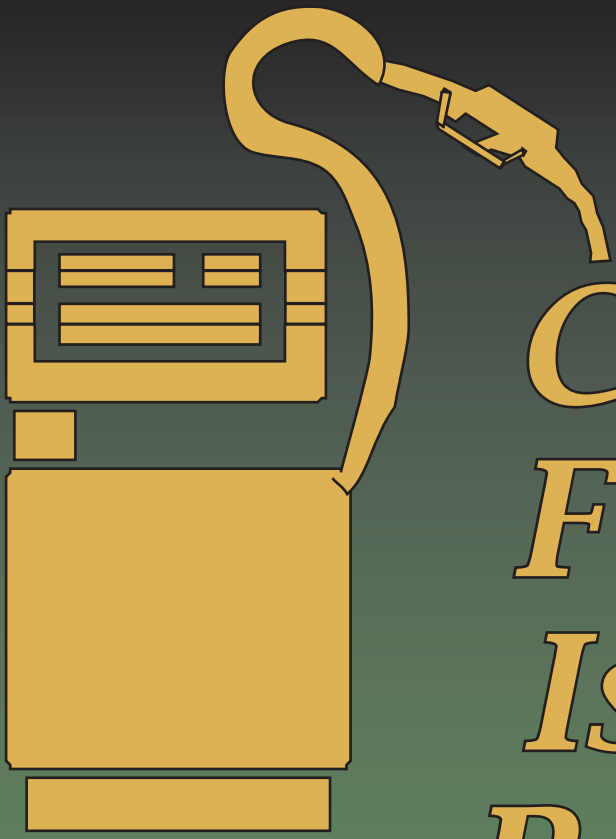

Clean Fuel... Is it a Reality or a Myth?

By Varsha Naidu

Briefing Paper 2007

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BACKGROUND

The DRC, Zambia, Angola and South Africa are amongst the richest countries on the African continent in terms of natural resources. However, the extraction of, amongst other resources, oil, gold, timber and diamonds rarely is an engine for just socio-economic growth and stability. On the contrary, the significance of natural resources for the economies grants disproportionate and inequitable political influence to foreign and state-owned companies exploiting these resources and the small (local) elite profiting from it. The extremely unequal division of revenues and the often-negative consequences of industrial activities for the local communities in the extractive area aggravate the potential for social unrest and the flare-up of conflicts.

The Civil Society Organisations (CSOs) participating in the Peace, Principles and Participation (PPP) network share the vision that the natural wealth of the region should contribute to sustainable pro-poor development. Civil society has an important role to play in dealing with issues related to the exploitation and processing of natural resources and in representing the interests of communities in this sector.

This publication is part of the project "Unearthing the extractive industries: A civil society research platform" which aims to strengthen Civil Society Organisations in South Africa, Zambia, Angola and the DRC in their work on the consequences of natural resources exploitation and processing in Southern Africa.

RESEARCH OBJECTIVES

In 2006 the addition of lead to petrol was at last banned in South Africa.

This research was undertaken to examine what was being put into petrol now that lead has been banned. Sample analysis was done to find out if petrol was within the specifications regulated. The analysis was done to see what additives are being used in the petrols.

We also investigated why the Department of Minerals and Energy changed the permissible levels of certain chemicals. The research looked at alternative fuels which could be introduced to South Africa, and the reality of vehicles being manufactured which emit less polluting chemicals.

The research was aimed at presenting information to the community so that future discussions about 'clean' fuel could happen with the community being armed with the relevant information. The sampling done was to expose in what percentages chemicals in petrol were being produced and sold. We looked at what alternatives

to lead are presently being used by the oil refineries here and what possible risks there are involved with these new additives.

The most important additive being used is Methylcyclopentadienyl Manganese Tricarbonyl (MMT) which, when burnt, emits manganese oxides. There have been arguments on both sides of MMT, and in this research we try to look at MMT in terms of its effect on human health and air quality.

INTRODUCTION

This research was done to investigate the practices of oil refineries, in light of the new law banning the use of lead in petrol grades. We wanted to know what the refineries were using instead of lead, and if there were health implications involved with these chemicals. We explored the health issues surrounding petrol, so that community would be able to understand the issues in a more informed manner.

The background research to petrol and the legislative history is to shed light on decisions made by the Department of Minerals and Energy and the oil refineries. The practices which are meant to be public and transparent often result in decision made which seem to benefit those two parties involved.

The air quality and human health issues are seen to be the driving force behind changes, but the actions taken differ. The idea of 'clean fuels' is that it is a cleaner fuel than previously available, but still not clean to a point where no harmful chemicals are emitted in the combustion process. This point needs to be put across to the public, as oil refineries are advertising fuels as being clean, i.e. not harmful, when in fact fuels still pose a health threat to the public.

The problem in South Africa is that there appears to be authoritative powers making decision which are positive for economic reasons, yet fail to take the environmental aspects into consideration. This research is mainly aimed at the communities, and in a secondary light the oil refinery industry.

We wanted to see if there was a way to take on the refineries if their petrol being produced was not within specifications. Unfortunately there is no stipulation for this in the new regulations. The other aspect was that of false advertising. Oil refineries are quick and happy to advertise that their petrol is lead-free; however there is an allowance for lead to be present in petrol grades, both metal-free and metal-containing. The public is unaware of this, due to the large amount of press coverage given to the fact that lead is out of petrol, when in fact it is still present, and lead contamination is expected to be flushed out by the continuous use of unleaded petrol.

Refinery - picture from cheweb.tamu.edu/.../Website/Pages/Projects.htm

RESEARCH METHOD

The collection of the background information was done by conducting a desktop research on petrol and its constituents. The desktop research was to reach understanding of the legislative background, and to investigate further into alternative fuel technology. We looked at the use of MMT in other countries, including the countries which are in a post-lead phase of their petrol production.

The main basis of our research was the sample testing which was conducted on the 24th of July 2006, where three sets of petrol samples were taken from four different stations. These samples were stored in the SDCEA Office until they were taken for testing later in that day to the Engen laboratories. The samples were labelled A1-A8 and therefore were anonymous.

The conditions of the sample containers were verified by the Engen representative who was in charge of the testing, and this was agreed upon before the samples were taken. The research question was whether the petrol being sold to the public was in line with the regulations laid out, and if there was a penalty involved for oil refineries producing these petrols. We also interviewed representatives from the oil refineries about the new legislation that prohibited the use of lead in petrol and asked how their refinery was adapting to the change. These questions were to find out if the refineries were all performing the same changes to their process or if each had a different approach. The problems which we encountered were that 2 sets of our samples were unable to be sent out for testing; therefore we only had one set of samples which were tested. We had wanted to do three sets so that the results could be correlated and provide a more solid base of the results.

RESEARCH RESULTS

The petrol analysis showed interesting differences in what the oil refineries said about their product and what the testing showed. We found that there were petrols being sold which had more than the regulated amount of manganese, sulphur and phosphorous. There is also a problem whereby in the regulations it is stated that there may only be one additive, either manganese, potassium or phosphorous added to metal-containing petrol. In the results, we found that all petrol samples, metal-free and metal-containing, had traces of all three additives. We questioned this with a technical expert, not involved with the refineries, and the answer which we given is the possibility of cross-contamination of samples at the petrol stations and in transport.

There was also a difference in the sample

results from Engen, given to us by them, and the independent testing done. Their internal batch results showed manganese to be lower than what it showed in the anonymous testing. This led us to ask Engen about their manganese levels, which they said were within the limits. Their sulphur levels were also higher than specified.

The Caltex petrol grade also had higher than allowed sulphur and manganese levels. This could be due to the fact that Caltex lifts is base volumes in Kwa-Zulu Natal from Engen.

Margaret Rowe, the SAPREF representative, said that both Shell and BP did not add any heavy-metal compounds to replace lead; instead they upgraded their equipment to raise the octane level of petrol.

Our main concern is that there are additives found in petrol grades which are advertised as being metal-free, when in fact they are not. We also question the practice of petrol stations which allow either metal-free and metal-containing petrol to be stored in the same storage containers. In these conditions they mix and could potentially cause problems in motor vehicles. It is obvious that neither the petrol stations nor the oil refineries will take responsibility for this and we are therefore considering approaching the regulating authority with our results to question what can be done with this information.

The possibility of the samples being compromised before we had taken them is not a major problem, as this just means that the practices of petrol stations themselves can come under light. If we had taken samples directly from the oil refineries, we would not have been able to see the product as it is pumped into vehicles.

We can see now that there are issues around how petrol is transported, and stored. Engen stated to us, when presented with the results, that they do not add phosphorous or potassium to any grades, not do they add MMT to their unleaded grades.

CONCLUSIONS

This project was designed to look at the new legislation regarding 'clean' fuels, and the reality of whether the fuels provided to the public were actually what was being advertised. Our results prove that chemicals used in the production process of petroleum are often not disclosed to the public, leading to the public not questioning the product which they use almost on a daily basis.

The outcome of the new legislation should not simply be about producing a product that is 'cleaner'. It should also encompass ramifications for those producing these products if they are not produced correctly. There has to be a stricter monitoring and reviewing process of the fuels being produced. It has to be an ongoing process which seeks to improve and not just maintain the status quo. The refineries whose parent companies operate in countries with higher standards than our own should seek to attain these standards. Why is it feasible for them to produce better fuels in developed countries, but here in South Africa we are forced to use a fuel which is not as clean as it could be?

RECOMMENDATIONS

To the government:

- Promotion of the use of current public transport system, for passenger and freight purposes;
- Legislation for cleaner fuels needs to be driven first and foremost by concern for people's health and the environment -*not* by demands from industry;
- Before any further legislation is passed, Best Available Technique, BAT, should be investigated, using the European Refineries as an example;
- Legislation should be implemented to cause the oil refineries to adhere to the best international standards;
- Once legislation is passed, pressure must be put on the refineries to abide by set deadlines and refineries should not be allowed to assert their position in order to change regulations;
- The regulatory and specification setting process must at all times remain transparent and accessible to the public;
- Government policy should inlude options to reduce the average age of vehicles on South African roads.
- All fuels should be labelled with appropriate health and safety warnings to alert the public of noxious and toxic substances - and substances which could potentially damage catalytic converters. (Material Safety Data Sheet-MSDS- to be made available for public viewing at petrol stations);
- Regulatory policy to evaluate the life cycle cost of all the alternatives as the public will ultimately pay for petrol and externalities involved in its use;
- Public opinion on draft regulations released should hold as much power as the industries involved;
- A regulation board should be set up to monitor progress of industry and to ensure adherence to the highest standards. These regulators should be independent in principal and practice;
- Comprehensive strategic health and environmental assessment of the consequences of utilizing the various additives must be performed, with special attention to sensitive populations;
- The provision of multiple octane rating grades is costly and potentially unnecessary. Government should revisit the need for these octane rating levels;
- The use of renewable alternatives needs to be encouraged and legislated;
- Legislation should be drafted to commit refineries and storage facilities dealing with hazardous materials to perform complete medicals for casual and permanent workers;
- Competitive pricing is to be encouraged with respect to alternative fuel supplies;
- There should be an investigation into the number of cars on the road without catalytic converters. A further proposal is that vehicles without catalytic converters should, by law, be made to install them;
- There should be a move towards a better maintained and implemented public transport system that encourages people to minimise the use

of private vehicles. This system would benefit the general public, and those unable to afford hybrid or new model vehicles;

- The Competition Act should be amended so as to include petroleum products, which are currently excluded;

To the oil industry

- The oil industry was consulted over many years and therefore excuses can not and should not be made for failing to follow fuel regulations. Choosing not to invest the necessary capital to make necessary refinery modifications is not acceptable;
- Multi-national companies should adhere to international standards of production and this should be carried out in developing countries as well;
- The precautionary principle needs to be applied in banning MMT from petrol in order to prevent potential health risks;
- A full and proper health study should be commissioned to investigate the health effects on manganese oxide in the atmosphere and in the soil;
- There should be an annual budget by each refinery dedicated to the continued improvement to the plant and the surrounding communities;
- Multi-National Companies should be required to publicly release their annual investments into renewable energy and BAT.

To the consumer:

- Demand an efficient, subsidised, public transport system;
- Stop subsidising road transport for passenger and freight purposes;
- Cleaning up the air we breathe must be a collective effort and not just the responsibility of the government and refineries;
- Make sure to use the right petrol since LRP contains more additives that may be bad for the environment. Check with the petrol station to see which fuel is best for your car. Generally any cars made after 1996 should use unleaded;
- Try to use the public transport system as much as possible to minimise the use of private vehicles;
- Try to conserve petrol by following simple tips.

This is a summary of the publication:

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SDCEA is an environmental watchdog organisation, dealing with industry and EIA processes, helping the community to deal with issues of personal health and environmental impacts.