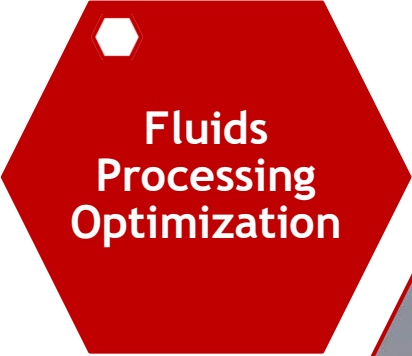


Kodiak

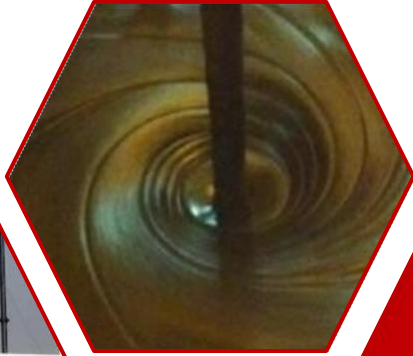
KODIAK FLUID MANAGEMENT KFM



KFM Portafolio de Servicios



Fluids
Processing
Optimization



Fluid
Management
QA/QC



Cementing
QA/QC



Waste
Management



On-site Mud
Laboratory



Solids
Control
Efficiency



DAK-1



Kodiak

Kodiak Fluid Management

KFM - Who we are NOT:

- A mud company
- A solids control Company
- KFM doesn't sell fluids, doesn't rent equipment nor provide disposal services
- Not a Personnel Supplier on every discipline



Fluid
Management
Consulting

Kodiak Fluid Management

KFM - Who we are:

- An independent team specialized in **OPTIMIZING** the back side of the rig:
 - ✓ **Drilling Fluids** QAQC, evaluation and recommendation
 - ✓ **Solids Control Equipment**- including rig owned and third party
 - ✓ **Cementing** program evaluations, planning and management to ensure well integrity
 - ✓ **Waste stream** management
 - ✓ **Audits** of fluid processing systems

A specialized member of your drilling team
Operations and Technical specialists - **Experienced**

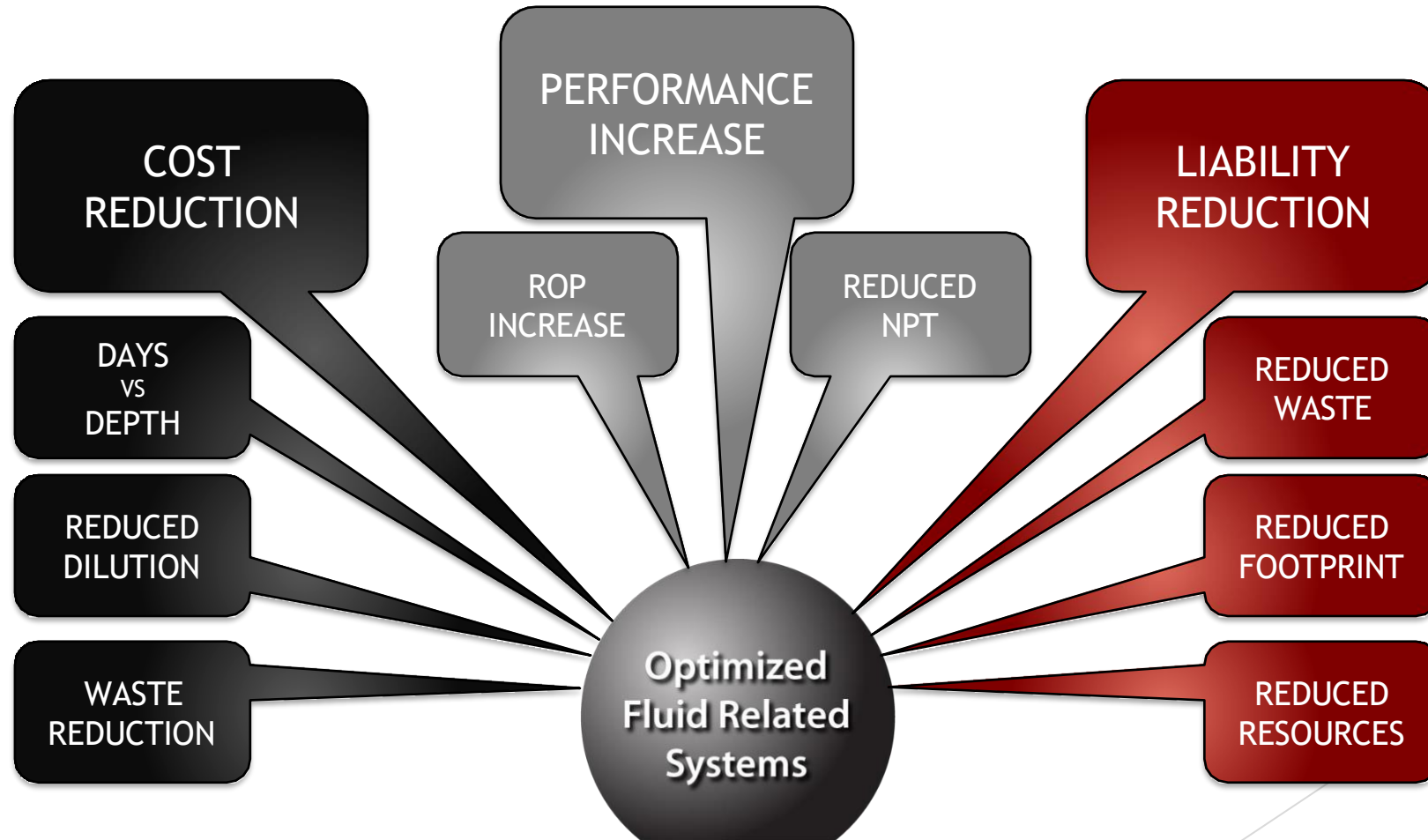


Fluid
Management
Consulting

KFM Project Management



KFM KPI's



KFM Fluids Processing Optimization

▶ **HOW DO WE OPTIMIZE YOUR
FLUIDS PROCESSING?**

Fluids Processing Optimization

Data Analysis and develop of

- ▶ Well Schematics
- ▶ Drilling Fluids Program
- ▶ OBW and WBM Reports
- ▶ Solids Control Reports
- ▶ Geology Master
- ▶ Cementation Program
- ▶ Service Companies Proposals, accepted after bid results
- ▶ Past NPTs Reported
- ▶ Correlated wells

Fluids Processing Optimization

API SPEC 13A-ISO 13500



▶ Solids Analysis and quality of raw materials

- ▶ Granulometric Analysis
- ▶ Le Chatelier Density
- ▶ Moisture Content
- ▶ Water soluble alkaline earth metals
- ▶ Particle size analysis
- ▶ Starch and derivatives presence
- ▶ Viscosity Measurements
- ▶ Volume Filtrate

Fluids Processing Optimization

Mud Lab API 13B1/B2 ISO 10414

- ▶ OBM & WBM
 - ▶ Density of drilling fluid (mud weight)
 - ▶ Viscosity and gel strength
 - ▶ Filtration
 - ▶ Water, oil and solids content
 - ▶ Sand content
 - ▶ Methylene blue capacity
 - ▶ pH
 - ▶ Alkalinity and lime content
 - ▶ Chloride content
 - ▶ Hardness total expressed as calcium

FIELD FULLY EQUIPPED LAB



Kodiak Fluid Management

New Technologies

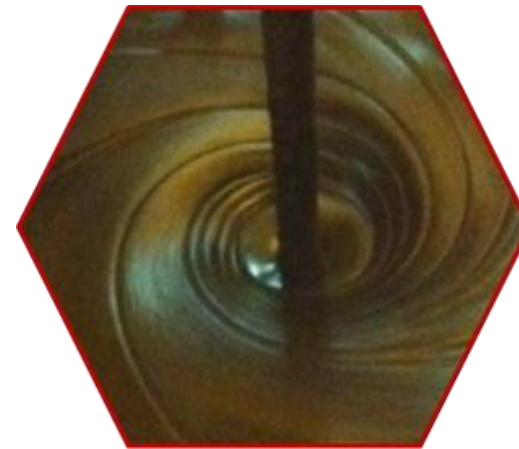
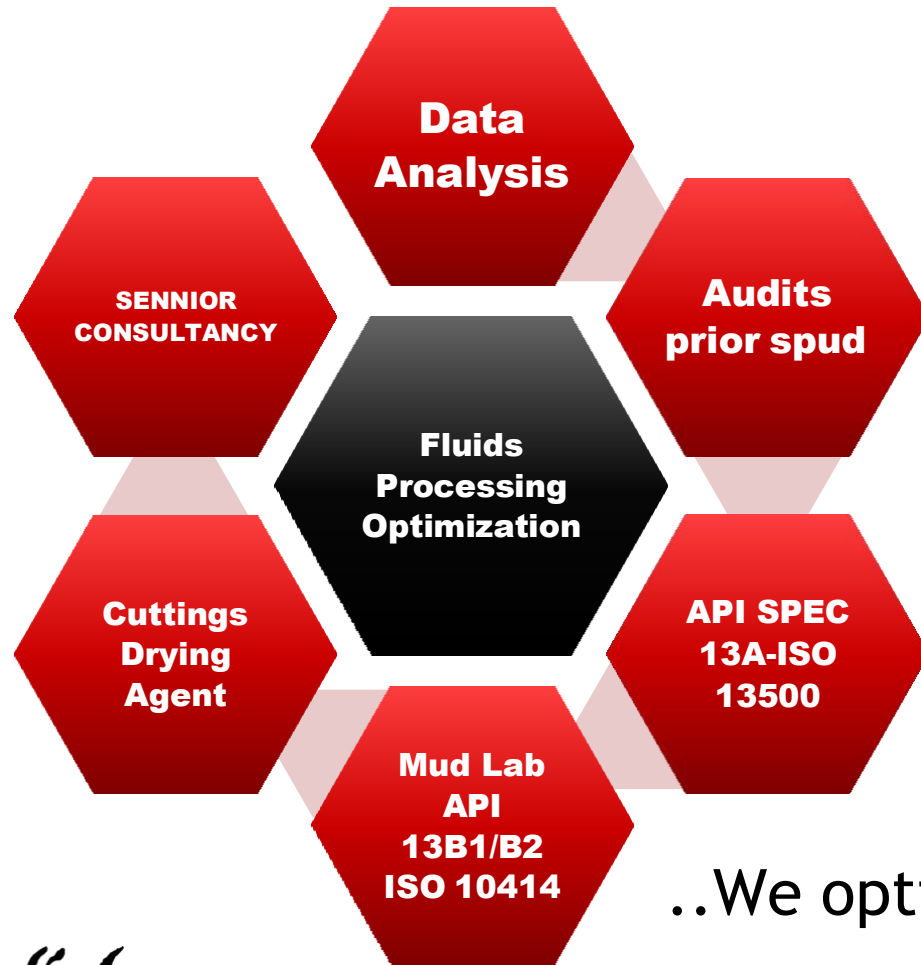
What if we could take your pit of wet solids and without affecting any parameters (pH, etc) change it to this.....

At a fraction of the cost without increasing the volume more than 2%



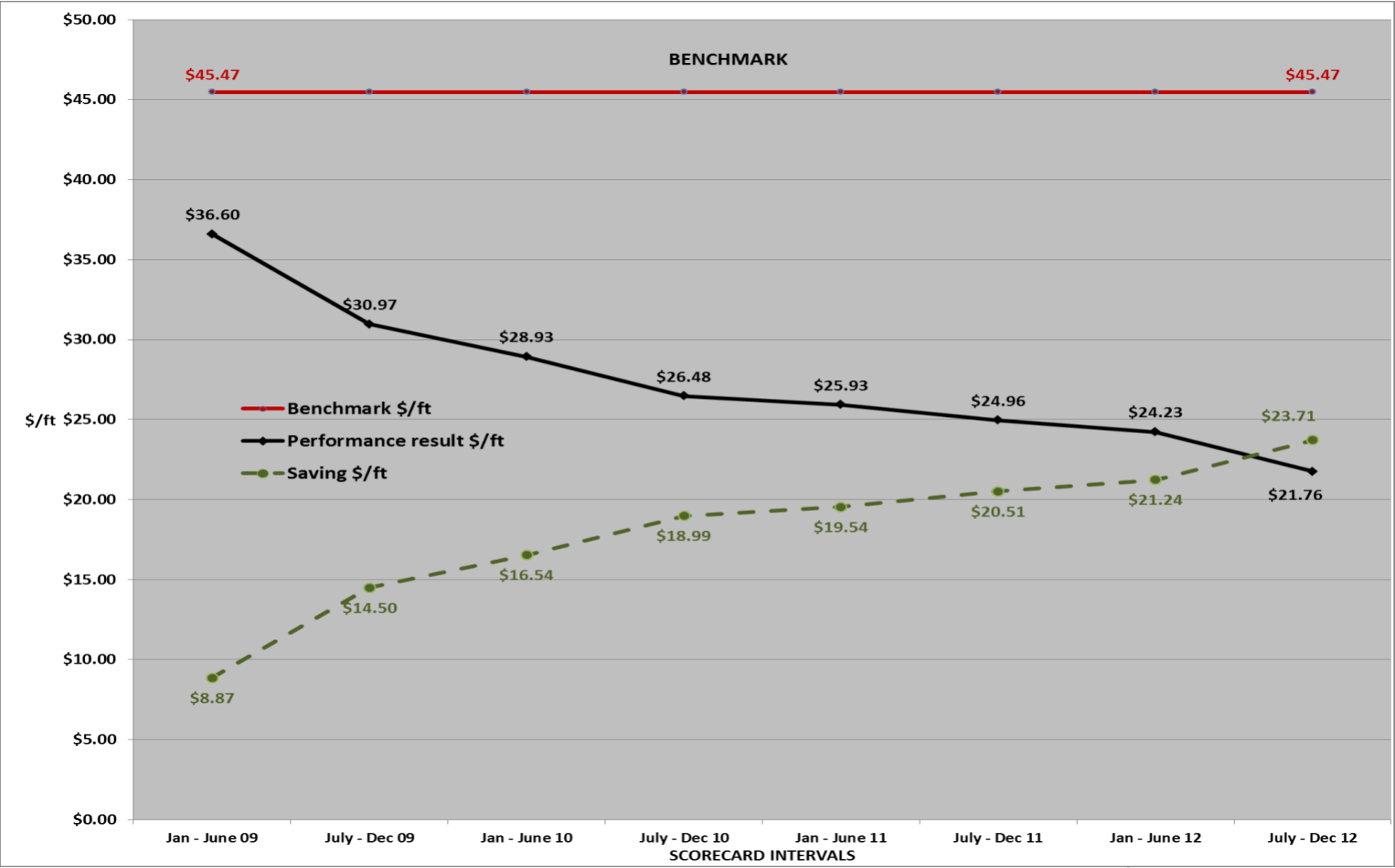
KFM Package

Fluids Processing Optimization



..We optimize fluid processing to reduce your waste stream

KFM Project Scorecard Summary to expect..



Kodiak Fluid Management

Companies we have experience with in Colombia..



Lewis Energy Colombia, Inc.®



Occidental Petroleum Corporation



Kodiak

Fluid
Management
Consulting

KFM Fluids Processing Optimization

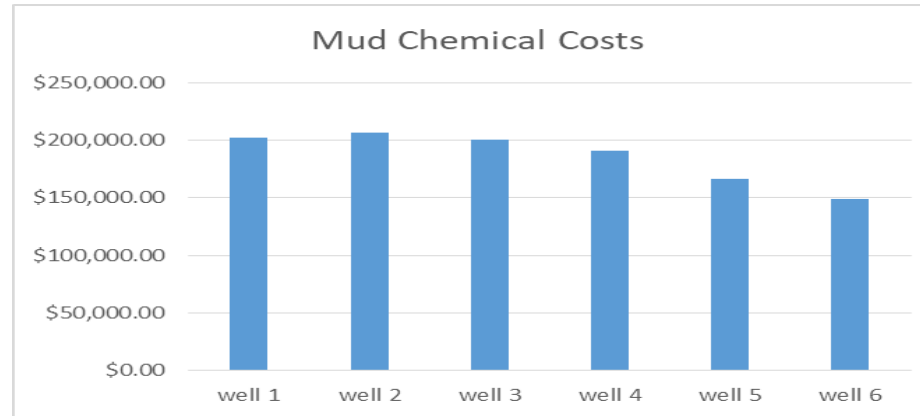
- ▶ **PROVEN RESULTS FOR OUR
COSTUMERS..**

Kodiak Fluid Management - Consulting

..Thinking about the Big Picture!!

An Example of Results from Past Wells:

- Mud chemical costs from a 6 well pad
- This reduction in fluid costs is mainly due to keeping a clean water based mud system.
- By setting up an efficient fluid processing system we were able to maintain less than 7% drilled solids. This allowed the option to recycle up to 1500 bbls of drilling fluid from one well to the next - In turn reducing chemical costs, waste streams and water consumption.
- Reducing drilled solids in the fluid system increases ROP, optimize hole stability and minimize formation damage.
- Careful tracking and recycling procedures has resulted in water reductions near 50%

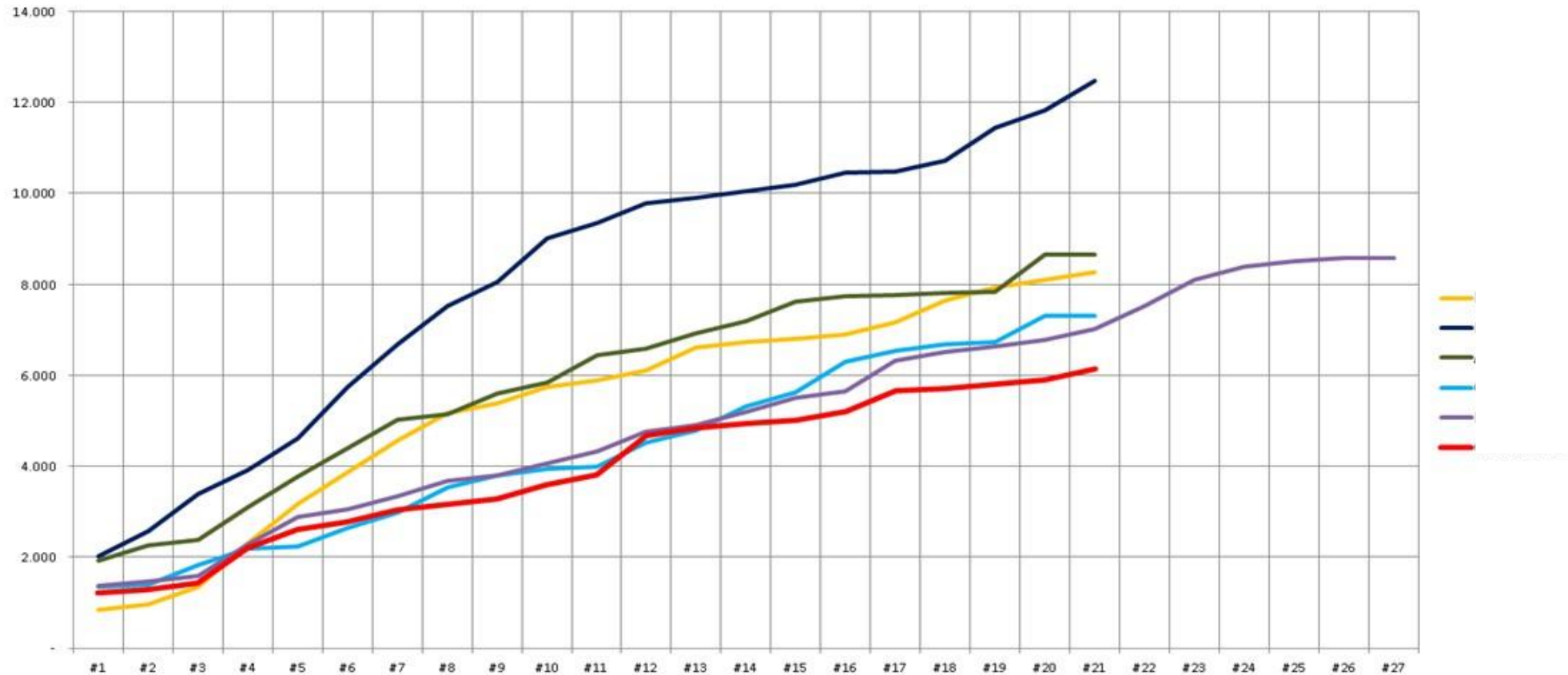


Drilling Campaign



Water Consumption. Block comparison

- Due to proper efficient tracking we have been able to recommend and make changes to reduce fresh water consumption. In six wells we have been able to reduce water consumption more than **50%**

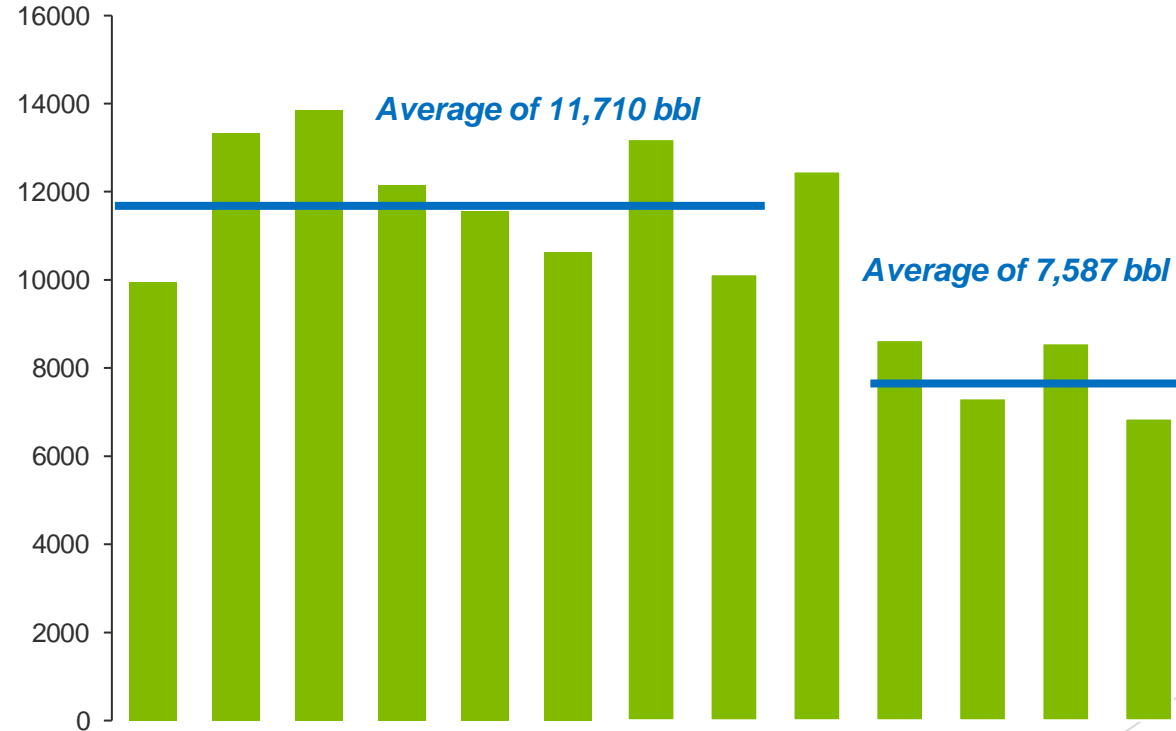


Drilling Campaign

Water Consumption after KFM Optimization

- Due to water reduction program we have been able to reduce the consumption by **35%**
- This has been due to reduced dilution and reduced losses to the solids waste stream.
- Increased the awareness of water reduction

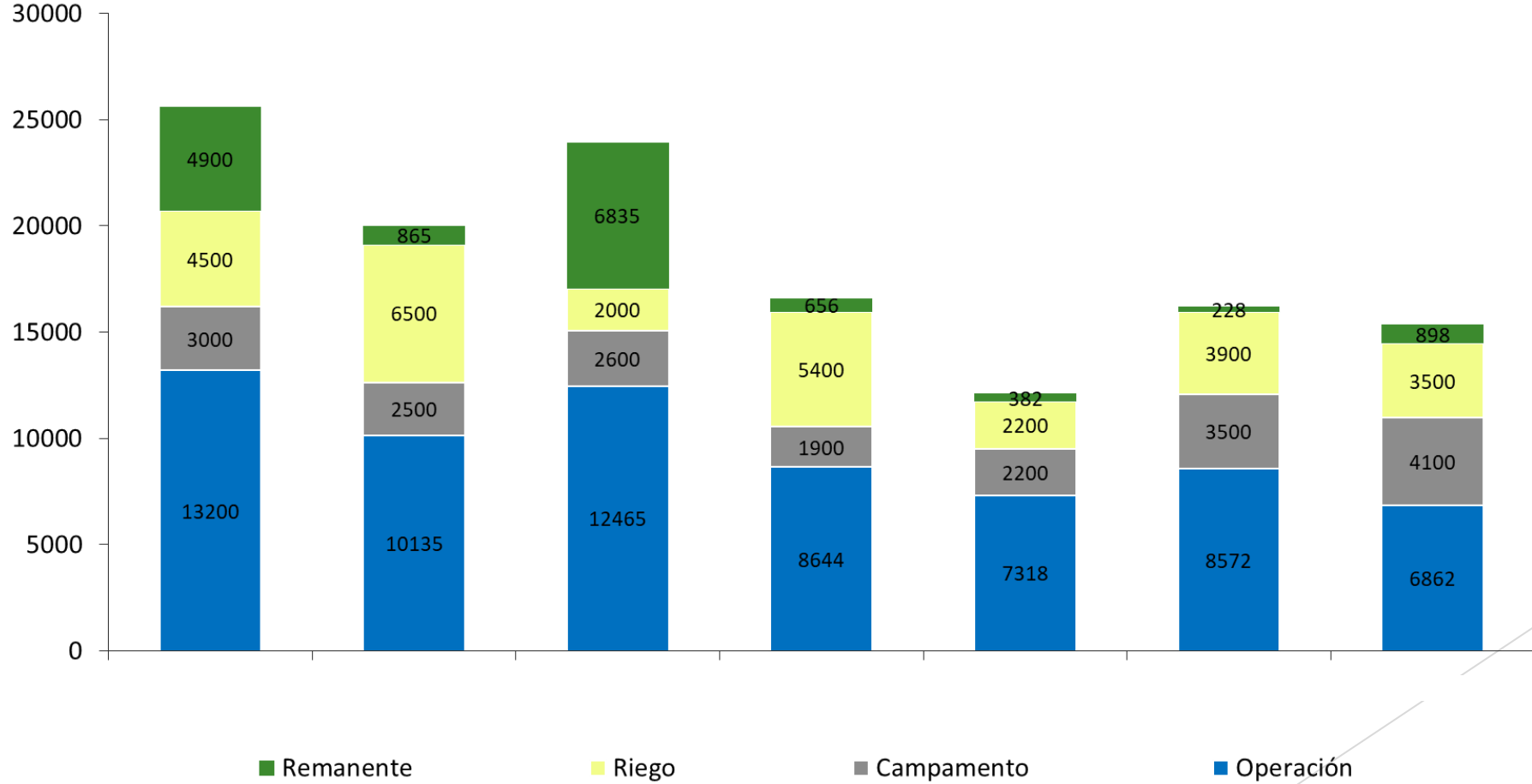
Savings of
USD \$36,800
per well



Drilling Campaign



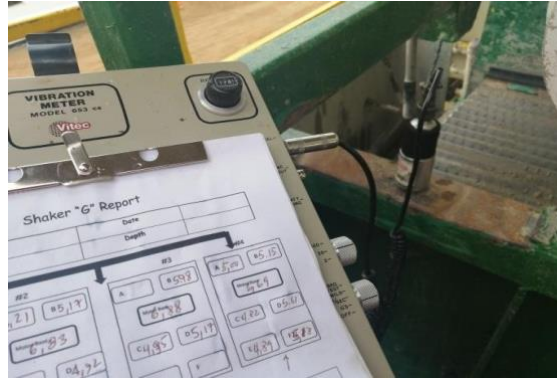
Operational Water Consumption



Kodiak Fluid Management

Solids Waste Volumes

- Due to our optimization process we have improved efficiencies of the rig owned solids control package.
 - ✓ Recommended improvements for controlling feed rates of each shaker.
 - ✓ Ensured all shakers are operating at OEM recommended G forces and ensured proper maintenance was completed.



- ✓ With the optimizations and changes in the drilling fluid we have been able to increase from API 140 to 170, even API 200s.
- ✓ A **25% reduction in solid waste** has been realized in just 4 wells.

Kodiak Fluid Management

Verification of inventories and quality of products used in the preparation of drilling fluid, at the location and in third-party laboratories.

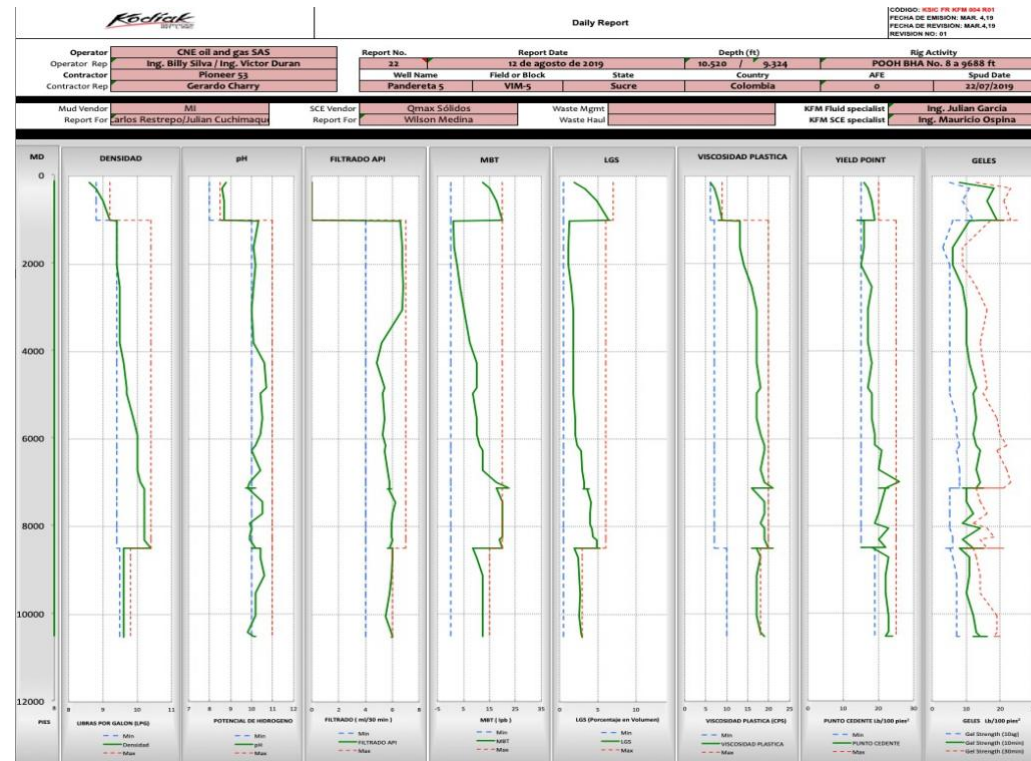
Permanent monitoring of fluid properties and interaction with fluid engineers to correct trends prior to deviation from programmed values

Bogotá D.C., Lunes 12 de agosto de 2019 Página: 2 de 9

INFORMACION DEL CLIENTE			INFORMACION DE LA MUESTRA		
Cliente:	KODIAK SERVICES INT'L INC.		Proyecto:	CALIDAD MATERIAS PRIMAS	
Nit.:	900.613.669-2		ID Plan de Muestreo:	N.A.	
Contacto:	RICARDO VEGA		Matriz:	MATERIAS PRIMAS	
E-mail:	ricardovega@kodiakintl.com		Tipo de muestreo:	PUNTUAL	
Dirección:	CARRERA 7 No. 113 - 21, OF. 1018		Procedencia:	N.E.	
Teléfono:	(+57) 320 820 72 12		Responsable muestreo:	KODIAK SERVICES INT'L INC.	
Ciudad:	BOGOTA		Fecha de recepción:	18-jul-19	
Departamento:	CUNDINAMARCA		Fecha de análisis:	22-jul-19 al 2-ago-19	

RESULTADOS						
Parámetro	Método	Técnica Analítica	Unidad	BARITA (8690° - 8700°)	BARITA LOTE-01140319	Especificación Norma API 13A
				# 19-2010	# 19-2011	
DENSIDAD	API 13A	VOLUMETRICO LE CHATELIER	g/mL	4,15	4,10	4,20 MIN.
METALES ALCALINOTERREOS SOLUBLES EN AGUA	API 13A	TITULOMETRICO	mg/kg	99,3	132	250 MAX.
PARTICULAS DE MENOS DE 6 µm DE DIAMETRO ESFERICO EQUIVALENTE	API 13A	HIDROMETRICO	% wt.	13,15	14,21	30 MAX.
TAMAÑO DE PARTICULA > 75 µm	API 13A	TAMIZADO	% wt.	2,88	2,97	3,0 MAX.

Observaciones:



Kodiak Fluid Management

Inspection of cuts into surface to evaluate the efficiency of inhibitors and encapsulators.



- Addition of amine, anti accretion and lubricant according to the visual inspection carried out by our engineers (more than 25 years of experience) of the cuts in the shakers.
- Waste volume reduction and Cuttings humidity made available for final disposal

Kodiak Fluid Management

- Residual inhibitor and actual consumption in perforated formation
 - Together with the Drilling Fluid Company, we perform the fluid inhibitor test, verifying the existence of the concentration required to stabilize the hydratable clays, calculating the consumption of the product in the formation. Avoid adding more product than required.

- Monitoring and optimization of the clay removal process, performing chemical products and configuration test equipment for the control of MBT, without affecting the properties of the fluid.



OCARINA 1. FLOCULACION SELECTIVA

FECHA: Julio 16 de 2019
 NOMBRE: _____ COMPAÑIA: Canacol

HORA DIN	CENTRIFUGA 1						CENTRIFUGA 2						
	MBT IN	MBT OFF	PESO SOLID SAL	PESO LIQD SAL	SOL POR VOL PRECIP	VOL AGUA PREPARADO	PESO LIQD VITA	MBT ENT	MBT SALE	PESO SOLID SAL	PESO LIQD SAL	SOL POR VOL PRECIP	VOL AGUA PREPARADO
1													
2													
3	10.5	20	5	12.2	8.5	90	60	4450					
4													
5													
6													
7													
8													
9	10.5	22.5	5	13	8.5	90	60	4600					
10													
11													
12													
13													
14													
15													
16													
17	10.5	22.5	7.5	13.7	8.5	90	60	5000					
18													
19													
20													
21													
22													
23													
24	10.5	22.5	2.5	12.2	8.4	90	80	5881					

CONSUMOS: _____
 Utiliza agua de Osmosis

- Cementation work monitoring
 - Sampling and verification of the densities of the different sludges allows us to monitor the cementation program in the field.
 - We check the volumes available for the displacements and the water required for spacers, washers and grouts, which allows for contingency plans in case of failure.
 - We check the volumes of each spacer and grouts received on the surface to detect possible inconveniences in the cementing work.

What is Required?

- ▶ Process is adopted and driven by the drilling team
- ▶ Teamwork and Communication
- ▶ Vendor involvement
- ▶ Time to increase optimization
- ▶ Performance tracked & verified
- ▶ Defined responsibilities
- ▶ Innovation
- ▶ Performance reviews
- ▶ Lessons learned implemented

Barriers to Success

- ▶ Resistance to change
- ▶ Lack of buy in to the KFM process
- ▶ Standard results accepted
- ▶ Poor communication through all levels
- ▶ Vendors services non supervized
- ▶ Systems standardized (not fit for purpose)
- ▶ Industry evaluation is cost/unit driven

Proven Results

Before KFM



OPPORTUNITIES

Save \$
Performance
H.S.E.
Risk
Reputation

After implementation



In this example, there were no equipment changes, but all equipment was inspected, repaired and in operation with many parameters modified to adhere to the new and 'Best Practices'.

However, to receive similar results in this project, there are many elements and procedures that will need to be changed, improved and maintained.

We at KFM want to be part of your team and accompany you in optimization.

DANKSCHEEN
 SPASSIBO ENACHALNITE
 MURUN TASHAKKUR ATU
 CHALTU YAQHANYELAY
 VYSPACHALNITE
 TINGKI
 BIYAN SHUKRIA
 GRACIAS
 SUKSAMA
 EKHMET
 TASHAKKUR ATU
 WADEEJA MATTERA
 THAKKARU
 ARIGATO
 SUKSAMA
 EKHMET
 TASHAKKUR ATU
 WADEEJA MATTERA
 THAKKARU
 SHUKURIA
 HEBASTRIMY
 GELUMO
 TAYTIPUCH MEDBMSDE
 GOZAIMASHITA
 EFCHARISTO
 ADUYAK
 FAXRAUK
 KOMAPSUMNIDA
 MAKE
 GRAZIE
 MEHRBANI
 PALDIES
 YOU
 BOLZIN
 MERCI
 JUSPAXAR
 SAUKA
 MAKETEJ
 HERRONCABE