

PROFITABILITY

A PUBLICATION OF ONDEO


NALCO REFINERY AND FUELS MANAGEMENT

WIN/WIN PARTNERSHIP

ONDEO NALCO HELPS CHEVRON TEXACO PROFIT FROM NAPHTHENIC CRUDES – WHILE HELPING REFINERS SAVE MILLIONS BY USING THEM

“The benefits to the refiners typically fall between \$2-3 million for a small refinery up to \$30 million or more,” says David Johnson, Ondeo Nalco RFM business manager for Europe, Africa and the Middle East. “Chevron Texaco now has a growing market for their naphthenic crude oils. In the future they will be able to produce more because there are customers who will take it.”

At the heart of this story is a partnership between Ondeo Nalco and Chevron Texaco – we help them sell their naphthenic crudes by helping potential customers use these crudes effectively and profitably. David describes how the partnership started:



Scorpion® II offers superior control of high temperature naphthenic acid corrosion.

Perfect fit

“We met one of the Chevron crude traders about six years ago in London. In the discussion, we found out that they had naphthenic crudes that were very difficult to sell. At the same time, we were marketing Scorpion® II to protect refiners against naphthenic-acid corrosion – but not that many refiners were running those crudes. We saw a fit.

“The way it worked at the time, the Chevron traders would only speak to the refiners’ buyers. The buyers would take the information back to the refiners, and the refiners would say, ‘We are not going to run this stuff – it’s corrosive. No way!’

“And at Ondeo Nalco, we would attempt to sell our programs by going to the refiners’ engineers. The engineers would go to the buyers, and the buyers wouldn’t have the crude on their selected crude slate. So nothing would happen for anyone.

“By partnering with Chevron Texaco, we could talk to the refiners about the problems of handling that crude and the profit potential, which was anywhere from \$1 per barrel up to \$4, based on current crude oil prices.”

Marketing partnership scores

In 2001, the partnership evolved still further with a series of seminars: two in Singapore and four in Europe. David worked closely with Chevron Texaco business manager Jan Skippins.

“At these seminars Chevron Texaco would start by talking about the economics of processing their naphthenic crude,” says David. “They know, because they refine these crude oils in their own refineries. Then their technical experts would discuss corrosion control and

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MARCH 2002

Partnership with Chevron Texaco Benefits Everyone

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The Changing Face of “Green”-How Ondeo Nalco stays ahead

Maximum Vanadium Protection-Run past your limits



svsz

THE DISTILLATE AUDIT

ARE YOU GETTING THE MOST FROM YOUR DISTILLATE STREAMS?

Blending diesel and heating oil is a delicate balancing act: You want to produce the maximum amount of on-road diesel, but you're cornered by sulfur and cetane specifications. With high-sulfur fuels, you also wrestle with stability. If you can't blend these streams into low- or high-sulfur diesel, they usually go to low-value heavy fuel streams. You know that if you could move 1,000 BPD from these low-value streams to a high-value stream you could gain half a million dollars or more in revenue – but how to do it?

Ondeo Nalco can help—we've been helping refiners maximize output of on-road diesel and #2 fuel oil for years. We have the technical savvy to know what can be achieved, the additives that make it possible, and worldwide field experience that makes the difference between something that looks good in the lab and something that really works in the refinery.

We've now consolidated our expertise and experience in a new Distillate Audit program. Our Distillate Audit team will survey your current blending scenario to understand your specifications, goals and procedures. Then we'll suggest alternatives for rearranging your blending streams to increase output without sacrificing specifications. There's nothing to lose and perhaps millions to gain. Call your local Ondeo Nalco representative to find out more, or call Chuck Muth at 281-263-7417.

introduce us as a solution. We would talk about corrosion control and the other problems that might surface in handling these crude oils—they tend to form tighter emulsions, the overhead corrosion mechanism changes from strong-acid to weak-acid, and there can be stability problems in finished products. We have experience with all of these issues.”

The results of the seminars speak for themselves – within a few months of the first Singapore conference, four refiners committed to processing the Chevron Texaco crude, and two of these came on-line successfully with Ondeo Nalco support last November.

“Everything went wonderfully well,” says David. “The first refinery calculated that this crude saved them over \$3 million by the end of last year. A large refinery could potentially save up to \$30 million or more.”

Industry acceptance


The success of the Chevron Texaco partnership has led other companies to talk with us about partnering to sell their opportunity crude oils.

“More and more, the industry as a whole is seeing us as the solution to corrosion and other problems associated with processing these naphthenic crudes,” David says, “and they also see us as a partner who can make them a huge amount of money.

“This is a working partnership where everybody benefits,” David concludes. “We can really and truly affect the price of the refiners’ raw material. They spend more money on crude than anything else, and if you can impact that you can really impact profitability.”

For more information

Call one of the numbers below for more information on the next Chevron Texaco/Ondeo Nalco seminar scheduled for May 23, 2002 in Houston, TX.

If you would like to partner with Ondeo Nalco to help market your own opportunity crude oil, please contact Gregg McAteer at +1 281-263-7979 (U.S. and Canada); Paul Rao at +1 281-263-7416 (Latin America); Sergio Bariosco at +44-1489-88-4610 (Europe, Africa and the Middle East); or Dennis Haynes at +81-479-46-5437 (Asia Pacific). 

THE CHANGING FACE OF “GREEN”

HOW ONDEO NALCO STAYS AHEAD

If necessity is the mother of invention, then surely regulation is the mother of innovation. “Green regulations are complex, and they’re moving all the time,” says David Martin, marketing manager for Europe, Africa and the Middle East. “Customers rely on us to stay ahead. We’re gearing our research strategy to mirror the strategy of key environmental organizations, and when new regulations come, we’ll be ready.”

Bringing offshore technology to land

Ideas about what it means to be “green” first developed offshore, crystallizing around the requirements of countries surrounding the oil and gas fields of the North Sea. Chemicals used offshore are evaluated by studying their overall toxicity, plus each component’s likely persistence and bioaccumulation potential in the marine environment.

As a major supplier to offshore producers, Ondeo Nalco is well positioned in green technology. “Our Oilfield Chemicals group has been driving the research into green applications,” David says, “and now Refining and Fuels

Management is building on this technology. A few weeks ago, we approached a refinery in Norway to see if they’d be interested in a new green demulsifier for tank dehydration. They’re going to give us a window of opportunity to try it in April. They’re willing to switch to a green chemical solution because they are very conscious of the need to protect the environment.

“This was a proactive way for us to deliver solutions, and we will be doing more of it,” David continues. “For example, Ondeo Nalco is no longer offering cleaning and degassing chemicals that contain APes [alkyl phenol ethoxylates, implicated as endocrine disrupters]. These compounds are great surfactants, and regulations still allow us to use them, but we have green solutions that work well, and that’s what we’re choosing to market.”

Green definitions offshore

Here are four ways that chemicals are evaluated:

- **Aquatic toxicity.** Most commonly, toxicity is measured as LC₅₀, the concentration of a chemical that is lethal to 50% of countable organisms. The organisms used in testing include algae, crustacea, fish and sediment reworkers.



• **Bioaccumulation.** Chemicals that do not tend to accumulate in living tissue are those that can be flushed out by water (the octanol/water partition coefficient, or log Pow, is less than 3); or are too large to pass through biological membranes (the molecular weight is under 600).

• **Biodegradability.** “Ready biodegradability” applies to products that degrade by 60% within 28 days. Biodegradability is measured by mixing each component of the product with filtered aged seawater and monitoring the loss of oxygen over time as natural organisms in seawater oxidize the chemical to carbon dioxide and water.

• **Endocrine disruption.** Certain chemicals are believed to interfere with various organisms’ natural endocrine systems by mimicking naturally produced hormones; for example, feminized male fish have been noted around sewage outlets.

Green on land

U.S. regulations have focused on preventing air emissions and groundwater contamination rather than testing for toxicity and bioaccumulation. Toxicity concerns have been channeled into a voluntary program, the EPA’s HPV (High Production Volume chemicals) Challenge Program.

The EU has had a similar voluntary testing program administered by the Organization for Economic Cooperation and Development – OECD. Adding to the alphabet soup, this program is known as SIDS, for Screening Information Data Set.

In January of 2002, the environmental minister of Sweden drafted a white paper for the European Union noting weaknesses in the current system; for example, only 140 chemicals are on the priority list for toxicity testing. The white paper proposes an expanded mandatory system that would test 30,000 chemicals by 2012, a daunting task.

“Scandinavia has been leading the green issue,” says David, “and recognition of the importance of



Solid science stands behind our commitment to the environment. ↗

Chemicals such as nonylphenol ethoxylates have been shown to be weak endocrine disrupters.

Today the Oslo and Paris Commission (OSPARCOM) administers umbrella green standards for the Northwest Atlantic. Each chemical used in this area is assessed using the Harmonized Offshore Chemical Notification Format (HOCNF). Each country develops and implements its own regulations based on the OSPARCOM requirements.

the issue is slowly moving south. Today the standards are voluntary, but we are going to see mandatory standards and increasing demand for green products.”

True to our parent company - SUEZ - mandate to “deliver the essentials of life,” Ondeo Nalco aims to stay at the forefront of green chemistry. 🧪

MAXIMUM VANADIUM PROTECTION

RUN PAST YOUR LIMITS

“The FCC unit was once known as the ‘gasoline producer,’” says Sandra-Garcia Swofford, marketing development manager, “but now it’s the ‘fuel oil reducer.’ With more and more resid being pushed through cracking units, heavy metals are a real problem.”

An early fix

Ondeo Nalco first spotted the problem in the early '90s. To respond, we worked with Refining Process Services, Inc. (RPS) to develop a metals passivation agent that would target vanadium

in FCC feed, and in 1995, we announced MVP, Maximum Vanadium Protection. Tests in the laboratory, in pilot plants and in full commercial applications proved that MVP worked well.

Unfortunately, a patent infringement issue surfaced in the US market as a result of a Phillips Petroleum Company patent that prevented the use of MVP in FCCs using antimony-based nickel passivation, and this impacted global acceptance. Many refiners turned to other solutions – vanadium traps, high-metals-tolerance catalysts, greater fresh catalyst make-up rates, or simply avoiding high-metals feedstocks.

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MVP now available worldwide

On November 1, 2001, Ondeo Nalco and Phillips entered into a patent license agreement that enables us to market and support MVP worldwide.

So what is MVP? It's a total metals management program designed and implemented by both Ondeo Nalco and RPS, and it includes our proven technology, technical expertise and on-site service.

MVP makes it possible to reduce vanadium dehydrogenation at the FCC by up to 75% and recover up to 50% of lost conversion. The MVP program increases unit conversion, gasoline selectivity and C3/C4 selectivity, while it decreases hydrogen, coke production and catalyst make-up.

Unlike high-metals-tolerance catalysts, the MVP technology requires no capital investment, is economic at lower levels of metal, and works in conjunction with other FCC programs. Apply the program whenever operating conditions call for it, and gain the extra flexibility of being able to process various qualities of feed, regardless of metals content. "We're really helping refiners extend their limits," says Sandra.

ROI: 39 to 1

That was the result of an MVP trial at one of the largest FCCs in Europe. The feed was gas oil with 0-10% resid, and vanadium levels on the equilibrium catalyst (e-cat) were 2000-3500 ppm. Figure 1 shows the microactivity test (MAT) data for conversion and coke selectivity.

During the trial, H₂ yield fell from 19.7 to 11.0 mol% using MVP. Even if only 50% of that reduction resulted from vanadium passivation, the money saved by moving H₂ from sponge gas to hydrocarbon products amounted to more than \$1 million per year.

The financial effect of increased conversion

was even more striking. Estimates and calculations indicated that passivation improved conversion (reducing LCO and slurry, increasing gasoline and LPG) by about 1.7%, which translates to just over \$11 million per year.

The cost of the program was just over \$300,000, for an MVP ROI of 39:1. We are now evaluating the use of this program to help this customer process more resid.

Is MVP right for you?

"We develop customized programs specific to a customer's objectives," says Sandra, "so every unit requires a detailed technical evaluation. That's the job of our global support team, which includes experts from both Ondeo Nalco and RPS."

The questions we ask include:

- Are the levels of vanadium on your e-cat greater than 1500 ppm?
- Do you process resid, and if so, how much? Resid is almost always high in metals.
- Are you operating at higher regenerator temperatures? Higher temperatures favor more off-gas production and increase dehydrogenation reactions.
- Are your e-cat sodium levels greater than 0.10 wt%? Like vanadium, sodium is a catalyst poison, and the combination of both sodium and vanadium can dramatically escalate catalyst damage.

If the answers to these questions indicate a vanadium-related problem that MVP can address, we gather data for a detailed technical and economic evaluation of the unit. If the information indicates that MVP will be successful, we work with you to design and conduct a field trial.


In our experience, typical net returns for the MVP program range from \$0.20 to \$0.50 per barrel of FCC feed. "The profit potential for refiners is huge," says Sandra. Call your Ondeo Nalco representative for more information. 

Figure 1. MAT data for a European FCC Unit

