



**STRATEGIC DECISION TO SELECT EQUIPMENT FOR  
WELL ABANDONMENT PROJECT FROM  
THREE ALTERNATIVE VENDORS INLINE WITH  
ENVIRONMENTAL, SOCIAL AND GOVERNANCE (ESG):  
EVIDENCE IN OIL AND GAS  
SERVICE COMPANY  
IN DURI FIELD, INDONESIA**

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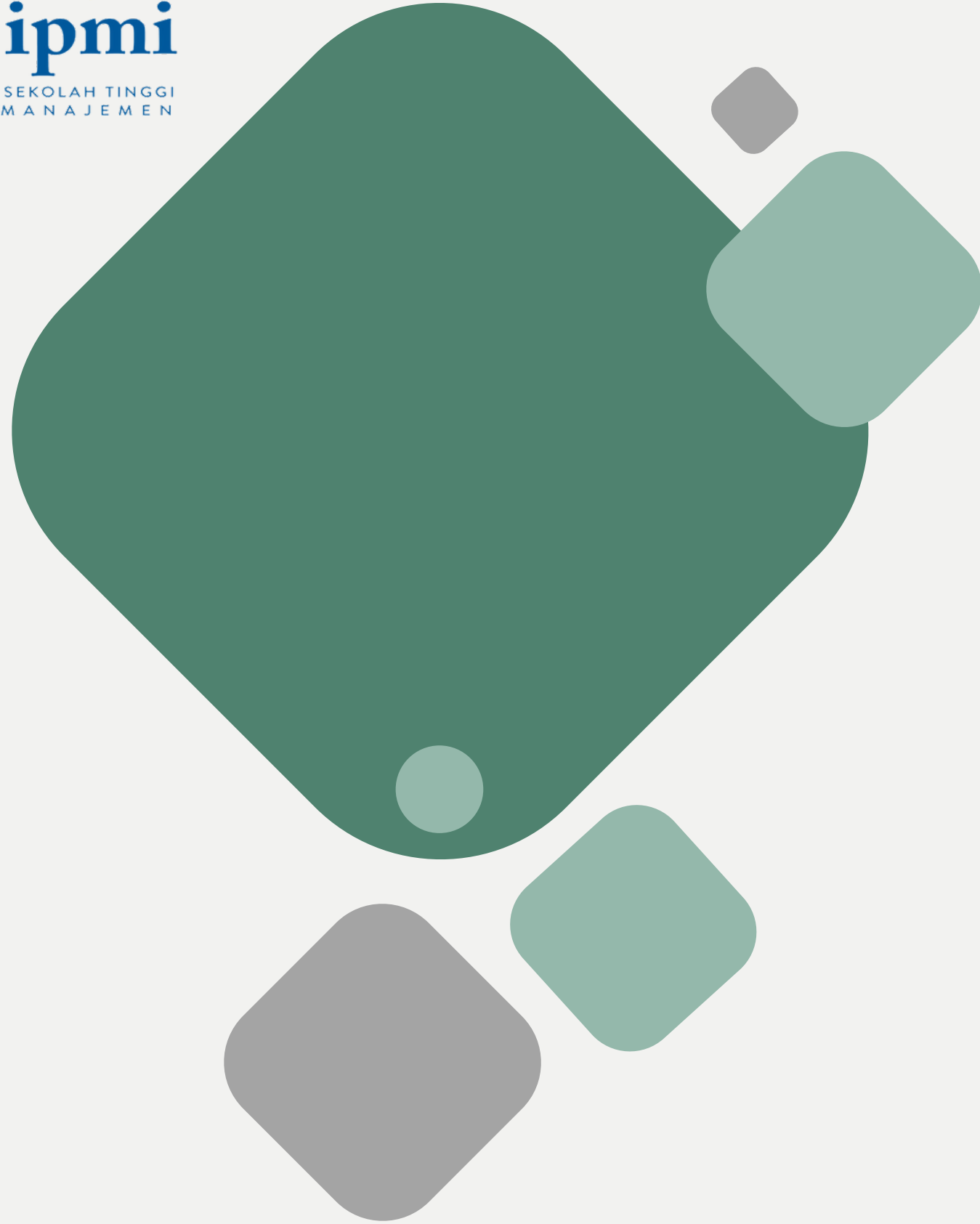
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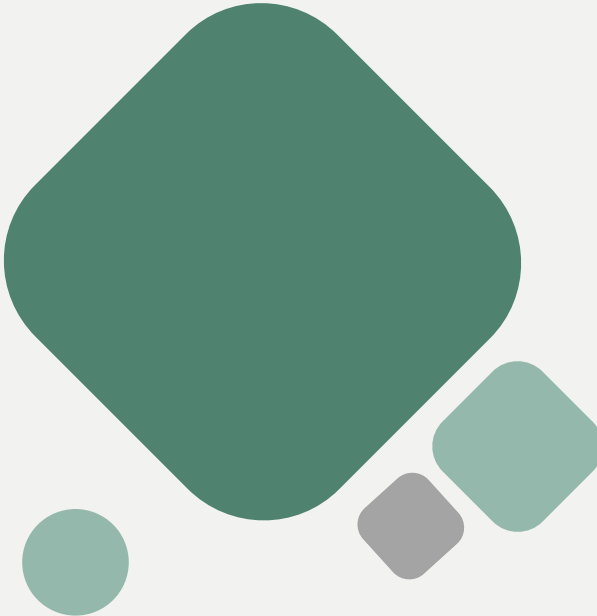
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# Chapter 1

# Introduction



Abandonment and Site Restoration or (ASR) or Well abandonment in Indonesia is a critical aspect of the oil and gas industry, involving the safe, go green and environmentally responsible decommissioning of wells that are no longer productive or economically viable. There are many, Indonesia's oil and gas fields are non-commercial viable in explorations and at present there are more than 100 inactive platforms and more than 20,000 inactive wells (onshore and offshore) awaiting decommissioning & abandonment. According to Journal of Earth Energy Engineering vol. 10 no. 3, 2021.

In Indonesia, well abandonment is governed by a combination of national laws, regulations, and guidelines, with a focus on environmental protection, safety, and resources management. The Key Legal Frameworks and regulations related to well abandonment are Law no.22 2001 on Oil and Gas, Government Regulation no. 35 of 2004 on Upstream Oil and Gas Business Activities, Minister of Energy and Mineral Resources (MEMR) Regulation no.15 of 2018.

The abandonment of wells typically occurs when the cost of production exceeds the revenue generated from the oil, or when the recovery rate drops below a sustainable level and for Duri, this point is extended due to the effective rate if EOR (Enhances Oil Recovery). Currently Duri still producing 100,000 – 200,000 barrels per day and the declining by years would be around 5%, and the production could reduce about 60,000-80,000 barrels oer day in the next 5-10 years.

Law No. 32/2009 on Environmental Protection and Management. The purpose of this Law is to create an environmentally sustainable development through means of an environmental planning policy, and the rational exploitation, development, maintenance, restoration, supervision and control of the environment.

MEMR Imposes New Abandonment and Site Restoration Obligations for Indonesian Upstream Oil and Gas Activities through MEMR Regulation No. 15 of 2018 regarding Post-Operation Activities in Upstream Oil and Gas Business Activities ("MEMR Reg. 15/2018") came into effect on February 23, 2018. It implements Article 17 (4) of Government Regulation No. 79 of 2010 regarding Recoverable Operating Costs and Income Tax Treatment in Upstream Oil and Gas Business Activities, as amended by Government Regulation No. 27 of 2017 (as amended, "GR 79"). Even though Article 17(4) of GR 79 only orders the MEMR to stipulate the procedure for the utilization of ASR funds, MEMR Reg. 15/2018 now imposes the obligation to conduct ASR (Abandonment Site Restoration) activities. (<https://ssek.com/blog/memr-imposes-new-abandonment-and-site-restoration-obligations-for-indonesian-upstream-oil-and-gas-activities/>)...

Integrating Environmental, Social and Governance (ESG) principles in the oil and gas industry emphasizes the importance of sustainability, community impact, and corporate responsibility. ESG-focused well abandonment goes beyond just meeting regulatory requirements; it involves proactive measures to ensure that the abandonment process aligns with broader sustainability and social goals.

Meanwhile, well abandonment in oil fields like Duri Rokan is a complex process involving the safe and environmentally responsible decommissioning of wells that are no longer productive or needed.

Estimated cost and time for well abandonment can vary based on several factors, including the number of wells, the depth of wells, the type of wells (whether they are production or injection wells), the environmental regulations in places and the techniques used for abandonment.

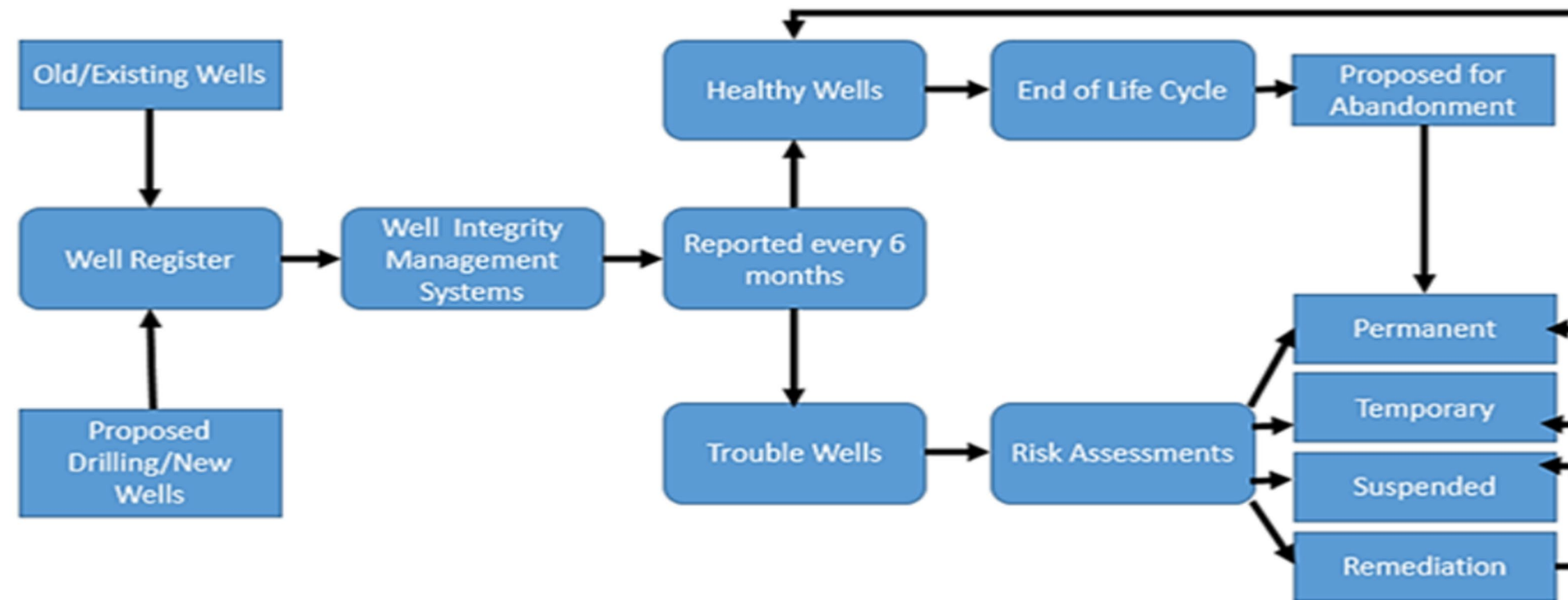
“Indonesia oil and gas field mostly are brownfields which were drilled in the late '40s up to '90s. Development and further development of a new structure throughout the years is done, including drilling exploration wells with new play and development wells. Now, most well locations become a populated village and might raise the potential risk to the people and environment. To fulfil safety commitment, well production operations have to be done safely to the people and environment”.

(Source)

Ganesha R Darmawan <sup>(1)</sup> 1) Bandung Institute of Science Technology, Indonesia,

<https://doi.org/10.25299/jeee.2021.5658>

Improvement on Well Management for Well Life Cycle



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## Research Question

1. What is the operational strategies to select the suitable equipment for ASR or Well abandonment Project at Duri's site (WS Rokan)?

2. How to measure and evaluate the feasibility for ASR or Well abandonment Project at Duri's site (WS Rokan)?

3. What actionable recommendation can be provided for ASR or Well abandonment Project at Duri's site (WS Rokan) in supporting the ESG Program?

## Research Objective

1. To analyze, evaluate the operational strategies to select equipment for ASR or Well abandonment Project at Duri's site (WS Rokan).

2. To measure and evaluate the feasibility for ASR or Well abandonment Project at Duri's site (WS Rokan).

3. To provide actionable recommendation for . ASR or Well abandonment Project at Duri's site (WS Rokan) in supporting the ESG Program .

# Novelty

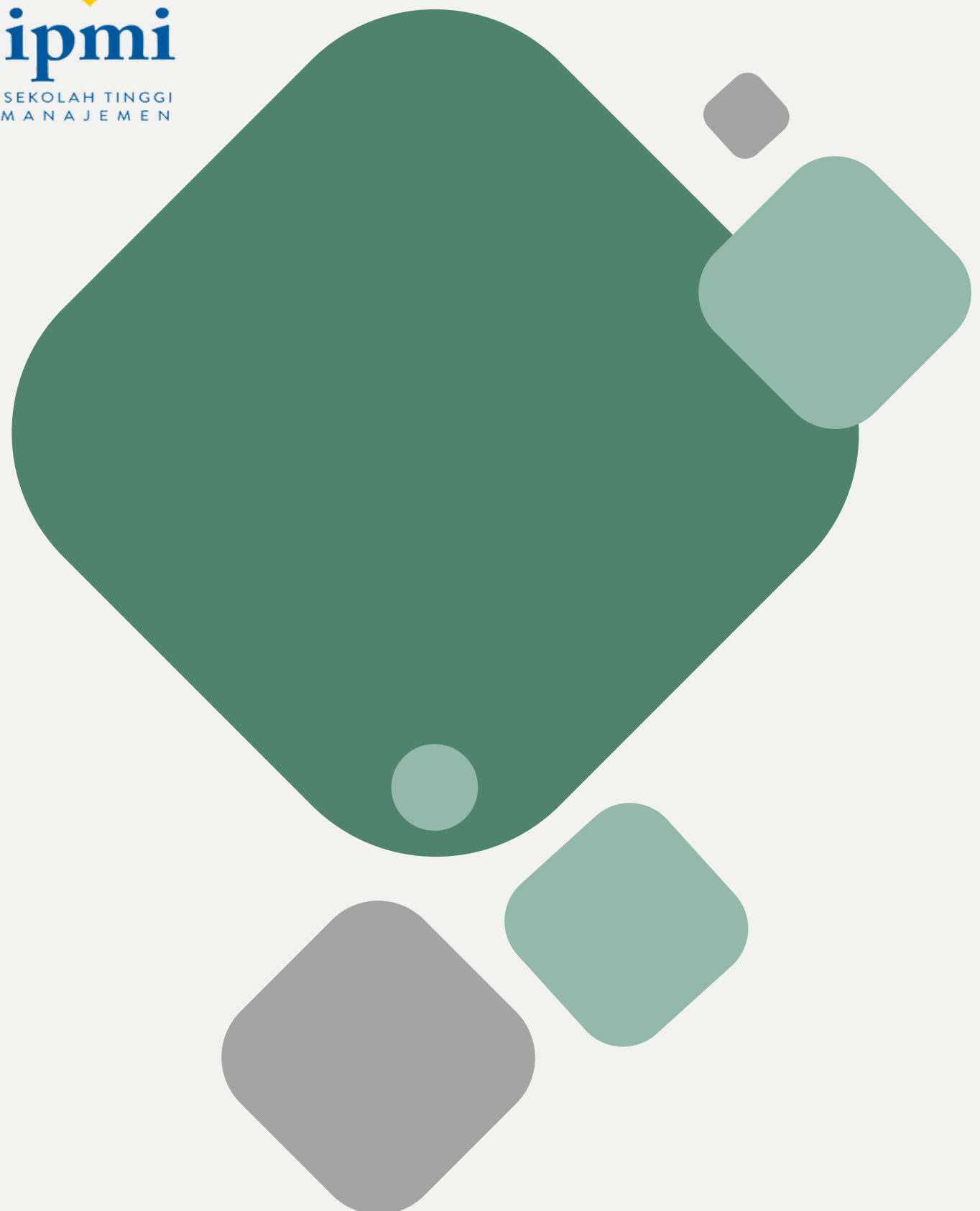
1. In previous research, focused on technical and operational process for ASR or well abandonment project, meanwhile in this research it combines Qualitative and Quantitative Method that relates with ESG's at Duri Site (WS Rokan), Indonesia of the year 2024.
2. This research to integrate Environmental, Social and Governance (ESG) principles in oil and gas industry emphasizes the importance of sustainability, community impact and corporate responsibility. In this research ESG-focused well abandonment goes beyond just meeting regulatory requirements; it involves proactive measures to ensure that the abandonment process aligns with broader sustainability and social goals.

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Sample Journals for ASR and Well abandonment Project :

Ali Rekso Tinamtul and Santi Novani<sup>2</sup>, “**DECISION ANALYSIS OF ABANDONMENT AND SITE RETIREMENT FOR SAND PLANT FACILITIES GATHERING STATION**”, 2023

Dyah Rini Ratnaningsih, Dedy Kristanto, Moulin Ayu, “**Abandonment and Site Restoration (ASR) Reservation Scenario with Cost Recovery on MATD Structure**”, 2011



# Chapter 2

# Literature<sup>11</sup> Review

P	E	S	T	E	L
<ul style="list-style-type: none"> <li>- Government policy</li> <li>- Political stability</li> <li>- Corruption</li> <li>- Foreign trade policy</li> <li>- Tax policy</li> <li>- Labour law</li> <li>- Trade restrictions</li> </ul>	<ul style="list-style-type: none"> <li>- Economic growth</li> <li>- Exchange rates</li> <li>- Interest rates</li> <li>- Inflation rates</li> <li>- Disposable income</li> <li>- Unemployment rates</li> </ul>	<ul style="list-style-type: none"> <li>- Population growth rate</li> <li>- Age distribution</li> <li>- Career attitudes</li> <li>- Safety emphasis</li> <li>- Health consciousness</li> <li>- Lifestyle attitudes</li> <li>- Cultural barriers</li> </ul>	<ul style="list-style-type: none"> <li>- Technology incentives</li> <li>- Level of innovation</li> <li>- Automation</li> <li>- R&amp;D activity</li> <li>- Technological change</li> <li>- Technological awareness</li> </ul>	<ul style="list-style-type: none"> <li>- Weather</li> <li>- Climate</li> <li>- Environmental policies</li> <li>- Climate change</li> <li>- Pressures from NGO's</li> </ul>	<ul style="list-style-type: none"> <li>- Discrimination laws</li> <li>- Antitrust laws</li> <li>- Employment laws</li> <li>- Consumer protection laws</li> <li>- Copyright and patent laws</li> <li>- Health and safety laws</li> </ul>

According to Francis Aguilar (1967), PESTEL analysis is a strategic planning tool that helps organizations identify and evaluate threats, opportunity for business.

V VALUABLE	R RARE	I INIMITABLE	O ORGANIZED
NO			
YES	NO		
YES	YES	NO	
YES	YES	YES	NO
YES	YES	YES	YES

According to Jay Barney (1991), the VRIO analysis, in its original form VRIN, was devised as a way to identify which resources must be in place for business to have a long-term competitive advantage in their sector.



According to Albert Humphrey (1960) and Sarsby (2016), SWOT is a four-box strategy analysis and strategy development framework. SWOT stands for Strength, Weaknesses, Opportunities, and Threats. SWOT analysis is a tool used by organizations for strategic planning and management.

The framework of SWOT analysis works well for developing both organizational and competitive strategies.

# Cost-Benefit Analysis

Cost-benefit analysis is a methodology for evaluating the pros and cons of major projects, investments, and policy changes by quantifying and comparing costs and benefits in monetary terms.



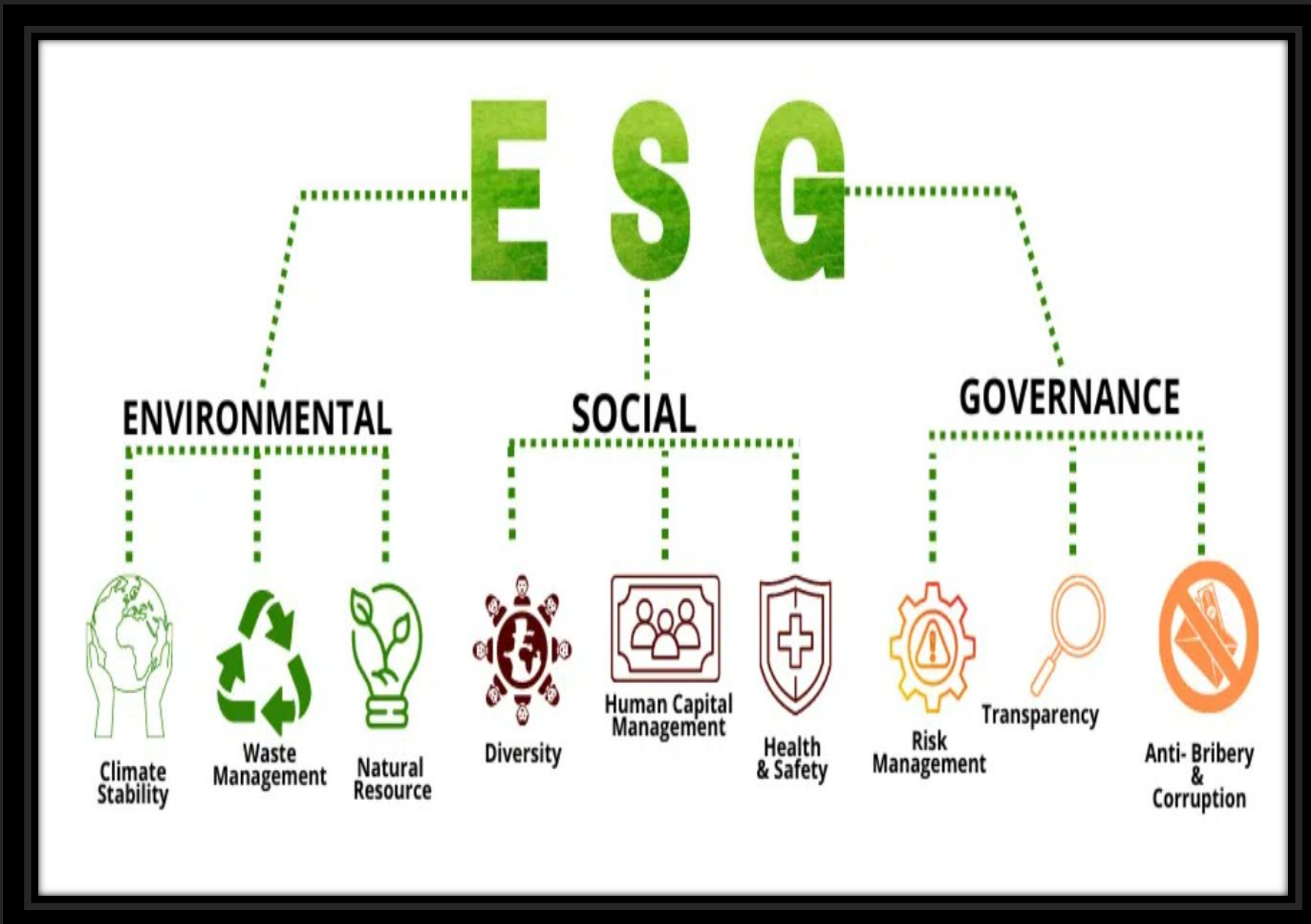
## COST BENEFIT ANALYSIS

The first use of Cost -Benefit Analysis in business is associated with a French engineer, Jules Dupuit (1840). Dupuit was a self -taught economist, and in the mid 19th Century, Dupuit used basic concepts, which were later known as Cost -Benefit Analysis.

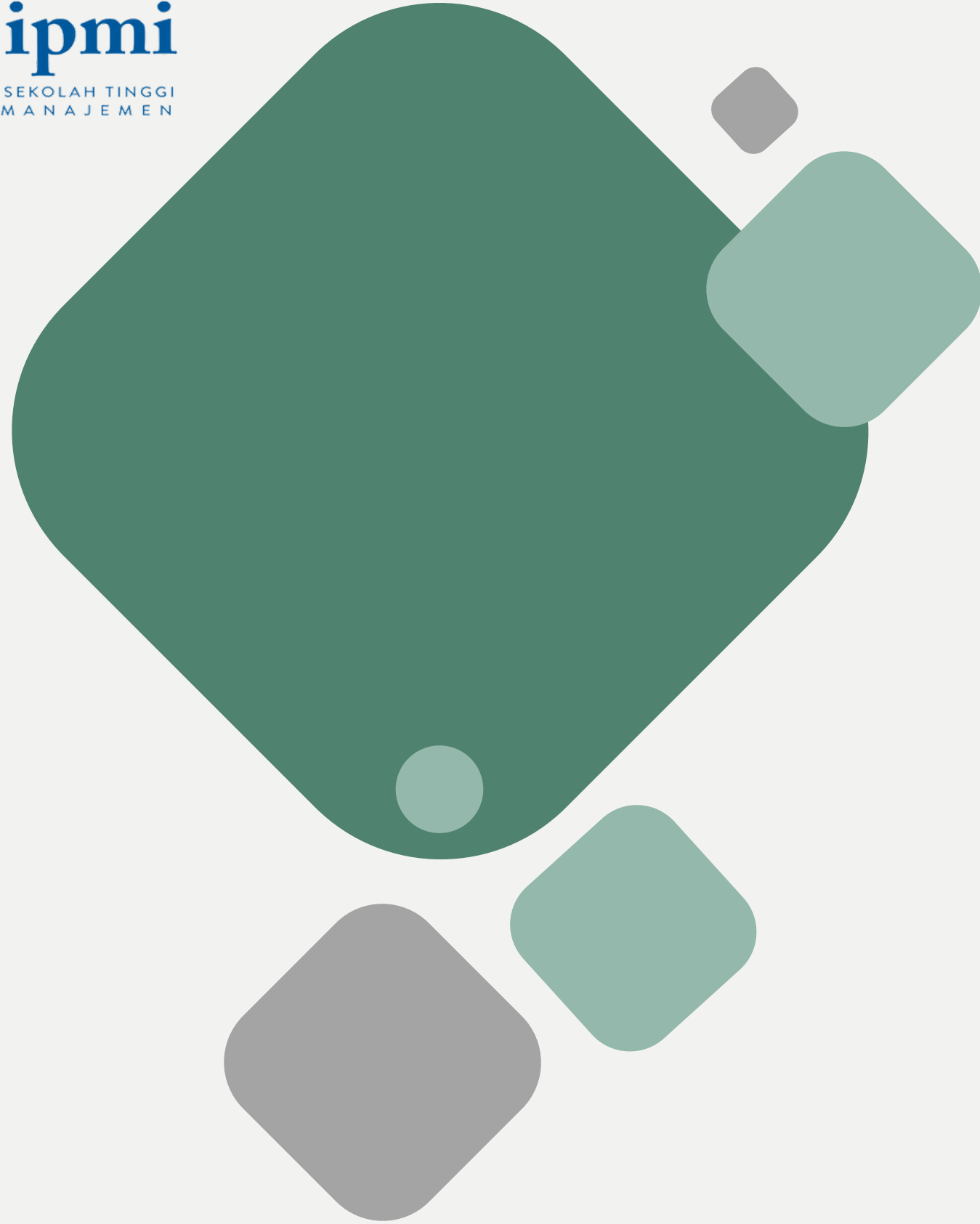
Based on value focus thinking (VFT) there are 4 alternative business solutions to support abandonment & site retirement activities, these 4 alternatives are in accordance with government regulations SKK Migas Guidelines PTK -040/SKKMA0000/2018/SO, The Alternative are mentioned below are Utilize unused assets in other business units, Disassembled and taken to temporary storage as scrap, In situ write off, sold to other party as scrap, Utilized for purposes other than Upstream Business Activities

OJK Reg 51/2017 mandates a specific ESG disclosure for public companies and financial institutions. This regulation primarily imposes the obligation for financial institutions and public companies to integrate sustainable economic practices and provide relevant disclosures to both the OJK and the public.

Abandonment site retirement refers to the process of permanently decommissioning oil and gas facilities and infrastructure that are no longer in use (Chandler et al., 2017; Ojukwu, 2020). This process involves the safe and proper closure of wells, pipelines, platforms, and other equipment, as well as the removal of all associated infrastructure (Jagerroos & Kayleigh, 2020). The goal of abandonment site retirement is to ensure that the decommissioned sites are safe, environmentally sound, and pose no risk to public health or safety (Bullard & Johnson, 2000; Malin, 2015; Rezaie & Anderson, 2020).







# Chapter 3

# Research Method

## What is Research Design?

Research design is a strategy for gathering, measuring and analyzing data based on research objectives (Sekaran & Bougie, 2017)



The research design of this thesis **consists of the subsequent stages:**

1. Stage 1 – Strategic Analysis by the interview with Leader of the Company
2. Stage 2 – Cost-Benefit Analysis During Well Abandonment Project
3. Stage 3 – Non – Monetary Analysis
4. Stage 4 – Final Project Assessment

Flow of Methodology to conduct research  
and objectives

in order to answer research questions



**STAGE 1**

- Background & analysis of Well Abandonment Project or ASR (Abandonment Site Restoration) (PESTEL, VRIO, SWOT, Process Flow)

**STAGE 2**

- Cost-benefit analysis (during ASR or well abandonment project)

**STAGE 3**

- Defined from ESG's

**STAGE 4**

- Management Final Decision

## Stage 1

### Strategic Analysis by Interviewing Leaders

A strategic analysis involves assessing cost analysis during the ASR or well abandonment process whether is aligned with the organization goals by end of exploration period, appraising strategic and assessing the most viable strategic alternatives .

## The key objective of strategic analysis

is to determine the effectiveness of the current strategy in the context *during the Abandonment Site Reperiod.*

The initial phase of data collection aims to gather insights from management perspectives.

### Stage 2 – COST BENEFIT and ANALYSIS

#### Direct Cost

- a. Initial Setup Costs : The cost of materials, labor, and equipment.
- b. Operational Costs : Ongoing labor, equipment, maintenance and logistic.
- c. Administrative Costs : Permitting, Legal Fees and compliance monitoring.
- d. Decommissioning Costs : If applicable to the well abandonment phase

#### Indirect Cost

- a. Opportunity costs : Delays in execution or inefficient use of resources.
- b. Environmental liabilities : Potential future remediation due to non-compliance or failure in well sealing.
- c. Contingency : Unforeseen expenses for delays, technical issues, or material shortages.

Direct costs are costs that can be attributed to a specific product or service, and they do not need to be allocated to the specific cost object.

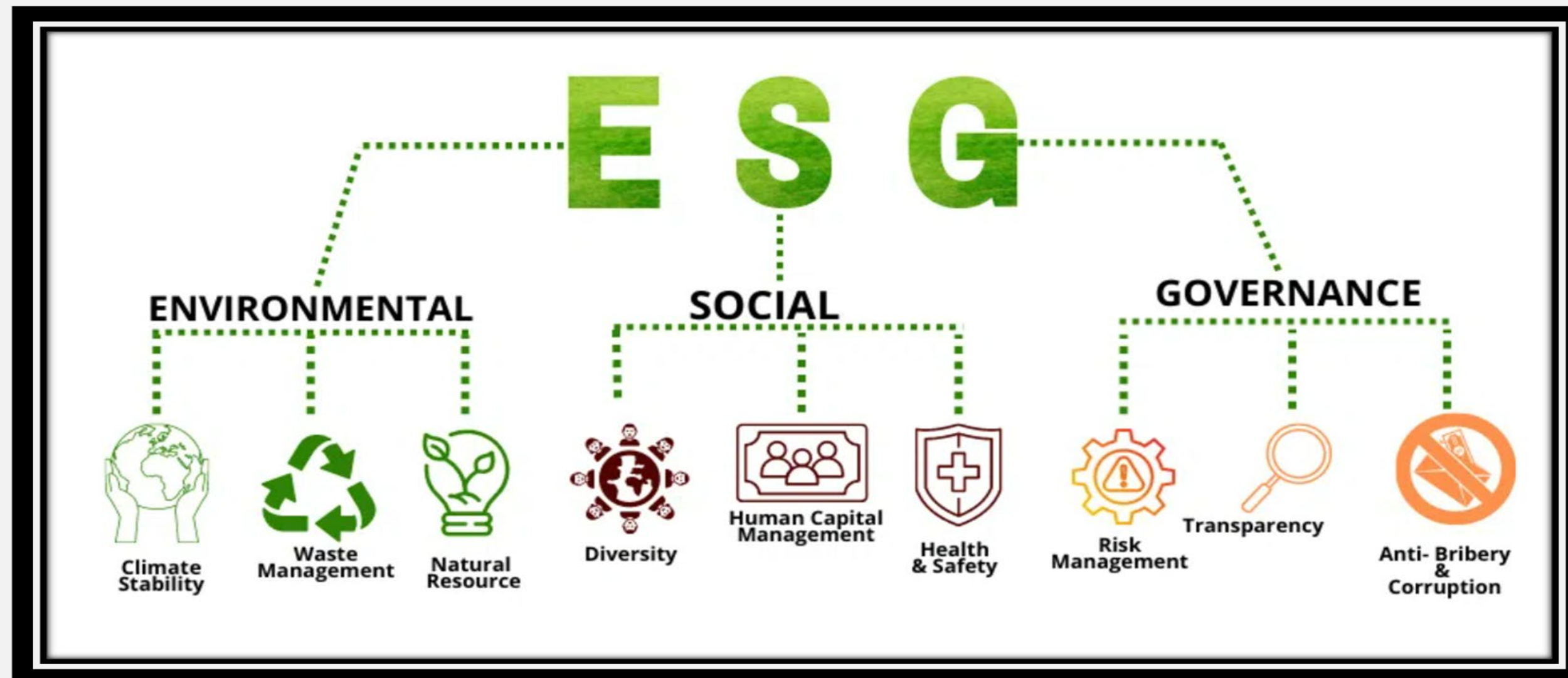
Indirect costs are costs that cannot be easily associated with a specific product or activity because they are involved in multiple activities. (According to [Jeff Schmidt](#))

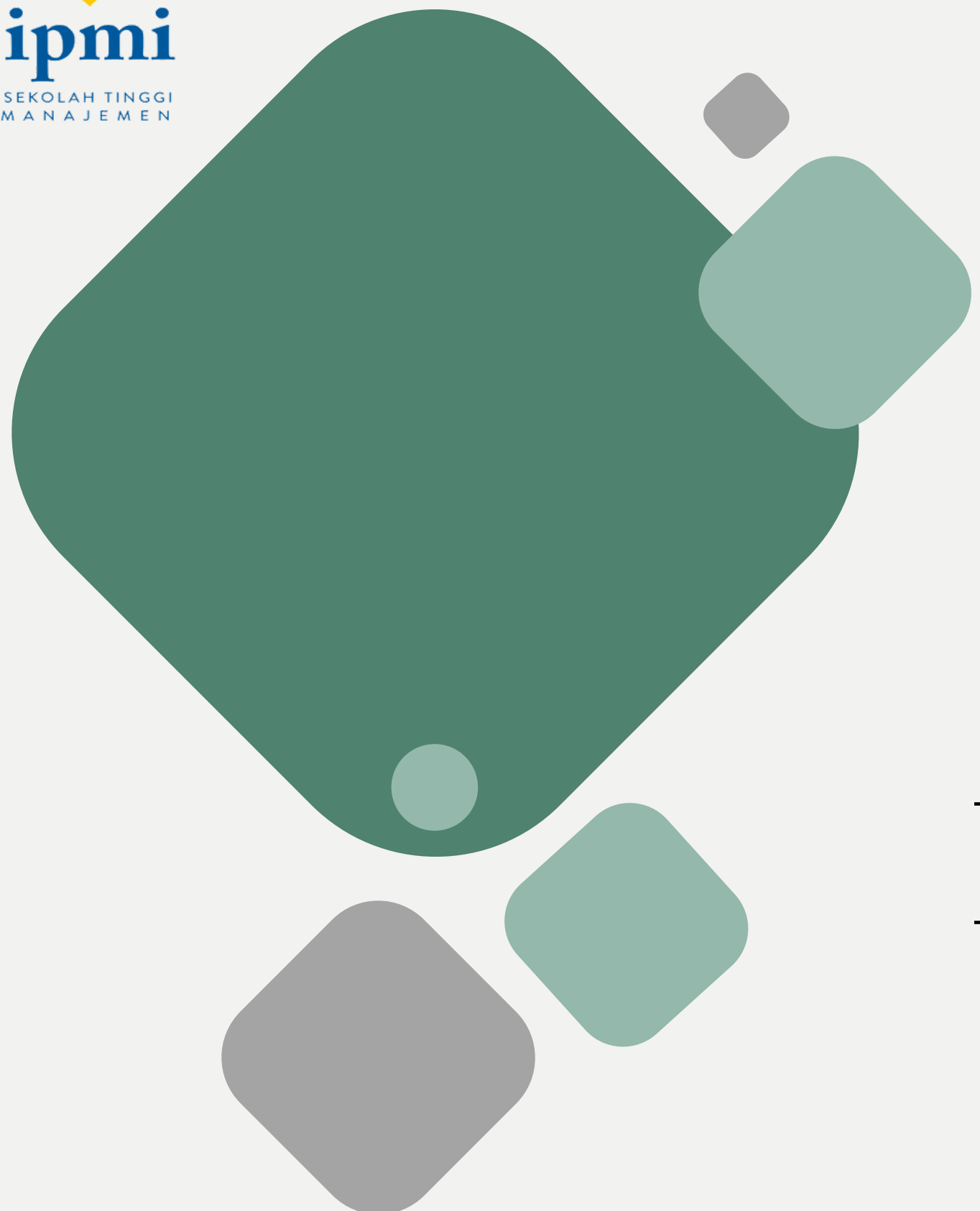
ESG :

Environmental : Waste Management and Natural Resources

Social : Health and Safety

Governance : Risk Management





# Chapter 4

## Finding, Analysis & Discussion

## Background Interview with Leaders

- To analyze, evaluate the operational strategies to select equipment for ASR or Well abandonment Project at Duri's site (WS Rokan) through Interview with leaders. Main priority that needs to be consider for decision maker ASR.
- To measure and evaluate the feasibility for ASR or Well abandonment Project at Duri's site (WS Rokan) through PESTEL, VRIO, SWOT and Cost Benefit Analysis.
- To provide actionable recommendation for . ASR or Well abandonment Project at Duri's site (WS Rokan) in supporting the ESG Program.



# Interview with Leaders

**Table 1: Interview with Leader Result based on priority.**

No.	Position	Productline	Experience	Cost	Enhancement	Delivery Timeline	Freight, Duty & Tax
1	Business Development Manager	Duri Field, WS Rokan	>+20years	1	4	2	3
2	Operations Manager	Duri Field, WS Rokan	>+10years	1	4	3	2
3	Supply Chain Manager	Indonesia	>+8years	1	2	3	4
4	Finance Manager	Indonesia	>+10years	1	2	3	4

\*)Importance scale base on operation real base practice

## Keynotes:

1. Position of Informant : 1. Business Development Manager, 2. Operational Manager, 3. Supply Chain Manager, 4. Finance Manager;
1. Experience : In Oil and Gas field or Business;
2. Cost : Cost of the Equipment for ASR or Well abandonment;
3. Enhancement : Technology Enhancement and System Integrated;
4. Delivery Time : Freight Schedule, DDP Incoterm;
5. Freight, Duty and Taxes : Sea Freight using vessel, Duty and Taxes will be depends to the Country Origin of vendor or supplier.

# Data Collection & Analysis

Origin of vendor	Company	Equipment (Cost in USD)	Insurance (5%)	Sea Freight in Kg	Equipment Weight (Kg)	Total Sea Freight (In USD)	Duty & Taxes (7,5%)	Total Cost
UK	Expro and 2hoffshore	\$ 1,200,000.00	\$ 60,000.00	\$ 2.45/Kg	10,250.00	\$ 25,112.50	\$ 90,000.00	\$ 1,375,112.50
US	Baker Hughes and Weatherford Intl	\$ 1,100,000.00	\$ 55,000.00	\$ 2.80/Kg	10,250.00	\$ 28,700.00	\$ 82,500.00	\$ 1,266,200.00
China	Vigor and Landdrilloiltools	\$ 900,000.00	\$ 45,000.00	\$ 2.05/Kg	10,250.00	\$ 21,012.50	\$ 67,500.00	\$ 1,033,512.50

## Overview

This table presents data on equipment for well abandonment or abandonment site restoration (ASR) from companies in the UK, US, and China. It includes key metrics like Equipment Cost, Insurance, Sea Freight Cost using Vessel, Duty and Taxes.

## Key Findings

Companies manage wells with significant cost allocation or reserves for reservoir of ASR and suggesting other economic factors drive abandonment decisions.



Costs are varied among the three countries, likely due to economies of scale.

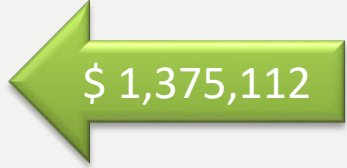
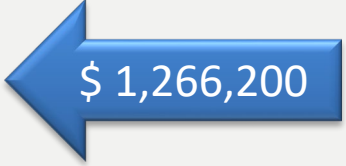
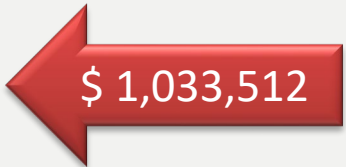


Costs range from \$1,033,512 to \$1,375,112, influenced by factors like well complexity, depth, and regulatory requirements.



## Cost Benefit Analysis

### Cost-Benefit Analysis

- **UK Option** : Highest Equipment Price with production enhancement solutions, selection of appropriate abandonment strategies, expertise in techniques, technologies and procedures, wireless barrier monitoring for temporary abandonment and wellsite supervision of abandonment operations.  \$ 1,375,112
- **US Option** : In between UK and China vendor or supplier price, with Integrated well abandonment solutions through well decommissioning process with flexible, scalable and can be tailored from single services to dully managed turnkey projects. Focus on safety, reliable timeline, from the surface until reservoir.  \$ 1,266,200
- **China Option:** The lowest, reliable and cost-effective method for plugging and abandoning oil and gas wells. Dissolvable plugs are designed to provide zonal isolation and temporary barriers in well abandonment operations, it can be easily removed using common well fluids, eliminating the need for costly milling operations and reducing the environmental footprint. Suitable for various well conditions and can be tailored to specific wellbore characteristics. It offers a simple and efficient solution for operators looking to streamline of well abandonment process, With a focus on quality and innovation,  \$ 1,033,512
- ❖ Considers the assumption : Choosing the right equipment for well abandonment in oil and gas operations requires a careful evaluation of the well's condition, regulatory requirements, safety standards, environmental protection, and the operational context. These factors should be balanced to ensure safe and cost-effective well abandonment process.



### Political

#### 1. Regulatory Environment:

The Indonesian government heavily regulates the oil and gas industry, including well abandonment projects.

Companies must comply with environmental laws and decommissioning regulations.

#### 2. Government Policies:

Political stability can influence the ease of doing business, Changes in leadership or government priorities can affect investment in the energy sector.

**3. Regional Tensions:** Local Political issues or conflicts in certain regions could impact the project's timeline or security.

#### 4. Permitting and

**Bureaucracy:** Government processes can be slow or complex, potentially delaying project timelines.



### Economical

**1. Oil Price Volatility :** The fluctuating global price of oil may influence funding, profitability, and project viability.

**2. Investment Climate:** Indonesia encourages foreign investment in oil and gas but may have protectionist policies in place.

**3. Cost of Labor and Materials:** Inflation, exchange rates, and the local cost of goods and services will affect project costs.

**4. Funding Availability:** Economic conditions in Indonesia and globally might limit the available capital for projects.



### Social

**1. Local Communities:** Well abandonment projects might affect nearby communities, leading to potential social challenges, particularly if there are concerns about environmental impact.

#### 2. Employment Opportunities:

The project could create jobs for local communities, which may be beneficial for gaining public support.

#### 3. Cultural Sensitivities:

Understanding and respecting local customs and community expectations is crucial to avoiding social friction.

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### Technological

#### 1. Technological Innovation:

Advancements in abandonment and decommissioning technology can improve efficiency and reduce costs

1. .

#### 2. Infrastructure:

Indonesia's existing infrastructure may limit the availability of advanced technologies, leading to delays or higher costs in acquiring necessary equipment.

#### 3. Local Expertise:

Availability of skilled workers and advanced technology in-country may impact project timelines and costs.



### Environment

**1. Environmental Regulations:** Stringent Indonesian environmental laws require compliance with abandonment standards that minimize environmental impact.

#### 2. Environmental Risks:

The potential environmental hazards (e.g., spills, contamination) associated with well abandonment could increase regulatory scrutiny and project complexity.

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**3. Sustainability:** The project must focus on sustainable practices, including proper sealing of wells and restoration of the surrounding environment.



### Legal

**1. Health and Safety Laws:** Indonesia has specific regulations regarding the health and safety of workers in the oil and gas sector.

#### 2. Liability and Legal Risks:

Companies may face legal risks if the well abandonment process leads to environmental damage or fails to comply with the law.

#### 3. Contractual Obligations:

Project contracts will be governed by Indonesian law, and there could be legal implications related to subcontracting or partnerships with local firms.

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# VRIO

Vendor or Supplier without good track records and lack of experience in ASR or Well Abandonment Project

Common Practice, Cost Efficiency

Specific Type of Equipment, Method and Timeline

Relationship and Partnership

Organization Agility, Innovation, Human Resources, Environmental, Social and Governance Commitment, Financial Stability.

V VALUABLE	R RARE	I INIMITABLE	O ORGANIZED	
NO				COMPETITIVE DISADVANTAGE
YES	NO			COMPETITIVE PARITY
YES	YES	NO		TEMPORARY COMPETITIVE ADVANTAGE
YES	YES	YES	NO	UNUSED COMPETITIVE ADVANTAGE
YES	YES	YES	YES	SUSTAINABLE COMPETITIVE ADVANTAGE



Strengths	<p><b>Established Infrastructure:</b> The Duri site, located within the Rokan block, is one of Indonesia's oldest and most developed oil fields. This means existing infrastructure might facilitate easier access to equipment and materials.</p>	Weaknesses	<p><b>Aging Infrastructure:</b> While the Duri field has a long history, much of its infrastructure is aging, which could pose challenges for compatibility with modern equipment and require additional investment in upgrades.</p>
	<p><b>Experienced Workforce:</b> The presence of experienced workers and technical experts familiar with the site can contribute to more efficient equipment and material selection..</p>		<p><b>Limited Technological Advancements:</b> Given that it's an older field, there may be limitations in terms of availability or use of cutting-edge technology for well abandonment, necessitating reliance on traditional equipment.</p>
	<p><b>Proximity to Local Suppliers:</b> The well-established supply chains for oil and gas operations in this area could help reduce delays in obtaining materials and equipment. <b>Government and Contractor Support:</b> As part of a significant oil production region, the government and major contractors like may offer support or recommendations for suitable equipment and materials with more efficient price and technology enhancement that suitable with the well's conditions.</p>		<p><b>Environmental Challenges:</b> Duri's hot, humid climate, combined with extensive previous production, might complicate the storage and transportation of materials, particularly those that are sensitive to environmental conditions. <b>Cost Constraints:</b> The need for specialized equipment and materials to meet both regulatory and technical requirements could escalate costs, particularly if advanced technology is required.</p>



Opportunities	<p><b>Access to Modern Technology:</b> There is potential to leverage technological advancements, such as more efficient plugging and sealing materials, as well as new equipment designed for challenging environments, which could improve the safety and efficiency of the abandonment process.</p>	Threats	<p><b>Regulatory Pressure:</b> Indonesia’s stringent environmental laws on decommissioning and well abandonment might require the use of specific materials and equipment, which could limit options and increase costs.</p>
	<p><b>Growing Local Expertise:</b> As the Indonesian oil and gas sector grows, local suppliers and service providers are expanding their capabilities. This could create opportunities for sourcing high-quality materials and equipment locally, reducing costs and lead times.</p> <p><b>Government Incentives:</b> The Indonesian government is encouraging the safe and environmentally responsible abandonment of wells, which might provide opportunities for regulatory support, subsidies, or tax incentives for using high-standard equipment and materials.</p>		<p><b>Supply Chain Disruptions:</b> Global or regional supply chain issues, particularly for specialized abandonment equipment, could cause delays and increase costs for the project.</p> <p><b>Fluctuations in Material Costs:</b> The costs of raw materials, especially steel or other metals used in well abandonment, may fluctuate due to global economic conditions, making budgeting and procurement challenging. Since the PPV due to unfavorable in FX since the purchased price using USD.</p>
	<p><b>Environmental Restoration:</b> Choosing equipment and materials that align with sustainable practices may offer opportunities to restore the Duri site’s environmental balance, potentially gaining public and regulatory favor.</p>		<p><b>Environmental Hazards:</b> The presence of hazardous materials or hydrocarbons at the Duri site could increase the need for specialized equipment to mitigate environmental risks, potentially increasing the project’s complexity and cost.</p>

# Research Limitation

This research limitation to the Oil and Gas Industry under the process for Abandonment Site Restoration (ASR) or Well Abandonment Project in Duri Site (Well Site Rokan), Indonesia.

Timeline for ASR or Well Abandonment Project :

1. Simple Well Abandonment : 1 to 3 weeks / well
2. Complex Well Abandonment with Restoration : 1 to 3 months / well
3. Large Scale Projects with Extensive Restoration: 6 months to over a year

The duration for ASR or Well Abandonment Project may vary and widely based due to several factors:

1. Well Depth Complexity, 2. Site Location, 3. Regulatory Requirements, 4. Condition of the Well and
5. Environmental Considerations.





# Conclusion

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# Recommendation

# C o n c l u s i o n

1. According to the research the proper operational strategy for equipment and material for “**Well Abandonment Project or Abandonment Site Restoration (ASR)**” with PESTEL analysis, VRIO analysis, and SWOT analysis is buying from China vendor and supplier, for operational efficiency, technology enhancement, suitable for well conditions and aligned with the safety standard. In well closure projects in the Asia Pacific region, the equipment used varies according to the standards of each country. In the UK, high-tech equipment is used with a focus on safety and efficiency, while in the US, cutting-edge and data-driven technology dominates to improve effectiveness and operations. China adopts a more economical solution while still meeting the required safety standards. Due to the sourcing equipment for well abandonment based on the identification and suppliers that are known for providing reliable and compliant tools with lower price level and as per safety standard. From the analysis China will be more reasonable to purchase the equipment and minimum requirement for the material for ASR or Well Abandonment Project.
2. To measure and evaluate the feasibility of investment, common methods include cost-benefit analysis and financial projections that consider various factors, such as initial costs, long-term benefits, and risks involved. This evaluation ensures that the investment in well closure equipment provides the best value and supports the sustainability of the project. Risk factor analysis is carried out by evaluating potential issues that may arise during the project, including technical, regulatory, and environmental risks. Alternatives to meet minimum requirements often involve the implementation of innovative technologies or risk mitigation approaches to ensure compliance and operational effectiveness.
3. Applying ESG principles to Well Abandonment Project in Oil and Gas industry for Duri Site (WS Rokan) involves addressing the environmental, social and governance aspects associated with decommissioning oil and gas wells. This process is critical because it not only mitigate potential risks but also aligns the project broader sustainability and ethical standards, also carried out in manner that minimizes environmental harm, respects social considerations, and adheres to strong governance practices. This approach not only reduces risks but also enhances the company’s reputation, aligns with stakeholder expectations, and contributes to the sustainable management of natural resources. By integrating ESG criteria into well abandonment, oil and gas companies can demonstrate their commitment to responsible resources management and long-term sustainability.

# R e c o m m e n d a t i o n

1. Adopt technologies like predictive analytics and automation to optimize operational and decommissioning costs. Enhance team skills through ongoing training and development, equipping them to address challenges effectively. Continuously monitor and evaluate market conditions, regulations, and operational risks to adjust strategies accordingly.
2. Regulatory Compliance : To ensure compliance with Indonesia's regulatory framework, particularly under the Ministry of Energy and Mineral Resources (MEMR). Well abandonment in Indonesia must comply with regulations outlined in “Ministerial Regulation No. 15/2018” on Oil and Gas Exploitation and well abandonment.
3. Prepare and submit a detailed abandonment plan for approval from the “SKK Migas” (Special Task Force for Upstream Oil and Gas Business Activities).. Collaborate with local environmental agencies and comply with any additional local permits and regulations.
4. Ensure the Environmental Impact Assessment (EIA), Well Integrity and Plugging, Wellhead and Surface Equipment Removal, Underground Injection Control (UIC) Considerations
5. Health and Safety Protocols, Stakeholder’s engagement, Post Abandonment Monitoring, Proper Documentation and Record Keeping> Contractor Selection and Technology : Partner with experienced<sup>35</sup> contractors with a proven track record in well abandonment, particularly those familiar with the challenges posed by “Thermal recovery wells” like those in Duri. Utilize the latest “Well Abandonment Technology”, including tools for precision plugging, wellhead removal, and environmental monitoring
6. Post Abandonment should be monitor and maintain by Operator / Licensee, Government Oversight, Financial Assurace / Bonding (incase the Operator becomes insolvent or fails to complete abandonment) and Landowner responsibility, or in summary the primary responsibility lies with the operator, but regulatory bodies ensure compliance, and financial mechanisms exist to handle cases where the operator defaults.



## APPENDIX I INFORMANT CONSENT

I, the undersigned:

Name : Parialan Ronald Sitorus  
Role : Business Development Manager  
Country : Indonesia

declare that I am willing to be an informant in research conducted by Miranti Lucia Herliana entitled:

**“STRATEGIC DECISION TO SELECT EQUIPMENT FOR WELL ABANDONMENT PROJECT FROM THREE ALTERNATIVE VENDORS IN LINE WITH ENVIRONMENTAL, SOCIAL AND GOVERNANCE (ESG): EVIDENCE IN OIL AND GAS SERVICE COMPANY IN DURI FIELD, INDONESIA”**

I understand that this research will not have a negative impact on me and will be kept confidential by the researcher and only used for research purposes. Therefore, I am willing to be an informant in this research.

Thus, I have made this statement letter to be used as it should.

Indonesia, 5<sup>th</sup> Sep 2024



(Parialan Ronald Sitorus)



## APPENDIX II INFORMANT CONSENT

I, the undersigned:

Name : Dwikie P  
Role : Operational Manager  
Country : Duri Field, WS Rokan

declare that I am willing to be an informant in research conducted by Miranti Lucia Herliana entitled:

**“STRATEGIC DECISION TO SELECT EQUIPMENT FOR WELL ABANDONMENT PROJECT FROM THREE ALTERNATIVE VENDORS IN LINE WITH ENVIRONMENTAL, SOCIAL AND GOVERNANCE (ESG): EVIDENCE IN OIL AND GAS SERVICE COMPANY IN DURI FIELD, INDONESIA”**

I understand that this research will not have a negative impact on me and will be kept confidential by the researcher and only used for research purposes. Therefore, I am willing to be an informant in this research.

Thus, I have made this statement letter to be used as it should.

Indonesia, 10<sup>th</sup> Sep 2024



(Dwikie P)



## APPENDIX III

### INFORMANT CONSENT

I, the undersigned:

Name : Syafaat Ma'aruf

Role : Supply Chain Manager

Country : Duri Field, Indonesia

declare that I am willing to be an informant in research conducted by Miranti Lucia Herliana entitled:

**“STRATEGIC DECISION TO SELECT EQUIPMENT FOR WELL ABANDONMENT PROJECT FROM THREE ALTERNATIVE VENDORS INLINE WITH ENVIRONMENTAL, SOCIAL AND GOVERNANCE (ESG): EVIDENCE IN OIL AND GAS SERVICE COMPANY IN DURI FIELD, INDONESIA”**

I understand that this research will not have a negative impact on me and will be kept confidential by the researcher and only used for research purposes. Therefore, I am willing to be an informant in this research.

Thus, I have made this statement letter to be used as it should.

Indonesia, 23<sup>rd</sup> July 2024



(Syafaat Ma'aruf)



## APPENDIX IV

### INFORMANT CONSENT

I, the undersigned:

Name : Riga Ponziani

Role : Finance Manager

Country : Duri Field, WS Rokan

declare that I am willing to be an informant in research conducted by Miranti Lucia Herliana entitled:

**“STRATEGIC DECISION TO SELECT EQUIPMENT FOR WELL ABANDONMENT PROJECT FROM THREE ALTERNATIVE VENDORS INLINE WITH ENVIRONMENTAL, SOCIAL AND GOVERNANCE (ESG): EVIDENCE IN OIL AND GAS SERVICE COMPANY IN DURI FIELD, INDONESIA”**

I understand that this research will not have a negative impact on me and will be kept confidential by the researcher and only used for research purposes. Therefore, I am willing to be an informant in this research.

Thus, I have made this statement letter to be used as it should.

Indonesia, 31<sup>st</sup> July 2024

Signed



(Riga Ponziani)

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Thank you