



European Petroleum Industry Association

EUROPIA Used Oil Position

The EU directives which regulate used oils management encourage effective collection for pollution prevention, followed by re-refining (regeneration) into lubricant base oils as the most energy efficient disposal option.

EUROPIA believes that pertinent conditions have changed since the original directive on Waste Oils (Directive 75/439/EEC) and its amendment (Directive 87/101/EEC) were enacted. This, combined with unexpectedly exacting interpretations since 1999 by the European Court of Justice, cause EUROPIA to believe that modifications to the Directive are now merited.

EUROPIA believes that the current emphasis placed by the EC on regeneration of used oils over other responsible recovery options is misplaced. It does not recognise the possible dual use of lubricant petroleum products both as a lubricant and or a fuel e. g. as a fuel replacement in cement kilns. These options could give similar results to regeneration. It also misses the opportunity to deal effectively, safely and in an environmentally sound manner with the pollutants that would inevitably be released during the process of regeneration and could accumulate in lubricants manufactured with re-refined base-oils if they are produced under insufficiently severe process conditions.

EUROPIA supports the implementation of responsible management practices for used oils to protect public health and the environment. Therefore, EUROPIA and its members are keen to continue working with end users, governments, other industries and NGOs to help ensure the effectiveness of such practices and to foster the development of used oils laws and regulations based on sound science.

In this regard, EUROPIA has reviewed the published information on Life Cycle Analysis (LCA) for the disposal of used oils. All data were analysed on the same basis taking into account the refining and marketing of the oil products as well as production and consumption of base oils in the EU. The objective was to evaluate the crude oil needs and fuel consumption in refining for several disposal methods (three regeneration processes and recycling by combustion in cement kilns or power plants).

The results show that combustion in cement kilns, or controlled combustion in power plants, is an attractive alternative to re-refining in terms of both crude oil consumption and carbon dioxide emissions. The differences in crude oil consumption among the disposal options analysed are in the range 6 to 13%. These results also indicate that maximising collection is the best policy to reduce either crude oil or energy consumption and could achieve higher natural resource savings than focusing on differences between disposal options.

EUROPIA believes that the fuels produced in the regeneration processes are not suitable for use as feedstock for production of automotive fuels. Components remaining in those fuels can damage engine injection systems and produce undesirable emissions. Similarly, EUROPIA believes that they are also unsuitable as blending components for home heating oil. Furthermore, their use as fuel under uncontrolled conditions (e.g. small furnaces) requires careful analysis on a case by case basis.

The study also analyses the application of re-refined base oils in the formulation of advanced lubricants that can lead to lower fuel consumption, longer drain intervals and therefore, less waste generation. From the review of data from tests done with commercial re-refined base oils, it can be concluded that only severely re-refined base oils can meet the requirements to produce high quality lubricants. This can only be achieved with significant energy inputs.

In the light of this, EUROPIA has adopted its position on the collection and disposal of used oils based on the following principles:

- EUROPIA welcomes and supports any acceptable initiative aimed at maximising the collection of used oils following the EU strategy for waste management
- EUROPIA supports any disposal option that ensures high levels of safety for the environment and public health.
- EUROPIA does not support the mandated or legally enforced priority of any specific disposal method.
- EUROPIA believes that all technically and environmentally acceptable disposal options should be treated in an equal manner. Any system of subsidies should not distort the single market.
- EUROPIA opposes any mandated requirement for the blending of regenerated base oils in the formulation of finished lubricants.
- EUROPIA supports that the same health and safety data be supplied with regenerated base oils as is required for virgin base oils.

Explanatory notes

EUROPIA supports the EU strategy to prevent the generation of waste. To this end, the continuous improvement in the quality of lubricants has made possible to increase the periods between engine oil changes and therefore, lowering the production of used oils.

EUROPIA considers recycle as the best way to dispose of used oils. Lubricants are essentially hydrocarbons that in addition to being fuels have lubricating properties. Used lubricating oils can be recycled either by regenerating their lubricating properties -as re-refined base oils- or by re-using their fuel properties in combustion -as energy feedstock-.

EUROPIA supports the implementation of responsible used oil management practices aimed to protect public health and the environment. EUROPIA agrees that sustainable practices for disposal of used oils should be promoted by Member States. Nevertheless, EUROPIA believes that no single method is of general application and the most sustainable practices could vary based on local conditions (overall lubricants and fuels market, market uses, taxation rates, power production, industrial energy consumption, etc.) and ongoing technological development as shown further in this report

EUROPIA and its members have worked and will continue working with end users, governments, other industries, and selected non-governmental organizations to foster development of effective used oil laws and regulations which are environmentally and public health driven and based on sound science and cost effectiveness.

The EUROPIA used oils management and disposal position is based on the following principles:

- Public health and environmental protection
- Sound science
- Cost effectiveness
- Overall sustainability

On the collection

EUROPIA supports any initiative aimed to maximise the collection of used oils. This position is based on the following points:

- Used oils have been classified as wastes by the European directives: directive 75/442/EEC on waste, directive 75/439/EEC on disposal of waste oils amended by the directive 87/101/EEC, directive 91/689/EEC on hazardous waste and Commission decision 2001/118/EC as regards the list of wastes. Therefore, they have been disposed following the provisions of the directive 75/442/EEC
- On the other hand, used lubricating oils have lost their original lubricating properties and cannot be used for that purpose; however, they still maintain their energy content. This means they still retain their combustion properties and can be re-used as fuel under controlled conditions.

In the light of this, collection of used oils will allow their recovery as fuels or lubricants. EUROPIA believes that actions leading to the maximum collection of used oils will contribute to a more sustainable use of natural resources. We believe that collection quotas are not required; nevertheless if point of sale collection is mandated it should apply equally to all such points of sale.

On the disposal

Environmentally sustainable disposal options complying with the provision of the waste directive 75/439/EEC can be achieved without any EU or governmentally mandated options. Consideration of site specific factors is important in deciding which of the available disposal options provides the greater environmental benefits in the most cost-effective manner. Thus legislation mandating any specific disposal option is unlikely to result in the best overall solution.

Environmentally sound burning of used oils is at least as attractive in terms of energy and crude oil savings as regeneration to re-refined base oils. These must have quality and performance characteristics equivalent to virgin base oils produced from crude oils. However, the savings of crude oil used and the reduction of CO₂ emissions from optimized collecting and recycling of used oils are more significant than the differences amongst disposal options.

On the use of regenerated oils

Due to potential health effects and product concerns, the use in finished lubricants of re-refined base stocks without appropriate processing and quality controls should generally be discouraged. Materials with potential health impacts are found in many untreated used oils and are difficult to remove. Hence, EUROPIA recommends the development of health and safety specifications for re-refined base oils. In addition, contamination with non-lubricants can introduce other undesirable materials that are even more difficult to remove, including polychlorinated biphenyls (PCBs). Thus, non-uniformity of the used oils for re-refining and poor control or outdated design of the re-refining process can lead to varying levels of product performance and toxicological properties that can affect the quality and the hazard classification of finished lubricants using re-refined base stocks. Furthermore, these products may not meet the technical requirements of car manufacturers for the new energy efficient, low emission engines.

Therefore, EUROPIA opposes any mandated requirement for blending regenerated base oils in the formulation of any lubricant. Industry, being responsible for the performance of its products, should be able to have control of the formulation of the finished lubricants.

On sustainability

The EU has legislated further reductions on emission and fuel consumption by light (directive 1998/69/EC) and heavy (directive 1999/96/EC) duty vehicles. To meet these standards the vehicle manufacturers have implemented advanced engine technologies, together with exhaust gas treatment systems, that require advanced lubricants with stringent technical specifications. These advanced lubricants make possible higher fuel economy and longer periods between oil changes, thus minimizing the generation of used oil. Largely due to difficulties and costs of segregation during collection of used oils, re-refined base-oils often cannot comply with the performance requirements for these engines.

On the economic measures

The safe, environmentally friendly and energy sustainable disposal of used oils in a cost effective manner can be achieved without requiring either special subsidies or market measures.

All technically and environmentally acceptable disposal options should be treated in an equal manner and any system of subsidies should not distort the single market.

Used Oil Communication Points

Purpose

The conclusions presented in this section are intended for use as "arguments" by National Oil Industry Associations to explain the EUROPIA viewpoint on used/waste oils to policy-makers, relevant NGOs, and other interested parties in their countries.

As a general guideline, these arguments could be used in combination with the EUROPIA position statement on Waste Oils when communicating with interested parties.

Background

Between 2 and 3 million tons per year of used lubricating oil can be estimated to be generated in the EU. Although information is limited on the amount generated and, particularly, the ultimate dispositions for this oil, the majority is collected and handled via environmentally acceptable routes. However, a sizable fraction is believed never to be collected or, in some cases, improperly disposed of after collection. The EUROPIA position strongly supports reduction and ultimate elimination of the fraction that is now not collected or improperly disposed of.

European Union directive 75/439/EEC, which regulates used/waste oils disposal, encourages effective collection for pollution prevention, followed by a re-refining (regeneration) into lube base stocks as the most energy efficient option. Some Member States have implemented this directive by introducing subsidies for used/waste oil re-refining. However, since the Waste Oils Directive was passed in 1975 and its significant amendment in 1987 (directive 87/101/EEC), most Member States have not complied and some have been prosecuted relatively recently as a result.

In September 1999, the European Court of Justice found that Germany was not in compliance with the existing Waste Oils Directive 75/439/EEC (as amended by directive 87/101/EEC) for not having taken sufficient tangible steps to overcome technical, economic, and organizational constraints in promoting re-refining of waste oils over combustion. In July 2001, the European Commission sent a formal request to Germany for non-implementation of the Court of Justice ruling.

The Commission has issued letters of notification to 13 member states and sent the cases for the UK, Belgium, Portugal, and Finland to the European Court of Justice. Portugal lost its waste oils court case on April 10, 2003.

EUROPIA believes that pertinent conditions have changed since the original 28 year-old Waste Oils Directive and its amendments (principally that of 1987) were enacted. This, combined with recent unexpectedly exacting interpretations given by the courts, cause EUROPIA to believe that modifications to the Directive are now merited. In order to achieve this end, EUROPIA considers that it is the industry's responsibility in each of the EU Member States to share its views with the national governments, NGOs, the media, and other interested parties on the implications of the current Directives for the environment and consumers.

Advocacy Arguments

1. Used lubricating oils and definitions of waste

The current legislation in the European Union causes difficulties in the definitions of waste and whether wastes are destined for recovery or disposal to the environment. While EU policy-makers are working to close these gaps, industry should engage in a dialogue with them on how used oils are different from most other used or spent products -- genuine "wastes" such as used packaging, carpets, or electronic components. A fundamental difference is that, unlike used lubricating oils, normal wastes must be significantly reprocessed before they can be re-applied in another useful "life". On the other hand, if applied in combustion, used oils can enjoy a "second life" with essentially no alterations as lubricating oil is derived from heavy fuel oil in the first place. It could, therefore, be argued that used oils disposal can follow two alternative approaches: 1. Energy recovery through combustion or 2. Base oil recovery through regeneration. In other words, combustion (or incineration with energy recovery) of used lubricating oil products reduces the need for the energy intensive re-refining of used oils, whereas the similar burning of, for instance, used packaging or carpets does not reduce the need to manufacture new packaging or carpets.

The European Court of Justice decisions clarify when waste combustion can be defined as recovery as follows "use principally as a fuel or other means to generate energy." The operation's principal objective must be to allow the use of wastes to produce energy. Secondly, the operation must be able to be considered effectively "a means of producing energy", which requires that more energy is produced than consumed and that this surplus energy is put to an effective use as heat or electricity. Thirdly, says the court, the majority of the waste must be consumed during the operation and the majority of energy produced recuperated and used.

So spent lubricating oils, unless unusually contaminated with certain compounds¹, are simply "used", but still usable, members of the family of petroleum products the vast majority of which have an original use as a fuel due to the relative ease of extraction of the comparatively high energy content inherent in hydrocarbons. Said another way, used lubricating oils, with their remaining high energy content and ease of application in normal combustion processes, represent, in effect, an intermediate step on the way to the ultimate fuels (energy recovery) disposition for a very large majority of hydrocarbons derived from crude oil. Most other forms of waste usually have significantly lower energy contents than used oils and can be burned only in special incineration processes to avoid being discarded.

Although used oils in general may continue to be qualified as wastes, combustion with energy recovery is, for used petroleum products unlike most other waste products, a form of "re-use." Re-use occupies a higher position than material re-cycling in the EC's own Waste Management Hierarchy and should, thus, be given at least the same priority in relevant Directives for used/waste oils²

2. Combustion of Used Oils in power plants and, especially, cement kilns has distinct environmental benefits. Studies by the British Cement Association have shown that potential used oil contaminants such as polycyclic aromatic compounds (PACs), chlorinated hydrocarbons (including PCBs), and heavy metals are destroyed or rendered harmless in the cement kiln process. This is due to the high combustion temperatures and residence times employed, the alkaline nature of materials in the kiln, and the incorporation of the metals into the klinker (cement) during the kiln process. Combustion of used oils as substitute fuels in power plants with effective ash management and flue gas abatement complying with the provisions of the incineration directive approximates to cement kiln operations in this regard.

¹ Such contaminants may include polychlorinated biphenyls (PCBs) above 50 parts per million or total halogens above 4000 parts per million

² C Olazabal presentation at Institute of Petroleum conference on Waste Oil Directive, November 5, 2002

Further, due to the higher hydrogen to carbon ratio of used oils, replacement of coal or petroleum coke as a fuel in power plants or cement kilns reduces the emissions of carbon dioxide by about 30%. Currently the principal fuels used in most (cement) kilns are coal and petroleum coke.

Finally, it is believed that there is more than adequate cement kiln capacity alone around the world to consume all of the used oil generated globally.

3. The fundamental basis used by the European Commission for giving regeneration (re-refining) priority over other used oil dispositions no longer applies. From the 1987 amendment to the 1975 Waste Oil Directive is the statement, "Whereas regeneration (re-refining) is generally the most rational way of re-using waste oils in view of the energy savings which can be achieved; whereas, therefore, priority should be given to the processing of waste oils by regeneration (re-refining) where technical, economic and organizational constraints allow it."

Re-refining technology has evolved substantially since 1975, and even since 1987. Today many of the simpler, lower energy, re-refining processes (such as acid treating or clay filtering) prevalent in Europe in the 1970s and 1980s (and still representing a small percentage of Europe's and most of the rest of the world's re-refining capacity even today) have been found to be incapable of consistently delivering re-refined base stocks that are safe and genuinely useful (with reliable product performance) in today's finished lubricant formulations. On the other hand, there are newly developed more complex re-refining processes using several steps and involving hydrotreating that can deliver such safe and technically useful products. The energy usage of those modern re-refining processes is higher than that of their simpler predecessors.

Therefore, the basic asserted advantage for giving re-refining (regeneration) priority over combustion -- energy efficiency -- no longer applies. Used oils generally require no energy intensive re-processing prior to such a combustion application.

All of that said, we do believe that there is a place for modern re-refining in the array of technically and environmentally sound used oil disposal routes. However, as a general principle, we simply believe that no individual technically and environmentally sound option, including well-controlled re-refining, should be given mandated general priority over any other sound used oil disposal option.

4. Performance qualities of some re-refined lubes have been lower than those of counterpart virgin products derived from crude oils. Acid/clay treatment and some acid/hydrotreatment re-refining processes generally give an inferior quality lube compared to the lube solvent extraction and hydrotreatment processes for virgin base stocks. The quality of lube base stocks from even the more recently developed re-refining processes can be problematic if great care is not exercised in both feed and product/processing quality control. Re-refined base oil quality deficiencies can include poor oxidation stability, de-emulsibility, colour, odour, viscosity, and volatility. This is one reason for market experience showing a general lack of customer acceptance for finished lubricants made using re-refined base stocks.

Additionally advanced engine technologies together with exhaust gas treatment systems require advanced lubricants. These advanced lubricants allow higher fuel economy and longer oil drains, thus minimizing the generation of used oil. Re-refined base-oils often cannot comply with the performance requirements for these applications mainly due to difficulties and costs of segregation during collection.

Although there is a place for modern re-refining (a several step process including hydrotreating and rigid feed/product quality controls) in the array of technically and environmentally sound used oil dispositions, we believe that the potential product performance (and health impact) concerns for some re-refined base stocks indicate that their universal use in finished lubricants (particularly those of the highest quality) should not be mandated and that re-refining should not be given general priority over other sound used oil disposition options.

5. Some re-refined base stocks may contain toxic compounds which can be hazardous to human health. Polycyclic aromatic compounds (PACs), which under certain conditions can be carcinogenic and are found in most used oils, have been shown to be incompletely removed in many commercial re-refining processes, particularly those employing technologies not involving hydrotreating, and even in some employing mild hydrotreating. Thus, with successive lubrication/re-refining cycles, there is the likelihood that these PACs would "concentrate" to levels of concern. Similarly PCBs, which (along with halogenated solvents, anti-freeze fluids, and other undesirable materials) can be introduced via contamination (e.g. were detected in randomly selected re-refined lube products in Germany in the 1980s) can accumulate and cannot be removed by any demonstrated re-refining technology.

As a final example of the potential human health impacts associated with re-refined base stocks, heavy metals found in all used oils cannot be disposed of directly in most re-refineries, but must be transported to a second plant in a concentrated "bottoms stream" -- with the potential for human and environmental exposure during that transportation.

6. Alternative disposal methods to re-refining are economically attractive. Studies have consistently shown that used oil dispositions to re-use, fuel blending, and combustion with energy recovery (like power plants and cement kilns) can be quite attractive economically, depending on the local collection/transportation costs. On the other hand, the economics for re-refining of used oils to base oils appear not to be so attractive, regardless of the particular processes used or the local collection/transportation costs.

The UK, for instance, has no subsidies for domestic used oils, but has relied on market economics to drive a system in which nearly all of the used oil goes to combustion with energy recovery (e.g., power plants³). Yet, per EC data, the used oil collection percentage in the UK is the highest in Europe (86%).

Further, re-refining by itself will not fully sustain the lube resource that it is intended to sustain. Analysis of the process of multiple recycle shows that the maximum amount of re-refined base-oils that can be produced from used oils may, at most, cover 25 % of the market demand.

7. An effective collection system is the key step in a responsible used oil management system and is the step which yields the largest environmental benefit. In the UK, despite no subsidy, nearly all of the collected used oil has been burned for energy recovery (e.g. in power plants) with Commission data showing the highest collection rate for any of the reporting countries (86%). Further, major ("Category 1") pollution incidents in the UK in which oil is the contaminant have fallen by about 90% during the last 12 years. The UK Environment Agency indicates that, if the market for the application of used oils into power plants and other similar combustion processes were to disappear, "illegal disposal will increase (and) pollution of surface and ground water will increase."⁴

This would be counter to a system with an objective of sustainable use of resources. In that regard, while increasing percentage targets on material recycling (regeneration or combustion) play an important role in such a resource sustaining system, even more important would be the volume of lubricants used per unit of economic production. The latter would put the emphasis on prevention (longer-lasting lubricants).

³ An inherent advantage of these existing combustion facilities is that, generally to date, little or no new capital expenditures have been required to allow them to burn used oils in an environmentally sound and acceptable manner.

⁴ M. Brocklehurst (UK Environment Agency) presentation at Institute of Petroleum conference on Waste Oil Directive, 5 November, 2002.

8. Considerations change with time and location, causing the optimum used oil disposal route to change similarly. A series of examples of pertinent changing considerations are given here. Environmental regulations can change with time. Differences in standards can favour one disposal technology over another. The used oil composition -- base stocks, additives, and contaminants -- even in the same location, can change with time as Original Equipment Manufacturer specifications or drain intervals for finished lubricants evolve. Composition differences can affect the relative effectiveness of the various disposal technologies. For instance, synthetic base stocks generally lead to longer-lasting lubricants and, thus, help prevent the generation of used oil -- the top of the EC's Waste Management Hierarchy. Yet such lubricants, which make up only a minority of the current product slate, but are fast growing, are very difficult to re-refine to achieve their original properties using today's re-refining technology. Also, such longer lasting lubricants, when used in gasoline engine service, accumulate larger quantities of difficult to remove PACs than today's conventional lubricants.

Entirely new disposal routes can occur which can clearly change the optimum disposal route. This happened for used tyres which when ground-up were utilized to enhance the performance of certain asphalts for the first time. Also, technology can be developed that improves the technical effectiveness of certain disposal routes, such as is the case for thin film evaporation (TFE) in re-refining. However, the advent of TFE is among the reasons that the most modern re-refining technology consumes substantially more energy than the simpler processes that were prevalent in the 1970s and 1980s when the Waste Oils Directive and its primary amendment were being drafted.

A final important example is that the economics affecting the relative attractiveness of the various disposal options invariably change with time and location. For instance, in some, but not all, locations the proximity of local used oil collection centers to combustion or other sound used oil disposal facilities can save substantial fuel costs (and environmental impacts) in the transportation of used oils.

As a result, government regulations should not artificially "force" the use of any one technically and environmentally sound option over any another. All such options should be allowed and be treated equally by government regulation.

9 Used oil collection systems should not disadvantage one type of sales outlet vs. another. Ideally, effective collection systems should naturally evolve because of market forces to retrieve and sustain this natural oil resource -- and to discourage improper disposal. Such collection systems should be part of an integrated management system (collection, plus proper disposal) for used oils -- again, driven by overall energy efficiency and economics, and not just mandated by governments. However, if such government mandates are enacted, they should apply equally to all retail and wholesale lubricant points of sale so as to not competitively disadvantage any single point of sale.