Schlumberger

SIMULTANEOUS

COMPENSATED NEUTRON-FORMATION DENSITY

COUNTY	COLUMBIA
FIELD	MIST GAS
LOCATION	1779.79'W AND 886.17'S
WELL	"COLUMBIA COUNTY" #31-34-
COMPANY	ARCO OIL AND GAS COMPANY

COMPANY ARCO OIL AND GAS COMPANY

WELL "COLUMBIA COUNTY" #31-34-65

FIELD MIST GAS

COUNTY COLUMBIA **STATE** OREGON

LOCATION 1779.79'W AND 886.17'S
OF NE CORNER

API SERIAL NO.	SECT.	TWP.	RANGE
	34	6N	5W

Other Services: DIL-BHC

Permanent Datum	GL	Elev.	902.5 F	Elev.: K.B. 912.5 F
Log Measured From	KB	10.0 F	above Perm. Datum	D.F. 911.5 F
Drilling Measured From	KB			G.L. 902.5 F

Date	04-OCT-87			
Run No.	ONE			
Depth Driller	2344.0 F			
Depth Logger (Schl.)	2336.0 F			
Btm. Log Interval	2332.0 F			
Top Log Interval	472.0 F			
Casing-Driller	9 5/8" @ 472.0 F	@	@	@
Casing-Logger	472.0 F			
Bit Size	8 1/2"			
Type Fluid In Hole	POLYMER			
Dens. / Visc.	10.60 LB/G	43.0 S		
pH / Fld. Loss	8.4	6.0 C3		
Source of Sample	FLOWLINE			
Rm @ Meas. Temp.	2.550 OHMM @ 73.0 DEGF		@	
Rmf @ Meas. Temp.	3.390 OHMM @ 54.0 DEGF		@	
Rmc @ Meas. Temp.	5.290 OHMM @ 54.0 DEGF		@	
Source: Rmf / Rmc	MEASURED	MEASURED		
Rm @ BHT	2.061 OHMM @ 92.0 DEGF		@	
TIME Circulation Ended	06:00 10-5			
TIME Logger on Bottom	10:47 10-5			
Max. Rec. Temp.	92.0 DEGF			
Equip. / Location	8504	SACRAMENTO		
Recorded By	SCOTT PILCH			
Witnessed By	MIKE ANDERSON			

FOLD HERE

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 willful 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	
Service Order No.	526354	
Drilling Fluid Level		
Salinity		
Rmf @ BHT	2.089 OHMM @ 92.0 DEGF	@
Rmc @ BHT	3.260 OHMM @ 92.0 DEGF	@
Logging Speed	1800.0 F/HR	
Equipment Data		
Tool Number 1	DRS-C 3756	
Tool Number 2	NSC-D 1955	
Tool Number 3	CNC-HA 1263	
Tool Number 4	SGC-SA 680	
Tool Number 5	CCC-B 1760	
Tool Number 6	CCSM-AB 17	
Tool Number 7		
Tool Number 8		
Tool Number 9		
Tool Number 10		
Tool Number 11		
Tool Number 12		

REMARKS:

MAXIMUM DEVIATION 30 DEGREES.
THANK YOU FOR USING SCHLUMBERGER.
CREW: GLEN KINION AND STEVE SALVATO

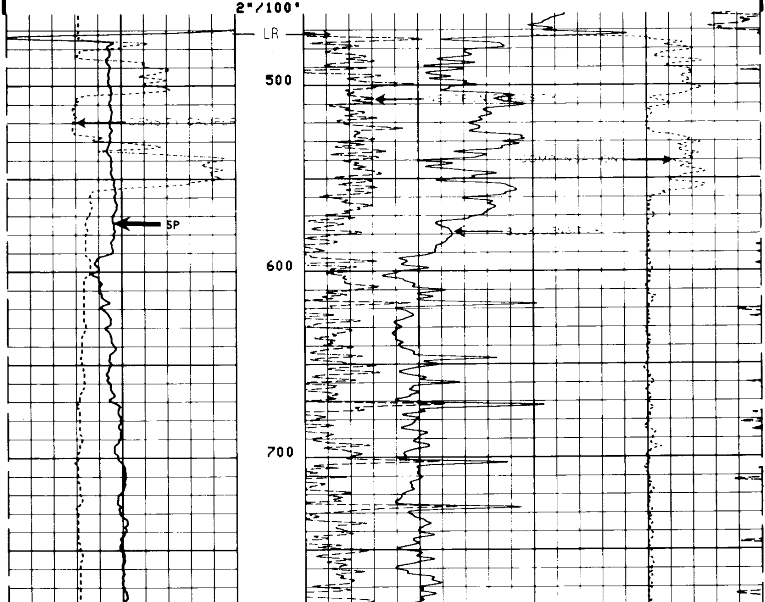
CEMENT VOLUME = 595.536 F3
HOLE VOLUME = 903.067 F3
FROM 2336.0 TO 472.0 FEET

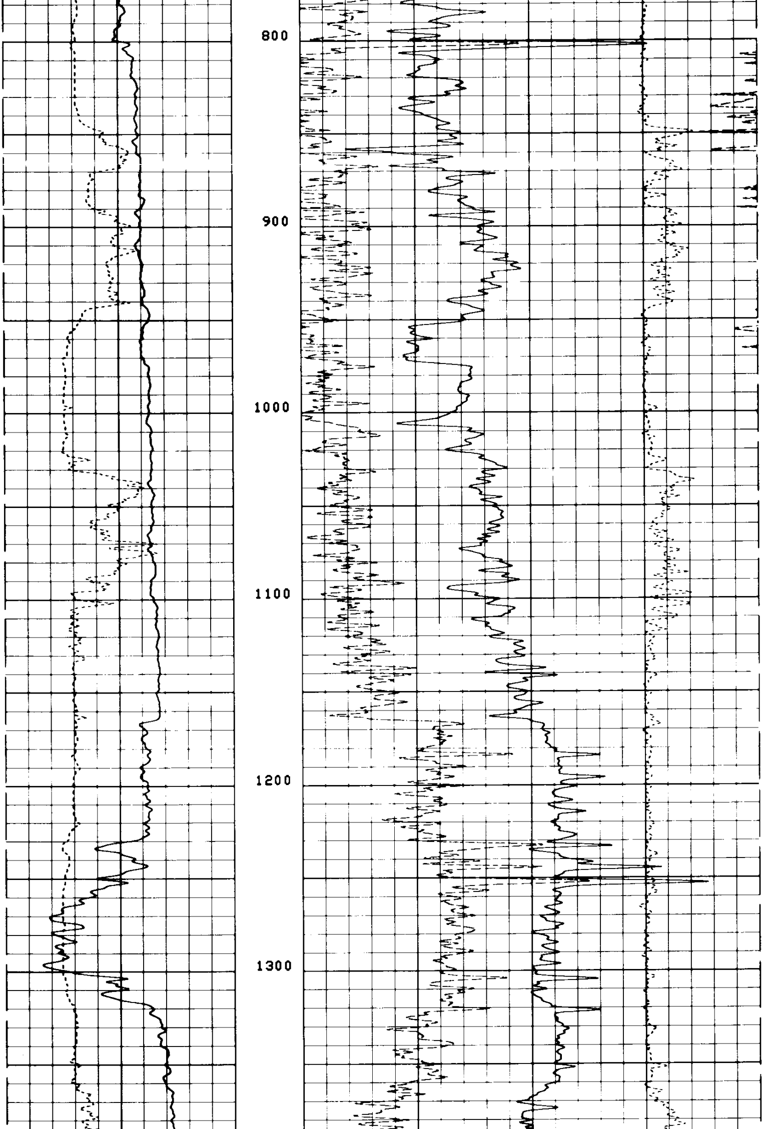
SP (MV)		NPHI	DRHO(G/C3)
-120.0 -20.00		.60000 0.0	-.2500 .25000
CALI(IN)		RHOB(G/C3)	
6.0000 16.000		1.6500 2.6500	

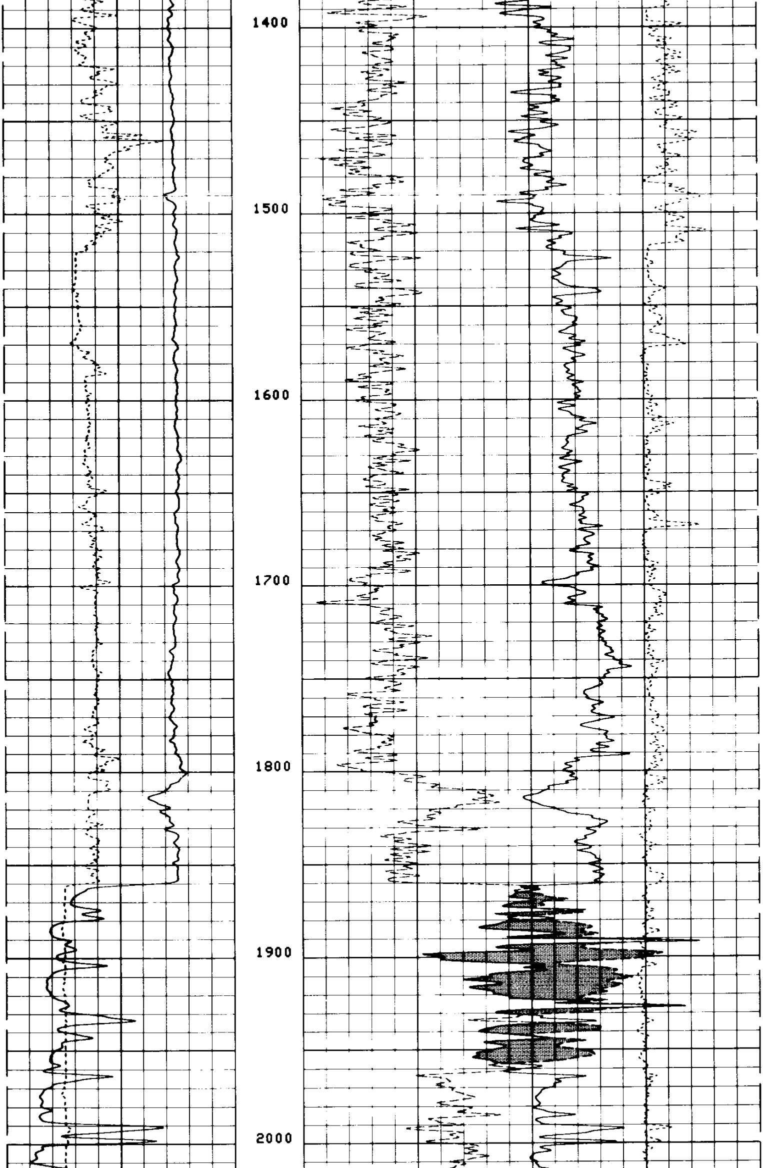
CP 30.22 FILE 30 05-OCT-87 14:22

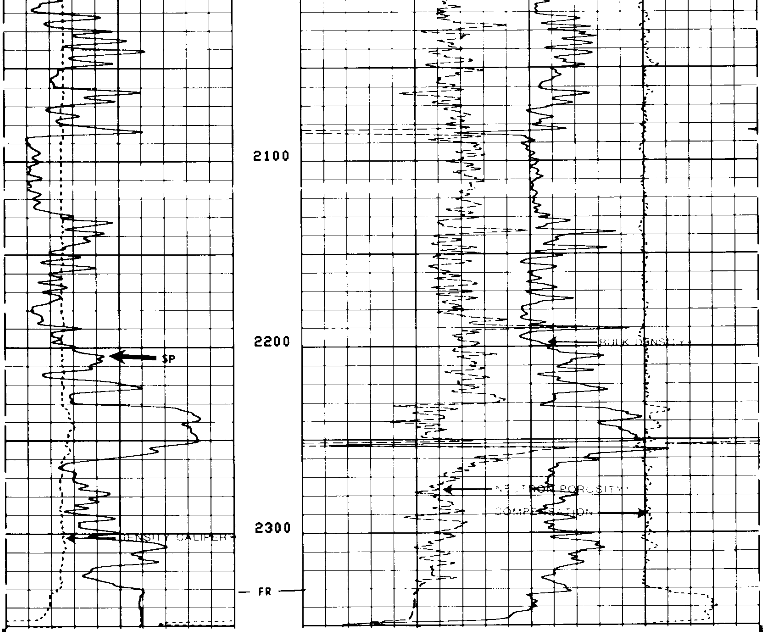
INPUT FILES
18
6

DATA ACQUIRED
05-OCT-87 11:48
NA









2"/100'

CP 30.22 FILE 30 05-OCT-87 14:13

INPUT FILES
18
6

DATA ACQUIRED
05-OCT-87 10:47
NA

SP (MV)
-120.0 -20.00
CALI(IN)
6.0000 16.000

DRHO(G/C3)
-.2500 .25000
NPHI
.60000 0.0
RHOB(G/C3)
1.6500 2.6500

SENSOR MEASURE POINT TO TOOL ZERO

SPAR	51.4	FEET	SP	51.4	FEET
STSG	2.5	FEET	GR	32.3	FEET
NCNL	23.7	FEET	FCNL	23.7	FEET
LITH	2.6	FEET	SCNL	2.5	FEET
LS	2.6	FEET	LL	2.6	FEET
SS1	2.1	FEET	LU	2.6	FEET
CALI	2.7	FEET	SS2	2.1	FEET
NRAT	23.7	FEET	TENS	2.5	FEET

PARAMETERS

NAME	VALUE	UNIT	NAME	VALUE	UNIT

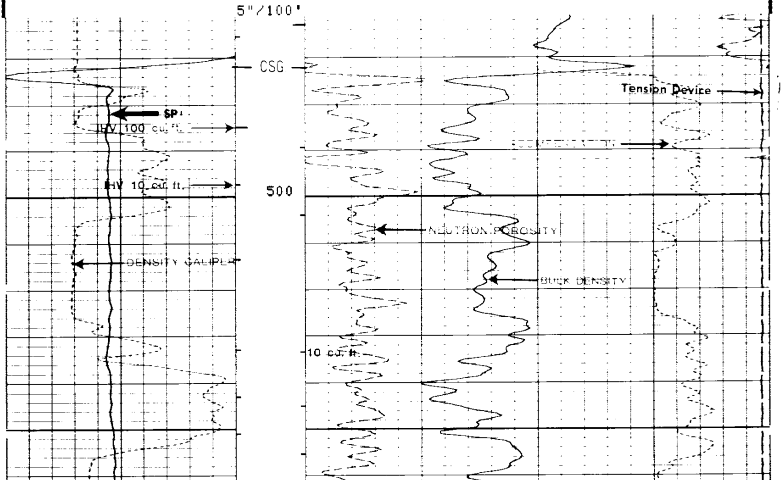
```
BS    8.50000      IN                    BHS  OPEN
HC    CALI                               PSNR 2.21300
FD    1.00000      G/C3                  MATR SAND
BFM   LIQU                               MDEN 2.65000      G/C3
WMUD  10.6000      LB/G                  DHC  BS
DO    0.0          F                     DO2  0.0          F
PP    NORM
```

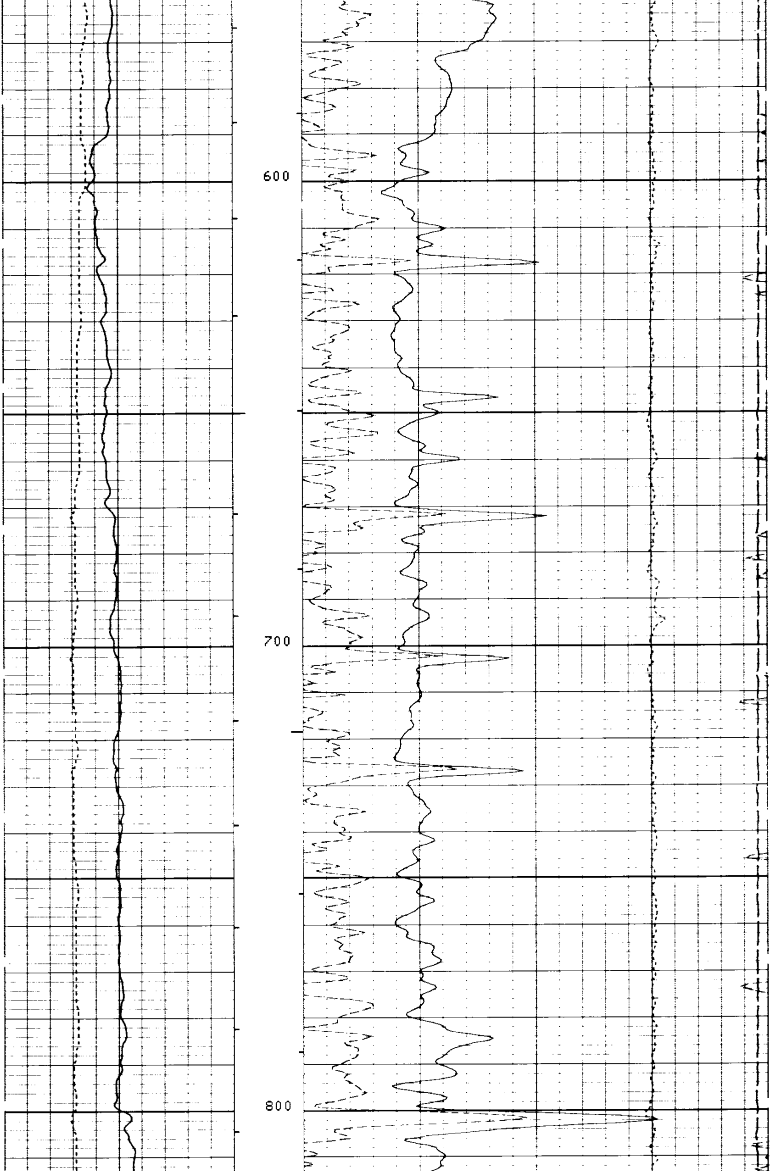
```
EVENT MARK SUMMARY:

OUTPUT   INTERVAL         DEPTH TRACK
         BETWEEN PIPS     EDGE

IHV      10.0000 F3       LEFT EDGE
ICV      10.0000 F3       RIGHT EDGE
```

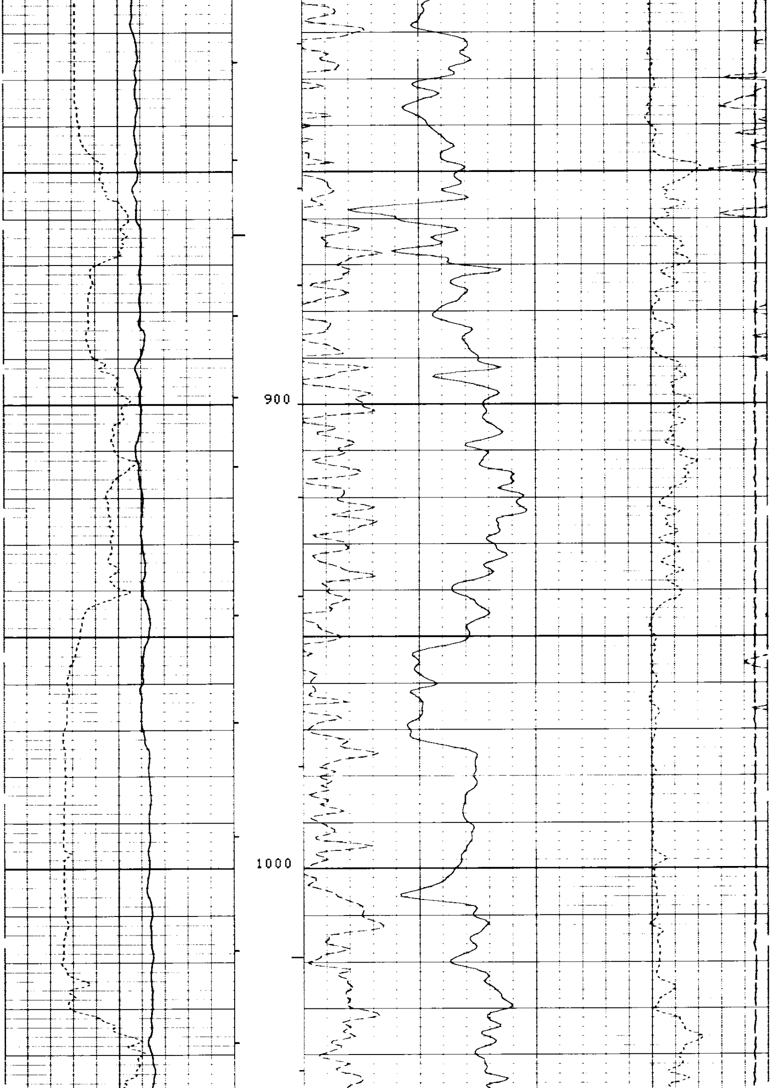
```
CEMENT VOLUME = 595.536 F3
HOLE VOLUME =   903.067 F3
FROM  2336.0 TO    472.0 FEET
```

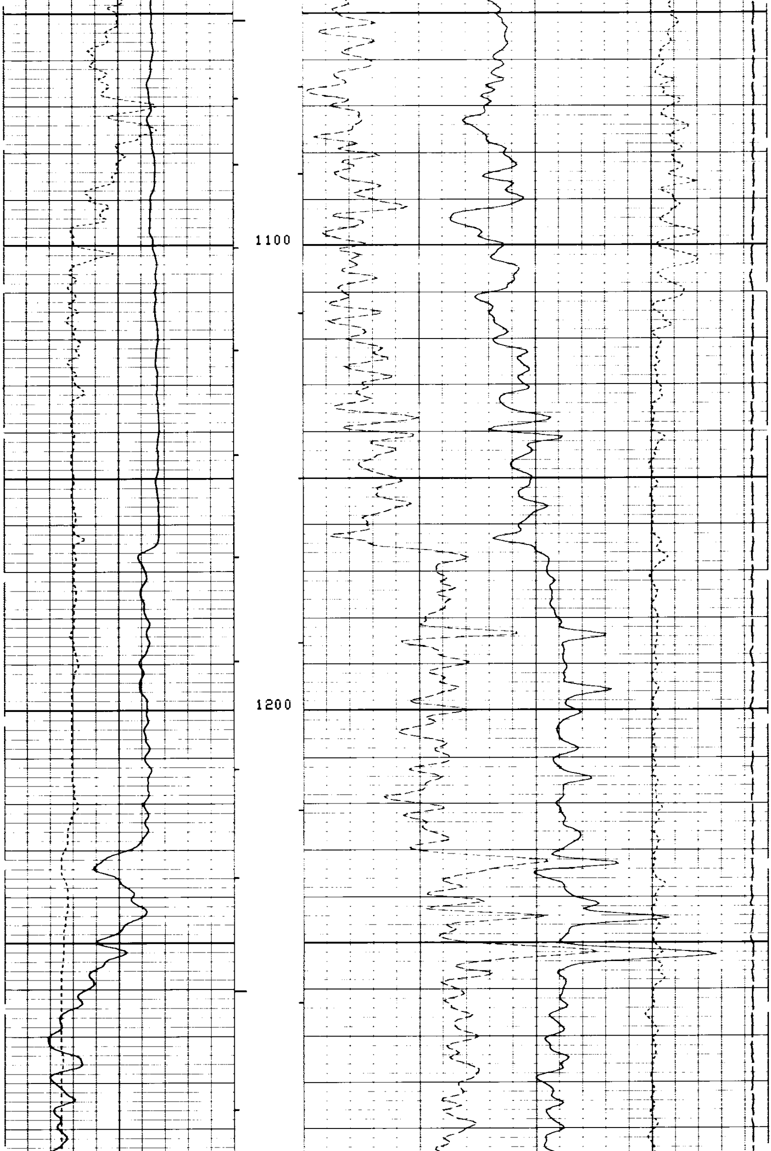
```
                                                             TENS(LB   )
                                                      10500.            500.00
                                                              DRHO(G/C3)
                                                      -.2500            .25000
      SP   (MV   )                         NPHI
-120.0            -20.00      .60000                                       0.0
      CALI(IN   )                          RHOB(G/C3)
6.0000            16.000      1.6500                                    2.6500
```

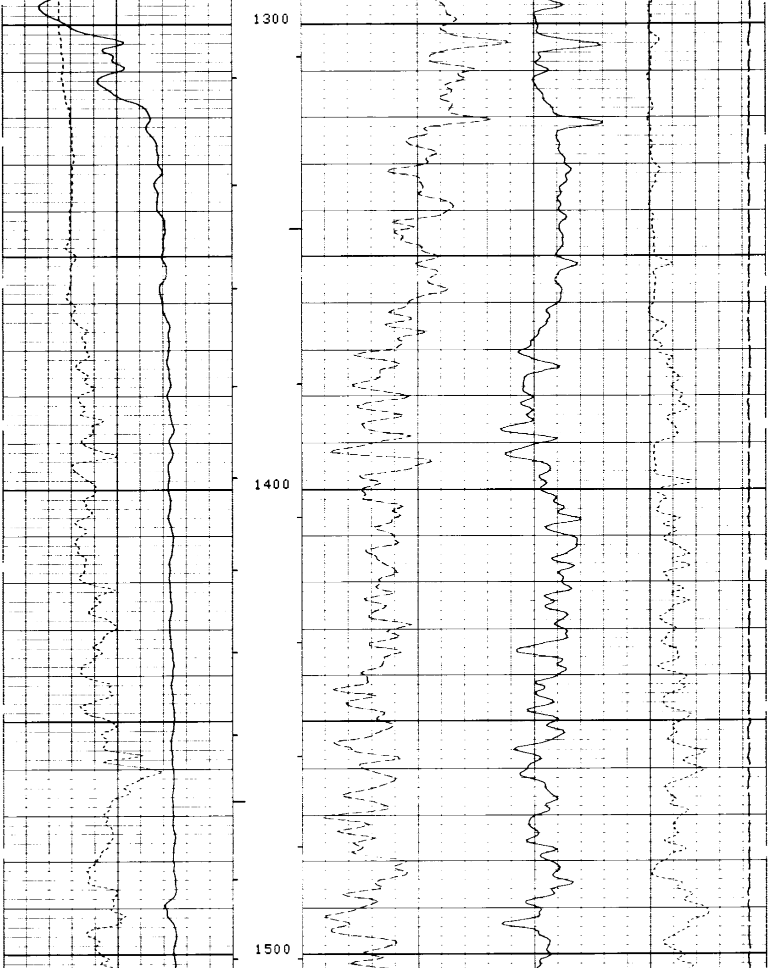
```
   CP 30.22            FILE    30        05-OCT-87 14:22

           INPUT FILES                   DATA ACQUIRED
           18                            05-OCT-87 11:48
           6                                  NA
```

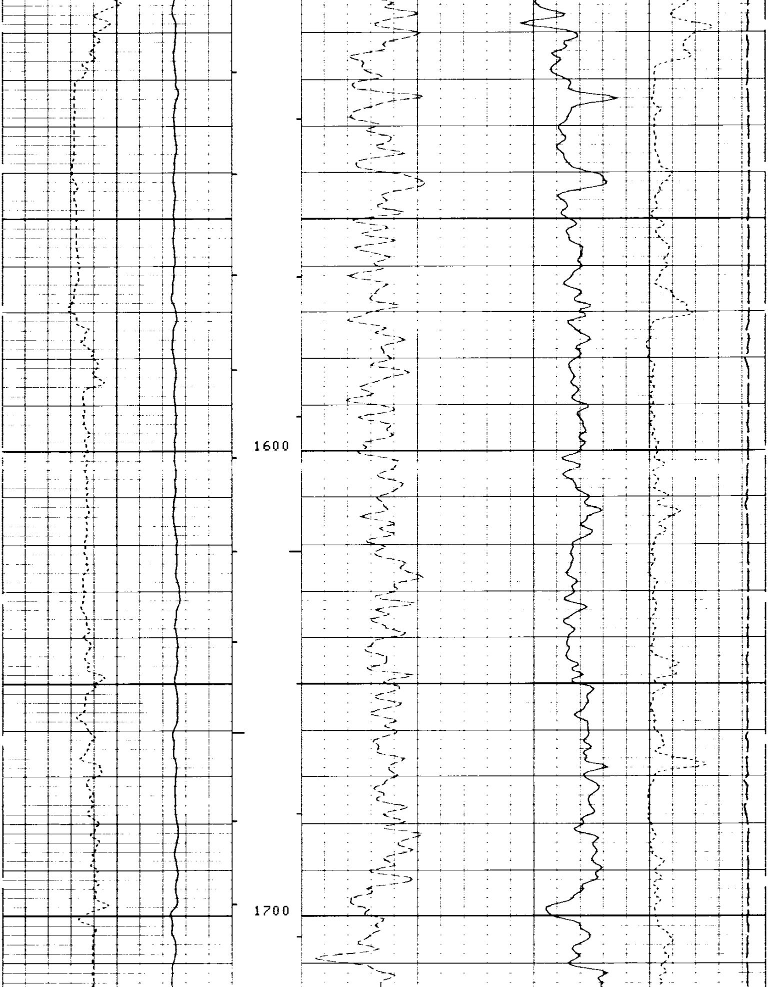


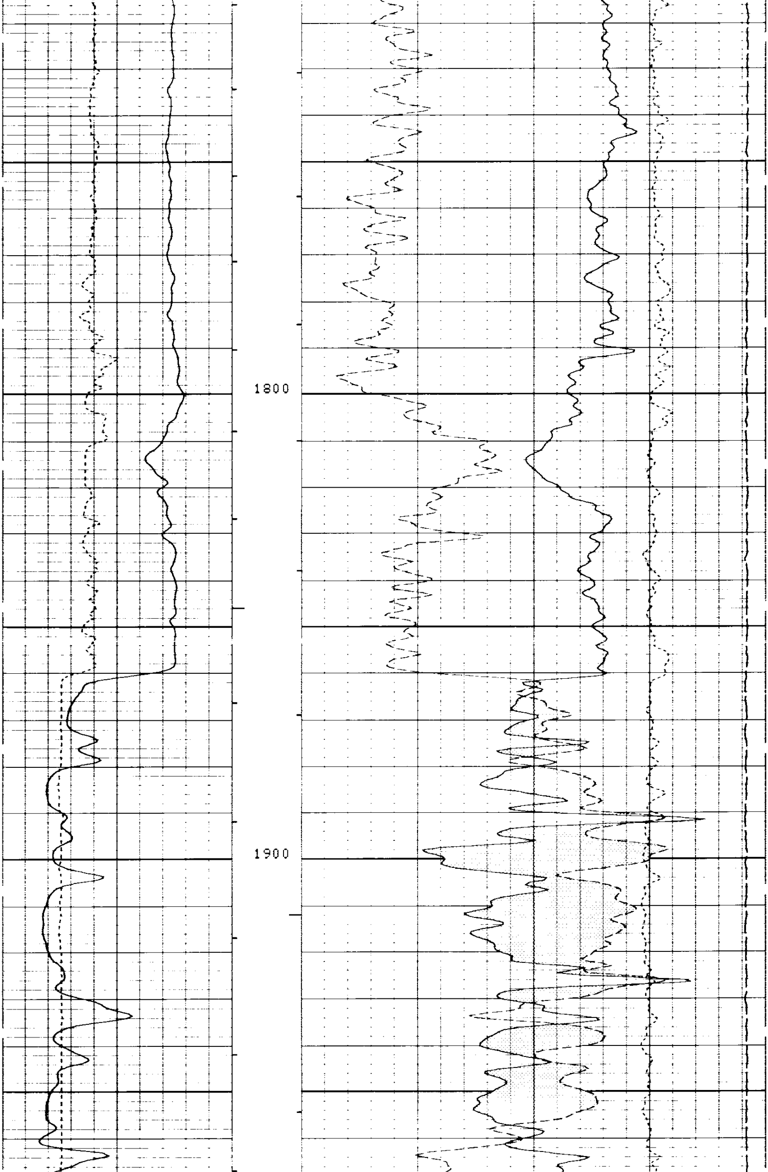


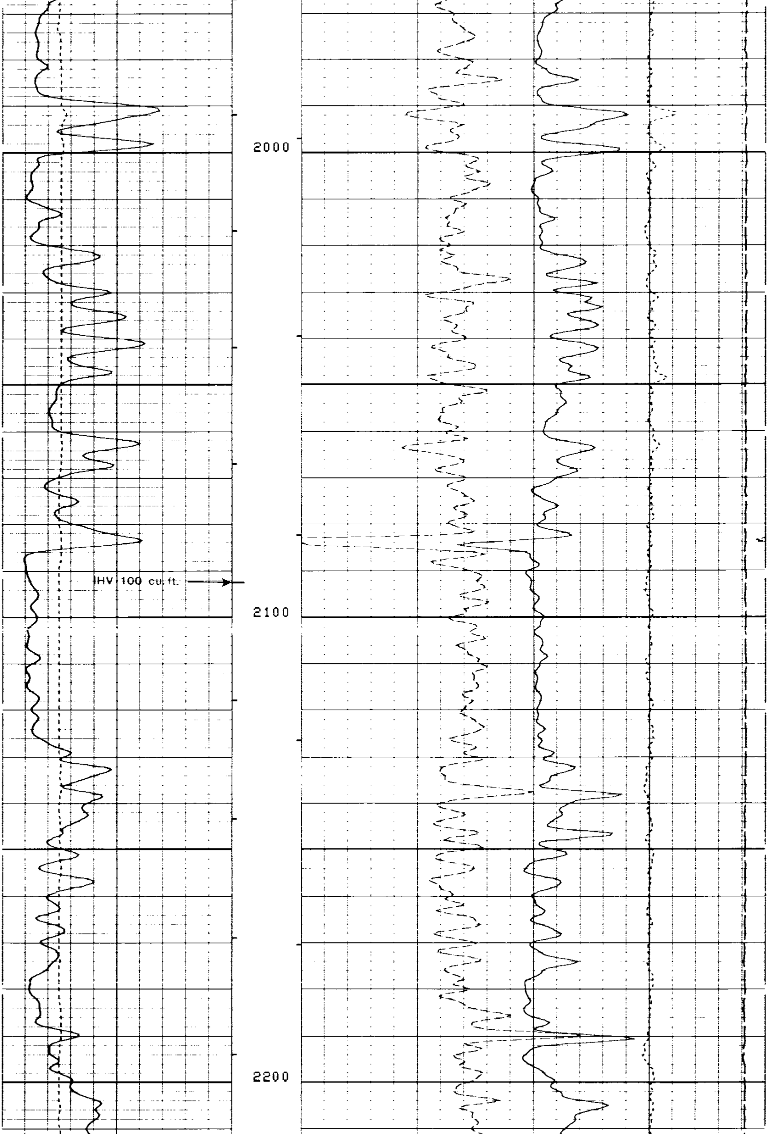


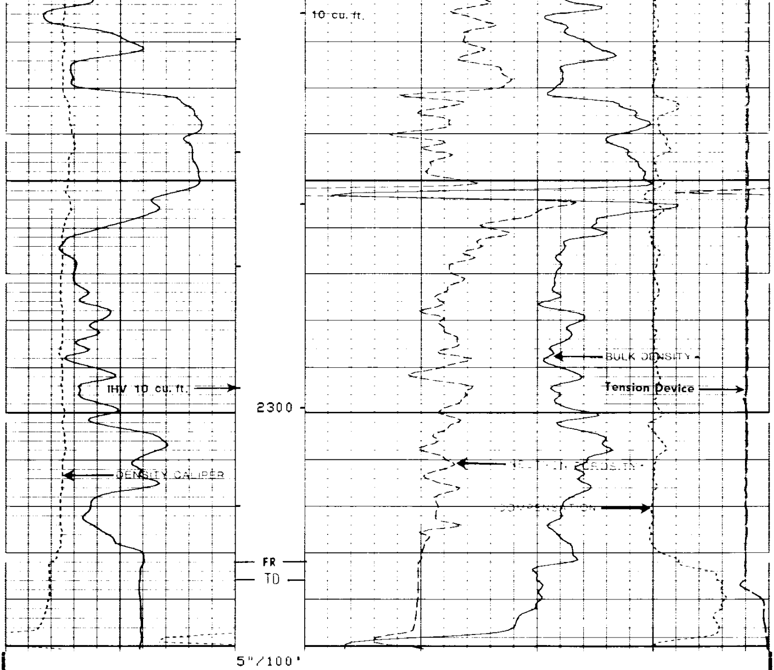












CP 30.22 FILE 30 05-OCT-87 14:13

INPUT FILES
18
6

DATA ACQUIRED
05-OCT-87 10:47
NA

		TENS(LB) 10500. 500.00
		DRHO(G/C3) -.2500 .25000
SP (MV) -120.0 -20.00	NPHI .60000 0.0	
CALI(IN) 6.0000 16.000	RHOB(G/C3) 1.6500 2.6500	

SENSOR MEASURE POINT TO TOOL ZERO

SPAR	51.4	FEET	SP	51.4	FEET
STSG	2.5	FEET	GR	32.3	FEET
NCNL	23.7	FEET	FCNL	23.7	FEET

```
LITH  2.6   FEET                            SCNL  2.5   FEET
LS    2.6   FEET                            LL    2.6   FEET
SS1   2.1   FEET                            LU    2.6   FEET
CALI  2.7   FEET                            SS2   2.1   FEET
NRAT 23.7   FEET                            TENS  2.5   FEET
```

```
                          PARAMETERS

NAME  VALUE       UNIT                NAME  VALUE       UNIT

BS    8.50000     IN                  BHS   OPEN
HC    CALI                            PSNR  2.21300
FD    1.00000     G/C3                MATR  SAND
BFM   LIQU                            MDEN  2.65000     G/C3
WMUD  10.6000     LB/G                DHC   BS
DO    0.0         F                   DO2   0.0         F
PP    NORM
```

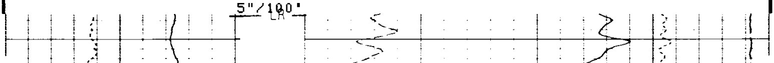
```
EVENT MARK SUMMARY:

OUTPUT  INTERVAL        DEPTH TRACK
        BETWEEN PIPS    EDGE

IHV     10.0000 F3      LEFT EDGE
ICV     10.0000 F3      RIGHT EDGE
```

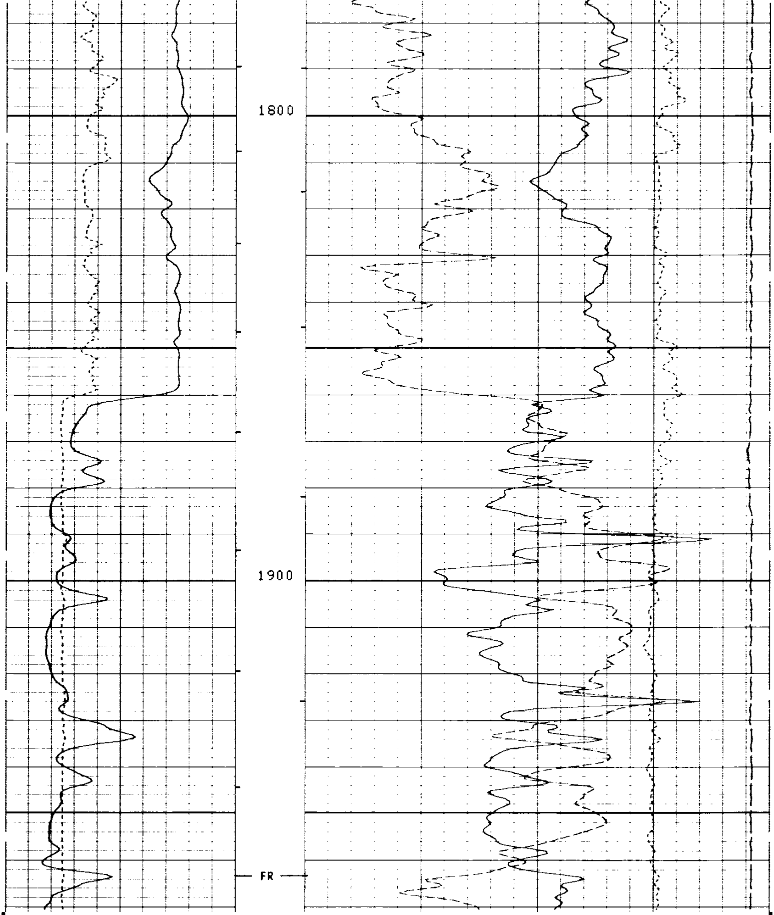
```
CEMENT VOLUME = 59.1504 F3
HOLE VOLUME =   93.1378 F3
FROM  1970.0 TO  1764.0 FEET
```

```
                                                              TENS(LB  )
                                                        10500.         500.00
                                                              DRHO(G/C3)
                                                        -.2500         .25000
     SP   (MV   )                                 NPHI
-120.0          -20.00         .60000                                   0.0
     CALI(IN  )                                   RHOB(G/C3)
6.0000          16.000         1.6500                                  2.6500
```

REPEAT SECTION

```
CP 30.22            FILE   29       05-OCT-87 14:11

        INPUT FILES                 DATA ACQUIRED
        17                          05-OCT-87 10:38
        6                               NA
```





5"/100'

CP 30.22 FILE 29 05-OCT-87 14:10

INPUT FILES
17
6

DATA ACQUIRED
05-OCT-87 10:32
NA

```
                                                              TENS(LB  )
                                                           10500.          500.00
                                                                DRHO(G/C3)
                                                           -.2500          .25000
        SP   (MV   )                                  NPHI
-120.0              -20.00    .60000                                          0.0
        CALI(IN  )                                    RHOB(G/C3)
6.0000              16.000     1.6500                                       2.6500
```

```
                      SENSOR MEASURE POINT TO TOOL ZERO

          SPAR 51.4  FEET                           SP    51.4  FEET
          STSG  2.5  FEET                           GR    32.3  FEET
          NCNL 23.7  FEET                           FCNL  23.7  FEET
          LITH  2.6  FEET                           SCNL   2.5  FEET
          LS    2.6  FEET                           LL     2.6  FEET
          SS1   2.1  FEET                           LU     2.6  FEET
          CALI  2.7  FEET                           SS2    2.1  FEET
          NRAT 23.7  FEET                           TENS   2.5  FEET
```

```
                                 PARAMETERS

        NAME  VALUE        UNIT                    NAME  VALUE        UNIT

        BS    8.50000      IN                      BHS   OPEN
        HC    CALI                                 PSNR  2.21300
        FD    1.00000      G/C3                    MATR  SAND
        BFM   LIQU                                 MDEN  2.65000      G/C3
        WMUD  10.6000      LB/G                    DHC   BS
        DO    0.0          F                       DO2   0.0          F
        PP    NORM
```

```
                 BEFORE SURVEY CALIBRATION SUMMARY


   PERFORMED:     04-OCT-87 22:02
   PROGRAM FILE: GTS    (VERSION    30.22   87/02/10  87/02/09)


 CNTH                 DETECTOR CALIBRATION SUMMARY

               TANK                            JIG
          INPUT   CALIBRATED          MEASURED    CALIBRATED
   NRAT   2.21300  2.158                2.200        2.145


 SGTL                 DETECTOR CALIBRATION SUMMARY

             MEASURED
           BKGD    JIG          CALIBRATED          UNITS
     GR     57     213            165               GAPI


 LDTC                 DETECTOR CALIBRATION SUMMARY

        DRS SONDE NUMBER                           :    3756
        NUCLEAR SERVICE CARTRIDGE NUMBER           :    1955
        POWERED DETECTOR HOUSING NUMBER            :    2942
        POWERED GAMMA-GAMMA DETECTOR NUMBER :    2710
        LDT LOGGING SOURCE NUMBER                  :    7137
        LDT CALIBRATION MODE                       :    WATE
        MUD DENSITY                                :    10.6000    LB/G

             M E A S U R E D
          BKGD   AL+FE     AL   UNITS
     LL   18.5    86.3    96.7    CPS
     LU   69.5   131.5   147.5    CPS
     LS   53.3   152.1   170.4    CPS
   LITH    5.3    33.6    50.2    CPS
    SS1   13.6   169.1   189.7    CPS
    SS2    9.2   243.4   267.8    CPS
```

```
         HV SETTINGS
   HV LS  1408.9    V
   HV SS  1449.1    V


LDTC                 CALIPER CALIBRATION SUMMARY

            MEASURED                          CALIBRATED
          SMALL    LARGE                    SMALL       LARGE         UNITS
  CALI     6.76     11.0                     8.00        12.0           IN

SMALL: 04-OCT-87 21:48  LARGE: 04-OCT-87 21:49  COMP: 04-OCT-87 21:49
```

```
   CP 30.22            FILE    1       04-OCT-87 22:01
```

```
                 AFTER SURVEY TOOL CHECK SUMMARY


   PERFORMED:     05-OCT-87 12:32
   PROGRAM FILE: GTS    (VERSION    30.22   87/02/10  87/02/09)


 CNTH                     TOOL   CHECK

                        JIG
              BEFORE        AFTER
   NRAT       2.145         2.170

   POROSITY CHANGE  (LIME):    .004


 LDTC                     TOOL   CHECK

         DRS SONDE NUMBER                               :    3756
         NUCLEAR SERVICE CARTRIDGE NUMBER               :    1955
         POWERED DETECTOR HOUSING NUMBER                :    2942
         POWERED GAMMA-GAMMA DETECTOR NUMBER            :    2710
         LDT LOGGING SOURCE NUMBER                      :    7137
         LDT CALIBRATION MODE                           :    WATE
         MUD DENSITY                                    :    10.6000    LB/G

             BACKGROUND MEASURED
             BEFORE         AFTER          UNITS     TOLERANCE ON BEFORE-AFTER
     LL      18.532         18.39          CPS         +- 1.0
     LU      69.467         69.22          CPS         +- 1.0
     LS      53.275         53.01          CPS         +- 1.0
   LITH       5.304          5.19          CPS         +- 0.3
    SS1      13.565         13.53          CPS         +- 0.5
    SS2       9.196          9.18          CPS         +- 0.5

           HV SETTINGS
     HV LS  1401.0    V
     HV SS  1430.0    V
```

```
   CP 30.22            FILE   23       05-OCT-87 12:32
```

```
                SHOP SUMMARY


  PERFORMED:     28-SEP-87 15:27
  PROGRAM FILE: CCSHOP (VERSION    30.22   87/02/09  87/02/09)


LDTC                 DETECTOR CALIBRATION SUMMARY
```

```
        DRS SONDE NUMBER                          :     3756
        NUCLEAR SERVICE CARTRIDGE NUMBER          :     1955
        POWERED DETECTOR HOUSING NUMBER           :     2942
        POWERED GAMMA-GAMMA DETECTOR NUMBER       :     2710
        LDT LOGGING SOURCE NUMBER                 :     7137
        LDT CALIBRATION MODE                      :     WATE

          MASTER  CALIBRATED
          BKGD   AL+FE    AL   UNITS
     LL   18.6    86.3   96.7   CPS
     LU   69.4   131.5  147.5   CPS
     LS   53.3   152.1  170.4   CPS
   LITH    5.3    33.6   50.2   CPS
    SS1   13.5   169.1  189.7   CPS
    SS2    9.1   243.4  267.8   CPS

          HV SETTINGS
     HV LS : 1412.2  V
     HV SS : 1438.0  V

          SPECTRUM QUALITY RATIOS
    QRLS       .6552
    QRSS       .7084
    QRLI       .2945
    QLIR      1.3324
    QR         .9984
```

```
                   SHOP SUMMARY


    PERFORMED:     28-SEP-87 14:50
    PROGRAM FILE:  CCSHOP (VERSION    30.22   87/02/09  87/02/09)


  CNTH                 DETECTOR CALIBRATION SUMMARY

                  TANK                        JIG
           MEASURED  CALIBRATED      MEASURED   CALIBRATED

    NRAT    2.213       2.158          2.201       2.146

                          (CNC:1263, CNB:2124)
```

COMPANY	ARCO OIL AND GAS COMPANY			SCHL.	FR	2332.0 F
				SCHL.	TD	2336.0 F
				DRLR.	TD	2344.0 F
WELL	"COLUMBIA COUNTY" #31-34-65			Elev:	KB	912.5 F
FIELD	MIST GAS				DF	911.5 F
COUNTY	COLUMBIA	**STATE**	OREGON		GL	902.5 F

Schlumberger

SIMULTANEOUS

COMPENSATED NEUTRON-FORMATION DENSITY