

Company: ENCANA OIL & GAS INC (USA)

Well: RANCHERO 1
Field: WATTENBERG
County: WELD

State: COLORADO

ULTRASONIC IMAGER
CASING EVALUATION

County: WELD

Field: WATTENBERG

Location: SEC. 34, T2N, R66W

Well: RANCHERO 1

Com pany: ENCANA OIL & GAS INC (USA)

LOCATION

SEC. 34, T2N, R66W

SHL: 1650' FSL X 990' FWL NWSW

Elev.: K.B. 5013.00 ft
G.L. 5010.00 ft
D.F. 5012.00 ft

Permanent Datum: GROUND LEVEL

Log Measured From: GROUND LEVEL

Drilling Measured From: GROUND LEVEL

Elev.: 5010.00 ft

3.00 ft

above Perm. Datum

API Serial No. 05-123-08576-0000

Section 34

Township 2N

Range 66W

Logging Date 6-May-2013

Run Number 1

Depth Driller 7131 ft

Schlumberger Depth 7130 ft

Bottom Log Interval 7130 ft

Top Log Interval 0 ft

Casing Fluid Type FRESH WATER

Salinity

Density 8.4 lbm/gal

Fluid Level 0 ft

BIT/CASING/TUBING STRING

Bit Size 7.875 in

From

To

Casing/Tubing Size 0.000 in

Weight 11.6 lbm/ft

Grade

From

To

Maximum Recorded Temperatures

Logger On Bottom 6-May-2013

Time 8:30

Unit Number 3030

Location FORT MORGAN, CO

Recorded By KERI LORING

Witnessed By ED MARTIN

PVT DATA				Run 1	Run 2	Run
Oil Density						
Water Salinity						
Gas Gravity						
Bo						
Bw						
1/Bg						
Bubble Point Pressure						
Bubble Point Temperature						
Solution GOR						
Maximum Deviation						
CEMENTING DATA						
Primary/Squeeze			Primary			
Casing String No						
Lead Cement Type						
Volume						
Density						
Water Loss						
Additives						
Tail Cement Type						
Volume						
Density						
Water Loss						
Additives						
Expected Cement Top						
Logging Date						
Run Number						
Depth Driller						
Schlumberger Depth						
Bottom Log Interval						
Top Log Interval						
Casing Fluid Type						
Salinity						
Density						
Fluid Level						
BIT/CASING/TUBING STRING						
Bit Size						
From						
To						
Casing/Tubing Size						
Weight						
Grade						
From						
To						
Maximum Recorded Temperatures						
Logger On Bottom						
Time						
Unit Number						
Location						
Recorded By						
Witnessed By						

DEPTH SUMMARY LISTING

Date Created: 6-MAY-2013 12:33:46

Depth System Equipment

Depth Measuring Device	Tension Device	Logging Cable
Type: IDW-B Serial Number: Calibration Date: Calibrator Serial Number: Calibration Cable Type: 7-46P Wheel Correction 1: Wheel Correction 2:	Type: CMTD-B/A Serial Number: 2858 Calibration Date: 26-Apr-2013 Calibrator Serial Number: 1613 Number of Calibration Points: 10 Calibration RMS: 10 Calibration Peak Error: 15	Type: 7-39P-LXS Serial Number: 710242 Length: 17650 FT Conveyance Method: Wireline Rig Type: LAND

Depth Control Parameters

Log Sequence: First Log In the Well Rig Up Length At Surface: 0.00 FT Rig Up Length At Bottom: 0.00 FT Rig Up Length Correction: 0.00 FT Stretch Correction: Tool Zero Check At Surface:

Depth Control Remarks

1. All Schlumberger depth control procedures followed. 2. IDW used as primary depth device. 3. Z-chart used as secondary depth control device. 4. 5. 6.
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DISCLAIMER

THE USE OF AND RELIANCE UPON THIS RECORDED-DATA BY THE HEREIN NAMED COMPANY (AND ANY OF ITS AFFILIATES, PARTNERS, REPRESENTATIVES, AGENTS, CONSULTANTS AND EMPLOYEES) IS SUBJECT TO THE TERMS AND CONDITIONS AGREED UPON BETWEEN SCHLUMBERGER AND THE COMPANY, INCLUDING: (a) RESTRICTIONS ON USE OF THE RECORDED-DATA; (b) DISCLAIMERS AND WAIVERS OF WARRANTIES AND REPRESENTATIONS REGARDING COMPANY'S USE OF AND RELIANCE UPON THE RECORDED-DATA; AND (c) CUSTOMER'S FULL AND SOLE RESPONSIBILITY FOR ANY INFERENCE DRAWN OR DECISION MADE IN CONNECTION WITH THE USE OF THIS RECORDED-DATA.

OTHER SERVICES1 OS1: OS2: OS3: OS4: OS5:	OTHER SERVICES2 OS1: OS2: OS3: OS4: OS5:
REMARKS: RUN NUMBER 1 Toolstring run as per toolsketch.	REMARKS: RUN NUMBER 2
Plug set a 7131.	
Log objective: Cement and Corrosion.	
Cement and casing information used from previous log of this well on 30-Mar-2011	

Well was not filled to surface with water initially, filled during main pass and topped off during repeat passes.		
Thank you for choosing Schlumberger wireline.		
Schlumberger crew: J. Musgrave, T. Riter.		


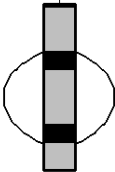
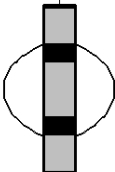
RUN 1			RUN 2		
SERVICE ORDER #:			SERVICE ORDER #:		
PROGRAM VERSION:			PROGRAM VERSION:		
FLUID LEVEL:			FLUID LEVEL:		
LOGGED INTERVAL	START	STOP	LOGGED INTERVAL	START	STOP

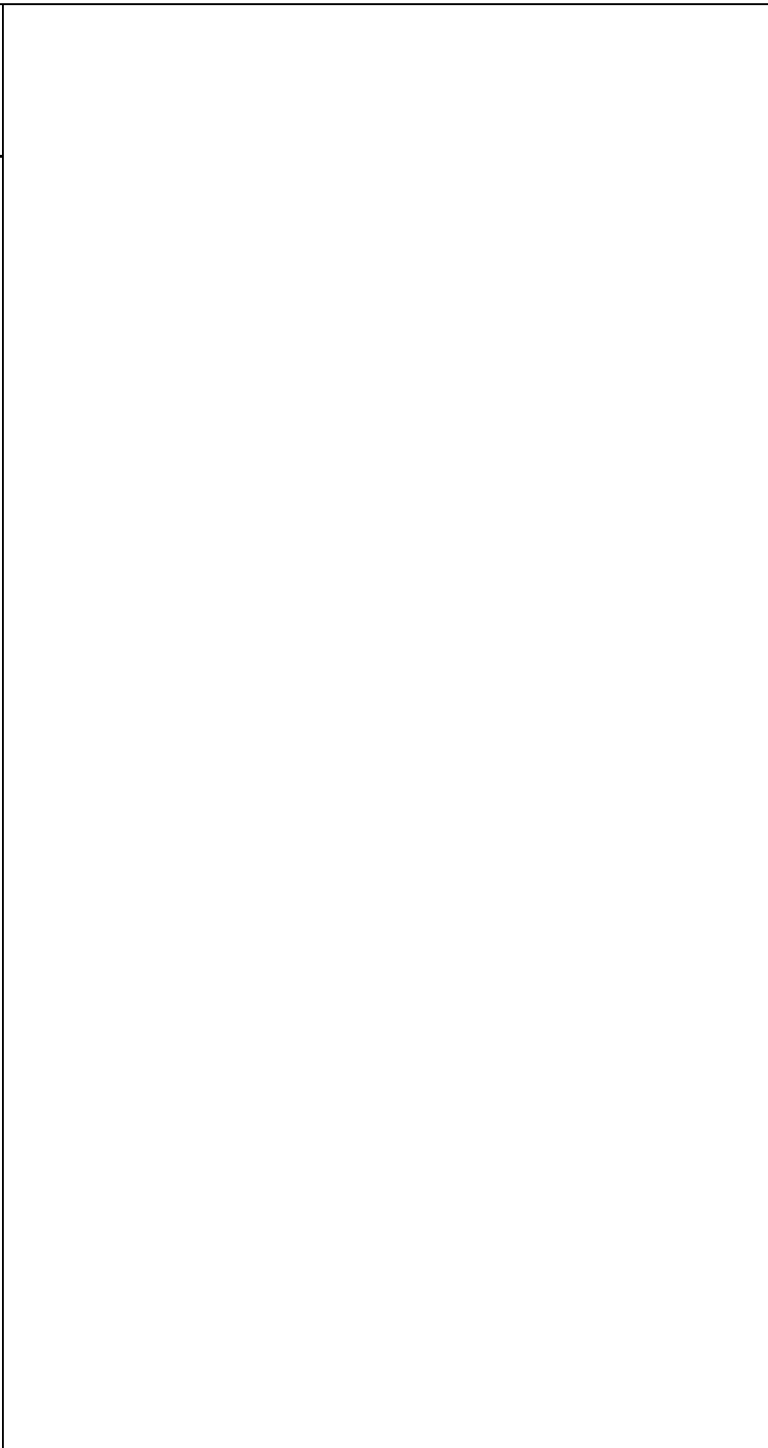
EQUIPMENT DESCRIPTION					
RUN 1			RUN 2		

SURFACE EQUIPMENT

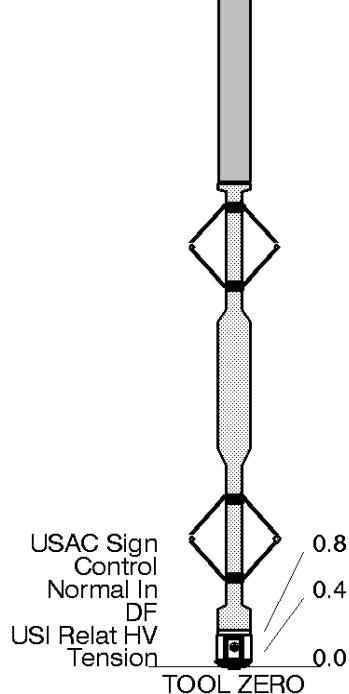
GSR-U/Y
WITM (DTS)-A

DOWNHOLE EQUIPMENT

LEH-QT LEH-QT		36.6
AH-CEN AH-CEN		33.7
DTC-H ECH-KC 10530 DTCH0-A DTCH1-A	CTEM TelStatus ToolStatu	28.9 26.9
SGT-N SGH-K 3039 SGC-TB 10249 SGD-TAB 21700	Gamma Ray	25.9
AH-107 AH-107		21.4
AH-CEN AH-CEN		19.4
USIT-E		15.6



USAC-A 981
 USIS-A 1739
 USSC-A
 USRS-A/AB 792



MAXIMUM STRING DIAMETER 3.56 IN
 MEASUREMENTS RELATIVE TO TOOL ZERO
 ALL LENGTHS IN FEET

Schlumberger

Main Pass
 5 in = 100 feet

MAXIS Field Log

Input DLIS Files

DEFAULT	USI_008LUP	FN:7	PRODUCER	06-May-2013 08:40	7110.0 FT	130.7 FT
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Output DLIS Files

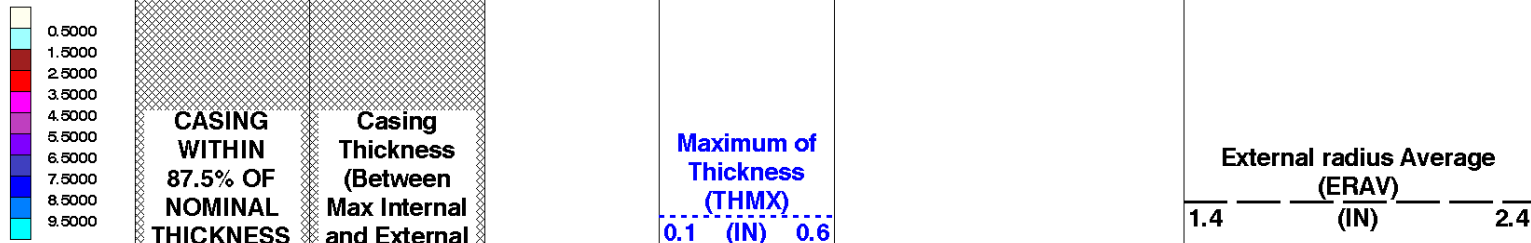
DEFAULT	USI_017PUP	FN:16	PRODUCER	06-May-2013 12:29	7086.0 FT	107.0 FT
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OP System Version: 19C1-222

USIT-E	19C1-222	SGT-N	19C1-222
DTC-H	19C1-222		

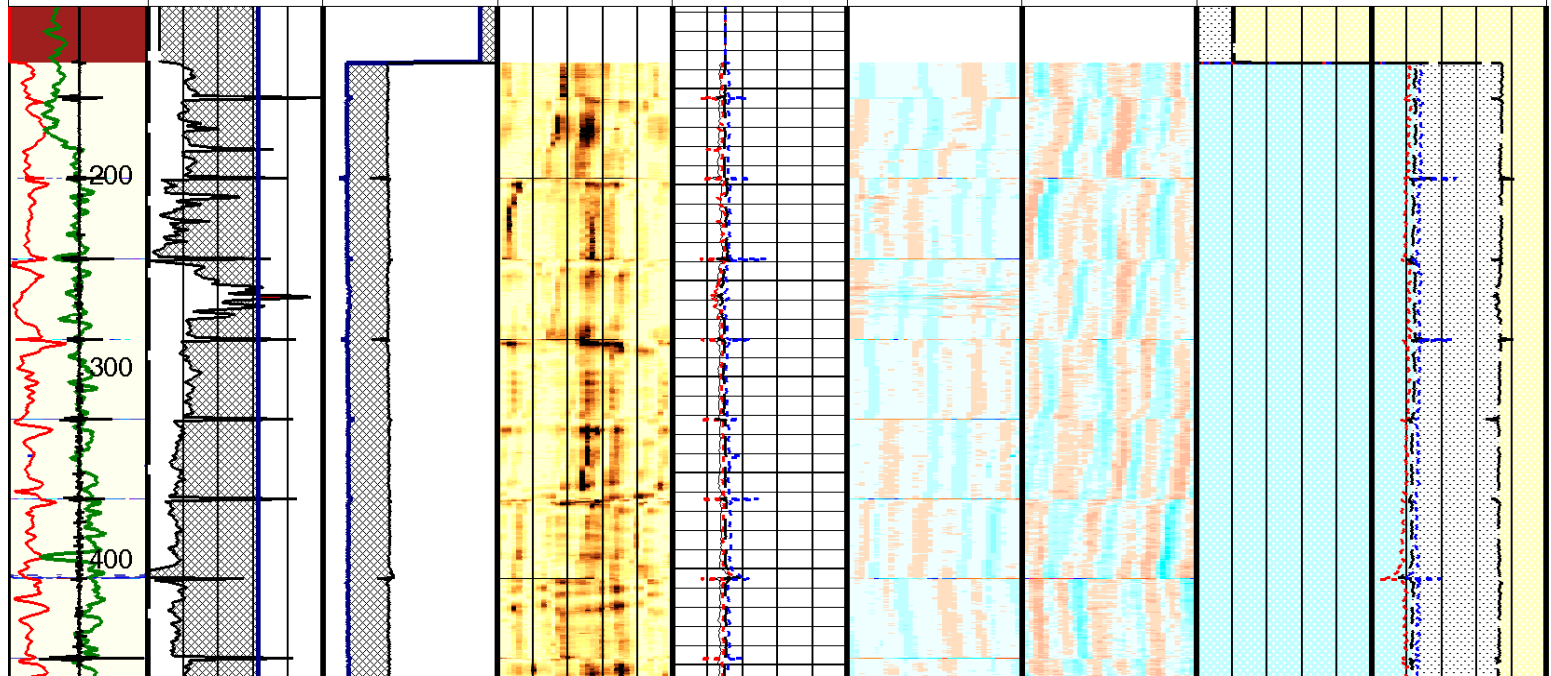
PIP SUMMARY

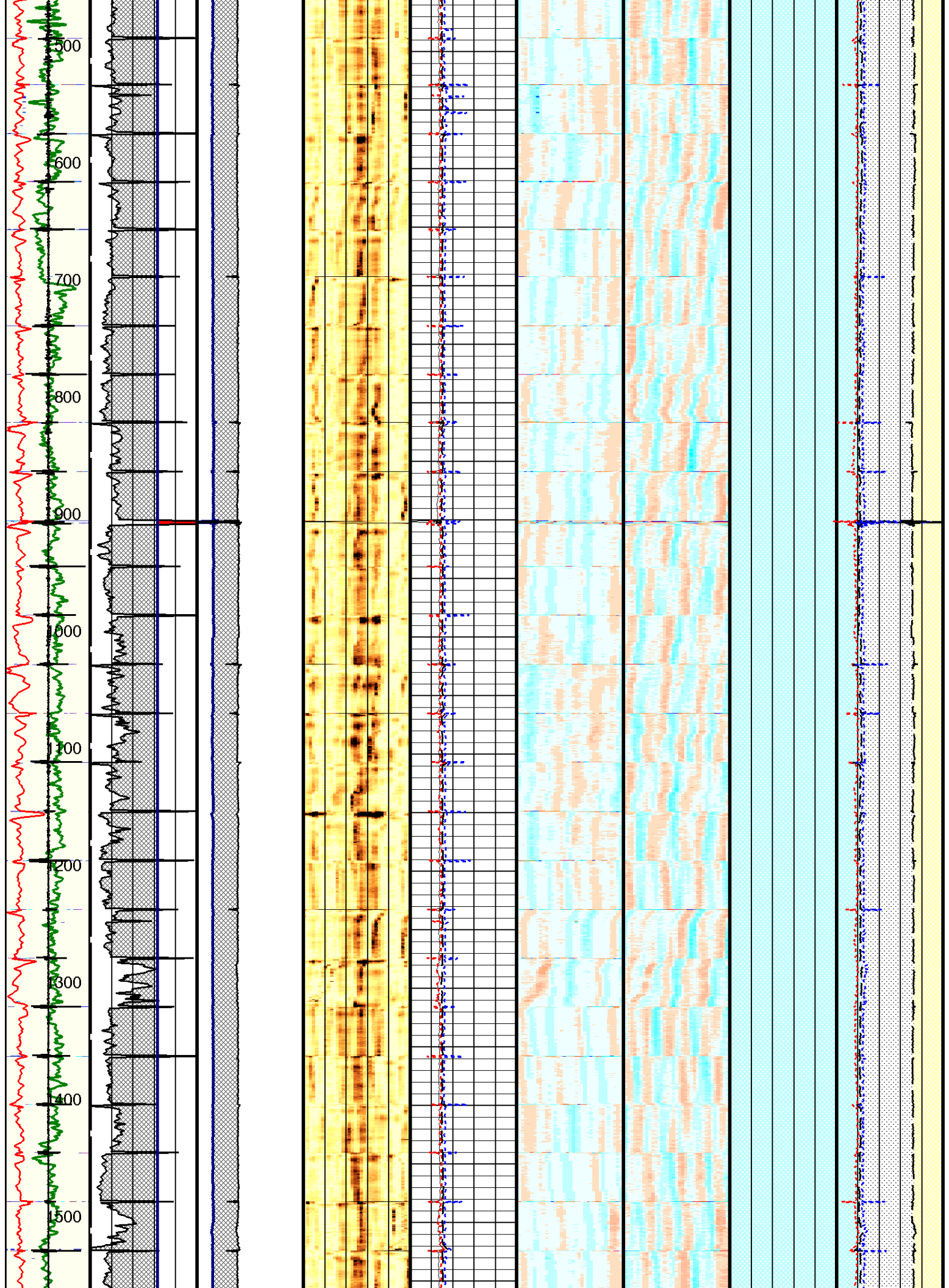
☒ Time Mark Every 60 S

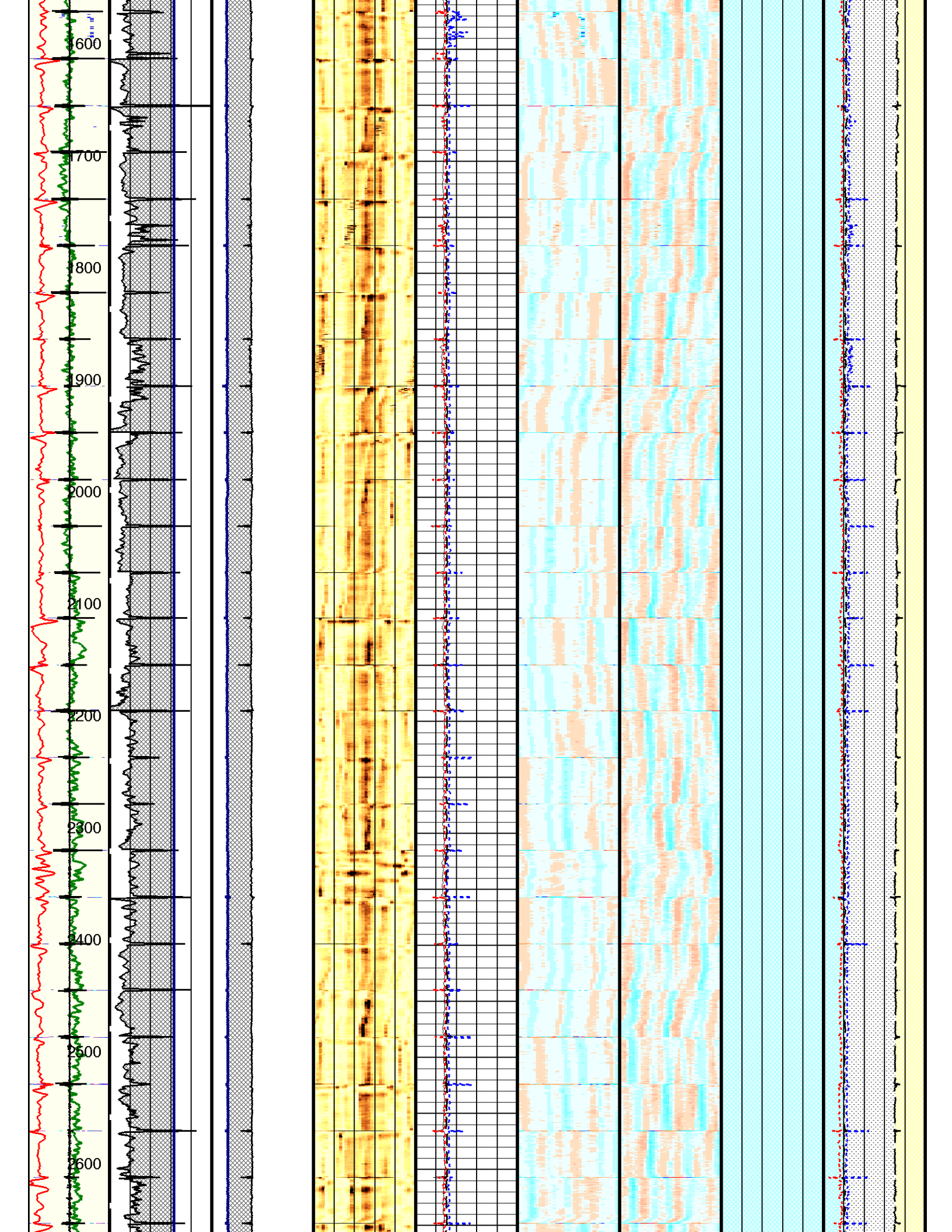


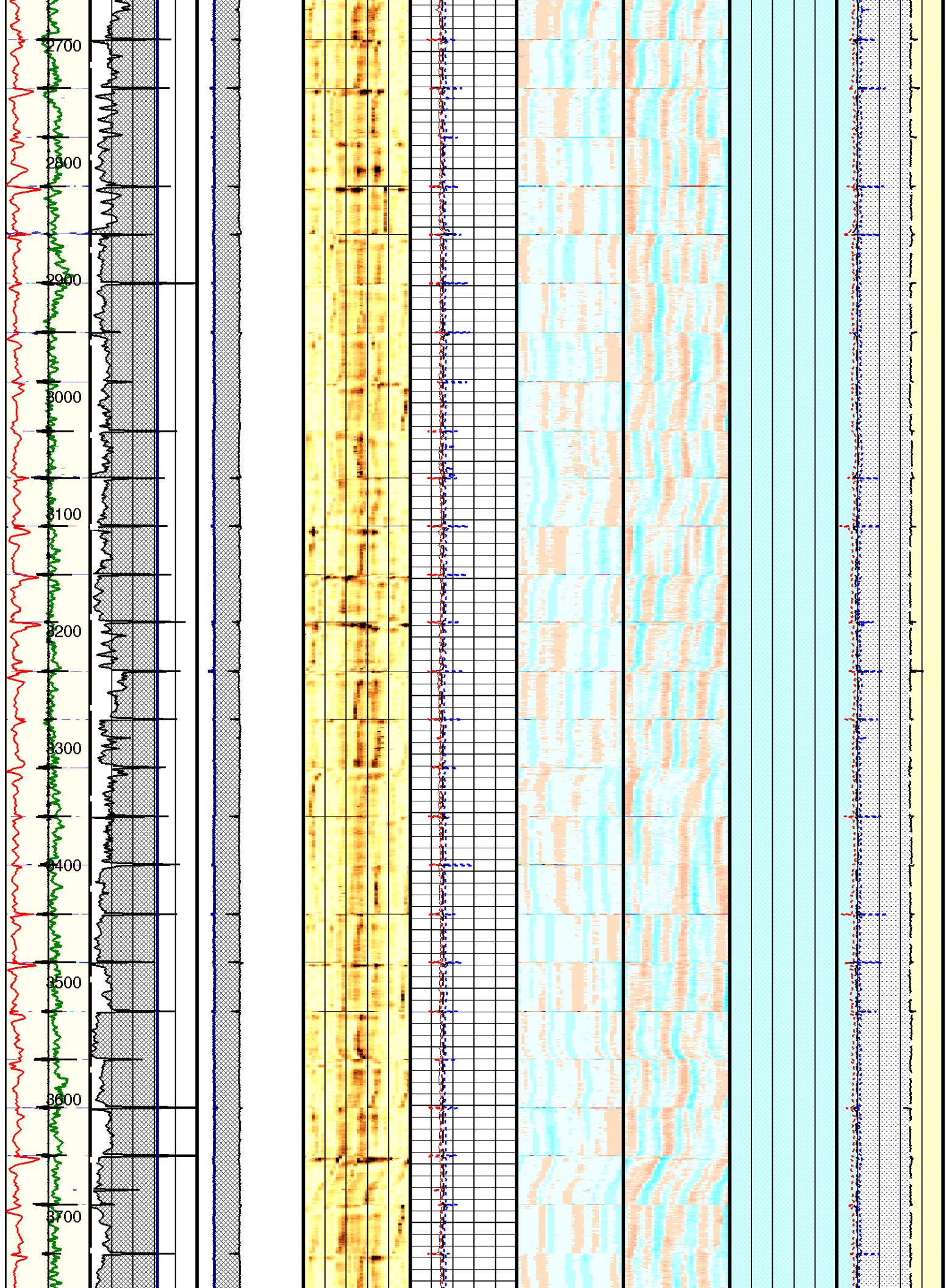
Process.
 flags
 (USFLO)

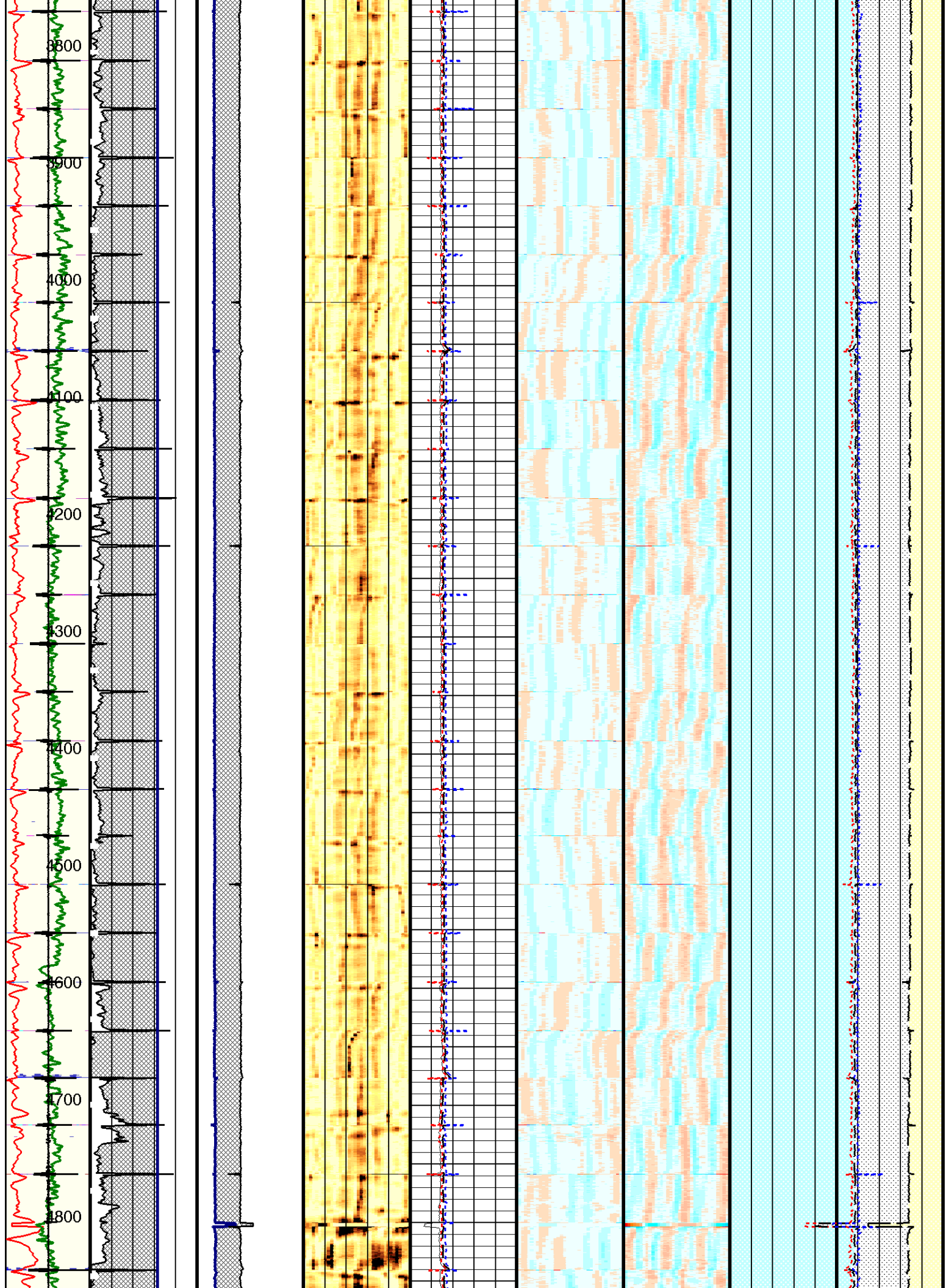
(UFLG) (----						
Gamma Ray (GR) (GAPI) 0 150	LARGE REDUCTION FROM NOMINAL THICKNESS	Internal Radius Exceeds External Average		Average of Thickness (THAV) 0.1 (IN) 0.6		Internal radius Maximum (IRMX) 1.4 (IN) 2.4
CCL (CCLU) (----	Thickness Percent from Nominal (LC02) 100 (----) 80	Internal radius Maximum (IRMX) 2.4 (IN) 1.4	<div> <div> -500.0000 -6.0000 -5.6000 -5.2000 -4.8000 -4.4000 -4.0000 -3.6000 -3.2000 -2.8000 -2.4000 -2.0000 -1.6000 -1.2000 -0.8000 -0.4000 0.0000 0.5000 </div> <div>Amplitude of echo minus Max (AWBK) (----</div> </div>	Minimum of Thickness (THMN) 0.1 (IN) 0.6		Internal radius Average (IRAV) 1.4 (IN) 2.4
Eccent. (ECCE) 0 (IN) 0.5	87.5% Reference (LC03) 100 (----) 80	External radius Average (ERAV) 2.4 (IN) 1.4	Image rotation (UCAZ) 360 (DEG) 0	ERAV - IRMX (LC07) 0.1 (IN) 0.6	<div> <div> -500.0000 -0.0760 -0.0680 -0.0600 -0.0520 -0.0440 -0.0360 -0.0280 -0.0200 -0.0120 -0.0040 0.0040 0.0120 0.0200 0.0280 0.0360 0.0440 0.0520 0.0600 0.0680 0.0760 </div> <div>Thickness minus Ave (THBK) (----</div> </div> <div> <div> -500.0000 -0.0760 -0.0680 -0.0600 -0.0520 -0.0440 -0.0360 -0.0280 -0.0200 -0.0120 -0.0040 0.0040 0.0120 0.0200 0.0280 0.0360 0.0440 0.0520 0.0600 0.0680 0.0760 </div> <div>Internal radii minus Ave (IRBK) (----</div> </div>	Internal radius Minimum (IRMN) 1.4 (IN) 2.4

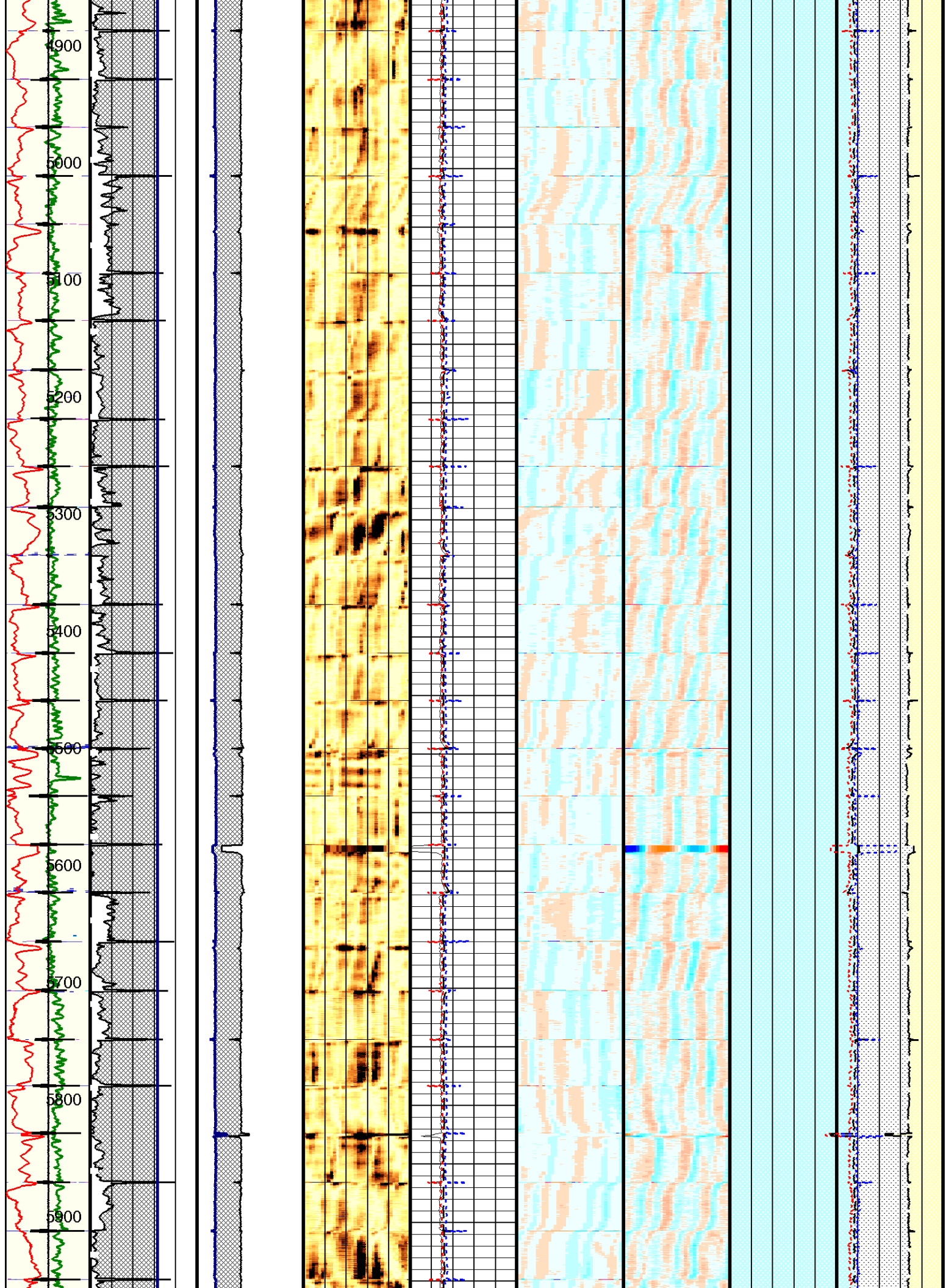


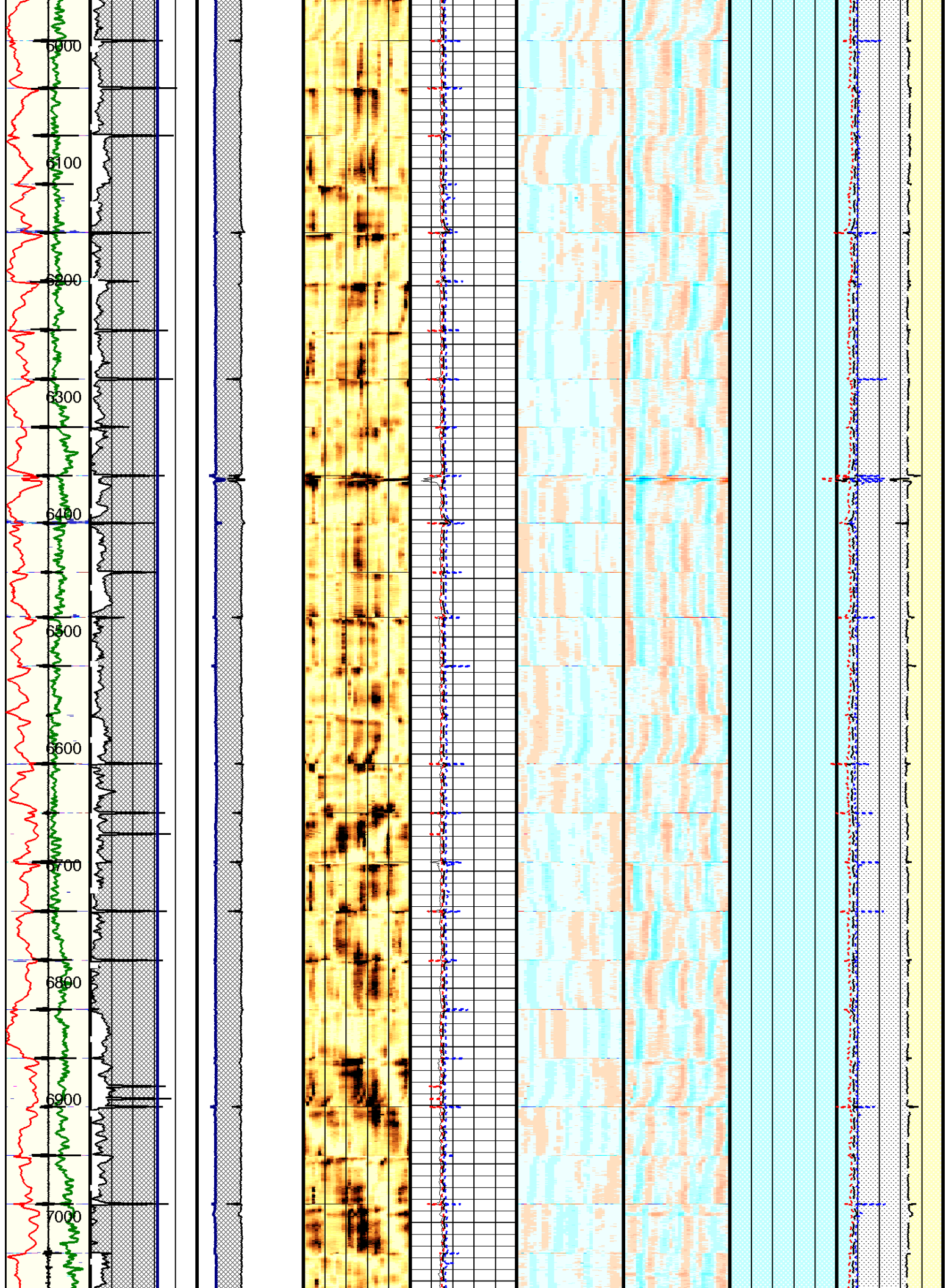


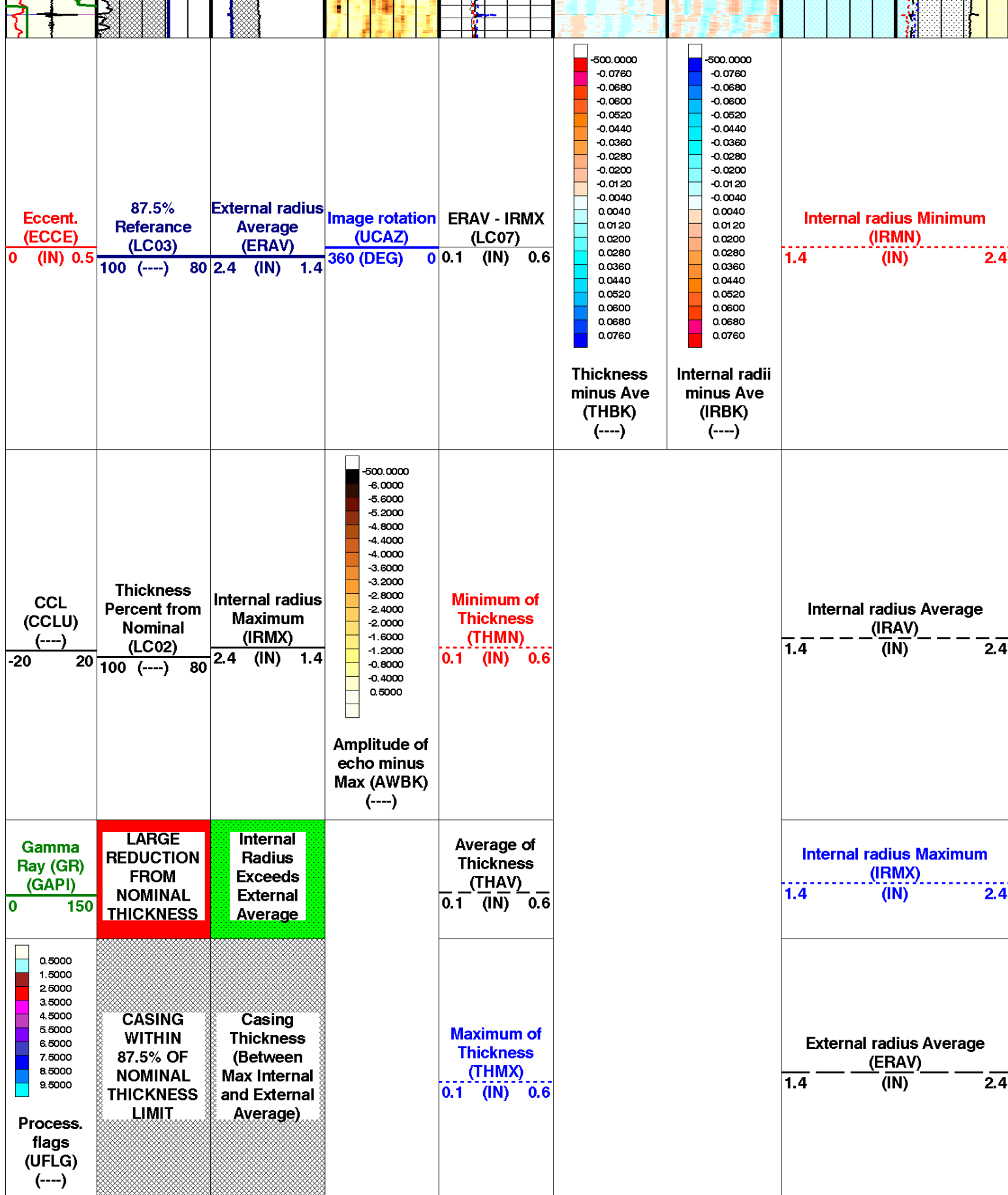












OP System Version: 19C1-222

COMPUTATION FLAGS LABELLING

(0 - 1.5)	UFLG 1	UTIM error
(1.5 - 2.5)	UFLG 2	Pulse origin not detected
(2.5 - 3.5)	UFLG 3	WINLEN error
<hr/>		
(3.5 - 6.5)	UFLG 4 UFLG 5 UFLG 6	CASING THICKNESS error
<hr/>		
(6.5 - 10)	UFLG 7 UFLG 8 UFLG 9	LOOP PROCESSING error

Parameters

DLIS Name	Description	Value	
USIT-E: Ultrasonic Imaging - E			
AGMN	Minimum Gain of Cartridge	-4	DB
AGMX	Maximum Gain of Cartridge	20	DB
BERJ	Bad Echo Rejection	ON	
CDIA	Casing Outer Diameter	4.5	IN
CSDE	Casing Density	486.94	LBCF
CSID	Casing Inner Diameter	4	IN
DFVL	Default Fluid Velocity	206	US/F
DOT	Diameter of Transducer Sensor	1.756	IN
EMXV	EMEX Voltage	20	V
FDII	FPM Data Interpolation Interval	0	FT
IMAR	Image Rotation	OFF	
MW	Mud Weight	8.4	LB/G
RCOD	Reference Calibrator Outer Diameter	4.5	IN
RCSO	Reference Calibrator Standoff	0.8425	IN
RCTH	Reference Calibrator Thickness	0.2165	IN
TCUB	T^3 Processing Level	Vax_Loop	
THDH	Maximum Search Thickness (percentage of nominal)	130	
THDL	Minimum Search Thickness (percentage of nominal)	70	
THDP	Thickness Detection Policy	Fundamental	
THNO	Nominal Thickness of Casing	0.25	IN
UMAO	USIT Measurement Angular Offset	18	DEG
USTO	Ultrasonic Time Offset	-2	US
USUB	Ultrasonic Subassembly Identifier	Sub_5_inch	
UWKM	Ultrasonic Working Mode	10DEG_3IN_60U_HF	
VCAS	Ultrasonic Transversal Velocity in Casing	51.4	US/F
WLEN	T^3 Processing Length	14.9916	US
ZCAS	Acoustic Impedance of Casing	46.25	MRAY
ZINI	Initial Estimate of Cement Impedance	-1	MRAY
ZMUD	Acoustic Impedance of Mud	1.48	MRAY
ZTCM	Acoustic Impedance Threshold for Cement	2.6	MRAY
ZTGS	Acoustic Impedance Threshold for Gas	0.3	MRAY
System and Miscellaneous			
CWEI	Casing Weight	11.60	LB/F
DO	Depth Offset for Playback	-24.0	FT
PP	Playback Processing	RECOMPUTE	

Input DLIS Files

DEFAULT	USI_008LUP	FN:7	PRODUCER	06-May-2013 08:40	7110.0 FT	130.7 FT
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Output DLIS Files

DEFAULT	USI_017PUP	FN:16	PRODUCER	06-May-2013 12:29
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Schlumberger

**High Res Repeat 0 - 290 Feet
5 in = 100 Feet**

Input DLIS Files

DEFAULT USI_015LUP FN:14 PRODUCER 06-May-2013 11:47 313.0 FT -5.5 FT

Output DLIS Files

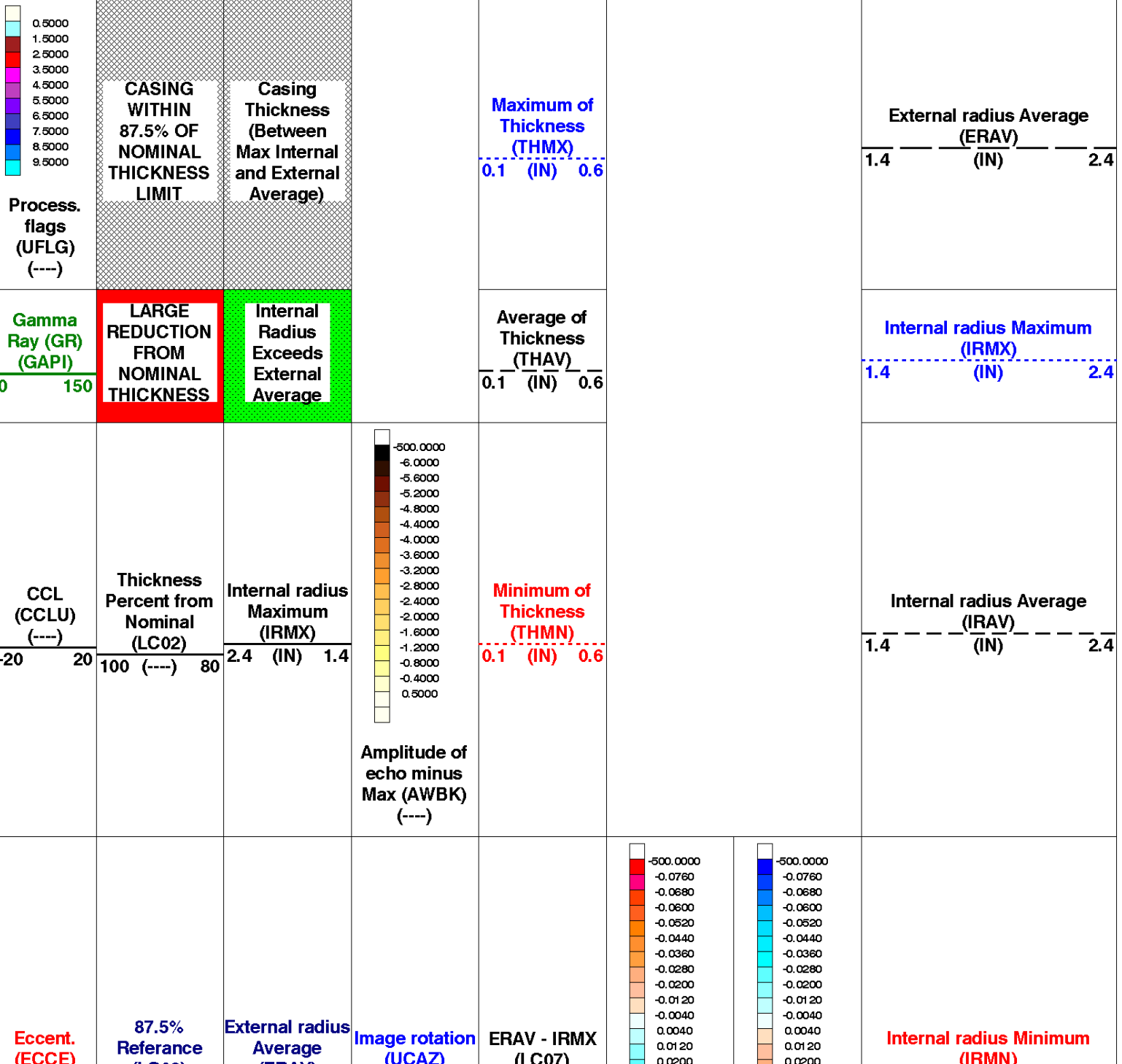
DEFAULT USI_028PUP FN:27 PRODUCER 06-May-2013 13:01 293.0 FT -25.5 FT

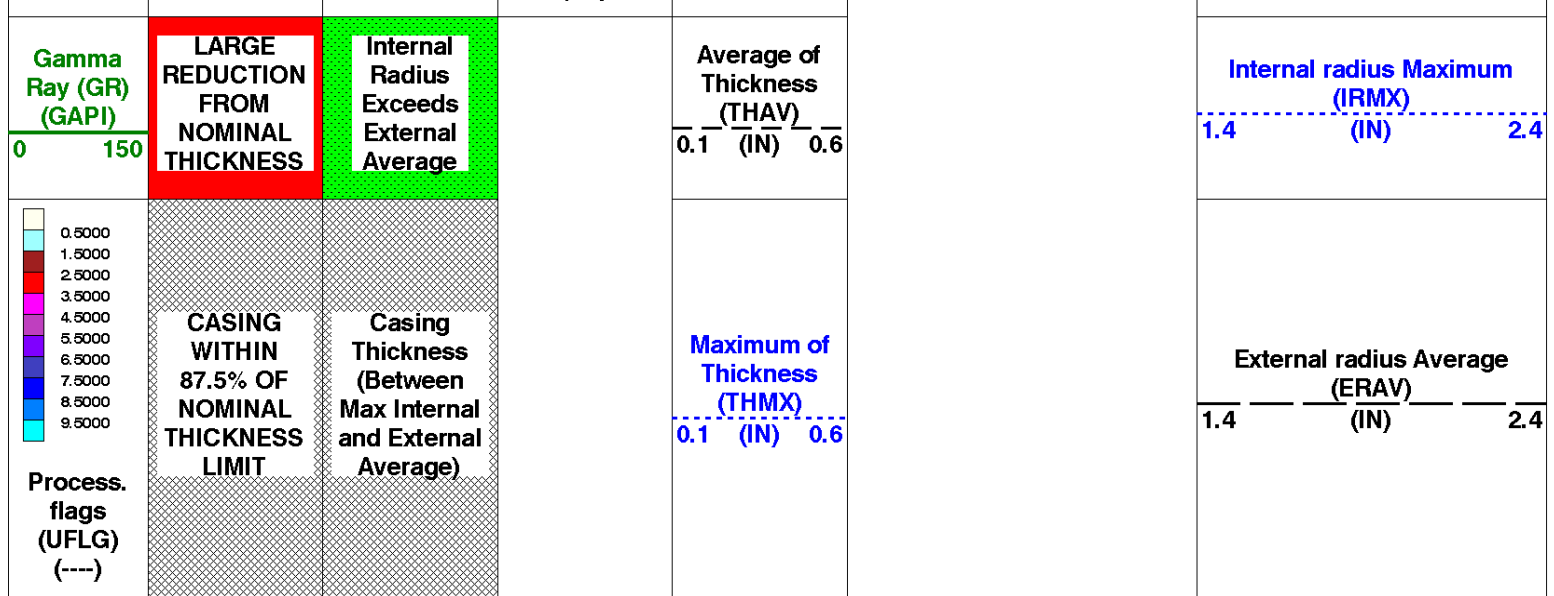
OP System Version: 19C1-222

USIT-E 19C1-222 SGT-N 19C1-222
DTC-H 19C1-222

PIP SUMMARY

 Time Mark Every 60 S





PIP SUMMARY

Time Mark Every 60 S

Format: USIT CASING 5 inch Vertical Scale: 1" per 100'

Graphics File Created: 06-May-2013 13:01

OP System Version: 19C1-222

USIT-E	19C1-222	SGT-N	19C1-222
DTC-H	19C1-222		

COMPUTATION FLAGS LABELLING


(0 - 1.5)	UFLG 1	UTIM error
(1.5 - 2.5)	UFLG 2	Pulse origin not detected
(2.5 - 3.5)	UFLG 3	WINLEN error
<hr/>		
(3.5 - 6.5)	UFLG 4 UFLG 5 UFLG 6	CASING THICKNESS error
<hr/>		
(6.5 - 10)	UFLG 7 UFLG 8 UFLG 9	LOOP PROCESSING error

Parameters

DLIS Name	Description	Value
USIT-E: Ultrasonic Imaging - E		
AGMN	Minimum Gain of Cartridge	-4 DB
AGMX	Maximum Gain of Cartridge	20 DB
BERJ	Bad Echo Rejection	ON
CDIA	Casing Outer Diameter	4.5 IN
CSDE	Casing Density	486.94 LBCF
CSID	Casing Inner Diameter	4 IN
DFVL	Default Fluid Velocity	206 US/F
DOT	Diameter of Transducer Sensor	1.756 IN
EMXV	EMEX Voltage	20 V
FDII	FPM Data Interpolation Interval	0 FT
IMAR	Image Rotation	OFF
MW	Mud Weight	8.4 LB/G
RCOD	Reference Calibrator Outer Diameter	4.5 IN
RCSO	Reference Calibrator Standoff	0.8425 IN
RCTH	Reference Calibrator Thickness	0.2165 IN
TCUB	T ³ Processing Level	Vax_Loop
THDH	Maximum Search Thickness (percentage of nominal)	130
THDL	Minimum Search Thickness (percentage of nominal)	70
THDP	Thickness Detection Policy	Fundamental
THNO	Nominal Thickness of Casing	0.25 IN
UMAO	USIT Measurement Angular Offset	18 DEG
USTO	Ultrasonic Time Offset	2 US

USUB	Ultrasonic Subassembly Identifier	Sub 5 inch	US
UWKM	Ultrasonic Working Mode	10DEG_0_6IN_60U HF	
VCAS	Ultrasonic Transversal Velocity in Casing	51.4	US/F
WLEN	T^3 Processing Length	14.9916	US
ZCAS	Acoustic Impedance of Casing	46.25	MRAY
ZINI	Initial Estimate of Cement Impedance	-1	MRAY
ZMUD	Acoustic Impedance of Mud	1.48	MRAY
ZTCM	Acoustic Impedance Threshold for Cement	2.6	MRAY
ZTGS	Acoustic Impedance Threshold for Gas	0.3	MRAY
System and Miscellaneous			
CWEI	Casing Weight	11.60	LB/F
DO	Depth Offset for Playback	-20.0	FT
PP	Playback Processing	RECOMPUTE	

Input DLIS Files						
DEFAULT	USI_015LUP	FN:14	PRODUCER	06-May-2013 11:47	313.0 FT	-5.5 FT
Output DLIS Files						
DEFAULT	USI_028PUP	FN:27	PRODUCER	06-May-2013 13:01		



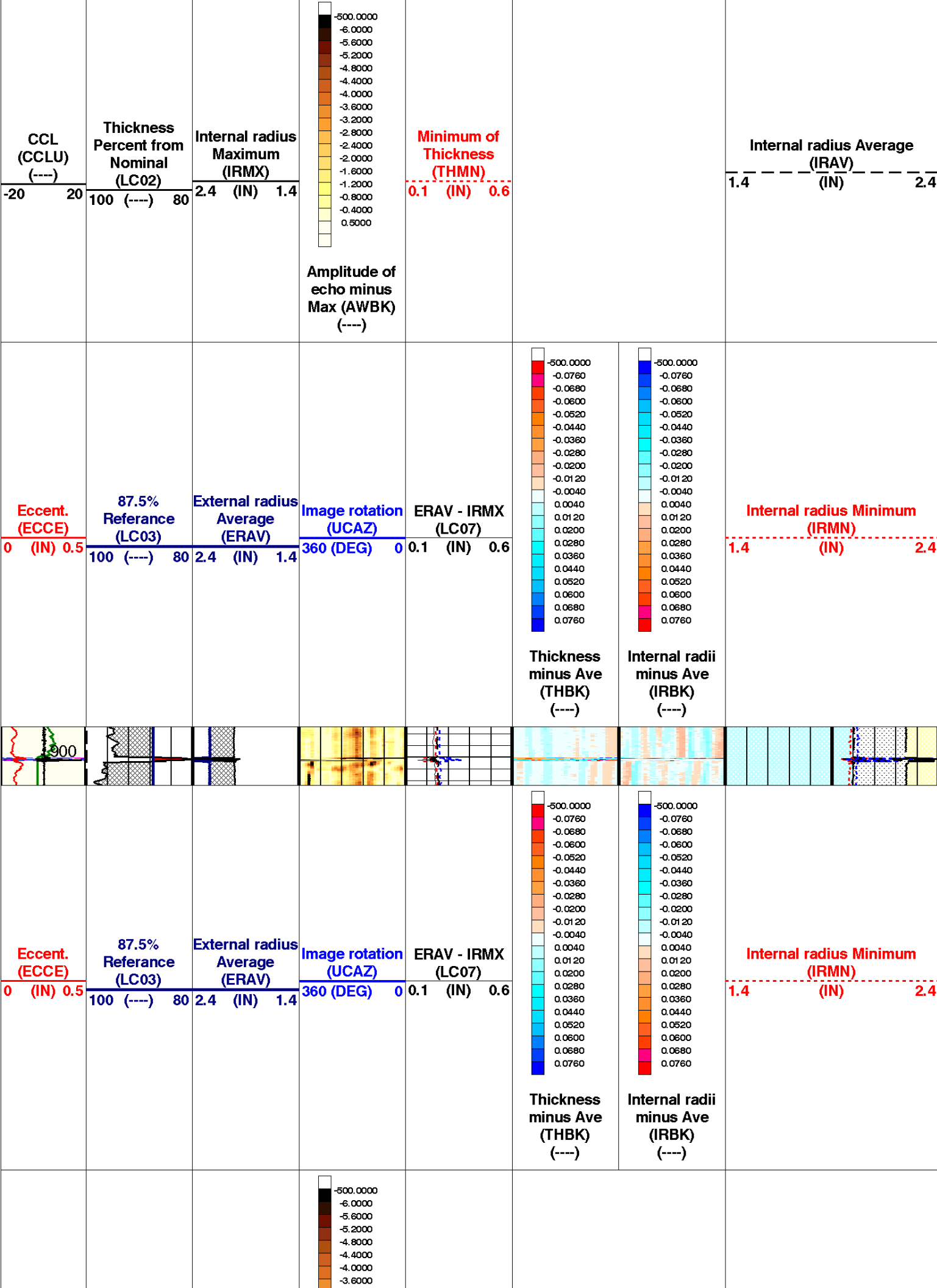
High Res Repeat 875 - 920 Feet
5 in = 100 Feet

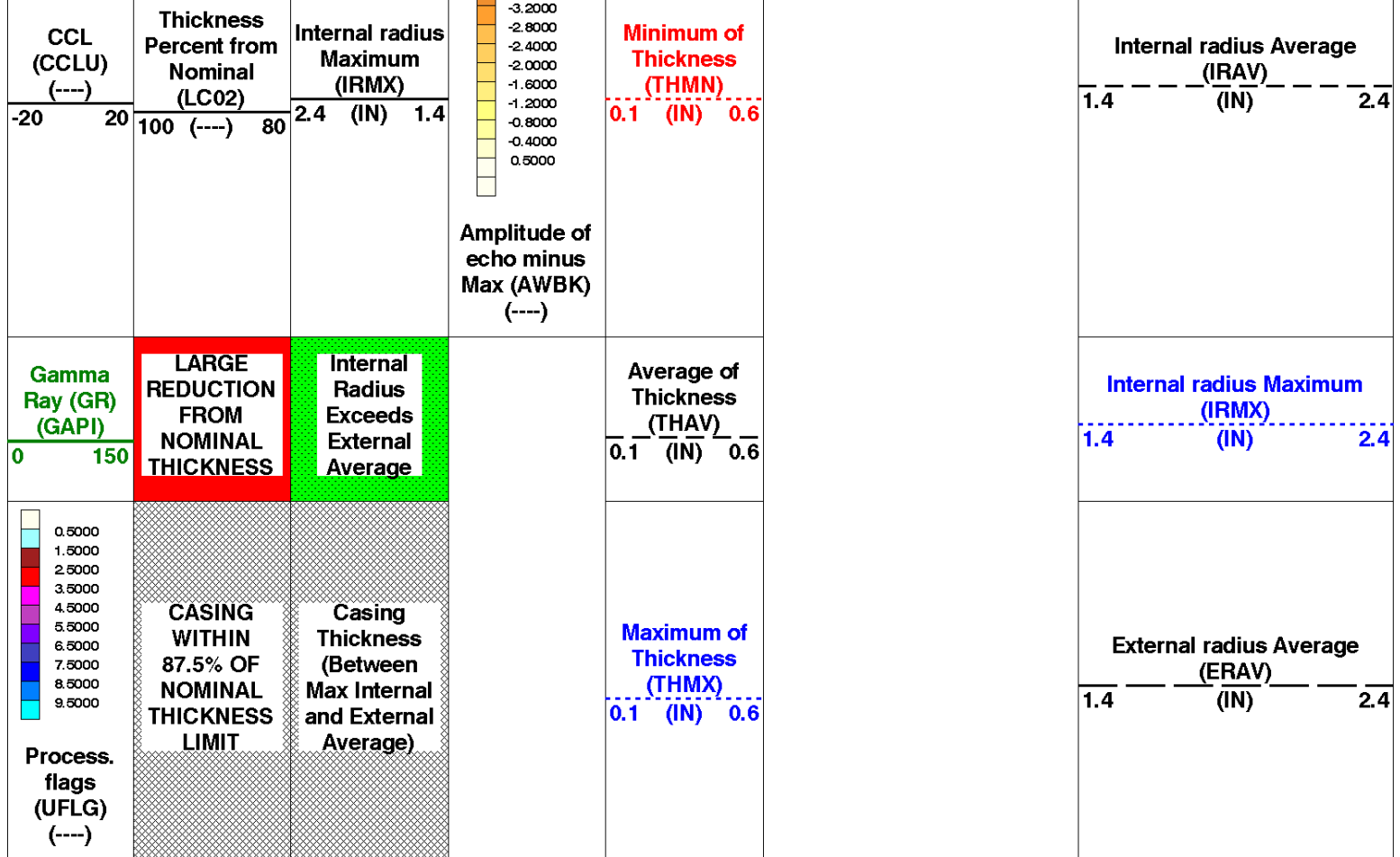
MAXIS Field Log

Input DLIS Files						
DEFAULT	USI_014LUP	FN:13	PRODUCER	06-May-2013 11:42	944.0 FT	894.0 FT
Output DLIS Files						
DEFAULT	USI_027PUP	FN:26	PRODUCER	06-May-2013 13:00	924.0 FT	874.0 FT

OP System Version: 19C1-222						
USIT-E	19C1-222	SGT-N	19C1-222			
DTC-H	19C1-222					

PIP SUMMARY					
<div><div><div><div></div><div>Time Mark Every 60 S</div></div></div></div>					
<div><div><div></div><div>0.5000</div></div><div><div></div><div>1.5000</div></div><div><div></div><div>2.5000</div></div><div><div></div><div>3.5000</div></div><div><div></div><div>4.5000</div></div><div><div></div><div>5.5000</div></div><div><div></div><div>6.5000</div></div><div><div></div><div>7.5000</div></div><div><div></div><div>8.5000</div></div><div><div></div><div>9.5000</div></div></div>	<div><div>CASING WITHIN 87.5% OF NOMINAL THICKNESS LIMIT</div></div>	<div><div>Casing Thickness (Between Max Internal and External Average)</div></div>	<div><div>Maximum of Thickness (THMX)</div><div>0.1 (IN) 0.6</div></div>	<div><div>External radius Average (ERAV)</div><div>1.4 (IN) 2.4</div></div>	
<div><div>Process. flags (UFLG) (----)</div></div>	<div><div>LARGE REDUCTION FROM NOMINAL THICKNESS</div></div>	<div><div>Internal Radius Exceeds External Average</div></div>	<div><div>Average of Thickness (THAV)</div><div>0.1 (IN) 0.6</div></div>	<div><div>Internal radius Maximum (IRMX)</div><div>1.4 (IN) 2.4</div></div>	
<div><div>Gamma Ray (GR) (GAPI)</div><div>0150</div></div>					





PIP SUMMARY

Time Mark Every 60 S

Format: USIT CASING 5 inch Vertical Scale: 1" per 100' Graphics File Created: 06-May-2013 13:00

OP System Version: 19C1-222

USIT-E 19C1-222 SGT-N 19C1-222
DTC-H 19C1-222

COMPUTATION FLAGS LABELLING

(0 - 1.5) UFLG 1 UTIM error

(1.5 - 2.5) UFLG 2 Pulse origin not detected

(2.5 - 3.5) UFLG 3 WINLEN error

(3.5 - 6.5) UFLG 4 UFLG 5 UFLG 6 CASING THICKNESS error

(6.5 - 10) UFLG 7 UFLG 8 UFLG 9 LOOP PROCESSING error

Parameters

DLIS Name	Description	Value	
USIT-E: Ultrasonic Imaging - E			
AGMN	Minimum Gain of Cartridge	-4	DB
AGMX	Maximum Gain of Cartridge	20	DB
BERJ	Bad Echo Rejection	ON	
CDIA	Casing Outer Diameter	4.5	IN
CSDE	Casing Density	486.94	LBCF
CSID	Casing Inner Diameter	4	IN
DFVL	Default Fluid Velocity	206	US/F


DOT	Diameter of Transducer Sensor	1.756	IN
EMXV	EMEX Voltage	20	V
FDII	FPM Data Interpolation Interval	0	FT
IMAR	Image Rotation	OFF	
MW	Mud Weight	8.4	LB/G
RCOD	Reference Calibrator Outer Diameter	4.5	IN
RCSO	Reference Calibrator Standoff	0.8425	IN
RCTH	Reference Calibrator Thickness	0.2165	IN
TCUB	T ³ Processing Level	Vax_Loop	
THDH	Maximum Search Thickness (percentage of nominal)	130	
THDL	Minimum Search Thickness (percentage of nominal)	70	
THDP	Thickness Detection Policy	Fundamental	
THNO	Nominal Thickness of Casing	0.25	IN
UMAO	USIT Measurement Angular Offset	18	DEG
USTO	Ultrasonic Time Offset	-2	US
USUB	Ultrasonic Subassembly Identifier	Sub 5 inch	
UWKM	Ultrasonic Working Mode	10DEG_0_6IN_60U_HF	
VCAS	Ultrasonic Transversal Velocity in Casing	51.4	US/F
WLEN	T ³ Processing Length	14.9916	US
ZCAS	Acoustic Impedance of Casing	46.25	MRAY
ZINI	Initial Estimate of Cement Impedance	-1	MRAY
ZMUD	Acoustic Impedance of Mud	1.48	MRAY
ZTCM	Acoustic Impedance Threshold for Cement	2.6	MRAY
ZTGS	Acoustic Impedance Threshold for Gas	0.3	MRAY
System and Miscellaneous			
CWEI	Casing Weight	11.60	LB/F
DO	Depth Offset for Playback	-20.0	FT
PP	Playback Processing	RECOMPUTE	

Input DLIS Files

DEFAULT USI_014LUP FN:13 PRODUCER 06-May-2013 11:42 944.0 FT 894.0 FT

Output DLIS Files

DEFAULT USI_027PUP FN:26 PRODUCER 06-May-2013 13:00



High Res Repeat 1245 - 1340 Feet

5 in = 100 Feet

MAXIS Field Log

Input DLIS Files

DEFAULT USI_013LUP FN:12 PRODUCER 06-May-2013 11:14 1361.5 FT 1263.0 FT

Output DLIS Files

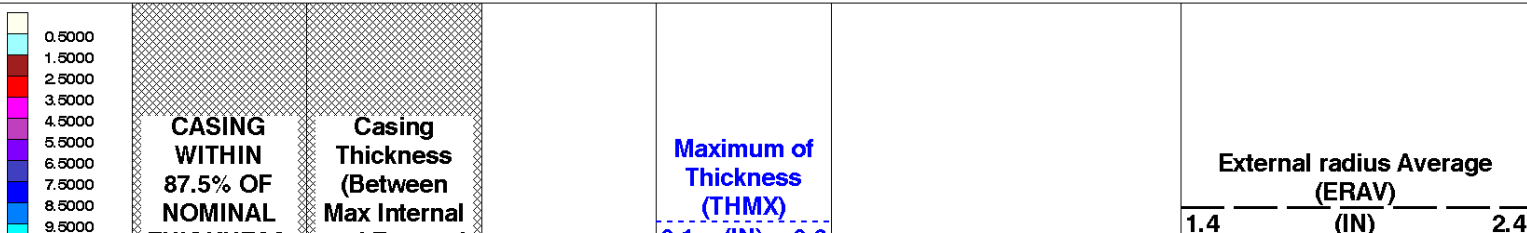
DEFAULT USI_026PUP FN:25 PRODUCER 06-May-2013 12:59 1341.5 FT 1243.0 FT

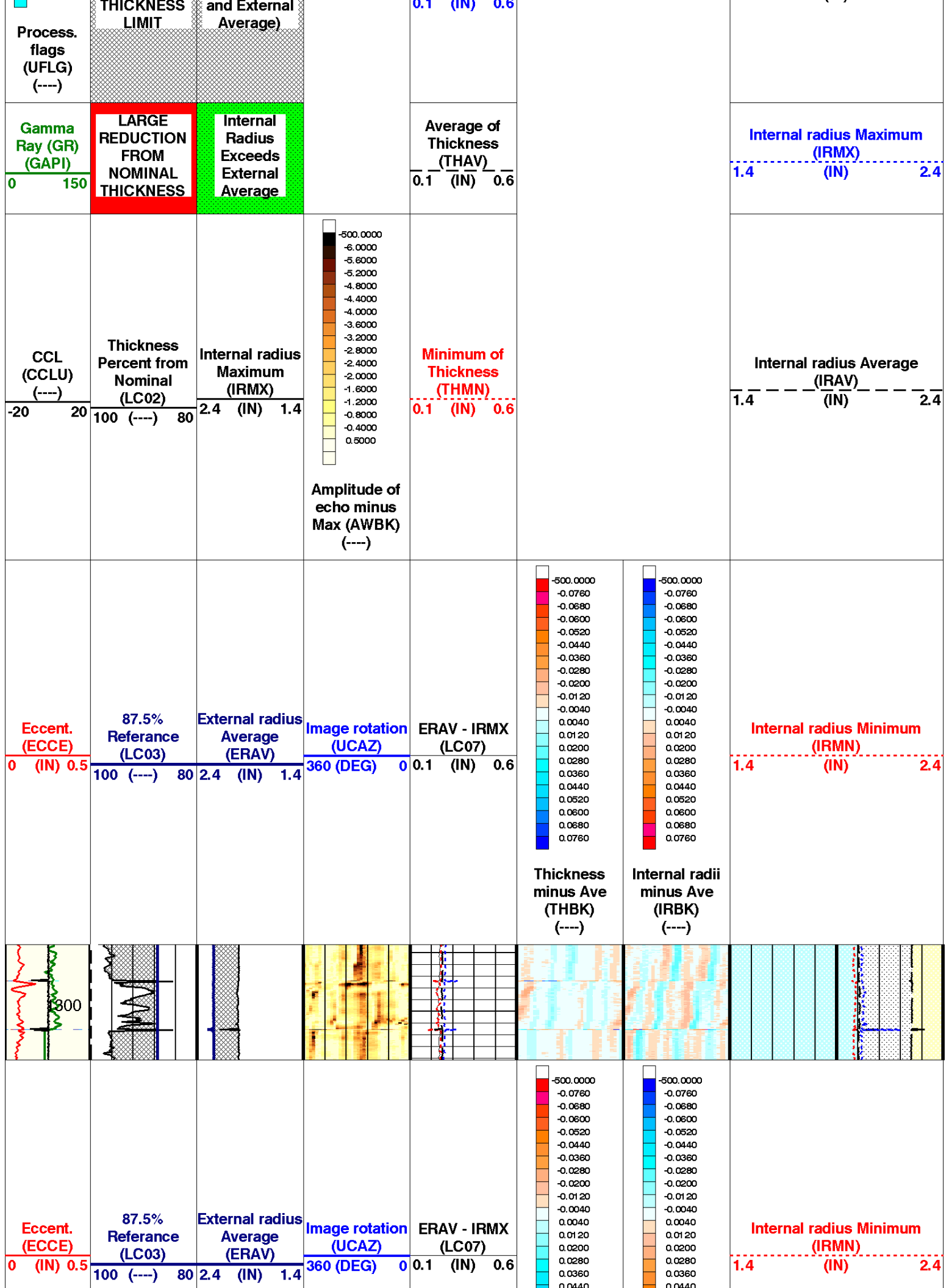
OP System Version: 19C1-222

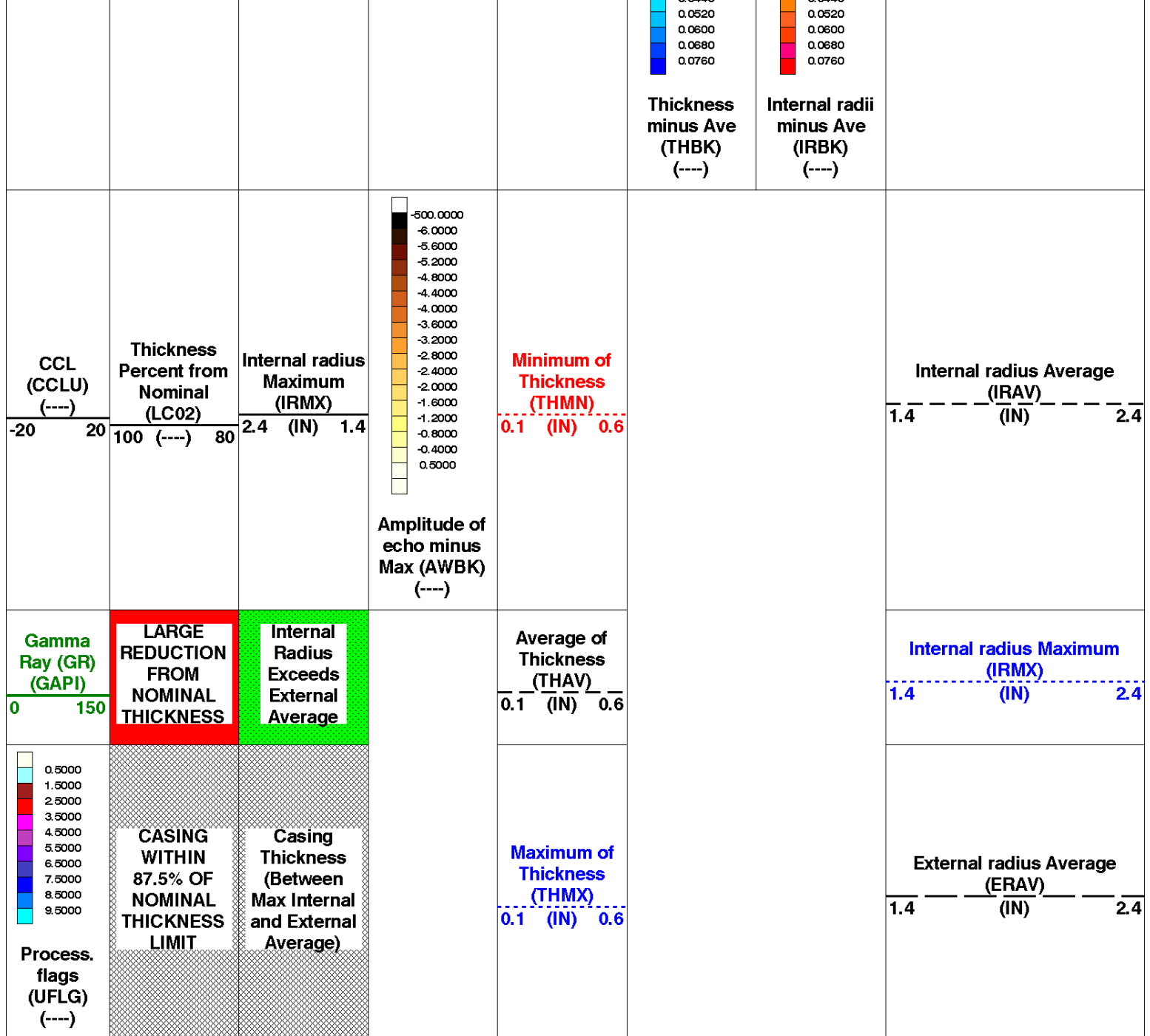
USIT-E 19C1-222 SGT-N 19C1-222
DTC-H 19C1-222

PIP SUMMARY

 Time Mark Every 60 S







PIP SUMMARY

 Time Mark Every 60 S

Format: USIT CASING 5 inch Vertical Scale: 1" per 100'

Graphics File Created: 06-May-2013 12:59

OP System Version: 19C1-222

USIT-E 19C1-222
DTC-H 19C1-222

SGT-N 19C1-222

COMPUTATION FLAGS LABELLING

(0 - 1.5)	UFLG 1	UTIM error
(1.5 - 2.5)	UFLG 2	Pulse origin not detected
(2.5 - 3.5)	UFLG 3	WINLEN error
<hr/>		
(3.5 - 6.5)	UFLG 4 UFLG 5 UFLG 6	CASING THICKNESS error

Parameters

DLIS Name	Description	Value	
USIT-E: Ultrasonic Imaging - E			
AGMN	Minimum Gain of Cartridge	-4	DB
AGMX	Maximum Gain of Cartridge	20	DB
BERJ	Bad Echo Rejection	ON	
CDIA	Casing Outer Diameter	4.5	IN
CSDE	Casing Density	486.94	LBCF
CSID	Casing Inner Diameter	4	IN
DFVL	Default Fluid Velocity	206	US/F
DOT	Diameter of Transducer Sensor	1.756	IN
EMXV	EMEX Voltage	30	V
FDII	FPM Data Interpolation Interval	0	FT
IMAR	Image Rotation	OFF	
MW	Mud Weight	8.4	LB/G
RCOD	Reference Calibrator Outer Diameter	4.5	IN
RCSO	Reference Calibrator Standoff	0.8425	IN
RCTH	Reference Calibrator Thickness	0.2165	IN
TCUB	T^3 Processing Level	Vax_Loop	
THDH	Maximum Search Thickness (percentage of nominal)	130	
THDL	Minimum Search Thickness (percentage of nominal)	70	
THDP	Thickness Detection Policy	Fundamental	
THNO	Nominal Thickness of Casing	0.25	IN
UMAO	USIT Measurement Angular Offset	18	DEG
USTO	Ultrasonic Time Offset	-2	US
USUB	Ultrasonic Subassembly Identifier	Sub 5 inch	
UWKM	Ultrasonic Working Mode	10DEG_0_6IN_60U_HF	
VCAS	Ultrasonic Transversal Velocity in Casing	51.4	US/F
WLEN	T^3 Processing Length	14.9916	US
ZCAS	Acoustic Impedance of Casing	46.25	MRAY
ZINI	Initial Estimate of Cement Impedance	-1	MRAY
ZMUD	Acoustic Impedance of Mud	1.48	MRAY
ZTCM	Acoustic Impedance Threshold for Cement	2.6	MRAY
ZTGS	Acoustic Impedance Threshold for Gas	0.3	MRAY
System and Miscellaneous			
CWEI	Casing Weight	11.60	LB/F
DO	Depth Offset for Playback	-20.0	FT
PP	Playback Processing	RECOMPUTE	

Input DLIS Files

DEFAULT	USI_013LUP	FN:12	PRODUCER	06-May-2013 11:14	1361.5 FT	1263.0 FT
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Output DLIS Files

DEFAULT	USI_026PUP	FN:25	PRODUCER	06-May-2013 12:59
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High Res Repeat 4780 - 4825 Feet
5 in = 100 Feet

MAXIS Field Log

Input DLIS Files

DEFAULT	USI_012LUP	FN:11	PRODUCER	06-May-2013 11:06	4848.0 FT	4795.0 FT
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Output DLIS Files

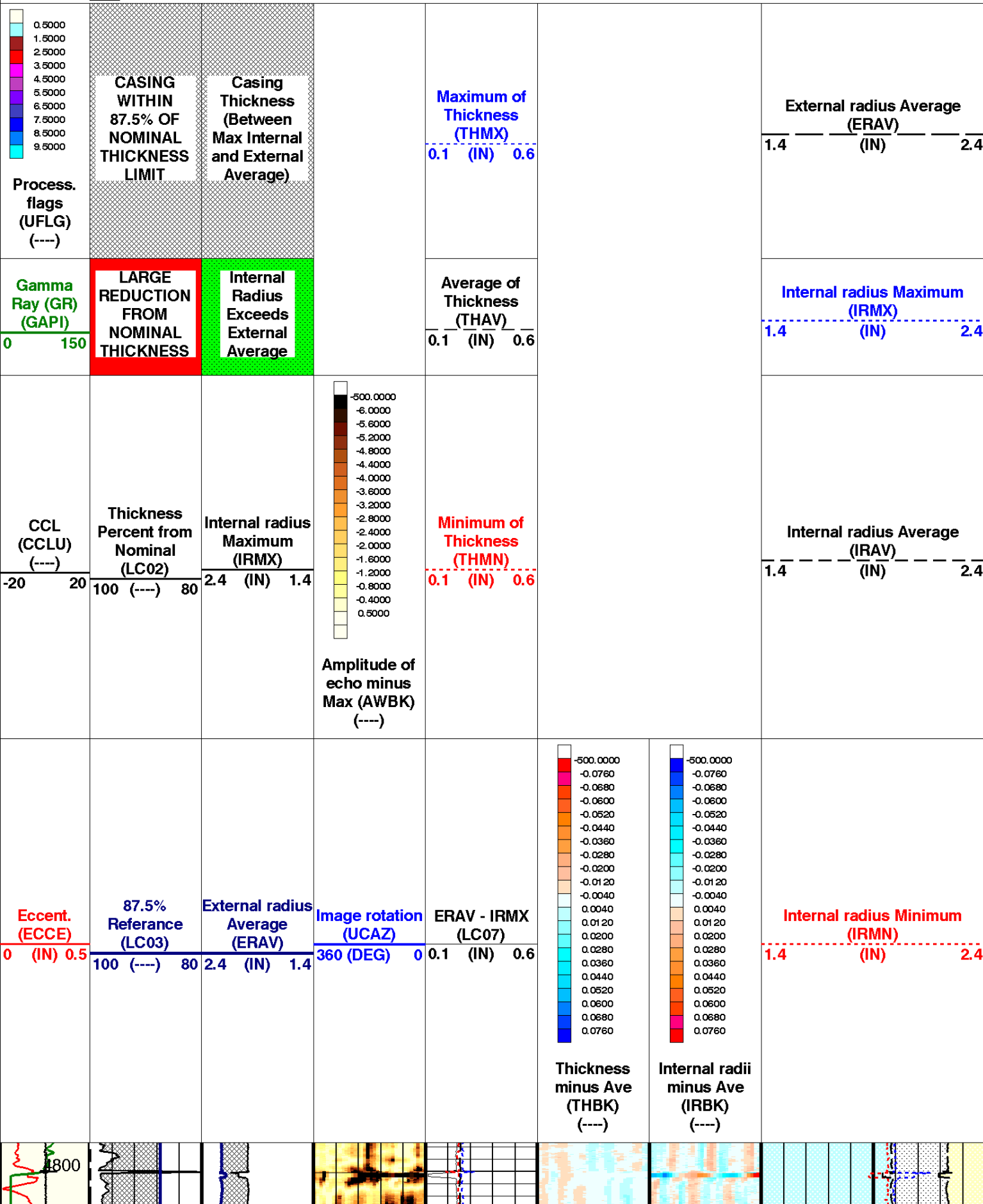
DEFAULT	USI_025PUP	FN:24	PRODUCER	06-May-2013 12:57	4828.0 FT	4776.5 FT
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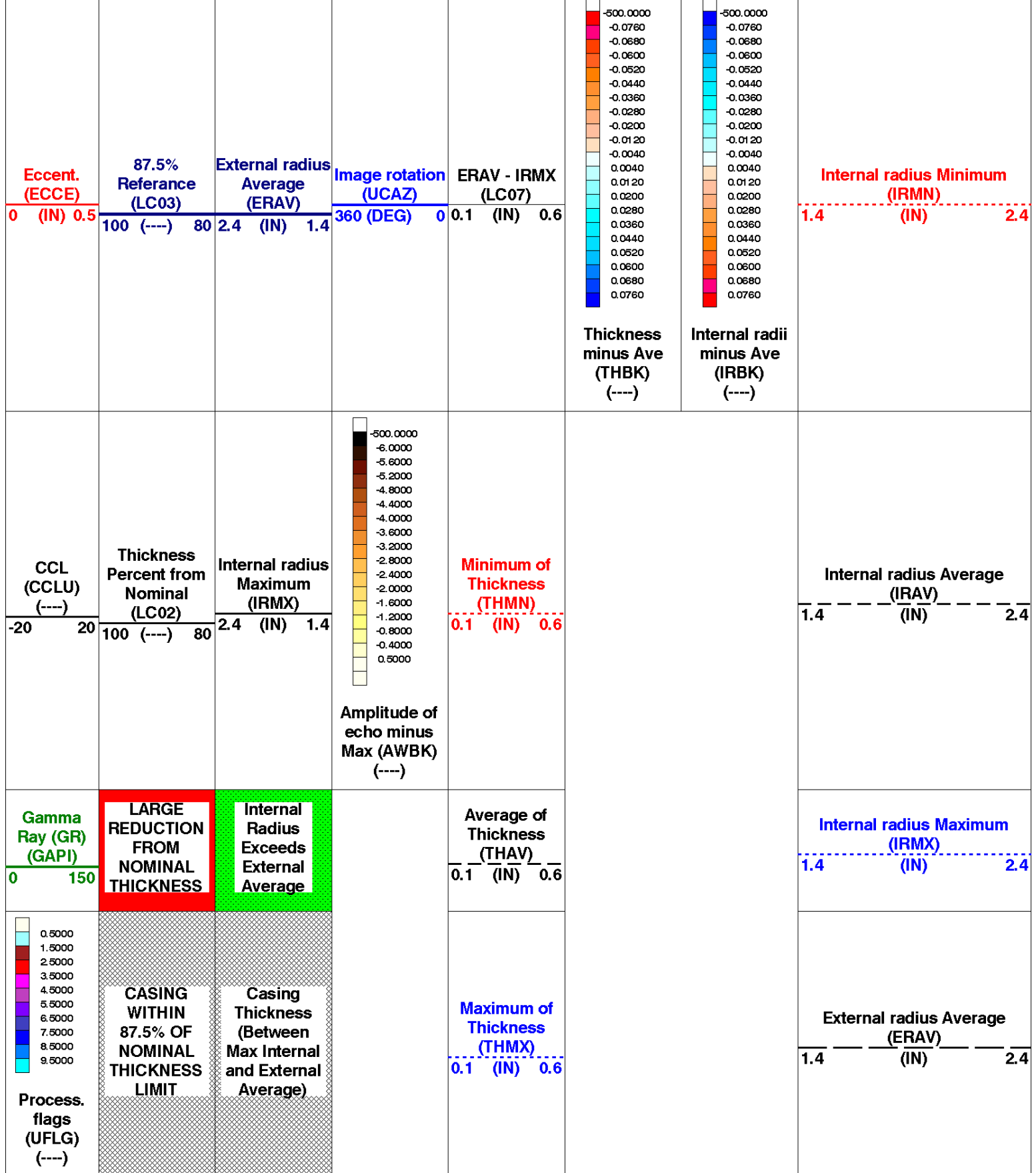
USIT-E
DTC-H19C1-222
19C1-222

SGT-N

19C1-222

PIP SUMMARY

 Time Mark Every 60 S



PIP SUMMARY

Time Mark Every 60 S

Format: USIT CASING 5 inch Vertical Scale: 1" per 100'

Graphics File Created: 06-May-2013 12:57

OP System Version: 19C1-222

USIT-E
DTC-H

19C1-222
19C1-222

SGT-N

19C1-222

COMPUTATION FLAGS LABELLING

DOWNHOLE STATUS ERROR LABELING

(0 - 1.5)	UFLG 1	UTIM error
(1.5 - 2.5)	UFLG 2	Pulse origin not detected
(2.5 - 3.5)	UFLG 3	WINLEN error
<hr/>		
(3.5 - 6.5)	UFLG 4 UFLG 5 UFLG 6	CASING THICKNESS error
<hr/>		
(6.5 - 10)	UFLG 7 UFLG 8 UFLG 9	LOOP PROCESSING error

Parameters

DLIS Name	Description	Value	
USIT-E: Ultrasonic Imaging - E			
AGMN	Minimum Gain of Cartridge	-4	DB
AGMX	Maximum Gain of Cartridge	20	DB
BERJ	Bad Echo Rejection	ON	
CDIA	Casing Outer Diameter	4.5	IN
CSDE	Casing Density	486.94	LBCF
CSID	Casing Inner Diameter	4	IN
DFVL	Default Fluid Velocity	206	US/F
DOT	Diameter of Transducer Sensor	1.756	IN
EMXV	EMEX Voltage	20	V
FDII	FPM Data Interpolation Interval	0	FT
IMAR	Image Rotation	OFF	
MW	Mud Weight	8.4	LB/G
RCOD	Reference Calibrator Outer Diameter	4.5	IN
RCSO	Reference Calibrator Standoff	0.8425	IN
RCTH	Reference Calibrator Thickness	0.2165	IN
TCUB	T^3 Processing Level	Vax_Loop	
THDH	Maximum Search Thickness (percentage of nominal)	130	
THDL	Minimum Search Thickness (percentage of nominal)	70	
THDP	Thickness Detection Policy	Fundamental	
THNO	Nominal Thickness of Casing	0.25	IN
UMAO	USIT Measurement Angular Offset	18	DEG
USTO	Ultrasonic Time Offset	-2	US
USUB	Ultrasonic Subassembly Identifier	Sub 5 inch	
UWKM	Ultrasonic Working Mode	10DEG_0_6IN_60U HF	
VCAS	Ultrasonic Transversal Velocity in Casing	51.4	US/F
WLEN	T^3 Processing Length	14.9916	US
ZCAS	Acoustic Impedance of Casing	46.25	MRAY
ZINI	Initial Estimate of Cement Impedance	-1	MRAY
ZMUD	Acoustic Impedance of Mud	1.48	MRAY
ZTCM	Acoustic Impedance Threshold for Cement	2.6	MRAY
ZTGS	Acoustic Impedance Threshold for Gas	0.3	MRAY
System and Miscellaneous			
CWEI	Casing Weight	11.60	LB/F
DO	Depth Offset for Playback	-20.0	FT
PP	Playback Processing	RECOMPUTE	

Input DLIS Files

DEFAULT USI_012LUP FN:11 PRODUCER 06-May-2013 11:06 4848.0 FT 4795.0 FT

Output DLIS Files

DEFAULT USI_025PUP FN:24 PRODUCER 06-May-2013 12:57

Schlumberger

**High Res Repeat 5610 - 5960 Feet
5 in = 100 Feet**

Input DLIS Files

DEFAULT

USI_011LUP

FN:10

PRODUCER

06-May-2013 11:01

5634.0 FT

5573.0 FT

Output DLIS Files

DEFAULT

USI_024PUP

FN:23

PRODUCER

06-May-2013 12:56

5614.0 FT

5553.0 FT

OP System Version: 19C1-222

USIT-E
DTC-H

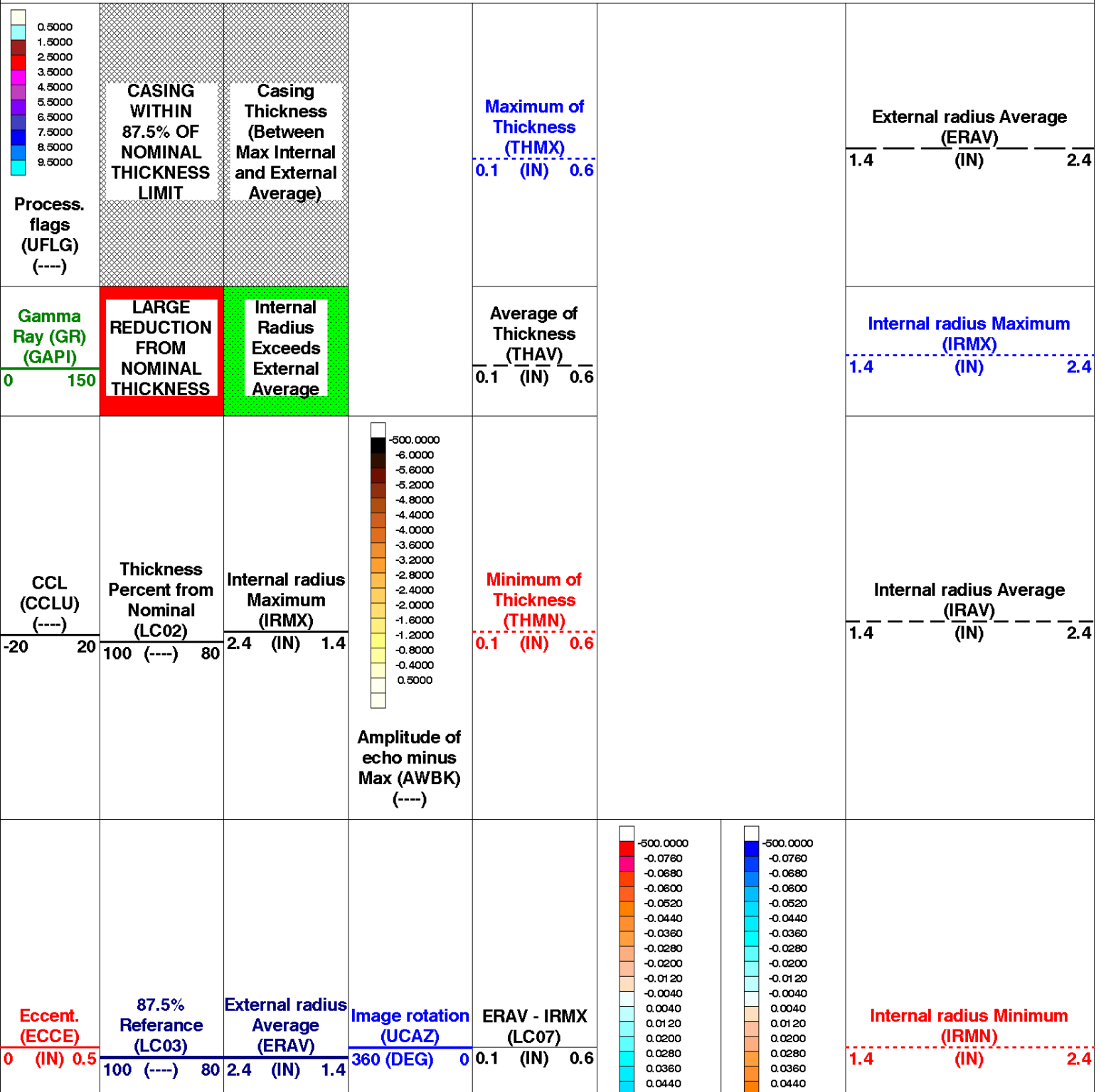
19C1-222
19C1-222

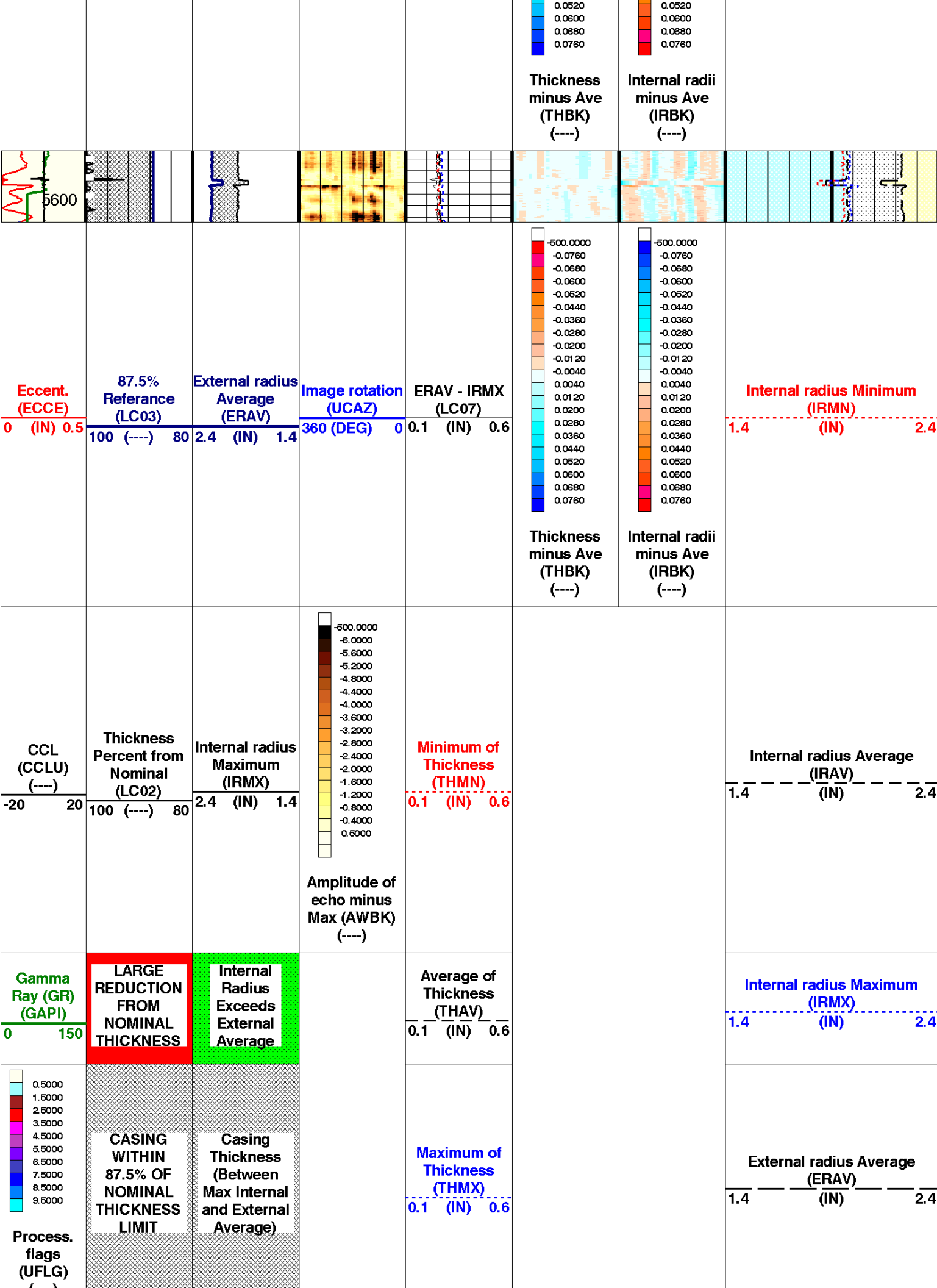
SGT-N

19C1-222

PIP SUMMARY

 Time Mark Every 60 S





PIP SUMMARY

Time Mark Every 60 S

Format: USIT CASING 5 inch

Vertical Scale: 1" per 100'

Graphics File Created: 06-May-2013 12:56

OP System Version: 19C1-222

USIT-E 19C1-222 SGT-N 19C1-222
DTC-H 19C1-222

COMPUTATION FLAGS LABELLING

(0 - 1.5)	UFLG 1	UTIM error
(1.5 - 2.5)	UFLG 2	Pulse origin not detected
(2.5 - 3.5)	UFLG 3	WINLEN error
<hr/>		
(3.5 - 6.5)	UFLG 4 UFLG 5 UFLG 6	CASING THICKNESS error
<hr/>		
(6.5 - 10)	UFLG 7 UFLG 8 UFLG 9	LOOP PROCESSING error

Parameters

DLIS Name	Description	Value
USIT-E: Ultrasonic Imaging - E		
AGMN	Minimum Gain of Cartridge	-4 DB
AGMX	Maximum Gain of Cartridge	20 DB
BERJ	Bad Echo Rejection	ON
CDIA	Casing Outer Diameter	4.5 IN
CSDE	Casing Density	486.94 LBCF
CSID	Casing Inner Diameter	4 IN
DFVL	Default Fluid Velocity	206 US/F
DOT	Diameter of Transducer Sensor	1.756 IN
EMXV	EMEX Voltage	20 V
FDII	FPM Data Interpolation Interval	0 FT
IMAR	Image Rotation	OFF
MW	Mud Weight	8.4 LB/G
RCOD	Reference Calibrator Outer Diameter	4.5 IN
RCSO	Reference Calibrator Standoff	0.8425 IN
RCTH	Reference Calibrator Thickness	0.2165 IN
TCUB	T ³ Processing Level	Vax_Loop
THDH	Maximum Search Thickness (percentage of nominal)	130
THDL	Minimum Search Thickness (percentage of nominal)	70
THDP	Thickness Detection Policy	Fundamental
THNO	Nominal Thickness of Casing	0.25 IN
UMAO	USIT Measurement Angular Offset	18 DEG
USTO	Ultrasonic Time Offset	-2 US
USUB	Ultrasonic Subassembly Identifier	Sub 5 inch
UWKM	Ultrasonic Working Mode	10DEG_0_6IN_60U HF
VCAS	Ultrasonic Transversal Velocity in Casing	51.4 US/F
WLEN	T ³ Processing Length	14.9916 US
ZCAS	Acoustic Impedance of Casing	46.25 MRAY
ZINI	Initial Estimate of Cement Impedance	-1 MRAY
ZMUD	Acoustic Impedance of Mud	1.48 MRAY
ZTCM	Acoustic Impedance Threshold for Cement	2.6 MRAY
ZTGS	Acoustic Impedance Threshold for Gas	0.3 MRAY
System and Miscellaneous		
CWEI	Casing Weight	11.60 LB/F
DO	Depth Offset for Playback	-20.0 FT
PP	Playback Processing	RECOMPUTE

Input DLIS Files

DEFAULT USI_011LUP FN:10 PRODUCER 06-May-2013 11:01 5634.0 FT 5573.0 FT

Output DLIS Files

DEFAULT USI_024PUP EN:23 PRODUCER 06-May-2013 12:56

Schlumberger

High Res Repeat 5800 - 5850 Feet
5 in = 100 Feet

MAXIS Field Log

Input DLIS Files

DEFAULT USI_010LUP FN:9 PRODUCER 06-May-2013 10:54 5871.5 FT 5817.0 FT

Output DLIS Files

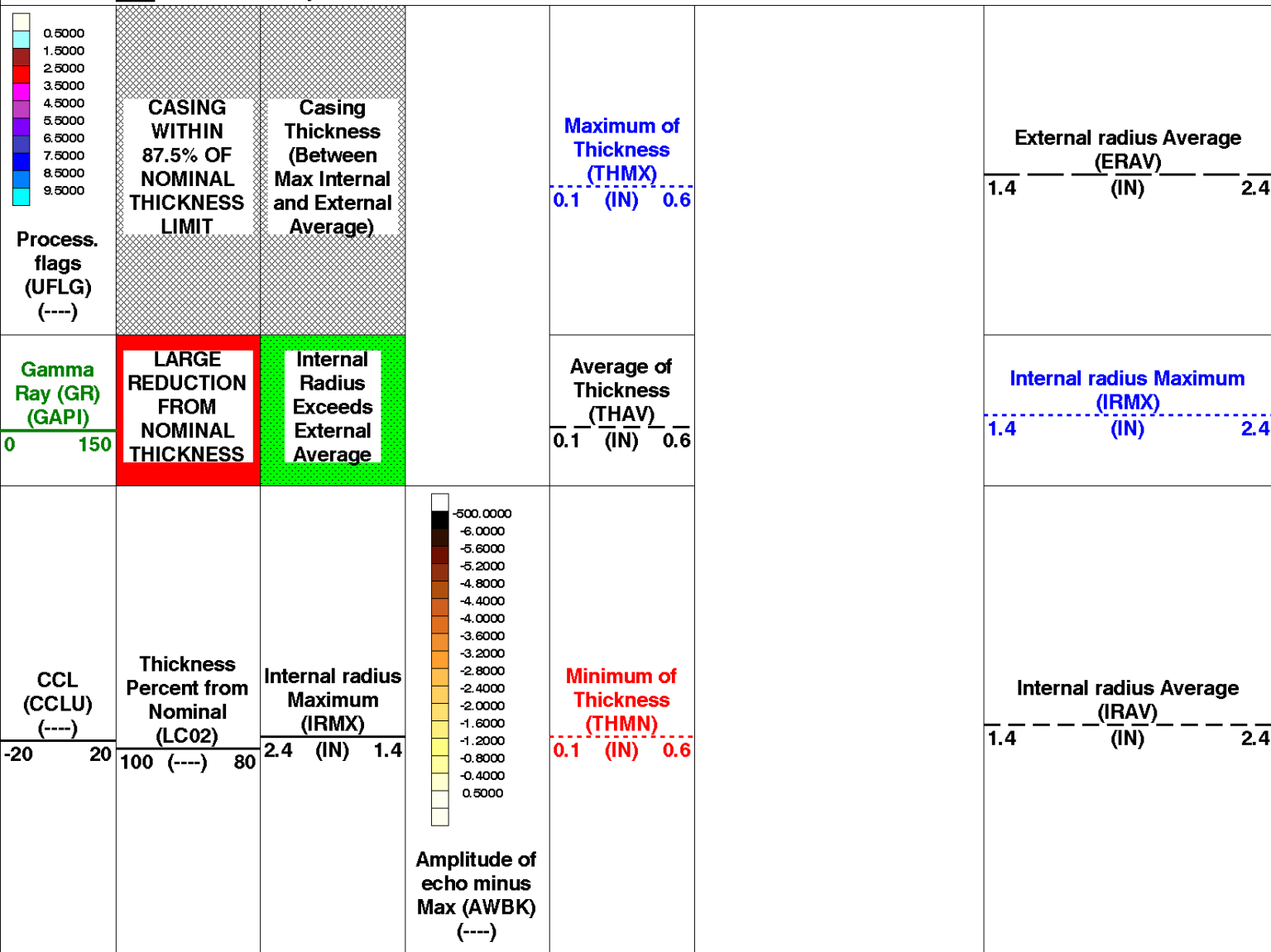
DEFAULT USI_023PUP FN:22 PRODUCER 06-May-2013 12:50 5851.5 FT 5798.5 FT

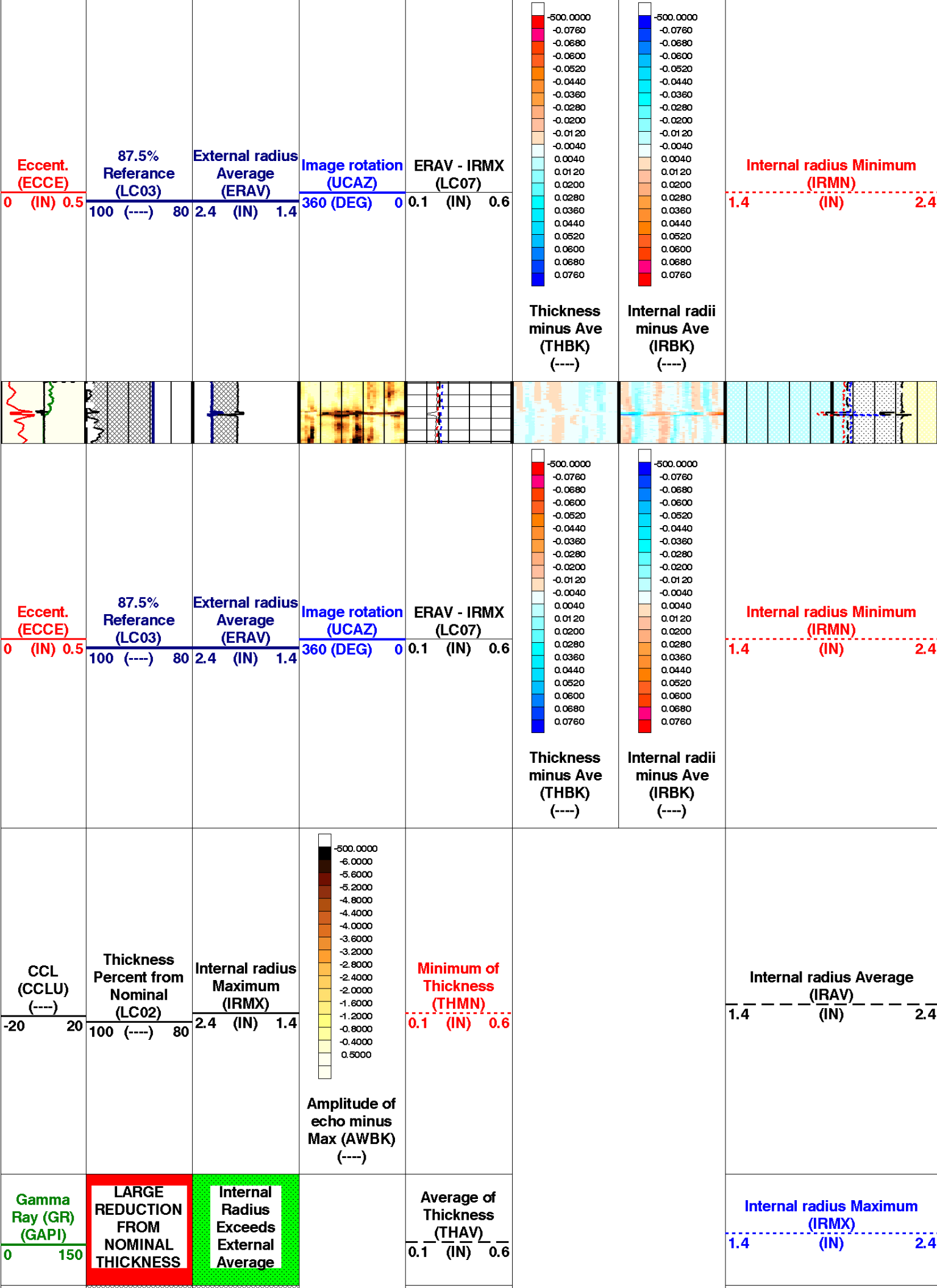
OP System Version: 19C1-222

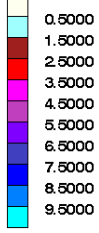
USIT-E 19C1-222 SGT-N 19C1-222
DTC-H 19C1-222

PIP SUMMARY

☒ Time Mark Every 60 S







Process.
flags
(UFLG)
(----

CASING
WITHIN
87.5% OF
NOMINAL
THICKNESS
LIMIT

Casing
Thickness
(Between
Max Internal
and External
Average)

Maximum of
Thickness
(THMX)
0.1 (IN) 0.6

External radius Average
(ERAV)
1.4 (IN) 2.4

PIP SUMMARY

Time Mark Every 60 S

Format: USIT CASING 5 inch Vertical Scale: 1" per 100' Graphics File Created: 06-May-2013 12:50

OP System Version: 19C1-222

USIT-E 19C1-222 SGT-N 19C1-222
DTC-H 19C1-222

COMPUTATION FLAGS LABELLING

- (0 - 1.5) UFLG 1 UTIM error
- (1.5 - 2.5) UFLG 2 Pulse origin not detected
- (2.5 - 3.5) UFLG 3 WINLEN error
- (3.5 - 6.5) UFLG 4 UFLG 5 UFLG 6 CASING THICKNESS error
- (6.5 - 10) UFLG 7 UFLG 8 UFLG 9 LOOP PROCESSING error

Parameters

DLIS Name	Description	Value	
USIT-E: Ultrasonic Imaging - E			
AGMN	Minimum Gain of Cartridge	-4	DB
AGMX	Maximum Gain of Cartridge	20	DB
BERJ	Bad Echo Rejection	ON	
CDIA	Casing Outer Diameter	4.5	IN
CSDE	Casing Density	486.94	LBCF
CSID	Casing Inner Diameter	4	IN
DFVL	Default Fluid Velocity	206	US/F
DOT	Diameter of Transducer Sensor	1.756	IN
EMXV	EMEX Voltage	20	V
FDII	FPM Data Interpolation Interval	0	FT
IMAR	Image Rotation	OFF	
MW	Mud Weight	8.4	LB/G
RCOD	Reference Calibrator Outer Diameter	4.5	IN
RCSO	Reference Calibrator Standoff	0.8425	IN
RCTH	Reference Calibrator Thickness	0.2165	IN
TCUB	T^3 Processing Level	Vax_Loop	
THDH	Maximum Search Thickness (percentage of nominal)	130	
THDL	Minimum Search Thickness (percentage of nominal)	70	
THDP	Thickness Detection Policy	Fundamental	
THNO	Nominal Thickness of Casing	0.25	IN
UMAO	USIT Measurement Angular Offset	18	DEG
USTO	Ultrasonic Time Offset	-2	US
USUB	Ultrasonic Subassembly Identifier	Sub_5_inch	
UWKM	Ultrasonic Working Mode	10DEG_0_6IN_60U	HF
VCAS	Ultrasonic Transversal Velocity in Casing	51.4	US/F
WLEN	T^3 Processing Length	14.9916	US
ZCAS	Acoustic Impedance of Casing	46.25	MRAY
ZINI	Initial Estimate of Cement Impedance	-1	MRAY
ZMUD	Acoustic Impedance of Mud	1.48	MRAY
ZTCM	Acoustic Impedance Threshold for Cement	2.6	MRAY

2100	Acoustic Impedance Threshold for Cement	2.0	MRAY
ZTGS	Acoustic Impedance Threshold for Gas	0.3	
CWEI	System and Miscellaneous		
DO	Casing Weight	11.60	LB/F
PP	Depth Offset for Playback	-20.0	FT
	Playback Processing	RECOMPUTE	

Input DLIS Files

DEFAULT USI_010LUP FN:9 PRODUCER 06-May-2013 10:54 5871.5 FT 5817.0 FT

Output DLIS Files

DEFAULT USI_023PUP FN:22 PRODUCER 06-May-2013 12:50

Schlumberger

**High Res Repeat 6350 - 6390 Feet
5 in = 100 Feet**

MAXIS Field Log

Input DLIS Files

DEFAULT USI_009LUP FN:8 PRODUCER 06-May-2013 10:51 6411.5 FT 6348.5 FT

Output DLIS Files

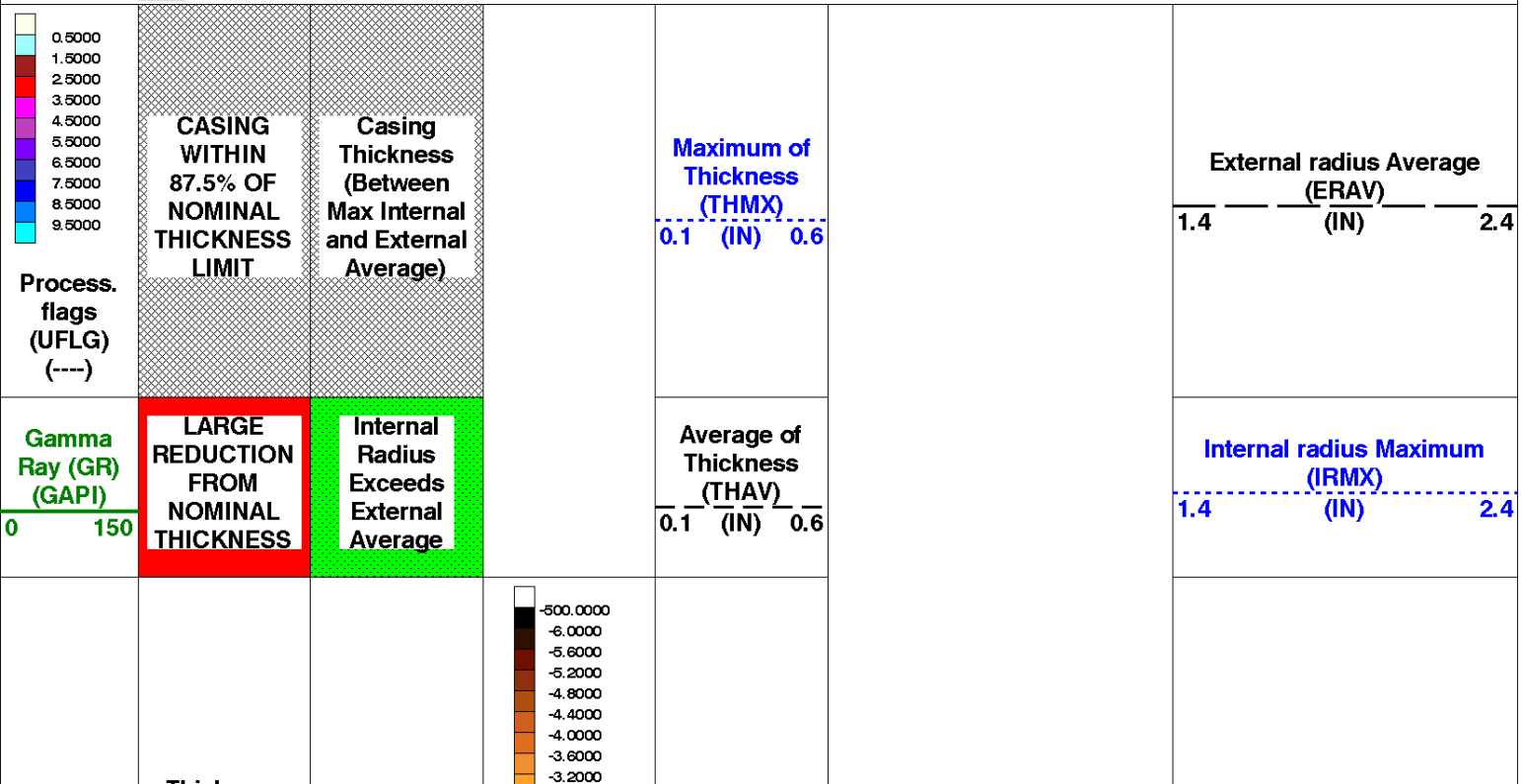
DEFAULT USI_022PUP FN:21 PRODUCER 06-May-2013 12:49 6391.5 FT 6328.5 FT

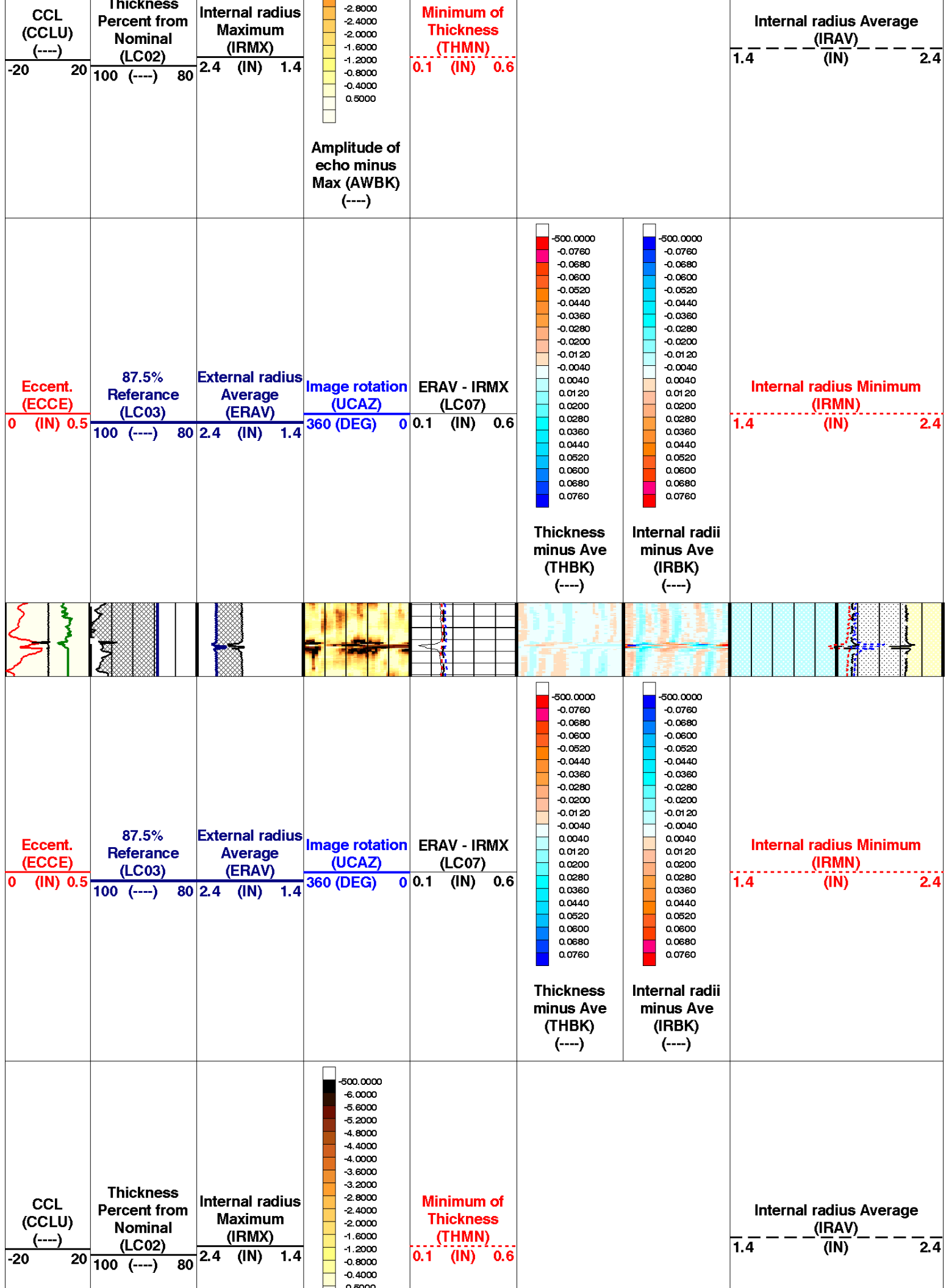
OP System Version: 19C1-222

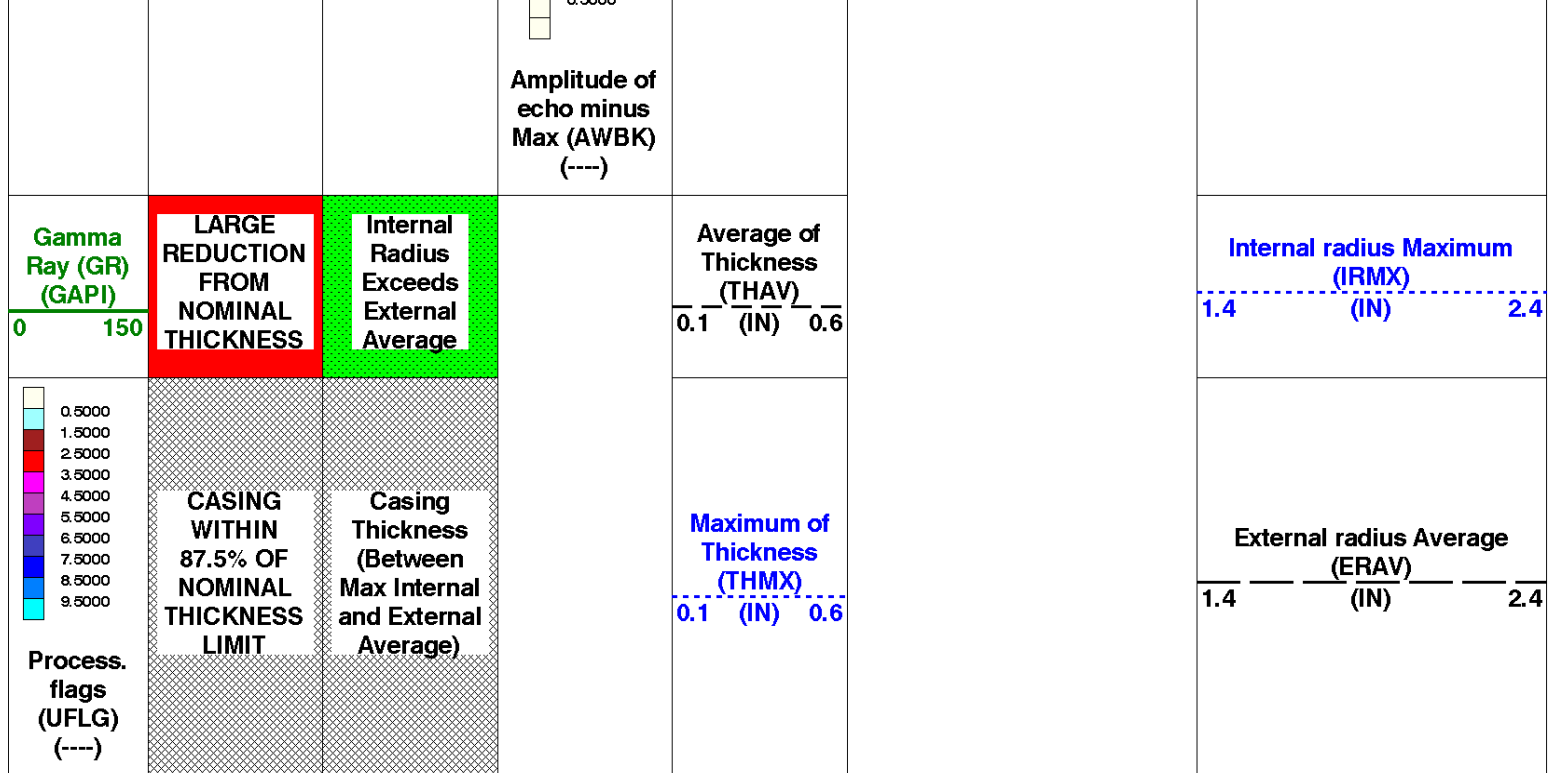
USIT-E 19C1-222 SGT-N 19C1-222
DTC-H 19C1-222

PIP SUMMARY

 Time Mark Every 60 S







PIP SUMMARY

Time Mark Every 60 S

Format: USIT CASING 5 inch Vertical Scale: 1" per 100'

Graphics File Created: 06-May-2013 12:49

OP System Version: 19C1-222

USIT-E 19C1-222 SGT-N 19C1-222
DTC-H 19C1-222

COMPUTATION FLAGS LABELLING

(0 - 1.5) UFLG 1 UTIM error

(1.5 - 2.5) UFLG 2 Pulse origin not detected

(2.5 - 3.5) UFLG 3 WINLEN error

(3.5 - 6.5) UFLG 4 UFLG 5 UFLG 6 CASING THICKNESS error

(6.5 - 10) UFLG 7 UFLG 8 UFLG 9 LOOP PROCESSING error

Parameters

DLIS Name	Description	Value	
USIT-E: Ultrasonic Imaging - E			
AGMN	Minimum Gain of Cartridge	-4	DB
AGMX	Maximum Gain of Cartridge	20	DB
BERJ	Bad Echo Rejection	ON	
CDIA	Casing Outer Diameter	4.5	IN
CSDE	Casing Density	486.94	LBCF
CSID	Casing Inner Diameter	4	IN
DFVL	Default Fluid Velocity	206	US/F
DOT	Diameter of Transducer Sensor	1.756	IN
EMXV	EMEX Voltage	20	V
FDII	FPM Data Interpolation Interval	0	FT
IMAR	Image Rotation	OFF	
MW	Mud Weight	8.4	LB/G
RCOD	Reference Calibrator Outer Diameter	4.5	IN
RCSO	Reference Calibrator Standoff	0.8425	IN
RCSU	Reference Calibrator Thickness	0.8125	IN


RC1H	Reference Calibrator Thickness	0.2165	IN
TCUB	T*3 Processing Level	Vax_Loop	
THDH	Maximum Search Thickness (percentage of nominal)	130	
THDL	Minimum Search Thickness (percentage of nominal)	70	
THDP	Thickness Detection Policy	Fundamental	
THNO	Nominal Thickness of Casing	0.25	IN
UMAO	USIT Measurement Angular Offset	18	DEG
USTO	Ultrasonic Time Offset	-2	US
USUB	Ultrasonic Subassembly Identifier	Sub 5 inch	
UWKM	Ultrasonic Working Mode	10DEG_0_6IN_60U HF	
VCAS	Ultrasonic Transversal Velocity in Casing	51.4	US/F
WLEN	T*3 Processing Length	14.9916	US
ZCAS	Acoustic Impedance of Casing	46.25	MRAY
ZINI	Initial Estimate of Cement Impedance	-1	MRAY
ZMUD	Acoustic Impedance of Mud	1.48	MRAY
ZTCM	Acoustic Impedance Threshold for Cement	2.6	MRAY
ZTGS	Acoustic Impedance Threshold for Gas	0.3	MRAY
System and Miscellaneous			
CWEI	Casing Weight	11.60	LB/F
DO	Depth Offset for Playback	-20.0	FT
PP	Playback Processing	RECOMPUTE	

Input DLIS Files

DEFAULT USI_009LUP FN:8 PRODUCER 06-May-2013 10:51 6411.5 FT 6348.5 FT

Output DLIS Files

DEFAULT USI_022PUP FN:21 PRODUCER 06-May-2013 12:49



Repeat Pass 6760 - 7090 Feet
5 in = 100 Feet

MAXIS Field Log

Input DLIS Files

DEFAULT USI_007LUP FN:6 PRODUCER 06-May-2013 08:25 7109.5 FT 6778.7 FT

Output DLIS Files

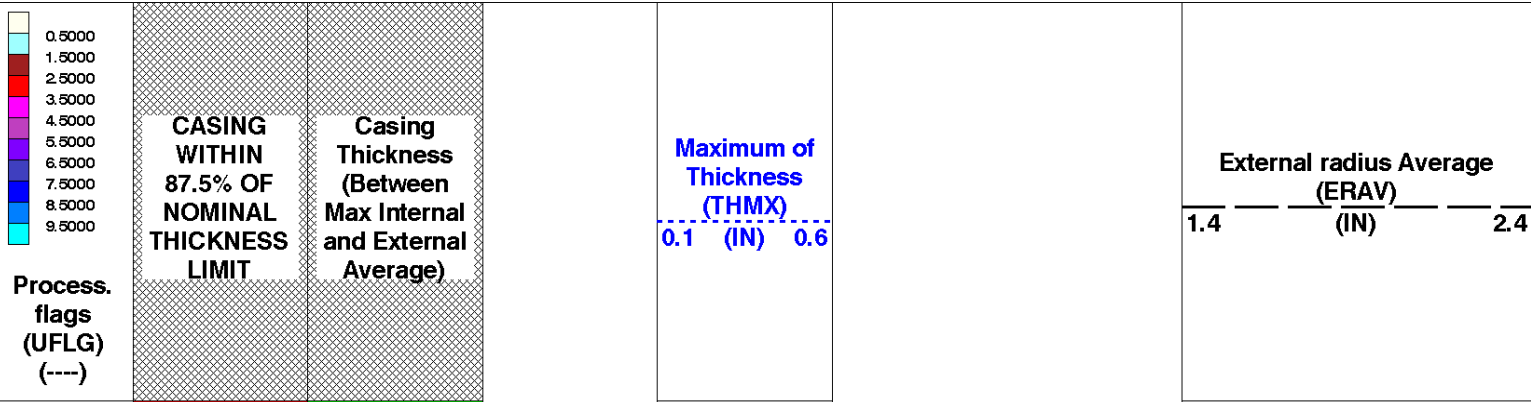
DEFAULT USI_029PUP FN:28 PRODUCER 06-May-2013 13:06 7087.5 FT 6757.0 FT

OP System Version: 19C1-222

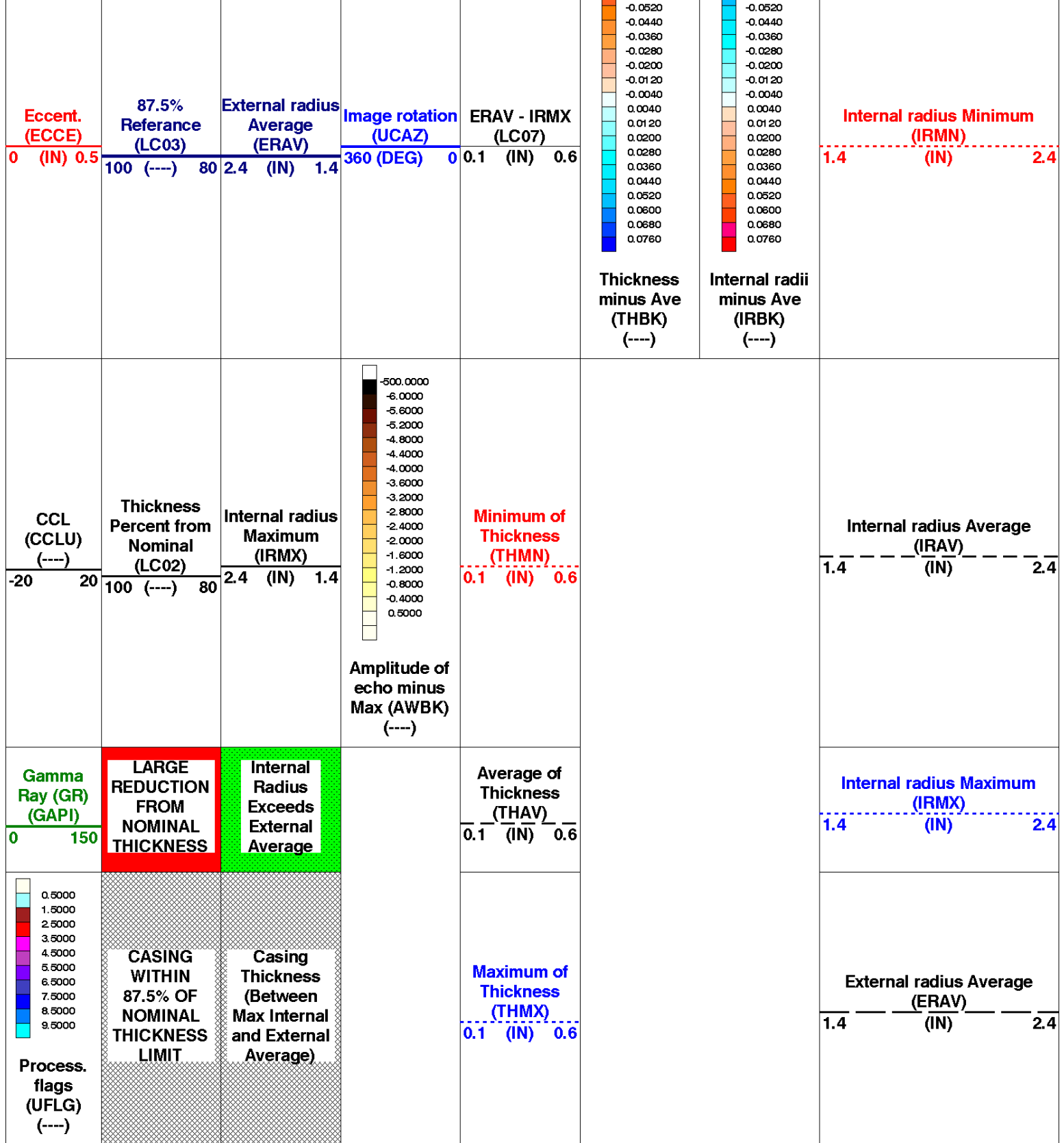
USIT-E 19C1-222 SGT-N 19C1-222
DTC-H 19C1-222

PIP SUMMARY

 Time Mark Every 60 S



Gamma Ray (GR) (GAPI)	LARGE REDUCTION FROM NOMINAL THICKNESS	Internal Radius Exceeds External Average		Average of Thickness (THAV)		Internal radius Maximum (IRMX)
0 150				0.1 (IN) 0.6		1.4 (IN) 2.4
CCL (CCLU) (----	Thickness Percent from Nominal (LC02)	Internal radius Maximum (IRMX)	 Amplitude of echo minus Max (AWBK) (----)	Minimum of Thickness (THMN)		Internal radius Average (IRAV)
-20 20	100 (----) 80	2.4 (IN) 1.4		0.1 (IN) 0.6		1.4 (IN) 2.4
Eccent. (ECCE)	87.5% Reference (LC03)	External radius Average (ERAV)	Image rotation (UCAZ)	ERAV - IRMX (LC07)	 Thickness minus Ave (THBK) (----)	Internal radius Minimum (IRMN)
0 (IN) 0.5	100 (----) 80	2.4 (IN) 1.4	360 (DEG) 0	0.1 (IN) 0.6	 Internal radii minus Ave (IRBK) (----)	1.4 (IN) 2.4
					 Thickness minus Ave (THBK) (----)	 Internal radii minus Ave (IRBK) (----)



PIP SUMMARY

Time Mark Every 60 S

Format: USIT CASING 5 inch Vertical Scale: 1" per 100'

Graphics File Created: 06-May-2013 13:06

OP System Version: 19C1-222

USIT-E 19C1-222
DTC-H 19C1-222

SGT-N 19C1-222

COMPUTATION FLAGS LABELLING

(0 - 1.5) UFLG 1

UTIM error

(1.5 - 2.5) UFLG 2 Pulse origin not detected

(2.5 - 3.5) UFLG 3 WINLEN error

(3.5 - 6.5) UFLG 4 UFLG 5 UFLG 6 CASING THICKNESS error

(6.5 - 10) UFLG 7 UFLG 8 UFLG 9 LOOP PROCESSING error

Parameters

DLIS Name	Description	Value	
USIT-E: Ultrasonic Imaging - E			
AGMN	Minimum Gain of Cartridge	-4	DB
AGMX	Maximum Gain of Cartridge	20	DB
BERJ	Bad Echo Rejection	ON	
CDIA	Casing Outer Diameter	4.5	IN
CSDE	Casing Density	486.94	LBCF
CSID	Casing Inner Diameter	4	IN
DFVL	Default Fluid Velocity	206	US/F
DOT	Diameter of Transducer Sensor	1.756	IN
EMXV	EMEX Voltage	20	V
FDII	FPM Data Interpolation Interval	0	FT
IMAR	Image Rotation	OFF	
MW	Mud Weight	8.4	LB/G
RCOD	Reference Calibrator Outer Diameter	4.5	IN
RCSO	Reference Calibrator Standoff	0.8425	IN
RCTH	Reference Calibrator Thickness	0.2165	IN
TCUB	T^3 Processing Level	Vax_Loop	
THDH	Maximum Search Thickness (percentage of nominal)	130	
THDL	Minimum Search Thickness (percentage of nominal)	70	
THDP	Thickness Detection Policy	Fundamental	
THNO	Nominal Thickness of Casing	0.25	IN
UMAO	USIT Measurement Angular Offset	18	DEG
USTO	Ultrasonic Time Offset	-2	US
USUB	Ultrasonic Subassembly Identifier	Sub_5_inch	
UWKM	Ultrasonic Working Mode	10DEG_3IN_60U HF	
VCAS	Ultrasonic Transversal Velocity in Casing	51.4	US/F
WLEN	T^3 Processing Length	14.9916	US
ZCAS	Acoustic Impedance of Casing	46.25	MRAY
ZINI	Initial Estimate of Cement Impedance	-1	MRAY
ZMUD	Acoustic Impedance of Mud	1.48	MRAY
ZTCM	Acoustic Impedance Threshold for Cement	2.6	MRAY
ZTGS	Acoustic Impedance Threshold for Gas	0.3	MRAY
System and Miscellaneous			
CWEI	Casing Weight	11.60	LB/F
DO	Depth Offset for Playback	-22.0	FT
PP	Playback Processing	RECOMPUTE	

Input DLIS Files

DEFAULT	USI_007LUP	FN:6	PRODUCER	06-May-2013 08:25	7109.5 FT	6778.7 FT
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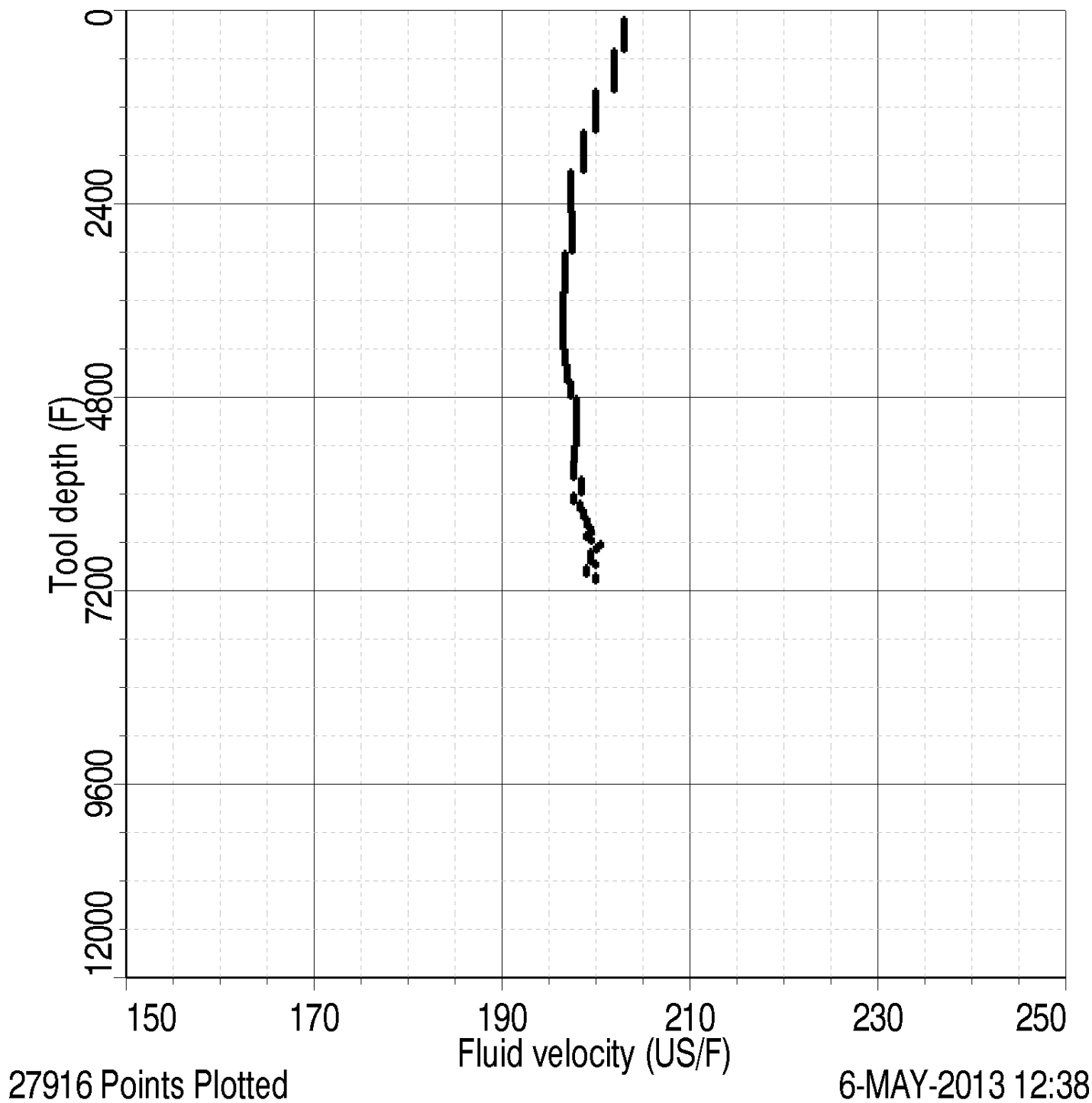
Output DLIS Files

DEFAULT	USI_029PUP	FN:28	PRODUCER	06-May-2013 13:06
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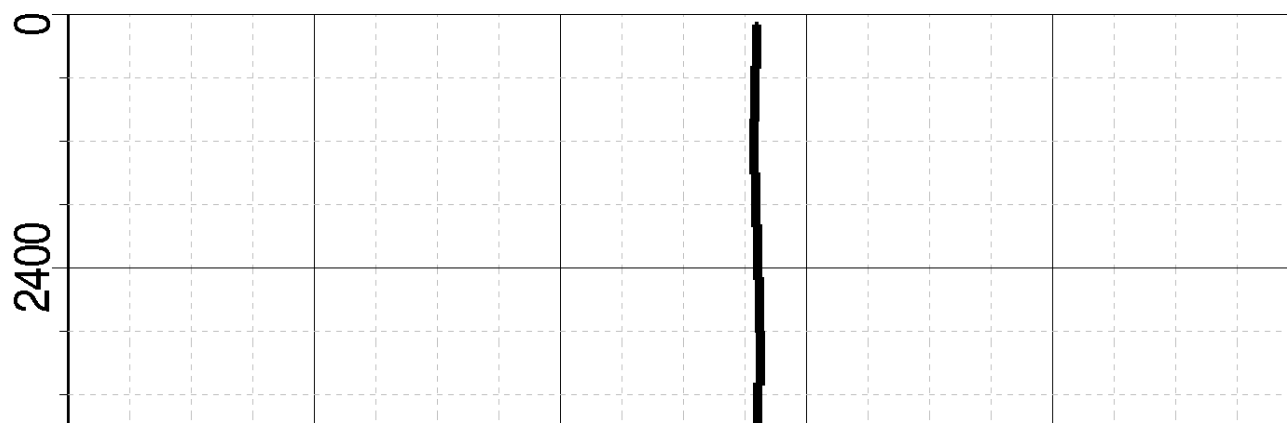
Schlumberger

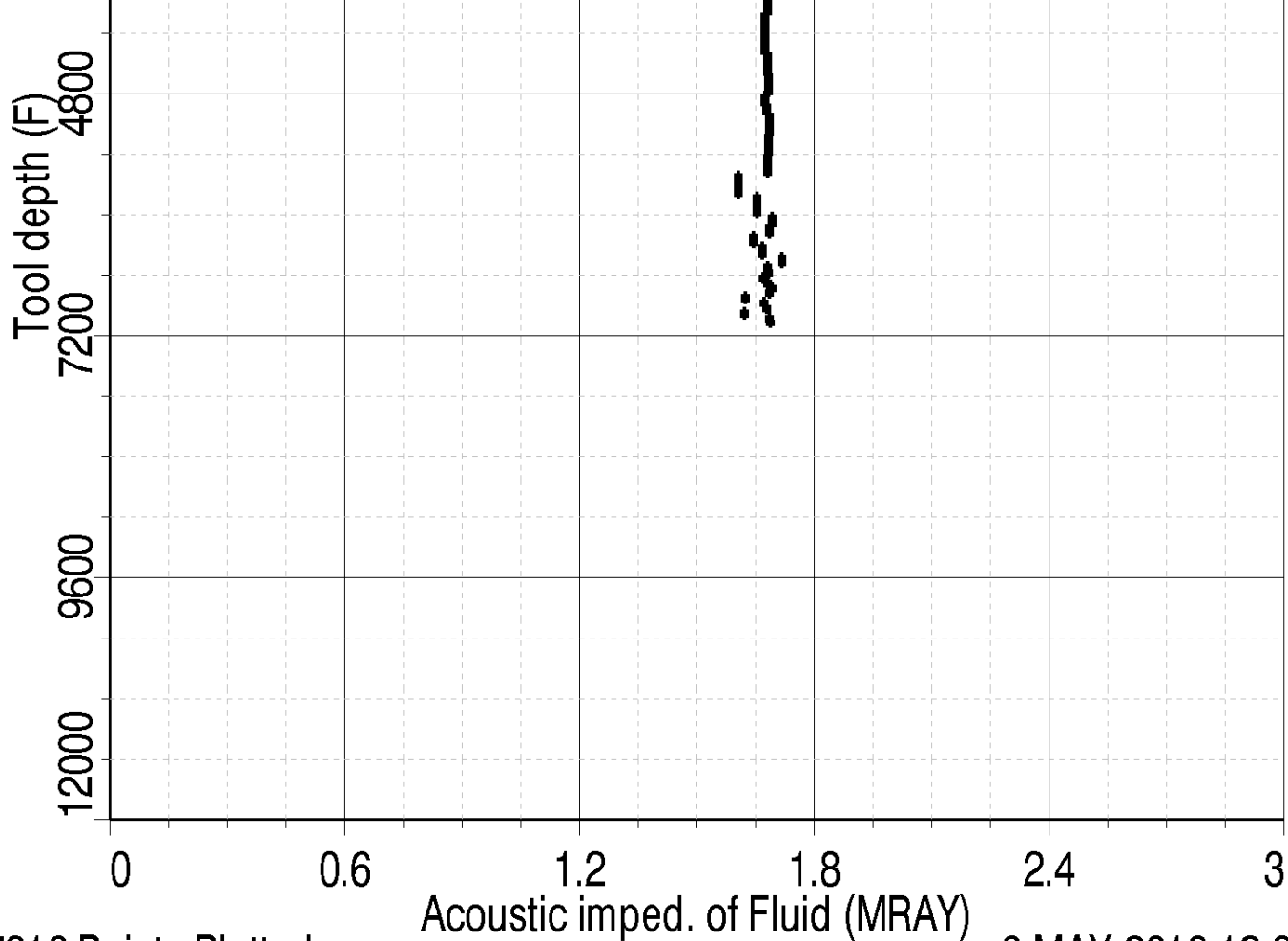
Fluid Properties

Index: 7086.0 - 107.2 FT



Index: 7086.0 - 107.2 FT





Schlumberger

Calibrations

MAXIS Field Log

Calibration and Check Summary

Measurement	Nominal	Master	Before	After	Change	Limit	Units
Ultrasonic Imaging - E Wellsite Calibration - IBC CSL: Far versus Near Gain Offset							
Before: Calibration not done							
Near Waveform for azimuth 001	0	N/A	0	N/A	N/A	N/A	DB/M
Scintillation Gamma Ray Tool - N Wellsite Calibration - Detector Calibration							
Before: 5-May-2013 13:14							
Gamma Ray (Jig - Bkg)	160.6	N/A	160.6	N/A	N/A	14.60	GAPI
Gamma Ray (Calibrated)	165.0	N/A	165.0	N/A	N/A	15.00	GAPI

Ultrasonic Imaging - E / Equipment Identification

Primary Equipment:

5 inches Sub

USIT sonde

USIT Sonde Cartridge

USRS -

USIS - A

USSC - A

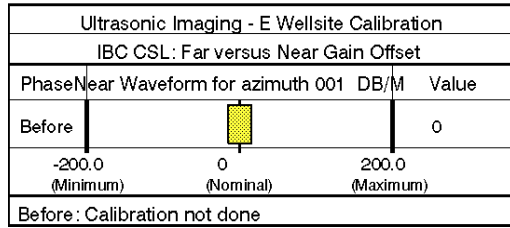
USAC Acquisition Cartridge DTS/FTB

USAC - A

Auxiliary Equipment:

USAC Housing/cartridge

ECH - MFA



Scintillation Gamma Ray Tool - N / Equipment Identification

Primary Equipment:

Scintillation Gamma Cartridge

SGC - TB

Scintillation Gamma Detector

SGD - TAB

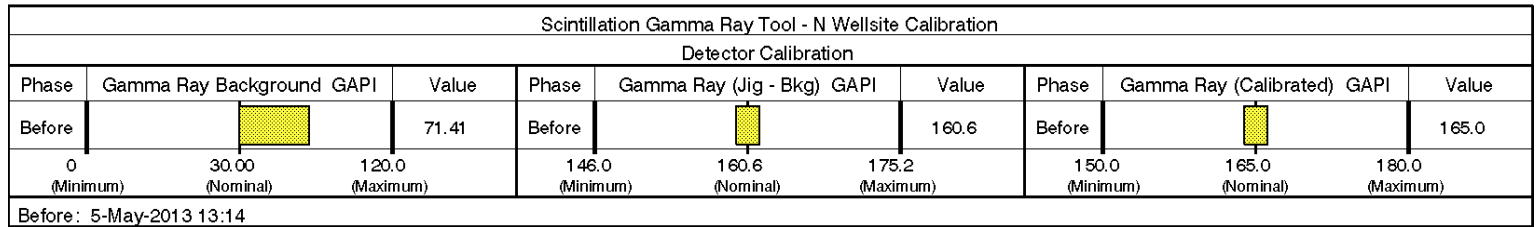
Auxiliary Equipment:

Scintillation Gamma Housing

SGH - K

Gamma Source Radioactive

GSR - U/Y



DTS Telemetry Tool / Equipment Identification

Primary Equipment:

DTC-H Auxiliary Cartridge

DTCH - A

DTC-H Telemetry Cartridge

DTCH - A

Auxiliary Equipment:

DTCH Telemetry Cartridge Housing

ECH - KC

Company: **ENCANA OIL & GAS INC (USA)**

Schlumberger

Well: **RANCHERO 1**
 Field: **WATTENBERG**
 County: **WELD**
 State: **COLORADO**

ULTRASONIC IMAGER
CASING EVALUATION