

**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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IN DURI FIELD, INDONESIA”

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NON-PLAGIARISM DECLARATION FORM

This Thesis is a presentation of our research work. Wherever contributions of others are involved, every effort is made to indicate this clearly, with due reference to the literature and acknowledgment of collaborative research and discussions.

Also, this work is being submitted in partial fulfilment of the requirements for the Master of Business Administration degree, has not previously been accepted in substance for any degree, and is not being concurrently submitted in candidature for any degree.

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TABLE OF CONTENTS

Certificate of Approval.....	iii
Recommendation.....	iv
Non-Plagiarism Declaration Form.....	v
Table of Contents.....	vi
List of Figures.....	ix
Acknowledgement.....	x
Abstract.....	xi
CHAPTER 1. INTRODUCTION.....	1
1.1. Background Research.....	1
1.2. Research Problem.....	2
1.3. Novelty.....	3
1.4. Research Problem.....	3
1.5. Research Questions.....	4
1.6. Research Objectives.....	4
1.7. Scope and Limitation of Study.....	4
1.8. Production Sharing Contract (PSC).....	6
1.8.1. The Creation of PSC.....	6
1.8.2. Production Sharing Contract Control.....	7
1.8.3. Cost Recovery: A Control Facility.....	9
1.8.4. Ownership of Asset Rests with the State.....	10
1.8.5. Production Sharing Contract Period.....	11
1.8.6. SKK Migas as Party to Production Sharing Contract.....	11
1.9. Structure of Report.....	13

CHAPTER 2. LITERATURE REVIEW	15
2.1. PESTEL Analysis.....	15
2.2. VRIO Analysis	16
2.3. SWOT Analysis.....	17
2.4. Cost-Benefit Analysis	18
2.5. Sustainable Development Goals (SDGs)	18
CHAPTER 3. RESEARCH METHODOLOGY	20
3.1. Introduction	20
3.2. Research Design.....	21
3.2.1 Stage 1 – Interview with Leader of the Company	20
3.2.2 Stage 2 – Cost-Benefit Analysis During Exploration Period	21
3.2.3 Stage 3 – Non-Monetary Analysis	21
3.2.4 Stage 4 – Final Project Assessment.....	21
3.3. Data Collection Methods.....	22
3.3.1. Qualitative Data Collection.....	22
3.4. Theoretical Frameworks.....	23
CHAPTER 4. FINDING, ANALYSIS AND DISCUSSION	24
4.1. Introduction	24
4.2 Interview with the Leader	24
4.3. Cost-Benefit Analysis.....	25
4.4. Non-Monetary Analysis	32
4.4.1 PESTEL Analysis	32
4.4.2 VRIO Analysis	35
4.4.3 SWOT Analysis	37
4.5 Key Factor Influencing Decision-Making of Strategic Acquisition Vehicle in PSC Contractor; Buying Vs Renting.....	40
4.6 Financial Implications	41

4.7 Operational Flexibility, Risk Mitigation Strategies, and Environmental Impact	42
4.8 Environmental, Social and Governance (ESGs)	45
4.9 Discussion	46
4.10 Limitation	46
CHAPTER 5. CONCLUSIONS AND RECOMMENDATIONS	47
5.1 Conclusions	47
5.2 Recommendation	48

LIST OF FIGURES

Figure 1: Indonesia PSC Scheme	13
Figure 2: PESTEL Analysis.....	16
Figure 3: VRIO Analysis	17
Figure 4: SWOT Analysis.....	17
Figure 5: Sustainable Development Goals	19
Figure 6: Research Methodology	22
Figure 7: Questioner for The Leaders	25
Figure 8: PESTEL Analysis.....	35
Figure 9: VRIO Analysis	37
Figure 10: SWOT Analysis.....	40

LIST OF TABLES

Table 1: Interview with Leader Result based on priority	24
Table 2: Buying Cost 10 years	28
Table 3: Renting Cost 10 years	29
Table 4: Cost Comparison Buying versus Renting 10 years	30

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Jakarta, 20th September 2024

Miranti Lucia Herliana

ABSTRACT

**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 DURU FIELD, INDONESIA**

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. The old oil and gas wells of approximately 70% are found to have no economic value in Indonesia, leading to being abandoned during the end of their lifecycle, as ruled by the government. This is part of decommissioning an entire field with an environmental preservation program, known as an Abandonment and Site Restoration (ASR). The process typically involves sealing the wellbore with cement to prevent the migration of hydrocarbons or other fluids, ensuring that the site poses no threat to public safety or the environment. In this research Duri's Site (WS Rokan) as the oldest well for 100 years in Indonesia, since 1941 owned by PT Chevron Pacific Indonesia (PT CPI) or so called "Caltex" which start their exploration 15 years after in 1958 until 2020. Pertamina Hulu Rokan (PHR) is a subsidiary of Pertamina, Indonesia's state-owned oil and gas company. This research to analyze, evaluate the operational strategies to select equipment for ASR or Well abandonment Project at Duri's site (WS Rokan) using Pestel, VRIO and SWOT analysis one with the most efficient yet aligned with safety standard of three vendor with source origin from UK, US and China, also to measure and evaluate the feasibility for ASR or Well abandonment Project at Duri's site (WS Rokan) using Cost Benefit Analysis and to provide actionable recommendation for Abandonment of Site Restoration (ASR) or Well abandonment Project at Duri's site (WS Rokan) in supporting the ESG Program by applying ESG principles to Well Abandonment Project in Oil and Gas industry involves addressing the environmental, social and governance aspects associated with decommissioning oil and gas wells. Based on this research and analysis China will be the preference among other source origin vendor.

Keywords: Abandonment of Site Restoration, Well Abandonment, Cost Benefit Analysis, Environmental, Social and Governance, Project Feasibility, and Sustainability.

CHAPTER I

INTRODUCTION

1.1. Background Research

Abandonment of 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. The old oil and gas wells of approximately 70% are found to have no economic value in Indonesia, leading to being abandoned during the end of their lifecycle, as ruled by the government.

The oil and gas sector comprises upstream and downstream activities, which are regulated and organized separately. Upstream activities include exploration and exploitation and are regulated under Government Regulation No. 35 of 2004 regarding Upstream Oil and Natural Gas Business Activities, as amended most recently by Government Regulation No. 55 of 2009 ("GR 35"). The upstream sector is managed and supervised by SKK Migas.

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.

This is part of decommissioning an entire field with an environmental preservation program, known as an Abandonment of Site Restoration (ASR). Law 22 states that businesses must guarantee environmental management, including preventing pollution, restoring damages, and includes post-mining obligations (Art 40) (Act of the Republic of Indonesia Number: 22 of 2001; Dated: November 23, 2001). Enables further government regulation to be developed for provisions on working safety and environmental management. The process typically involves sealing the wellbore with cement to prevent the migration of hydrocarbons or other fluids, ensuring that the site poses no threat to public safety or the environment. In this research Duri's Site (WS Rokan) as the oldest well for 100 years in Indonesia, since 1941 owned by PT Chevron Pacific Indonesia (PT CPI) or so called "Caltex" which start their exploration 15 years after in 1958 until 2020. Pertamina Hulu Rokan (PHR) is a subsidiary of Pertamina, Indonesia's state-owned oil and gas company. PHR is responsible for the exploration, development, and production of oil and gas reserves in the Rokan Block in Riau province, Sumatra, Indonesia, the Rokan Block is one of Indonesia's largest oil fields, covering an area of approximately 6,279 square kilometers (Pertamina Siaran Pers, 2021a). PHR took over the management of the Rokan Block from Chevron in 2021 and is now the operator of the block until 2041 (Asmarini, 2018; Karyza & Harsono, 2021). PHR's operations in the Rokan Block include drilling, production, and distribution of crude oil and natural gas (Rizki et al., 2023; Syafrinaldi et al., 2022). 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's Site (WS Rokan), this point is extended due to the effective rate if EOR (Enhances Oil Recovery). Currently Duri's Site (WS Rokan) 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 per 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”. Ganesha R Darmawan ⁽¹⁾ *Bandung Institute of Science Technology, Indonesia.*

Figure 1. Improvement on Well Management for Well Life Cycle

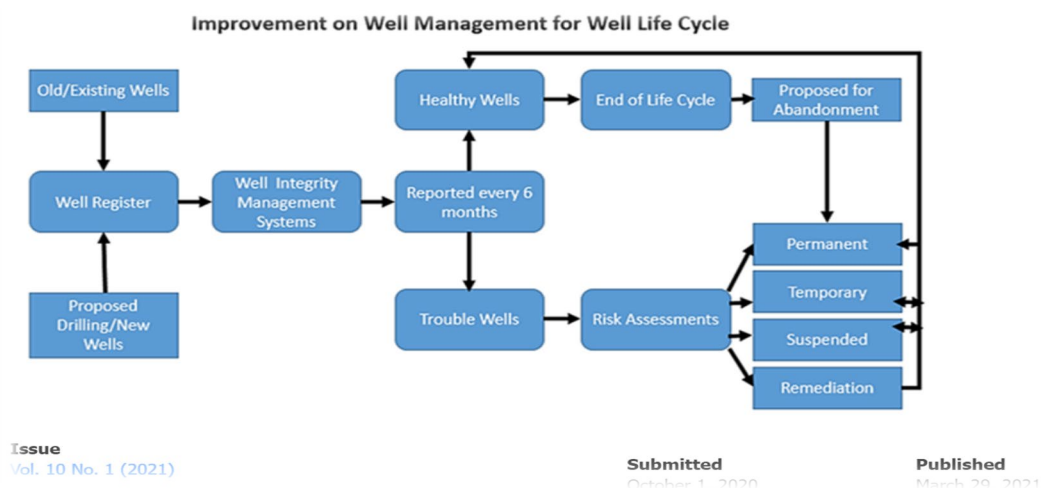


Figure 1. Improvement on Well Management for Well Life Cycle
(Ganesha R Darmawan ⁽¹⁾ *Bandung Institute of Science Technology, Indonesia*)

1.2. Research Gap

Duri's site or (WS (Well Site) Rokan) as one of the most important oil field in Indonesia, and facing several technical, environmental and regulatory challenges especially due to the Well Integrity and Plugging Challenges for its processed in established standards, innovations to address specific site conditions issues such as Duri's mature fields, which have unique geological formations and corrosion risks. The special techniques and equipment required to improve cementing techniques, material preferences, and ensuring wellbore sealing and prevention in leakage. In many cases required details process in choosing the right equipment, material and technologies for the Abandonment of Site Restoration or Well Abandonment. The importance management decision is required highlight risks or to calculate the cost impact and if necessary, action or modification required due to geological conditions or ground conditions for cost effectiveness and efficiency also Environmental, Social and Governance related.

Figure 2. Decision Makers Abandonment and Site Retirement Facilities



Figure 2. Decision Makers Abandonment and Site Retirement Facilities
(Journals : Ali Rekso Tinamtu1, Santi Novani, 2023)

1.3. 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 Environmental, Social and Governance 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.

1.4. Research Questions

Based on the information and problem statement above, this study would like to answer these questions:

1. What is the operational strategies to select the suitable equipment for Abandonment of Site Restoration (ASR) or Well Abandonment Project at Duri's site (WS Rokan)?
2. How to measure and evaluate the feasibility for Abandonment of Site Restoration (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 (Work Site (WS) Rokan) in supporting the (Environmental, Social and Governance) ESG Program?

1.5. Research Objectives

In alignment with the research question above. The objective on this research are:

1. To analyze, evaluate the operational strategies to select equipment for Abandonment of Site Restoration (ASR) or Well abandonment Project at Duri's site (WS Rokan).
2. To measure and evaluate the feasibility for Abandonment of Site Restoration (ASR) or Well abandonment Project in Duri's site (WS Rokan).
3. To provide actionable recommendation for Abandonment of Site Restoration or Well abandonment Project in Duri's site (WS Rokan) in supporting the ESG Program.

1.6. Scope and Limitation of the study

Well Abandonment projects involve decommissioning oil, gas or other types of wells that are no longer productive or economically viable. The scope of study for a well abandonment project typically covers several key areas:

1. Regulatory Compliance and Environmental Assessment.
2. Well Integrity Assessment.
3. Engineering and Technical Planning.
4. Cost Estimation and Budgeting.
5. Operational Planning.
6. Monitoring and Reporting.
7. Community and Stakeholder Engagement.
8. Technological and Innovation Consideration.
9. Legal and Contractual Consideration.
10. Decommissioning Strategy.

The scope of study for a well abandonment project is broad and involve multidisciplinary approach to ensure that the well is safety and efficiently decommissioned with minimal impact on the environment and the surrounding community. 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.

1.7. Relationship with and value added to previous research.

Numerous research has been conducted to determine the worth of projects using the Capital Budgeting Technique and Monte Carlo Analysis.

Table 1.5 - List of Previous Related Research

No	Author & Title of Research	Variable	Findings
1	Gafli, Gusti Fauzi Maulana. (2019) Decision Making On Project Feasibility Using Capital Budgeting Model and Sensitivity Analysis Case Study: Development Solar Power Plant Project	Payback Period, Discounted Payback Period, Return on Investment (ROI), Net Present Value (NPV), NPV Index, Internal Rate of Return (IRR), and Sensitivity	Using the Capital Budgeting Technique able to calculate with the estimated investment and the tariff set, the project can generate a positive income to the company
2	Daryanto, Wiwiek M; Primadona, A (2018) Capital Budgeting Model and Sensitivity Analysis of the Conventional Oil Production Sharing Contract (PSC) Fiscal Systems: Empirical Evidence from Indonesia	Payback Period, Net Present Value (NPV), Internal Rate of Return (IRR), and Weighted Average Cost of Capital (WACC)	The attractive terms and conditions of PSC Fiscal Systems are a maximum split of 50 percent for GOI, under controllable Cost Recovery (CR), the oil price of USD 50.00/barrel, and WACC <20%.
3	Isella, M. (2019). Applying Monte Carlo simulation in real estate capital budgeting for investment evaluation.	Discounted Cash Flow, Net Present Value and Internal Rate of Return	Monte Carlo makes it possible to assess the result of the investment if the forecasted cash flows included in the deterministic DCF are wrong, taking into consideration a distribution of probability of values and not just a single one, but there always be what the risk of hypothesizing a probability distribution for incorrect variables

Source: Author (2022)

As shown in Table 1.5, the previous research related to Capital Investment Analysis mostly focusing on quantitative analysis using Capital Budgeting and Risk analysis using Monte Carlo, but no further study combining with strategic analysis and non- monetary analysis. In addition, no research conducted for a local Oil and Gas company. The author decided to do research to evaluate the impact of purchasing materials or equipment for Well Abandonment from various countries, we can look at material suppliers from the UK, US, and China in processes by combining strategic, quantitative, risk and non-monetary analysis in acquiring equipment or tools in this study.

1.8. Abandonment of Site Restoration or Well Abandonment

Duri's Site or Oil field as one of the largest steam-flood projects not only in Indonesia, but in the world, presents both technical and regulatory challenges.

Abandonment of Site Restoration (ASR):

1. Environmental Monitoring: Post abandonment that should be aligned with Environmental, Social and Governance (ESG) values to ensure that there are no lasting environmental impacts is critical. The activities are includes monitoring for potential groundwater contamination, subsidence, or other adverse effects.
2. Regulatory and Financial Gaps: Indonesian government and operators facing challenges in terms of management and transparency of ASR funds. Surrounding cost recovery and fund allocation for ASR are not always in clarity which can delay site restoration. Therefore, Indonesia's Production Sharing Contract (PSC) system gaps in detailing specific obligations related to ASR, leading to potential conflicts.

Well Abandonment:

1. Well Integrity: The primary concern during well abandonment is to ensure long-term wellbore integrity. This includes preventing leakage of hydrocarbons, water or other materials from the wellbore after it is plugged. Given the mature nature of the Duri field, which has been producing since the 1950's corrosion and aging infrastructure need to be considered and may complicated the abandonment process.
2. Abandonment Procedures: Standard procedures for well abandonment are in place, which involve plugging the well with cement, this process is to isolate it from the surrounding environment. The challenges would be to gain the approval from local government and authorities for the procedures that will be taken and the timely disbursement of reserved ASR funds complying with both national and intern.
3. National standards while managing high costs involved.

"The abandonment site retirement process typically involves several steps, including site assessment, plugging and abandonment of wells, removal of equipment and infrastructure, site remediation and restoration, and ongoing monitoring and maintenance (Jones et al., 2022)."
"Abandonment site retirement is a critical part of the oil and gas industry (Jing et al., 2021)."

1.9. Production Sharing Contract (PSC)

In the context of control, Law 22/2001 prescribes for PSC Contractor to include provisions on the following:

- a. State revenues.

- b. Working areas and the relinquishment.
- c. Obligation to expend funds.
- d. Transfer of ownership of products obtained from natural oil and gas production.
- e. Term of validity and conditions for extending contract.
- f. Dispute settlement.
- g. Obligation to supply natural oil and/or gas for domestic needs.
- h. Termination of contract.
- i. Post-operational mining obligations.
- j. Work safety and health; k. Environmental management.
- l. Transfer of rights and obligations.
- m. Reporting requirements.
- n. Site development plan.
- o. Prioritizing the domestic use of goods and services.
- p. Development of surrounding communities and guaranteeing customary community rights.
- q. Prioritizing the use of Indonesian manpower.

All the above specified substantive items reflect the national interest as the owner of natural resources – which, in my view, is a manifestation of the term “control” exercised in the development of oil resources. The requirement to include the mentioned substantive items originates from the three main conditions that must be included in PSC, namely that:

1. The ownership of oil resources remains in the government’s hands, up to the point of submission.
2. Operations are managed by Satuan Kerja Kegiatan Minyak dan Gas Bumi (“SKK Migas”).
3. The capital and risks are fully borne by the contractor concerned. These three matters are the main pillars of PSC. The ownership of natural resources is the reflection of dimension of controlling natural resources by virtue of the 1945 Constitution.

Management is the consequence of the first pillar. The nature of contract, which is based on mutual agreement, is combined with the confirmation of the government’s role which remains in a dominant position, as management has an extensive meaning. This is part of the

obligation to control the use of oil resources in line with the mandate of the 1945 Constitution. In other words, this is a form of manifestation of the state's responsibility to its people in the development of natural resources. That is one of the reasons, to be further elaborated below that Law No. 25/2007 on Investment Law ("Law 25/2007") for instance relates *Cost Recovery* to potential corruption. On the other hand, such circumstances do not change the status of PSC as a private contract. The government is not able and legally not allowed to intervene in the substance of the contract, including *Cost Recovery*.

1.10. Significance of the study

The benefit of this study can be described as follows:

A. Theoretical Contribution

This study is expected to be a reference for future researchers in relation to combining strategic, quantitative, probabilistic, and non-monetary qualitative methods in Capital Investment Decision in other industries.

B. Practical Contribution

To provide a thorough analysis for Well Abandonment Project whether the project to have efficient equipment and tools is feasible.

1.4.Thesis Structure

This will help readers to understand the research's content. Below is the scheme of each chapter:

Chapter I – Introduction

This section outlines the prerequisites for an investigation. It also consists of several parts, such as background of study, research gap, problem identification, research questions, research objectives, research scope and benefits.

Chapter II - Literature Review

This section focused on the theoretical review to guide the investigation. It also shows underpinning theory, definition of variables, research framework and the result of previous

studies. The literature review is a collection of journals, newspapers, books, and other sources of information to support research.

Chapter III Methodology

This section explains the methods for completing the investigation. Its interest is about the research process such as step by step to the analysis of the data. Also, there will be a hypothesis, as well as the analysis indicators used in the study.

Chapter IV Data Analysis

This section describes the details of data analysis; this is an essential part of the study. This part shows the process of data by established procedures, then the result of the data processors and provides an analysis of the results.

Chapter V Conclusion and recommendations

This section is the final chapter, which summarises the entire analysis from the beginning to the end of this study. This final chapter will define the project conclusion based on former calculation and recommendation to be used by the company and can be useful for future researchers.

To evaluate the impact of purchasing materials for Well Abandonment from various countries, we can look at material suppliers from the UK, US, and China

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

This chapter sets the stage for Literature Review by establishing its foundational context. It forms the groundwork for explaining and defining the theoretical underpinnings chosen by the author for the research framework, includes PESTEL analysis, VRIO analysis, SWOT analysis and Cost-Benefit Analysis.

2.1.1 PESTEL Analysis

PEST analysis was developed in 1967 by Aguilar. He is an environmental scanning framework.[1] Aguilar argued that firms must scan the economic, technical, political, and social categories (ETPS) that may affect strategy, defining environmental scanning as follows, “scanning for information about events and relationships in a company’s outside environment, the knowledge of which would assist top management in its task of charting the company’s future course of action.”

In business analysis, **PEST analysis** ("political, economic, socio-cultural and technological") describes a framework of macro-environmental factors used in the environmental scanning component of strategic management. It is part of an external environment analysis when conducting a strategic analysis or doing market research and gives an overview of the different macro-environmental factors to be taken into consideration. It is a strategic tool for understanding market growth or decline, business position, potential, and direction for operations.

PESTEL or *PESTLE*, which adds legal and environmental factors. Legal factors include discrimination law, consumer law, antitrust law, employment law and health and safety law, which can affect how a company operates, its costs, and the demand for its products. Environmental factors include ecological and environmental aspects such

as weather, climate, and climate change, which may especially affect industries such as tourism, farming, and insurance.

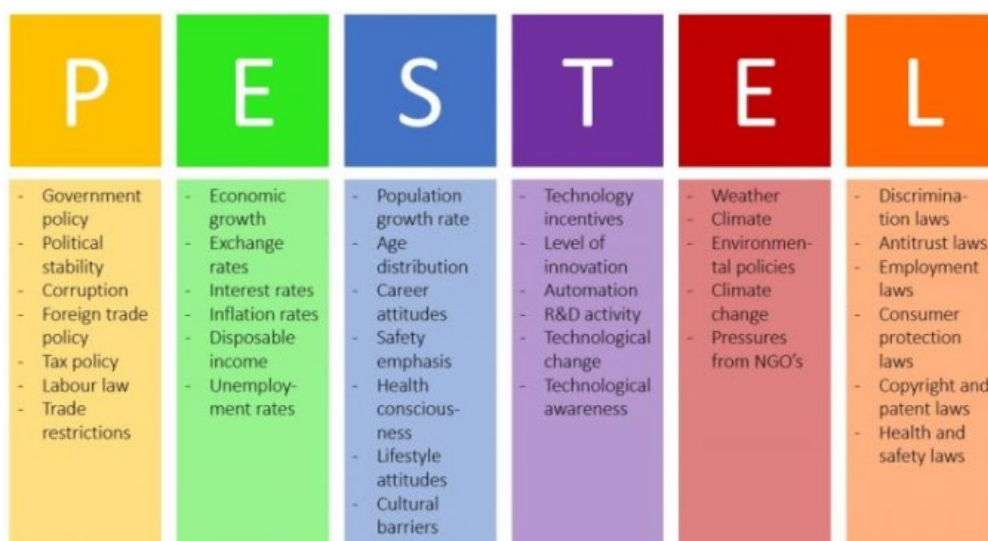


Figure 2.1. – PESTEL Analysis Model (Source: (Francis Aquilar, 1967))

2.2. VRIO Analysis

VRIO is a business analysis framework that forms part of a firm's larger strategic scheme, proposed by Jay Barney in 1991. The basic strategic process of any firm begins with a vision statement and continues through objectives, internal & external analysis, strategic choices (both business-level and corporate-level), and strategic implementation.

VRIO falls into the internal analysis step of these procedures but is used as a framework for evaluating just about all resources and capabilities of a firm, regardless of what phase of the strategic model it falls under.

VRIO is an initialism for the four-question framework asked about a resource or capability to determine its *competitive potential*: the question of Value, the question of Rarity, the question of Imitability (Ease/Difficulty to Imitate), and the question of Organization (ability to exploit the resource or capability)

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

Figure 2.3. – VRIO Analysis Model (Source: (Jay B Barney,1991))

2.3. SWOT Analysis

According to Sarsby (2016), SWOT is a four-box strategy analysis and strategy development framework. SWOT stands for Strengths, Weaknesses, Opportunities, and Threats. SWOT analysis is a tool used by organizations for strategic planning and management. This tool for strategic planning is used by organizations to design their strategies efficiently. The SWOT analysis framework is adaptable and assists in creating strategies for both the organization itself and its competitive position. Organizations, composed of different parts, operate as units that interact with their external and internal surroundings. From this viewpoint, an organization deals with two environments—internal and external—making it vital to use strategic management methods for both. SWOT analysis is the tool used to describe the process of assessing an organization and its environment.



Figure 2.4. – SWOT Analysis Model (Source: (Humphrey, 1960))

2.4 Cost-Benefit Analysis

According to Jean Dreze and Nicholas Stern (London School of Economics) Chapter 14: The Theory of Cost-Benefit Analysis, Cost-benefit analysis is very widely used, and it is therefore important that its methods be properly understood. In this chapter, we try to contribute to the understanding by giving a formal description of the subject and examining the theoretical basis for some of the techniques that have become accepted tools of decision-making around the world. The purpose of cost-benefit analysis is to provide a consistent procedure for evaluating decisions in terms of their consequences. This might appear as an obvious and sensible way to proceed, but it is by no means the only one (examples of alternative procedures are majority voting, collective bargaining, the exercise of power, or the assertion of rights). As described, cost-benefit analysis embraces an enormous field. To keep our subject matter manageable, we confine most of our attention in this chapter to its best-known and most important application: the evaluation of public sector projects. Nevertheless, the

According to Daryanto, W M (2017). The Net Cash Flows Measurement of The Conventional Oil Production Sharing Contract (PSC) Fiscal Systems: A Case Study from Malaysia. Mention in the sixth step is Cost Recovery (CR) calculation, is one of the points that the PSC Contractor must consider during the exploration period. According to Daryanto, W M (2018), capital budgeting is a process that companies use for decision-making on capital projects with a life of a year or more. According to Mowen et al. (2018), capital budgeting or the process of making capital investment decisions are concerned with the process of planning, setting goals, and priorities.

1.5.Environmental, Social and Governance (ESG's)

Environmental, Social and Governance (ESG) criteria are increasingly important factors in the analysis of corporate behaviour and investment strategies. ESG factors are increasingly essential to understanding the long-term risks and opportunities faces by companies (George Serafeim, Harvard Business School, 2023). Environmental, Social and Governance (ESG) refers to a set of criteria used to evaluate the sustainability and ethical impact of a company or organization. These criteria are increasingly used by investors, stakeholders, and policymakers to assess how well a company is managing its responsibilities beyond financial performance. **Environmental Criteria:** Climate Change, Resources Management, Pollution and Waste,

Biodiversity. **Social Criteria:** Labour Practices, Diversity and Inclusion, Community Engagement and Product Responsibility. **Governance Criteria:** Corporate Governance, Ethical Practices, Executive Compensation and Shareholder’s Rights. Applying ESG principles to Well Abandonment Project in Oil and Gas industry 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.

Figure 2.2 shows the ESG (Environment, Social and Governance)



Figure 2.5. – Environment, Social and Governance (Source: Sigma Earth, 2023)

CHAPTER III

RESEARCH METHOD

3.1. Introduction

The methodology methods used to address the research's question and the research will elaborate its goals. The research method is a scientific method used to obtain data with a purpose and usefulness by the integrity of the researcher (Khahro, Memon, Memon, Aarsal, & Ali, 2021). According to Polit and Beck (2004) methodology refers to ways of obtaining, systematizing, and analysing data. Creswell (2009) portrays methodology as a coherent group of methods that harmonize one another and that have the capability to fit to deliver data and findings that will reflect the research question and suits the researcher's purpose. In this chapter define how the approaches and steps to accomplish the research objective. The methodology employed in the research, encompassing data collection methods, analysis techniques, and theoretical frameworks utilized investigates the strategic decision to select equipment for well abandonment project from three alternative vendors in line with environmental, social and governance (ESG) in oil and gas service company in Duri Field, Indonesia.

3.2 Research Design

According to Sekaran and Bougie (2017), research design is a strategy for gathering, measuring, and analysing data based on research objectives. The research design in creating this thesis consists of the subsequent stages:

1. Stage 1 – Operation Strategic Analysis by the interview with Leader of the Company
2. Stage 2 – Cost-Benefit Analysis
3. Stage 3 – Non-Monetary Analysis (Environmental, Social and Governance)
4. Stage 4 – Final Project Assessment

3.2.1. Stage 1 – Operation Strategic Analysis by the interview with Leader of the Company

Strategic analysis involves assessing both the internal and external landscape of the organization, appraising existing strategies, and formulating and assessing the most viable strategic alternatives. For effective business strategy development, a clear understanding of the company's identity and values is imperative. For a business to formulate a robust strategy it's imperative to possess a comprehensive comprehension of its identity and the values it embodies. From the early stage, a company should conduct an environmental assessment of their current strategies.

From the internal environment, the factors to be assessed include operational inefficiencies, employee morale, and financial limitations. On the other hand, for the external environment, the factors include political trends, economics fluctuations, and shifts in customer preferences. The key objective of strategic analysis is to determine the effectiveness of the current strategy in the context of the current environment in which the business operates.

The research quality is impacted by the effectiveness of the data collection process. The initial phase of data collection aims to gather insights from management perspectives. Interview conducted with the project lead by signing the consent form to get more understanding of decision-maker objectives and analysis during the Abandonment of Site Restoration or Well Abandonment Project period such as:

1. How will the operational strategy be applied by management of Oil and Gas Service Company during the ASR or Well Abandonment Project period to enhance operational efficiency?

2. What is the feasible factor for the Equipment Purchase that relate to Abandonment of Site Restoration (ASR) and Well Abandonment Project from three source of origin (UK, US and China)?
3. How will the Abandonment of Site Restoration (ASR) and Well Abandonment Project will help Oil and Gas company to support the Environmental, Social and Governance (ESG's) aspect.

3.2.2. Stage 2 – Cost-Benefit Analysis

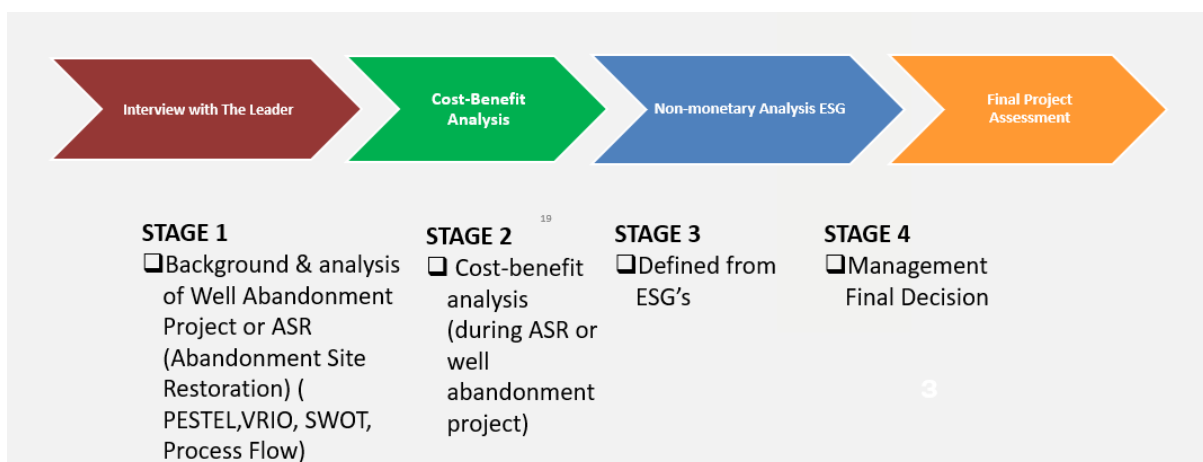
In this research, the author performed the calculation based on the data and information from Oil and Gas Service company leader to compare the cost of equipment purchase for ASR or Well Abandonment Project.

3.2.3. Stage 3 – Non-Monetary Analysis

In this research adds non-monetary analysis for management consideration to continue or discard the project by analysing from Environmental, Social and Governance perspective. Figure 7 shows the flow of methodology to conduct research to answer research questions and objectives.

3.2.4. Stage 4 – Final Project Decision

At the end of this research based on real best practices in ASR or Well Abandonment in Duri Field, Indonesia will be decided specifically on how the Oil and Gas Services company decide on the equipment of source origin that will be used on site.



3.2. Data Collection Methods:

The Research adopts a *descriptive qualitative approach, integrating qualitative methodology* to provide a comprehensive understanding of the subject matter. This approach enables triangulation of data sources, enhancing the validity and reliability of the findings. This approach is the best practice for Oil and Gas Services company for ASR or Well Abandonment Project.

3.3.1 Descriptive Qualitative Data Collection:

In-depth Interviews: Semi-structured interviews will be conducted with key stakeholders, including industry experts. These interviews will explore their perspectives on vehicle acquisition strategies, factors influencing decision-making, and best practices.

Document Analysis: Relevant documents such as corporate policies, and regulatory guidelines will be analysed to supplement qualitative data.

Financial Data Analysis: Financial data related to vehicle acquisition costs, operational expenses, and performance metrics will be obtained from company records, financial statements, and industry databases.

3.3. Theoretical Frameworks

The research will draw upon theoretical frameworks such as:

PESTEL Analysis: a tool that allows organizations to discover and evaluate the factors that may affect the business in the present and in the future. PESTEL is an acronym for Political, Economic, Social, Technological, Legal, and Environment.

VRIO Analysis: To measure competitiveness based on resources (Resource Based View), there are four elements in this VRIO analysis, namely Valuable, Rare, Imitate, and Organize.

SWOT Analysis: To assess the strengths, weaknesses, opportunities, and threats associated with renting and buying vehicle acquisition strategies.

Cost-Benefit Analysis: Comparison cost from buying and renting to evaluate the financial viability and the implications of acquisition strategies.

CHAPTER 4

FINDING, ANALYSIS AND DISCUSSION

4.1 Introduction

To evaluate the impact of equipment, purchase from three different supplier or vendor country origin (UK, US and China) for Well Abandonment. In the UK, there are two major suppliers to be considered: Expro and 2hoffshore. Expro provides services and products that measure, improve, control and process flow from high-value oil and gas wells, across the full lifecycle of the well. This includes a strong focus on mature field production optimisation, late field life enhancement and well decommissioning. With over 40 years of experience, technology development and their collaboration with technology company to develop newest high-end to deliver a truly world-class, fully integrated decommissioning service solution.

Meanwhile, 2hoofshore and extensive practical and hands-on installation knowledge and experience in well decommissioning, including project definition, scope and objectives, environmental objectives, contracting and procurement strategies, logistics and

detailed well abandonment procedures, organization and human resource plans, and QA and HSE plans with a range of complementary capabilities within the Group, including casing cutting and retrieval tools, marine procedure management, lifting and retrieval services, and facilitation of multi-operator abandonment programmes.

In the US, companies such as Baker Hughes and Weatherford International are noteworthy. Baker Hughes collaborated with WellGear and Mammoet to create a new enhancement, low impact, fully integrated well abandonment project one time solution for onshore P&A in The Netherlands including well P&A services, hydraulic workover (HWO), logistics, and site preparation. Project management and detailed engineering ensured efficient planning, good collaboration, and interface with the operator project team to drive efficiencies in executing the work. Outstanding project management ensured close cross product line and third-party collaboration and continuous interaction with the operator.

Meanwhile, Weatherford International offers specialized services for well abandonment and plug and abandonment (P&A), which are crucial in the lifecycle of an oil and gas well. These services ensure that wells that are no longer productive are safely and efficiently sealed to prevent environmental hazards and liability issues. Weatherford has developed specific technologies to streamline these operations, aiming for both cost-effectiveness and compliance with strict environmental regulations. Their goal is to safely seal and abandon wells, ensuring long-term environmental protection while also mitigating operational costs.

In China, Vigor Well Abandonment is a Chinese company specializing in well abandonment and plug and abandonment (P&A) services within the oil and gas industry. Their services are focused on safely decommissioning wells that are no longer productive, ensuring compliance with the environmental regulations and preventing future leaks or environmental hazards with modern well isolation technologies and efficient multistring cutting technologies, which enable the safe and rapid abandonment of wells. Landdrill Oil Tools also based in China, provides a range of products and services related to well abandonment in oil and gas sector, by focusing on manufacturing high-quality downhole tools and equipment essential for plugging and abandonment (P&A) operations. The uniqueness of Land drill Oil Tools are using cutting tools, packers, plugs and wellhead equipment designed specifically for well abandonment operations.

By considering factors such as material costs, shipping costs, import tax rates, project duration, as well as revenue and operational expenses, we can analyse the financial impact of purchasing materials from these companies on parameters like NPV, IRR, and Payback Period. This comparison will help determine the best option for the Well Abandonment project in an oil and gas company. Especially for Duri Field, WS Rokan the well abandonment project cannot be performed by most Oil and Gas services companies due to the advanced tools and technologies that required specific decommissioning process.

4.2. Interview with The Leader

The author conducted the appreciative inquiry and thorough discussion with Business Manager, Operation Manager, Finance Manager and Supply Chain Manager of PT. ABC to elaborate on the reason behind the decision, understand the strategy, and get data for financial assumptions. PT. ABC is one of the leading Oil & Gas companies in Indonesia. Their operations are widespread across Indonesia with a head office in Jakarta and a plant in many areas in Indonesia. They also have multiple site locations and workshops in various regions including Sumatera Utara, NAD, Sumatera Selatan, Kalimantan Tengah, Kalimantan Utara, Jawa Timur, and Sulawesi Tengah demonstrating their extensive presence in the Indonesian Oil & Gas sector. For all Leaders, the priority is about Cost and must align with company goals.

Table 1: Interview with Leader Result based on priority.

Table 1: Interview with Leader Result based on priority.							
No.	Position	Productline	Experience	Cost	Enhancemen	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

Table 1 is a summary of interviews with the leaders to get information as needed.

I. How to choose carefully the right VENDOR or SUPPLIER for Duri Field, WS Rokan well abandonment project due to the site conditions and location

I. Questionnaire to Business Development Manager:

1. What is your role in the company? *Business Development Manager*
2. How many years of experience do you have in your current position? *+/-20 years*
3. How important Abandonment Site Restoration (ASR) or Well Abandonment Project for Oil and Gas Industry? *Heavily Regulated and Highly Important.*
4. How many well at Duri's field per year will be under ASR or Well Abandonment Project? *+/-1,000 since Duri's field has been operated for exploration since 77 years ago with over 2.6 billion barrels.*
5. What is your areas of responsibilities for ASR or Well Abandonment Project? *spanning strategy, building relationship, financial management and project execution. To work closely with technical and operations team to develop proposals for ASR projects, ensuring alignment within the company and surroundings, regulatory compliance and environmental standard.*
6. What do you think about the importance choosing the right vendor or supplier for ASR or Well Abandonment Project? *Very Importance and complex. Vendor or Supplier need the necessary experience and equipment to complete the project safely and effectively.*
7. What do you think of management decision in choosing the right technology, experience and equipment that the vendor or supplier will be using for ASR or Well Abandonment Project? *To ensure that this project are executed on time, compliance with local regulation and international law and within the budget.*
8. There are 3 country origin of vendor or supplier to perform the ASR or Well Abandonment Project, from UK, US and China. Which one do you think are met the expectation from your point of view? *US or China*
9. How do you manage for the ASR and Well Abandonment Project on time and not cost overruns? *Maintain crucial link between operational teams, clients, and regulatory authorities, ensuring that the project is successful, compliant, and financial viable.*
10. Does the Environmental, Social and Governance taken part of the importance of ASR or Well Abandonment Project? *Yes it does, It should be align with corporate environmental goals and government objectives also safety.*

II. How to choose carefully the right VENDOR or SUPPLIER for Duri Field, WS Rokan well abandonment project due to the site conditions and location

II. Questionnaire to Operations Manager:

1. What is your role in the company? *Operations Manager*
2. How many years of experience do you have in your current position? *+/-10 years*
3. How important Abandonment Site Restoration (ASR) or Well Abandonment Project for Oil and Gas Industry? *Very important.*
4. How many well at Duri's field per year will be under ASR or Well Abandonment Project? *+/-850, but not shared to public yet by SKK Migas.*
5. What is your areas of responsibilities for ASR or Well Abandonment Project? *To ensure that the project is executed safely, efficiently, and in compliance with regulations.*
6. What do you think about the importance choosing the right vendor or supplier for ASR or Well Abandonment Project? *Highly important, to ensure proper use of specialized equipment and technology required for well abandonment, including cementing units, wellbore isolations tools and environmental monitoring devices.*
7. What do you think of management decision in choosing the right technology, experience and equipment that the vendor or supplier will be using for ASR or Well Abandonment Project? *It really matters on how to manage the cost not to overruns and complexity on the well conditions.*
8. There are 3 country origin of vendor or supplier to perform the ASR or Well Abandonment Project, from UK, US and China. Which one do you think are met the expectation from your point of view? *UK or China*
9. How do you manage for the ASR and Well Abandonment Project on time and not cost overruns? *Compliant execution of well closure activities, process conducted safely on time and within budget.*
10. Does the Environmental, Social and Governance taken part of the importance of ASR or Well Abandonment Project? *Yes it does, especially on the environmental restoration for site remediation and waste management.*

III. How to choose carefully the right VENDOR or SUPPLIER for Duri Field, WS Rokan well abandonment project due to the site conditions and location

III. Questionnaire to Supply Chain Manager:

1. What is your role in the company? *Supply Chain Manager*
2. How many years of experience do you have in your current position? *+/-8 years*
3. How important Abandonment Site Restoration (ASR) or Well Abandonment Project for Oil and Gas Industry? *It's important and crucial.*
4. How many well at Duri's field per year will be under ASR or Well Abandonment Project? *+/- 1,000 well and more on the upcoming years.*
5. What is your areas of responsibilities for ASR or Well Abandonment Project? *material and equipment delivery, freight, tax and duty. Mob and Demob at the site.*
6. What do you think about the importance choosing the right vendor or supplier for ASR or Well Abandonment Project? *Very Important.*
7. What do you think of management decision in choosing the right technology, experience and equipment that the vendor or supplier will be using for ASR or Well Abandonment Project? *Have to manage for not having cost overruns and delayed.*
8. There are 3 country origin of vendor or supplier to perform the ASR or Well Abandonment Project, from UK, US and China. Which one do you think are met the expectation from your point of view? *China.*
9. How do you manage for the ASR and Well Abandonment Project on time and not cost overruns? *By choosing vendor and supplier with level of expertise and technologies, also has fulfilled the minimum requirement of safety standards.*
10. Does the Environmental, Social and Governance taken part of the importance of ASR or Well Abandonment Project? *Yes it does, ASR and well abandonment regulated by Indonesian regulations.*

IV. How to choose carefully the right VENDOR or SUPPLIER for Duri Field, WS Rokan well abandonment project due to the site conditions and location

IV. Questionnaire to Finance Manager:

1. What is your role in the company? *Finance Manager*
2. How many years of experience do you have in your current position? *+/-10 years*
3. How important Abandonment Site Restoration (ASR) or Well Abandonment Project for Oil and Gas Industry? *Important and required by company.*
4. How many well at Duri's field per year will be under ASR or Well Abandonment Project? *+/- more than 500=1,000 wells.*
5. What is your areas of responsibilities for ASR or Well Abandonment Project? *financial planning, budget and managing the cost not to overruns.*
6. What do you think about the importance choosing the right vendor or supplier for ASR or Well Abandonment Project? *Important.*
7. What do you think of management decision in choosing the right technology, experience and equipment that the vendor or supplier will be using for ASR or Well Abandonment Project? *strategic planning required and deep consideration in managing the ASR and Well abandonment wisely.*
8. There are 3 country origin of vendor or supplier to perform the ASR or Well Abandonment Project, from UK, US and China. Which one do you think are met the expectation from your point of view? *China*
9. How do you manage for the ASR and Well Abandonment Project on time and not cost overruns? *Liaise with internal and external parties.*
10. Does the Environmental, Social and Governance taken part of the importance of ASR or Well Abandonment Project? *It does matter and important.*

Figure 7 – Questioner for the Leader's

4.3. Cost-Benefit Analysis

Conducting a cost-benefit analysis (CBA) for selecting vendor or supplier for an ASR or Well Abandonment Project involves structure process of comparing the financial, operational, and qualitative factors that contribute to project success by not having cost overruns. Vendor or supplier option are from UK, US and China.

4.3.1. Cost 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.

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.

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,

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.

These include the initial costs, equipment for ASR or Well Abandonment Project, Insurance, Freight and Duty Taxes. Common criteria include:

Costs

Direct Cost

- a. Initial Setup Costs : The cost of materials, labour, and equipment.
- b. Operational Costs : Ongoing labour, 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.

Benefits:

- a. Quality and Reliability: Vendors' ability to meet project specifications (e.g., long-term seal integrity in well abandonment).
- b. Vendor Reputation and Experience: Reputation and track record in similar projects. Prior success reduces risk.
- c. Timeliness and Efficiency: Vendors' ability to deliver on time and within the project timeline.
- d. Innovation and Technology: New methods (such as advanced materials or sealing techniques) that could offer long-term savings or environmental benefits.
- e. Risk Mitigation: Suppliers with robust contingency plans or who provide warranties may reduce project risks.

3. Quantify the Costs and Benefits

Assign a monetary value or a qualitative score to each factor. For instance:

Cost of delays can be quantified based on project timelines and penalties.

Reliability may be scored on a scale (e.g., 1-10) based on the supplier's track record.

Vendor innovations might have an indirect financial benefit over time (e.g., reduced long-term maintenance costs).

4. Weight the Factors

Assign weights to different criteria based on project priorities:

Cost might weigh more if the project is budget constrained.

Quality may be more important if long-term sustainability and reliability are the focus.

5. Compare Vendor

Comparison matrix for different suppliers, as per follows:

Criteria	Weight (%)	Vendor / Supplier from UK	Vendor / Supplier from US	Vendor / Supplier from China
Cost	30%	8	6	10
Quality	5%	10	8	8
Delivery	10%	8	8	8
Services	5%	6	10	8
Reputation	10%	10	8	6
Location	20%	6	8	10
Capacity	5%	6	8	10
Financial Stability	15%	10	6	8

	100%	64	62	68
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Criteria include:

- Price : Cost, Discount, Payment Term.
- Quality : Product Quality, Certifications, Defect Rates.
- Delivery : Lead Times, On-Time Delivery Rate, Shipping Options.
- Service : Customer Services Quality, Responsiveness, After – Sales Support.
- Reputation : References, Market Standing, Past Performance Evaluation.
- Location : Proximity, Regional Availability, Shipping Costs.
- Capacity : Ability to handle large order, Scalability.
- Financial Stability : Creditworthiness, Long-Term Viability

Final Score: Multiply each vendor’s score by the weight of each factor, then sum the results for a final score. The vendor with the highest weighted score provides the best overall value.

6. Conduct Sensitivity Analysis

Evaluate how changes in specific factors (e.g., a cost increase or a delay) impact the overall outcome. This helps anticipate the consequences of uncertainties and adjust for contingencies.

7. Make a Recommendation

After compiling the data, assess which vendor offers the best value in terms of cost, efficiency, reliability, and overall risk mitigation.

Other Considerations

Contractual Flexibility: Are there options for contract renegotiation in case of project changes or unforeseen conditions?

Vendor's Financial Stability: Is the supplier financially sound enough to handle the project scope without risking failure or default?

After-sales support: Does the vendor provide ongoing maintenance or warranty services, especially for well abandonment, where long-term monitoring may be required? or we can say Post Abandonment Monitoring and Evaluation.

By weighing costs against benefits—especially in a complex and environmentally sensitive project like ASR or well abandonment—a comprehensive CBA will guide decision-making, ensuring both compliance and financial prudence.

4.4. Non-Monetary Analysis

4.4.1. PESTEL Analysis

PESTEL analysis is a strategic framework used to analyse and understand the external macro-environmental factors that can impact an organization or industry. A PESTEL analysis for Abandonment of Site Restoration or Well Abandonment Project in oil and gas industry can help understand the external environment and its implications.

PESTEL Analysis for UK Vendor/Supplier:

1. Political Factors:

Brexit Impact: The UK's exit from the EU has changed trade agreements, tariffs, and customs regulations, affecting supply chain efficiency and costs.

Government Policies: Changes in regulations, taxation, or subsidies may influence vendor operations, especially in areas like environmental compliance or labor laws.

Trade Agreements: New trade deals with countries outside the EU may open opportunities or create challenges for UK-based suppliers.

2. Economic Factors:

Exchange Rates: Fluctuations in GBP can affect the cost of imported materials or exported goods, impacting pricing and profitability.

Inflation Rates: Rising inflation may increase costs for raw materials, logistics, and labor, affecting the overall cost structure for suppliers.

Interest Rates: Changes in borrowing costs can impact investment in infrastructure, technology, and expansion for vendors.

3. Social Factors:

Consumer Preferences: Growing demand for ethically sourced, sustainable, and eco-friendly products may influence the choice of suppliers.

Workforce Skills and Availability: The availability of skilled labor can impact production efficiency and quality, especially in industries like manufacturing and technology.

Cultural Trends: Suppliers need to adapt to changing trends, such as increased demand for health-conscious, organic, or digital-first products.

4. Technological Factors:

Digital Transformation: The adoption of technology like AI, automation, and supply chain management systems is crucial for efficiency and competitiveness.

E-commerce Growth: Increased online sales require suppliers to be flexible, with capabilities for faster order fulfilment and digital integration.

Innovation: Suppliers investing in innovative processes or products can offer a competitive edge, but this requires ongoing investment.

5. Environmental Factors:

Sustainability Requirements: Increasing demand for sustainable practices, such as reducing carbon footprints and waste management, is impacting supplier operations.

Environmental Regulations: Compliance with stricter environmental standards can affect operational costs and processes, especially in industries with significant environmental impact.

Climate Change: Adverse weather conditions and climate change may disrupt supply chains, requiring vendors to develop more resilient strategies.

6. Legal Factors:

Trade Laws and Regulations: Compliance with trade laws, including import/export restrictions and tariffs, is essential, especially post-Brexit.

Employment Laws: Suppliers must adhere to labor laws regarding wages, working hours, and health & safety, affecting their operations and costs.

Intellectual Property (IP) Rights: Vendors dealing with technology or proprietary products need to protect their IP, and any legal challenges can affect business continuity.

PESTEL Analysis for US Vendors/Suppliers:

1. Political Factors:

Trade Policies: US trade policies, tariffs, and duties, especially in the context of trade wars or agreements (e.g., with China or the EU), can impact the cost and availability of goods for suppliers.

Government Stability and Regulation: Regulatory changes, such as shifts in government administration, can affect policies related to labor, taxes, and environmental compliance.

Infrastructure Investment: Government initiatives to invest in infrastructure can affect transportation efficiency and costs for suppliers.

2. Economic Factors:

Exchange Rates: Fluctuations in the US dollar's value can impact the cost of importing materials and exporting goods, influencing supplier pricing strategies.

Economic Growth and Inflation: The overall economic climate, including GDP growth and inflation rates, affects demand, purchasing power, and production costs.

Interest Rates: Changes in interest rates can influence borrowing costs, impacting suppliers' ability to invest in growth, technology, and inventory.

3. Social Factors:

Consumer Preferences: US consumers are increasingly prioritizing sustainability, ethical sourcing, and locally made products, affecting supplier selection and product offerings.

Demographic Shifts: Aging populations, urbanization, and multicultural influences affect product demand, labor availability, and supply chain strategies.

Health and Wellness Trends: There is a growing focus on health and wellness, driving demand for organic, non-GMO, and eco-friendly products, influencing suppliers' offerings.

4. Technological Factors:

Digital Transformation: Suppliers in the US are increasingly adopting technologies such as AI, IoT, blockchain, and automation to optimize supply chain management and logistics.

E-commerce Growth: The rise of e-commerce requires suppliers to adapt to faster delivery expectations, digital order management, and inventory tracking systems.

Research and Development (R&D): Continuous innovation is critical for staying competitive, especially in high-tech industries, necessitating investment in R&D.

5. Environmental Factors:

Sustainability Initiatives: Growing awareness of environmental sustainability affects suppliers, pushing them to adopt eco-friendly practices, reduce carbon footprints, and manage waste.

Climate Change: Extreme weather events can disrupt supply chains, requiring suppliers to develop more resilient and adaptable operations.

Environmental Regulations: US vendors must comply with stringent environmental regulations, such as the Clean Air Act and EPA guidelines, which can impact operational costs and processes.

6. Legal Factors:

Trade Laws and Tariffs: Compliance with international trade laws, tariffs, and export regulations can influence supplier costs and market access.

Labor Laws: Suppliers must adhere to federal and state labor laws, including minimum wage, working conditions, and employee rights, affecting labor costs and workforce management.

Intellectual Property Rights: Protection of intellectual property is crucial, particularly for suppliers involved in technology, manufacturing, and design, to avoid legal disputes and safeguard proprietary products.

PESTEL Analysis for China Vendors/Suppliers

1. Political Factors:

Government Policies and Regulations: The Chinese government plays a significant role in regulating industries, with policies that can impact import/export regulations, taxes, and subsidies.

Trade Relations and Tariffs: China's trade relationships, particularly with countries like the US and EU, can impact tariffs and trade agreements, affecting supply chain costs and availability.

Political Stability: China is politically stable, but changes in international relations (e.g., trade wars or sanctions) can affect vendor operations and market access.

2. Economic Factors:

Economic Growth: China has a rapidly growing economy, but fluctuations can affect supplier production costs, demand, and pricing structures.

Currency Fluctuations: Changes in the value of the Chinese Yuan (CNY) can impact the cost of exports, affecting the competitiveness of suppliers in international markets.

Labor Costs: Although labor is relatively affordable compared to Western countries, rising wages in China's manufacturing sector could impact suppliers' pricing strategies over time.

3. Social Factors:

Cultural Factors: Chinese suppliers need to adapt to Western business practices and cultural expectations, including quality standards, transparency, and communication.

Consumer Demand: As Chinese consumers become more affluent, there is a shift toward higher quality, branded, and sustainable products, which may impact domestic suppliers.

Workforce Demographics: An aging population and a shrinking workforce could influence labor availability, leading to increased costs and a push toward automation.

4. Technological Factors:

Technological Advancements: China is investing heavily in technology, with suppliers increasingly adopting automation, AI, robotics, and smart manufacturing to improve efficiency.

E-commerce Integration: The rapid growth of e-commerce platforms that suppliers must be capable of digital integration, efficient logistics, and fast delivery.

R&D and Innovation: Chinese vendors are investing in research and development to produce higher-quality, innovative products, making them more competitive in global markets.

5. Environmental Factors:

Environmental Regulations: China has introduced stricter environmental policies to combat pollution and reduce carbon emissions, affecting manufacturing practices and operational costs for suppliers.

Sustainability: There is growing awareness of sustainability in China, and international customers are increasingly demanding eco-friendly, sustainable products, which affects supplier operations.

Climate Change and Resource Availability: Natural disasters, such as floods or droughts, can disrupt supply chains and impact resource availability, requiring suppliers to adapt to climate-related challenges.

6. Legal Factors:

Trade Laws and Compliance: Suppliers in China must comply with international trade laws, export restrictions, and customs regulations, which can vary based on political relations with other countries. Meanwhile the relationship with Indonesia, form D can be applied with 0% Duty and Taxes.

Intellectual Property (IP) Rights: While IP protection has improved in China, issues with counterfeit goods and patent infringement still exist, making it essential for suppliers to ensure compliance.

Labor Laws: Chinese labor laws are evolving, with increased focus on workers' rights, safety, and minimum wage, which can affect production costs and supplier practices.

P	E	S	T	E	L
Buying: <ul style="list-style-type: none"> Regulatory Environment Government policies Stability and governance 	Buying: <ul style="list-style-type: none"> Capital expenditure Depreciation Long-term investment 	Buying: <ul style="list-style-type: none"> Workforce needs Community Impact 	Buying: <ul style="list-style-type: none"> Technological advancements Fleet Management 	Buying: <ul style="list-style-type: none"> Sustainability commitments Corporate responsibility 	Buying: <ul style="list-style-type: none"> Ownership rights Compliance
Renting: <ul style="list-style-type: none"> Operational flexibility Local Partnership Short-term Policies 	Renting: <ul style="list-style-type: none"> Operational expenditure Cost predictability Short-term project 	Renting: <ul style="list-style-type: none"> Flexibility for Workforce Temporary project 	Renting: <ul style="list-style-type: none"> Access to modern fleet Adaptability 	Renting: <ul style="list-style-type: none"> Eco-friendly option Reduce impact 	Renting: <ul style="list-style-type: none"> Contractual flexibility Liability and insurance

Figure 8 – PESTEL Analysis (Source: Jay Barney (1991))

4.4.2.VRIO Analysis

VRIO analysis is a strategic tool used to assess the internal resources and capabilities of an organization to determine its potential competitive advantage. A VRIO analysis helps evaluate resources and capabilities to determine if they can be a source of sustained competitive advantage. Here's a VRIO analysis comparing Abandonment of Site Restoration or Well Abandonment at Duri Site in Indonesia:

VRIO UK Vendor/Supplier:

1. Value:

High-Quality Products: UK vendors often emphasize high-quality standards, which can provide value to customers seeking premium products. This value can be a competitive advantage, especially in industries where safety is no. one.

Local Expertise and Knowledge: A deep understanding of local markets, regulations, and consumer preferences adds value, particularly for clients who need customized or locally adapted products and services.

Efficient Supply Chains: UK vendors with well-established logistics and supply chain networks can offer timely deliveries, reducing lead times and providing value through efficiency.

Assessment: If a UK vendor consistently delivers quality, timely service, and local expertise, this is valuable for customers, offering a competitive advantage.

2. Rarity:

Access to Skilled Labour: The UK has a highly skilled workforce in many sectors (e.g., engineering, technology, finance). Vendors who can access and retain this talent possess a rare resource that may not be easily available in other regions.

Advanced Technology and Innovation: Vendors investing in cutting-edge technology, such as automation or AI, may possess rare capabilities that set them apart from competitors who have not made similar investments.

Sustainability Credentials: Vendors with strong sustainability practices (e.g., eco-friendly materials, carbon-neutral operations) are becoming rarer and more valued, as companies seek partners aligned with their sustainability goals.

Assessment: If a UK vendor has access to unique skills, technology, or sustainability practices, this rarity provides a potential competitive edge.

3. Imitability:

Brand Reputation and Trust: Building a trusted brand with a reputation for quality and reliability can be difficult for competitors to imitate, especially if it's been established over many years.

Proprietary Processes or Technology: Vendors who have developed unique production processes, patented technology, or specialized expertise can make it hard for competitors to replicate their capabilities.

Strong Relationships with Clients and Suppliers: Long-term relationships built on trust and consistent service can be hard to imitate, providing a UK vendor with a stable market position.

Assessment: While some aspects like technology might eventually be imitated, a strong brand, proprietary processes, and established relationships can be challenging for competitors to replicate, creating a sustained advantage.

4. Organization:

Efficient Operations: UK vendors who have structured their operations to leverage their valuable, rare, and inimitable resources (e.g., investing in training, technology, and supply chain management) are more likely to maintain a competitive advantage.

Adaptability and Responsiveness: Vendors that can quickly adapt to changes in market demand, regulations, or technology trends are well-organized to sustain their competitive advantage.

Strategic Partnerships: Collaborations with other businesses, industry bodies, or government initiatives can enhance a vendor's ability to organize and capitalize on their resources.

Assessment: If the vendor is well-organized and effectively utilizes its resources, they can maintain a sustainable competitive advantage.

VRIO Analysis for a US Vendor/Supplier

1. Value:

High-Quality Standards: US vendors often adhere to stringent quality standards and regulations offering value to clients who require reliable and compliant products or services.

Advanced Technology and Innovation: Many US suppliers leverage advanced technologies, such as automation, AI, and data analytics, to enhance efficiency and productivity, providing value through faster delivery times, better quality, and cost savings.

Extensive Distribution Networks: US vendors have access to well-established infrastructure and logistics networks, enabling efficient supply chain management and distribution.

Assessment: These capabilities provide significant value, making US vendors attractive to customers seeking quality, efficiency, and advanced solutions.

2. Rarity:

Access to Cutting-Edge Technology: The US is a global leader in technological innovation, and vendors that utilize the latest technology have rare capabilities that set them apart from many international competitors.

Highly Skilled Workforce: The US has a large pool of skilled workers in areas like technology, manufacturing, and logistics. Vendors with access to this talent have a rare advantage.

Sustainability and ESG Initiatives: US suppliers increasingly adopt sustainable practices and adhere to Environmental, Social, and Governance (ESG) standards, which can be rarer among global suppliers.

Assessment: Access to advanced technology, a highly skilled workforce, and strong sustainability practices makes US vendors stand out, giving them a competitive advantage that isn't widely available elsewhere.

3. Imitability:

Strong Brand Reputation: US vendors with a long-standing history and strong brand reputation for quality and reliability are difficult to imitate, especially in industries where trust and consistency are crucial.

Proprietary Technologies and Processes: Many US vendors develop proprietary technologies, patents, or specialized processes that are not easily replicable by competitors.

Established Relationships and Partnerships: Building strong, long-term relationships with customers, suppliers, and industry stakeholders can be difficult for others to replicate.

Assessment: While some aspects, such as technology, can be copied over time, brand reputation, proprietary knowledge, and established relationships are difficult to imitate, providing a sustained advantage.

4. Organization:

Operational Efficiency: US vendors that are well-organized, with streamlined operations, advanced technology integration, and efficient supply chain management, are better positioned to capitalize on their resources.

Adaptability and Innovation: Many US suppliers are highly adaptive, quickly responding to changing market demands, technological advancements, or regulatory shifts, ensuring they remain competitive.

Effective Management and Strategy: US vendors often have access to experienced management teams and strategic planning processes that allow them to effectively leverage their resources for maximum advantage.

VRIO Analysis for a China Vendor/Supplier

1. Value:

Cost Efficiency: One of the most significant advantages of Chinese vendors is their ability to offer lower production and labor costs, providing valuable cost savings to their clients.

Manufacturing Expertise and Scale: Chinese suppliers often have extensive manufacturing capabilities and can produce goods at scale, making them valuable partners for clients requiring high-volume orders.

Access to a Wide Range of Raw Materials: China has a robust supply of raw materials and components, which enables vendors to offer a diverse product range and faster production times.

Assessment: The cost efficiency, manufacturing expertise, and access to materials make China vendors highly valuable, especially for companies looking to reduce costs and achieve economies of scale.

2. Rarity:

Large Manufacturing Ecosystem: The concentration of specialized manufacturing clusters in China, such as electronics in Shenzhen or textiles in Guangdong, is rare and difficult to replicate in other countries.

Skilled Labor Force: China has a vast pool of skilled workers with expertise in various industries, which is not easily found elsewhere at the same scale and cost.

Established Supply Chain Networks: The deep integration of supply chains, with access to a variety of suppliers, logistics partners, and raw material sources, is a rare feature that allows for flexibility and resilience.

Assessment: The combination of a large manufacturing ecosystem, skilled labor, and established supply chains gives Chinese vendors a rare advantage that is difficult to match in other regions.

3. Imitability:

Cost Advantage: While competitors may try to imitate China's cost advantages, it's challenging to replicate the same level of efficiency and scale due to differences in labor costs, infrastructure, and supply chain networks.

Manufacturing Processes and Expertise: Over decades, Chinese vendors have developed deep manufacturing knowledge and expertise, making it difficult for competitors in other countries to fully replicate their capabilities quickly.

Brand Recognition: Some Chinese suppliers have developed strong reputations and brand recognition in certain sectors, which is harder for new entrants to imitate.

Assessment: Although certain aspects, such as cost structures, might eventually be matched by competitors in other low-cost countries, the overall manufacturing expertise, processes, and supply chain integration are harder to imitate, giving China vendors a competitive edge.

4. Organization:

Efficient Production Systems: Many Chinese vendors have highly efficient production systems, leveraging automation, technology, and lean manufacturing practices, allowing them to maximize value creation.

Government Support: The Chinese government often supports local industries through policies, subsidies, and infrastructure investment, which helps vendors organize and operate efficiently.

Adaptability and Responsiveness: Chinese vendors are typically quick to adapt to changing market demands, product specifications, and industry trends, making them highly flexible and responsive.

Assessment: The strong organizational structure, coupled with government support and adaptability, means that Chinese vendors are well-positioned to leverage their resources effectively, maintaining a competitive advantage.

	V VALUABLE	R RARE	I INIMITABLE	O ORGANIZED	
PSC Contractor's without good track records.	NO				COMPETITIVE DISADVANTAGE
Common Practice, Cost Efficiency	YES	NO			COMPETITIVE PARITY
Specific Type of Vehicle	YES	YES	NO		TEMPORARY COMPETITIVE ADVANTAGE
Relationship and Partnership	YES	YES	YES	NO	UNUSED COMPETITIVE ADVANTAGE
Organization Agility, Innovation, Human Resources, Sustainability Commitment, Financial Stability	YES	YES	YES	YES	SUSTAINABLE COMPETITIVE ADVANTAGE

Figure 9 - VRIO Analysis (Source: Jay Barney (1991))

4.4.3. SWOT Analysis

SWOT analysis is a strategic tool used to evaluate the strengths, weaknesses, opportunities, and threats facing an organization or project. SWOT analysis (Strengths, Weaknesses, Opportunities, Threats) can help evaluate the origin of vendor or supplier that more suitable for Abandonment Site Restoration or Well Abandonment Project.

SWOT Analysis for a UK Vendor/Supplier

Strengths:

1. **High-Quality Standards:** UK vendors are known for adhering to stringent quality control and regulatory standards, which enhances their reputation for delivering premium products and services.
2. **Advanced Technology and Innovation:** The UK is a leader in technological innovation, providing vendors access to advanced technologies, such as AI, automation, and Industry 4.0 practices.
3. **Skilled Workforce:** The UK has a highly educated and skilled labor force, which supports high-quality production and efficient operations.
4. **Strong Infrastructure:** The country has a well-developed infrastructure, including reliable transport networks and logistics systems, facilitating efficient distribution and supply chain management.
5. **Sustainability and Ethical Practices:** Many UK vendors emphasize sustainability and ethical sourcing, which appeals to clients with a focus on environmental and social responsibility.

Weaknesses:

1. **Higher Costs:** Operating costs, including labor, energy, and compliance expenses, are relatively higher in the UK compared to some global competitors, which may lead to higher prices for clients.
2. **Brexit Impact:** Post-Brexit, there are increased complexities around trade agreements, tariffs, and customs procedures, which can lead to supply chain disruptions and increased costs.
3. **Limited Market Size:** The domestic market is smaller compared to countries like the US or China, which may limit growth opportunities for vendors relying heavily on local clients.
4. **Skill Shortages in Certain Sectors:** There can be skill shortages in specific industries, such as technology and engineering, which may affect the vendor's ability to scale up or adapt to new market demands.

Opportunities:

1. **Export Potential:** Despite Brexit, the UK still has favourable trade relationships with many countries, and there are opportunities for vendors to expand into new international markets.

2. **Growing Demand for Sustainable Products:** There is an increasing global demand for environmentally friendly and ethically sourced products, which UK vendors can leverage, given their focus on sustainability.
3. **Adoption of Advanced Technologies:** By investing further in automation, AI, and digital transformation, UK vendors can enhance efficiency, reduce costs, and improve competitiveness.
4. **Strategic Partnerships and Collaborations:** Collaborating with international companies or entering joint ventures can help UK vendors access new markets, resources, and technologies.
5. **Government Support for Innovation:** The UK government provides grants, incentives, and support for businesses investing in R&D, sustainability, and digital transformation, offering growth opportunities for vendors.

Threats:

1. **Intense Global Competition:** UK vendors face strong competition from lower-cost suppliers in countries such as China, India, and Eastern Europe, which may challenge their market share.
2. **Economic Uncertainty:** Economic volatility, including inflation, currency fluctuations, or changes in interest rates, can impact the financial stability of vendors.
3. **Regulatory Changes:** Changing regulations, both domestically and internationally, can impact trade, supply chains, and compliance costs for UK vendors.
4. **Supply Chain Disruptions:** Global events (e.g., pandemics, geopolitical tensions, or natural disasters) can disrupt supply chains, affecting the availability of raw materials and increasing lead times.
5. **Technological Advancements by Competitors:** As competitors adopt advanced technologies, UK vendors may face threats from those who can offer similar products or services at lower costs or faster speeds.

Summary

Strengths: High-quality standards, advanced technology, skilled workforce, strong infrastructure, and sustainability practices.

Weaknesses: Higher operating costs, Brexit-related complexities, limited domestic market size, and skill shortages in certain sectors.

Opportunities:

Export potential, growing demand for sustainable products, advanced technology adoption, strategic partnerships, and government support for innovation.

Threats: Intense global competition, economic uncertainty, regulatory changes, supply chain disruptions, and technological advancements by competitors.

This SWOT analysis provides a comprehensive overview of the factors affecting a UK vendor, helping them identify areas to leverage and potential challenges to address for sustained growth and competitiveness.

SWOT Analysis for a US Vendor in ASR and Well Abandonment

Strengths:

1. **Technical Expertise and Experience:** US vendors often possess extensive experience and technical expertise in ASR and well abandonment, with skilled teams familiar with the latest techniques and best practices.
2. **Advanced Technology and Equipment:** The US is at the forefront of technological innovation, and vendors frequently utilize cutting-edge equipment, such as advanced plugging techniques, digital monitoring, and remote sensing, to ensure safe and efficient operations.
3. **Compliance with Regulatory Standards:** US vendors have experience in adhering to strict environmental and safety regulations set by agencies such as the Environmental Protection Agency (EPA) and the Bureau of Land Management (BLM), ensuring compliance and minimizing legal risks.
4. **Strong Safety Record:** US vendors emphasize safety in their operations, often boasting strong safety records and comprehensive safety training programs, which builds trust with clients.
5. **Access to a Well-Developed Supply Chain:** With a well-developed infrastructure and supply chain, US vendors can source materials, equipment, and skilled labor efficiently, reducing project delays.

Weaknesses:

1. Higher Operational Costs: US vendors face higher operational costs, including labor, equipment.

SWOT Analysis for a China Vendor in ASR and Well Abandonment**Strengths:**

1. Technical Expertise and Experience: China vendors competitive with current safety standard and expectations and extensive experience and technical expertise in ASR and well abandonment, with skilled teams familiar with the latest techniques and best practices.

2. Advanced Technology and Equipment: China with their rapid collaboration with well known vendor or integrated system for ASR and Well Abandonment also at the forefront of technological innovation, and vendors frequently utilize cutting-edge equipment, such as advanced plugging techniques, digital monitoring, and remote sensing, to ensure safe and efficient operations.

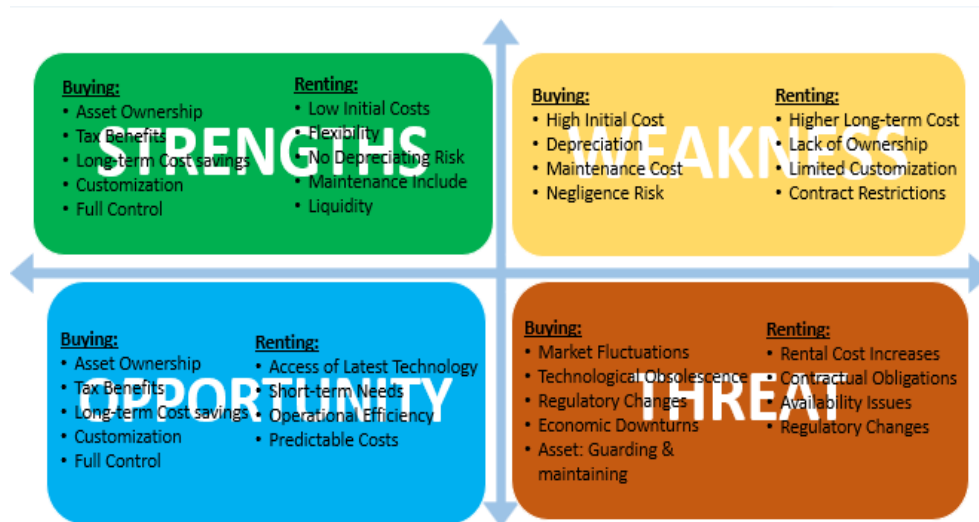
3. Compliance with Regulatory Standards: China vendors have experience in adhering to strict environmental and safety regulations according to the site that they will operate.

4. Strong Safety Record: China vendors emphasize safety in their operations, often boasting strong safety records and comprehensive safety training programs, which builds trust with clients.

5. Access to a Well-Developed Supply Chain: With a well-developed infrastructure and supply chain, China vendors easily finding source materials, equipment, and skilled labor efficiently, reducing project delays also short timeline and deliverables.

Weaknesses:

1. Innovation and Experience: China vendors might face challenge especially in ASR or Well Abandonment Project Innovation Equipment or Tools and also Experience.



• Figure 10 - SWOT Analysis (Source: Albert Humphrey (1960))

4.4.3. Environmental, Social, and Governance (ESG) Analysis for ASR and Well Abandonment Project at Duri Site

1. Environmental (E)

Site Restoration and Rehabilitation: The project should aim to restore the natural environment, ensuring that abandoned wells are safely plugged and that any contaminated soil, water, or air is remediated. This helps return the site to its original state or an agreed-upon ecological baseline.

Waste Management: Proper disposal and treatment of hazardous materials, drilling fluids, and other waste generated during the abandonment process are crucial. Adopting waste reduction, recycling, and safe disposal methods will minimize environmental impact.

Biodiversity Protection: Implement measures to protect local wildlife and vegetation throughout the project. Conduct environmental impact assessments (EIAs) to identify and mitigate potential disruptions to the ecosystem.

Water Management: Ensure that water used during the project is managed efficiently, and implement measures to prevent contamination of groundwater and surface water sources.

Carbon Emissions Reduction: Adopt practices and technologies that minimize carbon emissions during well abandonment activities, such as using low-emission equipment and optimizing transportation and logistics.

2. Social (S)

Community Engagement: Engage with local communities early in the project to understand their concerns, provide transparency about the project's activities, and keep them informed about potential impacts and timelines. Building trust and maintaining open communication can prevent misunderstandings and foster positive relationships.

Job Creation and Local Employment: The project can provide employment opportunities for local workers, offering training and skill development programs to enhance their capabilities and increase their employability in future projects.

Health and Safety: Prioritize the safety and well-being of employees, contractors, and local communities. Implement comprehensive safety protocols, provide regular safety training, and ensure that proper safety equipment is available and used.

Indigenous Rights and Cultural Sensitivity: Ensure respect for indigenous peoples' rights, traditions, and cultural heritage, if applicable. Conduct cultural impact assessments and avoid disrupting sites of cultural or historical significance.

Grievance Mechanism: Establish a transparent and accessible grievance mechanism for workers and community members to raise concerns or complaints related to the project.

3. Governance (G)

Regulatory Compliance: Adhere to all relevant local, national, and international regulations, as well as industry standards governing ASR and well abandonment projects. This includes environmental protection, health and safety, and labor laws.

Transparency and Reporting: Maintain transparent communication about the project's progress, environmental impact, safety records, and community engagement efforts. Regularly report on ESG performance to stakeholders, investors, and regulatory bodies.

Ethical Supply Chain Management: Ensure that all suppliers and subcontractors involved in the project adhere to ethical and sustainable practices. This includes verifying their compliance with labor laws, environmental regulations, and safety standards.

Risk Management: Implement robust risk management strategies to identify, assess, and mitigate potential environmental, social, and operational risks associated with the project.

Board Oversight and Accountability: Establish a governance structure that ensures accountability at all levels of the project. The board or senior management should actively oversee the project's ESG performance and ensure alignment with sustainability goals.

Summary of ESG Analysis for the Duri Site

Conclusion: Implementing a comprehensive ESG strategy for the ASR and well abandonment project at the Duri site is crucial for minimizing environmental impact, fostering positive community relations, and ensuring regulatory compliance and ethical operations. This approach not only aligns with sustainability goals but also enhances the project's long-term reputation and success.

Post Abandonment ASR (Abandonment and Site Restoration) and Well Abandonment project at the Duri site involves a series of critical steps to ensure that decommissioned wells are safely sealed, and the surrounding environment is restored to an acceptable state. Here's a detailed overview of the key considerations and processes for such a project:

1. Objectives of the Post Abandonment Project

Safe Well Abandonment: Ensuring that all wells at the Duri site are properly plugged and abandoned to prevent future leaks, groundwater contamination, or other environmental hazards.

Site Restoration: Rehabilitating the site to restore it to its natural condition or an agreed-upon standard, ensuring that soil, water, and vegetation are returned to their original state as much as possible.

Environmental Compliance: Adhering to local, national, and international environmental regulations, ensuring that the abandonment process minimizes adverse impacts on the surrounding ecosystem.

Community and Stakeholder Engagement: Engaging with local communities and stakeholders to address concerns, maintain transparency, and demonstrate commitment to responsible abandonment practices.

2. Key Steps in the Post Abandonment ASR and Well Abandonment Process

a. Planning and Assessment

Site Assessment: Conduct a thorough assessment of the Duri site to identify the number of wells to be abandoned, environmental conditions, and potential hazards.

Environmental Impact Assessment (EIA): Perform an EIA to understand the potential environmental impacts of the abandonment process and develop mitigation measures.

Project Planning: Develop a comprehensive abandonment and restoration plan that outlines the steps, timelines, resources, and budget required for the project.

b. Well Plugging and Abandonment

Well Integrity Assessment: Evaluate the integrity of each well to determine the appropriate plugging technique. This includes inspecting casing, tubing, and any other well components.

Isolation of Well Zones: Set mechanical barriers (cement plugs) at key intervals within the wellbore to isolate different underground formations and prevent fluid migration.

Primary and Secondary Plugging: Install primary plugs at the well's depth, followed by secondary plugs near the surface to ensure complete sealing. Pressure testing is done to confirm plug integrity.

Cutting and Removing Wellhead: Cut the well casing below the ground level and remove the wellhead to ensure no surface equipment remains.

c. Site Restoration

Surface Cleanup: Remove all equipment, structures, and debris from the site, ensuring that any contaminated materials are properly treated or disposed of.

Soil Remediation: Test soil for contamination and undertake necessary remediation measures to restore soil quality, including bioremediation, soil washing, or chemical treatment.

Revegetation and Landscaping: Reintroduce native vegetation to restore the natural habitat. This may involve planting trees, shrubs, grasses, or other vegetation that was present before the well's establishment.

Water Management: Ensure that any water bodies or groundwater sources affected by the operations are monitored, treated, and restored to prevent contamination.

d. Monitoring and Reporting

Post-Abandonment Monitoring: Conduct regular monitoring of the abandoned wells and surrounding environment to detect any potential leaks, subsidence, or environmental impacts.

Reporting and Documentation: Maintain detailed records of the abandonment and restoration activities, monitoring results, and any corrective actions taken. Report these findings to regulatory authorities and stakeholders.

3. Key Challenges and Considerations

Technical Complexity: Well abandonment involves technical challenges such as ensuring proper sealing of multiple zones, especially for older wells with deteriorated infrastructure.

Environmental Sensitivity: The Duri site may be located in ecologically sensitive areas, requiring careful planning to minimize impacts on wildlife, vegetation, and water resources.

Regulatory Compliance: Adhering to regulations set by Indonesian authorities and international standards is crucial to avoid legal complications and ensure responsible abandonment practices.

Community Impact: Engaging with the local community, addressing concerns, and providing transparency about the project's environmental safeguards are vital for maintaining good relations.

4. Best Practices for Post Abandonment at the Duri Site

Use of Advanced Plugging Techniques: Employ advanced technologies such as cement bond logging, expandable plugs, or resin-based sealing materials to ensure effective well isolation.

Environmental Monitoring Programs: Implement long-term monitoring programs to track environmental recovery and detect any potential issues early, ensuring rapid response.

Stakeholder Engagement: Maintain open communication with local communities, regulatory agencies, and other stakeholders throughout the abandonment process to build trust and transparency.

Training and Safety: Provide thorough training for personnel on safety protocols, environmental management, and well abandonment techniques to minimize risks.

5. Environmental, Social, and Economic Impact

Positive Environmental Impact: Properly conducted abandonment and restoration will reduce the risk of contamination, protect groundwater sources, and allow natural habitats to recover.

Social Impact: Engaging local communities in the project can foster goodwill and create opportunities for local employment and capacity building.

Economic Impact: While well abandonment incurs costs, it also eliminates potential liabilities, reduces long-term environmental risks, and fulfills regulatory obligations, leading to overall cost savings in the long term.

The Post Abandonment ASR and Well Abandonment Project at the Duri site should be executed with a focus on environmental integrity, technical excellence, regulatory compliance, and community engagement. Following best practices will not only minimize environmental impact but also ensure the site is restored responsibly, contributing to the long-term sustainability of the region.

CHAPTER 5

CONCLUSION AND REKOMENDATION

5.1 Conclusion.

- 5.1.1 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.
- 5.1.2 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.

5.1.3 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.

5.1.4 Investment in well closure equipment plays a role in supporting the Sustainable Development Goals (SDGs) principles by ensuring effective environmental management, regulatory compliance, and transparency and accountability. This project contributes to sustainability and corporate social responsibility by reducing environmental impacts and improving community safety and well-being.

5.2 Implications

5.2.1 Theoretical Implications

1. **Contribution to Financial and Energy Literature:** These findings enrich the literature on NPV analysis in the oil and gas industry. This study highlights how differences in NPV between companies can provide insights into different financial and operational strategies.
2. **Role of Reserve Estimates and Operational Costs:** This research emphasizes the importance of reserve estimates and operational costs in strategic decision-making, deepening the understanding of key factors influencing well decommissioning decisions.
3. **Financial Stability and Operational Decisions:** The study supports the theory that financial stability, measured through NPV, is a major factor in the decision to continue or abandon well operations.

5.2.2 Practical Implications

1. **Cost Optimization through Technology:** Companies can leverage technology to optimize operational and decommissioning costs, thereby improving efficiency and reducing financial burdens.

2. **Market Monitoring and Regulatory Compliance:** Implementing effective market monitoring measures and adhering to regulations will help companies adjust their strategies to external changes.
3. **Operational Risk Management:** Effective risk management in operations and maintenance will ensure safe and efficient operations, minimizing potential losses

5.2.3 Managerial Implications

1. **Data-Driven Strategic Decisions:** Managers can use NPV analysis and operational costs as a basis for making strategic decisions about the continuation or abandonment of wells.
2. **Enhanced Team Performance:** Clear and specific assignments to teams such as the Market Analysis Team, Regulatory Affairs Department, Operations and Maintenance Team, and Technology and Innovation Department will enhance overall organizational performance and efficiency.
3. **Review and Adjustment of Decisions:** Management should regularly review and adjust operational decisions based on significant changes in market conditions, regulations, or operational risks to ensure decisions remain relevant and effective.

5.3 Recommendations

- 5.3.1 **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. **Use of Advanced Technology for Cost Optimization:** Oil and gas companies should adopt the latest technologies to optimize operational and decommissioning costs. Technologies such as predictive analytics and automation can assist in making more accurate and efficient decisions.
- 5.3.2 **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. Development of Team Competence: Companies should continuously enhance team competencies through ongoing training and development. Teams such as Market Analysis, Regulatory Affairs, Operations and Maintenance, and Technology and Innovation should be equipped with the latest knowledge and skills to address existing challenges.

- 5.3.3 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. Regular Monitoring and Evaluation: Management should regularly monitor and evaluate market conditions, regulations, and operational risks. This is crucial for adjusting strategies and ensuring that decisions remain relevant to ongoing changes.
- 5.3.4 Ensure the Environmental Impact Assessment (EIA), Well Integrity and Plugging, Wellhead and Surface Equipment Removal, Underground Injection Control (UIC) Considerations.
- 5.3.5 Health and Safety Protocols, Stakeholder’s engagement, Post Abandonment Monitoring, Proper Documentation and Record Keeping> Contractor Selection and Technology: Partner with experienced 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. Enhancement of Internal Transparency and Communication: Companies should improve internal transparency and communication to ensure that all teams share a common understanding of strategic and operational goals. This will facilitate better coordination and collaboration.
- 5.3.6 Post Abandonment should be monitor and maintain by Operator / Licensee, Government Oversight, Financial Assurance / 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.

- 5.3.7 **Implementation of Sustainability Practices:** Companies should consider sustainability practices in their operations to minimize environmental impact. This includes effective waste management, the use of renewable energy, and environmental restoration after well decommissioning.
- 5.3.8 **Collaboration with Stakeholders:** Companies should establish close cooperation with stakeholders, including the government, local communities, and environmental organizations. Such collaboration is essential to ensure regulatory compliance and to garner support for the company's operations.
- 5.3.9 **For future research,** it is recommended to explore the relationship between advanced technology and cost efficiency in the oil and gas industry, particularly in the context of well decommissioning operations. The study could focus on how technologies such as predictive analytics, automation, and renewable energy utilization can reduce operational costs and enhance sustainability. Additionally, research could investigate the impact of ongoing training and team competency development on operational performance and regulatory compliance. Such research will provide further insights into optimal strategies that oil and gas companies can adopt to improve operational efficiency and sustainability.

REFERENCE

- Brealey, R. A., Myers, S. C., & Allen, F. (2021). *Principles of Corporate Finance* (13th ed.). McGraw-Hill Education.
- Johnson, R., & Lee, T. (2021). "Regulatory Compliance and Corporate Performance: Analyzing the Impact of New Regulations." *Regulation & Governance*, 15(3), 301-320.
- Khan, S., & Ali, N. (2023). "Technological Innovation and Cost Optimization in the Oil and Gas Industry." *Energy Policy*, 162, 112-127.
- Miller, P., & O'Leary, T. (2022). "Operational Risk Management: Strategies for Mitigation and Prevention." *Risk Management Journal*, 18(4), 290-310.
- Porter, M. E. (2020). *Competitive Advantage: Creating and Sustaining Superior Performance* (30th Anniversary ed.). Free Press.
- Smith, J., Johnson, M., & Lee, K. (2022). "Financial Stability and Market Volatility: Recent Evidence and Theoretical Implications." *Journal of Financial Economics*, 144(2), 215-238.
- Zhou, H., Wang, L., & Zhang, Y. (2024). "Strategic Flexibility and Adaptation in Changing Environments: A Study of Long-Term Success." *Strategic Management Journal*, 45(1), 75-95.

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 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, 5th 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, 10th 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 DURU 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, 23rd 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 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, 31st July 2024

Signed



(Riga Ponziani)

1. How to choose carefully the right VENDOR or SUPPLIER for Duri Field, WS Rokan well

abandonment project due to the site conditions and location

- **Questionnaire to Business Development Manager:**

1. What is your role in the company? **Business Development Manager**
2. How many years of experience do you have in your current position? **+/-20 years**
3. How important Abandonment Site Restoration (ASR) or Well Abandonment Project for Oil and Gas Industry? **Heavily Regulated and Highly Important.**
4. How many well at Duri's field per year will be under ASR or Well Abandonment Project? **+/-1,000 since Duri's field has been operated for exploration since 77 years ago with over 2.6 billion barrels.**
5. What is your areas of responsibilities for ASR or Well Abandonment Project? **spanning strategy, building relationship, financial management and project execution. To work closely with technical and operations team to develop proposals for ASR projects, ensuring alignment within the company and surroundings, regulatory compliance and environmental standard.**
6. What do you think about the importance choosing the right vendor or supplier for ASR or Well Abandonment Project? **Very Importance and complex. Vendor or Supplier need the necessary experience and equipment to complete the project safely and effectively.**
7. What do you think of management decision in choosing the right technology, experience and equipment that the vendor or supplier will be using for ASR or Well Abandonment Project? **To ensure that this project are executed on time, compliance with local regulation and international law and within the budget.**
8. There are 3 country origin of vendor or supplier to perform the ASR or Well Abandonment Project, from UK, US and China. Which one do you think are met the expectation from your point of view? **US or China**
9. How do you manage for the ASR and Well Abandonment Project on time and not cost overruns? **Maintain crucial link between operational teams, clients, and regulatory authorities, ensuring that the project is successful, compliant, and financial viable.**
10. Does the Environmental, Social and Governance taken part of the importance of ASR or Well Abandonment Project? **Yes it does, It should be align with corporate environmental goals and government objectives also safety.**

2. How to choose carefully the right VENDOR or SUPPLIER for Duri Field, WS Rokan well abandonment project due to the site conditions and location

- **Questionnaire to Operations Manager:**

1. What is your role in the company? **Operations Manager**
2. How many years of experience do you have in your current position? **+/-10 years**
3. How important Abandonment Site Restoration (ASR) or Well Abandonment Project for Oil and Gas Industry? **Very important.**
4. How many well at Duri's field per year will be under ASR or Well Abandonment Project? **+/-850, but not shared to public yet by SKK Migas.**
5. What is your areas of responsibilities for ASR or Well Abandonment Project? **To ensure that the project is executed safely, efficiently, and in compliance with regulations.**
6. What do you think about the importance choosing the right vendor or supplier for ASR or Well Abandonment Project? **Highly important, to ensure proper use of specialized equipment and technology required for well abandonment, including cementing units, wellbore isolations tools and environmental monitoring devices.**
7. What do you think of management decision in choosing the right technology, experience and equipment that the vendor or supplier will be using for ASR or Well Abandonment Project? **It really matters on how to manage the cost not to overruns and complexity on the well conditions.**
8. There are 3 country origin of vendor or supplier to perform the ASR or Well Abandonment Project, from UK, US and China. Which one do you think are met the expectation from your point of view? **UK or China**
9. How do you manage for the ASR and Well Abandonment Project on time and not cost overruns? **Compliant execution of well closure activities, process conducted safely on time and within budget.**
10. Does the Environmental, Social and Governance taken part of the importance of ASR or Well Abandonment Project? **Yes it does, especially on the environmental restoration for site remediation and waste management.**

3. How to choose carefully the right VENDOR or SUPPLIER for Duri Field, WS Rokan well abandonment project due to the site conditions and location

- **Questionnaire to Supply Chain Manager:**

1. What is your role in the company? **Supply Chain Manager**
2. How many years of experience do you have in your current position? **+/-8 years**
3. How important Abandonment Site Restoration (ASR) or Well Abandonment Project for Oil and Gas Industry? **It's important and crucial.**
4. How many well at Duri's field per year will be under ASR or Well Abandonment Project? **+/- 1,000 well and more on the upcoming years.**
5. What is your areas of responsibilities for ASR or Well Abandonment Project? **material and equipment delivery, freight, tax and duty. Mob and Demob at the site.**
6. What do you think about the importance choosing the right vendor or supplier for ASR or Well Abandonment Project? **Very Important.**
7. What do you think of management decision in choosing the right technology, experience and equipment that the vendor or supplier will be using for ASR or Well Abandonment Project? **Have to manage for not having cost overruns and delayed.**
8. There are 3 country origin of vendor or supplier to perform the ASR or Well Abandonment Project, from UK, US and China. Which one do you think are met the expectation from your point of view? **China.**
9. How do you manage for the ASR and Well Abandonment Project on time and not cost overruns? **By choosing vendor and supplier with level of expertise and technologies, also has fulfilled the minimum requirement of safety standards.**
10. Does the Environmental, Social and Governance taken part of the importance of ASR or Well Abandonment Project? **Yes it does, ASR and well abandonment regulated by Indonesian regulations.**

4. How to choose carefully the right VENDOR or SUPPLIER for Duri Field, WS Rokan well abandonment project due to the site conditions and location

5. Questionnaire to Finance Manager:

1. What is your role in the company? **Finance Manager**
2. How many years of experience do you have in your current position? **+/-10 years**

3. How important Abandonment Site Restoration (ASR) or Well Abandonment Project for Oil and Gas Industry? **Important and required by company.**
4. How many well at Duri's field per year will be under ASR or Well Abandonment Project? +/- **more than 500=1,000 wells.**
5. What is your areas of responsibilities for ASR or Well Abandonment Project? **financial planning, budget and managing the cost not to overruns.**
6. What do you think about the importance choosing the right vendor or supplier for ASR or Well Abandonment Project? **Important.**
7. What do you think of management decision in choosing the right technology, experince and equipment that the vendor or supplier will be using for ASR or Well Abandonment Project? **strategic planning required and deep consideration in managing the ASR and Well abandonment wisely.**
8. There are 3 country origin of vendor or supplier to perform the ASR or Well Abandonment Project, from UK, US and China. Which one do you think are met the expectation from your point of view? **China**
9. How do you manage for the ASR and Well Abandonment Project on time and not cost overruns? **Liaise with internal and external parties.**
10. Does the Environmental, Social and Governance taken part of the imporrance of ASR or Well Abandonment Project? **It does matter and important.**