SECTION 11150

VEHICLE WASHING EQUIPMENT

PART 1 - GENERAL

1.1. SECTION INCLUDES

A. Design, supply and installation of a drive through, combination touchless and friction, transit vehicle wash system.

1.2. REALTED WORK

A. Site Work
B. Concrete
C. Electrical
D. Mechanical
E. The general provisions of the Contract, including General and Supplementary Conditions, apply to the work detailed in this specification.

1.3. QUALITY ASSURANCE

A. Experience: The system shall be produced by a manufacturer of established reputation with a minimum of five (5) years experience supplying the specified equipment in similar applications.

B. Installation: Provide a qualified manufacturer's representative to supervise the work related to equipment installation, check out and start up.

C. Training: Provide a technical representative to train Owner's maintenance personnel in the operation and maintenance of specified equipment.

1.4. SUBMITTALS

A. General

1. This bid is for a custom engineered vehicle wash system for transit bus fleet washing. The intent is to install a combination friction/touchless bus

wash system that is capable of washing all of the Owner's transit fleet vehicles. All systems and designs must be prepared and engineered following the Owner's set design and engineering parameters. The bidders must include all technical information, drawings and documentation as listed herein. Information submitted has to be per theses requirements and shall provide the Owner and/or the Owner's representative adequate information to make a complete evaluation of the proposed system and its performance.

B. Shop Drawings

1. Site specific drawings for the wash system must be prepared and submitted as requested, with a bill of materials. Include the following drawings and items:

    a) 3-D view
    b) Plan view
    c) Side view with pit side view
    d) End view
    e) Wash system plumbing schematic
    f) 3-D piping view
    g) Electrical layout
        1. Provide UL listing card or equivalent document of a Nationally Recognized Testing Laboratory from the company building the electrical panel(s) and attach with the electrical drawings indicating that the electrical panels will be built to the required standards (see section 11.10 Electric Control Panel).
    h) Concrete layout
    i) Equipment layout with bill of materials list for all supplied components
    j) Any connections to and from the bus wash system and any modifications to the existing settling pits.

2. The submitted drawings shall be corrected for details after the completion of the system installation for the as-built drawings.

C. Operations and Maintenance Manual

1. Operation and Maintenance Manual

a) Assemble and provide copies of manual in 8.5 x 11 inch format. Fold out diagrams and illustrations are acceptable. Manuals shall be reproducible by dry copy method.
b) Operation and maintenance manuals shall be submitted with the bid package.

D. Warranty

1. Submit standard manufacturer warranty documents as specified. Warranty work specified herein is for one (1) year from the date of substantial completion against defects in materials.

    a) Defects shall include, but not be limited to:
        1. Operation: Noisy, rough or substandard operation
        2. Parts: Loose, damaged and missing parts
        3. Finish: Abnormal deterioration

1.5. QUALITY ASSURANCE

A. Supplier Qualifications

1. The supplier shall have been regularly engaged in the design and supply of the type of equipment specified herein, for a period of not less than five (5) years.

2. All bidders shall submit the following with their bid package:
    a) A complete list of spinner and touchless heavy duty vehicle wash systems manufactured and installed by the bidder. The list shall include all such installations made by the bidder in the last five (5) years, including the duration of service and application. Should the reference list have more than twenty-five (25) names, a list of the last twenty-five (25) installations shall suffice.
    b) Provide the name of a contact person at each location that is familiar with the operation and maintenance of the wash system.

3. The wash system, high pressure cleaning systems, friction systems, pumping stations and all electrical controls shall be designed and supplied by one supplier.

4. All similar items shall be the products of one manufacturer.

B. Deviations

1. The equipment specified herein is based on the system specification desired by the Owner. The Owner, however, shall not give a general approval or approved equal status to a bidder, an equipment package, or a manufacturer (including any manufacturers listed within this specification). The sole basis or acceptance or rejection for the Owner shall be the information and engineering designs submitted and their compliance with this specification. Components may be substituted individually if approval is granted by the Owner, but not the system or supplier as a whole (Refer to Part 4, Section E, for modification procedures). All bidders shall be given an equal opportunity to build their system to meet the requirements of these specifications.

2. The system is based on the design of InterClean Equipment, Inc. 3939 Bestech Drive, Ypsilanti, MI 48197; 1-800-468-3725.

3. These specifications are not designed to limit the competition or limit the equipment to any specific bidder. This specification may be modified and altered from the listed system specifications as follows:

    a) The concept of making the new system a combination of friction for sides and touchless for front/rear cannot be substituted.
    b) If the specification calls for “no substitution” the item(s) are considered to be commonly available and shall be provided as specified.
    c) All specified GPM and PSI listed are minimums that must be met or exceeded.
    d) All specified materials are minimums and must be met or exceeded. Lower grade material cannot substitute for higher grade material. Material listing from the lowest grade to the highest grade is as follows:
        1. Galvanized steel (lowest acceptable for any application)

2. Aluminum
3. Stainless steel 304
4. Stainless steel 316

e) The performance, where timing is specified (such as opening and closing times), must be met or exceeded.
f) The performance, where sizing is specified (such as microns for cyclone filter, pump intake filter, etc.)
g) Any other specific performance features must be met or exceeded.
h) The number of equipment packages, modules, number of pumps, arches and all other components listed herein must be met or exceeded.
i) All wash equipment and water recycling performance functions are minimums that must be met or exceeded. All deviations from the specified equipment performance must be fully documented with drawings, engineering calculations, and clearly explained as to why the proposed system meets and exceeds the specifications. The responsibility to meet the specified performance shall be the bidder's.
j) All proposed deviations from the specifications shall be supported by contact names, phone numbers and email addresses where such equipment has been in use in similar applications. Details on the application with drawings shall be submitted with the bid package.

4. The above information must be complete in all detail and must provide the Owner the basis for the proposed system evaluation. Based on the information supplied and discussions with the contact persons named, the engineer will determine the acceptability of the proposed supplier and the equipment.

5. Regardless of the Owner's approval for any deviations and/or changes, the supplier is solely responsible or the performance of the supplied equipment per these specifications.

6. If any part of the specification calls for components that are either patented or available only for a single bidder, Owner shall approve the substitution by the bidder whose component performs similar to the patented system.

PART 2 - PRODUCTS

2.1. SCOPE OF WORK

A. To furnish a completely automatic, touchless and friction combination heavy-duty vehicle wash and water reclamation system which washes, in drive through mode, the front, roof, rear and sides of specified transit vehicles used by Owner.

B. Front and rear of vehicles shall be washed without any friction. Sides of vehicles shall be washed with friction. Washing the roof of the vehicle shall be either touchless or friction.

C. The supplier shall be responsible for supplying the necessary equipment, materials and service for the complete assembly and erection of the equipment so it is ready for operation as indicated in these specifications.

2.2. WASH SYSTEM OPERATION AND PERFORMANCE

A. Transit Bus Operation Mode

1. The bus enters the wash and receives full soap on front, sides and rear.

2. The bus enters the high pressure station. The front high pressure (minimum 200 GPM at 320 PSI) washes only the front of the bus.

3. Once the front bus corner is reached, the high pressure is diverted to the roof washing station only (minimum 80 GPM at 320 PSI).

4. Once the bus departs the high pressure station, the high pressure is diverted to wash the rear of the bus (minimum 200 GPM at 320 PSI).

5. The wheel washing is activated at all times to clean the lower detail of the vehicle (minimum 60 GPM at 300 PSI).

6. The brushes are activated only to wash the sides of the buses.

7. It is noted herein that the high pressure valves must be selected by the bidder to meet the specified opening/closing speed (no substitution).

8. After bus leaves the high pressure/brush station, it receives the final rinse.

B. The supplier is responsible for designing the equipment to satisfactorily wash up to 30 vehicles per hour.

C. The vehicle wash shall be able to remove most of the visible heavy dirt accumulation and road film from the Owner's specified vehicles when they are driven through the washer at 50 feet/minute. The evaluation of the system capability to remove road film shall be determined only after the vehicles have been completely washed and have dried.

D. The cleaning performance shall match and/or exceed those standards that are prevailing in the touchless retail car wash industry.

E. No acids containing fluorides (HF or ABF) shall be allowed.

F. The supplier is solely responsible for the equipment performance. Should the equipment not perform per these specification requirements, the supplier shall modify, add and/or alter the equipment supplied at his own expense until the performance is satisfactory. The Owner shall approve all such changes. Should the performance criteria not be met after the changes are made, the supplier shall remove the system at no cost to the Owner.

G. The vehicle wash system must be capable of washing vehicles up to 12 feet in height, including the following:

1. Vans
2. Para-transit buses
3. Transit Buses
4. School buses

2.3. WATER RECLAMATION PERFORMANCE

A. The water reclamation system shall be capable of reclaiming water from the vehicle washer and processing it by means of settling pits, in-line filters, centrifugal filter systems and a bio-remediation system. The system must be able to continuously supply and adequate amount of water for the high-pressure pump regardless of traffic volume through the washer.

B. Regardless of technical specifications, the equipment supplier explicitly assumes the responsibility to design the water reclamation system for the

intended purpose and the supplier is familiar with all performance requirements prior to bidding.

C. All water reclamation equipment located outside the wash bay area, including the reclamation tank, high pressure pump, sump pump, aeration pump, booster pump, cyclonic separators and all float switches must be mounted on a single modular skid assembly.

D. The equipment module shall be tested for all plumbing connections (pressure tested), all electrical circuitry, pump rotations and all component functions at the factory prior to shipping.

E. The odors must be kept in total control without the use of any chemicals. The guarantee that the system is built to control odors must remain valid after the final acceptance for a period of three (3) years. Algae build-up in wash water that results in objectionable odors is not acceptable by the Owner.

F. The above ground tanks or tanks must be of the self-cleaning type and shall be designed not to accumulate any dirt build-up.

G. The bio-remediation system shall be included in the total system design, and shall be designed to eliminate and/or reduce the total load of hydrocarbon within the recycled water body. The system shall include at least the following components:

1. Enzyme dispensing system
2. Accelerator dispensing system
3. Dissolved oxygen and aeration system

2.4. MECHANICAL INTERCONNECTING PIPING

A. All field plumbing and mechanical work will be done by the Mechanical Contractor or General Contractor, including:

1. Water and gas utilities up to and connecting to the equipment.

2. Interconnecting piping between various equipment components located in the equipment room.

3. Interconnecting piping between the equipment located in the equipment room and the equipment located in the wash bay.

4. Furnish and installation of:
   a) Exhaust duct for water heater
   b) Backflow preventer
   c) Underground plumbing (if required) to be laid when concrete pad is being poured.

2.5. ELECTRICAL INTERCONNECTING WIRING

A. All field electrical work will be done by the Electrical Contractor or General Contractor, including:

1. Electrical service up to and connecting to the equipment panel.

2. Interconnecting wiring between various equipment components located in the equipment room.

3. Interconnecting wiring between the equipment located in the equipment room and the equipment located in the wash bay.

4. Furnish and installation of:
   a) Underground conduits (if required) to be laid when concrete pad is being poured.

2.6. WASH SYSTEM TECHNICAL SPECIFICATIONS

A. Chemical Arch Components

1. Timing of operation and position of the chemical arch shall be determined by the manufacturer to provide optimum detergent penetration before high-pressure/brush wash cycle.

2. The selected soap pump setup shall allow the Owner to manually adjust detergent dilution ratios for the sides and the rear of the vehicle at

independent variable output ratios from 1:20 to 1:100. This dilution ratio must be able to be set using the pump's output indicator.

3. The system shall have at least a 1 HP water booster pump to ensure even water pressure.

4. The chemical arch must be made of 1.25 inch stainless steel pipe, compatible with selected detergents, and equipped with an adequate number of nozzles to evenly apply hot water/detergent solution to front, rear, sides and roof of the vehicle proceeding through the arch. The design of the detergent arch shall allow immediate activation of the nozzles upon arch activation by the vehicle. All arch piping and structures must be stainless steel – no substitution allowed. Piping from the equipment room to the soap arch may be made of PVC or stainless steel.

5. The detergent arch shall have an Intensified Rear Detergent Feature. The application of detergent to the rear of the vehicle shall be done via a separate, stainless steel rear wash arch with its own soap pump. This arch will be activated immediately after the vehicle has passed through the detergent arch. The detergent concentration for the rear wash arch shall be individually adjustable. The Intensified Rear Detergent arch shall be controlled and operated by its own vehicle sensing device, solenoid valves and chemical pumps.

6. All system functions are to be activated by photo eyes.

7. The chemical spray components located in the equipment room must be assembled in a modular, wall-mounted assembly containing the following components:

    a) Solenoid valves (two required)
    b) Pressure gauge
    c) Pressure regulator
    d) In-line screen
    e) Isolator ball valves for all components
    f) Isolator ball valves to bypass water softener

8. A water softener for the detergent arch is required to be included by the supplier if the domestic water exceeds 3 grains of hardness. Should the water softener not be needed, the supplier shall provide to the Owner testing results proving the water hardness is acceptable (3 grains or lower).

9. The detergent arch shall be supplied hot water through a hot water heater. The heater shall be a minimum of 199,000 BTU.

B. The 4-Brush, Side Brush System

1. The system shall be equipped with a counter rotating, 4-brush stationary brush wash system.

2. The system support structure must be a minimum 10” x 10” x ¼” fabricated structure. This structure shall be stainless steel, hot dip galvanized or aluminum.

3. The four stationary brushes must be a combination of soft foam type (also known by the trade names Poly-Lite, Neo-Tex or Car-Lite) material and conventional polyethylene, polypropylene, nylon, or soft cloth material.

4. The roof mop shall be supported by the same structure as the brushes. The roof mop shall be designed so as to not interfere with any mirrors or other protrusions from the buses.

C. High Pressure Arch Assemblies

1. The front and rear wash shall each have a minimum flow rate of 200 GPM at 300PSI.

2. It is solely the supplier’s responsibility to design and build the high pressure arches to meet the specified operational characteristics. The supplier also has the responsibility to design the system to be safe for all buses and still be able to adequately clean the front, sides and rear of specified vehicles.

3. All water used by the high pressure arches shall be recycled water.

4. All bidders are notified and shall be aware of the fact that the sides of most transit buses are not well suited to be washed by high pressure due to the issues related to the leakage of water inside the buses (high pressure water penetrates inside of the bus). It is the supplier's responsibility to design the system, taking this point into consideration, to eliminate water penetration in to the bus interiors.

5. The supplier shall select the best-suited high pressure washing apparatus for front and rear washing.

D. Wheel Wash System

1. The system shall have a high pressure wheel wash on each side.

2. The wheel wash for the buses shall be a minimum of 30 GPM at 300 PSI.

3. The supplier shall take in to consideration that the oil cooler fins on most transit buses often get damaged by high pressure sprays. Therefore the wheel wash system must be designed to avoid damage to the bus while still performing adequate wheel cleaning.

E. High Pressure Valves

1. Switching between the front wash, side wash and rear wash high pressure functions must be instantaneous. <u>The minimum valve performance functions must be met, no substitutions</u>.

2. The high pressure switching from front to roof to rear must be based on a vehicle travelling through the washer at one (1) mile per hour.

3. The high pressure wash shall use a series of co-axial 2-way valves with the following features (no other type of valve shall be accepted as a substitution):

    a) The valve shall utilize a control tube that move linearly along the same axis as the fluid flow.
    b) The valve shall be pressure balanced so that operation is unaffected by inlet pressure or pressure fluctuations.

c) Designed cycle life for the intended application shall be a minimum of 500,000 cycles.
d) Adjustable switching time shall be 150 – 2,000 milliseconds.
e) The valves must have wear compensating seats.

F. Pumping Module

1. Pump: The high pressure pump shall be of the centrifugal diffuser type as manufactured by ITT/Goulds Pump and shall be capable of producing pressures up to 320 PSI. The pump shall deliver up to 240 GPM as determined by the nozzle sizes.

2. Casing: The suction casing shall be 3.0 inch 250 lb. ANSI flat faced flanged. It shall be oriented to right angles of the vertical center line when viewed from the drive end. The discharge is 2.0 inch 600 lb. ANSI raised face flange oriented on the vertical center line. The suction casing, discharge casing, stage casings and diffusers are made of ductile iron, free from blow holes, sand pockets, or other detrimental defects. Flow passages are smooth to permit maximum efficiency. Pump shall be equipped with external tie bolts to hold the radially split casing sealed by 'O' rings. The casing shall be capable of withstanding the hydrostatic test pressure of 150% of the maximum pumping pressure under which the pump could operate at the designed speed.

3. Impellers: The impellers are of the enclosed single suction type, hydraulically balanced to minimize axial thrust loads. Each impeller is individually keyed to the shaft. Impeller is to be made of bronze.

4. Stuffing Box: Packed type stuffing boxes shall be equipped with a mechanical seal.

5. Shaft Sleeves: The shaft sleeve through the stuffing box is 11-13% chrome stainless steel hardened to a minimum of 225 Brinnel and is keyed to shaft.

6. Shaft: The shaft is standard carbon steel adequately sized for loads transmitted.

7. Bearing: The bearings are designed for an average life of 50,000 hours. The outboard bearing is a deep groove type; the inboard bearings are of the radial roller type with grease fittings.

8. Base: A steel base plate contains the mounting of the pump and motor, which are carefully aligned and bolted in place prior to shipment. Final alignment will be checked and certified after installation and prior to operation by the user.

9. Coupling: The pumping module shall have a “Jaw” type coupling as manufactured by Lovejoy or equal and includes a coupling guard.

G. Electric Motor

1. The electric motor shall be of the squirrel cage induction type suitable for across the line starting.

2. The motor shall operate on 460 Volt, 3 Phase, 60 Cycle and be ODP with a 1.15 service factor.

3. The motor shall be sized to not exceed the name plate horse power during operation. The motor should be a minimum of 75 HP.

4. The 75 HP motor shall have a reduced voltage starter that monitors shaft horsepower, detects and records low and high voltages and pump cavitations.

H. Final Rinse Arch

1. The final rinse arch shall use fresh water.

2. Timing of operation and position of the rinse arch shall be determined by the manufacturer to provide optimum rinse penetration after the wash cycle.

3. The final rinse arches shall be made of 1.25 inch stainless steel (no substitution) pipe and equipped with 25 pieces of dual, adjustable Spraying Systems Swivel Nozzle Bodies QJ-8600 with Spraying Systems

Diaphragm Check Valve Model 8360 to evenly apply fresh water to rinse the front, sides, rear and roof of the vehicle proceeding through the arch.

I. Electric Control Panel and Components

1. The panel and controls must be built according to these specifications. No substitutions shall be allowed. No PLC based control panel shall be accepted as substitution. Any auxiliary panel reporting to the master control panel may be based on PLC.

2. The industrial PC component shall be used as the HMI and process controller for the proposed components and vehicle wash system. The application software shall provide near real-time control of the entire wash system. The PC is connected to a distributed I/O using an Ethernet network.

3. The PC will be panel mounted onto a 4’ x 5’ x 1’ electrical enclosure, which also will house the electrical controls for the wash system. The PC may be mounted in its own enclosure in an office environment. The PC will provide the centralized infrastructure to enable simple and complete integration with other systems, including modems, point-of-sale LANs, video, wireless internet, smart card readers, and other systems. The PC shall be compatible with Linux and Windows operating systems.

4. The application software shall be developed and provided by the supplier. This software shall include the specified bus wash components and be capable of future expansions. The application software shall be written either for Linux or Windows based systems.

5. The wash software will provide the following:

    a) GUI shall be intuitive to use by people without computer experience. Little or no training should be required.
    b) At program start up, all devices will be initialized to a known state.
    c) All system settings, such as baud rates, parity, communications, port configurations, etc., shall be reconfigurable without necessitating the recompilation of the application software.
    d) All user configurable settings shall be stored to disk using *.ini files, the windows registry, or a database to remember settings between

reboots. These include all timing set points, alarm settings, and communication settings.

e) Data being logged to disk shall be buffered and only physically written to disk periodically to prolong the life of flash/hard drive.

f) All user actions shall be logged to disk with a time and date stamp. User actions include: timing changes, placing the system into auto/manual, changing options, or powering the system up/down.

g) Periodic polling of I/O may be initiated by either hardware or software interrupts. All real-time processes, such as those required for closed loop control, shall be hardware interrupt driven.

h) A hardware watchdog circuit shall be used in case the PC locks up. The minimum timeout shall be 10 seconds. This circuit will be in series with the E-stop circuitry.

i) Error handling must be provided for each and every line of code. It is not necessary to alert the user of all errors, but all handled errors shall be logged to disk.

j) Alarms should have user configurable delays to prevent nuisance tripping.

k) Scanning intervals for all closed loop processes should be executed <500 ms.

l) Terminal windows shall be provided for spying on any devices communicating to the PC via Ethernet, RS232, etc. These will be used for troubleshooting communications problems.

m) Failure of any single component shall result in disabling the entire wash. For example, the system will not be allowed to wash vehicles in a crippled state if a chemical pump motor overload trips.

6. The industrial control panel shall be manufactured and evaluated in accordance with the Underwriters Laboratories, Inc. (UL) standard 508A (Industrial Control Panels). In addition, the panel shall be evaluated for high capacity short circuit withstand and shall bear the appropriate UL marks including the short circuit withstand value mark as part of the official UL label.

7. Electric panels that are not UL approved are not acceptable.

8. The industrial control panel shall be designed for operation on a 460 Volt, 3 Phase, 60 Hertz system, with a short circuit capacity of 25,000 amperes RMS Symm. Available at the incoming line terminals of the control panel.

9. The industrial control panel shall be designed to meet the requirements of the National Electric Code (NEC) Articles 430 and 670, and the National Fire Protections Association (NFPA) Standard 79 (Industrial Machinery).

10. All push buttons, selector switches, pilot devices, system control and access functions must be by Touch Screen Operator Interface Terminal.

J. Tire Guides

1. Tire guides shall be fabricated from 4 inch diameter, schedule 40 hot dip galvanized pipe.

2. The tire guides shall run the full length of the wash system starting at the earliest point and ending no more than 6 inches from the exit door frames.

3. The system shall have an angled entry. The ends of the rails are capped and all headings are smoothly finished to prevent tire damage. Brackets supporting the pipe shall be made of a minimum 3/8" steel plate that is welded to concrete imbedded cleats or anchor bolted to the concrete.

4. The system shall have stainless steel skid plates to allow misaligned buses to slide sideways for proper positioning.

5. The bidder must provide calculations and stress analysis of the tire guides with the bid package proving that they will be able to carry the heaviest possible single axle load of the Owner's fleet.

2.7. WATER RECLAMATION AND TREATMENT SYSTEM

A. Sump Pump

1. Sump pump shall be a self-priming type for transferring water from sump pit to the above ground recycled water tank through the filtration system. The minimum capacity shall be 300 GPM of cleaned water.

2. The capacity of the sump pump shall allow for the pressure losses from two cyclone separators used in series. The GPM after the pressure losses shall be greater than or equal to the high pressure wash water usage.

3. The sump pump shall be designed to handle solids that will be found in the reclaimed wash water.

B. Cyclone Separators

1. A minimum of two (2) cyclone separator systems are to be used in series with at least one of them being in-line. The cleaned water from the first cyclone shall pass through the second cyclone separator to ensure maximum solid removal performance.

2. The cyclone centrifugal separators shall provide second and third stage filtration.

C. Cyclone Solid Removal

1. Downflows (purge water containing solds) from the cyclone separators shall be pumped back to the exit end of the trench pit with a solid handling pump. The solid removal pump shall be activated when the cyclone separators need to be purged.

2. Solid removal from cyclone separators by gravity alone shall not be acceptable.

D. Aeration System

1. The aeration system shall supply air to the trench pit to prevent algae and odor build-up. The system shall be designed to have no odors from algae.

2. Aerated water shall be evenly distributed throughout the pit, even when the wash is not in operation.

3. No odor masking deodorants or other chemicals used to kill odors shall be allowed.

E. Stainless Steel Pump Intake Filter

1. A stainless steel intake filter screen shall provide first stage filtrations for sump pump intake. The pump intake filter shall be InterScreen or engineer approved equal.

2. The stainless steel intake filter screen shall be sized 0.015" or smaller.

3. The intake filter shall be made of stainless steel and shall have slotted orifices. Wire mesh filters are not acceptable. Intake filters shall prevent any dirt from clogging the recycled water spray nozzles under all circumstances.

4. The intake filter screen shall be equipped with a high pressure backwash system that is automatically activated to remove potential contaminants from the filter surface.

F. Reclamation Tank

1. The reclamation tank shall be made of linear low-density polyethylene with a minimum holding capacity to allow recycling of a minimum of 300 GPM continuous operational flow.

2. The tank shall have a conical bottom with a minimum 35-degree slope equipped with a 6 inch bottom manhole, float switch connection and other required fittings. The tank shall be equipped with a steel support structure with ½ inch thick polyethylene continuous support for the cone part of the tank.

G. Enzyme-Catalyzed Water Treatment System

1. A biological water treatment shall be included in the total system design. The enzyme-catalyzed water treatment system shall be designed to eliminate and/or reduce the total petroleum hydrocarbon loading within the recycled water body. When used in conjunction with the specified recycling equipment, the systems shall remove both organic contaminants and inorganic particulate from the reclaimed water stream.

2. The enzyme-catalyzed water treatment system shall be equipped with an automatic product injection system for the delivery of specialized biological products. These biological products shall be specifically suited for wash

water treatment applications, including degradation of petroleum hydrocarbon components commonly found in vehicle wash systems. This system will treat the reclaim wash water generated during the vehicle wash process. The bulk of the treatment process shall take place in the wash water pit, where continuous biological treatment of organic wastes in the vehicle wash water shall occur.

3. The enzyme-catalyzed treatment system shall deliver a constant supply of biological products, bio-enhancements, and oxygen to support the degradation of organic constituents. The biological products and enhancements shall be injected directly into the circulation/aeration discharge pipeline of the recycling system, where they will then subsequently be discharged into the wash water pit. Oxygen shall be provided by the aeration pumping and mixing system.

4. The automatic product injection system shall consist of a low-flow injector pump that injects biological products on a continuous basis. The injector pumps shall have:

    a) Operating temperature of 35° to 110° F
    b) Product flow rate of 0.5 to 1.5 liters per day, adjustable
    c) Product delivery by 3/8 inch diameter polyethylene tubing up to 10 feet in length
    d) Two3/8 inch NPT polyethylene check valves
    e) Two 3/8 inch compression fittings

PART 3 - EXECUTION

3.1. INSTALLATION, START-UP, TRAINING & SERVICE

A. Equipment shall be installed in accordance with manufacturer's supplied installation drawings.

B. Equipment supplier shall undertake the commissioning of the system and make all required adjustments to ensure proper operation.

C. The equipment manufacturer shall start up the system. The Owner shall have all operating personnel present during the start up and equipment training.

D. The supplier shall arrange for an adequate amount of detergent to be available for the performance testing.

E. The Owner's personnel shall be trained for a minimum of five (5) hours in the system's operation and maintenance.

F. The supplier shall provide the Owner with the names and addresses of all local service and maintenance personnel to assist in future service.