

# The Principles of Deep Alluvial Drilling Management on Borehole

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## Abstract

Drilling borehole is one of the Geotechnical studies methods in land. The improvement of the procedure for and largely reinforcing the ground and injecting the material into the ground used. According to ground conditions and specify the desired goals of the depth of the borehole, which could include the borehole of the shallow, deep and profound. In this research, in the alluvial land drilling operations are studied on alluvial layers. Soils of fine-grained up to coarse-grained and even the structure of There is a very complicated that you should be sure of the direction of the drilling operation. Soft rock with rock areas of the organization that the cycle of diagenz there has to be complete and their effect on tectonic setting or location and climate of the region suffered alteration and alteration have been certain important also in drilling. In fact, drilling in the sand and stone strata loose organization, some of chemical- vaporize, because the coal and limestone rock component that compresses the soft sensitive work; and the necessary measures in this regard should be anticipated. A variety of machine tools for drilling, digging wells and the borehole in the world level used. In this research is based on the mechanism of action of the machine, drilling them into different groups, which is divided into the selection of the drilling system to each of these sets of factors, geographical location, gender, position, and depth of the well diameter materials and other factors are correlated.

**Keywords: Drilling, Alluvium, New methods of speculation, Management.**

## 1. INTRODUCTION

One of the methods Renovation and strengthening of the land, injection into the land, materials, mainly of the drilling method used to achieve this goal. now depends on the ground conditions and the goal of changes in soil texture, drilling can be carried out in various forms such as can be used to make the chips, holes drilled, dug the pit Borehole by drill point, drilling in order to dig here by car of the digger, in order to inject mixes of Within the different ground

## 2. THE METHOD OF BOREHOLE DRILLING

To perform the drilling operation first must specify the position of the Borehole, as well as the location of the work shall have been appropriated and not opponent as well as the access road to the site is possible by car and in the case of not having the necessary measures must be well access way. in some cases, because of the existence of legal problems or terrain can designer The location of the Borehole could be as much as possible and as far as an aims the project would not be entered, move.

After you determine the location of the Borehole, according to the coordinates of the position presented in the map of the borehole as with the mapping camera by a surveyor in the walk location. After being determined the exact location of the borehole by seating the team preparing drilling. prepare device for seating include preparing the way to access the flat, horizontal directional drilling and seating create a sturdy platform and prove by concrete for mounting the device. After preparing the drilling platform of the device must be in the form of Bob (perpendicular to the ground) in the desired location is fixed. Fixed to the device and its perpendicular on the ground is very important, especially during drilling that the device should not be moved to no or Off-Plumb and level. the error in each of these cases can cause wrong results or business failure of the drilling operation at that point. At the time of the start of drilling operations generally, the value soil, alluvium or manual categories may exist that must be of casing investment methods. Unless the desired level of concrete or stone and dig out the starting point (zero point) on a concrete or stone. Soft rock with rock areas of the organization that the cycle of diagenz there has to be complete and their effect on tectonic setting or location and climate of the region suffered alteration and alteration have been certain important also in drilling. In fact, dig in the sand and stone flowers loose organization, some of vapor and chemical because the coal and limestone rock component that compresses the soft sensitive work; and the necessary measures in this regard should be anticipated (Mansouri, 1385).

A variety of tools and devices Drilling for the well, and the Borehole in the world used the mechanism of action they are., drilling of the four following main classified group (Bell, 1983):

- 1- bits drilling
- 2-wash drilling
- 3-impact drilling A
- 4-Rotary drilling

Select each of these systems Drilling of the collection of the following factors are correlated (Bell, 2000):

- The position of the geographical location of the
- Genus earth materials
- Diameter and depth of the wells and drilling machine
- The device being available.
- The aim of the drilling operation
- Sampling quality.

## **2.1. SPIRAL BITS DRILLING**

One of the methods Conventional drilling, in the activities of the development will count come the digging of wells in the rotation on their effect and spiral drill and go it on land obtained. application of this method of more drilling in soft and semi hard and depending on the type of drill, various used (Duncan, 2005). Drill drilling of the main two are divided into: 1. drill Manual of drill-2-mechanical indices.

### **2.1.1. HAND AUGERS**

This drill These are manual by one or two people are slaves earning. overall the composition they include bit, bar or tube in the Middle, and handles the drill head can be could have different shapes, and practice of drilling and sampling done by them (Shafai, 1373).

This type of drill for drilling to a depth of 10 to 30 meters used in drilling depths by gender. land and water access level control in underground, drilling through the drill. Manual of tasks usually done for the prospect of another application, such as a declaration recognizing and water level basement and creating wells, drainage can also.

Frequently asked questions The most common type of drill Manual, the following are divided into three groups:

#### **A: Post – hole Auger**

This type of drill for example, soil sampling of fine seeds used in sticky and their diameter shall be between 100-200 mm.

#### **B: Helical or Screw Auger**

Spiral drill for samples Any of the soil (the non-sticky sticky or) use. of course, the soil should dry and above the level of the ground water located between 50 to 100 mm in diameter they are.

#### **C: Spiral Auger**

This drill Building simulation, springs, and according to their forms and their uses are as follows:

1. Closed spiral drill, 2. Open spiral drill;

The first type of soil for samples of the hard clay soil and Sandy heaped up in use. the second type of soil sampling for non-adherent of the sand used in slave of the drill diameter are between 50 to 100 mm.

### **2.1.2. MECHANICAL AUGER**

The necessary resources for implementation of dropping this kind of drill Are supplied by a motor power consumption amounts to a kind of drills and drilling for the Earth in which sex may be depends. drill of its duty based on the mechanical properties of two group of drills and drill style of mechanical properties of heavy losses in the Division.

#### **2.1.2.1. LIGHT MECHANICAL AUGER**

This drill in terms of application interface limit of the drill of the drill manual and mechanical properties of heavy metals. Transport and work to get them done by one or two people from a small engine to power 10 horsepower for turning and sinking of land used in the drill. the depth of wells drilled by this type of drill between

10-15 m in diameter drilling, and between 75 to 300 mm. they further application in deposit that not soft and hard and toward the drill Manual of the higher speed.

### **2.1.2.2. HEAVY MECHANICAL AUGER**

These drills are usually on trucks and by them to the desired locations in data transfer with them by force. A powerful engine and penetrating power supply (pressure) they may be caused by the weight of the drill and drill machine itself or by an external supply of hydraulic power or dynamic.

#### **2.1.2.2.1. FLIGHT AUGERS**

These drills Height are equal to 50 to 300 mm and drilling to a depth of 50 of them for up to 60 meters in use. The drill blade, depending on the application they have to drill two of the spokes of the drill and short blade of a continuous classified.

##### **2.1.2.2.1.1. SHORT FLIGHT AUGERS**

The composition of this drill Are in three sections:

A: blade in the lower part of the winning and the drilling operation is performed.

B: drill spiral-length limit in the middle section.

C: the axial Rod drill set to attach drilling machine.

During the drilling drill machine to spin and the spin by the middle bar (axial) are transferred to the winner of the blade It is done by drilling materials. in the middle part of the spiral instead of may be brought to the surface of the Earth in this and rotated in the reverse-discharge materials drill drilling and drilling wells are sent to the end again.

According to the type of blade used, drilling a winner may the following can be in.

1-spiral blade 600 mm maximum diameters: simple, drill for deposits of the soil surface and soft.

2-blade diameter 400 mm double spiral: maximum drilling, for deposits Hard rock of altered.

3-blade fish tail shape: maximum diameter 300 mm, for drilling in stone of loose soil and hard.

4-blade 300 mm maximum diameters, mounted: for drilling in stone of semi hard.

##### **2.1.2.2.1.2. CONTINUOUS FLIGHT AUGERS**

This drill Page spiral form head to head Kelly bar section [9] are unlikely to be seen as going a snail, a result of the on-going progress in drilling and drilling materials with rotation of the page brought up in spiral, and finally, at the level of the discharge in the Earth. the possibility of mixing sample Being brought up in the end in this kind of drilling is high and not obtained samples of the precise location of the drilling depth will be introducing. using this drill, then can be used to a depth of 60 m continuous drilling in. diameter drill this is between 60 to 110 mm. drill with this type may be found in the any land, though in different drilling will use them more on the sediment surface of and, like the loose shale. The middle part of the drill of the spokes going in May to the following distort.

#### **A: bold Flight Augers**

When of the drill of the blades used in bold is required after each time the drill has to be outside of the sample or part discharge of drilling has been performed in Australia and or drill, but tests of the blade of this score are you available during the drilling core sampling done also and the intact samples of a diameter of 75 mm to 150 mm and a will get that, no need to drag out the drill from the inside Wells.

#### **B: Bucket Auger**

This drill Includes a cylindrical steel container in the shape of the top and on the bottom of the page are open there is a metal on the blade of the winner has been anticipated in the vicinity immediately. this blade of the winner of the thread that is located within the open compartment bar compartment of steel -to connect the drill machine May drill during drilling operations. To rotate dermis and blade of the winning cause shatter and cut rock or sediment in your path may be crushed by materials. Thread are way into the Chamber to be filled when they and the Chamber is brought to the surface of the Earth, the drill and the discharge Chamber contents in this case and the practice of oil drilling continue. using this method, the well of a diameter of one meter and to a depth of 50 meters drilled. Of course, this drills for drilling in soft sediment not suitable hard.

## 2.2. WASH BORING DRILLING

Wash boring drilling method A simple exploration of the common Borehole and germination in one application of this type of more drilling. deposits of soft and hard stones and half are badly needed, altered drilling depth 30 m. and a diameter of wells drilling, to a limit of 15 cm. drilling speed in the sediment of the soft alluvium in about 6 meters per hour and in stiff clay, 5.2 meters per hour. the practice of drilling samples obtained from most of the hand and many are disrupted and distorted value for the activity of identifying the samples in order to have healthy examples of tools usually used by Drilling tools include the drill (drilling blade) The bar mounted on the drilling and steel through the cable (rope) attached to the drilling device may include drilling of telecommunications device. (Three or four foundations), engine, steel cable, pulley and the water pump is a device. drill (blade), drilling a three form of linear, sharp tip and a page there is a crossover of the two types of deposits for the first drilling soft clay to silts, for deposits of alluvial rock semi hard and loose use of this method of drilling are usually in the form of the tube wall of the need to protect the wall used in the well and be in the Borehole that the party does not have the necessity of at least two-walled pipe the first meters of the well by the pipe wall protecting the safety of the Earth around the well that the place of establishment Drill machine is guaranteed.

This drilling method for drill and drilling is the first bar to a certain height (30 to 100 cm) high by the motion of the motor is brought Then abandoned and drilling tools in effect force called free fall to the bottom of the well shall enter that causes the path of wisdom and shortening their materials into the water simultaneously. Wells drilling through injected bar and through a hole that had been anticipated with the pressure on the drill blade out. by pressing the crushed materials and parts for water through the gap between the pipe and that bar drilling the wall with wall Located well to the top of the well, along with the materials out of the water to the pond or tank shall discharge the alternatives. in these ponds are gradually destroying the bomb materials may have been pumping and water wells within the injected again.

## 2.3. PERCUSSION DRILLING

This method for soil drilling Soil heaped up, hard and stiff clay minerals and rocks are used an average drilling depth of 60 meters. and a maximum of more than 200 m and diameter of drilling between the Borehole-100-600 in mm. drilling speed according to the type of ground materials and sex that are drilling be different. Coarse of Soft surface and 2 to 4 meters per hour, in the semi hard materials 1 to 2 meters per hour and in rock hard maximum of 1 meter per hour may. in rock drilling when the sample represents the mentality of the soil, but are often examples of the obtained hand and drains me. this method more dug in deep water may be and its application in geotechnical exploration due to the high cost of doing it and the lack of access to healthy, is limited. The device Drilling tool set is included in the operation of drilling and sampling in two stages separately. Summary description of how to work in below.

1. Drilling operation: on the effect of high and low go drilling tool within the wells and the influence they have on earth are in effect if you hit Drill drilling tool included. (Blade), bar drilling and may be replaced by metal cable pulley and the motor is attached to the drilling machine can be moved by first drilling tools. the engine up to a height of 50 cm high to 100 cm. then release brought shall be. This tool since all are steel, as a result, many weight. so many during the fall energy (D) may blow in and enter and penetrate the Earth to cause drill bits. Drilling drill during the penetration on the land, located in the materials is cut and their continued resistance. If drilling beneath the surface of the water within the well water level, seeps, and mixed with chopped materials and flowers and will create a layer that bring in the next step (stage of sampling) shall discharge from wells drilling. Over the surface of the Earth, it is necessary to be entered into some water wells up with the crushed stone mixed materials has mud and earth and can be used to discharge after layer.

2- the practice of sampling material discharge: after finding out drilling tools and drilling operation status do Sample tools. the sampling Chamber or barrel including discharge and are depending on the gender of the specific and different types of drilling materials type are part of the lower Chamber are each one win and her heel is a side valve open. "thus allow crushed materials and flowers came into the Chamber layer may increase, but prevents their exit Sample tools. the sampling and bar are connected to discharge drilling and drilling device by cable to attach metal and move it by the motor adjustment, usually the discharge Chamber with a shot to the bottom of the well is imported and with his winning of the heel into the building materials and flowers and are down layer and high vacancies, while flower materials and layer to the level of the Earth.

Method The discharge of the other for flowers and used wells Te layer, for example when the bottom of the well and mud materials sand layer of lacking adhesion can be used from head method and when more materials are made of clay may be of the drill of the vane rotor movement that have spiral.

## **2.4. ROTARY DRILLING**

This method of drilling in all types of land in earthy and stone and has taken to act too deep. Borehole diameter between 40 to 200 mm and has a sample of the obtained may be intact and represents or can depend on what purposes these are drilling are done.

Drilling on their speed of operation compared to other methods of it is, therefore, more extensive use of Borehole for digging deep and prospect of operating oil and gas. this method in the project application and exploration of high-cost geotechnical for the implementation of complex it systems and it limited drilling of this system is its duty according to the two groups of micro tool and the tool are divided into core study and a brief description of each of the following has come in.

### **2.4.1. CUTTING BIT**

When these tools are used The main purpose of the action are in the Earth, and the influence of advance at drilling and sampling in the second priority is located in the samples obtained in this way have been routed and crushed in the drill included utility (blade) and the body of the drill is a drilling axial rod is mounted and connected to it by drilling machine may. A drill machine is equipped with hydraulic power generating engine that move the supply of drilling tools on their May drill drilling. Rotate and move on their own and cause rapid shortening of materials in the bottom of the well and drilling tool weight effect causes the sink into the Earth and water or drilling mud. compressed air simultaneously through the drilling of the well within the injected bar and ultimately through the holes and slots in the drill designed to drill around b.OBO very high pressure injected and thus in the meantime climbed and materials have been routed to the surface of the Earth. of water (drilling mud) or compressed air for cooling is used to keep drilling bit drilling in the flowers. the protection of the wall of the well in front of the drilling mud also loss. Of the mix to water with bentonite obtained in drilling and wide use of oil.

### **2.4.2. CORING TOOLS**

The only difference between core tools Gear and tools in tools core barrel insult, core gear is installed after the bit and the sample during the 1960s dig into it driven and after completion of drilling, a thigh high along the sample. core barrel length is usually between 50 to 300 cm. two types of related core barrel and there is double core barrel related to the sample in the soil sample to take and double core barrel in the land of stone used It can be.

## **3. MODERN METHOD OF DRILLING**

In addition to the items listed by need method New ways have been devised to drilling is a brief description of them.

### **3.1. THERMAL DRILLING**

On the method of thermal, thermal radiation of energy helps the air with oxygen, or fuel type, white cementing, oil used for may Air or oxygen and fuel stone. of the two separate tract into the reservoir located on the back of the drill is added and after igniting the flame, heat the drill through the nozzle head to level the stones conveys and also heat the surface of the stone is ready for separation and laminate. Finally, to help the water pressure, laminate and parts of the Earth are transferred to the surface.

### **3.2. WATER DRILLING**

In this method, using the water supply pressure at the surface, digging wells is possible here, with water pressure in wear resistance; surface rocks in may Breaks, and thus, will face drilling. This method applied with the increase of water pressure in coal mining and Placer reserves.

### **3.3. SHAKE DRILLING**

This method of creating vibrations with high-frequency may be one of the most common stone broke. One of shake drilling method is ultrasonic drilling.

### **3.4 CHEMICAL DRILLING**

In this method, the use of chemical action of explosive in explosion Be used in drilling classes. This method is usually used of two types of spending.

- 1) Cylinder that makes spending are digging cylinder hole.
- 2) Spend hole is the increased diameter of the hole.

### **3.5. ELECTRICAL DRILLING**

In this method, with electrical production type or traits or spark drilling operations, done in stone In some of these methods, despite high temperatures, because of the call time short of being electric, the stone does not melt, but other methods are due to the high temperature and long time contact with the surface of the stone electric, after melting the surface of the stone, stone breaks.

### **3.6. LASER DRILLING**

Electromagnetic radiation can be used with laser rays to be traits of production. This type of radiation is Be used for evaporation, or melting of rocks, creating fractures in rocks and digging hole. With strong waves phosphorous infrared thermometer can be used to surface traits, causing evaporation and melting the surface of the stone, and the stone fractures around the melting range. The function of the radius of the areas heavily depends on the laser radiation power.

## **4. DRILLING CATEGORY WITH FLUIDS**

### **4.1. AIR FLOW**

To dig in the ground such loose and soft can be from the air as drilling fluid. the only course to a depth of 300 meters can be benefited from this method because for the depths of most existing equipment cannot be used with the air volume required for the preparation of the cutting exit.

### **4.2. OIL BASE FLUID**

The use of fluid with base oil which contains Automotive, petroleum and mining are to dig in the ground of salt rooms and the possibility of a dissolution of the clay and the Borehole it would, especially in the depths of the most high-temperature effect on clay may be used, these hydrated. so looking for a substitute fluid which does not react with clay and lowest effect on other samples can be used instead of the oil, the water that The lowest hand corrosion formation. One of the other benefits it resistance against salt pollution, chalk and acid gases CO<sub>2</sub> and H<sub>2</sub>S can be. Of course, the cost of the above it should also be considered and only in special cases and sensitive use. In addition to the cost of maintenance and the cost of disposal of waste transportation is also high. It is therefore in terms of environmental and pollution that are in use, except for special cases It is not recommended and is prohibited.

### **4.3. WATER-BASE FLUID**

Water-base drilling fluid more broadly than oil and gas. Construction and keeping it comfortable and simply can be low or high additive compounds it. For example, during the excavation until the Borehole in the sand Stone Data on the water before it is completely on the drilling, but in some parts of the limestone that as soon as the water reaches the full face excavation could not be found and in some other parts of the Red reverse in water There are caustic cavities of that with filling by Some clay minerals (Mansouri & Ghadiri & 2012).

## **5. DRILLING IN ALLUVIUM**

For the land in the section of alluvial clay which consists of alluvium and is to be no investment casing up to 20 meters of drilling, but also because of the high risk are advised to be walled pipes or bentonite used. But in the weakening of alluvium, coarse grain zone penalties crushed stone for each meter of drilling requires the casing investment and for each 50 cm and less need to steer the casing in zone and casing be relevant.

### 5.1. DETERMINE THE PRESSURE DROP IN THE RODS

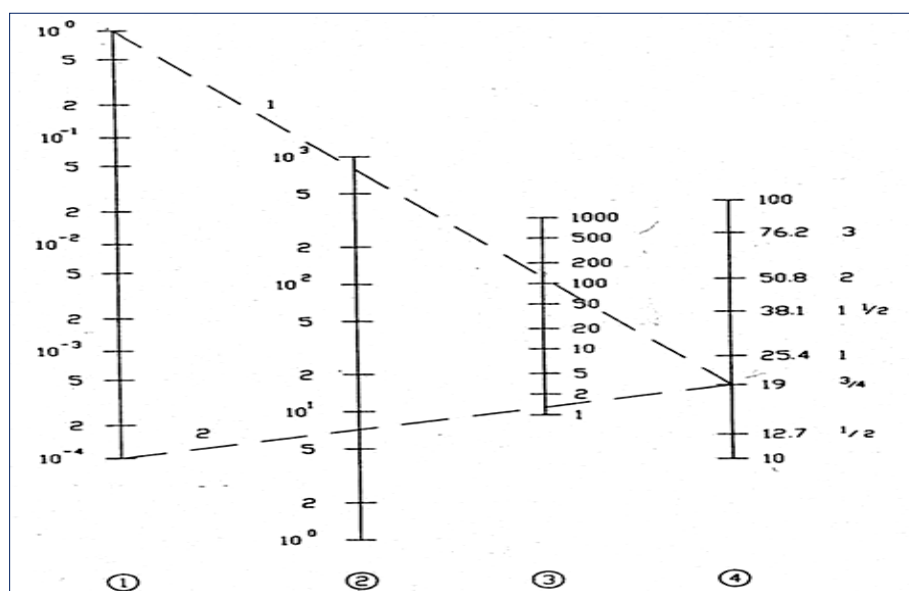
One of the issues which in drilling It is considered a deep calculation of pressure loss within the steel drilling rod. For this purpose, can be used with the graph of figure (1) the amount of pressure drop calculation for rods (Amoco).

For example:

$$d=19\text{mm}, q=150\text{l/m}, dp =1 \text{ Mpa}$$

$$d=19\text{mm}, q=1.5\text{l/m}, dp =10^{-4} \text{ Mpa}$$

If the diameter of the rods 19 mm for pressure drop on the 150 l/min flow equivalent to 1 MPa in the length of 10 meters and we so rod If Discharge is to reach the pressure drop 1.5 liters per minute for a length of 10 meters from the rods arrives to 0.1 Kpa.



**Figure 1: Determine The drop of pressure in rods (Amoco, 1994), (rods of metal and for length 10 m in comments taken made); 1-drop the pressure, dp (in MPa), 2-viscosity stream, v (Cm/S), 3-Discharge, Q (l/min), 4-diameter of pipe, D (mm, in)**

### 6. THE BOREHOLE DEEP ALLUVIAL SYSTEMS:

In some areas the thickness of the layer Of the more than 300 meters of alluvial perhaps time. for drilling on this earth can be the method of casing telescopic investments. The best method of drilling to the total length of the dividing sections of 50 meters. This case up to a depth of 50 meters with two sizes of drilling core samples taken, placed in the sample box and the required tests during the Borehole. Is done Of course, during the excavation to prevent Borehole parapet loss of drilling mud (bentonite + water) or the casing will use investment. If testing of the penetration the use of drilling mud is prohibited and can only be of the casing investments. After completing the 50 meters high and rods all casing from borehole has to continue excavation work out with the initial drilling diameter stabilizer along with drilling mud from the point 0 to 50 yards, where small size is to start and to the end of the Borehole will continue. So it's casing (a casing size) to a depth of 50 meters can be laid, and the Borehole thumbs up is given, the Borehole had to start drilling next 50 meters. This process has any value in coring the depths of the Borehole can be continued.

The role of stabilizer in the prevention of the diversion of Borehole here. it is also to prevent too much rods thong in the depths can be used spacers spacers depreciation in casing Working efficiency, and to prevent the waste of energy in the direction of increased engine power, and to completely pass the boring head. the process of drilling the Borehole of deep alluvial briefly can be divided into several stages:

1. drilling to a depth of 151 possible size (30-40 m), sampling and do the necessary tests and casing.
2. continue drilling to a depth of 50 meters with 127 size, sampling and do the necessary tests and casing Widget
3. send out rods and casing Of Borehole and Borehole within the rim by 151 stabilizers, along with drilling mud to a depth of 50 meters.
4. install the casing to a depth of 50 meters inside the Borehole 146 by tension wire.

5. wash the Borehole and Borehole for preparing drilling 50 meters.
6. continue the process of working with a smaller size, such as the steps one to five and repeat these steps to achieve the desired depth.

## **7. BOREHOLE MANAGEMENT**

Here are the questions before starting to dig the Borehole should be investigated. the answer to this question Can choose the appropriate size and performance management system for solid particles and help us (Growcock, 2005).

- 1-What are the parameters of the well?
- 2- Where do you dig?
- 3-What is the purpose of drilling?
- 4-What formations and geological effects expected?
- 5-well what is a teepee? (Straight, angled, horizontally)?
- 6-What is the foreseeable problems?

As well as the depth of underground water must be drilled in the location of the Borehole.

## **8. EQUIPMENT NEEDED FOR DRILLING**

In addition to the drilling device and injection pump, most major equipment for the start of the drilling operation and the infusion is necessary to be prepared as follows: casing, drill heads, drilling rod, and water pump, dredge pump drilling mud, a strong pressure hose and push the breaker.

## **9. DISCUSSION AND CONCLUSIONS**

At the end of the major issues that has arisen for the drilling operation may come and hole longing and it is necessary that the Geotechnical Engineer is aware of it has been brought to the summary.

### **9.1. DRILLING ISSUES**

- 1-What is the expected final depth?
- 2-Where and what places the necessary investment of casing? (The amount of the required size and how much)
- 3- Do chisel specified parameters? (Borehole size, type of drill, drilling speed, speed penetration)
- 4-What kind of drilling mud used to?
- 5- The amount of solid material density inside the well tolerance how much will it be?
- 6- What is the ratio of a stream is designed?
- 7- What to cutting Borehole of nazel intended?
- 8- What other demands of the flowers is considered? (The weight of the flowers, the point of surrender, stability, viscosity, electric)

### **9.2. ABILITY TO THE EQUIPMENT**

- 1- What kind of particle size Can be shipped?
- 2- What kind of equipment to the location of the cutting Suggested?
- 3- Is this equipment available? Where and who?
- 4- Weight and dimension of this equipment is how much?
- 5- The process of preparation of the equipment can be done how fast?
- 6- What is the efficiency of this equipment cannot be prospect?
- 7- How much drilling mud may be lost (go to waste)? (At ground level or within the well)?
- 8- What is the required fuel or power?
- 9- What are the experiences in this geographical area have already obtained? (The seller or the number of equipment units or branches)
- 10- The duration of a break machines?
- 11- Safety certificate vendors?
- 12- The degree of safety of the equipment, to what extent?
- 13- Safety and health plan is available?
- 14- The volume of what any well required?



### 12-3-mast design, equipment and its utility

What kind of pillar is selected?

How to install equipment?

Do not install correctly?

What repairs will be needed?

Do the layout and order the correct tanks do?

What does the conversion need to be corrected?

Do I need to add repositories or plumbing is required?

How section (Coupe divider) clean?

Where the mud volcano (mud gun) Take place?

Placement flower suction Volcano?

What is the size of the centrifugal pump which is available?

How to mix sucked and stirred added and check?

For each point of the Borehole for the preparation of the drilling mud on Earth spend time how long?

What are the changes and reforms is needed?

Do you have the desired space for modification and changes in the hands of clay?

What is the source of the force which is available?

## 9.4. LOGISTICS

1- The location of the project?

2- Building facilities, logistics and warehouse?

3- How many staffing needs?

4- Do they all over the place and need food?

5- The need for protection of the equipment is intended for people who have considered or available?

## 9.5. ENVIRONMENTAL EFFECTS

1- Do you cutting can be buried in the soil or that they will be empty without being a threat to the environment?

2- What are the functions of contraction for this case there?

3- When cutting they are clean; what decision have?

4- What to test Where should the need for analytical?

5. What period of time is required to determine their cleanliness?

For a special topic and that are:

1-There is a site on the inside or outside of the site?

2. What equipment is needed, which should be added? Where section?

3- What type of fuel and the necessary accommodations?

4-do in terms of climate change there are limitations?

5-What is the necessary permissions?

6-who is responsible to provide them?

## 9.6. ECONOMIC DIMENSION

1. The value of each barrel drilling mud?

2- Which is more expensive, solid or liquid?

3. To obtain the value and price of the equipment require what should we do?

4. The cost of the installation and what is reform?

5- The value of the prices and availability and how much is being important?

6- How much to save for it is intended?

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