Triple Combo Log / Platform Express / Resistivity

Schlumberger

Company: DCP Midstream LP

Well: ZIA AGI D2

Field: AGI Devonian Exploration

County: Lea State: New Mexico

Triple Combo Log

Platform Express

Resistivity

County: Lea
Field: AGI Devonian Exploration
Location: 1893' FSL & 950' FWL
Well: ZIA AGI D2
Company: DCP Midstream LP

Location:				
1893' FSL & 950' FWL Section:19, Township: T19S, Abstract:R32S			Elev.: K.B.	3574.00 ft
			G.L.	3547.00 ft
			D.F.	3573.00 ft
Permanent Datum:	Ground Level	Elev.:	3547.00 f	
Log Measured From:	Kelly Bushing	27.00 ft	above Perm.Datum	
Drilling Measured From:	Kelly Bushing			

API Serial No.	Section:	Township:	Abstract:
30-025-42207	19	T19S	R32S

Logging Date			11-Dec-2016			
Run Number			2A			
Depth Driller			14750.00 ft			
Schlumberger Depth			14770.00 ft			
Bottom Log Interval			14770.00 ft			
Top Log Interval			13635.00 ft			
Casing Driller Size @ Depth			7 in @ 13622.00 ft			
Casing Schlumberger			13635 ft			
Bit Size			6 in			
Type Fluid In Hole			Fresh Water			
MUD	Density	Viscosity	8.4 lbm/gal	28 s		
	Fluid Loss	PH	0 cm3	10		
	Source of Sample		Active Tank			
RM @ Meas Temp			0.25 ohm.m @ 60 degF			
RMF @ Meas Temp			0.13 ohm.m @ 60 degF			
RMC @ Meas Temp						
Source RMF	RMC		Calculated			
RM @ BHT	RMF @ BHT		0.08 @ 206	0.06 @ 206		
Max Recorded Temperatures			206 degF			
Circulation Stopped	Time		10-Dec-2016	12:30:00		
Logger on Bottom	Time		11-Dec-2016	08:15:00		
Unit Number	Location:		2191	Midland		
Recorded By			J.Shtull			
Witnessed By			Jim Hunter			

Disclaimer

Contents

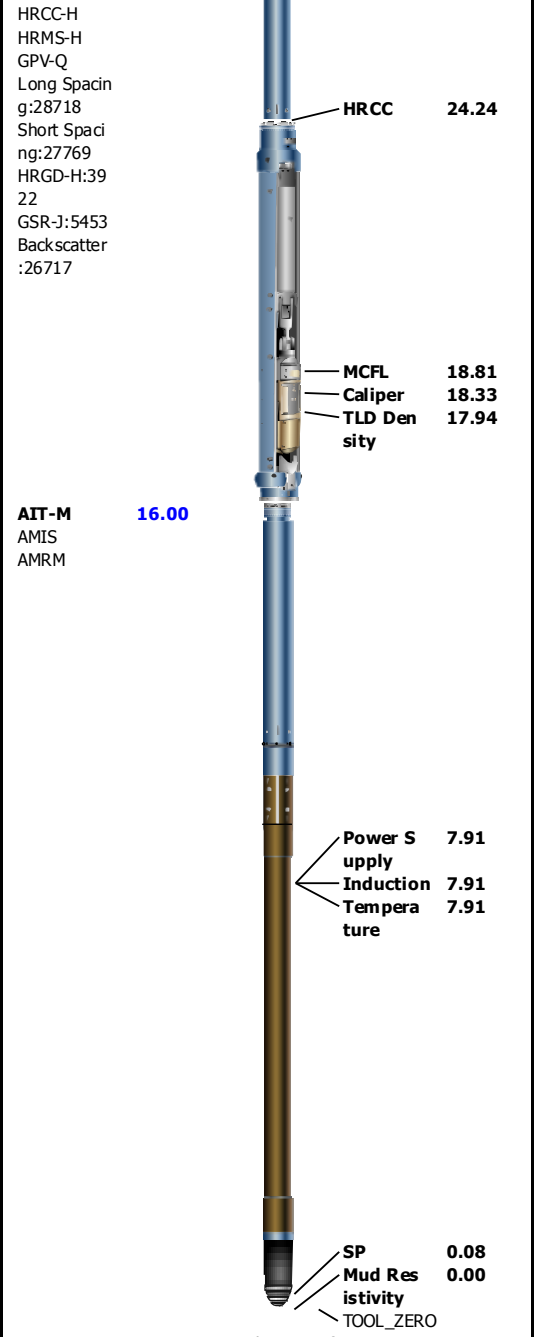
Remarks and Equipment Summary

2A: Toolstring

Equip name	Length	MP name	Offset
LEH-QC	**62.8**		
DTC-H	**60.34**	**CTEM**	**59.44**
ECH-KC		**HV**	**0.00**
DTC-H		**TelStatus**	**57.34**
		ToolStatus	**57.34**
HNGS-BA:365	**57.34**		
HEH-K:365			
HNGS-BA:365		**GR**	**54.35**
HNGC-B:623	**49.15**		
HNGH-A:4104			
HNGC-B:623		**Tel Status**	**47.4**
ILE-F	**45.65**		
HGNS-B	**37.65**	**Temperature**	**37.62**
HGNH:2978		**GR**	**36.91**
NPV-N			
NSR-F:5064			
HMCA-B			
HGNS-B			
HACCZ-B:419			
		CNL Porosity	**30.57**
		HGNS	**28.24**
		HMCA	**28.24**
		Accelerometer	**0.00**
HDRS-H	**28.24**		
ECH-MEB:4916			

2A: Remarks

Thank you for choosing Schlumberger Wireline
Toolstring ran as per tool sketch
Logging program and intervals confirmed with client prior to job
Limestone matrix used
AIT ran slick due to hole size
ILE used for eccentralization
HGNS corrected for hole size and standoff correction
Correlation to previous log confirmed with on-site gelogist at points: 13500, 13398
Induction tool ran for resistivity as per client request
Resistivity data out of tolerance due to borehole condition



Lengths are in ft
Maximum Outer Diameter = 4.770 in
Line: Sensor Location, Value: Gating Offset
All measurements are relative to TOOL_ZERO

Depth Summary

	2A		
Depth Measuring Device			
Type	IDW-B		
Serial Number	6609		
Calibration Date	03-Jun-2016		
Calibrator Serial Number			
Calibration Cable Type			
Wheel Correction 1	-3		
Wheel Correction 2	-2		
Tension Device			
Type	CMTD-B/A		
Serial Number	3500		
Calibration Date	09-Dec-2016		

Calibrator Serial Number	13		
Number of Calibration Points	10		
Calibration Root Mean Square Error	10		
Calibration Peak Error	15		

Logging Cable

Type	7-46P-XS		
Serial Number	U714051		
Length	22100.00 ft		
Conveyance Type	Wireline		
Rig Type	Land		

2A:Depth Control Parameters		Depth Control Remarks
Log Sequence	Subsequent Log In the Well	IDW used as primary depth control device
Reference Log Name	"Platform Express" - D.Krebs	ZChart used as secondary depth control device
Reference Log Run Number	1A	Correlation confirmed with onsite geologist
Reference Log Date	29-Nov-2016	

2A

Main Pass 5"=100'

Integration Summary

Output Channel(s)	Output Description	Input Parameter	Output Value	Unit
IHV	Integrated Hole Volume	GCSE_UP_PASS	235	ft3
ICV	Integrated Cement Volume	GCSE_UP_PASS, FCD	0	ft3

Software Version

Acquisition System	Version
Maxwell 2016 SP3	6.3.75395.3100
Application Patch	Wireline_Hotfix-MAST-2016SP3_6.3.77788

Pass Summary

Run Name	Pass Objective	Direction	Top	Bottom	Start	Stop	DSC Mode	Depth Shift	Include Parallel Data
2A	Log[4]:Up	Up	13328.05 ft	14782.97 ft	11-Dec-2016 8:47:35 AM	11-Dec-2016 9:38:53 AM	ON	-5.43 ft	Yes

All depths are referenced to toolstring zero

Log

Company:DCP Midstream LP Well:ZIA AGI D2 2A: Log[4]:Up:S029

Description: Triple Combo standard resolution template for Platform Express Format: Log (PEX Triple Combo) Index Scale: 5 in per 100 ft Index Unit: ft Index Type: Measured Depth Creation Date: 11-Dec-2016 15:00:15

Channel	Source	Sampling
AT10	AIT-M:AMIS:AMIS	3in
AT20	AIT-M:AMIS:AMIS	3in
AT30	AIT-M:AMIS:AMIS	3in
AT60	AIT-M:AMIS:AMIS	3in
AT90	AIT-M:AMIS:AMIS	3in
CALI	HDRS-H:HRCC-H:HRCC-H	1in
CGR	HNGS-BA:HNGS-BA:HNGS-BA	6in
DPHZ	HDRS-H:HRMS-H:HRGD-H	2in
DSOZ	HDRS-H:HRMS-H:HRGD-H	2in
HDRA	HDRS-H:HRMS-H:HRGD-H	2in

ICV	Borehole	6in - RT
IHV	Borehole	6in - RT
PEFZ	HDRS-H:HRMS-H:HRGD-H	2in
PXND	PEQL	6in
RSOZ	HDRS-H:HRMS-H:HRGD-H	2in
RXOZ	HDRS-H:HRMS-H:HRGD-H	2in
SGR	HNGS-BA:HNGS-BA:HNGS-BA	6in
TENS	WLWorkflow	6in
TIME_1900	WLWorkflow	0.1in
TNPH	HGNS-B:HGNS-B:HGNS-B	6in
TNPH_DOL	HGNS-B:HGNS-B:HGNS-B	6in

IHV - Integrated Hole Volume every 100.00 (ft3)

ICV - Integrated Cement Volume every 10.00 (ft3)

ICV - Integrated Cement Volume every 100.00 (ft3)

TIME_1900 - Time Marked every 60.00 (s)

IHV - Integrated Hole Volume every 10.00 (ft3)

Uranium Indicator

Caliper (HCAL) HDRS-H
3 in 13

Cable Tension (TENS)
8000 lbf 0

Spectroscopy Gamma Ray (HSGR) HNGS-BA
0 gAPI 150

Gamma Ray Contribution from Thorium and Potassium (HCGR) HNGS-BA
0 gAPI 150

DSOA

RSOA

Resistivity Standoff Standard Resolution (RSOZ) HDRS-H
2.5 in 0

Standard Resolution Density Standoff (DSOZ) HDRS-H
2.5 in 0

Array Induction Two Foot Resistivity A10 (AT10) AIT-M
0.2 ohm.m 2000

Array Induction Two Foot Resistivity A20 (AT20) AIT-M
0.2 ohm.m 2000

Array Induction Two Foot Resistivity A30 (AT30) AIT-M
0.2 ohm.m 2000

Array Induction Two Foot Resistivity A60 (AT60) AIT-M
0.2 ohm.m 2000

Array Induction Two Foot Resistivity A90 (AT90) AIT-M
0.2 ohm.m 2000

Invaded Formation Resistivity filtered at 18 inches (RXOZ) HDRS-H
0.2 ohm.m 2000

Standard Resolution Formation Photoelectric Factor (PEFZ) HDRS-H
0 10

Density Standoff Correction (HDRA) HDRS-H
-0.05 g/cm3 0.45

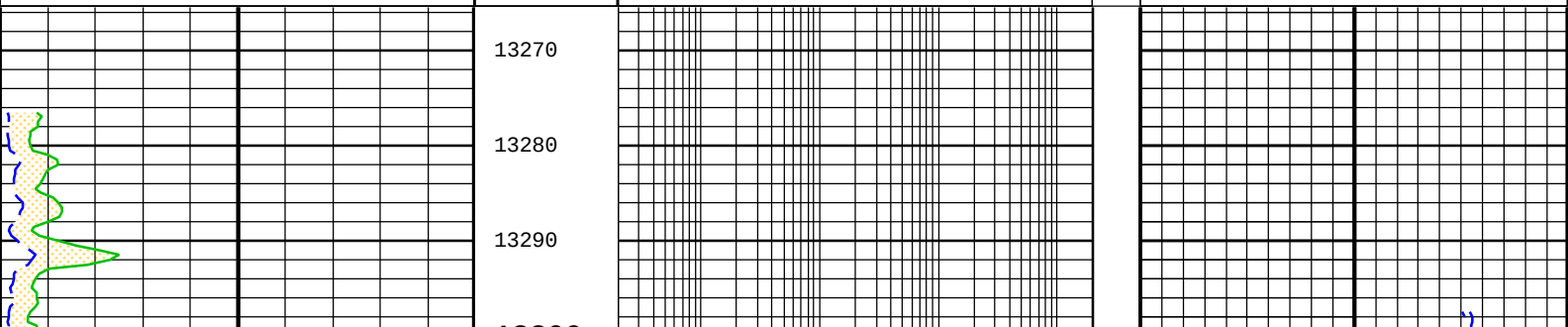
Thermal Neutron Porosity (Ratio Method) in Selected Lithology (TNPH) HGNS-B
0.3 ft3/ft3 -0.1

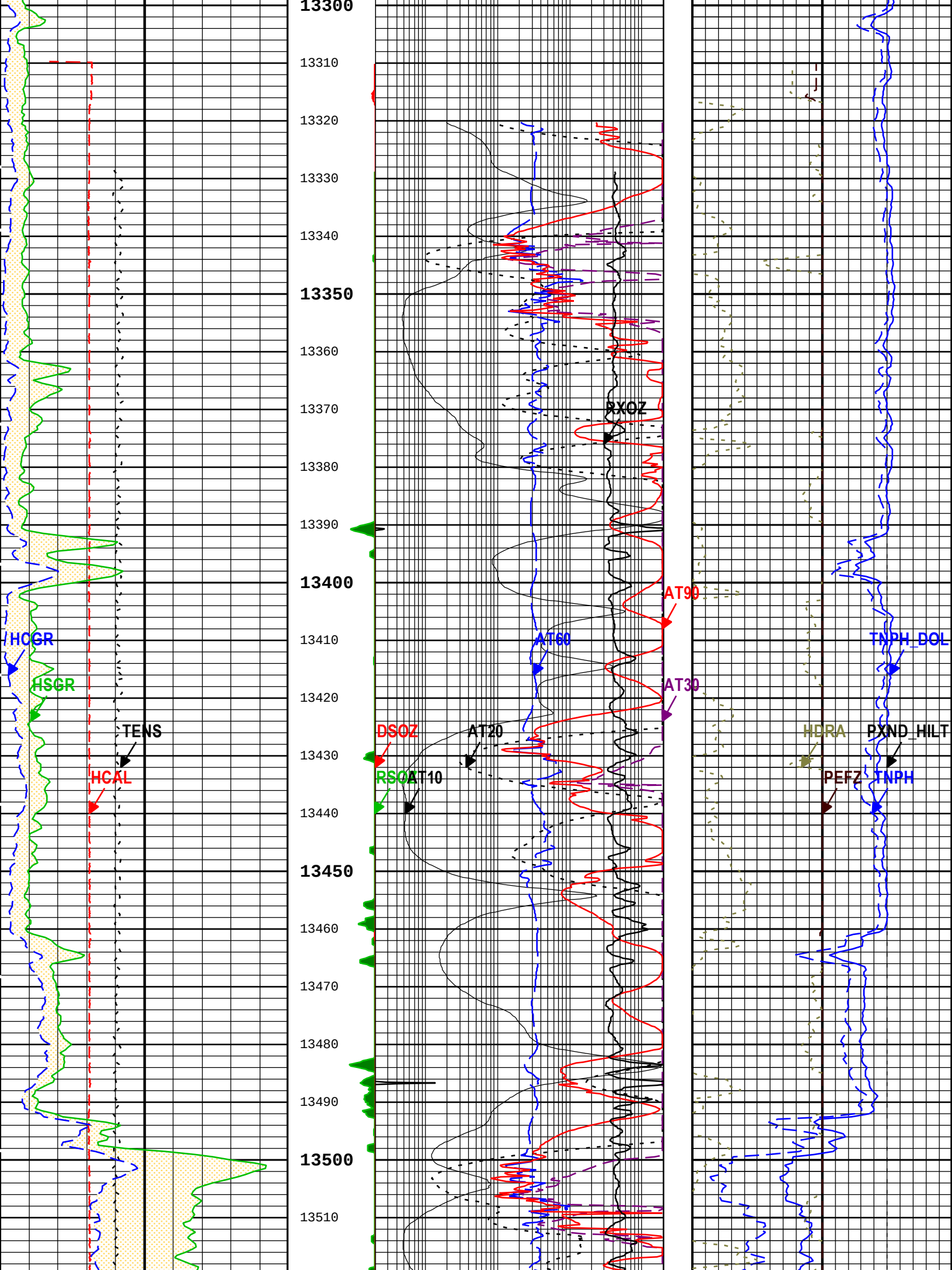
Crossplot Porosity for Neutron-Density (PXND_HILT)
0.3 ft3/ft3 -0.1

Standard Resolution Density Porosity (DPHZ) HDRS-H
0.3 ft3/ft3 -0.1

Thermal Neutron Porosity (matrix Dolomite) (TNPH_DOL) HGNS-B
0.45 ft3/ft3 -0.15

Standard Resolution Density Porosity (DPHZ) HDRS-H
0.45 ft3/ft3 -0.15

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13500
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HCGR
HSGR
TENS
HCAL
RXOZ
AT90
AT60
AT30
AT20
AT10
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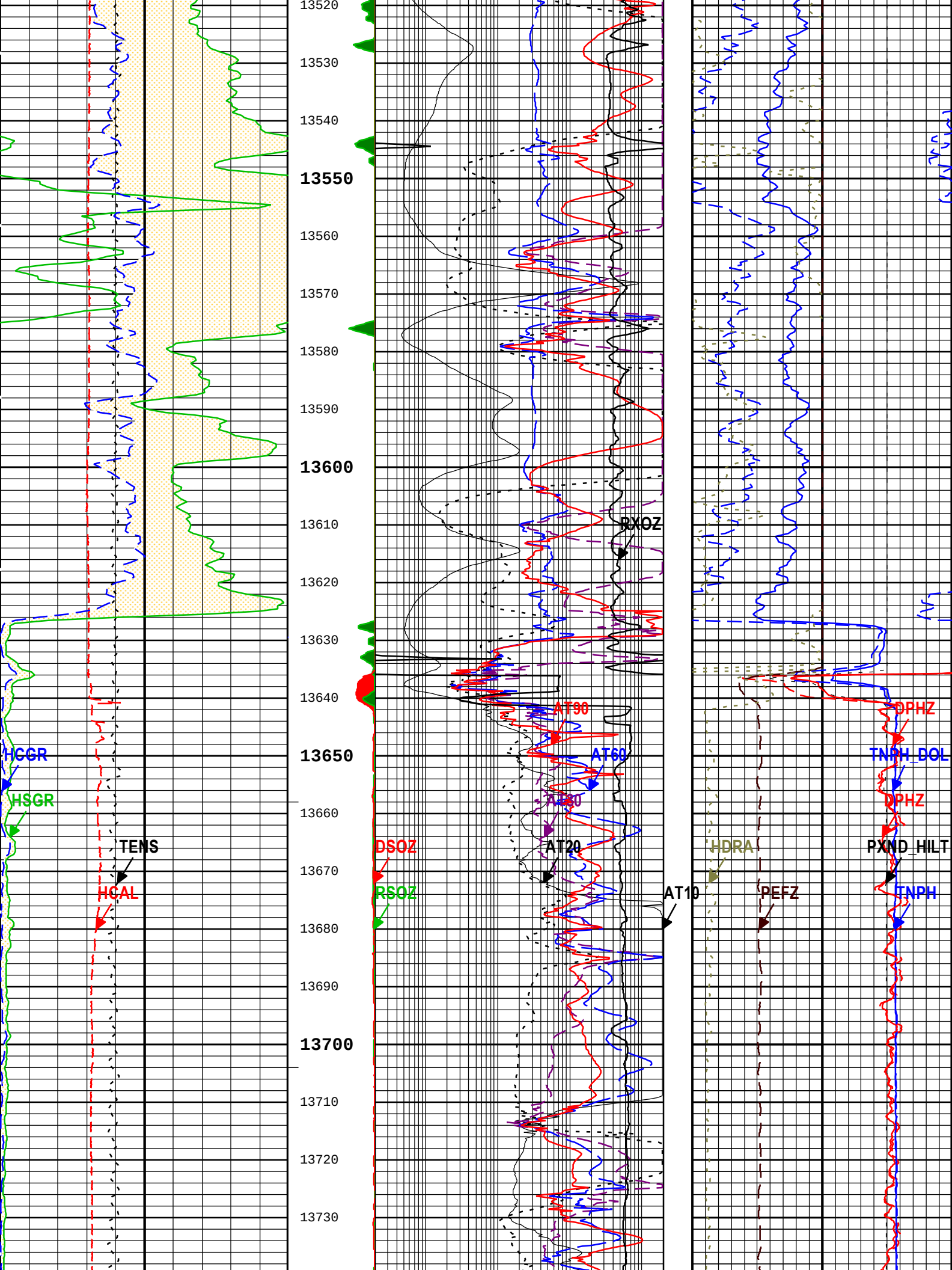
RSOZ
TNPH_DOL
HDRA
PXND_HILT
PEFZ
TNPH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RSOZ
RXOZ
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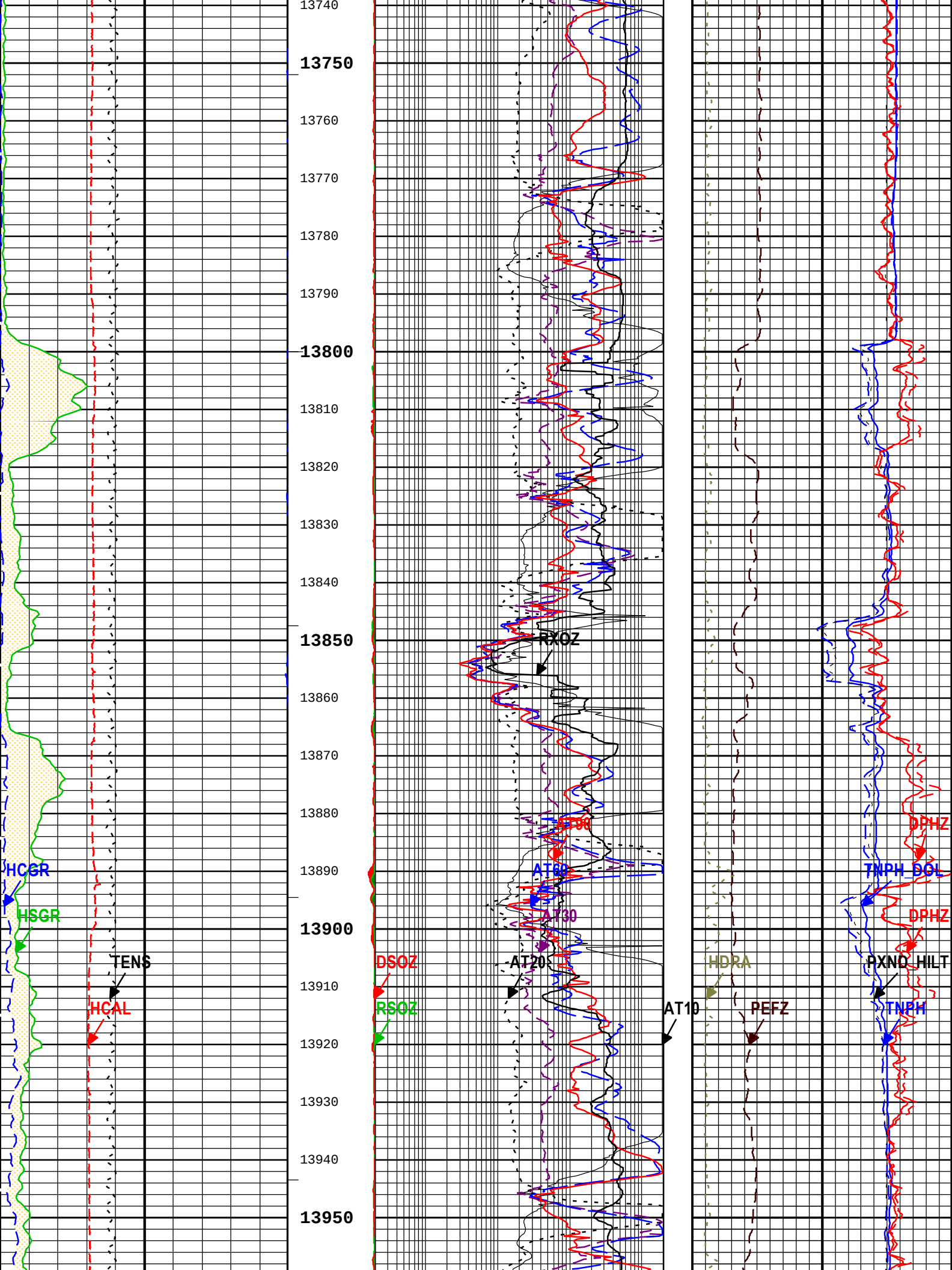
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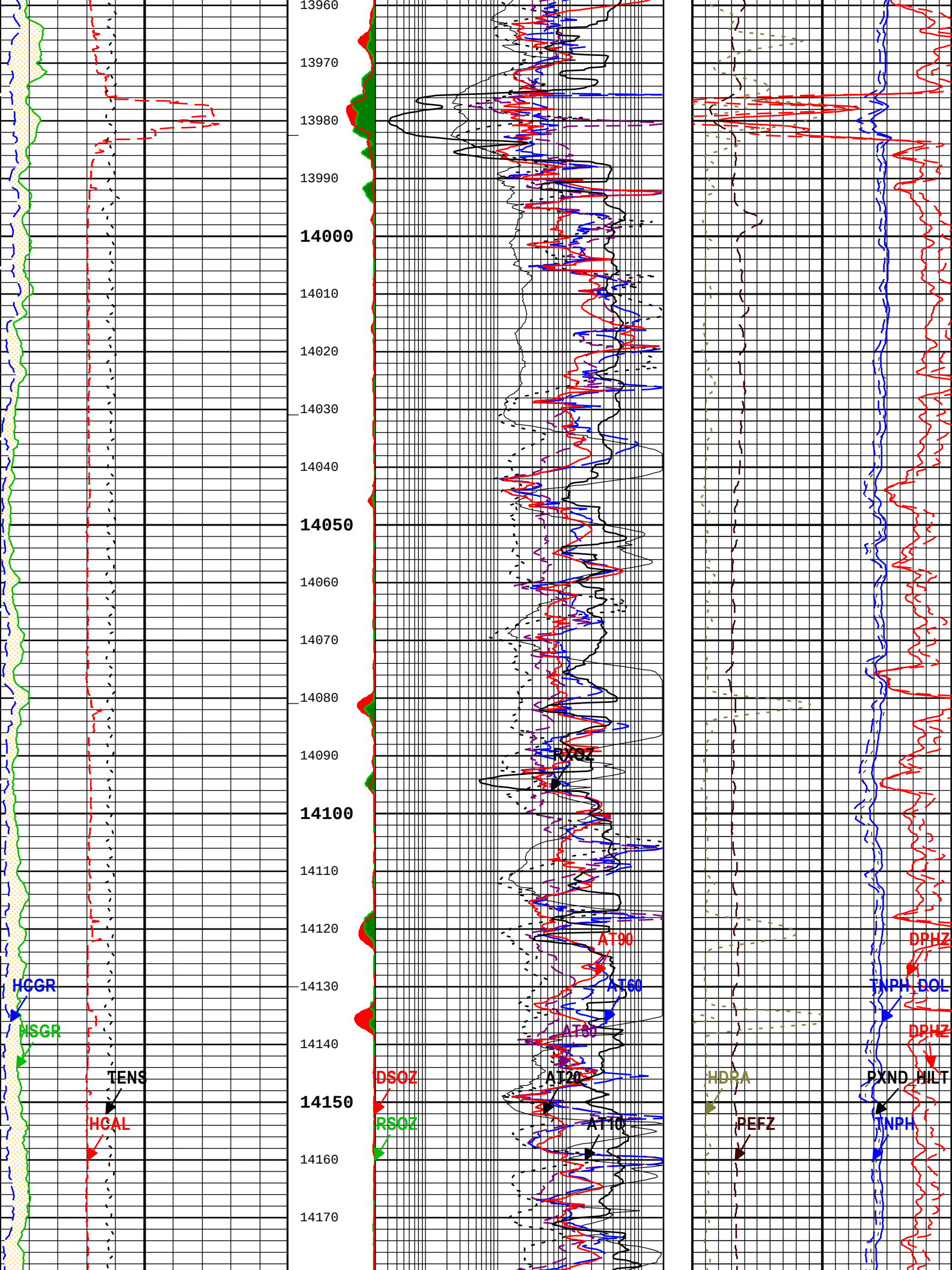
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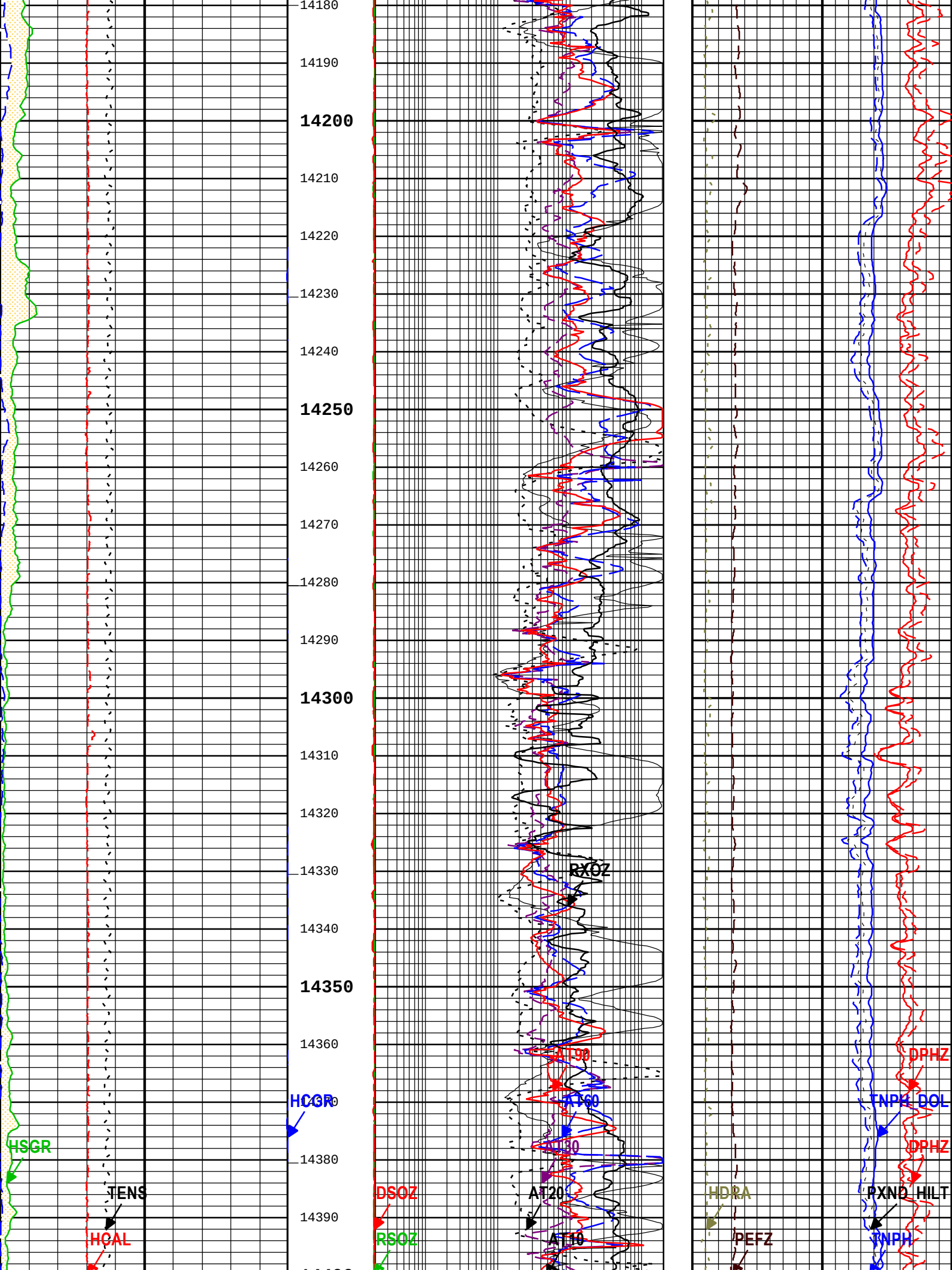
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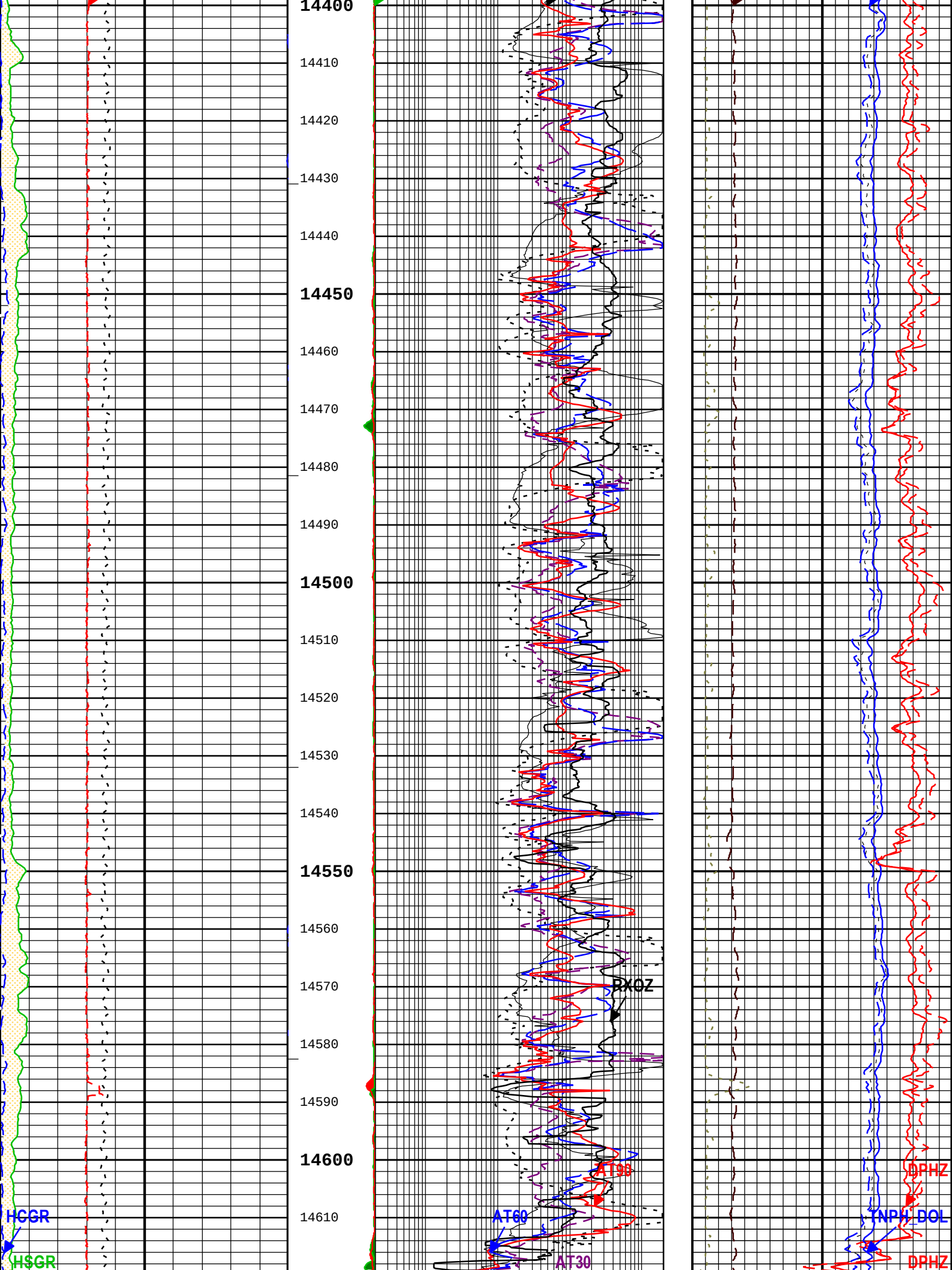
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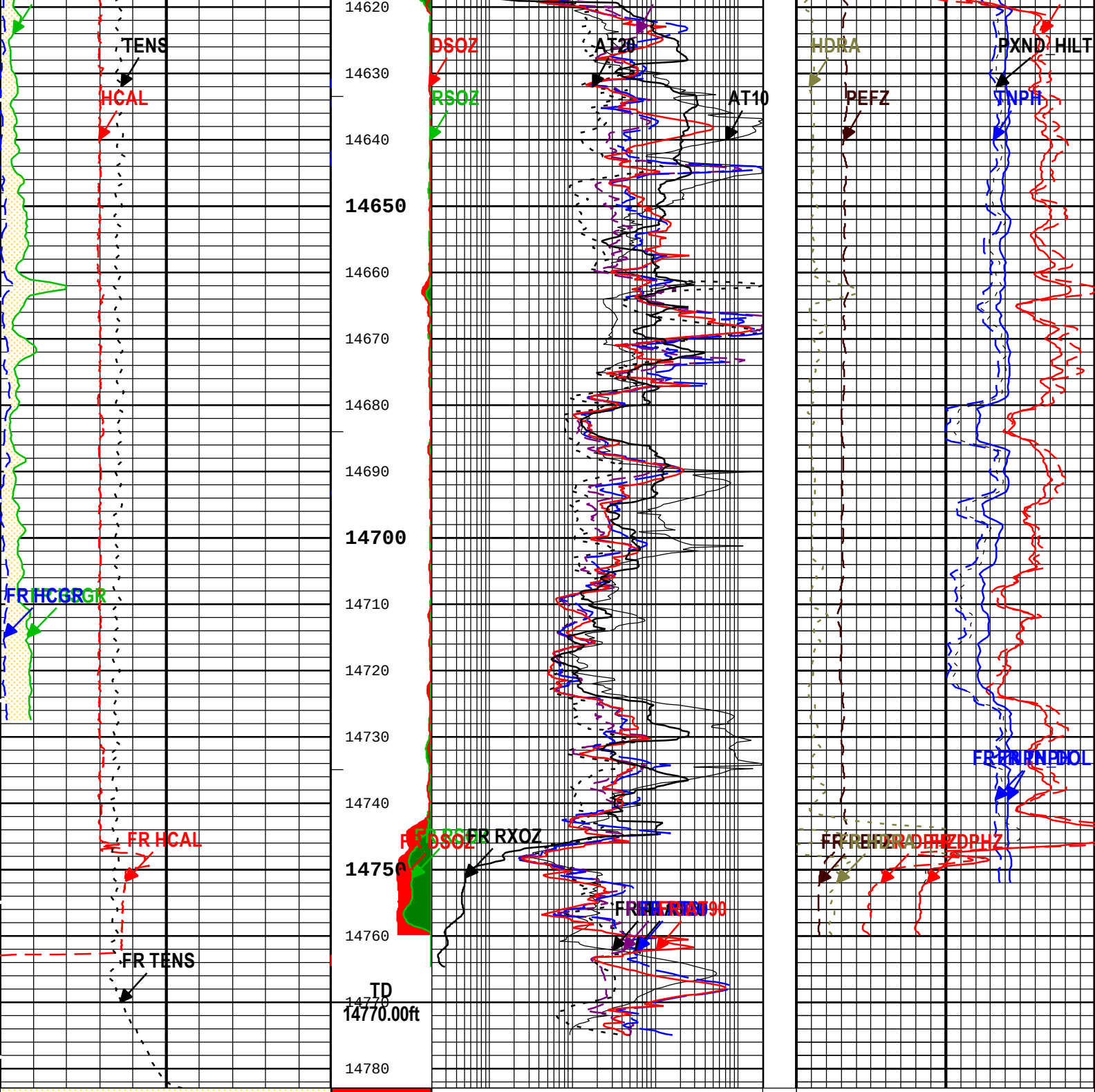
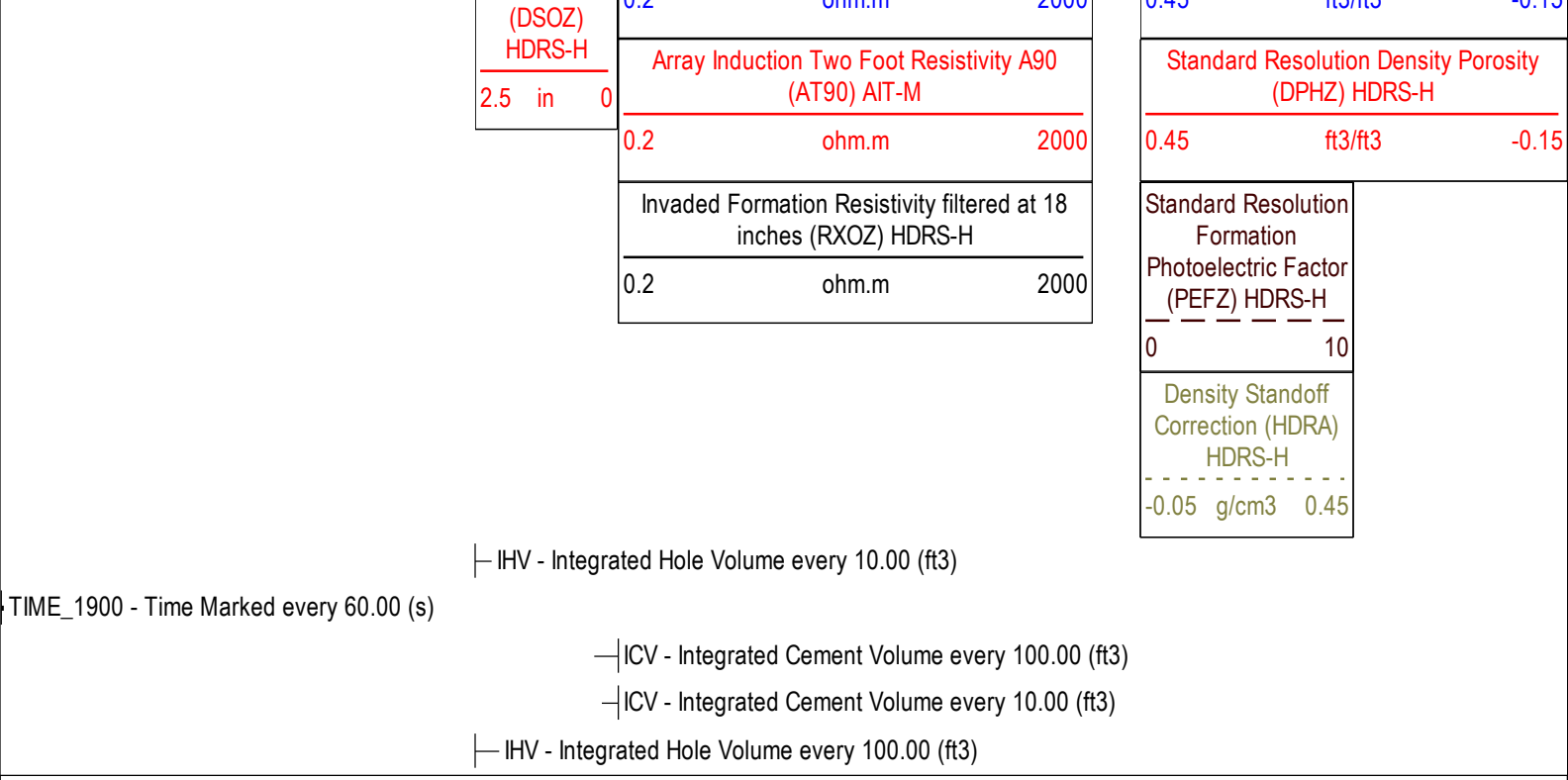


Uranium Indicator	DSOA	Array Induction Two Foot Resistivity A10 (AT10) AIT-M
Caliper (HCAL) HDRS-H	RSOA	0.2 ohm.m 2000
3 in 13	Resistivity Standoff Standard Resolution (RSOZ) HDRS-H	Array Induction Two Foot Resistivity A20 (AT20) AIT-M
Cable Tension (TENS)	2.5 in 0	0.2 ohm.m 2000
8000 lbf 0	Standard Resolution Density Standoff	Array Induction Two Foot Resistivity A30 (AT30) AIT-M
Spectroscopy Gamma Ray (HSGR) HNGS-BA		0.2 ohm.m 2000
0 gAPI 150		Array Induction Two Foot Resistivity A60 (AT60) AIT-M
Gamma Ray Contribution from Thorium and Potassium (HCGR) HNGS-BA		0.2 ohm.m 2000
0 gAPI 150		

Thermal Neutron Porosity (Ratio Method) in Selected Lithology (TNPH) HGNS-B
0.3 ft3/ft3 -0.1
Crossplot Porosity for Neutron-Density (PXND_HILT)
0.3 ft3/ft3 -0.1
Standard Resolution Density Porosity (DPHZ) HDRS-H
0.3 ft3/ft3 -0.1
Thermal Neutron Porosity (matrix Dolomite) (TNPH_DOL) HGNS-B
0.45 ft3/ft3 -0.15



Description: Triple Combo standard resolution template for Platform Express Format: Log (PEX Triple Combo) Index Scale: 5 in per 100 ft Index Unit: ft Index Type: Measured Depth Creation Date: 11-Dec-2016 15:00:15

Channel Processing Parameters

2A: Parameters

Parameter	Description	Tool	Value	Unit
ABHM	Array Induction Borehole Correction Mode	AIT-M	Compute Mud Resistivity	
ASTA	Array Induction Tool Standoff	AIT-M	0.125	in
ISSBAR	Barite Mud Presence Flag	Borehole	No	
BHK	Drilling Fluid Potassium Concentration	Borehole	0	%
BHS	Borehole Status (Open or Cased Hole)	Borehole	Depth Zoned	
BHT	Bottom Hole Temperature	Borehole	206	degF
BS	Bit Size	WLSESSION	6	in
BSAL	Borehole Salinity	Borehole	1000	ppm
CALI_SHIFT	CALI Supplementary Offset	HDRS-H	0.25	in
CBLO	Casing Bottom (Logger)	WLSESSION	13635	ft
CSODDRL	Casing Outer Diameter - Zoned along driller depths	WLSESSION	7	in
DBCC	Barite Constant Correction Flag	HNGS-BA	None	
DC_MODE	Depth Correction Mode	DepthCorrection	Real-time	
DFD	Drilling Fluid Density	Borehole	8.4	lbm/gal
DFT	Drilling Fluid Type	Borehole	Water	
DFT_WATER	Drilling Fluid Water Type	Borehole	Fresh Water	
DHC	Density Hole Correction	HDRS-H	Bit Size	
FD	Fluid Density	Borehole	1.1	g/cm3
FSAL	Formation Salinity	Borehole	0	ppm
GCSE_DOWN_PASS	Generalized Caliper Selection for WL Log Down Passes	Borehole	BS(RT)	
GCSE_UP_PASS	Generalized Caliper Selection for WL Log Up Passes	Borehole	CALI	
GRSE	Generalized Mud Resistivity Selection, from Measured or Computed Mud Resistivity	Borehole	AMF	
GTSE	Generalized Temperature Selection, from Measured or Computed Temperature	Borehole	CTEM	
HCRB	Apply Borehole Potassium Correction	HNGS-BA	None	
HEMA	Hematite Presence Flag	Borehole	No	
HSCO	Hole Size Correction Option	HGNS-B	Yes	

MATR	Rock Matrix for Neutron Porosity Corrections	Borehole	LIMESTONE	
MDEN	Matrix Density for Density Porosity	Borehole	2.71	g/cm3
MFST	Mud Filtrate Sample Temperature	Borehole	60	degF
NPRM	HRDD Nuclear Processing Mode	HDRS-H	High Resolution	
RMFS	Resistivity of Mud Filtrate Sample	Borehole	0.13	ohm.m
SGRC	Standard Gamma Ray Correction Flag	HNGS-BA	Yes	
SOCO	Standoff Correction Option	HGNS-B	Yes	

Depth Zone Parameters

Parameter	Value	Start (ft)	Stop (ft)
BHS	Cased	13265.5	13622
BHS	Open	13622	14783

All depth are actual.

Tool Control Parameters

2A: Parameters

Parameter	Description	Tool	Value	Unit
HMCA_BOARD_TYPE	HMCA Board Type	HGNS-B	0	
HRGD_BOARD_TYPE	HRGD Board Type	HDRS-H	WITH_HET	
MAX_LOG_SPEED	Toolstring Maximum Logging Speed	WLSESSION	1800	ft/h

Calibration Report

AIT-M (Array Induction Tool - M) Calibration - Run 2A

Primary Equipment :

File code for AIT-MA Sonde Tool Element AMIS

Auxiliary Equipment :

AITM Rm/SP Bottom Nose AMRM

AIT Sonde Calibration - Test Loop Gain

Master (Measured): 17:29:39 04-Oct-2016

Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit
Test Loop Gain - 0		Master	1.000	0.950	1.018	1.050
Test Loop Phase - 0	deg	Master	0	-3.000	-0.576	3.000
Test Loop Gain - 1		Master	1.000	0.950	1.015	1.050
Test Loop Phase - 1	deg	Master	0	-3.000	-0.756	3.000
Test Loop Gain - 2		Master	1.000	0.950	1.014	1.050
Test Loop Phase - 2	deg	Master	0	-3.000	-2.222	3.000
Test Loop Gain - 3		Master	1.000	0.950	1.017	1.050
Test Loop Phase - 3	deg	Master	0	-3.000	0.054	3.000
Test Loop Gain - 4		Master	1.000	0.950	0.996	1.050
Test Loop Phase - 4	deg	Master	0	-3.000	0.245	3.000
Test Loop Gain - 5		Master	1.000	0.950	0.991	1.050
Test Loop Phase - 5	deg	Master	0	-3.000	-0.048	3.000
Test Loop Gain - 6		Master	1.000	0.950	0.999	1.050
Test Loop Phase - 6	deg	Master	0	-3.000	0.329	3.000
Test Loop Gain - 7		Master	1.000	0.950	1.000	1.050
Test Loop Phase - 7	deg	Master	0	-3.000	-0.363	3.000

AIT Sonde Calibration - Sonde Error Correction

Master (Measured): 17:29:39 04-Oct-2016

Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit
Sonde Error Correction Real - 0	mS/m	Master	-----	-231.000	-93.483	119.000
Sonde Error Correction Quad - 0		Master	-----	-2250.000	-238.911	2250.000
Sonde Error Correction Real - 1	mS/m	Master	-----	114.000	150.552	204.000
Sonde Error Correction Quad - 1		Master	-----	-625.000	91.751	625.000
Sonde Error Correction Real - 2	mS/m	Master	-----	66.000	124.626	156.000
Sonde Error Correction Quad - 2		Master	-----	-350.000	136.800	350.000

Sonde Error Correction Real - 3	mS/m	Master	-----	39.000	61.310	89.000
Sonde Error Correction Quad - 3		Master	-----	-250.000	51.170	250.000
Sonde Error Correction Real - 4	mS/m	Master	-----	15.000	26.533	35.000
Sonde Error Correction Quad - 4		Master	-----	-63.000	-3.661	63.000
Sonde Error Correction Real - 5	mS/m	Master	-----	4.000	14.241	24.000
Sonde Error Correction Quad - 5		Master	-----	-50.000	-5.398	50.000
Sonde Error Correction Real - 6	mS/m	Master	-----	5.000	9.621	15.000
Sonde Error Correction Quad - 6		Master	-----	-30.000	-1.800	30.000
Sonde Error Correction Real - 7	mS/m	Master	-----	-5.000	-1.141	5.000
Sonde Error Correction Quad - 7		Master	-----	-30.000	2.109	30.000

AIT Mud Calibration - Mud Calibration Gain

Master (Manual Entry): 17:29:39 04-Oct-2016

Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit
Coarse Gain		Master	1.000	0.800	1.017	1.200
Fine Gain		Master	1.000	0.800	1.017	1.200

AIT Electronics Check - Thru Calibration Check

Master (Measured): 17:34:22 04-Oct-2016 Before (Measured): 06:41:00 11-Dec-2016

Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit
Thru Cal Mag - 0	V	Master	-----	0.366	0.617	0.854
		Before	-----	0.366	0.617	0.854
		Before-Master	-----	-----	0.000	-----
Thru Cal Phase - 0	deg	Master	-----	137.000	-174.020	-103.000
		Before	-----	137.000	-173.713	-103.000
		Before-Master	-----	-----	0.307	-----
Thru Cal Mag - 1	V	Master	-----	0.762	1.263	1.778
		Before	-----	0.762	1.264	1.778
		Before-Master	-----	-----	0.001	-----
Thru Cal Phase - 1	deg	Master	-----	136.000	-175.112	-104.000
		Before	-----	136.000	-174.801	-104.000
		Before-Master	-----	-----	0.311	-----
Thru Cal Mag - 2	V	Master	-----	0.372	0.627	0.868
		Before	-----	0.372	0.627	0.868
		Before-Master	-----	-----	0.000	-----
Thru Cal Phase - 2	deg	Master	-----	132.000	-178.785	-108.000
		Before	-----	132.000	-178.471	-108.000
		Before-Master	-----	-----	0.314	-----
Thru Cal Mag - 3	V	Master	-----	0.420	0.707	0.980
		Before	-----	0.420	0.708	0.980
		Before-Master	-----	-----	0.001	-----
Thru Cal Phase - 3	deg	Master	-----	131.000	-179.569	-109.000
		Before	-----	131.000	-179.253	-109.000
		Before-Master	-----	-----	0.316	-----
Thru Cal Mag - 4	V	Master	-----	0.804	1.321	1.876
		Before	-----	0.804	1.322	1.876
		Before-Master	-----	-----	0.001	-----
Thru Cal Phase - 4	deg	Master	-----	125.000	174.122	-115.000
		Before	-----	125.000	174.454	-115.000
		Before-Master	-----	-----	0.332	-----
Thru Cal Mag - 5	V	Master	-----	1.176	1.925	2.744
		Before	-----	1.176	1.927	2.744
		Before-Master	-----	-----	0.002	-----
Thru Cal Phase - 5	deg	Master	-----	122.000	172.433	-118.000
		Before	-----	122.000	172.770	-118.000
		Before-Master	-----	-----	0.337	-----
Thru Cal Mag - 6	V	Master	-----	1.176	1.930	2.744
		Before	-----	1.176	1.932	2.744
		Before-Master	-----	-----	0.002	-----
Thru Cal Phase - 6	deg	Master	-----	121.000	172.434	-119.000
		Before	-----	121.000	172.771	-119.000
		Before-Master	-----	-----	0.337	-----
Thru Cal Mag - 7	V	Master	-----	0.846	1.388	1.974
		Before	-----	0.846	1.390	1.974

		Before-Master	-----	-----	0.002	-----	
Thru Cal Phase - 7	deg	Master	-----	115.000	171.540	-125.000	
		Before	-----	115.000	171.956	-125.000	
		Before-Master	-----	-----	0.416	-----	
SPA Zero	mV	Master		-50.000	0.018	50.000	
		Before		-50.000	0.025	50.000	
		Before-Master	-----	-----	0.007	-----	
SPA Plus	mV	Master		941.000	991.494	1040.000	
		Before		941.000	991.893	1040.000	
		Before-Master	-----	-----	0.399	-----	
Temperature Zero	V	Master		-0.050	0.000	0.050	
		Before		-0.050	0.000	0.050	
		Before-Master	-----	-----	0.000	-----	
Temperature Plus	V	Master		0.870	0.918	0.960	
		Before		0.870	0.919	0.960	
		Before-Master	-----	-----	0.001	-----	

HDRS-H (HILT Density and Rxo Sonde, 150 degC) Calibration - Run 2A

Primary Equipment :

HILT High-Resolution Control Cartridge, 150 degC	HRCC-H	
HILT Resistivity Gamma-Ray Density Device, 150 degC	HRGD-H	3922

Auxiliary Equipment :

HRDD Backscatter Detector	Backscatter	26717
HRDD Long Spacing Detector	Long Spacing	28718
HRDD Short Spacing Detector	Short Spacing	27769
Cesium 137 Gamma-Ray Logging Source	GSR-J	5453
HILT High-Resolution Control Cartridge, 150 degC	HRCC-H	
HILT High-Resolution Mechanical Sonde, 150 degC	HRMS-H	

Calibration Parameter :

Small Ring Size (Caliper Calibration Small Ring)	8.00
Large Ring Size (Caliper Calibration Large Ring)	12.00

HDRS Caliper Calibration - Caliper Accumulations

Before (Measured): 18:30:41 10-Dec-2016

Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit	
Small Ring	in	Before	8.00	6.00	8.28	10.00	
Large Ring	in	Before	12.00	9.00	12.71	15.00	

HDRS Density Calibration - Inversion Results

Master (EEPROM): 12:37:32 10-Dec-2016

Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit	
Rho Aluminum	g/cm3	Master	2.596	2.586	2.597	2.606	
Rho Magnesium	g/cm3	Master	1.686	1.676	1.689	1.696	
Pe Aluminum		Master	2.570	2.470	2.541	2.670	
Pe Magnesium		Master	2.650	2.550	2.620	2.750	

HDRS Density Calibration - Deviation Summary

Master (EEPROM): 12:37:32 10-Dec-2016

Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit	
BS Average Deviation	%	Master	0	-0.6000	0.2840	0.6000	
BS Max Deviation	%	Master	0	-1.6000	0.5637	1.6000	
SS Average Deviation	%	Master	0	-1.0000	0.2628	1.0000	
SS Max Deviation	%	Master	0	-2.5000	0.7932	2.5000	
LS Average Deviation	%	Master	0	-1.5000	0.6664	1.5000	
LS Max Deviation	%	Master	0	-3.5000	1.7871	3.5000	

HDRS Density Calibration - Background Summary

Master (EEPROM): 12:37:32 10-Dec-2016 Before (Measured): 18:33:33 10-Dec-2016

Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit	

BS Window Ratio		Master	1.0000		0.7570		
		Before	0.7570	0.7192	0.7564	0.7949	
		Before-Master	-----	-----	-0.0006	-----	
BS Window Sum	1/s	Master	1		24218		
		Before	24218	23007	24217	25429	
		Before-Master	-----	-----	-1	-----	
SS Window Ratio		Master	1.0000		0.4862		
		Before	0.4862	0.4618	0.4873	0.5105	
		Before-Master	-----	-----	0.0011	-----	
SS Window Sum	1/s	Master	1		10727		
		Before	10727	10191	10719	11264	
		Before-Master	-----	-----	-8	-----	
LS Window Ratio		Master	1.0000		0.3045		
		Before	0.3045	0.2892	0.3025	0.3197	
		Before-Master	-----	-----	-0.0020	-----	
LS Window Sum	1/s	Master	1		1150		
		Before	1150	1093	1147	1208	
		Before-Master	-----	-----	-3	-----	

HDRS Density Calibration - Photo-multiplier High Voltages

Master (EEPROM): 12:37:32 10-Dec-2016 Before (Measured): 18:33:33 10-Dec-2016

Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit
BS PM High Voltage	V	Master		1000	1442	2400
		Before		1000	1452	2400
		Before-Master	-----	-100	10	100
SS PM High Voltage	V	Master		1000	1450	2400
		Before		1000	1453	2400
		Before-Master	-----	-100	3	100
LS PM High Voltage	V	Master		1000	1306	2400
		Before		1000	1311	2400
		Before-Master	-----	-100	5	100

HDRS Density Calibration - Crystal Quality Resolutions

Master (EEPROM): 12:37:32 10-Dec-2016 Before (Measured): 18:33:33 10-Dec-2016

Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit
BS Crystal Resolution	%	Master		5.00	10.86	25.00
		Before		5.00	10.94	25.00
		Before-Master	-----	-1.00	0.08	1.00
SS Crystal Resolution	%	Master		5.00	9.27	20.00
		Before		5.00	9.15	20.00
		Before-Master	-----	-1.00	-0.12	1.00
LS Crystal Resolution	%	Master		5.00	8.56	20.00
		Before		5.00	8.60	20.00
		Before-Master	-----	-1.00	0.04	1.00

HDRS MCFL Calibration - MCFL Accumulations

Before (Measured): 06:41:14 11-Dec-2016

Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit
Main Resistivity	ohm.m	Before	3875	3565	3870	4185
Deep Resistivity	ohm.m	Before	3830	3524	3814	4136
Shallow Resistivity	ohm.m	Before	3830	3524	3829	4136

HGNS-B (HILT Gamma-Ray and Neutron Sonde, 125 degC) Calibration - Run 2A

Primary Equipment :

HILT Gamma-Ray and Neutron Sonde, 125 degC	HGNS-B	

Auxiliary Equipment :

HGNS Accelerometer, 125 degC	HACCZ-B	419
AmBe Neutron Logging Source	NSR-F	5064

Calibration Parameter :

Water Temperature (Calibration Tank Water Temperature)	60.0
Housing Size (Thermal Housing Size)	3.38

JIG-BKG

HGNS Accelerometer EEPROM - Accelerometer EEPROM Read

Master (EEPROM): 00:00:00 15-Nov-1996

Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit
Accelerometer Manufacturer		Master			Sunstrand	
Accelerometer Reference Temperature	degF	Master		30.2	68.0	122.0
Accelerometer Coefficients - 0		Master	-----	-----	2727.000	-----
Accelerometer Coefficients - 1		Master	-----	-----	11.420	-----
Accelerometer Coefficients - 2		Master	-----	-----	0.002	-----
Accelerometer Coefficients - 3		Master	-----	-----	0.000	-----
Accelerometer Coefficients - 4		Master	-----	-----	2.233	-----
Accelerometer Coefficients - 5		Master	-----	-----	0.000	-----
Accelerometer Coefficients - 6		Master	-----	-----	0.000	-----
Accelerometer Coefficients - 7		Master	-----	-----	0.000	-----
Accelerometer Coefficients - 8		Master	-----	-----	293.500	-----
Accelerometer Coefficients - 9		Master	-----	-----	1.003	-----

HGNS Neutron Calibration - HGNS Neutron Accumulations

Master (EEPROM): 11:54:16 09-Nov-2016

Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit
Near Zero Measurement	1/s	Master	0	5.0	27.9	40.0
Far Zero Measurement	1/s	Master	0	5.0	25.5	40.0
Near Plus Measurement	1/s	Master	6031.0	4700.0	5446.0	6900.0
Far Plus Measurement	1/s	Master	2793.0	1900.0	2295.0	2900.0
Near Corrected Plus Measurement	1/s	Master		4700.0	5500.0	6900.0
Far Corrected Plus Measurement	1/s	Master		1900.0	2323.0	2900.0

HNGS-BA (Hostile-environment Natural Gamma-ray Sonde) Calibration - Run 2A

Primary Equipment :

HNGS Sonde Element	HNGS-BA	365

Auxiliary Equipment :

Hostile Natural Gamma Ray Cartridge	HNGC-B	623
HNGS Housing Element	HEH-K	365
		0
Housing for the HNGC	HNGH-A	4104

Calibration History - Calibration History

Master:

Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit
- 0		Master	-----	-----	-----	-----

HNGS Background and Na22 Set Point Determination - Detector 1 Check

Master (EEPROM): 17:10:47 28-Nov-2016 Before (Measured): 18:34:07 10-Dec-2016

Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit
Na 511 Peak Location		Master	40.000	37.500	39.599	42.500
		Before	40.000	37.500	39.663	42.500
		Before-Master	-----	-----	0.064	-----
Na 511 Peak Resolution	%	Master	15.500	12.000	14.429	19.000
		Before	15.500	12.000	14.947	19.000
		Before-Master	-----	-----	0.518	-----
High Voltage DAC Value	V	Master			927.150	
		Before	1150.000	850.000	915.598	1600.000
		Before-Master	-----	-----	-11.552	-----
Na 1785 Peak Location		Master	142.650	135.000	141.059	150.300
		Before	142.650	135.000	142.730	150.300
		Before-Master	-----	-----	1.671	-----
Na 1785 Peak Resolution	%	Master	8.500	6.500	7.897	11.000
		Before	8.500	6.500	8.027	11.000
		Before-Master	-----	-----	0.130	-----

Temperature - 0	degF	Master	-----	-----	-----	-----
		Before	59.900	-20.002	48.286	140.000
		Before-Master	-----	-----	-----	-----
Na Count Rate	CPS	Master	45.000	10.000	15.198	100.000
		Before	45.000	10.000	15.251	100.000
		Before-Master	-----	-----	0.053	-----

HNGS Background and Na22 Set Point Determination - Detector 2 Check

Master (EEPROM): 17:10:47 28-Nov-2016 Before (Measured): 18:34:07 10-Dec-2016

Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit
Na 511 Peak Location		Master	40.000	37.500	39.522	42.500
		Before	40.000	37.500	39.559	42.500
		Before-Master	-----	-----	0.037	-----
Na 511 Peak Resolution	%	Master	15.500	12.000	15.068	19.000
		Before	15.500	12.000	12.881	19.000
		Before-Master	-----	-----	-2.187	-----
High Voltage DAC Value	V	Master			1033.980	
		Before	1150.000	850.000	1017.323	1600.000
		Before-Master	-----	-----	-16.657	-----
Na 1785 Peak Location		Master	142.650	135.000	141.390	150.300
		Before	142.650	135.000	140.771	150.300
		Before-Master	-----	-----	-0.619	-----
Na 1785 Peak Resolution	%	Master	8.500	6.500	7.811	11.000
		Before	8.500	6.500	8.532	11.000
		Before-Master	-----	-----	0.721	-----
Temperature - 0	degF	Master	-----	-----	-----	-----
		Before	59.900	-20.002	47.005	140.000
		Before-Master	-----	-----	-----	-----
Na Count Rate	CPS	Master	45.000	10.000	15.231	100.000
		Before	45.000	10.000	15.420	100.000
		Before-Master	-----	-----	0.189	-----

HNGS Background and Na22 Set Point Determination - Ratio of Detector 1 to Detector 2

Master (EEPROM): 17:10:47 28-Nov-2016 Before (Measured): 18:34:07 10-Dec-2016

Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit
Coincidence Count Rate Ratio		Master			0.994	
		Before	1.000	0.950	0.992	1.050
		Before-Master	-----	-----	-0.002	-----

HNGS Background and Na22 Set Point Determination - Detector 1 Calibration

Master (EEPROM): 17:10:47 28-Nov-2016 Before (Measured): 18:34:07 10-Dec-2016

Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit
Th Peak Location		Master	209.630	201.000	211.408	218.250
		Before	-----	-----	-----	-----
		Before-Master	-----	-----	-----	-----
Th Peak Resolution	%	Master	7.000	5.000	6.600	9.000
		Before	-----	-----	-----	-----
		Before-Master	-----	-----	-----	-----
Background Count Rate	CPS	Master			102.497	
		Before	142.500	10.000	107.013	265.000
		Before-Master	-----	-----	4.516	-----
Gain Ratio		Master	1.000	0.940	1.016	1.060
		Before	-----	-----	-----	-----
		Before-Master	-----	-----	-----	-----

HNGS Background and Na22 Set Point Determination - Detector 2 Calibration

Master (EEPROM): 17:10:47 28-Nov-2016 Before (Measured): 18:34:07 10-Dec-2016

Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit
Th Peak Location		Master	209.630	201.000	210.579	218.250
		Before	-----	-----	-----	-----
		Before-Master	-----	-----	-----	-----
Th Peak Resolution	%	Master	7.000	5.000	5.932	9.000
		Before	-----	-----	-----	-----
		Before-Master	-----	-----	-----	-----
Background Count Rate	CPS	Master			102.163	

		Before	142.500	10.000	105.425	265.000	
		Before-Master	-----	-----	3.262	-----	
Gain Ratio		Master	1.000	0.940	1.014	1.060	
		Before	-----	-----	-----	-----	
		Before-Master	-----	-----	-----	-----	

HNGS Background and Na22 Set Point Determination - Detector 1 Calibration

Master (EEPROM): 17:10:47 28-Nov-2016 Before (Measured): 18:34:07 10-Dec-2016

Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit
Na 511 Peak Set Point		Master	40.000	38.000	41.000	43.500
		Before	-----	-----	-----	-----
		Before-Master	-----	-----	-----	-----

HNGS Background and Na22 Set Point Determination - Detector 2 Calibration

Master (EEPROM): 17:10:47 28-Nov-2016 Before (Measured): 18:34:07 10-Dec-2016

Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit
Na 511 Peak Set Point		Master	40.000	38.000	41.000	43.500
		Before	-----	-----	-----	-----
		Before-Master	-----	-----	-----	-----

Company:	DCP Midstream LP
Well:	ZIA AGI D2
Field:	AGI Devonian Exploration
County:	Lea
State:	New Mexico

Schlumberger

Triple Combo Log
Platform Express
Resistivity