



Report of the ATIEL Used Oil Technical Committee 16 March 2009

Summary

Legislation relating to lubricating oils has recently been under review at European level and also within individual member states. This report examines existing legislation and the background to current developments.

Section 8 of the report contains a statement of the ATIEL position:

Used oil is a field where management systems and legislation continue to evolve but also where it is possible for lubricant marketers in one member state to learn from those in another in terms of best practice. ATIEL members should remain aware of developments in legislation regarding used oil and comply with legislation.

ATIEL supports the maximal and safe collection of used oils, safe and proper recycling processes and/or energy recovery processes and the minimisation of environmental impacts. ATIEL also opposes harmful disposal practices.

ATIEL is not in favour of the mandated incorporation of re-refined stock into lubricants.

ATIEL has no preference for any used oil disposal option which is technically and environmentally acceptable.

ATIEL recommends the development of minimum health and safety standards for assessment of the carcinogenicity of RRBO and for this purpose ATIEL is seeking guidance from Concawe concerning this issue

1. Introduction

The Technical Committee has been working to summarise legislation concerning used oil and also to understand the drivers and direction for legislation both within member states and across the European Union. The aim of the work is to provide and maintain an ATIEL position for information of members and to guide future policy.

2. European used oil policy and legislation

A review of European legislation relating to used oil is available on the website of the European Commission (1). A diagram summarising the legal framework is given in appendix 1 (2).

The main EU documents covering used oil are the Waste Oil Directive (WOD), the Waste Framework Directive (WFD), the Waste Incineration Directive (WID) and the European Waste Catalogue (EWC).

2.1. Waste Oil Directive (WOD) 75/439/EEC amended by 87/101/EEC

The Directive requires member states ensure the safe collection and disposal of used oil. It gives priority to disposal by regeneration where technical, economic and organisational constraints allow and contains clauses relating to permitting, record keeping and mixing with PCBs and other toxic substances. WOD pre-dates the Waste Framework Directive.

2.2. Waste Incineration Directive (WID) 2000/76/EC

This directive came into force December 28 2005 and poses limits on atmospheric emissions from burning of waste. It applies to co-incineration plants such as cement kilns as well as dedicated incinerators.

2.3. Thematic strategy on the prevention and recycling of waste

To help in the development of policy concerning used oil the European Commission commissioned a review of existing environmental impact studies which was published in 2001 (3). The Commission produced a strategy document, the Thematic Strategy on Prevention and Recycling of Waste" (4) in 2005 aimed at reducing waste and seeking to improve the use of waste materials. This report applied life cycle thinking to used oil disposal and concluded that "priority to regeneration of waste oils over use as fuel is not justified by any clear advantage". A further conclusion was that collection rates are too low.

2.4. Waste Framework Directive (WFD) 75/442/EEC

This Directive covers waste management in general. The WFD is under revision by the European Council and European Parliament as proposed by the "Thematic Strategy" (4). The revised Directive is expected to repeal the WOD and to incorporate the Hazardous Waste Directive. The definition of waste is under review, as are the definitions of 'recovery' and 'recycling'.

2.5. Hazardous Waste Directive 91/689/EEC

This Directive places requirements on the management of used oils ensuring controlled consignments of hazardous wastes.

2.6. European Waste Catalogue (EWC 2002)

The European Commission has developed a classification system for waste which is based on the EWC, issued in annex to Commission Decision 2000/532/EC as amended by 2001/119/EEC. The EWC consists of 20 chapters, each dealing with a different industry sector. Materials which are hazardous wastes are defined within EWC. Used oils are listed in section 13 of the catalogue.

2.7. Waste Management Hierarchy

The concept of waste hierarchy is introduced in the WFD. The hierarchy lists different means of handling waste in decreasing order of preference and is cited in the Council common position:

Prevention
Preparing for re-use
Recycling
Other recovery (e.g. energy recovery)
Disposal

3. Used oil Disposal in Europe

Management systems for used oil collection and disposal vary from one country to another. This variation is illustrated by some examples.

3.1. Italy

The Italian system is of particular interest as much quantitative data are available and a high degree of material recycling to base oil is promoted. There are 5 active lubricant re-refining plants in Italy with a combined nameplate capacity of about 260 ktpa. (1 ktpa = one thousand metric tonnes per year):

The Waste oil Directive is adopted in Italian law as DPR 691/82, under which a non-profit Consortium was established. The Consortium (COOU) is responsible for collection, selection, quality control and appropriate disposal of used oils – by re-refining, combustion or incineration. A further role is in providing information on appropriate used oil disposal.

An incentive for recycling comes in the form of reduced excise duty. In Italy, re-refined product pays 50% of the excise duty applied to virgin lubricant. This tax advantage is granted only if the used oils for re-refining are collected in Italy. The European Commission (7) believes that this discriminates against RRBO manufactured from used oils collected in other EU countries and thus infringes Article 90 of the EC Treaty. The Commission has requested Italy to cease application of the ruling concerning used oil from outside of Italy.

3.2. UK

The major route for disposal of used oil in the UK has traditionally been as fuel. In recent years about 60% has been used in electricity generating stations and 40% in road stone coating plants in which the oil is used as fuel to heat aggregates used in road laying. Atmospheric emissions limits introduced in WID have impacted the

routes for disposal of UK used oil reducing the sites which can burn it as fuel as both power stations and road-stone plants are subject to WID. Much of the used oil previously taken by power stations is now used as a reducing agent in steel manufacture, a process not subject to WID. A re-refining plant was recently re-commissioned at Stoke on Trent.

As some legislation applies only to waste, issues arise when used oil is treated to make it more suitable for burning in particular furnaces: Which specifications (in terms of contaminants) are necessary and how much (if any) processing is required to classify waste oil as material which is no longer waste?

The UK Court of Appeal overturned a previous ruling in the high court that waste lubricating oils recovered for use as fuels should be classified as waste. The Court of Appeal ruled that if a material is "sufficiently analogous" to a raw material which it replaces and does not have higher environmental risks, then it should cease to be defined as a waste. The UK government has established a Technical Advisory Group of stakeholders to help implement this ruling. The group is working to understand the environmental impacts of burning used oil and to establish chemical and physical specifications for fuel products derived from the material.

3.3. Portugal

The lubricants market in Portugal is 100 ktpa. Portuguese law 153/2003 established a new company 'Sogilub' to manage used oil collection and disposal. A new system was introduced from 01.11.05 in which lubricant manufacturers and importers pay a levy of 63 €/m³ based on the volume of lubricant sales to fund the used oil management system. A target was established to collect 30 ktpa in 2003.

3.4. France

A summary of the French system was published by ADEME in 2004 (8). In France a tax is levied on sales of finished lubricants, except those which generate no recoverable waste (e.g. two stroke, white oils, soluble metalworking fluids, mould release oils and base oils). In 2002/3 this tax was levied at a rate of 38.11 €/t.

Subsidies to collectors are managed by the French Environment Agency ADEME, with a committee responsible for setting the level of subsidy. In 2003 the 'average collection cost' was 78.7 €/t. The subsidy to collectors being between 45 and 79 €/t depending on the price paid to collectors by their customers, the re-refining company paying 12 €/t and other customers paying 20-40 €/t.

Disposal is through use as fuel in approved installations such as cement kilns and France also has a large plant manufacturing re-refined base oil.

In 2006 the French government reviewed its policy with regards to use of oil and was keen to further promote material recycling of used oil into materials which can only be manufactured from hydrocarbons. This seems likely to include further re-refining and increased emphasis on use as feedstock for conventional refineries, producing either fuel or lubricant base oil.

3.5. Spain

Royal Decree 679/2006 came into force in Spain in June 2006 requiring lubricant manufacturers to establish a non-profit organisation (SIGAUS) to handle used oil collection and disposal. Each marketer is required to pay SIGAUS to collect used oil

in proportion to the amount of lubricant sold.

The legislation sets recycling milestones:

Re-refining yields must exceed 50% and must be greater than 55% by 1.1.08.

95% of used oil must be collected by 1.1.06 and value must be recovered from all of the oil collected.

The quantity of used oil employed as feedstock for re-refining is required to increase from 55% in 2007 to 65% in 2008.

The non-profit organisation is also charged with conducting campaigns of public awareness and education with regards to used oil handling and disposal.

The differences between the systems adopted by each country demonstrate the opportunity to develop different approaches within the framework established by Brussels.

4. Discussions within the ATIEL Used Oil Technical Committee regarding priority to regeneration

The issues of the application of the waste hierarchy to used oil and the priority to regeneration have been discussed by the ATIEL used oil technical committee. Some members note the priority to regeneration in the WOD and cite certain life cycle assessment studies describing environmental benefits for re-refining compared with use as fuel (IFEU study (9)). Other members cite other life cycle assessment studies (e.g. Sofres (3)) which do not reach such a clear conclusion and argue that environmental benefits accrue from increased collection rates offered when disposal routes are less constrained. They cite the technical, economic and organisational constraints referred to by the WOD, the conclusions of the EC Thematic Strategy report (4) and a CO₂ balance favouring use as fuel over other disposal routes (Europa report (10)). The Committee has reached no clear conclusion on these issues.

5. Toxicology of re-refined base oils

Toxicology including hazard classification of virgin base oils (those manufactured directly from crude oil) is covered by Concawe report 6/05 and Product Dossier 97/108. The work described in these reports using mouse skin painting, short-term analytical and biological screening tests and the IP 346 test method (11) for polycyclic aromatic compounds and is the basis for European legislation under which virgin base oils do not require cancer classification if they meet the criterion IP 346 < 3% (12). However, the IP 346 methodology has not been validated in cancer prediction for RRBO based on animal and other short-term predictive tests. At present there is no agreed Europe-wide toxicology standard for the cancer classification or hazard classification of RRBO.

Whilst individually they may not be present in sufficient amounts to cause cancer, the aggregated amounts of poly-aromatic hydrocarbons may be sufficient to render some RRBO carcinogenic depending on the re-refining process technology used and the

degree of refining severity. Compared to virgin base oils only a limited amount of data has been published on the toxicology of RRBO. Hence there is uncertainty regarding the toxicology of RRBO, particularly with respect to carcinogenic activity. This can affect the perception of RRBO in the minds of lubricant customers, potentially leading to reduced demand for RRBO.

Prof. E Clonfero of Padova University presented a summary of toxicology testing of re-refined and virgin base oils carried out at Padova and also by Blackburn of Petrolabs Inc. in the USA (14-16).

Two further documents relating to RRBO toxicology were cited (17-18). These papers were used by the Australian government to address their toxicology standard for RRBOs.

In addition, UEIL presented further toxicology information on RRBOs: Individual PNAs (Grimmer) modified Ames, IP 346, biodegradability, aquatic toxicity and Bovine Udder Skin testing on both virgin and re-refined base oils.

Technologies such as solvent extraction and hydrogenation are available which, with appropriate design, operation and monitoring can reduce levels of poly-aromatic hydrocarbons and other contaminants in the initial feedstock which may also be present in the RRBO. However, these technologies are not universally applied. Indeed, some re-refiners might require capital investment in plant to routinely achieve an acceptable toxicology standard.

A proposal has been made within the ATIEL used oil technical committee to review, and if appropriate, develop a lubricants industry position and guidance on RRBO toxicology. Some recent toxicology data on RRBO may be available within the ATIEL membership which could lead to better understanding of the toxicology issues. It has been suggested that toxicology and environmental data could be collected for RRBO, particularly for the most recent generation of re-refining processes.

One way to generate a toxicology specification may be with help from the Concawe toxicology working group. To this end the ATIEL used oil technical committee chairman has approached the Concawe Health Management Group for advice. No specific toxicology testing budget is thought to be required at this stage as the approach from ATIEL used oil technical committee concerns collation of existing data, hazard assessment and development of an understanding of the scope of the resource which might be required to establish a toxicology standard for RRBO.

Development of such a standard would assist re-refiners in registration of RRBOs under REACH legislation. However, development of a toxicology standard for RRBOs would require both time and funding if more detailed testing is required. An alternative proposal is to consider the toxicology of products from different re-refining plants on a case-by-case basis.

6. Mandated incorporation of re-refined base oils

There are technical restrictions on the formulation of lubricant viscosity grades and attainment of performance levels depending on base oil and additive type. Hence base stock and additive selection should remain within the scope of the lubricant marketer. For this reason ATIEL is, in principle, not in favour of mandated incorporation of any ingredient including base stock irrespective of source or additive of any type into lubricants.

7. The likely direction of future legislation

There are several key issues in deciding the future of used oil legislation. One is the proportion of material which is re-refined to base oil and that which is burned as fuel (the waste hierarchy and priority to regeneration).

From the end of 2005, enforcement of WID has reduced the number of facilities which can burn waste. In this environment, a further issue has become more fully developed; when does a waste material cease to be waste? In particular, which specifications (in terms of contaminants) are necessary and how much (if any) processing is required to classify waste oil as material which is no longer waste?

This issue “an end to waste” is important for used oil as processing into a ‘product’ can remove the material from the scope of legislation (like WID) relating specifically to waste and can thus broaden the range of facilities which can burn the oil as fuel. Fuel products derived from used oil might need a specification and, in common with other products, might be expected to require registration with CAS numbers under the chemical abstracts system and also compliance with the requirements of REACH legislation (13).

In the UK, a court ruling in 2007 permitted a company involved in the collection and processing of used oil to sell a fuel produced from used oil for use in burners which are not regulated under WID. Following this ruling, the UK Government established a Technical Advisory Group of stakeholders to develop a protocol for manufacture and use of fuel products derived from used oil. This group is considering issues such as the composition of used oil and fuel products derived from it and the toxicological impacts of burning these materials. An expert has been appointed by the UK Environment Agency to propose standards for fuel derived from used oil and these are expected to be issued by the end of June 2008 for review and consultation.

The European Council adopted a common position on revision of the WFD on 20 November 2007. For the future, it seems likely that the WOD will be withdrawn and that used oil issues will become incorporated into the revised WFD. Legislation will emphasize the separate collection of used oils and Member States will have an option to create barriers to cross-frontier shipment of used oil destined for use as fuel to help protect established re-refining industries. The issue concerning priority to regeneration embodied in the WOD will most likely be addressed when the revised WFD is published following a European Parliament vote in mid 2008.

Hence, the direction of future European legislation continues to be uncertain but will turn on revision of the waste framework directive in Brussels, outcomes of end to waste debate focussed in the UK as well as further initiatives above the requirements of Brussels in individual Member States.

8. Channels of information and communication, potential partners and avenues of influence

Key figures within the European Commission for communication of the outcomes of the working group are Martin Pohlmann (Administrator production, consumption and waste at DG Environment) Marianne Klingbeil (Head of Unit, production, consumption and waste at DG Environment) Chris Allen (DG Environment) and Paul Speight (Thematic Strategy, DG environment).

Apart from ATIEL, organisations which have a voice in the used oil debate are Europa (crude oil refiners), GEIR (used oil re-refiners), organisations which collect used oil, those which manufacture fuels from used oil and also the trade bodies representing industries which have historically employed the material as fuel.

9. ATIEL position

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10. Future of the ATIEL used oil technical committee

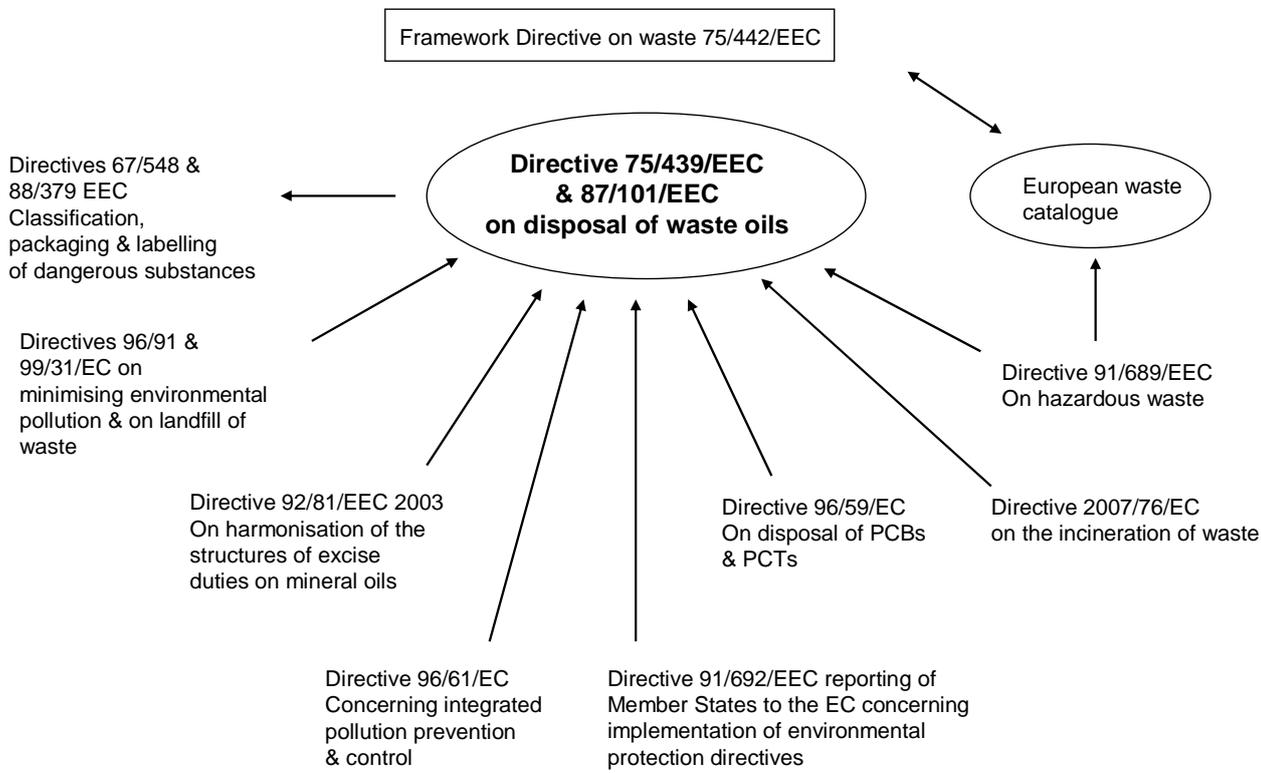
Like all of the ATIEL technical committees, the used oil committee reports to the ATIEL Technical Council. A meeting of the Technical Council on 28.03.07 agreed that the work of the Used Oil Technical Committee to date should be reported (this document) and that the committee should remain open, monitoring changes in legislation and meeting as and when necessary.

11. References

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3. Critical review of existing studies and life cycle analysis on the regeneration and incineration of waste oils. Taylor Nelson Sofres December 2001. Prepared for the European Commission.
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10. "Europa used oil position" EUROPIA 2003.
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14. Clonfero E et al "Mutagenicity and contents of polycyclic aromatic hydrocarbons in used and recycled motor oils" Mutat Res 1996 Jul 5; 368(3-4):283-91
15. Granella et al "Mutagenicity and contents of polycyclic aromatic hydrocarbons in new high-viscosity naphthenic oils and used and recycled mineral oils" Mutation Research / Genetic Toxicology Vol 343, issues 2-3, June 1995 pp. 145-150.
16. Dickson et al "Evaluation of the dermal carcinogenic potential of re-refined base stocks using the modified Ames assay, PAC analysis and the ³²P-postlabelling assay for DNA adduct induction. Applied Toxicology Vol 17, issue 2, pp. 113-7 (1997).
17. "A technical analysis of selected constituent maximum concentration limits in the Product Stewardship (Oil) Regulations 2000" prepared by Delta Toxicology Inc and Scientific Resources Inc, USA.
18. "Testing of motor oils against specific standards and prescribed tests as an element of the review of re-refined base oil tests under the Product Stewardship (Oil) Regulations 2000" prepared by SWB Consulting , Australia.

EU legal framework for used oil



After: C Olazabal Used oil workshop Brussels 30.5.2000 & C Hartmann Chester used oil conference 03.02.05