COMPANY: NORTHWEST NATURAL GAS

WELL: IW-24BH-23-65

FIELD: MIST

COUNTY: COLUMBIA STATE: OREGON

COUNTY: COLUMBIA
Field: MIST
Location: 976.5' NORTH, 1256.3' EAST
Well: IW-24BH-23-65
Company: NORTHWEST NATURAL GAS

Schlumberger

FORMATION MICRO IMAGER IMAGES/LQC
SCALE: 5" = 100'

LOCATION

976.5' NORTH, 1256.3' EAST
FROM THE SW SECTION CORNOR

Elev.:	K.B.	923 ft	
	G.L.	805 ft	
	D.F.	923 ft	

Permanent Datum:	GROUND LEVEL	Elev.:	905 ft
Log Measured From:	KB	18.0 ft	above Perm. Datum
Drilling Measured From:	KB		

API Serial No.	SECTION	TOWNSHIP	RANGE
36-009-00351	23	6N	5W

Logging Date		20-JUN-2000			
Run Number		1			
Depth Driller		2770 ft			
Schlumberger Depth		2762 ft			
Bottom Log Interval		2762 ft			
Top Log Interval		1870 ft			
Casing Driller Size @ Depth		8.625 in	@ 1870 ft	@	
Casing Schlumberger		1870 ft			
Bit Size		7.875 in			
Type Fluid In Hole		XCD/KCL			
MUD Density	Viscosity	8.6 lbm/gal	38 s		
Fluid Loss	PH	6.4 cm3	8		
Source Of Sample		FLOWLINE			
RM @ Measured Temperature		0.266 ohm.m	@ 58 degF	@	
RMF @ Measured Temperature		0.281 ohm.m	@ 19 degF	@	
RMC @ Measured Temperature		0.145 ohm.m	@ 18 degF	@	
Source RMF	RMC	PRESS	PRESS		
RM @ MRT	RMF @ MRT	0.230 @ 68	0.097 @ 68	@	@
Maximum Recorded Temperatures		68 degF	68	68	
Circulation Stopped	Time	19-JUN-2000	21:30		
Logger On Bottom	Time	20-JUN-2000	6:45		
Unit Number	Location	3152	SACRAMENTO		
Recorded By		M.KHAN			
Witnessed By		CLAYTON ROTH			

Run 1

Logging Date			
Run Number			
Depth Driller			
Schlumberger Depth			
Bottom Log Interval			
Top Log Interval			
Casing Driller Size @ Depth			@
Casing Schlumberger			
Bit Size			
Type Fluid In Hole			
MUD Density	Viscosity		
Fluid Loss	PH		
Source Of Sample			
RM @ Measured Temperature			@
RMF @ Measured Temperature			@
RMC @ Measured Temperature			@
Source RMF	RMC		
RM @ MRT	RMF @ MRT	@	
Maximum Recorded Temperatures			
Circulation Stopped	Time		
Logger On Bottom	Time		
Unit Number	Location		
Recorded By			
Witnessed By			

@ Run 2

@ Run 3

@ @ @ @

@ Run 4

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	OTHER SERVICES2
OS1: PEX-AITH-BHC	OS1:
OS2:	OS2:
OS3:	OS3:
OS4:	OS4:
OS5:	OS5:

REMARKS: RUN NUMBER 1	REMARKS: RUN NUMBER 2
MAXIMUM HOLE DEVIATION: 92 DEG	
LOGGED WITH TLC EQUIPMENT	

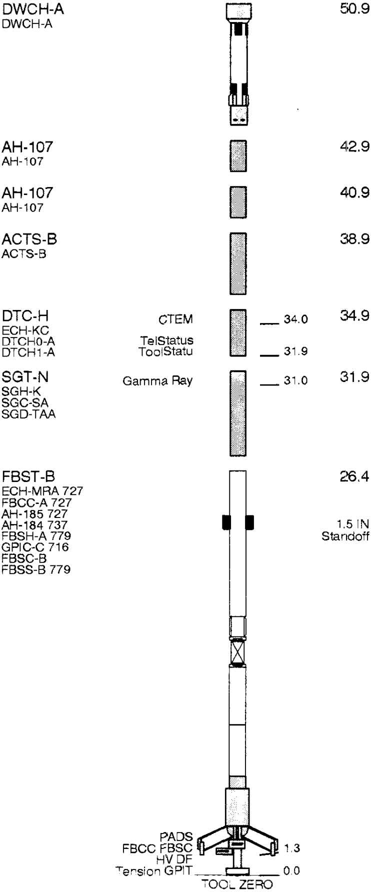
RUN 1		RUN 2	
SERVICE ORDER #	6266009	SERVICE ORDER #	
PROGRAM VERSION:	9C1-303	PROGRAM VERSION:	
FLUID LEVEL:	0 ft	FLUID LEVEL:	

LOGGED INTERVAL	START	STOP	LOGGED INTERVAL	START	STOP

EQUIPMENT DESCRIPTION

RUN 1	RUN 2
SURFACE EQUIPMENT GSR-U/Y WITM (DTS)-A	

DOWNHOLE EQUIPMENT



MAXIMUM STRING DIAMETER 6.38 IN
MEASUREMENTS RELATIVE TO TOOL ZERO
ALL LENGTHS IN FEET

Input DLIS Files

DEFAULT	FBSTB .004	FN:3	PRODUCER	20-Jun-2000 06:44	2761.5 FT	1863.0 FT

Output DLIS Files

DEFAULT	FBSTB .013	FN:8	PRODUCER	21-Jun-2000 00:40	2763.5 FT	1865.0 FT

OP System Version: 9C1-303

MCM

FBST-B	9C1-303	SGT-N	OP91-KP1a
DTC-H	OP91-KP1a		

PIP SUMMARY

▶ Time Mark Every 60 S

FMI Correlation Resistance (LOG) (FBCR)
2 (KOHM) 2000

Pad One Azimuth (P1AZ_FBST)
-40 (DEG) 360

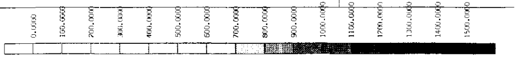
Hole Azimuth (HAZIM)
-40 (DEG) 360

Gamma Ray (GR)
0 (GAPI) 150

Deviation (DEVIM)
0 (DEG) 10

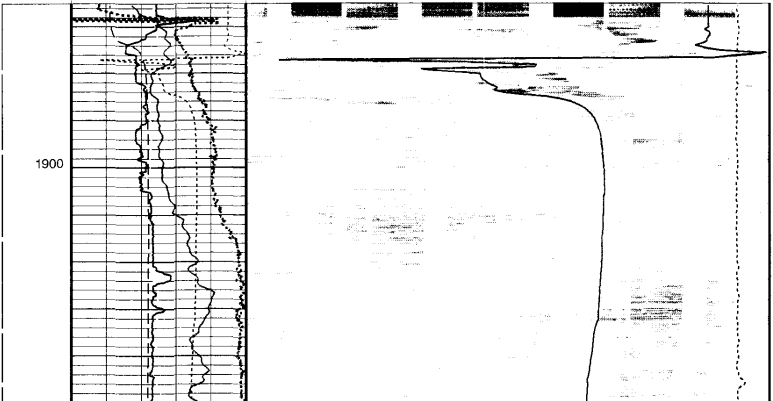
Tension (TENS)
10000 (LBF) 0

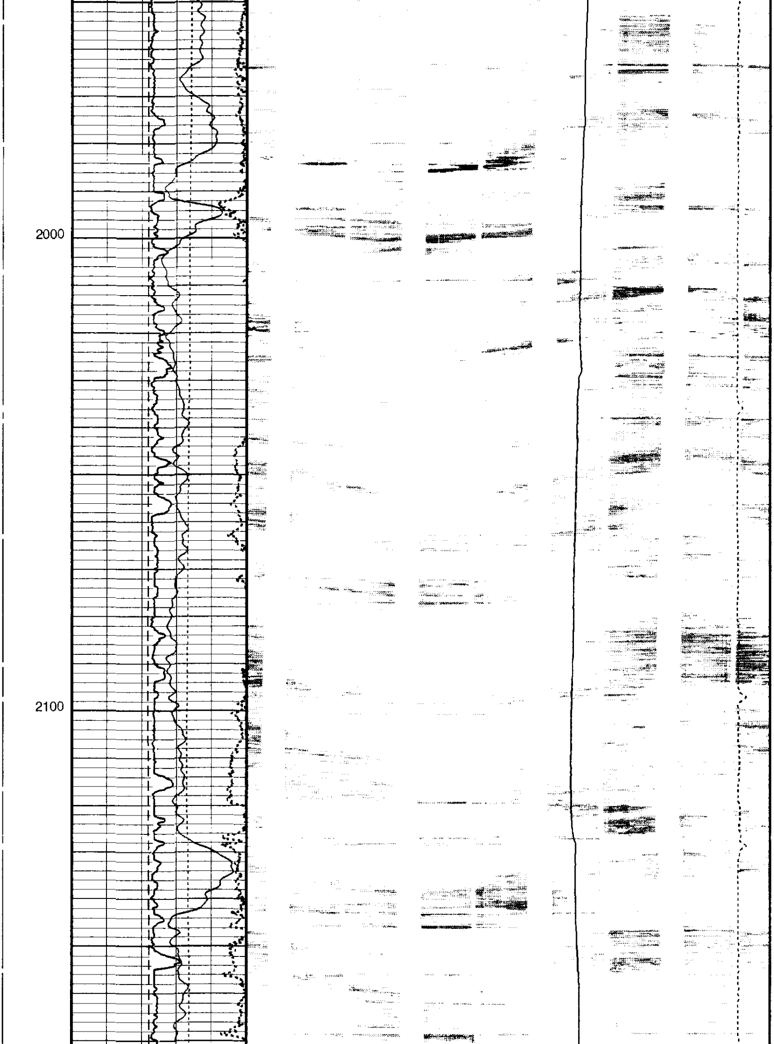
Caliper 2 (C2)
6 (IN) 11

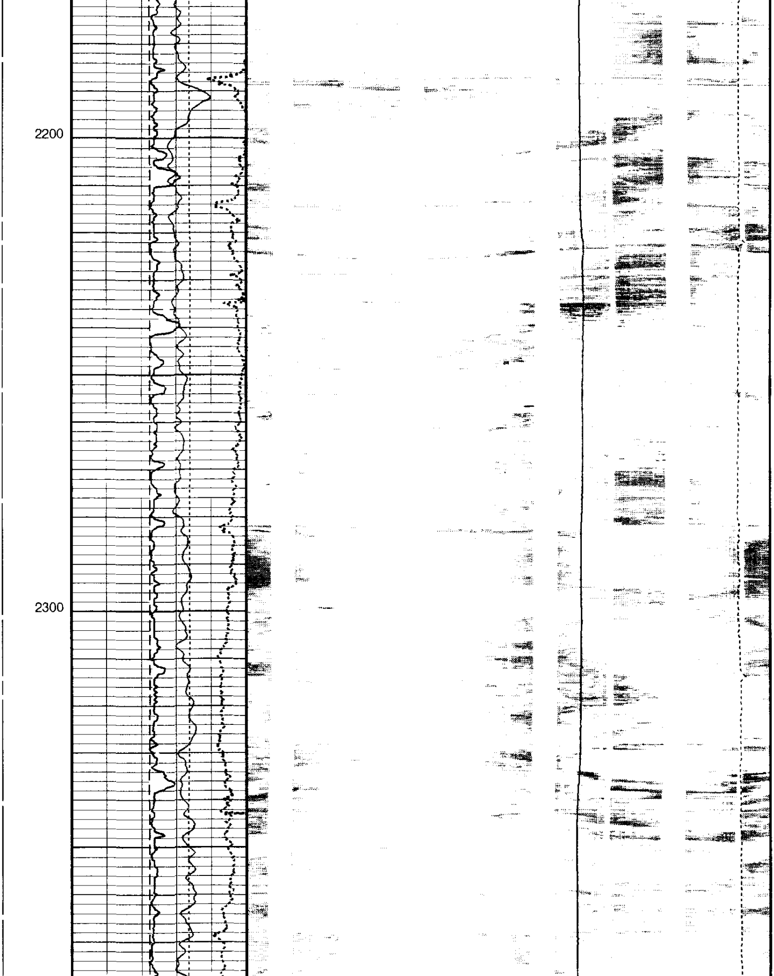


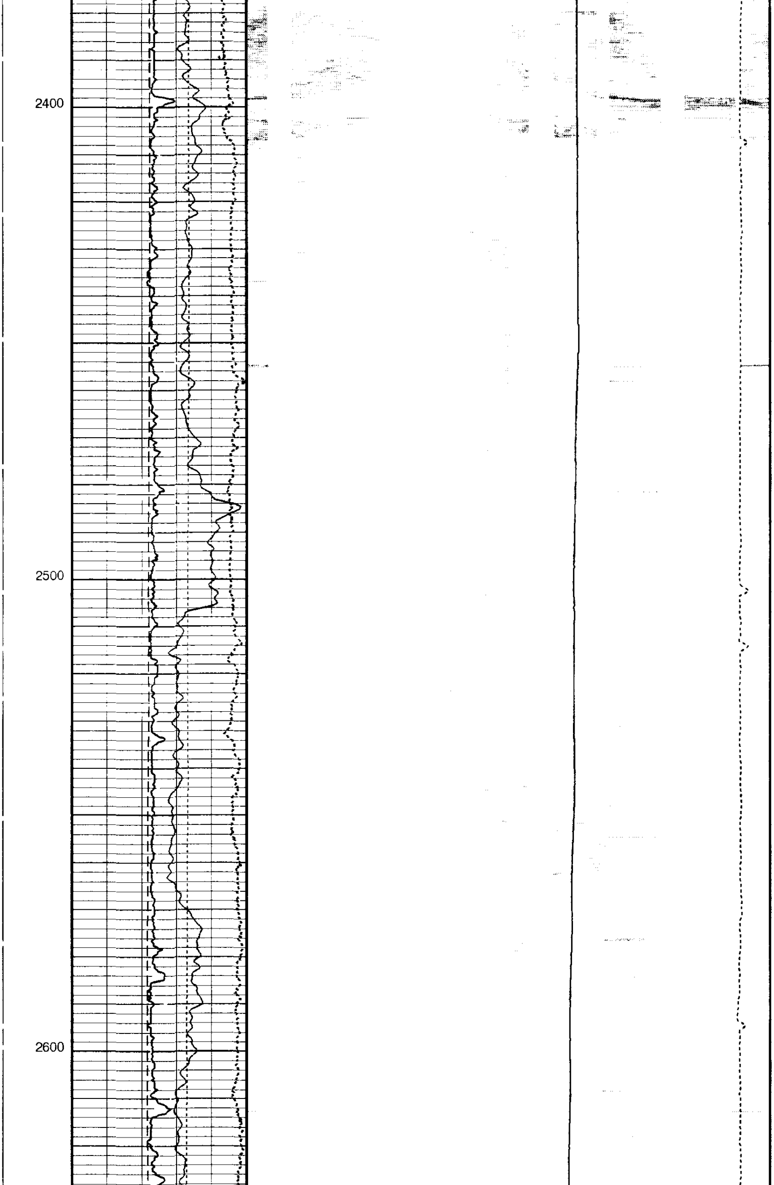
FBST/PADA (FBAA_A)
(----)

Image Orientation (P1AZ_FBST)
0 (DEG) 360









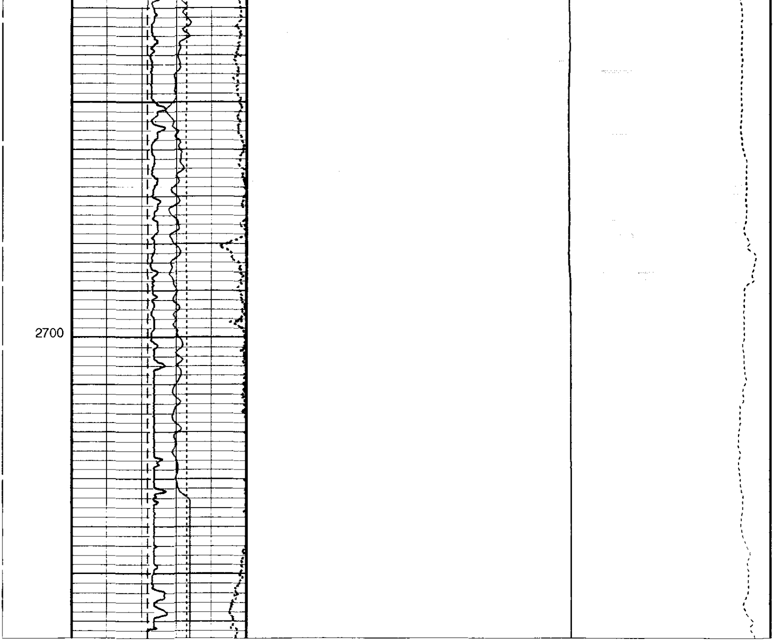
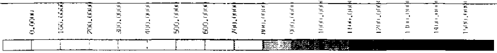


Image Orientation (P1AZ_FBST)

0 (DEG) 360



FBST/PADA (FBAA_A)
(----)

Caliper 2 (C2)
6 (IN) 11

Deviation (DEVIM)
0 (DEG) 10

Gamma Ray (GR)
0 (GAPI) 150

Hole Azimuth (HAZIM)
-40 (DEG) 360

Pad One Azimuth (P1AZ_FBST)
-40 (DEG) 360

FMI Correlation Resistance (LOG) (FBCR)
2 (KOHM) 2000

Tension (TENS)
10000 (LBF) 0

PIP SUMMARY

Time Mark Every 60 S

FMI Image.

Resistive (White) to Conductive (Black)

Format: FMI_BS_WRAP_BY_P1AZ Vertical Scale: 5" per 100' Graphics File Created: 21-Jun-2000 00:40

OP System Version: 9C1-303

MCM

FBST-B	9C1-303	SGT-N	OP91-KP1a
DTC-H	OP91-KP1a		

Parameters

DLIS Name	Description	Value	
AFMO	Accelerometer Filtering Mode	MOVING_AVERAGE	
ALTDPCHAN	Name of alternate depth channel	SpeedCorrectedDepth	
DO	Depth Offset for Logical Unit 1	2.0	FT
EGCO	FMI EMEX and GAIN Correction	NO	
FDBD	FMI Dead Buttons detection	OFF	
FDBP	FMI Dead Buttons Patching	OFF	
FIEQ	FMI Image Equalisation	OFF	
FLM	FMI Logging Mode	8PAD	
ICMO	Inclinometry Computation Mode	AUTOMATIC_SELECTION	
MDEC	Magnetic Field Declination	18.305	DEG
PBVSADP	Use alternate depth channel for playback	NO	
PP	Playback Processing	NORMAL	
SOFF	Stand-Off	0	IN
XGAI_FBST	Gain Value(When manu)	25_dB	
XGMO	Emex & Gain Modes	EmexManu_GainManu	
XVOL	Emex Voltage	0	V

Input DLIS Files

DEFAULT	FBSTB .004	FN:3	PRODUCER	20-Jun-2000 06:44	2761.5 FT	1863.0 FT

Output DLIS Files

DEFAULT	FBSTB .013	FN:8	PRODUCER	21-Jun-2000 00:40		

Input DLIS Files

DEFAULT	FBSTB .006	FN:5	PRODUCER	20-Jun-2000 08:57	2751.0 FT	1853.1 FT

Output DLIS Files

DEFAULT	FBSTB .014	FN:9	PRODUCER	21-Jun-2000 00:44	2753.0 FT	1855.5 FT

OP System Version: 9C1-303

MCM

FBST-B	9C1-303	SGT-N	OP91-KP1a
DTC-H	OP91-KP1a		

PIP SUMMARY

Time Mark Every 60 S

FMI Correlation Resistance (LOG) (FBCR)

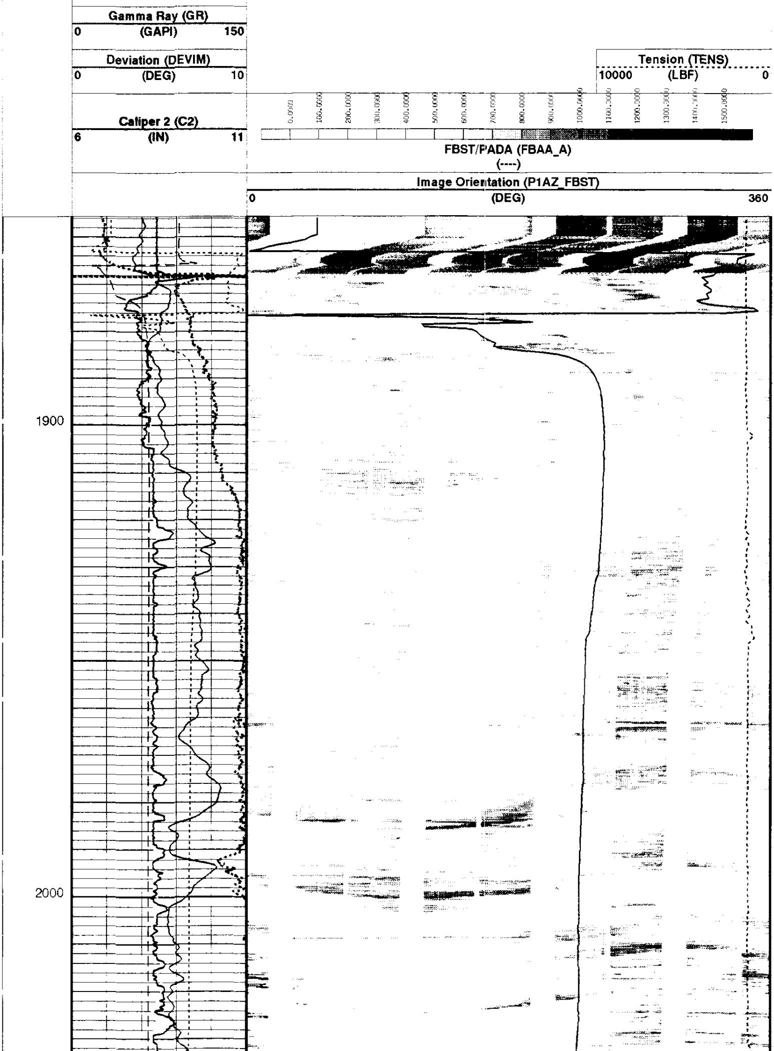
2 (KOHM) 2000

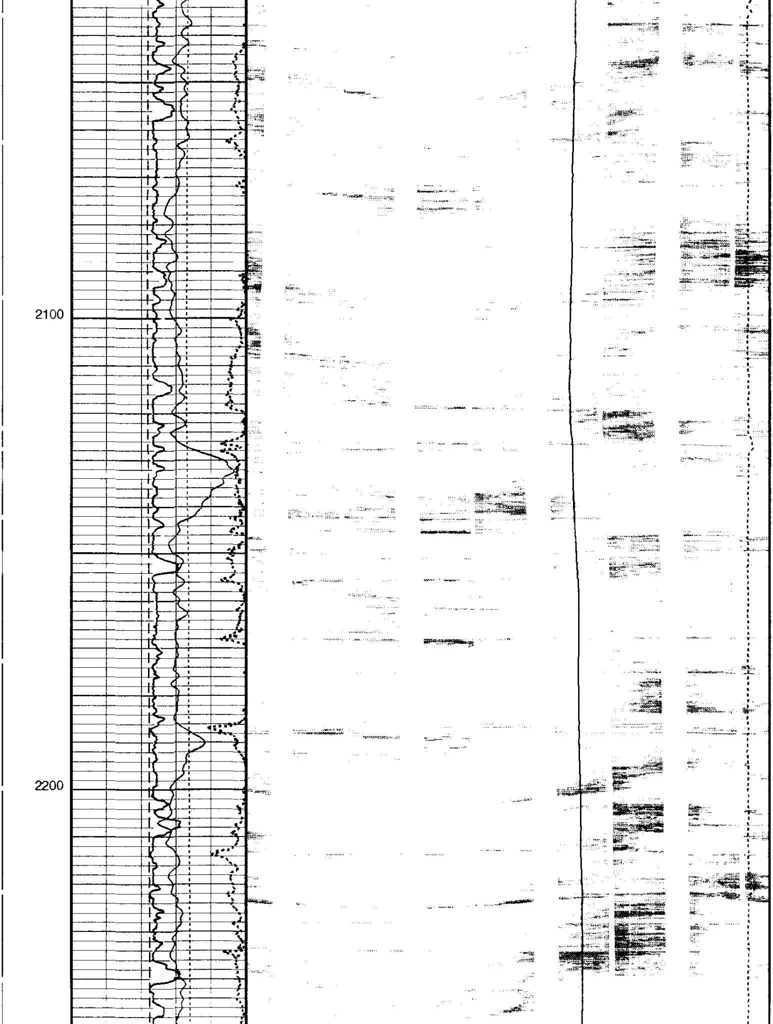
Pad One Azimuth (P1AZ_FBST)

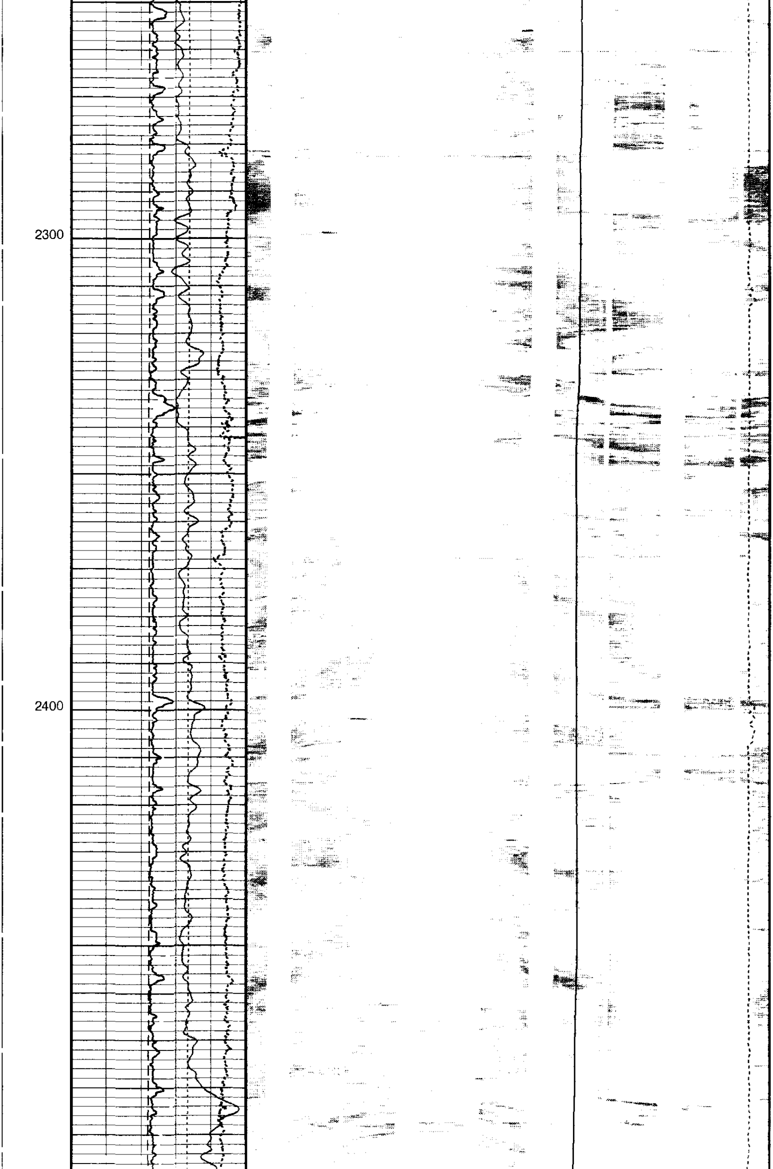
-40 (DEG) 360

Hole Azimuth (HAZIM)

-40 (DEG) 360







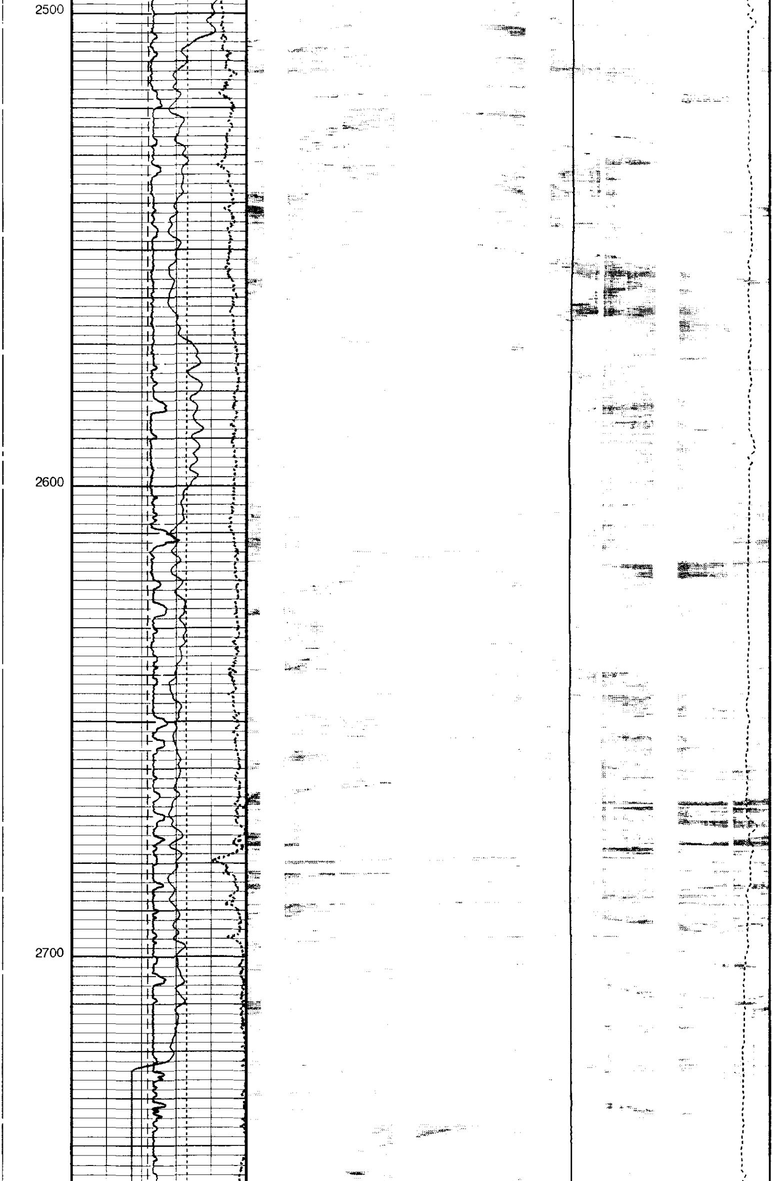
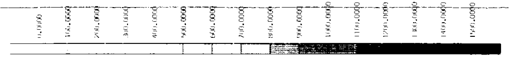


Image Orientation (P1AZ_FBST)
0 (DEG) 360



FBST/PADA (FBAA_A)
(----)

Caliper 2 (C2)
6 (IN) 11

Deviation (DEVIM)
0 (DEG) 10

Gamma Ray (GR)
0 (GAPI) 150

Hole Azimuth (HAZIM)
-40 (DEG) 360

Pad One Azimuth (P1AZ_FBST)
-40 (DEG) 360

FMI Correlation Resistance (LOG) (FBCR)
2 (KOHM) 2000

Tension (TENS)
10000 (LBF) 0

PIP SUMMARY

▶ Time Mark Every 60 S

FMI Image.

Resistive (White) to Conductive (Black)

Format: FMI_BS_WRAP_BY_P1AZ Vertical Scale: 5" per 100' Graphics File Created: 21-Jun-2000 00:44

OP System Version: 9C1-303

MCM

FBST-B	9C1-303	SGT-N	OP91-KP1a
DTC-H	OP91-KP1a		

Parameters

DLIS Name	Description	Value	
AFMO	Accelerometer Filtering Mode	MOVING_AVERAGE	
ALTDPCHAN	Name of alternate depth channel	SpeedCorrectedDepth	
DO	Depth Offset for Logical Unit 1	2.0	FT
EGCO	FMI EMEX and GAIN Correction	NO	
FDBD	FMI Dead Buttons detection	OFF	
FDBP	FMI Dead Buttons Patching	OFF	
FIEQ	FMI Image Equalisation	OFF	
FLM	FMI Logging Mode	8PAD	
ICMO	Inclinometry Computation Mode	AUTOMATIC_SELECTION	
MDEC	Magnetic Field Declination	18.305	DEG
PBVSADP	Use alternate depth channel for playback	NO	
PP	Playback Processing	NORMAL	
SOFF	Stand-Off	0	IN
XGAI_FBST	Gain Value(When manu)	25_dB	
XGMO	Emex & Gain Modes	EmexManu_GainManu	
XVOL	Emex Voltage	0	V

Input DLIS Files

DEFAULT	FBSTB .006	FN:5	PRODUCER	20-Jun-2000 08:57	2751.0 FT	1853.1 FT

Output DLIS Files

DEFAULT	FBSTB .014	FN:9	PRODUCER	21-Jun-2000 00:44

Input DLIS Files

DEFAULT	FBSTB .004	FN:3	PRODUCER	20-Jun-2000 06:44	2761.5 FT	1863.0 FT

Output DLIS Files

DEFAULT	FBSTB .013	FN:8	PRODUCER	21-Jun-2000 00:40	2763.5 FT	1865.0 FT

OP System Version: 9C1-303

MCM

FBST-B	9C1-303	SGT-N	OP91-KP1a
DTC-H	OP91-KP1a		

PIP SUMMARY

Time Mark Every 60 S

FMI Correlation Resistance (LOG) (FBCR) 2 (KOHM) 2000

Relative Bearing (RB_FBST) -40 (DEG) 360

Pad One Azimuth (P1AZ_FBST) -40 (DEG) 360

Hole Azimuth (HAZIM) -40 (DEG) 360

Gamma Ray (GR) 0 (GAPI) 150

Deviation (DEVIM) 0 (DEG) 25

Tension (TENS) 10000 (LBF) 0

Caliper 2 (C2) 6 (IN) 11

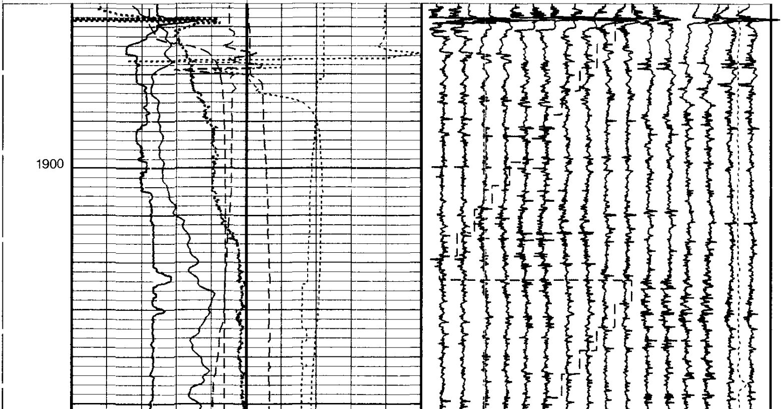
EMEX Intensity (EI) 0 (AMPS) 10

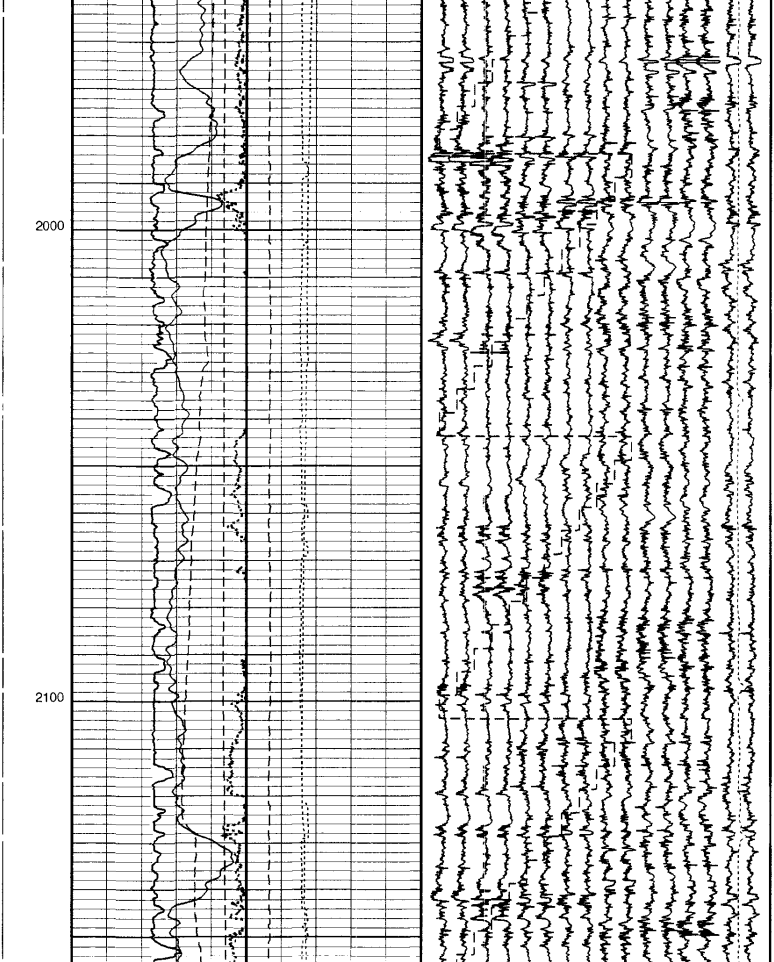
FMI resistivity buttons #1 to 16

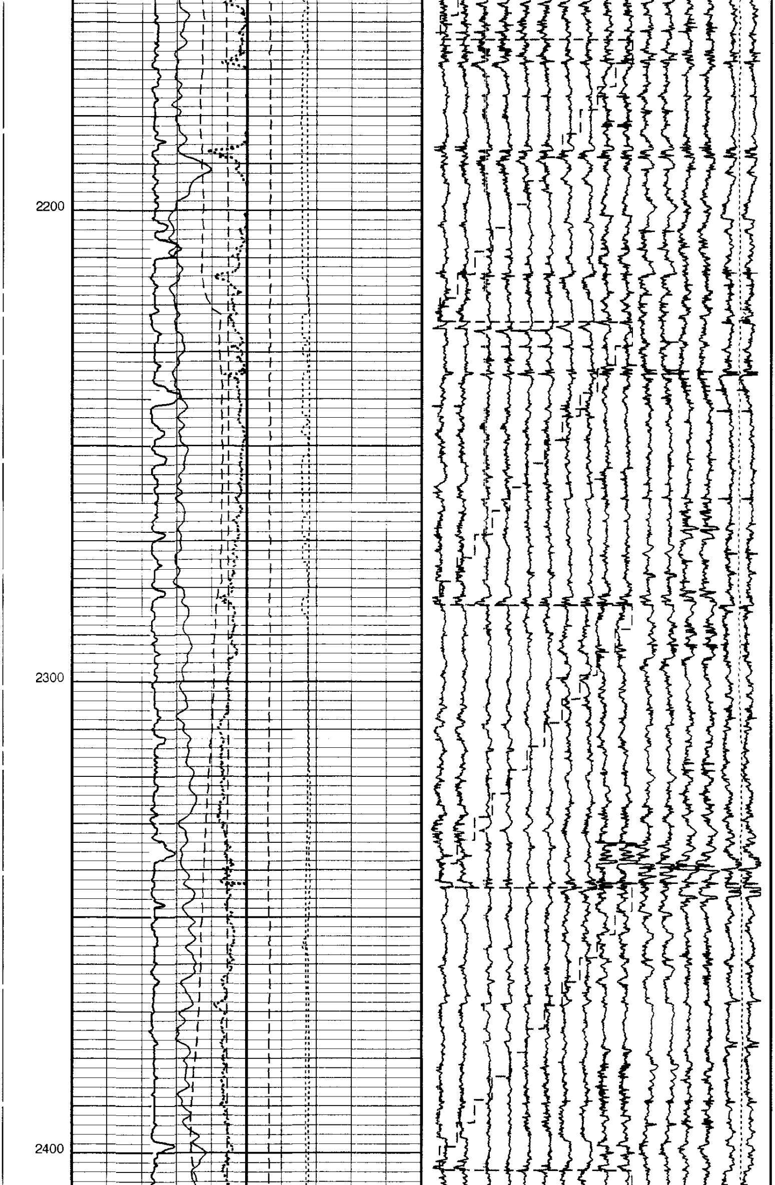
RB16 RB15 RB14 RB13 RB12 RB11 RB10 RB9 RB8 RB7 RB6 RB5 RB4 RB3 RB2 RB1

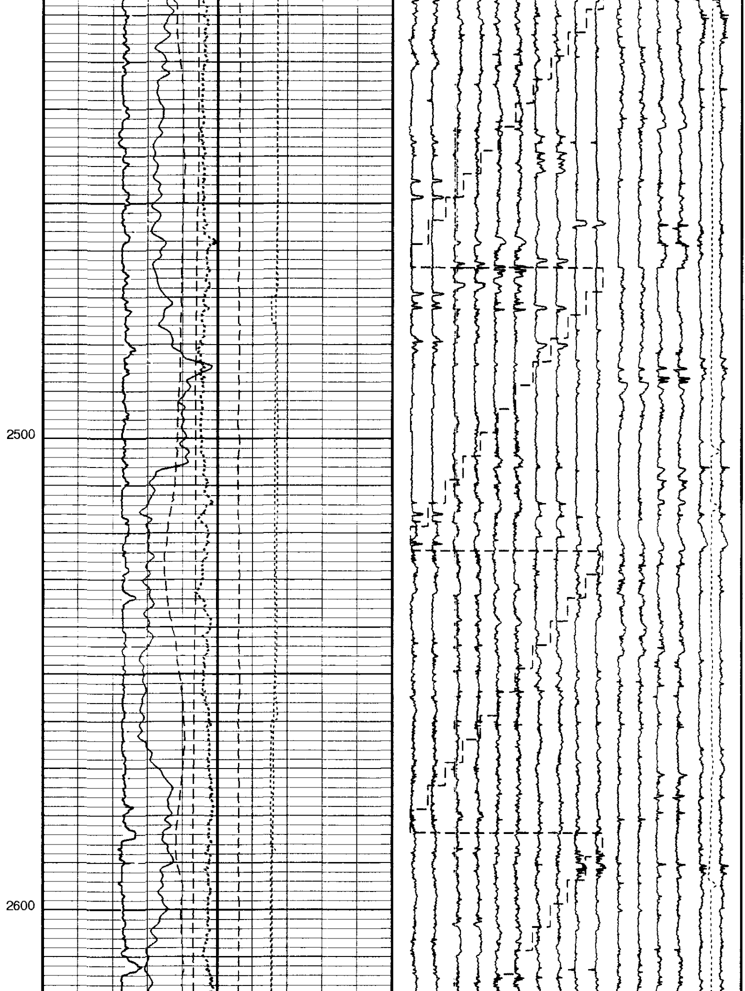
EMEX Voltage (EV) 0 (V) 50

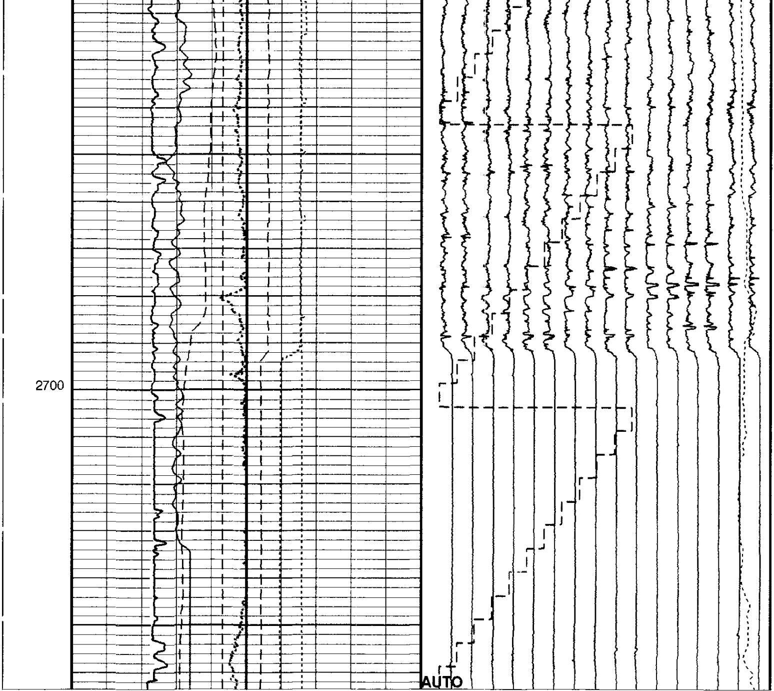
FMI RBS Value (RBSV) 0 (----) 20











EMEX Voltage (EV)
0 (V) 50

FMI RBS Value (RBSV)
0 (----) 20

Caliper 2 (C2)
6 (IN) 11

EMEX Intensity (EI)
0 (AMPS) 10

FMI resistivity buttons #1 to 16
RB16 RB15 RB14 RB13 RB12 RB11 RB10 RB9 RB8 RB7 RB6 RB5 RB4 RB3 RB2 RB1

Deviation (DEVIM)
0 (DEG) 25

Tension (TENS)
10000 (LBF) 0

Gamma Ray (GR)
0 (GAPI) 150

Hole Azimuth (HAZIM)
-40 (DEG) 360

Pad One Azimuth (P1AZ_FBST)
-40 (DEG) 360

Relative Bearing (RB_FBST)
-40 (DEG) 360

FMI Correlation Resistance (LOG) (FBCR)
2 (KOHM) 2000

PIP SUMMARY

Time Mark Every 60 S

Parameters

DLIS Name	Description	Value	
AFMO	Accelerometer Filtering Mode	MOVING_AVERAGE	
DO	Depth Offset for Logical Unit 1	2.0	FT
FBEF	Emex filtering activation	OFF	
FLM	FMI Logging Mode	8PAD	
ICMO	Inclinometry Computation Mode	AUTOMATIC_SELECTION	
MDEC	Magnetic Field Declination	18.305	DEG
PP	Playback Processing	NORMAL	
RBS	Resistivity Button Selection	AUTO	
RBSI	Auto RBS change interval	10	
SOFF	Stand-Off	0	IN
XGMO	Emex & Gain Modes	EmexManu_GainManu	
XVOL	Emex Voltage	0	V

Format: FMI_LQC   Vertical Scale: 5" per 100'   Graphics File Created: 21-Jun-2000 00:40

OP System Version: 9C1-303

MCM

FBST-B	9C1-303	SGT-N	OP91-KP1a
DTC-H	OP91-KP1a		

Input DLIS Files

DEFAULT	FBSTB .004	FN:3	PRODUCER	20-Jun-2000 06:44	2761.5 FT	1863.0 FT

Output DLIS Files

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Input DLIS Files

DEFAULT	FBSTB .006	FN:5	PRODUCER	20-Jun-2000 08:57	2751.0 FT	1853.1 FT

Output DLIS Files

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OP System Version: 9C1-303

MCM

FBST-B	9C1-303	SGT-N	OP91-KP1a
DTC-H	OP91-KP1a		

PIP SUMMARY

Time Mark Every 60 S

FMI Correlation Resistance (LOG) (FBCR)

2 (KOHM) 2000

Relative Bearing (RB_FBST)

-40 (DEG) 360

Pad One Azimuth (P1AZ_FBST)

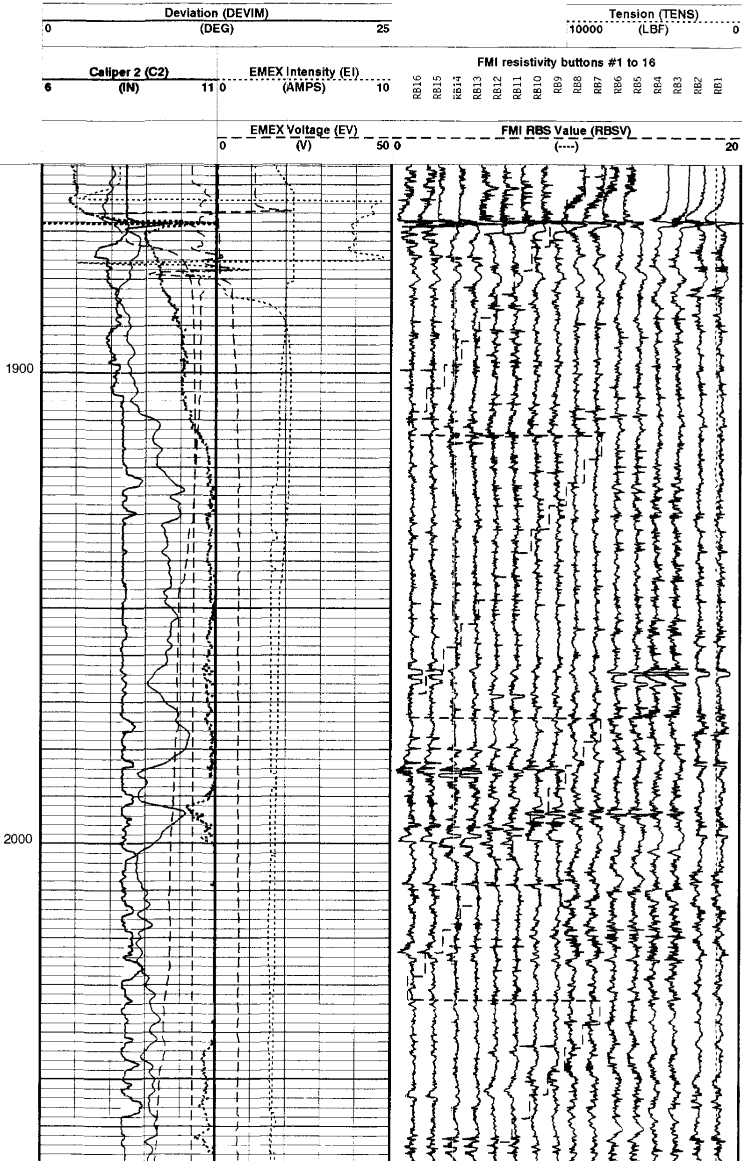
-40 (DEG) 360

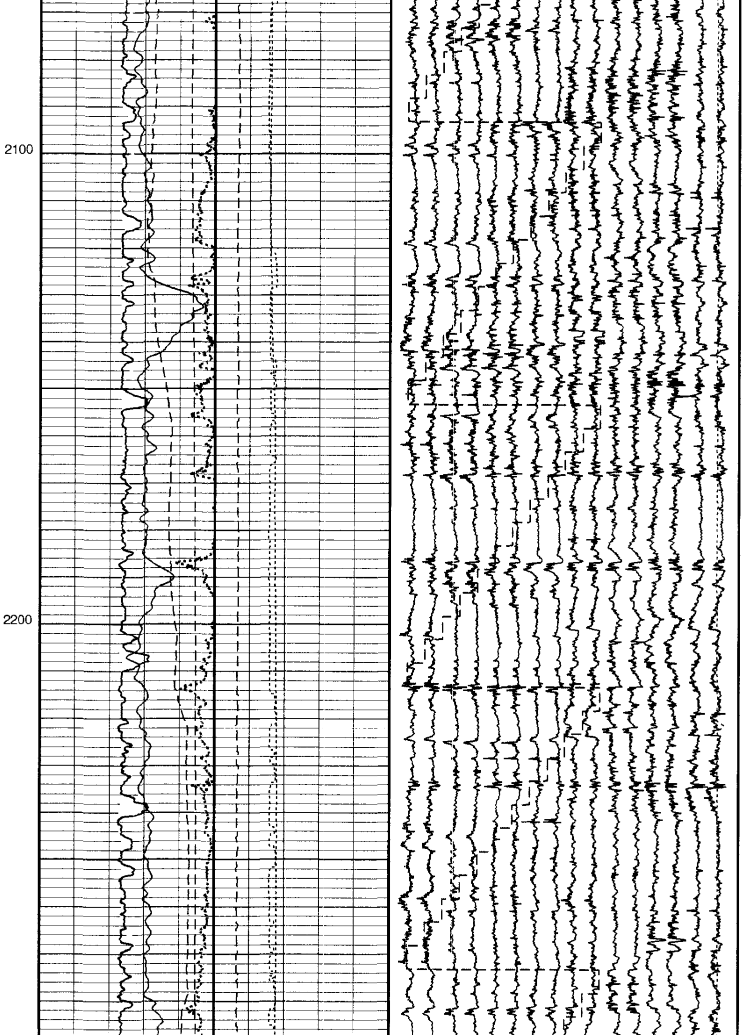
Hole Azimuth (HAZIM)

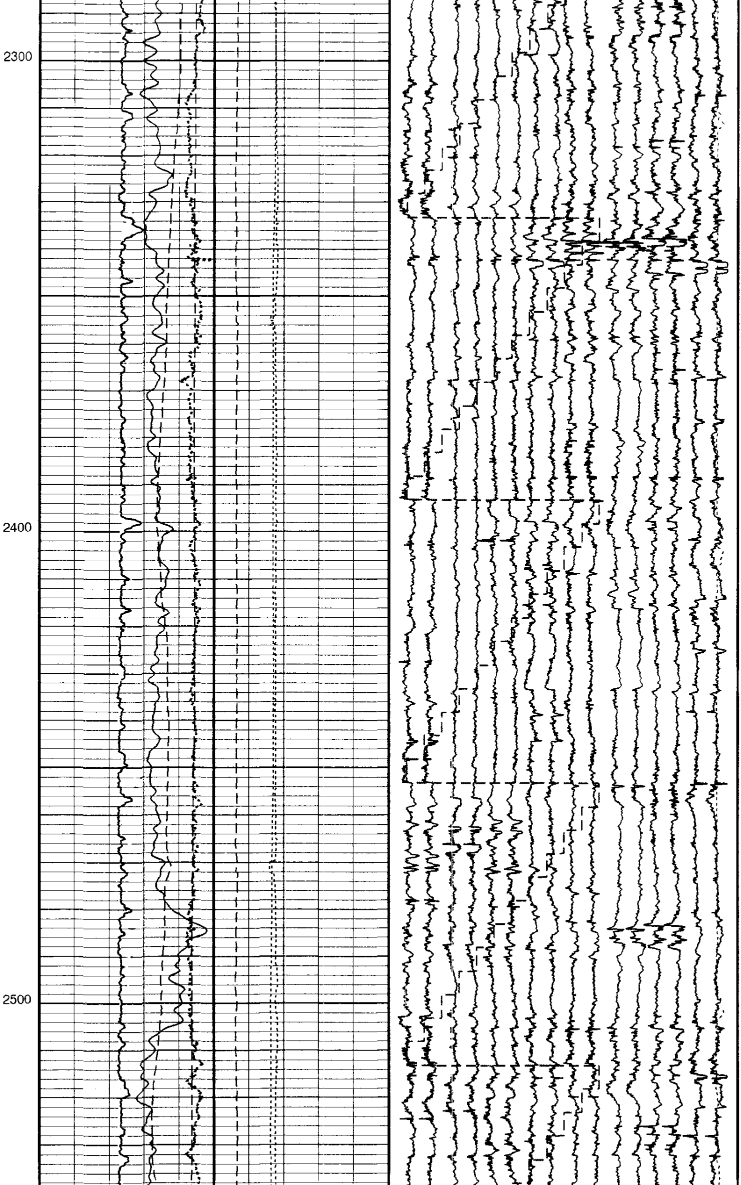
-40 (DEG) 360

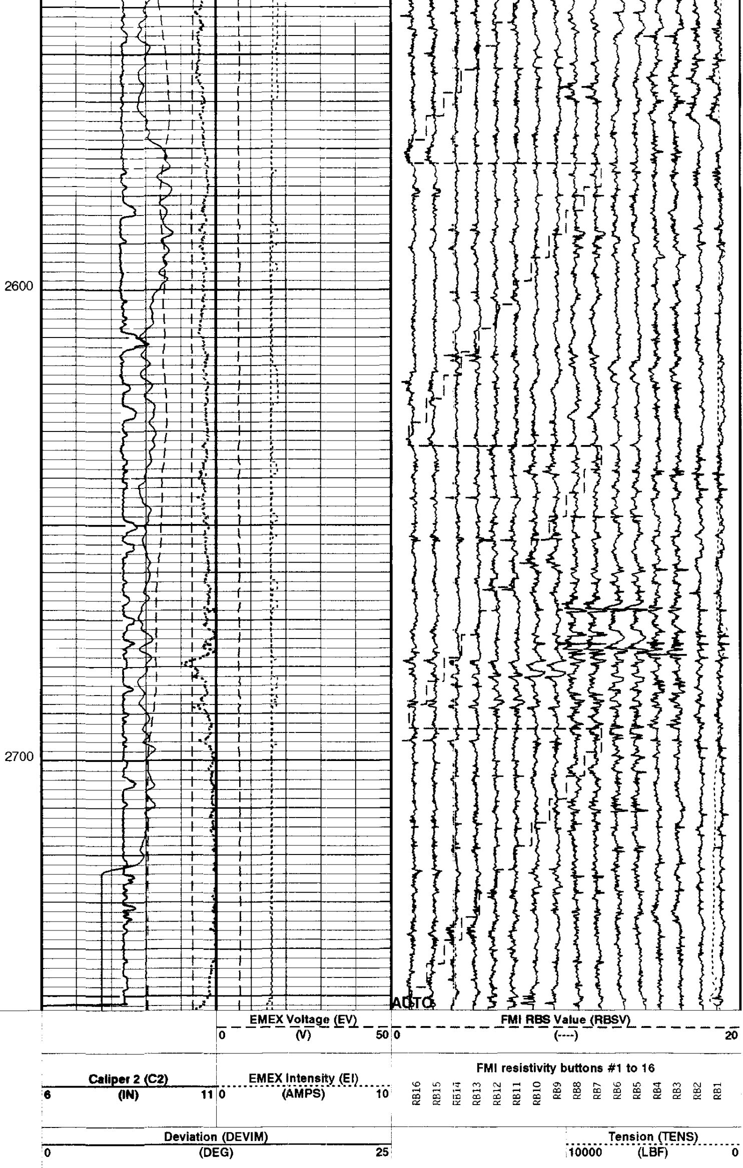
Gamma Ray (GR)

0 (GAPI) 150









Gamma Ray (GR)
0 (GAPI) 150

Hole Azimuth (HAZIM)
-40 (DEG) 360

Pad One Azimuth (P1AZ_FBST)
-40 (DEG) 360

Relative Bearing (RB_FBST)
-40 (DEG) 360

FMI Correlation Resistance (LOG) (FBCR)
2 (KOHM) 2000

PIP SUMMARY

■ **Time Mark Every 60 S**

Parameters

DLIS Name	Description	Value	
AFMO	Accelerometer Filtering Mode	MOVING_AVERAGE	
DO	Depth Offset for Logical Unit 1	2.0	FT
FBEF	Emex filtering activation	OFF	
FLM	FMI Logging Mode	8PAD	
ICMO	Inclinometry Computation Mode	AUTOMATIC_SELECTION	
MDEC	Magnetic Field Declination	18.305	DEG
PP	Playback Processing	NORMAL	
RBS	Resistivity Button Selection	AUTO	
RBSI	Auto RBS change interval	10	
SOFF	Stand-Off	0	IN
XGMO	Emex & Gain Modes	EmexManu_GainManu	
XVOL	Emex Voltage	0	V

Format: FMI_LQC **Vertical Scale: 5" per 100'** **Graphics File Created: 21-Jun-2000 00:44**

OP System Version: 9C1-303

MCM

FBST-B	9C1-303	SGT-N	OP91-KP1a
DTC-H	OP91-KP1a		

Input DLIS Files

DEFAULT	FBSTB .006	FN:5	PRODUCER	20-Jun-2000 08:57	2751.0 FT	1853.1 FT

Output DLIS Files

DEFAULT	FBSTB .014	FN:9	PRODUCER	21-Jun-2000 00:44

Calibration and Check Summary

Measurement	Nominal	Master	Before	After	Change	Limit	Units
Full-Bore Scanner - B Wellsite Calibration - Caliper Calibration							
Before: 17-JUN-2000 18:50							
Caliper #1 Small Jig	8.000	N/A	7.617	N/A	N/A	N/A	IN
Caliper #2 Small Jig	8.000	N/A	7.555	N/A	N/A	N/A	IN
Caliper #1 Large Jig	12.00	N/A	11.49	N/A	N/A	N/A	IN
Caliper #2 Large Jig	12.00	N/A	11.39	N/A	N/A	N/A	IN
Full-Bore Scanner - B Wellsite Calibration - CROUZET ACCELEROMETER PROM HAS BEEN READ CORRECTLY							
Before: 17-JUN-2000 18:40							
TEMPERATURE REFERENCE :	N/A	N/A	68	N/A	N/A	N/A	DEGF
YEAR OF CALIBRATION :	N/A	N/A	97	N/A	N/A	N/A	
MONTH OF CALIBRATION :	N/A	N/A	12	N/A	N/A	N/A	
SERIAL NUMBER :	N/A	N/A	676	N/A	N/A	N/A	
Full-Bore Scanner - B Wellsite Calibration - CROUZET MAGNETOMETER PROM HAS BEEN READ CORRECTLY							
Before: 17-JUN-2000 18:40							
TEMPERATURE REFERENCE :	N/A	N/A	70	N/A	N/A	N/A	DEGF
YEAR OF CALIBRATION :	N/A	N/A	95	N/A	N/A	N/A	
MONTH OF CALIBRATION :	N/A	N/A	5	N/A	N/A	N/A	
SERIAL NUMBER :	N/A	N/A	241	N/A	N/A	N/A	

Full-Bore Scanner - B / Equipment Identification

Primary Equipment:		
FullBore Scanner Sonde	FBSS - B	779
FullBore Scanner Sonde Upper part	FBSH - A	779
FullBore Scanner Sonde Cartridge	FBSC - B	
GPIT Cartridge - C	GPIC - C	716
Flex Joint	AH - 184	737
Insulating Sub	AH - 185	727
FullBore Scanner Control Cartridge	FBCC - A	727
Auxiliary Equipment:		
Electronics Cartridge Housing	ECH - MRA	727

Full-Bore Scanner - B Wellsite Calibration

Caliper Calibration

Phase	Caliper #1 Small Jig IN	Value	Phase	Caliper #2 Small Jig IN	Value
Before	▨	7.617	Before	▨	7.555
	6.800 (Minimum) 8.000 (Nominal) 9.200 (Maximum)			6.800 (Minimum) 8.000 (Nominal) 9.200 (Maximum)	

Phase	Caliper #1 Large Jig IN	Value	Phase	Caliper #2 Large Jig IN	Value
Before	▨	11.49	Before	▨	11.39
	10.20 (Minimum) 12.00 (Nominal) 13.80 (Maximum)			10.20 (Minimum) 12.00 (Nominal) 13.80 (Maximum)	

Before: 17-JUN-2000 18:50

COMPANY:	**NORTHWEST NATURAL GAS**	BOTTOM LOG INTERVAL	2762 ft
		SCHLUMBERGER DEPTH	2762 ft
WELL:	**IW-24BH-23-65**	DEPTH DRILLER	2770 ft
FIELD:	**MIST**	KELLY BUSHING	923 ft
COUNTY:	**COLUMBIA**	DRILL FLOOR	923 ft
STATE:	**OREGON**	GROUND LEVEL	905 ft

Schlumberger

FORMATION MICRO IMAGER
IMAGES/ LQC
SCALE: 5" = 100'