COMPANY: **NORTHWEST NATURAL GAS**

WELL: **I.W. 24C-23-65**

FIELD: **CALVIN CREEK GAS STORAGE**

COUNTY: **COLUMBIA** STATE: **OREGON**

COUNTY: COLUMBIA
Field: CALVIN CREEK GAS STORAGE
Location: 985.3' N & 1258.4' E FROM THE
Well: I.W. 24C-23-65
Company: NORTHWEST NATURAL GAS

Schlumberger

FORMATION MICRO IMAGER
LQC
SCALE: 5" = 100'

LOCATION
985.3' N & 1258.4' E FROM THE
FROM THE SW CORNER OF 23

Elev.: K.B. 917.5 ft
G.L. 905 ft
D.F. 917.3 ft

Permanent Datum: GROUND LEVEL Elev.: 905 ft
Log Measured From: K.B above Perm. Datum
Drilling Measured From: K.B

API Serial No.	SECTION	TOWNSHIP	RANGE
36-009-00350	23	6N	5W

Logging Date		7-MAY-2000			
Run Number		1			
Depth Driller		2591 ft			
Schlumberger Depth		2591 ft			
Bottom Log Interval		2581 ft			
Top Log Interval		1724 ft			
Casing Driller Size @ Depth		8.625 in	@ 1727 ft	@	
Casing Schlumberger		1725 ft			
Bit Size		7.875 in			
Type Fluid In Hole		DMA			
MUD Density	Viscosity	8.8 lbm/gal	38 s		
Fluid Loss	PH	6.6 cm3	10.5		
Source Of Sample		FLOWLINE			
RM @ Measured Temperature		0.914 ohm.m	@ 68 degF	@	
RMF @ Measured Temperature		1.250 ohm.m	@ 52 degF	@	
RMC @ Measured Temperature		1.325 ohm.m	@ 52 degF	@	
Source RMF	RMC	PRESS	PRESS		
RM @ MRT	RMF @ MRT	0.692 @ 92	0.744 @ 92	@	@
Maximum Recorded Temperatures		92 degF	92	92	
Circulation Stopped	Time	7-MAY-2000	0:30		
Logger On Bottom	Time	7-MAY-2000			
Unit Number	Location	3152	SACRAMENTO		
Recorded By		M.KHAN			
Witnessed By		JACK MEYER			

	Run 1	Run 2	Run 3	Run 4

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			

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: FMI GR	OS1:
OS2:	OS2:
OS3:	OS3:
OS4:	OS4:
OS5:	OS5:

REMARKS: RUN NUMBER 1	REMARKS: RUN NUMBER 2

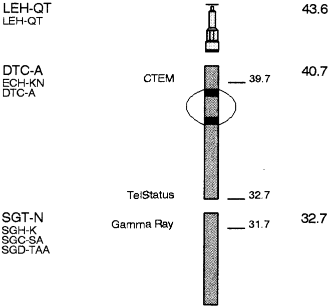
RUN 1		RUN 2	
SERVICE ORDER #:		SERVICE ORDER #:	
PROGRAM VERSION:	9C1-303	PROGRAM VERSION:	
FLUID LEVEL:	0 ft	FLUID LEVEL:	

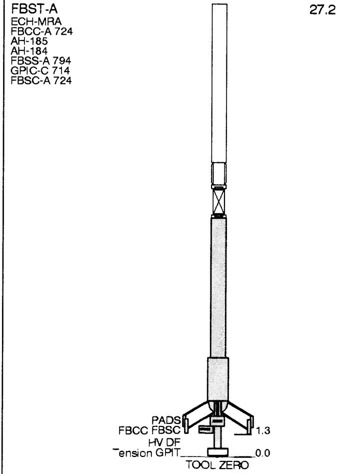
LOGGED INTERVAL	START	STOP	LOGGED INTERVAL	START	STOP

EQUIPMENT DESCRIPTION

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

DOWNHOLE EQUIPMENT





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

Input DLIS Files

DEFAULT	FBSTA .016	FN:15	PRODUCER	07-May-2000 08:25	2604.0 FT	1681.5 FT

Output DLIS Files

DEFAULT	FBSTA .018	FN:17	PRODUCER	07-May-2000 09:10	2607.0 FT	1684.5 FT

OP System Version: 9C1-303

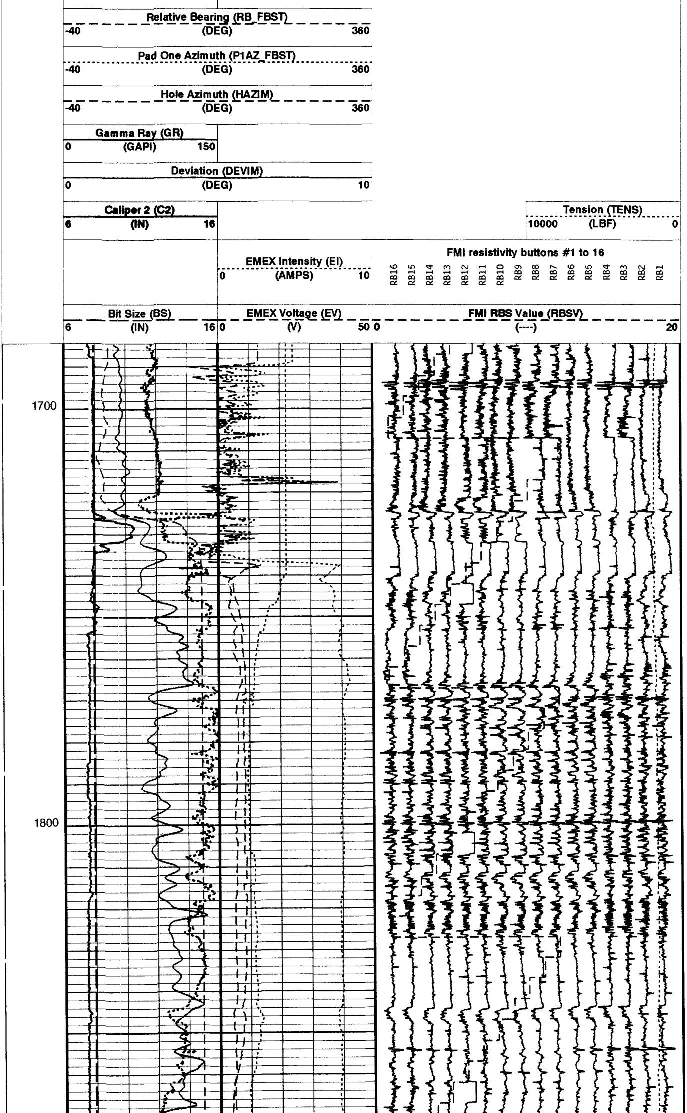
MCM

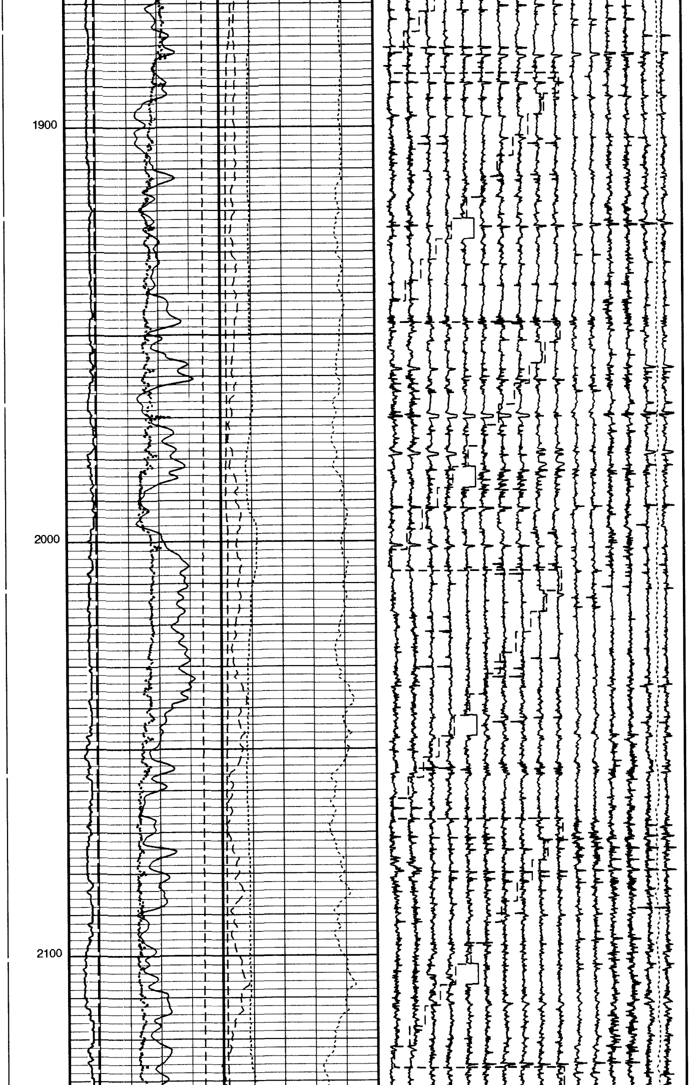
FBST-A	9C1-303	SGT-N	OP91-KP1a
DTC-A	OP91-KP1a		

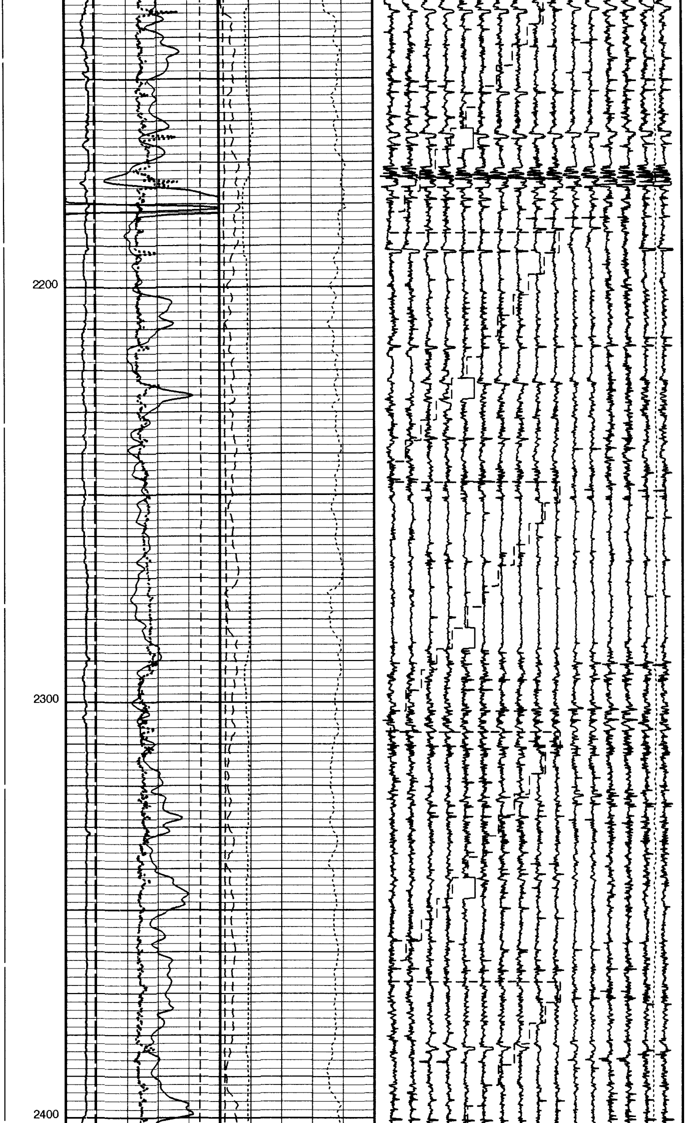
PIP SUMMARY

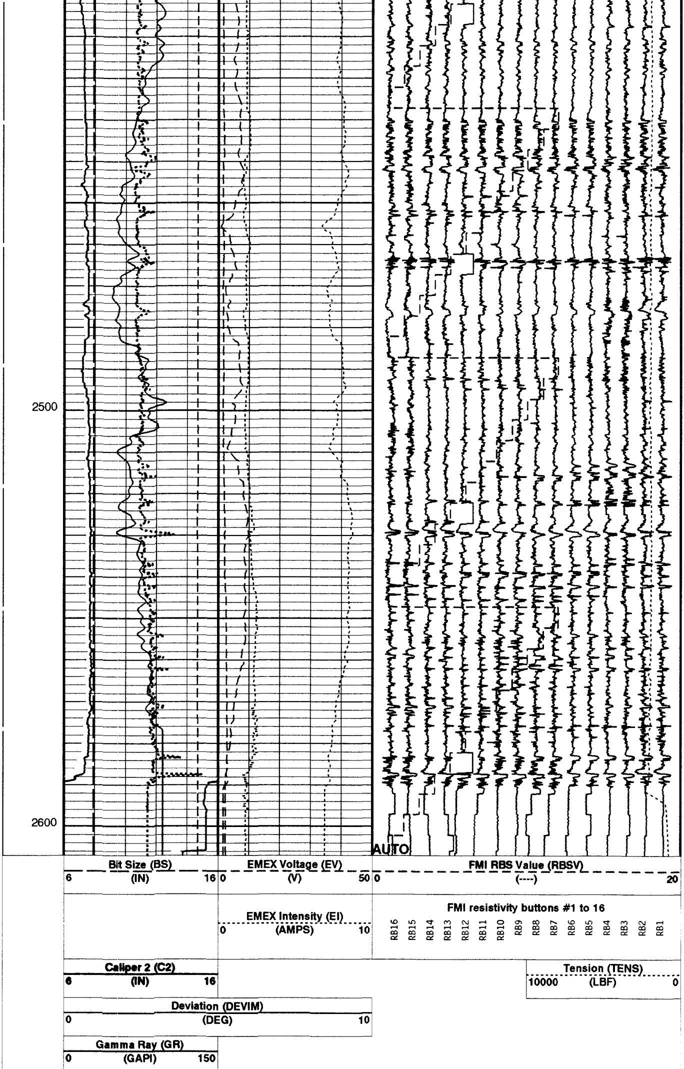
■ Time Mark Every 60 S

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









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	
BS	Bit Size	7.875	IN
DO	Depth Offset for Logical Unit 1	3.0	FT
FBEF	Emex filtering activation	OFF	
FLM	FMI Logging Mode	8PAD	
ICMO	Inclinometry Computation Mode	AUTOMATIC_SELECTION	
MDEC	Magnetic Field Declination	-9.54999	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: 07-May-2000 09:10

OP System Version: 9C1-303

MCM

FBST-A	9C1-303	SGT-N	OP91-KP1a
DTC-A	OP91-KP1a		

Input DLIS Files

DEFAULT	FBSTA .016	FN:15	PRODUCER	07-May-2000 08:25	2604.0 FT	1681.5 FT

Output DLIS Files

DEFAULT	FBSTA .018	FN:17	PRODUCER	07-May-2000 09:10

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REPEAT SECTION

MAXIS 500 Field Log

Input DLIS Files

DEFAULT	FBSTA .017	FN:16	PRODUCER	07-May-2000 08:55	2000.5 FT	1708.1 FT

Output DLIS Files

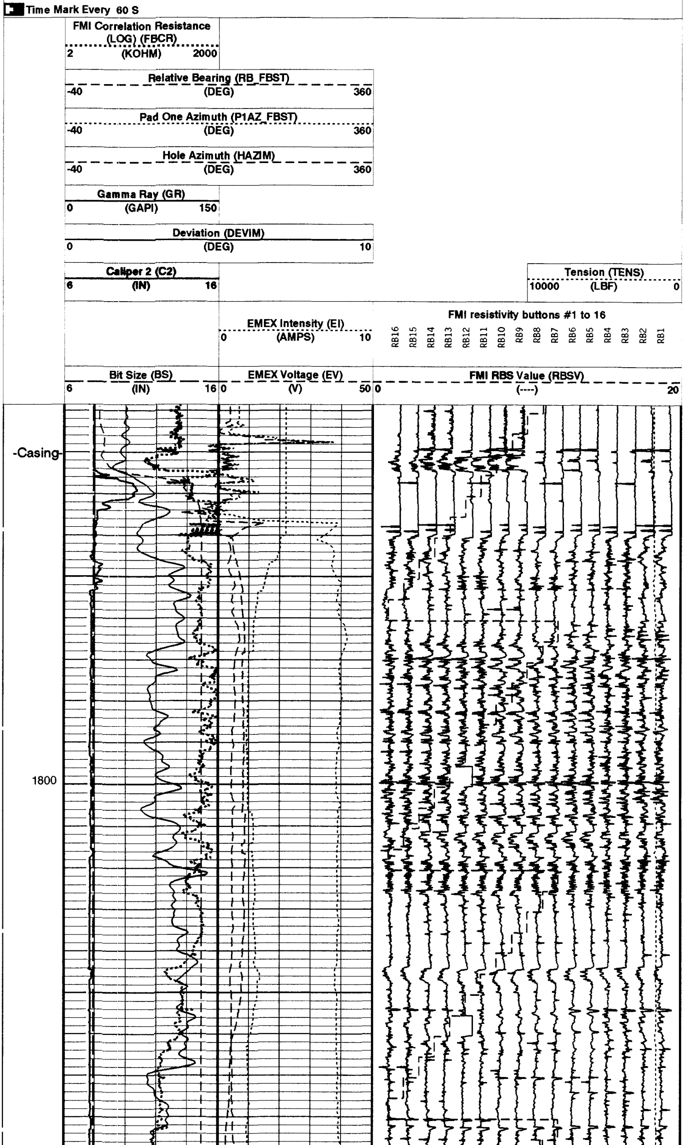
DEFAULT	FBSTA .019	FN:18	PRODUCER	07-May-2000 09:15	2000.5 FT	1708.5 FT

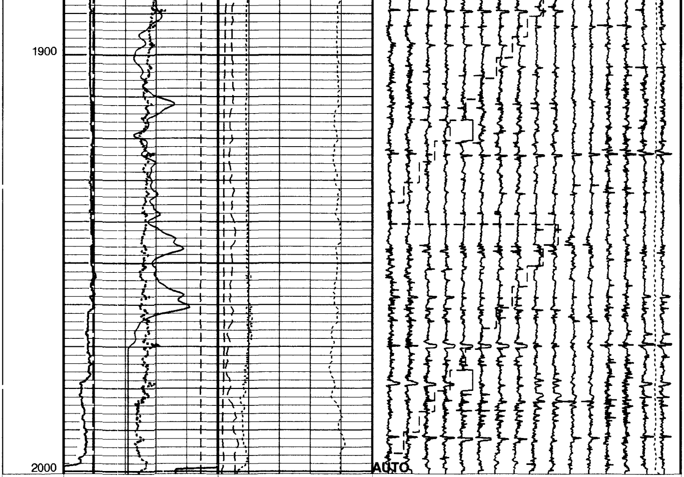
OP System Version: 9C1-303

MCM

FBST-A	9C1-303	SGT-N	OP91-KP1a
DTC-A	OP91-KP1a		

PIP SUMMARY





Bit Size (BS)
6 (IN) 16

EMEX Voltage (EV)
0 (V) 50

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

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

Caliper 2 (C2)
6 (IN) 16

Tension (TENS)
10000 (LBF) 0

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

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	
BS	Bit Size	7.875	IN
DO	Depth Offset for Logical Unit 1	0.0	FT
FBEF	Emex filtering activation	OFF	
FLM	FMI Logging Mode	8PAD	
ICMO	Inclinometry Computation Mode	AUTOMATIC_SELECTION	
MDEC	Magnetic Field Declination	-9.54999	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: 07-May-2000 09:16

OP System Version: 9C1-303
MCM

FBST-A	**9C1-303**	**SGT-N**	**OP91-KP1a**
DTC-A	**OP91-KP1a**		

Input DLIS Files

DEFAULT	**FBSTA .017**	**FN:16**	**PRODUCER**	**07-May-2000 08:55**	**2000.5 FT**	**1708.1 FT**

Output DLIS Files

DEFAULT	**FBSTA .019**	**FN:18**	**PRODUCER**	**07-May-2000 09:15**

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CALIBRATIONS

MAXIS 500 Field Log

Calibration and Check Summary

Measurement	Nominal	Master	Before	After	Change	Limit	Units
Full-Bore Scanner - A Wellsite Calibration - Caliper Calibration							
Before: 7-MAY-2000 7:57							
Caliper #1 Small Jig	8.000	N/A	8.733	N/A	N/A	N/A	IN
Caliper #2 Small Jig	8.000	N/A	8.326	N/A	N/A	N/A	IN
Caliper #1 Large Jig	12.00	N/A	11.80	N/A	N/A	N/A	IN
Caliper #2 Large Jig	12.00	N/A	11.77	N/A	N/A	N/A	IN
Full-Bore Scanner - A Wellsite Calibration - CROUZET ACCELEROMETER PROM HAS BEEN READ CORRECTLY							
Before: 7-MAY-2000 7:55							
TEMPERATURE REFERENCE :	N/A	N/A	68	N/A	N/A	N/A	DEGF
YEAR OF CALIBRATION :	N/A	N/A	93	N/A	N/A	N/A	
MONTH OF CALIBRATION :	N/A	N/A	11	N/A	N/A	N/A	
SERIAL NUMBER :	N/A	N/A	470	N/A	N/A	N/A	
Full-Bore Scanner - A Wellsite Calibration - CROUZET MAGNETOMETER PROM HAS BEEN READ CORRECTLY							
Before: 7-MAY-2000 7:55							
TEMPERATURE REFERENCE :	N/A	N/A	75	N/A	N/A	N/A	DEGF
YEAR OF CALIBRATION :	N/A	N/A	93	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	186	N/A	N/A	N/A	
Scintillation Gamma-Ray - N Wellsite Calibration - Detector Calibration							
Before: 7-MAY-2000 8:04							
Gamma Ray (Jig - Bkg)	165.1	N/A	165.1	N/A	N/A	15.01	GAPI
Gamma Ray (Calibrated)	165.0	N/A	165.0	N/A	N/A	15.00	GAPI

Full-Bore Scanner - A / Equipment Identification

Primary Equipment:	
FullBore Scanner Sonde	FBSS - A
	-
FullBore Scanner Sonde Cartridge	FBSC - A
GPIT Cartridge - C	GPIC - C
Flex Joint	AH - 184
Insulating Sub	AH - 185
FullBore Scanner Control Cartridge	FBCC - A
Auxiliary Equipment:	
Electronics Cartridge Housing	ECH - MRA

Full-Bore Scanner - A Wellsite Calibration

Caliper Calibration

Phase	Caliper #1 Small Jig IN	Value	Phase	Caliper #2 Small Jig IN	Value
Before		8.733	Before		8.326
	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		11.80	Before		11.77
	10.20 (Minimum) 12.00 (Nominal) 13.80 (Maximum)			10.20 (Minimum) 12.00 (Nominal) 13.80 (Maximum)	

Before: 7-MAY-2000 7:57

Scintillation Gamma-Ray - N / Equipment Identification

Primary Equipment:	
Scintillation Gamma Cartridge	SGC - SA
Scintillation Gamma Detector	SGD - TAA
Auxiliary Equipment:	
Scintillation Gamma Housing	SGH - K
Gamma Source Radioactive	GSR - U/Y

Scintillation Gamma-Ray - N Wellsite Calibration

Detector Calibration

Phase	Gamma Ray Background GAPI	Value	Phase	Gamma Ray (Jig - Bkg) GAPI	Value	Phase	Gamma Ray (Calibrated) GAPI	Value
Before	▨	25.80	Before	▨	165.1	Before	▨	165.0
	0 (Minimum) 30.00 (Nominal) 120.0 (Maximum)			150.1 (Minimum) 165.1 (Nominal) 180.1 (Maximum)			150.0 (Minimum) 165.0 (Nominal) 180.0 (Maximum)	

Before: 7-MAY-2000 8:04

COMPANY:	**NORTHWEST NATURAL GAS**	BOTTOM LOG INTERVAL	2581 ft
		SCHLUMBERGER DEPTH	2591 ft
WELL:	**I.W. 24C-23-65**	DEPTH DRILLER	2591 ft
FIELD:	**CALVIN CREEK GAS STORAGE**	KELLY BUSHING	917.5 ft
COUNTY:	**COLUMBIA**	DRILL FLOOR	917.3 ft
STATE:	**OREGON**	GROUND LEVEL	905 ft

Schlumberger

FORMATION MICRO IMAGER
LQC
SCALE: 5" = 100'