CC 34-04-65

API
36-009-00228

Welex

OPEN HOLE

DUAL INDUCTION GUARD LOG

COMP. ARCO OIL AND GAS
WELL COLUMBIA COUNTY 34-4-65
FIELD MIST GAS FIELD
COUNTY COLUMBIA ST. OREGON

COMPANY	ARCO OIL AND GAS		
WELL	COLUMBIA COUNTY 34-4-65		
FIELD	MIST GAS FIELD		
COUNTY	COLUMBIA	STATE	OREGON

API NO.
LOCATION N 2 35 51
W118.71
S 87 24 09
E606.15

SEC. 4 TWP. 6N RGE. 5W

OTHER SERVICES

PERMANENT DATUM GROUND LEVEL ELEV. 870.68
LOG MEASURED FROM KELLY BUSHING 10 FT. ABOVE PERM. DATUM
DRILLING MEASURED FROM KELLY BUSHING

ELEV.: K.B. 880.68
D.F. 879.68
G.L. 870.68

DATE	OCT. 16 1987			
RUN NO.	ONE			
DEPTH-DRILLER	3382			
DEPTH-WELEX	3375			
BTM. LOG INTER.	3370			
TOP LOG INTER.	442			
CASING-DRILLER	444 @ 9 5/8	@	@	@
CASING-WELEX	442			
BIT SIZE	8.5			
TYPE FLUID IN HOLE	POLYMER			
DENS. : VISC.	10.4 : 46	:	:	:
PH : FLUID LOSS	8.4 : 4.8 ML	: ML	: ML	: ML
SOURCE OF SAMPLE	FLOW LINE			
RM @ MEAS. TEMP.	1.35 @ 75 F	@ F	@ F	@ F
RMF @ MEAS. TEMP.	1.08 @ 75 F	@ F	@ F	@ F
RMC @ MEAS. TEMP.	1.68 @ 75 F	@ F	@ F	@ F
SOURCE RMF RMC	MEAS : MEAS	:	:	:
RM @ BHT	@ F	@ F	@ F	@ F
TIME CIRC. STOPPED	16:30			
TIME ON BOTTOM	20:40			
MAX. REC. TEMP.	109 F@	F@	F@	F@
EQUIP. : LOCATION	1888 : WOODLAN	:	:	:
RECORDED BY	STARNES			
WITNESSED BY	MR. H. ANDERSON			

CONFIDENTIAL

FOLD HERE

SERVICE TICKET NO.: API SERIAL NO.: PGM VERSION: V1.87 09/06/85

CHANGE IN MUD TYPE OR ADDITIONAL SAMPLES		
DATE : SAMPLE NO.	:	:
DEPTH-DRILLER		
TYPE FLUID IN HOLE	POLYMER	
DENS. : VISC.	:	:
PH : FLUID LOSS	: ML	: ML
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

RESISTIVITY SCALE CHANGES

TYPE LOG	DEPTH	SCALE UP HOLE	SCALE DOWN HOLE
DIGL98882			
AVL 1213123			
GUARD87279			
CALIPER 123123			

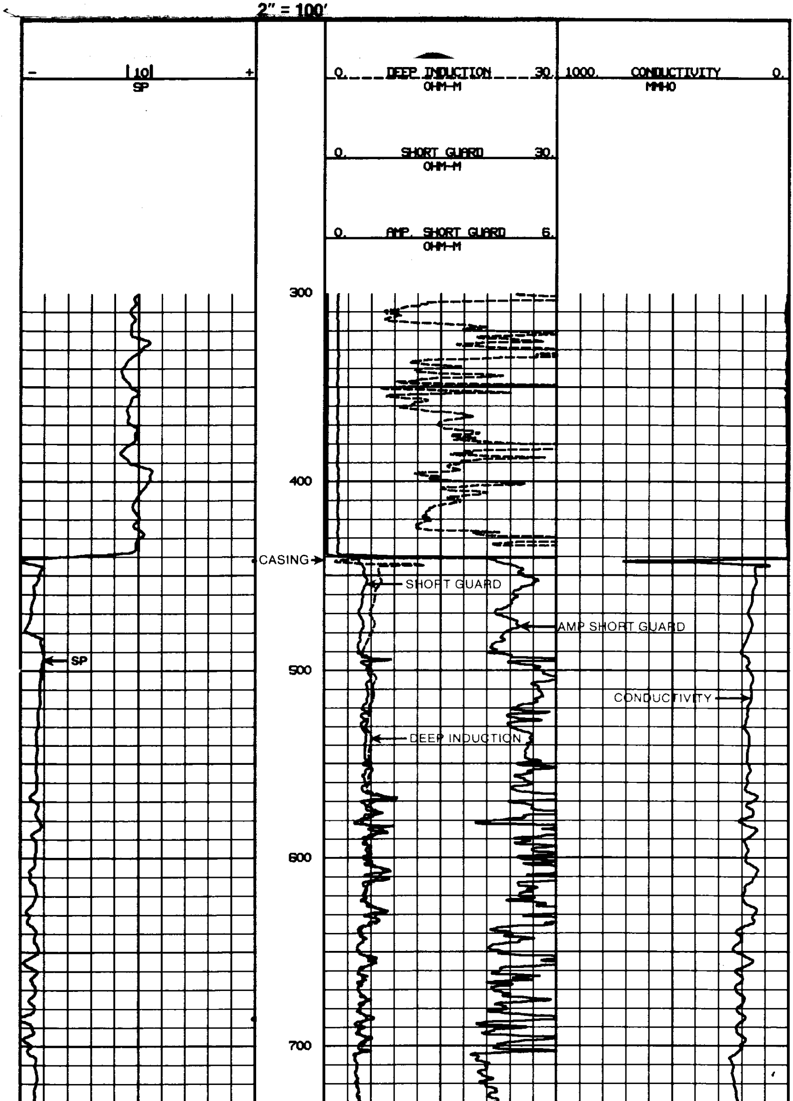
RESISTIVITY EQUIPMENT DATA

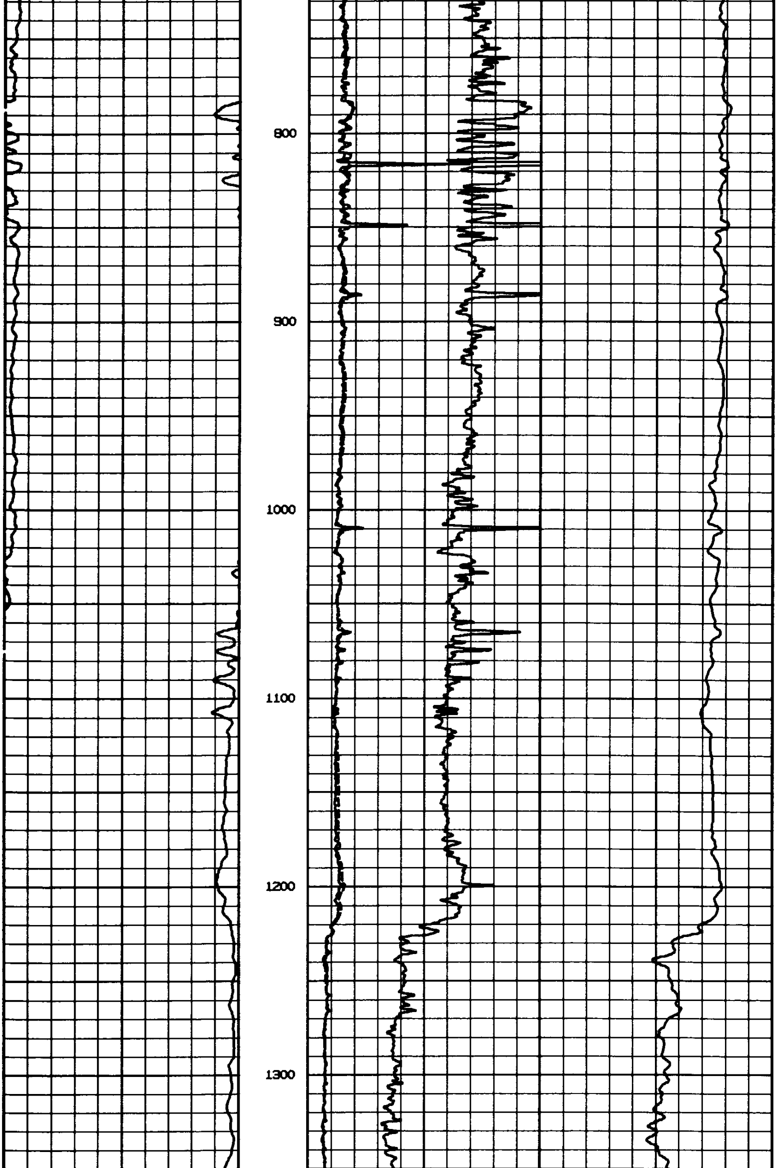
RUN NO.	TOOL TYPE AND NO.	PAD TYPE	TOOL POSITION	OTHER

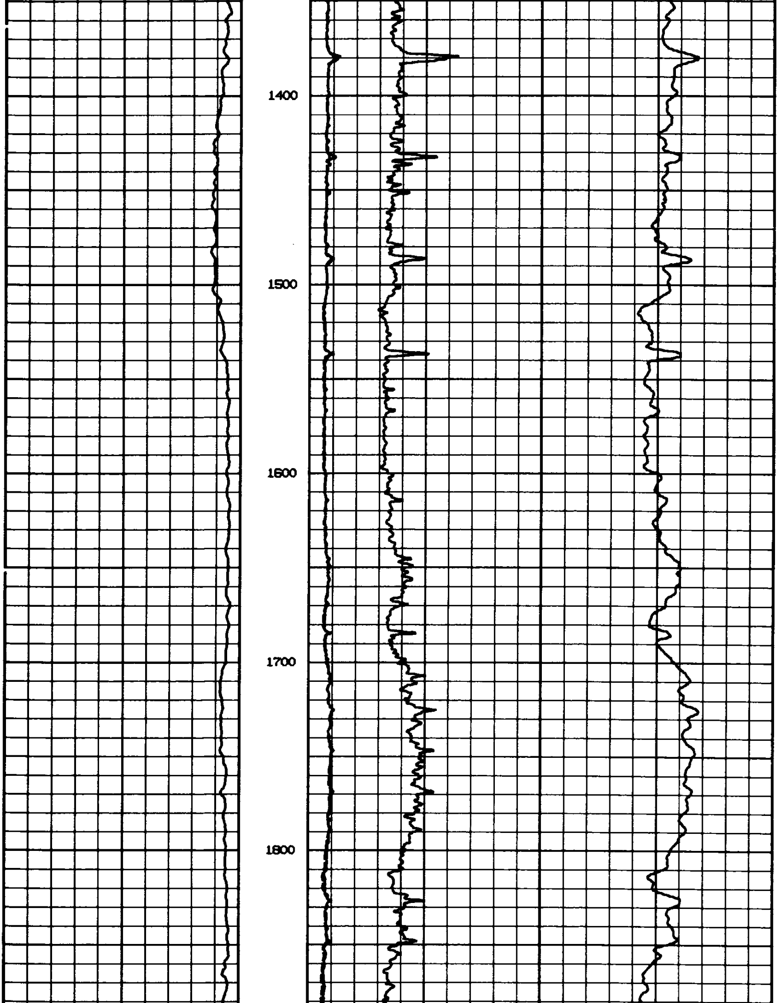
BOREHOLE CORRECTIONS: SHALLOW. MEDIUM. DEEP.

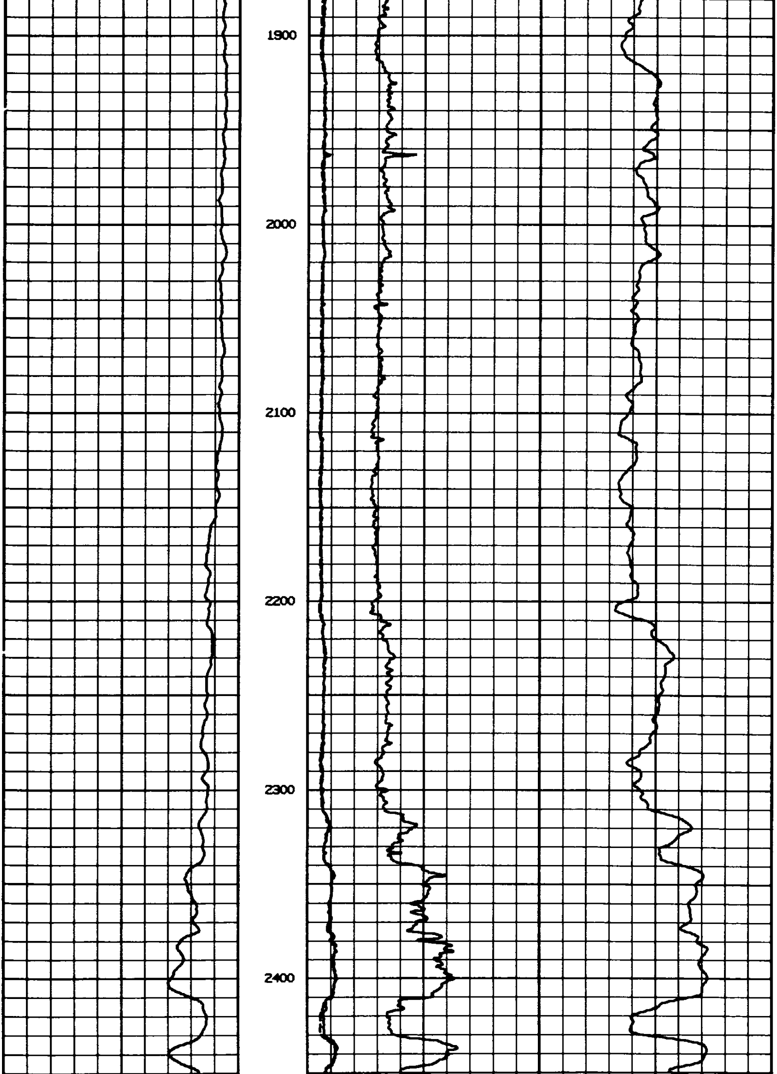
REMARKS: 2 DEG DEV AT 1500 1DEG 15MIN AT 2951

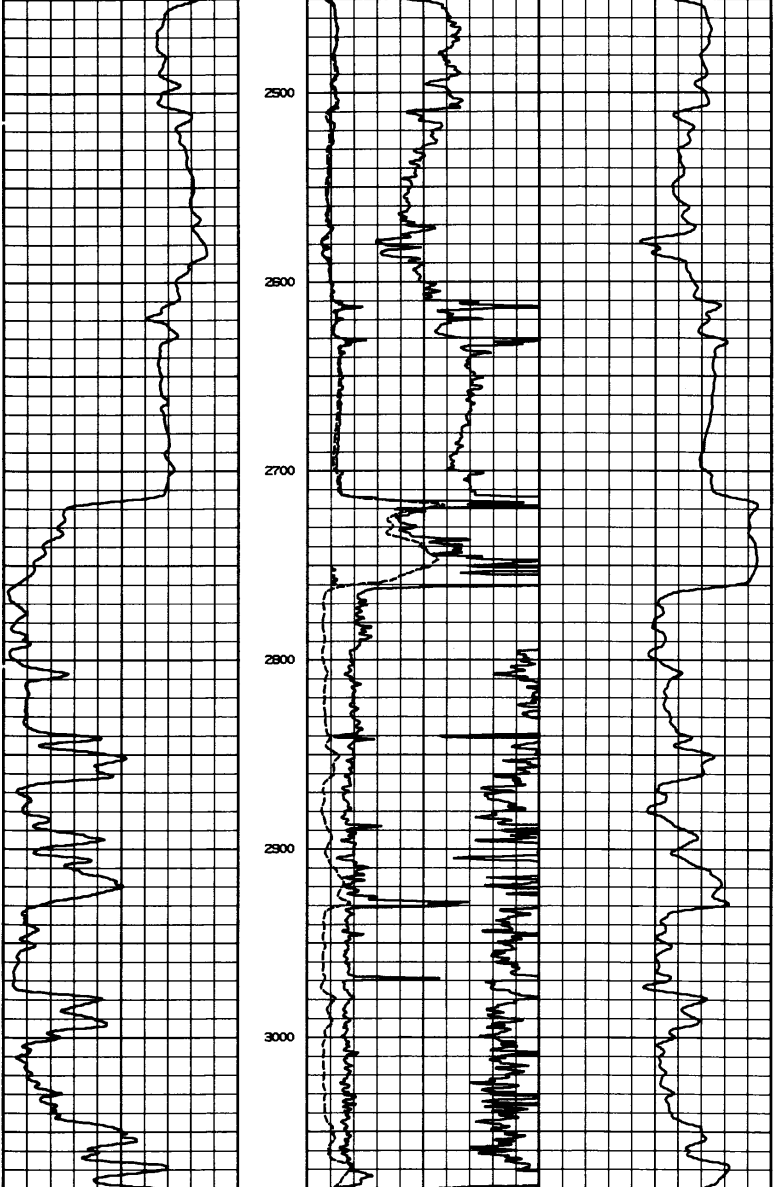
WELEX DOES NOT GUARANTEE THE ACCURACY OF ANY INTERPRETATION OF LOG DATA. CONVERSION OF LOG DATA TO PHYSICAL ROCK PARAMETERS. OR RECOMMENDATIONS WHICH MAY BE GIVEN BY WELEX PERSONNEL OR WHICH MAY APPEAR ON THE LOG OR IN ANY OTHER FORM. ANY USER OF SUCH DATA. INTERPRETATIONS. OR CONVERSIONS. OR RECOMMENDATIONS AGREES THAT WELEX IS NOT RESPONSIBLE. EXCEPT WHERE DUE TO GROSS NEGLIGENCE OR WILFULL MISCONDUCT FOR ANY LOSS. DAMAGES. OR EXPENSES RESULTING FROM THE USE THEREOF.

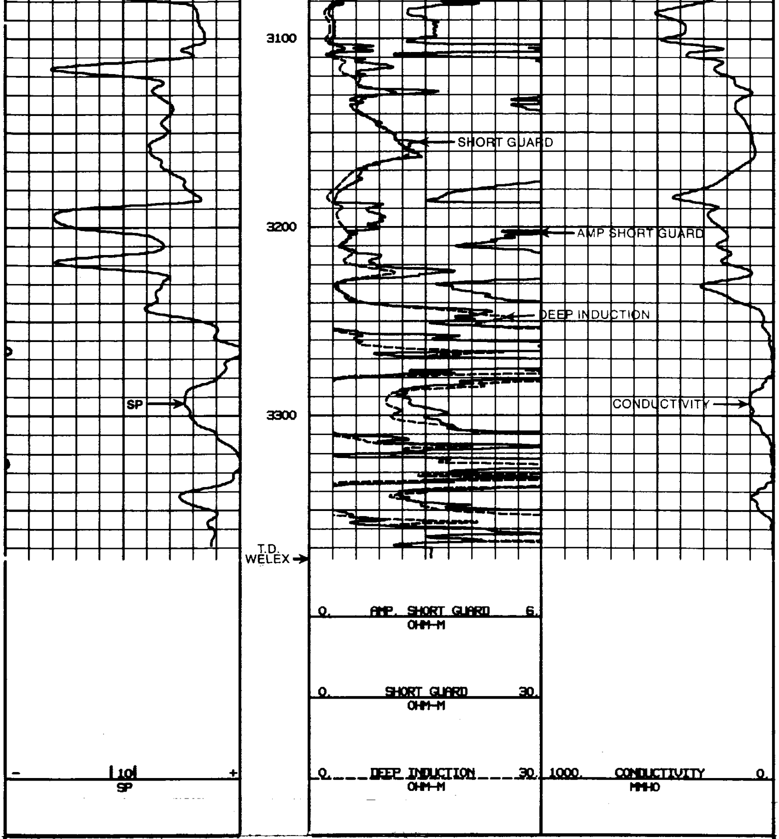




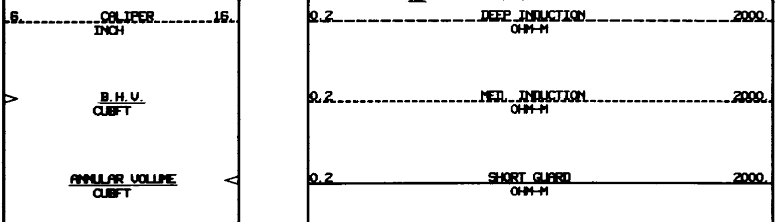


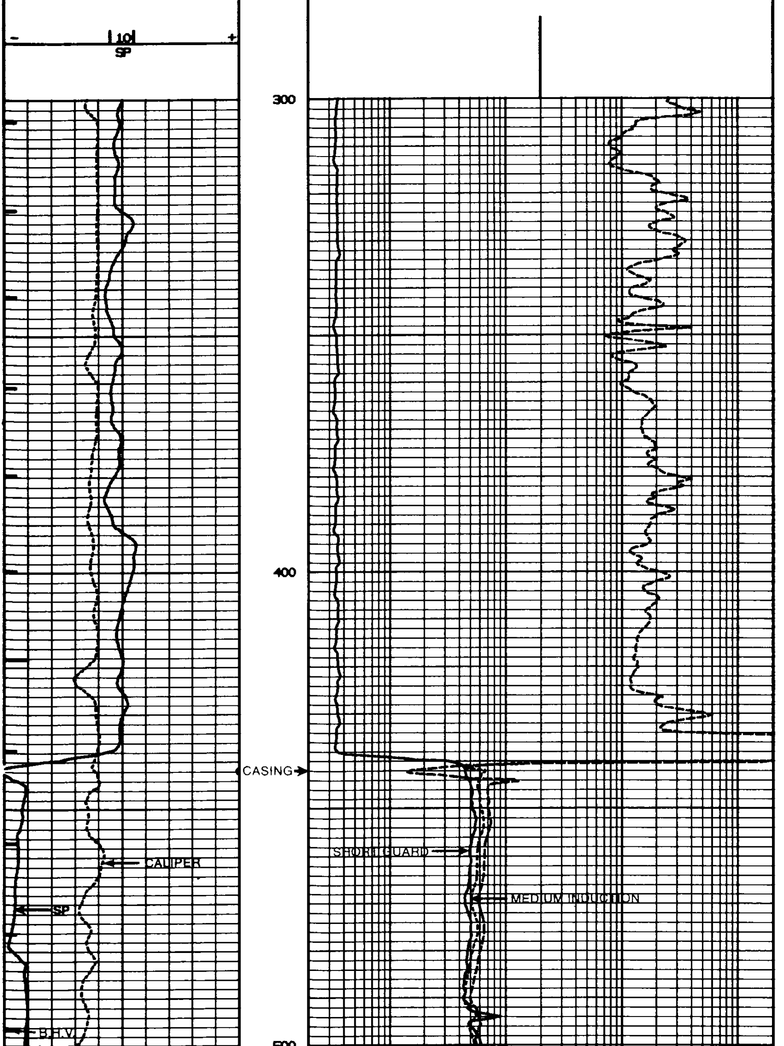


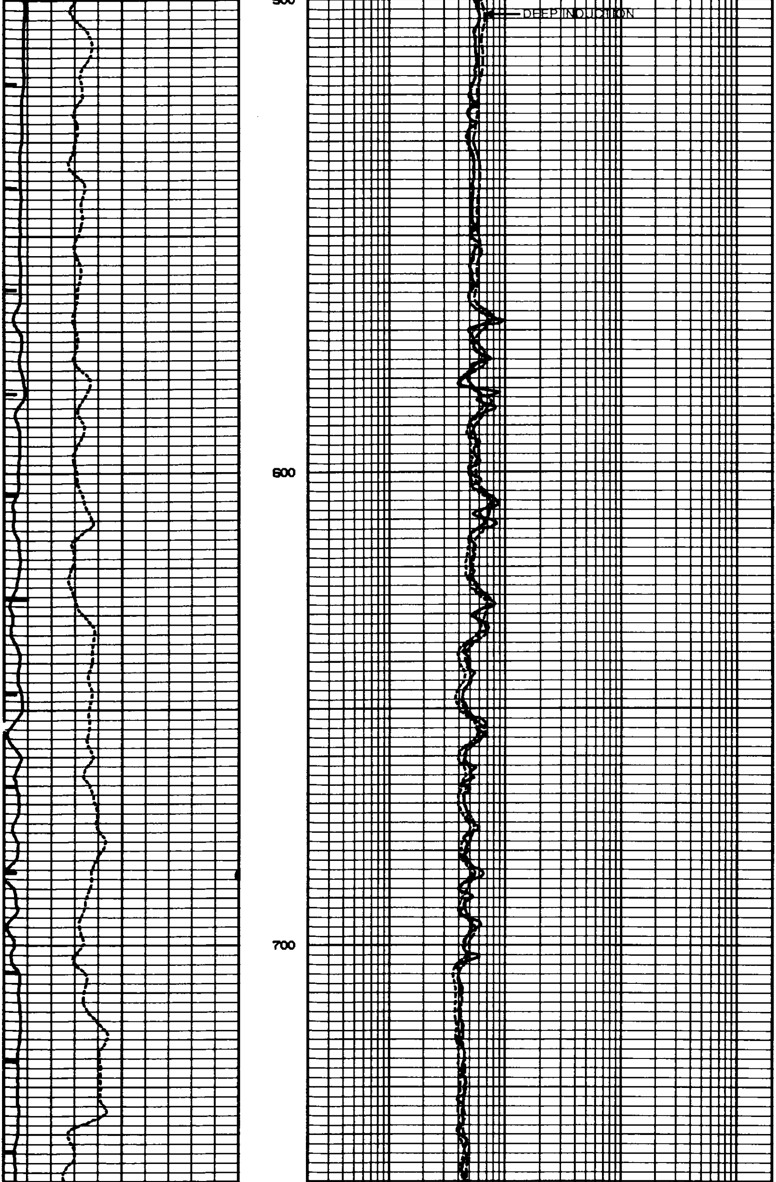


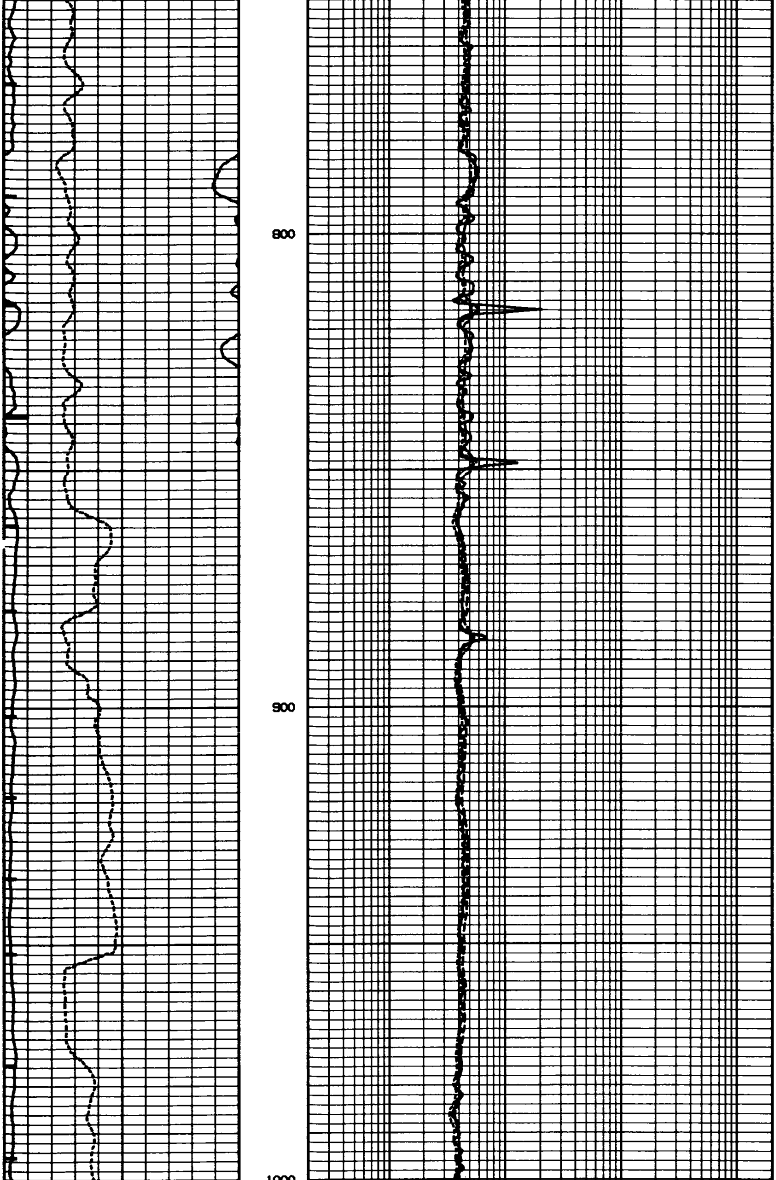


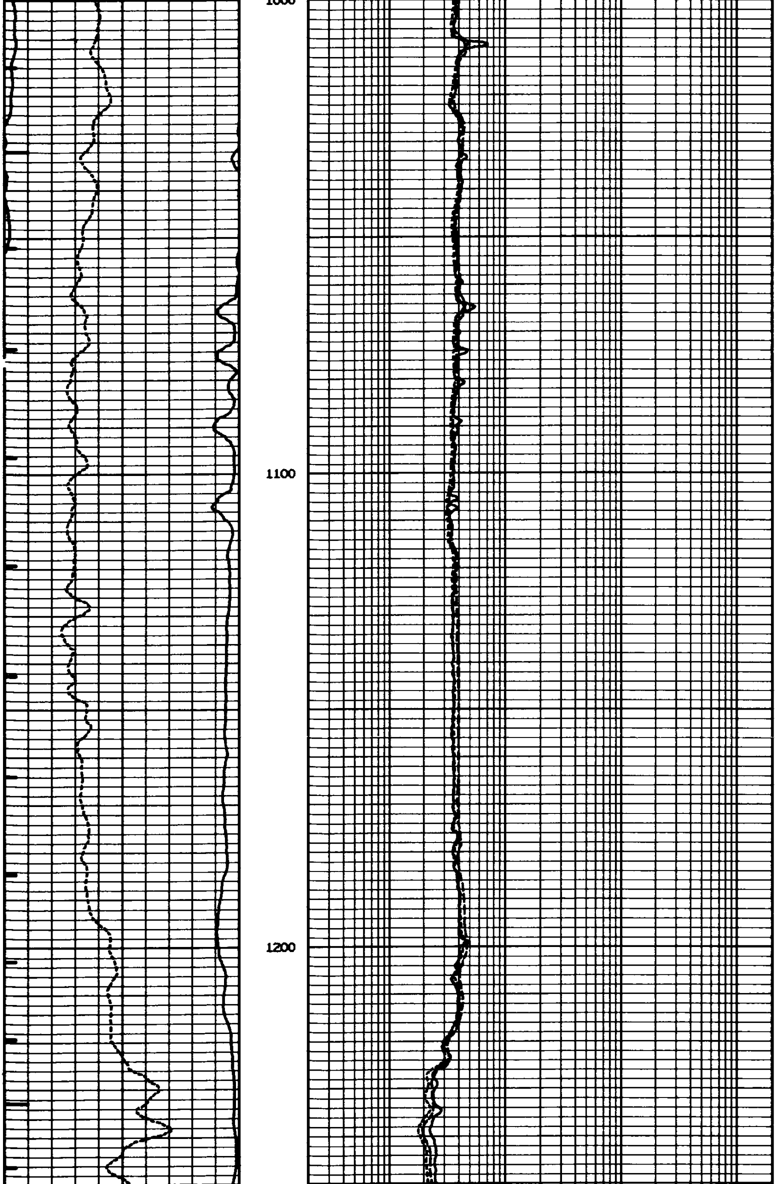
5″ = 100′

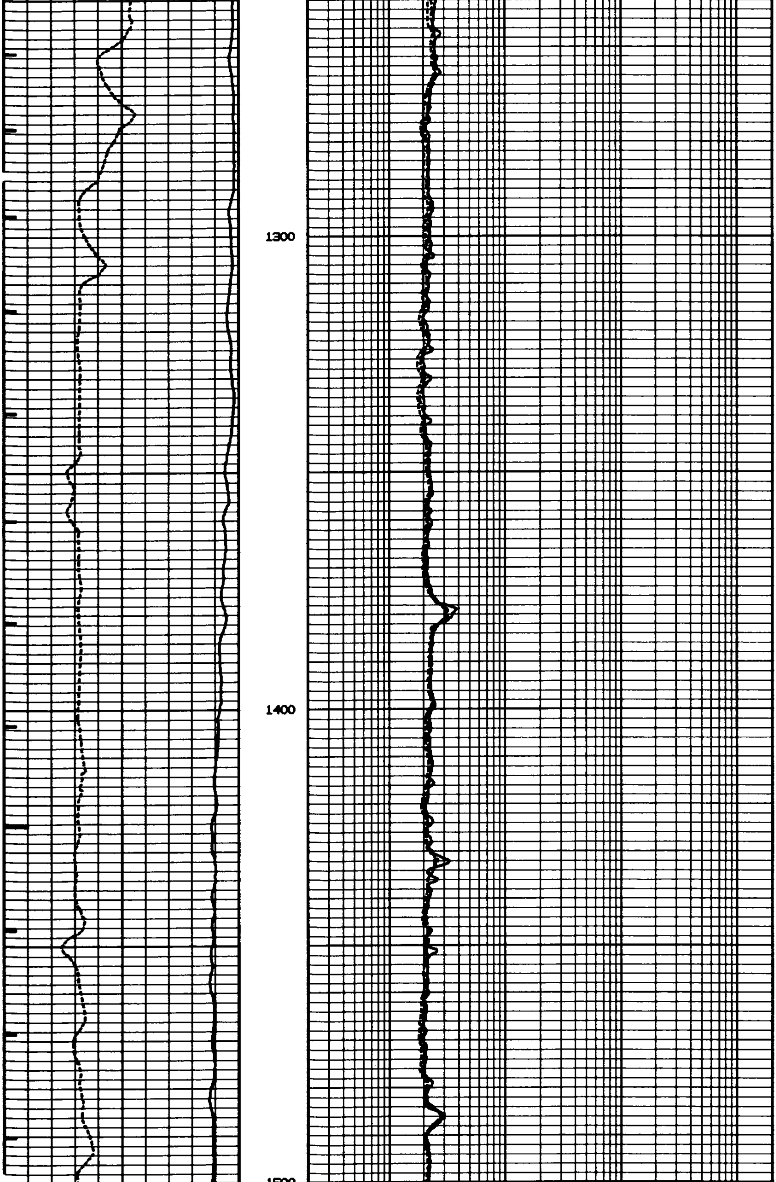


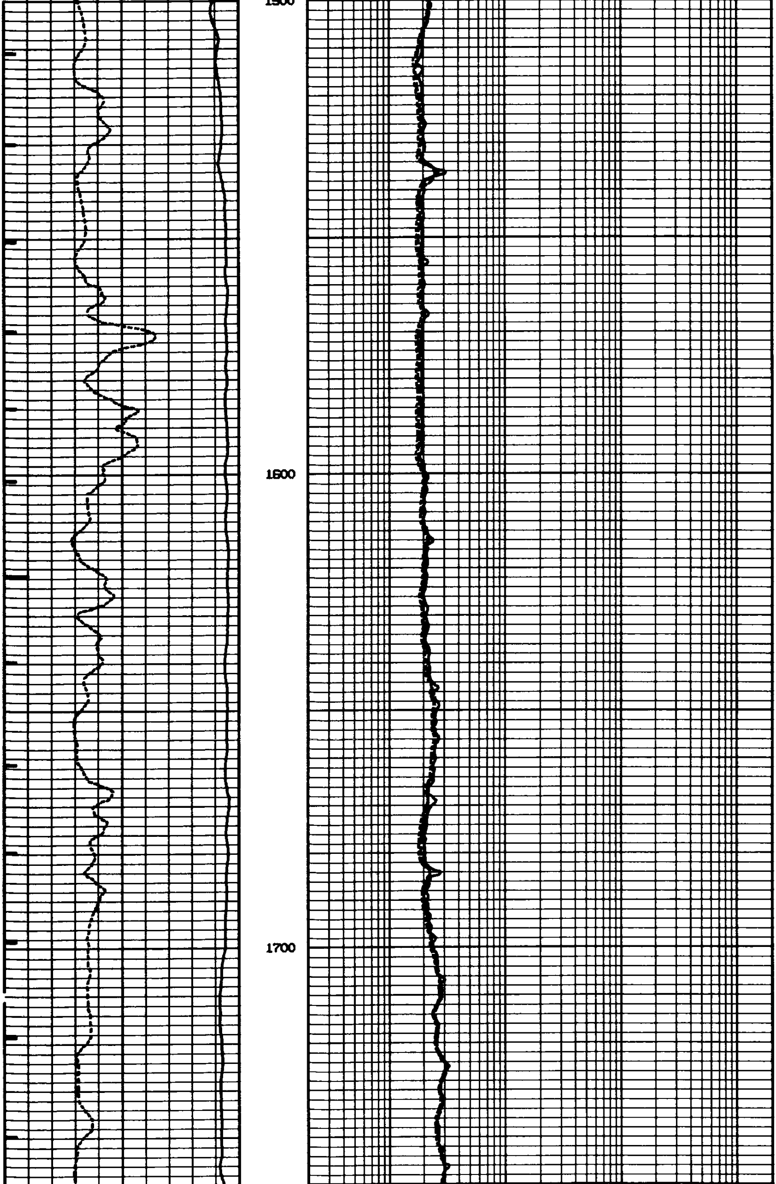


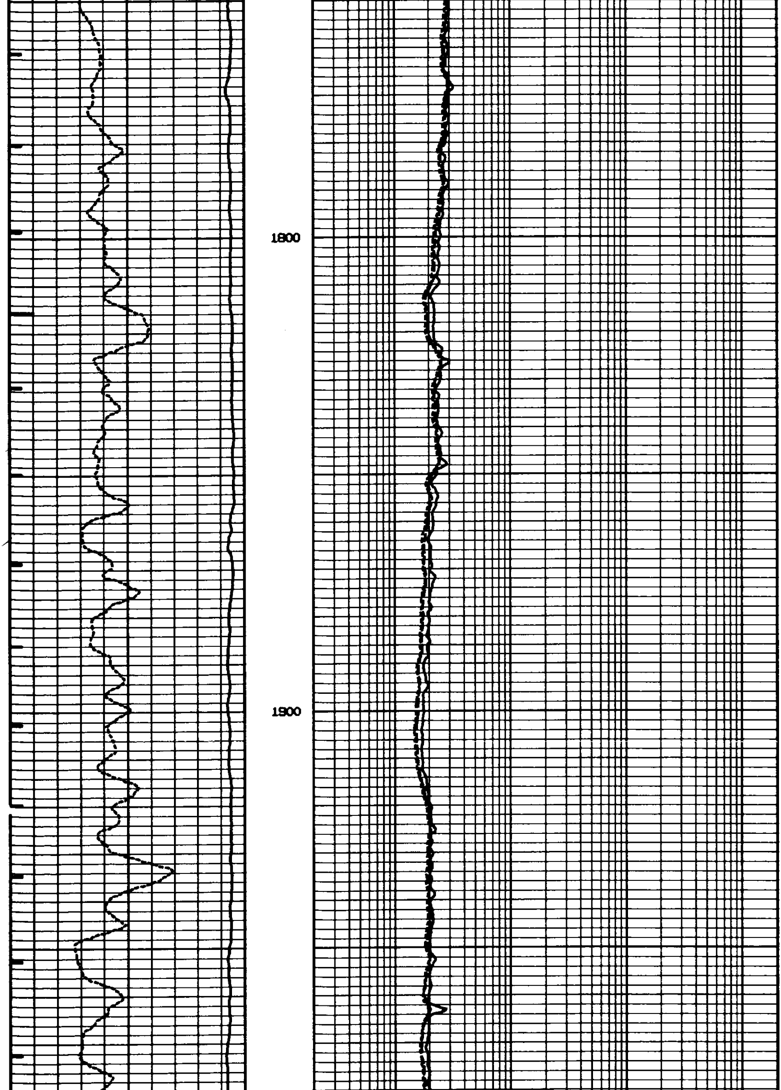


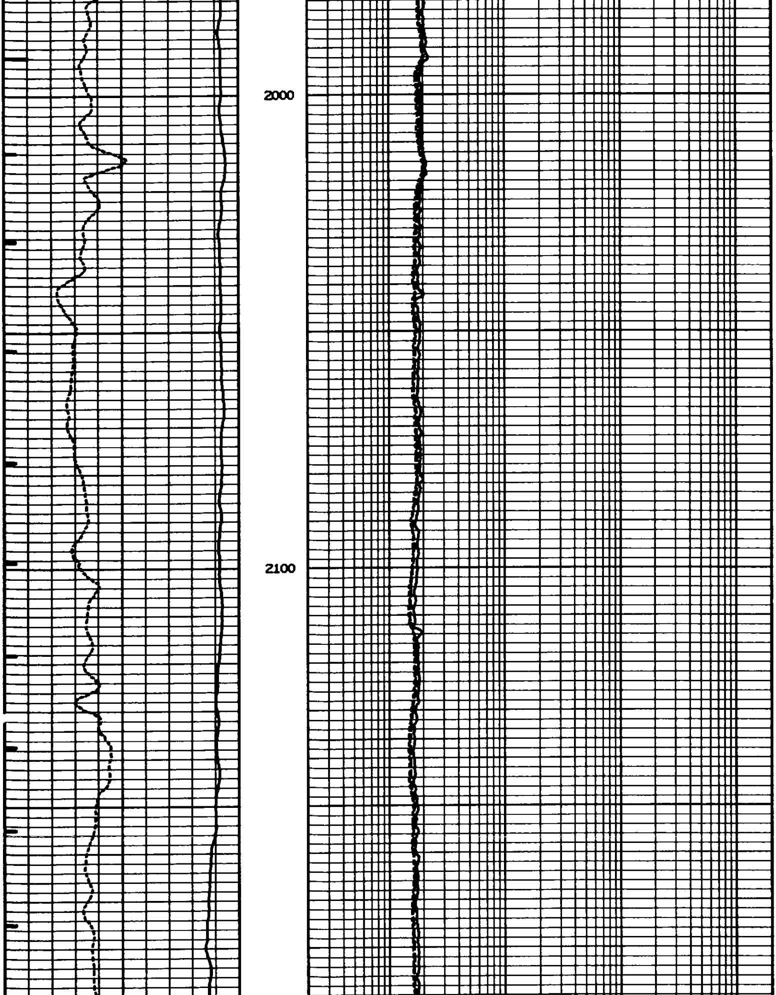


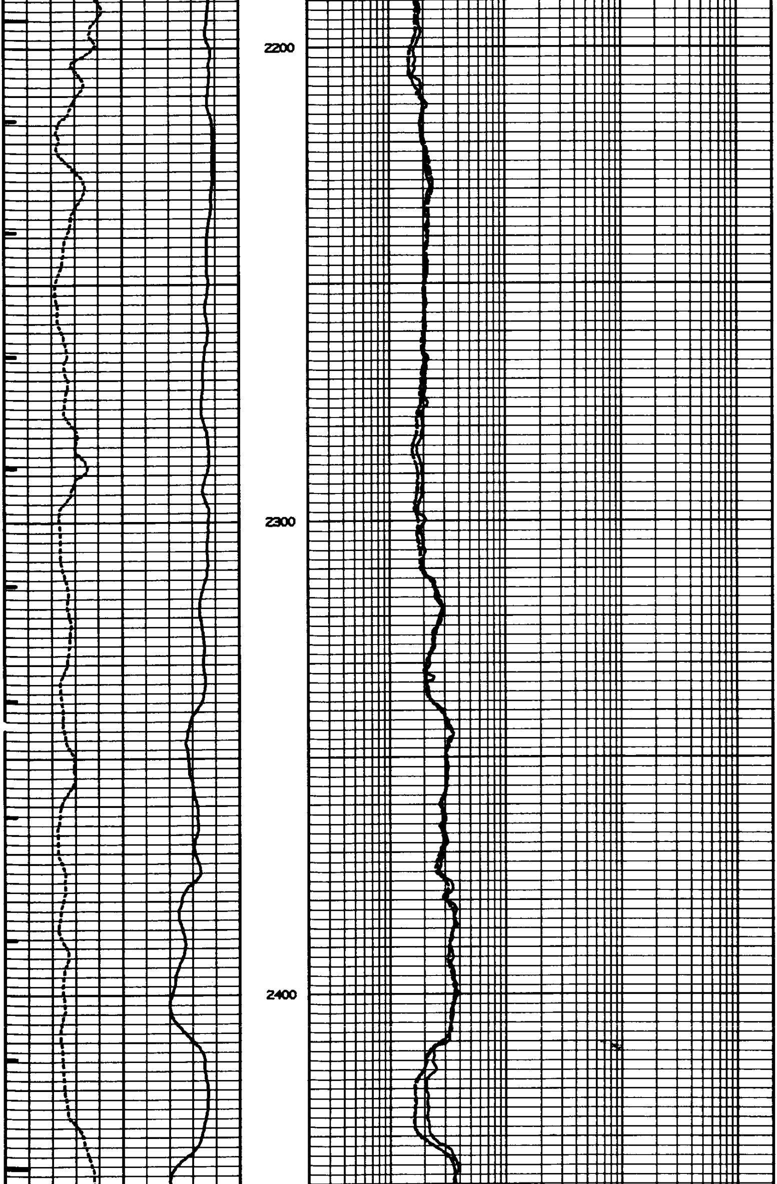


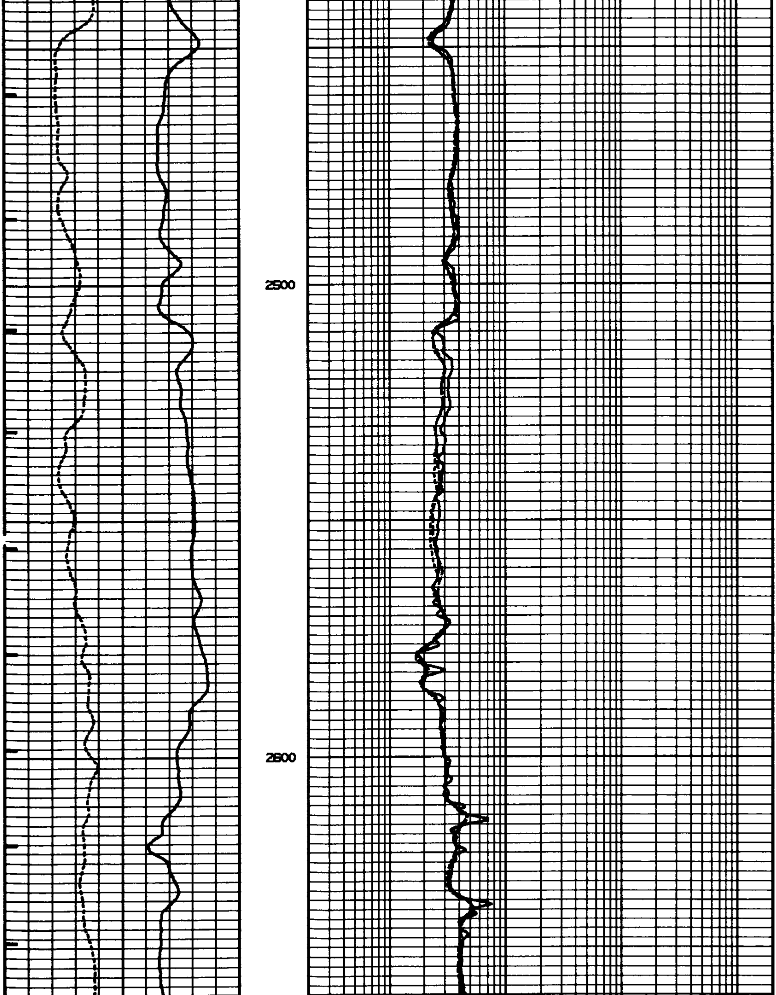


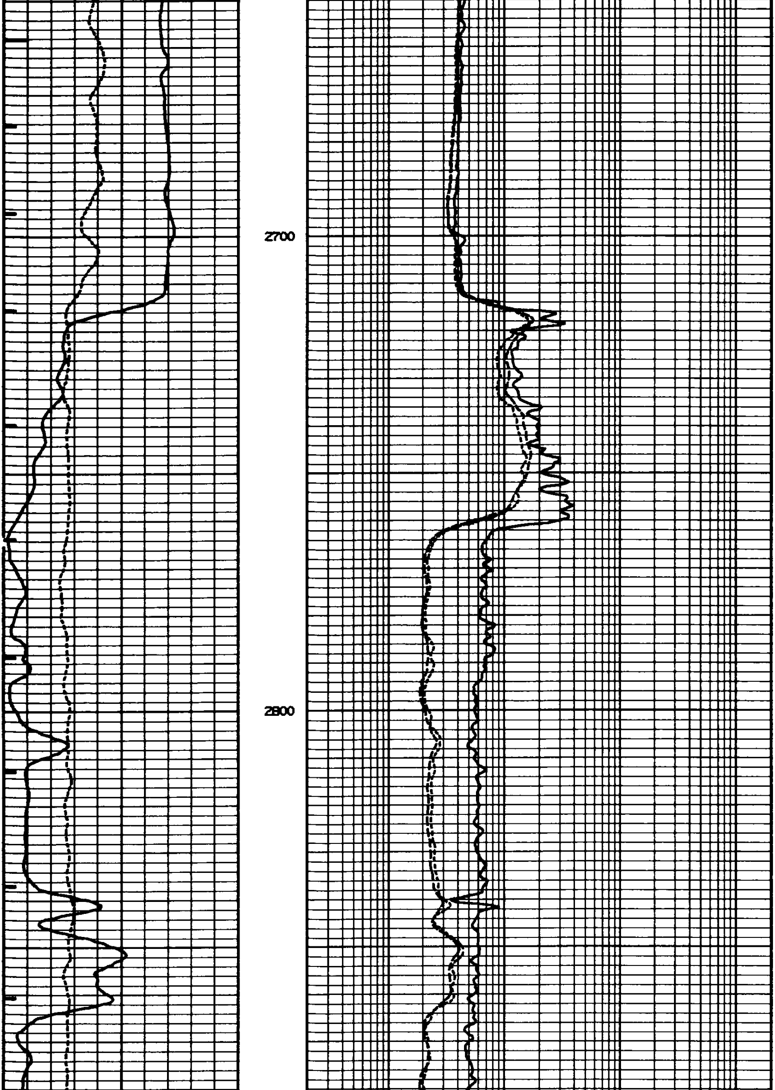


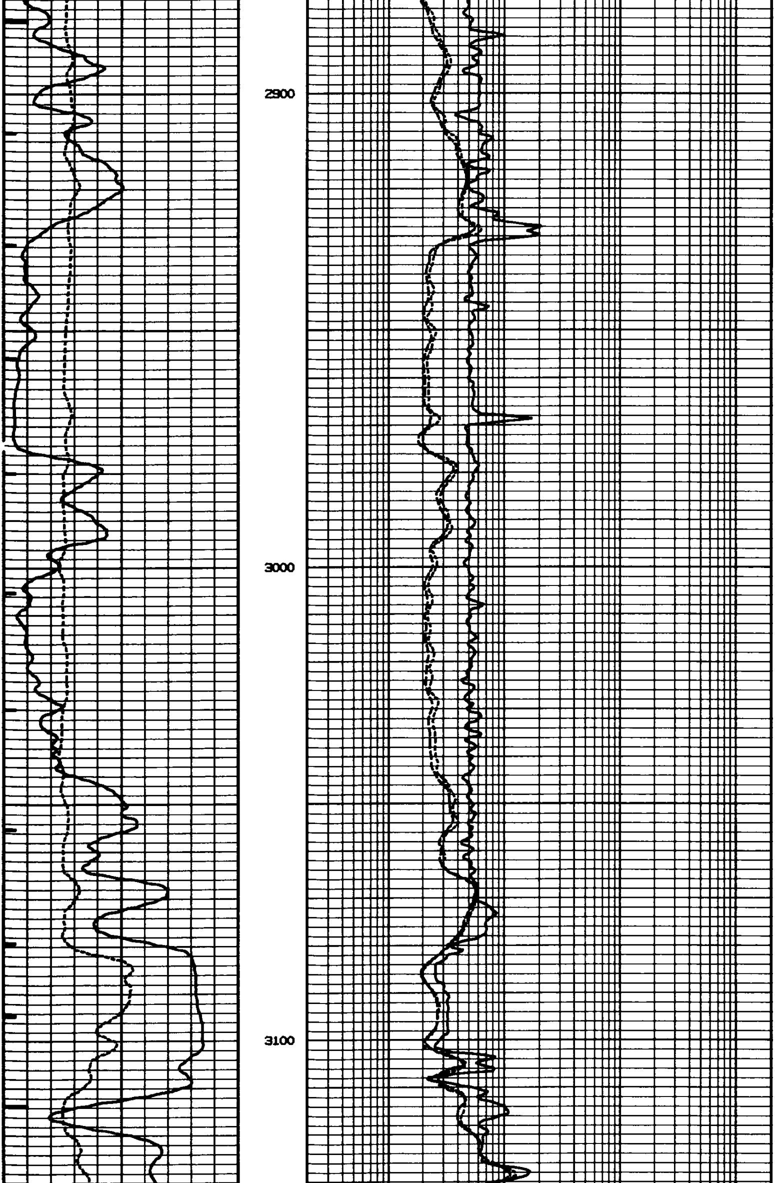


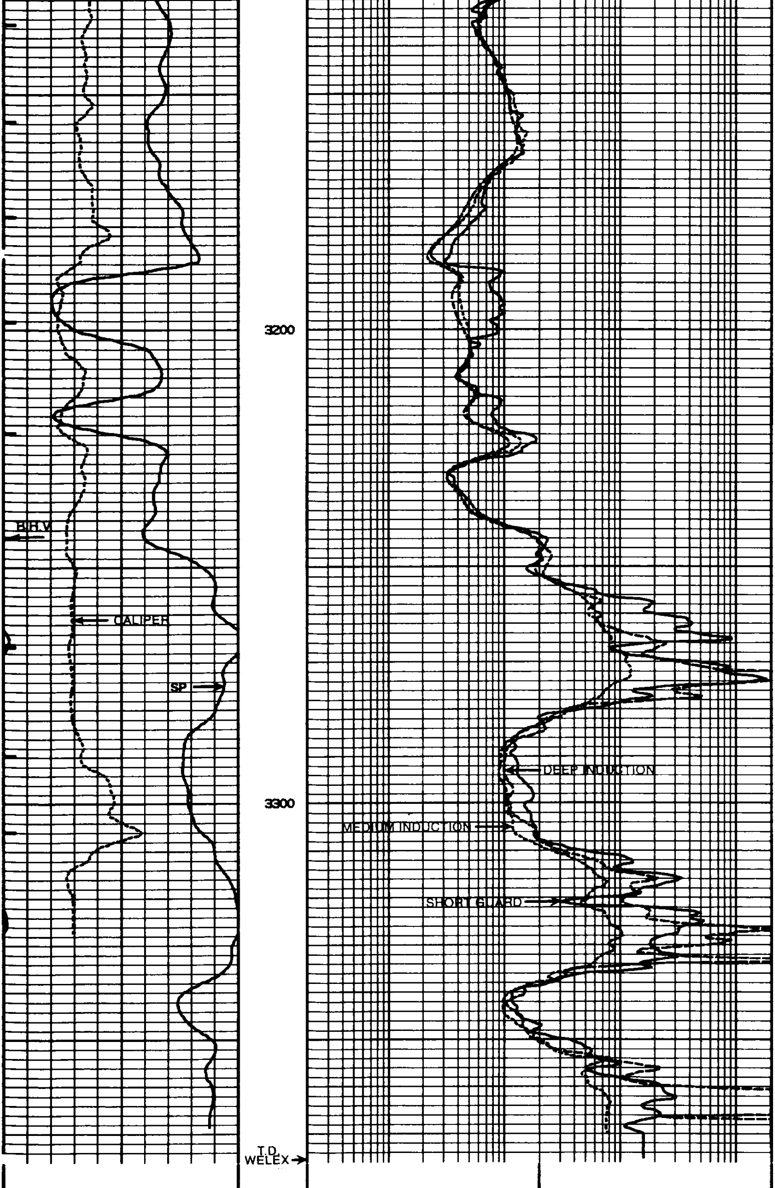


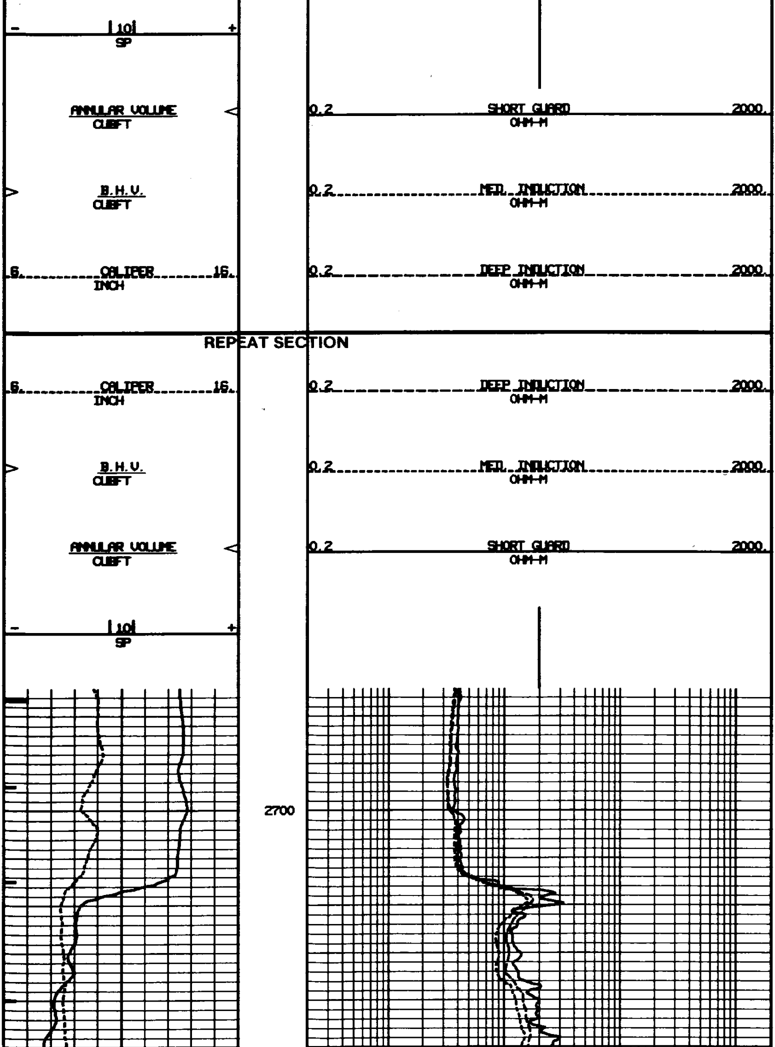


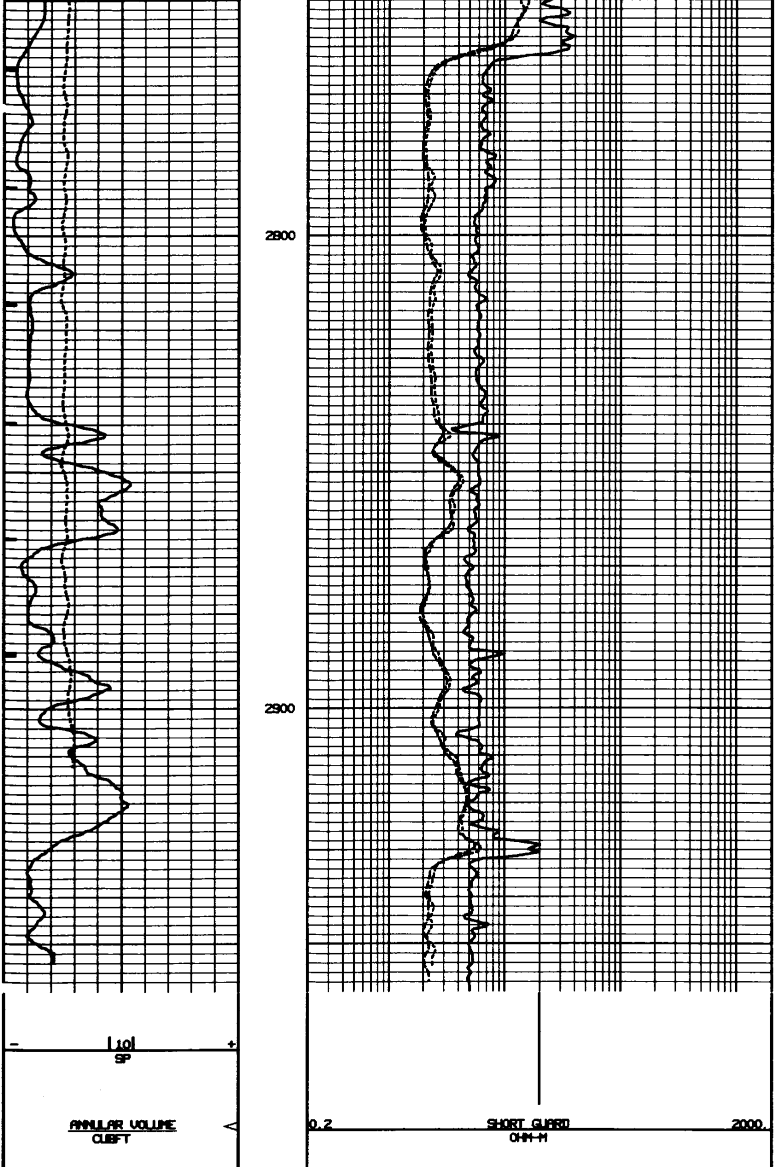


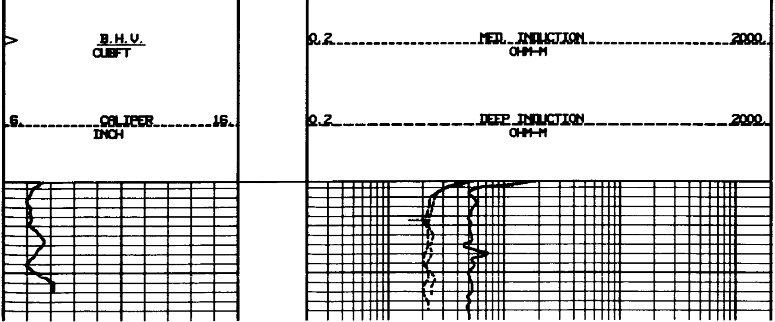












```
                         ENG V1.87 09/06/85 DUAL INDUCTION ACOUSTIC
                                   CONSTANT TABLE

      ILDB       ILMB       GLSB       ILSC
         0.         0.         0.      YES

      CAVL       SPAC       TRIG       MDT        FDT        SDT        LSSC
      YES           2.      NEG           57.       189.       100.     VEL

      NTYP       CENT       MNEU
      241        NO         LIME

      FNUM       FEXP       FPHI
        0.62       2.15     AVL

      BSIZ       CSIZ       DIG1       DIG2       DLY        DIR
         8.5        5.5     NO         NO         YES        UP
```

```
                         ENG V1.87 09/06/85 DUAL INDUCTION ACOUSTIC

SERVICE ID TRK  UNIT        SCL          RBASE TYPE DELY OPFL   OFF  TPE DGCHN CVC
                           L        R     L R                            IN/OT 1 2
BHV     25  1   CUBFT       0.      10.   0 0   9     0.   0.     0.  1  15 15 NYY
DCAL     0  4   INCH       -5.       5.   0 0   0     0.   0.     0.  1   0  0 NNN
AHV     26  1   CUBFT      10.       0.   0 0   9     0.   0.     0.  1   0  0 NYY
SP      12  1    MV         0.     100.   Y Y   4     0.   0.   -20.  1   6  6 YYY
SPU      2  1    MV         0.     100.   Y Y   4     0.   0.     0.  1   0  0 NNN
F       11  4               2.   20000.   0 0   0     0.   0.     0.  1   4  4 QQQ
RWA     13  1   OHM-M       0.       3.   0 1   2     0.   0.     0.  1  11 11 MQQ
BSIZ     0  1   INCH        6.      16.   0 0   0     0.   0.     0.  1   0  0 NNN
TENS    10  3            5000.       0.   1 1   0     0.   0.     0.  1  13 13 NQQ
RXRT     0  1               1.6     -0.4  0 0   0     0.   0.     0.  1   0  0 NNN
```

```
                         ENG V1.87 09/06/85 DUAL INDUCTION ACOUSTIC

SERVICE ID TRK  UNIT        SCL          RBASE TYPE DELY OPFL   OFF  TPE DGCHN CVC
                           L        R     L R                            IN/OT 1 2
CILD    22  3   MMHO     1000.       0.   1 0   0     0.   0.     0.  1   7  7 YQQ
ILDE    10  2   OHM-M       0.      20.   0 1   2     0.   0.     0.  1   8  8 MNN
ILD      4  4   OHM-M       0.2   2000.   0 1   0     0.   0.     0.  1   1  1 NMM
ILME     0  2   OHM-M       0.      20.   0 1   2     0.   0.     0.  1   0  0 QQQ
ILM      5  4   OHM-M       0.2   2000.   0 1   0     0.   0.     0.  1   2  2 NFF
GLSE    19  2   OHM-M       0.      20.   0 1   2     0.   0.     0.  1   9  9 YNN
GLS      6  4   OHM-M       0.2   2000.   0 1   0     0.   0.     0.  1   3  3 NYY
GLSA    20  2   OHM-M       0.       4.   0 0   0     0.   0.     0.  1  10 10 YNN
DT       9  3   US/FT     150.      50.   1 1   0     0.   0.     0.  1  16 16 MYQ
VPHI    29  3    %         45.     -15.   1 0   0     0.   0.     0.  1   0  0 QQQ
TDI     30  3              10.       0.   0 0   9     0.   0.     0.  1  12 12 NYQ
PAMP     0  2               0.    1000.   0 0   0     0.   0.     0.  1   0  0 NNN
APAM     0  2               0.     100.   0 0   0     0.   0.     0.  1   0  0 NNN
FAMP     0  2               0.    1000.   0 0   0     0.   0.     0.  1   0  0 NNN
TT       0  1   USEC      400.     200.   0 0   0     0.   0.     0.  1   0  0 NNN
CALI     1  1   INCH        6.      16.   1 1   0     0.   0.     0.  1   5  5 QFF
```

```
                        ENG V1.87 09/06/85 DUAL INDUCTION ACOUSTIC
                                   TOOL TABLE
SUB  SERIAL #  MODEL SOURCE #  CALB #    NRM1    INT1  NRM2    INT2  DLY    TCH
DIL  98862     280   0         0
 CILD                                     0.24473     0 0.04163     0    9.  12,13
 ILME                                      0.4232     0 0.07195     0    6.   8, 9
 SP                                            0.     0      0.     0    8.  22, 0
GLSE 67279     478   0         0          14.2264     0      0.     0    0.   3, 5
MGDE 0         0     0         0               0.     0      0.     0    0.   4, 6
AVL  213213    200   0         0
 DT                                            0.     0      0.     0  35.6  20,21
 PAMP                                        0.25     0      0.     0    0.  24, 0
 FAMP                                        0.25     0      0.     0    0.  25, 0
 TT                                         432.5     0      0.     0    0.   0, 0
NEU  0         0     0         0               0.     0      0.     0  37.5  18, 0
GR   0         0     0         0               0.     0      0.     0   38.  17, 0
CALI 123       123   0         0          0.00195  3779      0.     0  49.3  16, 0
CCL  0         0     0         0               0.     0      0.     0    0.  22, 0
TENS 1233      0     0         0               3.  -100      0.     0    0.  A5, 0
TEMP 0         0     0         0               0.     0      6.     0    0.   0, 0
GPC1 0         0     0         0               0.     0      0.     0    0.   0, 0
GPC2 0         0     0         0               0.     0      0.     0    0.   0, 0
```

```
                SHORT GUARD(NORMAL) BEFORE SURVEY CALIBRATION SUMMARY

PERFORMED   10/ 16/ 87    LAST SHOP CALIB   10/ 13/ 87
PROGRAM VERSION V1.87

               MEASURED CALIBRATED UNITS
LOW INT CAL       1.9495  1.9857    OHMM
HIGH INT CAL      199.69  198.85    OHMM

SER # 67279      MOD. # 478    SRC. # 0          FLD CAL. # 0
```

```
                SHORT GUARD(NORMAL) BEFORE SURVEY CALIBRATION SUMMARY

PERFORMED   10/ 16/ 87    LAST SHOP CALIB   10/ 13/ 87
PROGRAM VERSION V1.87

                    TOOL VALUE MEASURED CALIBRATED
INT LOW CAL VE          1269
INT LOW CAL IALPHA      9537    1.9495     1.9857
INT HIGH CAL VE         5689
INT HIGH CAL IALPHA      408    199.69     198.85

SHOP NORM  INTC      14.226         0
FIELD NORM  INTC     14.163         0

SER # 67279      MOD. # 478    SRC. # 0          FLD CAL. # 0
```

```
CALI FIELD CALIBRATION
PERFORMED   10/ 16/ 87    LAST SHOP CALIB   10/ 01/ 87
PROGRAM VERSION V1.87

            TOOL VALUE   MEASURED    CALIBRATED   UNITS
VALUE 1        7875.      8.397          8.        INCH
VALUE 2       11971.     16.795         16.        INCH
```

```
                BEFORE LOG  FIELD CALIBRATION SUMMARY

PERFORMED   10/ 16/ 87    LAST SHOP CALIB   10/ 13/ 87
PROGRAM VERSION V1.87

                         DEEP INDUCTION          MEDIUM INDUCTION
     ITEM              FIELD        SHOP        FIELD        SHOP
 TOOL ZERO           0.8326          0.       2.0146          0.
 INT. CALIB.         527.13      515.38       511.38      502.03
 MANDREL ERROR       0.8326                   6.9793


SER # 98862      MOD. # 280    SRC. # 0          FLD CAL. # 0
```

```
                  DUAL INDUCTION SHOP CALIBRATION SUMMARY
PERFORMED   10/ 13/ 87    LAST SHOP CALIB   10/ 13/ 87
PROGRAM VERSION V1.87
```

```
                          DEEP INDUCTION                 MEDIUM INDUCTION
     ITEM             MEASURED      CALIBRATED       MEASURED     CALIBRATED
TOOL ZERO             0.9097           0.            2.0014           0.
INT. CALIB.           511.33        515.38           498.65        502.03
WHEEL                  496.2        500.15           496.97        500.33
MANDREL ERROR                       0.8326                         6.9793


SER # 98862      MOD. # 280     SRC. # 0          FLD CAL. # 0
                 SHORT GUARD(NORMAL) SHOP CALIBRATION

PERFORMED   10/ 13/ 87    LAST SHOP CALIB    10/ 13/ 87
PROGRAM VERSION V1.87

                      MEASURED   CALIBRATED   UNITS
SHOP CAL LOW           1.6374        2.       OHMM
SHOP CAL HIGH          163.74       200.      OHMM
INTERNAL CAL LOW       1.6258      1.9857     OHMM
INTERNAL CAL HIGH       162.8      198.85     OHMM

SER # 67279      MOD. # 478     SRC. # 0          FLD CAL. # 0


                  AFTER LOG CALI CALIBRATION SUMMARY

PERFORMED   10/ 16/ 87    LAST SHOP CALIB   10/ 01/ 87
PROGRAM VERSION V1.87

               BEFORE      AFTER   UNITS
VALUE 1           8.       7.895   INCH
VALUE 2          16.      16.123   INCH


SER # 123        MOD. # 123     SRC. # 0          FLD CAL. # 0



              SHORT GUARD(NORMAL) AFTER SURVEY CALIBRATION

PERFORMED   10/ 16/ 87    LAST SHOP CALIB   10/ 13/ 87
PROGRAM VERSION V1.87
                   BEFORE     AFTER    UNITS
LOW INT CAL         1.9495  1.8287     OHMM
HIGH INT CAL        199.69  199.28     OHMM

SER # 67279      MOD. # 478     SRC. # 0          FLD CAL. # 0



              SHORT GUARD(NORMAL) AFTER SURVEY CALIBRATION

PERFORMED   10/ 16/ 87    LAST SHOP CALIB   10/ 13/ 87
PROGRAM VERSION V1.87
                                       MEASURED
                        TOOL VALUE   AFTER     BEFORE
INT LOW CAL VE             1233
INT LOW CAL IALPHA         9536     1.8287     1.9495
INT HIGH CAL VE            5653
INT HIGH CAL IALPHA         409     199.28     199.69



SER # 67279      MOD. # 478     SRC. # 0          FLD CAL. # 0



              AFTER  LOG  FIELD CALIBRATION SUMMARY

PERFORMED   10/ 16/ 87    LAST SHOP CALIB   10/ 13/ 87
PROGRAM VERSION V1.87

                           DEEP INDUCTION          MEDIUM INDUCTION
   ITEM                  AFTER       BEFORE       AFTER       BEFORE
 TOOL ZERO              1.0407       1.0407       1.9426      1.9426
 INT. CALIB.            525.89       527.13        510.8      511.38
 MANDREL ERROR          0.8326                    0.9793


SER # 98862      MOD. # 280     SRC. # 0          FLD CAL. # 0
```