

EXHIBIT A COIL TUBING UNIT/SKID MOUNTED/RIG SAFE

1.0 CONTROL CABIN/HOSE REEL SKID

1.1 SKID FITTED W/ 4-POINT LIFT AND CRASH FRAME SURROUNDING THE ENTIRE SKID

1.1.1 FRAME IS COMPLETELY SURROUNDING AND UNBROKEN BY OPENINGS OR HINGES EXCEPT FOR HINGED BARS AT TOP OF CRASH FRAME ACROSS DOORS

1.1.2 FRAME IS PIN CONNECTED FOR REMOVAL FROM SKID BASE

1.2 CABIN CONSTRUCTED OF ALUMINUM W/ WALLS AND FLOOR JOINED SO THAT CABIN ELEVATES AS A UNIT VIA FOUR (4) HYDRAULIC CYLINDERS

1.2.1 INTERIOR SPACE IS APPROXIMATELY 111”(L) X 76” (H)

1.3 MECHANICAL LOCK PROVIDED TO ENSURE CABIN STAYS IN POSITION ONCE ELEVATED

1.4 ACCESS TO CABIN VIA 2 EA. DOORS/PLATFORMS THAT SLIDE OUT BEYOND PROTECTIVE FRAME W/ LADDERS THAT ALLOW OPERATOR TO ACCESS PLATFORM PARALLEL TO CABIN

1.4.1 ACCESS LADDER AND PLATFORM HANDRAILS

1.4.2 PLATFORM GRATING DESIGNED TO MINIMIZE RISK OF SLIPPING

1.5 MINIMUM CLEARANCE WHERE POSSIBLE BETWEEN CAB AND CRASH FRAME

1.5.1 LIFT CORNERS DESIGNED TO ENSURE SHACKLES DO NOT DAMAGE CABIN

1.5.2 CABIN HAS PROTECTIVE PLATE THAT BOLTS IN PLACE ADJACENT TO CABIN ROOF

1.6 CAB IS TOTALLY ENCLOSED AND INSULATED W/ SWING OUT ACCESS DOORS

1.6.1 DOORS HAVE 12" X 12" WINDOWS

76177

- 1.6.2 DOORS HAVE STAINLESS STEEL HARDWARE
- 1.7** CABIN CONSTRUCTED OF TREATED, ALUMINUM W/
WHITE PAINTED INTERIOR SKIN
 - 1.7.1 CABIN IS MOUNTED ON RUBBER BLOCKS
- 1.8** CABIN HAS A SINGLE VERTICAL 28" (H) WINDOW FACING
FORWARD
 - 1.8.1 WINDOW IS FULL WIDTH OF CABIN AND EQUIPPED W/
ELECTRICAL DRIVEN WINDSHIELD WIPER SYSTEM
COVERING 30% OF WIDTH
 - 1.8.2 FRONT WINDOW IS MADE OF HIGH STRENGTH GLASS,
1/4" THICK
 - 1.8.3 CONTROL VALVE FOR WIPER IS CLEARLY IDENTIFIED
 - 1.8.4 MESH IN CRASH FRAME PROTECTING WINDOW
IS MOUNTED IN-BOARD OF FRAME
 - 1.8.5 FOLD DOWN STEPS ARE MOUNTED BELOW FRAME
CROSSMEMBER FOR STANDING TO CLEAN WINDOW
 - 1.8.6 STORAGE RACK FOR LADDER AND HANDRAILS IS
PROVIDED
- 1.9** TWO (2) SLIDING WINDOWS ARE PLACED IN EACH SIDE PANEL
OF CABIN
 - 1.9.1 SIDE WINDOWS MOUNTED AS LOW AND FORWARD
AS POSSIBLE TO PROVIDE UNOBSTRUCTED VIEW
FROM OPERATOR'S CHAIR
- 1.10** CABIN ROOF MADE OF ONE-PIECE CONSTRUCTION W/
RIVETS FASTENING ONLY OUTER EDGES
- 1.11** CABIN HAS TWO (2) EXTERIOR EXPLOSION PROOF FLOODLIGHTS
AND TWO (2) INTERIOR LIGHTS AGAINST THE SIDEWALLS
 - 1.11.1 VOLTAGE TO BE 220V-50HZ
 - 1.11.2 EXTERIOR LIGHTS MOUNTED ON EACH FRONT CORNER
OF CABIN

- 1.11.3 LIGHTS ARE EXPLOSION PROOF AND WIRED TO ZONE II, EX STANDARDS PER UL CLASS I, DIVISION II, GROUPS A,B,C,& D
- 1.12 AIR HORN OPERATED FROM CABIN PANEL
 - 1.12.1 CONTROL VALVE FOR HORN IS CLEARLY IDENTIFIED
- 1.13 NO AIR LINES ARE EXPOSED ON EXTERNAL CAB WALLS OR ROOF
- 1.14 CABIN HAS A CENTRALLY POSITIONED OFFICE CHAIR W/ ADJUSTABLE HEIGHT, TILT AND SWIVEL FOR OPERATOR, COVERED WITH BLACK VINYL
- 1.15 FULL WIDTH BENCH SEAT W/ BLACK VINYL COVER MOUNTED ON BACK CABIN WALL
- 1.16 FOLD DOWN JUMP SEAT MOUNTED INSIDE CABIN
- 1.17 EXPLOSION PROOF ROOF TOP AIR CONDITIONING UNIT
- 1.18 BOLT ON ACCESS PANELS W/ HANDLES FITTED ON INSIDE/OUTSIDE FRONT OF THE CONSOLES ALLOWS EASE OF REMOVAL FOR MAINTENANCE ON CONTROLS
- 1.19 PROOF BREAKER BOX TO DISTRIBUTE POWER
- 1.20 ONE (1) 2" DRAIN IN CABIN FLOOR W/ RUBBER PLUG FOR WASHOUT
- 1.21 CONTROL CONSOLE "L" SHAPE DESIGN INCLUDES:
 - 1.21.1 ONE (1) 8-BANK VALVE FOR BOP CONTROL, WITH FLIP-UP, LOCK-OUT LATCH A SEPARATE ACTIVATOR VALVE INSTALLED FOR BOP SUPPLY
 - 1.21.2 BOP PRESSURE GAUGE
 - 1.21.3 AIR REGULATOR VALVE, PRESSURE VALVE, BLEED VALVE AND GAUGES TO OPERATE TWO (2) DUAL ACTING STRIPPERS, HYDRAULIC SUPPLY FOR STRIPPER IS AIR-OVER-PUMP WITH MANUAL OVERRIDE
 - 1.21.4 WEIGHT INDICATOR FOR INJECTOR, 80,000 LBS. MOUNTED CENTER OF PANEL
 - 1.21.5 PRESSURE REGULATOR VALVE WITH ISOLATION AND

GAUGES FOR THREE (3) INJECTION TRACTION CIRCUITS

- 1.21.6 CONTROL VALVE FOR INJECTOR SPEED AND DIRECTION, W/ 0-600 PSI GAUGE AND 10 MICRON FILTER IN SUPPLY LINE
- 1.21.7 VALVE FOR INJECTOR BRAKE AND SPEED CONTROL
- 1.21.8 GAUGE FOR INJECTOR BRAKE PRESSURE
- 1.21.9 PRESSURE CONTROL VALVE FOR SETTING INJECTOR PULL CONTROL
- 1.21.10 PRESSURE CONTROL W/ GAUGE FOR INJECTOR CHAIN TENSION CONTROL
- 1.21.11 INJECTOR TRACTION PRESSURE DRAIN VALVE
- 1.21.12 VALVES FOR INJECTOR CHAIN AND REEL TUBING OILER
- 1.21.13 HYDRAULIC PRESSURE GAUGE (4") FOR INJECTOR PULL
- 1.21.14 HYDRAULIC VALVE, 3-BANK FOR REEL CONTROL; I.E., REEL PAY-OFF OR TAKE-UP, LEVELWIND RAISE AND LOWER, AND LEVELWIND OVERRIDE
- 1.21.15 RELIEF VALVE FOR REEL TENSION CONTROL
- 1.21.16 PRESSURE GAUGE FOR REEL TENSION
- 1.21.17 VALVE FOR REEL BRAKE
- 1.21.18 TWO (2) 6", 15,000 PSI PRESSURE GAUGES FOR WELLHEAD PRESSURE AND CIRCULATING PRESSURE MOUNTED RIGHT OF WEIGHT INDICATOR, BOTH GAUGES 4:1 DEBOOSTED
- 1.21.19 CTES MONITORING SYSTEM (ORION & CERBERUS)
- 1.21.20 ELECTRONIC CONTROLS FOR ENGINE SPEED, KILL AND EMERGENCY KILL
- 1.21.21 AIR PRESSURE GAUGE
- 1.21.22 CUSTOMER LOGO ENGRAVED ON CONTROL PANEL
- 1.21.23 ENGINE TACHOMETER

- 1.22 AIR DRIVEN PUMP INSTALLED AND USED TO DELIVER 5000 PSI TO THE STRIPPER IN CASE OF EMERGENCY. PUMP EQUIPPED W/ HANDLE TO ACT AS A SECOND MANUAL BACK-UP PUMP.
- 1.23 SKID DIMENSIONS: 14' (L) X 8' 6" (W) X 8' 2"(H), WEIGHT 12,000 LBS TO INCLUDE COMPONENTS REFERENCED IN ITEM 2.0

2.0 HOSE REELS AND HOSES SUPPLIED

- 2.1 ONE (1) HYDRAULICALLY POWERED HOSE REEL FOR INJECTOR CONTROL HOSES EACH 125 FT LONG W/ HOSE SIZE OPTIMIZED FOR INJECTOR FUNCTIONS
 - 2.2 ONE (1) HYDRAULICALLY CONTROLLED HOSE REEL FOR BOP CONTROL HOSES FITTED W/ TWELVE (12) HOSES 125 FT LONG; HOSES WILL BE FIRE RESISTANT THE LAST 15 FT
 - 2.2.1 EXTRA FOUR (4) BOP LINES ORIGINATING AT CABIN WILL DEADHEAD INTO THE CABIN COUPLING PANEL WITH QD'S
 - 2.3 BOTH CONTROL HOSE REELS EQUIPPED W/ PROVISIONS FOR DIRECT CONNECTION TO BULKHEAD PANEL
 - 2.3.1 BULKHEAD PANEL PROVIDED ON HOSE REEL SKID FOR JUMPER-HOSE ATTACHMENT FROM CABIN
 - 2.3.2 REELS MOUNT ON CABIN SKID EXTENSION IN FRONT OF CABIN AND ARE REMOVABLE
 - 2.4 SKID-MOUNTED HYDRAULICALLY POWERED HOSE REEL TO ACCOMMODATE TWO (2) 1-1/2" X 125' LONG INJECTOR POWER HOSES W/ CONNECTIONS
 - 2.5 CONTROL VALVES FOR HOSE REELS LOCATED ON THE INDIVIDUAL HOSE REEL SKIDS, HOSE REELS HAVE PAD EYES FOR LIFTING
 - 2.6 ONE (12) HOSE BUNDLE WITH 50 FT OF TUBING REEL CONTROL HOSES STORED IN BOTTOM OF CABIN SKID FOR EASY ACCESS
 - 2.6.1 HOSE BUNDLE BETWEEN CABIN AND POWER PACK IS 30 FT LONG AND STORED IN CABIN SKID
-

-
- 2.7 CONTROL HOSES HAVE QUICK DISCONNECTS W/ CAPS AND PLUGS FIRMLY SECURED TO HOSES
 - 2.8 HOSE TAGS INSTALLED AT END OF ALL HOSE BUNDLES AT APPROPRIATE DISTANCE FROM QUICK DISCONNECTS
 - 2.8.1 CONNECTIONS AT QUICK DISCONNECTS ARE INDEXED TO MINIMIZE POSSIBILITY OF INCORRECT HOOK-UP
 - 2.8.2 INJECTOR AND BOP HOSE BUNDLES ARE PROVIDED W/ CHAIN SUPPORT FOR SUPPORTING HOSE WEIGHT DURING OPERATION W/ A CHAIN ATTACHMENT POINT ON INJECTOR AND BOP'S
 - 2.9 HOSE BUNDLES COVERED W/ AN OIL RESISTANT JACKETING SECURELY TIED TO THE HOSES
 - 2.10 ALL DRIVE SPROCKETS ON HOSE REELS ARE COLD DRAWN STEEL (NOT CAST)
 - 2.11 ONE (1) JUMPER HOSE BUNDLE 30 FT LONG FOR CONNECTION OF POWER HOSE REEL TO POWER UNIT

3.0 HIGH PRESSURE OPEN LOOP POWER PACK

- 3.1 C-15 CATERPILLAR DIESEL ENGINE, RIG SAFE, W/ TRIPLE PUMP DRIVE MOUNTED DIRECTLY TO FLYWHEEL HOUSING.
- 3.2 POWER PACK SKID MOUNTED W/ FOUR POINT LIFT PROTECTIVE FRAME
- 3.3 FRAME COMPLETELY SURROUNDS POWER PACK AND WELDED IN PLACE
- 3.4 STAINLESS STEEL/WATERPROOF POWER PACK MOUNTED CONTROL PANEL INCLUDES:
 - 3.4.1 ELECTRIC THROTTLE SYSTEM FOR ENGINE SPEED CONTROL
 - 3.4.2 ELECTRONIC OPERATED ENGINE FUEL KILL
 - 3.4.3 EMERGENCY ENGINE AIR SHUTOFF SWITCH
 - 3.4.4 OIL PRESSURE GAUGE, WATER TEMPERATURE GAUGE, AIR PRESSURE GAUGE AND ENGINE TACHOMETER

- 3.4.5 ENGINE C/W SYSTEM SHUTDOWNS FOR OVER TEMPERATURE, OVER SPEED, LOSS OF OIL PRESSURE, LOSS OF COOLANT, AND HIGH EXHAUST TEMPERATURE AS REQUIRED FOR OPERATION
 - 3.4.5.1 ENGINE W/ SPARK ARRESTOR EXHAUST, SEALED CRANKCASE, CRANKCASE BREATHER FLAME TRAPS, REMOTE SHUTOFF DEVICE, FUEL SHUTDOWN VALVE, AND ANTI-STATIC FAN DRIVE BELTS
- 3.5 DIESEL-LUBRICATED AIR STARTER AND AIR RESERVOIR TANK W/ 30 GALLONS OF VOLUME TO START UNIT
 - 3.5.1 RESERVOIR HAS DRAIN VALVE AND ASSOCIATED FILTER/REGULATOR
- 3.6 AIR SYSTEM INCORPORATES A BENDIX AD-9 OR EQUIVALENT CHEMICALLY ACTIVATED AIR DRYER TO HANDLE AMBIENT HUMIDITY UP TO 100% AND TEMPERATURE -10 DEG C TO +45 DEG C
- 3.7 12 CFM AIR COMPRESSOR IS ENGINE DRIVEN C/W EXTERNAL AIR SUPPLY LINE W/ A 1" NPT THREAD AND PRESSURE BLEED OFF LOCATED AT REAR OF SKID
- 3.8 ALL HYDRAULIC PUMPS ARE DENISON
- 3.9 HEAVY DUTY, SOLDER DIPPED RADIATOR FITTED AND SIZED FOR 140 DEG F AMBIENT
- 3.10 LOOP TEMPERATURE GAUGE FOR INJECTOR ON LOW PRESSURE SIDE AT SUCTION OF PUMP W/ TEMPERATURE GAUGE PRIOR TO FILTER BEFORE HTX
- 3.11 FOUR (4) 10 GALLON ACCUMULATORS FOR BOP SYSTEM RATED AT 3000 PSI
- 3.12 INJECTOR DRIVE SYSTEM UTILIZES A 120 GPM DENISON VARIABLE DISPLACEMENT, OPEN LOOP LOAD SENSE AXIAL PISTON PUMP AND A PILOT OPERATED, PROPORTIONAL, DIRECTIONAL CONTROL VALVE, SYSTEM C/W HOSES RATED AT 5000 PSI
- 3.13 AIR TO OIL HEAT EXCHANGER MOUNTED ON ENGINE SKID, HEAT EXCHANGER SIZED FOR 140 DEG F AMBIENT

76177

- 3.14 CAPACITY FOR 100 GALLONS OF DIESEL FUEL
 - 3.14.1 TANKS ARE STAINLESS STEEL W/DRAIN AND ISOLATION VALVES
 - 3.14.2 LEVEL INDICATORS ON TANKS MOUNTED SO AS TO BE PROTECTED W/ AUXILIARY FUEL SELECTOR
- 3.15 STAINLESS STEEL HYDRAULIC OIL RESERVOIR W/ 240 GALLONS CAPACITY C/W INLET SUCTION STRAINERS AND ACCESSIBLE CLEAN OUT HATCH
 - 3.15.1 RESERVOIR PROVIDED W/ DRAIN AND ISOLATION VALVES ON SUCTION SIDES AND A VISIBLE LEVEL INDICATOR MOUNTED IN-BOARD
 - 3.15.2 TANK IS FITTED W/ TEMPERATURE GAUGE
 - 3.15.3 EXTRA 3/4" RETURN PORT LOCATED HIGH ON TANK IS PROVIDED FOR LOW PRESSURE CASE RETURN
- 3.16 30 GALLON AIR RESERVOIR SUPPLIES SYSTEM AIR THROUGH A FILTER AND REGULATOR
- 3.17 CHECK VALVES INSTALLED BETWEEN ALL TANKS OR RESERVOIRS AND FILTERS TO FACILITATE EASY FILTER CHANGES
- 3.18 ACCESS LADDER TO TOP FOR HYDRAULIC AND FUEL RESERVOIR MAINTENANCE
- 3.19 RELIEF VALVE PILOT DUMP CONTROLS AND GAUGES EASILY ACCESSIBLE FOR ENGINE START UP
- 3.20 NITROGEN BOTTLE W/ REGULATOR MOUNTED ON POWERPACK FOR EMERGENCY AIR SUPPLY FOR ENGINE START
- 3.21 SKID DIMENSIONS: 13' (L) X 8' 5" (W) X 8' (H), WEIGHT 14,600 LBS W/ FULL FLUIDS

4.0 GEAR DRIVE TUBING REEL ASSEMBLY

- 4.1 SKID 148" (L) X 102" (W) X 122" (H) C/W FULL-LENGTH DRIP PAN, DRAIN TUBES IN EACH CORNER, 6" X 14" FORKLIFT POCKETS AT 84" CENTERS, "D-RINGS" ON EACH CORNER. REEL IS SIZED

TO HOLD UP TO 18,000 FT. OF 1-1/2" COILED TUBING.

- 4.2 GEAR DRIVE ARRANGEMENT W/ INTEGRAL BRAKE CAPABLE OF SPOOLING 2" TUBING AT 2,500 PSI HYDRAULIC PRESSURE OR LESS, C/W CROSSOVER RELIEF VALVE PROTECTION FOR MOTOR
- 4.2 LEVEL WIND MECHANICALLY DRIVEN DIAMOND LEADSCREW C/W ADJUSTABLE CLUTCH SYSTEM REMOTELY OPERATED HYDRAULIC MOTOR TO OVERRIDE IN EITHER DIRECTION, DUAL-BAR CROSSTRACK DESIGN, HYDRAULICALLY RAISED TO WORKING POSITION, COUNTERBALANCE VALVE TO MAINTAIN ELEVATION
- 4.3 PIPE PLUGS EXPANDABLE NEOPRENE PLUGS FULLY RECESSED IN SKID SECURED W/ 1/8" PLASTIC COATED LANYARDS
- 4.4 STAINLESS STEEL IDENTIFICATION PLATE ATTACHED
- 4.5 NON-LIFT REMOVABLE PROTECTION FRAME, TWO (2) LADDERS AT OPPOSITE SIDES PROVIDE ACCESS TO TOP OF FRAME, PINS ATTACH FRAME TO SKID, REMOVABLE CROSSBAR
- 4.6 TUBING GUIDE COUNTER FULLY ADJUSTABLE FOR TUBING SIZES OF 1 IN THROUGH 2.88" W/ VERTICAL SLIDE MOUNT TO COMPENSATE FOR TUBING PAY-OFF ANGLE MEASURING IN FEET OR METERS
- 4.8 QUICK CHANGE SPROCKET FOR 1.5"
- 4.9 INTERNAL PLUMBING SPM OR EQUIVALENT 2X2 VALVES, STANDARD NON-H₂S SPM INTEGRAL 1502 TYPE FITTINGS RATED AT 10,000 PSI, TEE FOR BALL LAUNCHING OR WIRELINE ADAPTATION, 2X2 SPM SHUTOFF VALVE BETWEEN SWIVEL AND DRUM CORE
- 4.10 EXTERNAL PLUMBING SPM 2X2 VALVES OR EQUIVALENT, NON-H₂S SPM INTEGRAL 1502 FITTINGS RATED AT 10,000 PSI, DUAL INLET CONNECTIONS AND 2X2 SPM SHUTOFF VALVES BETWEEN SWIVEL AND INLETS, FLANGE MOUNTED 4:1 DEBOOSTER TO MONITOR CIRCULATING PRESSURE

76177

- 4.11 BULKHEAD CONNECTIONS ARE SNAPTITE QUICK DISCONNECT FITTINGS, PLASTIC CAPS/PLUGS
- 4.12 LUBRICATION SYSTEM IS SPRAY WAND, 30-GALLON LUBRICATION RESERVIOR, FILL CAP, LEVEL GAUGE, 140 PSI RELIEF VALVE, AIR REGULATOR; AIR PRESSURE DRAIN VALVE LUBE DRAIN VALVE
- 4.13 HYDRAULIC AND GREASE LINE HOSES ARE STANDARD CLIMATE RATED
- 4.14 SPREADER BAR ARRANGEMENT FOR LIFTING ENTIRE LOADED REEL ASSEMBLY OR LOADED DRUM ONLY, SOLID LINK DESIGN, SPREADER BAR STOWS AGAINST REAR FRAME MEMBERS WHEN NOT IN USE, SPREADER BAR STAMPED "100,000 LBS", TWO LEG SLING WITH SHACKLES, MASTER LINK AND THIMBLES, TAGGED W/ LOAD LIMIT, PURCHASE ORDER NUMBER, LINE ITEM AND PART NUMBER
- 4.15 MOUNT FOR ENCODER DATA ACQUISITION INSTALLED
- 4.16 REEL DRUM LOCKED INTO TRANSPORT POSITION BY A CHAIN AND BINDER SYSTEM ON ONE REEL FLANGE
- 4.17 CIRCULATING SWIVEL 10,000 PSI, 2" BORE SWIVEL, PROOF-TESTED TO 15,000 PSI; SUITABLE FOR BOTH H2S AND NON-H2S SERVICE, COMPONENTS EXPOSED TO CIRCULATING FLUIDS ARE REPLACEABLE
- 4.18 SPOOL D2072 OR EQUIVALENT 120" OUTSIDE DIAMETER RIM, 72" INSIDE WIDTH, 72" CORE DIAMETER; LIFT LUGS; TIE DOWN PLATES ON OUTER RIM

5.0 INJECTOR HEAD

- 5.1 DESIGNED FOR HANDLING COILED TUBING SIZES FROM 1-1/2" OD THROUGH 3-1/2" OD AND DESIGNED FOR OPERATION W/ BOTH OPEN LOOP AND CLOSED LOOP HYDRAULIC SYSTEMS
- 5.2 PULL CAPACITIES ARE AS FOLLOWS:
80,000 LBS. CONTINUOUS PULL CAPACITY @ 4400 PSI
MAXIMUM SPEED 150 FT PER MINUTE (60 GPM)
SNUBBING CAPACITY IS 40,000 LBS
- 5.3 ALL STRUCTURES AND ANCILLARY SYSTEMS ARE DESIGNED TO

80,000 LB TUBING LOAD LIMIT

- 5.4** INJECTOR DRIVE CASE IS A REMOVABLE GEAR DRIVEN POWER TRANSMISSION WITH A 33:1 DEEP REDUCTION RATIO
 - 5.4.1 GEAR DRIVEN TRANSMISSION HAS A SINGLE INPUT W/ DUAL OUTPUT SHAFTS
 - 5.4.2 SHAFTS HAVE DUAL OIL SEALS
- 5.5** DRIVE SPROCKETS ARE SPLINED AND THEN SLIPPED ONTO DRIVESHAFTS FOR PRECISE ALIGNMENT AND STRENGTH
- 5.6** INJECTOR IS POWERED BY A DUAL HIGH SPEED/HIGH-PRESSURE BENT AXIS VARIABLE DISPLACEMENT PISTON MOTOR
 - 5.6.1 MOTOR CASE DRAIN AND BRAKE PROTECTED BY POP-OFF RELIEF VALVES
- 5.7** A MODULAR BRAKE IS MOUNTED BETWEEN THE MOTOR AND GEARBOX AND IS SPRING APPLIED/PRESSURE RELEASED
- 5.8** HYDRAULIC DRIVE MOTOR IS PLUMBED DIRECTLY INTO TWO (2) COUNTERBALANCE SAFETY VALVES TO PREVENT LOSS OF CONTROL IF POWER FAILURE OCCURS
- 5.9** EACH HYDRAULIC LINE SUPPLYING FLOW TO DRIVE MOTOR IS PROTECTED W/ HIGH PRESSURE IN-LINE FILTER MOUNTED BETWEEN THE QUICK-DISCONNECT AND COUNTERBALANCE VALVES
 - 5.9.1 FILTERS INCORPORATE A VISUAL CONDITION INDICATOR
- 5.10** INJECTOR SUPPLIED WITH CHAIN ASSEMBLY CAPABLE OF RUNNING GRIPPERS FOR 1-1/2", 1-3/4", 2", 2-3/8", 2-7/8" AND 3-1/2" TUBING SIZES
- 5.11** INJECTOR INCORPORATES 200 PITCH HEAVY DUTY ROLLER CHAIN LINKS W/ PRECISION CAST CARRIERS
 - 5.11.1 TUBING GRIPPERS ARE GROOVED AND HARDENED, SINGLE PIECE, HALF ROUND CONFIGURATION, ELASTOMERICALLY BALANCED FOR OPTIMUM TUBING GRIP
 - 5.11.2 EACH CARRIER SUPPORTED BY DUAL HEAVY DUTY BEARINGS

- 5.12 INJECTOR USES THRU HARDENED STEEL ROLLERS TO APPLY PRESSURE TO THE BACK OF THE CARRIERS. THE ENDS OF THE STEEL ROLLERS FIT ON THE INSIDE RACE OF THE BEARINGS.
 - 5.12.1 TRACTION SYSTEM IS REMOTE CONTROLLED FROM OPERATOR'S CONSOLE
- 5.13 CHAIN LOOP TENSION PROVIDED BY DOWN TENSIONING W/ HYDRAULIC CYLINDERS
 - 5.13.1 SYSTEM REMOTE CONTROLLED FROM OPERATOR'S CABIN
- 5.14 INJECTOR CHAIN LUBE SYSTEM IS A PRESSURE SPRAY SYSTEM W/ TANK AND PUMP MOUNTED ON INJECTOR
- 5.15 ADJUSTABLE POSITION, 72" RADIUS, TUBING GUIDE ARCH W/ FLARED FOLD UNDER TAIL AND CONTOURED STEEL ROLLERS
 - 5.15.1 MOUNT DESIGNED TO FOLD DOWN FOR STORAGE OR REMOVABLE
- 5.16 DUAL SINGLE ACTING HYDRAULIC LOAD CELLS TO PROVIDE DIRECT PIPE HEAVY AND PIPE LIGHTWEIGHT INDICATION
- 5.17 FLANGE MOUNT FOR STRIPPER ON INJECTOR BASE (STRIPPER MOUNTING CONFIGURATION TO BE SPECIFIED BY PURCHASER)
- 5.18 COMPLETE INJECTOR ASSEMBLY MOUNTED ON STEEL BASE AND COUPLING PANEL INSTALLED AT BOTTOM FRONT OF INJECTOR
- 5.19 OUTER LIFTING/CRASH FRAME HAS 4-POINT SLING ATTACHMENT POINTS AND IS RATED FOR 90,000 LBS OPERATIONAL LIFTING CAPACITY
 - 5.19.1 STANDARD SHIPPING 4-LEG SLING ASSEMBLY FOR LIFTING INJECTOR DURING SHIPMENT ONLY AND IS NOT CAPABLE OF FULL INJECTOR LOAD CAPACITY
- 5.20 ONE (1) SET TELESCOPING SUPPORT LEGS WITH 8" SCREW ADJUSTMENT AND A SET OF STEEL SHORT FIXED LEGS FOR SUPPORTING THE INJECTOR W/ STRIPPER MOUNTED
- 5.21 ADDITIONAL REQUIREMENTS FROM THE PURCHASE IS REQUIRED AS FOLLOWS TO COMPLETE THE SPECIFICATION:

5.21.1 TUBING SIZE:	1-1/2"
GRIPPER BLOCKS	1-3/4"
	2"
	2-3/8"
	2-7/8"
5.21.2 INJECTOR LEGS:	STEEL
5.21.3 INJECTOR BRAKES:	2.50 DS34
	2.50 CS34 W/O COUNTER INST'L
	2.50 SD
	2.50 SD W/O COUNTER INST'L
	3.06 SD 10K O/U
	3.06 SD 15K
	4.06 SD 10K
	OTHER

6.0 INJECTOR HEAD/BOP TRANSPORT SKIDS

- 6.1 INJECTOR TRANSPORT SKID HAS DRIP PANS INCORPORATED INTO THE BASE W/ DRAIN PLUGS
- 6.2 SKID HAS REMOVABLE CRASH-FRAME THAT PINS ON W/ 4-POINT LIFT
- 6.3 INJECTOR TRANSPORT SKID IS FOR TRANSPORTING INJECTOR, STRIPPER, BOP'S AND GOOSENECK
- 6.4 JUMPER HOSE KIT FOR LAND OPERATIONS OF OFFSHORE CTU PACKAGE COMPLETE

7.0 GENERAL SPECIFICATIONS

- 7.1 COMPLETE UNIT SANDBLASTED, PRIMED AND PAINTED TO PURCHASER SPECIFIED COLOR.
- 7.2 COMPLETE UNIT ASSEMBLED AND TESTED FOR CUSTOMER ACCEPTANCE AT USA FACILITY.
- 7.3 WELDS SHALL BE OF GOOD QUALITY AND OF SUFFICIENT STRENGTH.
- 7.4 ALL LIFTING EYES TO BE LOAD TESTED TO A MINIMUM OF 1.5 TIMES THE EYE'S RATED SAFE WORKING LOAD

- 7.4.1 A POST TEST NDE INSPECTION TO VERIFY NO CRACKING OR DEFORMATION.
- 7.4.2 ALL LOAD TEST AND NDE TRACE DOCUMENTATION ARE DELIVERABLES UPON FINAL ACCEPTANCE OF EQUIPMENT.
- 7.5 USE SELF-LOCKING NUTS WHERE REQUIRED.
- 7.6 ALL HOSES WILL BE WELL SUPPORTED WITH SUPPORT TYPE CLAMPS.
- 7.7 ALL HOSES WILL BE PROTECTED WHERE NECESSARY BY WELL SECURED RUBBER SLEEVES TO PREVENT RUBBING BY FRAME, ETC.
- 7.8 THREE (3) OPERATIONS MANUALS SUPPLIED WITH EACH UNIT.

