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Environment

Reverse logistics in gas stations in the metropolitan region of Curitiba (Brazil)

Logística reversa em postos de combustíveis da região metropolitana de Curitiba

Mayara Fernanda Simões[I], Paulinho Rene Stefanello[I], Frederico Fonseca da Silva[I], Alexandre Machado Fernandes[I]

[I] Federal Institute of Paraná, Curitiba, PR, Brazil

ABSTRACT

The National Solid Waste Policy (PNRS) established by Law 12,305/2010, mentions Reverse Logistics (RL) as a development tool for the return of the production cycle, and also presents instruments for sharedresponsibility for the life cycle of products. The RL of lubricating oils in post-consumption and return is linked to concern for the environment and sustainability in the business sphere. The aim of this studywas to describe the RL process of gas stations and their tax benefits, through bibliographic and documentary research, in addition to an unstructured interview with professionals involved in the process and through a case study. It was found that compliance with environmental obligations imposed by the Government, such as the destination of used or contaminated lubricating oil packaging (OLUC), can be considered inputs that may generate PIS and COFINS credits, and the revenues obtained from the sale of the destination of OLUC may be considered as environmental revenues, as well as the structureof real estate to be measured as environmental assets.

Keywords: Reverse logistics; Lubricant oil; Environmental accounting

RESUMO

A Política Nacional dos Resíduos Sólidos (PNRS) instituída pela Lei 12.305/2010 cita a Logística Reversa (RL) como um instrumento de desenvolvimento para o retorno do ciclo produtivo, também apresenta instrumentos para a responsabilidade compartilhada pelo ciclo de vida dos produtos. A RL dos óleos lubrificantes no pós-consumo e o retorno está vinculado a preocupação com o meio ambiente e a sustentabilidade no âmbito empresarial. O objetivo deste estudo foi descrever o processo de logística reversa de postos de combustíveis e seus benefícios tributários, através de pesquisa bibliográfica e documental, além de entrevista não estruturada com profissionais envolvidos no processo e por meio

de estudo de caso. Verificou-se que o cumprimento das obrigações ambientais impostas pelo Poder Público, como a destinação das embalagens de óleos lubrificantes usadas ou contaminadas (OLUC), pode ser considerado insumos e que poderão gerar créditos de PIS e COFINS, e as receitas obtidas pela venda da destinação do OLUC poderão ser consideradas como receitas ambientais, bem como a estrutura dos bens imóveis serem mensurados como ativos ambientais.

Palavras-chave: Logística reversa; Óleo lubrificante; Contabilidade ambiental

1 INTRODUCTION

According to Leite (2017), studies on Reverse Logistics (RL) started in the 1960s, where terms such as “reverse channels” were already found. “Reverse flow” appeared in the scientific literature of the 70s, according to Brito and Bekker (2003). In the 90s, Stock (1992) referred to logistics as a role for waste disposal, recycling and management of hazardous materials. Business logistics was divided into four operational areas: supply logistics (supplying material inputs); manufacturing support logistics (planning, storage and control of internal flows); distribution logistics (delivery of received products); and RL (return of after-sales and post-consumer products).

A study carried out by the National Association of Automotive Vehicles (ANFAVEA, 2019), reports that in 20 years the vehicle fleet in the country will grow 140% and will reach the mark of 95.2 million units. Vehicles consume lubricating oil to prevent the wear of their parts; this oil is burned by the engine and is necessary to replace it due to time or wear and tear. Oil taken from the engine is defined as Used or Contaminated Lubricating Oil (OLUC).

Article First of Resolution 362/2005 of the National Council for the Environment (CONAMA, 2005) establishes that all used or contaminated lubricating oil must be collected, collected and disposed off. The PNRS (National Policy on Solid Waste), established by Law 12,305/2010, requires the mandatory management of solid waste, including OLUC and its packaging, and presents instruments for shared responsibility for the life cycle of products. Pursuant to article 33, item IV, lubricating oil traders are required to carry out RL.

Given this context, this article raises the following question: are there tax benefits for the lubricating oil dealer in the post-consumption RL process? The main objective of this article was to describe the RL process for gas stations and its tax benefits, with specific objectives: (i) describe the RL process for lubricating oil; (ii) verify tax benefits on the reseller's obligations; and, (iii) identify environmental accounting in RL.

The research took place through a case study, in a network of gas stations in the metropolitan region of Curitiba, State of Parana (Brazil).

2 THEORETICAL FOUNDATION

2.1 Environmental accounting

Environmental accounting, according to Ribeiro (2010), is a segmentation of accounting and not a new science, with the objective of identifying, measuring and clarifying events related to environmental preservation, protection, and recovery, highlighting the company's equity situation.

The definition of environmental accounting is the registration of environmental heritage (goods, rights and obligations). Creating conditions for stakeholders to analyze the economic and financial situation of the company is the objective, observing the effects caused to the environment by the company itself. The choice of adopting the concept of environmental accounting is up to the company itself, if it wants to demonstrate that it cares about the environment (SILVA, 2011).

Environmental assets are the goods acquired by the company for the purpose of controlling, preserving and recovering the environment (TINOCO; KRAEMER, 2011). According to Ribeiro (2010), they are made up of all assets and rights owned by companies, which are capable of generating economic benefits in future periods and which aim at environmental preservation, protection and recovery.

Accounting must show environmental liabilities resulting from present obligations and resulting from past events (RIBEIRO, 2010). Environmental liabilities, according to Silva (2011):

> These are all obligations, voluntarily or involuntary, that will require in the future the delivery of assets, provision of services or sacrifices of economic benefits, as a result of transactions or operations, past or present, which involved the institution with the environment and caused some environmental damage.

Ribeiro (2010) considers environmental expenses as all expenses involved with environmental management consumed in the period and incurred in the administrative area. However, according to Silva (2011), when environmental expenses are applied indirectly to production, these expenses are classified as environmental expenses and when they are applied directly; they are classified as environmental costs.

Environmental costs are expenses to manage the impacts of activities on the sector, being environmentally responsible (UN, 1998). According to Ribeiro (2010), environmental expenses thus improve the efficiency of the company's operations and, consequently, its environmental efficiency, which is one of the facts that make the separation of operating costs from those of an environmental nature complex.

According to Tinoco and Kraemer (2011), environmental costs represent all the effort, effort directly or indirectly linked to any expense, regardless of disbursement, related to goods and services aimed solely and exclusively at preserving the environment.

Environmental revenue can be defined as market gain, obtained by the company when public opinion recognizes its preservation policy and gives preference to its products. The environmental revenue comes from the provision of specialized services in environmental management; sale of products made from leftover inputs or recycled ones; use of gases and heat; reduction of energy and water consumption (TINOCO; KRAEMER, 2011).

2.2 Reverse logistics

Reverse business logistics, or simply RL, according to Valle and Gabbay (2014), is the process that guarantees the return of products in the opposite direction, generating new means of production or a new use.

As Castiglioni (2012) and Castro (2011) mentions, RL is the process of planning, implementing and controlling the flow of raw materials, in-process stock and finished products (and their information flow) from the point of consumption to the point of origin, with the objective of recapturing the value or making a proper disposal.

Law 12.305/2010 (BRASIL, 2010) defines RL

> Art. 3rd, item XII - reverse logistics: instrument of economic and social development characterized by a set of actions, procedures and means intended to enable the collection and return of solid waste to the business sector, for reuse, in its cycle or in other cycle's production, or other environmentally appropriate final destination.

According Novaes (2015), RL aims to reuse various consumer goods, such as cars, appliances, computers, cell phones, packaging, etc. When the use is not feasible, incineration or deposit in safe places considering its components so as not to contaminate the soil and surface and underground aquifers.

According to Paoleschi (2013) conceptualizes RL as:

> [...] it is the integrated logistics area that plans, operates and controls the flow and the corresponding logistical information, the return of after-sales and post-consumption goods or the production cycle, through reverse distribution channels, aggregating to them value of various natures: economic, ecological, legal, logistical, corporate image, among others.

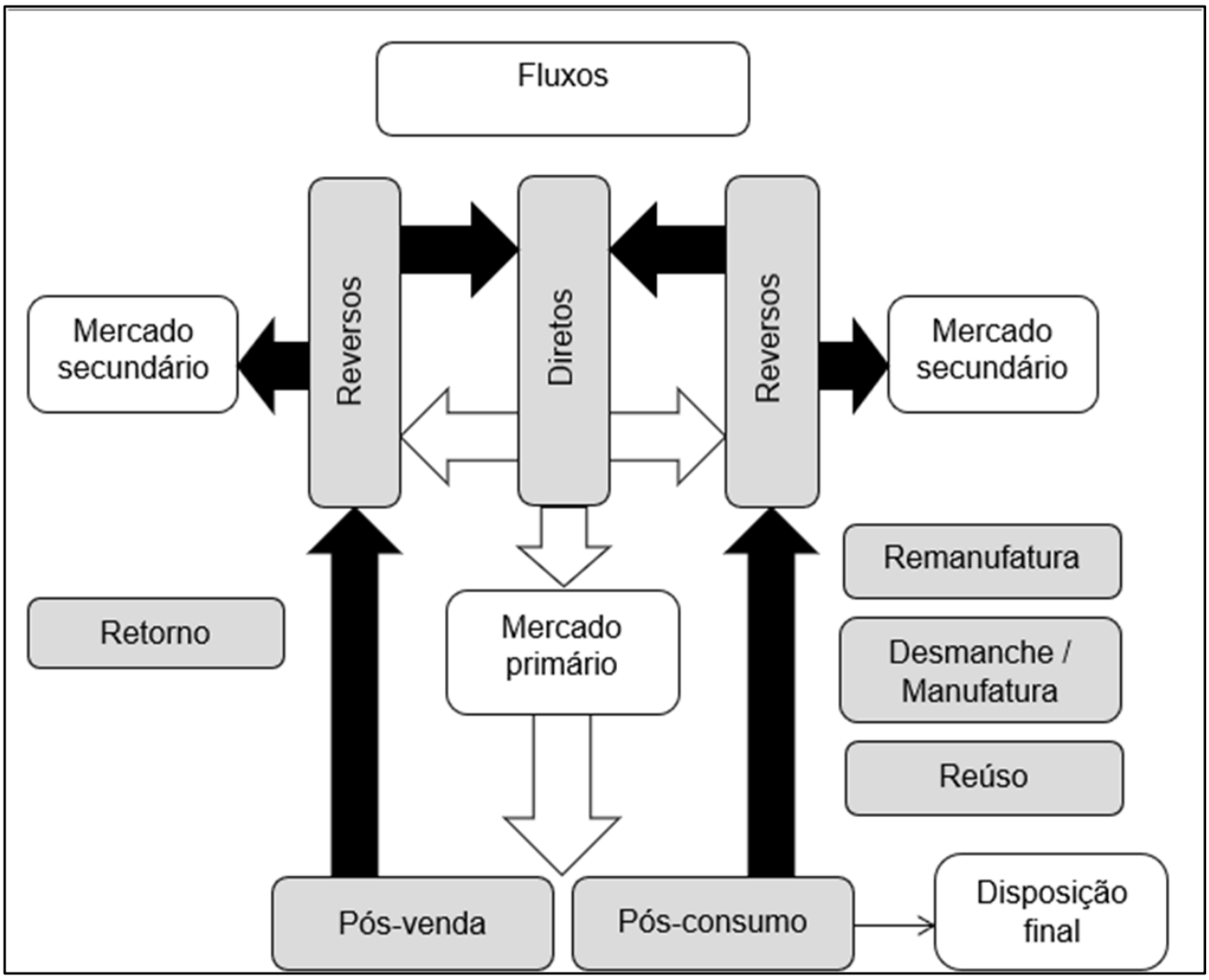
However, there is a divergence between the amounts of discarded and reused waste. This is because consumers often do not find organized reverse distribution channels for disposal (PAOLESCHI, 2013).

According to Leite (2017), the reverse distribution channels are divided into post-sale and post-consumption returns. Intrinsic quality, commercial agreements,

products that need repair or maintenance, returnable packaging, reuse and life cycle are some reasons for the return of products. The stages of the processes of the distribution channels range from commercialization to the final consumer, in which the physical distribution of goods is the path for moving the product to its final destination.

Also according to Leite (2017), the process of the direct flow of products covers the primary raw material to the primary market, where it can be continued until the consumer / end user of the product.

Figure 1 – Direct and reverse distribution channels in post-sales and post-consumption



Source: Adapted from Leite (2017)

As shown in Figure 1, after the primary market, the material is discarded. The flow of post-consumer distribution channels begins, separating into reverse

channels for reuse, remanufacturing and recycling. They go to the secondary market, thus initiating a new cycle or final disposition.

2.3 Post-consumption reverse logistics

Post-consumer RL is dedicated to the product after its useful life, with the expectation of reuse (PAOLESCHI 2013). According to Novaes (2015), goods produced by industry and sold by retailers have an estimated useful life, which is determined by the durability of components and parts and the obsolescence of their consumption characteristics.

According to Leite (2017), durable and semi-durable industrial goods, after being transferred to a second user, become a post-consumer product.

Considering the cases of the used product not being sold, and that it is donated to another person, the reverse flow continues, as it remains in use until final disposal. Laws regarding post-consumption flows on regulation and control are quite strict in several developed countries, following the concept of extended producer responsibility, in which companies are responsible for the entire life cycle of the good for they are produced or marketed (NOVAES, 2015).

After the consumption of the good for which its primary initial function was created, the flow of these goods follows three different destinations: remanufacturing, recycling[1] and final disposal[2] (LEITE, 2017).

Remanufacture is when a product goes through a technical-fundamental vision process, with some components replaced and performance tests carried out, forming a new product with functions identical to the original, also called reconditioned. When remanufacturing or recycling is not possible, the

[1] Recycling is a set of techniques for reusing discarded materials, reintroducing them into the production cycle(BRASIL, 2019).

[2] Final disposal is the orderly distribution of tailings in landfills, observing specific operational standards in order to avoid damage or risks to public health, safety and to minimize adverse environmental impacts (BRASIL, 2019).

predetermined destination is necessary for final disposal, incineration and landfills are the most common, varying according to the suitability of the product (NOVAES, 2015).

2.4 National Solid Waste Policy (PNRS)

The National Solid Waste Policy (PNRS), Law 12.305 was enacted on August 2, 2010 (BRASIL, 2010), together with the legislation of Law No. 11.445/2007 which establishes the national guidelines for basic sanitation[3]. The Law No. 9.974/2000 related to pesticides, their components and the like, provides for pollution caused by the movement of oil and other harmful or dangerous substances in water.

Law 9.966/2000 (BRASIL, 2000) also applies to solid waste the standards of the National System for the Environment (SISNAMA), the National Health Surveillance System (SNVS), the Unified Agricultural Health Care System (SUASA) and of the National Metrology, Standardization and Industrial Quality System (SINMETRO).

Law 12.305/2010 (BRASIL, 2010) in its article 3rd item XVI defines solid waste as:

> Solid waste: material, substance, object or discarded property resulting from human activities in society, whose final destination is proceeded, it is proposed to proceed or is obliged to proceed, in solid or semi-solid states, as well as gases contained in containers and liquids whose particularities make its release into the public sewer system or water bodies impracticable, or require technically or economically unfeasible solutions for this in view of the best available technology.

According to Leite (2017), the essence of the legislation is directed towards the implementation of RL for various products, contaminants or not, and can be summarized in three main aspects: accountability for the implementation of RL or the “polluter pays principle”; sharing of responsibility and differentiation between "waste and reject", in which the residue is any used product that can somehow be

[3] Basic sanitation, according to Law No. 11.445/07 (BRASIL, 2007), is a set of services, infrastructure and installationsfor water supply, sanitary sewage, urban cleaning and solid waste management and urban rainwater drainage (BRASIL, 2019).

reused by different processes, and the reject consists of leftovers that cannot be reused.

In the Section II of Article 30 deals with shared responsibility for the life cycle of products and the mandatory implementation of RL is required as described in Law 12.305/2010 (BRASIL, 2010).

> Article 33 - Manufacturers, importers, distributors and traders of lubricating oils, their residues and packaging. Such legislation paid special attention to reverse logistics and defined three different instruments that can be used for its implementation: sectorial agreement[4], regulation and term of commitment.

2.5 OLUC - Used or Contaminated Lubricant Oil

The National Environment Council (CONAMA) is the consultative and deliberative body of the National Environment System (SISNAMA), considering the need to establish new guidelines for the collection and disposal of OLUC, given that in the partial deterioration of the Used lubricating oil generates components that are harmful to health, and also considering the contamination of soil or rivers in the incorrect disposal after its use, combustion generates gases that are harmful to public health and the environment (CONAMA, 2005): “Art. 1: All OLUC must be collected, collected and disposed of in a way that does not negatively affect the environment and provides maximum recovery of the constituents contained therein [...]."

Conama Resolution No. 362/2005 (CONAMA, 2005) defines lubricating oil as:

> I. Basic lubricating oil: main constituent of finished lubricating oil;
>
> II. Finished lubricating oil: product formulated from basic lubricating oils, which may contain additives; and,

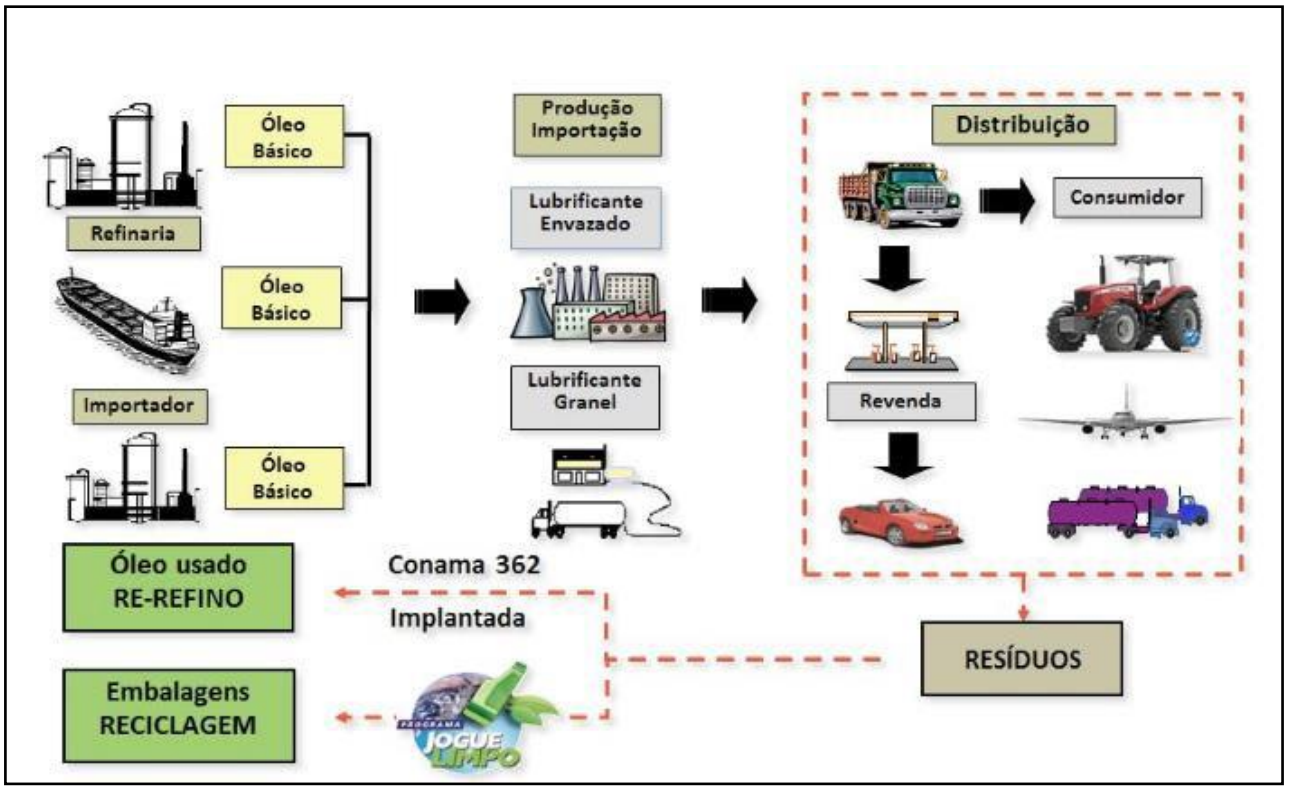
[4] In article 3, item l of Law 12.305/2010, the sector agreement is a contractual act signed between the governmentand manufacturers, importers, distributors or traders, with a view to implementing shared responsibility for the product's life cycle (BRASIL, 2010).

III. Used or contaminated lubricating oil: finished lubricating oil that, due to its normal use or possible contamination, has become unsuitable for its original purpose.

According to this Council (CONAMA, 2005), the most adequate and safe way to recycle OLUC is the category of technical-industrial processes called re-refining.

According to Figure 2 in post-consumption, in which the title as waste according to CONAMA standard goes to the re-refining industry.

Figure 2 – Reverse process of lubricating oils from the consumer product to the post-consumer



Source: SINDIREFFINO (2008)
Note: Portuguese subtitles

According to the classification of the NBR-10004 standard (ABNT, 2004), OLUC is considered a hazardous, toxic waste, for having in its composition organic acids, polynuclear aromatic hydrocarbons (HPAs) and dioxins, in addition to heavy metals such as cadmium, nickel, lead, mercury, chromium and copper - compounds considered to be potentially carcinogenic.

Conama Resolution No. 362/2005 (CONAMA, 2005) determines that all OLUC must be collected and have proper final destination:

> Producers and importers are required to collect all available oil or guarantee the cost of all collection of used or contaminated lubricating oil actually carried out, in proportion to the oil they place on the market according to the intermediate and final progressive targets established by the Ministries of Environment and Mines and Energy in joint normative act. In order to fulfill this obligation, producers/importers can be authorized by the ANP as collectors or, as happens in most cases, They can enter into a collection contract with an authorized collector. The collector, in turn, must collect the OLUC available from generators and dealers, allocate this OLUC to a re-refiner and require the recipient to issue the Re-refinery Receipt Certificate, in the model of ANP Resolution No. 19/2009 (ANP, 2019).

The minimum volumetric goals for the return of OLUC are established through the Interministerial Ordinance MME/MMA No. 100/2016 (BRASIL, 2016) under the responsibility of each producer and importer for the period 2016-2019 (ANP, 2017).

The target is calculated according to the finished lubricating oil market share of each producer and importer, by region and country, corresponding at least to the percentages established according to Table 1:

Table 1 – OLUC Collection Goals for the 2016-2019 (in %)

	Regions					
Year	**Northeast**	**North**	**Midwest**	**Southeast**	**South**	**Brazil**
2016	33,0	32,0	36,0	42,0	38,0	38,9
2017	34,0	33,0	36,0	42,0	38,0	39,2
2018	35,0	35,0	37,0	42,0	39,0	39,7
2019	36,0	36,0	38,0	42,0	40,0	40,1

Source: Adapted from ANP (2020)

2.6 Dealer obligations

According to Resolution 362/2005 (CONAMA, 2005) determines the obligations of the reseller, such as receiving plastic packaging of post-consumer lubricants at their establishment, and of individuals who deliver after their primary use, to have adequate storage facilities, drain and condition until collection, where it cannot be mixed with other residues, and they must be bagged in transparent impermeable containers, and must be delivered to the collector-transporter licensed by the IAP - Parana Environmental Institute.

The reseller must require the presentation of the valid operating license issued by the IAP for the collection activity and also the issuance of the Collection Certificate, and keep it filed for 5 years for inspection purposes, this certificate being very important as it is required to obtain the renewal of the establishment's operating license (CONAMA, 2005).

The Resolution calls for the reseller to publish a socio-educational-environmental publication at the place where the lubricating oil is sold to motivate the return of the lubricating oil package after use. Documentation for resellers referring to activities involving OLUC, according to the IBAMA inspection manual (2018), must contain: (a) the environmental licensing of the establishment issued by the competent environmental agency, when applicable; (b) registration in the CTF - Federal Technical Registry of Potentially Polluting Activities or Users of Environmental Resources in the respective category, when applicable; (c) documents evidencing the purchase of finished lubricants; and, (d) OLUC collection certificates issued by authorized collectors.

The article 2, item III, of Resolution 362 (CONAMA, 2005), defines the collection certificate as the document that proves the quantities of collected post-consumer lubricating oil packages.

The Sectoral Agreement for Lubricant Oil packaging in compliance with Decree No. 7.404/2010 (BRASIL, 2010) which regulates Law 12.305/2010, presents

the concept of delivery certificate for destination, which is the document issued by the final destination company, in the which proves the weight of the used plastic containers of lubricating oils delivered to them, thus assuming the commitment to its environmentally appropriate final destination, as well as its resulting tailings and effluents.

2.7 Tax instruments

The instrument of the invoice with all its apparatus in its issuance, in addition to constituting facts that generate taxes, it is used as an official instrument in most cases for the exchange of ownership. As for the OLUC trader, he is exempt from the obligation to issue the tax document in the collection process, according to the Tax Regulation on Operations related to the Circulation of Goods on Interstate and involving municipalities Transport and Communication Services of the State of Parana (RICMS-PR) approved by Decree 7.871/2017 (BRASIL, 2017), the ICMS Agreements 38/2000 and 17/2010, the obligation to issue the tax document is the responsibility of the collector, duly registered and authorized by the ANP for the re-refining establishment or reseller collector, in which the collector replacing the Invoice, model 1 or 1-A, the collector issues the Used or Contaminated Oil Collection Certificate (CCO).

Bureaucratically, the Certificate is issued in three copies that will be delivered to the sender (generator) where, in the case of this study, this copy was delivered to the petrol station; the second copy was filed by the collector (fixed); and the third copy will accompany the transit and will be filed by the recipient (recycler). The Certificate says: USED OR CONTAMINATED OIL COLLECTION - AGREEMENT ICMS 38/2000 (BRAZIL, 2000).

The Social Integration Program (PIS) and the Contribution for Social Security Financing (COFINS) started to be charged by the non-cumulative method for companies that use real income as a form of taxation as of Dec/2002, these

companies pay contributions at rates of 1.65% for PIS and 7.6% for COFINS, based on the total revenue (PÊGAS, 2014).

Law 10.637/2002 about PIS (BRASIL, 2002) and Law 10.833/2003 about COFINS (BRASIL, 2003) in their article 3, item II, present the right to credit: "goods and services, used as input in the provision of services and in the production or manufacture of goods or products intended for sale, including fuel and lubricant". According to the Administrative Council of Tax Appeals (CARF) in approving judgment 3301005.605 - 3rd Chamber / 1st Ordinary Panel (BRASIL, 2019), it presents the concept of inputs for PIS and COFINS, recognizing the right to credit in relation to all expenses with environmental preservation:

> NON-CUMULATIVE REGIME CONCEPT OF INPUTS: The non-cumulative COFINS deductible input is any input directly or indirectly related to the taxpayer's production and that affects the income taxed by the social contribution. And when the fulfillment of the environmental obligations imposed by the Public Power, with the condition for the company's operation, generates expenses, these must be considered as input.

Financial instruments are used in Law 12.305/2010 (BRASIL, 2010) in Article 8: These are PNRS instruments, among others: IX - tax, financial and credit incentives.

3 METHODOLOGY

The research consisted of methods, bibliographical and documentary, unstructured interview, resulting in a case study.

Bibliographic research, according to Gil (2011), are contributions already published on the studied topic, analyzed in scientific articles, books, legislation, websites and journals.

Unstructured interview presents open questions and can be answered in informal conversation environments. With that, he tries to find out why and how something happens. According to Beuren (2013), it allows the interviewee the freedom to develop each situation in the direction they consider most appropriate.

This means a way to explore the issues raised more fully. To describe how the process is done. Thus, the interview was carried out with people involved in the post-consumption RL process.

Documentary research or primary sources are the ones that contain information that did not obtain analytical treatment (GIL, 2011). In the documentary research, the entry of the purchase invoice for the new lubricating oil was verified, analyzing the quantity in liters purchased and raw material purchased; the lube oil intake inventory report; and the ledger of the environmental expense account; at the exit of OLUC, the CCOs were analyzed, verifying their quantity; at the exit of the lubricating oil packages, the Delivery Certificates for Destination were verified; and the accounting ledger of the account of other income, referring to the year 2020. The data were compiled in an Excel spreadsheet for a better analysis.

According to Godoy (1995) the case study has an exploratory and descriptive focus. The case study is qualitative and non-probalistic, being applied a sampling in a network of gas stations, composed of seven in the southern region, of which only five located in the south were analyzed. in the metropolitan region of Curitiba.

The company is subject to the Annual Taxable Income taxation regime, the code and description of the main activity is 47.31-8-00 for Retail trade of fuel for motor vehicles, among the secondary activities it has the codes 45.20-0-05 for Services of lubrication and 47.32-6-00 for Retail sale of lubricants.

4 RESULTS AND DISCUSSIONS

The RL process is presented; revenues from the sale of OLUC; and, the tax treatment of used or contaminated lubricant oil packaging expenses.

4.1 Reverse logistics process at the gas station

The need for purchase is analyzed at the end of each month where the manager responsible for the flow of purchases and sales at the gas station generates the lubricant stock report, identifies the inputs and outputs of the product and an analysis is made of how much will be needed for meet the demands of the next month.

With that, it makes a request to the purchasing department, requesting a certain lubricant and its quantity. After completing the purchase requisition, the document is sent to the manager for purchase authorization. And, as soon as he authorizes, the order is completed and contact is made with the supplier.

At the end of each month, the gas station aims to maintain a minimum stock, and has a goal of always selling the first one purchased, taking care of the shelf life of the stored products, thus ensuring product quality and consumer safety. The quantity of lubricating oil purchased was 87,809 liters in 2020.

After delivery of the goods, the invoice is entered in the stock system, consequently, the tax bookkeeping of the same. Bookkeeping is carried out as follows: CFOP 1,652 or 2,652 - Purchase of Fuel or Lubricant for Commercialization; and, NCM: 10.27.1932 - Corresponding Lubricating Oil.

When the new lubricant oil is sold to the final consumer, the Tax Coupon is issued and, thus, the system carries out the write-off of the merchandise in stock. It was observed that most sales are made to individual customers.

After the sale of the lubricating oil to the consumer, the oil change can take place in two ways: (1) The customer performs the lubricating oil change at an external mechanic or at his/her home; or, (2) Performs the exchange at the gas station, which charges for this service offered. It should be noted that option 2 is where the post-consumption gas station RL begins.

The gas station has an adequate installation for changing the oil, as well as the necessary equipment. It is duly licensed by the competent environmental

agency for the replacement of OLUC so that its collection can be done safely, the place is accessible for collection, uses suitable and leak-resistant containers so as not to contaminate the environment. The care so that used and contaminated lubricating oil is properly separated so that it is not mixed with chemicals, solvents, fuels, water or other substances making recycling unfeasible is done at the gas station.

The employees of the gas station who carry out the oil change are trained professionals with technical knowledge of the services offered. In the oil change process, the OLUC is removed from the vehicle and this residue is stored in an underground tank for subsequent final removal. By surveying the quantity of liters according to data from the OLUC Collection Certificates, the quantity collected in in 2020 was 33,446 liters as shown in Table 2.

Table 2 – Quantity, in liters, collected from OLUC in the year 2020

Month	**Volume**
January	1.100
February	7.000
March	3.700
April	3.050
May	3.300
June	1.400
July	5.046
August	2.250
September	1.350
October	1.750
November	850
December	2.650
Total	33.446

Source: Authors (2021)

The plastic packaging used in the lubricating oil returned by the consumer and those removed in the oil change by the professional at the gas station are stored in accordance with the requirements of the bodies.

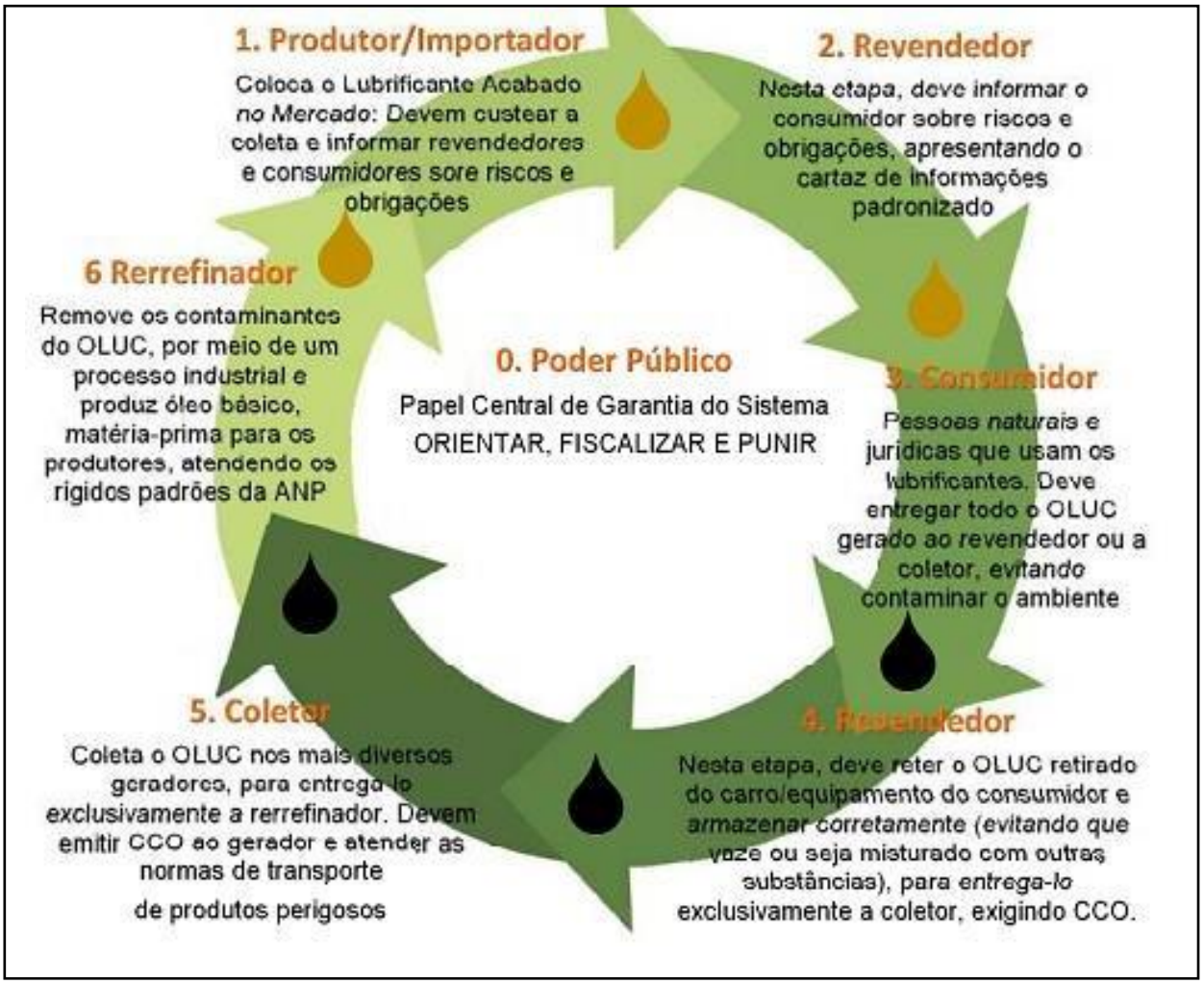
The company that collects from the gas station has its copies of CCO issued to the gas station during collection. The collecting company presented the environmental and other licenses regulated and authorized by the ANP: (a) CTF - Proof of enrollment in the Federal Technical Registry with your data duly registered in IBAMA's database; (b) Environmental authorization for the interstate transport of hazardous products, with all vehicles in the fleet presenting Plate, No. RNTRC (National Register of Road Cargo Transporters) and the type where the truck or equipment was described; and, (c) Registration of the Collector with the ANP, Natural Gas and Biofuels, informing the Registration with the ANP.

CCOs are issued by collectors who removed used or contaminated waste from the gas station, with a description that the material was destined for re-refining, in order to return to the market as basic lubricating oil.

The lubricating oil purchase documents and the Gas station CCO are filed and available for inspection where they remain for at least 5 years after their issue.

According to item 4, the dealer stores the OLUC and delivers it exclusively to the collector who, in turn, delivers it to the re-refiner, according to items 5 and 6 of this same Figure 3.

Figure 3 – Life cycle and reverse logistics of lubricating oils, from origin to post-consumption



Source: SINDIREFFINO (2015)
Note: Portuguese subtitles

There is a comparison in the purchase by the dealer of the volume of new lubricants with the volume of OLUC delivered for collection. The data used are from the reseller's acquisition, and not from the issuing of the outgoing invoice in comparison with the collection.

Comparing entries by invoices and collections by the CCO, it appears that approximately 38.10% of the oil purchased for the service station is returned as OLUC, as shown in Table 3.

Table 3 – Quantity purchased in 2020 of new lubricating oil compared to OLUC (in liters)

Purchase	Collected	% Collected over purchase
87.809	33.446	38,10%

Source: Authors (2021)

According to the OLUC Individual Collection Report (ANP, 2017), producers and importers are required to collect all available oil or guarantee the cost of collecting lubricating oil. The obligation of the OLUC collection goal belongs to the producer and importer.

Furthermore, the collection target for the South region in 2019 was 39%. The gas station studied is a point in the OLUC chain and its packaging, where it reached 38.10% of collection. However, it is still not required to account for the volume of the target.

Considering the target for everyone in the cycle, if this gas station were required to demonstrate, on purchases of new lubricating oil versus the collected volume of OLUC, the same would not have been reached, but less than 1.0% of the projected target or proposal.

4.2 OLUC recipe

When carrying out the collection of OLUC by the company certified by the ANP, the professional collector assesses the quality of the used and contaminated lubricating oil, proceeds with the issuance of the CCO and makes the payment in cash to the gas station for the used oil.

The amount received from the collector is accounted for at the gas station in the “Other Revenues” account and is taxed at PIS at 1.65% and COFINS at 7.60%. On the revenue presented, according to Table 4, in the amount of R$ 12,439.00 represents the equivalent of R$ 0.37 per liter.

Table 4 – Value acquired and accounted for in other revenues by the gas station from the destination of OLUC in 2020

Month	**R$**
January	407,00
February	2.577,00
March	420,00
April	1.260,00
May	1.055,00
June	490,00
July	1.260,00
August	1.220,00
September	810,00
October	540,00
November	765,00
December	1.635,00
Total	12.439,00
Volume (LTS):	33.446
Total in R$ per liter	0,37

Source: Authors (2021)

From the environmental accounting, the sale value with the destination of OLUC, can be accounted as environmental revenue as it comes from a set of actions that modify its patrimony in economic terms.

In this same context of measuring sales as environmental revenue, the environmental assets that make up the process from collection to delivery of destination could be constituted.

The financial accounting of gas stations, in general, does not measure environmental revenues, environmental assets and possible environmental expenses and costs that could be shown in their accounting liabilities.

4.3 Expenses of used or contaminated lubricant oil packaging

The gas station has the obligation to carry out the correct disposal of waste, according to Law 12.305/2010 (BRASIL, 2010) that, if these obligations are not complied with, the environmental licenses will not be renewed and certified. Therefore, the performance of the company's core activity is associated with this obligation. Thus, the residues from the disposal of lubricant packages can be considered inputs.

OLUC's post-consumer packaging is collected by a company certified by the ANP, the packaging collecting company has an active contract with the gas station for the correct disposal of the packaging. When carrying out the collection, it issues the delivery certificate for destination, with the amount (in kg) in two copies. One remains for the gas station and the other for the collecting company, together with the delivery of the invoice to be paid by the gas station to the collector.

Pursuant to Law 10.637/2002 (BRASIL, 2002) of PIS and Law 10.833/2003 (BRASIL, 2003) of COFINS in its article 3, item ll, provides for input credit, and the gas station does not appropriate of the PIS and COFINS credit of this input.

The amount raised in 2019 on the expense of packaging destination from the end activity was R$ 42,558.65, which may generate credits of R$ 702.22 for PIS and R$ 3,234.46 for COFINS, as shown in Table 5. This represents 0.77% per month or 9.25% per year of all the expense generated.

Table 5 – Amount (in R$) recorded in the environmental expense account from the destination of packaging in 2020

Continua...

Month	Calculation basis	PIS (1,65%)	COFINS (7,6%)
January	1.116,05	18,41	84,82
February	9.481,00	156,44	720,56
March	5.900,05	97,35	448,4

Table 5 – Amount (in R$) recorded in the environmental expense account from the destination of packaging in 2020

Conclusão

Month	Calculation basis	PIS (1,65%)	COFINS (7,6%)
April	1.709,35	28,2	129,91
May	933,3	15,4	70,93
June	653,65	10,79	49,68
July	5.331,20	87,96	405,17
August	10.153,80	167,54	771,69
September	571,2	9,42	43,41
October	2.186,20	36,07	166,15
November	2.690,25	44,39	204,46
December	1.832,60	30,24	139,28
Total 2019	42.558,65	702,22	3.234,46

Source: Authors (2021)

5 FINAL CONSIDERATIONS

In view of the data presented in the work, it is verified that the RL for OLUC takes place through the collection process at gas stations through prior storage to transfer by tax means, which is a document to third parties, generating revenue such as sales and expenses with the destination of the packages. The third party will proceed with pre-treatment; processing and distribution, in order to return them to the production chain or give them an adequate destination. Given the above, it was found that the gas station studied meets the legislation and specifications regarding the RL of lubricating oil.

The result of the study had as evidence tax benefits for the modality of taxation on real profit. Tax benefits were found in the RL process in the post-consumption of lubricating oil for PIS and COFINS, applied to the expense with the disposal of packaging which, as it is mandatory and linked to the main activity, are characterized as an input allowing appropriation of such taxes. It was found that

the gas station did not use the credit in the calculation, but had all the requirements to use it, as they were characterized as inputs.

Regarding the sales obtained by the allocation of OLUC, it was observed that the company is taxing PIS and COFINS correctly. However, the accounting as environmental revenue can be inserted, as well as the physical structure can be measured as environmental assets. It should be noted that the objective of implementing environmental revenues is not to generate profit, but to have a responsible control of production. But nothing prevents the company from having an economic benefit from its use.

Future research could be done in order to mitigate the target assigned to 40 % with the other 60% with an uncertain destination.

REFERENCES

ANFAVEA - ASSOCIAÇÃO NACIONAL DOS FABRICANTES DE VEÍCULOS AUTOMOTORES.

ANP - OIL NATIONAL AGENCY. **Relatório Individual de Coleta de OLUC**. 2019. Brasília, DF. Available at:http://www.anp.gov.br/energias/uso_racional.asp. Accessed on: Feb. 18. 2021.

ANP - OIL NATIONAL AGENCY. **Relatório Individual de Coleta de OLUC**. 2019. Brasília. DF Available at: http://www.anp.gov.br/images/DISTRIBUICAO_E_REVENDA/Lubrificantes/Dados_mercado/relatorio_coleta_OLUC1.1.pdf. Accessed on: Aug. 16. 2021.

BEUREN, I.M. **Como elaborar trabalhos monográficos em contabilidade.** 3. ed. São Paulo: Atlas, 2013.

BRASIL. Carf - Administrative Council Of Tax Appeals. **Acórdão 3301005.605 - 3ª Câmara / 1ª Turma Ordinária**. 2019. Available at: https://www.lexml.gov.br/urn/urn:lex:br:conselho.administrativo.recursos.fiscais;secao.julga mento.3; camara.3;turma.ordinaria.1:acordao:2019-01-29;3301-005.605,7636410. Accessed on: Aug. 21. 2021.

BRASIL. Decreto 7,871, de 02 de outubro de 2017. Aprova o Regulamento do Imposto relativas à Circulação de Mercadorias e sobre Prestações de Serviços de Transporte Interestadual e Intermunicipal e de Comunicação do Estado do Paraná - RICMS/PR. Separata de: **Diário Oficial do Paraná, Poder Executivo**, n. 10040, p. 5-1247, Paraná, 02 out. 2017. Available at: https://www.documentos.dioe.pr.gov.br/dioe/consultaPublicaPDF.do?action=pgLocalizar&enviado=true&numero=10040&dataInicialEntrada=&dataFinalEntrada=&search=&diarioCodigo=3&imagemVerificacao=BQRI&pg=0&submit=Localizar&localizador=, Accessed on: June. 5. 2018.BRASIL.

BRASIL. Decreto Nº 7.404, 23 de dezembro de 2010. National Solid Waste Policy. Separata de: **Diário Oficial da República Federativa do Brasil**, Ed. Extra, n. 245-A, p. 1-6, Brasília, 23 dez. 2017. Seção 1. Available at: http://www.planalto.gov.br/ccivil_03/_ato2007-2010/2010/decreto/d7404.htm. Accessed on: Jun. 30. 2021.

BRASIL. LEI Nº 11.445, de 5 de janeiro de 2007: Basic sanitation Law. Separata de**: Diário Oficial da República Federativa do Brasil**, n. 5, p. 3-7, Brasília, 08 jan. 2007. Seção 1. Available at: http://www.planalto.gov.br/ccivil_03/_ato2007-2010/2007/lei/l11445.htm. Accessed on: Jul. 18. 2021.

BRASIL. Lei nº 12.305, de 02 de agosto de 2010. Establishes the National Solid Waste Policy; amends Law No. 9.605, of February 12, 1998; and makes other arrangements. Separata de: **Diário Oficial da República Federativa do Brasil**, n. 147, p. 3-7, Brasília, 03 ago. 2010, Seção 1. Available at: http://www.planalto.gov.br/ccivil_03/_ato2007-2010/2010/lei/l12305.htm. Accessed on: Jun. 16. 2021..

BRASIL. LEI Nº 9.974. de 6 de junho de 2000. Altera a Lei nº 7.802, de 11 de julho de 1989, que dispõe sobre a pesquisa, a experimentação, a produção, a embalagem e rotulagem, o transporte, o armazenamento, a comercialização, a propaganda comercial, a utilização, a importação, a exportação, o destino final dos resíduos e embalagens, o registro, a classificação, o controle, a inspeção e a fiscalização de agrotóxicos, seus componentes e afins, e dá outras providências. Separata de: **Diário Oficial da República Federativa do Brasil**, n. 109-E, p. 1, Brasília, 07 jun. 2000, Seção 1. Available at: http://www.planalto.gov.br/ccivil_03/leis/L9974.htm. Accessed on: Jul. 20. 2021..

BRASIL. Ministério do Meio Ambiente. **Acordo Setorial Para Implementação do Sistemade Logística Reversa de Embalagens em Geral.** Brasília, DF: 2019. Available at: http://www.sinir.gov.br/documents/10180/93155/Acordo_embalagens.pdf/58e2cc53-3e38- 420a97fd-dba2ccae4cd3. Accessed on: Jun. 3. 2021.

BRASIL. **PORTARIA INTERMINISTERIAL No 100**, de 8 de abril de 2016. Available at: https://www.in.gov.br/materia/-/asset_publisher/Kujrw0TZC2Mb/content/id/22671586/do1- 2016-04-11-portaria-interministerial-no-100-de-8-de-abril-de-2016-22671471. Accessed on: Aug. 23. 2021.

BRASIL. **CONVÊNIO ICMS 38/00**. 2.000. Available at: https://www.confaz.fazenda.gov.br/legislacao/convenios/2000/CV038_00. Accessed on: Jul. 30. 2021.

BRASIL. LEI No 10.637. 30 de dezembro de 2002. Dispõe sobre a não-cumulatividade na cobrança da contribuição para os Programas de Integração Social (PIS) e de Formação do Patrimônio do Servidor Público (Pasep), nos casos que especifica; sobre o pagamento e o parcelamento de débitos tributários federais, a compensação de créditos fiscais, a declaração de inaptidão de inscrição de pessoas jurídicas, a legislação aduaneira, e dá outras providências. Separata de: **Diário Oficial da República Federativa do Brasil**, n. 252, p. 2, Brasília, 31 dez. 2002. Seção 1. Available at: http://www.planalto.gov.br/ccivil_03/leis/2002/l10637.htm. Accessed on: Jul. 30. 2021..

BRASIL. LEI No 10.833, de 29 de dezembro de 2003. Altera a Legislação Tributária Federal e dá outras providências. Separata de: **Diário Oficial da República Federativa do Brasil**, n. 253-A, p. 1-10, Brasília, 30 dez 2003. Seção 1. Available at: http://www.planalto.gov.br/ccivil_03/leis/2003/l10.833.htm. Accessed Jul. 30. 2021..

BRASIL. LEI Nº 9.966. de 28 de abril de 2000. Dispõe sobre a prevenção, o controle e a fiscalização da poluição causada por lançamento de óleo e outras substâncias nocivas ou perigosas em águas sob jurisdição nacional e dá outras providências. Separata de: **Diário Oficial da República Federativa do Brasil**, n. 82-A, p. 1-4, Brasília, 29 abr. 2002, Seção 1. Available at: https://legislacao.presidencia.gov.br/atos/?tipo=LEI&numero=9966&ano=2000&ato=e13o3Yq1kMNpWTdb4. Accessed on: Jul. 21. 2021..

BRAZILIAN ASSOCIATION OF TECHNICAL STANDARDS. **NBR 10004:** Resíduos Sólidos: classificação. Rio de Janeiro: ABNT, 2004.

BRITO, M.P.; DEKKER, R. **A Framework for Reverse Logistics**. ERIM report series research in management. 2003. Available at: www.erim.eur.nl. Accessed on: June. 3. 2020.

CASTIGLIONI, J.A. **Logística operacional: guia prático**. 2. Ed. São Paulo: Érica, 2012.

CASTRO M.D.G. **Caracterização do processo de reciclagem do óleo lubrificante usado em postos de combustíveis e identificação de desafios frente à política nacional de resíduossólidos**. 2011. Dissertação (Mestrado em Engenharia da Produção) Faculdade de Engenharia, Universidade Estadual Paulista (UNESP). Bauru, SP, 2011.

CONAMA - CONSELHO NACIONAL DE MEIO AMBIENTE. 2005. **Resolução CONAMA nº 362/2005**. Available at: http://www.mma.gov.br/port/conama/res/res05/res36205.xml. Accessed on: Jan. 7. 2021.

GIL, A.C. **Métodos e técnicas de pesquisa social**. 6.ed. São Paulo: Editora Atlas, 2011.

GODOY, A. S. (1995). **Pesquisa qualitativa: tipos fundamentais. Revista de Administração de Empresas**, São Paulo. SP (1995). Available at: http://www.scielo.br/pdf/rae/v35n3/a04v35n3.pdf. Accessedon: Jul. 17. 2021.

IBAMA - INSTITUTO BRASILEIRO DO MEIO AMBIENTE E DOS RECURSOS NATURAIS RENOVÁVEIS.

LEITE, P.R. **Logística reversa: sustentabilidade e competitividade**. 3. ed. São Paulo: Saraiva, 2017.

Manual de procedimentos para fiscalização das atividades relacionadas a óleos lubrificantes usados ou contaminados: Resolução Conama nº 362/2005 / Diqua. – Brasília: Ibama, 2018. Available at: https://www.ibama.gov.br/sophia/cnia/livros/fiscalizacaodeoleoslubrificantes.pdf. Accessed on: Jul. 1. 2020.

Mercado brasileiro de autoveículos. São Paulo, 2019 Available at: http://www.anfavea.com.br/docs/06%2011%2014_PressRelease_Estudo_2034.pdf. Accessed on: Feb. 10. 2020.

NOVAES, A.G. **Logística e gerenciamento da cadeia de distribuição.** 4. Ed. Rio de Janeiro: Elsevier, 2015.

PAOLESCHI, B. **Logística Industrial Integrada.** São Paulo: Érica, 2013.

PÊGAS, P. H. **Manual da Contabilidade Ambiental**. 8. Ed. Rio de Janeiro: Freitas Bastos, 2014.

RIBEIRO, M.S. **Contabilidade Ambiental**. São Paulo: Saraiva, 2010.

SILVA, B.G. **Contabilidade Ambiental**: **sob a ótica da contabilidade financeira**. 1. Ed. Curitiba: Juruá, 2011.

SINDIREFFINO. **Fiscalização Resolução Conama nº 362/2005 das Atividades Relacionadas a Óleos Lubrificantes Usados ou Contaminados**. 2008. Available at: https://static-sindirrefinoprod.s3.amazonaws.com/upload/arquivosparadownload/00 001507.pdf. Accessed on: Jul.1.2021.

SINDIREFFINO. **Gerenciamento de Óleos Lubrificantes Usados ou Contaminados: Guia Prático de Fiscalização**. São Paulo- Jun/2015. Available at: https://www.mprs.mp.br/media/areas/ambiente/arquivos/oleos_lubrificantes/guia_pratico_de_fiscalizacao.pdf. Accessed on: Jul. 8. 2021..

STOCK J.R. (1992), **Reverse Logistics, Council of Logistics Management**, Oak Brook, IL. (2803 Butterfield Road, Oak Brook 60521): Council of Logistics Management.

TINOCO, J.E.; KRAEMER, M.E. **Contabilidade e Gestão Ambiental**. 3. ed. São Paulo: Atlas, 2011.

UN - UNITED NATIONS. **Commission on Investment, Technology and Related Financial Matters of Working Group of Expert on International Standards of Accounting and Reporting**. Environmental financial accounting and reporting at the corporate level, 1998, p.6.Available at: https://unctad.org/en/Docs/c2isard3.en.pdf. Accessed on: Mar. 29. 2021.

VALLE, R; GABBAY, R. **Logística reversa: processo a processo**. São Paulo: Atlas, 2014.

Authorship contributions

1– Mayara Fernanda Simões
Accounting analyst, Graduate in Accounting Sciences
https://orcid.org/0000-0003-1414-7225 • mayara_fernanda@hotmail.com
Contribuition: Conceptualization, Formal Analysis, Investigation, Writing – original draft

2– Paulinho Rene Stefanello
Professor of Accounting Sciences, Master in Governance and Sustainability
https://orcid.org/0000-0002-0010-1720 • paulinho.stefanello@ifpr.edu.br
Contribuition: Conceptualization, Investigation, Methodology, Project Administration, Writing – review & editing

3– Frederico Fonseca da Silva (Corresponding Author)
Professor of Agribusiness, PhD in Irrigation and Environment
https://orcid.org/0000-0003-2817-6983 • prof.frederico.silva@gmail.com
Contribuition: Methodology, Project Administration, Writing – review & editing

4– Alexandre Machado Fernandes
Professor of Accounting Sciences, Master in Administration
https://orcid.org/0000-0002-1005-6169 • alexandre.fernandes@ifpr.edu.br
Contribuition: Methodology, Visualization, Writing – review & editing

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