

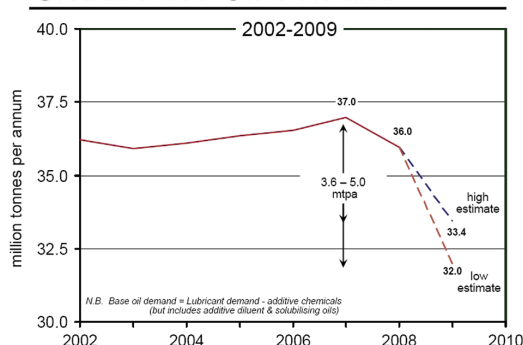
2009: The year in review and a brief look forward

Steve Ames, Managing Director of SBA Consulting reflects on what was a difficult year for many in the lubricants industry. He pointed out that perhaps his comments about 'difficult' was somewhat of an understatement of the realities for both end-users in industry and on the impact that the global recession has had on the lubricant supply industry. He also provided a brief 'look forward' and conceded that it will be more difficult than reporting history. He does see some of the signs of a slow recovery – more about that later.

DEMAND

In 2009 demand for both base oils and finished lubricants declined by around 7 – 11 % and this followed on from the circa 3% decline experienced in 2008. Overall the lubricant supply industry has seen a reduction in volume of some 4 to 5 million tonnes per annum (mtpa) since 2007. This means that lubricant supply tonnages were the lowest recorded for more than 25 years. Another significant impact on Group I refining was European legislation that forced the replacement of aromatic extracts by lower toxicity products such as naphthenics and treated distillate aromatic extracts (TDAE) now used in tyre production. Although the legislation was European based, its impact was global.

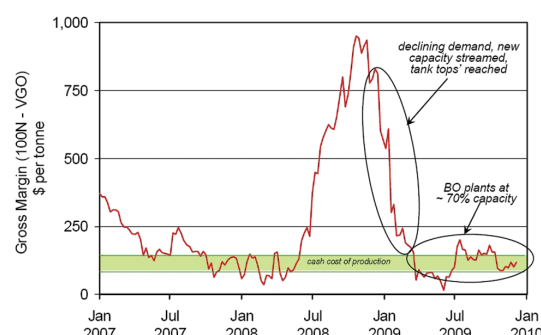
Global Base Oil Demand



SUPPLY ECONOMICS

Base oil supply was also impacted by the continuing decline in margins of the refinery fuel operations, crude slate changes, production run cuts and idled refineries and processes - these produced an overall global operating performance of about 70% for base oil refineries. The impact of these declining margins on pricing and profitability was such that base oil production provided little help to overall refinery economic performance.

Gross Margin vs VGO - USGC



Early in 2009 many refineries reached tank tops and subsequent action taken to reduce production influenced lower production output figures.

REFINERIES FOR SALE

More worrying was that 7 refineries with 2.5 mtpa of base oils capacity were put up for sale, some of this number remain unsold and may be closed, whilst other refineries have been or may be sold.

These movements probably reflect the base oil refinery margin pessimism. Sunoco Tulsa (and Sinclair Tulsa) was sold to Holly Corp and the marriage of the two refineries undertaken by Holly Corp provided synergies that should help keep the 490 ktpa Group I base oil plant operating. Agip's Livorno refinery was offered for sale in Feb 2009, this refinery normally produced 550 ktpa Group I, but we believe no acceptable offers have been received. Six Shell refineries were offered for sale during 2009 – 3 with base oils: Harburg (180 ktpa of Group I and 150 ktpa naphthenics), Stanlow (230 ktpa of Group I) and Montreal East (140 ktpa of Group I). In 1Q2009 Colas agreed to buy the 330 ktpa Group I SR Dunkerque base oil refinery from ExxonMobil & Total. Colas will operate it as a 300 ktpa bitumen plant as part of the deal. The deal is expected to be finalised in mid-2010, with possible base oil offtake agreements. Valero's Paulsboro refinery was put on the block in Jan 2010 and included a 590 ktpa Group I base oil plant.

Over capacity and poor margins had also taken their toll, already one base oil refinery has closed and three other closures were announced for 2010 / 11. The detail of these are: Puralube (Baufield subsidiary) closed the 80 ktpa Group I re-refining

facility at Duisberg, Germany in Jan 2009. The feed was redirected to Puralube's new 2nd train at Zeitz.

Caltex Kurnell, Australia announced the forthcoming closure of its 180 ktpa Group I operation by end 2011

That means all four Australian base oil plants will have closed since 2002. Shell Montreal, Canada will close its refinery and the 140 ktpa Group I plant by end 2010, as they have been unable to find a buyer. This refinery will be converted to a fuels terminal. ExxonMobil Sarnia, Canada will close the 330 ktpa Group I / II base oil plant by early 2011, as it had been operating at reduced throughput since 2006.

MERGERS AND ACQUISITIONS

2009 was quite an active year for mergers and acquisitions.

Nippon Oil and Nippon Mining merged forming JX Holding to reduce refining capacity at Negishi and NOC's Mizushima refineries – there may be a possible impact on base oil production. Nippon Oil purchased naphthenic base oil refiner, Sankyo Yuka Kogyo and its 95 ktpa Ichihara facility. Suncor purchased Petro-Canada including its 785 ktpa Group II/III base oil plant. IPIC (Abu Dhabi) purchased Banco Santander's equity in Spanish refiner Cepsa. IPIC now holds 41%, Total 48%. Cepsa has a 220 ktpa Group I base oil plant at Algeciras. OMV sold its 21% stake in MOL to Surgutneftgas. MOL has a 330 ktpa Group I base oil plant at Szazhalombatta. LukOil purchased Dow Chemical's 45% share of the Vlissingen, Netherlands refinery operated by Total provides hydrowax feedstock to Group II/III base oil operations.

Total purchased the lubricants business of ExxonMobil in Vietnam, Ultramar in Canada and Chevron in Uganda and Kenya. Petrobras acquired Chevron's lubricants business in Chile, including a blend plant in Santiago. Prista Oil has agreed to buy Bogdany Petrol Ltd, a Hungarian specialty manufacturer. Univar has signed a distribution agreement to market, sell and distribute Shell branded lubricants in Scandinavia. Motor Oil Hellas/Petros Petropolous bought Shell's blend plant and lubricant business in Greece.

Chevron closed its lubricant business in India after 70 yrs, but this does not include the Oronite joint venture.

NEW REFINERY CAPACITY / EXPANSIONS STREAMED IN 2009

1,560 ktpa of additional capacity was streamed during 2009. This was made up from 750 ktpa from new greenfields capacity, 750 ktpa from expansions and 60 ktpa from a re-start.

2009 Additional Capacity

The new Greenfield development was the Formosa Petrochemical (Taiwan) 500 ktpa Group II production facility that was streamed in Sep 2009. Albemarle (USA)

commenced 15 ktpa of high viscosity PAO and began production for ExxonMobil Chemical in Nov 09. Also there were major new re-refining operations: Puralube (Germany) 80 ktpa of Group II+ (Dec 08), Heartland Petroleum (US) 65 ktpa of Group II (Feb 09), Universal Lubricants (US) 40 ktpa of Group II (Aug 09) and L&T Recoil (Finland) 50 ktpa of Group II (Oct 09).

2009 Expansions

Ergon expanded their Vicksburg (US) naphthenics refinery by 400 ktpa to 1,000 ktpa during 2009, this naphthenic expansion streamed in September and new brightstock production began in November 09. GS Caltex debottlenecked the Group II / III Yeosu, Korea plant by 300 ktpa to 1,150 ktpa over the past year, originally streamed at 850 ktpa in 4Q2007. Neste increased PAO (low viscosity) at their Beringen, Belgium by 10 ktpa to 60 ktpa in May and Ineos expanded the PAO (low viscosity) at Feluy, Belgium by 35 ktpa to 126 ktpa in September.

2009 Restarts

Refinerija ulja Modrica (Bosnia Herzgovina) 60 ktpa of Group II / III re-started Feb 2009, following an 11 year hiatus due to war damage of Bosanski refinery. It is one of the world's original Group III producers (early 1980s) and the new owners are OAO Zarubezhneft.

FUTURE NEW REFINERY CAPACITY ANNOUNCEMENTS

Despite the difficult times and the associated problematical global market conditions approx. 2.4+ mtpa of future additions to base oil capacity were announced during 2009. These are detailed as follows:-

Future Greenfield Virgin Base Oil Developments

- Sinopec (Yanshan) 250-350 ktpa Group II/III in 2011
- PetroChina (Dalian) 300 ktpa Group II/III in 2011
- SK (Europe) 500 ktpa Group III JV in 2012
- SK (Asia) 500 ktpa Group III 2nd JV in 2014]

Future Greenfield Re-refined Base Oil Developments

- PdVSA (San Juan de la Morros) 40 ktpa Group II in 2011 (2nd plant to be built after this one streams).
- Puralube (Norway) – 80 ktpa Group II+ in 2010. Also possibly 80 ktpa in Changchun, China

Future Expansions

There have been announcements covering expansion of three existing plants in 2011,

- S-Oil (Onsan) – additional Group III in 2Q2010
- Nynas (Sweden) – 400 ktpa of Naphthenic expansion and...
- SK (Korea & Indonesia) – 225 ktpa of Group III

But, not everything went according to plan, one project was advanced, some were delayed and some were cancelled.

Advanced

400 ktpa Group III Bahrain Lube Base Oil Company ahead of schedule for September 2011 streaming, this is a joint venture of Neste, Bapco and Oil & Gas Holding (Bahrain).

Delays

Hindustan Petroleum's 200 ktpa Group II (Mumbai) originally April 2009 delayed to May 2010 will reduce Group I output by 200 ktpa.

Chevron's 1.25 mtpa Group II/III in Pascagoula, MS, USA, was postponed from late 2011 to early 2013 to allow for a rebidding process to be undertaken for lower construction costs.

Cancellations

CPC cancelled plans for a 250 ktpa Group II plant at Talin, Taiwan. CPC will close the entire Kaohsiung refinery including the 240 ktpa Group I base oil plant in 2015. They are also evaluating a possible JV base oil plant in China or Vietnam. Taiwan refinery will close the 240 ktpa Kaohsiung base oil plant in 2015, evaluating a possible JV base oil plant in China or Vietnam.

ONGC has apparently dropped plans for a 250 ktpa Group III plant at Mangalore, India.

CNOOC also apparently dropped plans for a 2nd, 400 ktpa, naphthenic plant in Zhanjiang, China.

1st naphthenic plant (300 ktpa) streamed in 2007 at Binzhou.

NEW BLENDING PLANT ANNOUNCEMENTS

Blend plants also got into the action, there was growth shown in the Middle East / Asia, but there was contraction in Europe.

Blend Plants Streamed

Pertamina streamed a 115 ktpa blend plant in Gresik, East Java and Shell streamed a new 180 ktpa blend plant in Zhuhai, China; its sixth plant in China.

Blend Plants Announced

Shell 180 ktpa blend plant in Torzhok, Russia by end 2010. Shell doubling the GTL wax plant at Bintulu, Malaysia early 2011. Idemitsu to expand West Java Indonesia 35 ktpa by Oct 2010 and Petromin 250 ktpa blend plant in Jeddah, Saudi Arabia 2Q10.

Blend Plants Closed

BP closed the Ellesmere Port, UK blend plant; operations transferred to Ghent and other European locations. Houghton closed the former DA Stuart blend plant at Wolverhampton, UK; operations transferred to Manchester.

NEW AUTOMOTIVE LUBRICANT SPECIFICATIONS

As if 2009 wasn't already difficult, new lubricant specifications were adopted around the world, three new OEM specifications adopted/implemented with increased appetites for Group III base oils.

ILSAC GF-5 specs agreed Dec 2009

ILSAC GF-5 specification provide better initial and prolonged fuel economy; robustness; allows for longer drain intervals; first licensing in October 2010; mandatory licensing in October 2011 at which time GF-4 will no longer be licensable.



GM dexos™1 specs

GM dexos™1 specs have been established for gasoline engines globally with 2011 model year for initial/service fills 0W and 5W-xx only all Group III and/or PAO - license fee concept under review.



GM dexos™2 specs

GM dexos™2 specs implemented for pc diesel engines in Europe during 2009 for initial / service fills 0W and 5W-xx only all Group III and / or PAO.

Looking forward, 2009 was a very difficult year, but will 2010 be any better?

What would happen if base oil plants were to operate independently of the overall refinery...

The Look Forward

Near Term Imbalance

Supply buffer - end 2009	10.1 - 11.5 mtpa
- % of demand	31 - 36 %
• New capacity to stream in 2010	1.0 mtpa
• Capacity to close in 2010**	0.6 mtpa
• Increase in demand (5-10%)	1.5 - 2.5 mtpa
Supply buffer - end 2010	9.0 - 9.5 mtpa
- % of demand	25 - 27 %

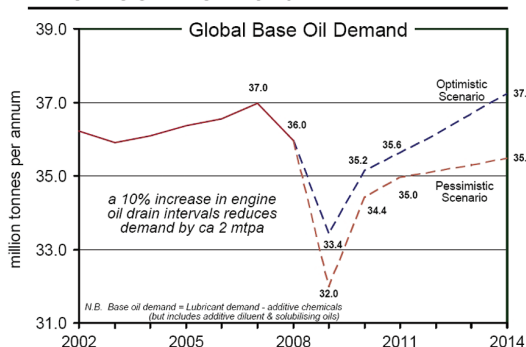
One-quarter of industry capacity still remains idle - far above the 10-15% historical average

** assumes the closures of Sarnia, Montreal and Kurnell occur in 2010

Global base oil refinery mass balance

The global base oil refinery mass balance projects that by the end of 2010, some 25 – 27 % of global capacity will be idle, a level that is well above the 10 – 15% industry historical average (these figures assumes the closures of Sarnia, Montreal and Kurnell will occur in 2010). This low level of utilisation is not economically sustainable and older, higher cost Group I refinery base oil capacity will be put at risk of closure.

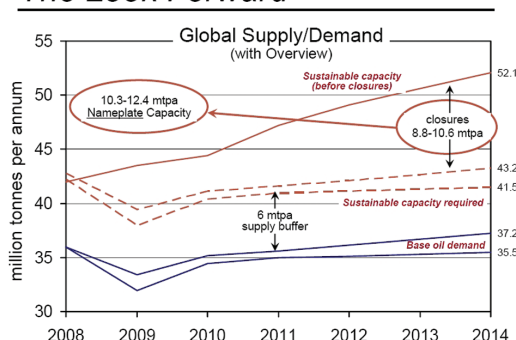
The Look Forward



Global base oil demand

Future global base oil demand is likely to recover from the 32.0 -33.4 lows of 2008 to around 35.5 – 37.2 by 2014. Taking into consideration both the optimistic and pessimistic scenarios shown on the chart, these show that demand levels may get back to somewhere around 2002 demand levels. Forecasting changes in sump sizes and increased drain periods are more apt to favour the lower demand (pessimistic) scenario.

The Look Forward



The effects of this reduced global supply / demand on base oil supply demand is likely to spell out more closures and Steve estimated that the size of the imbalance could reach around 10 – 12 mtpa of refinery nameplate capacity by 2014. As refinery closures are emotive events, it may take a number of years beyond 2014 for the surplus capacity to finally shake out.

REFINERY VIABILITY ISSUES

Most base oil plants are integrated within a larger fuel refinery and many have a large impact on the overall operations. Their future viability is very dependent upon the health of the 'mother ship' main refinery operations. So, to be objective let's have a look at the different perspectives of these possible effects.

From a Base Oil Perspective

Many refineries that have Group I base oil plants are now operating in increasingly diesel oriented markets, in Europe and globally. Group I plants use the same VGO feedstock that is used for diesel production, so there can be a conflict especially if they have a single production train. In Group II refineries diesel is a major by-product of these purpose-built plants, so fuel driven pressures are not the same.

Overall Group I production crude slate flexibility is limited, compared to Group II operations. Group I plants require a paraffinic 'lube' crude that often precludes optimising the overall refinery product-slate. Refineries with only one crude unit are most impacted and the loss of distillate aromatic extracts (DAE) to the rubber process industry, already mentioned, creates new disposal problems for DAE and will increase some blending / processing costs.

From a Fuels Perspective

OECD fuels demand has been predicted as weak, growth is only expected from developing areas of Asia and Latin America. CAFE / vehicle CO2 limits will further suppress demand in most OECD countries. As a result, North America / Europe crude based fuel demand has already peaked. Alternatives (biofuels, condensates, tar sands) are expected to reduce throughput at traditional Atlantic Basin refineries. 6-7 mb/d of new crude/fuels refining capacity will stream in the next 5 years; mainly in ME and Asia.

This will create limited fuel export opportunities for Atlantic Basin refiners. Other longer term developments such as carbon capture / carbon trading ventures will add to North American / Western European refining costs; hastening some closures and potentially increasing supplies from offshore areas. To rebalance supply demand in the Atlantic Basin, 2 mb/d of capacity needs to close (and stay closed!) over the near term.

Lastly, Atlantic Basin base oil plants co-located with 3rd/4th quartile fuels refineries are most at risk. Most closures will probably occur for non-base oil related reasons and these closures may happen sooner rather than later.

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