KODIAK FLUID MANAGEMENT

KFM

Drying Agent Kodiak (DAK-1)

2022

FEATURES OF DAK-1

WHAT IS FOR?

The new DAK-1 technology, through a three-dimensional polymeric network, efficiently encapsulates the free fluid, converting small particles of water into the dispersed phase, complying with the EPA 9095B standard..

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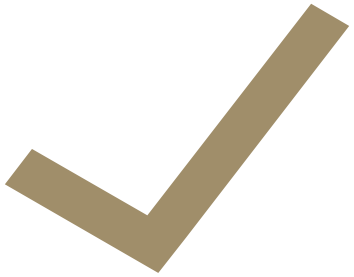
SCOPE OF WASTE TREATMENT IN - SITU

Traditional Treatment vs DAK-1 stabilization

Cost / Benefit



Analyze multiple scenarios

PMA

Restrictions

Communities

Recommend best alternative

Economic

Technical

Environmental

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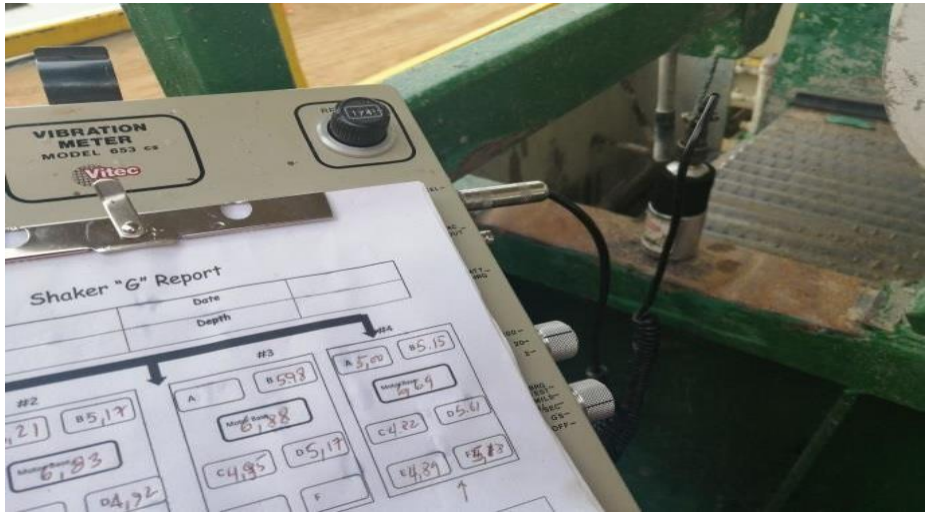
..STARTING WITH A FIELD FLUID PROCESSING OPTIMIZATION by KFM SENIOR ENGINEER



25% reduction of solid waste average

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BATCH TREATMENTS WITH THE ABILITY TO ABSORB HIGH WATER CONTENTS FROM CUTTINGS

Sections treated in a 200bbl catch tank with an initial critical volumetric percentage of 83%

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TREATMENT WITH DAK-1, FAST, SIMPLE and EFFICIENT

The time per treatment depends on the humidity of the cuttings and averages between 45 and 60 minutes.

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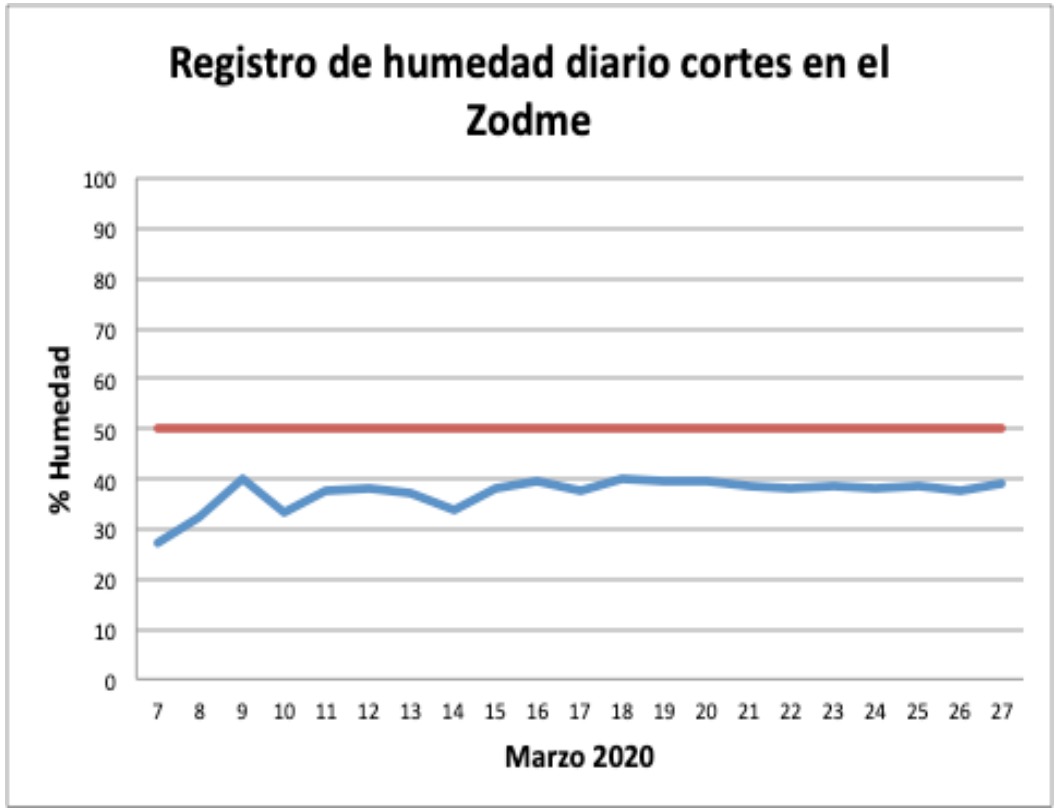
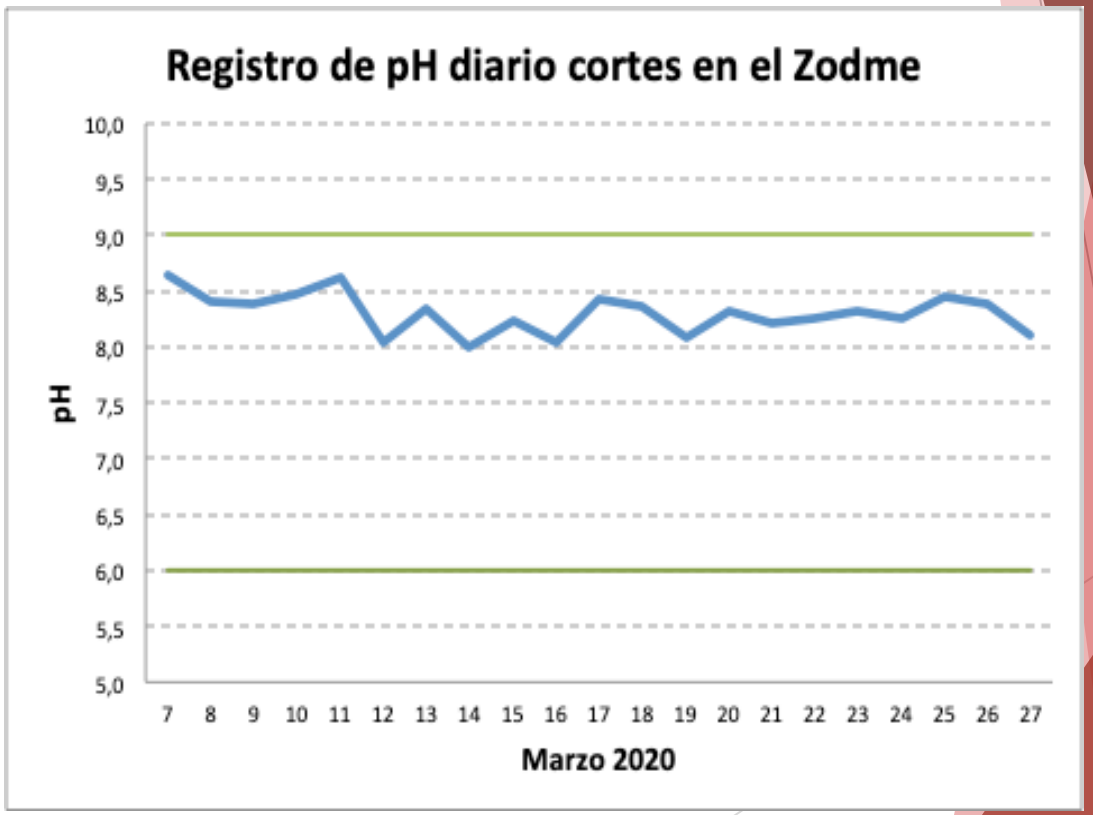
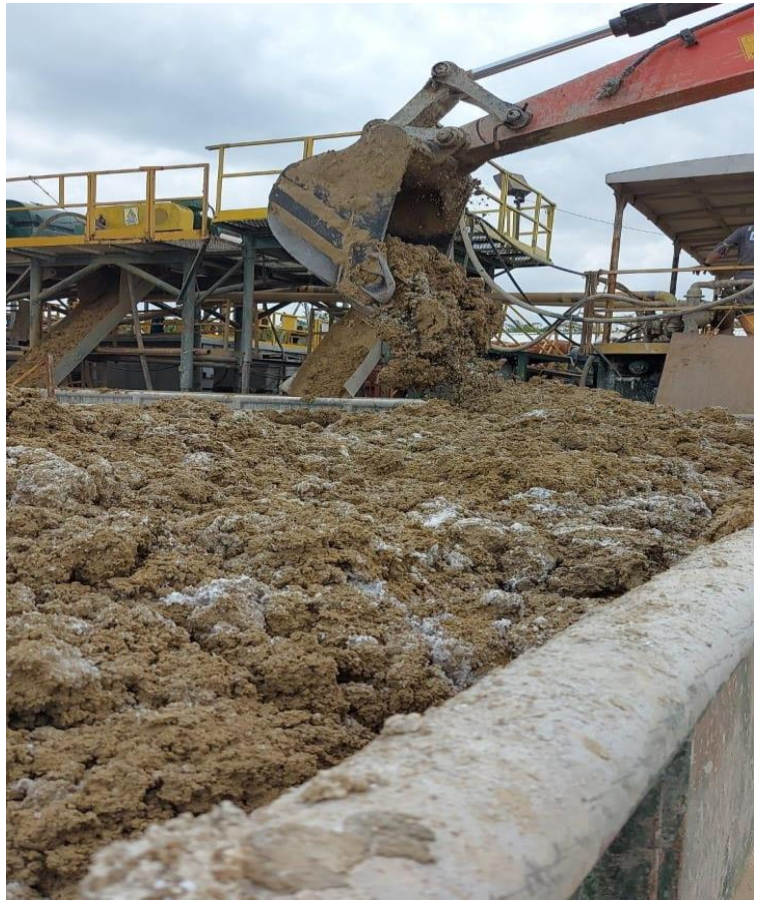
MONITORING CUTTINGS PARAMETERS DURING PROCESS AND IN THE ZODME AREA





IMMEDIATE TRANSPORTATION OF CUTTINGS MINIMIZES RISK OF CONTAMINATION



..We are able to optimize the effective volume that can be transported from the rigsite on each trip by eliminating the need for sealed dumptrucks

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THE DRYING AGENT CONTINUES ITS ACTION IN THE DISPOSITION AREA

Free water is rapidly transferred to the environment allowing rapid dehydration of the cuttings.

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3RD PARTY LABS TESTING, ENVIRONMENTAL PARAMETERS

Louisiana Protocol & Dec 4741 for Dangerous Waste

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Final Disposition with a fine layer of native soil on top, to seal the dried cuttings

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KFM RESULTS AND EXPERIENCE

+200.000 bbls treated with DAK – 1

AND CERTIFIED BY INDEPENDENT LABORATORIES

WITH OUT TREATMENT

WITH TREATMENT

Kodiak KFM New Technologies

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Waste Volume Reduced

An average of 47% of waste volume has been reduced from rig sites

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DAK-1 VS HAUL OFF CUTTINGS COST

(Drill Cuttings Volume: 8000 bbls)

	OPERATIONAL USD COST				COMMENTS
	Unit Cost	Qty	Unit	8000 bbls Cost	
HAUL OFF CUTTINGS					
TRANSPORTATION IN SEALED TRUCKS (60 BBLS average) TO 3RD PARTY PLANT OF THE SOLID WASTE GENERATED	$ 894	133	Trips	$ 118.902	8000bbls /60bbls = 133 trips to nearest treatment plant, 8hrs 11min away from location (334km)
HAUL OFF WASTE TREATMENT (1BBL)	$ 5,5	8000	Bbls	$ 44.000	Ref. 3rd plant cost to treat cuttings per bbl.
TOTAL	**$**			**162.902**	
DAK-1 SERVICE					
DAK-1. CUTTINGS STABILIZATION (1BBL)	$ 8	8000	Bbls	$ 64.000	Includes pH control, drying agent and load transportation
FIELD, OPTIMIZATION SENIOR ENGINEER	$ 750	30	Days	$ 22.500	Average drilling days and can be reduced once we optimize the fluids processing
FIELD ENGINEER FOOD & ACOMMODATION	$ 45	30	Days	$ 1.350	Average drilling days
FIELD ENGINEER TRASNPORTATION	$ 250	2	Flights	$ 500	Air Tikets, average price
CUTTING LAB FIELD TESTING	$ 314	1	Lab Test	$ 314	Certified lab testing required by local regulation
ZODME RETRO EXCAVADORA	$ 320	0	12 hrs	$ -	No need if zodme is close to location and it uses the same drilling rig retro
TOTAL	**$**			**88.664**	

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Reduced CO2 Emissions by reduced # of Dump Trucks to 3d party facilities

…for each liter of burned Diesel generates 2,68 Kg CO2

CO2 Emissions due to Waste Management haul off operations

✓ Estimated cuttings volume:	8.000 bbls
✓ Distance to transport from location to 3rd plant:	334 kms
✓ Travel time per trip to 3rd plant:	8 hrs aprox
✓ # of Dump trucks (60bbls) to haul off:	133 trucks
✓ Average 35 liter of burned Diesel each 100 km	
✓ Total distance for 133 trips:	44,422 km
✓ Diesel burned due to operations:	15,5478 lts
✓ 1 liter of burned diesel produce 2,68kg CO2	

✓ Total CO2 emissions generated: 41,668 kg CO2

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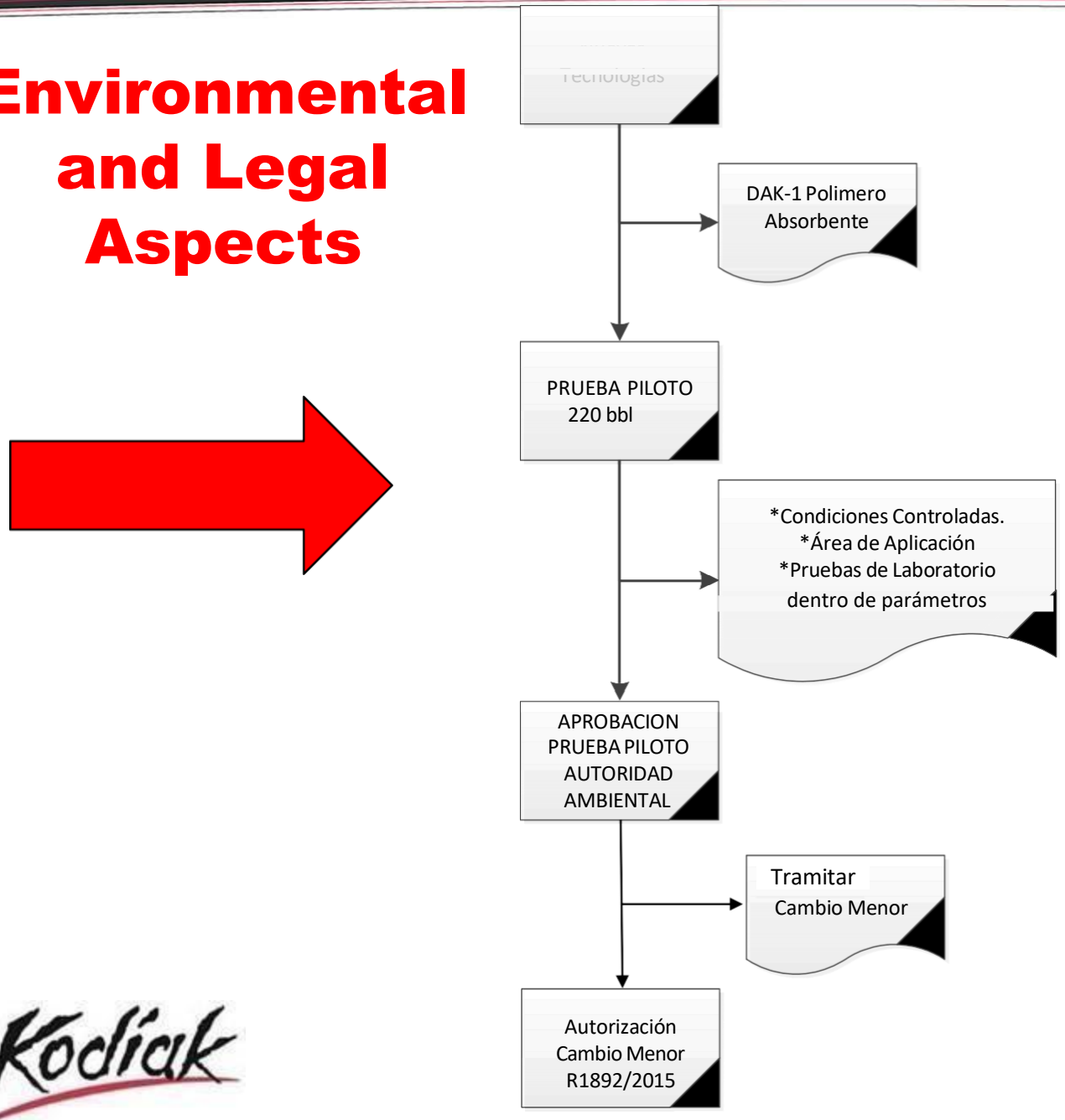
REUSE OF TREATED CUTTINGS IN CIVIL WORKS PILOT, IN PROGRESS..

Tabla 9. Requisitos del agregado para Suelo Cemento

USO / SUELO CEMENTO	REQUISITOS INVIAS ARTÍCULO 350 - 2013				
	Contenido de materia orgánica E-121 (% máximo)	Proporción de sulfatos del material combinado E-233 (% máximo de SO_4)	Reactividad álcali-agregado Concentración de SiO2 y reducción de alcalinidad R E-234	Límite líquido E-125 (% máximo)	Índice de plasticidad E-125-126(%)
GRADACIÓN A	1.0	0.5	$SiO_2 \leq R$ cuando $R \geq 70$	30	12 *
GRADACIÓN B			$SiO_2 \leq 35 + 0.5R$ cuando $R < 70$	35	15 *

Environmental and Legal Aspects

Principio de Precaución (LEY 99 de 1993)



Resolución 1892 de 2015

Artículo 1°. *Objeto y ámbito de aplicación. La presente resolución tiene por objeto señalar los* casos en los que no se requerirá adelantar trámite de modificación de la licencia ambiental o su equivalente, para aquellas obras o atividades consideradas cambios menores o de ajuste normal dentro del giro ordinario de los proyectos de hidrocarburos que cuenten con licencia ambiental o su equivalente, de competencia de la Autoridad Nacional de Licencias Ambientales(ANLA):

4.6. Cambios en los sistemas o facilidades de tratamiento de residuos sólidos domésticos e industriales y/o su receptor, siempre que se mejoren las condiciones del manejo, tratamiento y disposición final aprobadas previamente. En el evento que el manejo de residuos sólidos esté autorizado para ser desarrollado por un tercero, este debe contar con los permisos ambientales necesarios para el ejercicio de su actividad.


THANK
YOU
GRACIAS
ARIGATO
SHUKURIA
DANKSCHEEN
BIYAN
SHUKRIA
TINGKI
YAQHANYELAY
TASHAKKUR ATU
SUKSAMA
EKHMET
MEHRBANI
GRAZIE
MAAKE
PALDIES
KOMAPSUMNIDA
JUSPAXAR
GOZAIMASHITA
EFCHARISTO
BOLZÏN
MERCI

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