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DRILLING PROJECT MANAGEMENT

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ABSTRACT

Project management is the application of knowledge, skills, tools and techniques to project activities to meet project requirements. Project management is accomplished through the application and integration of the project management processes of initiating, planning, executing, monitoring and controlling and closing. A project is a temporary endeavour undertaken to create a unique product, service or result. Drilling of a geothermal well is a project and the product of the project is a well that could either be aimed at supplying steam for electricity generation or for other uses. Proper planning of any drilling venture is the key to optimizing operations and minimizing expenditures. Drilling project management is done balancing the competing demands of quality, scope, time and cost.

1. INTRODUCTION

Drilling a well is an expensive venture and if not properly managed the cost of drilling can escalate and impact negatively the success of the drilling project. Proper planning of any drilling venture is the key to optimizing operations and minimizing expenditures. Like any other projects, there are competing demands of quality, scope, time and cost which should be balanced during the execution or implementation of the drilling project. However, in drilling, time is the most important factor. All efforts should therefore be directed at reducing time Efficiency in drilling must be a team effort. Everyone involved from top level management to the roughneck must have the same priorities to be successful. Success is as much attitude as engineering.

2. WHAT IS PROJECT MANAGEMENT?

Project management is the application of knowledge, skills, tools and techniques to project activities to meet project requirements. Project management is about getting things done. It is about knowing exactly what you want to achieve, how you are going to achieve it and how long it will take. It is about ensuring everyone involved shares and understands those aims before the first steps are taken and those they continue to as the end of the project draws closer. Successful projects do not just happen. They are not long lists of jobs to be done; they are a master piece of planning, management, organization and communication.

3. MANAGEMENT STRATEGIES FOR DRILLING

It is important that the strategy envisaged to carry out drilling is known beforehand so that the right steps can be used to manage the project. Geothermal development is at an accelerated phase in most African Countries endowed with geothermal resources. Part of the development is to drill exploration wells to confirm availability of the resource. Drilling should be done safely, timely and efficiently and in a manner that decision making will not be delayed. The other phases of appraisal and production drilling that follow should also be executed timely since some major development decisions are pegged on their timely completion.

Drilling may be done by a contractor or the government through special purpose vehicle entities. In Kenya government organizations have been formed to spearhead the development of geothermal resource and success has been observed for example GDC and KenGen. Where the contractor is involved the contractor will own and operate the rig and employ and train the required personnel to operate the rig. Contracting strategies employed may be day-rate contracts or turnkey contracts.

In the case for day-rate contracts, the operator or the client prepares a detailed well design and program of work for the drilling operation and the drilling contractor provides the drilling rig and personnel to drill the well. All the consumables used for drilling (e.g. drilling bits, cement, drilling mud), transport and support services are provided by the operator/client.

For turnkey contracts the drilling contractor designs the well, contracts the transport and support services and purchases all the consumables and charges the client a fixed sum of money for the whole operation.

On the other hand the government may decide to take up drilling through its established entities as is the case with Kenya where GDC and KenGen have undertaken drilling of geothermal wells. With this kind of set up the government entities will shoulder all the responsibilities of the contractor i.e. it will own and operate rig, employ and train required personnel to operate rig, design the well, provide transport and support services and purchase all of the consumables (e.g. drilling bits, cement, drilling mud etc.). With government entities, procurement has to conform to any legislation/laws covering the tendering process which at times becomes a major a bottleneck for emergency works which require procurement of items.

The established government organizations which have been set up to develop geothermal resource are structured in a manner that a section or a department is tasked with carrying out the drilling operations. The drilling department exists with other departments that support the drilling operations in one way or the other. A smooth relationship between the drilling department and the other departments has to exist where communication and decision making will not be hampered. A typical organization structure is shown in Figure 1.

The relationship between the drilling department with other departments is shown in Figure 2. The relationship should be harmonized enough to offer full support to the drilling operations so that the success of the project can be achieved.

4. OBJECTIVES OF THE DRILLING PROJECT

The main objectives when embarking on a drilling venture is to drill the well within:

- Planned cost;
- Planned time;
- Desired quality standards; and
- Set safety standards.

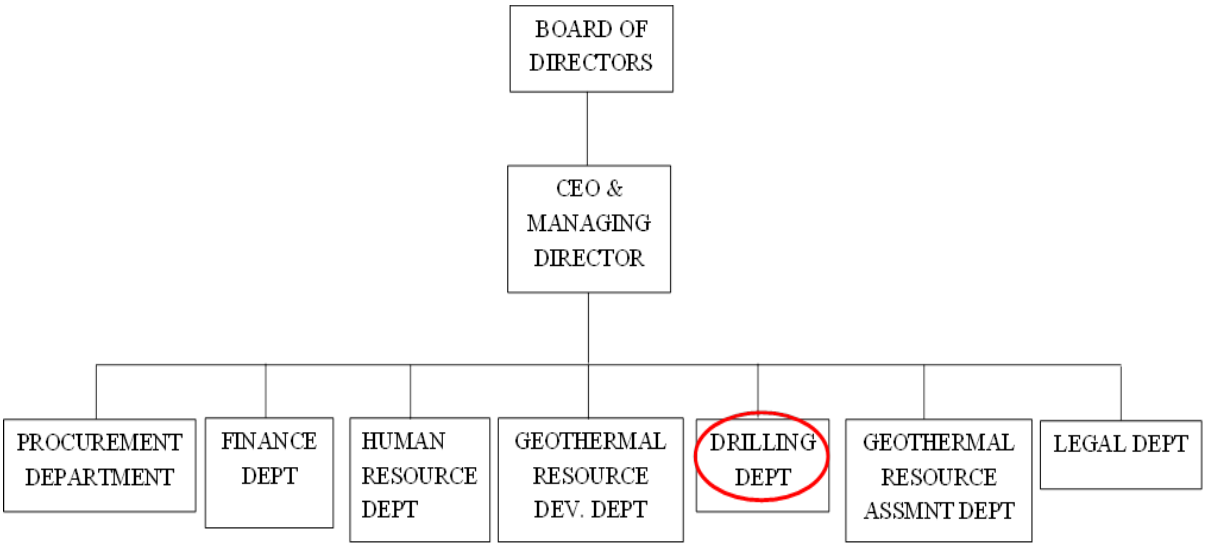

FIGURE 1: Typical organization structure

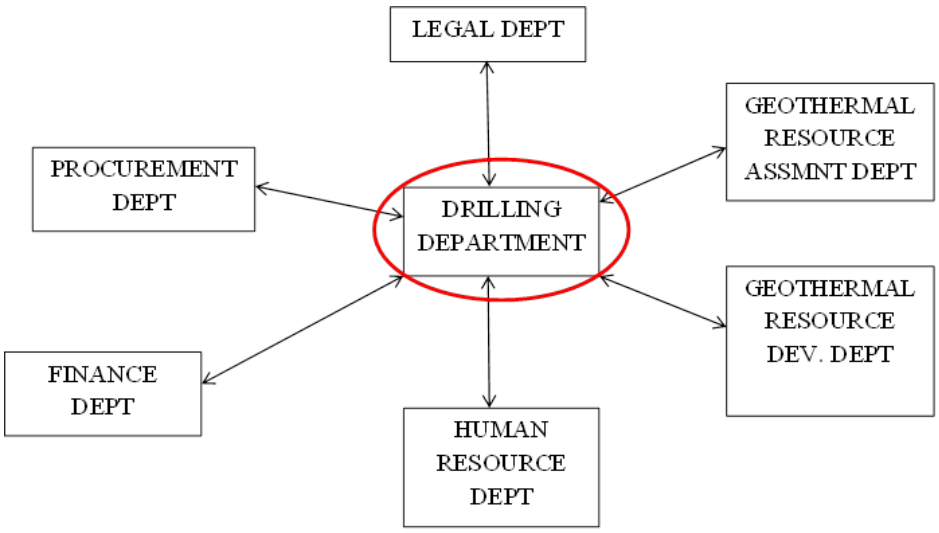

FIGURE 2: Linkage of drilling department with other departments in an organization

When the above objectives are achieved the end result is a successful drilling project. Similarly these objectives also form what is termed as the triple constraints which need to be balanced during the execution of the drilling project. The relationship among these constraints is such that if any one of the constraints changes at least one other constraint will be affected.

Figures 3 and 4 show the relationship between the constraints for a typical project and for a drilling project respectively.

5. DRILLING PROJECT MANAGEMENT PLAN

Integration is paramount to project management and it involves combining project requirements, activities and results to achieve the objectives and a successful outcome. The higher the complexity and the more the interested parties' expectations are varied the more a sophisticated approach is needed. The project management plan encompasses all the individual plans crucial for project management success. The project management plan defines how the project management system will

be utilized. The plan may vary from project to project depending on the level of complexity of the projects.

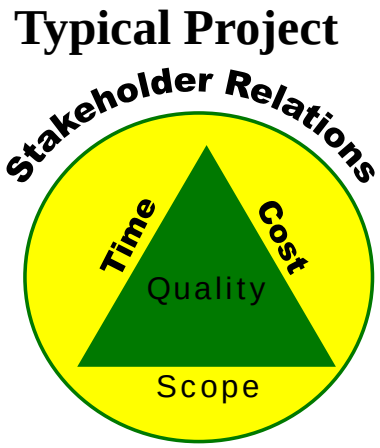

FIGURE 3: Triple constraints for a typical project

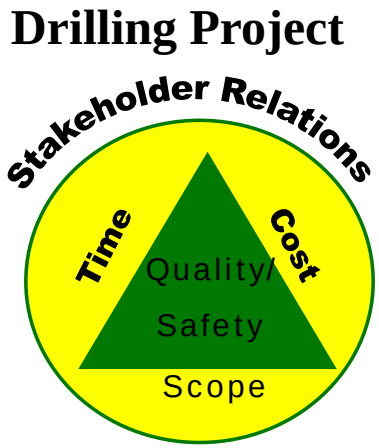

FIGURE 4: Triple constraints for a drilling project

Drilling project management plan integrates the following plans:

- The interested parties management plan;
- Project communication plan;
- Procurement plan;
- Contract plan; and
- Quality plan.

5.1 Interested parties management plan

Interested parties are the people or groups who have concerns with the performance or success of the project. The interested parties should be identified their interest made known and ranked in order of their importance towards the project. The project management team should manage the interested parties' influence in relation to their requirements to ensure a successful project. The interested parties can be categorised into internal and external interested parties. Internal interested parties are fully involved with the day to day running of the project whereas the external interested parties are involved with the project to some extent but not extensively.

For drilling projects where the government organizations are the ones carrying out drilling, example of internal interested parties would be the organization's management, drilling crews, geoscientists, reservoir management staffs etc. Examples of external interested parties would be the government, donors and the community surrounding the project area. A participatory approach where all the interested parties are involved should be encouraged to avoid conflicts while executing the drilling project.

5.2 Project communication plan

Communication is the effective exchange and understanding of information between the parties involved with the project. Communication planning is the process for determining the information and communication needs of the project interested parties. The right information should be transmitted to the relevant parties accurately and effectively to meet their expectations. The project manager in a drilling project needs to know who is to receive the information before being

disseminated. As the project progresses more information is generated and therefore the drilling project manager needs to know up to what level of detail will each interested party receive.

It is advisable to have a document showing who will what information and when. Some information is confidential and therefore should only be communicated to the relevant target group. In drilling projects a lot of communication is relayed through meetings where most of the decisions affecting the drilling project are made. Management of meetings is therefore important and includes preparation for the meeting, the conduct of the meeting, reporting the meeting and following up of meeting deliberations.

5.3 Procurement plan

Procurement is obtaining the best value for money from suppliers of goods and services to the project. Government organizations have to conform to legislation covering the procurement process. This process is normally lengthy and becomes a major challenge when procurement has to be done for emergency works like breakdowns of the rig. Elaborate plans should be put in place to deal with breakdowns for instance frame work contracting should be encouraged for services that may require immediate procurement for example fishing services.

Proper inventory should always be kept and updated regularly e.g. rig spares, rig tools and equipment, drilling consumables, personal protective equipment etc. Some of the drilling tools and equipment are special and only supplied or manufactured by few merchants therefore the organization involved in drilling should establish running contracts to avoid running into crisis during drilling project execution. In addition the organization should identify potential suppliers, seek quotations, and put bids to tender, select a supplier, and negotiate long-term agreements with crucial suppliers.

5.4 Contract plan

A contract is a legally binding agreement between two or several parties to perform work or supply goods and services under specified conditions. Drilling projects are subject to several contracts as some of the crucial works are contracted e.g. casing cementing, well logging, directional drilling etc. A contract plan should be available to show which and when services need to contracted and at what stage of the drilling project.

The legal department within the government established entities is tasked with drafting of the contracts and once agreed upon to monitor and manage during the life-cycle of the project. In addition any issues arising from the management will also be handled by the legal department. During management of the contract proper mode of communication should be maintained for ease of reference. Most preferred communication mode is written form e.g. email or letter.

5.5 Quality plan

Quality is the degree to which inherent characteristics fulfil the project objectives. Quality planning entails identifying which quality standards are relevant to the project and determining how to satisfy them. The project team should convene to define the desired quality of the well and to discuss the involvement of each party towards fulfilling the same.

For drilling projects quality is how appropriate the drilled well has been constructed for all the four (4) phases (surface hole, intermediate hole, production casing hole, liner section) and also if the drilled well has hit the target reservoir to produce steam. The project team has to participate in the management of the drilling project quality and the project manager has to follow through that everyone is a team player. Balancing of the three constraints (time, cost and scope) has to be done for quality to be achieved.