

APPENDIX A

CITY OF PASADENA WELL PERMIT PACKAGE



**APPLICATION FOR CONSTRUCTION PLAN /
HEALTH DEPARTMENT**

SUBMITTAL REQUIREMENTS: TWO (2) SETS OF PLANS.

Business Name: NASA

Address: 4800 Oak Grove Drive City: Pasadena

State: CA Zip: 91109

Business Owner: Same as above

Holding Address: _____ City: _____

State: _____ Zip: _____

Contractor: WDC Exploration and Wells

Address: 5566 Arrow Highway City: Montclair

State: CA Zip: 91763 Telephone: | 800 | 974-2769

Architect / Engineer: Battelle

Address: 505 King Avenue City: Columbus

State: OH Zip: 43201 Telephone: | 614 | 424-7723

Contact Person: David Clexton – Registered Geologist Telephone: | 760 | 476-9144

Maximum number of employees including owner at any given time: _____ Alcoholic beverage served on premises: yes no

Seating Capacity: _____ Square Footage: _____

Food Market/Retail

- 10-5,999 Sq. Ft.
- 6,000 + Sq. Ft.

Restaurants

- Full service
- Full + alcohol

Wells

- Drilling
- Destruction
- Construction

Food Processor

- 1 - 5,999 Sq. Ft.
- 6,000 + Sq. Ft.

Minor Remodel

- less than 200 Sq. Ft.

Payment Information

Minor Food Storage

- Food Storage
- Food Vehicle/Cart

Swimming Pools/Spas

-

Date: _____

Sewage Disposal

- New System
- Modify Existing System

Check No.: _____

Comments: _____

I declare that the amount of the fee paid is based on my declaration of the business classification of the plans submitted. If this declaration is incorrect, I understand that the plan will not be approved.

SIGNATURE: _____ Date: _____

PLAN APPROVED BY: _____ Date: _____

Note: Mechanical, Plumbing and Electrical permits may be required as a result of this permit. For questions in regards to filling out this form, please contact the Health Department at (626) 744 - 6804.

WELL PERMIT APPLICATION - NON-PRODUCTION WELLS
 WATER & SEWAGE / MOUNTAIN & RURAL PROGRAMS - ENVIRONMENTAL HEALTH DIVISION
 5050 COMMERCE DRIVE, BALDWIN PARK, CA 91706 (626) 430-5380 FAX (626) 813-3016

DATE:

<input checked="" type="checkbox"/> NEW WELL CONSTRUCTION	<input checked="" type="checkbox"/> MONITORING	<input type="checkbox"/> HEAT EXCHANGE
<input type="checkbox"/> RECONSTRUCTION OR RENOVATION	<input type="checkbox"/> CATHODIC	<input type="checkbox"/> OTHER (Specify) :
<input type="checkbox"/> DECOMMISSIONING	<input type="checkbox"/> INJECTION	
<input type="checkbox"/> OTHER: _____	<input type="checkbox"/> EXTRACTION	

WELL LOCATION	SITE ADDRESS 225 – 349 W Mountain St. CITY Pasadena ZIP CODE 91103	
	Township	Range
Section		Map Book Page/ Grid 565/G2
NO. OF WELLS IN EACH PARCEL: 1		Attach site map with well locations

WELL STRUCTURE	Type and Size of Production Casing	4" diameter low-carbon steel
	Sanitary / Annular Sealing Material	Volclay grout or equivalent
	Depth of Sanitary / Annular Seal	To be determined in the field
	Conductor Casing Seal	Volclay grout or equivalent

Company	Battelle	CONSULTANT
Contact Person	David Clexton	
Address	505 King Avenue	
City, State Zip	Columbus, OH 43201	
Telephone	760-476-9144	

OWNER / DRILLER INFORMATION	Well Owner	NASA
	Address	4800 Oak Grove Drive
	City / Zip Code	Pasadena, CA 91109
	Telephone	818-393-6683
	Well Driller	WDC Exploration and Wells
	Address	5566 Arrow Highway
	City / Zip Code	Montclair, CA 91763
C-57 License No.	283326	
Telephone	800-974-2769	

IF WELL AND GEOLOGIC CONDITIONS ENCOUNTERED IN THE FIELD ARE FOUND TO DIFFER FROM THE SCOPE OF WORK PRESENTED TO THIS OFFICE, WORK PLAN MODIFICATIONS MAY BE REQUIRED

DISPOSITION OF PERMIT (Department Use Only)
 THIS PERMIT IS CONSIDERED COMPLETE WHEN THE WORK PLAN IS APPROVED AND WHEN THE WELL COMPLETION LOG IS RECEIVED. NO WELL CONSTRUCTION OR DECOMMISSIONING CAN BE INITIATED WITHOUT THE WORK PLAN APPROVAL FROM THIS DEPARTMENT.

WORK PLAN APPROVAL
 This Approval is Valid for 180 Days

Date	REHS
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WELL DECOMMISSIONING	Well Depth log / records	Not Applicable
	Method of Well Assessment	
	Depth and Number of Perforations	
	Type of Perforator Size of Perforations	
	Type and Amount of Sealant	
	Method of Upper Seal Pressure Application	

Conditions	

FINAL INSPECTION

Date	REHS
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PERMIT ISSUED
 The well log must be submitted to this Department prior to issuance of the final approval

Date	REHS
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I hereby agree to comply in every respect with all the regulations of the County Environmental Health Division and with all ordinances and laws of the County of Los Angeles and the State of California pertaining to well construction, reconstruction and decommissioning. Upon completion of the well and within thirty days thereafter, I will furnish the Environmental Health office with a completion log of the well giving date drilled, depth of the well, perforations in the casing, and any other data deemed necessary by County Environmental Health Division.

_____ Applicant's Signature

Applicant Name: (PRINT)
 Telephone:



Figure 4-1. Proposed Monitoring Well Location

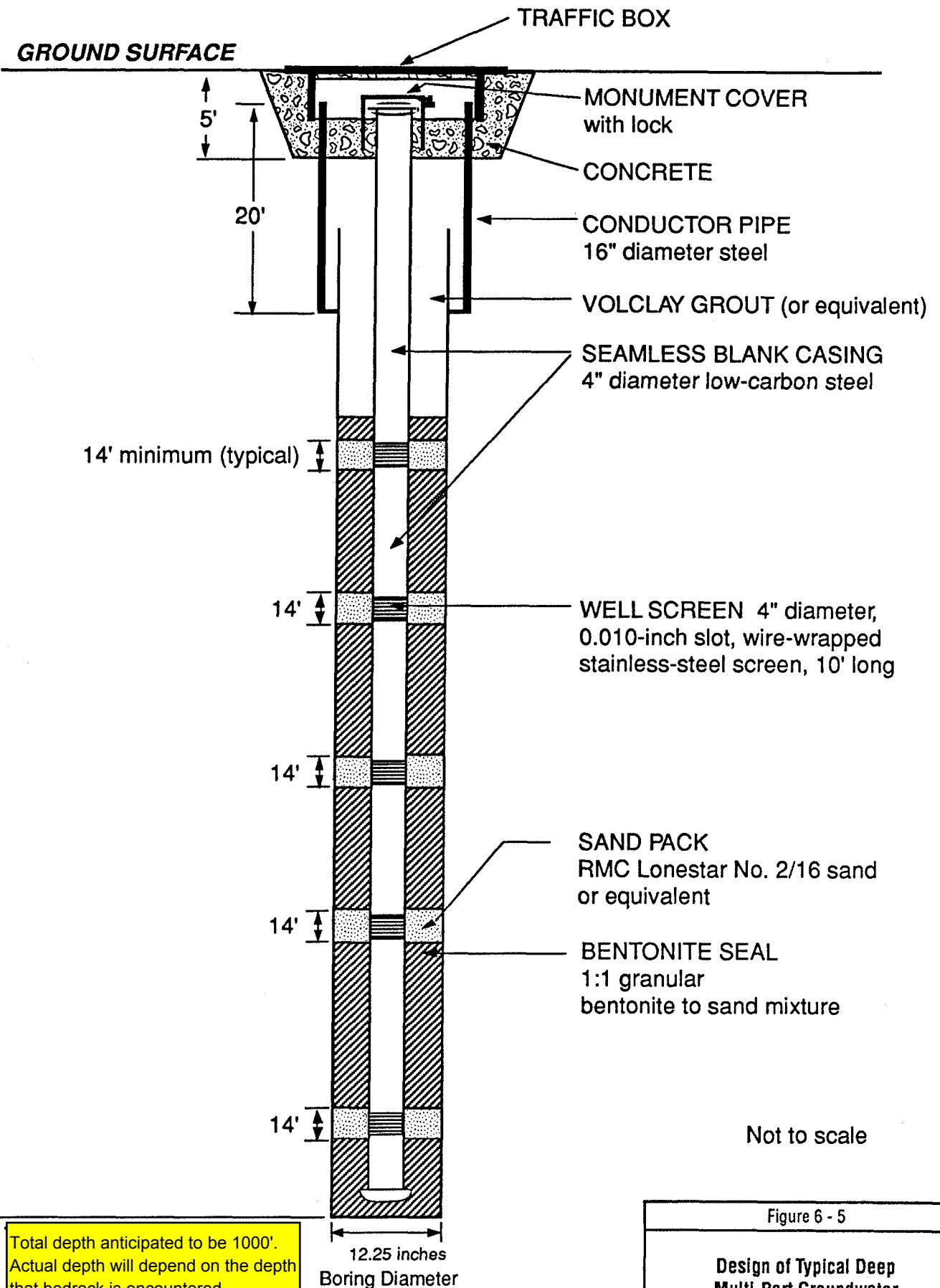
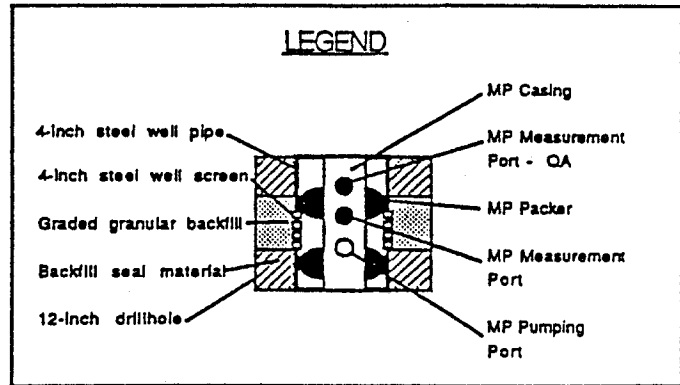
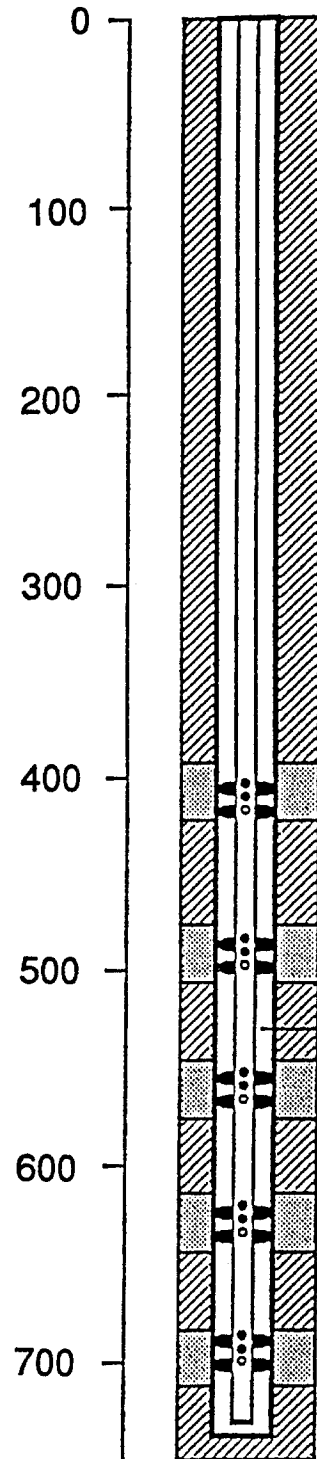


Figure 6 - 5

Design of Typical Deep Multi-Port Groundwater Monitoring Well

Depth
ft.

MP
Log



Not to scale

Primary Monitoring Zone
- for measuring fluid pressures,
collecting fluid samples,
and hydraulic-conductivity testing.

Secondary Zone
- used to measure fluid pressures
for QA testing.

Actual depths for Westbay equipment will be determined in the field based on the presence and location of sandy lithologies measured using geophysical methods.




Figure 6-6

**A Typical Multi-Port
System Installation**

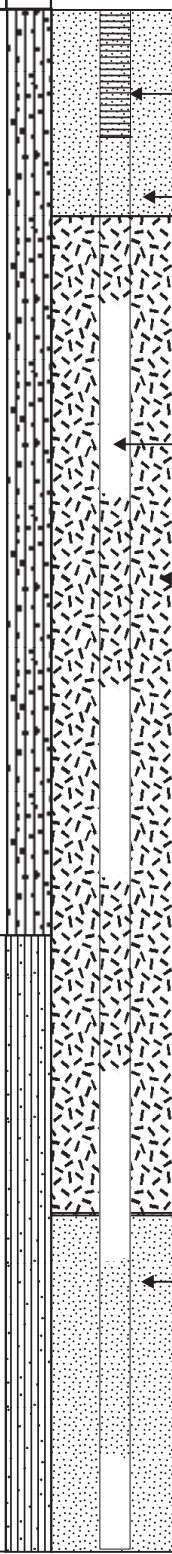
APPENDIX B

**MW-25 BORING/WELL CONSTRUCTION LOG AND MP CASING CONSTRUCTION
DETAILS**

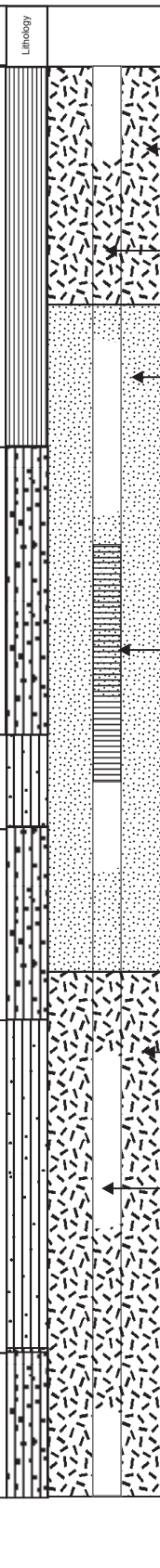
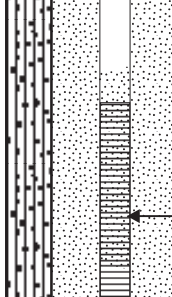
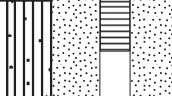
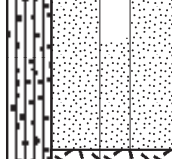

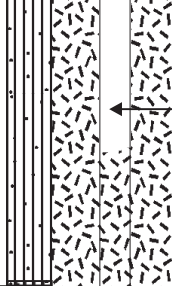
Borehole Location: JPL-MW-25 Project Location: NASA Jet Propulsion Lab Project #: G486048 Geologist: D. Conner Drilling Contractor: WDC Exploration & Wells Driller: Alberto Vega Reviewed by: David Clextan R.G. #7350	Sampler Type: Grab Sample from Shaker Screen Boring Diameter: 12 1/4" Drilling Method: Mud Rotary Drill Rig: Speedstar 50K Hammer Type: Casing Hammer Date: 09/20/04 - 09/24/04 Total Depth: 815' bgs	Coordinates (NAD 83/NAVD 88) Northing: 1,882,639.52 Surface Elevation: Easting: 6,514,027.89 Borehole Abandoned: Monitoring Device Installed: Yes No <input checked="" type="checkbox"/> Yes <input checked="" type="checkbox"/> No Method: N/A Type: Westbay Multi-Port Monitoring System
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Depth (feet bgs)	USCS symbols	Sample description	Comments	Lithology	Well Completion
300	GM	COBBLES with Silty SAND: 70% coarse-grained SAND, 30% fine- to medium-grained SAND; angular to subangular, trace gravel. Increase in cobbles.	Driller says it's very rocky, drill bit binding.		Bentonite Seal: 1:1 granular bentonite to sand mixture 3 - 335' bgs
305		As above.			
310		As above.			
315		As above. Decrease in cobbles.			
320		Increase in cobbles.	Drill bit binding, rig chatter.		
325		As above.			
330	SM	Gravelly SAND: tan to reddish brown, 70% medium- to coarse-grained SAND, 30% fine-grained SAND; angular to subangular, trace fine gravel.	Easier drilling.		4" Diameter Low-Carbon Steel Casing 0 - 355' bgs
335		As above.			
340	GM	COBBLES with Silty SAND: tan to reddish brown, 70% medium- to coarse-grained SAND, 30% fine-grained SAND; angular to subangular.			
345		Increase in cobbles.			Filter Pack: Lonestar No. 2/16 sand: 335 - 368' bgs
350		As above.	Some bit binding.		
355		Trace gravel.			
360					
					Well Screen #1: 355 - 365' bgs, 4" Diameter 0.010-inch slot, wire-wrapped stainless-steel screen

Borehole Location: JPL-MW-25 Project Location: NASA Jet Propulsion Lab Project #: G486048 Geologist: D. Conner Drilling Contractor: WDC Exploration & Wells Driller: Alberto Vega Reviewed by: David Clextan R.G. #7350	Sampler Type: Grab Sample from Shaker Screen Boring Diameter: 12 1/4" Drilling Method: Mud Rotary Drill Rig: Speedstar 50K Hammer Type: Casing Hammer Date: 09/20/04 - 09/24/04 Total Depth: 815' bgs	Coordinates (NAD 83/NAVD 88) Northing: 1,882,639.52 Surface Elevation: Easting: 6,514,027.89 Borehole Abandoned: Monitoring Device Installed: Yes No <input checked="" type="checkbox"/> Yes <input checked="" type="checkbox"/> No Method: N/A Type: Westbay Multi-Port Monitoring System
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Depth (feet bgs)	USCS symbols	Sample description	Comments	Lithology	Well Completion			
360	GM	COBBLES with Silty SAND: 70% medium- to coarse-grained SAND, 30% fine-grained SAND; angular to subangular, trace gravel.	Bit binding.		Well Screen #1: 355 - 365' bgs, 4" Diameter 0.010-inch slot, wire-wrapped stainless-steel screen Filter Pack: Lonestar No. 2/16 sand: 335 - 368' bgs 4" Diameter Low-Carbon Steel Casing 365 - 420' bgs Bentonite Seal: 1:1 granular bentonite to sand mixture 368 - 407' bgs			
365		As above.	Viscosity: 40 seconds. Weight: 9.0lbs/ft ³ SAND: 0.75%					
370		As above.						
375		60% coarse-grained SAND, 40% fine- to medium-grained SAND; angular.	Cuttings are finer grained than above due to the bit grinding through dense material. Driller comments that material is competent.					
380		70% coarse-grained SAND, 30% fine- to medium-grained SAND; angular to subangular, well graded.						
385		As above.						
390		As above.						
395		As above.						
400		SM	Silty SAND: 70% medium- to coarse-grained SAND, 30% fine-grained SAND.					
405			Gravels (406 - 414' bgs).					
410	As above.		Moderate rig chatter. Driller says hard material.		Filter Pack: Lonestar No. 2/16 sand: 407 - 435'			
415	As above.							
420								


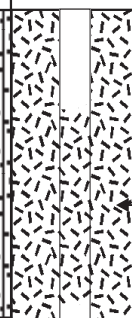

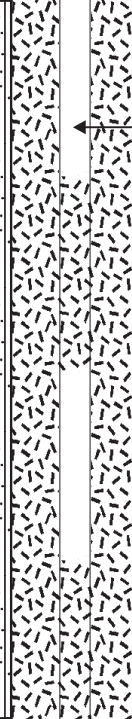

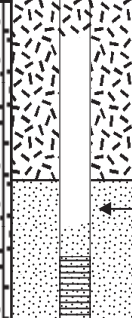
Borehole Location: JPL-MW-25 Project Location: NASA Jet Propulsion Lab Project #: G486048 Geologist: D. Conner Drilling Contractor: WDC Exploration & Wells Driller: Alberto Vega Reviewed by: David Clexton R.G. #7350	Sampler Type: Grab Sample from Shaker Screen Boring Diameter: 12 1/4" Drilling Method: Mud Rotary Drill Rig: Speedstar 50K Hammer Type: Casing Hammer Date: 09/20/04 - 09/24/04 Total Depth: 815' bgs	Coordinates (NAD 83/NAVD 88) Northing: 1,882,639.52 Surface Elevation: Easting: 6,514,027.89 Borehole Abandoned: Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Method: N/A Monitoring Device Installed: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Type: Westbay Multi-Port Monitoring System
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Depth (feet bgs)	USCS symbols	Sample description	Comments	Lithology	Well Completion
480	ML	Sandy SILT: orange brown, damp, medium dense, some fine-grained SAND, trace medium and trace coarse-grained SAND (logged from split-spoon sample).			<p>Bentonite Seal: 1:1 granular bentonite to sand mixture 435 - 490' bgs</p> <p>4" Diameter Low-Carbon Steel Casing 435 - 500' bgs</p> <p>Filter Pack: Lonestar No. 2/16 sand: 490 - 518' bgs</p> <p>Well Screen #3: 500 - 510' bgs, 4" Diameter 0.010-inch slot, wire-wrapped stainless-steel screen</p> <p>Bentonite Seal: 1:1 granular bentonite to sand mixture 518 - 617' bgs</p> <p>4" Diameter Low-Carbon Steel Casing 510 - 630' bgs</p>
485		As above.			
490		As above.	Attempted split spoon sample (300 lb. Slide hammer), 100 blows, 6" recovery.		
495		As above.			
500	GM	COBBLES with Silty SAND: 70% medium- to coarse-grained SAND, 30% fine-grained SAND; angular to subangular, trace gravel.			
505		As above.			
510	SM	Silty SAND: fine- to medium-grained SAND; angular to subangular, some coarse (up to 2-3mm).			
515	GM	COBBLES with Silty SAND: 70% medium- to coarse-grained SAND, 30% fine-grained SAND; angular to subangular, trace gravel, grains up to 3mm, moderately graded			
520		Silty SAND: fine- to medium-grained SAND, some coarse (up to 2-3mm); angular to subangular.			
525		As above.			
530	SM	As above.			
535	GM	COBBLES with Silty SAND: 70% medium- to coarse-grained SAND, 30% fine-grained SAND; angular to subangular, trace gravel, grains up to 3mm, moderately graded			
540					




Borehole Location: JPL-MW-25 Project Location: NASA Jet Propulsion Lab Project #: G486048 Geologist: D. Conner Drilling Contractor: WDC Exploration & Wells Driller: Alberto Vega Reviewed by: David Clexton R.G. #7350	Sampler Type: Grab Sample from Shaker Screen Boring Diameter: 12 1/4" Drilling Method: Mud Rotary Drill Rig: Speedstar 50K Hammer Type: Casing Hammer Date: 09/20/04 - 09/24/04 Total Depth: 815' bgs	Coordinates (NAD 83/NAVD 88) Northing: 1,882,639.52 Surface Elevation: Easting: 6,514,027.89 Borehole Abandoned: Monitoring Device Installed: Yes No <input checked="" type="checkbox"/> Yes <input checked="" type="checkbox"/> No Method: N/A Type: Westbay Multi-Port Monitoring System
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Depth (feet bgs)	USCS symbols	Sample description	Comments	Lithology	Well Completion
600	SM	Silty SAND: tan brown, medium- to coarse-grained SAND, with some fine-grained SAND; angular to subangular, moderately graded.			
605		As above.	Rig chatter.		Bentonite Seal: 1:1 granular bentonite to sand mixture 518 - 617' bgs
610		As above.	Viscosity: 41 seconds Weight: 9.1lbs/ft ³ Sand: 1%		4" Diameter Low-Carbon Steel Casing 510 - 630' bgs
615		Poorly graded SAND.			
620		As above.			Filter Pack: Lonestar No. 2/16 sand: 617 - 643' bgs
625		As above.			
630		As above.			
635		As above.	Attempt split spoon sample (300lb. slide hammer), 100 blows, no recovery.		Well Screen #4: 630 - 640' bgs, 4" Diameter 0.010-inch slot, wire-wrapped stainless-steel screen
640		Increase in coarse-grained SAND.			
645		As above.	Rig chatter (648 - 650').		Bentonite Seal: 1:1 granular bentonite to sand mixture 643 - 707' bgs
650		Fine- to medium-grained SAND; subangular, some cobbles, moderate grading.			
655		As above.			4" Diameter Low-Carbon Steel Casing 640 - 710' bgs
660					

Borehole Location: JPL-MW-25 Project Location: NASA Jet Propulsion Lab Project #: G486048 Geologist: D. Conner Drilling Contractor: WDC Exploration & Wells Driller: Alberto Vega Reviewed by: David Clexton R.G. #7350	Sampler Type: Grab Sample from Shaker Screen Boring Diameter: 12 1/4" Drilling Method: Mud Rotary Drill Rig: Speedstar 50K Hammer Type: Casing Hammer Date: 09/20/04 - 09/24/04 Total Depth: 815' bgs	Coordinates (NAD 83/NAVD 88) Northing: 1,882,639.52 Surface Elevation: Easting: 6,514,027.89 Borehole Abandoned: Monitoring Device Installed: Yes No <input checked="" type="checkbox"/> Yes <input checked="" type="checkbox"/> No Method: N/A Type: Westbay Multi-Port Monitoring System
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Depth (feet bgs)	USCS symbols	Sample description	Comments	Lithology	Well Completion
660	GM	COBBLES with Silty SAND: 70% medium- to coarse-grained SAND, 30% fine-grained SAND; angular to subangular, trace gravel.			
665		As above.			
670		As above.			
675	SM	Silty SAND: fine- to medium-grained, some cobbles (2-3mm), moderately graded, subangular.			
680		As above.			
685		As above.	Viscosity: 39 seconds Weight: 9.2lbs/ft ³ Sand: 1%		
690		As above.			
695		As above.			
700	GM	COBBLES with Silty SAND: 60% fine to medium-grained, 40% coarse-grained SAND; angular to subangular, up to 4 mm in length, some silt.			
705		As above.			
710		As above.	Heavy rig chatter.		
715		As above.			
720					

Borehole Location: JPL-MW-25 Project Location: NASA Jet Propulsion Lab Project #: G486048 Geologist: D. Conner Drilling Contractor: WDC Exploration & Wells Driller: Alberto Vega Reviewed by: David Clexton R.G. #7350	Sampler Type: Grab Sample from Shaker Screen Boring Diameter: 12 1/4" Drilling Method: Mud Rotary Drill Rig: Speedstar 50K Hammer Type: Casing Hammer Date: 09/20/04 - 09/24/04 Total Depth: 815' bgs	Coordinates (NAD 83/NAVD 88) Northing: 1,882,639.52 Surface Elevation: Easting: 6,514,027.89 Borehole Abandoned: Yes No <input checked="" type="checkbox"/> Monitoring Device Installed: Yes <input checked="" type="checkbox"/> No Type: Westbay Multi-Port Monitoring System Method: N/A
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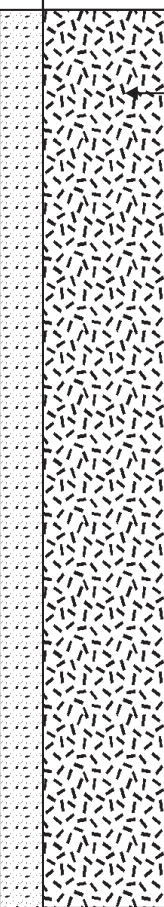
Depth (feet bgs)	USCS symbols	Sample description	Comments	Lithology	Well Completion
720	SM	Silty SAND: 50% fine- to medium-grained, 50% coarse-grained SAND; angular to subangular, grains up to 4 mm in length.	Increase in rig chatter (722').		 Filter Pack: Lonestar No. 2/16 sand: 707 - 724' bgs
725		As above.			
730	GM	SAND with COBBLES: 70% fine- to medium-grained, 30% coarse-grained.	Heavy rig chatter (COBBLES), and bit binding. Very hard (competent) Increased rig chatter (741'). More competent (742').		 4" Diameter Low-Carbon Steel Casing 720 - 740' bgs Bentonite Seal: 1:1 granular bentonite to sand mixture 740 - 815' bgs
735		As above.			
740		As above.			
745		As above.			
750		As above.			
755	As above.				
760		BEDROCK: buff to tannish pink, medium- to coarse-grained SAND; angular, some granodiorite grains (light colored with biotite).	Decrease in rig chatter and bit binding, consistent rotational speed and pressure indicating bedrock. Easier drilling (775 - 780') possibly due to fractured or weathered zone in bedrock.		
765		As above.			
770		As above.			
775		Possible fractured and weathered BEDROCK.			
780					

NASA/JPL BORING LOG AND WELL CONSTRUCTION – JPL-MW-25

Borehole Location: JPL-MW-25
 Project Location: NASA Jet Propulsion Lab
 Project #: G486048
 Geologist: D. Conner
 Drilling Contractor: WDC Exploration & Wells
 Driller: Alberto Vega
 Reviewed by: David Clexton R.G. #7350

Sampler Type: Grab Sample from Shaker Screen
 Boring Diameter: 12 1/4"
 Drilling Method: Mud Rotary
 Drill Rig: Speedstar 50K
 Hammer Type: Casing Hammer
 Date: 09/20/04 - 09/24/04
 Total Depth: 815' bgs

Coordinates (NAD 83/NAVD 88) Northing: 1,882,639.52
 Surface Elevation: Easting: 6,514,027.89
 Borehole Abandoned: Yes No
 Monitoring Device Installed: Yes No
 Method: N/A Type: Westbay Multi-Port Monitoring System

Depth (feet bgs)	USCS symbols	Sample description	Comments	Lithology	Well Completion
780		BEDROCK: buff to tannish pink, medium- to coarse-grained SAND, angular, some granodiorite grains (light colored with biotite).	Rig chatter and bouncing (782') indicating possibly fractured bedrock.		<u>Bentonite Seal:</u> 1:1 granular bentonite to sand mixture 740 - 815' bgs
785		As above.			
790		As above.			
795		As above.	Drill rod and bit rotating at constant speed, slower advancement.		
800		As above.			
805		As above.			
810		As above.			
815		As above.			

T.D.: 815' bgs.

APPENDIX C

IDW AND SAMPLE ANALYSIS DOCUMENTATION

Analytical Results from IDW Samples (Laboratory Reports Available on CD, by Request)

Water																												
Tank ID	Sample ID	Sample Date	Volatile Organic Compounds EPA 8260B (µg/L)	Semivolatile Organic Compounds EPA 8270C (µg/L)	Title 26 Metals plus Hexavalent Chromium and Strontium (mg/L) EPA 6010/7000																		Perchlorate EPA 314.0 (µg/L)	Cyanide EPA 4500 CN (mg/L)	TPH-E (Diesel) EPA 8015B (mg/L)	TPH-E (Jet Fuel) EPA 8015B (mg/L)	TPH-E (Oil) EPA 8015B (mg/L)	
					Sb	As	Ba	Be	Cd	Cr	Cr(VI)	Cu	Co	Pb	Mo	Hg	Ni	Se	Ag	Sr	Tl	V						Zn
BT-1517	BT1517-102604	10/26/2004	ND	ND	<0.0050	<0.0050	0.046	<0.0040	<0.0050	<0.0050	<0.001	<0.010	<0.005	<0.005	0.01	<0.0010	<0.0050	<0.0050	<0.0050	0.49	0.0081	<0.0050	<0.10	12	<0.005	<0.050	<0.050	<0.5
BT1717N	BT717N-102804	10/28/2004	ND	ND	<0.0050	<0.0050	0.073	<0.0040	<0.0050	0.0052	<0.001	<0.010	<0.005	<0.005	0.0062	<0.0010	0.0051	<0.0050	<0.0050	0.58	0.0029	0.0075	0.22	12	<0.005	<0.050	<0.050	<0.5
BT576D	576D-112204	11/22/2004	ND	ND	<0.0050	<0.0050	0.047	<0.0040	<0.0050	<0.0050	<0.001	<0.010	<0.0050	<0.0050	0.0078	<0.0010	0.0068	<0.0050	<0.0050	0.55	<0.0050	<0.0050	<0.10	13	<0.005	<0.050	<0.050	<0.5
Soil																												
Bin ID	Sample ID	Sample Date	Volatile Organic Compounds EPA 8260B (µg/kg)	Semivolatile Organic Compounds EPA 8270C (µg/kg)	Title 26 Metals plus Hexavalent Chromium and Strontium (mg/kg) EPA 6010/7000															Cyanide EPA 4500 CN (mg/kg)	TPH-E (Diesel) EPA 8015B (mg/kg)	TPH-E (Jet Fuel) EPA 8015B (mg/kg)	TPH-E (Oil) EPA 8015B (mg/kg)					
					Sb	As	Be	Cd	Cr	Cr(VI)	Cu	Pb	Hg	Ni	Se	Ag	Sr	Tl	Zn									
Bin 1 - R18116RT	BIN 1	9/28/2004	ND	ND	<1.0	1.5	<1.0	<1.0	8.3	<0.10	6.5	3.0	<0.20	4.2	<1.0	<1.0	22	<1.0	26	<0.5	<5.0	<5.0	<10	<0.5	<5.0	<5.0	<10	
Bin 2 - R18099RT	BIN 2	9/28/2004	ND	ND	<1.0	<1.0	<1.0	<1.0	4.9	<0.10	5.9	2.2	<0.20	2.7	<1.0	<1.0	17	<1.0	24	<0.5	<5.0	<5.0	<10	<0.5	<5.0	<5.0	<10	
Bin 3 - Black EFR	BIN 3	9/28/2004	ND	ND	<1.0	<1.0	<1.0	<1.0	5.7	<0.10	7.5	3.1	<0.20	3.5	<1.0	<1.0	24	<1.0	30	<0.5	<5.0	<5.0	<10	<0.5	<5.0	<5.0	<10	
Bin 4 - R2037RT	BIN 4	10/26/2004	ND	ND	<1.0	3.2	<1.0	<1.0	7.5	<0.01	9.9	18	0.85	5.7	<1.0	<1.0	35	<1.0	87	<0.5	<5.0	<5.0	<10	<0.5	<5.0	<5.0	<10	
Bin 5 - R2135	BIN 5	10/26/2004	ND	ND	<1.0	2.8	<1.0	<1.0	180	<0.01	9.3	24	0.80	330	<1.0	<1.0	<10	<1.0	48	<0.5	<5.0	<5.0	<10	<0.5	<5.0	<5.0	<10	
Bin 6 - Blue EFR	BIN 6	10/26/2004	ND	ND	<1.0	4.2	<1.0	<1.0	11	<0.01	14	11	0.86	8.2	<1.0	<1.0	<10	<1.0	51	<0.5	<5.0	<5.0	<10	<0.5	<5.0	<5.0	<10	
Bin 7 - 1992RT	BIN 7	10/26/2004	ND	ND	<1.0	<1.0	<1.0	<1.0	<1.0	<0.01	<2.0	7.4	0.68	1.8	<1.0	<1.0	<10	<1.0	<20	<0.5	<5.0	<5.0	<10	<0.5	<5.0	<5.0	<10	

Initial Sampling Analytical Results (Laboratory Reports Available on CD, by Request)

Sample Location	Sample ID	Sample Date	Volatile Organic Compounds EPA 524.2 (µg/L)	Perchlorate EPA 314.0 (µg/L)	Metals EPA 200.8 (mg/L)							Cr VI EPA 7196A/7199 (µg/L)	Anions EPA 300.0/9056 (mg/L)			1,2,3-Trichloropropane CA DHS (µg/L)	1,4 Dioxane EPA 8260B (µg/L)	Nitrosamines EPA 8270C (µg/L)	TDS EPA 160.1 (mg/L)	Alkalinity (as CaCO3) EPA 310.1 (mg/L)
					Na	Mg	K	Ca	Cr	As	Pb		Cr(VI)	Cl	NO ₃					
City of Pasadena Fire Hydrant (Source Water)	CPHYDRANT-92204	9/22/2004	Chloroform = 11 ⁽³⁾ Bromodichloromethane = 15 ⁽³⁾ Dibromochloromethane = 16 ⁽³⁾ Bromoform = 4.2 ⁽³⁾	<2.0																
MW25 Zone 1 (355'-365')	MW25-355-365	11/4/2004	<0.500 (Chloroform = 0.720)	13	31	22	2.6	74	<0.005	<0.005	<0.005	<20	42	11	77	<0.005	<3.0	<50 ⁽²⁾	440	200
	MW25-355-365	12/21/2004	<0.500	8.1	81	7.9	2.6	26	<0.005	<0.005	<0.005	<1.0 ⁽¹⁾⁽²⁾	22	<0.25 ⁽²⁾	84	<0.005	<3.0	<50	330	150
MW25 Zone 2 (420'-430')	MW25-420-430	11/4/2004	<0.500 (Chloroform = 0.790)	13	31	22	2.3	72	<0.005	<0.005	<0.005	<20	43	10	80	<0.005	<3.0	<50 ⁽²⁾	450	200
	MW25-420-430	12/21/2004	<0.500	12	56	20	3	65	<0.005	<0.005	<0.005	<1.0 ⁽¹⁾⁽²⁾	31	5.5 ⁽²⁾	66	<0.005	<3.0	<50	410	210
MW25 Zone 3 (500'-510')	MW25-500-510	11/5/2004	<0.500 (Chloroform = 0.850)	13	31	21	2.4	74	<0.005	<0.005	<0.005	<20 ⁽²⁾	42	10 ⁽²⁾	76	0.0055	<3.0	<50 ⁽²⁾	440	210
	MW25-500-510	12/21/2004	<0.500 (Chloroform = 0.650)	8.7	49	23	3.5	54	<0.005	<0.005	<0.005	<1.0 ⁽¹⁾⁽²⁾	30	9.4 ⁽²⁾	61	<0.005	<3.0	<50	380	170
MW25 Zone 4 (630'-640')	MW25-630-640	11/5/2004	<0.500 (Chloroform = 0.860)	13	32	23	2.5	77	<0.005	<0.005	<0.005	<20 ⁽²⁾	44	10 ⁽²⁾	79	<0.005	<3.0	<50 ⁽²⁾	450	210
	MW25-630-640	12/20/2004	<0.500	8.1	77	22	3.2	26	<0.005	<0.005	<0.005	<1.0 ⁽¹⁾⁽²⁾	34	5.4 ⁽²⁾	98	<0.005	<3.0	<50	360	90
MW25 Zone 5 (710'-720')	MW25-710-720	11/8/2004	<0.500 (Chloroform = 0.920)	13	30	21	2.4	70	<0.005	<0.005	<0.005	<20	39	9.6	76	<0.005	<3.0	<50	440	200
	MW25-710-720	12/20/2004	<0.500	<2.0	32	32	2.9	100	0.016	<0.005	<0.005	<1.0 ⁽¹⁾⁽²⁾	68	12 ⁽²⁾	130	<0.005	<3.0	<50	550	160

(1) Sample was analyzed by EPA Method 7199
(2) Sample was analyzed outside of the holding time.
(3) Sample was analyzed by EPA Method 8260B
Detections are in bold.
NA = Not analyzed or list not reported.
VOCs include Carbon Tetrachloride at <0.500 µg/L.

APPENDIX D

DOWNHOLE GEOPHYSICAL LOG

PACIFIC SURVEYS

CALIPER BOREHOLE VOLUMES

Job No. 11604
 Company WDC EXPLORATION & WELLS
 Well MW-25
 File No. Field PASADENA
 County LOS ANGELES State CA

Location: PASADENA CITY YARDS
 Other Services: ELOG/GR SONIC/VDL
 Sec. Twp. Rge.

Permanent Datum	GROUND LEVEL	Elevation	Elevation
Log Measured From	GROUND LEVEL	above perm. datum	K.B.
Drilling Measured From	GROUND LEVEL		D.F.
			G.L.

Date	09-27-2004		
Run Number	ONE		
Depth Driller	815'		
Depth Logger	814'		
Bottom Logged Interval	814'		
Top Log Interval	10'		
Casing Driller	20'		
Casing Logger	20'		
Bit Size	12.25"		
Type Fluid in Hole	BENTONITE		
Density / Viscosity	N/A		
pH / Fluid Loss	N/A		
Source of Sample	PIT		
Rm @ Meas. Temp	9.5 @ 75 F		
Rmf @ Meas. Temp	8.5 @ 75 F		
Rmc @ Meas. Temp	N/A		
Source of Rmf / Rmc	N/A		
Rm @ BHT	N/A		
Time Circulation Stopped	10:00		
Time Logger on Bottom	14:00		
Max. Recorded Temperature	N/A		
Equipment Number	PS-1		
Location	LA		
Recorded By	T. HOWARD	RIDDER	
Witnessed By	D. CLEXTON		

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Comments

XY Caliper Calibration Report

Serial Number:
 Tool Model:
 Performed: Thu Sep 09 15:12:51 2004

Short
 Comprobe
 in
 4
 14

Small Ring:
 Large Ring:

Large Ring.

X Caliper

Y Caliper

Reading with Small Ring:
Reading with Large Ring:

199.6
517.9

199.6
517.9

cps
cps

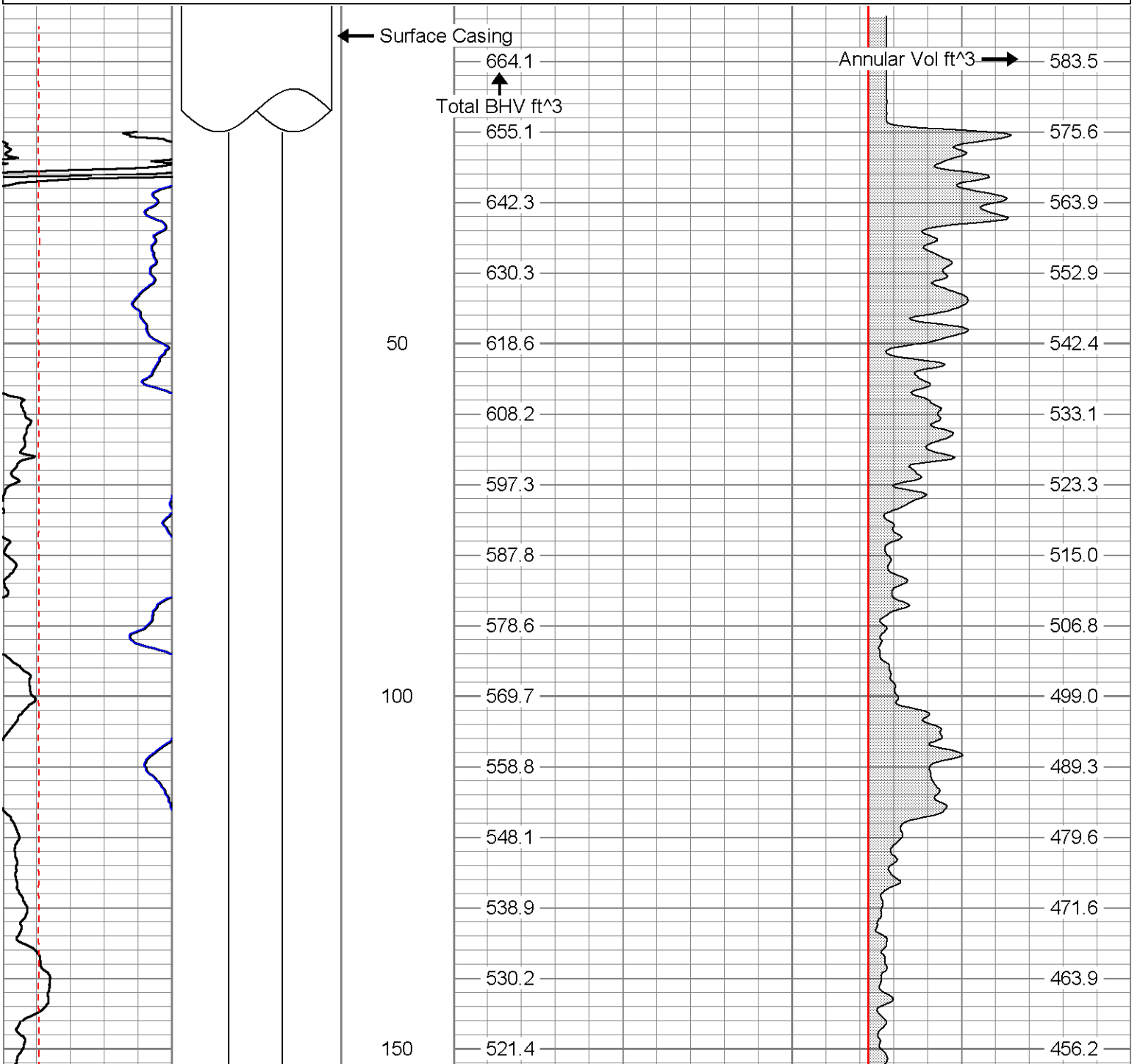
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Offset:

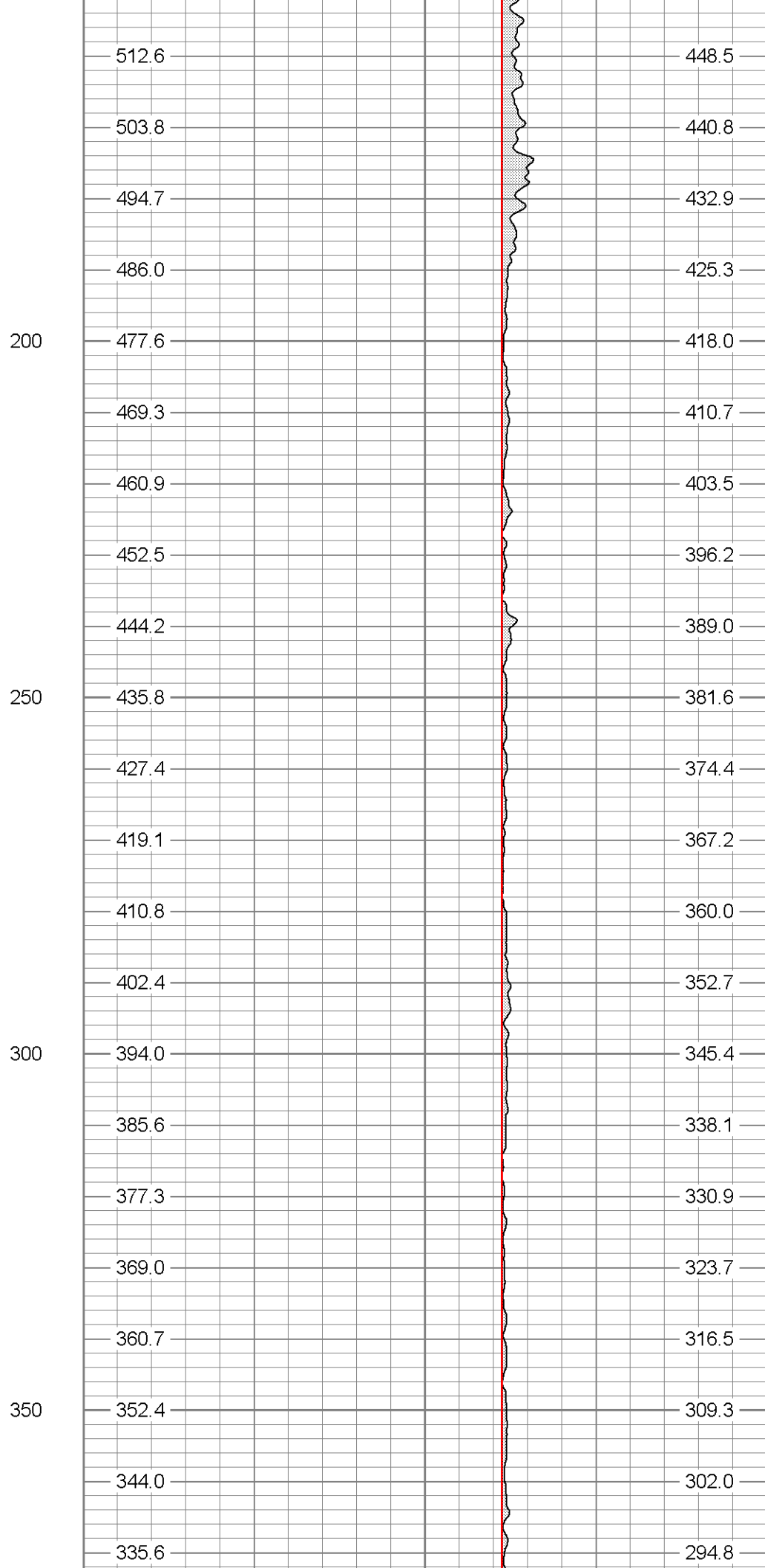
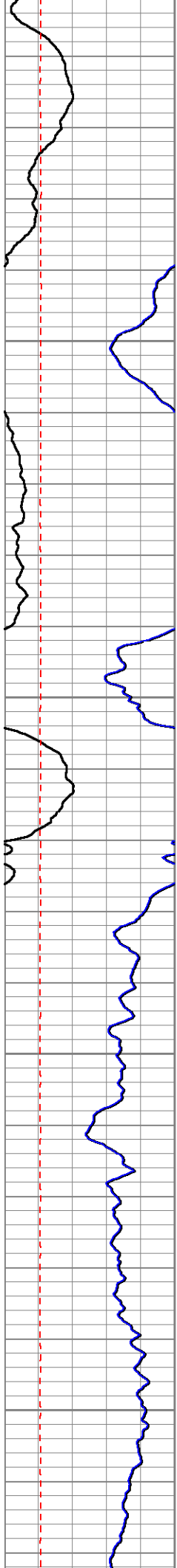
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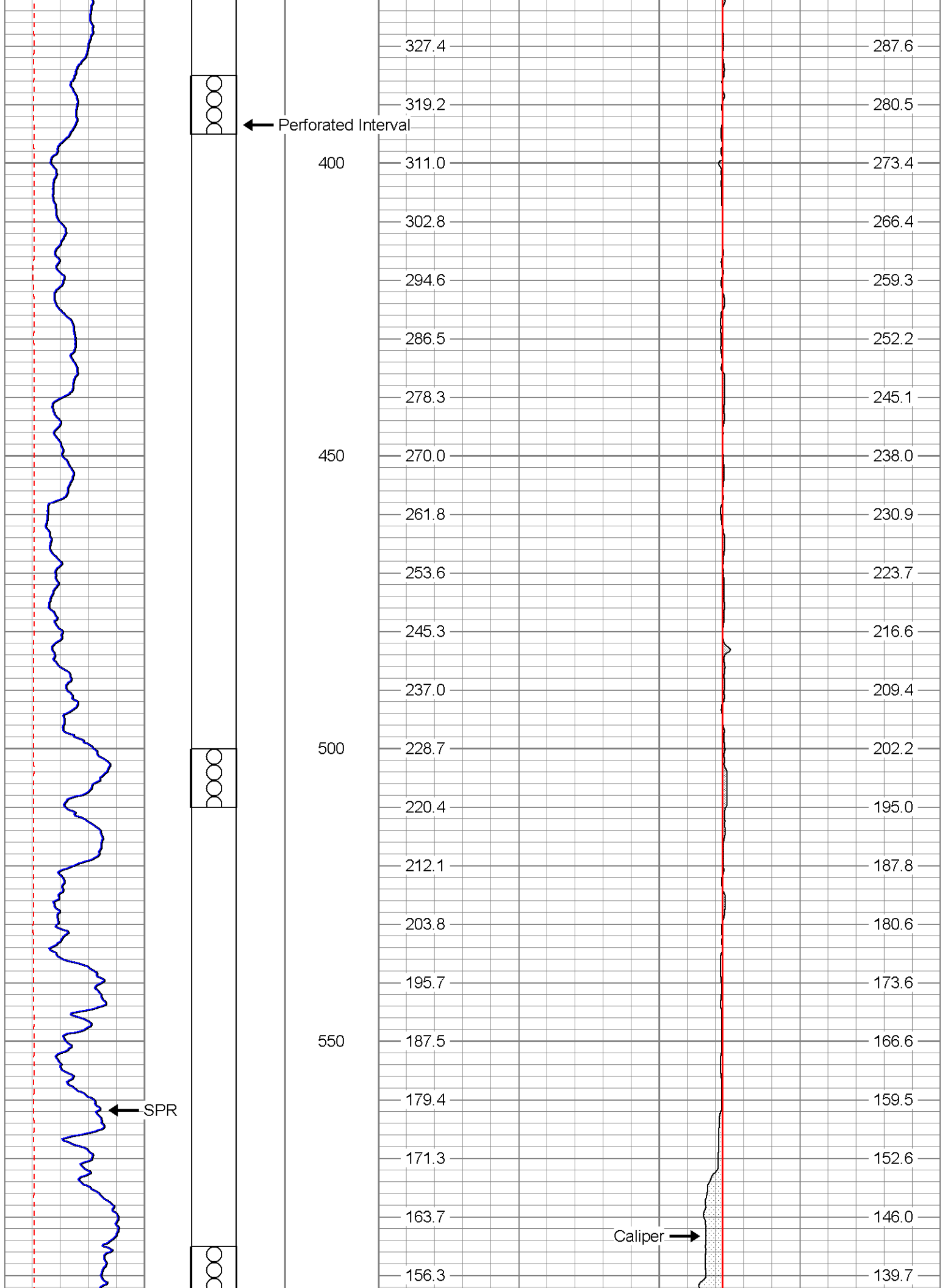
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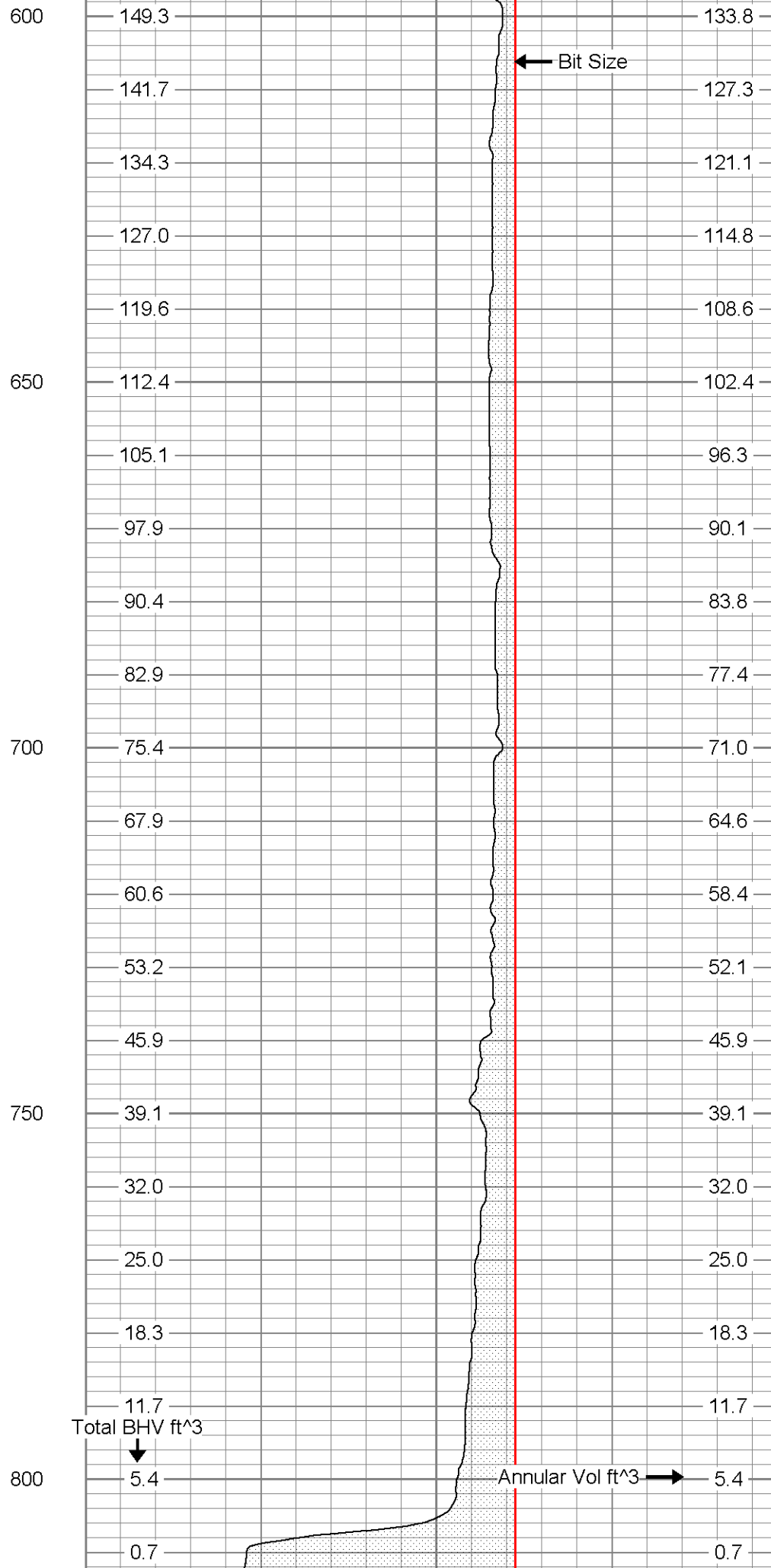
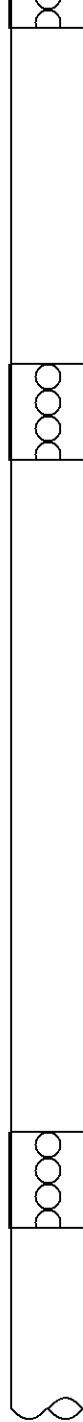
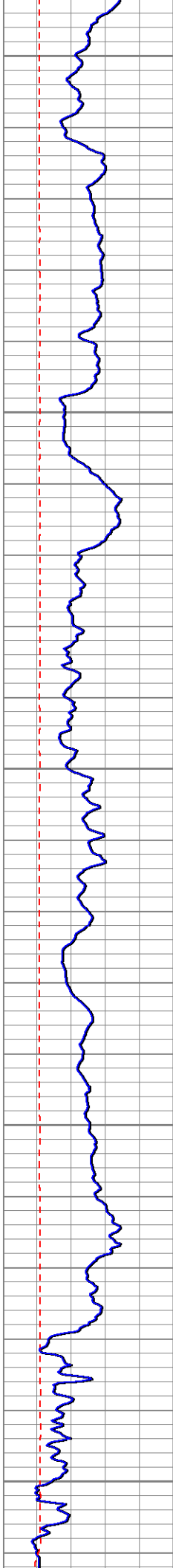
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Presentation Format: xyc2
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Charted by: Depth in Feet scaled 1:240

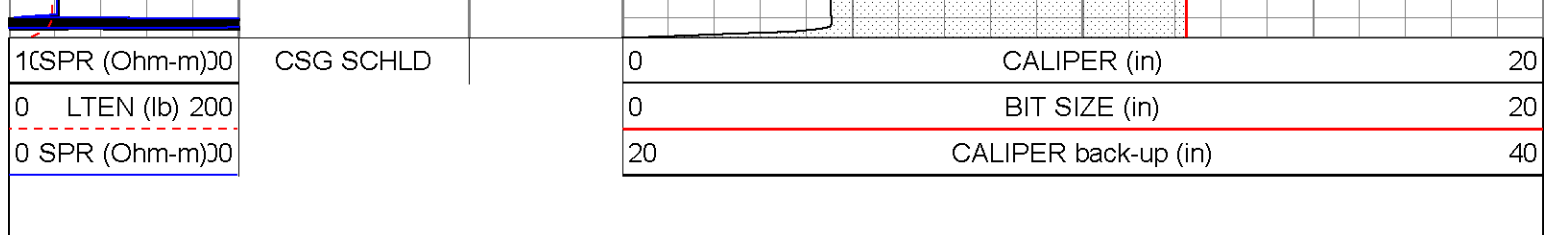
1(SPR (Ohm-m))0	CSG SCHLD	0	CALIPER (in)	20
0 LTEN (lb) 200		0	BIT SIZE (in)	20
0 SPR (Ohm-m))0		20	CALIPER back-up (in)	40











PACIFIC SURVEYS

ELECTRIC LOG GAMMA RAY

Job No. 11604
 Company WDC EXPLORATION & WELLS
 Well MW-25
 File No. Field PASADENA
 County LOS ANGELES State CA

Location: PASADENA CITY YARDS
 Other Services: CALIPER SONIC/VDL
 Sec. Twp. Rge.

Permanent Datum GROUND LEVEL Elevation
 Log Measured From GROUND LEVEL above perm. datum
 Drilling Measured From GROUND LEVEL
 K.B.
 D.F.
 G.L.

Date	09-27-2004		
Run Number	ONE		
Depth Driller	815'		
Depth Logger	814'		
Bottom Logged Interval	814'		
Top Log Interval	20'		
Casing Driller	20'		
Casing Logger	20'		
Bit Size	12.25"		
Type Fluid in Hole	BENTONITE		
Density / Viscosity	N/A		
pH / Fluid Loss	N/A		
Source of Sample	PIT		
Rm @ Meas. Temp	9.5 @ 75 F		
Rmf @ Meas. Temp	8.5 @ 75 F		
Rmc @ Meas. Temp	N/A		
Source of Rmf / Rmc	N/A		
Rm @ BHT	N/A		
Time Circulation Stopped	10:00		
Time Logger on Bottom	14:00		
Max. Recorded Temperature	N/A		
Equipment Number	PS-1		
Location	LA		
Recorded By	T. HOWARD	RIDDER	
Witnessed By	D. CLEXTON		

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Comments

ELOG Calibration Report

Serial:
Model:

D1
DTQ

Shop Calibration Performed:
Before Survey Verification Performed:
After Survey Verification Performed:

Thu Feb 12 18:50:48 2004
Fri Mar 28 18:39:54 2003
Thu Nov 20 13:45:24 2004

Shop Calibration						
	Readings		References		Results	
	Zero	Cal	Zero	Cal	Gain	Offset
Short	8.842	100.519	10.200	102.200	1.004	1.327
Long	6.083	95.489	10.200	102.200	1.029	-21.000
IEE	222.231	7097.889	0.243	7.768		A
VSN	79.981	8070.806	1.526	153.941		V
VLN	119.037	2050.833	2.270	39.117		V

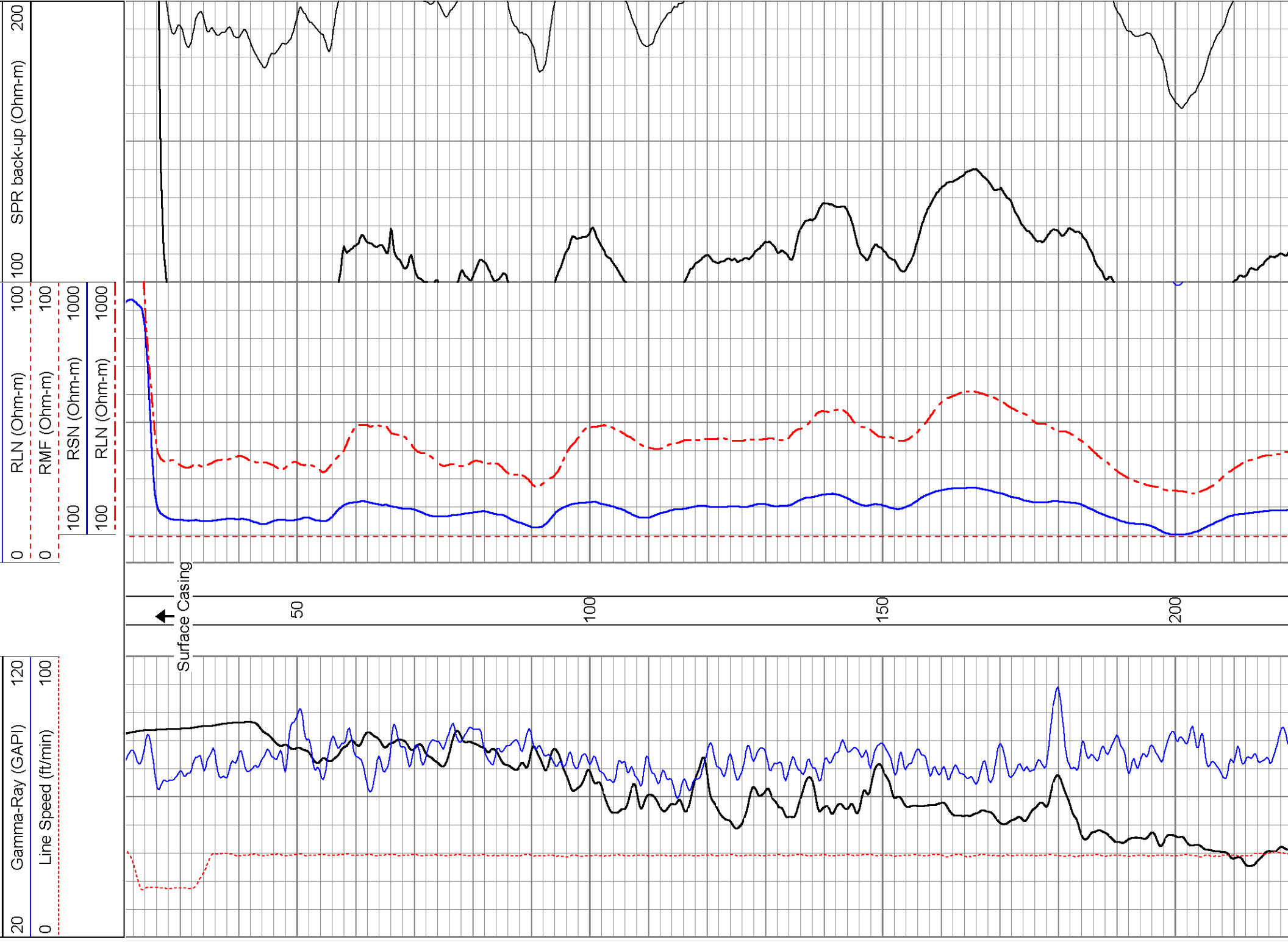
Before Survey Verification						
	Readings		References		Results	
	Zero	Cal	Zero	Cal	Gain	Offset
Short	255.170	100.412	46.444	100.411	-0.349	135.426
Long	1150.040	103.869	103.264	103.264	0.219	80.559
IEE	140.620	6475.111	0.154	7.086		A
VSN	403.139	7304.796	7.689	139.330		V
VLN	454.231	1889.074	8.664	36.032		V

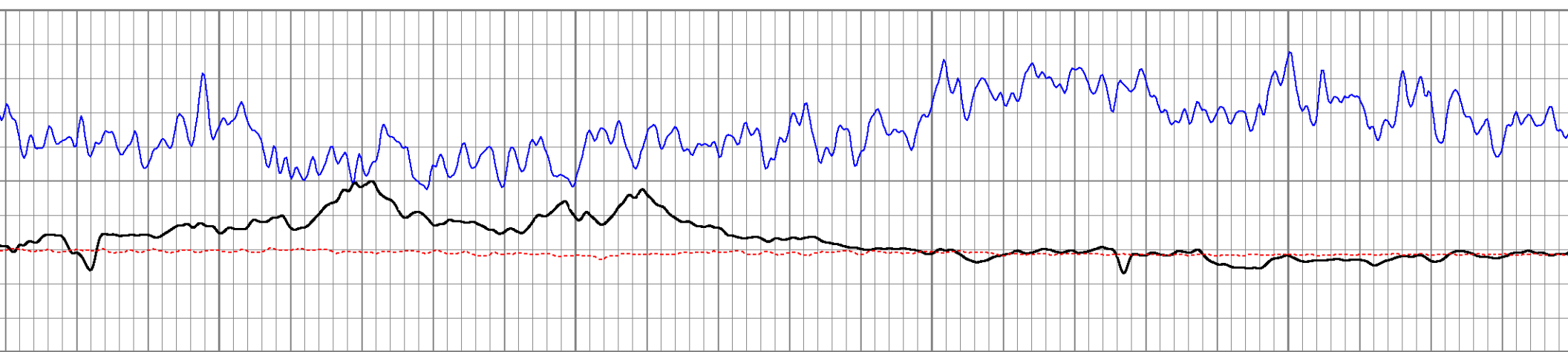
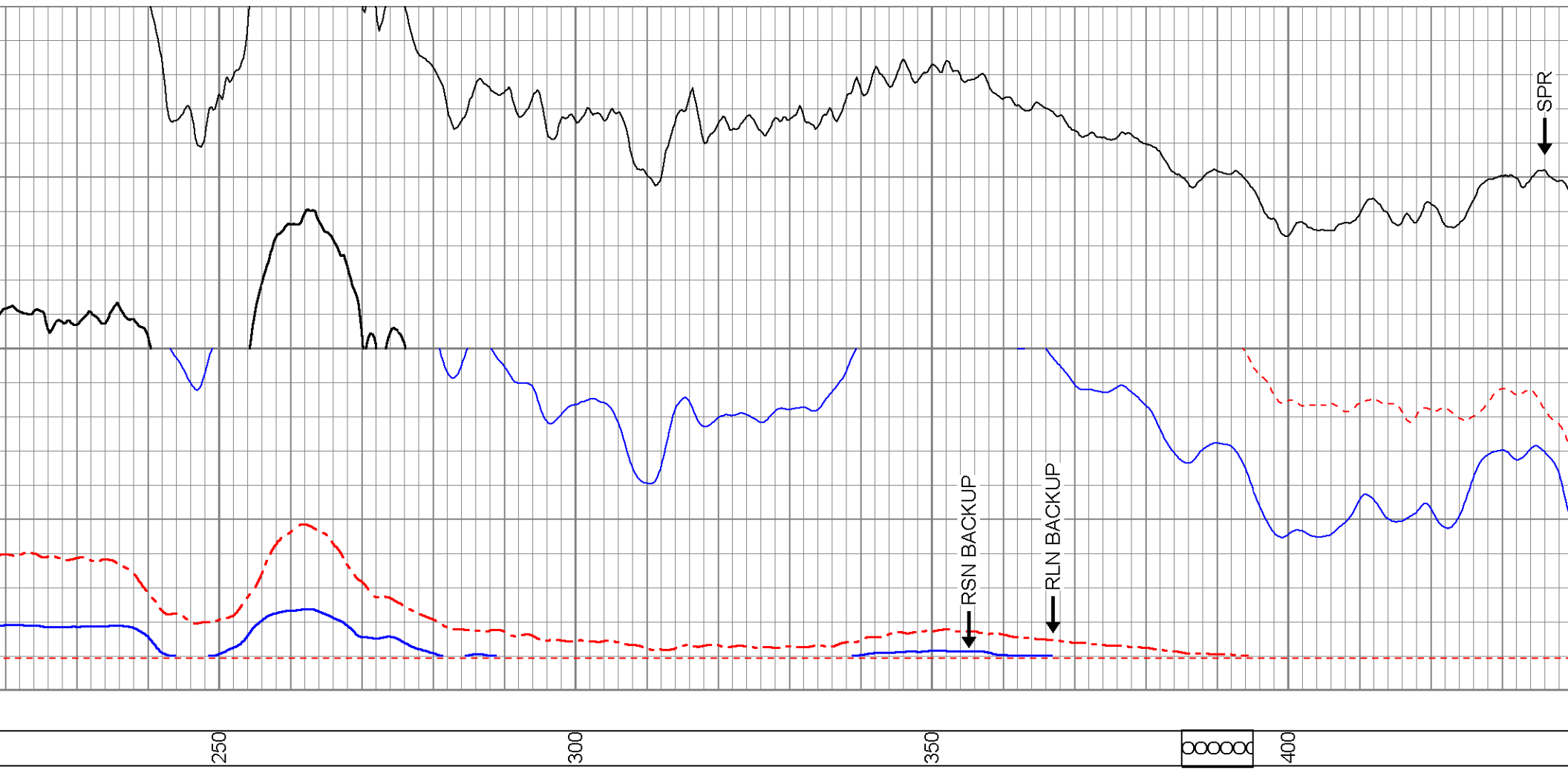
After Survey Verification						
	Readings		References		Results	
	Zero	Cal	Zero	Cal	Gain	Offset
Short	0.000	99.861	0.000	99.853	1.000	0.000
Long	0.000	102.069	102.055	102.055	1.000	0.000
IEE	129.370	6528.851	0.142	7.145		A
VSN	142.833	7325.000	2.724	139.715		V
VLN	114.778	1871.738	2.189	35.701		V

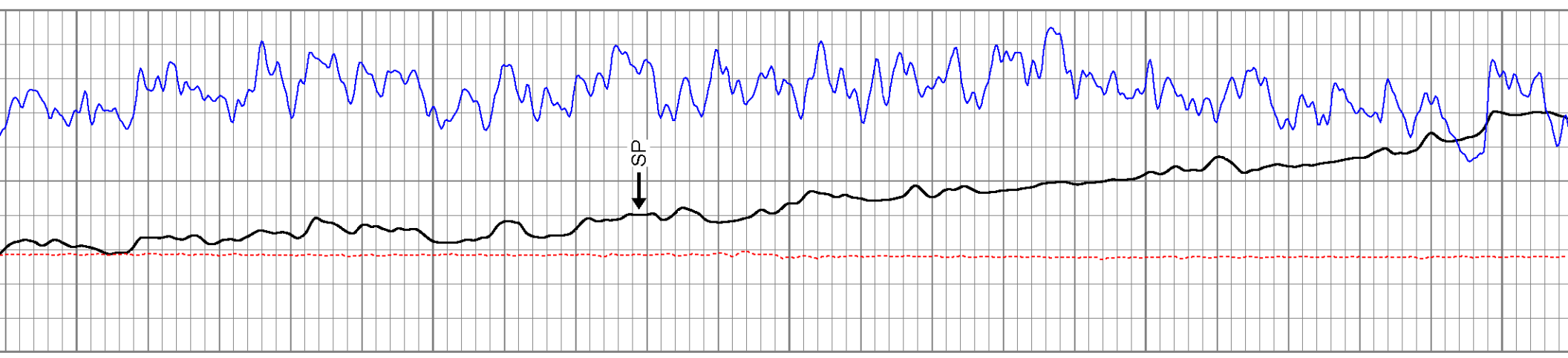
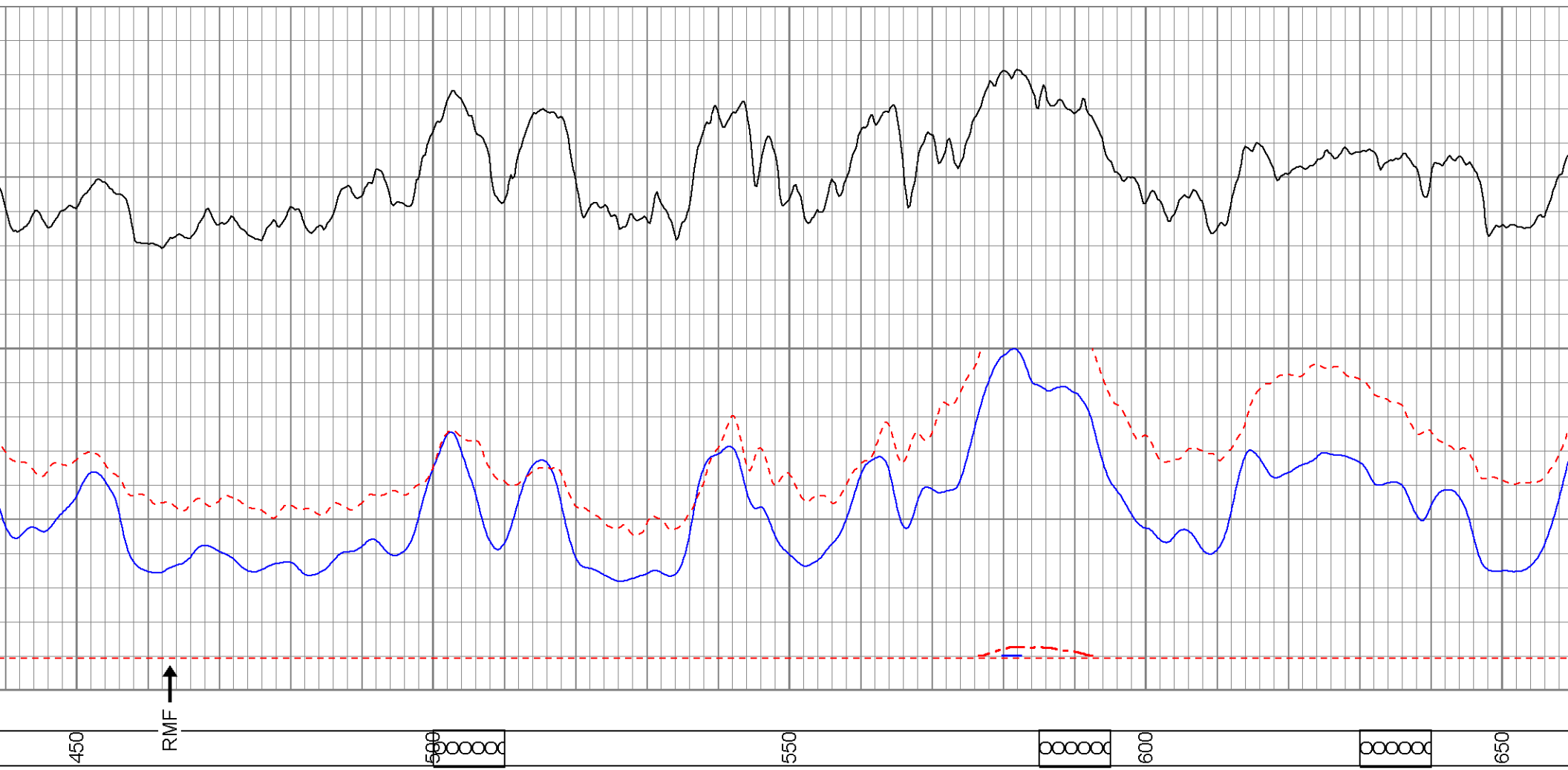
After Survey Verification compared to Before Survey Calibration					
	Zero		Cal		
	Before	After	Before	After	
Short	46.444	0.000	100.411	99.853	Ohm-m
Long	331.945	0.000	103.264	102.055	Ohm-m

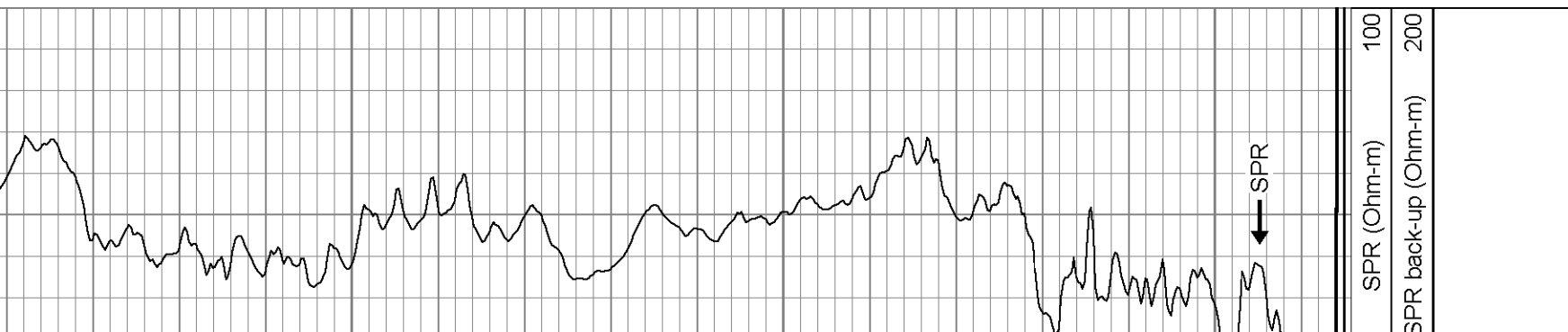
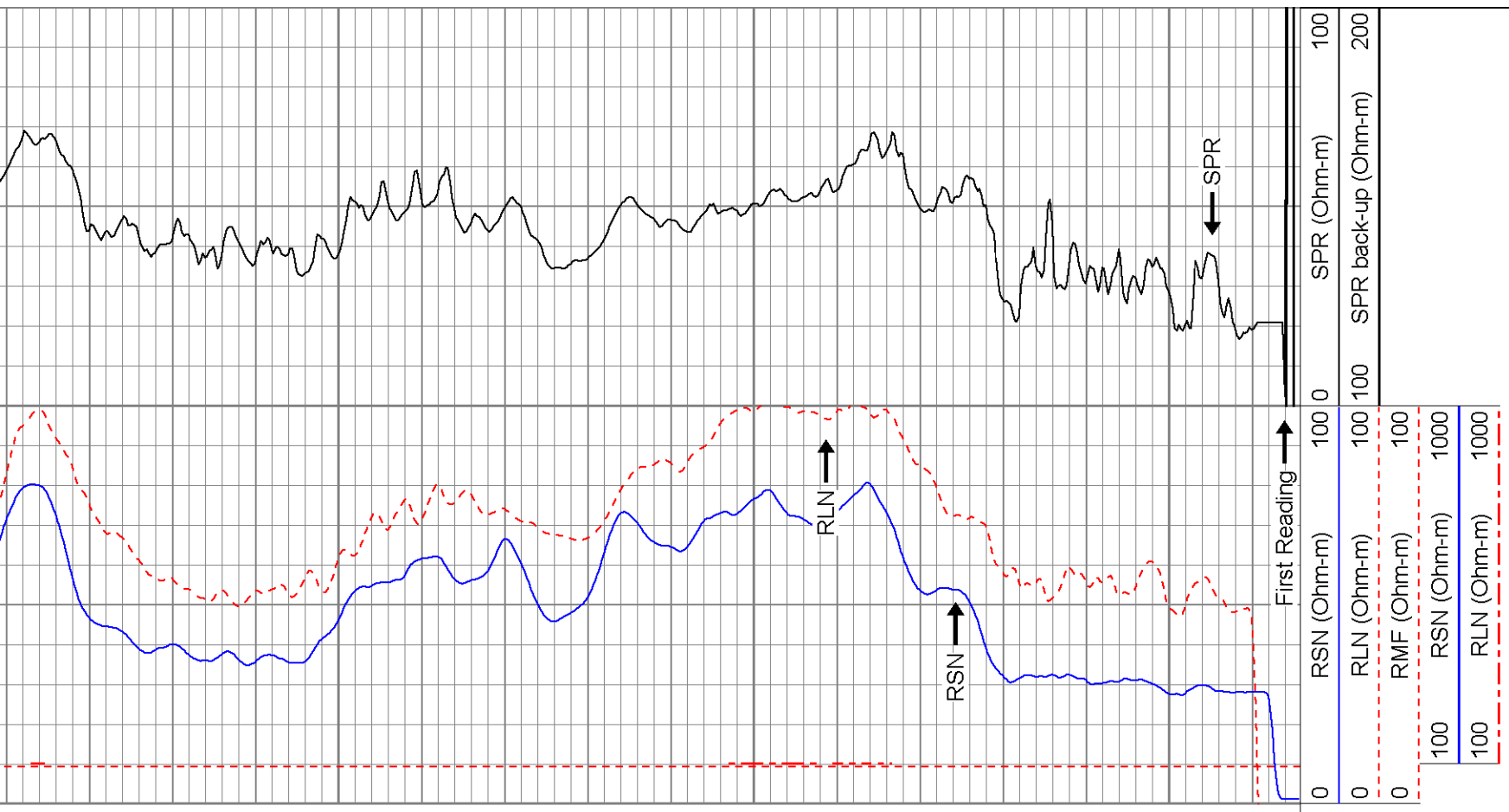
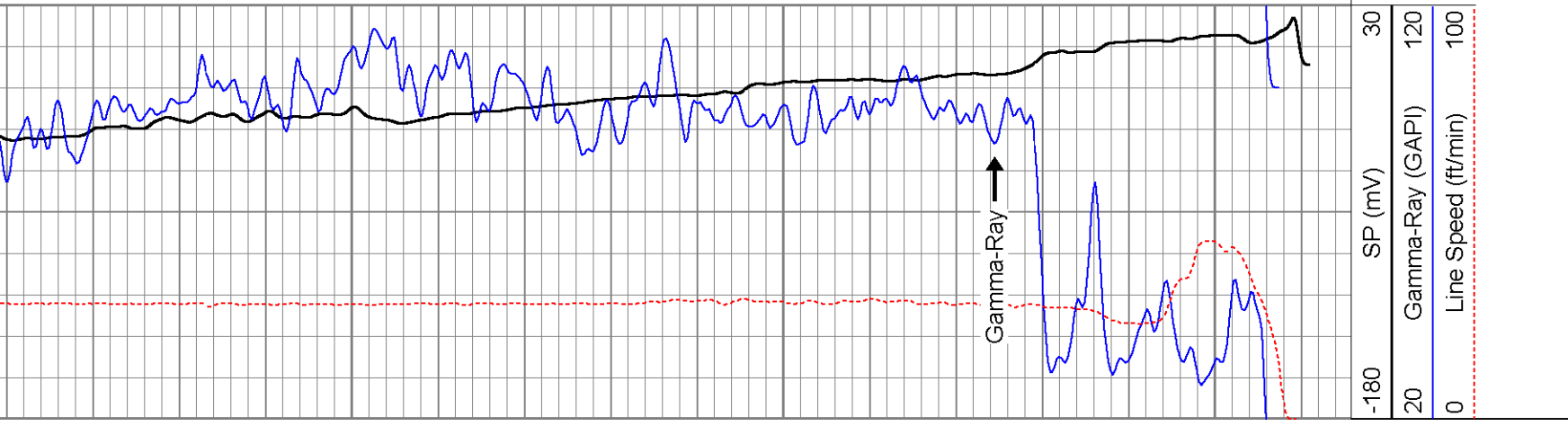
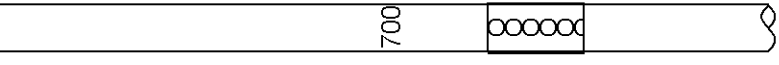
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Tool Model:	ELOG				
Performed:	Mon Jan 26 16:20:05 2004				
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Background Reading:	172.547	cps			
Calibrator Reading:	717.938	cps			
Sensitivity:	0.297034	GAPI/cps			

Database File:	11604.db				
Dataset Pathname:	WDC/City_yard/run1/pass1				
Presentation Format:	elog				
Dataset Creation:	Mon Sep 27 11:04:27 2004 by Log 6.2_B4				
Charted by:	Depth in Feet scaled 1:240				









PACIFIC SURVEYS

SONIC/VDL GAMMA RAY SINGLE POINT RESISTIVITY

Job No. 11604
 Company WDC EXPLORATION & WELLS
 Well MW-25
 File No. Field PASADENA
 County LOS ANGELES State CA

Location: PASADENA CITY YARDS
 Other Services: ELOG/GR CALIPER
 Sec. Twp. Rge.

Permanent Datum GROUND LEVEL Elevation
 Log Measured From GROUND LEVEL above perm. datum
 Drilling Measured From GROUND LEVEL
 K.B.
 D.F.
 G.L.

Date	09-27-2004		
Run Number	ONE		
Depth Driller	815'		
Depth Logger	814'		
Bottom Logged Interval	814'		
Top Log Interval	10'		
Casing Driller	20'		
Casing Logger	20'		
Bit Size	12.25"		
Type Fluid in Hole	BENTONITE		
Density / Viscosity	N/A		
pH / Fluid Loss	N/A		
Source of Sample	PIT		
Rm @ Meas. Temp	9.5 @ 75 F		
Rmf @ Meas. Temp	8.5 @ 75 F		
Rmc @ Meas. Temp	N/A		
Source of Rmf / Rmc	N/A		
Rm @ BHT	N/A		
Time Circulation Stopped	10:00		
Time Logger on Bottom	14:00		
Max. Recorded Temperature	N/A		
Equipment Number	PS-1		
Location	LA		
Recorded By	T. HOWARD	RIDDER	
Witnessed By	D. CLEXTON		

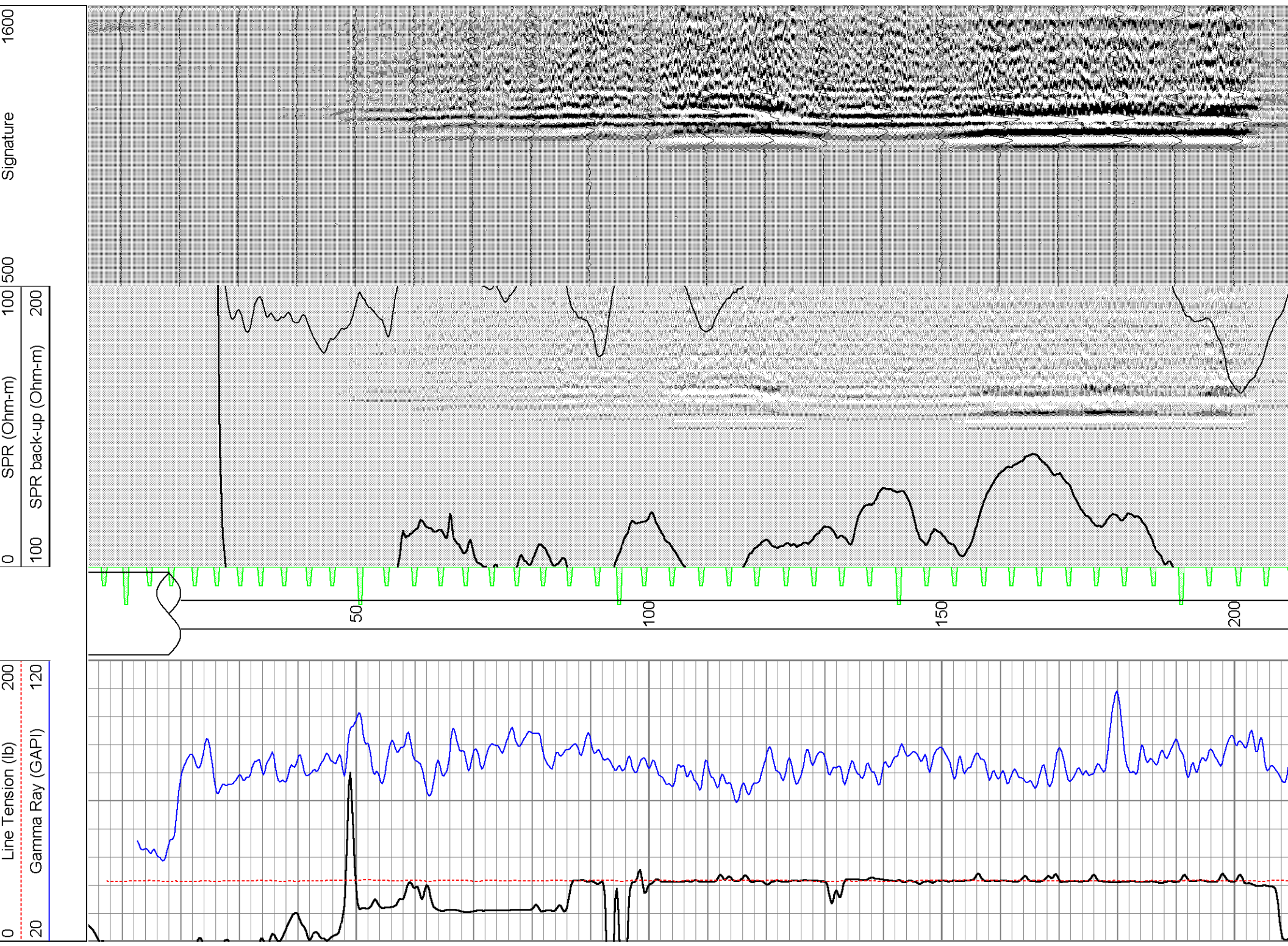
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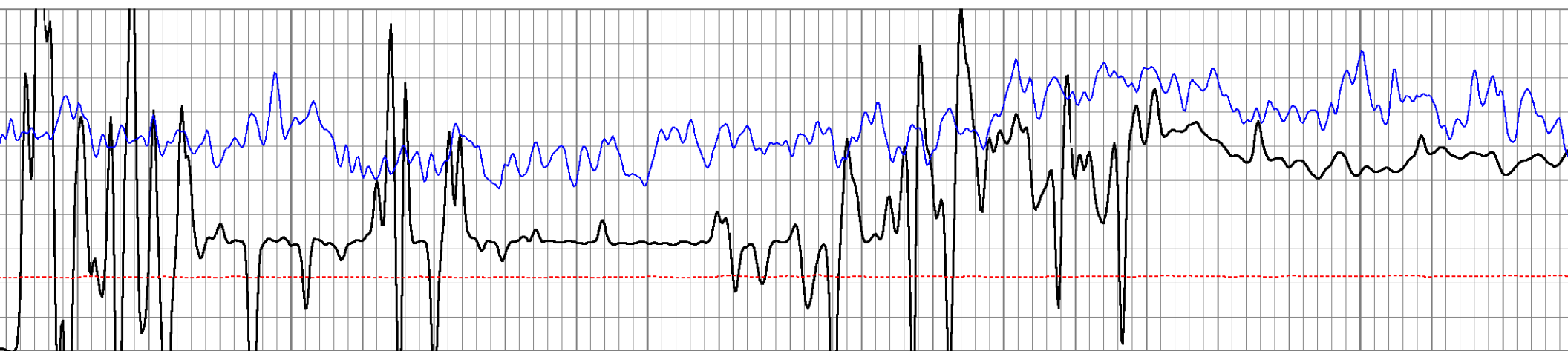
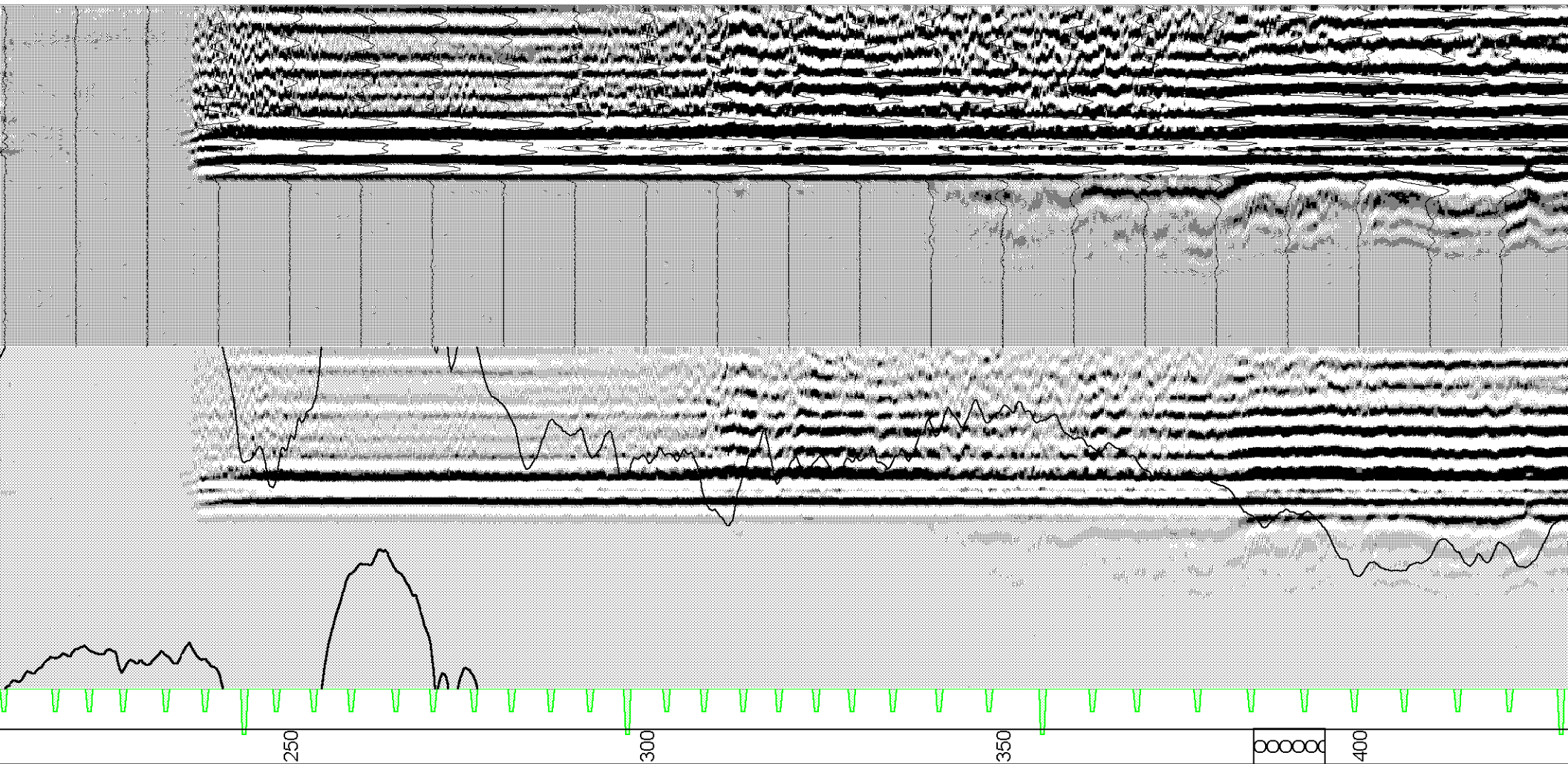
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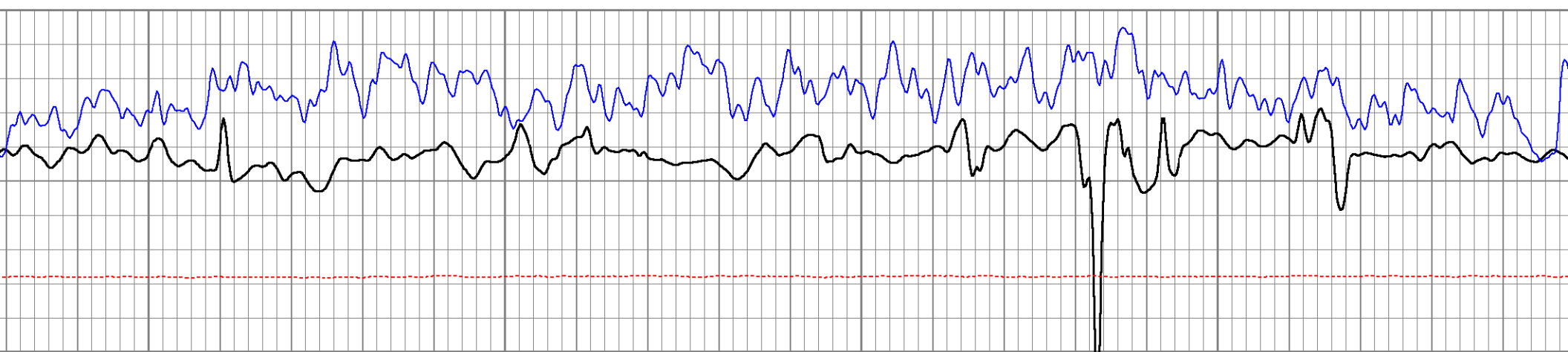
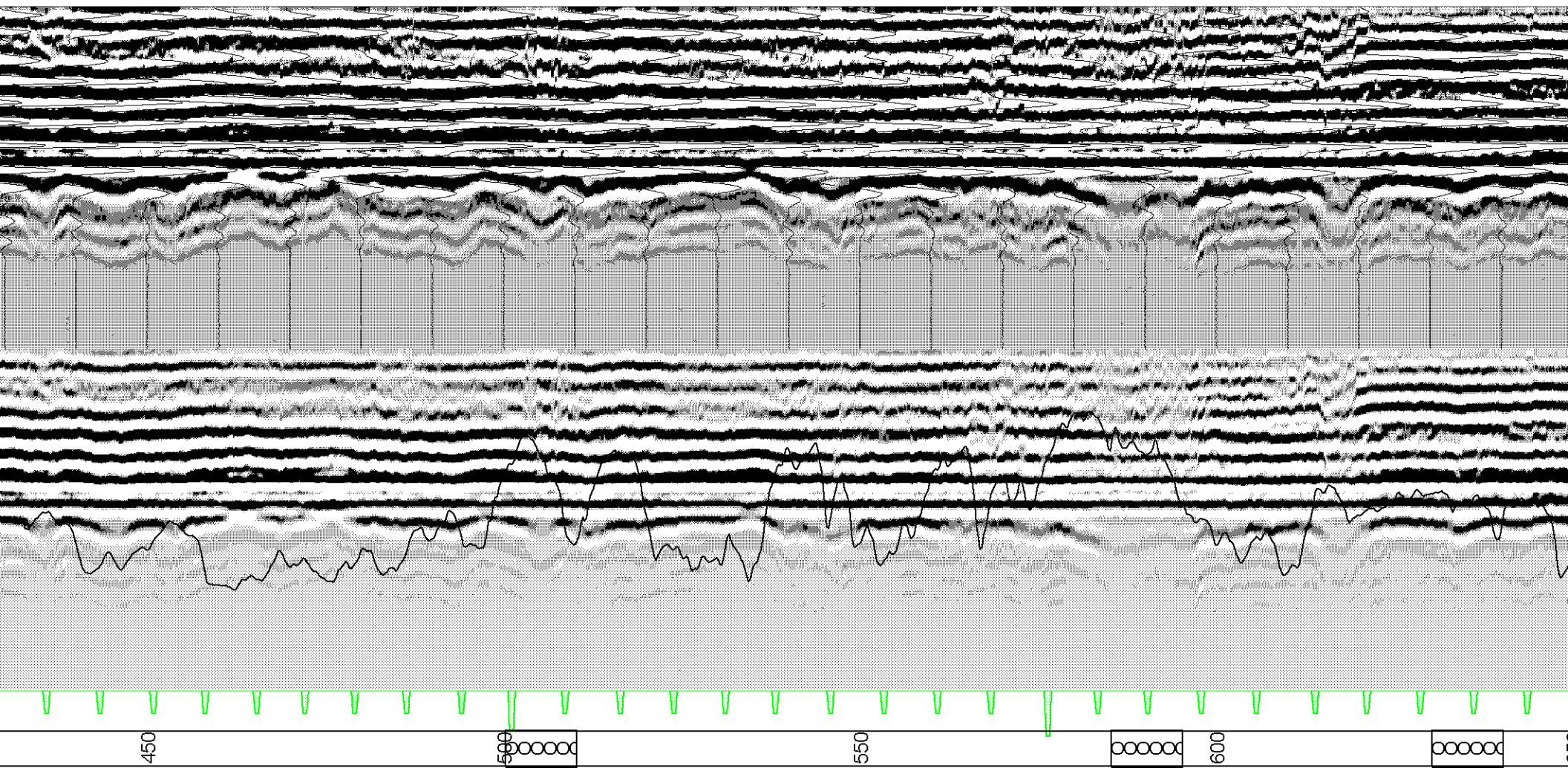
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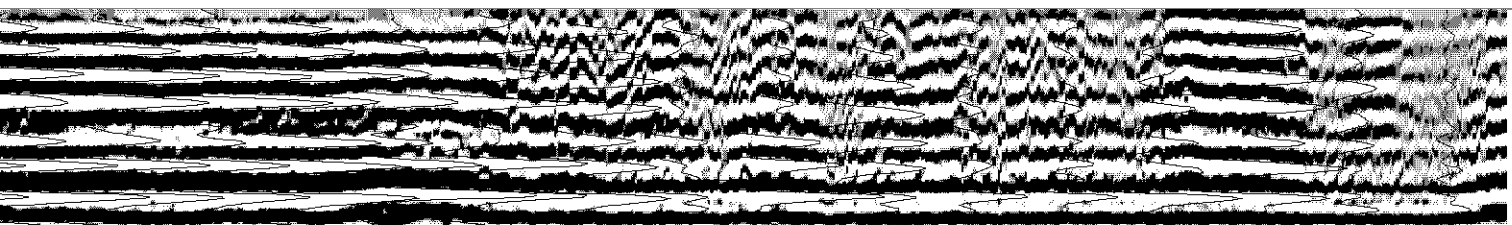
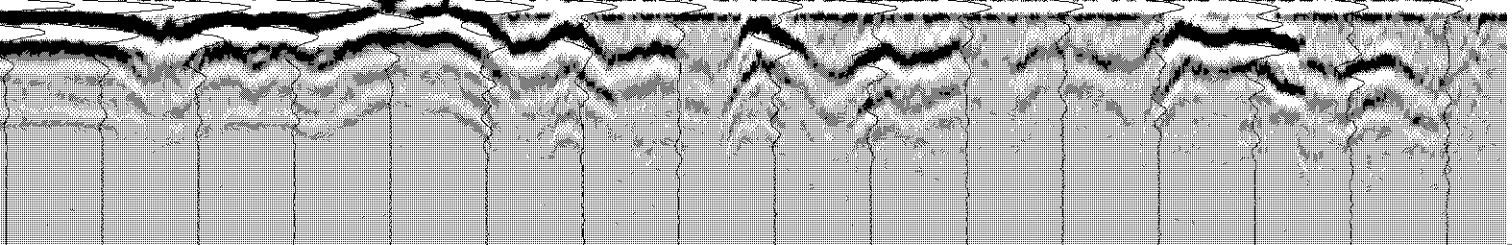
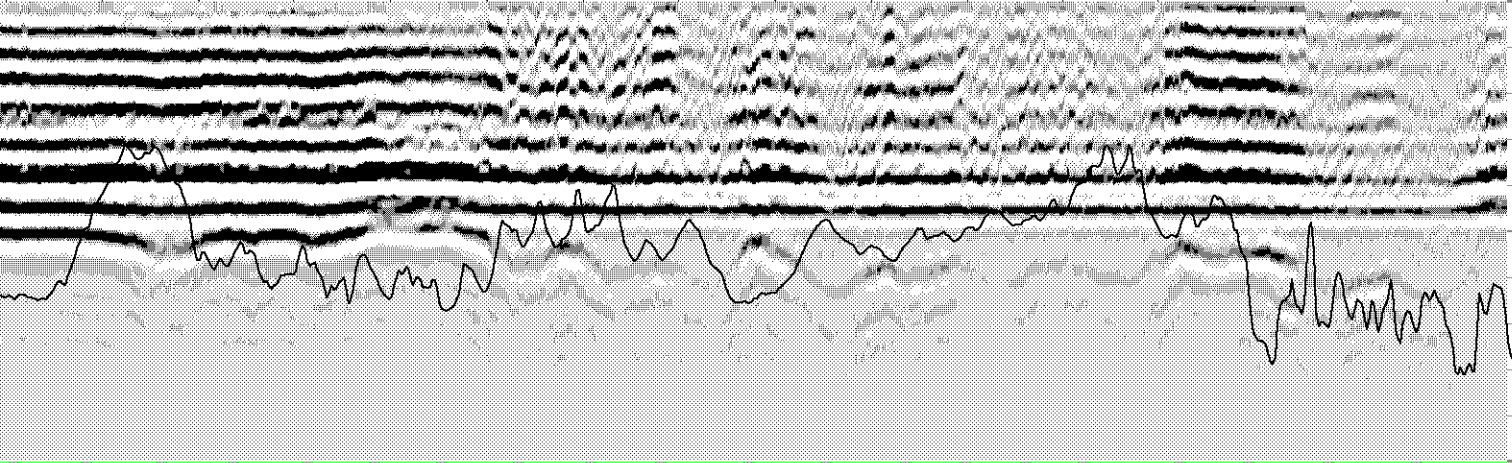
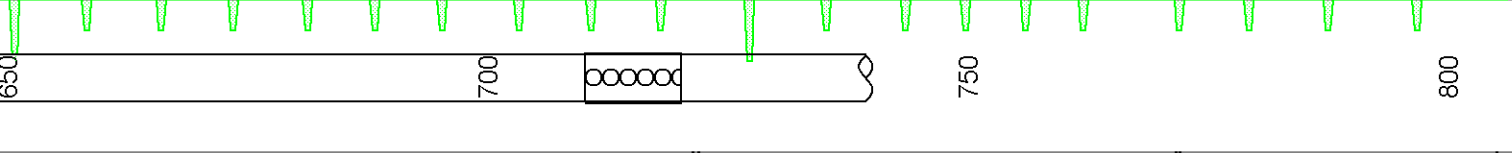
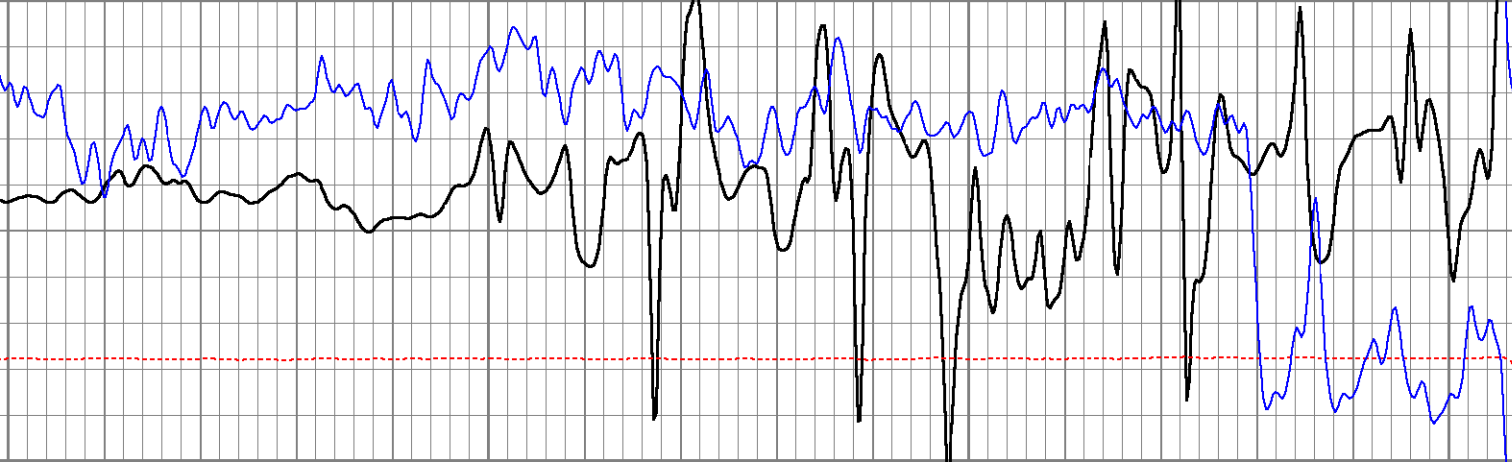
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 Charted by: Depth in Feet scaled 1:240

250 Delta Time (usec/ft) 50 (ITT (msec)) 500 Variable Density 5 ft 1600 500 Variable Density 5 ft 1600









250 Delta Time (usec/ft) 50
 0 Line Tension (lb) 200
 20 Gamma Ray (GAPI) 120

500 Variable Density 5 ft 1600
 0 SPR (Ohm-m) 100
 100 SPR back-up (Ohm-m) 200

500 Variable Density 5 ft 1600
 0 Signature 1600

500 Variable Density 5 ft 1600
 0 Signature 1600