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3. Pump System

One (1) Only Reciprocating Positive Displacement Plunger Pump

Make:	Wheatley
Model:	P323 Triplex Plunger Pump
Condition:	Remanufactured
Horsepower:	60 bhp @ 500 rpm
Stroke:	3.125"
Performance Data:	5.1.25
i. Plunger Size:	1.750"
	Tungsten Carbide
ii. Volume Requirement:	164 m³/day (30 gpm)
iii. Capacity:	60%
iv. Pump Speed:	307 rpm
v. Brake Horsepower Required:	16 bhp (30 gpm @ 800 psig)
	4,760 lbs
Stuffing Boxes:	Stainless Steel Sleeved
Fluid End Material:	Ductile Iron
Plunger Packing Material:	0838 Utex Non-Adjustable Plunger
0.0000 a - 0	Packing
Valve Assemblies:	Stainless Steel
M.A.W.P. (1 3/4" Plunger):	1,980 psi
Crankshaft Extension:	2.500"
Oil Capacity:	2.5 gal. (9.5 Liters).
 Splash lubricated power end (au.) 	xiliary lubrication system only
required for operations below 20	0 rpm).
Weight - Pump Only:	980 lbs (259 kg)
Suction Connection:	2.500" FNPT
Discharge Connection:	2.000" FNPT.

Please Note:

CanDyne will ensure the plunger pump is remanufactured to our exacting standards, whereby we can offer a six month warranty on the systems – the best remanufactured warranty in the pump industry that we are aware of.

This unit is sized whereby you may increase both volume and/or pressure without serious problems or serious equipment changes. The unit is designed to run at very low speeds at present time, with room for growth with both volume and pressure.

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4.	Dı	rive System	
Or	ne (1) Only Electric Motor	
		Type: HP Rating: Design: Voltage: Speed: Drive: Frame:	Teco Westinghouse 30 hp High Efficiency Style 3/60/460 1,200 rpm VFD Capable 286T
On	e ('	1) Only Belt & Sheave System	
		Type: Ratio: Design: Belt: Horsepower Design: Service Factor: Electric motor will be mounted, with motor send. There will be approximately 30" between purposes. Sheave kit and drive system will connect eleside of pump. All applicable safety belt guards will be incompared.	mp and motor for maintenance
One	e (1) Only Protective Safety Guard – Pump Sy	ystem
		Structurally designed for safety and lightweig Top Inspection door for belt inspection. Angle iron support at both ends of guard, both Shaft slots enlarged for future sheave increased Typical 3" additional area over/above current increase/decrease.	lted to support from sub-skid. ase/decrease.

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5. Sub-skid (Baseplate)

One (1) Only Structural Sub-Skid / Baseplate			
	Main Runners: Cross members: Design Criteria: Overall Length (Skid Only): Overall Width (Skid Only): Overall Width (Guard Included): Sub-skid designed not to interfere video Sandblasting: Paint:	W8x18 W8x18 Oversized Structurally 7'-0" 2'-6" 3' - 0" with fluid end maintenance procedures Brushed blasted to SSPC-SP6 Single coat of Primer Two coats of Black enamel paint	
6. P	ulsation Suppression Devices (Sta	bilizers)	
One	(1) Only Suction Stabilizer		
	Make: Model: Size: Cartridge: Connection:	Status Flow SFU-1503-F-100 100 Cubic Inch 2-Ply Nitrile Rubber Cartridge 3" 150 ANSI	
One (1) Only Discharge Stabilizer		
	Make: Model: Size: Cartridge: Flange Connection:	Status Flow SFT-14402-F-100 100 Cubic Inch 6-Ply Nitrile Rubber Cartridge 2" 600 ANSI	
7. In	strumentation Systems		
One (1) Suction Pressure Shutdown Swi	tch	
	Make: Model: Maximum System Pressure: Approximate Dead Band: SPDT: Wetted Parts: Connection: Classification:	CCS Dualsnap 6900GZE14 Series 500 psi 6 psi Relay 316 Stainless steel/viton ½" Stainless steel port/diaphragm CSA Class 1, Div. 2	

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One (1) Differential Pressure Shutdown Switch (Filter)		
 ☐ Make: ☐ Model: ☐ Maximum System Pr ☐ SPDT: ☐ Wetted Parts: ☐ Connection: ☐ Classification: ☐ Mounted on suction for the suction of the succion of the succio	Relay 316 Stainless steel/viton ½" Stainless steel port/diaphragm CSA Class 1, Div. 2	
One (1) Only Discharge Me	etering System	
Turbine Meter ☐ Make: ☐ Model: ☐ Size: ☐ Flow Range: ☐ Construction: ☐ Pickups: ☐ Hardware Kit: ☐ Maximum Pressure:	Primary Flow WM0150X2 1.5" x 2" 15 – 180 gpm 316 SS Body/Vanes, CD4MCu alloy rotor, tungsten carbide shaft & bearings. Magnetic Aluminum hub extension 3,700 psi	
Flow Analyzer/Indica Make: Model: Indication: Output: Display: Classification:	Primary Flow Altus XL Plus REMOTE Indication Only 4 – 20 mA Scalable Pulse Out Flow Rate Total Updates/Second Class 1, Division 1	
Three (3) Only Suction Pres	ssure Indicators	
 ☐ Make: ☐ Pressure: ☐ Size: ☐ Liquid Filled ☐ NACE stainless steel ☐ 1% Accuracy 	Bourdon Haenni 0 – 100 psi 4" x ½"	
☐ Situated:	Suction Inlet Line	

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One (1) Only Discharge Pressure Indicator				
	Pressure: Size: Liquid Filled NACE stainless steel internals & ca 1% Accuracy			
	Situated:	Discharge Line		
One (1) Only Pump Vibration Safety Shu	tdown Switch		
	Make: Model: Condition: Mounting: Classification:	Murphy VS-2-EX New On the top of the power end of pump CSA Class 1, Div. 1		
One (1	l) Only Pump Oil Level Switch			
	Make: Model: Condition: Mounting:	Murphy EL-150-EX New Installed / piped off drain connection of the pump		
	Classification:	CSA Class 1, Div. 1		
One (1) Only Sump Level Switch				
	Make: Design: Model: Connection: Electrical Classification: Input Power: Single Point Switch Insertion Depth: Location: Situated mounting above the sump vertically. Sump grating call and/or switch.	SOR Vertical Level Switch 1550C-F5A-C-W9-ES 1 1/2" NPT Class 1, Div. 2 110 VAC 48" Maximum (Estimate Sump at 8") ne sump, with stem running past grating into n still be removed without removing float		

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One (1) Only Back Pressure Control Valve Assembly

	Make: Model: Size:		Fisher D4-546 2"
	Rating: Integra Fail Op 0-33 ps	l size 40 actuator <u>en</u>	600 ANSI
	Regula	and the second s	Installed
	Locatio		Discharge Header.
		546 I/P Transducer	Discharge Header.
	•	4-20mA input, 0-33psi outpu	†
	•	XP, CSA approved	· ·
			Mars a second
		c/w Fisher 67CFR & 0-60psi	
	•	316 SST tubing and swagel	ok fittings
One (1) Only [Discharge Pressure Transm	itter
		Make: Pressure:	Rosemount 0 – 4,000 psi adjustable pressure
		Output Signal:	range 4-20mA

8. Suction Piping System

☐ Situated:

☐ Design:

Piping Design Criteria/Specifications

On discharge line

Class 1, Div 1

☐ 316 process conn., 316 diaphragm, silicone fill fluid

☐ ½" NPT process connection☐ ½" NPT conduit thread

 Piping:
 SA-106B

 Weld Fittings:
 SA-234 WCB

 Screwed & Socket Fittings:
 SA-105 Grade N

 Flanges:
 SA-105 Grade N, SA-181

 Grade 1 or 2

 Valves:
 SA-105, SA-216 WCB

 Bolts:
 SA-103-B7

 Nuts:
 SA-194-2H

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CanDyne Pump Services Inc. will manufacture the system design to a minimum of ASME B31.3, Alberta Boilers Safety Association (ABSA) Safety and Quality Control Association (AQP-2822).

Suction Piping System				
	Rating: Piping: Size: Suction Piping Inlet of 3" passing the	150 ANSI Sch. 80 3"/4"		
	Suction Piping Inlet of 3", passing thru a ball valve and y-strainer, and directly into a horizontal charge pump assembly. Piping Outlet from Charge pump will run upwards, passing thru a ball valve and			
	over to the inlet of the filter system. Pressure indicators are located before switch is also installed on the filter system.	re and after the filter. A pressure differential rstem, for shutdown due to blockage in the		
	filter. A low pressure shutdown switch	ch is located after the filter and ball valve. to the filter, to segregate the system during		
		" block valve prior to turning and entering		
	A flanged connection is used prior to connection of the pump.	entering the pump due to the threaded inlet		
	The Suction stabilizer is located off the vertically in relation to the pump. Drain Lines & Systems:	ne blind side of the pump, and standing		
	 We have set up two drain lines/systems; the first is off the y-strainer and the second is off the filter base. Both have 1" block valves and will be hard piped to the sump system. 			
	Suction Piping Supports:	e balance of piping supported by equipment		
	 All supports mounted on struction All supports secured by clamp The suction system is designed to management 	tural skid members style tie-downs. anage fluid at nominal conditions (Nominal		
	 is typically 1.5 – 3 feet/second): 3" individual pump line: 1.46 feet/second for 30 	gpm – current design		
	 Does not include any frictional system. 	losses, restrictions or turns in piping		
	We have utilized Full Port Valves on t current and future fluid volume of the	he system, which will be satisfactory for the pump.		
	We have sized the system for the full volume capability of the future requirements, not just for the current condition designs. 10 % x-ray of all welds on the suction line.			

☐ 100% hydro testing of all piping.

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Three (3) Only Block Valve Assembly

		Make: Size: Rating: Port: Style: Trim: Valve locations: suction	Meridian / Nutron 3" 150 ANSI Full Port Flanged/Floating WCC Body Std. Trim nlet and either side of the filter	
0	ne (1) Only Basket Strainer As	sembly	
		Make: Size: Rating: Model: Style: Body: Basket: Incorporate spool piece be system, now that the y-stra	Alta 3" 150 ANSI BFS150 Flanged ASTM A216-WCB 304 SS Basket with 1/8" perforations ween strainer and valve to accommodate drainer is no longer installed.	s
9.	Cer	ntrifugal Charge Pump Sy	stem	
On	e (1)	Only Charge Pump		
		Make: Condition: Model: Size: NPSHr: Impeller Size: Discharge Pressure: Efficiency: Horsepower: Inlet Connection: Outlet Connection:	Goulds New Surplus / Replicated 3196 STX 1x1.5-6 2.6 feet/head 4.75 40 psi 45.5 % 3.3 hp 1 1/2" 150 ANSI RF 1" 150 ANSI RF	

installation on the structural skid.

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One (1) Only Electric Motor

Make:	Teco-Westinghouse
Condition:	New
Size:	5 Hp
Classification:	Class 1, Division 2
	TEFC
Speed:	3,600 rpm
Frame:	184T
Voltage:	460 vac
Hertz (Cycle):	60 Hz
Phase:	3

10. Suction Filtration System

One (1) Only Filtration Vessel

Ш	Make:	JL Fluid Filtration / FSI
	Model:	P2S Series
	Bags:	1
	Volume:	40-50 gpm per bag
	Size:	PS style (10 - 25 micron)
	Connections:	3" 150 ANSI RF flanges
	Pressure:	150 psi
	Filter will be installed on a structural	members
		k valve, installed at the bottom of unit, for
	hose connection to sump system.	, and a section of direct, for

11. Discharge Piping System

Piping Design Criteria/Specifications

Piping: SA-106B Weld Fittings: **SA-234 WCB** Screwed & Socket Fittings: SA-105 Grade N Flanges:

SA-105 Grade N, SA-181

Grade 1 or 2

Valves: SA-105, SA-216 WCB

Bolts: SA-103-B7 Nuts: SA-194-2H

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CanDyne Pump Services Inc. will manufacture the system design to a minimum of ASME B31.3, Alberta Boilers Safety Association (ABSA) Safety and Quality Control Association (AQP-2822).

	Discharge Piping System	
	Rating:	600 ANSI
	Piping:	Sch. 80
	Size:	2"
	end removal.	to flange connection for ease in future fluid
	Discharge stabilizer is mounted on a perpendicular to the 2" line.	
	The pressure relief valve is located or return line runs to skid edge where it	directly after the discharge stabilizer. The
	The 2" manual start up bypass contronnecting to the return line back to	ol gate valve is located after the psy.
	The high-pressure shutdown switch	is located after the discharge stabilizer. ter/indicator is set up. The meter is located
	for an un-interrupted 10 times upstre	eam X 5 times downstream flow criteria. alve, has been placed further downstream of
	the metering system.	
	The 2" discharge line ends 6" from s We have set up a drain line/system of	kid edge with a 2" 600 ANSI RFWN flange. on the discharge line, which has a 1" block
	valve and hard piped to the sump sy	stem.
	Discharge Piping Supports:	
	o Five on 2" line	
	 All supports mounted on struct All supports secured by clamp 	ctural skid members
	All supports secured by clamp The discharge system is designed to	o style tie-downs.
_	(nominal is typically 7 – 10 feet/second	nd):
	o 2" Discharge line;	
	 3.27 feet/second for 3 	0 gpm – current design
	 Does not include any frictiona system. 	Il losses, restrictions or turns in piping
	the line/system.	the system to ensure adequate flow rating of
	10 % x-ray of all welds on the discha	rge line.
	100% hydro testing of all piping.	
One (1) Only Block Valve Assembly	
		Meridian / Nutron
		2" 600 ANSI
		Full Port

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☐ Style: ☐ Trim ☐ Location:		Flanged/Floating WCC Body – Std. Trim Discharge Line, start up bypass line.		
One (1) Only Check V	alve			
☐ Make:☐ Size:☐ Rating:☐ Style:☐ Wetted Parts:		Durabla 2" WLC 600 ANSI Spring assisted wafer style 316 Stainless Steel		
One (1) Only Pressure	Relief Valve (PSV	Line)		
 ☐ Make: ☐ Model: ☐ Set Pressure: ☐ Inlet Connection ☐ Outlet Connection ☐ Trim: ☐ Relief valve to be ☐ Flange connection 	on: e utilized for the prote	Farris 27 Series 1,480 psig 3/4" MNPT 1" FNPT Standard trim ection of the plunger pump e of removal in the future.		
12. Structural Skid Sys	stem			
CanDyne Pump Services Inc. will manufacture the system design to a minimum of ASME B31.3, Alberta Boilers Safety Association (ABSA) Safety and Quality Control Association (AQP-2822).				
One (1) Only Main Stru	ctural Skid Package	Ð		
□ Dimensions: □ Flooring: □ Main Members: ○	W8 @ 28 Wide fla 2 Beams run the fu beam down the cer	11' - 0" x 13' – 6" 3/16" Checker Plate nge Il outside length of package, as well as one oter. Two Beams run across (one at each		
□ Pump Support: ○ (s	end) see sub-skid system			

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Lifting Lugs:						
0	S	Structurally designed to be lifted with four point lift, with little/no leflection				
Cross Members:						
	0 0	W8 @ 28 Wide flange 2 Beams run underneath the pump sub-skid assembly. Charge pump and pipe supports located on W12@30 cross member.				
Floor Support:	0	L2x2x3/8 angle under filter.				
	0	C 6" @ 8.2 Channel. 2" x 2" x 3/8" Angle Iron.				
Structural Design						
	0	Oversized.				
5	0	Sump area between crossmembers of skid located underneath fluid end.				
Sump Drain:	0	Sump pump to drain sump into PSV/Bypass line.				
	0	2" 150 ANSI sump line for optional drainage.				
	0	3" Foam Insulation sprayed underneath structural beams of skid.				

Added Value:

CanDyne has designed our skid with a structural 'box' style skid, with additional I-beam situated underneath the pump/sub-skid assembly, as well as the piping systems. This allows for a much better four point lift and structural design.

CanDyne does not utilize two large runners in conjunction with lighter outriggers as we do not feel this design is conducive to the requirements of a pump system, where the weight is both under the pump and motor, but also the inlet and outlet piping, as well as the charge pump and filtration systems.

Our structural skid design is such that it distributes the structural strength where it is needed the most – under the pump sub-skid, piping systems, and other misc. components, as well as under the walls and outside area of the building.

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13. Building System								
	Skid Size: Building Size: Roof:	11' - 0" x 13' - 6" 11' - 0" x 13' - 6" x 8' Gable Style - self framing						
	Roof Slope: External Walls: Building Particulars R12 Insulation for roof and 24 Gauge white fluted alum 4 mil. Poly vapor barrier Building anchors & fastener Building flashing & cutouts Ice Rakes Heater support backing	inum lining for interior						
	One Door – Single: o 3' x 7' insulated man door o Gray painted steel door o Locking panic hardware, che window, rubber sweeps, we o To be placed the end of buil	eckchain, single glazed fixed wired glass ather-stripping, and aluminum threshold ding for ease in access.						
	window, rubber sweeps, wea	eckchain, single glazed fixed wired glass ather-stripping, and aluminum threshold of the pump sub-skid, for ease in removal of						
	Two Windows:	minum sash glass type sliding windows c/w ½						
	Two Louvers: o 12" x 12" o Wall louvers c/w bugscreen	and sliding closer						
	One Exhaust Fan: o Dayton 12" o Interior wall mounted, explos							
One (1) Only Building Heater							
	Make: Model: Size: Type:	Catadyne WX Series 24" x 24" Natural Gas						

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	Units come c/w SSOV, Maxitrol and Protection Grill Temperature Control Valve (thermos 24" Vent hood assembly 25 Foot battery cable style start –up of building. Classification: Regulator:	
14. Ele	ectrical System	
One (1) Only Electrical System	
Pleas	2 EA 150 W HPS interior lights (EVLF 1 EA ESD station c/w shrouds (located 2 EA light switch for interior lights (DSF 1 Ea switch for exhaust fan (DSD933). 1 EA Thermostat for exhaust fan (XT-21 EA H/O/A switch for plunger pump (sit 1 EA H/O/A switch for charge pump (sit 1 Ea H/O/A switch for sump pump (sit 1 Ea H/O/A switch for sump pump (sit 1 Ea H/O/A switch for sump pump (sit 1 Ea Electrical 120 v receptacle (CPS1 Ea Electrical 120 v receptacle (C	d at double man door) FS-933). 212). Situated near electric motor/wall, DSD925) tuation near electric motor/wall, DSD925) uation near wall, DSD925)

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15. Sump & Sump Pump System

One (1) Only Sump Pump								
	Make: Model: Horsep Electric			Monarch BE-S75 3/4 bhp 120V				
	Flow: Pressur Pump w Suction removal Pump w switch v	re: vill be mo piping w l. vill be act vithin the	ill consist of a hose of a hose of a hose of an electrical sump system.	Class 1, Div 2 3 gpm (12 L) 45 feet/head (19 psi) edge near the plunger pump fluid end. dropped down into the sump for fluid al switch on the wall, and a high level float with the return line/bypass line going back				
One (1) Only Sump System								
	Grating			3' Wide x 5'-2" Long 10" Sloping sump to pump inlet				
Paintir		Janubia:	sung Systems					
		Structur	Sandblasted and p Painted with a sing Floor painted with	painted to SSPC-SP6 specifications gle coat of red primer two coats of black paint. th two coats of red paint.				
		Piping:	specifications Painted with a sing Painted with two co	aint external piping to SSPC-SP5 le coat of red primer pats of grey enamel paint. tion stickers placed on piping at strategic				

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17. Documentation & Testing

Two (2) Only Operations Manuals for the Complete System					
 One copy CDROM format, one copy paper (field copy) Pump parts manual Pump operation and service manual Pump drawings Pump specifications Electric Motor parts & operations manual Relief valve parts/operations manual Instrumentation installation/operations manual Filtration information/operations manual Suction & discharge stabilizer installation/parts/operations manual Miscellaneous parts/operations manual systems Design drawings consisting of: General arrangement drawing Elevation drawing Building layout In AutoCAD format One paper operation manual to ship within package or system, unless stated otherwise. 					
One (1) Only Quality Assurance Manual					
 ☐ Mill Test Reports (MTR's) for all piping, flanges and fittings ☐ Pressure relief calibration tests ☐ Instrument data sheets ☐ Pressure test reports ☐ X-ray reports 					
17. Investment / Price Structure					
One (1) only Investment/Pricing structure for the plunger pump system as listed within the body of this quotation:					
Turnkey Package Investment / Price \$ 0.00					
Turnkey Package Investment / Price (TWO UNITS) \$ 0.00					