



***This paper reviews the options open to the end user for prevention and removal of problematic Paraffins, Asphaltenes and Crystalline from wells, flowlines, storage facilities including the reclamation of facilities using an innovative, cost efficient and environmentally safe Petroleum Remediation Additive (PRA©)***

***designed and tested over many years by James Hatcher the CEO of Plutus Environmental Technologies inc.***



I have spent 43 years in the oil industry

Worked for many of the majors  
Retired 3 times and here I am again

Back to the future  
and the reason I am stood here

When I look back at the result of all those years, I discover that a large amount of the work I did then, could have been counterproductive



if the product I am going to tell you about today had been available to the project engineers and designers of yesteryear.



**Paraffins,**  
that is the very reason I am  
stood here today

## **Paraffins – The Challenges**

Initially, paraffins are in equilibrium in the reservoir under certain temperature-pressure conditions. Once this equilibrium is disturbed by production and temperature or pressure conditions, deposition of wax may occur

Wells, pipelines, storage tanks and ancillary equipment then block, well pumps onshore and offshore go into ESD (emergency shut down)

Nodding donkeys stand up in the stuff and when they stop with a shudder, 9 times out of ten they actually break the pump strings

Which mostly results in a workover and a fishing trip downhole lasting 5 to 10 days,

Bit of a costly affair!



Paraffin deposition is a thermally driven process.

Cooling of the oil during production for many reasons causes wax to precipitate as the temperature drops below the cloud point with the paraffin deposition usually becoming problematic.



Due to paraffins solidifying and wells blocking, the cost of rectification, chemicals and hot water washes to dissolve the wax back down the well results in loss of production and revenue



## **plutus PRA**

is a safe and effective blend of emulsifiers and surfactants designed for use in all aspects of crude oil and oil service industries



Due to all those challenges, over the years, many thousands of miles of pipelines have been coated and insulated to prevent cloud point of the oil, using one of several methods which I am sure many of you have been or are still involved with:

**Steel pipe in steel pipe with PU or PP**  
**Steel pipe in Polyethylene with PU or PP**  
**Pipe in Pipe with Micro-spheres**  
**Pipe bundles with Gel**  
**FBE coated with Syntactic PU**  
**PU primed and Syntactic PU**  
**FBE and PP**



Many companies have invested heavily in insulating and heating pipelines, storage facilities and even transport facilities such as road, rail and sea going tankers to prevent paraffin deposition

A material has been **developed by necessity** to meet the constant challenges of Paraffin's and Asphaltenes and water in oil and oil in water that will keep oil and gas flowing without the constant requirement for heating and chemical and hot washing



The remedy is a material called PRA  
(Petroleum Remediation Additive)  
PRA is a non hazardous, environmentally  
friendly material  
made from a blend of food grade  
surfactants and emulsifiers.



PRA is specifically formulated to return precipitated wax and Asphaltenes back into their original phase in the crude oil where they will always remain irrespective of temperature drop thereby removing the problems of cloud and pour points!



The material has been tested  
by Senior Scientists from Hydrafact,  
Who are part of the  
Reservoir Fluids Research Group  
of the University of Heriot Watt Edinburgh  
with some very interesting results and  
comments from the scientists.



Removes paraffin wax deposition very quickly and effectively  
Puts the paraffin's back into the oil and they do not return (even at low temperatures)  
Drops the oil viscosity by up to 90%  
Drops oil out of water  
Drops water out of oil  
Removes Polyamides from pipe walls  
(Result from using corrosion inhibitors)  
Promotes the growth of Hydrates



TREATMENT TYPE		EACH	HOT WASH	PRA
WELL TYPE	JET N/D		N/D	N/D
GROSS BPD			100	100
BWPD			40	40
BOPD			60	60
SHUT DOWN TIME			3	0.125
S/DOWN COST			14220	592.5
CHEMICAL COST	Sulphamic acid	2400	0	6128
HOTWASH TRUCK PER DAY	chemical truck \$5600	1500	2000	0
TRUCK OPERATOR RATE	1	350	0	0
OWNER OPERATORS PER DAY	2	200	400	400
TREATMENT COST PER WELL			16620	7120.625
FREQUENCY REQUIRED (year)			12	4
ANNUAL COST				
			199440	28482.5
# OF WELLS	200		200	200
COMPANY COST PER ANNUM			\$39,888,000.00	\$ 5,696,500.00
SAVINGS PER ANNUM USING PRA				\$ 34,191,500.00
% COST PRA TO HWASH PER WELL				42.84371239 %
% COST PRA TO HWASH PER ANNUM FOR 200 WELLS				16.66057353 %



The previous slide shows the staggering cost saving and additional income that is made by using the unique **innovative** Plutus PRA treatment in a total of just 200 beam wells, increase the amount of wells to 100,000 as is the case in certain countries or USA states and you see how cost effective PRA really is!



Well Piping shown above was completely blocked with paraffins and pressure gauge not functioning, all paraffins cleared and pressure gauge operating within minutes of injecting PRA

**PRA is:**  
**non flammable**  
**cost effective**  
**non toxic**  
**non-hazardous**  
**biodegradable**  
**environmentally safe**  
**ecologically sound**

## **PRA characteristics**

**no flash point**

**oil soluble**

**Fresh or brine water dispersible**

**Infinite solubility in water**

**clear blue (or green) colour**

**aqueous solution form**

**average ph factor of 9-10**

**Slight citrus odour**

# How plutus PRA works

PRA is NOT a paraffin solvent.

PRA is a tension breaker that lowers the water/paraffin molecule surface tension.

PRA allows the paraffin to re-combine with the other components of the crude oil and re-enter the oil phase where it stays until it breaks out during the refining process. The quality of the crude remains



Finally, the continued use of the recommended treatments with PRA will result in a safe, environmentally friendly method of ensuring all the facilities and infrastructure remain free of Paraffins, Asphaltenes and Crystalline for the life of the oil/gas field and facilities with obvious cost savings and a massive increase in income.