# PROJECT REPORT ON BLENDING SYSTEM FOR DRILLING FLUID

Prepared By

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**Guyana.**

| Name of the project | Blending System for Drilling Chemicals |
|---|---|
| Type Of Industry | Chemical |
| Nature of the Project | New |
| | |

## PROCESS DESCRIPTION

This system is multipurpose design for blending of different solvents and additives to produce different products of required grade. The process consists of blending of additives and chemicals to produce Drilling Chemicals. The details of Raw material are mentioned in below table product wise.

First Chemical from storage tank is fed to blender by Air operated diaphragm (AODD) feed pump. The blender is provided with jacket. Jacket can used for heating or cooling based on the process requirements. The blender has high efficiency agitator (hydrofoil impeller) which is operated by VFD controlled motor for controlling of mixing speed. The blender is designed to operate over wide range of mixture viscosity. Dosing of additives as per requirement is done to the blender to mix with the feed. As per process requirement hot/cold water is continuously circulated in jacket of blender. The blender is maintained at required temperature & pressure as per process requirement. After the mixing is over the product is transferred to storage tank by AODD product pump.

The process temperature and pressure is monitored by temperature and pressure indicators installed in the system.

## GENERAL BLOCK DIAGRAM
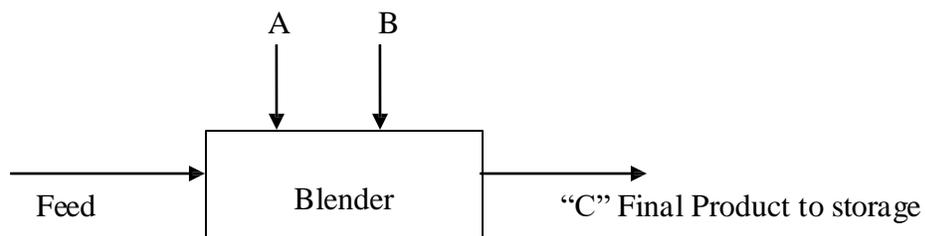
## DETAILS OF PRODUCT/RAW MATERIALS

| Sr. No. | PRODUCT | DESCRIPTION | BENEFITS | RAW MATERIAL |
|---------|---------|-------------|----------|--------------|
| 1 | CLOUD POINT GLYCOLS / SHALE INHIBITOR / LUBRICANT | These additives are low toxic, versatile cloud point glycols for shale control designed for low to high salinity water level system and can be used in well with low, moderate and high formation temperature in isolation or in combination with salts and polyamines. | Improved wellbore stability and shale Ÿinhibition. Improved lubricity. Improved filtration control. Reduced dilution rates and mud consumption. Reduced bit balling potential. Low toxicity. Faster Drilling. | Polyalkylene Glycol/ Polyglycol<br>Water<br><br>PHYSCAL STATE OF RAW MATERIAL<br><br>Solid<br>Liquid ✓<br>Gas |
| 2 | POLYAMINE BASED SHALE STABILIZER | These additives are amine based shale inhibitor which are formulated to stabilize reactive shales & clays while drilling with water based drilling fluids. These products are highly effective in inhibiting clay swelling and hydration of cuttings preventing bit balling and reducing torque and drag. | Compatible with most Water Based Systems. Non-Toxic and Bio-Degradable. Temperature Stable upto 204°C. Prevents Bit Balling. Reduces Torque and Drag. Reduces Dilution Rates. Improved wellbore stability & Shale inhibition. | Quaternary Polyamine Quaternary Alkylamine Quaternary Hydroxylamine<br>Water<br><br>PHYSCAL STATE OF RAW MATERIAL<br><br>Solid<br>Liquid ✓<br>Gas |
| 3 | DEFLOCCULANTS /THINNERS (Regular / High Temp. & High Pressure) | These additives are anionic acrylic co-polymers used in water-based mud systems to control rheological properties and to impart high temperature stability. | Effective in the presence of salt and divalent ions. Environmentally acceptable. Compatible with other common mud additives. Stable at temperatures ranging 350°F (177°C). Not pH dependent | Anionic Acrylates<br>Water<br>PHYSCAL STATE OF RAW MATERIAL<br><br>Solid<br>Liquid ✓<br>Gas |
| 4 | EXTREME PRESSURE LUBRICANT | These additives are general and special purpose extreme pressure lubricants which are used to reduce the torque, drag & possibility of wall sticking. These lubricants finds their application in highly deviated well bores, where a tough lubricating film is needed between the wall cake and drill string. | Decreases torque and drag. Reduces friction between the drill string & the open hole. May be used in all types of muds and salinity. Has application in deviated and extended reach wells. Reduces chances of Stuck Pipe. | Vegetable Oil Polyalkylene Glycol<br><br>PHYSCAL STATE OF RAW MATERIAL<br><br>Solid<br>Liquid ✓<br>Gas |
| 5 | FOAM CONTROL AGENTS / DEFOAMERS | An effective way to disrupt foam formation is to introduce a foam control surfactant into the system. A defoamer or antifoam functions by spreading over the gas/liquid interfaces, thereby preventing foam forming materials from coming to the surface and providing a surface layer which will not sustain foam. | Bio-degradable, non-toxic and nonhazardous. Effective in a pH range of 5.5 to 11. Miscible or highly dispersible in sea water. Effective in small concentrations. Compatible with other mud chemicals. | Glycol Alkoxylates Silicon Emulsion Water<br>PHYSCAL STATE OF RAW MATERIAL<br><br>Solid<br>Liquid ✓ |

| # | Name | Description | Function | Raw Material |
|---|------|-------------|----------|--------------|
| | | | Reduces chances of blowout. | Gas |
| 6 | DRILLING DETERGENTS | These additives are used to reduce the surface tension of water based mud systems and the sticking tendency of water sensitive formulations. | Reduces bit-balling, mud rings.<br>Reduces friction and torque.<br>Increases penetration rate.<br>Reduces chances of stuck pipe. | Non-ionic Surfactants Acid Slurry Caustic Water<br><br>PHYSCAL STATE OF RAW MATERIAL<br>Solid ✓<br>Liquid ✓<br>Gas |
| 7 | H2S SCAVENGERS | These are used in drilling fluids to scavenge/ react with H2S gas to form insoluble compounds. These products nullify the chances of H2S to remain in gaseous form while drilling. | Removes harmful H2S gas from the system.<br>Longer life span of drill string and other metal parts.<br>Remove corrosion in metallic parts due to H2S gas. | Triazine Base Water<br><br>PHYSCAL STATE OF RAW MATERIAL<br>Solid<br>Liquid ✓<br>Gas |
| 8 | Sodium Bromide Brine | C1W SODIUM BROMIDE is used to form clear-brine workover and completion fluids. Sodium Bromide has densities ranging from 8.4 to 12.8 lb/gal (1,007 to 15,34 kg/m3).. | This system eliminates the potential of formation damage due to the precipitation of carbonate, bicarbonate or sulfate compounds associated with using calcium-base brines where formation waters contain high concentrations of bicarbonate and sulfate ions | Bromide Salt Water<br><br>PHYSCAL STATE OF RAW MATERIAL<br><br>Solid ✓<br>Liquid✓<br>Gas |
| 9 | Calcium Bromide Brine | C1W CALCIUM BROMIDE is used to form clear-brine workover and completion fluids weighing 14.2 lb/gal (1,702 kg/m3) as a stock fluid, is used for clear - brine work over and completion fluids ranging from 8.4 to 15.3 lb/gal (1,007 to 1,833 kg/m3) or to be blended with heavier brines for higher - density applications. | It provides inhibition preventing the hydration and migration of swelling clays and can be used for packer fluids or to adjust the density of other brine systems.<br>Brines can be formulated with C1W CALCIUM BROMIDE with various crystallization points and are available for special applications and winter use | Bromide Salt Water<br><br>PHYSCAL STATE OF RAW MATERIAL<br><br>Solid ✓<br>Liquid✓<br>Gas |
| 10 | PRIMARY EMULSIFIERS | These additives are used to produce a highly stable invert emulsion fluid with excellent emulsion stability, filtration control and temperature stability. | Forms strong and stable coating film on water droplets in oil based muds. Extremely effective over a wide range of oil/water ratios & mud weights. Helps to maintain high temperature, high pressure filtrate in a water-free state. Partially improves the oil wettability of the solids dispersed in the emulsion mud.<br>Can be used over a wide | Emulsifiers Concentrate<br>Light Petroleum Distillate<br><br>PHYSCAL STATE OF RAW MATERIAL<br><br>Solid<br>Liquid✓<br>Gas |

| | | | | |
|---|---|---|---|---|
| | | | temperature range as well as in the presence of most contaminants. Improves the electrical stability of oil base mud. | |
| 11 | SECONDARY EMULSIFIERS | These additives are multi functional which provide higher stability to primary emulsifier & imparts preferential wetting of solids by the continuous oil phase. The oil phase may be diesel oil, mineral oil or any type of synthetic fluid; the water phase can be a sodium chloride / calcium chloride brine. | Gives high level of emulsion stability. Gives water free HTHP filtrates, even in absence of fluid loss reducers. Effective over a wide temperature range, oil/water ratios & mud weights. Can reduce the adverse effects of water contamination. ŸImproves the oil wettability of solids in oil mud system. Improves the electrical stability of oil base mud. | Emulsifiers Concentrate<br>Light Petroleum Distillate<br><br>PHYSCAL STATE OF RAW MATERIAL<br><br>Solid<br>Liquid✓<br>Gas |
| 12 | WETTING AGENTS | These additives can quickly change the natural water-wetting characteristics of drilled solids and weighting agents in oil muds, making them preferentially oil-wetting. They are used as a supplementary oil mud additive for improving fluid loss properties and emulsion stability. | Acts as a secondary emulsifier. Improves flow properties. Coats the surfaces of shale and other solids. | Organic phospholipid blend<br>Light Petroleum Distillate<br><br>PHYSCAL STATE OF RAW MATERIAL<br><br>Solid<br>Liquid✓<br>Gas |
| 13 | SURFACTANT FOR SPACER FLUIDS | These additives are specialty surfactants used in formulation of spacers used before cementing of oil wells drilled with oil based muds. It is designed to clean up and displace oil and synthetic based muds and solids for better cementation. | Facilitates effective removal of oil/ water based muds in a better lamination. Facilitates for better cement bond in a oil/gas wells. Can be dispersed in heavy brines to provide the means for a weighted spacer. Is unaffected by normal levels of calcium, magnesium, or barium ions found in most solution makeup waters. calcium, magnesium, or barium ions found in most solution makeup waters. | Glycol Ether<br>Blend of non-ionic & anionic surfactants<br>Water<br><br>PHYSCAL STATE OF RAW MATERIAL<br><br>Solid<br>Liquid✓<br>Gas |
| 14 | BIOCIDES | A biocide is a chemical substance or microorganism which can deter, render harmless, or exert a controlling effect on any harmful organism by chemical or biological means. Use of biocides will decrease degradation of the product by microorganisms & will enhance its life. These are readily biodegradable and will not bioaccumulate.. | Biocide treatments control the bacteria that produce H2S (H2S smells like rotten eggs, can be flammable and possibly explosive) | Biocide Concentrate<br>Water<br><br>PHYSCAL STATE OF RAW MATERIAL<br><br>Solid<br>Liquid✓<br>Gas |

| Number & Category of Employees in the Project | | | |
|---|---|---|---|
| **Category** | **No.** | **Category** | **No.** |
| Manager | ONE | Foreman | FOUR |
| Engineer | TWO | Labourer | FOUR |
| Technician | TWO | Others (specify): | |

| Storage | |
|---|---|
| Methods used for storing raw materials | **STORAGE TANKS** |
| Methods used for storing basic products | **STORAGE TANKS** |
| Methods used for storing byproducts | **NOT APPLICABLE AS NO BI-PRODUCT IS BEING GENERATED** |

| INDUSTRIAL WASTES | | | | | |
|---|---|---|---|---|---|
| **1. Liquid Wastes** | | | | | |
| Source of Liquid Wastes | Quantity | Unit (ton, gallon, $m^3$, ect..) | Average Drainage ($m^3$/day) | Maximum Drainage ($m^3$/hour) | Diameter of drainage pipe |
| Nil | 0 | M3 | 0.0 | | |
| | | | | | |
| | | | | | |
| | | | | | |
| **\* Please note as these are blending systems there is no liquid waste generated from process. Only liquid waste will be by washing the blender vessels through water and water used for cleaning of floor area for which drainage system will be provided. This Waste water management plan is provided on page no 10.** | | | | | |
| Methods used for drainage: There will be common drainage line for all feed and tansfer pumps as provision | | | | | |

| 2. Solid Wastes | | | |
|---|---|---|---|
| Source of Solid Wastes | Composition of Wastes and their percentage | Maximum Size (m³/day) | Weight of Solid Wastes (Ton/day) |
| **NO SOLID WASTE** | **NOT APPLICABLE** | **NOT APPLICABLE** | **ZERO** |
| | | | |
| | | | |
| | | | |

Is there any methods used to reduce quantity of solid wastes:     YES ☐

NO ☐

**If YES, please enclose plans.**

Is there any treatment of solid wastes prior to disposal:     YES ☐          NO ☐

**If YES, please enclose plans for:**

(1) No. of Units, (2) Effeciency, (3) Country of Origin, (4) Year of commissioning

Is there any Incinerator?          YES ☐          NO ☐

**If YES, please enclose plans for:**

(1) Number, (2) Type, (3) Capacity, (4) Efficiency, (5) Country of Origin, (6) Year of commissiong, (7) Disposal methods for incinerator wastes, (8) Physical & Chemical characteristics of these wastes (ash & dust)

Means of wastes transportation:  by Municipality ☐          Private Sector ☐

Others (specify): **NOT APPLICABLE**

Final waste disposal method: **NOT APPLICABLE**

Final waste disposal site: **NOT APPLICABLE**

| 3. Hazardous Wastes (Liquid & Solid) | | | |
|---|---|---|---|
| Source of Hazardous Wastes | Composition of Wastes and their percentage | Maximum Size (m³/day) | Weight of Hazardous Wastes (Ton/day) |
| **NIL** | **NOT APPLICABLE** | **NOT APPLICABLE** | ZERO |
| | | | |
| | | | |
| | | | |

| | |
|---|---|
| Is there any methods used to reduce quantity of solid wastes:    YES ☐    NO ☐ | |

**If YES, please enclose plans.**

Is there any treatment of hazardous wastes prior to disposal:    YES ☐    NO ☐

**If YES, please enclose plans for:**

(1) No. of Units, (2) Effeciency, (3) Country of Origin, (4) Year of commissioning

Means of wastes transportation:   by Municipality ☐     Private Sector ☐

Others (specify):

Final waste disposal method:

Final waste disposal site:

## 4. Pollutants Emitted to Air (Gases, Fumes & Dusts)

| Source of pollutants | No. of Stacks | Stack Height | Stack Internal Diameter | Type of Stack building | Emission Rate ($m^3$/hour) | Emission Speed (m/sec) |
|---|---|---|---|---|---|---|
| NIL | | | | | | |
| | | | | | | |
| | | | | | | |

Prevalent Wind Direction:

**\* Please enclose the physical and chemical characteristics of pollutants emitted from stacks and their concentrations.**

Is there any method used to decrease the size/quantity of emitted pollutants: YES ☐ NO ☐

**If YES, please enclose plans.**

Is there any method use for pre-treatment of pollutants prior to disposal:    YES ☐ NO ☐

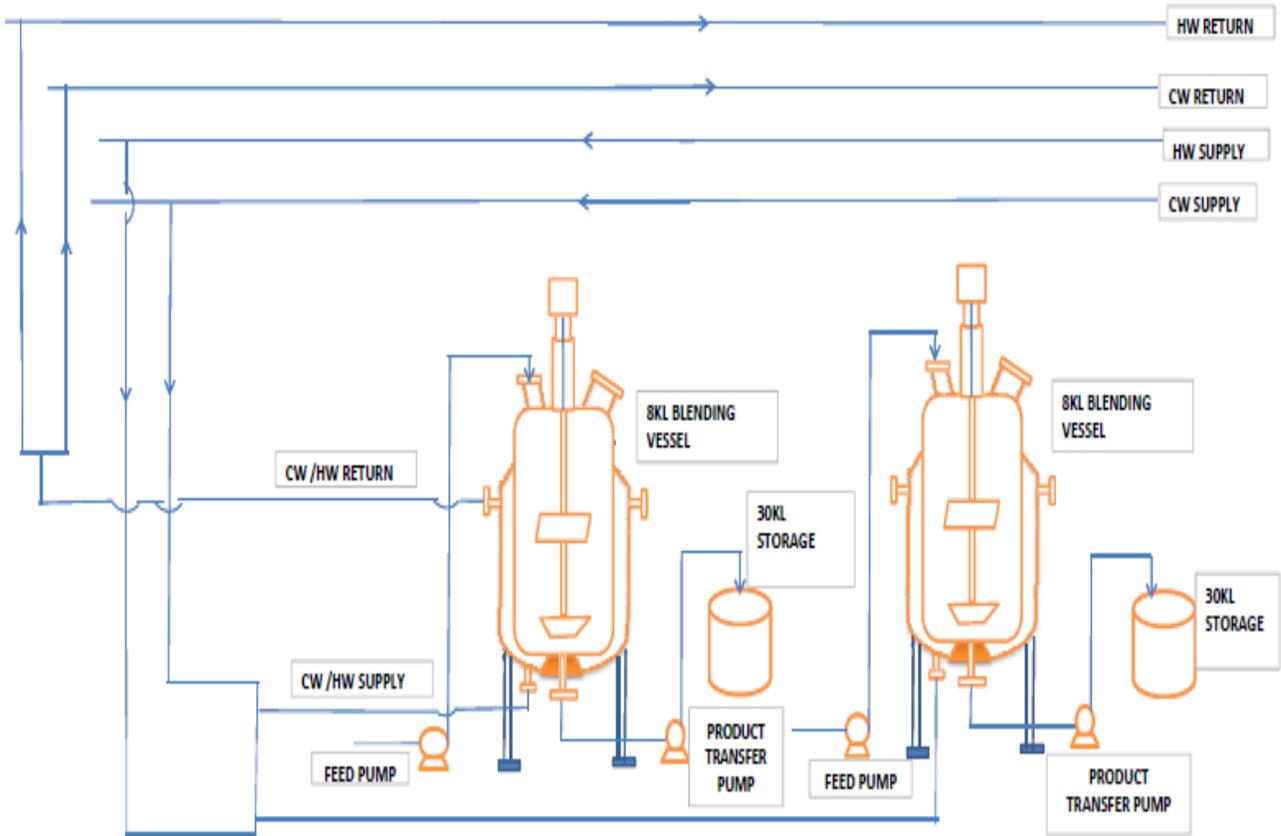**If YES, please enclose plans for:**

(1) No. of units, (2) Effeciency, (3) Country of Origin, (4) Year of commissioning.

Monitoring system for pollutants:

Monitoring rates for pollutants:

Monitoring rates (no of times and periods):

HW RETURN

CW RETURN

HW SUPPLY

CW SUPPLY

8KL BLENDING VESSEL

8KL BLENDING VESSEL

CW /HW RETURN

30KL STORAGE

30KL STORAGE

CW /HW SUPPLY

PRODUCT TRANSFER PUMP

FEED PUMP

FEED PUMP

PRODUCT TRANSFER PUMP

## Waste Water Management:-

- Wastewater is generated only by washing the blender vessels after production batch or change of product being blended and washing of factory floor space.

- The wastewater will be used for the next production batch which uses water as diluent.

- The above leads to ZERO waste of Water or any other form of liquid waste.