| | |
|---|---|
| HALLIBURTON LOGGING SERVICES, INC. | DUAL INDUCTION ACOUSTIC VELOCITY LOG 5"=100' |

FINAL PRINT

COMPANY ______________
WELL ______________
FIELD ______________
COUNTY __________ ST __

COMPANY NAHAMA AND WEAGANT ENERGY CO.
WELL C.E.R. NO. 41-21-64
FIELD MIST
COUNTY COLUMBIA STATE OR
API NO. 36-009-00273
LOCATION :
1137.6 FEET SOUTH AND
485.9 FEET WEST FROM THE
NORTHEAST CORNER OF:
SEC. 21 TWP 6N RGE 4W

OTHER SERVICES
DIPMETER
SDL/DSN/GR

PERMANENT DATUM G.L. ELEV. 1089.9
LOG MEASURED FROM K.B. 11.5 FT.ABOVE PERM.DATUM
DRILLING MEASURED FROM KELLY BUSHING

ELEV.:K.B. 1101.4
D.F. -----
G.L. 1089.9

| | | | |
|---|---|---|---|
| DATE | 11/06/90 | | |
| RUN NO. | ONE | | |
| DEPTH-DRILLER | 2121 | | |
| DEPTH- LOGGER | 2124 | | |
| BTM. LOG INTER. | 2121 | | |
| TOP LOG INTER. | 524 | | |
| CASING-DRILLER | 9 5/8@524 | @ | @ |
| CASING- LOGGER | 524 | | |
| BIT SIZE | 8 1/2 | | |
| TYPE FLUID IN HOLE | GEL/POLYMER | | |
| DENS. : VISC | 9.3 :35 | : | : |
| PH : FLUID LOSS | 8.5 :5.6 | : | : |
| SOURCE OF SAMPLE | CIRCULATED | | |
| RM @ MEAS. TEMP. | 6.0 @50. | @ | @ |
| RMF @ MEAS. TEMP. | 5.5 @52. | @ | @ |
| RMC @ MEAS. TEMP. | 4.5 @56. | @ | @ |
| SOURCE RMF : RMC | CIRC.:CIRC. | : | : |
| RM @ BHT | 3.45 @92. | @ | @ |
| TIME SINCE CIRC. | 3.5 HOURS | | |
| TIME ON BOTTOM | 6:48 PM | | |
| MAX. REC. TEMP. | 92. @BHT | @ | @ |
| EQUIP. : LOCATION | 2890 :WDLND | : | : |
| RECORDED BY | D.MCDANIEL | | |
| WITNESSED BY | J.VAUGHAN | M.CHALMERS | T.THOMAS |

Fold Here

Service Ticket No.: 44359 API Serial No.: 36-009-00273 PGM Version: 2.60 B

| Change in Mud Type or Additional Samples | | |
|---|---|---|
| Date/Sample No. | 11/06/90:ONE | / / : |
| Depth-Driller | | |
| Type Fluid in Hole | | |
| Dens. : Visc. | : | : |
| pH. : Fluid Loss | : | : |
| Source of Sample | | |
| Rm @ Meas.Temp. | @ | @ |
| Rmf @ Meas.Temp. | @ | @ |
| Rmc @ Meas.Temp. | @ | @ |
| Source: Rmf:Rmc | : | : |
| Rm @ BHT | 3.45 @92. | @ |
| Rmf @ BHT | 3.27 @92. | @ |
| Rmc @ BHT | 2.86 @92. | @ |

RESISTIVITY SCALE CHANGES

| Type Log | Depth | Scale Up Hole | Scale Down Hole |
|---|---|---|---|

RESISTIVITY EQUIPMENT DATA

| Run No | Tool Type & No | Pad Type | Tool Pos. | Other |
|---|---|---|---|---|
| ONE | DUAL #W109437 | N/A | 1.5"S.O. | M412 |
| ONE | SGRD #W108946 | N/A | 1.5"S.O. | M405 |

EQUIPMENT DATA

| GAMMA | | ACOUSTIC | | DENSITY | | NEUTRON | |
|---|---|---|---|---|---|---|---|
| Run No. | ONE | Run No. | ONE | Run No. | N/A | Run No. | N/A |
| Serial No. | W108580 | Serial No. | W109088 | Serial No. | W109740 | Serial No. | W108749 |
| Model No. | M432 | Model No. | M305 | Model No. | M465 | Model No. | M434 |
| Diameter | 3 5/8 | No.of Cent. | FOUR | Diameter | 4 1/2 | Diameter | 3 5/8 |
| Detector Model No. | M432 | Spacing | 1 FOOT | Log Type | GAMMA | Log Type | THERMAL |
| Type | SCINT. | | | Source Type | CS137 | Source Type | AM241BE |
| Length | 4 IN. | LSA | YES | Serial No. | 047 | Serial No. | 25 |
| Distance To Source | N/A | FWDA | NO | Strength | 1.5 CU | Strength | 19 CU |

LOGGING DATA

| GENERAL | | | | GAMMA | | ACOUSTIC | | | DENSITY | | | NEUTRON | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Run | Depth | | Speed | Scale | | Scale | | | Scale | | | Scale | | |
| No. | From | To | Ft/Min | L | R | L | R | Matrix | L | R | Matrix | L | R | Matrix |
| ONE | 2124 | 524 | 30 | 0 | 150 | 150 | 50 | 57 | | | | | | |
| | | | | | GAPI | | | US/FT | | | | | | |

Remarks: ANNULAR HOLE VOLUME CALCULATED FOR 4 1/2 INCH CASING.

CREW ON LOCATION:EMERSON,PORTMAN, AND WELLS.
THANK YOU FOR USING HALLIBURTON LOGGING SERVICES!

Halliburton Logging Services, Inc. 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 HLS personnel or which may appear on the log or in any other form. Any user of such data, interpretations, conversions or recommendations agrees that HLS is not responsible except where due to gross negligence or wilful misconduct, for any loss, damages, or expenses resulting from the use thereof.

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SHORT GUARD SHOP CALIBRATION SUMMARY
PERFORMED: 15:11:54 10/12/90 LAST SHOP CALIBRATION: 10:40:35 09/26/90
SERIAL NUMBER: 108946 PROGRAM VERSION: 2.60 B
MODEL: #405
PERFORMED BY: JOHNSON

| | MEASURED | CALIBRATED | UNITS |
|---|---|---|---|
| EXT. CAL. POINT #1 | 2.003 | 2.000 | OHM-M |
| EXT. CAL. POINT #2 | 20.031 | 20.000 | OHM-M |
| EXT. CAL. POINT #3 | 200.331 | 200.000 | OHM-M |
| INTERNAL REFERENCE | 19.698 | 19.667 | OHM-M |

SHORT GUARD BEFORE SURVEY FIELD CHECK SUMMARY
PERFORMED: 18:17:45 11/06/90 LAST SHOP CALIBRATION: 15:11:54 10/12/90

| | SHOP | FIELD | UNITS |
|---|---|---|---|
| INTERNAL REFERENCE | 19.666 | 19.700 | OHM-M |

SHORT GUARD AFTER SURVEY FIELD CHECK SUMMARY
PERFORMED: 19:48:07 11/06/90 LAST SHOP CALIBRATION: 15:11:54 10/12/90

| | BEFORE | AFTER | UNITS |
|---|---|---|---|
| INTERNAL REFERENCE | 19.700 | 19.668 | OHM-M |

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DUAL INDUCTION SHOP CALIBRATION SUMMARY
PERFORMED: 14:02:06 10/12/90 LAST SHOP CALIBRATION: 10:48:02 09/26/90
SERIAL NUMBER: 109437 PROGRAM VERSION: 2.60 B
MODEL: #412
PERFORMED BY: JOHNSON

| | DEEP INDUCTION MEASURED | DEEP INDUCTION CALIBRATED | MEDIUM INDUCTION MEASURED | MEDIUM INDUCTION CALIBRATED | UNITS |
|---|---|---|---|---|---|
| TOOL ZERO | -.000 | .000 | .029 | .000 | MMHOS/M |
| INTERNAL REFERENCE | 498.791 | 499.400 | 504.075 | 510.557 | MMHOS/M |
| WHEEL | 493.986 | 500.000 | 490.239 | 500.000 | MMHOS/M |
| MANDREL BASE | 4.013 | -.000 | 3.651 | 1.042 | MMHOS/M |

DUAL INDUCTION BEFORE SURVEY FIELD CHECK SUMMARY
PERFORMED: 18:19:14 11/06/90 LAST SHOP CALIBRATION: 14:02:06 10/12/90

| | DEEP INDUCTION SHOP | DEEP INDUCTION FIELD | MEDIUM INDUCTION SHOP | MEDIUM INDUCTION FIELD | UNITS |
|---|---|---|---|---|---|
| TOOL ZERO | .000 | .200 | .000 | -.107 | MMHOS/M |
| INTERNAL REFERENCE | 499.399 | 499.658 | 510.556 | 508.311 | MMHOS/M |
| MANDREL BASE | -.000 | -.000 | 1.042 | 1.042 | MMHOS/M |

DUAL INDUCTION AFTER SURVEY FIELD CHECK SUMMARY
PERFORMED: 19:52:13 11/06/90 LAST SHOP CALIBRATION: 14:02:06 10/12/90

| | DEEP INDUCTION BEFORE | DEEP INDUCTION AFTER | MEDIUM INDUCTION BEFORE | MEDIUM INDUCTION AFTER | UNITS |
|---|---|---|---|---|---|
| TOOL ZERO | .200 | .200 | -.107 | .000 | MMHOS/M |
| INTERNAL REFERENCE | 499.657 | 501.690 | 508.310 | 510.546 | MMHOS/M |
| MANDREL BASE | -.000 | -.000 | 1.042 | 1.042 | MMHOS/M |

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GAMMA SHOP CALIBRATION SUMMARY
PERFORMED: 10:35:12 09/21/90 LAST SHOP CALIBRATION: 12:18:26 08/24/90
SERIAL NUMBER: 108580 PROGRAM VERSION: 2.60 B
MODEL: #432 FIELD CALIBRATOR: #67
PERFORMED BY: M.SCHWARTZ

| | MEASURED | CALIBRATED | UNITS |
|---|---|---|---|
| BACKGROUND | 22 | 22 | GAPI |
| BACKGROUND+CALIBRATOR | 268 | 269 | GAPI |
| CALIBRATOR | 246 | 247 | GAPI |

GAMMA BEFORE SURVEY FIELD CHECK SUMMARY
PERFORMED: 18:15:56 11/06/90 LAST SHOP CALIBRATION: 10:35:12 09/21/90
FIELD CALIBRATOR: #67

| | SHOP | FIELD | UNITS |
|---|---|---|---|
| BACKGROUND | 22 | 27 | GAPI |
| BACKGROUND+CALIBRATOR | 269 | 283 | GAPI |
| CALIBRATOR | 247 | 256 | GAPI |

GAMMA AFTER SURVEY FIELD CHECK SUMMARY
PERFORMED: 20:02:49 11/06/90 LAST SHOP CALIBRATION: 10:35:12 09/21/90

| | BEFORE | AFTER | UNITS |
|---|---|---|---|
| BACKGROUND | 27 | 23 | GAPI |
| BACKGROUND+CALIBRATOR | 283 | 272 | GAPI |
| CALIBRATOR | 256 | 249 | GAPI |

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CALIPER SHOP CALIBRATION SUMMARY
PERFORMED: 00:35:00 11/03/90 LAST SHOP CALIBRATION: 18:50:00 09/29/90
SERIAL NUMBER: TAN PROGRAM VERSION: 2.60 B
MODEL: #202
PERFORMED BY: MCDANIEL

| | MEASURED | CALIBRATED | UNITS |
|---|---|---|---|
| VALUE 1 | 8.371 | 8.000 | INCHES |
| VALUE 2 | 16.000 | 16.000 | INCHES |

CALIPER BEFORE SURVEY FIELD CHECK SUMMARY
PERFORMED: 11:38:39 11/06/90 LAST SHOP CALIBRATION: 00:35:00 11/03/90

| | SHOP | FIELD | UNITS |
|---|---|---|---|
| VALUE 1 | 8.000 | 7.783 | INCHES |

CALIPER AFTER SURVEY FIELD CHECK SUMMARY
PERFORMED: 19:54:25 11/06/90 LAST SHOP CALIBRATION: 00:35:00 11/03/90

| | BEFORE | AFTER | UNITS |
|---|---|---|---|
| VALUE 1 | 7.783 | 8.186 | INCHES |

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H L S CALIBRATION SUMMARY TABLE

| SERVICE or SIGNAL | SHOP | BEFORE | AFTER | CHANGE | TOLERANCE |
|---|---|---|---|---|---|
| GUARD | 19.666 | 19.700 | 19.668 | .032 | +/-.80 |
| DEEP INDUCTION | 499.399 | 499.657 | 501.690 | -2.032 | +/- 20 |
| MEDIUM INDUCTION | 510.556 | 508.310 | 510.546 | -2.235 | +/- 20 |
| GAMMA | 247 | 256 | 249 | 6 | +/- 9.0 |
| CALIPER VALUE 1 | 8.000 | 7.783 | 8.186 | -.403 | +/- 0.50 |

| # | TIME | FT | EVENT | REMARKS |
|---|---|---|---|---|
| | | | PRE-LOGGING DATA | |
| 1 | 17:17:41 | 00000 | DATE OF LOG: MMDD 11 6 | |
| 2 | 17:20:11 | 00000 | PLS SOFTWARE REVISION 2.60 | |
| 3 | 17:40:41 | 00000 | CASING SIZE O.D. (INCHES) 5.500 | |
| 4 | 17:40:41 | 00000 | BIT SIZE? (INCHES) 7.875 | |
| 5 | 17:40:41 | 00000 | DT-MATRIX(40=DOL<DT<70=SHALY) 57.000 | |
| 6 | 17:40:41 | 00000 | DT-SHALE (100=MIN<DT<160=MAX) 100.000 | |
| 7 | 17:40:41 | 00000 | FOR FORMATION FACTOR(.5<A<2.5) 1.000 | |
| 8 | 17:40:41 | 00000 | FOR FORMATION FACTOR(1.2<M<2.5) 2.000 | |
| 9 | 17:40:41 | 00000 | CASING SIZE O.D. (INCHES) 7.000 | |
| 10 | 17:40:41 | 00000 | BIT SIZE? (INCHES) 8.500 | |
| 11 | 17:40:41 | 00000 | FOR FORMATION FACTOR(.5<A<2.5) 8.100-1 | |
| 12 | 17:41:40 | 00000 | "HALTING" END OF SECTION | |
| 13 | 18:25:31 | 00595 | CASING SIZE O.D. (INCHES) 4.500 | |
| 14 | 18:28: 0 | 00511 | "HALTING" END OF SECTION | |
| 15 | 18:36:23 | 00511 | "HALTING" END OF SECTION | |
| 16 | 18:39: 1 | 02126 | LOGGING SECTION NO. 2 | |
| 17 | 18:46:24 | 01891 | "HALTING" END OF SECTION | |
| 18 | 18:49: 6 | 02134 | LOGGING SECTION NO. 3 | |
| 19 | 19:38: 7 | 00513 | "HALTING" END OF SECTION | |