**COMPANY:** TRANS-PACIFIC GEOTHERMAL COMPA

**WELL:** ESI - A - S - ALT

**FIELD:** VALE

**COUNTY:** MALHEUR **STATE:** OREGON

Field: VALE
Location: 101'S & 718'E FROM THE
Well: ESI - A - S - ALT
Company: TRANS-PACIFIC GEOTHERMAL

**Schlumberger**

# DUAL INDUCTION - SFL - SP
# BHC SONIC
# GAMMA RAY - TEMPERATURE

LOCATION

101'S & 718'E FROM THE
NORTH CORNER OF SECTION 33

Elev.: K.B. 2487 F
G.L. 2465 F
D.F.

Permanent Datum: GROUND LEVEL Elev.: 2465 F
Log Measured From: KELLY BUSHING 22.0 F above Perm. Datum
Drilling Measured From: KELLY BUSHING

| API Serial No. | SECTION | TOWNSHIP | RANGE |
|---|---|---|---|
| | 33 | 18 S | 45 E |

| | | | | |
|---|---|---|---|---|
| Logging Date | 19 FEB 1994 | | | |
| Run Number | ONE | | | |
| Depth Driller | 3015 F | | | |
| Schlumberger Depth | 3011 F | | | |
| Bottom Log Interval | 3005 F | | | |
| Top Log Interval | 502 F | | | |
| Casing Driller Size @ Depth | 9.625 IN @ 506 F | | @ | |
| Casing Schlumberger | 502 F | | | |
| Bit Size | 8.750 IN | | | |
| Type Fluid In Hole | GEL / PAC | | | |
| Density / Viscosity | 9.1 LB/G | 47 S | | |
| Fluid Loss / PH | 11.5 C3 | 11 | | |
| Source Of Sample | FLOWLINE | | | |
| RM @ Measured Temperature | 3.680 OHMM @ 80 DEGF | | @ | |
| RMF @ Measured Temperature | 3.490 OHMM @ 47 DEGF | | @ | |
| RMC @ Measured Temperature | 2.740 OHMM @ 46 DEGF | | @ | |
| Source RMF / RMC | MEASURED | MEASURED | | |
| RM @ BHT / RMF @ BHT | 2.037 @ 150 | 1.197 @ 150 | @ | @ |
| Maximum Recorded BHT | 150 DEGF | | | |
| Circulation Stopped Time | 19 FEB 1994 | 18:30 | | |
| Logger On Bottom Time | 19 FEB 1994 | 19:45 | | |
| Unit Number Location | 2018 | BAKERSFIELD E.S. | | |
| Recorded By | J. RUSSELL | | | |
| Witnessed By | G. SUEMNICHT/W. TEPLOW | | | |

| | Run 1 | Run 2 |
|---|---|---|
| Logging Date | | |
| Run Number | | |
| Depth Driller | | |
| Schlumberger Depth | | |
| Bottom Log Interval | | |
| Top Log Interval | | |
| Casing Driller Size @ Depth | | @ |
| Casing Schlumberger | | |
| Bit Size | | |
| Type Fluid In Hole | | |
| MUD Density / Viscosity | | |
| Fluid Loss / PH | | |
| Source Of Sample | | |
| RM @ Measured Temperature | | @ |
| RMF @ Measured Temperature | | @ |
| RMC @ Measured Temperature | | @ |
| Source RMF / RMC | | |
| RM @ BHT / RMF @ BHT | @ | @ |
| Maximum Recorded BHT | | |
| Circulation Stopped Time | | |
| Logger On Bottom Time | | |
| Unit Number Location | | |
| Recorded By | | |
| Witnessed By | | |

@

@ @ @ @

@

@

Run 3

Run 4

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 CLAUSE 4 OF OUR GENERAL TERMS AND CONDITIONS AS SET OUT IN OUR CURRENT PRICE SCHEDULE.

OTHER SERVICES FOR RUN 1
DESCENT 1: DITE-BHC-GR-AMS
DESCENT 2: FMS-GR
DESCENT 3:
DESCENT 4:
DESCENT 5:

REMARKS: RUN NUMBER 1
THANK YOU FOR USING SCHLUMBERGER.
NABORS RIG #164
3 CME-Z, 1 1.5" STANDOFF ON TOOLS
SFL ACTIVITY ON BOTTOM 200' DUE TO ALTERED SANDSTONE

SWS CREW: RUSSELL, BENHAM, BROWN

OTHER SERVICES FOR RUN 2
DESCENT 1:
DESCENT 2:
DESCENT 3:
DESCENT 4:
DESCENT 5:

REMARKS: RUN NUMBER 2

RUN 1

SERVICE ORDER #: 630445
PROGRAM VERSION: 6C0-490
FLUID LEVEL: 0 F

| LOGGED INTERVAL | START | STOP |
|---|---|---|
| | | |
| | | |
| | | |
| | | |
| | | |

RUN 2

SERVICE ORDER #:
PROGRAM VERSION:
FLUID LEVEL:

| LOGGED INTERVAL | START | STOP |
|---|---|---|
| | | |
| | | |
| | | |
| | | |
| | | |

## EQUIPMENT DESCRIPTION

RUN 1

### SURFACE EQUIPMENT

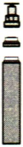
SLM-DB 1436
GSR-U/Y 314
TCM-AB 101

### DOWNHOLE EQUIPMENT

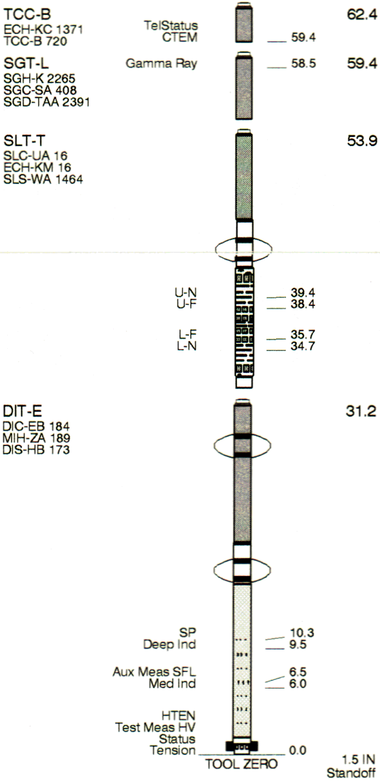
LEH-QB
LEH-QB 20181

AH-63

AMS-A
AMM-AA 1876
AME-AA



RUN 2

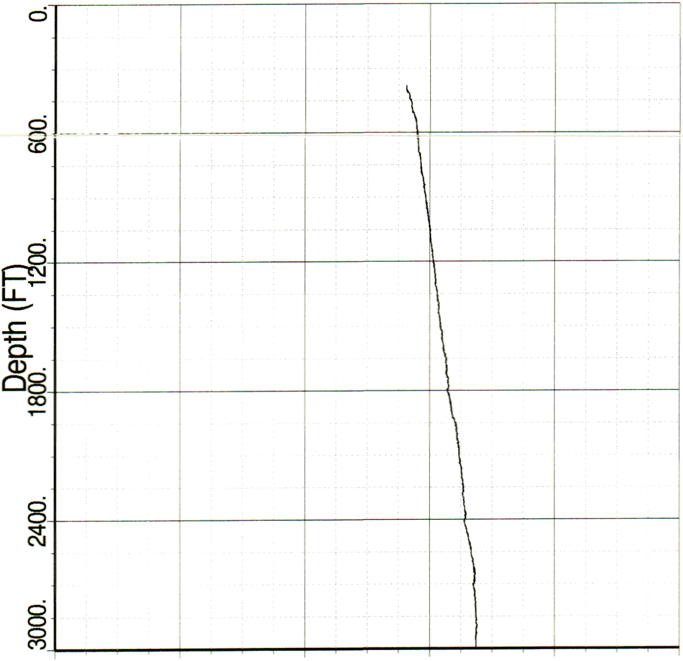


MAXIMUM STRING DIAMETER 6.63 IN
MEASUREMENTS RELATIVE TO TOOL ZERO
ALL LENGTHS IN FEET

## Schlumberger Job Event Summary

| | Time | Elapsed Time | Depth (FT) | File |
|---|---|---|---|---|
| Circulation Stopped | 19-FEB-1994 18:00 | | | |
| Before Calibration Completed | 19-FEB-1994 18:24 | | | |
| Log Pass (up) | 19-FEB-1994 18:41 | 0:12 | 3024.0 - 2756.5 | DITE .001 |
| Rig Up Started | 19-FEB-1994 18:45 | | | |
| Log Pass (up) | 19-FEB-1994 18:54 | 0:51 | 3025.0 - 379.0 | DITE .002 |
| After Calibration Completed | 19-FEB-1994 19:46 | | | |

Index: 3025.0 - 379.0 FT



0. 40. 80. 120. 160. 200.

Mud temperature (DEGF)

5292 Points Plotted

## Output DLIS Files

| | | | | | |
|---|---|---|---|---|---|
| DLIS | DITE .002 | FIELD | 19-FEB-1994 18:54 | 3025.0 FT | 379.0 FT |

## OP System Version: 6C0-490

PIP SUMMARY

⊣ Integrated Transit Time Minor Pip Every 1.0 MS
⊣ Integrated Transit Time Major Pip Every 10.0 MS

▮ Time Mark Every 60.0 S

GAMMA RAY BACKUP
From T1 to GR_1

SP (SP)
-80.0 (MV) 20.0

Mud temperature (MTEM)
0.0 (DEGF) 200.0

Gamma Ray (GR)
0.0 (GAPI) 150.0

Amplified SFL (SFLA)
0.0 (OHMM) 6.0

SFL Averaged (SFLA)
0.0 (OHMM) 30.0

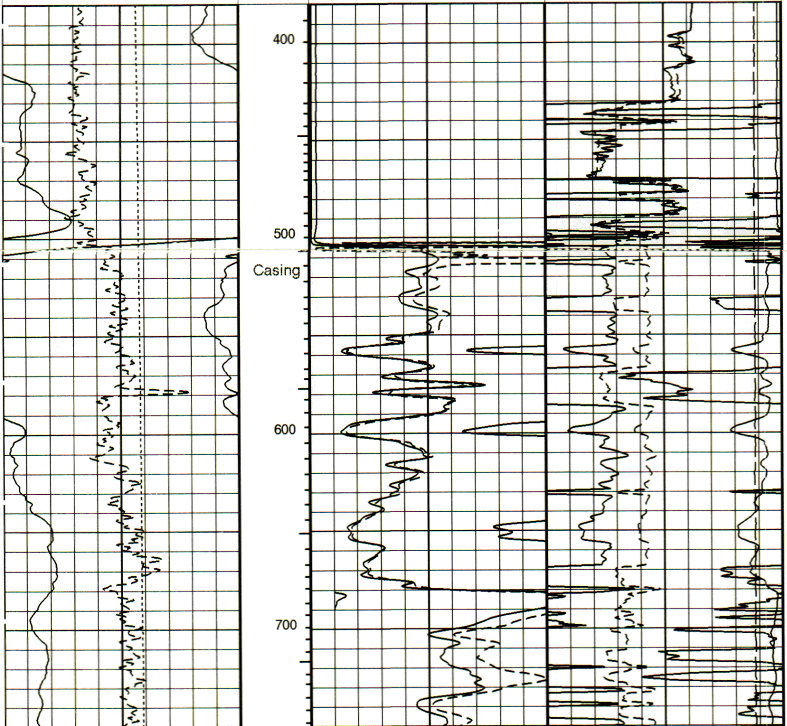
IL-Deep Resistivity (ILD)
0.0 (OHMM) 30.0

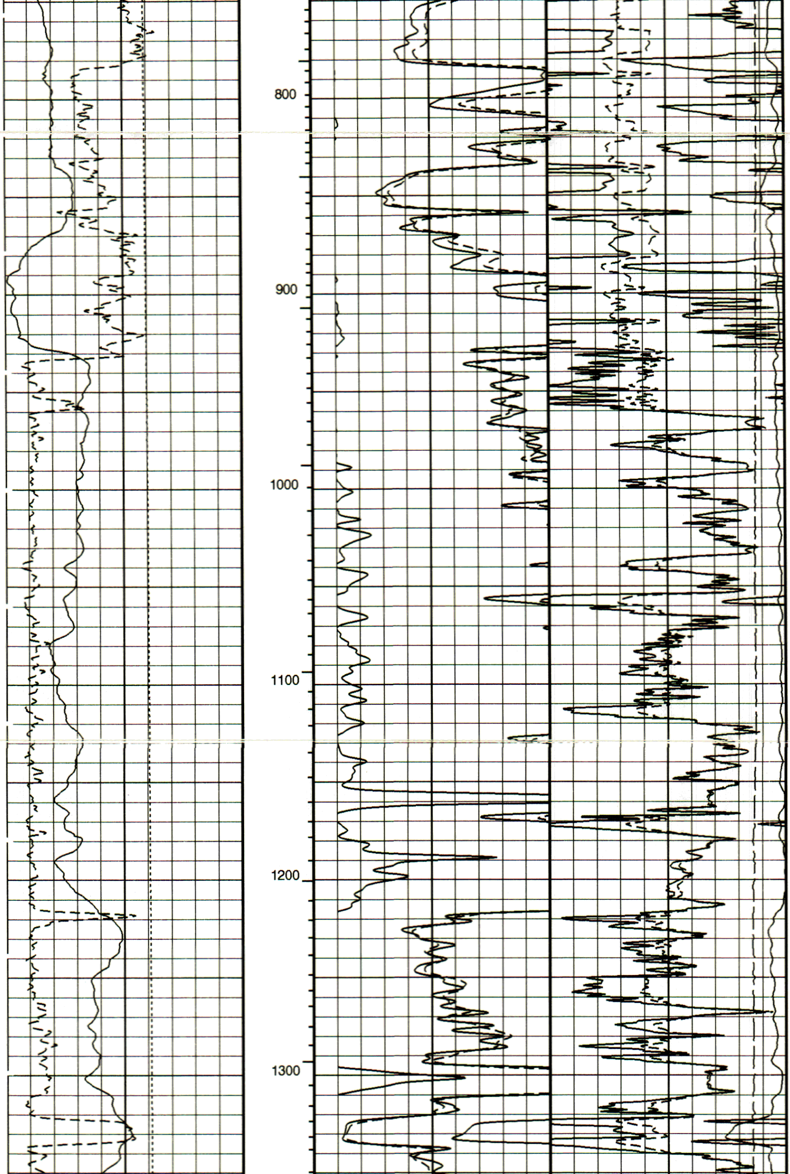
Tension (TENS)
10000.0 (LBF) 0.0

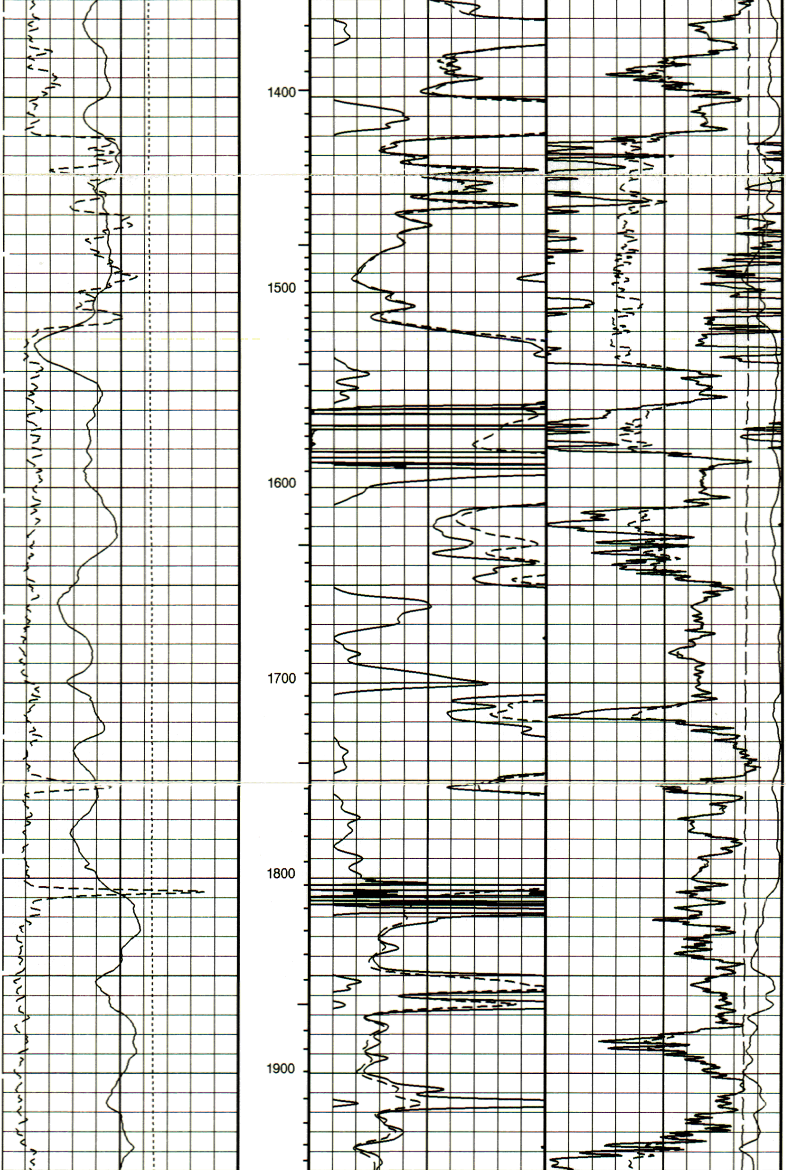
Sonic Porosity (SPHI)
0.6 (V/V) 0.0

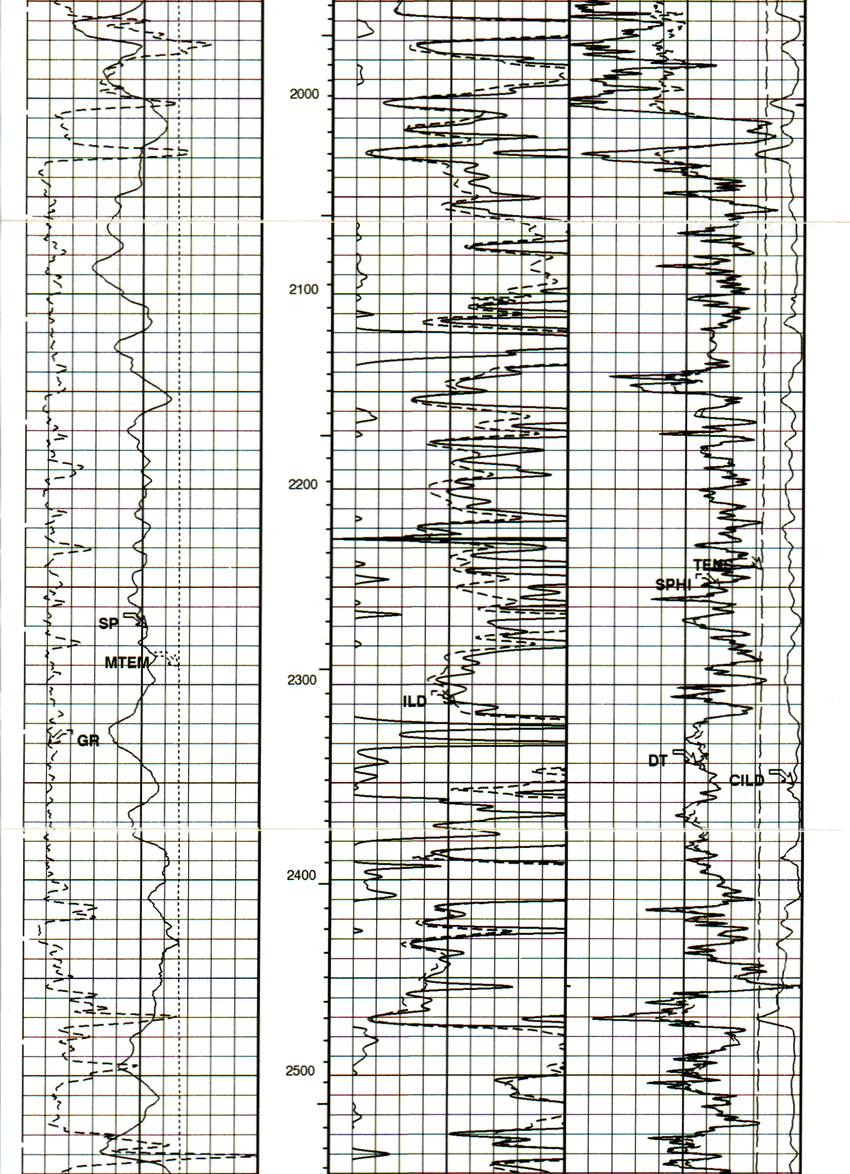
Delta-T (DT)
150.0 (US/F) 50.0

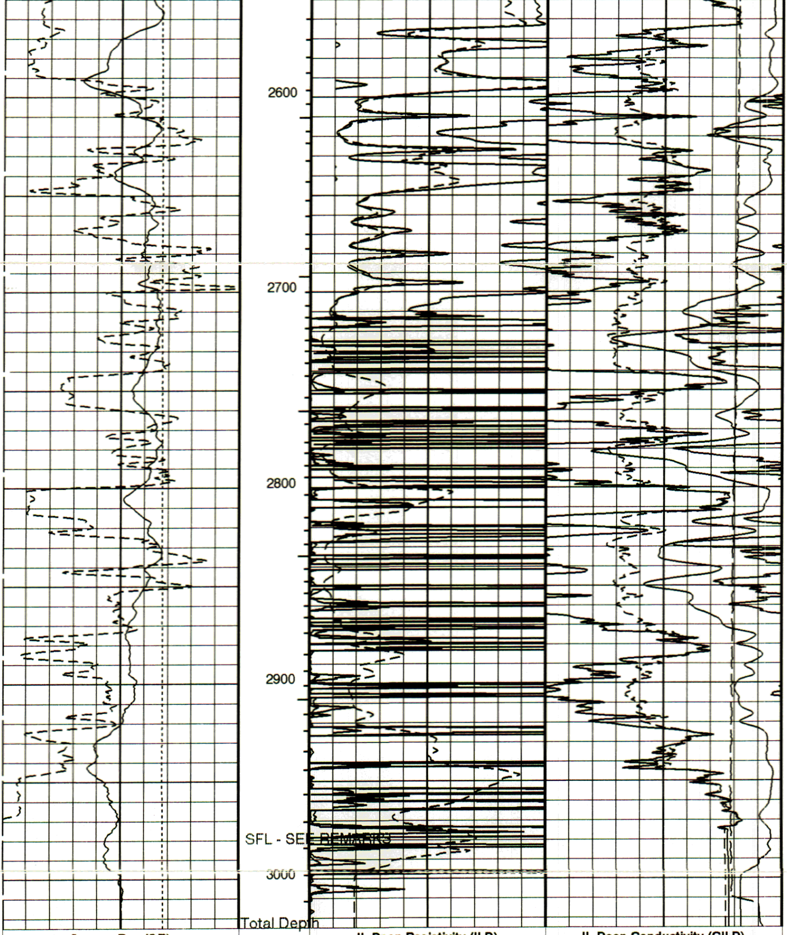
IL-Deep Conductivity (CILD)
1000.0 (MMHO) 0.0











| Gamma Ray (GR) | | |
|---|---|---|
| 0.0 | (GAPI) | 150.0 |
| **Mud temperature (MTEM)** | | |
| 0.0 | (DEGF) | 200.0 |
| **SP (SP)** | | |
| -80.0 | (MV) | 20.0 |

**GAMMA RAY BACKUP**
**From T1 to GR_1**

| IL-Deep Resistivity (ILD) | | |
|---|---|---|
| 0.0 | (OHMM) | 30.0 |
| **SFL Averaged (SFLA)** | | |
| 0.0 | (OHMM) | 30.0 |
| **Amplified SFL (SFLA)** | | |
| 0.0 | (OHMM) | 6.0 |

| IL-Deep Conductivity (CILD) | | |
|---|---|---|
| 1000.0 | (MMHO) | 0.0 |
| **Delta-T (DT)** | | |
| 150.0 | (US/F) | 50.0 |
| **Sonic Porosity (SPHI)** | | |
| 0.6 | (V/V) | 0.0 |
| **Tension (TENS)** | | |
| 10000.0 | (LBF) | 0.0 |

**PIP SUMMARY**

⊣ Integrated Transit Time Minor Pip Every 1.0 MS
⊣ Integrated Transit Time Major Pip Every 10.0 MS

Time Mark Every 60.0 S

| Format: DIT_BHC_S2 | Vertical Scale: 2.0" per 100.0' | Graphics File Created: 19-FEB-1994 18:54 |
|---|---|---|

## OP System Version: 6C0-490

## Output DLIS Files

| | | | |
|---|---|---|---|
| DLIS | DITE .002 | FIELD | 19-FEB-1994 18:54 |

## Output DLIS Files

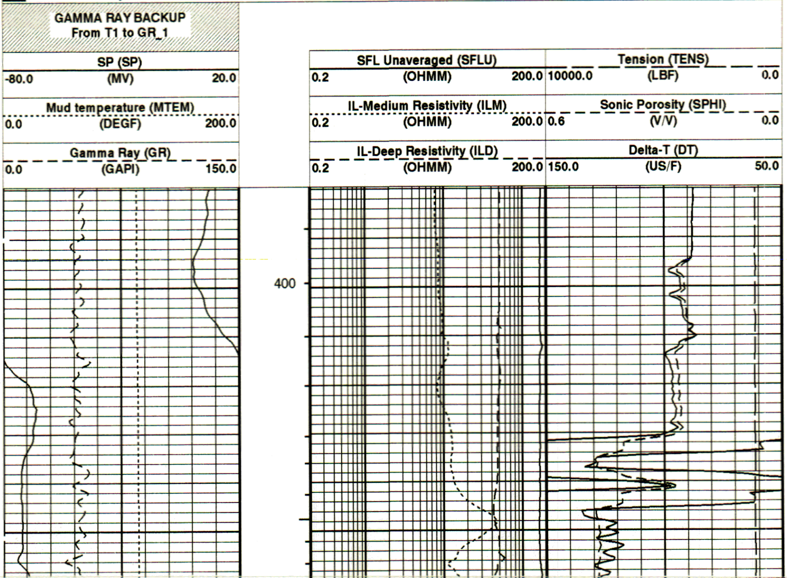
| | | | | | |
|---|---|---|---|---|---|
| DLIS | DITE .002 | FIELD | 19-FEB-1994 18:54 | 3025.0 FT | 379.0 FT |

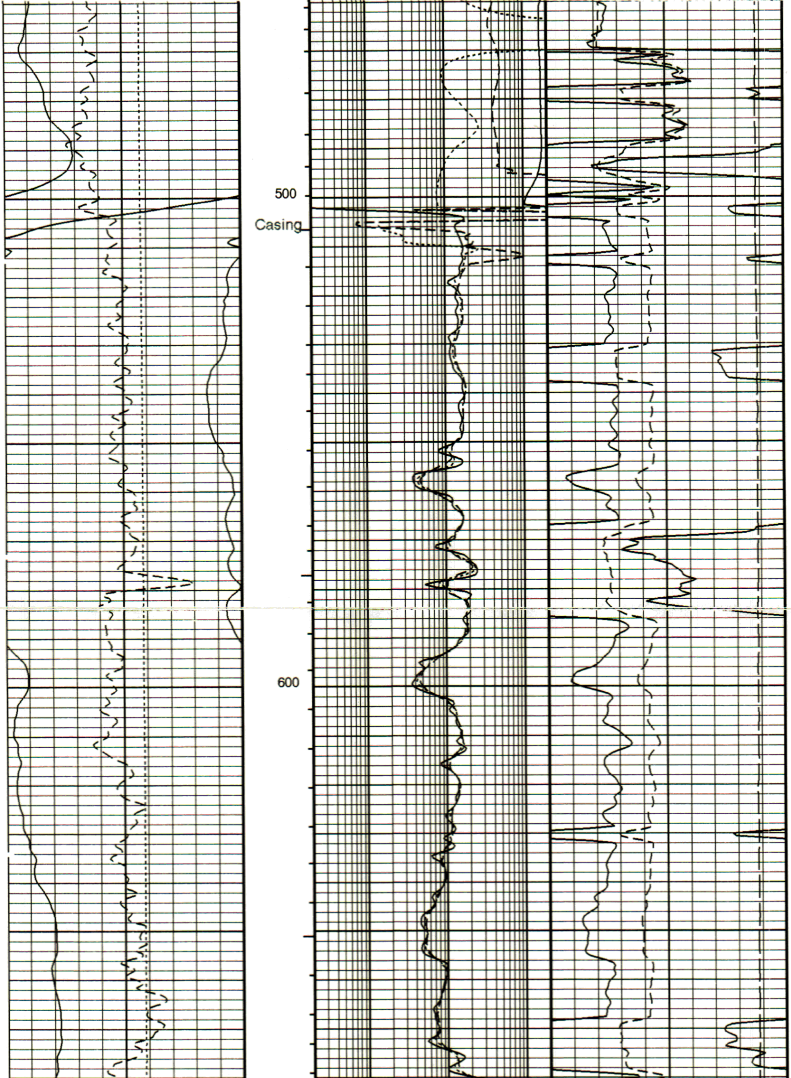
OP System Version: 6C0-490

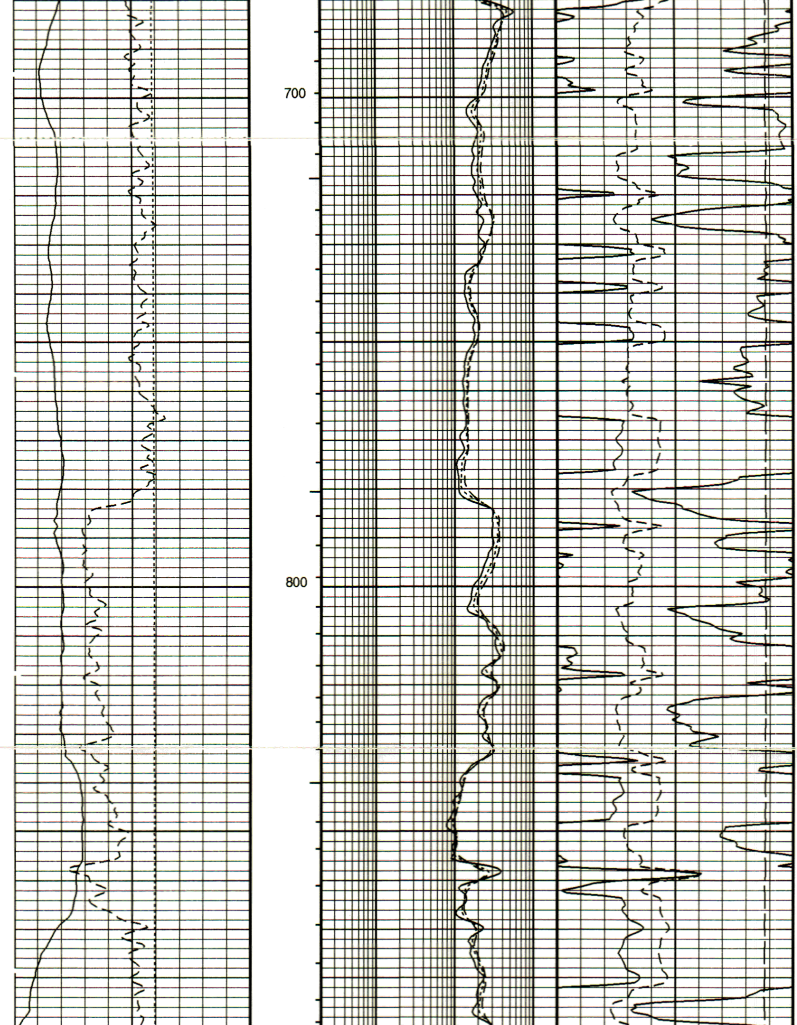
PIP SUMMARY

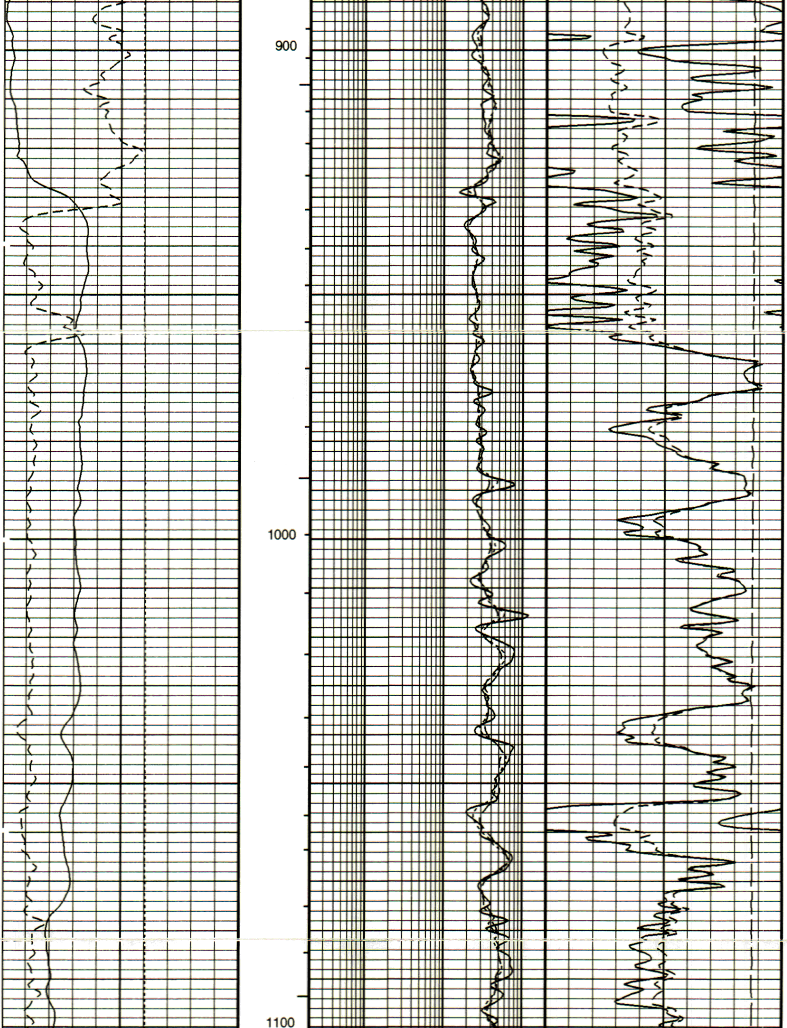
⊣ Integrated Transit Time Minor Pip Every 1.0 MS
⊣ Integrated Transit Time Major Pip Every 10.0 MS

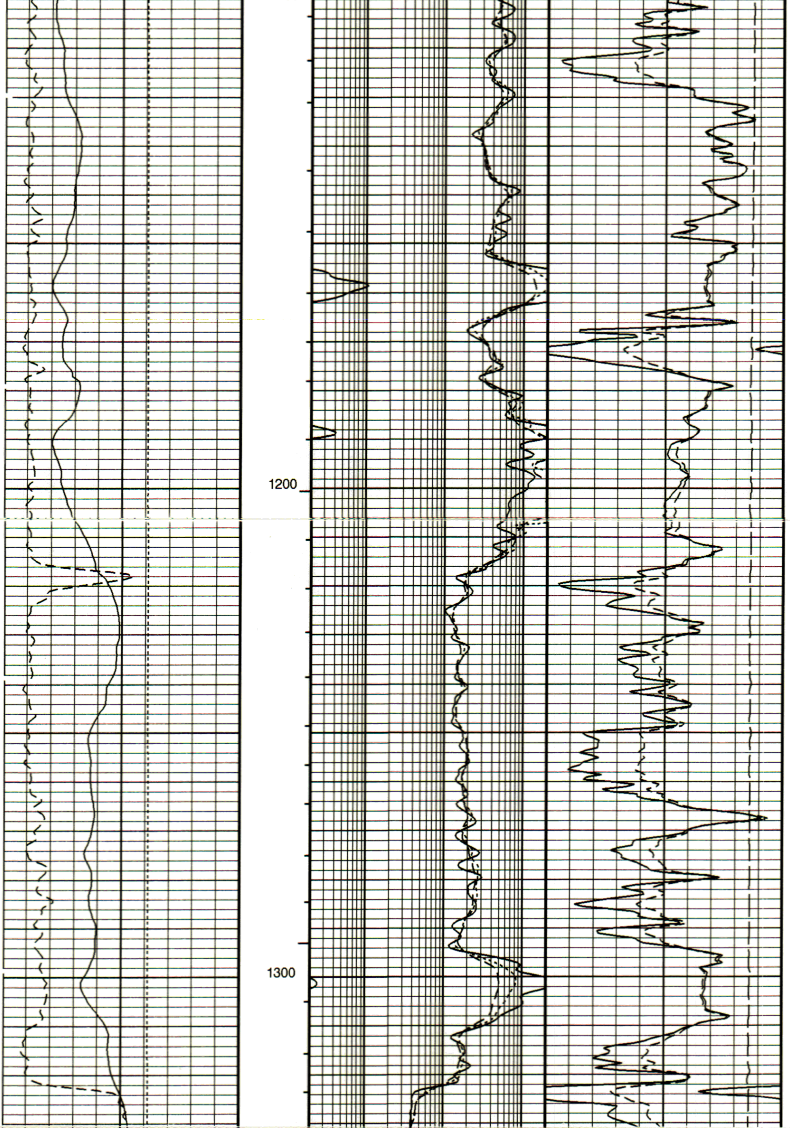
Time Mark Every 60.0 S

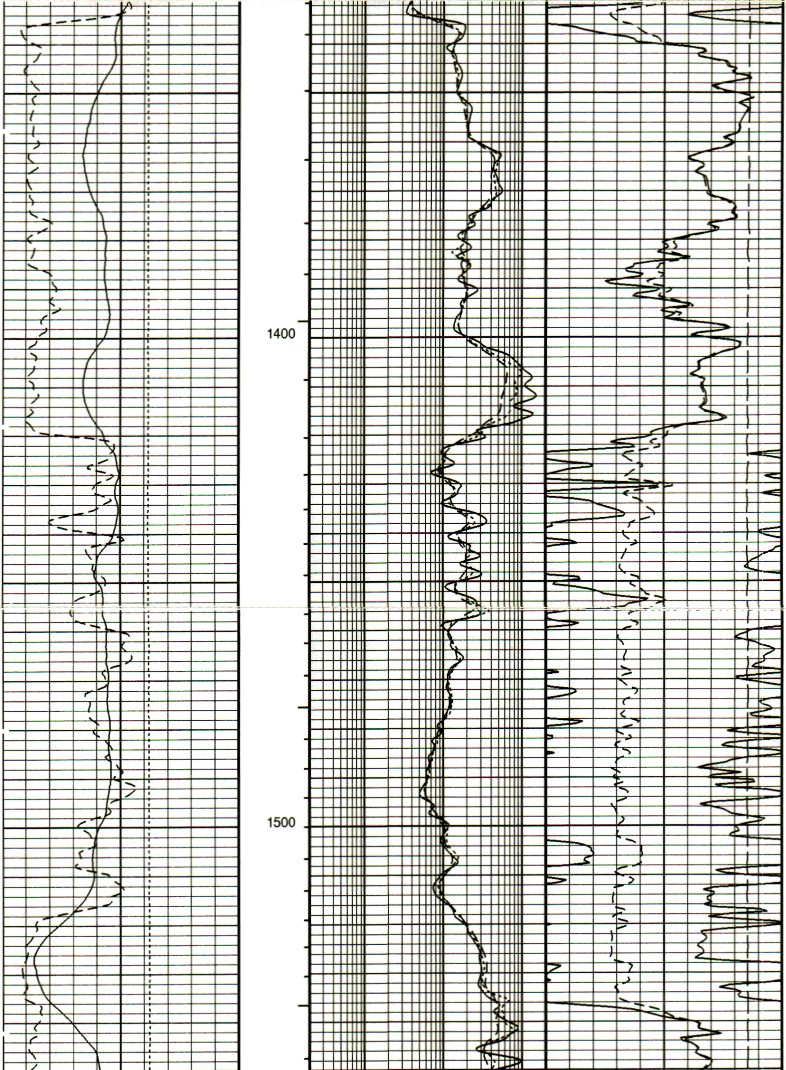


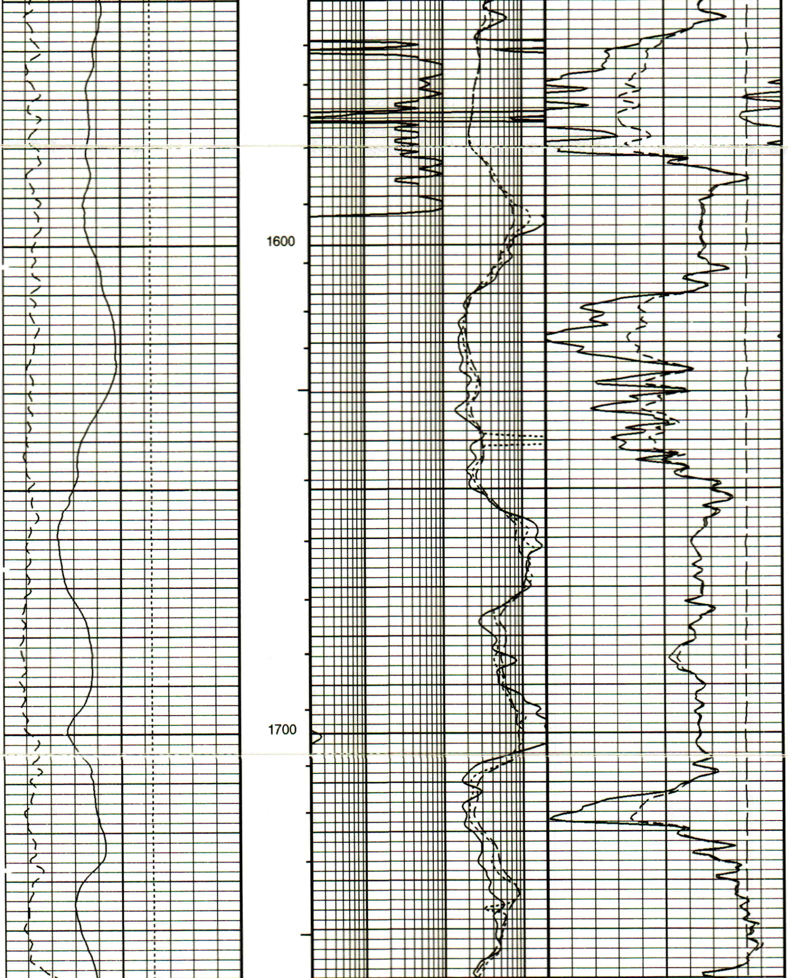


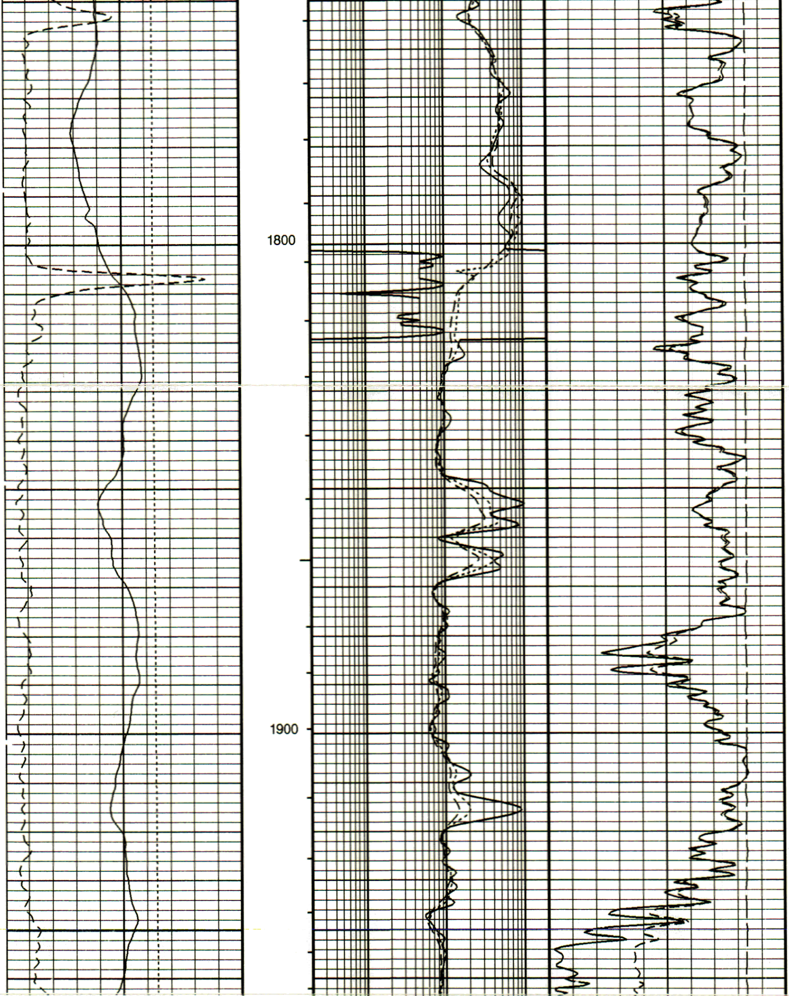


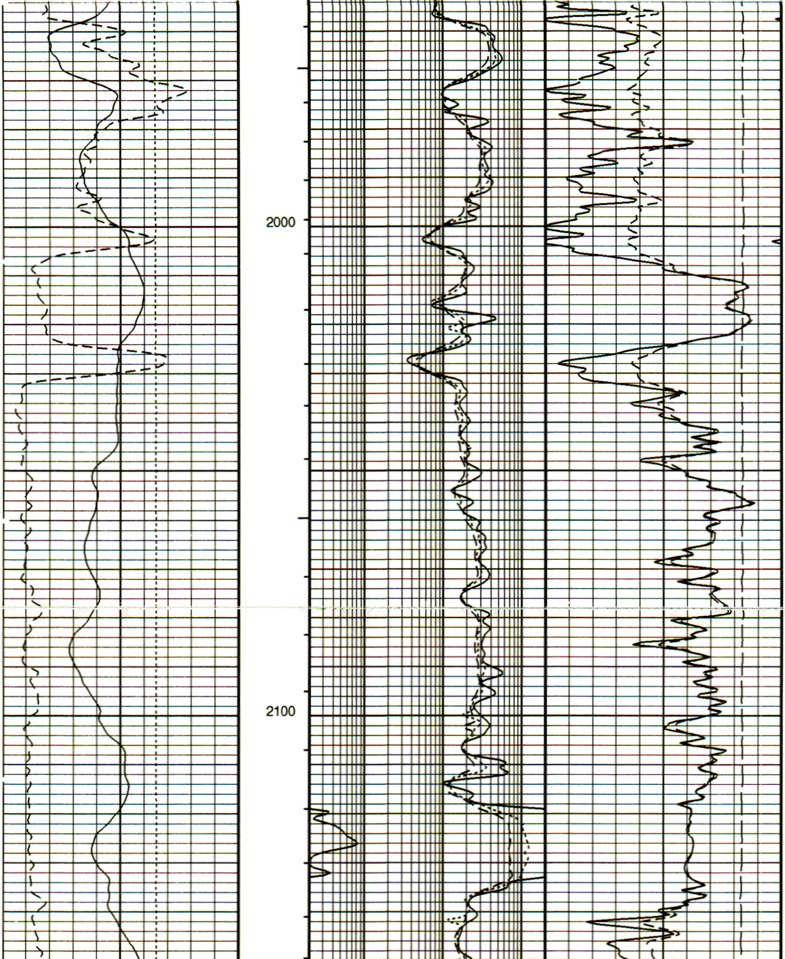


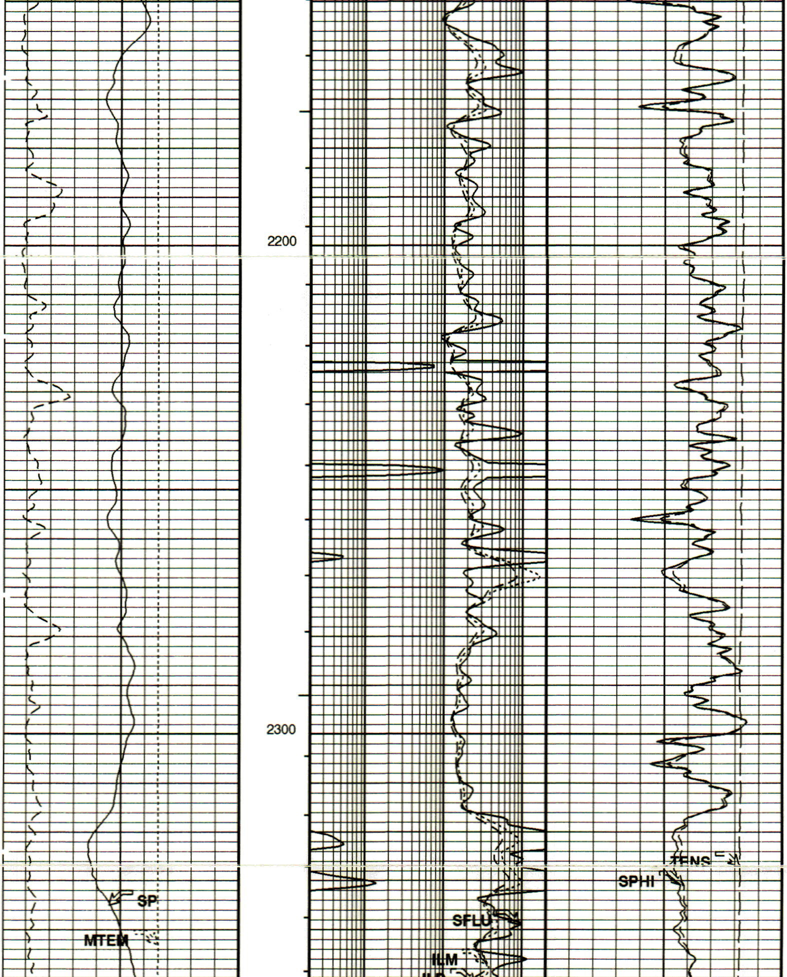


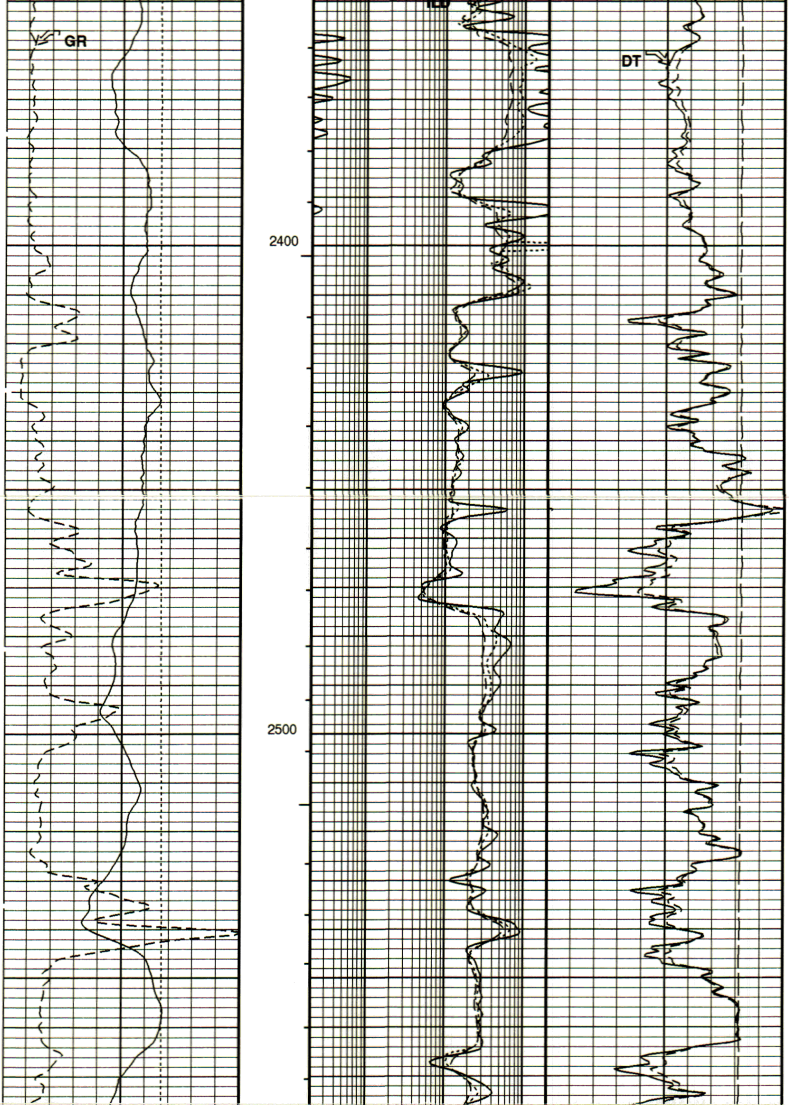


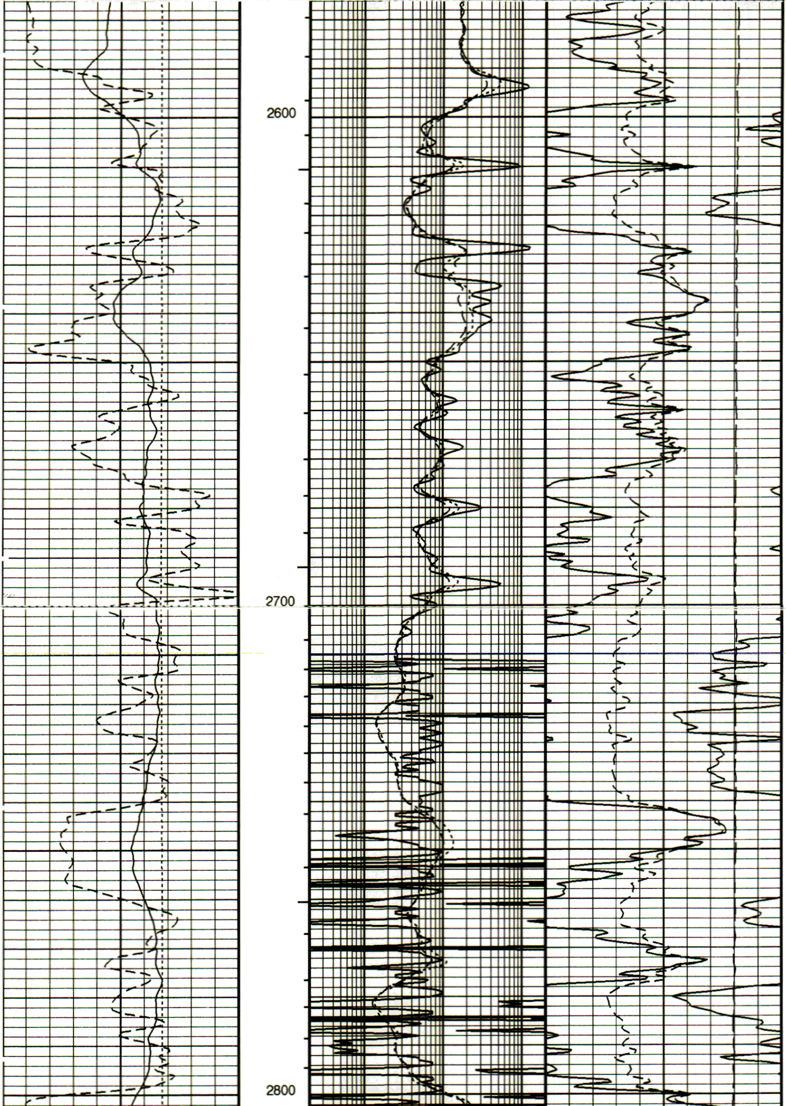


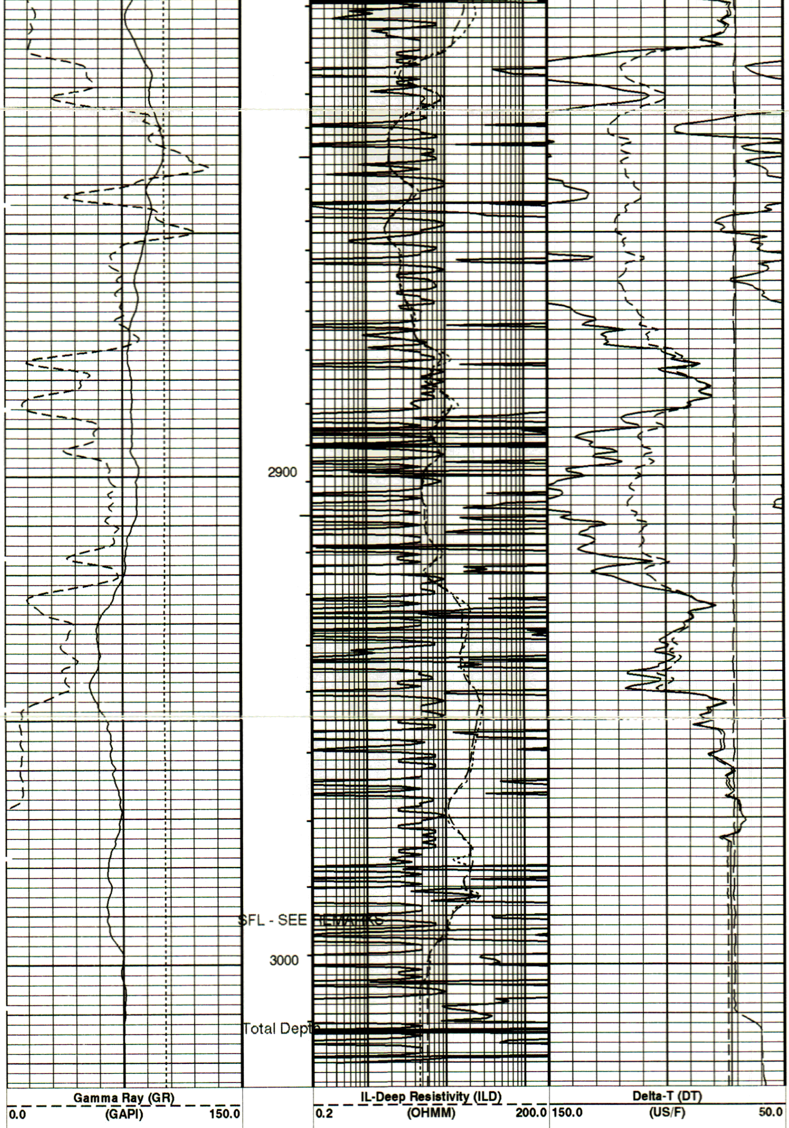












| Curve | Left | Unit | Right |
|---|---|---|---|
| Mud temperature (MTEM) | 0.0 | (DEGF) | 200.0 |
| SP (SP) | -80.0 | (MV) | 20.0 |
| IL-Medium Resistivity (ILM) | 0.2 | (OHMM) | 200.0 |
| Sonic Porosity (SPHI) | 0.6 | (V/V) | 0.0 |
| SFL Unaveraged (SFLU) | 0.2 | (OHMM) | 200.0 |
| Tension (TENS) | 10000.0 | (LBF) | 0.0 |

GAMMA RAY BACKUP
From T1 to GR_1

**PIP SUMMARY**

┤ Integrated Transit Time Minor Pip Every 1.0 MS
┤ Integrated Transit Time Major Pip Every 10.0 MS

Time Mark Every 60.0 S

Format: DIT_BHC_S5  Vertical Scale: 5.0" per 100.0'  Graphics File Created: 19-FEB-1994 18:54

## OP System Version: 6C0-490

## Output DLIS Files

| | | | |
|---|---|---|---|
| DLIS | DITE .002 | FIELD | 19-FEB-1994 18:54 |

## Input DLIS Files

| | | | | | |
|---|---|---|---|---|---|
| DLIS | DITE .001 | FIELD | 19-FEB-1994 18:41 | 3024.0 FT | 2756.5 FT |

## Output DLIS Files

| | | | |
|---|---|---|---|
| DLIS | DITE .002 | FIELD | 19-FEB-1994 18:54 |

## OP System Version: 6C0-490

**PIP SUMMARY**

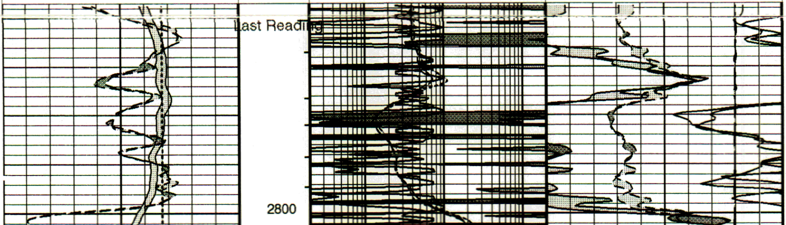
┤ Integrated Transit Time Minor Pip Every 1.0 MS
┤ Integrated Transit Time Major Pip Every 10.0 MS

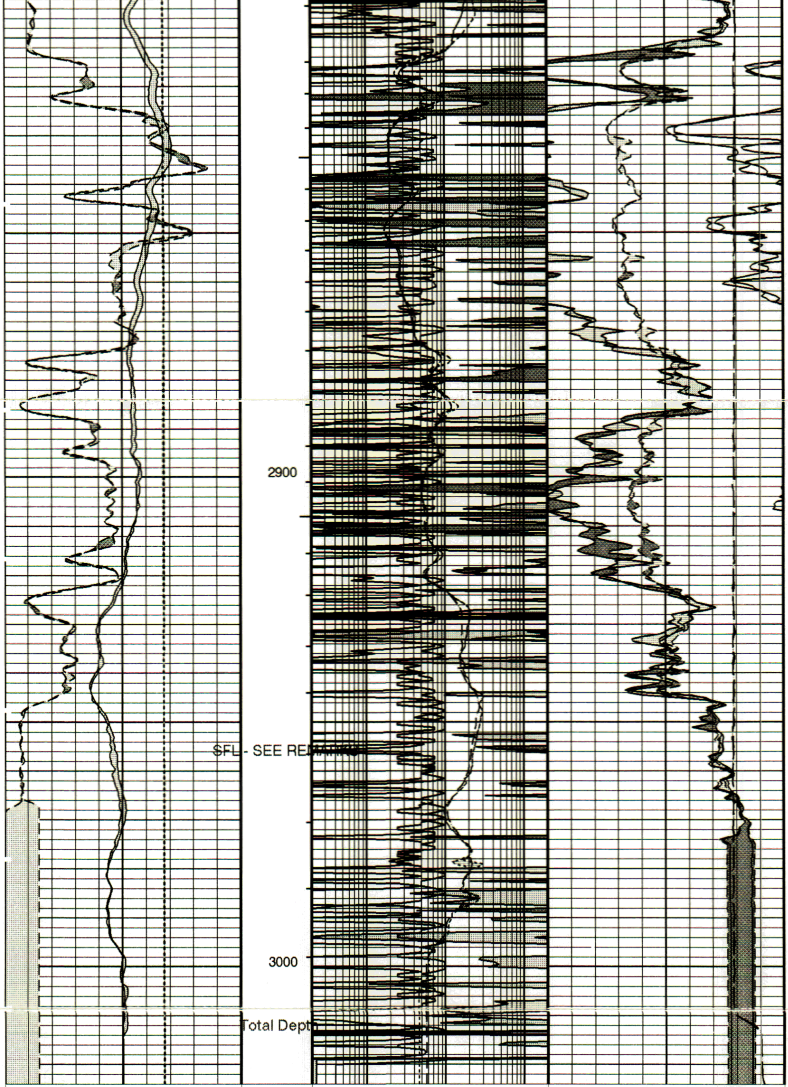
Time Mark Every 60.0 S

GAMMA RAY BACKUP
From T1 to GR_1

### REPEAT SECTION

| Curve | Left | Unit | Right |
|---|---|---|---|
| SP_REP Curve (SP_REP) | -80.0 | (MV) | 20.0 |
| MTEM_REP Curve (MTEM_REP) | 0.0 | (DEGF) | 200.0 |
| GR_REP Curve (GR_REP) | 0.0 | (GAPI) | 150.0 |
| SFLU_REP Curve (SFLU_REP) | 0.2 | (OHMM) | 200.0 |
| ILM_REP Curve (ILM_REP) | 0.2 | (OHMM) | 200.0 |
| ILD_REP Curve (ILD_REP) | 0.2 | (OHMM) | 200.0 |
| TENS_REP Curve (TENS_REP) | 10000.0 | (LBF) | 0.0 |
| SPHI_REP Curve (SPHI_REP) | 0.6 | (V/V) | 0.0 |
| DT_REP Curve (DT_REP) | 150.0 | (US/F) | 50.0 |





| GR_REP Curve (GR_REP) | ILD_REP Curve (ILD_REP) | DT_REP Curve (DT_REP) |
|---|---|---|
| 0.0 (GAPI) 150.0 | 0.2 (OHMM) 200.0 | 150.0 (US/F) 50.0 |
| MTEM_REP Curve (MTEM_REP) | ILM_REP Curve (ILM_REP) | SPHI_REP Curve (SPHI_REP) |
| 0.0 (DEGF) 200.0 | 0.2 (OHMM) 200.0 | 0.6 (V/V) 0.0 |

| SP_REP Curve (SP_REP) | | | SFLU_REP Curve (SFLU_REP) | | | TENS_REP Curve (TENS_REP) | | |
|---|---|---|---|---|---|---|---|---|
| -80.0 | (MV) | 20.0 | 0.2 | (OHMM) | 200.0 | 10000.0 | (LBF) | 0.0 |

GAMMA RAY BACKUP
From T1 to GR_1

REPEAT SECTION

PIP SUMMARY

⊣ Integrated Transit Time Minor Pip Every 1.0 MS
⊣ Integrated Transit Time Major Pip Every 10.0 MS

■ Time Mark Every 60.0 S

Format: DIT_BHC_S5_REP Vertical Scale: 5.0" per 100.0' Graphics File Created: 19-FEB-1994 18:54

## OP System Version: 6C0-490

## Input DLIS Files

| | | | | | |
|---|---|---|---|---|---|
| DLIS | DITE .001 | FIELD | 19-FEB-1994 18:41 | 3024.0 FT | 2756.5 FT |

## Output DLIS Files

| | | | |
|---|---|---|---|
| DLIS | DITE .002 | FIELD | 19-FEB-1994 18:54 |

## Parameters (Sequence # 002, Feb 19 18:56:10 1994)

| DLIS Name | Description | Value | |
|---|---|---|---|
| AGC | Automatic Gain Control | DISABLE | |
| AMSG | Auxilliary Minimum Sliding Gate | 150 | US |
| ARTS | AIT Rt Selection (for ALLRES computation) | 1_AT60 | |
| ASGL | Auxilliary Sliding Gate Length | 100 | US |
| BHS | Bore Hole Status | OPEN | |
| BHT | Bottom Hole Temperature (used in calculations) | 150 | DEGF |
| BILI | Bond Index Level for Zone Isolation | 0.8 | |
| BS | Bit Size | 8.750 | IN |
| BSAL | Borehole Salinity | -50000.0 | PPM |
| CBLG | CBL Gate Width | 95 | US |
| CDTS | C-Delta-T Shale | 100 | US/F |
| CSRL | Cycle Skip Recovery Logic Algorithm | ENABLE | |
| CSTR | Compressive Strength of Cement | 0 | PSI |
| CWEI | Casing Weight | 36 | LB/F |
| DDEL | Digitizing Delay | 200 | US |
| DETE | Detection | E2 | |
| DFD | Drilling Fluid Density | 9.10 | LB/G |
| DG | Downhole Gain | AUTO | |
| DG1W | Downhole Gain for Waveform 1 | 1/20 | |
| DG2W | Downhole Gain for Waveform 2 | 1/20 | |
| DG3W | Downhole Gain for Waveform 3 | 1/20 | |
| DG4W | Downhole Gain for Waveform 4 | 1/20 | |
| DGF2 | Deep 20 kHz Gain Factor | 0.947876 | |
| DORL | Depth Offset Repeat Analysis | 0.0 | FT |
| DPH2 | Deep 20 kHz Phase Shift | 0.263628 | DEG |
| DPPM | Density Porosity Processing Mode | STAN | |
| DRE2 | Deep Real 20 kHz Sonde Error Correction | 14.8176 | MM/M |
| DSIN | Digitizer Sample Interval | 5 | US |
| DSR2 | Deep Sigma Reference (20 kHz) | 1843 | MM/M |
| DTCI | DTEM computation Interval | 0 | FT |
| DTCM | Delta-T Computation Mode | FULL | |
| DTF | Delta-T Fluid | 200 | US/F |
| DTM | Delta-T Matrix | 56 | US/F |
| DWCO | Digitizer Word Count | 512 | |
| DXE2 | Deep Quad 20 kHz Sonde Error Correction | 117.397 | MM/M |
| FCF | CBL Fluid Compensation Factor | 1 | |
| FD | Fluid Density | 1 | G/C3 |
| FEXP | Form Factor Exponent | 2 | |
| FMSG | Far Minimum Sliding Gate | 480 | US |
| FNUM | Form Factor Numerator | 1 | |
| FPHI | Form Factor Porosity Source | SPHI | |
| GAI | Manual Gain | 2 | |
| GCSE | Generalized Caliper Selection | BS | |
| GDEV | Average Angular Deviation of Borehole from Normal | 0 | DEG |
| GOBO | Good Bond | 2 | MV |
| GRSE | Generalized Mud Resistivity Selection | CHART_GEN_9 | |
| GTSE | Generalized Temperature Selection | LINEAR_ESTIMATE | |
| IFRS | DIT-E Induction Frequency Selector | 20 | |

| | | | |
|---|---|---|---|
| IPHA | DIT-E Phasor Processing Mode | ALL | |
| IPRO | DIT-E Induction Processing Selector | PHASOR | |
| ITEN | DIT-E Temperature Enable | ENABLE | |
| ITTS | Integrated Transit Time Source | DT | |
| LQMS | LQMS Coverage | FULL | |
| MATR | Rock Matrix Type | SANDSTONE | |
| MCI | Minimum Cemented Interval | 14.8138 | F |
| MDEN | Matrix Density | 2.65 | G/C3 |
| MGAI | Maximum Gain | 8 | |
| MGF2 | Medium 20 kHz Gain Factor | 0.962877 | |
| MODE | Firing Mode | DT | |
| MPH2 | Medium 20 kHz Phase Shift | -0.712211 | DEG |
| MRE2 | Medium Real 20 kHz Sonde Error Correction | 9.17639 | MM/M |
| MSA | Minimum Sonic Amplitude | 13.5046 | MV |
| MSR2 | Medium Sigma Reference (20 kHz) | 3250 | MM/M |
| MST | Mud Sample Temperature | 80.0 | DEGF |
| MXE2 | Medium Quad 20 kHz Sonde Error Correction | 273.336 | MM/M |
| NC | Noise Control | ENABLE | |
| NMSG | Near Minimum Sliding Gate | 280 | US |
| RATE | Firing Rate | 15 | HZ |
| RMFS | Resistivity of Mud Filtrate Sample | 3.4900 | OHMM |
| RTCO | RTCO - Rt Invasion Correction | YES | |
| RW | Resistivity of Connate Water | 1.0000 | OHMM |
| SBR | Shoulder Bed Resistivity Factor | 1 | OHMM |
| SFCR | SFL Channel Ratio | 1000 | |
| SFLE | SFL Enable | ENABLE | |
| SGAD | Sliding Gate Status | ENABLE | |
| SGW | Sliding Gate Width | 150 | US |
| SHT | Surface Hole Temperature | 68.0001 | DEGF |
| SPAE | DIT-E SPARC Processing Enable | ENABLE | |
| SPFS | Sonic Porosity Formula | RAYMER_HUNT | |
| SPNV | SP Next Value | -30 | MV |
| SPSO | Sonic Porosity Source | DT | |
| STKT | STI Stuck Threshold | 2.5 | FT |
| T0CA | T0 Correction Status | DISABLE | |
| TD | Total Depth | 3013 | F |
| TLCK | TLC Kit | OFF | |
| TWS | Temperature of Connate Water Sample | 100.0 | DEGF |

## Calibration and Check Summary

| Measurement | Nominal | Master | Before | After | Change | Limit | Units |
|---|---|---|---|---|---|---|---|
| Scintillation Gamma Ray - L Wellsite Calibration - Detector Calibration | | | | | | | |
| Before: Feb 9 00:36 1994 | | | | | | | |
| Gamma Ray Background | 30.00 | N/A | 48.80 | N/A | N/A | N/A | GAPI |
| Gamma Ray (Jig - Bkg) | 170.4 | N/A | 170.4 | N/A | N/A | 15.49 | GAPI |
| Gamma Ray (Calibrated) | 165.0 | N/A | 165.0 | N/A | N/A | 15.00 | GAPI |

## Dual Induction - E / Equipment Identification

| | | |
|---|---|---|
| Primary Equipment: | | |
| Dual Induction Sonde | DIS - HB | 173 |
| Dual Induction Cartridge | DIC - EB | 184 |
| Auxiliary Equipment: | | |
| Mass Isolated Housing | MIH - ZA | 189 |

## Dual Induction - E Wellsite Calibration

### Induction Electronics (10 kHz)

| Phase | ID Elect Real Offset 10 kHz MM/M | | | Value |
|---|---|---|---|---|
| Before | | | | 19.38 |
| | -279.7<br>(Minimum) | 20.32<br>(Nominal) | 320.3<br>(Maximum) | |

| Phase | ID Elect Real Gain 10 kHz | | | Value |
|---|---|---|---|---|
| Before | | | | 0.9551 |
| | 0.8096<br>(Minimum) | 0.9596<br>(Nominal) | 1.143<br>(Maximum) | |

| Phase | ID Elect Phase 10 kHz DEG | | | Value |
|---|---|---|---|---|
| Before | | | | 11.37 |
| | 1.260<br>(Minimum) | 11.26<br>(Nominal) | 21.26<br>(Maximum) | |

| Phase | ID Elect Quad Offset 10 kHz MM/M | | | Value |
|---|---|---|---|---|
| Before | | | | -4.242 |
| | -303.4<br>(Minimum) | -3.381<br>(Nominal) | 296.6<br>(Maximum) | |

| Phase | ID Elect Quad Gain 10 kHz | | | Value |
|---|---|---|---|---|
| Before | | | | 0.9525 |
| | 0.8072<br>(Minimum) | 0.9572<br>(Nominal) | 1.140<br>(Maximum) | |

| Phase | IM Elect Phase 10 kHz DEG | | | Value |
|---|---|---|---|---|
| Before | | | | 10.68 |
| | 0.5849<br>(Minimum) | 10.58<br>(Nominal) | 20.58<br>(Maximum) | |

| Phase | IM Elect Real Offset 10 kHz MM/M | | | Value |
|---|---|---|---|---|
| Before | | | | 18.43 |
| | -531.3<br>(Minimum) | 18.74<br>(Nominal) | 568.7<br>(Maximum) | |

| Phase | IM Elect Real Gain 10 kHz | | | Value |
|---|---|---|---|---|
| Before | | | | 0.9373 |
| | 0.7945<br>(Minimum) | 0.9445<br>(Nominal) | 1.122<br>(Maximum) | |

| Phase | IM Elect Quad Offset 10 kHz MM/M | | | Value |
|---|---|---|---|---|
| Before | | | | 58.57 |
| | -490.8<br>(Minimum) | 59.21<br>(Nominal) | 609.2<br>(Maximum) | |

| Phase | IM Elect Quad Gain 10 kHz | | | Value |
|---|---|---|---|---|
| Before | | | | 0.9452 |
| | 0.8013<br>(Minimum) | 0.9513<br>(Nominal) | 1.131<br>(Maximum) | |

Before: Feb 19 18:21 1994

## Dual Induction - E Wellsite Calibration

### Induction Electronics (20 kHz)

| | Phase | Value | (Minimum) | (Nominal) | (Maximum) |
|---|---|---|---|---|---|
| ID Elect Real Offset 20 kHz MM/M | Before | 7.500 | -117.1 | 7.856 | 132.9 |
| ID Elect Real Gain 20 kHz | Before | 0.9770 | 0.8296 | 0.9796 | 1.171 |
| ID Elect Phase 20 kHz DEG | Before | 8.015 | -7.130 | 7.870 | 22.87 |
| ID Elect Quad Offset 20 kHz MM/M | Before | -1.871 | -126.5 | -1.535 | 123.5 |
| ID Elect Quad Gain 20 kHz | Before | 0.9743 | 0.8271 | 0.9771 | 1.168 |
| IM Elect Phase 20 kHz DEG | Before | 8.174 | -6.973 | 8.027 | 23.03 |
| IM Elect Real Offset 20 kHz MM/M | Before | 7.499 | -217.5 | 7.494 | 232.5 |
| IM Elect Real Gain 20 kHz | Before | 0.9633 | 0.8179 | 0.9679 | 1.155 |
| IM Elect Quad Offset 20 kHz MM/M | Before | 23.84 | -200.9 | 24.07 | 249.1 |
| IM Elect Quad Gain 20 kHz | Before | 0.9713 | 0.8249 | 0.9749 | 1.165 |

Before: Feb 19 18:22 1994

## Dual Induction - E Wellsite Calibration

### Induction Electronics (40 kHz)

| | Phase | Value | (Minimum) | (Nominal) | (Maximum) |
|---|---|---|---|---|---|
| ID Elect Real Offset 40 kHz MM/M | Before | 4.835 | -79.98 | 5.023 | 90.02 |
| ID Elect Real Gain 40 kHz | Before | 0.9598 | 0.8121 | 0.9621 | 1.146 |
| ID Elect Phase 40 kHz DEG | Before | 24.89 | 4.435 | 24.43 | 44.43 |
| ID Elect Quad Offset 40 kHz MM/M | Before | -1.305 | -86.11 | -1.111 | 83.89 |
| ID Elect Quad Gain 40 kHz | Before | 0.9565 | 0.8091 | 0.9591 | 1.142 |
| IM Elect Phase 40 kHz DEG | Before | 25.55 | 5.084 | 25.08 | 45.08 |
| IM Elect Real Offset 40 kHz MM/M | Before | 4.876 | -125.2 | 4.776 | 134.8 |
| IM Elect Real Gain 40 kHz | Before | 0.9587 | 0.8109 | 0.9609 | 1.145 |
| IM Elect Quad Offset 40 kHz MM/M | Before | 15.34 | -114.6 | 15.40 | 145.4 |
| IM Elect Quad Gain 40 kHz | Before | 0.9665 | 0.8177 | 0.9677 | 1.154 |

Before: Feb 19 18:24 1994

## Dual Induction - E Wellsite Calibration

### SFL Electronics

| | Phase | Value | (Minimum) | (Nominal) | (Maximum) |
|---|---|---|---|---|---|
| SFL Voltage Offset MV | Before | 0.1987 | -15.00 | 0 | 15.00 |
| SFL Voltage Gain | Before | 0.9977 | 0.8500 | 1.000 | 1.200 |
| SFL Current Offset MA | Before | 0.06309 | -0.6000 | 0 | 0.6000 |
| SFL Current Gain | Before | 0.9987 | 0.8500 | 1.000 | 1.200 |

Before: Feb 19 18:24 1994

## Dual Induction - E Wellsite Calibration

### Electronics Calibration Changes Files/Depth Intervals: 1: 0.0 - 21.5 1: 3024.0 - 2756.5 2: 3025.0 - 379.0

| | Phase | | Value | (Minimum) | (Nominal) | (Maximum) |
|---|---|---|---|---|---|---|
| ID (R > 27 OHM-M) MM/M | After | | 0.05910 | 0 | 0 | 0.7500 |
| ID (R < 27 OHM-M) % | After | | 0.0008853 | 0 | 0 | 2.000 |
| SFL (R < 1 OHM-M) OHMM | After | EXCEEDS LIMIT | 0.3191 | 0 | 0 | 0.02000 |
| IM (R > 27 OHM-M) MM/M | After | | 0.07270 | 0 | 0 | 0.7500 |
| IM (R < 27 OHM-M) % | After | | 0.001027 | 0 | 0 | 2.000 |
| SFL (R > 27 OHM-M) MM/M | After | EXCEEDS LIMIT | 70160000 | 0 | 0 | 0.7500 |
| SFL (R < 27 OHM-M) % | After | EXCEEDS LIMIT | 1706000 | 0 | 0 | 2.000 |

After: Feb 19 19:46 1994

## Dual Induction - E Master Calibration

Test Loop Calibration: Calibration of Internal Reference to Test Loop Standard

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Phase | Deep 10 kHz Gain Factor | Value | Phase | Deep 20 kHz Gain Factor | Value | Phase | Deep 40 kHz Gain Factor | Value |
| Master | | 0.9376 | Master | | 0.9479 | Master | | 0.9729 |
| 0.9000 (Minimum) | 1.000 (Nominal) | 1.100 (Maximum) | 0.9000 (Minimum) | 1.000 (Nominal) | 1.100 (Maximum) | 0.9000 (Minimum) | 1.000 (Nominal) | 1.100 (Maximum) |
| Phase | Medium 10 kHz Gain Factor | Value | Phase | Medium 20 kHz Gain Factor | Value | Phase | Medium 40 kHz Gain Factor | Value |
| Master | | 0.9579 | Master | | 0.9629 | Master | | 0.9919 |
| 0.9000 (Minimum) | 1.000 (Nominal) | 1.100 (Maximum) | 0.9000 (Minimum) | 1.000 (Nominal) | 1.100 (Maximum) | 0.9000 (Minimum) | 1.000 (Nominal) | 1.100 (Maximum) |
| Phase | Deep 10 kHz Phase Shift | Value | Phase | Deep 20 kHz Phase Shift | Value | Phase | Deep 40 kHz Phase Shift | Value |
| Master | | 0.1401 | Master | | 0.2636 | Master | | -0.6032 |
| -1.500 (Minimum) | 0 (Nominal) | 1.500 (Maximum) | -2.000 (Minimum) | 0 (Nominal) | 2.000 (Maximum) | -4.000 (Minimum) | -1.000 (Nominal) | 2.000 (Maximum) |
| Phase | Medium 10 kHz Phase Shift | Value | Phase | Medium 20 kHz Phase Shift | Value | Phase | Medium 40 kHz Phase Shift | Value |
| Master | | -0.2705 | Master | | -0.7122 | Master | | -1.886 |
| -1.500 (Minimum) | 0 (Nominal) | 1.500 (Maximum) | -3.000 (Minimum) | -1.000 (Nominal) | 1.000 (Maximum) | -5.000 (Minimum) | -2.000 (Nominal) | 1.000 (Maximum) |

Master: Jan 27 13:23 1994

## Dual Induction - E Master Calibration

Sonde Error Corrections: Correction for sonde response in zero conductivity environment. (Normalized to 25C).

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Phase | Real Deep 10 kHz S.E. Corr. | Value | Phase | Real Deep 20 kHz S.E. Corr. | Value | Phase | Real Deep 40 kHz S.E. Corr. | Value |
| Master | | 45.73 | Master | | 14.82 | Master | | 4.951 |
| -50.00 (Minimum) | 0 (Nominal) | 125.0 (Maximum) | -30.00 (Minimum) | 0 (Nominal) | 30.00 (Maximum) | -15.00 (Minimum) | 0 (Nominal) | 15.00 (Maximum) |
| Phase | Quad Deep 10 kHz S.E. Corr. | Value | Phase | Quad Deep 20 kHz S.E. Corr. | Value | Phase | Quad Deep 40 kHz S.E. Corr. | Value |
| Master | | 215.3 | Master | | 117.4 | Master | | 73.75 |
| -250.0 (Minimum) | 0 (Nominal) | 350.0 (Maximum) | -125.0 (Minimum) | 0 (Nominal) | 200.0 (Maximum) | -75.00 (Minimum) | 0 (Nominal) | 125.0 (Maximum) |
| Phase | Real Medium 10 kHz S.E. Corr. | Value | Phase | Real Medium 20 kHz S.E. Corr. | Value | Phase | Real Medium 40 kHz S.E. Corr. | Value |
| Master | | 20.24 | Master | | 9.176 | Master | | 2.574 |
| -50.00 (Minimum) | 0 (Nominal) | 140.0 (Maximum) | -50.00 (Minimum) | 0 (Nominal) | 50.00 (Maximum) | -30.00 (Minimum) | 0 (Nominal) | 30.00 (Maximum) |
| Phase | Quad Medium 10 kHz S.E. Corr. | Value | Phase | Quad Medium 20 kHz S.E. Corr. | Value | Phase | Quad Medium 40 kHz S.E. Corr. | Value |
| Master | | 506.7 | Master | | 273.3 | Master | | 162.4 |
| -1300 (Minimum) | 0 (Nominal) | 1300 (Maximum) | -650.0 (Minimum) | 0 (Nominal) | 650.0 (Maximum) | -350.0 (Minimum) | 0 (Nominal) | 350.0 (Maximum) |

Master: Jan 27 13:38 1994

## Scintillation Gamma-Ray - L / Equipment Identification

| | | |
|---|---|---|
| Primary Equipment: | | |
| Scintillation Gamma Cartridge | SGC - SA | 408 |
| Scintillation Gamma Detector | SGD - TAA | 2391 |
| Auxiliary Equipment: | | |
| Scintillation Gamma Housing | SGH - K | 2265 |
| Gamma Source Radioactive | GSR - U/Y | 314 |

## Scintillation Gamma-Ray - L Wellsite Calibration

Detector Calibration

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Phase | Gamma Ray Background GAPI | Value | Phase | Gamma Ray (Jig - Bkg) GAPI | Value | Phase | Gamma Ray (Calibrated) GAPI | Value |
| Before | | 48.80 | Before | | 170.4 | Before | | 165.0 |
| 0 (Minimum) | 30.00 (Nominal) | 120.0 (Maximum) | 154.9 (Minimum) | 170.4 (Nominal) | 185.9 (Maximum) | 150.0 (Minimum) | 165.0 (Nominal) | 180.0 (Maximum) |

Before: Feb 9 00:36 1994

| | | | |
|---|---|---|---|
| COMPANY: | **TRANS-PACIFIC GEOTHERMAL COMPANY** | BOTTOM LOG INTERVAL | 3005 F |
| | | SCHLUMBERGER DEPTH | 3011 F |
| WELL: | **ESI - A - S - ALT** | DEPTH DRILLER | 3015 F |
| FIELD: | **VALE** | KELLY BUSHING | 2487 F |
| COUNTY: | **MALHEUR** | DRILL FLOOR | |
| STATE: | **OREGON** | GROUND LEVEL | 2465 F |

Schlumberger

# DUAL INDUCTION - SFL - SP
# BHC SONIC
# GAMMA RAY - TEMPERATURE