COMPANY: NORTHWEST NATURAL GAS

WELL: OM-32-22-65

FIELD: CALVIN CREEK GAS STORAGE

COUNTY: COLUMBIA **STATE:** OREGON

COUNTY: COLUMBIA
Field: CALVIN CREEK GAS STORAGE
Location: 1884.04' S & 1261.26' E FROM T
Well: OM-32-22-65
Company: NORTHWEST NATURAL GAS

FIELD PRINT

Schlumberger

FORMATION MICRO IMAGER GAMMA RAY

LOCATION

1884.04' S & 1261.26' E FROM THE
NE CORNER OF SECTION 22

Elev.: K.B. 762 F
G.L. 753 F
D.F.

Permanent Datum: GROUND LEVEL Elev.: 753 F
Log Measured From: KELLY BUSHING 9.0 F above Perm. Datum
Drilling Measured From: KELLY BUSHING

API Serial No.	SECTION	TOWNSHIP	RANGE
	22	6N	5W

Logging Date	22-JUL-1998			
Run Number	ONE			
Depth Driller	2365 F			
Schlumberger Depth	2365 F			
Bottom Log Interval	2357 F			
Top Log Interval	1357 F			
Casing Driller Size @ Depth	8.625 IN @ 425 F		@	
Casing Schlumberger	425 F			
Bit Size	7.875 IN			
Type Fluid In Hole	CYPAN			
MUD Density / Viscosity	9.5 LB/G	45 S		
MUD Fluid Loss / PH	7.8 C3	8		
Source Of Sample	FLOWLINE			
RM @ Measured Temperature	1.870 OHMM @ 80 DEGF		@	
RMF @ Measured Temperature	1.910 OHMM @ 70 DEGF		@	
RMC @ Measured Temperature	1.650 OHMM @ 70 DEGF		@	
Source RMF / RMC	PRESS	PRESS		
RM @ MRT / RMF @ MRT	1.579 @ 96	1.427 @ 96	@	@
Maximum Recorded Temperatures	96 DEGF			
Circulation Stopped / Time	22-JUL-1998	2:30		
Logger On Bottom / Time	22-JUL-1998	5:30		
Unit Number / Location	3152	SACRAMENTO		
Recorded By	JASON GENDUR			
Witnessed By	JACK MEYER			

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	
MUD 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

ALL INTERPRETATIONS ARE OPINIONS BASED ON INFERENCES FROM ELECTRICAL OR OTHER MEASUREMENTS AND WE CANNOT, AND DO NOT GUARANTEE THE ACCURACY OR CORRECTNESS OF ANY INTERPRETATIONS, AND WE SHALL NOT, EXCEPT IN THE CASE OF GROSS OR WILLFUL NEGLIGENCE ON OUR PART, BE LIABLE OR RESPONSIBLE FOR ANY LOSS, COSTS, DAMAGES OR EXPENSES INCURRED OR SUSTAINED BY ANYONE RESULTING FROM ANY INTERPRETATION MADE BY ANY OF OUR OFFICERS, AGENTS OR EMPLOYEES. THESE INTERPRETATIONS ARE ALSO SUBJECT TO CLAUSE 4 OF OUR GENERAL TERMS AND CONDITIONS AS SET OUT IN OUR CURRENT PRICE SCHEDULE.

OTHER SERVICES1	OTHER SERVICES2
OS1:	OS1:
OS2:	OS2:
OS3:	OS3:
OS4:	OS4:
OS5:	OS5:

REMARKS: RUN NUMBER 1	REMARKS: RUN NUMBER 2
Thank you for choosing Schlumbeger!	
Your crew today is Forehand & Tye.	

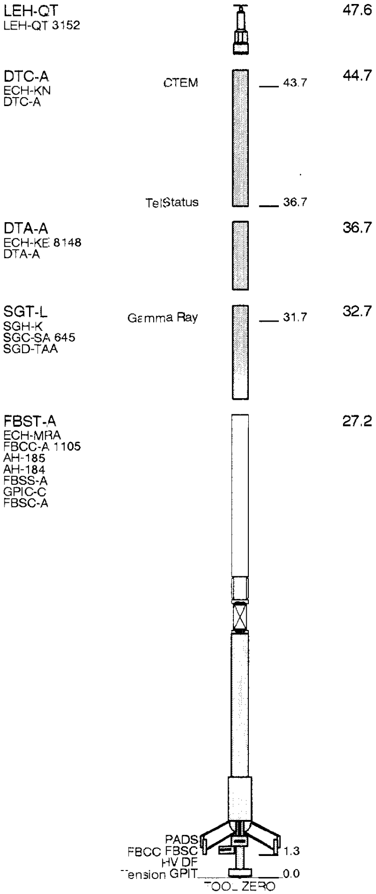
RUN 1		RUN 2	
SERVICE ORDER #:	1222172	SERVICE ORDER #:	
PROGRAM VERSION	8C1-205	PROGRAM VERSION	
FLUID LEVEL		FLUID LEVEL	

LOGGED INTERVAL	START	STOP	LOGGED INTERVAL	START	STOP

EQUIPMENT DESCRIPTION

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

DOWNHOLE EQUIPMENT



MAXIMUM STRING DIAMETER 5.00 IN
MEASUREMENTS RELATIVE TO TOOL ZERO
ALL LENGTHS IN FEET

Input DLIS Files

DEFAULT	FBSTA .025	FN:19	FIELD	22-Jul-1998 09:17	2368.0 FT	1334.7 FT

Output DLIS Files

DEFAULT	FBSTA .050	FN:42	FIELD	22-Jul-1998 14:07	2367.0 FT	1334.0 FT

OP System Version: 8C1-205

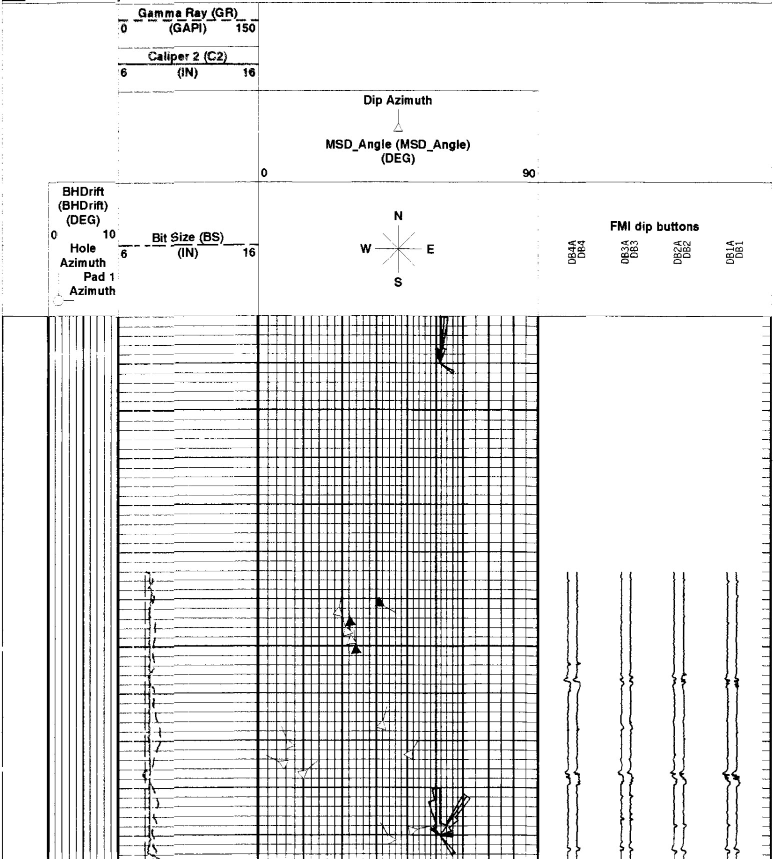
MCM

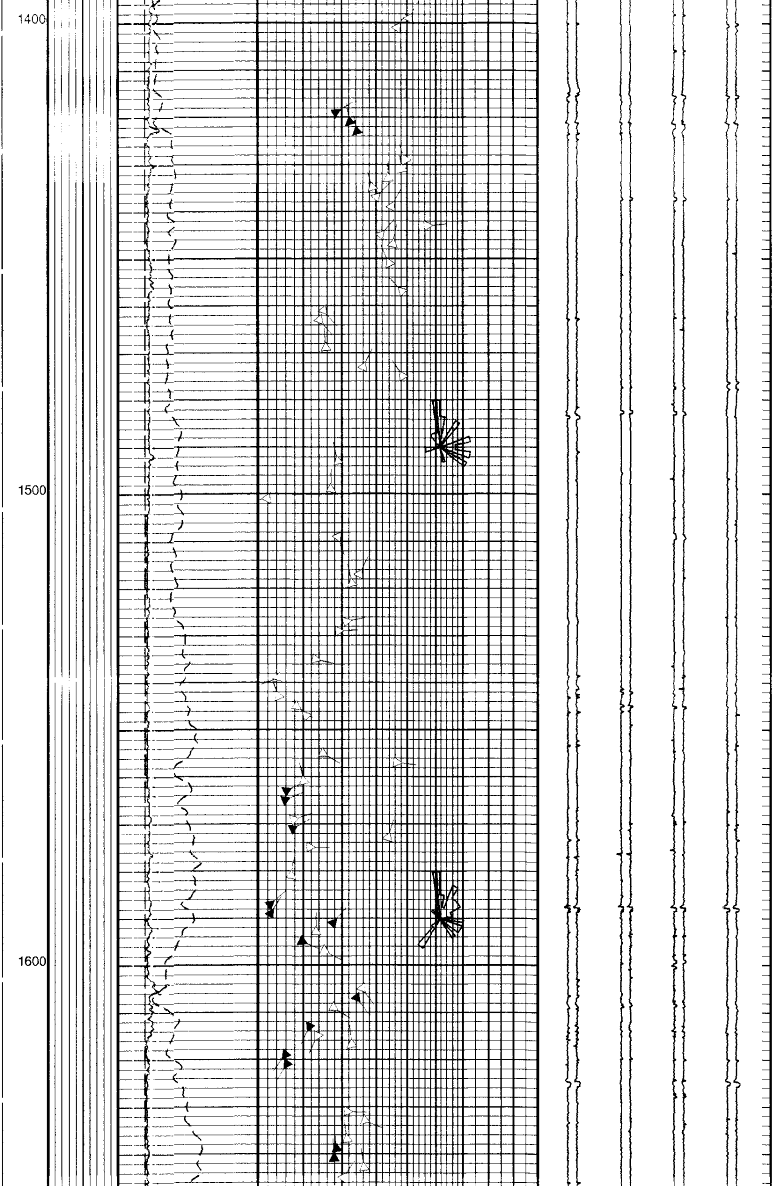
FBST-A	APCW-98Q1	SGT-L	APCW-98Q1
DTA-A	APCW-98Q1	DTC-A	APCW-98Q1

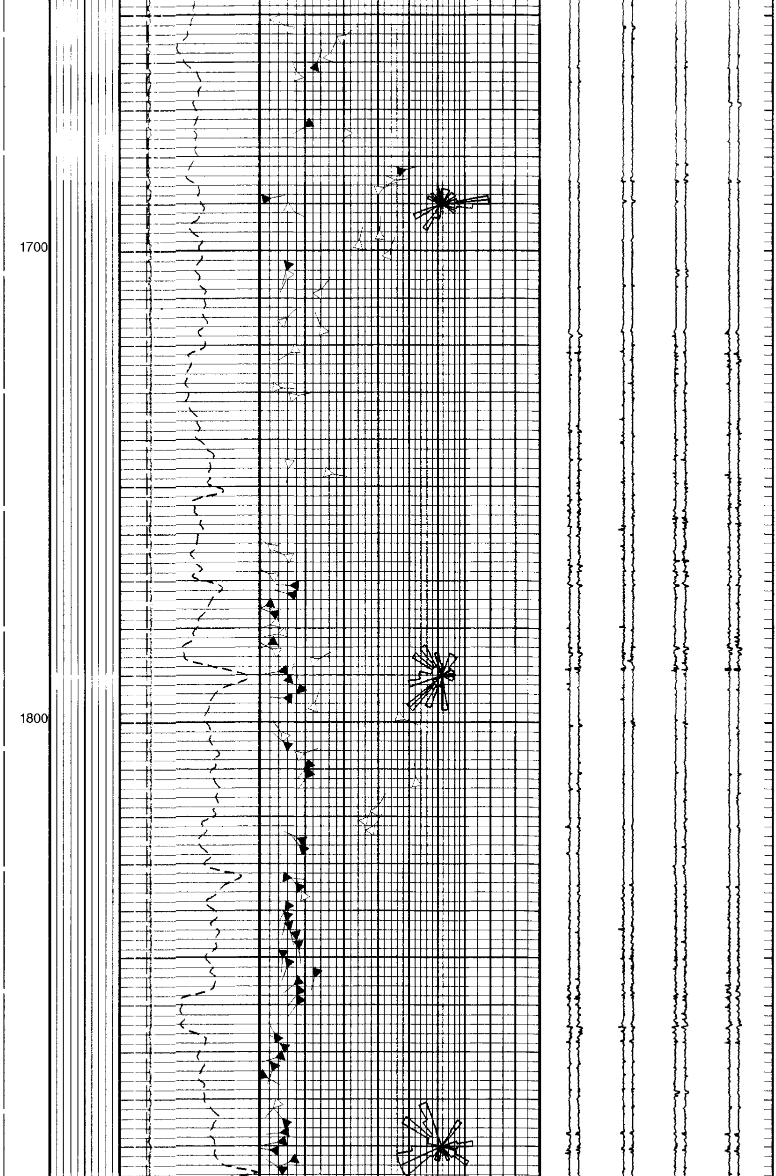
FMI Dip buttons values are Not corrected by Emex or Gain.

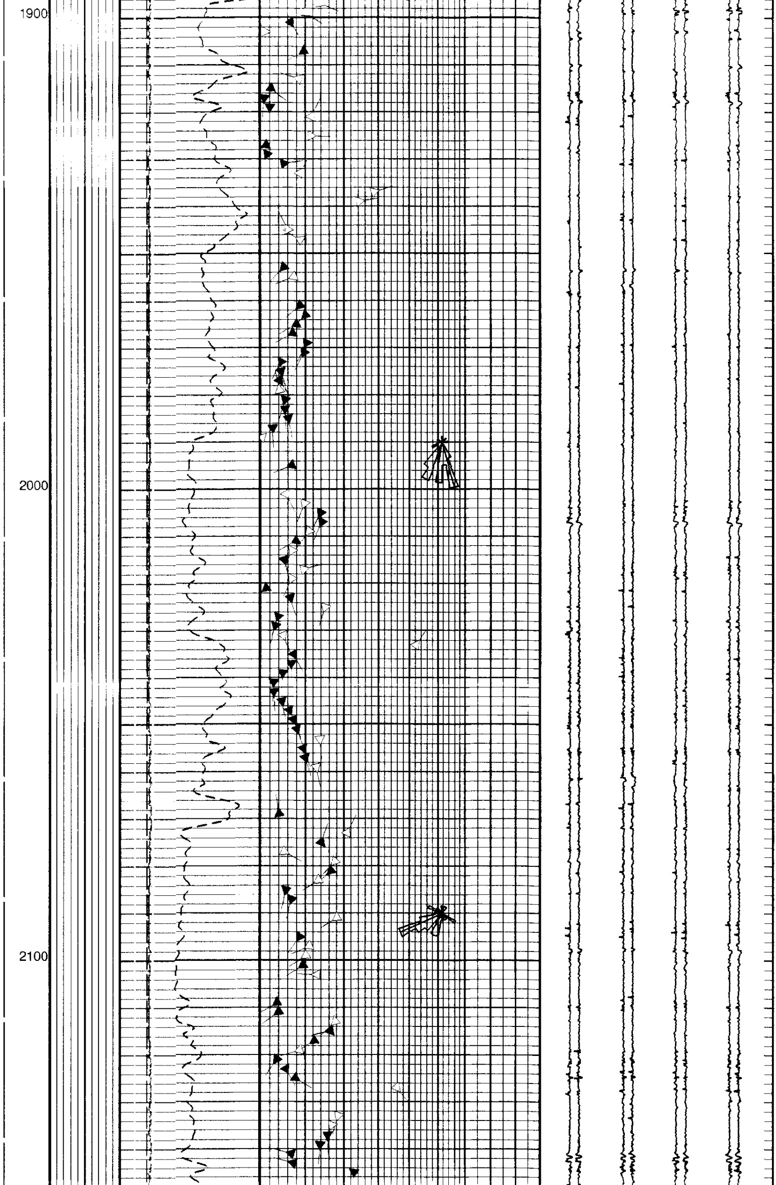
PIP SUMMARY

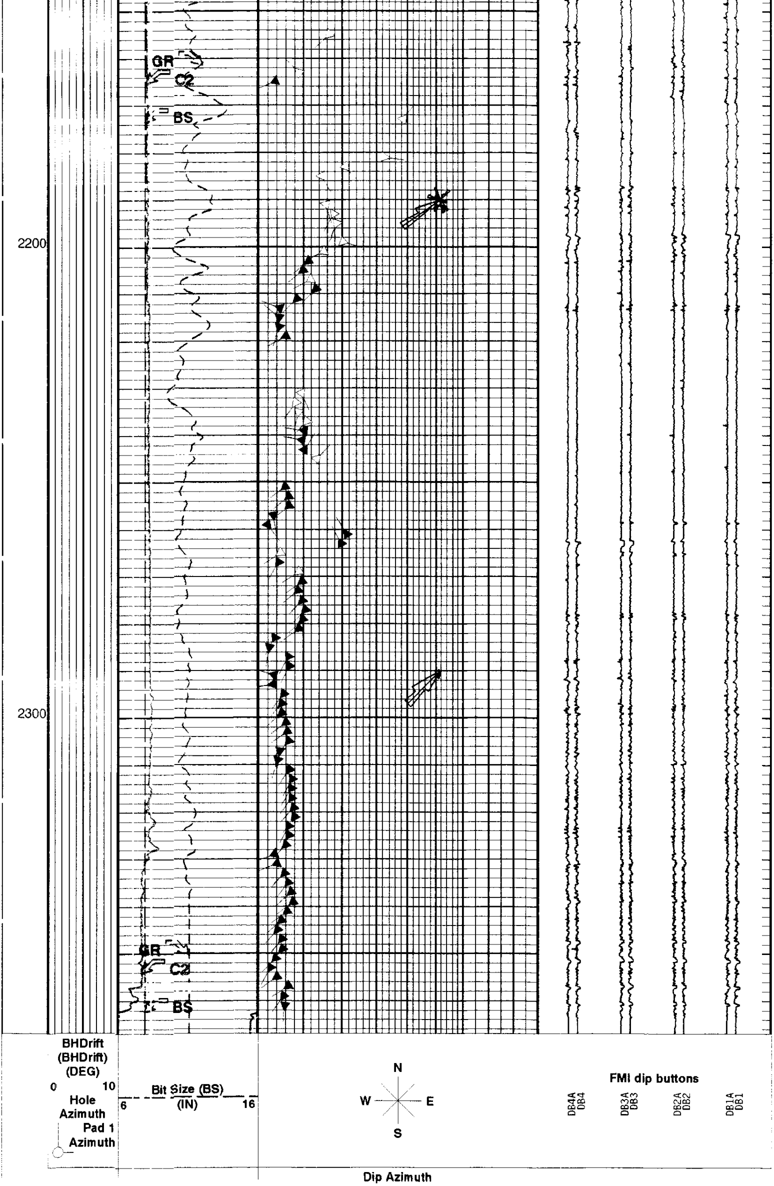
Time Mark Every 60 S











MSD_Angle (MSD_Angle)
(DEG)
0 90

Caliper 2 (C2)
6 (IN) 16

Gamma Ray (GR)
0 (GAPI) 150

PIP SUMMARY

Time Mark Every 60 S

FMI Dip buttons values are Not corrected by Emex or Gain.

Format: FMI_MSDip Vertical Scale: 5" per 100' Graphics File Created: 22-Jul-1998 14:07

OP System Version: 8C1-205

MCM

FBST-A	APCW-98Q1	SGT-L	APCW-98Q1
DTA-A	APCW-98Q1	DTC-A	APCW-98Q1

Parameters

DLIS Name	Description	Value	
	DIP Tool	FBST	
AFMO	Accelerometer Filtering Mode	MOVING_AVERAGE	
BS	Bit Size	7.875	IN
CSBL	CSB DIP Number of Levels	2L	
DO	Depth Offset	-0.8	FT
DPAD	Disabled Pad	NONE	
ELRA	Electrical Radius	0.5	IN
FBCD	FMI Correct Dip values from Emex, Gain	OFF	
FLM	FMI Logging Mode	8PAD	
ICMO	Inclinometry Computation Mode	AUTOMATIC_SELECTION	
INT	Correlation Interval	4	FT
MDEC	Magnetic Field Declination	18.628	DEG
PP	Playback Processing	NORMAL	
SANG	Correlation Search Angle	35	DEG
SBUT	DIP Set of Buttons	MSD	
SDFA	Side-by-Side Distance Factor	0.9	IN
SOFF	Stand-Off	0	IN
SPAN	DIP Spanning	1/4	
STDA	Structural DIP Azimuth	0	DEG
STDI	Structural DIP Angle	0	DEG
STEP	Correlation Step	2	FT

Input DLIS Files

DEFAULT	FBSTA .025	FN:19	FIELD	22-Jul-1998 09:17	2368.0 FT	1334.7 FT

Output DLIS Files

DEFAULT	FBSTA .050	FN:42	FIELD	22-Jul-1998 14:07

Input DLIS Files

DEFAULT	FBSTA .025	FN:19	FIELD	22-Jul-1998 09:17	2368.0 FT	1334.7 FT

Output DLIS Files

DEFAULT	FBSTA .050	FN:42	FIELD	22-Jul-1998 14:07	2367.0 FT	1334.0 FT

OP System Version: 8C1-205
MCM
FBST-A APCW-98Q1 SGT-L APCW-98Q1
DTA-A APCW-98Q1 DTC-A APCW-98Q1

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) 10

Tension (TENS)
10000 (LBF) 0

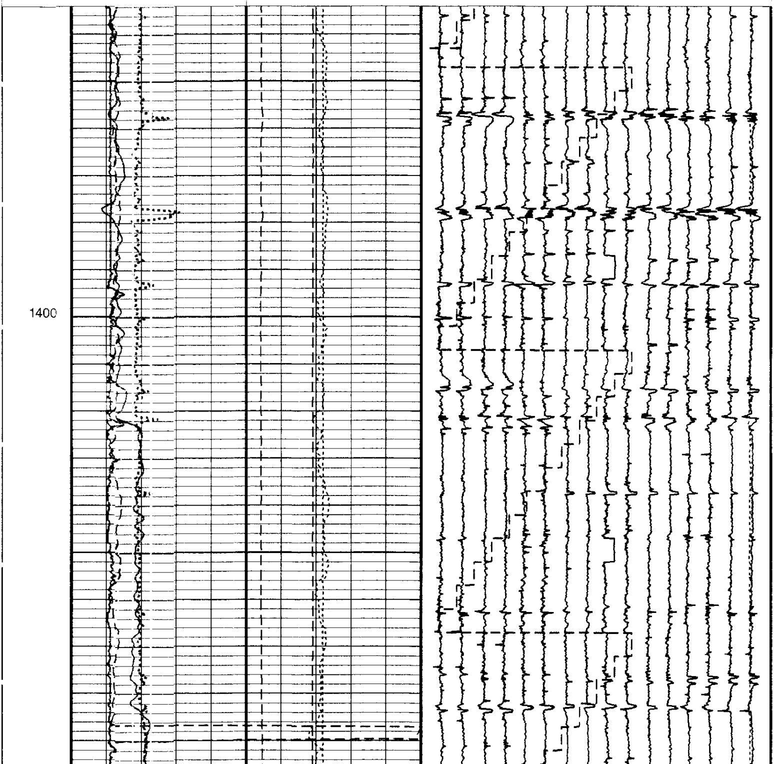
Caliper 2 (C2)
6 (IN) 16

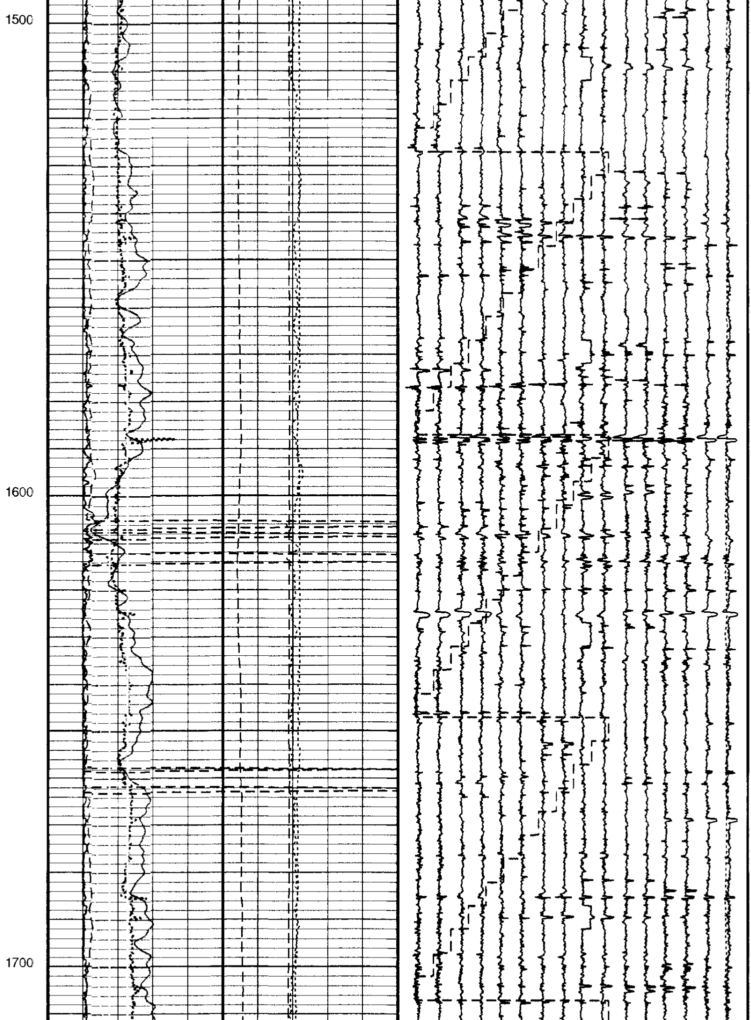
EMEX Intensity (EI)
0 (AMPS) 10

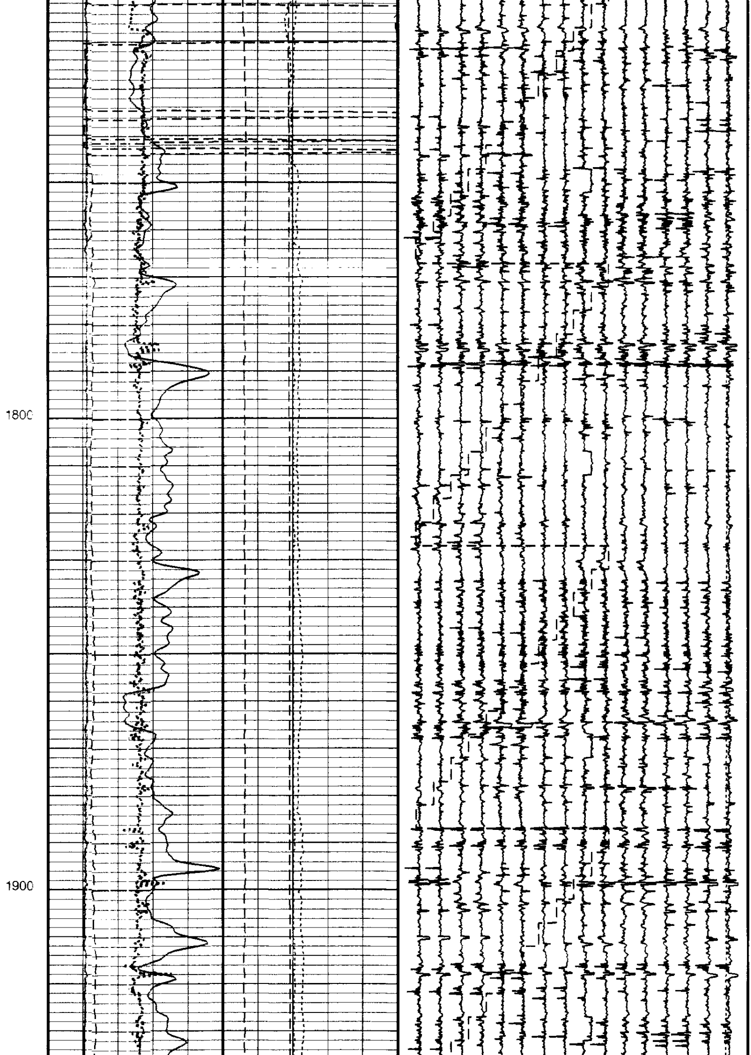
FMI resistivity buttons #1 to 16
RB16 RB15 RB14 RB13 RB12 RB11 RB10 RB9 RB8 RB7 RB6 RB5 RB4 RB3 RB2 RB1

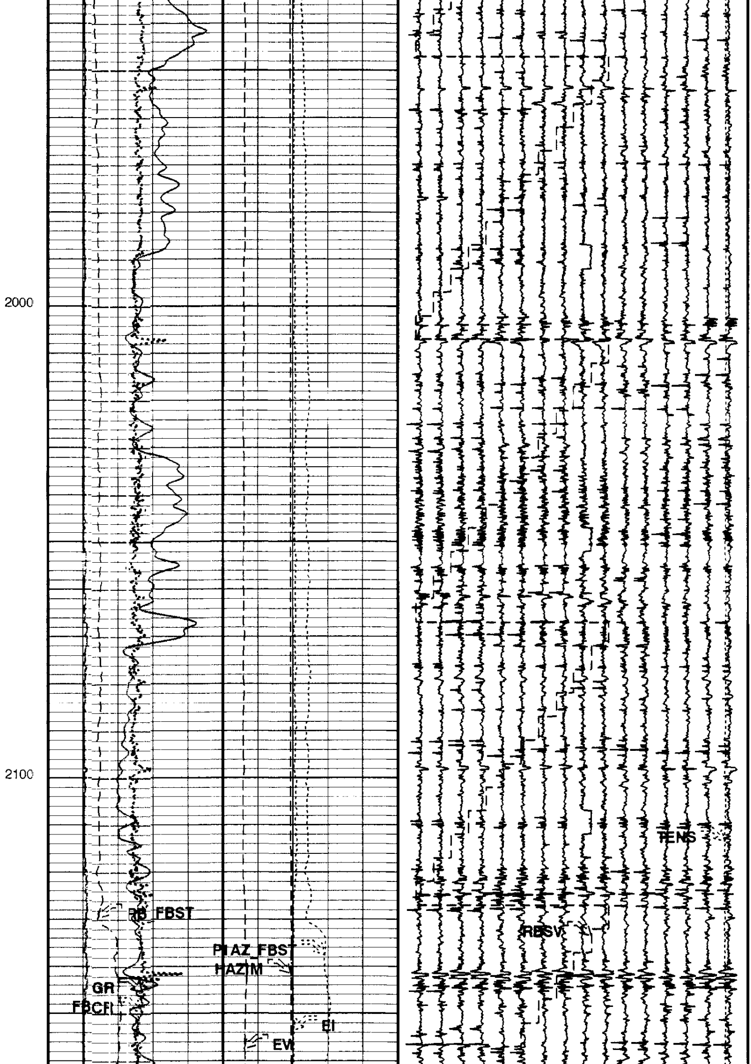
EMEX Voltage (EV)
0 (V) 50

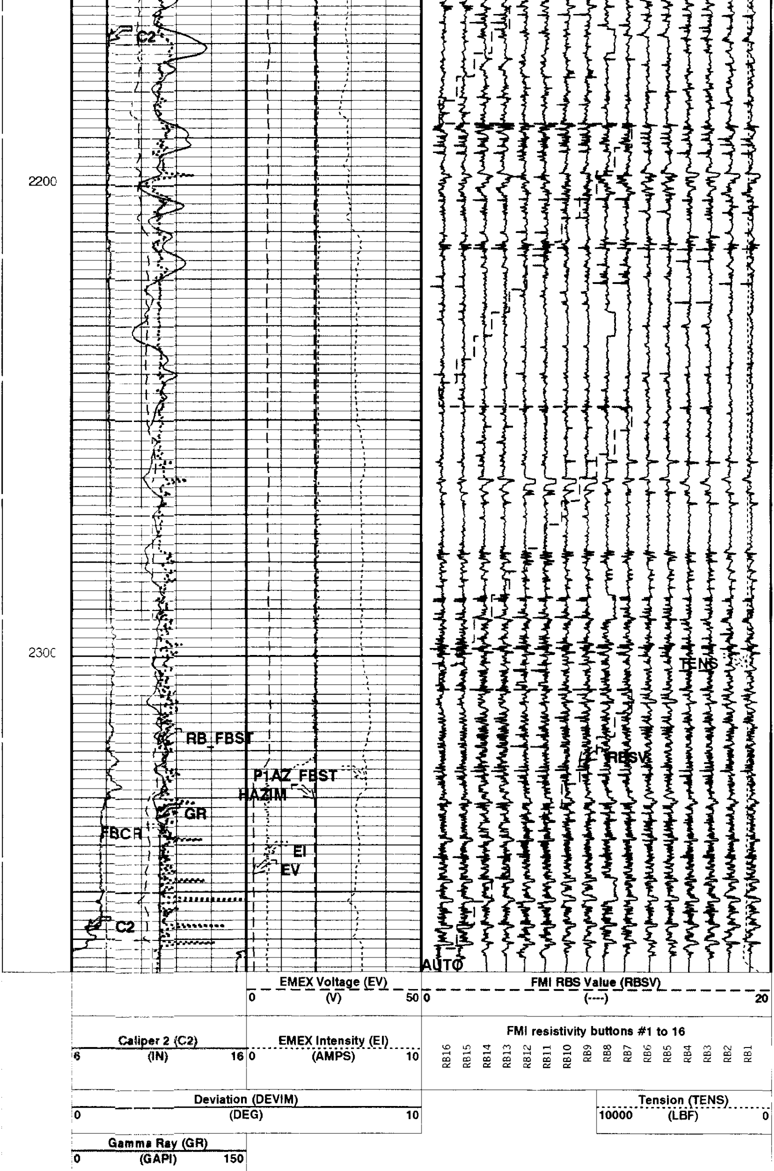
FMI RBS Value (RBSV)
0 (----) 20











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	-0.8	FT
FBEF	Emex filtering activation	OFF	
FLM	FMI Logging Mode	8PAD	
ICMO	Inclinometry Computation Mode	AUTOMATIC_SELECTION	
MDEC	Magnetic Field Declination	18.628	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: 22-Jul-1998 14:07

OP System Version: 8C1-205

MCM

FBST-A	APCW-98Q1	SGT-L	APCW-98Q1
DTA-A	APCW-98Q1	DTC-A	APCW-98Q1

Input DLIS Files

DEFAULT	FBSTA .025	FN:19	FIELD	22-Jul-1998 09:17	2368.0 FT	1334.7 FT

Output DLIS Files

DEFAULT	FBSTA .050	FN:42	FIELD	22-Jul-1998 14:07		

Input DLIS Files

DEFAULT	FBSTA .025	FN:19	FIELD	22-Jul-1998 09:17	2368.0 FT	1334.7 FT

Output DLIS Files

DEFAULT	FBSTA .050	FN:42	FIELD	22-Jul-1998 14:07	2367.0 FT	1334.0 FT

OP System Version: 8C1-205

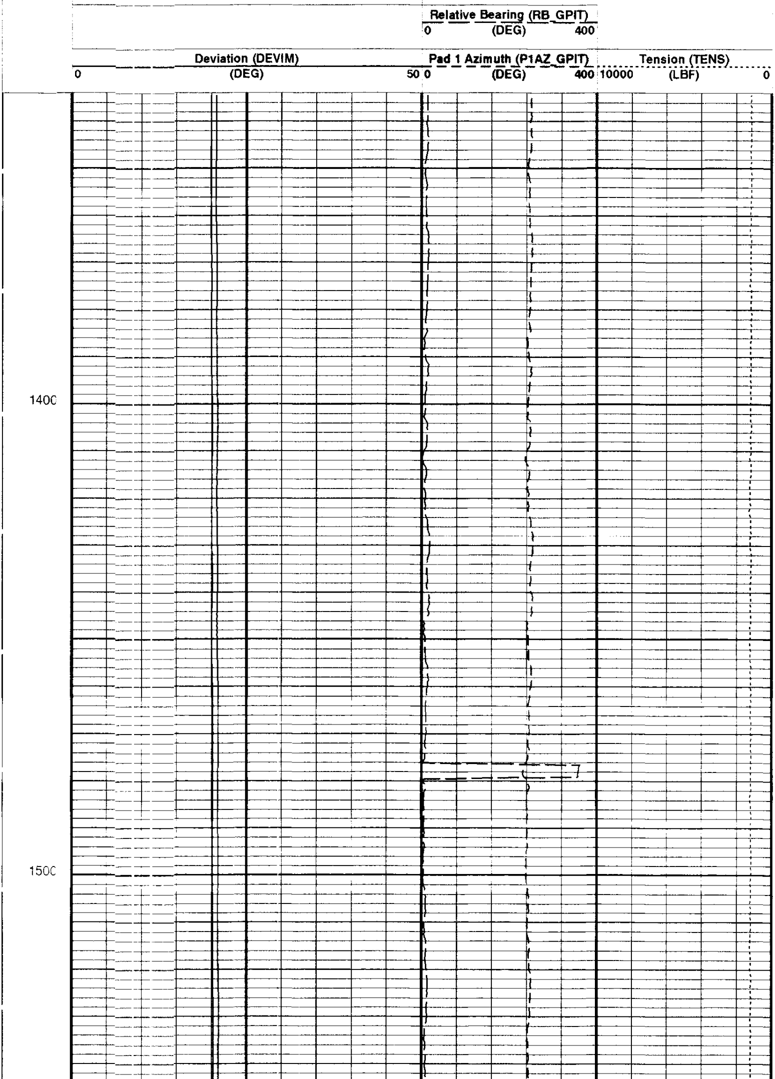
MCM

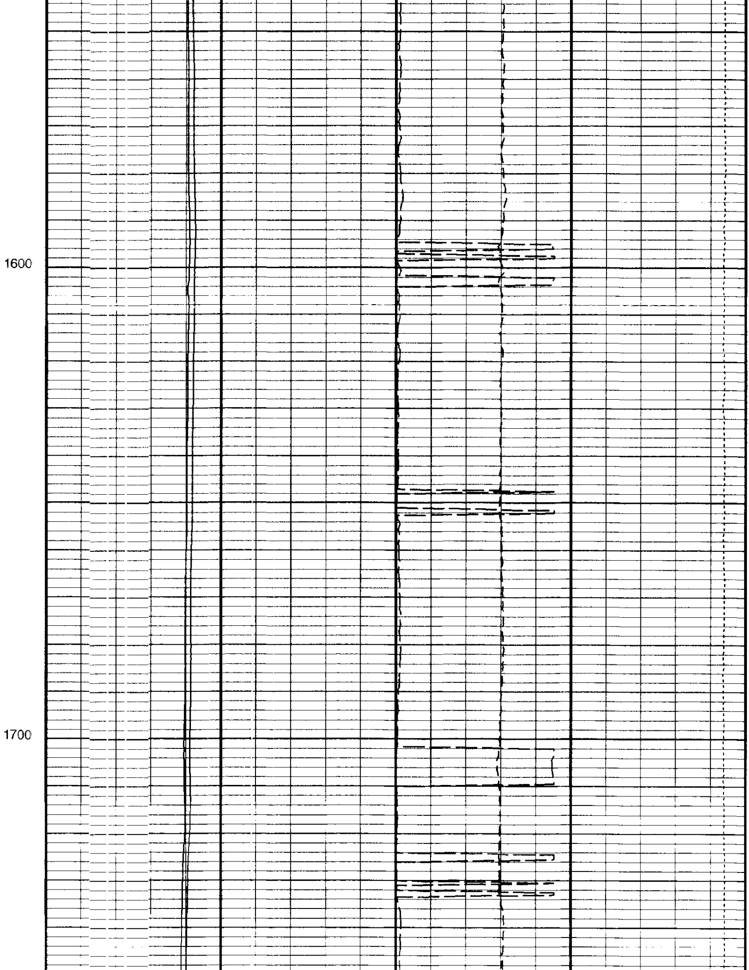
FBST-A	APCW-98Q1	SGT-L	APCW-98Q1
DTA-A	APCW-98Q1	DTC-A	APCW-98Q1

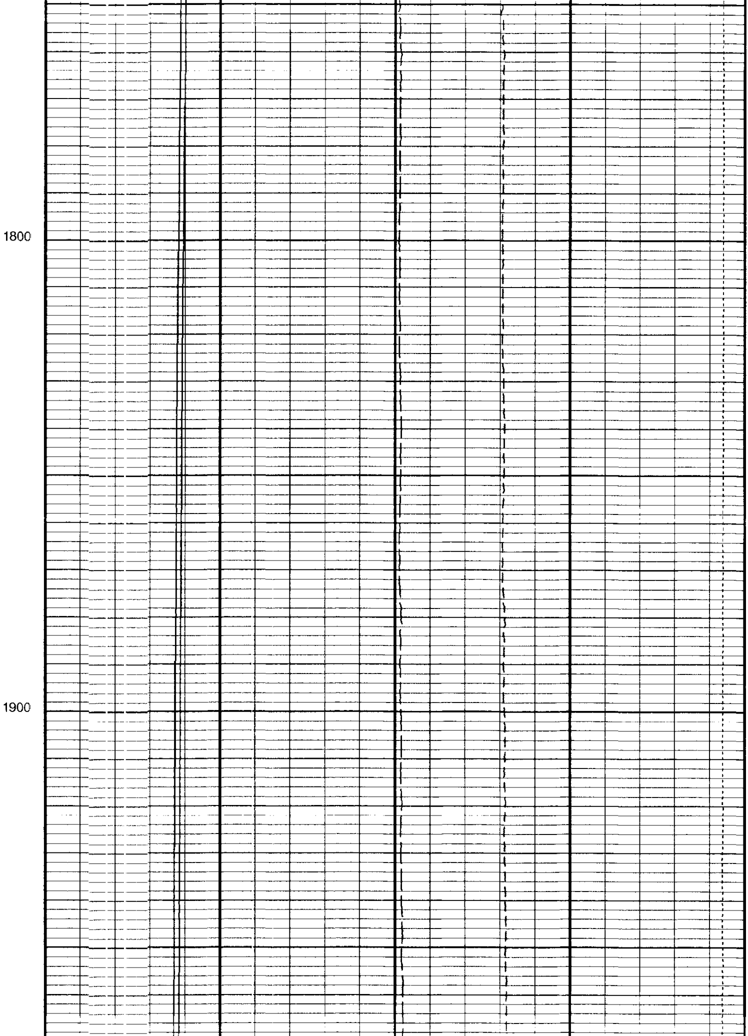
PIP SUMMARY

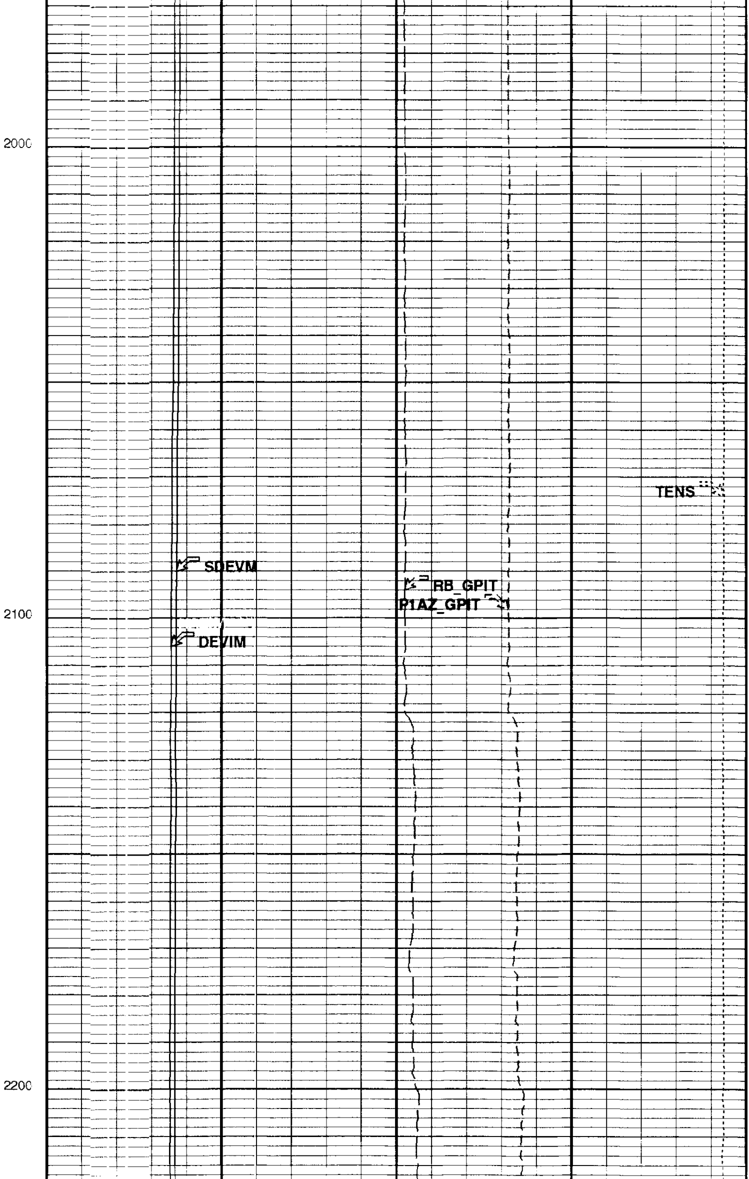
Time Mark Every 60 S

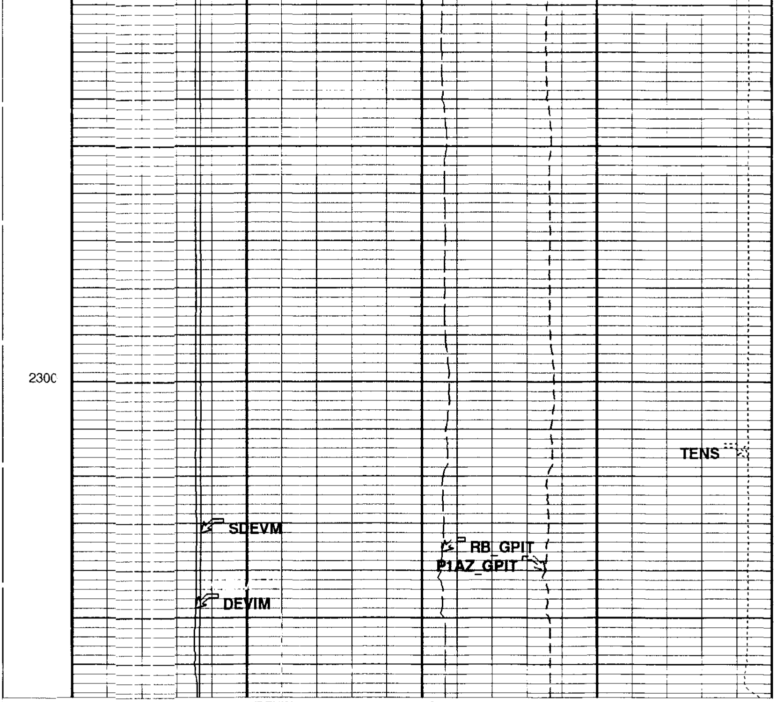
Sonde Deviation (SDEVM)
0 (DEG) 50











Deviation (DEVIM)	Pad 1 Azimuth (P1AZ_GPIT)	Tension (TENS)
0 (DEG) 50	0 (DEG) 400	10000 (LBF) 0
	Relative Bearing (RB_GPIT) 0 (DEG) 400	
Sonde Deviation (SDEVM) 0 (DEG) 50		

PIP SUMMARY

▮ Time Mark Every 60 S

Parameters

DLIS Name	Description	Value	
AFMO	Accelerometer Filtering Mode	MOVING_AVERAGE	
DO	Depth Offset	-0.8	FT
ICMO	Inclinometry Computation Mode	AUTOMATIC_SELECTION	
MDEC	Magnetic Field Declination	18.628	DEG
PP	Playback Processing	NORMAL	
SOFF	Stand-Off	0	IN

Format: INCLINOMETRY Vertical Scale: 5" per 100' Graphics File Created: 22-Jul-1998 14:07

OP System Version: 8C1-205

MCM

FBST-A	APCW-98Q1	SGT-L	APCW-98Q1
DTA-A	APCW-98Q1	DTC-A	APCW-98Q1

Input DLIS Files

DEFAULT	FBSTA .025	FN:19	FIELD	22-Jul-1998 09:17	2368.0 FT	1334.7 FT

Output DLIS Files

DEFAULT FBSTA .050 FN:42 FIELD 22-Jul-1998 14:07

Output DLIS Files

DEFAULT FBSTA .026 FN:20 FIELD 22-Jul-1998 10:11 1870.0 FT 1608.0 FT

OP System Version: 8C1-205

MCM

FBST-A	APCW-98Q1	SGT-L	APCW-98Q1
DTA-A	APCW-98Q1	DTC-A	APCW-98Q1

Changed Parameter Summary

DLIS Name	New Value	Previous Value	Depth & Time
XGMO	EmexAuto_GainAutoLowRange	EmexManu_GainManu	1587.8 10:12:13

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) 10

Tension (TENS)
10000 (LBF) 0

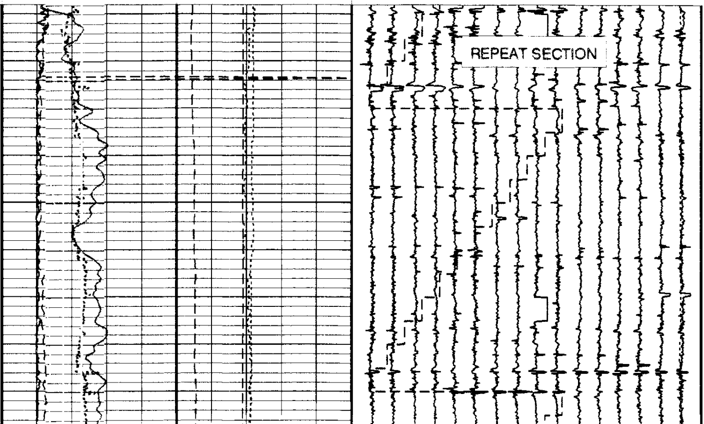
Caliper 2 (C2)
6 (IN) 16

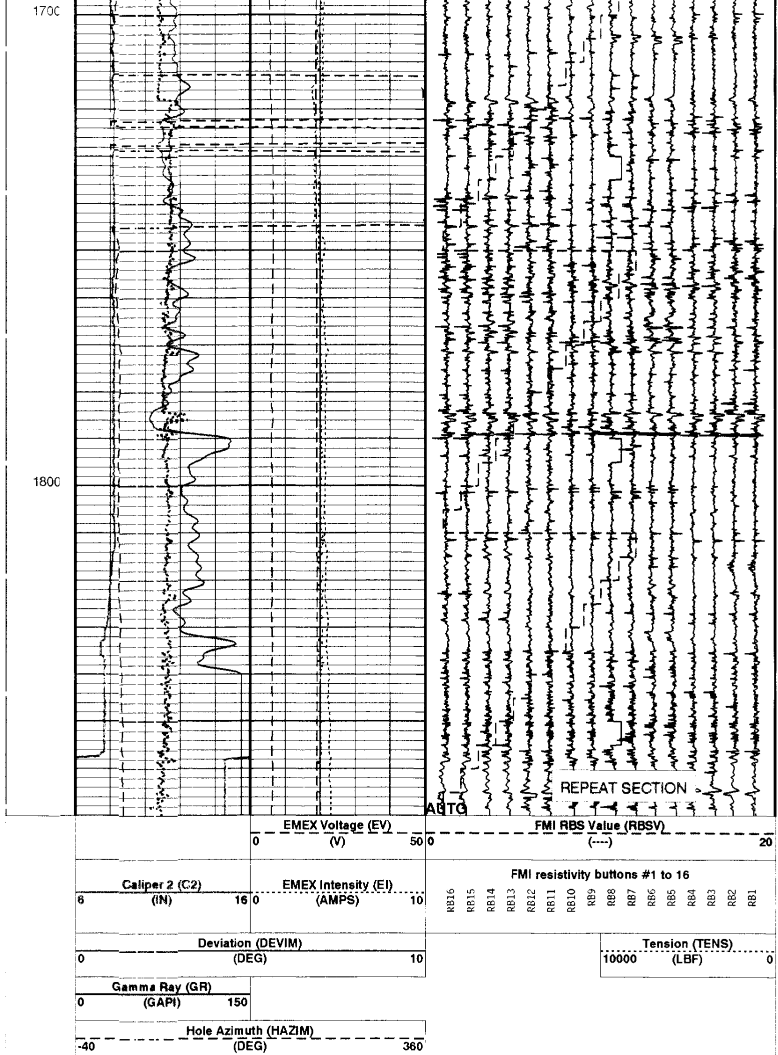
EMEX Intensity (EI)
0 (AMPS) 10

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





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	
FBEF	Emex filtering activation	OFF	
FLM	FMI Logging Mode	8PAD	
ICMO	Inclinometry Computation Mode	AUTOMATIC_SELECTION	
MDEC	Magnetic Field Declination	18.628	DEG
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: 22-Jul-1998 10:11

OP System Version: 8C1-205

MCM

FBST-A	APCW-98Q1	SGT-L	APCW-98Q1
DTA-A	APCW-98Q1	DTC-A	APCW-98Q1

Output DLIS Files

DEFAULT FBSTA .026 FN:20 FIELD 22-Jul-1998 10:11

COMPANY:	NORTHWEST NATURAL GAS	BOTTOM LOG INTERVAL	2357 F
		SCHLUMBERGER DEPTH	2365 F
WELL:	OM-32-22-65	DEPTH DRILLER	2365 F
FIELD:	CALVIN CREEK GAS STORAGE	KELLY BUSHING	762 F
COUNTY:	COLUMBIA	DRILL FLOOR	
STATE:	OREGON	GROUND LEVEL	753 F

Schlumberger

FORMATION
MICRO IMAG
GAMMA RAY