504

Schlumberger

MULTIFREQUENCY ELECTROMAGNETIC THICKNESS LOG

COUNTY	COLUMBIA
FIELD	MIST GAS STORAGE
LOCATION	N 03-03-15 E 2280.65 & S 86-56-45 E
WELL	IW 23a-22-6
COMPANY	NORTHWEST NATURAL GAS

COMPANY NORTHWEST NATURAL GAS

WELL IW 23a-22-65

FIELD MIST GAS STORAGE

COUNTY COLUMBIA **STATE** OREGON

LOCATION
N 03-03-15 E 2280.65' & S 86-56-45 E
1923.76' FROM THE SW COR. OF SEC 22

Other Services:
SONIC
INDUCTION
FMS
DENSITY
NEUTRON
GAMMA RAY

API SERIAL NO.	SECT.	TWP.	RANGE
36-009-00304	22	T1	R6

Permanent Datum	GROUND LEVEL	**Elev.** 580.5 F		**Elev.:** K.B. 596.5 F
Log Measured From	KELLY BUSHING	16.0 F	**above Perm. Datum**	D.F.
Drilling Measured From	KELLY BUSHING			G.L. 580.5 F

Date	27-SEPT-1997		03-OCT-1997		
Run No.	ONE		TWO		
Depth Driller	1402.0 F		2299.0 F		
Depth Logger (Schl.)	1399.0 F		2292.0 F		
Btm. Log Interval	1389.0 F		2282.0 F		
Top Log Interval	0.0 F		1350.0 F		
Casing-Driller	13 3/8" @ 359.0 F		8 5/8" @ 1395.0 F		@
Casing-Logger	355.0 F		1394.0 F		
Bit Size	@		@		@
Type Fluid in Hole	GEL/CYPAN		KCL/XCD		
Dens. | **Visc.**	9.50 LB/G	60.0 S	8.60 LB/G	36.0 S	
pH | **Fld. Loss**	8.0		9.0		
Source of Sample	FLOWLINE				
Rm @ Meas. Temp.	2.310 OHMM @ 69.0 DEGF		.328 OHMM @ 72.0 DEGF		
Rmf @ Meas. Temp.	3.720 OHMM @ 66.0 DEGF		.382 OHMM @ 69.0 DEGF		
Rmc @ Meas. Temp.	3.550 OHMM @ 66.0 DEGF		.662 OHMM @ 69.0 DEGF		
Source: Rmf | **Rmc**	CELL	CELL			
Rm @ BHT	1.611 OHMM @ 102. DEGF		.247 OHMM @ 98.0 DEGF		
TIME **Circulation Ended**	08:30 9-27-97		19:30 10-3-97		
TIME **Logger on Bottom**	SEE LOG				
Max. Rec. Temp.	102. DEGF		98.0 DEGF		
Equip. | **Location**	8303	BAKERSFIELD			
Recorded By	GREG PERRY				
Witnessed By	MR. MEYER / MR. THOMAS				

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

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 wilful 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.

Run No.	ONE	TWO
Service Order No.		
Drilling Fluid Level	0.0 F	
Salinity		
Rmf @ BHT	2.491 OHMM @ 102. DEGF	.276 OHMM @ 98.0 DEGF
Rmc @ BHT	2.378 OHMM @ 102. DEGF	.479 OHMM @ 98.0 DEGF
Logging Speed	1800.0 F/HR	
EQUIPMENT DATA		
Tool Number 1	DIS 151	
Tool Number 2	DIC 159	
Tool Number 3	SLS WA	
Tool Number 4	SLC UA	
Tool Number 5	SGCSA 483	
Tool Number 6	TCCB 1289	
Tool Number 7		
Tool Number 8		
Tool Number 9		
Tool Number 10		
Tool Number 11		
Tool Number 12		

REMARKS:

RAN INDUCTION AND SONIC IN COMBO. RAN FMS LDT CNL IN COMBO.
CENTRALIZERS RAN ON INDUCTION TOOL AND SONIC TOOL.
RAN REPEAT AT CASING DEPTH DUE TO PULLING TIGHT RAN REPEAT AT BOTTOM AT CLIENTS REQUEST

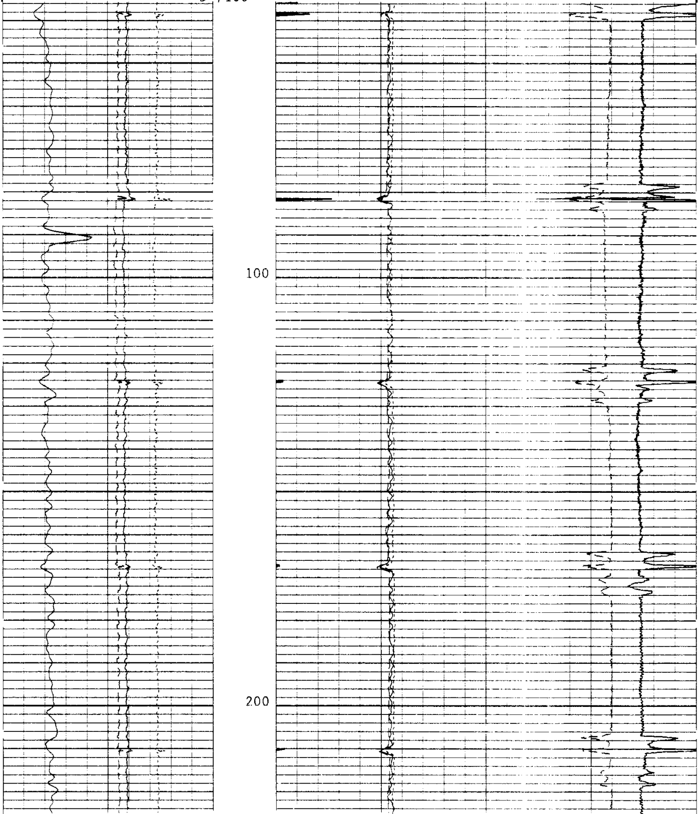
CREW: DAN LEE.
THANKS FOR USING SCHLUMBERGER!!!!!!!!

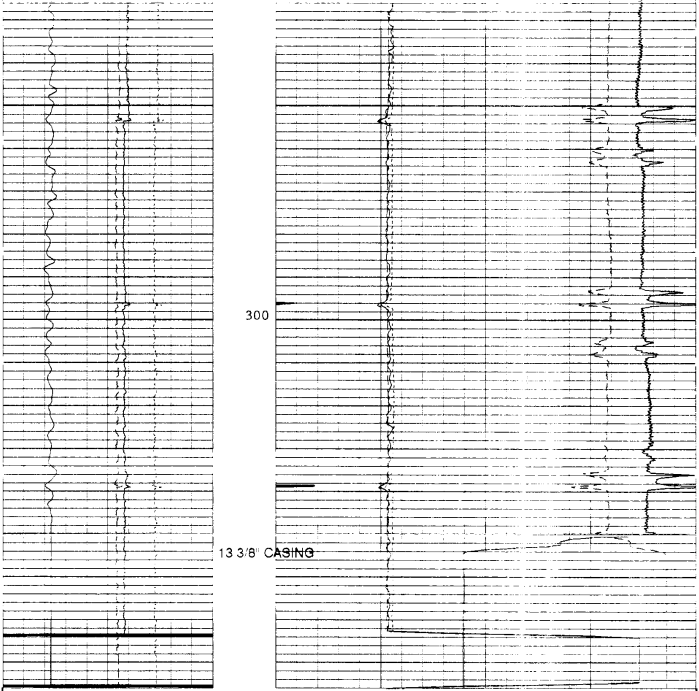
				LRAT(DB)	
			-100.0		0.0
	CIDL(IN)			CPRD(MORS)	
7.2000		8.2000	2.0000		12.000
	CIDS(IN)			CPRM(MORS)	
7.2000		8.2000	2.0000		12.000
	ECID(IN)			CPRS(MORS)	
7.2000		8.2000	2.0000		12.000
	GR(GAPI)			PLF(DEG)	
0.0		150.00	90.000		490.00

CP 44.2   FILE 2   05-OCT-1997 08:07

INPUT FILE(S)   CREATION DATE
60   04-OCT-1997 12:37

5"/100'





5"/100'

CP 44.2 FILE 2 05-OCT-1997 08:06

INPUT FILE(S) CREATION DATE
60 04-OCT-1997 12:37

Curve	Left scale	Right scale
LRAT(DB)	-100.0	0.0
CIDL(IN)	7.2000	8.2000
CIDS(IN)	7.2000	8.2000
ECID(IN)	7.2000	8.2000
GR(GAPI)	0.0	150.00
CPRD(MORS)	2.0000	12.000
CPRM(MORS)	2.0000	12.000
CPRS(MORS)	2.0000	12.000
PLF(DEG)	90.000	490.00

SENSOR MEASURE POINT TO TOOL ZERO

DTT 0.0 FEET
ETTD 8.5 FEET

SGTL 38.8 FEET

PARAMETERS

NAME	VALUE	UNIT	NAME	VALUE	UNIT
PP	NORM		DO	0.0	F
TD	32768.0	F	NCJT	GSRY	
GTSE	TEMP		SHT	60.0000	DEGF
BHT	98.0000	DEGF	LFRQ	35	HZ
ZMOD	CYCL	HZ	CMPZ	DEEP	HZ
CLSP	ECID		SOTP	ETSF	
BITR	2		C1CH	.116329	
C2CH	.116644		C1CM	.231203	
C2CM	.231930		C1CL	.462770	
C2CL	.462851		PCNH	-.464111	DEG
PCNM	-.980285	DEG	PCNL	-1.23318	DEG
DLTI	18.6421	DEG	VCAL	9.10647	V
SNDS	1.23394	DEG	SNDL	3.64563	DEG
AIRS	9.12512	V	AIRL	9.21157	V
CRES	15.0000	F	ZCN1	1.01567	
ZCN2	1.02991		ZCN3	1.02881	
CGNL	.914095		CGNS	.999397	
COFL	.511359	IN	COFS	.0111866	IN
CGNB	.928581		COFB	.428069	IN
ZGN1	1.02843		ZGN2	1.03118	
ZGN3	1.03683		ZOF1	-.024286	
ZOF2	-.026452		ZOF3	-.030737	
SGMA	5000.00	KM/M	STMP	25.0000	DEGC
BS	12.2500	IN	BHS	CASE	
CSIZ	8.67500	IN			

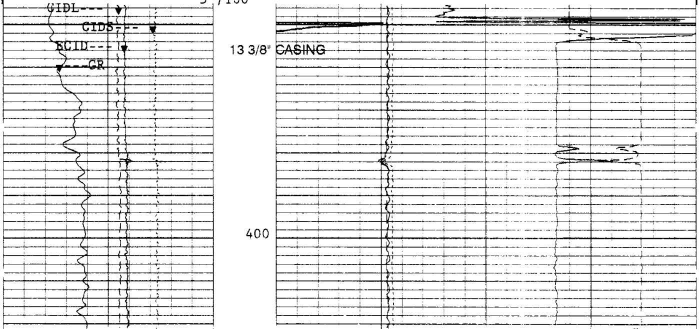
			[illegible]	
			-100.0	0.0
CIDL(IN)			CPRD(MORS)	
7.2000	8.2000	2.0000		12.000
CIDS(IN)			CPRM(MORS)	
7.2000	8.2000	2.0000		12.000
ECID(IN)			CPRS(MORS)	
7.2000	8.2000	2.0000		12.000
GR(GAPI)			PLF(DEG)	
0.0	150.00	90.000		490.00

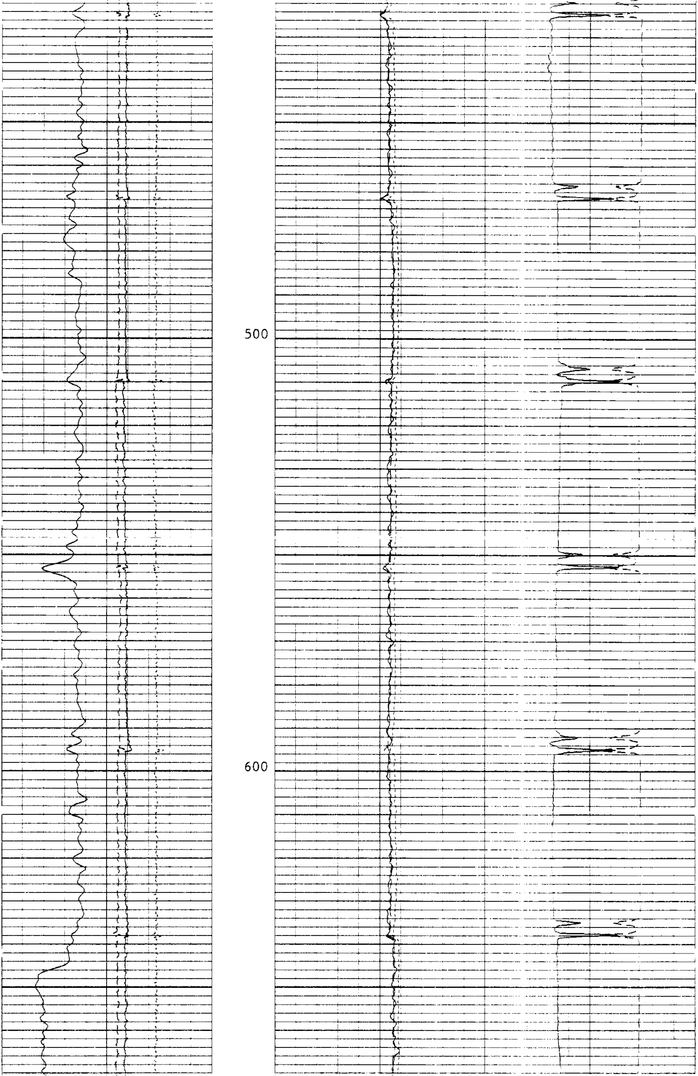
CP 44.2 FILE 1 05-OCT-1997 08:05

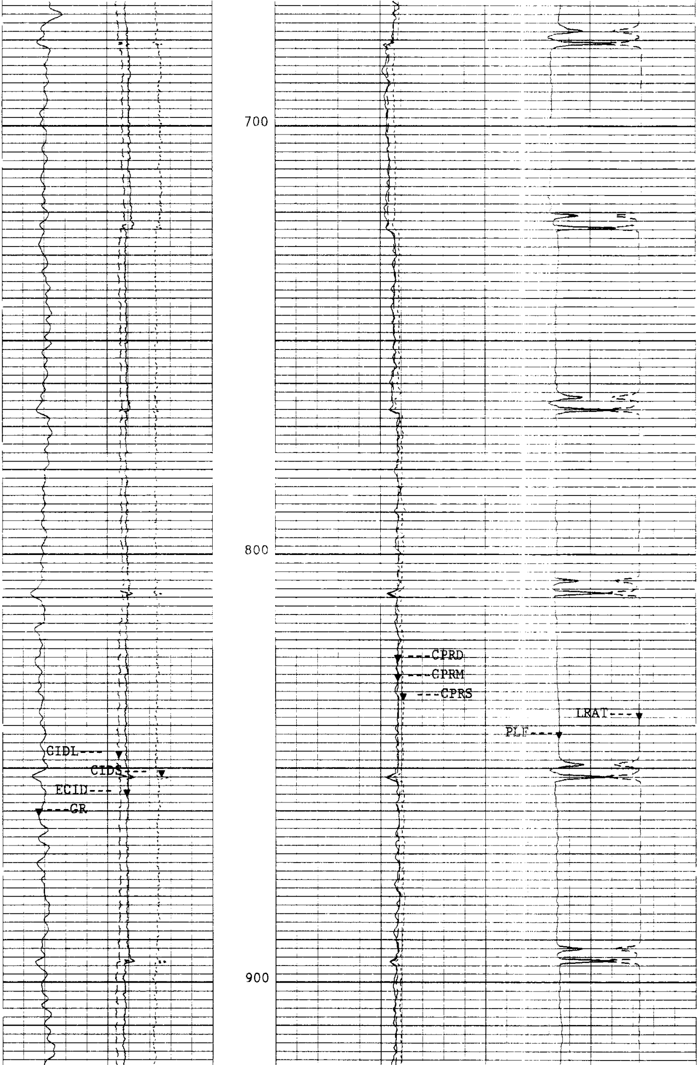
INPUT FILE(S) 59

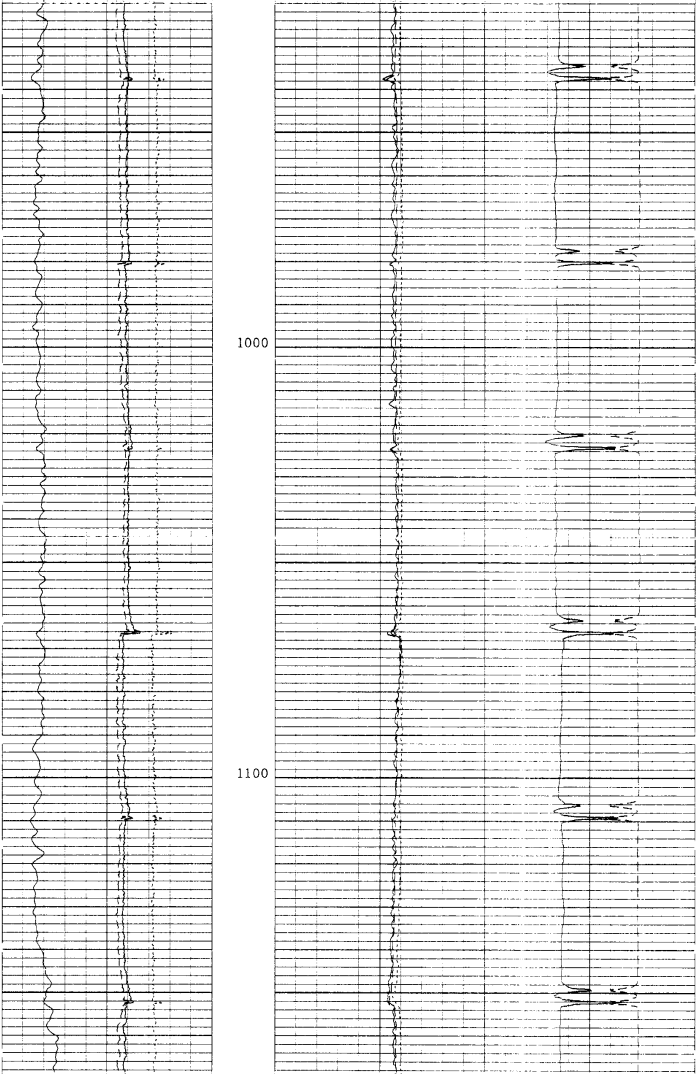
CREATION DATE 04-OCT-1997 12:01

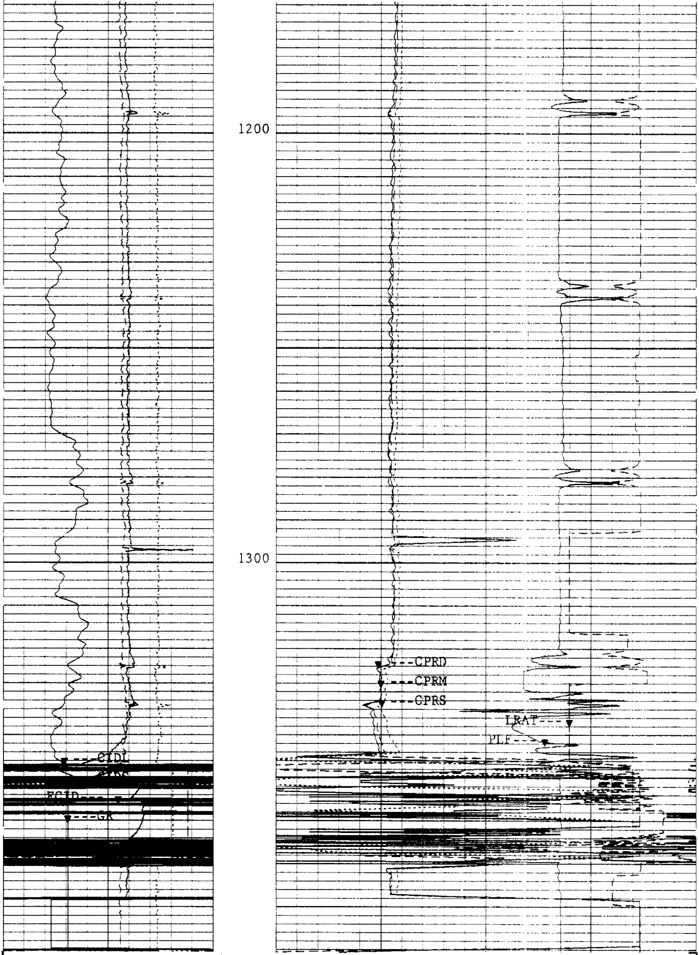
5"/100'











5"/100'

CP 44.2   FILE 1   05-OCT-1997 08:02

INPUT FILE(S)   CREATION DATE
59   04-OCT-1997 12:01

LRAT(DB)
-100.0 0.0

CIDL(IN)
7.2000 8.2000

CIDS(IN)
7.2000 8.2000

ECID(IN)
7.2000 8.2000

GR(GAPI)
0.0 150.00

CPRD(MORS)
2.0000 12.000

CPRM(MORS)
2.0000 12.000

CPRS(MORS)
2.0000 12.000

PLF(DEG)
90.000 490.00

SENSOR MEASURE POINT TO TOOL ZERO

DTT 0.0 FEET
ETTD 8.5 FEET

SGTL 38.8 FEET

PARAMETERS

NAME	VALUE	UNIT	NAME	VALUE	UNIT
PP	NORM		DO	0.0	F
TD	32768.0	F	NCJT	GSRY	
GTSE	TEMP		SHT	60.0000	DEGF
BHT	98.0000	DEGF	LFRO	35	HZ
ZMOD	CYCL	HZ	CMPZ	DEEP	HZ
CLSP	ECID		SOTP	ETSF	
BITR	2		C1CH	.116329	
C2CH	.116644		C1CM	.231203	
C2CM	.231930		C1CL	.462770	
C2CL	.462851		PCNH	-.464111	DEG
PCNM	-.980285	DEG	PCNL	-1.23318	DEG
DLTI	18.6421	DEG	VCAL	9.10647	V
SNDS	1.23394	DEG	SNDL	3.64563	DEG
AIRS	9.12512	V	AIRL	9.21157	V
CRES	15.0000	F	ZCN1	1.01567	
ZCN2	1.02991		ZCN3	1.02881	
CGNL	.914095		CGNS	.999397	
COFL	.511359	IN	COFS	.0111866	IN
CGNB	.928581		COFB	.428069	IN
ZGN1	1.02843		ZGN2	1.03118	
ZGN3	1.03683		ZOF1	-.024286	
ZOF2	-.026452		ZOF3	-.030737	
SGMA	5000.00	KM/M	STMP	25.0000	DEGC
BS	12.2500	IN	BHS	CASE	
CSIZ	8.67500	IN			

COD(IN)
7.5000 9.5000

ECID(IN)
7.0000 9.0000

CCID -- COD

LRAT(DB)
-100.0 0.0

PLF(DEG)
90.000 490.00

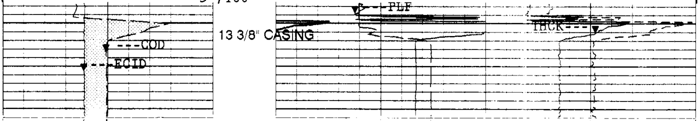
NTMU(IN)
0.0 1.0000

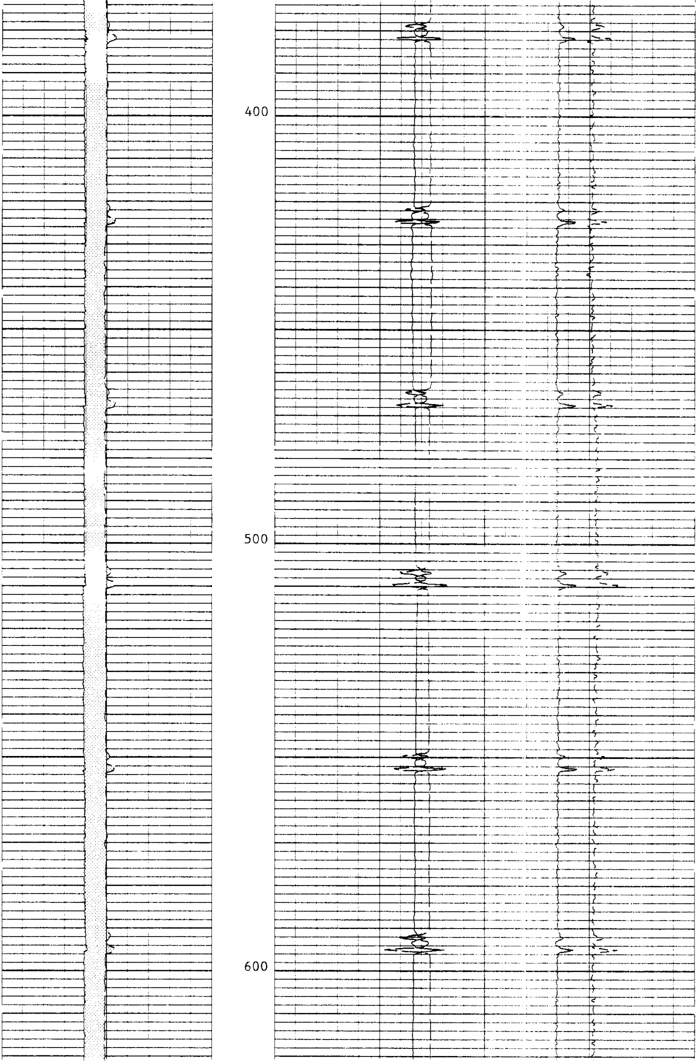
THCK(IN)
0.0 1.0000

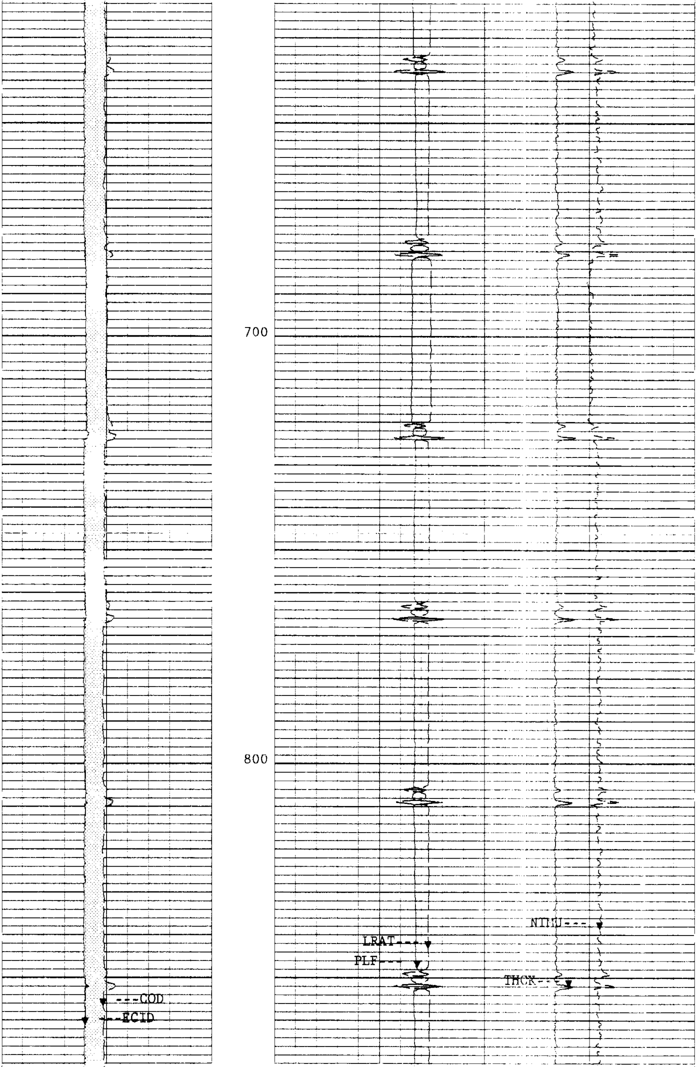
CP 44.2 FILE 1 05-OCT-1997 08:05

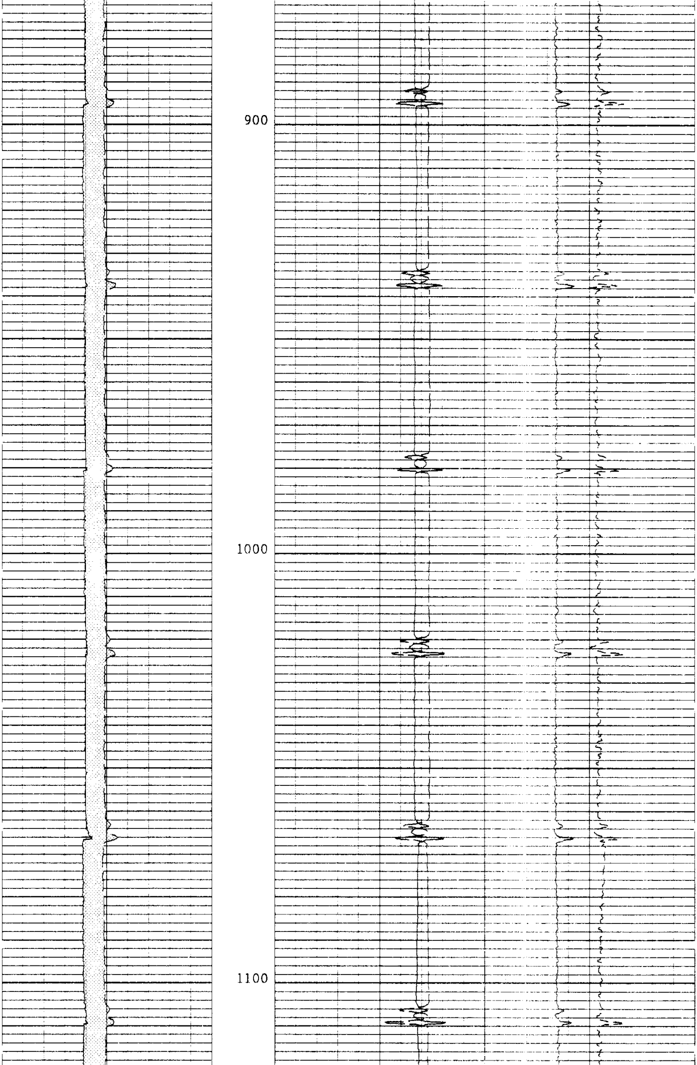
INPUT FILE(S) CREATION DATE
59 04-OCT-1997 12:01

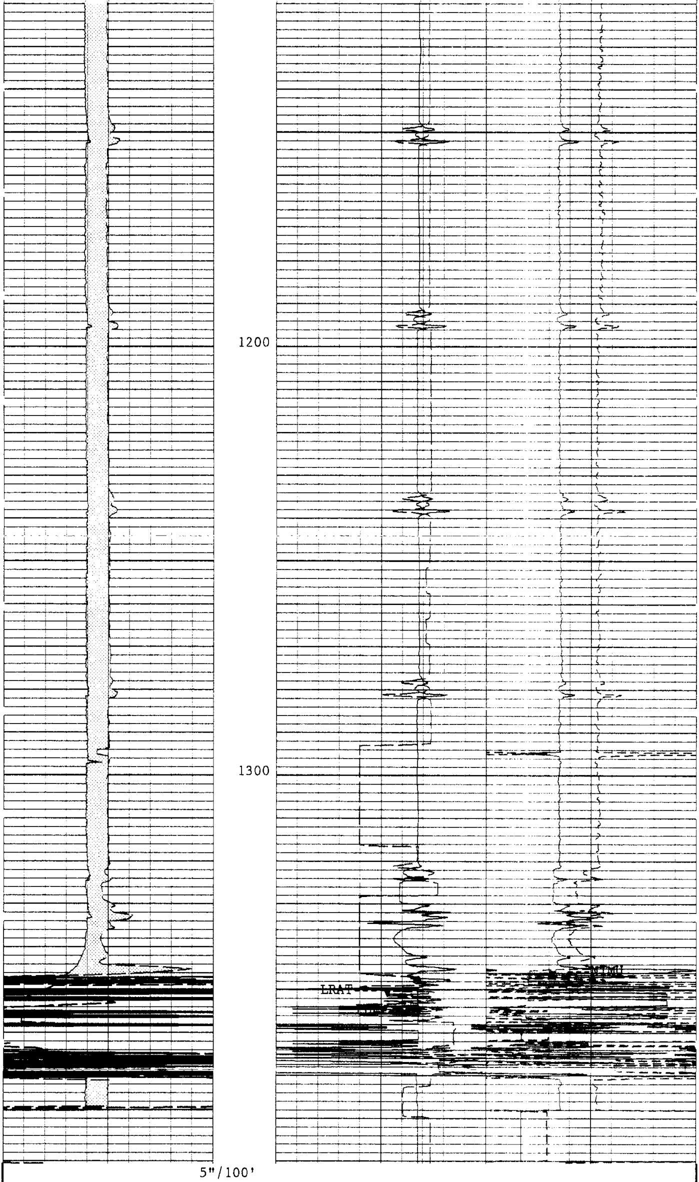
5"/100'











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CP 44.2            FILE     1       05-OCT-1997 08:02

                   INPUT FILE(S)   CREATION DATE
                        59         04-OCT-1997 12:01
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CCID -- COD

COD(IN)			LRAT(DB)		NTMU(IN)	
7.5000	9.5000		-100.0	0.0	0.0	1.0000
ECID(IN)			PLF(DEG)		THCK(IN)	
7.0000	9.0000		90.000	490.00	0.0	1.0000

```
                SENSOR MEASURE POINT TO TOOL ZERO

     DTT    0.0   FEET                       SGTL 38.8   FEET
     ETTD   8.5   FEET
```

```
                              PARAMETERS

     NAME   VALUE        UNIT                 NAME   VALUE        UNIT

     PP    NORM                               DO    0.0           F
     TD    32768.0       F                    NCJT  GSRY
     GTSE  TEMP                               SHT   60.0000       DEGF
     BHT   98.0000       DEGF                 LFRQ  35            HZ
     ZMOD  CYCL          HZ                   CMPZ  DEEP          HZ
     CLSP  ECID                               SOTP  ETSF
     BITR  2                                  C1CH  .116329
     C2CH  .116644                            C1CM  .231203
     C2CM  .231930                            C1CL  .462770
     C2CL  .462851                            PCNH  -.464111      DEG
     PCNM  -.980285      DEG                  PCNL  -1.23318      DEG
     DLTI  18.6421       DEG                  VCAL  9.10647       V
     SNDS  1.23394       DEG                  SNDL  3.64563       DEG
     AIRS  9.12512       V                    AIRL  9.21157       V
     CRES  15.0000       F                    ZCN1  1.01567
     ZCN2  1.02991                            ZCN3  1.02881
     CGNL  .914095                            CGNS  .999397
     COFL  .511359       IN                   COFS  .0111866      IN
     CGNB  .928581                            COFB  .428069       IN
     ZGN1  1.02843                            ZGN2  1.03118
     ZGN3  1.03683                            ZOF1  -.024286
     ZOF2  -.026452                           ZOF3  -.030737
     SGMA  5000.00       KM/M                 STMP  25.0000       DEGC
     BS    12.2500       IN                   BHS   CASE
     CSIZ  8.67500       IN
```

COMPANY	NORTHWEST NATURAL GAS			**SCHL.**	**FR**	2282.0 F
				SCHL.	**TD**	2292.0 F
WELL	IW 23a-22-65			**DRLR.**	**TD**	2299.0 F
				Elev:	**KB**	596.5 F
FIELD	MIST GAS STORAGE				**DF**	
COUNTY	COLUMBIA	**STATE**	OREGON		**GL**	580 5 F

Schlumberger

MULTIFREQUENCY ELECTROMAGNETIC THICKNESS LOG