

IPIECA Fuels and Vehicles Working Group

Workshop Report: Somerset West Refiners Workshop

The IPIECA Fuels and Vehicles Working Group successfully sponsored two workshops in Somerset West, South Africa from 6 - 9 October, 2003. The first workshop took place from October 6-7, under the auspices of World Bank/ESMAP Clean Air Initiative for Sub-Saharan Africa. This workshop was hosted jointly by IPIECA and the United Nations Partnership For Clean Fuels and Vehicles (UNEP/UNPCFV). This was the fourth subregional workshop in a two-year process that began in Dakar, Senegal in June 2001.

A joint IPIECA-World Bank follow on workshop, which ran from October 8–9 was designed to bring together refiners from all over Sub Saharan Africa with major service providers (such as engineering and process technology design companies) to discuss refinery technical issues relating to Lead phase out.

Each of the workshops was attended by over 50 representatives from regional government, international and regional oil industry and their refineries, and other stakeholder institutions (UNEP, IPIECA, WB and US-EPA). The documents presented at both workshops are available through the fuels and vehicles section of the IPIECA website at <http://www.ipieca.org> and the United Nations Partnership for Clean Fuels and Vehicles (UNPCFV) <http://www.unep.org/pcfV>

The Refiners workshop, which was held over two days, was opened by Dr. Rod Crompton of the South African Department of Minerals and Energy, which is the South African Authority responsible for setting fuel standards and parameters. Further keynote addresses were provided by Dr. Colin McClelland of the South African Petroleum Industry Association, and by Dr. Masami Kojima of the World Bank.

Following the introductions, the program explored refining solutions to the introduction of Unleaded Gasoline, with presentations from two process licensors. These were followed by presentations from additive manufacturers and engineering companies, leading into the workshop element in which participants highlighted challenges and opportunities. Details relating to the Breakout sessions are given as Appendix 1. The final program agenda is attached as Appendix 2.

Barriers and Challenges to Leaded Gasoline Phase Out

Reference should be made to the individual presentations. Three major issues were dealt with during the workshop:

- The need to define and implement regional fuel specifications
- The need to eliminate product dumping

- Structuring refinery process unit upgrade plans and programs to minimize the investment required for the countries in question

1. Lack of defined and regionally harmonized fuel specifications

In many cases, SSA gasoline specifications consist of a patchwork of standards inherited pre-independence and can consist of one relatively high Octane grade (97 or 98 RON) with another, much lower Octane Grade (89 RON or lower). In these circumstances the supplied quantities of the 'premium' grade can be a fraction of that of the 'regular' grade, and in some countries the refineries struggle to consistently achieve the higher specification. Given this situation, a consensus is emerging with respect to the adoption of at least a single grade of regular unleaded gasoline (ULG) grade at 91 RON. In countries with a single grade of gasoline this will enable new, catalysed vehicles compatible with 91 RON to be imported immediately. In countries wishing to provide optional lower or higher octane grades, these could be made available.

SSA Refinery managers at the workshop agreed that the replacement of a multi grade structure by a single grade 91 RON ULG was achievable in certain African countries at reasonable cost (in some cases at no additional cost) and in some cases may even be possible without the use of additives such as MMT. Some key countries (Nigeria, Ghana, Ethiopia, and Angola) have already adopted this specification and the managers of the refineries in Cameroon, Zambia, Cote d'Ivoire, and Gabon indicated that they would be proposing this solution to their respective regulatory bodies. For the Republic of South Africa (RSA) a recent study recommended 91 and 95 as the optimal gasoline octane grades. This aligns well with the above proposal solution because it would enable the alignment and supply of at least one grade of Octane (91 RON) from South Africa into more Northern markets forming the SADC (Southern African Development Community) and SACU (Southern African Customs Union) countries.

The adoption of harmonized regional specifications and pricing is desirable, as it will help to eliminate the occurrence of fuel smuggling and fuel adulteration that is currently widespread in SSA. It should be noted however that fuel specifications should still be tailored to the technologies and needs of the vehicle fleets in the markets that they supply.

One of the critical factors inherent in achieving the above is the timing of the promulgation of revised fuel quality specifications by governments. A gap of about four to five years between promulgation and implementation is considered good practice in countries with domestic refineries to give the refining industry sufficient lead time to plan and execute refinery revamp projects. A number of governments (for example, South Africa) have not yet finalized revised fuel quality specifications and the workshop heard that this is delaying medium-term investment projects. Refiners, in particular those in South Africa pressed for more precision over the likely timing of fuel quality regulations including a long term view on likely limits on benzene, aromatics, and olefins in gasoline that will allow them to make informed investment decisions.

Although the workshop primarily concerned itself with the removal of Lead from gasoline, some discussions took place on Sulfur. With respect to maximum sulfur contents, 500 parts per million (ppm) seems feasible for gasoline in many areas in the region by 2005. For diesel, while some countries are moving towards 500 ppm, in the medium-term it appears that region-wide, 5,000 ppm would be a more realistic value.

The workshop concluded that additional efforts are required to establish fuel quality specifications applicable to the sub-Saharan African region that would serve as minimal standards considered necessary to protect the environment and public health, including those applicable to the year 2010 and beyond.

2. Product dumping

Another concern expressed was the growing difficulties faced by European refiners in finding outlets for their surplus catalytically cracked gasoline with high olefins content ('Catgas') on account of tighter gasoline specifications imposed in North America (the so-called 'Tier II' limits) and elsewhere. Because the removal of this material is a key enabler of throughput, Europe will look increasingly to Africa as the primary market for cat cracked gasoline and the concern was expressed that this material (which can be extremely odourous) might end up being dumped in the region. Reference should be made to the CITAC presentation in this respect. Because of concerns over this issue, the SSA refineries have therefore requested expert advice on feasible aromatics and olefins contents that could be part of regional harmonized specifications for gasoline. UNEP has agreed to present a proposal to the Partnership for Clean Fuels and Vehicles in response to this request. During the workshop element it was highlighted that different countries had different specifications for the dye colour added to Gasoline for identification, and that in some cases the high value product was coloured whereas the low value product was colourless. These regional inconsistencies are an open invitation for fuel adulteration to continue.

3. Investment

During the workshop, there were several presentations on the strategies that could be employed to reduce the investment required for ULG introduction either by changing Octane grades, upgrading refinery process units, or by import substitution. Reference should be made in particular to the presentations by Total, CITAC, and UOP. With respect to obtaining external financing for Refinery upgrades, reference should be made to the presentation by TOR.

Overall Conclusions arising from the Workshop

There is a broad consensus that a complete phase out of leaded gasoline in SSA region by the end of 2005 is technically feasible, although it may require the use of additives, as there is insufficient lead time for construction solutions in the regional refineries. Some refineries are actively planning appropriate upgrade projects however. In non-refining countries, several governments have already decided to phase out leaded gasoline before the 2005 deadline specified in the Dakar declaration while others are still formulating action plans. Overall the average Lead content in gasoline continues to drop significantly in Africa.

There was a need for the oil industry to work closely with the Auto industry to ensure that fuels supplied were closely matched to vehicle technologies in a given region, however it was felt that there was a matching obligation from OEMs to fit Catalytic Converters to all (rather than a percentage of) new vehicles and to deliver on agreed emission control devices on both Diesel and Gasoline engines.

There is a need for industry to work constructively with the governments in the region on cost effective short-term actions to improve fuel supplies, such as harmonising key fuel specifications, introducing appropriate octane grades, and mandating and enforcing minimum quality standards at the pump. In the absence of a central standards organisation, specifications and practices vary widely between countries and regions, in many cases as a result of former ties to developed economies. These regional inconsistencies in turn provide opportunities for fuel smuggling and adulteration that further weaken supply infrastructure and drain revenue.

When this process is completed, SSA countries will have some protection from product dumping, as well as a better rationale and motivation for investment in local refining facilities to take place.

Appendix 1: Workshop Element
SSA Refiners workshop
Breakout session tasks

The delegates were broken into two breakout groups, representing South Africa and Sub-Saharan Africa (Other than South Africa). Each breakout group was asked to:

1. Propose a set of Oil Product Technical Specifications. These specifications should be technically and economically viable, as well as capable of rapid adoption (e.g. by 2005). The groups were asked to project the next steps in the process (i.e. between 2005 and 2010).
2. Identify Challenges and problems likely to be encountered in changing product technical specifications. What technical assistance and/or funding would be required?
3. Given that many of the delegates were either from government or were from industry with a working relationship to government, how would they set about advising governments on:
 - Pursuing fuel improvements
 - Taking action on fuel adulteration
 - Eliminating misfuelling
 - The role of industry in multistakeholder groups

Please refer to the PowerPoint presentations from the individual breakout groups.

Appendix 2: Final Agenda

Wednesday 8th October, 2003

Time	Subject	Speaker	Remark
08:30 – 09:00	<i>Registration</i>		
09:00 – 09:20	Workshop opening and welcome	Dr. Rod Crompton: Department of Minerals and Energy – South Africa	
<i>Objectives and Scene-setting</i>			
09:20 – 09:40	Objectives of the workshop Framework for Lead Removal	Mr. Michael Walsh, Consultant Mr. Rob de Jong, UNEP	
09:40 – 10:00	Keynote speech: Introducing unleaded—an Industry view	Mr. Colin McClelland, SAPIA	
10:00 – 10:20	Keynote Speech: Lead phaseout in perspective—International experience and relevance to Sub Saharan Africa	Dr. Masami Kojima, The World Bank	
10:20 – 10:40	<i>Coffee Break</i>		
<i>Commercial and Strategic Background</i>			
10:40 – 11:00	Planning a fuels future for Sub Saharan Africa: Economic and Commercial considerations	Mark Elliott, CITAC	
11:00 – 11:30	World Bank experience: Refining strategies and options for Lead phaseout and Sulfur reduction	Eleodoro Mayorga-Alba, The World Bank	
11:30 – 12:00	Questions / panel discussion		
12:00 – 13:00	<i>Lunch</i>		
<i>Refining Strategies</i>			
13:00 – 13:30	Options for gasoline reformulation	Stuart Simpson, UOP	
13:30 – 14:00	Options for gasoline reformulation	Christian Dupraz, Axens	
14:00 – 14:30	Question / panel discussion		
14:30 – 14:45	<i>Coffee Break</i>		
<i>Refinery Assessment studies</i>			
14:45 – 15:15	Refinery assessment studies for Leaded Gasoline Phase out	Alan Cousins, Fluor SA	
15:15 – 15:30	Questions		
<i>Additising Strategies</i>			
15:30 – 16:15	Additising Strategies for ULG formulation	John Aitken, Ethyl Corp.	
16:15 – 16:30	Questions		
17:00 – 18:00	<i>Reception</i>		

Thursday 9th October, 2003

Time	Subject	Speaker	Remarks
<i>Marketing Strategies (cont'd) & Social Responsibility Post-Lead:</i>			
09:00 – 09:45	The Responsible Phase Out of Leaded Gasoline	David Turner and Ian McRobbie, OCTEL	
09:45 – 10:00	Questions		
<i>Refinery Upgrades and other Strategies for Leaded Gasoline Phase Out</i>			
10:00 – 10:30	Lead phase out: a South African refinery perspective	Patrick Boddy, SAPREF	
10:30 – 10:45	<i>Coffee Break</i>		
10:45 – 11:15	The Total ULG experience in Africa	Hubert Charbonneau, TOTAL	
11:15 – 11:45	Upgrading a refinery in Ghana	E.K. Quartey, TOR, Ghana	
11:45 – 12:30	Questions / Panel Session		
12:30 – 13:30	<i>Lunch</i>		
13:30 – 14:00	Instructions to breakout groups	Mike Walsh & Rob Cox	
14:00 – 14:30	<i>Coffee Break</i>		
14:30 – 16:00	Breakout groups: Large refiners, Small refiners*		
16:00 – 17:00	Feedback sessions from Groups		Rapporteurs: Mark Elliott Pat Boddy
17:00	Workshop Close:	Eleodoro Mayorga-Alba	

Breakout Groups structured as follows:
 Group I: Strategies for Large/Complex Refineries
 Group II: Strategies for Small to Medium Refineries