aid the visual inspection.
    b. For areas where a clear color contrast between accumulated CCR and natural ground exists, colorimetric methods (such as the Munsell Color Chart) can be considered to supplement visual identifications.
4) If required, repeat steps 1 through 3 until CQA Engineer is satisfied that no CCR remains visible.
5) Complete "Pre 6-Inch Over-Dig Survey" and photographic documentation of applicable removal area(s).
    a. The Pre and Post 6-inch Over-Dig surveys will be performed either by:
        i. A grid of discrete survey points with a maximum 100-ft spacing (each way). Horizontal control shall be within 0.1 ft, and vertical control shall be within 0.02 ft, or
        i. For large areas, a photogrammetric or Lidar survey capable of generating a continuous surface of the surveyed area. For near continuous surveys Horizontal

and Vertical controls for Pre and Post Over Dig surveys can be reduced to 0.2 and 0.04 ft, respectively.

6) Over-excavation of a minimum of 6 inches at every applicable point (see Note below) in the designated removal area(s).

    a. For areas where rock, existing concrete designated to remain, or other similar hard surfaces are present in the excavation area (including the over-excavation zone) the surface will be cleaned to a visually-clean condition through hydraulic or mechanical means such as pressure washing. The soils surrounding the hard areas will be removed to the 6-inch over-excavation criterion.

7) Complete Post 6-Inch Over-Dig Survey and photographic documentation using the same survey points, procedures, and prescribed minimum tolerances as for the Pre 6-Inch Over-Dig Survey. Complete verification of the prescribed minimum 6” removal across the removal area by survey and visual comparison of the removal area(s). Photographs taken to document ash removal will be maintained at the site and will be available for review by project team members and ADEM personnel as necessary.

8) Hand augers borings to 12” depth will be performed at a minimum frequency of every acre and the collected hand auger samples visually assessed to check for the presence of CCR materials below the visible surface. Where site conditions lack safe accessibility for hand augering, a Geo Probe or other means of safely obtaining depth samples at a minimum of one per acre will be performed.

The details of the CCR Removal verification procedures are further outlined and incorporated into the project Quality Assurance Plan and technical specifications for closure.

4.3.5 CCR Placement

The CCR closure configuration consists of a series of stacks and fill areas in the southern upland reaches of the site. The footprint of the CCR consolidation area is comprised of a nominal 274 acre (2D measure) area that achieves the engineering objectives of the closure to permanently and safely store the CCR materials in a stable footprint located back away from and above the level of the Mulberry Fork of the Black Warrior River.

The closure design includes a combination of ash and soil slopes, embankments, and earthen buttresses to achieve stable closure. Final slopes comprised of compacted ash will be a maximum of 4H:1V, and the northern limit will be supported by a newly constructed containment dam.

The final placement and stabilization of ash will be achieved by two primary methods, namely:

- Deposition of ash from the thickening plant: Hydraulically dredged ash will be delivered to and mechanically thickened and dewatered by the ash thickening plant. Thickened ash will be delivered to the final deposition areas by two PD pumps via a series of pipelines and spigots. Once thickened ash is placed, no further mechanical conditioning or compaction of the ash will generally be required, noting that natural evaporation and drying processes and consolidation from placement of overlying materials will work to passively condition the ash after placement. Although the thickened deposition is a controlled process, the final cap profile will not be fully achieved by deposition from spigots alone. In certain areas, mechanically constructed berms will be required to support and control the footprint and shape the deposition to achieve final grades.

- Placement of trucked ash: Some portion of the CCR removal will not be practically achieved via direct dredging and will therefore have to be mechanically excavated and conveyed to the storage areas using haul trucks. Ash will be dewatered using a combination of in-situ and ex-situ dewatering techniques prior to final placement, grading and compaction in the closure area.

All final closure slopes and conditions will be designed to meet the stability requirements for each loading case outlined in section §257.73(e) of the CCR Rule.

4.3.6 Fugitive Dust Control Plan (ADEM 335-13-15-.02(11); 40 CFR 257.53)

The fugitive dust control plan identifies and describes the CCR fugitive dust control measures that will be implemented during closure to minimize CCR from becoming airborne at the facility, including CCR fugitive dust originating from ash ponds, roads, and material handling activities. 40 CFR 257.53 and ADEM Admin. r.ule 335-13-15.02(11) defines “fugitive dust” as “solid airborne particulate matter that contains or is derived from CCR, emitted from any source other that a stack or chimney”.

Fugitive dust originating from the ash pond or ash pond closure activities will be controlled using water suppression or polymer tackifiers. Pasted ash reduces origination of fugitive dust to some degree; however, dust management will still be an extensive and important operation.

The fugitive dust control measures identified and described in the plan will be adopted and implemented based upon an evaluation of site-specific conditions and are determined to be applicable and appropriate for the Plant Gorgas Ash Pond closure. Evaluation will include assessing the effectiveness of the fugitive dust control measures for the facility, taking into consideration various factors such as site conditions, weather conditions, and operative conditions.

CCR that is transported via truck to stockpiling prior to loading in trucks for hauling will be conditioned to appropriate moisture content to reduce the potential for fugitive dust.

Water suppression or polymer tackifiers will be used as needed to control fugitive dust on the facility roads used to transport CCR and other CCR management areas. Speed limits will be utilized to reduce the potential for fugitive dust. Trucks used to transport CCR will be filled to just under full capacity to reduce the potential for material spillage.

Southern Company and construction personnel will assess the effectiveness of the control measures by performing visual observations of the ash pond and surrounding areas and implementing appropriate corrective actions for fugitive dust, as necessary.

Any complaint received from a citizen regarding a CCR fugitive dust event at the facility will be documented and investigated. Appropriate steps will be taken, including any corrective action, if needed.

4.3.7 Surface Water Management During Closure

Managing water is a critical aspect of this closure due to the size of the watershed, the magnitude of annual rainfall, and the significant volumes and flow rates of water involved. Due to the general topography of the site, diverting stormwater from the contributing drainage areas away from the cap is not feasible and hence will have to be managed through the construction areas during closure and on the cap in post closure.

Surface water management during closure will be achieved by the management and operation of temporary berms, linings, and pumps to covey contact water to the northern portion of the site where a water management pond will be decanted by pumping to the water treatment facility prior to discharge off-site. At times, surface water will be blocked from gravity draining to the Northern end of the pond due to berms or temporary ash stacks. The temporarily impounded water will be pumped to the Northern end of the pond for treatment and discharge at NPDES the discharge location.

Once the final grades have been achieved, a cover system will be installed to limit the infiltration of surface run-off into the closed CCR unit, and stormwater will be managed in a series of channels and spillways.

4.3.8 Equipment Decontamination

All equipment (vehicles, pumps, pipelines, etc.) departing the site that have been in contact with CCR will be decontaminated via washing to remove all CCR materials. The overspray and all contact water from decontamination operations will be stored on site and treated prior to discharge.

4.3.9 Site Security

All access points to the site will be gated and gates will be locked with controlled access by approved personnel only. The site access and proposed security locations are shown on Early Works General Arrangement Drawing (EW-02) included as Appendix C. The main access point into the site is from the east off of Bankhead Road through Gate G1 and will be equipped with a manned security point. All site visitors including construction personnel will be required to check in at the security point and will be badged before being allowed to enter the site. No unauthorized personnel will be allowed to enter the site.

The site will be equipped with security cameras at key locations that will provide further around the clock surveillance.

4.3.10 Groundwater Monitoring

A groundwater monitoring plan was submitted with the original Plant Gorgas Ash Pond permit application. Please refer to Appendix 10 of the original permit application.

4.3.11 Operational inspections

Inspections will be conducted by a Qualified Person at intervals not exceeding 7 days to look for appearances of structural weakness and for proper operation of all outlet structures maintained for use during closure. Furthermore, an annual inspection will continue to be conducted by a qualified Professional Engineer throughout the closure process.

4.4 Closure Design Features

The current pond extents are defined by the existing dam crest at elevation 395 ft-msl. The footprint of the pond at this elevation is considered the extent of CCR material, and the closure design maintains all consolidated CCR material within this lateral footprint. The existing ash pond footprint includes low-lying areas in the northern reaches of the pond, and higher elevation areas in the southern portions of the site. As part of the overall closure strategy it was decided that CCR removal would occur in the low lying areas closest to the river with final storage of CCR in the further upland southern portions of the

site to provide for the creation of an increased buffer between CCR materials and the Mulberry Fork of the Black Warrior River.

The Plant Gorgas Ash Pond closure design consolidates ash behind a new confinement buttress into fingers F1 to F7, F12 and Middle areas M3 and M4 (see the 30 percent Design drawings included as Appendix B for key closure features), with closure by removal of ash within Fingers F8 to F11 and Middle Areas M1 and M2.

The CCR closure strategy includes the removal of all CCR from the low lying site areas below elevation 270 ft-MSL, even the zones that extend back beyond the extents of the permanent closure footprint, such as the natural low-lying topographic area between zones M1 and M2. This “over-excavation” of the low-lying areas within the permanent closure footprint is followed by the backfilling with clean non-CCR fill materials to create a buffer between the permanent CCR storage and estimated post-closure groundwater levels in these areas. CCR will then be placed over the non-CCR. This sequence therefore requires CCR to be temporarily stored in the Southern sections of the pond while the non-CCR fill is being place.

In the final closure configuration CCR will be consolidated behind a new engineered containment structure with an incorporated leachate collection system to provide permanent stability and containment. Post closure management of stormwater is provided by a newly designed stormwater control system culminating in two new spillways at the eastern and western abutments of the final containment area. The existing rockfill dam will be partially removed down to Elevation 295 ft-MSL to provide lower elevation but continued containment and separation with the Mulberry Fork of the Black Warrior River to form a new attenuation pond to the North of the closed unit as part of the site restoration efforts once ash from the closure-by-removal areas are removed.

To achieve the grades and capacity necessary to achieve final closure, CCR material will be stacked above the 395 ft-msl elevation within a portion of the pre-closure lateral footprint of the CCR Unit. To facilitate this stacking, in some areas clean fill will need to be built up to buttress the CCR material in a stack. As the top liner will need to be anchored into undisturbed, native soil in order to inhibit runoff infiltration, clean fill areas will also be included under lining when appropriate.

Final closure design is based on routing surface runoff into a central channel through a series of increasingly larger channels as would occur in a natural dendritic system. Off-cap, there will be little stormwater infrastructure apart from groin channels facilitating the transition from off-cap to on-cap flow. On-cap, a network of channels will move stormwater down decks and stacks to one of two spillways where it will flow down into the restoration area.

Water will flow across the cap decks through channels lined with grass or riprap directly to primary channels or downslope channels lined with Agru HydroTurf descending stacks or steeper grades. Stacks will collect water through a series of grass lined tack-on berms aligned at a 30-foot vertical spacing. A variance is being requested to allow for berms or terraces on a 30-ft spacing rather than 20-ft as required by r. 335-13-15-07(3).The tack-on berms will transmit the water to downslope channels descending steep sections directly or along stack access roads. Run-off will pass through the primary channel networks along road corridors. Depending on the anticipated conditions, these channels will be lined with either riprap or articulated concrete block (ACB). Water will drain off-cap down to the restoration area and attenuation pond through one of two concrete spillway structures with stilling basins.

Any Potential run-off impacts to the Mulberry Fork will be mitigated by an attenuation pond in the restoration area to which the spillways discharge. The attenuation pond will be impounded by a lowered section of the existing dam designed to contain the 100-year flood event at current discharge levels.

Cap stacks are designed as maximum 25 percent slopes (4H:1V) in accordance with the maximum closure slopes set forth in State Code 335-13-15-.07(3). Stormwater control tack-on berms are set along the stack slopes with a maximum vertical spacing of 30 feet. Top deck slopes within the CCR areas are generally set at between 3 and 5 percent as specified in ADEM Admin. Code r. 335-13-15-.07(3). A variance is being requested to allow slopes flatter than 5 percent. Within stormwater channels, minimum slopes of 1.5 percent were selected.

4.5 Final cover system

The final cover system for the Plant Gorgas Ash Pond closure is designed in accordance with r. 335-13-15-.07(3)(d)3. and § 257.102(d)(3)(i) to minimize maintenance after closure of the CCR unit. The final cover system is designed to prevent the future impoundment of water and includes measures to prevent infiltration, sloughing, minimize erosion from wind and water, settling, and subsidence.

The largest area requiring a final cover is approximately 274 acres. The engineered final cover system consists of the following minimum components, listed from top to bottom.

- An infiltration layer of a minimum of 18 inches thick earthen material
- An erosion prevention layer providing a minimum of 6 inches of earthen fill and vegetation
- A minimum 40 mil polyethylene (LLDPE or HDPE) geomembrane liner

The final cover system consists of two options for the final cover system of the unit. Each cover system option proposed consists of an 18-inch minimum layer of prepared and compacted subgrade material and incorporates a geosynthetic final cap. The Plant Gorgas Ash Pond includes an alternative final cover design, in accordance with r. 335-13-15-.07(3)(d)3.(ii) and § 257.102(d)(3)(ii). These areas are also designed to prevent the future impoundment of water and include measures to prevent infiltration, sloughing, minimize erosion from wind and water, settling, and subsidence.

The alternative final cover system consists of the following minimum components, listed from top to bottom.

- Specified final cover infill as outlined in the final closure plan design;
  - 1/2” minimum sand infill
  - 1/2" minimum sand infill with ArmorFill® application
  - 3/4” minimum HydroBinder® infill
  - Rock or articulated concrete block overlying a geosynthetic separation and protection layer
- Engineered Synthetic Turf (HydroTurf®)
- A minimum 40 mil polyethylene (LLDPE or HDPE) geomembrane liner

The final cover system, consisting of the above described engineered cover system alternatives with run-on and run-off controls, is currently being developed and designed to meet the closure standards of

§ 257.102(d)(3)(i) and r. 335-13-15-.07(3)(d)3.(i). Engineering calculations for the final cover design will be submitted as part of the Engineering Report for the final closure permit submittal.

5.0 MAXIMUM INVENTORY OF CCR– § 257.102(B)(1)(IV) AND R. 335-13-15-.07(3)(B)1.(IV)

The current estimate (as of July 2019) of the maximum inventory of CCR ever on-site at the Gorgas Ash Pond over the active life of the CCR unit is nominally 25 Million Cubic Yards (MCY). This maximum inventory estimate is updated from the initial closure plan estimate based on the addition of CCR within the unit from additional generation activities and a significant number of additional drilling and geophysical investigations completed allowing for a better estimate of the bottom of unit conditions.

Maximum unit inventory volume figures are derived from available information.

6.0 LARGEST AREA REQUIRING FINAL COVER– § 257.102(B)(1)(V) AND R. 335-13-15-.07(3)(B)1.(V)

The Plant Gorgas Ash Pond is approximately 420 acres in pre-closure size. Based on the current 30% closure design the largest area requiring final cover in the consolidated post-closure condition is 274 acres (2D post-closure limits of CCR).

7.0 CERTIFICATION OF CLOSURE

In accordance with §257.102(h) and r. 335-13-15-.07(3)(h), within 30 days of completion of closure, a professional engineer registered in Alabama will prepare and APC will submit a Closure Construction Certification Report and a Removal Certification Report to ADEM documenting the completion of closure activities as indicated in § 257.102(f)(3) and r. 335-13-15-.07(3)(f)3. APC, as required by ADEM, will submit confirmation that a notation on the property deed has been recorded in accordance with § 257.102(i) and r. 335-13-15-.07(3)(i).

8.0 DIRECTIONAL INFORMATIONAL SIGNS

A designated construction entrance and access road has been designed and will be completed prior to initiating closure activities. Signs will be posted at the entrance gate notifying users of the ash pond of the closure activities and a telephone number for emergencies will be posted. Emergency evacuation routes will be maintained for the duration of closure activities.

9.0 VEGETATION PLAN

No significant vegetation exists above the pre-closure pond water levels within the limits of the ash pond as the majority of the ash pond limits exist under a water cover. The extent of vegetation below CCR in closure by removal areas is uncertain prior to exposure of such areas during closure, and the needs for clearing and vegetation management in such areas will be progressively assessed during closure. Vegetative materials encountered within the ash pond limits as closure progresses will at a minimum be washed of any contacting CCR materials prior to further processing and handling onsite via approved means such as mulching, controlled burning, etc.

Vegetative management will also be required in a number of areas outside and surrounding the pond limits (non CCR areas) to support closure. Vegetation management in these non CCR areas will generally include timber and topsoil harvesting where applicable and mulching and/or burning of vegetative matter onsite for use in erosion control efforts, on-site compositing for topsoil generation / enhancement, or other approved means.

10.0 SITE EQUIPMENT NEEDED

The Contractor selected to perform closure construction will be responsible for all equipment needed during the construction period. For post-closure care, Alabama Power will provide all necessary company owned, leased or contracted equipment needed to perform maintenance and any necessary repairs.

11.0 SEDIMENT REMOVAL

On a periodic basis during closure, accumulated sediment will be removed when necessary from drop inlets, drainage pipes, diversion ditches, and other drainage structures.

12.0 EROSION AND SEDIMENT CONTROL

Upon closure, all proposed ditches, diversion berms, culverts, riprap, and other drainage structures serving disturbed areas, but not already built, will be constructed and placed according to the Design Drawings.

13.0 COST OF CLOSURE

Through coordination with the engineering design team and the subcontractor selected to execute the closure activities, the estimated cost of closing Plant Gorgas's ash pond is approximately $750 million. The estimate is considered to be at screening level with a low to moderate level of project definition. Due to the complexity, quantities, and duration of the overall project, some variability in costs is expected. Additional expenses of post closure care, maintenance, and corrective action are currently estimated at $31 million. Fully detailed long-term maintenance and corrective action strategies have not yet been determined which will have the potential to influence current estimates.

Some of the most significant cost items include:

- Water management including contact and noncontact water;
- Cover system;
- Construction management and construction quality control (CQC);
- Offsite fill materials such as soil and clay fill, gravel and riprap;
- Dredging and pasting operations;
- Excavation, placement, compaction, and grading of CCR into the consolidated footprint;
- Construction quality assurance (CQA);
- Dust control management;
- Engineering support; and
- General contingency and inflation on construction items.

14.0 CLOSURE SCHEDULE

Closure activities for the Gorgas Ash Pond are outlined in the schedule presented in Table 1. The Ash Pond is currently undergoing closure in accordance with r. 335-13-15-.07(3)(d) and § 257.102(d), and no longer receives CCR. Final capping and closure in place of the Ash Pond is expected to be completed in 2028.

Table 1: Gorgas Ash Pond Closure Milestones Schedule (335-13-15-.07(3)(b)1.(vi))

Closure Activity	Completion Date
Notice of Intent to Close	October 2016
Placement of CCR From Outside the Unit Ceased	April 2019
Begin Dewatering Activities	2019
Begin CCR Consolidation and Stabilization	2020
Begin Final Closure Construction Activities	2026
End Final Cap Construction Activities	2028

15.0 RECORDKEEPING/NOTIFICATION/INTERNET REQUIREMENTS

As outlined in § 257.105 and r. 335-13-15-.08(1), each Owner or Operator of a CCR unit subject to the Department regulations must maintain files of certain information in an operating record at the facility. Each file is to be retained for at least five years following the date of each occurrence, measurement, maintenance, corrective action, report, record or study. Electronic storage of the records is acceptable. These records are to be made available to the Department upon request.

Certain notifications are to be made in accordance with the requirements of § 257.106 and r. 335-13-15-.08(2). In many instances, such notifications are to be placed in the facility's Operating Record. In certain instances, further notifications are to be made to the Department Directory within 30 days of placement of a notification into the Operating Records. Furthermore, a publicly accessible internet site must be established for posting of certain notifications and compliance information within 30 days of it being placed in the Operating Record.

Alabama Power and Plant Gorgas maintain an electronic Operating Record for the facility. In addition, a publicly accessible internet site has already been established for compliance with EPA's CCR Rule. Required notifications and compliance data, as outlined in § 257.105 through § 257.107 and r. 335-13-15-.08 and as applicable to the Plant Gorgas Ash Pond, will be maintained in the electronic Operating Record, and as required, made available on the publicly accessible internet site within 30 days of placement in the Operating Record. Furthermore, required notifications will be made to the Department Director within 30 days of placement in the Operating Record.

Certain plans and assessments are required to be updated at specified intervals and/or upon modification of certain components of the facility. If and when applicable, updates will be made to the respective plans and assessments, and notifications placed in the Operating Record, posted to the

publicly accessible internet site, and communicated in writing to the Department Director in accordance with the Department rules.

16.0 WRITTEN POST-CLOSURE PLAN

40 CFR § 257.104 and ADEM Administrative Code r. 335-13-15-.07(5) requires the owner or operator of an existing CCR surface impoundment that is closed in place to provide for post-closure care of the unit for a period of at least 30 years. Post-closure care includes maintenance of the facility, as well as groundwater monitoring in accordance with § 257.90 through § 257.98 and r. 335-13-15-.06(1) through r. 335-13-15-.06(9).

The Plant Gorgas Ash Pond is currently expected to be closed in place under the performance standards outlined in § 257.102(d) and r. 335-13-15-.07(3)(d). Following closure, maintenance will be provided on the final cover system for the required post-closure care period so that the integrity and effectiveness of the final cover system will be maintained. Maintenance activities will include, as needed, repairs to the final cover to correct any effects related to settlement, subsidence, erosion or other events, and will be performed to prevent run-on or run-off from eroding or otherwise damaging the final cover. Maintenance tasks could include, but not be limited to, repair of erosion features, replacement of eroded cover soils and re-establishment of vegetation, where applicable. Maintenance will be performed on a semi-annual schedule, or more frequently if needed.

The groundwater monitoring system will be maintained throughout the required post-closure care period. Groundwater monitoring will be performed on a semiannual basis during the required post-closure care period as well.

The following office(s) can be contacted about the facility during the post-closure care period.

Gorgas Steam Plant
Compliance and Support Manager
460 Gorgas Road, Parrish, AL 35580-5715
1-205-686-2103
G2CCRPostGOR@southernco.com

At the present time, there is no planned use of the facility after closure. If current plans change, they will be noted in an amendment to this post-closure care plan. Any future use of the property after closure will not disturb the integrity of the final cover, liner or any other component of the containment system. Furthermore, the functionality of the groundwater monitoring system will be maintained.

No later than 60 days following completion of the post-closure care period of 30 years, Alabama Power Company will prepare a notification verifying completion of the post-closure care.

Table 1: Gorgas Ash Pond Closure Milestones Schedule (335-13-15-.07(3)(b)1.(vi))

Closure Activity	Completion Date
Notice of Intent to Close	October 2016
Cease Receipt of Waste Streams/Initiate Construction Activities	April 2019
Initiate Free Water Dewatering Activities	June 2020
Paste Plant Commissioning	August 2020
Begin CCR Consolidation and Stabilization	August 2020
Begin Final Cover Cap Construction Activities	August 2022
Completion of Dredging	October 2023
End Final Cap Construction Activities	June 2028

ALABAMA POWER
PLANT GORGAS
ASH POND CLOSURE DESIGN PLANS
WALKER COUNTY, ALABAMA
OCTOBER 2020

INDEX OF DRAWINGS			
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G-101	GENERAL NOTES	0	2020-10-16
G-200	PRE-CLOSURE CONDITIONS PLAN - AERIAL	0	2020-10-16
G-201	PRE-CLOSURE CONDITIONS PLAN - TOPOGRAPHY AND BATHYMETRY	0	2020-10-16
G-202	PRE-CLOSURE CONDITIONS PLAN - TOPOGRAPHY AND BATHYMETRY WITH SECTIONS	0	2020-10-16
G-203	ESTIMATED BOTTOM OF CCR PLAN	0	2020-10-16
G-204	ESTIMATED BOTTOM OF CCR PLAN WITH SECTIONS	0	2020-10-16
	CLOSURE DESIGN (C)		
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C-101	PROPOSED CLOSURE GRADING PLAN WITH SECTIONS - SHEET 1	0	2020-10-16
C-102	PROPOSED CLOSURE GRADING PLAN WITH SECTIONS - SHEET 2	0	2020-10-16
C-103	SURFACE WATER MANAGEMENT AND CHANNEL ARMORING PLAN	0	2020-10-16
C-200	SECTIONS AND PROFILES - SHEET 1	0	2020-10-16
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C-301	CLOSURE BUTTRESS SECTIONS AND DETAILS	0	2020-10-16
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C-502	CLOSURE DETAILS - SHEET 3	0	2020-10-16
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C-701	UNDERDRAIN OUTLET TIE-IN	0	2020-10-16
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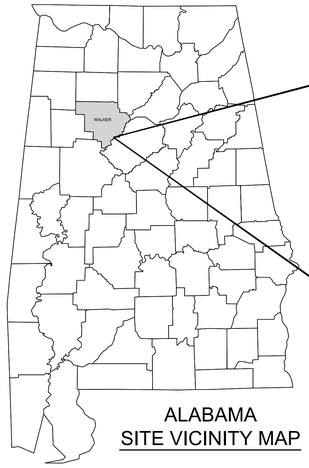
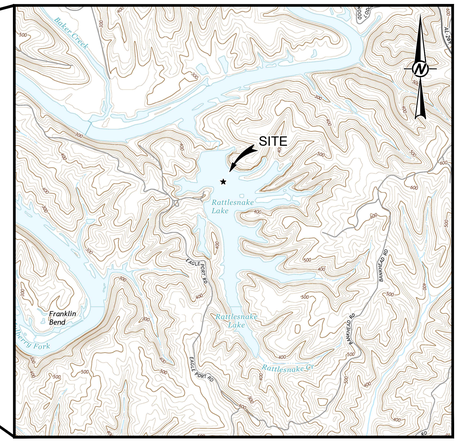


ALABAMA
SITE VICINITY MAP


SITE
Rattlesnake Lake
Franklin Bend
Rattlesnake Lake
Rattlesnake Dr
Rattlesnake Dr
Rattlesnake Dr

DEFINITIONS

1. THE OWNER IS ALABAMA POWER AND THEIR AUTHORIZED CONSTRUCTION MANAGEMENT AGENT IS SOUTHERN COMPANY SERVICES. THE ENGINEER IS GOLDER ASSOCIATES INC. (GOLDER). GOLDER HAS PREPARED THESE PLANS AND IS TO ASSIST THE OWNER IN MONITORING THE PERFORMANCE OF THE WORK. THE CONTRACTORS ARE THE ENTITIES WITH WHOM THE OWNER HAS AN AGREEMENT TO PERFORM WORK RELATED TO THIS PROJECT.

DESCRIPTION

1. THE CONTRACTOR IS RESPONSIBLE FOR THE CONSTRUCTION MEANS AND METHODS AND CONTROL OF THE PROCESS OF THE WORK ASSOCIATED WITH CLOSURE OF THE GORGAS ASH POND EXCEPT AS RESTRICTED IN THE DRAWINGS AND SPECIFICATIONS. THE CONTRACTOR SHALL FURNISH ALL LABOR, MATERIALS, EQUIPMENT, AND INCIDENTALS NECESSARY TO PERFORM THE WORK. THIS INCLUDES CONSTRUCTION SEQUENCE, PROTECTION OF WORKERS, WORK AREA ACCESS, BARRIERS, MOVEMENT AND DEWATERING OF MATERIALS AND EQUIPMENT INTO AND OUT OF THE WORK AREA, AND TEMPORARY MEASURES AS REQUIRED.
2. THE WORK SHALL CONSIST OF THE ACTIVITIES OUTLINED IN THESE DRAWINGS AND ASSOCIATED ACTIVITIES SUCH AS CLEARING VEGETATION, GRUBBING ROOTS AND STUMPS, CONTROL OF SURFACE WATER, INSTALLATION OF NEW SURFACE WATER AND CCR CONTACT WATER PIPING AND EQUIPMENT, DEWATERING THE EXCAVATION OF SURFACE AND GROUNDWATER AS REQUIRED TO SUPPORT THE WORK, EXCAVATION OF CCR, TRANSPORT AND PLACEMENT OF CCR, PLACEMENT OF NEW COVER MATERIALS, AND PROTECTION OF THE WORK AS SPECIFIED HEREIN AND INDICATED ON THE DRAWINGS.
3. TRADE NAMES ARE PROVIDED AS EXAMPLES ONLY. ALTERNATIVE PRODUCTS THAT SATISFY THE SPECIFICATION REQUIREMENTS WILL BE PERMITTED AS APPROVED BY THE ENGINEER. ALL WORK WILL BE PERFORMED IN ACCORDANCE WITH SOUTHERN COMPANY'S CONTRACTOR SAFETY PROGRAM REQUIREMENTS.

PRE-CONSTRUCTION MEETING

1. A KICKOFF MEETING SHALL BE HELD AT THE START OF THE WORK AND SHALL BE ATTENDED BY REPRESENTATIVES OF: THE OWNER, THE CONSTRUCTION MANAGEMENT TEAM, THE ENGINEER, THE PRIMARY CONTRACTORS, THE QUALITY ASSURANCE FIRM, AND OTHER INVITED PROJECT STAKEHOLDERS. THE MEETING SHALL BE HELD TO CLARIFY THE REQUIREMENTS FOR THE WORK, TO COORDINATE THE CONSTRUCTION ACTIVITIES, AND TO IDENTIFY CONTRACTUAL RELATIONSHIPS AND RESPONSIBILITIES.

EXISTING SITE CONDITIONS

1. THE CONTRACTOR SHALL BECOME FAMILIAR WITH THE SITE CONDITIONS PRIOR TO COMMENCING WORK FOR THE PURPOSE OF OBSERVING AND DOCUMENTING THE PRE-CLOSURE CONDITION OF THE GORGAS ASH POND AND SURROUNDING AREAS INCLUDING ALL SECURITY, STRUCTURES, INFRASTRUCTURE, ROADWAYS, AND OTHER FACILITIES ADJOINING THE SITE. THE GORGAS ASH POND HAS RECENTLY CEASED OPERATIONS AND CONDITIONS SHOWN AS EXISTING CONDITIONS MAY CHANGE PRIOR TO THE START OF WORK. THE CONTRACTOR IS RESPONSIBLE FOR VERIFYING ALL EXISTING DIMENSIONS AND SITE CONDITIONS THAT MAY AFFECT THE WORK AND REPORTING ANY DISCREPANCIES TO THE OWNER'S REPRESENTATIVE AND THE ENGINEER.

REFERENCES

1. EXISTING SURVEY INFORMATION (TOPOGRAPHY, PLANIMETRICS, WATER ELEVATIONS, ETC.) BASED ON SURVEY PROVIDED BY SOUTHERN COMPANY SERVICES, FEBRUARY 2020.
2. BATHYMETRIC SURFACE IS A COMPOSITE OF THE FEBRUARY 2020 SOUTHERN COMPANY AND THE JANUARY 2020 ARCSURVEY BATHYMETRIC SURVEYS TIED TO INTERPRETED SECTIONS OF THE 2016 SOUTHERN COMPANY BATHYMETRIC SURVEY WHERE SURVEY DATA IS NOT AVAILABLE.
3. BOTTOM OF CCR TOPOGRAPHY TAKEN FROM USGS, PORT BIRMINGHAM, 1938 AND GOODSPINGS, 1971 QUADRANGLES. TOPOGRAPHY WAS INTERPRETED BETWEEN 20 FOOT CONTOURS AND ADJUSTED BASED ON GEOTECHNICAL INVESTIGATION DATA BY GOLDER ASSOCIATES INC.
4. EXISTING PROPERTY AND BOUNDARIES PROVIDED BY SOUTHERN COMPANY SERVICES, APRIL 2020.

DATUM NOTES

1. ELEVATIONS ARE IN FEET ABOVE MEAN SEA LEVEL, NATIONAL GEODETIC VERTICAL DATUM (NGVD) 1988. COORDINATES CORRESPOND TO ALABAMA WEST COORDINATE SYSTEM, NORTH AMERICAN DATUM (NAD) 1983.
2. CONTOUR INTERVAL IS 5 FEET, UNLESS OTHERWISE LABELED.

GENERAL NOTES

1. THE CLOSURE CONSTRUCTION INVOLVES THREE PRIMARY CONTRACTORS: THE GENERAL CIVIL CONTRACTOR, THE MARINE AND PASTE CONTRACTOR, AND THE WATER TREATMENT CONTRACTOR. OTHER MINOR CONTRACTORS MAY ALSO BE RETAINED BY THE OWNER TO PERFORM PERIPHERAL WORKS.
2. COORDINATION OF WORK IS THE RESPONSIBILITY OF EACH CONTRACTOR.
3. ALL OWNER AND OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA) CONSTRUCTION HEALTH AND SAFETY REQUIREMENTS SHALL BE FOLLOWED DURING EXECUTION OF THE WORK. OWNER PROCEDURES SHALL BE USED FOR ALL EXCAVATIONS, HOT WORK, AND LOCK-OUT/TAG-OUT UNLESS AGREE OTHERWISE. ALL CONTRACTOR EMPLOYEES SHALL ATTEND THE OWNER'S CONTRACTOR SAFETY ORIENTATION.
4. WORKERS SHALL BE AWARE OF ENERGIZED EQUIPMENT IN THE VICINITY OF THE WORK AREA AND SHALL TAKE PRECAUTIONS NOT TO DISTURB OPERATING EQUIPMENT. ALL EQUIPMENT TO BE ASSUMED ENERGIZED UNLESS PROVEN OTHERWISE.
5. THE CONTRACTOR SHALL PERFORM HOUSEKEEPING DUTIES ON A REGULAR BASIS TO KEEP WORK AREAS CLEAN. HOUSEKEEPING SHALL BE PERFORMED AT THE COMPLETION OF THE WORK TO THE SATISFACTION OF THE OWNER.
6. THE CONTRACTORS ARE RESPONSIBLE FOR LOCATING AND PROTECTING UNDERGROUND AND OVERHEAD UTILITIES AND SHALL EXERCISE CARE AROUND EXISTING UTILITIES AND STRUCTURES.
7. THE CONTRACTORS SHALL BE AWARE OF WORK ACTIVITIES PERFORMED BY OTHERS INCLUDING THE OWNER AND OTHER CONTRACTORS.
8. THE CONTRACTORS ARE REQUIRED TO PROVIDE PORTABLE SANITARY FACILITIES ADJACENT TO WORK AREAS AS NEEDED.
9. THE CONTRACTOR SHALL PROTECT EXISTING FENCES, UTILITIES, MONITORING WELLS, AND OTHER SITE FEATURES FROM DAMAGE DURING CONSTRUCTION. ANY DAMAGE SHALL BE REPAIRED TO OWNER'S STANDARDS AT CONTRACTORS EXPENSE.
10. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS, ELEVATIONS, AND SITE CONDITIONS PRIOR TO STARTING WORK, AND SHALL NOTIFY THE OWNER'S REPRESENTATIVE IF CONFLICTS EXIST ON THE DRAWINGS.
11. LOCATIONS AND DIMENSIONS OF EXISTING STRUCTURES ARE BASED ON DRAWINGS PROVIDED BY THE OWNER AND SHOULD BE FIELD VERIFIED.
12. A RECORD (AS-BUILT) SURVEY SHALL BE PERFORMED ON ALL PERMANENT CONSTRUCTED FEATURES ACCORDING TO THE REQUIREMENTS OUTLINED IN THE PROJECT TECHNICAL SPECIFICATIONS AND CONTRACTUAL DOCUMENTS. COORDINATES AND ELEVATIONS SHALL BE SURVEYED AT ALL KEY FEATURES AND AT MINIMUM 100-FOOT INTERVALS ALONG TANGENTS. COORDINATES (NORTHING AND EASTING) SHALL BE REPORTED IN STATE PLANE COORDINATES, NORTH AMERICAN DATUM 83 (NAD83). DATA COLLECTION SHALL BE OVERSEEN BY A LICENSED LAND SURVEYOR WITHIN THE STATE OF ALABAMA. CONTRACTOR SHALL PROVIDE AN EXCEL SPREADSHEET CONTAINING SURVEY POINT NUMBER, NORTHING, EASTING, GROUND ELEVATION AND FEATURE ELEVATION (IF APPLICABLE). SURVEY METHOD AND EQUIPMENT USED SHALL BE INDICATED WITH THE DELIVERABLE.
13. THE GENERAL CIVIL CONTRACTOR IS RESPONSIBLE FOR SURVEY CONTROL, CONSTRUCTION STAKING, AND FOR RECORD-KEEPING REQUIRED TO PRODUCE RECORD DRAWINGS.
12. THE CONTRACTOR SHALL CONTROL SURFACE RUNOFF FROM WORK AREAS THROUGHOUT CONSTRUCTION AND PLACE AND MAINTAIN EROSION CONTROL FEATURES AS INDICATED IN THE SITEWIDE CONSTRUCTION BEST MANAGEMENT PRACTICES PLAN (CBMPP) AND AS SUPPLEMENTARY NEEDED TO PROTECT AGAINST EROSION.
13. THE CONTRACTOR SHALL PROVIDE TEMPORARY EXCAVATION SUPPORT AS NECESSARY TO COMPLETE THE WORK. EXCAVATION SUPPORT WILL BE INCIDENTAL TO THE APPLICABLE WORK.
14. ONCE PROTECTIVE SOIL COVER HAS BEEN PLACED ON AN AREA, EQUIPMENT TRAVERSING OR CARRYING CCR SHALL NOT BE ALLOWED.
15. DEMOLISH FENCING AS NEEDED FOR CONSTRUCTION. UPON COMPLETION OF GRADING FENCING SHALL BE REPLACED IN KIND.
16. THE PROJECT HAS SUBMITTED AN APPLICATION TO RECEIVE A US ARMY CORPS OF ENGINEERS (USACE) SECTION 404 PERMIT TO ALLOW FOR THE PLACEMENT OF FILL MATERIALS INTO WATERS OF THE US. UNTIL SUCH TIME THAT THE USACE PERMIT IS OBTAINED THE BLUE LINE STREAMS AS DELINEATED BY CAHABA CONSULTING LLC AND SHOWN ON THESE DRAWINGS SHALL BE PROTECTED AND REMAIN CLEAR OF FILL MATERIALS, INCLUDING A 25 FOOT BUFFER.
17. IF THE REVISED NPDES INDUSTRIAL STORMWATER PERMIT HAS NOT YET BEEN OBTAINED, THE PRE-CLOSURE NPDES PERMIT CONDITIONS APPLY, AND DO NOT ALLOW FOR THE USE OF THE WATER TREATMENT SYSTEM TO PROVIDE ACTIVE LOWERING OF THE MAIN POND WATER LEVELS.

GEOTECHNICAL REFERENCES

1. THE FOLLOWING GEOTECHNICAL REFERENCES CONTAIN SUBSURFACE DATA USED IN THE DESIGN OF THIS POND CLOSURE.

A. GORGAS ASH POND CLOSURE SITE INVESTIGATION AND GEOTECHNICAL DATA REPORT BY GOLDER.
B. GEOTECHNICAL MATERIAL PROPERTIES CALCULATION PACKAGE, BY GOLDER.

EROSION AND SEDIMENT CONTROL

1. SEDIMENT AND EROSION CONTROL ITEMS SHOWN ARE PROVIDED FOR INFORMATION ONLY AND ARE SUBJECT TO CHANGE. CONTRACTOR SHALL OBTAIN AND REVIEW APPROVED SEDIMENT AND EROSION CONTROL PLANS PRIOR TO COMMENCEMENT OF THE WORK.
2. THE WORK AREA IS ALMOST ENTIRELY CONTAINED WITHIN THE EXISTING WATERSHED OF THE GORGAS ASH POND. NO PART OF THE CLOSURE AREA NOW DRAINS OUT OF THE POND LIMITS. EROSION AND SEDIMENT CONTROL MEASURES ARE INTENDED TO PROVIDE PROTECTION OF THE WORK AREA, NOTABLY DEWATERING SYSTEMS AND EXISTING AND PROPOSED SLOPES. EROSION CONTROL MEASURES SHALL BE MAINTAINED TO PROTECT THE WORK PENDING ACCEPTANCE AND TURNOVER OF THE PROJECT.
3. NO CCR OR OTHER MATERIAL STOCKPILES, PIPING, OR OTHER CONSTRUCTION SHALL BE PLACED SO AS TO CAUSE DISCHARGE OF WATER FLOW OUT OF THE BOUNDARIES OF THE EXISTING POND.
4. ALL WATER COLLECTED FROM THE CLOSURE AREA SHALL BE DISCHARGED AT LOCATION(S) APPROVED BY THE ENGINEER IN THE EXISTING CCR POND. OR AS DIRECTED BY THE OWNER.
5. SURFACE WATER AND GROUNDWATER INTAKES SHALL BE PROTECTED FROM EXCESSIVE SUSPENDED MATERIALS BY APPROPRIATE PROTECTIONS INCLUDING FILTERS, SILT FENCE, ETC. ADDITIONAL MEASURES MAY BE REQUIRED IF EXCESSIVE TRANSPORT OF SUSPENDED SOLIDS IS NOTED.
6. EXPOSED SLOPES IN CCR AS WELL AS EXISTING SLOPES SHALL BE PROTECTED FROM EROSION USING MEASURES SUCH AS: GRADING (DITCHES/BERMS) AT THE TOP OF SLOPES, ROLLING OR TRACKING OF EXPOSED SLOPES, EROSION CONTROL MATTING, AND MEASURES TO PREVENT LEAKAGE FROM PIPING ON, IN, OR ABOVE SLOPES.
7. MECHANICALLY PLACED CCR AND SOIL SLOPES THAT ARE DAMAGED BY EROSION SHALL BE REPAIRED BY UNDERCUTTING RILLS AND REMOVING DISTURBED SOILS AND ACCUMULATED SEDIMENT AND REPLACEMENT WITH COMPACTED FILL.

QUALITY CONTROL

1. EACH CONTRACTOR IS RESPONSIBLE FOR QUALITY CONTROL (QC) DURING ALL PHASES OF THEIR CONSTRUCTION WORKS.
2. THE CONTRACTOR SHALL, AT ALL TIMES WHEN THE FIELD WORK IS IN PROGRESS, KEEP A COMPETENT REPRESENTATIVE OR SUPERINTENDENT IN CHARGE OF THE WORK WHO SHALL HAVE FULL AUTHORITY TO RECEIVE AND GIVE ORDERS TO CONTRACTOR'S PERSONNEL. THE CONTRACTOR SHALL GIVE THE WORK THE CONSTANT ATTENTION NECESSARY TO FACILITATE THE PROGRESS THEREOF AND SHALL COOPERATE WITH THE OWNER, AND WITH OTHER OWNER CONTRACTORS AUTHORIZED TO PERFORM WORK ADJACENT TO OR WITHIN THE PHYSICAL LIMITS OF THE WORK AREA. THE CONTRACTOR SHALL PROVIDE EXPERIENCED MANAGEMENT, SUPERVISORY AND KEY PERSONNEL AS REQUIRED TO COMPLETE THE WORK AS APPROVED BY THE OWNER AND THE ENGINEER.
3. THE CONTRACTOR IS RESPONSIBLE FOR QUALITY CONTROL WHICH SHALL INCLUDE ACTIONS TO BE TAKEN BY CONTRACTOR AND OTHER SUBCONTRACTORS, MANUFACTURER, FABRICATOR, AND/OR INSTALLER TO DOCUMENT THAT THEIR METHODS, MATERIALS, AND WORKMANSHIP ARE ACCURATE AND CORRECT AND MEET THE REQUIREMENTS OF REGULATIONS, AND ARE IN ACCORDANCE WITH THESE PLANS. FOR CONSTRUCTION TOLERANCES, SEE SPECIFICATIONS.
4. THE OWNER WILL EMPLOY THE ENGINEER AND/OR A FOURTH PARTY QUALITY ASSURANCE ENGINEERING FIRM TO MAKE CONSTRUCTION OBSERVATIONS AND PROVIDE WRITTEN DOCUMENTATION THAT THE PROJECT IS COMPLETED IN ACCORDANCE WITH THESE PLANS. THE ENGINEER OR QA ENGINEER WILL CONDUCT PERIODIC ON-SITE AND LABORATORY TESTING AND OTHER CONSTRUCTION QUALITY ASSURANCE TASKS REQUIRED HEREIN FOR THE PROJECT.

CCR ACCESSIBILITY

1. THE SURFACE OF CCR MAY BE INACCESSIBLE TO ANY BUT AMPHIBIOUS EQUIPMENT.
2. AFTER MODERATE TO HEAVY RAINFALL, THE CCR SURFACE MAY BECOME INACCESSIBLE UNTIL IT DRAINS SUFFICIENTLY TO RE-FORM STABLE SURFACE CONDITIONS.
3. WORK NEAR DITCHES AND STEEP CCR SLOPES SHOULD CONSIDER THE STABILITY AND POTENTIAL FOR ROLL-OVER OF EQUIPMENT, INCLUDING CONSIDERATION OF SLOPE FAILURE.
4. THE CONTRACTOR SHALL DEVELOP A PLAN FOR EVALUATING CCR ACCESSIBILITY FOR EQUIPMENT PRIOR TO THE START OF WORK EACH DAY AND AFTER RAINFALL, TO BE IMPLEMENTED PRIOR TO ALLOWING EQUIPMENT ON THE CCR. ELEMENTS OF THE PLAN MAY INCLUDE OPERATOR EXPERIENCE AND TRAINING AND MEASURES TO EVALUATE CCR CONSISTENCY AND SATURATION USING HAND TOOLS OR MECHANICAL MEASUREMENT EQUIPMENT OR AMPHIBIOUS VEHICLES.
5. ADJUSTMENTS OR MODIFICATIONS TO THE PLAN MAY BE NECESSARY BASED ON ACTUAL OR CHANGING CONDITIONS.
6. THE CONTRACTOR SHALL DEVELOP A PLAN FOR TIMELY RESCUE OF PERSONNEL AND RECOVERY OF EQUIPMENT THAT MAY BECOME BOGGED IN THE CCR POND. PLANS SHALL BE SUBMITTED TO THE OWNER AND ENGINEER.

CCR CUT SLOPE BASELINE ACCESS, MONITORING, AND DEWATERING CRITERIA NOTES

1. PRIOR TO COMMENCING ACCESS FOR LAND BASED (I.E. NON FLOATING OR AMPHIBIOUS ACTIVITIES) MECHANICAL CONSTRUCTION ACTIVITIES OVER IN-PLACE CCR MATERIALS, THE CONTRACTOR LOOKING TO ACCESS THE AREA SHALL VERIFY THE STRENGTH OF THE IN-PLACE MATERIAL, MEASURE THE DEPTH OF THE GROUND WATER SURFACE IN THE AREA, AND PROVIDE AN ENGINEERED PLAN FOR PROPOSED CONSTRUCTION ACTIVITIES ON CCR SLOPES STEEPER THAN 10H:1V, WITHIN 100 FEET OF A CCR CUT SLOPE, OR AS OTHER CONDITIONS DICTATE BASED ON THE EVALUATION OF A COMPETENT REPRESENTATIVE.

A. FOR LAND BASED WORK ON RELATIVELY FLAT IN-PLACE (10H:1V SLOPES OR SHALLOWER) MORE THAN 100 FEET FROM A DOWNWARD CCR CUT SLOPE FACE, STRENGTH EVALUATIONS CAN BE MADE WITH FIELD VANE, DYNAMIC CONE PENETROMETER (DCP), DEEP TECHNIQUES (CPT, ETC.) OR OTHER APPROPRIATE METHODS APPROVED BY THE ENGINEER.
B. FOR LAND BASED WORK ON IN-PLACE CCR WITHIN 100 FEET OF A DOWNWARD EDGE OF A CCR CUT SLOPE FACE STEEPER THAN 10H:1V, THE STRENGTH OF IN PLACE CCR MATERIALS SHOULD BE EVALUATED BY CONE PENETRATION TEST (CPT) SOUNDINGS OR OTHER APPROVED DEEP ELEVATION METHODS APPROVED BY THE ENGINEER AND USED TO VERIFY ACCESS PLANS AND TO MODIFY PLANS BASED ON THE OBSERVED CONDITIONS IF NECESSARY.
C. THE DEPTH TO THE WATER TABLE MAY BE VERIFIED BY CPT SOUNDINGS, OR VIBRATING WIRE PIEZOMETER (VWP) READINGS, AND/OR HAND AUGER OR TEST PIT OBSERVATIONS FOR SHALLOW CONDITIONS, OR OTHER METHODS APPROVED BY THE ENGINEER.

2. PLANS SHALL BE SUBMITTED TO THE OWNER AND ENGINEER PRIOR TO APPLICABLE CCR CONSTRUCTION ACTIVITIES. PLANS SHALL INCLUDE TYPE AND WEIGHT OF EQUIPMENT, PROPOSED USE OF VIBRATION, ETC. ALL PLANS SHALL BE BASED ON THE MEASURED AND VERIFIED SHEAR STRENGTH OF THE CCR, THE DEPTH TO THE WATER TABLE, AND THE APPLIED BEARING PRESSURE OF THE PROPOSED PIECES OF EQUIPMENT.
3. DURING DEWATERING OF DREDGED EXCAVATION SLOPES, THE RATE OF DRAWDOWN SHALL BE MAINTAINED AT LESS THAN 1 FOOT PER DAY FOR UNLINED CCR CUT AREAS, OR AN ENGINEERED PLAN FOR RAPID DRAWDOWN MUST BE SUBMITTED TO THE ENGINEER FOR REVIEW.
4. PRIOR TO DEWATERING AND PRIOR TO THE CCR MATERIAL ACHIEVING THE MINIMUM STRENGTHS DESCRIBED BELOW, ALL NON-AMPHIBIOUS EQUIPMENT MUST REMAIN A MINIMUM OF 100-FT AWAY FROM THE CREST OF ANY EXCAVATION SLOPE (MECHANICAL OR DREDGED).
5. IN PLACE CCR SHALL EXHIBIT A MINIMUM SHEAR STRENGTH RATIO (SU/S'V0) OF 0.22 WITH A MINIMUM UNDRAINED SHEAR STRENGTH (SU) OF 200 PSF AT THE SURFACE (AT ZERO EFFECTIVE NORMAL STRESS). THE DEPTH TO THE WATER TABLE REQUIRED TO HELP ACHIEVE THESE MINIMUM STRENGTHS MAY VARY BASED ON THE LOCALLY ENCOUNTERED CCR MATERIALS AND CONDITIONS. IF OBSERVED STRENGTHS ARE DIFFERENT FROM THOSE LISTED, ACCESS AND WORK PLANS SHOULD BE ADJUSTED ACCORDINGLY.
6. THE FOLLOWING BASELINE EXCAVATION AND ACCESS CRITERIA SHALL APPLY FOR ALL CCR EXCAVATIONS:

A. TEMPORARY CCR EXCAVATION SLOPES (DREDGED OR MECHANICAL) SHALL BE 4H:1V OR SHALLOWER.
B. CCR CUT EXCAVATIONS TALLER THAN 30 VERTICAL FEET SHALL INCLUDE BENCHES AT A MINIMUM OF EVERY 30 VERTICAL FEET.
C. THE FOLLOWING GROUNDWATER CONDITIONS MUST BE MET BEFORE MECHANICAL EQUIPMENT MAY ACCESS AND PERFORM WORK NEAR TO CCR CUT SLOPES, AND PRIOR TO CONTINUATION TO THE NEXT PHASE OF EXCAVATION (THAT IS - CONSTRUCTION OF THE NEXT LOWER BENCH):

i. THE WATER TABLE, AS MEASURED VERTICALLY AT A DISTANCE BETWEEN 50 AND 100 FT BEHIND THE UPPERMOST EXCAVATION CREST, MUST BE DRAWDOWN TO A MINIMUM OF 20-FEET BELOW THE CREST OF THE EXCAVATION.
ii. THE WATER TABLE, AS MEASURED AT THE TOE OF EACH SLOPE INCREMENT (AS MEASURED AT ANY POINT ALONG THE BENCH), MUST BE A MINIMUM OF 10-FEET BELOW THE TOE OF THE SLOPE INCREMENT. THIS CRITERIA INDICATES NO MECHANICAL WORK SHALL TAKE PLACE ON TEMPORARY CCR CUT SLOPES UNTIL WATER LEVELS ARE LOWERED TO MORE THAN 10 FEET BELOW THE BOTTOM OF EACH PROGRESSIVE BENCH UNLESS AN ENGINEERED WORK PLAN IS PROVIDED AND APPROVED.
iii. PRIOR TO MECHANICAL EQUIPMENT ACCESS AND WORK ON EACH SUBSEQUENT SLOPE INCREMENT AND BENCH, THE GROUND WATER LEVELS IN THE SLOPE MUST PROGRESS TO MEET THE MINIMUM REQUIREMENTS DESCRIBED ABOVE (I.E. 20 FEET BELOW THE TOP OF SLOPE / BENCH ELEVATION AND 10 FEET BELOW THE BOTTOM OF SLOPE/BENCH ELEVATION.
iv. ONCE NATIVE GROUND IS REACHED (BELOW THE FINAL BENCH OF A PARTICULAR CUT SLOPE), THE GROUNDWATER TABLE WITHIN NATIVE GROUND SHOULD BE CONTROLLED TO A MINIMUM DEPTH OF 2-FEET BELOW THE TOE OF THE CCR EXCAVATION SLOPE.

D. THE GROUNDWATER CONDITIONS DESCRIBED ABOVE SHALL BE MAINTAINED AT ALL TIMES BOTH DURING AND AFTER EXCAVATION. IT IS ANTICIPATED THAT ACTIVE DEWATERING WILL BE REQUIRED TO MEET THIS SLOPE STABILITY WATER LEVEL PERFORMANCE CRITERIA.
E. IF AREAS BECOME FLOODED / INUNDATED BEYOND THE WATER LEVEL PERFORMANCE CRITERIA LISTED HEREIN (OR IN AN APPROVED ENGINEERED PLAN) WORK SHALL BE STOPPED IN AN AREA UNTIL CONDITIONS RETURN TO THE PRESCRIBED LEVELS. SUCH RECOVERY DEWATERING ACTIVITIES SHOULD BE CONTROLLED SO AS TO NOT CAUSE RAPID DRAWDOWN INSTABILITY.
F. GROUNDWATER ELEVATIONS SHALL BE ACTIVELY MONITORED BY VIBRATING WIRE PIEZOMETER FOR ALL EXCAVATIONS, BEFORE, DURING, AND AFTER COMPLETION OF THE EXCAVATION, UNTIL SUCH TIME THAT THE EXCAVATION IS BUTTRESSED / ARMORED TO FINAL CONDITIONS AND/OR CONDITIONS EVALUATED BY A PROFESSIONAL ENGINEER TO BE STABLE.

LEGEND - CALLOUTS

A / C-200
SECTION IDENTIFYING NAME
DRAWING NUMBER WHERE SECTION IS SHOWN
SECTION ALIGNMENT LOCATION

SECTION REFERENCE ON DRAWING WHERE SECTION IS CALLED OUT

7 / R-400
DETAIL IDENTIFYING NUMBER
DRAWING NUMBER WHERE DETAIL IS SHOWN

DETAIL REFERENCE ON DRAWING WHERE SECTION IS CALLED OUT

2 / C-222 — TITLE / N.T.S.
DETAIL IDENTIFYING NUMBER
DETAIL TITLE
N.T.S. (NOT TO SCALE) OR GRAPHIC SCALE
DRAWING NUMBER WHERE DETAIL IS SHOWN

DETAIL NUMBER AND TITLE ON DRAWING WHERE DETAIL IS SHOWN

LEGEND - SECTIONS

- FINAL COVER FILL
- ARTICULATED CONCRETE BLOCK
- ALDOT STONE DRAINAGE LAYER
- GEOCOMPOSITE
- TEXTURED LINER
- HYDROTURF
- CLOSURE TURF NO INFILL
- TURF REINFORCEMENT MATTING
- GEOTEXTILE
- ALDOT RIP-RAP
- ROCK FILL SHELL
- CONCRETE SAND
- TRANSITION MATERIAL
- PRE-CLOSURE WATER
- EXISTING CCR TO REMAIN
- PROPOSED CCR CUT
- PROPOSED CCR FILL
- PROPOSED NON CCR CUT
- PROPOSED NON CCR COMMON FILL
- PROPOSED NON CCR STRUCTURAL FILL
- EXISTING NATURAL GROUND

LEGEND - PLANS

- 340 — EXISTING TOPOGRAPHY / BATHYMETRY CONTOURS
- 500 — PROPOSED CLOSURE COVER GRADING CONTOURS
- 340 — PROPOSED GRADING CONTOURS OUTSIDE CLOSURE LIMITS
- 340 — ESTIMATED BOTTOM OF CCR CONTOURS
- ESTIMATED MINE SPOIL AREA FOOTPRINT
- EXISTING ROAD
- EXISTING TRAIL
- EXISTING PARKING AREA
- EXISTING EDGE OF WATER
- EXISTING POWER POLES / TOWERS
- APC OWNED PROPERTY BOUNDARIES
- APPROXIMATE APC OWNED PROPERTY BOUNDARIES
- ESTIMATED PRE-CLOSURE FACILITY BOUNDARY
- EXCAVATION LINE AT BOTTOM OF EXISTING CCR
- EXCAVATION LINE AT TOP OF EXISTING CCR
- LIMITS OF CLOSURE FOOTPRINT
- POST-CLOSURE CCR LIMITS
- STREAMS PROVIDED BY CAHABA CONSULTING, LLC
- G-4 — EXISTING MONITORING WELL LOCATION (NOT IN MODELING NETWORK)
- GS-AP-PZ-18 — EXISTING PIEZOMETER LOCATION
- GS-AP-MW-01 — EXISTING MONITORING WELL LOCATION
- GS-AP-MW-05 — ABANDONED MONITORING WELL
- POST-CLOSURE 100 YR. POOL ELEVATION LIMITS
- ON CAP ACCESS ROAD
- EXISTING TRANSMISSION CORRIDOR
- AREA OF NON CCR CLOSURE GRADING
- CONCRETE LINED SPILLWAY
- CORRIDOR - ARTICULATED CONCRETE BLOCK (ACB)
- DECK CHANNEL RIP-RAP
- DOWNSLOPE CHANNEL, HYDROTURF
- BENCH - TURF REINFORCEMENT MAT (TRM)
- ALDOT RIP-RAP
- NORMAL POOL ELEVATION
- TEMPORARY LINER AREA
- PROPOSED 6" AND 8" (2) CS PIPE ROUTE
- PROPOSED 6" AND 8" CS PIPE ROUTE
- PROPOSED 8" CS PIPE ROUTE
- PROPOSED 10" HDPE PIPE ROUTE
- PROPOSED 8" & 10" HDPE PIPE ROUTE
- JW-02 — PROPOSED PIPELINE JUNCTION
- SW-02 — PROPOSED PIPELINE SPIGOT
- PROPOSED PIPE CROSSINGS
- PROPOSED PIPELINE VALVE
- (P) — PROPOSED WATER PUMP
- PROPOSED PUMPED WATER LINE
- P1 / F1 — PENINSULA / FINGER IDENTIFICATION NUMBER

REV	DATE	REVISION DESCRIPTION	DES	CADD	CHK	RVW
0	2020/10/16	ISSUED FOR CONSTRUCTION	GLH	CRP	SCN	GLH

CLIENT
SOUTHERN COMPANY SERVICES
Alabama Power

PROJECT
PLANT GORGAS
ASH POND CLOSURE
100% DESIGN DRAWINGS

TITLE
GENERAL NOTES

ALABAMA LICENSED No. 29143 PROFESSIONAL ENGINEER GREGORY L. HEBELER 16-OCT-2020
GREGORY L. HEBELER
ALABAMA PROFESSIONAL ENGINEER
CERTIFICATE NUMBER 29143

CONSULTANT
GOLDER

YYYY-MM-DD	2020/10/16
DESIGNED	GLH
PREPARED	CRP
CHECKED	SCN
REVIEWED / APPROVED	GLH

PROJECT NO. 1789848 | SCS REF. GOR17010 | REV. 0 | DRAWING G-101

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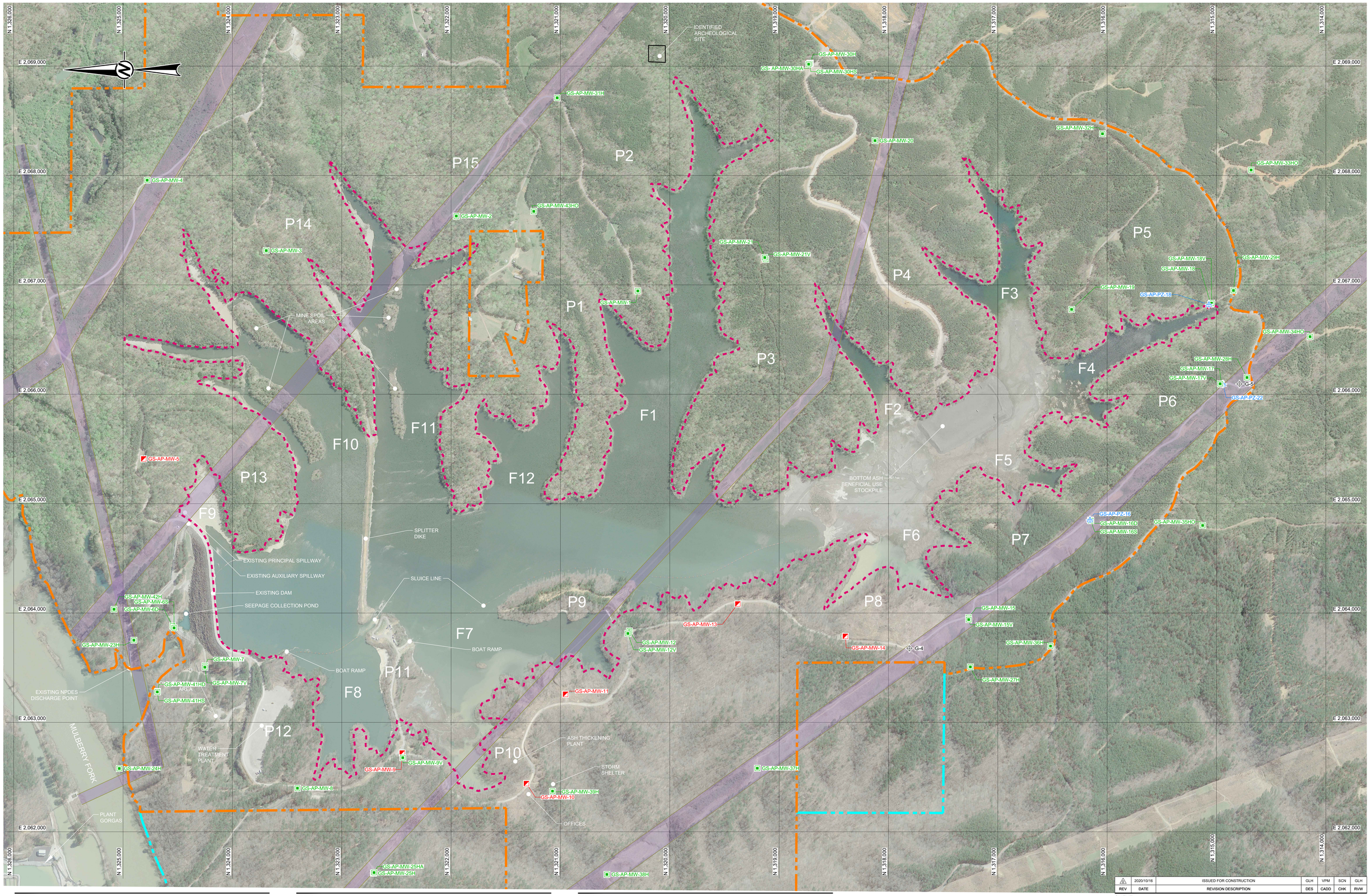

LEGEND

- APC OWNED PROPERTY BOUNDARIES
- APPROXIMATE APC OWNED PROPERTY BOUNDARIES
- ESTIMATED PRE-CLOSURE FACILITY BOUNDARY
- EXISTING TRANSMISSION CORRIDOR
- P1 — PENINSULA
- F1 — FINGER
- G-4 — EXISTING MONITORING WELL LOCATION (NOT IN MODELING NETWORK)
- GS-AP-PZ-18 — EXISTING PIEZOMETER LOCATION
- GS-AP-MW-01 — EXISTING MONITORING WELL LOCATION
- GS-AP-MW-05 — ABANDONED MONITORING WELL

NOTES

1. COORDINATES CORRESPOND TO ALABAMA WEST STATE PLANE COORDINATE SYSTEM, NORTH AMERICAN DATUM (NAD) 1983.

REFERENCES

1. EXISTING AND APPROXIMATE PROPERTY BOUNDARIES PROVIDED BY SOUTHERN COMPANY SERVICES, APRIL 2020.

© 2018 Google™
Source: Google Earth Pro 2018
IMAGE DATED: APRIL 2018 / MARCH 2019
SUPPLIED BY AND SOURCED UNDER LICENCE FROM GOOGLE EARTH PRO ON : 10/10/2019
IMAGE GEOREFERENCED BY GOLDER AND INTENDED FOR INDICATIVE PURPOSES ONLY

0 300 600
1" = 300' FEET

REV	DATE	REVISION DESCRIPTION	DES	CADD	CHK	RVW
1	2020/10/16	ISSUED FOR CONSTRUCTION	GLH	VPM	SCN	GLH

CLIENT
SOUTHERN COMPANY SERVICES

Alabama Power

PROJECT
PLANT GORGAS
ASH POND CLOSURE
DESIGN DRAWINGS

TITLE
PRE-CLOSURE CONDITIONS PLAN - AERIAL

ALABAMA LICENSED PROFESSIONAL ENGINEER GREGORY L. HEBELER No. 29143 16 OCT 2020

GREGORY L. HEBELER
ALABAMA PROFESSIONAL ENGINEER
CERTIFICATE NUMBER 29143

CONSULTANT
GOLDER

YYYY-MM-DD	2020/10/16
DESIGNED	GLH
PREPARED	VPM
CHECKED	SCN
REVIEWED / APPROVED	GLH

PROJECT NO. 1789848 | SCS REF. GOR17010 | REV. 0 | DRAWING G-200

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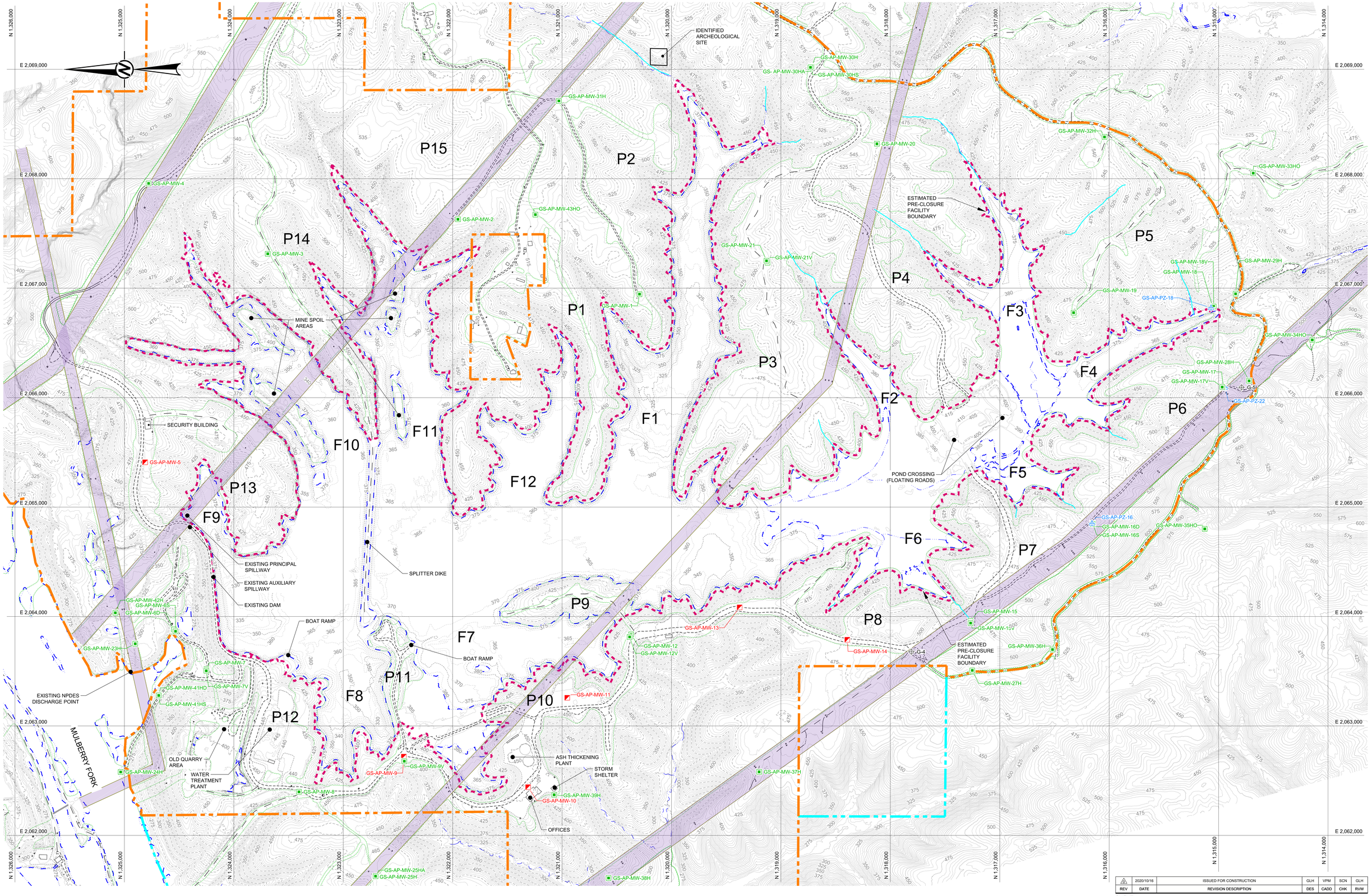

LEGEND

- EXISTING TOPOGRAPHY / BATHYMETRY CONTOURS (REFERENCE 1 & 2) — 340
- EXISTING ROAD
- EXISTING TRAIL
- EXISTING PARKING AREA
- EXISTING EDGE OF WATER
- EXISTING POWER POLES / TOWERS
- EXISTING TREE LINE
- APC OWNED PROPERTY BOUNDARIES
- APPROXIMATE APC OWNED PROPERTY BOUNDARIES
- ESTIMATED PRE-CLOSURE FACILITY BOUNDARY
- EXISTING TRANSMISSION CORRIDOR

- P1 — PENINSULA
- F1 — FINGER
- G-4 — EXISTING MONITORING WELL LOCATION (NOT IN MODELING NETWORK)
- GS-AP-PZ-18 — EXISTING PIEZOMETER LOCATION
- GS-AP-MW-01 — EXISTING MONITORING WELL LOCATION
- GS-AP-MW-05 — ABANDONED MONITORING WELL
- STREAMS BY CAHABA CONSULTING INC.

NOTES

1. ELEVATIONS ARE IN FEET WITH REFERENCE TO THE NORTH AMERICAN VERTICAL DATUM (NAVD) 1988. COORDINATES CORRESPOND TO ALABAMA WEST STATE PLANE COORDINATE SYSTEM, NORTH AMERICAN DATUM (NAD) 1983.

2. CONTOUR INTERVAL IS 5 FEET.

REFERENCES

1. EXISTING TOPOGRAPHY PROVIDED BY SOUTHERN COMPANY SERVICES, FEBRUARY 2020.

2. BATHYMETRIC SURFACE IS A COMPOSITE OF THE FEBRUARY 2020 SOUTHERN COMPANY AND THE JANUARY 2020 ARCSURVEY BATHYMETRIC SURVEYS TIED TO INTERPRETED SECTIONS OF THE 2016 SOUTHERN COMPANY BATHYMETRIC SURVEY WHERE SURVEY DATA IS NOT AVAILABLE.

3. EXISTING AND APPROXIMATE PROPERTY BOUNDARIES PROVIDED BY SOUTHERN COMPANY SERVICES, APRIL 2020.

0 300 600
1" = 300' FEET

REV	DATE	REVISION DESCRIPTION	DES	CADD	CHK	RVW
0	2020/10/16	ISSUED FOR CONSTRUCTION	GLH	VPM	SCN	GLH

CLIENT
SOUTHERN COMPANY SERVICES

Alabama Power

PROJECT
PLANT GORGAS
ASH POND CLOSURE
DESIGN DRAWINGS

TITLE
PRE-CLOSURE CONDITIONS PLAN TOPOGRAPHY AND BATHYMETRY

ALABAMA LICENSED No. 29143 PROFESSIONAL ENGINEER GREGORY L. HEBELER
16 OCT 2020

GREGORY L. HEBELER
ALABAMA PROFESSIONAL ENGINEER
CERTIFICATE NUMBER 29143

CONSULTANT
GOLDER

YYYY-MM-DD	2020/10/16
DESIGNED	GLH
PREPARED	VPM
CHECKED	SCN
REVIEWED / APPROVED	GLH

PROJECT NO.	SCS REF.	REV.	DRAWING
1789848	GOR17010	0	G-201

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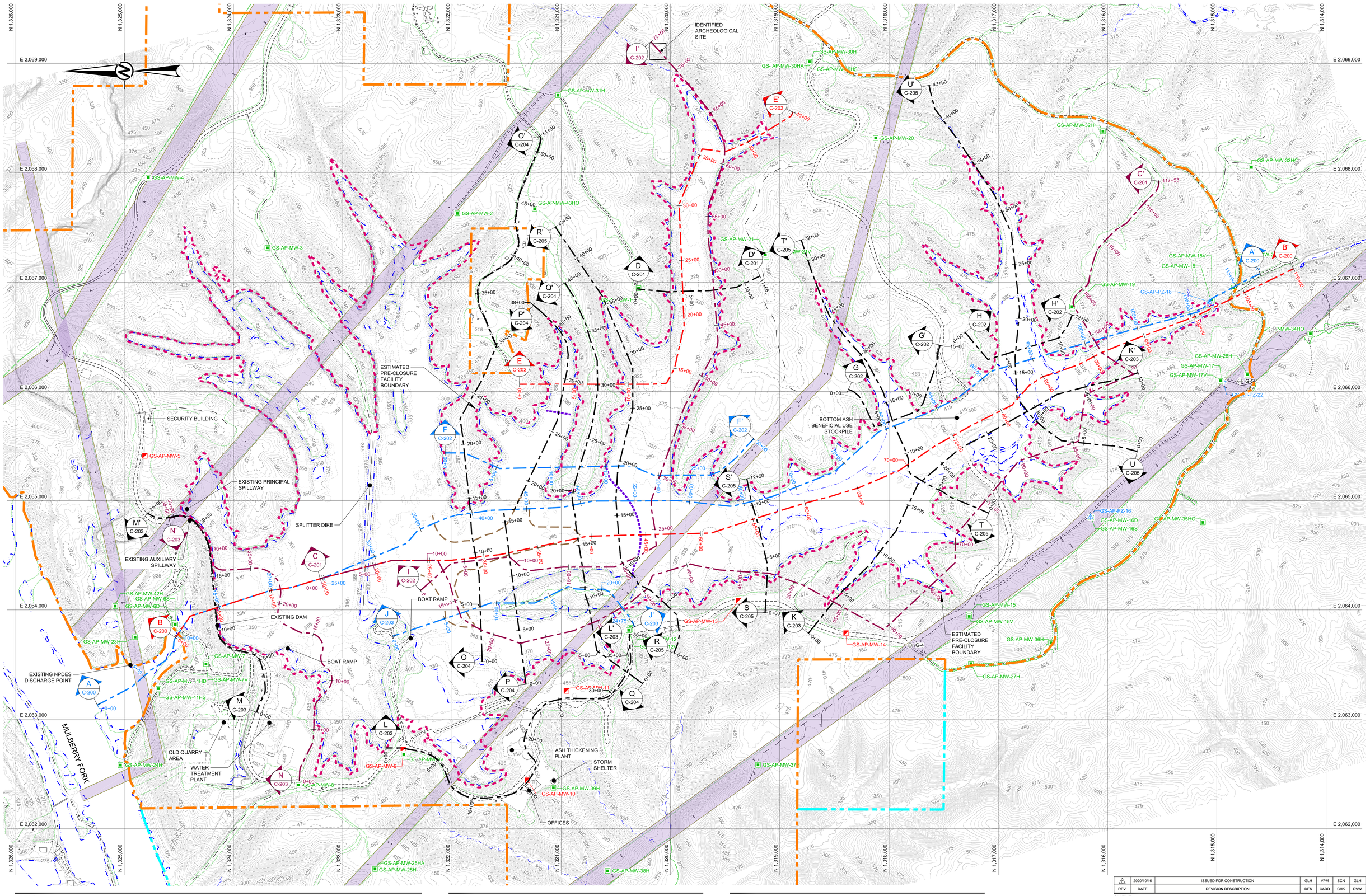

LEGEND

- EXISTING TOPOGRAPHY / BATHYMETRY CONTOURS (REFERENCE 1 & 2)
- EXISTING ROAD
- EXISTING TRAIL
- EXISTING PARKING AREA
- EXISTING EDGE OF WATER
- EXISTING POWER POLES / TOWERS
- EXISTING TREE LINE
- APC OWNED PROPERTY BOUNDARIES
- APPROXIMATE APC OWNED PROPERTY BOUNDARIES
- ESTIMATED PRE-CLOSURE FACILITY BOUNDARY
- EXISTING TRANSMISSION CORRIDOR
- EXCAVATION LINE AT BOTTOM OF EXISTING CCR
- EXCAVATION LINE AT TOP OF EXISTING CCR
- G-4 — EXISTING MONITORING WELL LOCATION (NOT IN MODELING NETWORK)
- GS-AP-PZ-18 — EXISTING PIEZOMETER LOCATION
- GS-AP-MW-01 — EXISTING MONITORING WELL LOCATION
- GS-AP-MW-05 — ABANDONED MONITORING WELL

NOTES

1. ELEVATIONS ARE IN FEET WITH REFERENCE TO THE NORTH AMERICAN VERTICAL DATUM (NAVD) 1988. COORDINATES CORRESPOND TO ALABAMA WEST STATE PLANE COORDINATE SYSTEM, NORTH AMERICAN DATUM (NAD) 1983.
2. CONTOUR INTERVAL IS 5 FEET.

REFERENCES

1. EXISTING TOPOGRAPHY PROVIDED BY SOUTHERN COMPANY SERVICES, FEBRUARY 2020.
2. BATHYMETRIC SURFACE IS A COMPOSITE OF THE FEBRUARY 2020 SOUTHERN COMPANY AND THE JANUARY 2020 ARCSURVEY BATHYMETRIC SURVEYS TIED TO INTERPRETED SECTIONS OF THE 2016 SOUTHERN COMPANY BATHYMETRIC SURVEY WHERE SURVEY DATA IS NOT AVAILABLE.
3. EXISTING AND APPROXIMATE PROPERTY BOUNDARIES PROVIDED BY SOUTHERN COMPANY SERVICES, APRIL 2020.

0 300 600
1" = 300' FEET

REV	DATE	REVISION DESCRIPTION	DES	CADD	CHK	RVW
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CLIENT
SOUTHERN COMPANY SERVICES

Alabama Power

PROJECT
PLANT GORGAS
ASH POND CLOSURE
DESIGN DRAWINGS

TITLE
PRE-CLOSURE CONDITIONS PLAN
TOPOGRAPHY AND BATHYMETRY WITH SECTIONS

ALABAMA LICENSED PROFESSIONAL ENGINEER No. 29143 16-OCT-2020 GREGORY L. HEBELER

GREGORY L. HEBELER
ALABAMA PROFESSIONAL ENGINEER
CERTIFICATE NUMBER 29143

CONSULTANT
GOLDER

YYYY-MM-DD	2020/10/16
DESIGNED	GLH
PREPARED	VPM
CHECKED	SCN
REVIEWED / APPROVED	GLH

PROJECT NO. 1789848 | SCS REF. GOR17010 | REV. 0 | DRAWING G-202

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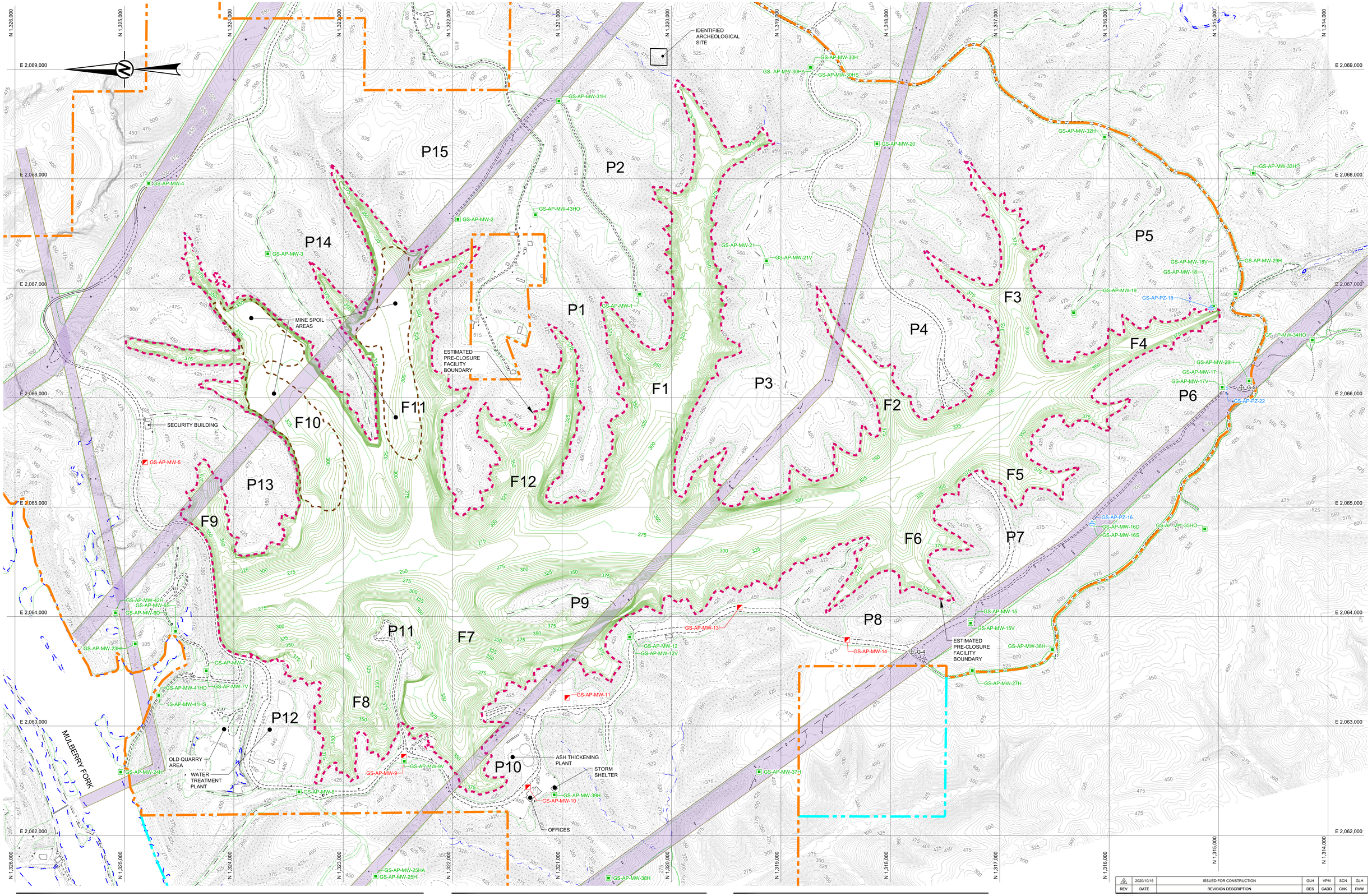

LEGEND

- EXISTING TOPOGRAPHY / BATHYMETRY CONTOURS (REFERENCE 1)
- ESTIMATED BOTTOM OF CCR CONTOURS (REFERENCE 2)
- ESTIMATED MINE SPOIL AREA FOOTPRINT
- EXISTING ROAD
- EXISTING TRAIL
- EXISTING PARKING AREA
- EXISTING EDGE OF WATER
- EXISTING POWER POLES / TOWERS
- EXISTING TREE LINE
- APC OWNED PROPERTY BOUNDARIES
- APPROXIMATE APC OWNED PROPERTY BOUNDARIES
- ESTIMATED PRE-CLOSURE FACILITY BOUNDARY
- EXISTING TRANSMISSION CORRIDOR

- P1 — PENINSULA
- F1 — FINGER
- G-4 — EXISTING MONITORING WELL LOCATION (NOT IN MODELING NETWORK)
- GS-AP-PZ-18 — EXISTING PIEZOMETER LOCATION
- GS-AP-MW-01 — EXISTING MONITORING WELL LOCATION
- GS-AP-MW-05 — ABANDONED MONITORING WELL

NOTES

1. ELEVATIONS ARE IN FEET WITH REFERENCE TO NORTH AMERICAN VERTICAL DATUM (NAVD) 1988. COORDINATES CORRESPOND TO ALABAMA WEST STATE PLANE COORDINATE SYSTEM, NORTH AMERICAN DATUM (NAD) 1983.

2. CONTOUR INTERVAL IS 5 FEET.

REFERENCES

1. EXISTING TOPOGRAPHY PROVIDED BY SOUTHERN COMPANY SERVICES, FEBRUARY 2020.

2. BOTTOM OF CCR TOPOGRAPHY TAKEN FROM USGS, PORT BIRMINGHAM, 1938 AND GOODSPINGS, 1971 QUADRANGLES. TOPOGRAPHY WAS INTERPRETED BETWEEN 20 FOOT CONTOURS AND ADJUSTED BASED ON GEOTECHNICAL INVESTIGATION DATA BY GOLDER ASSOCIATES INC.

3. EXISTING AND APPROXIMATE PROPERTY BOUNDARIES PROVIDED BY SOUTHERN COMPANY SERVICES, APRIL 2020.

0 300 600
1" = 300' FEET

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CLIENT
SOUTHERN COMPANY SERVICES

Alabama Power

PROJECT
PLANT GORGAS
ASH POND CLOSURE
DESIGN DRAWINGS

TITLE
ESTIMATED BOTTOM OF CCR PLAN

ALABAMA LICENSED PROFESSIONAL ENGINEER GREGORY L. HEBELER No. 29143 16 OCT 2020

GREGORY L. HEBELER
ALABAMA PROFESSIONAL ENGINEER
CERTIFICATE NUMBER 29143

CONSULTANT
GOLDER

YYYY-MM-DD	2020/10/16
DESIGNED	GLH
PREPARED	VPM
CHECKED	SCN
REVIEWED / APPROVED	GLH

PROJECT NO. 1789848 | SCS REF. GOR17010 | REV. 0 | DRAWING G-203

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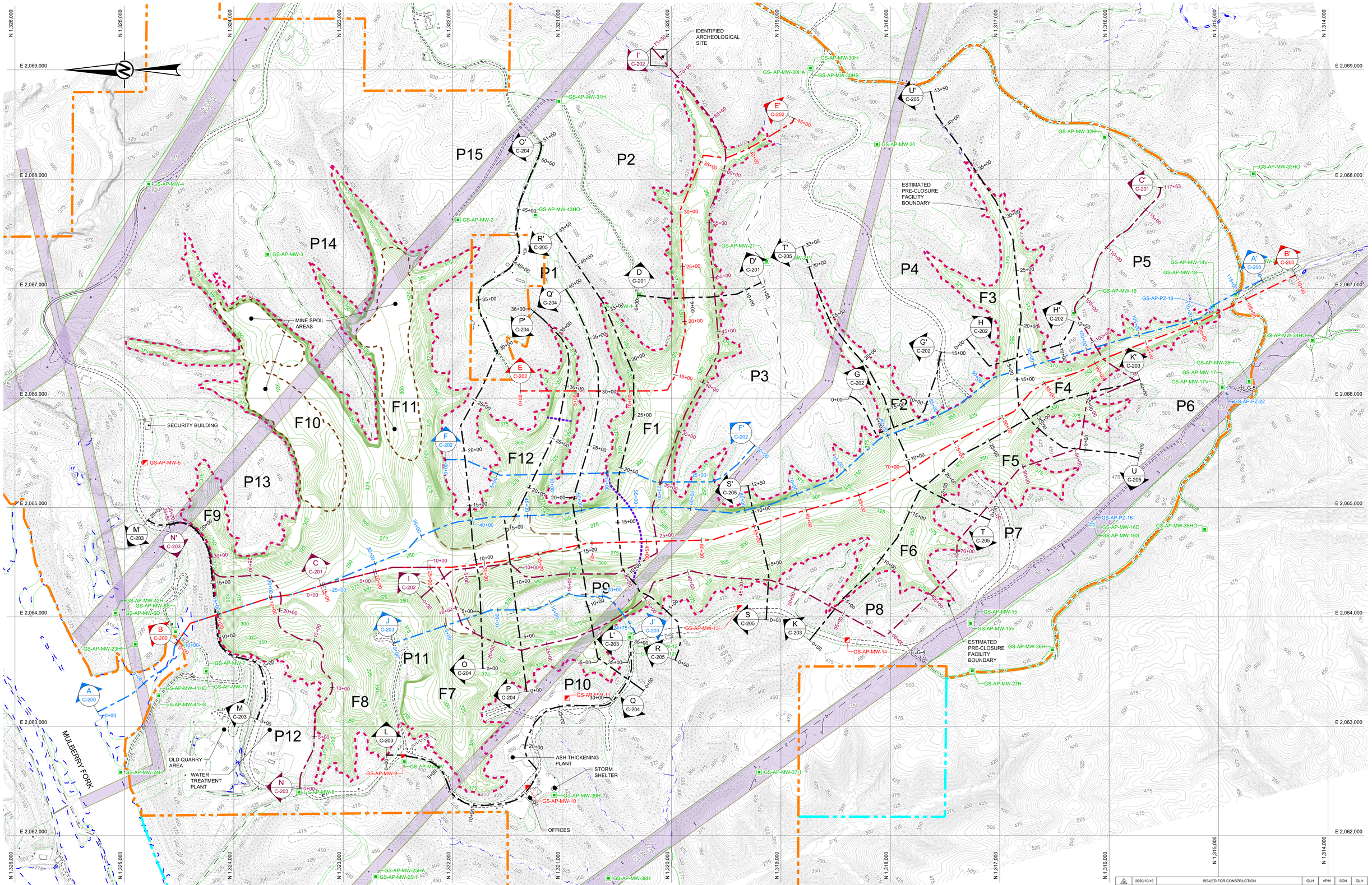

LEGEND

- EXISTING TOPOGRAPHY / BATHYMETRY CONTOURS (REFERENCE 1)
- ESTIMATED BOTTOM OF CCR CONTOURS (REFERENCE 2)
- ESTIMATED MINE SPOIL AREA FOOTPRINT
- EXISTING ROAD
- EXISTING TRAIL
- EXISTING PARKING AREA
- EXISTING EDGE OF WATER
- EXISTING POWER POLES / TOWERS
- EXISTING TREE LINE
- APC OWNED PROPERTY BOUNDARIES
- APPROXIMATE APC OWNED PROPERTY BOUNDARIES
- ESTIMATED PRE-CLOSURE FACILITY BOUNDARY
- EXISTING TRANSMISSION CORRIDOR
- EXCAVATION LINE AT BOTTOM OF EXISTING CCR
- EXCAVATION LINE AT TOP OF EXISTING CCR

- P1 — PENINSULA
- F1 — FINGER
- G-4 — EXISTING MONITORING WELL LOCATION (NOT IN MODELING NETWORK)
- GS-AP-PZ-18 — EXISTING PIEZOMETER LOCATION
- GS-AP-MW-01 — EXISTING MONITORING WELL LOCATION
- GS-AP-MW-05 — ABANDONED MONITORING WELL

NOTES

1. ELEVATIONS ARE IN FEET WITH REFERENCE TO THE NORTH AMERICAN VERTICAL DATUM (NAVD) 1988. COORDINATES CORRESPOND TO ALABAMA WEST COORDINATE SYSTEM, NORTH AMERICAN DATUM (NAD) 1983.

2. CONTOUR INTERVAL IS 5 FEET.

REFERENCES

1. EXISTING TOPOGRAPHY PROVIDED BY SOUTHERN COMPANY SERVICES, FEBRUARY 2020.

2. BOTTOM OF CCR TOPOGRAPHY TAKEN FROM USGS, PORT BIRMINGHAM, 1938 AND GOODSPINGS, 1971 QUADRANGLES. TOPOGRAPHY WAS INTERPRETED BETWEEN 20 FOOT CONTOURS AND ADJUSTED BASED ON GEOTECHNICAL INVESTIGATION DATA BY GOLDER ASSOCIATES INC.

3. EXISTING AND APPROXIMATE PROPERTY BOUNDARIES PROVIDED BY SOUTHERN COMPANY SERVICES, APRIL 2020.

0 300 600
1" = 300' FEET

REV	DATE	REVISION DESCRIPTION	DES	CADD	CHK	RVW
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CLIENT
SOUTHERN COMPANY SERVICES

Alabama Power

PROJECT
PLANT GORGAS
ASH POND CLOSURE
DESIGN DRAWINGS

TITLE
ESTIMATED BOTTOM OF CCR PLAN WITH SECTIONS

ALABAMA LICENSED PROFESSIONAL ENGINEER No. 29143 GREGORY L. HEBELER 16 OCT 2020

GREGORY L. HEBELER
ALABAMA PROFESSIONAL ENGINEER
CERTIFICATE NUMBER 29143

CONSULTANT
GOLDER

YYYY-MM-DD	2020/10/16
DESIGNED	GLH
PREPARED	VPM
CHECKED	SCN
REVIEWED / APPROVED	GLH

PROJECT NO. 1789848 | SCS REF. GOR17010 | REV. 0 | DRAWING G-204

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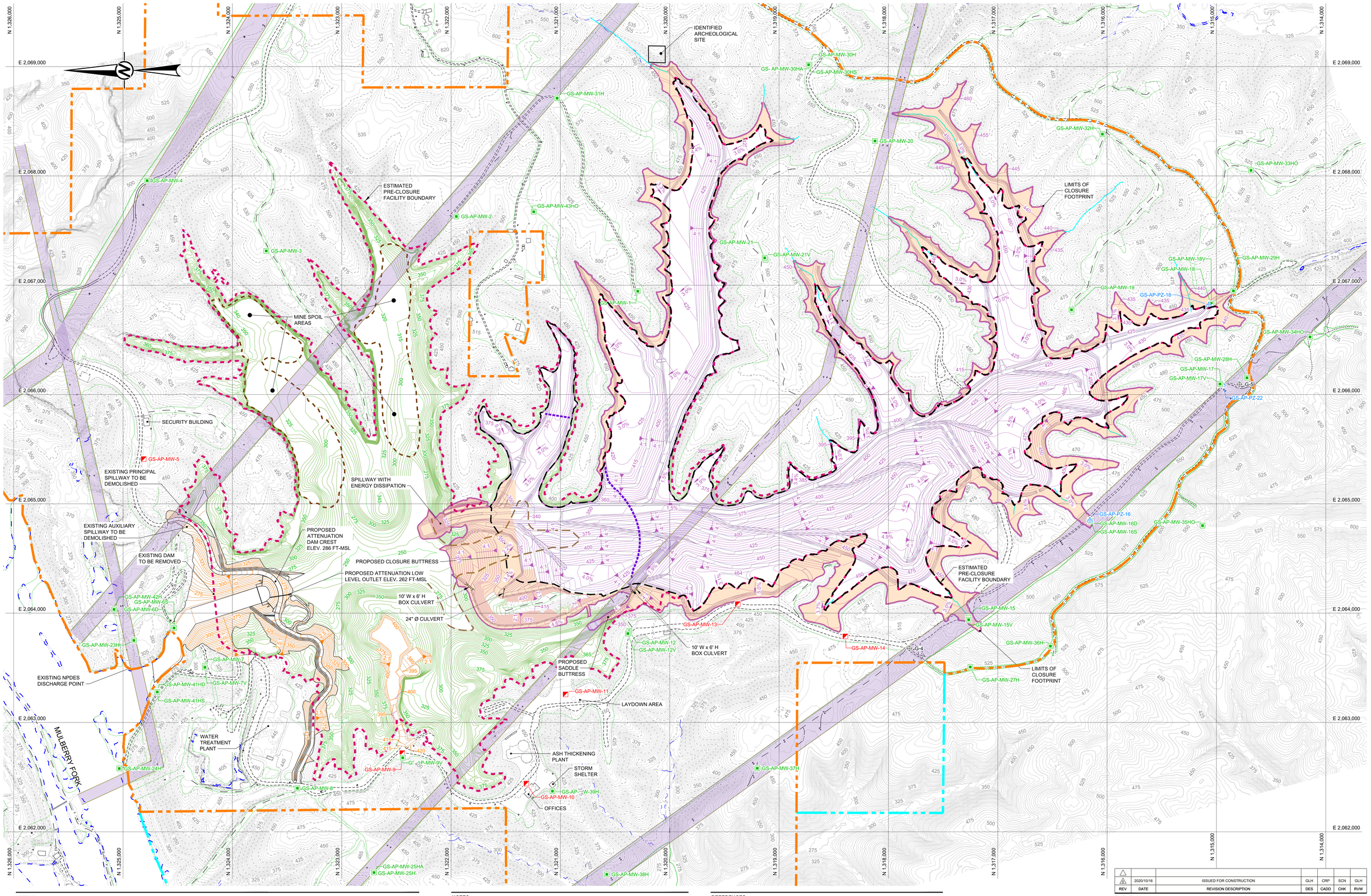

LEGEND

- EXISTING TOPOGRAPHY / BATHYMETRY CONTOURS (REFERENCE 1)
- PROPOSED CLOSURE COVER GRADING CONTOURS
- PROPOSED GRADING CONTOURS OUTSIDE CLOSURE LIMITS
- ESTIMATED BOTTOM OF CCR CONTOURS (REFERENCE 2)
- ESTIMATED MINE SPOIL AREA FOOTPRINT
- EXISTING ROAD
- EXISTING TRAIL
- EXISTING PARKING AREA
- EXISTING EDGE OF WATER
- EXISTING POWER POLES / TOWERS
- APC OWNED PROPERTY BOUNDARIES
- APPROXIMATE APC OWNED PROPERTY BOUNDARIES
- ESTIMATED PRE-CLOSURE FACILITY BOUNDARY
- EXISTING TRANSMISSION CORRIDOR
- AREA OF NON-CCR CLOSURE GRADING
- EXCAVATION LINE AT BOTTOM OF EXISTING CCR
- EXCAVATION LINE AT TOP OF EXISTING CCR
- LIMITS OF CLOSURE FOOTPRINT
- POST-CLOSURE CCR LIMITS
- STREAMS PROVIDED BY CAHABA CONSULTING, LLC
- G-4 — EXISTING MONITORING WELL LOCATION (NOT IN MODELING NETWORK)
- GS-AP-PZ-18 — EXISTING PIEZOMETER LOCATION
- GS-AP-MW-01 — EXISTING MONITORING WELL LOCATION
- GS-AP-MW-05 — ABANDONED MONITORING WELL

NOTES

1. ELEVATIONS ARE IN FEET WITH REFERENCE TO THE NORTH AMERICAN VERTICAL DATUM (NAVD) 1988. COORDINATES CORRESPOND TO ALABAMA WEST STATE PLANE COORDINATE SYSTEM, NORTH AMERICAN DATUM (NAD) 1983.

2. CONTOUR INTERVAL IS 5 FEET.

REFERENCES

1. EXISTING TOPOGRAPHY PROVIDED BY SOUTHERN COMPANY SERVICES, FEBRUARY 2020.

2. BOTTOM OF CCR TOPOGRAPHY TAKEN FROM USGS, PORT BIRMINGHAM, 1938 AND GOODSPINGS, 1971 QUADRANGLES. TOPOGRAPHY WAS INTERPRETED BETWEEN 20 FOOT CONTOURS AND ADJUSTED BASED ON GEOTECHNICAL INVESTIGATION DATA BY GOLDER ASSOCIATES INC.

3. EXISTING AND APPROXIMATE PROPERTY BOUNDARIES PROVIDED BY SOUTHERN COMPANY SERVICES, APRIL 2020.

0 300 600
1" = 300' FEET

REV	DATE	REVISION DESCRIPTION	DES	CADD	CHK	RVW
1	2020/10/16	ISSUED FOR CONSTRUCTION	GLH	CRP	SCN	GLH

CLIENT
SOUTHERN COMPANY SERVICES

Alabama Power

PROJECT
PLANT GORGAS
ASH POND CLOSURE
DESIGN DRAWINGS

TITLE
PROPOSED CLOSURE GRADING PLAN

ALABAMA LICENSED No. 29143 PROFESSIONAL ENGINEER GREGORY L. HEBELER
16 OCT 2020

GREGORY L. HEBELER
ALABAMA PROFESSIONAL ENGINEER
CERTIFICATE NUMBER 29143

CONSULTANT
GOLDER

YYYY-MM-DD	2020/10/16
DESIGNED	GLH
PREPARED	CRP
CHECKED	SCN
REVIEWED / APPROVED	GLH

PROJECT NO. 1789848 | SCS REF. GOR17010 | REV. 0 | DRAWING C-100

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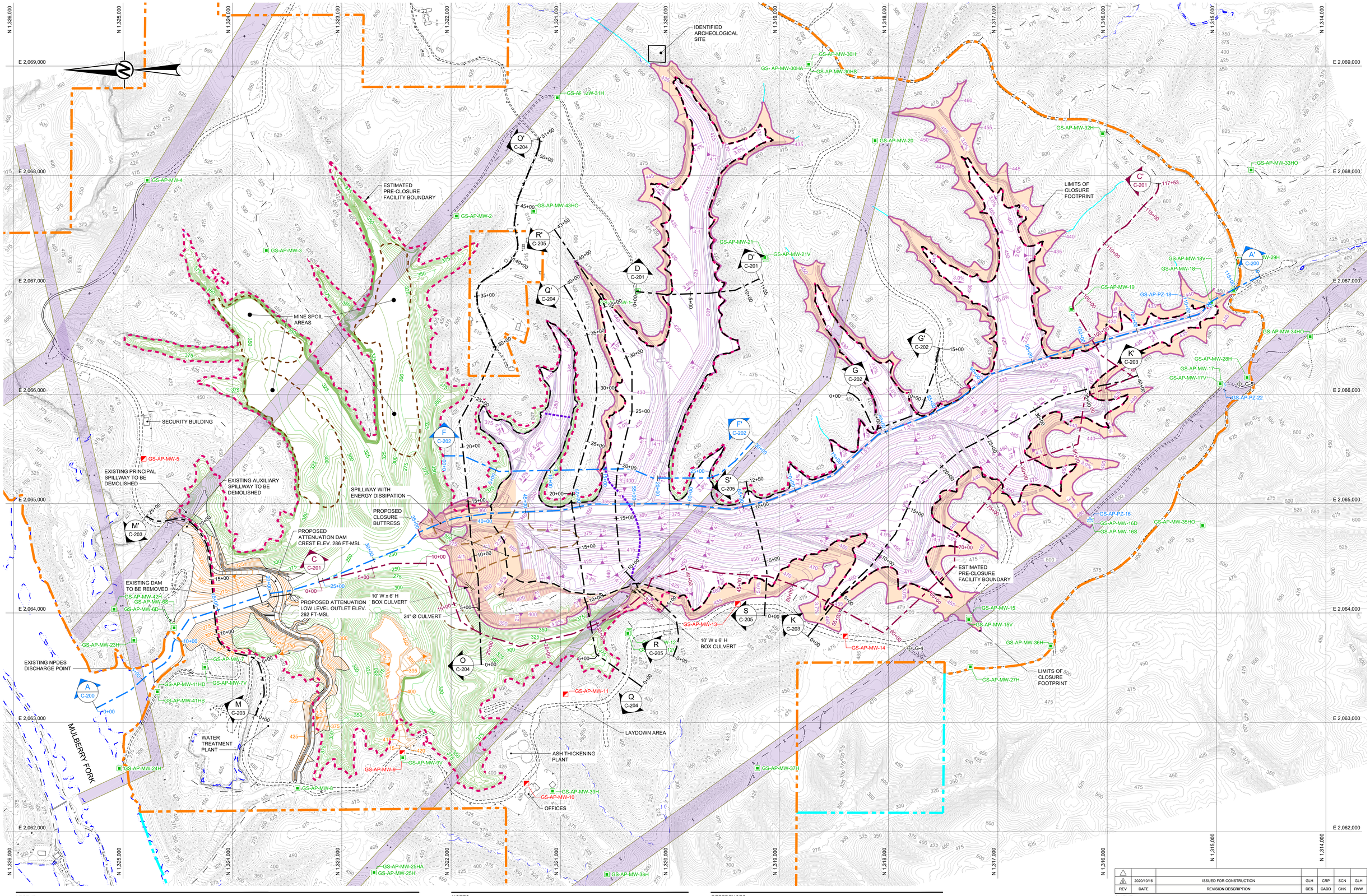

LEGEND

- EXISTING TOPOGRAPHY / BATHYMETRY CONTOURS (REFERENCE 1)
- PROPOSED CLOSURE COVER GRADING CONTOURS
- PROPOSED GRADING CONTOURS OUTSIDE CLOSURE LIMITS
- ESTIMATED BOTTOM OF CCR CONTOURS (REFERENCE 2)
- ESTIMATED MINE SPOIL AREA FOOTPRINT
- EXISTING ROAD
- EXISTING TRAIL
- EXISTING PARKING AREA
- EXISTING EDGE OF WATER
- EXISTING POWER POLES / TOWERS
- APC OWNED PROPERTY BOUNDARIES
- APPROXIMATE APC OWNED PROPERTY BOUNDARIES
- ESTIMATED PRE-CLOSURE FACILITY BOUNDARY
- EXISTING TRANSMISSION CORRIDOR
- AREA OF NON-CCR CLOSURE GRADING
- EXCAVATION LINE AT BOTTOM OF EXISTING CCR
- EXCAVATION LINE AT TOP OF EXISTING CCR
- LIMITS OF CLOSURE FOOTPRINT
- POST-CLOSURE CCR LIMITS
- STREAMS PROVIDED BY CAHABA CONSULTING, LLC
- EXISTING MONITORING WELL LOCATION (NOT IN MODELING NETWORK)
- EXISTING PIEZOMETER LOCATION
- EXISTING MONITORING WELL LOCATION
- ABANDONED MONITORING WELL

NOTES

1. ELEVATIONS ARE IN FEET WITH REFERENCE TO THE NORTH AMERICAN VERTICAL DATUM (NAVD) 1988. COORDINATES CORRESPOND TO ALABAMA WEST STATE PLANE COORDINATE SYSTEM, NORTH AMERICAN DATUM (NAD) 1983.
2. CONTOUR INTERVAL IS 5 FEET.

REFERENCES

1. EXISTING TOPOGRAPHY PROVIDED BY SOUTHERN COMPANY SERVICES, FEBRUARY 2020.
2. BOTTOM OF CCR TOPOGRAPHY TAKEN FROM USGS, PORT BIRMINGHAM, 1938 AND GOODSPINGS, 1971 QUADRANGLES. TOPOGRAPHY WAS INTERPRETED BETWEEN 20 FOOT CONTOURS AND ADJUSTED BASED ON GEOTECHNICAL INVESTIGATION DATA BY GOLDER ASSOCIATES INC.
3. EXISTING AND APPROXIMATE PROPERTY BOUNDARIES PROVIDED BY SOUTHERN COMPANY SERVICES, APRIL 2020.

0 300 600
1" = 300' FEET

REV	DATE	REVISION DESCRIPTION	DES	CADD	CHK	RVW
1	2020/10/16	ISSUED FOR CONSTRUCTION	GLH	CRP	SCN	GLH

CLIENT
SOUTHERN COMPANY SERVICES

Alabama Power

PROJECT
PLANT GORGAS
ASH POND CLOSURE
DESIGN DRAWINGS

TITLE
PROPOSED CLOSURE GRADING PLAN WITH SECTIONS SHEET 1

ALABAMA LICENSED No. 29143 PROFESSIONAL ENGINEER GREGORY L. HEBELER

GREGORY L. HEBELER
ALABAMA PROFESSIONAL ENGINEER
CERTIFICATE NUMBER 29143

CONSULTANT
GOLDER

YYYY-MM-DD	2020/10/16
DESIGNED	GLH
PREPARED	CRP
CHECKED	SCN
REVIEWED / APPROVED	GLH

PROJECT NO.	SCS REF.	REV.	DRAWING
1789848	GOR17010	0	C-101

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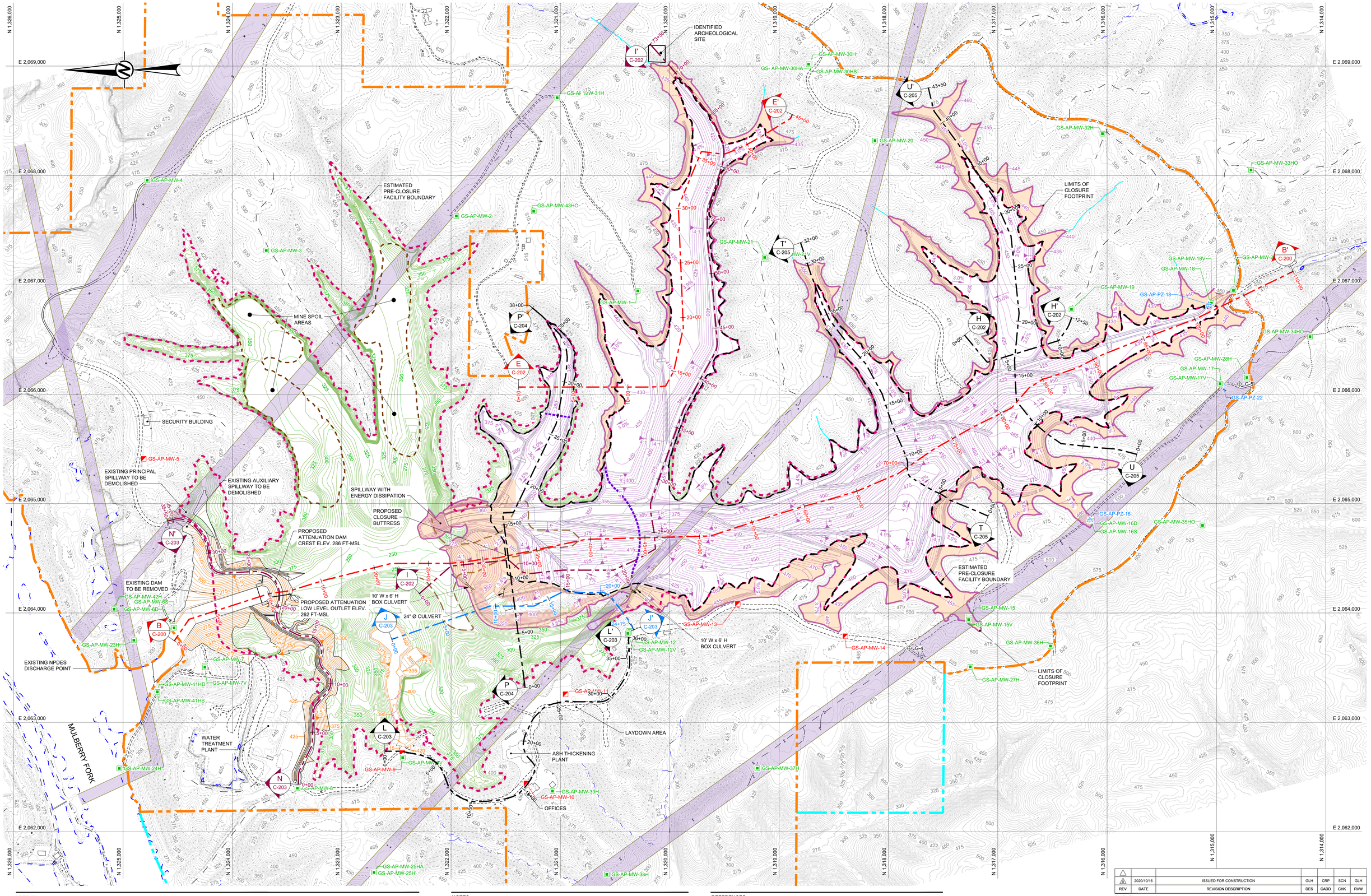

LEGEND

- EXISTING TOPOGRAPHY / BATHYMETRY CONTOURS (REFERENCE 1)
- PROPOSED CLOSURE COVER GRADING CONTOURS
- PROPOSED GRADING CONTOURS OUTSIDE CLOSURE LIMITS
- ESTIMATED BOTTOM OF CCR CONTOURS (REFERENCE 2)
- ESTIMATED MINE SPOIL AREA FOOTPRINT
- EXISTING ROAD
- EXISTING TRAIL
- EXISTING PARKING AREA
- EXISTING EDGE OF WATER
- EXISTING POWER POLES / TOWERS
- APC OWNED PROPERTY BOUNDARIES
- APPROXIMATE APC OWNED PROPERTY BOUNDARIES
- ESTIMATED PRE-CLOSURE FACILITY BOUNDARY
- EXISTING TRANSMISSION CORRIDOR
- AREA OF NON-CCR CLOSURE GRADING
- EXCAVATION LINE AT BOTTOM OF EXISTING CCR
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- LIMITS OF CLOSURE FOOTPRINT
- POST-CLOSURE CCR LIMITS
- STREAMS PROVIDED BY CAHABA CONSULTING, LLC
- G-4 — EXISTING MONITORING WELL LOCATION (NOT IN MODELING NETWORK)
- GS-AP-PZ-18 — EXISTING PIEZOMETER LOCATION
- GS-AP-MW-01 — EXISTING MONITORING WELL LOCATION
- GS-AP-MW-05 — ABANDONED MONITORING WELL

NOTES

1. ELEVATIONS ARE IN FEET WITH REFERENCE TO THE NORTH AMERICAN VERTICAL DATUM (NAVD) 1988. COORDINATES CORRESPOND TO ALABAMA WEST STATE PLANE COORDINATE SYSTEM, NORTH AMERICAN DATUM (NAD) 1983.

2. CONTOUR INTERVAL IS 5 FEET.

REFERENCES

1. EXISTING TOPOGRAPHY PROVIDED BY SOUTHERN COMPANY SERVICES, FEBRUARY 2020.

2. BOTTOM OF CCR TOPOGRAPHY TAKEN FROM USGS, PORT BIRMINGHAM, 1938 AND GOODSPINGS, 1971 QUADRANGLES. TOPOGRAPHY WAS INTERPRETED BETWEEN 20 FOOT CONTOURS AND ADJUSTED BASED ON GEOTECHNICAL INVESTIGATION DATA BY GOLDER ASSOCIATES INC.

3. EXISTING AND APPROXIMATE PROPERTY BOUNDARIES PROVIDED BY SOUTHERN COMPANY SERVICES, APRIL 2020.

0 300 600
1" = 300' FEET

REV	DATE	REVISION DESCRIPTION	DES	CADD	CHK	RVW
1	2020/10/16	ISSUED FOR CONSTRUCTION	GLH	CRP	SCN	GLH

CLIENT
SOUTHERN COMPANY SERVICES

Alabama Power

PROJECT
PLANT GORGAS
ASH POND CLOSURE
DESIGN DRAWINGS

TITLE
PROPOSED CLOSURE GRADING PLAN WITH SECTIONS SHEET 2

ALABAMA LICENSED No. 29143 PROFESSIONAL ENGINEER GREGORY L. HEBELER
16 OCT 2020

GREGORY L. HEBELER
ALABAMA PROFESSIONAL ENGINEER
CERTIFICATE NUMBER 29143

CONSULTANT
GOLDER

YYYY-MM-DD	2020/10/16
DESIGNED	GLH
PREPARED	CRP
CHECKED	SCN
REVIEWED / APPROVED	GLH

PROJECT NO.	SCS REF.	REV.	DRAWING
1789848	GOR17010	0	C-102

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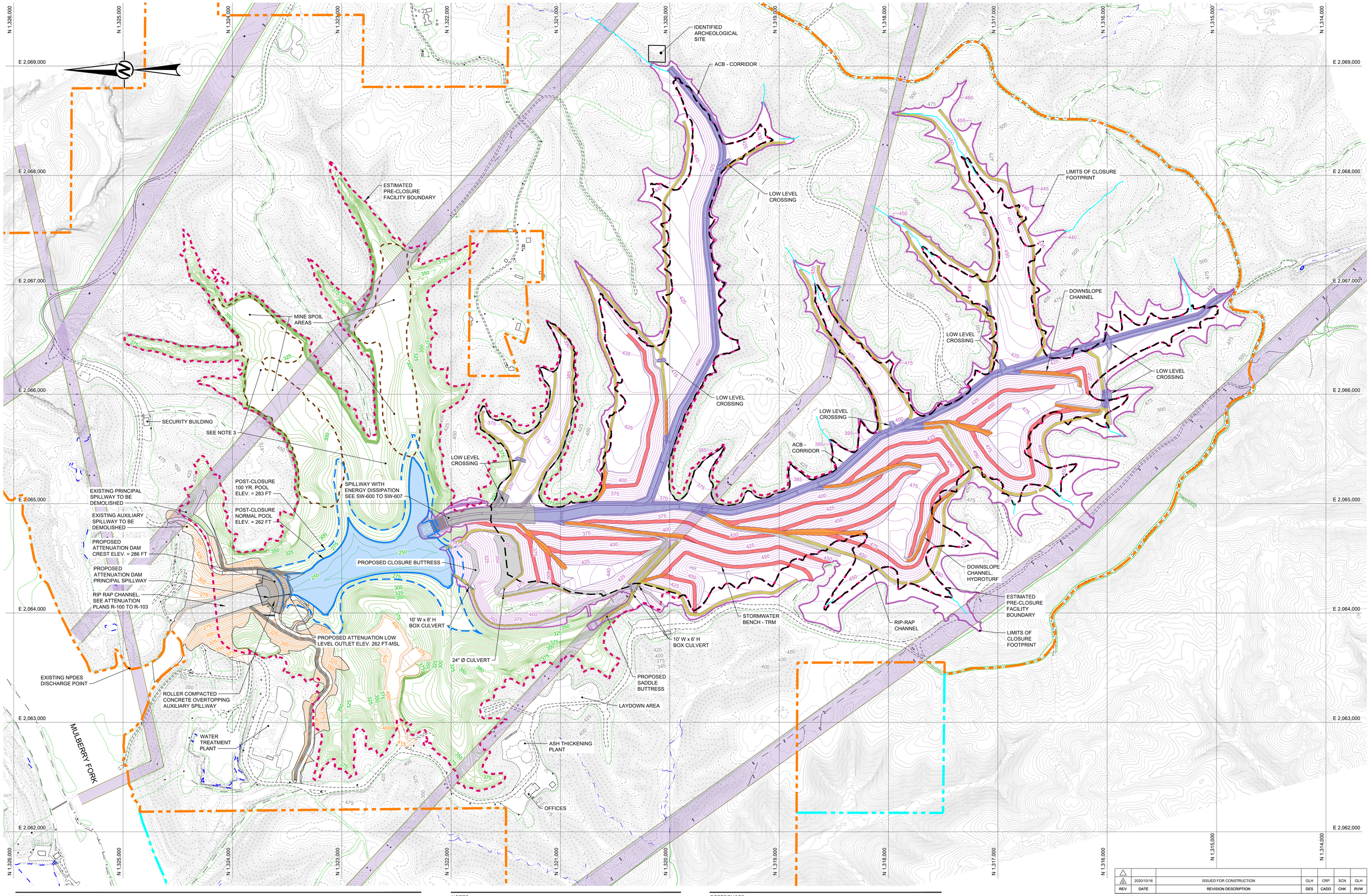

LEGEND

- EXISTING TOPOGRAPHY / BATHYMETRY CONTOURS (REFERENCE 1)
- PROPOSED CLOSURE COVER GRADING CONTOURS
- PROPOSED GRADING CONTOURS OUTSIDE CLOSURE LIMITS
- ESTIMATED BOTTOM OF CCR CONTOURS (REFERENCE 2)
- ESTIMATED MINE SPOIL AREA FOOTPRINT
- EXISTING ROAD
- EXISTING TRAIL
- EXISTING PARKING AREA
- EXISTING POWER POLES / TOWERS
- APC OWNED PROPERTY BOUNDARIES
- APPROXIMATE APC OWNED PROPERTY BOUNDARIES
- ESTIMATED PRE-CLOSURE FACILITY BOUNDARY
- EXISTING TRANSMISSION CORRIDOR
- LIMITS OF CLOSURE FOOTPRINT
- POST-CLOSURE CCR LIMITS
- STREAMS PROVIDED BY CAHABA CONSULTING, LLC
- POST-CLOSURE 100 YR. POOL ELEVATION LIMITS
- ON CAP ACCESS ROAD
- AREA OF NON-CCR CLOSURE GRADING
- CONCRETE LINED SPILLWAY
- CORRIDOR - ARTICULATED CONCRETE BLOCK (ACB)
- DECK CHANNEL RIP-RAP
- DOWNSLOPE CHANNEL, HYDROTURF
- BENCH - TURF REINFORCEMENT MAT (TRM)
- ALDOT RIP-RAP
- POST-CLOSURE NORMAL POOL ELEVATION = 262'

0 300 600
1" = 300' FEET

NOTES

1. ELEVATIONS ARE IN FEET WITH REFERENCE TO THE NORTH AMERICAN VERTICAL DATUM (NAVD) OF 1988. COORDINATES CORRESPOND TO THE ALABAMA WEST STATE PLANE COORDINATE SYSTEM, NORTH AMERICAN DATUM (NAD) 1983.

2. CONTOUR INTERVAL IS 5 FEET.

3. POST CLOSURE GRADES IN CLOSURE BY REMOVAL RESTORATION AREAS ARE NOT FINAL, WITH RESTORATION DESIGN TO FOLLOW LATER IN CLOSURE DESIGN PROCESS.

REFERENCES

1. EXISTING TOPOGRAPHY PROVIDED BY SOUTHERN COMPANY SERVICES, FEBRUARY 2020.

2. BATHYMETRIC SURFACE IS A COMPOSITE OF THE FEBRUARY 2020 SOUTHERN COMPANY AND THE JANUARY 2020 ARCSURVEY BATHYMETRIC SURVEYS TIED TO INTERPRETED SECTIONS OF THE 2016 SOUTHERN COMPANY BATHYMETRIC SURVEY WHERE SURVEY DATA IS NOT AVAILABLE.

3. BOTTOM OF CCR TOPOGRAPHY TAKEN FROM USGS, PORT BIRMINGHAM, 1938 AND GOODSPINGS, 1971 QUADRANGLES. TOPOGRAPHY WAS INTERPRETED BETWEEN 20 FOOT CONTOURS AND ADJUSTED BASED ON GEOTECHNICAL INVESTIGATION DATA BY GOLDER ASSOCIATES INC.

4. EXISTING AND APPROXIMATE PROPERTY BOUNDARIES PROVIDED BY SOUTHERN COMPANY SERVICES, APRIL 2020.

REV	DATE	REVISION DESCRIPTION	DES	CADD	CHK	RVW
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0	2020/10/16	ISSUED FOR CONSTRUCTION	GLH	CRP	SCN	GLH

CLIENT
SOUTHERN COMPANY SERVICES

Alabama Power

PROJECT
PLANT GORGAS
ASH POND CLOSURE
DESIGN DRAWINGS

TITLE
SURFACE WATER MANAGEMENT AND CHANNEL ARMORING PLAN

ALABAMA LICENSED PROFESSIONAL ENGINEER GREGORY L. HEBELER No. 29143 16 OCT 2020

GREGORY L. HEBELER
ALABAMA PROFESSIONAL ENGINEER
CERTIFICATE NUMBER 29143

CONSULTANT
GOLDER

YYYY-MM-DD	2020/10/16
DESIGNED	GLH
PREPARED	CRP
CHECKED	SCN
REVIEWED / APPROVED	GLH

PROJECT NO.	SCS REF.	REV.	DRAWING
1789848	GOR17010	0	C-103

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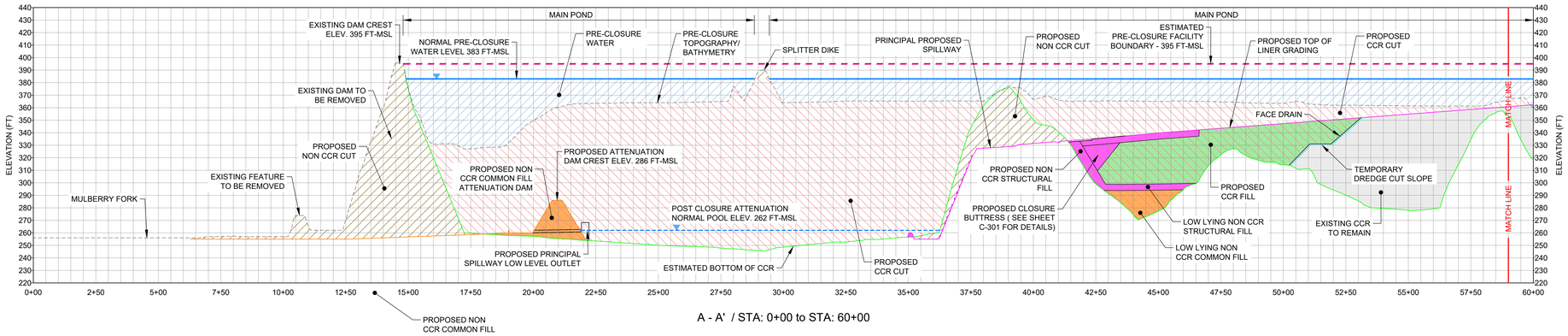
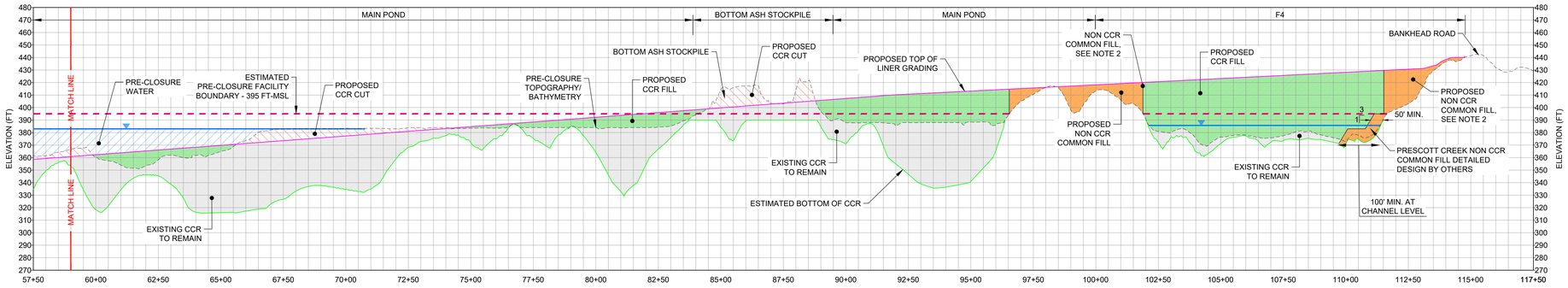
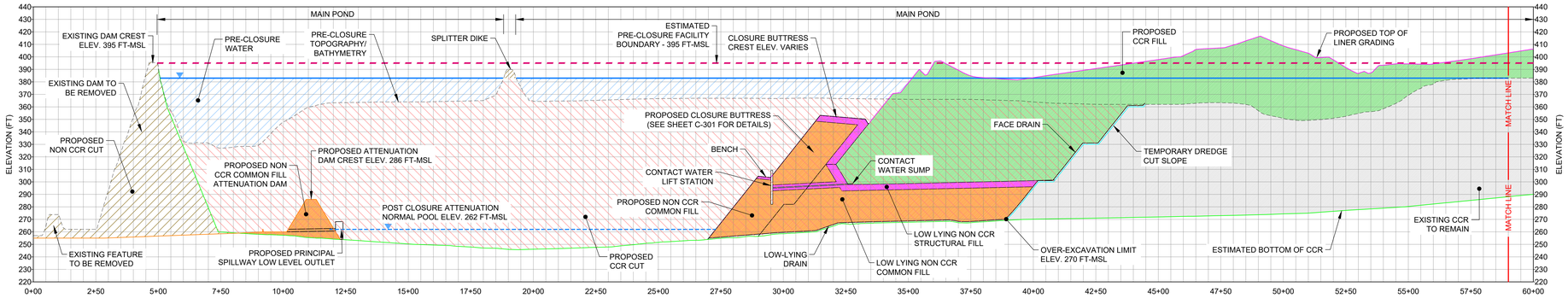


A - A' / STA: 0+00 to STA: 60+00



A - A' / STA: 57+50 to STA: 117+50



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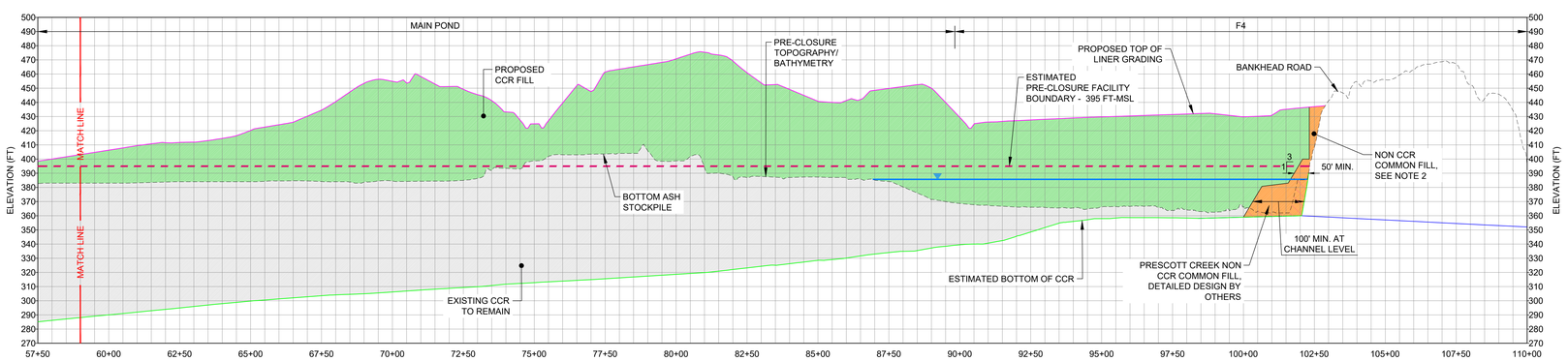
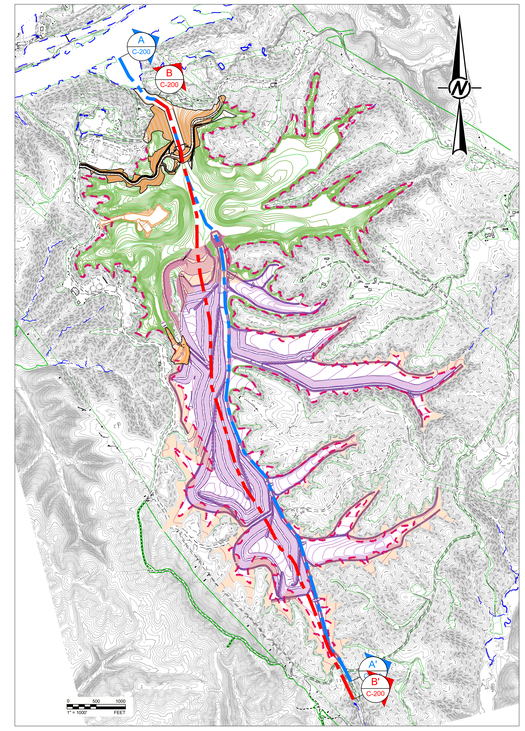


B - B' / STA: 57+50 to STA: 110+00



KEY MAP

LEGEND

- NORMAL PRE-CLOSURE WATER LEVEL
- PROPOSED TOP OF LINER GRADING
- PRE-CLOSURE TOPOGRAPHY AND BATHYMETRY (REFERENCE 1 & 2)
- ESTIMATED BOTTOM OF CCR (REFERENCE 3)
- TEMPORARY DREDGE CUT SLOPE
- ESTIMATED PRE-CLOSURE FACILITY BOUNDARY
- PROPOSED GRADING OUTSIDE CLOSURE LIMITS
- POST CLOSURE ATTENUATION POND NORMAL POOL
- PRE-CLOSURE WATER
- EXISTING CCR TO REMAIN
- PROPOSED CCR CUT
- PROPOSED CCR FILL
- PROPOSED NON CCR CUT
- PROPOSED NON CCR COMMON FILL
- PROPOSED NON CCR STRUCTURAL FILL

NOTES

1. ELEVATIONS ARE IN FEET WITH REFERENCE TO THE NORTH AMERICAN VERTICAL DATUM (NAVD) OF 1988. COORDINATES CORRESPOND TO THE ALABAMA WEST STATE PLAN COORDINATE SYSTEM, NORTH AMERICAN DATUM (NAD) 1983.
2. FOR NON CCR FILL CONSTRUCTION SEQUENCE SEE DETAILS 8 OR 9, SHEET C-500.

REFERENCES

1. EXISTING TOPOGRAPHY PROVIDED BY SOUTHERN COMPANY SERVICES, FEBRUARY 2020.
2. BATHYMETRIC SURFACE IS A COMPOSITE OF THE FEBRUARY 2020 SOUTHERN COMPANY AND THE JANUARY 2020 ARCSURVEY BATHYMETRIC SURVEYS TIED TO INTERPRETED SECTIONS OF THE 2016 SOUTHERN COMPANY BATHYMETRIC SURVEY WHERE SURVEY DATA IS NOT AVAILABLE.
3. BOTTOM OF CCR TOPOGRAPHY TAKEN FROM USGS, PORT BIRMINGHAM, 1938 AND GOODSPINGS, 1971 QUADRANGLES. TOPOGRAPHY WAS INTERPRETED BETWEEN 20 FOOT CONTOURS AND ADJUSTED BASED ON GEOTECHNICAL INVESTIGATION DATA BY GOLDER ASSOCIATES INC.

0 200 400
1" = 200' FEET
HORIZONTAL SCALE

0 40 80
1" = 40' FEET
VERTICAL SCALE

REV	DATE	REVISION DESCRIPTION	DES	CADD	CHK	RVW
1						
0	2020/10/16	ISSUED FOR CONSTRUCTION	GLH	VPM	SCN	GLH

CLIENT
SOUTHERN COMPANY SERVICES

Alabama Power

PROJECT
PLANT GORGAS
ASH POND CLOSURE
DESIGN DRAWINGS

TITLE
SECTIONS AND PROFILES
SHEET 1

ALABAMA PROFESSIONAL ENGINEER LICENSED No. 29143 16 - OCT - 2020 GREGORY L. HEBELER

GREGORY L. HEBELER
ALABAMA PROFESSIONAL ENGINEER
CERTIFICATE NUMBER 29143

CONSULTANT
GOLDER

YYYY-MM-DD	2020/10/16
DESIGNED	GLH
PREPARED	VPM
CHECKED	SCN
REVIEWED / APPROVED	GLH

PROJECT NO. 1789848 | SCS REF. GOR17010 | REV. 0 | DRAWING C-200

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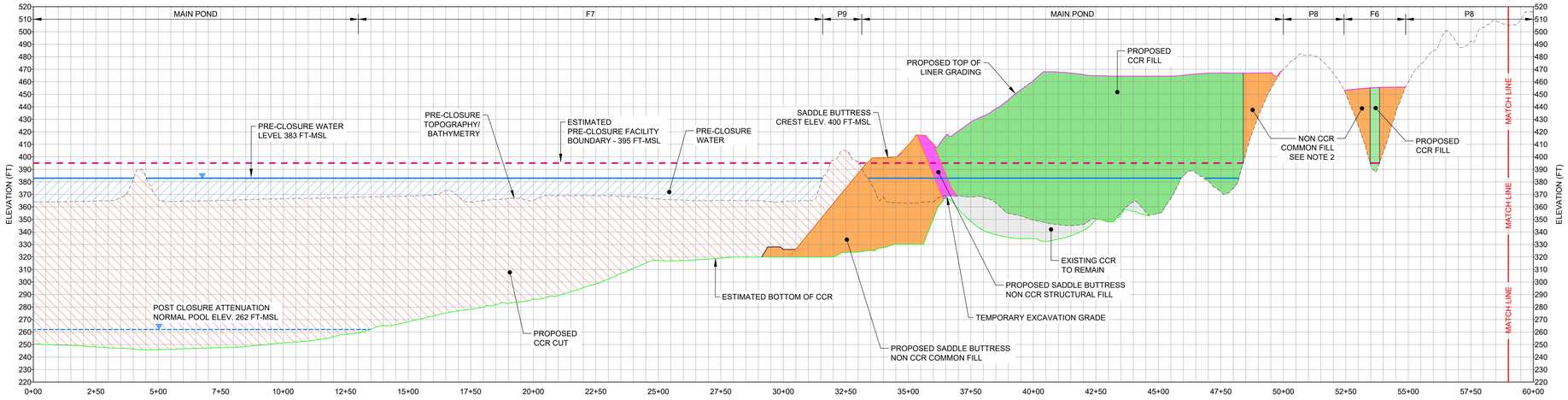
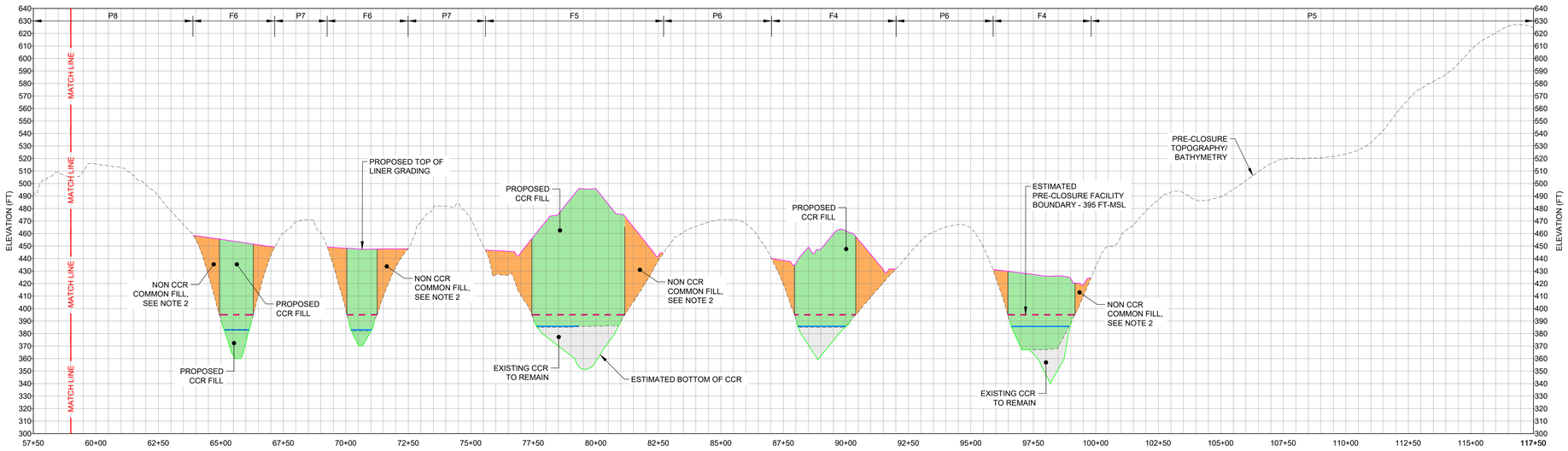
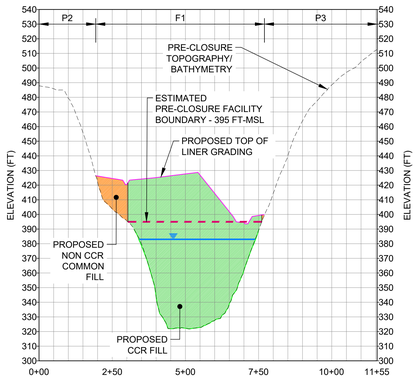


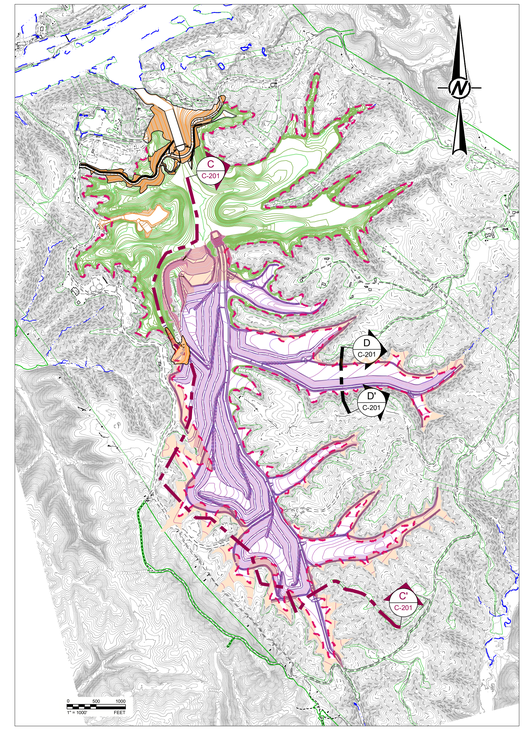
C - C' / STA: 0+00 to STA: 60+00



C - C' / STA: 57+50 to STA: 117+50



D - D' / STA: 0+00 to STA: 11+55



KEY MAP

LEGEND

- NORMAL PRE-CLOSURE WATER LEVEL
- PROPOSED TOP OF LINER GRADING
- PRE-CLOSURE TOPOGRAPHY AND BATHYMETRY (REFERENCE 1 & 2)
- ESTIMATED BOTTOM OF CCR (REFERENCE 3)
- TEMPORARY DREDGE CUT SLOPE
- ESTIMATED PRE-CLOSURE FACILITY BOUNDARY
- PROPOSED GRADING OUTSIDE CLOSURE LIMITS
- POST CLOSURE ATTENUATION POND NORMAL POOL
- PRE-CLOSURE WATER
- EXISTING CCR TO REMAIN
- PROPOSED CCR CUT
- PROPOSED CCR FILL
- PROPOSED NON CCR CUT
- PROPOSED NON CCR COMMON FILL
- PROPOSED NON CCR STRUCTURAL FILL

NOTES

1. ELEVATIONS ARE IN FEET WITH REFERENCE TO THE NORTH AMERICAN VERTICAL DATUM (NAVD) OF 1988. COORDINATES CORRESPOND TO THE ALABAMA WEST STATE PLAN COORDINATE SYSTEM, NORTH AMERICAN DATUM (NAD) 1983.

2. FOR NON CCR FILL CONSTRUCTION SEQUENCE SEE DETAILS 8 OR 9, SHEET C-500.

REFERENCES

1. EXISTING TOPOGRAPHY PROVIDED BY SOUTHERN COMPANY SERVICES, FEBRUARY 2020.

2. BATHYMETRIC SURFACE IS A COMPOSITE OF THE FEBRUARY 2020 SOUTHERN COMPANY AND THE JANUARY 2020 ARCSURVEY BATHYMETRIC SURVEYS TIED TO INTERPRETED SECTIONS OF THE 2016 SOUTHERN COMPANY BATHYMETRIC SURVEY WHERE SURVEY DATA IS NOT AVAILABLE.

3. BOTTOM OF CCR TOPOGRAPHY TAKEN FROM USGS, PORT BIRMINGHAM, 1938 AND GOODSPINGS, 1971 QUADRANGLES. TOPOGRAPHY WAS INTERPRETED BETWEEN 20 FOOT CONTOURS AND ADJUSTED BASED ON GEOTECHNICAL INVESTIGATION DATA BY GOLDER ASSOCIATES INC.

0 200 400
1" = 200' FEET
HORIZONTAL SCALE

0 40 80
1" = 40' FEET
VERTICAL SCALE

REV	DATE	REVISION DESCRIPTION	DES	CADD	CHK	RVW
1						
0	2020/10/16	ISSUED FOR CONSTRUCTION	GLH	VPM	SCN	GLH

CLIENT
SOUTHERN COMPANY SERVICES

Alabama Power

PROJECT
PLANT GORGAS
ASH POND CLOSURE
DESIGN DRAWINGS

TITLE
SECTIONS AND PROFILES
SHEET 2

ALABAMA LICENSED No. 29143 PROFESSIONAL ENGINEER GREGORY L. HEBELER
16 OCT 2020

GREGORY L. HEBELER
ALABAMA PROFESSIONAL ENGINEER
CERTIFICATE NUMBER 29143

CONSULTANT
GOLDER

YYYY-MM-DD	2020/10/16
DESIGNED	GLH
PREPARED	VPM
CHECKED	SCN
REVIEWED / APPROVED	GLH

PROJECT NO.	SCS REF.	REV.	DRAWING
1789848	GOR17010	0	C-201

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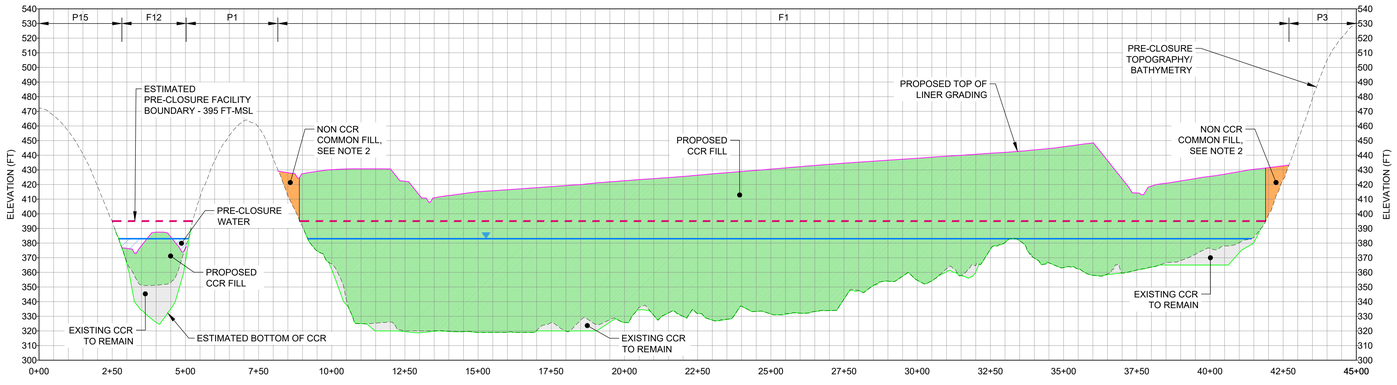
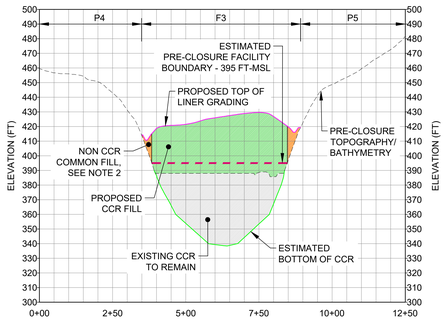
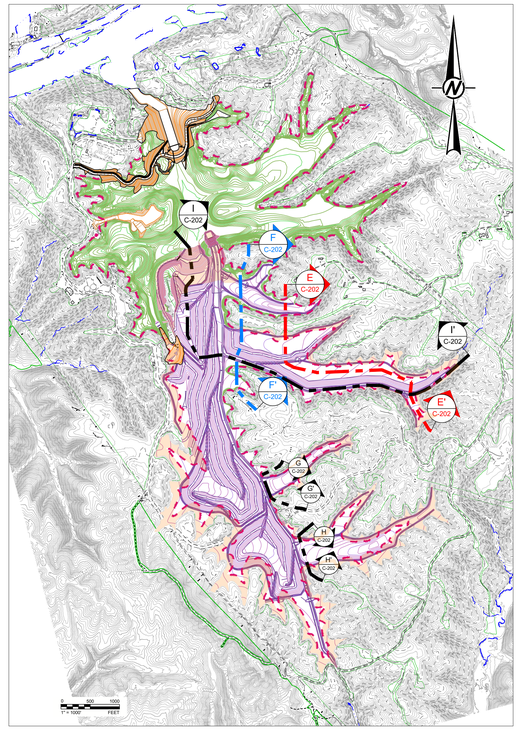


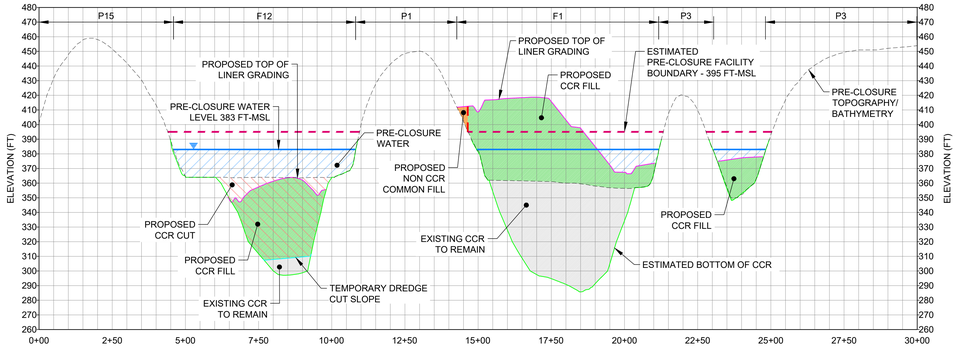
E - E' / STA: 0+00 to STA: 45+00



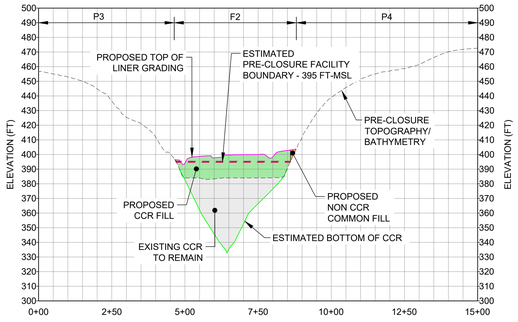
H - H' / STA: 0+00 to STA: 12+50



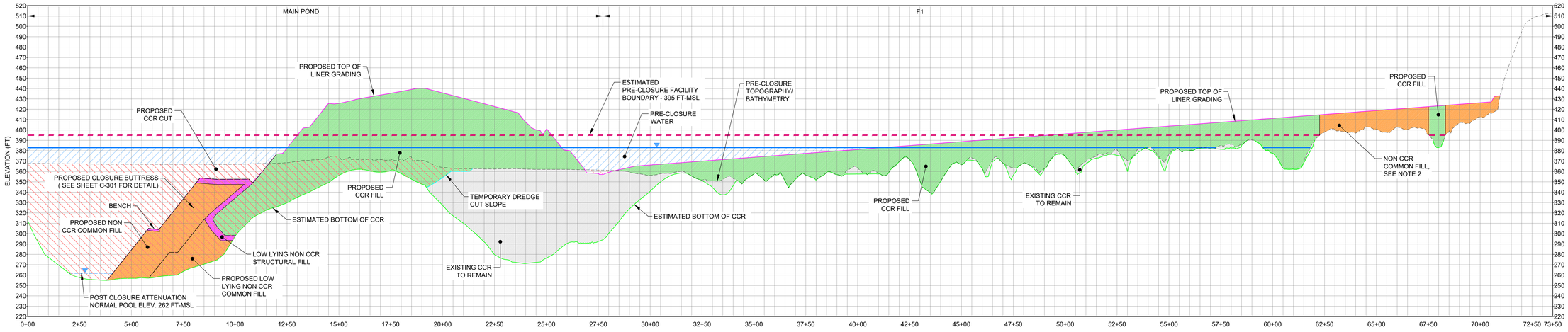
KEY MAP



F - F' / STA: 0+00 to STA: 30+00



G - G' / STA: 0+00 to STA: 15+00



I - I' / STA: 0+00 to STA: 73+50

LEGEND

- NORMAL PRE-CLOSURE WATER LEVEL
- PROPOSED TOP OF LINER GRADING
- PRE-CLOSURE TOPOGRAPHY AND BATHYMETRY (REFERENCE 1 & 2)
- ESTIMATED BOTTOM OF CCR (REFERENCE 3)
- TEMPORARY DREDGE CUT SLOPE
- ESTIMATED PRE-CLOSURE FACILITY BOUNDARY
- PROPOSED GRADING OUTSIDE CLOSURE LIMITS
- POST CLOSURE ATTENUATION POND NORMAL POOL
- PRE-CLOSURE WATER
- EXISTING CCR TO REMAIN
- PROPOSED CCR CUT
- PROPOSED CCR FILL
- PROPOSED NON CCR CUT
- PROPOSED NON CCR COMMON FILL
- PROPOSED NON CCR STRUCTURAL FILL

NOTES

1. ELEVATIONS ARE IN FEET WITH REFERENCE TO THE NORTH AMERICAN VERTICAL DATUM (NAVD) OF 1988. COORDINATES CORRESPOND TO THE ALABAMA WEST STATE PLAN COORDINATE SYSTEM, NORTH AMERICAN DATUM (NAD) 1983.

2. FOR NON CCR FILL CONSTRUCTION SEQUENCE SEE DETAILS 8 OR 9, SHEET C-500.

REFERENCES

1. EXISTING TOPOGRAPHY PROVIDED BY SOUTHERN COMPANY SERVICES, FEBRUARY 2020.

2. BATHYMETRIC SURFACE IS A COMPOSITE OF THE FEBRUARY 2020 SOUTHERN COMPANY AND THE JANUARY 2020 ARCSURVEY BATHYMETRIC SURVEYS TIED TO INTERPRETED SECTIONS OF THE 2016 SOUTHERN COMPANY BATHYMETRIC SURVEY WHERE SURVEY DATA IS NOT AVAILABLE.

3. BOTTOM OF CCR TOPOGRAPHY TAKEN FROM USGS, PORT BIRMINGHAM, 1938 AND GOODSPINGS, 1971 QUADRANGLES. TOPOGRAPHY WAS INTERPRETED BETWEEN 20 FOOT CONTOURS AND ADJUSTED BASED ON GEOTECHNICAL INVESTIGATION DATA BY GOLDER ASSOCIATES INC.

0 200 400
1" = 200' FEET
HORIZONTAL SCALE

0 40 80
1" = 40' FEET
VERTICAL SCALE

REV	DATE	REVISION DESCRIPTION	DES	CADD	CHK	RVW
1						
0	2020/10/16	ISSUED FOR CONSTRUCTION	GLH	VPM	SCN	GLH

CLIENT
SOUTHERN COMPANY SERVICES

Alabama Power

PROJECT
PLANT GORGAS
ASH POND CLOSURE
DESIGN DRAWINGS

TITLE
SECTIONS AND PROFILES SHEET 3

ALABAMA LICENSED PROFESSIONAL ENGINEER GREGORY L. HEBELER No. 29143
16 OCT 2020

GREGORY L. HEBELER
ALABAMA PROFESSIONAL ENGINEER
CERTIFICATE NUMBER 29143

CONSULTANT
GOLDER

YYYY-MM-DD	2020/10/16
DESIGNED	GLH
PREPARED	VPM
CHECKED	SCN
REVIEWED / APPROVED	GLH

PROJECT NO. 1789848 | SCS REF. GOR17010 | REV. 0 | DRAWING C-202

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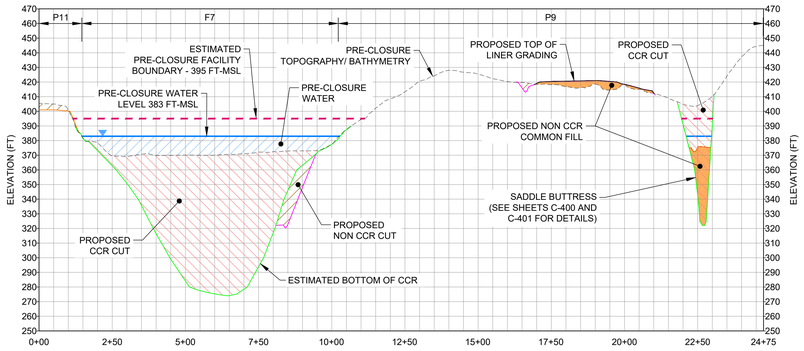
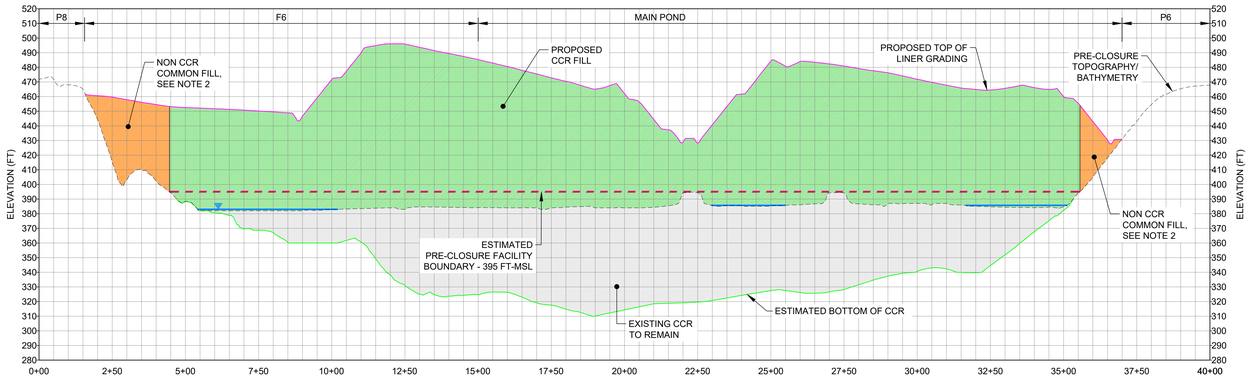
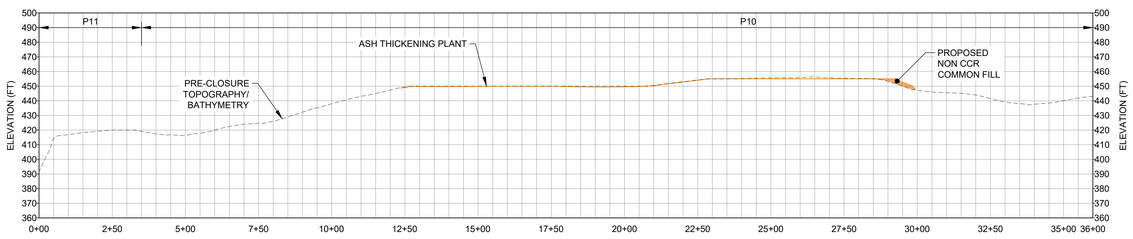


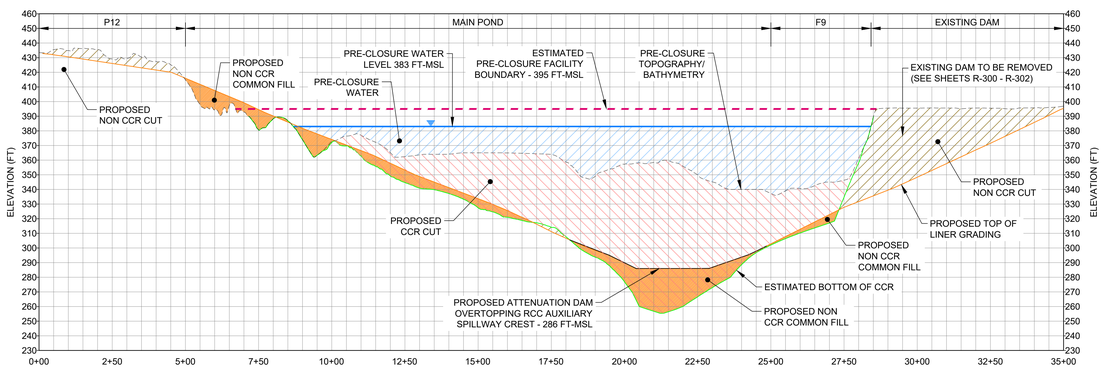
J - J' / STA: 0+00 to STA: 24+75



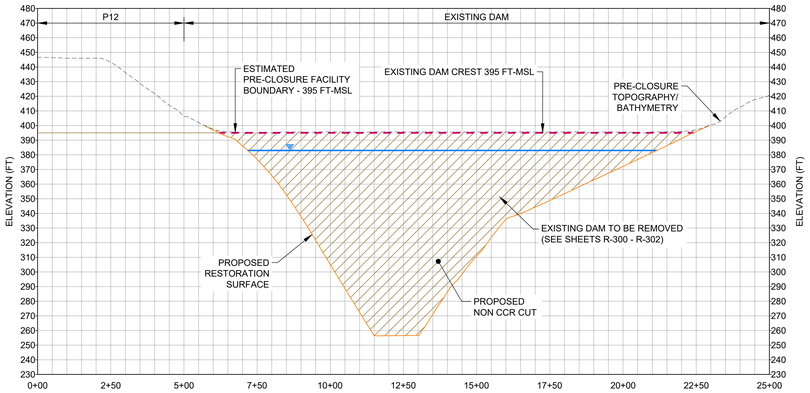
K - K' / STA: 0+00 to STA: 40+00



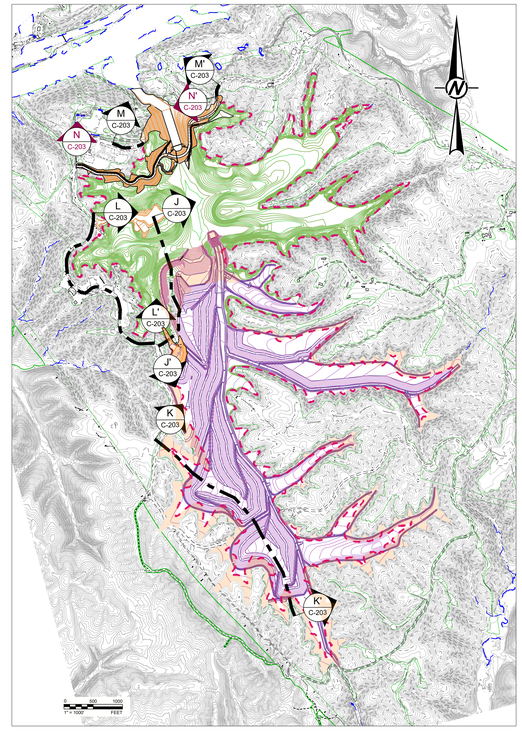
L - L' / STA: 0+00 to STA: 36+00



N - N' / STA: 0+00 to STA: 35+00



M - M' / STA: 0+00 to STA: 25+00



KEY MAP

LEGEND

- NORMAL PRE-CLOSURE WATER LEVEL
- PROPOSED TOP OF LINER GRADING
- PRE-CLOSURE TOPOGRAPHY AND BATHYMETRY (REFERENCE 1 & 2)
- ESTIMATED BOTTOM OF CCR (REFERENCE 3)
- TEMPORARY DREDGE CUT SLOPE
- ESTIMATED PRE-CLOSURE FACILITY BOUNDARY
- PROPOSED GRADING OUTSIDE CLOSURE LIMITS
- PRE-CLOSURE WATER
- EXISTING CCR TO REMAIN
- PROPOSED CCR CUT
- PROPOSED CCR FILL
- PROPOSED NON CCR CUT
- PROPOSED NON CCR COMMON FILL
- PROPOSED NON CCR STRUCTURAL FILL

NOTES

1. ELEVATIONS ARE IN FEET WITH REFERENCE TO THE NORTH AMERICAN VERTICAL DATUM (NAVD) OF 1988. COORDINATES CORRESPOND TO THE ALABAMA WEST STATE PLAN COORDINATE SYSTEM, NORTH AMERICAN DATUM (NAD) 1983.
2. FOR NON CCR FILL CONSTRUCTION SEQUENCE SEE DETAILS 8 OR 9, SHEET C-500.

REFERENCES

1. EXISTING TOPOGRAPHY PROVIDED BY SOUTHERN COMPANY SERVICES, FEBRUARY 2020.
2. BATHYMETRIC SURFACE IS A COMPOSITE OF THE FEBRUARY 2020 SOUTHERN COMPANY AND THE JANUARY 2020 ARCSURVEY BATHYMETRIC SURVEYS TIED TO INTERPRETED SECTIONS OF THE 2016 SOUTHERN COMPANY BATHYMETRIC SURVEY WHERE SURVEY DATA IS NOT AVAILABLE.
3. BOTTOM OF CCR TOPOGRAPHY TAKEN FROM USGS, PORT BIRMINGHAM, 1938 AND GOODSPINGS, 1971 QUADRANGLES. TOPOGRAPHY WAS INTERPRETED BETWEEN 20 FOOT CONTOURS AND ADJUSTED BASED ON GEOTECHNICAL INVESTIGATION DATA BY GOLDER ASSOCIATES INC.

0 200 400 — 1" = 200' — FEET — HORIZONTAL SCALE

0 40 80 — 1" = 40' — FEET — VERTICAL SCALE

REV	DATE	REVISION DESCRIPTION	DES	CADD	CHK	RVW
1						
0	2020/10/16	ISSUED FOR CONSTRUCTION	GLH	VPM	SCN	GLH

CLIENT
SOUTHERN COMPANY SERVICES

Alabama Power

PROJECT
PLANT GORGAS
ASH POND CLOSURE
DESIGN DRAWINGS

TITLE
SECTIONS AND PROFILES SHEET 4

ALABAMA LICENSED PROFESSIONAL ENGINEER No. 29143 GREGORY L. HEBELER 16-OCT-2020

GREGORY L. HEBELER
ALABAMA PROFESSIONAL ENGINEER
CERTIFICATE NUMBER 29143

CONSULTANT
GOLDER

YYYY-MM-DD	2020/10/16
DESIGNED	GLH
PREPARED	VPM
CHECKED	SCN
REVIEWED / APPROVED	GLH

PROJECT NO. 1789848 | SCS REF. GOR17010 | REV. 0 | DRAWING C-203

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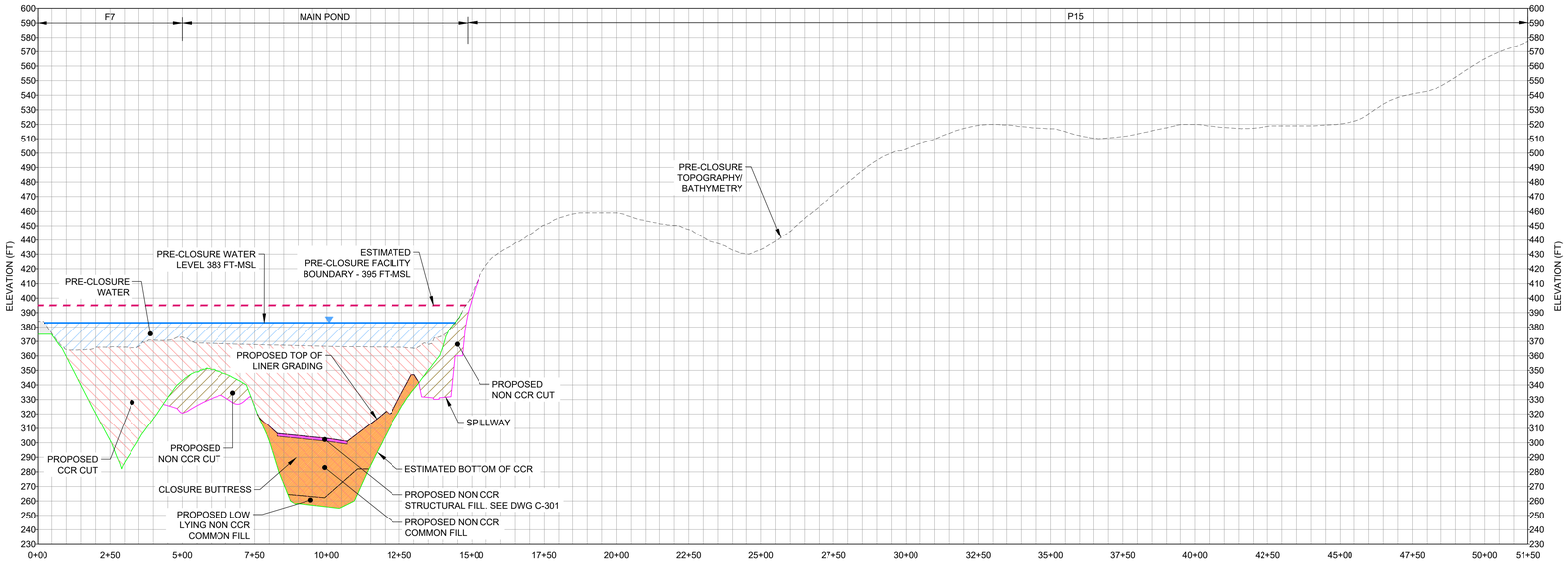
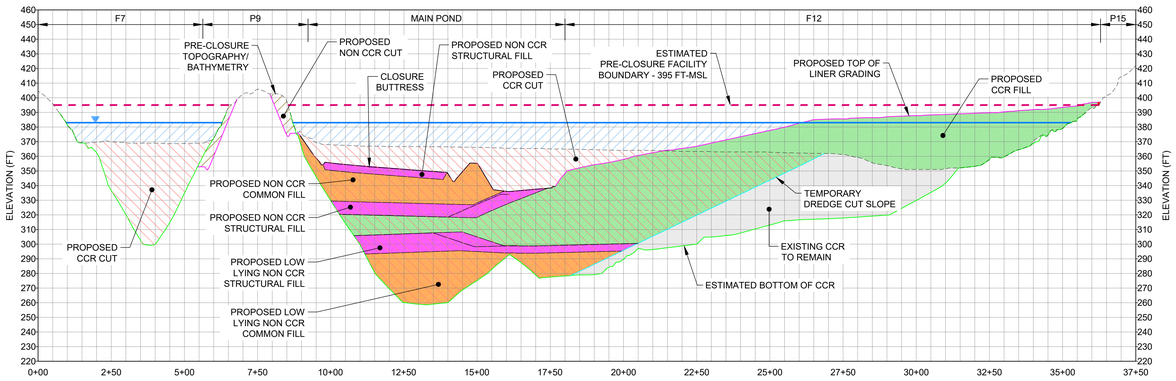


O - O' / STA: 0+00 to STA: 51+50



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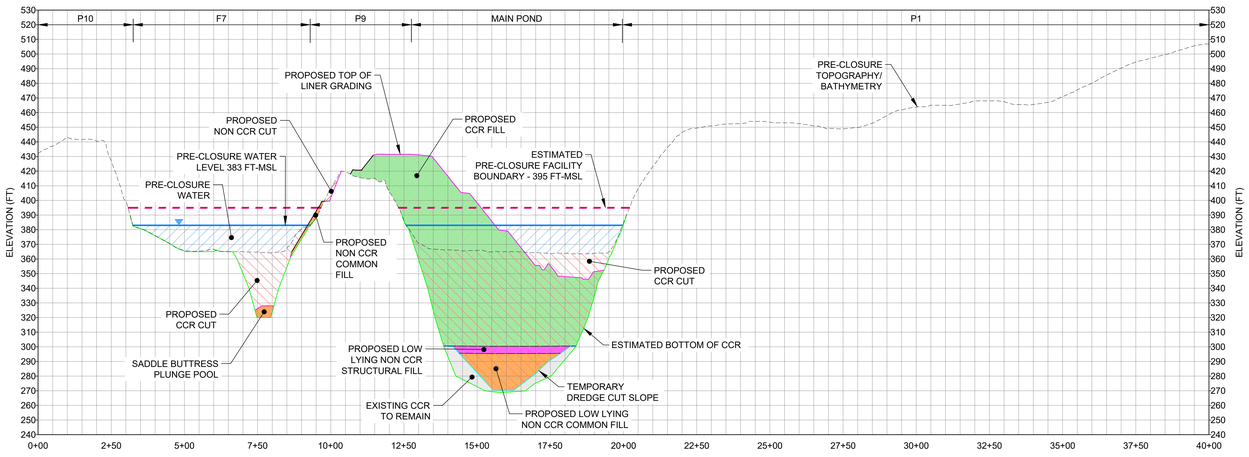
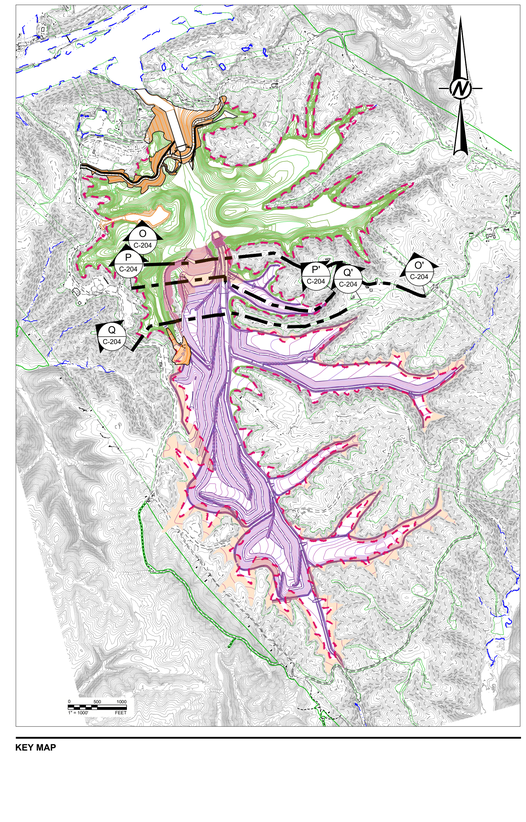


Q - Q' / STA: 0+00 to STA: 40+00



KEY MAP

LEGEND

- NORMAL PRE-CLOSURE WATER LEVEL
- PROPOSED TOP OF LINER GRADING
- PRE-CLOSURE TOPOGRAPHY AND BATHYMETRY (REFERENCE 1 & 2)
- ESTIMATED BOTTOM OF CCR (REFERENCE 3)
- TEMPORARY DREDGE CUT SLOPE
- ESTIMATED PRE-CLOSURE FACILITY BOUNDARY
- PROPOSED GRADING OUTSIDE CLOSURE LIMITS
- PRE-CLOSURE WATER
- EXISTING CCR TO REMAIN
- PROPOSED CCR CUT
- PROPOSED CCR FILL
- PROPOSED NON CCR CUT
- PROPOSED NON CCR COMMON FILL
- PROPOSED NON CCR STRUCTURAL FILL

NOTES

1. ELEVATIONS ARE IN FEET WITH REFERENCE TO THE NORTH AMERICAN VERTICAL DATUM (NAVD) OF 1988. COORDINATES CORRESPOND TO THE ALABAMA WEST STATE PLAN COORDINATE SYSTEM, NORTH AMERICAN DATUM (NAD) 1983.

2. FOR NON CCR FILL CONSTRUCTION SEQUENCE SEE DETAILS 8 OR 9, SHEET C-500.

REFERENCES

1. EXISTING TOPOGRAPHY PROVIDED BY SOUTHERN COMPANY SERVICES, FEBRUARY 2020.

2. BATHYMETRIC SURFACE IS A COMPOSITE OF THE FEBRUARY 2020 SOUTHERN COMPANY AND THE JANUARY 2020 ARCSURVEY BATHYMETRIC SURVEYS TIED TO INTERPRETED SECTIONS OF THE 2016 SOUTHERN COMPANY BATHYMETRIC SURVEY WHERE SURVEY DATA IS NOT AVAILABLE.

3. BOTTOM OF CCR TOPOGRAPHY TAKEN FROM USGS, PORT BIRMINGHAM, 1938 AND GOODSPINGS, 1971 QUADRANGLES. TOPOGRAPHY WAS INTERPRETED BETWEEN 20 FOOT CONTOURS AND ADJUSTED BASED ON GEOTECHNICAL INVESTIGATION DATA BY GOLDER ASSOCIATES INC.

0 200 400 FEET
1" = 200'
HORIZONTAL SCALE

0 40 80 FEET
1" = 40'
VERTICAL SCALE

REV	DATE	REVISION DESCRIPTION	DES	CADD	CHK	RVW
1	2020/10/16	ISSUED FOR CONSTRUCTION	GLH	VPM	SCN	GLH

CLIENT
SOUTHERN COMPANY SERVICES

Alabama Power

PROJECT
PLANT GORGAS
ASH POND CLOSURE
DESIGN DRAWINGS

TITLE
SECTIONS AND PROFILES
SHEET 5

ALABAMA LICENSED No. 29143 PROFESSIONAL ENGINEER GREGORY L. HEBELER
16 OCT 2020

GREGORY L. HEBELER
ALABAMA PROFESSIONAL ENGINEER
CERTIFICATE NUMBER 29143

CONSULTANT
GOLDER

YYYY-MM-DD	2020/10/16
DESIGNED	GLH
PREPARED	VPM
CHECKED	SCN
REVIEWED / APPROVED	GLH

PROJECT NO.	SCS REF.	REV.	DRAWING
1789848	GOR17010	0	C-204

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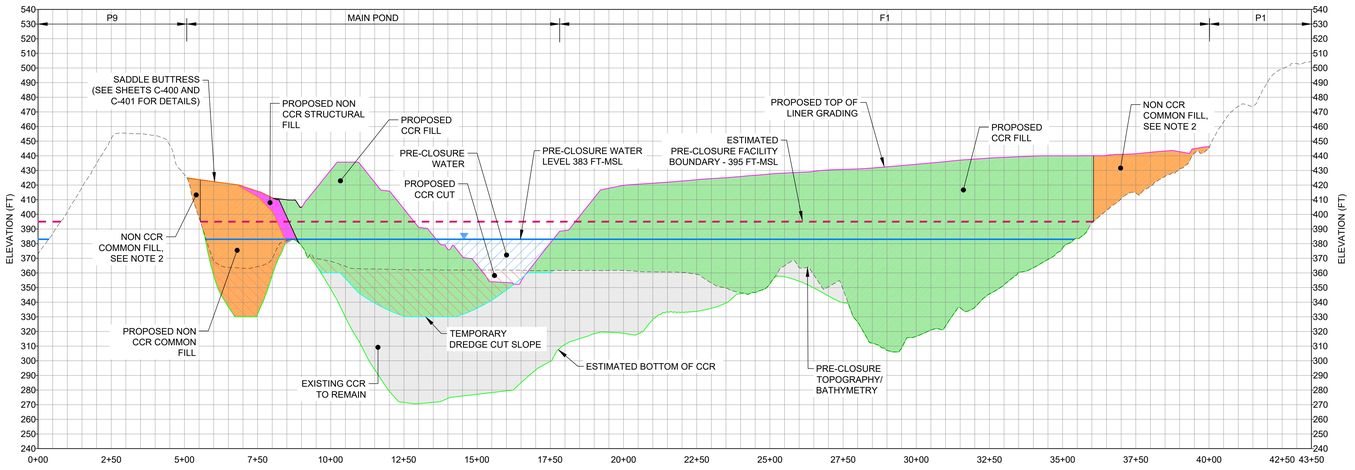
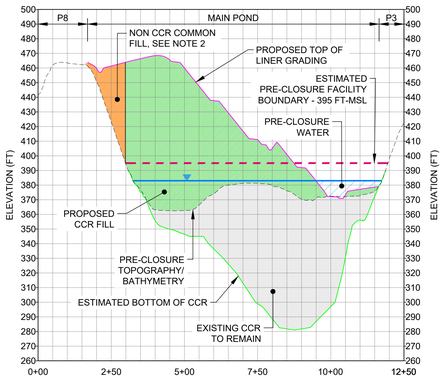
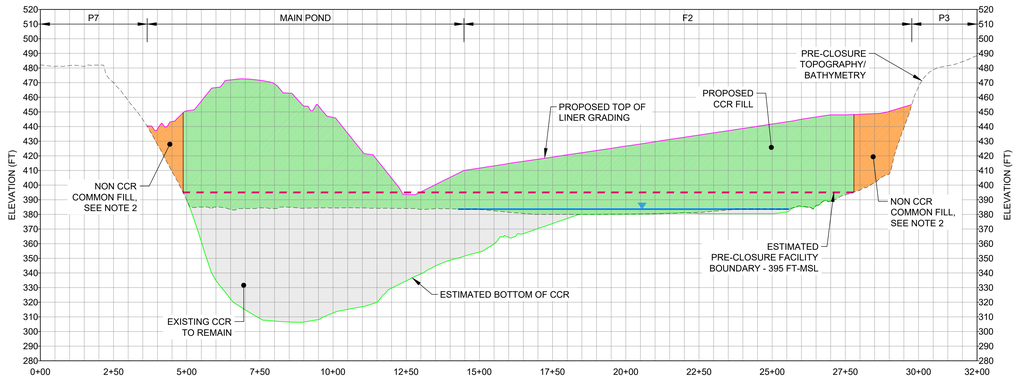


R - R' / STA: 0+00 to STA: 43+50



S - S' / STA: 0+00 to STA: 12+50



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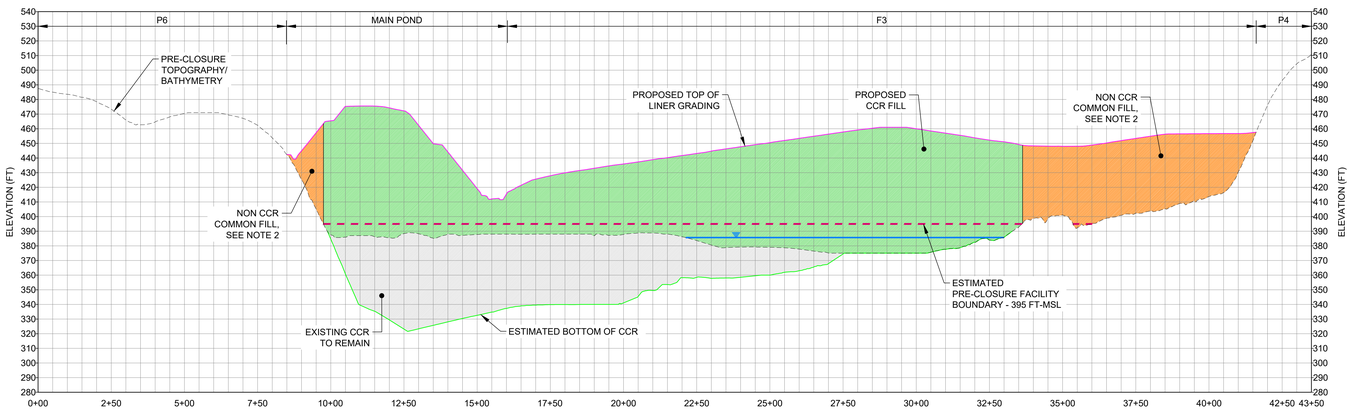
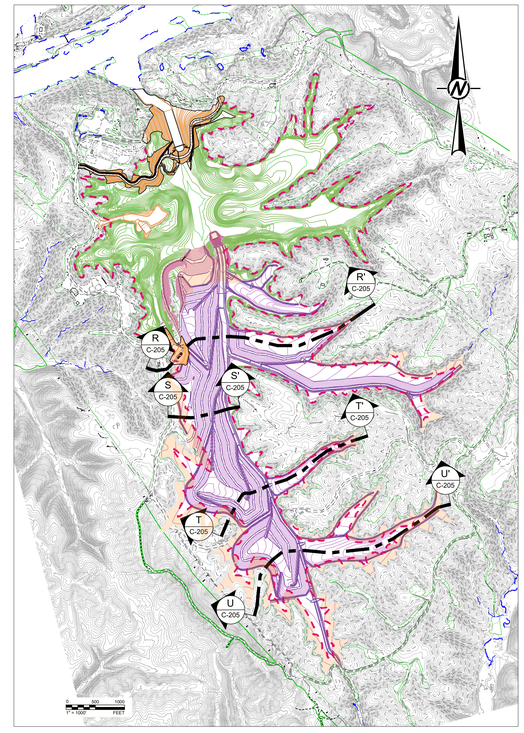


U - U' / STA: 0+00 to STA: 43+50



KEY MAP

LEGEND

- NORMAL PRE-CLOSURE WATER LEVEL
- PROPOSED TOP OF LINER GRADING
- PRE-CLOSURE TOPOGRAPHY AND BATHYMETRY (REFERENCE 1 & 2)
- ESTIMATED BOTTOM OF CCR (REFERENCE 3)
- TEMPORARY DREDGE CUT SLOPE
- ESTIMATED PRE-CLOSURE FACILITY BOUNDARY
- PROPOSED GRADING OUTSIDE CLOSURE LIMITS
- PRE-CLOSURE WATER
- EXISTING CCR TO REMAIN
- PROPOSED CCR CUT
- PROPOSED CCR FILL
- PROPOSED NON CCR CUT
- PROPOSED NON CCR COMMON FILL
- PROPOSED NON CCR STRUCTURAL FILL

NOTES

1. ELEVATIONS ARE IN FEET WITH REFERENCE TO THE NORTH AMERICAN VERTICAL DATUM (NAVD) OF 1988. COORDINATES CORRESPOND TO THE ALABAMA WEST STATE PLAN COORDINATE SYSTEM, NORTH AMERICAN DATUM (NAD) 1983.

2. FOR NON CCR FILL CONSTRUCTION SEQUENCE SEE DETAILS 8 OR 9, SHEET C-500.

REFERENCES

1. EXISTING TOPOGRAPHY PROVIDED BY SOUTHERN COMPANY SERVICES, FEBRUARY 2020.

2. BATHYMETRIC SURFACE IS A COMPOSITE OF THE FEBRUARY 2020 SOUTHERN COMPANY AND THE JANUARY 2020 ARCSURVEY BATHYMETRIC SURVEYS TIED TO INTERPRETED SECTIONS OF THE 2016 SOUTHERN COMPANY BATHYMETRIC SURVEY WHERE SURVEY DATA IS NOT AVAILABLE.

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0 200 400
1" = 200' FEET
HORIZONTAL SCALE

0 40 80
1" = 40' FEET
VERTICAL SCALE

REV	DATE	REVISION DESCRIPTION	DES	CADD	CHK	RVW
△						
1	2020/10/16	ISSUED FOR CONSTRUCTION	GLH	VPM	SCN	GLH

CLIENT
SOUTHERN COMPANY SERVICES

Alabama Power

PROJECT
PLANT GORGAS
ASH POND CLOSURE
DESIGN DRAWINGS

TITLE
SECTIONS AND PROFILES
SHEET 6

ALABAMA LICENSED PROFESSIONAL ENGINEER GREGORY L. HEBELER No. 29143 16-OCT-2020

GREGORY L. HEBELER
ALABAMA PROFESSIONAL ENGINEER
CERTIFICATE NUMBER 29143

CONSULTANT
GOLDER

YYYY-MM-DD	2020/10/16
DESIGNED	GLH
PREPARED	VPM
CHECKED	SCN
REVIEWED / APPROVED	GLH

PROJECT NO.	SCS REF.	REV.	DRAWING
1789848	GOR17010	0	C-205

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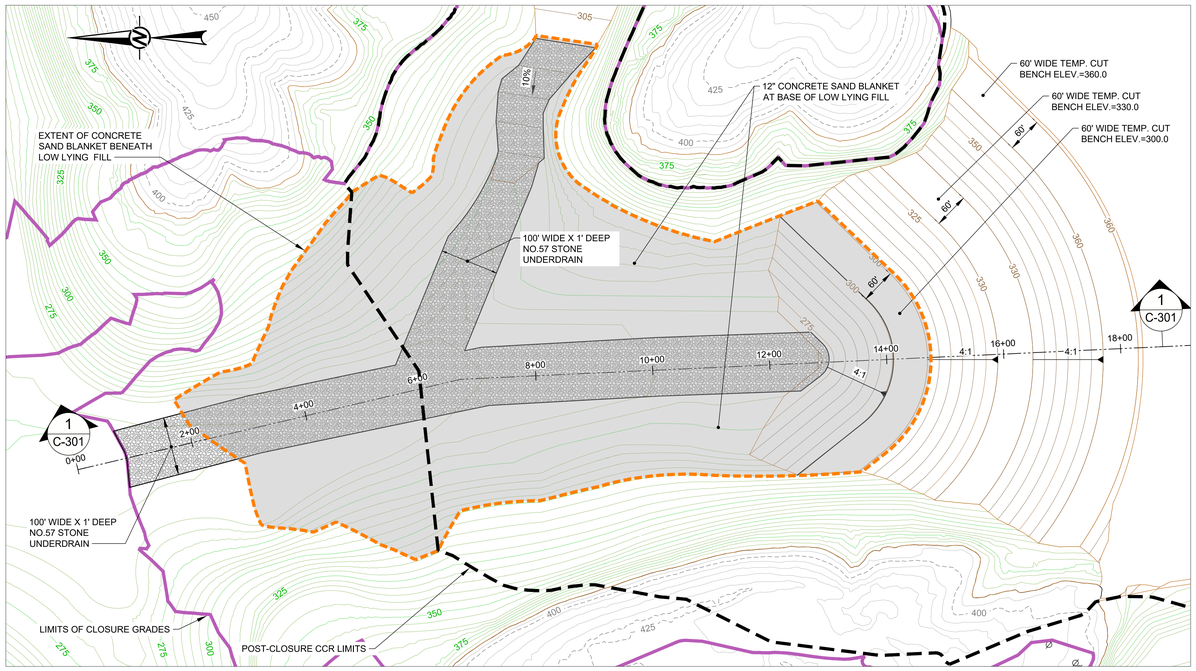
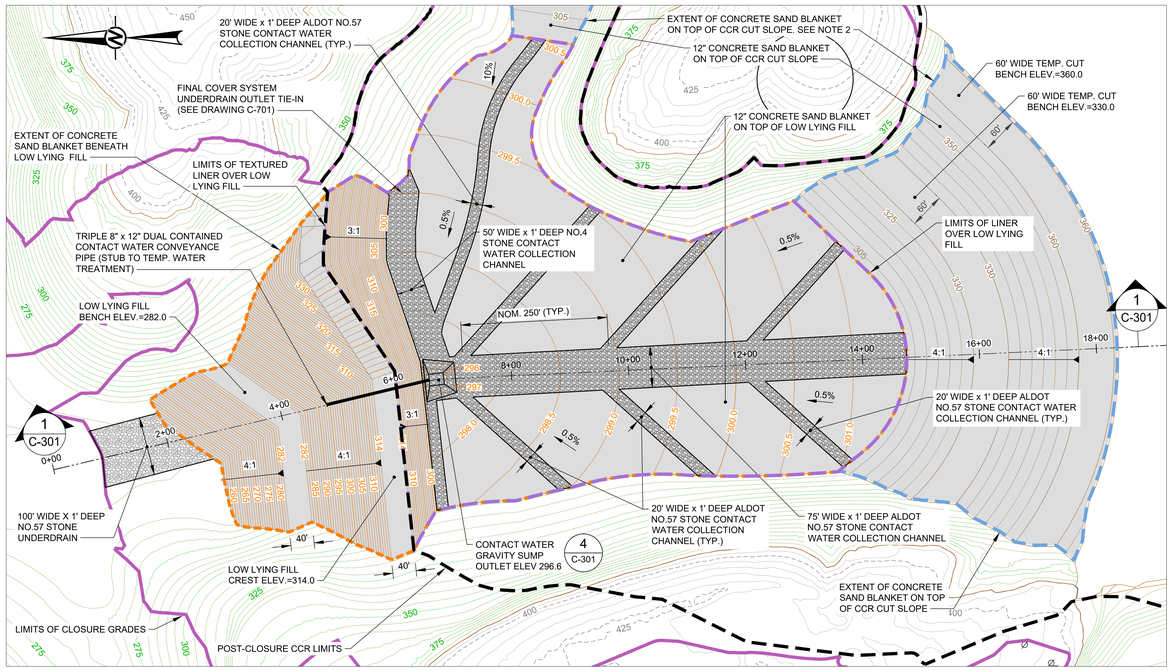
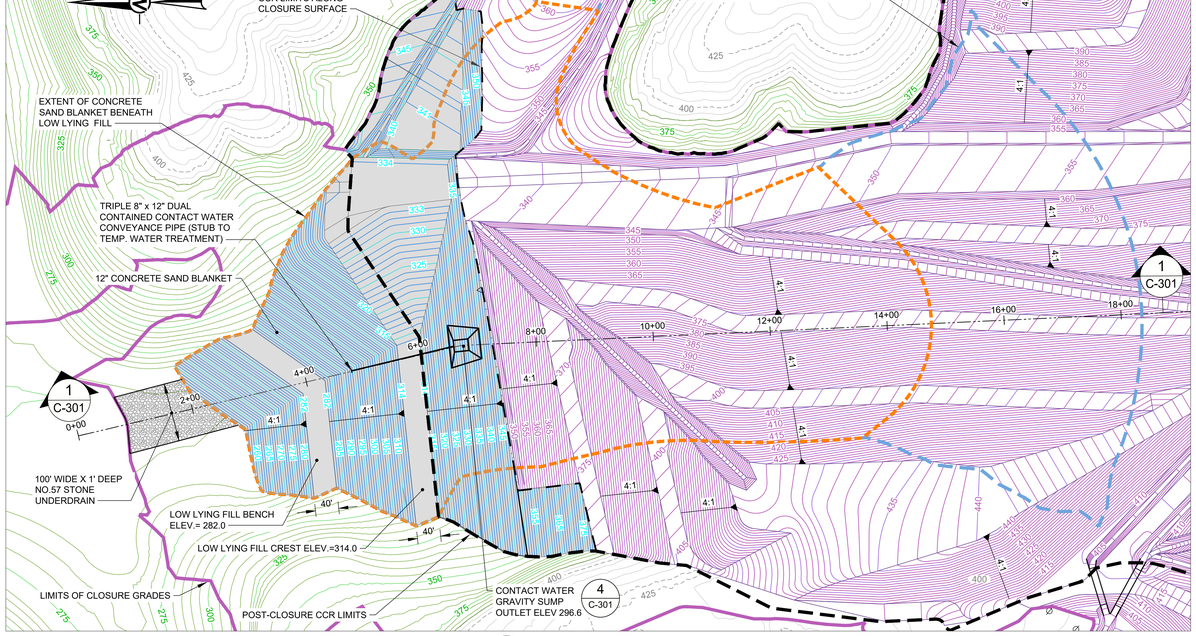


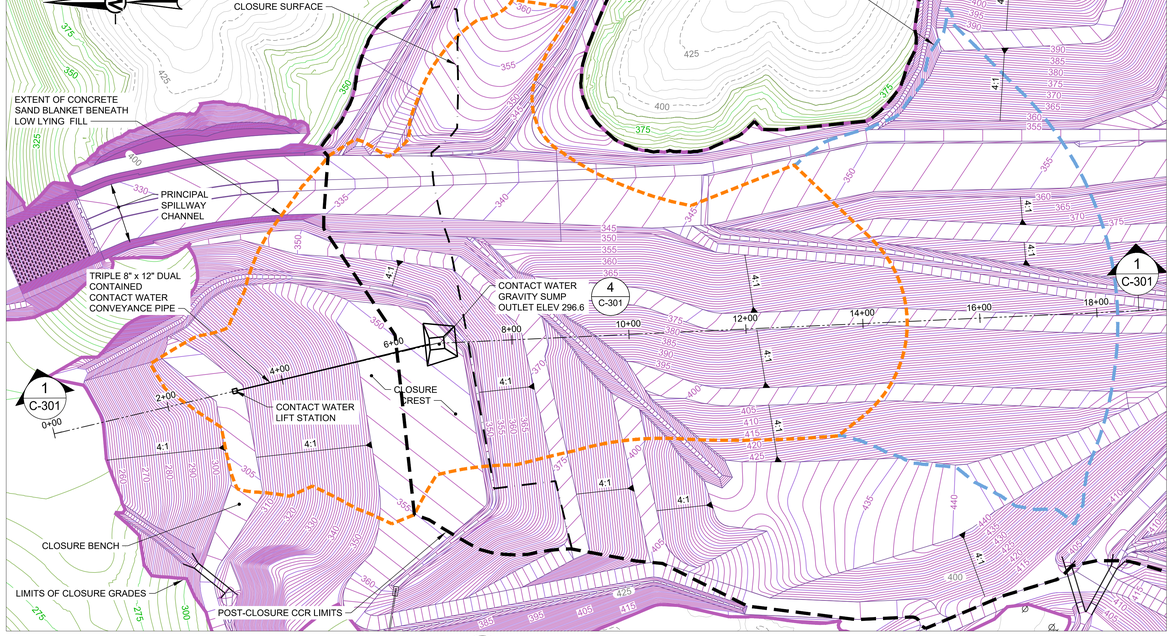
1 C-300 TEMPORARY EXCAVATION GRADING PLAN



2 C-300 LOW LYING FILL GRADING PLAN



3 C-300 BUTTRESS GRADING PLAN



4 C-300 TOP OF LINER GRADING PLAN

LEGEND

- 340 TEMPORARY CUT
- 340 ESTIMATED BOTTOM OF CCR CONTOURS (REFERENCE 1)
- 340 TOP OF LINER GRADES
- 340 BUTTRESS GRADES

NOTES

1. ELEVATIONS ARE IN FEET WITH REFERENCE TO THE NORTH AMERICAN VERTICAL DATUM (NAVD) OF 1988. COORDINATES CORRESPOND TO THE ALABAMA WEST STATE PLAN COORDINATE SYSTEM, NORTH AMERICAN DATUM (NAD) 1983.

2. CONCRETE SAND DRAINAGE LAYER ON TEMPORARY CUT SLOPE CAN BE CONCRETE SAND OR BOTTOM ASH WITH MAXIMUM FINES CONTENT OF (5%).

REFERENCES

1. EXISTING TOPOGRAPHY PROVIDED BY SOUTHERN COMPANY SERVICES, FEBRUARY 2020.

2. BATHYMETRIC SURFACE IS A COMPOSITE OF THE FEBRUARY 2020 SOUTHERN COMPANY AND THE JANUARY 2020 ARCSURVEY BATHYMETRIC SURVEYS TIED TO INTERPRETED SECTIONS OF THE 2016 SOUTHERN COMPANY BATHYMETRIC SURVEY WHERE SURVEY DATA IS NOT AVAILABLE.

3. EXISTING AND APPROXIMATE PROPERTY BOUNDARIES PROVIDED BY SOUTHERN COMPANY SERVICES, APRIL 2020.

0 100 200
1" = 100' FEET

REV	DATE	REVISION DESCRIPTION	DES	CADD	CHK	RVW
1	2020/10/16	ISSUED FOR CONSTRUCTION	GLH	RMS	SCN	GLH

CLIENT
SOUTHERN COMPANY SERVICES

Alabama Power

PROJECT
PLANT GORGAS
ASH POND CLOSURE
DESIGN DRAWINGS

TITLE
PROPOSED LOW LYING FILL AND CLOSURE BUTTRESS PLAN

ALABAMA LICENSED No. 29143 PROFESSIONAL ENGINEER GREGORY L. HEBELER 16 OCT 2020

GREGORY L. HEBELER
ALABAMA PROFESSIONAL ENGINEER
CERTIFICATE NUMBER 29143

CONSULTANT
GOLDER

YYYY-MM-DD	2020/10/16
DESIGNED	GLH
PREPARED	RMS
CHECKED	SCN
REVIEWED / APPROVED	GLH

PROJECT NO.	SCS REF.	REV.	DRAWING
1789848	GOR17010	0	C-300

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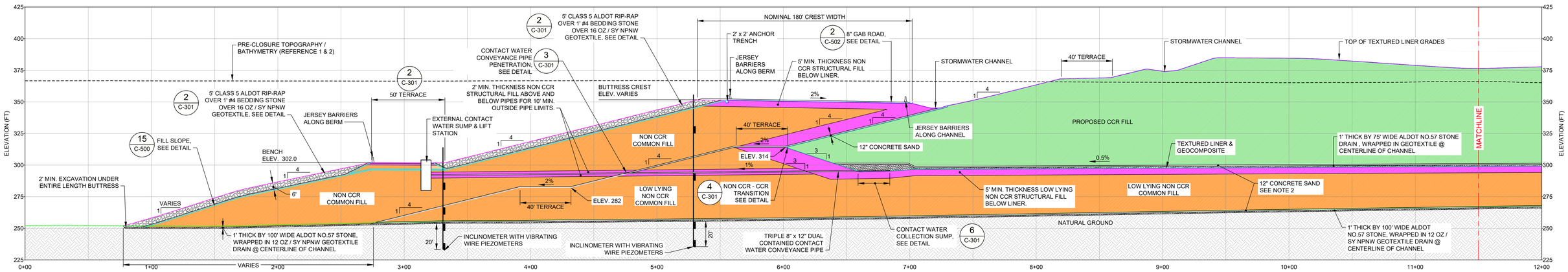
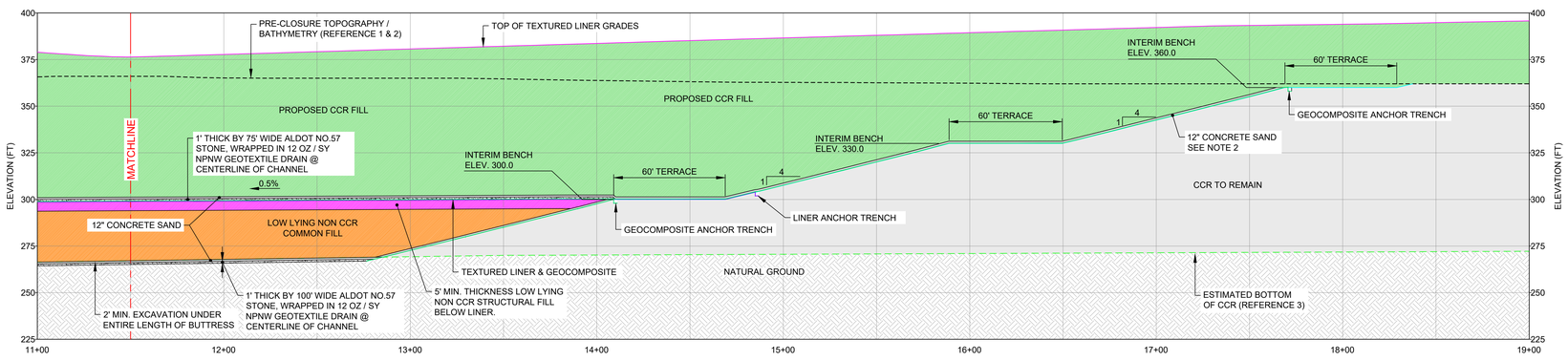
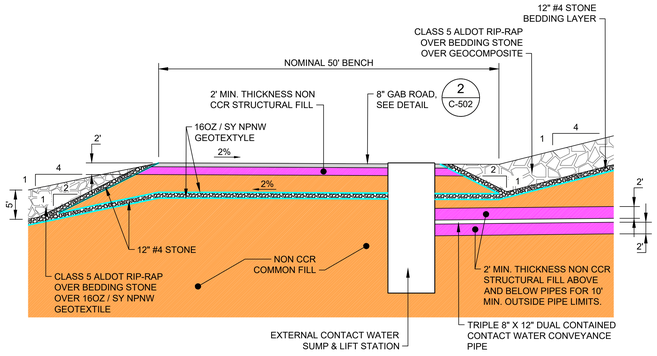




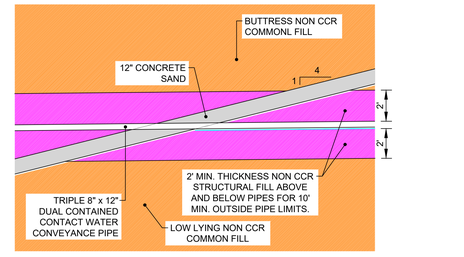
1 C-301 BUTTRESS DETAIL

0 30 60
1" = 30' FEET

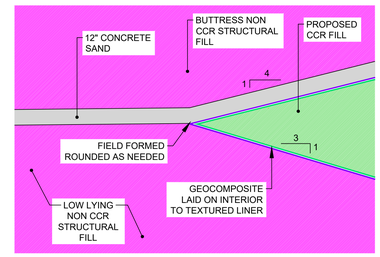


2 C-301 BUTTRESS 50' BENCH AND STONE PLACEMENT

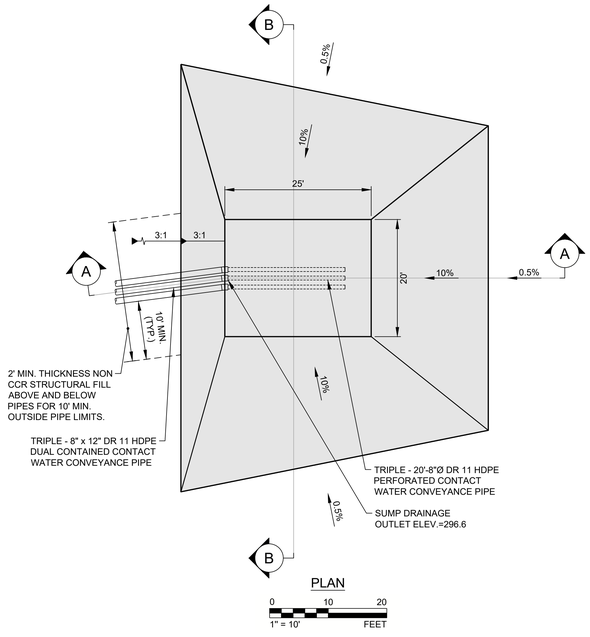
0 10 20
1" = 10' FEET



N.T.S. 3 C-301 CONTACT WATER PIPE PENETRATION DETAIL

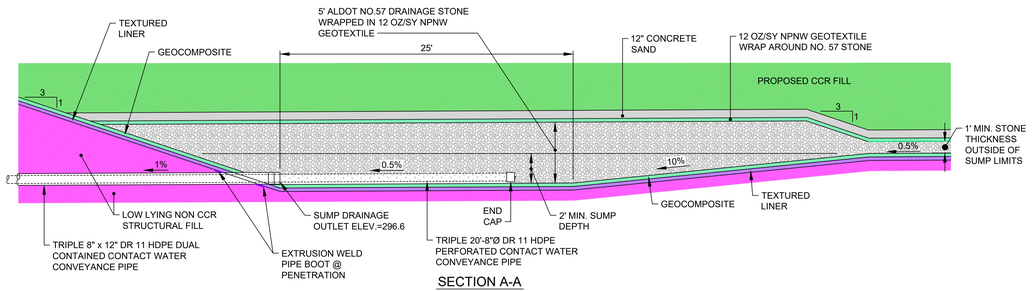


N.T.S. 4 C-301 BUTTRESS - NON CCR FILL - CCR TRANSITION DETAIL

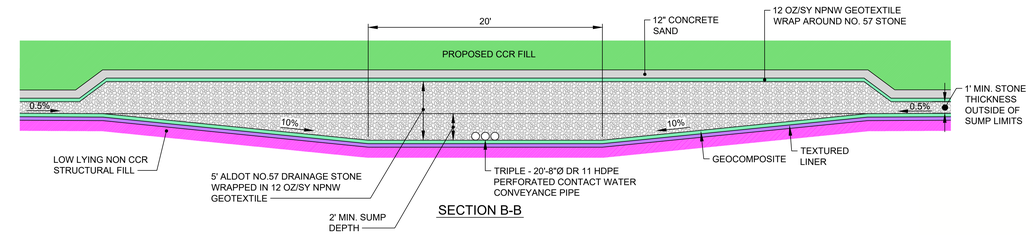


PLAN

0 10 20
1" = 10' FEET



SECTION A-A



SECTION B-B

0 5 10
1" = 5' FEET

6 C-301 CONTACT WATER COLLECTION SUMP DETAIL

LEGEND

- PROPOSED TEXTURED LINER
- PROPOSED GEOTEXTILE
- PROPOSED GEOCOMPOSITE
- PRE-CLOSURE TOPOGRAPHY / BATHYMETRY
- ESTIMATED BOTTOM OF CCR
- RIP-RAP
- CONCRETE SAND
- PROPOSED NON CCR STRUCTURAL FILL
- PROPOSED NON CCR COMMON FILL
- PROPOSED CCR FILL

NOTES

1. ELEVATIONS ARE IN FEET WITH REFERENCE TO THE NORTH AMERICAN VERTICAL DATUM (NAVD) OF 1988. COORDINATES CORRESPOND TO THE ALABAMA WEST STATE PLAN COORDINATE SYSTEM, NORTH AMERICAN DATUM (NAD) 1983.

2. CONCRETE SAND DRAINAGE LAYER ON TEMPORARY CUT SLOPE CAN BE CONCRETE SAND OR BOTTOM ASH WITH MAXIMUM FINES CONTENT OF (5%).

REFERENCES

1. EXISTING TOPOGRAPHY PROVIDED BY SOUTHERN COMPANY SERVICES, FEBRUARY 2020.

2. BATHYMETRIC SURFACE IS A COMPOSITE OF THE FEBRUARY 2020 SOUTHERN COMPANY AND THE JANUARY 2020 ARCSURVEY BATHYMETRIC SURVEYS TIED TO INTERPRETED SECTIONS OF THE 2016 SOUTHERN COMPANY BATHYMETRIC SURVEY WHERE SURVEY DATA IS NOT AVAILABLE.

REV	DATE	REVISION DESCRIPTION	DES	CADD	CHK	RVW
△						
1	2020/10/16	ISSUED FOR CONSTRUCTION	GLH	RMS	SCN	GLH

CLIENT
SOUTHERN COMPANY SERVICES

Alabama Power

PROJECT
PLANT GORGAS
ASH POND CLOSURE
DESIGN DRAWINGS

TITLE
CLOSURE BUTTRESS SECTIONS AND DETAILS

ALABAMA LICENSED PROFESSIONAL ENGINEER GREGORY L. HEBELER No. 29143 16-OCT-2020

GREGORY L. HEBELER
ALABAMA PROFESSIONAL ENGINEER
CERTIFICATE NUMBER 29143

CONSULTANT
GOLDER

YYYY-MM-DD	2020/10/16
DESIGNED	GLH
PREPARED	RMS
CHECKED	SCN
REVIEWED / APPROVED	GLH

PROJECT NO. 1789848 | SCS REF. GOR17010 | REV. 0 | DRAWING C-301

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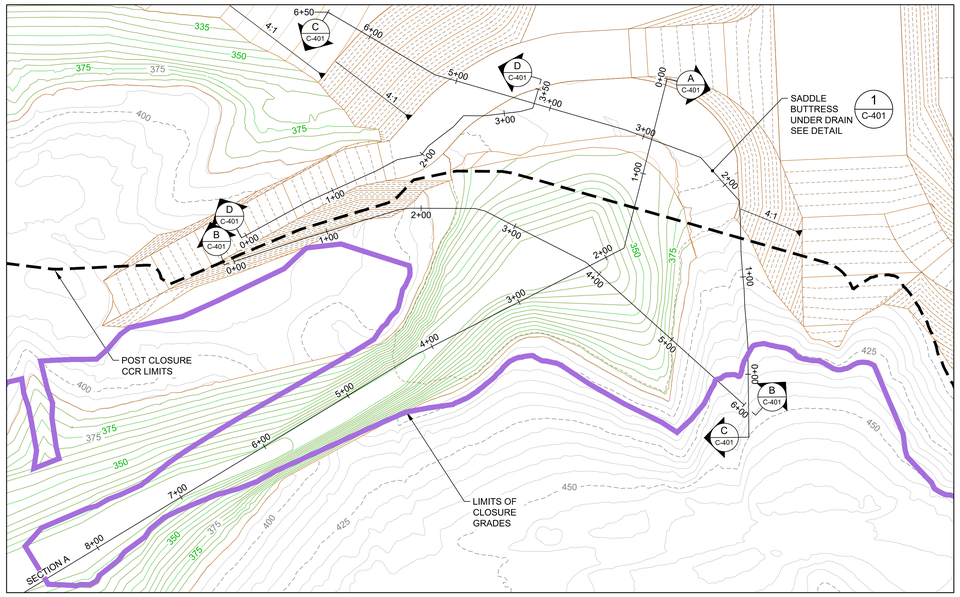
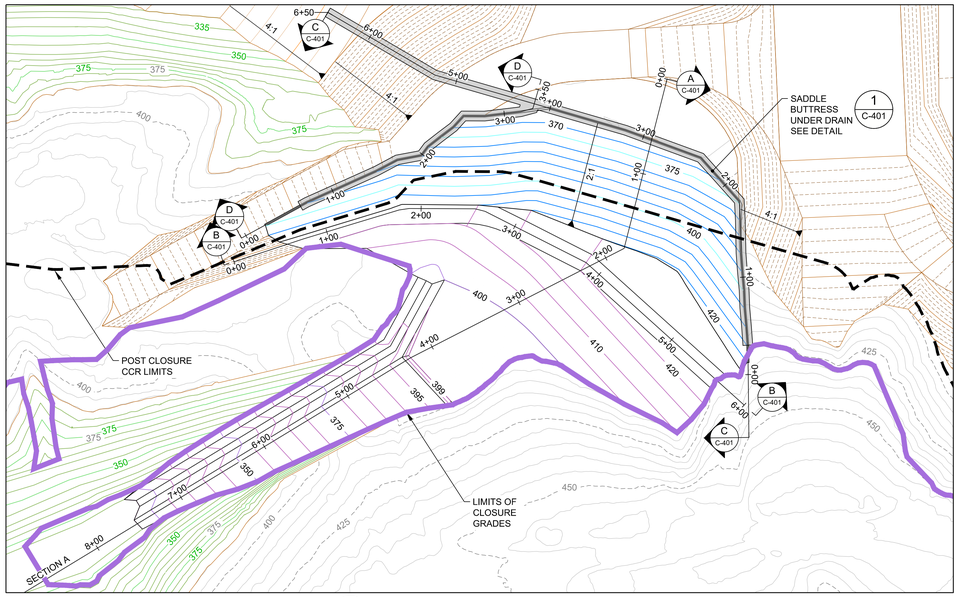
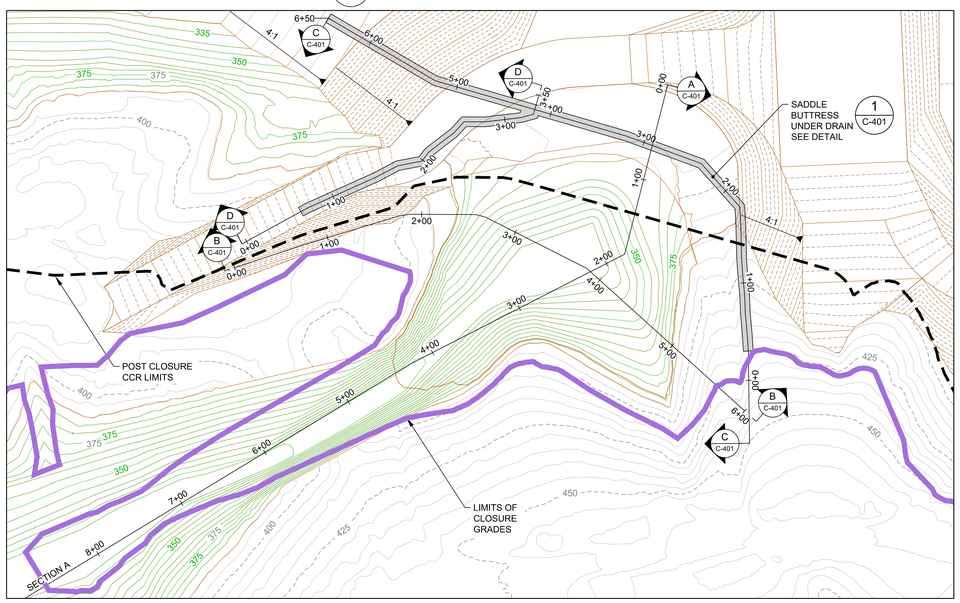


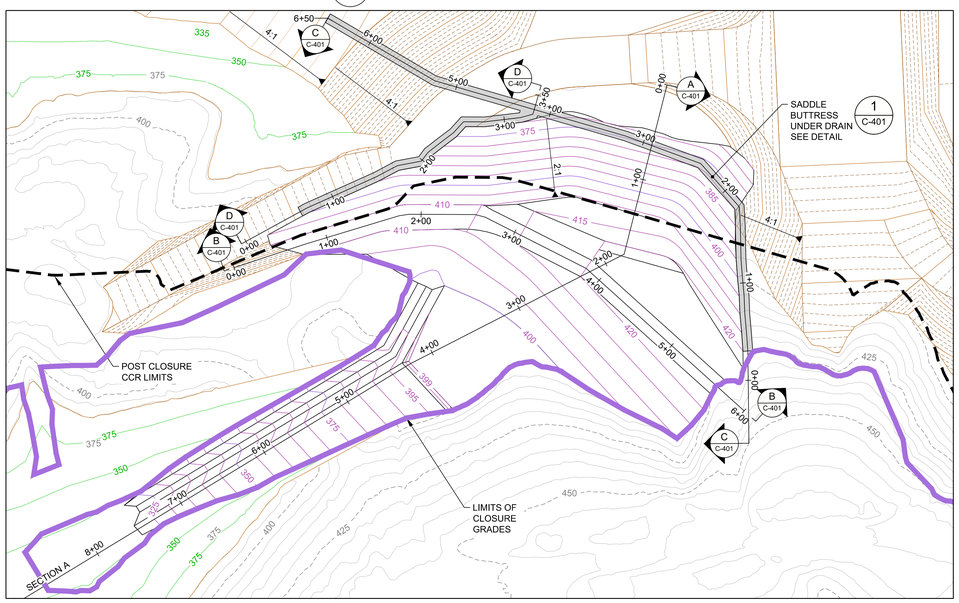
1 C-400 ASH REMOVAL & TEMPORARY CUT GRADES



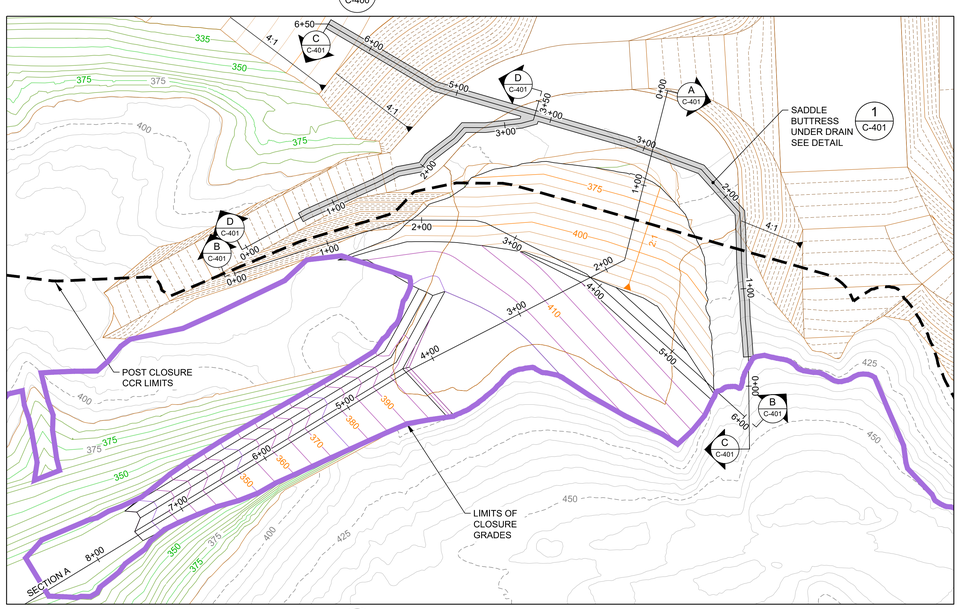
4 C-400 INTERMEDIATE SADDLE BUTTRESS GRADES & LINER INSTALATION



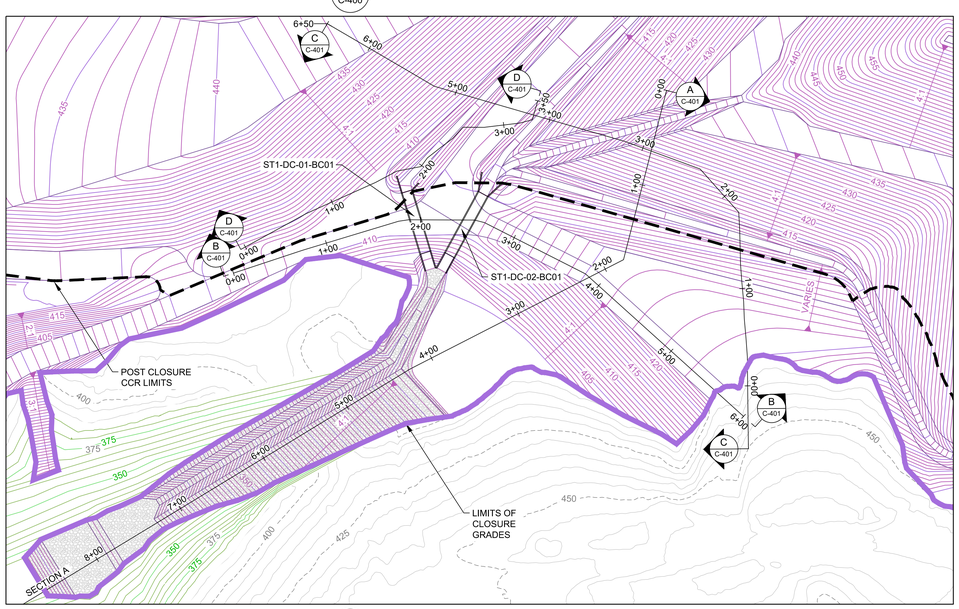
2 C-400 SADDLE BUTTRESS DRAIN INSTALLATION



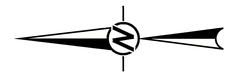
5 C-400 FINAL SADDLE BUTTRESS GRADES



3 C-400 SADDLE BUTTRESS COMMON CCR-FILL



6 C-400 TOP OF LINER GRADES



LEGEND

- 340 PROPOSED DAM GRADING CONTOURS
- 340 ESTIMATED BOTTOM OF CCR CONTOURS (REFERENCE 1)
- 340 TEMPORARY CUT SADDLE BUTTRESS CONTOURS
- 340 TEMP SLOPES MAX CUT DREDGE CONTOURS
- 340 TOP OF NON-CCR COMMON FILL CONTOURS

NOTES

1. ELEVATIONS ARE IN FEET WITH REFERENCE TO THE NORTH AMERICAN VERTICAL DATUM (NAVD) 1988. COORDINATES CORRESPOND TO ALABAMA WEST STATE PLANE COORDINATE SYSTEM, NORTH AMERICAN DATUM (NAD) 1983.

REFERENCES

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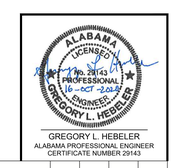
3. BOTTOM OF CCR TOPOGRAPHY TAKEN FROM USGS, PORT BIRMINGHAM, 1938 AND GOODSPINGS, 1971 QUADRANGLES. TOPOGRAPHY WAS INTERPRETED BETWEEN 20 FOOT CONTOURS AND ADJUSTED BASED ON GEOTECHNICAL INVESTIGATION DATA BY GOLDER ASSOCIATES INC.

0 60 120
1" = 60' FEET



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CLIENT
SOUTHERN COMPANY SERVICES
Alabama Power

PROJECT
PLANT GORGAS
ASH POND CLOSURE
DESIGN DRAWINGS

TITLE
PROPOSED SADDLE BUTTRESS PLAN

CONSULTANT
GOLDER

YYYY-MM-DD	2020/10/16
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REVIEWED / APPROVED	GLH

PROJECT NO.	SCS REF.	REV.	DRAWING
1789848	GOR17010	0	C-400

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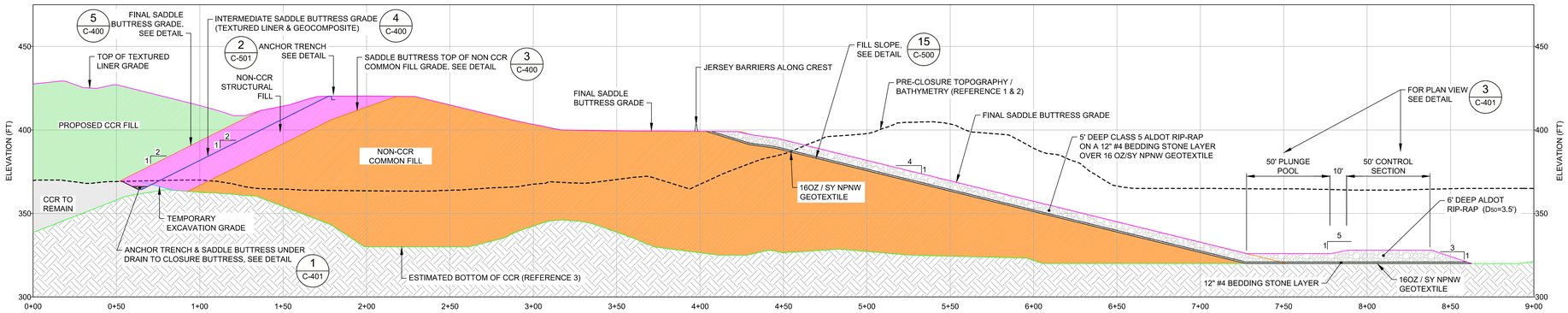
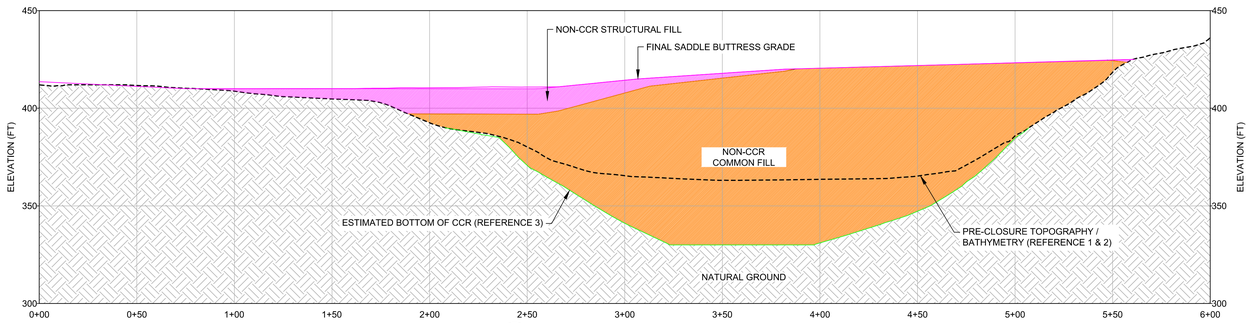


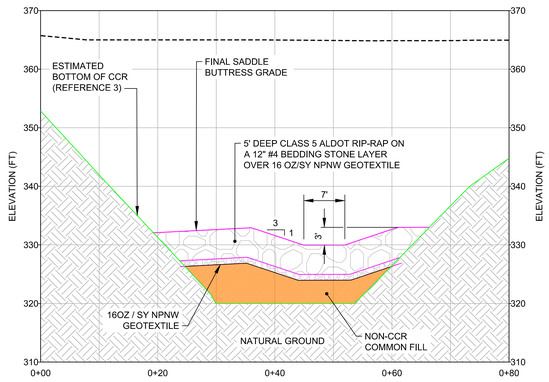
A C-401 SADDLE BUTTRESS SECTION A-A

1" = 30' 0 30 60 FEET



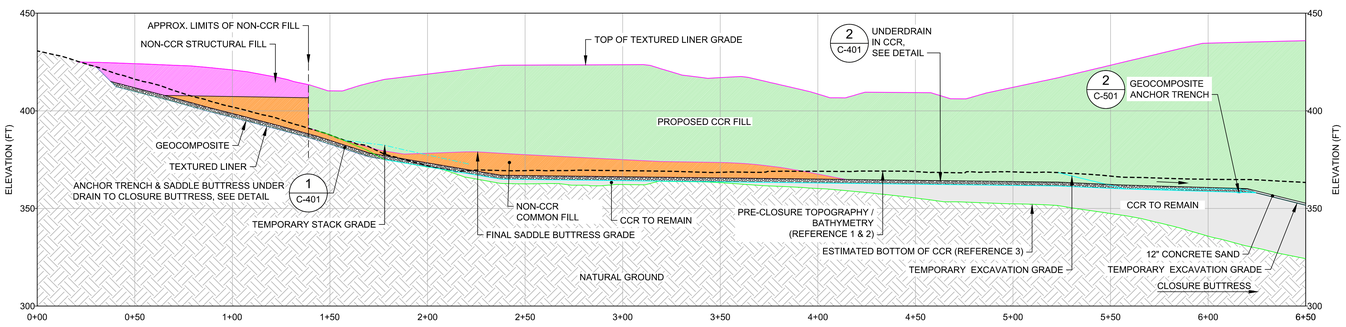
B C-401 SADDLE BUTTRESS SECTION B-B

1" = 30' 0 30 60 FEET



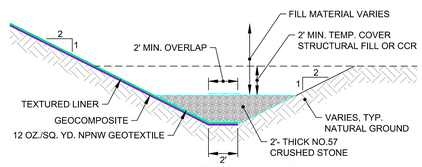
E C-401 SADDLE BUTTRESS SECTION E-E

1" = 10' 0 10 20 FEET

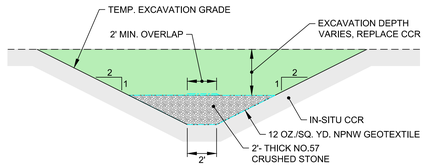


C C-401 SADDLE BUTTRESS SECTION C-C

1" = 30' 0 30 60 FEET



ANCHOR TRENCH & UNDER DRAIN @ TOE OF BUTTRESS

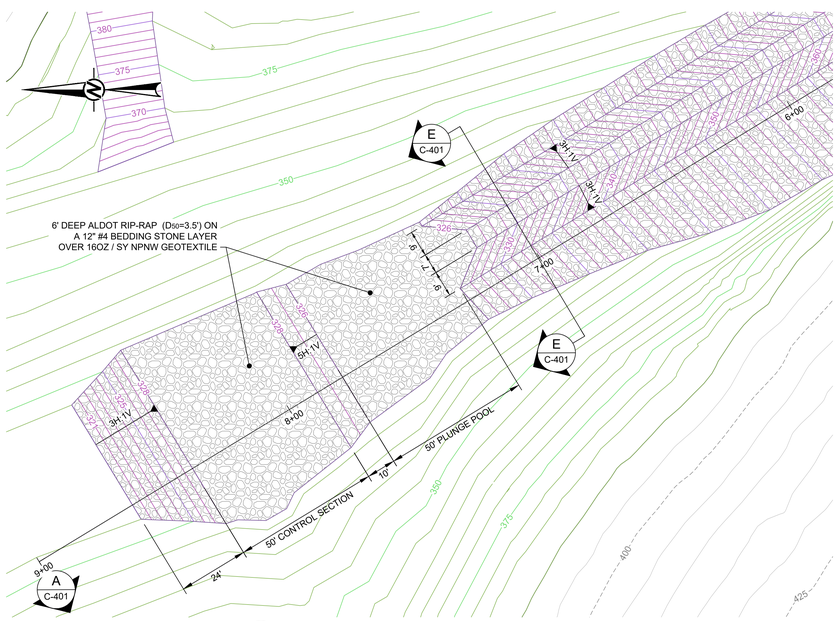


1 C-401 SADDLE BUTTRESS UNDER DRAIN

1" = 4' 0 4 8 FEET

2 C-401 UNDERDRAIN IN CCR

1" = 4' 0 4 8 FEET



3 C-401 SADDLE BUTTRESS PLUNGE POOL AND RIP-RAP PLAN VIEW

1" = 20' 0 20 40 FEET

LEGEND

- 340 — PRE-CLOSURE TOPOGRAPHY / BATHYMETRY CONTOURS (REFERENCE 1)
- 500 — PROPOSED CLOSURE COVER GRADING CONTOURS
- 340 — ESTIMATED BOTTOM OF CCR CONTOURS (REFERENCE 2)
- PROPOSED TEXTURED LINER
- PROPOSED GEOTEXTILE
- PROPOSED GEOCOMPOSITE
- PRE-CLOSURE TOPOGRAPHY / BATHYMETRY
- ESTIMATED BOTTOM OF CCR
- ROCK FILL SHELL
- CONCRETE SAND
- TRANSITION MATERIAL
- PROPOSED NON CCR STRUCTURAL FILL
- PROPOSED NON CCR COMMON FILL
- PROPOSED CCR FILL

NOTES

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SOUTHERN COMPANY SERVICES

Alabama Power

PROJECT
PLANT GORGAS
ASH POND CLOSURE
DESIGN DRAWINGS

TITLE
SADDLE BUTTRESS SECTIONS AND DETAILS

ALABAMA LICENSED No. 29143 PROFESSIONAL ENGINEER GREGORY L. HEBELER
16-OCT-2020

GREGORY L. HEBELER
ALABAMA PROFESSIONAL ENGINEER
CERTIFICATE NUMBER 29143

CONSULTANT
GOLDER

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PROJECT NO. 1789848 | SCS REF. GOR17010 | REV. 0 | DRAWING C-401

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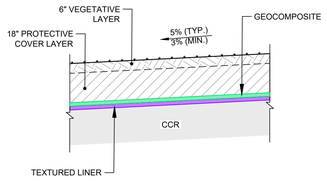
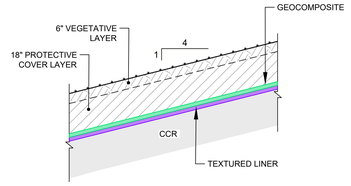


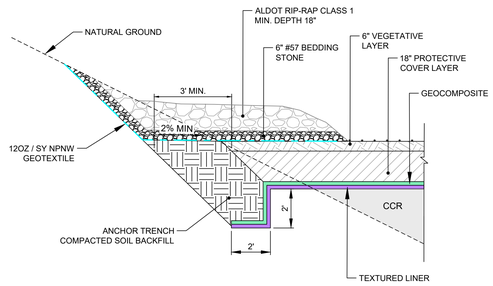
1 C-500 TYPICAL DECK FINAL COVER SYSTEM DETAIL

0 3 6
1" = 3' FEET



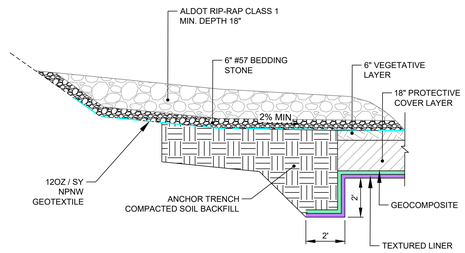
2 C-500 TYPICAL SIDE SLOPE FINAL COVER SYSTEM DETAIL

0 3 6
1" = 3' FEET



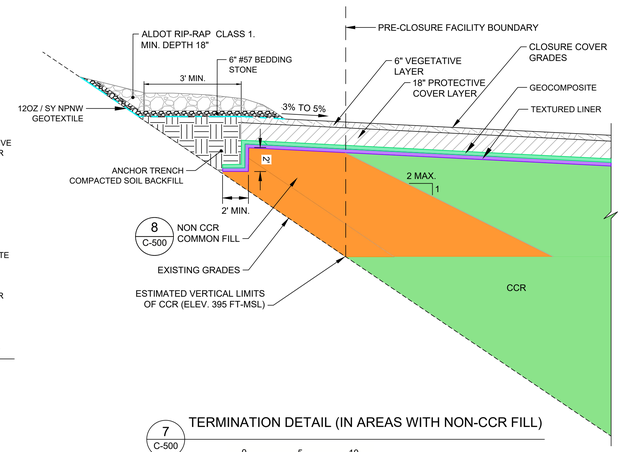
3 C-500 TYPICAL PERIMETER TERMINATION DETAIL

0 3 6
1" = 3' FEET



4 C-500 TYPICAL PERIMETER TERMINATION AT CONCENTRATED FLOW AREAS DETAIL

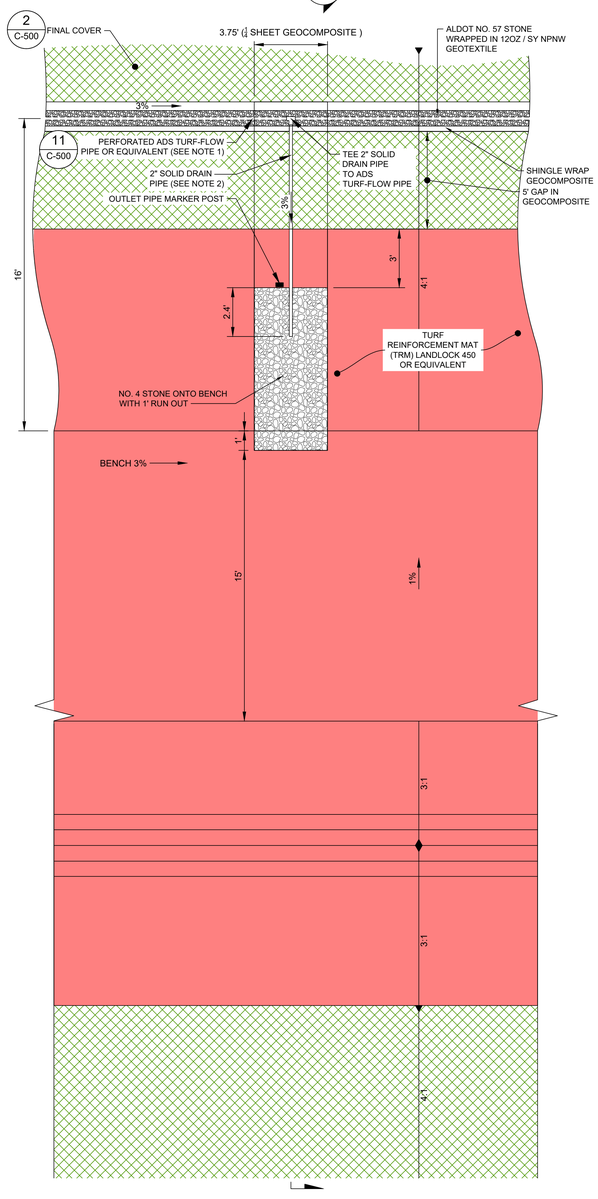
0 3 6
1" = 3' FEET



7 C-500 TERMINATION DETAIL (IN AREAS WITH NON-CCR FILL)

0 5 10
1" = 5' FEET

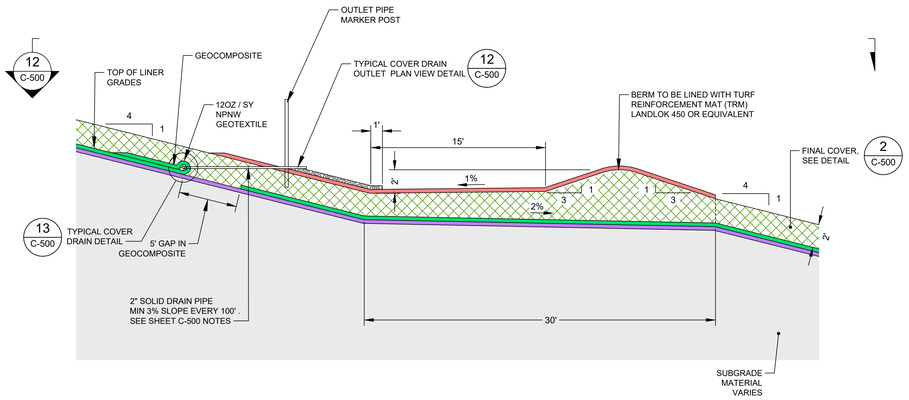
5 C-500



12 C-500 TYPICAL COVER DRAIN OUTLET PLAN VIEW

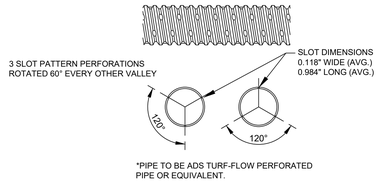
0 3 6
1" = 3' FEET

12 C-500



5 C-500 TYPICAL BENCH DETAIL WITH UNDERDRAIN AND SHOWING TYPICAL COVER DRAIN OUTLET

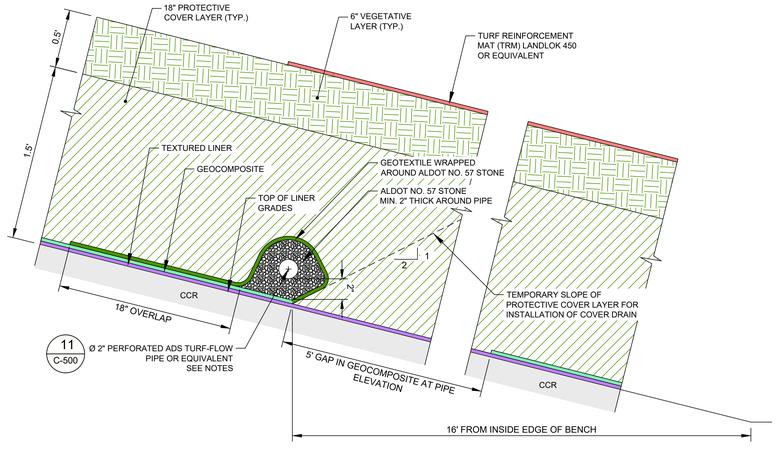
0 5 10
1" = 5' FEET



*PIPE TO BE ADS TURF-FLOW PERFORATED PIPE OR EQUIVALENT.

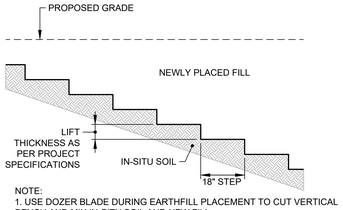
TYPICAL PERFORATED COVER DRAIN PIPE DETAIL
11 C-500

0 3 6
1" = 3' FEET



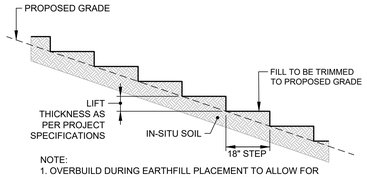
13 C-500 TYPICAL COVER DRAIN DETAIL

0 0.5 1
1" = 0.5' FEET



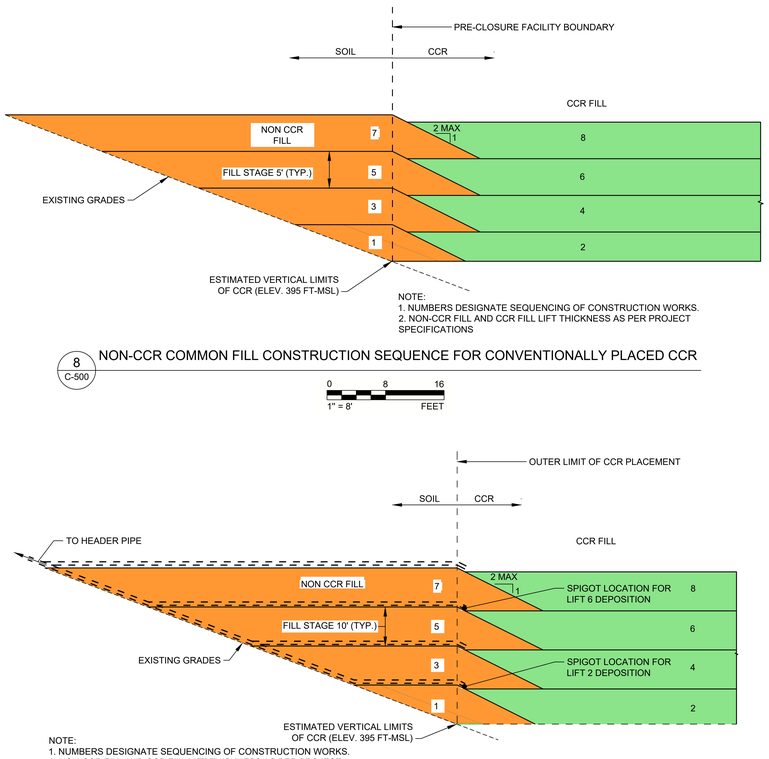
NOTE:
1. USE DOZER BLADE DURING EARTHFILL PLACEMENT TO CUT VERTICAL BENCH AND MIX IN-SITU SOIL AND NEW FILL.

14 C-500 EARTH PLACEMENT BENCH DETAIL



NOTE:
1. OVERBUILD DURING EARTHFILL PLACEMENT TO ALLOW FOR COMPACTION TO EXTEND OUT TO FINISHED GRADES.

15 C-500 FILL SLOPE EDGE DETAIL



NOTE:
1. NUMBERS DESIGNATE SEQUENCING OF CONSTRUCTION WORKS.
2. NON-CCR FILL AND CCR FILL LIFT THICKNESS AS PER PROJECT SPECIFICATIONS

8 C-500 NON-CCR COMMON FILL CONSTRUCTION SEQUENCE FOR CONVENTIONALLY PLACED CCR

0 8 16
1" = 8' FEET

NOTE:
1. NUMBERS DESIGNATE SEQUENCING OF CONSTRUCTION WORKS.
2. NON-CCR FILL AND CCR FILL LIFT THICKNESS AS PER PROJECT SPECIFICATIONS

9 C-500 NON-CCR COMMON FILL CONSTRUCTION SEQUENCE FOR THICKENED CCR DEPOSITION

0 15 30
1" = 15' FEET

NOTES

1. ADS PERFORATED TURF-FLOW PIPE OR EQUIVALENT TO BE INSTALLED 16' HORIZONTALLY FROM THE INSIDE EDGE OF THE BENCH TO RUN AT 3% FLOW, PARALLEL TO SAID BENCH.

2. 2" SOLID DRAIN PIPE TO BE INSTALLED AT 100' O.C. ALONG ADS TURF-FLOW PIPE WITH A MIN. 3% SLOPE DOWN TOWARDS BENCH.

REV	DATE	REVISION DESCRIPTION	DES	CADD	CHK	RVW
1	2020/10/16	ISSUED FOR CONSTRUCTION	GLH	RMS	SCN	GLH

CLIENT
SOUTHERN COMPANY SERVICES

Alabama Power

PROJECT
PLANT GORGAS
ASH POND CLOSURE
DESIGN DRAWINGS

TITLE
CLOSURE DETAILS
SHEET 1

ALABAMA LICENSED PROFESSIONAL ENGINEER GREGORY L. HEBELER No. 29143 16-OCT-2020

GREGORY L. HEBELER
ALABAMA PROFESSIONAL ENGINEER
CERTIFICATE NUMBER 29143

CONSULTANT
GOLDER

YYYY-MM-DD	2020/10/16
DESIGNED	GLH
PREPARED	RMS
CHECKED	SCN
REVIEWED / APPROVED	GLH

PROJECT NO.	SCS REF.	REV.	DRAWING
1789848	GOR17010	0	C-500

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM ANSI D

0 1 in

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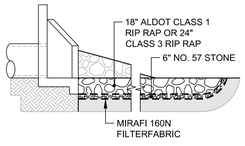

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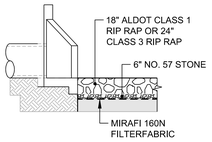

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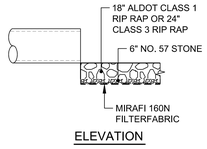

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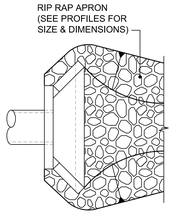
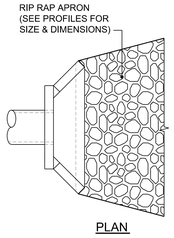


PLAN

1A C-501 PIPE OUTLET TO WELL DEFINED CHANNEL

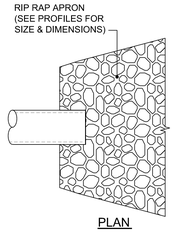
NTS



PLAN

1B C-501 PIPE OUTLET TO FLAT AREA NO WELL DEFINED CHANNEL

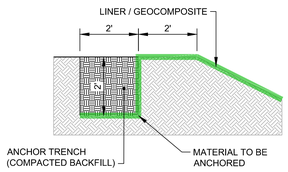
NTS



PLAN

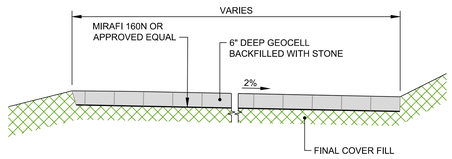
1C C-501 PIPE OUTLET NO HEADWALL TO FLAT AREA NO WELL DEFINED CHANNEL

NTS



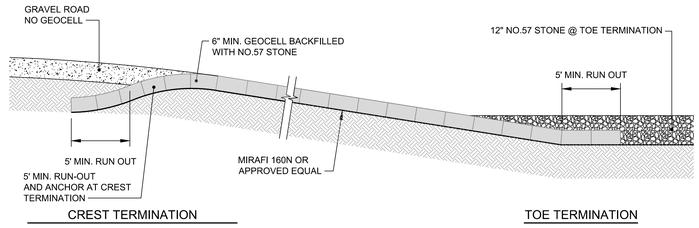
2 C-501 TYPICAL ANCHOR TRENCH

NTS



3 C-501 GEOCELL ACCESS ROAD

NTS



CREST TERMINATION

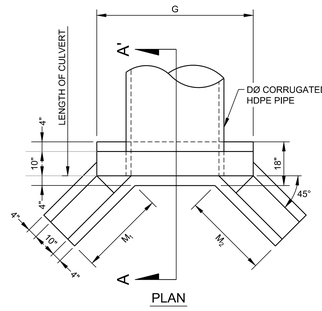
TOE TERMINATION

4 C-501 GEOCELL ACCESS RD. CREST AND TOE TERMINATION

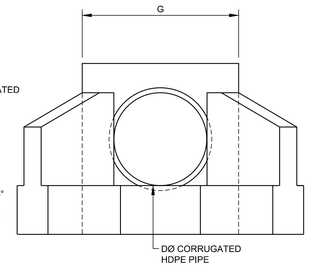
NTS

SINGLE PIPE DIMENSION (2:1 SLOPE)							
OPENING		WALL			FOOTING		
D	AREA SQ. FT.	H	G	L	M_1	M_2	F
30"	4.9	3'-6"	4'-10"	1'-9"	2'-5"	2'-5"	1'-6"
36"	7.1	4'-0"	5'-4"	2'-0"	2'-11"	2'-11"	1'-8"

SINGLE PIPE DIMENSION (3:1 SLOPE)							
OPENING		WALL			FOOTING		
D	AREA SQ. FT.	H	G	L	M_1	M_2	F
30"	4.9	3'-6"	4'-10"	1'-9"	3'-6"	3'-6"	1'-6"
36"	7.1	4'-0"	5'-4"	2'-1"	4'-3"	4'-3"	1'-8"



PLAN

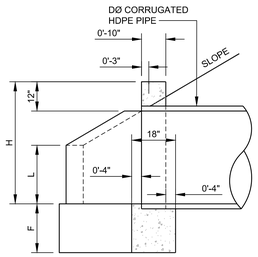


FRONT ELEVATION

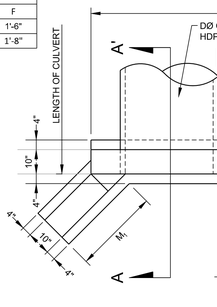
SINGLE PIPE

DUALPIPE DIMENSION (2:1 SLOPE)								
OPENING			WALL			FOOTING		
D	AREA SQ. FT.	C	H	G	L	M_1	M_2	F
2 X 30"	9.80	1'-0"	3'-6"	8'-4"	1'-9"	2'-5"	2'-5"	1'-6"
2 X 36"	14.2	1'-0"	4'-0"	9'-4"	2'-0"	2'-11"	2'-11"	1'-8"

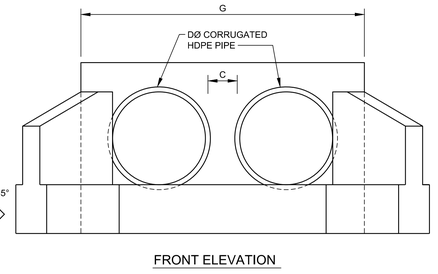
DUALPIPE DIMENSION (3:1 SLOPE)								
OPENING			WALL			FOOTING		
D	AREA SQ. FT.	C	H	G	L	M_1	M_2	F
2 X 30"	9.80	1'-0"	3'-6"	8'-4"	1'-9"	3'-6"	3'-6"	1'-6"
2 X 36"	14.2	1'-0"	4'-0"	9'-4"	2'-1"	4'-3"	4'-3"	1'-8"



SECTION A - A'



PLAN



FRONT ELEVATION

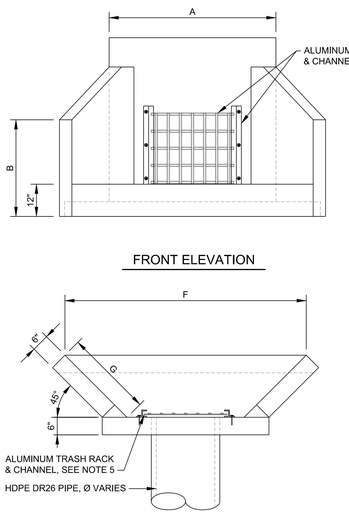
DUAL PIPE

NOTES

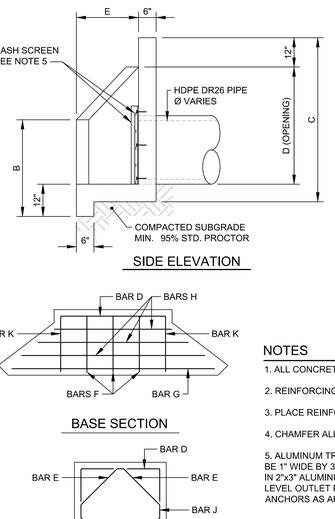
1. ALL CONCRETE TO BE CLASS 5000. ALL REINFORCEMENT SHALL BE GRADE 60.
2. ALL EXPOSED EDGES SHALL HAVE A ONE INCH CHAMFER.
3. REBAR SHALL HAVE 2 INCHES OF CONCRETE COVER WHEN FORMED AND 3 INCHES OF CONCRETE COVER WHEN CONSTRUCTED AGAINST SOIL OR ROCK.
4. THE PRECAST CONCRETE END SECTIONS ARE LIMITED TO 0° THRU 15° SKEW.
5. FOR SPECIFIC INSTALLATION PROCEDURES, CONTACT THE PRECAST END SECTION VENDOR.
6. CONTRACTOR TO PROVIDE REBAR REINFORCEMENT LAYOUT AND SCHEDULE FOR CAST IN PLACE HEADWALLS. REINFORCEMENT TO BE APPROVED BY DESIGN ENGINEER PRIOR TO INSTALLTION.
7. GSE POLYLOCK OR AGRU TRI-LOCK EMBEDMENT STRIPS FOR PRECAST STRUCTURES TO BE PRE-INSTALLED AT THE TIME OF CASTING.

8 C-501 OUTLET HEADWALL

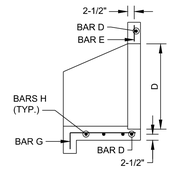
NTS



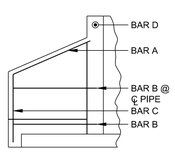
FRONT ELEVATION



SIDE ELEVATION



BASE & WALL SECTION



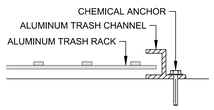
WING SECTION

PLAN

BASE SECTION

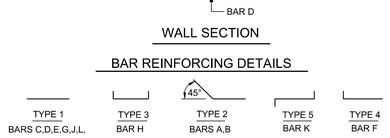
WALL SECTION

BAR REINFORCING DETAILS



ALUMINUM CHANNEL DETAIL

SEE NOTE 5



VARIABLE DIMENSIONS (HDPE DR26 PIPE)										
OUTSIDE DIA. PIPE	A	B	C	D	E	F	G	WT. LBS.	BASE AREA	CU. YDS. CONC.
18"	3'-5"	2'-4"	3'-4 1/2"	2'-0"	1'-5"	4'-10"	2'-0"	1783	8.30	0.43
24"	4'-0"	2'-9"	3'-11"	2'-7"	1'-8"	5'-11"	2'-4 1/2"	2063	11.90	0.51
36"	4'-8"	3'-5"	5'-0"	3'-8"	2'-4"	7'-11"	3'-3 1/2"	4060	19.60	1.00

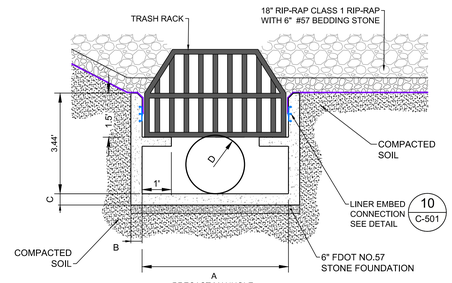
VERTICAL HEADWALL DETAIL

5 C-501 HEADWALLS DETAIL

NTS

NOTES

1. ALL CONCRETE SHALL BE 5000 PSI, UNLESS OTHERWISE NOTED.
2. REINFORCING STEEL SHALL BE #4 BARS (MIN.), GRADE 60, @ 12" O.C. MAX. SPACING.
3. PLACE REINFORCING 2" CLEAR MIN.
4. CHAMFER ALL EXPOSED EDGES 1".
5. ALUMINUM TRASH SCREEN TO BE INSTALLED WHEN SPECIFIED. ALUMINUM TRASH SCREEN SHALL BE 1" WIDE BY 3/8" THICK AND HAVE 4"x6" NOMINAL OPENINGS. TRASH SCREEN SHALL BE INSERTED IN 2"x3" ALUMINUM CHANNELS IN A MANNER WHICH FACILITATES REMOVAL FOR SERVICING LOW LEVEL OUTLET PIPE. ALUMINUM CHANNELS SHALL BE ATTACHED TO HEADWALL USING CHEMICAL ANCHORS AS APPROVED BY ENGINEER.



HDPE TRASH RACK AS SPECIFIED BY "PLASTIC SOLUTIONS INC.", OR APPROVED EQUIVALENT.

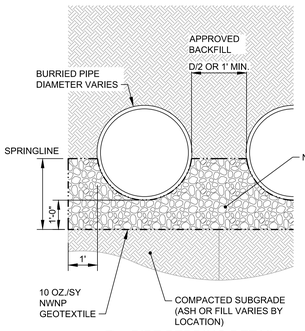
DIMENSION			
PIPE	MANHOLE		
D	A	B	C
24"	48" x 48"	8"	8

6 C-501 STORM WATER BOX IN CHANNEL ST1-DC-03

0 2 4

1" = 2' FEET

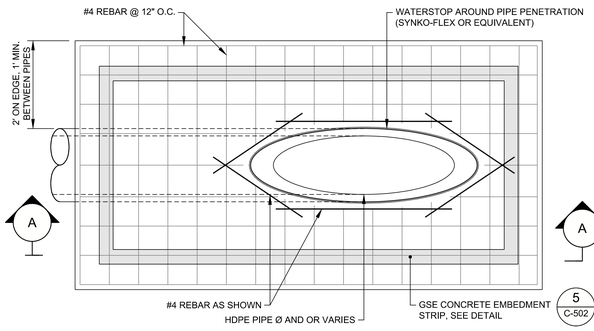
SECTION A - A'



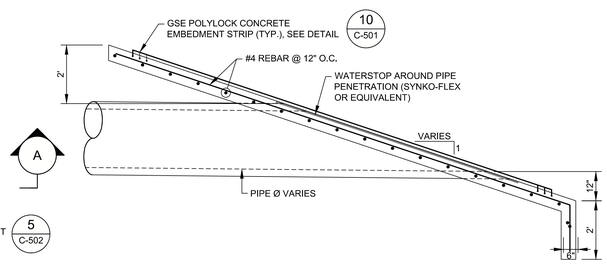
7 C-501 PIPE BEDDING DETAIL

0 2 4

1" = 2' FEET



PLAN

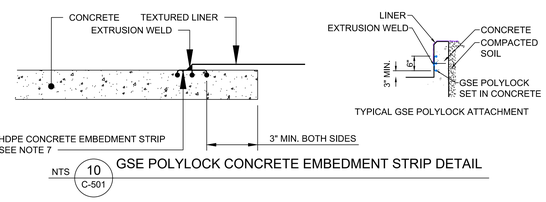


SECTION A-A

9 C-501 MITERED HEADWALL DETAIL

0 2 4

1" = 2' FEET



NTS 10 C-501 GSE POLYLOCK CONCRETE EMBEDMENT STRIP DETAIL

TYPICAL GSE POLYLOCK ATTACHMENT

REV	DATE	REVISION DESCRIPTION	DES	CADD	CHK	RVW
1						
0	2020/10/16	ISSUED FOR CONSTRUCTION	GLH	RS	SCN	GLH

CLIENT

SOUTHERN COMPANY
SERVICES

Alabama Power

PROJECT

PLANT GORGAS
ASH POND CLOSURE
DESIGN DRAWINGS

TITLE

CLOSURE DETAILS
SHEET 2



GREGORY L. HEBELER
ALABAMA PROFESSIONAL ENGINEER
CERTIFICATE NUMBER 29143

CONSULTANT

GOLDER

YYYY-MM-DD	2020/10/16
DESIGNED	GLH
PREPARED	RS
CHECKED	SCN
REVIEWED / APPROVED	GLH

PROJECT NO.	SCS REF.	REV.	DRAWING
1789848	GOR17010	0	C-501

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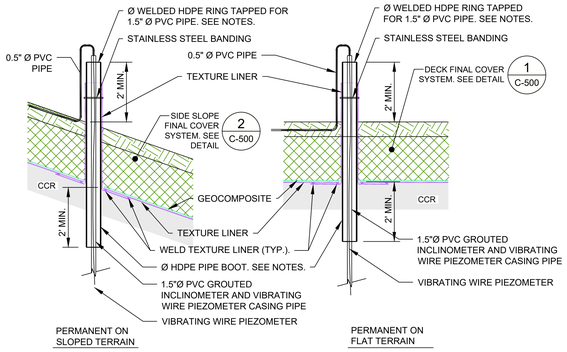
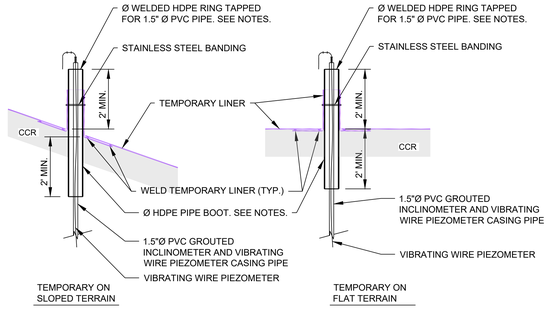
© THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM ARCH D

0 1 in



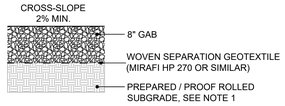


NOTES

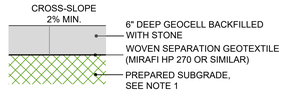
1. 4" Ø HDPE PIPE BOOT REQUIRED FOR INCLINOMETERS AND PIEZOMETERS.
2. 6" Ø HDPE PIPE BOOT REQUIRED FOR DATA ACQUISITION SYSTEM
3. OTHER PENETRATION DIAMETERS DESIGNED AS NEEDED.

1 C-502 INSTRUMENTATION PENETRATION THROUGH LINER

0 2 4
1" = 2' FEET



2 C-502 TYPICAL ROAD DETAIL



3 C-502 TYPICAL GEOCELL ROAD DETAIL

NOTES

1. ROADWAY SUBGRADES SHOULD BE PREPARED AND PROOF ROLLED ACCORDING TO THE PROJECT SPECIFICATIONS, WITH UNSUITABLE AREAS OVER-EXCAVATED OR OTHERWISE STABILIZED UNTIL A PASSING PROOF-ROLL IS OBTAINED.
2. MAX. VERTICAL GRADE ON ROADWAYS OF 8% PREFERRED, UP TO 12% AT APPROVAL OF OWNER OR ENGINEER.
3. ROADWAYS SHOULD EITHER BE CROWNED OR CROSS GRADED AT A NOMINAL TRANSVERSE SLOPE OF 2%.

REV	DATE	REVISION DESCRIPTION	DES	CADD	CHK	RVW
0	2020/10/16	ISSUED FOR CONSTRUCTION	GLH	AVR	SCN	GLH

CLIENT
SOUTHERN COMPANY SERVICES

Alabama Power

PROJECT
PLANT GORGAS
ASH POND CLOSURE
DESIGN DRAWINGS

TITLE
CLOSURE DETAILS
SHEET 3

ALABAMA LICENSED PROFESSIONAL ENGINEER GREGORY L. HEBELER No. 20143

GREGORY L. HEBELER
ALABAMA PROFESSIONAL ENGINEER
CERTIFICATE NUMBER 20143

CONSULTANT
GOLDER

YYYY-MM-DD	2020/10/16
DESIGNED	GLH
PREPARED	AVR
CHECKED	SCN
REVIEWED / APPROVED	GLH

PROJECT NO.	SCS REF.	REV.	DRAWING
1789848	GOR17010	0	C-502

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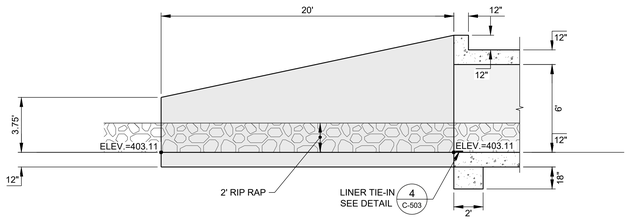
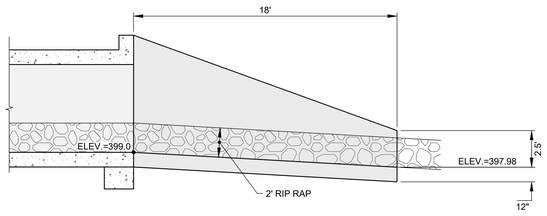
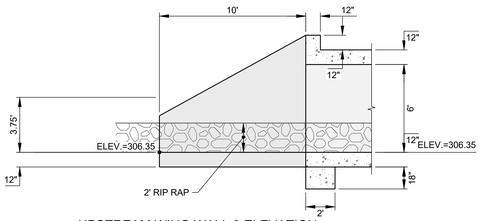


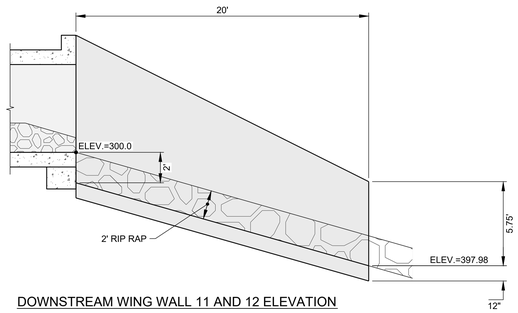
UPSTREAM WING WALL 1 AND 2 ELEVATION



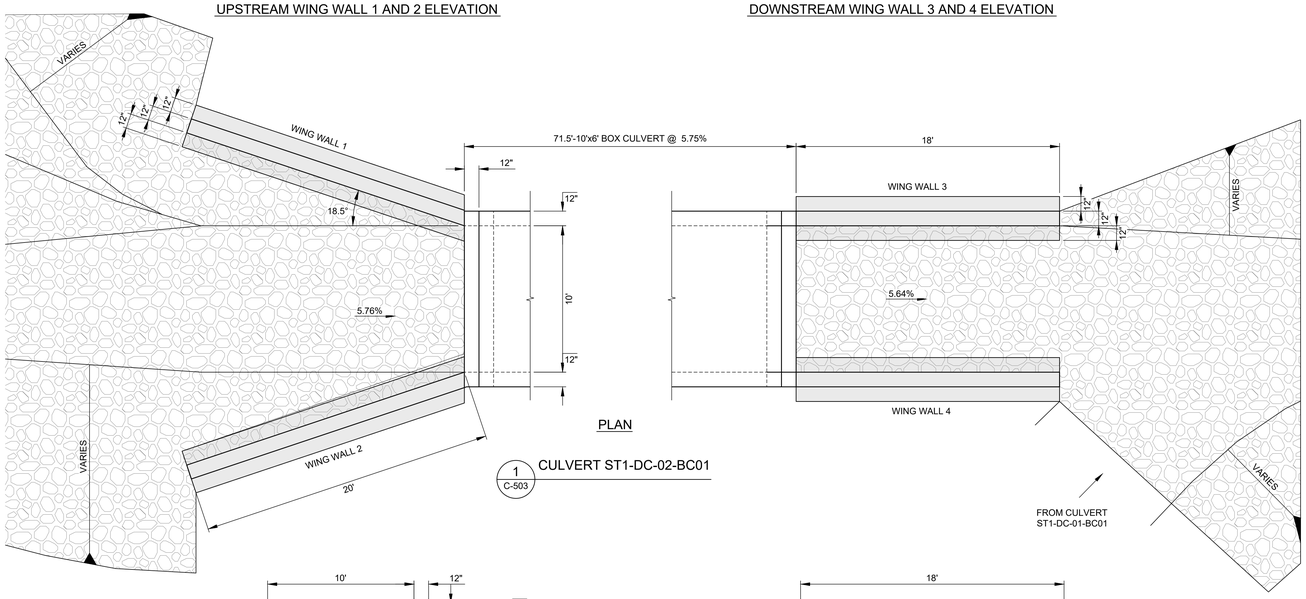
DOWNSTREAM WING WALL 3 AND 4 ELEVATION



UPSTREAM WING WALL 9 ELEVATION

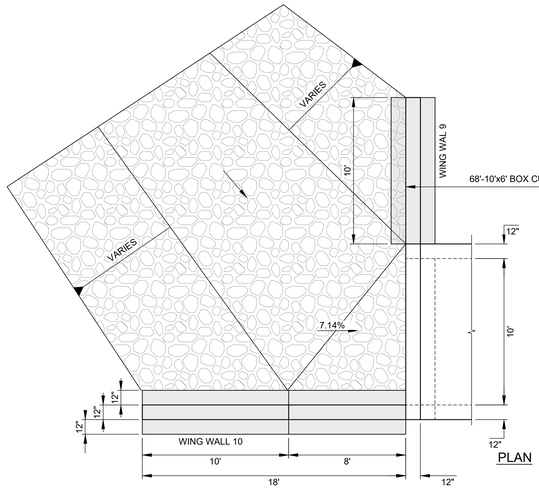


DOWNSTREAM WING WALL 11 AND 12 ELEVATION

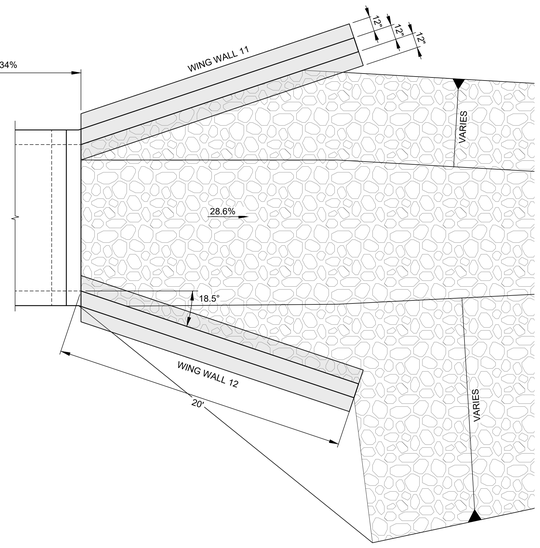


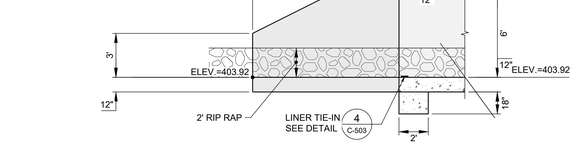
PLAN

1 C-503 CULVERT ST1-DC-02-BC01

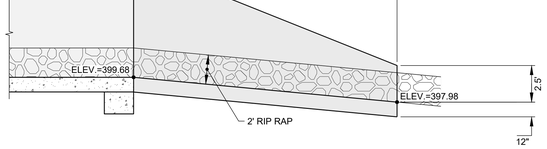


PLAN

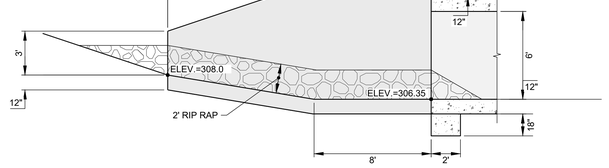




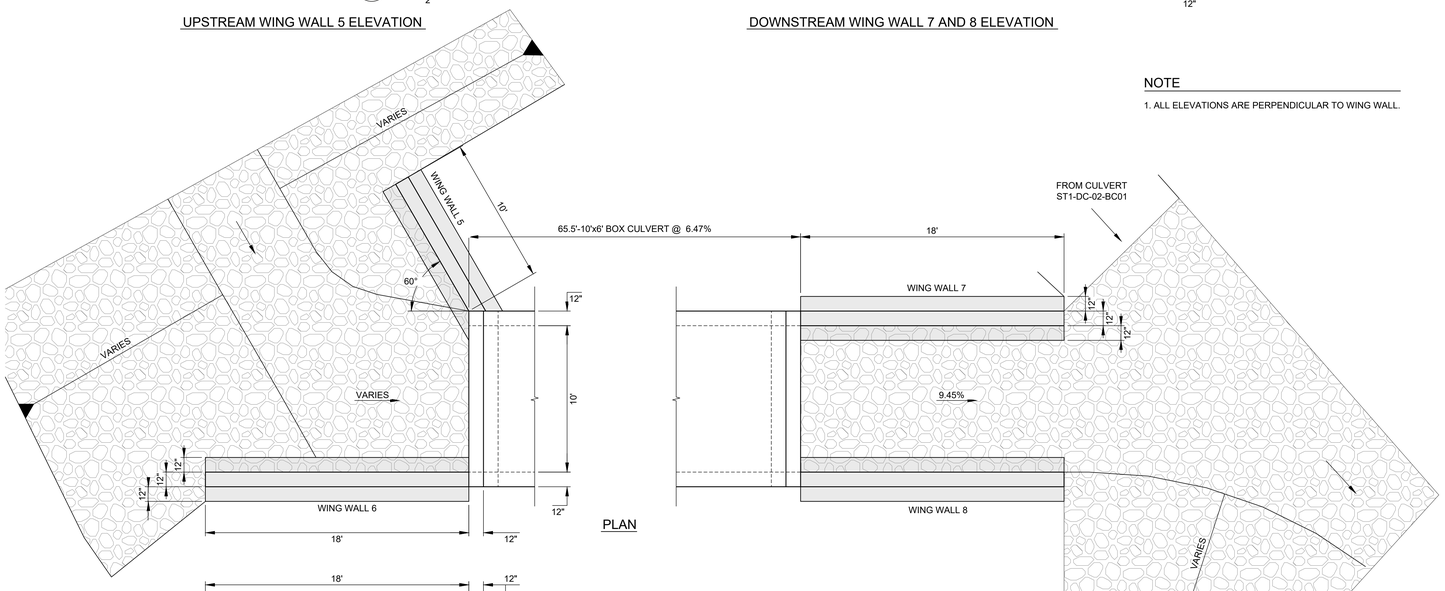
UPSTREAM WING WALL 5 ELEVATION



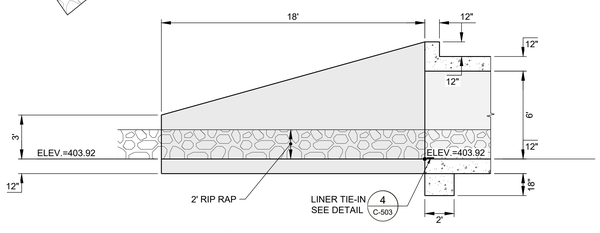
DOWNSTREAM WING WALL 7 AND 8 ELEVATION



UPSTREAM WING WALL 10 ELEVATION



PLAN



UPSTREAM WING WALL 6 ELEVATION

2 C-503 CULVERT ST1-DC-01-BC01

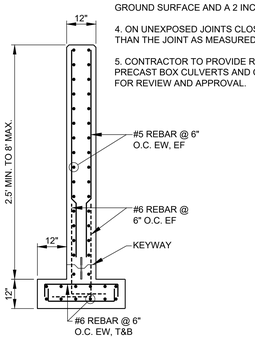
3 C-503 CULVERT BUT-DS-01-BC01

NOTE

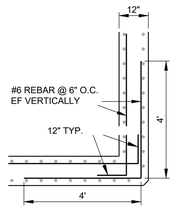
1. ALL ELEVATIONS ARE PERPENDICULAR TO WING WALL.

NOTES

1. ALL CONCRETE TO BE CLASS 5000. ALL REINFORCEMENT SHALL BE GRADE 60.
2. ALL EXPOSED EDGES SHALL HAVE A MINIMUM ONE INCH CHAMFER.
3. REBAR SHALL HAVE A 3 INCH CONCRETE COVER WHEN POURED AGAINST GROUND SURFACE AND A 2 INCH CONCRETE WHEN POURED AGAINST FORMS.
4. ON UNEXPOSED JOINTS CLOSED CELL ROUND BUTYL CORD 1/4 INCH LARGER THAN THE JOINT AS MEASURED IN THE FIELD, SHALL BE INSTALLED.
5. CONTRACTOR TO PROVIDE REINFORCEMENT LAYOUT AND SCHEDULE FOR PRECAST BOX CULVERTS AND CAST IN PLACE WING WALLS AS A SUBMITTAL FOR REVIEW AND APPROVAL.



TYPICAL REINFORCEMENT SECTION



TYPICAL WALL CORNER REINFORCEMENT - PLAN

NTS 5 C-503 REINFORCEMENT DETAIL

0 4 8
1" = 4' FEET

REV	DATE	REVISION DESCRIPTION	DES	CADD	CHK	RVW
1	2020/10/16	ISSUED FOR CONSTRUCTION	GLH	AVR	SCN	GLH

CLIENT
SOUTHERN COMPANY SERVICES

Alabama Power

PROJECT
PLANT GORGAS
ASH POND CLOSURE
100% DESIGN DRAWINGS

TITLE
CLOSURE DETAILS
SHEET 4

CONSULTANT
GOLDER

YYYY-MM-DD	2020/10/16
DESIGNED	GLH
PREPARED	AVR
CHECKED	SCN
REVIEWED / APPROVED	GLH

PROJECT NO. 1789848 | SCS REF. GOR17010 | REV. 0 | DRAWING C-503

ALABAMA LICENSED PROFESSIONAL ENGINEER GREGORY L. HEBELER No. 29143 16 OCT 2020

GREGORY L. HEBELER
ALABAMA PROFESSIONAL ENGINEER
CERTIFICATE NUMBER 29143

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM ANSI D
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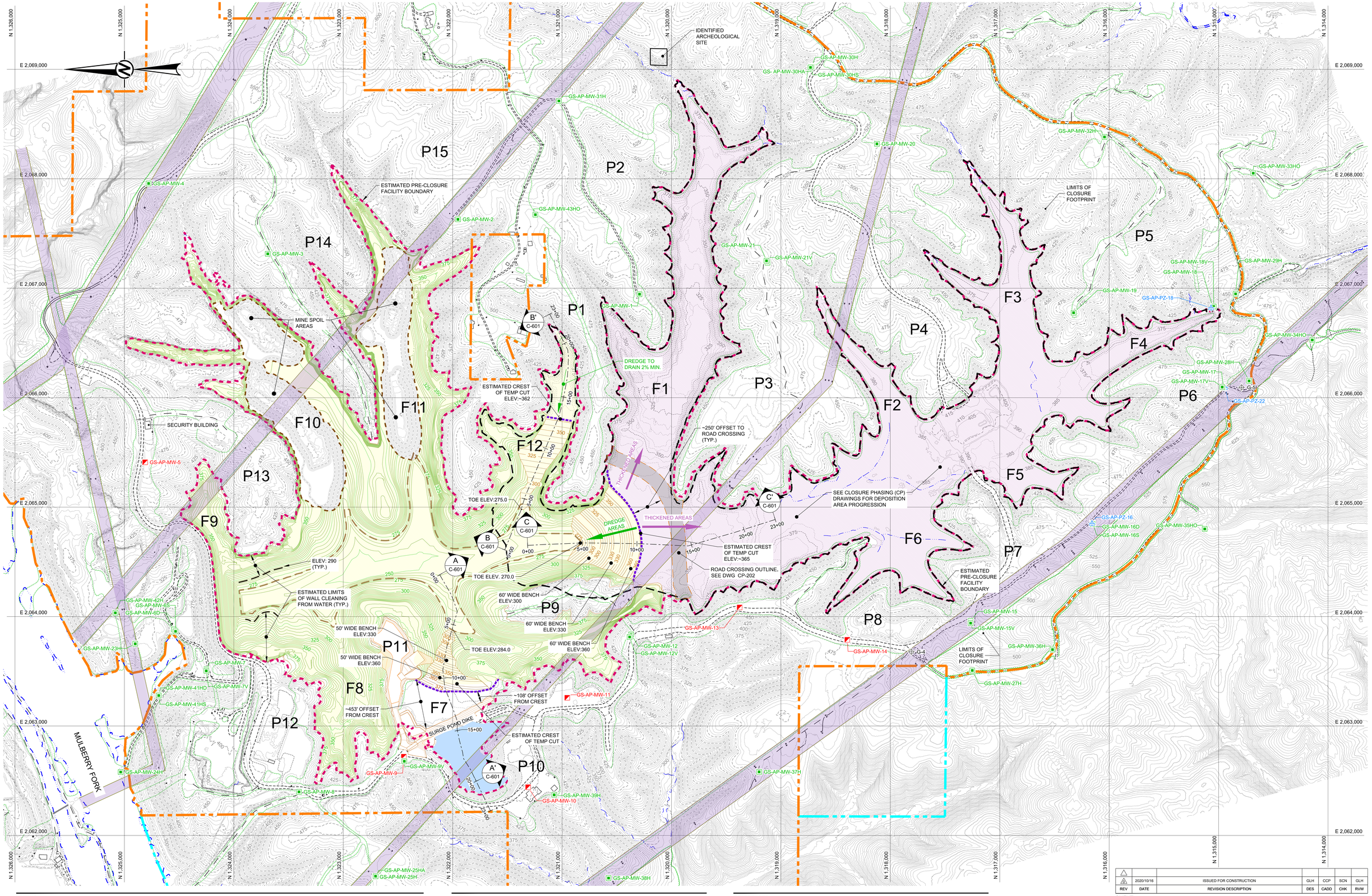

LEGEND

- EXISTING TOPOGRAPHY / BATHYMETRY CONTOURS (REFERENCE 1)
- PROPOSED GRADING CONTOURS OUTSIDE CLOSURE LIMITS
- ESTIMATED BOTTOM OF CCR CONTOURS (REFERENCE 2)
- PROPOSED DEPOSITION AND DREDGE GRADING CONTOURS (1FT)
- ESTIMATED MINE SPOIL AREA AREA FOOTPRINT
- EXISTING ROAD
- EXISTING TRAIL
- EXISTING PARKING AREA
- EXISTING POWER POLES / TOWERS
- APC OWNED PROPERTY BOUNDARIES
- APPROXIMATE APC OWNED PROPERTY BOUNDARIES
- EXISTING TRANSMISSION CORRIDOR
- ESTIMATED PRE-CLOSURE FACILITY BOUNDARY
- LIMITS OF CLOSURE FOOTPRINT
- POST-CLOSURE CCR LIMITS
- EXCAVATION LINE AT BOTTOM OF EXISTING CCR
- EXCAVATION LINE AT TOP OF EXISTING CCR
- G-4 — EXISTING MONITORING WELL LOCATION (NOT IN MODELING NETWORK)
- GS-AP-PZ-18 — EXISTING PIEZOMETER LOCATION
- GS-AP-MW-01 — EXISTING MONITORING WELL LOCATION
- GS-AP-MW-05 — ABANDONED MONITORING WELL
- PROPOSED DREDGE AREA
- PROPOSED THICKENED ASH DEPOSITION AREA
- P1 / F1 — PENINSULA / FINGER

NOTES

1. ELEVATIONS ARE IN FEET WITH REFERENCE TO NORTH AMERICAN VERTICAL DATUM (NAVD) 1988. COORDINATES CORRESPOND TO ALABAMA WEST STATE PLANE COORDINATE SYSTEM, NORTH AMERICAN DATUM (NAD) 1983.

REFERENCES

1. EXISTING TOPOGRAPHY PROVIDED BY SOUTHERN COMPANY SERVICES, FEBRUARY 2020.
2. BOTTOM OF CCR TOPOGRAPHY TAKEN FROM USGS, PORT BIRMINGHAM, 1938 AND GOODSPINGS, 1971 QUADRANGLES. TOPOGRAPHY WAS INTERPRETED BETWEEN 20 FOOT CONTOURS AND ADJUSTED BASED ON GEOTECHNICAL INVESTIGATION DATA BY GOLDER ASSOCIATES INC.
3. EXISTING AND APPROXIMATE PROPERTY BOUNDARIES PROVIDED BY SOUTHERN COMPANY SERVICES, APRIL 2020.

0 300 600
1" = 300' FEET

REV	DATE	REVISION DESCRIPTION	DES	CADD	CHK	RVW
1						
0	2020/10/16	ISSUED FOR CONSTRUCTION	GLH	CCP	SCN	GLH

CLIENT
SOUTHERN COMPANY SERVICES

Alabama Power

PROJECT
PLANT GORGAS
ASH POND CLOSURE
DESIGN DRAWINGS

TITLE
TEMPORARY CUT AND MAXIMUM DREDGE AREA PLAN

ALABAMA LICENSED PROFESSIONAL ENGINEER GREGORY L. HEBELER No. 29143 16 OCT 2020

GREGORY L. HEBELER
ALABAMA PROFESSIONAL ENGINEER
CERTIFICATE NUMBER 29143

CONSULTANT
GOLDER

YYYY-MM-DD	2020/10/16
DESIGNED	GLH
PREPARED	CCP
CHECKED	SCN
REVIEWED / APPROVED	GLH

PROJECT NO.	SCS REF.	REV.	DRAWING
1789848	GOR17010	0	C-600

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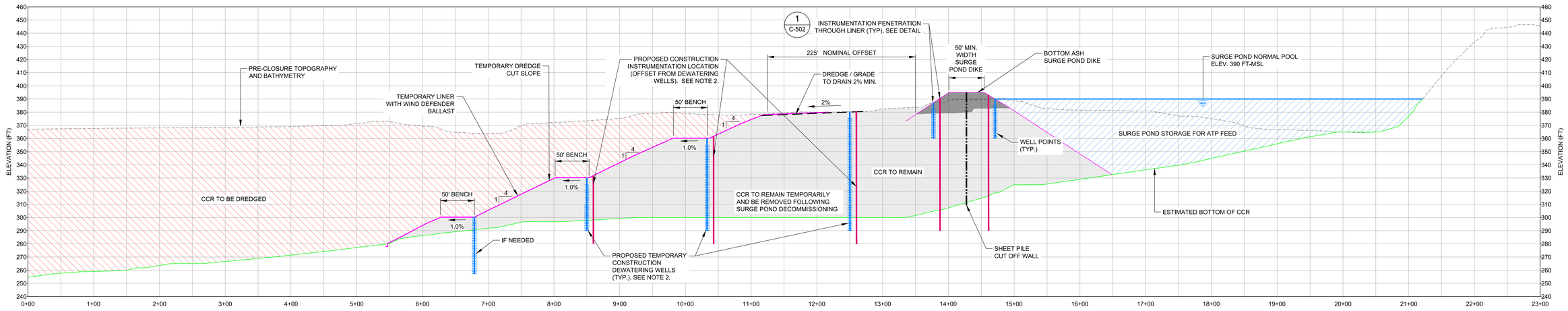
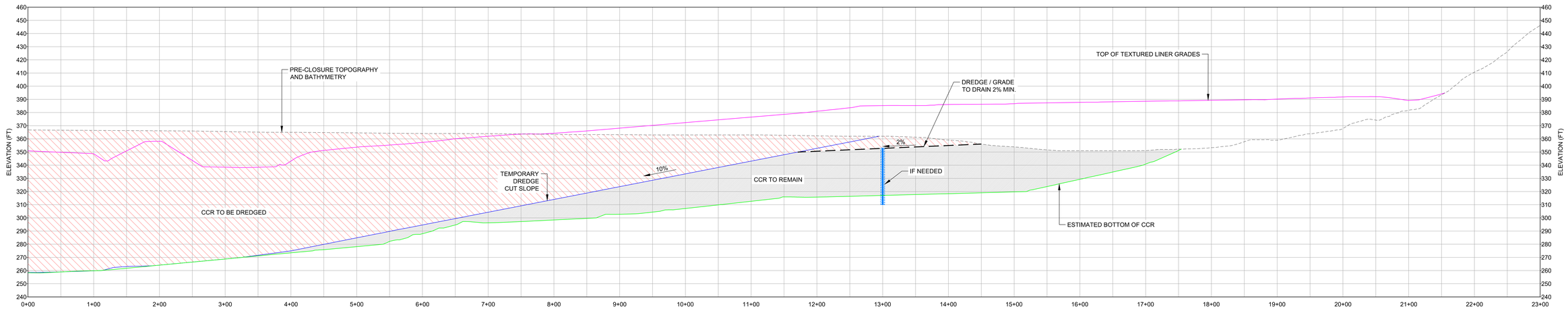
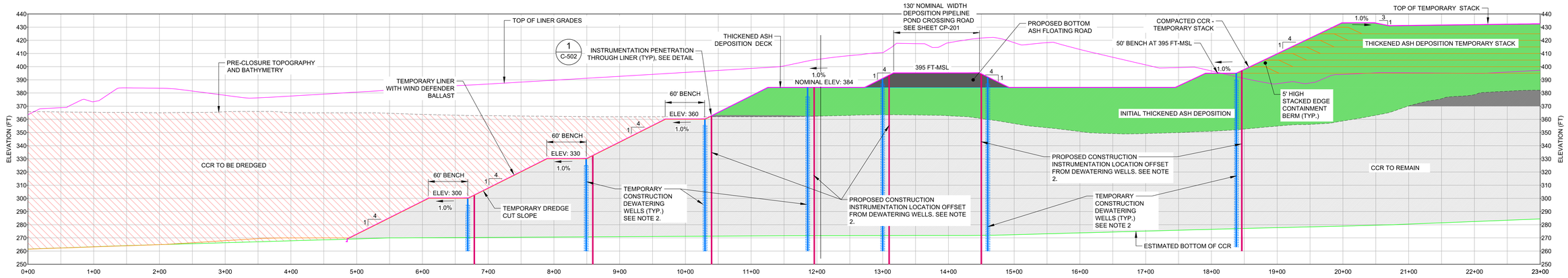


A - A' - FINGER F7 CUT SLOPE & SURGE POND AREA SECTION



B - B' - FINGER F12 CUT SLOPE SECTION



C - C' - MAIN POND CUT SLOPE SECTION

NOTES

1. ELEVATIONS ARE IN FEET WITH REFERENCE TO NORTH AMERICAN VERTICAL DATUM (NAVD) 1988. COORDINATES CORRESPOND TO ALABAMA WEST STATE PLANE COORDINATE SYSTEM, NORTH AMERICAN DATUM (NAD) 1983.

2. LOCATION AND TYPE OF INSTRUMENTATION AND DEWATERING WELLS AND WELL POINTS TO BE BASED ON FINAL IMS PLAN.

REFERENCES

1. EXISTING TOPOGRAPHY PROVIDED BY SOUTHERN COMPANY SERVICES, FEBRUARY 2020.

2. BATHYMETRIC SURFACE IS A COMPOSITE OF THE FEBRUARY 2020 SOUTHERN COMPANY AND THE JANUARY 2020 ARCSURVEY BATHYMETRIC SURVEYS TIED TO INTERPRETED SECTIONS OF THE 2016 SOUTHERN COMPANY BATHYMETRIC SURVEY WHERE SURVEY DATA IS NOT AVAILABLE.

3. BOTTOM OF CCR TOPOGRAPHY TAKEN FROM USGS, PORT BIRMINGHAM, 1938 AND GOODSPINGS, 1971 QUADRANGLES. TOPOGRAPHY WAS INTERPRETED BETWEEN 20 FOOT CONTOURS AND ADJUSTED BASED ON GEOTECHNICAL INVESTIGATION DATA BY GOLDER ASSOCIATES INC.

LEGEND

- NORMAL PRE-CLOSURE WATER LEVEL
- PROPOSED CLOSURE GRADING
- PRE-CLOSURE TOPOGRAPHY AND BATHYMETRY (REFERENCE 1 & 2)
- ESTIMATED BOTTOM OF CCR (REFERENCE 3)
- PRE-CLOSURE WATER
- EXISTING CCR TO REMAIN
- BOTTOM OF ASH
- PROPOSED CCR CUT
- PROPOSED CCR FILL

HORIZONTAL SCALE: 0, 60, 120 — 1" = 60' FEET

VERTICAL SCALE: 0, 30, 60 — 1" = 30' FEET

REV	DATE	REVISION DESCRIPTION	DES	CADD	CHK	RVW
1						
0	2020/10/16	ISSUED FOR CONSTRUCTION	GLH	CCP	SCN	GLH

CLIENT
SOUTHERN COMPANY SERVICES

Alabama Power

PROJECT
PLANT GORGAS
ASH POND CLOSURE
DESIGN DRAWINGS

TITLE
TEMPORARY CUT AND MAXIMUM DREDGE AREA SECTIONS

ALABAMA LICENSED PROFESSIONAL ENGINEER No. 29143 GREGORY L. HEBELER 16 OCT 2020

GREGORY L. HEBELER
ALABAMA PROFESSIONAL ENGINEER
CERTIFICATE NUMBER 29143

CONSULTANT
GOLDER

YYYY-MM-DD	2020/10/16
DESIGNED	GLH
PREPARED	CCP
CHECKED	SCN
REVIEWED / APPROVED	GLH

PROJECT NO.	SCS REF.	REV.	DRAWING
1789848	GOR17010	0	C-601

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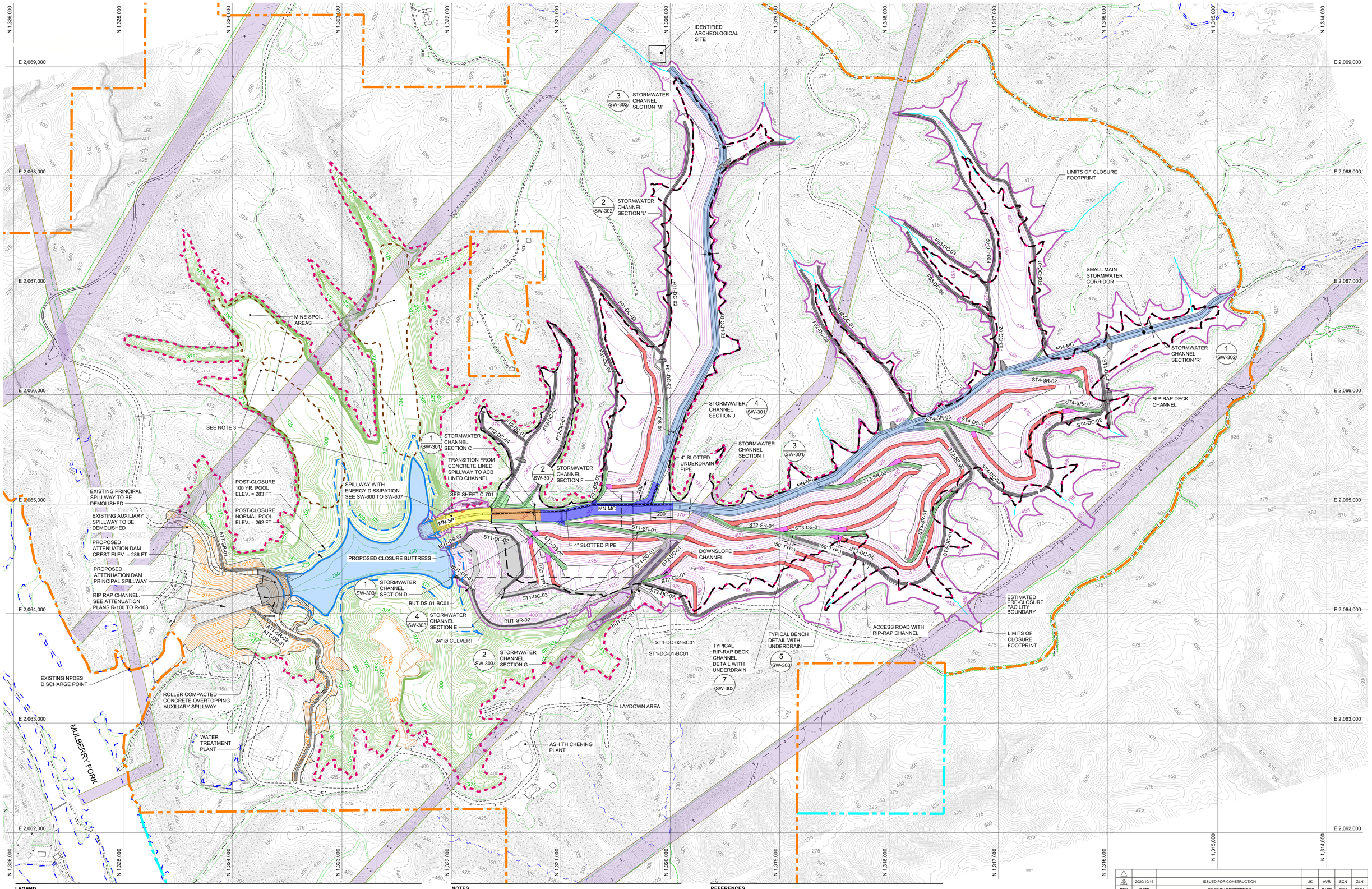

LEGEND

- EXISTING TOPOGRAPHY / BATHYMETRY CONTOURS (REFERENCE 1)
- PROPOSED CLOSURE COVER GRADING CONTOURS
- PROPOSED GRADING CONTOURS OUTSIDE CLOSURE LIMITS
- ESTIMATED BOTTOM OF CCR CONTOURS (REFERENCE 2)
- ESTIMATED MINE SPOIL AREA FOOTPRINT
- EXISTING ROAD
- EXISTING TRAIL
- EXISTING PARKING AREA
- EXISTING EDGE OF WATER
- EXISTING POWER POLES / TOWERS
- APC OWNED PROPERTY BOUNDARIES
- APPROXIMATE APC OWNED PROPERTY BOUNDARIES
- ESTIMATED PRE-CLOSURE FACILITY BOUNDARY
- EXISTING TRANSMISSION CORRIDOR
- LIMITS OF CLOSURE FOOTPRINT
- POST-CLOSURE CCR LIMITS
- STREAMS PROVIDED BY CAHABA CONSULTING, LLC
- POST-CLOSURE 100 YR. POOL ELEVATION LIMITS
- ON CAP ACCESS ROAD
- CONCRETE SPILLWAY OUTSIDE LIMITS OF CCR LIMITS.
- CONCRETE SAND (1' THICK) AND CONCRETE SAND TRENCH WITH SLOTTED PIPE
- BOTTOM ASH (1' THICK) AND CONCRETE SAND TRENCH WITH SLOTTED PIPE
- BOTTOM ASH (1' THICK) AND CONCRETE SAND TRENCH WITH NO PIPE
- GEOCOMPOSITE DRAINAGE MATERIAL
- BOTTOM ASH (1' THICK)
- CHANNEL WITH NO UNDERDRAIN
- BENCH WITH NO UNDERDRAIN
- ALDOT RIP-RAP

0 300 600
1" = 300' FEET

NOTES

1. ELEVATIONS ARE IN FEET WITH REFERENCE TO THE NORTH AMERICAN VERTICAL DATUM (NAVD) OF 1988. COORDINATES CORRESPOND TO THE ALABAMA WEST STATE PLANE COORDINATE SYSTEM, NORTH AMERICAN DATUM (NAD) 1983.
2. CONTOUR INTERVAL IS 5 FEET.
3. POST CLOSURE GRADES IN CLOSURE BY REMOVAL RESTORATION AREAS ARE NOT FINAL, WITH RESTORATION DESIGN TO FOLLOW LATER IN CLOSURE DESIGN PROCESS.

REFERENCES

1. EXISTING TOPOGRAPHY PROVIDED BY SOUTHERN COMPANY SERVICES, FEBRUARY 2020.
2. BATHYMETRIC SURFACE IS A COMPOSITE OF THE FEBRUARY 2020 SOUTHERN COMPANY AND THE JANUARY 2020 ARCSURVEY BATHYMETRIC SURVEYS TIED TO INTERPRETED SECTIONS OF THE 2016 SOUTHERN COMPANY BATHYMETRIC SURVEY WHERE SURVEY DATA IS NOT AVAILABLE.
3. BOTTOM OF CCR TOPOGRAPHY TAKEN FROM USGS, PORT BIRMINGHAM, 1938 AND GOODSPINGS, 1971 QUADRANGLES. TOPOGRAPHY WAS INTERPRETED BETWEEN 20 FOOT CONTOURS AND ADJUSTED BASED ON GEOTECHNICAL INVESTIGATION DATA BY GOLDER ASSOCIATES INC.
4. EXISTING AND APPROXIMATE PROPERTY BOUNDARIES PROVIDED BY SOUTHERN COMPANY SERVICES, APRIL 2020.

REV	DATE	REVISION DESCRIPTION	DES	CADD	CHK	RVW
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CLIENT
SOUTHERN COMPANY SERVICES

Alabama Power

PROJECT
PLANT GORGAS
ASH POND CLOSURE
DESIGN DRAWINGS

TITLE
FINAL COVER SYSTEM UNDERDRAIN LAYOUT

ALABAMA LICENSED No. 29143 PROFESSIONAL 16-OCT-2020 ENGINEER GREGORY L. HEBELER

GREGORY L. HEBELER
ALABAMA PROFESSIONAL ENGINEER
CERTIFICATE NUMBER 29143

CONSULTANT
GOLDER

YYYY-MM-DD	2020/10/16
DESIGNED	JK
PREPARED	AVR
CHECKED	SCN
REVIEWED / APPROVED	GLH

PROJECT NO. 1789848 | SCS REF. GOR17010 | REV. 0 | DRAWING C-700

0 1 in
IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM ANSI E

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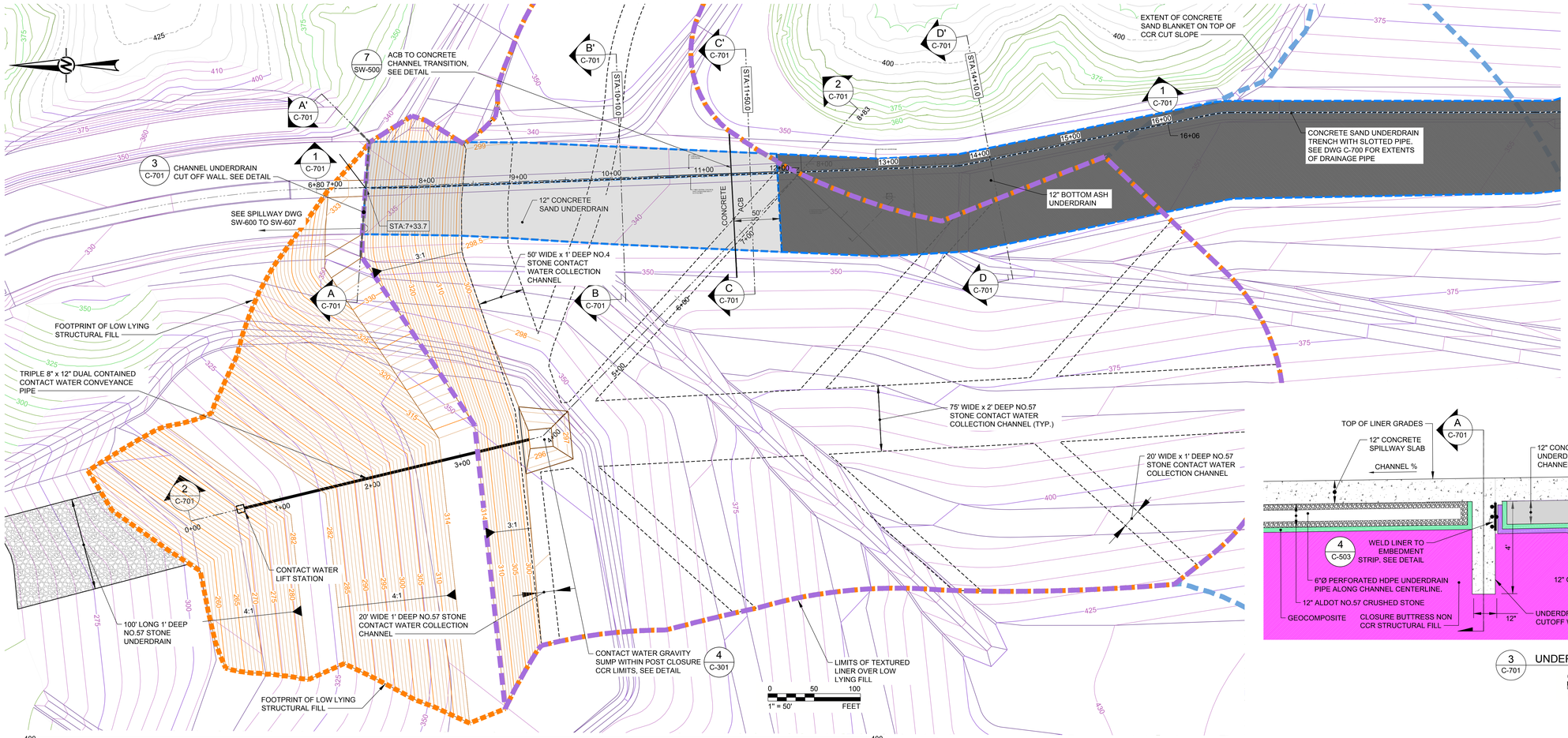


LEGEND

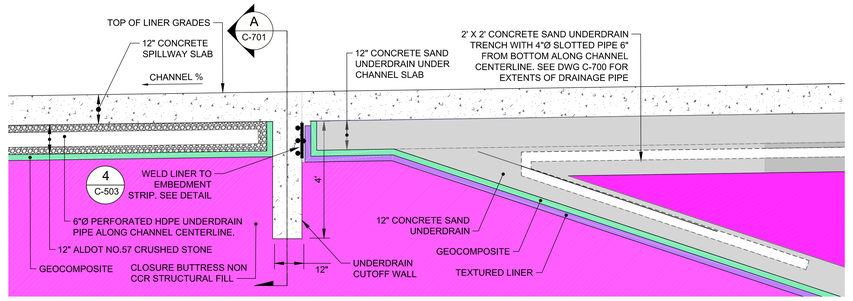
- PROPOSED TOP OF LINER GRADING
- EXISTING TOPOGRAPHY / BATHYMETRY GRADING (REFERENCE 1 & 2)
- ESTIMATED BOTTOM OF CCR
- LOW LYING STRUCTURAL FILL GRADING
- NO 57 STONE UNDERDRAIN
- CONCRETE SAND UNDERDRAIN
- PROPOSED BOTTOM ASH UNDERDRAIN
- PROPOSED STRUCTURAL FILL
- PROPOSED CCR FILL
- GEOCOMPOSITE
- TEXTURED LINER

NOTES

1. ELEVATIONS ARE IN FEET WITH REFERENCE TO THE NORTH AMERICAN VERTICAL DATUM (NAVD) OF 1988. COORDINATES CORRESPOND TO THE ALABAMA WEST STATE PLAN COORDINATE SYSTEM, NORTH AMERICAN DATUM (NAD) 1983.

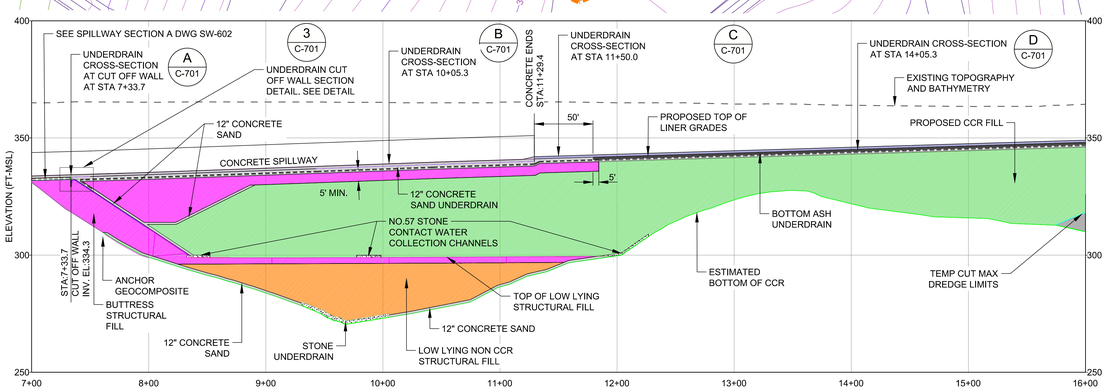
REFERENCES

1. EXISTING TOPOGRAPHY PROVIDED BY SOUTHERN COMPANY SERVICES, FEBRUARY 2020.
2. BOTTOM OF CCR TOPOGRAPHY TAKEN FROM USGS, PORT BIRMINGHAM, 1938 AND GOODSPINGS, 1971 QUADRANGLES. TOPOGRAPHY WAS INTERPRETED BETWEEN 20 FOOT CONTOURS AND ADJUSTED BASED ON GEOTECHNICAL INVESTIGATION DATA BY GOLDER ASSOCIATES INC.



3 C-701 UNDERDRAIN CUT OFF WALL SECTION DETAIL

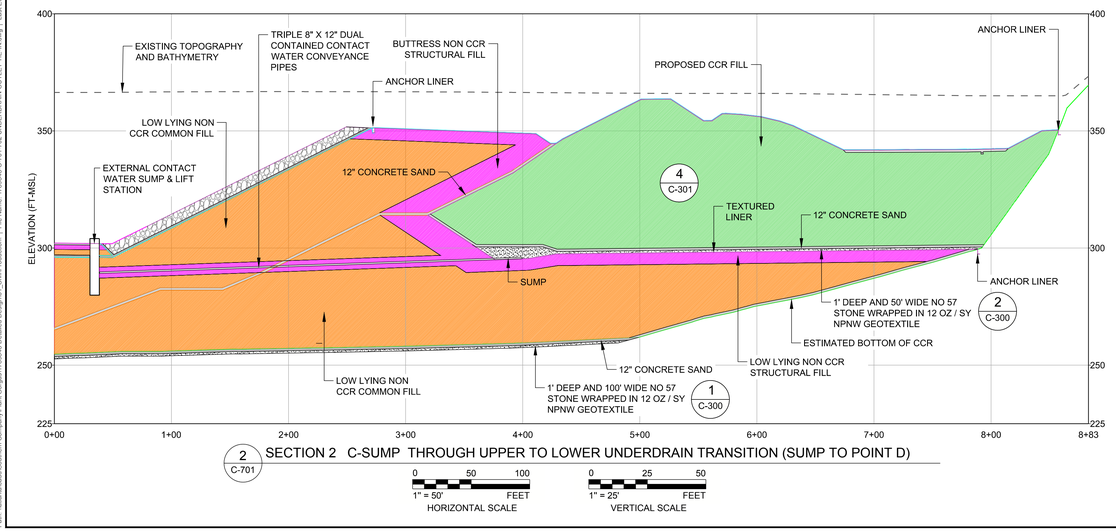
0 2 4
1" = 2' FEET



1 C-701 SECTION 1 A-C-B THROUGH CHANNEL UNDERDRAIN TERMINATION (POINTS A TO C TO B)

0 50 100
1" = 50' FEET
HORIZONTAL SCALE

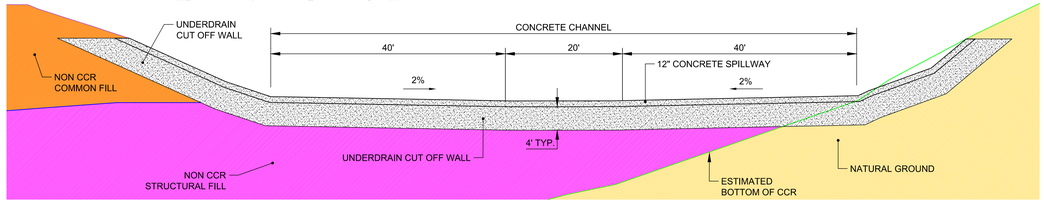
0 25 50
1" = 25' FEET
VERTICAL SCALE



2 C-701 SECTION 2 C-SUMP THROUGH UPPER TO LOWER UNDERDRAIN TRANSITION (SUMP TO POINT D)

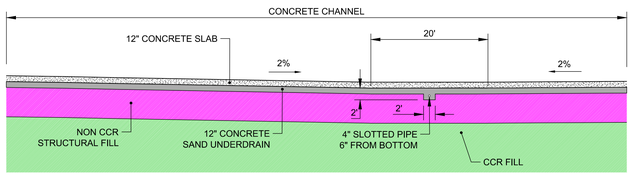
0 50 100
1" = 50' FEET
HORIZONTAL SCALE

0 25 50
1" = 25' FEET
VERTICAL SCALE



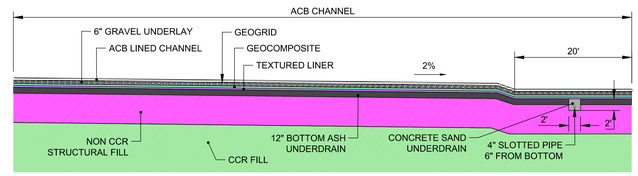
A C-701 UNDERDRAIN CUT OFF WALL CROSS SECTION A - A'

0 10 20
1" = 10' FEET



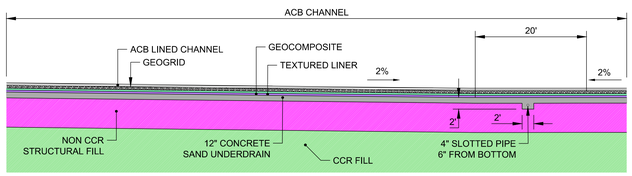
B C-701 UNDERDRAIN CROSS-SECTION B - B'

0 10 20
1" = 10' FEET



D C-701 UNDERDRAIN CROSS-SECTION D - D'

0 10 20
1" = 10' FEET



C C-701 UNDERDRAIN CROSS-SECTION C - C'

0 10 20
1" = 10' FEET

REV	DATE	REVISION DESCRIPTION	DES	CADD	CHK	RVW
△						
1	2020/10/16	ISSUED FOR CONSTRUCTION	GLH	AVR	SCN	GLH

CLIENT
SOUTHERN COMPANY SERVICES

Alabama Power

PROJECT
PLANT GORGAS
ASH POND CLOSURE
90% DESIGN PLANS

TITLE
UNDERDRAIN OUTLET TIE-IN

ALABAMA LICENSED PROFESSIONAL ENGINEER GREGORY L. HEBELER No. 29143 16 - OCT - 2020

GREGORY L. HEBELER
ALABAMA PROFESSIONAL ENGINEER
CERTIFICATE NUMBER 29143

CONSULTANT
GOLDER

YYYY-MM-DD	2020/10/16
DESIGNED	GLH
PREPARED	AVR
CHECKED	SCN
REVIEWED / APPROVED	GLH

PROJECT NO. 1789848 | SCS REF. GOR17010 | REV. 0 | DRAWING C-701

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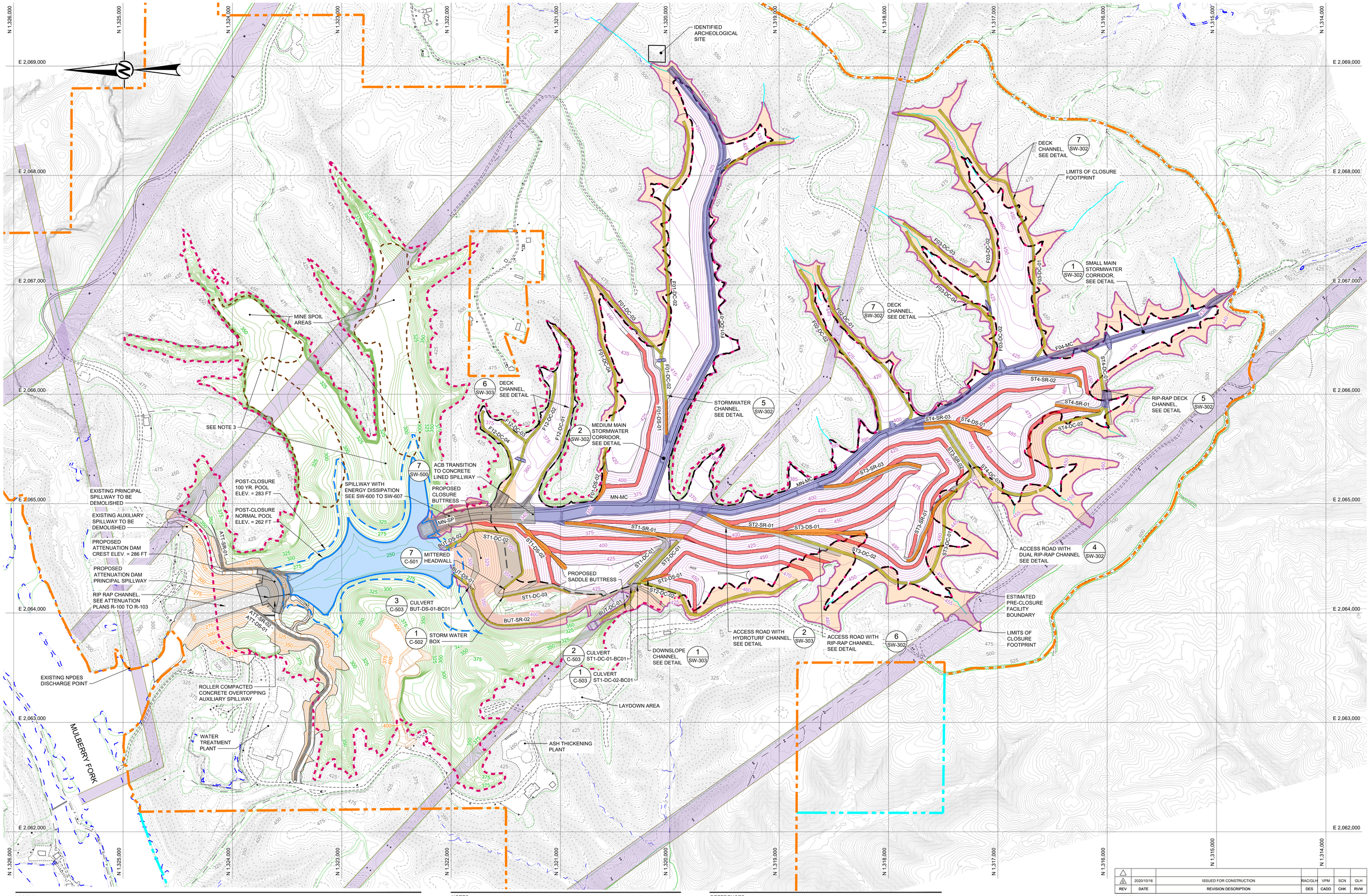

LEGEND

- EXISTING TOPOGRAPHY / BATHYMETRY CONTOURS (REFERENCE 1)
- PROPOSED CLOSURE COVER GRADING CONTOURS
- PROPOSED GRADING CONTOURS OUTSIDE CLOSURE LIMITS
- ESTIMATED BOTTOM OF CCR CONTOURS (REFERENCE 2)
- ESTIMATED MINE SPOIL AREA FOOTPRINT
- EXISTING ROAD
- EXISTING TRAIL
- EXISTING PARKING AREA
- EXISTING EDGE OF WATER
- EXISTING POWER POLES / TOWERS
- APC OWNED PROPERTY BOUNDARIES
- APPROXIMATE APC OWNED PROPERTY BOUNDARIES
- ESTIMATED PRE-CLOSURE FACILITY BOUNDARY
- EXISTING TRANSMISSION CORRIDOR
- LIMITS OF CLOSURE FOOTPRINT
- POST-CLOSURE CCR LIMITS
- STREAMS PROVIDED BY CAHABA CONSULTING, LLC
- POST-CLOSURE 100 YR. POOL ELEVATION LIMITS
- ON CAP ACCESS ROAD
- AREA OF NON-CCR CLOSURE GRADING
- CONCRETE LINED SPILLWAY
- CORRIDOR - ARTICULATED CONCRETE BLOCK (ACB)
- DECK CHANNEL RIP-RAP
- DOWNSLOPE CHANNEL, HYDROTURF
- BENCH - TURF REINFORCEMENT MAT (TRM)
- ALDOT RIP-RAP
- POST-CLOSURE NORMAL POOL ELEVATION = 262'

0 300 600
1" = 300' FEET

NOTES

1. ELEVATIONS ARE IN FEET WITH REFERENCE TO THE NORTH AMERICAN VERTICAL DATUM (NAVD) OF 1988. COORDINATES CORRESPOND TO THE ALABAMA WEST STATE PLANE COORDINATE SYSTEM, NORTH AMERICAN DATUM (NAD) 1983.

2. CONTOUR INTERVAL IS 5 FEET.

3. POST CLOSURE GRADES IN CLOSURE BY REMOVAL RESTORATION AREAS ARE NOT FINAL, WITH RESTORATION DESIGN TO FOLLOW LATER IN CLOSURE DESIGN PROCESS.

REFERENCES

1. EXISTING TOPOGRAPHY PROVIDED BY SOUTHERN COMPANY SERVICES, FEBRUARY 2020.

2. BATHYMETRIC SURFACE IS A COMPOSITE OF THE FEBRUARY 2020 SOUTHERN COMPANY AND THE JANUARY 2020 ARCSURVEY BATHYMETRIC SURVEYS TIED TO INTERPRETED SECTIONS OF THE 2016 SOUTHERN COMPANY BATHYMETRIC SURVEY WHERE SURVEY DATA IS NOT AVAILABLE.

3. BOTTOM OF CCR TOPOGRAPHY TAKEN FROM USGS, PORT BIRMINGHAM, 1938 AND GOODSPINGS, 1971 QUADRANGLES. TOPOGRAPHY WAS INTERPRETED BETWEEN 20 FOOT CONTOURS AND ADJUSTED BASED ON GEOTECHNICAL INVESTIGATION DATA BY GOLDER ASSOCIATES INC.

4. EXISTING AND APPROXIMATE PROPERTY BOUNDARIES PROVIDED BY SOUTHERN COMPANY SERVICES, APRIL 2020.

REV	DATE	REVISION DESCRIPTION	DES	CADD	CHK	RVW
1	2020/10/16	ISSUED FOR CONSTRUCTION	RAC/GLH	VPM	SCN	GLH

CLIENT
SOUTHERN COMPANY SERVICES

Alabama Power

PROJECT
PLANT GORGAS
ASH POND CLOSURE
DESIGN DRAWINGS

TITLE
SURFACE WATER MANAGEMENT AND ARMORING PLAN

ALABAMA LICENSED PROFESSIONAL ENGINEER No. 29143 16 OCT 2020 GREGORY L. HEBELER

GREGORY L. HEBELER
ALABAMA PROFESSIONAL ENGINEER
CERTIFICATE NUMBER 29143

CONSULTANT
GOLDER

YYYY-MM-DD	2020/10/16
DESIGNED	RAC/GLH
PREPARED	VPM
CHECKED	SCN
REVIEWED / APPROVED	GLH

PROJECT NO. 1789848 | SCS REF. GOR17010 | REV. 0 | DRAWING SW-100

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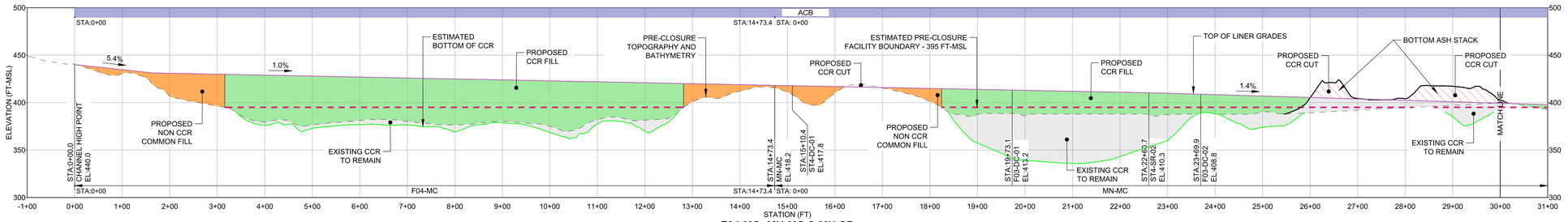

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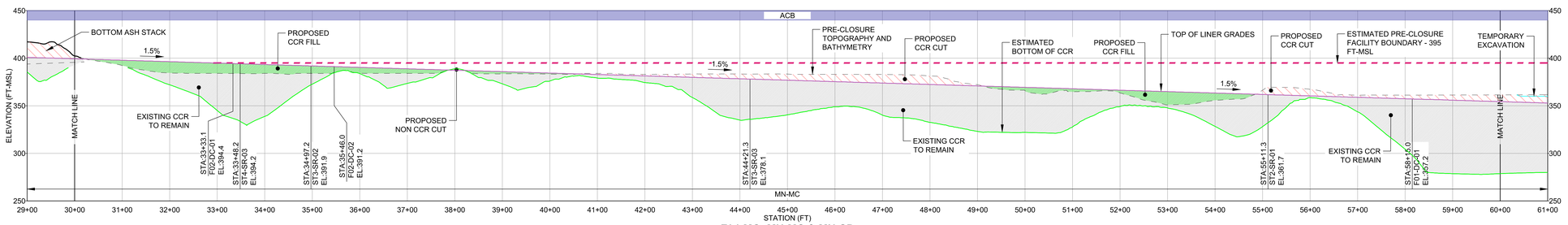

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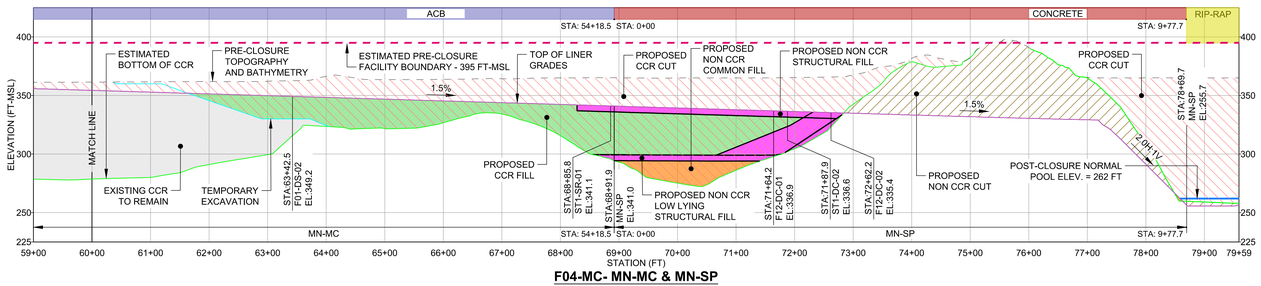

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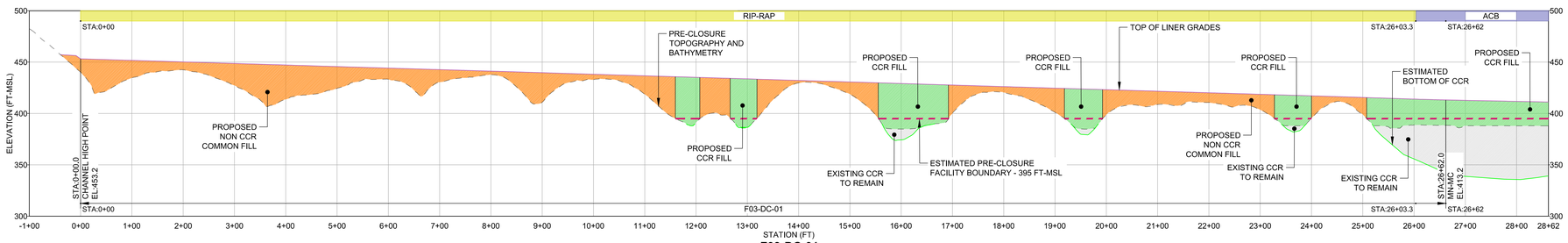

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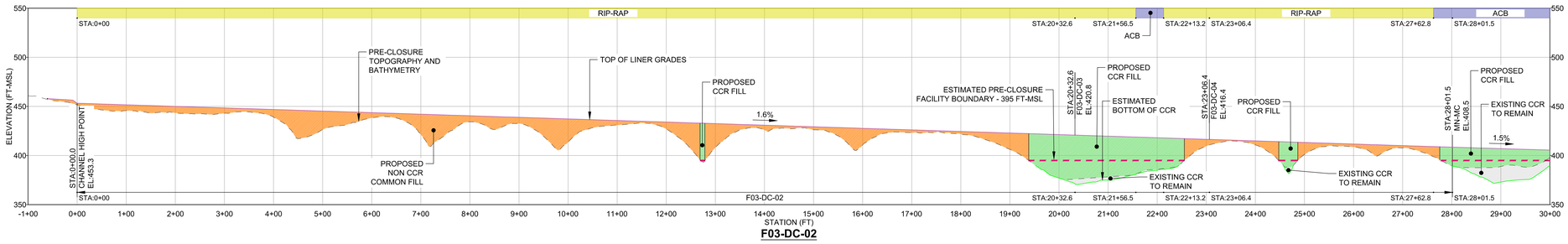

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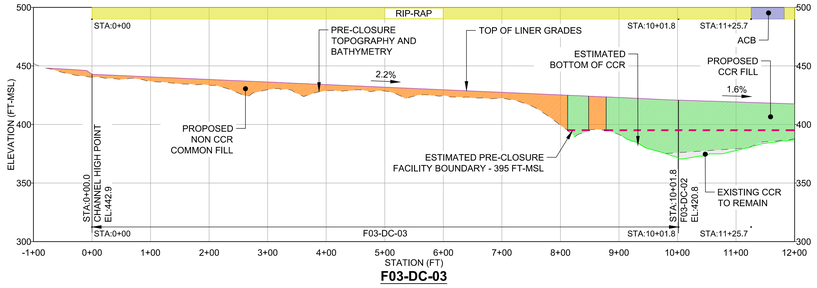

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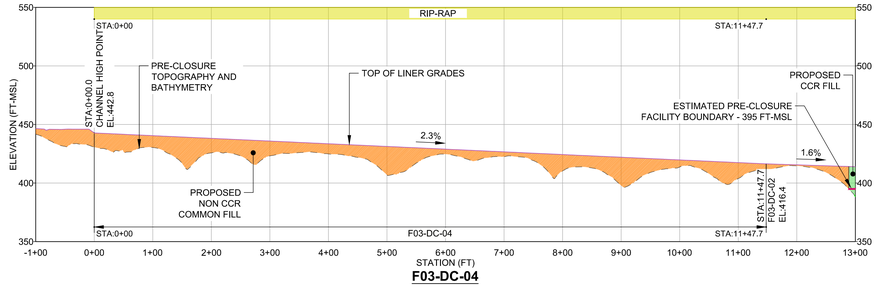

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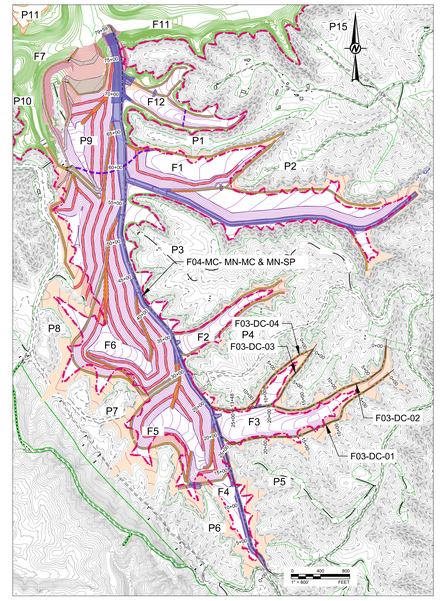

KEY MAP

LEGEND

- PROPOSED TOP OF LINER GRADING
- PRE-CLOSURE TOPOGRAPHY / BATHYMETRY GRADING (REFERENCE 1 & 2)
- ESTIMATED BOTTOM OF CCR (REFERENCE 3)
- TEMPORARY DREDGE CUT SLOPE
- ESTIMATED PRE-CLOSURE FACILITY BOUNDARY
- EXISTING CCR TO REMAIN
- PROPOSED CCR CUT
- PROPOSED CCR FILL
- PROPOSED NON CCR CUT
- PROPOSED NON CCR COMMON FILL
- PROPOSED NON CCR STRUCTURAL FILL

NOTES

1. ELEVATIONS ARE IN FEET WITH REFERENCE TO THE NORTH AMERICAN VERTICAL DATUM (NAVD) OF 1988. COORDINATES CORRESPOND TO THE ALABAMA WEST STATE PLAN COORDINATE SYSTEM, NORTH AMERICAN DATUM (NAD) 1983.

2. NON CCR FILL CONSTRUCTION SEQUENCE SHALL BE AS DENOTED ON DETAILS 8 OR 9, SHEET C-500.

REFERENCES

1. EXISTING TOPOGRAPHY PROVIDED BY SOUTHERN COMPANY SERVICES, FEBRUARY 2020.

2. BATHYMETRIC SURFACE IS A COMPOSITE OF THE FEBRUARY 2020 SOUTHERN COMPANY AND THE JANUARY 2020 ARCSURVEY BATHYMETRIC SURVEYS TIED TO INTERPRETED SECTIONS OF THE 2016 SOUTHERN COMPANY BATHYMETRIC SURVEY WHERE SURVEY DATA IS NOT AVAILABLE.

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0 100 200 — 1" = 100' FEET — HORIZONTAL SCALE

0 50 100 — 1" = 50' FEET — VERTICAL SCALE

REV	DATE	REVISION DESCRIPTION	DES	CADD	CHK	RVW
1	2020/10/16	ISSUED FOR CONSTRUCTION	RAC/GLH	AVR	SCN	GLH

CLIENT
SOUTHERN COMPANY SERVICES

Alabama Power

PROJECT
PLANT GORGAS
ASH POND CLOSURE
DESIGN DRAWINGS

TITLE
STORMWATER CHANNEL PROFILES
SHEET 1

ALABAMA LICENSED No. 29143 PROFESSIONAL ENGINEER GREGORY L. HEBELER
16 - OCT - 2020

GREGORY L. HEBELER
ALABAMA PROFESSIONAL ENGINEER
CERTIFICATE NUMBER 29143

CONSULTANT
GOLDER

YYYY-MM-DD	2020/10/16
DESIGNED	RAC/GLH
PREPARED	AVR
CHECKED	SCN
REVIEWED / APPROVED	GLH

PROJECT NO. 1789848 | SCS REF. GOR17010 | REV. 0 | DRAWING SW-200

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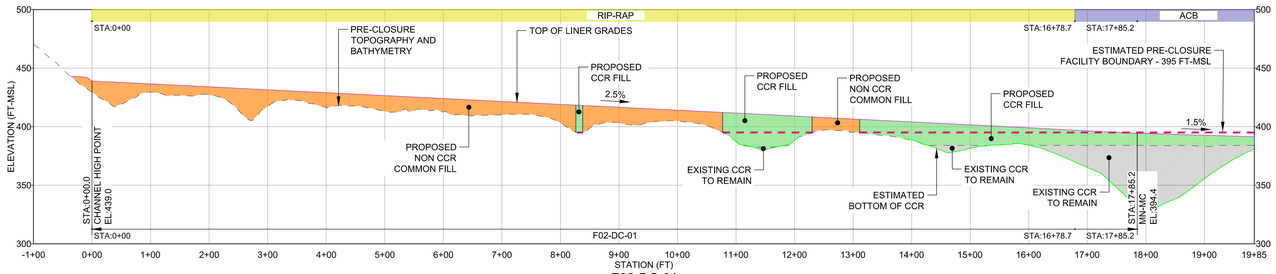

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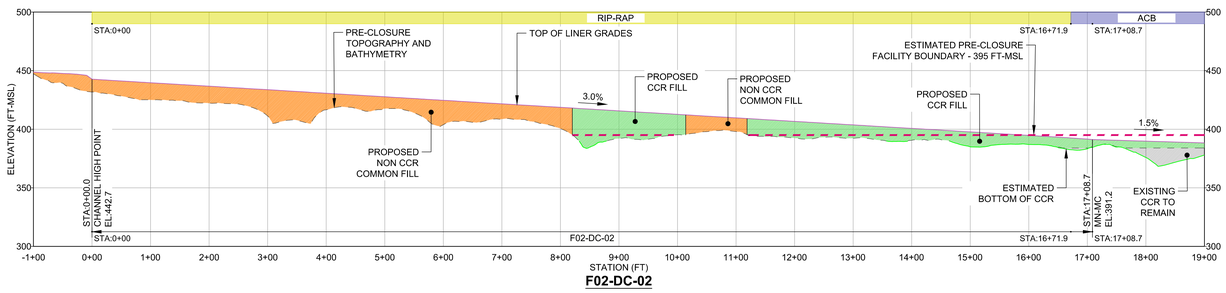

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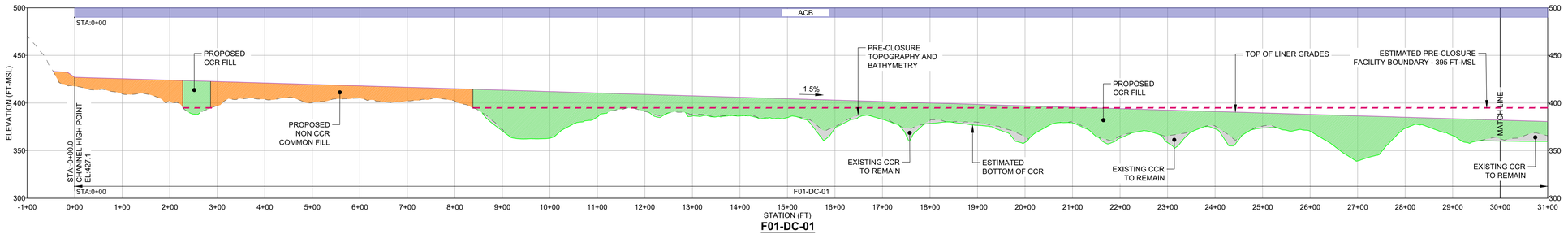

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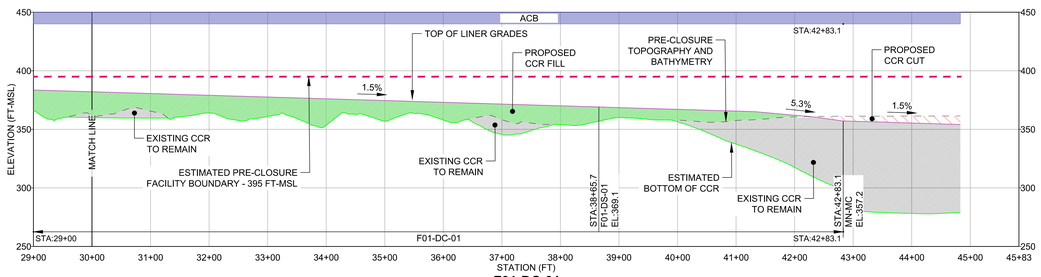

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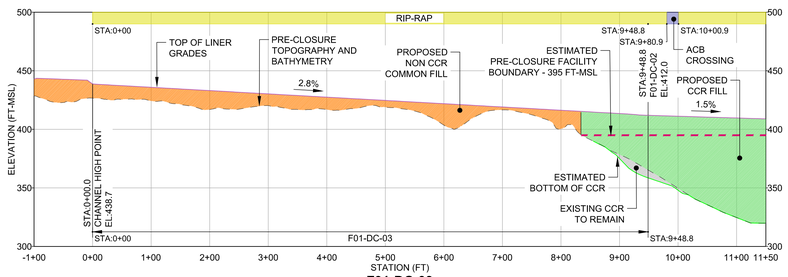

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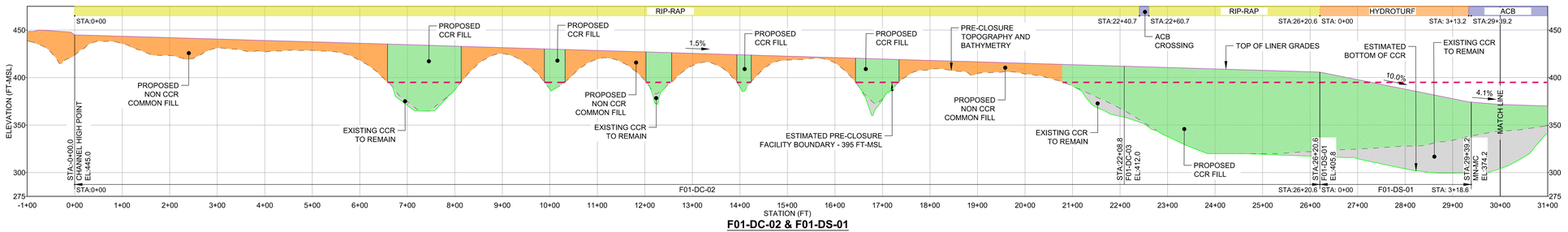

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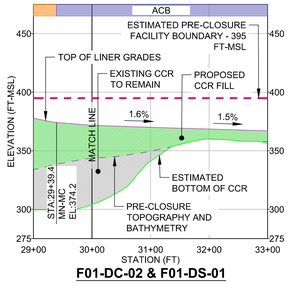

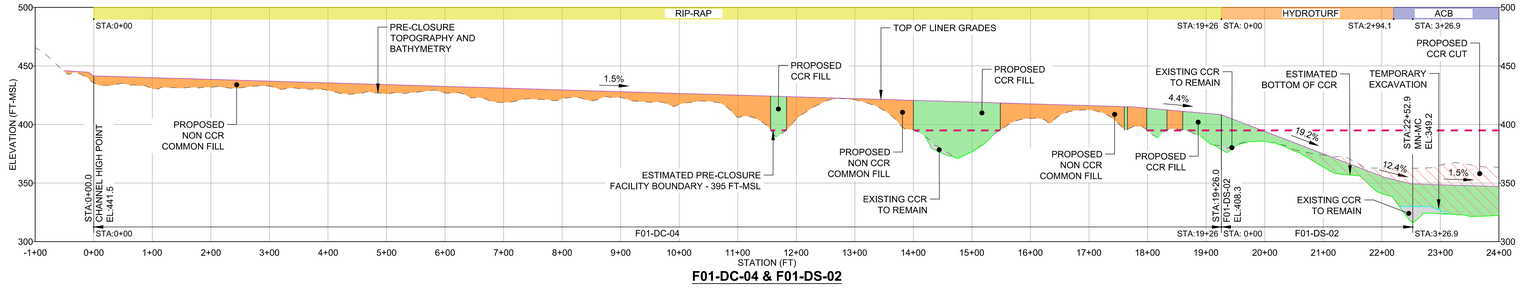

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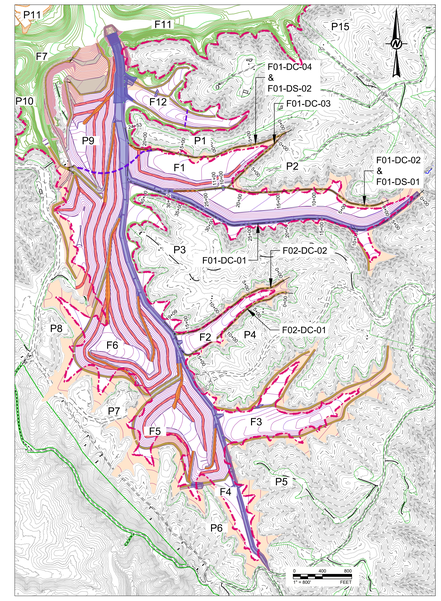

KEY MAP

LEGEND

- PROPOSED TOP OF LINER GRADING
- PRE-CLOSURE TOPOGRAPHY / BATHYMETRY GRADING (REFERENCE 1 & 2)
- ESTIMATED BOTTOM OF CCR (REFERENCE 3)
- TEMPORARY DREDGE CUT SLOPE
- ESTIMATED PRE-CLOSURE FACILITY BOUNDARY
- EXISTING CCR TO REMAIN
- PROPOSED CCR CUT
- PROPOSED CCR FILL
- PROPOSED NON CCR CUT
- PROPOSED NON CCR COMMON FILL
- PROPOSED NON CCR STRUCTURAL FILL

NOTES

1. ELEVATIONS ARE IN FEET WITH REFERENCE TO THE NORTH AMERICAN VERTICAL DATUM (NAVD) OF 1988. COORDINATES CORRESPOND TO THE ALABAMA WEST STATE PLAN COORDINATE SYSTEM, NORTH AMERICAN DATUM (NAD) 1983.

2. NON CCR FILL CONSTRUCTION SEQUENCE SHALL BE AS DENOTED ON DETAILS 8 OR 9, SHEET C-500.

REFERENCES

1. EXISTING TOPOGRAPHY PROVIDED BY SOUTHERN COMPANY SERVICES, FEBRUARY 2020.

2. BATHYMETRIC SURFACE IS A COMPOSITE OF THE FEBRUARY 2020 SOUTHERN COMPANY AND THE JANUARY 2020 ARCSURVEY BATHYMETRIC SURVEYS TIED TO INTERPRETED SECTIONS OF THE 2016 SOUTHERN COMPANY BATHYMETRIC SURVEY WHERE SURVEY DATA IS NOT AVAILABLE.

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REV	DATE	REVISION DESCRIPTION	DES	CADD	CHK	RVW
1	2020/10/16	ISSUED FOR CONSTRUCTION	RAC/GLH	AVR	SCN	GLH

CLIENT
SOUTHERN COMPANY SERVICES

Alabama Power

PROJECT
PLANT GORGAS
ASH POND CLOSURE
DESIGN DRAWINGS

TITLE
STORMWATER CHANNEL PROFILES
SHEET 2

ALABAMA LICENSED No. 29143 PROFESSIONAL ENGINEER GREGORY L. HEBELER
16 OCT 2020

GREGORY L. HEBELER
ALABAMA PROFESSIONAL ENGINEER
CERTIFICATE NUMBER 29143

CONSULTANT
GOLDER

YYYY-MM-DD	2020/10/16
DESIGNED	RAC/GLH
PREPARED	AVR
CHECKED	SCN
REVIEWED / APPROVED	GLH

PROJECT NO.	SCS REF.	REV.	DRAWING
1789848	GOR17010	0	SW-201

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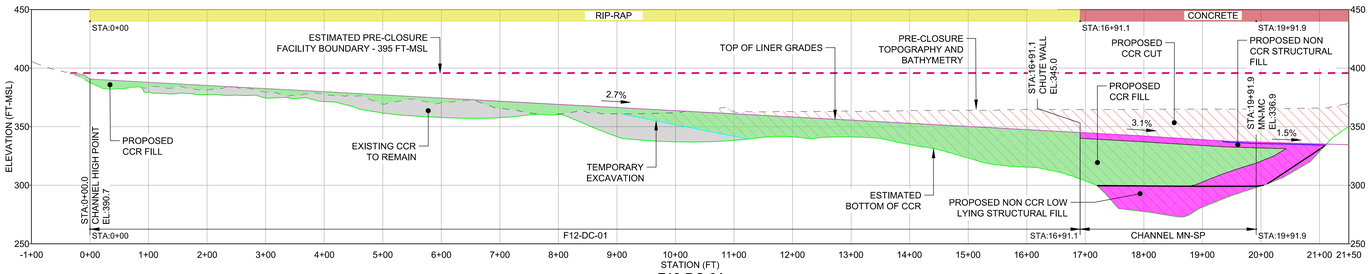

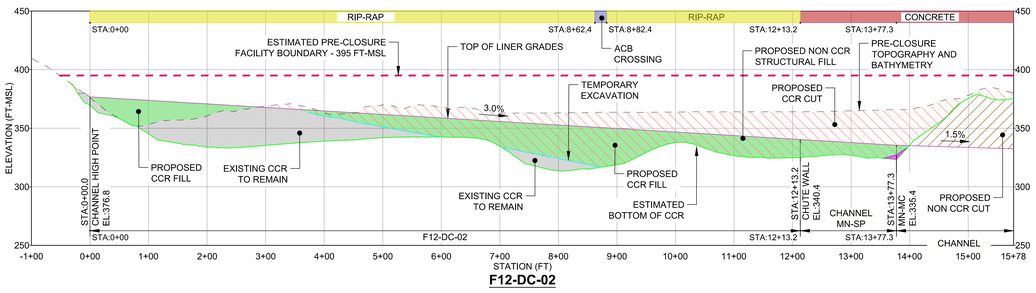

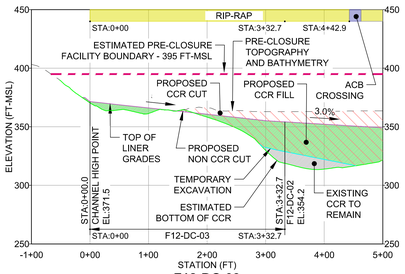

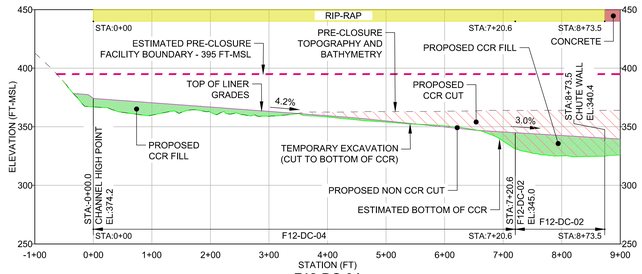

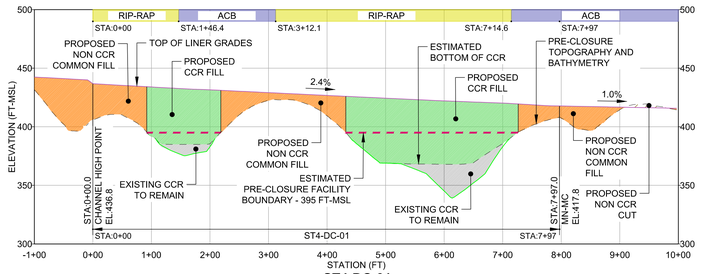

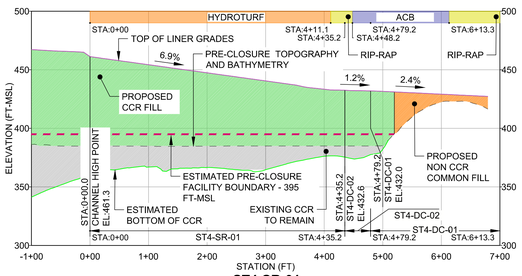

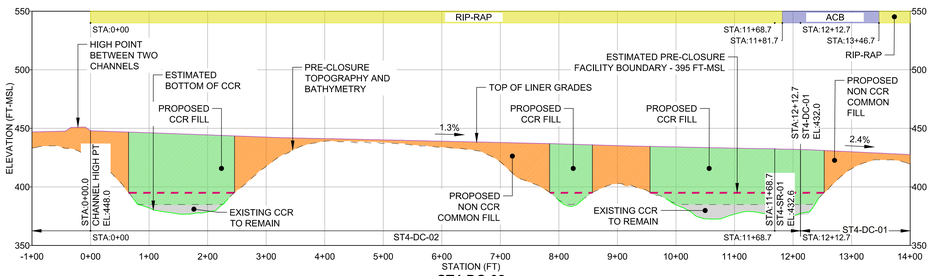

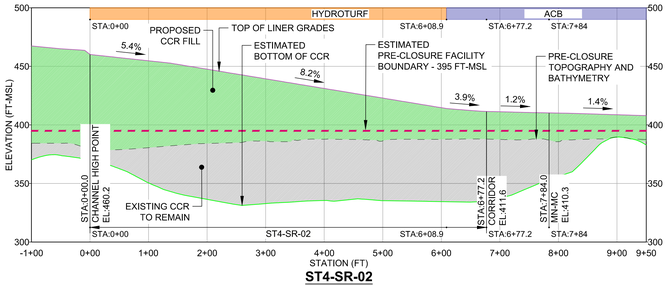

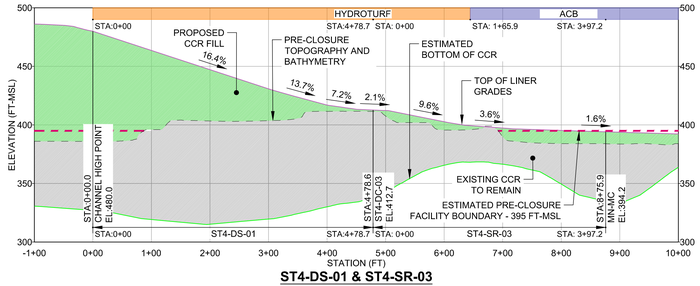

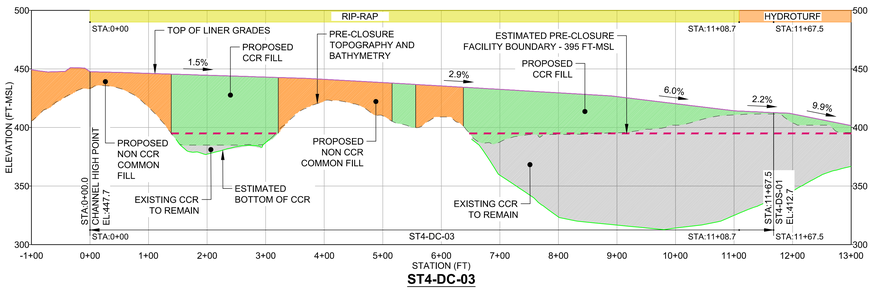

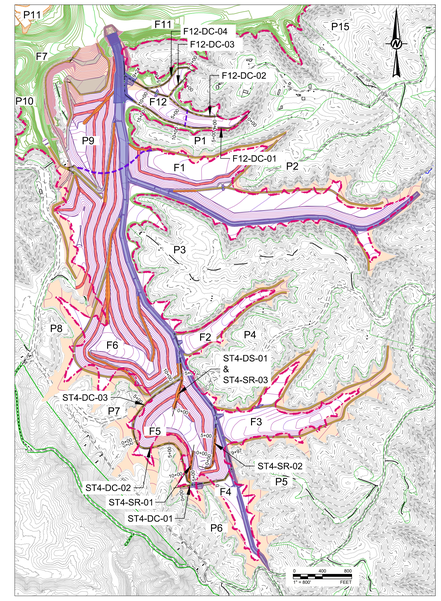

KEY MAP

LEGEND

- PROPOSED TOP OF LINER GRADING
- PRE-CLOSURE TOPOGRAPHY / BATHYMETRY GRADING (REFERENCE 1 & 2)
- ESTIMATED BOTTOM OF CCR (REFERENCE 3)
- TEMPORARY DREDGE CUT SLOPE
- ESTIMATED PRE-CLOSURE FACILITY BOUNDARY
- EXISTING CCR TO REMAIN
- PROPOSED CCR CUT
- PROPOSED CCR FILL
- PROPOSED NON CCR CUT
- PROPOSED NON CCR COMMON FILL
- PROPOSED NON CCR STRUCTURAL FILL

NOTES

1. ELEVATIONS ARE IN FEET WITH REFERENCE TO THE NORTH AMERICAN VERTICAL DATUM (NAVD) OF 1988. COORDINATES CORRESPOND TO THE ALABAMA WEST STATE PLAN COORDINATE SYSTEM, NORTH AMERICAN DATUM (NAD) 1983.

2. NON CCR FILL CONSTRUCTION SEQUENCE SHALL BE AS DENOTED ON DETAILS 8 OR 9, SHEET C-500.

REFERENCES

1. EXISTING TOPOGRAPHY PROVIDED BY SOUTHERN COMPANY SERVICES, FEBRUARY 2020.

2. BATHYMETRIC SURFACE IS A COMPOSITE OF THE FEBRUARY 2020 SOUTHERN COMPANY AND THE JANUARY 2020 ARCSURVEY BATHYMETRIC SURVEYS TIED TO INTERPRETED SECTIONS OF THE 2016 SOUTHERN COMPANY BATHYMETRIC SURVEY WHERE SURVEY DATA IS NOT AVAILABLE.

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0 100 200 — 1" = 100' FEET — HORIZONTAL SCALE

0 50 100 — 1" = 50' FEET — VERTICAL SCALE

REV	DATE	REVISION DESCRIPTION	DES	CADD	CHK	RVW
1	2020/10/16	ISSUED FOR CONSTRUCTION	RAC/GLH	AVR	SCN	GLH

CLIENT
SOUTHERN COMPANY SERVICES

Alabama Power

PROJECT
PLANT GORGAS
ASH POND CLOSURE
DESIGN DRAWINGS

TITLE
STORMWATER CHANNEL PROFILES SHEET 3

ALABAMA LICENSED 29143 PROFESSIONAL ENGINEER GREGORY L. HEBELER
16 OCT 2020

GREGORY L. HEBELER
ALABAMA PROFESSIONAL ENGINEER
CERTIFICATE NUMBER 29143

CONSULTANT
GOLDER

YYYY-MM-DD	2020/10/16
DESIGNED	RAC/GLH
PREPARED	AVR
CHECKED	SCN
REVIEWED / APPROVED	GLH

PROJECT NO.	SCS REF.	REV.	DRAWING
1789848	GOR17010	0	SW-202

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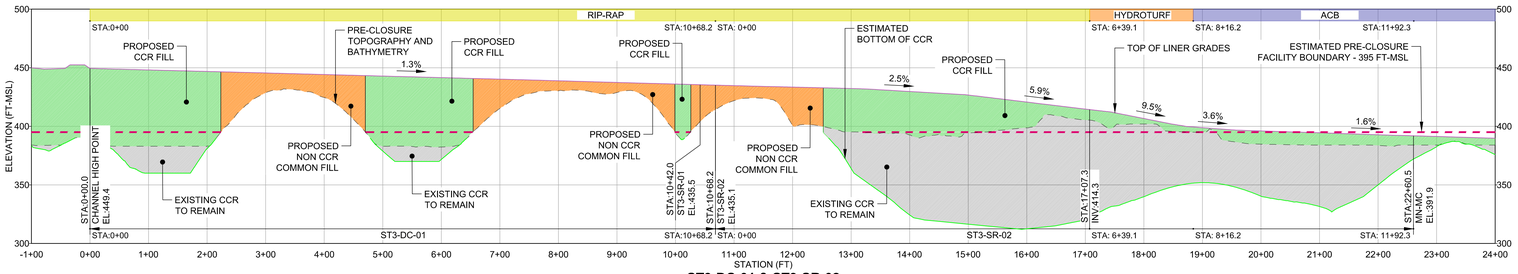

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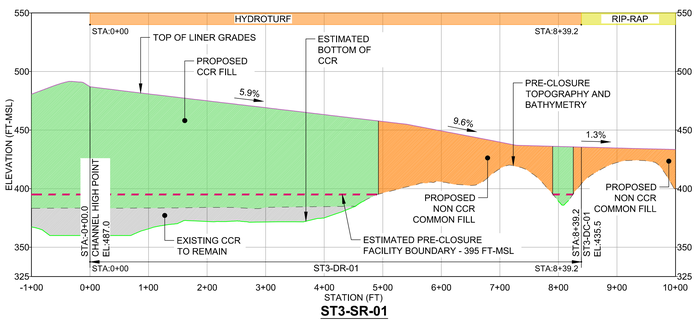

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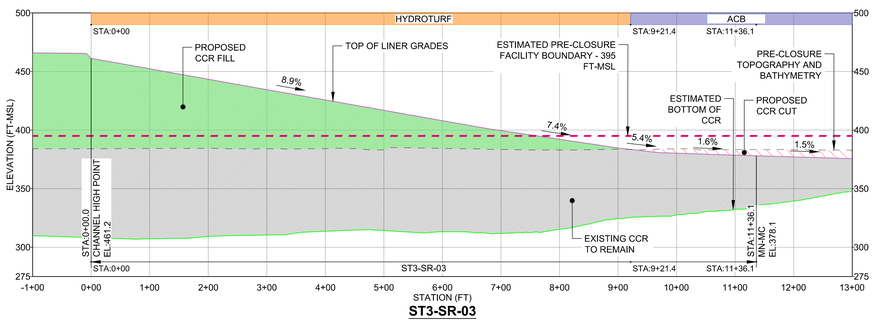

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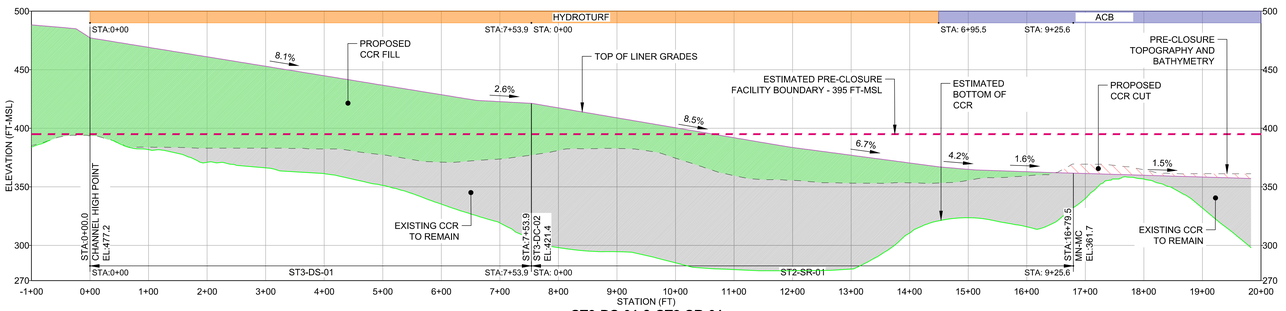

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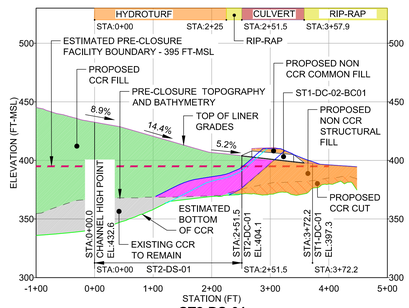

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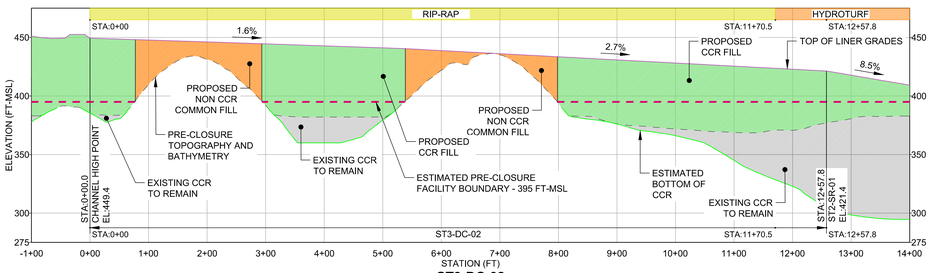

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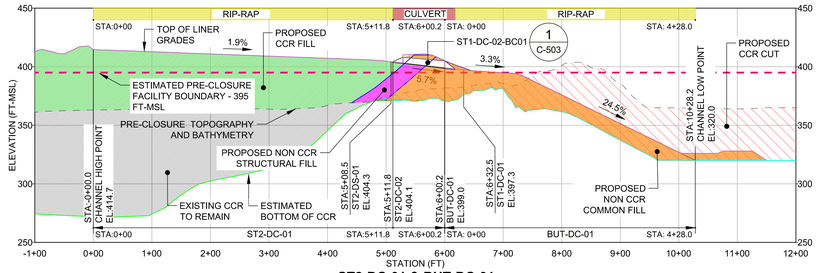

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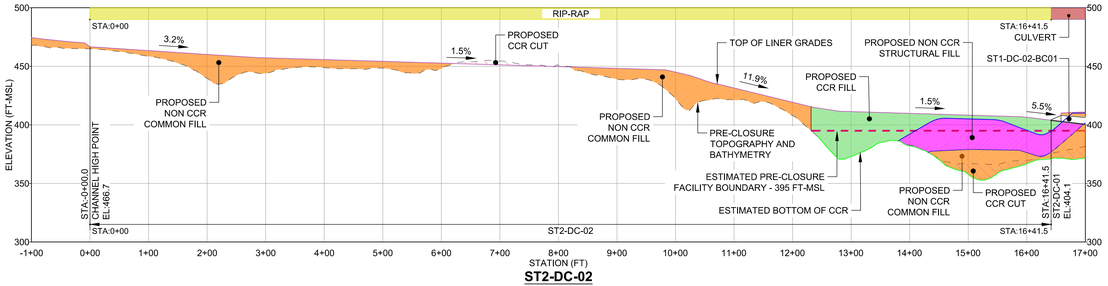

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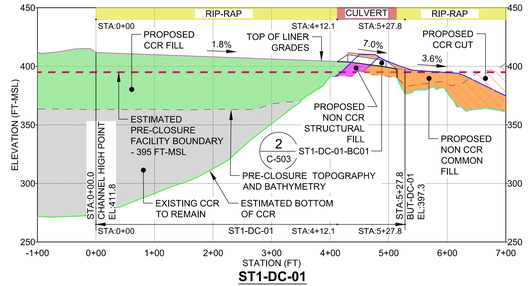

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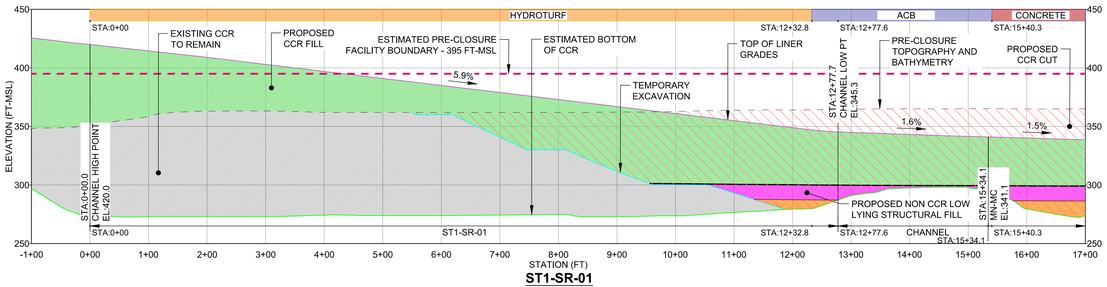

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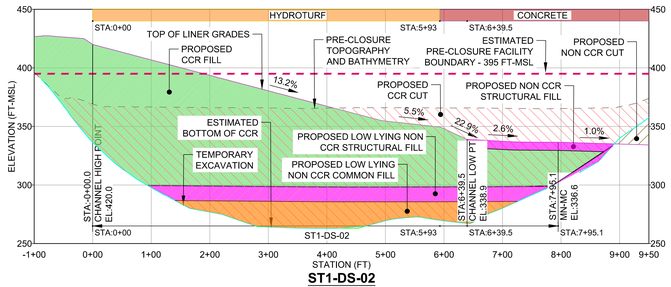

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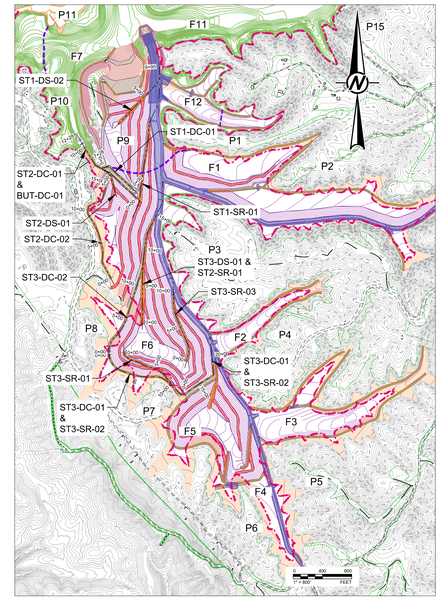

KEY MAP

LEGEND

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NOTES

1. ELEVATIONS ARE IN FEET WITH REFERENCE TO THE NORTH AMERICAN VERTICAL DATUM (NAVD) OF 1988. COORDINATES CORRESPOND TO THE ALABAMA WEST STATE PLAN COORDINATE SYSTEM, NORTH AMERICAN DATUM (NAD) 1983.

2. NON CCR FILL CONSTRUCTION SEQUENCE SHALL BE AS DENOTED ON DETAILS 8 OR 9, SHEET C-500.

REFERENCES

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2. BATHYMETRIC SURFACE IS A COMPOSITE OF THE FEBRUARY 2020 SOUTHERN COMPANY AND THE JANUARY 2020 ARCSURVEY BATHYMETRIC SURVEYS TIED TO INTERPRETED SECTIONS OF THE 2016 SOUTHERN COMPANY BATHYMETRIC SURVEY WHERE SURVEY DATA IS NOT AVAILABLE.

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0 100 200 1" = 100' FEET — HORIZONTAL SCALE

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REV	DATE	REVISION DESCRIPTION	DES	CADD	CHK	RVW
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1	2020/10/16	ISSUED FOR CONSTRUCTION	RAC/GLH	AVR	SCN	GLH

CLIENT
SOUTHERN COMPANY SERVICES

Alabama Power

PROJECT
PLANT GORGAS
ASH POND CLOSURE
DESIGN DRAWINGS

TITLE
STORMWATER CHANNEL PROFILES
SHEET 4

ALABAMA LICENSED PROFESSIONAL ENGINEER — GREGORY L. HEBELER — No. 29143 — 16 OCT 2020

GREGORY L. HEBELER
ALABAMA PROFESSIONAL ENGINEER
CERTIFICATE NUMBER 29143

CONSULTANT
GOLDER

YYYY-MM-DD	2020/10/16
DESIGNED	RAC/GLH
PREPARED	AVR
CHECKED	SCN
REVIEWED / APPROVED	GLH

PROJECT NO. 1789848 | SCS REF. GOR17010 | REV. 0 | DRAWING SW-203

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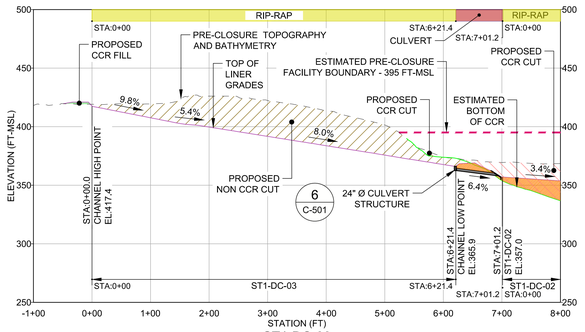

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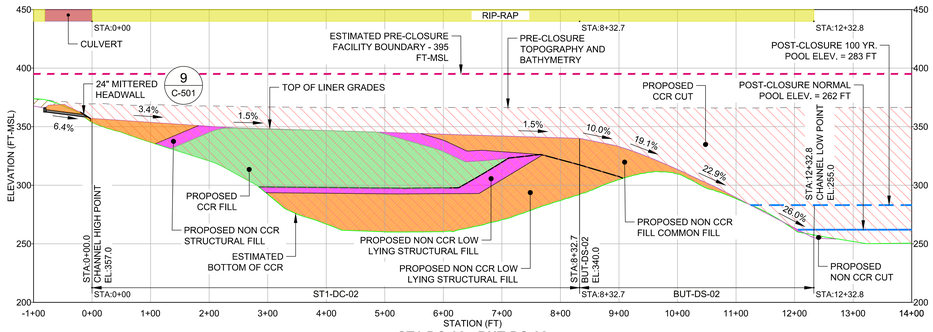

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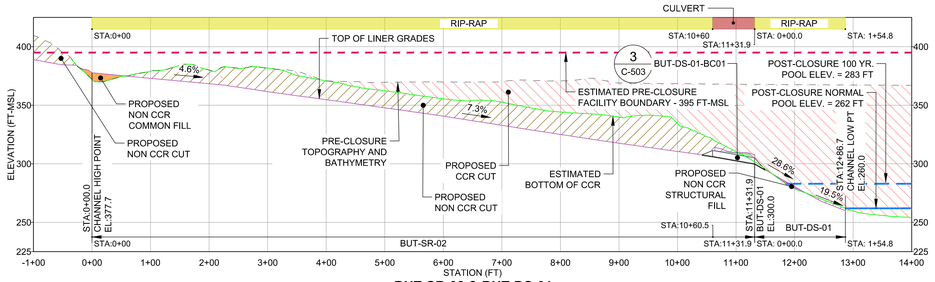

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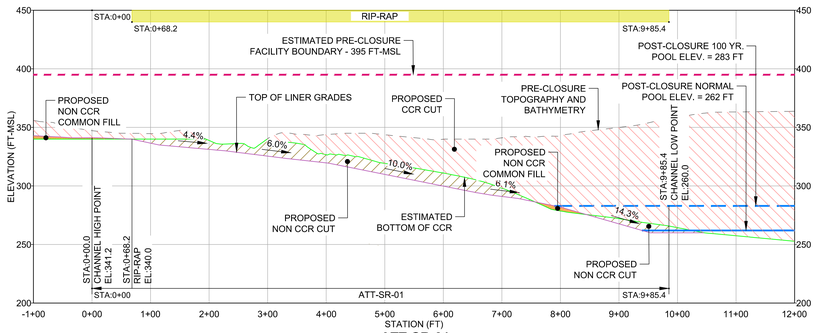

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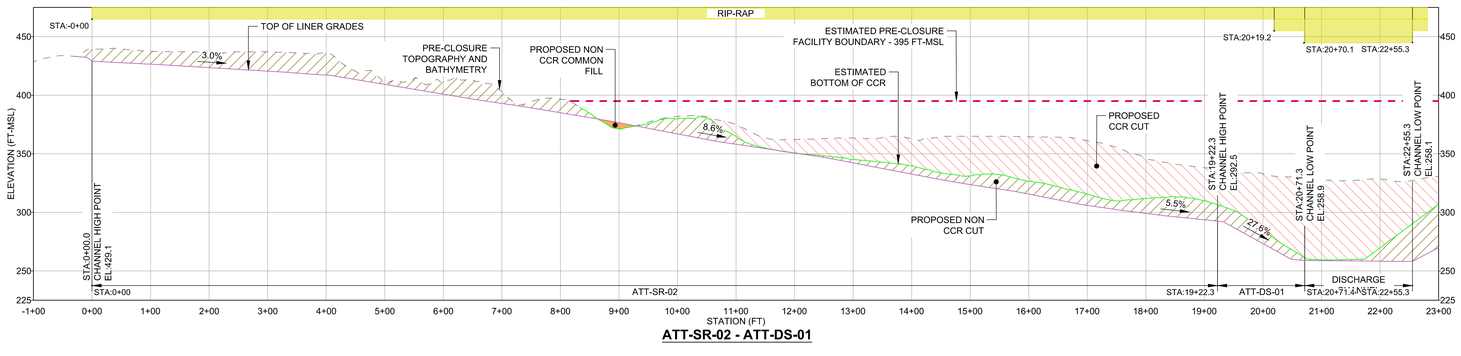

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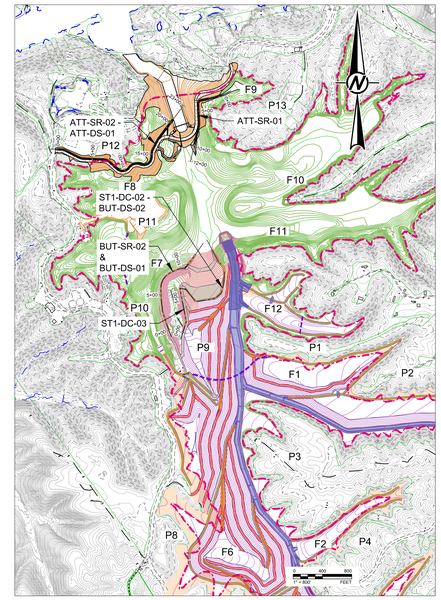

KEY MAP

LEGEND

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REFERENCES

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0 100 200
1" = 100' FEET
HORIZONTAL SCALE

0 50 100
1" = 50' FEET
VERTICAL SCALE

REV	DATE	REVISION DESCRIPTION	DES	CADD	CHK	RVW
1						
0	2020/10/16	ISSUED FOR CONSTRUCTION	RAC/GLH	AVR	SCN	GLH

CLIENT
SOUTHERN COMPANY SERVICES

Alabama Power

PROJECT
PLANT GORGAS
ASH POND CLOSURE
DESIGN DRAWINGS

TITLE
STORMWATER CHANNEL PROFILES
SHEET 5

ALABAMA LICENSED PROFESSIONAL ENGINEER GREGORY L. HEBELER No. 29143 16 OCT 2020

GREGORY L. HEBELER
ALABAMA PROFESSIONAL ENGINEER
CERTIFICATE NUMBER 29143

CONSULTANT
GOLDER

YYYY-MM-DD	2020/10/16
DESIGNED	RAC/GLH
PREPARED	AVR
CHECKED	SCN
REVIEWED / APPROVED	GLH

PROJECT NO.	SCS REF.	REV.	DRAWING
1789848	GOR17010	0	SW-204

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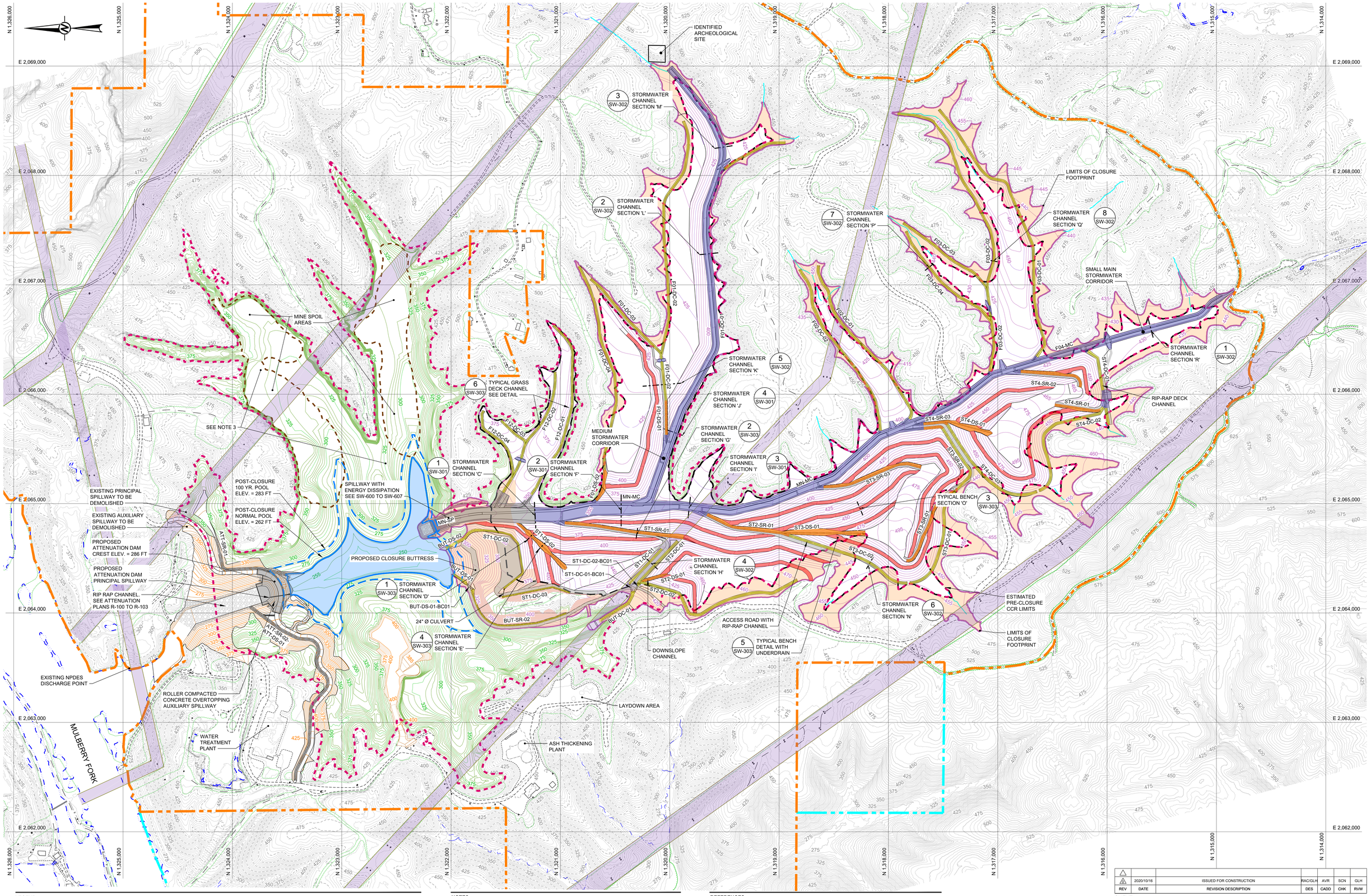

LEGEND

- EXISTING TOPOGRAPHY / BATHYMETRY CONTOURS (REFERENCE 1)
- PROPOSED CLOSURE COVER GRADING CONTOURS
- PROPOSED GRADING CONTOURS OUTSIDE CLOSURE LIMITS
- ESTIMATED BOTTOM OF CCR CONTOURS (REFERENCE 2)
- ESTIMATED MINE SPOIL AREA FOOTPRINT
- EXISTING ROAD
- EXISTING TRAIL
- EXISTING PARKING AREA
- EXISTING POWER POLES / TOWERS
- APC OWNED PROPERTY BOUNDARIES
- APPROXIMATE APC OWNED PROPERTY BOUNDARIES
- ESTIMATED PRE-CLOSURE FACILITY BOUNDARY
- EXISTING TRANSMISSION CORRIDOR
- LIMITS OF CLOSURE FOOTPRINT
- POST-CLOSURE CCR LIMITS
- STREAMS PROVIDED BY CAHABA CONSULTING, LLC
- POST-CLOSURE 100 YR. POOL ELEVATION LIMITS
- ON CAP ACCESS ROAD
- AREA OF NON-CCR CLOSURE GRADING
- CONCRETE LINED SPILLWAY
- CORRIDOR - ARTICULATED CONCRETE BLOCK (ACB)
- DECK CHANNEL RIP-RAP
- DOWNSLOPE CHANNEL, HYDROTURF
- BENCH - TURF REINFORCEMENT MAT (TRM)
- ALDOT RIP-RAP
- POST-CLOSURE NORMAL POOL ELEVATION = 262'

0 300 600
1" = 300' FEET

NOTES

1. ELEVATIONS ARE IN FEET WITH REFERENCE TO THE NORTH AMERICAN VERTICAL DATUM (NAVD) OF 1988. COORDINATES CORRESPOND TO THE ALABAMA WEST STATE PLANE COORDINATE SYSTEM, NORTH AMERICAN DATUM (NAD) 1983.

2. CONTOUR INTERVAL IS 5 FEET.

3. POST CLOSURE GRADES IN CLOSURE BY REMOVAL RESTORATION AREAS ARE NOT FINAL, WITH RESTORATION DESIGN TO FOLLOW LATER IN CLOSURE DESIGN PROCESS.

REFERENCES

1. EXISTING TOPOGRAPHY PROVIDED BY SOUTHERN COMPANY SERVICES, FEBRUARY 2020.

2. BATHYMETRIC SURFACE IS A COMPOSITE OF THE FEBRUARY 2020 SOUTHERN COMPANY AND THE JANUARY 2020 ARCSURVEY BATHYMETRIC SURVEYS TIED TO INTERPRETED SECTIONS OF THE 2016 SOUTHERN COMPANY BATHYMETRIC SURVEY WHERE SURVEY DATA IS NOT AVAILABLE.

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4. EXISTING AND APPROXIMATE PROPERTY BOUNDARIES PROVIDED BY SOUTHERN COMPANY SERVICES, APRIL 2020.

REV	DATE	REVISION DESCRIPTION	DES	CADD	CHK	RVW
1	2020/10/16	ISSUED FOR CONSTRUCTION	RAC/GLH	AVR	SCN	GLH

CLIENT
SOUTHERN COMPANY SERVICES

Alabama Power

PROJECT
PLANT GORGAS
ASH POND CLOSURE
DESIGN DRAWINGS

TITLE
SURFACE WATER MANAGEMENT PLAN WITH CHANNEL SECTIONS

ALABAMA LICENSED PROFESSIONAL ENGINEER No. 29143 16 - OCT - 2020 GREGORY L. HEBELER

GREGORY L. HEBELER
ALABAMA PROFESSIONAL ENGINEER
CERTIFICATE NUMBER 29143

CONSULTANT
GOLDER

YYYY-MM-DD	2020/10/16
DESIGNED	RAC/GLH
PREPARED	AVR
CHECKED	SCN
REVIEWED / APPROVED	GLH

PROJECT NO. 1789848 | SCS REF. GOR17010 | REV. 0 | DRAWING SW-300

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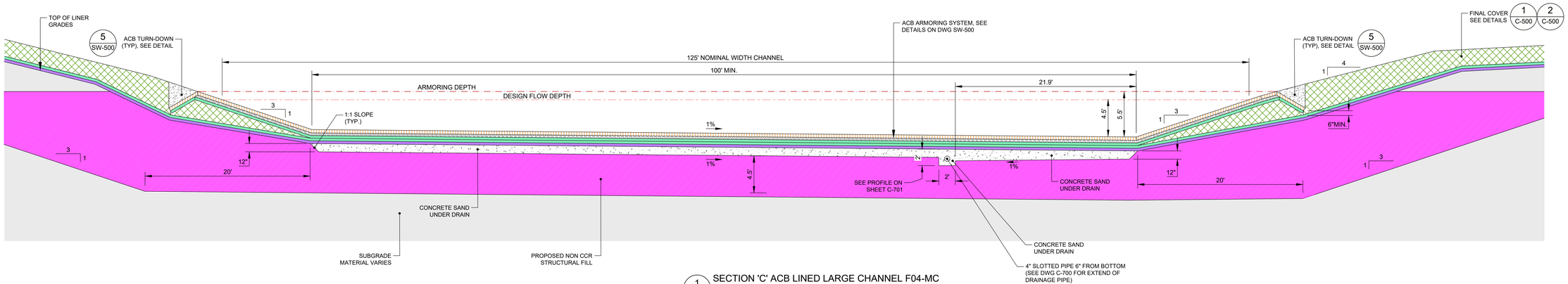

1 SW-301 SECTION 'C' ACB LINED LARGE CHANNEL F04-MC

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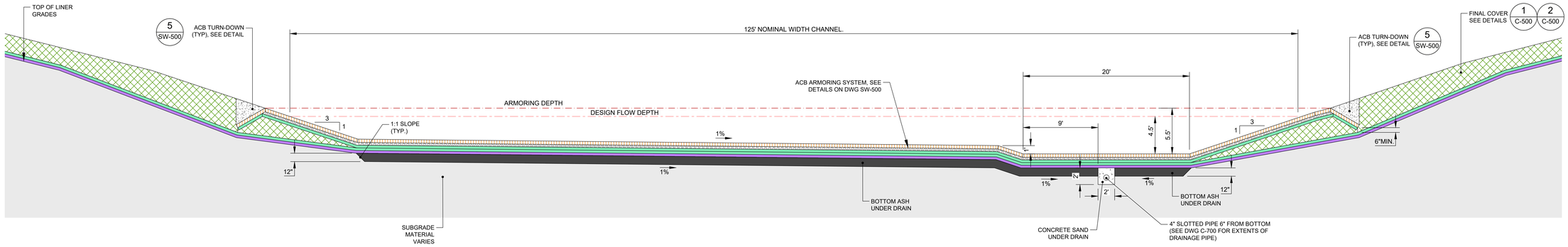
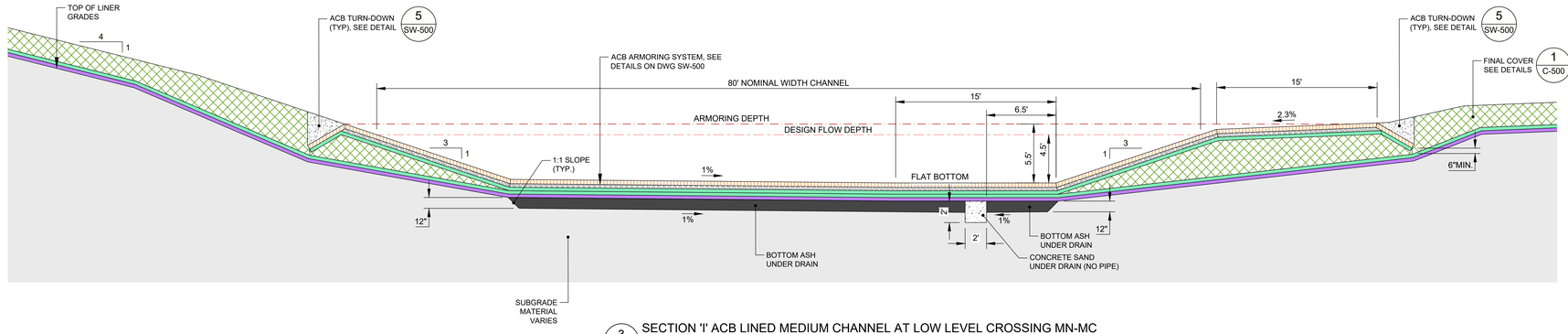
1" = 5' FEET



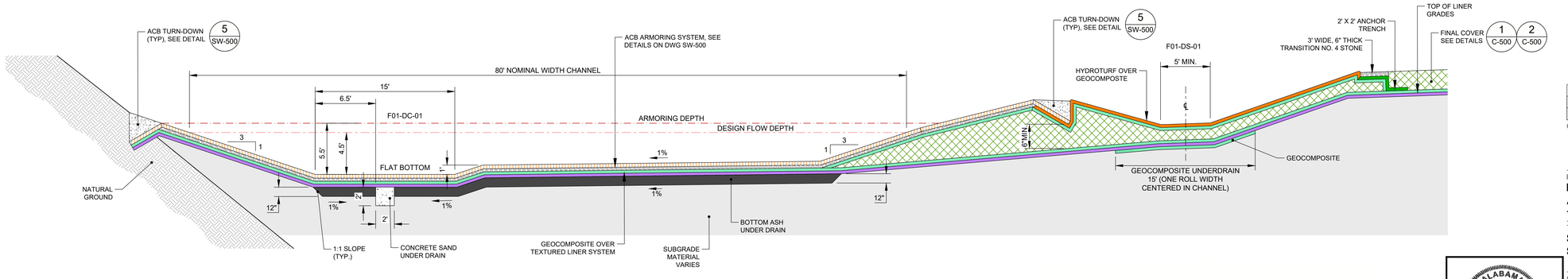
2 SW-301 SECTION 'F' ACB LINED LARGE CHANNEL MN-MC

0 5 10
1" = 5' FEET



3 SW-301 SECTION 'I' ACB LINED MEDIUM CHANNEL AT LOW LEVEL CROSSING MN-MC

0 5 10
1" = 5' FEET



4 SW-301 SECTION 'J' ACB LINED MEDIUM CHANNEL F01-DC-01 & HYDROTURF SMALL CHANNEL F01-DS-01

0 5 10
1" = 5' FEET

NOTES

1. SEE DRAWING C-700 FOR UNDERDRAIN LAYOUT.

LEGEND

- FINAL COVER FILL
- ARTICULATED CONCRETE BLOCK
- ALDOT NO. 57 STONE DRAINAGE LAYER
- GEOCOMPOSITE
- TEXTURED LINER
- HYDROTURF
- CLOSURE TURF NO INFILL
- TURF REINFORCEMENT MATTING
- 12 OZ / SY NPNW GEOTEXTILE
- ALDOT CLASS 1 RIP-RAP

REV	DATE	REVISION DESCRIPTION	DES	CADD	CHK	RVW
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CLIENT
SOUTHERN COMPANY SERVICES

Alabama Power

PROJECT
PLANT GORGAS
ASH POND CLOSURE
100% DESIGN DRAWINGS

TITLE
STORMWATER CHANNEL CROSS SECTIONS SHEET 1

ALABAMA LICENSED No. 29143 PROFESSIONAL ENGINEER GREGORY L. HEBEBER
16 OCT 2020

GREGORY L. HEBEBER
ALABAMA PROFESSIONAL ENGINEER
CERTIFICATE NUMBER 29143

CONSULTANT
GOLDER

YYYY-MM-DD	2020/10/16
DESIGNED	RAC/GLH
PREPARED	AVR
CHECKED	SCN
REVIEWED / APPROVED	GLH

PROJECT NO.	SCS REF.	REV.	DRAWING
1789848	GOR17010	0	SW-301

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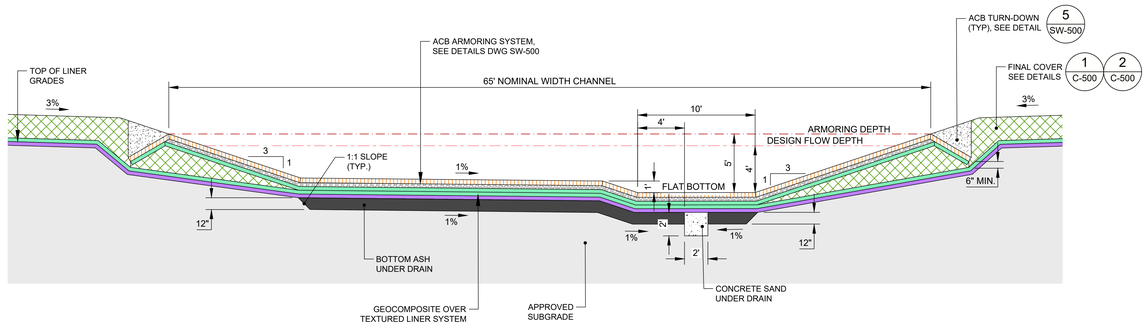
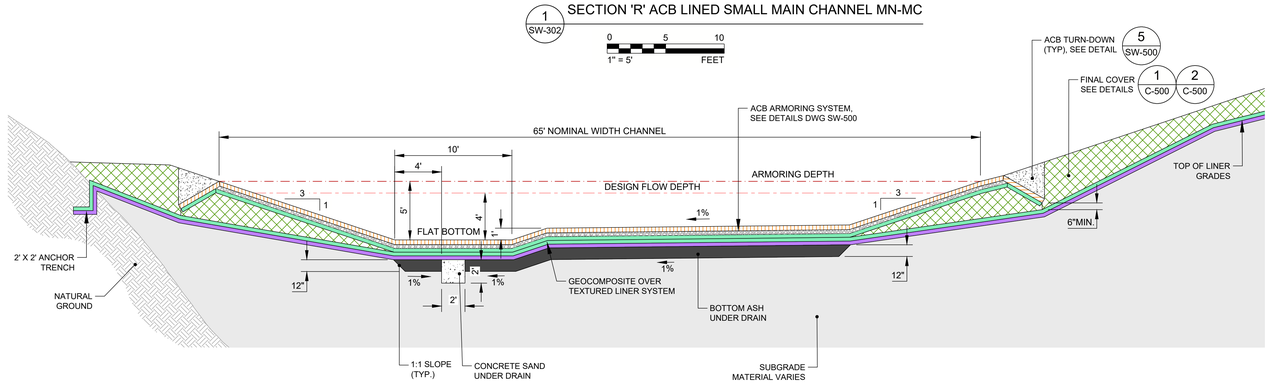


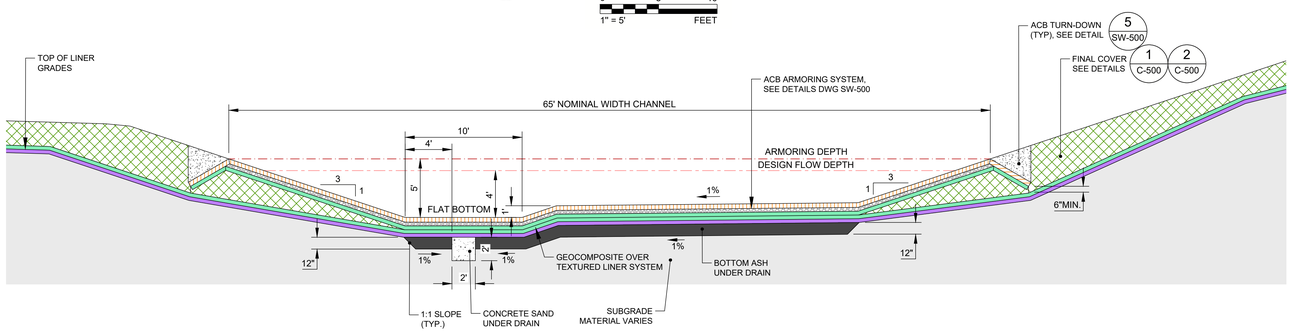
1 SW-302 SECTION 'R' ACB LINED SMALL MAIN CHANNEL MN-MC

0 5 10
1" = 5' FEET



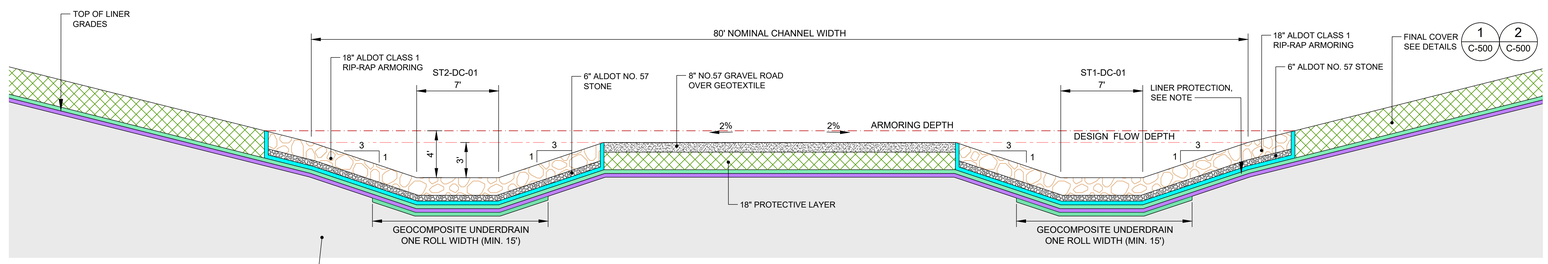
2 SW-302 SECTION 'L' ACB LINED SMALL CHANNEL F01-DC-01

0 5 10
1" = 5' FEET



3 SW-302 SECTION 'M' ACB LINED SMALL CHANNEL F01-DC-01

0 5 10
1" = 5' FEET



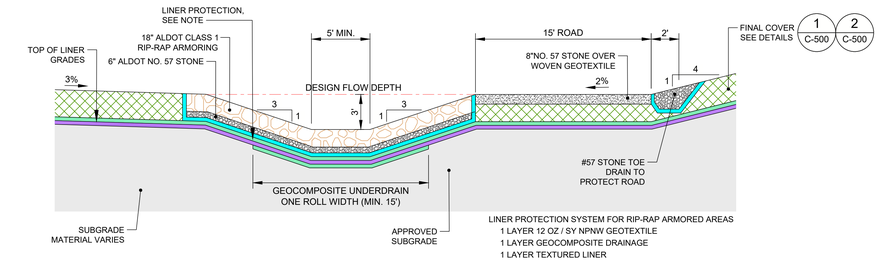
4 SW-302 SECTION 'H' ACCESS ROAD WITH DOUBLE SIDED RIP-RAP CHANNELS ST1-DC-01 & ST2-DC-01

SEE NOTE 1

0 5 10
1" = 5' FEET

NOTES

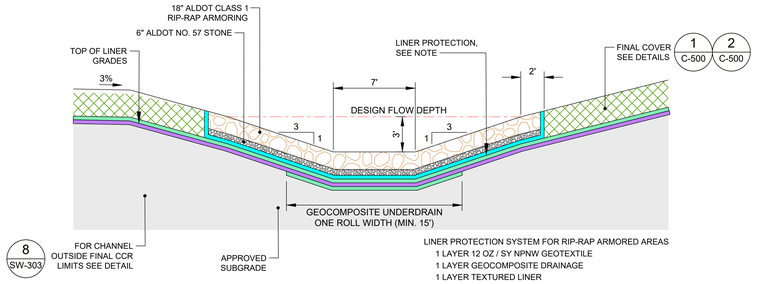
1. DECK CHANNELS NOT WITHIN 50' OF A TIE-IN SHALL HAVE NO UNDERDRAIN SYSTEM.



5 SW-302 SECTION 'K' RIP-RAP LINED CHANNEL F01-DC-02

SEE NOTE 1

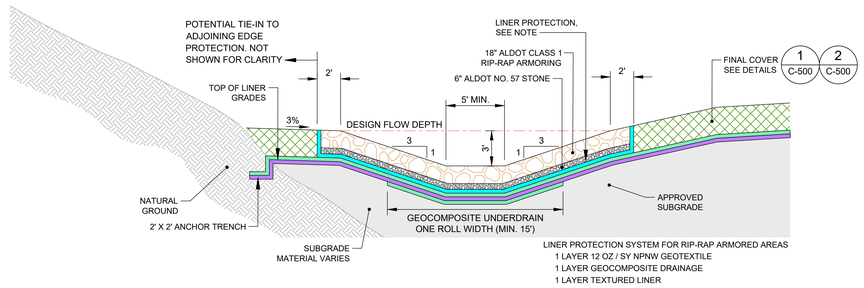
0 5 10
1" = 5' FEET



6 SW-302 SECTION 'N' RIP-RAP LINED CHANNEL ST3-DC-02

SEE NOTE 1

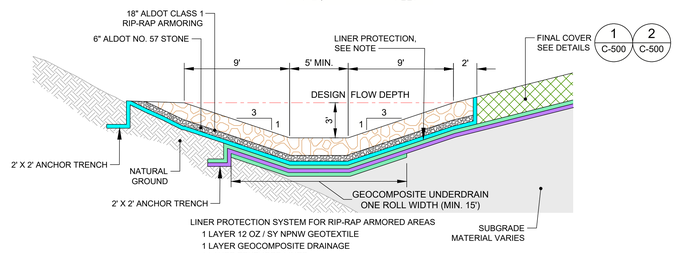
0 5 10
1" = 5' FEET



7 SW-302 SECTION 'P' RIP-RAP LINED CHANNEL F03-DC-04

SEE NOTE 1

0 5 10
1" = 5' FEET



8 SW-302 SECTION 'Q' RIP-RAP LINED CHANNEL F03-DC-02

SEE NOTE 1

0 5 10
1" = 5' FEET

LEGEND

- ALDOT CLASS 1 RIP-RAP
- FINAL COVER FILL
- ARTICULATED CONCRETE BLOCK
- ALDOT NO. 57 STONE DRAINAGE LAYER
- GEOCOMPOSITE
- TEXTURED LINER
- HYDROTURF
- CLOSURE TURF NO INFILL
- GEOTEXTILE

REV	DATE	REVISION DESCRIPTION	DES	CADD	CHK	RVW
1						
0	2020/10/16	ISSUED FOR CONSTRUCTION	RAC/GLH	AVR	SCN	GLH

CLIENT
SOUTHERN COMPANY SERVICES

Alabama Power

PROJECT
PLANT GORGAS
ASH POND CLOSURE
DESIGN DRAWINGS

TITLE
STORMWATER CHANNEL CROSS SECTIONS SHEET 2

ALABAMA LICENSED No. 29143 PROFESSIONAL ENGINEER GREGORY L. HEBELER

16 OCT 2020

GREGORY L. HEBELER
ALABAMA PROFESSIONAL ENGINEER
CERTIFICATE NUMBER 29143

CONSULTANT
GOLDER

YYYY-MM-DD	2020/10/16
DESIGNED	RAC/GLH
PREPARED	AVR
CHECKED	SCN
REVIEWED / APPROVED	GLH

PROJECT NO. 1789848 | SCS REF. GOR17010 | REV. 0 | DRAWING SW-302

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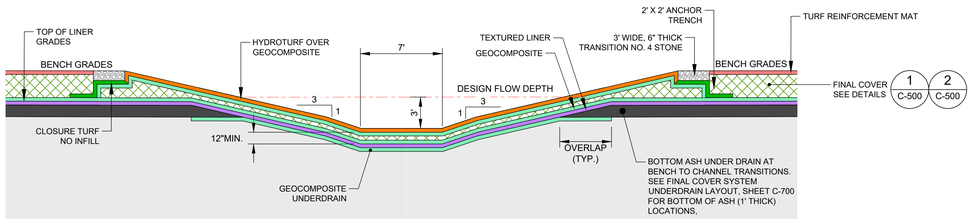
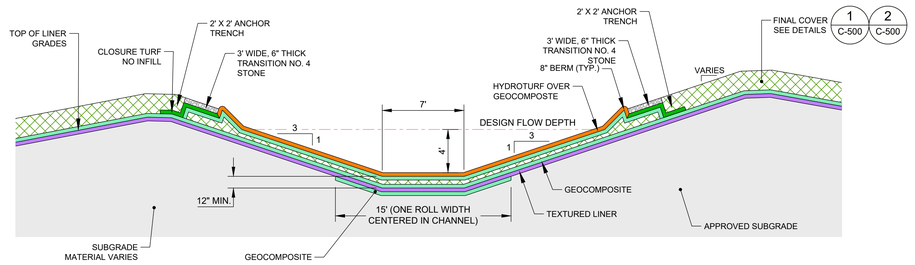


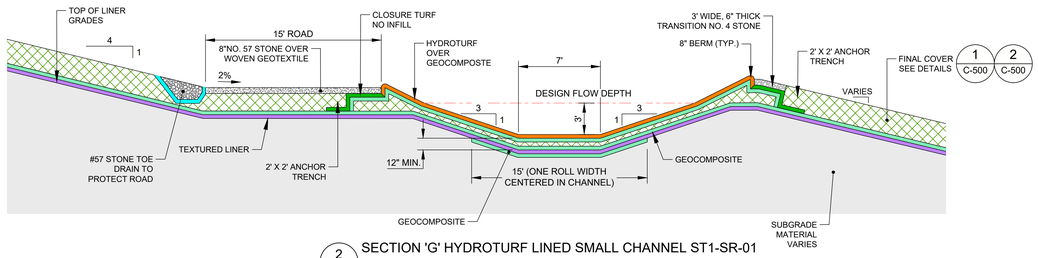
1 SW-303 SECTION 'D' HYDROTURF LINED CHANNEL ST1-DS-02

0 5 10
1" = 5' FEET



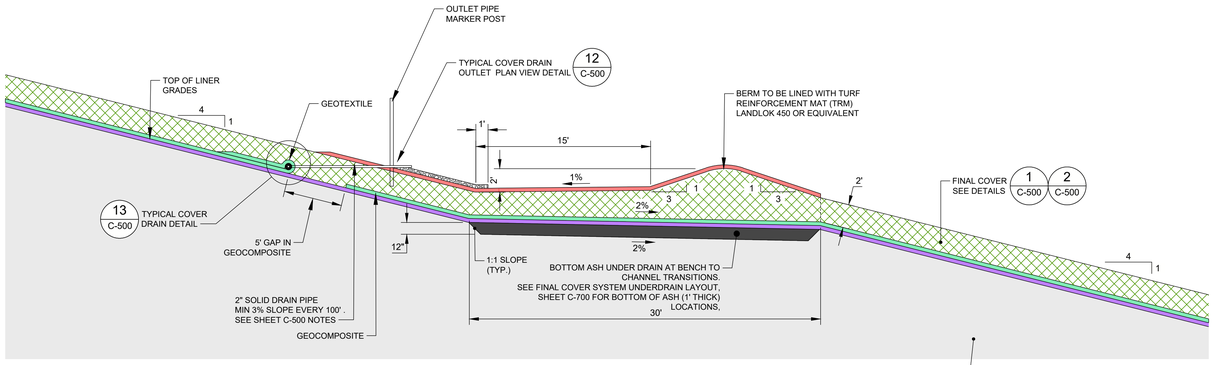
4 SW-303 SECTION 'E' HYDROTURF LINED SMALL CHANNEL ST1-DS-02

0 5 10
1" = 5' FEET



2 SW-303 SECTION 'G' HYDROTURF LINED SMALL CHANNEL ST1-SR-01

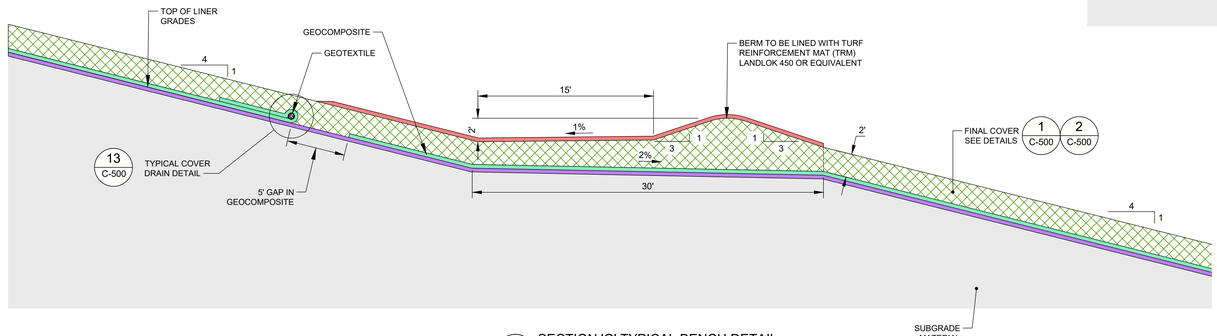
0 5 10
1" = 5' FEET



5 SW-303 TYPICAL BENCH DETAIL WITH UNDERDRAIN AND SHOWING TYPICAL COVER DRAIN OUTLET

SEE NOTE 1

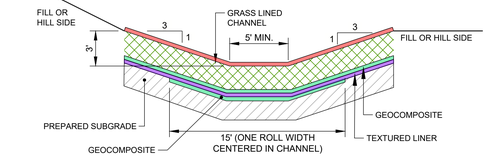
0 5 10
1" = 5' FEET



3 SW-303 SECTION 'O' TYPICAL BENCH DETAIL

SEE NOTE 1

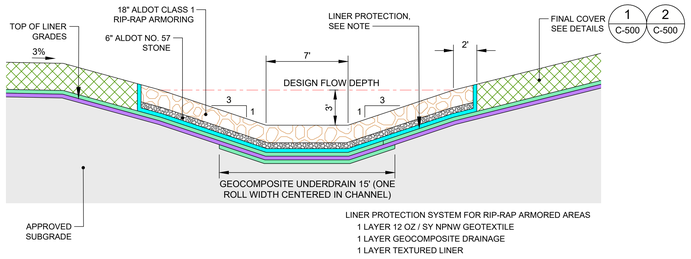
0 5 10
1" = 5' FEET



6 SW-303 TYPICAL GRASS DECK CHANNEL DETAIL WITH UNDERDRAIN

0 5 10
1" = 5' FEET

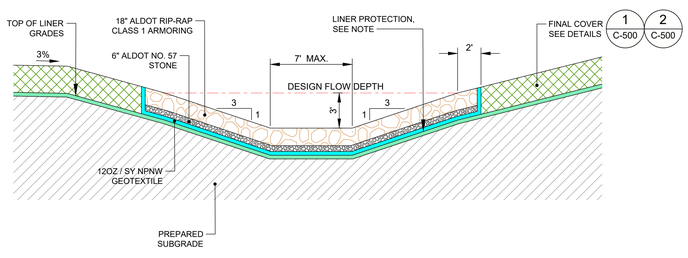
SEE NOTE 1



7 SW-303 TYPICAL RIP-RAP DECK CHANNEL DETAIL WITH UNDERDRAIN

SEE NOTE 1

0 5 10
1" = 5' FEET



8 SW-303 TYPICAL RIP-RAP DECK CHANNEL OUTSIDE FINAL CCR LIMITS

0 5 10
1" = 5' FEET

NOTES

1. DECK CHANNELS AND BENCHES NOT WITHIN 50' OF A TIE-IN SHALL HAVE NO UNDERDRAIN SYSTEM.

LEGEND

- FINAL COVER FILL
- ARTICULATED CONCRETE BLOCK
- ALDOT NO. 57 STONE DRAINAGE LAYER
- GEOCOMPOSITE
- TEXTURED LINER
- HYDROTURF
- CLOSURE TURF NO INFILL
- TURF REINFORCEMENT MATTING
- 12 OZ / SY NPNW GEOTEXTILE
- ALDOT CLASS 1 RIP-RAP

REV	DATE	REVISION DESCRIPTION	DES	CADD	CHK	RVW
1	2020/10/16	ISSUED FOR CONSTRUCTION	RAC/GLH	AVR	SCN	GLH

CLIENT
SOUTHERN COMPANY SERVICES

Alabama Power

PROJECT
PLANT GORGAS
ASH POND CLOSURE
DESIGN DRAWINGS

TITLE
STORMWATER CHANNEL CROSS SECTIONS
SHEET 3

ALABAMA LICENSED PROFESSIONAL ENGINEER GREGORY L. HEBELER No. 29143 16-OCT-2020

GREGORY L. HEBELER
ALABAMA PROFESSIONAL ENGINEER
CERTIFICATE NUMBER 29143

CONSULTANT
GOLDER

YYYY-MM-DD	2020/10/16
DESIGNED	RAC/GLH
PREPARED	AVR
CHECKED	SCN
REVIEWED / APPROVED	GLH

PROJECT NO. 1789848 | SCS REF. GOR17010 | REV. 0 | DRAWING SW-303

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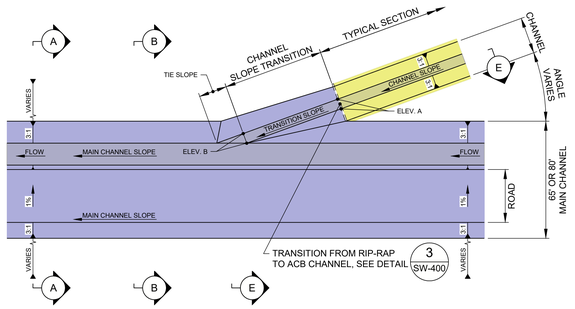
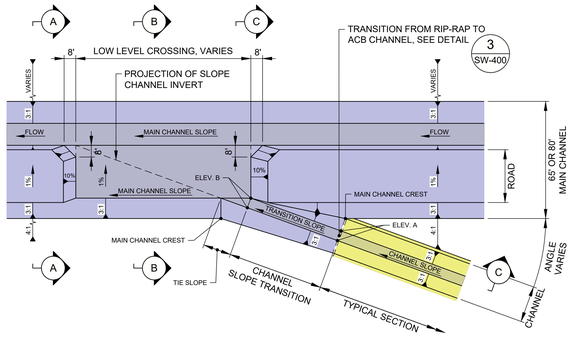


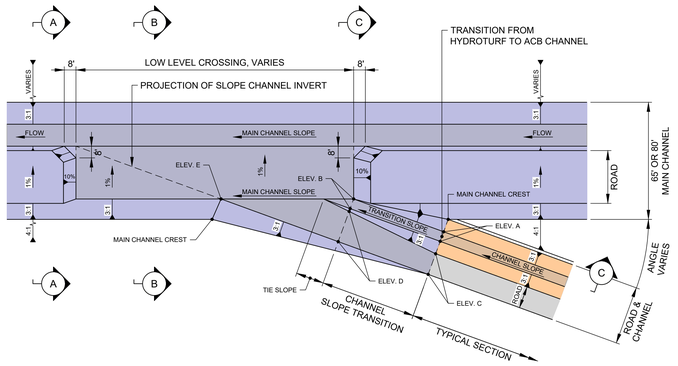
MAIN CHANNEL & SINGLE CHANNEL

0 40 80
1" = 40' FEET



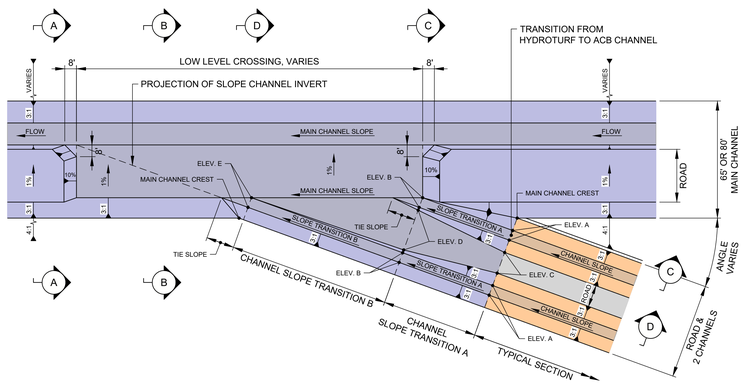
MAIN CHANNEL-LOW LEVEL CROSSING & SINGLE CHANNEL

0 40 80
1" = 40' FEET



MAIN CHANNEL-LOW LEVEL CROSSING & SINGLE CHANNEL-ROAD

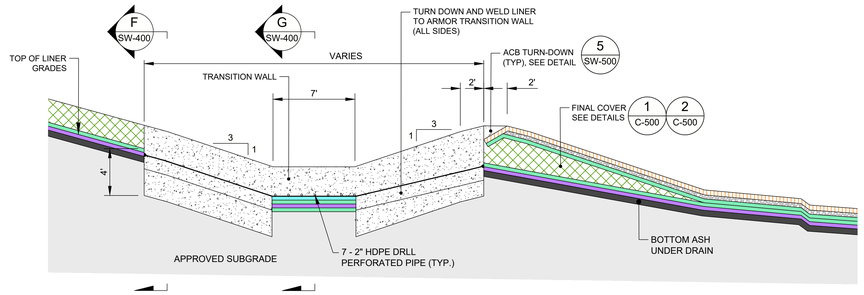
0 40 80
1" = 40' FEET



MAIN CHANNEL-LOW LEVEL CROSSING & DOUBLE CHANNEL-ROAD

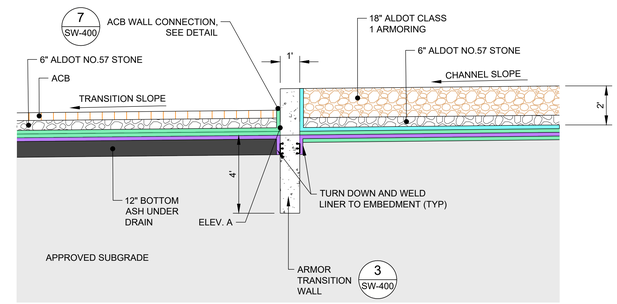
0 40 80
1" = 40' FEET

1 SW-400 MAIN CHANNEL & SLOPE CHANNEL BIFURCATION DETAILS



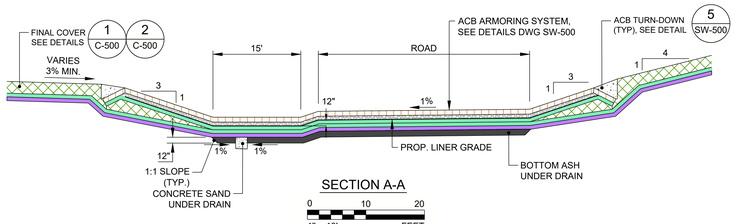
3 SW-400 ARMOR TRANSITION WALL

0 5 10
1" = 5' FEET



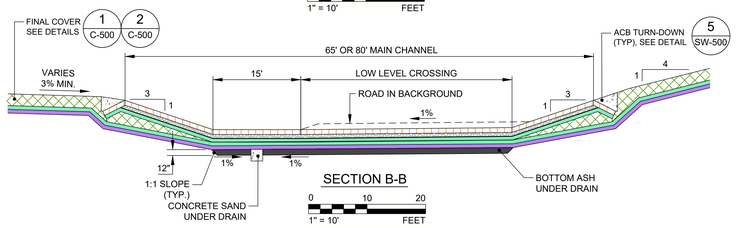
F SW-400 RIP-RAP TRANSITION TO ACB WING

0 3 6
1" = 3' FEET



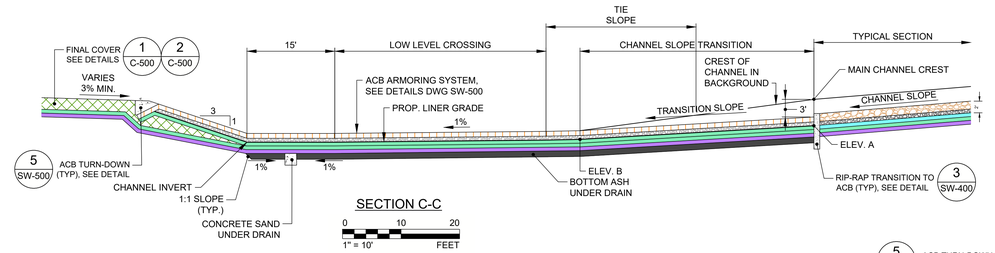
SECTION A-A

0 10 20
1" = 10' FEET



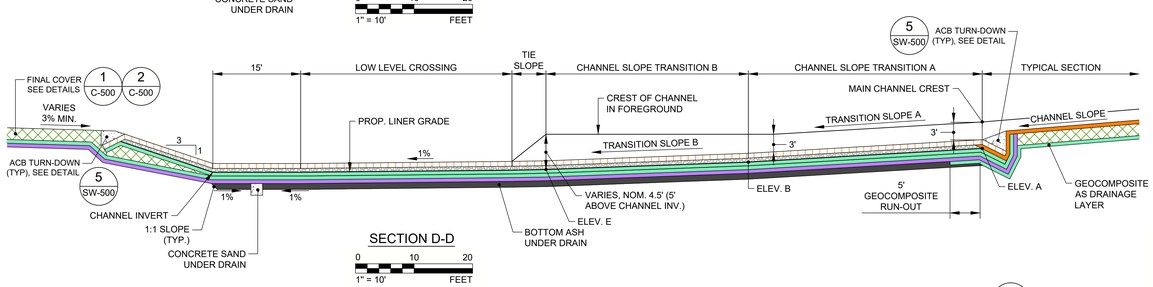
SECTION B-B

0 10 20
1" = 10' FEET



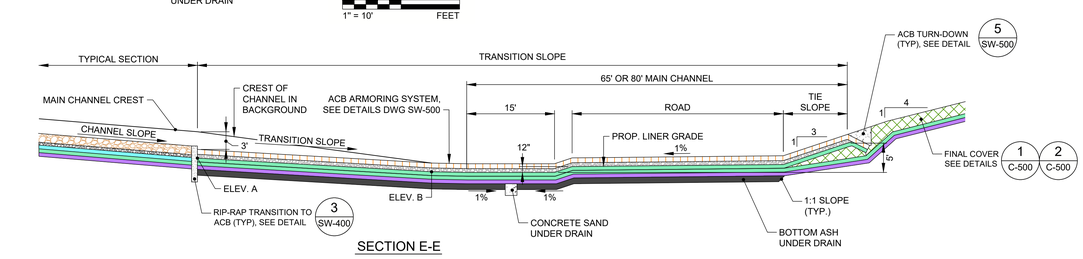
SECTION C-C

0 10 20
1" = 10' FEET



SECTION D-D

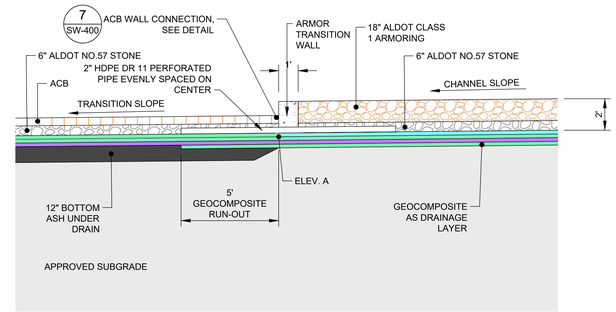
0 10 20
1" = 10' FEET



SECTION E-E

0 10 20
1" = 10' FEET

2 SW-400 MAIN CHANNEL & SLOPE CHANNEL SECTIONS



G SW-400 RIP-RAP TRANSITION TO ACB CENTER

0 3 6
1" = 3' FEET

LEGEND

PLAN

- CORRIDOR - ARTICULATED CONCRETE BLOCK (ACB)
- DECK CHANNEL RIP-RAP
- DOWNSLOPE CHANNEL, HYDROTURF
- BENCH - TURF REINFORCEMENT MAT (TRM)
- CHANNEL ROAD

SECTIONS

- CONCRETE
- FINAL COVER FILL
- ARTICULATED CONCRETE BLOCK
- ALDOT NO. 57 STONE DRAINAGE LAYER
- GEOCOMPOSITE
- TEXTURED LINER
- HYDROTURF
- CLOSURE TURF NO INFILL
- TURF REINFORCEMENT MATTING
- 12 OZ / SY NPNW GEOTEXTILE

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1	2020/10/16	ISSUED FOR CONSTRUCTION	RAC/GLH	RMS	SCN	GLH

CLIENT
SOUTHERN COMPANY SERVICES

Alabama Power

PROJECT
PLANT GORGAS
ASH POND CLOSURE
DESIGN DRAWINGS

TITLE
CHANNEL JUNCTIONS AND CROSSINGS SHEET 1

ALABAMA LICENSED No. 29143 PROFESSIONAL ENGINEER GREGORY L. HEBELER

16 OCT 2020

GREGORY L. HEBELER
ALABAMA PROFESSIONAL ENGINEER
CERTIFICATE NUMBER 29143

CONSULTANT
GOLDER

YYYY-MM-DD	2020/10/16
DESIGNED	RAC/GLH
PREPARED	RMS
REVIEWED	SCN
APPROVED	GLH

PROJECT NO. 1789848 | SCS REF. GOR17010 | REV. 0 | DRAWING SW-400

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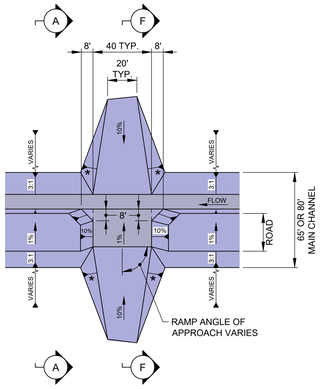
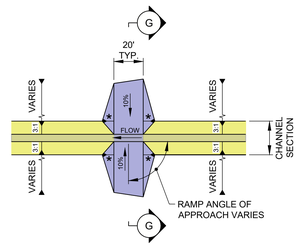


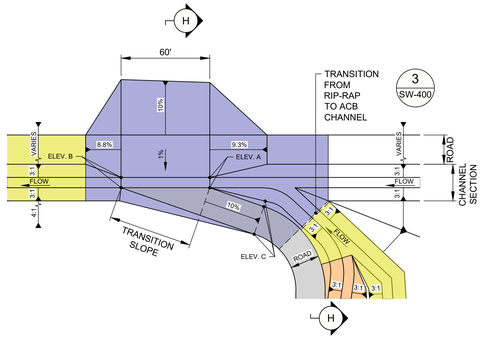
MAIN CHANNEL-LOW LEVEL CROSSING & ACCESS RAMPS

0 40 80
1" = 40' FEET



TYPICAL CHANNEL & ACCESS RAMPS

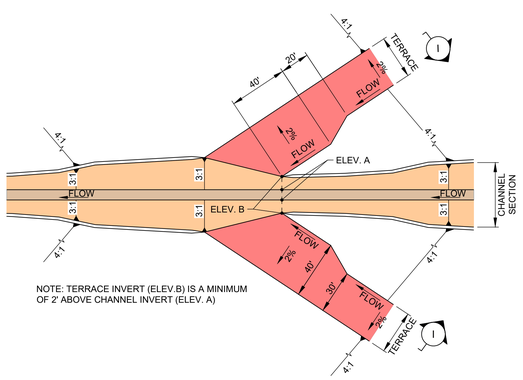
0 40 80
1" = 40' FEET



SINGLE CHANNEL-LOW LEVEL CROSSING

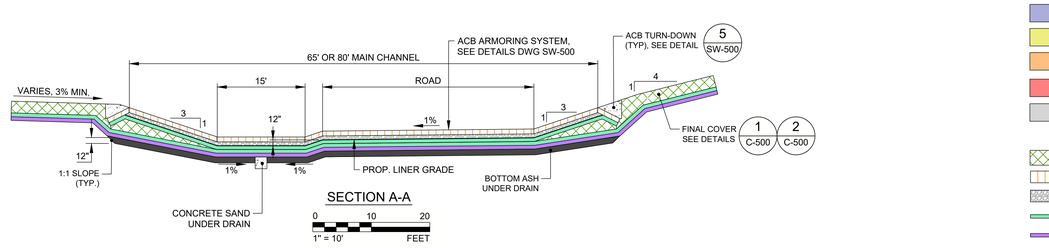
0 40 80
1" = 40' FEET

1 SW-401 DECK ACCESS RAMP DETAILS



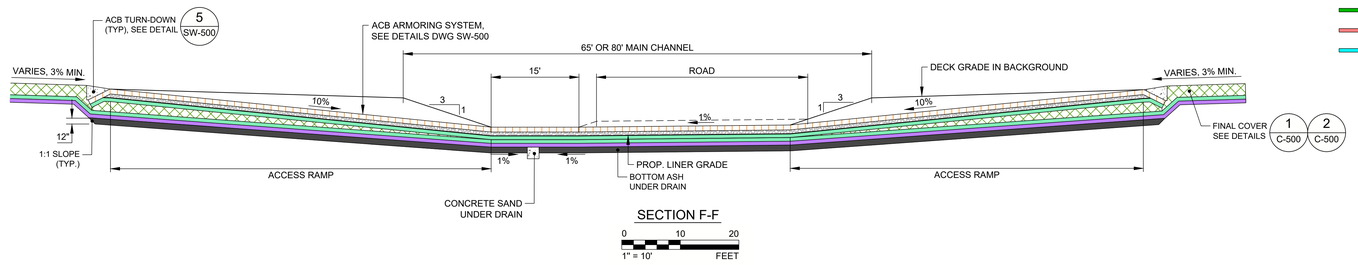
2 SW-401 SLOPE CHANNEL & TERRACE BIFURCATION DETAIL

0 40 80
1" = 40' FEET



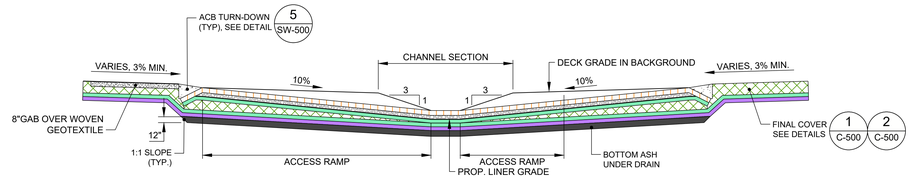
SECTION A-A

0 10 20
1" = 10' FEET



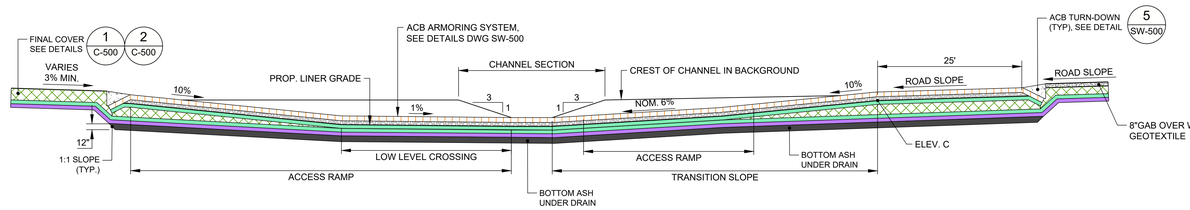
SECTION F-F

0 10 20
1" = 10' FEET



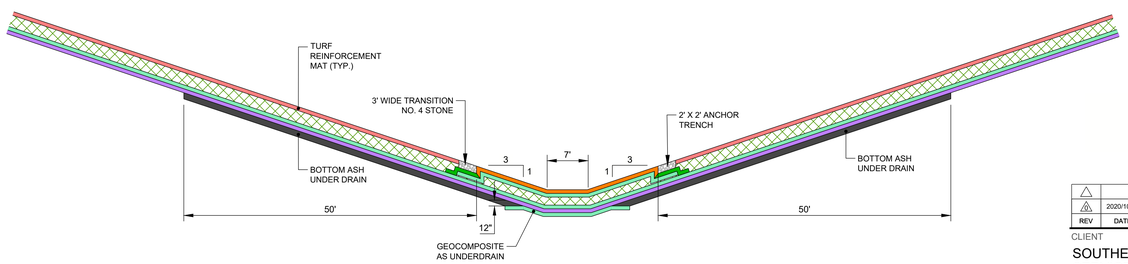
SECTION G-G

0 10 20
1" = 10' FEET



SECTION H-H

0 10 20
1" = 10' FEET



SECTION I-I

0 10 20
1" = 10' FEET

LEGEND

PLAN
- CORRIDOR - ARTICULATED CONCRETE BLOCK (ACB)
- DECK CHANNEL RIP-RAP
- DOWNSLOPE CHANNEL, HYDROTURF
- BENCH - TURF REINFORCEMENT MAT (TRM)
- CHANNEL ROAD

SECTIONS
- FINAL COVER FILL
- ARTICULATED CONCRETE BLOCK
- ALDOT NO. 57 STONE DRAINAGE LAYER
- GEOCOMPOSITE
- TEXTURED LINER
- HYDROTURF
- CLOSURE TURF NO INFILL
- TURF REINFORCEMENT MATTING
- 12 OZ / SY NPNW GEOTEXTILE

REV	DATE	REVISION DESCRIPTION	DES	CADD	CHK	RVW
1	2020/10/16	ISSUED FOR CONSTRUCTION	RAC/GLH	RMS	SCN	GLH

CLIENT
SOUTHERN COMPANY SERVICES

Alabama Power

PROJECT
PLANT GORGAS
ASH POND CLOSURE
100% DESIGN DRAWINGS

TITLE
CHANNEL JUNCTIONS AND CROSSINGS
SHEET 2

ALABAMA LICENSED PROFESSIONAL ENGINEER GREGORY L. HEBELER No. 29143 16-OCT-2020

GREGORY L. HEBELER
ALABAMA PROFESSIONAL ENGINEER
CERTIFICATE NUMBER 29143

CONSULTANT
GOLDER

YYYY-MM-DD	2020/10/16
DESIGNED	RAC/GLH
PREPARED	RMS
CHECKED	SCN
REVIEWED / APPROVED	GLH

PROJECT NO. 1789848 | SCS REF. GOR17010 | REV. 0 | DRAWING SW-401

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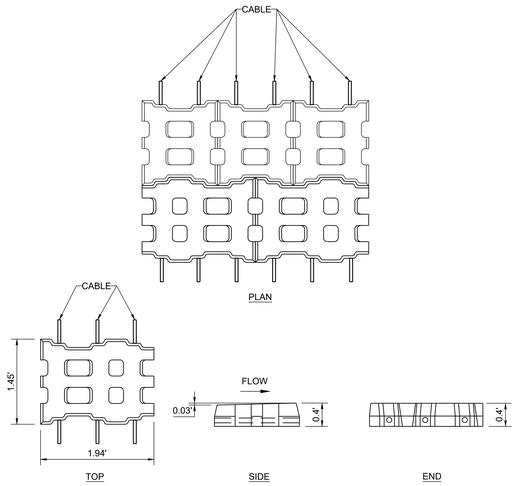
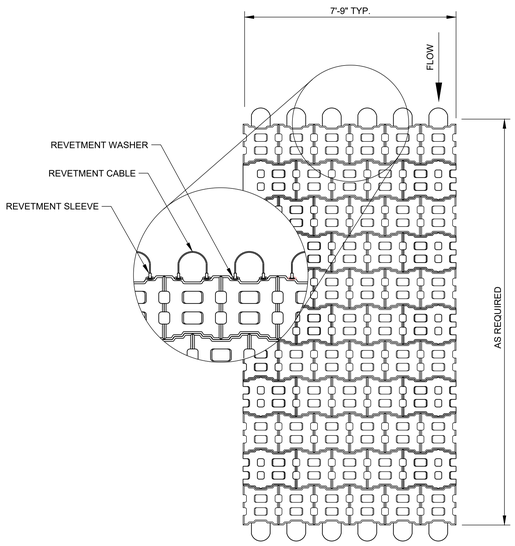


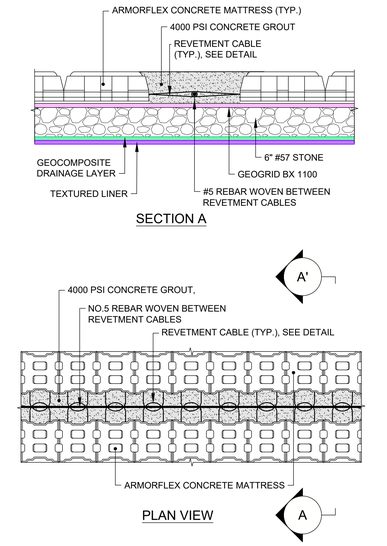
1 SW-500 TYPICAL ACB BLOCK DETAILS

NTS



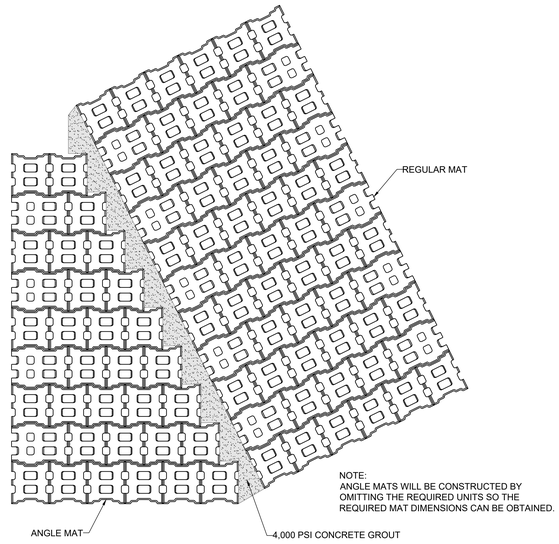
2 SW-500 TYPICAL ACB MAT DETAIL

NTS



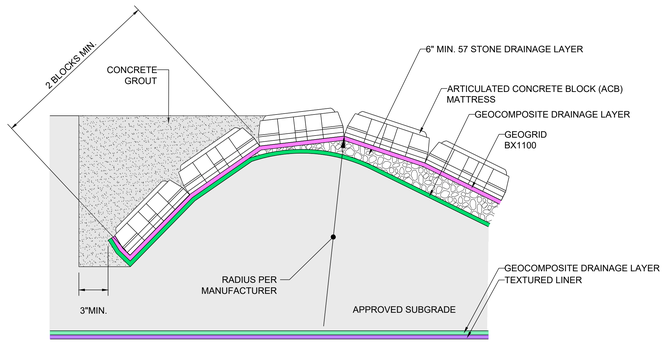
3 SW-500 TYPICAL MATTRESS TO MATTRESS CONNECTION

NTS



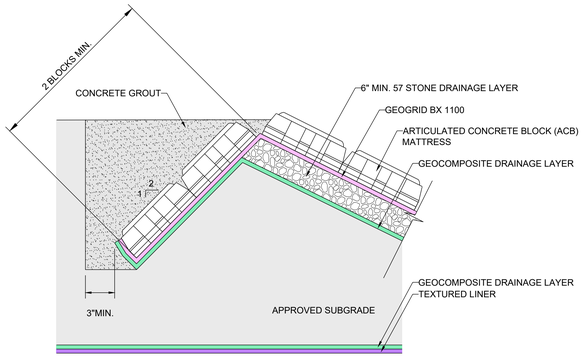
4 SW-500 TYPICAL ANGLED MAT CONNECTION

NTS



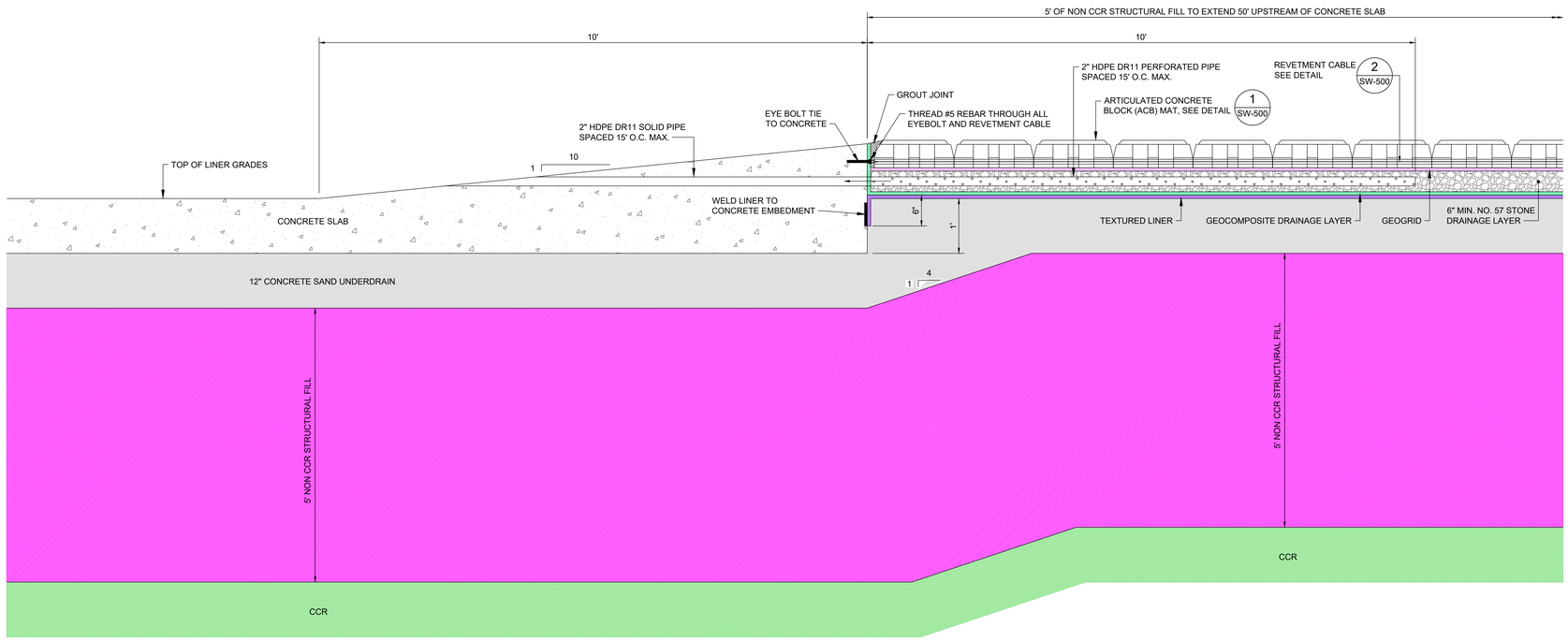
5 SW-500 ACB TURN-DOWN DETAIL

NTS



6 SW-500 ALTERNATIVE ACB TURN-DOWN DETAIL

NTS



NTS 7 SW-500 ACB TRANSITION TO CONCRETE LINED SPILLWAY

REV	DATE	REVISION DESCRIPTION	DES	CADD	CHK	RVW
△						
1	2020/10/16	ISSUED FOR CONSTRUCTION	RAC/GLH	RS	SCN	GLH

CLIENT
SOUTHERN COMPANY SERVICES

Alabama Power

PROJECT
PLANT GORGAS
ASH POND CLOSURE
DESIGN DRAWINGS

TITLE
SURFACE WATER MANAGEMENT GENERAL DETAILS

ALABAMA LICENSED No. 29143 PROFESSIONAL ENGINEER GREGORY L. HEBELER
16 OCT 2020

GREGORY L. HEBELER
ALABAMA PROFESSIONAL ENGINEER
CERTIFICATE NUMBER 29143

CONSULTANT
GOLDER

YYYY-MM-DD	2020/10/16
DESIGNED	RAC/GLH
PREPARED	RS
CHECKED	SCN
REVIEWED / APPROVED	GLH

PROJECT NO.	SCS REF.	REV.	DRAWING
1789848	GOR17010	0	SW-500

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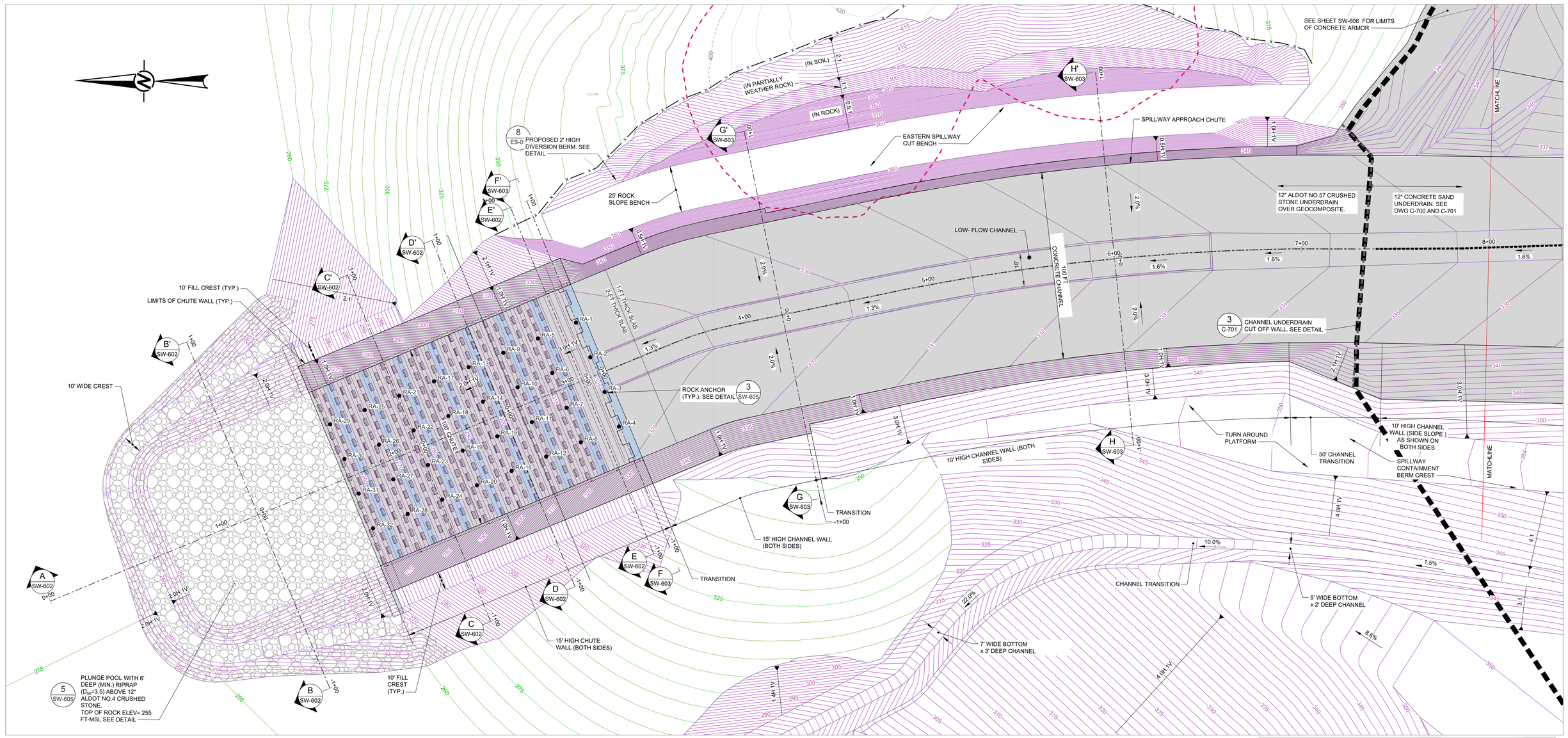

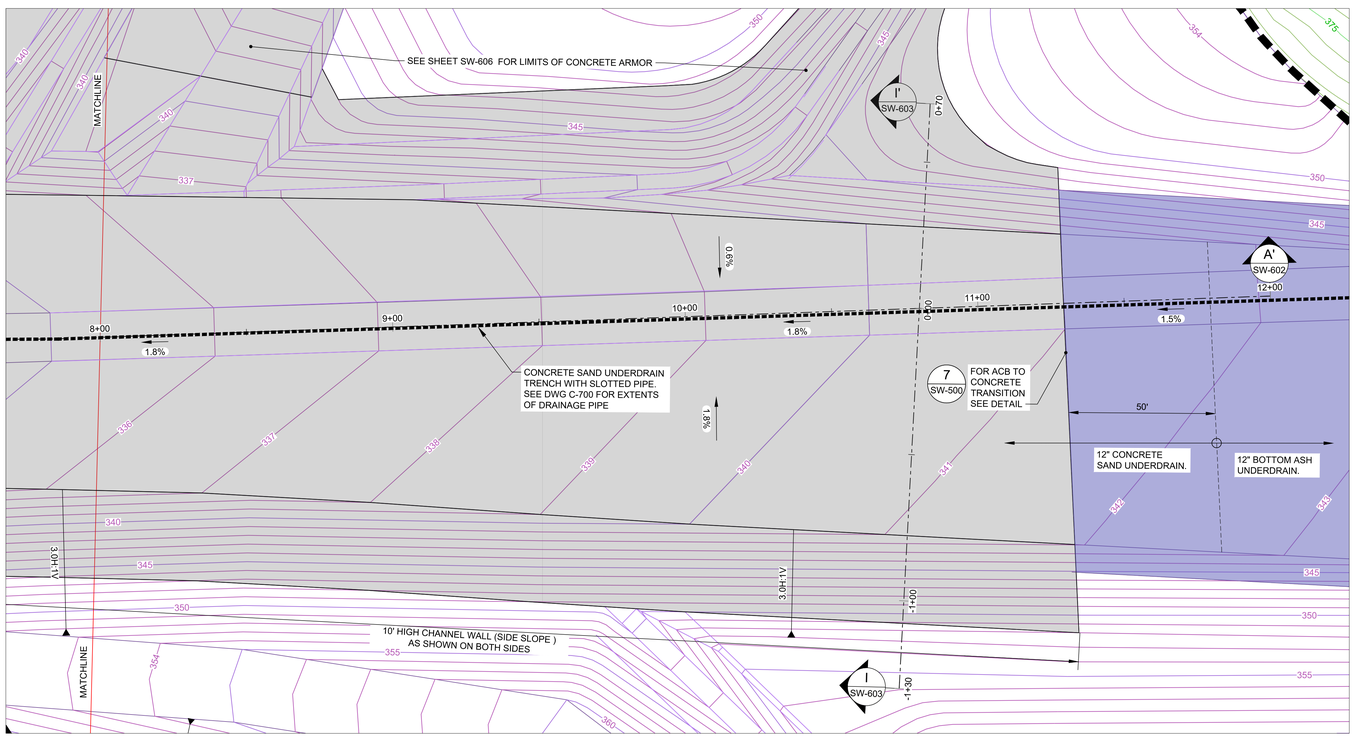

1 SW-600 SPILLWAY GENERAL ARRANGEMENT PLAN

0 20 40
1" = 20' FEET

ROCK ANCHOR TABLE

ROCK ANCHIOR NO.	NORTHING (FT)	EASTING (FT)
RA-1	1322053.30	2064870.10
RA-2	1322045.52	2064851.67
RA-3	1322037.74	2064833.25
RA-4	1322029.97	2064814.82
RA-5	1322073.59	2064861.53
RA-6	1322065.81	2064843.11
RA-7	1322058.03	2064824.68
RA-8	1322050.25	2064806.26
RA-9	1322092.02	2064853.75
RA-10	1322084.24	2064835.33
RA-11	1322076.44	2064816.91
RA-12	1322068.68	2064798.48
RA-13	1322110.43	2064845.98
RA-14	1322102.65	2064827.55
RA-15	1322094.87	2064809.13
RA-16	1322087.10	2064790.70
RA-17	1322128.87	2064838.20

ROCK ANCHOR TABLE

ROCK ANCHIOR NO.	NORTHING (FT)	EASTING (FT)
RA-18	1322121.08	2064819.78
RA-19	1322113.30	2064801.35
RA-20	1322105.53	2064782.92
RA-21	1322147.28	2064830.42
RA-22	1322139.50	2064812.00
RA-23	1322131.73	2064793.57
RA-24	1322123.95	2064775.14
RA-25	1322165.71	2064822.64
RA-26	1322157.93	2064804.21
RA-27	1322150.16	2064785.79
RA-28	1322142.38	2064767.36
RA-29	1322184.13	2064814.86
RA-30	1322176.35	2064796.44
RA-31	1322168.58	2064778.01
RA-32	1322160.80	2064759.59

NOTES

1. ELEVATIONS ARE IN FEET WITH REFERENCE TO THE NORTH AMERICAN VERTICAL DATUM (NAVD) OF 1988. COORDINATES CORRESPOND TO THE ALABAMA WEST STATE PLAN COORDINATE SYSTEM, NORTH AMERICAN DATUM (NAD) 1983.

2. CONTOUR INTERVAL IS 5 FEET IN EXISTING GROUND AREAS AND 1 FOOT IN PROPOSED GRADING AREAS.

3. ARMORING AWAY FROM SPILLWAY NOT SHOWN FOR CLARITY.

REFERENCES

1. EXISTING TOPOGRAPHY PROVIDED BY SOUTHERN COMPANY SERVICES, FEBRUARY 2020

2. BOTTOM OF CCR TOPOGRAPHY TAKEN FROM USGS, PORT BIRMINGHAM, 1938 AND GOODSPINGS, 1971 QUADRANGLES. TOPOGRAPHY WAS INTERPRETED BETWEEN 20 FOOT CONTOURS AND ADJUSTED BASED ON GEOTECHNICAL INVESTIGATION DATA BY GOLDER ASSOCIATES INC.

LEGEND

- 340 — EXISTING TOPOGRAPHY / BATHYMETRY CONTOURS, 5' INTERVAL (REFERENCE 1)
- 500 — PROPOSED CLOSURE COVER GRADING CONTOURS, 1' INTERVAL
- 340 — ESTIMATED BOTTOM OF CCR CONTOURS, 5' INTERVAL (REFERENCE 2)
- ESTIMATED PRE-CLOSURE FACILITY BOUNDARY
- CHANNEL UNDERDRAIN. SEE DWG'S C-700 TO C-702 XXXXXXXXX
- x — x PROPOSED DIVERSION BERM
- PROPOSED CONCRETE SLAB
- ARTICULATED CONCRETE BLOCK (ACB)
- SPILLWAY CHUTE KEYWAY LOCATION
- ● RA-5 ROCK ANCHOR LOCATION

REV	DATE	REVISION DESCRIPTION	DES	CADD	CHK	RVW
1	2020/10/16	ISSUED FOR CONSTRUCTION	HH	BCL	BTH	ST/GLH
0						

CLIENT
SOUTHERN COMPANY SERVICES

Alabama Power

PROJECT
PLANT GORGAS
ASH POND CLOSURE
DESIGN DRAWINGS

TITLE
SPILLWAY GENERAL ARRANGEMENT

ALABAMA LICENSED No. 29143 PROFESSIONAL ENGINEER GREGORY L. HEBELER
16 OCT 2020

GREGORY L. HEBELER
ALABAMA PROFESSIONAL ENGINEER
CERTIFICATE NUMBER 29143

CONSULTANT
GOLDER

YYYY-MM-DD	2020/10/16
DESIGNED	HH
PREPARED	BCL
CHECKED	BTH
REVIEWED / APPROVED	ST/GLH

PROJECT NO.	SCS REF.	REV.	DRAWING
1789848	GOR17010	0	SW-600

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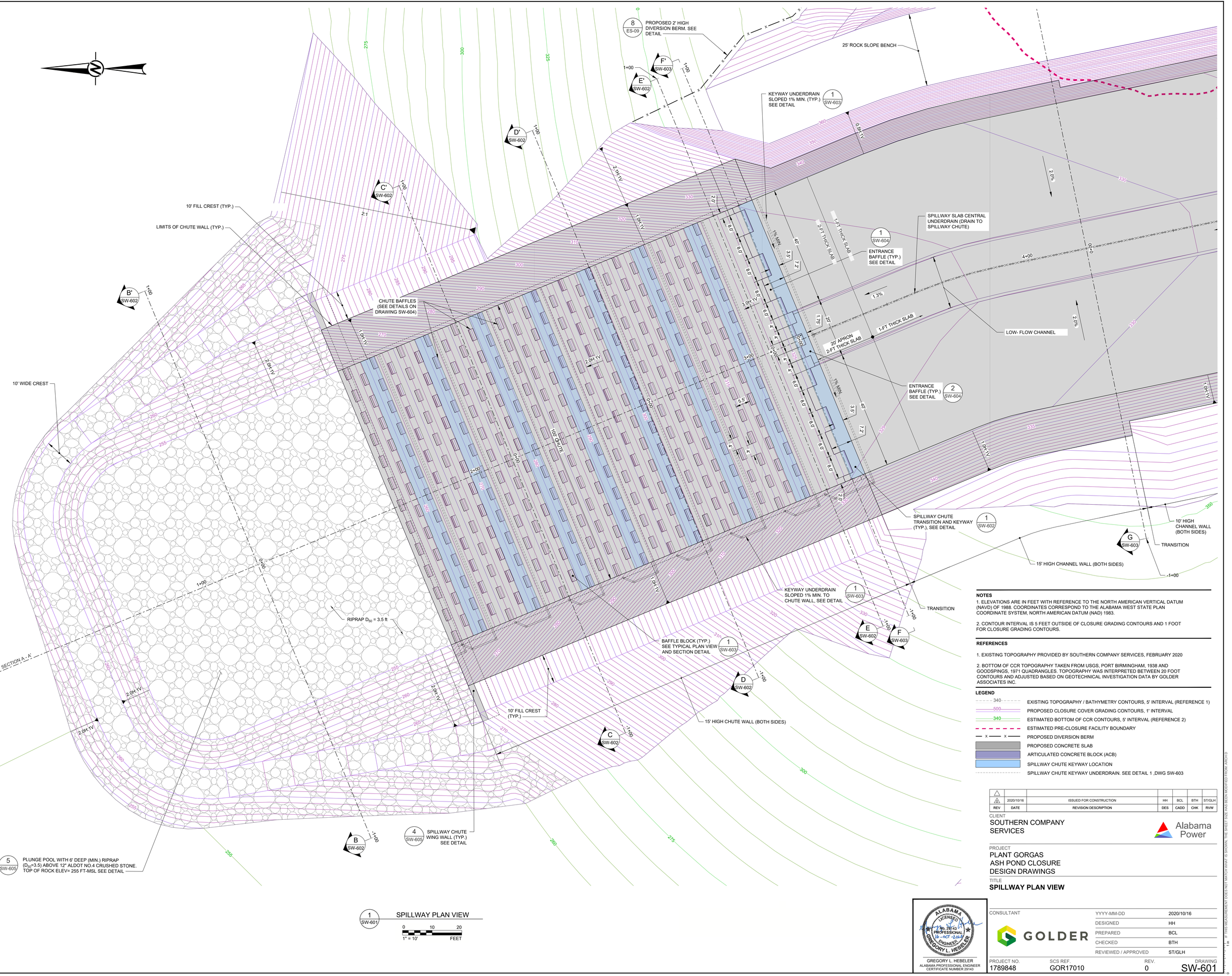

NOTES

1. ELEVATIONS ARE IN FEET WITH REFERENCE TO THE NORTH AMERICAN VERTICAL DATUM (NAVD) OF 1988. COORDINATES CORRESPOND TO THE ALABAMA WEST STATE PLAN COORDINATE SYSTEM, NORTH AMERICAN DATUM (NAD) 1983.

2. CONTOUR INTERVAL IS 5 FEET OUTSIDE OF CLOSURE GRADING CONTOURS AND 1 FOOT FOR CLOSURE GRADING CONTOURS.

REFERENCES

1. EXISTING TOPOGRAPHY PROVIDED BY SOUTHERN COMPANY SERVICES, FEBRUARY 2020

2. BOTTOM OF CCR TOPOGRAPHY TAKEN FROM USGS, PORT BIRMINGHAM, 1938 AND GOODSPRINGS, 1971 QUADRANGLES. TOPOGRAPHY WAS INTERPRETED BETWEEN 20 FOOT CONTOURS AND ADJUSTED BASED ON GEOTECHNICAL INVESTIGATION DATA BY GOLDER ASSOCIATES INC.

LEGEND

- 340 — EXISTING TOPOGRAPHY / BATHYMETRY CONTOURS, 5' INTERVAL (REFERENCE 1)
- 500 — PROPOSED CLOSURE COVER GRADING CONTOURS, 1' INTERVAL
- 340 — ESTIMATED BOTTOM OF CCR CONTOURS, 5' INTERVAL (REFERENCE 2)
- ESTIMATED PRE-CLOSURE FACILITY BOUNDARY
- x — x PROPOSED DIVERSION BERM
- PROPOSED CONCRETE SLAB
- ARTICULATED CONCRETE BLOCK (ACB)
- SPILLWAY CHUTE KEYWAY LOCATION
- SPILLWAY CHUTE KEYWAY UNDERDRAIN. SEE DETAIL 1 ,DWG SW-603

REV	DATE	REVISION DESCRIPTION	DES	CADD	CHK	RVW
2	2020/10/16	ISSUED FOR CONSTRUCTION	HH	BCL	BTH	ST/GLH

CLIENT
SOUTHERN COMPANY SERVICES

Alabama Power

PROJECT
PLANT GORGAS
ASH POND CLOSURE
DESIGN DRAWINGS

TITLE
SPILLWAY PLAN VIEW

ALABAMA LICENSED PROFESSIONAL ENGINEER GREGORY L. HEBELER No. 29143 16 - OCT - 2020

GREGORY L. HEBELER
ALABAMA PROFESSIONAL ENGINEER
CERTIFICATE NUMBER 29143

CONSULTANT
GOLDER

YYYY-MM-DD	2020/10/16
DESIGNED	HH
PREPARED	BCL
CHECKED	BTH
REVIEWED / APPROVED	ST/GLH

PROJECT NO.	SCS REF.	REV.	DRAWING
1789848	GOR17010	0	SW-601

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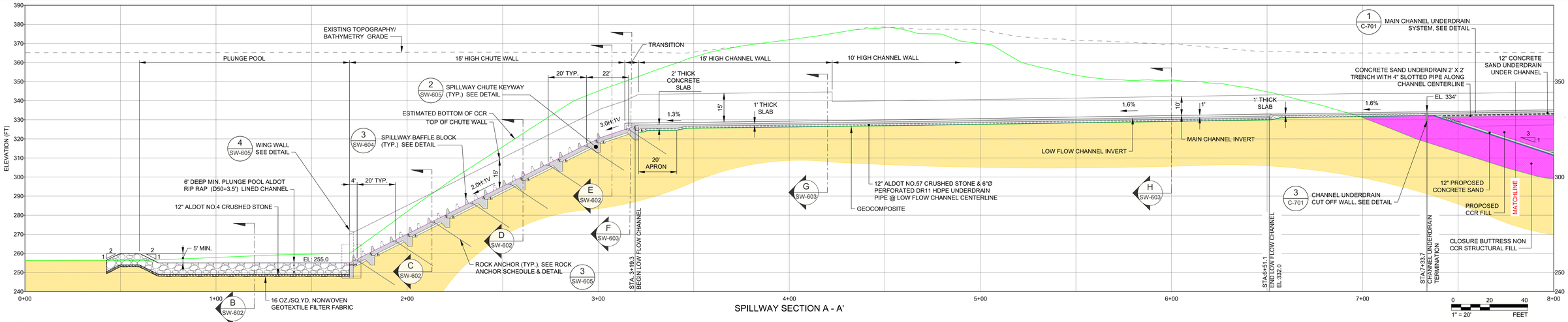
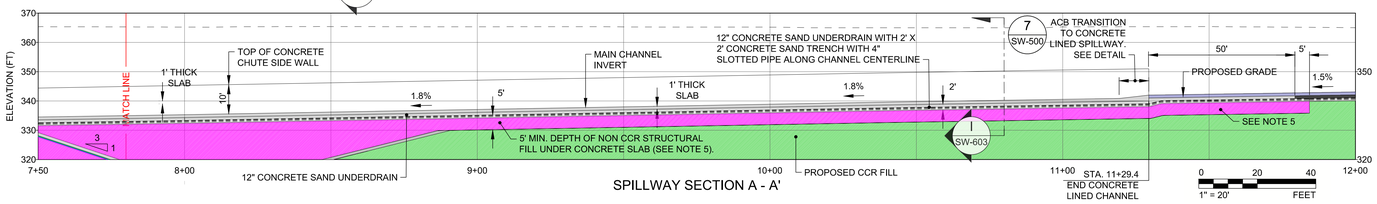
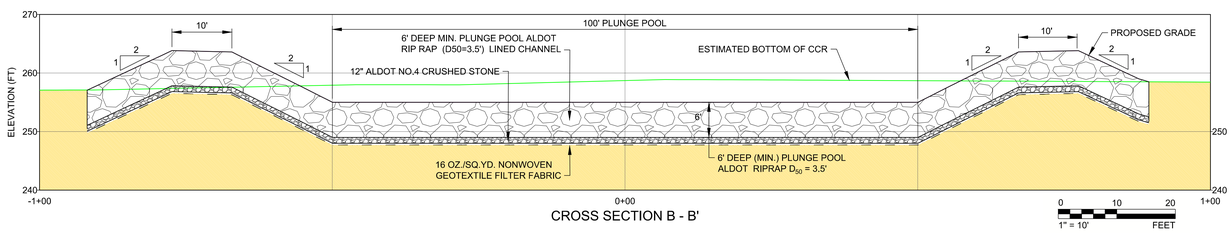


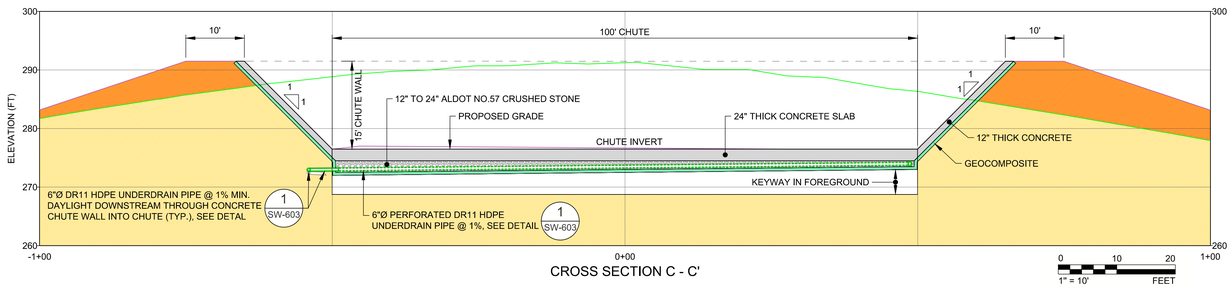
SPILLWAY SECTION A - A'



SPILLWAY SECTION A - A'



CROSS SECTION B - B'



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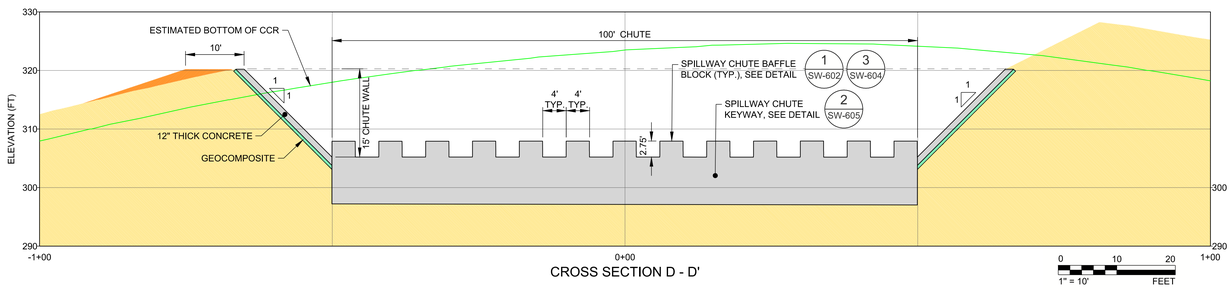

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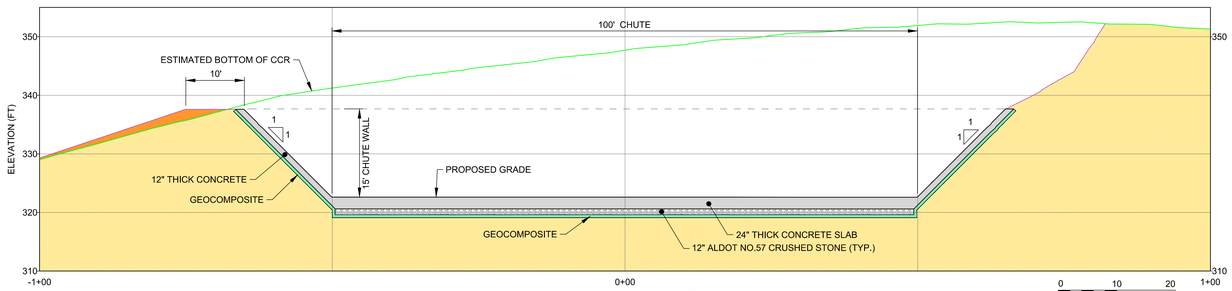

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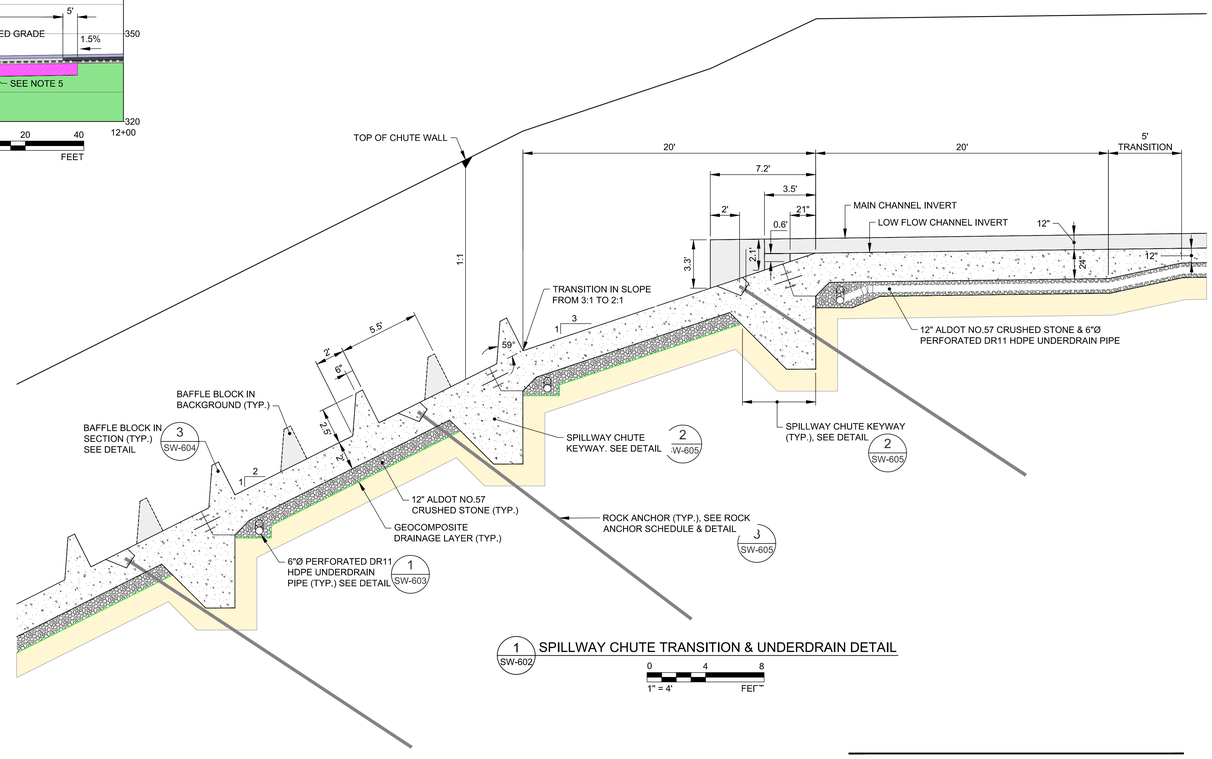

1 SW-602 SPILLWAY CHUTE TRANSITION & UNDERDRAIN DETAIL

NOTES

1. ELEVATIONS ARE IN FEET WITH REFERENCE TO THE NORTH AMERICAN VERTICAL DATUM (NAVD) OF 1988. COORDINATES CORRESPOND TO THE ALABAMA WEST STATE PLAN COORDINATE SYSTEM, NORTH AMERICAN DATUM (NAD) 1983.
2. BAFFLE BLOCKS NOT SHOWN FOR CLARITY.
3. INFERRED SOIL DEPTH, PARTIALLY WEATHERED ROCK DEPTH, AND DEPTH TO BEDROCK ARE ESTIMATED. FIELD CONDITIONS ARE LIKELY TO VARY. EXCAVATION IN EACH MATERIAL TYPE SHALL BE COMPLETED AS DESCRIBED BELOW:
   A. BEDROCK: 0.5H:1V
   B. PARTIALLY WEATHERED ROCK 1H:1V
   C. RESIDUUM: 2H:1V
4. SLAB AND CHUTE WALLS TO BE REINFORCED STRUCTURAL CONCRETE.
5. NON CCR STRUCTURAL FILL WITHIN 5 VERTICAL FEET OF CONCRETE SPILLWAY AND 50 FEET UPSTREAM OF SPILLWAY TO BE COMPACTED TO 98 PERCENT STANDARD PROCTOR DENSITY.

REFERENCES

1. EXISTING TOPOGRAPHY PROVIDED BY SOUTHERN COMPANY SERVICES, FEBRUARY 2020.

2. BATHYMETRIC SURFACE IS A COMPOSITE OF THE FEBRUARY 2020 SOUTHERN COMPANY AND THE JANUARY 2020 ARCSURVEY BATHYMETRIC SURVEYS TIED TO INTERPRETED SECTIONS OF THE 2016 SOUTHERN COMPANY BATHYMETRIC SURVEY WHERE SURVEY DATA IS NOT AVAILABLE.

3. BOTTOM OF CCR TOPOGRAPHY TAKEN FROM USGS, PORT BIRMINGHAM, 1938 AND GOODSPINGS, 1971 QUADRANGLES. TOPOGRAPHY WAS INTERPRETED BETWEEN 20 FOOT CONTOURS AND ADJUSTED BASED ON GEOTECHNICAL INVESTIGATION DATA BY GOLDER ASSOCIATES INC.

LEGEND

- PROPOSED TOP OF LINER GRADING
- EXISTING TOPOGRAPHY / BATHYMETRY GRADING (REFERENCE 1 & 2)
- GEOCOMPOSITE
- ESTIMATED BOTTOM OF CCR
- EXISTING NATURAL GROUND (UNSPECIFIED)
- PROPOSED CONCRETE SLAB
- PROPOSED CCR CUT (NOT SHOWN FOR CLARITY)
- PROPOSED CCR FILL
- PROPOSED NON CCR STRUCTURAL FILL
- PROPOSED NON CCR STRUCTURAL FILL
- PROPOSED NATURAL GROUND CUT (NOT SHOWN FOR CLARITY)

REV	DATE	REVISION DESCRIPTION	DES	CADD	CHK	RVW
1	2020/10/16	ISSUED FOR CONSTRUCTION	HH	BCL	BTH	ST/GLH

CLIENT
SOUTHERN COMPANY SERVICES

Alabama Power

PROJECT
PLANT GORGAS
ASH POND CLOSURE
DESIGN DRAWINGS

TITLE
SPILLWAY CROSS SECTIONS AND DETAILS SHEET 1

ALABAMA LICENSED PROFESSIONAL ENGINEER GREGORY L. HEBELER No. 29143 — 16 OCT 2020

GREGORY L. HEBELER
ALABAMA PROFESSIONAL ENGINEER
CERTIFICATE NUMBER 29143

CONSULTANT
GOLDER

YYYY-MM-DD	2020/10/16
DESIGNED	HH
PREPARED	BCL
CHECKED	BTH
REVIEWED / APPROVED	ST/GLH

PROJECT NO. 1789848 | SCS REF. GOR17010 | REV. 0 | DRAWING SW-602

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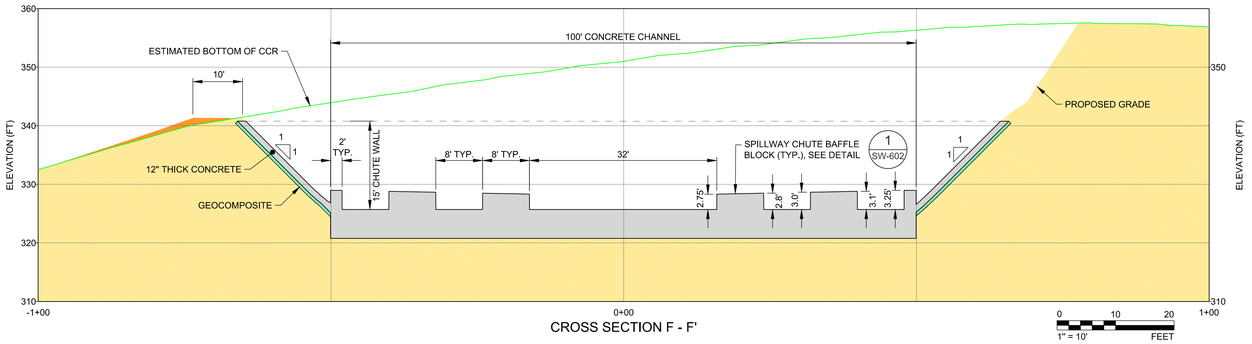

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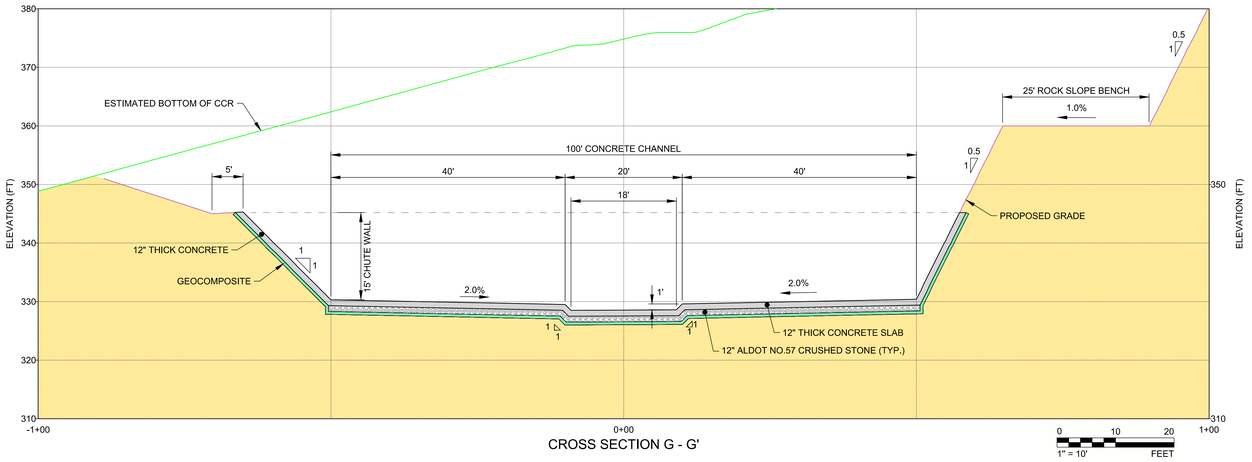

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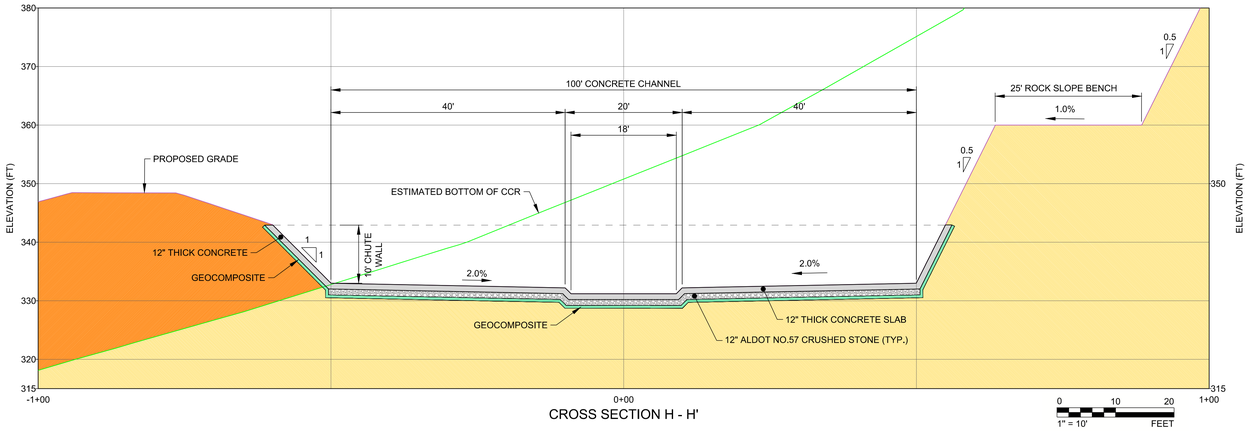

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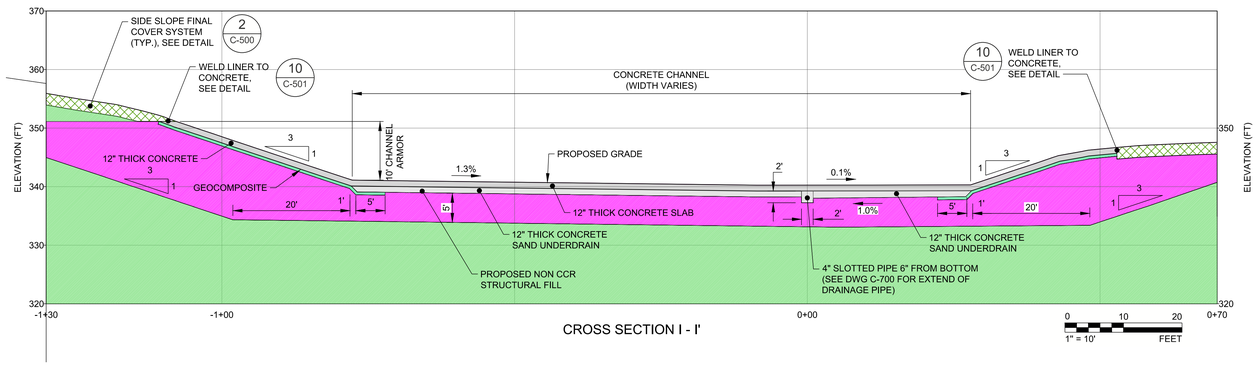
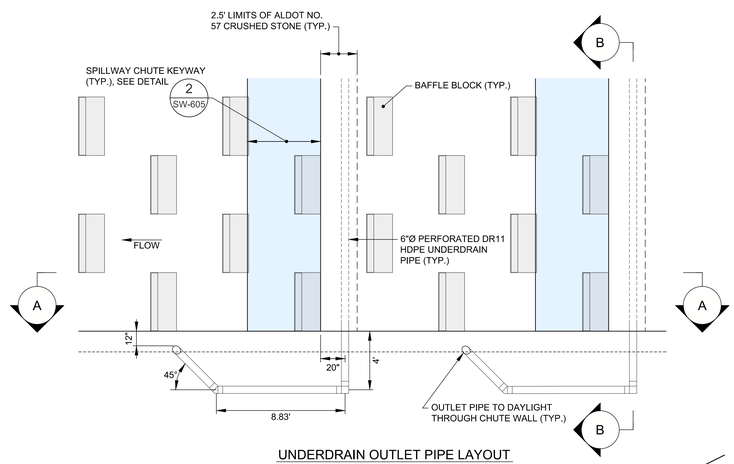
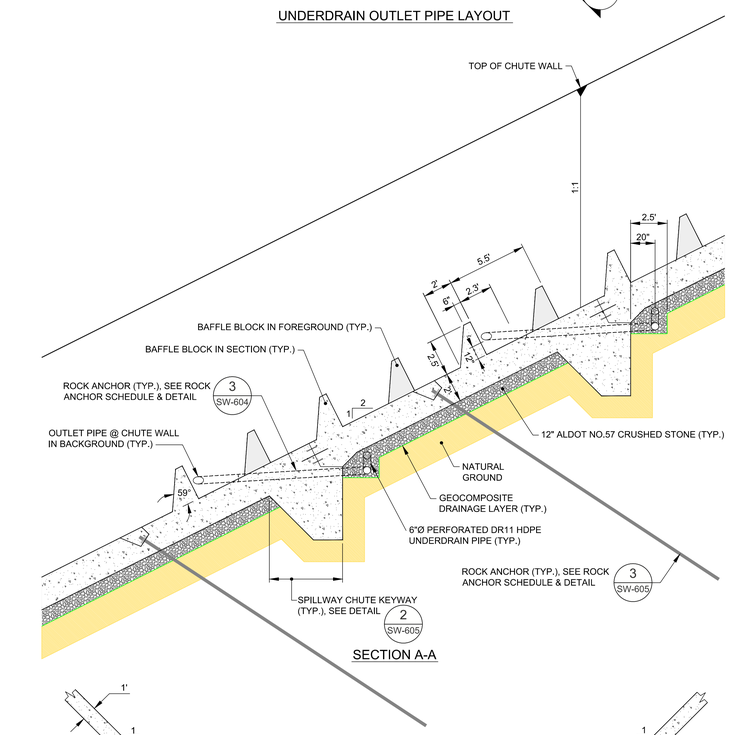


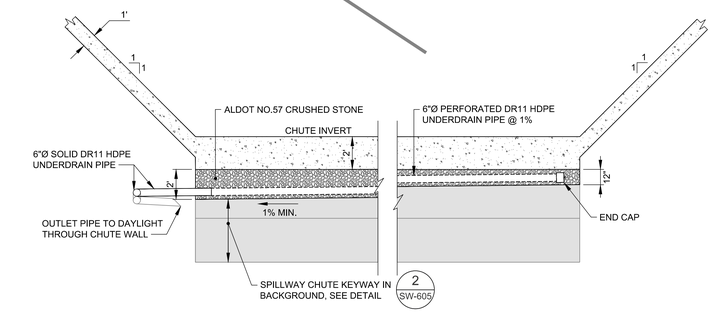
CROSS SECTION I - I'



UNDERDRAIN OUTLET PIPE LAYOUT



SECTION A-A



NOTE: BAFFLE BLOCKS NOT SHOWN FOR CLARITY.

SECTION B-B

1 SW-603 SPILLWAY CHUTE UNDERDRAIN DETAIL

0 4 8
1" = 4'
FEET

LEGEND

- PROPOSED TOP OF LINER GRADING
- EXISTING TOPOGRAPHY / BATHYMETRY GRADING (REFERENCE 1 & 2)
- GEOCOMPOSITE
- ESTIMATED BOTTOM OF CCR
- EXISTING NATURAL GROUND (UNSPECIFIED)
- PROPOSED CONCRETE SLAB
- PROPOSED CCR CUT (NOT SHOWN FOR CLARITY)
- PROPOSED CCR FILL
- PROPOSED NON CCR STRUCTURAL FILL
- PROPOSED NON CCR STRUCTURAL FILL
- PROPOSED NATURAL GROUND CUT (NOT SHOWN FOR CLARITY)

NOTES

1. ELEVATIONS ARE IN FEET WITH REFERENCE TO THE NORTH AMERICAN VERTICAL DATUM (NAVD) OF 1988. COORDINATES CORRESPOND TO THE ALABAMA WEST STATE PLAN COORDINATE SYSTEM, NORTH AMERICAN DATUM (NAD) 1983.
2. BAFFLE BLOCKS NOT SHOWN FOR CLARITY.
3. INFERRED SOIL DEPTH, PARTIALLY WEATHERED ROCK DEPTH, AND DEPTH TO BEDROCK ARE ESTIMATED. FIELD CONDITIONS ARE LIKELY TO VARY. EXCAVATION IN EACH MATERIAL TYPE SHALL BE COMPLETED AS DESCRIBED BELOW:
   A. BEDROCK: 0.5H:1V
   B. PARTIALLY WEATHERED ROCK 1H:1V
   C. RESIDUUM: 2H:1V
4. SLAB AND CHUTE WALLS TO BE REINFORCED STRUCTURAL CONCRETE.

REFERENCES

1. EXISTING TOPOGRAPHY PROVIDED BY SOUTHERN COMPANY SERVICES, FEBRUARY 2020.

2. BATHYMETRIC SURFACE IS A COMPOSITE OF THE FEBRUARY 2020 SOUTHERN COMPANY AND THE JANUARY 2020 ARCSURVEY BATHYMETRIC SURVEYS TIED TO INTERPRETED SECTIONS OF THE 2016 SOUTHERN COMPANY BATHYMETRIC SURVEY WHERE SURVEY DATA IS NOT AVAILABLE.

3. BOTTOM OF CCR TOPOGRAPHY TAKEN FROM USGS, PORT BIRMINGHAM, 1938 AND GOODSPINGS, 1971 QUADRANGLES. TOPOGRAPHY WAS INTERPRETED BETWEEN 20 FOOT CONTOURS AND ADJUSTED BASED ON GEOTECHNICAL INVESTIGATION DATA BY GOLDER ASSOCIATES INC.

REV	DATE	REVISION DESCRIPTION	DES	CADD	CHK	RVW
1	2020/10/16	ISSUED FOR CONSTRUCTION	GLH	RMS	SCN	GLH

CLIENT
SOUTHERN COMPANY SERVICES

Alabama Power

PROJECT
PLANT GORGAS
ASH POND CLOSURE
DESIGN DRAWINGS

TITLE
SPILLWAY CROSS SECTIONS AND DETAILS SHEET 2

ALABAMA LICENSED PROFESSIONAL ENGINEER GREGORY L. HEBELER No. 29143 16 OCT 2020

GREGORY L. HEBELER
ALABAMA PROFESSIONAL ENGINEER
CERTIFICATE NUMBER 29143

CONSULTANT
GOLDER

YYYY-MM-DD	2020/10/16
DESIGNED	GLH
PREPARED	RMS
CHECKED	SCN
REVIEWED / APPROVED	GLH

PROJECT NO.	SCS REF.	REV.	DRAWING
1789848	GOR17010	0	SW-603

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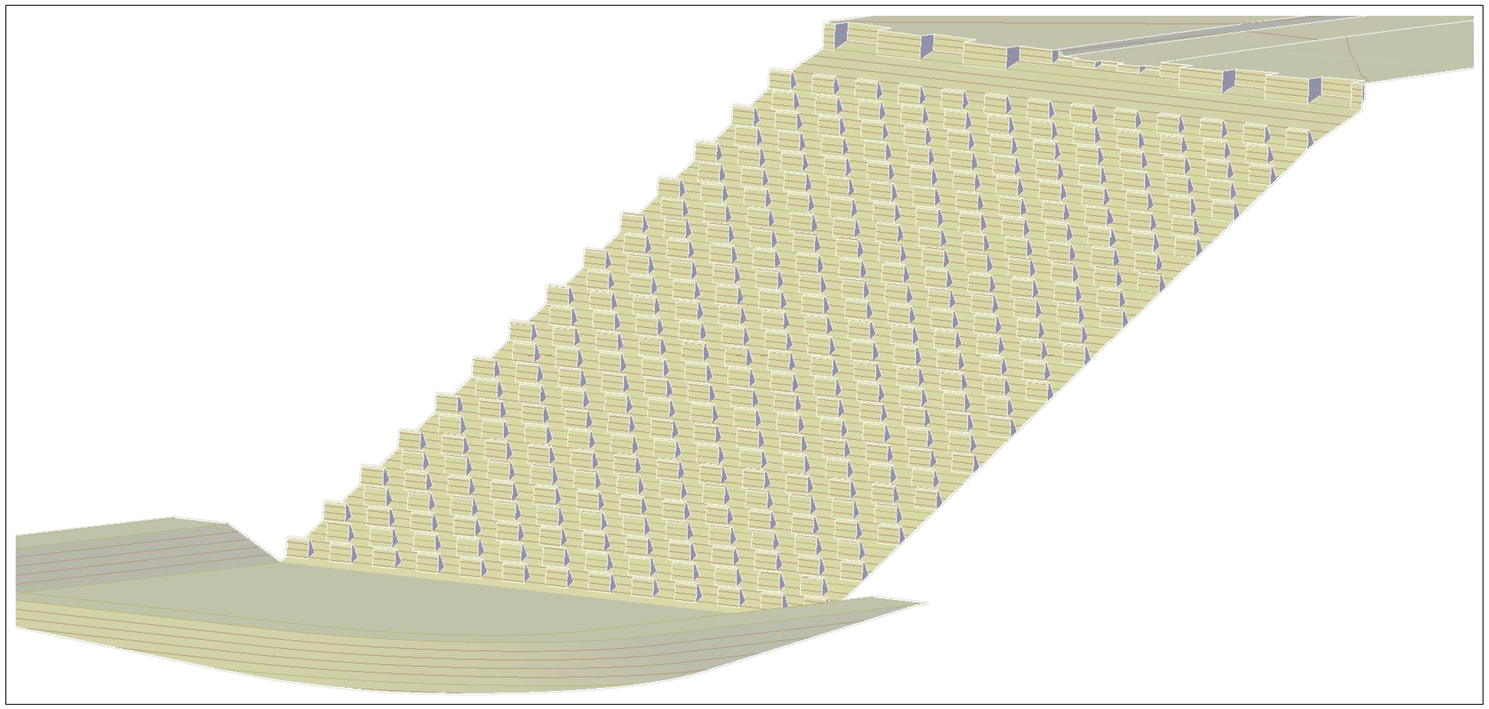
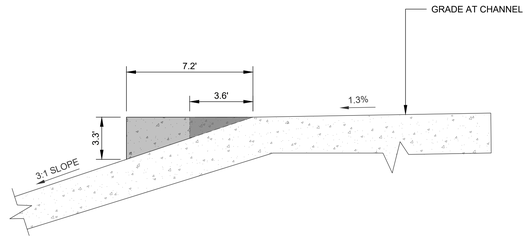
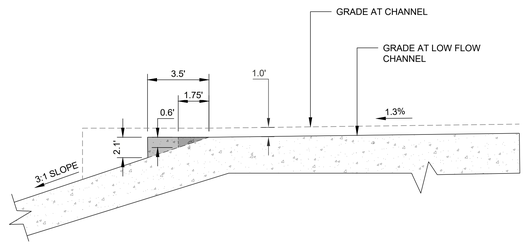
0 1 in



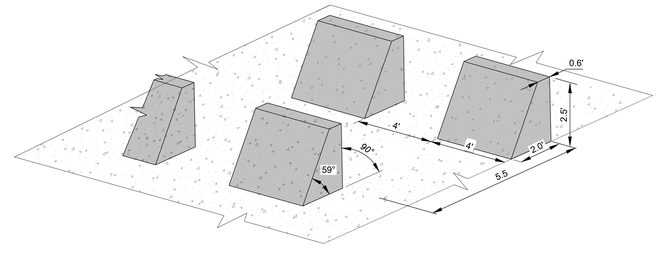
SPILLWAY ISOMETRIC VIEW
NTS



1 SW-604 ENTRANCE BAFFLE DETAIL 1
NTS



2 SW-604 ENTRANCE BAFFLE DETAIL 2
NTS



3 SW-604 CHUTE BAFFLE BLOCK DETAIL
NTS

NOTES

1. COORDINATES CORRESPOND TO ALABAMA WEST STATE PLANE COORDINATE SYSTEM, NORTH AMERICAN DATUM (NAD) 1983.

2. SPILLWAY WALLS NOT SHOWN FOR CLARITY, SEE SHEETS SW-601 AND SW-602 FOR WALL LAYOUTS.

REV	DATE	REVISION DESCRIPTION	DES	CADD	CHK	RVW
1	2020/10/16	ISSUED FOR CONSTRUCTION	HH	BCL	BTH	ST/GLH

CLIENT
SOUTHERN COMPANY SERVICES

Alabama Power

PROJECT
PLANT GORGAS
ASH POND CLOSURE
100% DESIGN DRAWINGS

TITLE
SPILLWAY CHANNEL DETAILS
SHEET 1

ALABAMA LICENSED No. 29143 PROFESSIONAL ENGINEER GREGORY L. HEBELER
16 - OCT - 2020

GREGORY L. HEBELER
ALABAMA PROFESSIONAL ENGINEER
CERTIFICATE NUMBER 29143

CONSULTANT
GOLDER

YYYY-MM-DD	2020/10/16
DESIGNED	HH
PREPARED	BCL
CHECKED	BTH
REVIEWED / APPROVED	ST/GLH

PROJECT NO.	SCS REF.	REV.	DRAWING
1789848	GOR17010	0	SW-604

0 1 in

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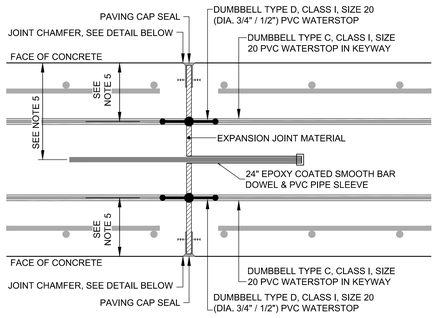
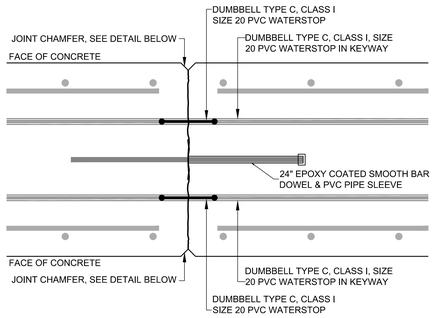
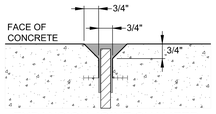


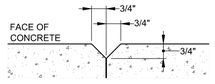
EXPANSION JOINT DETAIL



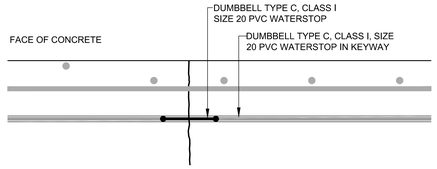
CONTRACTION JOINT DETAIL



EXPANSION JOINT CHAMFER



CONTRACTION JOINT CHAMFER



CONSTRUCTION JOINT DETAIL

NOTES

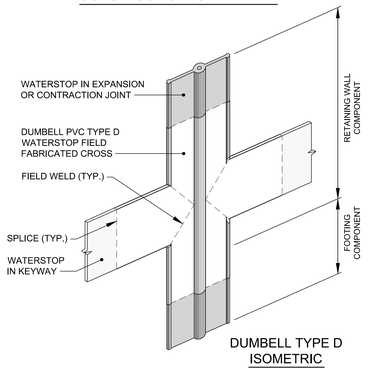
1. ALL CONCRETE TO BE CLASS 5000. ALL REINFORCEMENT SHALL BE GRADE 60.

2. ALL EXPOSED EDGES SHALL HAVE A 3/4 INCH CHAMFER.

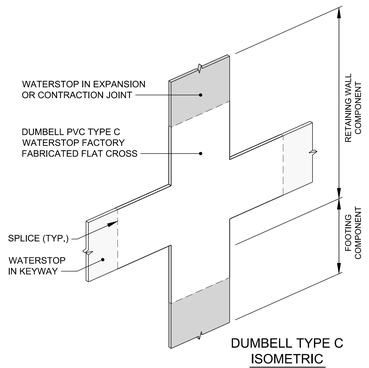
3. REBAR SHALL HAVE 2 INCHES OF CONCRETE COVER WHEN FORMED AND 3 INCHES OF CONCRETE COVER WHEN CONSTRUCTED AGAINST SOIL OR ROCK.

4. CONTRACTOR SHALL NOT BACKFILL AGAINST THE WALLS UNTIL ALL THE WALL AND SLABS HAVE BEEN POURED AND REACH A COMPRESSIVE STRENGTH OF 4500 PSI.

5. DOWEL SHALL BE LOCATED AT CENTER OF POUR, WATERSTOP SHALL BE LOCATED EQUIDISTANT BETWEEN THE BAR AND THE FACE OF CONCRETE. TWO WATERSTOPS ARE TO BE INSTALLED IN EXPANSION AND CONTRACTION JOINTS SYMMETRICALLY ABOUT THE SMOOTH BAR DOWEL. ALL DOWELS ARE TO BE EPOXY COATED SMOOTH BAR.



DUMBBELL TYPE D ISOMETRIC



DUMBBELL TYPE C ISOMETRIC

WATERSTOP SPLICING DETAILS

SPLICING PROCEDURE FOR PVC WATERSTOPS

1. PROVIDE FACTORY FABRICATED CORNERS, INTERSECTIONS AND TRANSITIONS, LEAVING ONLY STRAIGHT BUTT JOINT SPLICES FOR THE FIELD.

2. USE A WORKTABLE TO CREATE FIELD SPLICES. TABLE SHOULD BE SOLID, HAVE ACCESS TO 110V POWER SUPPLY AND HAVE JIGS AND FIXTURES TO AID SPLICING.

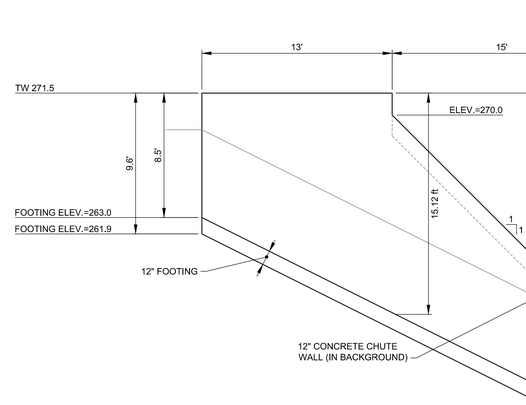
3. CUT ENDS SQUARE, USING A RAZOR KNIFE OR CIRCULAR SAW EQUIPPED WITH A CARBIDE TIPPED BLADE (10" DIAMETER WITH 40 TEETH) TO ENSURE MATCHING EDGES.

4. PREHEAT TEFLON COVERED SPLICING IRON TO BETWEEN 360-390 DEGREES.

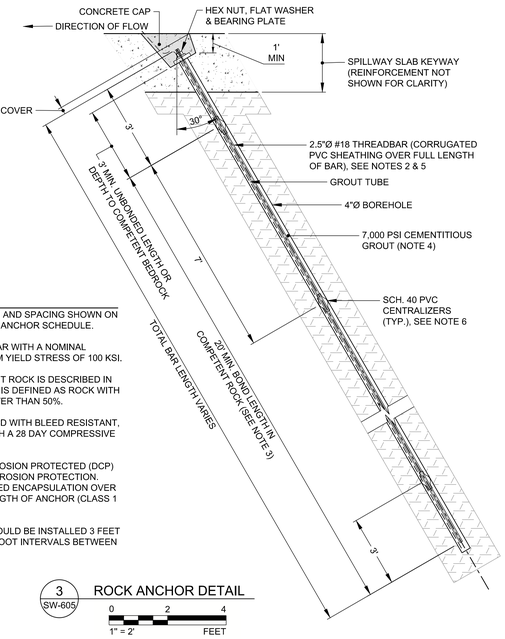
5. PRESS ENDS OF CUT WATERSTOP FIRMLY AGAINST THE PREHEATED IRON. MAINTAIN PRESSURE UNTIL APPROXIMATELY 1/8" OF MELTED MATERIAL APPEARS ON THE IRON SURFACE.

6. QUICKLY REMOVE SPLICING IRON AND HOLD PVC WATERSTOP ENDS TIGHTLY TOGETHER UNTIL THEY BOND (APPROXIMATELY 60 SECONDS). WATER MAY BE USED TO COOL THE MATERIAL QUICKLY. DO NOT MOVE, BEND, STRETCH, OR STRESS THE SPLICE BEFORE THE 60 SECOND BOND TIME.

1 SW-605 CONCRETE JOINT DETAILS
NTS



2 SW-605 SPILLWAY CHUTE KEYWAY DETAIL
0 2 4
1" = 2' FEET



ROCK ANCHOR NOTES

1. INSTALL ANCHORS IN CONFIGURATION AND SPACING SHOWN ON DRAWING SW-600 AND AS DESCRIBED IN ANCHOR SCHEDULE.

2. ANCHORS SHALL BE #18 THREADED BAR WITH A NOMINAL DIAMETER OF 2.5 INCHES AND A MINIMUM YIELD STRESS OF 100 KSI.

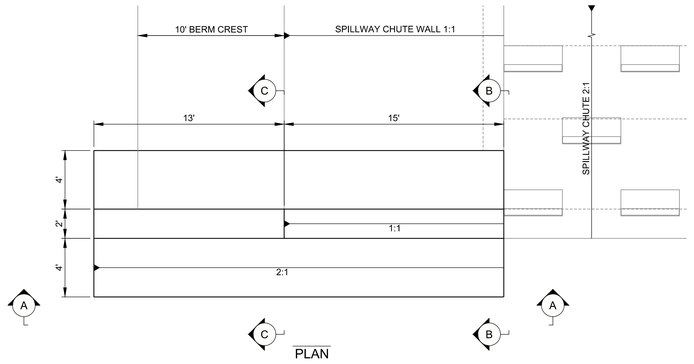
3. MINIMUM BOND LENGTH IN COMPETENT ROCK IS DESCRIBED IN ANCHOR SCHEDULE. COMPETENT ROCK IS DEFINED AS ROCK WITH RMR GREATER THAN 41 AND RQD GREATER THAN 50%.

4. 4-INCH BOREHOLE DIAMETER GROUTED WITH BLEED RESISTANT, SAND FREE, CEMENTITIOUS GROUT, WITH A 28 DAY COMPRESSIVE STRENGTH OF 7,000 PSI.

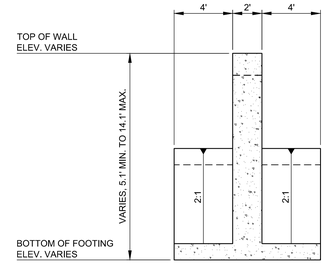
5. FULLY ENCAPSULATED DOUBLE CORROSION PROTECTED (DCP) THREADBAR SHOULD BE USED FOR CORROSION PROTECTION. FACTORY APPLIED CEMENT-GROUT FILLED ENCAPSULATION OVER BOTH THE BONDED AND UNBONDED LENGTH OF ANCHOR (CLASS 1 CORROSION PROTECTION).

6. SCHEDULE 40 PVC CENTRALIZERS SHOULD BE INSTALLED 3 FEET FROM EACH END AND AT A MAXIMUM 7 FOOT INTERVALS BETWEEN ENDS.

3 SW-605 ROCK ANCHOR DETAIL
0 2 4
1" = 2' FEET

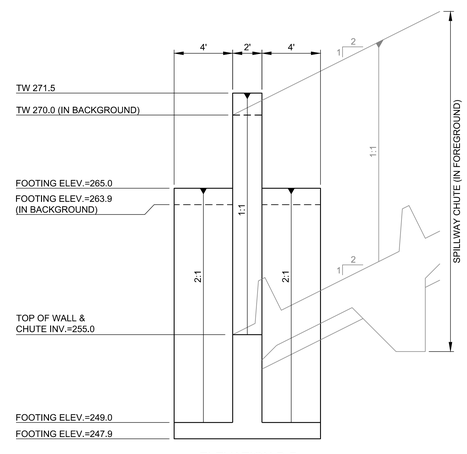


PLAN



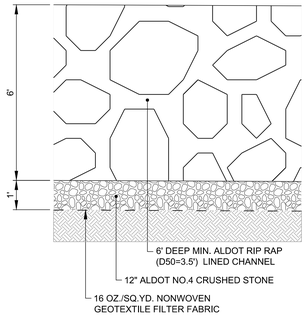
SECTION / ELEVATION C-C

ELEVATION A-A



ELEVATION B-B

4 SW-605 SPILLWAY CHUTE WING WALL DETAIL
0 4 8
1" = 4' FEET



5 SW-605 TYPICAL PLUNGE POOL RIP RAP DETAIL
0 2 4
1" = 2' FEET

REV	DATE	REVISION DESCRIPTION	DES	CADD	CHK	RVW
1						
0	2020/10/16	ISSUED FOR CONSTRUCTION	HH	BCL	BTH	ST/GLH

CLIENT
SOUTHERN COMPANY SERVICES

Alabama Power

PROJECT
PLANT GORGAS
ASH POND CLOSURE
DESIGN DRAWINGS

TITLE
SPILLWAY CHANNEL DETAILS
SHEET 2

ALABAMA LICENSED PROFESSIONAL ENGINEER GREGORY L. HEBELER No. 29143 16-OCT-2020

GREGORY L. HEBELER
ALABAMA PROFESSIONAL ENGINEER
CERTIFICATE NUMBER 29143

CONSULTANT
GOLDER

YYYY-MM-DD	2020/10/16
DESIGNED	HH
PREPARED	BCL
CHECKED	BTH
REVIEWED / APPROVED	ST/GLH

PROJECT NO.	SCS REF.	REV.	DRAWING
1789848	GOR17010	0	SW-605

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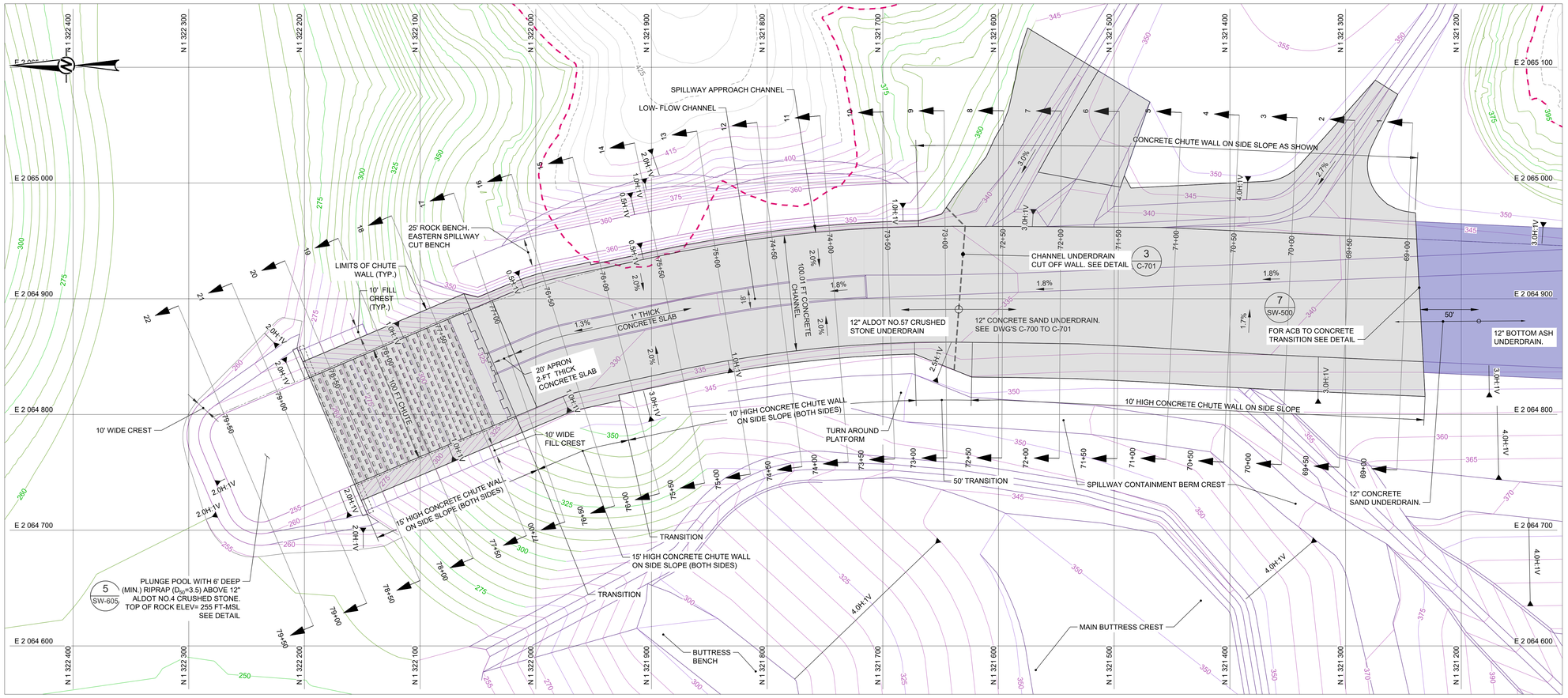

LEGEND

- EXISTING TOPOGRAPHY / BATHYMETRY CONTOURS, 5' INTERVAL (REFERENCE 1 AND 2)
- PROPOSED CLOSURE COVER GRADING CONTOURS, 5' INTERVAL
- ESTIMATED BOTTOM OF CCR CONTOURS, 5' INTERVAL (REFERENCE 3)
- ESTIMATED PRE-CLOSURE FACILITY BOUNDARY
- PROPOSED CONCRETE SLAB
- ARTICULATED CONCRETE BLOCK (ACB)

1 SW-606 SPILLWAY PLAN VIEW

0 40 80
1" = 40' FEET

NOTES

1. ELEVATIONS ARE IN FEET WITH REFERENCE TO THE NORTH AMERICAN VERTICAL DATUM (NAVD) OF 1988. COORDINATES CORRESPOND TO THE ALABAMA WEST STATE PLAN COORDINATE SYSTEM, NORTH AMERICAN DATUM (NAD) 1983.
2. BAFFLE BLOCKS NOT SHOWN FOR CLARITY.
3. INFERRED SOIL DEPTH, PARTIALLY WEATHERED ROCK DEPTH, AND DEPTH TO BEDROCK ARE ESTIMATED. FIELD CONDITIONS ARE LIKELY TO VARY. EXCAVATION IN EACH MATERIAL TYPE SHALL BE COMPLETED AS DESCRIBED BELOW:
   - BEDROCK: 0.5H:1V
   - PARTIALLY WEATHERED ROCK 1H:1V
   - RESIDUUM: 2H:1V
4. SLAB AND CHUTE /CHANNEL WALLS TO BE REINFORCED STRUCTURAL CONCRETE.
5. UNDERDRAINS NOT SHOWN FOR CLARITY. REFER TO SHEETS SW-602 AND SW-603 FOR DETAILS.
6. CONTOUR INTERVAL IS 5 FEET.

REFERENCES

1. EXISTING TOPOGRAPHY PROVIDED BY SOUTHERN COMPANY SERVICES, FEBRUARY 2020.
2. BATHYMETRIC SURFACE IS A COMPOSITE OF THE FEBRUARY 2020 SOUTHERN COMPANY AND THE JANUARY 2020 ARCSURVEY BATHYMETRIC SURVEYS TIED TO INTERPRETED SECTIONS OF THE 2016 SOUTHERN COMPANY BATHYMETRIC SURVEY WHERE SURVEY DATA IS NOT AVAILABLE.
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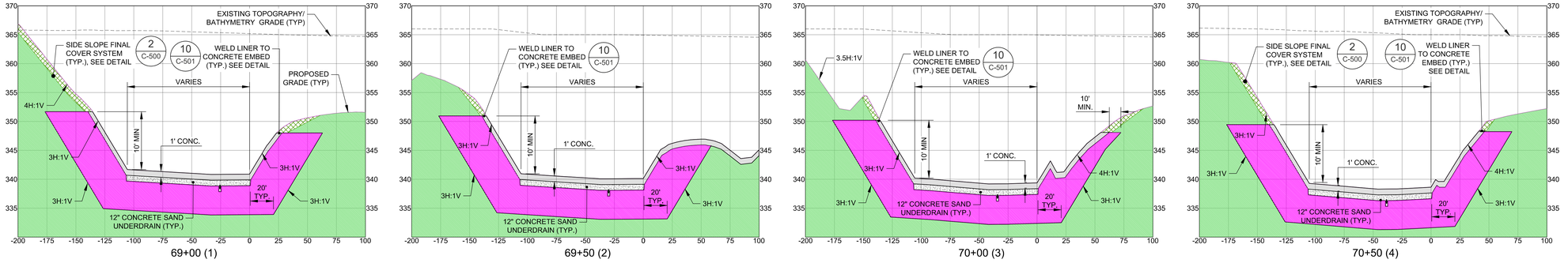

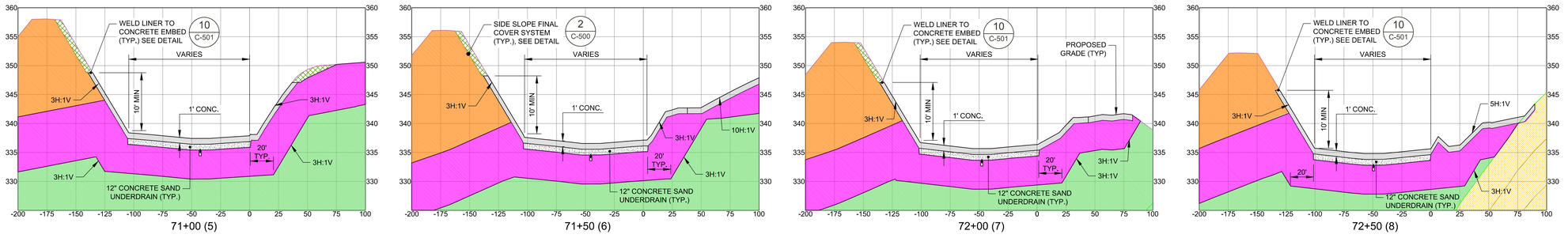

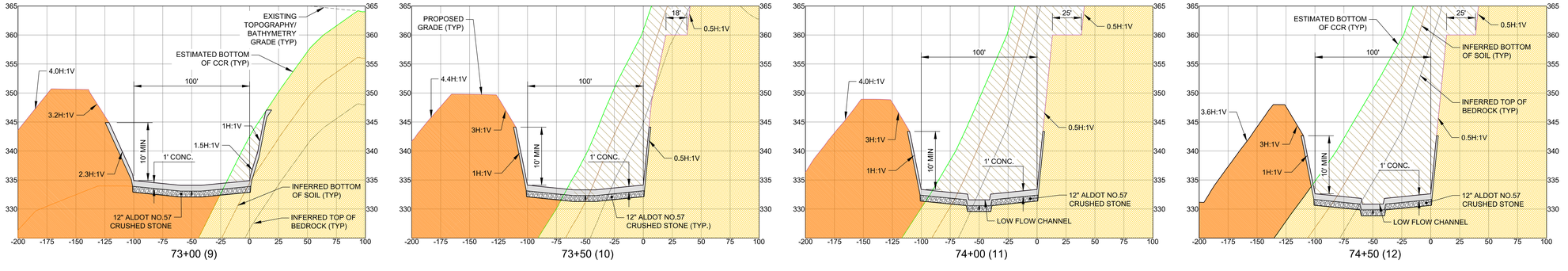

LEGEND

- PROPOSED TOP OF LINER GRADING
- EXISTING TOPOGRAPHY / BATHYMETRY GRADING (REFERENCE 1 & 2)
- ESTIMATED BOTTOM OF CCR
- GEOCOMPOSITE
- EXISTING NATURAL GROUND (UNSPECIFIED)
- PROPOSED CONCRETE SLAB
- PROPOSED CCR CUT (NOT SHOWN FOR CLARITY)
- PROPOSED CCR FILL
- PROPOSED NATURAL GROUND CUT
- PROPOSED NON-CCR COMMON FILL
- PROPOSED NON-CCR STRUCTURAL FILL
- PROPOSED CRUSH STONE
- PROPOSED CONCRETE SAND UNDERDRAIN

0 40 80
1" = 40' FEET
HORIZONTAL SCALE

0 8 16
1" = 8' FEET
VERTICAL SCALE

ALABAMA LICENSED PROFESSIONAL ENGINEER GREGORY L. HEBELER 29143 16 OCT 2020

GREGORY L. HEBELER
ALABAMA PROFESSIONAL ENGINEER
CERTIFICATE NUMBER 29143

REV	DATE	REVISION DESCRIPTION	DES	CADD	CHK	RVW
1	2020/10/16	ISSUED FOR CONSTRUCTION	HH	BCL	BTH	ST/GLH
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CLIENT
SOUTHERN COMPANY SERVICES

Alabama Power

PROJECT
PLANT GORGAS
ASH POND CLOSURE
DESIGN DRAWINGS

TITLE
SPILLWAY STORMWATER CHANNEL SECTIONS
SHEET 1

CONSULTANT
GOLDER

YYYY-MM-DD	2020/10/16
DESIGNED	HH
PREPARED	BCL
CHECKED	BTH
REVIEWED / APPROVED	ST/GLH

PROJECT NO.	SCS REF.	REV.	DRAWING
1789848	GOR17010	0	SW-606

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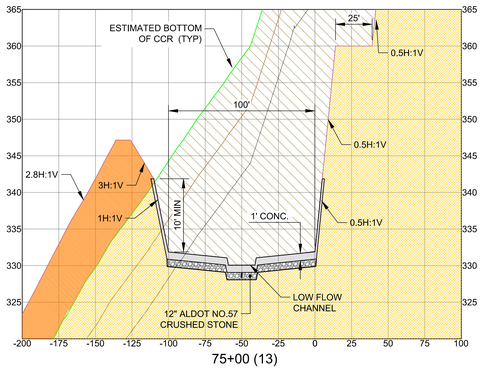

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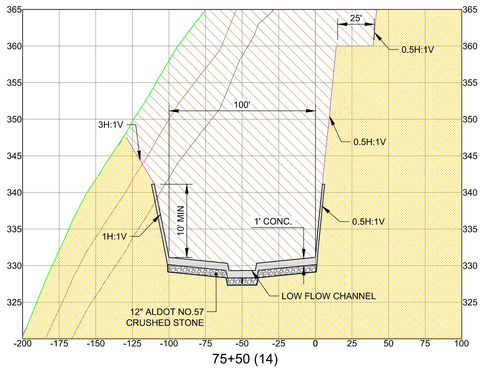

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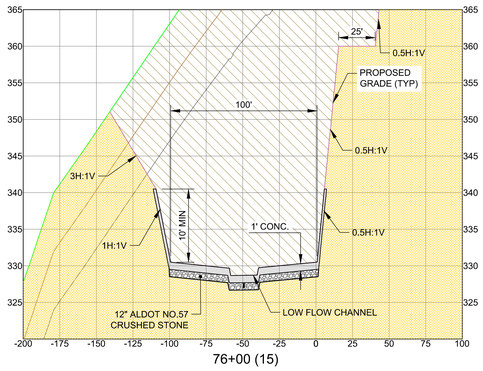

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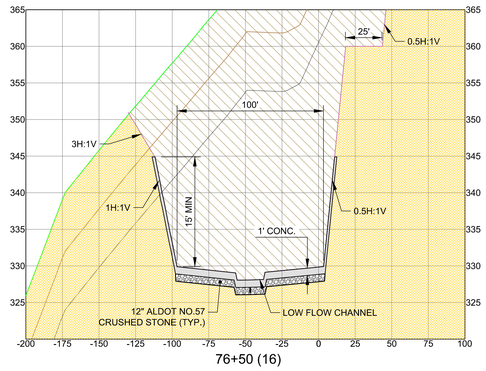

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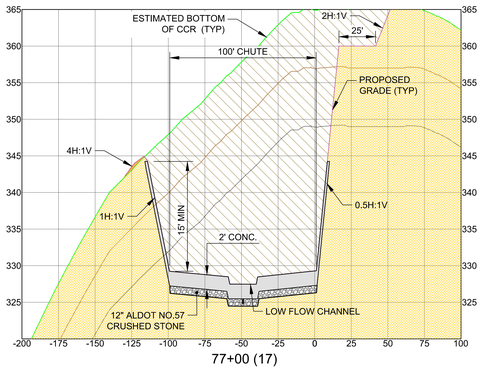

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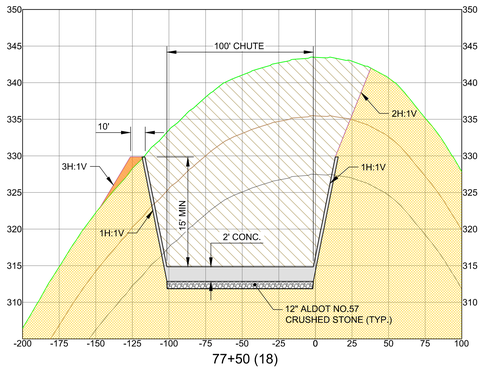

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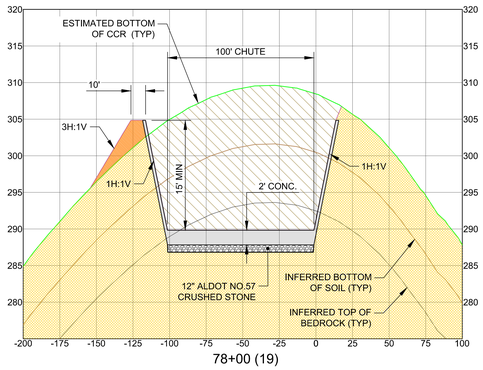

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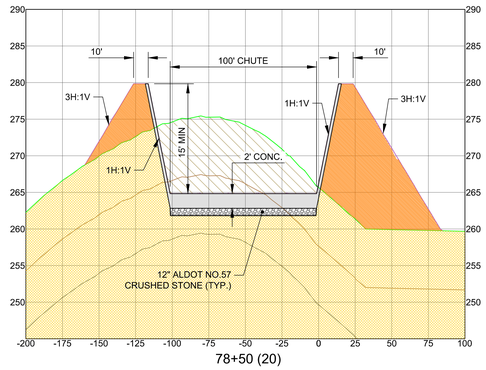
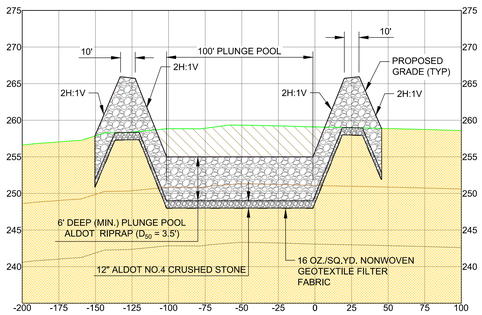
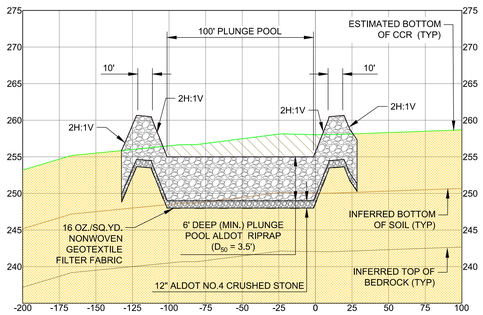


78+50 (20)



79+00 (21)



79+50 (22)

LEGEND

- PROPOSED TOP OF LINER GRADING
- EXISTING TOPOGRAPHY / BATHYMETRY GRADING (REFERENCE 1 & 2)
- ESTIMATED BOTTOM OF CCR
- GEOCOMPOSITE
- EXISTING NATURAL GROUND (UNSPECIFIED)
- PROPOSED CONCRETE SLAB
- PROPOSED CCR CUT (NOT SHOWN FOR CLARITY)
- PROPOSED NATURAL GROUND CUT
- PROPOSED NON-CCR COMMON FILL
- PROPOSED CRUSH STONE
- PROPOSED RIP RAP

NOTES

1. ELEVATIONS ARE IN FEET WITH REFERENCE TO THE NORTH AMERICAN VERTICAL DATUM (NAVD) OF 1988. COORDINATES CORRESPOND TO THE ALABAMA WEST STATE PLAN COORDINATE SYSTEM, NORTH AMERICAN DATUM (NAD) 1983.

2. BAFFLE BLOCKS NOT SHOWN FOR CLARITY.

3. INFERRED SOIL DEPTH, PARTIALLY WEATHERED ROCK DEPTH, AND DEPTH TO BEDROCK ARE ESTIMATED. FIELD CONDITIONS ARE LIKELY TO VARY. EXCAVATION IN EACH MATERIAL TYPE SHALL BE COMPLETED AS DESCRIBED BELOW:
   BEDROCK: 0.5H:1V
   PARTIALLY WEATHERED ROCK 1H:1V
   RESIDUUM: 2H:1V

4. SLAB AND CHUTE / CHANNEL WALLS TO BE REINFORCED STRUCTURAL CONCRETE.

5. UNDERDRAINS NOT SHOWN FOR CLARITY. REFER TO SHEETS SW-602 AND SW-603 FOR DETAILS.

REFERENCES

1. EXISTING TOPOGRAPHY PROVIDED BY SOUTHERN COMPANY SERVICES, FEBRUARY 2020.

2. BATHYMETRIC SURFACE IS A COMPOSITE OF THE FEBRUARY 2020 SOUTHERN COMPANY AND THE JANUARY 2020 ARCSURVEY BATHYMETRIC SURVEYS TIED TO INTERPRETED SECTIONS OF THE 2016 SOUTHERN COMPANY BATHYMETRIC SURVEY WHERE SURVEY DATA IS NOT AVAILABLE.

2. BOTTOM OF CCR TOPOGRAPHY TAKEN FROM USGS, PORT BIRMINGHAM, 1938 AND GOODSPINGS, 1971 QUADRANGLES. TOPOGRAPHY WAS INTERPRETED BETWEEN 20 FOOT CONTOURS AND ADJUSTED BASED ON GEOTECHNICAL INVESTIGATION DATA BY GOLDER ASSOCIATES INC.

HORIZONTAL SCALE: 0, 40, 80 — 1" = 40' — FEET

VERTICAL SCALE: 0, 8, 16 — 1" = 8' — FEET

REV	DATE	REVISION DESCRIPTION	DES	CADD	CHK	RVW
1	2020/10/16	ISSUED FOR CONSTRUCTION	HH	BCL	BTH	ST/GLH

CLIENT
SOUTHERN COMPANY SERVICES

Alabama Power

PROJECT
PLANT GORGAS
ASH POND CLOSURE
DESIGN DRAWINGS

TITLE
SPILLWAY STORMWATER CHANNEL SECTIONS
SHEET 2

ALABAMA LICENSED No. 29143 PROFESSIONAL ENGINEER GREGORY L. HEBELER
16 OCT 2020

GREGORY L. HEBELER
ALABAMA PROFESSIONAL ENGINEER
CERTIFICATE NUMBER 29143

CONSULTANT
GOLDER

YYYY-MM-DD	2020/10/16
DESIGNED	HH
PREPARED	BCL
CHECKED	BTH
REVIEWED / APPROVED	ST/GLH

PROJECT NO.	SCS REF.	REV.	DRAWING
1789848	GOR17010	0	SW-607

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ARCH D

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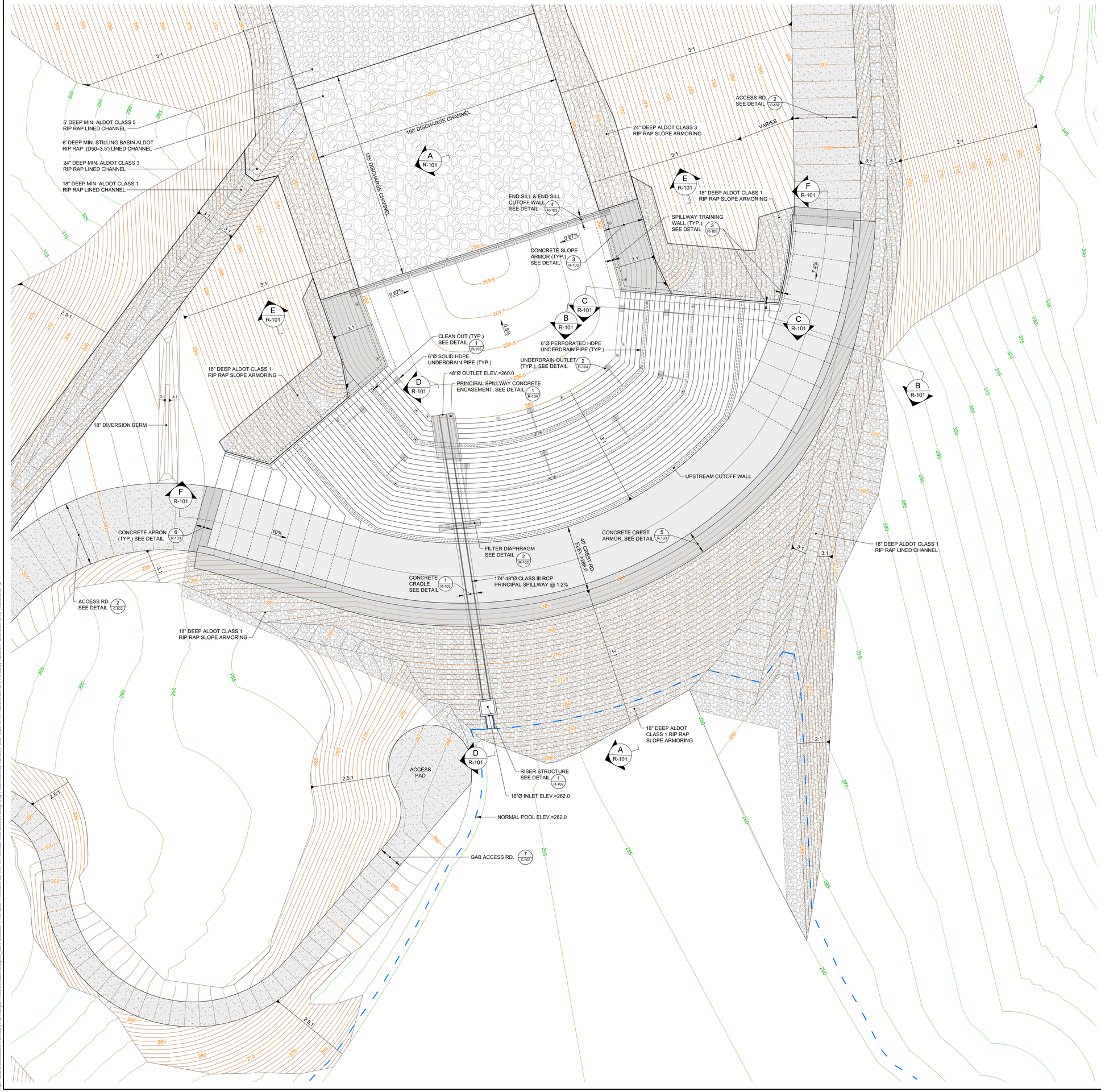

LEGEND

340	PROPOSED DAM GRADING CONTOURS (1 FT. CONTOURS)
340	ESTIMATED BOTTOM OF CCR CONTOURS (5 FT. CONTOURS) EXCAVATION LINE AT TOP OF EXISTING CCR (REFERENCE 1)
340	CONCRETE GRADING (1 FT. CONTOURS)

NOTES

1. ELEVATIONS ARE IN FEET WITH REFERENCE TO THE NORTH AMERICAN VERTICAL DATUM (NAVD) 1988. COORDINATES CORRESPOND TO ALABAMA WEST STATE PLANE COORDINATE SYSTEM, NORTH AMERICAN DATUM (NAD) 1983.

REFERENCES

1. BOTTOM OF CCR TOPOGRAPHY TAKEN FROM USGS, PORT BIRMINGHAM, 1938 AND GOODSPINGS, 1971 QUADRANGLES. TOPOGRAPHY WAS INTERPRETED BETWEEN 20 FOOT CONTOURS AND ADJUSTED BASED ON GEOTECHNICAL INVESTIGATION DATA BY GOLDER ASSOCIATES INC.

0 20 40
1" = 20' FEET

ALABAMA LICENSED No. 29143 PROFESSIONAL ENGINEER 16-OCT-2020 GREGORY L. HEBELER
GREGORY L. HEBELER
ALABAMA PROFESSIONAL ENGINEER
CERTIFICATE NUMBER 29143

REV	DATE	REVISION DESCRIPTION	DES	CADD	CHK	RVW
0	2020/10/16	ISSUED FOR CONSTRUCTION	GLH	RMS	SCN	GLH

CLIENT
SOUTHERN COMPANY SERVICES

Alabama Power

PROJECT
PLANT GORGAS
ASH POND CLOSURE
DESIGN DRAWINGS

TITLE
ATTENUATION DAM GRADING PLAN

CONSULTANT
GOLDER

YYYY-MM-DD	2020/10/16
DESIGNED	GLH
PREPARED	RMS
CHECKED	SCN
REVIEWED / APPROVED	GLH

PROJECT NO.	SCS REF.	REV.	DRAWING
1789848	GOR17010	0	R-100

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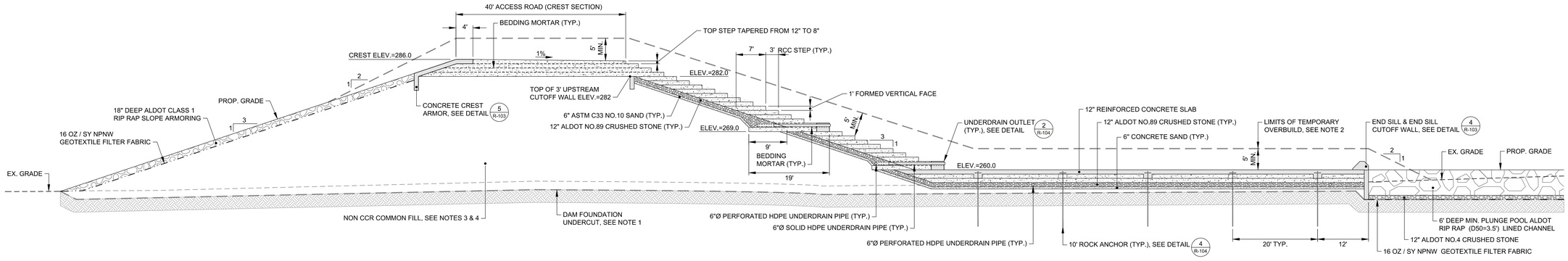
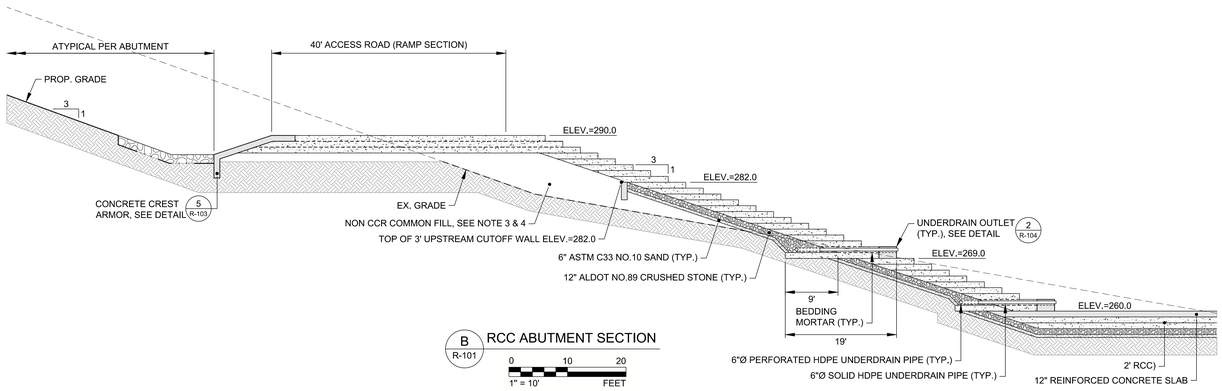


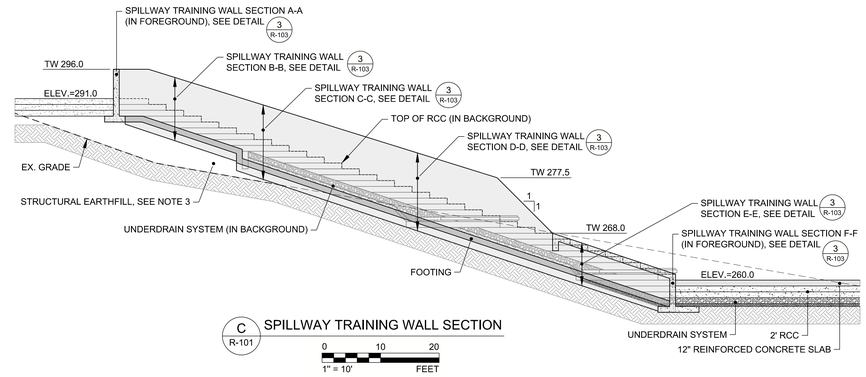
A R-101 RCC SPILLWAY SECTION

0 10 20
1" = 10' FEET



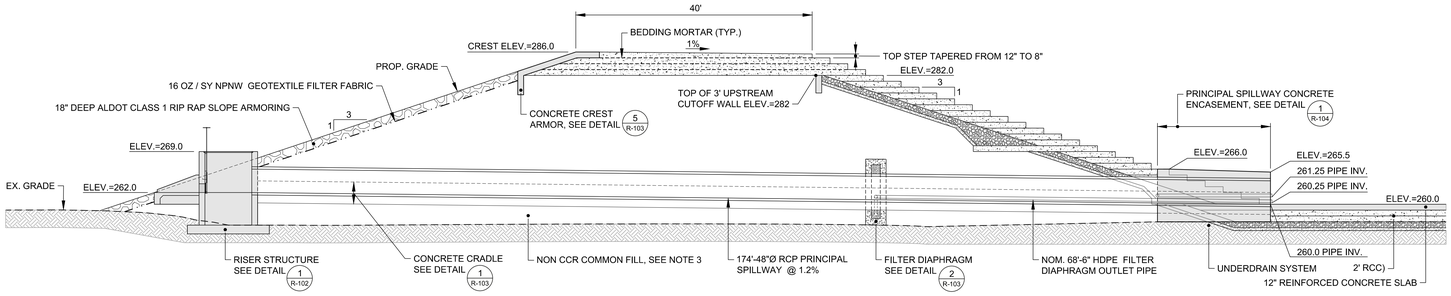
B R-101 RCC ABUTMENT SECTION

0 10 20
1" = 10' FEET



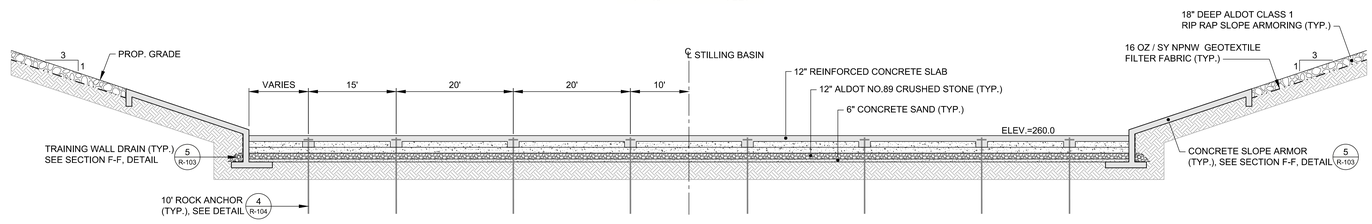
C R-101 SPILLWAY TRAINING WALL SECTION

0 10 20
1" = 10' FEET



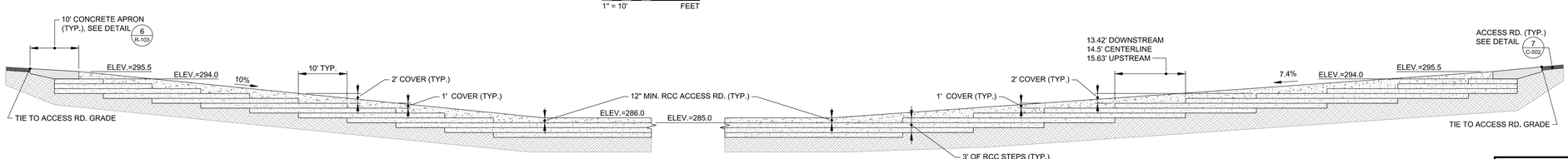
D R-101 PRINCIPAL SPILLWAY SECTION

0 10 20
1" = 10' FEET



E R-101 RCC STILLING BASIN SECTION

0 10 20
1" = 10' FEET



F R-101 RCC CREST SECTION

0 10 20
1" = 10' FEET

NOTES

1. DAM AND OTHER STRUCTURE FOUNDATIONS TO BE UNDERCUT BY A MINIMUM OF 2 FEET IN AREAS OF SOIL/FILL. FOUNDATION SUBGRADE TO BE INSPECTED AND PREPARED AS PER TECHNICAL SPECIFICATION REQUIREMENTS.

2. AREAS TO RECEIVE ROLLER COMPACTED CONCRETE (RCC) TO RECEIVE A MINIMUM OF 5 FEET TEMPORARY OVERBUILD ABOVE FINISH GRADES TO CONTROL SETTLEMENT AND POTENTIAL FOR RCC CRACKING. OVERBUILD TO BE COMPRISED OF MATERIAL WITH A MINIMUM UNIT WEIGHT OF 100 LBS/FT. OVER BUILT MATERIAL SHALL REMAIN IN PLACE FOR AT LEAST 60 DAYS PRIOR TO REMOVAL.

3. ATTENUATION DAM COMMON FILL TO CONSIST OF SOIL MATERIALS WITH A MINIMUM OF 30% FINES (PASSING #200 SIEVE) AND A MINIMUM DRY UNIT WEIGHT OF 100 PCF.

4. ALL ATTENUATION DAM EARTHFILL SHALL COMPLY WITH CONSTRUCTION SPECIFICATIONS AND BE COMPACTED TO 98% STANDARD PROCTOR DENSITY. EARTHFILL SUBGRADE TO BE PROOF ROLLED AND APPROVED BY ENGINEER PRIOR TO PLACEMENT OF OVERLYING FILL.

REV	DATE	REVISION DESCRIPTION	DES	CADD	CHK	RVW
△						
1	2020/10/16	ISSUED FOR CONSTRUCTION	GLH	RMS	SCN	GLH

CLIENT
SOUTHERN COMPANY SERVICES

Alabama Power

PROJECT
PLANT GORGAS
ASH POND CLOSURE
DESIGN DRAWINGS

TITLE
ATTENUATION DAM SECTIONS

ALABAMA LICENSED PROFESSIONAL ENGINEER GREGORY L. HEBELER No. 29143 16 OCT 2020

GREGORY L. HEBELER
ALABAMA PROFESSIONAL ENGINEER
CERTIFICATE NUMBER 29143

CONSULTANT
GOLDER

YYYY-MM-DD	2020/10/16
DESIGNED	GLH
PREPARED	RMS
CHECKED	SCN
REVIEWED / APPROVED	GLH

PROJECT NO.	SCS REF.	REV.	DRAWING
1789848	GOR17010	0	R-101

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NOTES

1. HDPE TRASH RACK AS SPECIFIED BY "PLASTIC SOLUTIONS INC.", OR APPROVED EQUIVALENT.

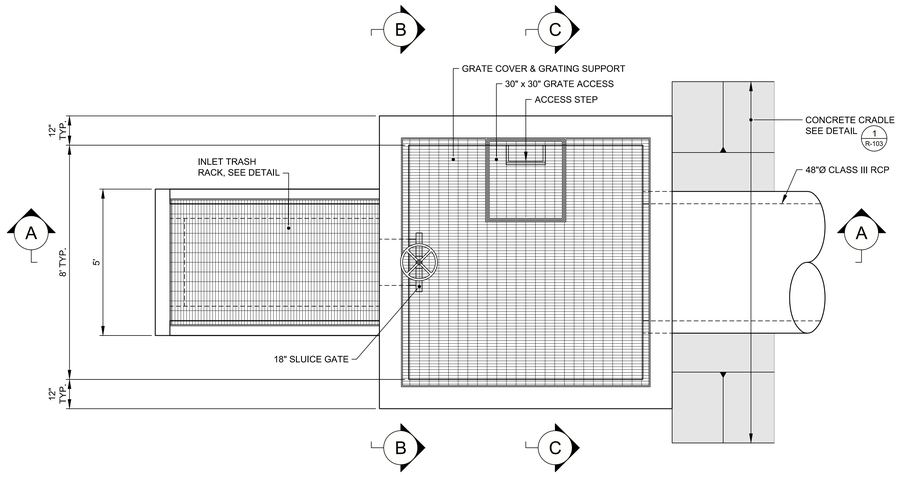
2. ALL CONCRETE TO BE CLASS 5000. ALL REINFORCEMENT SHALL BE GRADE 60.

3. ALL EXPOSED EDGES SHALL HAVE A MINIMUM ONE INCH CHAMFER.

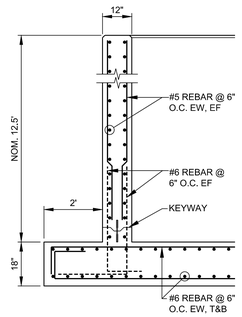
4. REBAR SHALL HAVE A 3 INCH CONCRETE COVER WHEN POURED AGAINST GROUND SURFACE AND A 2 INCH CONCRETE WHEN POURED AGAINST FORMS.

5. ON UNEXPOSED JOINTS CLOSED CELL ROUND BUTYL CORD 1/4 INCH LARGER THAN THE JOINT AS MEASURED IN THE FIELD, SHALL BE INSTALLED.

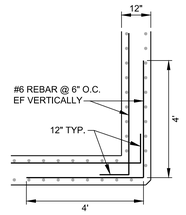
6. AT OPENINGS WHERE REINFORCEMENT IS INTERRUPTED EXTEND ONE HALF (MIN. OF 2 BARS) OF INTERRUPTED VERTICAL BARS (FULL HEIGHT IN EACH FACE) ON EACH SIDE OF THE OPENING. ADD ONE HALF (MIN. OF 2 BARS) OF THE INTERRUPTED HORIZONTAL REINFORCEMENT (FULL LENGTH IN EACH FACE) TO TOP AND BOTTOM OF OPENING. TWO (2) ADDITIONAL TRIMMER BARS SHALL BE ADDED IN EACH FACE AT THE CORNERS OF EACH OPENING.



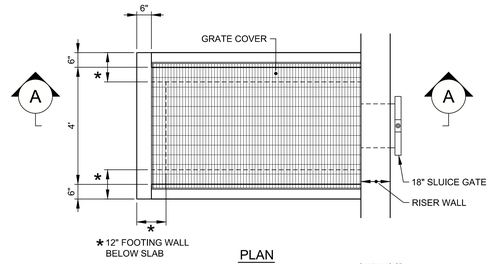
PLAN



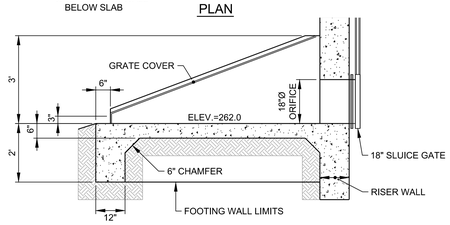
TYPICAL REINFORCEMENT SECTION



TYPICAL WALL CORNER REINFORCEMENT - PLAN

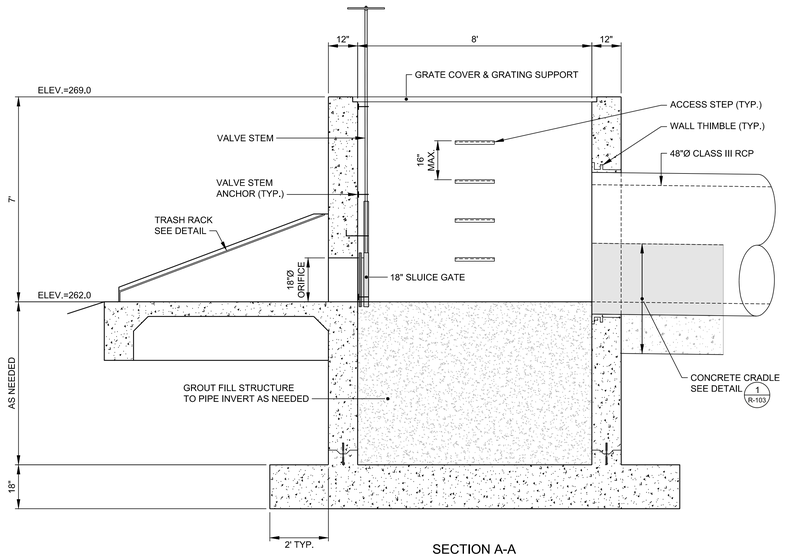


PLAN

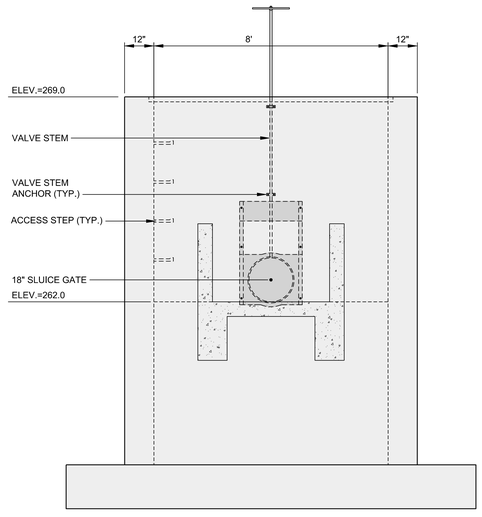


SECTION

INLET TRASH RACK DETAIL



SECTION A-A



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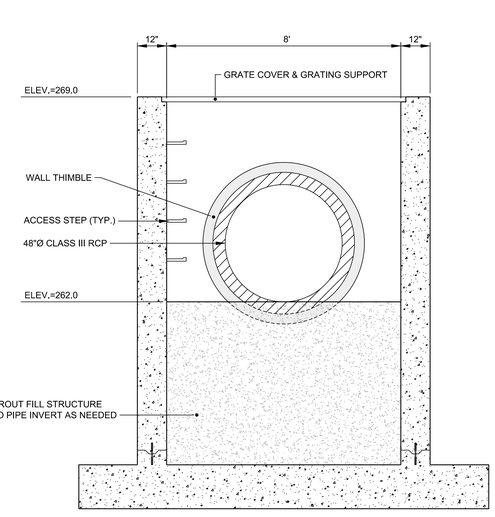

SECTION C-C

REV	DATE	REVISION DESCRIPTION	DES	CADD	CHK	RVW
1	2020/10/16	ISSUED FOR CONSTRUCTION	GLH	RMS	SCN	GLH

CLIENT
SOUTHERN COMPANY
SERVICES

Alabama Power

PROJECT
PLANT GORGAS
ASH POND CLOSURE
DESIGN DRAWINGS

TITLE
ATTENUATION DAM PRINCIPAL SPILLWAY DETAILS
SHEET 1

ALABAMA LICENSED PROFESSIONAL ENGINEER No. 29143 GREGORY L. HEBELER
16 OCT 2020

GREGORY L. HEBELER
ALABAMA PROFESSIONAL ENGINEER
CERTIFICATE NUMBER 29143

CONSULTANT
GOLDER

YYYY-MM-DD	2020/10/16
DESIGNED	GLH
PREPARED	RMS
CHECKED	SCN
REVIEWED / APPROVED	GLH

PROJECT NO.	SCS REF.	REV.	DRAWING
1789848	GOR17010	0	R-102

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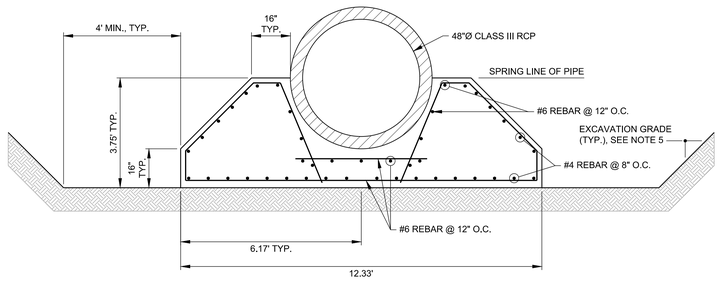


1 R-103 CONCRETE CRADLE DETAIL

0 2 4 FEET
1" = 2'

NOTES

1. ALL CONCRETE TO BE CLASS 5000. ALL REINFORCEMENT SHALL BE GRADE 60.

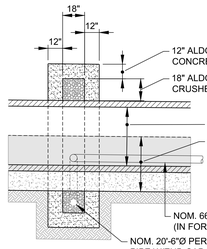
2. ALL EXPOSED EDGES SHALL HAVE A MINIMUM ONE INCH CHAMFER.

3. REBAR SHALL HAVE A 3 INCH CONCRETE COVER WHEN POURED AGAINST GROUND SURFACE AND A 2 INCH CONCRETE WHEN POURED AGAINST FORMS.

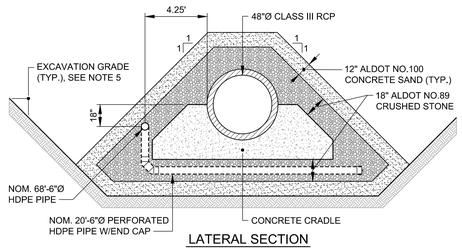
4. ON UNEXPOSED JOINTS CLOSED CELL ROUND BUTYL CORD 1/4 INCH LARGER THAN THE JOINT AS MEASURED IN THE FIELD, SHALL BE INSTALLED.

5. ACTUAL EXCAVATION SLOPE SHALL BE DETERMINED BY CONTRACTOR AND SHALL COMPLY WITH OSHA REQUIREMENTS.

6. ENGINEER SHALL FIELD VERIFY EMBANKMENT SOILS AND BORROW SOILS TO CONFIRM FILTER COMPATIBILITY WITH ALDOT NO.100 SAND.



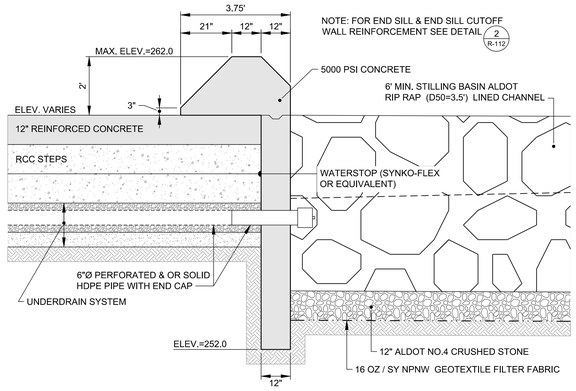
LONGITUDINAL SECTION



LATERAL SECTION

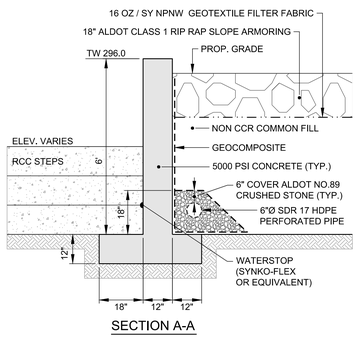
2 R-103 FILTER DIAPHRAGM DETAIL

0 4 8 FEET
1" = 4'

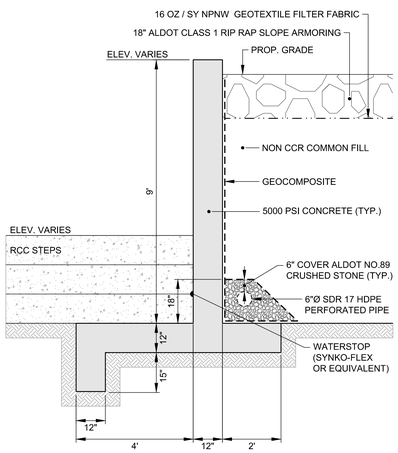


END SILL & END SILL CUTOFF WALL SECTION

STILLING BASIN ARMOR



SECTION A-A



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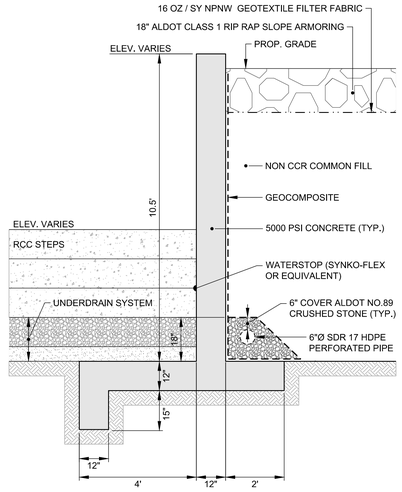
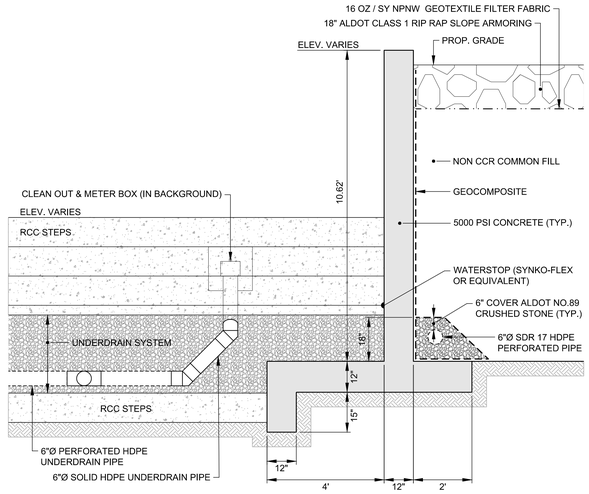


SECTION C-C



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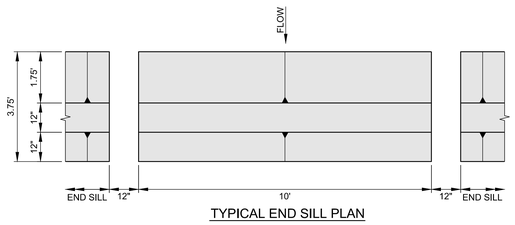
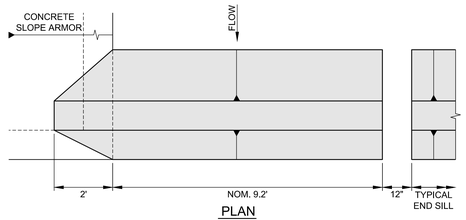
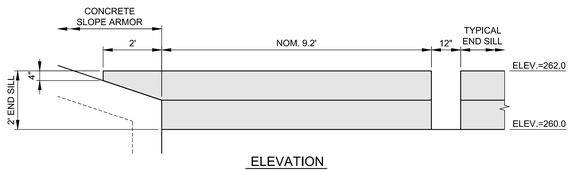


TYPICAL END SILL PLAN



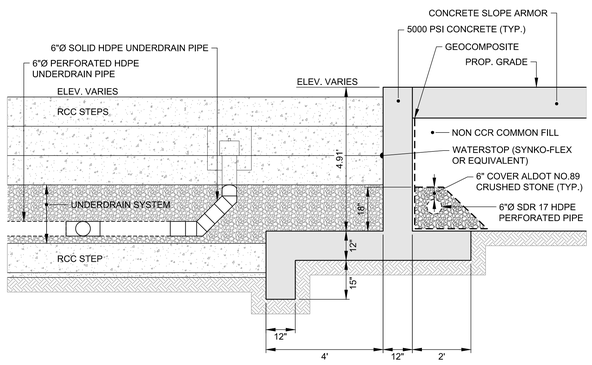
PLAN



ELEVATION
END SILL PLAN @ ABUTMENTS

4 R-103 END SILL & END SILL CUTOFF WALL & STILLING BASIN ARMOR DETAIL

0 2 4 FEET
1" = 2'



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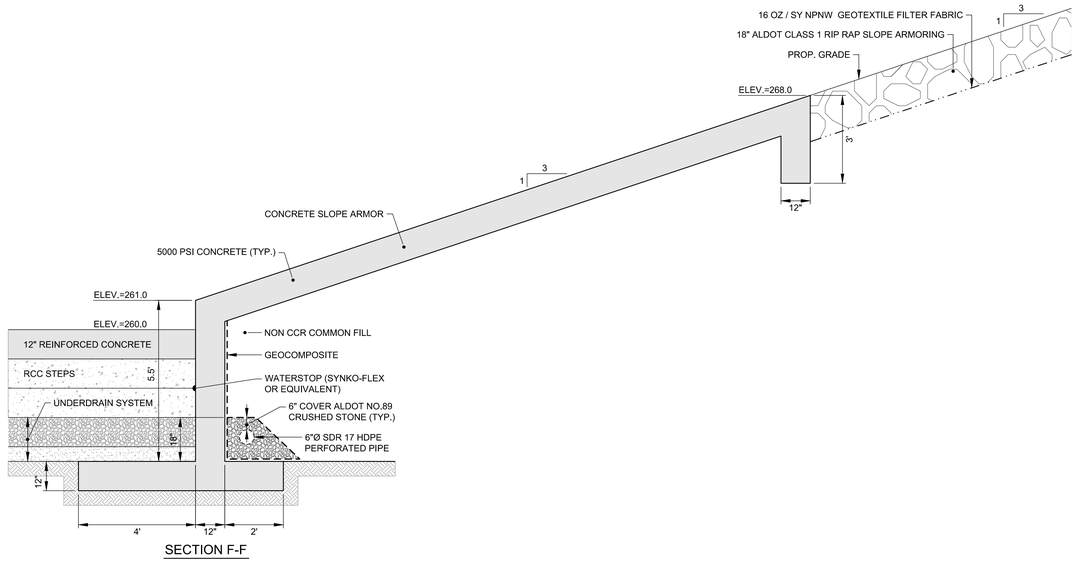
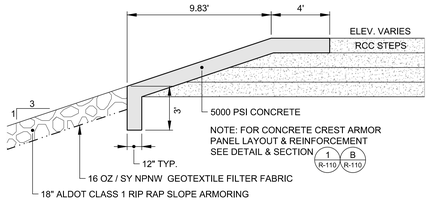


SECTION F-F

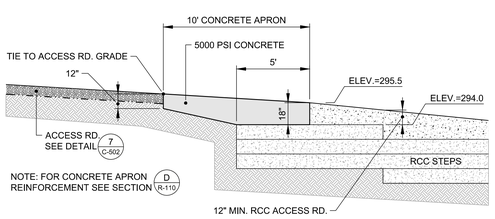
3 R-103 SPILLWAY TRAINING WALL DETAILS

0 2 4 FEET
1" = 2'



5 R-103 CONCRETE CREST ARMOR DETAIL

0 4 8 FEET
1" = 4'



6 R-103 CONCRETE APRON DETAIL

0 4 8 FEET
1" = 4'

REV	DATE	REVISION DESCRIPTION	DES	CADD	CHK	RVW
1						
0	2020/10/16	ISSUED FOR CONSTRUCTION	GLH	RMS	SCN	GLH

CLIENT
SOUTHERN COMPANY SERVICES

Alabama Power

PROJECT
PLANT GORGAS
ASH POND CLOSURE
DESIGN DRAWINGS

TITLE
ATTENUATION DAM PRINCIPAL SPILLWAY DETAILS SHEET 2

ALABAMA LICENSED No. 29143 PROFESSIONAL ENGINEER GREGORY L. HEBELER
16-OCT-2020

GREGORY L. HEBELER
ALABAMA PROFESSIONAL ENGINEER
CERTIFICATE NUMBER 29143

CONSULTANT
GOLDER

YYYY-MM-DD	2020/10/16
DESIGNED	GLH
PREPARED	RMS
CHECKED	SCN
REVIEWED / APPROVED	GLH

PROJECT NO.	SCS REF.	REV.	DRAWING
1789848	GOR17010	0	R-103

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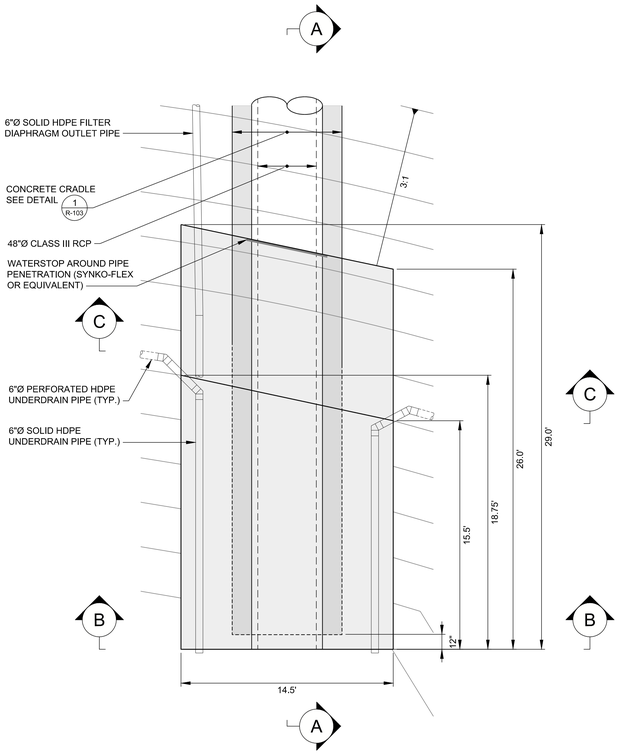
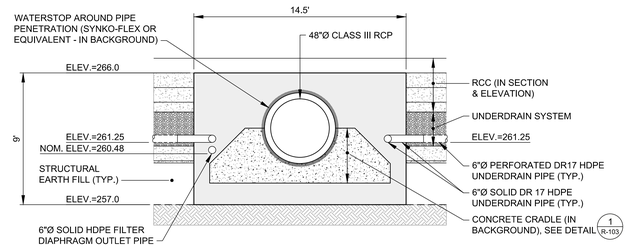
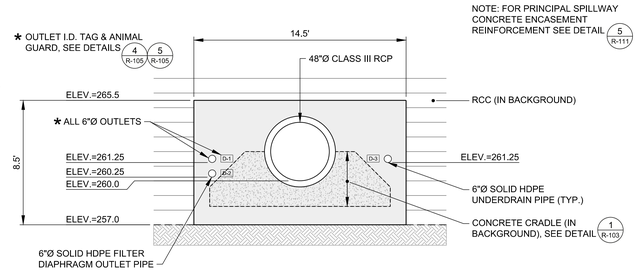
0 1 in



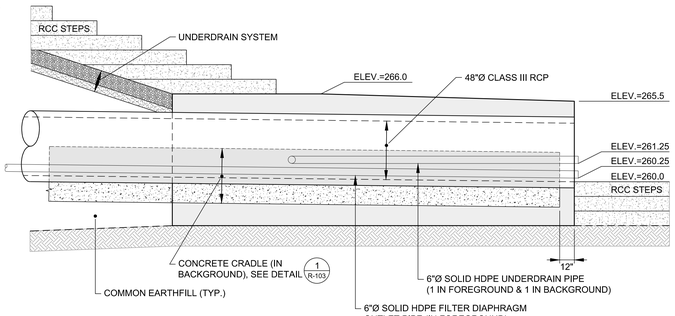
PLAN



SECTION C-C



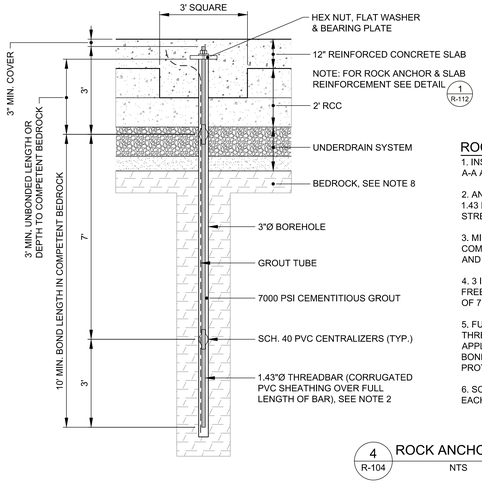
SECTION B-B



SECTION A-A

1 R-104 PRINCIPAL SPILLWAY CONCRETE ENCASEMENT DETAIL

0 4 8
1" = 4' FEET



ROCK ANCHOR NOTES

1. INSTALL ANCHORS ON A 20 FOOT GRID AND AS SHOWN IN SECTIONS A-A AND E-E ON SHEET R-101 AND AS DESCRIBED IN ANCHOR SCHEDULE.

2. ANCHORS SHALL BE THREADED BAR WITH A NOMINAL DIAMETER OF 1.43 INCHES (BAR #10), BAR GRADE OF GR 100, WITH A MINIMUM YIELD STRESS OF 100 KSI.

3. MINIMUM BOND LENGTH IN COMPETENT ROCK IS 10 FOOT MINIMUM. COMPETENT ROCK IS DEFINED AS ROCK WITH RMR GREATER THAN 41 AND RQD GREATER THAN 50%.

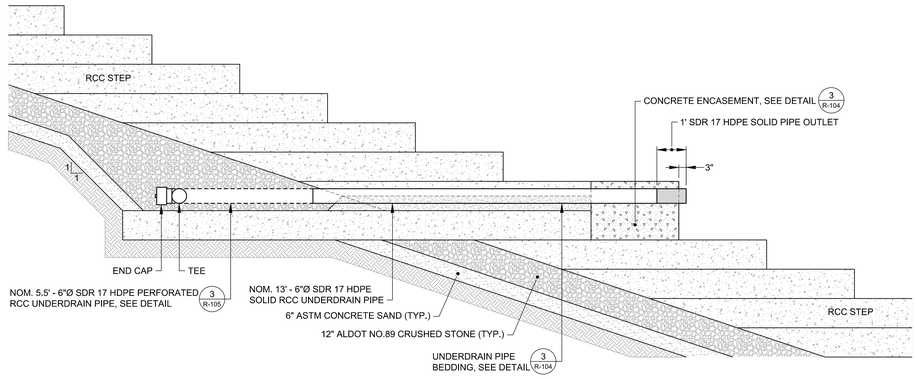
4. 3 INCH BOREHOLE DIAMETER GROUTED WITH BLEED RESISTANT, SAND FREE, CEMENTITIOUS GROUT, WITH A 28 DAY COMPRESSIVE STRENGTH OF 7,000 PSI.

5. FULLY ENCAPSULATED DOUBLE CORROSION PROTECTED (DCP) THREADBAR SHOULD BE USED FOR CORROSION PROTECTION. FACTORY APPLIED CEMENT-GROUT FILLED ENCAPSULATION OVER BOTH THE BONDED AND UNBONDED LENGTH OF ANCHOR (CLASS 1 CORROSION PROTECTION).

6. SCHEDULE 40 PVC CENTRALIZERS SHOULD BE INSTALLED 3 FEET FROM EACH END AND AT A MAXIMUM 7 FOOT INTERVALS BETWEEN ENDS.

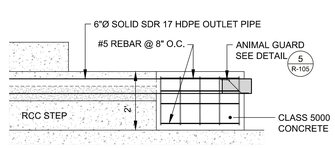
4 R-104 ROCK ANCHOR DETAIL

NTS

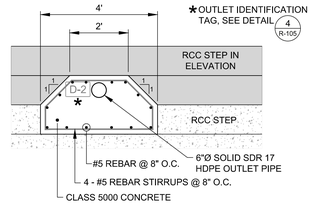


2 R-104 UNDERDRAIN OUTLET DETAIL

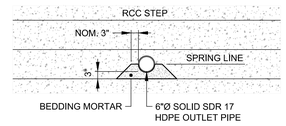
0 2 4
1" = 2' FEET



LONGITUDINAL SECTION



LATERAL SECTION



NOTE

1. WHERE PIPE IS ENCASED IN RCC, BEDDING MORTAR SHALL BE PLACED AROUND PIPE UP TO THE SPRING LINE.

PIPE BEDDING

3 R-104 UNDERDRAIN PIPE ENCASEMENT & BEDDING DETAIL

0 2 4
1" = 2' FEET

REV	DATE	REVISION DESCRIPTION	DES	CADD	CHK	RVW
0	2020/10/16	ISSUED FOR CONSTRUCTION	GLH	RMS	SCN	GLH

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Alabama Power

PROJECT
PLANT GORGAS
ASH POND CLOSURE
DESIGN DRAWINGS

TITLE
ATTENUATION DAM PRINCIPAL SPILLWAY DETAILS SHEET 3

ALABAMA LICENSED No. 29143 PROFESSIONAL ENGINEER GREGORY L. HEBELER 16 OCT 2020

GREGORY L. HEBELER
ALABAMA PROFESSIONAL ENGINEER
CERTIFICATE NUMBER 29143

CONSULTANT
GOLDER

YYYY-MM-DD	2020/10/16
DESIGNED	GLH
PREPARED	RMS
CHECKED	SCN
REVIEWED / APPROVED	GLH

PROJECT NO.	SCS REF.	REV.	DRAWING
1789848	GOR17010	0	R-104

0 1 in
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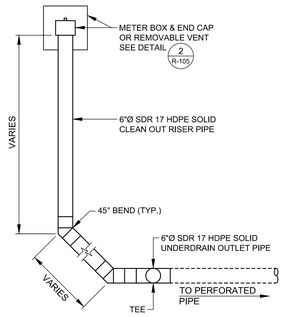
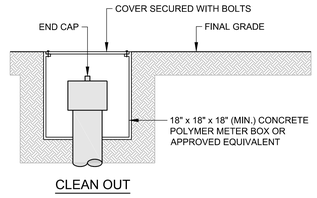


1 R-105 CLEAN OUT RISER DETAIL
NTS



2 R-105 METER BOX & END CAP DETAIL
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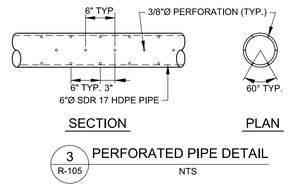
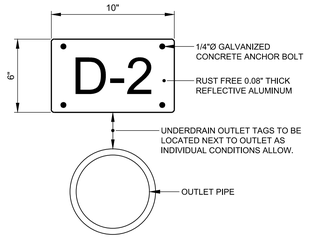
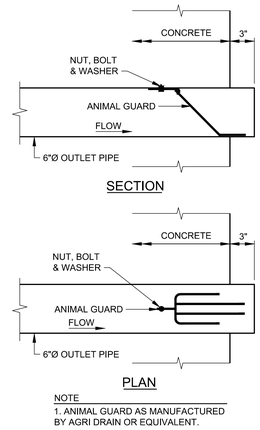


3 R-105 PERFORATED PIPE DETAIL
NTS



4 R-105 OUTLET IDENTIFICATION TAG DETAIL
NTS



NOTE
1. ANIMAL GUARD AS MANUFACTURED BY AGRI DRAIN OR EQUIVALENT.

5 R-105 ANIMAL GUARD DETAIL
NTS

REV	DATE	REVISION DESCRIPTION	DES	CADD	CHK	RVW
0	2020/10/16	ISSUED FOR CONSTRUCTION	JLL	EMM	EMM	GLH

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PROJECT
PLANT GORGAS
ASH POND CLOSURE
DESIGN DRAWINGS

TITLE
ATTENUATION DAM PRINCIPAL SPILLWAY DETAILS
SHEET 4

ALABAMA LICENSED No. 29143 PROFESSIONAL ENGINEER GREGORY L. HEBELER
16 OCT 2020

GREGORY L. HEBELER
ALABAMA PROFESSIONAL ENGINEER
CERTIFICATE NUMBER 29143

CONSULTANT
GOLDER

YYYY-MM-DD	2020/10/16
DESIGNED	JLL
PREPARED	EMM
CHECKED	EMM
REVIEWED / APPROVED	GLH

PROJECT NO.	SCS REF.	REV.	DRAWING
1789848	GOR17010	0	R-105

0 1 in
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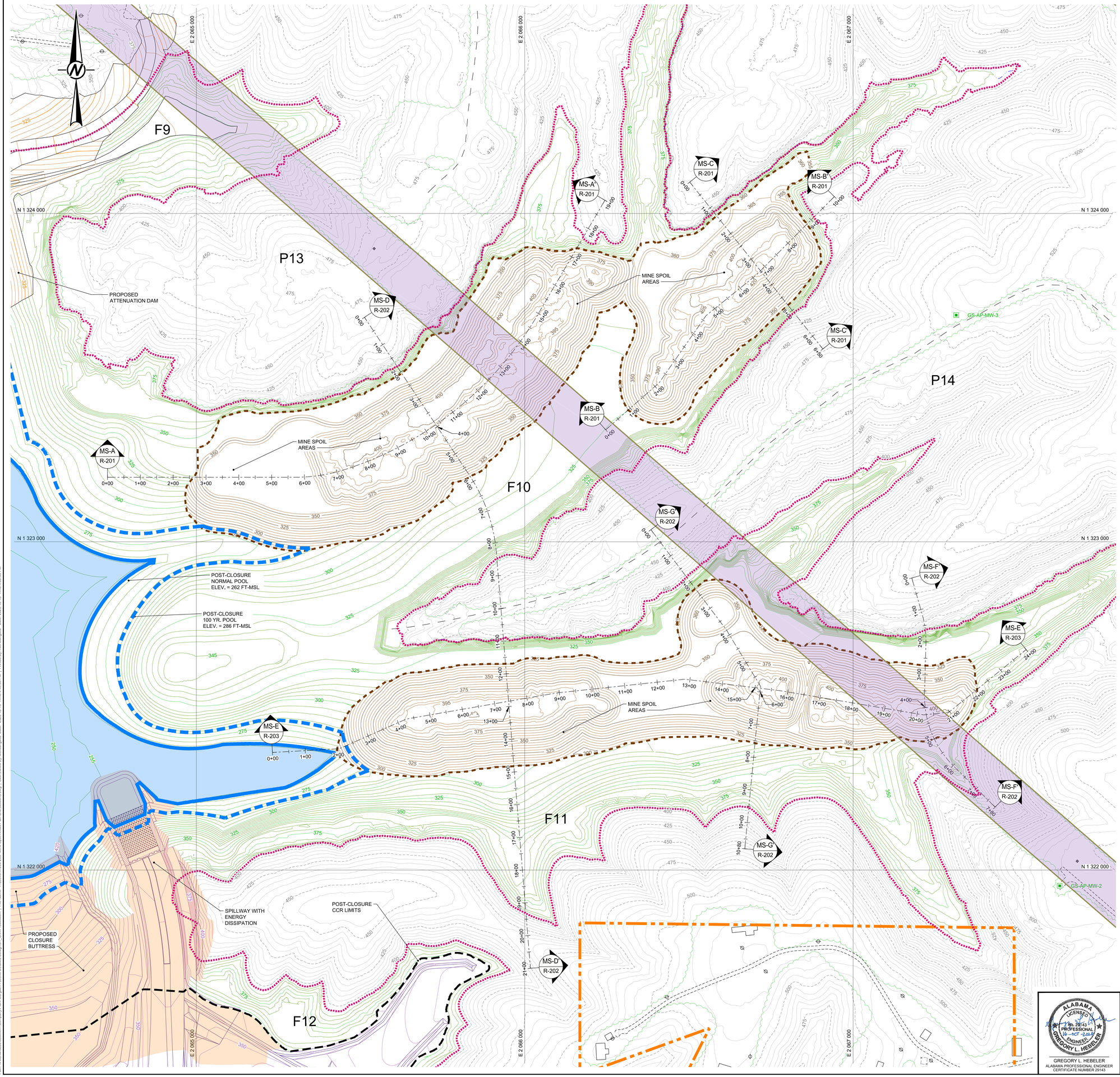

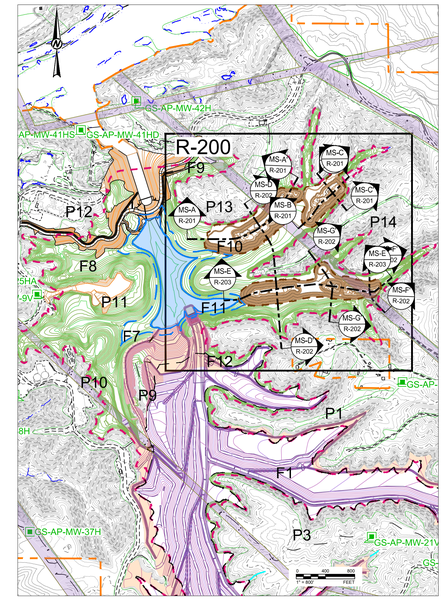

KEY MAP

LEGEND

- 340 — EXISTING TOPOGRAPHY / BATHYMETRY CONTOURS (REFERENCE 1)
- 500 — PROPOSED CLOSURE COVER GRADING CONTOURS
- 340 — PROPOSED GRADING CONTOURS OUTSIDE CLOSURE LIMITS
- 340 — ESTIMATED BOTTOM OF CCR CONTOURS (REFERENCE 2)
- 340 — ESTIMATED MINE SPOIL AREA CONTOURS (REFERENCE 2)
- ESTIMATED MINE SPOIL AREA AREA FOOTPRINT
- EXISTING ROAD
- EXISTING TRAIL
- EXISTING POWER POLES / TOWERS
- APC OWNED PROPERTY BOUNDARIES
- EXISTING TRANSMISSION CORRIDOR
- ESTIMATED PRE-CLOSURE FACILITY BOUNDARY
- LIMITS OF CLOSURE FOOTPRINT
- POST-CLOSURE CCR LIMITS
- STREAMS PROVIDED BY CAHABA CONSULTING, LLC
- POST-CLOSURE 100 YR. POOL ELEVATION LIMITS
- P1 — PENINSULA
- F1 — FINGER
- GS-AP-MW-01 — EXISTING MONITORING WELL LOCATION
- AREA OF NON-CCR CLOSURE GRADING
- POST-CLOSURE NORMAL POOL ELEVATION = 262'

NOTES

1. ELEVATIONS ARE IN FEET WITH REFERENCE TO NORTH AMERICAN VERTICAL DATUM (NAVD) 1988. COORDINATES CORRESPOND TO ALABAMA WEST STATE PLANE COORDINATE SYSTEM, NORTH AMERICAN DATUM (NAD) 1983.

2. CONTOUR INTERVAL IS 5 FEET.

REFERENCES

1. EXISTING TOPOGRAPHY PROVIDED BY SOUTHERN COMPANY SERVICES, FEBRUARY 2020.

2. BOTTOM OF CCR TOPOGRAPHY TAKEN FROM USGS, PORT BIRMINGHAM, 1938 AND GOODSPINGS, 1971 QUADRANGLES. TOPOGRAPHY WAS INTERPRETED BETWEEN 20 FOOT CONTOURS AND ADJUSTED BASED ON GEOTECHNICAL INVESTIGATION DATA BY GOLDER ASSOCIATES INC.

3. EXISTING AND APPROXIMATE PROPERTY BOUNDARIES PROVIDED BY SOUTHERN COMPANY SERVICES, APRIL 2020.

0 100 200
1" = 100' FEET

REV	DATE	REVISION DESCRIPTION	DES	CADD	CHK	RVW
0	2020/10/16	ISSUED FOR CONSTRUCTION	GLH	CRP	SCN	GLH

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SOUTHERN COMPANY SERVICES

Alabama Power

PROJECT
PLANT GORGAS
ASH POND CLOSURE
DESIGN DRAWINGS

TITLE
MINE SPOILS AREAS
CCR REMOVAL VERIFICATION AND RESTORATION PLAN

CONSULTANT
GOLDER

YYYY-MM-DD	2020/10/16
DESIGNED	GLH
PREPARED	CRP
CHECKED	SCN
REVIEWED / APPROVED	GLH

ALABAMA LICENSED No. 29143 PROFESSIONAL ENGINEER 16-OCT-2020 GREGORY L. HEBELER
GREGORY L. HEBELER
ALABAMA PROFESSIONAL ENGINEER
CERTIFICATE NUMBER 29143

PROJECT NO.	SCS REF.	REV.	DRAWING
1789848	GOR17010	0	R-200

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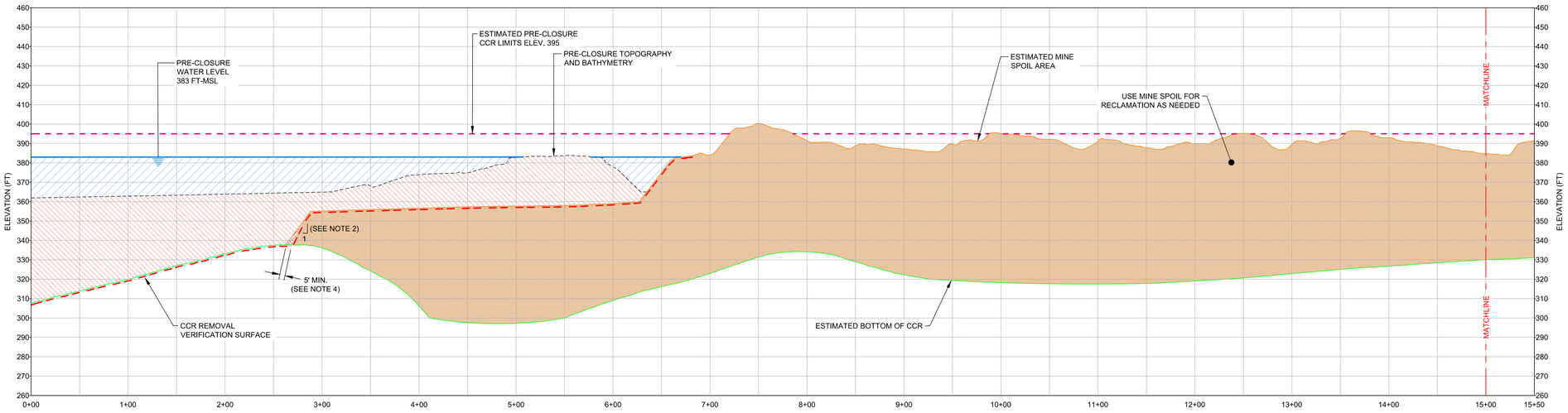
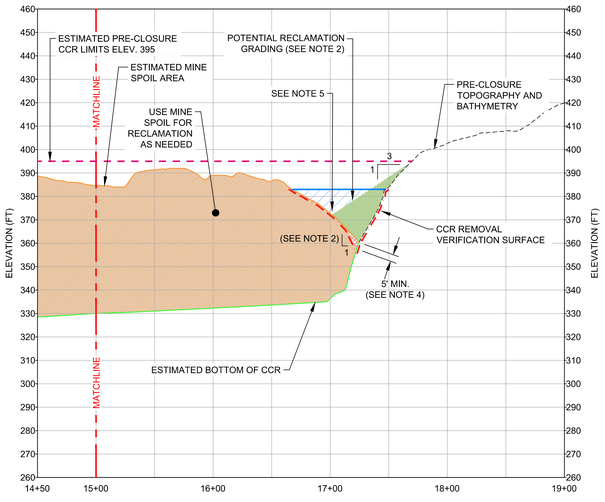


SECTION MS-A - MS-A'



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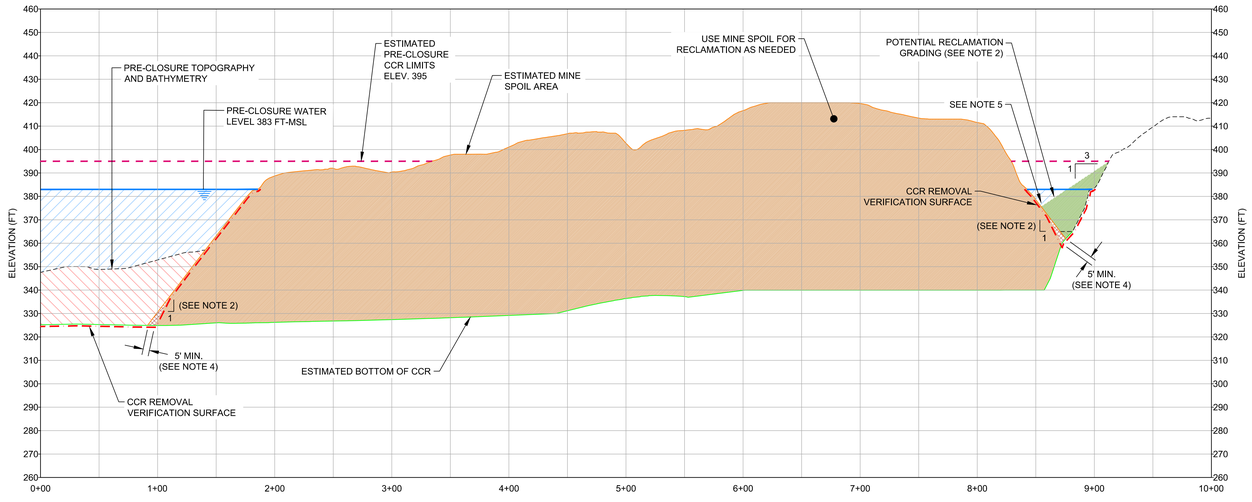
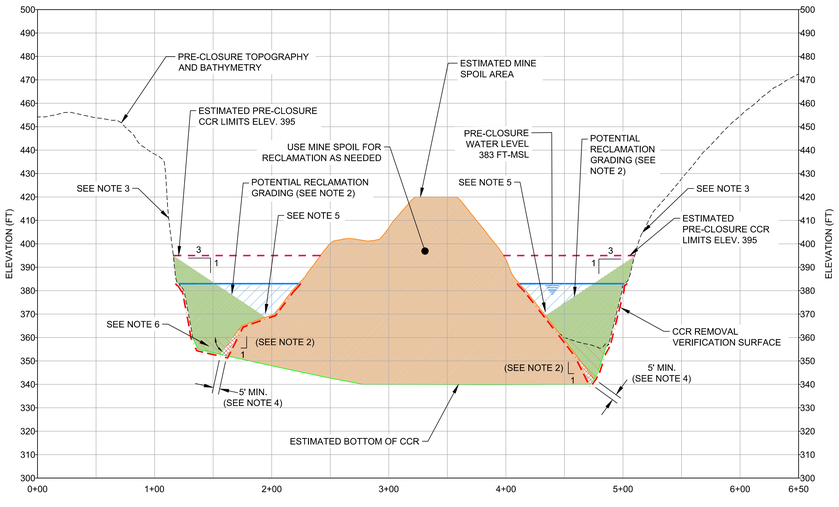
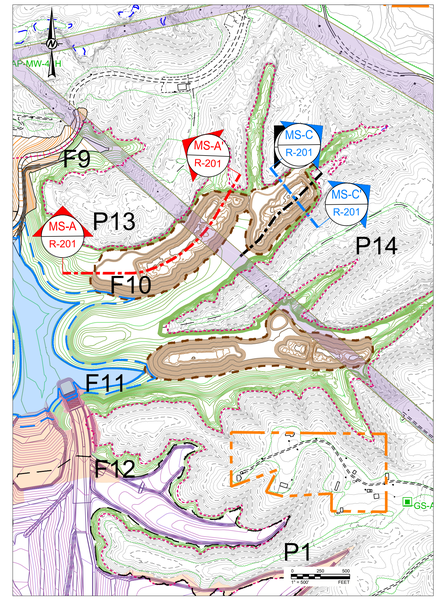


SECTION MS-B - MS-B'



SECTION MS-C - MS-C'



KEY MAP

LEGEND

- APC OWNED PROPERTY BOUNDARIES
- PRE-CLOSURE WATER LEVEL 383 FT-MSL
- PRE-CLOSURE TOPOGRAPHY / BATHYMETRY GRADING (REFERENCE 1 & 2)
- ESTIMATED BOTTOM OF CCR GRADING (REFERENCE 3)
- ESTIMATED MINE SPOIL AREA GRADING (REFERENCE 3)
- CCR REMOVAL VERIFICATION SURFACE
- ESTIMATED PRE-CLOSURE FACILITY BOUNDARY
- ESTIMATED MINE SPOIL AREA AREA FOOTPRINT
- PRE-CLOSURE WATER
- PROPOSED CCR CUT
- PROPOSED CCR REMOVAL VERIFICATION AT MINE SPOIL AREA
- ESTIMATED MINE SPOIL MATERIAL
- POTENTIAL MINE SPOIL RECLAMATION FILL

NOTES

1. ELEVATIONS ARE IN FEET WITH REFERENCE TO NORTH AMERICAN VERTICAL DATUM (NAVD) 1988. COORDINATES CORRESPOND TO ALABAMA WEST STATE PLANE COORDINATE SYSTEM, NORTH AMERICAN DATUM (NAD) 1983.

2. LIMITS AND EXTENT OF RESTORATION FILL AND GRADING TO BE FINALIZED FOLLOWING ENGINEERING ASSESSMENT OF EXPOSED CONDITIONS AND AS PER OVERALL RESTORATION STRATEGY. LIMITS OF POTENTIAL RECLAMATION ARE SHOWN FOR CONCEPTUAL VISUALIZATION ONLY.

3. RESTORATION OF MINE ISLAND AND HIGH WALL AREAS ABOVE ELEVATION 395 FT-MSL SHOULD BE DISCUSSED AND RESTORATION REQUIREMENTS IF NEEDED AGREED UPON WITH ENGINEER AND OWNER.

4. PROVIDE 5' MINIMUM CCR REMOVAL VERIFICATION ALONG BASE OF MINE SPOIL EDGES. SEE PROJECT SPECIFICATIONS FOR FULL CCR REMOVAL VERIFICATION PROCEDURES.

5. MAINTAIN 2% MINIMUM FLOW LINE IN GROINS.

6. VERIFY EDGE OF MINE SPOIL AREAS UPON EXPOSURE AS PART OF CCR REMOVAL VERIFICATION PROCEDURE.

7. CONTRACTOR TO TAKE EXTRA PRECAUTIONS AS NOT TO DAMAGE ANY EXISTING TRANSMISSION LINE STRUCTURES OR LINES DURING CONSTRUCTION. ANY DAMAGE WILL BE THE RESPONSIBILITY OF THE CONTRACTOR.

REFERENCES

1. EXISTING TOPOGRAPHY PROVIDED BY SOUTHERN COMPANY SERVICES, FEBRUARY 2020.

2. BOTTOM OF CCR TOPOGRAPHY TAKEN FROM USGS, PORT BIRMINGHAM, 1938 AND GOODSPINGS, 1971 QUADRANGLES. TOPOGRAPHY WAS INTERPRETED BETWEEN 20 FOOT CONTOURS AND ADJUSTED BASED ON GEOTECHNICAL INVESTIGATION DATA BY GOLDER ASSOCIATES INC.

0 50 100 — 1" = 50' FEET — HORIZONTAL SCALE

0 25 50 — 1" = 25' FEET — VERTICAL SCALE

REV	DATE	REVISION DESCRIPTION	DES	CADD	CHK	RVW
1	2020/10/16	ISSUED FOR CONSTRUCTION	GLH	CRP	SCN	GLH

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SOUTHERN COMPANY SERVICES

Alabama Power

PROJECT
PLANT GORGAS
ASH POND CLOSURE
DESIGN DRAWINGS

TITLE
MINE SPOILS AREAS
CROSS SECTIONS - SHEET 1

ALABAMA LICENSED No. 29143 PROFESSIONAL ENGINEER GREGORY L. HEBELER
16 OCT 2020

GREGORY L. HEBELER
ALABAMA PROFESSIONAL ENGINEER
CERTIFICATE NUMBER 29143

CONSULTANT
GOLDER

YYYY-MM-DD	2020/10/16
DESIGNED	GLH
PREPARED	CRP
CHECKED	SCN
REVIEWED / APPROVED	GLH

PROJECT NO.	SCS REF.	REV.	DRAWING
1789848	GOR17010	0	R-201

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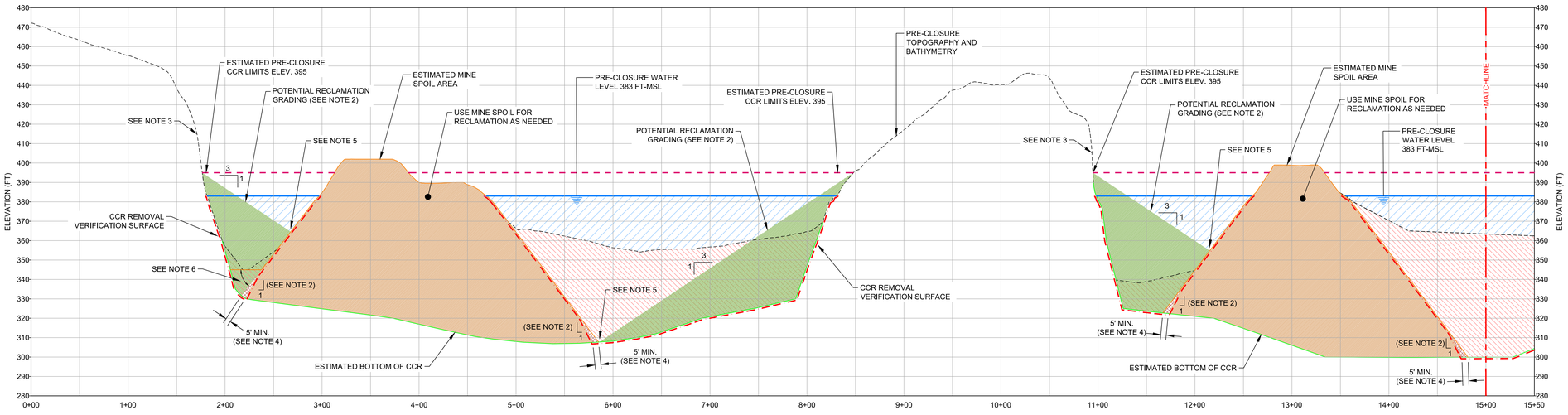
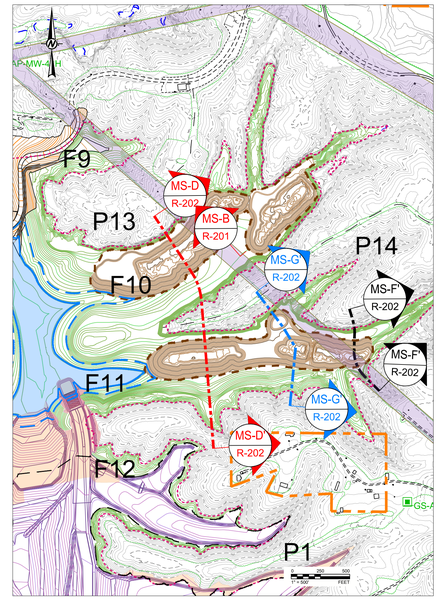
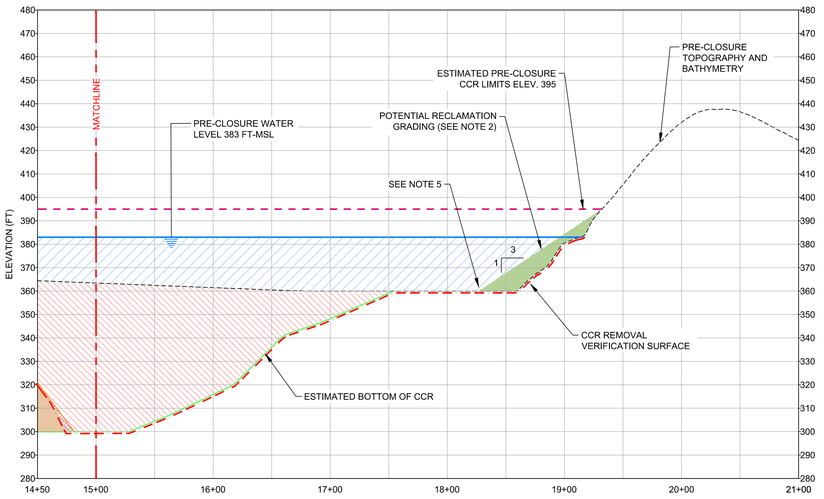


SECTION MS-D- MS-D'



KEY MAP



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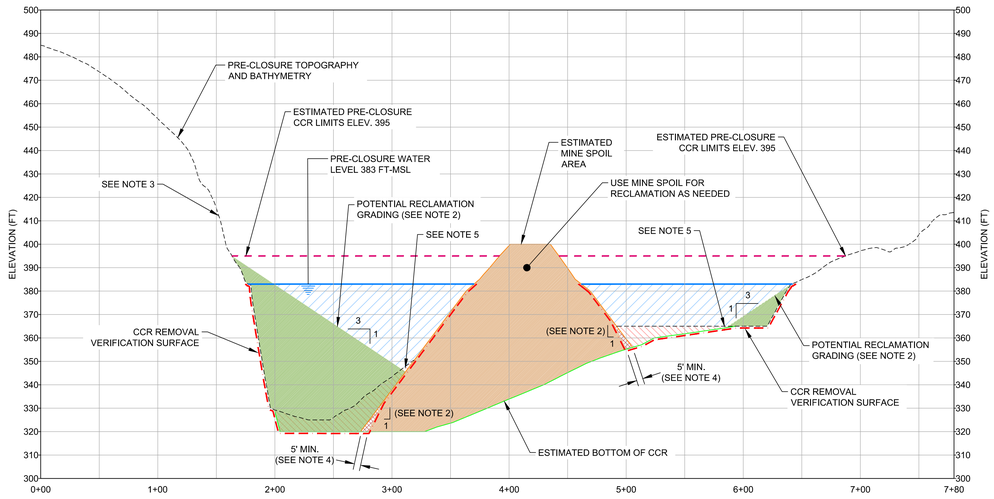
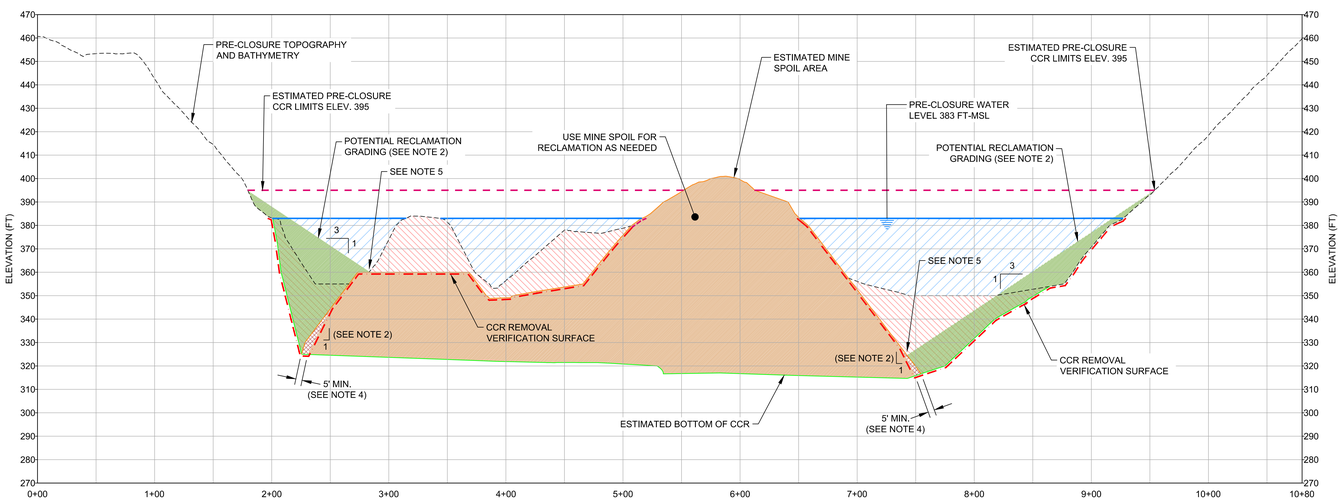


SECTION MS-F - MS-F'



SECTION MS-G - MS-G'

LEGEND

- APC OWNED PROPERTY BOUNDARIES
- PRE-CLOSURE WATER LEVEL 383 FT-MSL
- PRE-CLOSURE TOPOGRAPHY / BATHYMETRY GRADING (REFERENCE 1 & 2)
- ESTIMATED BOTTOM OF CCR GRADING (REFERENCE 3)
- ESTIMATED MINE SPOIL AREA GRADING (REFERENCE 3)
- CCR REMOVAL VERIFICATION SURFACE
- ESTIMATED PRE-CLOSURE FACILITY BOUNDARY
- ESTIMATED MINE SPOIL AREA AREA FOOTPRINT
- PRE-CLOSURE WATER
- PROPOSED CCR CUT
- PROPOSED CCR REMOVAL VERIFICATION AT MINE SPOIL AREA
- ESTIMATED MINE SPOIL MATERIAL
- POTENTIAL MINE SPOIL RECLAMATION FILL

NOTES

1. ELEVATIONS ARE IN FEET WITH REFERENCE TO NORTH AMERICAN VERTICAL DATUM (NAVD) 1988. COORDINATES CORRESPOND TO ALABAMA WEST STATE PLANE COORDINATE SYSTEM, NORTH AMERICAN DATUM (NAD) 1983.

2. LIMITS AND EXTENT OF RESTORATION FILL AND GRADING TO BE FINALIZED FOLLOWING ENGINEERING ASSESSMENT OF EXPOSED CONDITIONS AND AS PER OVERALL RESTORATION STRATEGY. LIMITS OF POTENTIAL RECLAMATION ARE SHOWN FOR CONCEPTUAL VISUALIZATION ONLY.

3. RESTORATION OF MINE ISLAND AND HIGH WALL AREAS ABOVE ELEVATION 395 FT-MSL SHOULD BE DISCUSSED AND RESTORATION REQUIREMENTS IF NEEDED AGREED UPON WITH ENGINEER AND OWNER.

4. PROVIDE 5' MINIMUM CCR REMOVAL VERIFICATION ALONG BASE OF MINE SPOIL EDGES. SEE PROJECT SPECIFICATIONS FOR FULL CCR REMOVAL VERIFICATION PROCEDURES.

5. MAINTAIN 2% MINIMUM FLOW LINE IN GROINS.

6. VERIFY EDGE OF MINE SPOIL AREAS UPON EXPOSURE AS PART OF CCR REMOVAL VERIFICATION PROCEDURE.

7. CONTRACTOR TO TAKE EXTRA PRECAUTIONS AS NOT TO DAMAGE ANY EXISTING TRANSMISSION LINE STRUCTURES OR LINES DURING CONSTRUCTION. ANY DAMAGE WILL BE THE RESPONSIBILITY OF THE CONTRACTOR.

REFERENCES

1. EXISTING TOPOGRAPHY PROVIDED BY SOUTHERN COMPANY SERVICES, FEBRUARY 2020.

2. BOTTOM OF CCR TOPOGRAPHY TAKEN FROM USGS, PORT BIRMINGHAM, 1938 AND GOODSPINGS, 1971 QUADRANGLES. TOPOGRAPHY WAS INTERPRETED BETWEEN 20 FOOT CONTOURS AND ADJUSTED BASED ON GEOTECHNICAL INVESTIGATION DATA BY GOLDER ASSOCIATES INC.

0 50 100 — 1" = 50' FEET — HORIZONTAL SCALE

0 25 50 — 1" = 25' FEET — VERTICAL SCALE

REV	DATE	REVISION DESCRIPTION	DES	CADD	CHK	RVW
1	2020/10/16	ISSUED FOR CONSTRUCTION	GLH	CRP	SCN	GLH

CLIENT
SOUTHERN COMPANY SERVICES

Alabama Power

PROJECT
PLANT GORGAS
ASH POND CLOSURE
DESIGN DRAWINGS

TITLE
MINE SPOILS AREAS
CROSS SECTIONS - SHEET 2

ALABAMA LICENSED No. 29143 PROFESSIONAL ENGINEER GREGORY L. HEBELER
16 OCT 2020

GREGORY L. HEBELER
ALABAMA PROFESSIONAL ENGINEER
CERTIFICATE NUMBER 29143

CONSULTANT
GOLDER

YYYY-MM-DD	2020/10/16
DESIGNED	GLH
PREPARED	CRP
CHECKED	SCN
REVIEWED / APPROVED	GLH

PROJECT NO.	SCS REF.	REV.	DRAWING
1789848	GOR17010	0	R-202

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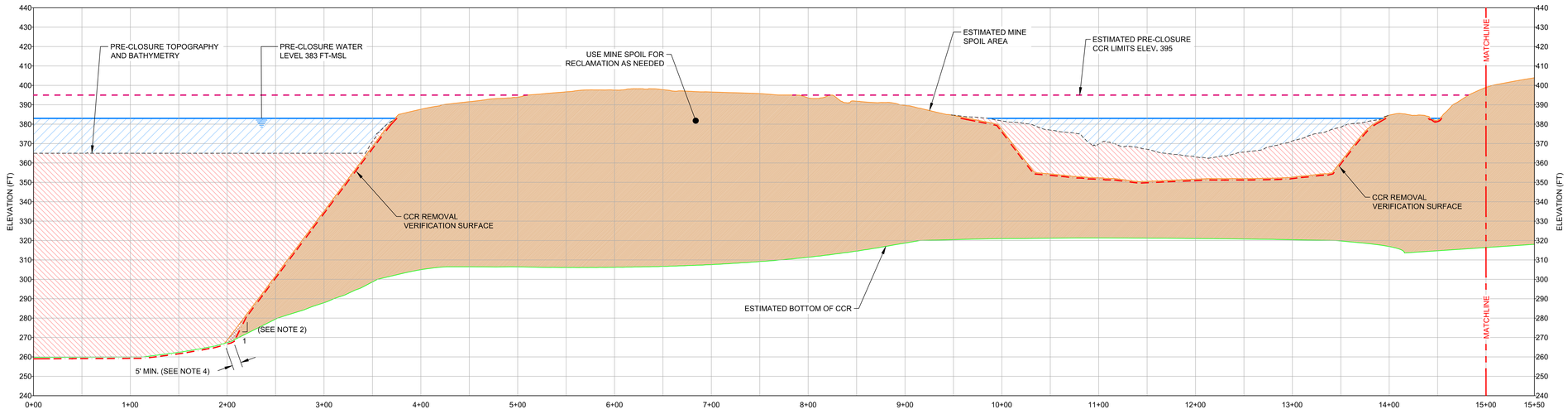
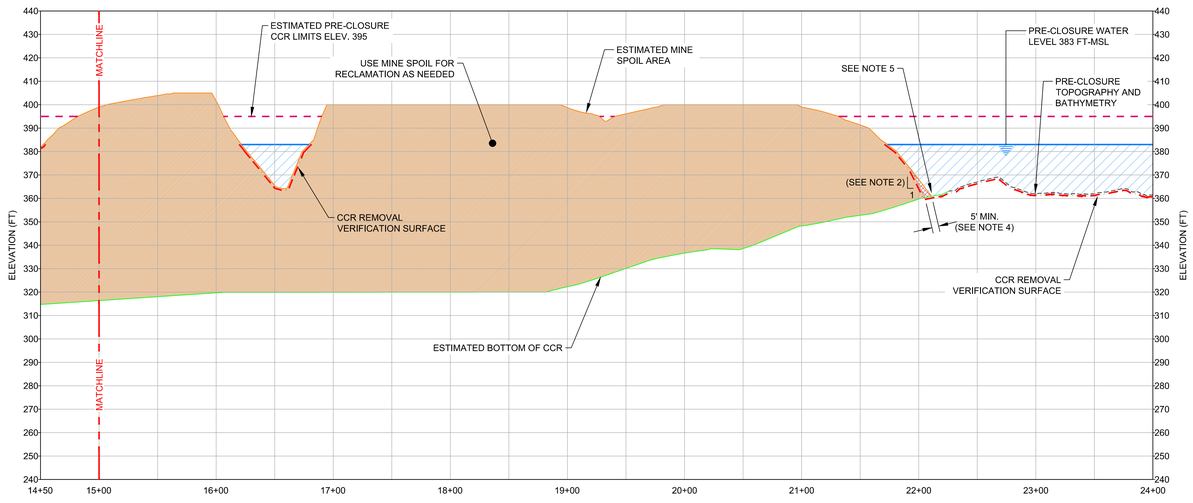
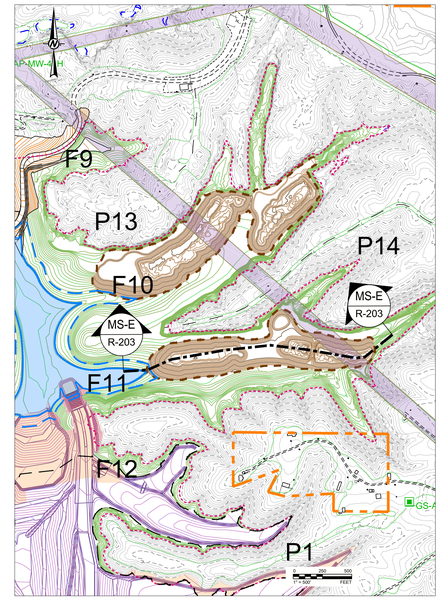


SECTION MS-E - MS-E'



SECTION MS-E - MS-E'



KEY MAP

LEGEND

- APC OWNED PROPERTY BOUNDARIES
- PRE-CLOSURE WATER LEVEL 383 FT-MSL
- PRE-CLOSURE TOPOGRAPHY / BATHYMETRY GRADING (REFERENCE 1 & 2)
- ESTIMATED BOTTOM OF CCR GRADING (REFERENCE 3)
- ESTIMATED MINE SPOIL AREA GRADING (REFERENCE 3)
- CCR REMOVAL VERIFICATION SURFACE
- ESTIMATED PRE-CLOSURE FACILITY BOUNDARY
- ESTIMATED MINE SPOIL AREA AREA FOOTPRINT
- PRE-CLOSURE WATER
- PROPOSED CCR CUT
- PROPOSED CCR REMOVAL VERIFICATION AT MINE SPOIL AREA
- ESTIMATED MINE SPOIL MATERIAL
- POTENTIAL MINE SPOIL RECLAMATION FILL

NOTES

1. ELEVATIONS ARE IN FEET WITH REFERENCE TO NORTH AMERICAN VERTICAL DATUM (NAVD) 1988. COORDINATES CORRESPOND TO ALABAMA WEST STATE PLANE COORDINATE SYSTEM, NORTH AMERICAN DATUM (NAD) 1983.

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5. MAINTAIN 2% MINIMUM FLOW LINE IN GROINS.

6. VERIFY EDGE OF MINE SPOIL AREAS UPON EXPOSURE AS PART OF CCR REMOVAL VERIFICATION PROCEDURE.

7. CONTRACTOR TO TAKE EXTRA PRECAUTIONS AS NOT TO DAMAGE ANY EXISTING TRANSMISSION LINE STRUCTURES OR LINES DURING CONSTRUCTION. ANY DAMAGE WILL BE THE RESPONSIBILITY OF THE CONTRACTOR.

REFERENCES

1. EXISTING TOPOGRAPHY PROVIDED BY SOUTHERN COMPANY SERVICES, FEBRUARY 2020.

2. BOTTOM OF CCR TOPOGRAPHY TAKEN FROM USGS, PORT BIRMINGHAM, 1938 AND GOODSPINGS, 1971 QUADRANGLES. TOPOGRAPHY WAS INTERPRETED BETWEEN 20 FOOT CONTOURS AND ADJUSTED BASED ON GEOTECHNICAL INVESTIGATION DATA BY GOLDER ASSOCIATES INC.

0 50 100 FEET
1" = 50'
HORIZONTAL SCALE

0 25 50 FEET
1" = 25'
VERTICAL SCALE

REV	DATE	REVISION DESCRIPTION	DES	CADD	CHK	RVW
1						
0	2020/10/16	ISSUED FOR CONSTRUCTION	GLH	CRP	SCN	GLH

CLIENT
SOUTHERN COMPANY SERVICES

Alabama Power

PROJECT
PLANT GORGAS
ASH POND CLOSURE
DESIGN DRAWINGS

TITLE
MINE SPOILS AREAS
CROSS SECTIONS - SHEET 3

ALABAMA LICENSED PROFESSIONAL ENGINEER GREGORY L. HEBELER No. 29143 16-OCT-2020

GREGORY L. HEBELER
ALABAMA PROFESSIONAL ENGINEER
CERTIFICATE NUMBER 29143

CONSULTANT
GOLDER

YYYY-MM-DD	2020/10/16
DESIGNED	GLH
PREPARED	CRP
CHECKED	SCN
REVIEWED / APPROVED	GLH

PROJECT NO.	SCS REF.	REV.	DRAWING
1789848	GOR17010	0	R-203

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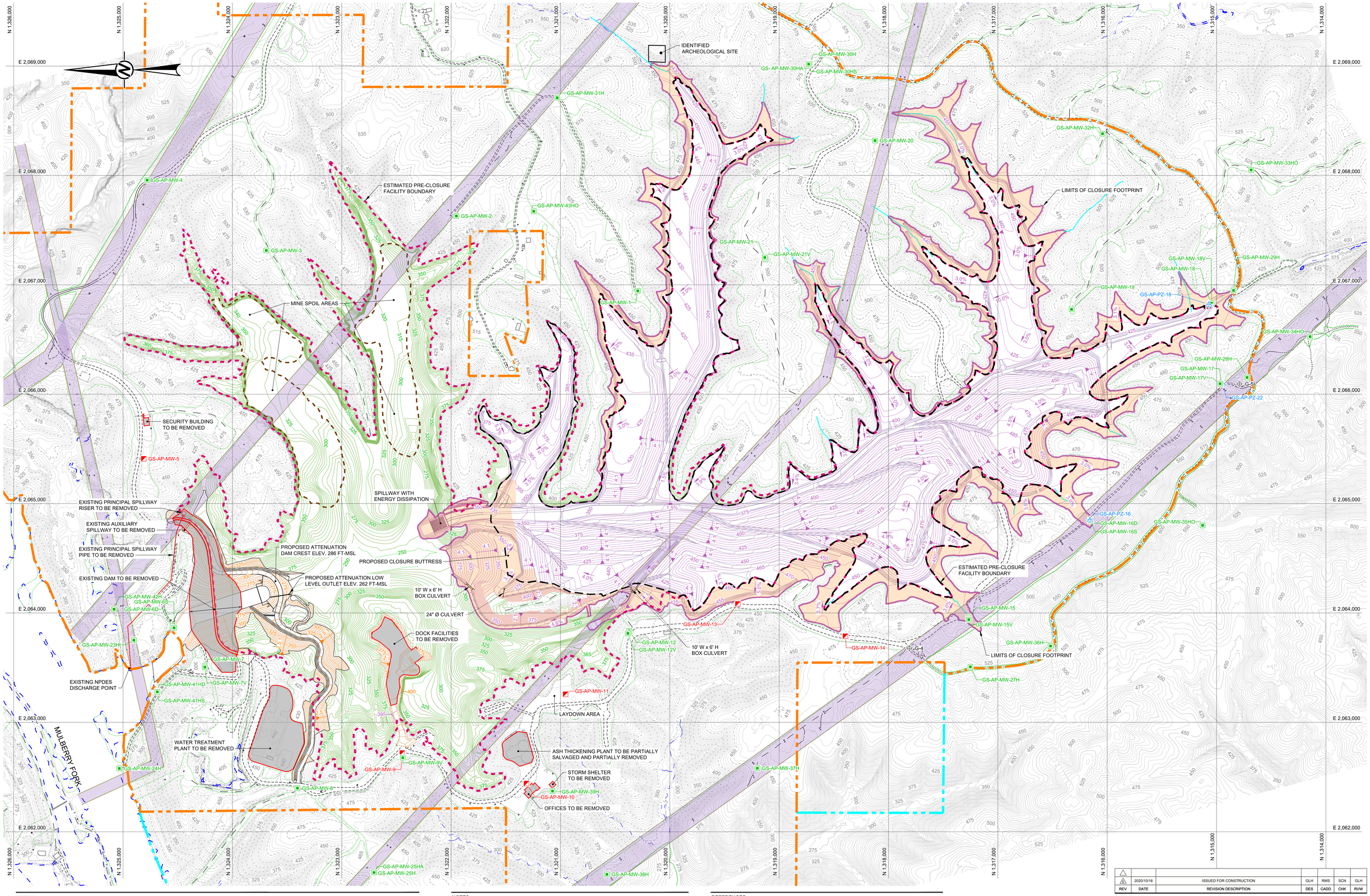

LEGEND

- EXISTING TOPOGRAPHY / BATHYMETRY CONTOURS (REFERENCE 1)
- PROPOSED CLOSURE COVER GRADING CONTOURS
- PROPOSED GRADING CONTOURS OUTSIDE CLOSURE LIMITS
- ESTIMATED BOTTOM OF CCR CONTOURS (REFERENCE 2)
- ESTIMATED MINE SPOIL AREA FOOTPRINT
- EXISTING ROAD
- EXISTING TRAIL
- EXISTING PARKING AREA
- EXISTING EDGE OF WATER
- EXISTING POWER POLES / TOWERS
- APC OWNED PROPERTY BOUNDARIES
- APPROXIMATE APC OWNED PROPERTY BOUNDARIES
- ESTIMATED PRE-CLOSURE FACILITY BOUNDARY
- EXISTING TRANSMISSION CORRIDOR
- LIMITS OF CLOSURE FOOTPRINT
- POST-CLOSURE CCR LIMITS
- STREAMS PROVIDED BY CAHABA CONSULTING, LLC
- AREA OF NON-CCR CLOSURE GRADING
- AREA OF DEMOLITION
- G-4 — EXISTING MONITORING WELL LOCATION (NOT IN MODELING NETWORK)
- GS-AP-PZ-18 — EXISTING PIEZOMETER LOCATION
- GS-AP-MW-01 — EXISTING MONITORING WELL LOCATION
- GS-AP-MW-05 — ABANDONED MONITORING WELL

NOTES

1. ELEVATIONS ARE IN FEET WITH REFERENCE TO THE NORTH AMERICAN VERTICAL DATUM (NAVD) 1988. COORDINATES CORRESPOND TO ALABAMA WEST STATE PLANE COORDINATE SYSTEM, NORTH AMERICAN DATUM (NAD) 1983.
2. CONTOUR INTERVAL IS 5 FEET.
3. ALL TEMPORARY WORK TO REMOVED AND IF NEEDED DISPOSED OFF IN ACCORDANCE WITH PROJECT SPECIFICATIONS AND CONTRACT DOCUMENTS.

REFERENCES

1. EXISTING TOPOGRAPHY PROVIDED BY SOUTHERN COMPANY SERVICES, FEBRUARY 2020.
2. BOTTOM OF CCR TOPOGRAPHY TAKEN FROM USGS, PORT BIRMINGHAM, 1938 AND GOODSPINGS, 1971 QUADRANGLES. TOPOGRAPHY WAS INTERPRETED BETWEEN 20 FOOT CONTOURS AND ADJUSTED BASED ON GEOTECHNICAL INVESTIGATION DATA BY GOLDER ASSOCIATES INC.
3. EXISTING AND APPROXIMATED PROPERTY BOUNDARIES PROVIDED BY SOUTHERN COMPANY SERVICES, APRIL 2020.

0 300 600
1" = 300' FEET

REV	DATE	REVISION DESCRIPTION	DES	CADD	CHK	RVW
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0	2020/10/16	ISSUED FOR CONSTRUCTION	GLH	RMS	SCN	GLH

CLIENT
SOUTHERN COMPANY SERVICES

Alabama Power

PROJECT
PLANT GORGAS
ASH POND CLOSURE
DESIGN DRAWINGS

TITLE
OVERALL DEMOLITION PLAN

ALABAMA LICENSED PROFESSIONAL ENGINEER GREGORY L. HEBELER 29143
16 OCT 2020
GREGORY L. HEBELER
ALABAMA PROFESSIONAL ENGINEER
CERTIFICATE NUMBER 29143

CONSULTANT
GOLDER

YYYY-MM-DD	2020/10/16
DESIGNED	GLH
PREPARED	RMS
CHECKED	SCN
REVIEWED / APPROVED	GLH

PROJECT NO.	SCS REF.	REV.	DRAWING
1789848	GOR17010	0	R-300

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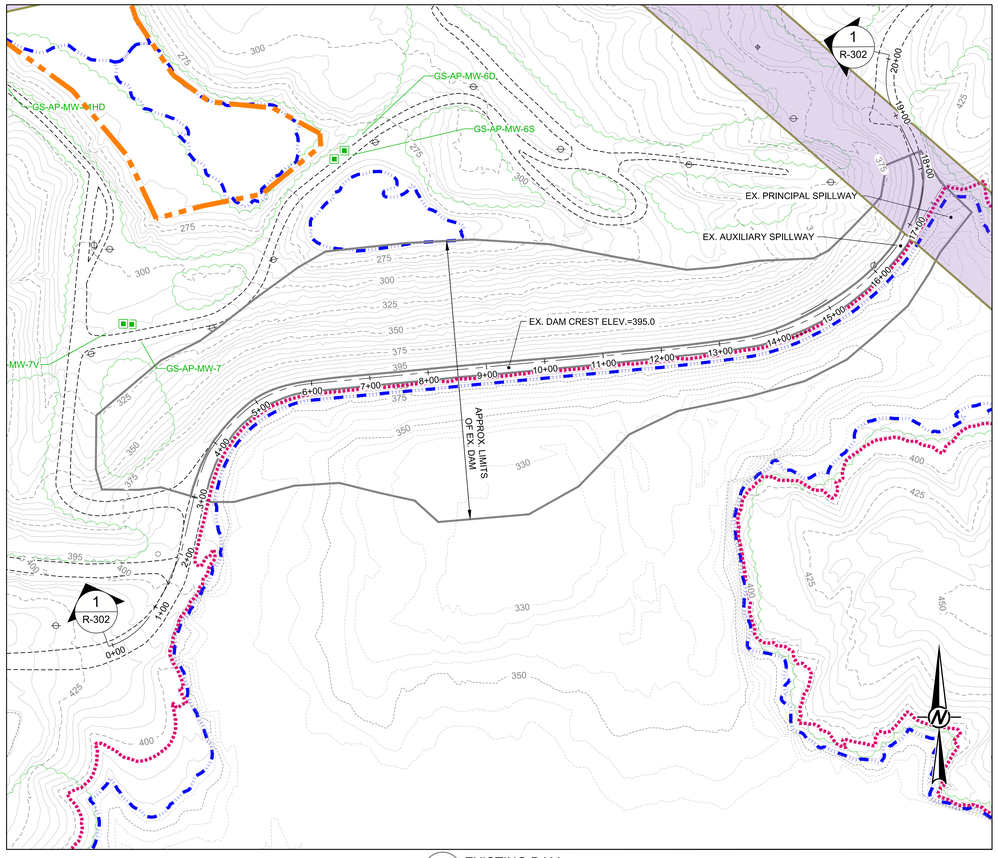
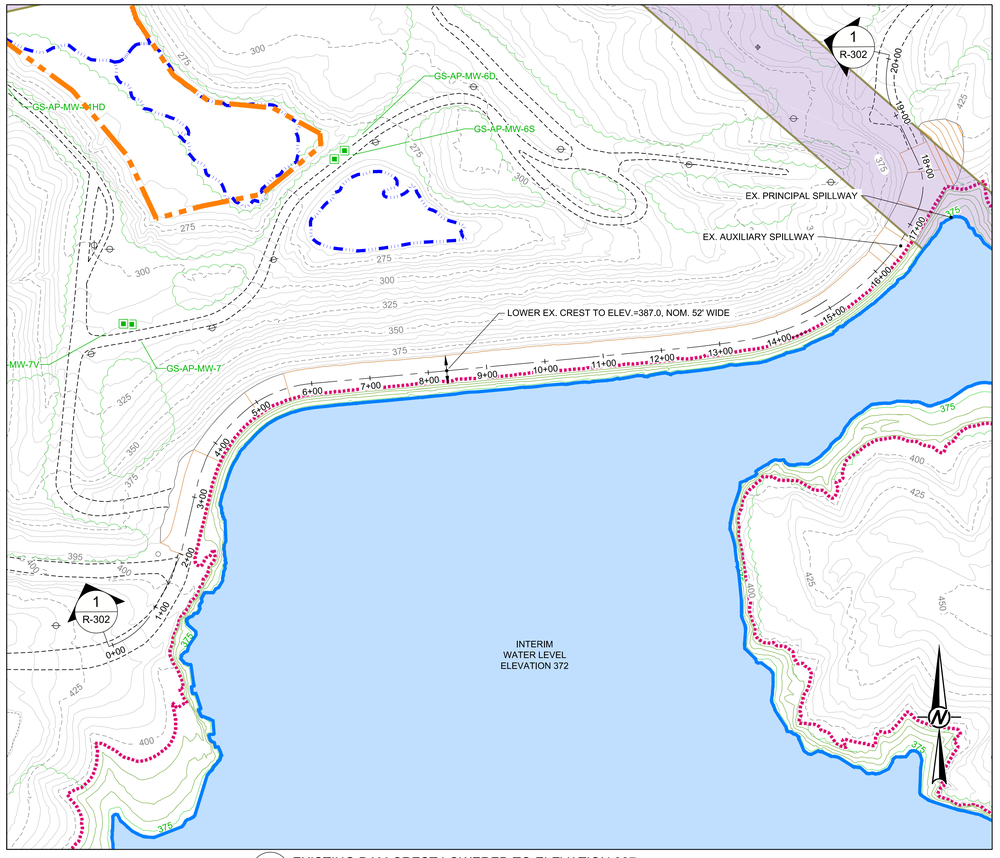
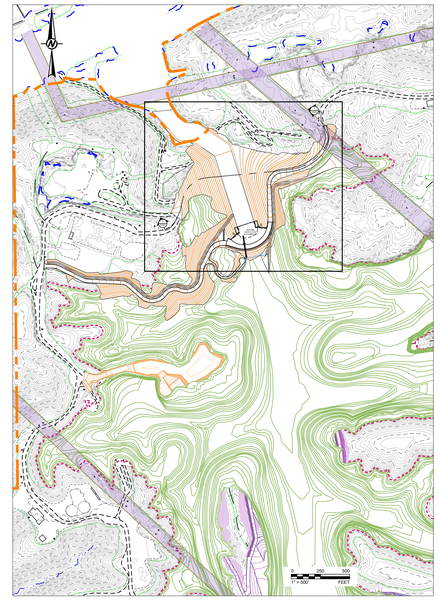


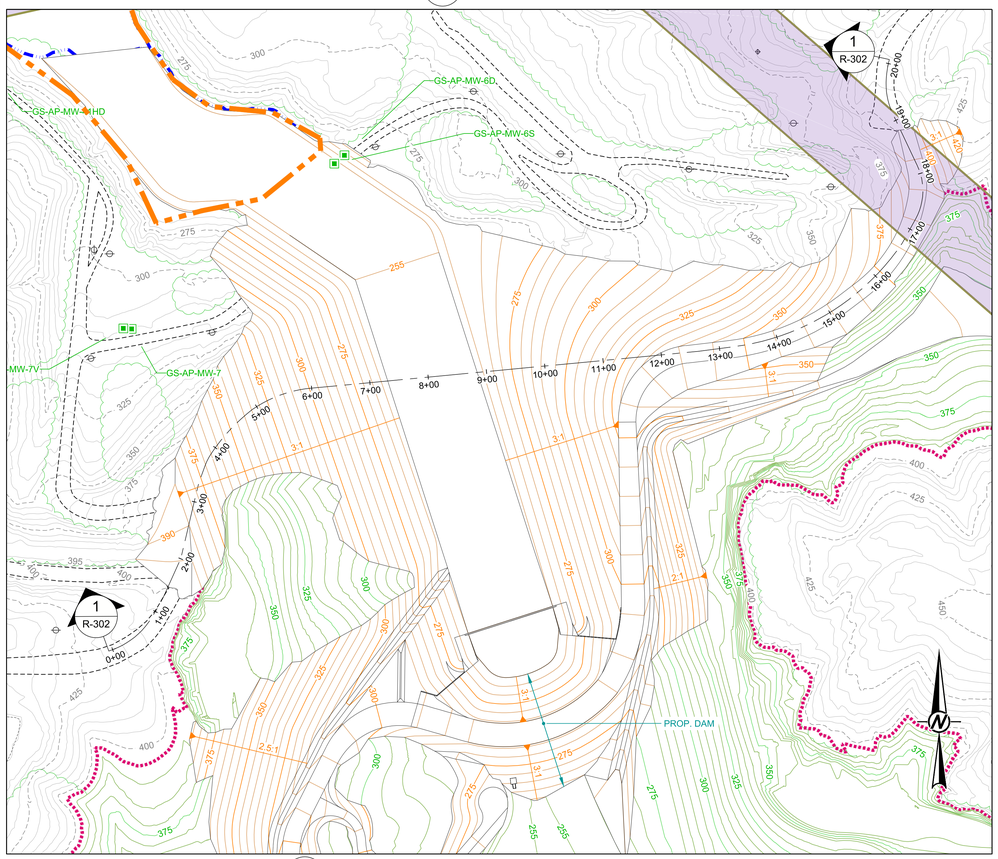
1 R-301 EXISTING DAM



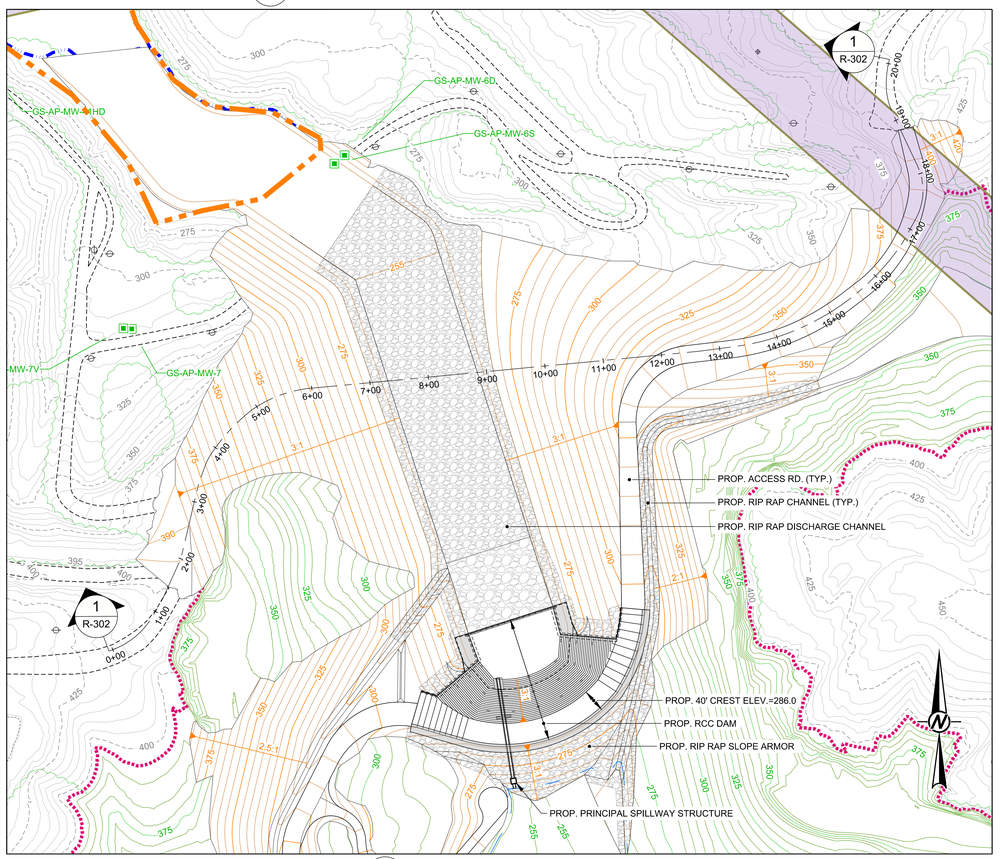
2 R-301 EXISTING DAM CREST LOWERED TO ELEVATION 387



KEY MAP



3 R-301 EXISTING DAM DEMOLITION & ATTENUATION POND GRADING



4 R-301 ATTENUATION DAM COMPLETION

LEGEND

- 340 — EXISTING TOPOGRAPHY / BATHYMETRY CONTOURS (REFERENCE 1)
- 500 — PROPOSED CLOSURE COVER GRADING CONTOURS
- 340 — PROPOSED GRADING CONTOURS OUTSIDE CLOSURE LIMITS
- 340 — ESTIMATED BOTTOM OF CCR CONTOURS (REFERENCE 2)
- EXISTING ROAD
- EXISTING TRAIL
- EXISTING POWER POLES / TOWERS
- APC OWNED PROPERTY BOUNDARIES
- EXISTING TRANSMISSION CORRIDOR
- ESTIMATED PRE-CLOSURE FACILITY BOUNDARY
- LIMITS OF CLOSURE FOOTPRINT
- EXISTING EDGE OF WATER
- GS-AP-MW-01 — EXISTING MONITORING WELL LOCATION
- PROPOSED RIP RAP
- PROPOSED ACCESS ROAD
- PROPOSED CONCRETE CREST

NOTES

1. ELEVATIONS ARE IN FEET WITH REFERENCE TO NORTH AMERICAN VERTICAL DATUM (NAVD) 1988. COORDINATES CORRESPOND TO ALABAMA WEST STATE PLANE COORDINATE SYSTEM, NORTH AMERICAN DATUM (NAD) 1983.

2. CONTOUR INTERVAL IS 5 FEET.

REFERENCES

1. EXISTING TOPOGRAPHY PROVIDED BY SOUTHERN COMPANY SERVICES, FEBRUARY 2020.

2. BOTTOM OF CCR TOPOGRAPHY TAKEN FROM USGS, PORT BIRMINGHAM, 1938 AND GOODSPINGS, 1971 QUADRANGLES. TOPOGRAPHY WAS INTERPRETED BETWEEN 20 FOOT CONTOURS AND ADJUSTED BASED ON GEOTECHNICAL INVESTIGATION DATA BY GOLDER ASSOCIATES INC.

3. EXISTING AND APPROXIMATE PROPERTY BOUNDARIES PROVIDED BY SOUTHERN COMPANY SERVICES, APRIL 2020.

0 100 200
1" = 100' FEET

REV	DATE	REVISION DESCRIPTION	DES	CADD	CHK	RVW
1	2020/10/16	ISSUED FOR CONSTRUCTION	GLH	RMS	SCN	GLH

CLIENT
SOUTHERN COMPANY SERVICES

Alabama Power

PROJECT
PLANT GORGAS
ASH POND CLOSURE
DESIGN DRAWINGS

TITLE
EXISTING DAM DEMOLITION PLAN

ALABAMA LICENSED No. 29143 PROFESSIONAL ENGINEER GREGORY L. HEBELER
16 OCT 2020

GREGORY L. HEBELER
ALABAMA PROFESSIONAL ENGINEER
CERTIFICATE NUMBER 29143

CONSULTANT
GOLDER

YYYY-MM-DD	2020/10/16
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PROJECT NO.	SCS REF.	REV.	DRAWING
1789848	GOR17010	0	R-301

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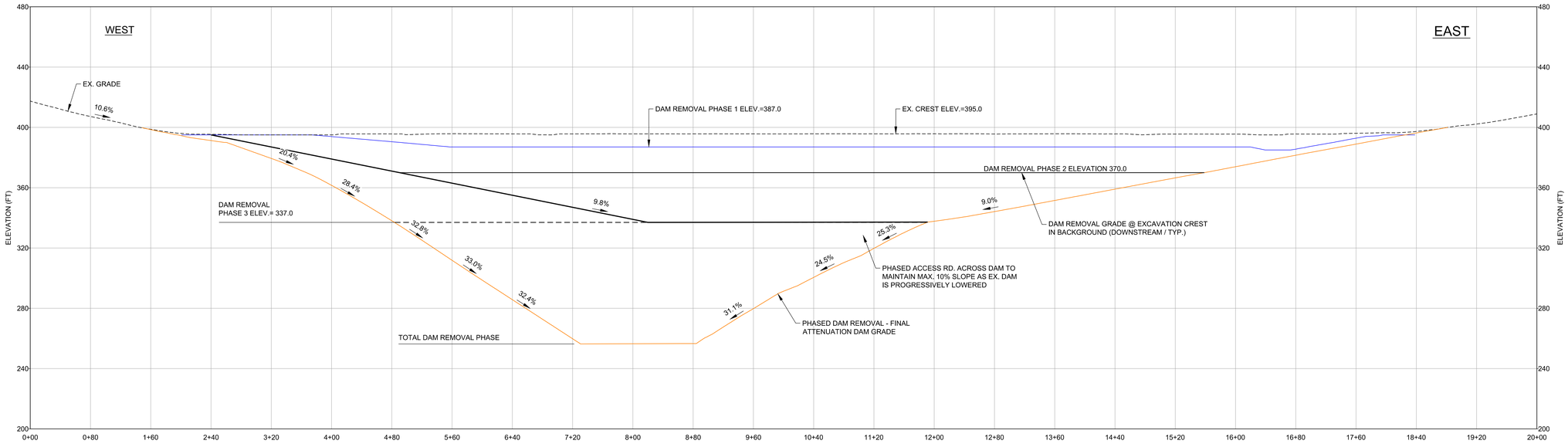
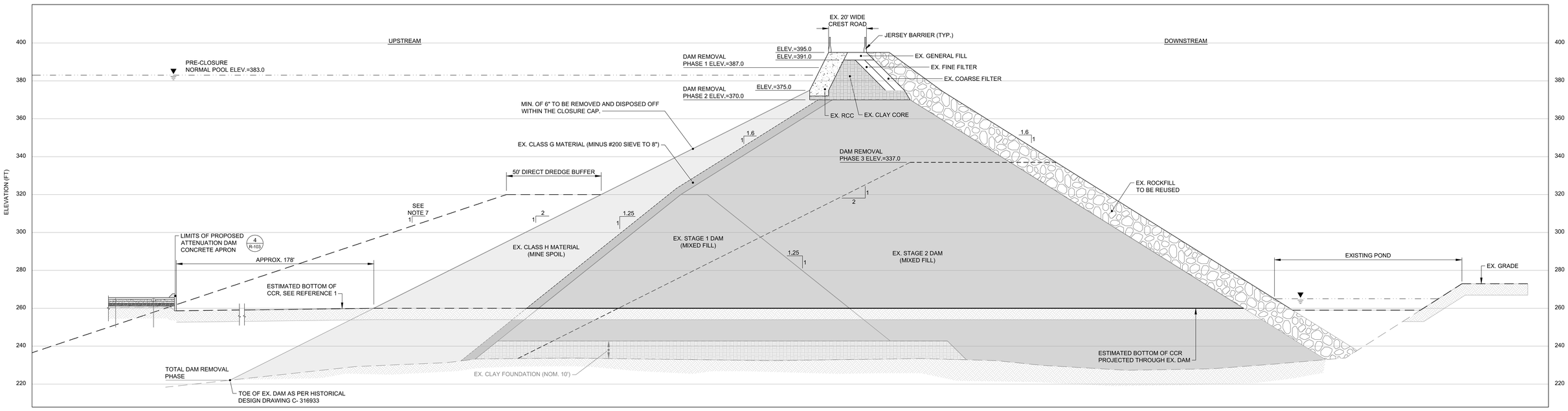


1 R-302 EXISTING DAM REMOVAL PROFILE (DOWNSTREAM)

0 60 120 FEET
1" = 60'

0 30 60 FEET
1" = 30'



2 R-302 HISTORICAL EXISTING DAM SECTION

0 20 40 FEET
1" = 20'

NOTES

1. ELEVATIONS ARE IN FEET WITH REFERENCE TO NORTH AMERICAN VERTICAL DATUM (NAVD) 1988. COORDINATES CORRESPOND TO ALABAMA WEST STATE PLANE COORDINATE SYSTEM, NORTH AMERICAN DATUM (NAD) 1983.

2. THE GENERAL CONTRACTOR SHALL SUBMIT A DETAILED REMOVAL PLAN FOR APPROVAL PRIOR TO LOWERING ANY SECTIONS OF THE EXISTING DAM. THE REMOVAL PLAN SHALL LIMIT THE NEED FOR DOUBLE HANDLING OF MATERIAL.

3. WHERE POSSIBLE THE CONTRACTOR SHALL MAKE ALL EFFORTS TO REUSE MATERIAL IN THE CONSTRUCTION OF PROPOSED CLOSURE AND RESTORATION ITEMS. THE CONTRACTOR SHALL MAKE PROVISION FOR THE TESTING OF MATERIAL TO CONFIRM SUITABILITY FOR REUSE AND COMPLIANCE WITH THE PROJECT SPECIFICATIONS.

4. ON REMOVAL OF THE EXISTING DAM MATERIAL THE CONTRACTOR SHALL COMPLETELY FILL BELOW GRADE AREAS AND VOIDS RESULTING FROM THE REMOVAL OPERATIONS WITH SUITABLE MATERIALS IN ACCORDANCE THE PROJECT SPECIFICATIONS.

5. THE CONTRACTOR SHALL UNIFORMLY GRADE THE AREAS OF REMOVAL TO A SMOOTH SURFACE, FREE FROM IRREGULAR SURFACE CHANGES. PROVIDE A SMOOTH TRANSITION BETWEEN ADJACENT EXISTING GRADES AND NEW GRADES. ELIMINATE AREAS WHERE WATER MAY COLLECT.

6. MATERIALS NOT TO BE REUSED OR DISPOSED OF IN THE CLOSURE, SHALL BE REMOVED AND STOCKPILED ONSITE IN LOCATION APPROVED BY THE CONSTRUCTION MANAGER.

7. ASH CUTS IN FRONT OF THE DAM AND OTHER STABLE NATURAL GROUND AREAS NOT PROPOSED FOR EQUIPMENT LOADING OR WORK BELOW CAN BE CUT TEMPORARILY STEEPER THAN 4:1 AS PART OF CCR REMOVAL EXCAVATION ACTIVITIES.

REFERENCES

1. EXISTING TOPOGRAPHY PROVIDED BY SOUTHERN COMPANY SERVICES, FEBRUARY 2020.

2. BOTTOM OF CCR TOPOGRAPHY TAKEN FROM USGS, PORT BIRMINGHAM, 1938 AND GOODSPINGS, 1971 QUADRANGLES. TOPOGRAPHY WAS INTERPRETED BETWEEN 20 FOOT CONTOURS AND ADJUSTED BASED ON GEOTECHNICAL INVESTIGATION DATA BY GOLDER ASSOCIATES INC.

MAXIMUM POND WATER SURFACE ELEVATION FOR DAM LOWERING CREST HEIGHTS

DAM CREST ELEVATION (FT-MSL)	MAX WSEL WITH FB (FT-MSL)
390	378
385	372
380	365
375	349
370	347
365	340
360	333
355	326
350	318
345	309
340	300
335	289

NOTES

1. A MAXIMUM POND WATER SURFACE CONDITION MUST BE MAINTAINED DURING CONSTRUCTION SUCH THAT THE IMPOUNDING DAM CREST IS EQUAL OR GREATER THAN THE EXISTING POND WATER SURFACE ELEVATIONS (WSEL) WITH THE ADDITIONAL STORAGE OF THE PROBABLE MAXIMUM PRECIPITATION EVENT (PMP) AND WAVE ACTION FREEBOARD (FB).

2. IF THE MAX. WSEL GIVEN IN THE TABLE ABOVE IS EXCEEDED FOR THE CORRESPONDING DAM CREST ELEVATION, THE POND SHOULD BE DEWATERED AT THE MAX. CAPACITY OF THE WATER TREATMENT PLANT UNTIL THE WATER SURFACE RECEDESBELOW THE TABULATED LIMITS.

3. A DAM CREST ELEVATION OF 337 FT MSL IS THE LAST ELEVATION THAT STORES THE FULL PMP WITH FREEBOARD (ASSUMING DEAD STORAGE BELOW ELEV 289). DO NOT LOWER DAM CREST BELOW ELEV 337 WITHOUT PERMISSION FROM THE EOR AND SCS FOSSIL DAM SAFETY.

LEGEND

- EXISTING GRADE
- DAM REMOVAL GRADE AT EXCAVATION CREST IN BACKGROUND
- PHASED ACCESS ROAD
- FINAL GRADES

REV	DATE	REVISION DESCRIPTION	DES	CADD	CHK	RVW
1						
0	2020/10/16	ISSUED FOR CONSTRUCTION	GLH	RMS	SCN	GLH

CLIENT
SOUTHERN COMPANY SERVICES

Alabama Power

PROJECT
PLANT GORGAS
ASH POND CLOSURE
100% DESIGN DRAWINGS

TITLE
DEMOLITION DETAILS AND SECTIONS

ALABAMA LICENSED PROFESSIONAL ENGINEER GREGORY L. HEBELER No. 29143 16-OCT-2020

GREGORY L. HEBELER
ALABAMA PROFESSIONAL ENGINEER
CERTIFICATE NUMBER 29143

CONSULTANT
GOLDER

YYYY-MM-DD	2020/10/16
DESIGNED	GLH
PREPARED	RMS
CHECKED	SCN
REVIEWED / APPROVED	GLH

PROJECT NO. 1789848 | SCS REF. GOR17010 | REV. 0 | DRAWING R-302

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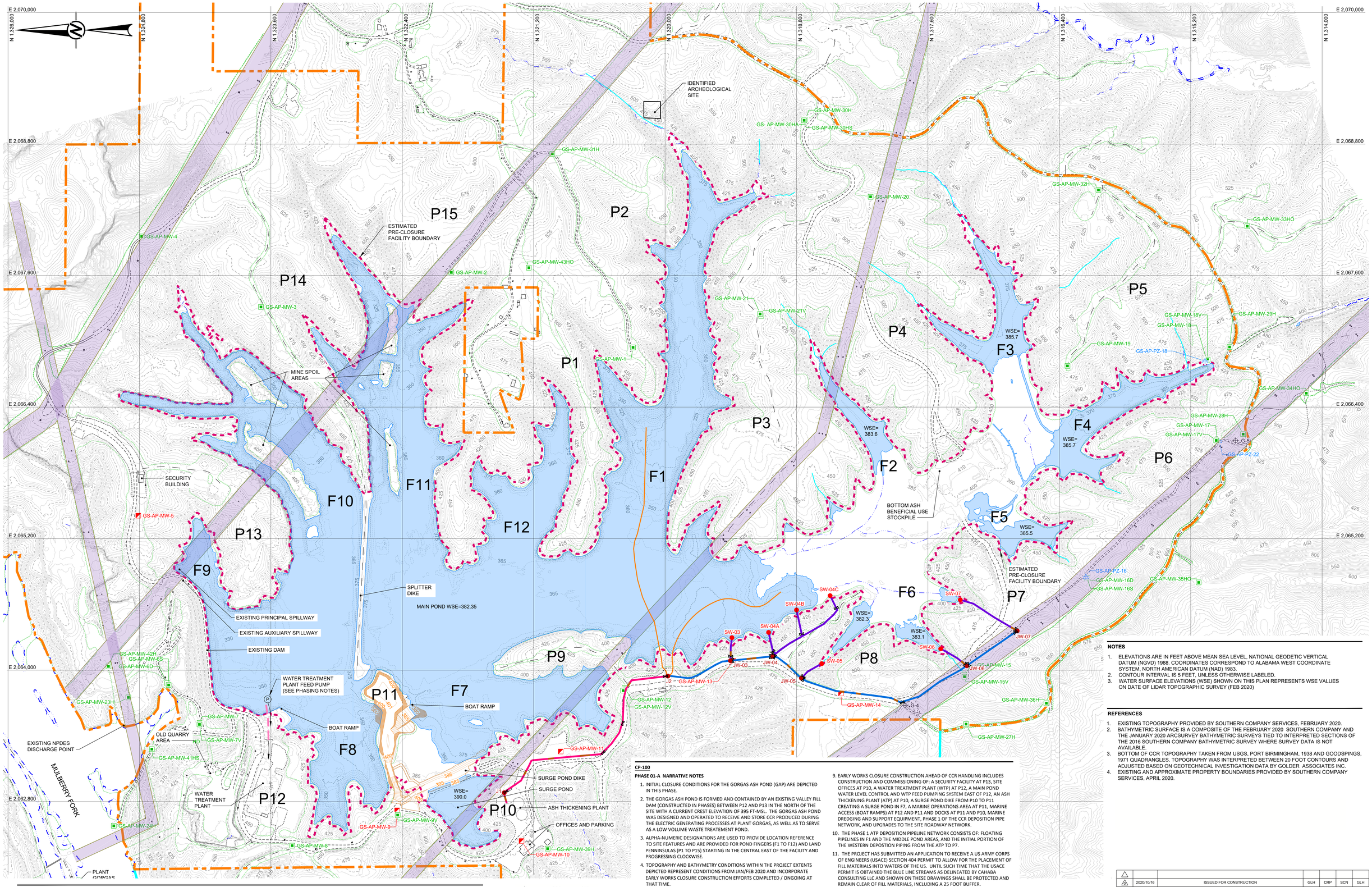

LEGEND

- EXISTING TOPOGRAPHY / BATHYMETRY CONTOURS (REFERENCE 1)
- PROPOSED DEPOSITION AND DREDGE GRADING CONTOURS (1FT)
- PROPOSED GRADING CONTOURS OUTSIDE CLOSURE LIMITS
- EXISTING ROAD
- EXISTING TRAIL
- EXISTING PARKING AREA
- EXISTING POWER POLES / TOWERS
- APC OWNED PROPERTY BOUNDARIES
- APPROXIMATE APC OWNED PROPERTY BOUNDARIES
- ESTIMATED PRE-CLOSURE FACILITY BOUNDARY
- EXISTING TRANSMISSION CORRIDOR
- DREDGE PHASE NORMAL POOL
- P1 / F1 PENINSULA / FINGER
- STREAMS PROVIDED BY CAHABA CONSULTING, LLC
- G-4 EXISTING MONITORING WELL LOCATION (NOT IN MODELING NETWORK)
- GS-AP-PZ-18 EXISTING PIEZOMETER LOCATION
- GS-AP-MW-01 EXISTING MONITORING WELL LOCATION
- GS-AP-MW-05 ABANDONED MONITORING WELL
- PROPOSED 6" AND 8" (2) CS PIPE ROUTE
- PROPOSED 6" AND 8" CS PIPE ROUTE
- PROPOSED 8" CS PIPE ROUTE
- PROPOSED 10" HDPE PIPE ROUTE
- PROPOSED 8" & 10" HDPE PIPE ROUTE
- JW-02 PROPOSED PIPELINE JUNCTION
- SW-02 PROPOSED PIPELINE SPIGOT
- PROPOSED PIPE CROSSINGS
- PROPOSED PIPELINE VALVE
- PROPOSED WATER PUMP
- PROPOSED PUMPED WATER LINE

CP-100

PHASE 01-A NARRATIVE NOTES

1. INITIAL CLOSURE CONDITIONS FOR THE GORGAS ASH POND (GAP) ARE DEPICTED IN THIS PHASE.
2. THE GORGAS ASH POND IS FORMED AND CONTAINED BY AN EXISTING VALLEY FILL DAM (CONSTRUCTED IN PHASES) BETWEEN P12 AND P13 IN THE NORTH OF THE SITE WITH A CURRENT CREST ELEVATION OF 395 FT-MSL. THE GORGAS ASH POND WAS DESIGNED AND OPERATED TO RECEIVE AND STORE CCR PRODUCED DURING THE ELECTRIC GENERATING PROCESSES AT PLANT GORGAS, AS WELL AS TO SERVE AS A LOW VOLUME WASTE TREATEMENT POND.
3. ALPHA-NUMERIC DESIGNATIONS ARE USED TO PROVIDE LOCATION REFERENCE TO SITE FEATURES AND ARE PROVIDED FOR POND FINGERS (F1 TO F12) AND LAND PENNINSULAS (P1 TO P15) STARTING IN THE CENTRAL EAST OF THE FACILITY AND PROGRESSING CLOCKWISE.
4. TOPOGRAPHY AND BATHYMETRY CONDITIONS WITHIN THE PROJECT EXTENTS DEPICTED REPRESENT CONDITIONS FROM JAN/FEB 2020 AND INCORPORATE EARLY WORKS CLOSURE CONSTRUCTION EFFORTS COMPLETED / ONGOING AT THAT TIME.
5. PRE-CLOSURE NORMAL POOL WATER ELEVATIONS GENERALLY RANGED BETWEEN 382 AND 384 FT-MSL IN THE NORTH MAIN POND AREAS, WITH WATER SURFACE ELEVATIONS PRESENT DURING THE FEB 2020 SURVEY EVENT DEPICTED IN THE MAIN POND AND FINGERS F2, F3, F4, F5, AND F6 ON THIS DRAWING.
6. POND WATER LEVEL MANAGEMENT IN PRE-CLOSURE IS PROVIDED BY GRAVITY DISCHARGE VIA THE EXISTING PRINCIPAL SPILLWAY IN F9 WITH A CONCRETE INLET STRUCTURE (WEIR INLET ELEVATION OF 382 FT-MSL) FEEDING A 48 INCH DIAMETER CMP PRINCIPAL SPILLWAY PIPE (PIPE INLET INVERT ELEVATION 371 FT-MSL) PROVIDING CONVEYANCE TO THE EXISTING NPDES DISCHARGE POINT (032 OUTFALL) NORTH OF EXISTING DAM. THE EXISTING DAM ALSO INCLUDES A CONCRETE AUXILLIARY SPILLWAY CHANNEL WITH AN INVERT ELEVATION OF 385 FT-MSL.
7. THE CLOSURE CONCEPT FOR THE GAP AT A BROAD LEVEL CONSISTS OF CCR REMOVAL ACTIVITIES FROM THE NORTHERN PORTIONS OF THE POND (FROM P9/F12 NORTH), WITH CCR RELOCATION INTO A CONSOLIDATED CLOSURE FOOTPRINT IN THE SOUTHERN PORTIONS OF THE SITE (FROM F1 SOUTH).
8. THE CLOSURE APPROACH USES A COMBINATION OF HYDRAULIC AND MECHANICAL MEANS TO ACHIEVE MATERIAL EXCAVATION, HANDLING, AND PLACEMENT, INCLUDING THE USE OF: MARINE DREDGES AND SUPPORT EQUIPMENT; HYDRAULIC MONITORS; AN ASH THICKENING PLANT AND ASSOCIATED DEPOSTION PIPELINES; AND A COMBINATION OF AMPHIBIOUS AND LAND BASED MECHANICAL EXCAVATION, TRANSPORT, AND PLACEMENT EQUIPMENT. THE HYDRAULIC (DREDGE AND PASTE) PHASES OF CLOSURE CONSTRUCTION ARE DEPICTED IN DRAWINGS CP-100 TO CP-107, WITH PROPOSED POST-CLOSURE CONDITIONS SHOWN ON DRAWING C-100.
9. EARLY WORKS CLOSURE CONSTRUCTION AHEAD OF CCR HANDLING INCLUDES CONSTRUCTION AND COMMISSIONING OF: A SECURITY FACILITY AT P13, SITE OFFICES AT P10, A WATER TREATMENT PLANT (WTP) AT P12, A MAIN POND WATER LEVEL CONTROL AND WTP FEED PUMPING SYSTEM EAST OF P12, AN ASH THICKENING PLANT (ATP) AT P10, A SURGE POND DIKE FROM P10 TO P11 CREATING A SURGE POND IN F7, A MARINE OPERATIONS AREA AT P11, MARINE ACCESS (BOAT RAMPS) AT P12 AND P11 AND DOCKS AT P11 AND P10, MARINE DREDGING AND SUPPORT EQUIPMENT, PHASE 1 OF THE CCR DEPOSITION PIPE NETWORK, AND UPGRADES TO THE SITE ROADWAY NETWORK.
10. THE PHASE 1 ATP DEPOSITION PIPELINE NETWORK CONSISTS OF: FLOATING PIPELINES IN F1 AND THE MIDDLE POND AREAS, AND THE INITIAL PORTION OF THE WESTERN DEPOSTION PIPING FROM THE ATP TO P7.
11. THE PROJECT HAS SUBMITTED AN APPLICATION TO RECEIVE A US ARMY CORPS OF ENGINEERS (USACE) SECTION 404 PERMIT TO ALLOW FOR THE PLACEMENT OF FILL MATERIALS INTO WATERS OF THE US. UNTIL SUCH TIME THAT THE USACE PERMIT IS OBTAINED THE BLUE LINE STREAMS AS DELINEATED BY CAHABA CONSULTING LLC AND SHOWN ON THESE DRAWINGS SHALL BE PROTECTED AND REMAIN CLEAR OF FILL MATERIALS, INCLUDING A 25 FOOT BUFFER.
12. THE PROJECT IS SUBMITTING AN APPLICATION TO UPDATE THE FACILITY NPDES INDUSTRIAL STORMWATER DISCHARGE PERMIT TO ALLOW FOR OUT OF POND WATER TREATMENT PRIOR TO DISCHARGE. UNTIL THE REVISED NPDES INDUSTRIAL STORMWATER PERMIT IS OBTAINED THE EXISTING NPDES PERMIT CONDITIONS APPLY, AND DO NOT ALLOW FOR THE USE OF THE WATER TREATMENT SYSTEM TO PROVIDE ACTIVE LOWERING OF THE MAIN POND WATER LEVELS BELOW THE WATER LEVEL CONTROL PROVIDED BY THE CONTINUED OPERATION OF THE EXISTING PRINCIPAL SPILLWAY OUTLET STRUCTURE.

NOTES

1. ELEVATIONS ARE IN FEET ABOVE MEAN SEA LEVEL, NATIONAL GEODETIC VERTICAL DATUM (NGVD) 1988. COORDINATES CORRESPOND TO ALABAMA WEST COORDINATE SYSTEM, NORTH AMERICAN DATUM (NAD) 1983.
2. CONTOUR INTERVAL IS 5 FEET, UNLESS OTHERWISE LABELED.
3. WATER SURFACE ELEVATIONS (WSE) SHOWN ON THIS PLAN REPRESENTS WSE VALUES ON DATE OF LIDAR TOPOGRAPHIC SURVEY (FEB 2020)

REFERENCES

1. EXISTING TOPOGRAPHY PROVIDED BY SOUTHERN COMPANY SERVICES, FEBRUARY 2020.
2. BATHYMETRIC SURFACE IS A COMPOSITE OF THE FEBRUARY 2020 SOUTHERN COMPANY AND THE JANUARY 2020 ARCSURVEY BATHYMETRIC SURVEYS TIED TO INTERPRETED SECTIONS OF THE 2016 SOUTHERN COMPANY BATHYMETRIC SURVEY WHERE SURVEY DATA IS NOT AVAILABLE.
3. BOTTOM OF CCR TOPOGRAPHY TAKEN FROM USGS, PORT BIRMINGHAM, 1938 AND GOODSPINGS, 1971 QUADRANGLES. TOPOGRAPHY WAS INTERPRETED BETWEEN 20 FOOT CONTOURS AND ADJUSTED BASED ON GEOTECHNICAL INVESTIGATION DATA BY GOLDER ASSOCIATES INC.
4. EXISTING AND APPROXIMATE PROPERTY BOUNDARIES PROVIDED BY SOUTHERN COMPANY SERVICES, APRIL 2020.

REV	DATE	REVISION DESCRIPTION	DES	CADD	CHK	RVW
1						
0	2020/10/16	ISSUED FOR CONSTRUCTION	GLH	CRP	SCN	GLH

CLIENT
SOUTHERN COMPANY SERVICES

Alabama Power

PROJECT
PLANT GORGAS
ASH POND CLOSURE
DESIGN DRAWINGS

TITLE
PROPOSED DREDGE AND PASTE PHASING PLAN PHASE 01-A

ALABAMA LICENSED PROFESSIONAL ENGINEER GREGORY L. HEBELER 16 OCT 2020

GREGORY L. HEBELER
ALABAMA PROFESSIONAL ENGINEER
CERTIFICATE NUMBER 29143

CONSULTANT
GOLDER

YYYY-MM-DD	2020/10/16
DESIGNED	GLH
PREPARED	CRP
CHECKED	SCN
REVIEWED / APPROVED	GLH

PROJECT NO.	SCS REF.	REV.	DRAWING
1789848	GOR17010	0	CP-100

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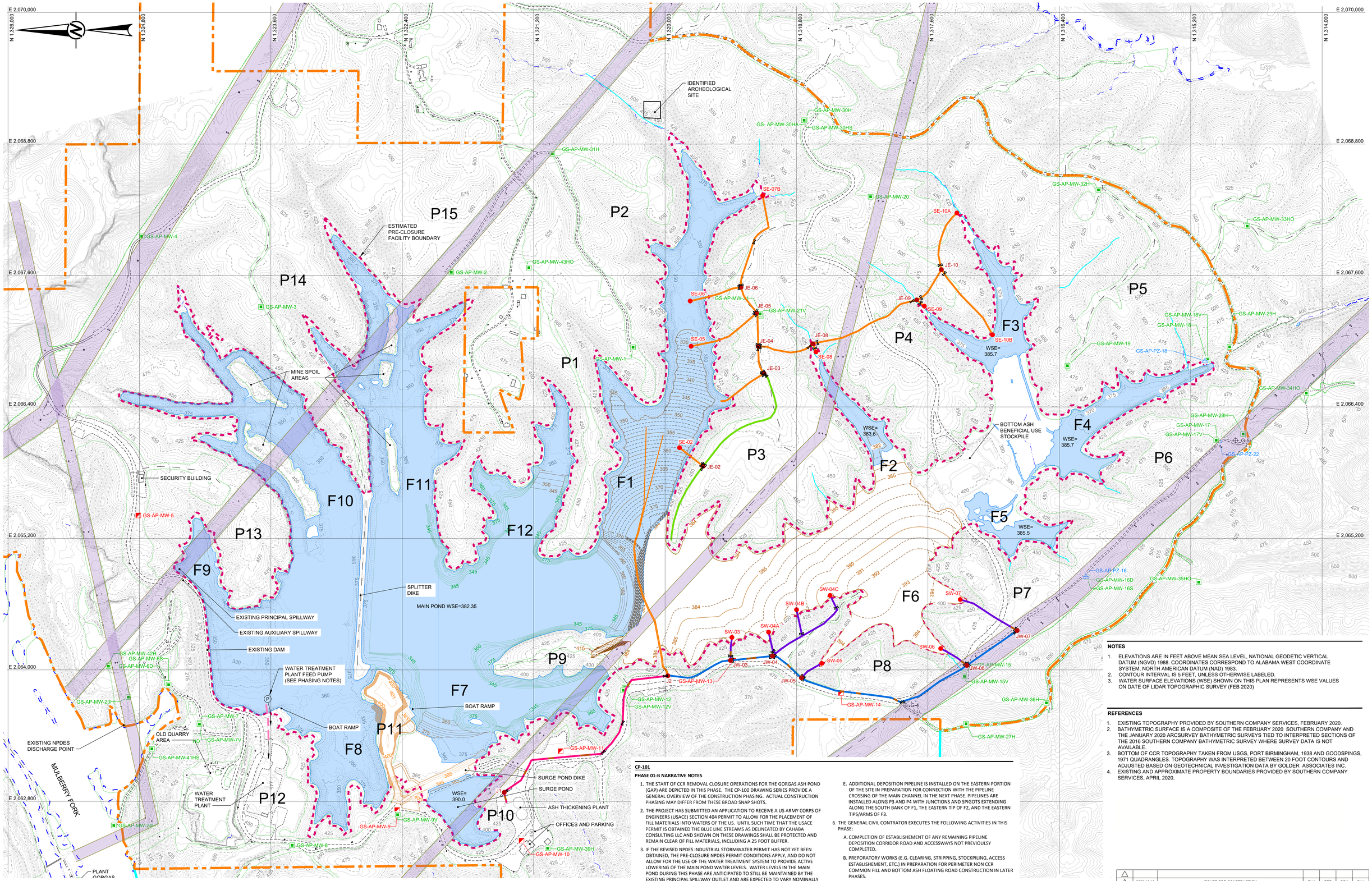

LEGEND

- EXISTING TOPOGRAPHY / BATHYMETRY CONTOURS (REFERENCE 1)
- PROPOSED DEPOSITION AND DREDGE GRADING CONTOURS (1FT)
- PROPOSED GRADING CONTOURS OUTSIDE CLOSURE LIMITS
- EXISTING ROAD
- EXISTING TRAIL
- EXISTING PARKING AREA
- EXISTING POWER POLES / TOWERS
- APC OWNED PROPERTY BOUNDARIES
- APPROXIMATE APC OWNED PROPERTY BOUNDARIES
- ESTIMATED PRE-CLOSURE FACILITY BOUNDARY
- EXISTING TRANSMISSION CORRIDOR
- DREDGE PHASE NORMAL POOL
- P1 / F1 PENINSULA / FINGER
- STREAMS PROVIDED BY CAHABA CONSULTING, LLC
- G-4 EXISTING MONITORING WELL LOCATION (NOT IN MODELING NETWORK)
- GS-AP-PZ-18 EXISTING PIEZOMETER LOCATION
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- PROPOSED 8" & 10" HDPE PIPE ROUTE
- JW-02 PROPOSED PIPELINE JUNCTION
- SW-02 PROPOSED PIPELINE SPIGOT
- PROPOSED PIPE CROSSINGS
- PROPOSED PIPELINE VALVE
- PROPOSED WATER PUMP
- PROPOSED PUMPED WATER LINE

CP-101

PHASE 01-B NARRATIVE NOTES

1. THE START OF CCR REMOVAL CLOSURE OPERATIONS FOR THE GORGAS ASH POND (GAP) ARE DEPICTED IN THIS PHASE. THE CP-100 DRAWING SERIES PROVIDE A GENERAL OVERVIEW OF THE CONSTRUCTION PHASING. ACTUAL CONSTRUCTION PHASING MAY DIFFER FROM THESE BROAD SNAP SHOTS.
2. THE PROJECT HAS SUBMITTED AN APPLICATION TO RECEIVE A US ARMY CORPS OF ENGINEERS (USACE) SECTION 404 PERMIT TO ALLOW FOR THE PLACEMENT OF FILL MATERIALS INTO WATERS OF THE US. UNTIL SUCH TIME THAT THE USACE PERMIT IS OBTAINED THE BLUE LINE STREAMS AS DELINEATED BY CAHABA CONSULTING LLC AND SHOWN ON THESE DRAWINGS SHALL BE PROTECTED AND REMAIN CLEAR OF FILL MATERIALS, INCLUDING A 25 FOOT BUFFER.
3. IF THE REVISED NPDES INDUSTRIAL STORMWATER PERMIT HAS NOT YET BEEN OBTAINED, THE PRE-CLOSURE NPDES PERMIT CONDITIONS APPLY, AND DO NOT ALLOW FOR THE USE OF THE WATER TREATMENT SYSTEM TO PROVIDE ACTIVE LOWERING OF THE MAIN POND WATER LEVELS. WATER LEVELS IN THE MAIN POND DURING THIS PHASE ARE ANTICIPATED TO STILL BE MAINTAINED BY THE EXISTING PRINCIPAL SPILLWAY OUTLET AND ARE EXPECTED TO VARY NOMINALLY BETWEEN 382 AND 384 FT-MSL AS A FUNCTION OF STORM EVENTS WITHIN THE WATERSHED.
4. WATER MANAGEMENT WITHIN THE POND LIMITS GENERALLY REMAINS AS PER PRE-CLOSURE CONDITIONS IN THIS PHASE, WITH PASSIVE WATER MANAGEMENT IN THE SOUTHERN POND AREAS OVERFLOWING TO THE NORTHERN MAIN POND AREAS. CONTRACTORS TO ADD ADDITIONAL TEMPORARY PUMPING, SUMPS, AND CONTROLS AS NEEDED TO MANAGE WATER IN LOCAL WORK AREAS.
5. THE MARINE AND PASTE CONTRACTOR EXECUTES THE FOLLOWING ACTIVITIES IN THIS PHASE:
   - A. MARINE CONTRACTOR TO PROVIDE MAIN POND TEMPORARY PUMPING SYSTEM WITH A CAPACITY CAPABLE OF 12,000 GPM AT A MINIMUM STATIC HEAD OF 175 FEET (FOR LATER PHASES) ADJACENT TO P12 TO PROVIDE WATER TREATMENT PLANT (WTP) FEED AND MAIN POND WATER LEVEL CONTROL WHEN ALLOWED BY THE NPDES INDUSTRIAL STORMWATER PERMIT.
   - B. HYDRAULIC DREDGING OF CCR BEGINS IN THIS PHASE AND STARTS BETWEEN THE SPLITTER DIKE AND THE DREDGE LIMITS DEPICTED BETWEEN P1 AND P9. THE SPLITTER DIKE REMAINS IN PLACE DURING THIS PHASE.
   - C. OPERATION OF THE SURGE POND AND DEPOSITION LINES AND TECHNICAL DIRECTION FOR THE ASH THICKENING PLANT (ATP) OPERATED BY ALABAMA POWER.
   - D. DEPOSITION FROM THE ATP IN THIS PHASE IS AVAILABLE THROUGH FLOATING PIPELINE DEPOSITION IN THE CENTRAL PORTION OF THE MAIN CHANNEL, F1, AND SIDEWALL DEPOSITION IN THE WESTERN PORTIONS OF F6 TO THE DEPICTED ACTIVE DEPOSITION AREAS. CCR PLACEMENT AND DEPOSITION WILL NEED TO REMAIN BELOW ELEVATION 385 IN THIS PHASE IF THE USACE PERMIT HAS NOT YET BEEN OBTAINED.
   - E. ADDITIONAL DEPOSITION PIPELINE IS INSTALLED ON THE EASTERN PORTION OF THE SITE IN PREPARATION FOR CONNECTION WITH THE PIPELINE CROSSING OF THE MAIN CHANNEL IN THE NEXT PHASE. PIPELINES ARE INSTALLED ALONG P3 AND P4 WITH JUNCTIONS AND SPIGOTS EXTENDING ALONG THE SOUTH BANK OF F1, THE EASTERN TIP OF F2, AND THE EASTERN TIPS/ARMS OF F3.
6. THE GENERAL CIVIL CONTRATOR EXECUTES THE FOLLOWING ACTIVITIES IN THIS PHASE:
   - A. COMPLETION OF ESTABLISHEMENT OF ANY REMAINING PIPELINE DEPOSITION CORRIDOR ROAD AND ACCESSWAYS NOT PREVIOULSY COMPLETED.
   - B. PREPORATORY WORKS (E.G. CLEARING, STRIPPING, STOCKPILING, ACCESS ESTABLISHEMENT, ETC.) IN PREPARATION FOR PERIMETER NON CCR COMMON FILL AND BOTTOM ASH FLOATING ROAD CONSTRUCTION IN LATER PHASES.
   - C. CONSTRUCTION OF A ROADWAY FROM P9 TO THE DEPOSITION AREA / TRANSMISSION CORRIDOR INTERSECTION.
   - D. MAINTENANCE OF SITE ROADWAYS AND OUT OF POND SITE EROSION AND SEDIMENT CONTROL MEASURES AS NEEDED AND DIRECTED BY THE SCS CONSTRUCTION MANAGENT TEAM.
   - E. THE EXISTING DAM CREST REMAINS AT THE PRE-CLOSURE ELEVATION OF 395 FT-MSL IN THIS PHASE. SEE DRAWING R-301 FOR DAM LOWERING REQUIREMENTS.
7. THE WATER TREATMENT CONTRACTOR EXECUTES THE FOLLOWING ACTITIES IN THIS PHASE:
   - A. PROVIDE A WATER TREATMENT SYSTEM WITH A TREATMENT THROUGHPUT CAPACITY OF 12,000 GPM.
   - B. PROVIDE CLEAN WATER SUPPLY TO THE ATP.
   - C. PROVIDE FOR RECIRCULATION WATER TREATMENT IF NEEDED / REQUESTED BY THE SCS CONSTRUCTION MANAGEMENT TEAM.

NOTES

1. ELEVATIONS ARE IN FEET ABOVE MEAN SEA LEVEL, NATIONAL GEODETIC VERTICAL DATUM (NGVD) 1988. COORDINATES CORRESPOND TO ALABAMA WEST COORDINATE SYSTEM, NORTH AMERICAN DATUM (NAD) 1983.
2. CONTOUR INTERVAL IS 5 FEET, UNLESS OTHERWISE LABELED.
3. WATER SURFACE ELEVATIONS (WSE) SHOWN ON THIS PLAN REPRESENTS WSE VALUES ON DATE OF LIDAR TOPOGRAPHIC SURVEY (FEB 2020)

REFERENCES

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4. EXISTING AND APPROXIMATE PROPERTY BOUNDARIES PROVIDED BY SOUTHERN COMPANY SERVICES, APRIL 2020.

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1	2020/10/16	ISSUED FOR CONSTRUCTION	GLH	CRP	SCN	GLH

CLIENT
SOUTHERN COMPANY SERVICES

Alabama Power

PROJECT
PLANT GORGAS
ASH POND CLOSURE
DESIGN DRAWINGS

TITLE
PROPOSED DREDGE AND PASTE PHASING PLAN PHASE 01-B

ALABAMA LICENSED PROFESSIONAL ENGINEER No. 29143 16-OCT-2020 GREGORY L. HEBELER

GREGORY L. HEBELER
ALABAMA PROFESSIONAL ENGINEER
CERTIFICATE NUMBER 29143

CONSULTANT
GOLDER

YYYY-MM-DD	2020/10/16
DESIGNED	GLH
PREPARED	CRP
CHECKED	SCN
REVIEWED / APPROVED	GLH

PROJECT NO.	SCS REF.	REV.	DRAWING
1789848	GOR17010	0	CP-101

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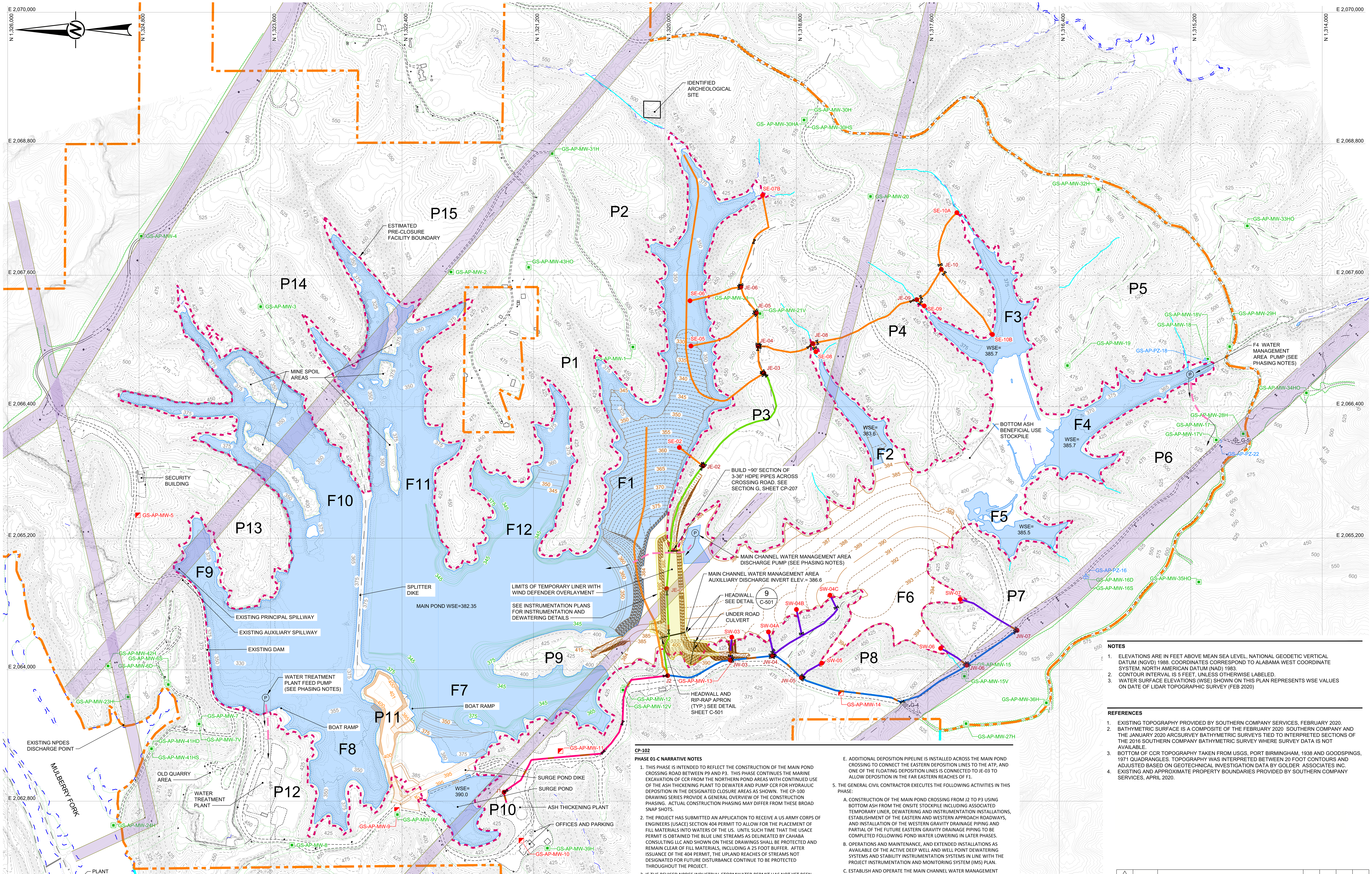


LEGEND

Symbol	Description
340	EXISTING TOPOGRAPHY / BATHYMETRY CONTOURS (REFERENCE 1)
500	PROPOSED DEPOSITION AND DREDGE GRADING CONTOURS (1FT)
340	PROPOSED GRADING CONTOURS OUTSIDE CLOSURE LIMITS
	EXISTING ROAD
	EXISTING TRAIL
	EXISTING PARKING AREA
	EXISTING POWER POLES / TOWERS
	APC OWNED PROPERTY BOUNDARIES
	APPROXIMATE APC OWNED PROPERTY BOUNDARIES
	ESTIMATED PRE-CLOSURE FACILITY BOUNDARY
	EXISTING TRANSMISSION CORRIDOR
	DREDGE PHASE NORMAL POOL
	TEMPORARY LINER AREA
P1 / F1	PENINSULA / FINGER
	STREAMS PROVIDED BY CAHABA CONSULTING, LLC
G-4	EXISTING MONITORING WELL LOCATION (NOT IN MODELING NETWORK)
GS-AP-PZ-18	EXISTING PIEZOMETER LOCATION
GS-AP-MW-01	EXISTING MONITORING WELL LOCATION
GS-AP-MW-05	ABANDONED MONITORING WELL
	PROPOSED 6" AND 8" (2) CS PIPE ROUTE
	PROPOSED 6" AND 8" CS PIPE ROUTE
	PROPOSED 8" CS PIPE ROUTE
	PROPOSED 10" HDPE PIPE ROUTE
	PROPOSED 8" & 10" HDPE PIPE ROUTE
JW-02	PROPOSED PIPELINE JUNCTION
SW-02	PROPOSED PIPELINE SPIGOT
	PROPOSED PIPE CROSSINGS
	PROPOSED PIPELINE VALVE
(P)	PROPOSED WATER PUMP
	PROPOSED PUMPED WATER LINE

0 300 600
1" = 300' FEET

CP-102

PHASE 01-C NARRATIVE NOTES

1. THIS PHASE IS INTENDED TO REFLECT THE CONSTRUCTION OF THE MAIN POND CROSSING ROAD BETWEEN P9 AND P3. THIS PHASE CONTINUES THE MARINE EXCAVATION OF CCR FROM THE NORTHERN POND AREAS WITH CONTINUED USE OF THE ASH THICKENING PLANT TO DEWATER AND PUMP CCR FOR HYDRAULIC DEPOSITION IN THE DESIGNATED CLOSURE AREAS AS SHOWN. THE CP-100 DRAWING SERIES PROVIDE A GENERAL OVERVIEW OF THE CONSTRUCTION PHASING. ACTUAL CONSTRUCTION PHASING MAY DIFFER FROM THESE BROAD SNAP SHOTS.
2. THE PROJECT HAS SUBMITTED AN APPLICATION TO RECEIVE A US ARMY CORPS OF ENGINEERS (USACE) SECTION 404 PERMIT TO ALLOW FOR THE PLACEMENT OF FILL MATERIALS INTO WATERS OF THE US. UNTIL SUCH TIME THAT THE USACE PERMIT IS OBTAINED THE BLUE LINE STREAMS AS DELINEATED BY CAHABA CONSULTING LLC AND SHOWN ON THESE DRAWINGS SHALL BE PROTECTED AND REMAIN CLEAR OF FILL MATERIALS, INCLUDING A 25 FOOT BUFFER. AFTER ISSUANCE OF THE 404 PERMIT, THE UPLAND REACHES OF STREAMS NOT DESIGNATED FOR FUTURE DISTURBANCE CONTINUE TO BE PROTECTED THROUGHOUT THE PROJECT.
3. IF THE REVISED NPDES INDUSTRIAL STORMWATER PERMIT HAS NOT YET BEEN OBTAINED, THE PRE-CLOSURE NPDES PERMIT CONDITIONS APPLY, AND DO NOT ALLOW FOR THE USE OF THE WATER TREATMENT SYSTEM TO PROVIDE ACTIVE LOWERING OF THE MAIN POND WATER LEVELS. WATER LEVELS IN THE MAIN POND DURING THIS PHASE ARE ANTICIPATED TO STILL BE MAINTAINED BY THE EXISTING PRINCIPAL SPILLWAY OUTLET AND ARE EXPECTED TO VARY NOMINALLY BETWEEN 382 AND 384 FT-MSL AS A FUNCTION OF STORM EVENTS WITHIN THE WATERSHED.
4. THE MARINE AND PASTE CONTRACTOR EXECUTES THE FOLLOWING ACTIVITIES IN THIS PHASE:
   A. CONTINUED OPERATION AND MAINTENANCE OF THE MAIN POND PUMPING SYSTEM WITH A CAPACITY CAPABLE OF 12,000 GPM AT A MINIMUM STATIC HEAD OF 175 FEET (FOR LATER PHASES) ADJACENT TO P12 TO PROVIDE WATER TREATMENT PLANT (WTP) FEED AND MAIN POND WATER LEVEL CONTROL WHEN ALLOWED BY THE NPDES INDUSTRIAL STORMWATER PERMIT.
   B. HYDRAULIC DREDGING OF CCR CONTINUES IN THIS PHASE AND CONTINUES IN AREAS ACCESSIBLE WITHOUT A DROP IN WATER LEVEL UNTIL SUCH TIME AS THE REVISED NPDES INDUSTRIAL STORMWATER PERMIT IS AVAILABLE.
   C. OPERATION OF THE SURGE POND AND DEPOSITION LINES AND TECHNICAL DIRECTION FOR THE ATP OPERATED BY ALABAMA POWER.
   D. DEPOSITION FROM THE ATP IN THIS PHASE IS AVAILABLE THROUGH FLOATING PIPELINE DEPOSITION IN THE CENTRAL PORTION OF THE MAIN CHANNEL, F1, AND SIDEWALL DEPOSITION IN THE WESTERN PORTIONS OF F6 TO THE DEPICTED ACTIVE DEPOSITION AREAS. ONCE THE CONNECTION TO THE EASTERN DEPOSITION LINES IS MADE, DEPOSITION IN F2 AND F3 ARE AVAILABLE AND ARE PRIORITIZED FROM A PROJECT SEQUENCING PERSPECTIVE. DEPOSITION WILL NEED TO REMAIN BELOW ELEVATION 385 FT-MSL IN THIS PHASE IF THE USACE PERMIT HAS NOT YET BEEN OBTAINED.
   E. ADDITIONAL DEPOSITION PIPELINE IS INSTALLED ACROSS THE MAIN POND CROSSING TO CONNECT THE EASTERN DEPOSITION LINES TO THE ATP, AND ONE OF THE FLOATING DEPOSITION LINES IS CONNECTED TO JE-03 TO ALLOW DEPOSITION IN THE FAR EASTERN REACHES OF F1.
5. THE GENERAL CIVIL CONTRACTOR EXECUTES THE FOLLOWING ACTIVITIES IN THIS PHASE:
   A. CONSTRUCTION OF THE MAIN POND CROSSING FROM J2 TO P3 USING BOTTOM ASH FROM THE ONSITE STOCKPILE INCLUDING ASSOCIATED TEMPORARY LINER, DEWATERING AND INSTRUMENTATION INSTALLATIONS, ESTABLISHMENT OF THE EASTERN AND WESTERN APPROACH ROADWAYS, AND INSTALLATION OF THE WESTERN GRAVITY DRAINAGE PIPING AND PARTIAL OF THE FUTURE EASTERN GRAVITY DRAINAGE PIPING TO BE COMPLETED FOLLOWING POND WATER LOWERING IN LATER PHASES.
   B. OPERATIONS AND MAINTENANCE, AND EXTENDED INSTALLATIONS AS AVAILABLE OF THE ACTIVE DEEP WELL AND WELL POINT DEWATERING SYSTEMS AND STABILITY INSTRUMENTATION SYSTEMS IN LINE WITH THE PROJECT INSTRUMENTATION AND MONITORING SYSTEM (IMS) PLAN.
   C. ESTABLISH AND OPERATE THE MAIN CHANNEL WATER MANAGEMENT PUMPING SYSTEM AT THE SOUTHEAST SIDE OF THE MAIN CHANNEL CROSSING WITH DISCHARGE TO THE MAIN POND CAPABLE OF PROVIDING 1,000 GPM AT A MINIMUM STATIC HEAD OF 25 FEET.
   D. ESTABLISH AND OPERATE THE F4 WATER MANAGEMENT PUMPING SYSTEM CAPABLE OF 6,000 GPM AT A MINIMUM STATIC HEAD OF 150 FEET TO PROVIDE WATER MANAGEMENT FOR THE SOUTHERN POND AREAS WITH DISCHARGE TO THE MAIN POND AT THE WESTERN SIDE OF P9.
   E. CONTINUED PREPARATORY WORKS (E.G. CLEARING, STRIPPING, STOCKPILING, ACCESS ESTABLISHMENT, ETC.) IN PREPARATION FOR PERIMETER NON CCR COMMON FILL AND BOTTOM ASH FLOATING ROAD CONSTRUCTION IN LATER PHASES.
   F. MAINTENANCE OF SITE ROADWAYS AND OUT OF POND SITE EROSION AND SEDIMENT CONTROL MEASURES AS NEEDED AND DIRECTED BY THE SCS CONSTRUCTION MANAGEMENT TEAM.
   G. THE EXISTING DAM CREST REMAINS AT THE PRE-CLOSURE ELEVATION OF 395 FT-MSL IN THIS PHASE. SEE DRAWING R-301 FOR DAM LOWERING REQUIREMENTS.
6. THE WATER TREATMENT CONTRACTOR EXECUTES THE FOLLOWING ACTIVITIES IN THIS PHASE:
   A. PROVIDE A WATER TREATMENT SYSTEM WITH A TREATMENT THROUGHPUT CAPACITY OF 12,000 GPM.
   B. PROVIDE CLEAN WATER SUPPLY TO THE ATP.
   C. PROVIDE FOR RECIRCULATION WATER TREATMENT IF NEEDED / REQUESTED BY THE SCS CONSTRUCTION MANAGEMENT TEAM UNTIL SUCH TIME THAT WATER TREATMENT DISCHARGE TO THE NPDES OUTFALL IS ALLOWED BY PERMIT.

NOTES

1. ELEVATIONS ARE IN FEET ABOVE MEAN SEA LEVEL, NATIONAL GEODETIC VERTICAL DATUM (NGVD) 1988. COORDINATES CORRESPOND TO ALABAMA WEST COORDINATE SYSTEM, NORTH AMERICAN DATUM (NAD) 1983.
2. CONTOUR INTERVAL IS 5 FEET, UNLESS OTHERWISE LABELED.
3. WATER SURFACE ELEVATIONS (WSE) SHOWN ON THIS PLAN REPRESENTS WSE VALUES ON DATE OF LIDAR TOPOGRAPHIC SURVEY (FEB 2020)

REFERENCES

1. EXISTING TOPOGRAPHY PROVIDED BY SOUTHERN COMPANY SERVICES, FEBRUARY 2020.
2. BATHYMETRIC SURFACE IS A COMPOSITE OF THE FEBRUARY 2020 SOUTHERN COMPANY AND THE JANUARY 2020 ARCSURVEY BATHYMETRIC SURVEYS TIED TO INTERPRETED SECTIONS OF THE 2016 SOUTHERN COMPANY BATHYMETRIC SURVEY WHERE SURVEY DATA IS NOT AVAILABLE.
3. BOTTOM OF CCR TOPOGRAPHY TAKEN FROM USGS, PORT BIRMINGHAM, 1938 AND GOODSPINGS, 1971 QUADRANGLES. TOPOGRAPHY WAS INTERPRETED BETWEEN 20 FOOT CONTOURS AND ADJUSTED BASED ON GEOTECHNICAL INVESTIGATION DATA BY GOLDER ASSOCIATES INC.
4. EXISTING AND APPROXIMATE PROPERTY BOUNDARIES PROVIDED BY SOUTHERN COMPANY SERVICES, APRIL 2020.

REV	DATE	REVISION DESCRIPTION	DES	CADD	CHK	RVW
0	2020/10/16	ISSUED FOR CONSTRUCTION	GLH	CRP	SCN	GLH

CLIENT
SOUTHERN COMPANY SERVICES
Alabama Power

PROJECT
PLANT GORGAS
ASH POND CLOSURE
DESIGN DRAWINGS

TITLE
PROPOSED DREDGE AND PASTE PHASING PLAN
PHASE 01-C

CONSULTANT
GOLDER

YYYY-MM-DD	2020/10/16
DESIGNED	GLH
PREPARED	CRP
CHECKED	SCN
REVIEWED / APPROVED	GLH

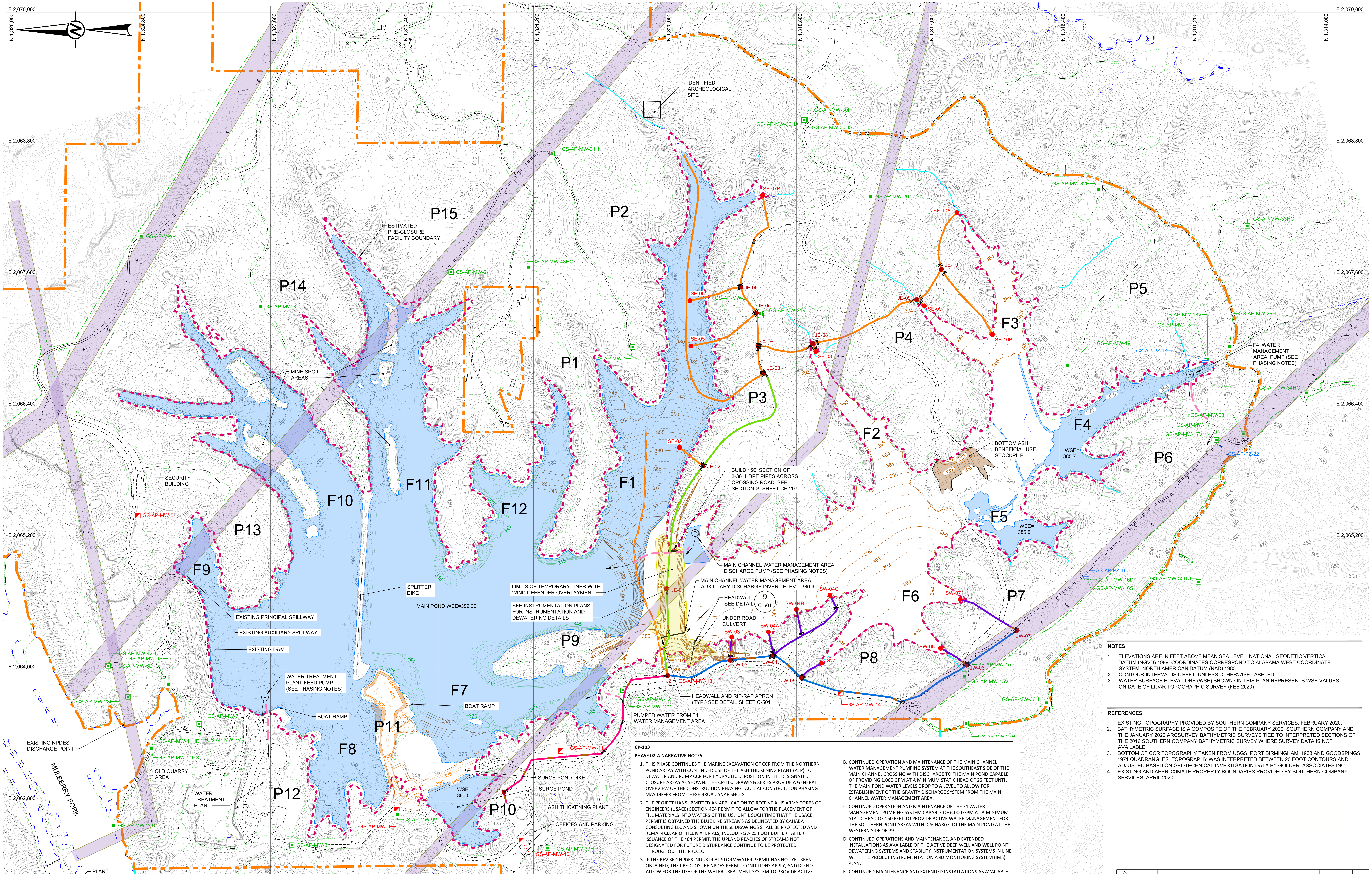
ALABAMA LICENSED No. 29143 PROFESSIONAL ENGINEER GREGORY L. HEBELER 16-OCT-2020

GREGORY L. HEBELER
ALABAMA PROFESSIONAL ENGINEER
CERTIFICATE NUMBER 29143

PROJECT NO.	SCS REF.	REV.	DRAWING
1789848	GOR17010	0	CP-102

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI E

Path: \\Atlanta\cadd\Southern Company\Plant Gorgas\1789848 Detailed Design\01_Civil\Production\ | File Name: 1789848-CP-102 PHASE 1-C.dwg | Last Edited By: alerodriguez Date: 2020-10-16 Time:5:21:45 PM | Printed By: AleRodriguez Date: 2020-10-16 Time:5:22:17 PM



LEGEND

- 340 — EXISTING TOPOGRAPHY / BATHYMETRY CONTOURS (REFERENCE 1)
- 500 — PROPOSED DEPOSITION AND DREDGE GRADING CONTOURS (1FT)
- 340 — PROPOSED GRADING CONTOURS OUTSIDE CLOSURE LIMITS
- EXISTING ROAD
- EXISTING TRAIL
- EXISTING PARKING AREA
- EXISTING POWER POLES / TOWERS
- APC OWNED PROPERTY BOUNDARIES
- APPROXIMATE APC OWNED PROPERTY BOUNDARIES
- ESTIMATED PRE-CLOSURE FACILITY BOUNDARY
- EXISTING TRANSMISSION CORRIDOR
- DREDGE PHASE NORMAL POOL
- TEMPORARY LINER AREA
- P1 / F1 — PENINSULA / FINGER
- STREAMS PROVIDED BY CAHABA CONSULTING, LLC
- G-4 — EXISTING MONITORING WELL LOCATION (NOT IN MODELING NETWORK)
- GS-AP-PZ-18 — EXISTING PIEZOMETER LOCATION
- GS-AP-MW-01 — EXISTING MONITORING WELL LOCATION
- GS-AP-MW-05 — ABANDONED MONITORING WELL
- PROPOSED 6" AND 8" (2) CS PIPE ROUTE
- PROPOSED 6" AND 8" CS PIPE ROUTE
- PROPOSED 8" CS PIPE ROUTE
- PROPOSED 10" HDPE PIPE ROUTE
- PROPOSED 8" & 10" HDPE PIPE ROUTE
- JW-02 — PROPOSED PIPELINE JUNCTION
- SW-02 — PROPOSED PIPELINE SPIGOT
- PROPOSED PIPE CROSSINGS
- PROPOSED PIPELINE VALVE
- PROPOSED WATER PUMP
- PROPOSED PUMPED WATER LINE

CP-103

PHASE 02-A NARRATIVE NOTES

1. THIS PHASE CONTINUES THE MARINE EXCAVATION OF CCR FROM THE NORTHERN POND AREAS WITH CONTINUED USE OF THE ASH THICKENING PLANT (ATP) TO DEWATER AND PUMP CCR FOR HYDRAULIC DEPOSITION IN THE DESIGNATED CLOSURE AREAS AS SHOWN. THE CP-100 DRAWING SERIES PROVIDE A GENERAL OVERVIEW OF THE CONSTRUCTION PHASING. ACTUAL CONSTRUCTION PHASING MAY DIFFER FROM THESE BROAD SNAP SHOTS.
2. THE PROJECT HAS SUBMITTED AN APPLICATION TO RECEIVE A US ARMY CORPS OF ENGINEERS (USACE) SECTION 404 PERMIT TO ALLOW FOR THE PLACEMENT OF FILL MATERIALS INTO WATERS OF THE US. UNTIL SUCH TIME THAT THE USACE PERMIT IS OBTAINED THE BLUE LINE STREAMS AS DELINEATED BY CAHABA CONSULTING LLC AND SHOWN ON THESE DRAWINGS SHALL BE PROTECTED AND REMAIN CLEAR OF FILL MATERIALS, INCLUDING A 25 FOOT BUFFER. AFTER ISSUANCE OF THE 404 PERMIT, THE UPLAND REACHES OF STREAMS NOT DESIGNATED FOR FUTURE DISTURBANCE CONTINUE TO BE PROTECTED THROUGHOUT THE PROJECT.
3. IF THE REVISED NPDES INDUSTRIAL STORMWATER PERMIT HAS NOT YET BEEN OBTAINED, THE PRE-CLOSURE NPDES PERMIT CONDITIONS APPLY, AND DO NOT ALLOW FOR THE USE OF THE WATER TREATMENT SYSTEM TO PROVIDE ACTIVE LOWERING OF THE MAIN POND WATER LEVELS. DRAWDOWN OF THE MAIN POND MAY START DURING THIS PHASE IF THE REVISED NPDES PERMIT IS IN PLACE BUT ARE SHOWN AT PRE-CLOSURE LEVELS TO HIGHLIGHT THE POTENTIAL FOR PERMIT ISSUANCE TO BE DELAYED.
4. THE MARINE AND PASTE CONTRACTOR EXECUTES THE FOLLOWING ACTIVITIES IN THIS PHASE:
   - A. CONTINUED OPERATION AND MAINTENANCE OF THE MAIN POND PUMPING SYSTEM WITH A CAPACITY CAPABLE OF 12,000 GPM AT A MINIMUM STATIC HEAD OF 175 FEET (FOR LATER PHASES) ADJACENT TO P12 TO PROVIDE WATER TREATMENT PLANT (WTP) FEED AND MAIN POND WATER LEVEL CONTROL WHEN ALLOWED BY THE NPDES INDUSTRIAL STORMWATER PERMIT.
   - B. HYDRAULIC DREDGING OF CCR CONTINUES IN THIS PHASE AND CONTINUES IN AREAS ACCESSIBLE WITHOUT A DROP IN WATER LEVEL UNTIL SUCH TIME AS THE REVISED NPDES INDUSTRIAL STORMWATER PERMIT IS AVAILABLE.
   - C. OPERATION OF THE SURGE POND AND DEPOSITION LINES AND TECHNICAL DIRECTION FOR THE ATP OPERATED BY ALABAMA POWER.
   - D. DEPOSITION FROM THE ATP IN THIS PHASE IS AVAILABLE THROUGH FLOATING PIPELINE DEPOSITION IN F1, AND SIDEWALL DEPOSITION IN F1, F2, F3, AND F6. DEPOSITION WILL NEED TO REMAIN BELOW ELEVATION 385 FT-MSL IN THIS PHASE IF THE USACE PERMIT HAS NOT YET BEEN OBTAINED.
   - E. ADDITIONAL DEPOSITION PIPELINE MAY BE INSTALLED FOR LATER DEPOSITION PHASES DURING THIS PHASE AS AVAILABLE.
5. THE GENERAL CIVIL CONTRACTOR EXECUTES THE FOLLOWING ACTIVITIES IN THIS PHASE:
   - A. CONSOLIDATION AND STABILIZATION OF THE BOTTOM ASH STOCKPILE SUCH THAT IT DOES NOT REQUIRE ACTIVE MANAGEMENT UNTIL NEEDED IN LATER PROJECT PHASES.
   - B. CONTINUED OPERATION AND MAINTENANCE OF THE MAIN CHANNEL WATER MANAGEMENT PUMPING SYSTEM AT THE SOUTHEAST SIDE OF THE MAIN CHANNEL CROSSING WITH DISCHARGE TO THE MAIN POND CAPABLE OF PROVIDING 1,000 GPM AT A MINIMUM STATIC HEAD OF 25 FEET UNTIL THE MAIN POND WATER LEVELS DROP TO A LEVEL TO ALLOW FOR ESTABLISHMENT OF THE GRAVITY DISCHARGE SYSTEM FROM THE MAIN CHANNEL WATER MANAGEMENT AREA.
   - C. CONTINUED OPERATION AND MAINTENANCE OF THE F4 WATER MANAGEMENT PUMPING SYSTEM CAPABLE OF 6,000 GPM AT A MINIMUM STATIC HEAD OF 150 FEET TO PROVIDE ACTIVE WATER MANAGEMENT FOR THE SOUTHERN POND AREAS WITH DISCHARGE TO THE MAIN POND AT THE WESTERN SIDE OF P9.
   - D. CONTINUED OPERATIONS AND MAINTENANCE, AND EXTENDED INSTALLATIONS AS AVAILABLE OF THE ACTIVE DEEP WELL AND WELL POINT DEWATERING SYSTEMS AND STABILITY INSTRUMENTATION SYSTEMS IN LINE WITH THE PROJECT INSTRUMENTATION AND MONITORING SYSTEM (IMS) PLAN.
   - E. CONTINUED MAINTENANCE AND EXTENDED INSTALLATIONS AS AVAILABLE OF THE TEMPORARY LININGS IN F1, F7, AND THE MAIN CHANNEL AREAS.
   - F. START OF PERIMETER NON CCR COMMON FILL PLACEMENT IN F2, F3 AND THE WESTERN AREAS BETWEEN F6 AND F7 AS ASH LEVELS PROGRESS TO ELEVATIONS ABOVE THE WATER TO ALLOW SAFE CONSTRUCTION ACCESS AND PROVIDED THAT THE USACE 404 PERMIT IS IN PLACE.
   - G. CONTINUED PREPARATORY WORKS (E.G. CLEARING, STRIPPING, STOCKPILING, ACCESS ESTABLISHMENT, ETC.) AS NEEDED IN PREPARATION FOR PERIMETER NON CCR COMMON FILL AND BOTTOM ASH FLOATING ROAD CONSTRUCTION IN LATER PHASES.
   - H. MAINTENANCE OF SITE ROADWAYS AND OUT OF POND SITE EROSION AND SEDIMENT CONTROL MEASURES AS NEEDED AND DIRECTED BY THE SCS CONSTRUCTION MANAGEMENT TEAM.
   - I. THE EXISTING DAM CREST REMAINS AT THE PRE-CLOSURE ELEVATION OF 395 FT-MSL IN THIS PHASE. SEE DRAWING R-301 FOR DAM LOWERING REQUIREMENTS.
6. THE WATER TREATMENT CONTRACTOR EXECUTES THE FOLLOWING ACTITIES IN THIS PHASE:
   - A. PROVIDE A WATER TREATMENT SYSTEM WITH A TREATMENT THROUGHPUT CAPACITY OF 12,000 GPM.
   - B. PROVIDE CLEAN WATER SUPPLY TO THE ATP.
   - C. PROVIDE FOR RECIRCULATION WATER TREATMENT IF NEEDED / REQUESTED BY THE SCS CONSTRUCTION MANAGEMENT TEAM UNTIL SUCH TIME THAT WATER TREATMENT DISCHARGE TO THE NPDES OUTFALL IS ALLOWED BY PERMIT.

NOTES

1. ELEVATIONS ARE IN FEET ABOVE MEAN SEA LEVEL, NATIONAL GEODETIC VERTICAL DATUM (NGVD) 1988. COORDINATES CORRESPOND TO ALABAMA WEST COORDINATE SYSTEM, NORTH AMERICAN DATUM (NAD) 1983.
2. CONTOUR INTERVAL IS 5 FEET, UNLESS OTHERWISE LABELED.
3. WATER SURFACE ELEVATIONS (WSE) SHOWN ON THIS PLAN REPRESENTS WSE VALUES ON DATE OF LIDAR TOPOGRAPHIC SURVEY (FEB 2020)

REFERENCES

1. EXISTING TOPOGRAPHY PROVIDED BY SOUTHERN COMPANY SERVICES, FEBRUARY 2020.
2. BATHYMETRIC SURFACE IS A COMPOSITE OF THE FEBRUARY 2020 SOUTHERN COMPANY AND THE JANUARY 2020 ARCSURVEY BATHYMETRIC SURVEYS TIED TO INTERPRETED SECTIONS OF THE 2016 SOUTHERN COMPANY BATHYMETRIC SURVEY WHERE SURVEY DATA IS NOT AVAILABLE.
3. BOTTOM OF CCR TOPOGRAPHY TAKEN FROM USGS, PORT BIRMINGHAM, 1938 AND GOODSPINGS, 1971 QUADRANGLES. TOPOGRAPHY WAS INTERPRETED BETWEEN 20 FOOT CONTOURS AND ADJUSTED BASED ON GEOTECHNICAL INVESTIGATION DATA BY GOLDER ASSOCIATES INC.
4. EXISTING AND APPROXIMATE PROPERTY BOUNDARIES PROVIDED BY SOUTHERN COMPANY SERVICES, APRIL 2020.

REV	DATE	REVISION DESCRIPTION	DES	CADD	CHK	RVW
0	2020/10/16	ISSUED FOR CONSTRUCTION	GLH	RMS	SCN	GLH

CLIENT
SOUTHERN COMPANY SERVICES

Alabama Power

PROJECT
PLANT GORGAS
ASH POND CLOSURE
DESIGN DRAWINGS

TITLE
PROPOSED DREDGE AND PASTE PHASING PLAN
PHASE 02-A

CONSULTANT
GOLDER

YYYY-MM-DD	2020/10/16
DESIGNED	GLH
PREPARED	RMS
CHECKED	SCN
REVIEWED / APPROVED	GLH

ALABAMA LICENSED No. 29143 PROFESSIONAL ENGINEER GREGORY L. HEBELER 16-OCT-2020

GREGORY L. HEBELER
ALABAMA PROFESSIONAL ENGINEER
CERTIFICATE NUMBER 29143

PROJECT NO.	SCS REF.	REV.	DRAWING
1789848	GOR17010	0	CP-103

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI E

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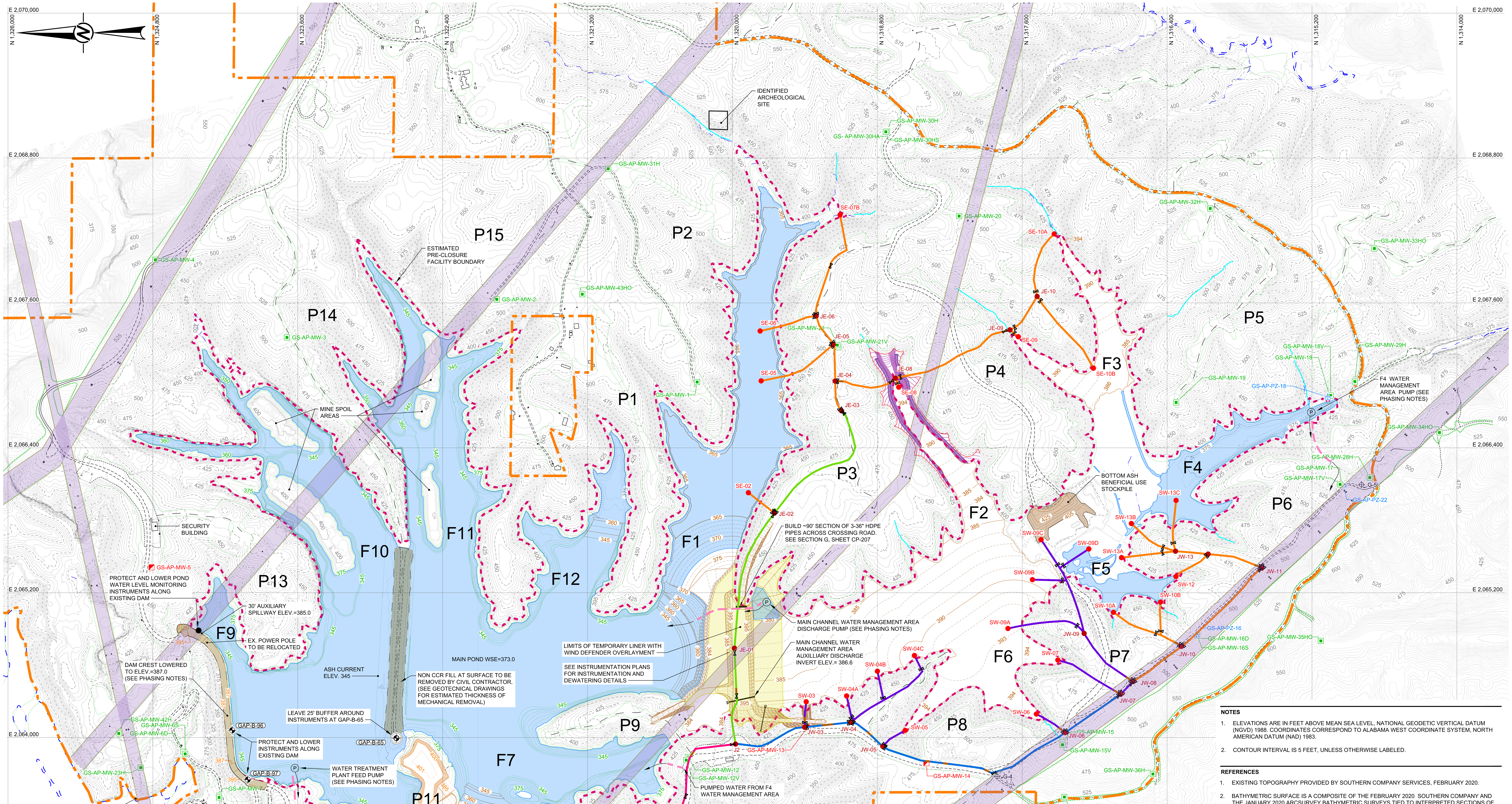

LEGEND

340 (dashed)	EXISTING TOPOGRAPHY / BATHYMETRY CONTOURS (REFERENCE 1)
500	PROPOSED DEPOSITION AND DREDGE GRADING CONTOURS (1FT)
340	PROPOSED GRADING CONTOURS OUTSIDE CLOSURE LIMITS
	EXISTING ROAD
	EXISTING TRAIL
	EXISTING PARKING AREA
	EXISTING POWER POLES / TOWERS
	APC OWNED PROPERTY BOUNDARIES
	APPROXIMATE APC OWNED PROPERTY BOUNDARIES
	ESTIMATED PRE-CLOSURE FACILITY BOUNDARY
	EXISTING TRANSMISSION CORRIDOR
	DREDGE PHASE NORMAL POOL
	TEMPORARY LINER AREA
	AREA OF NON-CCR FILL TO BE REMOVED
P1 / F1	PENINSULA / FINGER
	STREAMS PROVIDED BY CAHABA CONSULTING, LLC
G-4	EXISTING MONITORING WELL LOCATION (NOT IN MODELING NETWORK)
GS-AP-PZ-18	EXISTING PIEZOMETER LOCATION
GS-AP-MW-01	EXISTING MONITORING WELL LOCATION
GS-AP-MW-05	ABANDONED MONITORING WELL
GAP-B-65	EXISTING BOREHOLE (SEE GEOTECHNICAL PLANS)
	PROPOSED 6" AND 8" (2) CS PIPE ROUTE
	PROPOSED 6" AND 8" CS PIPE ROUTE
	PROPOSED 8" CS PIPE ROUTE
	PROPOSED 10" HDPE PIPE ROUTE
	PROPOSED 8" & 10" HDPE PIPE ROUTE
JW-02	PROPOSED PIPELINE JUNCTION
SW-02	PROPOSED PIPELINE SPIGOT
	PROPOSED PIPE CROSSINGS
	PROPOSED PIPELINE VALVE
	PROPOSED WATER PUMP
	PROPOSED PUMPED WATER LINE

0 300 600
1" = 300' FEET

CP-104

PHASE 02-B NARRATIVE NOTES

1. THIS PHASE CONTINUES THE MARINE EXCAVATION OF CCR FROM THE NORTHERN POND AREAS WITH CONTINUED USE OF THE ASH THICKENING PLANT (ATP) TO DEWATER AND PUMP CCR FOR HYDRAULIC DEPOSITION SUPPORTED BY NON CCR COMMON FILL ACTIVITIES IN THE DESIGNATED CLOSURE AREAS AS SHOWN. THE CP-100 DRAWING SERIES PROVIDE A GENERAL OVERVIEW OF THE CONSTRUCTION PHASING. ACTUAL CONSTRUCTION PHASING MAY DIFFER FROM THESE BROAD SNAP SHOTS.
2. THE PROJECT HAS SUBMITTED AN APPLICATION TO RECEIVE A US ARMY CORPS OF ENGINEERS (USACE) SECTION 404 PERMIT TO ALLOW FOR THE PLACEMENT OF FILL MATERIALS INTO WATERS OF THE US. UNTIL SUCH TIME THAT THE USACE PERMIT IS OBTAINED THE BLUE LINE STREAMS AS DELINEATED BY CAHABA CONSULTING LLC AND SHOWN ON THESE DRAWINGS SHALL BE PROTECTED AND REMAIN CLEAR OF FILL MATERIALS, INCLUDING A 25 FOOT BUFFER. AFTER ISSUANCE OF THE 404 PERMIT, THE UPLAND REACHES OF STREAMS NOT DESIGNATED FOR FUTURE DISTURBANCE CONTINUE TO BE PROTECTED THROUGHOUT THE PROJECT.
3. IT IS ASSUMED THAT THE REVISED NPDES INDUSTRIAL STORMWATER PERMIT HAS BEEN ISSUED BY THIS PHASE, AND THE WATER TREATMENT SYSTEM WILL HAVE STARTED TO PROVIDE ACTIVE LOWERING OF THE MAIN POND WATER LEVELS.
4. THE MARINE AND PASTE CONTRACTOR EXECUTES THE FOLLOWING ACTIVITIES IN THIS PHASE:
   A. CONTINUED OPERATION AND MAINTENANCE OF THE MAIN POND PUMPING SYSTEM WITH A CAPACITY CAPABLE OF 12,000 GPM AT A MINIMUM STATIC HEAD OF 175 FEET (FOR LATER PHASES) ADJACENT TO P12 TO PROVIDE WATER TREATMENT PLANT (WTP) FEED AND MAIN POND WATER LEVEL CONTROL WHEN ALLOWED BY THE NPDES INDUSTRIAL STORMWATER PERMIT.
   B. HYDRAULIC DREDGING OF CCR CONTINUES IN THIS PHASE AND CONTINUES IN AREAS ACCESSIBLE WITHOUT A DROP IN WATER LEVEL UNTIL SUCH TIME AS THE REVISED NPDES INDUSTRIAL STORMWATER PERMIT IS AVAILABLE.
   C. MARINE POND WALL CLEANING OPERATIONS START FOLLOWING THE START OF MAIN POND WATER LEVEL DRAWDOWN AND PROGRESS AS POND SIDEWALL AREAS BELOW ELEVATION 385 ARE EXPOSED.
   D. OPERATION OF THE SURGE POND AND DEPOSITION LINES AND TECHNICAL DIRECTION FOR THE ATP OPERATED BY ALABAMA POWER.
   E. DEPOSITION FROM THE ATP IN THIS PHASE IS AVAILABLE THROUGH FLOATING PIPELINE DEPOSITION IN F1, AND SIDEWALL DEPOSITION IN F1, F2, F3, AND F6. DEPOSITION WILL NEED TO REMAIN BELOW ELEVATION 385 IN THIS PHASE IF THE USACE PERMIT HAS NOT YET BEEN OBTAINED.
   F. DEPOSITION PIPELINES EXTENDED ON THE WEST TO F5 AND F4. ADDITIONAL DEPOSITION PIPELINE MAY BE INSTALLED FOR USE IN LATER DEPOSITION PHASES.
5. THE GENERAL CIVIL CONTRACTOR EXECUTES THE FOLLOWING ACTIVITIES IN THIS PHASE:
   A. CONTINUED OPERATION AND MAINTENANCE OF THE MAIN CHANNEL WATER MANAGEMENT PUMPING SYSTEM AT THE SOUTHEAST SIDE OF THE MAIN CHANNEL CROSSING WITH DISCHARGE TO THE MAIN POND CAPABLE OF PROVIDING 1,000 GPM AT A MINIMUM STATIC HEAD OF 25 FEET UNTIL THE MAIN POND WATER LEVELS DROP TO A LEVEL TO ALLOW FOR ESTABLISHMENT OF THE GRAVITY DISCHARGE SYSTEM FROM THE MAIN CHANNEL WATER MANAGEMENT AREA.
   B. CONTINUED OPERATION AND MAINTENANCE OF THE F4 WATER MANAGEMENT PUMPING SYSTEM CAPABLE OF 6,000 GPM AT A MINIMUM STATIC HEAD OF 150 FEET TO PROVIDE ACTIVE WATER MANAGEMENT FOR THE SOUTHERN POND AREAS WITH DISCHARGE TO THE MAIN POND AT THE WESTERN SIDE OF P9.
   C. CONTINUED OPERATIONS AND MAINTENANCE, AND EXTENDED INSTALLATIONS AS AVAILABLE OF THE ACTIVE DEEP WELL AND WELL POINT DEWATERING SYSTEMS AND STABILITY INSTRUMENTATION SYSTEMS IN LINE WITH THE PROJECT INSTRUMENTATION AND MONITORING SYSTEM (IMS) PLAN.
   D. CONTRACTOR TO ADD ADDITIONAL TEMPORARY WATER MANAGEMENT SYSTEMS AS NEEDED TO MANAGE WATER WITHIN WORK AREAS.
   E. CONTINUED MAINTENANCE AND EXTENDED INSTALLATIONS AS AVAILABLE OF THE TEMPORARY LININGS IN F1, F7, AND THE MAIN CHANNEL AREAS.
   F. CONTINUED PROGRESSION OF PERIMETER NON CCR COMMON FILL PLACEMENT IN F2, F3 AND THE WESTERN AREAS BETWEEN F6 AND F7 AS CCR DEPOSITION LEVELS PROGRESS TO HIGHER ELEVATIONS.
   G. CONTINUED PREPARATORY WORKS (E.G. CLEARING, STRIPPING, STOCKPILING, ACCESS ESTABLISHMENT, ETC.) AS NEEDED IN PREPARATION FOR PERIMETER NON CCR COMMON FILL AND BOTTOM ASH FLOATING ROAD CONSTRUCTION IN LATER PHASES.
   H. MAINTENANCE OF SITE ROADWAYS AND OUT OF POND SITE EROSION AND SEDIMENT CONTROL MEASURES AS NEEDED AND DIRECTED BY THE SCS CONSTRUCTION MANAGEMENT TEAM.
   I. MECHANICAL REMOVAL OF NON CCR FILL FROM THE SPLITTER DIKE AREAS TO ALLOW FOR THE HYDRAULIC REMOVAL OF THE UNDERLYING ASH AREAS.
   J. THE EXISTING DAM CREST IS LOWERED TO ELEVATION 387 TO ALLOW FOR THE WIDENING OF THE DAM CREST ROAD. DAM LOWERING REQUIRES THE PRIOR APPROVAL OF THE EOR AND THE SCS FOSSIL DAM SAFETY GROUP AND SHALL FOLLOW THE CRITERIA AND REQUIREMENTS PROVIDED ON DRAWING R-301.
6. THE WATER TREATMENT CONTRACTOR EXECUTES THE FOLLOWING ACTIVITIES IN THIS PHASE:
   A. OPERATION AND MAINTENANCE OF THE WATER TREATMENT SYSTEM WITH A TREATMENT THROUGHPUT CAPACITY OF 12,000 GPM CAPABLE OF MEETING THE NPDES EFFLUENT REQUIREMENTS.
   B. PROVIDE FOR WATER TREATMENT AS NEEDED / REQUESTED BY THE SCS CONSTRUCTION MANAGEMENT TEAM AND AS COORDINATED WITH THE MARINE CONTRACTOR TO ADJUST WATER TREATMENT OPERATIONS AND DISCHARGE VOLUMES SUCH THAT THE MAIN POND WATER LEVELS ARE MANAGED TO MEET THE PROJECT REQUIREMENTS.
   C. PROVIDE CLEAN WATER SUPPLY TO THE ASH THICKENING PLANT.
   D. PROVIDE FOR RECIRCULATION WATER TREATMENT IF NEEDED / REQUESTED BY THE SCS CONSTRUCTION MANAGEMENT TEAM.

NOTES

1. ELEVATIONS ARE IN FEET ABOVE MEAN SEA LEVEL, NATIONAL GEODETIC VERTICAL DATUM (NGVD) 1988. COORDINATES CORRESPOND TO ALABAMA WEST COORDINATE SYSTEM, NORTH AMERICAN DATUM (NAD) 1983.
2. CONTOUR INTERVAL IS 5 FEET, UNLESS OTHERWISE LABELED.

REFERENCES

1. EXISTING TOPOGRAPHY PROVIDED BY SOUTHERN COMPANY SERVICES, FEBRUARY 2020.
2. BATHYMETRIC SURFACE IS A COMPOSITE OF THE FEBRUARY 2020 SOUTHERN COMPANY AND THE JANUARY 2020 ARCSURVEY BATHYMETRIC SURVEYS TIED TO INTERPRETED SECTIONS OF THE 2016 SOUTHERN COMPANY BATHYMETRIC SURVEY WHERE SURVEY DATA IS NOT AVAILABLE.
3. BOTTOM OF CCR TOPOGRAPHY TAKEN FROM USGS, PORT BIRMINGHAM, 1938 AND GOODSPINGS, 1971 QUADRANGLES. TOPOGRAPHY WAS INTERPRETED BETWEEN 20 FOOT CONTOURS AND ADJUSTED BASED ON GEOTECHNICAL INVESTIGATION DATA BY GOLDER ASSOCIATES INC.
4. EXISTING AND APPROXIMATE PROPERTY BOUNDARIES PROVIDED BY SOUTHERN COMPANY SERVICES, APRIL 2020.

REV	DATE	REVISION DESCRIPTION	DES	CADD	CHK	RVW
0	2020/10/16	ISSUED FOR CONSTRUCTION	GLH	CRP	SCN	GLH

CLIENT
SOUTHERN COMPANY SERVICES
Alabama Power

PROJECT
PLANT GORGAS
ASH POND CLOSURE
DESIGN DRAWINGS

TITLE
PROPOSED DREDGE AND PASTE PHASING PLAN
PHASE 02-B

CONSULTANT
GOLDER

YYYY-MM-DD	2020/10/16
DESIGNED	GLH
PREPARED	CRP
CHECKED	SCN
REVIEWED / APPROVED	GLH

ALABAMA LICENSED No. 29143 PROFESSIONAL ENGINEER GREGORY L. HEBELER 16-OCT-2020
GREGORY L. HEBELER
ALABAMA PROFESSIONAL ENGINEER
CERTIFICATE NUMBER 29143

PROJECT NO.	SCS REF.	REV.	DRAWING
1789848	GOR17010	0	CP-104

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI E
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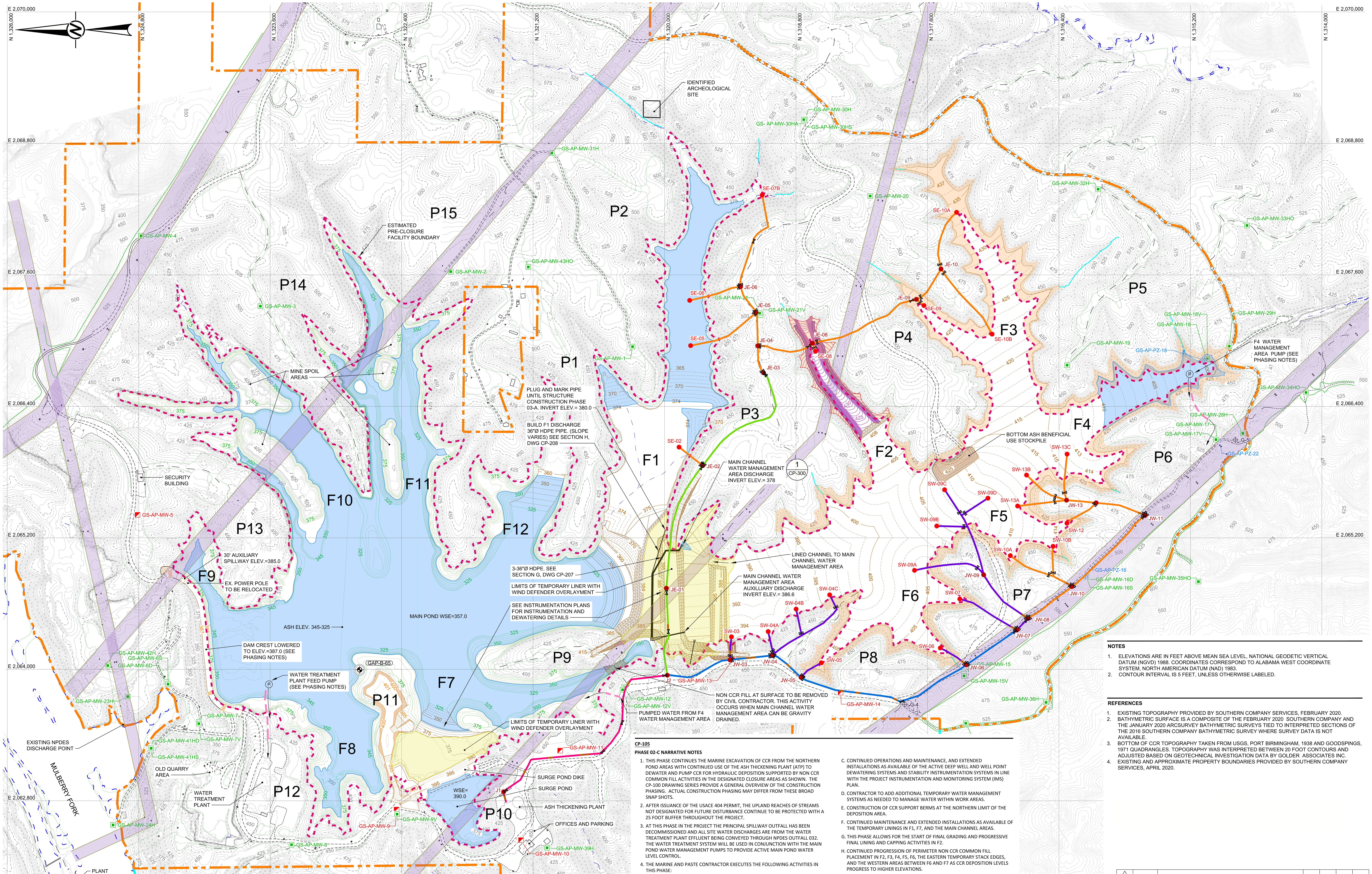

LEGEND

340	EXISTING TOPOGRAPHY / BATHYMETRY CONTOURS (REFERENCE 1)
500	PROPOSED DEPOSITION AND DREDGE GRADING CONTOURS (1FT)
340	PROPOSED GRADING CONTOURS OUTSIDE CLOSURE LIMITS
	EXISTING ROAD
	EXISTING TRAIL
	EXISTING PARKING AREA
	EXISTING POWER POLES / TOWERS
	APC OWNED PROPERTY BOUNDARIES
	APPROXIMATE APC OWNED PROPERTY BOUNDARIES
	ESTIMATED PRE-CLOSURE FACILITY BOUNDARY
	EXISTING TRANSMISSION CORRIDOR
	DREDGE PHASE NORMAL POOL
	TEMPORARY LINER AREA
	AREA OF NON-CCR CLOSURE GRADING
P1 / F1	PENINSULA / FINGER
	STREAMS PROVIDED BY CAHABA CONSULTING, LLC
G-4	EXISTING MONITORING WELL LOCATION (NOT IN MODELING NETWORK)
GS-AP-PZ-18	EXISTING PIEZOMETER LOCATION
GS-AP-MW-01	EXISTING MONITORING WELL LOCATION
GS-AP-MW-05	ABANDONED MONITORING WELL
GAP-B-65	EXISTING BOREHOLE (SEE GEOTECHNICAL PLANS)
	PROPOSED 6" AND 8" (2) CS PIPE ROUTE
	PROPOSED 6" AND 8" CS PIPE ROUTE
	PROPOSED 8" CS PIPE ROUTE
	PROPOSED 10" HDPE PIPE ROUTE
	PROPOSED 8" & 10" HDPE PIPE ROUTE
JW-02	PROPOSED PIPELINE JUNCTION
SW-02	PROPOSED PIPELINE SPIGOT
	PROPOSED PIPE CROSSINGS
	PROPOSED PIPELINE VALVE
	PROPOSED WATER PUMP
	PROPOSED PUMPED WATER LINE

0 300 600
1" = 300' FEET

CP-105

PHASE 02-C NARRATIVE NOTES

1. THIS PHASE CONTINUES THE MARINE EXCAVATION OF CCR FROM THE NORTHERN POND AREAS WITH CONTINUED USE OF THE ASH THICKENING PLANT (ATP) TO DEWATER AND PUMP CCR FOR HYDRAULIC DEPOSITION SUPPORTED BY NON CCR COMMON FILL ACTIVITIES IN THE DESIGNATED CLOSURE AREAS AS SHOWN. THE CP-100 DRAWING SERIES PROVIDE A GENERAL OVERVIEW OF THE CONSTRUCTION PHASING. ACTUAL CONSTRUCTION PHASING MAY DIFFER FROM THESE BROAD SNAP SHOTS.
2. AFTER ISSUANCE OF THE USACE 404 PERMIT, THE UPLAND REACHES OF STREAMS NOT DESIGNATED FOR FUTURE DISTURBANCE CONTINUE TO BE PROTECTED WITH A 25 FOOT BUFFER THROUGHOUT THE PROJECT.
3. AT THIS PHASE IN THE PROJECT THE PRINCIPAL SPILLWAY OUTFALL HAS BEEN DECOMMISSIONED AND ALL SITE WATER DISCHARGES ARE FROM THE WATER TREATMENT PLANT EFFLUENT BEING CONVEYED THROUGH NPDES OUTFALL 032. THE WATER TREATMENT SYSTEM WILL BE USED IN CONJUNCTION WITH THE MAIN POND WATER MANAGEMENT PUMPS TO PROVIDE ACTIVE MAIN POND WATER LEVEL CONTROL.
4. THE MARINE AND PASTE CONTRACTOR EXECUTES THE FOLLOWING ACTIVITIES IN THIS PHASE:
   A. CONTINUED OPERATION AND MAINTENANCE OF THE MAIN POND PUMPING SYSTEM WITH A CAPACITY CAPABLE OF 12,000 GPM AT A MINIMUM STATIC HEAD OF 175 FEET (FOR LATER PHASES) ADJACENT TO P12 TO PROVIDE WATER TREATMENT PLANT (WTP) FEED AND MAIN POND WATER LEVEL CONTROL.
   B. HYDRAULIC DREDGING OF CCR CONTINUES IN THIS PHASE AND PROGRESSES WITH PARALLEL DRAWDOWN OF THE MAIN POND WATER LEVELS AS NEEDED TO OPTIMIZE HYDRAULIC EXCAVATIONS.
   C. MARINE POND WALL CLEANING OPERATIONS CONTINUE AND PROGRESS IN PARALLEL WITH DRAWDOWN OF THE MAIN POND AND AS POND SIDEWALL AREAS BELOW ELEVATION 385 FT-MSL ARE EXPOSED.
   D. OPERATION OF THE SURGE POND AND DEPOSITION LINES AND TECHNICAL DIRECTION FOR THE ASH THICKENING PLANT OPERATED BY ALABAMA POWER.
   E. DEPOSITION FROM THE ATP IN THIS PHASE IS AVAILABLE ACROSS THE PHASE 2 DEPOSITION PIPELINE AREAS IN F1, F3, F5 AND F6, AND WITH FINGER F2 DEPOSITION LIKELY COMPLETED. DEPOSITION PHASING AND PLANNING IS ADJUSTED TO PROMOTE POSITIVE DRAINAGE IN DEPOSITION AREAS AND IN SEQUENCE WITH PERIMETER NON CCR COMMON FILL SUPPORT ACTIVITIES.
   F. ADDITIONAL DEPOSITION PIPELINE MAY BE INSTALLED FOR USE IN LATER DEPOSITION PHASES.
5. THE GENERAL CIVIL CONTRACTOR EXECUTES THE FOLLOWING ACTIVITIES IN THIS PHASE:
   A. ESTABLISHMENT AND MAINTENANCE OF THE FULL EXTENTS OF THE MAIN CHANNEL WATER MANAGEMENT GRAVITY DISCHARGE SYSTEM IF NOT PREVIOUSLY COMPLETE.
   B. CONTINUED OPERATION AND MAINTENANCE OF THE F4 WATER MANAGEMENT PUMPING SYSTEM CAPABLE OF 6,000 GPM AT A MINIMUM STATIC HEAD OF 150 FEET TO PROVIDE ACTIVE WATER MANAGEMENT FOR THE SOUTHERN POND AREAS WITH DISCHARGE TO THE MAIN POND AT THE WESTERN SIDE OF P9.
   C. CONTINUED OPERATIONS AND MAINTENANCE, AND EXTENDED INSTALLATIONS AS AVAILABLE OF THE ACTIVE DEEP WELL AND WELL POINT DEWATERING SYSTEMS AND STABILITY INSTRUMENTATION SYSTEMS IN LINE WITH THE PROJECT INSTRUMENTATION AND MONITORING SYSTEM (IMS) PLAN.
   D. CONTRACTOR TO ADD ADDITIONAL TEMPORARY WATER MANAGEMENT SYSTEMS AS NEEDED TO MANAGE WATER WITHIN WORK AREAS.
   E. CONSTRUCTION OF CCR SUPPORT BERMS AT THE NORTHERN LIMIT OF THE DEPOSITION AREA.
   F. CONTINUED MAINTENANCE AND EXTENDED INSTALLATIONS AS AVAILABLE OF THE TEMPORARY LININGS IN F1, F7, AND THE MAIN CHANNEL AREAS.
   G. THIS PHASE ALLOWS FOR THE START OF FINAL GRADING AND PROGRESSIVE FINAL LINING AND CAPPING ACTIVITIES IN F2.
   H. CONTINUED PROGRESSION OF PERIMETER NON CCR COMMON FILL PLACEMENT IN F2, F3, F4, F5, F6, THE EASTERN TEMPORARY STACK EDGES, AND THE WESTERN AREAS BETWEEN F6 AND F7 AS CCR DEPOSITION LEVELS PROGRESS TO HIGHER ELEVATIONS.
   I. CONTINUED PREPARATORY WORKS (E.G. CLEARING, STRIPPING, STOCKPILING, ACCESS ESTABLISHMENT, ETC.) AS NEEDED IN PREPARATION FOR PERIMETER NON CCR COMMON FILL AND BOTTOM ASH FLOATING ROAD CONSTRUCTION IN LATER PHASES.
   J. MAINTENANCE OF SITE ROADWAYS AND OUT OF POND SITE EROSION AND SEDIMENT CONTROL MEASURES AS NEEDED AND DIRECTED BY THE SCS CONSTRUCTION MANAGEMENT TEAM.
   K. THE EXISTING DAM CREST MAY BE PROGRESSIVELY LOWERED DOWN TO A MINIMUM ELEVATION OF 370 FT-MSL IF DIRECTED BY THE SCS CONSTRUCTION MANAGEMENT TEAM, WITH THE PRIOR APPROVAL OF THE EOR AND THE SCS FOSSIL DAM SAFETY GROUP, AND SHALL FOLLOW THE CRITERIA AND REQUIREMENTS PROVIDED ON DRAWING R-301.
6. THE WATER TREATMENT CONTRACTOR EXECUTES THE FOLLOWING ACTIVITIES IN THIS PHASE:
   A. OPERATION AND MAINTENANCE OF THE WATER TREATMENT SYSTEM WITH A TREATMENT THROUGHPUT CAPACITY OF 12,000 GPM CAPABLE OF MEETING THE NPDES EFFLUENT REQUIREMENTS.
   B. PROVIDE FOR WATER TREATMENT AS NEEDED / REQUESTED BY THE SCS CONSTRUCTION MANAGEMENT TEAM AND AS COORDINATED WITH THE MARINE CONTRACTOR TO ADJUST WATER TREATMENT OPERATIONS AND DISCHARGE VOLUMES SUCH THAT THE MAIN POND WATER LEVELS ARE MANAGED TO MEET THE PROJECT REQUIREMENTS.
   C. PROVIDE CLEAN WATER SUPPLY TO THE ATP.
   D. PROVIDE FOR RECIRCULATION WATER TREATMENT IF NEEDED / REQUESTED BY THE SCS CONSTRUCTION MANAGEMENT TEAM.

NOTES

1. ELEVATIONS ARE IN FEET ABOVE MEAN SEA LEVEL, NATIONAL GEODETIC VERTICAL DATUM (NGVD) 1988. COORDINATES CORRESPOND TO ALABAMA WEST COORDINATE SYSTEM, NORTH AMERICAN DATUM (NAD) 1983.
2. CONTOUR INTERVAL IS 5 FEET, UNLESS OTHERWISE LABELED.

REFERENCES

1. EXISTING TOPOGRAPHY PROVIDED BY SOUTHERN COMPANY SERVICES, FEBRUARY 2020.
2. BATHYMETRIC SURFACE IS A COMPOSITE OF THE FEBRUARY 2020 SOUTHERN COMPANY AND THE JANUARY 2020 ARCSURVEY BATHYMETRIC SURVEYS TIED TO INTERPRETED SECTIONS OF THE 2016 SOUTHERN COMPANY BATHYMETRIC SURVEY WHERE SURVEY DATA IS NOT AVAILABLE.
3. BOTTOM OF CCR TOPOGRAPHY TAKEN FROM USGS, PORT BIRMINGHAM, 1938 AND GOODSPINGS, 1971 QUADRANGLES. TOPOGRAPHY WAS INTERPRETED BETWEEN 20 FOOT CONTOURS AND ADJUSTED BASED ON GEOTECHNICAL INVESTIGATION DATA BY GOLDER ASSOCIATES INC.
4. EXISTING AND APPROXIMATE PROPERTY BOUNDARIES PROVIDED BY SOUTHERN COMPANY SERVICES, APRIL 2020.

REV	DATE	REVISION DESCRIPTION	DES	CADD	CHK	RVW
0	2020/10/16	ISSUED FOR CONSTRUCTION	GLH	RMS	SCN	GLH

ALABAMA LICENSED No. 29143 PROFESSIONAL ENGINEER GREGORY L. HEBELER 16-OCT-2020

GREGORY L. HEBELER
ALABAMA PROFESSIONAL ENGINEER
CERTIFICATE NUMBER 29143

CLIENT
SOUTHERN COMPANY SERVICES
Alabama Power

PROJECT
PLANT GORGAS
ASH POND CLOSURE
DESIGN DRAWINGS

TITLE
PROPOSED DREDGE AND PASTE PHASING PLAN
PHASE 02-C

CONSULTANT
GOLDER

YYYY-MM-DD	2020/10/16
DESIGNED	GLH
PREPARED	RMS
CHECKED	SCN
REVIEWED / APPROVED	GLH

PROJECT NO.	SCS REF.	REV.	DRAWING
1789848	GOR17010	0	CP-105

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI E
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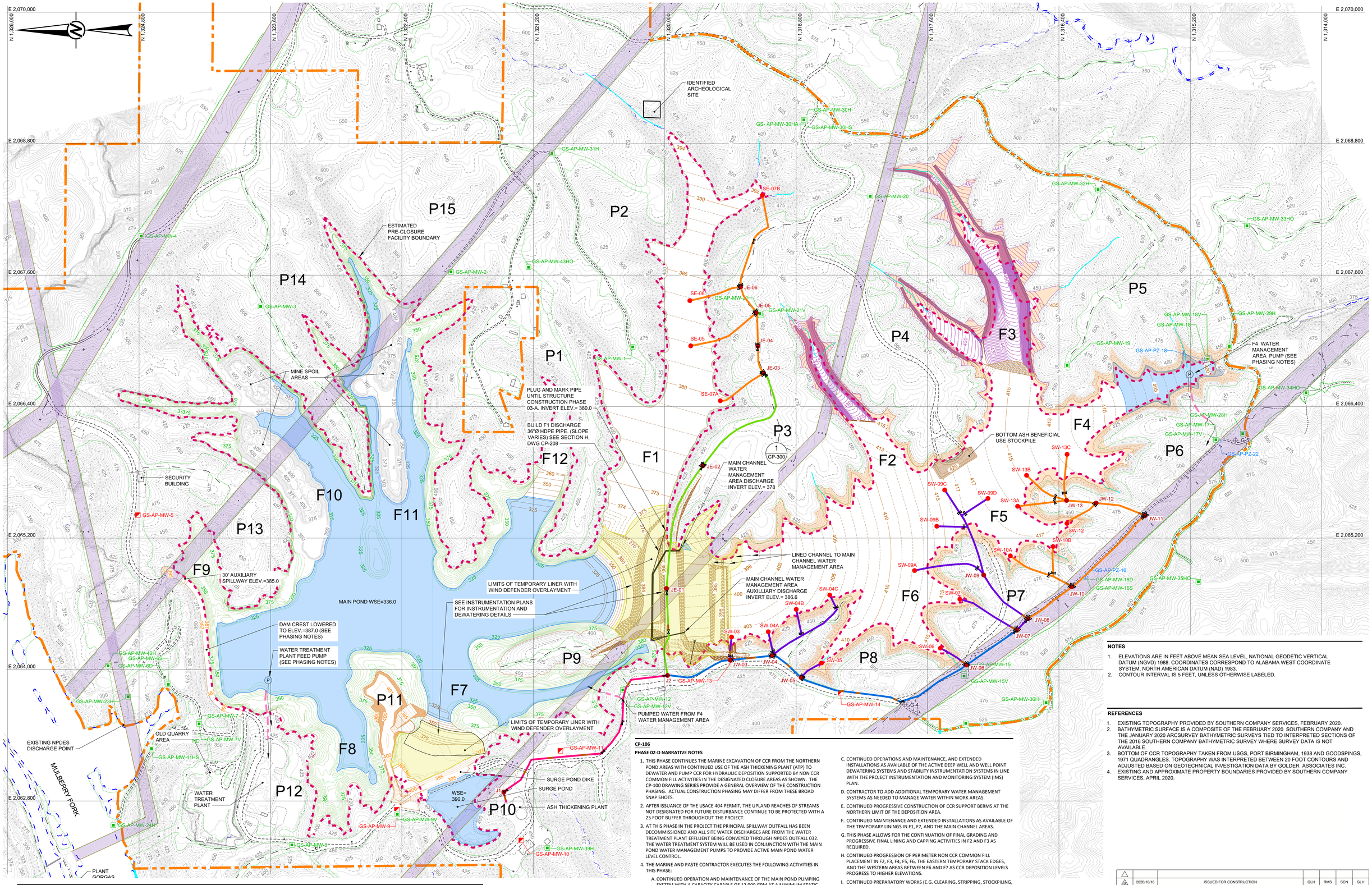
Path: \\Atlanta\cadd\Southern Company\Plant Gorgas\1789848 Detailed Design\01_Civil\Production\ | File Name: 1789848-CP-105 PHASE 2-C (2-6).dwg | Last Edited By: alerodriguez Date: 2020-10-16 Time:6:07:05 PM | Printed By: AleRodriguez Date: 2020-10-16 Time:7:20:31 PM



LEGEND

- EXISTING TOPOGRAPHY / BATHYMETRY CONTOURS (REFERENCE 1)
- PROPOSED DEPOSITION AND DREDGE GRADING CONTOURS (1FT)
- PROPOSED GRADING CONTOURS OUTSIDE CLOSURE LIMITS
- EXISTING ROAD
- EXISTING TRAIL
- EXISTING PARKING AREA
- EXISTING POWER POLES / TOWERS
- APC OWNED PROPERTY BOUNDARIES
- APPROXIMATE APC OWNED PROPERTY BOUNDARIES
- ESTIMATED PRE-CLOSURE FACILITY BOUNDARY
- EXISTING TRANSMISSION CORRIDOR
- DREDGE PHASE NORMAL POOL
- TEMPORARY LINER AREA
- AREA OF NON-CCR CLOSURE GRADING
- P1 / F1 PENINSULA / FINGER
- STREAMS PROVIDED BY CAHABA CONSULTING, LLC
- G-4 EXISTING MONITORING WELL LOCATION (NOT IN MODELING NETWORK)
- GS-AP-PZ-18 EXISTING PIEZOMETER LOCATION
- GS-AP-MW-01 EXISTING MONITORING WELL LOCATION
- GS-AP-MW-05 ABANDONED MONITORING WELL
- PROPOSED 6" AND 8" (2) CS PIPE ROUTE
- PROPOSED 6" AND 8" CS PIPE ROUTE
- PROPOSED 8" CS PIPE ROUTE
- PROPOSED 10" HDPE PIPE ROUTE
- PROPOSED 8" & 10" HDPE PIPE ROUTE
- JW-02 PROPOSED PIPELINE JUNCTION
- SW-02 PROPOSED PIPELINE SPIGOT
- PROPOSED PIPE CROSSINGS
- PROPOSED PIPELINE VALVE
- PROPOSED WATER PUMP
- PROPOSED PUMPED WATER LINE

0 300 600
1" = 300' FEET

CP-106

PHASE 02-D NARRATIVE NOTES

1. THIS PHASE CONTINUES THE MARINE EXCAVATION OF CCR FROM THE NORTHERN POND AREAS WITH CONTINUED USE OF THE ASH THICKENING PLANT (ATP) TO DEWATER AND PUMP CCR FOR HYDRAULIC DEPOSITION SUPPORTED BY NON CCR COMMON FILL ACTIVITIES IN THE DESIGNATED CLOSURE AREAS AS SHOWN. THE CP-100 DRAWING SERIES PROVIDE A GENERAL OVERVIEW OF THE CONSTRUCTION PHASING. ACTUAL CONSTRUCTION PHASING MAY DIFFER FROM THESE BROAD SNAP SHOTS.
2. AFTER ISSUANCE OF THE USACE 404 PERMIT, THE UPLAND REACHES OF STREAMS NOT DESIGNATED FOR FUTURE DISTURBANCE CONTINUE TO BE PROTECTED WITH A 25 FOOT BUFFER THROUGHOUT THE PROJECT.
3. AT THIS PHASE IN THE PROJECT THE PRINCIPAL SPILLWAY OUTFALL HAS BEEN DECOMMISSIONED AND ALL SITE WATER DISCHARGES ARE FROM THE WATER TREATMENT PLANT EFFLUENT BEING CONVEYED THROUGH NPDES OUTFALL 032. THE WATER TREATMENT SYSTEM WILL BE USED IN CONJUNCTION WITH THE MAIN POND WATER MANAGEMENT PUMPS TO PROVIDE ACTIVE MAIN POND WATER LEVEL CONTROL.
4. THE MARINE AND PASTE CONTRACTOR EXECUTES THE FOLLOWING ACTIVITIES IN THIS PHASE:
   - A. CONTINUED OPERATION AND MAINTENANCE OF THE MAIN POND PUMPING SYSTEM WITH A CAPACITY CAPABLE OF 12,000 GPM AT A MINIMUM STATIC HEAD OF 175 FEET (FOR LATER PHASES) ADJACENT TO P12 TO PROVIDE WATER TREATMENT PLANT (WTP) FEED AND MAIN POND WATER LEVEL CONTROL.
   - B. HYDRAULIC DREDGING OF CCR CONTINUES IN THIS PHASE AND PROGRESSES WITH PARALLEL DRAWDOWN OF THE MAIN POND WATER LEVELS AS NEEDED TO OPTIMIZE HYDRAULIC EXCAVATIONS.
   - C. MARINE POND WALL CLEANING OPERATIONS CONTINUE AND PROGRESS IN PARALLEL WITH DRAWDOWN OF THE MAIN POND AND AS POND SIDEWALL AREAS BELOW ELEVATION 385 FT-MSL ARE EXPOSED.
   - D. OPERATION OF THE SURGE POND AND DEPOSITION LINES AND TECHNICAL DIRECTION FOR THE ASH THICKENING PLANT OPERATED BY ALABAMA POWER.
   - E. DEPOSITION FROM THE ATP IN THIS PHASE CONCENTRATES ON COMPLETING DEPOSITION IN AREAS OF PHASE 2 DEPOSITION PIPELINE. DEPOSITION IS PROGRESSED IN F1, F4, F5, F6, AND THE MAIN CHANNEL TEMPORARY STACK. DEPOSITION PHASING AND PLANNING IS ADJUSTED TO PROMOTE POSITIVE DRAINAGE IN DEPOSITION AREAS AND IN SEQUENCE WITH PERIMETER NON CCR COMMON FILL SUPPORT ACTIVITIES.
   - F. ADDITIONAL DEPOSITION PIPELINE MAY BE INSTALLED FOR USE IN LATER DEPOSITION PHASES.
5. THE GENERAL CIVIL CONTRACTOR EXECUTES THE FOLLOWING ACTIVITIES IN THIS PHASE:
   - A. CONTINUED MAINTENANCE OF THE MAIN CHANNEL WATER MANAGEMENT GRAVITY DISCHARGE SYSTEM.
   - B. CONTINUED OPERATION AND MAINTENANCE OF THE F4 WATER MANAGEMENT PUMPING SYSTEM CAPABLE OF 6,000 GPM AT A MINIMUM STATIC HEAD OF 150 FEET TO PROVIDE ACTIVE WATER MANAGEMENT FOR THE SOUTHERN POND AREAS WITH DISCHARGE TO THE MAIN POND AT THE WESTERN SIDE OF P9.
   - C. CONTINUED OPERATIONS AND MAINTENANCE, AND EXTENDED INSTALLATIONS AS AVAILABLE OF THE ACTIVE DEEP WELL AND WELL POINT DEWATERING SYSTEMS AND STABILITY INSTRUMENTATION SYSTEMS IN LINE WITH THE PROJECT INSTRUMENTATION AND MONITORING SYSTEM (IMS) PLAN.
   - D. CONTRACTOR TO ADD ADDITIONAL TEMPORARY WATER MANAGEMENT SYSTEMS AS NEEDED TO MANAGE WATER WITHIN WORK AREAS.
   - E. CONTINUED PROGRESSIVE CONSTRUCTION OF CCR SUPPORT BERMS AT THE NORTHERN LIMIT OF THE DEPOSITION AREA.
   - F. CONTINUED MAINTENANCE AND EXTENDED INSTALLATIONS AS AVAILABLE OF THE TEMPORARY LININGS IN F1, F7, AND THE MAIN CHANNEL AREAS.
   - G. THIS PHASE ALLOWS FOR THE CONTINUATION OF FINAL GRADING AND PROGRESSIVE FINAL LINING AND CAPPING ACTIVITIES IN F2 AND F3 AS REQUIRED.
   - H. CONTINUED PROGRESSION OF PERIMETER NON CCR COMMON FILL PLACEMENT IN F2, F3, F4, F5, F6, THE EASTERN TEMPORARY STACK EDGES, AND THE WESTERN AREAS BETWEEN F6 AND F7 AS CCR DEPOSITION LEVELS PROGRESS TO HIGHER ELEVATIONS.
   - I. CONTINUED PREPARATORY WORKS (E.G. CLEARING, STRIPPING, STOCKPILING, ACCESS ESTABLISHMENT, ETC.) AS NEEDED IN PREPARATION FOR PERIMETER NON CCR COMMON FILL AND BOTTOM ASH FLOATING ROAD CONSTRUCTION IN LATER PHASES.
   - J. MAINTENANCE OF SITE ROADWAYS AND OUT OF POND SITE EROSION AND SEDIMENT CONTROL MEASURES AS NEEDED AND DIRECTED BY THE SCS CONSTRUCTION MANAGEMENT TEAM.
   - K. THE EXISTING DAM CREST MAY BE PROGRESSIVELY LOWERED DOWN TO A MINIMUM ELEVATION OF 370 FT-MSL IF DIRECTED BY THE SCS CONSTRUCTION MANAGEMENT TEAM, WITH THE PRIOR APPROVAL OF THE EOR AND THE SCS FOSSIL DAM SAFETY GROUP, AND SHALL FOLLOW THE CRITERIA AND REQUIREMENTS PROVIDED ON DRAWING R-301.
6. THE WATER TREATMENT CONTRACTOR EXECUTES THE FOLLOWING ACTIVITIES IN THIS PHASE:
   - A. OPERATION AND MAINTENANCE OF THE WATER TREATMENT SYSTEM WITH A TREATMENT THROUGHPUT CAPACITY OF 12,000 GPM CAPABLE OF MEETING THE NPDES EFFLUENT REQUIREMENTS.
   - B. PROVIDE FOR WATER TREATMENT AS NEEDED / REQUESTED BY THE SCS CONSTRUCTION MANAGEMENT TEAM AND AS COORDINATED WITH THE MARINE CONTRACTOR TO ADJUST WATER TREATMENT OPERATIONS AND DISCHARGE VOLUMES SUCH THAT THE MAIN POND WATER LEVELS ARE MANAGED TO MEET THE PROJECT REQUIREMENTS.
   - C. PROVIDE CLEAN WATER SUPPLY TO THE ATP.
   - D. PROVIDE FOR RECIRCULATION WATER TREATMENT IF NEEDED / REQUESTED BY THE SCS CONSTRUCTION MANAGEMENT TEAM.

NOTES

1. ELEVATIONS ARE IN FEET ABOVE MEAN SEA LEVEL, NATIONAL GEODETIC VERTICAL DATUM (NGVD) 1988. COORDINATES CORRESPOND TO ALABAMA WEST COORDINATE SYSTEM, NORTH AMERICAN DATUM (NAD) 1983.
2. CONTOUR INTERVAL IS 5 FEET, UNLESS OTHERWISE LABELED.

REFERENCES

1. EXISTING TOPOGRAPHY PROVIDED BY SOUTHERN COMPANY SERVICES, FEBRUARY 2020.
2. BATHYMETRIC SURFACE IS A COMPOSITE OF THE FEBRUARY 2020 SOUTHERN COMPANY AND THE JANUARY 2020 ARCSURVEY BATHYMETRIC SURVEYS TIED TO INTERPRETED SECTIONS OF THE 2016 SOUTHERN COMPANY BATHYMETRIC SURVEY WHERE SURVEY DATA IS NOT AVAILABLE.
3. BOTTOM OF CCR TOPOGRAPHY TAKEN FROM USGS, PORT BIRMINGHAM, 1938 AND GOODSPINGS, 1971 QUADRANGLES. TOPOGRAPHY WAS INTERPRETED BETWEEN 20 FOOT CONTOURS AND ADJUSTED BASED ON GEOTECHNICAL INVESTIGATION DATA BY GOLDER ASSOCIATES INC.
4. EXISTING AND APPROXIMATE PROPERTY BOUNDARIES PROVIDED BY SOUTHERN COMPANY SERVICES, APRIL 2020.

REV	DATE	REVISION DESCRIPTION	DES	CADD	CHK	RVW
0	2020/10/16	ISSUED FOR CONSTRUCTION	GLH	RMS	SCN	GLH

CLIENT
SOUTHERN COMPANY SERVICES
Alabama Power

PROJECT
PLANT GORGAS
ASH POND CLOSURE
DESIGN DRAWINGS

TITLE
PROPOSED DREDGE AND PASTE PHASING PLAN PHASE 02-D

ALABAMA LICENSED PROFESSIONAL ENGINEER GREGORY L. HEBELER 29143 16-OCT-2020

GREGORY L. HEBELER
ALABAMA PROFESSIONAL ENGINEER
CERTIFICATE NUMBER 29143

CONSULTANT
GOLDER

YYYY-MM-DD	2020/10/16
DESIGNED	GLH
PREPARED	RMS
CHECKED	SCN
REVIEWED / APPROVED	GLH

PROJECT NO.	SCS REF.	REV.	DRAWING
1789848	GOR17010	0	CP-106

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM ANSI E

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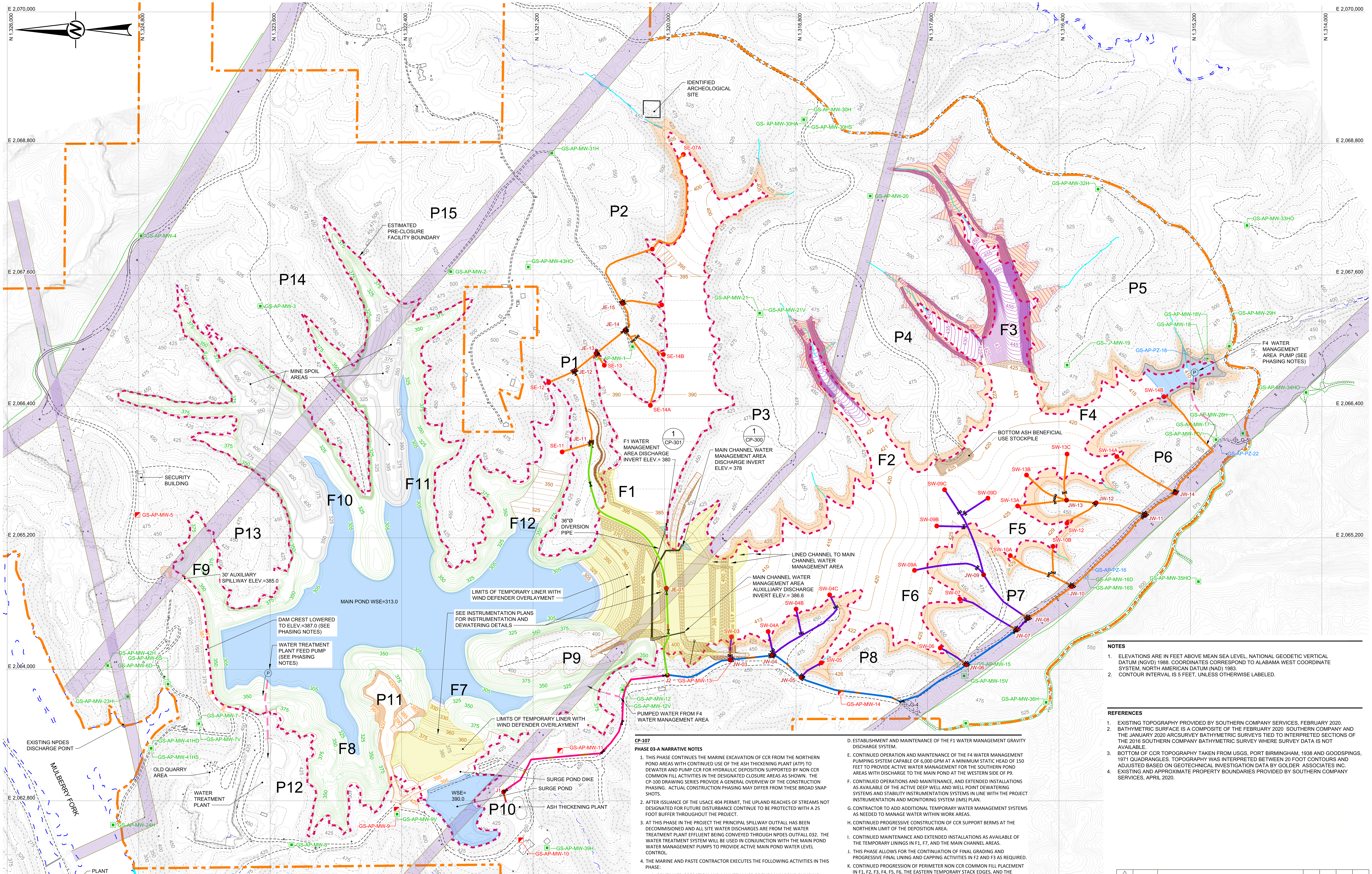

LEGEND

340	EXISTING TOPOGRAPHY / BATHYMETRY CONTOURS (REFERENCE 1)
500	PROPOSED DEPOSITION AND DREDGE GRADING CONTOURS (1FT)
340	PROPOSED GRADING CONTOURS OUTSIDE CLOSURE LIMITS
	EXISTING ROAD
	EXISTING TRAIL
	EXISTING PARKING AREA
	EXISTING POWER POLES / TOWERS
	APC OWNED PROPERTY BOUNDARIES
	APPROXIMATE APC OWNED PROPERTY BOUNDARIES
	ESTIMATED PRE-CLOSURE FACILITY BOUNDARY
	EXISTING TRANSMISSION CORRIDOR
	DREDGE PHASE NORMAL POOL
	TEMPORARY LINER AREA
	AREA OF NON-CCR CLOSURE GRADING
P1 / F1	PENINSULA / FINGER
	STREAMS PROVIDED BY CAHABA CONSULTING, LLC
G-4	EXISTING MONITORING WELL LOCATION (NOT IN MODELING NETWORK)
GS-AP-PZ-18	EXISTING PIEZOMETER LOCATION
GS-AP-MW-01	EXISTING MONITORING WELL LOCATION
GS-AP-MW-05	ABANDONED MONITORING WELL
	PROPOSED 6" AND 8" (2) CS PIPE ROUTE
	PROPOSED 6" AND 8" CS PIPE ROUTE
	PROPOSED 8" CS PIPE ROUTE
	PROPOSED 10" HDPE PIPE ROUTE
	PROPOSED 8" & 10" HDPE PIPE ROUTE
JW-02	PROPOSED PIPELINE JUNCTION
SW-02	PROPOSED PIPELINE SPIGOT
	PROPOSED PIPE CROSSINGS
	PROPOSED PIPELINE VALVE
	PROPOSED WATER PUMP
	PROPOSED PUMPED WATER LINE

CP-107

PHASE 03-A NARRATIVE NOTES

1. THIS PHASE CONTINUES THE MARINE EXCAVATION OF CCR FROM THE NORTHERN POND AREAS WITH CONTINUED USE OF THE ASH THICKENING PLANT (ATP) TO DEWATER AND PUMP CCR FOR HYDRAULIC DEPOSITION SUPPORTED BY NON CCR COMMON FILL ACTIVITIES IN THE DESIGNATED CLOSURE AREAS AS SHOWN. THE CP-100 DRAWING SERIES PROVIDE A GENERAL OVERVIEW OF THE CONSTRUCTION PHASING. ACTUAL CONSTRUCTION PHASING MAY DIFFER FROM THESE BROAD SNAP SHOTS.
2. AFTER ISSUANCE OF THE USACE 404 PERMIT, THE UPLAND REACHES OF STREAMS NOT DESIGNATED FOR FUTURE DISTURBANCE CONTINUE TO BE PROTECTED WITH A 25 FOOT BUFFER THROUGHOUT THE PROJECT.
3. AT THIS PHASE IN THE PROJECT THE PRINCIPAL SPILLWAY OUTFALL HAS BEEN DECOMMISIONED AND ALL SITE WATER DISCHARGES ARE FROM THE WATER TREATMENT PLANT EFFLUENT BEING CONVEYED THROUGH NPDES OUTFALL 032. THE WATER TREATMENT SYSTEM WILL BE USED IN CONJUNCTION WITH THE MAIN POND WATER MANAGEMENT PUMPS TO PROVIDE ACTIVE MAIN POND WATER LEVEL CONTROL.
4. THE MARINE AND PASTE CONTRACTOR EXECUTES THE FOLLOWING ACTIVITIES IN THIS PHASE:
   A. CONTINUED OPERATION AND MAINTENANCE OF THE MAIN POND PUMPING SYSTEM WITH A CAPACITY CAPABLE OF 12,000 GPM AT A MINIMUM STATIC HEAD OF 175 FEET (FOR LATER PHASES) ADJACENT TO P12 TO PROVIDE WATER TREATMENT PLANT (WTP) FEED AND MAIN POND WATER LEVEL CONTROL.
   B. HYDRAULIC DREDGING OF CCR CONTINUES IN THIS PHASE AND PROGRESSES WITH PARALLEL DRAWDOWN OF THE MAIN POND WATER LEVELS AS NEEDED TO OPTIMIZE HYDRAULIC EXCAVATIONS.
   C. MARINE POND WALL CLEANING AND HYDRAULIC WASHING OPERATIONS CONTINUE AND PROGRESS IN PARALLEL WITH DRAWDOWN OF THE MAIN POND AND AS POND SIDEWALL AREAS BELOW ELEVATION 385 ARE EXPOSED.
   D. OPERATION OF THE SURGE POND AND DEPOSITION LINES AND TECHNICAL DIRECTION FOR THE ASH THICKENING PLANT OPERATED BY ALABAMA POWER.
   E. PHASE 3 OF THE DEPOSITION PIPELINE IS FULLY ESTABLISHED.
   F. DEPOSITION FROM THE ATP IN THIS PHASE TRANSITIONS FROM PHASE 2 TO PHASE 3 OF THE DEPOSITION PIPELINE SYSTEM. DEPOSITION IS PROGRESSED IN F1, F4, F5, F6, AND THE MAIN CHANNEL TEMPORARY STACK. DEPOSITION PHASING AND PLANNING IS ADJUSTED TO PROMOTE POSITIVE DRAINAGE IN DEPOSITION AREAS AND IN SEQUENCE WITH PERIMETER NON CCR COMMON FILL SUPPORT ACTIVITIES.
5. THE GENERAL CIVIL CONTRACTOR EXECUTES THE FOLLOWING ACTIVITIES IN THIS PHASE:
   A. COMPLETION OF ESTABLISHMENT OF ANY REMAINING PIPELINE DEPOSITION CORRIDOR ROAD AND ACCESSWAYS NOT PREVIOUSLY COMPLETED.
   B. CONSTRUCTION OF THE F1 POND CROSSING USING BOTTOM ASH FROM THE ONSITE STOCKPILE INCLUDING ASSOCIATED DEWATERING AND INSTRUMENTATION INSTALLATIONS, AND ESTABLISHMENT OF THE P1 EASTERN APPROACH ROADWAY.
   C. CONTINUED MAINTENANCE OF THE MAIN CHANNEL WATER MANAGEMENT GRAVITY DISCHARGE SYSTEM.
   D. ESTABLISHMENT AND MAINTENANCE OF THE F1 WATER MANAGEMENT GRAVITY DISCHARGE SYSTEM.
   E. CONTINUED OPERATION AND MAINTENANCE OF THE F4 WATER MANAGEMENT PUMPING SYSTEM CAPABLE OF 6,000 GPM AT A MINIMUM STATIC HEAD OF 150 FEET TO PROVIDE ACTIVE WATER MANAGEMENT FOR THE SOUTHERN POND AREAS WITH DISCHARGE TO THE MAIN POND AT THE WESTERN SIDE OF P9.
   F. CONTINUED OPERATIONS AND MAINTENANCE, AND EXTENDED INSTALLATIONS AS AVAILABLE OF THE ACTIVE DEEP WELL AND WELL POINT DEWATERING SYSTEMS AND STABILITY INSTRUMENTATION SYSTEMS IN LINE WITH THE PROJECT INSTRUMENTATION AND MONITORING SYSTEM (IMS) PLAN.
   G. CONTRACTOR TO ADD ADDITIONAL TEMPORARY WATER MANAGEMENT SYSTEMS AS NEEDED TO MANAGE WATER WITHIN WORK AREAS.
   H. CONTINUED PROGRESSIVE CONSTRUCTION OF CCR SUPPORT BERMS AT THE NORTHERN LIMIT OF THE DEPOSITION AREA.
   I. CONTINUED MAINTENANCE AND EXTENDED INSTALLATIONS AS AVAILABLE OF THE TEMPORARY LININGS IN F1, F7, AND THE MAIN CHANNEL AREAS.
   J. THIS PHASE ALLOWS FOR THE CONTINUATION OF FINAL GRADING AND PROGRESSIVE FINAL LINING AND CAPPING ACTIVITIES IN F2 AND F3 AS REQUIRED.
   K. CONTINUED PROGRESSION OF PERIMETER NON CCR COMMON FILL PLACEMENT IN F1, F2, F3, F4, F5, F6, THE EASTERN TEMPORARY STACK EDGES, AND THE WESTERN AREAS BETWEEN F6 AND F7 AS CCR DEPOSITION LEVELS PROGRESS TO HIGHER ELEVATIONS.
   L. CONTINUED PREPARATORY WORKS (E.G. CLEARING, STRIPPING, STOCKPILING, ACCESS ESTABLISHMENT, ETC.) AS NEEDED IN PREPARATION FOR PERIMETER NON CCR COMMON FILL AND BOTTOM ASH FLOATING ROAD CONSTRUCTION IN LATER PHASES.
   M. MAINTENANCE OF SITE ROADWAYS AND OUT OF POND SITE EROSION AND SEDIMENT CONTROL MEASURES AS NEEDED AND DIRECTED BY THE SCS CONSTRUCTION MANAGEMENT TEAM.
   N. THE EXISTING DAM CREST MAY BE PROGRESSIVELY LOWERED DOWN TO A MINIMUM ELEVATION OF 370 IF DIRECTED BY THE SCS CONSTRUCTION MANAGEMENT TEAM, WITH THE PRIOR APPROVAL OF THE EOR AND THE SCS FOSSIL DAM SAFETY GROUP, AND SHALL FOLLOW THE CRITERIA AND REQUIREMENTS PROVIDED ON DRAWING R-301.
6. THE WATER TREATMENT CONTRACTOR EXECUTES THE FOLLOWING ACTIVITIES IN THIS PHASE:
   A. OPERATION AND MAINTENANCE OF THE WATER TREATMENT SYSTEM WITH A TREATMENT THROUGHPUT CAPACITY OF 12,000 GPM CAPABLE OF MEETING THE NPDES EFFLUENT REQUIREMENTS.
   B. PROVIDE FOR WATER TREATMENT AS NEEDED / REQUESTED BY THE SCS CONSTRUCTION MANAGEMENT TEAM AND AS COORDINATED WITH THE MARINE CONTRACTOR TO ADJUST WATER TREATMENT OPERATIONS AND DISCHARGE VOLUMES SUCH THAT THE MAIN POND WATER LEVELS ARE MANAGED TO MEET THE PROJECT REQUIREMENTS.
   C. PROVIDE CLEAN WATER SUPPLY TO THE ATP.
   D. PROVIDE FOR RECIRCULATION WATER TREATMENT IF NEEDED / REQUESTED BY THE SCS CONSTRUCTION MANAGEMENT TEAM.

NOTES

1. ELEVATIONS ARE IN FEET ABOVE MEAN SEA LEVEL, NATIONAL GEODETIC VERTICAL DATUM (NGVD) 1988. COORDINATES CORRESPOND TO ALABAMA WEST COORDINATE SYSTEM, NORTH AMERICAN DATUM (NAD) 1983.
2. CONTOUR INTERVAL IS 5 FEET, UNLESS OTHERWISE LABELED.

REFERENCES

1. EXISTING TOPOGRAPHY PROVIDED BY SOUTHERN COMPANY SERVICES, FEBRUARY 2020.
2. BATHYMETRIC SURFACE IS A COMPOSITE OF THE FEBRUARY 2020 SOUTHERN COMPANY AND THE JANUARY 2020 ARCSURVEY BATHYMETRIC SURVEYS TIED TO INTERPRETED SECTIONS OF THE 2016 SOUTHERN COMPANY BATHYMETRIC SURVEY WHERE SURVEY DATA IS NOT AVAILABLE.
3. BOTTOM OF CCR TOPOGRAPHY TAKEN FROM USGS, PORT BIRMINGHAM, 1938 AND GOODSPINGS, 1971 QUADRANGLES. TOPOGRAPHY WAS INTERPRETED BETWEEN 20 FOOT CONTOURS AND ADJUSTED BASED ON GEOTECHNICAL INVESTIGATION DATA BY GOLDER ASSOCIATES INC.
4. EXISTING AND APPROXIMATE PROPERTY BOUNDARIES PROVIDED BY SOUTHERN COMPANY SERVICES, APRIL 2020.

REV	DATE	REVISION DESCRIPTION	DES	CADD	CHK	RVW
△						
0	2020/10/16	ISSUED FOR CONSTRUCTION	GLH	RMS	SCN	GLH

CLIENT
SOUTHERN COMPANY SERVICES
Alabama Power

PROJECT
PLANT GORGAS
ASH POND CLOSURE
DESIGN DRAWINGS

TITLE
PROPOSED DREDGE AND PASTE PHASING PLAN
PHASE 03-A

CONSULTANT
GOLDER

YYYY-MM-DD	2020/10/16
DESIGNED	GLH
PREPARED	RMS
CHECKED	SCN
REVIEWED / APPROVED	GLH

ALABAMA LICENSED No. 29143 PROFESSIONAL ENGINEER GREGORY L. HEBELER 16-OCT-2020
GREGORY L. HEBELER
ALABAMA PROFESSIONAL ENGINEER
CERTIFICATE NUMBER 29143

PROJECT NO.	SCS REF.	REV.	DRAWING
1789848	GOR17010	0	CP-107

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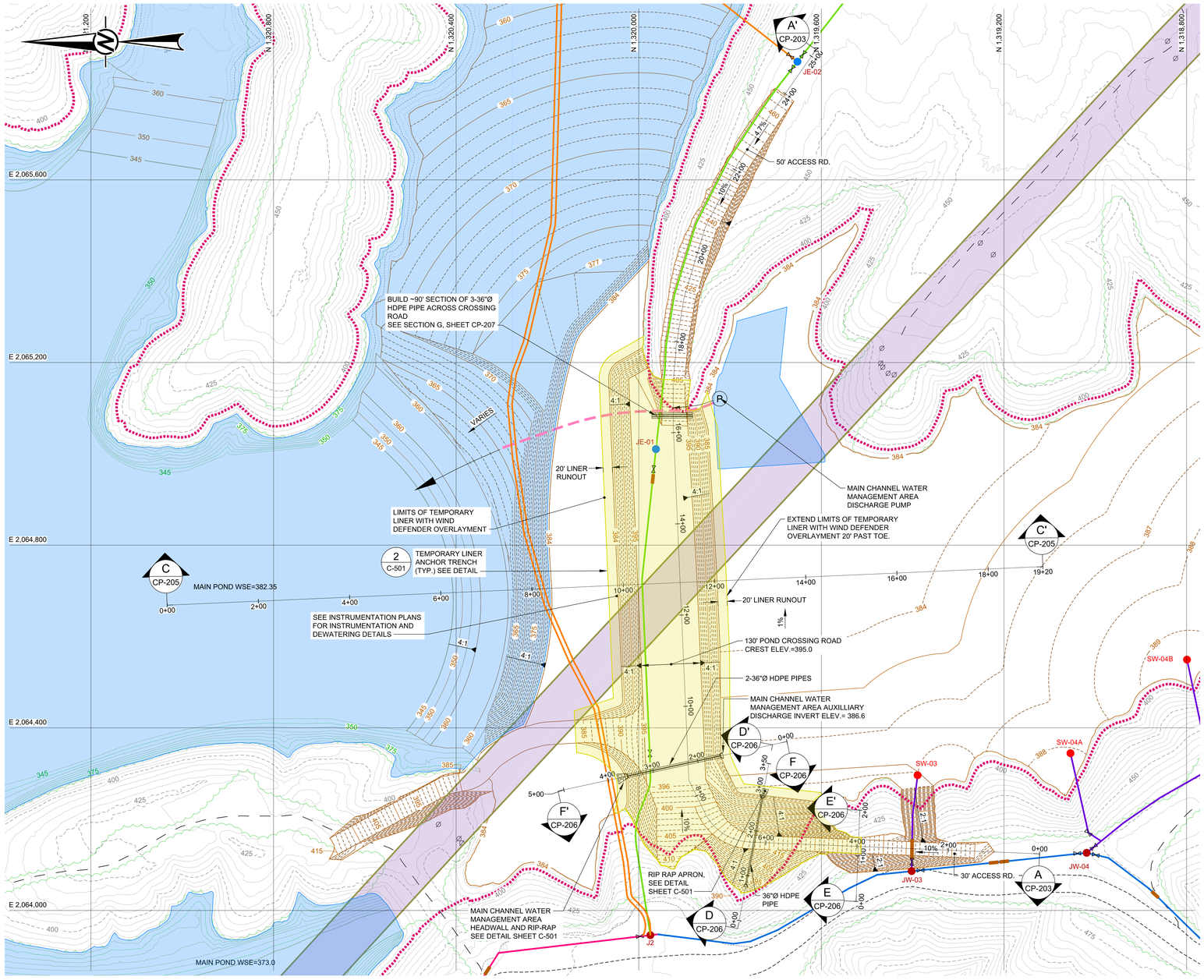
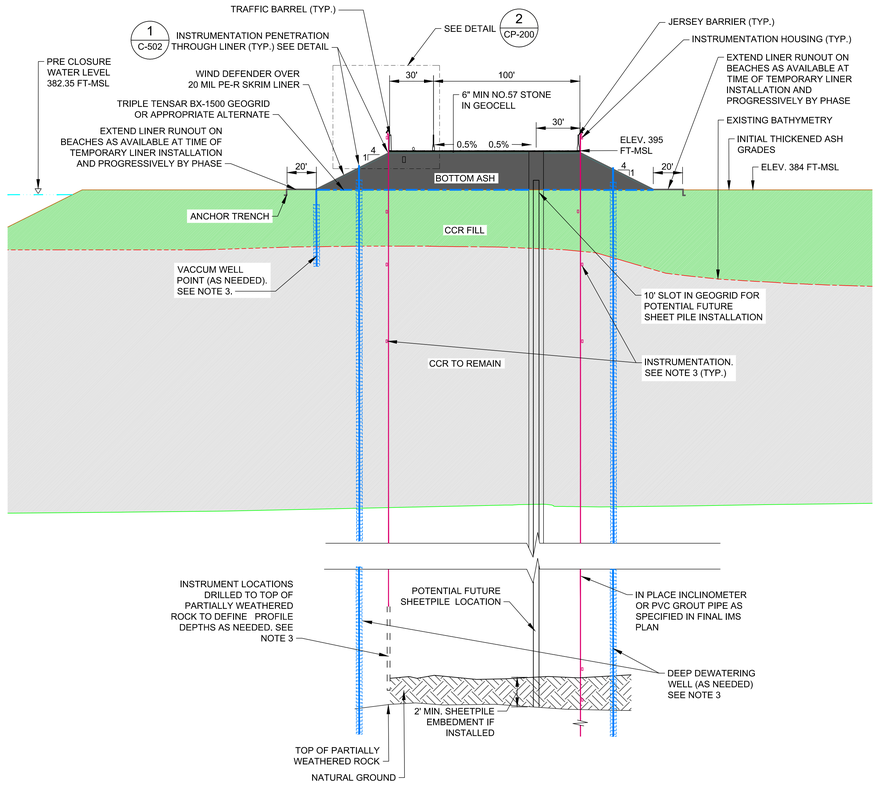


POND CROSSING AND SURFACE WATER MANAGEMENT PLAN - PHASE 1C

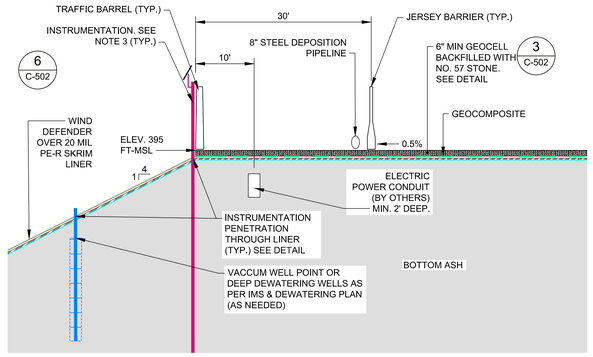
0 100 200
1" = 100' FEET



1 CP-200 POND CROSSING ROAD SECTION

0 40 80
1" = 40' FEET
HORIZONTAL SCALE

0 20 40
1" = 20' FEET
VERTICAL SCALE



2 CP-200 POND CROSSING ROAD DETAIL

0 40 80
1" = 40' FEET
HORIZONTAL SCALE

0 20 40
1" = 20' FEET
VERTICAL SCALE

LEGEND

- EXISTING TOPOGRAPHY / BATHYMETRY CONTOURS (REFERENCE 1)
- PROPOSED DEPOSITION AND DREDGE GRADING CONTOURS (1FT)
- PROPOSED GRADING CONTOURS OUTSIDE CLOSURE LIMITS
- EXISTING ROAD
- EXISTING TRAIL
- EXISTING PARKING AREA
- EXISTING POWER POLES / TOWERS
- APC OWNED PROPERTY BOUNDARIES
- ESTIMATED PRE-CLOSURE FACILITY BOUNDARY
- EXISTING TRANSMISSION CORRIDOR
- DREDGE PHASE NORMAL POOL
- TEMPORARY LINER AREA
- 25' STREAM BUFFER
- STREAMS PROVIDED BY CAHABA CONSULTING, LLC
- PROPOSED 6" AND 8" (2) CS PIPE ROUTE
- PROPOSED 6" AND 8" CS PIPE ROUTE
- PROPOSED 8" CS PIPE ROUTE
- PROPOSED 10" HDPE PIPE ROUTE
- PROPOSED 8" & 10" HDPE PIPE ROUTE
- JW-02 PROPOSED PIPELINE JUNCTION
- SW-02 PROPOSED PIPELINE SPIGOT
- PROPOSED PIPE CROSSINGS
- PROPOSED PIPELINE VALVE
- PROPOSED WATER PUMP
- PROPOSED PUMPED WATER LINE
- EXISTING CCR TO REMAIN
- BOTTOM OF ASH
- PROPOSED CCR FILL

NOTES

1. ELEVATIONS ARE IN FEET ABOVE MEAN SEA LEVEL, NATIONAL GEODETIC VERTICAL DATUM (NGVD) 1988. COORDINATES CORRESPOND TO ALABAMA WEST COORDINATE SYSTEM, NORTH AMERICAN DATUM (NAD) 1983.
2. CONTOUR INTERVAL IS 5 FEET, UNLESS OTHERWISE LABELED.
3. LOCATION AND TYPE OF INSTRUMENTATION AND DEWATERING WELLS AND WELL POINTS TO BE BASED ON FINAL IMS PLAN.

REFERENCES

1. EXISTING TOPOGRAPHY PROVIDED BY SOUTHERN COMPANY SERVICES, FEBRUARY 2020.
2. BATHYMETRIC SURFACE IS A COMPOSITE OF THE FEBRUARY 2020 SOUTHERN COMPANY AND THE JANUARY 2020 ARCSURVEY BATHYMETRIC SURVEYS TIED TO INTERPRETED SECTIONS OF THE 2016 SOUTHERN COMPANY BATHYMETRIC SURVEY WHERE SURVEY DATA IS NOT AVAILABLE.
3. BOTTOM OF CCR TOPOGRAPHY TAKEN FROM USGS, PORT BIRMINGHAM, 1938 AND GOODSPINGS, 1971 QUADRANGLES. TOPOGRAPHY WAS INTERPRETED BETWEEN 20 FOOT CONTOURS AND ADJUSTED BASED ON GEOTECHNICAL INVESTIGATION DATA BY GOLDER ASSOCIATES INC.
4. EXISTING AND APPROXIMATE PROPERTY BOUNDARIES PROVIDED BY SOUTHERN COMPANY SERVICES, APRIL 2020.

POND CROSSING ROAD NOTES

1. PRIOR TO THE START OF CONSTRUCTION OF THE POND CROSSING, THE INSTRUMENTATION INSTALLATIONS ARE TO BE COMPLETED IN LINE WITH THE FINAL INSTRUMENTATION MONITORING SYSTEM (IMS) PLAN.
2. PRIOR TO THE START OF THE POND CROSSING CONSTRUCTION, THE CONTRACTOR SHALL SUBMIT THEIR PROPOSED WORK PLANS (INCLUDING SAFETY PROTOCOL PLANS AND MATERIALS OF CONSTRUCTION FOR REVIEW BY ENGINEER AND OWNER), AND PARTICIPATE IN A PRE-CONSTRUCTION MEETING.
3. THE BRIDGING LAYER, CONSISTING OF A COMBINATION OF BOTTOM ASH AND GEOGRID, SHALL BE CONSTRUCTED OVER THE POND CROSSING FOUNDATION AREA TO PROVIDE A STABLE PLATFORM UPON WHICH A CONFORMING FILL LAYER CAN BE CONSTRUCTED.
4. THE MAXIMUM THICKNESS OF THE BRIDGING LAYER WILL BE CONFIRMED BY ANALYSIS OF THE PRE-CONSTRUCTION INSTRUMENTATION INSTALLATION DRILLING, BUT SHOULD, WHEN COMPLETED, NOT EXCEED 3 FEET GRADE WITHOUT PRIOR APPROVAL FROM THE ENGINEER AND OWNER.
5. VIBRATORY COMPACTION EQUIPMENT IS NOT PERMITTED TO OPERATE IN THE CONSTRUCTION OF THE POND CROSSING OVER EXISTING SLUICED ASH.
6. THE POND CROSSING FILL SHALL BE COMPACTED TO 95% OF THE STANDARD PROCTOR (ASTM D698) MAXIMUM DRY DENSITY AT A MOISTURE CONTENT WITHIN 3% OF THE OPTIMUM MOISTURE CONTENT.
7. THE POND CROSSING SHALL BE CONSTRUCTED FROM BOTTOM ASH AND SHALL BE FREE OF ALL ORGANIC MATERIAL, STONES LARGER THAN FOUR (4) INCHES IN ANY DIMENSION, BROKEN CONCRETE, MASONRY, RUBBLE OR OTHER SIMILAR UNSTABLE MATERIALS.
8. THE POND CROSSING FILL MATERIAL SHALL BE PLACED IN UNIFORM LIFTS NOT EXCEEDING EIGHT (8) INCHES IN THICKNESS (LOOSE MEASURES)
9. TESTING SHALL BE DONE IN ACCORDANCE WITH THE TECHNICAL SPECIFICATIONS.
10. UPSTREAM AND DOWNSTREAM SLOPES OF THE POND CROSSING TO RECEIVE A TEMPORARY LINER SYSTEM.

REV	DATE	REVISION DESCRIPTION	DES	CADD	CHK	RVW
1	2020/10/16	ISSUED FOR CONSTRUCTION	GLH	VPM	SCN	GLH

CLIENT
SOUTHERN COMPANY SERVICES

Alabama Power

PROJECT
PLANT GORGAS
ASH POND CLOSURE
DESIGN DRAWINGS

TITLE
POND CROSSING AND SURFACE WATER MANAGEMENT PLAN PHASE 1C

ALABAMA LICENSED PROFESSIONAL ENGINEER No. 29143 GREGORY L. HEBELER 16 OCT 2020

GREGORY L. HEBELER
ALABAMA PROFESSIONAL ENGINEER
CERTIFICATE NUMBER 29143

CONSULTANT
GOLDER

YYYY-MM-DD	2020/10/16
DESIGNED	GLH
PREPARED	VPM
CHECKED	SCN
REVIEWED / APPROVED	GLH

PROJECT NO. 1789848 | SCS REF. GOR17010 | REV. 0 | DRAWING CP-200

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POND CROSSING AND SURFACE WATER MANAGEMENT PLAN

0 100 200
1" = 100' FEET

LEGEND

- EXISTING TOPOGRAPHY / BATHYMETRY CONTOURS (REFERENCE 1)
- PROPOSED DEPOSITION AND DREDGE GRADING CONTOURS (1FT)
- PROPOSED GRADING CONTOURS OUTSIDE CLOSURE LIMITS
- EXISTING ROAD
- EXISTING TRAIL
- EXISTING POWER POLES / TOWERS
- ESTIMATED PRE-CLOSURE FACILITY BOUNDARY
- EXISTING TRANSMISSION CORRIDOR
- DREDGE PHASE NORMAL POOL
- TEMPORARY LINER AREA
- 25' STREAM BUFFER
- STREAMS PROVIDED BY CAHABA CONSULTING, LLC
- PROPOSED 6" AND 8" (2) CS PIPE ROUTE
- PROPOSED 6" AND 8" CS PIPE ROUTE
- PROPOSED 8" CS PIPE ROUTE
- PROPOSED 10" HDPE PIPE ROUTE
- PROPOSED 8" & 10" HDPE PIPE ROUTE
- JW-02 PROPOSED PIPELINE JUNCTION
- SW-02 PROPOSED PIPELINE SPIGOT
- PROPOSED PIPE CROSSINGS
- PROPOSED PIPELINE VALVE
- PROPOSED WATER PUMP
- PROPOSED PUMPED WATER LINE

NOTES

1. ELEVATIONS ARE IN FEET ABOVE MEAN SEA LEVEL, NATIONAL GEODETIC VERTICAL DATUM (NGVD) 1988. COORDINATES CORRESPOND TO ALABAMA WEST COORDINATE SYSTEM, NORTH AMERICAN DATUM (NAD) 1983.
2. CONTOUR INTERVAL IS 5 FEET, UNLESS OTHERWISE LABELED.
3. FOR INSTRUMENTATION AND DEWATERING WELL LOCATIONS SEE IMS PLANS.

REFERENCES

1. EXISTING TOPOGRAPHY PROVIDED BY SOUTHERN COMPANY SERVICES, FEBRUARY 2020.
2. BATHYMETRIC SURFACE IS A COMPOSITE OF THE FEBRUARY 2020 SOUTHERN COMPANY AND THE JANUARY 2020 ARCSURVEY BATHYMETRIC SURVEYS TIED TO INTERPRETED SECTIONS OF THE 2016 SOUTHERN COMPANY BATHYMETRIC SURVEY WHERE SURVEY DATA IS NOT AVAILABLE.
3. BOTTOM OF CCR TOPOGRAPHY TAKEN FROM USGS, PORT BIRMINGHAM, 1938 AND GOODSPINGS, 1971 QUADRANGLES. TOPOGRAPHY WAS INTERPRETED BETWEEN 20 FOOT CONTOURS AND ADJUSTED BASED ON GEOTECHNICAL INVESTIGATION DATA BY GOLDER ASSOCIATES INC.
4. EXISTING AND APPROXIMATE PROPERTY BOUNDARIES PROVIDED BY SOUTHERN COMPANY SERVICES, APRIL 2020.

REV	DATE	REVISION DESCRIPTION	DES	CADD	CHK	RVW
1	2020/10/16	ISSUED FOR CONSTRUCTION	GLH	RMS	SCN	GLH

CLIENT
SOUTHERN COMPANY SERVICES

Alabama Power

PROJECT
PLANT GORGAS
ASH POND CLOSURE
DESIGN DRAWINGS

TITLE
POND CROSSING AND SURFACE WATER MANAGEMENT PLAN PHASE 2

CONSULTANT
GOLDER

YYYY-MM-DD	2020/10/16
DESIGNED	GLH
PREPARED	RMS
CHECKED	SCN
REVIEWED / APPROVED	GLH

ALABAMA LICENSED PROFESSIONAL ENGINEER GREGORY L. HEBELER No. 29143 16 OCT 2020

GREGORY L. HEBELER
ALABAMA PROFESSIONAL ENGINEER
CERTIFICATE NUMBER 29143

PROJECT NO.	SCS REF.	REV.	DRAWING
1789848	GOR17010	0	CP-201

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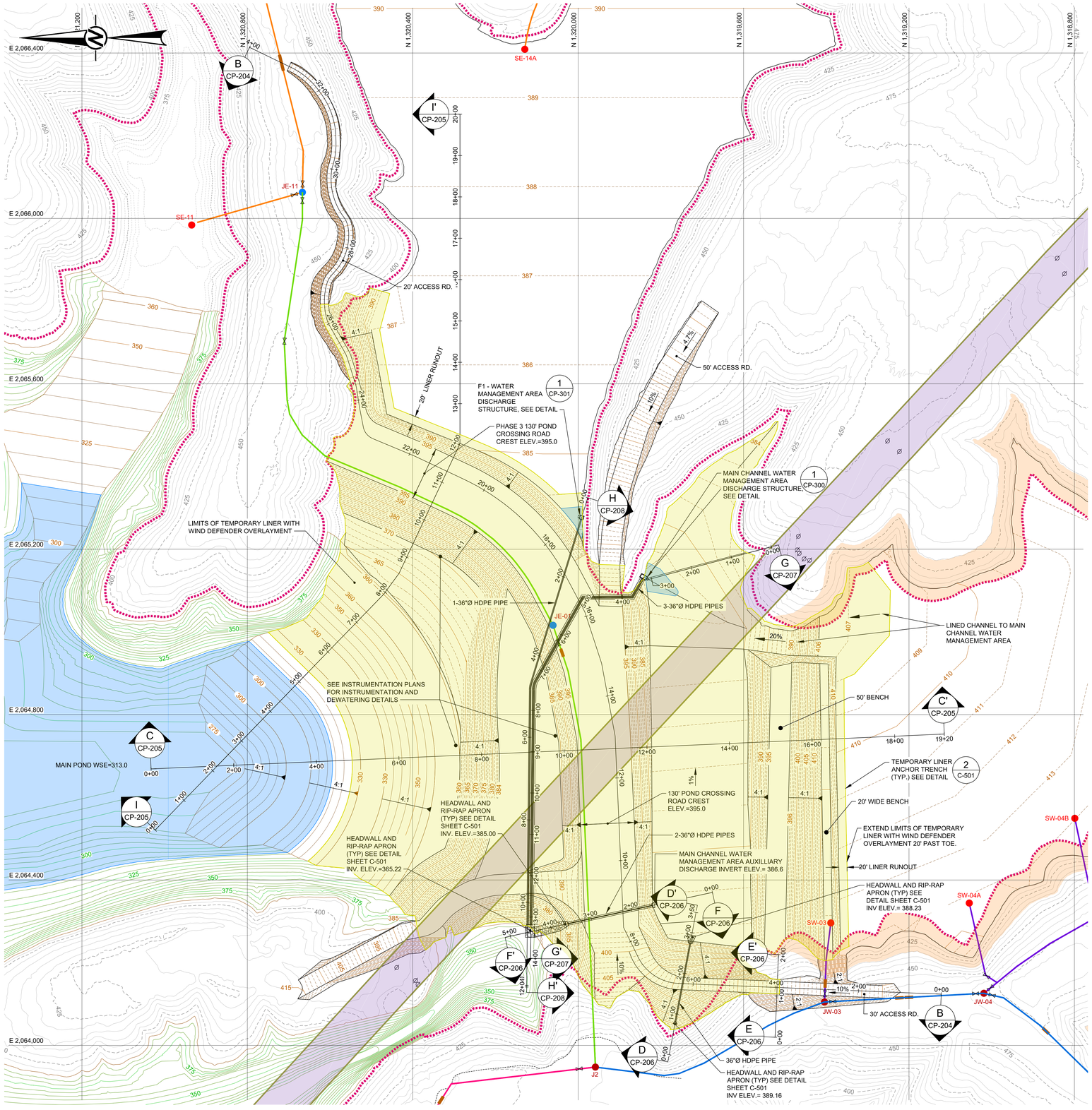

POND CROSSING AND SURFACE WATER MANAGEMENT PLAN

0 100 200
1" = 100' FEET

LEGEND

- EXISTING TOPOGRAPHY / BATHYMETRY CONTOURS (REFERENCE 1)
- PROPOSED DEPOSITION AND DREDGE GRADING CONTOURS (1FT)
- PROPOSED GRADING CONTOURS OUTSIDE CLOSURE LIMITS
- EXISTING ROAD
- EXISTING TRAIL
- EXISTING POWER POLES / TOWERS
- ESTIMATED PRE-CLOSURE FACILITY BOUNDARY
- EXISTING TRANSMISSION CORRIDOR
- DREDGE PHASE NORMAL POOL
- TEMPORARY LINER AREA
- STREAMS PROVIDED BY CAHABA CONSULTING, LLC
- PROPOSED 6" AND 8" (2) CS PIPE ROUTE
- PROPOSED 6" AND 8" CS PIPE ROUTE
- PROPOSED 8" CS PIPE ROUTE
- PROPOSED 10" HDPE PIPE ROUTE
- PROPOSED 8" & 10" HDPE PIPE ROUTE
- JW-02 PROPOSED PIPELINE JUNCTION
- SW-02 PROPOSED PIPELINE SPIGOT
- PROPOSED PIPE CROSSINGS
- PROPOSED PIPELINE VALVE

NOTES

1. ELEVATIONS ARE IN FEET ABOVE MEAN SEA LEVEL, NATIONAL GEODETIC VERTICAL DATUM (NGVD) 1988. COORDINATES CORRESPOND TO ALABAMA WEST COORDINATE SYSTEM, NORTH AMERICAN DATUM (NAD) 1983.
2. CONTOUR INTERVAL IS 5 FEET, UNLESS OTHERWISE LABELED.
3. FOR INSTRUMENTATION AND DEWATERING WELL LOCATIONS SEE IMS PLANS.

REFERENCES

1. EXISTING TOPOGRAPHY PROVIDED BY SOUTHERN COMPANY SERVICES, FEBRUARY 2020.
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3. BOTTOM OF CCR TOPOGRAPHY TAKEN FROM USGS, PORT BIRMINGHAM, 1938 AND GOODSPINGS, 1971 QUADRANGLES. TOPOGRAPHY WAS INTERPRETED BETWEEN 20 FOOT CONTOURS AND ADJUSTED BASED ON GEOTECHNICAL INVESTIGATION DATA BY GOLDER ASSOCIATES INC.

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1	2020/10/16	ISSUED FOR CONSTRUCTION	GLH	RMS	SCN	GLH

CLIENT
SOUTHERN COMPANY SERVICES

Alabama Power

PROJECT
PLANT GORGAS
ASH POND CLOSURE
DESIGN DRAWINGS

TITLE
POND CROSSING AND SURFACE WATER MANAGEMENT PLAN PHASE 3

CONSULTANT
GOLDER

YYYY-MM-DD	2020/10/16
DESIGNED	GLH
PREPARED	RMS
CHECKED	SCN
REVIEWED / APPROVED	GLH

ALABAMA LICENSED PROFESSIONAL ENGINEER No. 29143 16-OCT-2020 GREGORY L. HEBELER

GREGORY L. HEBELER
ALABAMA PROFESSIONAL ENGINEER
CERTIFICATE NUMBER 29143

PROJECT NO.	SCS REF.	REV.	DRAWING
1789848	GOR17010	0	CP-202

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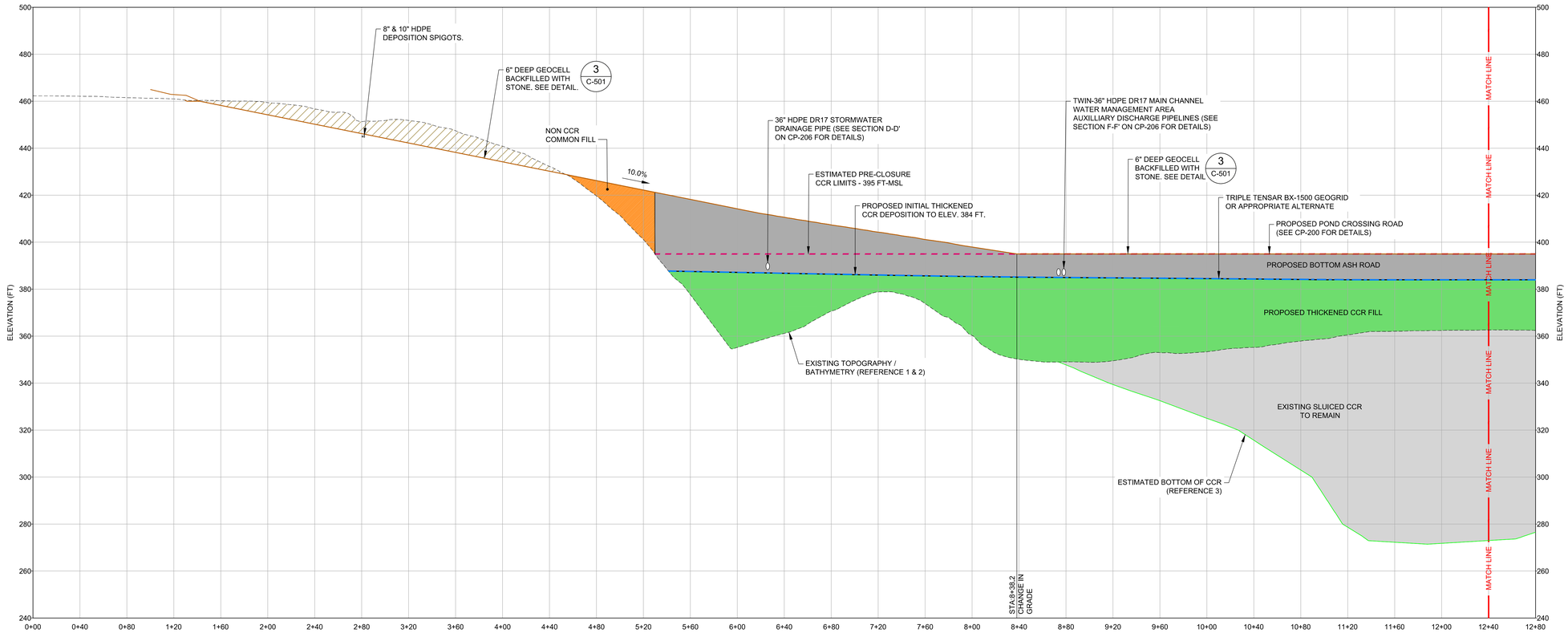

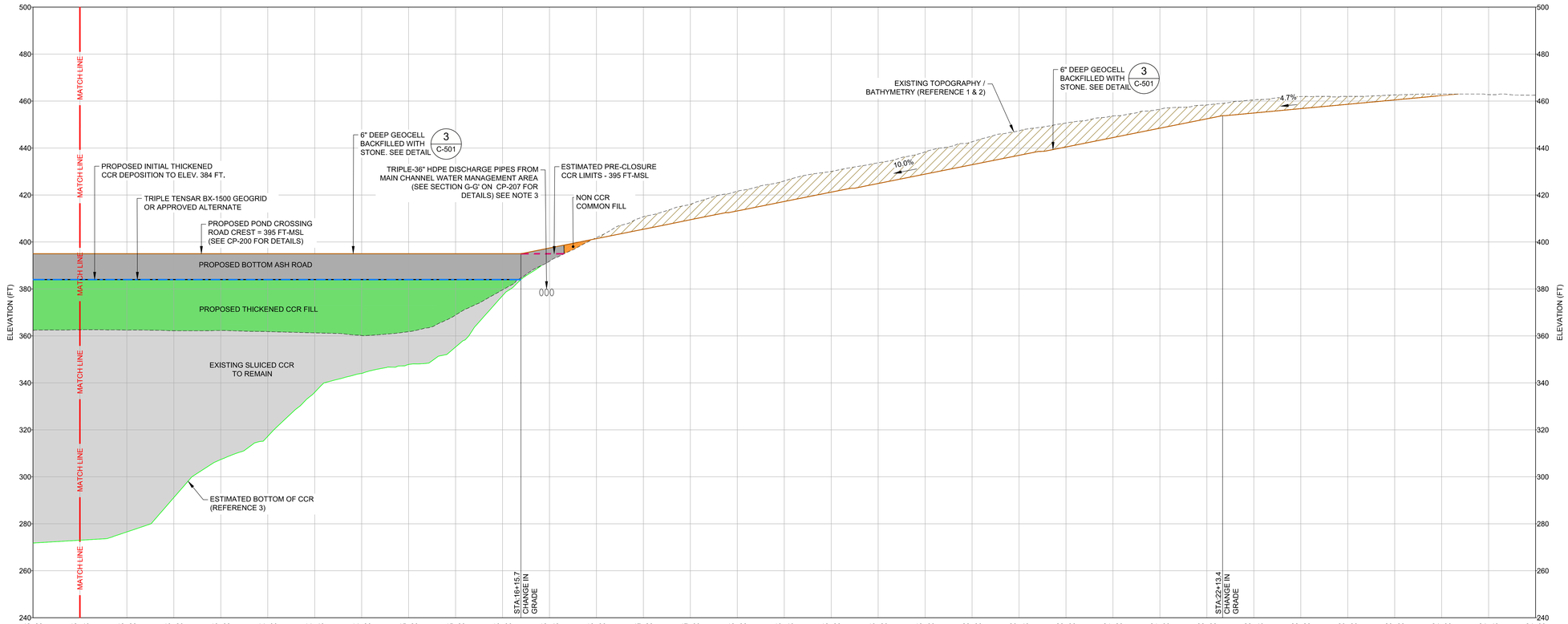

A CP-203 PROFILE A - A' POND CROSSING ROAD - PHASE 2

HORIZONTAL SCALE: 0, 40, 80 — 1" = 40' FEET

VERTICAL SCALE: 0, 20, 40 — 1" = 20' FEET

LEGEND

- PRE-CLOSURE TOPOGRAPHY AND BATHYMETRY (REFERENCE 1 & 2)
- ESTIMATED BOTTOM OF CCR (REFERENCE 3)
- ESTIMATED PRE-CLOSURE FACILITY BOUNDARY ELEV. 395.0 FT-MSL
- PROPOSED PHASING GRADING
- NON CCR COMMON FILL
- BOTTOM ASH
- THICKENED CCR FILL
- EXISTING SLUICED CCR TO REMAIN
- NATURAL GROUND CUT
- PROPOSED CCR CUT

NOTES

1. ELEVATIONS ARE IN FEET WITH REFERENCE TO THE NORTH AMERICAN VERTICAL DATUM (NAVD) OF 1988. COORDINATES CORRESPOND TO THE ALABAMA WEST STATE PLAN COORDINATE SYSTEM, NORTH AMERICAN DATUM (NAD) 1983.

2. DEWATERING WELLS AND INSTRUMENTATION NOT SHOWN FOR CLARITY. LOCATION AND TYPE OF INSTRUMENTATION AND DEWATERING WELLS AND WELL POINTS TO BE BASED ON FINAL IMS PLAN.

3. LATERAL LOCATION OF MAIN WATER MANAGEMENT PIPES CAN BE FIELD ADJUSTED TO EASE CONSTRUCTION PROVIDED INVERT ELEVATIONS ARE MAINTAINED.

REFERENCES

1. EXISTING TOPOGRAPHY PROVIDED BY SOUTHERN COMPANY SERVICES, FEBRUARY 2020.

2. BATHYMETRIC SURFACE IS A COMPOSITE OF THE FEBRUARY 2020 SOUTHERN COMPANY AND THE JANUARY 2020 ARCSURVEY BATHYMETRIC SURVEYS TIED TO INTERPRETED SECTIONS OF THE 2016 SOUTHERN COMPANY BATHYMETRIC SURVEY WHERE SURVEY DATA IS NOT AVAILABLE.

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CLIENT
SOUTHERN COMPANY SERVICES

Alabama Power

PROJECT
PLANT GORGAS
ASH POND CLOSURE
DESIGN DRAWINGS

TITLE
POND CROSSING AND SURFACE WATER MANAGEMENT SECTIONS SHEET 1

CONSULTANT
GOLDER

YYYY-MM-DD	2020/10/16
DESIGNED	GLH
PREPARED	RMS
CHECKED	SCN
REVIEWED / APPROVED	GLH

ALABAMA LICENSED PROFESSIONAL ENGINEER GREGORY L. HEBELER No. 29143 16-OCT-2020

GREGORY L. HEBELER
ALABAMA PROFESSIONAL ENGINEER
CERTIFICATE NUMBER 29143

PROJECT NO.	SCS REF.	REV.	DRAWING
1789848	GOR17010	0	CP-203

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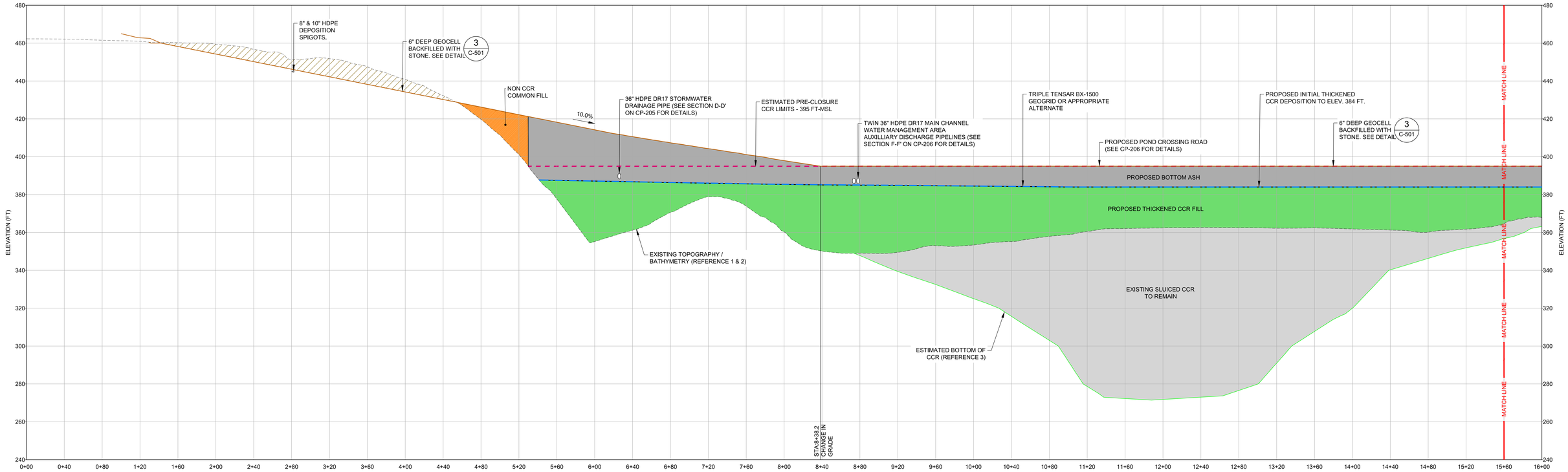
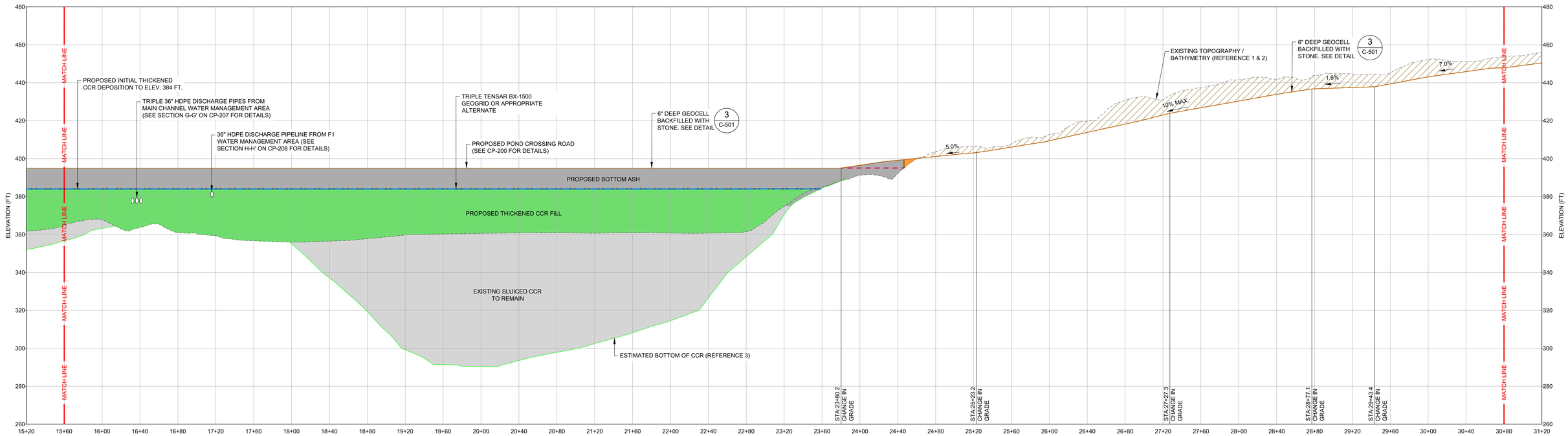
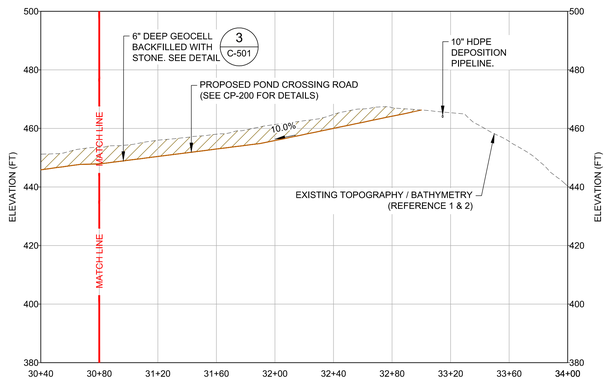




B CP-204 PROFILE B - B' POND CROSSING ROAD - PHASE 3

HORIZONTAL SCALE 1" = 40' (0, 40, 80 FEET)

VERTICAL SCALE 1" = 20' (0, 20, 40 FEET)



LEGEND

- PRE-CLOSURE TOPOGRAPHY AND BATHYMETRY (REFERENCE 1 & 2)
- ESTIMATED BOTTOM OF CCR (REFERENCE 3)
- ESTIMATED PRE-CLOSURE FACILITY BOUNDARY ELEV. 395.0 FT-MSL
- PROPOSED PHASING GRADING
- NON CCR COMMON FILL
- BOTTOM ASH
- THICKENED CCR FILL
- EXISTING SLUICED CCR TO REMAIN
- NATURAL GROUND CUT
- PROPOSED CCR CUT

NOTES

1. ELEVATIONS ARE IN FEET WITH REFERENCE TO THE NORTH AMERICAN VERTICAL DATUM (NAVD) OF 1988. COORDINATES CORRESPOND TO THE ALABAMA WEST STATE PLAN COORDINATE SYSTEM, NORTH AMERICAN DATUM (NAD) 1983.

2. DEWATERING WELLS AND INSTRUMENTATION NOT SHOWN FOR CLARITY. LOCATION AND TYPE OF INSTRUMENTATION AND DEWATERING WELLS AND WELL POINTS TO BE BASED ON FINAL IMS PLAN.

REFERENCES

1. EXISTING TOPOGRAPHY PROVIDED BY SOUTHERN COMPANY SERVICES, FEBRUARY 2020.

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REV	DATE	REVISION DESCRIPTION	DES	CADD	CHK	RVW
1						
0	2020/10/16	ISSUED FOR CONSTRUCTION	GLH	RMS	SCN	GLH

CLIENT
SOUTHERN COMPANY SERVICES

Alabama Power

PROJECT
PLANT GORGAS
ASH POND CLOSURE
DESIGN DRAWINGS

TITLE
POND CROSSING AND SURFACE WATER MANAGEMENT SECTIONS SHEET 2

ALABAMA LICENSED PROFESSIONAL ENGINEER GREGORY L. HEBELER No. 29143 16-OCT-2020

GREGORY L. HEBELER
ALABAMA PROFESSIONAL ENGINEER
CERTIFICATE NUMBER 29143

CONSULTANT
GOLDER

YYYY-MM-DD	2020/10/16
DESIGNED	GLH
PREPARED	RMS
CHECKED	SCN
REVIEWED / APPROVED	GLH

PROJECT NO.	SCS REF.	REV.	DRAWING
1789848	GOR17010	0	CP-204

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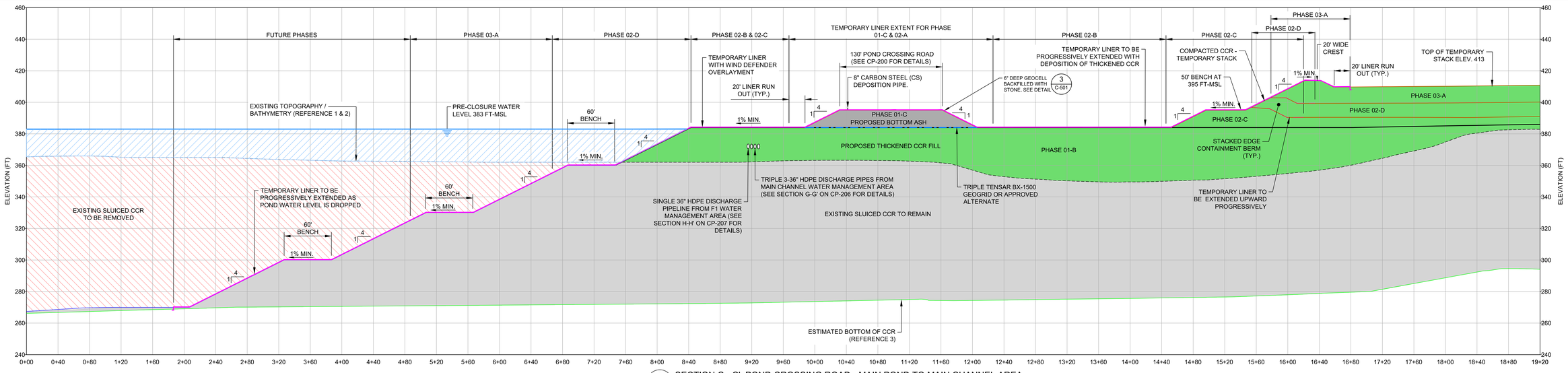
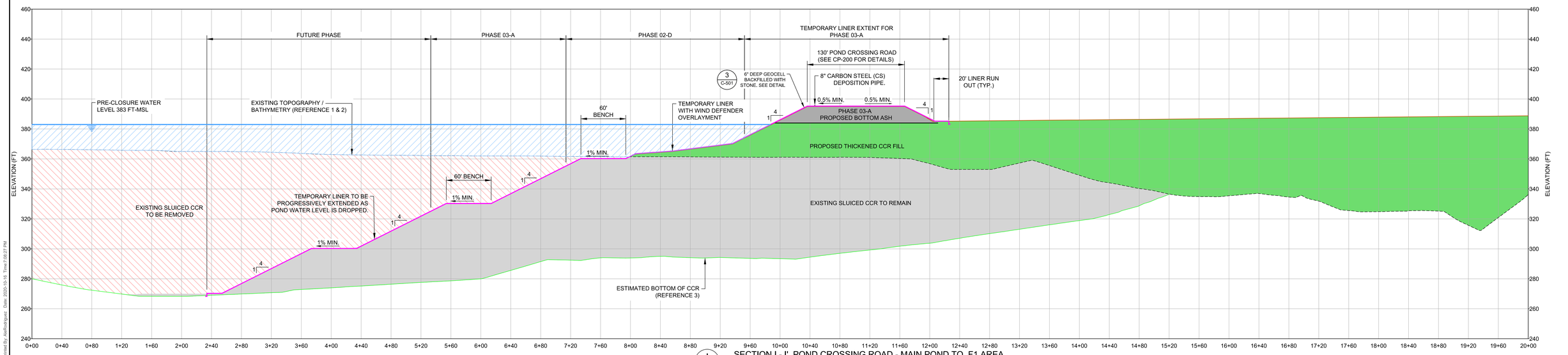


C / CP-205 SECTION C - C' POND CROSSING ROAD - MAIN POND TO MAIN CHANNEL AREA

HORIZONTAL SCALE: 0 50 100 FEET, 1" = 50'

VERTICAL SCALE: 0 25 50 FEET, 1" = 25'



I / CP-205 SECTION I - I' POND CROSSING ROAD - MAIN POND TO F1 AREA

HORIZONTAL SCALE: 0 50 100 FEET, 1" = 50'

VERTICAL SCALE: 0 25 50 FEET, 1" = 25'

LEGEND

- PRE-CLOSURE TOPOGRAPHY AND BATHYMETRY (REFERENCE 1 & 2)
- ESTIMATED BOTTOM OF CCR (REFERENCE 3)
- ESTIMATED PRE-CLOSURE FACILITY BOUNDARY ELEV. 395.0 FT-MSL
- PROPOSED PHASING GRADING
- NON CCR COMMON FILL
- BOTTOM ASH
- THICKENED CCR FILL
- EXISTING SLUICED CCR TO REMAIN
- NATURAL GROUND CUT
- PROPOSED CCR CUT
- PRE CLOSURE WATER

NOTES

1. ELEVATIONS ARE IN FEET WITH REFERENCE TO THE NORTH AMERICAN VERTICAL DATUM (NAVD) OF 1988. COORDINATES CORRESPOND TO THE ALABAMA WEST STATE PLAN COORDINATE SYSTEM, NORTH AMERICAN DATUM (NAD) 1983.

2. DEWATERING WELLS AND INSTRUMENTATION NOT SHOWN FOR CLARITY. LOCATION AND TYPE OF INSTRUMENTATION AND DEWATERING WELLS AND WELL POINTS TO BE BASED ON FINAL IMS PLAN.

REFERENCES

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REV	DATE	REVISION DESCRIPTION	DES	CADD	CHK	RVW
1						
0	2020/10/16	ISSUED FOR CONSTRUCTION	GLH	RMS	SCN	GLH

CLIENT
SOUTHERN COMPANY SERVICES

Alabama Power

PROJECT
PLANT GORGAS
ASH POND CLOSURE
DESIGN DRAWINGS

TITLE
POND CROSSING AND SURFACE WATER MANAGEMENT SECTIONS SHEET 3

ALABAMA LICENSED PROFESSIONAL ENGINEER GREGORY L. HEBELER No. 29143 16 OCT 2020

GREGORY L. HEBELER
ALABAMA PROFESSIONAL ENGINEER
CERTIFICATE NUMBER 29143

CONSULTANT
GOLDER

YYYY-MM-DD	2020/10/16
DESIGNED	GLH
PREPARED	RMS
CHECKED	SCN
REVIEWED / APPROVED	GLH

PROJECT NO.	SCS REF.	REV.	DRAWING
1789848	GOR17010	0	CP-205

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1 in.

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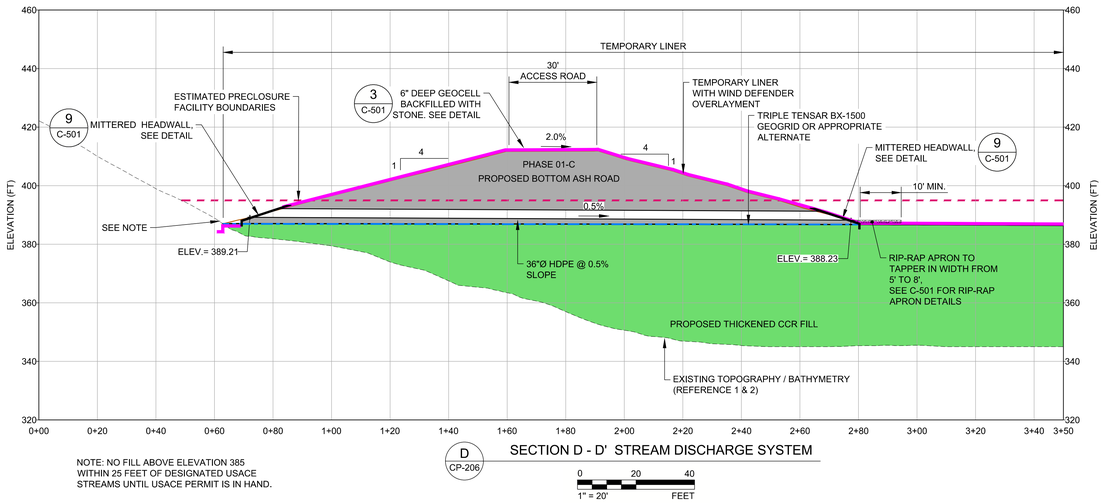
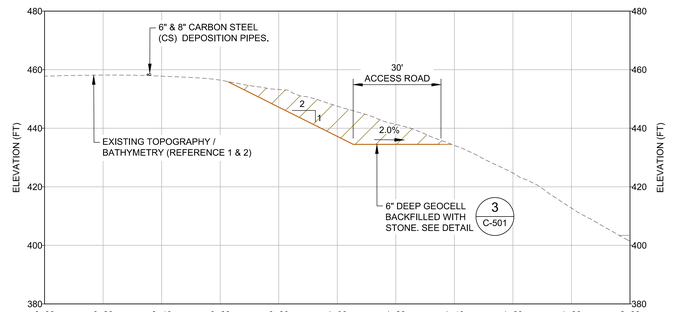


NOTE: NO FILL ABOVE ELEVATION 385 WITHIN 25 FEET OF DESIGNATED USACE STREAMS UNTIL USACE PERMIT IS IN HAND.

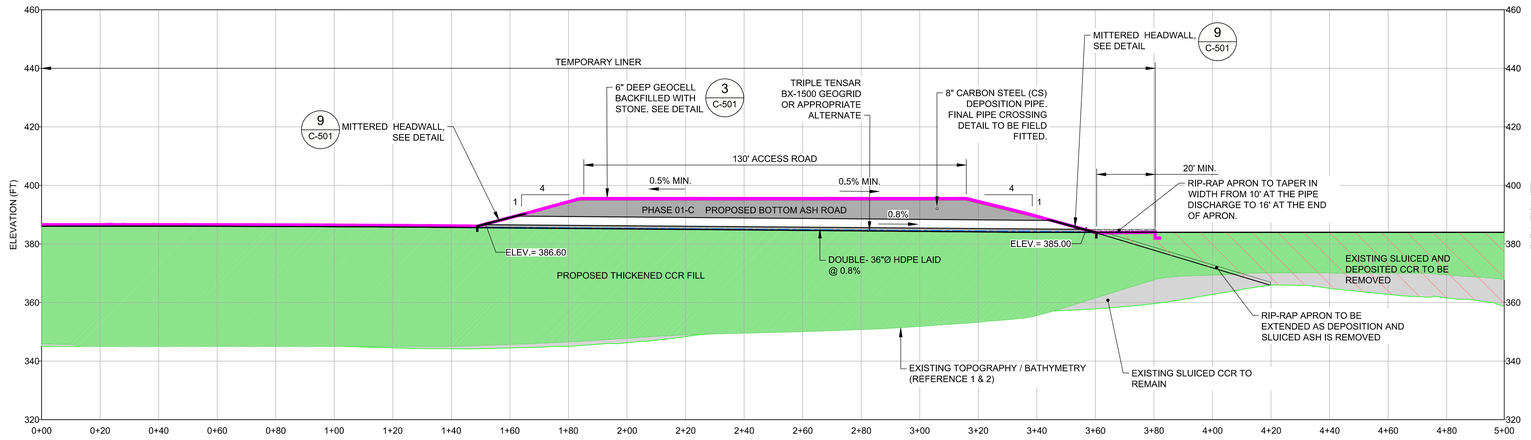
D CP-206 SECTION D - D' STREAM DISCHARGE SYSTEM

0 20 40
1" = 20' FEET



E CP-206 SECTION E - E' POND CROSSING ACCESS ROAD

0 20 40
1" = 20' FEET



F CP-206 SECTION F - F' MAIN CHANNEL AREA AUXILLIARY DISCHARGE - PHASE 2

0 20 40
1" = 20' FEET

LEGEND

- PRE-CLOSURE TOPOGRAPHY AND BATHYMETRY (REFERENCE 1 & 2)
- ESTIMATED BOTTOM OF CCR (REFERENCE 3)
- ESTIMATED PRE-CLOSURE FACILITY BOUNDARY ELEV. 395.0 FT-MSL
- PROPOSED PHASING GRADING
- NON CCR COMMON FILL
- BOTTOM ASH
- THICKENED CCR FILL
- EXISTING SLUICED CCR TO REMAIN
- NATURAL GROUND CUT
- PROPOSED CCR CUT

NOTES

1. ELEVATIONS ARE IN FEET WITH REFERENCE TO THE NORTH AMERICAN VERTICAL DATUM (NAVD) OF 1988. COORDINATES CORRESPOND TO THE ALABAMA WEST STATE PLAN COORDINATE SYSTEM, NORTH AMERICAN DATUM (NAD) 1983.

2. DEWATERING WELLS AND INSTRUMENTATION NOT SHOWN FOR CLARITY. LOCATION AND TYPE OF INSTRUMENTATION AND DEWATERING WELLS AND WELL POINTS TO BE BASED ON FINAL IMS PLAN.

REFERENCES

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1						
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CLIENT
SOUTHERN COMPANY SERVICES

Alabama Power

PROJECT
PLANT GORGAS
ASH POND CLOSURE
DESIGN DRAWINGS

TITLE
POND CROSSING AND SURFACE WATER MANAGEMENT SECTIONS SHEET 4

ALABAMA LICENSED PROFESSIONAL ENGINEER No. 29143 GREGORY L. HEBELER 16 OCT 2020

GREGORY L. HEBELER
ALABAMA PROFESSIONAL ENGINEER
CERTIFICATE NUMBER 29143

CONSULTANT
GOLDER

YYYY-MM-DD	2020/10/16
DESIGNED	GLH
PREPARED	RMS
CHECKED	SCN
REVIEWED / APPROVED	GLH

PROJECT NO.	SCS REF.	REV.	DRAWING
1789848	GOR17010	0	CP-206

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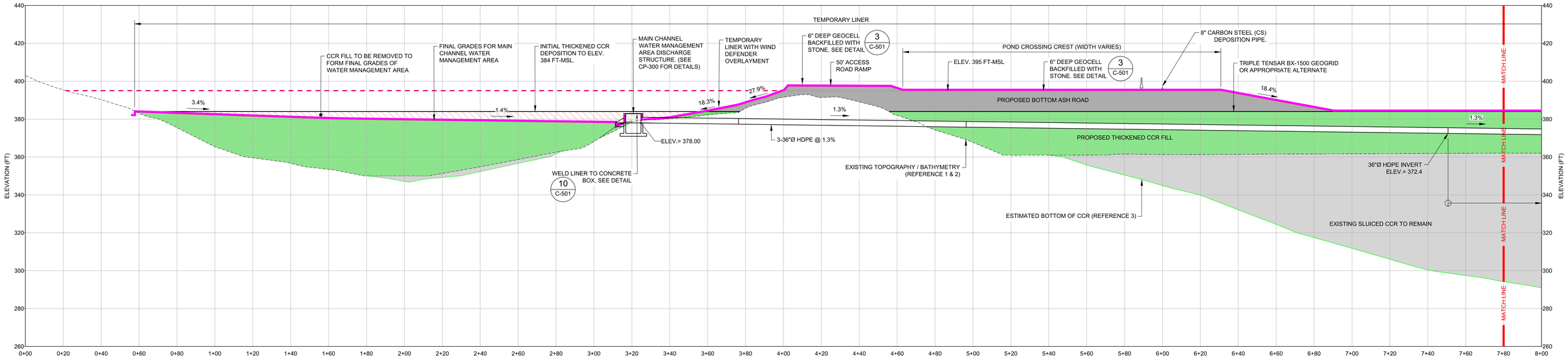

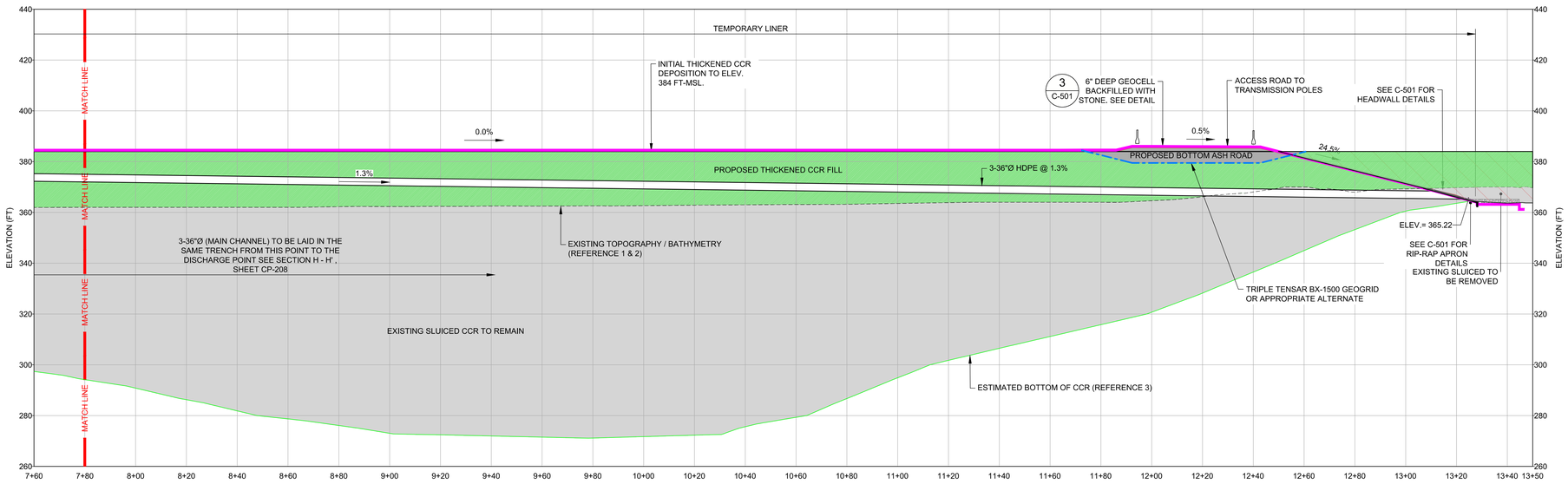

G CP-207 SECTION G - G' MAIN CHANNEL AREA DISCHARGE SYSTEM

0 20 40
1" = 20' FEET

LEGEND

- PRE-CLOSURE TOPOGRAPHY AND BATHYMETRY (REFERENCE 1 & 2)
- ESTIMATED BOTTOM OF CCR (REFERENCE 3)
- ESTIMATED PRE-CLOSURE FACILITY BOUNDARY ELEV. 395.0 FT-MSL
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- BOTTOM ASH
- THICKENED CCR FILL
- EXISTING SLUICED CCR TO REMAIN
- NATURAL GROUND CUT
- PROPOSED CCR CUT

NOTES

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CLIENT
SOUTHERN COMPANY SERVICES

Alabama Power

PROJECT
PLANT GORGAS
ASH POND CLOSURE
DESIGN DRAWINGS

TITLE
POND CROSSING AND SURFACE WATER MANAGEMENT SECTIONS SHEET 5

ALABAMA LICENSED PROFESSIONAL ENGINEER GREGORY L. HEBELER No. 29143 16-OCT-2020

GREGORY L. HEBELER
ALABAMA PROFESSIONAL ENGINEER
CERTIFICATE NUMBER 29143

CONSULTANT
GOLDER

YYYY-MM-DD	2020/10/16
DESIGNED	GLH
PREPARED	RMS
CHECKED	SCN
REVIEWED / APPROVED	GLH

PROJECT NO.	SCS REF.	REV.	DRAWING
1789848	GOR17010	0	CP-207

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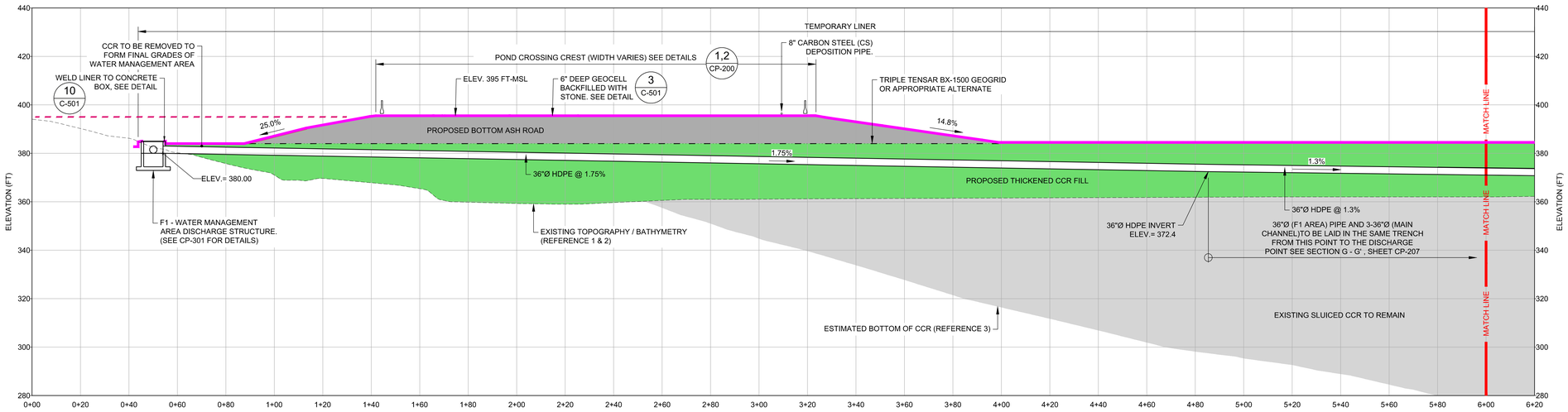

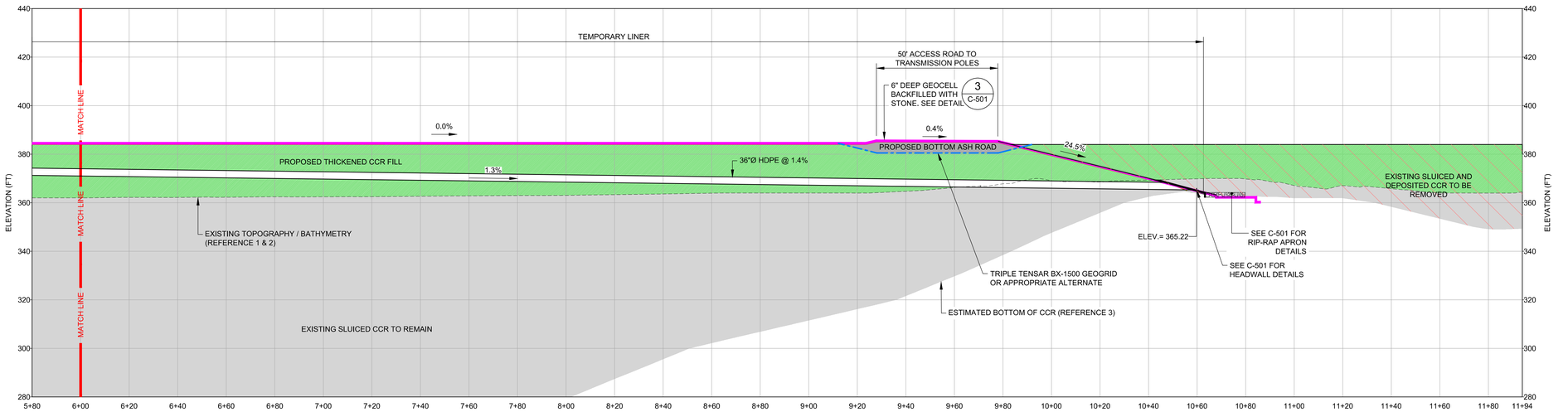

H CP-208 SECTION H - H' F1 AREA DISCHARGE SYSTEM

0 20 40
1" = 20' FEET

LEGEND

- PRE-CLOSURE TOPOGRAPHY AND BATHYMETRY (REFERENCE 1 & 2)
- ESTIMATED BOTTOM OF CCR (REFERENCE 3)
- ESTIMATED PRE-CLOSURE FACILITY BOUNDARY ELEV. 395.0 FT-MSL
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- EXISTING SLUICED CCR TO REMAIN
- NATURAL GROUND CUT
- PROPOSED CCR CUT

NOTES

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CLIENT
SOUTHERN COMPANY SERVICES

Alabama Power

PROJECT
PLANT GORGAS
ASH POND CLOSURE
DESIGN DRAWINGS

TITLE
POND CROSSING AND SURFACE WATER MANAGEMENT SECTIONS SHEET 6

ALABAMA LICENSED PROFESSIONAL ENGINEER GREGORY L. HEBELER No. 29143 16 OCT 2020

GREGORY L. HEBELER
ALABAMA PROFESSIONAL ENGINEER
CERTIFICATE NUMBER 29143

CONSULTANT
GOLDER

YYYY-MM-DD	2020/10/16
DESIGNED	GLH
PREPARED	RMS
CHECKED	SCN
REVIEWED / APPROVED	GLH

PROJECT NO. 1789848 | SCS REF. GOR17010 | REV. 0 | DRAWING CP-208

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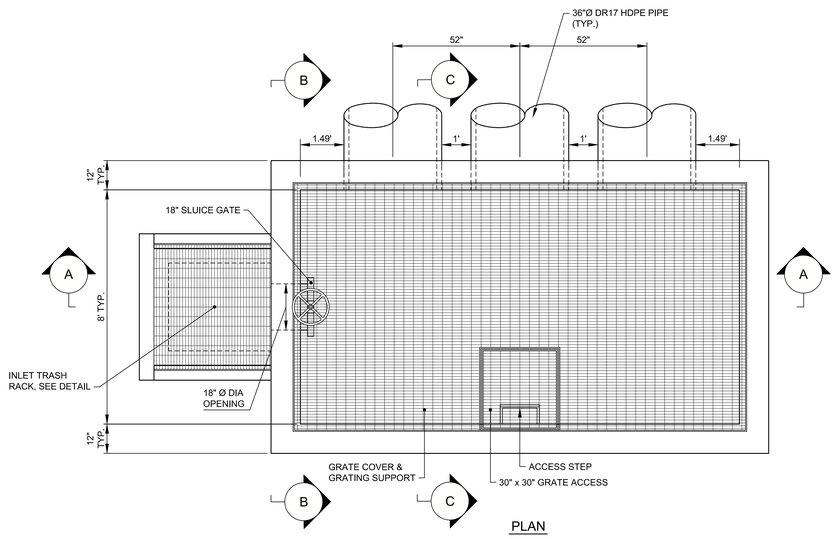


PLAN

NOTES

1. HDPE TRASH RACK AS SPECIFIED BY "PLASTIC SOLUTIONS INC.", OR APPROVED EQUIVALENT.

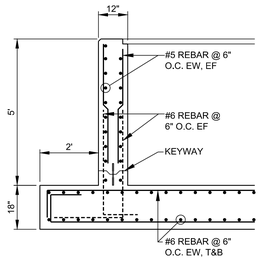
2. ALL CONCRETE TO BE CLASS 5000. ALL REINFORCEMENT SHALL BE GRADE 60.

3. ALL EXPOSED EDGES SHALL HAVE A MINIMUM ONE INCH CHAMFER.

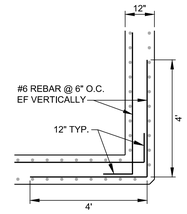
4. REBAR SHALL HAVE A 3 INCH CONCRETE COVER WHEN POURED AGAINST GROUND SURFACE AND A 2 INCH CONCRETE COVER WHEN POURED AGAINST FORMS.

5. ON UNEXPOSED JOINTS CLOSED CELL ROUND BUTYL CORD 1/4 INCH LARGER THAN THE JOINT AS MEASURED IN THE FIELD, SHALL BE INSTALLED.

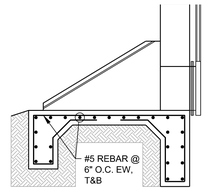
6. AT OPENINGS WHERE REINFORCEMENT IS INTERRUPTED EXTEND ONE HALF (MIN. OF 2 BARS) OF INTERRUPTED VERTICAL BARS (FULL HEIGHT IN EACH FACE) ON EACH SIDE OF THE OPENING. ADD ONE HALF (MIN. OF 2 BARS) OF THE INTERRUPTED HORIZONTAL REINFORCEMENT (FULL LENGTH IN EACH FACE) TO TOP AND BOTTOM OF OPENING. TWO (2) ADDITIONAL TRIMMER BARS SHALL BE ADDED IN EACH FACE AT THE CORNERS OF EACH OPENING.



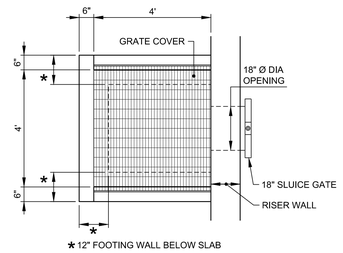
TYPICAL REINFORCEMENT SECTION



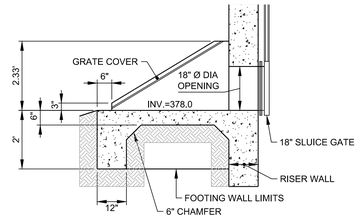
TYPICAL WALL CORNER REINFORCEMENT - PLAN



REINFORCEMENT SECTION



PLAN



SECTION

INLET TRASH RACK DETAIL

SECTION A-A

SECTION B-B

SECTION C-C

1 CP-300 MAIN CHANNEL WATER MANAGEMENT AREA DISCHARGE STRUCTURE DETAIL

0 2 4
1" = 2' FEET

REV	DATE	REVISION DESCRIPTION	DES	CADD	CHK	RVW
1	2020/10/16	ISSUED FOR CONSTRUCTION	GLH	RMS	SCN	GLH

CLIENT
SOUTHERN COMPANY SERVICES

Alabama Power

PROJECT
PLANT GORGAS
ASH POND CLOSURE
DESIGN DRAWINGS

TITLE
WATER MANAGEMENT STRUCTURE DETAILS SHEET 1

ALABAMA LICENSED PROFESSIONAL ENGINEER No. 29143 GREGORY L. HEBELER 16 - OCT - 2020

GREGORY L. HEBELER
ALABAMA PROFESSIONAL ENGINEER
CERTIFICATE NUMBER 29143

CONSULTANT
GOLDER

YYYY-MM-DD	2020/10/16
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PROJECT NO. 1789848 | SCS REF. GOR17010 | REV. 0 | DRAWING CP-300

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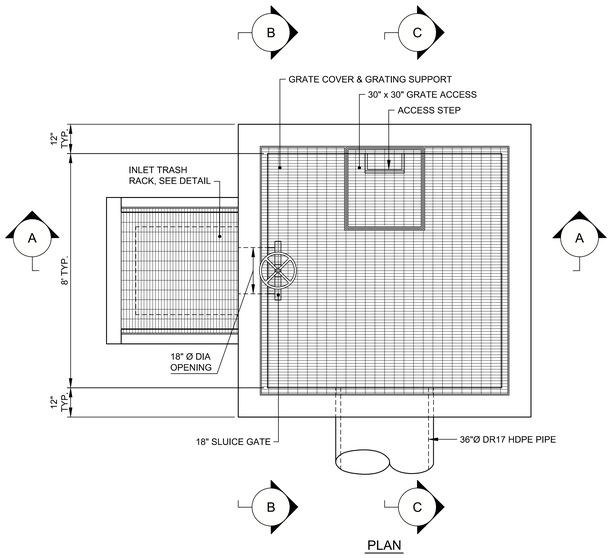


PLAN

NOTES

1. HDPE TRASH RACK AS SPECIFIED BY "PLASTIC SOLUTIONS INC.", OR APPROVED EQUIVALENT.

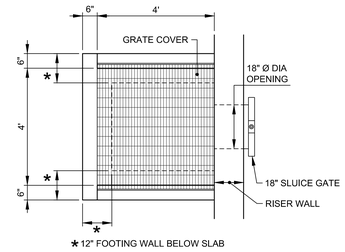
2. ALL CONCRETE TO BE CLASS 5000. ALL REINFORCEMENT SHALL BE GRADE 60.

3. ALL EXPOSED EDGES SHALL HAVE A MINIMUM ONE INCH CHAMFER.

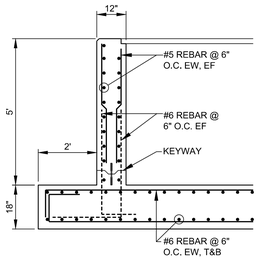
4. REBAR SHALL HAVE A 3 INCH CONCRETE COVER WHEN POURED AGAINST GROUND SURFACE AND A 2 INCH CONCRETE COVER WHEN POURED AGAINST FORMS.

5. ON UNEXPOSED JOINTS CLOSED CELL ROUND BUTYL CORD 1/4 INCH LARGER THAN THE JOINT AS MEASURED IN THE FIELD, SHALL BE INSTALLED.

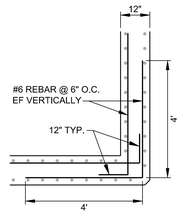
6. AT OPENINGS WHERE REINFORCEMENT IS INTERRUPTED EXTEND ONE HALF (MIN. OF 2 BARS) OF INTERRUPTED VERTICAL BARS (FULL HEIGHT IN EACH FACE) ON EACH SIDE OF THE OPENING. ADD ONE HALF (MIN. OF 2 BARS) OF THE INTERRUPTED HORIZONTAL REINFORCEMENT (FULL LENGTH IN EACH FACE) TO TOP AND BOTTOM OF OPENING. TWO (2) ADDITIONAL TRIMMER BARS SHALL BE ADDED IN EACH FACE AT THE CORNERS OF EACH OPENING.



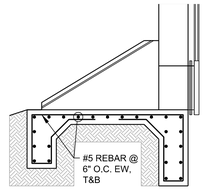
PLAN



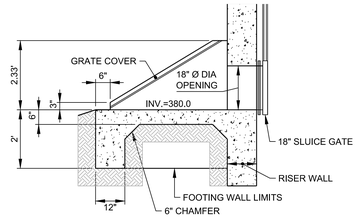
TYPICAL REINFORCEMENT SECTION



TYPICAL WALL CORNER REINFORCEMENT - PLAN

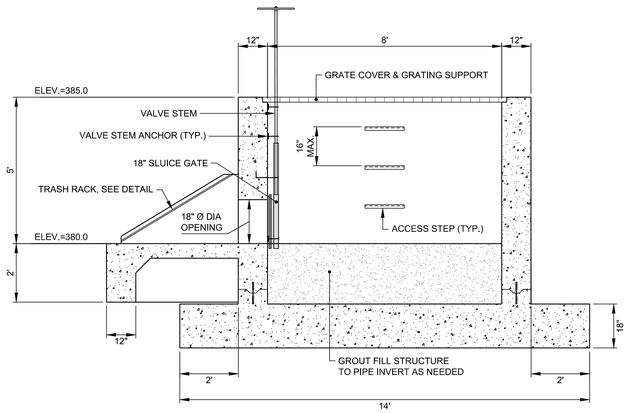


REINFORCEMENT SECTION

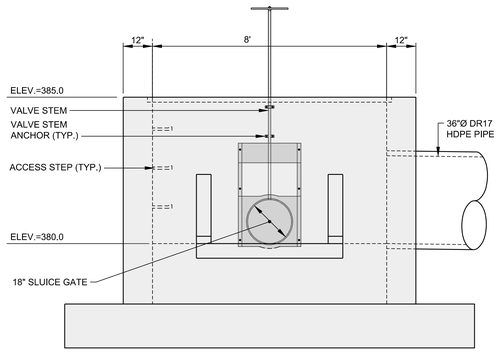


SECTION

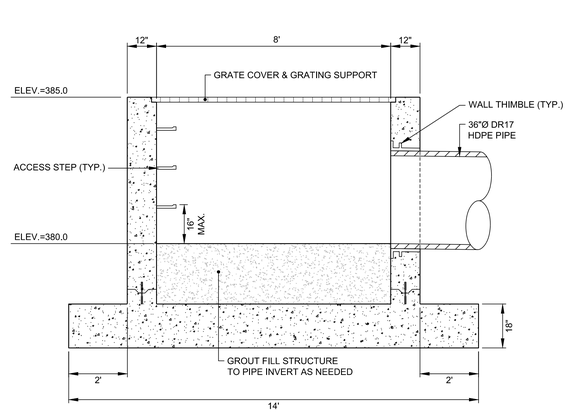
INLET TRASH RACK DETAIL



SECTION A-A



SECTION B-B



SECTION C-C

1 CP-301 F1 - WATER MANAGEMENT AREA DISCHARGE STRUCTURE DETAIL

0 2 4
1" = 2' FEET

REV	DATE	REVISION DESCRIPTION	DES	CADD	CHK	RVW
1	2020/10/16	ISSUED FOR CONSTRUCTION	GLH	RMS	SCN	GLH

CLIENT
SOUTHERN COMPANY SERVICES

Alabama Power

PROJECT
PLANT GORGAS
ASH POND CLOSURE
DESIGN DRAWINGS

TITLE
WATER MANAGEMENT STRUCTURE DETAILS SHEET 2

ALABAMA LICENSED PROFESSIONAL ENGINEER No. 29143 16 OCT 2020 GREGORY L. HEBELER

GREGORY L. HEBELER
ALABAMA PROFESSIONAL ENGINEER
CERTIFICATE NUMBER 29143

CONSULTANT
GOLDER

YYYY-MM-DD	2020/10/16
DESIGNED	GLH
PREPARED	RMS
CHECKED	SCN
REVIEWED / APPROVED	GLH

PROJECT NO.	SCS REF.	REV.	DRAWING
1789848	GOR17010	0	CP-301

Path: \Atlanta\cad\Southern Company\Plant Gorgas\1789848 Detailed Design\01_Civil\Production | File Name: 1789848-CP-300-301 POND XING-SWM Structure Details.dwg | Last Edited By: aleocklgraw Date: 2020-10-16 Time:7:00:12 PM | Printed By: AlaRockgraw Date: 2020-10-16 Time:7:00:55 PM

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM ANSI E
0 1 in

POST-CLOSURE CARE PLAN FOR EXISTING CCR SURFACE IMPOUNDMENT
PLANT GORGAS ASH POND
ADEM Admin. Code r. 335-13-15-.07(5)

ADEM Administrative Code r. 335-13-15-.07(5) requires the owner or operator of an existing CCR surface impoundment that is closed in place to provide for post-closure care of the unit for a period of at least 30 years. Post-closure care includes maintenance of the facility, as well as groundwater monitoring in accordance with r. 335-13-15-.06(1) through 335-13-15-.06(9).

The CCR surface impoundment located at Alabama Power Company's Plant Gorgas that is also referred to as the Plant Gorgas Ash Pond is currently expected to be closed in place under the provisions of r. 335-13-15-.07(3). Following closure, maintenance will be provided on the final cover system for the required post-closure care period so that the integrity and effectiveness of the final cover system will be maintained. Maintenance activities will include, as needed, repairs to the final cover to correct any effects related to settlement, subsidence, erosion or other events, and will be performed to prevent run-on or run-off from eroding or otherwise damaging the final cover. Maintenance tasks could include, but not be limited to, repair of erosion features, replacement of eroded cover soils and re-establishment of vegetation, where applicable. Maintenance will be performed on a semi-annual schedule, or more frequently if needed.

The groundwater monitoring system will be maintained throughout the required post-closure care period. Groundwater monitoring will be performed on a semiannual basis during the required post-closure care period as well.

The following office(s) can be contacted about the facility during the post-closure care period.

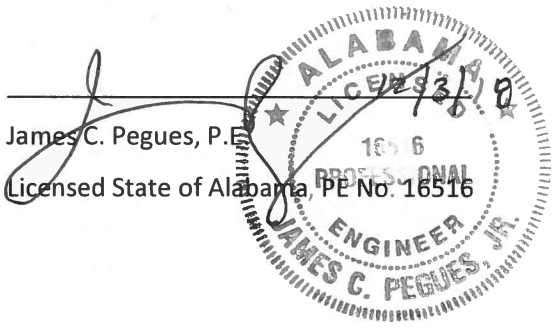
Gorgas Steam Plant
Compliance and Support Manager
460 Gorgas Road, Parrish, AL 35580-5715
1-205-686-2103
G2CCRPostGOR@southernco.com

At the present time, there is no planned use of the facility after closure. If current plans change, they will be noted in an amendment to this post-closure care plan. Any future use of the property after closure

will not disturb the integrity of the final cover, liner or any other component of the containment system. Furthermore, the functionality of the groundwater monitoring system will be maintained.

No later than 60 days following completion of the post-closure care period of 30 years, Alabama Power Company will prepare a notification verifying completion of the post-closure care.

I hereby certify that this post-closure care plan has been prepared in accordance with the requirements of r. 335-13-15-.07(5).



James C. Pegues, P.E.
Licensed State of Alabama, PE No. 16516

APPENDIX 12

ADJACENT PROPERTY OWNERS

Parcel Number	Owner	Owner 2	Mailing Address	Care Of	Mailing City	Mailing State	Mailing Zip
17-00-33-0-000-010.000	ALAWEST AL L L C		PO BOX 412		NORTHPORT	AL	35476
26-08-28-0-000-001.001	ALAWEST-AL L L C		PO BOX 412		NORTHPORT	AL	35476
26-08-28-0-000-001.003	ALAWEST-AL L L C		PO BOX 412		NORTHPORT	AL	35476
26-08-28-0-000-002.000	ALAWEST-AL L L C		PO BOX 412		NORTHPORT	AL	35476
26-09-29-0-000-001.001	ALAWEST-AL L L C		PO BOX 412		NORTHPORT	AL	35476
26-09-32-0-000-004.000	ALAWEST-AL L L C		PO BOX 412		NORTHPORT	AL	35476
26 05 21 0 000 011.002	BARNWELL TIMOTHY A & ELAINE F		81 HUMMINGBIRD LANE		QUINTON	AL	35130
26 05 21 0 000 011.001	BARNWELL TIMOTHY A & ELAINE F		81 HUMMINGBIRD LANE		QUINTON	AL	35130
26-05-16-0-000-041.001	MURPHY, LAWSON W		PO BOX 1345		JASPER	AL	35502
26-05-16-0-000-041.000	MURPHY, SAM WALKER		PO BOX 1345		JASPER	AL	35502
26 05 21 0 000 007.000	SHORT RANDY LEE		799 BANKHEAD RD		QUINTON	AL	35130
26 05 21 0 000 006.000	SHORT RANDY LEE		799 BANKHEAD RD		QUINTON	AL	35130
26 05 21 0 000 011.000	SHORT WILLIAM EDWARD		270 WINNS BOOTH LANE		PARRISH	AL	35580
26-09-29-0-000-003.000	JAMESTOWN FORESTLANDS LLC		654 N STATE ST		JACKSON	MS	39202