



The GRS Series treatment systems are designed to treat wastewater generated by groundwater remediation facilities where water needs treatment prior to disposal.

The GRS systems are designed for treatment of water generated by pump & treat groundwater remediation facilities. System configuration can be customized depending on the project needs. The GRS systems are designed to remove petroleum based oils, fuels, organics, suspended solids and other contaminants. Where removal of high loadings of suspended solids, dissolved minerals and metals are required additional treatment or design may be needed.

Any of our treatment products can be combined to design the needed configuration for any flow rate and contaminant type(s).

Options can be provided to complete the system design, such as, GAC filtration, bag or sand filtration, chemical treatment, pH adjustment, metals precipitation/filtration and any of the technologies in our product lineup.

Customization & modifications to fit your project needs are offered. Typical performance is 10 ppm and 5 ppm or less, 30 micron oil droplet.

Features:

- ◆ OS oil water separator
- ◆ Effluent pumpout
- ◆ Effluent solids filter
- ◆ AQAM organoclay filter
- ◆ Flow meter
- ◆ Sealed/gasketed cover
- ◆ Coated steel system skid
- ◆ Nema 4 pump controls
- ◆ Schedule 80 PVC piping
- ◆ High performance
- ◆ Compact, simple design

Typical applications:

- ◆ Groundwater remediation sites
- ◆ Forklift wash pads
- ◆ DAF/Clarifier pre/posttreatment
- ◆ Power plant water treatment
- ◆ Refinery process water
- ◆ Aircraft wash racks
- ◆ Military wash racks
- ◆ Tank farm leakage treatment
- ◆ Vehicle washwater treatment
- ◆ R.O. Filter pre-treatment
- ◆ Oil spill recovery
- ◆ Trench water treatment
- ◆ Bilge water treatment
- ◆ Hydraulic fluid tank de-watering

Model
GRS

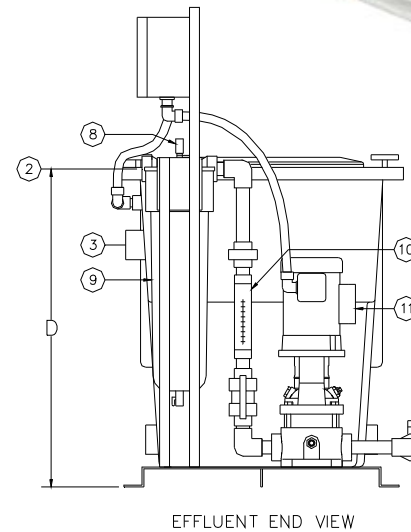
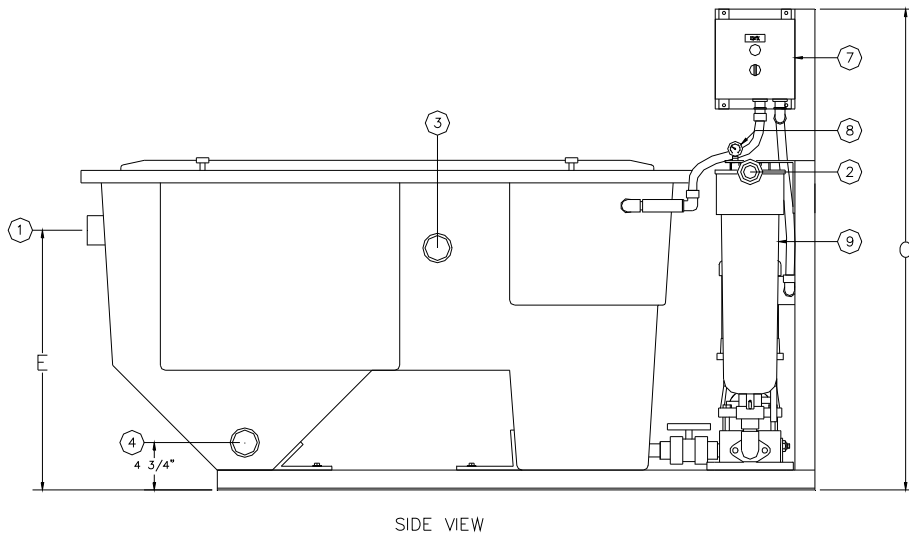
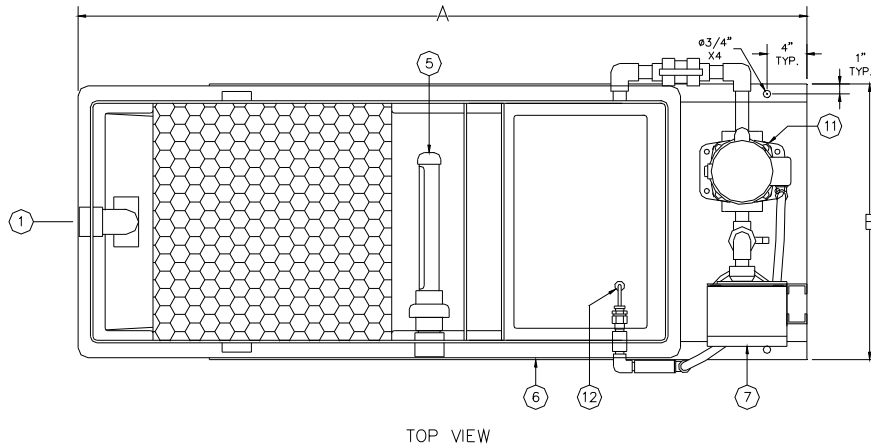
GRS

Groundwater Remediation Systems
1 - 50 GPM



Model
GRS

GRS
Groundwater
Remediation Systems

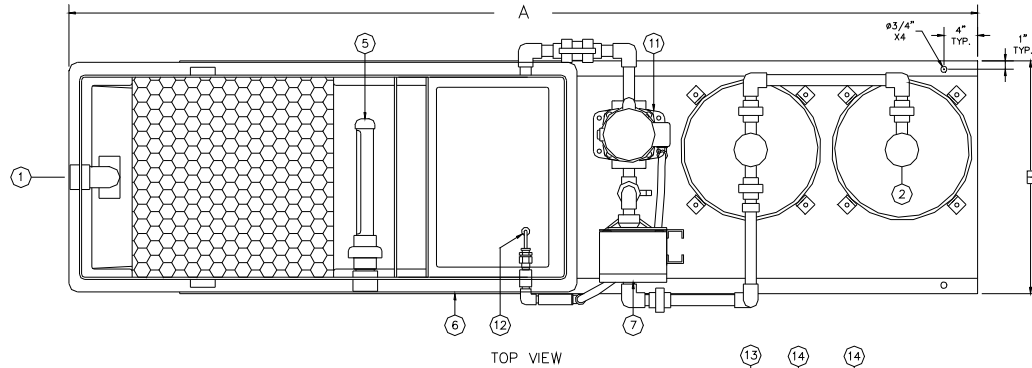


Models	Dimensions					Fitting Sizes			Weights (lbs)		Flow	
	A	B	C	D	E	Inlet	Outlet	Oil	Sludge Empty	Oper.	Sludge	GPM
GRS2	6'-1"	2'-4"	4'-0"	2'-8"	2'-2"	2"	1 1/2"	2"	2"	310	703	7 gal. 0-5
GRS4	6'-1"	2'-4"	4'-0"	2'-8"	2'-2"	2"	1 1/2"	2"	2"	335	1200	16 0-10
GRS8	6'-10"	2'-4"	4'-0"	2'-8"	3'-2"	2"	1 1/2"	2"	2"	405	2045	16 0-20

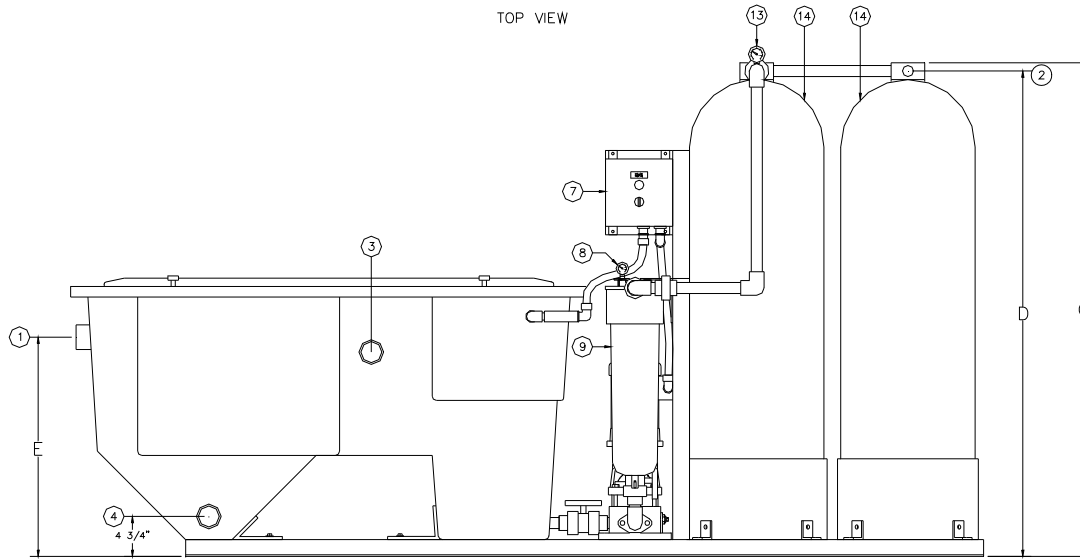
Item	QTY	Description	Item	QTY	Description	Item	QTY	Description	Item	QTY	Description	Item	QTY	Description
1	1	Inlet	4	2	Sludge Outlet	7	1	Control Panel	10	1	Flowmeter	13	1	Skid
2	1	Outlet	5	1	Oil Skimmer	8	1	Pressure Gauge	11	1	Effluent Pump	14		
3	1	Oil Outlet	6	1	Separator	9	1	Bag Filter	12	1	Level Switch	15		

Not for construction: Design and Dimensions subject to change without notice

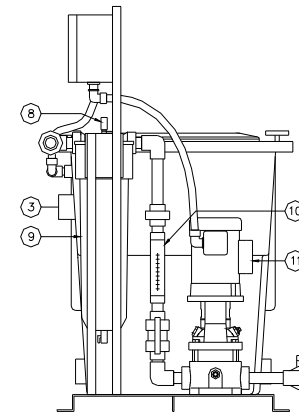




TOP VIEW



SIDE VIEW



EFFLUENT END VIEW
AQAM FILTERS REMOVED
FOR CLARITY

Model
GRS

GRS
Groundwater Remediation
Systems



Models	Dimensions					Fitting Sizes				Weights (lbs)		Flow	
	A	B	C	D	E	Inlet	Outlet	Oil	Sludge Empty	Oper.	Sludge	GPM	
GRS2A	9'-0"	2'-4"	4'-0"	3'-1"	2'-2"	2"	1"	2"	2"	622	805	7	0-5
GRS4A	9'-0"	2'-4"	4'-10"	4'-9"	2'-2"	2"	1"	2"	2"	812	2000	16	0-10
GRS8A	9'-6"	3'-0"	6'-10"	6"	3'-2"	2"	1-1/4"	2"	2"	1750	4020	16	0-20

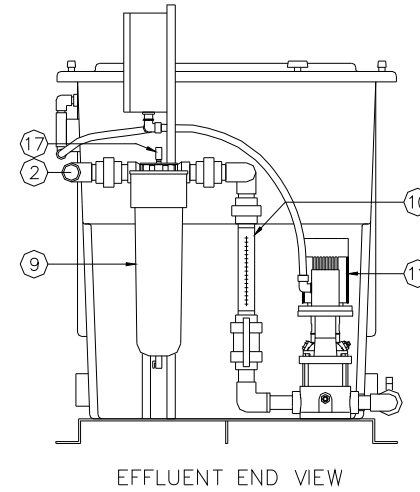
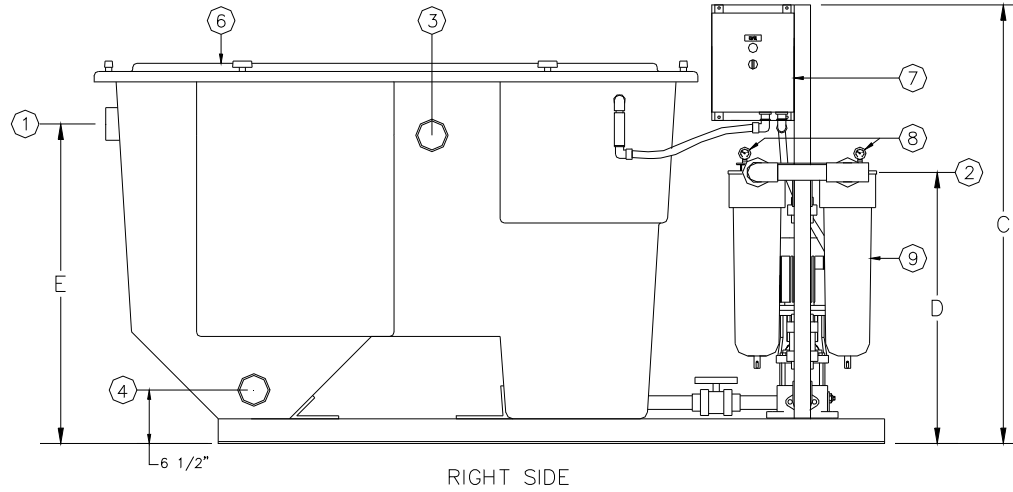
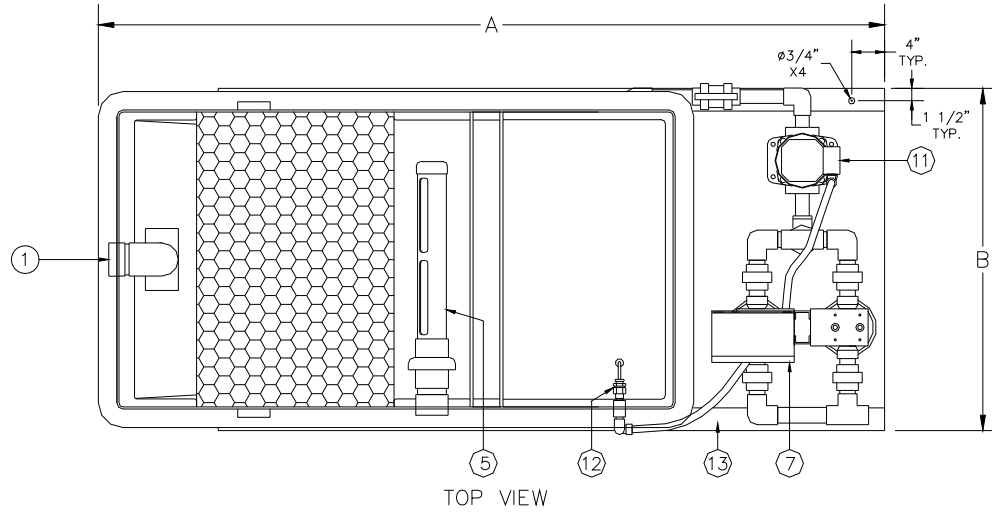
Item	QTY	Description	Item	QTY	Description	Item	QTY	Description	Item	QTY	Description	Item	QTY	Description
1	1	Inlet	4	2	Sludge Outlet	7	1	Control Panel	10	1	Flowmeter	13	1	Pressure Gauge
2	1	Outlet	5	1	Oil Skimmer	8	1	Pressure Gauge	11	1	Effluent Pump	14	1-2	AQAM Filter
3	1	Oil Outlet	6	1	Separator	9	1	Bag Filter	12	1	Level Switch	15		

The GRS8A is provided with a single AQAM filter vessel.
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**Model
GRS**

GRS
Groundwater
Remediation Systems



Models	Dimensions					Fitting Sizes			Weights (lbs)			Flow	
	A	B	C	D	E	Inlet	Outlet	Oil	Sludge Empty	Oper.	Sludge	GPM	
GRS12	8'-0"	3'-5"	4'-5"	2'-9"	3'-3"	3"	1-1/2"	3"	3"	751	3216	25	0-35
GRS16	8'-0"	4'-5"	4'-5"	2'-9"	3'-3"	3"	1-1/2"	3"	3"	900	5200	37	0-50

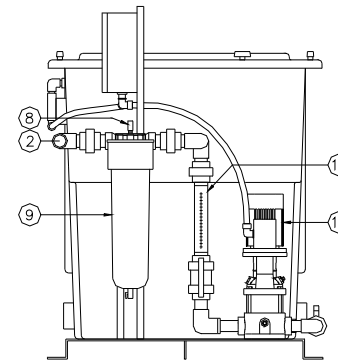
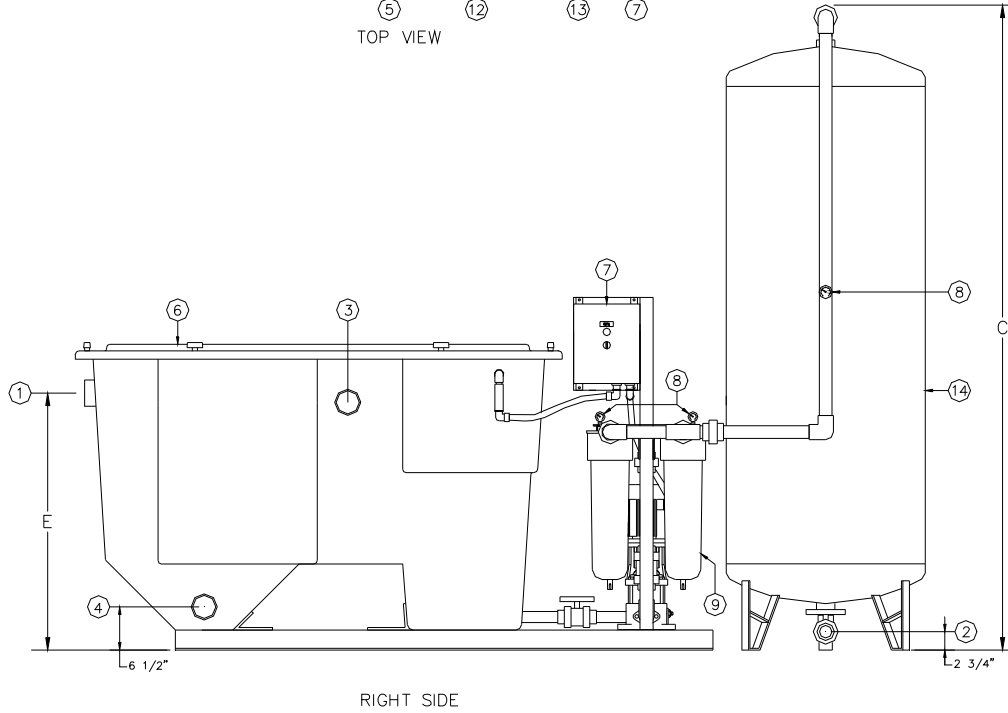
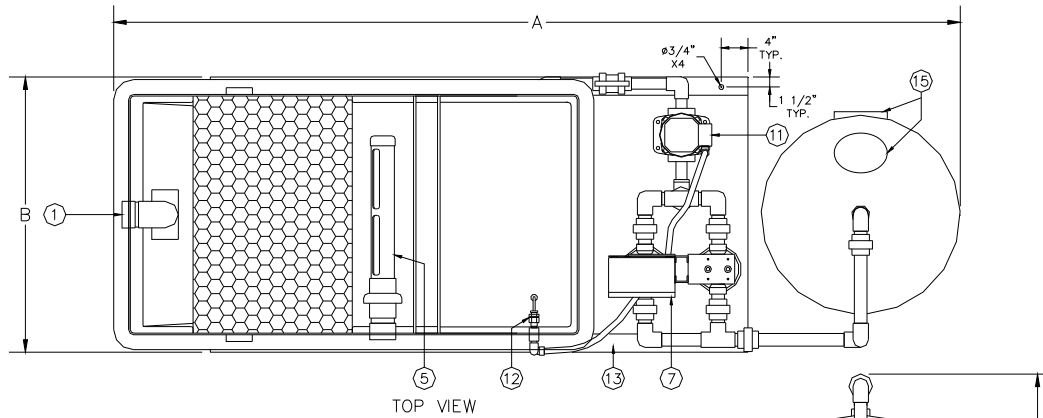
Item	QTY	Description	Item	QTY	Description	Item	QTY	Description	Item	QTY	Description	Item	QTY	Description
1	1	Inlet	4	2	Sludge Outlet	7	1	Control Panel	10	1	Flowmeter	13	1	Skid
2	1	Outlet	5	1	Oil Skimmer	8	1	Pressure Gauge	11	1	Effluent Pump	14		
3	1	Oil Outlet	6	1	Separator	9	1	Bag Filter	12	1	Level Switch	15		

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Model
GRS

GRS
Groundwater
Remediation Systems



EFFLUENT END VIEW
AQAM FILTER REMOVED
FOR CLARITY

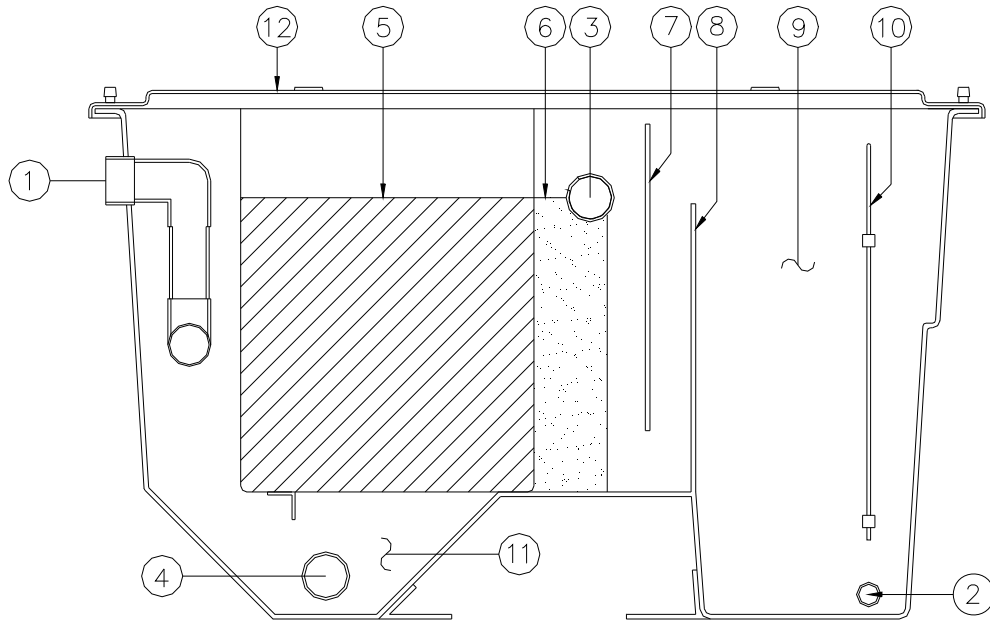
Models	Dimensions					Fitting Sizes				Weights (lbs)		Flow	
	A	B	C	D	E	Inlet	Outlet	Oil	Sludge	Empty	Oper.	Sludge	GPM
GRS12A	11'-2"	3'-5"	7'-4"	3"	2'-2"	3"	1-1/2"	3"	3"	2506	5630	25	0-35
GRS16A	11'-2"	4'-5"	8'-4"	3"	2'-2"	3"	2"	3"	3"	3200	7500	37	0-50

Item	QTY	Description	Item	QTY	Description	Item	QTY	Description	Item	QTY	Description	Item	QTY	Description
1	1	Inlet	4	2	Sludge Outlet	7	1	Control Panel	10	1	Flowmeter	13	1	Pressure Gauge
2	1	Outlet	5	1	Oil Skimmer	8	1	Pressure Gauge	11	1	Effluent Pump	14	1-2	AQAM Filter
3	1	Oil Outlet	6	1	Separator	9	1	Bag Filter	12	1	Level Switch	15	2	AQAM Access

Not for construction: Design and Dimensions subject to change without notice



Oil Water Separator Configuration



SEPARATOR SECTION VIEW

Item	QTY	Description	Item	QTY	Description	Item	QTY	Description	Item	QTY	Description
1	1	Inlet	4	2	Sludge Out let	7	1	Oil Baffle	10	1	Level Switch
2	1	Outlet	5	1	Flopak Media	8	1	Water Weir	11	1	V-hopper
3	1	Oil Outlet	6	1	Retpak Media	9	1	Effluent Tank	12	1	Cover

GRS System Specification

Models: GRS2 – GRS16

The GRS systems are used as a single pass and discharge treatment system. 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.

PAE recommends the addition of our GAC carbon filter for removal of dissolved VOCs, light pesticide loads, solvents and other organics in projects where your clientele or site might expect to have these materials.

Implementation

PAE recommends use of a collection tank prior to the system in order to drop out heavy solids loads and large particulates if they exist. 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 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. Where the VEW-A version is provided performance of <5 mg/L is specified. 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 size (nominal). Removal of free and trace petroleum, dispersed oils, sheens, slightly soluble chlorinated hydrocarbons and high molecular weight organics is also provided with the VEW-A version (see AQAM treatment reference chart).

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 also 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 spread out across the depth and width of the chamber. Any readily settleable solids drop to the bottom of the V-shaped solids accumulation chamber located directly under the coalescing media bundle.

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.

A Retpak, secondary, reticulated coalescing media pack is also provided to increase performance by capturing smaller oil drops.

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 Accumulation Hopper

The separator shall have a V-shaped solids accumulation 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 the 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 EPDM 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, integral, fiberglass bond to the tank for permanent, leak resistant

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 corrosion proof resin with a minimum of 25% chopped fiberglass fiber to resin mix. An ultraviolet stabilized gel coat shall be used to coat external surfaces 16-20 mils dft.

2.02 Piping

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

2.03 Coalescing Media

Cross-fluted, oleophilic, PVC Flopak and polyurethane Retpak coalescing medias shall be provided as manufactured by Pan America Environmental.

2.04 Cover Gasketing

Closed cell, industrial grade EPDM 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. Other voltages available.

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 (GRS-A Version)

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 fiberglass or steel 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 Filter Cell Construction

The AQAM filter cell construction shall be coated steel or fiberglass. Filter cell is designed for operating pressures up to 100 psi. Construction can also be based on material availability at time of order.

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 zinc plated 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 polyurethane enamel coating (6 mils dft min.) (standard color is white).

3.06 Manufacturer

The manufacturer of preference shall be:
Pan America Environmental, Inc.

3.05 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.

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: 115/208V/1pH/60Hz or
230/460V/3pH/60Hz.
Amp load: 15-35

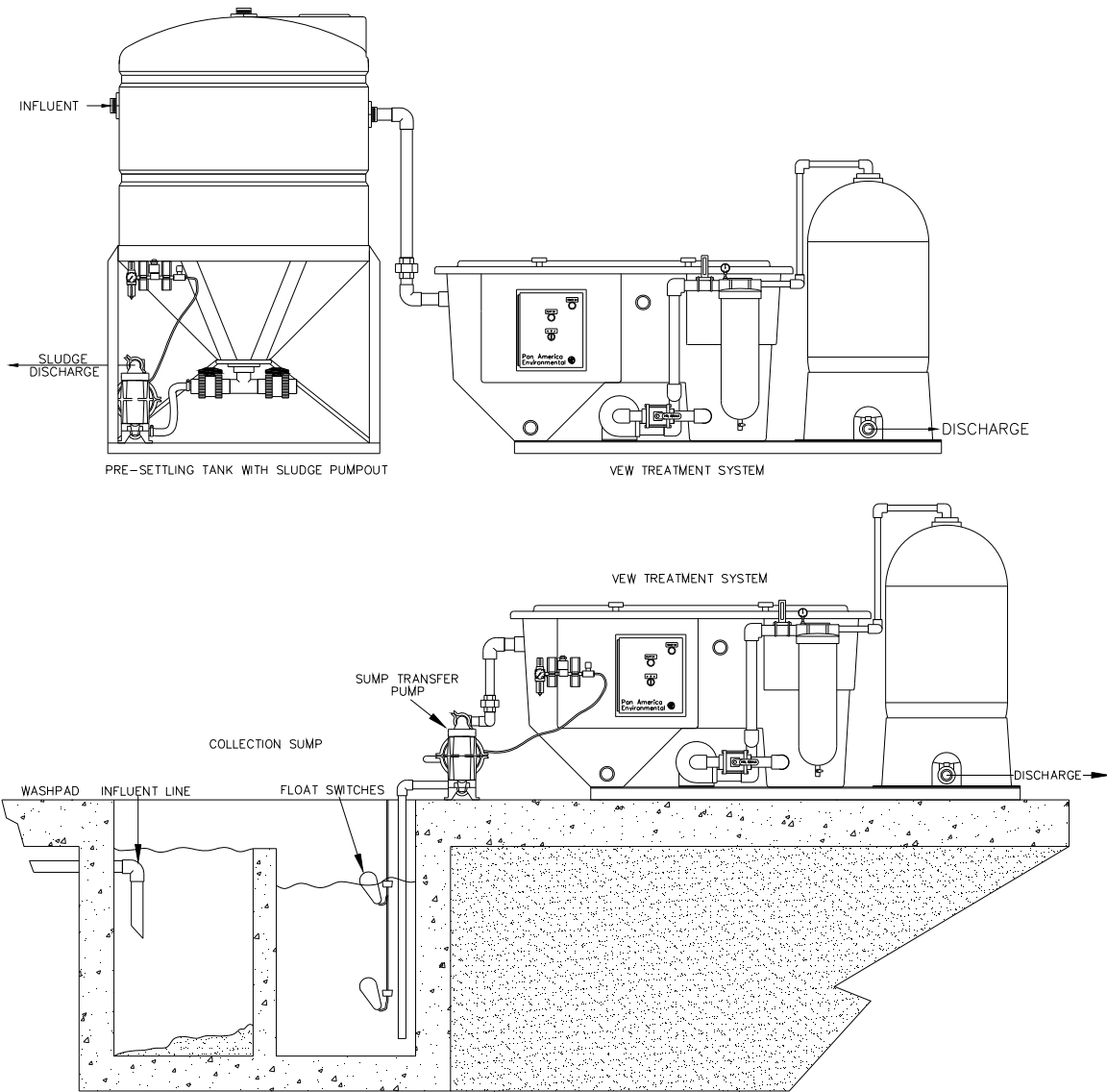
Available Options

- Influent/Oil/Sludge Pumping Systems
- Elevated Design
- Ozone/Biocide System
- External Storage Tanks
- Hi-Temp Upgrade
- Emulsion Cracking System
- Air Stripper
- Walkway/Platform
- Nema 7 Explosion Proof Designs
- GAC Filtration
- Containerized Construction
- Trailer Mounted Design



Model
GRS

GRS
Groundwater Remediation
Systems



Pretreatment Tank

To presettle solids this configuration can be used to reduce solids loads to the GRS.

Collection Sump

To presettle solids and provide a point of wastestream collection this configuration can be used to reduce solids loads to the GRS.