

GRS Series Ground Water Remediation Treatment System Engineering Specification GRS-2 through GRS-16

Section 1.0 Equipment Design & Construction

Remediation Use

The GRS systems can be used as a single pass and discharge system or as a recycle system depending on the project needs. The GRSs are designed to remove oils, fuels, suspended solids and other contaminants as detailed in this specification. Where rigorous removal of dissolved minerals and metals are required additional treatment may be needed.

When used in combination with other equipment dictated by the project requirements the GRS can provide pre-treatment for more rigorous treatment systems. Additional equipment may consist of air stripping, carbon filtration, metals removal, additional filtration and VOC oxidation and other types of equipment to meet the needs of your particular application.

Implementation

PAE recommends use of a system mount pad, groundwater pumping/collection system prior to the GRS system to include a pre-separation tank to reduce heavy solids loads and large particulates prior to the GRS system. This design will reduce the solids load to the GRS leading to less maintenance and less possibility of overloading the oil and solids removal systems within the GRS system.

Performance

The Pan America Environmental GRS Series groundwater treatment systems are designed to produce an effluent concentration of 10 mg/l or less of oil droplets 30 micron and larger of non-emulsified, free and dispersed oils at the influent. By virtue of our Flopak coalescing media and tank design readily settleable solids are also removed. All filterable solids are removed down to 20 micron particle sizing (nominal). Removal of free and trace hydrocarbons, dispersed oils, sheens, slightly soluble chlorinated hydrocarbons and high molecular weight organics is also provided when the AQAM filter model is chosen.

1.01 System Components

The GRS system shall consist of the following components:

OS Series Oil/Water Separator, Retpak Secondary Coalescer, Effluent Transfer Pump & Nema 4 Control Panel
Effluent Solids Filter, AQAM Polishing Filter, Flow Meter, Carbon Steel Skid. The GRS-A systems incorporate the AQAM filter.

1.02 Oil/Water Separator Design

The OS series oil/water separator will be designed and fabricated per the following specifications. Rectangular tankage with features and components as described designed per API #421 Design & Operation of Oil/Water Separators Manual, February 1990 and Stokes law. The design will incorporate flexible flow rating capability based on application parameters.

1.03 Influent Chamber

Influent flow enters the clog proof influent diffuser pipe and is immediately spreadout across the depth and width of the chamber. Any readily settleable solids drop to the bottom of the V-shaped solids hopper located directly under the coalescing media pack.

1.04 Oil/Water Separation Chamber

The separation chamber is to be packed with Flopak cross-fluted coalescing media. The media pack will be designed to create a quiescent zone, a laminar flow pattern to facilitate the impingement of oil on the media, and will provide numerous impact sites and changes of flow direction. The media shall have a 60 degree cross-flute angle.

1.05 Cylindrical Oil Skimmer

The separator shall be provided with an adjustable cylindrical oil skimmer that allows the skim head to be readily removed or adjusted without tools. The skim head rotation collar will be provided with Buna-N seal. The oil skimmer is to be located at the effluent end of the separation chamber. The skimmer shall not require lubrication for operation.

1.06 Solids Hopper

The separator shall have a V-shaped solids hopper located under the coalescing media. This chamber will provide temporary solids storage. The hopper walls are to be pitched at 45 degrees to assure simple and thorough solids removal. Dual outlet ports will be provided for sludge removal.

1.07 Clean Water Effluent Chamber

The cleansed water will flow under the oil baffle, over the water weir and into the effluent chamber. The effluent transfer pump will draw flow from a suction fitting in this chamber.

1.08 Separator Cover

The separator is to have a single piece cover that provides complete closure of the tank. The separator cover will be mounted to the tank via quick release hardware and vapor sealed with an industrial grade closed cell, compressible PVC gasket.

1.09 Tank Vent

The oil outlet can be used as tank vent by plumbing in a PVC tee. If separate vent fitting is required PAE can provide an individual coupling located wherever desired.

1.10 Fittings

All wetted fittings must be fiberglass constructed, integrally bonded via fiberglass bond to the tank for permanent, leak proof fitting seal. Tank penetrating, gasketed bulkhead fittings or couplings are not to be used.

Section 2.0 Materials of Construction

2.01 Fiberglass Construction

Tank shell, baffles and cover shall be molded of premium grade DION 6694/95 corrosion proof resin with a minimum of 25% chopped fiberglass fiber to resin mix. An ultraviolet stabilized white gel coat shall be used to coat external surfaces 16-20 mils dft.

2.02 Piping

Internal piping to be schedule 40 PVC / external piping shall be type 1, grade 1 PVC, schedule 80.

2.03 Coalescing Media

Cross-fluted, oleophilic, PVC Flopak coalescing media shall be provided as manufactured by Pan America Environmental.

2.04 Cover Gasketing

Closed cell, industrial grade PVC constructed vapor sealed cover gasketing shall be provided. No neoprene shall be permitted.

Section 3.0 System Components

3.01 Retpak Secondary Coalescing Media

A Retpak, reticulated, polyurethane secondary coalescing media shall be included to provide increased coalescing surface area in the oil/water separator to remove smaller oil and fuel droplets.

3.02 Effluent Pump and Control Panel

The treated wastestream is pumped out of the oil/water separator via an automatic/manual pumpout system. The pump will be a centrifugal design with TEFC motor. The pump is to be controlled via a Nema 4 control panel with HOA operation. When in the automatic mode the pump on/off function is to be controlled by a dual, level switch assembly located in the oil/water separator effluent chamber. A flowmeter will be provided to accurately indicate system flow rate. The entire pumpout system will be mounted, plumbed and wired to the GRS system skid and plumbed via ASTM, D-1784, schedule 80 PVC. Power disconnect optional. Power required: 115V/1ph/60Hz. Higher voltages can be provided where required.

3.03 Effluent Solids Filter

A filter housing assembly shall be provided mounted to the pump discharge piping to facilitate removal of all the filterable solids down to the 20 micron (nominal) size level. Filter housing, housing cap, internal bag basket and replaceable filter bags are to be of polypropylene construction. Cap housing seal is Buna-N. A pressure gauge is provided to indicate bag changeout pressures.

3.04 AQAM Polishing Filter (provided with the GRS-A system)

The AQAM polishing filter is designed for the selective adsorption of free, dispersed oils, sheens, slightly soluble chlorinated hydrocarbons and high molecular weight organics. The AQAM media is an Alkyl Quaternary Ammonium Montmorillonite (AQAM) material distributed in a support bed of anthracite coal. The filter housing may be polyethylene or fiberglass construction that allows removal and refill of exhausted media. The type of vessel provided is determined by PAE according to flow rate and application requirements. The vessel is provided with internal distributors that distribute and collect the flow evenly throughout the media bed to avoid channeling and incomplete exposure of the AQAM media to the waste flow.

3.04.1 AQAM Standard Filter Cell Construction

The AQAM filter cell construction shall be of continuous, filament wound fiberglass design, NSF,UL approved WQA standard S-100. The cell base will be of compression molded fiberglass. Filter cell is designed for operating pressures up to 100 psi.

3.04.2 Filter Cell Piping

Filter cell external piping shall be schedule 80, ASTM, D1785 PVC. Internal distributor and pickup pipe shall be schedule 80, ASTM, D1785 PVC.

3.04.3 Mounting Hardware

The AQAM filter will be mounted to the system skid via 304 stainless steel brackets and attaching hardware.

3.04.4 AQAM Performance

The AQAM media functions by absorbing contaminant(s). The media will remove as much as 50% of its own weight in contaminant. Due to its modified nature AQAM media is hydrophobic and organophilic (oil attracting). These characteristics allow it to remove contaminant while minimizing water absorption. Oil removal of 5 mg/L or less can be attained.

3.05 System Skid

The system will be provided mounted, plumbed and wired to a forkliftable skid constructed of A-36 carbon steel. The external surfaces shall be prepared to an SSPC-SP6 finish followed by a prime coat and industrial grade epoxy coating (6 dft min.) (standard color is Rain Forest Green).

3.06 Manufacturer

The manufacturer of preference shall be: Pan America Environmental
950 Rand Rd. Unit 120 Wauconda, IL 60084

3.07 Warranty

Pan America Environmental warrants its products to be free of defect in materials and workmanship for a period of one year from the date of shipment.

Section 4.0 System Operational Details

4.01 Maintenance and Operation

The GRS systems contain two consumable products. 1. Filter bags (solids filtration) 2. AQAM filter media. The life expectancy of each is determined by influent loadings put into them. PAE can estimate the life expectancy of the AQAM media by computer calculation. To do this we will need: flow rate, hours per day system is used, days per week system is used and contaminants in wastestream. The system requires 115V/1pH/60Hz, 15 amp electrical to operate the control panel and effluent pump system. Usually one or two standard control switches on the control panel are all that is required to operate (exclusive of any system customization).

To maintain the system you must:

1. Remove oils from external storage drum/tank,
2. Remove solids from oil/water separator hopper and solids filter
3. Clean out Flopak & Retpak media (if needed)
4. Check overall system for proper operation.

4.02 System Electrical Requirements

Electrical supply: 115V/1ph/60Hz
Amp load: 15-35A
