

Company: SHELL

Well: DAWSON CREEK 1 25

Field: WILLIAMS FORK UNIT

County: ROUTT Country: USA

HOSTILE NATURAL GAMMA SPECTROSCOPY

County:	ROUTT
Field:	WILLIAMS FORK UNIT
Location:	SHL: 2032' FNL & 1639' FWL
Well:	SHL: 2032' FNL & 1639' FWL
Company:	SHELL
Location:	
Permanent Datum:	SHL: 2032' FNL & 1639' FWL
Log Measured From:	BHL: 971' FNL & 2022' FEL
Drilling Measured From:	Ground Level
API Serial No.	Kelly Bushing
Max. Hole Deviation	Kelly Bushing
53.05 deg	14.30 ft
-107.21337 degrees	6658.20 f
40.450486 degrees	above Perm. Datum

Logging Date	25-Oct-2012
Run Number	1
Depth Driller	9233.00 ft
Schlumberger Depth	9233.00 ft
Bottom Log Interval	8170.00 ft
Top Log Interval	6169.00 ft
Casing Driller Size @ Depth	7.625 in @ 6169.00 ft
Casing Schlumberger	6169 ft
Bit Size	6.75 in
Type Fluid In Hole	Silicate
Density	10.1 lbm/gal
Fluid Loss	PH
Source of Sample	Active Tank
RM @ Meas Temp	2.5 ohm.m @ 75 degF
RMF @ Meas Temp	1.88 ohm.m @ 75 degF
RMC @ Meas Temp	3.13 ohm.m @ 75 degF
Source RMF	Calculated
RM @ BHT	1.09 @ 181
Max Recorded Temperatures	181 degF
Circulation Stopped	25-Oct-2012 07:30:00
Logger on Bottom	25-Oct-2012 19:30:53
Unit Number	2379
Recorded By	FOLAKE O, GARETH S.
Witnessed By	CRAIG ROSENBAUM

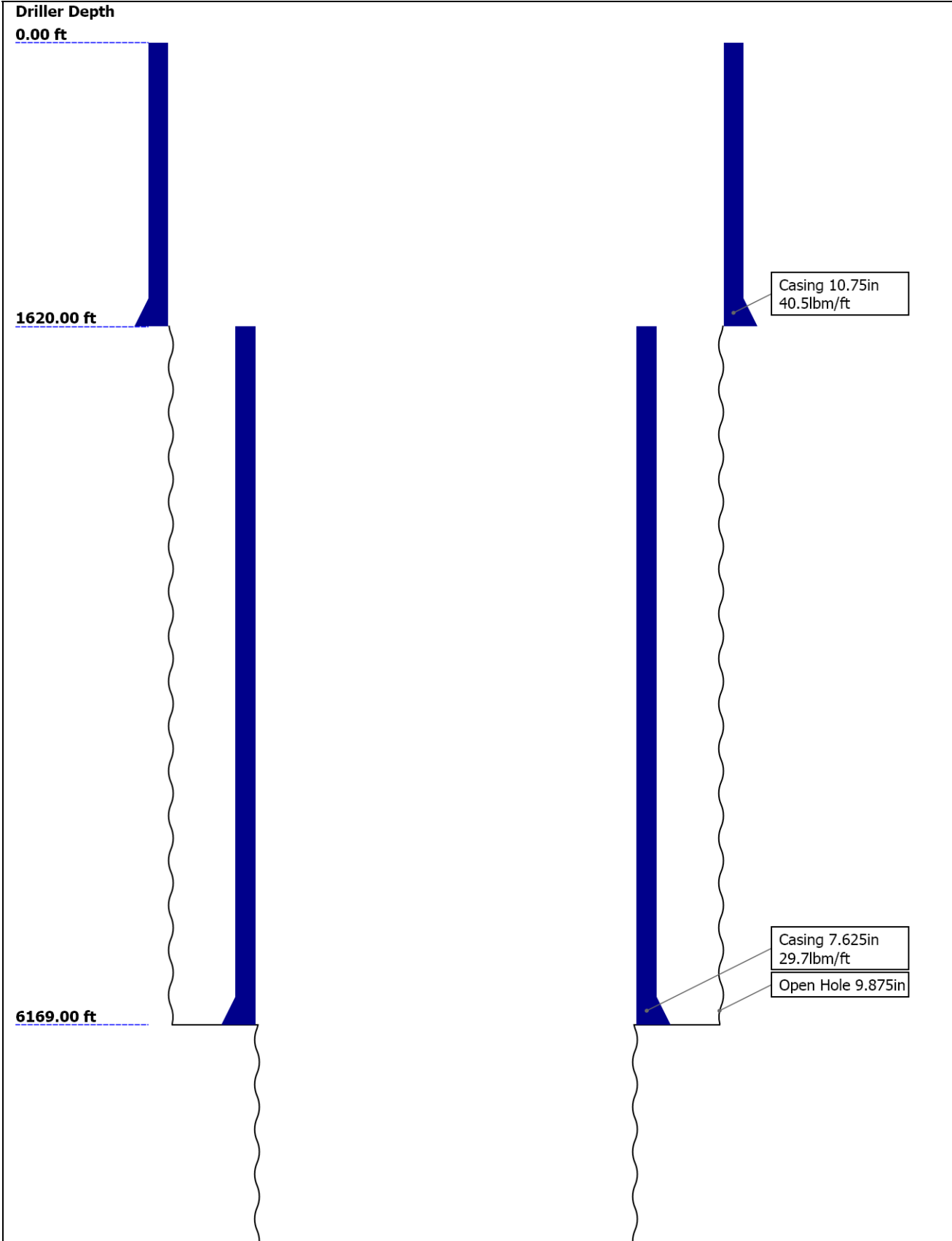
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Well Sketch



9233.00 ft

Open Hole 6.75in

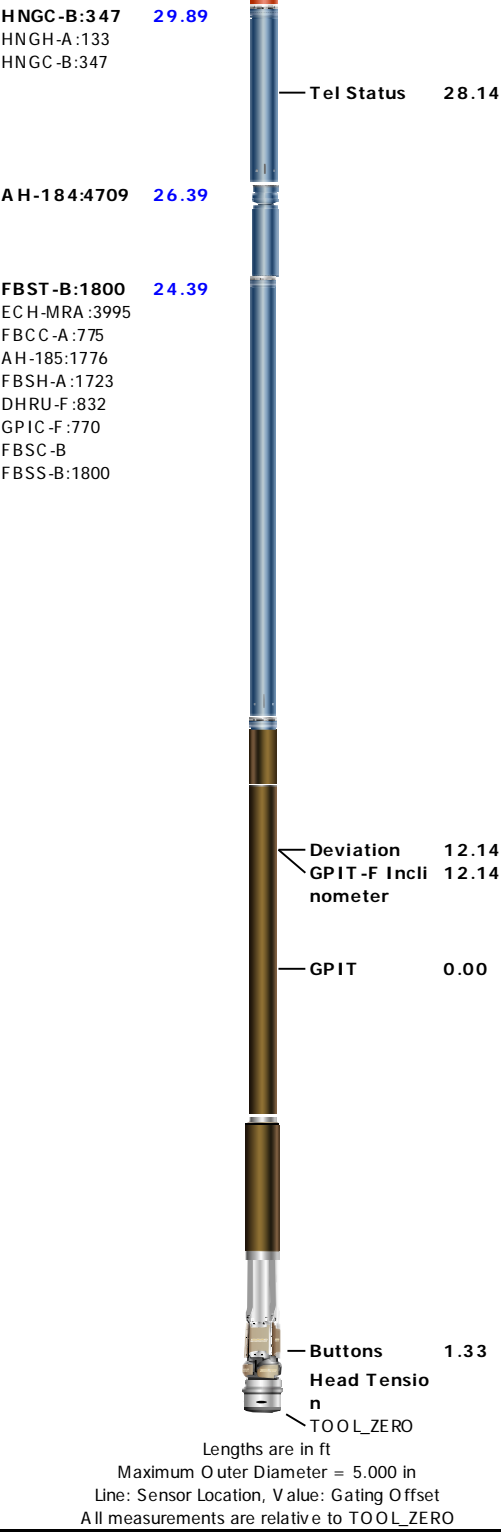
Borehole Size/Casing/Tubing Record

Bit						
Bit Size (in)	9.875	6.75				
Top Driller (ft)	1620	6169				
Top Logger (ft)	0	6169				
Bottom Driller (ft)	6169	9233				
Bottom Logger (ft)	6169	9233				
Casing						
Size (in)	10.75	7.625				
Weight (lbm/ft)	40.5	29.7				
Inner Diameter (in)	10.036	6.875				
Grade	J55	P110				
Top Driller (ft)	0	1620				
Top Logger (ft)	0	1620				
Bottom Driller (ft)	1620	6169				
Bottom Logger (ft)	1620	6169				

Operational Run Summary

Parameter (unit)	1					
Date Log Started	25-Oct-2012					
Time Log Started	15:05:27					
Date Log Finished	25-Oct-2012					
Time Log Finished	21:36:28					
Top Log Interval (ft)	6169.00					
Bottom Log Interval (ft)	8170.00					
Total Depth (ft)	9233.00					
Max Hole Deviation (deg)	53.05					
Azimuth of Max Deviation (deg)	239.53					
Bit Size (in)	6.750					
Logging Unit Number	2379					
Logging Unit Location	VERNAL					
Recorded By	FOLAKE O, GARETH S.					
Witnessed By	CRAIG ROSENBAUM					

Service Order Number		BXV3-00069				
Borehole Fluids						
Parameter(unit)	1					
Fluid Type	Water					
Fluid Name	Silicate					
Max Recorded Temperatures (degF)	181					
Source of Sample	Active Tank					
Salinity (ppm)	2122.51					
Density (lbm/gal)	10.1					
Funnel Viscosity (s)	49					
Fluid Loss (cm3)						
PH	10					
Date/Time Circulation Stopped	25-Oct-2012 07:30:00					
Date Logger on Bottom	25-Oct-2012					
Time Logger on Bottom	19:30:53					
Source RMF	Calculated					
RMC	Calculated					
RM @ Meas Temp (ohm.m@degF)	2.5 @ 75					
RMF @ Meas Temp (ohm.m@degF)	1.88 @ 75					
RMC @ Meas Temp (ohm.m@degF)	3.13 @ 75					
RM @ BHT (ohm.m@degF)	1.09 @ 181					
RMF @ BHT (ohm.m@degF)	0.82 @ 181					
RMC @ BHT (ohm.m@degF)	1.36 @ 181					
Total Solid (%)	9					
High Gravity Solids (%)						
Remarks and Equipment Summary						
1: Toolstring			1: Remarks			
Equip name	Length	MP name	Offset	Tool string run as per toolsketch		
LEH-QT:2886	47.5			Wireline tools bridged @ 8170'. Log data acquired from 8170' to casing shoe.		
LEH-QT:2886				No repeat pass done due to hole conditions.		
EDTC-B:3815	44.58			Maximum temperature 181 degF obtained from EDTC sensor		
EDTH-B:3886				Maximum deviation 53.2 deg obtained from GPIT		
EDTG-A				Log affected be hole stickiness.		
EDTC-B:3815				No repeat pass done due to hole conditions.		
		CTEM	41.08			
		ACCZ	0.00			
		HV	0.00			
		Gamma Ray	39.21			
		TelStatus	38.08			
HNGS-BA:165	38.08					
HEH-K:176						
HNGS-BA:165						
		GR	35.09			



Depth Summary

Depth Control Parameters	1		
Conveyance Type	Wireline		
Log Sequence	Subsequent trip in hole.		
Reference Log Date	15-Oct-2012		
Reference Log Name	Schlumberger Intermediate Platform Express		
Reference Log Run Number	1		
Rig Type	LAND		
Depth Remark Parameters	1		
Depth Remark 1	All depth procedures followed as per Schlumberger depth control standard dated April 7th, 2010.		
Depth Remark 2	IDW used as primary depth control		

Depth Remark 2	IDW used as primary depth control.		
Depth Remark 3	Z-chart used as secondary depth control.		
Depth Remark 4	Log correlated to reference log over the interval of 4500' - 6000'		
Depth Measuring Device	1		
Type	IDW-B		
Wheel Correction 1	1		
Wheel Correction 2	0		
Tension Device	1		
Type	CMTD-B/A		
Calibration Points	0		
Logging Cable	1		
Type	7-46NT-XS		
Logging Cable Length (ft)	24000.00		

1

Main Pass - 5" = 100'

Integration Summary

Output Channel(s)	Output Description	Input Parameter	Output Value	Unit
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Pass Summary

Run Name	Pass Objective	Direction	Top	Bottom	Start	Stop	Depth Shift	Include Parallel Data
1	Log[6]:Up	Up	6146.66 ft	8723.68 ft	25-Oct-2012 7:26:00 PM	25-Oct-2012 9:00:05 PM	16.00 ft	true

All depths are referenced to toolstring zero

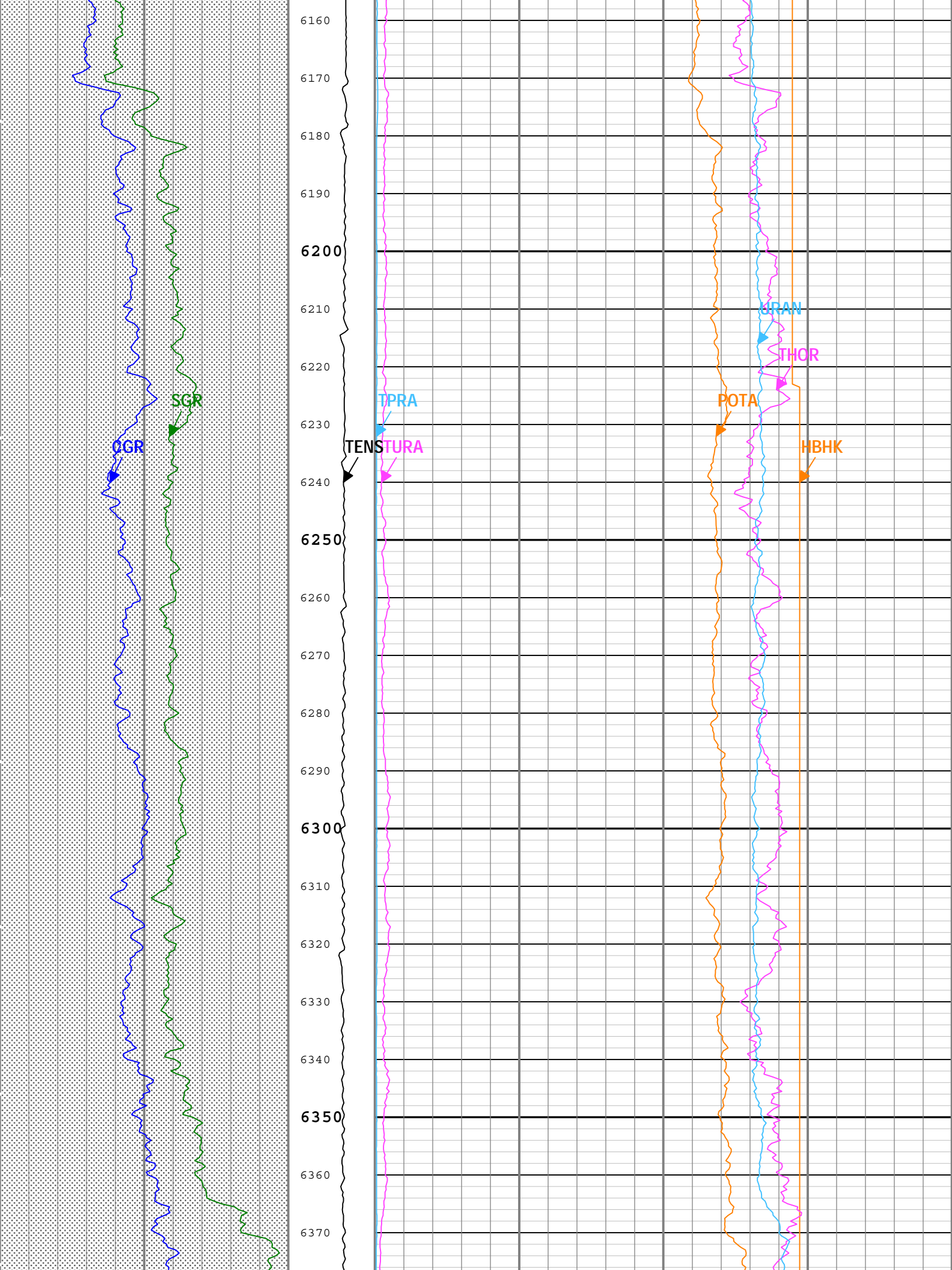
Log

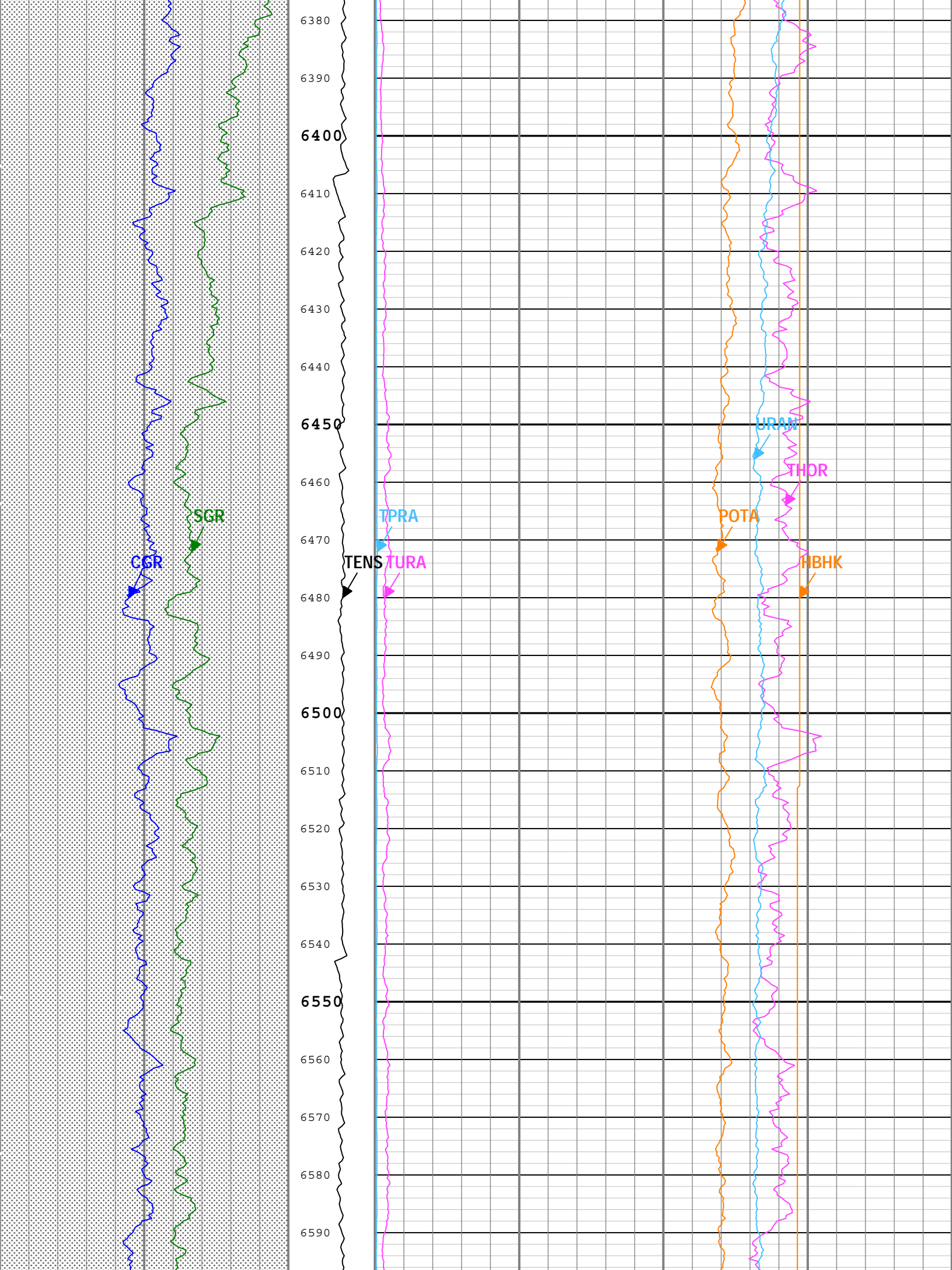
1: Log[6]:Up

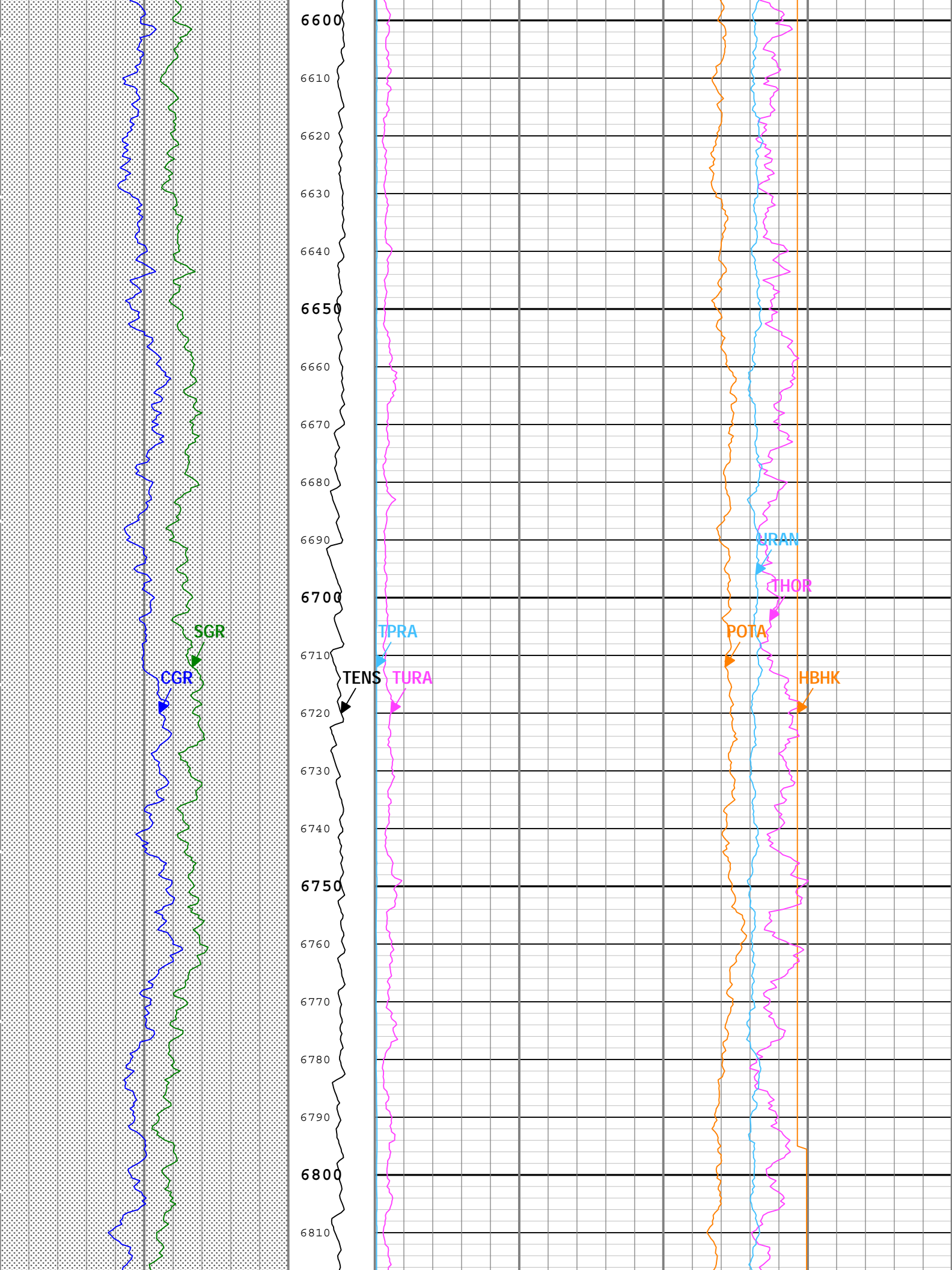
Description: HNGS Basic Format: Log (HNGS Basic- 5 inch) Index Scale: 5 in per 100 ft Index Unit: ft Index Type: Measured Depth Creation Date: 26-Oct-2012 06:54:45

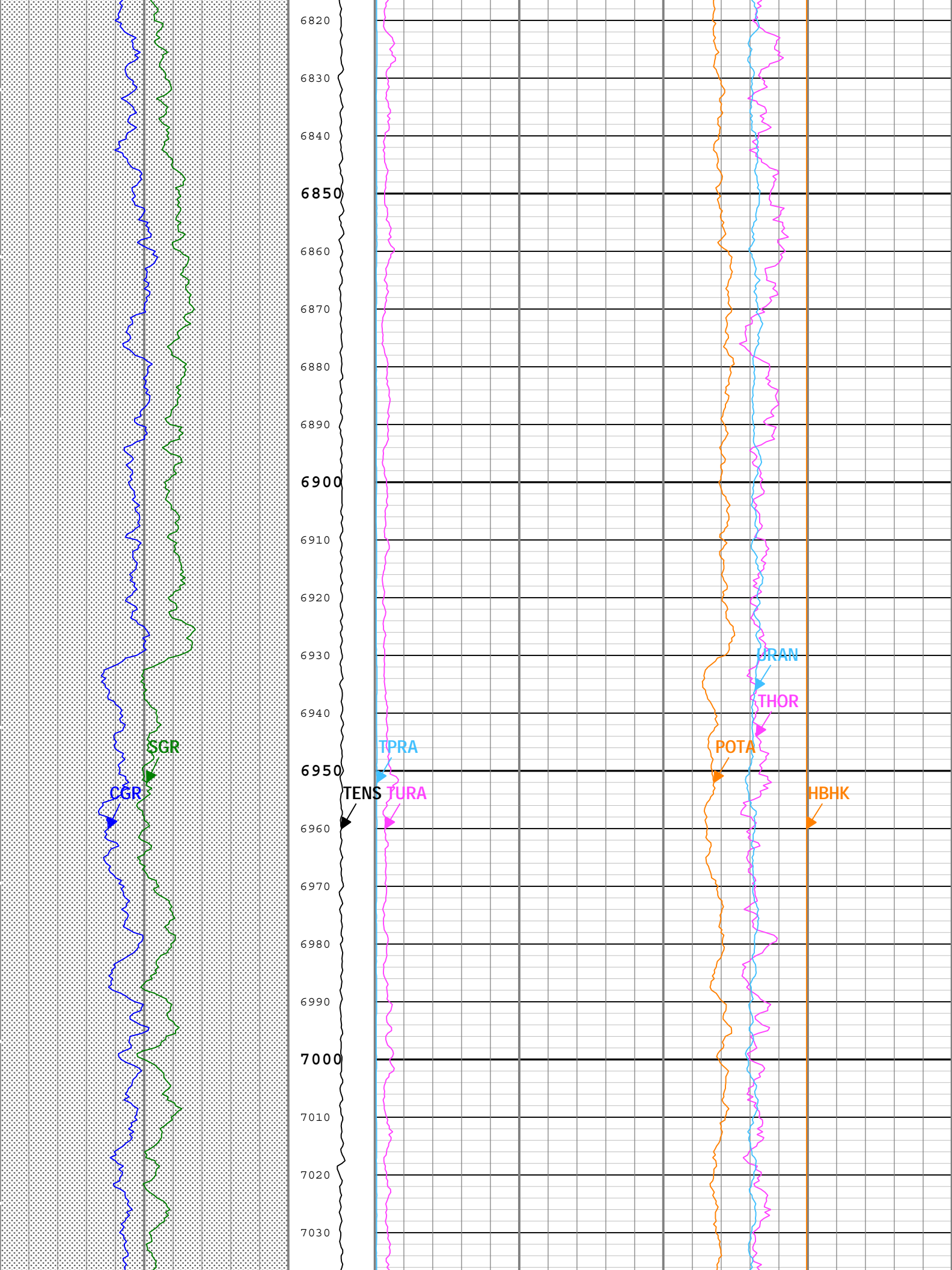
TIME_1900 - Time Marked every 60.00 (s)

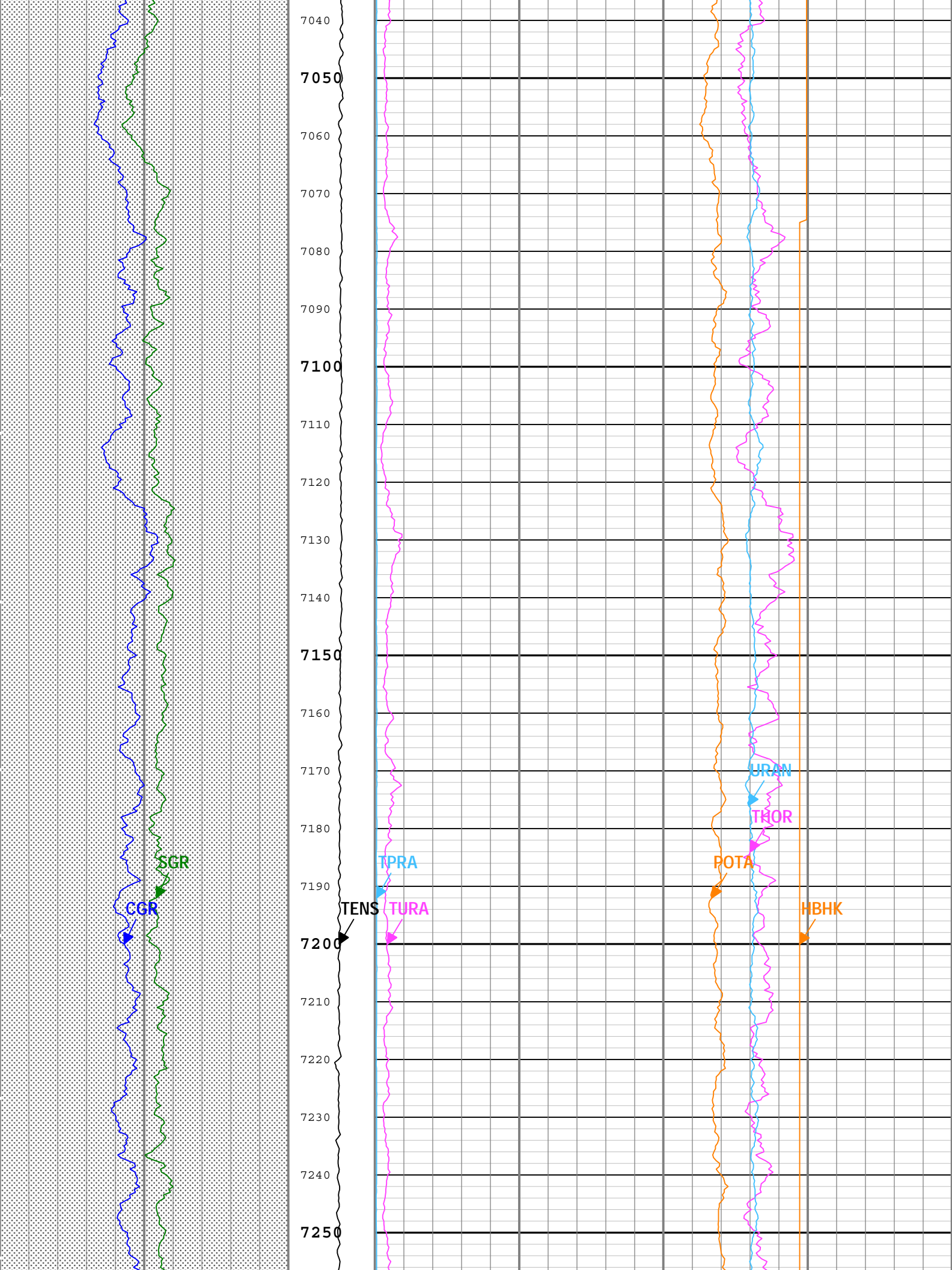
		Borehole Potassium Concentration (HBHK) HNGS-BA	
		-5	%
		Potassium Concentration (POTA) HNGS-BA	
		0	%
AREA FROM CGR TO SGR		Thorium/Uranium Ratio (TURA) HNGS-BA	
Gamma Ray Contribution from Thorium and Potassium (CGR) HNGS-BA		0.01	100
0	gAPI	150	
Spectroscopy Gamma Ray (SGR) HNGS-BA		Thorium Concentration (THOR) HNGS-BA	
0	gAPI	150	0
		ppm	
		Thorium/Potassium Ratio (TPRA) HNGS-BA	
		0.1	1000
		Uranium Concentration (URAN) HNGS-BA	
		-10	30
		ppm	

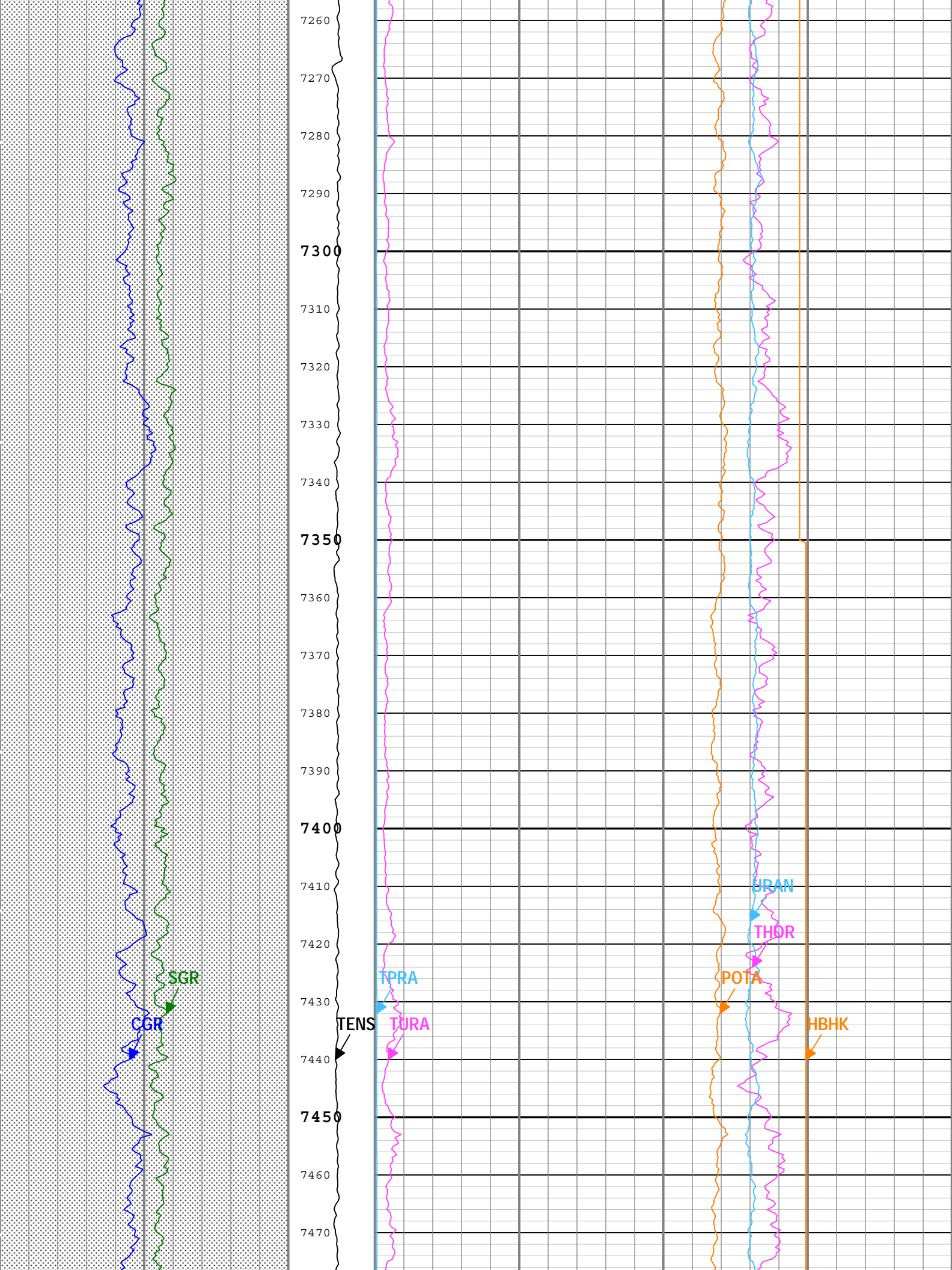


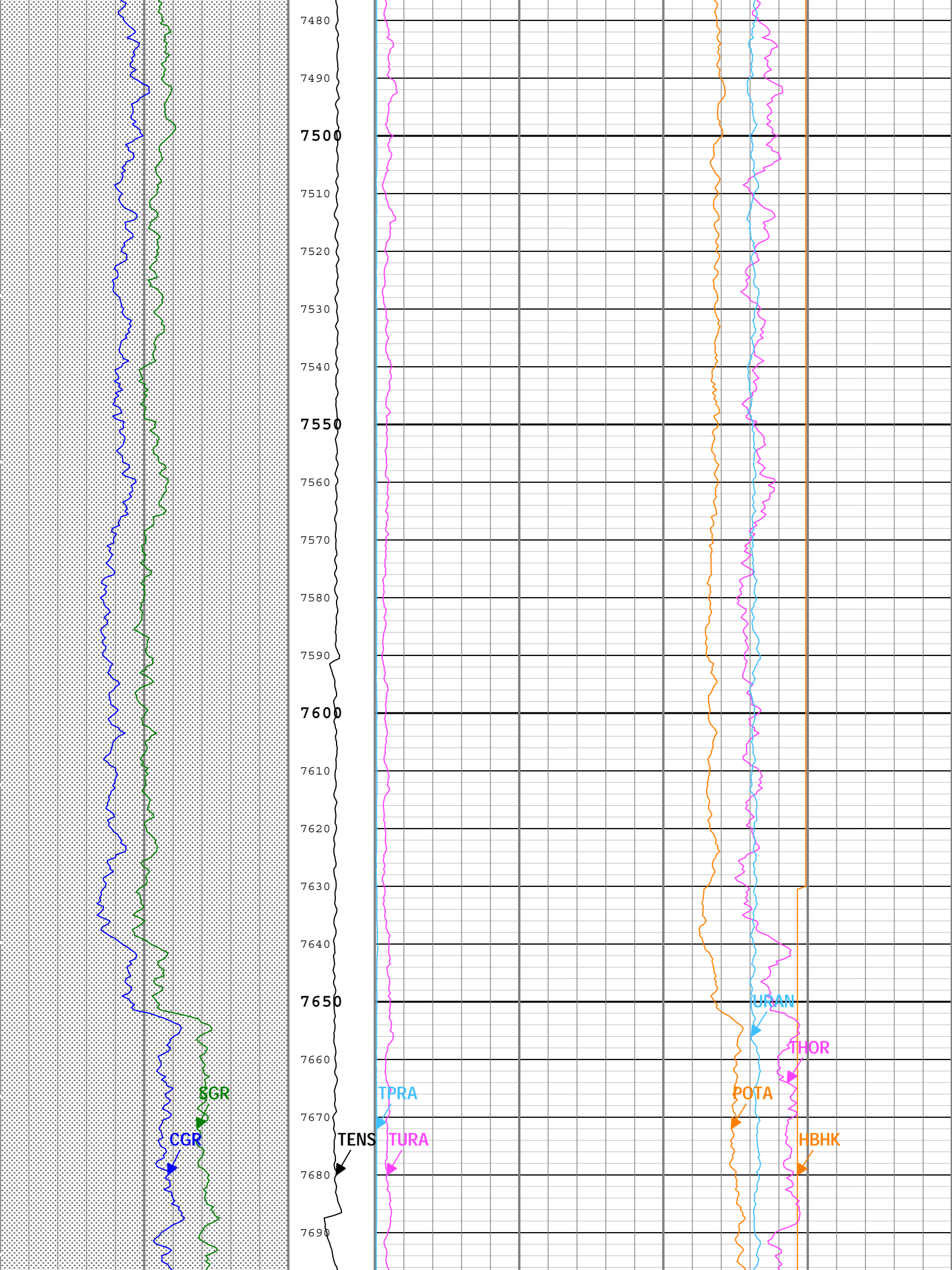


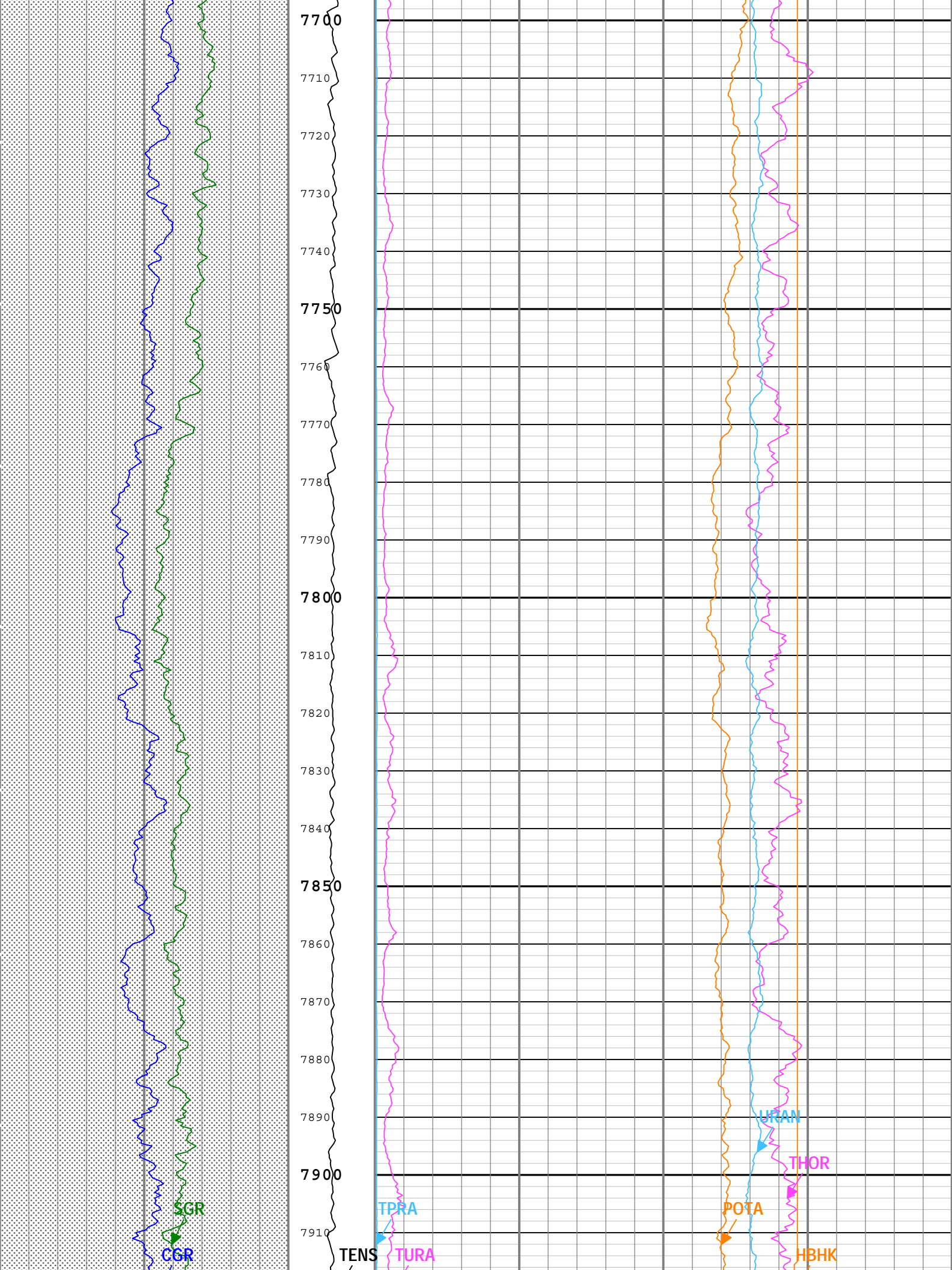


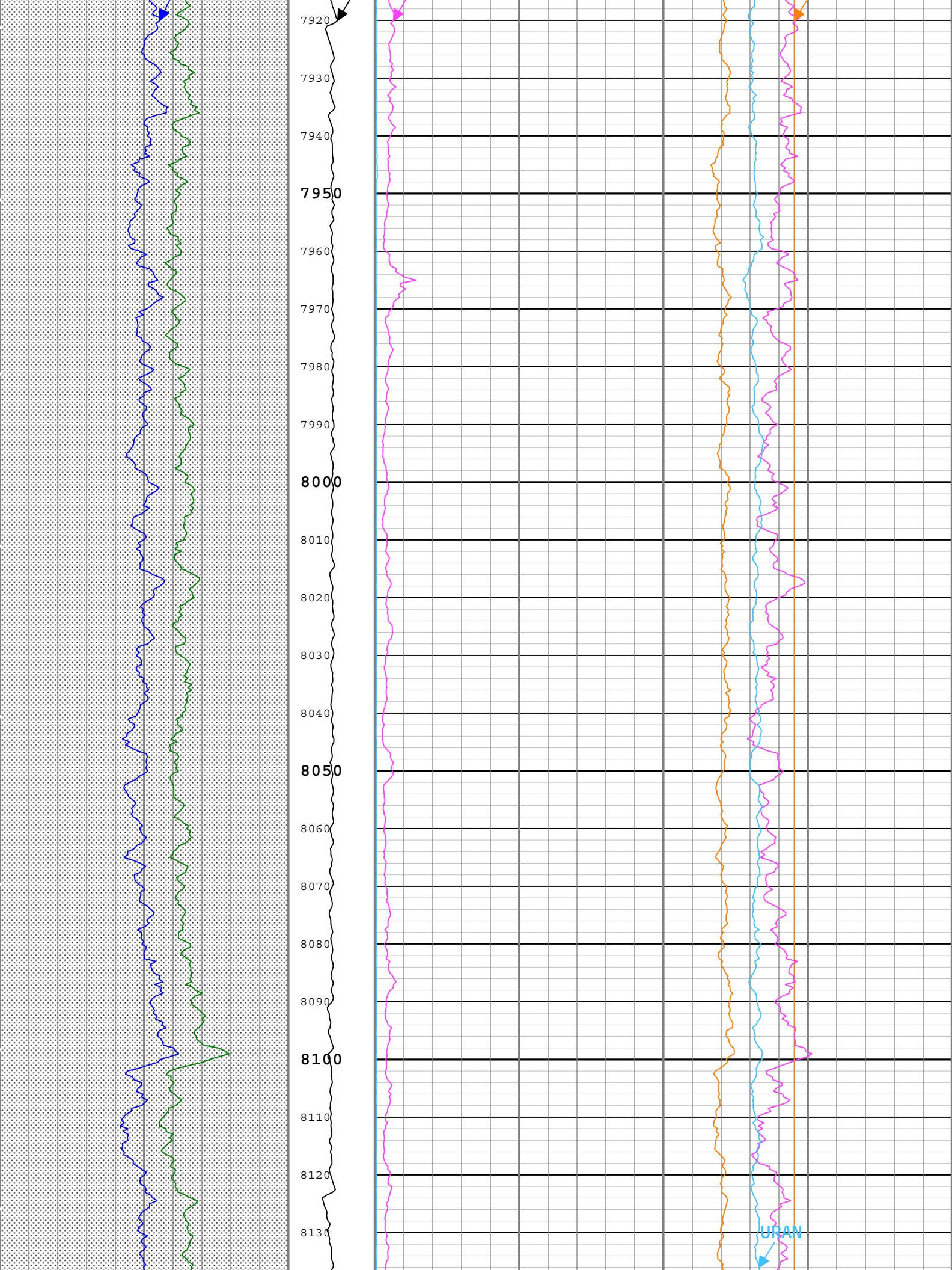


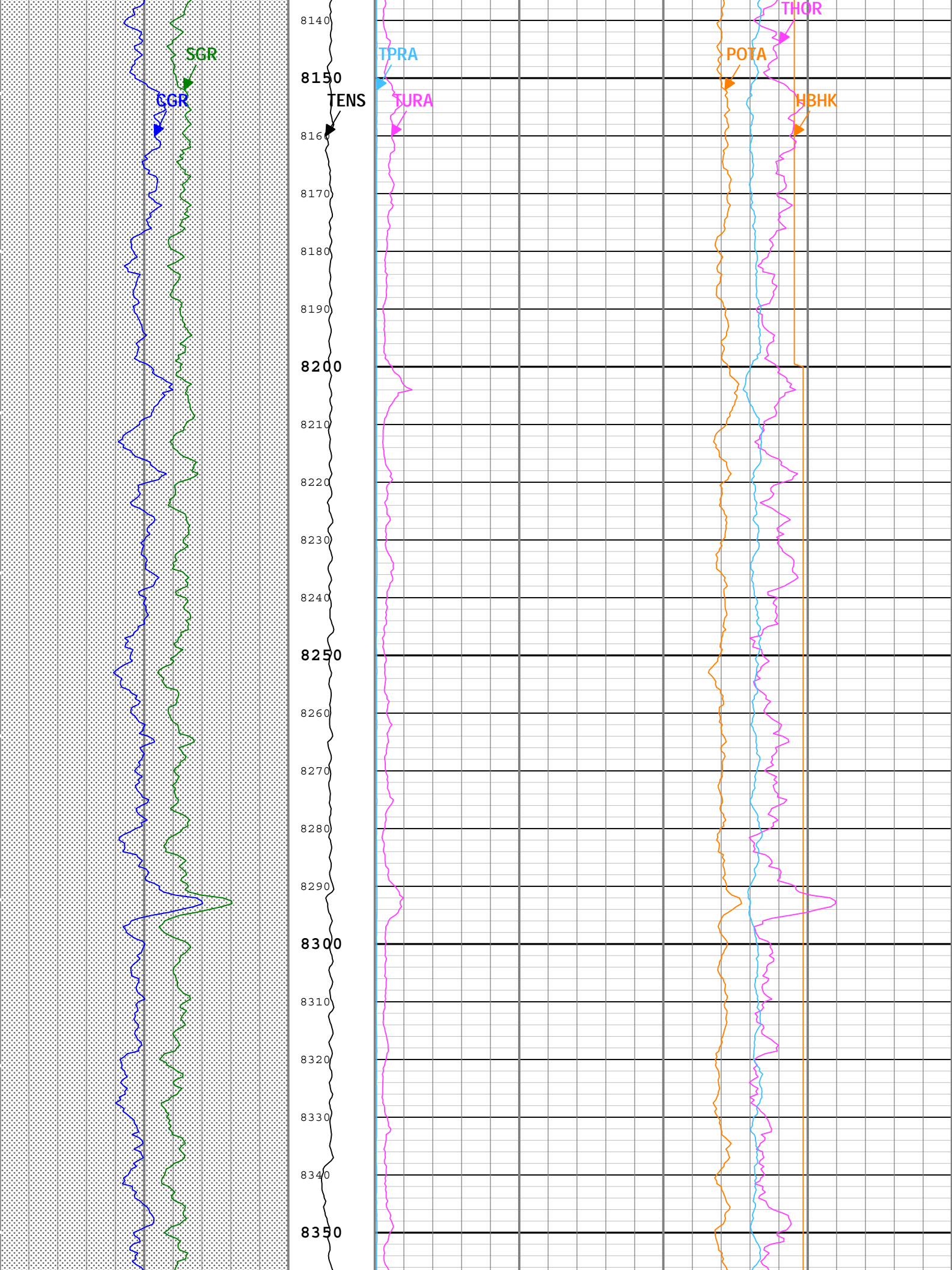


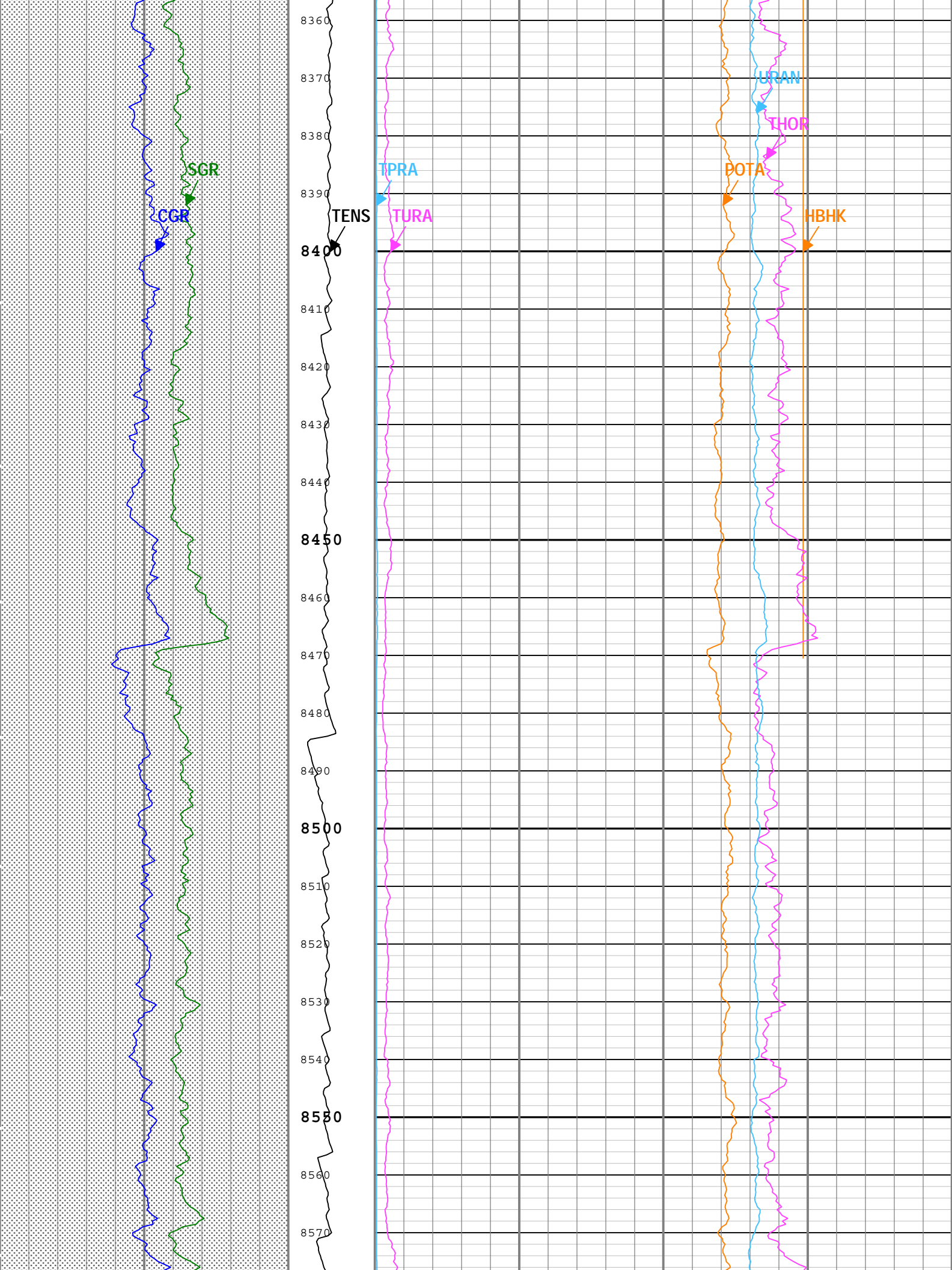


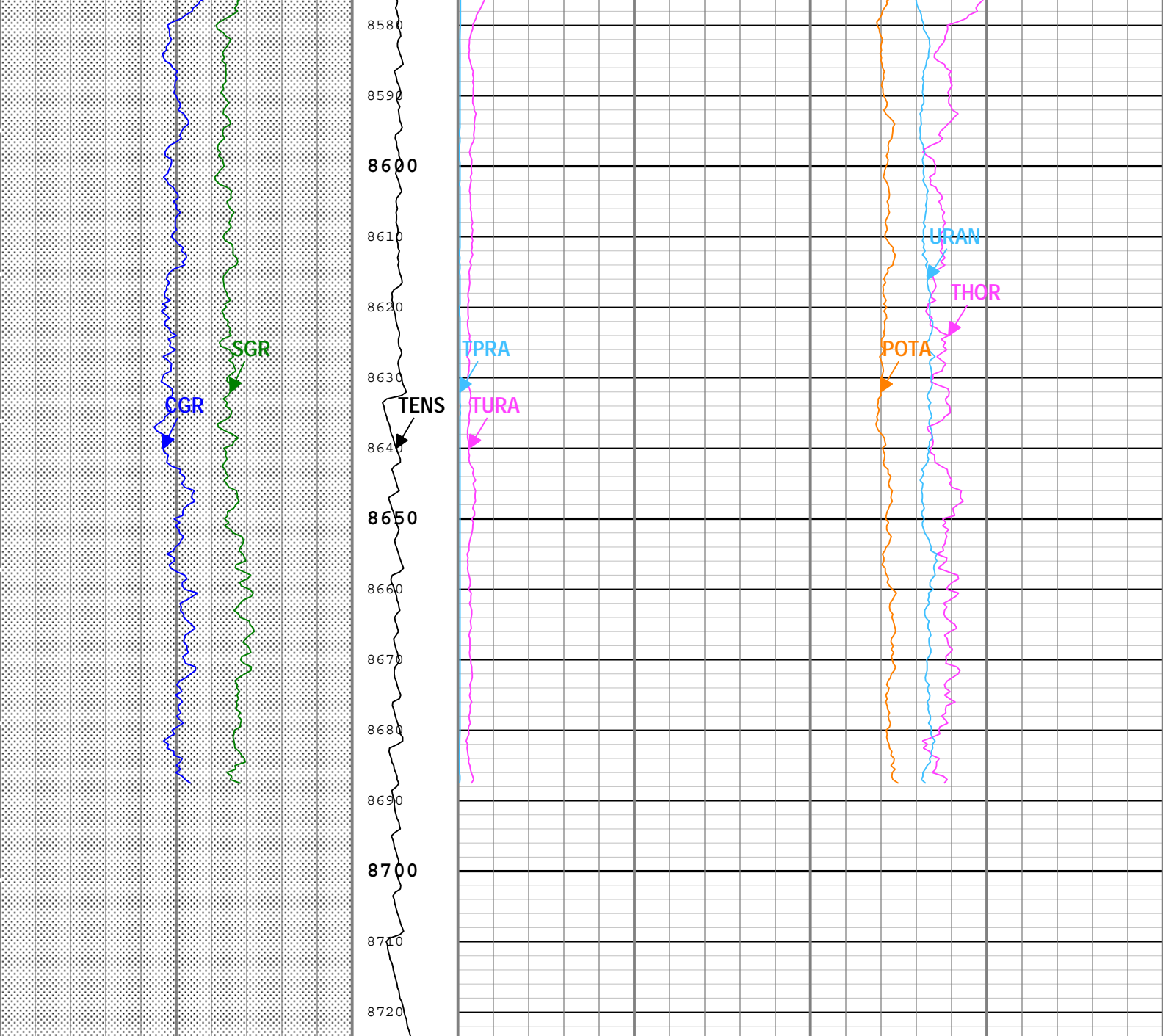












AREA FROM CGR TO SGR			Cable Tension (TENS)	Thorium/Uranium Ratio (TURA) HNGS-BA		Borehole Potassium Concentration (HBHK) HNGS-BA			
Gamma Ray Contribution from Thorium and Potassium (CGR) HNGS-BA				0.01	100	-5	%	5	
0	gAPI	150	10000 lbf	Thorium/Potassium Ratio (TPRA) HNGS-BA		Potassium Concentration (POTA) HNGS-BA			
Spectroscopy Gamma Ray (SGR) HNGS-BA				0.1		0		10	
0				gAPI		150		Thorium Concentration (THOR) HNGS-BA	
						0		ppm	30
						-10		ppm	30

TIME_1900 - Time Marked every 60.00 (s)

Description: HNGS Basic Format: Log (HNGS Basic- 5 inch) Index Scale: 5 in per 100 ft Index Unit: ft Index Type: Measured Depth Creation Date: 26-Oct-2012 06:54:45

Channel Processing Parameters				
Parameter	Description	Tool	Value	Unit
BARI	Barite Mud Presence Flag	Borehole	Yes	

BHK	Drilling Fluid Potassium Concentration	Borehole	0	%
BHS	Borehole Status (Open or Cased Hole)	Borehole	Open	
BS	Bit Size	WLSESSION	Depth Zoned	in
C1_SHIFT	C1 Caliper Supplementary Offset	FBST-B	1.165	in
C2_SHIFT	C2 Caliper Supplementary Offset	FBST-B	1.09	in
CBLO	Casing Bottom (Logger)	WLSESSION	6169	ft
DBCC	Barite Constant Correction Flag	HNGS-BA	None	
DFD	Drilling Fluid Density	Borehole	10.1	lbm/gal
GCSE_DOWN_PASS	Generalized Caliper Selection for WL Log Down Passes	Borehole	BS	
GCSE_UP_PASS	Generalized Caliper Selection for WL Log Up Passes	Borehole	C1	
HCRB	Apply Borehole Potassium Correction	HNGS-BA	None	
HEMA	Hematite Presence Flag	Borehole	No	
SGRC	Standard Gamma Ray Correction Flag	HNGS-BA	Yes	

Depth Zone Parameters			
Parameter	Value	Start (ft)	Stop (ft)
BS	9.875	6111	6169
BS	6.75	6169	8723.5
All depth are actual.			

Tool Control Parameters				
Parameter	Description	Tool	Value	Unit
FBMV	EMEX Maximum Voltage Calculation	FBST-B	Off	
FLM	Logging Mode	FBST-B	Full Image Mode	
MAX_LOG_SPEED	Toolstring Maximum Logging Speed	WLSESSION	1800	ft/h
XGAI_FBST	Gain Value in Manual Mode	FBST-B	35 dB	
XGMO	EMEX and Gain Modes	FBST-B	Time Zoned	
XVOL	EMEX Voltage	FBST-B	Time Zoned	V

Time Zone Parameters					
Parameter	Value	Start Time	Stop Time	Start Depth (ft)	Stop Depth (ft)
XGMO	EMEX=Manual and Gain=Auto, High Range	25-Oct-2012 19:26:00	25-Oct-2012 20:58:53	8723.68	6180.47
XGMO	EMEX=Manual and Gain=Manual	25-Oct-2012 20:58:53	25-Oct-2012 21:00:05	6180.47	6146.66
XVOL	80	25-Oct-2012 19:26:00	25-Oct-2012 19:49:18	8723.68	8144.14
XVOL	90	25-Oct-2012 19:49:18	25-Oct-2012 20:09:20	8144.14	7574.92
XVOL	100	25-Oct-2012 20:09:20	25-Oct-2012 20:58:53	7574.92	6180.47
XVOL	0	25-Oct-2012 20:58:53	25-Oct-2012 21:00:05	6180.47	6146.66
All depth are at tool zero.					

Calibration Report				
HNGS-BA (Hostile-environment Natural Gamma-ray Sonde) Calibration - Run 1				
Primary Equipment :				
	HNGS Sonde Element	HNGS-BA	165	
Auxiliary Equipment :				
	Hostile Natural Gamma Ray Cartridge	HNGC-B	347	
	HNGS Housing Element	HEH-K	176	
			317	
	Housing for the HNGC	HNGH-A	133	

HNGS Background and Na22 Set Point Determination - Detector 1 Check							
Master (EEPROM):	10:13:42 23-Aug-2012	Before (Measured):	09:45:00 24-Oct-2012	After:			
Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit	
Na 511 Peak Location		Master			38.663		

		Before After Before-Master After-Before	40.000 ----- ----- -----	37.500 ----- ----- -----	38.606 ----- -0.057 -----	42.500 ----- ----- -----	<div><div></div><div></div><div></div></div>
Na 511 Peak Resolution	%	Master Before After Before-Master After-Before	15.500 ----- ----- ----- -----	12.000 ----- ----- ----- -----	16.783 16.767 ----- -0.016 -----	19.000 ----- ----- ----- -----	<div><div></div><div></div><div></div></div>
High Voltage DAC Value	V	Master Before After Before-Master After-Before	1150.000 ----- ----- ----- -----	850.000 ----- ----- ----- -----	1080.565 1059.541 ----- -21.024 -----	1600.000 ----- ----- ----- -----	<div><div></div><div></div><div></div></div>
Na 1785 Peak Location		Master Before After Before-Master After-Before	142.650 ----- ----- ----- -----	135.000 ----- ----- ----- -----	139.498 139.261 ----- -0.237 -----	150.300 ----- ----- ----- -----	<div><div></div><div></div><div></div></div>
Na 1785 Peak Resolution	%	Master Before After Before-Master After-Before	8.500 ----- ----- ----- -----	7.000 ----- ----- ----- -----	8.330 8.369 ----- 0.039 -----	11.000 ----- ----- ----- -----	<div><div></div><div></div><div></div></div>
Temperature	degF	Master Before After Before-Master After-Before	----- 59.900 ----- ----- -----	----- -20.002 ----- ----- -----	----- 64.627 ----- ----- -----	----- 140.000 ----- ----- -----	<div><div></div><div></div><div></div></div>
Na Count Rate	CPS	Master Before After Before-Master After-Before	45.000 45.000 ----- ----- -----	10.000 10.000 ----- ----- -----	30.865 29.768 ----- -1.097 -----	100.000 100.000 ----- ----- -----	<div><div></div><div></div><div></div></div>

HN GS Background and Na22 Set Point Determination - Detector 2 Check							
Master (EEPROM): 10:13:42 23-Aug-2012		Before (Measured): 09:45:00 24-Oct-2012		After:			
Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit	<div><div></div><div></div><div></div></div>
Na 511 Peak Location		Master Before After Before-Master After-Before	40.000 ----- ----- ----- -----	37.500 ----- ----- ----- -----	40.600 40.621 ----- 0.021 -----	42.500 ----- ----- ----- -----	<div><div></div><div></div><div></div></div>
Na 511 Peak Resolution	%	Master Before After Before-Master After-Before	15.500 ----- ----- ----- -----	12.000 ----- ----- ----- -----	16.145 15.082 ----- -1.063 -----	19.000 ----- ----- ----- -----	<div><div></div><div></div><div></div></div>
High Voltage DAC Value	V	Master Before After Before-Master After-Before	1150.000 ----- ----- ----- -----	850.000 ----- ----- ----- -----	1071.942 1042.883 ----- -29.059 -----	1600.000 ----- ----- ----- -----	<div><div></div><div></div><div></div></div>
Na 1785 Peak Location		Master Before After Before-Master After-Before	142.650 ----- ----- ----- -----	135.000 ----- ----- ----- -----	146.939 145.416 ----- -1.523 -----	150.300 ----- ----- ----- -----	<div><div></div><div></div><div></div></div>
Na 1785 Peak Resolution	%	Master Before After Before-Master After-Before	8.500 ----- ----- ----- -----	7.000 ----- ----- ----- -----	9.184 9.608 ----- 0.424 -----	11.000 ----- ----- ----- -----	<div><div></div><div></div><div></div></div>
Temperature	degF	Master Before After Before-Master After-Before	----- 59.900 ----- ----- -----	----- -20.002 ----- ----- -----	----- 64.554 ----- ----- -----	----- 140.000 ----- ----- -----	<div><div></div><div></div><div></div></div>

Na Count Rate	CPS	Master	45.000	10.000	30.748	100.000
		Before	45.000	10.000	29.385	100.000
		After	----	----	-----	-----
		Before-Master	----	----	-1.363	-----
		After-Before	----	----	-----	-----

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

Master (EEPROM): 10:13:42 23-Aug-2012 Before (Measured): 09:45:00 24-Oct-2012 After:

Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit	
Coincidence Count Rate Ratio		Master			0.997		
		Before	1.000	0.950	1.007	1.050	
		After	----	----	----	----	
		Before-Master	----	----	0.010	----	
		After-Before	----	----	----	----	

HNGS Background and Na22 Set Point Determination - Detector 1 Calibration

Master (EEPROM): 10:13:42 23-Aug-2012 Before (Measured): 09:45:00 24-Oct-2012 After:

Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit		
Th Peak Location - 0		Master	209.630	201.000	207.668	218.250		
		Before	----	----	----	----		
		After	----	----	----	----		
		Before-Master	----	----	----	----		
		After-Before	----	----	----	----		

Th Peak Resolution - 0	%	Master	7.000	5.000	7.392	9.000	
		Before	----	----	----	----	
		After	----	----	----	----	
		Before-Master	----	----	----	----	
		After-Before	----	----	----	----	

[illegible]

Gain Ratio - 0		Master	1.000	0.940	1.021	1.060	
		Before	----	----	----	----	
		After	----	----	----	----	
		Before-Master	----	----	----	----	
		After-Before	----	----	----	----	

HNGS Background and Na22 Set Point Determination - Detector 2 Calibration

Master (EEPROM): 10:13:42 23-Aug-2012 Before (Measured): 09:45:00 24-Oct-2012 After:

Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit		
Th Peak Location - 0		Master	209.630	201.000	207.931	218.250		
		Before	----	----	----	----		
		After	----	----	----	----		
		Before-Master	----	----	----	----		
		After-Before	----	----	----	----		

Th Peak Resolution - 0	%	Master	7.000	5.000	8.784	9.000			
		Before	-----	-----	-----	-----			
		After	-----	-----	-----	-----			
		Before-Master	-----	-----	-----	-----			
		After-Before	-----	-----	-----	-----			

Background Count Rate	CPS	Master			179.763				
		Before	142.500	10.000	107.700	265.000			
		After	----	----	----	----			
		Before-Master	----	----	-72.063	----			
		After-Before	----	----		----			

[illegible]

		Before	-----	-----	-----	-----		
--	--	--------	-------	-------	-------	-------	--	--

		After	----	----	----	----		
		Before-Master	----	----	----	----		
		After-Before	----	----	----	----		

HNGS Background and Na22 Set Point Determination - Detector 1 Calibration

Master (EEPROM):	10:13:42 23-Aug-2012	Before (Measured):	09:45:00 24-Oct-2012	After:		
Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit

Na 511 Peak Set Point - 0	Master	40.000	38.000	40.000	43.500				
---------------------------	--------	--------	--------	--------	--------	--	--	--	--

		Before	----	----	----	----		
		After	----	----	----	----		

		Before-Master After-Before	----- -----	----- -----	----- -----	----- -----	
HNGS Background and Na22 Set Point Determination - Detector 2 Calibration							
Master (EEPROM): 10:13:42 23-Aug-2012		Before (Measured): 09:45:00 24-Oct-2012		After:			
Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit	
Na 511 Peak Set Point - 0		Master	40.000	38.000	42.000	43.500	
		Before	-----	-----	-----	-----	
		After	-----	-----	-----	-----	
		Before-Master	-----	-----	-----	-----	
		After-Before	-----	-----	-----	-----	

Company:

SHELL

Well:

DAWSON CREEK 1 25

Field:

WILLIAMS FORK UNIT

County:

ROUTT

Country:

USA

HOSTILE NATURAL GAMMA SPECTROSCOPY

Schlumberger