# East Java Mud Volcano (LUSI): Drilling Facts and Analysis\*

## Nurrochmat Sawolo<sup>1</sup>, Edi Sutriono<sup>1</sup>, Bambang P. Istadi<sup>1</sup>, and Agung B. Darmoyo<sup>1</sup>

Search and Discovery Article #50186 (2009) Posted June 10, 2009

\*Adapted from extended abstract prepared for AAPG International Conference and Exhibition, Cape Town, Africa, October 26-29, 2008. Another article on this subject, with a different interpretation, is "Triggering of the Lusi Mud Eruption: Earthquake Versus Drilling Initiation," by Mark Tingay et al., 2008, Search and Discovery Article #50187 (2009).

<sup>1</sup>Energi Mega Persada, JI. Jend. Gatot Subroto 42, 12710, Jakarta Indonesia

#### Abstract

A sudden eruption of hot mud and steam began on May 29th, 2006, near the Banjarpanji-1 exploration well in Sidoarjo, East Java, Indonesia. In the early stages, the general public opinion speculated that the mud flows were caused by an underground blowout on the Banjarpanji well. But as the data was studied and analyzed, it quickly became clear that the mud flow was not triggered by the well, that an underground blowout did not occur. Firstly, the well-bore fluid pressure was too low to fracture the well bore. Secondly, there was no sustained pressure to propagate fractures. Thirdly and most importantly, the well bore was open and totally dead whilst mud was erupting at more than 300,000 bbl/day only 200 m away.

In the absence of the Underground Blowout, studies (e.g., Mazzini et al., 2007) suggest that tectonically reactivated faults provide the conduit for the water and overpressured shale to erupt and form the LUSI mud volcano. The presence of overpressured zone due to rapid subsidence and burial in the East Java Basin is evident. The high sedimentation rate of its maturing organic-rich sediments makes it an ideal setting for mud volcanism. Other mud volcanoes occur naturally in the area, and they are aligned with the LUSI mud volcano on the NNE-SSW Watukosek fault zone.

#### Introduction

On May 29, 2006, at around 05:00 hrs it was reported that Hot Water eruption intermittently with a maximum height of 25 ft and elapsed time of 5 minutes between the burst occurred around 200 meters from the well. This burst was very dramatic with a distinct geyser-like cycle of active and passive periods. This marks the formation of a new mud volcano known as LUSI in East Java, Indonesia. This new mud volcano adds to the many mud volcanoes existing in the area, such as the Porong collapse structure (NE of LUSI), Kalang Anyar & Pulungan (Sedati, Sidoarjo), Gunung Anyar (UPN campus, Surabaya), Bleduk Kuwu & Keradenan (Purwodadi), Wringin Anom / Pengangson (Gresik), Semolowaru (Unitomo campus, Surabaya), Dawar Blandong (Mojokerto), Sangiran (Central Java), Socah (Bangkalan, Madura) and others. LUSI however is special, as one can observe the ongoing geological processes from its controversial birth.

Three different hypotheses have been proposed as the trigger of LUSI; namely:

i). Underground Blowout (Davies et al., 2007; Tingay et al., 2008).

ii). Mud Volcanism due to remobilization of overpressured shale through a reactivated fault as the conduit (Mazzini et al., 2007).

iii). Geothermal activities where superheated hydrothermal fluids at high temperature and pressure are released through fault zone or fracture network as the conduit.

The objective of this paper is to clearly and transparently set out the drilling engineering data and analysis to correct the technical record and to provide a platform for further analysis. It focuses on key drilling pressure measurements and drilling facts to investigate the early speculation that drilling was the trigger of LUSI.

# **Underground Blowout As a Hypothesis**

Several writers suggested that an Underground blowout triggered LUSI (Davies et.al, 2007; Tingay et al., 2008). However, the facts and pressure calculations clearly show that an underground blowout did not happen in the Banjarpanji-1 well. Several conditions must be met for an underground blowout to occur. The most important is that pressure in the wellbore must be sufficiently high to break the weakest formation (typically the casing shoe). Secondly, sustained fracture propagation pressure is required to extend the fracture to surface. Davies et al. (2007) suggested that the casing shoe was fractured and breached. However, calculations based on proper data obtained from the well and related facts clearly show the opposite; the shoe was still intact and not breached.

An investigation was carried out to determine if there was a connection between the well and the mud eruption. If an underground blowout did occur, then it was expected that a temperature anomaly and noise would be recorded in the Banjarpanji-1 wellbore. Temperature and Sonan logging were carried out during the relief well campaign to determine if such phenomena occurred. The

temperature logs did not record any anomaly within the Banjarpanji-1 well (Figure 1). The sonan log did not indicate any unusual noise, indicating there was no flow behind casing (Figure 2).

Other facts that do not support the underground blowout hypothesis include:

- From the time after the well kick was killed on May 28, 2006, until the mud eruption, the Blow Out Preventer (BOP) was kept in the open position and numerous activities were conducted in the wellbore, such as fishing, cementing, and circulating. If the well was fractured, in order to propagate the fracture to surface, it would require sustained high pressure and for the BOP to be kept closed.
- No mud or gas or steam came out of the well despite the BOP being in the open position. It would have been easier for the mud to come out of the well instead of having to fracture the formation (Figure 3-I/D). If caused by drilling, the well should at the least be surging and flowing itself as the path of least resistance to surface and there would definitely be some gas and steam coming from the wellhead. It seems totally impossible for 300,000 bbl/day of mud and steam and gas at the beginning to flow through a well that is totally dead at surface.
- Noting this nearby eruption, the first information required was evidence for any connection or channel between the eruption and the well. This assessment was done by closing the well and pumping into it on May 29, 2006. After pumping two batches of mud the well did not experience any losses and the pressure was holding at 900 psi. Another injection test was done on May 30, 2006, prior to placing the cement plug with an injection pressure at 370 psi with a rate of 2.5 bbl/minute. Pumping into the well confirmed no connection between the well and the mud eruption.
- The unprotected wellbore was expected to enlarge due to erosion from the very high mud rates. Such erosion was expected to result in the dropping of the fish and cement (Figure 3-II/H); however this did not happen and the fish remained intact as reported in Daily Drilling Report on July16, 2006, 1.5 months after the eruption.
- The mud eruption occurred along lines of weakness aligned with the Watukosek fault zones; this is not typical of underground blowouts. The crack that formed at the rig site on June 2, 2006, was not followed by extrusion of fluid nor mud, suggesting they were not due to hydro-fracturing. Other fractures parallel with the Watukosek fault were observed at the same time as the initial mud eruption. The movements suggest sinistral reactivation of the faults. Second-order dextral movements were observed several times in the railway line movements in September, 2006 (Figure 4).

# **Banjarpanji-1 Casing Shoe Strength Analysis**

The following data is used to calculate the pressure at the casing shoe and determine if an underground blowout occurred in the well.

## **Shut In Casing Pressure**

The maximum Casing Pressure of 1,054 psi is used based on the Real Time Data (RTD) of May 28th, 2006. This casing pressure of 1,054 psi is considered as more reliable pressure measurement where stabilized maximum pressure is reached 36 minutes after shut in, and remained constant until it was bled off as part of the well control procedure, as shown in Figure 5.

Note that the normal reading of ISICP (Initial Shut In Casing Pressure) is not applicable here since the casing pressure was not stable throughout the shut in period. Similarly the drill pipe pressure cannot be used to calculate well pressure in this instance because of a flapper valve at the bottom of the drill string that prevented wellbore pressure reading.

## Fluid Density at the Top of the Well

The well took a fluid influx of over 300 bbls. During the kill process, the well was bled off and found water instead of gas or mud. After the well was killed, this influx was circulated out with a density of 8.9 ppg as shown in the well's IADC report and Morning Report dated May 29, 2006 (Figure 6). The influx represents approximately 30% of the hole volume. This large influx of water, due to its lighter density found its way to the top and occupied the upper portion of the well.

# **Bottom Hole Pressure**

The bottom hole pressure is calculated to be 12.8 ppg based on the fill-up volume of the well (Real Time Data of May 27, 2006). The common practice for calculating bottom hole pressure when a loss circulation occurs is by measuring the amount of mud needed to fill the hole (Fill Up method). It took 220 bbl to fill-up the hole, equivalent to 6200 psi (12.8 ppg) of bottom hole pressure (Figure 7).

This calculated BHP value of 12.8 ppg was checked using other theoretical bottom hole pressure calculations using the drilling Dcexponent and Resistivity log which shows that the value is within the correct range (Figure 8). Other evidence that supports the correctness of this Bottom Hole Pressure includes:

• The well lost mud twice on May 27, 2006, indicating that the BHP is less than the mud weight of 14.7 ppg (Figure 11).

• The Static Influx Test conducted at 9010 ft on May 27, 2006, was used to check the Bottom Hole Pressure. This test was negative with no increase in gas reading meaning that the pore pressure was less than the Mud Weight used, which was 14.7 ppg.

# Leak Off Test

The leak off test done at the 13 3/8" casing shoe is shown in Figure 9. The LOT was 16.4 ppg at a depth of 3580 ft. The LOT result is consistent with the LOT of Wunut 2, an offset well approximately 2 km away which had a LOT of 16.6 ppg at a shallower depth of 3160 ft. It should be noted that the shallow section of Banjarpanji-1 is within the Wunut anticlinal structure.

#### Pressure Analysis at the Casing Shoe

This analysis showed that it is intact.

Using the basic data above, the pressure analysis is as follows:

- 1. Maximum Casing Pressure = 1,054 psi.
- 2. Fluid in the upper part of the hole = 8.9 ppg. Maximum mud weight = 14.7 ppg.
- 3. Bottom Hole Pressure = 12.8 ppg.
- 4. Leak Off Test at the casing shoe (3,580') = 16.4 ppg.

The resulting graph is shown in Figure 10. The pressure at the shoe exerted by the fluid is 2710 psi which is lower than the strength of the rock (LOT) of 3053 psi. This proves that the weakest point in the well, which is the shoe, was still intact and was not fractured.

#### **Underground Blowout Arguments**

Observers were quick to assume that the mud eruption was caused by an Underground Blowout because of its proximity to the well. Arguments on Underground Blowout, however, are not supported by facts.

These include:

1. Davies et al. (2007) showed the bottom hole pressure of 48 MPa (14.4 ppg) and proposed a kick occurred while drilling into the Kujung Formation. However, in fact well had a loss, not a kick, when drilling using 14.7 ppg drilling mud on May 27, 2006. The well suffered a partial loss of 20 bbls of drilling mud less than 10 minutes after May 27, 2006, earthquake recorded at the Tretes BMG

Station (Figure 11). The total loss of circulation of 130 bbls occurred in the well after 2 major aftershocks around midday of the same day.

2. Tingay et al. (2008) quoted pore pressures which are unrealistically high (Figure 3). Pore pressure in BJP-1 was reported as 17.84 MPa/km (15.2 ppg) at 2130 m depth and 17.1 MPa/km (14.5 ppg) at 2800 m depth. These pressures are higher than the mud weight and the Static Influx Test that shows the actual pore pressure to be much lower than 14.7 ppg.

3. Claims made by Davies et al. (2007) that hydrofracturing occurred and by Tingay et al. (2008) that the fluid pressures inside the well exceeded 19.5 MPa/km (16.4 ppg) shortly after the blowout preventer was closed. Contrary to claims, as shown on Figure 10 and by calculations below, the pressure at the casing shoe, which is the weakest point of the wellbore, was lower than the fracture pressure.

Pressure at casing shoe = Maximum casing pressure + hydrostatic pressure of fluid

 $P@3580 = 1054 + (0.052 \times 8.9 \times 3580)$ = 2710 mgi < 2052 mgi (fragtura mg

# = 2710 psi < 3053 psi (fracture pressure)

#### Conclusion

A number of papers hypothesized that the birth of the LUSI mud volcano was related to drilling of the Banjarpanji-1 well.

This article presents drilling data, facts, analysis, and investigation during the re-entry and relief well campaign, which show that the well casing shoe did not breach. The well bore pressure was too low to fracture the well. Supporting this conclusion, field data demonstrated that the well was still intact and indicated no communication between the well and the mud eruption. Therefore it is concluded that an Underground Blowout as a trigger of the LUSI mud volcano is a hypothesis not supported by drilling data and facts.

In the absence of any evidence supporting an underground blow out hypothesis, reactivation of the Watukosek Fault is seen as the most likely and natural trigger for the mud volcano, as there was a clear connection between the timing of earthquake and aftershocks, and mud losses in the well.

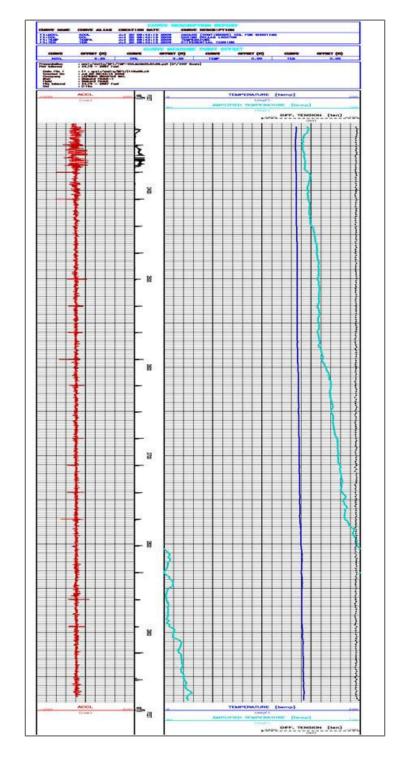


Figure 1. Temperature log does not indicate any temperature anomaly.

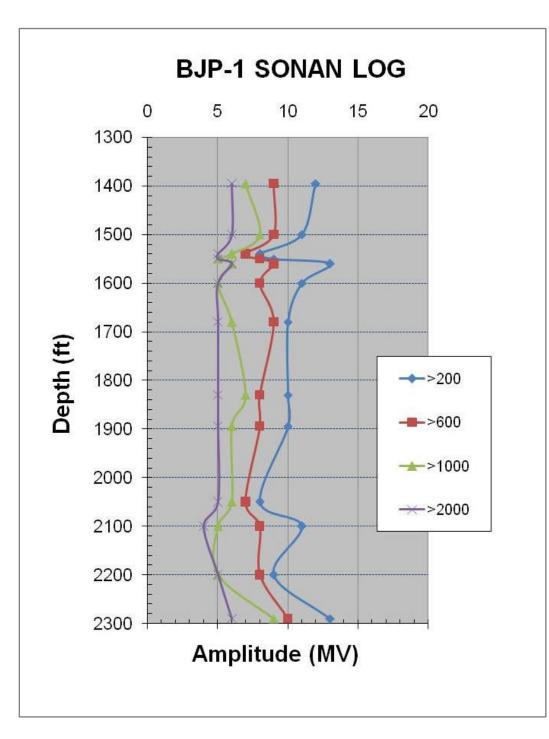


Figure 2. Sonan log taken during re-entry operations, 2 months after eruption did not show any noise indicating no flow behind casing.

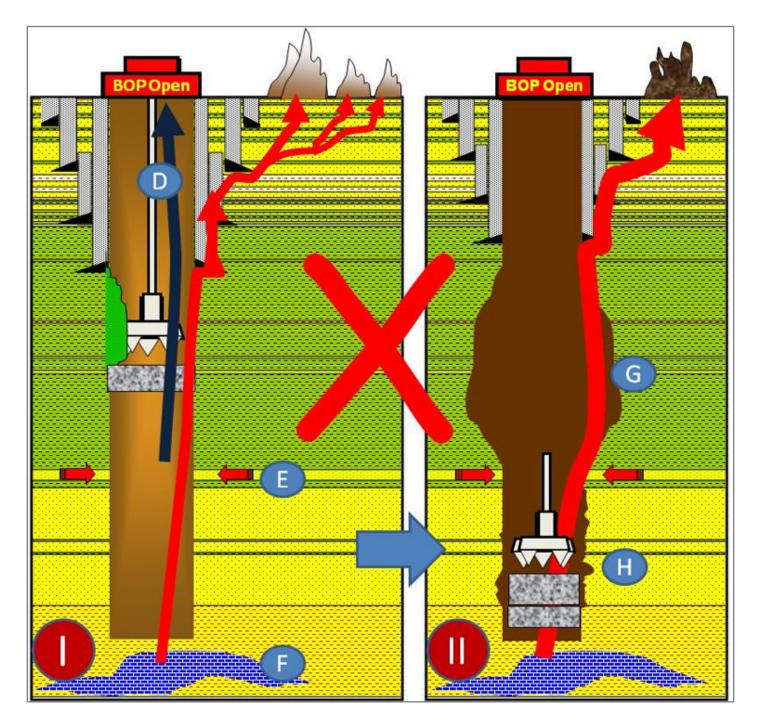


Figure 3. Illustration of underground blowout scenario of what would be expected.

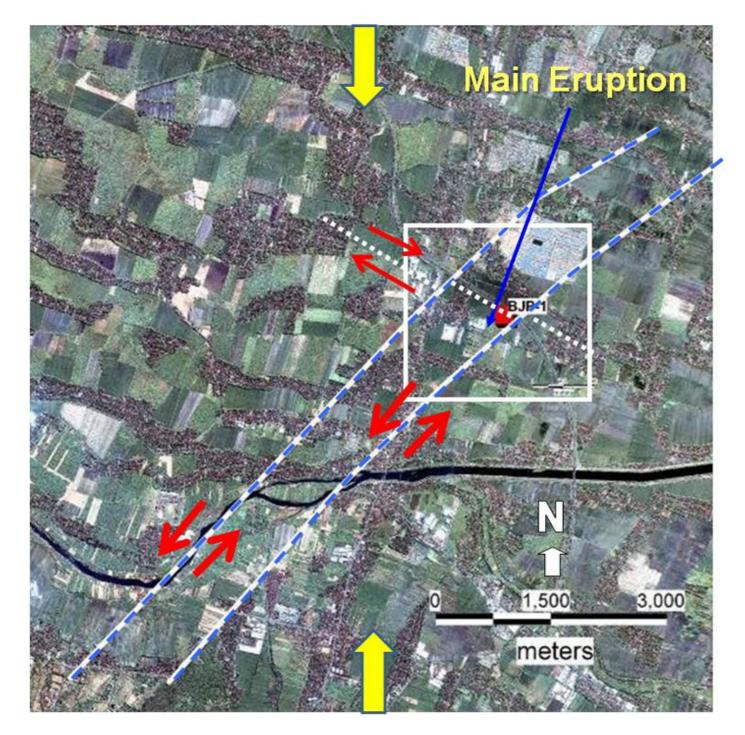


Figure 4. Location of the mud eruption, major stress directions, fault zones and their relative movements.

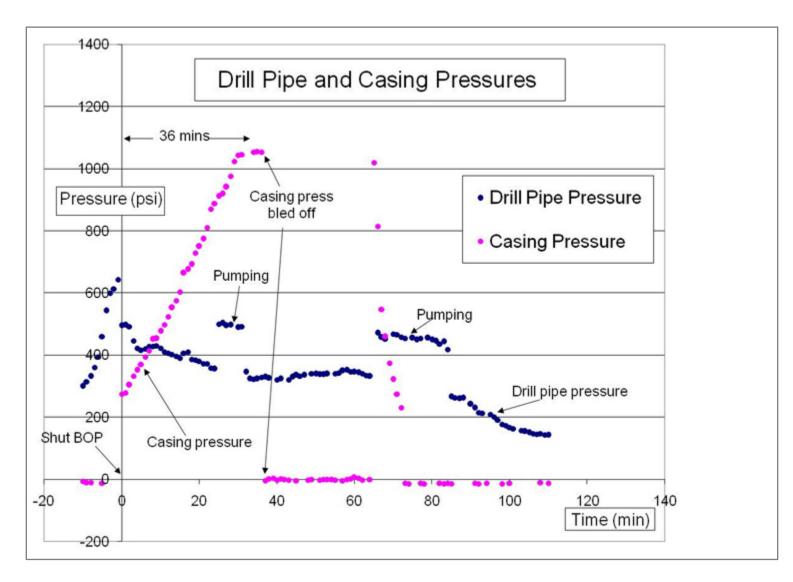


Figure 5. BJP-1 Real time data dated May 28, 2006. The maximum casing pressure was 1054 psi, pressure reading 30 min after shut in. Well was dead and BOP was opened at 10:00 hrs, May 28, 2006.

TUR		Interves							REEL	NO.			ORILLING CREW P	YROL DATA		NO BO			
STMOLO	FEET	RIKB TO CSG	SHO SEAT AT		SUZE     1 %     NO. LINES     /.Z     FEET SUPPED       FT. CUT OFF     PRESENT LEWGTH								DATE	28-00	5 - 9176	·			
			119	51 1	ON MILE D	_		-					WELL NAME BJP *01						
27			2/8										COMPANY : EMP BRANTAS						
27				580 CUMU		NPS							TOOL PUBLICE : SATE ENTRATE SYDATISTIC & RIG NO :						
	FORMAT	ION	ROTARI	WT. ON	PULLP	PULP		PUMP N	-	PUMPN		AETHOD RUN	MORNING TOUR	060		NIGHT 18	DAY	8	
(SHOW CORE RECOVERY)			8.9.8	BT 1990'	PRESS	SIZE	3.P.N	SIZE	S.P.H SIZE	1 5		COM D C	CREW	SOC, SEC. NO	NAME		HRS		19
						-		1.					- DRILLER		LILIK M		n		
				4				-				·	- ASST DRILLER		SUBER	/	12		
								. 1	-	_	-		- DERRICKMAN I	-	1 DRUS	40	12		
DIREC	CTION		ертн	. 06	τν.	DIREC	TION .	DEPTH		DEV.		DIRECTION	- FLOORMAN		SARKIA		12		
						· ·						1.	- FLOORMAN		SUGIME	10	12	** :	
				1						- 17	4	* *	-FLOORMAN		h. ARIE	IAH	12	1	
				UL OF OPE					1		1.1	1	ROUSTABOUT	·	HARDIA,	UTO :	. 12		
TED	HOOH	TO 424	ECTED S	TED I	MDICA.	TION	WELL I	ER.	SHUT UP +	10-4	New C	PA EIZ	- ROUSTABOUT		PIOPRAB ZULVAR	DETO	17		
CUAT	TED 1	O BRIE,	FENG A	REA.	1							•	MUD BOY		BAGUS		12		
RE RE	CARDEN	D DATA	SIDP = 35	SOPA	REP							D VOLCHE	Mup Boy	2. 1.1.	DARKIN		12		-
			HROUGH										HECHOMC .		JUFR! ADIGUS		12		
ONTH	MINA	TED \$1	10 ton	hud	1125	DW	TH I	9RAC	E W	TR C	ouse	D MUED.	-11-		DEDEN	G	15		
TOTA	TRE	DUCED	TO 8.9	PPG.	CRS	ERVER	n well	THA	BLGH	TRI	PTA	NE	MOTOR HAN	· ·	MAMA		12		
UORA	EPI	DE ATT	CE OS.C EMPTED	TOG	ier ‡	LEE	By	PULLE	DUF	0.70	400	Hels	ELECT.		UKA S	. ,	12		
WHIL	LE PI	DE ATTO	D.000	TORG	iet ‡	LEE INTE	By	PULLE WS	TUP &	Bum	DED	UP TO	- 11 - WEDER		ROCH M	AN	12		
WHIL SOD	LE PI	DE ATTO DELIED HOW	EMPTED	TORG	iet ‡	LEE INTE	By	PULLE WS	TUP &	Bum	DED	UP TO	- 11		UKA S	INN	12		
WHIL SOD	E PI GPH	DE ATTO DELIED HOW	D.000	TORG	iet ‡	LEE INTE SSE	By STRI SFUU	FULLE WE	D UF AD ALS I	Dump NDM	DED CATE	UP TO TO AAL	- 11 - WE DER CREAT ON		ROCH M DAR M	AN	12 12 12		
WHIL SOD	GPH GPH	DE ATT DELIZED HOW	D.000	TO G TORG UNSU	iet ‡	REE INTE SSE	By	PUW	TO UI- AND A ARS 1	PURP	DED CATE	UP TO	- 11 - UNE DER CLENE ONT DEEDIP OP		UKA S ROCH M DAR M TARST	AN	12 12 12 12	AYS	
WHIL SOD EUM	E PI GPH	DE ATT	EVER	TO G TORG UNSU	iet ‡	LEE INTE SSE	By STRI SFUU	FULLE WE	TO US ALD ALS A ALS A	Dump NDM	DED CATE	WETHOD RUN	- 11 - UNE DER CLEAR ONY RECLIP OF NO. OF DAYS		UKA S ROCH M DAR 14 TARST.		12 12 12 12	AYS	
WHIL SOD EUM	GPH GPH GPH	DE ATT	ROTANU	TO G TORG UNSU WT. ON ST	PUR	PUI	Bay STR	PUMP	TO US ALD ALS A ALS A	PUNP	DED	UP TO D MAL BETHOD RUH SOL S PAREL P	- 11 <u>() ИТ DETE</u> <u>() CENT O DY</u> <u>() CENT O DY</u> <u>() CENT O DY</u> NO, OF DAYS - MORNING TOUR - CREW - DRILLER	7  	ЦКА-5 <u>R</u> BCH M <u>D</u> AR M <u>T</u> ARST. висе саят совт кал <u>H</u> MDI S	ATA THE ACCIDENT NIGHT	12 12 12 12 12 12 12 12 12	AYS	
WHIL SOD EUM	GPH GPH GPH	DE ATT	ROTANU	TO G TORG UNSU WT. ON ST	PUR	PUI	Bay STR	PUMP	TO US ALD ALS A ALS A	PUNP	PHO	UP TO D MAL BETHOD RUH SOL S PAREL P	- II - UNE DEC CELAR ON CREATING TOUR - CREW - ORBLER - ASST CHELER	7  	ЦКА-5 <u>R</u> BCH M <u>D</u> AR.M <u>T</u> ARST. ВИСЕ LAST LOST ВИСЕ LAST LOST КАЛ <u>H</u> MDI S <u>U</u> ( <u>CI</u> )	ATA TIME ACCIDENT NIGHT	12 12 12 12 12 0 0 0 0 0 0 0 0 0 0 0 0 0	AYS	
<u>III)Hill</u> Soc EUM	CTION FORMUSHOW CORE	DE ATT	ROTANU RPM	TO G TOR G UNSU	PULE PULE PULE PULE	PUI	Ву 3 ле 5 <u><u></u> <u></u> <u></u></u>	PULLE NG TURER SIZE	D UF AND 1 ARS 1 NO S.P.M	PUNP NDA	DED CATE PHO S P.M	UP TO D PARC NETHOD RUN SOL S PAREL P COM D C	- 11 <u>() ИТ DETE</u> <u>() CENT O DY</u> <u>() CENT O DY</u> <u>() CENT O DY</u> NO, OF DAYS - MORNING TOUR - CREW - DRELER	SOC. SEC. NO	ЦІКА 5 <u>RBCH</u> <u>DAR</u> <u>TAR</u> <u>TAR</u> <u>I</u> <u>I</u> <u>I</u> <u>I</u> <u>I</u> <u>I</u> <u>I</u> <u>I</u>	АЛ АЛ ТІНЕ АССІСЕНТ НЕСПЛЕНТ НЕ ШВЕЛЮ ЦІЗЦР Л.	12 12 12 12 12 12 12 12 12	AYS	
<u>III)Hill</u> Soc EUM	GPH GPH GPH	DE ATT	ROTANU	TO G TOR G UNSU	PUR	PUI	Bay STR	PUMP	D UF AND 1 ARS 1 NO S.P.M	PUNP LINER	DED CATE PHO S P.M	UP TO D MAL BETHOD RUH SOL S PAREL P	- 1 JAE DEC- CEAR ON CREW NO. OF DAYS MORNING TOUR. CREW OPELER - DESTORLING - DERRICHARN - FLOORMAN	SOC. SEC. NO	ЦКА+ 5 КВСН М ДАЯС / М ТАЯС / М ТАЯС / М ТАЯС / С КМ НАЮ / S ЦСЦА С ТАИ JIN SUGEA АВРИ	АЛ АН ТІНЕ АССІДЕНТ ПИЕ АССІДЕНТ ИВ 617. ИВ 617. ИВ 617. ИВ 617. К. К. К. К. К. К. К. К. К. К	12 12 12 12 12 12 12 12 12 12 12 12	AY/S	
<u>III)Hill</u> Soc EUM	CTION FORMUSHOW CORE	DE ATT	ROTANU RPM	TO G TOR G UNSU	PULE PULE PULE PULE	PUI	Ву 3 ле 5 <u><u></u> <u></u> <u></u></u>	PULLE NG TURER SIZE	D UF AND 1 MES 1 NO S.P.M	PUNP NDA	DED CATE PHO S P.M	UP TO D PARC NETHOD RUN SOL S PAREL P COM D C		SOC. SEC. NO	ЦІКА- <u>КВС-1</u> 47 <u>ДАВС-14</u> 7 <u>ДАВС-14</u> <u>ДАВС-174</u> <u>ТАВС-174</u> <u>ТАВС-174</u> <u>ТАШ-114</u> <u>SUGEA</u> <u>SUGEA</u> <u>ABBUL</u> <u>D</u> B5175	АЛУ АНД ТІНЕ АССІСЕНТ НВСИТ	12 12 12 12 12 12 00 HRS 12 12 12 12 12 12 12	AYS	
<u>III)Hill</u> Soc EUM	CTION FORMUSHOW CORE	DE ATT	RADTED 10,000 EVER Rotani RPM DEPTH	TO G TO R G UNSU WE ON ST 10000	PUMP PRESS	PUI	<u>Рач</u> 3 <i>те</i> 5 <i>F-Ш Ц</i> 8. Р. я.	PULL TO FULL SIZE	D UF AND 1 MES 1 NO S.P.M	PUNP NDA	DED CATE PHO S P.M	UP TO D PARC NETHOD RUN SOL S PAREL P COM D C	- 1 JAE DEC- CEAR ON CREW NO. OF DAYS MORNING TOUR. CREW OPELER - DESTORLING - DERRICHARN - FLOORMAN	SOC. SEC. NO	ЦКА- 5 <i>RBCH</i> А <i>DAR</i> 174 <i>TALSI</i> виссинтист <i>HADI</i> 5 <i>UCIP</i> <i>TALJIA</i> <i>SUGEA</i> <i>ABPU</i> <i>DBSI</i> 7 <i>AUMI</i> <i>DUTA</i>	АЛУ АЛУ ТШЕ АССОЕНТ ШВЕЛИО ШВЕЛИО ШВЕЛИО С С С С С С С С С С С С С	12 12 12 12 12 12 12 12 12 12 12 12	AYS	
ILIAA SOC EUAA IS	CE PIL		ROTARI ROTARI ROTARI REPTH	TO C TO R C UNSU WT. OK 61 1000 1	PULE PULE PULE PRESS	PUI PUI SSE PUI UNER SZE OIRU N SEQUE	Рэч 3 372 5 F Ш (/ 8 F Ш (/ 8 F Л) 8 F Л) 10 100 10 10	PUMP TT PUMP LINER SIZE DUP	D UF ALD } MES /	PURP	PHC SPA	<u>U</u>		SOC. SEC. NO	ЦКА-5 <i>RBCH</i> Р <i>DPR I</i> <sup>4</sup> <i>TP</i> 257. виде LATLOST <i>HADIS</i> <i>YAUSE</i> <i>XUSEA</i> <i>XUSEA</i> <i>XUSEA</i> <i>XUSEA</i> <i>XUSEA</i> <i>XUSEA</i> <i>XUSEA</i> <i>XUSEA</i> <i>XUSEA</i>	АЛ АЛ ТТИЕ АСССЕНТ ТТИЕ АСССЕНТ ТТИЕ АСССЕНТ ИСИ	12 12 12 12 12 12 12 12 12 12 12 12 12 1	NTS	
DER	ECTION		ROTARI ROTARI ROTARI REPTH	TO 6 TO 8 G UNSU WT. ON ST 1999 AL OF OP	PULE PULE PULE PULE PULE PRESS	PUU PUU UNER SZE DINI N SEQUE CT ≠	Рэч 3 те 5 F Ш (/ 1 P но 1 P но	PUND FUND FUND EMARKS BY 1	D UF ALD Y MES / NO EPM EPM	PURP UNDU PURP UNER SIZE	рер Сате рно з рм N.	<u>UP</u> 72 D Л.Н. нетноо яин во. в <i>раке и</i> сой в с окастои		SOC. SEC. NO	ЦКА-5 <i>RBCH</i> Р <i>DPR I</i> <sup>4</sup> <i>TP</i> 257. виде LATLOST <i>HADIS</i> <i>YAUSE</i> <i>XUSEA</i> <i>XUSEA</i> <i>XUSEA</i> <i>XUSEA</i> <i>XUSEA</i> <i>XUSEA</i> <i>XUSEA</i> <i>XUSEA</i> <i>XUSEA</i>	АЛЛ АЛЛ ТПИЕ АССВЕНТ ПИЕ АССВЕНТ ПИЕ АССВЕНТ ПИЕ ПЛЕТИС ПИЕ ПЛЕТИС ПЛЕТИС ТИЕ ПЛЕТИС ПЛЕ	12 12 12 12 12 12 12 12 12 12 12 12 12 1	XY5	
UTTE UTTE	ECTION		<u>риртер</u> 10,000 <u>е</u> VER потали RPA обрани обрани обрани Стембо	TO G TOR CO CINSU WT. ON ST ST ST ST ST ST ST ST ST ST ST ST ST	PULE PULE PRESS		Вуч 5 5782 5 5 - Ш (/ 8 - Р. 1) 10 - 10 - 10 10 - 1	PULUE PULUE PULUER SUZE CEMARKS BY / 1 1075	D US ALD S ALS I S.P.M S.P.M TH TH CUNED ALS ALS		рер Сате рно s рм N. 70	<u>U</u> 72		7 SOC. SEC. NO	ЦКА- 5 <i>R</i> ВСК Р <i>R</i> ВСК Р <i>R</i> 7 <i>R</i> 8 <i>R</i> 8	АЛЛ АЛЛ Тане Ассеент ие USGENO USGIP V. КС К К. К. К. К. К. К. К. К. К. К	12 12 12 12 12 12 12 12 12 12 12 12 12 1	NTS	
14/11/11/11/11/11/11/11/11/11/11/11/11/1	EE PIL GPI-	hipi - Tian	емртер (0.000 EVER вота кола к	TO G TOR G UNSC WT. COM ST WWT. COM ST WT. COM ST WT. COM ST WWT. COM ST WT. COM ST WT. COM ST WT. COM ST WT. COM ST WT. COM ST WT. COM ST WT. COM ST WT. COM ST WT. COM ST WWT. COM ST WT. COM ST WT.		PUU       UNPL       SSE       PUU       UNER       SSE       DUNU       M SEQUE       EFF       M TOCCE	By     By       > STREM     STREM       8 F W     S F W W       8.P.M     S F W       1000     S F W       1000     S F W       1000     S F W	раси// В 11/15	DUP ADD MES MES MES MED RPM MED ATOT	PUBP PUBP PUBP UNDA SUZE DE UNDA SUZE DE CUP D PUBP D PUBP D PUBP D PUBP D PUBP D PUBP D PUBP	рер САТВ 9 НО 3 Р.М 3 Р.М 70 Ла Да Да Се	ЦА ТВ В ААС МЕТНОС ПАН ВОL В РАКСР СОЙ 0 С 00050CCOM 0000		50C, 55C, HO	ЦКАР 5 <i>RDCH PP</i> <i>RDCH PP</i> <i>TPREST</i> BRIGELASTLOST <i>UQUP</i> <i>UQUP</i> <i>UQUP</i> <i>TAU JIA</i> <i>SUGEA</i> <i>ARDPU</i> <i>DOST P</i> <i>AVARD</i> <i>AVARD</i> <i>AVARD</i> <i>AVARD</i>	нл нт тине асобент не <i>DRETNO</i> <i>USUP</i> <i>V</i> <i>KG R</i> <i>fTUNY//</i> <i>KG R</i> <i>fTUNY//</i> <i>A f</i> <i>G S</i> <i>G S</i> <i>G S</i> <i>G N</i> <i>G N</i>	12 12 12 12 12 12 12 12 12 12	AY5	
00000000000000000000000000000000000000	СЕ РП С. А. С. Т. С. ГОЛШ БОЛШ БОЛШ БОЛШ БОЛШ С. Т. С. С. С. С. С. С. С. С. С. С.	Die Arth Die Arthoux H	рантер (0,200) EVER Вогла кра кра Совти Сов	<u>Тр 6</u> <u>1025</u> <u>UNSU</u> <u>WR.08</u> ST ST <u>ST</u> <u>ST</u> <u>ST</u> <u>ST</u> <u>ST</u> <u>ST</u> <u>S</u>	PULE PULE PULE PRESS DEV. ERATION TO G UEV.		By     By       > 3T/2, dr     3T/2, dr       > 8 F.U.I/     3. F.H       3. F.H     3. F.H       Interview     3. F.H       Int	POINT	D U/ADD ] mas / mas / m		DED CATE PHO S P.M S P.M N. N. TO DO CATE S P.M S P.M	ЦА ТД Д ААС ИСТНОО ПАН ВОL В РАКС СОИ СС ОЧИСТОИ СОИ СС ОЧИСТОИ СОИ СС ОЧИСТОИ СОИ СС ОЧИСТОИ СОИ СС СС СС СС СС СС СС СС СС С		50C, 55C, 110	ЦКА- 5 <i>R</i> 500 / 19 <i>П</i> 778257. Висську 19 <i>Т</i> 78257. Висську 19 <i>П</i> 78257. Висську 19 <i>П</i> 78257. <i>П</i> 78	нлл нлл тие лоорент не <i>ШКЕТИБ</i> <i>ШКЕТИБ</i> <i>ШКЕТИБ</i> <i>ШКЕТИБ</i> <i>ШКЕТИБ</i> <i>ШКЕТИБ</i> <i>ШКЕТИБ</i> <i>ШКЕТИБ</i> <i>ШКЕТИБ</i> <i>ШКЕТИБ</i> <i>ШКЕТИБ</i> <i>ШКЕТИБ</i> <i>ШКЕТИБ</i> <i>ШКЕТИБ</i> <i>ШКЕТИБ</i> <i>ШКЕТИБ</i> <i>ШКЕТИБ</i> <i>ШКЕТИБ</i> <i>ШКЕТИБ</i> <i>ШКЕТИБ</i> <i>ШКЕТИБ</i> <i>ШКЕТИБ</i> <i>ШКЕТИБ</i> <i>ШКЕТИБ</i> <i>ШКЕТИБ</i> <i>ШКЕТИБ</i> <i>ШКЕТИБ</i> <i>ШКЕТИБ</i> <i>ШКЕТИБ</i> <i>ШКЕТИБ</i> <i>ШКЕТИБ</i> <i>ШКЕТИБ</i> <i>ШКЕТИБ</i> <i>ШКЕТИБ</i> <i>ШКЕТИБ</i> <i>ШКЕТИБ</i> <i>ШКЕТИБ</i> <i>ШКЕТИБ</i> <i>ШКЕТИБ</i> <i>ШКЕТИБ</i> <i>ШКЕТИБ</i> <i>ШКЕТИБ</i> <i>ШКЕТИБ</i> <i>ШКЕТИБ</i> <i>ШКЕТИБ</i> <i>ШКЕТИБ</i> <i>ШКЕТИБ</i> <i>ШКЕТИБ</i> <i>ШКЕТИБ</i> <i>ШКЕТИБ</i> <i>ШКЕТИБ</i> <i>ШКЕТИБ</i> <i>ШКЕТИБ</i> <i>ШКЕТИБ</i> <i>ШКЕТИБ</i> <i>ШКЕТИБ</i> <i>ШКЕТИБ</i> <i>ШКЕТИБ</i> <i>ШКЕТИБ</i> <i>ШКЕТИБ</i> <i>ШКЕТИБ</i> <i>ШКЕТИБ</i> <i>ШКЕТИБ</i> <i>ШКЕТИБ</i> <i>ШКЕТИБ</i> <i>ШКЕТИБ</i> <i>ШКЕТИБ</i> <i>ШКЕТИБ</i> <i>ШКЕТИБ</i> <i>ШКЕТИБ</i> <i>ШКЕТИБ</i> <i>ШКЕТИБ</i> <i>ШКЕТИБ</i> <i>ШКЕТИБ</i> <i>ШКЕТИБ</i> <i>ШКЕТИБ</i> <i>ШКЕТИБ</i> <i>ШКЕТИБ</i> <i>ШКЕТИБ</i> <i>ШКЕТИБ</i> <i>ШКЕТИБ</i> <i>ШКЕТИБ</i> <i>ШКЕТИБ</i> <i>ШКЕТИБ</i> <i>ШКЕТИБ</i> <i>ШКЕТИБ</i> <i>ШКЕТИБ</i> <i>ШКЕТИБ</i> <i>ШКЕТИБ</i> <i>ШКЕТИБ</i> <i>ШКЕТИБ</i> <i>ШКЕТИБ</i> <i>ШКЕТИБ</i> <i>ШКЕТИБ</i> <i>ШКЕТИБ</i> <i>ШКЕТИБ</i> <i>ШКЕТИБ</i> <i>ШКЕТИБ</i> <i>ШКЕТИБ</i> <i>ШКЕТИБ</i> <i>ШКЕТИБ</i> <i>ШКЕТИБ</i> <i>ШКЕТИБ</i> <i>ШКЕТИБ</i> <i>ШКЕТИБ</i> <i>ШКЕТИБ</i> <i>ШКЕТИБ</i> <i>ШКЕТИБ</i> <i>ШКЕТИБ</i> <i>ШКЕТИБ</i> <i>ШКЕТИБ</i> <i>ШКЕТИБ</i> <i>ШКЕТИБ</i> <i>ШКЕТИБ</i> <i>ШКЕТИБ</i> <i>ШКЕТИБ</i> <i>ШКЕТИБ</i> <i>ШКЕТИБ</i> <i>ШКЕТИБ</i> <i>ШКЕТИБ</i> <i>ШКЕТИБ</i> <i>ШКЕТИБ</i> <i>ШКЕТИБ</i> <i>ШКЕТИБ</i> <i>ШКЕТИБ</i> <i>ШКЕТИБ</i> <i>ШКЕТИБ</i> <i>ШКЕТИБ</i> <i>ШКЕТИБ</i> <i>ШКЕТИБ</i> <i>ШКЕТИБ</i> <i>ШКЕТИБ</i> <i>ШКЕТИБ</i> <i>ШКЕТИБ</i> <i>ШКЕТИБ</i> <i>ШКЕТИБ</i> <i>ШКЕТИБ</i> <i>ШКЕТИБ</i> <i>ШКЕТИБ</i> <i>ШКЕТИБ</i> <i>ШКЕТИБ</i> <i>ШКЕТИБ</i> <i>ШКЕТИБ</i> <i>ШКЕТИБ</i> <i>ШКЕТИБ</i> <i>ШКЕТИБ</i> <i>ШКЕТИБ</i> <i>ШКЕТИБ</i> <i>ШКЕТИБ</i> <i>ШКЕТИБ</i> <i>ШКЕТИБ <i>ШКЕТИБ</i> <i>ШКЕТИБ</i> <i>ШКЕТИБ</i> <i>ШКЕТИБ</i> <i>ШКЕТИБ</i> <i>ШКЕТИБ</i> <i>ШКЕТИБ</i> <i>ШКЕТИБ</i> <i>ШКЕТИБ</i> <i>ШКЕТИБ</i> <i>ШКЕТИБ</i> <i>ШКЕТИБ</i> <i>ШКЕТИБ</i> <i>ШКЕТИБ</i> <i>ШКЕТИБ</i> <i>ШКЕТИБ</i> <i>ШКЕТИБ</i> <i>ШКЕТИБ</i> <i>ШКЕТИБ</i> <i>ШКЕТИБ</i> <i>ШКЕТИБ</i> <i>ШКЕТИБ</i> <i>ШКЕТИБ</i> <i>ШКЕТИБ</i> <i>ШКЕТИБ</i> <i>ШКЕТИБ</i> <i>ШКЕТИБ</i> <i>ШКЕТИБ</i> <i>ШКЕТИБ</i> <i>ШКЕТИБ</i> <i>ШКЕТИБ</i> <i>ШКЕТИБ <i>ШКЕТИБ</i> <i>ШКЕТИБ</i> <i>ШКЕТИБ</i> <i>ШКЕТИБ</i> <i>ШКЕТИБ</i> <i>ШКЕТИБ</i> <i>ШКЕТИБ</i> <i>ШКЕТИБ</i> <i>ШКЕТИБ</i> <i>ШКЕТИБ</i> <i>ШКЕТИБ</i> <i>ШКЕТИБ <i>ШКЕТИБ</i> <i>ШКЕТИБ</i> <i>ШКЕТИБ <i>ШКЕТИБ</i> <i>ШКЕТИБ</i> <i>ШКЕТИБ <i>ШКЕТИБ <i>ШКЕ</i></i></i></i></i></i></i>	12 12 12 12 12 12 12 12 12 12		
00000000000000000000000000000000000000	Е РИ С 710 С 710 КСТТОА КСТТОА КСТТОА КСТТОА КСТТОА КСТТОА КСТТОА КСТТОА КСТТОА КСТТОА КСТТОА	26 ATT 101/20 HOL HOL HOL HOL HOL HOL HOL HOL	240 рт. 20 6. 2000 EVER потлац колац к	То G То 2 5 102 5 102 5 100 100 100 100 100 100 100 10	PULE PULE PULE PRESS PRE	Put       Put       UNER       SSE       Put       UNER       SSE       DBN       M SEQUE       ET       PUT       CONTET/I	Ву 5 5	рини рини	D UIA AND I MRS / HO KRM HO KRM KRM KRM KRM KRM KRM KRM KRM KRM KRM	0 TC DUM) 11/100/	DED CATE PHO S P.M S P.M N. TO CA S P.M S	ЦА ТЪ		7 50C. SEC. NO 50C. SEC. SEC. SEC. SEC. NO 50C. SEC. SEC. SEC. SEC. SEC. SEC. SEC. SE	ЦСА- 5 <i>R</i> BCC / <i>P</i> <i>D</i> DAR / <i>P</i> <i>T</i> PB237.	АЛ АЛ Ттие лосовент тие лосовент повит	12 12 12 12 12 12 12 12 12 12	VV5.	
081 081 081 081 081 081 081 081	E PH La AP (GP/A) КСТТОМ КСТТОМ КСТТОМ КСТТОМ КСТТОМ КСТТОМ КСТТОМ КСТТОМ КСТТОМ КСТТОМ	DE ATT DE ATT	рантер (0,200) EVER Вогла кра кра Совти Сов	ТО 6 10% 5 UNSU WR. 08 WR. 08 WR	PULE PULE PULE PRESS PRE	Put       Put       UNER       SSE       Put       UNER       SSE       DBN       M SEQUE       ET       PUT       CONTET/I	Ву 5 5	рини рини	D UIA AND I MRS / HO KRM HO KRM KRM KRM KRM KRM KRM KRM KRM KRM KRM	0 TC DUM) 11/100/	DED CATE PHO S P.M S P.M N. TO CA S P.M S	ЦА ТЪ	- 1 <u>112</u> <u>Dr.R.</u> <u>226.18</u> <u>0.57</u> <u>226.18</u> <u>0.57</u> <u>226.18</u> <u>0.57</u> <u>226.18</u> <u>0.57</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206.18</u> <u>206</u>	7 50C. SEC. NO 50C. SEC. SEC. SEC. SEC. NO 50C. SEC. SEC. SEC. SEC. SEC. SEC. SEC. SE	ЦКА- 5 <i>R</i> 500 / 19 <i>П</i> 778257. Висську 19 <i>Т</i> 78257. Висську 19 <i>П</i> 78257. Висську 19 <i>П</i> 78257. <i>П</i> 78	АЛЛ АЛЛ ТНЕ АСОДЕНТ НЕ ИЛ БИГ ИЛ БИГ ИЛ БИГ ИЛ БИГ ИЛ БИГ КС Р. ТИГАГР С 5 С 5 С 5 С 5 С 5 С 5 С 5 С 5	12 12 12 12 12 12 12 12 12 12		
0000 000 0	LE PH LG AP LG AP GP/ FORMA FORM	DE ATT DE ATT DE ATT DE ATT TON RECOVERN NITION RECOVERN DE ATT DE AT	емртер (0,000 EVER вота котали к	ТС 6 ТС 6 UNSU UNSU WR. 085 F WR. 0	ET 1 1 0.12 10	Репя ////2 SSE /////////////////////////////////	By       372  <	PUBP PUBP PUBP SUZE EMARKS SUZE EMARKS SUZE EMARKS SUZE EMARKS SUZE COMP COMP COMP COMP COMP COMP COMP COMP	D UFF AND 1 ARS 1 140 140 140 140 140 140 140 140 140 14	0 TC DUM) 110000 100000 10000 10000 10000 10000 10000 10000 10	DED CATE PHO 3 P.M N. N. 70 CA DUA DUA DUA CA DUA DUA CA CA CA CA CA CA CA CA CA C	ЦА ТВ В ААС В ААС В ААС В АС В АС	- 1 - 1       	7 50C. SEC. NO 50C. SEC. SEC. SEC. SEC. NO 50C. SEC. SEC. SEC. SEC. SEC. SEC. SEC. SE	ЦКАР 5 <i>R</i> ВСК Р <i>R</i>	АЛ АЛ Ман Пан Асорент Пан	12 12 12 12 12 12 12 12 12 12		
0000 000 0	LE PH LG AP LG AP GP/ FORMA FORM	DE ATT DE ATT DE ATT DE ATT TON RECOVERN NITION RECOVERN DE ATT DE AT	емртер (0,200) EVER Вогла кра кра кра Сорон	ТС 6 ТС 6 UNSU UNSU WR. 085 F WR. 0	ET 1 1 0.12 10	Репя ////2 SSE /////////////////////////////////	By       372  <	PUBP PUBP PUBP SUZE EMARKS SUZE EMARKS SUZE EMARKS SUZE EMARKS SUZE COMP COMP COMP COMP COMP COMP COMP COMP	D UFF AND 1 ARS 1 140 140 140 140 140 140 140 140 140 14	0 TC DUM) 110000 100000 10000 10000 10000 10000 10000 10000 10	DED CATE PHO 3 P.M N. N. 70 CA DUA DUA DUA CA DUA DUA CA CA CA CA CA CA CA CA CA C	ЦА ТВ В ААС В ААС В ААС В АС В АС	- 1 <u>112</u> <u>DPX</u> <u>112</u> <u>DPX</u> <u>112</u> <u>DPX</u> <u>112</u> <u>DPX</u> <u>122</u> <u>EPX</u> <u>122</u> <u>EPX</u> <u>EPX</u> <u>122</u> <u>EPX</u> <u>122</u> <u>EPX</u> <u>122</u> <u>EPX</u> <u>122</u> <u>EPX</u> <u>122</u> <u>EPX</u> <u>122</u> <u>EPX</u> <u>E</u>	×	ЦКАР 5 <i>R</i> ВСК Р <i>R</i>	АЛ АЛ Ман Пан Асорент Пан	12 14 17 17 17 17 17 17 17 17 17 17		
UNTE DOM DOM DOM DOM DOM DOM DOM DOM	E PUIL G AP GPL GPL FORMUS HOMEONE BROWN CONTINUE SOU ED II SOU ED II SOU ED SOU ED II SOU ED II SOU SOU ED II SOU ED II SOU SOU ED II SOU SOU SOU SOU SOU SOU SOU SOU SOU SOU	№ АТТ НОШ НОШ НОШ О ПОН ВСОУСКА ВСОУСКА О ВСОУСКА О ВСОУСКА О ВСОУСКА О ВСОУСКА О ВСОУСКА О ВСОУСКА О ВСОУСКА О ВСОУСС О ВСОУСС О ВСОУСС О О О О О О О О О О О О О О О О О	емртер (0,000 EVER вотан котан	То G То G UNSU UNSU Wr. 08 87 1997	ет 1	Puese       INTEL       SSE       INTEL       SSE       INTEL       INTEL	By     Brever       SFUU     SFUU       BFUU     SFUU       BFUU     SFUU       BFUU     SFUU       BFUU     SFUU       BFUU     SFUU       BFUU     STR       STR     STR       STR     STR       STR     STR       STR     STR       SSTR     STR       SS     PP       BEIE     SE	рини	D UF AND 1 ARS - 	Pater Pater Barrier Ba	DED CATE SPM SPM N. ZCA DUC DUC CENT	ЦА ТВ В ААС В ААС В ААС В АС В АС		7 50C. SEC. NO 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	ЦКА- 5 <i>R</i> 500 / <i>P</i> 4 <i>R</i> 500 / <i>P</i> 5	нлл нлл на на на на на на на на на на	12 12 12 12 12 12 12 12 12 12		
Della Contraction of the second secon	е <u>ра</u> <i>и</i> <i>и</i> <i>и</i> <i>и</i> <i>и</i> <i>и</i> <i>и</i> <i>и</i>	ре ATI PD (20) HOU HOU HOU HOU HOU HOU HOU PDP6 C HOU HOU HOU HOU HOU HOU HOU HOU	амртер (0,200) EVER ВVER	ТО 60 ТО 60 СИЛУС СИЛУС СИЛУС 1 1 1 1 1 1 1 1 1 1 1 1 1		Риссе 10/72 556 556 556 556 556 556 556 55	By 3re 3re 3re 3re 3re 3re 3re 3re	рини	D UF AND 1 ARS 1 14RS 1 14RS 1 14RS 1 14RS 1 14RS 1 12S 1 12S 1 6 AS 1 2AS 1 2AS 1 2AS 1 2AS 1 2AS 1 2AS 1 2AS 1 2 AS 1 AS 1 AS 1 AS 1 AS 1 AS 1 AS 1 AS 1	Part Part Part Part Part Part Part Part	DED CATE PHO 3 P.M N. N. TO CATE S P.M N. N. TO CATE DICE TO CATE S P.M N.	ЦА ТВ В ААС В ААС В ААС В ААС В ААС В ААС В ААС В АСС В ААС В АСС В АСС		7 50C. SEC. NO 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	ЦКА- 5 <i>R</i> 500 / <i>R</i> 10 <i>R</i> 500 / <i>R</i> 10 <i>R</i> 100 / <i>R</i> 10 <i>R</i> 10 / <i>R</i> 10 / <i>R</i> 10 <i>R</i> 10 / <i>R</i> 10 / <i>R</i> 10 <i>R</i> 10 / <i>R</i> 10 / <i>R</i> 10 / <i>R</i> 10 <i>R</i> 10 / <i>R</i>	АЛ АЛ Ман Пан Асорент Пан	12 12 12 12 12 12 12 12 12 12		
UNCE DOB DOB DOB DOB DOB DOB DOB DOB	е <u>ра</u> <i>и</i> <i>и</i> <i>и</i> <i>и</i> <i>и</i> <i>и</i> <i>и</i> <i>и</i>	ре ATI PD (20) HOU HOU HOU HOU HOU HOU HOU PDP6 C HOU HOU HOU HOU HOU HOU HOU HOU	анртер (0,000 EVER ВИСКА ВИСКА ВИСКА ВИСКА ВИСКА ВИСКА ВИСКА ВИСКА ВИСКА ВИСКАНОВОВОВОВОВОВОВОВОВОВОВОВОВОВОВОВОВОВОВ	ТО 60 ТО 60 СИЛУС СИЛУС СИЛУС 1 1 1 1 1 1 1 1 1 1 1 1 1	ERATION ERATION ERATION CONSERVICE ERATION ERATION CONSERVICE CONSERVI	Риссе 10/72 556 556 556 556 556 556 556 55	Ву 3 778	PULLE PULL	D UF AND 1 ARS 1 14RS 1 14RS 1 14RS 1 14RS 1 14RS 1 12S 1 12S 1 6 AS 1 2AS 1 2AS 1 2AS 1 2AS 1 2AS 1 2AS 1 2AS 1 2 AS 1 AS 1 AS 1 AS 1 AS 1 AS 1 AS 1 AS 1	Part Part Part Part Part Part Part Part	DED CATE PHO 3 P.M N. N. TO CATE S P.M N. N. TO CATE DICE TO CATE S P.M N.	ЦА ТВ В ААС В ААС		7 50C. SEC. NO 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	ЦКА- 5 <i>R</i> 500 / <i>R</i> 10 <i>R</i> 500 / <i>R</i> 10 <i>R</i> 100 / <i>R</i> 10 <i>R</i> 10 / <i>R</i> 10 / <i>R</i> 10 <i>R</i> 10 / <i>R</i> 10 / <i>R</i> 10 <i>R</i> 10 / <i>R</i> 10 / <i>R</i> 10 / <i>R</i> 10 <i>R</i> 10 / <i>R</i>	АЛЛ АЛЛ ТНЕ АСОДЕНТ ТНЕ АСОДЕНТ ПОЛИТ	12 12 12 12 12 12 12 12 12 12		
WEEEE WEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEE	е <u>ра</u> <i>и</i> <i>и</i> <i>и</i> <i>и</i> <i>и</i> <i>и</i> <i>и</i> <i>и</i>	ре ATI PD (20) HOU HOU HOU HOU HOU HOU HOU PDP6 C HOU HOU HOU HOU HOU HOU HOU HOU	амртер (0,200) EVER ВVER	ТО 60 ТО 60 СИЛУС СИЛУС СИЛУС 1 1 1 1 1 1 1 1 1 1 1 1 1		Риссе 10/72 556 556 556 556 556 556 556 55	By 3re 3re 3re 3re 3re 3re 3re 3re	PULLE PULL	D UF AND 1 ARS 1 14RS 1 14RS 1 14RS 1 14RS 1 14RS 1 12S 1 12S 1 6 AS 1 2AS 1 2AS 1 2AS 1 2AS 1 2AS 1 2AS 1 2AS 1 2 AS 1 AS 1 AS 1 AS 1 AS 1 AS 1 AS 1 AS 1	PUBP PUBP PUBP SUE DE D D D D D D D D D D D D D D D D D	DED CATE PHO STM STM TO CATE STM STM TO CATE TO CATE TO CATE TO CATE TO CATE STM STM STM STM STM STM STM STM STM STM	ЦА ТВ В ААС В ААС		7 50C. SEC. NO 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	ЦКА- 5 <i>R</i> 500 / <i>R</i> 10 <i>R</i> 500 / <i>R</i> 10 <i>R</i> 100 / <i>R</i> 10 <i>R</i> 10 / <i>R</i> 10 / <i>R</i> 10 <i>R</i> 10 / <i>R</i> 10 / <i>R</i> 10 <i>R</i> 10 / <i>R</i> 10 / <i>R</i> 10 / <i>R</i> 10 <i>R</i> 10 / <i>R</i>	АЛЛ АЛЛ ТНЕ АСОДЕНТ ТНЕ АСОДЕНТ ПОЛИТ	12 12 12 12 12 12 12 12 12 12		
UNCE COLOR COL	е <u>ра</u> <i>и</i> <i>и</i> <i>и</i> <i>и</i> <i>и</i> <i>и</i> <i>и</i> <i>и</i>	ре ATI PD (20) HOU HOU HOU HOU HOU HOU HOU PDP6 C HOU HOU HOU HOU HOU HOU HOU HOU	амртер (0,200) EVER ВVER	<u>ТС 60</u> 1246 <u>6</u> 1246 <u>6</u> 1246 <u>6</u> 1247 <u>1</u> 1000 100		Риссе 10/72 556 556 556 556 556 556 556 55	Ву 3 778	PULLE PULL	DUI- AND 1 MRS 1 MRS 1 MRS 1 MR 1 MR 1 MR 1 MR 1 MR 1 MR 1 MR 1 MR	PUBP PUBP PUBP SUE DE D D D D D D D D D D D D D D D D D	DED CATE PHO STM STM TO CATE STM STM TO CATE TO CATE TO CATE TO CATE TO CATE STM STM STM STM STM STM STM STM STM STM	ЦА ТВ В ААС В ААС		7 50C. SEC. NO 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	ЦКА- 5 <i>R</i> 500 / <i>R</i> 10 <i>R</i> 500 / <i>R</i> 10 <i>R</i> 100 / <i>R</i> 10 <i>R</i> 10 / <i>R</i> 10 / <i>R</i> 10 <i>R</i> 10 / <i>R</i> 10 / <i>R</i> 10 <i>R</i> 10 / <i>R</i> 10 / <i>R</i> 10 / <i>R</i> 10 <i>R</i> 10 / <i>R</i>	АЛЛ АЛЛ ТНЕ АСОДЕНТ ТНЕ АСОДЕНТ ПОПП. НЕ	12 12 12 12 12 12 12 12 12 12		

Figure 6. BJP-1 IADC report dated May 29, 2006. Note the 8.9 ppg fluid influx into the wellbore that was circulated out after a kick.

FLOW	PUMP STROKE COUNTER
726   Dasting Bross 198 23   02   4.1     7   114321   0   144321   0     8   gal /misodd 0   Pat SOCOSE3Pal. ft//nr   1   1     8   gal /misodd 0   Pat SOCOSE3Pal. ft//nr   1   1     9   1   Dig /misodd 0   Pat SOCOSE3Pal. ft//nr   1   1     9   1   Dig /misodd 0   Pat SOCOSE3Pal. ft//nr   1   1   1     9   1   Dig /misodd 0   Pat SOCOSE3Pal. ft//nr   1<	150 dt a D/2 piret of 1     15   9279.817   105     16   9272.041   108     17   9272.041   108     18   9272.041   108     19   9272.041   108     19   9277.625   389     19   9204.872   477     19   9217.313   585     10   9232.55   635     15   9272.638   833     15   9272.706   1016     16   -0254.315   743     15   9272.706   1016     15   9263.957   1133     16   9236.003   1376     17   9236.003   1376     18   9236.003   1376     19   9236.003   1376     10   9236.003   1376     115   9219.8   2106     10   9236.77   2342     10   9236.77   243     115   9219.8   2446

Figure 7. Real time data May 27, 2006, shows 220 bbls to fill the hole.

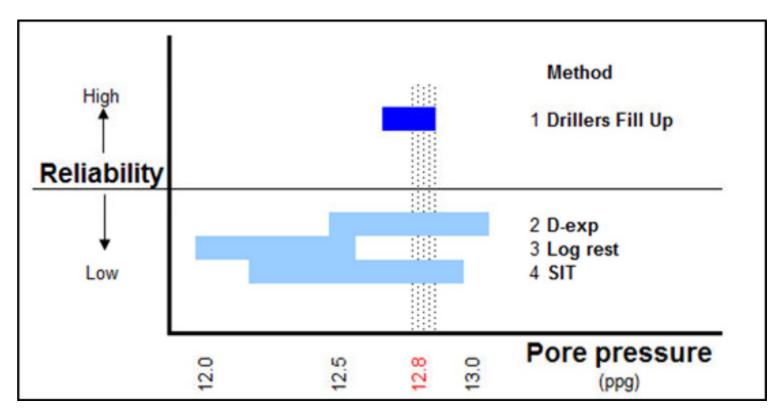


Figure 8. Range of bottom hole pore pressures. The pore pressures are derived from a number of pressure prediction methods with different reliability. The 'Fill Up' method is considered the most reliable and widely used in drilling.

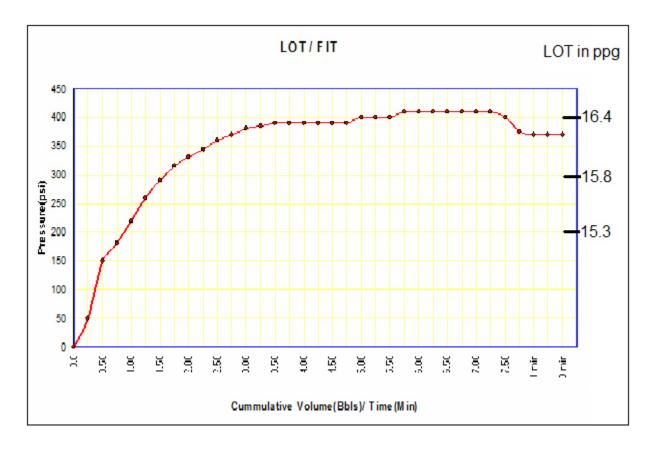


Figure 9. Banjarpanji-1 Leak off test result of 16.4 ppg at the 13-3/8" casing shoe at a depth of 3580 ft. The result is consistent with the nearest offset Wunut-2 well which had 16.6 ppg LOT from a shallower depth of 3160 ft.

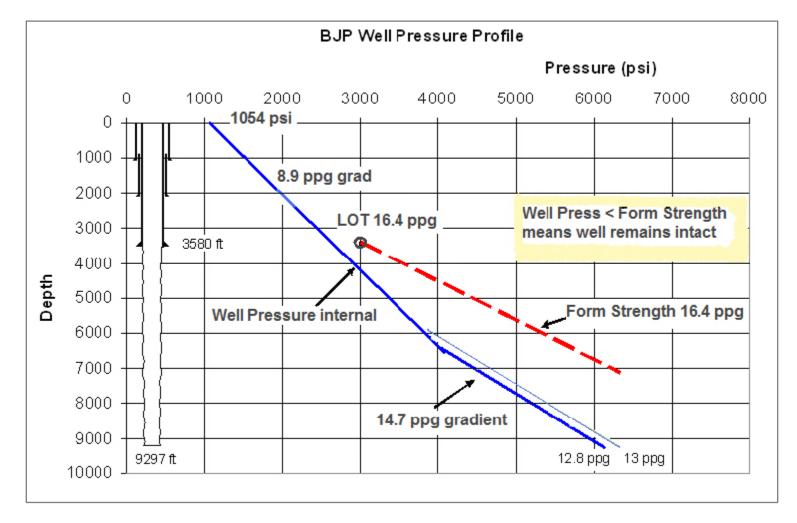


Figure 10. BJP-1 Pressure profile shows that the pressure within the wellbore is still lower than the strength of the rock at its weakest point; i.e., lower than the LOT.

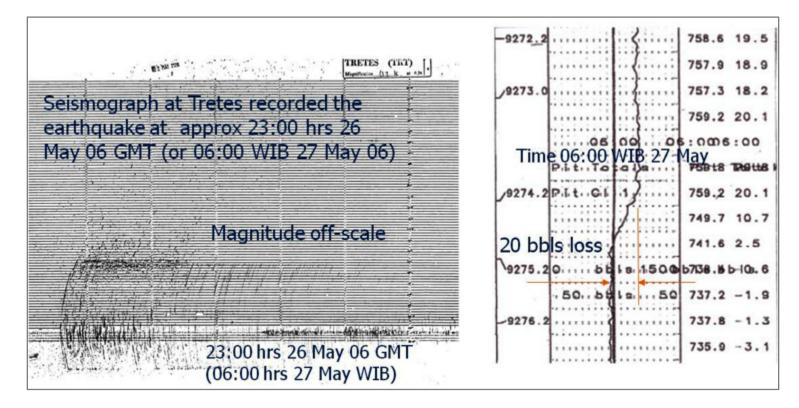


Figure 11. BJP-1 RTD showing drilling mud losses less than 10 minutes after May 27, 2006, recorded in Tretes BMG Station (10 km away from LUSI.

## References

Davies, R.J., R.E. Swarbrick, R.J. Evans, M. Huuse, 2007, Birth of a mud volcano, east Java, 29 May 2006: GSA Today, v. 17/2, p. 4-9. <u>http://dx.doi.org/10.1130/GSAT01702A.1</u>

Mazzini, A., H. Svensen, G.G. Akhmanov, G. Aloisi, S. Plante, A. Malthe-Sorenssen, and B. Istadi, 2007, Triggering and dynamic evolution of the LUSI mud volcano, Indonesia: Earth and Planetary Science Letters, v. 261/3-4, p. 375-388. http://dx.doi.org/10.1016/j.epsl.2007.07.001

Tingay, M., O. Heidbach, R. Davies, and R. Swarbrick, 2008, Triggering of the Lusi mud eruption; earthquake versus drilling initiation: Geology Boulder, v. 36/8, p. 639-642. <u>http://dx.doi.org/10.1130/G24697A.1</u>

Tingay, M., O. Heidbach, R. Davies, and R. Swarbrick, 2008, The Lusi mud eruption of East Java (abstract): Search and Discovery Article #90082 (2009) <u>http://searchanddiscovery.net/abstracts/html/2008/intl\_capetown/abstracts/469863.htm</u>