UNIVERSIDAD PARA LA COOPERACION INTERNACIONAL
(UCI)

PROJECT MANAGEMENT PLAN FOR INSTALLING A BREATHING AIR SYSTEM FOR AN OFFSHORE DRILLING RIG – ADMARINE 690

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DEDICATION

This project is dedicated to my family, mainly my wife, whose unwavering support and encouragement have been the driving force behind my academic progress. Your belief in my abilities and your support have inspired me to reach new goals. This accomplishment is as much yours as it is mine. Thank you for being my pillars of support.

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ABSTRACT

The objective of this document is to develop a project management plan for the project of installation of a breathing air system for the offshore drilling rig ADMARINE 690. The company currently does not use a project management plan for the execution of projects. The implementation of the plan will ensure that all the expected project benefits are realized. The breathing air system is an essential lifesaving system used for the survival of personnel in case of an H2S gas discharge during a drilling operation. The application of the project management plan will ensure that all the product and project requirements are completed with the expected quality.

The project's final product is the project management plan consisting of subsidiary plans from different knowledge areas, namely; scope, cost, schedule, quality, resources, communications, risk, procurement, and stakeholders. The creation of the plan will be accomplished by using primary and secondary sources of information along with research methods such as Qualitative research, Quantitative research, and Applied research to collect the data and information which will then be subjected to tools and techniques to create the final project deliverables.

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ABBREVIATIONS AND ACRONYMS

ADES	Advances Energy Systems
ADM 690	ADMARINE 690
ASRY	Arab Shipbuilding and Repair Yard
CPI	Cost Performance Index
CV	Cost Variance
EV	Earned Value
EVM	Earned Value Management
FFA	Fire Fighting Appliances
FGP	Final Graduation Project
H2S	Hydrogen sulfide
HSERM	Health, Safety and Environmental Requirements Manual
ISO	International Organization for Standardization
KPI	Key Performance Indicators
LSA	Life Saving Appliances
OPA's	Organizational Process Assets
OSHA	Occupational Safety and Health Administration
PMBOK	Project Management Body of Knowledge
PMI	Project Management Institute
PO	Purchase Order
PPM	Parts Per Million
QA	Quality Assurance

QC	Quality Control
RBS	Risk Breakdown Structure
RFQ	Request for Quotation
SPI	Schedule Performance Index
SV	Schedule Variance
WBS	Work Breakdown Structure
WBS Dictionary	Work Breakdown Structure Dictionary

EXECUTIVE SUMMARY

Solas Marine Services is a company that provides supply and servicing for Life Saving Appliances (LSA) and Fire Fighting Appliances (FFA) in the Middle East region. One of their main systems aims to help personnel survive the H2S gas that might occur on offshore rigs during drilling operations by providing a supply of breathing air through masks connected to the breathing air system, thus, saving them from the deadly effects of inhaling the gas.

The organization currently carries out its projects by following the procedures set for the activities by the company itself, and there are internal and external audits carried out regularly to ensure compliance to these procedures. The enterprise does not implement project management techniques to create a project management plan for executing projects.

The creation of the project management plan will guide the project team by providing important information pertaining to the individual project management sub-plan's knowledge area and providing the necessary information references to the project team to carry out the different project management processes effectively. The project management plan will also help to efficiently monitor the project's progress, preventing or responding to variances, to successfully achieve the project's objectives.

The general objective of the project was to develop a project management plan for the project of installation of a breathing air system for the offshore drilling rig ADMARINE 690. The specific objectives of the project were: to create a Project Charter that provides high level information about the project and formally authorizes the project; to develop the Scope management plan that will tell us how the scope will be defined, monitored, controlled, and validated; to produce the Requirements Management plan that will explain how the product requirements will be identified, prioritized, analyzed, documented, and managed; to prepare a Schedule management plan to effectively define, sequence, and estimate the project activities; to use this information to develop the project schedule and to effectively control it; to create the Cost management plan that will tell us how the project's cost will be planned, controlled, and structured; to define a Quality management plan that describes how the applicable policies, procedures and guidelines will be implemented to achieve the quality objectives; to put together the Resource management plan that describes how the resources will be acquired, allocated, monitored, and controlled for the project; to create a Communications management plan that explains how, when, and by whom the information on the project will be administered and distributed; to produce the Risk management plan that will describe how the project's risk management activities will be structured and performed; to define the Procurement management plan that details the acquisition process for goods and services from outside the organization; to create a Stakeholder engagement plan that identifies the strategies required to promote productive stakeholder involvement.

To achieve the general and specific objectives of the FGP, information was collected from primary sources as well as secondary sources. Additional research was carried out to collect data and to analyze and understand the FGP topic. These research methods included Qualitative research, Quantitative research, and/or Applied research. Thereafter, tools and techniques were applied to the collected data and information to create the project

deliverables that correspond to each of the project's objectives and record the assumptions and constraints for every deliverable created for future reference.

1 INTRODUCTION

1.1. Background

Solas Marine Services Company provides Life Saving Appliances (LSA) and Fire Fighting Appliances (FFA) to its clients, focused on business in the Middle East region. The Engineering solution is a division that caters to the supply of new systems for clients to meet the regulatory requirements of the oil & gas, and marine industries. This FGP will focus on creating a Project Management Plan for Installing a Breathing Air system for a client.

The breathing air system is used to survive and evade the effects of H2S gas which occur during oil & gas drilling operations. H2S, also known as Hydrogen Sulfide, is found in oil and gas formations and is highly toxic. As it is heavier than air and collects in low areas where personnel operate, health effects begin with prolonged exposure to levels as low as 2 to 5 ppm (parts per million) causing nausea, teary eyes, headache, and loss of sleep. Low exposure to anything above 100 ppm can cause a wide range of health effects depending on the duration of exposure. Exposure to H2S levels from 700-1000 ppm can knock down a worker immediately in 1 or 2 breaths resulting in death (U.S. Department Of Labor, n.d.). The installed breathing air system provides a source of H2S free, clean breathing air to the workers. When the H2S levels rise in the work areas, this system is a regulatory requirement for drilling rigs operating in Saudi Aramco and forms a major source of business for Solas Marine Services.

Solas Marine Services currently does not use project management techniques to execute projects but rather relies on the organization set procedures and processes for executing projects. Though the company has been growing steadily for the past 30 years, the creation of the project management plan will ensure the effective implementation of project management techniques that will greatly increase the benefits realized from the project and increase the portfolio growth substantially. Furthermore, the accurate application of the project management sub-plans will engage clients effectively, improving their satisfaction and increasing their confidence in the company which will help secure future business opportunities for the company.

1.2. Statement of the problem

Solas Marine Services have been planning and executing their projects by following the organization set procedures and processes that are being carried out and managed by ISO (International Organization for Standardization) management systems. A management system typically has a management plan and procedures. A plan that outlines what, how, who, and when, and procedures that detail the task completion instructions (JVR Consultancy, 2022). An ISO management system is a set of tools that will implement policies, procedures, and guidelines to ensure quality and consistency in every process and can help increase the company's revenue, improve efficiency, reduce costs, improve safety performance, and competitiveness (JVR Consultancy, 2022). Solas Marine Services implement three ISO management systems; ISO 9001:2015 - Quality Management Systems, ISO 45001:2018 - Occupational Health and Safety, and ISO 14001:2015 - Environmental

Management Systems (*About Us | Company Profile | Solas Marine Services*, 2020). Internal audits are arranged to ensure compliance and external audits are conducted to gain and maintain these compliance certifications.

Though the company implements the three ISO management systems stated, it does not have any standard that provides guidance for managing projects. PMBOK guides the application of tools, techniques, processes, and knowledge areas that are essential for project management. The project management plan is the collection of sub-plans, each of which detail how to implement the project management processes, tools, and techniques in their respective knowledge areas. Therefore, the FGP for creating a Project Management Plan for Installing a Breathing Air system for the offshore rig ADM 690 will allow the effective implementation of project management for the successful completion of the project within the scope, budget, expected quality, and to accomplish the benefits expected from the project. Additionally, the stakeholder management plan and communications management plan will ensure that the clients are effectively engaged to gain their confidence and improve the organization's reputation with the client ADES to secure future projects from the key stakeholder. The created project management plan can be used as a template for future projects which can be tailored to the requirements of a particular project to ensure the success of future project endeavours as well.

1.3. Purpose

A project management plan is the collection of all the sub-plans which are the outputs of the planning process of different knowledge areas. The purpose of the project

management plan is to act as a guide for execution by providing information such as project objectives, goals, scope, milestones, risks, and resources. This information helps the project management team to monitor and control the project in the control phase (*Project Planning*, 2023). The project management plan created during the FGP will consist of different sub-plans and each of them will show how the processes in each of the knowledge areas will be carried out. Therefore, the purpose and benefits of the FGP project management plan can also be expressed by consolidating the purposes and benefits of each of its knowledge area plans.

- The purpose of the project charter is to formally authorize the project and provide high level information about the project.
- The scope management plan helps undertake processes that will ensure that all the required work, and only the required work, is carried out. This will also avoid scope creep.
- The requirements management plan will explain how to carry out the processes to make sure that the project deliverables will meet all the Client requirements, which in the case of the FGP involves fulfilling the Saudi Aramco requirements for the system.
- The purpose of the schedule management plan is to guide the processes that will help the timely completion of the breathing air system project.
- The cost management plan will guide to carry out the processes that are involved in planning, estimating, budgeting, financing, managing and controlling costs so that the project budget is of USD 870,000.00.

- The quality management plan provides the quality metrics of the project deliverables and describes how the implemented policies, procedures and guidelines will help achieve the quality metrics and the quality objectives.
- The resource management plan serves the purpose of guiding the processes used to identify, acquire, and manage resources for the project.
- The communication management plan explains the execution of processes to ensure timely planning, creation, collection, distribution, storage, retrieval, control, monitoring, and even disposal of the project's information.
- The risk management plan serves the purpose of explaining how risk management activities will be structured and performed, including information like risk methodology, risk approach, risk categories, reserves, and roles and responsibilities.
- The procurement management plan will clarify how the procurement processes related to acquiring goods and services from outside the organization will be accomplished.
- The purpose of the Stakeholder engagement plan is to explain how to accomplish processes required to identify the stakeholders that may impact the project, analyze their impact, find their expectations and develop engagement strategies accordingly.

The final graduation project on creating a project management plan for the installation of the breathing air system for the offshore rig ADM-690 is important as it will guide the execution and help in monitoring of the project through its sub-plans, which in turn will help in successfully completing the deliverables and achieving all the project's objectives. The benefits of the project management plan include (Gaur, 2013): saves crucial

execution time by planning in advance; defines the project in detail; establishes the project boundaries, scope and deliverables; identifies the project stakeholders and the project team; explains the project schedule and identifies all major milestones; provides a monitoring mechanism and helps in project performance reporting; establishes communication requirements and methods; identifies risks and their responses; explains change management processes for project scope, schedule cost, quality and risk; lists metrics and quality objectives that the product or service should accomplish to meet the project objectives; improves monitoring and control of project activities; identifies additional requirements and indicates existing resources; provides financial requirements the project phase wise (Gaur, 2013).

1.4. General objective

To develop a project management plan for the project of installation of a breathing air system for the offshore drilling rig ADMARINE 690.

1.5. Specific objectives

1. To create a Project Charter that provides high level information about the project and formally authorizes the project.
2. To develop the Scope management plan that will tell us how the scope will be defined, monitored, controlled, and validated.
3. To produce the Requirements Management plan that will explain how the product requirements will be identified, prioritized, analyzed, documented, and managed.

4. To prepare a Schedule management plan to effectively define, sequence, and estimate the project activities and to use this information to develop the project schedule and to effectively control it.
5. To create the Cost management plan that will tell us how the project's cost will be planned, controlled, and structured.
6. To define a Quality management plan that describes how the applicable policies, procedures and guidelines will be implemented to achieve the quality objectives.
7. To put together the Resource management plan that describes how the resources will be acquired, allocated, monitored, and controlled for the project.
8. To create a Communications management plan that explains how, when, and by whom the information on the project will be administered and distributed.
9. To produce the Risk management plan that will describe how the project's risk management activities will be structured and performed.
10. To define the Procurement management plan that details the acquisition process for goods and services from outside the organization.
11. To create a Stakeholder engagement plan that identifies the strategies required to promote productive stakeholder involvement.

2 THEORETICAL FRAMEWORK

2.1 Company/Enterprise framework

2.1.1 Company/Enterprise background

Solas Marine Services company was established in the United Arab Emirates (UAE) to meet the growing need for services in the areas of Life Saving Appliances (LSA) and Fire Fighting Appliances (FFA). Since its establishment over 30 years ago, the company has opened several branches in the Middle East and Asia and aims at providing services to clients in the marine, and oil & gas sectors(*About Us - Company Profile - Solas Marine Services*, 2020).

The organization has an Engineering solutions division that caters to the supply of new systems for clients that meet the regulatory requirements of these industries. Another division, Specialized services, helps to service and maintain the installed systems and issues an annual or five-yearly recertification that is a requirement of the industry and accepted by the regulatory bodies. The competency and professionalism of the company over the years has helped set up branches in several countries such as Qatar, Saudi Arabia, Oman, Kuwait, Bahrain, India, Sri Lanka, and Singapore (*About Us - Company Profile - Solas Marine Services*, 2020).

2.1.2 Mission and vision statements

Vision statement: Solas Marine Services seeks to be the leading service provider in the oil & gas, and marine sector in the field of safety in the region. Their vision is to

provide their clients with expert, quality, and reliable services in the field of safety in the Middle East.

Mission statement: The organization's mission is to provide complete solutions to the client in the field of safety by providing quality and reliable services and products that meet international regulatory standards.

Generally, when safety is of concern, they know that no compromise is acceptable. Therefore, Solas Marine Services uses products and physical resources that comply with international regulatory standards. The facilities of Solas Marine Services are certified by classification societies, i.e., ABS, BV, Class NK, DNV-GL, IRS, KRS, Lloyd's and USCG. These classification societies' approvals attest to the organization's compliance to its procedures, and regulatory standards to ensure the provision of the best services. Project team members are trained in the areas of design, fabrication, installation, testing and commissioning. Project team members are regularly trained by the Original Equipment Manufacturer (OEM) to keep them updated on the equipment and motivated. We see above that Solas Marine Services has taken the right steps to fulfill their mission and vision.

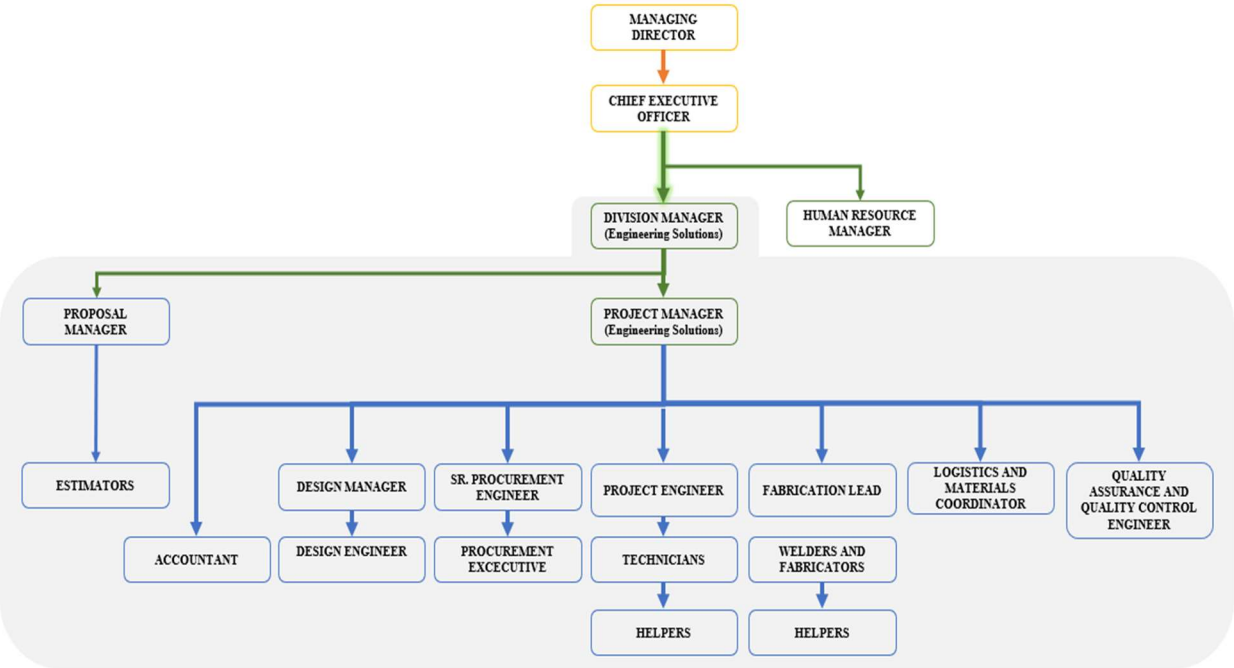
2.1.3 Organizational structure

Solas Marine Services has a Managing Director and CEO who represent the senior management of the organization. The Division manager acts as the project sponsor for all projects and reports to the senior manager and helps address issues beyond the responsibility of the project manager. The project manager leads the project team comprising of dedicated team members from different departments as shown in the

organizational structure below. The team remains assigned to the project for the majority of the project duration and is released from the project towards its completion.

Figure 1

Solas Marine Services Organizational structure (Source: By author)



Note: Own work

2.1.4 Products offered.

Solas Marine Services provides professional services to clients to install a variety of systems to meet the Saudi Aramco regulatory requirements. Below are some of the systems installations that the company undertakes:

- Deck Integrated Fire Fighting system
- Carbon Dioxide Fire extinguishing system
- Clean Agent Fire Extinguishing system

- Fire, Gas & Flame detection system
- Rig Talkback system
- Early Warning system
- Helicopter Deck Lighting System
- CCTV systems
- Breathing Air systems

For breathing air systems for offshore drilling rigs, the services that are offered prior to commencement of the project include:

- Inspection report of the work site/rig (If required):

  The offshore rig will be inspected to gather details on the scope of work to be completed to submit an effective proposal.
- Submission of Technical and commercial proposal in response to the enquiry:

  The technical and commercial proposals will be submitted to the client for review and approval.

Upon the receipt of the purchase order and the approval of the project charter by the project sponsor, the below products are generally delivered to the client:

- System drawings
- Installed system equipment
- Inspection, quality control and validation of the installed system
- Submission of project updates and progress reports

2.2 Project Management concepts

2.2.1 Project management principles

Project Management principles are not methodologies, but guidelines that aid the behavior of the people involved in the projects in areas of strategy decision making, and problem solving. These twelve principles are applicable to all industries, cultures, and organizations for effective project management. The implementation of these principles will be used in the preparation of the project management plan in the FGP to maximize the efficiency of the project management plan. The 12 principles as per the PMI are (PMI, 2021):

- Be a diligent, respectful, and caring steward
- Create a collaborative project team environment
- Effectively engage with stakeholders
- Focus on value
- Recognize, evaluate, and respond to system interactions
- Demonstrate leadership behaviors
- Tailor based on context
- Build quality into processes and deliverables
- Navigate complexity
- Optimize risk responses
- Embrace adaptability and resiliency
- Enable change to achieve the envisioned future state

2.2.2 Project management domains

The project management performance domain represents a collection of related activities that help in effectively achieving the project objectives. These seven project performance domains operate as an integrated system simultaneously for effective project delivery. The following project management domains will guide the creation of the project management plan in the FGP:

- Stakeholder performance domain
- Team performance domain
- Development Approach and life cycle performance domain
- Planning performance domain
- Project work performance domain
- Delivery performance domain
- Measurement performance domain
- Uncertainty performance domain

2.2.2.1 Stakeholders Performance Domain:

This performance domain directs the activities and functions associated with the stakeholders. Stakeholders can be any person, group, or organization that can be affected by, can affect, or perceive to be affected by the project decision, activities, or outcome (PMI, 2021). Stakeholder engagement refers to the effective involvement of stakeholders by implementing actions and strategies. For the FGP, we will use the steps below to ensure that the stakeholders are engaged productively from the start till the end of the project:

- Identify stakeholders: All the project stakeholders are identified. This list may be progressively elaborated as new stakeholders who are not directly connected to the project are later identified.
- Understand and analyze: The project team will analyze the listed stakeholders against several stakeholder aspects such as power impact, attitude, beliefs, expectations, degree of influence, proximity to the project, interest in the project, and other aspects surrounding stakeholder interaction with the project. The project team will also seek to understand the stakeholder's feelings, emotions, beliefs, feelings, and values to help engage them better.
- Prioritize: The stakeholders are prioritized based on their power and interest. This helps to ensure that the engaged are based on their priority, and this list is revisited and re-prioritized as the project progresses through its lifecycle.
- Engage: This involves interacting with the stakeholders to introduce the project, collect requirements, resolve issues, negotiate, solve problems, and to make decisions.
- Monitor: This includes identifying new stakeholders and cancelling stakeholders whose involvement in the project has been completed. It also includes interacting with the stakeholders to gauge their satisfaction with the project deliverables and overall project management and also involves identifying the change in power or attitude of stakeholders and to adjust the stakeholder engagement strategy to improve their engagement.

2.2.2.2 Team Performance Domain:

This performance domain addresses the functions and activities of all the project team members to create a high performing team, a sense of shared ownership, and an environment where leadership and interpersonal skills are demonstrated by all team members to effectively realize the business outcomes (PMI, 2021). For the FGP project of the "Project Management Plan for Installing Breathing Air system for an Offshore Drilling Rig – ADMARINE 690":

- A centralized management style will be followed where the project manager will be at the center and will be accountable for project management activities. Leadership should be followed by all the project team members. The team will be developed by communicating vision and objectives, understanding their roles and responsibilities, facilitating project team operations, guidance, and individual and team growth.
- It will be the responsibility of the project manager to develop its own team culture that will be guided by the organization's policies and procedures. It must also reflect behaviors such as transparency, integrity, respect, positive discourse, support, courage, celebrating success, open communication, shared understanding, shared ownership, trust, collaboration, adaptability, resilience, empowerment, and recognition.
- Leadership skills also play an important role in centralized management. This firstly will involve committing and motivating the project team in fulfilling the project's vision. Secondly, leaders will have to apply critical thinking that involves thinking in a disciplined, rational, logical, evidence-based way to recognize bias, identify the

root cause of problems while considering ambiguity, and complexity. Next, leadership will involve motivating the team members by finding the individual's dominating motivator (intrinsic or extrinsic) and rewarding the team in such a way that they will remain committed to the project and its outcomes. Lastly, effective leadership will be achieved by using interpersonal skills such as emotional intelligence, decision making, and conflict management.

2.2.2.3 Development Approach and Life Cycle Performance domain:

This domain addresses activities associated with the development approach, cadence, and life cycle phases of the project (PMI, 2021).

- Delivery cadence is used to understand the timing and frequency of the project deliverables - they can be single delivery, multiple deliveries, or periodic deliveries. For the FGP project we will have a single delivery cadence.
- A development approach refers to the means used to create the product service or result. Project life cycle development approach can be predictive, hybrid, or adaptive. For this FGP project a predictive development approach is used.

2.2.2.4 Planning Performance domain:

This performance domain addresses functions and activities involved in the organization, and the coordination necessary for delivering the project deliverables and outcomes (PMI, 2021). The desired outcomes mentioned in the initial project documents such as the project charteror business case are used to plan a path to realizing the benefits through progressive elaboration. For this FGP project the predictive development cycle is used, where the project deliverables are decomposed into lower levels.

- The project estimates will be reached through absolute and relative estimating where specific information and actual numbers from the WBS decomposition to work packages will be used. Additionally, there will be adjusting of estimates for uncertainty by applying a contingency reserve to the estimates.
- A schedule is a model that shows the project activities with their durations, dependencies, and other information. The schedule planning will use a predictive approach where the WBS work packages will be decomposed into activities that will be sequenced; effort, people, physical resources, and duration will be estimated; estimated resources will be allocated to the activities; the sequence, estimates, or resources will be adjusted to achieve the required schedule.

  The schedule compression technique of crashing aims to shorten the duration by least cost increment, by adding people to activities, working overtime, or expediting. Another schedule compression technique of fast tracking performs activities parallelly that are normally done in sequence. This creates leads and lags in the schedule.
- The work packages will be estimated for the cost. These cost estimates are aggregated to calculate the project budget. The project budget includes the cost estimates plus the contingency reserve for the identified project risks. The management reserves for unexpected risks which is determined by the organization's policy is added to the project budget.

- Project teams can be collocated or physically dispersed. For this FGP, the project team will be collocated that will allow for seamless communication and problem-solving.
- The scope management plan, communication management plan, resource management plan, and procurement management plan will guide the changes to scope, transmission of communications, management of physical resources, and procurement activities respectively.

2.2.2.5 Project Work Performance domain:

This performance domain addresses functions associated with establishing project processes, managing physical resources, and fostering a learning environment (PMI, 2021). For the FGP, the project team will be kept focused and project activities smoothly running by:

- Managing the flow of existing work, new work, and changes to work by following the project management plan's sub-plans.
- Keeping the project team focused, managing material, equipment, supplies, and logistics by following the resource management plan.
- Communicating with stakeholders and engaging them by following the communications management plan.
- Working with contracting professionals and vendors to plan and manage procurements and contracts by following the procurement management plan.

2.2.2.6 Delivery Performance domain:

This performance domain addresses functions and activities associated with delivering the scope and quality promised (PMI, 2021). This is focused on fulfilling the outcomes, by producing the deliverables that meet the requirements, scope, and quality expectations. For the FGP project:

- The delivery of value will be realized at the end of the project's predictive life cycle.
- The requirements of the projects are elicited and are to meet the regulatory requirements of the Saudi Aramco requirements for the breathing air system.
- The scope is defined by decomposing the major deliverables into work packages in the WBS. This summarizes the total scope of work to be done for the project.
- Any additional requirements will follow the formal change control system.
- All the project work will follow the organization's policies, procedures, and work processes to meet the quality standards.

2.2.2.7 Measurement Performance domain:

PMI (2021) states that the measurement performance domain addresses activities and functions that are related to checking the project performance and applying measures to maintain the acceptable performance. The attributes are measured against the metrics and the performance is measured against the approved baselines. This performance domain establishes effective measures to track, evaluate, and report the information. In the FGP, we will establish effective measures for the deliverable metrics, the delivery measurements, resource measurements, and business value measurements in the project management plan

generated. Having this information will help the project team to formulate the appropriate action to address the current variance. Additionally, these measures can be used for (PMI, 2021):

- Evaluating performance compared to the plan
- Tracking the utilization of resources, work completed, and budget expended
- Demonstrating accountability
- Providing information to stakeholders
- Assessing whether project deliverables are on track to deliver the planned benefits
- Focusing conversations about trade-offs, threats, opportunities, and options
- Ensuring the project deliverables will meet the customer acceptance criteria

2.2.2.8 Uncertainty Performance domain:

This performance domain addresses functions and activities linked with uncertainty and risk (PMI, 2021). Uncertainty is the state of not knowing or unpredictability and can be divided into:

- General uncertainty: Risk associated with not knowing future events
- Ambiguity: Risk associated with not being aware of current or future conditions
- Complexity: Risk associated with dynamic systems having unpredictable outcomes
- Volatility: Risks associated with rapid and unpredictable change due to a volatile environment

Risks are an aspect of uncertainty. There can be negative risks (threats) or positive risks (opportunities) and their occurrence can have an effect on one or more of the project objectives. For the FGP project, all the project's risks will be identified, carefully analyzed

using qualitative analysis, and if required quantitative analysis will be conducted. The risk responses will then be applied to them in the form of strategies for threats and opportunities.

- Strategies for threats: Avoid, Escalate, Transfer, Mitigate, Accept
- Strategies for opportunities: Exploit, Escalate, Share, Enhance, Accept

The implemented risk responses will be checked for any secondary risks and residual risks. A Contingency reserve will be added in the event the identified risks occur and a Management reserve is also considered additionally for any unplanned risk not foreseen for the approved scope of work. The uncertainty performance domain knowledge will be used to formulate the risk management plan for the FGP.

2.2.3 Predictive, adaptative and hybrid projects

A project development life cycle represents the series of project phases throughout its life and provides the basic framework for effectively managing the project. Depending on the project sector and deliverable deliveries, the project development lifecycle can be either predictive, iterative, adaptive or hybrid.

- Predictive Life cycles: This approach is also known as plan driven, cascade, or waterfall and is used when the project scope, time, and cost are clear early in the project. In this lifecycle the requirements are fixed once agreed upon and the final deliverable is available at the end of the project.
- Adaptive Life cycles: This approach is used in industries where the project scope and requirements are likely to change throughout the project. In this approach the project team and stakeholders determine which requirements will be worked on in

each iteration that lasts between 2 to 4 weeks to complete frequent small deliveries. Agile, Iterative and Incremental are examples of different adaptive approaches.

- Iterative Life cycles: In this approach the project scope is defined at a high level at the initial stages, but the project cost and schedule are developed as the project moves through iterations during the project execution. The final deliverable is completed at the end of the project.
- Incremental Life cycles: In this life cycle frequent small deliveries are made to the customer at the end of every predetermined increment duration. Each iteration will add functionality to the product and the final deliverable will be created through a series of increments.
- Hybrid Life cycles: This approach uses a combination of predictive and adaptive life cycles.

2.2.4 Project management

Project Management is the application of knowledge, skills, techniques, etc. to get work done and meet the project objectives. The project vision is achieved effectively through supervision and control of required work by using project management processes (Phillips, 2018). Successfully implementing project management will help the organizations to (Project Management Institute, 2017):

- Meet business objectives
- Satisfy stakeholder expectations
- Be more predictable
- Increase chances of success

- Deliver the right products at the right time
- Resolve problems and issues
- Respond to risks in a timely manner
- Optimize the use of organizational resources
- Identify, recover, or terminate failing projects
- Manage constraints (e.g., scope, quality, schedule, costs, resources)
- Balance the influence of constraints on the project (e.g., increased scope may increase cost or schedule)
- Manage change in a better manner

A project comprises of activities that have relationships with each other. As all the activities are related to each other, projects need to be managed from start to finish. This activity is known as the management of the project. The author explains that the projects need a lot of planning to be managed and that it is easy to miss the minutest detail that interrelates activities to one another. The project therefore needs a step-by-step process to manage a project which follows the following steps to create a project management plan (Davis, 2023).

Step 1: Identifying and Determining the Project's Goal

Step 2: Outlining and Mapping the Scope

Step 3: Developing a Detailed Plan

Step 4: Sharing and Discussing the Plan's First Draft with the rest of the team

Step 5: Finalizing the Plan to start working on it with Immediate Effect

Team (2023) explains that project management is the usage of the company's resources to complete tasks in an orderly and planned manner. Project management can be implemented to all industries and sectors to complete a series of complex tasks to create a functioning product. Project management uses the processes of planning, initiation, execution, monitoring and controlling, and closing to prepare a plan that outlines how all activities will be initiated and concluded.

Project management can be seen as the action of planning, organizing and managing a project to meet the set goals or requirements. It is an important business tool that can be used by organizations to manage the creation of deliverables that add business value to the organization by strategically planning different areas of management such as scope, schedule, cost, quality, resource, communications, risk, procurement, and stakeholders. Project management adds value to the process of planning and creates a culture that values deadlines and budget constraints. It greatly increases the chance of project success and attaining the organization's strategic objectives (McDowell, 2021).

2.2.5 Project management knowledge areas and processes

Project management knowledge areas are areas of project management grouped together based on knowledge requirement similarities. Every knowledge area has project management processes, inputs, tools and techniques, and outputs that are categorized together. The ten knowledge areas described in PMI are explained below (PMI, 2021):

1) Project Integration management: This knowledge area includes processes and activities to identify, define, combine, unify, and coordinate several project

management activities and processes. Once the project is approved, this knowledge area carries out project monitoring and controlling. The processes include develop Project Charter, develop Project Management Plan, direct and manage Project Work, manage Project Knowledge, monitor and control Project Work, perform Integrated Change Control, and close Project or Phase.

2) Project Scope Management: This knowledge area includes processes to ensure that the project includes all the work required, and only the required work. The processes include Plan Scope Management, Collect Requirements, Define Scope, Create WBS, Validate Scope, and Control Scope
3) Project Schedule Management: This knowledge area includes processes that allow us to manage the timely completion of the project. The processes include Plan Schedule Management, Define Activities, Sequence Activities, Estimate Activity Durations, Develop Schedule, and Control Schedule.
4) Project Cost Management: This knowledge area has processes that are concerned with planning, estimating, budgeting, and controlling project costs. The processes include Plan Cost Management, Estimate Costs, Determine Budget, and Control Costs.
5) Project Quality Management: This knowledge area has the processes that deal with quality planning, assurance and control. The processes include Plan Quality Management, Manage Quality, and Control Quality.
6) Project Resource Management: This knowledge area includes processes that identify, acquire, develop, lead, and manage project resources. The processes include Plan

Resource Management, Estimate Activity Resources, Acquire Resources, Develop Team, Manage Team, and Control Resources.

7) Project Communications Management: This knowledge area has the processes that ensure timely project information planning, collection, creation, distribution, storage, retrieval, control, monitoring and disposal. The processes include Plan Communications Management, Manage Communications, and Monitor Communications.
8) Project Risk Management: This knowledge area has processes that focus on risk planning, analysis, monitoring and control. The processes include Plan Risk Management, Identify Risks, Perform Qualitative Risk Analysis, Implement Risk Responses, Monitor Risks, Perform Quantitative Risk Analysis, Plan Risk Responses, Implement Risk Responses, and Monitor Risks.
9) Project Procurement Management: This knowledge area has processes that allow us to acquire products, services, or results from outside the project team. The processes include Plan Procurement Management, Conduct Procurements, and Control Procurements.
10) Project Stakeholder Management: This knowledge area has the processes to identify all stakeholders, analyze their impact and expectations, and develop stakeholder engagement strategies. The processes include Identify Stakeholders, Plan Stakeholder Engagement, Manage Stakeholder Engagement, and Monitor Stakeholder Engagement.

Figure 2

Project Management Knowledge Areas And Processes. (Source: PMI, 2017, p.25)

Knowledge Areas	Project Management Process Groups				
	Initiating Process Group	Planning Process Group	Executing Process Group	Monitoring and Controlling Process Group	Closing Process Group
4. Project Integration Management	4.1 Develop Project Charter	4.2 Develop Project Management Plan	4.3 Direct and Manage Project Work 4.4 Manage Project Knowledge	4.5 Monitor and Control Project Work 4.6 Perform Integrated Change Control	4.7 Close Project or Phase
5. Project Scope Management		5.1 Plan Scope Management 5.2 Collect Requirements 5.3 Define Scope 5.4 Create WBS		5.5 Validate Scope 5.6 Control Scope	
6. Project Schedule Management		6.1 Plan Schedule Management 6.2 Define Activities 6.3 Sequence Activities 6.4 Estimate Activity Durations 6.5 Develop Schedule		6.6 Control Schedule	
7. Project Cost Management		7.1 Plan Cost Management 7.2 Estimate Costs 7.3 Determine Budget		7.4 Control Costs	
8. Project Quality Management		8.1 Plan Quality Management	8.2 Manage Quality	8.3 Control Quality	
9. Project Resource Management		9.1 Plan Resource Management 9.2 Estimate Activity Resources	9.3 Acquire Resources 9.4 Develop Team 9.5 Manage Team	9.6 Control Resources	
10. Project Communications Management		10.1 Plan Communications Management	10.2 Manage Communications	10.3 Monitor Communications	
11. Project Risk Management		11.1 Plan Risk Management 11.2 Identify Risks 11.3 Perform Qualitative Risk Analysis 11.4 Perform Quantitative Risk Analysis 11.5 Plan Risk Responses	11.6 Implement Risk Responses	11.7 Monitor Risks	
12. Project Procurement Management		12.1 Plan Procurement Management	12.2 Conduct Procurements	12.3 Control Procurements	
13. Project Stakeholder Management	13.1 Identify Stakeholders	13.2 Plan Stakeholder Engagement	13.3 Manage Stakeholder Engagement	13.4 Monitor Stakeholder Engagement	

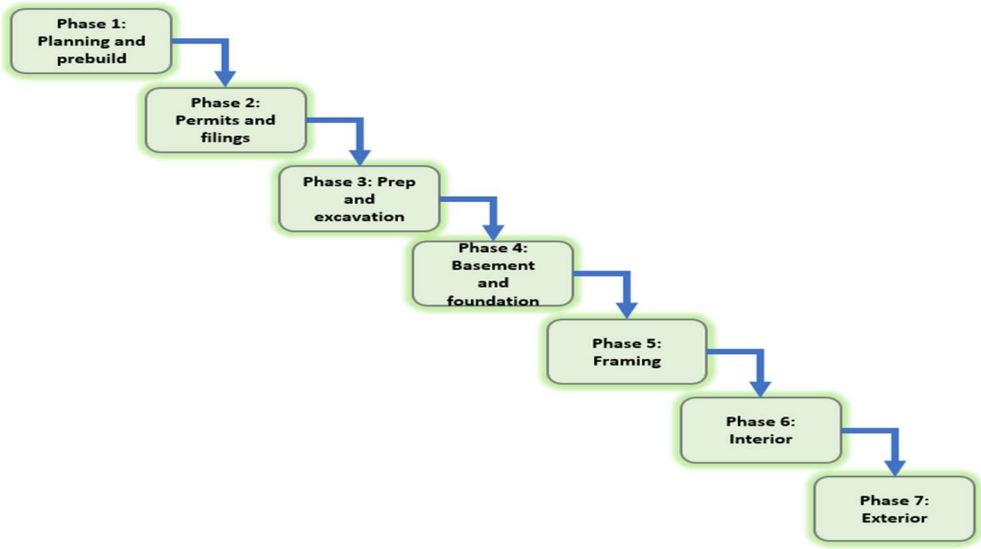
Note: Reprinted from the book, *A Guide to the Project Management Body of Knowledge (PMBOK® Guide)–Sixth Edition* (Sixth Edition, PMI, 2017, p.25) by PMI, 2017. Copyright (2017) Project Management Institute, Inc. All rights reserved.

2.2.6 Project life cycle

The Project lifecycle is the sequential series of phases that the project undergoes in a project. Each project phase has specific work that will be completed and accepted and enable us to move to the next phase in the project. These are different from the project management processes and usually include the type of work and activities that the project team will be completing (Phillips, 2018). The project lifecycle of a typical construction project is shown below.

Figure 3

Predictive life cycle (Source: By author)



Note: Own work

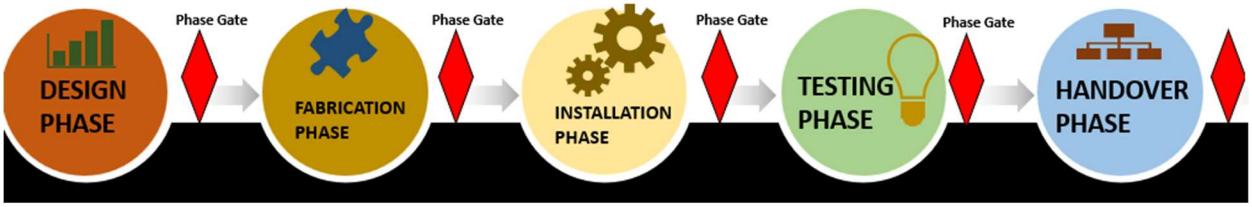
The project lifecycle is the project phases in series that the project passes through from its start to completion (Project Management Institute, 2017). The end of the phase provides the project team and stakeholders to review the project's performance, and if the project is not performing as expected, there is a possibility that the project might be cancelled. This end of phase review is referred to as different terms such as end-of-phase review, phase review, phase gate, kill point, or milestone.

The project lifecycle explains the high-level workflow or steps taken for the project delivery. It is the order of processes and phases used for the project delivery (Aston, 2023). Though there are several phases in the project lifecycle, these phases have different relationships with one another. The project phases can be sequential, overlapping, or iterative.

The project lifecycle for a project can be understood as the series of project phases that constitute the project from start to finish. Below is the project lifecycle for the project of the installation of the breathing air system for rig ADMARINE 690. The project will follow a sequential project lifecycle or a predictive lifecycle where completion of one project phase will result in the start of the subsequent project phase provided that the phase review performance is acceptable.

Figure 4

Breathing Air System Installation Project life cycle (Source: By author)



Note: Own work

2.2.7 Company strategy, portfolios, programs and projects

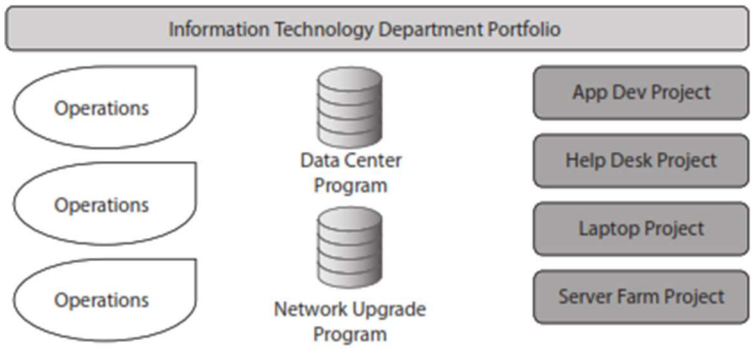
Business strategy is a business document that defines the process that will help the organization reach its objectives. The strategy clearly defines the business needs and provides information on the resource requirements to support these goals. It is the structure for the company to carry out its organizational goals. It helps the organization to identify and get rid of weaknesses while focusing on their strengths to improve their business operations (Indeed Editorial Team, 2023). A business strategy is all the performed decisions and actions that focus on achieving its goals, objectives and vision. An effective business strategy, if executed properly, can help the organization lead the market. On the contrary, any shortcomings in executing the business strategy will greatly hamper the organization's goals and objectives (Emeritus, 2023).

PMI defines portfolios as a group comprising of projects, programs, subsidiary portfolios, and operations which are managed as a group to achieve the organization's strategic objectives (Project Management Institute, 2017). Another author also suggests that portfolios are made up of projects, programs, and even operations which are linked to the organization's strategic objectives and therefore need to be carefully managed and coordinated. Portfolio managers oversee the portfolio and monitor the marketplace to

confirm that the endeavors selected to meet the strategic objectives of the organization are still viable to continue (Phillips, 2018).

Figure 5

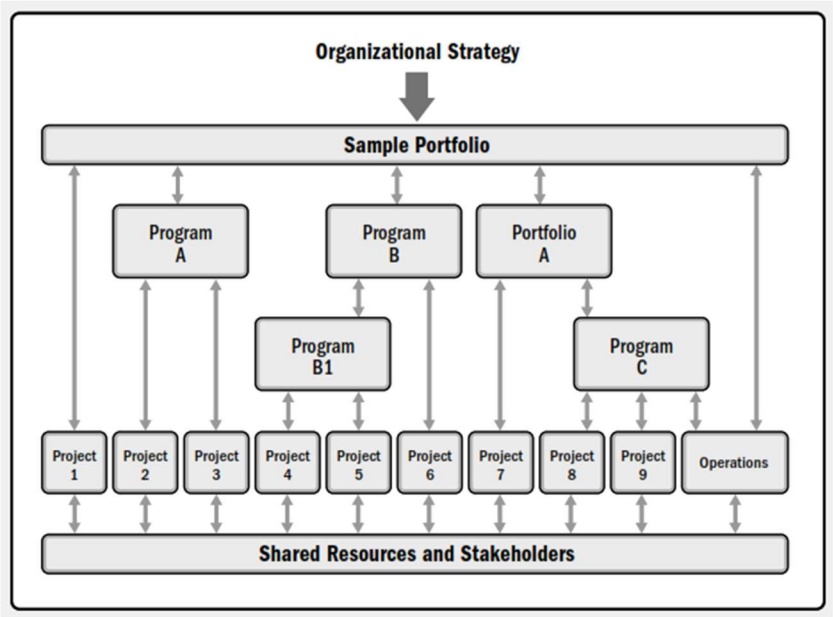
Project, Program, and Portfolio (Source: PMP Project Management Professional Study Guide, Fifth Edition, p.30)



Note: Reprinted from the book, *PMP Project Management Professional Study Guide, Fifth Edition* (Fifth Edition, 2018, p.30) by Phillips. J, 2018. Copyright 2018 McGraw-Hill Education. All rights reserved.

Figure 6

Project, Program, and Portfolio. (Source: PMI, 2017, p.12)



Note: Reprinted from the book, *A Guide to the Project Management Body of Knowledge (PMBOK® Guide)–Sixth Edition* (Sixth Edition, PMI, 2017, p-12) by PMI, 2017.

A program consists of a group of related projects, subsidiary programs and program activities that are managed together to receive benefits that are created by the coordinated effort that would not be achieved if managed individually (Project Management Institute, 2017). Phillips (2018) explains that a program is made up of multiple projects that are managed collectively rather than individually to achieve benefits. These benefits are owed to the fact that the integrated management allows the projects within a program to better share resources, manage interdependencies, resolve issues quickly, and leverage resources (Phillips, 2018).

A project is a temporary endeavor, it has a start and an end. However, the project deliverable may or may not be temporary. If the work is not temporary, it will be

considered as an operation (Phillips, 2018). Projects comprise of work that has not been done before and create a unique product, service, result, or a combination of the three. Projects may seem similar as they have the basic approach and similar results, but several aspects such as the environment, schedule, procurement, and stakeholders involved are always unique (Phillips, 2018). Projects are used to move the organization from its current state to its desired future state. This change can be in the form of something being moved, added, changed, or deleted. A project adds business value, which is the sum of the benefits to the organization. These benefits can be defined in financial terms or may be intangible benefits such as goodwill, recognition, reputation, and strategic alignment (Phillips, 2018). PMI defines a project as a temporary endeavor which is undertaken to create a unique product, service, or result, to drive change, and to create business value (Project Management Institute, 2017).

The objectives of the FGP are fulfilled considering that the project of installing a Breathing Air system for an Offshore Drilling Rig – ADMARINE 690 is a project.

2.3 Other applicable theories/concepts related to the project topic and context

2.3.1 Current situation of the problem or opportunity in study

Currently for these breathing air system installation projects being executed at Solas Marine Services, once a project is approved by the project sponsor then only a project charter which has high-level information is prepared and the project is handed over to the project manager in a meeting. The project charter, the techno-commercial proposal and the Client issued purchase order forms the basis for references for the project manager and the team for

any project related information in the future. A design document is also prepared referring to these documents and is used as reference by the project team. There are some plans, reports and documents prepared, but these are not in line with the project management techniques stated by the PMI.

Though there are procedures governing the execution of projects in the company, there is no formal project management plan prepared for the projects. This would therefore provide us an opportunity to prepare a Project Management Plan for Installing the Breathing Air system for an Offshore Drilling Rig – ADMARINE 690. The creation of the project management plan will provide the project team with easy reference for all aspects of the project by integrating all the subsidiary plans and baselines, and describing how the project will be executed, monitored, controlled, and closed. The creation of the project management plan will ensure a smooth project execution which will not only improve the realized project business value for this and future projects but will also improve the organization's reputation and recognition with the client and improve business opportunities. This plan will also be stored in the organization's knowledge repositories and can be used as a template reference for future similar projects as well.

2.3.2 Previous research done for the topic in study.

The creation of a Project Management Plan for Installing a Breathing Air system for an Offshore Drilling Rig – ADMARINE 690 will help the drilling rig meet the regulatory requirement of Saudi Aramco's Drilling and Workover Health Safety and Environmental Requirements Manual (HSERM). This manual is created by Saudi Aramco and is reviewed every 48 months to incorporate any new technology or to overcome any shortcomings that

have been noticed. The scope of the project will therefore be created to fulfill the requirements specified in the HSERM for the breathing air system.

The processes, policies, and procedures from Solas Marine Services and the documents available such as the technical and commercial proposal, sponsor handover report and design document will be used as a reference for creating the project management plan for Installing the Breathing Air system for an Offshore Drilling Rig – ADMARINE 690.

The project management plan will be created using the sixth and seventh edition of the PMBOK guide as another major reference. The plan will also include templates available on the Project Management Institute website and the Project Management Professional study guides will also be referred to for completing this plan. Information will vary from definitions, explanations, understanding processes, roles, systems, knowledge areas, inputs, tools and techniques, outputs, etc.

All the above researched information, knowledge and references will equip the author with all the necessary tools required to create all the subsidiary plans that form the project management plan.

2.3.3 Other theories related to the topic in study

Project documents in general are documents that ensure that all the project requirements are fulfilled and provide traceability with regards to which requirements or activities have been done, who has done it, and when it was performed (Verma, 2023). Project documents are an essential part of project management and refer to a range of documents that provide an overview of the project, its goals, and steps taken to achieve them (Sharma, 2023). Project documents are not a part of the Project management plan, but these documents in

conjunction with the project management plan provide us with all the necessary information to help plan and execute the project. The project documents used in projects are discussed below:

1. Activity list: The project activities that need to be performed to complete to project.
2. Activity attributes: Activity details such as coding structure, successor and predecessor activity identification, resource requirements, imposed dates, constraints, assumptions, and other pertinent information.
3. Assumption log: This document identifies and tracks all project assumptions and constraints.
4. Basis of estimates: This document clearly shows how you and the project team arrived at the project estimated cost and duration.
5. Change log: This document records changes to the project in terms of scope, time, or cost with their statuses for future references.
6. Cost estimates: This document explains the cost of resources, including materials, services, and required labor.
7. Cost forecasts: This document predicts what the project and its activities will cost and when these costs will occur based on current project performance.
8. Duration estimates: This document includes a prediction of project activities durations to complete.
9. Issue log: A condition or situation that needs a decision is referred to as an issue. This document records issues along with an issue owner, a date for resolution of issue, and the eventual outcome of the issue.

10. Lessons learned register: This document records all the project's lessons learned.
11. Milestone list: This document lists out all the project milestones and the anticipated milestone completion dates.
12. Physical resource assignments: This document indicates when physical and people resources are available or scheduled to work on the project.
13. Project calendar: This document explains when the project work will take place. It provides information on any special accommodations, such as working weekends or after hours, holidays, or pauses in the project so as not to interfere with operations.
14. Project communications: This is the organized collection of all the information and communication throughout the project.
15. Project schedule: This document predicts the occurrence of project events such as milestones accomplished, phases completed, and project closed.
16. Project schedule network diagram: This document is a diagram that reveals the project's critical path and float opportunity through the diagram of flow of the project activities.
17. Project scope statement: This document defines the major project deliverables required to fulfill the project scope and complete the project objectives, along with the assumptions and constraints.
18. Quality control measurements: This document has the predefined values that signal problems with quality within the project deliverables.
19. Quality metrics: This document has the acceptable values that the project deliverables should fulfill.

20. Quality report: This report or document highlights the adherence of the projects to their quality requirements. These are helpful in projects where activities are repetitive in nature.
21. Requirements documentation: These documents include everything the project is expected to create. It is a refined list of requirements of the product scope.
22. Requirements traceability matrix: This table or matrix has all the information about the project requirements, when the requirements are due, when the requirements are created, and any other pertinent information.
23. Resource assignments: This document includes details on who will do what in the project activities and usually includes a roles and responsibility matrix chart.
24. Resource breakdown structure: This chart shows the resources utilized in each section of the project's WBS.
25. Resource calendars: This document identifies when the resources such as people and facilities are available or scheduled to work on the project.
26. Resource requirements: This document is used as a supporting document for planning and for identifying all the required resources to complete the project work.
27. Risk register: This document is used to record all the project risks in their active status, irrespective of their probability or impact.
28. Risk report: This document records the status of risk events that are pending, passed, or are in motion within the project.
29. Schedule data: This document has raw data about the activities, project progress, and schedule information.

30. Schedule forecast: This is a predicted forecast for the project events like milestones, phase completion, and project closure.
31. Stakeholder register: This document records information on all stakeholders, such as their positions, contact information, and any other characteristics.
32. Team charter: This document explains the agreed upon project team values, meeting guidelines, and communication rules.
33. Team resource assignments: This document lists out who will do what activities during the project execution.
34. Test and evaluation documents: These documents explain the test and evaluations required in the projects and their respective results.

3 METHODOLOGICAL FRAMEWORK

A methodological framework is used to guide the research process in a systematic and structured manner by following a set of procedures, methods, and tools (Hassan, 2023). The methodological framework for the FGP will guide the structure by providing information on the data collection sources, research conducting methods, analyzing the data using tools, identify the assumptions and constraints, and detailing the deliverables being produced.

3.1 Information sources

Information sources are any media that provide data, insights, or knowledge about a specific topic. The information source can therefore be a person, organization, website, database, or any other platform that allows access to information sources about specific

topics to understand the subject and support its understanding and decision making (*What Does Information Source Mean*, n.d.). Resource sources or materials can be categorized into primary sources and secondary sources. Primary sources provide direct access or raw information compiled by the research whereas secondary sources provide secondhand information in the form of interpretations or analysis of primary sources (Western Governors University, 2023).

3.1.1 Primary sources

A primary source is an original material created at the time of a historical event or soon thereafter. These sources refer to records of events or evidence as they happened, or events or evidence as they are first described. Primary sources are the information that is recorded or shown for the first time without any interpretation or commentary. These are the sources used as original materials on which other research is based on (*Primary, Secondary, and Tertiary Sources*, n.d.). Primary sources can be original documents, creative works, material published in modern times, institutional and government documents, or relics and artifacts which can be used by authors to interpret these primary sources to create secondary sources (Western Governors University, 2023). The primary sources used in the Final Graduation project include interviews and meetings with the stakeholders, project reports and historical information from the organizational process assets to check recorded information, and the organization's procedures and policies,

3.1.2 Secondary sources

Secondary sources are sources that analyze the primary sources and are works that interpret, reorganize, or provide an added value to the primary source (*Primary, Secondary, and Tertiary Sources*, n.d.). Secondary sources are created by someone who did not experience or participate in the event or evidence being researched to interpret, assign value to, give opinion on, and draw conclusion on the information recorded in the primary source. Secondary sources include textbooks, edited works, books, and articles that interpret or review research works, histories, biographies, literary criticism and interpretation, reviews of law and legislation, political analyses, and commentaries which can be used by authors of research studies to support their arguments, argue against existing theories, or formulate new theories (Western Governors University, 2023). The secondary sources referred to, in the final graduation project include the PMBOK Guides sixth and seventh edition, project management professional study guides, University lectures, notes, and templates, organization's documents, websites, articles, and templates.

Chart 1

Information sources (Source: Western Governors University, 2023)

Objectives	**Information sources**	
	Primary	**Secondary**
1. To create a Project Charter that provides high level information about the project and formally authorizes the project.	Interviews with the project sponsor and project manager. Reference to the OPA's, other older project reports and documents. Saudi Aramco HESRM regulations.	PMBOK Guide Sixth Edition Books: PMP study guides UCI lecture notes and templates. Websites, conference papers, journal articles from PMI.
2. To develop the Scope management plan that will tell us how the scope will be defined, monitored, controlled, and validated.	Interviews with the project sponsor, project manager, and project team. Reference to the OPA's, other older project reports and documents.	PMBOK Guide Sixth Edition Books: PMP study guides UCI lecture notes and templates. Websites, conference papers, journal articles from PMI. Received Purchase order from the client.
3. To produce the Requirements Management plan that	Interviews with the project sponsor,	PMBOK Guide Sixth Edition Books: PMP study guides UCI lecture notes and templates.

Objectives	Information sources	
	Primary	**Secondary**
will explain how the product requirements will be identified, prioritized, analyzed, documented, and managed.	project manager, and project team. Reference to the OPA's, other older project reports and documents. Saudi Aramco HESRM regulations.	Websites, conference papers, journal articles from PMI. Received Purchase order from client.
4. To prepare a Schedule management plan to effectively define, sequence, and estimate the project activities. To use this information to develop the project schedule and to effectively control it.	Interviews with the project manager, and project team. Reference to the OPA's, other older project reports and documents.	PMBOK Guide Sixth Edition Books: PMP study guides UCI lecture notes and templates. Websites, conference papers, journal articles from PMI. Received Purchase order from the client.
5. To create the Cost management plan that will tell us how the project's cost will be planned, controlled, and structured.	Interviews with the project sponsor and project manager. Referring to the OPA's, other older	PMBOK Guide Sixth Edition Books: PMP study guides UCI lecture notes and templates. Websites, conference papers, journal articles from PMI. Received Purchase order from client.

Objectives	Information sources	
	Primary	**Secondary**
	project reports and documents.	
6. To define a Quality management plan that describes how the applicable policies, procedures and guidelines will be implemented to achieve quality objectives.	Interviews with the project manager, Quality Assurance, & Quality Control team, and project team. Reference to the OPA's.	PMBOK Guide Sixth Edition Books: PMP study guides UCI lecture notes and templates. Websites, conference papers, journal articles from PMI. Organization's Quality Assurance, and Quality Control procedures.
7. To put together the Resource management plan that describes how the resources will be acquired, allocated, monitored, and controlled for the project.	Interviews with the project manager, human resource team, and project team. Referring to the OPA's.	PMBOK Guide Sixth Edition Books: PMP study guides UCI lecture notes and templates. Websites, conference papers, journal articles from PMI.
8. To create a Communications management plan that explains how, when, and by whom the information on the project will be	Interviews with the project manager, and project team. Reference to the OPA's.	PMBOK Guide Sixth Edition Books: PMP study guides UCI lecture notes and templates. Websites, conference papers, journal articles from PMI.

Objectives	Information sources	
	Primary	**Secondary**
administered and distributed.		
9. To produce the Risk management plan that will describe how the project's risk management activities will be structured and performed.	Interviews with the project sponsor and project manager. Reference to the OPA's.	PMBOK Guide Sixth Edition Books: PMP study guides UCI lecture notes and templates. Websites, conference papers, journal articles from PMI.
10. To define the Procurement management plan that details the acquisition process for goods and services from outside the organization.	Interviews with the project sponsor, project manager, and procurement team. Reference to the OPA's.	PMBOK Guide Sixth Edition Books: PMP study guides UCI lecture notes and templates. Websites, conference papers, journal articles from PMI. Old purchase orders issued to suppliers.
11. To create a Stakeholder engagement plan that identifies the strategies required to promote productive stakeholder involvement.	Interviews with the project sponsor, project manager, and project team. Reference to the OPA's.	PMBOK Guide Sixth Edition Books: PMP study guides UCI lecture notes and templates. Websites, conference papers, journal articles from PMI.

Note: Own work

3.2 Research methods

Research methods are the strategies, techniques, and processes for collecting the evidence or dates to be analyzed for understanding a topic (*LibGuides*, 2023). Rangaiah (2021) explains that research is done to gain knowledge required to interpret, write, dig further, and distribute data to support a quest regarding a particular concept or theory to reach a conclusion. The basic type of research methods are as follows (Rangaiah, 2021).

3.2.1 Descriptive research:

This research form incorporates surveys and fact-finding investigation to report the details as they are taking place. This research method is used to decipher characteristics, trends, and frequencies. These methods involve observations, surveys, as well as case studies (Rangaiah, 2021).

3.2.2 Analytical Research:

This research method uses data and factual information to acutely evaluate the data. This research method is undertaken to uncover evidence that supports the present research and increase its authenticity, or for creating fresh ideas relating to the research topic (Rangaiah, 2021).

3.2.3 Applied Research Method:

This research method is used by researchers to resolve issues in our business or daily life that impact our work, health, or welfare. Applied research will help uncover solutions for issues and conclude the best possible approach for the issue. Applied research

is further divided into Evaluation research, Research and development, and Action research (Rangaiah, 2021).

- Evaluation research: Prevailing topic data is interpreted to reach a proper decision.
- Research and development: To develop fresh products or services to target market requirements.
- Action research: Aims to provide direction to business issues to practically resolve them.

3.2.4 Fundamental Research:

This research method is used to formulate theories or understand a particular natural phenomenon. This form of research is mainly carried out in areas of education, psychology, and science to find information with an extensive application, adding to the existing concepts in the industry area (Rangaiah, 2021).

3.2.5 Conceptual Research:

This research is used to develop new concepts and re-examine existing concepts by researchers and philosophers using the existing information on the topic and does not include implementing practical experiments (Rangaiah, 2021).

3.2.6 Empirical Research:

This research method uses data to reach conclusions that can be confirmed through observation and experiment on how certain variables are affecting the others. In this research method a hypothesis is generated and a process to confirm or invalidate the hypothesis is followed. The researcher must be involved directly and should be able to

manipulate the inputs to gain the information firsthand. This research method is also known as Experimental research because of the process involved (Rangaiah, 2021).

3.2.7 Quantitative Research:

This research method uses measurements and the interpretation of numerical data for discovering averages, or patterns, or drawing predictions and conclusions. This research method uses tables, data, and graphs to reach a measurable conclusion. The research outcomes can be repeated unlike the outcome of the qualitative research. Quantitative research methods include (Rangaiah, 2021).:

- Experiment Research
- Surveys, or questionnaires: Asking the same set of questions to people through different modes like online, face to face, or over the phone
- (Systematic) Observation: Monitoring and detecting occurrences in natural setting
- Secondary research: Making use of previously collected data
- Document screening: Sourcing numerical data from financial reports

3.2.8 Qualitative Research:

This research method is used to understand the “why” and “what” of a phenomenon by getting to the bottom of the reasons for human behavior to understand the factors influencing the people for preferring certain things or behaving in a certain way. Qualitative research methods include (Rangaiah, 2021).:

- Observations: Recorded details of the observer’s experience of what is seen, heard, and encountered

- Interviews: One-on-one personally conducted questioning sessions
- Focus groups: Question and discussions session with a group aimed at reaching a conclusion
- Surveys: Different from quantitative surveys and aimed at receiving elaborate answers on questionnaires with open ended questions
- Secondary research: Collecting data such as images, texts, audios, or videos and may include analysis of the collected texts, case study, performed interviews
- Document analysis: Interrogation of correspondences like emails, letters, diaries or reports
- Oral histories or life stories: Experiences explained to the researcher

For the completion of the Final graduation project, the research methods used include qualitative research methods, quantitative research methods, and applied research methods. We will discuss the application of the research methods used to complete the specific objectives in the project in Chart 2 below.

Chart 2

Research methods (Source Rangaiah, 2021)

Objectives	**Research methods**		
	Qualitative research methods	Quantitative research methods	Applied research methods
1. To create a Project Charter that provides high level information about	Interviews with the project	Secondary research and document	Evaluation research applied to use the

Objectives	Research methods		
	Qualitative research methods	Quantitative research methods	Applied research methods
the project and formally authorizes the project.	sponsor and project manager. Secondary research on the project charter. OPA document analysis to retrieve information.	screening of the client issued purchase order.	available information on PMBOK and other sources. Action research aimed to improve business profits.
2. To develop the Scope management plan that will tell us how the scope will be defined, monitored, controlled, and validated.	Interviews, focus groups with the project sponsor, project manager and project team. Secondary research, document analysis on client issued purchase order, project charter, project management sub-plans, OPA's.	Secondary research and document screening of the client issued purchase order, project charter.	Evaluation research applied to use the available information on the project management sub-plans, PMBOK and other sources. Action research aimed to prevent scope creep.
3. To produce the Requirements Management plan that	Interviews, focus groups with the project sponsor,	Secondary research and document	Evaluation research applied to use the

Objectives	Research methods		
	Qualitative research methods	Quantitative research methods	Applied research methods
will explain how the product requirements will be identified, prioritized, analyzed, documented, and managed.	project manager and project team. Secondary research, document analysis on client issued purchase order, project charter, project management sub-plans, OPA's.	screening of the client issued purchase order, project charter.	available information on the project management sub-plans, PMBOK and other sources. Action research aimed to manage requirements.
4. To prepare a Schedule management plan to effectively define, sequence, and estimate the project activities. To use this information to develop the project schedule and to effectively control it.	Interviews, focus groups with the project sponsor, project manager and project team. Secondary research, document analysis on client issued purchase order, project charter, project management sub-plans, OPA's.	Secondary research and document screening of the client issued purchase order, project charter. Experiment research to determine the schedule development model.	Evaluation research applied to: Understand the activity dependencies. Use the available information on project management sub-plans, PMBOK and other sources.

Objectives	Research methods		
	Qualitative research methods	Quantitative research methods	Applied research methods
5. To create the Cost management plan that will tell us how the project's cost will be planned, controlled, and structured.	Interviews, focus groups with the project sponsor, project manager and project team. Secondary research, document analysis on client issued purchase order, project charter, project management sub-plans, OPA's.	Secondary research and document screening of the client issued purchase order, project charter.	Evaluation research applied to: Calculate the project budget. Use the available information on the project management sub-plans, PMBOK and other sources.
6. To define a Quality management plan that describes how the applicable policies, procedures and guidelines will be implemented to achieve the quality objectives.	Interviews, focus groups with the project manager and project team. Secondary research, document analysis on client issued purchase order, project charter, project		Evaluation research applied to: Use the organization's QA and QC procedures for the objective. Use the available information on the project management

Objectives	Research methods		
	Qualitative research methods	Quantitative research methods	Applied research methods
	management sub-plans, OPA's.		sub-plans, PMBOK and other sources.
7. To put together the Resource management plan that describes how the resources will be acquired, allocated, monitored, and controlled for the project.	Interviews, focus groups with the project manager and project team. Secondary research, document analysis on the client issued purchase order, project charter, project management sub-plans, OPA's.	Experiment research to achieve optimal resource allocation.	Evaluation research applied to use the available information on the project management sub-plans, PMBOK and other sources.
8. To create a Communications management plan that explains how, when, and by whom the information on the project will be administered and distributed.	Interviews, focus groups with the project manager and project team. Secondary research, document analysis on the client issued		Evaluation research applied to use the available information on the project management sub-plans,

Objectives	Research methods		
	Qualitative research methods	Quantitative research methods	Applied research methods
	purchase order, project charter, project management sub-plans, OPA's.		PMBOK and other sources.
9. To produce the Risk management plan that will describe how the project's risk management activities will be structured and performed.	Interviews, focus groups with the project manager and project team. Secondary research, document analysis on the client issued purchase order, project charter, project management sub-plans, OPA's.	Experiment research to calculate probability impact of risks.	Evaluation research applied to use the available information on project management sub-plans, PMBOK and other sources. Action research to reduce business risks.
10. To define the Procurement management plan that details the acquisition process for goods and services from outside the organization.	Interviews, focus groups with the project manager and project team. Secondary research, document	Secondary research and document screening of the client issued purchase order.	Evaluation research applied to use the available information on the project management

Objectives	**Research methods**		
	Qualitative research methods	Quantitative research methods	Applied research methods
	analysis on the client issued purchase order, project charter, project management sub-plans, OPA's.		sub-plans, PMBOK and other sources. Action research aimed to improve business profits.
11. To create a Stakeholder engagement plan that identifies the strategies required to promote productive stakeholder involvement.	Interviews, focus groups with the project sponsor, project manager and project team. Secondary research, document analysis on the client issued purchase order, project charter, project management sub-plans, OPA's.		Evaluation research applied to use the available information on the project management sub-plans, PMBOK and other sources. Action research aimed to improve business profits.

Note: Own work

3.3 Tools

A tool is something tangible that can be used in performing an activity to produce a product or result (PMI, 2017). The Cambridge Dictionary explains a tool as something that helps you do a particular activity, or anything that helps you do something that you want to do, or something that is necessary for doing a particular job (*Tool*, 2023). The project management team uses various tools to successfully complete all the project management processes. We will use some of these tools in the creation of the project management plan in the Final Graduation Project. These tools will include expert judgement, data gathering, interpersonal and team skills, meetings, data analysis, decomposition, templates, data representation, estimation techniques, inspections, etc.

Chart 3

Tools (Source: PMI, 2017)

Objectives	**Tools**
1. To create a Project Charter that provides high level information about the project and formally authorizes the project.	• Expert Judgement • Data gathering: Brainstorming, Focus Groups, Interviews • Interpersonal and team skills: Active listening, Facilitation, meeting management • Meetings • Project Charter template • Data analysis: document analysis

Objectives	Tools
2. To develop the Scope management plan that will tell us how the scope will be defined, monitored, controlled, and validated.	• Expert judgement • Data gathering: Interviews, brainstorming • Data analysis: document analysis • Interpersonal and team skills: Facilitation • Decomposition • Meetings • Scope management plan template
3. To produce the Requirements Management plan that will explain how the product requirements will be identified, prioritized, analyzed, documented, and managed	• Expert judgement • Data gathering: Interviews, brainstorming • Data analysis: document analysis • Interpersonal and team skills: Facilitation, active listening, networking, leadership • Requirements traceability matrix • Meetings
4. To prepare a Schedule management plan to effectively define, sequence, and estimate the project activities. To use this information to develop the project schedule and to effectively control it.	• Expert judgement • Meetings • Data analysis: Alternate analysis, reserve analysis, document analysis • Decomposition • Dependency determination and integration

Objectives	Tools
	• Project Management Information system: MS project • Duration estimates: Analogous, Parametric, bottom-up • Schedule management plan template
5. To create the Cost management plan that will tell us how the project's cost will be planned, controlled, and structured.	• Expert judgement • Meetings • Data analysis: Alternate analysis, Reserve analysis, document analysis • Estimation: Analogous, Parametric, bottom-up • Cost aggregation • Cost management plan template
6. To define a Quality management plan that describes how the applicable policies, procedures and guidelines will be implemented to achieve the quality objectives	• Expert judgement • Meetings • Data analysis: document analysis, Interviews • Test and inspection planning • Quality management plan template
7. To put together the Resource management plan that describes how the resources will be acquired, allocated, monitored, and controlled for the project	• Meetings • Expert judgement • Data representation: Hierarchical charts, Responsibility assignment matrix • Estimation: Analogous, Parametric, bottom-up

Objectives	Tools
	• Decision analysis: Multicriteria decision analysis • Resource management plan template
8. To create a Communications management plan that explains how, when, and by whom the information on the project will be administered and distributed	• Meetings • Expert judgement • Communication requirements analysis • Data representation • Interpersonal and team skills • Project management information system
9. To produce the Risk management plan that will describe how the project's risk management activities will be structured and performed	• Meetings • Expert judgement • Data gathering: Brainstorming, checklists, Interviews • Data analysis • Risk categorization • Data representation • Strategies for risks, opportunities, and contingency response
10. To define the Procurement management plan that details the acquisition process for goods and services from outside the organization	• Meetings • Expert judgement • Source selection analysis • Data gathering • Data analysis • Inspection

Objectives	Tools
11. To create a Stakeholder engagement plan that identifies the strategies required to promote productive stakeholder involvement	• Meetings • Expert judgement • Interpersonal and team skills • Data gathering: Brainstorming • Data analysis: Stakeholder analysis, document analysis • Data representation

Note: Own work

3.4 Assumptions and constraints

Assumptions are beliefs that are considered to be true, but not proven to be true. All assumptions are treated as risks and recorded in the assumptions log document so that they can be studied regularly for its stability and consequences in case they turn against the project (Phillips, 2018). Constraints are the restrictions applicable to the project work and therefore can hinder project performance. Constraints are applied to a project activity or the entire project. The different type of project constraints include but are not limited to (Phillips, 2018):

- Time constraints such as deadlines, milestone dates, and availability of personnel
- Cost constraints refer to the predetermined budget for the project
- Scope constraints are the project deliverable requirements and are necessary to be fulfilled for the project success regardless of the cost and time constraints

Assumptions and constraints are applicable to the FGP project also, as they apply to all projects in general. Chart 4 below lists some of the assumptions and constraints in the creation of project management plan for the Final Graduation Project.

Chart 4

Assumptions and constraints (Source: Author)

Objectives	**Assumptions**	**Constraints**
1.To create a Project Charter that provides high level information about the project and formally authorizes the project.	The company will provide the information and allow its disclosure.	The project charter should be ready and accepted within two weeks of the project initiation
2.To develop the Scope management plan that will tell us how the scope will be defined, monitored, controlled, and validated.	The scope of the project will be clearly understood.	Only the defined project work will be carried out.
3.To produce the Requirements Management plan that will explain how the product requirements will be identified, prioritized, analyzed, documented, and managed	The requirements of all the stakeholders are clearly understood.	All the stakeholder requirements cannot be fulfilled. Only the necessary ones will be met.
4.To prepare a Schedule management plan to effectively define, sequence, and estimate the project activities. To use this information to develop the project schedule and to effectively control it.	The project team is trained in the software to create the project schedule.	The project schedule should not extend beyond the promised project delivery date.

Objectives	Assumptions	Constraints
	The schedule estimates are accurate.	
5.To create the Cost management plan that will tell us how the project's cost will be planned, controlled, and structured.	The cost estimates are accurate. The contingency reserve and management reserve will be included in the project budget.	The project cost should not exceed the project budget
6.To define a Quality management plan that describes how the applicable policies, procedures and guidelines will be implemented to achieve the quality objectives	The organization quality control and quality assurance procedures, documents and reports will be available.	No external failure cost of quality.
7.To put together the Resource management plan that describes how the resources will be acquired, allocated, monitored, and controlled for the project	All the required resources for the project are estimated.	No overtime for project team resources.
8.To create a Communications management plan that explains how, when, and by whom the information on the project will be administered and distributed	The organization will share the details about the communication methods and	Only the specified communication media can be used.

Objectives	Assumptions	Constraints
	communication technology used.	
9.To produce the Risk management plan that will describe how the project's risk management activities will be structured and performed	All the risks will be identified and analyzed effectively.	Risk identification meetings should be regular after a fixed period.
10. To define the Procurement management plan that details the acquisition process for goods and services from outside the organization	The physical resources required are available in stock with the sellers.	Only the pre-approved sellers can be used for the project.
11. To create a Stakeholder engagement plan that identifies the strategies required to promote productive stakeholder involvement	The list of the stakeholders, along with the supporting information is available.	Availability of stakeholders. Stakeholders might be unaware, neutral, or not engaged due to other work commitments.

Note: Own work

3.5 Deliverables

Deliverables can be defined as any unique and verifiable product, result or service that is produced to complete a phase, process, or project. These deliverables can be tangible or intangible and are created at the end of each project phase and the project can move forward if the deliverables meet the preset matrix (Phillips, 2018).

During the project, the FGP will create the below deliverables:

- Project Charter
- Scope management plan
- Requirements management plan
- Schedule management plan
- Cost management plan
- Quality management plan
- Resource management plan
- Communications management plan
- Risk management plan
- Procurement management plan
- Stakeholder engagement plan

Chart 5

Deliverables (Source: PMI, 2017)

Objectives	Deliverables
1. To create a Project Charter that provides high level information about the project and formally authorizes the project.	Project Charter: It is an official document that once approved by the sponsor formally authorizes the project's existence and grants the project manager with the authority to apply the organization's resources to the activities. It has high level information on different aspects of the project (PMI, 2017).
2. To develop the Scope management plan that will tell us how the scope will be defined, monitored, controlled, and validated.	Scope management plan: Explains how the project's scope will be defined, developed, monitored, controlled, and validated (PMI, 2017).
3. To produce the Requirements Management plan that will explain how the product requirements will be identified, prioritized, analyzed, documented, and managed	Requirements management plan: Explains how the project's requirements will be analyzed, documented, and managed (PMI, 2017).
4. To prepare a Schedule management plan to effectively define, sequence, and estimate the project activities. To use this information to develop the project schedule and to effectively control it.	Schedule management plan: Explains the criteria and activities for developing, monitoring, and controlling the project schedule (PMI, 2017).
5. To create the Cost management plan that will tell us how the project's cost will be planned, controlled, and structured.	Cost management plan: Explains how the project costs will be planned, structured, and controlled (PMI, 2017).

Objectives	Deliverables
6. To define a Quality management plan that describes how the applicable policies, procedures and guidelines will be implemented to achieve the quality objectives	Quality management plan: Explains how the organization´s quality policies, methodologies, and standards will be implemented to the project (PMI, 2017).
7. To put together the Resource management plan that describes how the resources will be acquired, allocated, monitored, and controlled for the project	Resource management plan: Guides on how the project resources should be categorized, allocated, managed, and released (PMI, 2017).
8. To create a Communications management plan that explains how, when, and by whom the information on the project will be administered and distributed	Communications management plan: Explains how, when, and by whom the project information will be administered and transmitted (PMI, 2017).
9. To produce the Risk management plan that will describe how the project's risk management activities will be structured and performed	Risk management plan: Explains how the risk management activities will be structured and performed (PMI, 2017).
10. To define the Procurement management plan that details the acquisition process for goods and services from outside the organization	Procurement management plan: Explains how the project team will acquire goods and services from outside of the organization (PMI, 2017).
11. To create a Stakeholder engagement plan that identifies the strategies required to promote productive stakeholder involvement	Stakeholder engagement plan: Explains how stakeholders will be engaged in project decisions and execution, according to their needs, interests, and impact (PMI, 2017).

Note: Own work

4 RESULTS

4.1. Project Charter

Project charter is the document approved by the project sponsor that formally approves the project and authorizes the project manager to use organizational resources towards the project. This document directly links the project with the organization's strategic objectives, formally creates and records the project showing the organization's commitment to the project (PMI, 2017). Solas Marine Services is performing an external project on the offshore drilling rig ADM 690 for the client ADES Saudi. The project charter was created by referring to the techno-commercial proposal submitted by Solas Marine, and the purchase order received from ADES Saudi.

Chart 6

Project Charter for the Installing Breathing Air System (Source: Author)

PROJECT CHARTER	
DATE	**PROJECT NAME**
07-Nov-2023	Installing a Breathing Air System For An Offshore Drilling Rig – Admarine 690
PROJECT LIFE CYCLE	Predictive
KNOWLEDGE AREA ▪ Integration Management ▪ Scope Management ▪ Schedule Management ▪ Cost Management ▪ Quality Management ▪ Resource Management	**Application area (Sector / Activity)** Oil and gas industry, Safety industry

▪ Communications Management ▪ Risk Management ▪ Procurement Management ▪ Stakeholders Management PROCESS GROUP ▪ Initiating ▪ Planning		
Tentative start date	**Tentative completion date**	**Duration (months)**
August 14, 2024	February 11, 2025	6 months

Project objectives (general and specific)

General objective

To supply a Breathing Air System for the Offshore Drilling Rig – Admarine 690, with 120 Persons On Board.

Specific objectives

1. To supply the SAUDI ARAMCO compliant 70 numbers of 30 minutes Breathing Apparatus and 211 numbers of 15 minutes Breathing Apparatus for the personnel.
2. To supply 48 numbers of 50 liters breathing air cylinders to store HP breathing air at 3600 psi to supply breathing air to 120 crew members.
3. To install 1 diesel powered breathing air compressor and 2 electric powered breathing air compressors capable to supply air at 11 Standard cubic feet per minute (scfm) per compressor.
4. To provide breathing air regulators to convert high pressure air to breathable low-pressure air at the manifold outlets.
5. One breathing air manifold outlet for every personnel assigned to a muster station. 75 manifold outlets on the port muster station, 75 manifold outlets on the STBD muster station and 75 manifold outlets on the FWD muster station.
6. One breathing air manifold outlet for every person that can be accommodated inside the 60-person capacity lifeboats. For Lifeboat 1, Lifeboat 2, and Lifeboat 3.
7. Breathing air manifolds with the required number of outlets and suitable length of hoses to be located at different workstation locations throughout the Rig.
8. Pressure testing the system to 1.1 times the system working pressure with the client for system approval.

Justification or purpose of the project (Contribution and expected results)

The availability of an operational breathing air system is a regulatory and contractual requirement for an offshore drilling rig operating in Saudi Aramco waters; the

installation of the system is therefore mandatory. The daily rate received by the client's drilling rig during operation is USD 100,000.00 (StackPath, 2022) per day from Saudi Aramco which will cover the project budget of USD 870,000.00 within days of operation. The successful completion and handover of the project will market the system to other clients operating within Saudi Aramco.

The system will provide a safe supply of breathing air for personnel during H2S occurrences and protect them from its deadly effects.

The expected benefits of the installed breathing air system are:

- Safer working environment for the employees
- Helps meet the Saudi Aramco regulatory and contractual requirements
- Approval of the Offshore rig's drilling contract
- Future project expectations

Description of the product or service that the project will generate – Final deliverables of the project

The final product is a new Breathing Air System on the Offshore Drilling Rig ADM-690

The main deliverables during the project stage are:

- Equipment location drawings/details
- Breathing air system for the accommodation area
- Breathing air system for the Main deck area
- Breathing air system for the Machinery area
- Breathing air system for the Lifeboats
- Breathing air system for the Drill Floor
- Connected and tested breathing air system

Assumptions

Assumptions include:

1. The economic conditions will remain the same for the duration of the project.
2. The project cost will be the same as the budgeted cost.
3. The funding for the entire project will be received as planned.
4. All resources (such as materials and equipment) will be delivered and available as planned.
5. A dedicated execution team will be assigned for the project.
6. The weather conditions will have a negligible impact on the project schedule.
7. All additional requirements outside of Saudi Aramco are highlighted by the client.
8. No additional scope will be added by the client.

9. There will be no major or fatal accidents on site that will drastically delay the project.

Restrictions

Constraints that would limit the executing team and make it difficult to fulfill the project's objectives are:

1. The project is limited to the available resources with the standard suppliers.
2. The project must be completed within seven months' time after initiation.
3. The allocated budget of USD 870,000.00 for the project, is not to be exceeded.
4. The installed breathing air system should meet the Saudi Aramco requirement.
5. Limited access to rig areas due to other simultaneously ongoing client projects.
6. The installation of the system will adopt a 5-day work week.

Preliminary risk identification

Potential risks are provided below.

1. As a result of changes in the economic environment, the cost of resources may change and impact the project's cost.
2. Any scope creep or gold plating will impact the allocated project resources, the project's cost and schedule may be impacted.
3. As a result of delayed funding and delay of payments to suppliers, the delivery of the project's physical resources may be delayed or prevented.
4. As a result of the resource unavailability or scarcity, the project's scope and schedule may be impacted, delaying the project delivery.
5. A competent replacement should be made available for a project team member who may apply for annual leave during the duration of the project. Failure to do so will delay the project.
6. As a result of the extreme summer heat, the project's schedule may be impacted, and the completion of the final product may be delayed.
7. Any area access restrictions for installation due to other client activities may delay the project.
8. Delay in provision of welders and fabricators by the client will delay the project.
9. As a result of incorrect technicians' work, the leak rectification during the testing stage may take longer than scheduled.

General resources and budget

Deliverable	Name of the resource	Unit	Quantity	Unit cost	Total Cost
Design Documents	Human, equipment, material	Nos	1	5000	5000

Accommodation Area breathing air system	Human, equipment, material	Nos	1	748200	748200
Main Deck Area breathing air system	Human, equipment, material	Nos	1	9900	9900
Machinery Area breathing air system	Human, equipment, material	Nos	1	8100	8100
Lifeboats 1, 2, 3 breathing air system	Human, equipment, material	Nos	1	73500	73500
Drill Floor Area breathing air system	Human, equipment, material	Nos	1	8400	8400
Connection and Testing the complete breathing air system	Human, equipment, material	Nos	1	16900	16900
				TOTAL	**870,000.00**

Milestone schedule

Milestone name	**End date**
Design Documents	30/09/2024
Accommodation Area breathing air system	07/01/2025
Main Deck Area breathing air system	31/10/2024
Machinery Area breathing air system	06/11/2024
Lifeboats breathing air system	26/12/2024
Drill Floor Area breathing air system	03/01/2025
Connection and Testing the complete breathing air system	11/02/2025

Relevant historical information

Solas Marine Services (Foreign Branch) has a workshop located within the ASRY shipyard in Bahrain. ADES Saudi has made a contract with Solas Marine to install a breathing air system on one of its offshore drilling rig ADM 690, while the rig is in the ASRY shipyard for other repair works.
ADES Saudi is expected to have at least 10 more rigs that will need the breathing air system installed as well, therefore the successful execution of this project is vital to secure future business for Solas Marine.

Identification of interest groups (involved)

Directly Involved:

▪ Project Manager ▪ Project Sponsor ▪ Project Team ▪ Advances Energy Systems (ADES) Saudi Company Limited ▪ Saudi Aramco ▪ Suppliers **Indirect stakeholders:** ▪ Arab Shipbuilding and Repair Yard ▪ Bahrain Custom Affairs

Name of the Project Manager: Gourish Keshav Vaingankar	**Signature:**
Name and position of the Project Sponsor: Jayasimha Pai, Division Manager	**Signature:**

4.2. Scope Management Plan

The Scope management plan explains how the project scope will be defined, developed, monitored, controlled, and validated. It will explain how the below processes will be performed (PMI, 2017):

- Preparing the project scope statement
- Creation of the WBS from the project scope statement
- How the scope baseline will be approved and maintained
- Obtaining final approval of the completed project deliverables

The product scope covers the detailed features, function, and attributes of the project deliverables. This information is then used to prepare the project scope, which defines the work required to be carried out by the execution team to produce the project deliverables with the required features and functions. The product scope is related and measured against

the requirements, while the project scope is related and measured against the project plan (Phillips, 2018).

4.2.1 Scope Management Approach

The scope for the project of Installing a Breathing Air System for Rig ADM-690 is created to meet the requirements of SAUDI ARAMCO regulations as well as any additional requirements identified by the client during the requirements collection process. These requirements are then used to create the project scope statement, WBS, and WBS dictionary that will be used to validate and control the project scope. All change requests, internal or external, will follow the control scope procedure.

4.2.2 Roles and Responsibilities

Chart 7 below shows the roles and responsibilities of the key project team members.

Chart 7

Roles and responsibilities (Source: Author)

Role	**Responsibilities**
Client	Major project stakeholder Initiates and/or approves change requests Validates project deliverables
Project Sponsor	Authorizes the project Helps in resolving any project related issues Evaluates change requests to approve or reject them Monitors the project Verifies the key project deliverables and offers to the client for

Role	Responsibilities
	validation Approves revisions to project management plans due to scope changes
Project Manager	Managing the project and account for it Effective implementation of project management techniques Leading the creation of the project management plan and its sub-plans Facilitating meetings and interviews to collect requirements, define scope, create WBS and WBS dictionary Verification of completion of the WBS elements with the project team Offer for the verification of the key deliverables to the project sponsor Initiates the verification of the project deliverables with the project sponsor and lead the inspections with client for validation of project deliverables Monitoring the project progress against the performance plan and reporting to the sponsor, senior management, and client Developing and managing the work plan, securing appropriate resources and delegating the work and ensuring successful completion of the project Leading the project team and monitoring their progress Collects any change requests from the project team and formally initiates change requests for review of the sponsor
Project Team Members	Highlight change requests to the project manager Initiates the verification of deliverables on completion Implement only formally approved change requests Follow the project plan to execute the project Provides updates and reports to the project manager

Note: Own work

4.2.3 Project Scope Baseline

The scope baseline is a component of the project management plan that comprises the scope statement, WBS, and WBS dictionary. The project scope statement describes the project and product scope, the project's deliverables with their acceptance criteria, and project scope exclusions (PMI, 2017). The Project scope statement explains all the work required to complete a product, and the assumptions and constraints that may influence the project work. This document will define the project work that is included or excluded in the project scope and guides the project manager's decision to add, change, or remove any project work (Phillips, 2018).

The WBS refers to the hierarchical decomposition of the approved scope statement and organizes the total scope of the project. A WBS work package refers to the lowest level of WBS components that is a product or deliverable achieved as a result of activities where work is scheduled, estimated, monitored, and controlled (PMI, 2017).

The WBS dictionary is a document that supports the WBS by providing detailed information on deliverables, activities, and scheduling. This information is created as an output from other project management processes and updated in the WBS dictionary.

4.2.3.1 Scope Statement

Scope Description:

The scope of the project is to Install a Breathing Air System For An Offshore Drilling Rig – Admarine 690 that meets the SAUDI ARAMCO regulations and client requirements.

Project Exclusions:

- The provision of refilling stations for the SCBA's and EEBD's at the 5 usual locations: (1) port muster station, (1) STBD muster station, (1) main deck, (1) drill floor, (1) machinery deck
- The supply of Lifeboat break-away couplers for Lifeboats 1, 2, and 3
- The supply of independent breathing air system for the rig cranes – 3 numbers
- The supply of an Air quality test kit for breathing air
- Annual servicing and maintenance of the system, and the supply of any spares required for operations, maintenance and servicing
- Arrangement of any third-party inspectors

Project Deliverables and Project acceptance criteria:

Chart 8 below shows the key project deliverables and their acceptance criteria.

Chart 8

Project Deliverables and Project acceptance criteria (Source: Author)

Project Deliverable	**Project Deliverable Acceptance Criteria**
Equipment location drawings/details	Meets the SAUDI ARAMCO and client requirements Approval/ Validation by the client
Breathing air system for the accommodation area	Meets the SAUDI ARAMCO and client requirements Complete installation as per the approved drawings Testing of the assembled equipment to 1.1 times working pressure Inspection and validation of the deliverable by client

Project Deliverable	**Project Deliverable Acceptance Criteria**
Breathing air system for the Main deck area	Meets the SAUDI ARAMCO and client requirements Complete installation as per the approved drawings Testing of the assembled equipment to 1.1 times working pressure Inspection and validation of the deliverable by client
Breathing air system for the Machinery area	Meets the SAUDI ARAMCO and client requirements Complete installation as per the approved drawings Testing of the assembled equipment to 1.1 times working pressure Inspection and validation of the deliverable by client
Breathing air system for the Lifeboats 1, 2, 3	Meets the SAUDI ARAMCO and client requirements Complete installation as per the approved drawings Testing of the assembled equipment to 1.1 times working pressure Inspection and validation of the deliverable by client
Breathing air system for the Drill Floor	Meets the SAUDI ARAMCO and client requirements Complete installation as per the approved drawings Testing of the assembled equipment to 1.1 times working pressure Inspection and validation of the deliverable by client

Project Deliverable	Project Deliverable Acceptance Criteria
Connected and tested breathing air system	Meets the SAUDI ARAMCO and client requirements Complete installation as per the approved drawings Testing of the assembled equipment to 1.1 times working pressure Inspection and validation of the deliverable by client

Note: Own Work

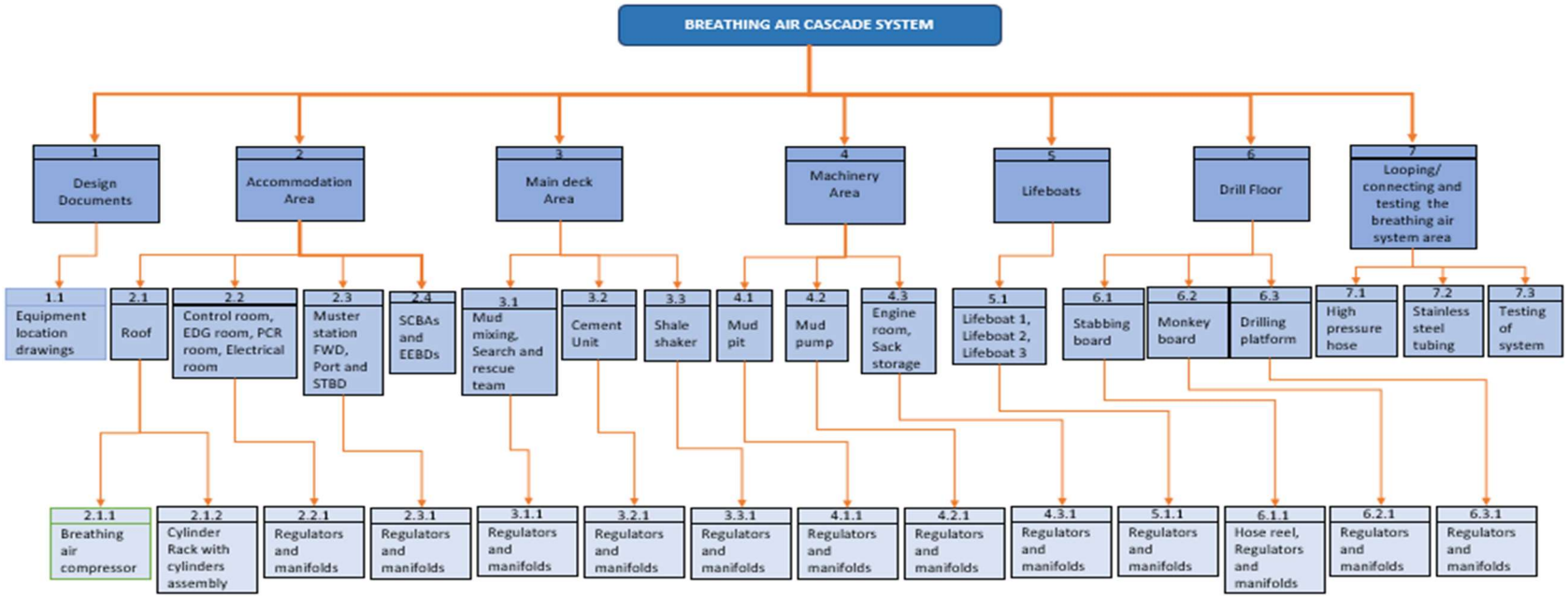
Assumptions and Constraints:

- The assigned equipment locations in the approved design will be available or made available for installation onboard
- Solas Marine Services will only communicate with ADES (the client)
- The power supply onboard the rig will be provided by the client free of any charge
- Solas Marine Services will use their own tools and equipment for the project execution
- All requirements have been covered in the project scope and any additional requirements will be considered as a change request

4.2.3.2 WBS

Figure 7

WBS (Source: Author)



Note: Own Work

4.2.3.3 WBS Dictionary

Chart 9

WBS Dictionary (Source: Author)

WBS code	Element / Deliverables	Description of Work	Owner	Resources required	Cost Estimate	Assumptions and Constraints
1.1	Equipment location drawings	Preparation and approval of system design, equipment support, and location drawings to be followed for installation.	Design Manager	Design team, communications, software, computer, training.	5000	The location proposed by the design team will be available on site for installation by the client.
2.1.1	Breathing air compressor	Procurement, installation, testing and commissioning of the Breathing air compressors.	Project Manager	Procurement team, communications, execution team, fabrication team, logistics team, and QAQC team.	115000	Project manager will be supported by the project engineer, fabrication team, procurement, QAQC team.
2.1.2	Cylinder Rack with cylinders assembly	Procurement, assembly, installation, and testing of the cylinder rack assembly	Project Manager	Procurement team, communications, execution team, fabrication team, logistics team, and QAQC team.	360000	Project manager will be supported by the project engineer, fabrication team, procurement, QAQC team.
2.2.1	Control room, EDG room, PCR room, Electrical room: Regulators	Procurement, assembly, installation, and testing of the regulator panels and manifold assembly in the area.	Project Manager	Procurement team, communications, execution team, fabrication team, logistics team, and QAQC team.	9700	Project manager will be supported by the project engineer, fabrication team, procurement, QAQC team. Project team will communicate effectively.

WBS code	Element / Deliverables	Description of Work	Owner	Resources required	Cost Estimate	Assumptions and Constraints
	and manifolds					
2.3.1	Muster station Port and STBD: Regulators and manifolds	Procurement, assembly, installation, and testing of the regulator panels and manifold assembly in the area.	Project Manager	Procurement team, communications, execution team, fabrication team, logistics team, and QAQC team.	43600	Project manager will be supported by the project engineer, fabrication team, procurement, QAQC team. Project team will communicate effectively.
2.4	Self-Contained Breathing Apparatus and Emergency Escape Breathing device	Procurement, assembly, and supply of SCBA's and EEBD's.	Project Manager	Procurement team, communications, execution team, logistics team, and QAQC team.	219900	Project manager will be supported by the project engineer, procurement, QAQC team. Project team will communicate effectively.
3.1.1	Mud mixing, Search and rescue team: Regulators and manifolds	Procurement, assembly, installation, and testing of the regulator panels and manifold assembly in the area.	Project Manager	Procurement team, communications, execution team, fabrication team, logistics team, and QAQC team.	5100	Project manager will be supported by the project engineer, fabrication team, procurement, QAQC team. Project team will communicate effectively.

WBS code	Element / Deliverables	Description of Work	Owner	Resources required	Cost Estimate	Assumptions and Constraints
3.2.1	Cement Unit: Regulators and manifolds	Procurement, assembly, installation, and testing of the regulator panels and manifold assembly in the area.	Project Manager	Procurement team, communications, execution team, fabrication team, logistics team, and QAQC team.	2400	Project manager will be supported by the project engineer, fabrication team, procurement, QAQC team. Project team will communicate effectively.
3.3.1	Shale Shaker: Regulators and manifolds	Procurement, assembly, installation, and testing of the regulator panels and manifold assembly in the area.	Project Manager	Procurement team, communications, execution team, fabrication team, logistics team, and QAQC team.	2400	Project manager will be supported by the project engineer, fabrication team, procurement, QAQC team. Project team will communicate effectively.
4.1.1	Mud Pit: Regulators and manifolds	Procurement, assembly, installation, and testing of the regulator panels and manifold assembly in the area.	Project Manager	Procurement team, communications, execution team, fabrication team, logistics team, and QAQC team.	2050	Project manager will be supported by the project engineer, fabrication team, procurement, QAQC team. Project team will communicate effectively.
4.2.1	Mud Pump: Regulators and manifolds	Procurement, assembly, installation, and testing of the regulator panels and manifold assembly in the area.	Project Manager	Procurement team, communications, execution team, fabrication team, logistics team, and QAQC team.	2050	Project manager will be supported by the project engineer, fabrication team, procurement, QAQC team. Project team will communicate effectively.

WBS code	Element / Deliverables	Description of Work	Owner	Resources required	Cost Estimate	Assumptions and Constraints
4.3.1	Engine Room, Sack storage: Regulators and manifolds	Procurement, assembly, installation, and testing of the regulator panels and manifold assembly in the area.	Project Manager	Procurement team, communications, execution team, fabrication team, logistics team, and QAQC team.	4000	Project manager will be supported by the project engineer, fabrication team, procurement, QAQC team. Project team will communicate effectively.
5.1	Lifeboats No: 1, 2, 3	Procurement, assembly, installation, and testing of the regulator panels and manifold assembly in the area.	Project Manager	Procurement team, communications, execution team, fabrication team, logistics team, and QAQC team.	73500	Project manager will be supported by the project engineer, fabrication team, procurement, QAQC team. Project team will communicate effectively.
6.1.1	Stabbing Board: Regulators and manifolds	Procurement, assembly, installation, and testing of the regulator panels and manifold assembly in the area.	Project Manager	Procurement team, communications, execution team, fabrication team, logistics team, and QAQC team.	2000	Project manager will be supported by the project engineer, fabrication team, procurement, QAQC team. Project team will communicate effectively.
6.2.1	Monkey Board: Regulators and manifolds	Procurement, assembly, installation, and testing of the regulator panels and manifold assembly in the area.	Project Manager	Procurement team, communications, execution team, fabrication team, logistics team, and QAQC team.	1900	Project manager will be supported by the project engineer, fabrication team, procurement, QAQC team. Project team will communicate effectively.

WBS code	Element / Deliverables	Description of Work	Owner	Resources required	Cost Estimate	Assumptions and Constraints
6.3.1	Drilling Platform: Hose reel, Regulators and manifolds	Procurement, assembly, installation, and testing of the hose reel, regulator panels and manifold assembly in the area.	Project Manager	Procurement team, communications, execution team, fabrication team, logistics team, and QAQC team.	4500	Project manager will be supported by the project engineer, fabrication team, procurement, QAQC team. Project team will communicate effectively.
7.1	High pressure hose	Procurement, assembly, and installation of high-pressure hoses.	Project Manager	Procurement team, communications, execution team, fabrication team, logistics team, and QAQC team.	2000	Project manager will be supported by the project engineer, fabrication team, procurement, QAQC team. Project team will communicate effectively.
7.2	Stainless steel tubing	Procurement and installation of stainless-steel tubes.	Project Manager	Procurement team, communications, execution team, fabrication team, logistics team, and QAQC team.	8900	Project manager will be supported by the project engineer, fabrication team, procurement, QAQC team. Project team will communicate effectively.
7.3	Testing the complete system	Testing the complete system to 1.1 times the working pressure.	Project Manager	Procurement team, communications, execution team, fabrication team, logistics team, and QAQC team.	6000	Project manager will be supported by the project engineer, fabrication team, procurement, QAQC team. Project team will communicate effectively.
					$870,000.00	

Note: Own Work

4.2.4 Scope Validation:

Validation of the project scope is accomplished through inspections at the end of each phase when major deliverables are created where the client would accept the deliverables. The produced deliverables are checked against the planned product for completeness and correctness.

For the project of Installing a Breathing Air System For An Offshore Drilling Rig – Admarine 690, all the processes, procedures and deliverables will be inspected by the quality assurance and quality control team. The project engineer upon completion of a phase would officially request for an inspection by the quality control team for the completed WBS element / deliverable. Upon approval this deliverable would then be inspected and verified by the project manager. Upon approval of the many such WBS elements that complete a major deliverable, an inspection with the project sponsor would be arranged, where the deliverable would be verified and upon his approval would be submitted to the client for validation.

4.2.5 Scope control:

The process of scope control monitors the project and product scope to manage changes to the scope baseline. It aims to maintain the scope baseline by preventing any addition of unapproved work to the project and ensures that only the approved project work is carried out. The scope control also ensures that all the approved change requests as well as corrective and preventive actions are processed through the perform integrated change control process.

For the project of installing a Breathing air system for the Rig ADM-690, scope control is the primary responsibility of the project manager who will collect the work performance data from the project team and compare them against the scope baseline to identify any variances as well as their causes. The project manager has the authority to reject lower-level change requests, but the approval of change requests will be the responsibility of the project sponsor and/or the client. The project sponsor has the authority to approve internal change requests that are created as corrective and preventive actions, and the client is responsible for the approval of change results that result from additional scope as new requirements are realized by the client and this would influence the project delivery schedule, scope, cost, and quality. The project manager will ensure that all change requests are processed through an integrated change control process which will ensure that the necessary updates are applied to the deliverables, project documents, and the project management plan.

4.3 Requirements Management Plan

The requirements management plan also referred to as the business analysis plan describes how the product and the project requirements will be collected, documented, analyzed, and managed (PMI, 2017). The plan will provide information on:

- How activities related to requirements will be planned, tracked, and reported
- Activities related to configuration management
- Requirements prioritization
- Metrics to be used and why the specific metrics

- Traceability of requirements and their attributes

The requirements management plan will explain how the requirements will be managed throughout the project's phases, and clearly define the process to apply any changes to requirements (Phillips, 2018).

Collect requirements:

For the project of Installing a Breathing Air system for the Offshore Drilling Rig ADM-690, the process of collecting requirements will be done once at the beginning of the project, where the approved proposal and the purchase order received from the client will serve as the main inputs for the process. The project requirements will cover the SAUDI ARAMCO requirements for the breathing air cascade system as well as a few additional requirements specified by the client in the initial request for the proposal.

Requirements:

Chart 10

Requirements Documentation (Source: Author)

Requirement Description	Requirement Category	Stakeholder requested by	UOM	Testable/ Test type	
Location drawings and calculations	Client requirement	ADES	1 Set	No	Approval required
Breathing air cylinder, 300 BAR With Valve, 50Ltr. capacity	Project requirements	ADES/ SAUDI ARAMCO	48 Nos	Yes	Pressure test and commissioning
Breathing air manifold 2 outlets with 10 feet hoses	Project requirements	ADES/ SAUDI ARAMCO	1 Nos	Yes	Pressure test and commissioning
Breathing air manifold 3 outlets with 10 feet hoses	Project requirements	ADES/ SAUDI ARAMCO	7 Nos	Yes	Pressure test and commissioning
Breathing air manifold 4 outlets with 10 feet hoses	Project requirements	ADES/ SAUDI ARAMCO	11 Nos	Yes	Pressure test and commissioning
Breathing air manifold 5 outlets with 10 feet hoses	Project requirements	ADES/ SAUDI ARAMCO	3 Nos	Yes	Pressure test and commissioning
Breathing air manifold 6 outlets with 10 feet hoses	Project requirements	ADES/ SAUDI ARAMCO	1 Nos	Yes	Pressure test and commissioning
Breathing air manifold 10 outlets with 10 feet hoses	Project requirements	ADES/ SAUDI ARAMCO	22 Nos	Yes	Pressure test and commissioning
Breathing air manifold 60 outlets with 10 feet hoses	Project requirements	ADES/ SAUDI ARAMCO	3 Nos	Yes	Pressure test and commissioning
High Pressure to Low Pressure, 1 Regulator Panel	Project requirements	ADES/ SAUDI ARAMCO	8 Nos	Yes	Pressure test and commissioning

Requirement Description	Requirement Category	Stakeholder requested by	UOM	Testable/ Test type	
High Pressure to Low Pressure, 3 Regulator Panels	Project requirements	ADES/ SAUDI ARAMCO	2 Nos	Yes	Pressure test and commissioning
High Pressure to Low Pressure, 5 Regulator Panels	Project requirements	ADES/ SAUDI ARAMCO	3 Nos	Yes	Pressure test and commissioning
High Pressure to Low Pressure, 6 Regulator Panels	Project requirements	ADES/ SAUDI ARAMCO	3 Nos	Yes	Pressure test and commissioning
BAUER / O-320E, Electrical air compressor (safe area type) capacity: 13cfm, pressure: 300 bar, power: 3p-480v-60hz,55°c rated	Project requirements	ADES/ SAUDI ARAMCO	2 Nos	Yes	Commissioning
BAUER / O-320D, Diesel air compressor (safe area type) capacity: 13cfm, pressure: 300bar, power: 55°c rated & battery charger	Project requirements	ADES/ SAUDI ARAMCO	1 Nos	Yes	Commissioning
High-pressure Stainless-steel tubes and fittings	Project requirements	ADES/ SAUDI ARAMCO	1 Set	Yes	Pressure test
High pressure Hoses 300 bar working pressure, 50 meters length	Project requirements	ADES/ SAUDI ARAMCO	2 Nos	Yes	Pressure test
Retractable Hose Reel for the stabbing board	Project requirements	ADES/ SAUDI ARAMCO	1 Nos	No	Commissioning
Supply of assembled 30 minutes breathing air sets, SCBAs in protective cases	Project requirements	ADES/ SAUDI ARAMCO	70 Nos	Yes	Commissioning
Supply of assembled 15 minutes breathing air sets, EEBDs in protective cases	Project requirements	ADES/ SAUDI ARAMCO	211 Nos	Yes	Commissioning
Pressure testing of the system to 1.1 times the working pressure	Project requirements Quality requirements	ADES/ SAUDI ARAMCO	1 system	Yes	Pressure test

Note: Own Work

Requirements Traceability Matrix:

The requirements traceability matrix links the product requirements to the respective project deliverables and ensures that the requirements add value to the project objectives. This grid helps to track all the project requirements throughout the project and ensures that all the product requirements are met at the end of the project.

Chart 11

Requirements Traceability Matrix (Source: Author)

Req uirements ID	WBS ID	Requirement Description	Business needs, Opportunities, Goals, Objectives.	Project objectives	Test scenario	Requested by	Unit of Measurement
01	1.1	Breathing Air System schematic drawings Breathing Air System calculation drawings. Breathing Air	For effective planning and execution of project	Client requirement	Approval by client	Client (ADES)	1 Set

Req uirements ID	WBS ID	Requirement Description	Business needs, Opportunities, Goals, Objectives.	Project objectives	Test scenario	Requested by	Unit of Measurement
		System equipment location drawings, equipment foundation drawings					
02	2.1.1	Supply and install (1) Diesel and (2) Electrical Breathing air compressors capable to supply air at 11 Standard cubic feet per minute (scfm) per compressor. The compressors are to be located at the highest practical location, away from	SAUDI ARAMCO regulatory requirement	Specific objective 3.	Testing and commissioning of the breathing air compressors	SAUDI ARAMCO regulations	3 Nos

Req uirements ID	WBS ID	Requirement Description	Business needs, Opportunities, Goals, Objectives.	Project objectives	Test scenario	Requested by	Unit of Measurement
		contaminated air					
03	2.1.2	Supply and install (48) Breathing air cylinders of 50 Ltr Capacity, Working Pressure: 320 bar in racks	SAUDI ARAMCO regulatory requirement	Specific objective 2.	Leak testing the cylinder assembly at 300 bar	SAUDI ARAMCO regulations	48 Cylinders
04	2.2.1	Control room (1) 1 regulator panel and (1) 6 outlets manifold assembly with hoses.	SAUDI ARAMCO regulatory requirement	Specific objective 7 Specific objective 4	Leak testing at 9 bar	SAUDI ARAMCO regulations	1 Regulator panel -1 Nos 6 outlets Manifold-1 Nos 10 feet Manifold hoses- 6 Nos

Req uirements ID	WBS ID	Requirement Description	Business needs, Opportunities, Goals, Objectives.	Project objectives	Test scenario	Requested by	Unit of Measurement
05	2.2.1	EDG room (1) 1 regulator panel and (1) 4 outlets manifold assembly with hoses.	Special client request	Specific objective 7 Specific objective 4	Leak testing at 9 bar	Client (ADES)	1 Regulator panel -1 Nos 4 outlets Manifold-1 Nos 10 feet Manifold hoses - 4 Nos
06	2.2.1	PCR room (1) 1 regulator panel and (1) 4 outlets manifold assembly with hoses.	Special client request	Specific objective 7 Specific objective 4	Leak testing at 9 bar	Client (ADES)	1 Regulator panel -1 Nos 4 outlets Manifold-1 Nos 10 feet Manifold hoses - 4 Nos
07	2.2.1	Electrical room (1) 1 regulator panel and (1) 4 outlets manifold assembly with hoses.	Special client request	Specific objective 7 Specific objective 4	Leak testing at 9 bar	Client (ADES)	1 Regulator panel -1 Nos 4 outlets Manifold-1 Nos 10 feet Manifold hoses - 4 Nos

Req uirements ID	WBS ID	Requirement Description	Business needs, Opportunities, Goals, Objectives.	Project objectives	Test scenario	Requested by	Unit of Measurement
08	2.3.1	Muster station FWD, (1) 6 regulator panels, (7) 10 outlets manifolds and (1) 5 outlet manifold assembly with hoses.	SAUDI ARAMCO regulatory requirement	Specific objective 5	Leak testing at 9 bar	SAUDI ARAMCO regulations	6 Regulator panel -1 Nos 10 outlets Manifold-7 Nos, 5 outlets Manifold -1 Nos 10 feet Manifold hoses - 75 Nos
09	2.3.1	Muster station Port (1) 6 regulator panel, (7) 10 outlets manifolds and (1) 5 outlet manifold assembly with hoses.	SAUDI ARAMCO regulatory requirement	Specific objective 5	Leak testing at 9 bar	SAUDI ARAMCO regulations	6 Regulator panel -1Nos 10 outlets Manifold–7 Nos, 5 outlets Manifold-1 Nos 10 feet Manifold hoses - 75 Nos
10	2.3.1	Muster station STBD (1) 6 regulator panel, (7) 10 outlets	SAUDI ARAMCO regulatory requirement	Specific objective 5	Leak testing at 9 bar	SAUDI ARAMCO regulations	6 Regulator panel -1 Nos 10 outlets Manifold-7

Req uirements ID	WBS ID	Requirement Description	Business needs, Opportunities, Goals, Objectives.	Project objectives	Test scenario	Requested by	Unit of Measurement
		manifolds and (1) 5 outlet manifold assembly with hoses.					Nos, 5 outlets Manifold-1 Nos 10 feet Manifold hoses - 75 Nos
11	2.4	Supply of assembled (70) 30 minutes breathing air sets, SCBAs in protective cases	SAUDI ARAMCO regulatory requirement	Specific objective 1	Certificate of conformance	SAUDI ARAMCO regulations	70 Nos
12	2.4	Supply of assembled (211) 15 minutes breathing air sets, EEBDs in protective cases	SAUDI ARAMCO regulatory requirement	Specific objective 1	Certificate of conformance	SAUDI ARAMCO regulations	211 Nos
13	3.1.1	Mud mixing area (1) 1 regulator panel and (1) 4 outlets manifold assembly with hoses.	SAUDI ARAMCO regulatory requirement	Specific objective 7 Specific objective 4	Leak testing at 9 bar	SAUDI ARAMCO regulations	1 Regulator panel -1 Nos 4 outlets Manifold-1 Nos 10 feet

Req uirements ID	WBS ID	Requirement Description	Business needs, Opportunities, Goals, Objectives.	Project objectives	Test scenario	Requested by	Unit of Measurement
							Manifold hoses - 4 Nos
14	3.1.1	Search and rescue team (1) 1 regulator panel and (1) 10 outlets manifold assembly with hoses.	Special client request	Specific objective 7 Specific objective 4	Leak testing at 9 bar	Client (ADES)	1 Regulator panel -1 Nos 10 outlets Manifold-1 Nos 10 feet Manifold hoses - 10 Nos
15	3.2.1	Cement Unit (1) 1 regulator panel and (1) 4 outlets manifold assembly with hoses.	SAUDI ARAMCO regulatory requirement	Specific objective 7 Specific objective 4	Leak testing at 9 bar	SAUDI ARAMCO regulations	1 Regulator panel -1 Nos 4 outlets Manifold-1 Nos 10 feet Manifold hoses - 4 Nos
16	3.3.1	Shale shaker (1) 1 regulator panel and (1) 4 outlets manifold assembly with hoses.	SAUDI ARAMCO regulatory requirement	Specific objective 7 Specific objective 4	Leak testing at 9 bar	SAUDI ARAMCO regulations	1 Regulator panel- 1 Nos 4 outlets Manifold-1 Nos 10 feet

Req uirements ID	WBS ID	Requirement Description	Business needs, Opportunities, Goals, Objectives.	Project objectives	Test scenario	Requested by	Unit of Measurement
							Manifold hoses - 4 Nos
17	4.1.1	Mud pit (2) 3 outlet manifold assembly with hoses.	SAUDI ARAMCO regulatory requirement	Specific objective 7 Specific objective 4	Leak testing at 9 bar	SAUDI ARAMCO regulations	3 outlets Manifold - 2 Nos 10 feet Manifold hoses - 6 Nos
18	4.2.1	Mud pump (2) 3 outlet manifold assembly with hoses.	SAUDI ARAMCO regulatory requirement	Specific objective 7 Specific objective 4	Leak testing at 9 bar	SAUDI ARAMCO regulations	3 outlets Manifold - 2 Nos 10 feet Manifold hoses - 6 Nos
19	4.3.1	Engine room (1) 3 regulator panel and (4) 3 outlets manifold assembly with hoses.	SAUDI ARAMCO regulatory requirement	Specific objective 7 Specific objective 4	Leak testing at 9 bar	SAUDI ARAMCO regulations	3 Regulator panel- 1 Nos 4 outlets Manifold-2 Nos 10 feet Manifold hoses - 8 Nos

Req uirements ID	WBS ID	Requirement Description	Business needs, Opportunities, Goals, Objectives.	Project objectives	Test scenario	Requested by	Unit of Measurement
20	4.3.1	Sack storage area (1) 4 outlet manifold assembly with hoses.	Special client request	Specific objective 7 Specific objective 4	Leak testing at 9 bar	Client (ADES)	4 outlets Manifold-1 Nos 10 feet Manifold hoses - 4 Nos
21	5.1.1	Lifeboat 1, (1) 5 regulator panel and (1) 60 outlets manifold assembly with hoses.	SAUDI ARAMCO regulatory requirement	Specific objective 6	Leak testing at 9 bar	SAUDI ARAMCO regulations	5 Regulator panel -1 Nos 60 outlets Manifold-1 Nos 10 feet Manifold hoses - 60 Nos
22	5.1.1	Lifeboat 2, (1) 5 regulator panel and (1) 60 outlets manifold assembly with hoses.	SAUDI ARAMCO regulatory requirement	Specific objective 6	Leak testing at 9 bar	SAUDI ARAMCO regulations	5 Regulator panel -1 Nos 60 outlets Manifold-1 Nos 10 feet Manifold hoses - 60 Nos
23	5.1.1	Lifeboat 3, (1) 5 regulator panel and (1) 60 outlets manifold	SAUDI ARAMCO regulatory requirement	Specific objective 6	Leak testing at 9 bar	SAUDI ARAMCO regulations	5 Regulator panel- 1 Nos 60 outlets Manifold - 1

Req uirements ID	WBS ID	Requirement Description	Business needs, Opportunities, Goals, Objectives.	Project objectives	Test scenario	Requested by	Unit of Measurement
		assembly with hoses.					Nos 10 feet Manifold hoses - 60 Nos
24	6.1.1	Stabbing board (1) 2 outlets manifold assembly with hoses.	SAUDI ARAMCO regulatory requirement	Specific objective 7 Specific objective 4	Leak testing at 9 bar	SAUDI ARAMCO regulations	2 outlets Manifold-1 Nos 10 feet Manifold hoses - 2 Nos
25	6.1.1	Stabbing board retractable Hose reel supply and installation	SAUDI ARAMCO regulatory requirement	Specific objective 7 Specific objective 4	Leak testing at 9 bar	SAUDI ARAMCO regulations	Retractable hose reel - 1 Nos
26	6.2.1	Monkey board (1) 3 outlets manifold assembly with hoses.	SAUDI ARAMCO regulatory requirement	Specific objective 7 Specific objective 4	Leak testing at 9 bar	SAUDI ARAMCO regulations	2 outlets Manifold-1 Nos 10 feet Manifold hoses - 2 Nos
27	6.3.1	Drilling platform (1) 3 regulator panel and (4) 4 outlets manifold	SAUDI ARAMCO regulatory requirement	Specific objective 7 Specific objective 4	Leak testing at 9 bar	SAUDI ARAMCO regulations	3 Regulator panel -1 Nos 4 outlets Manifold - 4 Nos 10 feet

Req uirements ID	WBS ID	Requirement Description	Business needs, Opportunities, Goals, Objectives.	Project objectives	Test scenario	Requested by	Unit of Measurement
		assembly with hoses.					Manifold hoses - 16 Nos
28	7.1	High pressure hose 50 mtr length, Working pressure 400 Bar, supply and installation in the drag chain	SAUDI ARAMCO regulatory requirement	In the moving areas of the drilling rig	Leak testing at 9 bar	SAUDI ARAMCO regulations	2 Nos
29	7.2	High pressure and low-pressure Stainless-steel tubing to connect the equipment at different locations together.	SAUDI ARAMCO regulatory requirement	Specific objective 6	Leak testing at 9 bar	SAUDI ARAMCO regulations	1 Set
30	7.3	Testing of system at 1.1 times the working pressure. High pressure	SAUDI ARAMCO regulatory requirement	Specific objective 8	Leak testing at 330 bar Leak testing at 9 bar	SAUDI ARAMCO regulations	1 system

Req uirements ID	WBS ID	Requirement Description	Business needs, Opportunities, Goals, Objectives.	Project objectives	Test scenario	Requested by	Unit of Measurement
		test pressure - 330 Bar Low pressure test pressure - 9 bar					

Note: Own Work

Configuration Management:

For the project, after the requirements documentation is approved or baselined any changes to requirements or additional requirements will be considered as a change request. As majority of the requirements fulfill the SAUDI ARAMCO regulations, changes to this would not be an option, unless the client has an alternate means to fulfill these requirements. Changes to the requirements that are outside the regulations would be a possibility. In both cases, a change request would have to be raised by the project manager that would be analyzed by the project manager, project sponsor, and the client. As any changes would affect the final product, only the Client would be responsible for approving all requirements related to change the order.

4.4 Schedule management plan

4.4.1 Schedule Management Plan

The schedule management plan guides the processes for developing, monitoring, and controlling the project schedule. This plan is a component of the project management plan that depending on the needs of the project can be formal or informal, highly detailed or broadly framed (PMI, 2017).

Schedule Management approach

The schedule management plan for the project of Installing a Breathing Air System for the Offshore Drilling Rig ADM 690 will:

- Be created using the Microsoft Project Professional 2019
- Have the Unit of measurement as days

- Have the current project schedule that will be updated and submitted at the end of every week. A schedule negative variance of more than 5% or 9 days must be reported to the project sponsor and would call for immediate corrective action.
- Follow the project management processes of Define activities, Sequence activities, and Estimate activity duration that will be performed using historical information from similar projects and expert judgement from the project team.

4.4.2 Define Activities

This process further decomposes the identified project's work packages into individual activities. Define Activities identify and document all the activities required to be carried out to complete every project work package which can be further used for effective estimating, scheduling, monitoring, and controlling the project work. (PMI, 2017).

Activity List:

This document includes all the activities required to be performed for the project. Activity attributes provide information about the activity such as the activity number, associated WBS ID, and activity name.

Chart 12

Activity List and Activity Attributes (Source: Author)

WBS ID	WORK PACKAGE	Activity Number	ACTIVITY NAME	DESCRIPTION
1	**Design Documents**			
1.1	Equipment location drawings	1.1.1	To Approve Project Charter	Formal approval of the project charter
		1.1.2	Preparing of Design Documents	Creation of the location drawings, fabrication drawings, installation drawings, and equipment support drawings
		1.1.3	Submitting the Design Documents	Submission of the design documents for client approval
		1.1.4	Updating the Design Documents as per the comments (if required)	Updating of the design documents as per the client comments and resubmission for approval (if required)
		1.1.5	Approving the Design Documents	Formal approval of the design document by the client
2	**Accommodation Area**			
2.1	**Roof**			
2.1.1	Breathing air compressor	2.1.1.1	Procuring the Breathing air compressors	Procurement and delivery of the breathing air compressors as per the approved specifications.
		2.1.1.2	Fabricating the Compressor foundation structure	Fabrication and installation of the compressor foundations as per the approved drawings
		2.1.1.3	Painting of the Compressor Foundation	Blasting, priming and painting of the fabricated foundations
		2.1.1.4	Installing the Breathing air compressors	Installation of the compressors on the ready foundation
		2.1.1.5	Testing and commissioning of the Breathing air compressors	Quality checks on the installed compressors. Testing and commissioning of the installed compressors

WBS ID	WORK PACKAGE	Activity Number	ACTIVITY NAME	DESCRIPTION
2.1.2	**Cylinder Rack with cylinders assembly**	2.1.2.1	Procuring the Breathing air bottles and physical resources	Procurement of equipment and materials as per the approved design documents
		2.1.2.2	Fabricating and painting the Cylinder Rack	Blasting, priming and painting of the fabricated cylinder rack assembly
		2.1.2.3	Assembling the air bottles in the cylinder rack	Installation of the air bottles in the cylinder rack, connecting them together by stainless steel tubes, fittings, and valves
		2.1.2.4	Testing the assembly	Quality checks on the installed assembly. Pressure testing the assembly at 1.1 the working pressure
		2.1.2.5	Filling of the Breathing air bottles	Filling the air cylinders with breathing air after a successful pressure test
2.2	**Control room, EDG room, PCR room, Electrical room**			
2.2.1	**Regulators panel assembly and manifolds assembly**	2.2.1.1	Procuring of physical resources	Procurement of equipment and materials required as per the approved design documents
		2.2.1.2	Fabricating manifolds and equipment support	Fabrication of breathing air manifolds and equipment support
		2.2.1.3	Assembly and installation of manifolds and regulator panels	Assembly and installation of the breathing air manifolds and regulator panel installation
		2.2.1.4	Installing S.S tubing between the manifolds and regulator panels	Connection of the regulator panel and the breathing air manifold with high-pressure stainless-steel tubing
		2.2.1.5	Testing the integrated assembly	Testing of the assembled system at 1.1 times the working pressure

WBS ID	WORK PACKAGE	Activity Number	ACTIVITY NAME	DESCRIPTION
2.3	**Muster station FWD, Port and STBD**			
2.3.1	**Regulators panel assembly and manifolds assembly**	2.3.1.1	Procuring of physical resources	Procurement of equipment and materials required as per the approved design documents
		2.3.1.2	Fabricating manifolds and equipment support	Fabrication of breathing air manifolds and equipment support
		2.3.1.3	Assembly and installation of manifolds and regulator panels	Assembly and installation of the breathing air manifolds and regulator panel installation
		2.3.1.4	Installing S.S tubing between the manifolds and regulator panels	Connection of the regulator panel and the breathing air manifold with high-pressure stainless-steel tubing
		2.3.1.5	Testing the integrated assembly	Testing of the assembled system at 1.1 times the working pressure
2.4	**Self Contained Breathing Appratus and Emergency Escape Breathing device**	2.4.1	Procuring of SCBA's and EEBD's	Procurement of the SCBA's and EEBD's parts from the OEM as per the requirements.
		2.4.2	Assembling the SCBA's and EEBD's	Assembly and inspection of the assembled equipment
		2.4.3	Filling of SCBA's and EEBD's	Filling the SCBA and EEBD cylinders to the required pressure
		2.4.4	Locating the sets on designated locations	Delivering the equipment onboard the drilling rig.
3	**Main Deck**			
3.1	**Mud mixing, Search and rescue team**			

WBS ID	WORK PACKAGE	Activity Number	ACTIVITY NAME	DESCRIPTION
3.1.2	**Regulators panel assembly and manifolds assembly**	3.1.1.1	Procuring of physical resources	Procurement of equipment and materials required as per the approved design documents
		3.1.1.2	Fabricating manifolds and equipment support	Fabrication of breathing air manifolds and equipment support
		3.1.1.3	Assembly and installation of manifolds and regulator panels	Assembly and installation of the breathing air manifolds and regulator panel installation
		3.1.1.4	Installing S.S tubing between the manifolds and regulator panels	Connection of the regulator panel and the breathing air manifold with high-pressure stainless-steel tubing
		3.1.1.5	Testing the integrated assembly	Testing of the assembled system at 1.1 times the working pressure
3.2	**Cement Unit**			
3.2.1	**Regulators panel assembly and manifolds assembly**	3.2.1.1	Procuring of physical resources	Procurement of equipment and materials required as per the approved design documents
		3.2.1.2	Fabricating manifolds and equipment support	Fabrication of breathing air manifolds and equipment support
		3.2.1.3	Assembly and installation of manifolds and regulator panels	Assembly and installation of the breathing air manifolds and regulator panel installation
		3.2.1.4	Installing S.S tubing between the manifolds and regulator panels	Connection of the regulator panel and the breathing air manifold with high-pressure stainless-steel tubing
		3.2.1.5	Testing the integrated assembly	Testing of the assembled system at 1.1 times the working pressure
3.3	**Shale Shaker**			
3.3.1	**Regulators panel assembly**	3.3.1.1	Procuring of physical resources	Procurement of equipment and materials required as per the approved design documents

WBS ID	WORK PACKAGE	Activity Number	ACTIVITY NAME	DESCRIPTION
	and manifolds assembly	3.3.1.2	Fabricating manifolds and equipment support	Fabrication of breathing air manifolds and equipment support
		3.3.1.3	Assembly and installation of manifolds and regulator panels	Assembly and installation of the breathing air manifolds and regulator panel installation
		3.3.1.4	Installing S.S tubing between the manifolds and regulator panels	Connection of the regulator panel and the breathing air manifold with high-pressure stainless-steel tubing
		3.3.1.5	Testing the integrated assembly	Testing of the assembled system at 1.1 times the working pressure
4	Machinery			
4.1	**Mud Pit**			
4.1.1	**Regulators panel assembly and manifolds assembly**	4.1.1.1	Procuring of physical resources	Procurement of equipment and materials required as per the approved design documents
		4.1.1.2	Fabricating manifolds and equipment support	Fabrication of breathing air manifolds and equipment support
		4.1.1.3	Assembly and installation of manifolds and regulator panels	Assembly and installation of the breathing air manifolds and regulator panel installation
		4.1.1.4	Installing S.S tubing between the manifolds and regulator panels	Connection of the regulator panel and the breathing air manifold with high-pressure stainless-steel tubing
		4.1.1.5	Testing the integrated assembly	Testing of the assembled system at 1.1 times the working pressure
4.2	**Mud Pump**			
4.2.1	**Regulators panel assembly**	4.2.1.1	Procuring of physical resources	Procurement of equipment and materials required as per the approved design documents

WBS ID	WORK PACKAGE	Activity Number	ACTIVITY NAME	DESCRIPTION
	and manifolds assembly	4.2.1.2	Fabricating manifolds and equipment support	Fabrication of breathing air manifolds and equipment supports
		4.2.1.3	Assembly and installation of manifolds and regulator panels	Assembly and installation of the breathing air manifolds and regulator panel installation
		4.2.1.4	Installing S.S tubing between the manifolds and regulator panels	Connection of the regulator panel and the breathing air manifold with high-pressure stainless-steel tubing
		4.2.1.5	Testing the integrated assembly	Testing of the assembled system at 1.1 times the working pressure
4.3	**Engine room, Sack storage**			
4.3.1	**Regulators panel assembly and manifolds assembly**	4.3.1.1	Procuring of physical resources	Procurement of equipment and materials required as per the approved design documents
		4.3.1.2	Fabricating manifolds and equipment support	Fabrication of breathing air manifolds and equipment support
		4.3.1.3	Assembly and installation of manifolds and regulator panels	Assembly and installation of the breathing air manifolds and regulator panel installation
		4.3.1.4	Installing S.S tubing between the manifolds and regulator panels	Connection of the regulator panel and the breathing air manifold with high-pressure stainless-steel tubing
		4.3.1.5	Testing the integrated assembly	Testing of the assembled system at 1.1 times the working pressure
5	**Lifeboats**			
5.1	**Lifeboats No: 1, 2, 3**			

WBS ID	WORK PACKAGE	Activity Number	ACTIVITY NAME	DESCRIPTION
5.1.1	**Regulators panel assembly and manifolds assembly**	5.1.1.1	Procuring of physical resources	Procurement of equipment and materials required as per the approved design documents
		5.1.1.2	Fabricating manifolds and equipment support	Fabrication of breathing air manifolds and equipment support
		5.1.1.3	Assembly and installation of manifolds and regulator panels	Assembly and installation of the breathing air manifolds and regulator panel installation
		5.1.1.4	Installing S.S tubing between the manifolds and regulator panels	Connection of the regulator panel and the breathing air manifold with high-pressure stainless-steel tubing
		5.1.1.5	Testing the integrated assembly	Testing of the assembled system at 1.1 times the working pressure
6	**Drill Floor**			
6.1	**Stabbing Board**			
6.1.1	**Regulators panel assembly and manifolds assembly**	6.1.1.1	Procuring of physical resources	Procurement of equipment and materials required as per the approved design documents
		6.1.1.2	Fabricating manifolds and equipment support	Fabrication of breathing air manifolds and equipment support
		6.1.1.3	Assembly and installation of manifolds and regulator panels	Assembly and installation of the breathing air manifolds and regulator panel installation
		6.1.1.4	Installing S.S tubing between the manifolds and regulator panels	Connection of the regulator panel and the breathing air manifold with high-pressure stainless-steel tubing
		6.1.1.5	Testing the integrated assembly	Testing of the assembled system at 1.1 times the working pressure
6.2	**Monkey Board**			

WBS ID	WORK PACKAGE	Activity Number	ACTIVITY NAME	DESCRIPTION
6.2.1	**Regulators panel assembly and manifolds assembly**	6.2.1.1	Procuring of physical resources	Procurement of equipment and materials required as per the approved design documents
		6.2.1.2	Fabricating manifolds and equipment support	Fabrication of breathing air manifolds and equipment support
		6.2.1.3	Assembly and installation of manifolds and regulator panels	Assembly and installation of the breathing air manifolds and regulator panel installation
		6.2.1.4	Installing S.S tubing between the manifolds and regulator panels	Connection of the regulator panel and the breathing air manifold with high-pressure stainless-steel tubing
		6.2.1.5	Testing the integrated assembly	Testing of the assembled system at 1.1 times the working pressure
6.3	**Drilling Platform**			
6.3.1	**Regulators panel assembly and manifolds assembly**	6.3.1.1	Procuring of physical resources	Procurement of equipment and materials required as per the approved design documents
		6.3.1.2	Fabricating manifolds and equipment support	Fabrication of breathing air manifolds and equipment support
		6.3.1.3	Assembly and installation of manifolds and regulator panels	Assembly and installation of the breathing air manifolds and regulator panel installation
		6.3.1.4	Installing S.S tubing between the manifolds and regulator panels	Connection of the regulator panel and the breathing air manifold with high-pressure stainless-steel tubing
		6.3.1.5	Testing the integrated assembly	Testing of the assembled system at 1.1 times the working pressure

WBS ID	WORK PACKAGE	Activity Number	ACTIVITY NAME	DESCRIPTION
7	**Looping/ connecting the breathing air system area**			
7.1	**High pressure hose**	7.1.1	Procuring, Fabricating, and testing of hoses as per required lengths	Procurement of the hose materials and crimping the hoses as per the required length onboard
		7.1.2	Installing and securing the hoses	Running and securing the hose through the drag chain of the rig
		7.1.3	Connecting to the stainless-steel tubing.	Connecting the hose to the breathing air system stainless-steel tubes on both sides of the drag chain
7.2	**Stainless steel tubing**	7.2.1	Procuring of stainless-steel tubes and tube fittings.	Procurement of high pressure 3 stainless steel tubes and tube fittings as per the approved drawing
		7.2.2	Fabrication and installation of supports	Installation of supports on the bulkheads for fastening the stainless-steel tubes every 600 to 1000 mm along the proposed routing as per the approved drawings.
		7.2.3	Connecting all areas of the system together	Connecting the system equipment including the compressors, cylinder racks, lifeboats, and high-pressure hoses together
7.3	**Testing the complete system**	7.3.1	Testing the complete system to 1.1 times the working pressure	Testing the connected system at 1.1 times the working pressure

Note: Own Work

Chart 13

Milestone List (Source: Author)

Milestone List	
Milestone name	**Completion date**
Design Documents	30/09/2024
Accommodation Area breathing air system	07/01/2025
Main Deck Area breathing air system	31/10/2024
Machinery Area breathing air system	06/11/2024
Lifeboats breathing air system	26/12/2024
Drill Floor Area breathing air system	3/1/2025
Connection and Testing the complete breathing air system	11/02/2025

Note: Own Work

4.4.3 Sequence Activities and Estimate Activity Duration

In the process of Sequence activities, the project activities are sequenced after identifying and documenting the relations between them. In this process all the predecessors and successors of activities will be identified along with activity logical relationships, dependencies, leads, and lags. Estimate Activity duration gives us an estimate of the amount of time required for completing an individual activity using the resources booked for it (PMI, 2017).

The project team will use historical information from the organizational process assets and expert judgement from the experienced execution team to sequence activities and estimate their durations. Bottom-up estimation will be used to achieve the project duration

estimates. These inputs will then be used to create the project schedule using Microsoft Project Professional 2019.

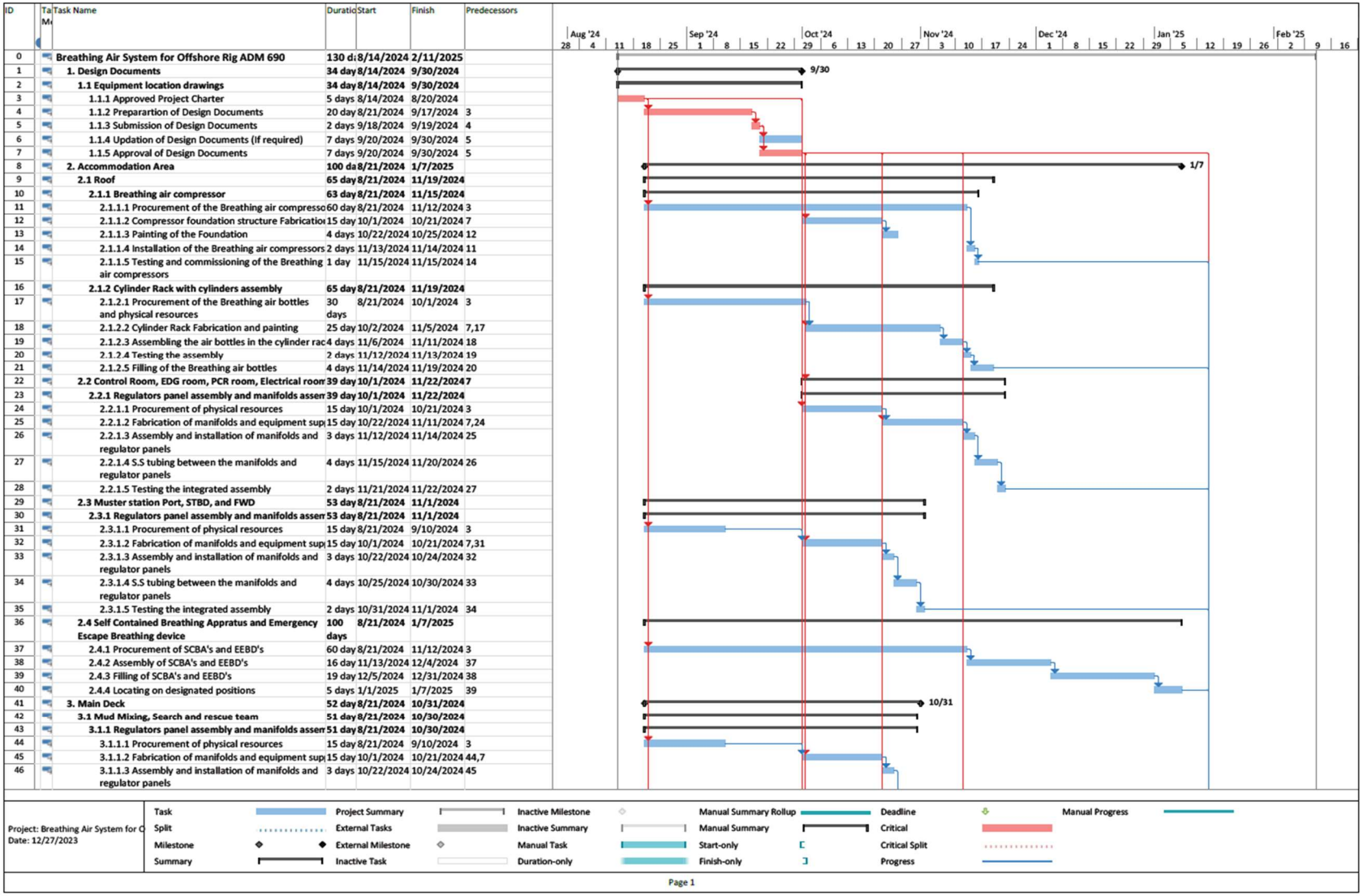
4.4.4 Develop Schedule

The project schedule refers to the schedule model that represents all the project activities with their planned dates, relations, duration estimates, and milestones.

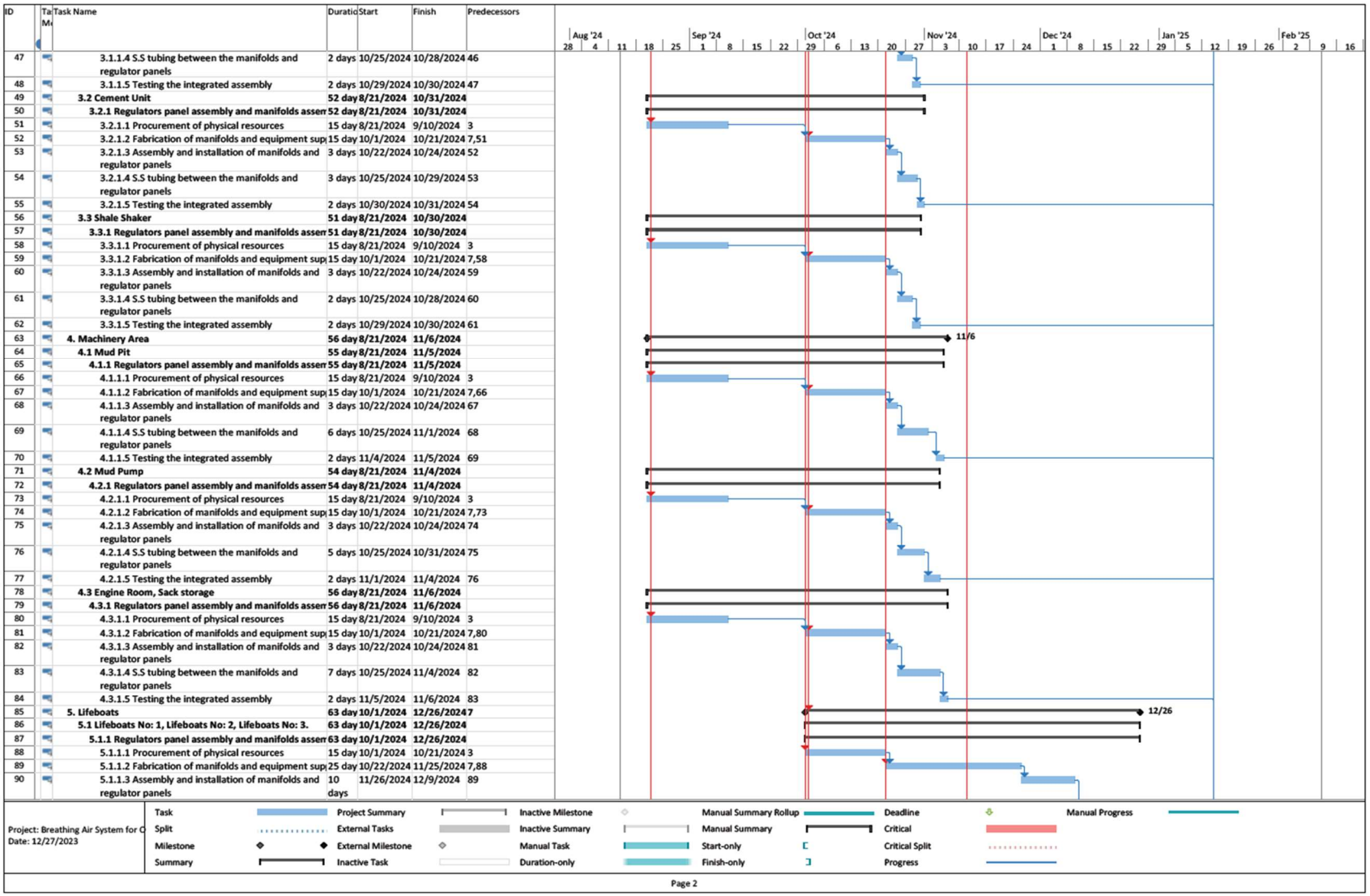
For the project of Installing a Breathing Air System For An Offshore Drilling Rig – ADM690, the identified activities, their dependencies and relations, and duration estimates will be fed into the Microsoft Project software to create the Project Schedule. Once the Project schedule is approved by the project sponsor, the schedule baseline will be used to monitor and control the project. The project schedule once baselined can be only changed through the formal change control procedure.

Figure 8

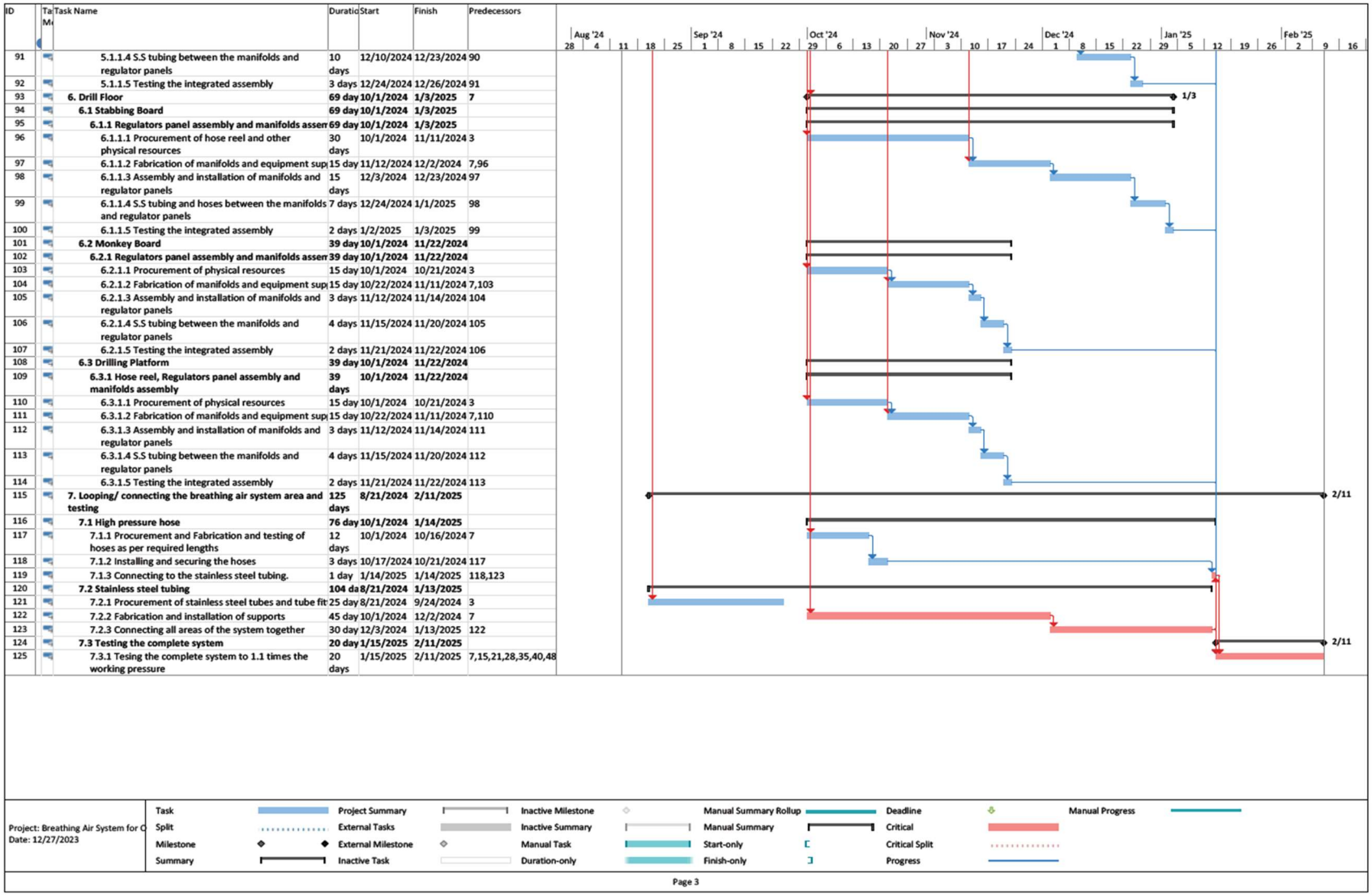
Project Schedule (Source: Author)



ID	Task Mode	Task Name	Duration	Start	Finish	Predecessors
0		**Breathing Air System for Offshore Rig ADM 690**	130 d	8/14/2024	2/11/2025	
1		**1. Design Documents**	34 day	8/14/2024	9/30/2024	
2		**1.1 Equipment location drawings**	34 day	8/14/2024	9/30/2024	
3		1.1.1 Approved Project Charter	5 days	8/14/2024	8/20/2024	
4		1.1.2 Prepararion of Design Documents	20 day	8/21/2024	9/17/2024	3
5		1.1.3 Submission of Design Documents	2 days	9/18/2024	9/19/2024	4
6		1.1.4 Updation of Design Documents (If required)	7 days	9/20/2024	9/30/2024	5
7		1.1.5 Approval of Design Documents	7 days	9/20/2024	9/30/2024	5
8		**2. Accommodation Area**	100 da	8/21/2024	1/7/2025	
9		**2.1 Roof**	65 day	8/21/2024	11/19/2024	
10		**2.1.1 Breathing air compressor**	63 day	8/21/2024	11/15/2024	
11		2.1.1.1 Procurement of the Breathing air compresso	60 day	8/21/2024	11/12/2024	3
12		2.1.1.2 Compressor foundation structure Fabricatio	15 day	10/1/2024	10/21/2024	7
13		2.1.1.3 Painting of the Foundation	4 days	10/22/2024	10/25/2024	12
14		2.1.1.4 Installation of the Breathing air compressors	2 days	11/13/2024	11/14/2024	11
15		2.1.1.5 Testing and commissioning of the Breathing air compressors	1 day	11/15/2024	11/15/2024	14
16		**2.1.2 Cylinder Rack with cylinders assembly**	65 day	8/21/2024	11/19/2024	
17		2.1.2.1 Procurement of the Breathing air bottles and physical resources	30 days	8/21/2024	10/1/2024	3
18		2.1.2.2 Cylinder Rack Fabrication and painting	25 day	10/2/2024	11/5/2024	7,17
19		2.1.2.3 Assembling the air bottles in the cylinder rac	4 days	11/6/2024	11/11/2024	18
20		2.1.2.4 Testing the assembly	2 days	11/12/2024	11/13/2024	19
21		2.1.2.5 Filling of the Breathing air bottles	4 days	11/14/2024	11/19/2024	20
22		**2.2 Control Room, EDG room, PCR room, Electrical room**	39 day	10/1/2024	11/22/2024	7
23		**2.2.1 Regulators panel assembly and manifolds assen**	39 day	10/1/2024	11/22/2024	
24		2.2.1.1 Procurement of physical resources	15 day	10/1/2024	10/21/2024	3
25		2.2.1.2 Fabrication of manifolds and equipment sup	15 day	10/22/2024	11/11/2024	7,24
26		2.2.1.3 Assembly and installation of manifolds and regulator panels	3 days	11/12/2024	11/14/2024	25
27		2.2.1.4 S.S tubing between the manifolds and regulator panels	4 days	11/15/2024	11/20/2024	26
28		2.2.1.5 Testing the integrated assembly	2 days	11/21/2024	11/22/2024	27
29		**2.3 Muster station Port, STBD, and FWD**	53 day	8/21/2024	11/1/2024	
30		**2.3.1 Regulators panel assembly and manifolds assen**	53 day	8/21/2024	11/1/2024	
31		2.3.1.1 Procurement of physical resources	15 day	8/21/2024	9/10/2024	3
32		2.3.1.2 Fabrication of manifolds and equipment sup	15 day	10/1/2024	10/21/2024	7,31
33		2.3.1.3 Assembly and installation of manifolds and regulator panels	3 days	10/22/2024	10/24/2024	32
34		2.3.1.4 S.S tubing between the manifolds and regulator panels	4 days	10/25/2024	10/30/2024	33
35		2.3.1.5 Testing the integrated assembly	2 days	10/31/2024	11/1/2024	34
36		**2.4 Self Contained Breathing Appratus and Emergency Escape Breathing device**	100 days	8/21/2024	1/7/2025	
37		2.4.1 Procurement of SCBA's and EEBD's	60 day	8/21/2024	11/12/2024	3
38		2.4.2 Assembly of SCBA's and EEBD's	16 day	11/13/2024	12/4/2024	37
39		2.4.3 Filling of SCBA's and EEBD's	19 day	12/5/2024	12/31/2024	38
40		2.4.4 Locating on designated positions	5 days	1/1/2025	1/7/2025	39
41		**3. Main Deck**	52 day	8/21/2024	10/31/2024	
42		**3.1 Mud Mixing, Search and rescue team**	51 day	8/21/2024	10/30/2024	
43		**3.1.1 Regulators panel assembly and manifolds assen**	51 day	8/21/2024	10/30/2024	
44		3.1.1.1 Procurement of physical resources	15 day	8/21/2024	9/10/2024	3
45		3.1.1.2 Fabrication of manifolds and equipment sup	15 day	10/1/2024	10/21/2024	44,7
46		3.1.1.3 Assembly and installation of manifolds and regulator panels	3 days	10/22/2024	10/24/2024	45



ID	Task Mode	Task Name	Duration	Start	Finish	Predecessors
47		3.1.1.4 S.S tubing between the manifolds and regulator panels	2 days	10/25/2024	10/28/2024	46
48		3.1.1.5 Testing the integrated assembly	2 days	10/29/2024	10/30/2024	47
49		**3.2 Cement Unit**	**52 day**	**8/21/2024**	**10/31/2024**	
50		**3.2.1 Regulators panel assembly and manifolds assem**	**52 day**	**8/21/2024**	**10/31/2024**	
51		3.2.1.1 Procurement of physical resources	15 day	8/21/2024	9/10/2024	3
52		3.2.1.2 Fabrication of manifolds and equipment sup	15 day	10/1/2024	10/21/2024	7,51
53		3.2.1.3 Assembly and installation of manifolds and regulator panels	3 days	10/22/2024	10/24/2024	52
54		3.2.1.4 S.S tubing between the manifolds and regulator panels	3 days	10/25/2024	10/29/2024	53
55		3.2.1.5 Testing the integrated assembly	2 days	10/30/2024	10/31/2024	54
56		**3.3 Shale Shaker**	**51 day**	**8/21/2024**	**10/30/2024**	
57		**3.3.1 Regulators panel assembly and manifolds assem**	**51 day**	**8/21/2024**	**10/30/2024**	
58		3.3.1.1 Procurement of physical resources	15 day	8/21/2024	9/10/2024	3
59		3.3.1.2 Fabrication of manifolds and equipment sup	15 day	10/1/2024	10/21/2024	7,58
60		3.3.1.3 Assembly and installation of manifolds and regulator panels	3 days	10/22/2024	10/24/2024	59
61		3.3.1.4 S.S tubing between the manifolds and regulator panels	2 days	10/25/2024	10/28/2024	60
62		3.3.1.5 Testing the integrated assembly	2 days	10/29/2024	10/30/2024	61
63		**4. Machinery Area**	**56 day**	**8/21/2024**	**11/6/2024**	
64		**4.1 Mud Pit**	**55 day**	**8/21/2024**	**11/5/2024**	
65		**4.1.1 Regulators panel assembly and manifolds assem**	**55 day**	**8/21/2024**	**11/5/2024**	
66		4.1.1.1 Procurement of physical resources	15 day	8/21/2024	9/10/2024	3
67		4.1.1.2 Fabrication of manifolds and equipment sup	15 day	10/1/2024	10/21/2024	7,66
68		4.1.1.3 Assembly and installation of manifolds and regulator panels	3 days	10/22/2024	10/24/2024	67
69		4.1.1.4 S.S tubing between the manifolds and regulator panels	6 days	10/25/2024	11/1/2024	68
70		4.1.1.5 Testing the integrated assembly	2 days	11/4/2024	11/5/2024	69
71		**4.2 Mud Pump**	**54 day**	**8/21/2024**	**11/4/2024**	
72		**4.2.1 Regulators panel assembly and manifolds assem**	**54 day**	**8/21/2024**	**11/4/2024**	
73		4.2.1.1 Procurement of physical resources	15 day	8/21/2024	9/10/2024	3
74		4.2.1.2 Fabrication of manifolds and equipment sup	15 day	10/1/2024	10/21/2024	7,73
75		4.2.1.3 Assembly and installation of manifolds and regulator panels	3 days	10/22/2024	10/24/2024	74
76		4.2.1.4 S.S tubing between the manifolds and regulator panels	5 days	10/25/2024	10/31/2024	75
77		4.2.1.5 Testing the integrated assembly	2 days	11/1/2024	11/4/2024	76
78		**4.3 Engine Room, Sack storage**	**56 day**	**8/21/2024**	**11/6/2024**	
79		**4.3.1 Regulators panel assembly and manifolds assem**	**56 day**	**8/21/2024**	**11/6/2024**	
80		4.3.1.1 Procurement of physical resources	15 day	8/21/2024	9/10/2024	3
81		4.3.1.2 Fabrication of manifolds and equipment sup	15 day	10/1/2024	10/21/2024	7,80
82		4.3.1.3 Assembly and installation of manifolds and regulator panels	3 days	10/22/2024	10/24/2024	81
83		4.3.1.4 S.S tubing between the manifolds and regulator panels	7 days	10/25/2024	11/4/2024	82
84		4.3.1.5 Testing the integrated assembly	2 days	11/5/2024	11/6/2024	83
85		**5. Lifeboats**	**63 day**	**10/1/2024**	**12/26/2024**	7
86		**5.1 Lifeboats No: 1, Lifeboats No: 2, Lifeboats No: 3.**	**63 day**	**10/1/2024**	**12/26/2024**	
87		**5.1.1 Regulators panel assembly and manifolds assem**	**63 day**	**10/1/2024**	**12/26/2024**	
88		5.1.1.1 Procurement of physical resources	15 day	10/1/2024	10/21/2024	3
89		5.1.1.2 Fabrication of manifolds and equipment sup	25 day	10/22/2024	11/25/2024	7,88
90		5.1.1.3 Assembly and installation of manifolds and regulator panels	10 days	11/26/2024	12/9/2024	89



ID	Task Mode	Task Name	Duration	Start	Finish	Predecessors
91		5.1.1.4 S.S tubing between the manifolds and regulator panels	10 days	12/10/2024	12/23/2024	90
92		5.1.1.5 Testing the integrated assembly	3 days	12/24/2024	12/26/2024	91
93		**6. Drill Floor**	**69 days**	**10/1/2024**	**1/3/2025**	**7**
94		**6.1 Stabbing Board**	**69 days**	**10/1/2024**	**1/3/2025**	
95		**6.1.1 Regulators panel assembly and manifolds assem**	**69 days**	**10/1/2024**	**1/3/2025**	
96		6.1.1.1 Procurement of hose reel and other physical resources	30 days	10/1/2024	11/11/2024	3
97		6.1.1.2 Fabrication of manifolds and equipment sup	15 days	11/12/2024	12/2/2024	7,96
98		6.1.1.3 Assembly and installation of manifolds and regulator panels	15 days	12/3/2024	12/23/2024	97
99		6.1.1.4 S.S tubing and hoses between the manifolds and regulator panels	7 days	12/24/2024	1/1/2025	98
100		6.1.1.5 Testing the integrated assembly	2 days	1/2/2025	1/3/2025	99
101		**6.2 Monkey Board**	**39 days**	**10/1/2024**	**11/22/2024**	
102		**6.2.1 Regulators panel assembly and manifolds assem**	**39 days**	**10/1/2024**	**11/22/2024**	
103		6.2.1.1 Procurement of physical resources	15 days	10/1/2024	10/21/2024	3
104		6.2.1.2 Fabrication of manifolds and equipment sup	15 days	10/22/2024	11/11/2024	7,103
105		6.2.1.3 Assembly and installation of manifolds and regulator panels	3 days	11/12/2024	11/14/2024	104
106		6.2.1.4 S.S tubing between the manifolds and regulator panels	4 days	11/15/2024	11/20/2024	105
107		6.2.1.5 Testing the integrated assembly	2 days	11/21/2024	11/22/2024	106
108		**6.3 Drilling Platform**	**39 days**	**10/1/2024**	**11/22/2024**	
109		**6.3.1 Hose reel, Regulators panel assembly and manifolds assembly**	**39 days**	**10/1/2024**	**11/22/2024**	
110		6.3.1.1 Procurement of physical resources	15 days	10/1/2024	10/21/2024	3
111		6.3.1.2 Fabrication of manifolds and equipment sup	15 days	10/22/2024	11/11/2024	7,110
112		6.3.1.3 Assembly and installation of manifolds and regulator panels	3 days	11/12/2024	11/14/2024	111
113		6.3.1.4 S.S tubing between the manifolds and regulator panels	4 days	11/15/2024	11/20/2024	112
114		6.3.1.5 Testing the integrated assembly	2 days	11/21/2024	11/22/2024	113
115		**7. Looping/ connecting the breathing air system area and testing**	**125 days**	**8/21/2024**	**2/11/2025**	
116		**7.1 High pressure hose**	**76 days**	**10/1/2024**	**1/14/2025**	
117		7.1.1 Procurement and Fabrication and testing of hoses as per required lengths	12 days	10/1/2024	10/16/2024	7
118		7.1.2 Installing and securing the hoses	3 days	10/17/2024	10/21/2024	117
119		7.1.3 Connecting to the stainless steel tubing.	1 day	1/14/2025	1/14/2025	118,123
120		**7.2 Stainless steel tubing**	**104 da**	**8/21/2024**	**1/13/2025**	
121		7.2.1 Procurement of stainless steel tubes and tube fit	25 days	8/21/2024	9/24/2024	3
122		7.2.2 Fabrication and installation of supports	45 days	10/1/2024	12/2/2024	7
123		7.2.3 Connecting all areas of the system together	30 days	12/3/2024	1/13/2025	122
124		**7.3 Testing the complete system**	**20 days**	**1/15/2025**	**2/11/2025**	
125		7.3.1 Tesing the complete system to 1.1 times the working pressure	20 days	1/15/2025	2/11/2025	7,15,21,28,35,40,48

Note: Own Work

4.4.5 Control Schedule

Control schedule is the process of monitoring the project's status against the schedule baseline and managing changes to the schedule baseline if required (PMI, 2017). For this project, the created project schedule will be reviewed by the project manager and submitted for approval by the project sponsor and the client. Once the schedule is baselined, any further changes to the baseline will be routed through the perform integrated change control process.

After the project execution begins, the project manager will get the updates from the project team with regards to the project schedule. The project manager will compare the actual status of the project against the plan and manage changes to the project schedule. Earned Value Management (EVM) will be used to monitor the project's performance by comparing the planned value (PV) and earned value (EV) for the control accounts points. The project team will determine the PV, which refers to the planned budget to be spent at any point in the project and this will be compared to the budgeted cost of work performed (EV) to determine the project's schedule status. The schedule variance (EV-PV) and ratio (SPI=EV/PV) between the EV and AC will be used to determine how the project is performing,

EV>PV, SPI>1, project is ahead of schedule.

EV<PV, SPI<1, project is behind schedule.

EV=PV, SPI=0, project is exactly on schedule.

The project manager can apply preventive action to avert projected schedule variances or corrective actions to get minor schedule differences back on track. This performance review meeting will be held once every week.

Any schedule variances equal to or greater than negative 5%, must be reported to the project sponsor and will follow the perform integrated change control process, where the project sponsor will approve the implementation of the change request proposed by the project team or propose one himself. The project sponsor will also verify the current validity of the approved project schedule and confirm if it needs to be updated and re-baselined.

4.5 Cost Management Plan

4.5.1 Cost management plan

This plan determines how the project's costs will be planned, structured, and controlled. The plan explains the tools and techniques associated with the project management processes (PMI, 2017).

The cost management plan will provide information on the project of Installing a Breathing Air System for the Rig ADM-690, such as:

- Units of measurement: Will be measured in days for the equipment and human resources
- Level of Accuracy: The acceptable range for estimate cost is ±10%, using bottom-up estimation technique

- Control threshold: Cost variance of equal to or greater than 5% or Cost Performance Index of 0.95
- Rules for performance measurement: The project performance will be monitored at the control accounts and at the end of every week

4.5.2 Estimate Cost

This project management process helps determine the monetary resources required for the project by developing an approximate cost of resources needed for the project work (PMI, 2017, p. 240). The cost estimates for the project will apply the charges for labor, materials, equipment, services, cost of quality, and facilities to all the project activities.

Chart 14

Estimate Cost (Source: Author)

WBS Code	Control Account	Description	Aug-24	Sep-24	Oct-24	Nov-24	Dec-24	Jan-25	Feb-25	Mar-25	Total
1	100000	**Design Documents**									5000
1.1		**Equipment location drawings**									
1.1.1		Approved Project Charter	0	0	0	0	0	0	0	0	
1.1.2		Preparation of Design Documents	5000	0	0	0	0	0	0	0	
1.1.3		Submission of Design Documents	0	0	0	0	0	0	0	0	
1.1.4		Updating of Design Documents (If required)	0	0	0	0	0	0	0	0	
1.1.5		Approval of Design Documents	0	0	0	0	0	0	0	0	
2	200000	**Accommodation Area**									748200
2.1	210000	**Roof**									475000
2.1.1	211000	**Breathing air compressor**									115000
2.1.1.1		Procurement of the Breathing air compressors	25800	25800	25800	25800	0	0	0	0	
2.1.1.2		Compressor foundation structure Fabrication	0	0	9000	0	0	0	0	0	
2.1.1.3		Painting of the Foundation	0	0	1200	0	0	0	0	0	
2.1.1.4		Installation of the Breathing air compressors	0	0	0	600	0	0	0	0	
2.1.1.5		Testing and commissioning of the Breathing air compressors	0	0	0	1000	0	0	0	0	
2.1.2	212000	**Cylinder Rack with cylinders assembly**									246400
2.1.2.1		Procurement of the Breathing air bottles and physical resources	0	220000	0	0	0	0	0	0	
2.1.2.2		Cylinder Rack Fabrication and painting	0	0	15000	0	0	0	0	0	
2.1.2.3		Assembling the air bottles in the cylinder rack	0	0	0	7200	0	0	0	0	

WBS Code	Control Account	Description	Aug-24	Sep-24	Oct-24	Nov-24	Dec-24	Jan-25	Feb-25	Mar-25	Total
2.1.2.4		Testing the assembly	0	0	0	1800	0	0	0	0	
2.1.2.5		Filling of the Breathing air bottles	0	0	0	2400	0	0	0	0	
2.2	220000	**Control room, EDG room, PCR room, Electrical room**									9700
2.2.1		**Regulators panel assembly and manifolds assembly**	0	0	0	0	0	0	0	0	
2.2.1.1		Procurement of physical resources	0	0	2500	0	0	0	0	0	
2.2.1.2		Fabrication of manifolds and equipment support	0	0	2250	2250	0	0	0	0	
2.2.1.3		Assembly and installation of manifolds and regulator panels	0	0	0	900	0	0	0	0	
2.2.1.4		S.S tubing between the manifolds and regulator panels	0	0	0	1200	0	0	0	0	
2.2.1.5		Testing the integrated assembly	0	0	0	600	0	0	0	0	
2.3	230000	**Muster station FWD, Port and STBD**									43600
2.3.1		**Regulators panel assembly and manifolds assembly**	0	0	0	0	0	0	0	0	
2.3.1.1		Procurement of physical resources	20000	20000	0	0	0	0	0	0	
2.3.1.2		Fabrication of manifolds and equipment support	0	0	2250	0	0	0	0	0	
2.3.1.3		Assembly and installation of manifolds and regulator panels	0	0	450	0	0	0	0	0	
2.3.1.4		S.S tubing between the manifolds and regulator panels	0	0	600	0	0	0	0	0	
2.3.1.5		Testing the integrated assembly	0	0	0	300	0	0	0	0	
2.4	240000	**Self-Contained Breathing Apparatus and Emergency Escape Breathing device**									219900
2.4.1		Procurement of SCBA's and EEBD's	37875	37875	37875	37875	0	0	0	0	
2.4.2		Assembly of SCBA's and EEBD's	0	0	0	24000	24000	0	0	0	

WBS Code	Control Account	Description	Aug-24	Sep-24	Oct-24	Nov-24	Dec-24	Jan-25	Feb-25	Mar-25	Total
2.4.3		Filling of SCBA's and EEBD's	0	0	0	0	6000	6000	0	0	
2.4.4		Locating on designated locations	0	0	0	0	0	8400	0	0	
3	300000	**Main Deck**									9900
3.1	310000	**Mud mixing, Search and rescue team**									5100
3.1.1		**Regulators panel assembly and manifolds assembly**	0	0	0	0	0	0	0	0	
3.1.1.1		Procurement of physical resources	1162.5	1162.5	0	0	0	0	0	0	
3.1.1.2		Fabrication of manifolds and equipment support	0	0	2250	0	0	0	0	0	
3.1.1.3		Assembly and installation of manifolds and regulator panels	0	0	225	0	0	0	0	0	
3.1.1.4		S.S tubing between the manifolds and regulator panels	0	0	150	0	0	0	0	0	
3.1.1.5		Testing the integrated assembly	0	0	150	0	0	0	0	0	
3.2	320000	**Cement Unit**									2400
3.2.1		**Regulators panel assembly and manifolds assembly**	0	0	0	0	0	0	0	0	
3.2.1.1		Procurement of physical resources	337.5	337.5	0	0	0	0	0	0	
3.2.1.2		Fabrication of manifolds and equipment support	0	0	1125	0	0	0	0	0	
3.2.1.3		Assembly and installation of manifolds and regulator panels	0	0	225	0	0	0	0	0	
3.2.1.4		S.S tubing between the manifolds and regulator panels	0	0	225	0	0	0	0	0	
3.2.1.5		Testing the integrated assembly	0	0	150	0	0	0	0	0	
3.3	330000	**Shale Shaker**									2400
3.3.1		**Regulators panel assembly and manifolds assembly**	0	0	0	0	0	0	0	0	

WBS Code	Control Account	Description	Aug-24	Sep-24	Oct-24	Nov-24	Dec-24	Jan-25	Feb-25	Mar-25	Total
3.3.1.1		Procurement of physical resources	375	375	0	0	0	0	0	0	
3.3.1.2		Fabrication of manifolds and equipment support	0	0	1125	0	0	0	0	0	
3.3.1.3		Assembly and installation of manifolds and regulator panels	0	0	225	0	0	0	0	0	
3.3.1.4		S.S tubing between the manifolds and regulator panels	0	0	150	0	0	0	0	0	
3.3.1.5		Testing the integrated assembly	0	0		150	0	0	0	0	
4	400000	**Machinery Area**									8100
4.1	410000	**Mud Pit**									2050
4.1.1		**Regulators panel assembly and manifolds assembly**									
4.1.1.1		Procurement of physical resources	50	50	0	0	0	0	0	0	
4.1.1.2		Fabrication of manifolds and equipment support	0	125	1000	0	0	0	0	0	
4.1.1.3		Assembly and installation of manifolds and regulator panels	0	0	225	0	0	0	0	0	
4.1.1.4		S.S tubing between the manifolds and regulator panels	0	0	450	0	0	0	0	0	
4.1.1.5		Testing the integrated assembly	0	0		150	0	0	0	0	
4.2	420000	**Mud Pump**									2050
4.2.1		**Regulators panel assembly and manifolds assembly**	0	0	0	0	0	0	0	0	
4.2.1.1		Procurement of physical resources	150	160	0	0	0	0	0	0	
4.2.1.2		Fabrication of manifolds and equipment support	0	0	900	0	0	0	0	0	
4.2.1.3		Assembly and installation of manifolds and regulator panels	0	0	180	0	0	0	0	0	

WBS Code	Control Account	Description	Aug-24	Sep-24	Oct-24	Nov-24	Dec-24	Jan-25	Feb-25	Mar-25	Total
4.2.1.4		S.S tubing between the manifolds and regulator panels	0	0	0	300	0	0	0	0	
4.2.1.5		Testing the integrated assembly	0	0	0	360	0	0	0	0	
4.3	430000	**Engine room, Sack storage**									4000
4.3.1		**Regulators panel assembly and manifolds assembly**	0	0	0	0	0	0	0	0	
4.3.1.1		Procurement of physical resources	975	1000	0	0	0	0	0	0	
4.3.1.2		Fabrication of manifolds and equipment support	0	1125	0	0	0	0	0	0	
4.3.1.3		Assembly and installation of manifolds and regulator panels	0	225	0	0	0	0	0	0	
4.3.1.4		S.S tubing between the manifolds and regulator panels	0	0	250	275	0	0	0	0	
4.3.1.5		Testing the integrated assembly	0	0	0	150	0	0	0	0	
5	500000	**Lifeboats**									73500
5.1		**Lifeboats No: 1, 2, 3**									
5.1.1		**Regulators panel assembly and manifolds assembly**									
5.1.1.1		Procurement of physical resources	0	0	51900	0	0	0	0	0	
5.1.1.2		Fabrication of manifolds and equipment support	0	0	1250	10000	0	0	0	0	
5.1.1.3		Assembly and installation of manifolds and regulator panels	0	0	0	2000	2500	0	0	0	
5.1.1.4		S.S tubing between the manifolds and regulator panels	0	0	0	0	4500	0	0	0	
5.1.1.5		Testing the integrated assembly	0	0	0	0	1350	0	0	0	
6	600000	**Drill Floor**									8400
6.1	610000	**Stabbing Board**									2000

WBS Code	Control Account	Description	Aug-24	Sep-24	Oct-24	Nov-24	Dec-24	Jan-25	Feb-25	Mar-25	Total
6.1.1		**Regulators panel assembly and manifolds assembly**									
6.1.1.1		Procurement of physical resources	0	0	220	220	0	0	0	0	
6.1.1.2		Fabrication of manifolds and equipment support	0	0	0	300	300	0	0	0	
6.1.1.3		Assembly and installation of manifolds and regulator panels	0	0	0	0	600	0	0	0	
6.1.1.4		S.S tubing between the manifolds and regulator panels	0	0	0	0	0	280	0	0	
6.1.1.5		Testing the integrated assembly	0	0	0	0	0	80	0	0	
6.2	620000	**Monkey Board**									1900
6.2.1		**Regulators panel assembly and manifolds assembly**									
6.2.1.1		Procurement of physical resources	0	0	100	0	0	0	0	0	
6.2.1.2		Fabrication of manifolds and equipment support	0	0	500	625	0	0	0	0	
6.2.1.3		Assembly and installation of manifolds and regulator panels	0	0	0	225	0	0	0	0	
6.2.1.4		S.S tubing between the manifolds and regulator panels	0	0	0	300	0	0	0	0	
6.2.1.5		Testing the integrated assembly	0	0	0	150	0	0	0	0	
6.3	630000	**Drilling Platform**									4500
6.3.1		**Regulators panel assembly and manifolds assembly**									
6.3.1.1		Procurement of physical resources	0	0	2700	0	0	0	0	0	
6.3.1.2		Fabrication of manifolds and equipment support	0	0	0	1125	0	0	0	0	
6.3.1.3		Assembly and installation of manifolds and regulator panels	0	0	0	225	0	0	0	0	

WBS Code	Control Account	Description	Aug-24	Sep-24	Oct-24	Nov-24	Dec-24	Jan-25	Feb-25	Mar-25	Total
6.3.1.4		S.S tubing between the manifolds and regulator panels	0	0	0	300	0	0	0	0	
6.3.1.5		Testing the integrated assembly	0	0	0	150	0	0	0	0	
7	700000	**Looping/ connecting the breathing air system area**									16900
7.1	710000	**High pressure hose**									2000
7.1.1		Procurement and Fabrication and testing of hoses as per required lengths	0	0	1475	0	0	0	0	0	
7.1.2		Installing and securing the hoses	0	0	450	0	0	0	0	0	
7.1.3		Connecting to the stainless-steel tubing.	0	0	0	0	0	75	0	0	
7.2	720000	**Stainless steel tubing**									8900
7.2.1		Procurement of stainless-steel tubes and tube fittings.	1500	1775	0	0	0	0	0	0	
7.2.2		Fabrication and installation of support	0	0	1500	1500	375	0	0	0	
7.2.3		Connecting all areas of the system together	0	0	0	0	1000	1250	0	0	
7.3	730000	**Testing the complete system**									6000
7.3.1		Testing the complete system to 1.1 times the working pressure	0	0	0	0	0	3000	3000	0	
		Total Cost Estimate/month	**93225**	**310010**	**166025**	**124430**	**40625**	**19085**	**3000**	**0**	

Note: Own Work

4.5.3 Determine Project Budget

Then using bottom-up estimation the activity cost estimates will be aggregated to achieve the project's budget after applying the 8% contingency reserve and 7% management reserve.

Chart 15

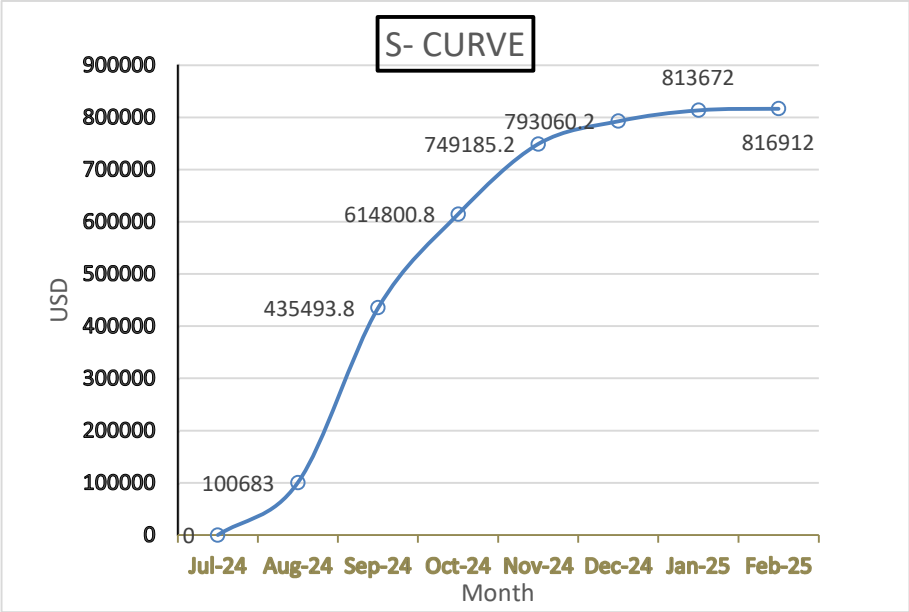
Determining Project Budget (Source: Author)

Description	USD Aug-24	USD Sep-24	USD Oct-24	USD Nov-24	USD Dec-24	USD Jan-25	USD Feb-25	USD Mar-25	USD Total
Project Cost Estimate month wise in USD	93225	310010	166025	124430	40625	19085	3000	0	**756400**
Cost Baseline: (with 8% contingency Reserve)	100683	334811	179307	134384	43875	20612	3240	0	**816912**
Management Reserve - 7% (Amount)	6525.8	21701	11622	8710.1	2843.8	1336	210	0	52948
Project Budget:	107209	356512	190929	143095	46719	21948	3450	0	**869860**

Note: Own Work

Figure 9

Scope baseline, S - Curve (Source: Author)



Note: Own Work

4.5.4 Project Funding requirements

The funds for the projects will be released to the team as per the amounts specified in Chart 16 below. These periodic funding requirements are derived from the project's cost baseline and will be released by the organization's finance department at the beginning of every month. Additionally, there will be a management reserve amount of USD 52948.00 that will be available to the project team for any unforeseen negative risk that occurs provided the project sponsor approves it.

Chart 16

Project Funding Requirements (Source: Author)

Project Funding Needs	**1-Aug-2024**	**1-Sep-2024**	**1-Oct-2024**	**1-Nov-2024**	**1-Dec-2024**	**1-Jan-2025**	**1-Feb-2025**	**1-Mar-2025**	**Total**
Cost Baseline requirement	100683	334810.8	179307	134384.4	43875	20611.8	3240	0	**816912**
Management Reserve (If and when required)	52948								**52948**

Note: Own Work

4.5.5 Controlling Cost

The process of control costs aims to monitor the project status and manage the cost baseline with the aim to maintain the cost baseline throughout the project (PMI, 2017, p.257). The Project Manager will be responsible for monitoring the project budget. He will be supported by the project engineer, the accountant, and the project team in collecting the work performance data and assist in preparing the reports to monitor the project's cost. Earned Value Management (EVM) will be used to monitor the project's performance by comparing the three criteria of PV, AC, and EV for the work packages and control accounts.

For controlling the project costs, the project team will collect the data that will help determine the actual money amount (actual cost, AC) spent to complete the work for all the control accounts points till date. This consumed amount will then be compared to the achieved earned value (EV) from the project work completed. This variance and ratio (CPI=EC/AC) between the EV and AC will be used to determine how the project is performing,

EV>AC, CPI>1, project costs are less than originally planned for the current progress.

EV<AC, CPI<1, project costs are higher than originally planned for the current progress.

EV=AC, CPI=0, project cost is exactly as planned for the current progress.

Cost variance of equal to or greater than 5% or Cost Performance Index of 0.95 must be studied for the root cause and highlighted to the project sponsor immediately. The

project sponsor and the project manager will then approve a change request for corrective action or update the cost baseline to provide a realistic basis for monitoring project costs.

4.6 Quality Management Plan

This plan will describe how the policies, procedures, and guidelines will be applied to achieve the project's quality standards. It tells us about the activities and the resources required by the project team to fulfill the project's quality standards (PMI, 2017, p-286). The project management plan for Installing a Breathing Air System For An Offshore Drilling Rig – Admarine 690 will inform us about the quality standards used, quality objectives, quality roles and responsibilities, quality activities, and quality monitoring and reporting.

4.6.1 Quality standards used:

ISO 9001:2015 - Quality management systems will be used for the project wherein established policies, procedures and guidelines will ensure that quality is achieved in every activity, process, or procedure.

4.6.2 Roles and responsibilities chart

Chart 17

Quality roles and responsibilities (Source: Author)

Role	Responsibilities
Collecting Project requirements	Project Manager
Initiating and following up on change requests Validation of project deliverables	Project Manager

Role	Responsibilities
Prepare and submit design documents with the equipment specifications to client	Design Manager
Assuring ordered equipment meets specifications	Sr. Procurement Engineer, Quality Assurance and Quality control team.
Fabrication of the equipment and their support, as per the approved drawing by following the set procedure and guidelines	Fabrication Lead
Assembly and installation of the Breathing air system and its components, as per the approved drawing by following the set procedure and guidelines	Project Engineer
Testing and commissioning of equipment, partial systems, and complete system by following the set procedure and guidelines	Project Engineer
Inspection of goods and equipment (physical resources) received in stock Inspect and verify deliverables	Quality Assurance and Quality control team
Project compliance to ISO 9000 series standard	Quality Assurance and Quality control team
Validate the Project deliverables	Client

Note: Own Work

4.6.3 Key Factors related to quality.

Chart 18

Key Quality Factors (Source: Author)

Factor	Factor Definition
Project completion	The project should be completed as per the approved scope and handed over no later than 6 months after project's initiation.

Factor	Factor Definition
Technical Compliance	The components and equipment should meet the technical specifications mentioned in the project requirements. The project should comply with the agreed upon Quality policies: ISO 9000 series.
Functionality	The functionality of the system should be validated through system commissioning with the ADES team. Training session to be provided while handing the system over to the client
Regulatory compliance	The project must comply with all the regulatory requirements as stated by SAUDI ARAMCO.
Budget	The project budget should not exceed USD 870,000.00

Note: Own Work

4.6.4 Metrics and Quality Baseline:

Quality Metrics specifically explain a project or product feature/ attribute, with information on how the control quality process will confirm the completion of the attribute (PMI, 2017).

Chart 19

Metrics and Quality Baseline (Source: Author)

Quality Objective	Metric	Metric definition	Expected outcome/result	Measurement frequency	Responsible
To complete the entire Project scope	Design documents are in line with the project's scope baseline	System design documents	Client and Saudi Aramco requirements are fulfilled	Once at the beginning of the project after scope baseline is approved	Design Manager

Quality Objective	Metric	Metric definition	Expected outcome/result	Measurement frequency	Responsible
To verify project physical resources	Project scope baseline/ Design documents	Physical resources (material, equipment) are as per project specifications	Verified physical resources	For every physical resource entering the project	Quality Assurance and Quality control team
Inspections to verify the equipment support for the breathing air system	Approved Design document	Fabrication and installation of the supports as per the approved design	Verified Deliverable	After completion of every activity	Quality Assurance and Quality control team
Inspections to validate the equipment installations for the breathing air system	Approved Design document	Installation of the system as per the approved design	Validated Deliverable	At the end of each work package	Project Engineer, Quality Assurance and Quality control team
Project Audits	Organization's policy OPA	Compliance to organization's policies, processes, and procedures	Quality reports with minimal comments/ improvements	From project initiation till closing	Quality assurance team
Testing and commissioning of the breathing air system	Approved commissioning procedure (Testing and evaluation documents)	Approved commissioning procedure	Validated Deliverable	After the completion of a work package	Project Engineer, Quality Assurance and Quality control team

Note: Own Work

4.6.5 Quality Activities Matrix:

Chart 20

Quality Activities Matrix (Source: Author)

Deliverable	Requirement	Manage and Control activities	Frequency	Responsible
Equipment location drawings/ details	Regulatory compliance: Meet the SAUDI ARAMCO standards	Manage: Activity to be performed by senior designers only Use OPA as a template for designing	For every design revision/ submission	Design Manager and Engineering team
		Control: The design document must be reviewed and approved by two levels of the design team hierarchy	For every design revision/ submission	Design Manager and Engineering team
Breathing air system for accommodation area	Functionality: To confirm that the system functions as designed Regulatory compliance: Meet the SAUDI ARAMCO standards	Manage: Equipment is ordered only from registered suppliers Installation is done as per the organization's approved procedures	For every installation	Quality Assurance, Quality control, Project Engineer
		Control: -Equipment is verified against the project specifications upon receipt of equipment at stores -Inspection after completion of every activity by competent person/supervisor - checklist to be used	After each installation activity	Quality control, Quality Assurance, Project Engineer
Breathing air system for the	Functionality: To confirm that the system	Manage: Equipment is ordered only from registered suppliers	For every installation	Quality Assurance, Quality control,

Deliverable	Requirement	Manage and Control activities	Frequency	Responsible
Main deck area	functions as designed Regulatory compliance: Meet the SAUDI ARAMCO standards	Installation is done as per the organization's approved procedures		Project Engineer
		Control: -Equipment is verified against the project specifications upon receipt of equipment at stores -Inspection after completion of every activity by competent person/supervisor - checklist to be used	After each installation activity	Quality control, Quality Assurance, Project Engineer
Breathing air system for the Machinery area	Functionality: To confirm that the system functions as designed Regulatory compliance: Meet the SAUDI ARAMCO standards	Manage: Equipment is ordered only from registered suppliers Installation is done as per the organization's approved procedures	For every installation	Quality Assurance, Quality control, Project Engineer
		Control: -Equipment is verified against the project specifications upon receipt of equipment at stores -Inspection after completion of every activity by competent person/supervisor - checklist to be used	After each installation activity	Quality control, Quality Assurance, Project Engineer
Breathing air system for the Lifeboats	Functionality: To confirm that the system functions as designed Regulatory compliance: Meet the	Manage: Equipment is ordered only from registered suppliers Installation is done as per the organization's approved procedures	For every installation	Quality Assurance, Quality control, Project Engineer
		Control:	After each installation activity	Quality control, Quality

Deliverable	Requirement	Manage and Control activities	Frequency	Responsible
	SAUDI ARAMCO standards	-Equipment is verified against the project specifications upon receipt of equipment at stores -Inspection after completion of every activity by competent person/supervisor - checklist to be used		Assurance, Project Engineer
Breathing air system for the Drill Floor	Functionality: To confirm that the system functions as designed Regulatory compliance: Meet the SAUDI ARAMCO standards	Manage: Equipment is ordered only from registered suppliers. Installation is done as per the organization's approved procedures	For every installation	Quality Assurance, Quality control, Project Engineer
		Control: -Equipment is verified against the project specifications upon receipt of equipment at stores -Inspection after completion of every activity by competent person/supervisor - checklist to be used	After each installation activity	Quality control, Quality Assurance, Project Engineer
Connected and tested breathing air system	Functionality: To confirm that the system functions as designed Regulatory compliance: Meet the SAUDI ARAMCO standards	Manage: -Testing and commissioning is done in line with the approved manufacturer's or organization's procedures - Cause and effect diagram to be referred	Once, after system validation	Project Engineer, Quality Assurance,
		Control: -Internal testing by project team internally, prior to stakeholder attendance for testing	One or two times, after system validation	Project Engineer, Quality control

Deliverable	Requirement	Manage and Control activities	Frequency	Responsible
		- Testing using cause and effect along with root cause analysis can be used		

Note: Own Work

4.1.6 Continuous improvement plan

Solas Marine Services aims to improve the organization's performance and competency by continuously looking for opportunities to improve. All the project knowledge is therefore collected and stored in a database for future reference. There is a research and development team to investigate ways to improve the provided systems. Below are some of the project management techniques used to aid the implementation of the Plan-Do-Check-Act cycle of continuous improvement:

- Data gathering techniques and data analysis techniques can be used to select an alternate breathing air system supplier for equipment such as the compressor, cylinder, regulators, hoses, etc.
- Benchmarking technique can be used to compete with another organization that completes installation in shorter durations, as compared to our six (6) months, using process analysis to reduce future project durations, e.g. Replacing bolted arrangement by rivetted arrangement to save installment time.
- Project documents like Issue log, lessons learnt, risk register from past projects to be discussed, highlighted and changes incorporated during the quality meetings to avoid repetitions.

- More frequent audits to be conducted to immediately highlight any deviations from the organization's procedures and processes.
- Frequent refresher training is to be arranged for team members to keep them motivated and competent.
- Client feedback and recommendations to be taken after closing every phase. These can be used to reform the organization's procedures and policies.

4.6.7 Quality Monitoring and Reporting

Internal audits will be conducted by the project's dedicated quality assurance team continuously for the entire duration of the project. This will help highlight any inconsistencies in any procedures thus helping to correct them or help the auditors identify any shortcomings in following the activity procedures set for the project. These audit/ quality reports once ready will be circulated along with the weekly quality communications. Similarly, inspections will be conducted by the quality control team when requests for inspections are submitted by the project engineer. These requests can be made upon the completion of an individual activity or a series of activities for every work package but prior to testing of the work packages. The quality control team will witness all testing and commissioning activities as well as inspecting the work packages to verify the project deliverables. The quality control measurements and work performance information will be reported to the project manager on a weekly basis at the end of every week.

4.7 Resource Management Plan

The resource management plan is a component of the project management plan that guides as to how the project's physical and team resources will be identified, categorized, acquired, allocated, managed, and released. The resource management plan for Installing a Breathing Air System For An Offshore Drilling Rig – Admarine 690 will tell us how:

- Resources will be identified and acquired
- Project organization charts
- Roles and responsibilities
- Project team resource management
- Training and Team development
- Resource control

4.7.1 Resource identification and acquisition

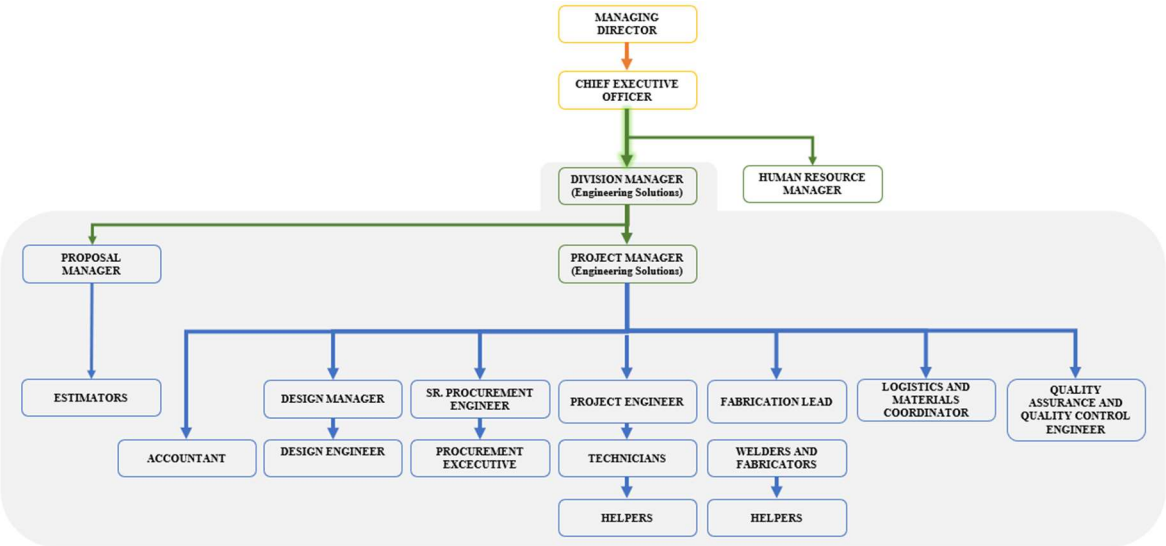
The estimation of the resources will be done using the tools and techniques of bottom-up estimation through meetings with the experienced team members. The compiled data along with historical information will be used for creating the resource estimates. The estimated resources will be pre-assigned to the project for the estimated duration and the project manager can acquire them as per the assigned schedule. Any change in dates or extension of team resources will be subjective to approval through the integrated change control process.

4.7.2 Organizational Breakdown Structure

Figure 10 below shows the organizational breakdown structure for Solas Marine Services and the hierarchical structure of the organization's project team.

Figure 10

Solas Marine Services Organizational structure (Source: By author)



Note: Own work

4.7.3 Roles and responsibilities

Chart 21 below shows the roles and responsibilities for the project's resource management activities.

Chart 21

Roles and responsibilities chart (Source: Author)

Role	Responsibilities
Client: ADES	To validate the specifications and physical resources used for the project To approve the use of additional resources in case of project delays
Project Sponsor: Division Manager	Approving the resource management plan and any updates to the plan To review, approve, or reject any change request for project resources To approve the use of additional resources in case of any internal project delays
Project Manager	Responsible for ensuring that the project resources are qualified and trained Follows up for the booked resources acquisitions, efficient usage, and release Preparation on the team charter Facilitating the creation of the resource management plan Reviewing change requests from the project team
Project Engineer	Creating the list of raw materials required for fabricating the equipment such as manifold, cylinder racks, equipment support, etc. for the project with the specifications and quantity Checking the training requirements and re-certification requirements for the technicians and helpers Coordinating with the project manager for project resource acquisitions and release
Design Manager	Creating the list of equipment required for the project with the required equipment with the specifications and quantity
Fabrication Lead	Creating the list of physical and people resources required for fabricating the equipment such as manifold, cylinder racks, equipment support, etc. for the project with the specifications and quantity Checking the training requirements and re-certification requirements for the welders, fabricators, and helpers Coordinating with the project manager for project resource acquisitions and release
Welders and Fabricators	To refer the equipment supports drawings and fabricate the structures by following the procedures set by the organization
QA/QC team	Inspecting the physical resources as they arrive in stock to confirm that the goods have been received as per the ordered specifications
Procurement Engineer	Ordering the resources from outside the organization in a timeframe that meets the project schedule and within the project budget. This information is communicated with the proposal manager to incorporate into the project management plan.
Technicians	To refer the equipment drawings to assemble, install, and test the system by following the procedures set by the organization

Role	Responsibilities
Proposal manager	Will collect the resource estimates from the project engineer and the fabrication lead to incorporate it into the project scope, schedule, and cost estimates
ASRY: Shipyard where project is conducted	Will confirm that the tools and equipment used at the project facility are certified, calibrated, and in good working condition for safe usage
Human Resource Manager	Hire new project team members as per the project's qualification requirements Issue recognition awards to the project team members

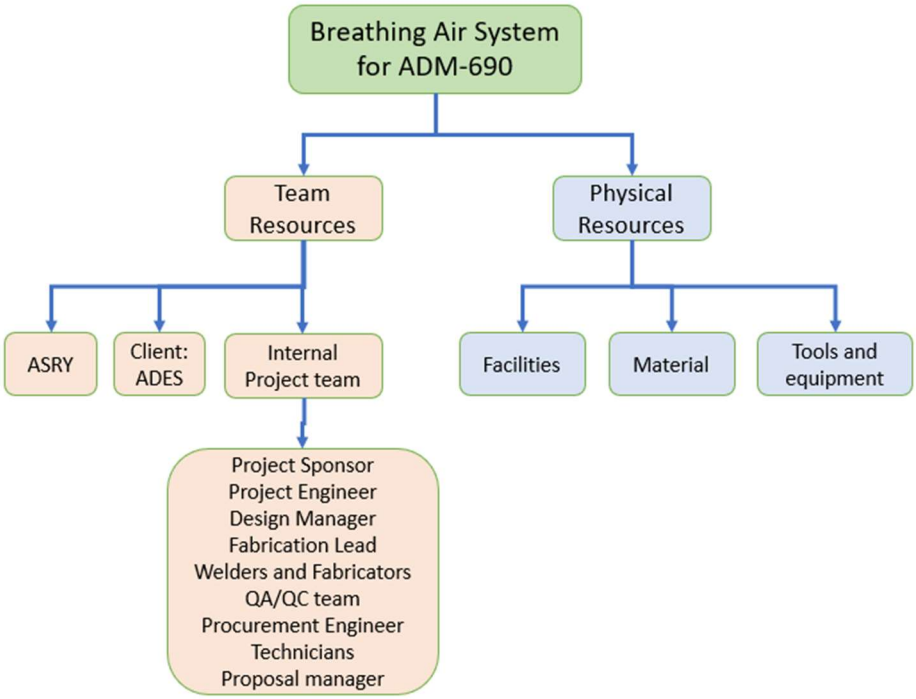
Note: Own work

4.7.4 Resource Breakdown Structure

Figure 11 below shows the resource breakdown structure for the project, explaining the hierarchical structure of team resources by category and resource type. Chart 21 and Chart 22 below support the resource breakdown structure and provides further information on the project's physical and team resources requirements. Chart 21 on the project's team resources lists out the human resources with a diverse set of skills that are required for the project, while Chart 22 on the project's physical resources include equipment, materials, facilities, and infrastructure needed for the project.

Figure 11

Resource breakdown structure (Source: By author)



Note: Own work

4.7.4.1 Project Team Resources

Chart 22

Team resources (Source: Author)

Role	**Type of Acquisition**	**Method of acquisition**
Project Sponsor: Division Manager	Permanent staff	Pre-assignment
Project Manager	Permanent staff	Pre-assignment
Project Engineer	Permanent staff	Pre-assignment
Design Manager	Permanent staff	Virtual team/ Pre-assignment
Fabrication Lead	Permanent staff	Pre-assignment

Role	**Type of Acquisition**	**Method of acquisition**
Welders and Fabricators	Permanent staff	Pre-assignment
QA/QC team	Permanent staff	Pre-assignment
Procurement Engineer	Permanent staff	Pre-assignment
Technicians	Permanent staff	Pre-assignment
Proposal manager	Permanent staff	Virtual team/ Pre-assignment
Human Resource Manager	Permanent staff	Virtual team/ Pre-assignment

Note: Own work

4.7.4.2 Project Physical Resources

Chart 23

Physical resources (Source: Author)

Physical Resource	Quantity	Method of Acquisition	Resource Category
Site Office	1 No	Owned	Facility
Office supplies	1 Set	Owned	Material
Design software	1 No	Owned	Tools & Equipment
Cutting machine, grinding machine, bending machine, welding machine, buffing machine, painting machine, etc.	1 Lot	Owned	Tools & Equipment
Nuts, bolts and fasteners	1 Lot	To be procured	Tools & Equipment
Cranes and forklifts	1 Lot	Client to provide	Tools & Equipment
Chipping tool, brush, primer, and paint	1 Lot	To be procured	Tools & Equipment
Stainless steel tubes, tube fittings, tube fasteners, and tube valves	1 Lot	To be procured	Material
Stainless steel pipes, pipe fittings, and pipe fasteners	1 Lot	To be procured	Material
Mild steel angles, mild steel square tubes, mild steel flat bars, and mild steel plates	1 Lot	To be procured	Material
Testing and commissioning equipment	10 Sets	Owned	Tools & Equipment
Breathing air cylinder, 300 BAR With Valve, 50Ltr.capacity	48 Nos	To be procured and assembled	Material
Breathing air manifold 2 outlets with 10 feet hoses	1 Nos	To be fabricated and assembled	Material
Breathing air manifold 3 outlets with 10 feet hoses	7 Nos	To be fabricated and assembled	Material
Breathing air manifold 4 outlets with 10 feet hoses	11 Nos	To be fabricated and assembled	Material
Breathing air manifold 5 outlets with 10 feet hoses	3 Nos	To be fabricated and assembled	Material

Physical Resource	Quantity	Method of Acquisition	Resource Category
Breathing air manifold 6 outlets with 10 feet hoses	1 Nos	To be fabricated and assembled	Material
Breathing air manifold 10 outlets with 10 feet hoses	22 Nos	To be fabricated and assembled	Material
Breathing air manifold 60 outlets with 10 feet hoses	3 Nos	To be fabricated and assembled	Material
High Pressure to Low Pressure, 1 Regulator Panel	8 Nos	To be procured and assembled	Material
High Pressure to Low Pressure, 3 Regulator Panel	2 Nos	To be procured and assembled	Material
High Pressure to Low Pressure, 5 Regulator Panel	3 Nos	To be procured and assembled	Material
High Pressure to Low Pressure, 6 Regulator Panel	3 Nos	To be procured and assembled	Material
BAUER / O-320E, Electrical air compressor (safe area type) capacity: 13cfm, pressure: 300bar, power: 3p-480v-60hz,55°c rated	2 Nos	To be procured	Material
BAUER / O-320D, Diesel air compressor (safe area type) capacity: 13cfm, pressure: 300bar, power: 55°c rated & battery charger	1 Nos	To be procured	Material
High pressure SS tubes and fittings	1 Set	To be procured and assembled	Material
High pressure Hoses	2 Nos	To be procured and assembled	Material
Retractable Hose Reel	1 Nos	To be procured	Material
Supply of assembled 30 minutes breathing air sets, SCBAs in protective cases	70 Nos	To be procured and assembled	Material
Supply of assembled 15 minutes breathing air sets, EEBDs in protective cases	211 Nos	To be procured and assembled	Material

Note: Own work

4.7.5 Responsibility Assignment Matrix: RACI Chart

The project for Installing a Breathing Air System For An Offshore Drilling Rig – Admarine 690 involves the client ADES, as well as different teams from within the organization. Therefore, a RACI chart as shown in Chart 24 below is used to ensure the clear assignment of roles and responsibilities.

Chart 24

RACI chart (Source: Author)

Project Tasks	**ADES**	**Project Sponsor**	**Project Manager**	**Project Engineer**	**Design Manager**	**Fabrication Lead**	**QA/QC team**	**Procurement Engineer**
Design documents: Creation, submission, and approval	C	C	A	I	R	I	I	I
Accommodation Area: Procurement	I	C	A	I	I	I	I	R
Accommodation Area: Fabrication	I	C	A,C	C,I	I	R	R	I
Accommodation Area: Installation	I	C	A,C	R	I	C,I	R	I
Accommodation Area: testing	I	C	A,C	R	I	I	R	I
Main deck area: Procurement	I	C	A	I	I	I	I	R
Main deck area: Fabrication	I	C	A,C	C,I	I	R	R	I
Main deck area: Installation	I	C	A,C	R	I	C,I	R	I
Main deck area: testing	I	C	A,C	R	I	I	R	I
Machinery area: Procurement	I	C	A	I	I	I	I	R
Machinery area: Fabrication	I	C	A,C	C,I	I	R	R	I
Machinery area: Installation	I	C	A,C	R	I	C,I	R	I
Machinery area: testing	I	C	A,C	R	I	I	R	I
Lifeboats: Procurement	I	C	A	I	I	I	I	R
Lifeboats: Fabrication	I	C	A,C	C,I	I	R	R	I
Lifeboats: Installation	I	C	A,C	R	I	C,I	R	I
Lifeboats: testing	I	C	A,C	R	I	I	R	I
Drill floor: Procurement	I	C	A	I	I	I	I	R
Drill floor: Fabrication	I	C	A,C	C,I	I	R	R	I

Project Tasks	ADES	Project Sponsor	Project Manager	Project Engineer	Design Manager	Fabrication Lead	QA/QC team	Procurement Engineer
Drill floor: Installation	I	C	A,C	R	I	C,I	R	I
Drill floor: testing	I	C	A,C	R	I	I	R	I
Looping, connecting, and testing: Procurement	I	C	A	I	I	I	I	R
Looping, connecting, and testing: Fabrication	I	C	A,C	C,I	I	R	R	I
Looping, connecting, and testing: Installation	I	C	A,C	R	I	C,I	R	I
Looping, connecting, and testing: testing	I	C	A,C	R	I	I	R	I

R: Responsible for completing the work
A: Accountable for ensuring task completion
C: Consulted before any decisions are made
I: Informed when a decision has been made

Note: Own work

4.7.6 Training and Team Development

All required training will be provided to all project team members at the beginning of the project. These can be fresh training sessions or refresher training for the team members, this will ensure that all the team members are significantly trained at the beginning of the project. These can be manufacturer specific trainings, safety trainings, etc. Thereafter, regular safety refresher training will be provided at the start of every calendar month to keep the team sharp, safe, and motivated, aimed towards avoiding accidents and incidents. The organization will also arrange for regular sports sessions on the weekends to promote team development, team interactions and the team's overall well-being.

4.7.7 Manage team and Control Resources

The process of manage team deals with optimizing team performance by tracking team performances, providing feedback, resolving issues and managing team changes. The project manager will use the work performance reports and team performance assessments received from the project team members like the project engineer, fabrication lead, design manager, and QAQC team to raise change requests for approval by the project manager and the project sponsor.

The project management process of control resource ensures that the physical resources ordered or booked for the project are available for the project team as planned, to monitor the utilization of the physical resources and to take the necessary corrective action. The procurement engineer will be the team responsible for ensuring that the ordered materials arrive on schedule. The project manager and the fabrication lead will be responsible to ensure that the physical resources are utilized effectively by their team. The project manager and the project sponsor will approve any change request that arises because of control resources process.

4.8 Communications Management Plan

The Communications management plan explains how the project communications will be effectively planned, structured, implemented, and monitored (PMI, 2017, p.377). The communications management plan for the project of installing a Breathing Air System For An Offshore Drilling Rig – Admarine 690 will describe the following:

- Stakeholder communications requirements
- Information, deliverable or reports to be communicated

- Escalation process
- Timeframe and frequency of communication
- Person responsible for communicating theses information
- Technology or method used for communications
- Methods for updating and refining the communications management plan

4.8.1 Communication Matrix

The communications matrix details the communicated document or event with the clear details for every communication such as the type of information communicated, the planned audience, the technology to be used, the frequency of communications, and the responsible person.

Chart 25

Project Communication Matrix (Source: Author)

Communication/ Document/ Deliverable/ Event	**Purpose/ Description**	**Recipient/ Audience**	**Delivery Method/ Technologies**	**Schedule/ Frequency**	**Owner(s)**
Project Kickoff meeting	Discuss and explain the approved project management plan	Project team, Project Sponsor, Client (ADES)	Face-to-face, or Virtual Meeting	Once, at the beginning of the project	Project Manager
Design documents	To approve and distribute the design documents	Project team, Project Sponsor, Project Manager, Client (ADES)	Emails, Google Drive, Hard copies, Meetings (Virtual and face-to-face)	As and when required till design approval	Design Manager
Personal Communication	Regular project communications	Project team, Project Sponsor, Client (ADES), ASRY	Telephone calls, Emails, Meetings (Virtual and face-to-face)	Daily	Project Manager
Daily Morning meetings	Daily project updates and issue resolutions	Project team, Client	Face-to-face, or Virtual	Daily	Project Manager
Status Reports	Reported updates on project's performance	Project team, Project Sponsor, Client (ADES)	Emails, Google Drive, Hard copies, Meetings (Virtual and face-to-face)	Weekly	Project Manager

Communication/ Document/ Deliverable/ Event	Purpose/ Description	Recipient/ Audience	Delivery Method/ Technologies	Schedule/ Frequency	Owner(s)
Status review meetings	Meeting to review the project's performance	Project team, Project Sponsor, Client (ADES)	Meetings (Virtual & face-to-face)	Weekly	Project Manager
Project Announcements	Information sharing	Project team, Project Sponsor, Client (ADES), ASRY	Email, Press releases, Social media posts, Website, WhatsApp messages, Meetings (Virtual & face-to-face)	As and when required	Project Manager
Presentations/ Project Information Meetings	Meetings to explain reports, plans, roles and responsibilities, issues, risks, or to provide trainings	Project team, Project Sponsor, Client (if required)	Meetings (Virtual & face-to-face), Emails	As and when required	Project Manager
Project Decision Making meeting	Approval or Rejection of change requests, Issues resolution	Project team, Project Manager Project Sponsor, Client (ADES)	Telephone, Emails, Meetings (Virtual & face-to-face)	As and when required	Project Manager/ Project sponsor
Minutes of Meetings	Record of meeting minutes	Project team, Project Manager Client ((if required), ASRY (if required)	Shared in Google Drive Emails	Two days after the meeting completion	Project Manager

Note: Own work

4.8.2 Communication Escalations

Escalation is the process where the team members realize that the responsibility is beyond his/her authority and transfers the responsibility to his supervisor in the hierarchy. All the project team members should notify the project manager of such issues and the project manager will escalate the issue to the respective new responsible person who will formally acknowledge the risk's ownership.

Chart 26

Escalation Chart (Source: Author)

Decision Category	**Decision type**	**Escalation path**
Design documents	Approval/rejection of project design documents	Design Manager - Project Manager - Project Sponsor
Change management/ Project change requests	Approval/rejection of project change requests	Project Team - Project Manager - Project Sponsor
Project management plan	Changes to approved/baselines project management plan, sub-plans, and project documents	Project Team - Project Manager - Project Sponsor
Execution/ Installation	Issue resolution	Project Team - Project Manager - Project Sponsor - ADES (Client)
Verify Project deliverables	Verification of project deliverables	Quality Control team - Project Engineer/Fabrication lead - Project Manager - Project Sponsor
Project closure/ Phase closure	Validation of deliverable	Project Team - Project Manager - Project Sponsor/ ADES (client)
Financial	Issuing projects funds	Accounts team - Project Manager- Project Sponsor

Decision Category	Decision type	Escalation path
Policies/ Quality assurance	Quality and Audit reports: recommended corrective action	Quality Assurance team - Project Engineer/Fabrication Lead - Project Manager - Project Sponsor
Project risks	Quantitative risk analysis report, risk registry, risk report	Project Team - Project Manager - Project Sponsor
Procurements	RFQs, Purchase orders, Acknowledgement of contracts	Procurement team - Project Management - Project Sponsor
Procurements	Claims administration	Procurement team - Project Management - Project Sponsor
Communications	Project communications, Stakeholder engagement	Project Team - Project Manager - Project Sponsor
Project performance measurement	Scope, schedule, cost, quality reports	Project Team - Project Manager - Project Sponsor

Note: Own work

4.8.3 Monitoring Communications

This is the project management process that ensures that the communication needs of the project are being met and are performed throughout the project. This task is the major responsibility of the project manager who will check the change requests raised by the project stakeholders and respond to these issues if deemed necessary by updating the communication plan. The project manager will also have to actively participate in communications with stakeholders to recognize any arising issues and resolve them if noticed during daily communications.

4.9 Risk Management Plan

This component of the project management plan explains how the risk management activities for the project of installing a Breathing Air System For An Offshore Drilling Rig – Admarine 690 will be performed.

4.9.1 Risk Management Strategy, Methodology, and timing

The Project will use the historical information from previous similar projects as the main input for creating the risk management plan. Meetings with stakeholders will be another important input into this process. The risk management processes will be performed every week to identify any new risks and to evaluate these risks against the defined risk probability and impacts and update the risks in the risk register. Also, to verify the impact score of the upcoming risks; to monitor, control, and update the status of the current risks in the risk register.

4.9.2 Risk Categories

Risk categories are used as a means to group individual projects risks. A Risk Breakdown Structure (RBS) will be used for this project to identify the risk categories which will show the hierarchical representation of potential sources of project risks, and this will help consider the full range of risk sources while identifying the project risks.

Chart 27

Risk Breakdown Structure (Source: Author)

RBS LEVEL 0	RBS LEVEL 1	RBS LEVEL 2	RBS LEVEL 3
0. All sources of Project Risks	1. Technical	1.1 Project requirements	1.1.1 If the customer needs or regulations change, the requirements may change
		1.2 Project scope	1.2.1 If the customer adds the project scope
		1.3 Technology	1.3.1 Failure of unfamiliar or new technology
		1.4 Technical trainings	1.4.1 Failure to provide OEM refresher trainings to employees
	2. External	2.1 Market	2.1.1 Fluctuations in prices
		2.2 Logistics	2.2.1 Transportation and shipments
		2.3 Environmental	2.3.1 Environmental Pollution
		2.4 Weather	2.4.1 Delays in project activities
		2.5 Legal and permits	2.5.1 Accidents and incidents on site
			2.5.2 Labor laws and holidays
	3. Organizational	3.1 Equipment and tools	3.1.1 Equipment and tools shortages for the ongoing projects
		3.2 Employees	3.2.1 Shortage of skilled employees
		3.3 Procedures and policies	3.3.1 The team is not well-versed with the company procedures and policies
	4. Project Management	4.1 Funding/Budget	4.1.1 Client funding/ payment delays
		4.2 Planning	4.2.1 Delays due to underestimated activity durations
		4.3 Procurement	4.3.1 Delay in deliveries of resources
		4.4 Monitoring and controlling	4.4.1 Activity corrections and reworks

Note: Own work

4.9.3 Definition of Risk Probability and Impact

The definition of risk probability and impact levels specific to this project are created with the inputs from the key project stakeholders.

Chart 28

Definition of Risk probability and Impacts (Source: Author)

Rating Scale	**Probability**	***+/- Impact on Project**		
		Schedule	**Cost**	**Quality**
Nil	<1%	No change	No change	No change to planned cost and time
1- Very Low	1-10%	1 weeks	< 1%	Temporary defects, causing minor short-term consequences.
2- Low	11 - 30%	1 - 2 weeks	1 - 2%	Product performance shortfall in area of tertiary (minor) importance.
3- Medium	31 - 50%	2 - 3 weeks	2 - 4%	Product performance shortfall in area of secondary importance.
4- High	50 - 70%	3 - 4 weeks	4 - 7%	Minor product performance shortfall in area of primary (critical) performance.
5- Very High	> 70%	> 4 weeks	> 7%	Significant failure of product to meet one of its primary (critical) purposes.

Note: Own work

4.9.4 Probability and Impact Matrix

Chart 29

Risk probability and Impact Matrix (Source: Author)

PROBABILITY						
	5	5	10	15	20	25
	4	4	8	12	16	20
	3	3	6	9	12	15
	2	2	4	6	8	10
	1	1	2	3	4	5
		1	**2**	**3**	**4**	**5**
	IMPACT					

	HIGH RISK
	MEDIUM RISK
	LOW RISK

Note: Own work

4.9.5 Risk Register

The project's risk registered will be created using expert judgement and historical information. This document will be revisited every week to incorporate any new risks identified, to re-evaluate risk probability and impact score for upcoming risks if required, update the risk status for ongoing or occurred risks.

Chart 30

Project Risk Register (Source: Author)

RBS Code	Risk	Cause	Consequence	Probability	#	Impact	#	PXI Risk Score	Risk Rating	Risk response	Owner
1.1.1	1.1 Project requirements	1.1.1 If the customer needs or regulations change, the requirements change	Change in project management plan and/or closure of project	Low	1	Very High	5	5	Low Risk	Finalize the requirements before 3 years of the next regulations update	Project Sponsor
1.2.1	1.2 Project scope	1.2.1 If customer adds the project scope	Project performance deteriorates due to changes in scope	Medium	3	Very High	5	15	High Risk	Change in scope to be accepted as a last resort. If accepted, to be incorporated through integrated change management.	Project Sponsor
1.3.1	1.3 Technology	1.3.1 Failure of unfamiliar or new technology	Delay in project activities, failure of equipment	Low	2	High	4	8	Medium Risk	Trainings to all employees and supervisors working on the technology	Project Manager
1.4.1	1.4 Technical trainings	1.4.1 Failure to provide OEM refresher trainings to employees	Malfunctioning or breakdown of project equipment	Low	2	High	4	8	Medium Risk	OEM arranged trainings to all employees and supervisors	Project Manager

RBS Code	Risk	Cause	Consequence	Probability	#	Impact	#	PXI Risk Score	Risk Rating	Risk response	Owner
										working on the technology	
2.1.1	2.1 Market	2.1.1 Fluctuations in prices	Cost of procured physical resources higher than estimated	Low	2	Very High	5	10	Medium Risk	Physical resources to be ordered as soon as the project is offered at the estimated price only	Procurement Engineer
2.2.1	2.2 Logistics	2.2.1 Transportation and shipments	Delay in the delivery of required physical resources resulting in project completion delay	Medium	3	High	4	12	High Risk	Closely monitor the delivery of the project physical resources	Procurement Engineer
2.3.1	2.3 Environmental	2.3.1 Environmental Pollution	Pollution of the environment	Very Low	1	High	4	4	Low Risk	Project team to strictly follow the organization's waste management procedures	Project Manager
2.4.1	2.4 Weather	2.4.1 Delays in project activities	Delay in the completion of the project	Medium	3	High	4	12	High Risk	Create flexibility in the project schedule to account for stoppages due to weather using forecasts	Project Manager

RBS Code	Risk	Cause	Consequence	Probability	#	Impact	#	PXI Risk Score	Risk Rating	Risk response	Owner
2.5.1	2.5 Legal and permits	2.5.1 Accidents and incidents on site	Delay in the start of the project and possibly abandoning of the project	Low	2	High	4	8	Medium Risk	Project to follow strict health and safety procedures	Project Manager
2.5.2		2.5.2 Labor laws and holidays	High employee turnover	Low	2	High	4	8	Medium Risk	Organization policies and procedures to reflect the labor laws and public holidays	Project Manager
3.1.1	3.1 Equipment and tools	3.1.1 Equipment and tools shortages for the ongoing projects	Shortfall of resources leading to project delays	Very Low	1	Medium	3	3	Low Risk	Ensure that required equipment and tools are available, tested, and certified prior to project start	Project Manager
3.2.1	3.2 Employees	3.2.1 Shortage of skilled employees	High number of project activities re-performed	Very Low	1	Medium	3	3	Low Risk	Training and re-certification of all employees and their supervisors Regular quality control and quality assurance activities	Project Manager
3.3.1	3.3 Procedures and policies	3.3.1 The team is not well-versed with the company procedures and policies	High number of project activities re-performed	Low	2	High	4	8	Medium Risk	Presentations and training for employees. Regular quality assurance activities such as audits	Project Manager

RBS Code	Risk	Cause	Consequence	Probability	#	Impact	#	PXI Risk Score	Risk Rating	Risk response	Owner
4.1.1	4.1 Funding/ Budget	4.1.1 Client funding/ payment delays	Inadequate funding to complete the project	Low	2	Very High	5	10	Medium Risk	Client to make payments no later than 30 days after invoice submission	Project Manager
4.2.1	4.2 Planning	4.2.1 Delays due to underestimated activity durations	Project delay due to changes in the schedule	Low	2	High	4	8	Medium Risk	Historical information to be used for project estimates	Project Manager
4.3.1	4.3 Procurement	4.3.1 Delay in deliveries of resources	Project delay due to changes in the schedule	Low	2	High	4	8	Medium Risk	Closely monitor the delivery of the project physical resources	Procurement Engineer
4.4.1	4.4 Monitoring and controlling	4.4.1 Corrective activities and reworks	Project delay due to changes in the schedule, and budget overruns	Low	2	High	4	8	Medium Risk	High frequency of quality control and quality assurance activities	Quality Assurance and Quality control team

Note: Own work

4.10 Procurement Management Plan

The procurement management plan is the component of the project management plan that describes the activities to be undertaken during the procurement process.

4.10.1 Procurement Management Approach, Conduct, and Control Procurements

As Solas Marine Services have completed several projects of installing the breathing air system onboard different drilling rigs, the procurement management approach has been fairly simplified over the years.

The make or buy analysis has revealed that making most of the equipment would be a profitable option for the company. Therefore, the organization has invested in assets that can be used for repetitive projects. Machinery and tools set up in the workshop facility can be used to create the required equipment from the raw materials procured.

Raw materials and equipment required for the project are to be procured only from sole suppliers that are approved by the client ADES. Request For Quotations (RFQ's) are sent to suppliers for the raw materials and equipment and the purchase order is issued to the supplier. Historical information will be used to avail the organization the best prices from the suppliers. These costs will be an input to the project cost estimates.

The procurement team will update the remainder of the project team, including the project manager about the expected delivery dates, and the current statuses of the order on a weekly basis. Any delays in the delivery schedule of over one week are to be highlighted to the project manager and the project sponsor immediately.

4.10.2 Project Procurement Definition

The project's procurement definition list below outlines all the project's resources, identifies the organization's assets, the approved sole supplier, and the equipment or raw material delivery date.

Chart 31

Project Procurement Definition List (Source: Author)

Resource	**Qty**	**Method of Acquisition**	**Type/Justification**	**Needed by (mm/dd/yyyy)**	**Sole Supplier**
Site Office	1 No	Owned/ Inventory/ Assets	Facility	8/14/2024	N/A
Office supplies	1 Set	Owned/ Inventory/ Assets	Material	8/14/2024	N/A
Design software	1 No	Owned/ Inventory/ Assets	Tools & Equipment	8/14/2024	N/A
Cutting machine, grinding machine, bending machine, welding machine, buffing machine, painting machine, etc.	1 Lot	Owned/ Inventory/ Assets	Tools & Equipment	8/14/2024	N/A
Nuts, bolts and fasteners	1 Lot	RFQ - To be procured	Tools & Equipment	8/14/2024	Kavalani W.L.L
Cranes and forklifts	1 Lot	Client to provide/ Available on site	Tools & Equipment	8/14/2024	ADES (Client)

Resource	Qty	Method of Acquisition	Type/Justification	Needed by (mm/dd/yyyy)	Sole Supplier
Chipping tool, brush, primer, and paint	1 Lot	To be procured	Tools & Equipment	8/14/2024	Kavalani W.L.L
Stainless steel tubes, tube fittings, tube fasteners, and tube valves	1 Lot	RFQ -To be procured	Material	10/1/2024	Kavalani W.L.L
Stainless steel pipes, pipe fittings, and pipe fasteners	1 Lot	RFQ -To be procured	Material	9/10/2024	Kavalani W.L.L
Mild steel angles, mild steel square tubes, mild steel flat bars, and mild steel plates	1 Lot	To be procured	Material	9/10/2024	Kavalani W.L.L
Testing and commissioning equipment	10 Sets	Owned/ Inventory/ Assets	Tools & Equipment	10/29/2024	3M Scott Fire & Safety
Breathing air cylinder, 300 BAR With Valve, 50Ltr.capacity	48 Nos	RFQ - To be procured and assembled	Material	10/1/2024	3M Scott Fire & Safety
Breathing air manifold 2 outlets with 10 feet hoses	1 Nos	RFQ - To be procured and assembled	Material	9/10/2024	Kavalani W.L.L
Breathing air manifold 3 outlets with 10 feet hoses	7 Nos	RFQ - To be procured and assembled	Material	9/10/2024	Kavalani W.L.L
Breathing air manifold 4 outlets with 10 feet hoses	11 Nos	RFQ - To be procured and assembled	Material	9/10/2024	Kavalani W.L.L
Breathing air manifold 5 outlets with 10 feet hoses	3 Nos	RFQ - To be procured and assembled	Material	9/10/2024	Kavalani W.L.L
Breathing air manifold 6 outlets with 10 feet hoses	1 Nos	RFQ - To be procured and assembled	Material	9/10/2024	Kavalani W.L.L
Breathing air manifold 10 outlets with 10 feet hoses	22 Nos	RFQ - To be procured and assembled	Material	9/10/2024	Kavalani W.L.L

Resource	Qty	Method of Acquisition	Type/Justification	Needed by (mm/dd/yyyy)	Sole Supplier
Breathing air manifold 60 outlets with 10 feet hoses	3 Nos	RFQ - To be procured and assembled	Material	9/10/2024	Kavalani W.L.L
High Pressure to Low Pressure, 1 Regulator Panel	8 Nos	RFQ - To be procured and assembled	Material	9/10/2024	Kavalani W.L.L
High Pressure to Low Pressure, 3 Regulator Panels	2 Nos	RFQ - To be procured and assembled	Material	9/10/2024	Kavalani W.L.L
High Pressure to Low Pressure, 5 Regulator Panels	3 Nos	RFQ - To be procured and assembled	Material	9/10/2024	Kavalani W.L.L
High Pressure to Low Pressure, 6 Regulator Panels	3 Nos	RFQ - To be procured and assembled	Material	9/10/2024	Kavalani W.L.L
BAUER / O-320E, Electrical air compressor	2 Nos	RFQ -To be procured	Material	11/12/2024	Bauer Kompressoren GCC
BAUER / O-320D, Diesel air compressor	1 Nos	RFQ -To be procured	Material	11/12/2024	Bauer Kompressoren GCC
High pressure SS tubes and fittings	1 Set	RFQ - To be procured and assembled	Material	9/24/2024	Kavalani W.L.L
High pressure Hoses	2 Nos	RFQ - To be procured and assembled	Material	10/1/2024	Kavalani W.L.L
Retractable Hose Reel	1 Nos	RFQ -To be procured	Material	11/11/2024	Kavalani W.L.L
Supply of assembled 30 minutes breathing air sets, SCBAs in protective cases	70 Nos	RFQ - To be procured and assembled	Material	11/12/2014	3M Scott Fire & Safety

Resource	Qty	Method of Acquisition	Type/Justification	Needed by (mm/dd/yyyy)	Sole Supplier
Supply of assembled 15 minutes breathing air sets, EEBDs in protective cases	211 Nos	RFQ - To be procured and assembled	Material	11/12/2014	3M Scott Fire & Safety
Project Team Resources	1 Team	Company employees/ Project calendars/ Pre-assigned	Project Team	8/14/2024	N/A

Note: Own work

4.11 Stakeholders Engagement Plan

This component of the project management plan describes the actions required and strategies for effective involvement of the stakeholders in project decisions and executions (PMI, 2017, p.522)

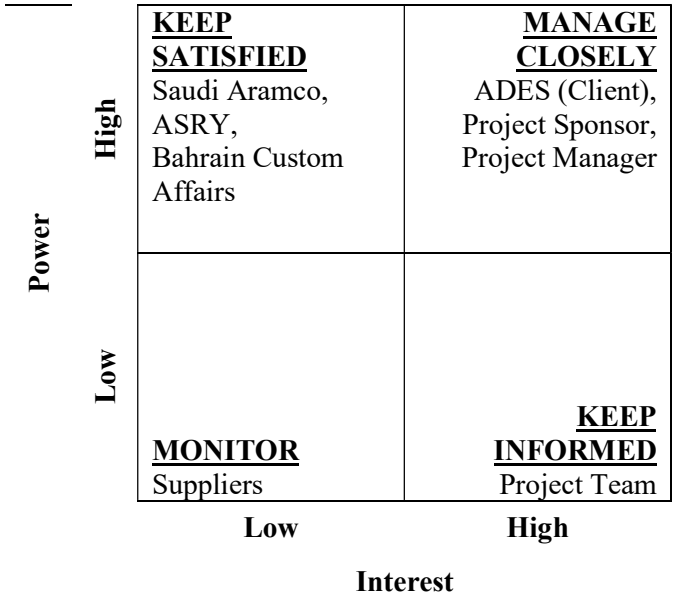
4.11.1 Stakeholder Register and Power Interest Grid

4.11.1.1 Power Interest Grid

The power interest data representation technique is used to categorize the stakeholders according to their level of authority/power and the ability to influence the outcome of the project.

Chart 32

Stakeholder Register (Source: Author)



Note: Own work

4.11.1.2 Stakeholder Register

This project document contains information about the identified project stakeholders.

Chart 33

Stakeholder Register (Source: Author)

ID	Stakeholder	Roles/ Details/ Names	Main Expectations	Major Requirement	Power/ Interest (Low/ High)
1	Project Manager	Gourish Vaingankar	Successful completion of the project	Clear project scope and requirements. Timely provision of quality resources	High / High
2	Project Sponsor	Jayasimha Pai	Meeting the strategic objective of the project	To complete the project with the planned performance	High / High
3	Project Team	Project Engineer, Design Manager, Fabrication Lead, Welder and fabricators, QA/QC team, Procurement Engineer, Technicians, Proposals Manager	Successful completion of the project	Clear procedures, roles and responsibilities	Low/ High
4	Advances Energy Systems (ADES) Saudi Company Limited	Client	Meeting the Saudi Aramco regulations plus additional requirements	A completely installed, tested and commissioned breathing air system. Timely completion of the project	High / High
5	Saudi Aramco	End User/ Regulating body	Meeting the Saudi Aramco regulations	A functional and operational breathing air system onboard the drilling rig	High/ Low
6	Suppliers	Kavalani W.L.L, 3M Scott Fire & Safety, Bauer Kompressoren GCC	Delivering the ordered physical resources	Concise specifications and quantity of the ordered resources	Low/Low
7	Arab Shipbuilding and Repair Yard	Shipyard	Compliance to the Health and safety regulations during project execution	Adherence to the shipyards safety policies and procedures	High/ Low

ID	Stakeholder	Roles/ Details/ Names	Main Expectations	Major Requirement	Power/ Interest (Low/ High)
8	Bahrain Custom Affairs	Government	Meeting the shipment's logistics and legal requirements	Providing the required documentation	High/ Low

Note: Own work

4.11.2 Monitoring Stakeholder Engagement and Stakeholder Engagement Assessment Matrix

The stakeholder engagement assessment matrix provides us the comparison between the current and desired engagement levels of stakeholders. The desired levels of stakeholder engagement are vital for successful project delivery as depicted in Chart 33. The engagement levels of stakeholders are classified as:

- Unaware – Unaware of the project and potential impacts
- Resistant – Aware of the project and potential impacts but resistant to any changes that may occur because of the project. Will be unsupportive.
- Neutral – Aware of the project, but neither supportive nor unsupportive
- Supportive – Aware of the project and potential impacts and supportive of the work and its outcomes
- Leading – Aware of the project and potential impact and actively engaged in

ensuring that the project is a success

- C – represents the current engagement level of each stakeholder
- D – represents the desired engagement level that the Project Team has assessed as essential for project success

Chart 34

Stakeholder Engagement Assessment Matrix (Source: Author)

Stakeholder	**Unaware**	**Resistant**	**Neutral**	**Supportive**	**Leading**
Project Manager					C, D
Project Sponsor					C, D
Project Team					C, D
Advances Energy Systems (ADES)				C	D
Saudi Aramco	C			D	
Suppliers			C	D	
Arab Shipbuilding and Repair Yard			C	D	

Stakeholder	Unaware	Resistant	Neutral	Supportive	Leading
Bahrain Custom Affairs	C		D		

Note: Own Work

Stakeholder Engagement Matrix

On the basis of the stakeholder engagement assessment matrix, the stakeholder engagement matrix is derived to engage the stakeholders effectively to achieve the desired level of engagement. This process is to be followed throughout the project and is the responsibility of the Project Manager.

Chart 35

Stakeholder Engagement Matrix (Source: Author)

Stakeholder	Project Phase	Engagement Approach	Engagement tools	Frequency
Project Manager	All phases	Consult/ Collaborate	Emails, Telephone calls, WhatsApp, shared drive, Meetings (Virtual and face-to-face)	Very Frequent
Project Sponsor	All phases	Consult/ Collaborate	Emails, Telephone calls, WhatsApp, shared drive, Meetings (Virtual and face-to-face)	Very Frequent

Stakeholder	Project Phase	Engagement Approach	Engagement tools	Frequency
Project Team	All phases	Consult/ Collaborate	Emails, Telephone calls, WhatsApp, shared drive, Meetings (Virtual and face-to-face)	Very Frequent
Advances Energy Systems (ADES)	All phases	Consult/ Collaborate/ Inform	Emails, Telephone calls, shared drive, Meetings (Virtual and face-to-face)	Very Frequent
Saudi Aramco	Handover phase	Inform	Emails	When required
Suppliers	Design, fabrication, Installation	Request updates	Emails, Telephone calls.	Very Frequent
Arab Shipbuilding and Repair Yard	Design, fabrication, Installation, Testing	Inform/ Collaborate	Emails, Telephone calls, Meetings (Virtual and face-to-face)	Frequent
Bahrain Custom Affairs	When required	Inform/ Collaborate	Emails	Only when required

Note: Own Work

5 CONCLUSIONS

1. The developed project management plan for the project of installation of a breathing air system for the offshore drilling rig ADMARINE 690 includes the development of the project charter and the project subsidiary plans that ensures effective implementation of project management for the successful completion of the project.
2. The Project Charter is created to formally authorize the project, assign a project manager, and allow the project manager access to the organizational resources. This document has high level information about the project such as the methodology, business need, objectives, milestones and deliverables, assumptions, constraints, risks, and stakeholders.
3. The developed Scope management plan guides us in the processes of creating the scope baseline, monitoring and controlling the scope so that only the required work is carried out, and to get the project deliverables validated by the client.
4. The created Requirements Management plan explains how the project requirements were collected, prioritized, analyzed, documented, and managed. The requirements documentation and the requirements traceability matrix link the product requirements to the respective project deliverables and ensures that all the product requirements are met at the end of the project.
5. The Schedule management plan explains how we define, sequence, and estimate the project activities required to complete the respective project deliverables and the overall project. It also gives information on the relation between different activities, and when the major project deliveries can be expected.

6. The Cost management plan provides details on how the project's budget was achieved, after considering the cost estimates, contingency reserve and management reserve. It also ensures that the project funds are made available to the project team as per the scheduled requirements.
7. The Quality management plan describes the applicable policies, procedures and guidelines on the project's activities and deliverables ass well as the individual quality requirements to be fulfilled for all the major project deliverables.
8. The Resource management plan describes how the project's physical and team resources will be estimated, acquired, and allocated. It also defines the process to monitor and control the physical resources as well the roles and responsibilities for the project team members to project team effectively monitor and control the resources.
9. The Communications management plan ensures that the communication needs of the stakeholders are fulfilled throughout the project. This plan explains how, when, and by whom the information on the project will be administered and distributed.
10. The Risk management plan explains how the risk breakdown structure is used to identify all the project risks. The risk register provides important information on the risks such as their cause, effect, calculating the risk score, and the planned risk responses.
11. The Procurement management plan details how the physical resources and services from outside the project team will be acquired. It details the selection criteria for the suppliers and lists out the resources that are to be procured.
12. The Stakeholder engagement plan defines the process to identify the project stakeholders and to record their important information such as power, influence, expectations, and

requirements in the stakeholder registry. And when to communicate with the stakeholders to ensure that they are effectively engaged.

6 RECOMMENDATIONS

1. The Project Charter should consider the business objective that the client is expected to have 10 other rigs that could soon have similar projects on each of these rigs. This could be a strategic objective to be captured in the Project Charter for the project.
2. The provision of the project exclusions listed in the project scope statement which are under the client's scope are important for the project completion. The project manager must communicate with the client so that these scopes are completed before the final testing so that they do not withhold the project scope completion.
3. The additional requirements requested by the client in addition to the Saudi Aramco regulations must mention the personal details of the client that requested the requirements in addition to all the specifications.
4. As the short duration of the project is achieved by schedule compression technique of fast tracking several activities, this may result in rework of several activities. Therefore, the project needs to be closely monitored.
5. The project's cost funding requirements are achieved through the payments received by the client. Therefore, it is recommended that the invoices are submitted to the client in a timely manner and that the client is aware that delaying payments will delay the project.
6. Quality check sheets and checklists should be used for inspection by the quality control team for verifying the successful completion of activities.

7. The timely delivery of the physical resources is a key factor for the timely completion of the project. Therefore, it is recommended that these are closely followed up for delivery. It is also important that the project team is dedicatedly available as per the project calendars and not involved in multiple projects.
8. It is recommended that the design team is available for face-to-face meetings with the client during the initial design document approval stage, so that the changes and comments can be applied correctly and immediately. Overall, collocating the complete project team will improve project communications greatly.
9. It is important that the project team also considers and plans for secondary risks and residual risks for the project.
10. As the client has only sole suppliers for the physical project resource there is a possibility that they might not have resources available in stock, so it is recommended to ask the client to consider alternate suppliers who meet the requirements to ensure timely delivery of resources.
11. The project manager should regularly be in touch with the project stakeholders to ensure that they are being engaged effectively.

7 VALIDATION OF THE FGP IN THE FIELD OF REGENERATIVE AND SUSTAINABLE DEVELOPMENT

Sustainable development is development that uses resources to progress society's well-being without destroying or undermining the support systems needed for future growth. Regenerative development is the development of society's wellbeing using resources in a way that builds the support systems needed for future growth.

The installation of the breathing air system would involve fabrication of breathing air manifolds, that are connected through stainless steel tubes. Other installed equipment include air cylinder bottles with racks, high to low pressure regulator panels, breathing air compressors, breathing air hoses, and portable breathing air sets. The system provides a supply of breathing air through masks to the personnel at different locations when H2S levels in the area increase.

As the breathing air system is required to meet the Saudi Aramco regulatory requirements, there can be no compromise on the materials used for the equipment as the system operates at high pressure and is subjected to the high temperatures of the region. The requirements specify the materials to be used, and the quantity and specific locations of the equipment. However, the FGP can help improve the sustainable and regenerative aspects of the project by involving aspects in the planning and execution, such as:

- Reusing physical resources such as cylinder bottles, cylinder racks, stainless steel tubes, and manifolds that are available from older projects that meet the quality requirements, thus preventing the generation of waste as well as resources.

- Planning will help find the best equipment and tube routing locations to minimize the physical and team resources. Efficient execution will ensure that the resources are utilized without any waste.
- The system equipment can be installed on pre-existing supports such as handrails and bulkheads, instead of fabricating new supports. This will help save high quantities of mild steel, stainless steel tubes, and physical and people resources.
- Effective planning will ensure that suppliers who apply regenerative and sustainable development will be preferred over regular suppliers.

As the installation project will be executed in the Middle East which has a high duration and intensity of sunlight, solar power can be harnessed to power some of the equipment. The breathing air system once installed uses natural atmospheric air as the air source to store breathing air in a compressed state and this same air can be returned and released into the atmosphere without any issues, waste, or pollution. This system now also cancels out the requirement for industry supplied air that would have generated a lot of waste biproducts. This shows that the project fulfills the “planet” aspect of the sustainable model. The main intention behind installing the breathing air system is to save the lives of the personnel in case of the release of H2S gas. In the given scenario the system will be crucial for the survival of the crew against permanent disabilities or death, this covers the “people” aspect of the sustainable model. The breathing air system once installed requires minimum to no maintenance, this reduces the operational spares requirement or resources required.

7.1 Key Performance Indicators

Key performance indicators (KPI) are quantifiable measures used for evaluating the success of projects (PMI, 2021). These indicators can be either leading indicators or lagging indicators. For this project information will be collected during the project execution to find their dependencies on the variables.

Chart 36

Deliverables (Source: Author)

P5 Domain	Lens	Category	Element	Key Performance Indicator	Metric
PEOPLE	Lifespan	Labor Practices and decent work	Training and qualification	Training certificates of employees	100% of employees with valid training certificates
	Effectiveness	Labor Practices and decent work	Project Health and safety	Reports on risk assessments, inspection, safety inductions and trainings	90% reduction in recorder incidents. 99% reduction in recorded accidents
	Lifespan	Labor Practices and decent work	Local competency development	Percentage of local employees	5% increase from last year
	Effectiveness	Society and customers	Customer health and safety	Reports on risk assessments, inspection, safety inductions and trainings	100% compliance to customer health and safety procedures and policies
	Effectiveness	Society and customers	Product and service labeling	Identification on all chemicals	100% identification markers on supplied equipment
	Efficiency	Ethical Behavior	Sustainable procurement and	Efficiency in procurement and resource allocation	15% cost savings achieved through recycling equipment

P5 Domain	Lens	Category	Element	Key Performance Indicator	Metric
			contracts		
	Efficiency	Ethical Behavior	Fair competition	Percentage of diverse vendors engaged	Quotations from at least 3 vendors to be received and reviewed
	Fairness	Society and customers	Public policy/ compliance	Leaves granted as per the local policies	100% compliance to public holidays
Planet	Lifespan	Transport	Digital communication	Reduction in the number of face-to-face meetings	50% of meetings to be online
	Efficiency	Transport	Travelling and communication	Staff using the company's carpool bus	70% of employees to avail transportation
	Effectiveness	Transport	Logistics	Number of project shipments	Total project shipments not to exceed 10 shipments
	Servicing	Energy	Energy consumption	Reduction in the project's energy consumed using solar panels	30% reduction in usage
	Servicing	Energy	Greenhouse gas emissions	Reduction in the air compressor exhaust gasses	Diesel air compressor to be run less than 5 hours per month
	Effectiveness	Land, Air and Water	Noise Pollution	Number of complaints made by nearby residents	90% or more of survey respondents indicating that the noise emitted from the job site did not bother them
	Lifespan	Consumption	Recycling and reuse	Reusing available good quality equipment	At least 3% of the equipment to be reused
Prosperity	Lifespan	Project Feasibility	Social return on investment (SROI)	SROI = (Financial and Non-financial Benefits – Financial and Non-financial Costs) / Financial and Non-financial Costs	SROI ≥ 0 (Always positive)
	Services	Project Feasibility	Financial Analysis	Employment to community members and contractors	At least 15 jobs are created

P5 Domain	Lens	Category	Element	Key Performance Indicator	Metric
	Effectiveness	Market and economic stimulation	Indirect benefits	Creation of the project management plan template	100% templates available for future similar projects
	Lifespan	Business Agility	Flexibility Optionality	Management reserve	5-10% of the cost baseline

Note: Own work

7.2 P5 Analysis

The P5 standard uses P5 ontology which has three classification categories namely People, Planet, and Prosperity which are further broken down into subcategories and elements. These 3 categories are affected by the product's characteristics and the project's activities, results, and outcomes. P5 analyzes these impacts using two perspectives,

Product perspective: The product lifespan perspective examines the sustainability of the product over its useful life. The product servicing lens examines the sustainability of servicing the product over its useful life.

Process perspective: Process efficiency lens examines to verify if the project's processes will optimally use the resources. Process effectiveness lens examines to verify if the project's processes will effectively use the resources. Process Fairness evaluates if all involved in the project are treated fairly and respectfully.

People Impacts: This category looks at the impacts the project's activities may have on individuals, societies, and communities.

Planet Impacts: This category looks at the impacts the project's activities may have on living and non-living natural systems.

Prosperity Impacts: This category looks at the impacts the project's activities may have on the project stakeholders' finances.

Figure 12

P5 Standard Impact Analysis (Source: Author)

P5 Impact Analysis

Impact Scores: 5 = Strongly positive Impact, 4 = Positive Impact, 3 = Neutral = No impact 2 = Negative Impact 1 = Severe negative impact

1	**People Impacts**								
1.1	**Category: Labor practices and Decent work**	LENS	SCORED	Description (Cause)	Pottential Sustainable Impact	Impact Score Before	Proposed Response	New Impact score	Change
1.1.1	Employment and staffing	Fainess		Experienced project team will be travelling from overseas branch for the execution of the project.	No diversity in project team. No locals.	2	Hiring local team for the project and training them. The project will create many job oppertunities for the local commity	4	2
1.1.2	Labor/ Management Relations	Lifespan		The helpers and technicians are not involved in discussions that address complaints, disputes, and grievances	Low productivity due to demotivated team	2	Weekly meetings involving the technicians, helpers and the project team should beheld that openly adreeses any issues and takes inputs everyone involved in the project.	4	2
1.1.3	Project Health and Safety	Efficiency		Delay in the project schedule due to downtime resulting from frequent accidents and incidents	Illness and injuries of workers increasing the time lost and project cost	1	Regular risk assesments and inspections to ensure a safe working environment	4	3
1.1.4	Training and Qualifications	Effectiveness		Some project team members miss the skill and qualifications to execute the project	Less productivity, Low performance, and high rate of rework.	2	Identifying the skill gaps and proposing trainings to develoop the team members	4	2
1.1.5	Organizational Learning	Efficiency		The lessons learnt from a project are not captured and shared throughout the organization.	Repetition of past mistakes, over and over again.	2	Incorporate the lessons learnt from projects into the procedures to reflect the required changes	4	2
1.1.6	Equal Opportunity	Lifespan		No local women employed for the project due to physical aspect of the project	Unequall oppertunities for local women	2	To conduct interviews with locals for job opportunities based on skill and zero bias for women for administrative jobs	3	1
1.1.7	Local Competencey development	Servicing		No local employment opportunities created by the project	No economic growth or social inclusion of the local area	2	Include a clause in the service contract to target local labor	4	2
1.1.8	Work life Harmony and Mental Health	Efficiency		Long work and overtime hours required by employees to meet the project deadlines	Low moral, motivation, productivity at the work place.	2	Offer paid time off in compensation for the additional hours worked	3	1

1.2	**Category: Society and Customers**	LENS	SCORED	Description (Cause)	Pottential Sustainable Impact	Impact Score Before	Proposed Response	New Impact score	Change
1.2.1	Public Policy and Compliance	Lifespan		Violation of the county's policies and proceures	Legal actions against the company and loss of brand recognition	1	Review the ecisting procedures and policies and keep them up to date	3	2
1.2.2	Customer Health and Safety	Lifespan		Incidents and accidents that can harm the health and safety of customers during their visits to project areas	High number of complaints and customer dis-satisfaction	2	Implement training for customers prior to visit. Performing insoections and safety drills to gain customer's confidense	4	2
1.2.3	Product and Service Labeling	Lifespan		Use of products from suppliers that are not produced in an environmentally friendly or sustainable way	Increase in pollution of air, water, land.	1	Use environmentally friendly or sustainable materials	4	3
1.2.4	Customer Privacy and Data Protection	Lifespan		Personal or inappropriate use of client provided information	Reduced customer trust and increased legal disputes	1	Client provuded information to be available to only middle and senior level nanagement.	3	2
1.3	**Category: Human Rights**	LENS	SCORED	Description (Cause)	Pottential Sustainable Impact	Impact Score Before	Proposed Response	New Impact score	Change
1.3.1	Harassment and discrimination	Effectiveness		Zero reported incidents and investigations	Reduced productivity, and high turnover	2	Provide training to employees on laws, regulations, and policies about harassment and discriminination to promote zero-tolerance and reporting incidents	4	2
1.3.2	Exploitative Child Labor	Efficiency		Employment of undersage labor by subcontractors or suppliers	High number of Lawsuits and claims. Improved company reputation	2	Audits and inspections of subcontractors or suppliers	4	2
1.3.3	Forced or Compulsory Labor	Lifespan		Employees that are forced to work against their will or compensated less than subsidised levels	Vulnerable employers being exploited	2	Monthly surveys and interviews conducted with employees at all levels	3	1
1.3.4	Dignity, diversity, equity, and inclusion	Efficiency		Inputs and opinions of emplyees at lower levels are not valued equally	Low productivity, and employee engagement.	2	Implement stong policies and programs to develop equitable workplace environments	4	2

1.4	**Category: Ethical Behavior**	LENS	SCORED	Description (Cause)	Pottential Sustainable Impact	Impact Score Before	Proposed Response	New Impact score	Change
1.4.1	Sustainable Procurement Practices and Contracts	Lifespan		The procurement team use suppliers with lower cost that have the resources available in stock	Increased waste generated due to low or no recycling	2	Evaluate the environmental performace of suppliers and choose products and services from sustainably run organizations	4	2
1.4.2	Anti-corruption	Efficiency		Possibilities of corruption and bribery in the organization	Low level of transperency and integrity in the organization	1	Establish clear procedure to counter corruption and bribery, create a environment to prevent, detect, and report corruption	3	2
1.4.3	Fair competition	Lifespan		Fixed/ preferred supplier for physical resources	Less competitive prices and delivery schedules from suppliers	2	Implement transparent bidding and selection process for suppliers	3	1
1.4.4	Responsible technology	Efficiency		Not using Airtificail intelligence for projects	Missing out on best possible sustainable and regenrative solutions	3	Use artificial intlligence to check for for alternate analysis	4	1
2.2	**Category: Energy**	LENS	SCORED	Description (Cause)	Pottential Sustainable Impact	Impact Score Before	Proposed Response	New Impact score	Change
2.2.1	Energy Consumption	Efficiency		High volume of welding works and other mechanical works for the project.	High consumption of non-renewable energy	2	Use equipments that run on solar panels as much as possible to reduce power consumption. Replace old equipment with more efficient ones.	4	2
2.2.2	Greenhouse gas emissions	Efficiency		The diesel generator is used to power the equipments for the project	Emission of green house gasses	2	Use of shore power connetion and solas powered equipments wherever possible	4	2
2.2.3	Renewables and clean energy return	Lifespan		Use of diesel generators to power the equipment	Consumption of non renewable energy	2	Use equipments that run on solar panels as much as possible	4	2
2	Environmental Impacts (Planet)								
2.1	**Category: Transport**	LENS	SCORED	Description (Cause)	Pottential Sustainable Impact	Impact Score Before	Proposed Response	New Impact score	Change
2.1.1	LocalProcurement	Lifespan		All the resourec materials are outsourced from Dubai into Bahrain	Oppositions from local community suppliers	3	Procure physical resources such as bolts and other fasteners from local suppliers	4	1
2.1.2	Digital Communication	Efficiency		The project team meets daily for meeting	Time and cost wastage	2	The team is to meet virtually for daily meeting, and physically meet once every week.	3	1
2.1.3	Traveling and Commuting	Efficiency		The project team members travels in their own personal vehicles to work.	Increased Air Pollution and cost	2	Provide carpooling facilities for project team travelling from the same area	4	2
2.1.4	Logistics	Efficiency		Shipments are initiated as per the requirement on site	Increased cost, high pollution	2	Only limited shipments are allowed to be sent for the project, and the shipments are to be consolidated and moved only after the approval of the project manager	4	2

2.2	**Category: Energy**	LENS	SCORED	Description (Cause)	Pottential Sustainable Impact	Impact Score Before	Proposed Response	New Impact score	Change
2.2.1	Energy Consumption	Efficiency		High volume of welding works and other mechanical works for the project.	High consumption of non-renewable energy	2	Use equipments that run on solar panels as much as possible to reduce power consumption. Replace old equipment with more efficient ones.	4	2
2.2.2	Greenhouse gas emissions	Efficiency		The diesel generator is used to power the equipments for the project	Emission of green house gasses	2	Use of shore power connetion and solas powered equipments wherever possible	4	2
2.2.3	Renewables and clean energy return	Lifespan		Use of diesel generators to power the equipment	Consumption of non renewable energy	2	Use equipments that run on solar panels as much as possible	4	2
2.3	**Category: Land, Air, and Water**	LENS	SCORED	Description (Cause)	Pottential Sustainable Impact	Impact Score Before	Proposed Response	New Impact score	Change
2.3.1	Biological diversity	Lifespan		Sea Water used onboard for cooling system and pumps is discharged back into the sea	Loss of biodiversity in the sea	2	Sea water is to be stored in a tank onboard for inspections and can be returned back to the sea only after quality checks are cleared	4	2
2.3.2	Air and water quality	Efficiency		Sea Water used onboard for cooling system and pumps is discharged back into the sea	Reduction in the quality of sea water	2	Sea water is to be stored in a tank onboard for inspections and can be returned back to the sea only after quality checks are cleared	4	2
2.3.3	Water consumption	Efficiency		Uncontrolled water consumption for the project	High water consumption and cost	2	A creation of a water management plan so that the water from one source can be treated and reused	4	2
2.3.4	Noise pollution			High level of noise generated due to the project installation activities	Increased temper and stress of employees	2	Continiously measuring the noice in thr room and protecting the employees bu providing ear muffs.	3	1
2.4	**Consumption**	LENS	SCORED	Description (Cause)	Pottential Sustainable Impact	Impact Score Before	Proposed Response	New Impact score	Change
2.4.1	Recycling and reuse	Efficiency		High volume of equipments to be packaged and shipped for the project	Generation of high quantities of waste	2	Hire logistics team that resuse packaging equipments used for shipments	3	
2.4.2	Disposal	effectiveness		Generation of waste from the project activities.	Unorganized disposal of the generated waste	2	All the generated waste are to be segregated and disposed as per the laws and policies of the region	4	
2.4.3	Contamination and pollution	Lifespan		Sea Water used onboard for cooling system and pumps is discharged back into the sea	Contamination of Sea water	2	Sea water is to be stored in a tank onboard for inspections and can be returned back to the sea only after quality checks are cleared	4	2
2.4.4	Waste generation	Efficiency		High probablilty of generating large volume of waste in the project	High quantities of waste generated	2	Create a comprehensive plan to reduce waste generation and monitor the project's generated waste	4	2

3	Prosperity Impacts								
3.1	**Category:Project Feasibility**	LENS	SCORED	Description (Cause)	Pottential Sustainable Impact	Impact Score Before	Proposed Response	New Impact score	Change
3.1.1	Business Case Analysis	Lifespan		There is no breathing air system on the Rig ADM-690	The rig will not comply with the Saudi Aramco contractual requirements to operate	3	The installation of the breathing air system that meets the Saudi Aramco requirements. It will improve the oil production of the region	3	0
3.1.2	Financial Analysis	Lifespan		The cost of the breathing air system is high, USD 870,000	High cost of the system	3	The rig opertations will bring the client USD 100,000 per day in operation. Additionally it will also improve oil production levels and the country's economy	3	0
3.1.3	Social Return on Investment	Effectiveness		There is a probability that some project benefits may be overlooked and missed	Lower Social return on investment than expected	2	Monitor project progress closely to ensure that varainces are kept in check.	4	2
3.1.4	Modeling and Simulation	Effectiveness		Not effectively using modeling and simulations	Lower chances of project success	2	Use of simulations to predict variances and alter conditions to predict or achive the desired goals	4	2
3.2	**Category: Business Agility**	LENS	SCORED	Description (Cause)	Pottential Sustainable Impact	Impact Score Before	Proposed Response	New Impact score	Change
3.2.1	Flexibility/ Optionality in the Project			Predictive life cycle of the project	Loss of opportunity/ Implementation of a sustanable process	3	Change request to be raised by the project team for the implementation of the idea to realize the opportunity	4	1
3.2.2	Resiliency/ Increase Business Flexibility			Predictive life cycle of the project	Low resilence to extreme events	3	The project team should closely monitor the conditions and identify the critical functions and processes that might pose a threat	4	1
3.3	**Category: Market and Economic Stimulation**	LENS	SCORED	Description (Cause)	Pottential Sustainable Impact	Impact Score Before	Proposed Response	New Impact score	Change
3.3.1	Local Economic Impact			Not many job oppertunitues created for the local people	Minimum local economic growth from the project	2	The maintainance and servicing of the project can be performed by local employers	4	2
3.3.2	Indirect Benefits			Failure to recognize the future benefits of the project	Loss of future market and ecomnomic stumulation	1	The successful execution of the project will create oppertunities for similar projects in the future	4	3

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APPENDICES

Appendix 1: FGP Charter

CHARTER OF THE PROPOSED
FINAL GRADUATION PROJECT (FGP)

1. Student name

GOURISH KESHAV VAINGANKAR

2. FGP name

Project Management Plan for Installing Breathing Air system for an Offshore Drilling Rig – ADMARINE 690

3. Application Area (Sector or activity)

Oil and Gas/ Health and safety

4. Student signature

5. Name of the Graduation Seminar facilitator

Roger Valverde Jimenez

6. Signature of the facilitator

7. Date of charter approval

20 October 2023

8. Project start and finish date

28 August 2023	18 March 2024

9. Research question

What sub-plans and tailoring aspects must be covered in the project management plan for the project of the installation of a Breathing air system on the offshore drilling rig ADMARINE 690?

10. Research hypothesis

Will the project management plan help to effectively complete the project for the installation of a Breathing air system for the offshore drilling rig ADMARINE 690?

11. General objective

To develop a project management plan for the project of the installation of a breathing air system for the offshore drilling rig ADMARINE 690.

12. Specific objectives

Specific objectives

1. To create a Project Charter that provides high level information about the project and formally authorizes the project.
2. To develop the Scope management plan that will tell us how the scope will be defined, monitored, controlled, and validated.
3. To produce the Requirements Management plan that will explain how the product requirements will be identified, prioritized, analyzed, documented, and managed.
4. To prepare a Schedule management plan to effectively define, sequence, and estimate the project activities. To use this information to develop the project schedule and to effectively control it.
5. To create the Cost management plan that will tell us how the project's cost will be planned, controlled, and structured.
6. To define a Quality management plan that describes how the applicable policies, procedures and guidelines will be implemented to achieve the quality objectives.
7. To put together the Resource management plan that describes how the resources will be acquired, allocated, monitored, and controlled for the project.
8. To create a Communications management plan that explains how, when, and by whom the information on the project will be administered and distributed.
9. To produce the Risk management plan that will describe how the project's risk management activities will be structured and performed.
10. To define the Procurement management plan that details the acquisition process for goods and services from outside the organization.
11. To create a Stakeholder engagement plan that identifies the strategies required to promote productive stakeholder involvement.

13. FGP purpose or justification

The installation of the breathing air system will have an initial investment of USD 870,000.00 for complying with the Saudi Aramco safety and contractual requirements (Saudi Aramco, 2020). As the project is high in terms of value, and as well as the organization's reputation for continual future business, the creation of a project management plan is critical for the project's success. The sub-plans or component of the project management plan will describe how every process for each knowledge area will be performed. The creation of the project management plan will thereby provide the complete collection of sub-plans that can be referred to throughout the project lifecycle to manage the project effectively and efficiently to realize maximum benefits.

14. Work Breakdown Structure (WBS). In table form, describing the main deliverable as well as secondary, products or services to be created by the FGP.

1. Graduation Seminar
    - 1.1. FGP deliverables
        - 1.1.1. Deliverable 1: FGP Charter (section 1-10), Preliminary Bibliography (Appendix-4)
        - 1.1.2. Deliverable 2: FGP Charter (section 11,12), FGP WBS (Appendix 2)
        - 1.1.3. Deliverable 3: FGP Charter (section 13-19)
        - 1.1.4. Deliverable 4: Theoretical framework (Chapter 2), FGP Charter (section 20)
        - 1.1.5. Deliverable 5: Methodological Framework (Chapter 3), FGP Charter (section 21)
        - 1.1.6. Deliverable 6: Introduction (Chapter 1), FGP Charter (section-22), FGP Schedule (Appendix 3), Project validation in the regenerative and sustainable development (Chapter 7)
        - 1.1.7. Deliverable 7: Executive summary, Abstract, Bibliographical references, Indexes (contents, figures, charts), Signed FGP Charter
2. Tutoring process
    - 2.1. Tutor.
        - 2.1.1. Tutor assignment
        - 2.1.2. Communication
    - 2.2. Adjustments of previous chapters (If needed)
    - 2.3. Development (Chapter 4 - Results)
        - 2.3.1. Project charter
        - 2.3.2. Scope management plan
        - 2.3.3. Requirements management plan

2.3.4. Schedule management plan
2.3.5. Cost management plan
2.3.6. Quality management plan
2.3.7. Resource management plan
2.3.8. Communications management plan
2.3.9. Risk management plan
2.3.10. Procurement management plan
2.3.11. Stakeholder's management plan
2.4. Conclusions (Chapter 5.)
2.5. Recommendations (Chapter 6.)
3. Reading by reviewers
3.1. Reviewer assignment request
3.1.1. Assignment of two reviewers
3.1.2. Communication
3.1.3. FGP submission to reviewers
3.2. Reviewers work
3.2.1. FGP reading.
3.2.2. Reader 1 report
3.2.3. Reader 2 report
4. Adjustments
4.1. Report for reviewers
4.2. FGP update
4.3. Second review by reviewers
5. Presentation to board of examiners
5.1. Final review by board
5.2. FGP grade report

15. FGP budget

Final project printing and binding: USD 50.00
Final project document shipping to the University: USD 500.00
Philologist review: USD 150.00
Total cost: USD 700.00

16. FGP planning and development assumptions.

1. Any documents and information required from the organization regarding the project will be readily available to access.
2. The graduation seminar deliverables will be accepted and approved by the facilitator.
3. There will be effective feedback and communications with the assigned facilitator, tutor, and reviewers during the project.
4. The knowledge acquired during the master's course and software made available by the University is sufficient to effectively complete the FGP.

5. The student will be able to apply the knowledge, skills and capabilities gained during the master's degree program to the FGP.

17. FGP constraints

1. The maximum time for completing, submitting the graduation seminar for approval is 7 weeks.
2. The FGP should be completed and submitted within 20 weeks of commencement.
3. The total cost of the project should not exceed USD 700.
4. Corrections to all project deliverables must be made as per the comments of facilitator and submitted in the next week's deliverable.
5. The scope of the FGP is limited to the scope approved in the final deliverable graduation seminar.
6. The final version of the FGP must be reviewed and corrected by a philology professional prior to submission for reviewers reading.
7. Changes to the FGP document must be made using change control features to track changes.
8. Citations must be made using APA 7th edition.

18. FGP development risks

1. The time taken between requesting and receiving additional information from the organization may delay the deliverable completion.
2. The time difference between the student in India and the facilitator, tutor in Costa Rica may cause delays in communication and set back the FGP completion. This may cause a delay in delivery of deliverables after applying effective corrections.
3. Requesting to change sections of the deliverables during the development stage due to unavailability of sufficient resources and information.
4. Unable to manage time efficiently towards the project in order to complete all the deliverables in a timely manner due to work and other personal commitments.
5. The project cost can be reduced significantly by up to 50% if the final document can be printed and bound in Costa Rica and delivered to the University.
6. The project cost can be reduced by up to 30% if the mode of shipment selected from India to Cost Rica is through national postal services instead of DHL. But the delivery takes an additional 20 days.

19. FGP main milestones

Deliverable	**Finish estimated date**
1. Graduation Seminar FGP deliverables	16/Oct/2023

1.1. Graduation Seminar Deliverable 1: FGP Charter (section 1-10), Preliminary Bibliography (Appendix-4)	04/Sep/2023
1.2. Graduation Seminar Deliverable 2: FGP Charter (section 11,12), FGP WBS (Appendix 2)	11/Sep/2023
1.3. Graduation Seminar Deliverable 3: FGP Charter (section 13-19)	18/Sep/2023
1.4. Graduation Seminar Deliverable 4: Theoretical framework (Chapter 2), FGP Charter (section 20)	25/Sep/2023
1.5. Graduation Seminar Deliverable 5: Methodological Framework (Chapter 3), FGP Charter (section 21)	02/Oct/2023
1.6. Graduation Seminar Deliverable 6: Introduction (Chapter 1), FGP Charter (section-22), FGP Schedule (Appendix 3), Project validation in the regenerative and sustainable development (Chapter 7)	09/Oct/2023
1.7. Graduation Seminar Deliverable 7: Executive summary, Abstract, Bibliographical references, Indexes (contents, figures, charts), Signed FGP Charter.	16/Oct/2023
2. Tutoring process	16/Jan/2024
2.1. Tutor	25/Oct/2023
2.1.1. Tutor assignment	19/Oct/2023
2.1.2. Communication	25/Oct/2023
2.2. Adjustments of previous chapters (If needed)	3/Nov/2023
2.3. Development (Chapter 4 - Results)	16/Jan/2024
2.3.1. Project charter	09/Nov/2023
2.3.2. Scope management plan	15/Nov/2023
2.3.3. Requirements management plan	21/Nov/2023
2.3.4. Schedule management plan	27/Nov/2023
2.3.5. Cost management plan	01/Dec/2023
2.3.6. Quality management plan	07/Dec/2023
2.3.7. Resource management plan	13/Dec/2023
2.3.8. Communications management plan	19/Dec/2023
2.3.9. Risk management plan	25/Dec/2023
2.3.10. Procurement management plan	29/Dec/2023
2.3.11. Stakeholder's management plan	04/Jan/2024
2.4. Conclusions (Chapter 5.)	10/Jan/2024
2.5. Recommendations (Chapter 6.)	16/Jan/2024
3. Reading By reviewers	02/Feb/2024
3.1. Reviewer assignment request	02/Feb/2024
3.1.1. Assignment of two reviewers	17/Jan/2024

3.1.2. Communication	18/Jan/2024
3.1.3. FGP submission to reviewers	18/Jan/2024
3.2. Reviewers work	02/Feb/2024
3.2.1. FGP reading.	30/Jan/2024
3.2.2. Reader 1 report	02/Feb/2024
3.2.3. Reader 2 report	02/Feb/2024
4. Adjustments	23/Feb/2024
4.1. Report for reviewers	09/Feb/2024
4.2. FGP update	16/Feb/2024
4.3. Second review by reviewers	23/Feb/2024
5. Presentation to board of examiners	18/Mar/2024
5.1. Final review by board	08/Mar/2024
5.2. FGP grade report	18/Mar/2024

20. Theoretical framework

20.1 Estate of the "matter"

There is currently no project management plan created to execute the project of Installing a Breathing Air system for an Offshore Drilling Rig – ADMARINE 690. Past projects executed by the company have followed several available organizational procedures for its completion. Though many projects have been completed to date, the implementation of the project management plan will ensure the success of this project and guarantee the fulfillment of its business and strategic objectives. All the information required for creating the project management plan is available and we will use these inputs to create the project management plan for the project.

20.2 Basic conceptual framework

Organizational systems, Organizational structures, Project charter, Project management plan, Project development cycle, Project Life cycle, Project management domains, Project management principles, Project management knowledge areas, Project management processes, Project documents.

21. Methodological framework

Objective	Name of deliverable	Information sources	Research method	Tools	Restrictions
To create a Project	Project Charter	Primary: Interviews,	Qualitative: Interviews, Secondary	Expert Judgement	The project charter

Charter that provides high level information about the project and formally authorizes the project.		Referring to the OPA's Secondary: PMBOK Guide Sixth Edition Books: PMP study guides UCI lecture notes and templates.	research on project charter. OPA document Quantitative: Secondary research and document screening of the client issued purchase order Applied: Evaluation research applied to use the available information on PMBOK and other sources. Action research aimed to improve business profits.	Data gathering: Brainstorming, Focus Groups, Interviews. Interpersonal and team skills: Active listening, Facilitation, meeting management. Meetings. Project Charter template. Data analysis: document analysis.	should be ready and accepted within two weeks of the project initiation
To develop the Scope management plan that will tell us how the scope will be defined, monitored, controlled, and validated.	Scope management plan	Primary: Interviews, Referring to the OPA's. Saudi Aramco HESRM regulations. Secondary: PMBOK Guide Sixth Edition Books: PMP study guides UCI lecture notes and templates.	Qualitative: Interviews, focus groups, Secondary research, document analysis on client issued purchase order, project charter Quantitative: Secondary research and document screening of the client issued purchase order, project charter. Applied: Evaluation research applied to use the available information on the project management sub-plans, PMBOK and other sources. Action research aimed to prevent scope creep.	Expert judgement Data gathering: Interviews, brainstorming. Data analysis: document analysis Interpersonal and team skills: Facilitation Decomposition Meetings Scope management plan template	Only the defined project work will be carried out.
To produce the	Requirements	Primary: Interviews,	Qualitative: Interviews, focus	Expert judgement	All the stakeholde

Requirements Management plan that will explain how the product requirements will be identified, prioritized, analyzed, documented, and managed	management plan	Referring to the OPA's, Saudi Aramco HESRM regulations. Secondary: PMBOK Guide Sixth Edition Books: PMP study guides UCI lecture notes and templates.	groups, Secondary research, document analysis. Quantitative: Secondary research and document screening of the client issued purchase order, project charter. Applied: Evaluation research applied to use the available information on project management sub-plans, PMBOK and other sources. Action research aimed to manage requirements.	Data gathering: Interviews, brainstorming. Data analysis: document analysis Interpersonal and team skills: Facilitation, active listening, networking, leadership. Requirements traceability matrix Meetings	r requirements cannot be fulfilled. Only the necessary ones will be met.
To prepare a Schedule management plan to effectively define, sequence, and estimate the project activities. To use this information to develop the project schedule and to effectively control it.	Schedule management plan	Primary: Interviews, Referring to the OPA's. Secondary: PMBOK Guide Sixth Edition Books: PMP study guides UCI lecture notes and templates.	Qualitative: Interviews, focus groups, Secondary research, document analysis. Quantitative: Secondary research and document screening of the client issued purchase order, project charter. Experiment research to determine the schedule development model. Applied: Evaluation research applied to: Understand the activity dependencies.	Expert judgement Meetings Data analysis: Alternate analysis, reserve analysis, document analysis. Decomposition Dependency determination and integration Project Management Information system: MS project. Duration estimates: Analogous, Parametric, bottom-up.	The project schedule should not extend beyond the promised project delivery date.

				Schedule management plan template	
To create the Cost management plan that will tell us how the project's cost will be planned, controlled, and structured.	Cost management plan	Primary: Interviews, Referring to the OPA's. Secondary: PMBOK Guide Sixth Edition Books: PMP study guides UCI lecture notes and templates.	Qualitative: Interviews, focus groups, Secondary research, document analysis. Quantitative: Secondary research and document screening of the client issued purchase order, project charter. Applied: Evaluation research applied to: Calculate project budget. Use the available information on project management sub-plans, PMBOK and other sources.	Expert judgement Meetings Data analysis: Alternate analysis, Reserve analysis, document analysis. Estimation: Analogous, Parametric, bottom-up. Cost aggregation Cost management plan template	The project cost should not exceed the project budget
To define a Quality management plan that describes how the applicable policies, procedures and guidelines will be implemented to achieve the quality objectives	Quality management plan	Primary: Interviews, Referring to the OPA's. Secondary: PMBOK Guide Sixth Edition Books: PMP study guides UCI lecture notes and templates.	Qualitative: Interviews, focus groups, Secondary research, document analysis. Quantitative: Applied: Evaluation research applied to: Use the organization's QA and QC procedures for the objective. Use the available information on project management sub-plans, PMBOK and other sources.	Expert judgement Meetings Data analysis: document analysis, Interviews Test and inspection planning. Quality management plan template	No external failure cost of quality.

To put together the Resource management plan that describes how the resources will be acquired, allocated, monitored, and controlled for the project	Resource management plan	Primary: Interviews, Referring to the OPA's. Secondary: PMBOK Guide Sixth Edition Books: PMP study guides UCI lecture notes and templates.	Qualitative: Interviews, focus groups, Secondary research, document analysis. Quantitative: Experiment research to achieve optimal resource allocation. Applied: Evaluation research applied to use the available information on project management sub-plans, PMBOK and other sources.	Meetings Expert judgement Data representation: Hierarchical charts, Responsibility assignment matrix. Estimation: Analogous, Parametric, bottom-up. Decision analysis: Multicriteria decision analysis. Resource management plan template	No overtime for project team resources.
To create a Communications management plan that explains how, when, and by whom the information on the project will be administered and distributed	Communications management plan	Primary: Interviews, Referring to the OPA's. Secondary: PMBOK Guide Sixth Edition Books: PMP study guides UCI lecture notes and templates.	Qualitative: Interviews, focus groups, Secondary research, document analysis. Applied: Evaluation research applied to use the available information on project management sub-plans, PMBOK and other sources.	Meetings Expert judgement Communication requirements analysis Data representation Interpersonal and team skills Project management information system	Only the specified communication mediums can be used.
To produce the Risk management plan that will describe how the project's	Risk management plan	Primary: Interviews, Referring to the OPA's. Secondary:	Qualitative: Interviews, focus groups, Secondary research, document analysis.	Meetings Expert judgement Data gathering: Brainstorming,	Risk identification meetings should be regular

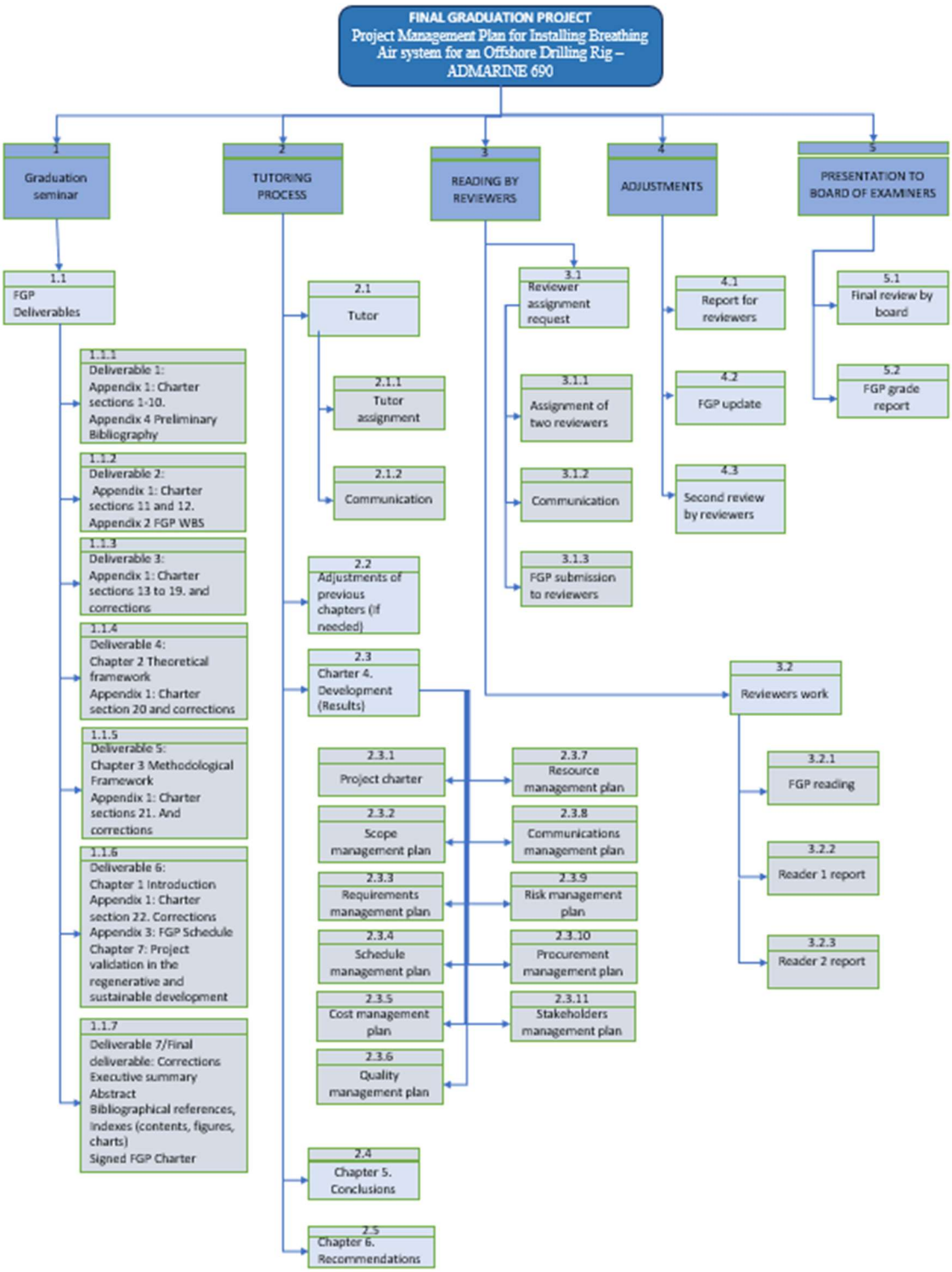
risk management activities will be structured and performed		PMBOK Guide Sixth Edition Books: PMP study guides UCI lecture notes and templates.	Quantitative: Experiment research to calculate prob-impact of risks. Applied: Evaluation research applied to use the available information on project management sub-plans, PMBOK and other sources. Action research to reduce business risks.	checklists, Interviews. Data analysis Risk categorization Data representation Strategies for risks, opportunities, and contingency response	after a fixed period.
To define the Procurement management plan that details the acquisition process for goods and services from outside the organization	Procurement management plan	Primary: Interviews, Referring to the OPA's. Secondary: PMBOK Guide Sixth Edition Books: PMP study guides UCI lecture notes and templates.	Qualitative: Interviews, focus groups, Secondary research, document analysis. Quantitative: Secondary research and document screening of the client issued purchase order Applied: Evaluation research applied to use the available information on project management sub-plans, PMBOK and other sources. Action research aimed to improve business profits.	Meetings Expert judgement Source selection analysis Data gathering Data analysis Inspection	Only pre-approved sellers can be used for the project.
To create a Stakeholder engagement plan that identifies the strategies required to promote	Stakeholder engagement plan	Primary: Interviews, Referring to the OPA's. Secondary:	Qualitative: Interviews, focus groups, Secondary research, document analysis. Applied: Evaluation research applied to use the available	Meetings Expert judgement Interpersonal and team skills Data gathering: Brainstorming	Availability of stakeholders. Stakeholders might be unaware, neutral, or

productive stakeholder involvement		PMBOK Guide Sixth Edition Books: PMP study guides UCI lecture notes and templates.	information on project management sub-plans, PMBOK and other sources. Action research aimed to improve business profits.	Data analysis: Stakeholder analysis, document analysis Data representation.	not engaged due to other work commitments.

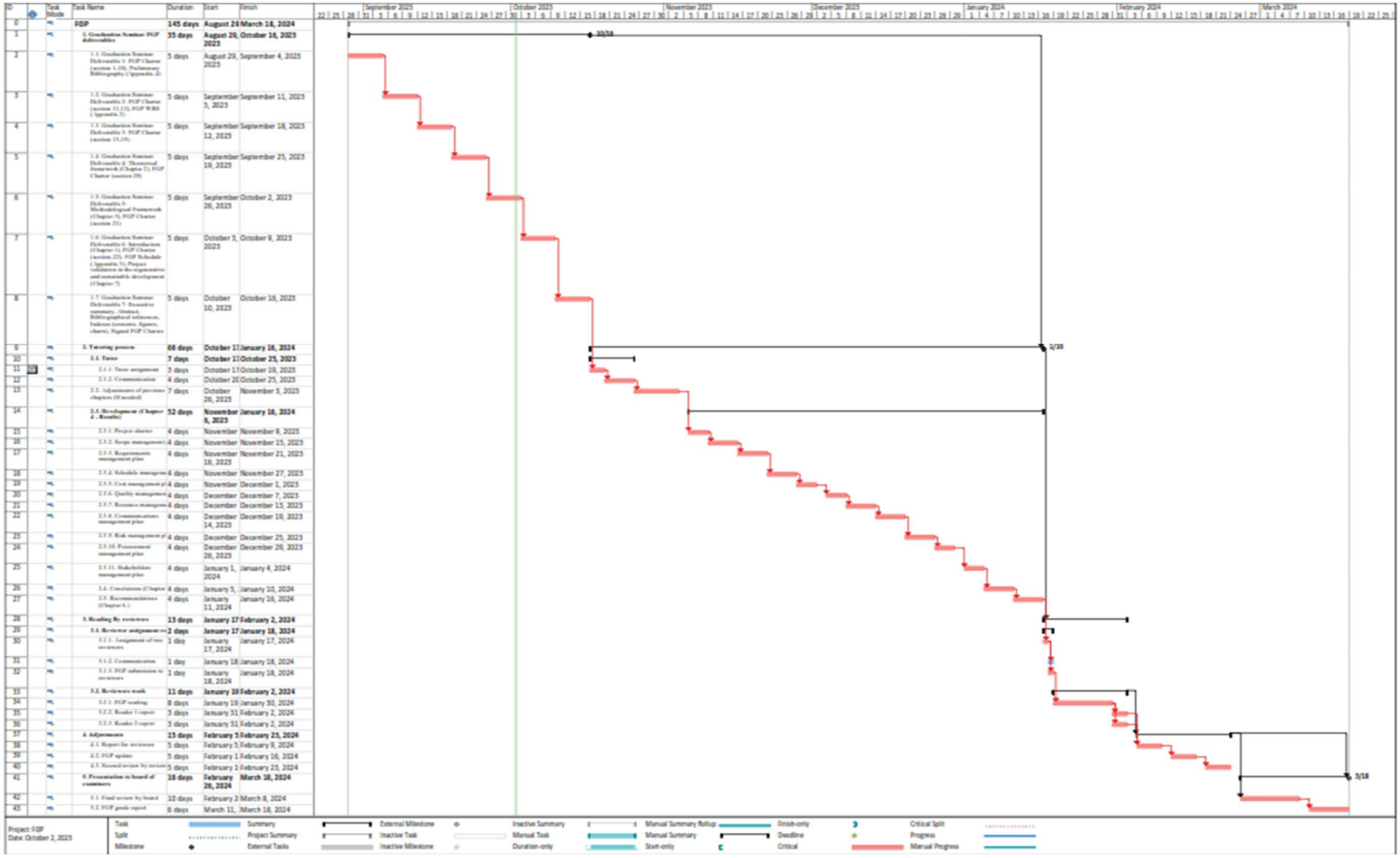
22. Validation of the work in the field of regenerative and sustainable development.

The FGP will help in the implementation of regenerative and sustainable development ideas for the project of installation of a breathing air system project for the offshore rig ADM-690. The Saudi Aramco regulations limits the changes to the project requirements, but the creation of the project management plan will help ensure that the possible regenerative and sustainable development ideas are incorporated in the project management sub-plans and monitored to ensure they are executed. The potential indicators will be measures using primary and secondary information sources. These key performance indicators will include, training certificates of employees; reports on risk assessments, inspection, safety inductions, and trainings; percentage of local employees; efficiency in procurement and resource allocation; percentage of diverse vendors engaged; leaves granted as per the local policies; reduction in number of face-to-face meetings; staff using company's carpool bus; number of project shipments; reduction in project's energy consumed using solar panels; reduction in compressor exhaust gasses; number of complaints made by nearby residents; reusing available good quality equipment; social return on investment; employment to community members and contractors; creation of project management plan template; and management reserve.

Appendix 2: FGP WBS



Appendix 3: FGP Schedule



Appendix 4: Preliminary bibliographical research

About us | Company Profile | Solas Marine Services. (2020, December 28). Solas Marine. https://solasmarine.com/about/ (Solas Marine Services, is the organization which will be executing the project. The company's OPA and EEF's will guide the development of the Project management plan)

ASRY rig Repair & Conversion. (2022). *www.asry.net*. https://www.asry.net/Our%20Services/Core%20Services/Rig%20Repair%20Conversion/ (ASRY is the shipyard where the project is being executed. Solas Marine may be using ASRY's support and facilities for completing the project, SOLAS Marine will have to fulfill the shipyard's health and safety requirements for the project.)

Breathing Air Cascade System | Breathing Apparatus | Solas Marine. (2020, December 15). Solas Marine. https://solasmarine.com/product/breathing-air-cascade-system-2/ (This is the system that will be installed on the offshore rig ADMARINE 690, and on which this project will be based on)

Ellen MacArthur Foundation. (2011, August 28). *Explaining the Circular Economy and How Society Can Re-think Progress | Animated Video Essay* [Video]. YouTube. https://www.youtube.com/watch?v=zCRKvDyyHmI (We will use this to highlight the concepts of circular economics wherever used, or suggest where we can use it in the project)

Kerzner, H. (2017). *Project management: A Systems Approach to Planning, Scheduling, and Controlling*. John Wiley & Sons. (A guide on project management that will be

used as reference for project management processes templates, information, and reference.)

Navegar por los elementos · UCI BIBLIOTECA. (n.d.). omeka.campusuci2.com. https://omeka.campusuci2.com/biblioteca/items/browse?collection=4 (Link for the FGP projects online library of University of International Corporation as a reference)

Offshore Fleet - ADES Group. (2023, August 28). ADES Group. https://adesgroup.com/our-fleet/offshore-fleet/ (ADES group is the Client and the owner of the offshore rig who has issued the purchase order to SOLAS marine. This is the information on their fleet and other additional information.)

Oil production. (2022, March 8). Saudi Aramco. https://www.aramco.com/en/creating-value/products/oil (SAUDI ARAMCO is the organization where the offshore rig will be in drilling operation. SAUDI ARAMCO has a set of regulatory requirements that needs to be met for the project).

Phillips, J. (2018). *PMP Project Management Professional Study Guide, Fifth Edition* (5th ed.). McGraw Hill. (A study guide on project management that will be used as reference for project management processes templates, information, and reference.)

Project Management Institute. (2017). *A Guide to the Project Management Body of Knowledge (PMBOK® Guide)–Sixth Edition* (Sixth Edition). (A book on project management that will be used as reference for project management processes templates, information, and reference.)

Project Management Institute. (2021). *A Guide to the Project Management Body of Knowledge (PMBOK® Guide) – Seventh Edition and The Standard for Project Management (ENGLISH)* (Seventh edition). (A book on project management that will be used as reference for project management processes templates, information, and reference.)

Saudi Aramco. (2020). Drilling & Workover Health Safety and Environmental Requirements Manual. In *Section a/ Administrative Requirements*. (The document details the regulatory requirements of the breathing air system that the project should meet)

Scribbr. (n.d.). *Research Methods | Definitions, types, Examples*. https://www.scribbr.com/category/methodology/ (Information on types of research methods that may be used in the section for the methodical framework.)

Seow, Y. (2022, August 17). *Tightening jackup market sparks supply crunch in APAC.* S&P Global. https://www.spglobal.com/commodityinsights/en/ci/research-analysis/tightening-jackup-market-sparks-supply-crunch-in-apac.html (This has additional information about the client ADES group that has issued the PO to SOLAS marine services.)

StackPath. (2022, May). https://www.offshore-mag.com/rigs-vessels/article/14277372/report-saudi-aramco-saves-the-day-for-the-jackup-fleet (Used to get information on the daily charges of the offshore rig in operation in Saudi Aramco)

Appendix 5: Philologist Review Report

Aditi Silveira

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January 27, 2024

Academic Advisor

Masters Degree in Project Management (MPM)

University for International Cooperation (UCI).

Dear Academic Advisor,

Subject: Thorough review and proofreading of the Final Graduation Project submitted by Gourish Vaingankar in partial fulfilment of the requirements for the Masters in Project Management (MPM) Degree.

I hereby confirm that Gourish Vaingankar has made all the corrections to the Final Graduation Project document as I have advised. In my opinion, the document does now meet the literary and linguistic standards expected of a student for a degree at the Masters level.

Aditi Silveira

Master of Arts (English)

GOA UNIVERSITY

Certificate

This is to certify that ***Silveira Aditi***
Passed the ***Master of Arts (English)*** *Examination*
held in ***April, 2014*** *obtaining 'O' -* ***Outstanding Grade*** *and*
Second *Rank at this examination.*

Date : 23rd January, 2015

Registrar