Geotech Guzzler

Installation and Operation Manual

Rev 07/31/2018 Part #16600169

TABLE OF CONTENTS

DOCUMENTATION CONVENTIONS

This manual uses the following conventions to present information:

WARNING

An exclamation point icon indicates a **WARNING** of a situation or condition that could lead to personal injury or death. You should not proceed until you read and thoroughly understand the **WARNING** message.

CAUTION

A raised hand icon indicates **CAUTION** information that relates to a situation or condition that could lead to equipment malfunction or damage. You should not proceed until you read and thoroughly understand the **CAUTION** message.

NOTE

A note icon indicates **NOTE** information. Notes provide additional or supplementary information about an activity or concept

Section 1: System Description

Function and Theory

The Geotech Guzzler, when used in conjunction with a down well intake, efficiently collects free-floating hydrocarbons and other fluids in 2" (5 cm) or larger recovery wells. Designed for shallow well applications, the pump pulls fluid from up to 25' (7.6 m) and requires no electricity for the controls.

The system consists of a Pneumatic Dual Diaphragm Pump, Tankfull Shut-off Valve, Air Regulator, and user controls secured in a stainless steel enclosure. The Guzzler can be attached to a Skimmer with floating intake cartridge or Total Fluids Intake, and a Tankfull Shut-off Sensor tube.

The Guzzler's Dual Diaphragm Pump creates a vacuum, drawing product from the down well intake and discharges it into a recovery tank (not included with system). The Guzzler requires 6 SCFM (.17 SCMM) minimum of air pressure at 45 PSI (3 bar) in order to operate.

Geotech Skimmer intakes are designed to efficiently collect free-floating hydrocarbons in 2" (5cm) or larger recover wells. The Skimmer's buoy follows the water table fluctuations and places an oleophilic screen at the water/product interface, skimming LNAPL (light, non-aqueous phase liquid) down to a sheen within the range of the float travel. As the system cycles, product is drawn through the intake screen and transferred to the pump through a coiled hose and the Skimmer's transfer shaft. Optional Heavy Oil and High Temperature Skimmers are also available and can recover product in 4" (10 cm) diameter and larger wells.

For total fluids recovery applications, the Total Fluids Intake can be deployed up to 25' (7.6 m) depth to fluid and pumps all fluids through a screened intake. When installed with an automatic Level Control Valve, the Total-Fluids Intake will automatically pump or standby depending on fluid level in the well.

When installed to the Guzzler Control Box and a recovery tank, the Guzzler's Tankfull Shut-off valve shuts off the pump when the recovery tank becomes full.

Specific Gravity and Viscosity Limitations

The specific gravity of the product to be recovered must be less than 1.0 and its viscosity less than 50 SSU for use with the "light" oil filter, and 400 SSU for use with the "heavy" oil filter cartridge. Consult Geotech for product recovery operations with viscosities outside that range.

This type of filter and recovery technology is designed to be used in wells with free-floating product of at least 1/8" (3 mm) thickness.

The presence of surfactants or detergents in the product requires careful application. When handling these contaminants please consult Geotech.

Section 2: System Components

Guzzler Control Box

Diaphragm Pump

The Guzzler utilizes an air driven Dual Diaphragm Pump secured in a steel enclosure for protection. The Pump Intake, Pump Discharge, Tankfull Sensor, and Air-In ports of the pump are pre-plumbed to fittings attached to the exterior of the enclosure. Exterior fluid fitting hose barbs come standard to fit 3/8" (9.5 mm) ID tubing. Air Supply Input connects with an industrial 1/4" coupling plug and socket fittings. Additional information for pump service recommendation and instructions are provided in the Manufacturer's Service and Operating Manual for the pump.

Air Regulator

Each Guzzler includes a built-in Air Regulator with a filter and pressure gauge, and an AIR ON/OFF switch. The Air Regulator controls operating pressure, removes particles and liquids in the air stream, and has an automatic drain plumbed to the bottom of the control box. See Figure 2-1.

When initially applying air to the pump, the air pressure must be regulated down to 30 PSI (2 bar) in order for the Dual Diaphragm Pump to prime. The air requirements for the system will vary with the operating speed of the pump. As the pumping rate increases, the airflow requirement increases. At maximum speed, the pump requires 6 SCFM (.17 SCMM) of air. During normal operation, the Guzzler uses approximately 2 SCFM (.05 SCMM) to 4 SCFM (.11 SCMM) of air. In freezing conditions, adding an additional air dryer to the system inlet may be needed to avoid stalling the pump.

Figure 2-1: Guzzler Control Box Components

Down well Intakes: Skimmers and Total Fluids

Skimmer Attachments

A standard Skimmer attachment can be used in either 2” (5 cm) diameter or 4” (10 cm) diameter and larger wells. Figure 2-2 shows an example of the two most common Geotech Skimmers. These Skimmers come with a standard 100-mesh intake screen. A 60-mesh intake screen is also available for use with higher viscosity fluids. See Geotech Manual “Hydrocarbon Viscosity Test Kit” for more information on choosing the correct intake cartridge.

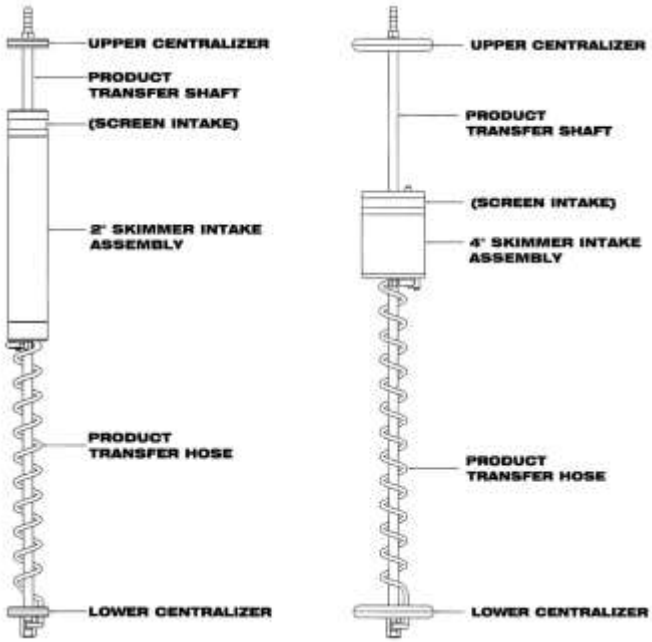

Figure 2-2: Standard 2” and 4” Skimmer Attachments

The Skimmer assembly discharge line attaches to the PUMP INTAKE hose barb on the Guzzler Control Box. The Skimmer consists of a product intake float, a coiled product transfer hose, and a transfer shaft. Well centralizers are positioned at the top and bottom of the Skimmer shaft to protect the intake float and to allow unobstructed travel within the well. Standard Skimmers can provide 12” (30 cm) to 24” (61 cm) of intake travel. Geotech can provide up to an extended 5’ (1.5 m) of travel (4” Skimmers only) on a custom order basis.

A Skimmer assembly will not draw water unless the intake cartridge is forcibly submerged, surfactants are present, or when the “conditioning” of the intake screen is removed. See *Section 5: System Maintenance* for information on reconditioning the intake.

Heavy Oil Skimmer Attachment

The optional Heavy Oil Skimmer attachment is designed to recover a range of fluids from gasoline to gear oil, skimming the product down to .01' (3 mm) in 4" (10 cm) diameter and larger wells. This option is best suited when the viscosity of the hydrocarbon is greater than the capability of the filter screen technology (screen can no longer pass the hydrocarbon fluid).

The Heavy Oil Skimmer consists of a polypropylene intake buoy, a coiled product transfer hose, and a transfer shaft with well centralizers placed at the top and bottom. The intake buoy on the Heavy Oil Skimmer is designed to "ride" at the oil water interface and has a travel range of 24" (61 cm).

The intake buoy can also be "fine-tuned" by adjusting the intake fitting on the top of the buoy. Turning the fitting clockwise will lower the intake fitting relative to the product/water interface. Turning the fitting counter-clockwise will raise the intake fitting away from the interface. Figure 2-3 is an example of a Heavy Oil Skimmer assembly.

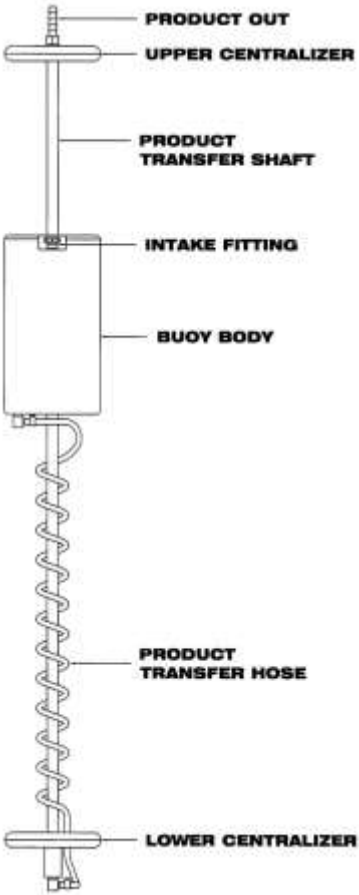

Figure 2-3: Heavy Oil Skimmer Attachment (optional)

High Temperature, Heavy Oil Skimmer Attachment

For high temperature well environments, Geotech provides a High Temperature, Heavy Oil (HTHO) Skimmer that incorporates an ultra-high molecular weight (UHMW) polyethylene intake buoy. The HTHO Skimmer has stainless steel end caps placed at the top and bottom of a stainless steel screen to keep out debris. The intake buoy of the HTHO Skimmer has a travel range of 26" (66 cm).

Like the Heavy Oil Skimmer, the intake buoy can be "fine-tuned" by adjusting the intake fitting on the top of the buoy. Turning the fitting clockwise will lower the intake fitting relative to the product/water interface. Turning the fitting counter-clockwise will raise the intake fitting away from the interface. Figure 2-4 is an example of the High Temperature, Heavy Oil Skimmer.

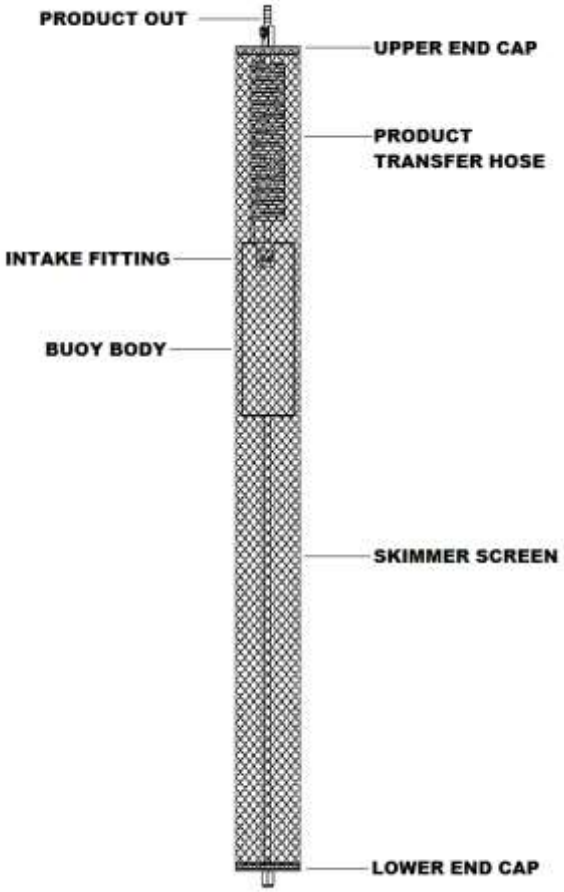

Figure 2-4: High Temp, Heavy Oil Skimmer Attachment (optional)

Total Fluids System

The Total Fluids System consists of a Level Control Valve, a Total Fluids Intake, and 50' of sensor airline. The Level Control Valve is mounted directly onto the Guzzler Control Box at the AIR SUPPLY INPUT quick connect. Figure 2-5 shows an example of how the Total Fluids System connects to the Guzzler.

The Total Fluids Intake pumps all product down to approximately 2.5" (6.35cm). When used with the Level Control Valve the Total Fluids Intake will turn off when the fluid level is 2.5" (6.35cm) from the screened intake and resume operation when the fluid level is 4" (10 cm) above the screened intake. If the Total Fluids Intake is used without the Level Control Valve, the pump will continue to run even in the absence of fluid.

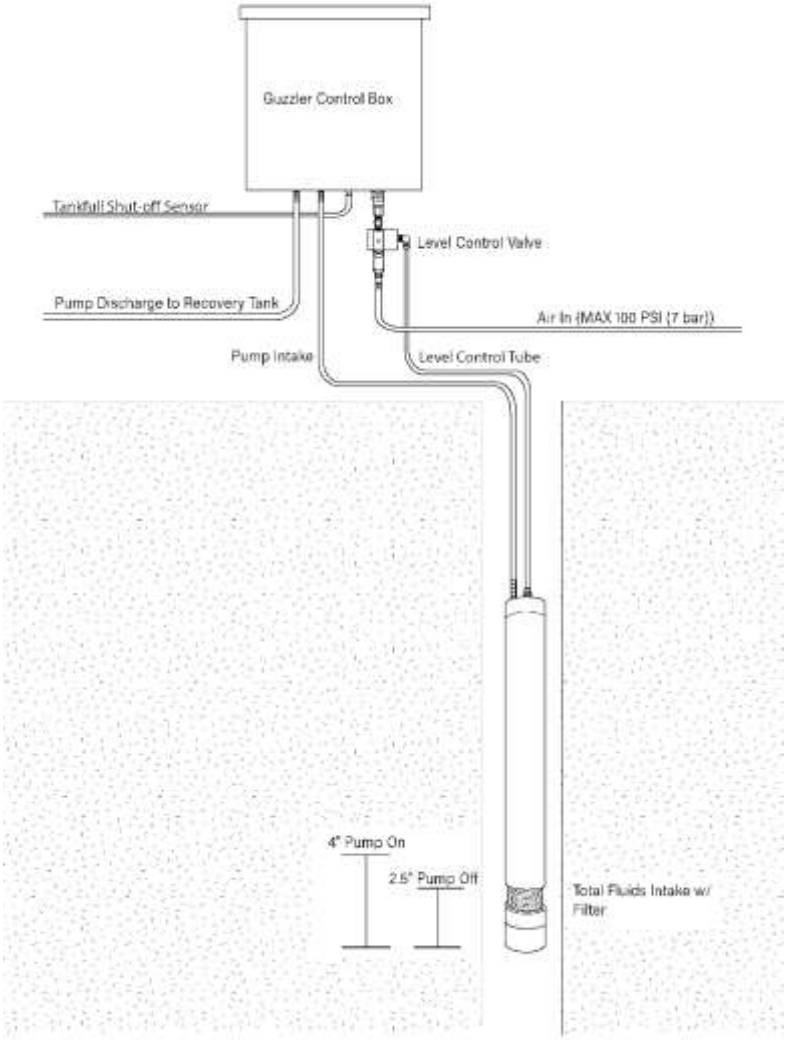

Figure 2-5: Example of a Total Fluids System

Tankfull Shut-off Sensor Tube

The Tankfull Shut-off Sensor assembly consists of a PVC or Stainless Steel sensor installed to a 2” NPT bung opening in a recovery tank and connects to the Guzzler Control Box’s TANKFULL SHUTOFF input with a 1/4” OD sensor airline. The recovery tank with the Tankfull Shut-off Sensor tube installed must be within 50’ (15 m) of the Guzzler Control Box.

As the tank fills, pressure created in the Tankfull Shut-off Sensor tube by the rising product is transmitted to the Tankfull Shut-off Valve. The Tankfull Shut-off Valve will activate when the product level has risen approximately 11” (28 cm) up the Tankfull Shut-off Sensor tube, shutting off the air supply to the pump. When the recovery tank is drained, a manual reset on the Guzzler Control Box is required to resume operation.

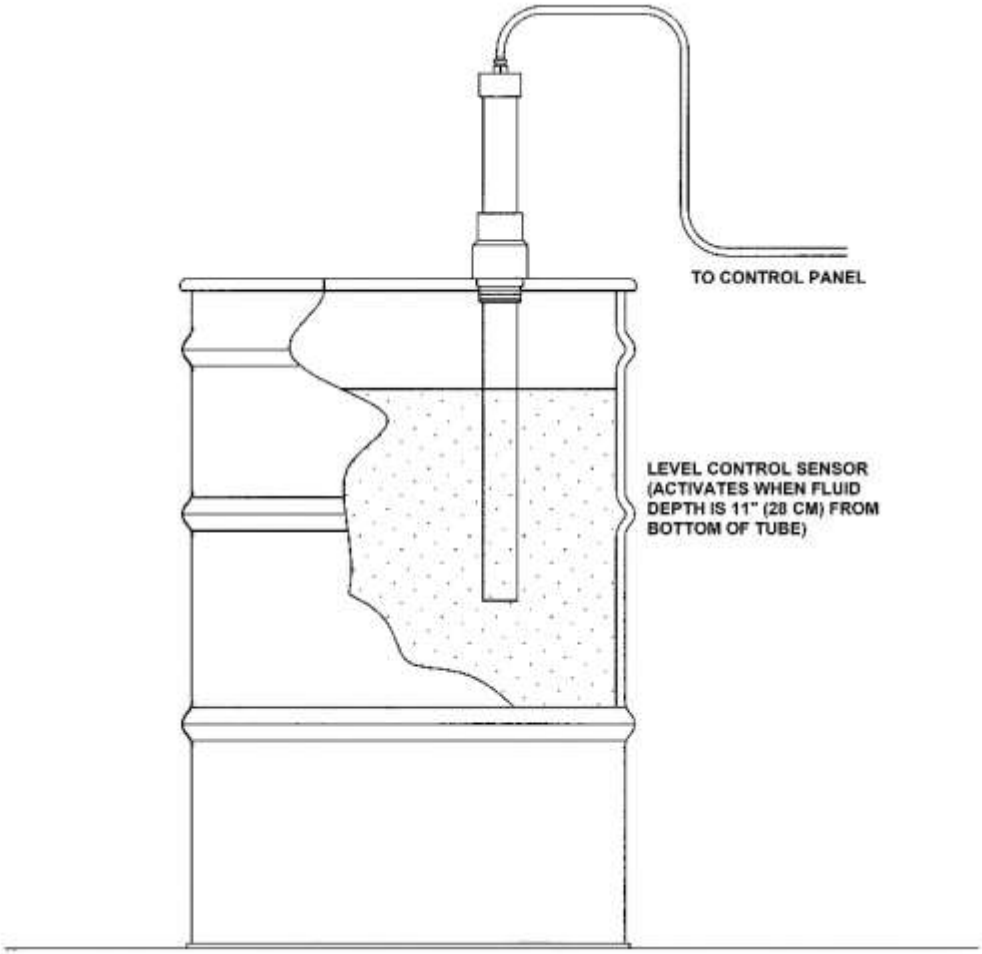

Figure 2-6: Example of the Tankfull Shut-off Sensor tube shown with a 55-gallon recovery tank. (Recovery tank not supplied)

Accessories

Air Compressor (not provided with the Guzzler system)

Refer to instructions provided with the air compressor for installation procedures. An automatic tank drain and an air dryer may be required for the air compressor if the system is operating in humid conditions. Bottled air may be used to operate the Guzzler if operating an air compressor is not feasible. A high-pressure regulator must be used to reduce the air pressure to the range of 45 PSI (.06 bar) to 100 PSI (7 bar).

Ensure air compressor is well protected. If placing the compressor in an enclosure, it must be well ventilated and a fan may be required for proper cooling. Refer to air compressor user manual for general guidelines.

Product Recovery Tank (optionally provided with the Guzzler)

A product recovery tank with a 2” NPT bung opening for the Tankfull Shut-off Sensor tube, a product inlet opening, and a vent are required for proper operation – typically a 55 gallon (208 liter) drum or other suitable container (See Figure 2-6). Check government regulations regarding fuel storage before selecting a recovery tank.

Section 3: System Installation

Planning Guidelines

To install the Guzzler, use the following guidelines to determine a suitable location for the air compressor, Guzzler Control Box, down well intakes, and product recovery tank.

- The Standard Guzzler does not include an air source. The air source/compressor must supply 6 CFM (170 LFM) at 45 PSI (bar) minimum.
    - Do not locate the compressor in areas where there may be explosive vapors. Compliance with Section 5 of the U.S. National Electric Code Handbook and any local codes is essential for an electrically safe installation. The compressor requires a cool, well-ventilated environment to operate efficiently, and may require an air dryer in freezing or humid environments.

- Mount the Guzzler Control Box at the wellhead, or as close to the wellhead as possible.
    - The Guzzler Control Box must be mounted upright in order for it to operate.

- The product recovery tank should be located within 50’ (15 m) of the Guzzler Control Box when the Tankfull Shut-off Sensor tube is used.

- Run all air and pump tubing through pipe or conduit to protect them from damage. All air and discharge tubes must be installed correctly for the system to operate properly. The cut ends of the tubing must be straight and the connections leak free. Use clamps for tubing to hose barb connections whenever possible.

Because site requirements vary, customers must supply all mounting hardware for the Guzzler Control Box.

Air Line Preparation

Confirm all measurements before making any cuts to the tubing.

Place the Guzzler Control Box, discharge tank, and air compressor in a suitable location as outlined in the Planning Guidelines.

Calculate the tubing lengths required to install the Skimmer or Total Fluids Intake.

- Down well tubing lengths cannot exceed 25’ (7.6 m).
- To calculate the amount of discharge tubing required:
    - Measure the static water depth in the well using a Geotech Interface Probe.
    - Measure the distance between the wellhead and the Guzzler Control Box.

- Measure the distance between the Guzzler Control Box and the product recovery tank.

Installation

For systems using a well cap:

1. Remove the inner ring of the well cap, and secure it to the well casing using the three (3) setscrews located on the perimeter of the ring.

2. Pull the measured lengths of discharge tubing through the fitting on the well cap (when applicable).

The well cap is designed to suspend the intake assembly by the hose. It is recommended to deploy a safety cable in addition to the tubing for the heavier, stainless steel screened Skimmers and HTHO Skimmers.

3. Attach the discharge tubing from the down well Skimmer or Total Fluids Intake to the Guzzler Control Box hose barb labeled PUMP INTAKE.

4. Place the Skimmer assembly into the well so that the midpoint of the intake float travel lies on the static water level measured.

5. Place the Total Fluids Intake at the desired depth for pumping.

6. Attach tubing from the Guzzler Control Box hose barb labeled PUMP DISCHARGE to the product recovery tank.

7. Install the Tankfull Shut-off Sensor tube in a 2” NPT bung opening on your recovery tank.

8. Adjust the position of the Tankfull Shut-off Sensor tube so that 12” (30 cm) to 13” (33 cm) of the tube is within the tank.
   - When the fluid level reaches approximately 11” (28 cm) on the sensor tube side, the Tankfull Shut-off Valve will activate to shut off the pump.

9. Attach tubing from Tankfull Shut-off Sensor tube to the Guzzler Control Box tube connector labeled TANKFULL SENSOR.

10. Open the front panel, locate the AIR ON/OFF switch, and ensure it is in the AIR OFF position prior to connecting air source.

11. If using a Total Fluids Intake with Level Control Valve, install the Level Control Valve on the quick connect fitting labeled AIR SUPPLY INPUT.

12. Connect air source to the AIR SUPPLY INPUT (or on the Level Control Valve) quick connect fitting.
    - The air source must be less than 100 PSI (7 bar).

Section 4: System Operation

Do not operate the Gas Guzzler system with air pressures exceeding 100 PSI (6 bar).

Higher air pressures will not yield a higher recovery rate, and should only be used to overcome high discharge head pressures.

Adjust the Pumping Rate

1. Inside the Control Box, locate the Air Regulator. Pull up on the Air Regulator adjustment knob to unlock. Rotate adjustment knob counter-clockwise until loose before putting the switch into the AIR ON position.

2. With the AIR ON/OFF switch in the AIR ON position, slowly turn the Air Regulator knob clockwise until the pump begins to cycle (around 30 PSI/2 bar). Allow 20 seconds for the pump to prime before adjusting to desired air pressure, recommended 45 PSI/3 bar.

The Guzzler requires only compressed air to operate. All units will be sent with the AIR ON/OFF switch in the OFF position. Required pressure will vary depending on site conditions. The fastest pumping rate possible on the system varies according to pumping depth, distance from the pump to the product recovery tank, and the product layer thickness. The Regulator Adjustment Knob is located inside the Guzzler Control Box (See Figure 2-1). The Air Regulator adjusts by rotating the Regulator Adjustment Knob counter-clockwise to decrease the pressure rate, and clockwise to increase the pressure rate.

The pump's air supply must never be increased to the point where the air compressor is running at more than a 50% duty cycle. The pump should be adjusted so that it runs at its slowest steady speed. Higher pump speeds will not yield a higher pumping rate, and will cause premature pump and compressor wear.

The internal Air Regulator is equipped with an auto-draining filter that removes particles and moisture from the air stream to prevent damage to the pump and provide proper air pressure for system operation.

Section 5: System Maintenance

The Guzzler requires very little maintenance. With proper installation, and by following periodic maintenance procedures, operation of the system will remain efficient and trouble free.

In cold climates where the temperatures may fall below freezing, the air supply should be run through an air dryer to prevent the pump from stalling.

Weekly Maintenance

- Verify that the Skimmer is set at the correct well depth for the collection of free product, and that the speed of the pump is correct for the amount of product available.
- Pull the Skimmer from the well and inspect it, making sure the coiled hose is not tangled and that the buoy moves freely over its travel range. Inspect the buoy body and clean or replace it as needed, according to the Skimmer user manual.

Always ensure all hose and tubing fittings at the Guzzler pump and between the pump and Skimmer are tight prior to deploying the unit into the well.

Monthly Maintenance

- Inspect all tubing for cracks, kinks, and damage. Replace any old and brittle tubing.
- Inspect the coiled tubing for physical damage or obstructions. Verify the intake assembly moves freely over its travel range. (Skimmer)
- Inspect the float (buoy) and intake screen. Clean the intake screen and float according to the Skimmer user manual. (Skimmer)
- If using a Total Fluids intake, inspect the intake screen and clean according to directions found later in this section.
- Inspect the Skimmer/Total Fluids Intake for signs of physical damage. Scrapes or dents in the screen intake may cause the Skimmer/Total Fluids Intake to take on water. If such damage is found, a new intake assembly may be necessary.
- Clear away any debris collected in the well vault (or above ground casement).
- Measure the well and record product layer thickness and depth to water from top of well casing.
- Place a Skimmer/Total Fluids Intake positioning mark or zip tie on the discharge tubing even with the top of well casing.
- Re-deploy the Skimmer/Total Fluids Intake, aligning new depth to water mark on discharge tubing with top of well casing.
- Check the Tankfull Shut-off Sensor tube for proper operation. Clean if necessary.

Quarterly Maintenance

- Pull Skimmer or Total Fluids Intake from the well.

- Clean the well screen (site specific, primarily to clear bio growth and keep thick degraded product from impeding conductivity to the well at the product layer. Frequency to be determined by user).
- Place float assembly in water to verify the screen stays out of the water at the top of the traverse range. If it does not, replace the coiled tubing and retest. If it still does not, replace the float assembly. (Skimmers)

Cleaning the Skimmer and Intake Screen

For Heavy Oil Skimmers, first use warm, soapy water, followed by a penetrating lubricant to remove debris or bio growth from the buoy body, then rinse and let dry.

Using warm, soapy water, clean all debris and bio growth from the Skimmer/Total Fluids Intake shaft and tubing.

Air Regulator Maintenance

1. Turn the AIR ON/OFF switch into the OFF position.
2. Turn off the air supply.
3. Locate the Air Regulator and turn the adjustment knob on the Air Regulator fully counter-clockwise. See Figure 5-1.
4. Remove the Air Filter bowl by pushing it upward and turning counter-clockwise.
5. Clean the bowl with warm water only. Clean all other parts with warm water and soap.
6. Rinse and dry all parts.

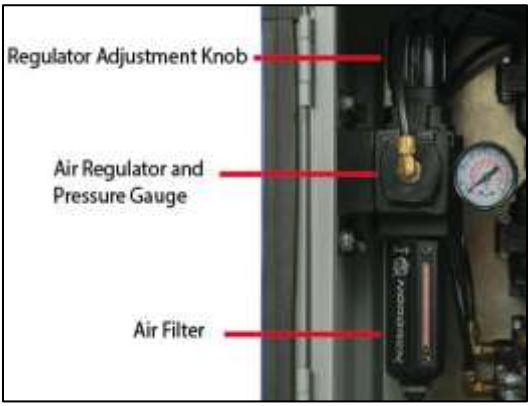

Figure 5-1: Air Regulator Features

7. Blow out internal passages in Air Regulator with clean, dry compressed air.
8. Blow air through filter element from inside to outside to remove surface contaminants.
9. Inspect parts. Replace any parts that are damaged.
10. Reassemble the Air Regulator.

Servicing the Guzzler Pump and Control Box

To service the Guzzler Control Box, contact Geotech at 1-800-833-7958.

Section 6: System Troubleshooting

Problem: The Guzzler operates but recovers no product.

Solutions:
Product has been removed.

- Decrease the pumping rate/pressure to conserve air.

Pump is operating too fast, pumping rate exceeds product recharge rate.

- Decrease the pumping rate.

Fluid level is below Skimmer assembly.

- Adjust the Skimmer as outlined in *Section 3: System Installation* of this manual.

Viscosity of the product is too thick for the buoy to recover.

- Contact Geotech at 1-800-833-7958.

Discharge piping plugged or damaged.

- Verify that the discharge piping is clear and undamaged.

Filter material on the Skimmer buoy is plugged.

- Clean or replace the filter.

Problem: Pump discharges water only.

Solutions:
Water level has exceeded the allowable travel of the Skimmer buoy.

- Pull the Skimmer out of the well and purge water out of the buoy by allowing the system to pump until all water is removed from the buoy. Refer to the *Section 3: System Installation* of this manual and reset the pump and skimmer.

The intake assembly will not slide freely, or the coiled hose is tangled.

- Inspect the Skimmer assembly and repair as necessary.

Loose hose or tubing on fittings below intake level.

- Check all fitting connections.

The standard 4” Skimmer buoy will travel 24 vertical inches (61 cm) within the well, and will not pump water unless forcibly submerged. If the water table fluctuation exceeds the available travel of the buoy, the system may recover water. If the well is slow to recharge and/or there is only a small volume of product to pump, the pumping rate should be decreased by turning the speed control valve clockwise to conserve air and minimize compressor wear.

Problem: The pump discharges air only, no product.

Solutions:

- Ensure the pump is primed.
- Product has been removed.
- Recalculate and reduce the pumping rate.

The Product layer is below the bottom of the Skimmer's travel range.

- Adjust the position of the Skimmer assembly within the well.

The Skimmer assembly has detached from the pump (due to a cut hose or loose hose clamp.)

- If the Skimmer assembly cannot be removed from the well then a new Skimmer will be needed.

Problem: The pump cycles but does not discharge product.

Solutions:

The viscosity of the product is too thick for the Skimmer.

- Contact Geotech to discuss other Skimmer options for the type of product in the well.

The intake screen is obstructed or the coiled hose is kinked.

- Verify that the intake is clean of debris and bio growth
- Check the condition of the coiled hose.

Intake has exceeded maximum depth.

- Bring intake up to a depth level pump can handle, maximum of 25' (7.6m) to fluid.
- Use alternate pumping system for deeper wells. Contact Geotech at 1-800-833-7958.

Problem: Pump does not operate.

Solutions:

Air supply operating pressure is too low.

- Verify that the air supply is providing air (45 PSI (3 bar)), use the Air Regulator to adjust if necessary.

There is a pump malfunction.

- Refer to the pump manual or contact Geotech at 1-800-833-7958.

Problem: Pump will not cycle.

Solutions:

Fluid is not high enough to activate the Level Control Valve.

- Check fluid level and the position of the sensor tube (*see Section 2: System Installation*). Adjust if necessary.

Recovery tank is full.

- Turn the air supply OFF. Empty the recovery tank, and turn the air supply ON. Press RESET on the Guzzler Control Box.
- Inspect Tankfull Shut-off Sensor tube and ensure that it is sealed.

Level Control Valve not functioning.

- If the Total Fluids Intake is submerged, remove the Level Control Valve and run the system. If the pump cycles, then first check all of the fittings and connections between the Level Control Valve and the Total Fluids Intake for possible air leaks. If no leaks are found and pump is still not cycling there may be a problem with the Level Control Valve. Contact Geotech at 1-800-833-7958.

Air supply operating pressure or flow capacity is too low.

- Verify that the air supply is providing air (45 PSI (3 bar)), use the Air Regulator to adjust if necessary.

There is a pump malfunction.

- Contact Geotech at 1-800-833-7958.

Problem: Pump cycles, but flow rate is unsatisfactory.

Solutions:

- Check system for kinks in air and discharge tubing.
- Check for cuts or air leaks in tubing and tube connections.
- Check viscosity of fluid being pumped.

Problem: Pump cycle seems to produce excessive vibration.

Solutions:

Debris clogging pump check valve.

- Contact Geotech for service and maintenance.

Problem: Level Control Valve is not working.

Solutions:

- Check Level Control Valve plumbing for air leaks. All seals must be tight. Breather vent may exhaust small amounts of air.
- If there are no noticeable leaks, contact Geotech.

If these troubleshooting guidelines have not resolved the problem, then contact Geotech at 1-800-833-7958.

Section 7: System Specifications

General Specifications

Application: 2” (5 cm) or larger recovery wells
Maximum Depth to Fluid: 25’ (7.6 m)
Maximum Inlet Pressure: 100 PSIG (6.9 bar)
Nominal Operating Pressure: 45 PSIG (3.1 bar)
Minimum Operating Temperature, unless otherwise specified: 34°F (1°C)

Guzzler Control Box *(includes mounting tabs and door latch)*

Enclosure Size: 14” H x 12.5” W x 10.5” D (35.5 cm H x 32 cm W x 27 cm D)
Weight: 30 lbs. (13.6 kg)
Materials: Powder coated Stainless Steel Enclosure, Poly, FEP, Nylon tubing
Process Connections (Brass):
- Air Supply Input: 1/4" Industrial Quick Connect Plug
- Pump Intake: 3/8” Hose barb
- Pump Discharge: 3/8” Hose barb
- Tankfull Sensor: 1/4" OD Tube, Poly-Tite Compression Fitting

Total Fluids Intake *(installed with or without Level Control Valve)*

Intake Size: 17” L x 1.9” OD (43 cm L x 1.8 cm OD)
Weight: 1.2 lbs. (0.5 kg)
Materials: PVC Body, Brass Connections, Stainless Steel Intake
Process Connections:
- Discharge line: 3/8” Hose barb
- To Level Control Valve: 1/4" OD Tube, Poly-Tite Compression Fitting

Level Control Valve *(installed with Total Fluids Intake only)*

Size: 2” x 4” x 5.25” (5 cm x 10 cm x 13 cm)
Weight: 1.2 lbs. (0.5 kg)
Materials: Buna-N, Aluminum, Brass, Zinc Plated Steel, Stainless Steel
Process Connections:
- To Guzzler Control Box (AIR IN): 1/4” Industrial Quick Connect Coupling
- To Total Fluids Intake: 1/4" OD Tube, Poly-Tite Compression Fitting

Tankfull Shut-off Sensor Tube

Size: 24” L x 1.9” OD (61 cm L x 4.8 cm OD)
Weight: 1.8 lbs. (0.8 kg)
Materials: PVC, Stainless Steel, Brass, Rubber
Process Connections:
- To Guzzler Control Box: 1/4" OD Tube, Poly-Tite Compression Fitting
- To recovery tank: 2” NPT Bung on sensing tube

Maximum 1/4” OD tubing length from Sensor to Guzzler Control Box: 50’ (15.2 m)

2” Skimmer Assembly

Size: 35.5” L x 1.75” OD (90 cm L x 4.5 cm OD)
Weight: 1.8 lbs. (0.8 kg)
Materials: 304 SS, Polyethylene, PVC, Polypropylene, and Brass Fittings
Effective Travel: 12” (30.5 cm) Standard Travel
Operating Temperature: 32º to 100º F (0° to 38° C)
Minimum fluid level to activate Skimmer = 15” (38 cm)
Oil/Water Separation: Oleophilic/hydrophobic mesh screen

4” Skimmer Assembly

Size: 35.5” L x 3.75” OD (90 cm L x 9.5 cm OD)
Weight: 2.25 lbs. (1 kg)
Materials: 304 SS, Polyethylene, PVC, Polypropylene, and Brass Fittings
Effective Travel: 24” (61 cm) Standard Travel, up to 5’ (1.5 m) extended travel available
Operating Temperature: 32º to 100º F (0° to 38° C)
Minimum fluid level to activate Skimmer = 9” (23 cm)
Oil/Water Separation: Oleophilic/hydrophobic mesh screen

4” Heavy Oil Skimmer Assembly

Size: 40” L x 3.75” OD (102 cm L x 9.5 cm OD)
Weight: 2.5 lbs. (1.1 kg)
Materials: 304 SS, PP, and Brass Fittings
Effective Travel: 24” (61 cm) Standard Travel
Operating Temperature: 32º to 100º F (0° to 38° C)
Minimum fluid level to activate Skimmer = 15” (38 cm)
Oil/Water Separation: Oleophilic/hydrophobic mesh screen

4” High Temperature, Heavy Oil Skimmer Assembly

Size: 40” L x 3.75” OD (102 cm L x 9.5 cm OD)
Weight: 2.5 lbs. (1.1 kg)
Materials: 304 SS, UHMW, PTFE, and Brass Fittings
Effective Travel: 24” (61 cm) Standard Travel, up to 5’ (1.5 m) extended travel available
Operating Temperature: 32º to 212º F (0° to 100° C)
Minimum fluid level to activate Skimmer = 15” (38 cm)
Oil/Water Separation: Oleophilic/hydrophobic mesh screen

Tubing Information

FEP tubing
ASTM 3296;
Chemically Inert to most industrial fluids and gasses;
UL 94 V-0;
FDA Compliant

Material:	Virgin/Recycled Blend
Chemical resistance:	Excellent
Weather Resistance:	ASTM Method: Florida Exposure. No significant change in tensile strength; slight increase in elongation, but still high after 25 years.
UV rating:	High resistance to sustained UV exposure per ASTM Florida Exposure Method
ID:	3/8" (.95cm)
OD:	1/2" (1.27cm)
Operating Pressure (room temp):	1.56 MPa; 230PSI
Burst Pressure (room temp):	6.62 MPa; 960PSI
Density:	2150 kg/m3
Flexural Modulus (ASTM D790):	586 MPa; 80,000PSI
Tensile strength (ASTM D638):	23 MPa; 3,400 PSI
Elongation (ASTM D638):	400%
MIT Flex Life (ASTM D638):	5,000
Hardness (ASTM D2240):	60 shore D
Melting point:	500° F (260 °C)
Operating temperature:	-99.4° F to 394° F (-73 to 200 °C)
Water absorption (ASTM):	<0.01 % after 24 hours
Dielectric constant (Dk) at 1MHz:	2.1
Dissipation factor at 1MHz :	0.0007
Arc resistance:	< 300 seconds
Resistivity at 50% R.H.	> 1016 Ω m

Rubber tubing
Chemical resistance: Good (excellent for liquid hydrocarbon fuel)
Weather Resistance: Good

Nylon tubing
Chemical resistance Good
Weather resistance: Fair (UV and water exposure must be limited)

System Schematics

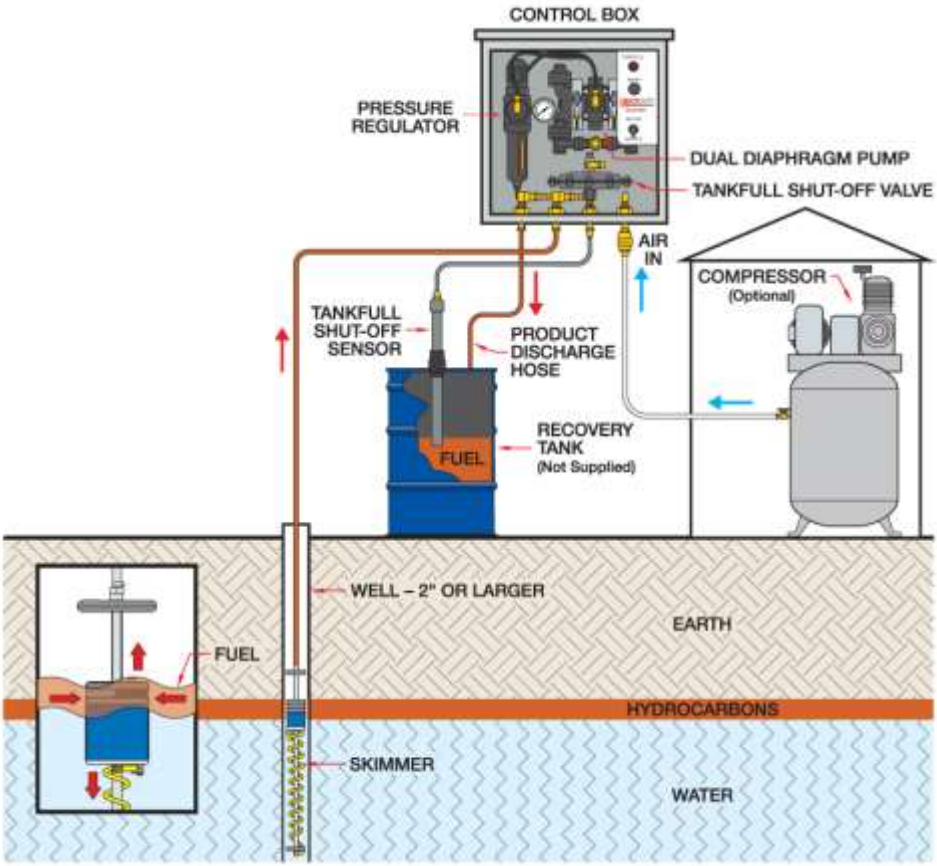

Figure 7-1: Guzzler Hydrocarbon Recovery Schematic

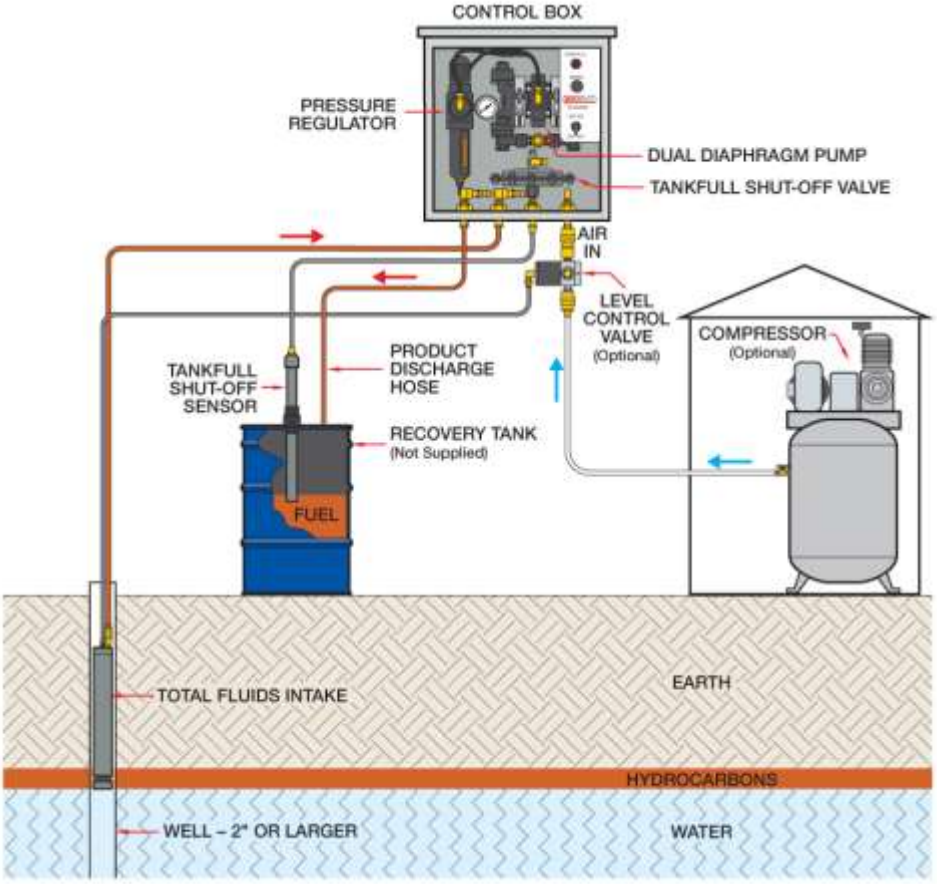

Figure 7-2: Guzzler Total Fluids Schematic

Section 8: Replacement Parts List

Guzzler Components

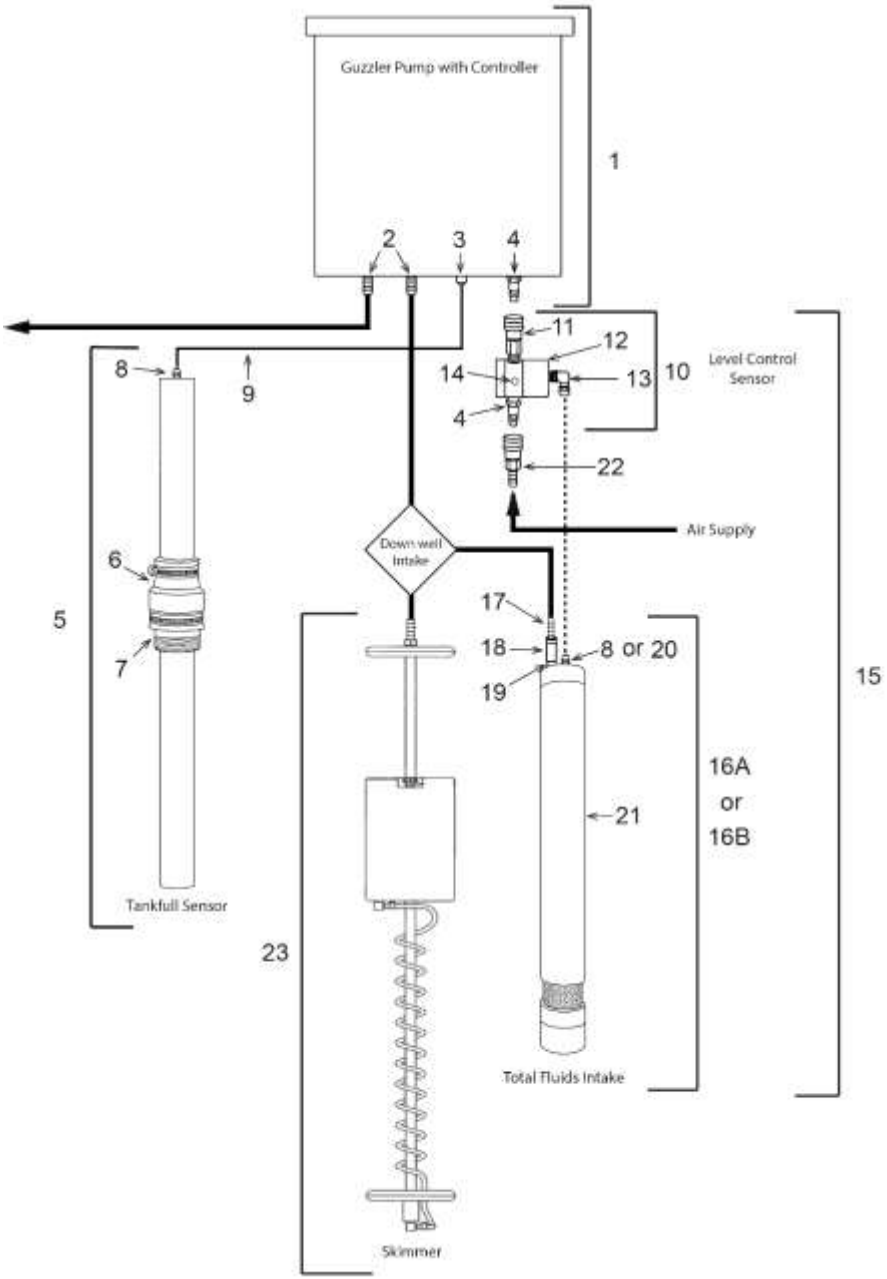

Figure 8-1: Guzzler System

Guzzler Components List

Item #	Part Description	Part #
1	**GUZZLER PUMP W/CONTROLER, INCLUDES TFSO**	**86600150**
2	HOSEBARB,BRS,3/8"X1/4MPT	16650323
3	FITTING,BRS,1/4X1/4MPT CONN, POLY-TITE	16600035
4	PLUG, BRS, 1/4MPTx1/4"CPLG	11150346
5	**ASSY,TUBE,TANKFULL SENSOR PVC W/ 50FT TUBING**	**56600061**
6	COUPLING, PVC, 2"x1.5"	16600078
7	NIPPLE,PVC80,2"NPTx3"L,SENSOR TUBES	16600075
8	TUBE,CONN,1/4x1/8MPT,POLYTITE PUMP	16600037
9	TUBING,NYL,1/4ODX.040"W,BLK	16600039
10	**GUZZLER, LVL CNTRL SNSR ONLY,TOTAL FLUIDS,UPPER**	**56600092**
4	PLUG, BRS, 1/4MPTx1/4"CPLG	11150346
11	COUPLING, BRS, 1/4MPTx1/4, QD	16600311
12	VALVE, LEVEL CONTROL, ¼", 2POS, 30-125PSI, N/C	16600390
13	TUBE,CONN,ELBOW,.25"x.125,MxM	16600009
14	VENT, BREATHER, 1/4" NPT	11150252
15	**GUZZLER, INTAKE,TOTAL FLUIDS,W/ LVL CNTRL SNSR,50'1/4"TUBING**	**56600093**
10	GUZZLER, LVL CNTRL SNSR ONLY,TOTAL FLUIDS,UPPER	56600092
16A	GUZZLER, INTAKE ONLY, LVL CNTRL, TOTAL FLUIDS, LOWER	56600091
9	TUBING,NYL,1/4ODX.040"W,BLK	16600039
16A	**GUZZLER, INTAKE ONLY, LVL CNTRL, TOTAL FLUIDS, LOWER**	**56600091**
8	TUBE,CONN,1/4x1/8MPT,POLYTITE PUMP	16600037
17	HOSEBARB, BRS,3/8"x1/8MPT	16650310
18	VALVE,CHECK,PRODUCT DISCHARGE,BRS,1/8"NPT,FXF	26600157
19	NIPPLE,BRS,HEX,1/8NPT	17500151
21	ASSY, TOTAL FLUIDS INTAKE	56600102
16B	**GUZZLER, INTAKE ONLY, TOTAL FLUIDS, LOWER**	**56600095**
20	PLUG,BRS,1/8"MPT,SOCKET	11150305
17	HOSEBARB, BRS,3/8"x1/8MPT	16650310
18	VALVE,CHECK,PRODUCT DISCHARGE,BRS,1/8"NPT,FXF	26600157
19	NIPPLE,BRS,HEX,1/8NPT	17500151
21	ASSY, TOTAL FLUIDS INTAKE	56600102
23	*See Skimmer Parts List on the following pages for details*	
	Pump Intake/Pump Discharge Tubing	
	TUBING,RBR, 3/8"IDx5/8"OD,PER FT,PRODUCT DISCHARGE	16600019
	TUBING,RBR, 3/8"IDx5/8"OD,100' ROLL,PRODUCT DISCHARGE	16600072
	TUBING,TLPE,3/8"IDx1/2"OD,PER FT, FEP LINED PE	87050506
	TUBING,TLPE,3/8"IDx1/2"OD,500' ROLL, FEP LINED PE	77050506
	TUBING,FEP,3/8"IDx1/2"OD,PER FT	87050511
	TUBING,FEP,3/8"IDx1/2"OD,500' ROLL	77050511
	Intake & Tubing Accessories	
18	VALVE,CHECK,PRODUCT DISCHARGE,BRS,1/8"NPT,FXF	26600157
22	CPLG, BRS, ¼"QD x 3/8" HOSEBARB	16650335
	CLAMP,SS6,WORM,7/32-5/8"	16600063

Additional Intake Options

ASSY, INTAKE, 166, DROP TUBE, WITH 3/8" HOSEBARB	51150138

Remediation Accessories

MANUAL,TEST KIT,HYDROCARBON VISCOSITY	26030020
TEST KIT,HYDROCARBON VISCOSITY	86020001

Down Well Skimmers

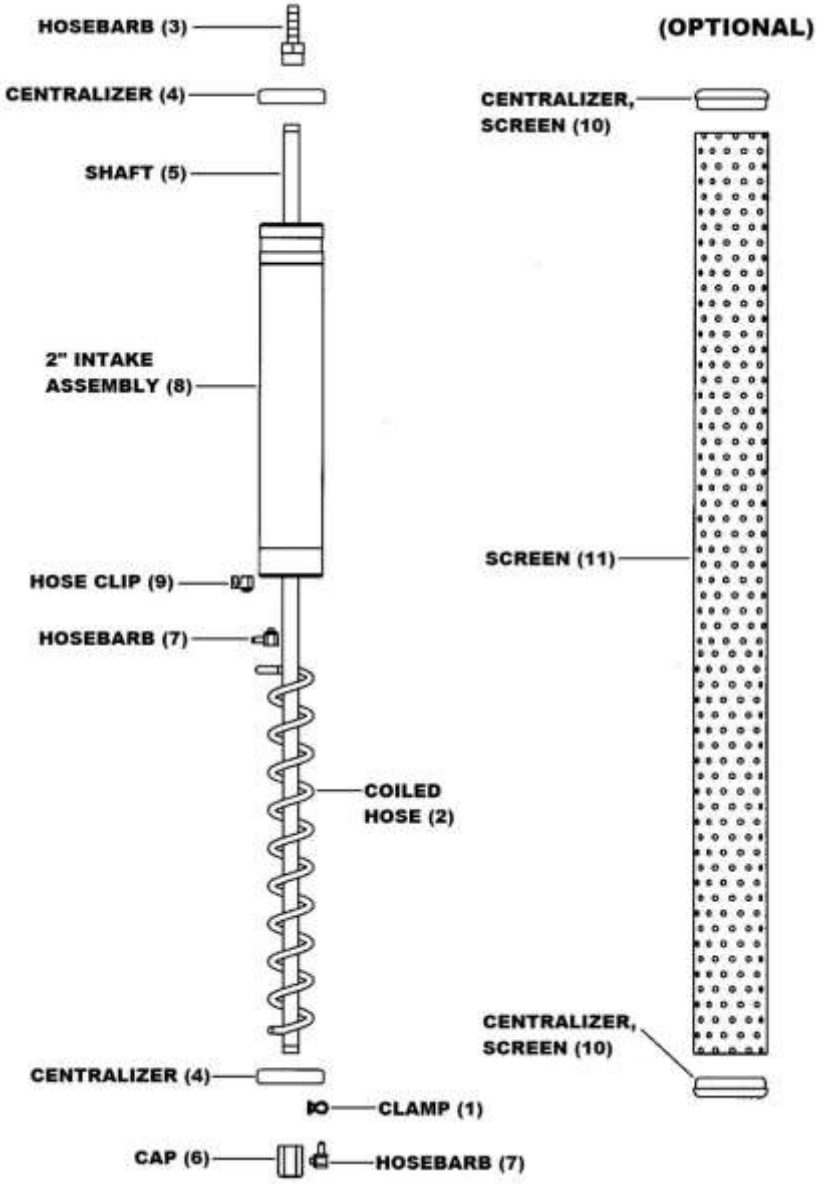

Figure 8-2: Standard 2” Skimmer Assembly

2” Skimmer Assembly 100-mesh (56600003) and 60-mesh (56600069)

Item #	Part Description	Part #
1	CLAMP,SS,STEPLESS EAR,7MM	16600005
2	HOSE,COILED,PR2	26650304
3	HOSEBARB,BRS,3/8"X1/8FPT	16650308
4	CENTRALIZER,PVC,SKIMMER,2"	26650306
5	SHAFT,SS,SKIMMER,33.5",PRC	26600002
6	CAP,BRS,1/8FPTx10-32 90 DEG	16600064
7	HOSEBARB,BRS,1/8"X10-32,90DEG	17500149
8	ASSY,BUOY,SKIMMER,2"100MESH	56650309
	ASSY,BUOY,SKIMMER,2" 60 MESH	56650312
9	HOSE CLIP,SKIMMER FLOAT	26650028

2" Skimmer Options

10	CENTRALIZER,PVC,SCREENED PR2	26600186
11	SCREEN,SS,1.88"ODX32.7" STRAIGHT WELD	26600188

Additional 2" Skimmers

	ASSY,SKIMMER,2”100M,W/SCREEN	56600054
	ASSY,SKIMMER,2",60M,W/SCREEN	56600071

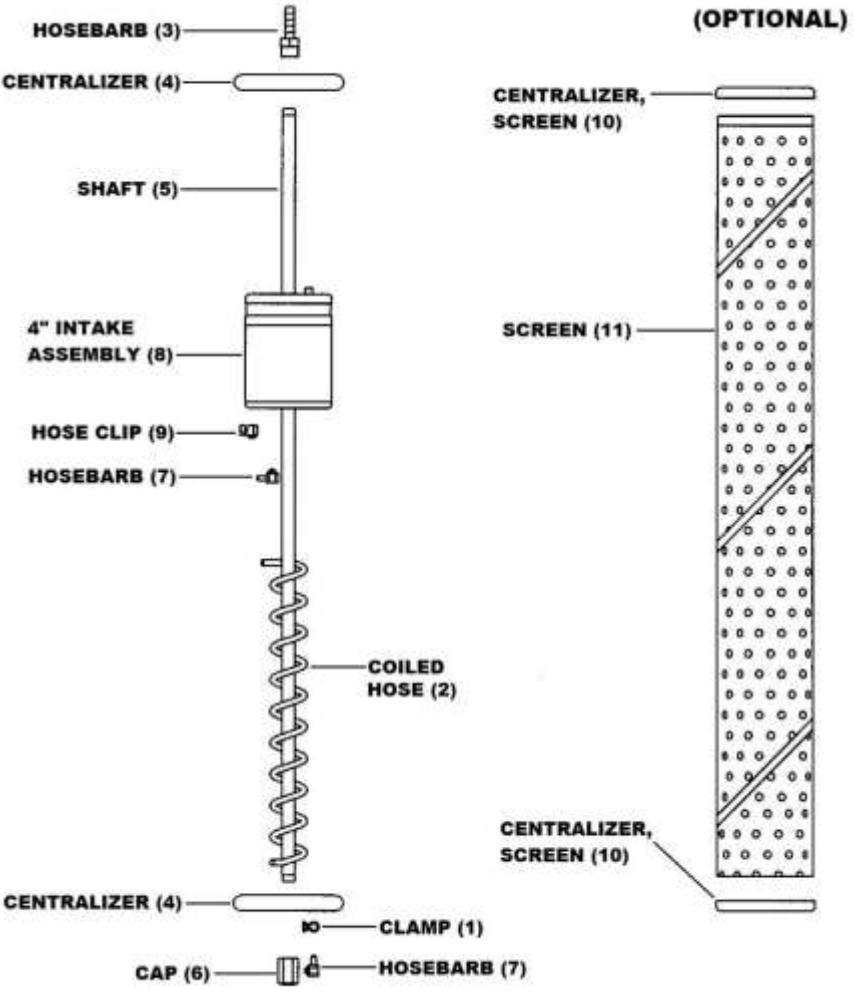

Figure 8-3: Standard 4” Skimmer Assembly, extended options available

4” Skimmer Assembly 100-mesh (56600004) and 60-mesh (56600070)

Item #	Part Description	Part #
1	CLAMP,SS,STEPLESS EAR,7MM	16600005
2	HOSE,COILED,PR4	16650312
3	HOSEBARB,BRS,3/8"X1/8FPT	16650308
4	CENTRALIZER,SKIMMER,PR4	16600048
5	SHAFT,SS,SKIMMER,33.5",PRC	26600002
6	CAP,BRS,1/8FPTx10-32 90 DEG	16600064
7	HOSEBARB,BRS,1/8"X10-32,90DEG	17500149
8	ASSY,BUOY,SKIMMER,4"100 MESH	56650310
	ASSY,BUOY,SKIMMER,4" 60 MESH	56650313
9	HOSE CLIP,SKIMMER FLOAT	26650028

4" Skimmer Options

10	CENTRALIZER,PVC,SCREENED PR4	26600187
11	SCREEN,SS,3.67" DIAM X32.7"	26600189

Additional 4" Skimmers

	ASSY,SKIMMER,4",100M,W/SCREEN	56600055
	ASSY,SKIMMER,4",100 MESH,5 FT EXTENDED TRAVEL	56600008
	ASSY,SKIMMER,4",60M,W/SCREEN	56600072
	ASSY,SKIMMER,4",60 MESH,5 FT EXTENDED TRAVEL	56600073

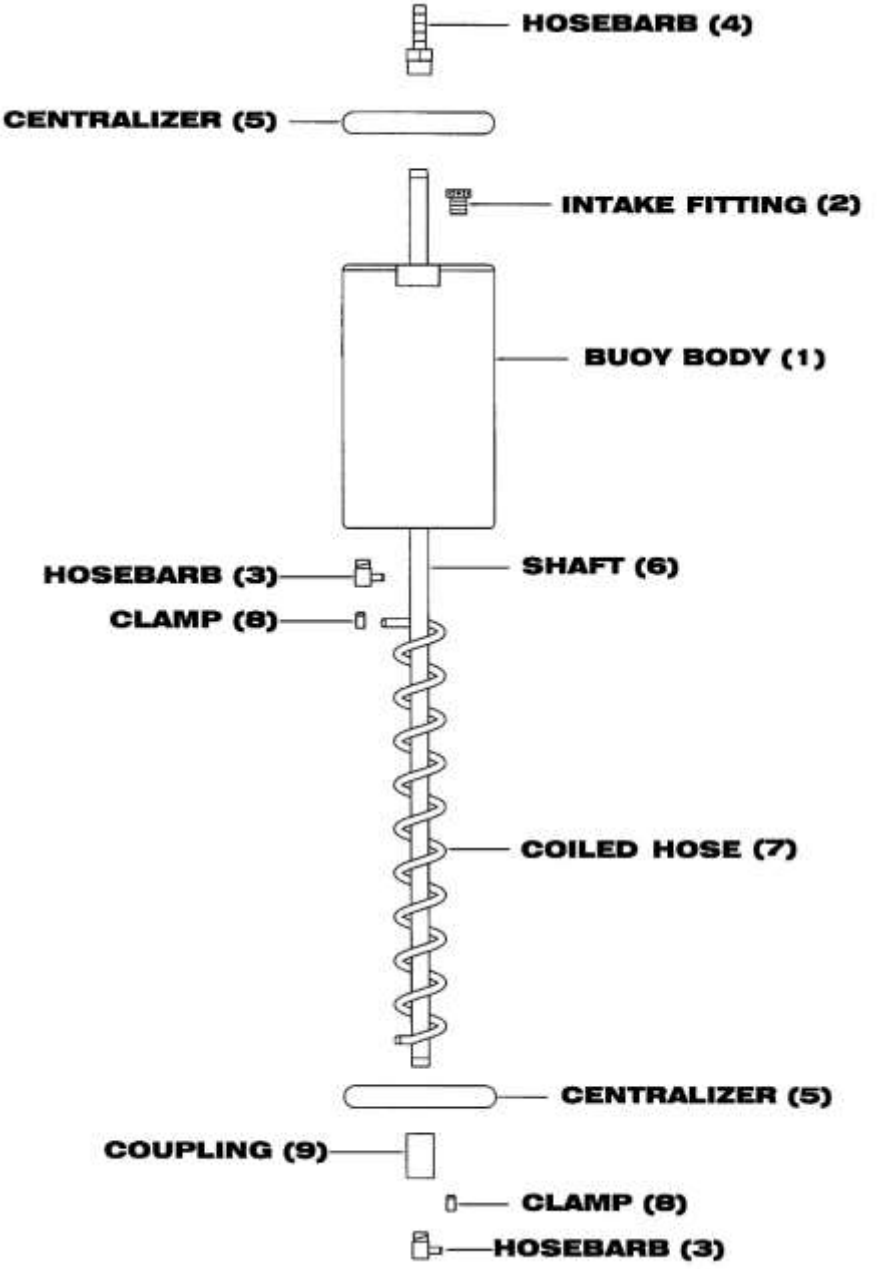

Figure 8-4: 4" Heavy Oil Skimmer Assembly

4” Heavy Oil Skimmer (56600005)

Item #	Part Description	Part #
1	BUOY,PP,HEAVY OIL	26600004
2	FTG,INTAKE,OIL BOUY	26600005
3	HOSEBARB,BRS,.170"X1/8MPT,90D	17500148
4	HOSEBARB,BRS,3/8"X1/8FPT	16650308
5	CENTRALIZER,SKIMMER,PR4	16600048
6	SHAFT,SS,OIL SKIMMER,38"	26600006
7	HOSE,COILED,OIL SKIMMER	26600007
8	CLAMP,SS,DBL PINCH,9/32-23/64"	11200273
9	COUPLING,SS4,.125"	16600006

4" Heavy Oil Skimmer Options

	ASSY,BUOY,OIL SKIMMER,4"	56600060
	VALVE, CHECK, PRODUCT DISCHARGE	26600157

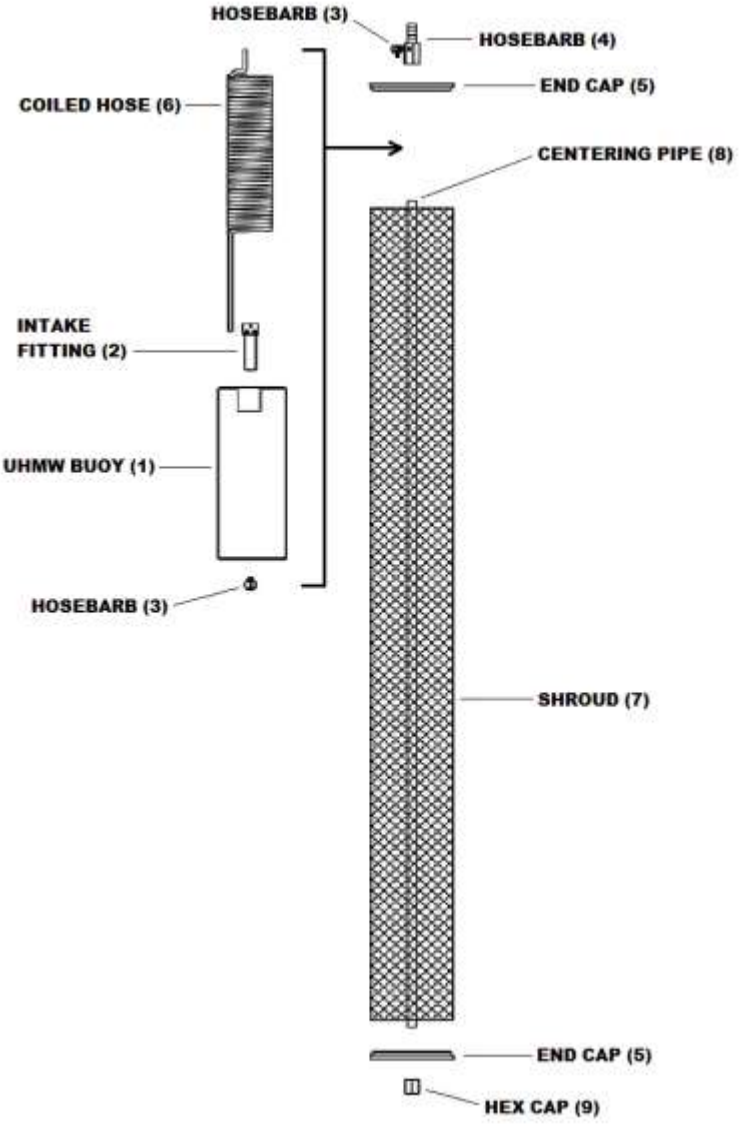

Figure 8-5: 4" High Temperature, Heavy Oil Skimmer Assembly

4”, High Temp, Heavy Oil Skimmer with Screen (56600012)

Item #	Part Description	Part #
1	BUOY,UHMW,HEAVY OIL,HI-TEMP	26600206
2	FITTING,BUOY INTAKE,HTHO	26600207
3	HOSEBARB,BRS,1/8"X10-32,90DEG	17500149
4	HOSEBARB,EXT,1/8M/F NPT,10-32	27200012
5	END CAP,BUOY INTAKE,HTHO	26600209
6	TUBING, COILED, PTFE, HTHO	56600074
7	SKIMMER,SHROUD,4",HTHO	26600210
8	PIPE,CENTERING,SCH80,1/8",HTHO	27500005
9	FITTING,HEX CAP,1/8FPT,HTHO	27200013

Additional 4" High Temp, Heavy Oil Skimmers

	ASSY,SKIMMER,4”,HTHO,5’,EXT. TRAVEL W/SCREEN	56600077

EDCF#	DESCRIPTION	REV/DATE
-	Previous Release	11/02/2011
Project #1369	Updated manual to reflect standard pump - DD	03/25/2014
Project #1369	Updated with tubing information – DD	06/03/2014
Project #1427	Combined Total Fluid System, updated Guzzler Design and Operation, StellaR, SB	4/18/2017

NOTES

NOTES

The Warranty

For a period of one (1) year from date of first sale, product is warranted to be free from defects in materials and workmanship. Geotech agrees to repair or replace, at Geotech's option, the portion proving defective, or at our option to refund the purchase price thereof. Geotech will have no warranty obligation if the product is subjected to abnormal operating conditions, accident, abuse, misuse, unauthorized modification, alteration, repair, or replacement of wear parts. User assumes all other risk, if any, including the risk of injury, loss, or damage, direct or consequential, arising out of the use, misuse, or inability to use this product. User agrees to use, maintain and install product in accordance with recommendations and instructions. User is responsible for transportation charges connected to the repair or replacement of product under this warranty.

Equipment Return Policy

A Return Material Authorization number (RMA #) is required prior to return of any equipment to our facilities, please call our 800 number for appropriate location. An RMA # will be issued upon receipt of your request to return equipment, which should include reasons for the return. Your return shipment to us must have this RMA # clearly marked on the outside of the package. Proof of date of purchase is required for processing of all warranty requests.

This policy applies to both equipment sales and repair orders.

FOR A RETURN MATERIAL AUTHORIZATION, PLEASE CALL OUR SERVICE DEPARTMENT AT 1-800-833-7958.

Model Number: _____

Serial Number: _____

Date of Purchase: _____

Equipment Decontamination

Prior to return, all equipment must be thoroughly cleaned and decontaminated. Please make note on RMA form, the use of equipment, contaminants equipment was exposed to, and decontamination solutions/methods used. Geotech reserves the right to refuse any equipment not properly decontaminated. Geotech may also choose to decontaminate the equipment for a fee, which will be applied to the repair order invoice.

Geotech Environmental Equipment, Inc.
2650 East 40th Avenue Denver, Colorado 80205
(303) 320-4764 ● **(800) 833-7958** ● FAX (303) 322-7242
email: sales@geotechenv.com website: www.geotechenv.com