# Waste Stream

## Name

Used, spent or waste oils.

## Waste description

Used oil is any oil from industrial and non-industrial sources which has been used for lubricating or other purposes and has become unsuitable for its original purpose due to the presence of contaminants or impurities, or the loss of original properties ([[1]](#endnote-1)).Used oil includes, but is not limited to, used engine, gear, lubricating, hydraulic, metalworking, insulating and heat transmission oils.

Used oils comprise the original base oils and additives plus contaminants and impurities that are produced or that build-up in the oil during its use. Used oil commonly contains carcinogenic polycyclic aromatic hydrocarbons (PAHs) such as benzo[a]pyrene and benzo[a]anthracene ([[2]](#endnote-2)) ([[3]](#endnote-3)) ([[4]](#endnote-4)). Used motor oil, in particular, also contains heavy metals from certain additives and metal particles from engine wear; small amounts of water and antifreeze; gasoline and gasoline combustion products.

## Information on waste / non-waste classification

National provisions concerning the definition of waste may differ and, therefore, the same material may be regarded as waste in one country but as non-waste in another country. Determining whether a substance or object is or not a waste may not always be straightforward; however, it is ultimately the mandate of the national competent authority on waste to decide when an item is to be defined as waste or non-waste. Further work on clarifying this matter under the Basel Convention is in progress ([[5]](#endnote-5)).

## Classification under the Basel Convention (Annexes I, II, III, VIII and/or IX)

Used oil belongs to category Y8­—waste mineral oils unfit for their originally intended use—in Annex I, and is further classified as A3020 in Annex VIII. Used oils are generally considered to possess hazard characteristics H11, H12 and H13 in Annex III.

Used oil is combustible, but not generally flammable. The Material Safety Data Sheet (MSDS) may provide information about the flash point of the virgin oil. If used oil is mixed with solvents or acids, additional flammability (H3), corrosivity (H8) or other hazards will need to be considered.

## Basel Convention guidelines and other guidelines/instruments

* Technical Guidelines on Waste Oils from Petroleum Origins and Sources (Y8) – Available at http://www.basel.int/Implementation/TechnicalMatters/DevelopmentofTechnicalGuidelines/AdoptedTechnicalGuidelines/tabid/2376/Default.aspx
* New Zealand Environmental Protection Authority. 2013. Management and Handling of Used Oil. Code of Practice HSNOCOP 63. Available at http://www.epa.govt.nz/Publications/Management\_and\_handling\_of\_used\_oil.pdf
* Technical Guidelines on Used Oil Re-Refining or Other Re-Uses of Previously Used Oil (R9) – Available at http://www.basel.int/Implementation/TechnicalMatters/DevelopmentofTechnicalGuidelines/AdoptedTechnicalGuidelines/tabid/2376/Default.aspx
* IETC-UNEP Compendium of Recycling and Destruction Technologies for Waste Oils – Available at http://www.unep.org/ietc/InformationResources/Publications/WasteOilsRecyclingDestructionCompendium/tabid/106700/Default.aspx
* Reference Document on Best Available Techniques for the Waste Treatments Industries – Available at http://eippcb.jrc.ec.europa.eu/reference/

# Waste Management

## General handling

Appropriate personal protective equipment (PPE) should be worn, and Material Safety Data Sheet (MSDS) should be readily available for employees to seek additional information about potential hazards and the appropriate corrective action in the event of an accident.

Used oil should be kept separate from solvents and other waste streams to allow for proper reclamation or ultimate disposal options. PCB-based oils which may be contained, in particular, in transformers, condensers and hydraulic installations, should be managed separately from other used oils.

## Collection

The principles and regulations laid down in many countries for the collection of used oil include the following aspects that can be used as a model for setting up a used oil management scheme ([[6]](#endnote-6)): (1) regulation on the character/properties/composition of the oil that will be accepted, (2) reprocessing procedures, (3) stipulation of limit values for polychlorobiphenyl derivatives and total halogens, (4) introduction of a labelling and take-back obligation, (5) priority given to materials recycling and energy recovery over final disposal, (6) positioning of used oil collection stations in the vicinity of sales outlets and places of use, and (7) prohibition of the admixture of foreign substances (such as used oils containing polychlorobiphenyl derivatives, other hazardous wastes, and solvents).

Collection centres and aggregation points collect used oil from smaller generators and store it and transport it to a recycling/disposal facility. Collection centres typically accept used oil from multiple sources that include both businesses and individuals; aggregation points collect oil only from places run by the same owner or operator and from individuals. While visual inspection and scanning for the quality of used oil can be done, the use of a halogen detector to scan incoming oil is suggested in order to help minimise the potential for contamination of the collection tank.

Used oil collection depots should include features to minimize the potential for unauthorized or unsupervised deliveries to the facility. Appropriate signage should also be posted identifying the site as a used oil collection depot.

## Storage

Tanks and containers used to store used oil should be kept in good condition (with no severe rusting, structural defects or deterioration, and not visibly leaking). Regular inspection and routine maintenance of all storage tanks and containers should be required. Containers should have tight-fitting lids that are kept closed except when removing or adding used oil.

Tank and containers should have a secondary containment system sufficiently impervious to prevent used oil releases from migrating out of the system to the soil, groundwater or surface water. Secondary containment systems for single storage tanks should have a volumetric capacity of not less than 110% of the tank volume (the additional bund volume compensates for loss of capacity due to accumulated rainwater and also provides some limited margin of safety in the event of tank overfilling). Where there is more than one tank within the bund, it is recommended that the capacity should be at least sufficient to accommodate 110% of the largest tank’s maximum capacity or 25% of the total maximum capacities of all tanks, whichever is the greater ([[7]](#endnote-7)) ([[8]](#endnote-8)) ([[9]](#endnote-9)). Used oil tanks should also be equipped with overfill protection.

Used oils should be stored in separate tanks and trucks collecting oils must be equipped with separate tanks according to the type and quality of oils, if they are intended for recycling. If the oils are mixed, the quality is impacted and the oils may need to be sent directly for destruction (instead of recycling).

## Packaging and labelling

Containers should be identified with labels marked “Class 9” using the appropriate symbol, the relevant United Nations number and proper shipping name: UN3082, waste environmentally hazardous substance, liquid, N.O.S.

## Transportation

Transport vehicles should be properly marked with placards identifying the fact that used oil is being transported. PPE should be provided for the transport personnel, who should be trained in its emergency use. Transport vehicles should be outfitted with the equipment necessary to neutralize any simple spillage or leakage problems, and the transport personnel trained on how to use it. All releases should be immediately contained.

Hazardous waste manifests or consignment notes must accompany each shipment of hazardous waste in accordance with national law, until it reaches its final destination. On completion of a shipment, the disposal company should complete the hazardous waste manifest form and return it to the establishment. If the waste regulatory authority is sufficiently well established, it may be possible to pre-notify the agency about a planned offsite transport and disposal of hazardous waste and to obtain the agency’s approval.

Emergency response information—Emergency Response Intervention Cards (ERICards) ([[10]](#endnote-10)), Emergency Response Guides ([[11]](#endnote-11))—should accompany shipments of hazardous waste to provide guidance on initial actions in response to a transport accident.

# Disposal Operations (Annex IV, Sections A and B)

## Best available techniques (BAT) and best environmental practices (BEP)

Disposal facilities should meet all basic requirements to ensure an environmentally sound management (ESM) of wastes and commit to continual improvement in their operations. A facility should have the following, which should meet the approval of the relevant authorities: (a) appropriate design and location; (b) an environmental and social impact assessment, where appropriate; (c) sufficient measures in place to safeguard occupational safety and health, including an appropriate and adequate training programme for its personnel; (d) sufficient measures in place to protect the environment; (e) an applicable EMS in place, if feasible and appropriate; (f) an adequate and transparent monitoring, recording, reporting and evaluation programme; (g) an adequate emergency plan and response mechanism; (h) an adequate plan for closure and aftercare.[[12]](#endnote-12)

A compendium of technologies for the recycling and destruction of used oil, published by the International Environmental Technology Centre of the United Nations Environment Program (IETC-UNEP), presents an overview of generic treatment technologies, and provides detailed information on specific technologies ([[13]](#endnote-13)); the compendium outlines a process of technology selection based on UNEP’s Sustainable Assessment of Technologies (SAT) methodology ([[14]](#endnote-14)).

In all waste oil treatment processes, the economic and calorific values of the waste oils are recovered to varying degrees. Re-refining to base oil by various physical and chemical methods of treatment, and direct burning (mainly in cement factories) are the main management approaches used across Europe, with the main processes used for the treatment of waste oils being blending, separation, chemical treatment, and distillation and cracking ([[15]](#endnote-15)).

The European Commission’s BAT (Best Available Techniques) Reference Document (BREF) for the waste treatment industries describes BAT applicable to the re-refining of waste oils (checking chlorinated solvents and polychlorinated biphenyls; condensation for the gas phase of the flash distillation units; abatement during the loading and unloading of vehicles; different abatements when chlorinated species are present; thermal oxidation; vacuum systems; using the residues from vacuum distillation or thin film evaporators; highly efficient re-refining processes of waste oil; waste water emission values for hydrocarbon and phenols), and to the preparation of waste to be used as fuel (transferring the knowledge of the waste fuel composition prepared; quality assurance systems; manufacturing different type of waste fuels; waste water treatments; safety aspects) ([[16]](#endnote-16)). Information pertaining to the use of used oils as alternative fuels in cement kilns may be found in the Technical Guidelines on the Environmentally Sound Co-Processing of Hazardous Wastes in Cement Kilns adopted under the Basel Convention ([[17]](#endnote-17)).

# Sustainable Materials Management (SMM)

## Extended Producer Responsibility (EPR)

* Canada: The Manitoba Association for Resource Recovery Corporation (MARRC), the British Columbia Used Oil Management Association (BCUOMA), the Alberta Used Oil Management Association (AUOMA), the “Société de Gestion des Huiles Usagés” (SOGHU), and the Saskatchewan Association for Resource Recovery Corporation (SARRC), administer province wide mandatory stewardship programmes for used oil materials, in compliance with the respective provincial legislation. The programmes are funded by environmental handling charges (EHC) remitted by industry stewards—wholesalers, first sellers or producers—to the corresponding association as a condition of membership; the EHC may or not be passed along the supply chain to the consumer. Return Incentives (RI) are paid by the associations to registered collectors to provide additional economic drive to encourage the collection and processing of used oil. ([[18]](#endnote-18))
* Australia: The Product Stewardship for Oil Program (PSO), administered by the Department of the Environment, aims to encourage the environmentally sustainable management and re-refining of used oil and its re-use. The product stewardship oil levy is currently set at AUD$0.085 per litre of lubricant oil produced or sold in Australia; the levy applies to both domestic and imported oils and is paid by oil producers and importers. The Product Stewardship (Oil) Act 2000 establishes the general framework and benefit entitlements of the PSO arrangements. Product stewardship benefits are paid to recyclers as a volume-based incentive to encourage increased oil recycling. Benefits are provided at different rates depending on the type of product: the lowest benefits are provided for basic burner fuels and the highest are provided for full recycling into as new, re-refined base oil. The Product Stewardship (Oil) Regulations 2000 specify a health, safety and environmental standard for re-refined lubricants. ([[19]](#endnote-19))

## Financing systems

* Deposit/Refund Schemes: In a deposit/refund system, a payment (the deposit) is made when a potentially polluting product (or a product that is valuable at end of life) is purchased and is fully or partially refunded when the product or its residual is returned through the retail network, i.e. when pollution is avoided. If the product or its residual is not returned, the deposit can be used for measures that aim to improve the management of waste products. Ideally, the deposit rate component of a deposit-refund system should reflect the marginal external cost of damage from improper disposal of waste oil; the refund rate should reflect the net avoided marginal external cost of damage resulting from recycling.
* Product Taxes: Product taxes are applied to products that create pollution either when they are manufactured, consumed or disposed. A product tax on lubricants that do not meet certain environmental standards could encourage the purchase of high-quality lubricants with a reduced environmental impact. A product tax can be levied on all lubricants imported/sold; such a tax can raise the money needed to improve the wastes oil management system. ([[20]](#endnote-20))
* Advanced Recycling Fee: An advanced recycling fee is a fee that the consumer pays for certain products at the point of sale. The fee is based on estimated costs of collection, recycling and disposal. The fee is often set per unit of the product sold, but can also be assessed on a weight basis. The fee can be either visible, i.e. shows on the customer’s receipt, or invisible, i.e. incorporated into the product retail price. ([[21]](#endnote-21))

# Legislation

## Existing national, regional and international legislations

* European Union: Directive 2008/98/EC of the European Parliament and of the Council, of 19 November 2008, on waste and repealing certain Directives. Available at http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32008L0098
* United States: Standards for the Management of Used Oil. Available at http://www.gpo.gov/fdsys/granule/CFR-2000-title40-vol19/CFR-2000-title40-vol19-part279/content-detail.html
* British Columbia, Canada: Recycling Regulation of the Environmental Management Act (B.C. Reg. 449/2004) as amended by B.C. Reg. 296/2009. Available at http://www.bclaws.ca/Recon/document/ID/freeside/449\_2004
* Australia: Product Stewardship (Oil) Act 2000. Available at http://www.comlaw.gov.au/Details/C2010C00840
* Germany: Waste Oil Ordinance (Altölverordnung), as amended in 2002. Available at http://www.bmub.bund.de/en/topics/water-waste-soil/waste-management/details-waste-management/artikel/oekobilanz-fuer-altoelverwertungsverfahren-ergebnisse-eines-vergleichs-von-altoel-verwertungswegen-nach-oekologischen-kriterien/?tx\_ttnews%5BbackPid%5D=583&cHash=7c5bb3b50e37fb601e16ce6a3a78071d

# Capacity and Feasibility

Information on disposal and recovery facilities authorized, permitted or registered to operate in the territories of the Parties to the Basel Convention, is provided in the Online Reporting Database of the Basel Convention, which contains data and information on hazardous wastes and other wastes, as transmitted by Parties, annually, pursuant to Article 13 (3) of the Convention. The database is accessible through the Basel Convention website on: http://www.basel.int/Countries/NationalReporting/ReportingDatabase/tabid/1494/Default.aspx.

# Permitting

Waste facilities should be licensed/authorised/permitted. Waste exporters should be licensed and should present a detailed set of operating procedures describing its activities and those of its partners in other countries in order to facilitate governmental actions in the regional scenario.

# Enforcement

The ESM of wastes requires a regulatory and enforcement infrastructure that ensures compliance with legal instruments and standards. Consideration should be given to a national (and sometimes a regional) policy that includes provisions to allow prompt, adequate and effective enforcement actions to be undertaken, including sanctions and penalties that will serve as a deterrent to non-compliance.

Measures should be in place to ensure adequate monitoring, inspection and enforcement of waste imports and exports subject to the requirements of the Basel Convention, by agents of the State and cooperation with enforcement agencies in other States (to prevent illegal traffic). Adequate penalties and sanctions for illegal traffic should discourage such movements in the future.

# Certification and Auditing Systems

It is recommended that licensed waste management facilities should be subject to annual inspections by the appropriate government agencies and/or audits by a recognised independent auditor. The objective of the inspection and/or auditing procedure would be to: check conformance of the facility with all basic requirements to ensure the ESM of wastes, with relevant environmental regulations, and, if applicable, current EMS systems. Verifying compliance with existing laws and regulations is embodied in the European Community Eco-Management and Audit Scheme (EMAS). Under ISO 14001, a facility is required to know whether or not it is in compliance with applicable laws and regulations; without that knowledge, the facility would be considered out of conformance with that ISO standard. The inspection and/or audit should also assess the performance of the facility with respect to environment, health and safety objectives.[[22]](#endnote-22)

In Germany, facilities may be certified as “Entsorgungsfachbetrieb” (specialised waste management companies) according to the requirements set out in the Ordinance on Specialised Waste Management Companies (EfbV).[[23]](#endnote-23)

# Transboundary Movements

Governments should put in place legal requirements to implement and enforce the provisions of relevant international and/or regional instruments in relation to the transboundary movement of wastes (pre-notification, prior informed consent, etc.), including the Basel Convention.

Transboundary movements of wastes for management in another country cannot be assured to result in ESM by evaluating receiving facilities alone. Elements such as those for effective legal systems, government oversight and other infrastructure to protect the occupational health and safety of workers, communities and the environment, should also be considered. Transboundary movements of wastes should not be considered to be legal where there is a reason to believe the waste in question will not be managed according to ESM.

Notifications received by the Secretariat of the Basel Convention from Parties—pursuant to Article 13 of the Convention—on decisions to prohibit or restrict the import/export of hazardous or other wastes are published on the website of the Secretariat[[24]](#endnote-24).

1. Secretariat of the Basel Convention. 2002. Technical Guidelines on Used Oil Re-Refining or Other Re-Uses of Previously Used Oil (R9). Basel Convention Series/SBC No. 02/05. Available at http://www.basel.int/Implementation/TechnicalMatters/DevelopmentofTechnicalGuidelines/AdoptedTechnicalGuidelines/tabid/2376/Default.aspx [↑](#endnote-ref-1)
2. Irwin, R.J. (Ed.) 1997. Environmental Contaminants Encyclopedia: Oil, Used Motor Oil Entry. National Park Service, Water Resources Divisions, Water Operations Branch. Available at http://www.nature.nps.gov/water/ecencyclopedia/contents.cfm [↑](#endnote-ref-2)
3. Randles, K., Mazur, L. and Milanes, C. 2007. A Review of the Potential Human and Environmental Health Impacts of Synthetic Motor Oils. Office of Environmental Health Hazard Assessment, California Environmental Protection Agency. Available at http://oehha.ca.gov/risk/pdf/SyntheticsFINAL-040607.pdf [↑](#endnote-ref-3)
4. Agency for Toxic Substances and Disease Registry. 1997. Toxicological Profile for Used Mineral-based Crankcase Oil. U.S. Department of Health and Human Services. Available at http://www.atsdr.cdc.gov/toxprofiles/tp102.pdf [↑](#endnote-ref-4)
5. For further information, refer to the development of “Technical Guidelines on Transboundary Movements of E-waste and Used Electrical and Electronic Equipment, in Particular Regarding the Distinction Between Waste and Non-waste Under the Basel Convention” (http://www.basel.int/Implementation/TechnicalMatters/DevelopmentofTechnicalGuidelines/Ewaste/tabid/2377/Default.aspx), the development of Guidance to Provide Further Legal Clarity in Relation to “Used and End-of-life Goods” (http://www.basel.int/Implementation/LegalMatters/CountryLedInitiative/OutcomeofCOP10/Providingfurtherlegalclarity/tabid/2673/Default.aspx), and the development of a Glossary of Terms to provide additional legal clarity with respect to certain terms used in the Convention (http://www.basel.int/Implementation/LegalMatters/LegalClarity/tabid/3621/Default.aspx) [↑](#endnote-ref-5)
6. Speight, J.G. and Exall, D.I. 2014. Refining Used Lubricating Oils. Chemical Industries/138. Boca Raton: CRC Press. [↑](#endnote-ref-6)
7. Environment Agency for England and Wales, Northern Ireland Environment Agency & Scottish Environment Protection Agency. 2011. Pollution Prevention Guidelines PPG 2. Safe storage: Above ground oil storage tanks. Available at https://www.gov.uk/government/uploads/system/uploads/attachment\_data/file/290118/pmho0811bucr-e-e.pdf [↑](#endnote-ref-7)
8. Environment Protection Authority (EPA) South Australia. 2012. Liquid Storage Guidelines: Bunding and spill management. Updated August 2012. Available at http://www.epa.sa.gov.au/xstd\_files/Waste/Guideline/guide\_bunding.pdf [↑](#endnote-ref-8)
9. Province of British Columbia Environmental Management Act, Hazardous Waste Regulation, Part 4–Additional Requirements, Division 2–Storage Facilities: Operational requirements. Available at http://www.bclaws.ca/Recon/document/ID/freeside/63\_88\_00 [↑](#endnote-ref-9)
10. For further information, refer to http://www.ericards.net/ [↑](#endnote-ref-10)
11. For further information, refer to http://www.tc.gc.ca/eng/canutec/guide-menu-227.htm or http://phmsa.dot.gov/hazmat/library [↑](#endnote-ref-11)
12. Secretariat of the Basel Convention. 2013. Framework for the Environmentally Sound Management of Hazardous Wastes and Other Wastes. Available at http://www.basel.int/Implementation/CountryLedInitiative/EnvironmentallySoundManagement/ESMFramework/tabid/3616/Default.aspx [↑](#endnote-ref-12)
13. International Environmental Technology Centre (IETC). 2012. Compendium of Recycling and Destruction Technologies for Waste Oils. United Nations Environment Programme. Available at http://www.unep.org/ietc/InformationResources/Publications/WasteOilsRecyclingDestructionCompendium/tabid/106700/Default.aspx [↑](#endnote-ref-13)
14. International Environmental Technology Centre (IETC). 2012. Application of the Sustainability Assessment of Technologies Methodology: Guidance Manual. United Nations Environment Programme. Available at http://www.unep.org/ietc/InformationResources/Publications/SustainabilityAssessmentofTechnologyManual/tabid/106701/Default.aspx [↑](#endnote-ref-14)
15. EIPPCB (European Integrated Pollution Prevention and Control Bureau). 2006. Reference Document on Best Available Techniques for the Waste Treatment Industries (August 2006). European Commission, Joint Research Centre, Institute for Prospective Technological Studies. Seville. Available at ftp://ftp.jrc.es/pub/eippcb/doc/wt\_bref\_0806.pdf [↑](#endnote-ref-15)
16. EIPPCB (European Integrated Pollution Prevention and Control Bureau). 2006. Reference Document on Best Available Techniques for the Waste Treatment Industries (August 2006). European Commission, Joint Research Centre, Institute for Prospective Technological Studies. Seville. Available at ftp://ftp.jrc.es/pub/eippcb/doc/wt\_bref\_0806.pdf [↑](#endnote-ref-16)
17. Secretariat of the Basel Convention. 2012. Technical Guidelines on the Environmentally Sound Co-Processing of Hazardous Wastes in Cement Kilns adopted under the Basel Convention. Available at http://www.basel.int/Implementation/TechnicalMatters/DevelopmentofTechnicalGuidelines/AdoptedTechnicalGuidelines/tabid/2376/Default.aspx [↑](#endnote-ref-17)
18. For further information, refer to http://www.usedoilrecycling.com/en/ [↑](#endnote-ref-18)
19. For further information, refer to http://www.environment.gov.au/protection/used-oil-recycling/product-stewardship-oil-program [↑](#endnote-ref-19)
20. Africa Institute for Environmentally Sound Management of Hazardous and Other Wastes. 2013. Regional Policy Guidelines: Economic Instruments for the Environmentally Sound Management of Waste Oil. Available at http://africainstitute.info/reports/AI%20-%20Regional%20Policy%20Guidelines\_%20for%20Waste%20Oil.pdf [↑](#endnote-ref-20)
21. Africa Institute for Environmentally Sound Management of Hazardous and Other Wastes. 2013. Regional Policy Guidelines: Economic Instruments for the Environmentally Sound Management of Waste Oil. Available at http://africainstitute.info/reports/AI%20-%20Regional%20Policy%20Guidelines\_%20for%20Waste%20Oil.pdf [↑](#endnote-ref-21)
22. Organisation for Economic Co-operation and Development (OECD). 2007. Guidance Manual on Environmentally Sound Management of Waste. Available at http://www.oecd.org/env/waste/39559085.pdf [↑](#endnote-ref-22)
23. German Ordinance on Specialised Waste Management Companies (Entsorgungsfachbetriebeverordnung - EfbV), of September 1996. Available at http://www.bmub.bund.de/fileadmin/bmu-import/files/pdfs/allgemein/application/pdf/wastemanage.pdf [↑](#endnote-ref-23)
24. For further information, refer to http://www.basel.int/Countries/ImportExportRestrictions/tabid/1481/Default.aspx [↑](#endnote-ref-24)