



Management of Environmental Impacts from Hydrocarbons (IANR)

Orgullosamente
ECOPETROL



Introduction

Ecopetrol S.A. is a company committed to protecting the environment at all levels of the organization, as evidenced by its corporate environmental strategy, which establishes guidelines for environmental management across its projects, works, and activities and lays the foundation for operating in harmony with the environment and its surroundings.

This environmental strategy is expressed within the 2040 Strategy, specifically under the Generating Value through TSEG pillar and through the HSE Management System, which allows the Ecopetrol Group, through its business lines, to prevent and/or mitigate the materialization of risks to natural resources, guarantee emergency preparedness, and progressively reduce impacts on ecosystems—generating environmental and social value.

To implement its environmental strategy, eight management pillars were defined, one of which is the enhanced prevention and remediation of environmental impacts. This strategic pillar aims to prevent potential environmental impacts from hydrocarbon or other hazardous substance spills in Ecopetrol's areas of operation through proactive risk management and the analysis of the potential materialization of environmental risks specific to the different businesses of the company.

In addition, it focuses on remediation and improvement of areas impacted by hydrocarbons and/or their derivatives by incorporating cutting-edge technology into diagnostic and recovery processes, enabling progressive reductions in impacts and the environmental recovery of these sites, in compliance with applicable environmental regulations.

In order for this document to be properly understood, it is necessary to define the following terms:

Seepage: the natural occurrence of oil or gas on the earth's surface from the subsoil, which seeps over long periods of time (thousands to millions of years) between ruptures, cracks, faults, and layers of rock with high porosity and permeability, until it reaches the surface.

Incident: *“any sudden event that involves the presence of one or more dangerous substances and that, if not for influences, actions or mitigating systems, could have led to a major accident”* (Article 1 of Decree 1347 of 2021). Incidents can be caused by (i) operational conditions (integrity failures and/or loss of containment); (ii) by intentional third-party actions, such as attacks on infrastructure or product thefts; (iii) natural phenomena, including earthquakes or floods; and (iv) unintentional third-party actions, in which the damage to infrastructure and the consequent impact on the environment occurs accidentally.

Environmental Liability: *“Environmental Liabilities are understood to be the environmental effects caused by anthropic activities directly or indirectly by the hand of man, authorized or not, cumulative or not, capable of being measurable, locatable and geographically delimited, which generate an unacceptable level of risk to life, human health or the environment, in accordance with the provisions of the Ministry of Environment and Sustainable Development and the Ministry of Health, and for which no environmental or sectoral instrument for control exists* (Article 2. Law 2327 of 2023)”. (emphasis added)

Hydrocarbon Environmental Impacts Associated with Prior Operations (IANRs for its Spanish acronym), also known as Unresolved Environmental Impacts: Physical space or place (site) with the presence of hydrocarbons or other substances, which are found in concentrations above the current



reference levels (Louisiana Standard¹), either in soils, sediments, groundwater and/or flood-prone areas, related to the processes of the value chain (exploration, production, transport or refining) generated by prior operations in assets, that began their activities prior to the issuance of Law 99/93² and that are currently operated by Ecopetrol and/or its environmental monitoring and control instrument is its responsibility.

Taking into account the above characterizations, the following are not considered unresolved environmental impacts (IANRs):

- Seepage caused by natural conditions
- Incidents affecting the environment, according to the applicable environmental legal framework.
- Environmental liabilities, as defined by the law (Article 2, Law 2327 of 2023).

Scope

The purpose of this document is to outline the actions undertaken by Ecopetrol regarding Hydrocarbon environmental impacts associated with prior operations (IANRs, for its Spanish acronym), also known as Unresolved Environmental Impacts, highlighting the progress it has made in this area and its key results and achievements over the past years.

Background

Oil exploitation in Colombia began more than 100 years ago, with the Mid-Magdalena Valley among the first regions in which exploration and production were undertaken. For 75 years – prior to the enactment of Law 99 of 1993 - oil operations lacked a rigorous and specific environmental regulatory framework comparable to one currently in place, and activities were largely conducted by transnational companies operating under the regulations applicable at the time (Images 1 and 2).



Image 1. Tropical Oil Company -Troco oil well (1920-1930), located in Ecopetrol's current La Cira field

Source: *Vanguardia Liberal* newspaper. Found at:

<https://www.vanguardia.com/santander/barrancabermeja/2018/04/30/imagenes-de-hace-un-siglo-cuando-en-barrancabermeja-se-extrajo-por-primera-vez-petroleo-en-colombia/>

¹ **Louisiana Administrative Code, Statewide Order 29-B:** International reference standard adopted by the Colombian Environmental Authority and Ecopetrol for the establishment of technical limits in the recovery of areas impacted by hydrocarbons, adopting a TPH (Total Petroleum Hydrocarbons) concentration limit of **1% of hydrocarbons** by weight (< 10,000 mg/kg).

² Through which the Ministry of Environment is established, the public sector in charge of environmental management and the conservation of renewable natural resources is restructured, the National Environmental



System (SINA) is organized, and other provisions are issued.



Image 2. Troco Oil Company workers in the early years of oil exploitation.

Source: *El Gráfico*, No. 411-412, May 25, 1918, p. 90

Ecopetrol was founded in 1951 and began operations in oil production fields under the regulatory framework applicable at the time. This changed in 1993, when Law 99 of 1993 came into effect, establishing the Ministry of the Environment and specific regulations for the hydrocarbons sector.

(highlight)

Ecopetrol continues to operate under these new mechanisms, with its production activities reaffirming its commitment to regulatory compliance and to environmental protection through preventive measures.

Since the entry into force of Law 99 of 1993, Ecopetrol, with the support of the community and environmental authorities, has begun to assess the environmental impacts of hydrocarbons and their derivatives within its areas of influence, and to establish characterization, intervention, and reporting strategies through environmental compliance reports. Accordingly, since the beginning of 2000, the Company had already begun to carry out identification, diagnosis, and recovery work in these affected areas.

In 2018, Ecopetrol undertook the design of a database to compile the impacts of hydrocarbons across all its segments (exploration, production, refining, and transportation). This exercise began with the inclusion of 839 sites associated with different types of impacts, not only environmental impacts associated with hydrocarbons (IANRs), but also events of operational origin or caused by third parties (attacks/thefts) reported to the environmental authority, as well as infrastructure in the process of dismantling or desertion (such as wells and process pools). without being initially limited by size or condition. The following figure illustrates the initial tally of the sites identified as impacted.

Figure 1. Impacts associated with the 839 sites identified in 2018

- 286- IANRs
- 54- Operational incidents
- 190-Incidents caused by third parties
- 309-Inoperative civil works and infrastructure

Source: Ecopetrol S.A.

Concurrently with the aforementioned exercise, from 2018 to 2019, Ecopetrol consolidated the results of a series of bioremediation pilots conducted in affected areas of the Palagua field, which led to the technique now known as “**Enhanced Bioremediation**”. This method, based on a biotechnological package (hydrocarbon-degrading bacterial strain patented by ICPET), has currently reduced recovery



times by 50% to 60%. This procedure, in addition to being endorsed by the National Environmental Licensing Authority (ANLA) through follow-up visits, has become a national benchmark for such interventions.

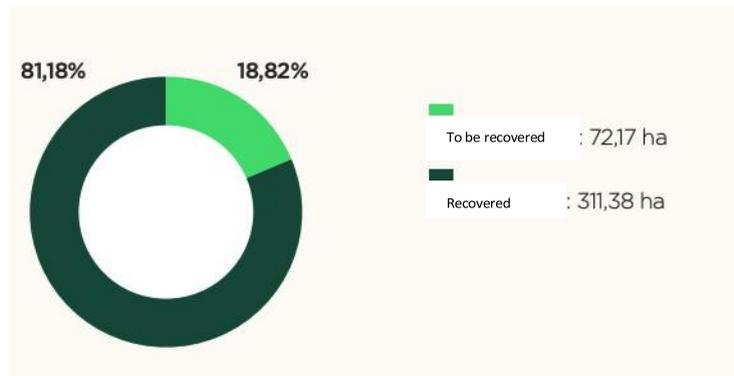
In 2019, Ecopetrol proactively incorporated new techniques for diagnosing hydrocarbon-affected areas, known as “**Advanced Environmental Geophysics**”, thereby becoming a national pioneer. This cutting-edge technology reduces diagnostic times by 50%, optimizes costs by 16% compared with conventional test pits (*apique*), and reduces uncertainty regarding the affected areas by 55%.

Focusing on the effects associated with hydrocarbons and their derivatives, Ecopetrol continued to structure and refine the consolidated database maintained since 2018, distinguishing IANRs from environmental incidents and from infrastructure undergoing dismantling. The aim is to prioritize and address all hydrocarbon-related impacts that could pose environmental risks using currently available technologies.

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As of December 31, 2024, a total of 286 identified IANRs (383.5 ha) were documented, of which 272 sites had been technically and environmentally recovered; in terms of recovered area, this represents 76% of the total impacted area (Figure 2). This result is due to the incorporation and evolution of techniques for diagnosing and recovering areas.

Figure 2. Progress in the recovery of the IANR in Ecopetrol.



Source: Ecopetrol

Currently, Ecopetrol S.A. continues to perform activities for the diagnosis, delimitation, and recovery of the remaining unresolved environmental impacts (IANRs) (91.1 ha) identified to date through the incorporation of cutting-edge technology and continuous improvement in bioremediation processes, thus reaffirming its commitment to the environment and encouraging a harmonious operation with the environment.

Governance in this area

Board of Directors

Ecopetrol’s Board of Directors is the Company’s highest administrative body, with six (6) permanent committees that support its governance. The main function of these committees is to conduct a preliminary analysis and issue informed recommendations on issues submitted to the Board for consideration. The most relevant of these committees are:

- Corporate Governance and Sustainability Committee: assists the Board of Directors in matters



related to good corporate governance and the sustainability agenda.

- Territorial Transformation and HSE Committee: monitors and manages risks associated with occupational health and industrial and process safety for workers and contractors. In addition, it monitors environmental performance and contributions to territorial development.
- Audit and Risk Committee: responsible for supervising the handling and effectiveness of the Internal Control System, ensuring timely risk management and the effectiveness of the controls implemented, among other duties.

(highlight)

These committees have the power to intervene in Ecopetrol's actions they consider strategic to the Company's growth, and may request specific reports from Management.

In this way, Board members delve deeper into key issues, including the business risk map, the sustainability agenda, environmental performance, contributions to territorial development, occupational health and safety, and industrial and process safety, among others. During 2020 and 2021, the HSE Committee of the Board of Directors met periodically to analyze and study issues related to the environment and the Company's industrial and process safety. In 2022, it monitored the industrial safety roadmap; in 2024, it monitored environmental impact events and corporate environmental management. Additionally, the Board of Directors receives monthly operational updates that address various issues, including incidents with environmental impact, enabling continuous and timely monitoring.

During 2020 and 2021, the HSE Committee of the Board of Directors emphasized environmental, industrial, and process safety matters, including the progress of IANR recoveries.

Senior Management

The Strategic Committee is the highest-level body, led by the Company's president, and serves as a forum for articulating the Ecopetrol Group's strategy. Its main value lies in ensuring alignment between strategic pillars and long-term corporate decisions.

In this space, fundamental strategic issues are reviewed, monitored, and approved, including decarbonization objectives, investments in clean technologies, and environmental management across the Ecopetrol Group.

In turn, the Business Line Committees — Hydrocarbons, Transition Energies, and Transmission and Roads — perform supervisory and strategic alignment functions within their respective operational areas. These committees monitor progress on the specific environmental objectives of each line, promote the exchange of good practices, and ensure coherence between operations and the corporate environmental strategy. Their role is essential for the effective implementation of the environmental strategy in daily operations.

HSE Management System

Ecopetrol S.A. has implemented an HSE Management System that establishes the necessary elements for the Company to manage risks and protect life while promoting environmental care. The mandatory basic requirements of the HSE Management System are based on the international standards ISO 14001:2015 and ISO 45001:2018, and are certified to ensure compliance with national legislation.

In terms of operational risk management, the HSE management system allows Ecopetrol, through technical guidelines, to advance the management for the recovery of Unresolved Environmental Impacts – IANR, including:



- HSE-H-016 Indicator profile: Management of identified unresolved environmental impacts associated with hydrocarbons or other substances, developed in 2019 and last updated in 2025.
- HSE-H-045 Methodological guide for the diagnosis and recovery of sites impacted by hydrocarbons in Ecopetrol and its business group, developed in 2014 and last updated in 2025.

The aforementioned guidelines allow Ecopetrol's operational areas to establish and develop methodologies to delimit, characterize, diagnose, and environmentally recover a site with possible hydrocarbon impact and determine the state of the ecosystems present (aquatic, marine, coastal, and/or terrestrial), based on four (4) main phases:

Phase I: classification of the impact, determining the methodology to categorize it as an unresolved environmental impact (IANR) or as a natural phenomenon, such as a seepage.

Phase II: characterization and diagnosis of the impacted site through the description of applicable techniques and methodologies, such as advanced environmental geophysics and the use of drones to capture infrared imagery to detect anomalies in the ground. This technology is combined with other techniques, such as georadar and tomography, to geolocate the points of highest hydrocarbon concentration and prioritize the areas for intervention during recovery.

Phase III: once the area has been diagnosed and prior to the intervention, the analysis of risks that may arise during the development of intervention activities and the recovery of unresolved environmental impacts is conducted, using Ecopetrol's risk management methodology.

Phase IV: intervention and recovery of areas affected by hydrocarbons utilizing enhanced bioremediation techniques, adopted by Ecopetrol, and which can optimize and accelerate the bioremediation processes of areas affected by hydrocarbons, systematically innovating the biotechnological package associated with highly efficient microorganisms, biodegradable inputs, design of air injection equipment, and bacterial broths, connected to active process control with field laboratories.

(highlight)

This technique enables the assimilation, transformation, and decomposition of hydrocarbons present in soils and aqueous media, efficiently facilitating the recovery of impacted areas. The results show a reduction in TPH (total petroleum hydrocarbons) to levels below those required by Louisiana Standard 29B(1% of TPH) within 7 to 15 days, depending on the initial hydrocarbon concentrations.

Regulatory Backdrop

Currently no regulation in Colombia defines the permissible limits of hydrocarbon concentrations in the soil after a process of remediation of affected or impacted areas, which is why the national environmental authorities adopt Louisiana Standard 29-B (technically known as LAC 43:XIX Subpart 1, Chapter 29 – Statewide Order 29-B) established by the Louisiana Department of Natural Resources (LDNR), Office of Conservation, which regulates the criteria for remediation of soils contaminated by oil and gas activities in the state of Louisiana in the USA.

This standard defines guideline levels for contaminants in soils, such as TPH (Total Petroleum Hydrocarbons), heavy metals, and chlorides, and characterizes and outlines remediation procedures for sites affected by spills or releases of hydrocarbons and other substances associated with oil and gas exploration and production operations. This standard is internationally recognized as one of the best sectoral benchmarks for the recovery of sites impacted by hydrocarbons, and therefore accepted by both Ecopetrol and the Colombian environmental authority.

Louisiana Standard 29-B, accepted as a benchmark by Colombia's environmental authority, provides



Ecopetrol and operators in the oil and gas sector a reference limit for remediation processes in areas affected by hydrocarbons or their derivatives. Once the soil hydrocarbon concentration level established by Louisiana Standard 29-B has been reached, the remediation activity is concluded, and recovery proceeds. However, for TPH, while this Louisiana Standard establishes a target of 3% for soils outside operational areas (Chapters 3 and 5), Ecopetrol has internally set a TPH target of 1% for recovered areas.

Once the environmental impact has been identified, diagnosed, and classified as an IANR, Ecopetrol S.A.'s operations areas report these findings to the competent environmental authorities through Environmental Compliance Reports (ICAs, for their Spanish acronym) or specific compliance reports. The foregoing occurs within the authority's environmental management and control mechanisms, including Environmental Management Plans and environmental licenses.

By means of these environmental management and control instruments, the competent environmental authorities establish the management measures and specific requirements to handle and recover these IANRs, in compliance with the applicable environmental regulations (including permits for the use and exploitation of resources) and in keeping with the matter identified in follow-up and inspection visits to the recovery activities of the IANRs.

Identification, Diagnosis, and Management of IANRS in Ecopetrol

As of December 31, 2025, Ecopetrol had 72.17 hectares slated for environmental recovery, corresponding to 18.82% of the total areas identified as affected by hydrocarbons in the tally conducted in 2018.

Accordingly, Ecopetrol continues to identify, diagnose, and recover sites affected by hydrocarbons or their derivatives in the areas where it operates or is responsible for environmental mechanisms, through a continuous improvement process focused on progressively reducing impacts and risks to ecosystems, in harmony with the environment and stakeholders.

Ecopetrol reports all identification, diagnosis, and recovery information for the IANR to the competent environmental authorities through compliance reports – ICAs, responses to specific administrative orders, and environmental monitoring and control visits carried out by the aforementioned authorities.

Advanced IANRS Diagnostics (Environmental Geophysics)

To diagnose potentially impacted areas, Ecopetrol employs advanced environmental geophysics techniques - the collection and analysis of samples or the combination thereof - to determine the hotspots³ with the highest concentration of hydrocarbon. It uses this information to construct an intervention plan for the recovery.

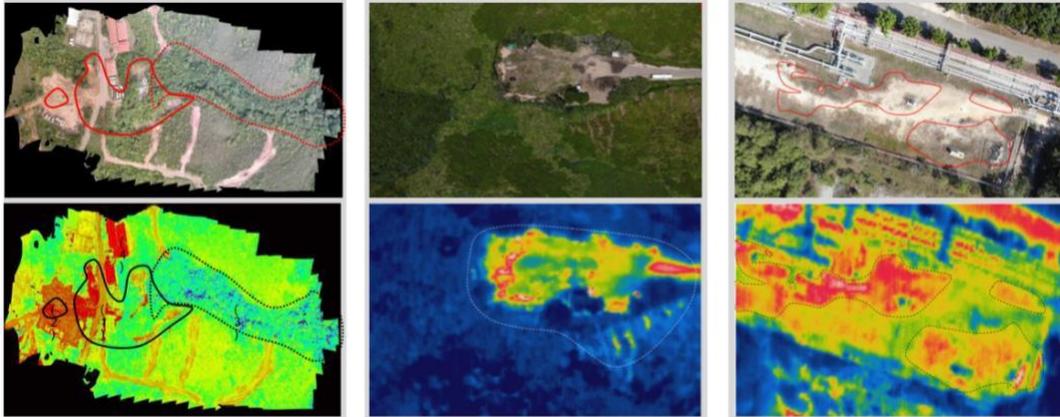
One of the diagnostic techniques is the use of drones, which consist of taking a series of aerial photographs using an unmanned aerial vehicle equipped with an infrared, thermographic, and multispectral digital camera, employed in the morning and following a predetermined grid. This technique allows precise localization of alterations caused by chemical differences (hydrocarbons) in the soil at the surface and at depth.

Another technique is the use of georadar or a profilometer over the site to define the subsoil's geomorphological and geological structure. This makes it possible to define anomalies at greater depths and with a greater degree of detail, pinpointing their presence and areas of higher hydrocarbon concentration.

³ Point or area located within the impacted site where the highest concentration of contaminants -in this case hydrocarbons is found.



Image 3. Graphical outputs of the advanced environmental geophysics



Source: Ecopetrol

(highlight)

Oncethe areas with the highest concentration are identified, the next step is to delimit the affected area's polygon and subdivide it into areas between 1500 m² and 2000 m², which, when combined with a topographic survey, allows specifying the area and volume of soil to be recovered.

These techniques offer a series of advantages and benefits over traditional environmental diagnostic techniques, such as:

A. LOCATION ACCURACY AND ENVIRONMENTAL IMPACT DELINEATION

Previously, test pits (*apiques*) were excavated in soils using primary information obtained from communities or from the operation itself to determine their location and delimitation. These test pits, for the sampling and characterization of hydrocarbons in the soil, were dug at random intervals (approximately 10, 50, or even 100 meters) with limitations imposed by topography, area, and depth, which reduced the precision for locating and delimiting these impacts.

With the implementation of a non-intrusive and multidisciplinary geophysical model, it is possible, through the use of cutting-edge technologies, to take a continuous photograph of the area, denoting with greater accuracy the location of anomalies or alterations in the soil, sediments, or bodies of water with high reliability, **reducing uncertainty by 55% in regard to the pre-identified areas.**

B. OPTIMIZATION OF SITES SCHEDULED FOR INTERVENTION AND ASSOCIATED COSTS

By applying advanced environmental geophysics, in addition to reducing uncertainty, it was possible to optimize the estimated and provisioned budget to recover the 55% of unaffected or minimally impacted sites, whose delimitation was defined using this technique. The cost savings from using this delimitation were close to COP 47 trillion.

C. Diagnostic Runtime and Costs

Using the environmental geophysics diagnostic technique, costs decreased by 16% and execution times by 50% compared to the test pit technique.

For example, in an 80-hectare area, site delimitation and environmental diagnosis conducted using conventional test pit (*apique*) methods required approximately four (4) months and incurred costs of around COP 430 million. In contrast, the application of advanced environmental geophysics reduces the



execution time to approximately two (2) months—including data processing and preparation of the final report—at an estimated cost of COP 360 million.

Management and recovery of IANRS (biotechnology package)

Once the IANR is identified, diagnosed, and delimited, a comprehensive risk analysis of this impact is conducted, considering possible scenarios that may arise during the execution of intervention and recovery activities. Among the variables considered are the social environment, the presence of sensitive environmental ecosystems, natural seepages, etc. Subsequently, an assessment, prioritization, and mitigation measures plan is carried out.

ENHANCED BIOREMEDIATION:⁴

Before the bioremediation technique is implemented, a previous and individual analysis of each site for recovery is carried out, which includes:

- Impacts to humid areas or aqueous environments: natural or artificial bodies of water, seasonal floodplains.
- Impacts on dry areas: areas without water.
- Contaminant type: crude, refined, high API, low API.
- Contaminant state: liquid, viscous, or solid.
- Concentration: level of hydrocarbon in the soil.
- Water table: the only means of bacterial mobility is the water present in the water table; if the soil is dry, water must be applied to the soil to generate moisture.

Based on the previous site analysis, a biotechnological treatment process is implemented for the remediation of soils and waters contaminated with hydrocarbons, supported by three fundamental pillars: applied products, preparation of the bacterial broth, and monitoring and control of the process. Each of these components integrates specific technologies that enable effective, controlled biodegradation.

APPLIED PRODUCTS:

Specialized products are used that favor the bacteria-hydrocarbon interaction and improve the efficiency of the remediation process. Ecopetrol uses a **consortium of native bacterial strains**, microorganisms adapted to different matrices (soil, water, or sediments) with a high capacity for hydrocarbon degradation.

⁴ Currently, for the recovery of areas impacted by hydrocarbons, Ecopetrol uses the technique called **enhanced bioremediation**, which is based on the technical package of microorganisms for the efficient degradation of hydrocarbons in impacted areas that decreases degradation times.

During the intervention and recovery stages of unresolved environmental impacts, Ecopetrol has invested since the 90s in developing technologies, products, and pilot tests for bioremediation of impacted areas.

Between the 1990s and the early 2000s, the necessary studies were conducted to optimize an enhanced, intensive biodegradation technique that recovered impacted soils in 90 days. Subsequently, various biotechnological developments were introduced that employed bacterial consortia and improved microorganisms designed to treat water, waste, and soils pervaded by hydrocarbons.

In 2011, the methodology for recovering contaminated soils through biostimulated phytoremediation was established. In subsequent years, multipurpose surfactants, used as degreasers in soil cleaning and recovery tasks, were introduced, along with new biotechnological solutions to optimize hydrocarbon bioremediation.

Ecopetrol has licensed some of its products to third parties for manufacturing and marketing.



Likewise, other technical products can be employed to accelerate the process, such as **multipurpose surfactants** that reduce surface tension, releasing trapped hydrocarbons and increasing the speed of removal, and **lignocellulosic biopolymers**, which facilitate contact between bacteria and pollutants, promoting biodegradation.

PREPARATION OF THE BACTERIAL BROTH:

The formulation of a bacterial broth is key to ensure an effective and viable application in the field, scaling the bacteria with the use of water, the use of meshes to pack the bacterial consortium in fast-tank type tanks, along with the application of nutrients (such as Triple 7) that favor its multiplication, as well as an air distribution system in the fast tank for uniform aeration, optimizing bacterial growth.

ON-SITE APPLICATION AND RECOVERY:

The bacterial broth is metered out in humid or low-lying areas subject to flooding by means of specially designed injection flutes to achieve a homogeneous distribution in the contaminated environment. In dry or low-humidity soils, they are applied directly to the affected soils and homogenized using machinery in continuous operations until the levels of hydrocarbon degradation are reached.

Image 4. Improved bioremediation through the application of biological agents and soil homogenization.



Source: Ecopetrol

PROCESS MONITORING AND CONTROL

For on-site monitoring of the recovery activity and to guarantee the effectiveness of the treatment, continuous monitoring and real-time adjustments are conducted through 24/7 operational physicochemical monitoring to continuously assess parameters such as hydrocarbon levels, employing equipment such as retorts, which allow obtaining data in the field in less than an hour, and maintain a daily oversight of the process. Based on these daily hydrocarbon results, real-time adjustments to the treatment dosage are made, ensuring accurate and efficient application until the Louisiana 29B reference limit of 1% hydrocarbon content is reached.

This innovation in the recovery techniques of areas impacted by hydrocarbons has allowed optimizing the bioremediation times of soil from 90 days/m³ to 15 days/m³ on average, in all the areas where these works are conducted, placing Ecopetrol at the forefront of biotechnology implementation for the recovery of areas affected by hydrocarbons or their derivatives. Below is an example of the results obtained through the application of the aforementioned biotechnologies in an impacted area.



Image 5. Results from employing the enhanced bioremediation process



Before After

Source: Ecopetrol

Conclusions

From the findings provided in this document relating to the integral management Ecopetrol has been conducting for the environmental recovery of the sites identified with Hydrocarbon Environmental Impacts Associated with Prior Operations (IANRs for its Spanish acronym), also known as Unresolved Environmental Impacts, it can be concluded that:

1. Ecopetrol, under a framework of responsible business conduct, identifies and manages risks and impacts associated with its operations, aiming to prevent, mitigate, or remediate these. Based on this action principle, the Company has implemented the respective actions to address Unresolved Environmental Impacts (IANR).
2. Ecopetrol has been systematically identifying and proactively reporting, within the framework of its environmental instruments, the areas affected by hydrocarbons associated with previous operations, known as IANRs.
3. In 2018, Ecopetrol conducted an exercise to determine the impacts of hydrocarbons, contingencies, and infrastructure on the dismantling process and the condition of the dismantled assets, ultimately identifying the impacts of hydrocarbons associated with previous operations (IANR). This exercise concluded with 286 IANRs identified.
4. All IANRs identified - many with the help of the surrounding communities - have been duly reported to the competent environmental authorities.
5. The environmental authorities periodically conduct control and monitoring of the management and recovery of the IANR through visits and administrative orders.
6. Ecopetrol, in the exercise of its continuous improvement, develops and incorporates state-of-the-art technology in the diagnosis of impacted areas through Advanced Environmental Geophysics.
7. The Company also incorporates biotechnology into the recovery of affected areas (enhanced bioremediation) using microorganisms specialized in degrading hydrocarbons, thereby optimizing recovery time by up to 50%.
8. Ecopetrol has defined a structured methodology to identify, diagnose, and recover areas impacted by hydrocarbons, supported by advanced environmental geophysics, including drones equipped with multispectral thermographic cameras and terrestrial georadars.



9. As of December 2025, 286 IANRs have been identified, of which 272 have been recovered technically and environmentally, recovering 96.8% of the total identified IANRs. The record of impacted sites may vary as new diagnostic studies of possible areas are conducted.
10. The IANR identification and recovery records at Ecopetrol S.A. are continuously updated, aiming to identify and recover all areas affected by hydrocarbons associated with previous operations.