Case No

7459

Large Exhibits

U.S.D.C.J. MICROGRAPHICS

BEST AVAILABLE COPY

Schlumberger

DUAL INDUCTION-SFL
WITH LINEAR CORRELATION LOG

COUNTY MCKINLEY, N.M.
FIELD CHACO WASH
LOCATION
WELL STATE #7
COMPANY RED MOUNTAIN ASSOC.

COMPANY RED MOUNTAIN ASSOCIATES
WELL STATE #7
FIELD CHACO WASH
COUNTY MCKINLEY STATE NEW MEXICO

LOCATION
Other Services: CNL/FDC

API SERIAL NO.	SEC.	TWP	RANGE
	28	20-N	9-W

Permanent Datum: G.L. ; Elev.: 6421
Log Measured From G.L. Ft. Above Perm. Datum
Drilling Measured From G.L.
Elev.: K.B.
D.F.
G.L. 6421

Date	8-28-80			
Run No.	ONE			
Depth—Driller	550			
Depth—Logger	553			
Btm. Log Interval	547			
Top Log Interval	22			
Casing—Driller	@	@	@	@
Casing—Logger				
Bit Size	6 1/4			
Type Fluid in Hole	F.G.M.			
Dens. | Visc.	8.7 | 27			
pH | Fluid Loss	8 | ml	ml	ml	ml
Source of Sample	MUD PIT			
Rm @ Meas. Temp.	.73 @ 80°F	@ °F	@ °F	@ °F
Rmf @ Meas. Temp.	.58 @ 80°F	@ °F	@ °F	@ °F
Rmc @ Meas. Temp.	.91 @ 80°F	@ °F	@ °F	@ °F
Source: Rmf | Rmc	M | M			
Rm @ BHT	@ °F	@ °F	@ °F	@ °F
TIME Circulation Stopped	1300			
TIME Logger on Bottom	±400			
Max. Rec. Temp.	°F	°F	°F	°F
Equip. | Location	8192 | FARM			
Recorded By	PRICE			
Witnessed By	BALKUS			

FOLD HERE

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

Run No.	ONE			
Service Order No.	120172			
Fluid Level	FULL			
Salinity ppm. Cl				
Speed F.P.M.	100			
EQUIPMENT DATA				
Panel No.	BC 547			
Cart No.	DA 223			
Sonde No.	EA 604			
Mem. Panel No.	1107			
G.R. Panel No.				
G.R. Cart No.				
Tape Recorder - (TTR)	2859			
Depth Encoder - (DRE)				
Pressure Wheel - (CPW)				
Type Centralizers				
Stand Off - Inches				
CALIBRATION DATA				
SBR	1.0			
Sonde Error - ILM	6.4			
Sonde Error - ILD	6.7			
G.R. BKG. - CPS.				
G.R. Source - CPS.				
S.E. Set In Hole - Depth				
S.E. Corr. - Hole Size				
LOGGING DATA				
SBR	1.0			
S.E. Log - ILM	6.4			
S.E. Log - ILD	6.7			
G.R. Scale per 100 Div.				
G.R. - T.C.				
G.R. Sens.				

SCALE CHANGES

Type Log	Depth	Scale Up Hole	Scale Down Hole

REMARKS

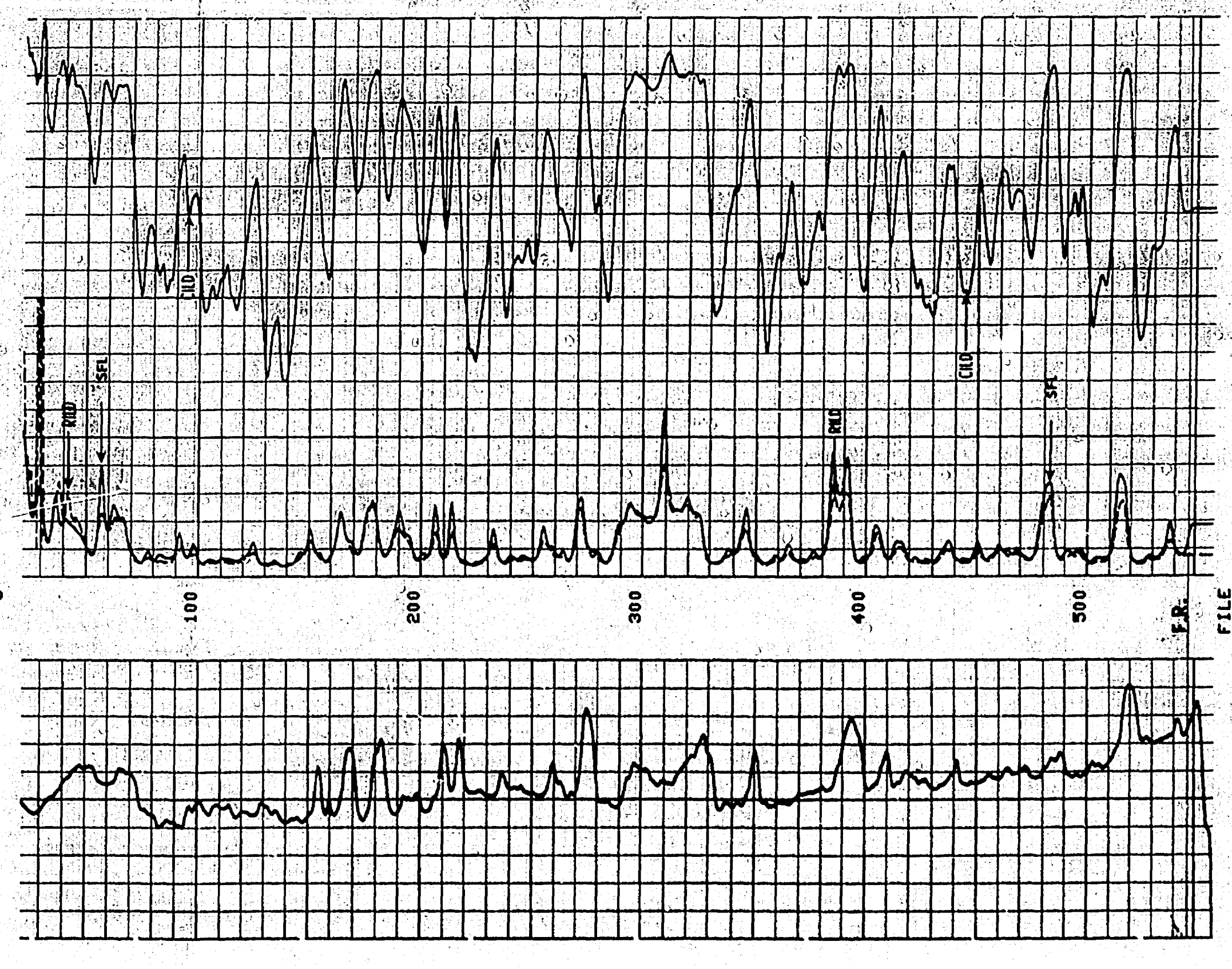
All interpretations are opinions based on inferences from electrical or other measurements and we cannot, and do not guarantee the accuracy or correctness of any interpretations, and we shall not, except in the case of gross or willful negligence on our part, be liable or responsible for any loss, costs, 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 our General Terms and Conditions as set out in our current Price Schedule.

PARAMETERS

NAME	UNIT	VALUE	NAME	UNIT	VALUE	NAME	UNIT	VALUE
SBR	OHMM	1.000	DSEC	MM/M	6.700	BS	INCH	6.250
FPHI		PHIX	MSEC	MM/M	6.400			
DO		0.0	BHS		OPEN			

SP (MV) -80.00 20.00
ILD (OHMM) 0.0 100.0
SFLA(OHMM) 0.0 100.0
CILD(MM/M) 400.0 0.0

FILE 5

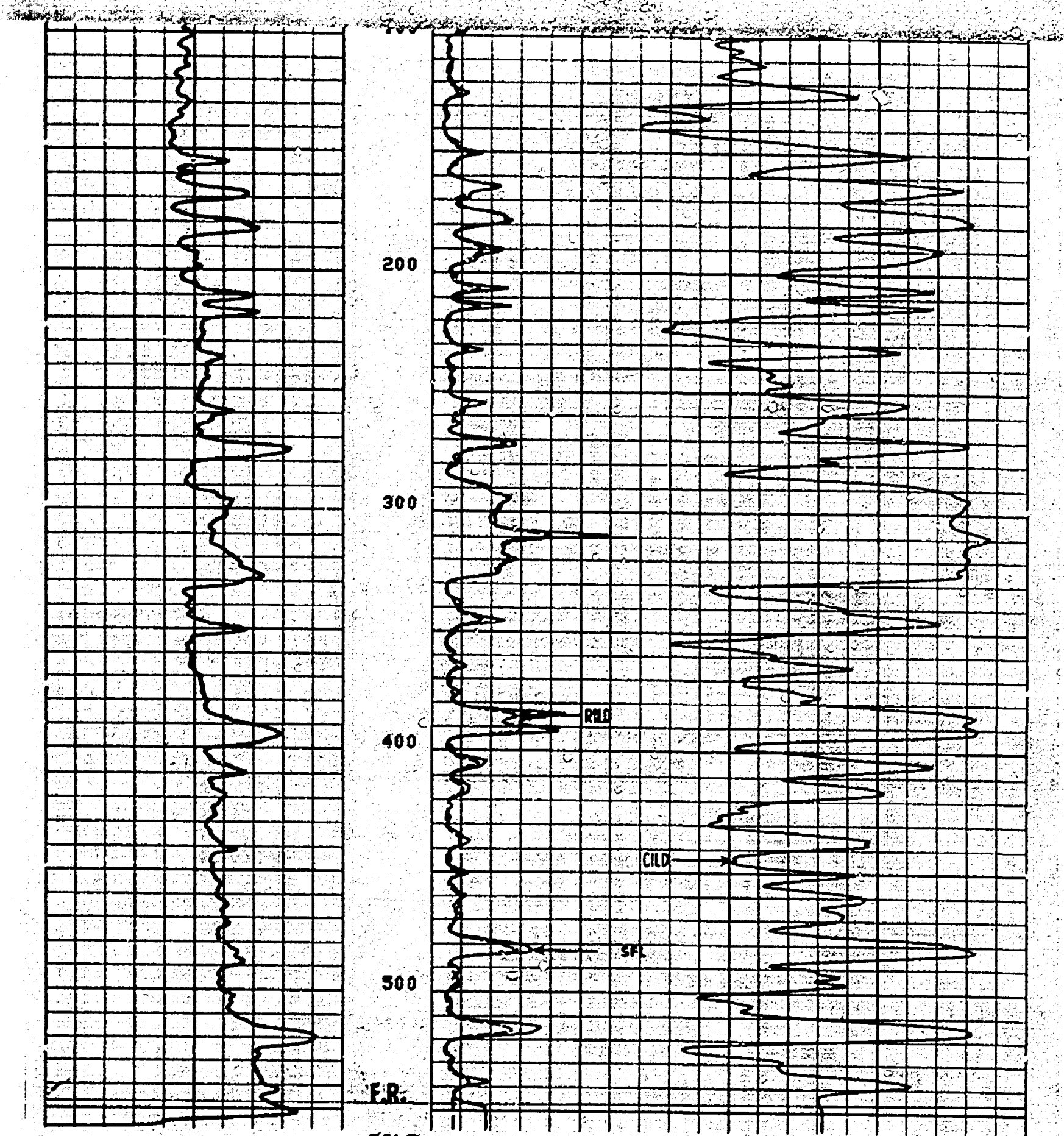


FILE 5

SP (MV) -80.00 20.00
ILD (OHMM) 0.0 100.0
SFLA(OHMM) 0.0 100.0
CILD(MM/M) 400.0 0.0

PARAMETERS

NAME	UNIT	VALUE	NAME	UNIT	VALUE	NAME	UNIT	VALUE
SBR	OHMM	1.000	DSEC	MM/M	6.700	BS	INCH	6.250



FILE
5

SP (MV) -80.00 20.00

ILD (OHMM) 0.0 100.0

SFLA(OHMM) 0.0 100.0

CILD(MM/M) 400.0 0.0

PARAMETERS

NAME	UNIT	VALUE	NAME	UNIT	VALUE	NAME	UNIT	VALUE
SBR	OHMM	1.000	DSEC	MM/M	6.700	BS	INCH	6.250
FPHI		PHIX	MSEC	MM/M	6.400			
DO		0.0	BHS		OPEN			

PARAMETERS

NAME	UNIT	VALUE	NAME	UNIT	VALUE	NAME	UNIT	VALUE
SBR	OHMM	1.000	DSEC	MM/M	6.700	BS	INCH	6.250
FPHI		PHIX	MSEC	MM/M	6.400			
DO		0.0	BHS		OPEN			

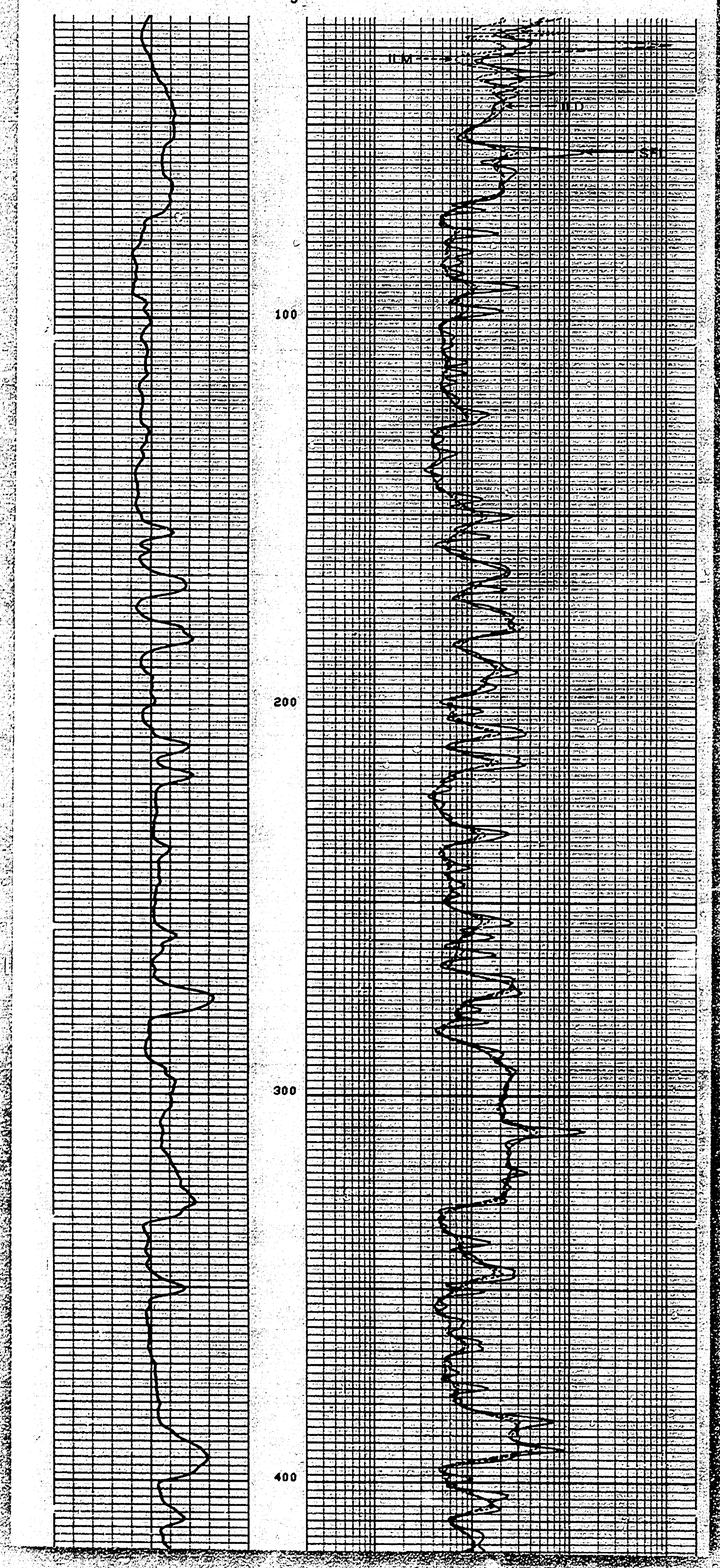
ILD (OHMM) 0.2000 2000.

ILM (OHMM) 0.2000 2000.

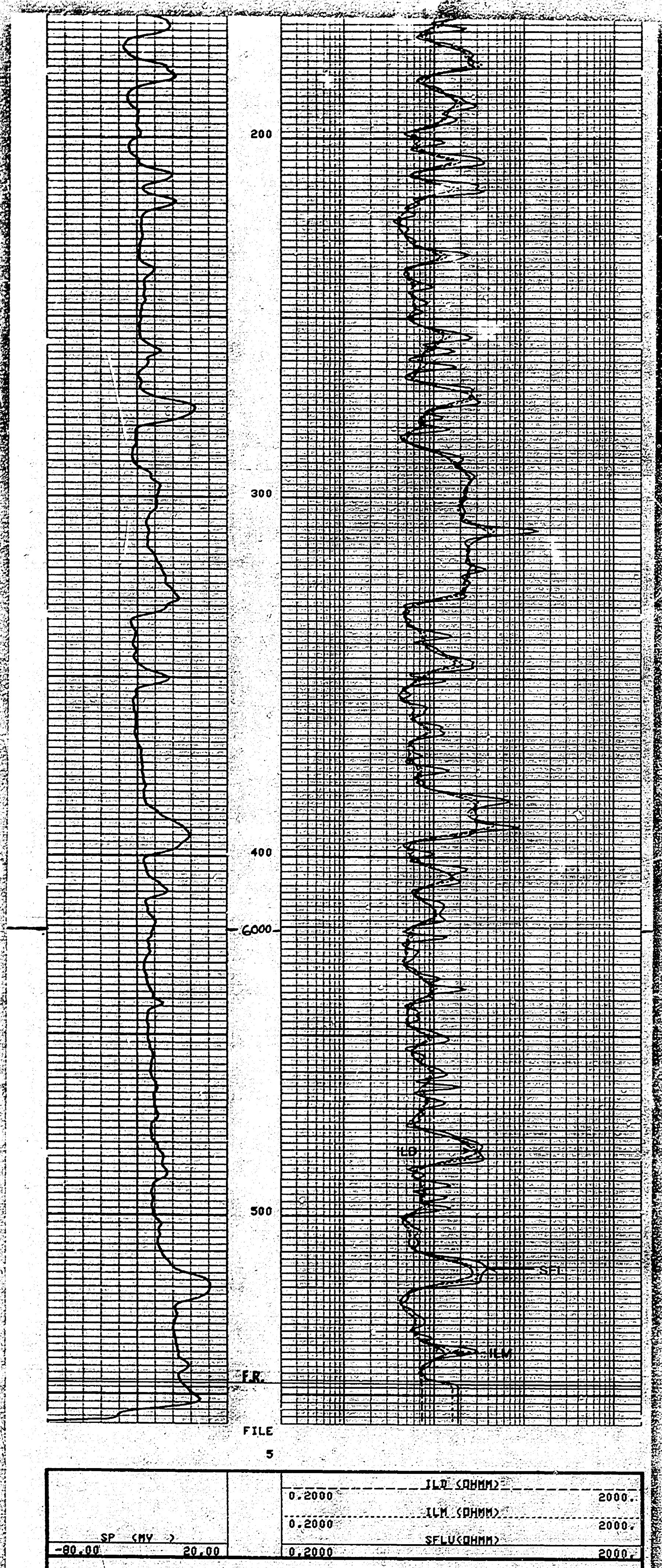
SFLU(OHMM) 0.2000 2000.

SP (MV) -8?.00 20.00

FILE
5



V.R.R.C.T. MICROGRAPHICS
BEST AVAILABLE COPY

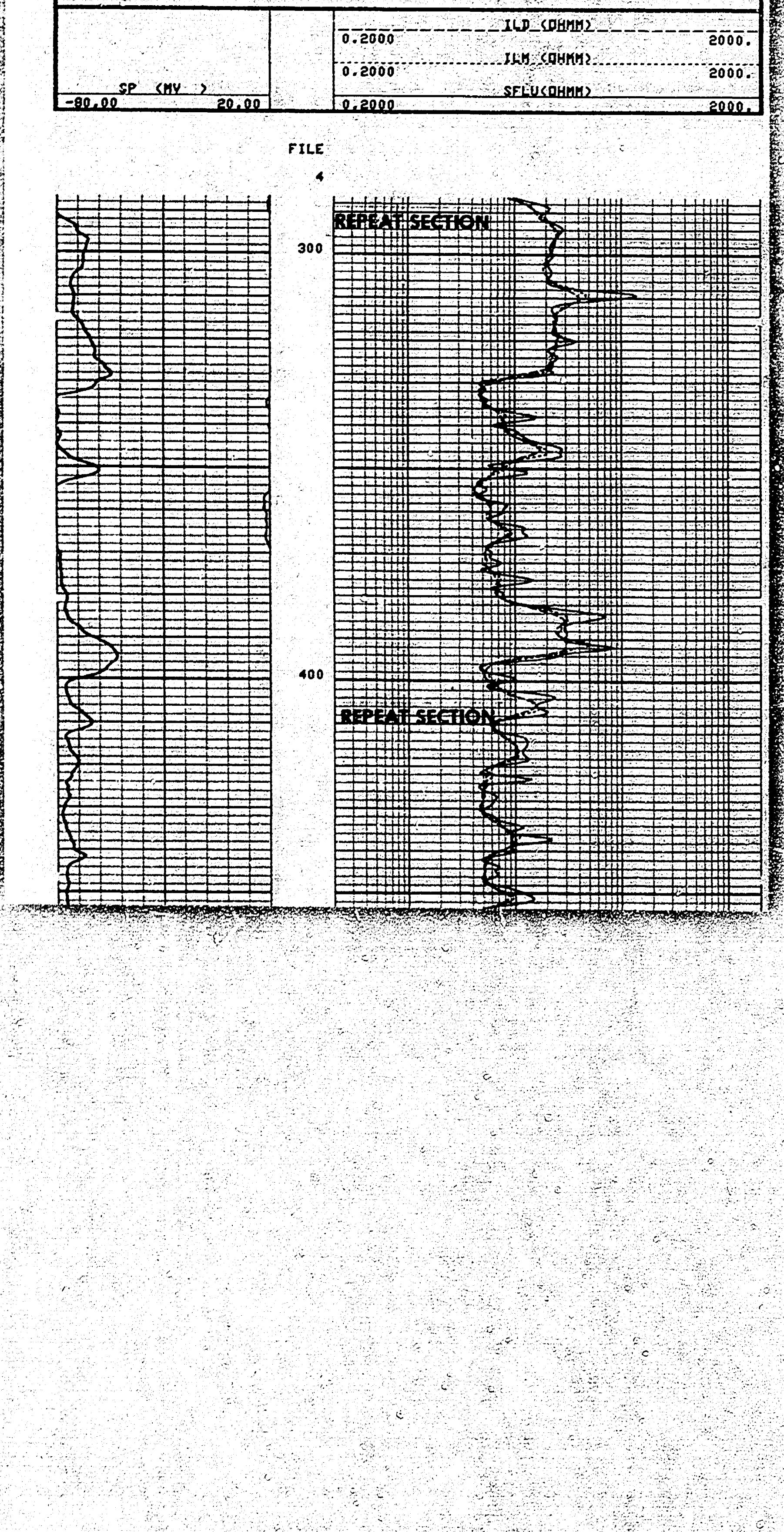


PARAMETERS

NAME	UNIT	VALUE	NAME	UNIT	VALUE	NAME	UNIT	VALUE
SBR	OHMM	1.000	DSEC	MM/M	6.700	BS	INCH	6.250
FPHI		PHIX	MSEC	MM/M	6.400			
DD		0.0	BHS		OPEN			

PARAMETERS

NAME	UNIT	VALUE	NAME	UNIT	VALUE	NAME	UNIT	VALUE
SBR	OHMM	1.000	DSEC	MM/M	6.700	BS	INCH	6.250
FPHI		PHIX	MSEC	MM/M	6.400			
DD		0.0	BHS		OPEN			



```
                          PARAMETERS

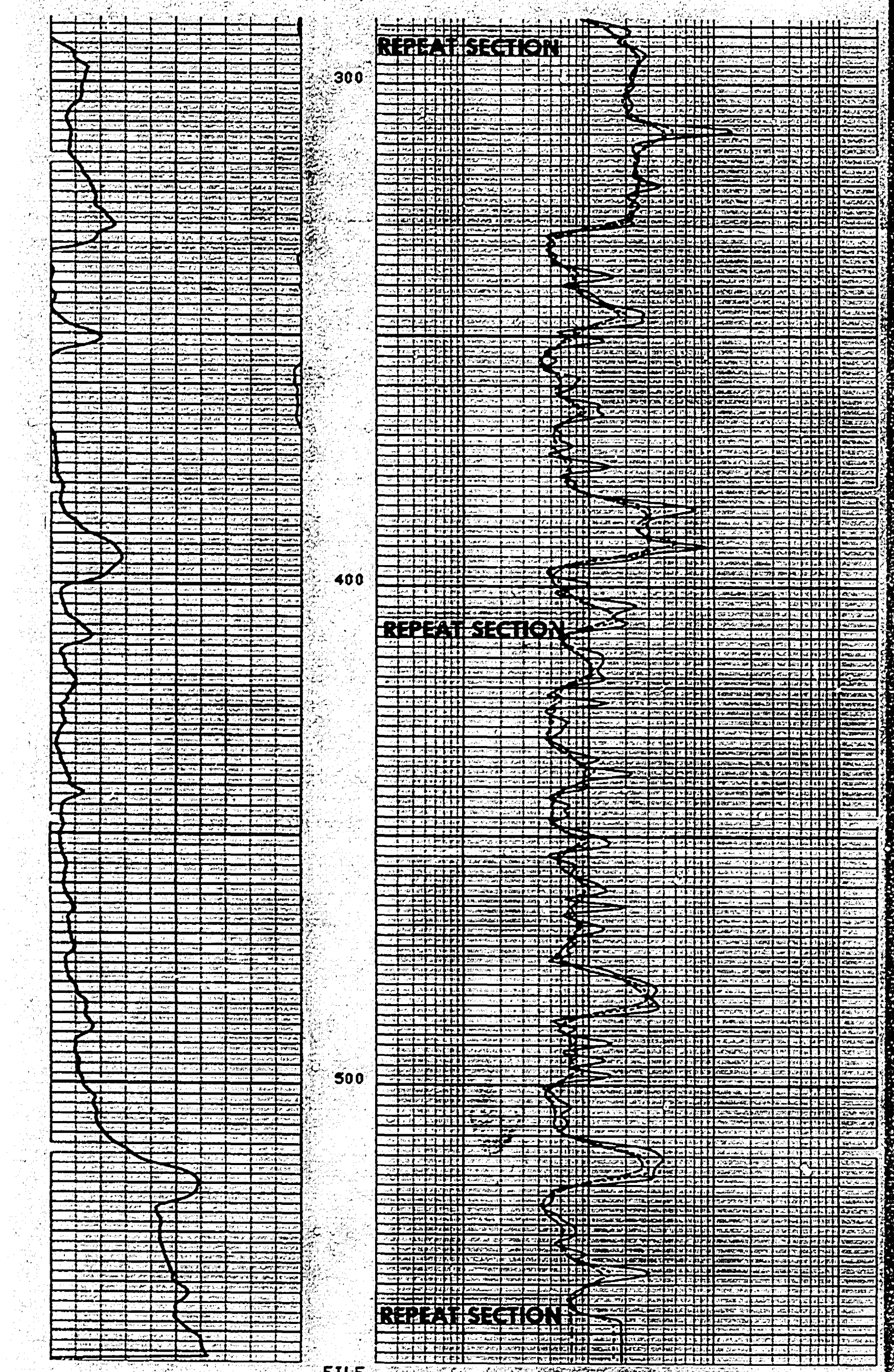
 NAME  UNIT  VALUE       NAME  UNIT  VALUE       NAME  UNIT  VALUE

 SBR   OHMM  1.000       DSEC  MM/M  6.700       BS    INCH  6.250
 FPHI        PHIX        MSEC  MM/M  6.400
 DO          0.0         BHS         OPEN
```

```
                          ---------------ILD (OHMM)---------------
                          0.2000                              2000.
                          ...............ILM (OHMM)...............
      SP  (MV  )          0.2000                              2000.
                                         SFLU(OHMM)
-80.00          20.00     0.2000                              2000.
```

FILE

4



FILE

4

```
                          ---------------ILD (OHMM)---------------
                          0.2000                              2000.
                          ...............ILM (OHMM)...............
      SP  (MV  )          0.2000                              2000.
                                         SFLU(OHMM)
-80.00          20.00     0.2000                              2000.
```

```
                          PARAMETERS

 NAME  UNIT  VALUE       NAME  UNIT  VALUE       NAME  UNIT  VALUE

 SBR   OHMM  1.000       DSEC  MM/M  6.700       BS    INCH  6.250
 FPHI        PHIX        MSEC  MM/M  6.400
 DO          0.0         BHS         OPEN
```

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              BEFORE SURVEY CALIBRATION SUMMARY

   PERFORMED:     80/08/28
   PROGRAM FILE: IGR    (VERSION    [illegible]

 DITD               ELECTRONICS CALIBRATION SUMMARY

            MEASURED                      CALIBRATED
          ZERO    PLUS                  ZERO     PLUS        UNITS
    ILD    4.8    861.3                  0.0     499.8       MM/M
    ILM    5.9    771.3                  0.0     499.9       MM/M
    SFL    0.0    708.0                  0.0     499.9       MM/M

 ILM  SONDE ERROR CORRECTION :        6.4   MM/M
 ILD  SONDE ERROR CORRECTION :        6.7   MM/M
                          FILE
                 SHOP SUMMARY

   PERFORMED:     80/07/26
   PROGRAM FILE: SHOP   (VERSION    18.2    80/ 4/29)

 DITD               ELECTRONICS CALIBRATION SUMMARY

              ELECTRONICS CALIBRATION          SONDE
            MEASURED         CALIBRATED        ERROR
          ZERO    PLUS     ZERO      PLUS      CORR.     TEST      UNITS
                                                         LOOP
    ILD    4.8    860.5     0.0      499.8     6.71      495.9     MM/M
    ILM    5.9    771.3     0.0      500.0     6.42      493.9     MM/M

                       (IS:604   , IC:223   )
-------------------------------------------------------------------------
                AFTER SURVEY TOOL CHECK SUMMARY

   PERFORMED:     80/08/28
   PROGRAM FILE: IGR    (VERSION    18.2    80/07/02)

 DITD                       TOOL  CHECK

                    ZERO                     PLUS
            BEFORE         AFTER       BEFORE     AFTER     UNITS
    ILD       0.0          -0.0        499.8      500.7     MM/M.
    ILM       0.0           0.0        499.9      500.3     MM/M
    SFL       0.0           0.0        499.9      501.4     MM/M

 ILM  SONDE ERROR CORRECTION :        6.4   MM/M
 ILD  SONDE ERROR CORRECTION :        6.7   MM/M
                          FILE
                           7
```

COMPANY	RED MOUNTAIN ASSOCIATES	SCHL. FR	547
WELL	STATE #7	SCHL. TD	553
FIELD	CHACO WASH	DRLR. TD	550
COUNTY	MCKINLEY	Elev: KB	
STATE	NEW MEXICO	DF	
		GL	6421

V.R.R.C.F. MICROGRAPHICS
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Schlumberger

DUAL INDUCTION-SFL
WITH LINEAR CORRELATION LOG

COUNTY MCKINLEY
FIELD CHACO WASH
LOCATION
WELL STATE #9
COMPANY RED MOUNTAIN ASSOC.

COMPANY RED MOUNTAIN ASSOCIATES

WELL STATE #9

FIELD CHACO WASH

COUNTY MCKINLEY STATE NEW MEXICO

LOCATION

API SERIAL NO.	SEC.	TWP	RANGE
	28	20-N	9-W

Other Services:
CNL/FDC

Permanent Datum: G.L. ; Elev. 6421
Log Measured From G.L. Ft. Above Perm. Datum
Drilling Measured From G.L.

Elev.: K.B. 6424
D.F. 6424
G.L. 6421

Date	8-24-80			
Run No.	ONE			
Depth—Driller	536			
Depth—Logger	534			
Btm. Log Interval	528			
Top Log Interval	27			
Casing—Driller	@	@	@	@
Casing—Logger				
Bit Size	6 3/4			
Type Fluid in Hole	FGM			
Dens. | Visc.	8.9 | 52			
pH | Fluid Loss	8.0 | 6.4 ml	ml	ml	ml
Source of Sample	MUD PIT			
Rm @ Meas. Temp.	2.39 @82 °F	@ °F	@ °F	@ °F
Rmf @ Meas. Temp.	2.16 @82 °F	@ °F	@ °F	@ °F
Rmc @ Meas. Temp.	3.57 @82 °F	@ °F	@ °F	@ °F
Source: Rmf | Rmc	M | C			
Rm @ BHT	@ °F	@ °F	@ °F	@ °F
TIME Circulation Stopped				
TIME Logger on Bottom	1130			
Max. Rec. Temp.	°F	°F	°F	°F
Equip. | Location	8171 | FARM			
Recorded By	THORN			
Witnessed By	BALKUS			

FOLD HERE

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

Run No.	ONE			
Service Order No.	112618			
Fluid Level	FULL			
Salinity ppm. Cl				
Speed F.P.M.	60			
EQUIPMENT DATA				
Panel No.	358			
Cart No.	249			
Sonde No.	296			
Mem. Panel No.	CSU			
G.R. Panel No.				
G.R. Cart No.				
Tape Recorder - (TTR)	CSU			
Depth Encoder - (DRE)	CSU			
Pressure Wheel - (CPW)	CSU			
Type Centralizers				
Stand Off - Inches				
CALIBRATION DATA				
SBR	SEE CAL			
Sonde Error - ILM	FILM			
Sonde Error - ILD				
G.R. BKG. - CPS.				
G.R. Source - CPS.				
S.E. Set In Hole - Depth				
S.E. Corr. - Hole Size				
LOGGING DATA				
SBR				
S.E. Log - ILM				
S.E. Log - ILD				
G.R. Scale per 100 Div.				
G.R. - T.C.				
G.R. Sens.				

SCALE CHANGES

Type Log	Depth	Scale Up Hole	Scale Down Hole

REMARKS

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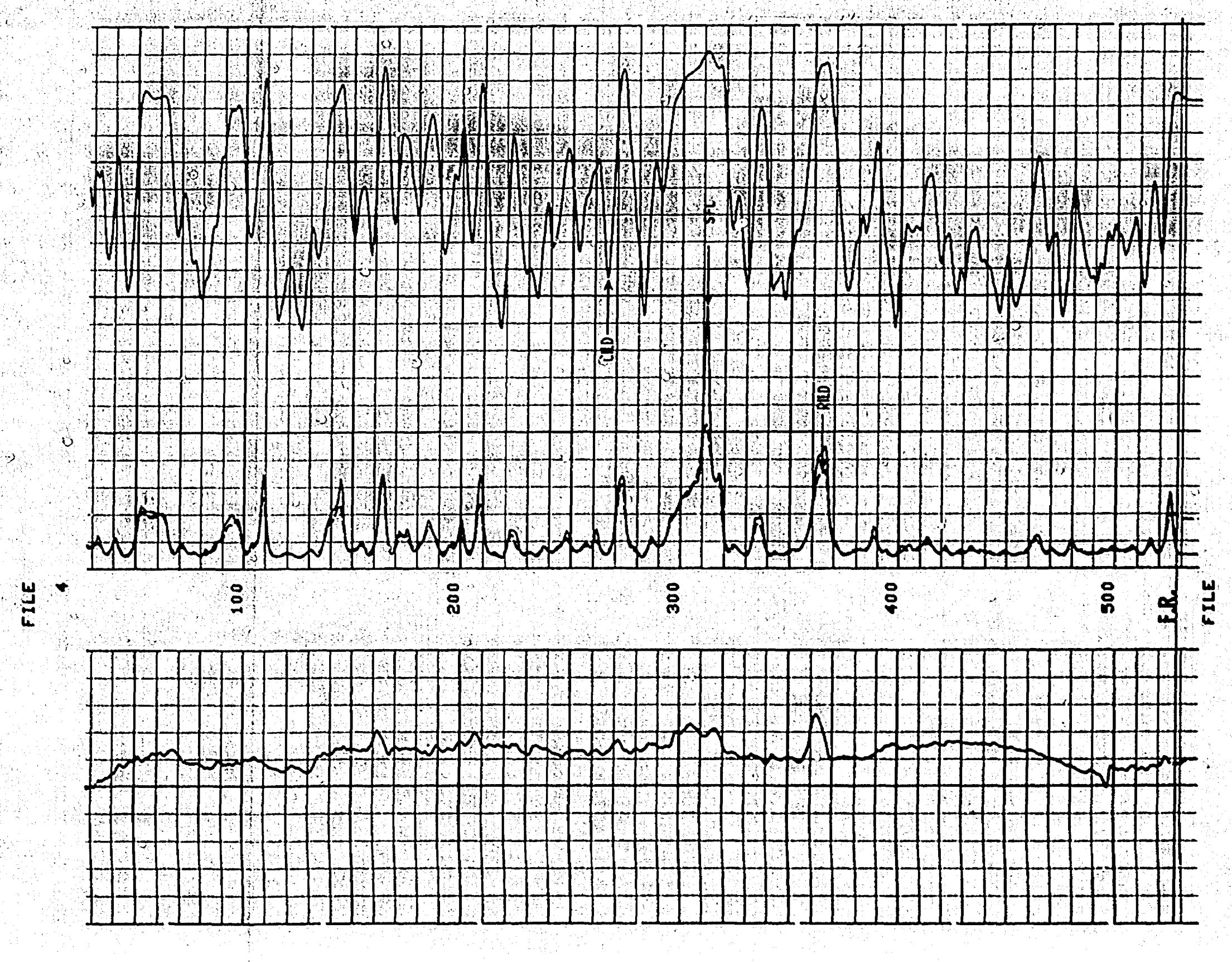
PARAMETERS

NAME	UNIT	VALUE	NAME	UNIT	VALUE	NAME	UNIT	VALUE
SBR	OHMM	1.000	DSEC	MM/M	4.390	BS	INCH	6.750
FPHI		PHIX	MSEC	MM/M	2.340			
DD		0.0	BHS		OPEN			

SP (MV) -100.0 0.0

ILD (OHMM) 0.0 100.0
SFLA(OHMM) 0.0 100.0
CILD(MM/M) 400.0 0.0



SP (MV) -100.0 0.0

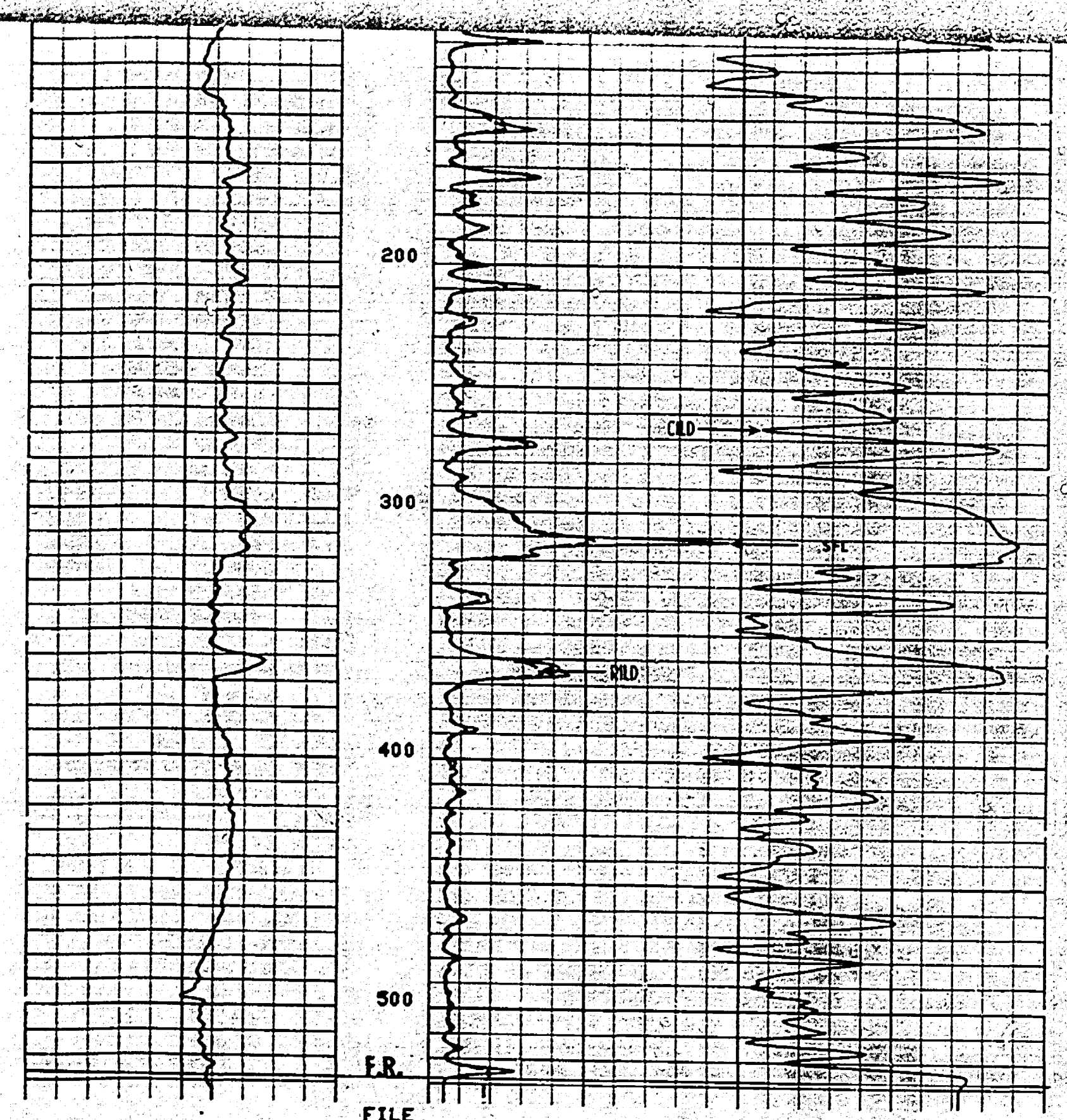
ILD (OHMM) 0.0 100.0
SFLA(OHMM) 0.0 100.0
CILD(MM/M) 400.0 0.0

PARAMETERS

NAME	UNIT	VALUE	NAME	UNIT	VALUE	NAME	UNIT	VALUE
SBR	OHMM	1.000	DSEC	MM/M	4.390	BS	INCH	6.250
FPHI		PHIX	MSEC	MM/M	2.340			
DD		0.0	BHS		OPEN			

W.R.R.C.F. MICROGRAPHICS

BEST AVAILABLE COPY



FILE
4

SP (MV) -100.0 0.0

ILD (OHMM) 0.0 100.0
SFLA(OHMM) 0.0 100.0
CILD(MM/M) 400.0 0.0

PARAMETERS

NAME	UNIT	VALUE	NAME	UNIT	VALUE	NAME	UNIT	VALUE
SBR	OHMM	1.000	DSEC	MM/M	4.390	BS	INCH	6.250
FPHI		PHIX	MSEC	MM/M	2.340			
DO		0.0	BHS		OPEN			

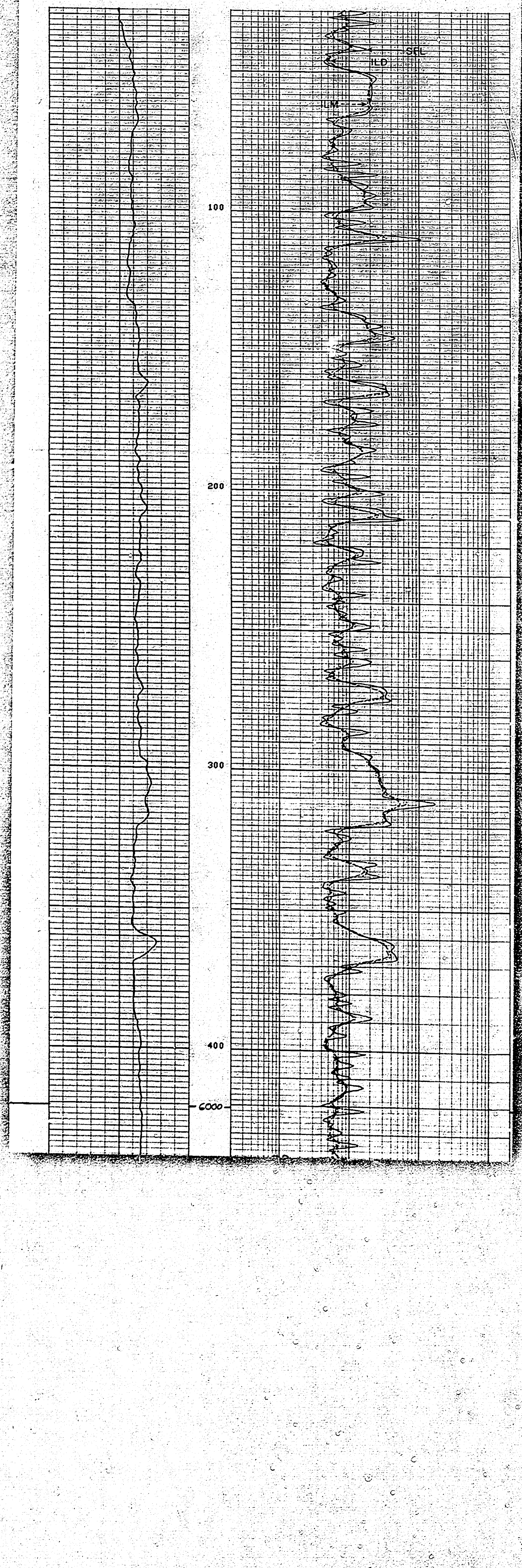
PARAMETERS

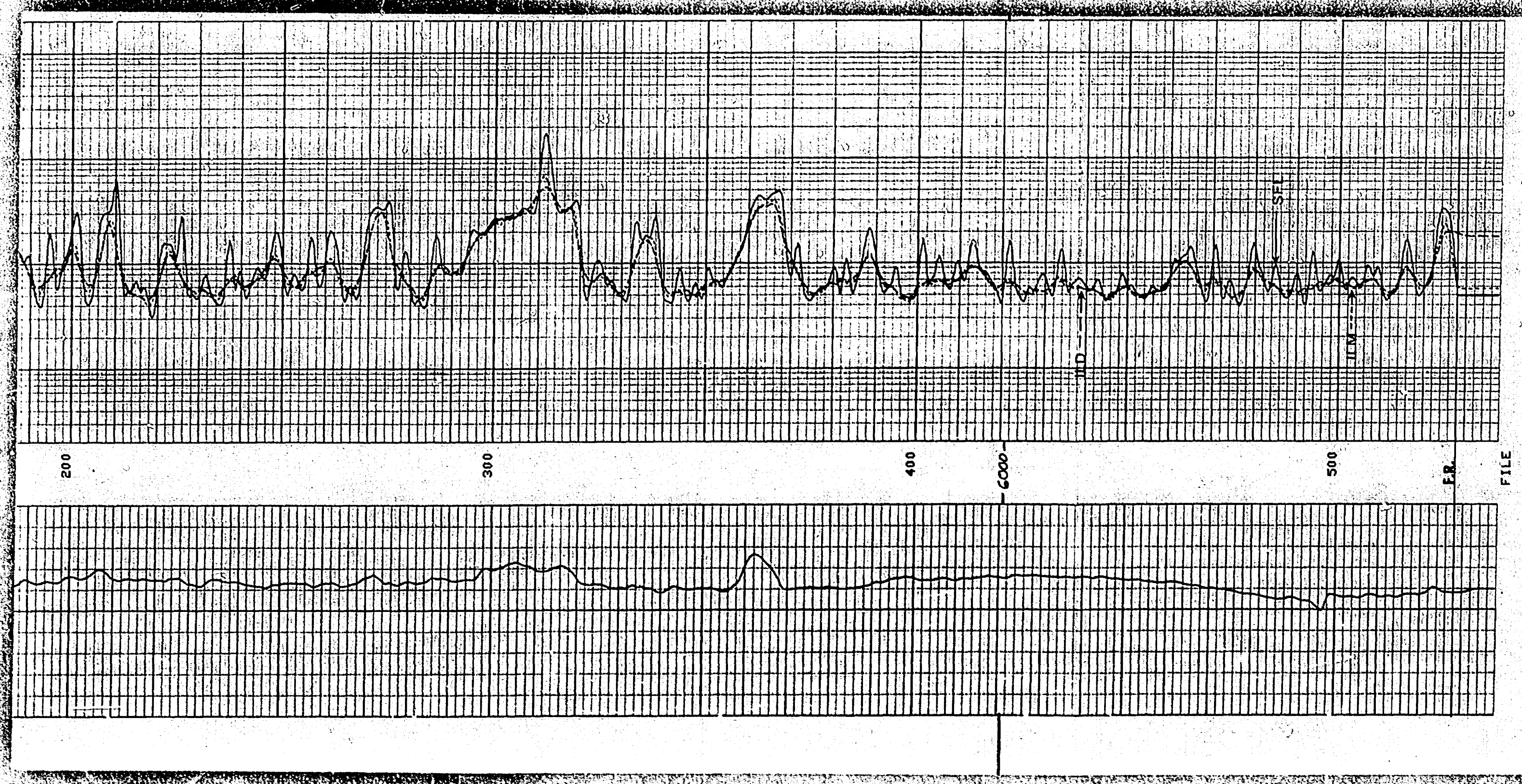
NAME	UNIT	VALUE	NAME	UNIT	VALUE	NAME	UNIT	VALUE
SBR	OHMM	1.000	DSEC	MM/M	4.390	BS	INCH	6.750
FPHI		PHIX	MSEC	MM/M	2.340			
DO		0.0	BHS		OPEN			

SP (MV) -100.0 0.0

ILD (OHMM) 0.2000 2000.
ILM (OHMM) 0.2000 2000.
SFLU(OHMM) 0.2000 2000.

FILE
4





FILE 4

ILD (OHMM) 0.2000 — 2000.
ILM (OHMM) 0.2000 — 2000.
SFLU(OHMM) 0.2000 — 2000.
SP (MV) -100.0 — 0.0

PARAMETERS

NAME	UNIT	VALUE	NAME	UNIT	VALUE	NAME	UNIT	VALUE
SBR	OHMM	1.000	DSEC	MM/M	4.390	BS	INCH	6.250
FPHI		PHIX	MSEC	MM/M	2.340			
DO		0.0	BHS		OPEN			

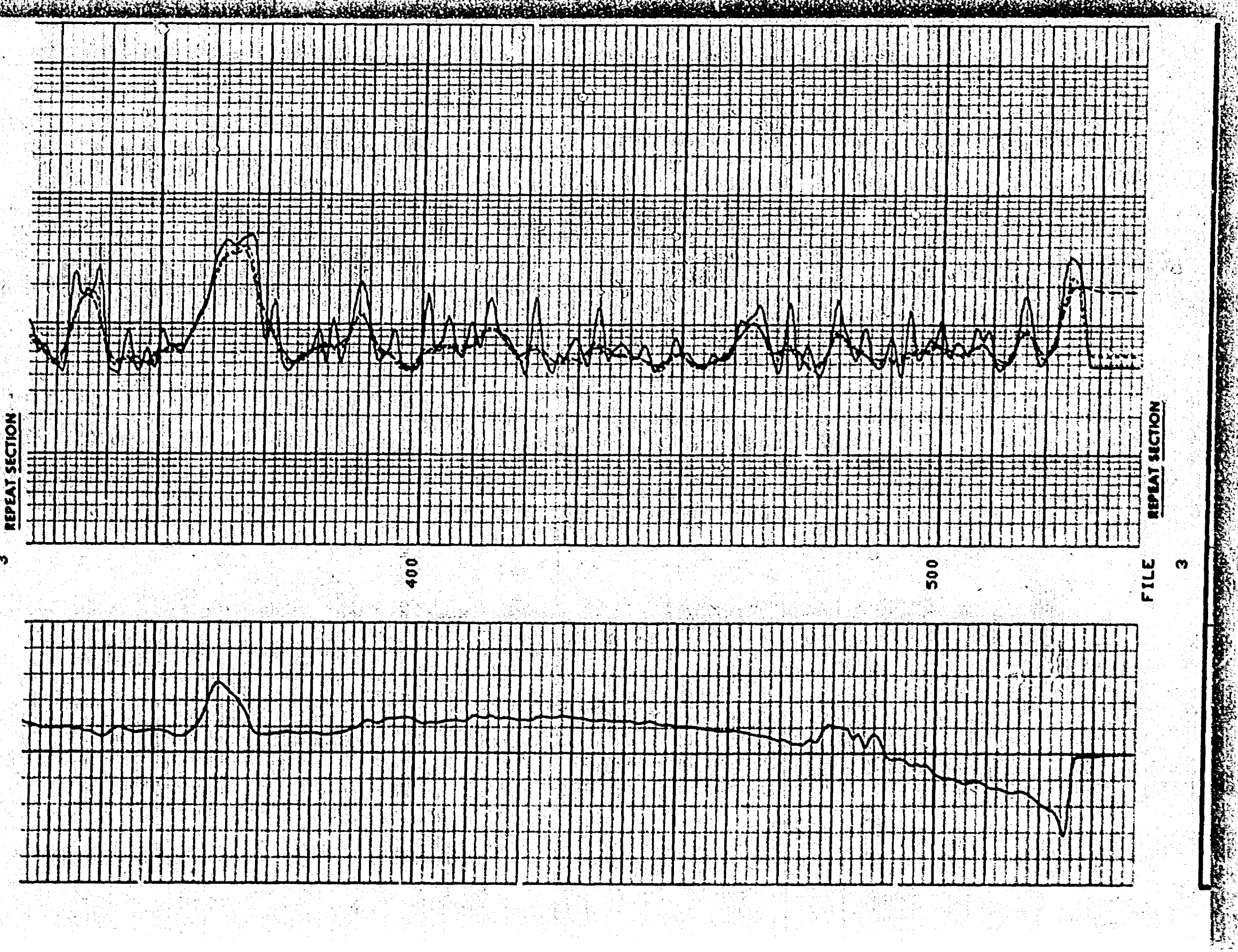
PARAMETERS

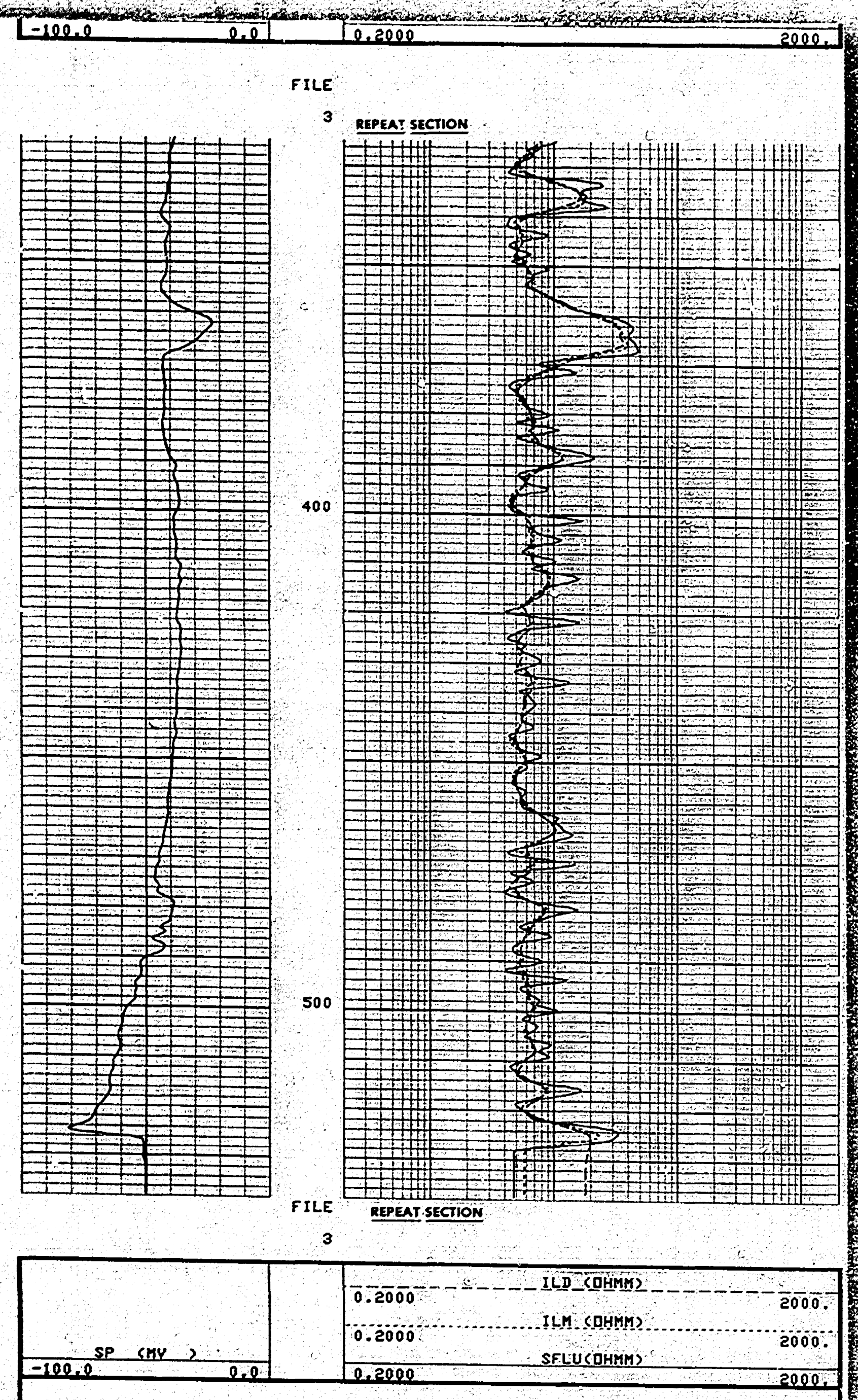
NAME	UNIT	VALUE	NAME	UNIT	VALUE	NAME	UNIT	VALUE
SBR	OHMM	1.000	DSEC	MM/M	4.390	BS	INCH	6.250
FPHI		PHIX	MSEC	MM/M	2.340			
DO		0.0	BHS		OPEN			

ILD (OHMM) 0.2000 — 2000.
ILM (OHMM) 0.2000 — 2000.
SFLU(OHMM) 0.2000 — 2000.
SP (MV) -100.0 — 0.0

FILE 3

REPEAT SECTION





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                          PARAMETERS
 NAME  UNIT  VALUE      NAME  UNIT  VALUE      NAME  UNIT  VALUE


 SBR   OHMM  1.000      DSEC  MM/M  4.390      BS    INCH  6.250
 FPHI        PHIX       MSEC  MM/M  2.340
 DO          0.0        BHS         OPEN
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               BEFORE SURVEY CALIBRATION SUMMARY

  PERFORMED:     80/08/24
  PROGRAM FILE: IDN    (VERSION    18.2    80/07/02)

 DITD               ELECTRONICS CALIBRATION SUMMARY

                MEASURED                     CALIBRATED
              ZERO   PLUS                  ZERO      PLUS         UNITS
      ILD     3.5    595.7                 0.0       499.8         MM/M
      ILM     3.7    562.4                 0.0       499.9         MM/M
      SFL     0.1    521.5                 0.0       499.9         MM/M

 ILM  SONDE ERROR CORRECTION :         2.3    MM/M
 ILD  SONDE ERROR CORRECTION :         4.3    MM/M
                          FILE

                            2
                SHOP SUMMARY

  PERFORMED:     80/07/31
  PROGRAM FILE: SHOP   (VERSION    18.2    80/ 4/29)

 DITD               ELECTRONICS CALIBRATION SUMMARY

                 ELECTRONICS CALIBRATION          SONDE
               MEASURED        CALIBRATED          ERROR     TEST
             ZERO    PLUS     ZERO      PLUS       CORR.     LOOP      UNITS
      ILD     3.6    590.6     0.0      499.8      4.39      495.6     MM/M
      ILM     3.6    556.5     0.0      499.9      2.34      500.4     MM/M

                        (IS:296  , IC:249  )
               AFTER SURVEY TOOL CHECK SUMMARY

  PERFORMED:     80/08/24
  PROGRAM FILE: IDN    (VERSION    18.2    80/07/02)

 DITD                       TOOL  CHECK

                        ZERO                         PLUS
               BEFORE        AFTER           BEFORE       AFTER      UNITS
      ILD        0.0           0.0           499.8        500.1      MM/M
      ILM        0.0          -0.0           499.9        501.0      MM/M
      SFL        0.0           0.0           499.9        501.8      MM/M

 ILM  SONDE ERROR CORRECTION :         2.3    MM/M
 ILD  SONDE ERROR CORRECTION :         4.3    MM/M
                          FILE

                            6
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COMPANY RED MOUNTAIN ASSOCIATES
WELL STATE #9
FIELD CHACO WASH
COUNTY MCKINLEY STATE NEW MEXICO

SCHL. FR 528
SCHL. TD 534
DRLR. TD 536
Elev: KB 6424
DF 6424
GL 6421

Schlumberger

DUAL INDUCTION-SFL
WITH LINEAR CORRELATION LOG

COUNTY MCKINLEY, N.M.
FIELD CHACO WASH
LOCATION
WELL STATE WELL #11
COMPANY RED MOUNTAIN ASSOC.

COMPANY RED MOUNTAIN ASSOCIATES

WELL STATE WELL #11

FIELD CHACO WASH

COUNTY MCKINLEY STATE NEW MEXICO

LOCATION 330' FNL 660' FEL

Other Services: CNL-FDC

API SERIAL NO	SEC.	TWP	RANGE
	28	20-N	9-W

Permanent Datum: G.L. ; Elev.: 6415
Log Measured From G.L. Ft. Above Perm. Datum
Drilling Measured From G.L.

Elev.: K.B.
D.F.
G.L. 6415

Date	9-4-80			
Run No.	ONE			
Depth—Driller	564			
Depth—Logger	566'			
Btm. Log Interval	560			
Top Log Interval	24			
Casing—Driller	- @	@	@	@
Casing—Logger	-			
Bit Size	6.25			
Type Fluid in Hole	FGM			
Dens. | Visc.	9.0 | 40			
pH | Fluid Loss	8 | 6.4 ml	ml	ml	ml
Source of Sample	MUD PIT			
Rm @ Meas. Temp.	2.07 @ 84 °F	@ °F	@ °F	@ °F
Rmf @ Meas. Temp.	1.62 @ 84 °F	@ °F	@ °F	@ °F
Rmc @ Meas. Temp.	- @ °F	@ °F	@ °F	@ °F
Source: Rmf | Rmc	M			
Rm @ BHT	- @ °F	@ °F	@ °F	@ °F
TIME Circulation Stopped	1830			
TIME Logger on Bottom	2200			
Max. Rec. Temp.	- °F	°F	°F	°F
Equip. | Location	8174 | FARM			
Recorded By	HARNESS			
Witnessed By	SINCLAIR			

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

Run No.	ONE			
Service Order No.	112564			
Fluid Level	FULL			
Salinity ppm. cl	-			
Speed F.P.M.	100			
EQUIPMENT DATA				
Panel No.	358			
Cart No.	249			
Sonde No.	296			
Mem. Panel No.	589			
G.R. Panel No.	-			
G.R. Cart No.	-			
Tape Recorder - (TTR)	2132			
Depth Encoder - (DRE)	IDW			
Pressure Wheel - (CPW)	IDW			
Type Centralizers				
Stand Off - Inches				
CALIBRATION DATA				
SBR	1			
Sonde Error - ILM	2.34			
Sonde Error - ILD	4.39			
G.R. BKG. - CPS.	-			
G.R. Source - CPS.	-			
S.E. Set In Hole - Depth	-			
S.E. Corr. - Hole Size	-			
LOGGING DATA				
SBR	1			
S.E. Log - ILM	2.34			
S.E. Log - ILD	4.39			
G.R. Scale per 100 Div.				
G.R. - T.C.				
G.R. Sens.				

SCALE CHANGES			
Type Log	Depth	Scale Up Hole	Scale Down Hole

REMARKS

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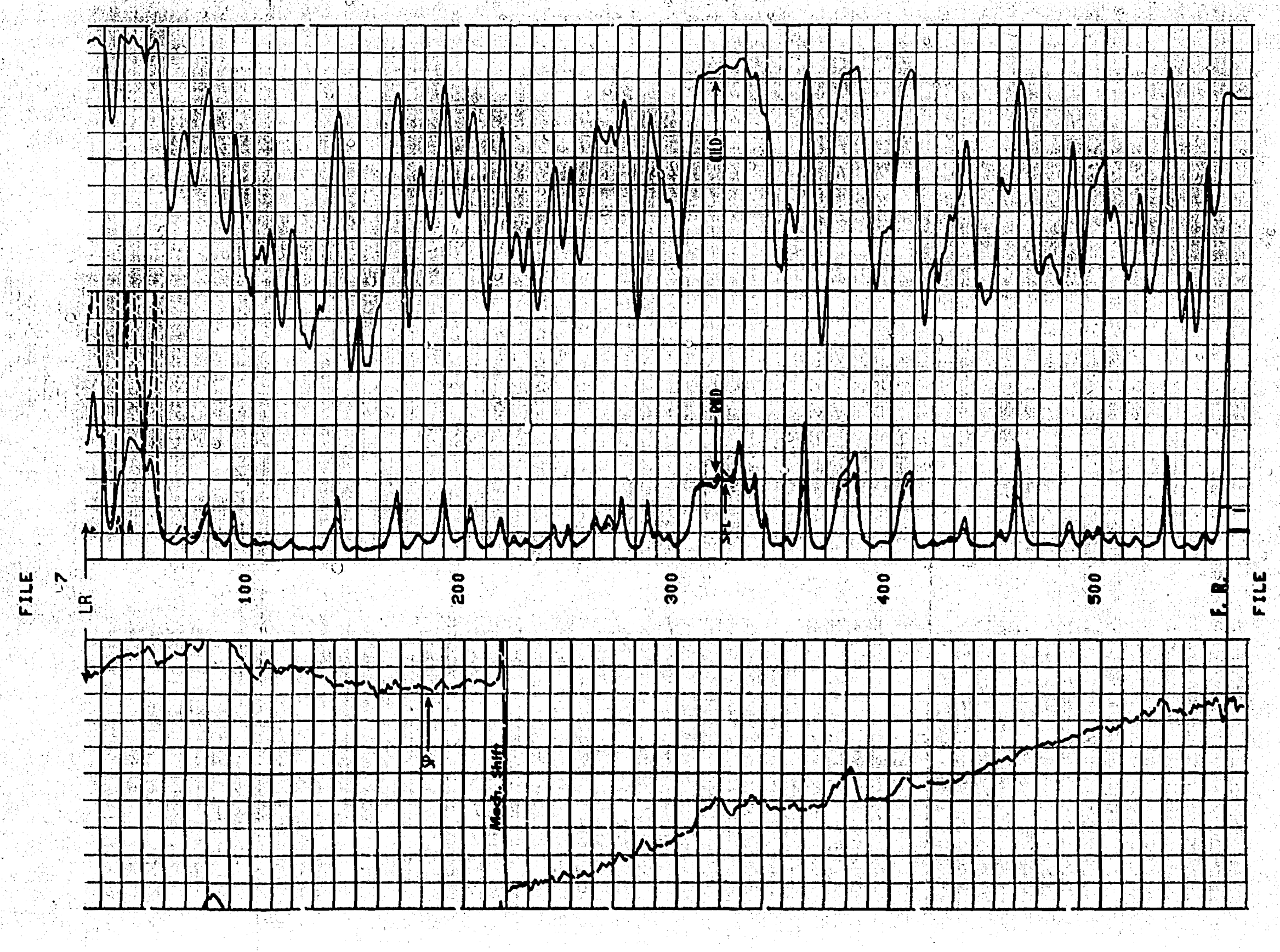
PARAMETERS

NAME	UNIT	VALUE	NAME	UNIT	VALUE	NAME	UNIT	VALUE
SBR	OHMM	1.000	DSEC	MM/M	4.390	BS	INCH	6.250
FPHI		PHIX	MSEC	MM/M	2.340			
DO		0.0	BHS		OPEN			

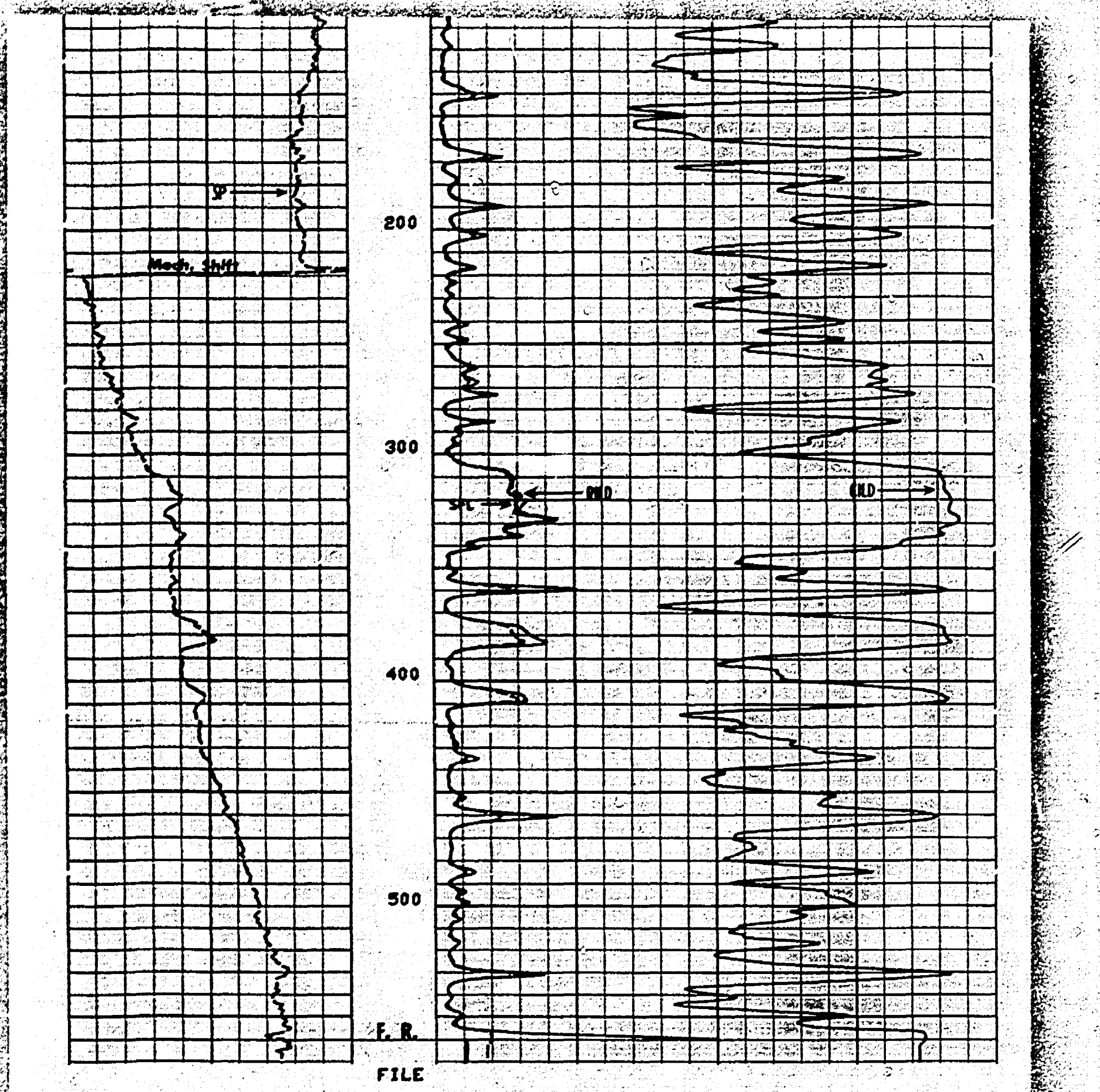
SP (MV) -100.0 0.0
ILD (OHMM) 0.0 100.0
SFLA(OHMM) 0.0 100.0
CILD(MM/M) 400.0 0.0



SP (MV) -100.0 0.0
ILD (OHMM) 0.0 100.0
SFLA(OHMM) 0.0 100.0
CILD(MM/M) 400.0 0.0

PARAMETERS

NAME	UNIT	VALUE	NAME	UNIT	VALUE	NAME	UNIT	VALUE



FILE

7

SP (MV)		ILD (OHMM)	
-100.0 0.0		0.0 100.0	
		SFLA(OHMM)	
		0.0 100.0	
		CILD(MM/M)	
		400.0	0.0

PARAMETERS

NAME	UNIT	VALUE	NAME	UNIT	VALUE	NAME	UNIT	VALUE
SBR	OHMM	1.000	DSEC	MM/M	4.390	BS	INCH	6.250
FPHI		PHIX	MSEC	MM/M	2.340			
DO		0.0	BHS		OPEN			

AFTER SURVEY TOOL CHECK SUMMARY

PERFORMED: 80/09/04
PROGRAM FILE: IGR (VERSION 18.2 80/07/02)

DITD TOOL CHECK

	ZERO		PLUS		
	BEFORE	AFTER	BEFORE	AFTER	UNITS
ILD	0.0	0.0	499.8	498.9	MM/M
ILM	0.0	-0.0	499.9	500.4	MM/M
SFL	0.0	0.0	499.9	500.4	MM/M

ILM SONDE ERROR CORRECTION : 2.3 MM/M
ILD SONDE ERROR CORRECTION : 4.3 MM/M

FILE

10

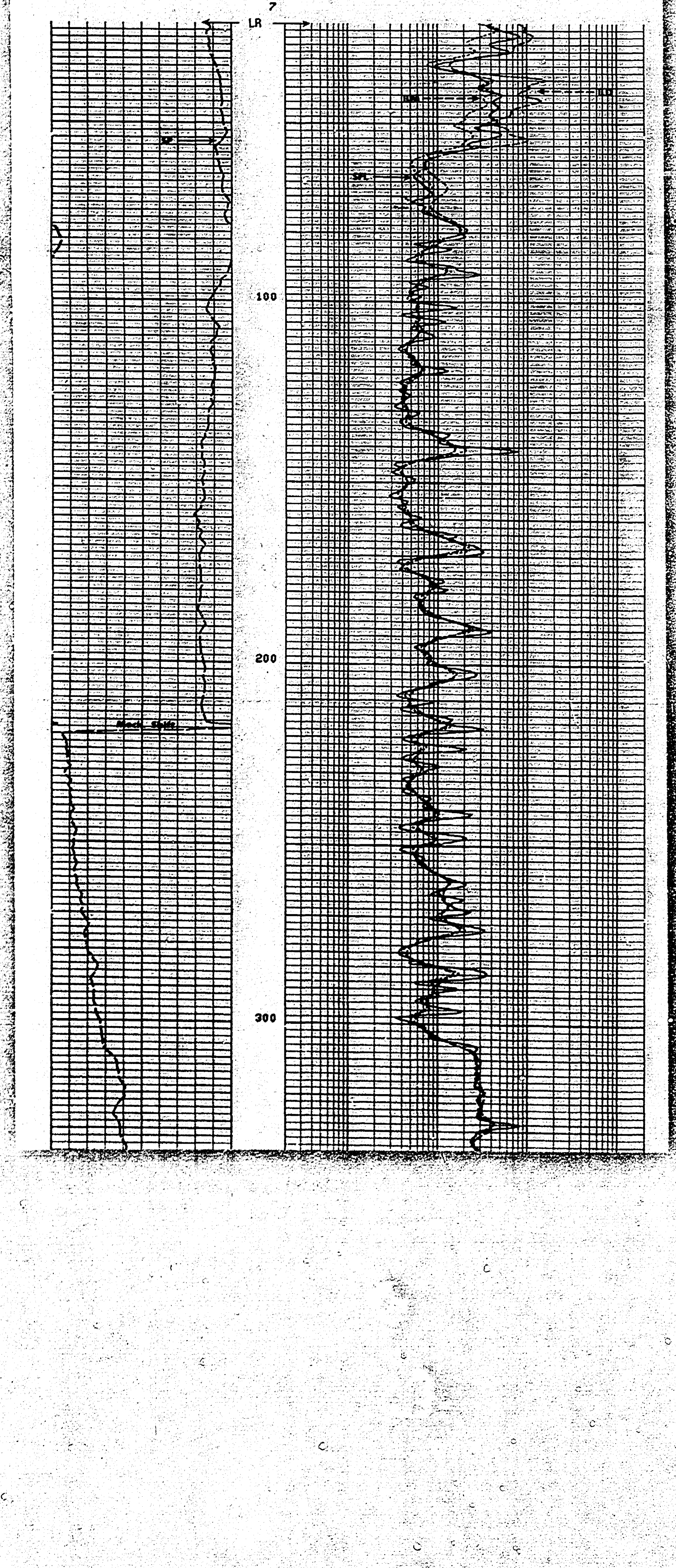
PARAMETERS

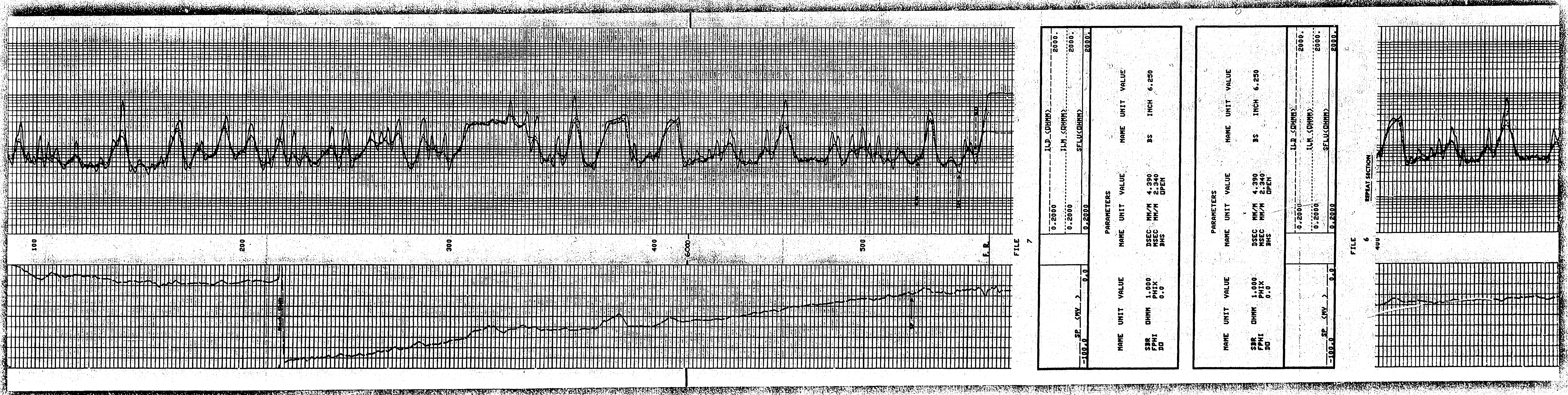
NAME	UNIT	VALUE	NAME	UNIT	VALUE	NAME	UNIT	VALUE
SBR	OHMM	1.000	DSEC	MM/M	4.390	BS	INCH	6.250
FPHI		PHIX	MSEC	MM/M	2.340			
DO		0.0	BHS		OPEN			

SP (MV)		ILD (OHMM)	
		0.2000	2000.
		ILM (OHMM)	
		0.2000	2000.
		SFLU(OHMM)	
-100.0 0.0		0.2000	2000.

FILE

7




100
200
300
400
500
F.R.
FILE
7
SP (MV)
-100.0
0.0
ILD (OHMM)
ILM (OHMM)
SFLU(OHMM)
0.2000
2000.
PARAMETERS
NAME UNIT VALUE
SBR OHMM 1.000
FPHI PHIX
DO 0.0
DSEC MM/M 4.390
MSEC MM/M 2.340
BHS OPEN
BS INCH 6.250
FILE
6
REPEAT SECTION
400

```
                          ILD (OHMM)
                0.2000                          2000.
                          ILM (OHMM)
                0.2000                          2000.
     SP  (MV  )           SFLU(OHMM)
-100.0       0.0    0.2000                          2000.
```

```
                          PARAMETERS
  NAME  UNIT  VALUE     NAME  UNIT  VALUE     NAME  UNIT  VALUE

  SBR   OHMM  1.000     DSEC  MM/M  4.390     BS    INCH  6.250
  FPHI        PHIX      MSEC  MM/M  2.340
  DO          0.0       BHS         OPEN
```

```
                          PARAMETERS
  NAME  UNIT  VALUE     NAME  UNIT  VALUE     NAME  UNIT  VALUE

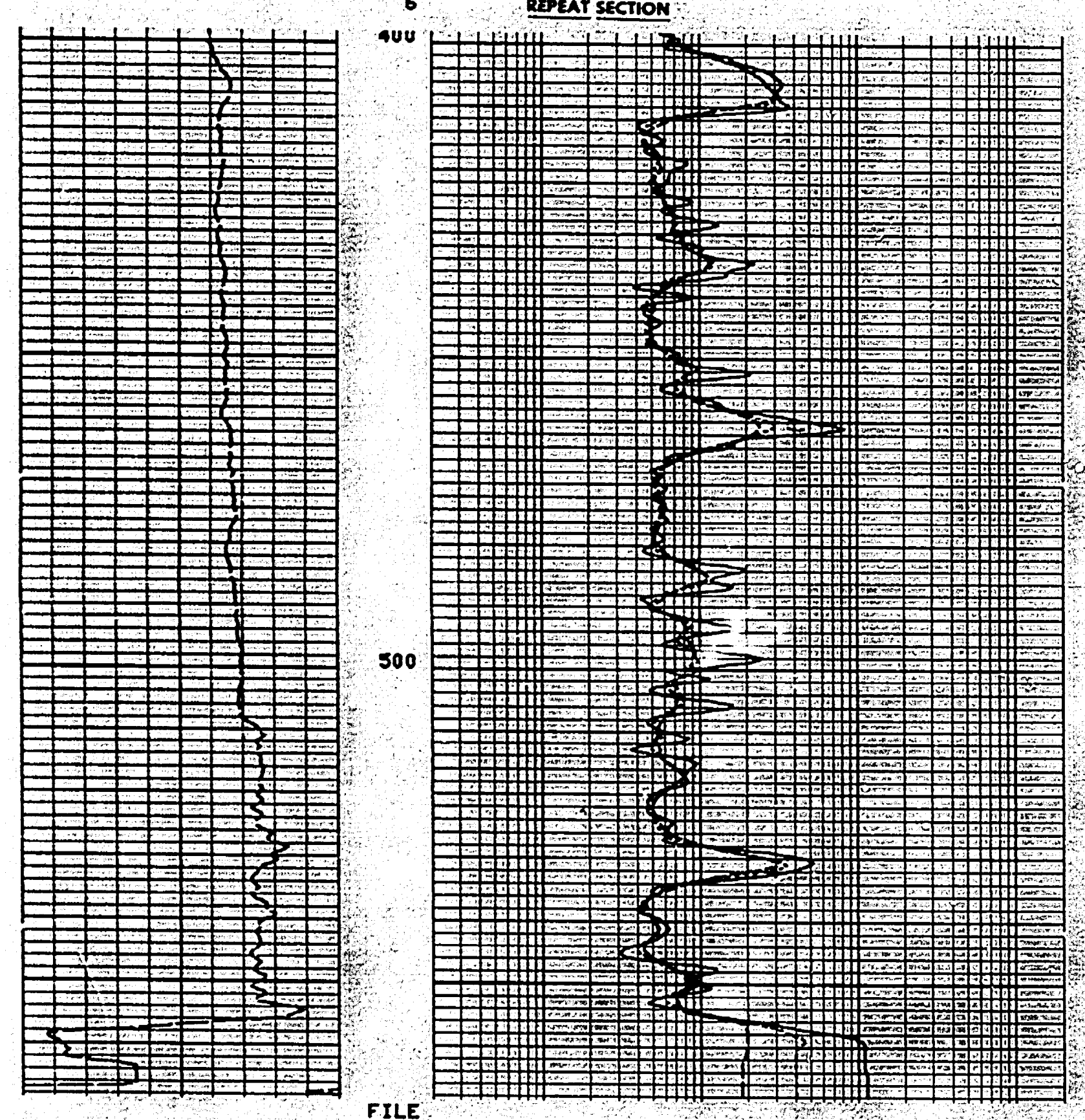
  SBR   OHMM  1.000     DSEC  MM/M  4.390     BS    INCH  6.250
  FPHI        PHIX      MSEC  MM/M  2.340
  DO          0.0       BHS         OPEN
```

```
                          ILD (OHMM)
                0.2000                          2000.
                          ILM (OHMM)
                0.2000                          2000.
     SP  (MV  )           SFLU(OHMM)
-100.0       0.0    0.2000                          2000.
```

FILE

6

REPEAT SECTION



FILE

6

```
                          ILD (OHMM)
                0.2000                          2000.
                          ILM (OHMM)
                0.2000                          2000.
     SP  (MV  )           SFLU(OHMM)
-100.0       0.0    0.2000                          2000.
```

```
                          PARAMETERS
  NAME  UNIT  VALUE     NAME  UNIT  VALUE     NAME  UNIT  VALUE

  SBR   OHMM  1.000     DSEC  MM/M  4.390     BS    INCH  6.250
  FPHI        PHIX      MSEC  MM/M  2.340
  DO          0.0       BHS         OPEN
```

```
              BEFORE SURVEY CALIBRATION SUMMARY

   PERFORMED:      80/09/04
   PROGRAM FILE: IGR     (VERSION     18.2     80/07/02)

DITD                 ELECTRONICS CALIBRATION SUMMARY

              MEASURED                        CALIBRATED
            ZERO     PLUS                   ZERO       PLUS         UNITS
    ILD      3.5     596.8                   0.0       499.8         MM/M
    ILM      3.6     561.3                   0.0       499.9         MM/M
    SFL      0.2     521.0                   0.0       499.9         MM/M

ILM  SONDE ERROR CORRECTION :         2.3    MM/M
ILD  SONDE ERROR CORRECTION :         4.3    MM/M
                          FILE

                            5
```

```
                   SHOP SUMMARY

   PERFORMED:      80/07/31
   PROGRAM FILE: SHOP    (VERSION     18.2     80/ 4/29)

DITD                 ELECTRONICS CALIBRATION SUMMARY

               ELECTRONICS CALIBRATION          SONDE
             MEASURED          CALIBRATED       ERROR     TEST
           ZERO     PLUS      ZERO      PLUS    CORR.     LOOP      UNITS
    ILD     3.6     590.6      0.0      499.8   4.39      495.6     MM/M
    ILM     3.6     556.5      0.0      499.9   2.34      500.4     MM/M

                       (IS:296  , IC:249  )
```

CALIBRATION RECORD

COMPANY RED MOUNTAIN ASSOCIATES
WELL STATE WELL #11
FIELD CHACO WASH
COUNTY MCKINLEY STATE NEW MEXICO

SCHL. FR 560
SCHL. TD 566
DRLR. TD 564
Elev: KB
DF
GL 6115

U.S.D.C.F. MICROGRAPHICS
BEST AVAILABLE COPY

FORM 925244

Dresser Atlas

Dual Induction Focused Log
WITH LINEAR CORRELATION LOG

FILE NO. FM-6266

COMPANY	RED MOUNTAIN ASSOCIATES
WELL	STATE #12
FIELD	CHACO WASH
COUNTY	MCKINLEY STATE NEW MEXICO
LOCATION:	990' FNL, 660' FEL
SEC	28 TWP 20N RGE 9W
Other Services	NONE

Permanent Datum	G.L.	Elev. 6422	Elevations: KB -
Log Measured from	G.L.	0 Ft. Above Permanent Datum	DF -
Drilling Measured from	G.L.		GL 6422

Date	9/23/80			
Run No.	ONE			
Depth—Driller	545			
Depth—Logger	550			
Bottom Logged Interval	550			
Top Logged Interval	30			
Casing—Driller	- @ -	@	@	@
Casing—Logger	-			
Bit Size	6 1/4			
Type Fluid in Hole	CHEM GEL			
	@	@	@	@
Density and Viscosity	8.5 | 35			
pH and Fluid Loss	- | - cc	cc	cc	cc
Source of Sample	FLOWLINE			
Rm @ Meas. Temp.	3.39 @ 62 °F	@ °F	@ °F	@ °F
Rmf @ Meas. Temp.	2.54 @ 62 °F	@ °F	@ °F	@ °F
Rmc @ Meas. Temp.	4.24 @ 62 °F	@ °F	@ °F	@ °F
Source of Rmf and Rmc	CALCULATED			
Rm @ BHT	- @ - °F	@ °F	@ °F	@ °F
Time Since Circ.	4 HRS.			
Max. Rec. Temp. Deg. F.	- °F	°F	°F	°F
Equip. No. and Location	6103 | FARM.			
Recorded By	HITCHNER			
Witnessed By	SINCLAIR			

THIS HEADING AND LOG CONFORMS TO API RECOMMENDED STANDARD PRACTICE RP-31

FOLD HERE

REMARKS

Equipment Used

Series No.	1503
Run No.	ONE
S.O.	23145
Tool No.	49362
Elec. No.	49362
Panel No.	34832
C.S.	160

Scale Changes

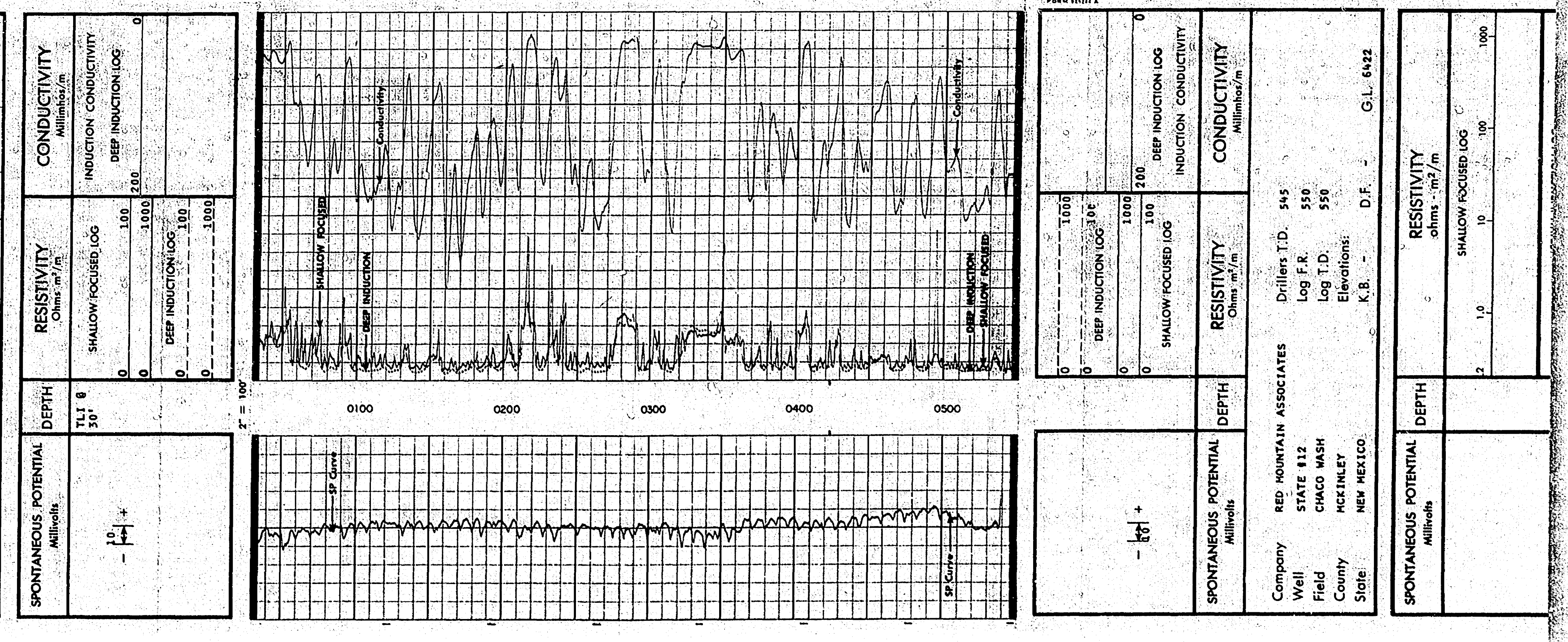
Type Log	Depth	Scale Up Hole	Scale Down Hole

Changes in Mud Type or Additional Samples

Date		
Sample No.		
Depth-Driller		
Type Fluid in Hole		
Dens. | Visc.		
pH | Fluid Loss	cc	cc
Source of Sample		
Rm @ Meas. Temp.	@ °F	@ °F
Rmf @ Meas. Temp.	@ °F	@ °F
Rmc @ Meas. Temp.	@ °F	@ °F
Source Rmf | Rmc		
Rm @ BHT	@ °F	@ °F
Rmf @ BHT	@ °F	@ °F
Rmc @ BHT	@ °F	@ °F

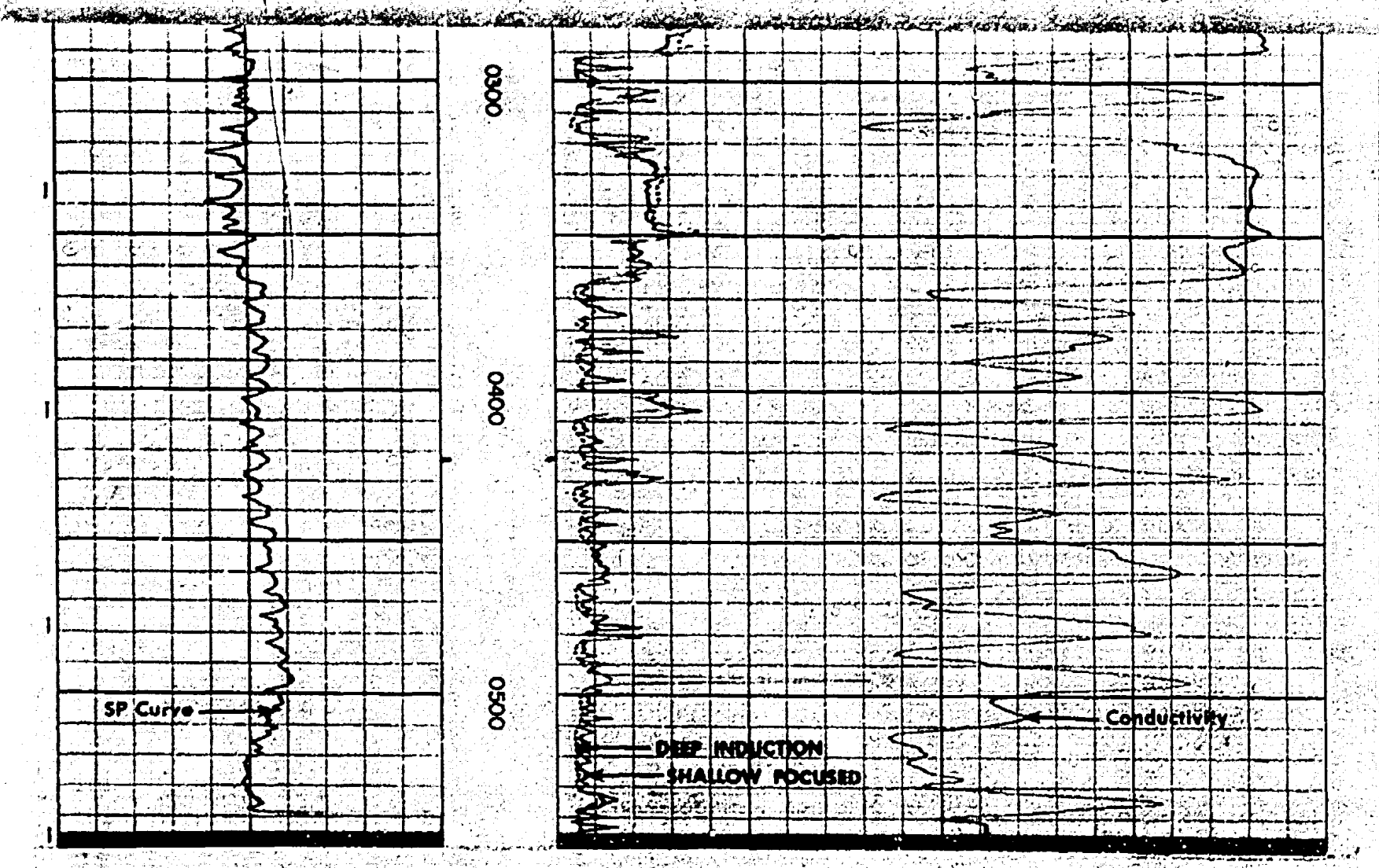
Equipment Data

Run No.	Tool Type	Pad Type	Tool Position	Other
ONE	DIFL 1503	-	1.5" S.O.	



Company	RED MOUNTAIN ASSOCIATES
Well	STATE #12
Field	CHACO WASH
County	MCKINLEY
State	NEW MEXICO

Drillers T.D.	545
Log F.R.	550
Log T.D.	550
Elevations:	
K.B.	-
D.F.	-
G.L.	6422

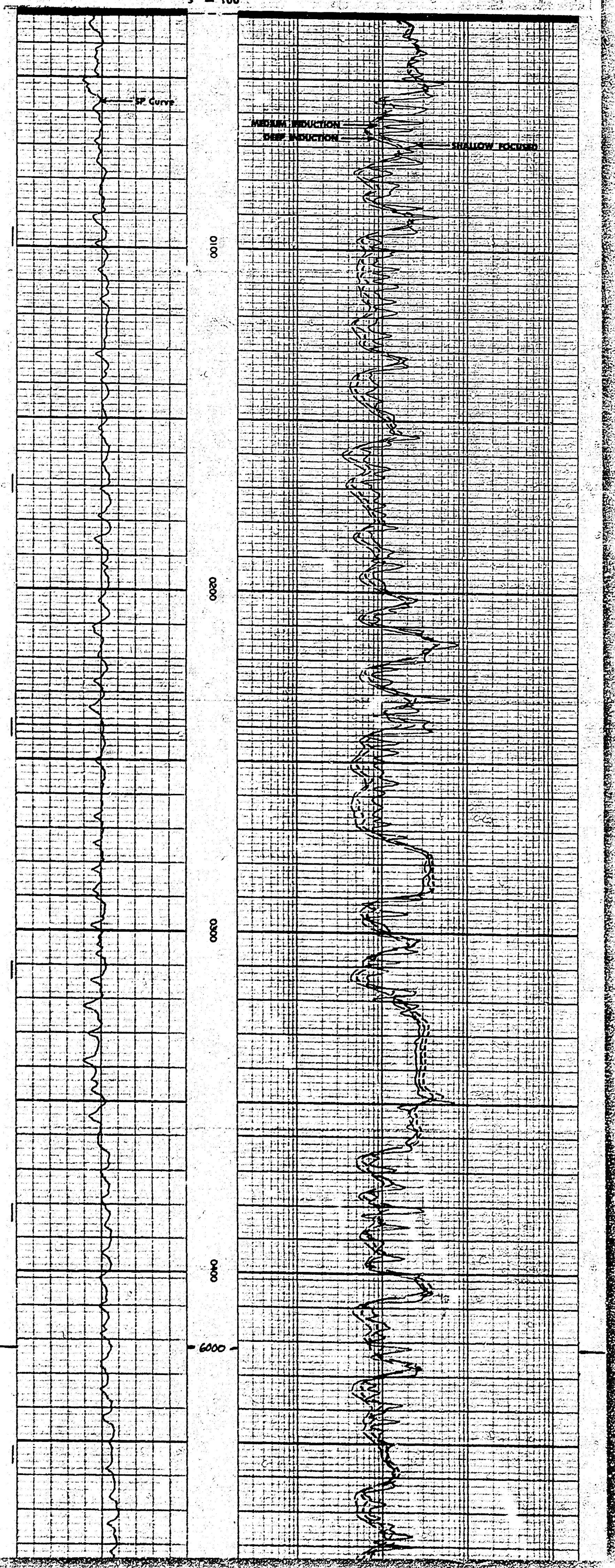


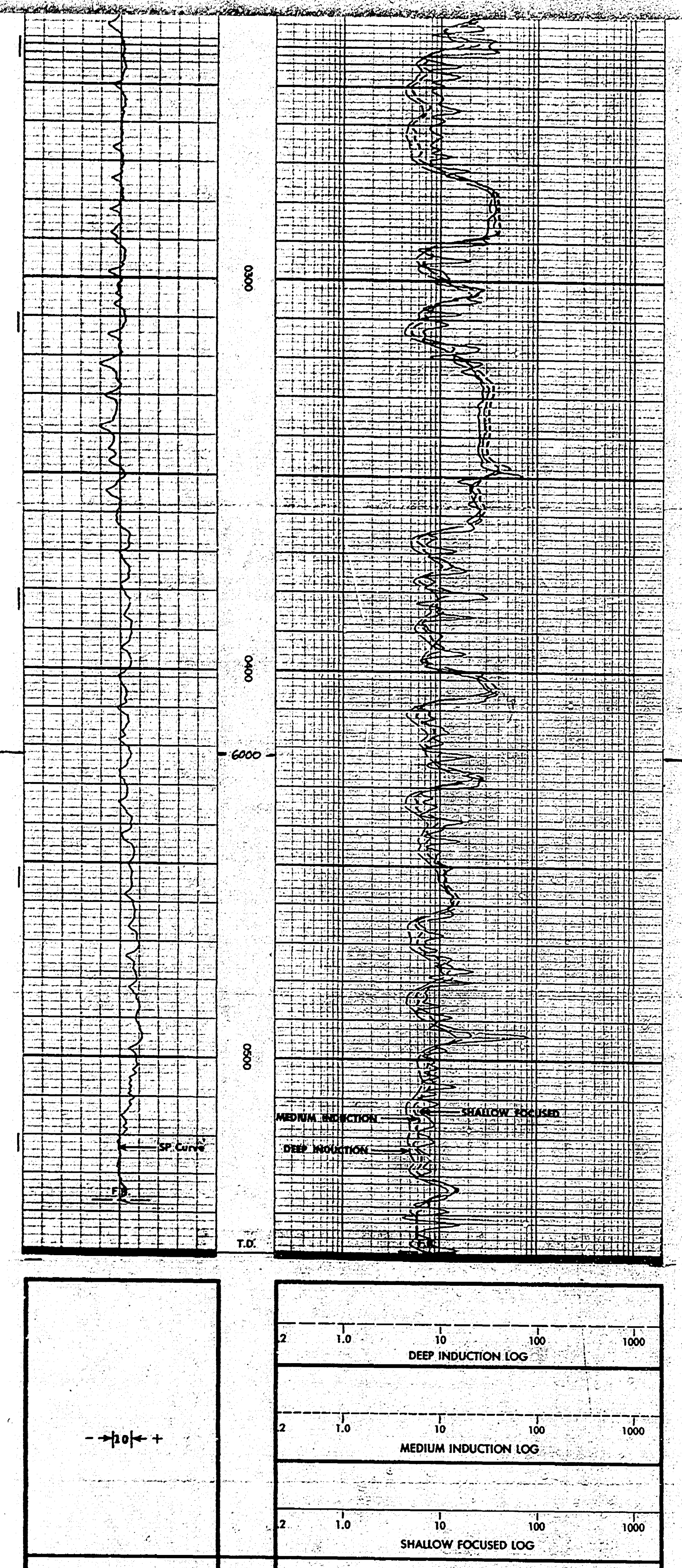
− |20| +		0 — 1000 0 — 100 DEEP INDUCTION LOG 0 — 1000 0 — 100 SHALLOW FOCUSED LOG	200 — 0 DEEP INDUCTION LOG INDUCTION CONDUCTIVITY
SPONTANEOUS POTENTIAL Millivolts	DEPTH	RESISTIVITY Ohms m²/m	CONDUCTIVITY Millimhos/m

Company	RED MOUNTAIN ASSOCIATES	Drillers T.D.	545
Well	STATE #12	Log F.R.	550
Field	CHACO WASH	Log T.D.	550
County	MCKINLEY	Elevations:	
State	NEW MEXICO	K.B. - D.F. -	G.L. 6422

SPONTANEOUS POTENTIAL Millivolts	DEPTH	RESISTIVITY ohms - m²/m
− →|10|← +		SHALLOW FOCUSED LOG .2 1.0 10 100 1000 MEDIUM INDUCTION LOG .2 1.0 10 100 1000 DEEP INDUCTION LOG .2 1.0 10 100 1000

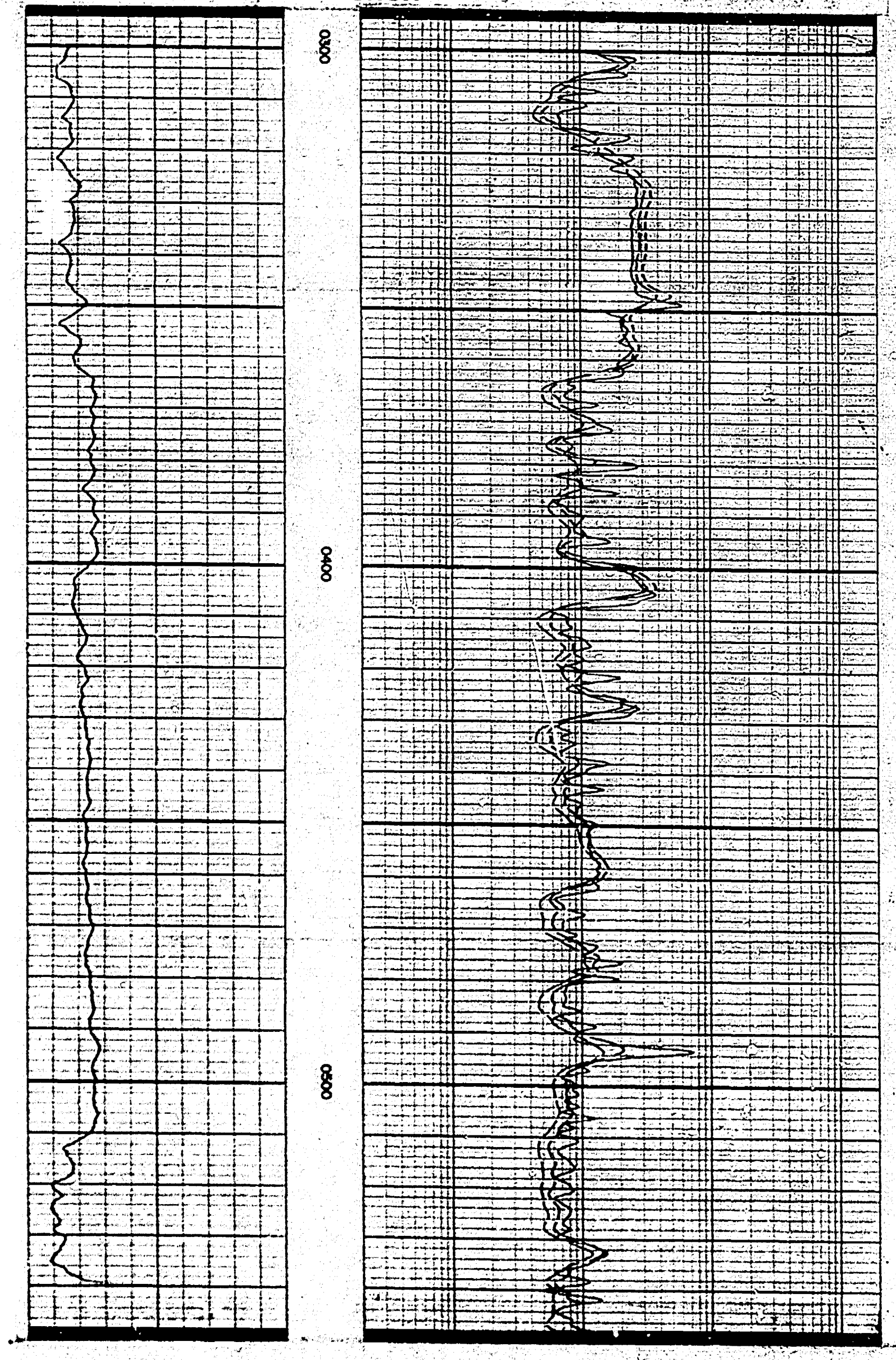
5" = 100'





Company	RED MOUNTAIN ASSOCIATES	Drillers T.D.	545
Well	STATE #12	Log F.R.	550
Field	CHACO WASH	Log T.D.	550
County	MCKINLEY	Elevations:	
State	NEW MEXICO	K.B. - D.F. -	G.L. 6422

REPEAT SECTION

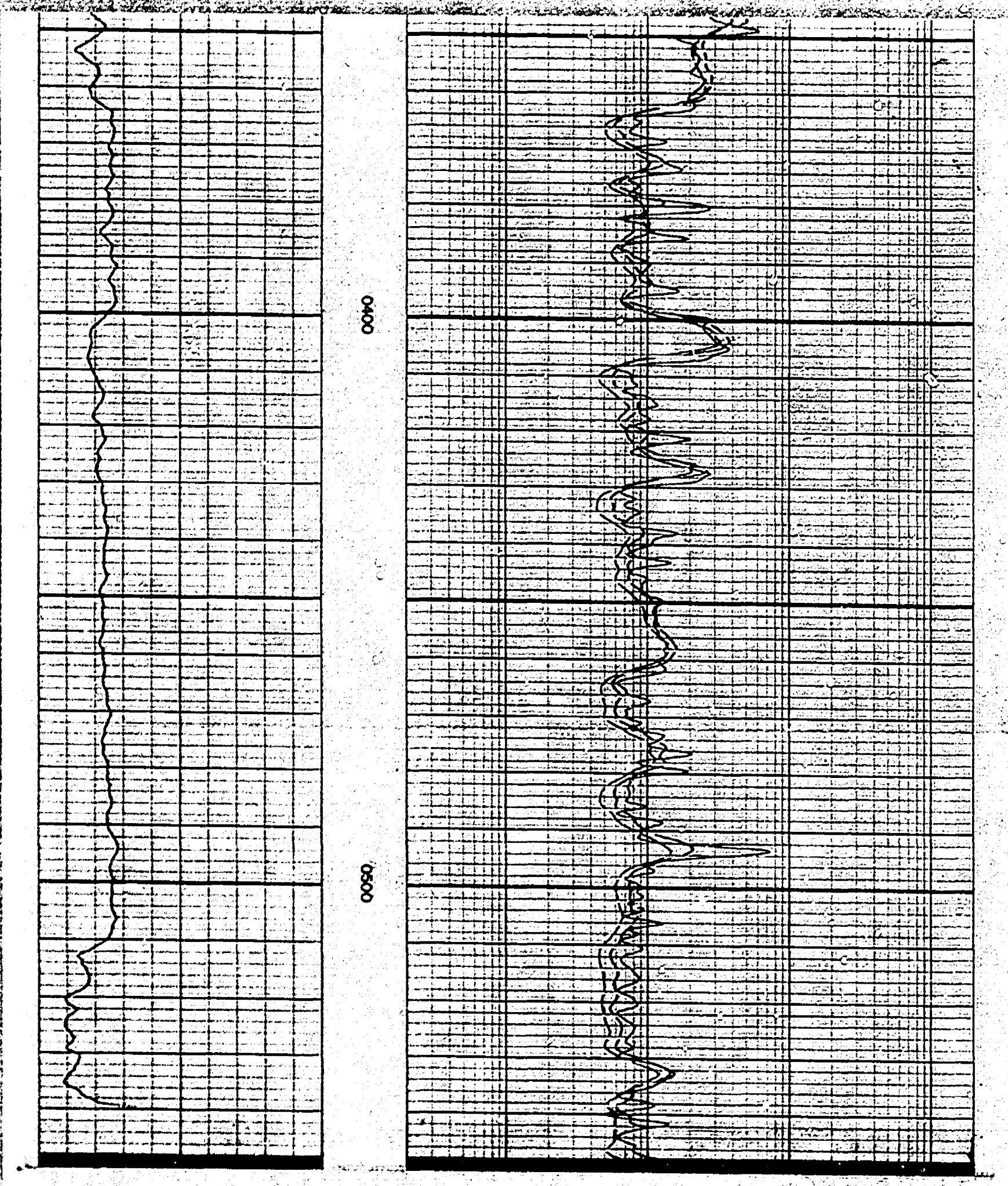


CALIBRATION

DUAL INDUCTION FOCUSED LOG

(LOGARITHMIC)

1. MECHANICAL ZERO
2. PANEL—LOW
3. PANEL—HIGH
4. ZERO CONDUCTIVITY—AIR
5. ILD TEST LOOP—SEC. OFF

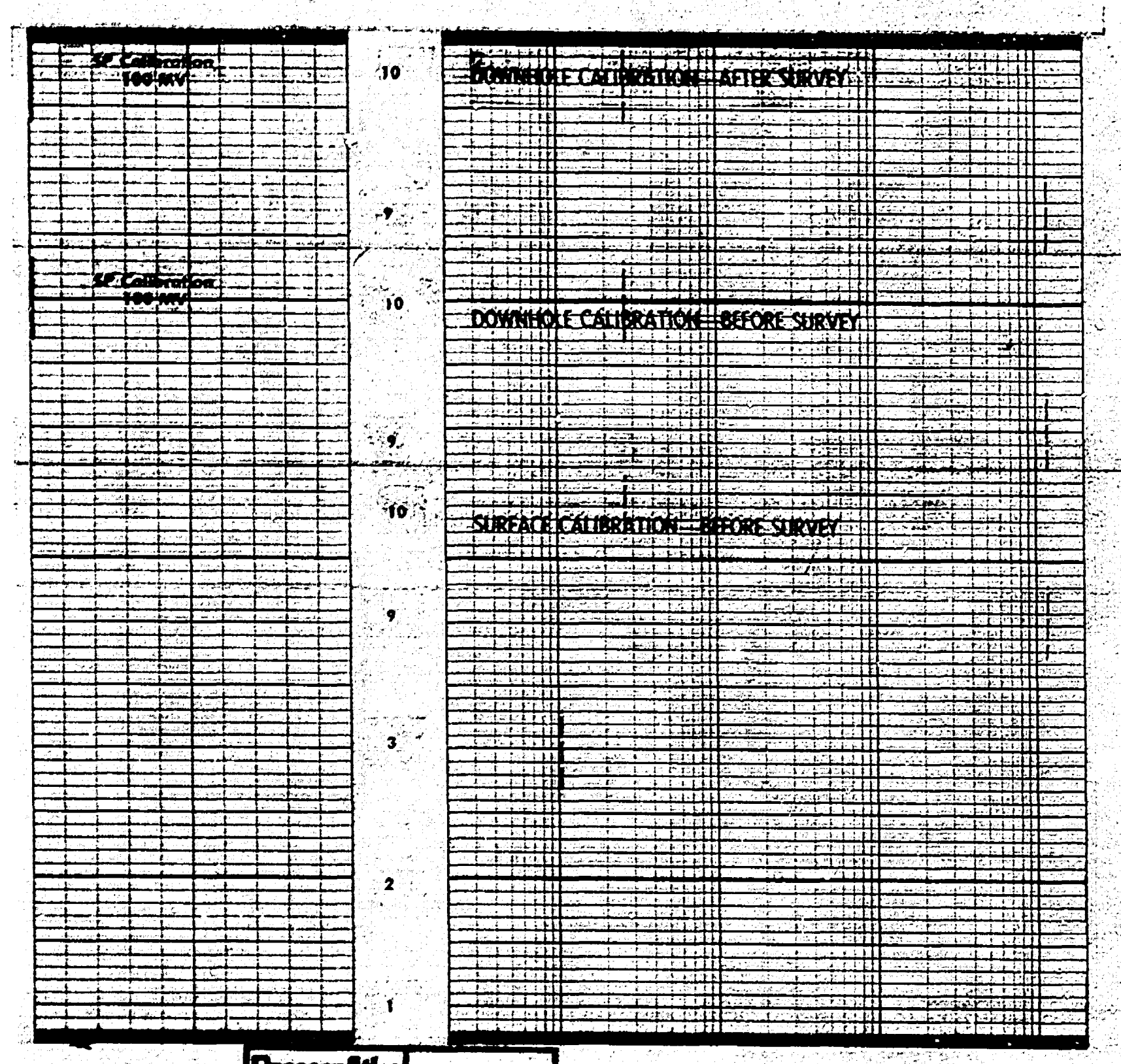


CALIBRATION

DUAL INDUCTION FOCUSED LOG

(LOGARITHMIC)

1. MECHANICAL ZERO
2. PANEL—LOW
3. PANEL—HIGH
4. ZERO CONDUCTIVITY—AIR
5. ILD TEST LOOP—SEC. OFF
6. ILD TEST LOOP—SEC. ON
7. ILM TEST LOOP
8. FL EXTERNAL
9. INTERNAL REFERENCE—LOW
10. INTERNAL REFERENCE—HIGH



Dresser Atlas
DRESSER
Division of Dresser Industries, Inc.

V.U.R.C.T. MICROGRAPHICS
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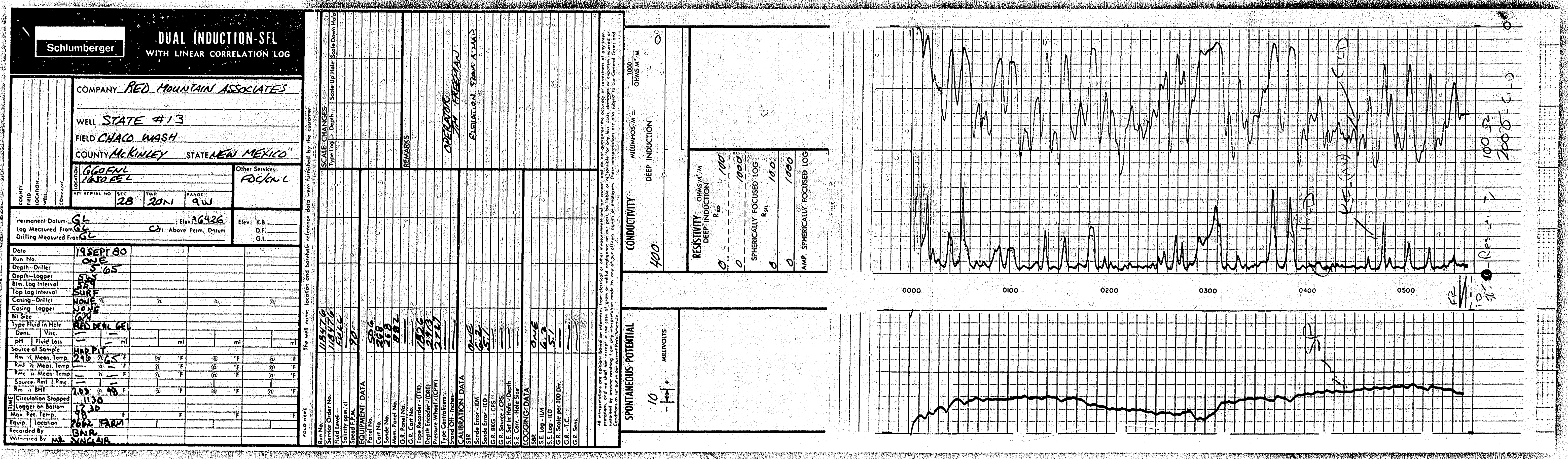


Schlumberger

DUAL INDUCTION-SFL
WITH LINEAR CORRELATION LOG

COMPANY RED MOUNTAIN ASSOCIATES

WELL STATE #13

FIELD CHACO WASH

COUNTY McKINLEY STATE NEW MEXICO

LOCATION 660 FNL
1650 FEL

Other Services: FDC/CNL

API SERIAL NO	SEC	TWP	RANGE
	28	20N	9W

Permanent Datum: GL ; Elev.: 6426
Log Measured From GL 0 Ft. Above Perm. Datum
Drilling Measured From GL

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

Date	19 SEPT 80			
Run No.	ONE			
Depth—Driller	565			
Depth—Logger	565			
Btm. Log Interval	559			
Top Log Interval	SURF			
Casing—Driller	NONE @	@	@	@
Casing—Logger	NONE			
Bit Size	6¾			
Type Fluid in Hole	RED DEVIL GEL			
Dens. | Visc.	— | —	|	|	|
pH | Fluid Loss	— | — ml	| ml	| ml	| ml
Source of Sample	MUD PIT			
Rm @ Meas. Temp.	2.96 @ 65 °F	@ °F	@ °F	@ °F
Rmf @ Meas. Temp.	— @ — °F	@ °F	@ °F	@ °F
Rmc @ Meas. Temp.	— @ — °F	@ °F	@ °F	@ °F
Source: Rmf | Rmc	— | —	|	|	|
Rm @ BHT	2.03 @ 98 °F	@ °F	@ °F	@ °F
TIME Circulation Stopped	1130			
TIME Logger on Bottom	1230			
Max. Rec. Temp.	98 °F	°F	°F	°F
Equip. | Location	7662 | FARM	|	|	|
Recorded By	BNR			
Witnessed By	MR SINCLAIR			

COUNTY
FIELD
LOCATION
WELL
COMPANY

FOLD HERE

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

Run No.	118476			
Service Order No.	118476			
Fluid Level	FULL			
Salinity ppm. Cl	—			
Speed F.P.M.	90			
EQUIPMENT DATA				
Panel No.	SDG			
Cart No.	268			
Sonde No.	268			
Mem. Panel No.	882			
G.R. Panel No.	—			
G.R. Cart No.	—			
Tape Recorder - (TTR)	1826			
Depth Encoder - (DRE)	2913			
Pressure Wheel - (CPW)	2727			
Type Centralizers	—			
Stand Off - Inches	—			
CALIBRATION DATA				
SBR	ONE			
Sonde Error - ILM	6.2			
Sonde Error - ILD	5.1			
G.R. BKG. - CPS.	—			
G.R. Source - CPS.	—			
S.E. Set In Hole - Depth	—			
S.E. Corr. - Hole Size	—			
LOGGING DATA				
SBR	ONE			
S.E. Log - ILM	6.2			
S.E. Log - ILD	5.1			
G.R. Scale per 100 Div.	—			
G.R. - T.C.	—			
G.R. Sens.	—			

SCALE CHANGES			
Type Log	Depth	Scale Up Hole	Scale Down Hole

REMARKS

OPERATOR
TM FREEMAN

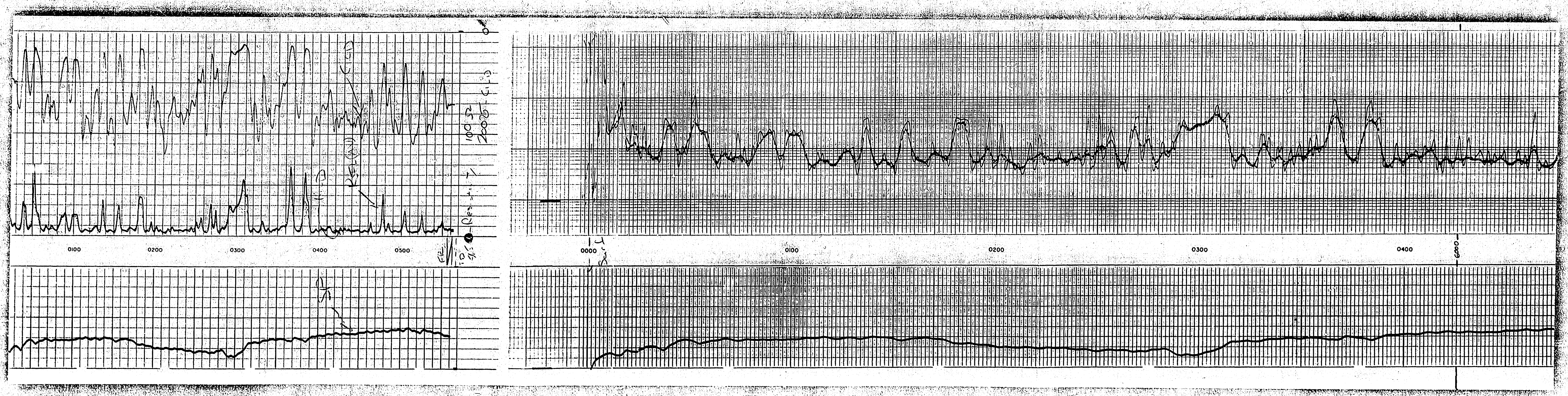
ELEVATION FROM A MAP

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 our General Terms and Conditions as set out in our Current Price Schedule.

CONDUCTIVITY
MILLIMHOS/M = 1000 / OHMS M²/M
DEEP INDUCTION
400 … 0

RESISTIVITY OHMS M²/M
DEEP INDUCTION R_{ILD}
0 … 100
0 … 1000
SPHERICALLY FOCUSED LOG R_{SFL}
0 … 100
0 … 1000
AMP. SPHERICALLY FOCUSED LOG

SPONTANEOUS-POTENTIAL
MILLIVOLTS
10
− |←→| +



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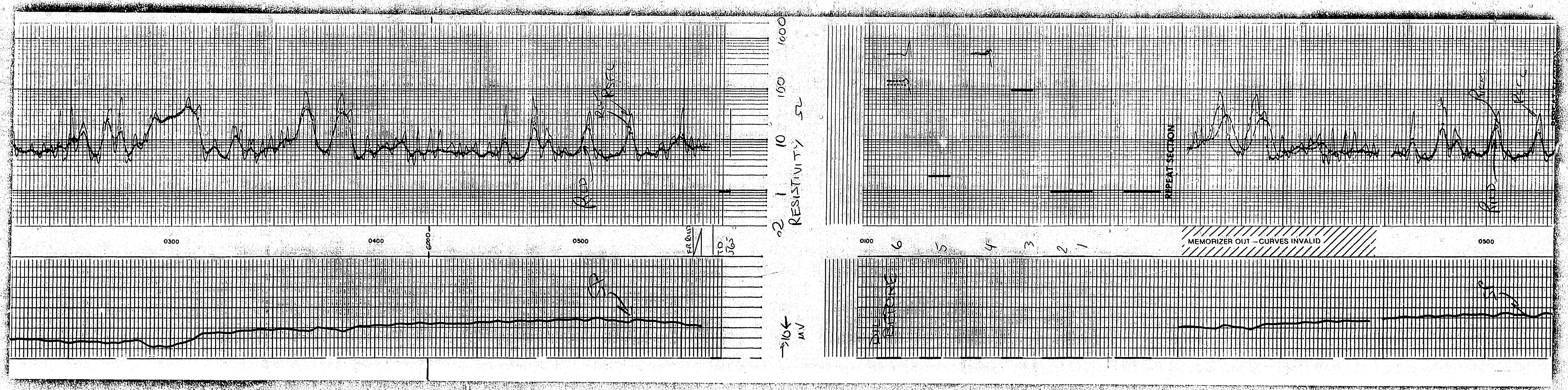

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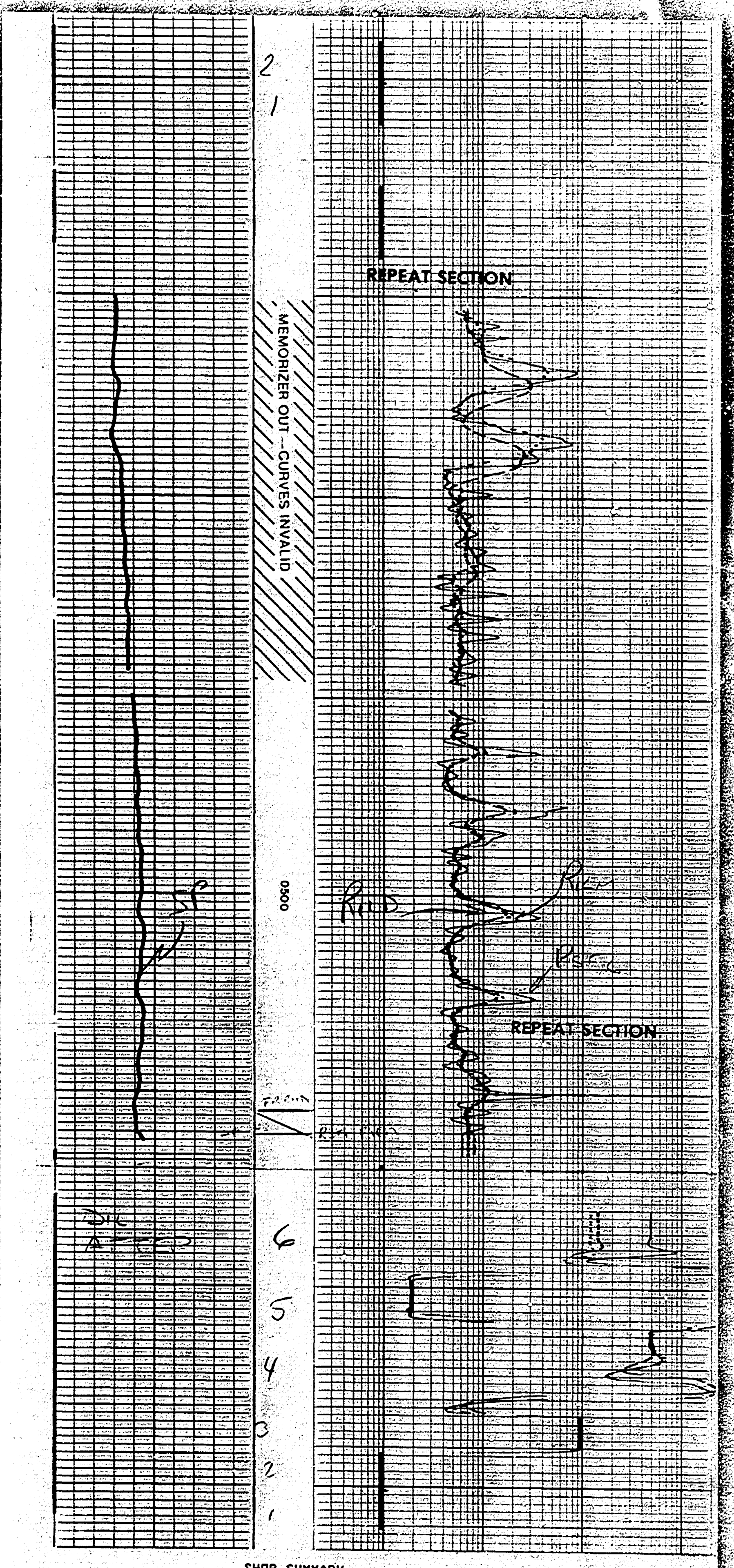

SHOP SUMMARY

```
PERFORMED:     80/09/13
PROGRAM FILE: SHOP   (VERSION    18.2    80/ 4/29)

DITD                  ELECTRONICS CALIBRATION SUMMARY

              ELECTRONICS CALIBRATION         SONDE
             MEASURED        CALIBRATED       ERROR      TEST
           ZERO    PLUS     ZERO     PLUS     CORR.      LOOP      UNITS
  ILD      4.6    823.7     0.0     499.7     5.01       493.2     MM/M
  ILM      5.1    738.9     0.0     499.9     6.23       487.0     MM/M

                       (IS:268  , IC:268  )
```

DUAL INDUCTION CALIBRATION FILM CODING

1. MECHANICAL ZERO
2. 1 OHM-M
3. 100 OHM-M
4. ELECTRICAL ZERO (500 OHM-M)
5. 2 OHM-M
6. SONDE ERRORS (+2 MMHO)
7. ZERO SIGNAL IN AIR
8. ILd TEST LOOP (2 OHM SIGNAL)
9. ILm TEST LOOP (2 OHM SIGNAL)
10. Rxo/Rt UNITY
11. Rxo/Rt CALIBRATE

GAMMA RAY CALIBRATION CODING

1. MECHANICAL ZERO
2. ELECTRICAL ZERO
3. RECORDER SENSITIVITY
4. MEMORIZER ADJUSTMENT
5. BACKGROUND
6. CALIBRATE - SOURCE IN PLACE