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## 1. GENERAL CHARACTERISTICS:

The Drawworks, Mast, Substructure and accessories comply with the following API specifications:

- Mobile Desert Rig type UE 1000.
- Mast and Substructure Nominal Gross Capacity: 700,000 lbs. (318 ton).
- Capacity of rig hoisting equipment: 500,600 lbs. (227 ton).
- Capable of drilling 2500 m. with 5" drill pipe and 3700 with 3 ½" drill pipe.
- Maximum working pressure 5000 psi.
- Capable of handling Casing: 5", 5 1/2", 7", 7 5/8", 9 5/8", 13 3/8", 18 5/8" and 20"
- 115 ft. Double Erecting Mast and Hydraulic slingshot, fully moveable 25 ft. height Substructure.

## 2. DOCUMENTATIONS:

1. Rig Manuals and Catalogs.
2. Rig Drawings and Layouts.
3. Rig Certification Documents.
4. Rig PMS Records.
5. Rig Spare Parts Inventory.

## 3. DRAWWORKS:

One (1) ea. Drawworks type **DRECO** UE 1000HP, designed and rated to comply with API spec 7K for Drilling and Production Hoisting Equipment. The Drawworks is grooved for drill line size 1 1/8 in. Driven by Two (2) Reliance D68R002A X 800HP DC traction motors,

Drawworks Features:

- Lifting points on each module and breakdown/assembly instructions are provided.
- Two (2) 800HP DC Traction Motors heavy duty sub skid
- Heavy-duty drum sized for the application and Lebus grooving for 1 1/8 in drilling line.
- Maximum fast line pull, @ 50,000 lbs.
- Maximum line pull (2 layers), 55,700 lbs.
- Auxiliary Brake, Dretch 19 RD 130, Torque Rating 35,000 lbs.
- Crown Saver.

### 3.1. CATHEADS:

Two (2) ea. Catheads Foster make up 665-AH, Break out 166-BAH.

## 4. MAST & SUBSTRUCTURE:

### 4.1. MAST:

**DRECO** Double Mast model M11516-10 is a freestanding 115 ft. clear height, Nominal Gross Capacity 700,000 lbs., with 500,600 lb. hook load capacity with 10 lines. With safety, climb ladder and guards. The mast comprises of the following:

- One (1) ea. piece consists of a base section, a crown/upper section. Each base section is complete with handrails and toe plates that are designed to facilitate inspection of the latching system during the mast extension and vertical erection procedure.
- One (1) piece identical lower sections, which can be raised without crane assistance.

- Racking Board: The racking board 55 ft. above the drill floor and includes high hand rails and an escape platform. Racking platform capacity for 5" drill pipe 2,000m and 8 stands of 8" dill collars, or 2500 meter of 3 ½" DP.
- Casing stabbing board: Type D 1-5318-097827. Adjustable height 8 m (26 feet)
- Two (2) ea. counterweight systems, two (2) ea. for the tongs.
- One (1) lot Mast ladders with safety cage from the working floor to the Crown and one (1) ea. integrated stair up the back of the each of the A-legs.
- Escape line: Type **Mittelman** RG 10 D
- DRILLER'S CABIN/DOG HOUSE: Driller's cabin meets, includes:
  - ✓ One (1) ea. personnel doors
  - ✓ One (1) ea. air conditioner
  - ✓ Two (2) ea. interior lights
  - ✓ One (1) set impact resistant fixed glass windows

#### 4.2. SUBSTRUCTURE HYDRAULIC ERECTING STYLE:

**DRECO** Hydraulic slingshot erecting fully moveable substructure, it is extended up and retracted down with hydraulic rams.

The drill floor height is 25 ft. clear height, Size 13.4 m X 6.7 m (43 feet X 21 feet), Is complete with hinged handrails complete with toe plate and a sliding gate at the V-Door.

The independent Rotary system is designed into the center drill floor section and the Drill Floor is checker plated with 3/8" plate around rotary table and drill floor.

The Base Box sections are 25 ft tall 21 ft. wide 46 ft. long.

The substructure includes:

- Rotary Table Load (Casing Load): 450,000 lbs.
- Set back capacity: 375,000 lbs.
- Height: 7.62 m (25 feet).
- Height to underside of rotary beam: 6.7 m (21.9 feet)
- Three (3) sets of stairs complete with handrails are standard.
- One (1) ea. Mouse-hole range II.
- One (1) set 20 T BOP trolley beams integrated into the drill floor boxes and are complete with a hydraulic hoist and trolley system.

#### 4.3. CATWALK:

One (1) ea. Two-piece Catwalk 51 ft. wide x 42 in. high x 53 ft. long is complete with a bumper.

#### 4.4. CROWN BLOCK:

One (1) ea. **DRECO** Crown Block assembly have 5-sheave main cluster consisting of five (5) ea. 42" diameter sheaves grooved for 1-1/8" wire line, one (1) ea. 60" fast line sheave assembly with sheave grooved 1-1/8" sheave, high handrails and bumper blocks. The crown assembly frame will have pad eyes for a block suspension line complete with a certified wire rope and shackle assembly. The Mast assembly is supplied tugger sheaves as necessary.

#### 4.5. TRAVELING BLOCK ASSEMBLY:

One (1) ea. IRI International UTB-260-5-36, Model "B" Hook-Block Combination Assembly of 260-ton capacity complete with five (5) ea. 36" sheaves grooved for 1-1/8" drill line, comply with API spec 8A.

#### 4.6. DEADLINE ANCHOR:

One (1) ea. **DRECO** SUPERIOR model "LOF- 65-C" Deadline anchor for use with 1-1/8" wire rope, 40,000 lb. Deadline load. Anchor located at base of mast.

#### 4.7. DRILL LINE:

5000 ft. Drill Line size 1-1/8" type "6x19S IWRC" with including pneumatic Drill Line spooler.

#### 4.8. WINCHES:

##### 4.8.1 PNEUMATIC DRILL FLOOR WINCHE:

- a. Two (2)-ea. Pneumatic winch manufacturer **EMCE** type SB 305R LPR 5 of 5500 lbs., and 500 ft. 5/8" cable.
- b. One (1) ea. **INGERSOLL RAND** Pull back winch 1000 lbs.
- c. One (1) ea. **GARDNER DENVER** Air winch HK-12, 2000 lbs. (mounted at the end of catwalk)

##### 4.8.2 MAN-RIDING AIR WIN.:

One (1) ea. **EMCE** type MR30FLG Man-riding winch, Capacity 150 kg. and no-load mid-layer line speed 115 fpm. Local with throttle w/ automatic return to neutral, Auto disc brake.

#### 5. ROTATING EQUIPMENT:

##### 5.1. ROTARY TABLE:

One (1) ea. **NATIONAL** Model C-275 Rotary Table rigid box-type base cartridge type pinion shaft assembly with roller bearings turntable locking-dog and selection of permanent lock in both directions. Heat-treated spiral bevel gear, pinion precision alloy- steel main table ball bearing and upper thrust ball bearing, centralized oil, and grease lubrication. Hydraulic motor directly connected to input drive shaft, driven by Draw-works via propeller shaft.

- One (1) ea. Slit Type Rotary Master bushing. Including # 1, 2, 3 bowls.
- One (1) ea. Bowl Insert 11-3/4" - 13-3/8" Casing.
- One (1) ea. Bowl Insert 10-3/4" - 9-5/8" Casing.
- One (1) ea. Bowl Insert 2-3/8"- 8-5/8" Casing.

#### 6. MUD SYSTEM:

##### 6.1. HIGH PRESSURE MUD SYSTEM:

##### 6.1.1 MUD PUMPS:

Tow (2) ea. Triplex Mud Pumps 1000HP, Type **NATIONAL** Model 9P-100 Electric Drive. Each mud pump driven by One (1) ea. Reliance 950DR16 X 1000HP DC traction motors,

The Mud Pumps technical specifications:

- Rated Input power: 1000HP @ 150 SPM
- Single-Acting Triplex Rated: SPM 160
- Stroke: 9.25 in.

- Gear Ratio: 2.658

The Mud Pumps are Complete with different sizes of liners and pistons, Polyurethane Valves and Seats, Suction Manifold and the following main components:

#### **6.1.1.1 PUMP SKID UNITIZATION:**

The Mud Pumps are complete with structural steel three-runner skid with one (1) chain drive assembly guards and drive sheaves. Structural steel motor sub-base with one adjustable motor base plate all mounted on master skid complete with I washer pump and oil filter pump.

#### **6.1.1.2 SUCTION SYSTEM:**

Suction system complete for three (2) pumps as follows:

Two (2) ea. charging pumps with Two (2) ea. 6" suction lines from suction valves in mix tank and suction tank to mud pump suction manifold. Provide suction connection for supercharger pumps from suction lines. Manifold supercharger pump discharge for charging triplex pump.

#### **6.1.1.3 SUPERCHARGING PUMP:**

One (1) set Supercharging pump assembly on each pump complete with the following:

- Baker 6x5 centrifugal pump with mechanical seal mounted on an oil base type skid with coupling, OSHA compliant coupling guard and 50 HP, 480 volts, 3-phase, 60hz AC motor.

#### **6.1.1.4 DRIVE MOTOR ASSEMBLY:**

One (1) ea. 800 HP (595 kW) Type **Reliance SDR 13** Traction Motor, with blower on each mud pump.

#### **6.1.1.5 PULSATION DAMPENER:**

One (1) ea. Hydril Model K20 5000 psi on each mud pump.

- Maximum Service Pressure: 5,000 psi
- Surge Capacity: 20 gallons
- Connection: 4" API 5,000 RTJ
- With Bottom Connection Kit & Charging Hose Assembly
- Studs, nuts, ring gaskets, flanges and fittings for installing pulsation dampener, relief valve, and pressure gauge.

#### **6.1.1.6 RESET RELIEF VALVE:**

- One (1) ea. **Retsco** 3 in., type "C" per mud pump, Pressure rating 1500psi x 5000psi, Mounting Bracket.

#### **6.1.1.7 PRESSURE GAUGE:**

- One (1) ea. **MARTIN DECKER** Pressure gauge per mud pump, (0-5000) psi, Nuted.

#### **6.1.1.8 TOOLS SET FOR FLUID END MAINTENANCE:**

- Hydraulic Valve Seat Puller
- Tee Handle Bolt
- Driver for Valve Seat
- Wrench for Valve Cover
- Charging hose assembly with pressure gauge to charge mud pump pulsation Dampener.

#### **6.1.1.9 MUD DISCHARGE SYSTEM:**



- Two (2) set Mud pumps provide 4" schedule XXH lines complete with 2 x 2" and 3 x 4" (5) valve manifold for pump isolation with hammer unions at break points from bottom of substructure to mud pumps via vibrator hoses.
- Vibrator Hoses 3-1/2 in. ID x approximately 15', 5000 lb. working pressure with 4" API welded type connections for connection of mud pumps to above high-pressure mud lines.
- One (1) set Single 4", 5,000-psi WP high-pressure mud delivery system.

#### **6.1.2 STANDPIPE ASSEMBLY:**

##### **6.1.2.1 STANDPIPE LINE:**

One (1) set 4" Single standpipe assembly 75' tall complete with clamps installed on off driller's side, including weld on type unions with schedule XXH piping.

##### **6.1.2.2 STANDPIPE MANIFOLD ASSEMBLY:**

One (1) set H style 4", 5,000 lb. WP standpipe manifold assembly with connections for two (2) 2", 5000 psi pressure gauge, two (2) 3", 5000psi kill/fill line and five (5) 4" 1502 welded connections for mud pump sensors. Weld on type unions and schedule XXH piping to be utilized.

#### **6.2 LOW PRESSURE MUD SYSTEM:**

##### **6.2.1 MUD TANKS SYSTEM:**

The Mud Tanks total capacity 2164 bbls (344 m<sup>3</sup>), Active Capacity 1831 bbls (291 m<sup>3</sup>).

The Mud System comprised of the following compartments:

##### **6.2.1.1 One (1) ea. SHAKER TANK:**

- Volume capacity: 53 m<sup>3</sup> (333 bbl.)
- Number of sections: Two
- Sand trap volume: 4 m<sup>3</sup> (25 bbl.)
- Agitators: Two (2) ea. **EKATO FLUID** model ZR128-K4-DNGW-160LL (7.5 kW)
- Mud guns: Three

##### **6.2.1.2 One (1) ea. INTERMEDIATE TANK:**

- Volume capacity: 66m<sup>3</sup> (415 bbl.)
- Number of sections: Two
- Agitators: Two (2) ea. **EKATO FLUID** model ZR128-K4-DNGW-160LL (7.5 kW)
- Mud guns: Two

##### **6.2.1.3 One (1) ea. SUCTION TANK:**

- Volume capacity 66 m<sup>3</sup> (415 bbl.)
- Number of sections Two
- Agitators: Two (2) ea. **EKATO FLUID** model ZR128-K4-DNGW-160LL (7.5 kW)

##### **6.2.1.4 One (1) ea. MIXING TANK:**

- Volume capacity: 40 m<sup>3</sup> (250 bbl.)
- Agitators: Two (2) ea. **EKATO FLUID** model ZR128-K4-DNGW-160LL (7.5 kW)
- Mud guns: Four

##### **6.2.1.5 One (1) ea. RESERVE TANK:**

- Volume capacity: 76 m3 (478 bbl.)
- Agitators: Two (2) ea. **EKATO FLUID** model ZR128-K4-DNGW-160LL (7.5 kW)

#### 6.2.1.6 TRIP TANK / STRIP TANK:

- 5.1 m3 (32 bbl.) 1.2 m3 (7.5 bbl.)

Also, include:

The tanks are supplied with 10 in. butterfly dump valves for clean out in each compartment, telescoping light pole, hinged starter mounting arms and bottom mud guns in each tank.

### 6.2.2 SOLID CONTROL SYSTEM:

#### 6.2.2.1 SHALE SHAKERS:

Two (02) ea. Shale shaker type **Derrick FLC-2000 3-Panel** Adjustable Shaker with wedge lock tensioners, two (2) ea. Derrick Super G vibrator motors 2.5 HP vibrator motors, 50 Hz, 460 volts, 3 phase, explosion proof electrics, linear and balanced elliptical motion switchable while running.

The 2-ea. shale shaker set process 1200 GPM with mud weight of 10 PPG and 15 to 25 CP mud viscosity.

#### 6.2.2.2 DESANDER:

One (1) ea. **WERKSTÄTTEN** Desander type "S2-12", 2 Cyclone, 4" Inlet, 1200 GPM.

#### 6.2.2.3 DESILTER:

One (1) ea. **SILTMASER** type "T16-4", 16 Cyclone, 4" Inlet, 1200 GPM.

#### 6.2.2.4 VACUUM DEGASSER:

One (1) ea. **BRANDT** Vacuum degasser type "DG-12" with 1200 GPM minimum flow, explosion proof 5 HP electric motor and 8 x 6 centrifuge pump.

Vessel and Vacuum Pump Mounted to a Unitized Skid Complete with Venturi and Eductor Rated at 600 GPM, (480Volts, 50 Cycle, 3 Phase), Max Dims: 60" (L) x 100" (W) x 77" (H).

#### 6.2.2.5 MUD GAS SEPARATOR:

One (1) ea. **Bentec** 1000 gpm mud gas separator, 48 in. diameter Inlet to be 6 in. diameter, outlet 8 in. diameter, vent line 8 in. diameter and inspection hatch 18 in. diameter.

The Unit also includes integrated piping to choke manifold.

### 6.2.3 MUD MIXING SYSTEM:

The Mud Mixing System consists of mud mixing pumps, injection hoppers, suction and discharge manifolds as per following:

- Two (2) ea. mixing mud hoppers with access to any mud tank, independent discharge line and bottom mud gun in each tank.
- 6" Mixing Funnels.
- Two (2) ea. **MISSION MAGNUM** Centrifugal pump sets for circulating, processing drilling fluid and mud pump charging system must be equipped with 75 HP Electric Motor Explosion-Proof – 480 Volt 1750 RPM, 50 HZ, 3 phase and 6" x 5" x 11" Centrifugal Pumps.

#### **6.2.4 OTHER MUD EQUIPMENT:**

One (1) ea. Laboratory on mud tank with working stand, sink, water loss, densimeter, air 120 psi, water, 127 v power etc. The mud laboratory is set with a complete mud measuring apparatus.

- Cellar electric pump or jet for cellar clean.

### **7 WELL CONTROL EQUIPMENT:**

#### **7.1 ANNULAR BOP:**

N/A

#### **7.2 RAMS BOP:**

##### **7.2.1 Single Rams BOP: inquirers**

N/A

#### **7.3 RAM ASSEMBLIES:**

- N/A

#### **7.4 BOP HYDRAULIC ACCUMULATOR UNIT:**

- N/A

##### **7.4.1 BOP Remote Control System (Rig Floor):**

- N/A

##### **7.4.2 BOP Remote Control System (Toolpusher Office):**

8 N/A

#### **8.1 CHOKE MANIFOLD:**

9 N/A

#### **9.1 KILL LINE:**

10 N/A

#### **10.1 CHOKE LINE:**

11 N/A

#### **11.1 DRILLING SPOOL:**

12 N/A

#### **12.1 SPACER SPOOLS:**

13 N/A

#### **13.1 ADAPTER FLANGES:**

14 N/A

- 

#### **14.1 INSIDE BLOWOUT PREVENTER (IBOPs):**

15 N/A

### **15.1 BOP TESTING UNIT:**

16 N/A

### **16.1 BOPs HOIST UNIT:**

One (1) set of two ea. **JD NEUHAUSE** Hydraulic hoist for BOP movement model "II2GBIIBT4" (2 x 20) ton Capacity and 5.5 m. lift, Hang on **DRECO** beams.

### **16.2 KELLY COCK:**

17 N/A

### **17.1**

## **18 POWER GENERATION:**

### **18.1 MAIN GENERATORS:**

- Three (3) set Engine **Caterpillar** Engine Model 3512-B.
- Four (4) Piller Generators Model NKT 1000, 600Volt, 3PH, 1000kW, 875 A, 50Hz.
- The Gensets are especially made for desert transport operations.

### **18.2 AUXILIARY GENERATORS:**

- N/A

### **18.3 SCR DRIVE SYSTEM AND GENERATOR CONTROLS:**

The system consists of four (4) ea. Bays.

#### **18.3.1 SCR GENERAL DESCRIPTION:**

- Manufacturer **AEG**
- Type Semi
- Voltage 600 VAC
- Frequency 50Hz

#### **18.3.2 CIRCUIT BREAKER SECTION:**

One (1) ea. 800 AMP frame Circuit Breaker of stationary type, Molded case.

#### **18.3.3 E-CONTROL CABINET (MCC):**

Two (2) ea. MCC Manufacturer Deutag

### **18.4 GROUNDING SYSTEM:**

Per IEEE and API Standards.

### **18.5 LIGHTING SYSTEM:**

Heavy duty vapor tight explosion proof and weatherproof fluorescent and mercury vapor lighting system, using lighting fixtures for use with a land rig with related equipment as shown. All lights within 10 ft. of well center shall be explosion proof.

Lighting Fixtures to operate from 120 volts, 1 phase, 50 Hz. Power and meet or exceed American Petroleum Institute (API) specifications RP-500. Each fixture to have a Class 1 Division 1 rated plug and receptacle disconnect to allow safe and easy removal of any fixture for service or movement to another location day or night without interruption of any power of illumination.

## **18.6 GRASS HOPPER & CABLE TRAYS:**

One (1) Lot Electrical cable/service trays to accommodate air, fuel, water and electrical cable. Top of trays covered to provide walkway. One (1) Grass Hopper skid assembly complete.

## **18.7 HPU:**

One (1) ea. **HYDROLINK** Electric/Hydraulic, and. 100 HP Electric motors to include reservoir, sight glass, thermometer, low/high level alarm, aux. connection, pressure gauges, filters and cooling radiator. Electrical enclosures are explosion proof. 480 vac.

One (1) ea. **HYDROLINK** Diesel driven hydraulic unit for rig move.

## **19 AIR SYSTEM:**

### **19.1 AIR COMPRESSORS:**

(2) ea. Atlas Copco rotary screw compressor

- Type GA 45-150P
- Working pressure (max) 150 psi (10 bar)
- Volume flow 5.3 m<sup>3</sup> per minute
- Emergency Stop button
- CSA/UL Wye Delta Starter 480 VAC

### **19.2 AIR DRYER:**

One (1) ea. **ATLAS COPCO**, Model MT-1150.

### **19.3 DIESEL DRIVEN COLD START AIR COMPRESSOR:**

One (1) ea. **BAUER KOMPRESSOREN** Air compressor two-stage cold start compressor 330 bar, 6.7 cu ft./ min. with constant speed control, inlet filter, intercooler and relief valve.

### **19.4 AIR RECEIVER:**

One (1) ea. Air receivers, 3.0 m<sup>3</sup> on Air Compressor skid with pressure relief valve, gauge and piping.

## **20 INSTRUMENTATION AND DATA ACQUISITION:**

- Drillers Control Console.
- Hook Load (incl. recorder), Type Martin Decker FS.
- Pump pressure Martin Decker 0-5000 psi
- Choke manifold pressure Martin Decker 0-5000 psi
- Rotary table torque Martin Decker type FA9-2
- Make-up torque Martin Decker 0 – 2,500 kg
- Pump stroke Incorporated in tank monitoring system
- One (1) set Deviation survey double recorder 2 unit x 8 degree, 1 x 16 degree Complete assy. With overshoot and sinker bar, for 8", 6-1/2", and 4-3/4" drill collars.

## **21 WATER TANK:**

### **21.1 INDUSTRIAL WATER TANKS:**

One (1) ea. Volume capacity 80 m<sup>3</sup> (503 bbl.) with (2) ea. transfer pumps 3 x 2 x 13, 20 HP.