1.5 Unit Specifications

1.5.1 Trailer

The trailer is a 100,000 lb Holland Neway TR-4100-B mechanical suspension trailer that is fitted with sixteen 315/80R22.5 tires. The trailer deck is covered with safety tread plate. Hydraulic leveling jacks are located at the front and rear of the trailer. Mechanical belly jacks are located at the middle of the trailer. The trailer also includes folding diamond grip walkways, handrails, and removable stairs located on both sides of the trailer.

Crown Energy Technologies Inc. (Crown) is certified to manufacture Trailers and Carriers that meet all the required Canadian and United States Federal Motor Vehicle Safety Standards.

Crown Energy Technologies Inc. (Crown) is registered with the National Highway Traffic Safety Administration as a manufacturer of Motor vehicles using the assigned WMI: 2C9/173 for trailers, and 2R9/678 for Trucks.

1.5.1.1 Running Gear

The running gear consists of a Holland Neway TR-4100-B mechanical suspension with sixteen 315/80R22.5 tires.

1.5.1.2 Highway equipment

The highway lighting package includes rear turn signal lights, clearance lights, stop/brake lights, and reflectors. All wires are routed through cable hangers located in the carrier frame and shielded to protect the wires from damage.

1.5.1.3 Leveling Jacks

Four hydraulic and four manual jacks, with pedestals, are used for leveling and supporting the carrier during rig operations.

1.5.1.4 Deadline Anchor

One deadline anchor for 1-1/8" line is included.

1.5.2 Engine

The DRS-00750 Drilling Rig is fitted with two Caterpillar C-15 engines rated at 475 HP @ 2100 RPM.

The Caterpillar C-15 DIT ATAAC Industrial diesel engine comes with the following standard equipment and accessories:

- Radiator
- Muffler and spark arrester
- Hydraulic power steering pump (engine MTD)
- Air inlet safety shutoff ASM (with all metal plumbing)
- Transmission oil cooler ASM (engine MTD)
- Fuel primer pump ASM (engine MTD)
- Alternator (12/24 V), 45 amp
- Air compressor (27 cfm) (Engine MTD)

- Air governor ASM (engine MTD)
- Plug Cover ASM
- Engine oil pan (HD-metal)
- Engine valve covers (metal)
- Oil filler and oil dip-stick ASM (all LH/operator/driller-side MTD)
- Air cleaner
- Instrument panel, four (4) gauge
- Starting electric (12 V) air shut-off, safety
- Air shut-off safety
- Horton fan hub assembly, sensors and switch
- 40 inch, 12 blade Crowley fan
- OEM pins and connector
- Low coolant level sensor
- Mag pick-up

1.5.3 Transmission

Two Allison Model S5610-H series transmissions are coupled to the engines. This transmission is designed for diesel engines up to 550 net HP. Six forward ranges and one reverse make it best suited for off-highway applications.

Specifications:

Range	Ratios	Range	Ratios	Range	Ratios
First	4.00:1	Third	2.01:1	Fifth	1.00:1
Second	2.68:1	Fourth	1.35:1	Sixth	0.67:1
				Reverse	5.15:1

1.5.4 PTO

A pneumatically controlled Chelsea Power Take-off is mounted to each transmission.

1.5.5 Compound

The Crown two engine, chain driven compound comes with two mechanical disconnects.

1.5.6 Right Angle Gear Box

The Crown right angle gearbox supplies power to the drawworks and comes complete with a reversing box to drive the rotary table.

Features:

The right angle gear train is a spiral bevel gear set with hardened steel gears. The gearbox case is fabricated from high strength heavy steel tubing to minimize distortion. Gears and bearings are lubricated by oil bath arrangement.

All shafts are machined from high strength heat-treated steel. Input shaft bearings are double Timken with straight roller bearings at the pinion end. Output shaft is supported on spherical bearings.

1.5.7 Drawworks

The Crown Model CE750SD drawworks is rated for 650 through 900 HP. It is a single drum, double shaft drawworks mounted on a heavy-duty framework with sheet metal covers. Auxiliary braking is achieved with a McKinney 23S (or equivalent) water-cooled brake.

1.5.7.1 Drawworks Specifications:

Main Drum:	44 inches x 11 inches, with brake bands and brake linkage.
Core Diameter:	19-7/8 inches
Distance Between Flanges:	35-1/2 inches
Auxiliary Braking (hydro dynamic):	McKinney 23S Single
Grooved Jacket:	1-1/8 inch grooving

1.5.8 Mast

The mast is a 118 ft, 375,000 lb guyed telescoping mast with hollow structural steel framing, designed and built in accordance with API 4F using three dimensional non-linear dynamic finite element software. Maximum hook load capacity is 375,000 lb. The mast is manufactured with all HSS construction ensuring minimum weight and maximum stability.

1.5.8.1 Features

This mast is equipped with a ladder mounted on the off-driller's side. The safety platform, handrails, and a fall arrest post are included with the crown frame assembly. The mast is equipped with a block cradle and two load lines.

Two three-stage hydraulic cylinders are used for raising the mast and are equipped with safety chokes to prevent freefall in the event of a complete loss of hydraulic pressure. The mast is fitted with two single acting telescoping cylinders for raising the top section.

The crown platform provides safety when servicing the crown sheaves. The crown block assembly includes:

- Three 30 inch fleet sheaves
- One 36 inch fastline sheave
- One 30-inch deadline sheave

These steel sheaves are mounted on Timken tapered roller bearing inserts, thus ensuring that bearing failure will not damage the sheave. Fittings are provided for individual greasing of the bearings.

1.5.8.2 Mast Specifications

- Capacity: 375,000 lb
- Height: 118 ft
- Line String Up: 8 lines
- Wind Load: 69 mph (as per API 4F)

1.5.8.3 Included Options

The following options are included with this unit:

- Steel sheaves,
- Manual tong counterweights,
- 4" standpipe with gooseneck at the top and unions at top and bottom of pipe,
- Guy lines.

1.5.8.4 Racking Board

The mast is equipped with an automatically erecting racking board:

- Capacity for 7,400 feet of 4-1/2 inch drill pipe and 600 feet of 6-1/4 inch drill collars.
- Provisions to allow for drill pipe sizes from 3-1/2 inch to 6-5/8 inch, and drill collar sizes from 4 inch to 11 inch.
- Positioned for use with Range II tubulars in doubles.
- Complete with a rear escape system.

1.5.9 Hydraulic System

The rig hydraulic system supplies power for operation of the following carrier components:

- hydraulic winches,
- power tongs,
- mast raising cylinders,
- telescoping cylinders,
- leveling cylinders,
- make and break out cylinders.

The hydraulic system equipment consists of:

- a 300 gallon hydraulic tank;
- two hydraulic pumps, each mounted on an engine, and each rated at a capacity of 50 gpm;
- Two (2) hydraulic coolers mounted in front of the engine radiators.
- hydraulic inline filter, filler breather, all related valves, pressure gauge, and control valves.

NOTE: the hydraulic system is run from two pumps – one installed on each engine/ transmission/PTO assembly. This provides failsafe operation.

1.5.9.1 Winches

This unit is fitted with two 12,000 lb hydraulic winches.

1.5.9.2 Make Up and Break Out Assembly

Features:

- two hydraulic cylinders, sheaves, rollers and cables,
- hydraulic controls for make up and breakout functions,
- make and break cylinders mounted on back of mast.

1.5.10 Pneumatic System (Air System)

The rig air system supplies air pressure for normal rig operation. System equipment consists of:

- engine mounted air compressors,
- air dryer and alcohol scrubber,
- pneumatic plumbing (valves, drains, lubricators, de-icers, filters and gauges).

1.5.11 Control Panel

The Operator's Control Panel consists of the following Controls and Gauges:

Controls	Gauges
Hydraulic Pump (On/Off) (air)	Hydraulic Pressure
Gear Selector (air)	Main Air Pressure
Engine Stop (air)	Rotary Table Torque
Emergency Stop (air)	
Fast Idle (air)	
Horn (air)	
Two Winches (up/down)(air/hyd)	
Slips (in/out)(air)	
Hoist (up/down) (air)	
Rotary Table (air)	

1.5.12 Electrical

Equipment selection and classification of areas is in accordance with American Petroleum Institute Recommended Practice 500B (RP500B).

Wiring features:

- Where practical, lighting wiring is in rigid conduit with flexible terminations in liquid tight flex or rough service cord. Connection of derrick lights is with RL 80 cord connectors.
- Mast is equipped with nine explosion proof 110 volt fluorescent lights and receptacles for 24-hour operations.

1.5.13 Substructure

The unit comes with a 15-foot high substructure. It is skid mounted, manually raised, and built in accordance with API 4F. The substructure is complete with two sets of stairs, one layer of 4 inch timbers under the setback, mouse-hole, rat-hole, tong backup posts, Kelly pull back post,

handrails, rotary beams for rotary tables, and a pipe ramp. The substructure has the following specifications:

Floor Height:	15 ft.
Width (Working Floor):	19 ft. 6 in.
Length (Working Floor):	12 ft.
Width (Substructure Base):	36 ft.
Clearance Under Rotary Beams:	12 ft.
Clearance From the Bottom of the Crown to the Top of the Rotary Table Floor When Used with Mud Boat:	104 ft.
Roading Height:	11 ft. 6 in.
Setback Capacity:	300,000 lbs.
Rotary Capacity:	375,000 lbs.
Rotary Table Opening:	17-1/2 in.
Rotary Table Center:	44 in.
Recommended Clearance of Crown Saver From Bottom of the Crown:	6 ft.

1.5.14 Mud Boat

The mud boat runs the full length of the trailer and has provisions for tie down at both the front, and rear of the trailer. An integrated mudline is installed in the center of the mud boat. The mudline attaches to the standpipe, on the off-drillers side, by means of a kicker hose. Guide rails running the length of the mudboat allow alignment of the trailer to the substructure.

1.0 INTRODUCTION AND SPECIFICATIONS

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3.0 CARRIER AND POWER UNIT

4.0 MAST

5.0 DRAWWORKS

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REXROTH. Type "A" Pilotair Directional Control Valves. Technical Information. *(Section 7)*

SALA. Sealed, Self Retracting Lifelines. User Instruction Manual. *(Section 4)*

SPICER / DANA. Universal Joints and Driveshafts, 1000 through 1880 Series Light, Medium and Heavy Duty Axles. Service Manual. *(Section 3)*

SPM FLOW CONTROL, INC. Hammer Unions. Technical and Safety Information. *(Section 4)*