MLS LAW AND INTERNATIONAL POLITICS

https://www.mlsjournals.com/MLS-Law-International-Politics

ISSN: 2952-248X

LAW AND INTERNATIONAL POLITICS

How to cite this article:
Morais, P. G., Campos Salvador, S. S., & da Piedade Oliveira, C. I. (2023). Análise das políticas ambientais reguladoras da actividade de produção petrolífera em Angola, identificação inconformidades e propostas de solução. *MLS Law and International Politics, 2*(2), 33-48. doi: 10.58747/mlslip.v2i2.2283.

ANALYSIS OF THE ENVIRONMENTAL POLICIES REGULATING THE PETROLEUM PRODUCTION ACTIVITY IN ANGOLA, IDENTIFICATION OF NON-CONFORMITIES AND PROPOSED SOLUTIONS

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Abstract. This research aimed to identify the main non-conformities of the environmental policies regulating oil production activities in Angola and to present proposals for solutions. Through qualitative research and by means of a descriptive study, the different regulations used in the oil activity were analysed and compared with the most diverse environmental impact scenarios registered in Angolan production activities in recent years. The work highlighted a total of 17 (sixteen) environmental references applied to oil production activities in Angola and elsewhere, divided into 12 (twelve) national and 5 (five) international ones. Our study identified 4 (four) very relevant and pertinent non-conformities in the exercise of production activities in Angola, which trigger the existence of several operational occurrences in the industry that have caused several environmental problems, such as spills, contamination of water and land and consequently the loss of the marine population, and especially the lack of consideration from public opinion. In this context, we consider an efficiency of 76.5% of the efficiency of compliance with the environmental policies of the activities following the oil production, since the 4 (four) non-conformities represent a percentage of 23.5%. In order to overcome these non-conformities, the work indicates proposed solutions which include the indication of measures to be increased in the respective regulations.

Key-words: Environmental policies, oil production, non-conformities and solutions.

ANÁLISE DAS POLÍTICAS AMBIENTAIS REGULADORAS DA ACTIVIDADE DE PRODUÇÃO PETROLÍFERA EM ANGOLA, IDENTIFICAÇÃO INCONFORMIDADES E PROPOSTAS DE SOLUÇÃO

Resumo. Esta pesquisa teve como objectivo de identificar principais inconformidades das políticas ambientais reguladoras da actividade de produção petrolífera em Angola e apresentar propostas de solução. Através de uma investigação qualitativa e por via de um estudo descritivo foram analisados os diferentes regulamentos utilizados na actividade petrolífera e confrontando-os com as mais diversos cenários de impacto ambientais registados nas actividades de produção angolana, nos últimos anos. O trabalho permitiu destacar um total de 17 (dezasseis) referências ambientais aplicadas às actividades de produção de petróleo em Angola e não só, divididas em 12 (doze) nacionais e 5 (cinco) internacionais, o nosso estudo identificou 4 (quatro) inconformidades com muita relevância e pertinência no exercício das actividades de produção em Angola, que desencadeiam na existência de várias ocorrências operacionais na indústria que vêm causando diversos problemas ambientais, como derrames, contaminações dos meios aquáticos e terrestres e consequentemente a perca de população marinha, e especialmente a falta de consideração da opinião pública. Neste contexto, consideramos uma eficiência de 76,5% da eficiência de cumprimento das políticas ambientais das actividades do seguimento de produção de petróleo, uma vez que as 4 (quatro) inconformidades representam uma percentagem de 23,5 %. Por formas a ultrapassar tais inconformidades, o trabalho indica propostas de soluções que passam pela indicação de medidas a se incrementar nos respectivos regulamentos.

Palavras-chave: Políticas ambientáis, produção de petróleo, inconformidades e soluções.

ANÁLISIS DE LAS POLÍTICAS MEDIOAMBIENTALES QUE REGULAN LA PRODUCCIÓN DE PETRÓLEO EN ANGOLA, IDENTIFICACIÓN DE NO CONFORMIDADES Y SOLUCIONES PROPUESTAS

Resumen. Esta investigación tuvo como objetivo identificar las principales disconformidades de las políticas ambientales que regulan las actividades de producción de petróleo en Angola y presentar propuestas de solución. A través de una investigación cualitativa y mediante un estudio descriptivo, se analizaron las diferentes normativas utilizadas en la actividad petrolera y se compararon con los más diversos escenarios de impacto ambiental registrados en las actividades de producción angoleñas en los últimos años. El trabajo destacó un total de 17 (dieciséis) referencias ambientales aplicadas a las actividades de producción de petróleo en Angola y en otros países, divididas en 12 (doce) nacionales y 5 (cinco) internacionales. Nuestro estudio identificó 4 (cuatro) no conformidades con gran relevancia y pertinencia en el ejercicio de las actividades de producción en Angola, que desencadenan la existencia de varios sucesos operacionales en la industria que vienen causando diversos problemas ambientales, como derrames, contaminación de los medios acuático y terrestre y consecuentemente la pérdida de la población marina, y sobre todo la falta de consideración de la opinión pública. En este contexto, consideramos una eficiencia del 76,5% de la eficiencia del cumplimiento de las políticas ambientales de las actividades posteriores a la producción de petróleo, ya que las 4 (cuatro) no conformidades representan un porcentaje del 23,5%. Para superar estas no conformidades, el trabajo indica propuestas de solución que incluyen la indicación de medidas a ser aumentadas en los respectivos reglamentos.

Palabras-clave: Políticas medio ambientales, producción de petróleo, no conformidades y soluciones.

Introduction

On the one hand, oil is being exploited more and more every day and is seen as an energy resource that generates foreign currency for the economy of the producing countries; on the other hand, it is becoming one of the potential sources of negative environmental impacts at the production stage, causing changes to the environment and risks to public health that lead to the loss of considerable working hours, which is detrimental to work efficiency.

However, oil production implies clear and permanent compliance with measures that precisely guarantee environmental safety. In real terms, Angola is a precariously documented country in terms of its biodiversity, which is still far below its real need for knowledge about its biodiversity.

What is also very important is the need to guarantee the performance of the environmental balance in the producing countries, and this requires a redoubled effort in the sense of discernment for the elaboration of efficient policies applied to the need for environmental preservation.

This is precisely where the need to investigate and balance aspects relating to the efficiency of environmental policies and to define the size of the resources required by the context of oil production operations in producing countries, such as Angola, comes in.

The aim of this research is therefore to analyze the environmental policies that regulate oil production in Angola, identify inconsistencies and propose solutions.

Theoretical background

Oil production stages and their environmental impacts

Due to mechanical effects, oil migrates underground, accumulating in porous and permeable rocks called reservoir rocks that belong to a particular oil field. The feasibility of exploiting this oil led to the creation of the oil industry, which is divided into three areas of activity, which are *Upstream*, *Midstream* and *Downstream*, where the five basic segments of the oil industry are established, which are Exploration, Production, Transportation, Refining (of oil and natural gas), Distribution and Marketing.

In all these activities, any operational action is preceded by an Environmental Impact Assessment, which gives rise to a list of protection and mitigation measures, taking into account biotic, physical, socio-economic and cultural factors.

In the oil industry there are (3) ways in which pollutants are emitted into the environment during operations:

a) Emissions into the atmosphere: They represent the form of emission of pollutants in the gaseous state;;
b) Disposal of liquid effluents: They represent the form of emission of pollutants in liquid form;
c) Solid waste disposal: They represent the form of pollutant emissions in the solid state.

In this study **we specifically highlight the oil production segment,** where, after analyzing the efficiency of the environmental policies that regulate this activity in Angola, we will present the main drawbacks of the respective policies and their proposed solutions.

The oil production phase consists of removing crude oil from reservoirs in order to transport it for refining, and then marketing the final product. Production only takes place if the field proves to be commercial, i.e. if the exploration and completion studies show that it is commercially viable to produce oil from a given well (Kimura, 2005, apud Martins et al., 2015, p.65).

For the production phase, emergence techniques, or primary methods, are used to get the material to the surface and, if these techniques are ineffective during production, secondary techniques, also known as secondary recovery, are used to optimize production in the well or tertiary techniques or special recovery methods**.**

Table 1 below shows the most common effluents associated with the production stage.

Table 1
Typical effluents from oil production activities

Source or Activities	Effluent
Production Operations	Production water (including reservoir formation water and injection water), ballast water, deck drainage water, drilling muds, drilling gravels, production sands, cement residues, BOP fluid, sanitary and domestic sewage, oil and gas processing effluents, cooling waters, firefighting system test water, atmospheric emissions
Accidental discharges	Oil spills, gas explosions and chemical spills

Note. Source: Adapted from (Mariano, 2017, p. 169).

During production operations, atmospheric emissions the inert gas ventilation system a load resulting from the release of fugitive emissions i.e. unusual atmospheric emissions, inert gases relieve the pressure that builds up in the cargo and oily waste tanks through ventilation, flaring occurs routinely during maintenance operations and excess gas from the oil separation and stabilization unit, the produced water treatment unit, and hydrocarbon flaring.

Table 2 shows the potential material outputs (atmospheric emissions, water effluents and solid waste) of some of the production processes.

Table 2
Potential material outputs of the production process

Process	Atmospheric emissions	Effluent	Waste
Production	Fugitive emissions of natural gas and VOCs, polyaromatic hydrocarbons (PAHs), CO_2, CO and H_2S, fugitive emissions of BTX resulting from the conditioning of natural gas.	Production water probably contaminated by heavy metals, radionuclides, dissolved solids, oxygen-consuming organic compounds, salts. They can also contain biocides, lubricants and corrosion inhibitors. Effluents containing glycol, amines, salts and emulsions.	Production sand, elemental sulphur, separator sludge, tank sediment, used filters, sanitary waste.

Note. Source: Adapted from (Mariano, 2017, p. 170)

One of the main environmental concerns in the oil industry is production water, which basically accounts for 99% of oil and gas production waste. The water produced is treated and then disposed of at sea, in offshore production fields or re-injected into onshore production wells.

During production operations, produced water will be generated in the oil separation and stabilization unit where reservoir fluids are separated into formation water, crude oil and produced gas. Water produced in excess is re-injected into the reservoirs and water produced during disturbance conditions is discharged into the sea.

Excess produced water is treated to ensure that the oil content in the water is below the required level before discharge into the sea.

Production water is the water effluent produced in the greatest quantity during production operations. The extent of the impacts of their disposal into water bodies can only be verified by an environmental impact assessment.

"The main environmental impacts on the physical environment caused by oil production, taking into account the environmental aspects mentioned, are: variation in water quality, variation in air quality and variation in soil quality" (Mariano, 2017, p. 185).

Fauna and flora can also be directly affected by changes in their environment, through variations in water, air and soil/sediment quality and by disturbances such as noise, lighting and changes in vegetation cover.

> The variation in water quality during operation is due to the discharge of waste into the seawater, such as drainage water, cleaning liquids, sanitary effluent and food waste. On the other hand, effluents contaminated by chemical substances, such as cleaning liquids and industrial processing waste, when they come into contact with the sea, modify its physical and chemical characteristics, such as turbidity, which is increased, and the concentration of dissolved oxygen, which is reduced, (Martins, Azevedo, Silva, & Silva, 2015, p. 71).

The discharge of untreated liquid effluents from the oil industry and sanitary sewage into the sea causes an imbalance in the ecosystem. Domestic waste consumes oxygen throughout its decomposition process, which causes fish mortality and excessive algae reproduction. Seawater involves filtering to remove suspended liquids, removing sulphates and deaeration to remove oxygen.

> The environmental impacts on air quality stem from gas emissions due to the burning of hydrocarbons during well testing. In every combustion process, carbon dioxide (CO_2) emissions are inevitable. This gas does not cause any health risks, but there is great concern about its greenhouse effect, which many scientists believe is increasing the temperature of the planet. (Martins, Azevedo, Silva, & Silva, 2015, p. 71).

The concentration of excessive gas causes the greenhouse effect, which is global warming. When hydrocarbons are burned, carbon dioxide (CO_2) emissions are formed. CO_2 emissions are important for maintaining the ideal temperature, but too much is harmful, causing global warming.

> The variation in soil quality is due to the removal of the vegetation cover present for the installation of the well. By removing the vegetation cover, the soil loses its natural defense and becomes prone to erosion. In addition, there is an impact on the

> soil due to the disposal of oil-contaminated gravel, which is disposed of around the wellheads, (Martins, Azevedo, Silva, & Silva, 2015, p. 71).

Soil degradation can occur through erosion causing deforestation, removal of vegetation and land scarcity which threatens food security, because if the soil doesn't produce there is no food to live on, by removing the vegetation cover from an area it loses its consistency and by salinity the concentration of salts causes irrigation and low irrigation efficiency and insufficient drainage making the process unproductive.

Description of the environmental policies regulating oil production in Angola and their analysis

In order to carry out petroleum activities in the country, the sector's operating companies must comply with environmental protection standards, as well as standards that minimize the impact of environmental contaminants produced by the sector's activities. These standards have national and international validity.

National references

Among the various standards and reference documents for oil activity, the standards regulating oil production activities are highlighted here.

a) Regulation of environmental protection in the course of petroleum activities (Decree no. 39/00, of October 10)

According to Dias (2015, p. 457),

> Object: This decree regulates the protection of the environment in the course of petroleum activities, with a view to guaranteeing its preservation, namely with regard to health, water, soil and subsoil, air, flora and fauna, ecosystems, landscape, atmosphere and cultural, archaeological and aesthetic values. Scope: This decree defines the environmental protection regime to which petroleum activities are subject, both on land and at sea.

The decree relates to the activities of prospecting, exploration, development, production, transportation, refining, distribution and sale of oil and its by-products, as well as the use and storage of chemical products necessary for oil-related activities.

"Decree 39/00, of October 10, also stresses that both the concessionaire and its associates must be responsible for drawing up and keeping up-to-date plans for preventing and responding to spills." (Velho, 2015, p. 52).

This decree aims to ensure that the concessionaire and its associates carry out plans, i.e. sensitivity maps, to help in the response to spills.

b) Regulations on the management and removal of waste deposits (Executive Decree no. 8/05, of January 5)

> Object: The purpose of this decree is to establish rules and procedures on the management, removal and deposit of waste, to be implemented by the operator and other oil companies with a view to ensuring the prevention or minimization of damage to people's health and the environment. **Scope:** This regulation applies to all waste generated in the course of petroleum activities (Dias, 2015, pp. 468-469)

This regulation governs management, removal and waste from production to final destination. Companies draw up a waste management plan which must include the type of waste to be produced, quantities, removal and reuse; the same plan must also include information on who will transport and treat the waste.

c) Decree on spill notification procedures (Executive Decree no. 11/05, of January 12)

"Object: The purpose of these regulations is to define and standardize the spill notification procedures to be provided to the Ministry of Mineral Resources and Petroleum by the operator and other oil companies" (Dias, 2015, p. 483).

Establishes the procedures for notifying the Ministry of Mineral Resources and Petroleum of spills. Considerable negative impacts should be publicized as quickly as possible.

d) Decree on the management of operational discharges (Executive Decree no. 97/14, of April 8)

> Object: The purpose of these regulations is to establish rules and procedures for the Management of Operational Discharges. Scope: This regulation applies to all Operational Discharges generated in the course of petroleum operations, whether onshore or offshore, except when installations are in transit, (Dias, 2015, p. 500).

It stipulates how companies must deal with existing effluent discharges both on land and at sea. It also stipulates that companies must submit a management plan to the Ministry of Mineral Resources and Petroleum, which must include the main effluents generated during production, the method of treatment and the exact location of the discharges. A year before starting production, you should send a list of the main chemicals you will use in the production phase.

e) Basic Environmental Law (Law no. 5/98, of June 19th)

"Scope of application: This law defines the basic concepts and principles for the protection, preservation and conservation of the environment, the promotion of quality of life and the rational use of natural resources" (Dias, 2015, p. 22).

This decree defines the rights and duties of citizens and introduces the concept of penalties for illegal activities that cause damage to the environment.

f) Decree on environmental licensing (Decree no. 59/07, July 13th)

> Object: This law establishes the rules governing the environmental licensing of activities which, due to their nature, location or size, are likely to have a significant environmental and social impact. Scope: This law applies to the type of activities that are subject to environmental impact assessment or are likely to have a significant environmental and social impact (Dias, 2015, p. 36).

Any activity that requires an environmental impact assessment must acquire an environmental license, as they are responsible for environmental policies.

There are (2) types of environmental license: one is acquired initially and is required for the establishment or execution of an activity, while the other for operation is issued after all the environmental impact assessment requirements have been met.

g) Decree on environmental impact assessment (Decree no. 51/04, of July 23)

"Objective: The purpose of this law is to establish the rules and procedures for environmental impact assessment of public and private projects. Scope: They apply to all public and private projects subject to environmental impact assessment" (Dias, 2015, p. 53).

The aim is to identify possible environmental impacts and determine appropriate mitigation measures to reduce negative impacts. It establishes a set of standards and procedures that must be followed when preparing environmental impact assessments.

h) Regulation of environmental audits of public or private activities likely to cause significant damage to the environment (Decree no. 1/10 of January 13)

"Object: The purpose of this law is to carry out public or private environmental audits that may cause significant damage to the environment" (Dias, 2015, p. 65).

Environmental audits are carried out every 3 to 4 years in order to find out what damage the operators are causing so that they can correct it.

i) Regulation on liability for environmental damage (Presidential Decree No. 194/11 of July 7)

According to Dias (2015, pp. 72-74),

> Object: The purpose of this law is to establish liability for the risk and degradation of the environment based on the "polluter pays" principle, in order to prevent and repair environmental damage. Scope: It applies to all activities likely to cause damage to the environment; It also applies to environmental damage, or imminent threats of such damage, even if they result from incidents for which liability or compensation is subsidiarily covered by the scope of application of some international conventions; It applies to environmental damage, or the imminent threat of such damage, caused by pollution of a diffuse nature, whenever it is possible to establish a causal link between the damage and the operator's activity causing it.

Under this decree, all those who have caused damage to the environment through their own fault are obliged to repair the damage and/or compensate the state and private individuals for the loss and damage they have caused in the form of compensation measures and environmental restoration.

j) Decree on the terms of reference for the preparation of environmental impact studies (Executive Decree no. 92/12, of March 1)

"Object: The purpose of this statute is to establish guidelines for the preparation of the EIAs required for the environmental feasibility analysis of projects subject to environmental impact assessment" (Dias, 2015, p. 83).

This decree stipulates that the E.I.A. must be drawn up under the terms of the legislation on the A.I.A., and comply with the terms of reference approved by the Ministry of the Environment, which guides the drawing up of the E.I.A. according to the specialty of each project.

k) Regulations for public consultations on projects subject to environmental impact assessment (Executive Decree 87/12 of February 24)

"**Object**: The purpose of this statute is to establish the rules for carrying out public consultations on public or private projects subject to environmental impact assessment" (Dias, 2015, p. 94).

It provides a more extensive and detailed explanation of the objectives and requirements of the environmental impact assessment public consultation process. It defines administrative details such as the deadline for holding the public consultation, and the obligation for the proponent to pay the fees and costs associated with the public consultation.

l) Contingency Plan for Oil Spills at Sea Published in Diário da República - I Serious - n.º 240 - of December 22, 2008

Its main objective is to respond to emergencies, minimizing damage to the environment and reproducing the recovery of affected natural or economic resources in a short time, with acceptable clean-up.

This plan responds to:

- Direct the spilled oil to less sensitive areas (by combating it at sea or diverting it to rocky or environmentally and economically less sensitive areas);
- Removing oil as completely as possible from certain areas of interest and disposing of it in an environmentally acceptable manner, based on an analysis of the net benefit to the environment.

International references

m) United Nations Framework Convention on Climate Change. Kyoto Protocol (Resolution no. 14/07, of March 28)

> In accordance with the United Nations Charter, the Republic of Angola has the duty to take the necessary measures in order to make a notable contribution to strengthening the protection and increase of sinks and reservoirs of greenhouse gases not controlled by the Montreal Protocol, the Kyoto Protocol contributes to the efforts made by the international community in general, resulting in numerous benefits and advantages, with a view to conditions that do not endanger human health and the environment." (Dias, 2015, p. 195).

The Kyoto convention aims to stabilize atmospheric concentrations and greenhouse gases at a level that can avoid dangerous interference with the climate system. The convention does not impose mandatory limits on greenhouse gas emissions; the treaty provides for updates known as the Kyoto protocol, which set mandatory limits.

n) International Convention for the Prevention of Pollution from Ships, 1973 (Resolution no. 41/01, of December 21) MARPOL Protocol

According to Dias (2015, pp. 1032 – 1033),

> Undertakes to comply with the provisions of this Convention and the Annexes by which it is bound, in order to prevent the pollution of the marine environment by the discharge of harmful substances or effluents containing such substances in contravention of the Convention. The Convention shall not apply to warships or any other ship owned or operated by a State and used solely for non-commercial public service purposes.

The Marpol convention is the main international convention and aims to prevent pollution of the marine environment by ships due to operational causes and to minimize discharges and other substances.

o) International Convention on Intervention on the High Seas in the Event of an Accident Causing or Likely to Cause Oil Pollution, 1969 (Resolution no. 29-A/01, of October 5)

> This convention aims to protect the interests of its populations against the serious consequences of an accident involving the danger of pollution of sea waters and coastlines by hydrocarbons. In order to protect these interests, the measures cannot constitute an attack on the principle of freedom of the high seas. Does not apply to warships or state-owned ships intended for non-commercial government service (Dias, 2015, pp. 488 – 489).

> This convention was replaced by the 1982 United Nations Convention on the Law of the Sea, which defines the rights and responsibilities of the United Nations in its use of the oceans.

p) Vienna Convention for the Protection of the Ozone Layer (Resolution No. 12/98, of august 28th

According to Dias (2015, pp. 323 – 324),

> Measures to protect the ozone layer from changes caused by human activities require international action and cooperation and should be based on important scientific and technical considerations. The objectives of this convention are to protect health and the environment from the effects resulting or likely to result from human activities that modify the ozone layer.

Climate change is the result of warming in the atmosphere caused by excessive concentrations of greenhouse gases. This convention deals with the quantities of gases that can be emitted, i.e. it regulates the gases that can be emitted into the atmosphere to protect the ozone layer.

In certain types of equipment in production there are instruments that regulate the amount of pollutants that can normally be emitted, such as chimneys that usually have a filter to regulate the amount of gas that is emitted. On a quarterly basis, companies must send a report to the Ministry of Mineral Resources Oil and Gas and the Ministry of the Environment stating the types and quantities of gases emitted.

q) Montreal Protocol on substances that deplete the ozone layer

> Noting that preventive measures have already been taken at national and regional level to regulate emissions of certain chlorine fluorine carbons. This Protocol extends the Vienna Convention for the Protection of the Ozone Layer, adopted on March 22, 1985; it extends the quantity of controlled substances produced by producing the quantity eliminated by means of techniques to be adopted by the Parties to this Protocol", (Dias, 2015, pp. 339 – 340).

Ozone depletion is caused by chlorine fluoride carbides (CFCs) used for cooling in transportation and building air conditioning and refrigeration systems and in thermal insulation foam. The Montreal Protocol deals with practical aspects of the Vienna Convention for the protection of the ozone layer, the methods used to measure the gases and how the gases should be calculated.

Methodology

The study included a careful decomental analysis, starting by checking the operational procedures of the oil industry's production segment and its environmental impacts. Next, all the regulations (national and international) on operational monitoring were analyzed. Finally, we identified inconsistencies by comparing international legislation with the same effect, by the nature of the applicable legislation "*VS"* the mode of operation in the field during the course of production activity.

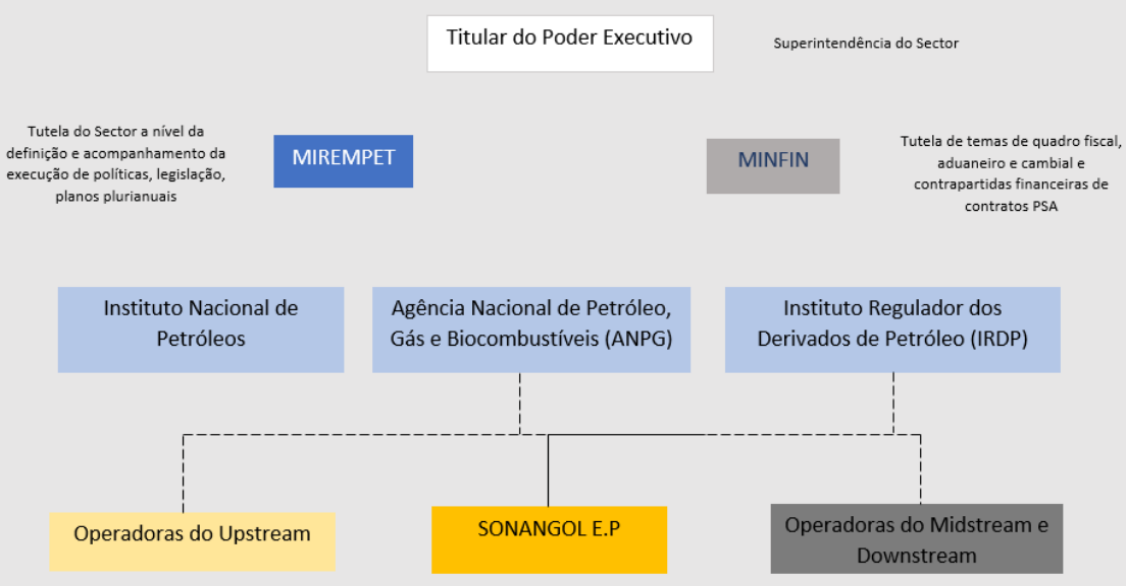
Results and Discussions

As we have already mentioned, the activities involved in harnessing the energy potential of oil form a chain of operations we call the oil industry, which includes activities ranging from exploration, production, transportation, refining, distribution and the marketing of crude oil and oil products.

For this study, we will focus on oil production, which consists of the operations carried out to obtain crude oil. Since 2010, this activity in Angola has experienced a number of scenarios that have led to profound changes in the organizational model of the oil industry.

The figure below shows the organizational model of the oil industry in Angola.

Figure 1
Organizational model of the livestock sector

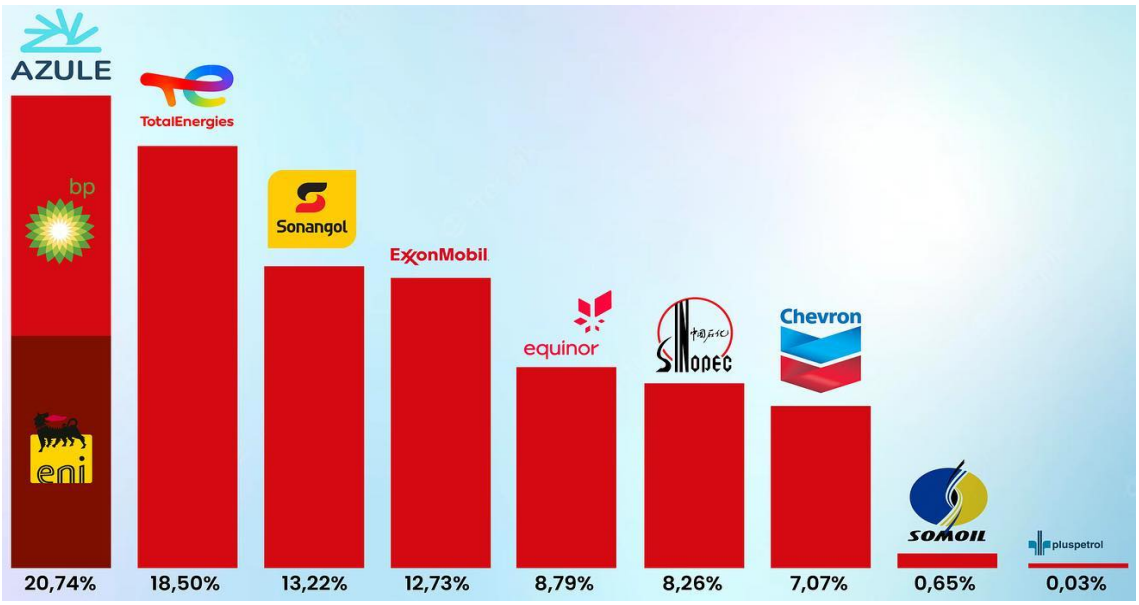


Note. Source: MIREMPET **(2019)**

The figure represents the current model for organizing the oil sector under Presidential Decree no. 49/19, of 6 February, Presidential Decree no. 133/13, which assigns political and operational supervision to MIREMPET, fiscal supervision to MINFIN, staff training to INP, the ANPG the role of national concessionaire with a strong role in the Upstream and the IRDP the role of regulating activities in the *Downstream* sector.

In order to carry out their operating activities, these companies are assisted by other companies called service providers, which work on oil production sites providing specialized services. The figure below shows the operators operating in Angola.

Figure 2
Operating oil companies in Angola and production quotas in August 2022



Note. Source: Petroangola **(2022)**

The activities that these companies carry out are accompanied by organizational action regulations, such as industrial management principles, legal regimes, ethics and corporate responsibility, etc., they are also accompanied by economic action regulations such as tax regimes, financial plans for companies and their proponents, etc., as well as environmental action regulations such as good practices for environmental protection, industrial sustainability, etc.

The enforcement of environmental standards has been widely studied in international environmental law. This branch of the law is seen as a new and dynamic area of international law. It was born out of the emergence of environmental concerns following major accidents in the 1960s (Ribeiro, 2013)in recent years, different control mechanisms have emerged in relation to environmental damage, the best known being those that seek to repair damage that has already occurred, such as public civil action. In addition to repressive measures, however, an even more recent trend in environmental law emphasizes preventive means (Neto, Tinoco, Andrade, & Rocha, 2005) and here we highlight environmental impact studies on oil operations and comparative legal analysis for the definition, execution and monitoring of oil activities.

After a qualitative analysis of the policies mentioned above (in the theoretical framework) and contextualizing them with the industrial reality of oil production, its practices, difficulties and needs, it was possible to identify the main non-conformities of the environmental policies regulating oil production in Angola. And these are:

a) Diário da Republica I Série nº 240 22/12 there is a lack of a local spill response plan to complement the national plans;

b) Decree 97/14 sets out the premise of the sector regulator's total trust in the information provided by the operator on the chemicals injected into the production operation and their quantities;

c) Decree 8/05 establishes the operator's free will to choose the method for managing his waste;

d) Decree 39/00 fails to provide for public consultation on the results of environmental impact studies for projects, new operations and industrial buildings.

These non-conformities lead to the following problems:

a) Concerning the non-conformity registered in Diário da república I Series no. 240 22/12

The lack of a local spill response plan to complement the national plan slows down the implementation of contingency actions. A local contingency plan against spills would enable rapid and more specific action to be taken in response to the situation.

b) Regarding the non-conformity registered in decree 97/14

The creation of a joint commission between the operator and the regulatory body to analyze the environmental impacts caused by the chemicals and inject their quantities before drawing up the chemicals management plan.

c) Regarding the non-conformity registered in decree 8/05

The choice of waste management method should be categorized into levels according to the risk and the waste represented.

d) Regarding the non-conformity registered in decree 39/00

In this decree, during the environmental bidding period, the authorization of the authorities in non-compliance with the environmental agencies does not refer to a public consultation authority on the environmental impact study following the rules established in decree 87/12.

In order to improve the delivery of the policies in question, we are putting forward the following proposals for solutions.

The following measures are suggested to overcome them:

For the nonconformity of the Diário da República I Series no. 240 22/12 which presents the actions of the National Contingency Plan against Oil Spills at Sea, we propose to the proposer the creation and inclusion of a Local spill response plan in addition to the National plans, to speed up the execution of contingency actions.

To address the non-compliance of Executive Decree No. 97/14 of April 8, which describes the management of operational discharges, we propose to the proposer the creation of a ministerial (governmental) body with the technical capacity to conduct environmental impact studies of chemical injection plans.

For the non-compliance of Executive Decree no. 8/05, of January 5, which talks about the management of waste removal and deposits, we propose that the applicant add an article to the Decree, which relates the level of risk of the waste and the selected management measure.

To address the non-compliance of Decree 39/00, of October 10, which deals with environmental protection in the course of oil activities, we propose that the proponent add an article to the Decree that obliges the need for public consultation in accordance with the rules of Decree 87/12 during the process of obtaining the environmental bidding license, since all action projects whose activities affect the interests of communities, interfere with ecological balance and use natural resources to the detriment of third parties, must be subject to Environmental and Social Impact Assessment processes, in which the practice of Public Consultation is mandatory (Lei nº 5/98 de 19 de Junho, 1998).

Environmental policies are created in such a way as to guarantee the existence of good environmental practices, the operating measure, degree of risk and mitigation measure that will be used. Our proposal aims to improve the performance of the above-mentioned Decrees and

objectively guarantee better results from production activity while complying with environmentally satisfactory regulations.

Conclusions

In a total of 17 (seventeen) environmental references applied to oil production activities in Angola and beyond, divided into 12 (twelve) national and 5 (five) international, our study identified 4 (four) non-conformities with great relevance and pertinence in the exercise of production activities in Angola, which trigger the existence of several operational occurrences in the industry that have been causing various environmental problems, such as spills, contamination of aquatic and terrestrial environments, deforestation of marine species, especially morale and public consideration. In this context, we consider the efficiency of compliance with the environmental policies of the production activity to be 76.5%, since the 4 (four) non-conformities represent a percentage of 23.5% within the 17 references analyzed.

We consider non-conformities and suggestions to be applied in policies, such as Diário da República I Série no. 240 22/12, which describes the actions of the National Contingency Plan against Oil Spills at Sea, Executive Decree no. 97/14, of April 8, which deals with the management of operational discharges, Executive Decree no. 8/05, of January 5, which presents the procedures to be carried out for the management of the removal and deposit of waste, Executive Decree no. 39/00, of October 10, which deals with environmental protection in the course of oil activities, in which we suggest proposals for solutions.

Since the environment is a common good, it is everyone's responsibility to ensure that it is in good condition. In this context, we must implement the measures proposed so that all regulations are better and better.

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Reception date: 12/07/2023
Review date: 14/09/2023
Acceptance date: 10/10/2023