Schlumberger

Sonic Scanner
Borehole Anisotropy Analysis

Anisotropy Analysis from Oriented Fast and Slow Shear Computations

1054 ft to 4050 ft

COMPANY: Battelle Pacific Northwest Lab
WELL: Wallula Basalt Pilot #1
FIELD: Wildcat
County: Walla Walla
State: Washington
COUNTRY: USA

LOCATION

API No: Job No.:

Field: SOUTHWEST 1/4 OF SECTION 10

Section: 10 Township: 7 Range: 31E
Latitude: 46.1049 Longitude: –118.916

Other Services:
Sonic Scanner

Permanent Datum: GROUND LEVEL Elev: –999.25 ft
Log Measured From: DF 5.5 ft above Perm. Datum
Drilling Measured From: DF

Elevations:
K.B. 369.68 ft
G.L. 363.18 ft

Date					
Run No.		TWO			
Depth Driller		4105 ft			
Depth Logger (Schl)		4105 ft			
Btm. Log Interval		4103 ft			
Top Log Interval		1108 ft			
Casing–Driller		13.325 in @ 1108 ft			
Casing–Logger		1108 ft			
Bit Size		12.25 in			
Type fluid in hole		FRESH WATER			
Dens.	Visc.	8.4 lbm/gal	–999.25 s		
pH	Fluid Loss	–999.25	–999.25 in3		
Source of Sample					
Rm @ Meas. Temp.		23.1 ohm.m @ 64.2 deg			
Rmf @ Meas. Temp.		–999.25 ohm.m @ –999			
Rmc @ Meas. Temp.		–999.25 ohm.m @ –999			
Source: Rmf	Rmc				
Rm @ BHT		–999.25 ohm.m @ 212 (			
Circulation Stopped					
Logger on Bottom		10:35			
Max. Rec. Temp.		–999.25 degF			
Equip.	Location	3152	SACRAMEN		
Recorded by:		BEN GRAU			
Witnessed by:		CHARLOTTE SULLIVAN			

The well name, location and borehole reference data were furnished by the customer

FOLD HERE

Log Analyst: S.Riley,G.Martinez | Baseline: GF4.4 | Center: DCS–Denver | Process Date: Jun–09–2009 | OP Vers.: 17C0–154 | Ser. Order # AZJT00051

Field Engineer's

TOOL STRING
BOWSPRING R
TOTAL CHLORI
MATRIX: LIMES
DENSITY: 2.71
ICV CALCULAT

DOWN

LEH-QT
LEH-QT

EDTC-B
EDTH-B 8611
EDTC-B 8620
EDTG-A/B

PPC2-B
PPC2-B 8152
PPC_CAL_STD

MAPC-B
MAPC-BA
ECH-SF 8092
MAMS-BA 8148

MAXS-B
MASS-BA 8136
MAXS-BA 8136

PPC1-B
PPC1-B 8334
PPC_CAL_STD

FBST-B
ECH-MRA 5881
FBCC-A
AH-184
AH-18511773
FBSH-A 1730
GPIC-F
FBSC-B
FBSS-B

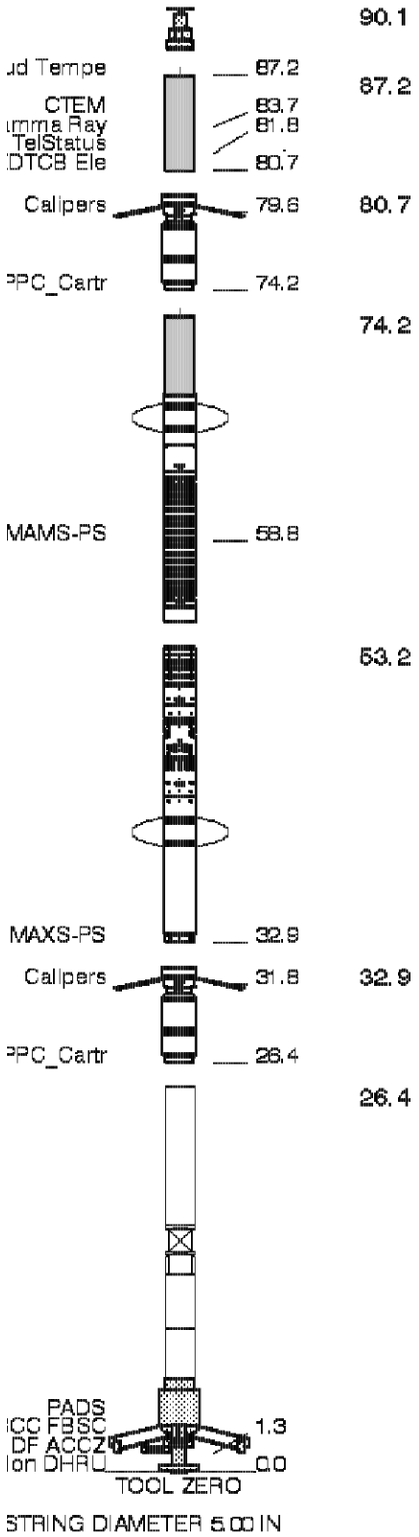
FB
HV
Tens

MAXIMUM
MEASUREMEN
ALL

s Remarks:

RAN AS PER TOOL SKETCH
AN ON NEUTRON TOOL
DES: ??? PPM
TONE
G/CC
ED USING FCD = 13.375"

HOLE EQUIPMENT



STRING DIAMETER 5.00 IN
ITS RELATIVE TO TOOL ZERO
LENGTHS IN FEET

Log Analyst's Remarks:

OBJECTIVE:

Sonic anisotropy analysis using

AVAILABLE INPUT DATA:

SONIC SCANNER – Full Config
DTCO: DT–Compressional from
DTSM: DT–Shear from CROSS
anisotropy processing).
HD1 & HD2 or HDAR calipers fc
Scanner.
P1AZ – Pad #1 (Upper Dipole) A
Sonic Scanner.
NPOR and RHOZ from Open H
GR
Mud Weight

DATA QUALITY:

Far Monopole waveforms were a
reprocessing due to poor boreho

The waveforms of the Cross–Di
contain good information where
reprocessing was required to ac

Platform Express run was used

PROCESSING DETAILS:

DT–Compressional was process
Shear was obtained from unrota
then run in the "4–Component R
and Slow dipole waveforms whe
slownesses (DTSM_FAST and D

RESULTS:

The logged well displayed sever
by open fractures, segmented fe
SHEAR AZIMUTH in zones of fr
~ 290 degrees (NW). The orient
features where other fractures w
also has a strong East–West co
AZIMUTH as filtered by slownes
(NW). This azimuth corresponds
slowness dispersion analysis an
to maximum stress orientation ir

Sonic Scanner Cross–Dipole waveforms

uration; All modes recorded
FAR MONOPOLE waveforms.
DIPOLE waveforms or DTSM–Fast (Fast Shear from

rm 4 arm CALIPERS run in combination with the Sonic

Azimuth from GPIT survey run in combination with the

ole Neutron – Density logs.

analyzed to obtain DT–Compressional. Some sections needed
ole conditions and tension pulls.

pole were processed to obtain DT–Shear. In general, they
the borehole conditions were good. Otherwise, some
hieve good formation arrivals.

as depth reference.

sed from monopole waveforms using "Best DT: program. DT–
ted X–Dipole waveforms using "Best DT" program. The DTSM was
lotation" program to obtain FAST SHEAR AZIMUTH, the Fast
re processed in "Best DT" to obtain Fast and Slow shear
DTSM_SLOW).

al sections with well defined anisotropy, which was caused
eatures (non–planar), and stress. The orientation of the FAST
actures where no segmented features were present is
tation of the FAST SHEAR AZIMUTH in zones of segmented
ere not present ranges from ~295–315 degrees (NW), and
mponent. Overall, the most confident reading for FAST SHEAR
s and time–based anisotropy lies between 310 and 320 degrees
to zones where stress–based anisotropy was detected in
d also to the strike of the fractures which are most open due
the region.

Processing Parameters: *

* Parameters are assumed to be default parameters unles

GENERAL

Shear Slownesses were obtained via Shear Parametric In

Graphic Illustration Captions:

Fig 1 (Above Log Data)

Rose plots of the filtered FAST SHEAR AZIMUTH (See Ca

Fig 2 (Below Log Data)

Diagrams of the Sonic Waveform Dispersion Analysis to c
anisotropic zones of the well (See Captions for interpreted

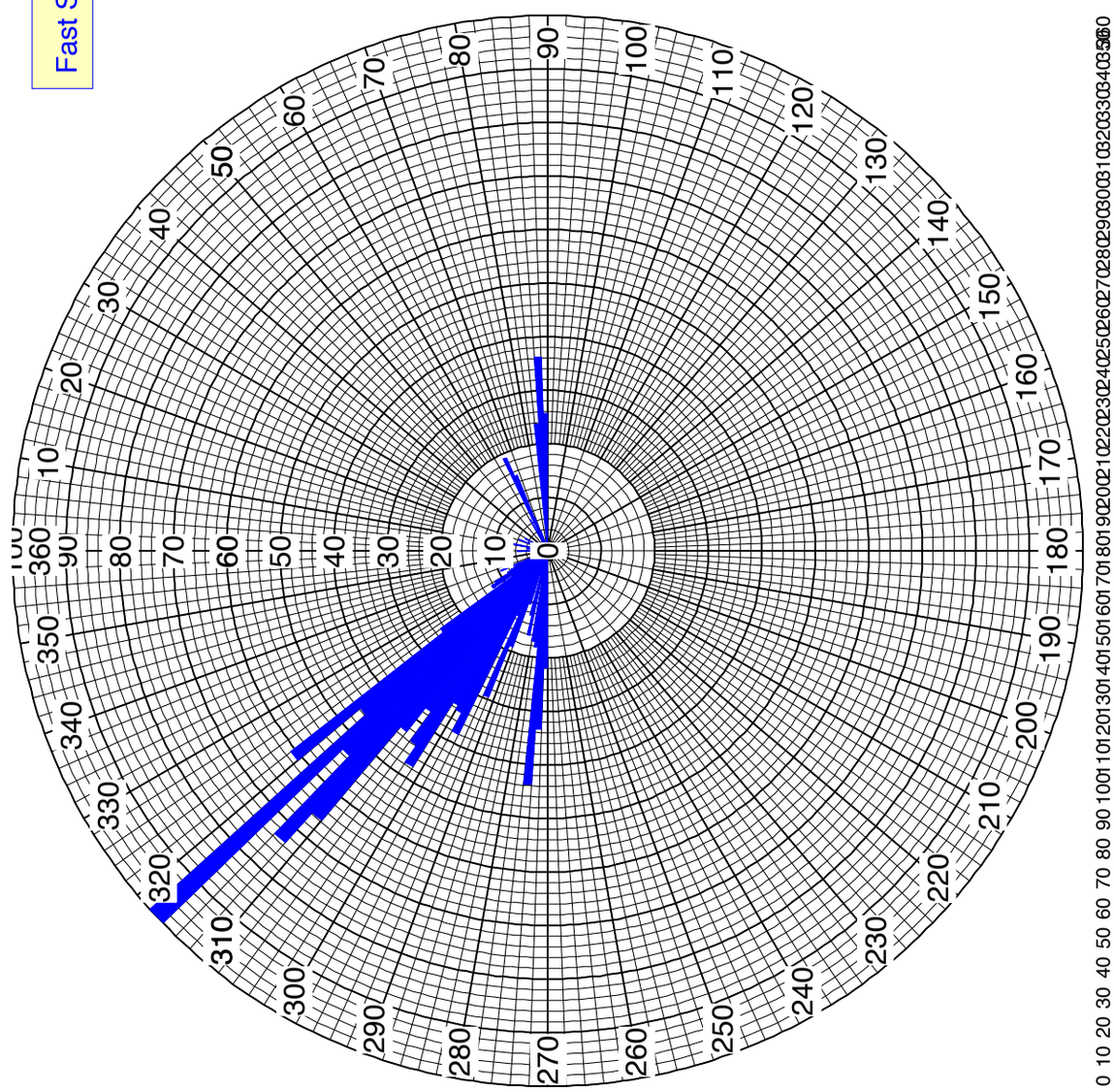
ss otherwise specified.

version of waveform data.

aptions for Filter Details).

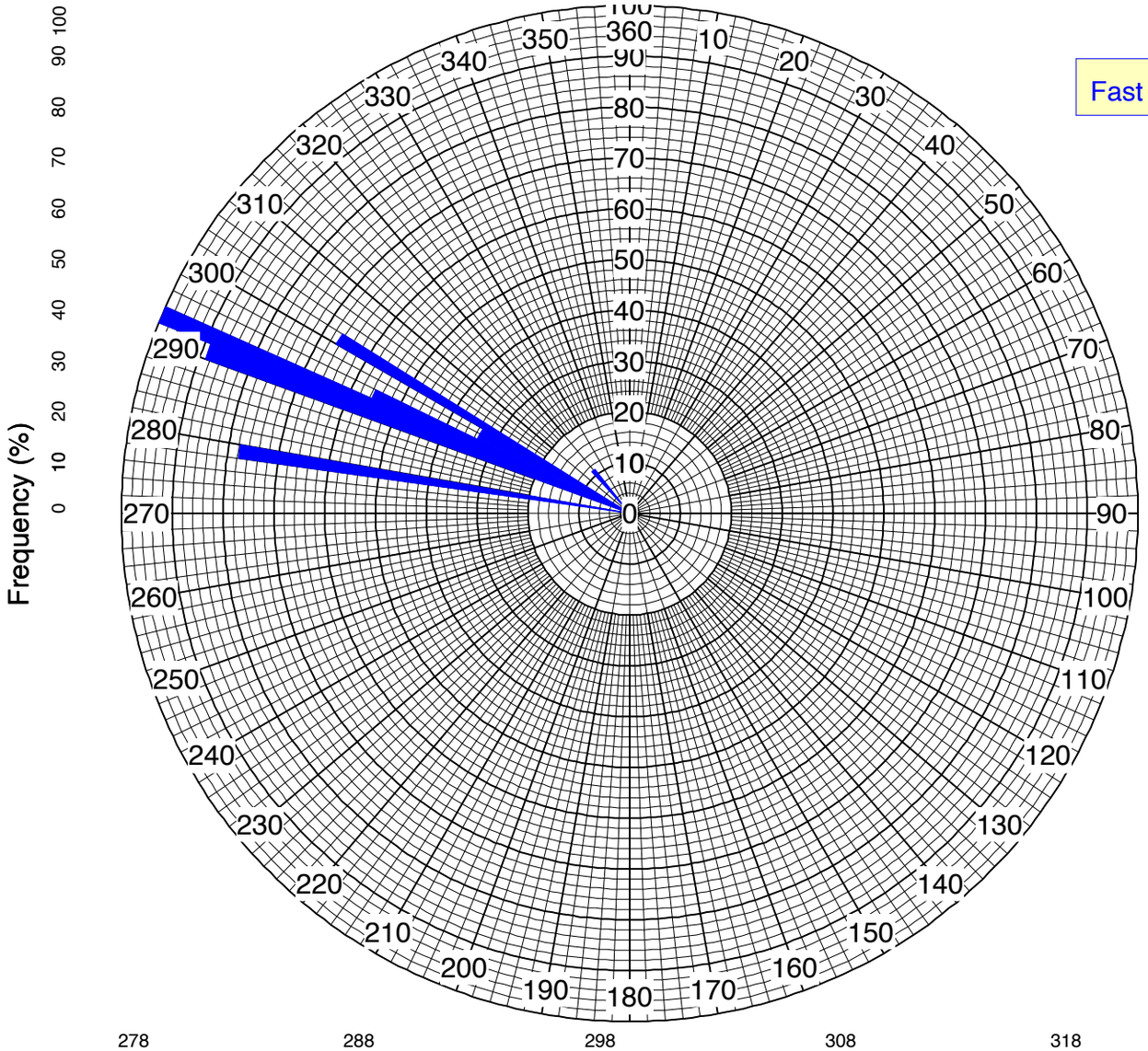
haracterize the different
l source of Anisotropy)

Fast Shear Azimuth for time–based and slowness–based anisotropy > 2 %



?IM_OVERALL.ROSESLO2TIM2 FSH_AZIM_OVERALL@UNKNOWN;7 .ROSESLO2TIM2 [A9297

		# Points Total:	5905
Start Depth:	4062 ft	**# Points Plotted:**	1280
Stop Depth:	1110 ft	**# Points Absent:**	0
Sampling Rate:	0.5 ft	**# Points Cut:**	4625
X Max Value:	359.972 deg	**# > X Scale Max:**	0
X Min Value:	0.0620155 deg	**# < X Scale Min:**	0



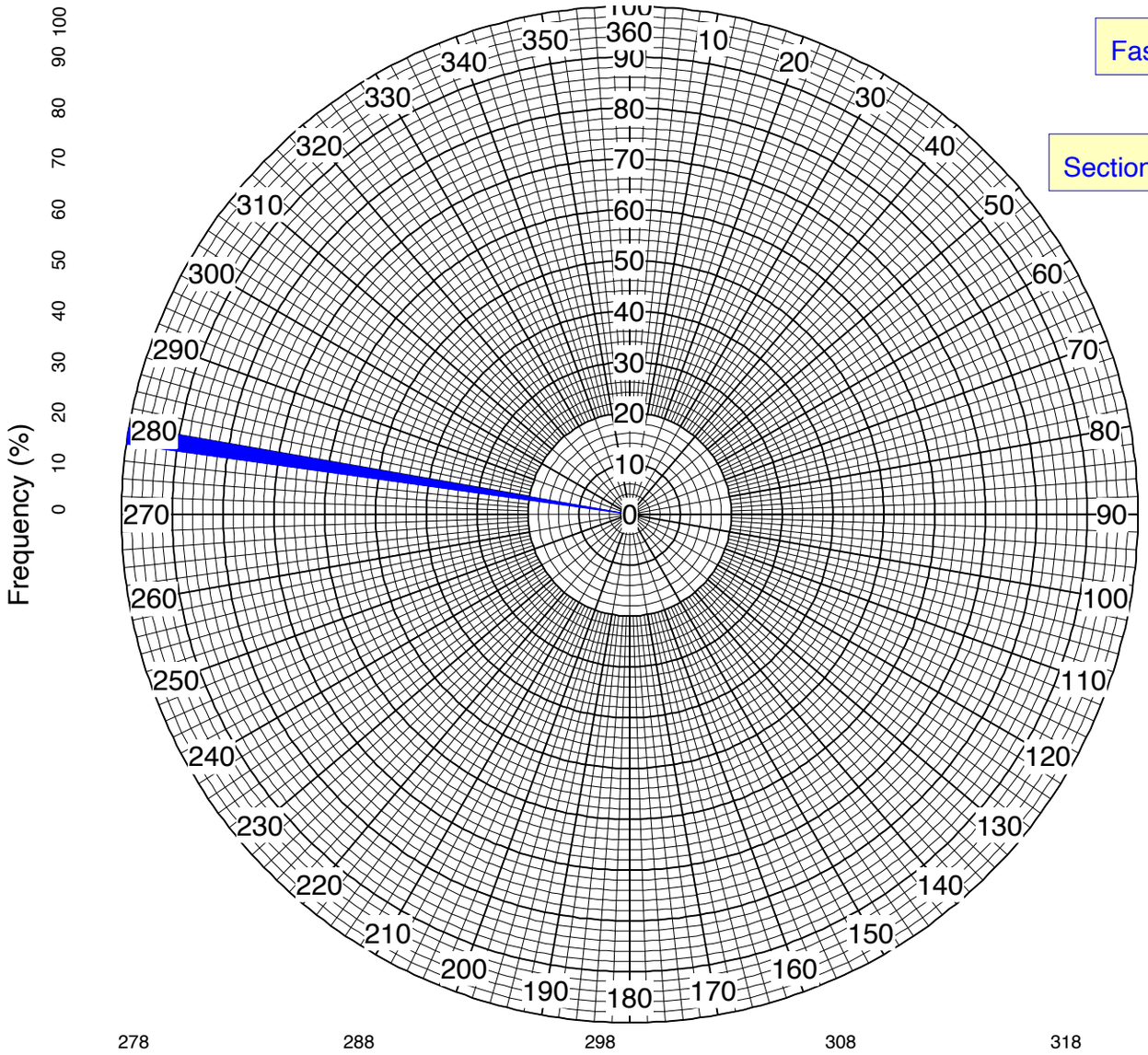
Fast Shear Azimuth for time–based and slowness–based anisotropy > 2 %

Sections that contain Fractures as interpreted in FMI. Full section

/ERALL.ROSESLO2TIM2FRAC FSH_AZIM_OVERALL@UNKNOWN;10 .ROSESLO2TIM2FRAC [

		# Points Total:	3920
Start Depth:	4062 ft	**# Points Plotted:**	43
Stop Depth:	1110 ft	**# Points Absent:**	0
Sampling Rate:	0.5 ft	**# Points Cut:**	3877

X Max Value:	320.325 deg	**# > X Scale Max:**	0
X Min Value:	278.131 deg	**# < X Scale Min:**	0

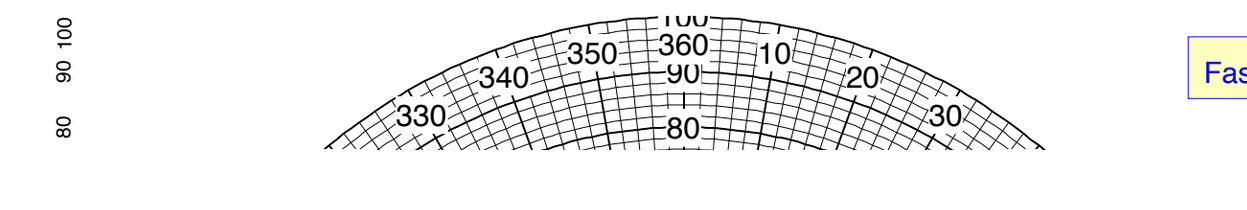


Fast Shear Azimuth for time–based and slowness–based anisotropy > 2 %

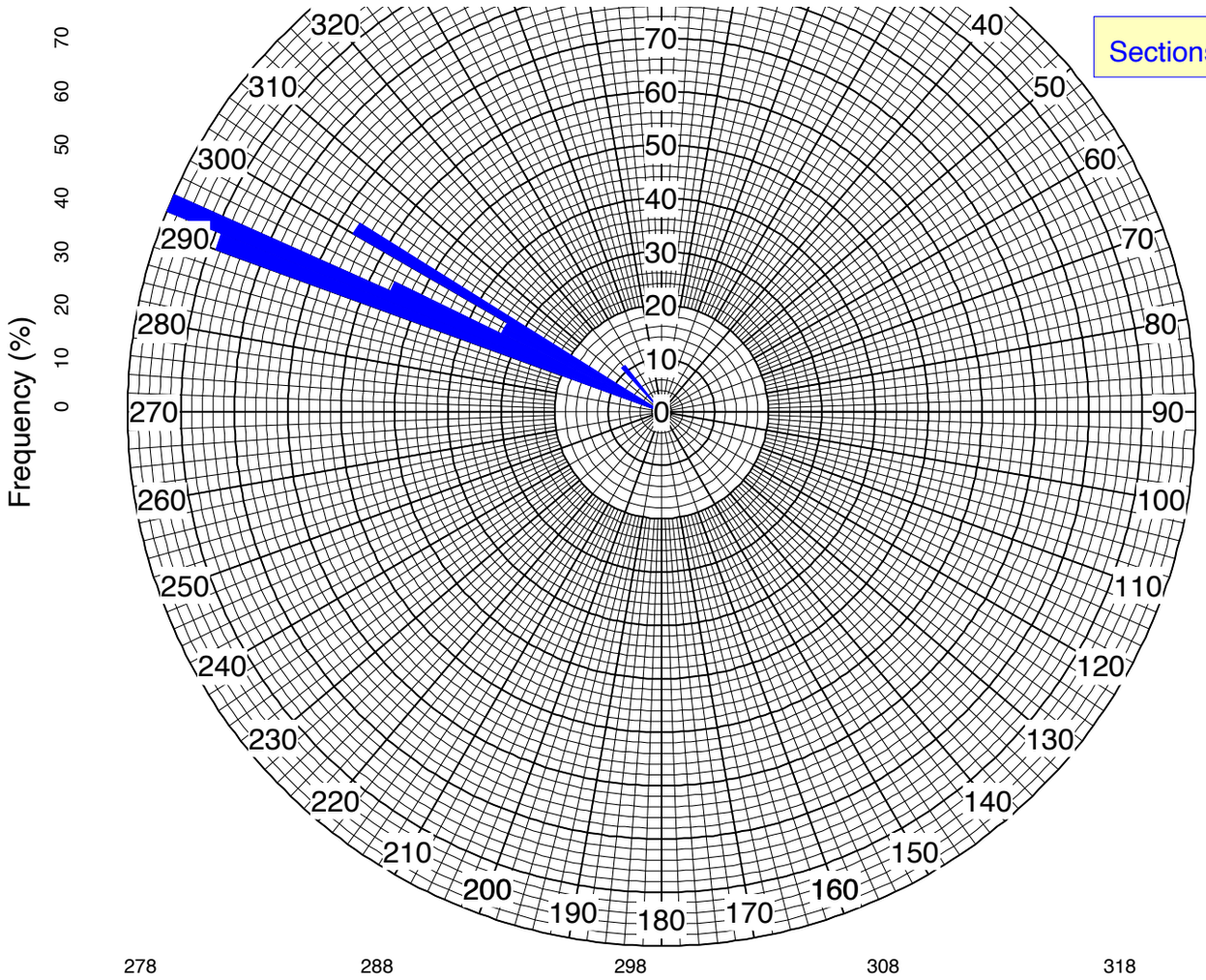
Sections that contain Fractures as interpreted in FMI. Top section above 3150 ft

/ERALL.ROSESLO2TIM2FRAC FSH_AZIM_OVERALL@UNKNOWN;10 .ROSESLO2TIM2FRAC [

		# Points Total:	2101
Start Depth:	3150 ft	**# Points Plotted:**	7
Stop Depth:	1110 ft	**# Points Absent:**	0
Sampling Rate:	0.5 ft	**# Points Cut:**	2094
X Max Value:	278.42 deg	**# > X Scale Max:**	0
X Min Value:	278.131 deg	**# < X Scale Min:**	0



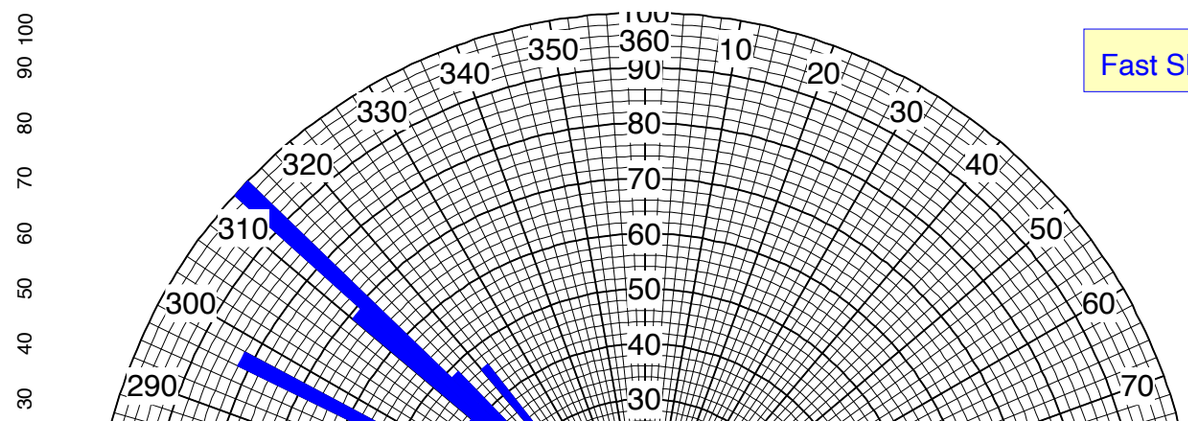
Fast Shear Azimuth for time–based and slowness–based anisotropy > 2 %



Sections that contain Fractures as interpreted in FMI. Bottom section up to 3150 ft

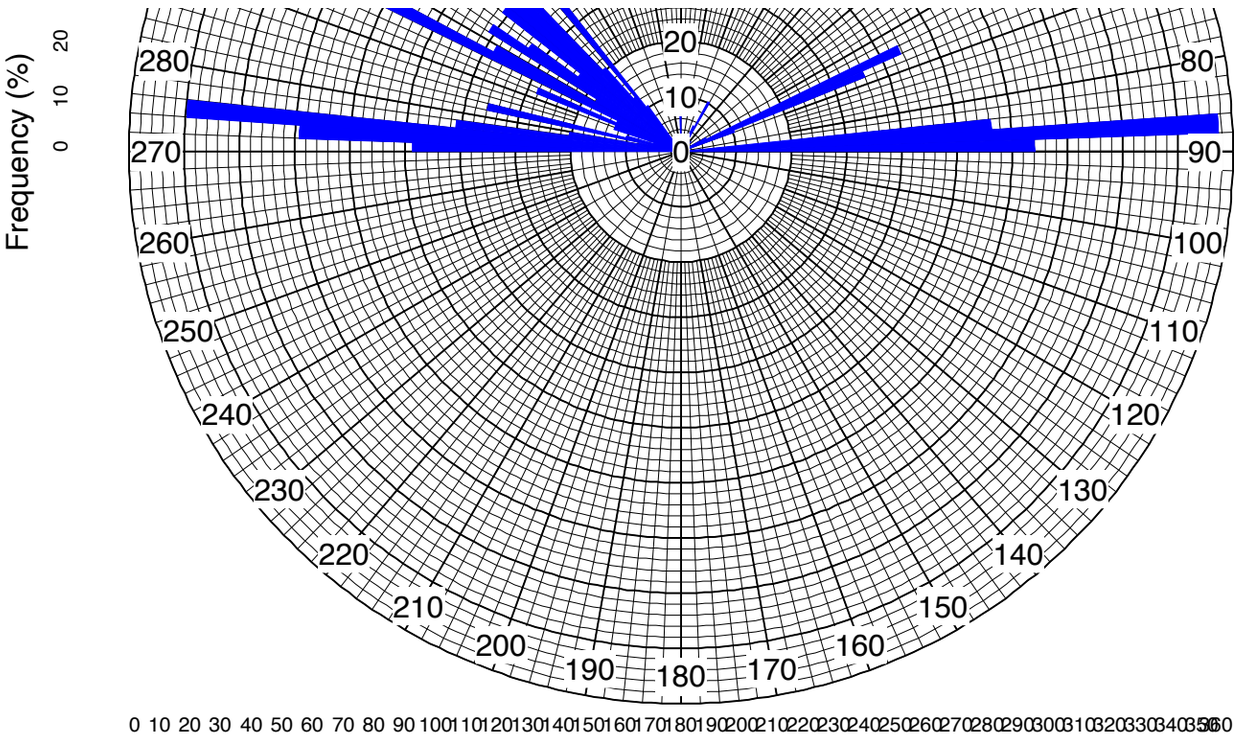
/ERALL.ROSESLO2TIM2FRAC FSH_AZIM_OVERALL@UNKNOWN;10 .ROSESLO2TIM2FRAC [

		# Points Total:	1820
Start Depth:	4104 ft	**# Points Plotted:**	36
Stop Depth:	3150 ft	**# Points Absent:**	0
Sampling Rate:	0.5 ft	**# Points Cut:**	1784
X Max Value:	320.325 deg	**# > X Scale Max:**	0
X Min Value:	290.751 deg	**# < X Scale Min:**	0



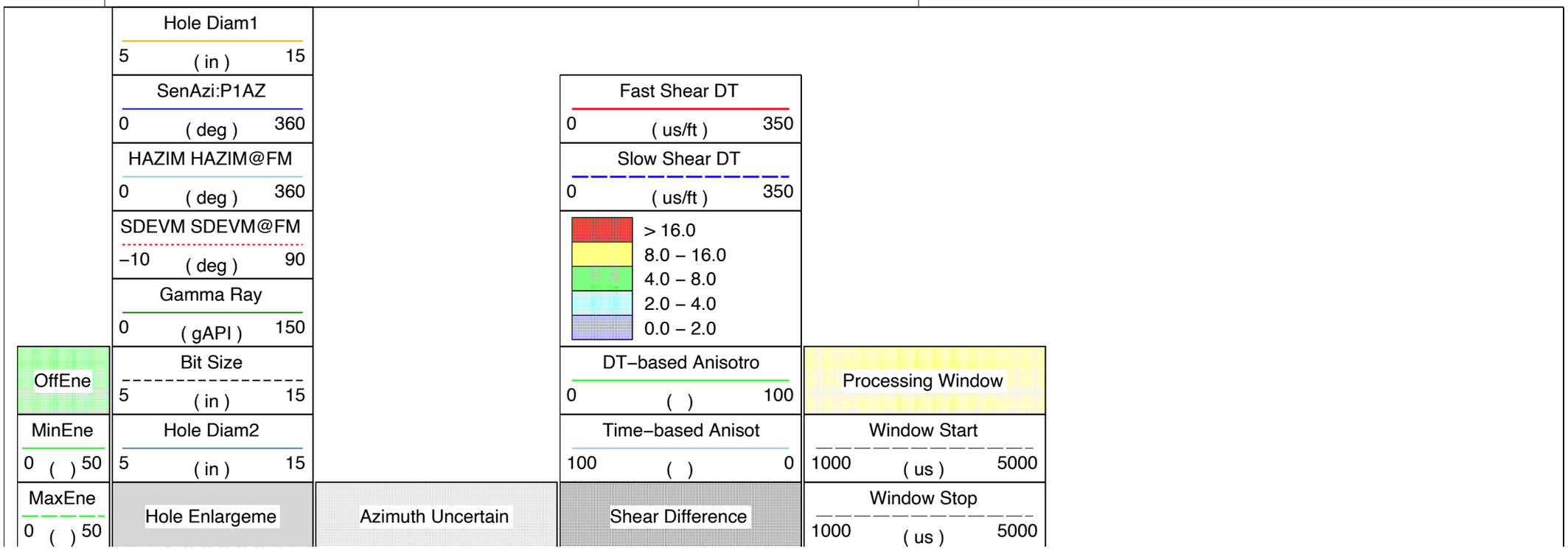
Fast Shear Azimuth for time–based and slowness–based anisotropy > 2 %

Sections that contain Segments as interpreted in FMI



OVERALL.ROSESLO2TIM2SEG FSH_AZIM_OVERALL@UNKNOWN;9 .ROSESLO2TIM2SEG [A

		# Points Total:	3921
Start Depth:	4062 ft	**# Points Plotted:**	520
Stop Depth:	1110 ft	**# Points Absent:**	0
Sampling Rate:	0.5 ft	**# Points Cut:**	3401
X Max Value:	359.972 deg	**# > X Scale Max:**	0
X Min Value:	0.0620155 deg	**# < X Scale Min:**	0



MD
1 : 240
ft

TENS
2000 (lbf) 3000

Ovalization

Formation Tops

Fast Shear Azimut
−90 (deg) 90

Anisotropic FSA
−90 (deg) 90

Compressional DT
0 (us/ft) 350

Stoneley DT
0 (us/ft) 350

Level11 : SLOW_IN
1000 (us) 5000

Level11 : FAST_IN
1000 (us) 5000

SFAEXR (Fast)
60 (us/ft) 360

Fast DT
60 (us/ft) 360

SFAEXR (Slow)
60 (us/ft) 360

Slow DT
60 (us/ft) 360

1100

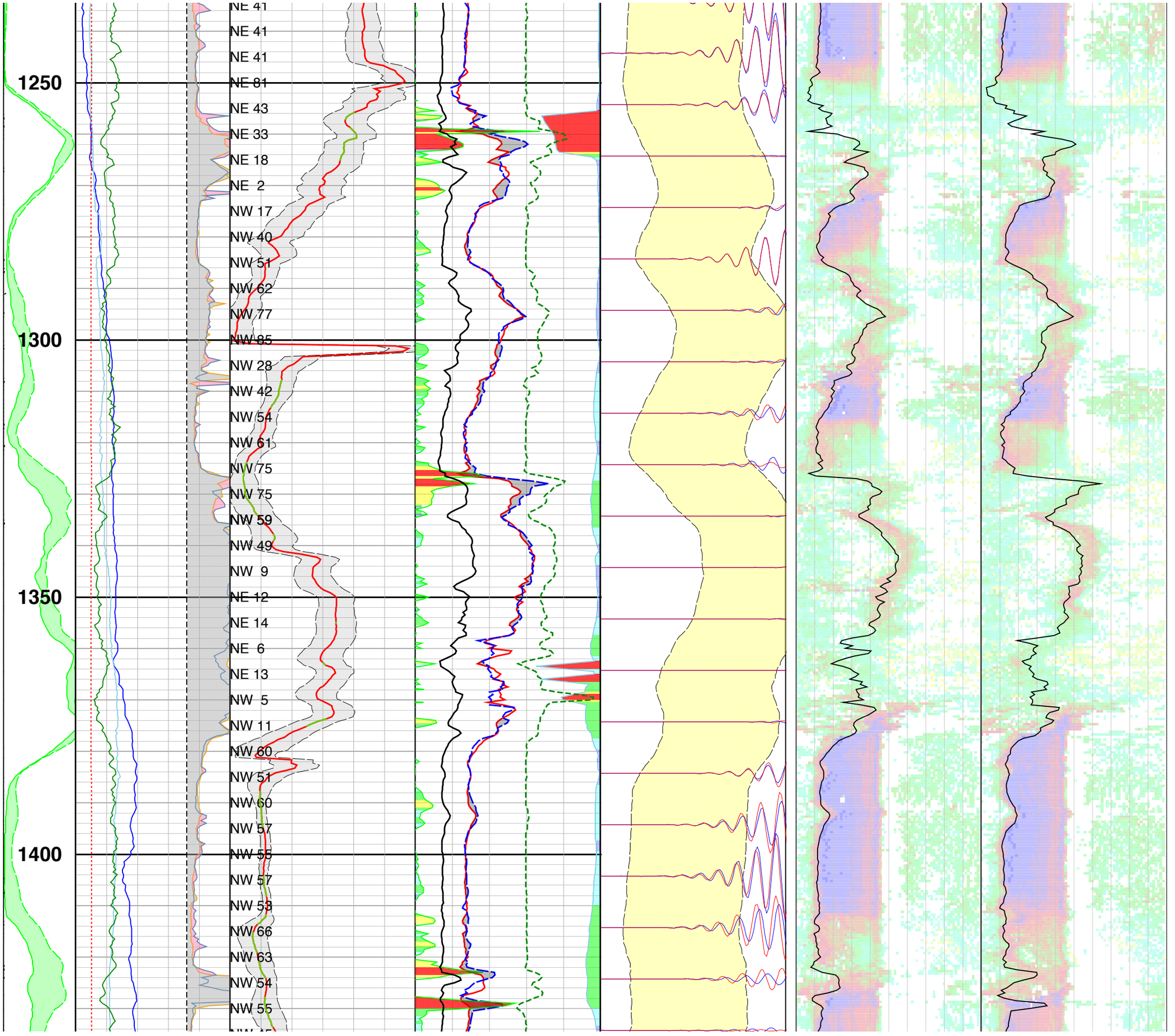
NE 3
NW 30
NW 43
NW 27
NW 41
NW 44
NW 40
NW 45
NW 26
NW 16
NW 18
NW 30
NW 39
NW 39
NW 40
NW 38
NW 32
NW 25

1150

NW 25
NW 34
NW 42
NW 39
NW 38
NW 39
NW 42
NW 43
NW 45
NW 48

1200

NW 49
NE 42
NE 38
NE 36
NE 35
NE 42
NE 42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1300
1350
1400
NE 41
NE 41
NE 41
NE 81
NE 43
NE 33
NE 18
NE 2
NW 17
NW 40
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NW 77
NW 85
NW 28
NW 42
NW 54
NW 61
NW 75
NW 75
NW 59
NW 49
NW 9
NE 12
NE 14
NE 6
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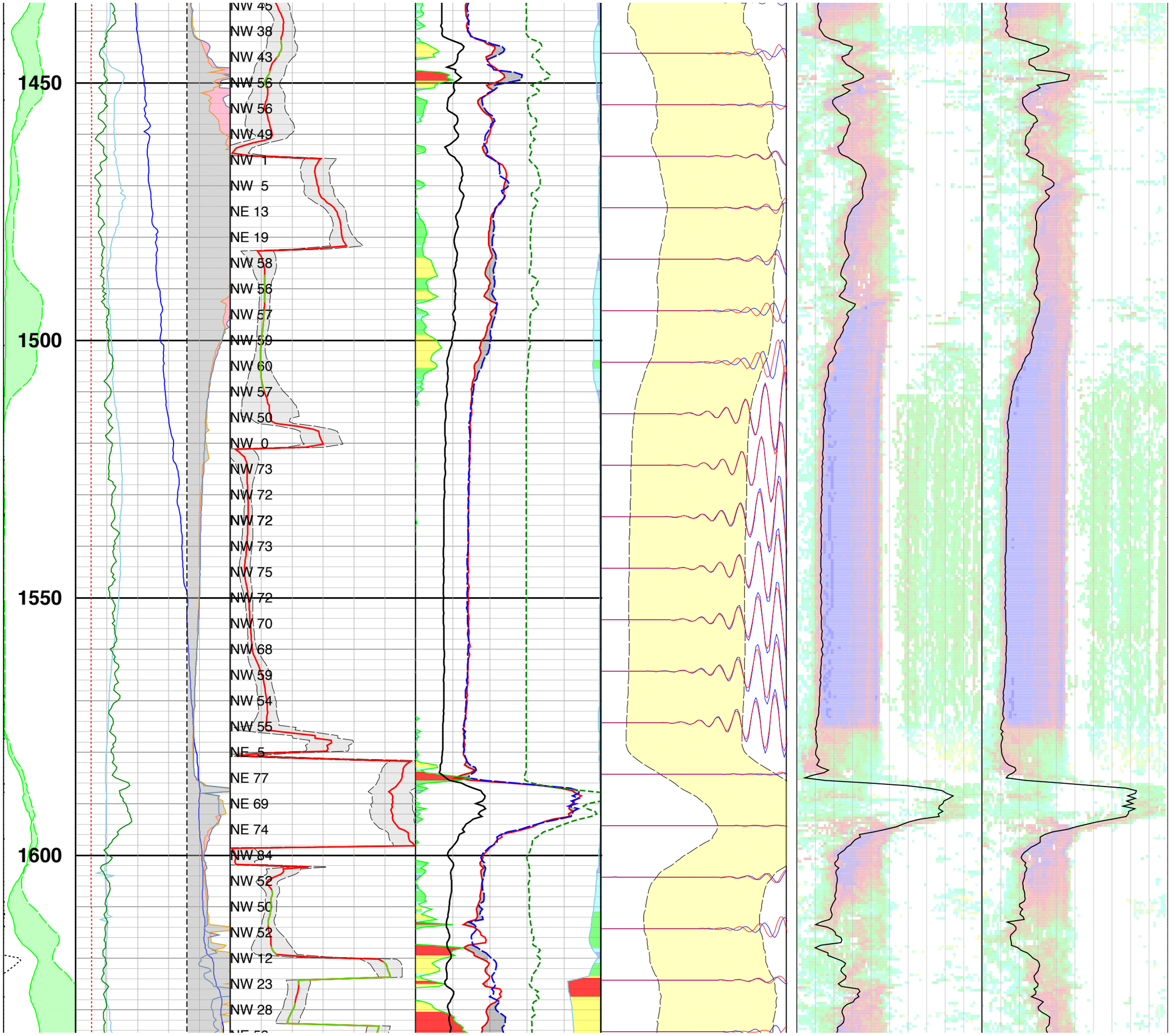
NW 54
NW 55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1500
1550
1600
NW 45
NW 38
NW 43
NW 56
NW 56
NW 49
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NW 5
NE 13
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NW 58
NW 56
NW 57
NW 59
NW 60
NW 57
NW 50
NW 0
NW 73
NW 72
NW 72
NW 73
NW 75
NW 72
NW 70
NW 68
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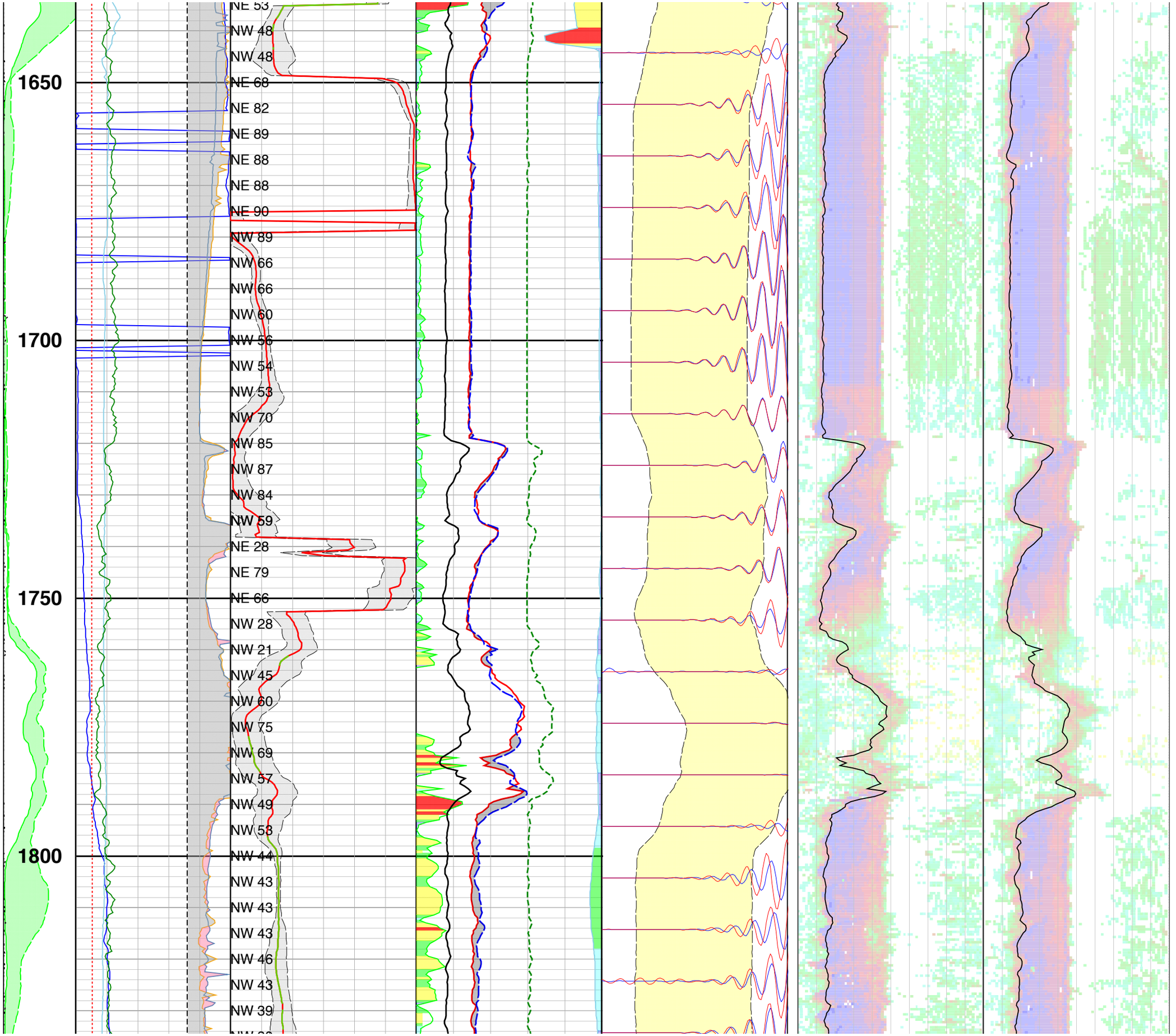
NW 55
NE 5
NE 77
NE 69
NE 74
NW 84
NW 52
NW 50
NW 52
NW 12
NW 23
NW 28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1700
1750
1800
NE 53
NW 48
NW 48
NE 68
NE 82
NE 89
NE 88
NE 88
NE 90
NW 89
NW 66
NW 66
NW 60
NW 56
NW 54
NW 53
NW 70
NW 85
NW 87
NW 84
NW 59
NE 28
NE 79
NE 66
NW 28
NW 21
NW 45
NW 60
NW 75
NW 69
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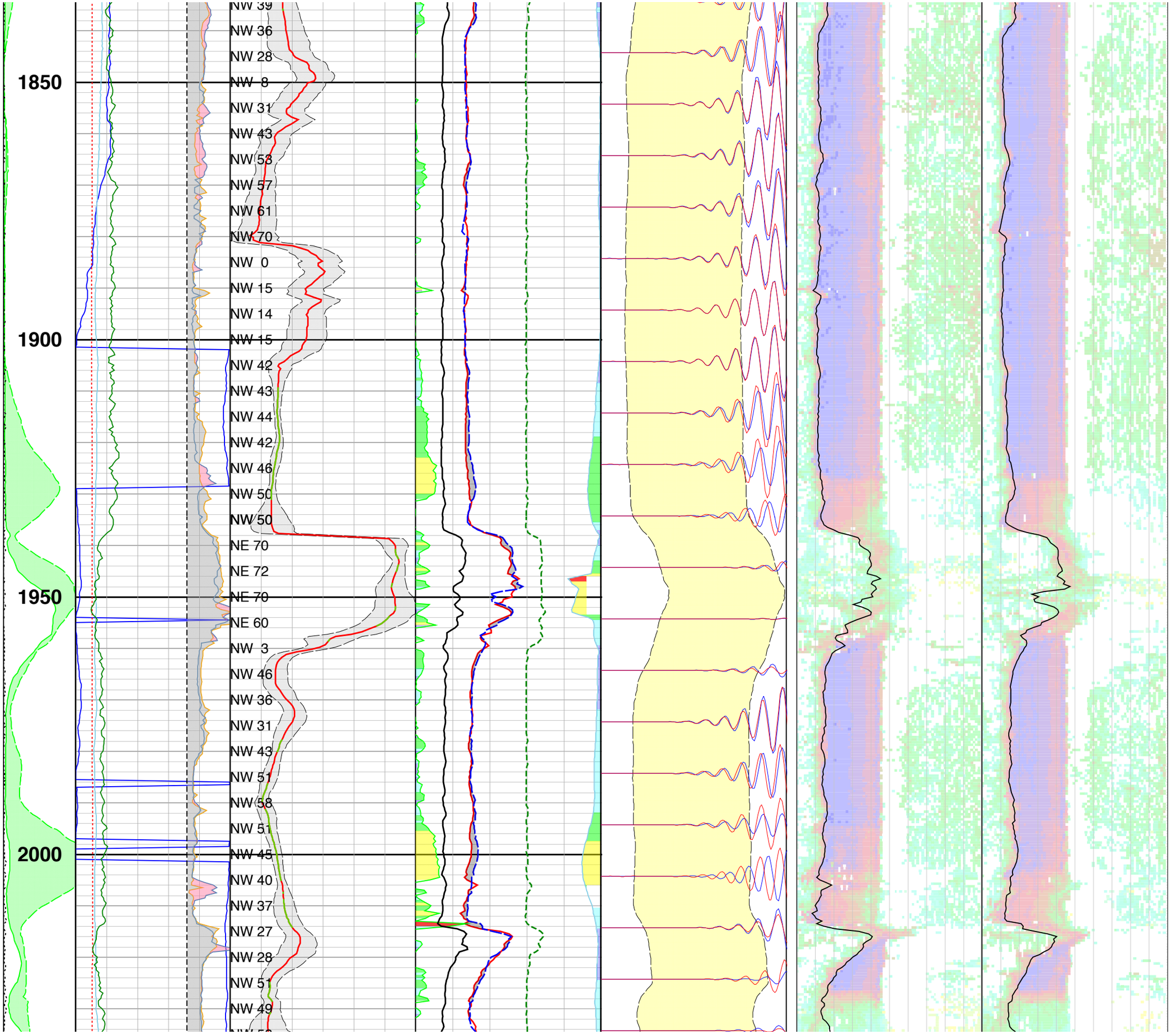
NW 44
NW 43
NW 43
NW 43
NW 46
NW 43
NW 39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1900
1950
2000
NW 39
NW 36
NW 28
NW 8
NW 31
NW 43
NW 53
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NW 61
NW 70
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NW 14
NW 15
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NW 43
NW 44
NW 42
NW 46
NW 50
NW 50
NE 70
NE 72
NE 70
NE 60
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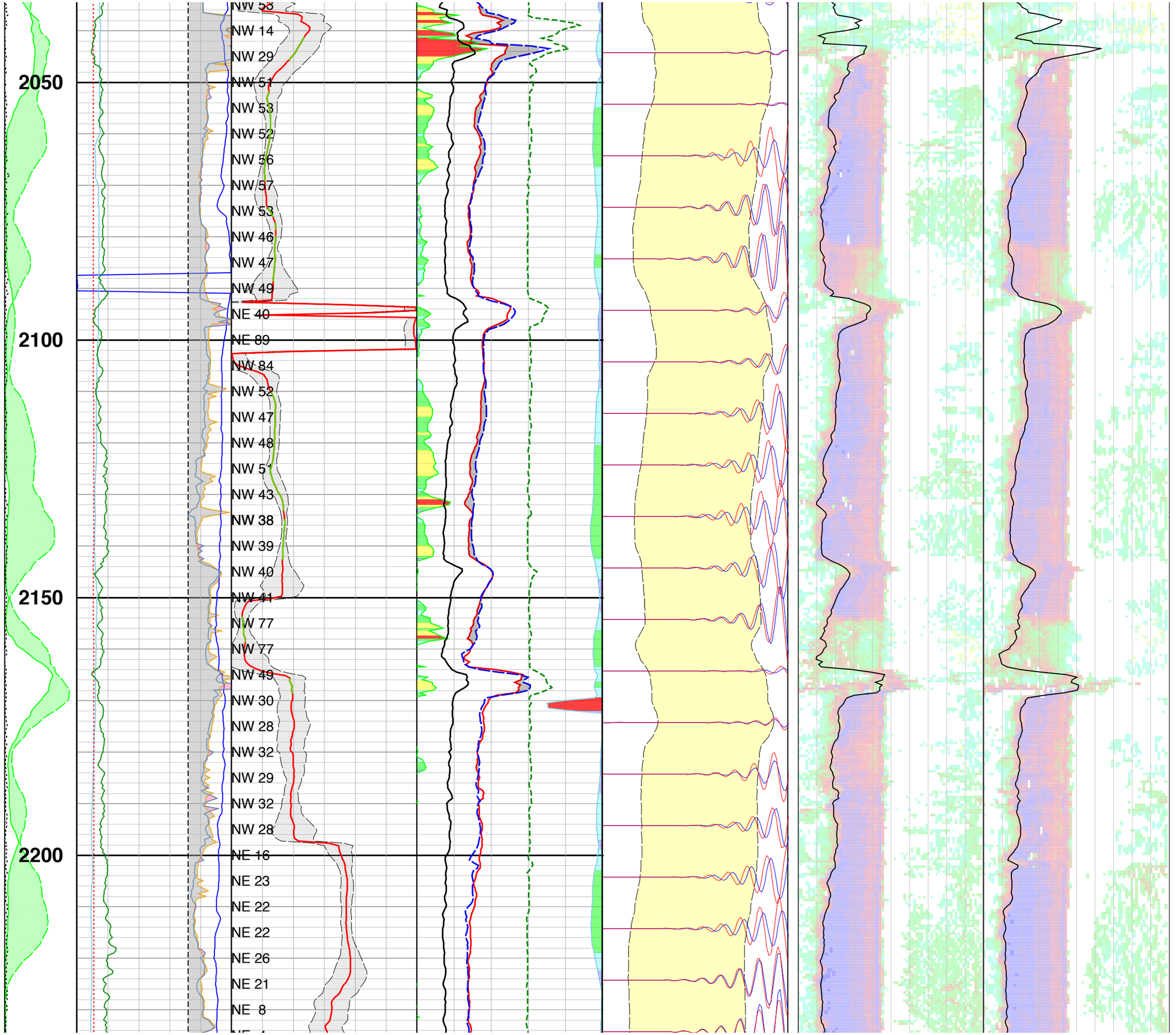
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2100
2150
2200
NW 53
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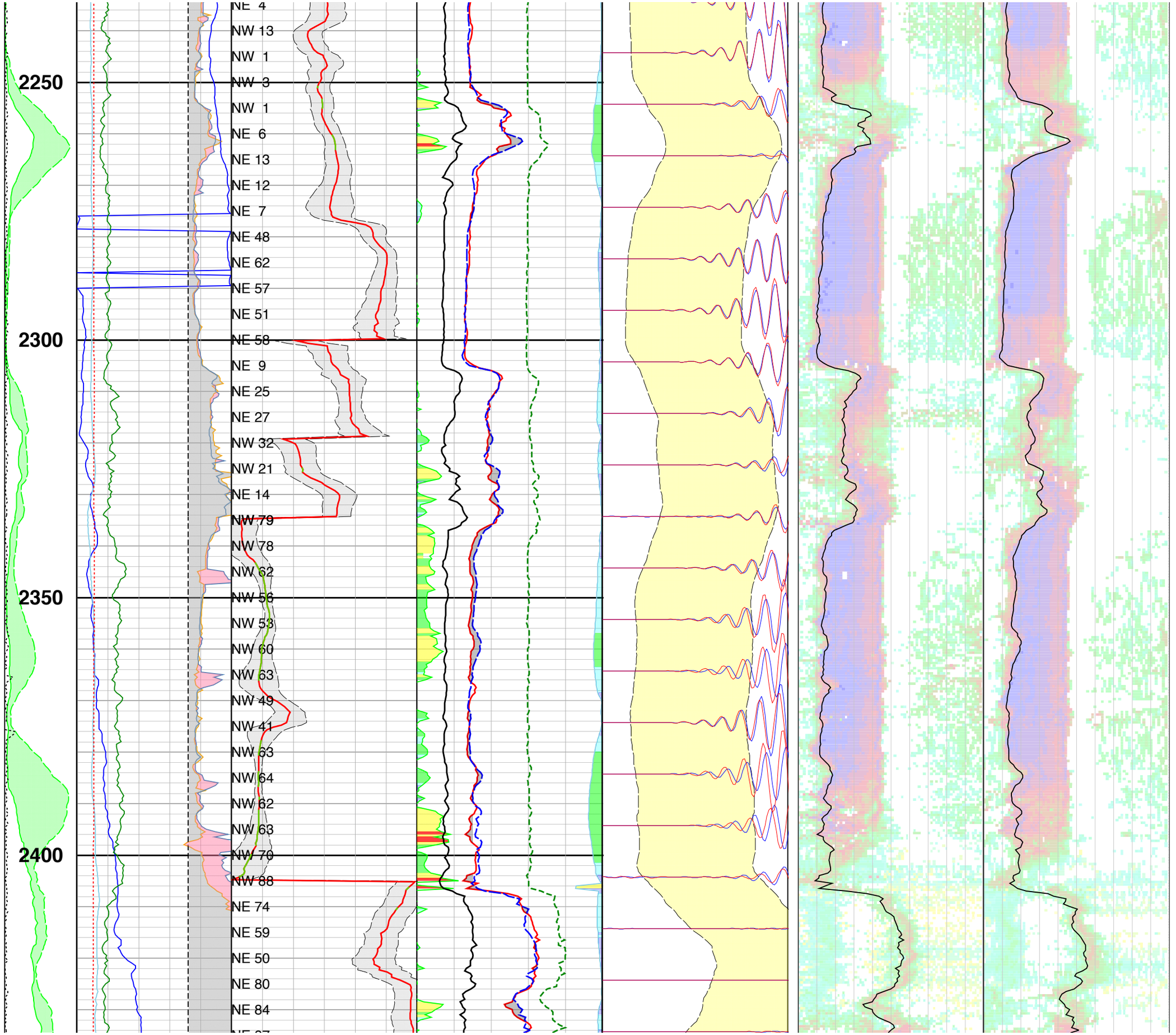
NE 26
NE 21
NE 8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NW 13
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NW 3
NW 1
NE 6
NE 13
NE 12
NE 7
NE 48
NE 62
NE 57
NE 51
NE 58
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NE 25
NE 27
NW 32
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NE 14
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NW 78
NW 62
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NW 53
NW 60
NW 63
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NW 41
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NE 80
NE 84
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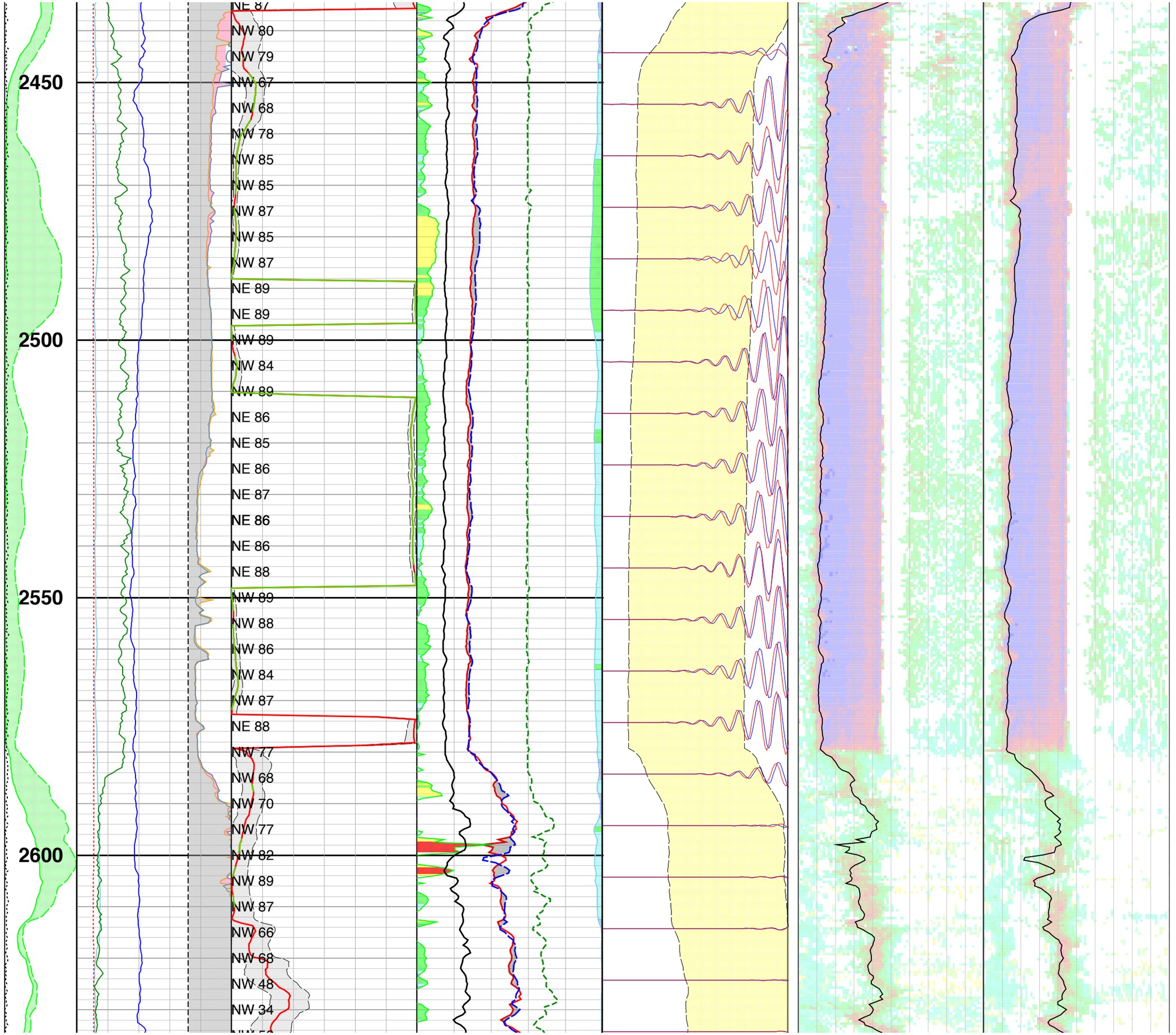
2300
2350
2400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2500
2550
2600
NE 87
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NW 79
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NW 68
NW 78
NW 85
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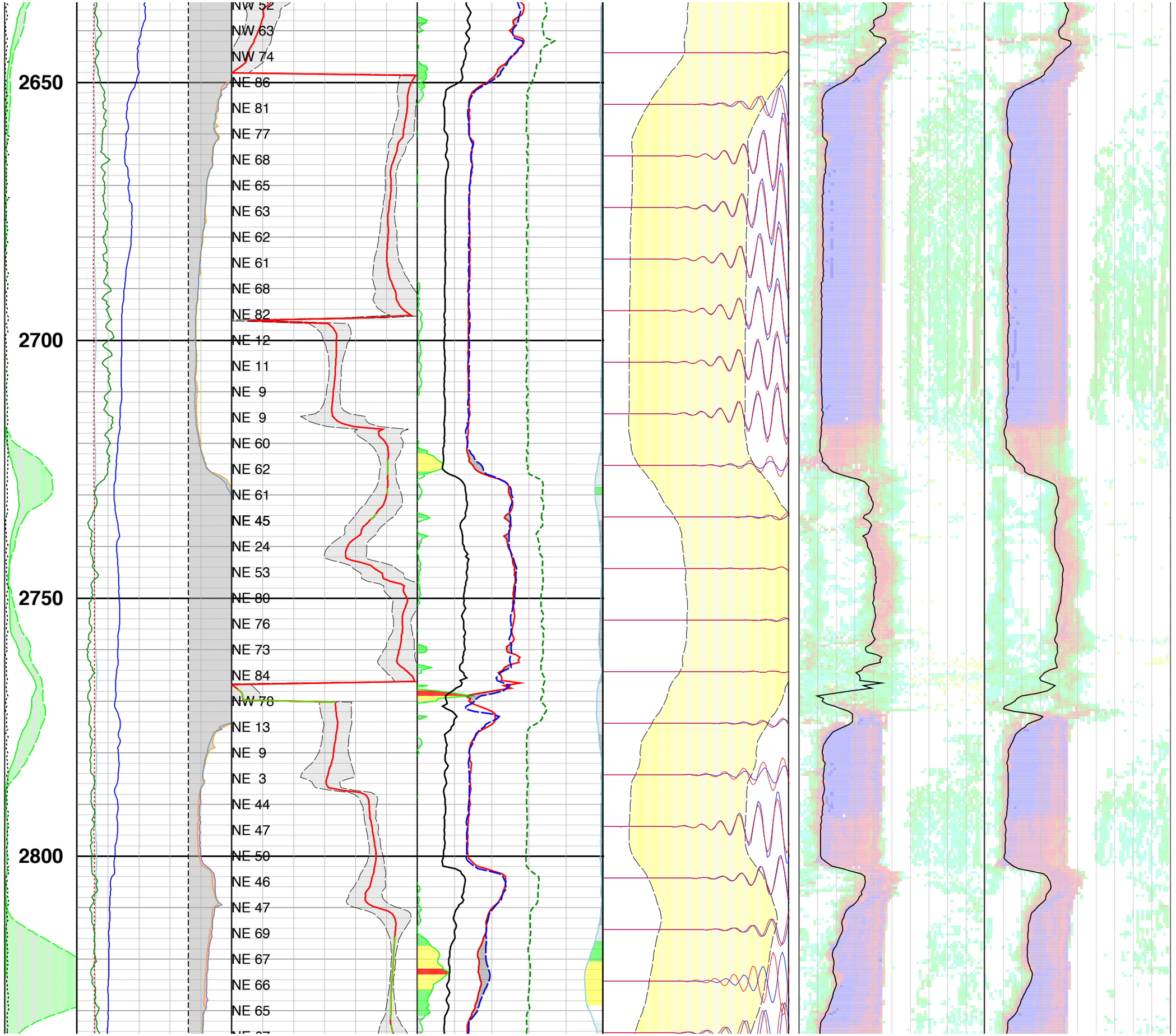
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NE 61
NE 45
NE 24
NE 53
NE 80
NE 76
NE 73
NE 84
NW 78
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NE 69
NE 67
NE 66
NE 65
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2700
2750
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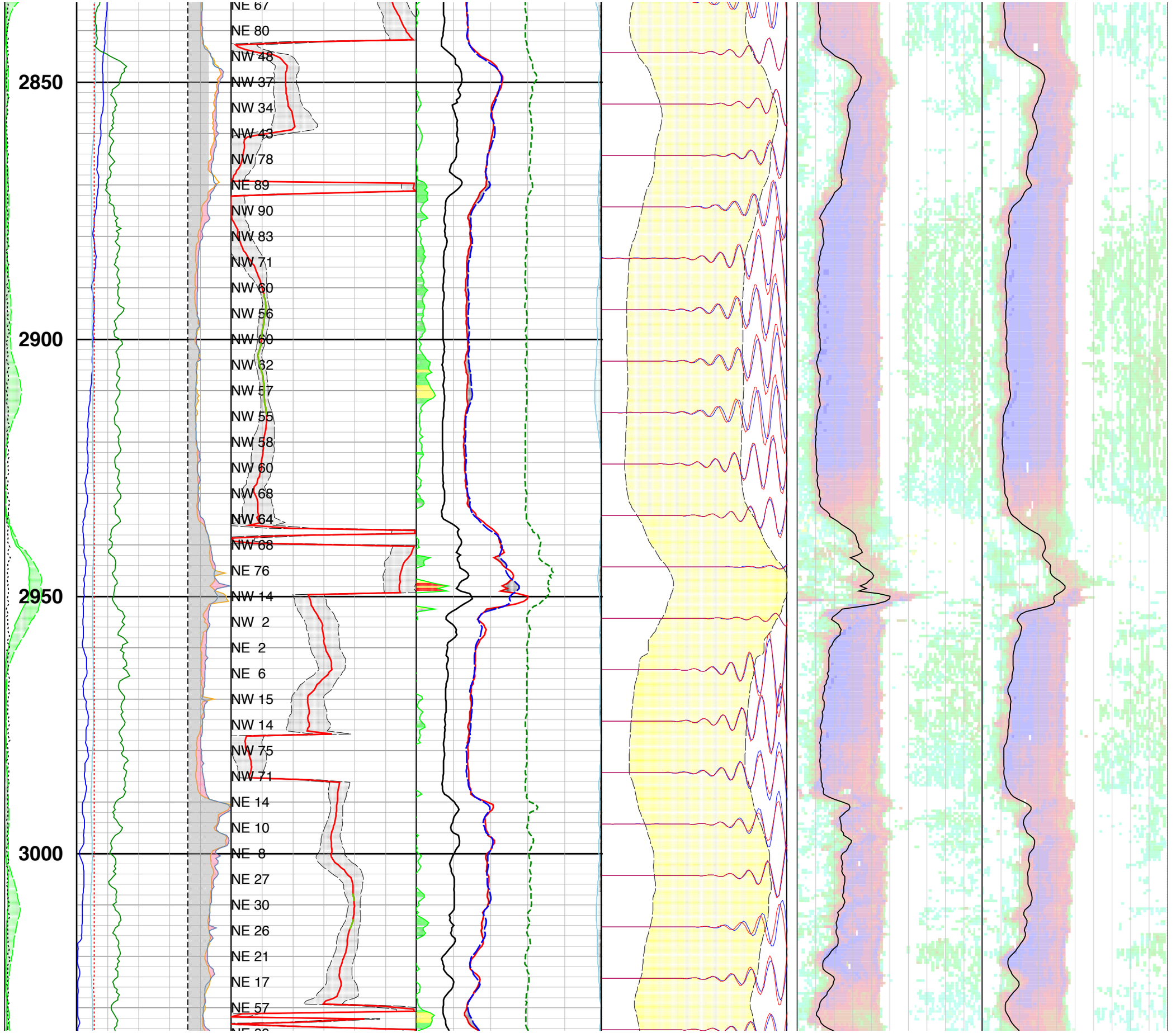
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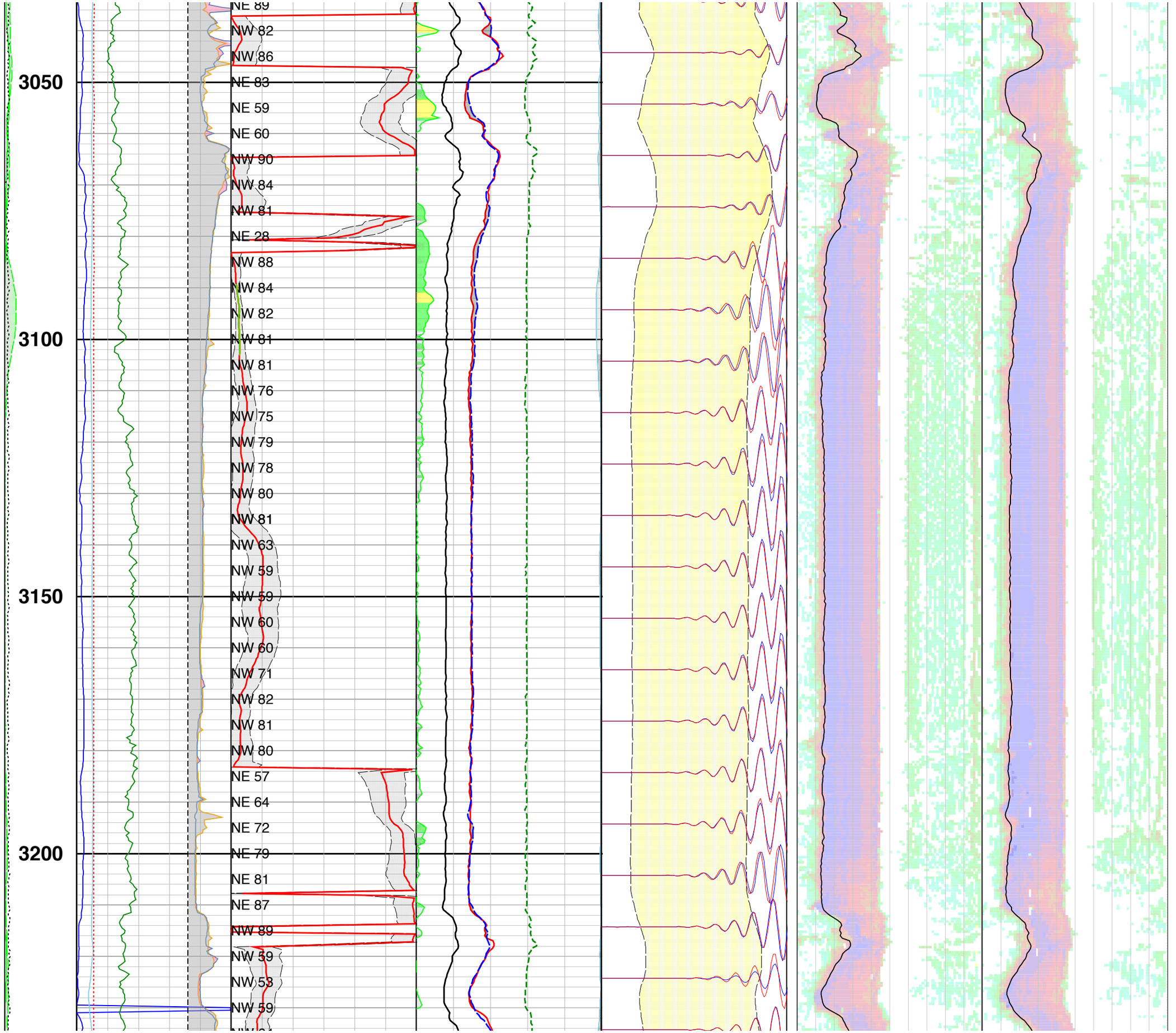
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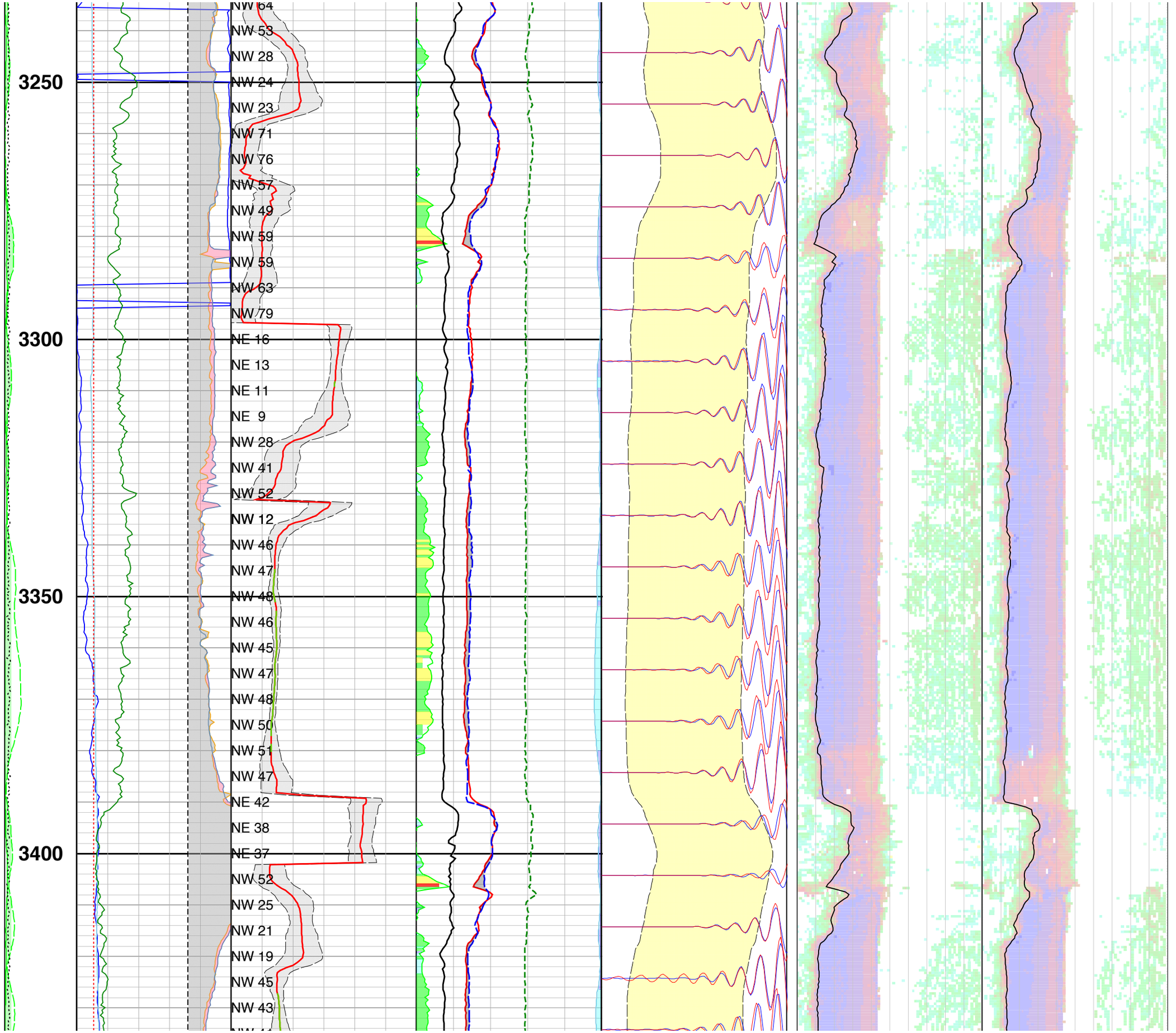
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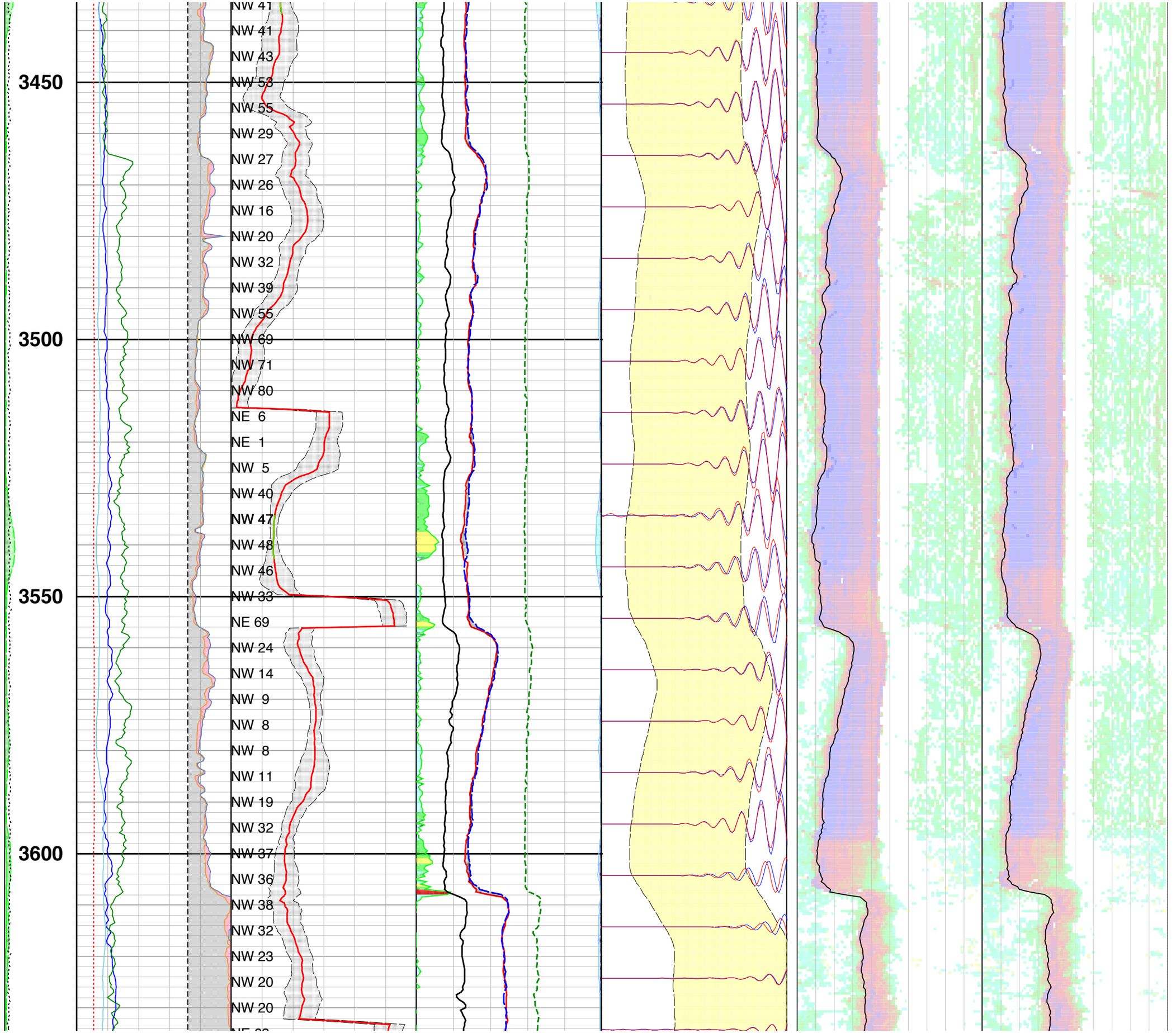
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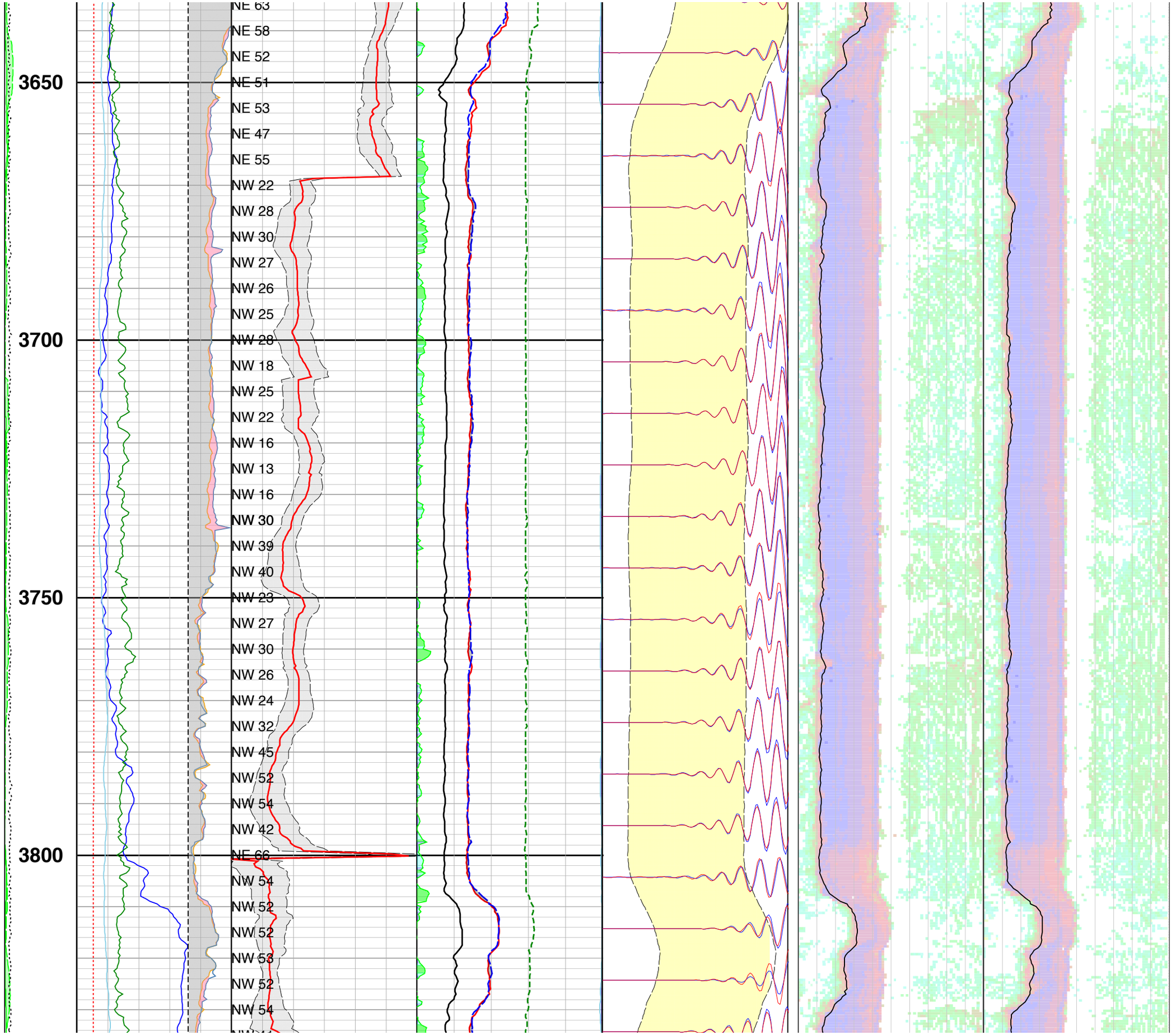
NW 20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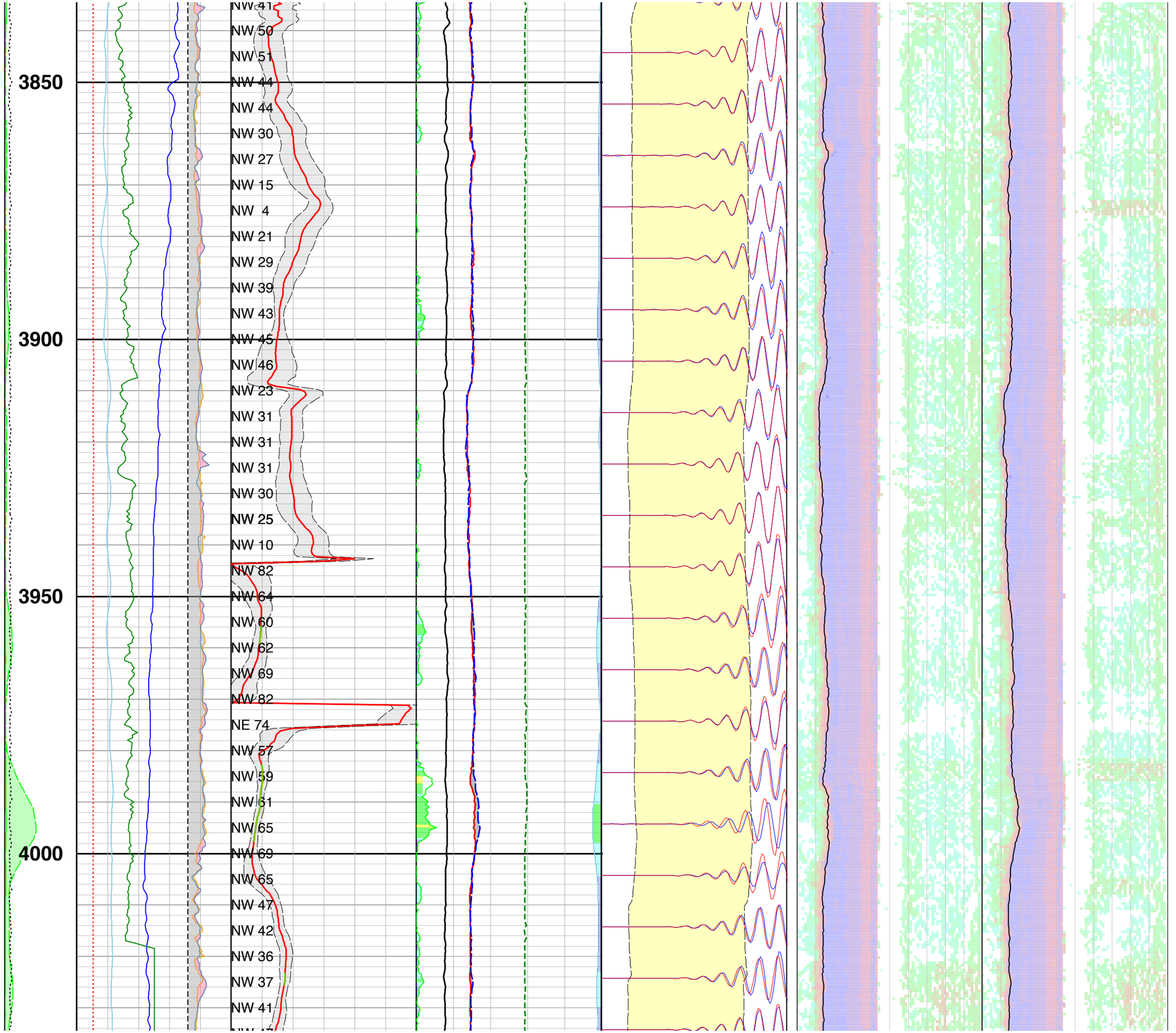
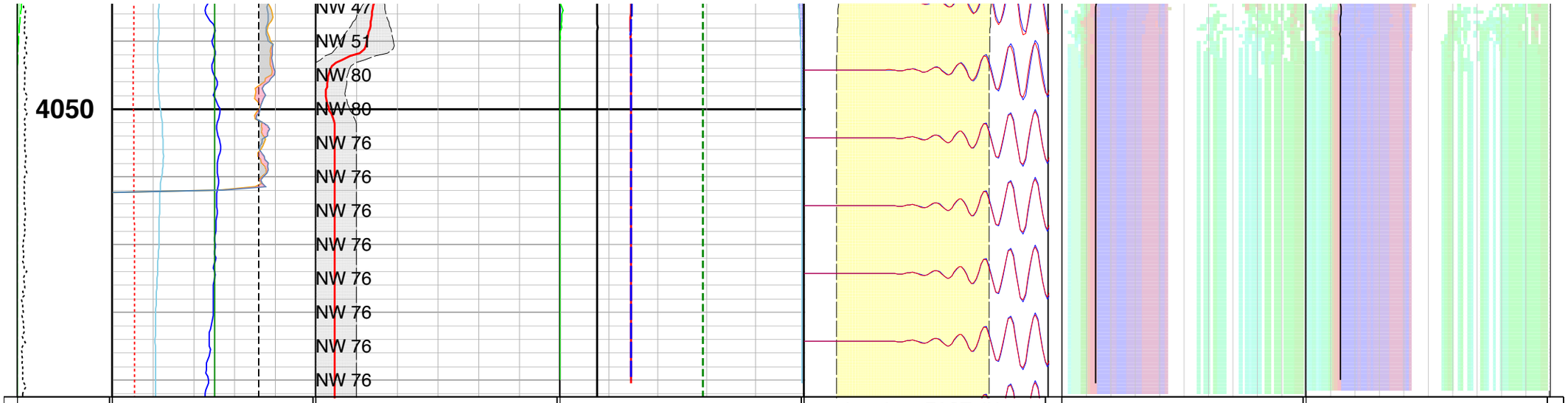
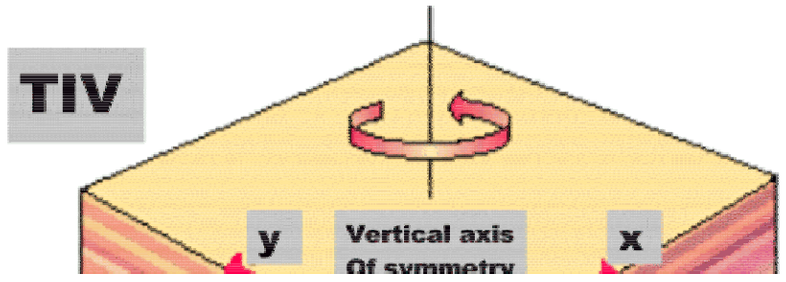
NW 39
NW 40
NW 23
NW 27
NW 30
NW 26
NW 24
NW 32
NW 45
NW 52
NW 54
NW 42
NE 66
NW 54
NW 52
NW 52
NW 53
NW 52
NW 54


3850
3900
3950
4000
NW 41
NW 50
NW 51
NW 44
NW 44
NW 30
NW 27
NW 15
NW 4
NW 21
NW 29
NW 39
NW 43
NW 45
NW 46
NW 23
NW 31
NW 31
NW 31
NW 30
NW 25
NW 10
NW 82
NW 64
NW 60
NW 62
NW 69
NW 82
NE 74
NW 57
NW 59
NW 61
NW 65
NW 69
NW 65
NW 47
NW 42
NW 36
NW 37
NW 41



TENS 2000 (lbf) 3000	Formation Tops	Anisotropic FSA –90 (deg) 90	Stoneley DT 0 (us/ft) 350	Level11 : FAST_IN 1000 (us) 5000	Fast DT 60 (us/ft) 360	Slow DT 60 (us/ft) 360
MD 1 : 240 ft	Ovalization	Fast Shear Azimut –90 (deg) 90	Compressional DT 0 (us/ft) 350	Level11 : SLOW_IN 1000 (us) 5000	SFAEXR (Fast) 60 (us/ft) 360	SFAEXR (Slow) 60 (us/ft) 360
MaxEne 0 ( ) 50	Hole Enlargeme	Azimuth Uncertain	Shear Difference	Window Stop 1000 (us) 5000		
MinEne 0 ( ) 50	Hole Diam2 5 (in) 15		Time–based Anisot 100 ( ) 0	Window Start 1000 (us) 5000		
OffEne	Bit Size 5 (in) 15		DT–based Anisotro 0 ( ) 100	Processing Window		
	Gamma Ray 0 (gAPI) 150		> 16.0 8.0 – 16.0 4.0 – 8.0 2.0 – 4.0 0.0 – 2.0			
	SDEVM SDEVM@FM –10 (deg) 90		Slow Shear DT 0 (us/ft) 350			
	HAZIM HAZIM@FM 0 (deg) 360		Fast Shear DT 0 (us/ft) 350			
	SenAzi:P1AZ 0 (deg) 360					
	Hole Diam1 5 (in) 15					

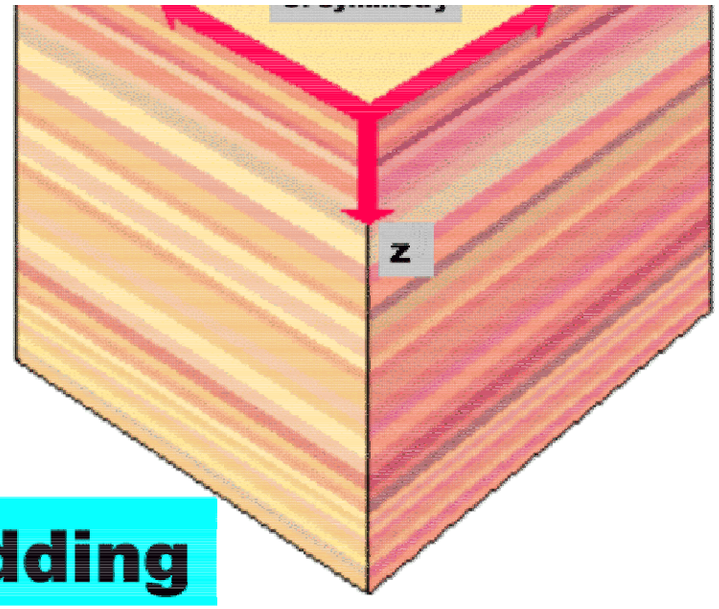
Shear Wave Anisotropy Mechanisms



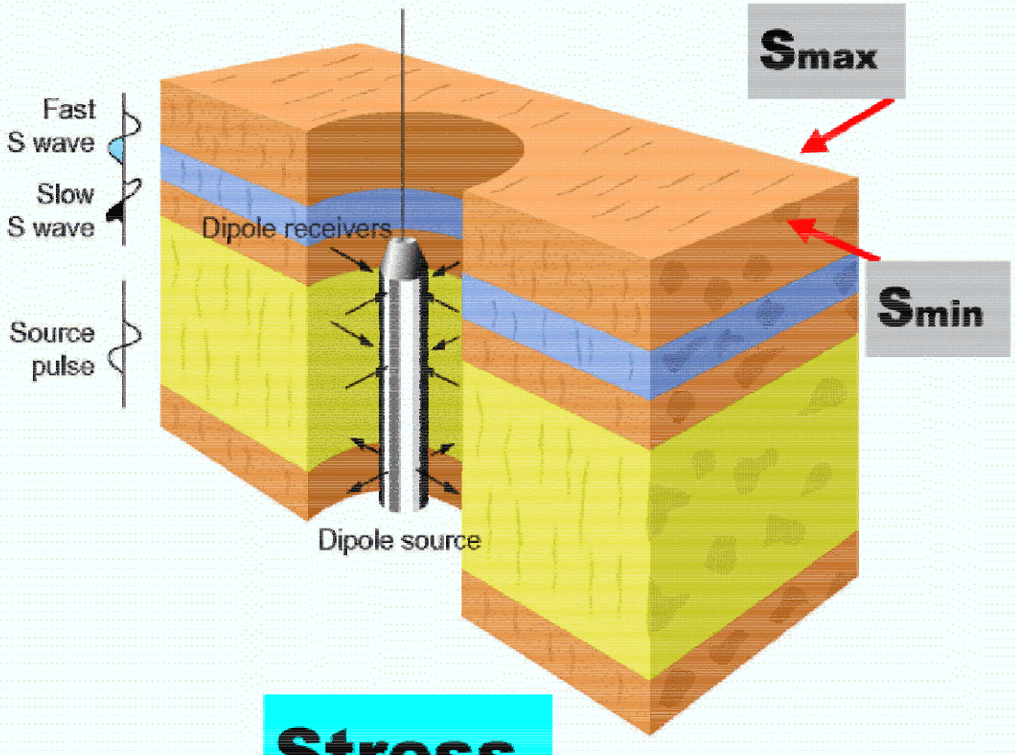
* Under some circumstances, the shear wave can split into two shear waves – "fast" and "slow".

* Cross Dipole log provides measurement of Fast and Slow Shear Velocities as well as the Fast Shear Azimuth

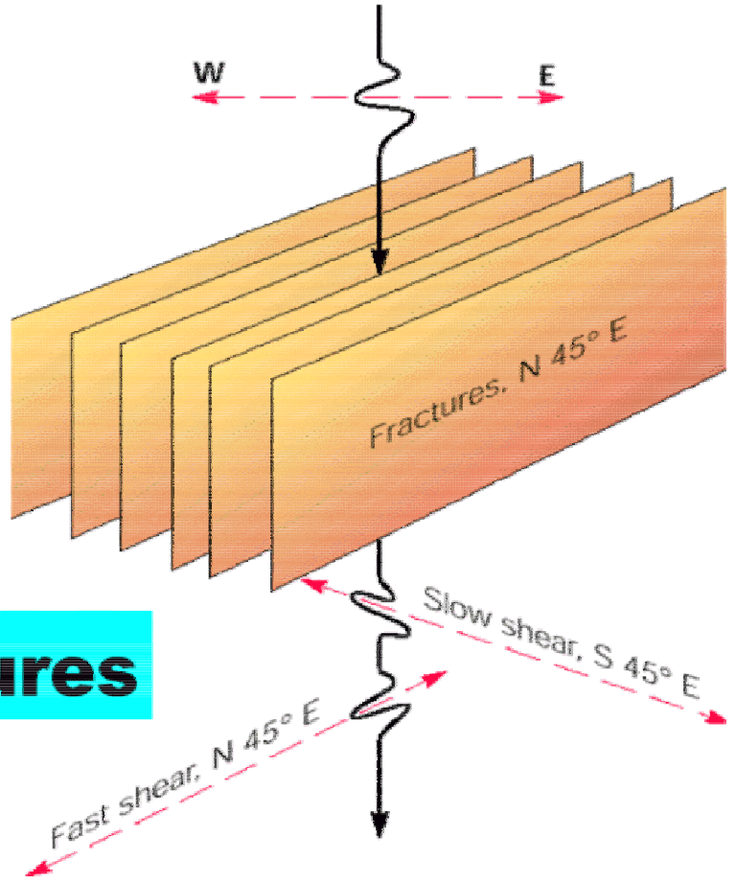
$$\text{* \% Anisotropy} = \frac{DTs(slow) - DTs(fast)}{[DTs(slow) + DTs(fast)]/2}$$



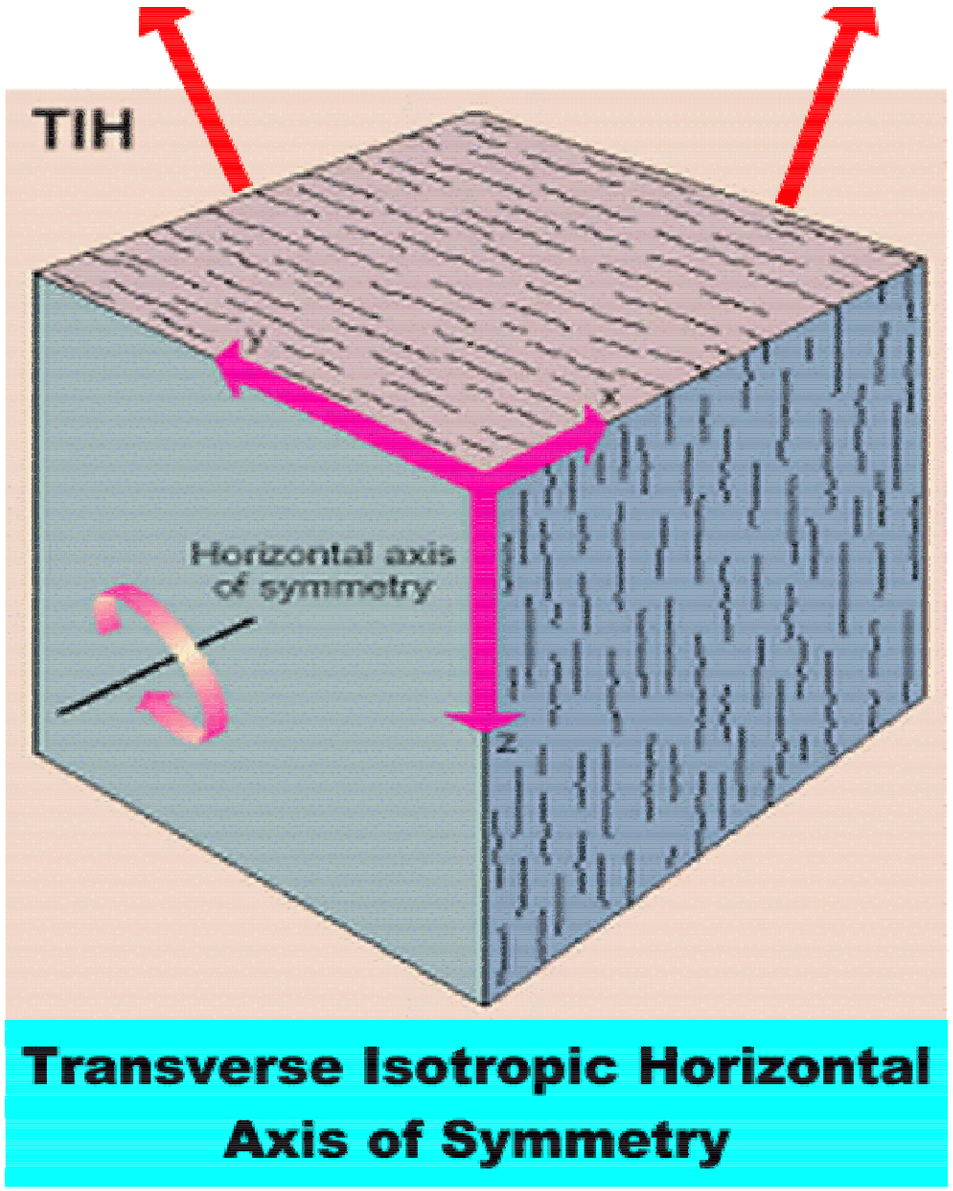
Inter-Bedding



Stress



Fractures



Technical Paper References:

SPWLA
"Stress–Induced Dipole Anisotropy: Theory, Experiment and Field Data"; T. Plona, B. Sinha, M. Kane, K. Winkler and B. Frignet;
Annual SPWLA Symposium held at Oslo, Norway, 1999

SPWLA
"Using Acoustic Anisotropy"; T. Plona, M. Kane, B. Sinha, J. Walsh, O. Viloria; presented at the 41st Annual SPWLA Symposium June 2000

Output Channels From This Processing:

ANISOTROPY CURVES DESCRIPTION:
––––––––––––––––––––

DTSM_FAST Fast Dt–Shear after 4–Component Rotation.

DTSM_SLOW Slow Dt–Shear after 4–Component Rotation.

SLOANI Slowness Anisotropy
{[DTSM_SLOW – DTSM_FAST]/[Average(DTSM_FAST + DTSM_SLOW)]}.

TIMANI Time Anisotropy (a simple conceptual explanation is: [Slow Average Transit Time – Fast Average Transit Time]/[Fast Average Transit Time]).

MINXENE_OVERALL Minimum Overall Cross Energy ([Minimum Overall Cross Energy in processing window] / [Sum of Energies of UDP_In Line, UDP_Cross, LDP_In Line and LDP_Cross) in processing window]).

MAXXENE_OVERALL Maximum Overall Cross Energy (Maximum Overall Cross Energy in processing window] / [Sum of Energies of UDP_In Line, UDP_Cross, LDP_In Line and LDP_Cross) in processing window]).

"OffEne" Area between MINXENE_OVERALL and MAXXENE_OVERALL.

FSH_AZIM_OVERALL Fast Shear Azimuth.

FSH_AZIM_ERR Fast Shear Azimuth Error (= Azimuth Uncertainty).

TWB.L7 Time Window Begin for receivers set #7 set.

TWE.L7 Time Window End for receivers set #7 set.

"Processing Window" Area between TWB and TWE curves.

Level 7: FAST_IN Sonic waveform of FAST Shear at receivers set #7.

Level 7: SLOW_IN Sonic waveform of SLOW Shear at receivers set #7.

SENSOR_AZIM_QCI Azimuth of X–Dipole Source (at Source depth).

HAZI Hole Azimuth.

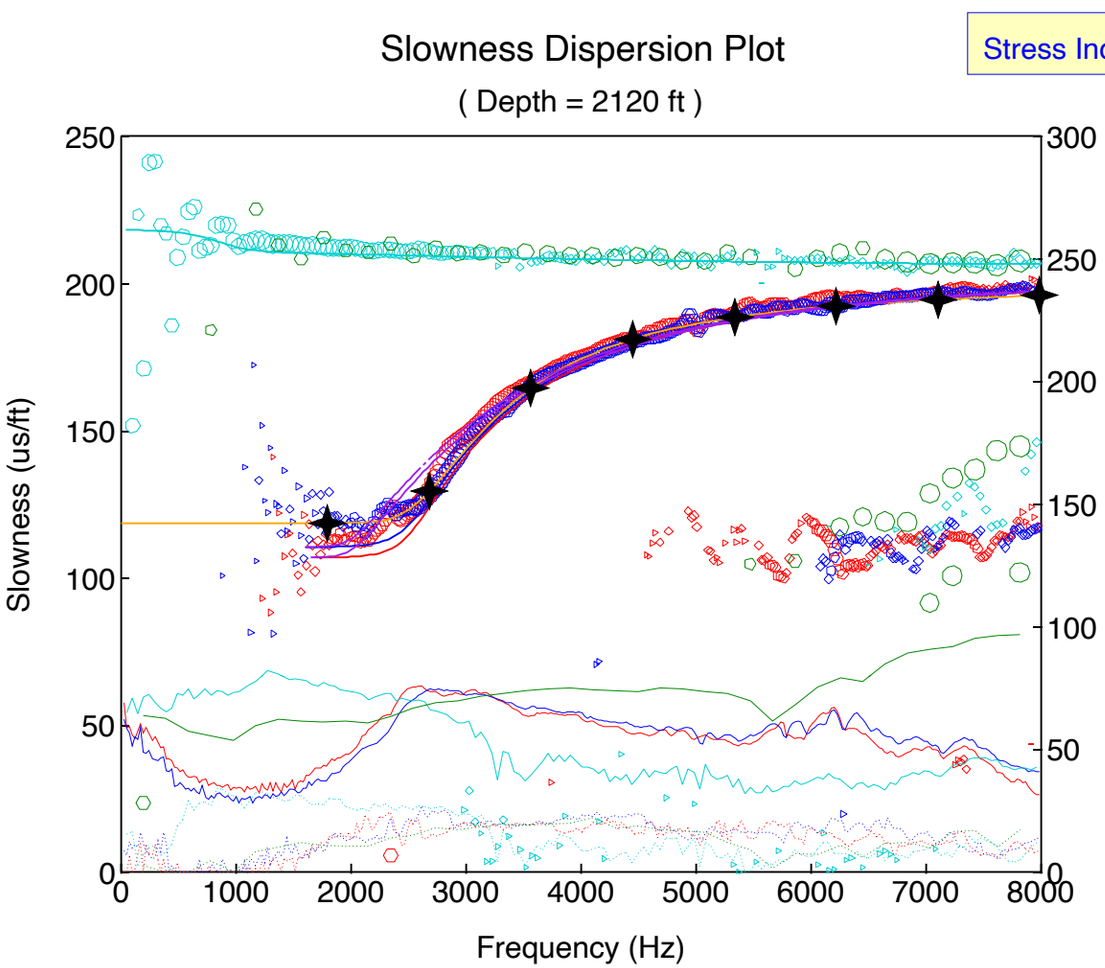
OVALITY Hole ovality measured by difference between Calipers 1 & 2 of a 4–arm caliper.

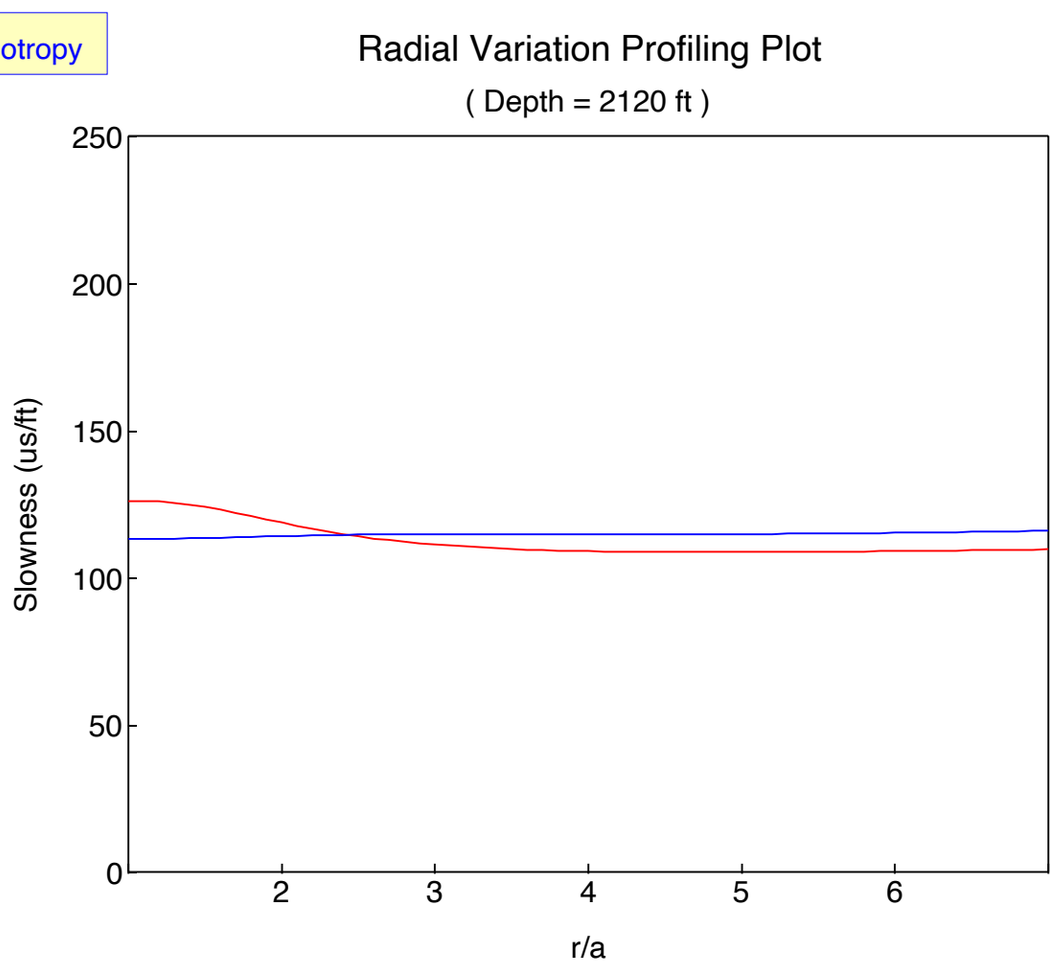
WASHOUT Hole washout (difference between Caliper and BS).

SPRShearFast STC Slowness Projection for Fast Dipole Waveforms processed in BestDT

SPRShearSlow STC Slowness Projection for Slow Dipole Waveforms processed in BestDT

Stress Induced Anisotropy





TKO Plot (Slowness, Spectrum, S/N)

SWF_SET .FAST_DIIN .DP_CD_D .MSIPCOMM .XD .SWAP .ROT4C [C80359]
Model Order (3), Tolerance (50%), Array (REC), Receivers (R1 to R11)
Max Amp (75.7773)

SWF_SET .SLOW_DIIN .DP_CD_D .MSIPCOMM .YD .SWAP .ROT4C [C80361]
Model Order (3), Tolerance (50%), Array (REC), Receivers (R1 to R11)
Max Amp (74.7518)

SWF_SET .MF_MONO .MP_LF .MS4 .MSIPCOMM .Stoneley [C80331]
Model Order (3), Tolerance (50%), Array (REC), Receivers (R1 to R13)
Max Amp (82.2673)

SWF_SET .MF_MONO .MP_MF_D .MS3 .MSIPCOMM .MF [C80329]
Model Order (3), Tolerance (50%), Array (REC), Receivers (R1 to R13)
Max Amp (96.982)

Model Dispersive Slowness
- Dipole 1
- Dipole 2
- Stoneley
- Leaky p

Non–Dispersive Slowness
- Shear 1
- Shear 2
- Shear for St
- Stoneley
- Compressional
- Mud

Input Selection

Mud DT	(us/ft)	201	Fixed Value

Radial Variation Profiling
- SRVP Manual Picking, Shear DT1
- SPI3–SRVP, WF2 and Shear DT2
- STRVP Manual Picking

Slowness Input for SRVP
- Shear DT1
- Shear DT2

Dispersion in the Reference State
- SPI3–SRVP, WF2 and Shear DT2
- STRVP Manual Picking

TI Input Parameters

C11	(Mpsi)	–999.25
C13	(Mpsi)	–999.25
C33	(Mpsi)	–999.25
C44	(Mpsi)	–999.25
C66	(Mpsi)	–999.25

Model Type – Full TI

Thomsen's Parameters

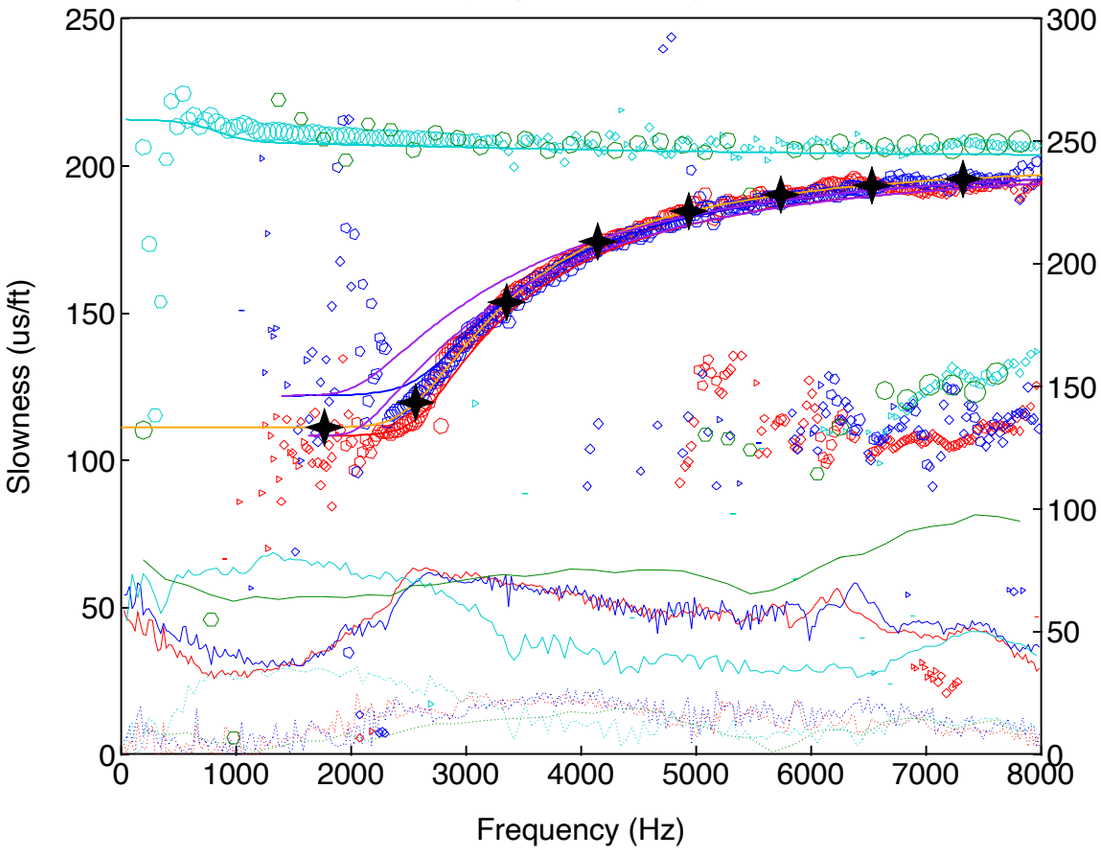
epsilon	–999.25
gamma	–999.25
delta	–999.25

Mud Density	(lbm/gal)	8.4	Fixed Value
Compr DT	(us/ft)	59.2053	Channel (DTRP@BestDT–3;2 .CO .MF_MONO .MP_MF_D .MS3 .MSIPCOMM .MF .BDT .EDT [A76743])
Shear DT 1	(us/ft)	106.932	Channel (DT_FAST_R@BestDT–3;2 .FAST_DIIN .DP_CD_D .MSIPCOMM .XD .SWAP .ROT4C .BDT .EDT [A76445])
Shear DT 2	(us/ft)	110.465	Channel (DT_SLOW_R@BestDT–3;2 .SLOW_DIIN .DP_CD_D .MSIPCOMM .YD .SWAP .ROT4C .BDT .EDT [A76599])
Shear DT for St	(us/ft)	106.932	Channel (DT_FAST_R@BestDT–3;2 .FAST_DIIN .DP_CD_D .MSIPCOMM .XD .SWAP .ROT4C .BDT .EDT [A76445])
Stoneley DT	(us/ft)	213.872	Channel (DTST DTST@FMI_CAL_MAXS_MAPC_003PUP;1 [A77909])
Bulk Density	(g/cm3)	2.68827	Channel (RHOZ RHOZ@ASCII_Load;2 [A87327])
Hole Diameter	(in)	13.4537	Channel (HD1_PPC1.AVG HD1_PPC1@FMI_CAL_MAXS_MAPC_003PUP;2 .AVG [A83315])

Probably Intrinsic Anisotropy

Slowness Dispersion Plot

(Depth = 2358 ft)



TKO Plot (Slowness, Spectrum, S/N)

- SWF_SET .FAST_DIIN .DP_CD_D .MSIPCOMM .XD .SWAP .ROT4C [C80359]
  Model Order (3), Tolerance (50%), Array (REC), Receivers (R1 to R11)
  Max Amp (76.0497)
- SWF_SET .SLOW_DIIN .DP_CD_D .MSIPCOMM .YD .SWAP .ROT4C [C80361]
  Model Order (3), Tolerance (50%), Array (REC), Receivers (R1 to R11)
  Max Amp (74.1054)
- SWF_SET .MF_MONO .MP_LF .MS4 .MSIPCOMM .Stoneley [C80331]
  Model Order (3), Tolerance (50%), Array (REC), Receivers (R1 to R13)
  Max Amp (82.3432)
- SWF_SET .MF_MONO .MP_MF_D .MS3 .MSIPCOMM .MF [C80329]
  Model Order (3), Tolerance (50%), Array (REC), Receivers (R1 to R13)
  Max Amp (97.4693)

Model Dispersive Slowness
- Dipole 1
- Dipole 2
- Stoneley
- Leaky p

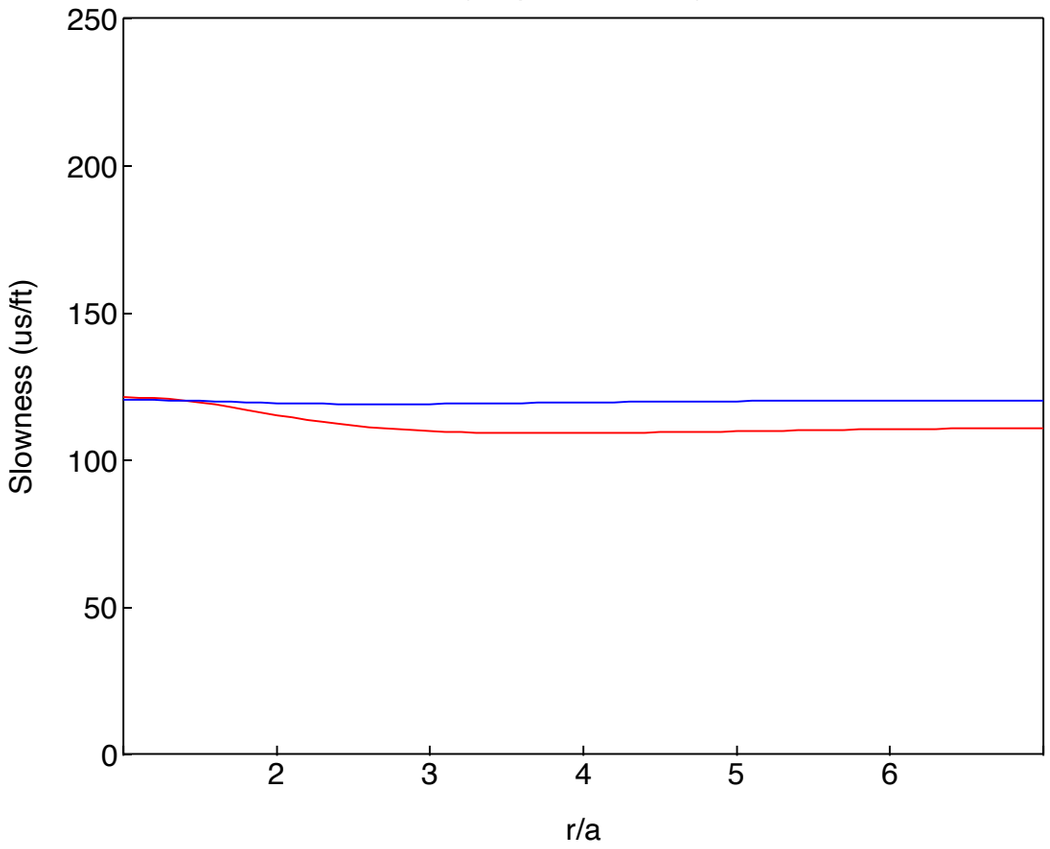
Non–Dispersive Slowness
- Shear 1
- Shear 2
- Shear for St
- Stoneley
- Compressional
- Mud

Input Selection

Mud DT	(us/ft)	198	Fixed Value

Radial Variation Profiling Plot

(Depth = 2358 ft)



Radial Variation Profiling
- SPI3–SRVP, WF1 and Shear DT1
- SPI3–SRVP, WF2 and Shear DT2
- STRVP Manual Picking

Slowness Input for SRVP
- Shear DT1
- Shear DT2

Dispersion in the Reference State
- SPI3–SRVP, WF1 and Shear DT1
- STRVP Manual Picking

TI Input Parameters

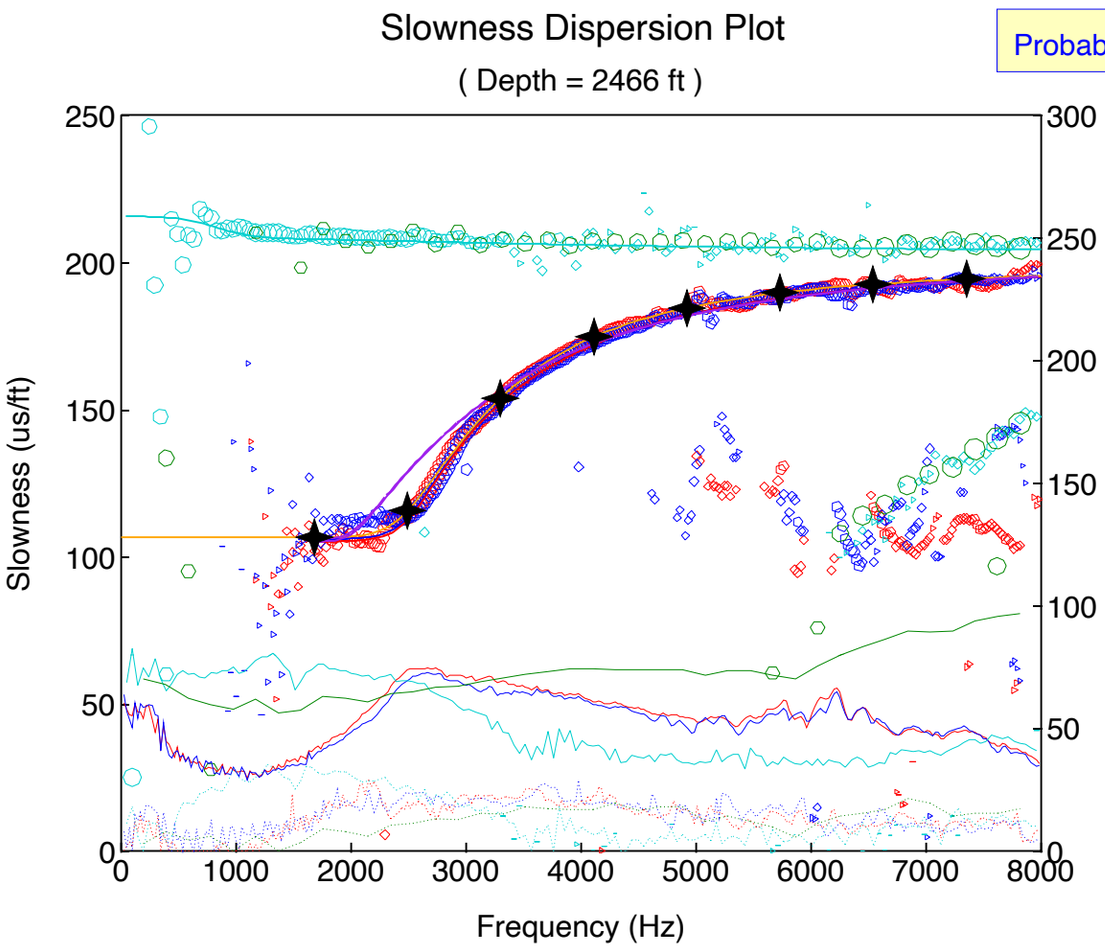
C11	(Mpsi)	–999.25
C13	(Mpsi)	–999.25
C33	(Mpsi)	–999.25
C44	(Mpsi)	–999.25
C66	(Mpsi)	–999.25

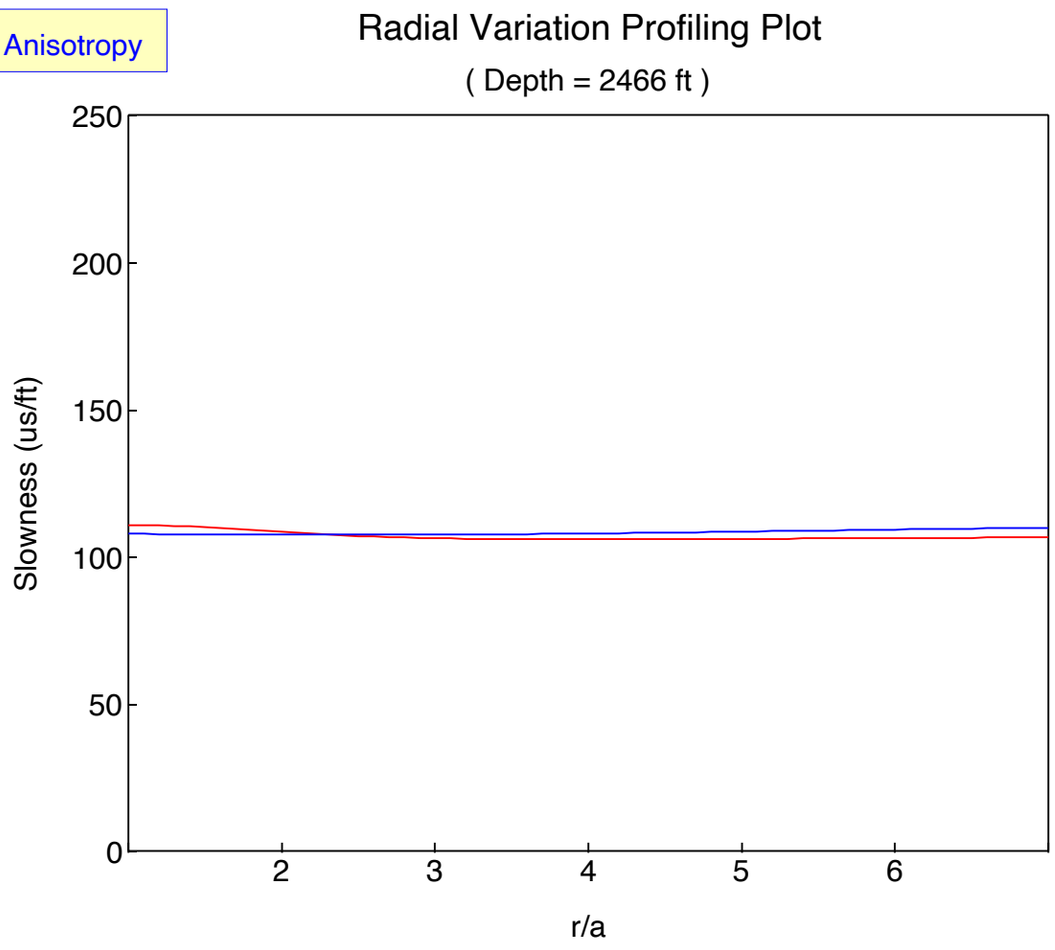
Model Type – Full TI

Thomsen's Parameters

epsilon	–999.25
gamma	–999.25
delta	–999.25

Mud Density	(lbm/gal)	8.4	Fixed Value
Compr DT	(us/ft)	55.8152	Channel (DTRP@BestDT–3;2 .CO .MF_MONO .MP_MF_D .MS3 .MSIPCOMM .MF .BDT .EDT [A76743])
Shear DT 1	(us/ft)	108.136	Channel (DT_FAST_R@BestDT–3;2 .FAST_DIIN .DP_CD_D .MSIPCOMM .XD .SWAP .ROT4C .BDT .EDT [A76445])
Shear DT 2	(us/ft)	121.81	Channel (DT_SLOW_R@BestDT–3;2 .SLOW_DIIN .DP_CD_D .MSIPCOMM .YD .SWAP .ROT4C .BDT .EDT [A76599])
Shear DT for St	(us/ft)	108.136	Channel (DT_FAST_R@BestDT–3;2 .FAST_DIIN .DP_CD_D .MSIPCOMM .XD .SWAP .ROT4C .BDT .EDT [A76445])
Stoneley DT	(us/ft)	211.184	Channel (DTST DTST@FMI_CAL_MAXS_MAPC_003PUP;1 [A77909])
Bulk Density	(g/cm3)	2.79827	Channel (RHOZ RHOZ@ASCII_Load;2 [A87327])
Hole Diameter	(in)	13.1509	Channel (HD1_PPC1.AVG HD1_PPC1@FMI_CAL_MAXS_MAPC_003PUP;2 .AVG [A83315])





TKO Plot (Slowness, Spectrum, S/N)

SWF_SET .FAST_DIIN .DP_CD_D .MSIPCOMM .XD .SWAP .ROT4C [C80359]
Model Order (3), Tolerance (50%), Array (REC), Receivers (R1 to R11)
Max Amp (74.5946)

SWF_SET .SLOW_DIIN .DP_CD_D .MSIPCOMM .YD .SWAP .ROT4C [C80361]
Model Order (3), Tolerance (50%), Array (REC), Receivers (R1 to R11)
Max Amp (72.6913)

SWF_SET .MF_MONO .MP_LF .MS4 .MSIPCOMM .Stoneley [C80331]
Model Order (3), Tolerance (50%), Array (REC), Receivers (R1 to R13)
Max Amp (82.7587)

SWF_SET .MF_MONO .MP_MF_D .MS3 .MSIPCOMM .MF [C80329]
Model Order (3), Tolerance (50%), Array (REC), Receivers (R1 to R13)
Max Amp (96.879)

Model Dispersive Slowness
- Dipole 1
- Dipole 2
- Stoneley
- Leaky p

Non–Dispersive Slowness
- Shear 1
- Shear 2
- Shear for St
- Stoneley
- Compressional
- Mud

Input Selection

Mud DT	(us/ft)	199	Fixed Value

Radial Variation Profiling
- SPI3–SRVP, WF1 and Shear DT1
- SPI3–SRVP, WF2 and Shear DT2
- STRVP Manual Picking

Slowness Input for SRVP
- Shear DT1
- Shear DT2

Dispersion in the Reference State
- SPI3–SRVP, WF1 and Shear DT1
- STRVP Manual Picking

TI Input Parameters

C11	(Mpsi)	–999.25
C13	(Mpsi)	–999.25
C33	(Mpsi)	–999.25
C44	(Mpsi)	–999.25
C66	(Mpsi)	–999.25

Model Type – Full TI

Thomsen's Parameters

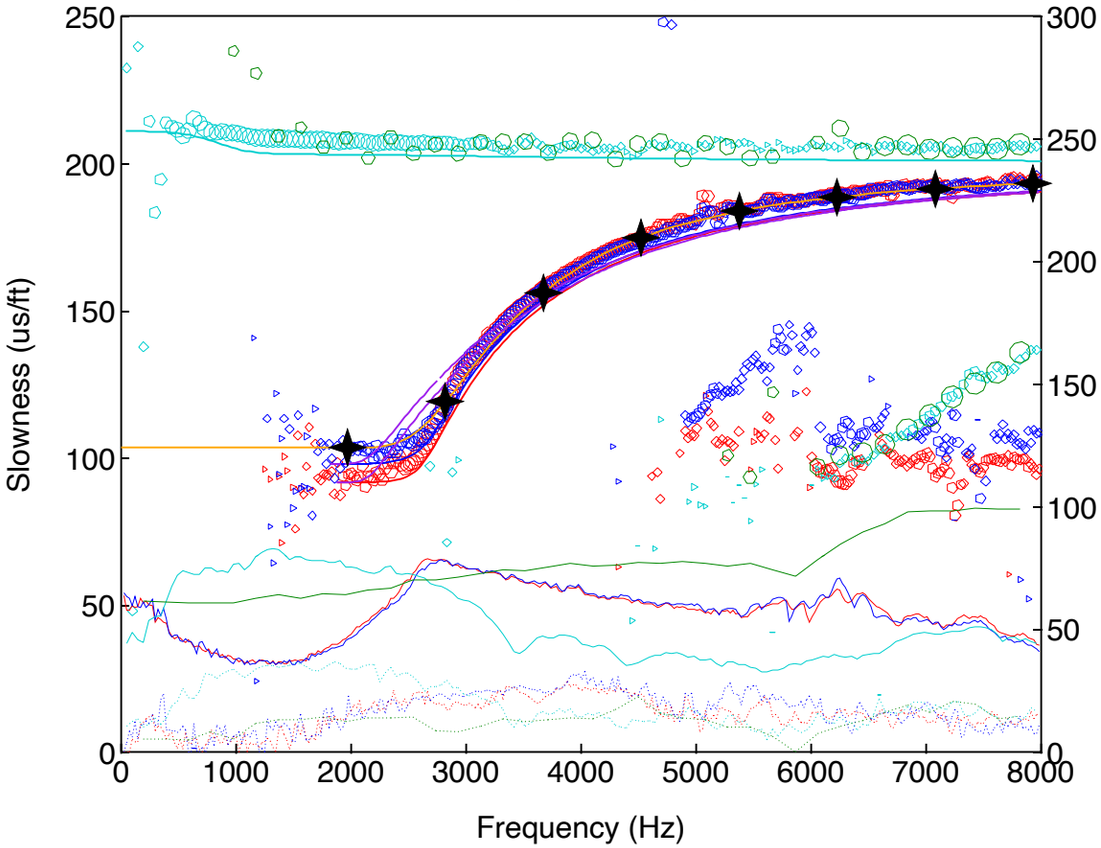
epsilon	–999.25
gamma	–999.25
delta	–999.25

Mud Density	(lbm/gal)	8.4	Fixed Value
Compr DT	(us/ft)	57.934	Channel (DTRP@BestDT–3;2 .CO .MF_MONO .MP_MF_D .MS3 .MSIPCOMM .MF .BDT .EDT [A76743])
Shear DT 1	(us/ft)	105.146	Channel (DT_FAST_R@BestDT–3;2 .FAST_DIIN .DP_CD_D .MSIPCOMM .XD .SWAP .ROT4C .BDT .EDT [A76445])
Shear DT 2	(us/ft)	105.977	Channel (DT_SLOW_R@BestDT–3;2 .SLOW_DIIN .DP_CD_D .MSIPCOMM .YD .SWAP .ROT4C .BDT .EDT [A76599])
Shear DT for St	(us/ft)	105.146	Channel (DT_FAST_R@BestDT–3;2 .FAST_DIIN .DP_CD_D .MSIPCOMM .XD .SWAP .ROT4C .BDT .EDT [A76445])
Stoneley DT	(us/ft)	209.535	Channel (DTST DTST@FMI_CAL_MAXS_MAPC_003PUP;1 [A77909])
Bulk Density	(g/cm3)	2.71141	Channel (RHOZ RHOZ@ASCII_Load;2 [A87327])
Hole Diameter	(in)	13.6477	Channel (HD1_PPC1.AVG HD1_PPC1@FMI_CAL_MAXS_MAPC_003PUP;2 .AVG [A83315])

Slowness Dispersion Plot

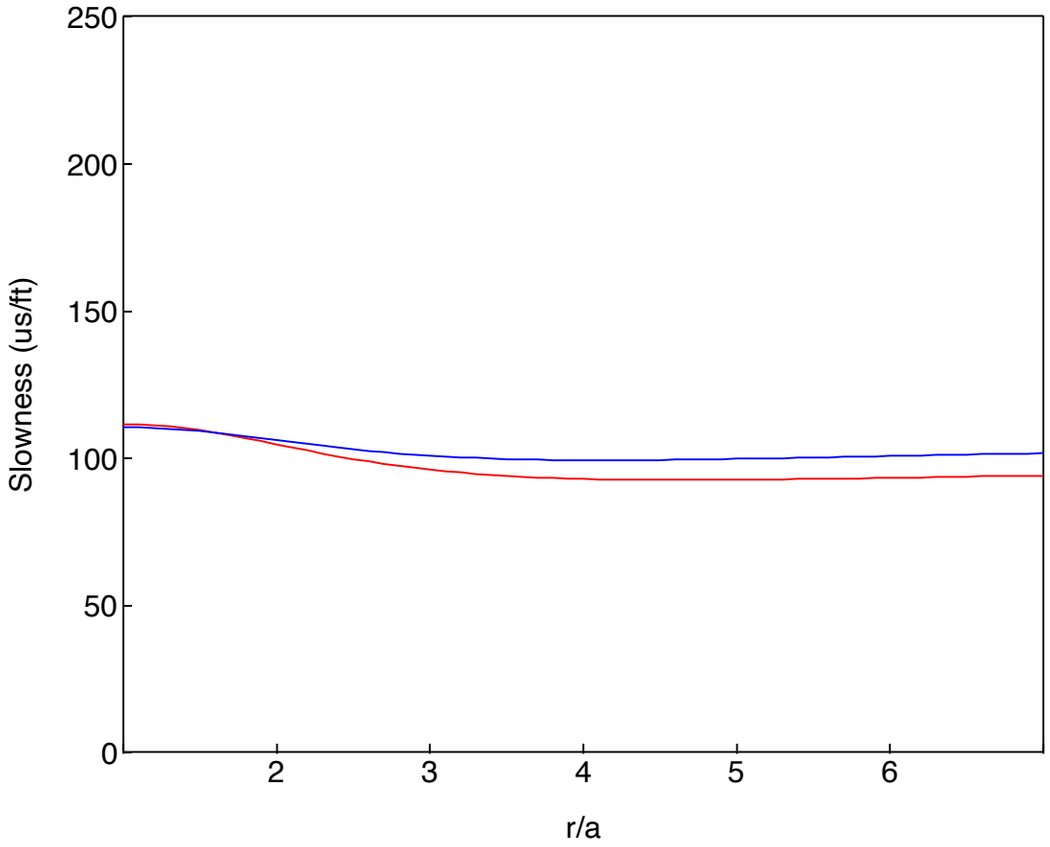
(Depth = 2532 ft)

Intrinsic Anisotropy



Radial Variation Profiling Plot

(Depth = 2532 ft)



TKO Plot (Slowness, Spectrum, S/N)

- SWF_SET .FAST_DIIN .DP_CD_D .MSIPCOMM .XD .SWAP .ROT4C [C80359]
  Model Order (3), Tolerance (50%), Array (REC), Receivers (R1 to R11)
  Max Amp (79.0208)
- SWF_SET .SLOW_DIIN .DP_CD_D .MSIPCOMM .YD .SWAP .ROT4C [C80361]
  Model Order (3), Tolerance (50%), Array (REC), Receivers (R1 to R11)
  Max Amp (78.4729)
- SWF_SET .MF_MONO .MP_LF .MS4 .MSIPCOMM .Stoneley [C80331]
  Model Order (3), Tolerance (50%), Array (REC), Receivers (R1 to R13)
  Max Amp (83.1076)
- SWF_SET .MF_MONO .MP_MF_D .MS3 .MSIPCOMM .MF [C80329]
  Model Order (3), Tolerance (50%), Array (REC), Receivers (R1 to R13)
  Max Amp (99.5792)

Model Dispersive Slowness

- Dipole 1
- Dipole 2
- Stoneley
- Leaky p

Non–Dispersive Slowness

- Shear 1
- Shear 2
- Shear for St
- Stoneley
- Compressional
- Mud

Input Selection

Mud DT	(us/ft)	196	Fixed Value

Radial Variation Profiling

- SPI3–SRVP, WF1 and Shear DT1
- SPI3–SRVP, WF2 and Shear DT2
- STRVP Manual Picking

Slowness Input for SRVP

- Shear DT1
- Shear DT2

Dispersion in the Reference State

- SPI3–SRVP, WF2 and Shear DT2
- STRVP Manual Picking

TI Input Parameters

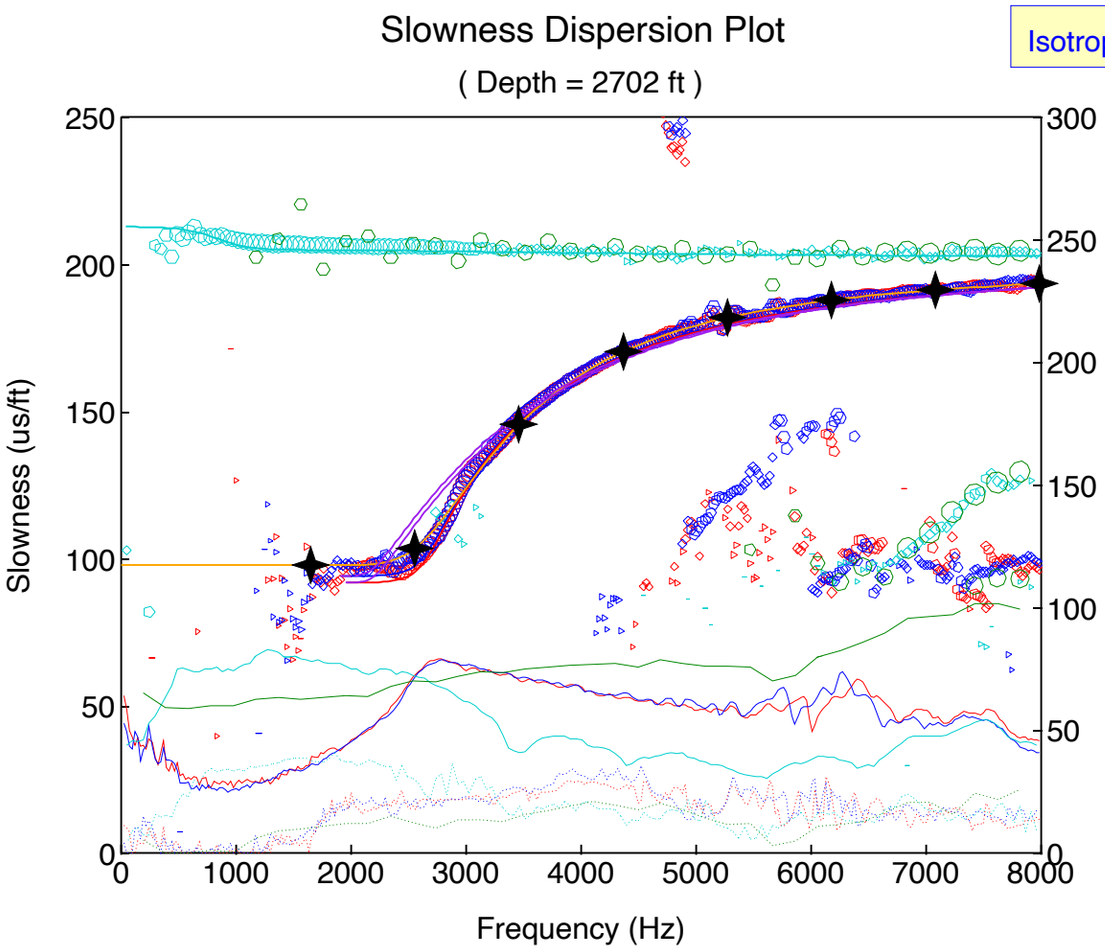
C11	(Mpsi)	–999.25
C13	(Mpsi)	–999.25
C33	(Mpsi)	–999.25
C44	(Mpsi)	–999.25
C66	(Mpsi)	–999.25

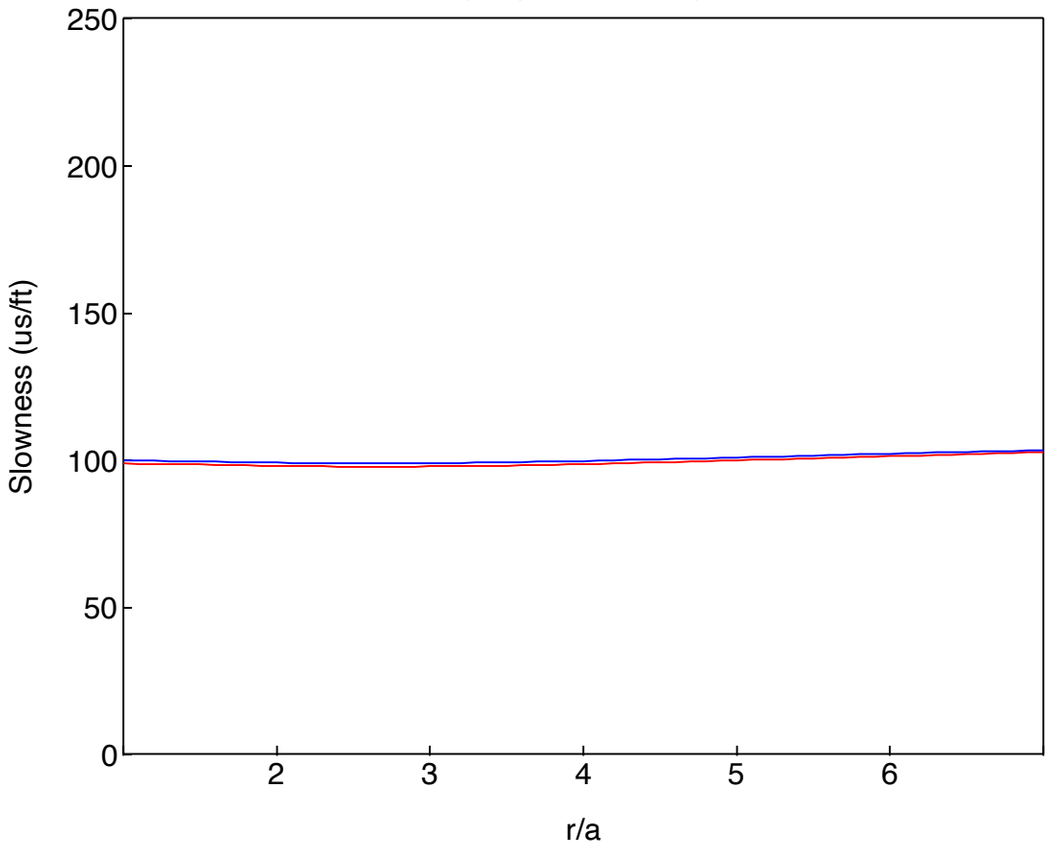
Model Type – Full TI

Thomsen's Parameters

epsilon	–999.25
gamma	–999.25
delta	–999.25

Mud Density	(lbm/gal)	8.4	Fixed Value
Compr DT	(us/ft)	50.8274	Channel (DTRP@BestDT–3;2 .CO .MF_MONO .MP_MF_D .MS3 .MSIPCOMM .MF .BDT .EDT [A76743])
Shear DT 1	(us/ft)	91.6475	Channel (DT_FAST_R@BestDT–3;2 .FAST_DIIN .DP_CD_D .MSIPCOMM .XD .SWAP .ROT4C .BDT .EDT [A76445])
Shear DT 2	(us/ft)	97.8741	Channel (DT_SLOW_R@BestDT–3;2 .SLOW_DIIN .DP_CD_D .MSIPCOMM .YD .SWAP .ROT4C .BDT .EDT [A76599])
Shear DT for St	(us/ft)	91.6475	Channel (DT_FAST_R@BestDT–3;2 .FAST_DIIN .DP_CD_D .MSIPCOMM .XD .SWAP .ROT4C .BDT .EDT [A76445])
Stoneley DT	(us/ft)	208.096	Channel (DTST DTST@FMI_CAL_MAXS_MAPC_003PUP;1 [A77909])
Bulk Density	(g/cm3)	2.7961	Channel (RHOZ RHOZ@ASCII_Load;2 [A87327])
Hole Diameter	(in)	12.9132	Channel (HD1_PPC1.AVG HD1_PPC1@FMI_CAL_MAXS_MAPC_003PUP;2 .AVG [A83315])





TKO Plot (Slowness, Spectrum, S/N)

SWF_SET .FAST_DIIN .DP_CD_D .MSIPCOMM .XD .SWAP .ROT4C [C80359]
Model Order (3), Tolerance (50%), Array (REC), Receivers (R1 to R11)
Max Amp (79.4129)

SWF_SET .SLOW_DIIN .DP_CD_D .MSIPCOMM .YD .SWAP .ROT4C [C80361]
Model Order (3), Tolerance (50%), Array (REC), Receivers (R1 to R11)
Max Amp (78.8068)

SWF_SET .MF_MONO .MP_LF .MS4 .MSIPCOMM .Stoneley [C80331]
Model Order (3), Tolerance (50%), Array (REC), Receivers (R1 to R13)
Max Amp (82.9685)

SWF_SET .MF_MONO .MP_MF_D .MS3 .MSIPCOMM .MF [C80329]
Model Order (3), Tolerance (50%), Array (REC), Receivers (R1 to R13)
Max Amp (101.778)

Model Dispersive Slowness
- Dipole 1
- Dipole 2
- Stoneley
- Leaky p

Non–Dispersive Slowness
- Shear 1
- Shear 2
- Shear for St
- Stoneley
- Compressional
- Mud

Input Selection

Mud DT	(us/ft)	198	Fixed Value

Radial Variation Profiling
- SPI3–SRVP, WF1 and Shear DT1
- SPI3–SRVP, WF2 and Shear DT2
- STRVP Manual Picking

Slowness Input for SRVP
- Shear DT1
- Shear DT2

Dispersion in the Reference State
- SPI3–SRVP, WF2 and Shear DT2
- STRVP Manual Picking

TI Input Parameters

C11	(Mpsi)	–999.25
C13	(Mpsi)	–999.25
C33	(Mpsi)	–999.25
C44	(Mpsi)	–999.25
C66	(Mpsi)	–999.25

Model Type – Full TI

Thomsen's Parameters

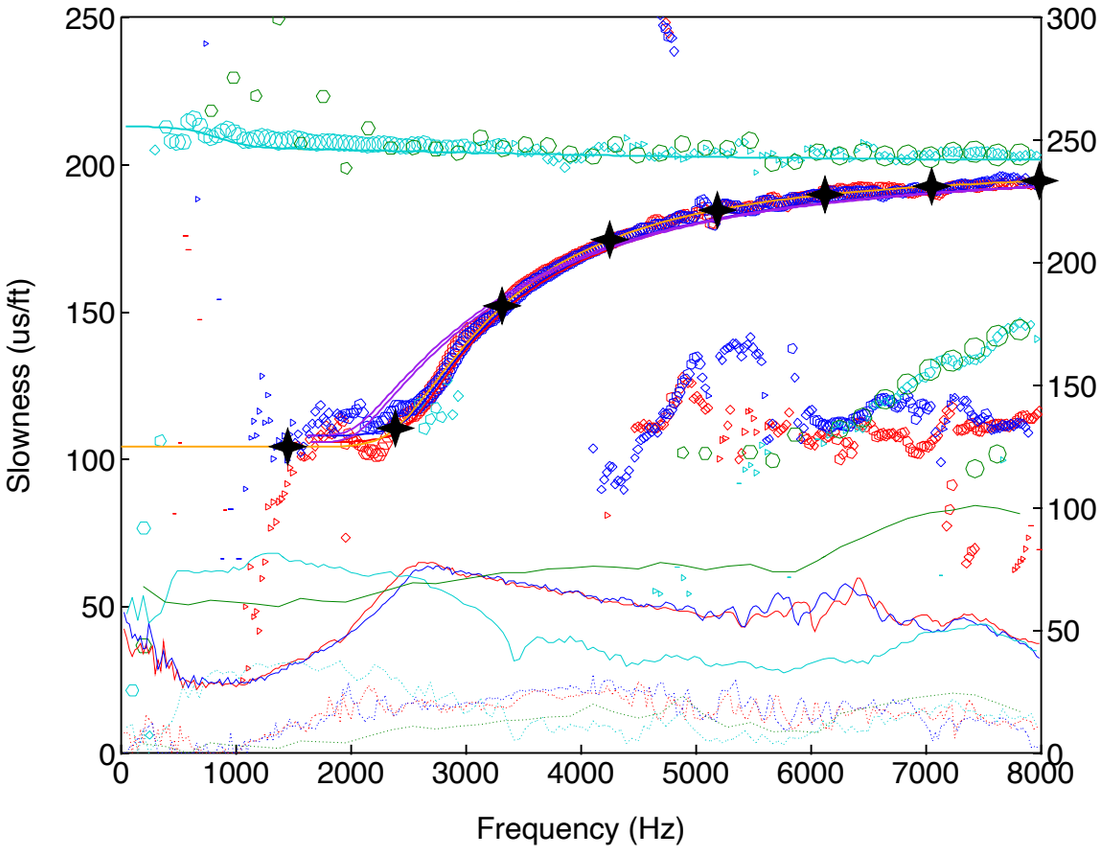
epsilon	–999.25
gamma	–999.25
delta	–999.25

Mud Density	(lbm/gal)	8.4	Fixed Value
Compr DT	(us/ft)	52.2341	Channel (DTRP@BestDT–3;2 .CO .MF_MONO .MP_MF_D .MS3 .MSIPCOMM .MF .BDT .EDT [A76743])
Shear DT 1	(us/ft)	91.8986	Channel (DT_FAST_R@BestDT–3;2 .FAST_DIIN .DP_CD_D .MSIPCOMM .XD .SWAP .ROT4C .BDT .EDT [A76445])
Shear DT 2	(us/ft)	94.1137	Channel (DT_SLOW_R@BestDT–3;2 .SLOW_DIIN .DP_CD_D .MSIPCOMM .YD .SWAP .ROT4C .BDT .EDT [A76599])
Shear DT for St	(us/ft)	91.8986	Channel (DT_FAST_R@BestDT–3;2 .FAST_DIIN .DP_CD_D .MSIPCOMM .XD .SWAP .ROT4C .BDT .EDT [A76445])
Stoneley DT	(us/ft)	206.826	Channel (DTST DTST@FMI_CAL_MAXS_MAPC_003PUP;1 [A77909])
Bulk Density	(g/cm3)	2.88301	Channel (RHOZ RHOZ@ASCII_Load;2 [A87327])
Hole Diameter	(in)	12.7933	Channel (HD1_PPC1.AVG HD1_PPC1@FMI_CAL_MAXS_MAPC_003PUP;2 .AVG [A83315])

Intrinsic Anisotropy

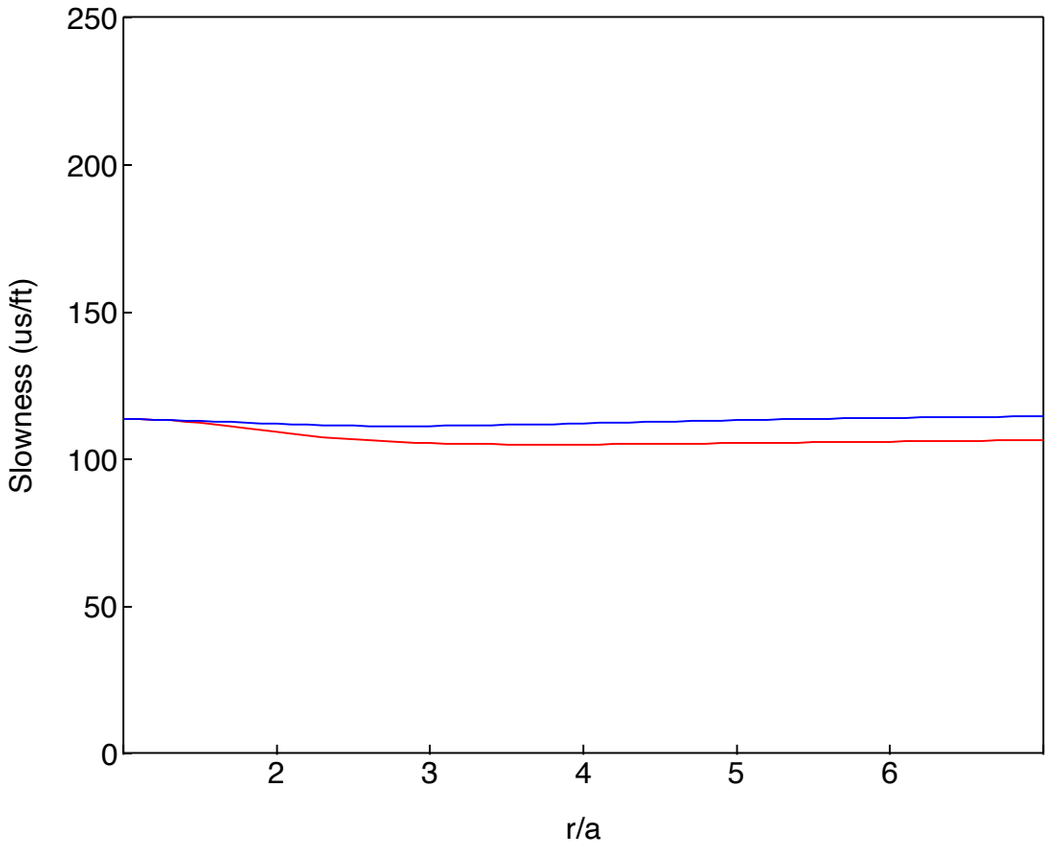
Slowness Dispersion Plot

(Depth = 3095 ft)



Radial Variation Profiling Plot

(Depth = 3095 ft)



TKO Plot (Slowness, Spectrum, S/N)

- SWF_SET .FAST_DIIN .DP_CD_D .MSIPCOMM .XD .SWAP .ROT4C [C80359]
  Model Order (3), Tolerance (50%), Array (REC), Receivers (R1 to R11)
  Max Amp (77.81)
- SWF_SET .SLOW_DIIN .DP_CD_D .MSIPCOMM .YD .SWAP .ROT4C [C80361]
  Model Order (3), Tolerance (50%), Array (REC), Receivers (R1 to R11)
  Max Amp (76.3041)
- SWF_SET .MF_MONO .MP_LF .MS4 .MSIPCOMM .Stoneley [C80331]
  Model Order (3), Tolerance (50%), Array (REC), Receivers (R1 to R13)
  Max Amp (81.6632)
- SWF_SET .MF_MONO .MP_MF_D .MS3 .MSIPCOMM .MF [C80329]
  Model Order (3), Tolerance (50%), Array (REC), Receivers (R1 to R13)
  Max Amp (100.861)

Model Dispersive Slowness

- Dipole 1
- Dipole 2
- Stoneley
- Leaky p

Non–Dispersive Slowness

- Shear 1
- Shear 2
- Shear for St
- Stoneley
- Compressional
- Mud

Input Selection

Mud DT	(us/ft)	196	Fixed Value

Radial Variation Profiling

- SPI3–SRVP, WF1 and Shear DT1
- SPI3–SRVP, WF2 and Shear DT2
- STRVP Manual Picking

Slowness Input for SRVP

- Shear DT1
- Shear DT2

Dispersion in the Reference State

- SPI3–SRVP, WF1 and Shear DT1
- STRVP Manual Picking

TI Input Parameters

C11	(Mpsi)	–999.25
C13	(Mpsi)	–999.25
C33	(Mpsi)	–999.25
C44	(Mpsi)	–999.25
C66	(Mpsi)	–999.25

Model Type – Full TI

Thomsen's Parameters

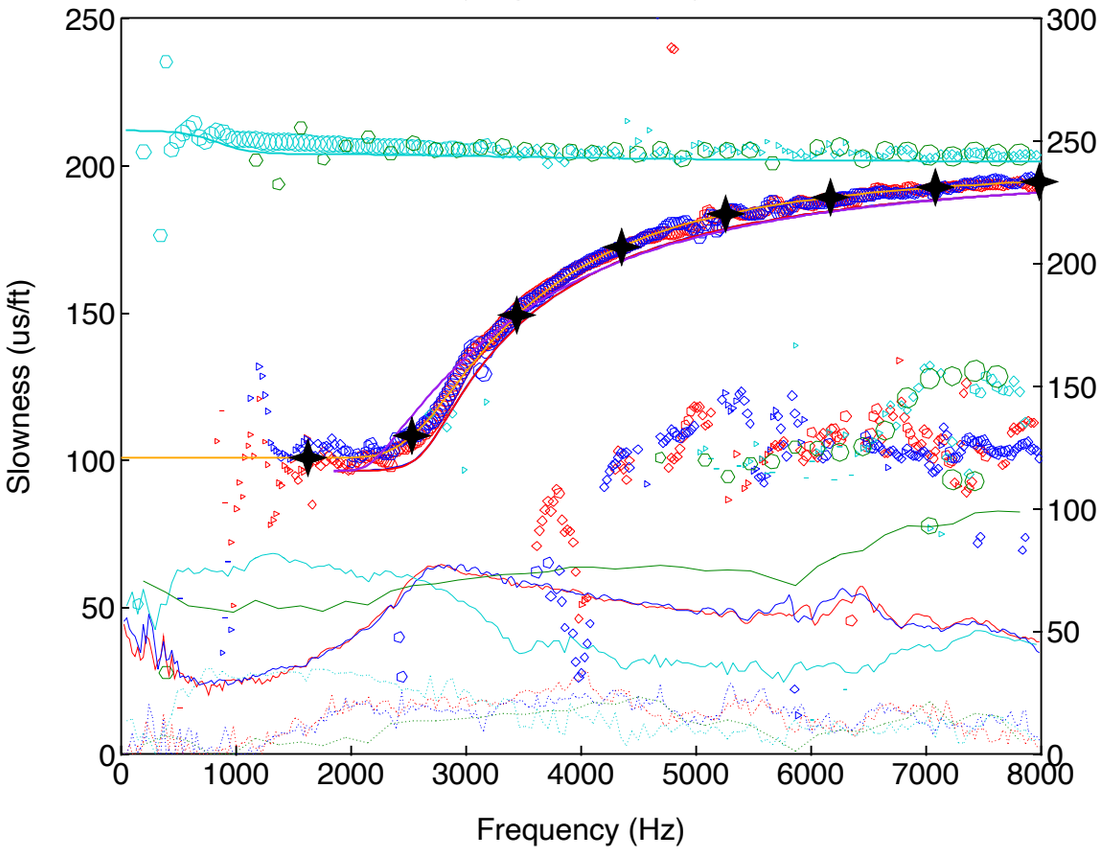
epsilon	–999.25
gamma	–999.25
delta	–999.25

Mud Density	(lbm/gal)	8.4	Fixed Value
Compr DT	(us/ft)	59.1881	Channel (DTRP@BestDT–3;2 .CO .MF_MONO .MP_MF_D .MS3 .MSIPCOMM .MF .BDT .EDT [A76743])
Shear DT 1	(us/ft)	105.567	Channel (DT_FAST_R@BestDT–3;2 .FAST_DIIN .DP_CD_D .MSIPCOMM .XD .SWAP .ROT4C .BDT .EDT [A76445])
Shear DT 2	(us/ft)	107.782	Channel (DT_SLOW_R@BestDT–3;2 .SLOW_DIIN .DP_CD_D .MSIPCOMM .YD .SWAP .ROT4C .BDT .EDT [A76599])
Shear DT for St	(us/ft)	105.567	Channel (DT_FAST_R@BestDT–3;2 .FAST_DIIN .DP_CD_D .MSIPCOMM .XD .SWAP .ROT4C .BDT .EDT [A76445])
Stoneley DT	(us/ft)	208.295	Channel (DTST DTST@FMI_CAL_MAXS_MAPC_003PUP;1 [A77909])
Bulk Density	(g/cm3)	2.72808	Channel (RHOZ RHOZ@ASCII_Load;2 [A87327])
Hole Diameter	(in)	13.6444	Channel (HD1_PPC1.AVG HD1_PPC1@FMI_CAL_MAXS_MAPC_003PUP;2 .AVG [A83315])

Slowness Dispersion Plot

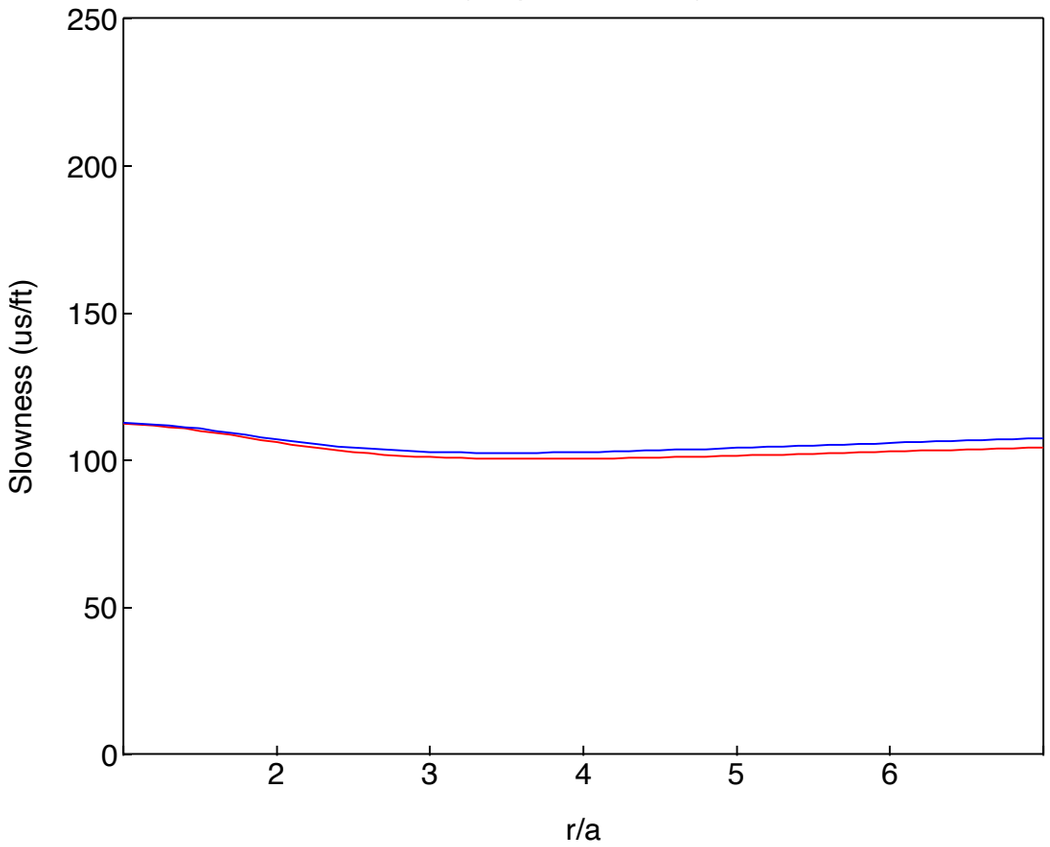
(Depth = 3180 ft)

Intrinsic Anisotropy



Radial Variation Profiling Plot

(Depth = 3180 ft)



TKO Plot (Slowness, Spectrum, S/N)

- SWF_SET .FAST_DIIN .DP_CD_D .MSIPCOMM .XD .SWAP .ROT4C [C80359]
  Model Order (3), Tolerance (50%), Array (REC), Receivers (R1 to R11)
  Max Amp (77.2159)
- SWF_SET .SLOW_DIIN .DP_CD_D .MSIPCOMM .YD .SWAP .ROT4C [C80361]
  Model Order (3), Tolerance (50%), Array (REC), Receivers (R1 to R11)
  Max Amp (77.5222)
- SWF_SET .MF_MONO .MP_LF .MS4 .MSIPCOMM .Stoneley [C80331]
  Model Order (3), Tolerance (50%), Array (REC), Receivers (R1 to R13)
  Max Amp (81.8648)
- SWF_SET .MF_MONO .MP_MF_D .MS3 .MSIPCOMM .MF [C80329]
  Model Order (3), Tolerance (50%), Array (REC), Receivers (R1 to R13)
  Max Amp (99.149)

Model Dispersive Slowness

- Dipole 1
- Dipole 2
- Stoneley
- Leaky p

Non–Dispersive Slowness

- Shear 1
- Shear 2
- Shear for St
- Stoneley
- Compressional
- Mud

Input Selection

Mud DT	(us/ft)	196	Fixed Value

Radial Variation Profiling

- SPI3–SRVP, WF1 and Shear DT1
- SPI3–SRVP, WF2 and Shear DT2
- STRVP Manual Picking

Slowness Input for SRVP

- Shear DT1
- Shear DT2

Dispersion in the Reference State

- SPI3–SRVP, WF1 and Shear DT1
- STRVP Manual Picking

TI Input Parameters

C11	(Mpsi)	–999.25
C13	(Mpsi)	–999.25
C33	(Mpsi)	–999.25
C44	(Mpsi)	–999.25
C66	(Mpsi)	–999.25

Model Type – Full TI

Thomsen's Parameters

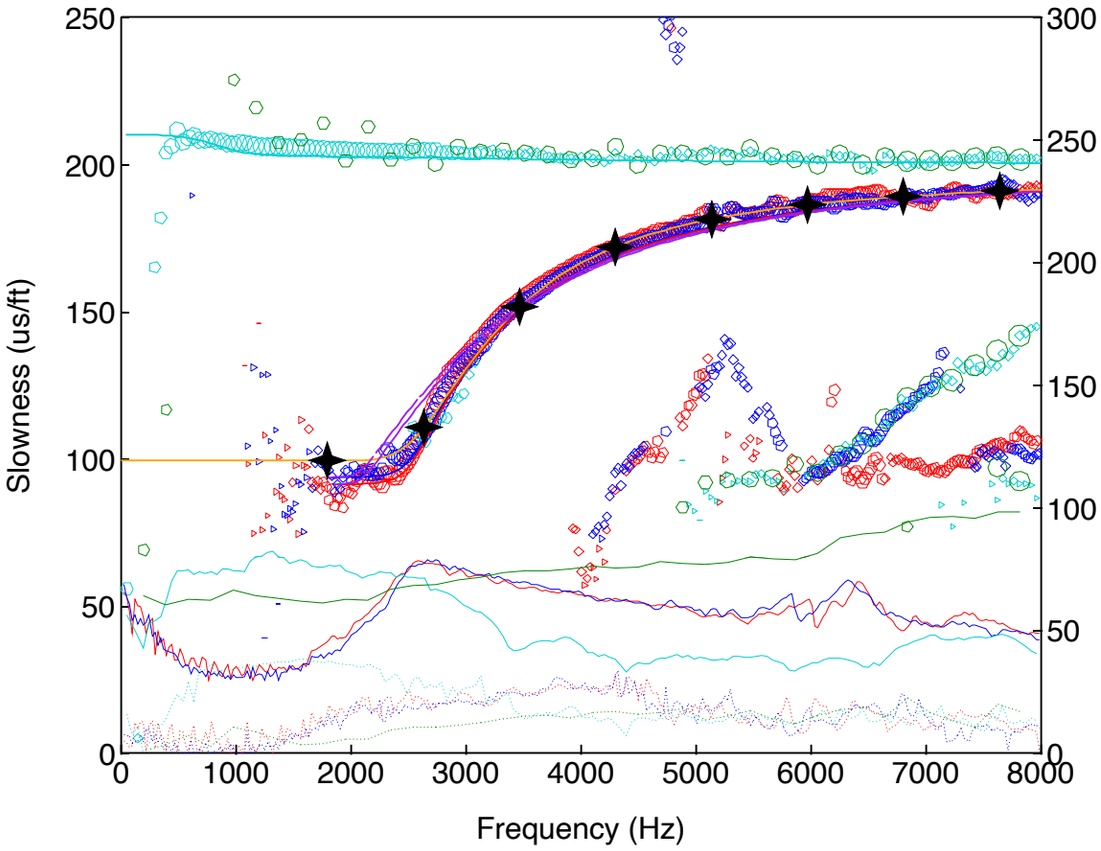
epsilon	–999.25
gamma	–999.25
delta	–999.25

Mud Density	(lbm/gal)	8.4	Fixed Value
Compr DT	(us/ft)	56.4632	Channel (DTRP@BestDT–3;2 .CO .MF_MONO .MP_MF_D .MS3 .MSIPCOMM .MF .BDT .EDT [A76743])
Shear DT 1	(us/ft)	96.1739	Channel (DT_FAST_R@BestDT–3;2 .FAST_DIIN .DP_CD_D .MSIPCOMM .XD .SWAP .ROT4C .BDT .EDT [A76445])
Shear DT 2	(us/ft)	96.3215	Channel (DT_SLOW_R@BestDT–3;2 .SLOW_DIIN .DP_CD_D .MSIPCOMM .YD .SWAP .ROT4C .BDT .EDT [A76599])
Shear DT for St	(us/ft)	96.1739	Channel (DT_FAST_R@BestDT–3;2 .FAST_DIIN .DP_CD_D .MSIPCOMM .XD .SWAP .ROT4C .BDT .EDT [A76445])
Stoneley DT	(us/ft)	207.737	Channel (DTST DTST@FMI_CAL_MAXS_MAPC_003PUP;1 [A77909])
Bulk Density	(g/cm3)	2.79564	Channel (RHOZ RHOZ@ASCII_Load;2 [A87327])
Hole Diameter	(in)	12.8423	Channel (HD1_PPC1.AVG HD1_PPC1@FMI_CAL_MAXS_MAPC_003PUP;2 .AVG [A83315])

Slowness Dispersion Plot

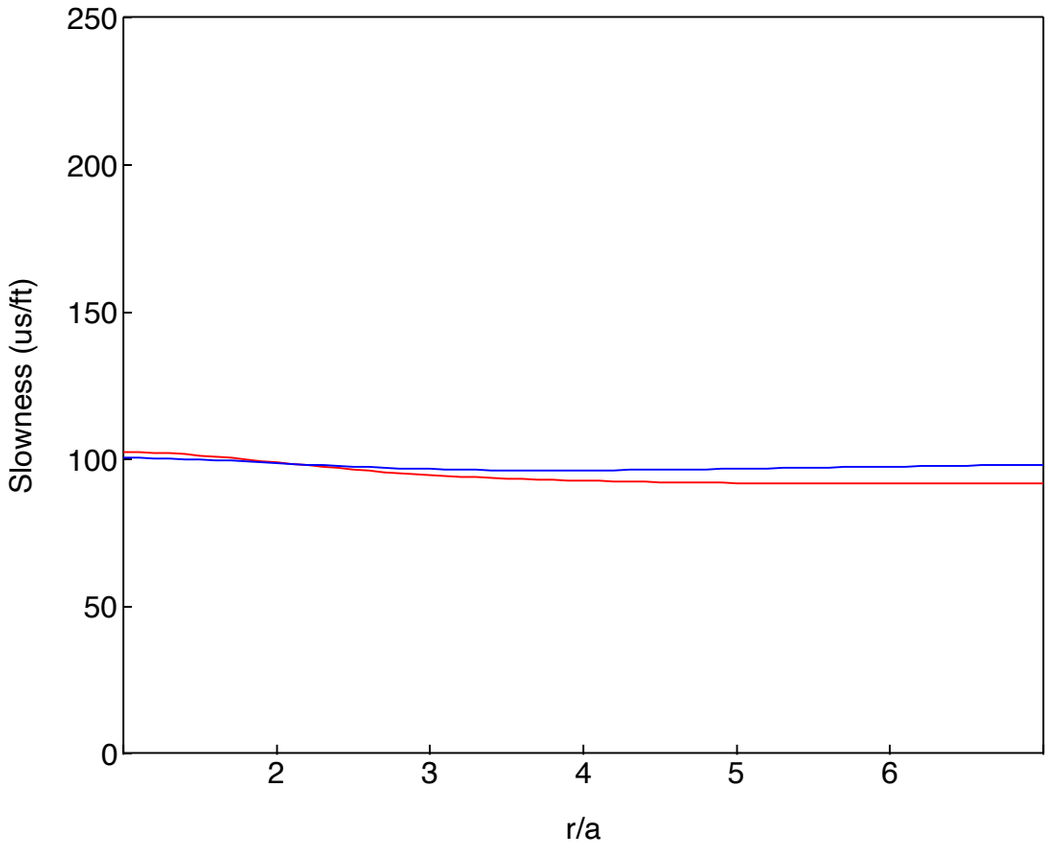
(Depth = 3370 ft)

Possible Stress–Induced Anisotropy



Radial Variation Profiling Plot

(Depth = 3370 ft)



TKO Plot (Slowness, Spectrum, S/N)

SWF_SET .FAST_DIIN .DP_CD_D .MSIPCOMM .XD .SWAP .ROT4C [C80359]
Model Order (3), Tolerance (50%), Array (REC), Receivers (R1 to R11)
Max Amp (78.5051)

SWF_SET .SLOW_DIIN .DP_CD_D .MSIPCOMM .YD .SWAP .ROT4C [C80361]
Model Order (3), Tolerance (50%), Array (REC), Receivers (R1 to R11)
Max Amp (79.0078)

SWF_SET .MF_MONO .MP_LF .MS4 .MSIPCOMM .Stoneley [C80331]
Model Order (3), Tolerance (50%), Array (REC), Receivers (R1 to R13)
Max Amp (82.2114)

SWF_SET .MF_MONO .MP_MF_D .MS3 .MSIPCOMM .MF [C80329]
Model Order (3), Tolerance (50%), Array (REC), Receivers (R1 to R13)
Max Amp (98.3108)

Model Dispersive Slowness
- Dipole 1
- Dipole 2
- Stoneley
- Leaky p

Non–Dispersive Slowness
- Shear 1
- Shear 2
- Shear for St
- Stoneley
- Compressional
- Mud

Input Selection

Mud DT	(us/ft)	196	Fixed Value

Radial Variation Profiling
- SPI3–SRVP, WF1 and Shear DT1
- SPI3–SRVP, WF2 and Shear DT2
- STRVP Manual Picking

Slowness Input for SRVP
- Shear DT1
- Shear DT2

Dispersion in the Reference State
- SPI3–SRVP, WF2 and Shear DT2
- STRVP Manual Picking

TI Input Parameters

C11	(Mpsi)	–999.25
C13	(Mpsi)	–999.25
C33	(Mpsi)	–999.25
C44	(Mpsi)	–999.25
C66	(Mpsi)	–999.25

Model Type – Full TI

Thomsen's Parameters

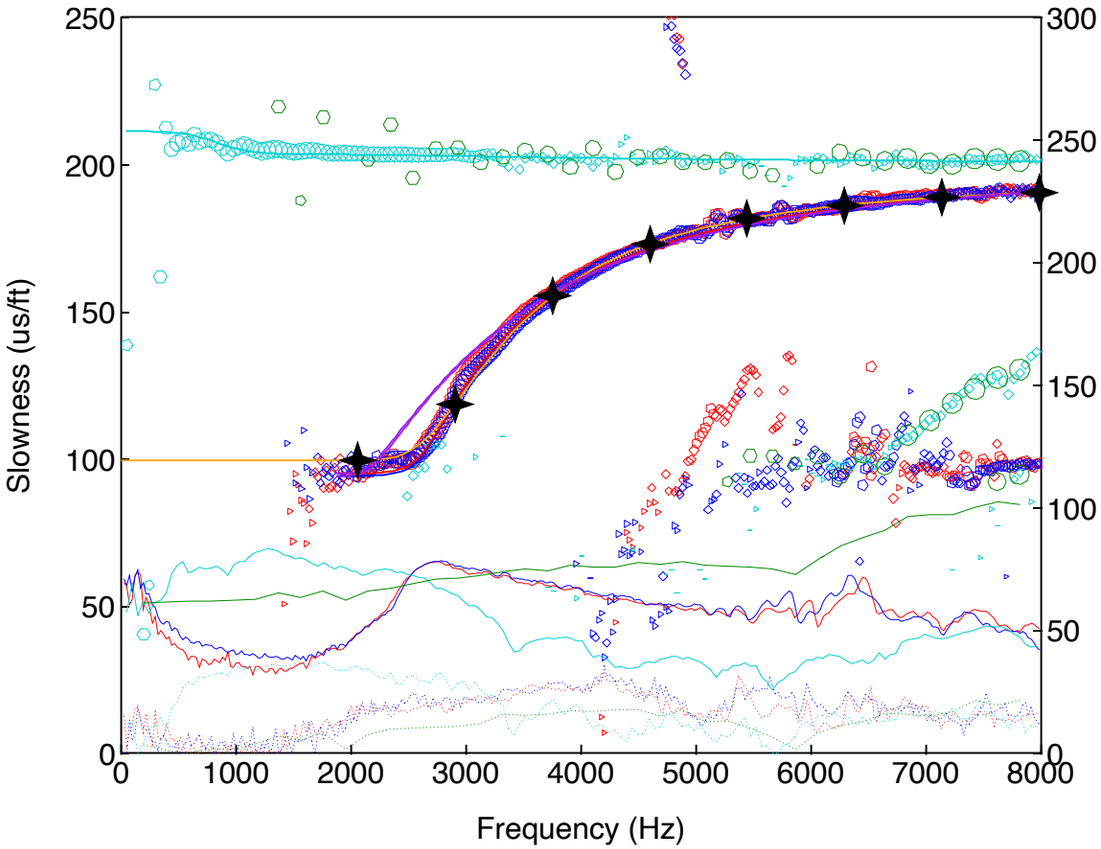
epsilon	–999.25
gamma	–999.25
delta	–999.25

Mud Density	(lbm/gal)	8.4	Fixed Value
Compr DT	(us/ft)	51.125	Channel (DTRP@BestDT–3;2 .CO .MF_MONO .MP_MF_D .MS3 .MSIPCOMM .MF .BDT .EDT [A76743])
Shear DT 1	(us/ft)	91.3826	Channel (DT_FAST_R@BestDT–3;2 .FAST_DIIN .DP_CD_D .MSIPCOMM .XD .SWAP .ROT4C .BDT .EDT [A76445])
Shear DT 2	(us/ft)	93.6694	Channel (DT_SLOW_R@BestDT–3;2 .SLOW_DIIN .DP_CD_D .MSIPCOMM .YD .SWAP .ROT4C .BDT .EDT [A76599])
Shear DT for St	(us/ft)	91.3826	Channel (DT_FAST_R@BestDT–3;2 .FAST_DIIN .DP_CD_D .MSIPCOMM .XD .SWAP .ROT4C .BDT .EDT [A76445])
Stoneley DT	(us/ft)	205.762	Channel (DTST DTST@FMI_CAL_MAXS_MAPC_003PUP;1 [A77909])
Bulk Density	(g/cm3)	2.80562	Channel (RHOZ RHOZ@ASCII_Load;2 [A87327])
Hole Diameter	(in)	13.573	Channel (HD1_PPC1.AVG HD1_PPC1@FMI_CAL_MAXS_MAPC_003PUP;2 .AVG [A83315])

Slowness Dispersion Plot

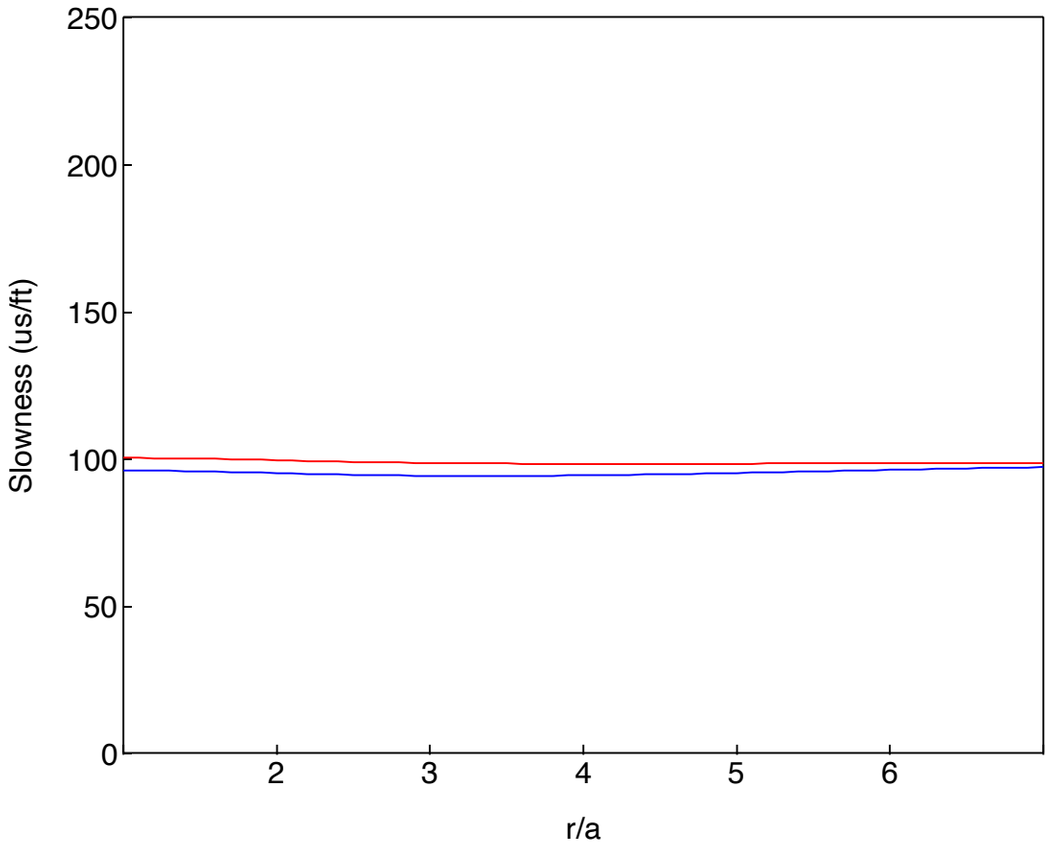
(Depth = 3783 ft)

Isotropic Formation



Radial Variation Profiling Plot

(Depth = 3783 ft)



TKO Plot (Slowness, Spectrum, S/N)

- SWF_SET .FAST_DIIN .DP_CD_D .MSIPCOMM .XD .SWAP .ROT4C [C80359]
  Model Order (3), Tolerance (50%), Array (REC), Receivers (R1 to R11)
  Max Amp (78.1736)
- SWF_SET .SLOW_DIIN .DP_CD_D .MSIPCOMM .YD .SWAP .ROT4C [C80361]
  Model Order (3), Tolerance (50%), Array (REC), Receivers (R1 to R11)
  Max Amp (78.5875)
- SWF_SET .MF_MONO .MP_LF .MS4 .MSIPCOMM .Stoneley [C80331]
  Model Order (3), Tolerance (50%), Array (REC), Receivers (R1 to R13)
  Max Amp (83.3289)
- SWF_SET .MF_MONO .MP_MF_D .MS3 .MSIPCOMM .MF [C80329]
  Model Order (3), Tolerance (50%), Array (REC), Receivers (R1 to R13)
  Max Amp (102.532)

Model Dispersive Slowness

- Dipole 1
- Dipole 2
- Stoneley
- Leaky p

Non–Dispersive Slowness

- Shear 1
- Shear 2
- Shear for St
- Stoneley
- Compressional
- Mud

Input Selection

Mud DT	(us/ft)	196	Fixed Value

Radial Variation Profiling

- SPI3–SRVP, WF1 and Shear DT1
- SPI3–SRVP, WF2 and Shear DT2
- STRVP Manual Picking

Slowness Input for SRVP

- Shear DT1
- Shear DT2

Dispersion in the Reference State

- SPI3–SRVP, WF2 and Shear DT2
- STRVP Manual Picking

TI Input Parameters

C11	(Mpsi)	–999.25
C13	(Mpsi)	–999.25
C33	(Mpsi)	–999.25
C44	(Mpsi)	–999.25
C66	(Mpsi)	–999.25

Model Type – Full TI

Thomsen's Parameters

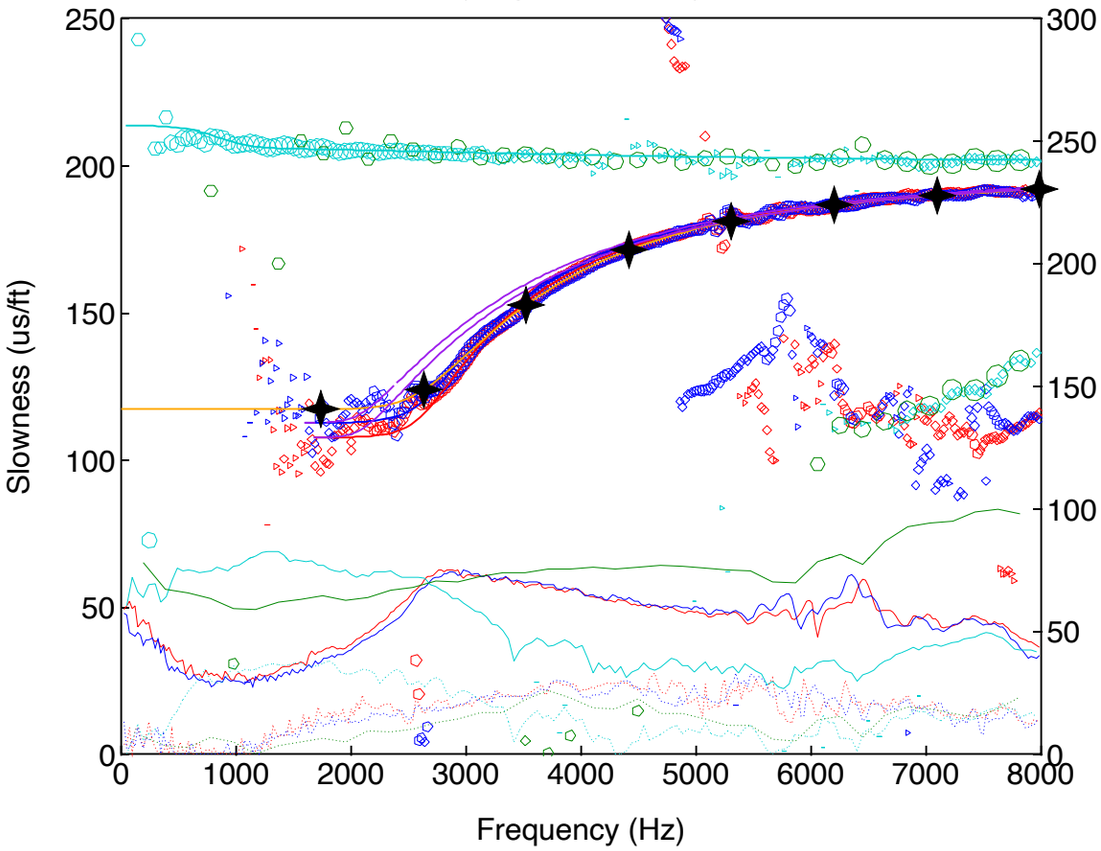
epsilon	–999.25
gamma	–999.25
delta	–999.25

Mud Density	(lbm/gal)	8.4	Fixed Value
Compr DT	(us/ft)	54.0911	Channel (DTRP@BestDT–3;2 .CO .MF_MONO .MP_MF_D .MS3 .MSIPCOMM .MF .BDT .EDT [A76743])
Shear DT 1	(us/ft)	95.0042	Channel (DT_FAST_R@BestDT–3;2 .FAST_DIIN .DP_CD_D .MSIPCOMM .XD .SWAP .ROT4C .BDT .EDT [A76445])
Shear DT 2	(us/ft)	94.1638	Channel (DT_SLOW_R@BestDT–3;2 .SLOW_DIIN .DP_CD_D .MSIPCOMM .YD .SWAP .ROT4C .BDT .EDT [A76599])
Shear DT for St	(us/ft)	95.0042	Channel (DT_FAST_R@BestDT–3;2 .FAST_DIIN .DP_CD_D .MSIPCOMM .XD .SWAP .ROT4C .BDT .EDT [A76445])
Stoneley DT	(us/ft)	204.667	Channel (DTST DTST@FMI_CAL_MAXS_MAPC_003PUP;1 [A77909])
Bulk Density	(g/cm3)	2.83982	Channel (RHOZ RHOZ@ASCII_Load;2 [A87327])
Hole Diameter	(in)	12.9891	Channel (HD1_PPC1.AVG HD1_PPC1@FMI_CAL_MAXS_MAPC_003PUP;2 .AVG [A83315])

Slowness Dispersion Plot

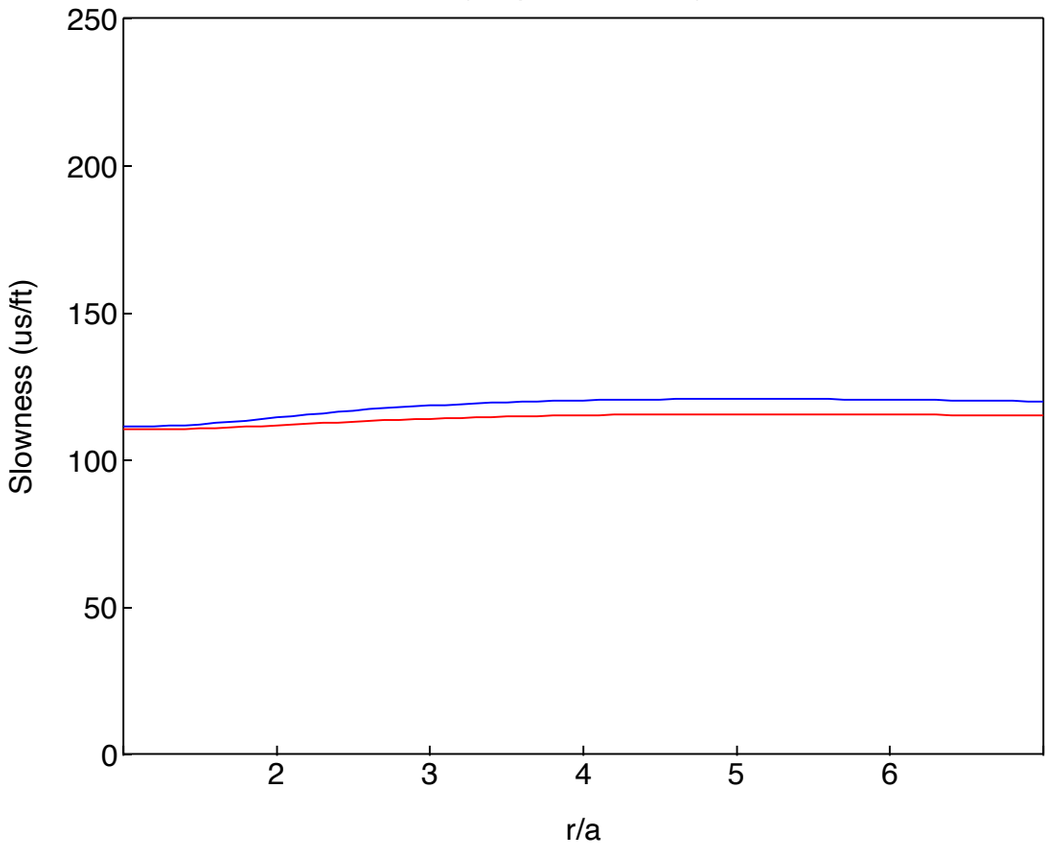
(Depth = 3998 ft)

Intrinsic Anisotropy



Radial Variation Profiling Plot

(Depth = 3998 ft)



TKO Plot (Slowness, Spectrum, S/N)

SWF_SET .FAST_DIIN .DP_CD_D .MSIPCOMM .XD .SWAP .ROT4C [C80359]
Model Order (3), Tolerance (50%), Array (REC), Receivers (R1 to R11)
Max Amp (75.1865)

SWF_SET .SLOW_DIIN .DP_CD_D .MSIPCOMM .YD .SWAP .ROT4C [C80361]
Model Order (3), Tolerance (50%), Array (REC), Receivers (R1 to R11)
Max Amp (75.2253)

SWF_SET .MF_MONO .MP_LF .MS4 .MSIPCOMM .Stoneley [C80331]
Model Order (3), Tolerance (50%), Array (REC), Receivers (R1 to R13)
Max Amp (82.8002)

SWF_SET .MF_MONO .MP_MF_D .MS3 .MSIPCOMM .MF [C80329]
Model Order (3), Tolerance (50%), Array (REC), Receivers (R1 to R13)
Max Amp (99.8384)

Model Dispersive Slowness
- Dipole 1
- Dipole 2
- Stoneley
- Leaky p

Non–Dispersive Slowness
- Shear 1
- Shear 2
- Shear for St
- Stoneley
- Compressional
- Mud

Input Selection

Mud DT	(us/ft)	196	Fixed Value

Radial Variation Profiling
- SPI3–SRVP, WF1 and Shear DT1
- SPI3–SRVP, WF2 and Shear DT2
- STRVP Manual Picking

Slowness Input for SRVP
- Shear DT1
- Shear DT2

Dispersion in the Reference State
- SPI3–SRVP, WF2 and Shear DT2
- STRVP Manual Picking

TI Input Parameters

C11	(Mpsi)	–999.25
C13	(Mpsi)	–999.25
C33	(Mpsi)	–999.25
C44	(Mpsi)	–999.25
C66	(Mpsi)	–999.25

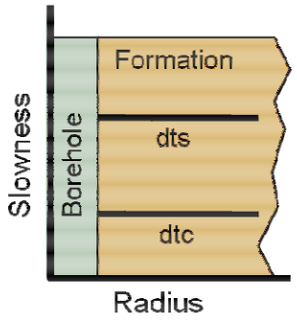
Model Type – Full TI

Thomsen's Parameters

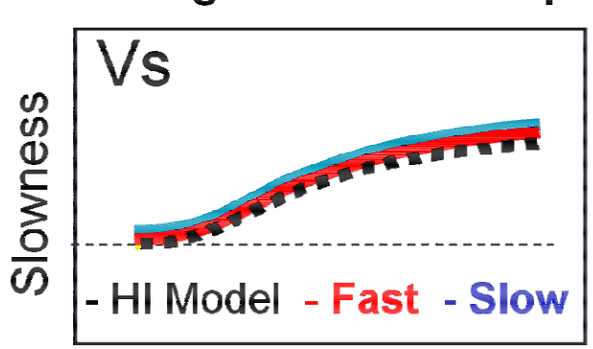
epsilon	–999.25
gamma	–999.25
delta	–999.25

Mud Density	(lbm/gal)	8.4	Fixed Value
Compr DT	(us/ft)	59.5418	Channel (DTRP@BestDT–3;2 .CO .MF_MONO .MP_MF_D .MS3 .MSIPCOMM .MF .BDT .EDT [A76743])
Shear DT 1	(us/ft)	107.576	Channel (DT_FAST_R@BestDT–3;2 .FAST_DIIN .DP_CD_D .MSIPCOMM .XD .SWAP .ROT4C .BDT .EDT [A76445])
Shear DT 2	(us/ft)	112.538	Channel (DT_SLOW_R@BestDT–3;2 .SLOW_DIIN .DP_CD_D .MSIPCOMM .YD .SWAP .ROT4C .BDT .EDT [A76599])
Shear DT for St	(us/ft)	107.576	Channel (DT_FAST_R@BestDT–3;2 .FAST_DIIN .DP_CD_D .MSIPCOMM .XD .SWAP .ROT4C .BDT .EDT [A76445])
Stoneley DT	(us/ft)	206.4	Channel (DTST DTST@FMI_CAL_MAXS_MAPC_003PUP;1 [A77909])
Bulk Density	(g/cm3)	2.76929	Channel (RHOZ RHOZ@ASCII_Load;2 [A87327])
Hole Diameter	(in)	13.2662	Channel (HD1_PPC1.AVG HD1_PPC1@FMI_CAL_MAXS_MAPC_003PUP;2 .AVG [A83315])

Homogeneous Isotropic Model

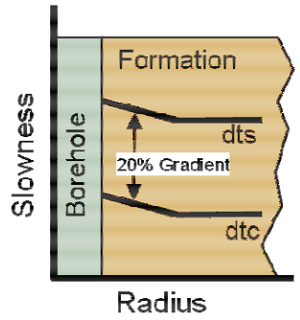


Vp,s

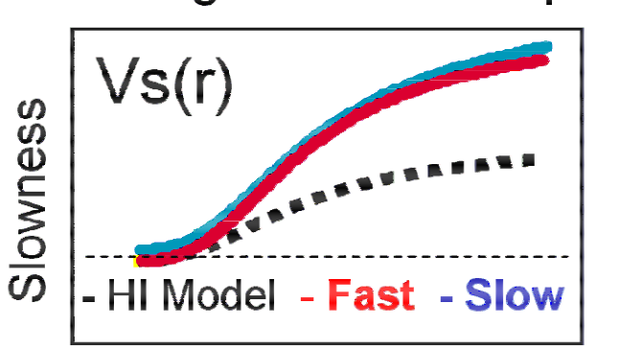


Shear slowness is the same in all directions, which is the basis of the Homogeneous Isotropic (HI) formation model.

Inhomogeneous Isotropic Model



Vp(r),Vs(r)
change with distance

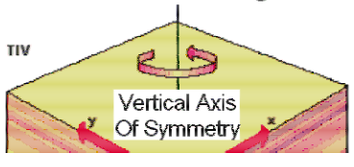


Shear slowness changes with distance from the borehole. On dispersion plots, fast and slow shear curves will overlay and be higher than the HI model at higher frequencies.

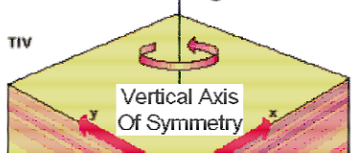
Homogeneous Anisotropic Formation Model

Transverse Isotropic Vertical – TIV
Shales & Bedding or Layering - $V_s(\theta)$

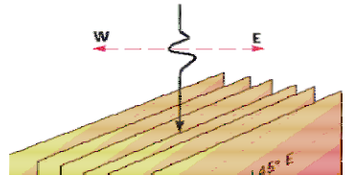
Deviated well at angle to TI axis

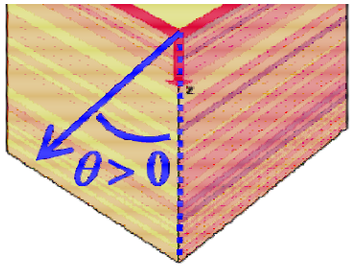


Vertical well along the TI axis

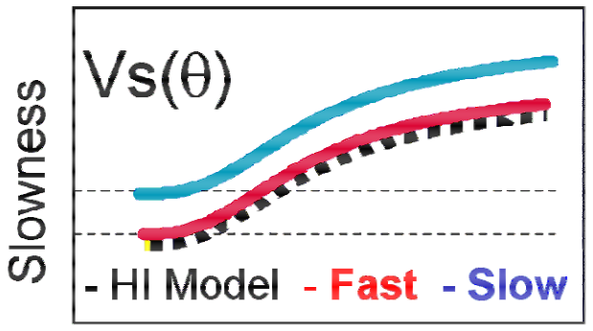


Transverse Isotropic Horizontal – TIH
Fractures - $V_s(\theta)$

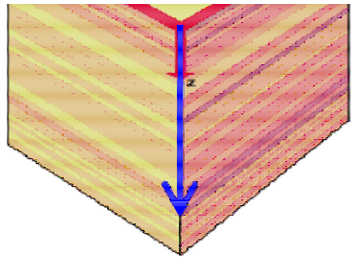




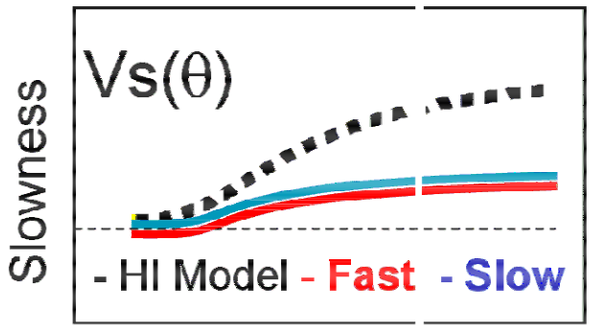
Intrinsic Anisotropy

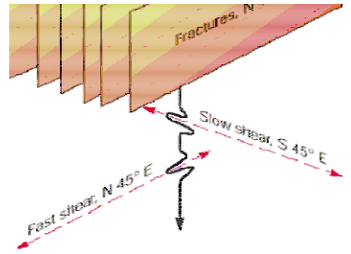


Shear velocity is function of angle in shales. On dispersion plots, the fast and slow shear are parallel to each other, and their relationship to the HI model is a function of angle.

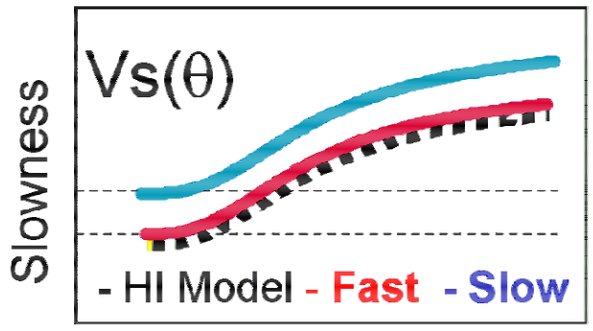


Intrinsic Anisotropy





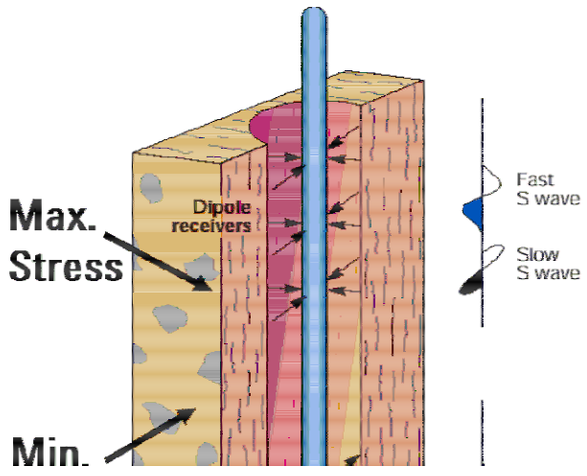
Intrinsic Anisotropy

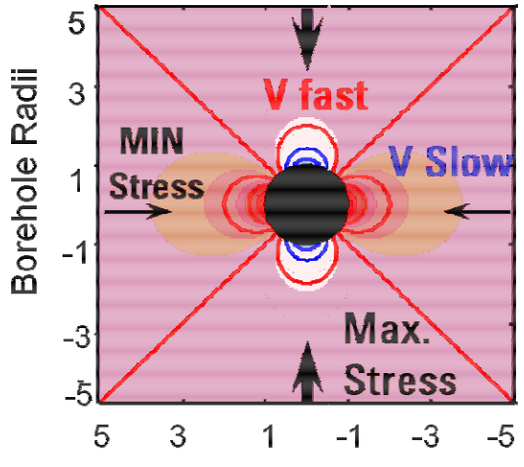


Shear travels slower across fractures. On dispersion plots, the fast and slow shear are parallel to each other, with the slow shear shape close to that of the HI model.

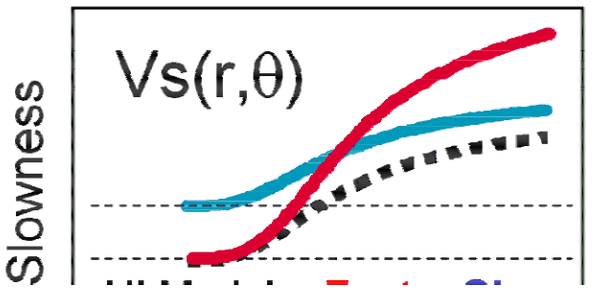
Inhomogeneous Anisotropic Formation Model

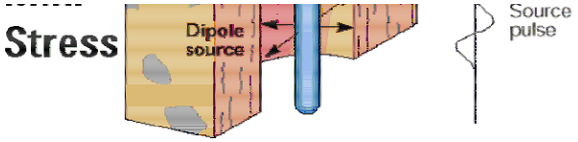
Intrinsic Anisotropy – Stress Induced – $V_s(r,\theta)$

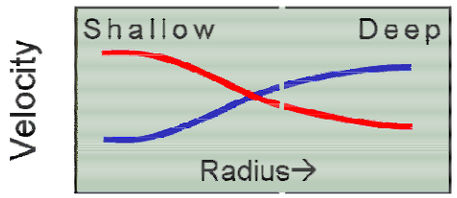




Inhomogeneous Anisotropic (Stress) Induced







- HI Model - Fast - Slow

Frequency

Shear velocity is a function of radius and angle, with the slowest shear velocity in the direction of minimum stress. On a dispersion plot, this is characterized as a crossover of the fast and slow shear as frequency increases.