Data & Consulting Services
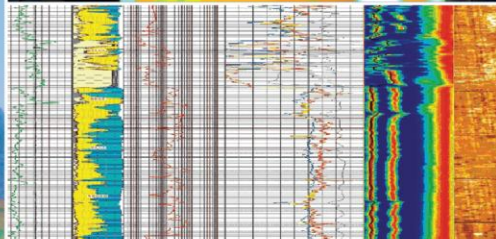
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Well:	C0019B
Field:	JFAST
State:	
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API#:	
Job#:	
Report Date:	10-May-12
Analyst:	Tadahiro NAGANO
Client:	CDEX
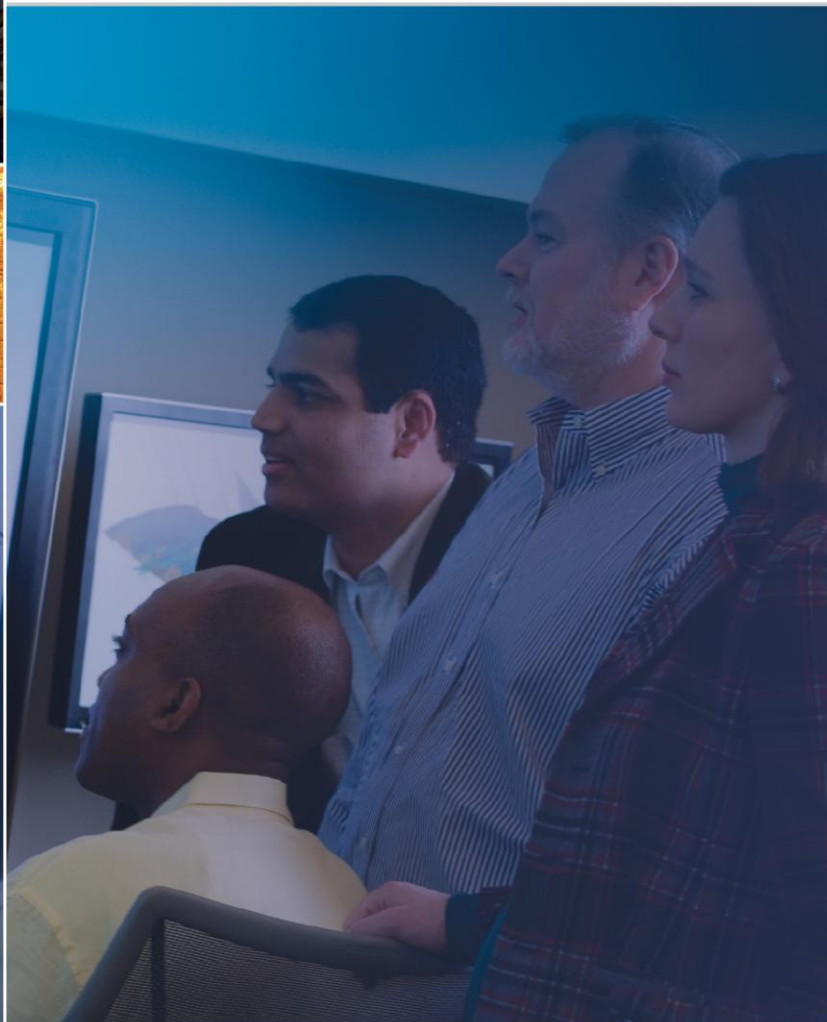
JAMSTEC GeoVISION Inversion

LWD_INVASION:

Schlumberger

Personnel Resources

Tadahiro NAGANO

Standard Disclaimer

Table of Contents

Executive Summary

This report is for the GeoVISION invasion processing within GeoFrame. The inversion is carried out using the producer DLIS with RAB Inversion in GeoFrame 4.5 DC-6. Processed data was acquired at JFAST C0019B.

Contextual Information

The GeoVISION Resistivity tool (GVR) outputs 5 resistivity curves, 3 from button measurements, one RING measurement and one Bit measurement. The depth of investigation (DOI) of the measurement increases from the shallow button to the bit measurement. This array of resistivities can be inverted to simultaneously solve for up to four formation characteristics: formation resistivity (Rt), invaded zone resistivity (Rxo), Diameter of Invasion (Di) and Hole size (Dh). The button resistivities can be used as an average measurement around the borehole or as directional measurements.

The translatory separation of resistivity curve from different depth of investigations may indicate the invasion profile. No separation means 'no invasion' or 'significant washout'. Washout case can be identified by the gap between bit resistivity and the others.

Logging area is located around trench. Pelagic, channel sediments and igneous rocks may be observed. Drilling pass is 858.5 m under 6883.5 m water column.

Data processing and/or interpretation

Input Data Acceptance Criteria

In general, the image data quality is affected by incomplete rotation. Image interruptions are caused by higher angular acceleration indicator (AAI) with lower rotation per minute (RPM). These conditions are observed at shallower interval than 7180 m and at the depth of drill pipe connected. Azimuthal data continuity looks enough to pick bed boundaries and faults.

Average resistivity arrays are less affected by incomplete rotation.

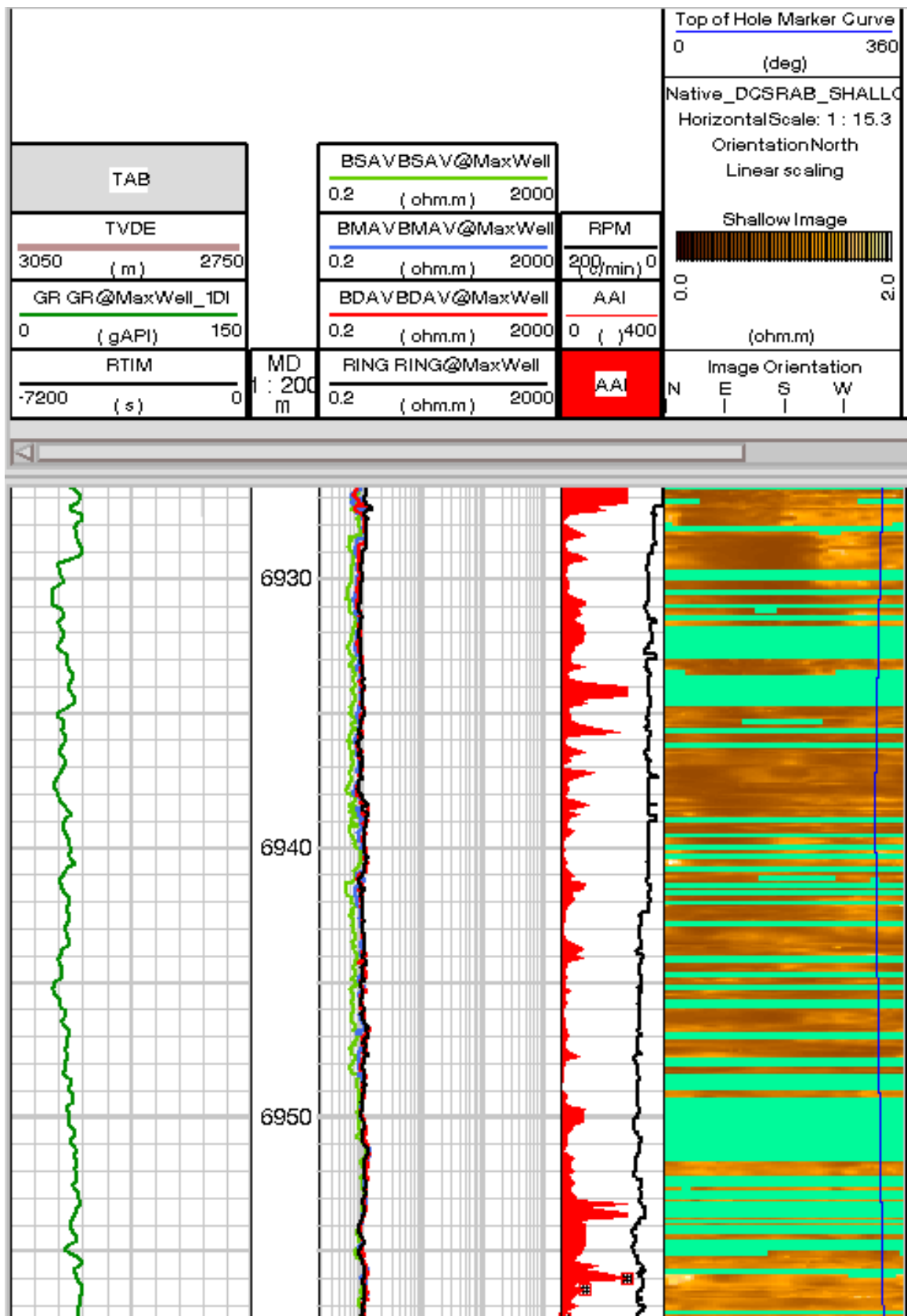| TAB						
TVDE		BSAVBSAV@MaxWell			Top of Hole Marker Curve	
		0.2 (ohm.m) 2000			0 360 (deg)	
3050 (m) 2750		BMAVBMAV@MaxWell		RPM	Native_DCSRAB_SHALL	
GR GR@MaxWell_1DI		0.2 (ohm.m) 2000		200 (o/min) 0	HorizontalScale: 1 : 15.3 OrientationNorth Linear scaling	
0 (gAPI) 150		BDAVBDAV@MaxWell		AAI	Shallow Image	
		0.2 (ohm.m) 2000		0 ( )400	0.0 2.0	
RTIM	MD 1 : 200 m	RING RING@MaxWell		AAI	(ohm.m)	
-7200 (s) 0		0.2 (ohm.m) 2000			Image Orientation N E S W	

Fig. 1 Incomplete rotation at shallower interval

Processing Steps

Data was loaded and quality controlled within GeoFrame. Average measurement invasion inversion was carried out. Because the separation did not occurred, there is no clear difference between the invasions in individual layers. Major input/output curves and parameters are summarised in table 1.

Table 1. Input and output data for the GVR Inversion

Curves					
Input	~~RBIT~~	~~RING~~	BDAV	BMAV	BSAV
Output	Rt	Rxo	Di	Dh	~~MRES~~
Parameters					
Rm	0.29 ohm m	@ 2 degC	**BHT**	12 degC	
Curve Separation	0.15	**Continuity Multiplier**	1.0	**Rt - RDeep**	0.5
Inversion Cut Off Channel	GR	**Cut Off Value**	75	**Rw @ Temp**	0.28@10

Output Data

Outputs of the GVR Inversion processing are summarised in table 1. The following digital and graphical files were generated:

CDEX_JFAST_GVRinversion.dlis
CDEX_JFAST_GVRinversion200.pds
CDEX_JFAST_GVRinversion500.pds

Output Data Evaluation and Quality Review

As it is mentioned above, there are only a few separations on resistivity inputs. This implies invasions did not occur frequently. Generally, only shallow button resistivity reads smaller than the other DOI resistivities and it could be caused by standoff changing. It is clear that longer 'time after bit' make the borehole be washed out by mud circulations.
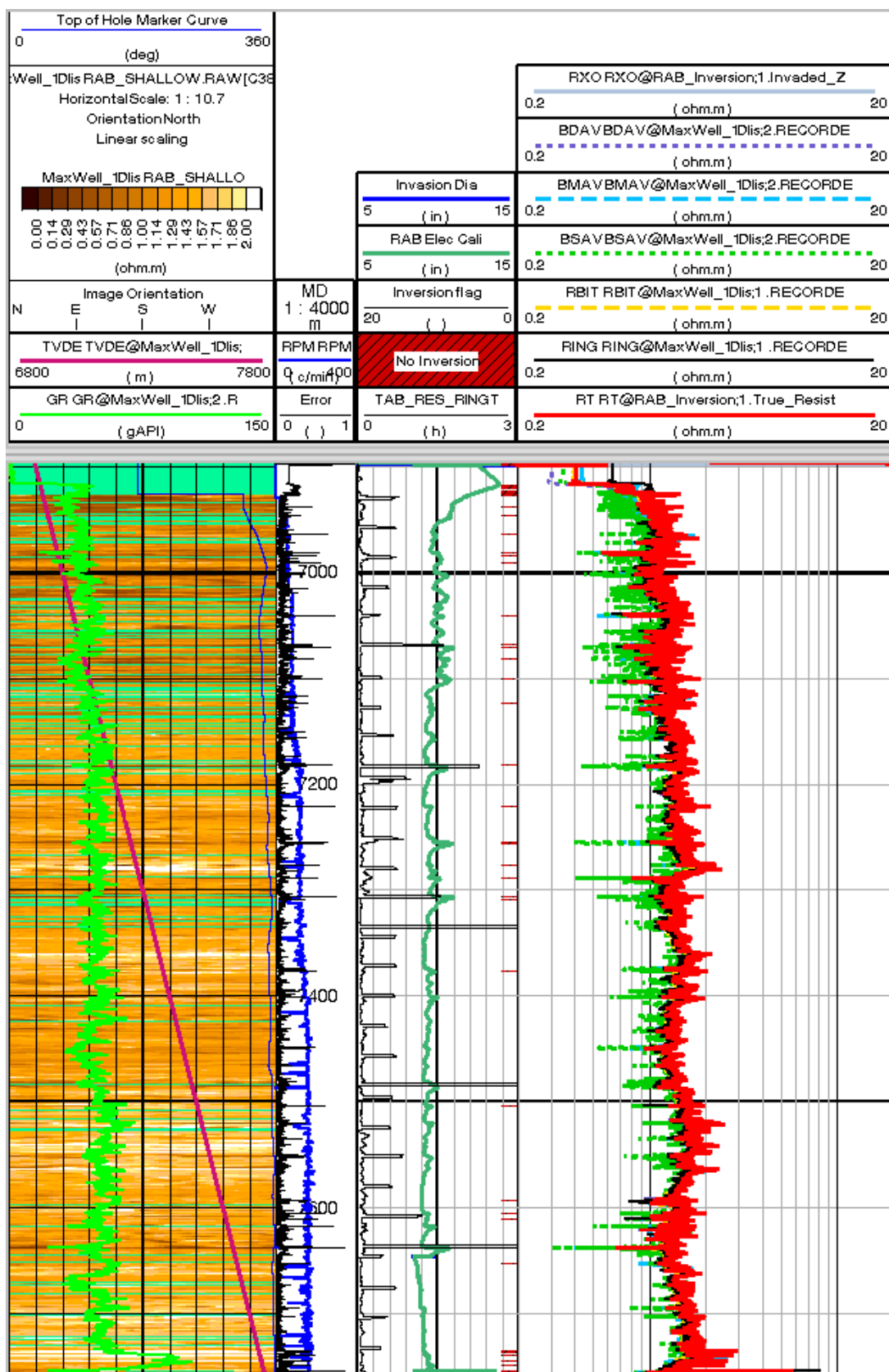
Fig. 2 Inversion output. RTIM (time after bit of RING resistivity) is shown on linear scale

Terms and Definitions

AAI	Angular Acceleration Indicator
BDAV	Deep button average resistivity
BHT	Bottom Hole Temperature
BMAV	Medium button average resistivity
BS	Bit Size
BSAV	Shallow button average resistivity
CRPM / RPM	Collar Revolutions Per Minute
Di	Diameter of invasion
ECAL / HD	Electrical caliper - Hole Diameter
FLAG	Inversion Flag
GR_RAB / GR	Gamma Ray
Error	Inversion Error
GVR	GeoVISION Resistivity
LWD	Logging While Drilling
MRES	Mud Resistivity
MST	Mud Sample Temperature
RBIT	Bit resistivity
RING	RING resistivity
Rm	Mud resistivity
Rmf	Mud Filtrate Resistivity
Rt	Formation Resistivity
RTIM / TAB_RES_RING	RING resistivity time after bit
Rxo	Flushed Zone Resistivity
Rw	Formation Water Resistivity

References

"A Novel Inversion Method for Interpretation of a Focused Multisensor LWD Laterolog Resistivity Tool" Li, Rasmus, and Cannon. SPWLA Annual Conference, 1999.