# Schlumberger

Company: Lamont-Doherty Borehole Research

Well: IODP Expedition 311 CAS-02C

Field: Cascadia Margin

Rig: JOIDES Resolution State: Pacific Ocean

Rig: JOIDES Resolution
Field: Cascadia Margin
Location: Vancouver Island
Well: IODP Expedition 311 CAS-02C
Company: Lamont-Doherty Borehole Research

## EcoScope Resistivity - Dual Frequency
## 1:240 Measured Depth
## Recorded Mode Log

Location

| | |
|---|---|
| Total depth: | 2562 m |
| Spud date: | 20-Sep-2005 |
| Runs: | 1 To 1 |

Elevation

| | |
|---|---|
| K.B. | 10.06 m |
| G.L. | -2202 m |
| D.F. | 9.60 m |

Permanent datum: MEAN SEA LEVEL Elev.: 0 m
Log measured from: Kelly Bushing 10.06 m above Perm. datum
Depth reference: Driller's Depth

| Service Order no. | NAD 27 | Longitude | Latitude |
|---|---|---|---|
| 40012416 | UTM Zone 10 N | W 126.98322 | N 48.64480 |

| | | | |
|---|---|---|---|
| Depth logged: | 2212 m To 2556 m | Mag decl: | 18.83 deg. |
| Date logged: | 20-Sep-05 To 21-Sep-05 | Mag dip: | 69.17 deg. |

Other services: geoVISION, sonicVISION, proVISION

**Bore hole record**

| Hole size | from | to |
|---|---|---|
| 9.875 in. | 2212 m | 2562 m |

**Casing record**

| Size | Density | from | to |
|---|---|---|---|

**Mud record**

| Type | from | to |
|---|---|---|
| Seawater | 2212 m | 2562 m |

**Borehole deviation record**

| Min | Max | from | to |
|---|---|---|---|

**Surface equipment**

| | |
|---|---|
| Unit | TWIS |
| Depth system | Geolograph |

**Software record**

| | | | |
|---|---|---|---|
| IDEAL Wis | ID10_2C_01 | | |
| SPM | hspm10_1c_05 | | |
| LWD | See Remarks | | |
| MWD | 9.0_C03 | | |



OTHER SERVICES FOR RUN

OTHER SERVICES FOR RUN 1
Real Time STC Projection
Annular Pressure While Drilling

OTHER SERVICES FOR RUN

REMARKS: RUN NUMBER

REMARKS: RUN NUMBER

REMARKS: RUN NUMBER 1
Run Objective: Drill and log sites CAS-02C to select the coring point.
Source of data: Recorded Mode
Reason POOH: To change batteries before start drilling the next sites.
EcoScope gamma ray is not environmentally corrected.
EcoScope resistivity is borehole compensated and is environmentally corrected for bit size and mud resistivity.
Neutron Porosity was computed using a sandstone matrix of 2.65 g/cc and was corrected for bit size, temperature, borehole salinity and mud hydrogen index.
Barite was not present in the mud.

Tool Record Rates:
EcoScope Res, Density & Neutron @ 2 sec

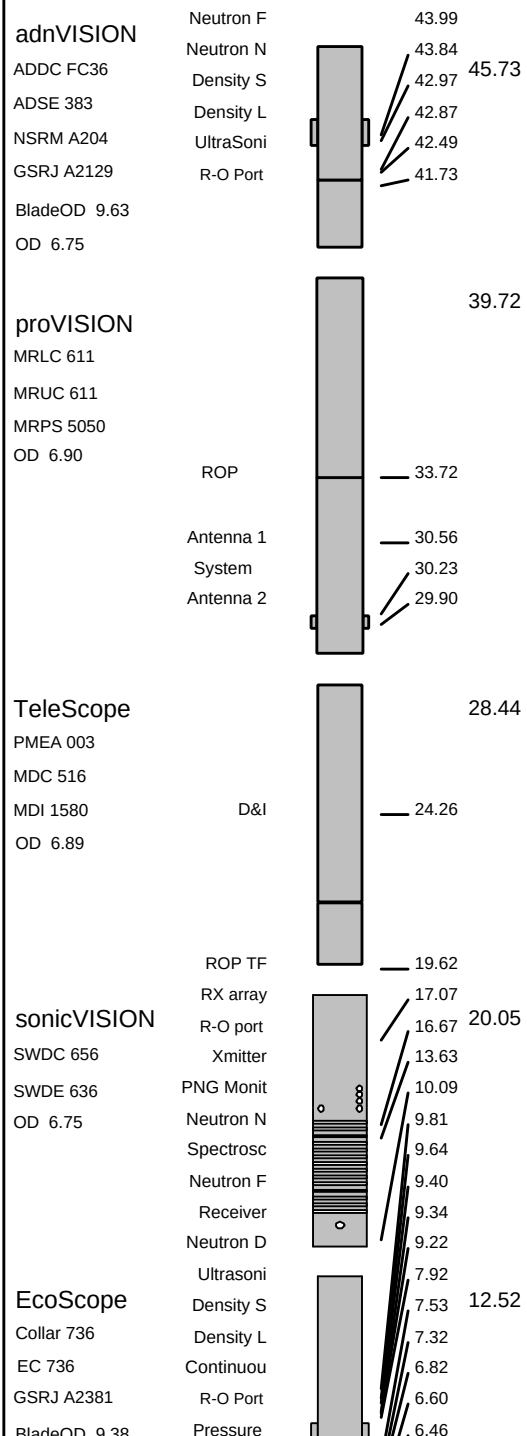
Tool Software Version:
TeleScope: 9.0_C03  EcoScope: 11

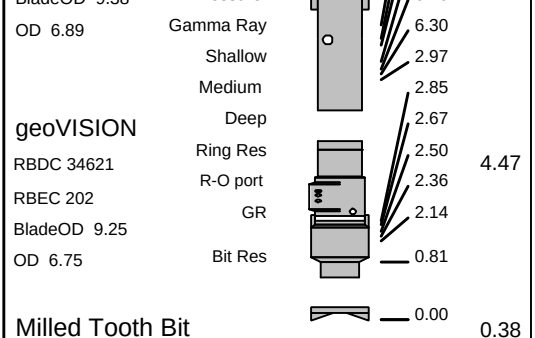
Crew: L. Loh and D. Buster

# EQUIPMENT DESCRIPTION

| RUN1 | RUN | RUN |
|---|---|---|

DOWNHOLE EQUIPMENT






Maximum string diameter 9.88 in.

All lengths in Meters

# Bit Run Summary

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Run number | | 1 | | | | | | | | | |
| | | | | | | | | | | | |
| Bit size | in. | 9.875 | | | | | | | | | |
| Bit start depth | m | 2212 | | | | | | | | | |
| Bit end depth | m | 2562 | | | | | | | | | |
| Top interval logged | m | 2212 | | | | | | | | | |
| Bottom interval logged | m | 2556 | | | | | | | | | |
| Begin log: time | | 23:08 | | | | | | | | | |
| Begin log: date | | 20-Sep-05 | | | | | | | | | |
| End log: time | | 19:28 | | | | | | | | | |
| End log: date | | 21-Sep-05 | | | | | | | | | |
| Mud data | | | | | | | | | | | |
| Depth | m | 2212 | | | | | | | | | |
| Type | | Seawater | | | | | | | | | |
| Mud weight | ppg | 8.5 | | | | | | | | | |
| Solids | % | n/a | | | | | | | | | |
| Chlorides | mg/L | Seawater | | | | | | | | | |
| Rm | ohmmdegF | Seawater | | | | | | | | | |
| Rmf | ohmmdegF | Seawater | | | | | | | | | |
| Rmc | ohmmdegF | Seawater | | | | | | | | | |
| Potassium | ppm | n/a | | | | | | | | | |
| Environmental data | | | | | | | | | | | |
| GR | | | | | | | | | | | |
| Mud weight | ppg | 8.5 | | | | | | | | | |
| Bit size | in. | 9.875 | | | | | | | | | |
| Resistivity | | | | | | | | | | | |
| Neutron porosity | | | | | | | | | | | |
| Hole Size | in. | 9.875 | | | | | | | | | |
| Mud weight | ppg | 8.5 | | | | | | | | | |
| Temperature | degC | 4 | | | | | | | | | |
| Mud salinity | ppm | Seawater | | | | | | | | | |
| Formation salinity | ppm | n/a | | | | | | | | | |
| Recording rate 1 | SEC | 5 sec | | | | | | | | | |
| Recording rate 2 | SEC | 10 sec | | | | | | | | | |
| Filtering GR | | 3 points | | | | | | | | | |
| Filtering density | | 3 points | | | | | | | | | |
| Filtering Neutron | | 3 points | | | | | | | | | |
| Company representative | | G. Myers | | | | | | | | | |
| Schlumberger D&M Personnel | | L. Loh | | | | | | | | | |

| Variable Name | Variable Description | Run Name & Value |
|---|---|---|

Run Number 1

General Information

| | | |
|---|---|---|
| BHT_RM | Bottom Hole Temperature (RM) | 41.000000 |
| BSAL_RM | Mud Salinity (RM) | 0.000000 |
| BS_RM | Bit Size (RM) | 9.875000 |
| COEF_M | User Defined FEXP in Clean Sand | 1.650000 |
| C_WS | Overpressure correction to Sw and M | 1.000000 |
| FEXP | Formation Factor Exponent(RM) | 2.000000 |
| FNUM | Formation Factor Enumerator(RM) | 1.000000 |
| FPHI_RM | Formation Factor Porosity Source (RM) | XPLOT |
| MST_RM | Mud Sample temperature (RM) | 75.000000 |
| MW_RM | Mud Weight (RM) | 8.500000 |
| OBMF_RM | Oil Based Mud (RM) | NO |
| RHOF_RM | Mud Filtrate Density (RM) | 1.000000 |
| RHOM_RM | Matrix density (RM) | 2.650000 |
| RMS_RM | Resistivity of Mud Sample (RM) | 1.000000 |
| RWA_COMP_M | Rwa computation model | BASIC |
| RWA_DEN_AD | Rwa Density Input ADN | RHOB |
| RWA_DEN_CD | Rwa Density Input CDN | RHOB |
| RWA_DEN_IN | Rwa Density Input | RHOB |
| RWA_FORM_M | Rwa computation formation model | CLASTIC |
| RWA_RES_IN | Rwa computation resistivity input | RT |
| RWS_RM | Resistivity of Connate Water (RM) | 1.000000 |
| SHT_RM | Surface Hole Temperature (RM) | 15.000000 |
| TD_RM | Total Measured Depth (RM) | 8405.509766 |
| TWS_RM | Temperature of Connate Water (RM) | 75.000000 |
| VF_ILLI | Fraction of illite in shales | 0.500000 |
| VF_KAOL | Fraction of kaolinite in shales | 0.500000 |
| VF_MONT | Fraction of montmorillonite in shales | 0.000000 |
| XPDM_RM | Cross plot density porosity multiplier | 0.675000 |
| XPNM_RM | Cross plot neutron porosity multiplier | 0.325000 |

DVD

| | | |
|---|---|---|
| LWD_RM/STATION_FILE/PARAMETER | Station Time-frame file name | Station |
| ---------- | ----------Density Parameter---------- | ----------Density |
| ---------- | ----------Neutron Parameter---------- | ----------Neutron |
| ---------- | ---------Interpretation Parameter---------- | ---------Interpretation |
| ---------- | ---------Sigma Parameter---------- | ---------Sigma |
| A12A | ARC Air Cal Attenuation From T1 at 2 MHz | 8.096470 |
| A14A | ARC Air Cal Attenuation From T1 at 400 KHz | 8.154540 |
| A22A | ARC Air Cal Attenuation From T2 at 2 MHz | 6.357980 |
| A24A | ARC Air Cal Attenuation From T2 at 400 KHz | 6.313930 |
| A32A | ARC Air Cal Attenuation From T3 at 2 MHz | 4.697780 |
| A34A | ARC Air Cal Attenuation From T3 at 400 KHz | 4.754960 |
| A42A | ARC Air Cal Attenuation From T4 at 2 MHz | 4.759350 |
| A44A | ARC Air Cal Attenuation From T4 at 400 KHz | 4.713040 |
| A52A | ARC Air Cal Attenuation From T5 at 2 MHz | 3.258230 |
| A54A | ARC Air Cal Attenuation From T5 at 400 KHz | 3.315620 |
| ABNT | Abnormal Transmitter Indicator | No_Tx_Failed |
| ALPHA_DEN_ | Density Enhanced Vertical Resolution Processing Switch | YES |
| ANISO_COMP | Anisotropy Computation Option | YES |
| ATMP_ARC | ARC Select Temperature Channel | Annulus_Temp |
| AZMF | Formation DIP Azimuth | 0.000000 |
| BH_COMPUTE | Borehole Inversion Computation Option | YES |
| CALG | DVDM Gamma Ray Cal Gain Factor | -1.000000 |
| CDPTH_ARC | Process Start Depth | 100.000000 |
| DEVI | Well Section Deviation | 0.100000 |
| DIELEC_COM | Dielectric Computation Option | YES |
| DIPF | Formation DIP Angle | 0.000000 |
| DVDMDHS | DVDM Down Hole Software Version | 0.000000 |
| DYN_IMAGE_ | Generate Dynamic Normalized Image? | YES |
| EDPTH | Wizard Process Stop Depth | 50000 |
| EN_WIZARD | Enable ARC Wizard Processing | NO |
| ERRCT | Percentage Error Cutoff | 4.500000 |
| EVRL | EVR Process averaging number of samples (RM) | 49 |
| FWVN | Firmware Version Number | 1.100000 |
| GCSE | Generalized Caliper Selection | BS |
| GRBC | RM: DVDM Gamma Ray Blanket (CPS) | 75.000000 |
| GRSH | GR Shale (Invasion Computation Cutoff) | 1000.000000 |
| GR_CF | Gamma Ray Correction Factor | 2.250000 |
| HIGH_BLEND | High Resistivity Threshold for Blending | 2.000000 |
| IDQT | Image Derived Quality Threshold | 1.000000 |
| IMAGE_MAX_ | Image Density Caliper Right Scale | 8.000000 |
| IMAGE_MAX_ | Image Density Quality Right Scale | 1.000000 |
| IMAGE_MAX_ | Image PEF(Segment) Right Scale | 6.000000 |
| IMAGE_MAX_ | Image RHOB(Segment) Right Scale | 2.650000 |
| IMAGE_MIN_ | Image Density Caliper Left Scale | 2.000000 |
| IMAGE_MIN_ | Image Density Quality Left Scale | 0.000000 |
| IMAGE_MIN_ | Image PEF(Segment) Left Scale | 2.000000 |
| IMAGE_MIN_ | Image RHOB(Segment) Left Scale | 2.050000 |
| IMAGE_ORIE | Image Orientation Options, e.g. Top of Hole or True North | NORTH |
| INCLIN_B0 | ARC Bias Constant (mg) | 0.000000 |
| INCLIN_B1 | ARC Bias First-order Coefficient (mg/degC) | 0.000000 |
| INCLIN_B2 | ARC Bias Secod-order Coeeficient (mg/degC) | 0.000000 |
| INCLIN_B3 | ARC Bias Third-order Coeeficient (mg/degC) | 0.000000 |
| INCLIN_C0 | ARC Current Scale Factor Constant (mA/g) | 1.000000 |
| INCLIN_C1 | ARC Scale First-order Coeeficient (mA/g/degC) | 0.000000 |
| INCLIN_C2 | ARC Scale Second-order Coeeficient (mA/g/degC) | 0.000000 |
| INCLIN_C3 | ARC Scale Third-order Coeeficient (mA/g/degC) | 0.000000 |

| | | |
|---|---|---|
| INVAS_COMP | Invasion Computation Option | YES |
| JSD | Acquisition start date | YES |
| JSD_ARC | ARC Acquisition start date | YES |
| LOW_BLEND | Low Resistivity Threshold for Blending | 1.000000 |
| MATR | Rock Matrix for Neutron Porosity Corrections | SANDSTONE |
| MSWS | ARC Wizard Model Switch Window | 5.000000 |
| MULTIEFFEC | Multi Effect Option | YES |
| NEU_DCOR_O | Density Correction Source for Neutron Processing | Average |
| NEU_FTUBE_ | Far Thermal Tube Selection | Both |
| NTIK_SEL | Neutron Tick Channel Name | FAZ1 |
| OACF | O2 Activation Correction Factor (RM) | 0.000000 |
| P12A | ARC Air Cal Phase-Shift From T1 at 2 MHz | 1.143270 |
| P14A | ARC Air Cal Phase-Shift From T1 at 400 KHz | 1.838910 |
| P22A | ARC Air Cal Phase-Shift From T2 at 2 MHz | -1.152680 |
| P24A | ARC Air Cal Phase-Shift From T2 at 400 KHz | -1.826430 |
| P32A | ARC Air Cal Phase-Shift From T3 at 2 MHz | 1.064520 |
| P34A | ARC Air Cal Phase-Shift From T3 at 400 KHz | 1.835500 |
| P42A | ARC Air Cal Phase-Shift From T4 at 2 MHz | -1.202580 |
| P44A | ARC Air Cal Phase-Shift From T4 at 400 KHz | -1.845070 |
| P52A | ARC Air Cal Phase-Shift From T5 at 2 MHz | 1.092880 |
| P54A | ARC Air Cal Phase-Shift From T5 at 400 KHz | 1.844270 |
| PMUD | Potassium Concentration in Mud | 0.000000 |
| POFFSET | Pressure Offset | 0.000000 |
| PRTD | Preferred Resistivity Log for Rt Display while Multi-Effects | P34B |
| PSOF_ADJ_T | ARC: User Input Phase offset | 0.000000 |
| RESTIK | ARC resistivity tick source | Phase |
| SDPTH | Wizard Process Start Depth | 100 |
| SIG_PCOR_O | Porosity Correction Source for Sigma Processing | Best |
| SPEC_CSG_D | Casing Depth for Spectroscopy Processing | 100.000000 |
| SPL_CLAY_M | SpectroLith Clay Model | ARENITE |
| SPL_COAL_O | SpectroLith Coal Processing Option | NONE |
| SPL_SULFUR | SpectroLith Sulfur Mineral Option | ANHYDRITE |
| STAB_SIZE | Stabilizer Size | 9.375000 |
| STOH | Density Top of Hole Sector (Left Boundary) | SECTOR_0 |
| TRNO | Tool Run Number | 8405.509766 |
| TSIZ_ARC | ARC Tool Size | 6.900000 |
| TSNO | Tool Serial Number | 6.900000 |
| UNIFORM_CO | Uniform Rock Option | YES |
| VERS_ARC | ARC Down hole software version Number | 1.100000 |
| WRK | Way to Report Potassium Concentration | K_by_Wgt_% |
| WSDI | Window Size of Dynamic Normalization Image | 50.000000 |

Schlumberger Drilling & Measurements Parameter Insert Header Software version 2.0c

# IDEAL Version: ID10_2B_08

IDF

ADN id10_2c_01

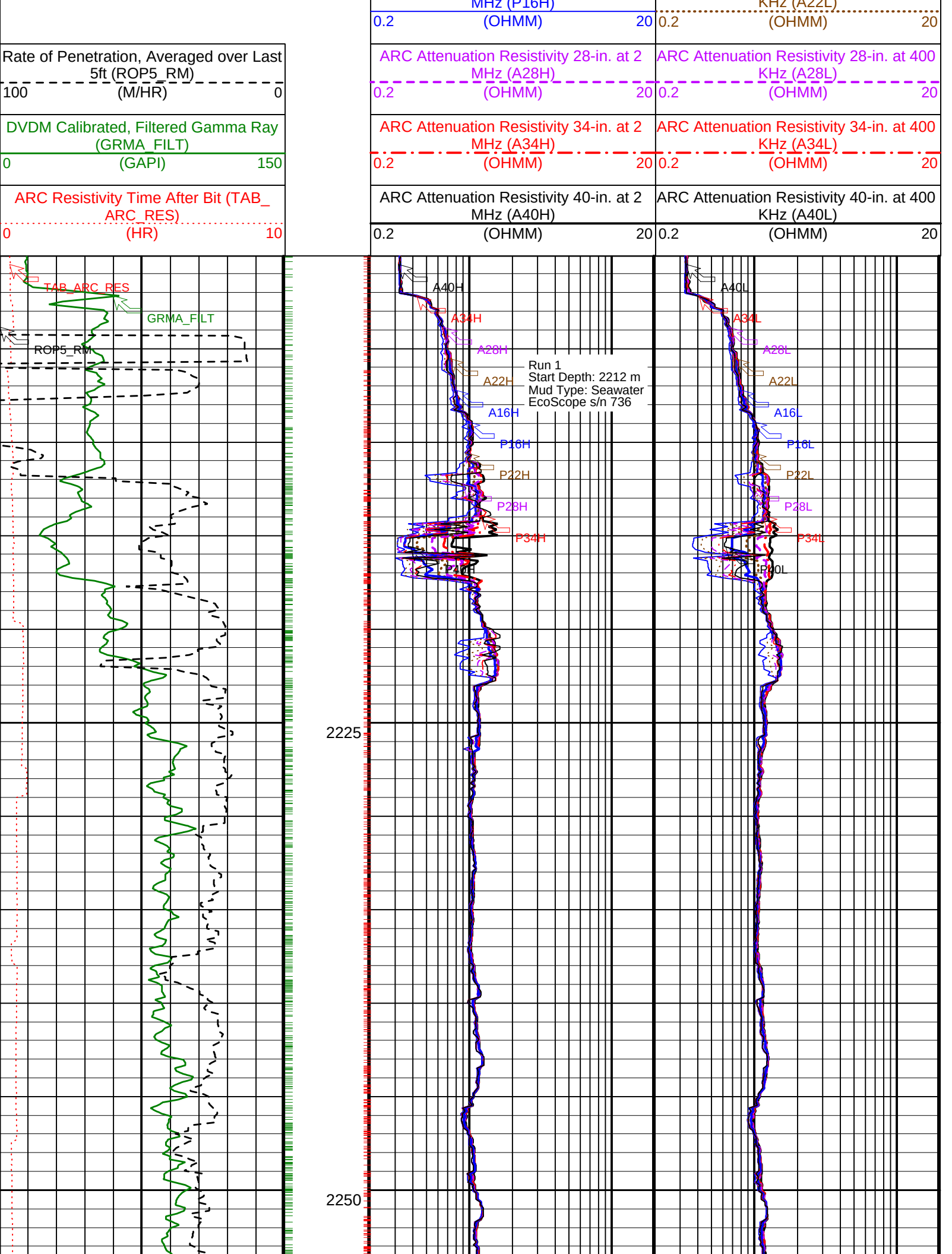
Format: 5 MD ARC DUAL FREQ Vertical Scale: 1:240 Graphics File Created: 03-Oct-2005 07:53

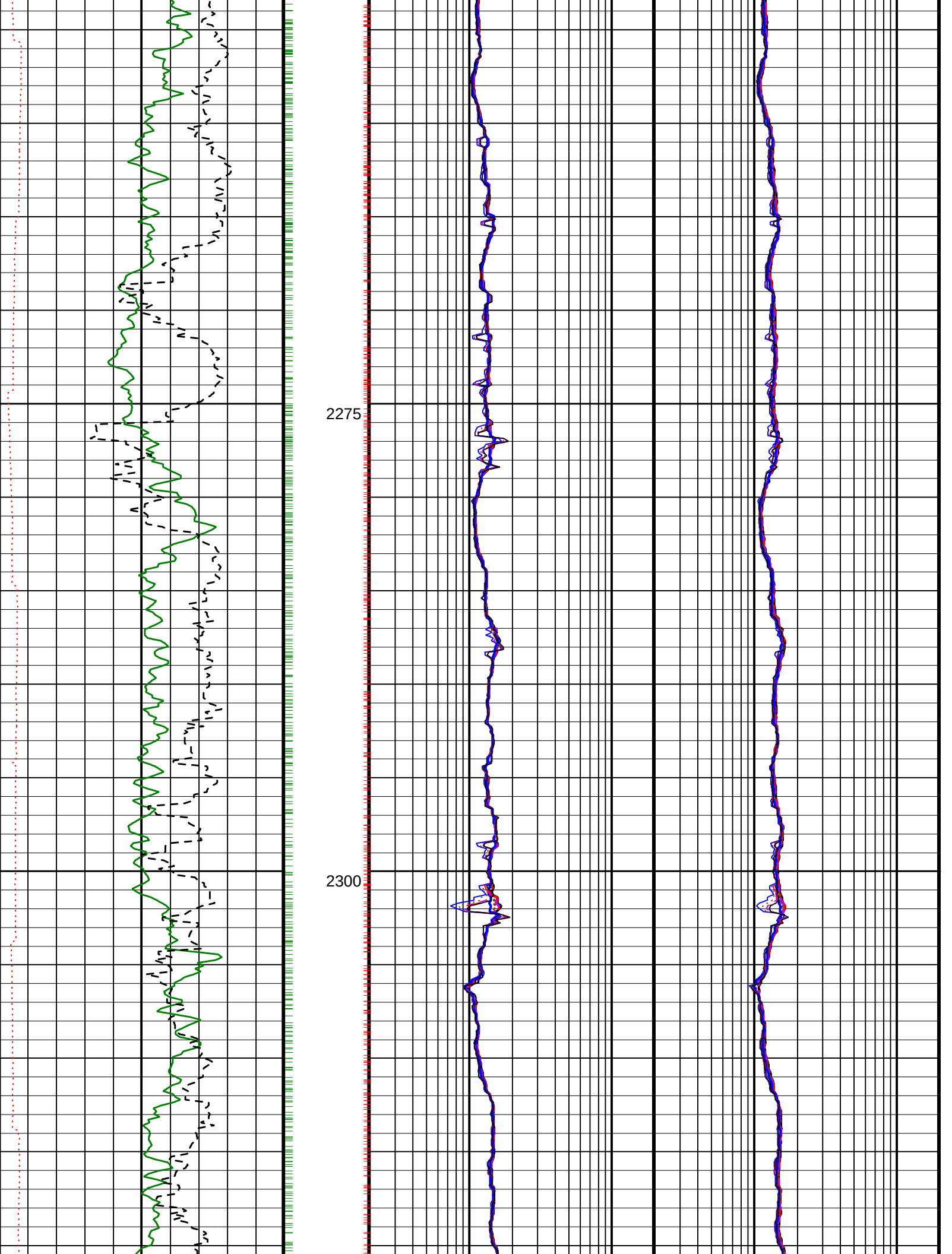
PIP SUMMARY

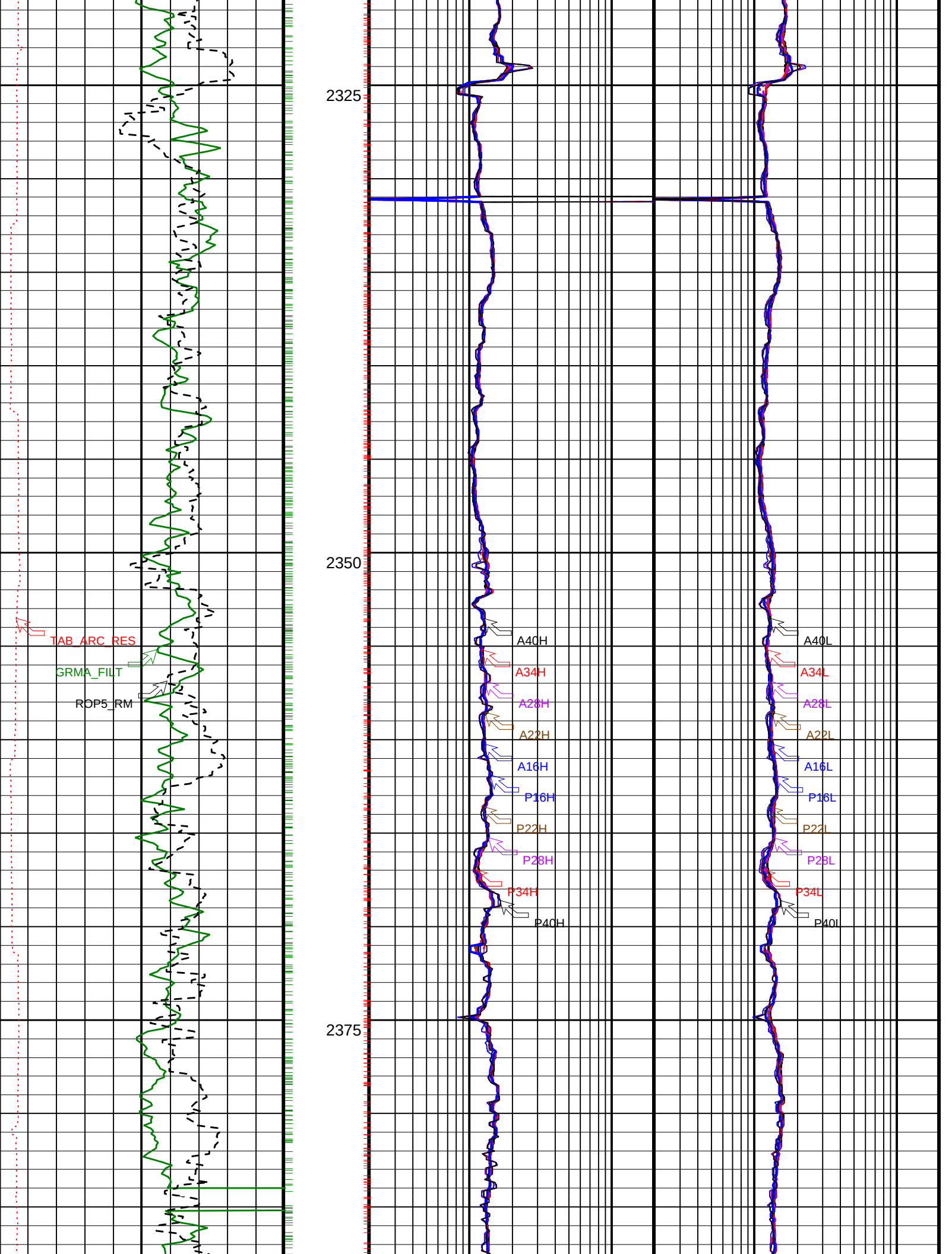
ARC Resistivity Samples

DVDM Gamma Ray Samples

| | | | | | |
|---|---|---|---|---|---|
| ARC Attenuation Resistivity 16-in. at 2 MHz (A16H) | 0.2 | (OHMM) | 20 | ARC Phase-Shift Resistivity 40-in. at 400 KHz (P40L) | 0.2 (OHMM) 20 |
| ARC Attenuation Resistivity 22-in. at 2 MHz (A22H) | 0.2 | (OHMM) | 20 | ARC Phase-Shift Resistivity 34-in. at 400 KHz (P34L) | 0.2 (OHMM) 20 |
| ARC Phase-Shift Resistivity 40-in. at 2 MHz (P40H) | 0.2 | (OHMM) | 20 | ARC Phase-Shift Resistivity 28-in. at 400 KHz (P28L) | 0.2 (OHMM) 20 |
| ARC Phase-Shift Resistivity 34-in. at 2 MHz (P34H) | 0.2 | (OHMM) | 20 | ARC Phase-Shift Resistivity 22-in. at 400 KHz (P22L) | 0.2 (OHMM) 20 |
| ARC Phase-Shift Resistivity 28-in. at 2 MHz (P28H) | 0.2 | (OHMM) | 20 | ARC Phase-Shift Resistivity 16-in. at 400 KHz (P16L) | 0.2 (OHMM) 20 |
| ARC Phase-Shift Resistivity 22-in. at 2 MHz (P22H) | 0.2 | (OHMM) | 20 | ARC Attenuation Resistivity 16-in. at 400 KHz (A16L) | 0.2 (OHMM) 20 |
| ARC Phase-Shift Resistivity 16-in. at 2 | | | | ARC Attenuation Resistivity 22-in. at 400 | |


MHz (P16H)
0.2 (OHMM) 20
KHz (A22L)
0.2 (OHMM) 20
Rate of Penetration, Averaged over Last 5ft (ROP5_RM)
100 (M/HR) 0
ARC Attenuation Resistivity 28-in. at 2 MHz (A28H)
0.2 (OHMM) 20
ARC Attenuation Resistivity 28-in. at 400 KHz (A28L)
0.2 (OHMM) 20
DVDM Calibrated, Filtered Gamma Ray (GRMA_FILT)
0 (GAPI) 150
ARC Attenuation Resistivity 34-in. at 2 MHz (A34H)
0.2 (OHMM) 20
ARC Attenuation Resistivity 34-in. at 400 KHz (A34L)
0.2 (OHMM) 20
ARC Resistivity Time After Bit (TAB_ARC_RES)
0 (HR) 10
ARC Attenuation Resistivity 40-in. at 2 MHz (A40H)
0.2 (OHMM) 20
ARC Attenuation Resistivity 40-in. at 400 KHz (A40L)
0.2 (OHMM) 20
TAB_ARC_RES
GRMA_FILT
ROP5_RM
A40H
A34H
A28H
A22H
A16H
P16H
P22H
P28H
P34H
P40H
Run 1
Start Depth: 2212 m
Mud Type: Seawater
EcoScope s/n 736
A40L
A34L
A28L
A22L
A16L
P16L
P22L
P28L
P34L
P40L
2225
2250


2275
2300


2325
2350
2375
TAB_ARC_RES
GRMA_FILT
ROP5_RM
A40H
A34H
A28H
A22H
A16H
P16H
P22H
P28H
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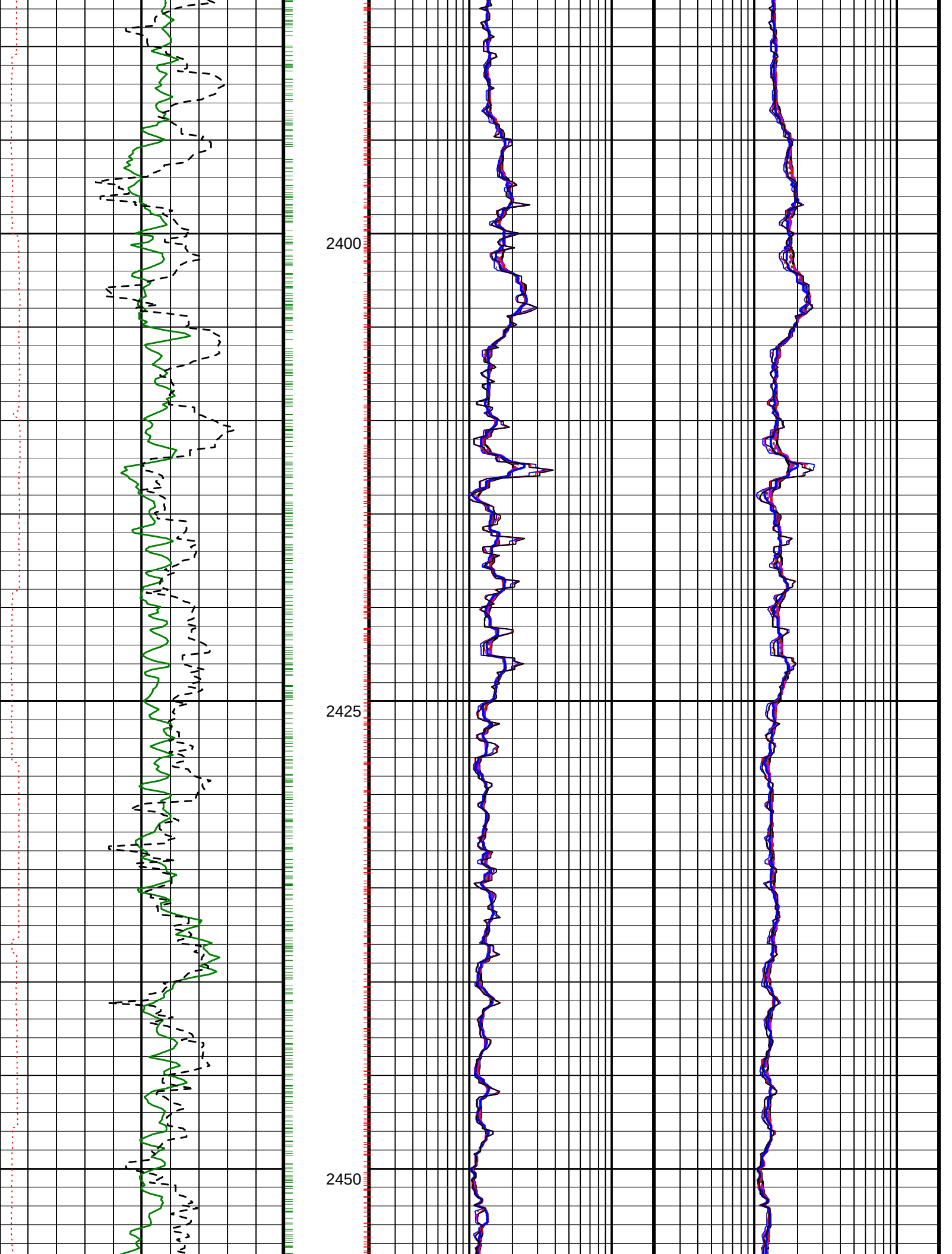
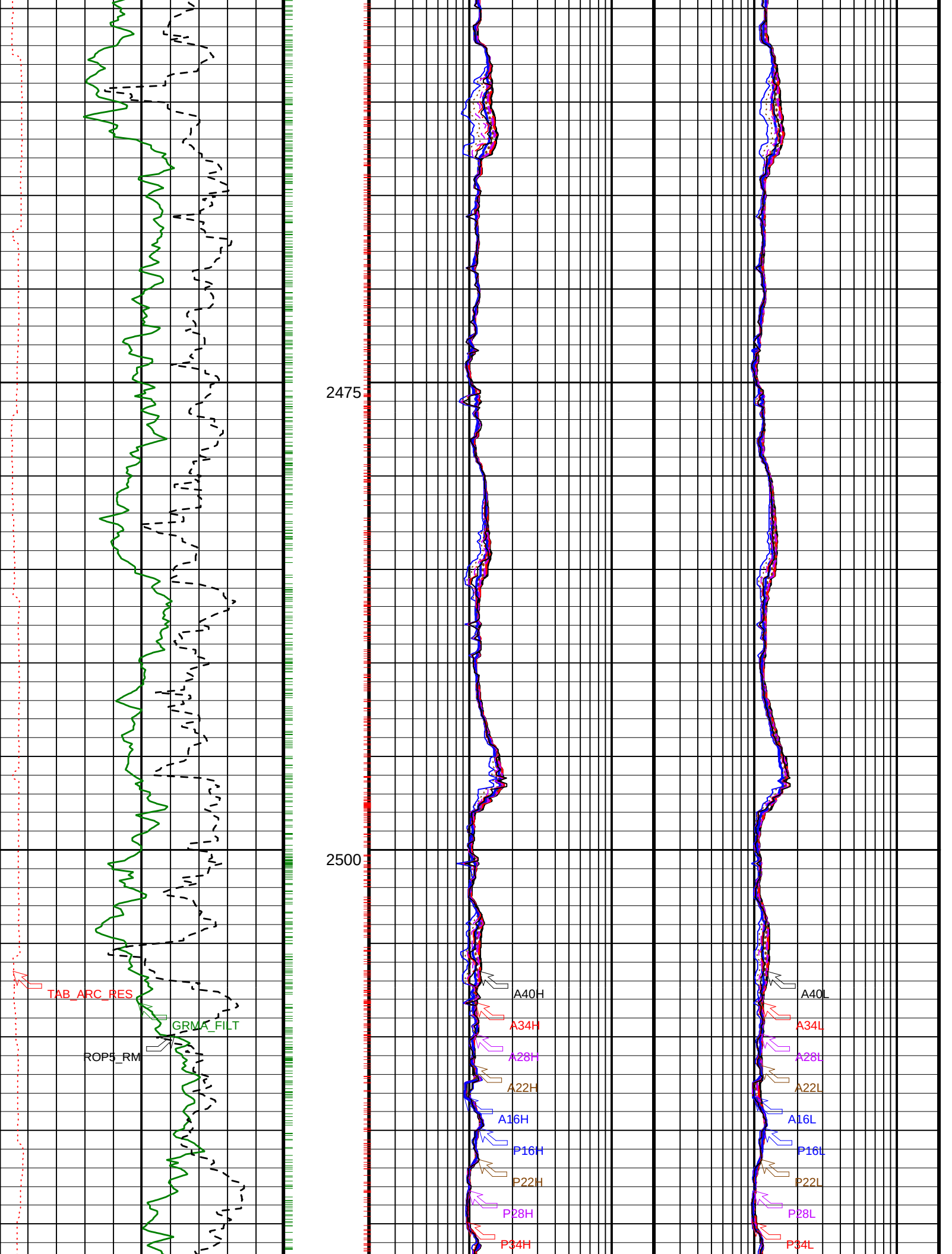
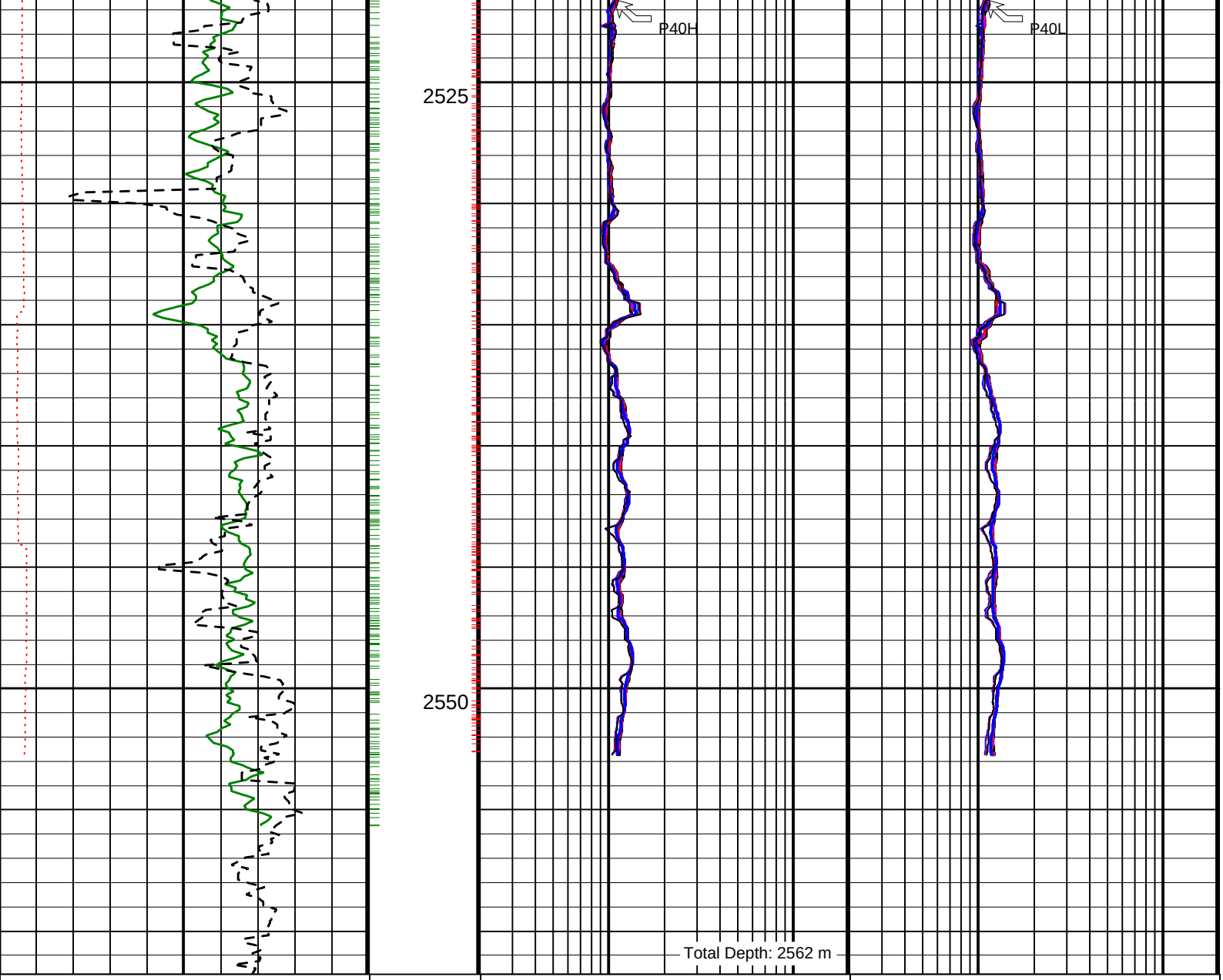
A16L
P16L
P22L
P28L
P34L
P40L


2400
2425
2450


2475
2500
TAB_ARC_RES
GRMA_FILT
ROP5_RM
A40H
A34H
A28H
A22H
A16H
P16H
P22H
P28H
P34H
A40L
A34L
A28L
A22L
A16L
P16L
P22L
P28L
P34L




ARC Resistivity Time After Bit (TAB_ARC_RES)
0 (HR) 10

DVDM Calibrated, Filtered Gamma Ray (GRMA_FILT)
0 (GAPI) 150

Rate of Penetration, Averaged over Last 5ft (ROP5_RM)
100 (M/HR) 0

ARC Attenuation Resistivity 40-in. at 2 MHz (A40H)
0.2 (OHMM) 20

ARC Attenuation Resistivity 34-in. at 2 MHz (A34H)
0.2 (OHMM) 20

ARC Attenuation Resistivity 28-in. at 2 MHz (A28H)
0.2 (OHMM) 20

ARC Phase-Shift Resistivity 16-in. at 2 MHz (P16H)
0.2 (OHMM) 20

ARC Phase-Shift Resistivity 22-in. at 2 MHz (P22H)
0.2 (OHMM) 20

ARC Phase-Shift Resistivity 28-in. at 2 MHz (P28H)
0.2 (OHMM) 20

ARC Phase-Shift Resistivity 34-in. at 2 MHz (P34H)
0.2 (OHMM) 20

ARC Attenuation Resistivity 40-in. at 400 KHz (A40L)
0.2 (OHMM) 20

ARC Attenuation Resistivity 34-in. at 400 KHz (A34L)
0.2 (OHMM) 20

ARC Attenuation Resistivity 28-in. at 400 KHz (A28L)
0.2 (OHMM) 20

ARC Attenuation Resistivity 22-in. at 400 KHz (A22L)
0.2 (OHMM) 20

ARC Attenuation Resistivity 16-in. at 400 KHz (A16L)
0.2 (OHMM) 20

ARC Phase-Shift Resistivity 16-in. at 400 KHz (P16L)
0.2 (OHMM) 20

ARC Phase-Shift Resistivity 22-in. at 400 KHz (P22L)
0.2 (OHMM) 20

| | | | | |
|---|---|---|---|---|
| ARC Phase-Shift Resistivity 40-in. at 2 MHz (P40H) | | | ARC Phase-Shift Resistivity 28-in. at 400 KHz (P28L) | |
| 0.2 | (OHMM) | 20 | 0.2 | (OHMM) 20 |
| ARC Attenuation Resistivity 22-in. at 2 MHz (A22H) | | | ARC Phase-Shift Resistivity 34-in. at 400 KHz (P34L) | |
| 0.2 | (OHMM) | 20 | 0.2 | (OHMM) 20 |
| ARC Attenuation Resistivity 16-in. at 2 MHz (A16H) | | | ARC Phase-Shift Resistivity 40-in. at 400 KHz (P40L) | |
| 0.2 | (OHMM) | 20 | 0.2 | (OHMM) 20 |

PIP SUMMARY

ARC Resistivity Samples

DVDM Gamma Ray Samples

# IDEAL Version: ID10_2B_08

IDF

ADN id10_2c_01

EcoScope Integrated Logging-While-Drilling Tool - 6.75 inch / Equipment Identification

Primary Equipment:

| | | |
|---|---|---|
| Tool Name and Serial Number | ECO - 675 | 736 |
| Calibration Status | - | |
| Collar Type and Serial Number | ADDC - AA | |
| Chassis Type and Serial Number | ADSE - EA | |
| Stabilizer Type and Serial Number | ADCS - CA | |
| Neutron Logging Source | NSR - M | |
| Density Logging Source | GSR - J/Z | |
| Stabilizer Size | 9.38 - in. | |

Master: 22-Jul-2005 12:37

EcoScope Integrated Logging-While-Drilling Tool - 6.75 inch Calibration

SSn LSn : Water Tank

| Phase | SSn Gain | Value | Phase | SSn Offset | Value |
|---|---|---|---|---|---|
| Master | | 1.000 | Master | | 0 |
| 0.6000 (Minimum) | 1.000 (Nominal) | 1.400 (Maximum) | -3.000 (Minimum) | 0 (Nominal) | 3.000 (Maximum) |

| Phase | LSn Gain | Value | Phase | LSn Offset | Value |
|---|---|---|---|---|---|
| Master | | 1.000 | Master | | 0 |
| 0.6000 (Minimum) | 1.000 (Nominal) | 1.400 (Maximum) | -3.000 (Minimum) | 0 (Nominal) | 3.000 (Maximum) |

Master: 22-Jul-2005 12:37

EcoScope Integrated Logging-While-Drilling Tool - 6.75 inch Calibration

Neutron: Water Tank

| Phase | Far 2 Gain | Value | Phase | Far 2 Offset | Value |
|---|---|---|---|---|---|
| Master | | 1.056 | Master | | -0.7620 |
| 0.7000 (Minimum) | 1.000 (Nominal) | 1.300 (Maximum) | -3.000 (Minimum) | 0 (Nominal) | 3.000 (Maximum) |

| Phase | Far 1 Gain | Value | Phase | Far 1 Offset | Value |
|---|---|---|---|---|---|
| Master | | 1.055 | Master | | -0.4690 |
| 0.7000 (Minimum) | 1.000 (Nominal) | 1.300 (Maximum) | -3.000 (Minimum) | 0 (Nominal) | 3.000 (Maximum) |

| Phase | Thermal Near gain | Value | Phase | Thermal Near offset | Value |
|---|---|---|---|---|---|
| Master | | 1.155 | Master | | -137.6 |
| 0.7000 (Minimum) | 1.000 (Nominal) | 1.300 (Maximum) | -500.0 (Minimum) | 0 (Nominal) | 500.0 (Maximum) |

| Phase | Epithermal Near gain | Value | Phase | Eptithermal Near offset | Value |
|---|---|---|---|---|---|
| Master | | 1.221 | Master | | -13.57 |
| 0.7000 (Minimum) | 1.000 (Nominal) | 1.300 (Maximum) | -300.0 (Minimum) | 0 (Nominal) | 300.0 (Maximum) |

Master: Calibration out of date 11-Apr-2005 19:14

EcoScope Integrated Logging-While-Drilling Tool - 6.75 inch Calibration

Gamma Density: Magnesium Block

| Phase | LS window 3 - Mg CPS | Value | Phase | SS window 1 - Mg CPS | Value | Phase | SS window 3 - Mg CPS | Value |
|---|---|---|---|---|---|---|---|---|
| Master | | 2041 | Master | | 5077 | Master | | 11910 |

| Phase | | Value |
|---|---|---|
| Master | | 2041 |

1000 (Minimum) 2000 (Nominal) 3000 (Maximum)

| Phase | | Value |
|---|---|---|
| Master | | 3077 |

2500 (Minimum) 5250 (Nominal) 8000 (Maximum)

| Phase | | Value |
|---|---|---|
| Master | | 11910 |

6000 (Minimum) 12000 (Nominal) 18000 (Maximum)

Master: Calibration out of date 11-Apr-2005 19:14

EcoScope Integrated Logging-While-Drilling Tool - 6.75 inch Calibration

Gamma Density: Aluminum Block

| Phase | LS window 3 - Al CPS | Value |
|---|---|---|
| Master | | 372.3 |

200.0 (Minimum) 400.0 (Nominal) 600.0 (Maximum)

| Phase | SS window 1 - Al CPS | Value |
|---|---|---|
| Master | | 2692 |

1500 (Minimum) 3000 (Nominal) 4500 (Maximum)

| Phase | SS window 3 - Al CPS | Value |
|---|---|---|
| Master | | 8750 |

4000 (Minimum) 8500 (Nominal) 13000 (Maximum)

Master: Calibration date not found

EcoScope Integrated Logging-While-Drilling Tool - 6.75 inch Calibration

Gamma Density: Background

| Phase | LS window 3 - Background CPS | Value |
|---|---|---|
| Master | | 57.82 |

50.00 (Minimum) 70.00 (Nominal) 90.00 (Maximum)

| Phase | SS window 1 - Background CPS | Value |
|---|---|---|
| Master | | 85.68 |

50.00 (Minimum) 75.00 (Nominal) 100.0 (Maximum)

| Phase | SS window 3 - Background CPS | Value |
|---|---|---|
| Master | | 413.0 |

270.0 (Minimum) 370.0 (Nominal) 470.0 (Maximum)

Master: Calibration date not found

EcoScope Integrated Logging-While-Drilling Tool - 6.75 inch Calibration

Gamma Density: Water Block Check

| Phase | Long spacing water density G/C3 | Value |
|---|---|---|
| Master | | 1.047 |

0.9000 (Minimum) 1.150 (Nominal) 1.400 (Maximum)

| Phase | Short spacing water density G/C3 | Value |
|---|---|---|
| Master | | 1.262 |

0.9000 (Minimum) 1.150 (Nominal) 1.400 (Maximum)

Master: Calibration date not found

EcoScope Integrated Logging-While-Drilling Tool - 6.75 inch Calibration

Resistivity: Air

| Phase | Phase-Shift T1 | Value |
|---|---|---|
| Master | | 1.143 |

-4.000 (Minimum) 0 (Nominal) 4.000 (Maximum)

| Phase | Phase-Shift T2 | Value |
|---|---|---|
| Master | | -1.153 |

-4.000 (Minimum) 0 (Nominal) 4.000 (Maximum)

| Phase | Phase-Shift T3 | Value |
|---|---|---|
| Master | | 1.065 |

-4.000 (Minimum) 0 (Nominal) 4.000 (Maximum)

| Phase | Phase-Shift T4 | Value |
|---|---|---|
| Master | | -1.203 |

-4.000 (Minimum) 0 (Nominal) 4.000 (Maximum)

| Phase | Phase-Shift T5 | Value |
|---|---|---|
| Master | | 1.093 |

-4.000 (Minimum) 0 (Nominal) 4.000 (Maximum)

| Phase | Phase-Shift T1 at 400KHz | Value |
|---|---|---|
| Master | | 1.839 |

-4.000 (Minimum) 0 (Nominal) 4.000 (Maximum)

| Phase | Phase-Shift T2 at 400KHz | Value |
|---|---|---|
| Master | | -1.826 |

-4.000 (Minimum) 0 (Nominal) 4.000 (Maximum)

| Phase | Phase-Shift T3 at 400KHz | Value |
|---|---|---|
| Master | | 1.836 |

-4.000 (Minimum) 0 (Nominal) 4.000 (Maximum)

| Phase | Phase-Shift T4 at 400KHz | Value |
|---|---|---|
| Master | | -1.845 |

-4.000 (Minimum) 0 (Nominal) 4.000 (Maximum)

| Phase | Phase-Shift T5 at 400KHz | Value |
|---|---|---|
| Master | | 1.844 |

-4.000 (Minimum) 0 (Nominal) 4.000 (Maximum)

Master: Calibration date not found

EcoScope Integrated Logging-While-Drilling Tool - 6.75 inch Calibration

Resistivity: Air

| Phase | Attenuation T1 | Value |
|---|---|---|
| Master | | 8.096 |

7.000 (Minimum) 9.000 (Nominal) 11.00 (Maximum)

| Phase | Attenuation T2 | Value |
|---|---|---|
| Master | | 6.358 |

4.000 (Minimum) 6.000 (Nominal) 8.000 (Maximum)

| Phase | Attenuation T3 | Value |
|---|---|---|
| Master | | 4.698 |

3.500 (Minimum) 5.500 (Nominal) 7.500 (Maximum)

| Phase | Attenuation T4 | Value |
|---|---|---|
| Master | | 4.759 |

2.500 (Minimum) 4.500 (Nominal) 6.500 (Maximum)

| Phase | Attenuation T5 | Value |
|---|---|---|
| Master | | 3.258 |

2.000 (Minimum) 4.000 (Nominal) 6.000 (Maximum)

| Phase | Attenuation T1 at 400KHz | Value |
|---|---|---|
| Master | | 8.155 |

7.000 (Minimum) 9.000 (Nominal) 11.00 (Maximum)

| Phase | Attenuation T2 at 400KHz | Value |
|---|---|---|
| Master | | 6.314 |

4.000 (Minimum) 6.000 (Nominal) 8.000 (Maximum)

| Phase | Attenuation T3 at 400KHz | Value |
|---|---|---|
| Master | | 4.755 |

3.500 (Minimum) 5.500 (Nominal) 7.500 (Maximum)

| Phase | Attenuation T4 at 400KHz | Value |
|---|---|---|
| Master | | 4.713 |

2.500 (Minimum) 4.500 (Nominal) 6.500 (Maximum)

| Phase | Attenuation T5 at 400KHz | Value |
|---|---|---|
| Master | | 3.316 |

| | | |
|---|---|---|
| 2.000 (Minimum) | 4.000 (Nominal) | 6.000 (Maximum) |

Master: Calibration date not found

EcoScope Integrated Logging-While-Drilling Tool - 6.75 inch

Calibration

Gamma Ray: Blanket

| Phase | Gamma ray factor | Value |
|---|---|---|
| Master | | 2.250 |

| 2.000 (Minimum) | 2.500 (Nominal) | 3.000 (Maximum) |
|---|---|---|

Company: Lamont-Doherty Borehole Research

Schlumberger

Well: IODP Expedition 311 CAS-02C

Field: Cascadia Margin

Rig: JOIDES Resolution

State: Pacific Ocean

EcoScope Resistivity - Dual Frequency

1:240 Measured Depth

Recorded Mode Log

| | | | |
|---|---|---|---|
| Geomarket | NGC | Location | |
| Job Date | 20-SEP-2005 | Customer | Lamont-Doherty Borehole Research |
| Rig | JOIDES Resolution | Field/Well | Cascadia Margin / IODP Expedition 311 CAS-02C |
| Engineer | Lake Loh | Job Number | 4C |

Operation Presentation

Description of Well - Names, Geometry, Services, Location
Header, user of trademarks, directional data, well plot, order
sensor to toolface angle recorded

Equiment and Software Description

Tool sketch, equipment numbers, software versions, data rate

Processing Traceability and Environment Description
Acquisition environment, parameters and key constants for ea
remarks

Annotations, Presented Formats, QC Curves, Print Quality
Documented splice points; data gap explanations, mud chang
selection

Calibration and Verificatio

Calibration / Before survey verification / After survey verific

Validity, completeness (includes equipment number), timeline

Operating Procedures

Depth Control
Comparison with driller's depth, other logs, other bit runs, betw
listing

Logging speed and sampling rates

As recommended in reference manual or job planner. No loss

Data Comparison

Between runs and passes, with data from nearby wells, other

Operating Anomalies/Failure/Missing Data/Sensor Orientat

Absence of noise and spurious variations, anomaly repeated,

Digital Delivery

Digital Products
Labeled, verification listing with complete digital record, backu
hard copy.

Job Quality Rating (JQR)

Number of boxes without number X 1

Environmental effects

Irregular Operation

Excessive ROP or speed, high deviation, shocks, vibrations, s

Borehole Geometry

Shape (caves, etc), rugosity, spiralled hole, mud induced frac

Borehole Fluid

Barite, KCl, salinity, additives, gas cut, unstable

Interferences

External noise, nearby casing or drillpipe, debris, unusual form

Operation Outside Tool Specifications
GeomarketTemperature, pressure, hole size, hole deviation, d
value of parameter

Environmental Quality Rating (EQ

Number of boxes without number X

# Data Quality Report

| | |
|---|---|
| ancouver Island | |
| amont-Doherty Borehole Research | |
| ascadia Margin/CAS-02C | |
| 0012416 | |

Type of Measurement

When data does not meet standards, put a number in the colum corresponding to the measurement with a corresponding number and remark below. Use additional pages for remarks
Positive remarks are welcome; do not append them with a number.

| | Res | GR | Neu | Den | APWD |
|---|---|---|---|---|---|
| and References; General Content of components, spelling and style, units | | | | | |
| s, filtering weights | | | | | |
| ach run or zone, complete and relavant | 1 | | 3 | | |
| ges, movement indicator, color | | | | | |
| **ons** | | | | | |
| cation | | | | | |
| ss, unedited, descrepency explained | | | | | |
| | | | | | |
| ween RT and RM. Depth summary | 2 | 2 | 2 | 2 | |
| s of data or spatial resolution | | | | | |
| conveyance, mud log and markers | | | | | |
| tion/Transmission Losses corrected, reported or explained. | | | | | |
| | | | | | |
| up for archival; record matches | | | | | |
| 0 | 80 | 90 | 80 | 90 | 100 |
| s | | | | | |
| sticking conditions | 1 | 1 | 1 | 1 | 1 |
| tures. Casing, tubing conditions | 2 | | 2 | 2 | |
| | | | | | |
| nation composition | | | | | |
| og-leg severity, flow rate, rpm, solids | | | | 3 | |
| R) 20 | 60 | 80 | 60 | 40 | 80 |

## Remarks

1. Correcting the resistivity data by assumming mud resistivity as 1 ohmm @ 75 degF.
2. Depth is not compensated for heave. The heave cause the spikes of ROP and this eventually cause the low data density and distortion on the image. The heave also cause the curves (gamma ray, resistivity, density and neutron porosity) do not correlate to each other very well and cause the resistivity curves blocky.
3. Correcting the Neutron Porosity data by assumming borehole salinity as 0 ppk.

1. Excessive ROP is causing low data density.
2. Borehole washouts cause the resistivity curves separation. EcoScope Neutron Porosity is only corrected for bit size. Large borehole washouts cause low density readings.
3. Low RPM during the early stage of the well reduce the image's resolution.

Cell Manager: Lake Loh FSM: Vijay Moras

DQR Header Utility ver 1.1c

Schlumberger Drilling & Measurements

Revised January 2002

| | | | |
|---|---|---|---|
| Geomarket | NGC | Location | Va |
| Job Date | 20-SEP-2005 | Customer | La |
| Rig | JOIDES Resolution | Field/Well | Ca |
| Engineer | Lake Loh | Job Number | 40 |

| Operation | |
|---|---|
| Presentation | |
| Description of Well - Names, Geometry, Services, Location Header, user of trademarks, directional data, well plot, order o sensor to toolface angle recorded | |
| Equiment and Software Description | |
| Tool sketch, equipment numbers, software versions, data rate | |
| Processing Traceability and Environment Description Acquisition environment, parameters and key constants for ea remarks | |
| Annotations, Presented Formats, QC Curves, Print Quality Documented splice points; data gap explanations, mud chang selection | |
| **Calibration and Verificatio** | |
| Calibration / Before survey verification / After survey verific | |
| Validity, completeness (includes equipment number), timeline | |
| **Operating Procedures** | |
| Depth Control Comparison with driller's depth, other logs, other bit runs, betw listing | |
| Logging speed and sampling rates | |
| As recommended in reference manual or job planner. No loss | |
| Data Comparison | |
| Between runs and passes, with data from nearby wells, other | |
| Operating Anomalies/Failure/Missing Data/Sensor Orientat | |
| Absence of noise and spurious variations, anomaly repeated, | |
| **Digital Delivery** | |
| Digital Products Labeled, verification listing with complete digital record, backu hard copy. | |
| Job Quality Rating (JQR) Number of boxes without number X 1 | |

| Environmental effects | |
|---|---|
| Irregular Operation | |
| Excessive ROP or speed, high deviation, shocks, vibrations, s | |
| Borehole Geometry | |
| Shape (caves, etc), rugosity, spiralled hole, mud induced frac | |
| Borehole Fluid | |
| Barite, KCl, salinity, additives, gas cut, unstable | |
| Interferences | |
| External noise, nearby casing or drillpipe, debris, unusual form | |
| Operation Outside Tool Specifications GeomarketTemperature, pressure, hole size, hole deviation, d value of parameter | |
| Environmental Quality Rating (EQ Number of boxes without number X | |

ancouver Island
amont-Doherty Borehole Research
ascadia Margin/CAS-02C
0012416

# Data Quality Report

Type of Measurement

| | Res | GR | Neu | Den | APWD |
|---|---|---|---|---|---|
| and References; General Content of components, spelling and style, units | | | | | |
| s, filtering weights | | | | | |
| ach run or zone, complete and relavant | | | | | |
| ges, movement indicator, color | | | | | |
| ons | | | | | |
| cation | | | | | |
| ess, unedited, descrepency explained | | | | | |
| | | | | | |
| ween RT and RM. Depth summary | | | | | |
| s of data or spatial resolution | | | | | |
| conveyance, mud log and markers | | | | | |
| tion/Transmission Losses corrected, reported or explained. | | | | | |
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| up for archival; record matches | | | | | |
| 0 | | | | | |
| s | | | | | |
| sticking conditions | | | | | |
| ctures. Casing, tubing conditions | | | | | |
| | | | | | |
| mation composition | | | | | |
| og-leg severity, flow rate, rpm, solids | | | | | |
| R) 20 | | | | | |

When data does not meet standards, put a number in the colum corresponding to the measurement with a corresponding number and remark below. Use additional pages for remarks
Positive remarks are welcome; do not append them with a number.

Remarks

Cell Manager: Lake Loh FSM: Vijay Moras

DQR Header Utility ver 1.1c

Schlumberger Drilling & Measurements

Revised January 2002