OPERATOR:	STATOILHYDRO
WELL:	15/9-F-14
WELLBORE:	15/9-F-14
FIELD:	VOLVE
RIG:	MAERSK INSPIRER
COUNTRY:	NORWAY
DRILL PERMIT#:	2726-P

Report

WLC_COMPOSITE_1.LIS

Prepared by: **LOGTEK AS**
Date: **22-JUL-2008**

The WLC_COMPOSITE_1.LIS has been created in accordance with the NPD
"**Guidelines to the Petroleum Regulations/REPORTING REQUIREMENTS FOR DIGITAL WELL DATA (Drilling Regulations, Section 12)**"
http://www.npd.no/regelverk/R2002/B_OG_B_DIGITAL_RAPPORTERING_E.HTM#Additional_Composited_Data

Definition

The Composite Log is defined as a set of curves, usually depth-matched and spliced (joined) so that measurements are available over the greatest possible depth interval within a given wellbore. Where necessary, composite curves will be created from different input curves (different contractors or physical measurement methods) spliced together. A deep resistivity curve created from a deep induction and deep laterolog curve would be such an example.

The Composite Log is NOT the graphical 'Composite' or 'Completion' Log that is created at the end of most wells showing, for example, log curves, formation tops, cored intervals, DST intervals etc. This is reported graphically as a separate item (cf. Table A1, Item No. 14.07). The curves presented on this graphical Log are ideally the same as those in the digitally reported Composite Log, but this is not a requirement.

Purpose

The main purpose of this Composite Log is to provide quality, 'full-depth-range' well-log data to a wide range of E&P technical users. Typical usage would be for geological correlation.

It is recognized that other, more 'specialized' curves will also be processed at the same time as those contained in the Composite Log. These will be held in a 'Petrophysical Composite' described in Section 3.2.

Note that composited (and usually environmentally corrected) data prepared specifically for interpretation usage will be found in the 'Petrophysical Interpretation INPUT' data set detailed in Section 4.1.

Quality

The Composite is prepared to a standard that will allow reliable correlation work to be carried out. This means the removal of any artifacts that could cause false correlations, and includes cycle-skip removal and a depth-matching accuracy appropriate to the geological formations.

For detailed guidelines refer to the previous Reporting Requirements: (See Appendix E). The key points from these guidelines are summarized below (see Section below entitled 'Guidelines for Compositing').

All work carried out must be documented in an Audit Trail that must be supplied as an Information File. It shall contain all edits, depth shifts and splice depths applied as well as any comments on data quality

Content

The Composite Log should contain all the primary measurements made in a given well/wellbore. Examples of primary measurements and associated standard curve names and curve types are given in Appendix B-3.2.

A primary measurement may be composed of data taken from different physical tools (for example, it could be made from a combination of EWL and MWD measurements)

For each primary measurement, the 'best version' of that data available over a given depth interval should be used and the resultant spliced curve should cover the greatest possible depth interval. All information on edits, depth shifts, splice points or any other data manipulations should be contained in a suitably structured Audit Trail file.

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MWD data plotted and verified to prints.
Curves renamed:

On field print	in composite
GR_ARC	GRA (GR)
GR_ARC_F	GRAF (GR)
ROP5_RM	ROP5 (ROP)

Depth units are meters.

Quality comments:
MWD ARC-Sonic, run 3:
20 in casing shoe at 1077.0m (depth from log heading).
Logger's remarks:
All depths are referenced to driller's depth and are checked at least every stand.
All data from tool memory.
All data acquired while drilling.
Gamma Ray measurement is environmentally corrected for collar thickness but not for Potassium content.
Resistivity measurements are borehole compensated and environmentally corrected for bit size, mud resistivity and temperature.
17 1/2 in. section TD at 2281 m.

MWD Sonic Best DT, run 3:
Remarks:
Delta-T Compressional (DTCO) derived from receiver and transmitter arrays.
Delta-T Compressional processed using a 7.5-9.5 KHz filter.
Median Residual 4000 Noise reduction applied.

MWD ARC-Sonic, run 4:
14 in casing shoe at 2275.4m (depth from log heading).
Data above 2282.0m affected by large/washed out borehole.
Logger's remarks:
All depths are referenced to driller's depth and are checked at least every stand.
All data from tool memory.
All data acquired while drilling.
Gamma Ray measurement is environmentally corrected for mud weight, bit size and collar thickness.
Resistivity measurements are borehole compensated and require no environmental correction for borehole effect.
Run 4 TD at 2788 m.

MWD Sonic Best DT, run 4:
Remarks:
Delta-T Compressional (DTCO) derived from receiver and transmitter arrays.
Delta-T Compressional processed using a 7.5-9.5 KHz filter above 2465.0m and 10-15 KHz below.
Median Residual 4000 Noise reduction applied.

MWD EcoScope-Sonic, run 5:

9 5/8 in casing shoe at 2783.5m (depth from log heading).
Logger's remarks:
All depths are referenced to driller's depth and are checked at least every stand.
All data from tool memory.
All data acquired while drilling.
Gamma Ray measurement is environmentally corrected for mud weight, bit size and collar thickness.
Resistivity measurements are borehole compensated and require no environmental correction for borehole effect.
Bulk Density is compensated for tool standoff/mudcake.
Neutron Porosity measurement is calculated with limestone matrix, and is environmentally corrected for bit size, mud weight, temperature, pressure, and mud salinity.

MWD Sonic Best DT, run 5:
Remarks:
Delta-T Compressional (DTCO) derived from receiver and transmitter arrays.
Delta-T Compressional processed using a 10-16 KHz filter.
Median Residual 400 Noise cut filter applied.
Delta-T Shear (DTSM) derived from receiver and transmitter arrays.
Delta-T Shear processed using a 8-10 KHz filter.

Editing on WLC_COMPOSITE_1.LIS:
MWD ARC-Sonic, run 3:
RDEP and RMED above 1084.4m affected by casing and have been replaced by empty values in this zone.

MWD ARC-Sonic, run 4:
RDEP and RMED above 2282.0m affected by casing and large/washed out borehole and have been replaced by empty values in this zone.

MWD EcoScope-Sonic, run 5:
RDEP, RMED, CALI and DENC and affected by 9 5/8 in casing above 2783.5m and have been removed in this zone.
NEU, DEN and PEF affected by casing and large/washed out borehole above 2789.0m and have been replaced by empty values above this depth.

Depth shifts:
No depth shifting performed.

CURVE SUMMARY, file WLC_COMPOSITE_1.LIS:

Main Services	Input curve	Run no.	Date (start)	Interval (meters)	Merge depth (meters)
The composite output curve **GR** consists of the following:					
MWD ARC	GRAF	3	11-MAY-08	1076.7-2268.4	
MWD ARC	GRA	4	21-MAY-08	2269.8-2759.3	
MWD EcoScope	GRMA	5	10-JUN-08	2777.9-3740.0	
The composite output curve **CALI** consists of the following:					
MWD EcoScope	UCAV*	5	10-JUN-08	2783.5-3738.5	
The composite output curve **RDEP** consists of the following:					
MWD ARC	P40H	3	11-MAY-08	1084.4-2268.6	
MWD ARC	P40H	4	21-MAY-08	2282.0-2759.5	
MWD EcoScope	P40H	5	10-JUN-08	2783.5-3737.1	

The composite output curve **RMED** consists of the following:

MWD ARC	P28H	3	11-MAY-08	1084.4-2268.6
MWD ARC	P28H	4	21-MAY-08	2282.0-2759.5
MWD EcoScope	P28H	5	10-JUN-08	2783.5-3737.1

The composite output curve **DEN** consists of the following:

MWD EcoScope	ROBB	5	10-JUN-08	2789.0-3738.6

The composite output curve **DENC** consists of the following:

MWD EcoScope	DRHB	5	10-JUN-08	2783.5-3738.6

The composite output curve **PEF** consists of the following:

MWD EcoScope	PEB	5	10-JUN-08	2789.0--3738.6

The composite output curve **NEU** consists of the following:

MWD EcoScope	TNPH	5	10-JUN-08	2789.0-3736.3

The composite output curve **AC** consists of the following:

MWD Sonic Best DT	DTCO	3	11-MAY-08	1078.8-2254.6
MWD Sonic Best DT	DTCO	4	21-MAY-08	2274.4-2745.0
MWD Sonic Best DT	DTCO	5	10-JUN-08	2780.5-3713.9

The composite output curve **ACS** consists of the following:

MWD Sonic Best DT	DTSM	5	10-JUN-08	2782.3-3710.9

The composite output curve **ROP** consists of the following:

MWD ARC	ROP5	3	11-MAY-08	1083.5-2280.8	2280.9
MWD ARC	ROP5	4	21-MAY-08	2280.9-2787.8	2788.0
MWD EcoScope	ROP5	5	10-JUN-08	2788.0-3749.9	

The composite output curve **BS** consists of the following (depths from MWD log heading):

Bit Size, 17.5”	1083.1-2280.9	2281.1
Bit Size, 12.25”	2281.1-2787.3	2787.5
Bit Size, 8.5”	2787.5-3749.9	

* Not presented on plot

Compositing Methods:

-NEU *will be presented in casing in top of log.*
-If ***NEU*** *is used in casing between runs, it will be normalised.*
-DEN, ***PEF***, ***RDEP***, ***RMED***, ***RMIC*** *will be removed in casing.*
-GR *is presented in casing, and is normalised in casing between runs in reservoir section.*
-No environmental corrections performed on Composite curves by Logtek.
-Constant values in top and bottom on Composite curves are removed.
-Data below first reading on wireline data will be left if uncertain to pick from Log or tool diagram.
-AC *will be presented in casing if acceptable quality. Cycle skipping will be edited through the whole section.*
-DEN *will be edited in washed out intervals. Will not be edited in intervals where effected* by *hydrocarbons.*

Definitions:

Dynamic depth shift *- variable depth shifting (stretch and pull) as opposed to linear depth shifting.*
Linear depth shift *- Constant depth shift through a certain depth interval.*
Reference curve *- Curve that will be used as the depth* ***Reference*** *for a set of logging curves.*
Offset Curve *- Curve that will be compared to the* ***Reference*** *curve in order to find required depth pairs.*
Curves shifted *- Curves that will be shifted with depth pairs found by comparing* ***Reference*** *to* ***Offset*** *curve.*
Observed *-* ***Observed*** *depth is the depth of a point before depth shifting*
Actual *-* ***Actual*** *depth is the depth of the point after depth shifting.*
Output Composite Curve *- Curve name of the composite curve presented on the WLC_COMPOSITE_1.LIS.*
Input Curve *- Curve name as presented on raw data tape.*

WLC_COMPOSITE_1.LIS completed: **22-JUL-2008**
WLC_COMPOSITE_1_INF_1.PDF completed: **22-JUL-2008**