

RECEIVED

By Alameda County Environmental Health 10:48 am, Jan 28, 2016

January 5, 2016

Ms. Donna Drogos
Alameda County Environmental Health
1131 Harbor Parkway, Suite 250
Oakland, CA 94502-6577

Subject: EBMUD Discharge Application
Shore Acres Gas
403 East 12th Street, Oakland, Alameda County, California
RO #0002931
ECG # GHA.19009

Dear Ms. Drogos:

Enclosed please find a copy of the November 5, 2013 *Application for Discharge Treated Groundwater to the Sanitary Sewer* for the above referenced site prepared by our consultant Environmental Compliance Group, LLC.

I declare, under penalty and perjury, that the information and/or recommendations contained in this report are true and correct to the best of my knowledge.

Respectfully,



Rashid Ghafoor

November 5, 2013

East Bay Municipal Utility District
Environmental Services Division
P.O. Box 24055, MS#702
Oakland, CA 94623-1055

Subject: **Application to Discharge Treated Groundwater to the Sanitary Sewer**
 403 East 12th Street, Oakland, California
 ECG Project #GHA.19009

Dear Sir or Madam:

Environmental Compliance Group, LLC (ECG) has been authorized by Mr. Rashid Ghafoor to submit this application for discharge of treated groundwater to the sanitary sewer at the above referenced site. The site location map is shown as Figure 1. A completed wastewater discharge permit application is included as Appendix A.

Based on the data collected during site assessment studies and monitoring events, ECG prepared the Revised Corrective Action Plan (CAP), dated October 25, 2012 recommending dual phase extraction (DPE) to cleanup gasoline fuel the leaked into soil and groundwater at the site that originated from the former fuel dispensing system and the underground storage tanks (USTs). The former USTs and the fuel dispensing system were removed in August 2009. Alameda County Health Care Services (ACHCS) approved the Revised CAP in a letter dated February 7, 2013 (Appendix B).

The remedial system consists of DPE. The location of the remediation compound is shown on Figure 19. The system once started will operate on a continuous basis for 24 hours and 365 days per year and discharge treated groundwater to the sanitary sewer.

DUAL PHASE EXTRACTION SYSTEM

Equipment

Groundwater and soil vapor will be extracted from the subsurface through extraction wells EW-1 through EW-4 utilizing a Solleco 400 standard cubic feet per minute (scfm) liquid ring pump, a liquid/vapor separator (knockout), a filtration system, an air stripper, two 1,000 pound carbon vessels, and a thermal/catalytic oxidizer for treating extracted vapor prior to discharge through an exhaust stack to the atmosphere under a separate permit.

Soil vapor and groundwater will be extracted simultaneously and the influent water, once separated from the vapor stream in the knockout, will be directed through a filtration system, have 90 percent of the gasoline related contaminants removed through the air stripper, and be pumped through two 1,000-pound carbon adsorption vessels located in series prior to metered discharge to the sanitary sewer. The proposed equipment location is shown on Figure 19 and the process and flow diagram for the equipment is shown on Figure 24.

Process Point 1

Soil vapors and groundwater from the subsurface will be extracted by applying high vacuum on extraction wells using the 400 scfm liquid ring pump as shown process point 1.

Process Point 2

The air-water mixture in the extracted stream will be separated in the 200-gallon knockout tank located within the DPE unit.

Process Point 3

Influent water separated in the knockout tank will be pumped using a 2-HP transfer pump built into the Solleco unit and threw a filtration system. Any sedimentation in the influent larger in diameter than 50 microns will be filtered using one filter housing rated at 150 pounds per square inch (psi) and 125 gallons per minute. The dimensions of the filter are 45-inch in height and 8.62-inch in diameter.

Process Point 4

Groundwater from the filter will enter a QED EZ-Stacker air stripper (specification sheet attached). The air stripper is a high density polyethylene constructed 6 tray design with a sump. An air to water ratio at 150/1, which is 100% efficiency in water treatment for benzene, toluene, xylenes, ethyl benzene, TPHg and TAME. MTBE shows 90% reduction efficiency in modeling. Stripped vapor will be piped back to the Solleco unit and destroyed in the thermal/catalytic oxidizer. Water will be pumped from the air stripper using a 1-HP pump to the granular activated carbon vessels.

Process Point 5

The groundwater will be treated with two 1,000-pound aqueous phase carbon vessels, in series. A totalizing flow meter will be installed inline at the discharge point to the sanitary sewer. The calibrated meter will record the gallons discharged to the sanitary sewer. The location of the sanitary sewer connection is shown on Figure 19.

Level Controls

The knockout tank and air stripper will be equipped with level controls and high-high level alarms and shut-off switches to the DPE system. If one of the transfer pumps fail the high-high level alarm in the holding tank or air stripper will shut down the DPE system.

Carbon Usage

Table 1 shows the weekly and annual calculated carbon usage assuming historically high concentrations of TPHg, benzene, and MTBE. Currently, TPHg will break through the carbon units prior to MTBE and benzene. Based on current conditions, the site will use approximately 220 pounds of carbon in the first year.

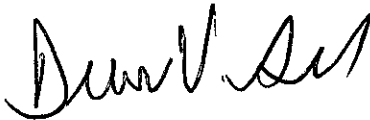
Sampling and Reporting

A sample collection port will be installed for each individual extraction well prior to manifolding, after the knockout tank, after the air stripper, between the two carbon vessels and after the last carbon vessel. The sampling schedule and requirements will be coordinated with EBMUD to comply with permit conditions.

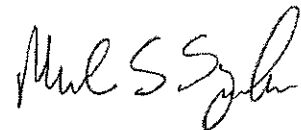
To determine the concentrations of total suspended solids (TSS) and chemical oxygen demand as required in the EBMUD permit application, ECG collected groundwater samples from well EW-1 on October 10, 2013. The results are included in Attachment C. The TSS and COD concentrations were reported at 37 and 26 milligrams per liter, respectively.

If you have any questions, please contact Environmental Compliance Group, LLC at (209) 664-1035.

Respectfully,



Drew Van Allen
Senior Project Manager



Michael S. Sgourakis
Principal Geologist
CA P.G. No. 7194

cc

FIGURES

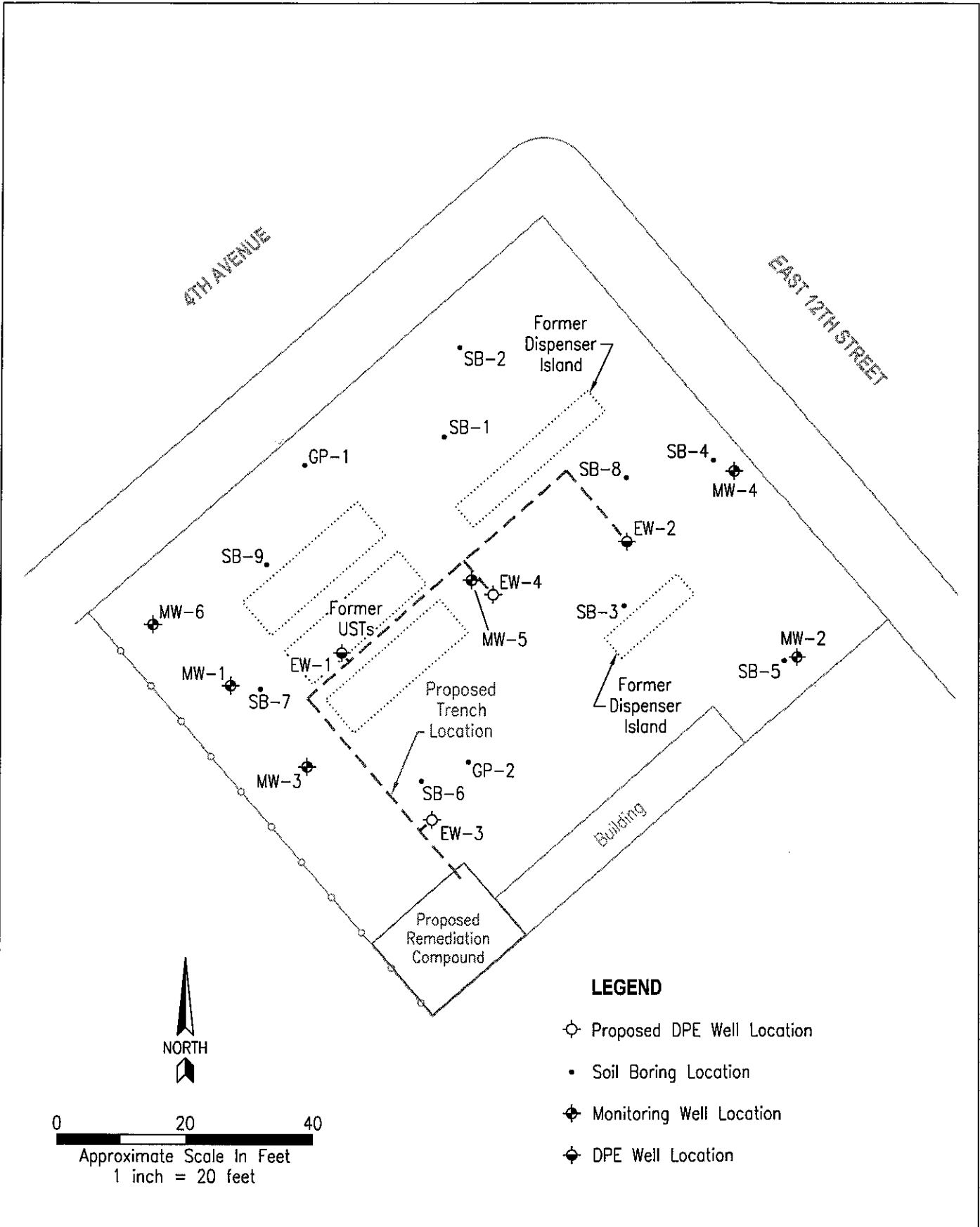


FIGURE 19

Project Number:
GHA.19009

Date:
October 28, 2013

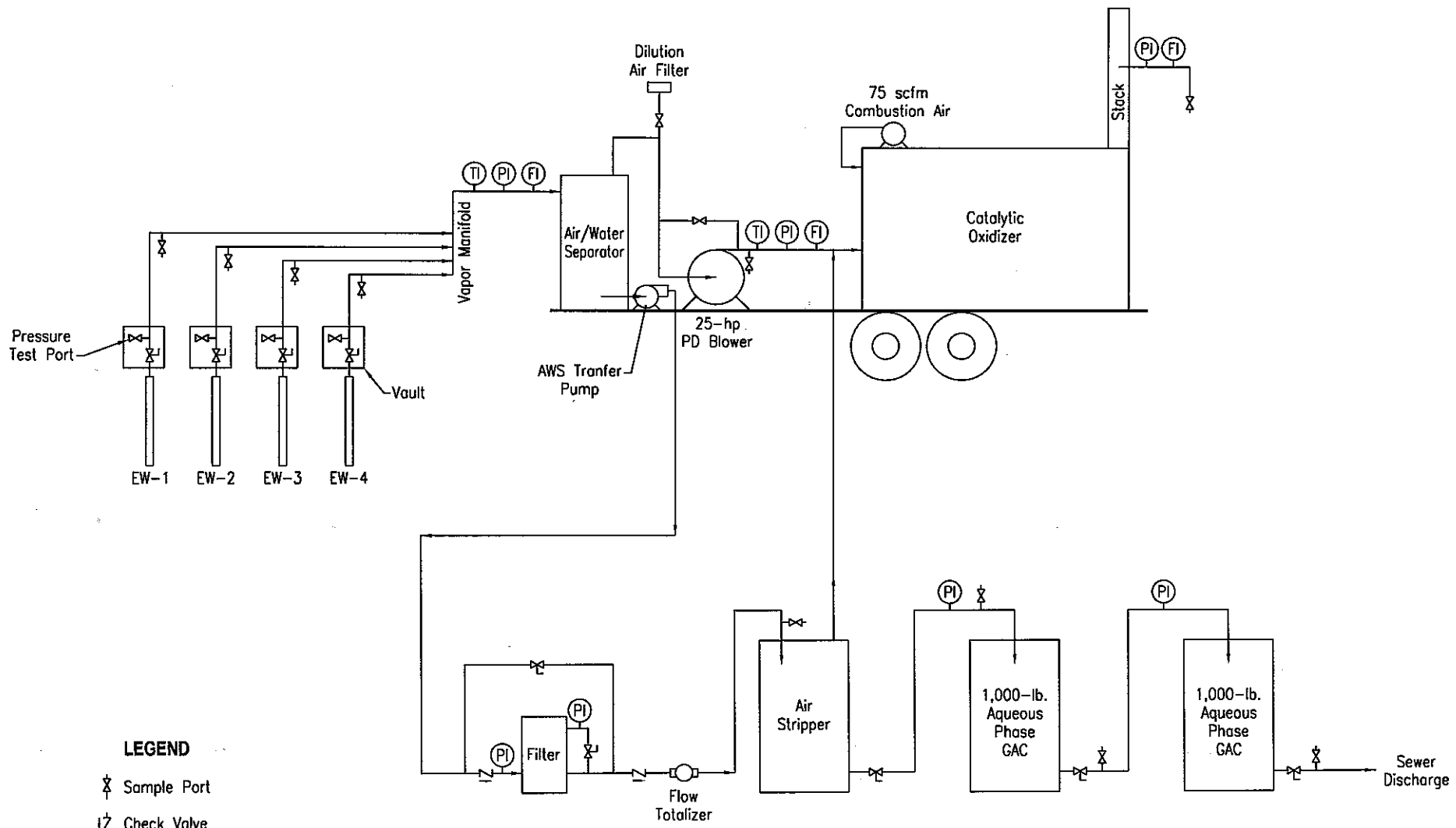
**PROPOSED EXTRACTION WELL TRENCH AND
REMEDIAION COMPOUND LOCATION MAP**

Shore Acre Gas
403 East 12th Street
Oakland, California



**Environmental
Compliance
Group, LLC**

270 Vintage Drive, Turlock, CA 95382
Phone: (209) 664-1035



LEGEND

- ⊗ Sample Port
- ⌞ Check Valve
- ⊗ Ball Valve
- Ⓟ Pressure Indicator
- Ⓡ Flow Indicator
- Ⓣ Temperature Indicator
- Ⓢ Air Bypass Valve

FIGURE 24
 Project Number:
 GHA.19009
 Date:
 October 28, 2013

PROCESS FLOW DIAGRAM

Shore Acre Gas
 403 East 12th Street
 Oakland, California

Environmental Compliance Group, LLC
 270 Vintage Drive, Turlock, CA 95382
 Phone: (209) 664-1035

TABLES

Table 1
Carbon Usage
 Shore Acres Gas
 403 East 12th Street
 Oakland, California

Maximum Influent Concentration (ug/L)	Maximum Effluent Concentration Limit (ug/L)	Average Differential Concentration (ug/L)	Average Flowrate (gpm)	Rate of TPHg Removal (lbs/min)	Rate of TPHg Removal (lbs/day)	Rate of TPHg Removal (lbs/week)	Loading percent	Carbon Usage pounds (week)	Carbon Usage pounds (annual)
1,100	50	1,050	10	9.16E-05	1.32E-01	0.92	22	4.2	218

Maximum Influent Concentration (ug/L)	Maximum Effluent Concentration Limit (ug/L)	Average Differential Concentration (ug/L)	Average Flowrate (gpm)	Rate of Benzene Removal (lbs/min)	Rate of Benzene Removal (lbs/day)	Rate of Benzene Removal (lbs/week)	Loading percent	Carbon Usage pounds (week)	Carbon Usage pounds (annual)
99	0.5	99	10	8.24E-06	1.19E-02	0.08	22	0.4	20

Maximum Influent Concentration (ug/L)	Maximum Effluent Concentration Limit (ug/L)	Average Differential Concentration (ug/L)	Average Flowrate (gpm)	Rate of MTBE Removal (lbs/min)	Rate of MTBE Removal (lbs/day)	Rate of MTBE removal (lbs/week)	Loading percent	Carbon Usage pounds (week)	Carbon Usage pounds (annual)
260	0.5	260	10	2.16E-05	3.12E-02	0.22	24	0.9	47

notes:

TPHg maximum concentration is based on 10 percent of 11,000 ug/L at well EW-4
 Benzene maximum concentration is based on 10 percent of 990 ug/L at well EW-4
 MTBE maximum concentration is based on 10 percent of 460 ug/L at well EW-2
 Mass of Contaminant: (10% concentration (ug/L))*3.78L/gallon*10gpm*(1 g / 10⁶ ug)*(1 lb / 454 g)
 Flowrate based on maximum discharge capacity rate of 10 gpm
 Loading percent based on carbon usage = 22%, based on US Filter rates for TPHg and benzene
 Loading percent based on carbon usage = 24%, based on US Filter rates for mtbe

APPENDIX A



**WASTEWATER DISCHARGE PERMIT
Terms and Conditions
APPLICANT INFORMATION**

APPLICANT BUSINESS NAME		PERMIT NUMBER	
Environmental Compliance Group, LLC			
ADDRESS OF SITE DISCHARGING WASTEWATER			
403 East 12th Street	Oakland	94606	
<small>STREET ADDRESS</small>	<small>CITY</small>	<small>ZIP CODE</small>	
PERSON TO BE CONTACTED REGARDING THIS APPLICATION			
Drew Van Allen	ecg.ust@gmail.com	(209) 664-1035	2096641040
<small>NAME</small>	<small>EMAIL ADDRESS</small>	<small>PHONE NUMBER</small>	<small>FAX NUMBER</small>
PERSON(S) TO RECEIVE PERMIT AND CORRESPONDENCE IF DIFFERENT THAN PERSON SIGNING APPLICATION			
NAME	same		
same	MAILING ADDRESS		
NAME	MAILING ADDRESS		
PERSON TO BE CONTACTED IN THE EVENT OF AN EMERGENCY			
Drew Van Allen	(209) 648-0647	(209) 632-2728	
<small>NAME</small>	<small>DAYTIME TELEPHONE NUMBER</small>	<small>EVENING TELEPHONE NUMBER</small>	
AUTHORIZATION			
Drew Van Allen Principal	is authorized to sign reports, documents, and other correspondence required by this Permit.		
<small>NAME & TITLE</small>			
CERTIFICATION			
<i>I understand that I am legally responsible for discharge of wastewater from the facility and for complying with the Terms and Conditions of this Wastewater Discharge Permit.</i>			
<i>I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.</i>			
Drew Van Allen	Principal		
<small>NAME</small>	<small>TITLE</small>		
	October 8, 2013		
<small>SIGNATURE</small>	<small>DATE</small>		
<small>(TO BE SIGNED BY CHIEF EXECUTIVE OFFICER OR DULY AUTHORIZED REPRESENTATIVE. SEE CERTIFICATION REQUIREMENTS ON REVERSE)</small>			
270 Vintage Drive	(209) 664-1035		
<small>MAILING ADDRESS</small>	<small>PHONE NUMBER</small>		



APPLICANT BUSINESS NAME Environmental Compliance Group, LLC

WASTEWATER DISCHARGE PERMIT

Terms and Conditions

PROCESS DESCRIPTION

The information on this form provides a description of wastewater generating processes, characteristics of the wastewater, and waste management activities. Instructions are on the back of this form.

Permit Number

BUSINESS ACTIVITY Gasoline Service Station	Standard Industrial Classification 5541-01	Business Classification Code
--	---	------------------------------

PROCESSES

Process Description	Wastewater Characteristics	Schematic Process Number
Groundwater Extraction	TPHg, BTEX, MTBE	1
Air/Water Separator	TPHg, BTEX, MTBE	2
Groundwater Collection/Filtration	TPHg, BTEX, MTBE	3
Air Stripper	TPHg, BTEX, MTBE	4
<i>2 carbon vessels</i>	"	<i>5</i>

POLLUTION PREVENTION TECHNIQUES / BEST MANAGEMENT PRACTICES (BMPs)

Air and water are separated in initial system inlet, air is then treated in thermal/catalytic oxidizer and discharged to atmosphere. Water is filtered and run through air stripper to removed the majority of VOCs. VOCs stripped out of water are treated by thermal/catalytic oxidizer. Water passes through two 1,000-pound aqueous phase carbon vessels and into the sanitary sewer.

PRETREATMENT

Pretreatment System	Design Capacity	Loading Rate	Size	Side Sewer Number
<input checked="" type="checkbox"/> filtration	12 gpm	450 psi <i>450</i>	45"	
<input type="checkbox"/> grease trap/oil and water separator				
<input checked="" type="checkbox"/> granular activated carbon	12 gpm	720 <i>720</i>	(2) 1,000 pound vessels	
<input type="checkbox"/> sedimentation				
<input type="checkbox"/> pH adjustment				
<input type="checkbox"/> chlorination				
<input type="checkbox"/> chemical precipitation				
<input checked="" type="checkbox"/> other (describe) <i>air stripper</i>	<i>10 gpm</i>	<i>90° tray</i>		
<input type="checkbox"/> none				

PROCESS GENERATED WASTE

Waste / Disposal Method	Annual Waste Generation	
	Quantity	Unit
Carbon - transport of spent carbon offsite with non-hazardous manifest	11890	pounds



WATER BALANCE/STRENGTH SUMMARY

The information on this form describes the volume, source, and strength of wastewater discharged to the community sewer. Instructions are on the back of this form. Permit Number

WATER USE AND WASTEWATER DISCHARGE BALANCE

Units expressed in: gallons per calendar day or gallons per working day (Number of working days per year 365)

	Source			Wastewater Discharge to each Side Sewer					Water Diverted	Code
	EBMUD	Other	Code ¹	No.	No.	No.	No.	No.		
Sanitary	17280									
Processes										
Product										
Boiler										
Cooling										
Washing										
Irrigation										
Sub-total										
Total	All Sources	17280		All Side Sewers				All Side Sewers + Water Diverted		
Maximum Daily Discharge (gallons)										

METERED WATER

Water Meter Number	Code ³	Percent Discharge to each Side Sewer					Total % Discharge
Private Meter	P	100					

¹Other / Code: Compute the average gallon per day water use from non-EBMUD sources and enter the value in the Other "Sub-total" box. Do not include sources that discharge only to the stormdrain. Allocate the subtotal value to each type of water use. Enter the code(s) that identifies the source water:

A= Well Water / Groundwater B= Stormwater C= Reclaimed Water D= Other (describe)

²Water Diverted/Code: Enter the diverted volume for each type of water use. Enter the code(s) that identifies the diversion:

A= Product B= Evaporation C= Irrigation D= Creek/Bay E= Rail, Truck, Vessel F= Other (describe)

³Metered Water Code(s): E= EBMUD Meter P= Private Meter



WASTEWATER DISCHARGE PERMIT

APPLICANT BUSINESS NAME Environmental Compliance Group, LLC

TERMS AND CONDITIONS

WATER BALANCE/STRENGTH SUMMARY

WASTEWATER STRENGTH ESTIMATES		Wastewater Discharge to each Side Sewer				
		No.	No.	No.	No.	No.
Total Suspended Solids mg/L (TSS)	Average					
	Maximum					
COD	Average					
	Maximum					

DISCHARGE FREQUENCY

Days of Week	<i>continuous discharge</i>				
Time of Day (Start & Stop Time)					
Volume, if Batch Discharge					

SIDE SEWER LOCATION

No.	<i>See site map</i>
No.	
No.	
No.	
No.	

STORMWATER AREA

Total square-foot area exposed to stormwater that drains to the sanitary sewer: 400 sq. ft.

*based on dimensions
of remediation
compound*

APPENDIX B



ENVIRONMENTAL HEALTH DEPARTMENT
ENVIRONMENTAL PROTECTION
1131 Harbor Bay Parkway, Suite 250
Alameda, CA 94502-6577
(510) 567-6700
FAX (510) 337-9335

February 7, 2013

Rashid Ghafoor and Waseem Iqbal (Sent via e-mail to rashidz1@aol.com)
226 Havenwood Circle
Pittsburg, CA 94567

Subject: Revised Corrective Action Plan for Fuel Leak Case No. RO0002931 and GeoTracker
Global ID T0600174667, Shore Acres Gas, 403 E 12th St., Oakland, CA 94606

Dear Messrs. Ghafoor and Iqbal:

Alameda County Environmental Health (ACEH) staff has reviewed the recently submitted document entitled, *Revised Corrective Action Plan* dated October 25, 2012, which was prepared by Environmental Compliance Group (ECG), LLC for the subject site. The Revised CAP presents an evaluation of three active remediation methods including costs with timeframes to reach clean-up levels. The selected remedial option is dual phase extraction (DPE) based on the time frame and lowest costs of cleanup.

The proposed scope of work to implement DPE is acceptable for public comment at this time. Therefore, we request that you distribute the Fact Sheet (attached) to the attached mailing list. Following distribution of the Fact Sheet, please provide personal verification by e-mail or uploaded letter that the Fact Sheet was distributed by U.S. Mail no later than January 20, 2012.

At the end of the 30-day public comment period, ACEH may request that you address the public comments received. If no public comments are received, ACEH may approve implementation of operation of the DPE provided that technical comment 1 below is incorporated during implementation of DPE. We request that you address the following comments, perform the requested work, and send us the reports described below.

TECHNICAL COMMENTS

1. **Downgradient Extent of Groundwater Contamination** – Groundwater samples collected from off-site boring SB-16 contained 4,800 micrograms per liter ($\mu\text{g/L}$) total petroleum hydrocarbons as gasoline (TPHg) and 1,600 $\mu\text{g/L}$ benzene, yet no off-site downgradient monitoring wells have been installed. Please present a work plan to install an appropriate groundwater monitoring and performance monitoring network along transects by the due date listed below. We anticipate that the transect(s) of wells be installed concurrently with system installation and sampled prior to system startup.

2. **Groundwater Monitoring** - Please implement quarterly monitoring for all monitoring wells and quarterly reporting once remediation begins.
3. **Soil Vapor Sampling** – An evaluation of vapor intrusion at the site and adjacent residential properties have not been performed. Please submit a work plan to evaluate soil vapor by the due date below.
4. **Landowner Notification** - Pursuant to Section 25297.15 (a), ACEH, the local agency, shall not consider cleanup or site closure proposals from the primary or active responsible party, issue a closure letter, or make a determination that no further action is required with respect to a site upon which there was an unauthorized release of hazardous substances from an underground storage tank subject to this chapter unless all current record owners of fee title to the site of the proposed action have been notified of the proposed action by the primary or active responsible party. ACEH is required to notify the primary or active responsible party of their requirement to certify in writing to the local agency that the notification requirement in the above-mentioned regulation has been satisfied and to provide the local agency with a complete mailing list of all record fee title owners.

To satisfy the above-mentioned requirement, please complete the enclosed "List of Landowners Form," and mail it back to ACEH within thirty (30) days from the date of this letter.

5. **Baseline Environmental Project Schedule** The State Water Resources Control Board passed Resolution No. 2012-0062 on November 6, 2012 which requires development of a Path to Closure Plan by December 31, 2013 that addresses the impediments to closure for the site. The Path to Closure must have milestone dates to calendar quarter which will achieve site cleanup and case closure in a timely and efficient manner that minimizes the cost of corrective action. The Project Schedule should include, but not be limited to, the following key environmental elements and milestones as appropriate:
 - Preferential Pathway Study
 - Soil, Groundwater, and Soil Vapor Investigations
 - Initial, Updated, and Final/Validated SCMs
 - Interim Remedial Actions
 - Feasibility Study/Corrective Action Plan
 - Pilot Tests
 - Remedial Actions
 - Soil Vapor and Groundwater Monitoring Well Installation and Monitoring
 - Public Participation Program (Fact Sheet Preparation/Distribution/Public Comment Period, Community Meetings, etc.)
 - Case Closure Tasks (Request for closure documents, ACEH Case Closure Summary Preparation and Review, Site Management Plan, Institutional Controls, Public Participation, Landowner Notification, Well Decommissioning, Waste Removal, and Reporting.)

Please include time for regulatory and RP in house review, permitting, off-site access agreements, and utility connections, etc.

Please use a critical path methodology/tool to construct a schedule with sufficient detail to support a realistic and achievable Path to Closure Schedule. The schedule is to include at a minimum:

- Defined work breakdown structure including summary tasks required to accomplish the project objectives and required deliverables
- Summary task decomposition into smaller more manageable components that can be scheduled, monitored, and controlled
- Sequencing of activities to identify and document relationships among the project activities using logical relationships
- Identification of critical paths, linkages, predecessor and successor activities, leads and lags, and key milestones
- Identification of entity responsible for executing work
- Estimated activity durations (60-day ACEH review times are based on calendar days)

Please submit an electronic copy of the Path to Closure Schedule by the date listed below. ACEH will review the schedule to ensure that all key elements are included.

TECHNICAL REPORT REQUEST

Please submit technical reports to ACEH (Attention: Barbara Jakub), according to the following schedule:

- **February 19, 2013** – Send out Fact Sheet
- **February 25, 2013** – Verification that Fact Sheet was distributed to the attached mailing list and persons on cc list at the end of this correspondence and Landowner Notification Form
- **March 21, 2013** – Public Comment Period Ends
- **April 8, 2013** – Work Plan
(File to be named WP_R_yyyy-mm-dd)
- **April 8, 2013** – Path to Closure and Schedule
(File to be named PROJ_SCH_yyyy-mm-dd)
- **June 20, 2013** – Quarterly Monitoring Report (2nd Quarter 2013)
(File to be named GWM_R_yyyy-mm-dd)

Messrs. Ghafoor and Iqbal
RO0002931
February 7, 2013, Page 4

- **September 20, 2013** – Quarterly Monitoring Report (3rd Quarter 2013)
(File to be named GWM_R_yyyy-mm-dd)
- **December 20, 2013** – Quarterly Monitoring Report (4th Quarter 2013)
(File to be named GWM_R_yyyy-mm-dd)

Should you have any questions or concerns regarding this correspondence or your case, please call me at (510) 639-1287 or send me an electronic mail message at barbara.jakub@acgov.org.

Sincerely,



Digitally signed by Barbara J. Jakub
DN: cn=Barbara J. Jakub, o, ou,
email=barbara.jakub@acgov.org, c=US
Date: 2013.02.07 16:04:59 -08'00'

Barbara J. Jakub, P.G.
Hazardous Materials Specialist

Enclosure: Public Notification of Site Remediation
 Mailing List for Fact Sheet
 List of Landowners Form Responsible Party(ies) Legal Requirements/Obligations
 ACEH Electronic Report Upload (ftp) Instructions

cc: Michael S. Sgourakis, Environmental Compliance Group, LLC, 270 Vintage Drive,
 Turlock, CA 95382 (*Sent via E-mail to: ecg.ust@gmail.com*)
 Leroy Griffin, Oakland Fire Department, 250 Frank H. Ogawa Plaza, Ste. 3341, Oakland,
 CA 94612-2032 (*Sent via E-mail to: lgriffin@oaklandnet.com*)
 Donna Drogos, ACEH (*Sent via E-mail to: donna.drogos@acgov.org*)
 Barbara Jakub, ACEH (*Sent via E-mail to: barbara.jakub@acgov.org*)
 GeoTracker, e-file

APPENDIX C

argon laboratories

14 October 2013

Mike Sgourakis
Environmental Compliance Group, LLC
270 Vintage Drive
Turlock, CA 95382

RE: Shore Acres Gas Project Data

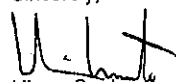
Enclosed are the results for sample(s) received on 10/10/13 14:10 by Argon Laboratories. The sample(s) were analyzed according to instructions in accompanying chain-of-custody. Results are summarized on the following pages.

Please see quality control report for a summary of QC data pertaining to this project.

The sample(s) will be stored for 30 days after completion of analysis, then disposed of in accordance with State and Federal regulations. Sample(s) may be archived by prior arrangement.

Thank you for the opportunity to service the needs of your company.

Sincerely,



Hiram Cueto
Lab Manager

Argon Analytical Services, Inc. CHAIN OF CUSTODY

Project Information:					Report To:					Samples Submitted To:									
Project No:					Consultant:					Laboratory:									
Project Title: <i>Shore Acres Gas</i>					Address:					Address: Argon Labs									
Location: <i>403 E. 12th St. Oakland CA</i>					<i>ECG</i>					2905 Railroad Avenue									
Sampler's Name:										Contact:					Ceres, CA 95307				
(print)					Phone:					(209) 581-9280									
Sampler's Signature:					Fax:					(209) 581-9282									
					Bill To:					Date Results Required:									
					Client:					Date Report Required:									
Address:					<i>ECG</i>														
TURN AROUND TIME					ANALYSIS														
RUSH	24 Hour	48 Hour	Standard (5 days)	Special (10-14 days)															
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<i>TSS</i>	<i>Gas</i>													
																	EDF Reports		COMMENTS
Sample ID.	Date	Time	# Containers	Matrix															Preservative
<i>EW-1</i>	<i>10/10/13</i>	<i>1030</i>	<i>2</i>	<i>water</i>	<i>X</i>	<i>X</i>													
Relinquished By: <i>D. Smith</i>			Date: <i>10/10/13</i>	Time: <i>1410</i>	Received By: <i>U. H. Smith</i>			Date: <i>10/10/13</i>	Time: <i>1410</i>	SPECIAL INSTRUCTIONS:									
Relinquished By:			Date:	Time:	Received By:			Date:	Time:										
Relinquished By:			Date:	Time:	Received By:			Date:	Time:										

Argon Laboratories Sample Receipt Checklist

Client Name: Environmental Compliance Group Date & Time Received: 10/10/13 14:10

Project Name: Shore Acres Gas Client Project Number: GHA.19009

Received By: H.C. Matrix: Water Soil Sludge

Sample Carrier: Client Laboratory Fed Ex UPS Other

Argon Labs Project Number: N310015

Shipper Container in good condition? N/A Yes No Samples received in proper containers? Yes No

Samples received under refrigeration? Yes No Samples received intact? Yes No

Chain of custody present? Yes No Sufficient sample volume for requested tests? Yes No

Chain of Custody signed by all parties? Yes No Samples received within holding time? Yes No

Do samples contain proper preservative? N/A Yes No

Chain of Custody matches all sample labels? Yes No Do VOA vials contain zero headspace? (None submitted) Yes No

ANY "No" RESPONSE MUST BE DETAILED IN THE COMMENTS SECTION BELOW

Date Client Contacted: _____ Person Contacted: _____

Contacted By: _____ Subject: _____

Comments:

Action Taken:

ADDITIONAL TEST(S) REQUEST / OTHER

Contacted By: _____ Date: _____ Time: _____

Call Received By: _____

Comments:



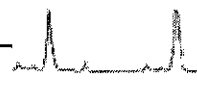


Environmental Compliance Group, LLC 270 Vintage Drive Turlock, CA 95382	Project Number: GHA.19009 Project Name: Shore Acres Gas Project Manager: Mike Sgourakis	Work Order No.: N310015
---	---	----------------------------

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
EW-1	N310015-01	Water	10/10/13 10:30	10/10/13 14:10

Approved By
Argon Laboratories, Inc. California D.O.H.S. Cert. #2359



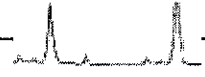
Environmental Compliance Group, LLC 270 Vintage Drive Turlock, CA 95382	Project Number: GHA.19009 Project Name: Shore Acres Gas Project Manager: Mike Sgourakis	Work Order No.: N310015
---	---	----------------------------

ANALYSIS REPORT

Analyte	Result	Reporting Limit	Units	Dilution	Analyzed	Method	Notes
EW-1 (N310015-01) Water Sampled: 10-Oct-13 10:30 Received: 10-Oct-13 14:10							
Total Suspended Solids	37	10	mg/L	1	10-Oct-13	EPA 160.2	
Chemical Oxygen Demand	26	10	"	"	10-Oct-13	SM 5220D	

Approved By

Argon Laboratories, Inc. California D.O.H.S. Cert. #2359



Environmental Compliance Group, LLC
 270 Vintage Drive
 Turlock, CA 95382

Project Number: GHA.19009
 Project Name: Shore Acres Gas
 Project Manager: Mike Sgourakis

Work Order No.:
 N310015

ANALYSIS REPORT - Quality Control

Argon Laboratories

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
---------	--------	-----------------	-------	-------------	---------------	------	-------------	-----	-----------	-------

Batch N301179 - General Prep

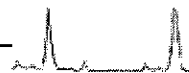
Blank (N301179-BLK1)				Prepared & Analyzed: 10/10/13						
Chemical Oxygen Demand	ND	10	mg/L							
LCS (N301179-BS1)				Prepared & Analyzed: 10/10/13						
Chemical Oxygen Demand	48.0		mg/L	50		96	80-120			
LCS Dup (N301179-BSD1)				Prepared & Analyzed: 10/10/13						
Chemical Oxygen Demand	49.5		mg/L	50		99	80-120	3	20	
Matrix Spike (N301179-MS1)				Source: N310015-01		Prepared & Analyzed: 10/10/13				
Chemical Oxygen Demand	72.5		mg/L	50	26.0	93	70-130			
Matrix Spike Dup (N301179-MSD1)				Source: N310015-01		Prepared & Analyzed: 10/10/13				
Chemical Oxygen Demand	74.0		mg/L	50	26.0	96	70-130	2	20	

Batch N301180 - General Prep

Blank (N301180-BLK1)				Prepared & Analyzed: 10/10/13						
Total Suspended Solids	ND	10	mg/L							
LCS (N301180-BS1)				Prepared & Analyzed: 10/10/13						
Total Suspended Solids	103		mg/L	100		103	80-120			
LCS Dup (N301180-BSD1)				Prepared & Analyzed: 10/10/13						
Total Suspended Solids	102		mg/L	100		102	80-120	1	20	
Matrix Spike (N301180-MS1)				Source: N310015-01		Prepared & Analyzed: 10/10/13				
Total Suspended Solids	135		mg/L	100	37.0	98	70-130			
Matrix Spike Dup (N301180-MSD1)				Source: N310015-01		Prepared & Analyzed: 10/10/13				
Total Suspended Solids	133		mg/L	100	37.0	96	70-130	1	20	

Approved By

Argon Laboratories, Inc. California D.O.H.S. Cert. #2359



Environmental Compliance Group, LLC 270 Vintage Drive Turlock, CA 95382	Project Number: GHA.19009 Project Name: Shore Acres Gas Project Manager: Mike Sgourakis	Work Order No.: N310015
---	---	----------------------------

Notes and Definitions

- DET Analyte DETECTED
- ND Analyte NOT DETECTED at or above the reporting limit
- NR Not Reported
- dry Sample results reported on a dry weight basis
- RPD Relative Percent Difference

Approved By
Argon Laboratories, Inc. California D.O.H.S. Cert. #2359

SPECIFICATION SHEETS



Global (734) 995-2547
Toll-Free (800) 824-2026
Fax (734) 995-1170

▼ Home ▼ About QED ▼ Products ▼ Support ▼ Resources ▼ News ▼ Contact Us ▼ Search

Home » 64.9.214.199 » Products » Treatment » EZ Stacker Air Stripper

EZ-Stacker Low Profile Air Stripper

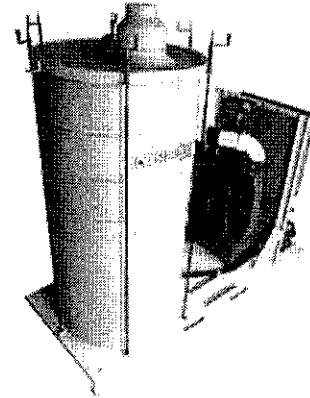
Stackable High-Efficiency Air Stripper For VOC Removal

The EZ-Stacker is a low profile air stripper used to remove volatile organic compounds (VOC) from groundwater. The exclusive design of the EZ-Stacker stripper results in VOC removal rates up to 99%.

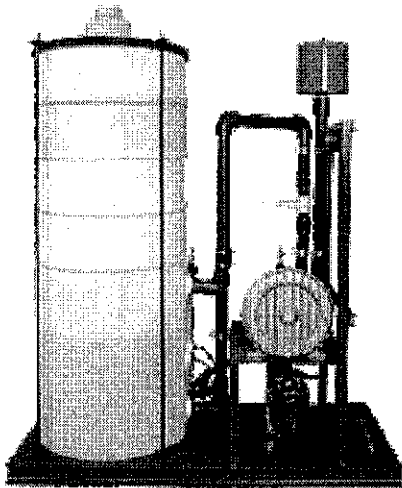
The unique E-Z Stacker configuration consists of a series of integrally-molded shell/tray modules. The multiple sieve tray design uses forced-draft air bubble generation to provide rapid, effective VOC removal (up to 99%).

Every element of the heavy-duty HDPE construction has been engineered for durable, reliable performance with a multi-step positive seal against leakage.

The EZ-Stacker air strippers are available in configurations with 4 or 6 trays, with maximum flow rates from 1 to 40 GPM (4 - 151 LPM).



Low Cost, Low Maintenance, Low Flow Performance



The innovative design of E-Z Stacker™ Air Strippers delivers many advantages to environmental consultants, remediation contractors, and end-users.

E-Z Stacker models are sized and priced to be the most economical choice for many low to moderate flow cleanup applications (up to 40 GPM). Low capital expense and low O & M requirements make the difference.

The unique E-Z Stacker configuration consists of a series of integrally-molded shell/tray modules. The multiple sieve tray design uses forced-draft air bubble generation to provide rapid, effective VOC removal (up to 99%).

Every element of the heavy-duty HDPE construction has been engineered for durable, reliable performance with a multi-step positive seal against leakage.

Easy disassembly cuts cleaning costs





Disassembly for routine cleaning is a quick, simple, one-person job. The whole stack (4 or 6 trays) can be taken apart by releasing just four connections. Trays have no loose parts when disassembled, and cannot be reassembled incorrectly.

Easy-access fittings allow units to be placed in corners or other tight spaces. Two sizes are available in four or six-tray versions, for maximum flow ranges from 1-25 GPM.


Specifications

EZ-Stacker Advantages

- ▼ Cylindrical shape provides consistent tray to tray contact with no loose or weak points from corners or edges.
- ▼ 360 degree lockdown ring, made of solid 2 x 2 x 1/4" steel angle stock, applies even pressure to the whole circumference of the complete stack.
- ▼ Recessed tray bottom prevents contact between the water and the gaskets.
- ▼ Heavy-duty gaskets are captured on both inboard and outboard edges to eliminate creeping.
- ▼ Continuous molded-in bead provides optimum gasket compression.
- ▼ Unlike tedious, potentially weak tray-to-tray latches, the whole stack ties down securely with just four easy-access connections.

Model	Flow (GPM)	Dry Weight	Operation Weight	Shell Dimensions	No. Trays and Weight	Active Area	Nominal airflow	Drawings
EZ-2.4P	1-25 GPM (4-94.6 LPM)	103 lb (46.72 Kg)	483 lb (219 Kg)	27 x 83 in (68.6 x 210.8 cm)	4 x 16 lb (4 x 7.3 Kg)	2.6 sq. ft (0.24 m ²)	140 cfm (3.96 m ³ /min)	
EZ-2.6P	1-25 GPM (4-94.6 LPM)	135 lb (61.3 Kg)	531 lb (240.9 Kg)	27 x 103 in (68.6 x 261.6 cm)	6 x 16 lb (6 x 7.3 Kg)	2.6 sq. ft (0.24 m ²)	140 cfm (3.96 m ³ /min)	
EZ-4.4P	1-40 GPM (4-151.4 LPM)	155 lb (70.3 Kg)	1,004 lb (455.4 Kg)	37 x 83 in (94.0 x 210.8 cm)	4 x 24 lb (4 x 10.9 Kg)	5.8 sq. ft (0.54 m ²)	210 cfm (5.95 m ³ /min)	
EZ-4.6P	1-40 GPM (4-151.4 LPM)	203 lb (92.1 Kg)	1,134 lb (514.4 Kg)	37 x 102 in (94.0 x 259.1 cm)	6 x 24 lb (6 x 10.9 Kg)	5.8 sq. ft (0.54 m ²)	210 cfm (5.95 m ³ /min)	

* skid mounted

 Complete EZ-Stacker Engineering Specifications

Materials of construction:

Trays, sump, cover, internals
Piping
Skid
Demister

HDPE
CPVC
Epoxy coated mild steel
Polypropylene

Blower Options:

208-230/460 Volt,
115/208-230 Volt,
208-230/460 Volt,
230 Volt,

3 Phase, TEFC, 3.5HP
1 Phase, TEFC, 2.5HP
3 Phase, EXP, 4HP
1 Phase, EXP 3HP

All blowers supplied with blower piping and flow throttle

Sound Rating:

70dB at 10', 74dB at 3' with 230V/1/TEFC blower and two 1/2HP transfer pumps operating

Stripper Options:

Air flow meter
Sump high level switch
Stack support kit

Sump low pressure switch
Sump high pressure switch
Discharge pump level controls

On Line Air Stripper Modeler

The exclusive QED On Line Air Stripper Modeler has been developed to assist you in selecting the most efficient air stripping package for your groundwater cleanup project.

 Run the QED On Line Air Stripper Modeler Now

 Print Friendly Version

QED Environmental Systems, Inc.



6095 Jackson Road • Ann Arbor, MI 48103-9573 USA
Mailing Address: PO Box 3726 • Ann Arbor, MI 48106-3726 USA
Tel (734) 995-2547 • Toll-Free in North America (800) 624-2026 • Fax (734) 995-1170

1133 Seventh Street • Oakland, CA 94607 USA
Tel (510) 891-0880 • Toll-Free in North America (800) 537-1767 • Fax (510) 444-6789

[Home](#) | [Site Map](#) | [Contact Us](#)

www.qedenv.com • info@qedenv.com

© 1982 - 2007, QED Environmental Systems, Inc. All Rights Reserved

QED SAMPLE ENGINEERING SPECIFICATION

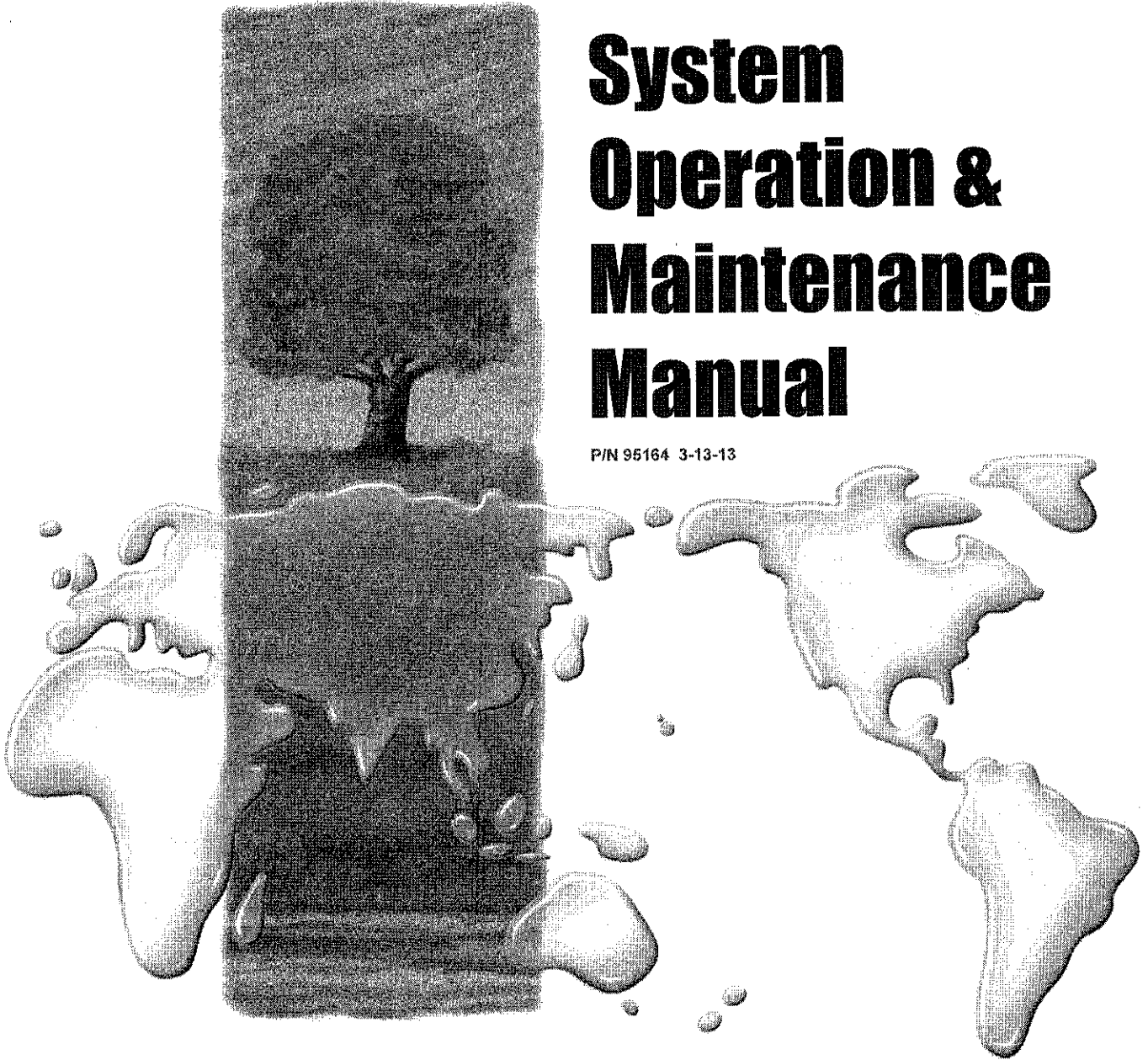
**ENGINEERING DATA SHEET 2
AIR STRIPPER (STACKABLE TRAY)**

<u>REF</u>	<u>ITEM</u>	<u>SPECIFICATION (S)</u>
1.3.1.3	<u>Standard</u> Sump pressure gauge:	Differential pressure gauge, diaphragm-actuated dial type, 0-50" H ₂ O range
	Sump sight gauge:	Clear tube connected to sump water drain for visual sump water level monitoring
	<u>Recommended options</u> Sump high level switch:	PVC jacketed SPST, 20VA
	Sump low pressure switch:	SPST, 15VA, EXP
	<u>Options</u> High pressure switch:	SPST, 15VA, EXP
	Air flow indicator:	Pitot tube
	Air flow gauge:	Differential pressure gauge, diaphragm-actuated dial type: 0-0.25" H ₂ O range (2.XP models) 0-1" H ₂ O range (4.XP models)
	Liquid flow meter:	Digital in-line <u>or</u> Check if included <u>r</u> mechanical brass nutating disk
	Pump on/off switch:	PVC jacketed SPST, 20VA
2.2.1.3	Demister:	High efficiency polypropylene (98% removal of droplets @ 10 microns)
2.2.1.6	Shell/tray material: Wall thickness:	UV-protected high-density polyethylene (HDPE) 0.25"
2.2.2.1	Tray material:	304 stainless steel
2.3.4	Minimum air/water ratio:	50:1
2.3.5	Design flow for this spec:	_____ GPM Or see attached
2.3.6	Design temperature for this spec:	_____ °F (water) Or see attached _____ °F (air) Or see attached
	Site altitude:	_____ feet above sea level
2.3.7	Design concentrations for this spec:	_____ _____ _____ _____ _____

EZ-Stacker Air Stripper

System Operation & Maintenance Manual

P/N 95164 3-13-13



QED EZ-Stacker™ Operations and Maintenance Manual

Introduction

This manual contains instructions for installing, start-up and operation of a QED EZ-Stacker™ Air Stripper for the treatment of dissolved-VOC-contaminated waters. The EZ-Stacker™ Air Stripper is a sieve tray type of stripper which accomplishes mass transfer by creating a large amount of fine air bubbles into which volatile organics are stripped. Efficient stripping with this type of a unit is affected by:

- Water temperature-- higher temperature allows better stripping
- Specific compound being stripped--higher Henry's Law constant equals better stripping
- Air to water ratio--the higher the air to water ratio (air flow for a given water flow) the better the stripping
- Stripper efficiency--certain design elements, such as tray design affect stripping efficiency
- Surfactants (soaps, cleaning agents, etc.) and oil/grease can negatively impact stripping efficiency

From an operation standpoint the single most important factor is ensuring that the recommended amount of clean air is flowing through the stripper. Air flow is most affected by tray fouling (typically with precipitated iron oxides) which creates back pressure on the blower and causes it to operate at a lower air flow point on its curve. Maintaining clean trays and using the excess capacity on the blower can help control fouling conditions. Occasional gasket replacement can be anticipated depending on the frequency of stripper disassembly and reassembly. The stripper blowers and any transfer pumps should be regularly maintained based upon the manufacturer's maintenance schedule. All other stripper components are largely maintenance free. Please refer to Figure 1 at the end of this manual for understanding terminology.

Installation

Installing Skid Mounted Systems

Complete skid mounted systems arrive at your site as shown in Figure 1. A system of this type is mounted, piped and optionally wired at the factory. All components and functions are 100% wet checked.

Influent piping. Connect system influent piping to the influent feed pump or directly to the stripper at the piping connection located on the top of the stripper. Factory piped influent feed pump systems use flexible pressure hose between the pump and the stripper influent piping connection and includes a check valve to prevent air backup into a transfer tanks or oil water separator. If the stripper

influent is plumbed directly on site, a flexible hose connection is recommended to ease stripper disassembly and reassembly during use.

Effluent piping. Factory piped effluent discharge pump systems use flexible pressure hose between the stripper discharge piping connection, located at the bottom of the stripper sump and the effluent discharge pump. Factory installed gravity discharge piping connects at the same discharge point on the stripper sump and utilizes a gravity drain kit which includes a siphon break and water head seal. If the stripper is plumbed on site connect the discharge pump to the stripper sump at the discharge connector. Gravity drain piping should be a minimum of 2-3" in diameter (depends on the model) and designed as shown in Figures 4 or 5.

Blower piping. *Important! Total sump pressures should never exceed 50" WC! This will void QED Warranty.* The blower piping that connects the blower to the air stripper are typically of an inverted-U shape, with a high leg to reduce the chance of flooding the blower in the event of an unforeseen flood condition.

On EZ-2.xP models, QED typically use regenerative blowers sized so that they do not require much, if any, throttling of the airflow. Regenerative blowers are limited in the amount of throttling that can be applied, since added backpressures may cause the blower motor to run above full-load-amp condition and cause the blower motor to overheat. If customer is installing their own piping kit on an oversized regenerative blower, it is recommended that an air dilution/bleed valve be installed in the blower piping to provide flexibility in controlling airflow.

Stripper Air Discharge Stack. The stripper discharge pipe is located on top of the air stripper and is 4" or 6" in diameter (depending upon model). The wider section of the discharge porting contains the demister element which removes entrained water droplets from the air exiting the stripper. Coalesced water droplets collect on the demister and then fall back into the stripper top tray. Piping or ducting for the stripper discharge stack should be of equal diameter or larger to avoid creating excess back pressure on the stripper blower. A flexible coupling, such as a Fernco brand, is recommended to connect the discharge pipe to the stripper air discharge stack to ease unit disassembly for cleaning. It is also important to pipe the air stripper air discharge such that it is not in proximity with the air stripper blower inlet; this minimizes the risk of sending already-contaminated air back into the air stripper and reducing stripper performance.

Sensors. Normal sensors used with this type of air stripper include a sump high level alarm float sensor, sump low air pressure sensor and optional discharge pump on-off float sensor. If these sensors are supplied with the stripper they will be installed in the stripper sump and piping. Often the system control panel must be mounted in a remote location from the stripper (in cases where the location is classified as an explosion hazard area.) If the panel is to be remotely-mounted a licensed electrician should hook the stripper sensors up to the panel. It is

important that these sensors be tested prior to operating the stripper. A frequent cause of improperly operating systems are float sensors which act in the opposite sense of that which the control panel expects (normally-open vs. normally-closed). It is also important to conform to electrical code requirements for classified areas; sensors may require intrinsically safe barriers.

Installing Bare Stripper Sump and Tray Systems

Bare stripper sump and tray systems are provided in cases where the contractor will mount the stripper to a user supplied skid or concrete pad. These systems are supplied with a second gasket compression ring that anchors the gasket compression rods at the bottom of the stripper. The bottom gasket compression ring has tabs protruding around its circumference which allow mounting of the ring to a skid or concrete pad.

If the blower is purchased from the factory it is recommended that the blower piping package also be purchased. If the contractor is supplying their own blower it must meet the typical performance specifications listed below to achieve the desired contaminant removals. If the air stripper is built to non-standard parameters, the performance specifications below may not apply.

<u>Air Flow:</u>	140 cfm (for EZ-2.xP) or 280 cfm (for EZ-4.xP) at maximum system back pressure
<u>Pressure:</u>	Sufficient to overcome tray, piping and air treatment process back pressures at a flow rate of 140cfm. <i>Important! Total sump pressures should never exceed 50" WC! This will void QED Warranty.</i>
<u>Tray Back Pressures</u>	16-20"H ₂ O for 4-trays; 24-30"H ₂ O for 6-trays (assuming no add'l pressure from equipment downstream of air stack).

The blower piping should include a high leg which acts to reduce the risk of flooding the blower if the high sump level sensor was to malfunction in the stripper sump. See Figures 2 and 3 (for models EZ-2.xP and EZ-4.xP, respectively) for examples of proper blower piping configurations.

The EZ-2.xP models typically use regenerative blowers sized so that they do not require much, if any, throttling of the airflow. Regenerative blowers are limited in the amount of throttling that can be applied, since added backpressures can cause the blower motor to run above full-load-amp conditions and overheat. If customer is installing their own piping kit on an oversized regenerative blower, it is recommended that an air dilution/bleed valve be installed in the blower piping to provide flexibility in controlling airflow. A throttle valve is shown in Figure 1; a dilution/bleed valve is not shown.

Influent and effluent piping and sensor hook-up should be as described in the section on skid mounted systems, above.

Startup

The EZ-Stacker™ stripper is designed to start up dry without priming the sealpot or throttling the blower. The stripper blower should be running before water is introduced to the stripper. Water flows into the top tray and proceeds tray by tray to the stripper sump. Stripper seal pots fill with water and allow complete start up during intermittent operation. IMPORTANT: Before starting the system verify correct blower motor rotation (plus any other motors within the treatment system).

Verify that the sump air pressure is 16-20" H₂O for 4-tray systems or 24-30" H₂O for 6-tray systems (it is normal to see lower sump pressures at the very start of operation before the seal pots and trays fill with water.) Sump pressures lower than these values may indicate either a blower throttle which is not sufficiently open or insufficiently-compressed tray seal gaskets. *If the system configuration includes additional backpressure (from vapor phase carbon, for example), the sump pressures will be greater than these values. it is important that the blower is sized to accommodate the added pressures, being careful that air stripper sump pressures never exceed 50" WC. Total sump pressures exceeding 50" WC will void QED Warranty!* Check the blower piping throttle valve and make sure the hold-down rods are tightened firmly, but not over tightened. The hold-down tensioning springs should be compressed to a length of 3-1/2 inches for proper gasket sealing.

Step by step startup includes:

1. Power the main control panel on.
2. Turn the blower on. For QED supplied control panels set the motor operation switch to AUTO.
3. Turn the stripper feed pump on (allow water to enter the stripper for gravity feed systems.) For QED supplied control panels set the motor operation switch to AUTO (some systems have a delay timer on the feed pump--check control panel documentation for details.)
4. Turn the discharge pump on. For QED supplied control panels set the motor operation switch to AUTO.
5. Open or close the blower air flow throttle and air dilution valve (if required) to produce a sump pressure reading of 16-20"H₂O for 4-tray systems or 24-30"H₂O for 6-tray systems (these are typical values, but these may differ depending whether any other pressures need to be accounted for. NOTE: It is normal to see

lower sump pressures at the very start of operation due to sealpots and trays filling with water.

Operation

Stripper operation is normally automatic. One option for QED supplied control panels is a blower time-out relay which continues to run the blower for several minutes after the feed pump stops. Continued blower operation insures that any residual water left on the stripper trays has sufficient time to strip before the blower shuts down. A time of at least 15 minutes is recommended. Strippers with start-stop cycles of more than 2-4 times per hour should be set to run continuously.

For sites with high dissolved iron content stripper cleaning may be required. Tray fouling is evidenced by increasing sump back pressure. Opening the blower air flow throttle will allow continued operation in some situations and will lengthen the time between tray cleanings. It is most important to maintain an air flow of 140cfm through the unit. If the stripper air flow decreases the stripping efficiency decreases. Below 100 cfm air flow the stripper will start begin to “weep” water through the tray holes from upper trays to lower trays before the water has had sufficient residence time for removal. If stripper performance falls off, check for tray fouling or a blower air flow throttle that is not opened sufficiently.

Maintenance

Tray fouling due to iron precipitation, solids loading, or bio-fouling is evidenced by increased sump pressures, decreased stripper performance (removal rates not being met) or noticeable discoloration on the trays. Stripper cleaning is required when trays are fouled.

Step by step cleaning includes:

1. Before working on any equipment lock-out power to the unit.
2. Disconnect the stripper discharge pipe from the stripper exhaust stack piping.
3. Unscrew the hold-down rod nuts (cranks) and remove the gasket hold-down ring.
4. Remove the stripper trays. Please note the tray seal pots will have some water remaining in them.
5. Using a pressure washer and medium bristle brush clean any residue from the trays surfaces, concentrating on the sieve holes. DO NOT USE SOAP or cleaning agents unless they will be thoroughly rinsed from the trays; soap residue can affect stripper performance.

6. For hard to remove scales and precipitates a dilute (5%-10%) muriatic acid and water solution can be used to rinse or soak the trays. Be certain to completely rinse the solution off the trays before reassembling the unit.
7. Reassemble the trays--note that they are numbered and that a mark is used to assist in proper alignment of the trays during reassembly. Check to make sure the gasket is still seated correctly and undamaged.
8. Reinstall the gasket hold-down ring and retension the hold-down rod nuts (cranks.) The hold-down tensioning springs should be compressed to a length of 3-1/2 inches for proper gasket sealing.
9. Reattach any pipe and exhaust stack connections.
10. Follow Start-Up instructions, above.

Other stripper maintenance items include:

1. Periodically check blower for vibration. Bearings may require eventual service or conditions of excessive motor start / stop cycles may lead to premature motor or blower failure.
2. Check gasket condition during disassembly for cleaning. The gasket is designed to allow numerous assembly and disassemblies before requiring replacement. Contact QED for information and pricing about gasket replacement kits.
3. The stripper demister element is essentially maintenance free, although dried inorganic residue can build up within the demister and affect demister operation. This condition is evidenced in water droplets not being removed by the demister and blowing out of the stripper exhaust stack--occasionally on start-up water is discharged from the stripper stack, which is normal. The demister may be cleaned with a dilute muriatic and water solution (5%-10%) as instructed for tray cleaning.
4. Solids may build up in the sump. These solids can be suctioned out during tray cleaning operations.
5. Periodically check the structural integrity of the stripper sump, trays and top. Check bulkhead nuts for snugness. Cracks or loose fittings will normally be evidenced by water leakage.

Troubleshooting

Some common problems include:

1. *Leaks.* Leaks around trays or at the sump indicate an insufficiently compressed tray gasket. Make sure the hold-down tensioning springs are compressed to a length of 3-1/2 inches for proper gasket sealing. Also check for damaged gaskets (over compressed gaskets, cut gaskets, loose gaskets, etc.) Damaged gaskets

should be replaced with new gaskets. Contact QED for information and pricing about gasket replacement kits. For leaks at fittings, check for fitting tightness.

2. *Stripper not meeting removal requirements.* Contaminated stripper air is the most common reason for poor stripping performance within the low-ppb concentration range--make sure that the stripper blower intake is drawing in clean, uncontaminated air. Check for sufficient air flow through the stripper. Check that trays are clean. Check that demister is not clogged or causing increased blower back pressure. Check any stripper air discharge treatment units for increased back pressure. Check that stripper influent flow or concentration has not increased beyond the design basis used to predict stripper performance. Make sure that the influent does not have surfactants (soaps, etc.), oils, grease, or other immiscible phases in the influent stream. Surfactants are evidenced by increased foaming through the stripper unit.

3. *Sump pressure not at recommended levels.* Check sump pressure gauge tubing for accumulated water that could impair gauge performance. Check gaskets for damage and proper seating. Check for proper hold-down spring tensioning. Check blower piping connections for leakage. Check blower for proper rotation. Check design of gravity drain piping if piping is not QED-supplied. Check blower intake filter / silencer (if included) for clogging. Order new filter elements from QED.

4. *Stripper cleaning frequency seems excessive.* At sites with high iron loading, consider iron sequestering agents or other technology which will reduce/prevent iron precipitation or allow for easier cleaning.

Please investigate all the above-mentioned items while troubleshooting. For additional problem solving assistance contact QED Service at:

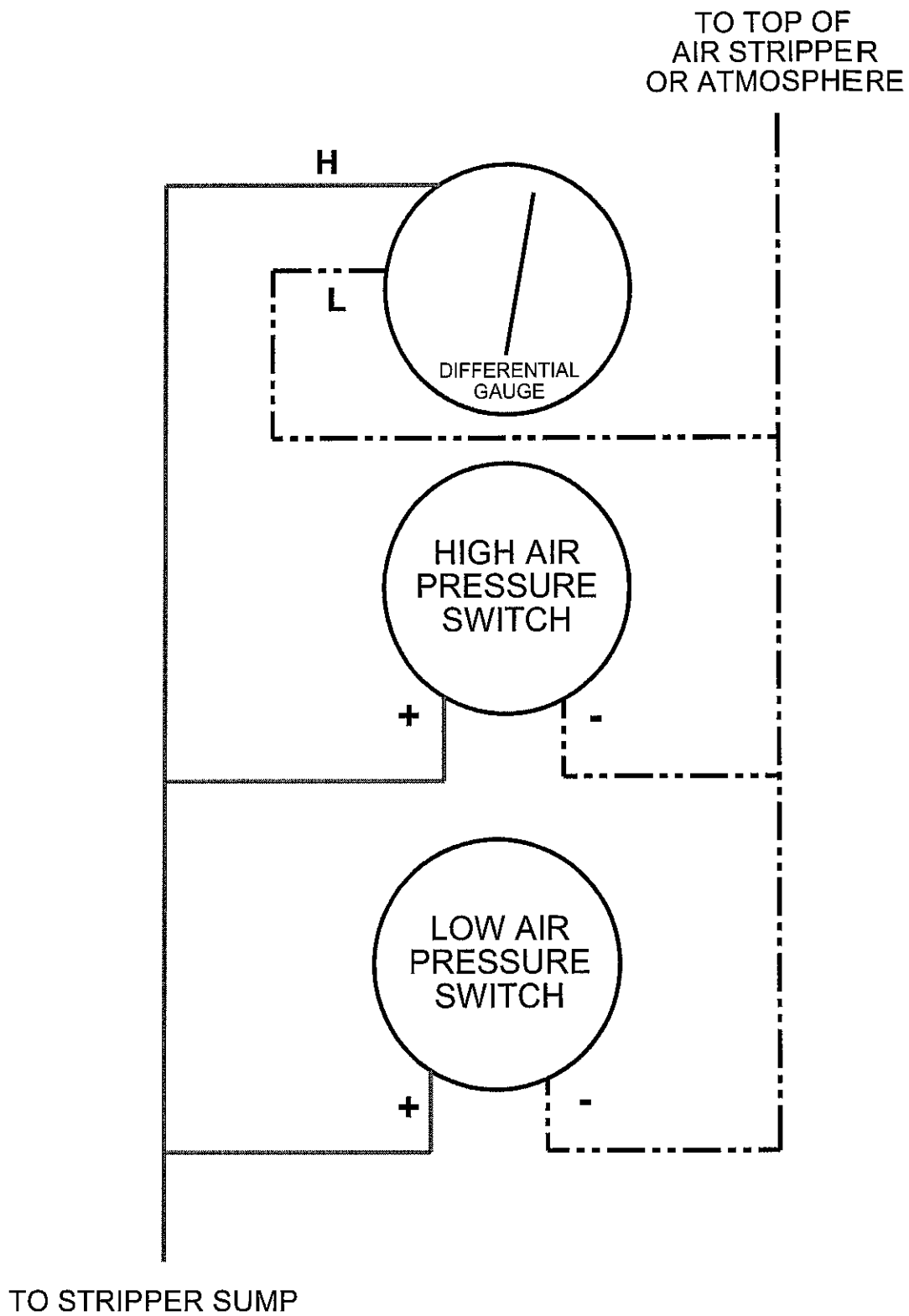
Phone: 1-800-624-2026

FAX: 1-734-995-1170

24 Hour Service Hot Line: 1-800-272-9559

Please have the following information ready for the QED Service person:

1. Identify the product or system involved by QED order number.
2. Specify where, when, and from whom the product was purchased.
3. Describe the nature of the defect or malfunction.



AIR STRIPPER GAUGE AND PRESSURE SWITCH CONNECTION DIAGRAM (Optional)

QED TREATMENT EQUIPMENT WARRANTY

QED Environmental Systems Inc. (QED) warrants to the original purchaser of its products that, subject to the limitations and conditions provided below, the products, materials and/or workmanship shall reasonably conform to descriptions of the products and shall be free of defects in materials and workmanship. Any failure of the products to conform to this warranty will be remedied by QED in the manner provided herein.

QED warrants the equipment components of its manufacture for a period of one (1) year from date of delivery. Our sole obligation during this warranty will be to repair or replace (at our option) the defective components. We are not responsible for consequential damages. Labor costs are not included.

Purchaser's exclusive remedy for breach of said warranty shall be as follows: if, and only if, QED is notified in writing within the applicable warranty period of the existence of any such defects in the said products, and QED upon examination of any such defects, shall find the same to be within the term of and covered by the warranty running from QED to Purchaser, QED will, at its option, as soon as reasonably possible, replace or repair any such product, without charge to Purchaser. If QED for any reason, cannot repair a product covered hereby within four (4) weeks after receipt of the original Purchaser's notification of a warranty claim, then QED's sole responsibility shall be, at its option, either to replace the defective product with a comparable new unit at no charge to the Purchaser, or to refund the full purchase price. In no event shall such allegedly defective products be returned to QED without its consent, and QED's obligations of repair, replacement or refund are conditioned upon the Purchaser's return of the defective product to QED.

IN NO EVENT SHALL QED ENVIRONMENTAL SYSTEMS INC. BE LIABLE FOR CONSEQUENTIAL OR INCIDENTAL DAMAGES FOR BREACH OF SAID WARRANTY.

The foregoing warranty does not apply to major subassemblies and other equipment, accessories, and other parts manufactured by others, and such other parts, accessories, and equipment are subject only to the warranties supplied by their respective manufacturers. In the event of failure of any such product or accessory, QED will give assistance to Purchaser in obtaining from the respective manufacturer whatever adjustment is reasonable in light of the manufacturer's own warranty.

THE FOREGOING WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED, IMPLIED OR STATUTORY (INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE), WHICH OTHER WARRANTIES ARE EXPRESSLY EXCLUDED HEREBY, and of any other obligations or liabilities on the part of QED, and QED neither assumes nor authorizes any person to assume for it any other obligation or liability in connection with said products, materials and/or workmanship.

It is understood and agreed that QED shall in no event be liable for incidental or consequential damages resulting from its breach of any of the terms of this agreement, nor for special damages, nor for improper selection of any product described or referred to for a particular application.

This warranty will be void in the event of unauthorized disassembly of component assemblies. Defects in any equipment that result from abuse, operation in any manner outside the recommended procedures, use and applications other than for intended use, or exposure to chemical or physical environment beyond the designated limits of materials and construction will also void this warranty.

The equipment is warranted to perform as specified under the conditions specified here and within the air stripper model or QED will make the necessary changes at no cost to the owner. Some restrictions apply. Requirements for warranty consideration include, (but are not limited to):

1. Current operating conditions do not differ from the previously-modeled conditions.
2. The system should be cleaned regularly to maintain system performance.

3. The equipment is installed, operated and maintained according to QED's instruction or non-QED manufactured subassembly manufacturer's instructions.
4. Air stripper influent air is not "dirty" (does not contain VOC's, etc.).
5. No surfactants, oils, greases, or other immiscible phases are present in the water.
6. Each influent contaminant does not exceed 25% of its maximum solubility under modeled conditions.

QED shall be released from all obligations under all warranties if any product covered hereby is repaired or modified by persons other than QED's service personnel unless such repair by others is made with the consent of QED. If any product covered hereby is actually defective within the terms of this warranty, Purchaser must contact QED for determination of warranty coverage. If the return of a component is determined to be necessary, QED will authorize the return of the component, at owner's expense. If the product proves not to be defective within the terms of this warranty, then all costs and expenses in connection with the processing of the Purchaser's claim and all costs for repair, parts and labor as authorized by owner hereunder shall be borne by the Purchaser.

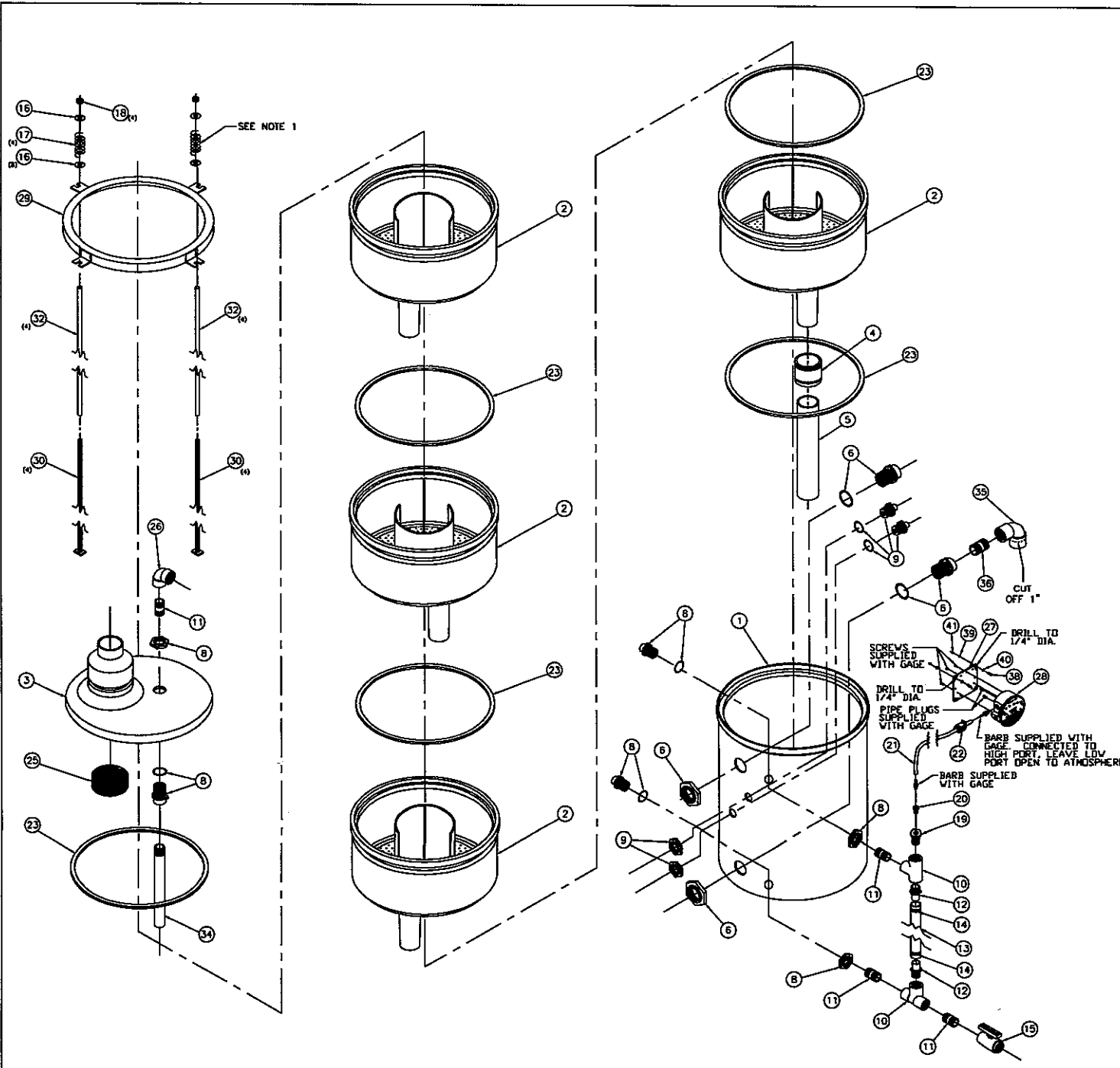
In the event of air stripper performance issues, QED may require customer to conduct a variety of troubleshooting steps. These include, but are not limited to, modifying operational parameters, cleaning air stripper system, modifying (temporarily or permanently) process piping, and obtaining reasonable and necessary influent/effluent samples. These steps are the responsibility of the customer and will be conducted by customer prior to consideration by QED for a site visit. These steps and the associated costs incurred are the responsibility of the customer, regardless of future action. Should customer request a site visit by QED or accept a site visit offer by a QED-trained technician, the visit and associated costs: a) will be the responsibility of the customer at \$500/day, plus travel, lodging, and meals, if the visit finds improper sampling, process piping installation, or equipment operation inconsistent with QED's Operation and Maintenance Manual; or b) will be the responsibility of QED if the visit finds QED responsible for the performance issue(s) raised.

The original Purchaser's sole responsibility in the instance of a warranty claim shall be to notify QED of the defect, malfunction, or other manner in which the terms of this warranty are believed to be violated. You may secure performance of obligations hereunder by contacting the Customer Service Department of QED and:

1. Identify the product or system involved by QED order number.
2. Specify where, when, and from whom the product was purchased.
3. Describe the nature of the defect or malfunction covered by this warranty.
4. If applicable, send the malfunctioning component, *after receiving a Return Authorization Code (RAC) Number by the QED Service Department, to:*

**QED Environmental Systems Inc.
2355 Bishop Circle West
Dexter, MI 48130**

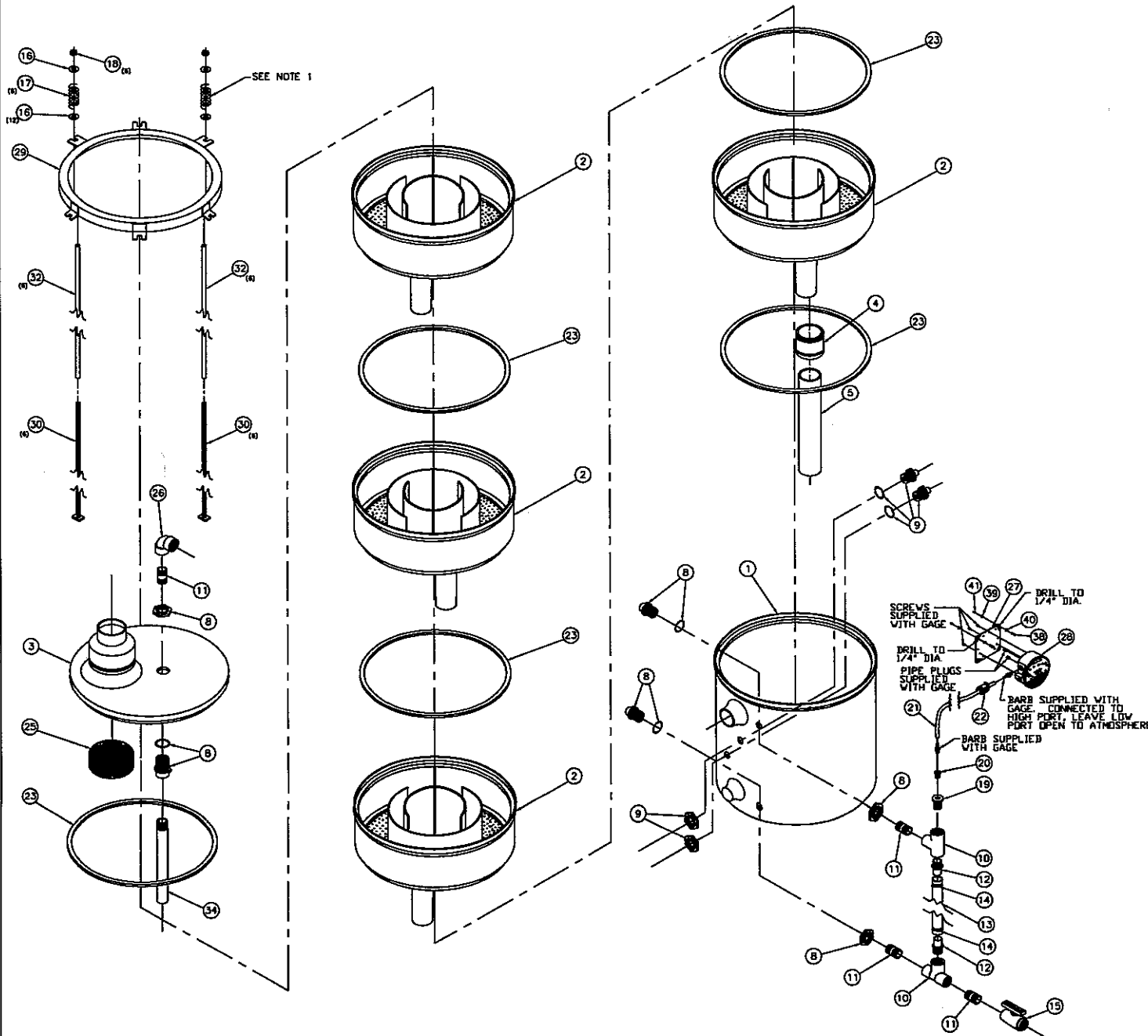
Attn: R.A.C. No. (Return Authorization Code Number provided by QED Service Dept.)



41	2	NUT 1/4"	EXPENSED
40	2	WASHER, FLAT 1/4"	EXPENSED
39	2	WASHER, LOCK 1/4"	EXPENSED
38	2	BOLT, 1/4" HEX HD.	EXPENSED
37			
36	1	NIPPLE, CLOSE 2" PVC	802074
35	1	ELBOW 2" 90 DEGREE PVC THREADED	802034
34	1	PIPE 1" PVC 12.50 LG (THD. ONE END)	802162
33			
32	4	TUBING, NYLON 1/2" OD X 3/8" ID 69" LG	35097
31			
30	4	TIE ROD ASSEMBLY	804042
29	1	RING, TOP HOLD DOWN 27.63 OD	804040
28	1	MAGNETIC DIFFERENTIAL PRESSURE GAUGE INCLUDES THE FOLLOWING: SCREWS, 8-32 RD. HD. (2) PIPE PLUG 1/8" (2) BARBS, 1/8" MPT X 3/16" BARB (2)	EZPGAUGE
27	1	BRACKET MOUNTING	805179
26	1	ELBOW 90 DEGREES PVC 1" MPT SCH 80	802037
25	1	DEMISTER 3 PADS OF 37/97 3.60 HIGH X 7.50 DIA.	804052
24			
23	5	GASKET, ROUND	804038
22	1	PINCH VALVE	36559
21	TBD	TUBING, CLEAR 5/16" O.D. X 3/16" I.D.	802248
20	1	REDUCER, BUSHING 1/4" X 1/8" BRASS	34103
19	1	REDUCER, BUSHING 1" X 1/4" BRASS	803054
18	4	NUT, 3/8-16 ZINC PLATED STEEL	805180
17	4	SPRING, NICKEL PLATED	805214
16	8	WASHER, FLAT 3/8 ZINC PLATED STEEL	805181
15	1	VALVE, BALL PVC 1" FPT X 1" FPT	802196
14	2	CLAMPS, HOSE 1.3/16 X 1 1/2"	805055
13	18 FT	TUBING, CLEAR PVC 1" I.D. 3/16" WALL	802236
12	2	BARB, NYLON 1" MPT X 1" BARB	805020
11	4	NIPPLE, CLOSE PVC 1" SCH 80	802103
10	2	TEE, PVC 1" FPT SCH 80	802028
9	2	BULKHEAD FITTING (RAVEN) 1/2" FPT	802169
8	3	BULKHEAD FITTING (RAVEN) 1" FPT	802171
7			
6	2	BULKHEAD FITTING 2" FPT (RAVEN)	802174
5	1	PIPE, PVC 3" 17.50 LG REF.	802156
4	1	PERNCO 3" COUPLER	802166
3	1	TRAY, TOP	804067
2	4	TRAYS, WITH SECONDARY PARTS	804068
1	1	SUMP	804069

ITEM	QTY	DESCRIPTION	PART #
UNLESS OTHERWISE SPECIFIED, DIMENSIONS ARE IN INCHES AND INCLUDE PLATING REMOVE ALL BURRS			
TOLERANCES		APPROVED BY DATE	
3/16" - .001 FRACT	+/- 1/64	MFG APPROVAL	
3/16" - .001 ANGLES	+/- 1/16		
OTHER TOLERANCES AS SPECIFIED		MATERIAL	
2.4 EZ STACKER			
NEXT ASSY	USED ON	FINISH	

Q.E.D.
 ENVIRONMENTAL SYSTEMS INC.
 6155 JACKSON ROAD, ANN ARBOR, MI.
 TITLE
 EZ-2.4 P
 ASSEMBLY/BOM/KIT
 DRAWING NUMBER EZ-2.4P
 SCALE N.T.S. SHEET 1 OF 1



41	2	NUT 1/4"	EXPENSED
40	2	WASHER, FLAT 1/4"	EXPENSED
39	2	WASHER, LOCK 1/4"	EXPENSED
38	2	BOLT 1/4" HEX HD.	EXPENSED
37			
36			
35			
34	1	PIPE 1" PVC 12.50 LG (THD. ONE END)	802162
33			
32	6	TUBING, NYLON 1/2" OD X 3/8" ID 66" LG	35097
31			
30	6	TIE ROD ASSEMBLY	804042
29	1	RING, TOP HOLD DOWN 37.88 OD	804060
28	1	MAGNETIC DIFFERENTIAL PRESSURE GAGE INCLUDES THE FOLLOWING: SCREWS, 6-32 RD. HD. (2) PIPE PLUG 1/8" (2) BARBS, 1/8" MPT X 3/16 BARB (2)	EZPGAUGE
27	1	BRACKET, MOUNTING	805179
26	1	ELBOW 90 DEGREES PVC 1" MPT SCH 80	802037
25	1	DEMISTER 3 PADS OF 37/97 3.60 HIGH X 10" DIA.	804053
24			
23	5	GASKET, ROUND	804059
22	1	PINCH VALVE	36559
21	TBD	TUBING, CLEAR 5/16" O.D. X 3/16" I.D.	802248
20	1	REDUCER, BUSHING 1/4" X 1/8" BRASS	34103
19	1	REDUCER, BUSHING 1" X 1/4" BRASS	803054
18	6	NUT, 3/8-16 ZINC PLATED STEEL	805180
17	6	SPRING, NICKEL PLATED	805214
16	12	WASHER, FLAT 3/8 ZINC PLATED STEEL	805181
15	1	VALVE, BALL PVC 1" FPT X 1" FPT	802196
14	2	CLAMPS, HOSE 13/16 X 1 1/2"	805055
13	46 FT	TUBING, CLEAR PVC 1" I.D. 3/16" WALL	802236
12	2	BARB, NYLON 1" MPT X 1" BARB	805020
11	4	NIPPLE, CLOSE PVC 1" SCH 80	802103
10	2	TEE, PVC 1" FPT SCH 80	802028
9	2	BULKHEAD FITTING (RAVEN) 1/2" FPT	802169
8	3	BULKHEAD FITTING (RAVEN) 1" FPT	802171
7			
6			
5	1	PIPE, PVC 3" 17.50 LG REF.	802156
4	1	FERNCO 3" COUPLER	802166
3	1	TRAY, TOP	804049
2	4	TRAYS, WITH SECONDARY PARTS	804050
1	1	SUMP	804051

ITEM QTY	DESCRIPTION	PART #
UNLESS OTHERWISE SPECIFIED, DIMENSIONS ARE IN INCHES AND INCLUDE PLATING REMOVE ALL BURRS TOLERANCES: XXX +/- .01 FRACT +/- .1/64 XXXX +/- .005 ANGLES +/- .1/2" OTHER TOLERANCES AS SPECIFIED		
4.4 EZ STACKER		
NEXT ASSY	USED ON	FINISH
DRAWN BY: KM DATE: 1-11-95		Q.E.D. ENVIRONMENTAL SYSTEMS INC. 6155 JACKSON ROAD, ANN ARBOR, MI.
CHECKED BY: LN DATE: 1-12-95		
APPROVED BY: DATE:		TITLE: EZ-4.4 P ASSEMBLY/BOM/KIT
MATERIAL:		DRAWING NUMBER: EZ-4.4P
SCALE: N.T.S.		SHEET: 1 OF 1