#504

Schlumberger

# DUAL INDUCTION / SP
# GAMMA RAY / SONIC 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

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**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 324 | 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 | | |
| **epth Logger (Schl.)** | 1399.0 F | | | 2292.0 F | | |
| **n. Log Interval** | 1389.0 F | | | 2282.0 F | | |
| **Log Interval** | 0.0 F | | | 1350.0 F | | |
| **ing-Driller** | 13 3/8" @ 359.0 F | | @ | | @ | |
| **ng-Logger** | 355.0 F | | | | | |
| **ize** | @ | | @ | | @ | |
| **Fluid in Hole** | GEL/CYPAN | | | KCL/XCD | | |
| **Visc.** | 9.50 LB/G | 60.0 S | | 8.60 LB/G | 36.0 S | |
| **Fld. Loss** | 8.0 | | | 9.0 | | |
| **e of Sample** | FLOWLINE | | | FLOWLINE | | |
| **Meas. Temp.** | 2.310 OHMM | @ 69.0 DEGF | | .328 OHMM | @ 72.0 DEGI | |
| **Meas. Temp.** | 3.720 OHMM | @ 66.0 DEGF | | .382 OHMM | @ 69.0 DEGI | |
| **Meas. Temp.** | 3.550 OHMM | @ 66.0 DEGF | | .662 OHMM | @ 69.0 DEGI | |
| **: Rmf \| Rmc** | CELL | CELL | | CELL | CELL | |
| **BHT** | 1.611 OHMM | @ 102. DEGF | | .247 OHMM | @ 98.0 DEGI | |
| **ulation Ended** | 08:30 9-27-97 | | | 19:30 10-3-97 | | |
| **er on Bottom** | SEE LOG | | | SEE LOG | | |
| **c. Temp.** | 102. DEGF | | | 98.0 DEGF | | |
| **Location** | 8303 | BAKERSFIELD | | 8303 | BAKERSFIELD | |
| **ded By** | GREG PERRY | | | GREG PERRY | | |
| **essed By** | MR. MEYER / MR. THOMAS | | | 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 | 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 | 1800.0 F/HR |
| **EQUIPMENT DATA** | | |
| **Tool Number 1** | DIS 151 | DIS 151 |
| **Tool Number 2** | DIC 159 | DIC 159 |
| **Tool Number 3** | SLS WA | SLS WA |
| **Tool Number 4** | SLC UA | SLC UA |
| **Tool Number 5** | SGCSA 483 | SGCSA 483 |
| **Tool Number 6** | TCCB 1289 | 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.

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

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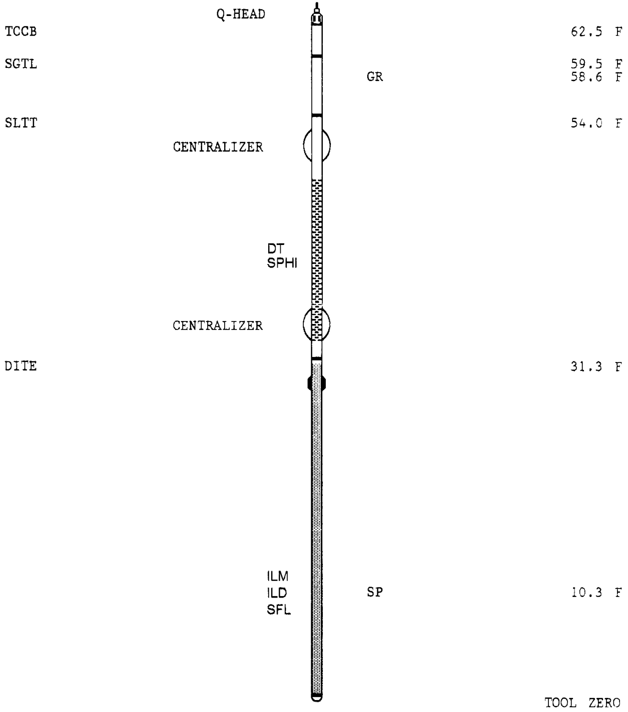
## LOGGING TOOL STRING SKETCH



TOTAL TOOL STRING LENGTH IS 64.7 F.
TOTAL TOOL STRING WEIGHT IS 1032. LB IN AIR.

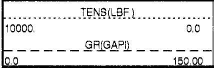
MAIN PASS

ACCUMULATED INTEGRATION VALUES SUMMARY:

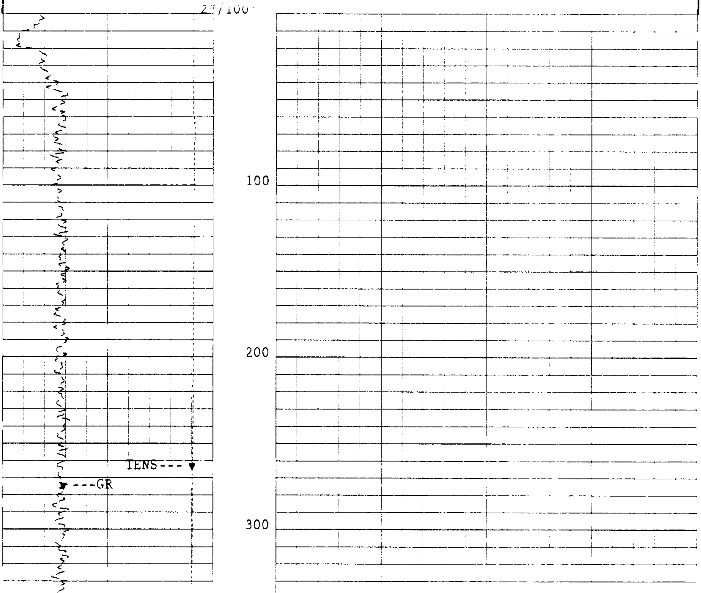
Integrated Transit Time: .256533 S FROM 2292.00 F TO 355.000 F

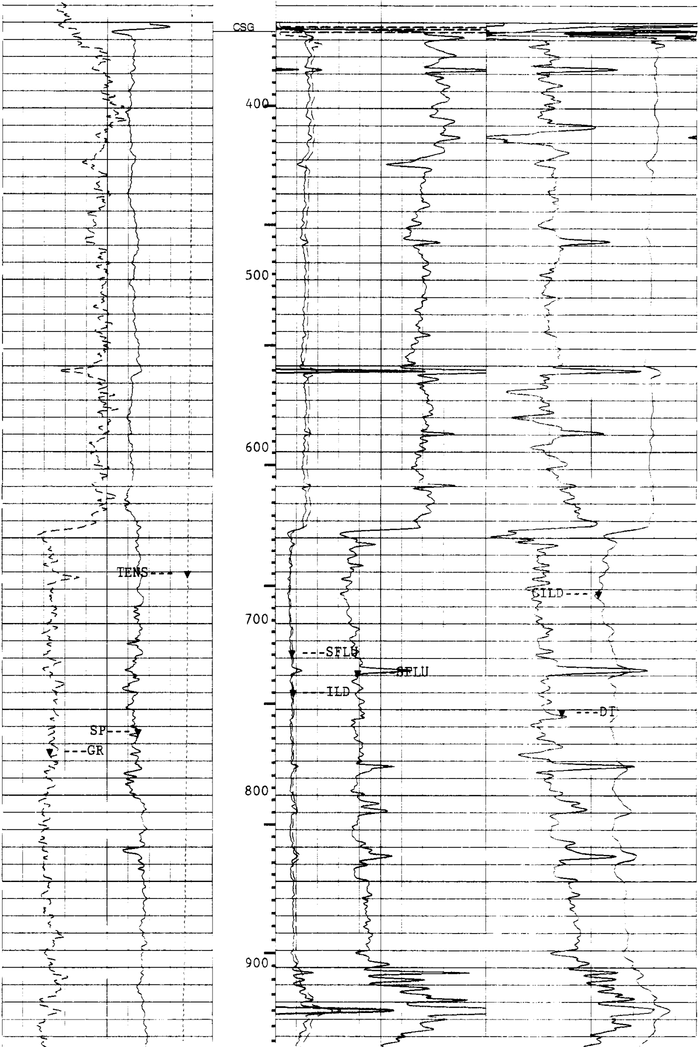
EVENT MARK SUMMARY:

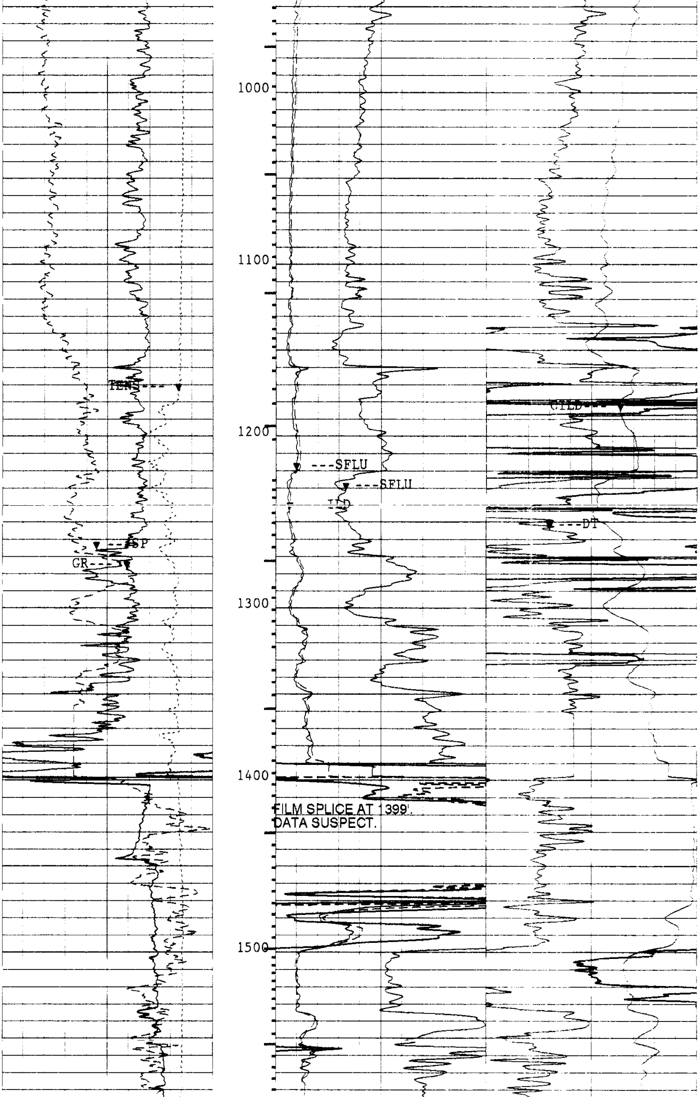
| OUTPUT | INTERVAL BETWEEN PIPS | DEPTH TRACK EDGE |
|---|---|---|
| Integrated Transit Time | .00100000 S | RIGHT EDGE |



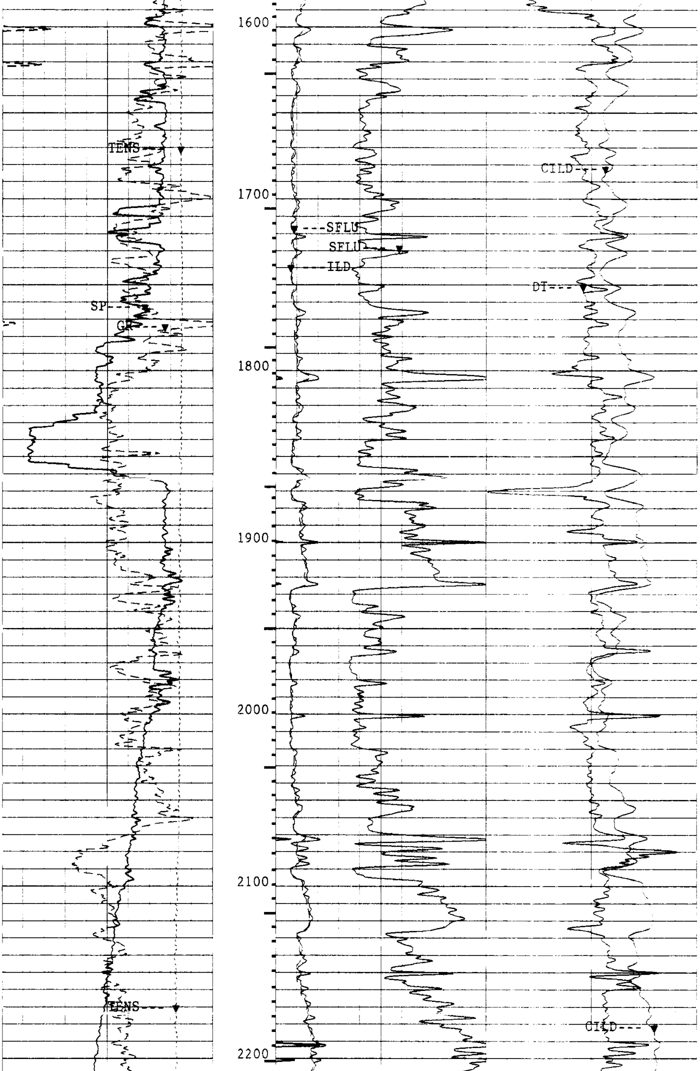
| CP 44.2 | FILE 59 | 04-OCT-1997 10:59 |
|---|---|---|
| | INPUT FILE(S)<br>58 | CREATION DATE<br>04-OCT-1997 10:21 |

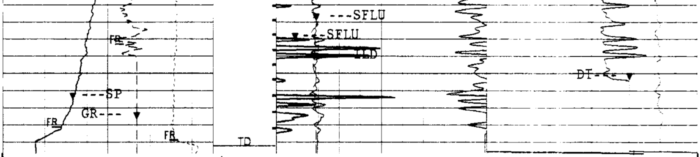






FILM SPLICE AT 1399'.
DATA SUSPECT.





2"/100'

CP 44.2 FILE 59 04-OCT-1997 10:52

INPUT FILE(S) CREATION DATE
58 04-OCT-1997 10:21

| Curve | Left | Right |
|---|---|---|
| TENS(LBF) | 10000. | 0.0 |
| SP(MV) | -20.00 | 80.000 |
| GR(GAPI) | 0.0 | 150.00 |
| SFLU(OHMM) | 0.0 | 30.000 |
| SFLU(OHMM) | 0.0 | 6.0000 |
| ILD(OHMM) | 0.0 | 30.000 |
| [illegible] | 1000.0 | 0.0 |
| DT(US/F) | 175.00 | 75.000 |

## SENSOR MEASURE POINT TO TOOL ZERO

| | | | | | |
|---|---|---|---|---|---|
| GR | 58.6 | FEET | SP | 10.3 | FEET |
| SRAT | 37.1 | FEET | AMPL | 39.6 | FEET |
| TT1 | 38.6 | FEET | CBL | 39.6 | FEET |
| TT3 | 35.8 | FEET | TT2 | 39.6 | FEET |
| T0 | 39.6 | FEET | TT4 | 34.8 | FEET |
| TTSL | 39.6 | FEET | TT | 39.6 | FEET |
| IXM | 6.0 | FEET | CBSL | 39.6 | FEET |
| IXD | 9.5 | FEET | IRM | 6.0 | FEET |
| SPA | 10.3 | FEET | ITEM | 6.5 | FEET |
| SFC | 6.5 | FEET | SFB | 6.5 | FEET |
| IRD | 9.5 | FEET | SFV | 6.5 | FEET |
| CCL | 65.3 | FEET | TENS | 3.0 | FEET |
| NOIS | 3.0 | FEET | | | |

## PARAMETERS

| NAME | VALUE | UNIT | NAME | VALUE | UNIT |
|---|---|---|---|---|---|
| SMB | DISA | | VDLR | 2IN | |
| TOCA | DISA | | RATE | 15 | HZ |
| DG | AUTO | | DETE | E2 | |
| NMSG | 180 | US | CBLG | 35 | US |
| AMPL | 2 | | CBL | 2 | |
| WFM | 1 | | SS | FAST | |
| TOD | DISA | | SLC | UA | |
| DTF | 189.000 | US/F | DTM | 56.0000 | US/F |
| CDTS | 100.000 | | SPFS | R-H | |
| PP | NORM | | DO | 0.0 | F |
| WMUD | 8.60000 | LB/G | TD | 2292.00 | F |
| IFRS | 20 | KHZ | SBR | 1.00000 | OHMM |
| MXE2 | 30.2658 | MM/M | DXE2 | 121.315 | MM/M |
| MRE2 | 17.4291 | MM/M | DRE2 | 13.9156 | MM/M |
| MPH2 | -.893001 | DEG | DPH2 | .0599204 | DEG |
| MGF2 | 1.02163 | | DGF2 | .993476 | |
| DESP | DISA | | SFLE | ALLO | |
| DCAS | -50000.0 | F | ITEN | ALLO | |
| DEVI | 32.0000 | DEG | DSES | H412 | |
| IPRO | STAN | | IPHA | NORM | |
| DWCO | 512 | | DSIN | 5 | US |
| DDEL | 200 | US | NCJT | GSRY | |
| GTSE | TEMP | | SHT | 75.0000 | DEGF |
| BHT | 98.0000 | DEGF | SPAE | DISA | |
| BS | 7.87500 | IN | BHS | OPEN | |

# REPEAT SECTION

ACCUMULATED INTEGRATION VALUES SUMMARY:

Integrated Transit Time: .0225089 S FROM 2292.00 F TO 2095.50 F

EVENT MARK SUMMARY:

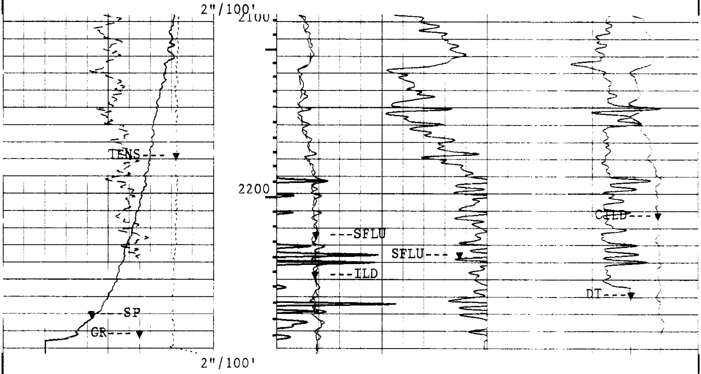
| OUTPUT | INTERVAL BETWEEN PIPS | DEPTH TRACK EDGE |
|---|---|---|
| Integrated Transit Time | .00100000 S | RIGHT EDGE |

## CHANGED PARAMETERS

| NAME | VALUE | UNIT | DEPTH ( F ) | NAME | VALUE | UNIT | DEPTH ( F ) |
|---|---|---|---|---|---|---|---|
| WMUD | 8.60000 | LB/G | 2290.5 | TD | 2292.00 | F | 2229.5 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| TENS(LBF) | 10000. | 0.0 | SFLU(OHMM) | 0.0 | 30.000 | | | 
| SP(MV ) | -50.00 | 50.000 | SFLU(OHMM) | 0.0 | 6.0000 | CILD(MM/M) | 1000.0 | 
| GR(GAPI) | 0.0 | 150.00 | ILD(OHMM) | 0.0 | 30.000 | DT(US/F) | 175.00 |

CP 44.2 FILE 49 03-OCT-1997 21:58 (UP)



CP 44.2 FILE 49 03-OCT-1997 21:53 (UP)

| | | | | | |
|---|---|---|---|---|---|
| TENS(LBF) | | SFLU(OHMM) | | | |
| 10000 | 0.0 | 0.0 | 30.000 | | |
| SP(MV) | | SFLU(OHMM) | | CILD(MM/M) | |
| -50.00 | 50.000 | 0.0 | 6.0000 | 1000.0 | 0.0 |
| GR(GAPI) | | ILD(OHMM) | | DT(US/F) | |
| 0.0 | 150.00 | 0.0 | 30.000 | 175.00 | 75.000 |

## SENSOR MEASURE POINT TO TOOL ZERO

DITE 10.3 FEET
CALY 65.3 FEET
SLTT 39.6 FEET
SGTL 58.6 FEET
DTT 3.0 FEET

## PARAMETERS

| NAME | VALUE | UNIT | NAME | VALUE | UNIT |
|---|---|---|---|---|---|
| SMB | DISA | | VDLR | 2IN | |
| TOCA | DISA | | RATE | 15 | HZ |
| DG | AUTO | | DETE | E2 | |
| NMSG | 180 | US | CBLG | 35 | US |
| AMPL | 2 | | CBL | 2 | |
| WFM | 1 | | SS | FAST | |
| TOD | DISA | | SLC | UA | |
| DTF | 189.000 | US/F | DTM | 56.0000 | US/F |
| CDTS | 100.000 | | SPFS | R-H | |
| WMUD | 9.50000 | LB/G | TD | 32768.0 | F |
| IFRS | 20 | KHZ | SBR | 1.00000 | OHMM |
| MXE2 | 30.2658 | MM/M | DXE2 | 121.315 | MM/M |
| MRE2 | 17.4291 | MM/M | DRE2 | 13.9156 | MM/M |
| MPH2 | -.893001 | DEG | DPH2 | .0599204 | DEG |
| MGF2 | 1.02163 | | DGF2 | .993476 | |
| DESP | DISA | | SFLE | ALLO | |
| DCAS | -50000.0 | F | ITEN | ALLO | |
| DEVI | 32.0000 | DEG | DSES | H412 | |
| IPRO | STAN | | IPHA | NORM | |
| DWCO | 512 | | DSIN | 5 | US |
| DDEL | 200 | US | NCJT | GSRY | |
| GTSE | TEMP | | SHT | 75.0000 | DEGF |
| BHT | 102.000 | DEGF | SPAE | DISA | |
| BS | 7.87500 | IN | BHS | OPEN | |

## CALIBRATIONS

### BEFORE SURVEY CALIBRATION Summary

Performed: 03-OCT-1997 21:49
Program File: TOH (Version 44.2 95/07/25 95/07/25)

SGTL Detector Calibration Summary

| | MEASURED | | | |
|---|---|---|---|---|
| | BKGD | JIG | CALIBRATED | UNITS |
| GR | 35 | 192 | 165 | GAPI |

Back: 29-AUG-1997 10:04 Jig: 29-AUG-1997 10:08 Comp: 29-AUG-1997 10:08

DITE Electronics Calibration Summary

Sonde SN#: 151
Cartridge SN#: 159
Induction Freq: 20 KHz

```
Induction Electronics:

       Offset   Valid Range    Gain  Valid Range    Phase   Valid Range
       (MM/M )    (MM/M )      (--)     (---)       (DEG.)    (DEG.)

  IRD     7.9 -125. => 125.    .988  0.0   => 0.0
  IXD    20.4 -125. => 125.    .996  0.0   => 0.0     8.44 -15.00 => 15.00
  IRM    25.9 -225. => 225.    .999  0.0   => 0.0
  IXM      .2 -225. => 225.    .959  0.0   => 0.0     7.96 -15.00 => 15.00

SFL Electronics:

        Offset  Valid Range    Units      Gain   Valid Range

  SFV      .4   -15.0 => 15.0   MV          .98  0.0   => 0.0
  SFC     -.0     -.6 =>   .6   MA          .98  0.0   => 0.0

Plus Measurement performed at: 03-OCT-1997 21:48

Shop cals used were performed: 29-AUG-1997 11:39

   CP 44.2          FILE     0       03-OCT-1997 21:49
```

| | | | | | | |
|---|---|---|---|---|---|---|
| **COMPANY** | NORTHWEST NATURAL GAS | | | **SCHL.** | **FR** | 1389.0 F |
| | | | | **SCHL.** | **TD** | 1399.0 F |
| **WELL** | IW 23a-22-65 | | | **DRLR.** | **TD** | 1402.0 F |
| | | | | **Elev:** | **KB** | 596.5 F |
| **FIELD** | MIST GAS STORAGE | | | | **DF** | |
| **COUNTY** | COLUMBIA | **STATE** | OREGON | | **GL** | 580.5 F |

Schlumberger

## DUAL INDUCTION / SP
## GAMMA RAY / SONIC 2"