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# *The Airless Adapter (A.A.)*

## **Case Histories**

*“A Patented Product”*

*Reduce Mud Costs*

*Aerated Mud increases Costs*



# Case History

**Date:** 7-24-08  
**Operator:** United World  
**Problem Area:** Entire well  
**Well:**  
**Rig:** Justiss # 54  
**Consultant:**  
**Mud Weight:** 13.5  
**Mud Type:** Water Base  
**Engineer:**  
**Depth:** 11343'

**Problem:** Air trapped in mud

**Application:** Installed A.A. system and 100% of all mixing was done through A.A. with jet flooded each time hopper was used.

**Comments:** Barite consumption was considerably less compared to a recent offset well. Had fewer problems raising and maintaining mud weight.

**JUSTISS 54**

**17.5 HOLE SIZE**

**13 3/8 CASING**

**SURFACE CASING**

**3510'**

**12 1/4 BIT**

**9 5/8 CASING**

**7833' INTERVAL**

**13.5 MWT**

**BARITE CONSUMPTION**

**7000 SACKS**

**DRILL IN 18 DAYS**

**11,343**

**Two leading mud companies had estimated Barite Consumption at 14,000 sacks for this well. Only 7,000 sacks were used.**



# Case History

<b>Date:</b>	7-24-08
<b>Operator:</b>	
<b>Problem Area:</b>	11600-14089'
<b>Last Casing:</b>	11800'
<b>Well:</b>	
<b>Rig:</b>	H & P 79
<b>Consultant:</b>	
<b>Mud Weight:</b>	17.3
<b>Mud Type:</b>	Water Base
<b>Engineer:</b>	
<b>Depth:</b>	14062'



# Case History *(continued)*

**Problem:** Drilled to 12597' took saltwater kick—raised MWT to 17.5 began losing mud. Pumped 2 Frac Attack pills. After 1st pill began staging to bottom. Lost 58 bbls at 12015' decided to pump another. Staging to bottom, no losses at 11625'—Lost 18 bbl mud...losing 75 to 100 bbl per day.

**Application:** Began pumping Black Seal, Fiber Set and fiber pills---Got to bottom and resumed drilling pumping the above pills—reached casing point @ 14089' with minor losses less than 30 bbl in 14 days. As drilling continued ECD increased to 18.0 ppg—Shoe test was only 17.7 ppg. Fiber Set and Black Seal increased the strength of the shoe. Several Major Operators have concluded in extensive test that Black Seal can, and this well proves that it does improve the integrity of the shoe. During the cement job only 30 bbls of mud was lost. The customer was able to set pipe and resume drilling without farther incident.

**Comments:** Operator had installed A.A. system which helps maintain a constant BHP. The Black Seal/Fiber sweeps and the A.A. was a major factor in reaching casing point. Another job well done. The engineer over the project is completely happy with our products and its application.

# Case History

**Operator:** Brammer Engineering

**Date:** 10-1-08 – 12/1/2008

**Problem Area:** 8 ½" interval      3500' – 11000' (+ - )

**Well:** Evans\*, Napper, Miles, Wilder, Temple, Cole

**Rig:** Scan Energy

**Consultant:** Dennis Johnson

**Mud Weight:** 13.2 to 14.3 PPG

**Mud Type:** Water Base

**Engineer:** Pat Brown

**Comment:** 13.2 to 14.3 PPG duration is 6 days



# Case History *(continued)*

**PROBLEM:** Air trapped in mud

**APPLICATION:** A.A. installed and jet flooded each time hopper was used.

**COMMENTS:** The information listed below was compiled from 5 different wells and a test well. The overall savings combined was \$131,000 in barite, trucking and rig time was noted. Weighted mud section lasted only 6 days. Dennis Johnson the Drilg Consultant noted that less circulation time was required after WT UP thus saving costly rig time.





# Case History

Well Name	Bulk Usage	MWT	ADJ	Savings (tons)
Evans 2*	432	14.3	0	
Napper 5	319	14.6	298.2	133.8
Miles 2	304	14.05	312	120
Wilder 9-1	290	13.6	319.4	112.6
Temple 8-1	311	13.5	344	88
Cole 22-1	365	14.3	0	67

**Savings on Barite: \$75,603.00 (521.4 tons @ \$145.00/ton)**  
**Savings on Trucking: \$17,761.00 (521.4 tons @ \$34.00/ton)**  
**Tax Savings: \$ 5,670.00 (75,603.00 x .075+ \$ 5670.00)**  
**Rig Time Savings: \$32,000.00 (40 hours @ \$800.00/hour)**  
**Total Savings: \$131,034.00 (on 5 well program)**

\* Evans 2 was comparison well where the Airless Adapter was not used

# Case History

<b>Operator:</b>	Panther Bayou
<b>Date:</b>	1-02-09 thru 2-15-09
<b>Problem Area:</b>	
<b>Well:</b>	Lastrapes #1
<b>Rig:</b>	Justiss 54
<b>Consultant:</b>	Fruge/Monin/Champange/Stuart
<b>Mud Weight:</b>	9.0-14.7 ppg
<b>Mud Type:</b>	Water Base
<b>Engineer:</b>	Craig Durio



# Case History *(continued)*

**PROBLEM:** Air in mud

**APPLICATION:** A.A. installed and jet flooded each time hopper was used.

**COMMENTS:** This rig had used the A.A. system on a previous well for United World, with great results. The new customer wanted to save barite and maintain a more accurate MWT to insure well-bore stability. Since there were no comparable offset wells, we used, as our criteria, the mud program estimates on Barite.



# Case History

**Comments:** The well was drilled with 14.7 ppg instead of 17.2. A correction of 3684 sacks of barite was made for using less MWT. The 8 ½" hole was drilled to a deeper depth.

## Actual Savings:

Barite: \$19,111.00 (131.8 tons @ \$145.00/ton)

Trucking : \$4700.00

Sales Taxes: \$1527.00

Rig Time Savings: \$15,000.0

**Total Savings: \$40,311.00 on the Lastrapes #1.**



# Case History

**Operator:** Chesapeake Operating  
**Date:** 01/13  
02/23  
04/24  
06/08  
**Problem Area:** 9 7/8" and 6 1/2" interval  
**Well:** Caspiana 13H-1  
Woolworth Foundation 15 H-1  
Agurs 9H -1  
McCoy 9H-1  
**Rig:** Trinidad 100  
**Consultant:** Fred Colvin  
**Mud Weight:** 10.8 PPG WBM 15.2 OBM  
**Mud Type:** WBM AND OBM

## *Haynesville Well*



# Case History *(continued)*

**PROBLEM:** Previous wells experienced hopper and aeration problems and lost days to drilling curve.

**APPLICATION:** A.A. installed and jet flooded each time hopper was used.

**COMMENTS:** Consultant wanted to see if A.A.. would solve aeration problems. To everyone's surprise, the next 3 out of 4 wells beat the drilling curve. We have no concrete data to indicate A.A.. was responsible for its success, but we know that it eliminated aeration. We don't guarantee beating the curve every time but it's a good drilling practice.



# Case History

**Operator:** Chesapeake Operating  
**Date:** 06/27/2009  
**Problem Area:** 9 7/8" interval 2200' – 11000' (+ - )  
**Well:** Johnson Trust 31 H-1  
**Rig:** Trinidad 101  
**Consultant:** Dave Sharp  
**Mud Weight:** 10.8 PPG  
**Mud Type:** Water Base

*Drilling vertical section of Haynesville, Desoto Parish*



# Case History *(continued)*

**PROBLEM:** Air trapped in mud due to contaminated mud and anemometer readings on rig hopper of 522 fpm.

**APPLICATION:** A.A. installed and jet flooded each time hopper was used.

**COMMENTS:** While drilling, lost 1100 psi on stand pipe. Consultant assumed washout. P/U drilling string and had not lost any drill string weight. Decided to mix slug and look for washout. While pumping slug, stand pipe pressure was normal. Resumed drilling but called to rig up A.A. After rig up, was able to run hopper with no decrease in stand pipe pressure.





# Case History

**Operator:** Devon Energy  
**Date:** 09/10/08  
09/30/08  
10/20/08  
**Problem Area:** 9 7/8" and 6 1/2" interval  
**County:** Panola County  
**Well:** Hudson-Johnson 26  
Chadwick #27  
Roberson #11  
**Rig:** Big E-3  
**Consultant:** Josh Childress  
**Mud Weight:** 9.5 – 10.2 PPG  
**Mud Type:** WBM



# Case History *(continued)*

**PROBLEM:** Severe aeration problems

**APPLICATION:** A.A. installed and jet flooded each time hopper was used.

**COMMENTS:** Although this was basically an un-weighted system, the operator felt keeping air out of mud would improve their operation. At times when hopper was turned on, 150 psi was lost on stand pipe pressure. After installing A.A., all aeration problems were eliminated. We followed rig from well to well until rig was stacked.



# Case History

**Operator:** Indigo Minerals  
**Date:** 01/02/09 - 02/02/09 (1<sup>st</sup> location)  
02/25/09 – 03/13/09 (2<sup>nd</sup> location)  
03/20/09 – 04/06/09 (3<sup>rd</sup> location)  
**Problem Area:** 8 ½” interval 3500’ – 11000’ (+ - )  
**Well:** Hodge Heart 15H-1  
Hodge Heart 16H-1  
Figg 7 #1  
**Rig:** Performance 28  
**Consultant:** Mike Francis  
**Mud Weight:** 13.2 to 14.3 PPG  
**Mud Type:** Water Base  
**Engineer:** Pat Brown  
***Comment: 13.2 to 14.3 PPG duration is 6 days***



# Case History *(continued)*

**PROBLEM:** Air trapped in mud

**APPLICATION:** A.A. installed and jet flooded each time hopper was used.

**COMMENTS:** After completion of the Hodge Heart 15H-1 we were called to rig down because company man felt as though it had not performed to his expectations, although we had successfully completed 5 wells in the area for the same Operator but on a different rig. After three weeks, same company man called to rig up on Hodge Heart 16H-1 because of severe aeration problems. Aeration was so severe, solids control equipment could not pump the mud. While drilling this well, company man realized how efficiently A.A. had performed, saving valuable rig time. There was no question he wanted A.A. on the Figg 7 #1. After Figg 7 #1, Operator released rig and A.A. rigged down.

# Case History

**Operator:** EOG Resources

**Date:** 03/02/2009

**Problem Area:** 0 – 15,700 ft

**Well:** DN Bell #3

**Rig:** Nabors F8

**Mud Weight:** 10.8 – 15.4

**Mud Type:** WBM and OBM

**Superintendent:** Ronnie Carney



# Case History

## *Haynesville Well*

	<u>Without Adapter</u>	<u>With Adapter</u>
<b>Wells:</b>	Billingsly*	D.N. Bell
<b>Depth:</b>	15240	15700
<b>TVD:</b>		11837
<b>Days:</b>	58	59
<b>WBM Drlg. Days:</b>	23	21
<b>OBM Drlg. Days:</b>	35	38
<b>MWT WBM:</b>	11.0	10.8
<b>MWT OBM:</b>	15.5	15.45
<b>Barite Usage Tons:</b>	459.4	308
<b>Barite in WBM:</b>	304	135
<b>Barite in OBM:</b>	146	178
<b>Barite Usage SX:</b>	7	113
<b>Barite Cost Tons:</b>	\$65,234	\$43,736
<b>Barite Cost SX:</b>	\$65.03	\$1062

**\*Billingsly was comparable well where Airless Adapter was not used**

# Haynesville Well

Barite Savings 151.4 tons @ \$142/ton	\$ 21,498.80
Trucking Savings @ \$34/ton	\$ 5,147.60
Tax on Barite @ 8%	<u>\$ 1,719.90</u>
<b>Total Savings</b>	<b>\$ 28,366.30</b>

Cost of Equipment	\$ 8850.00
Less MWT correction	<u>\$ 1,262.00</u>
	\$ 10,112.00

**Net Savings \$18,254.30**



# Haynesville Well *(continued)*

- The Bell well was drilled with A.A. then removed to compare a like well, Billingsly without A.A.. Results clearly show a significant saving.
- Barite numbers in OBM are higher due to different AMTS of liquid OBM brought to location.
- Savings data was acquired from mud vendor from post well recap with approval of operator.





# Case History

**Operator:** Encana Oil & Gas  
**Date:** 10/5/2009 – 10/12/2009  
**Problem Area:** Horizontal Section  
**Well:** Jackson B Davis 25H-01  
**Rig:** Trinidad 124  
**Consultant:** Jeff Norris  
**Mud Weight:** 16.0  
**Mud Type:** Water Base



# Case History *(continued)*

- Attempting to drill horizontal section in Haynesville with Newpark's evolution mud.
- Within 300ft of TD air entrapment became a big problem. Mud was so aerated, centrifugal pump could not operate hopper or mix chemicals. MWT in 16.0 ppg MWT out 15.0 ppg, no gas.
- After rigging up A.A., mixing equipment began to function. Twenty drums and 45 - 5 gallon buckets of lubricant were added with no problems.
- Within 14 hours of operation , MWT in 16.0 ppg, MWT out 16.0 ppg.

# Case History

**Operator:** R & D Exploration  
**Date:** 09/15/2011  
**Problem Area:** 14 3/4" hole section  
**Well:** AD Kennison #1  
**Rig:** Precision #425  
**Consultant:** Doc McCoy/Elray Foret  
**Mud Weight:** 10.5  
**Mud Type:** Water Base



# Case History *(continued)*

## Estimated Mud Weight 10.5 PPG

The proposed casing point was drilled with 10.5 PPG MWT. The estimate was based on 14 ¾" hole with a 10% wash out factor going from 9.0 PPG to 10.5 PPG.

<i>Estimated sacks of barite @ 10.5 PPG</i>	8,450
<i>Cost per sack</i>	\$ 8.00
<b>Total estimated barite cost</b>	<b>\$67,600</b>



# Case History *(continued)*

## Actual Rig Site Data

8000' Hole

14 ¾" Diameter

10.5 PPG MWT

3114 Sacks of Barite Used

Using the FSI patented Airless Adapter eliminated the air in the mud. The anemometer reading while using the Airless Adapter dropped from 1500 FPM to 0 FPM. This resulted in a significant REDUCTION in barite consumption and thereby reduced mud costs.

	<u>Actual</u>	<u>Estimated</u>
Sacks of Barite Used	3,114	8450
Cost per sack	\$ 8.00	\$8.00
<b>Total</b>	<b>\$24,912</b>	<b>\$67,600</b>
Proposed Barite Cost	\$67,600	
Actual Barite Cost	\$24,912	
<b>BARITE SAVINGS</b>	<b>\$42,688</b>	

***REDUCED BARITE = LESS VOLUME = REDUCED DISPOSAL COST***

# Case History

- Operator: PETRODOME OPERATING
- Date: 6-14 THRU 6-28-11
- Problem Area: DRILLING 0 TO 10392'
- Well: CARTER ESTATES # 1
- Rig: BIG E 4
- Consultant: BOB HORN
- Mud Weight: 9.0 TO 11.2 PPG
- Mud Type: WBM
- HOLE SIZE 17.5" @ 3597'
- HOLE SIZE 12.25" @ 10392'

# Case History (Cont)

- **PROBLEM:** AIR IN MUD
- **APPLICATION:** Airless Adapter installed and jet flooded each time hopper was used.
- **COMMENTS:** THE INTERVAL WAS DRILLED AND CASING POINT REACHED @ 10392' SAVINGS FROM PROJECTION ON BARITE WAS 98 TONS & 6 CANS OF DEFOAMER AT A SAVINGS OF \$13884.00. DRILLED THE INTERVAL WITHOUT AIR RELATED PUMP PROBLEMS.
- **MI ENGINEER –CHARLES RAY CALCULATED DATA**
- **BOB HORN WAS COMPLETELY SATISFIED**

# Case History

- Operator: ANADARKO
- Date: 05/26/2012
- Problem Area: ENTIRE WELL
- Well: CGU 15-52 HH
- Rig: NABORS F30
- Consultant: VANCE/JERRY BUTLER
- Mud Weight:
- Mud Type: EVOLUTION MUD (NEWPARK)
- HOLE SIZE:



- **PROBLEM: WHILE DRILLING WITH EVOLUTION MUD, AIRRED UP MUD WAS CAUSING PROBLEMS**
- **APPLICATION: AIRLESS ADAPTER INSTALLED AND JET FLOODED EACH TIME HOPPER WAS USED**
- **COMMENTS: MUD ENGINEERS AND COMPANY MEN WERE COMPLETELY SATISFIED. EQUIPMENT WAS KEPT FOR THE NEXT JOB.**

# The Airless Adapter (A.A.)

After 3 years of recording data, Fluid Solutions International has determined that the conventional rig hopper is responsible for 80% of air introduced into the mud system. An anemometer reading of 200 FPM equals to 7 barrel equivalent of air per minute. An anemometer reading of 700 FPM equals to 24 barrel equivalent of air per minute. These are typical numbers when using a mixing hopper. If hopper is used for a 8 hr treatment per day, using 450FPM, you add 7344 barrel equivalent and 1311 cubic feet and hope most of it breaks out. A better way is to use the A.A. and never put air in your mud.



# The Airless Adapter (A.A.)

If 100% of the air remained in the mud, this would become an air drilling operation. Some of the air readily breaks out but the air that remains becomes entrained in the mud and creates a problem by lightening the mud weight. This **REQUIRES** the use of additional barite to achieve the desired mud weight. This is barite that should have never been used.

