**Quote #Q17-001-114255-03**
12/3/2019

BECKART ENVIRONMENTAL

**Prepared For:**
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| Expires | Customer:Job | Title | Sales Territory | Prepared by |
|---|---|---|---|---|
| 1/2/2020 | Wesco Integrated Supply (Westinghouse) : Carrier Corporation | 6,000 Gallon PLC Automated BFP Treatment System | OV | Mike Fedrigon |

GENERAL DESCRIPTION:

The Beckart Environmental Batch Filter Press Wastewater Treatment System "separates" water-based waste into two disposable waste products. The first product is a clean water stream; the second product is a dry cake consisting of approximately 35% to 50% (by weight) waste solids. The treatment system operator periodically transfers a fixed volume of waste water into the chemical reactor tank. Treatment chemicals are added in a sequential fashion to the wastewater to separate selected contaminants from the wastewater. These selected contaminants coalesce into a floc which is separable from the water. After the chemical treatment cycle, the contents of the treatment tank are filtered through the Hy-Pack® filter press to separate the floc from the water. The filtration process produces a clean water filtrate and a dry cake. The treated water will then be pumped to the sewer for discharge.

SYSTEM OPERATION
WASTEWATER COLLECTION AND EQUALIZATION:
The wastewater will be collected in an equalization/holding tank. Beckart systems can incorporate additional and or optional equipment that can be provided if requested, or the wastewater conditions merit, are an air blower with air sparge for aeration of the tank, a screen for solids removal, mixer for tank agitation and an oil skimmer to remove any free oil from the surface of this tank. These equipment items may or may not be included in the proposal that follows.

BATCH TREATMENT PROCESS CYCLE:
The operator will initiate a new treatment cycle whenever there is sufficient wastewater in the equalization tank to fill the chemical reactor tank and the operator has cleared the previous cycle. Wastewater to be treated will be transferred to the chemical treatment tank. The chemical treatment tank mixer and recirculation/sludge transfer pump will then be activated. The chemical treatment process begins with the addition of coagulant to break the emulsion in the water. After the addition of coagulant the operator will measure the pH and will adjust the treatment tank contents by adding acid or alkali as necessary. The last step in the chemical treatment process is the addition of polymer which enlarges the floc formation for filtration.

FILTER PRESS PROCESS CYCLE
After the chemical treatment process is completed, the operator will turn valves to transfer the contents of the chemical treatment tank to the filter press. The recirculation/sludge transfer pump will then be activated, pumping the treated water containing the enlarged floc, through the Hy-Pack® filter press. The Hy-Pack® filter press will capture the floc complex and form a filter cake. The clean treated water will flow through the forming filter cake and pass through the filter cloth. The clean treated water will flow through the collection channels in the Hy-Pack® filter press and will be collected in the filtrate / sample tank. The operator will sequence (increase) the operating air pressure to the recirculation/sludge transfer pump to obtain the optimal fluid flow rate through the Hy-Pack® filter press. After the initial filter cake layer has formed on the filter cloths the operator progressively increases the pump pressure to minimize the time required to process a batch of treated wastewater. When the Hy-Pack® filter press is full (filtrate diminishes at high pressure) this indicates to the operator that the air dry out phase should be initiated. The operator then opens a valve to circulate air through the filter cake to minimize the moisture content of the cake. After the air dry out cycle is completed, the press is ready to be emptied. The operator opens the press and separates the plates. The filter cakes will fall off the filter cloths and into the forkliftable sludge hoppers underneath the filter press.

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| | QTY | Item | Amount |
|---|---|---|---|
| 1.1 | 1 | **Equalization Tank Stainless Steel Inlet Basket Screen**<br>One (1) Stainless steel Equalization Inlet wire mesh basket screen- 304 ss, 18"L x 8" wide x 18" deep w/ 4 Mesh screen x 0.063 Woven (.187 Mesh openings) with stacking dual grip 3" x 5" handle, 5/16" rod frame, 14.2lbs. | |
| 1.2 | 1 | **Pneumatic Diaphragm Valve 2" 2 way**<br>Pneumatically actuated 2" 2 way diaphragm valve air to spring closure, PVC with epdm seats, manual override, solenoid | |
| 1.3 | 1 | **Equalization Tank**<br>One (1) 10,414 gallon (39,417 liter) centrifugal cast dish bottom fiberglass tank. 144" (366 cm) diameter x 132" (336 cm) straight side x 175" (444 cm) overall height. | |
| 1.4 | 1 | **Equalization Tank Agitator**<br>One (1) Heavy duty, right angle, top entering agitator. Stainless steel shaft 2 inches in diameter by 142 inches in length. Two 42 inch diameter 3-blade HiFlow impellers rotating at 44 RPM. The Direct pumping capacity is 12,000 GPM, which does not include additional fluid entrainment. 3/4 HP/1800 RPM/3f/60 Hz/TEFC motor. Includes carbon steel mixer beam (Diameter of tank should be specified) | |
| 1.5 | 1 | **Equalization Tank High - High Float**<br>One (1) Float level assembly, with one (1) float switch | |
| 1.6 | 1 | **Equalization Tank Level Assembly**<br>One (1) Radar sensor with 40mm/1-1/2", PTFE encapsulated antenna good to 260 deg. farenheit, process connection ANSI thread NPT Output operation, 4-20mA, 4 line display. Housing is IP65, Nema 4X | |
| 1.7 | 1 | **Equalization Transfer Pump**<br>One (1) Air-powered double-diaphragm pump with ball type check valves. Top discharge, bottom suction. Intake/discharge pipe size 3 inch 125 # ASA bolt-on flange.<br>Two (2) Manually operated suction and discharge block ball valves.<br>One (1) Pneumatic and electrical control assembly consisting of:<br>One (1) Air supply filter and regulator.<br>One (1) Solenoid-operated air valve. | |
| 1.8 | 1 | **Chemical Treatment Tank Unit**<br>One (1) 6,700 gallon (24,716 liter) centrifugal cast dish bottom fiberglass mix tank. 120 inches (3.05 m) in diameter, 164 inches (4.16 m) in height. The tank includes steel mixer support beam and three side mounted full coupling decant ports.<br>Two (2) Air operated three-way stainless steel ball valves with manual over-ride hand lever and solenoid.<br>One (1) Air operated two way ball valve with manual over-ride, stainless steel | |
| 1.9 | 1 | **Treatment Tank High - High Float**<br>One (1) Float level assembly, with one (1) float switch | |

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1.10 1 **Chemical Treatment Tank Level Control**
One (1) Radar sensor with 40mm/1-1/2", PTFE encapsulated antenna good to 260 deg. farenheit, process connection ANSI thread NPT Output operation, 4-20mA, 4 line display. Housing is IP65, Nema 4X

1.11 1 **pH Probe and Meter Assembly (Treatment Tank)**
Beckart pH sensor with pH trap assembly or submersible stalk assembly with Nema 4X analyzer

1.12 1 **Chemical Treatment Tank Mixer**
One (1) Heavy duty, right angle, top entering agitator. Stainless steel shaft 1.5 inches in diameter by 97 inches in length. Two 42 inch diameter 3-blade HiFlow impellers rotating at 44 RPM. The Direct pumping capacity is 12,000 GPM, which does not include additional fluid entrainment. 3/4 HP/1800 RPM/3f/60 Hz/TEFC motor. Includes carbon steel mixer beam (Diameter of tank should be specified)

1.13 1 **Inclined Ladder with Platform**
One (1) Inclined ladder with platform, 175 inches (441 cm) in height.

1.14 1 **Coagulant Metering Unit (Automatic)**
One (1) Air-powered double-diaphragm non-metallic pump with ball type check valves. Intake/ discharge pipe size 3/4 inch NPT(F). Capacity 0 to 25 gallons per minute (0 to 95 liters per minute) water.
One (1) Low level float switch and light. One (1) Proximity Switch.

1.15 2 **Single drum containment Skid, 26" Length x 26" width by 5.75" H**

1.16 1 **pH Adjust Metering Pump (Caustic)**
Chemical metering pump, 25 GPH (94.6 LPH), maximum pressure 30 PSIG, with manual dual function controls.

1.17 1 **Super Sack Clay Feed Auger , carbon steel body, epoxy coated, variable speed control, 5.5 pounds per minute transfer rate.**
Super Sack Clay Feed Auger , carbon steel body, epoxy coated, variable speed control, 5.5 pounds per minute transfer rate.

1.18 1 **Polymer Storage and Metering Unit (Automatic)**
One (1) 260 gallon (984 liter) polypropylene tank, 39 inches (99 cm) in diameter by 53 inches (135 cm) in height.
One (1) Air-powered double-diaphragm non-metallic pump with ball type check valves. Intake/ discharge pipe size 3/4 inch NPT(F). Capacity 0 to 25 gallons per minute (0 to 95 liters per minute) water.
One (1) Automatic potable water filling assembly.
One (1) Level control assembly. One (1) Proximity Switch.
One (1) high - high float (Emergency)

1.19 1 **Tank Mixing Assembly**
One (1) Air Powered Mixer with 1.5 HP air motor. Propeller: Single 10inch aluminum propeller.
Shaft: 316 stainless steel 5/8in diameter by 60in long.
One (1) Filter Regulator Lubricator for motor lubrication.
One (1) Air Solenoid - for control from panel mounted switch.

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1.21 1 **Sludge Pump Pressure Regulating Assembly (Automatic)**
One (1) Air filter/regulator, 3/4" (1.91 cm), 5-125 PSI.
One (1) Air line transducer.
One (1) Proximity switch, for staging of filter press.
One (1) Air pressure gauge.
One (1) Set of connectors and valves.

1.22 1 **Hy-Pack® Filter Press (Semi-Automatic Closure)**
One (1) 12 cubic foot capacity (expandable to 15) 630 mm Beckart Hy-Pack® Filter Press.
One (1) Set of thirty-six (36) 630 mm square by 32 mm in depth polypropylene filter plates with installed CGR polypropylene filter cloths - 12.0 cubic feet nominal volume
One (1) 3 cubic foot rolling substitution spacer.
One (1) Semiautomatic closure assembly consisting of:
A 50 ton (48 Bar) single-acting, solid plunger, hydraulic cylinder. A Control console with the following controls and indicators: three position selector switch, hydraulic glycerin filled pressure gauge and air supply gauge, air driven hydraulic pump, air operated release valve, hydraulic pressure relief valve, and oil reservoir.
One (1) Filtrate Discharge and Air Blow Down Manifold Assembly Consisting of:
An assembly of schedule 80 PVC pipe, fittings, and ball valves to interconnect the filtrate discharge ports of the Hy-Pack® Filter Press and a manually adjustable air pressure regulator and air pressure gauge for the air blow down stage.
One (1) Set of two (2) rolling filter cake dumpsters with forklift guides, 13.25 cubic feet (380 liter) capacity, 36 inches (91 cm) in width, 48 inches (122 cm) in length. Total capacity 26.5 cubic feet (760 liter).

1.23 1 **Filtrate Tank Level Assembly**
One (1) Radar sensor with 40mm/1-1/2", PTFE encapsulated antenna good to 260 deg. farenheit, process connection ANSI thread NPT Output operation, 4-20mA, 4 line display. Housing is IP65, Nema 4X

1.24 1 **Filtrate Tank High - High Float**
One (1) Float level assembly, with one (1) float switch

1.25 1 **pH Control Assembly (Final pH Monitoring)**
Beckart pH sensor with pH trap assembly or submersible stalk assembly with Nema 4X analyzer

1.26 1 **Filtrate Holding Tank Unit (Automatic)**
One (1) 200 gallon (757 liter) capacity free standing open top, flat bottom polyethylene tank. 36 inches (91 cm) in diameter, 48 inches (122 cm) in height.
One (1) Level control assembly.

1.27 1 **Filtrate Transfer Pump**
One (1) Centrifugal pump close coupled to a NEMA standard electric motor. 3 inch (7.6 cm) enclosed impeller, all cast iron impeller and case. 2 HP, 60 Hz, 3 phase, 230/460 V, TEFC, 3500 RPM. High efficiency motor installed as a standard.
Two (2) Manually operated inlet and outlet ball valves.

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1.34 1 **Operating Manuals**
Set of two Operation and Maintenance Manuals.

1.35 5 **Commissioning & Training**
Day(s) of commissioning/start-up of equipment and operator training.

1.36 1 **Drawings**
CAD Drawings

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**Equipment Subtotal**

**OPTIONS**

2.1 1 **Installation**
Lot labor and materials for interconnecting piping and wiring installation with the following scope of work: All interconnecting piping within the Beckart Environmental wastewater treatment system and out to the Publicly Operated Treatment Works sewer line using schedule 80 P.V.C. pipe and fittings. Installation of conduit between the the Beckart supplied electrical control enclosure. (Wiring of service disconnect to incoming disconnect in electrical control enclosure is customer responsibility.) Installation of conduit and all interconnecting wiring between all supplied Beckart equipment. Conduit provided will be P.V.C.* conduit. All wiring and interconnects will be made according to the National Fire Protection Association National Electrical Code. Note: Above labor is non-union. Union labor available at extra cost. Setting, site preparation, civil work, utilities to jobsite, etc. not included in installation price. Sewer run not to exceed 20 feet. Time required for installation approximately 2 weeks, by Beckart Specially trained installers (if locally licensed people are required for installation there is an additional charge). *Note: Above electrical conduit is rigid electrical conduit.

2.2 1 **Receipt and Setting**
Receipt and Setting of Treatment Tank and Equipment

2.3 2 **Chemical Rack System**
One (1) Chemical tote stand for two totes to be double stacked. Approximate dimensions are 4.5' x 4.5' x 9' high

2.4 1 **Filter Press Curtain**
One (1) Protective curtain for power washing filter press plates in place.

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1.28 1 **Electrical Control System**
One (1) Free standing NEMA 12 rated enclosure. Enclosure dimensions 60 inches (152 cm) in height by 48 inches (121 cm) in width by 12 inches (30 cm) in depth.
One (1) Enclosure door with rotary electrical disconnect, three position selector switches, electrical power on push button with sleeve, emergency electrical power off push button with sleeve. All operator interface devices are NEMA 12 rated. All operator interface devices have engraved legends.
One (1) Assembly of protective fuses, manual motor starters and protectors, IEC rated contactors, relays, and terminal blocks as required to operate all electrical and pneumatic appliances specified in the equipment listing.
One (1) Wiring and assembly of all internal components. All field wiring connections are through interposing terminal blocks. All internal wiring and terminal blocks color coded and labeled. All electrically operated and pneumatically operated appliances are manually operable utilizing the three position selector switches mounted into the enclosure door.
One (1) Alarm horn and red strobe light.

1.29 1 **PLC Control System**
One (1) Allen-Bradley Programmable Logic Controller - Micrologix 1400 Processor.
One (1) Base with Power Supply and twelve (12) outputs, 115 Volts AC, and twelve (20) inputs, 115 Volts AC
One (1) Allen-Bradley PLC Relay input module, sixteen (16) inputs, 115 Volts AC.
One (1) Allen-Bradley PLC Analog Output module. Four (4) Analog in, Two (2) Analog out.
One (1) Ethernet Capabilities
One (1) PLC Active Line Power Filter
Two (2) Illuminated (Green) Process Start Button
Two (2) Illuminated (Red) Process Stop Button
One (1) Four position system selector switch

1.30 1 **UL Inspection for Electrical Panel**
All manual motor starters and protectors, IEC rated contactors, relays, fuse blocks, terminal blocks, and transformers are Underwriters Laboratory approved or recognized components. Rotary disconnect, selector switches, push buttons, and pilot lights are Underwriters Laboratory approved or recognized components. pH or ORP analyzers are not approved or recognized by Underwriters Laboratory. An Underwriters Laboratory approved ground fault circuit interrupter is installed to meet Underwriters Laboratory requirements for the use of a unevaluated electrical device. The completed electrical enclosure is inspected by a Underwriters Laboratory inspector for compliance to U. L. specifications for industrial control panels. The electrical enclosure contains a U. L. label signifying that the electrical enclosure has been inspected and complies to U. L. specifications for industrial control panels. Beckart Environmental is U. L. listed for fabrication of electrical control panels. U. L. File Number E-139607.

1.31 1 **One (1) Siemens HMI Color graphic touch screen 15" screen with CE rating**
One (1) Siemens HMI Color graphic touch screen 15" screen with CE rating
One (1) Simatic WINCC Smart Server allows remote operator control and monitoring via the Ethernet or Internet/Intranet

1.32 1 **Voltage Vision Monitor**
Voltage Vision Monitor

1.33 1 **Standard Test Kit**
One (1) Roll of pH paper
One (1) Plastic carrying case
One (1) Set of lab supplies for jar test procedures

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|---|---|---|---|
| 2.5 | 1 | **Existing System and Existing Building Removal**<br>Removal of Equipment:<br><br>Provide labor and equipment needed to remove existing equipment.<br>Quote to include (1) 10,000 LB Forklift and (1) 19' Scissor Lift.<br>Beckart or (Beckart Contractor) to provide dumpsters for tanks and misc metals.<br>Customer to be responsible for de-energizing of all existing electrical.<br>Customer to be responsible for the removal of liquids in existing tanks/equipment. Customer to be responsible for the disposal of metal/Earger peace of equipment. (CSI will remove from building and load on customer provided truck if desired)<br><br>Demolition of Existing Structure:<br><br>Once equipment is removed provide labor and equipment needed to demo existing structure.<br>Quote to include (1) Boom Shooting Lift and (1) Articulating Lift<br>Customer to be responsible for the removal of existing Date, Fire Suppression and Existing HVAC on top of roof. (De-energize HVAC we can lift from roof if desired however, customer to be responsible for disposal for environmental reasons)<br>Beckart or (Beckart Contractor) to remove existing retaining wall. Customer to be responsible for patch work once wall is removed.<br><br>Please Note: The above Total Project Cost is based on site walk-down. Items not listed above to be discussed and approved prior to moving forward. Quotation excludes ENG Drawings and Permits. | [redacted] |

**Terms and Conditions:**
Standard terms and conditions apply - see attached
F.O.B. Kenosha Plant
Payment Terms: 30% down, 60% prior to shipment, 10% on acceptance, not to exceed 30 days after delivery
Prices exclude all applicable taxes
Delivery 14-18 weeks unless otherwise specified