#504

Schlumberger

FORMATION DENSITY COMPENSATED NEUTRON GAMMA RAY 2"

COUNTY	COLUMBIA
FIELD	MIST GAS STORAGE
LOCATION	N 03-03-15 E 2280.65 & S 86-56-45 E
WELL	IW 23a 22-65
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

API SERIAL NO.	SECT.	TWP.	RANGE
36-009-00304 324	22	T1	R6

Other Services:
SONIC
INDUCTION
FMS
DENSITY
NEUTRON
GAMMA RAY

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 interpretations 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						

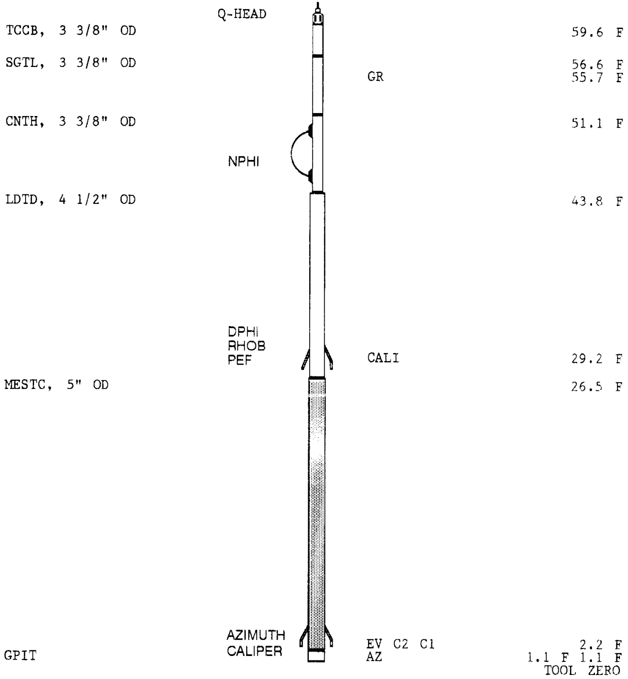
REMARKS:

RAN INDUCTION AND SONIC IN COMBO.
CENTRALIZERS RAN ON INDUCTION TOOL AND SONIC TOOL.
RAN REPEAT AT CASING DEPTH DUE TO PULLING TIGHT AT BOTTOM.

RAN FMS LDT CNL IN COMBO.
RAN REPEAT AT BOTTOM AT CLIENTS REQUEST

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

LOGGING TOOL STRING SKETCH



TOTAL TOOL STRING LENGTH IS 61.6 F.
TOTAL TOOL STRING WEIGHT IS 1115. LB IN AIR.

MAIN PASS

FILES SPLICED	SPLICE DEPTH
55 TO 48	1398.0 F

SPEED CORRECTION NOT APPLIED

TENS(LBF)
10000 0.0
GR(GAPI)
0.0 150.00
CALI(IN)
6.0000 16.000

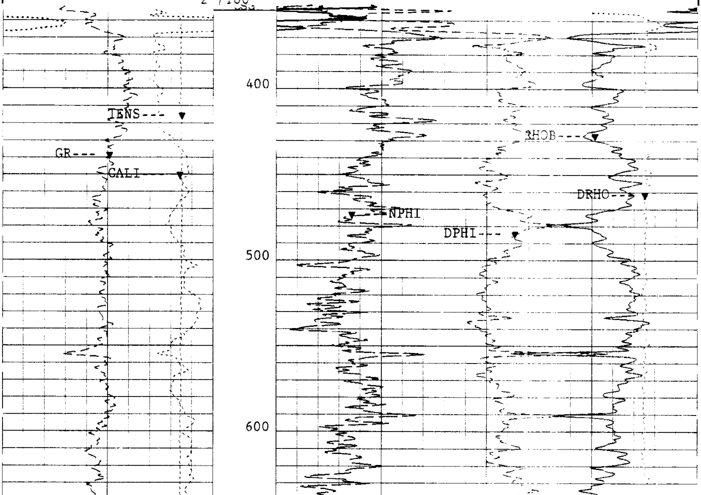
DRHO(G/C3)
-.2500 .25000
RHOB(G/C3)
3.0000 2.0000
NPHI(V/V)
.60000 0.0
DPHI(V/V)
.60000 0.0

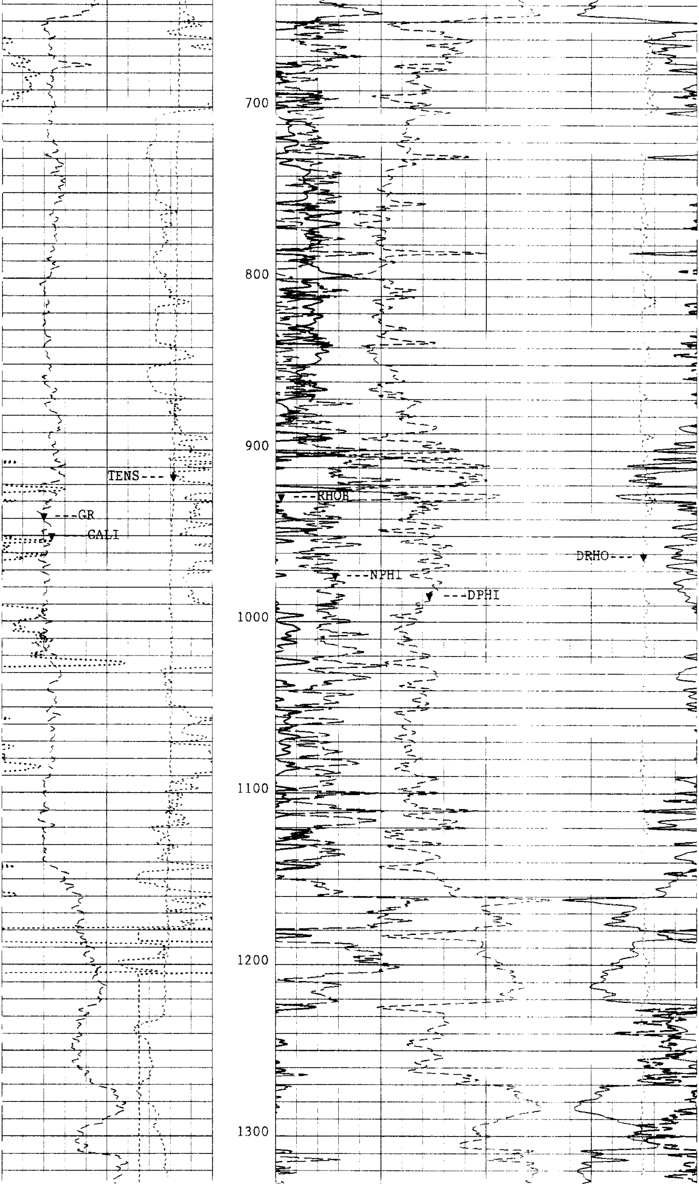
CROSSOVER

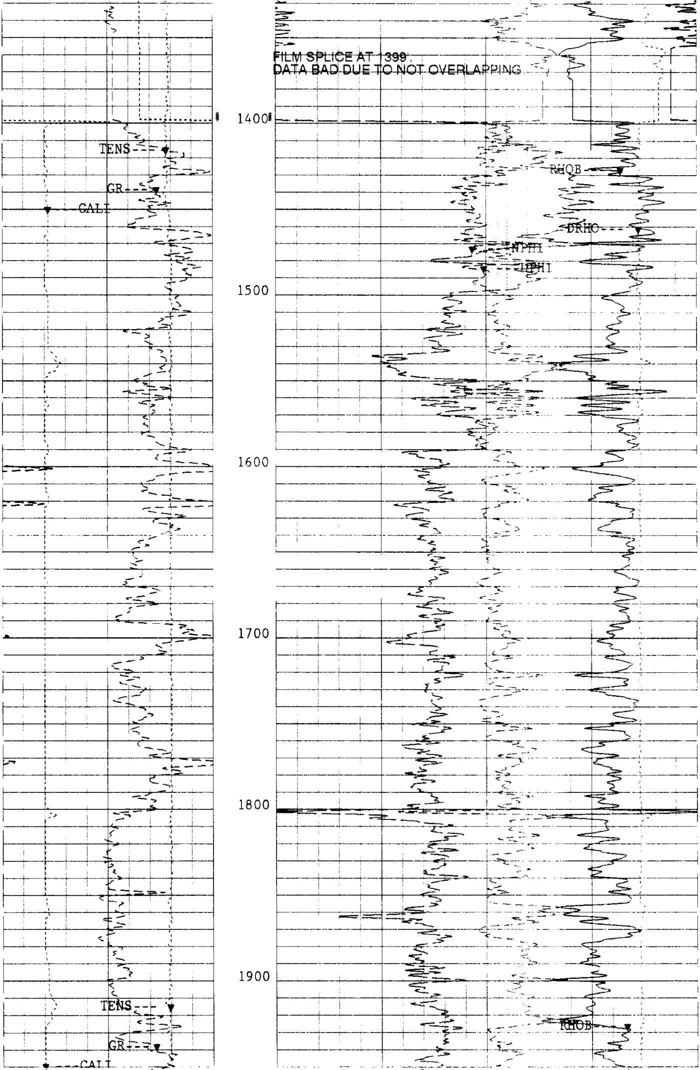
CP 44.2 FILE 61 04-OCT-1997 18:38

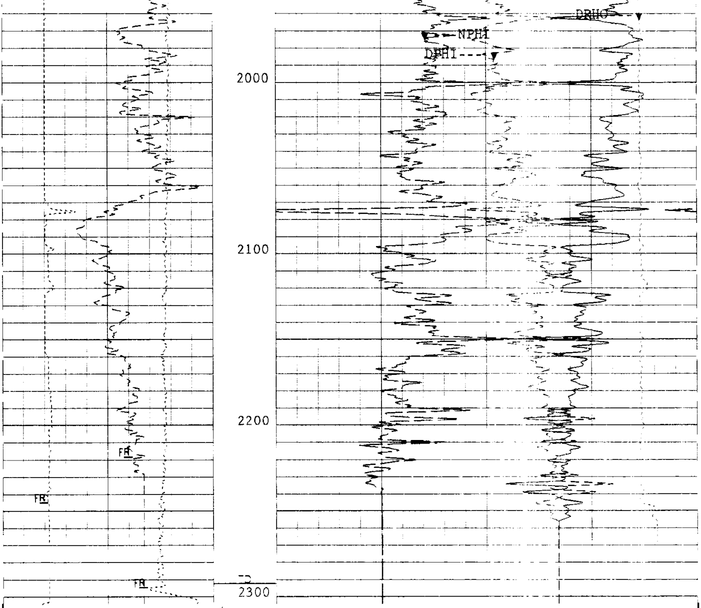
INPUT FILE(S) CREATION DATE
48 01-OCT-1997 09:12

2"/100'









2"/100'

CP 44.2 FILE 61 04-OCT-1997 17:37

INPUT FILE(S) CREATION DATE
55 04-OCT-1997 09:05

CROSSOVER

DRHO(G/C3)
-.2500 25000

TENS(LBF)
10000. 0.0

GR(GAPI)
0.0 150.00

CALI(IN)
6.0000 16.000

RHOB(G/C3)
3.0000 2.0000

NPHI(V/V)
.60000 0.0

DPHI(V/V)
.60000 0.0

SENSOR MEASURE POINT TO TOOL ZERO

LDTD 46.9 FEET
MESTC 2.2 FEET
CNTH 64.9 FEET
SGTL 73.4 FEET
DTT -2.9 FEET
GPIT 1.1 FEET

PARAMETERS

NAME	VALUE	UNIT	NAME	VALUE	UNIT
PADT	.500000	DEG	PP	NORM	
DO	1.00000	F	WMUD	8.60000	LB/G
NCJI	GSRY		DHC	BS	
BFM	LIQU		NPDC	0	
HSCO	YES		SOCO	NO	
MCCO	NO		BSCO	NO	
FSCO	NO		MWCO	NO	
PTCO	NO		CCCO	NO	
SDAT	SOCN		MCOR	NATU	
SOCN	.500000	IN	FSAL	-50000.0	PPM
ANGL	0.0	DEG	GGRD	.0100000	DF/F
BHFL	WATE		MDEN	2.65000	G/C3
FD	1.00000	G/C3	FCSR	0.1"	
AFMO	HAMM		ICMO	AUTO	
MDEC	19.5000	DEG	GLM	DIPM	
ICSD	-50000.0	F	RBS	AUTO	
PTYP	MEC		MLM	1800	
SOFF	-1.00000	IN	CSR	.6"	
ODFO	LIS		XMOD	AUTO	
XGAI	2		XOFF	0	
DPPM	STAN		MATR	SAND	
HC	CALI		FCD	5.50000	IN
SPCR	DISA		TDL	1399.00	F
MRT	102.000	DEGF	DFD	9.50000	LB/G
RMFS	3.72000	OHMM	RMS	2.31000	OHMM
MST	69.0000	DEGF	MFST	66.0000	DEGF
BS	7.87500	IN	BHS	OPEN	

REPEAT SECTION

SPEED CORRECTION NOT APPLIED

ACCUMULATED INTEGRATION VALUES SUMMARY:

```
Integrated Hole Volume:    110.316 F3    FROM 1704.00 F    TO 1395.00 F
Integrated Cement Volume:  59.4997 F3    FROM 1704.00 F    TO 1395.00 F
  (ASSUMING 5.50000 IN    O.D. CASING)
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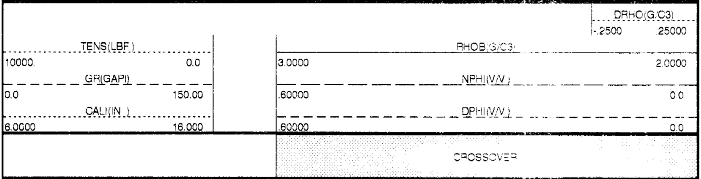
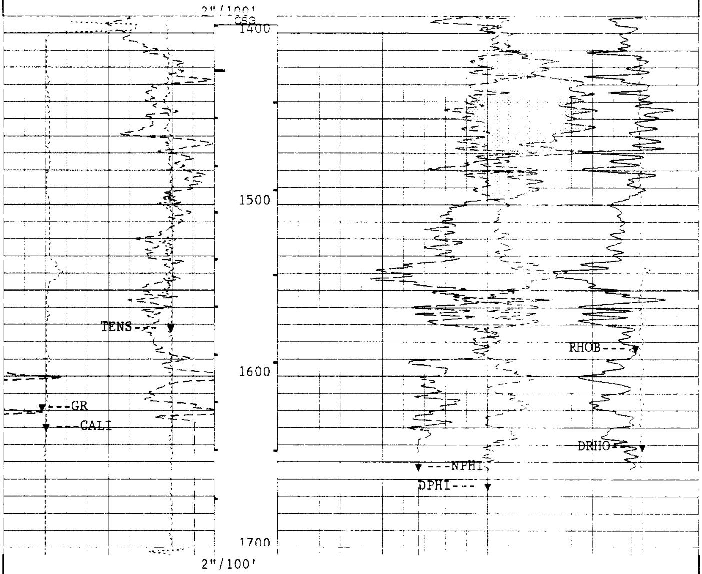
EVENT MARK SUMMARY:

OUTPUT	INTERVAL BETWEEN PIPS	DEPTH TRACK EDGE
Integrated Hole Volume	10.0000 F3	LEFT EDGE
Integrated Cement Volume	10.0000 F3	RIGHT EDGE



CP 44.2   FILE   56   04-OCT-1997 10:15   (UP)



CP 44.2 FILE 56 04-OCT-1997 10:01 (UP

CROSSOVER

DRHO(G/C3)	-.2500	25000
TENS(LBF)	10000.	0.0
GR(GAPI)	0.0	150.00
CALI(IN)	6.0000	16.000
RHOB(G/C3)	3.0000	2.0000
NPHI(V/V)	.60000	0.0
DPHI(V/V)	.60000	0.0

SENSOR MEASURE POINT TO TOOL ZERO

CNTC	63.9	FEET	CFTC	64.4	FEET
LL	46.8	FEET	LITH	46.8	FEET
LU	46.8	FEET	LS	46.8	FEET
SS1	46.3	FEET	PARI	46.3	FEET
GR	73.4	FEET	SS2	46.3	FEET
TENS	-2.9	FEET	CALI	46.9	FEET
C2	2.2	FEET	C1	2.2	FEET
MRPD	2.2	FEET	MDRB	2.2	FEET
MRPB	2.2	FEET	MRPC	2.2	FEET
AX	1.1	FEET	MRPA	2.2	FEET
AZ	1.1	FEET	AY	1.1	FEET
FY	1.1	FEET	FX	1.1	FEET
FCAX	1.1	FEET	FZ	1.1	FEET
FCAZ	1.1	FEET	FCAY	1.1	FEET
TNRA	64.9	FEET	FTIM	1.1	FEET

PARAMETERS

```
NAME  VALUE      UNIT                    NAME  VALUE      UNIT

PADT 0.0         DEG                     WMUD 8.60000     LB/G
NCJT GSRY                                DHC  BS
BFM  LIQU                                NPDC 0
HSCO YES                                 SOCO NO
MCCO NO                                  BSCO NO
FSCO NO                                  MWCO NO
PTCO NO                                  CCCO NO
SDAT SOCN                                MCOR NATU
SOCN .500000     IN                      FSAL -50000.0    PPM
ANGL 0.0         DEG                     GGRD .0100000    DF/F
BHFL WATE                                MDEN 2.65000     G/C3
FD   1.00000     G/C3                    FCSR 0.1"
AFMO HAMM                                ICMO AUTO
MDEC 19.5000     DEG                     GLM  DIPM
ICSD -50000.0    F                       RBS  AUTO
PTYP MEC                                 MLM  1800
SOFF -1.00000    IN                      CSR  .6"
ODFO RAW                                 XMOD AUTO
XGAI 2                                   XOFF 0
DPPM STAN                                MATR SAND
HC   CALI                                FCD  5.50000     IN
SPCR DISA                                TDL  1399.00     F
MRT  102.000     DEGF                    DFD  9.50000     LB/G
RMFS 3.72000     OHMM                    RMS  2.31000     OHMM
MST  69.0000     DEGF                    MFST 66.0000     DEGF
BS   7.87500     IN                      BHS  OPEN
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CALIBRATIONS

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              BEFORE SURVEY CALIBRATION Summary


  Performed:    04-OCT-1997 08:32
  Program File: NSDIP  (Version    44.2    95/07/25  95/07/25)


MEST            Caliper Calibration Summary

            MEASURED                        CALIBRATED
          Small   Large                  Small      Large       UNITS
    C1    8.75    12.75                  8.00       11.88        IN
    C2    8.50    12.53                  8.00       11.88        IN

Small: 04-OCT-1997 08:27 Large: 27-SEP-1997 15:58 Comp: 04-OCT-1997 08:29


GPIC            Calibration Summary

 MAGNETOMETER MANUFACTURER CODE:                3
 MAGNETOMETER SERIAL NUMBER:                  228
 MAGNETOMETER REFERENCE TEMPERATURE :          20.0   DEGC


GPIC            Calibration Summary

 ACCELEROMETER MANUFACTURER CODE:               3
 ACCELEROMETER SERIAL NUMBER:                 520
 ACCELEROMETER REFERENCE TEMPERATURE :         20.0   DEGC


CNTH            Detector Calibration Summary

      Neutron Cartridge Number     : 1345
      Neutron Source Number        : 2576
      Thermal Housing Number       : 4431
      Alpha detectors              : Yes
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            Input     Plus        Shop      Gain       Shop      Before      Tol.
                   Reference      Tank                 Bkg        Bkg        Bkg
                     Counts      Counts               Counts     Counts     Counts

            CNTC    6031.00     5998.75    1.005     24.754     25.[illegible]60      3.713
            CFTC    2793.00     2640.31    1.058     30.245     31.886      4.537

            Ratio     2.159       2.272


   Before Survey Calibrations done: 27-SEP-1997 15:39


   LDTD            Detector Calibration Summary

           Density Resistivity Sonde Number       :     4768
           Nuclear Services Cartridge Number      :     2979
           Powered Detector Housing Number        :     1989
           Powered Gamma-Gamma Detector Number :     1989
           LDT Logging Source Number              :     1925
           LDT Calibration Mode                   :     WATE

                    Measured       Shop  Values
                     Bkgd         Al+Fe    Al       Units
             LL      19.8          91.5  100.0       CPS
             LU      76.0         137.2  150.3       CPS
             LS      57.8         160.1  175.1       CPS
            LITH      5.5          42.3   66.5       CPS
             SS1     18.0         174.5  191.0       CPS
             SS2     12.3         250.6  271.1       CPS

              HV Settings          Detector Resolutions
            HV LS:  1232.6 V             LS:  8.7 %
            HV SS:  1206.0 V             SS:  8.7 %

   Wellsite Calibration done: 27-SEP-1997 15:44


   SGTL            Detector Calibration Summary

                MEASURED
              BKGD     JIG          CALIBRATED          UNITS
       GR       0        0               0              GAPI

   Back:                       Jig:                       Comp:


   LDTD            Caliper Calibration Summary

                MEASURED                        CALIBRATED
              Small    Large                  Small      Large           UNITS
     CALI      .80      .80                   2.59       2.59             IN

   Small: 27-SEP-1997 15:47 Large: 27-SEP-1997 15:46 Comp: 27-SEP-1997 15:46

      CP 44.2            FILE     0        04-OCT-1997 08:30
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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

FORMATION DENSITY
COMPENSATED NEUTRON
GAMMA RAY 2"