

KERR-MCGEE CHEMICAL CORPORATION

HENDERSON, NEVADA FACILITY

WORK PLAN

HAZARDOUS WASTE LANDFILL

POST CLOSURE MONITORING

GROUNDWATER SAMPLING



Prepared by S. M. Crowley

June 10, 1993

Revised November 18, 1993

**KERR-McGEE CHEMICAL CORPORATION
HENDERSON, NEVADA FACILITY**

SUPPLEMENT TO SAMPLING PLAN

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1.0 INTRODUCTION

1.0.1 APPLICATION

This work plan is intended to provide guidance for sampling the hazardous waste landfill on-site at the Kerr-McGee Chemical Corporation facility in Henderson, Nevada. It is to be used in conjunction with the Sampling and Analysis Plan prepared for Henderson by Roy Widemann, August 16, 1993.

1.0.2 FREQUENCY

Sampling is done annually, with results reported to the Nevada Division of Environmental Protection (NDEP) 30 days after laboratory analyses are received. Included in the report is a statistical determination of water quality parameter changes.

2.0 SAMPLING EQUIPMENT AND PROCEDURES

2.0.1 Field Data Collection

2.0.1.1 A field notebook will be prepared prior to beginning sampling activities and will be maintained throughout the sample round. The notebook will contain pertinent information about the monitoring wells, such as depth of casing and water levels. During sampling, all the activities will be recorded on a Field Sampling Log Sheet (see Figure 2.1). Any deviation from the sampling procedure described in the following paragraphs will be outlined in detail and justified in the field notebook.

2.0.2 Presampling Activities

2.0.2.1 Sampling and purge equipment, as shown in Table A.1 Appendix A, should be

Figure 2.1

Kerr McGee Chemical Corporation
Field Sampling Log

Well ID _____ Personnel _____
Date _____ Involved _____
Time _____

Weather : _____

Well Condition : _____

Well Information :
Depth to Water _____
Depth of Well _____ (see completion data)
Calculated 3 casing Volumes _____
Well Evacuation Method _____
Final Evacuation Volume _____
Well Water Appearance _____

Equipment Information :
pH meter model # _____ Serial # _____
pH Calib Std _____ Lot # _____ Exp _____
SC meter model # _____ Serial # _____
SC Calib Std _____ Lot # _____ Exp _____

<i>Field Measurements :</i>					<u>Observations</u>
<u>Time</u>	<u>Vol Evac</u>	<u>pH</u>	<u>Temp</u>	<u>SC</u>	
pH Std		_____			_____
SC Std				_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
pH Std		_____			_____
SC Std				_____	_____

Sample Collection:
Time Started _____ Method _____
Time Finished _____ Bottles _____

assembled and tested prior to sampling any well. Operating and maintenance information for each piece of equipment is included in Appendix A and should be used to decide whether the equipment is in good operating condition. If at any time, before or during the sampling process, the sampling or measurement equipment gives an indication of the need for repair or replacement or falls outside of applicable specifications, the sampling process should be stopped. As repairs are made or as the equipment is replaced, the sampling may continue. If there is a delay that will effect the representative nature of the samples, consideration will be given to restarting the sampling process for the affected well. The decision and reason should be recorded on the Field Sampling Log Sheet (Figure 2.1).

2.0.2.2 Prior to sampling any well, the well head will be examined for its general condition and signs of tampering upon arrival at the monitoring well. All indications of tampering will be recorded in the field notebook. The lock and cap (if present) will then be removed from the well casing.

2.0.2.3 The depths to water and to the bottom of the well casing will be measured to the nearest 0.01 foot and recorded in the field notebook. Well recompletion and/or replacement will be considered if the depth to bottom has changed more than 10% of the original completed depth and/or the well provides no water. Liquid levels will be measured using a decontaminated water level meter as listed in Table A.1, Appendix A.

2.0.3 Well Evacuation

2.0.3.1 **Monitoring Wells.** The monitoring wells will be evacuated and sampled no

sooner than 48 hours after development using a dedicated pump or a decontaminated stainless steel or Teflon bailer (with a new polypropylene rope at each well). Pumping is the preferred method and should be used if at all possible. The pump should be as listed in Table A.1, Appendix A. Each well should have its own dedicated pump. A spare pump of the same model may be installed in a well if there is an indication of mechanical failure before or during the sampling process. Replacement of the pump will be recorded in the field notebook. If a model other than those listed in Table A.1 is used, reasons for the substitution will also be recorded in the field notebook. The well evacuation procedure will be to remove a volume of water equal to at least three times the submerged casing volume before sampling. If this is not possible due to low yields, the well will be pumped or bailed dry and sampled as soon as sufficient recharge occurs. Casing volumes of existing wells will be estimated based on measured or historical water levels and available well logs. Casing volumes will include estimates of the volume of any piping through which discharge water will flow.

2.0.3.2 Discharge Water. The appearance of the discharge water will be recorded in the field notebook during well evacuation. The discharge water from the monitoring wells will be discharged to a practical location as directed by the sampling supervisor.

2.0.3.3 Field Measurements. The pH, specific conductivity, and temperature of the groundwater will be measured at least four times during well evacuation and recorded in the field notebook. After evacuation, a confirmatory sample will be

collected in a chemically inert container as specified in Table 2.1.

2.0.3.4 Meters will be field calibrated prior to each use. Calibration and operation will be conducted in accordance with the manufacturer's recommended procedure, in Appendix A and as discussed briefly below.

2.0.3.5 The pH meters will be calibrated against two standard pH solutions, either 4.0 and 7.0 or 7.0 and 10.0, depending on whether previous pH measurements have been less than or greater than 7.0, respectively. The meter readings will be adjusted and the probe will then be rinsed thoroughly with distilled water. The probe will then be immersed in the water sample and the pH and temperature will be recorded.

2.0.3.6 Specific conductivity meters will be standardized by immersing a decontaminated specific conductivity probe into a standard solution of conductivity buffer. The conductivity of the standard solution will be within the same order of magnitude as anticipated for the water sample. The meter reading will be adjusted to the standard solution value and the probe will then be thoroughly rinsed with distilled water. The probe will then be immersed in the well water sample and the conductivity will be recorded. The specific conductivity reading is automatically temperature-compensated to 25°C by the meter.

2.0.3.7 The pH and specific conductivity meters and the groundwater probe will be decontaminated prior to use at each well. In addition, the probes will be decontaminated prior to storage each day and the meters will be checked for battery charge and physical damage. Conductivity buffers, pH solution, and meters will be stored in a cool, dry environment. Standard solutions will be

TABLE 2.1

SAMPLE CONTAINERS - PRESERVATION

	<u>Container Type</u>	<u>Size</u>	<u>Preservation</u>	<u>Closure Type</u>	<u>Holding Time</u>
pH	Plastic	1 liter	Ice to 4°C	Cap with Teflon Seal	ASAP
Spec. Conductance	Plastic	1 liter	Ice to 4°C	Cap with Teflon Seal	28 days
Sulfate	Plastic	1 liter	Ice to 4°C	Cap with Teflon Seal	28 days
Chloride	Plastic	1 liter	Ice to 4°C	Cap with Teflon Seal	28 days
Sodium	Plastic	1 liter	pH < 2, HNO ₃ Ice to 4°C	Cap with Teflon Seal	6 months
Chromium	Glass Bottle	500 ml	Ice to 4°C	Cap with Teflon Seal	6 months
Iron	Glass Bottle	500 ml	Ice to 4°C	Cap with Teflon Seal	6 months
Manganese	Glass Bottle	500 ml	Ice to 4°C	Cap with Teflon Seal	6 months
Phenols	Glass Bottle	1 liter	Ice to 4°C	Cap with Teflon Seal	7 days
TOC	Glass Bottle	40 ml	pH < 2, HCl Ice to 4°C	Septum	7 days
TOH (TOX)	Glass Bottle	500 ml	pH < 2, HCl Ice to 4°C	Cap with Teflon Seal	7 days

routinely discarded on their expiration dates.

2.0.4 Sample Collection

2.0.4.1 A complete set of sample containers will be prepared prior to sampling each well. Table 2.1 lists the characteristics and volumes of each container for all analytes, the preservatives added, if any, and the maximum holding times. The containers will be labeled with the date, well designation, project name, collector's name, time of collection, and parameters to be analyzed.

2.0.4.2 The sample bottles will be filled in order of volatility so that the containers for volatile organics will be filled from the bailer first and samples that are not pH-sensitive or subject to loss through volatilization will be collected last.

2.0.4.3 **Monitoring Wells.** All monitoring well samples will be collected using a dedicated pump or a decontaminated stainless steel or Teflon bailer. If a bailer is used, the bailer will be lowered down the well casing to the bottom of the well. After the bailer has filled with water, it will be raised to the surface. The well water will fill the sample containers so that air entrainment in the sample is minimized.

2.0.4.4 **Total Petroleum Hydrocarbon Sampling.** Volatile organics vials will be used to collect Total Organic Carbon (TOC), Total Organic Halide (TOH), and Total Petroleum Hydrocarbon (TPH) samples, as specified in Table 2.1. These vials will be filled to the top to minimize aeration. The container will then be turned upside down to check for bubbles and, if they are present, additional sample will be added. Extreme care will be taken so that the Teflon-coated septum lid, which securely caps the vials, does not come into contact with the ground or that the

sampler does not touch the inside of the lid. At no time will the inside of the bottle come into contact with anything other than the sample.

2.0.4.5 Additional Samples. Kerr-McGee may elect to collect samples for other analytes in addition to analytes listed in this plan.

2.0.4.6 Sample Container/Preservation/Handling. The sample containers will be preserved as listed in Table 2.1. Chain of Custody forms (Figure 2.2) will be completed and stored with the samples. The cooler will be labeled and sealed with self-adhesive tape. To detect tampering of the water samples during transportation to the analytical laboratory, frangible custody seals will be placed over the crack between the body of the cooler and the cooler lid and signed by the collecting personnel. If the seal is broken upon arrival at the laboratory, the sample will be inspected for signs of tampering. If one or more of the bottles appears to have been opened, the suspected bottles will be discarded and resampling will be required.

2.0.5 QA/QC Samples

2.0.5.1 QA/QC samples will be collected during the groundwater sampling program. These samples consist of QA/QC field quadruplicates collected for TOC and TOH analyses.

2.0.5.2 Field blanks will be included in each sample group (1 blank set per day at a minimum). Field blanks are collected by rinsing the measurement equipment and collecting the final rinsate. The field blank samples will be preserved, handled, and transported in an identical manner as the actual water samples.

2.0.5.3 Trip blanks will be collected to detect contamination of the TPH water samples

introduced from sample containers and during transportation. The trip blanks will consist of a sample bottle filled with reagent-grade water at the laboratory that will accompany the empty sample bottles to the site and will be subsequently analyzed with the samples. Trip blanks will be sent exclusively with coolers containing samples which have been collected for volatile organic analysis. The trip blank sample containers will remain sealed until analyzed.

3.0 SAMPLE ANALYSIS

3.0.1 Analyses Required. Monitoring well samples will be analyzed for pH, specific conductance, sulfate, chloride, sodium, chromium, iron, manganese, phenols, TOC and TOH. Kerr-McGee reserves the option to also perform additional analyses. Table 3.1 lists the analytical methods appropriate for the individual analytes covered by this plan.

3.0.2 Laboratory QA/QC. Please refer to the site Sampling Plan to review the QA/QC program of the laboratory used to perform the analyses.

SMC#1/WORKPLAN

TABLE 3.1

GROUNDWATER PARAMETERS AND ANALYTICAL METHODS

<u>General Indicators</u>	<u>Analytical Method</u>	<u>Holding Times</u>
pH	9040 ⁽¹⁾	ASAP
Specific Conductance	2510.B ⁽³⁾	28 days
<u>Anions</u>		
Sulfate	4500-SO ₄ E ⁽³⁾	28 days
Chloride	4500-Cl, B ⁽³⁾	28 days
<u>Cations</u>		
Sodium	6010 ⁽²⁾	6 months
<u>Total Metals</u>		
Chromium	6010 ⁽²⁾	6 months
Iron	6010 ⁽²⁾	6 months
Manganese		6 months
<u>Organics</u>		
Phenols	5530.C ⁽³⁾	7/28 days ⁽⁴⁾
TOC	415.1 ⁽¹⁾	7/28 days ⁽⁴⁾
TOH (TOX)	9020 ⁽²⁾	7/28 days ⁽⁴⁾

⁽¹⁾ *Method for Chemical Analysis of Water and Waste*, EPA 600/4-79/020, EMSL, Cincinnati, OH 1993

⁽²⁾ *Test Methods for Evaluating Solid Waste*, SW-846, Third Edition, Office of Solid Waste, U.S. EPA, Document Control No. 995-001-00000-1, 1986

⁽³⁾ *Standard Methods*, Seventeenth Edition, American Water Works Association, 1989

⁽⁴⁾ Days to extraction / Extractant holding time.

APPENDIX A

Table A.1

EQUIPMENT INVENTORY

HAZARDOUS WASTE LANDFILL GROUND WATER SAMPLING

pH/Specific Conductance Meter

Omega Model # PHH-80 - One meter is moved from well to well as sampling is done.

Water Level Sensor

QED Model # 6000 - One sensor is moved from well to well as sampling is done.

Sampling Pump

QED Well Wizard Pump - Each of the hazardous waste landfill wells has a dedicated pump.

Sampling Pump Controller

QED Model 350 Automatic Controller with Model 3020 Air Compressor - The controller is moved from well to well as sampling is done.

Bailer (if needed)

Timco 2" Teflon Bailer with Teflon Emptying Device

Misc

Magic markers
Data sheet
Calculator
Water jugs (2*1 gallon for washing equipment)
pH 7 & 10 buffers (call lab for lot # and expiration date)
Conductivity standard solution (call lab for lot # and expiration date)
pH/Spec conductance meter (listed above)
Water level sensor (listed above)
4" bailer
2" bailer
4 @ 1' bailer (clear)
Polypropylene rope
Paper towels
Gloves
5 gallon pail
Sample Bottles with ice chest (from lab)
Frozen ice packs
4 large mouth plastic Nalgene bottles
8 * 125 ml glass bottles (4 oz)
Timer
Key for gate 9

WELL WIZARD PACKET

- 1) Operating instructions: well purging and Sampling
- 2) Well Wizard Warranty
- 3) Attention Sheet: Please Read Before Operating
- 4) Directions for Cap and Ferrule Replacement at Cap/Tubing
- 5) Pump Installation with Bulk Tubing
- 6) Pump Connections: Stainless Steel, Barb and Polypropylene
- 7) Tubing Insert Installation Schematic

THANK YOU FOR BUYING QED

OPERATING INSTRUCTIONS

WELL PURGING AND SAMPLING

1. Attach the compressor output to the long quick-connect nipple labeled Pump Pressure Inlet on the face of the controller panel (See Figure 1), using the black hose with mating fittings.
2. Connect either end of the red controller air hose to the short brass quick-connect nipple labeled Pump Supply on the right side of the control panel (See Figure 1). Connect the other end of the controller air hose to the sample type of quick-connect nipple located in the well cap assembly.
3. To begin operation of the Well Wizard[®] pump, start the compressor engine. Five to fifteen pumping cycles are required to purge the air from the pump and tubing. Full water flow from the sample supply tube should then begin.
4. To reduce the water flow rate during sample collection, turn the throttle control on the left side of the control panel in the counterclockwise direction (See Figure 1). For increased flow rate during well purging, turn the throttle control clockwise.
5. Position The refill and discharge control knobs at the "H" position for average well depths with refill and discharge cycle times of 6 to 8 seconds each. To optimize pumping efficiency for a specific well depth, the following three-step procedure can be followed:
 - a. Adjust the refill and discharge cycles to 10-15 seconds each. Measure the water volume discharged in a single discharge cycle. For 1100 series pumps, the volume should be 250 to 350 ml. For 1200 series pumps, the volume should be 350 to 450 ml. Increase the refill cycle time if this volume is not achieved.
 - b. Shorten the discharge cycle period (by counterclockwise knob adjustment) until the end of the discharge cycle just begins to coincide with the end of water flow from the Well Wizard pump outlet tube.
 - c. Shorten the refill cycle period until the water volume per discharge cycle decreases 10-25% from the maximum value measured in step a.

WELL WIZARD

SAMPLE PRO

QED PUMP

6. Operating Guidelines:

- a. Deeper wells require both the refill and discharge cycles to be lengthened, by turning the control knobs clockwise up to one-quarter turn.
- b. The compressed gas source is applied to the Well Wizard pump to discharge water during the discharge cycle. The pump is vented to atmosphere to refill during the refill cycle.
- c. If the controller does not sound as if it is alternating between cycles (pressurizing and venting), the control knobs are adjusted for excessively long cycle times, and should be adjusted counterclockwise.
- d. The full range of useful refill and discharge cycle lengths is 3 to 20 seconds each.
- e. Higher compressed gas pressure levels provide higher pumping rates. Lower compressed gas pressure levels pump more water per unit volume of gas.
- f. If the pumping rate is unsatisfactory, recheck the cycle lengths according to the three-step procedure. If the pumping rate is still unsatisfactory, check all air fitting connections for leaks.
- g. Please note that a light air leaking sound will accompany controller operation. This is a normal condition for the controller unit.

7. Maintenance

Maintenance of the controller is limited to periodic draining of the internal accumulator filter bowl.

The bowl is drained by depressing the silver button labeled Moisture Vent on the control panel as shown in Figure 1. It is recommended that the bowl be drained after every 1/2 hour of controller operation, especially in humid conditions. The button should be held down for five seconds while the controller is operating, until the flow of moisture ceases. Maintenance of the engine should follow the engine manufacturer's recommendation.

WELL WIZARD[®]

Dedicated Monitoring System

WARRANTY

Q.E.D. ENVIRONMENTAL SYSTEMS, INC. ("Q.E.D.") 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 Q.E.D. in the manner provided herein.

This warranty shall be limited to the duration and the conditions set forth below. All warranty durations are calculated from the original date of purchase.

1. Dedicated-Use Systems Products - All components, equipment and accessories are warranted for one year.
2. Portable-Use Systems - Controllers and Water Level Meters are warranted for one year. Hose Reels, Pumps and Caps are warranted for ninety (90) days. Tubing and Purge Mixers are covered by a ninety (90) day material and workmanship warranty. There will be no warranty for application on Tubing and Purge Mixers when used as part of a Portable System.
3. Separately Sold Parts and Spare Parts Kits - Separately sold parts and spare parts kits are warranted for ninety (90) days. Repairs performed by Q.E.D. are warranted for ninety (90) days from date of repair or for the full term of the original warranty, whichever is longer.

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

IN NO EVENT SHALL Q.E.D. ENVIRONMENTAL SYSTEMS, INC. BE LIABLE FOR CONSEQUENTIAL OR INCIDENTAL DAMAGES FOR BREACH OF SAID WARRANTY.

The foregoing warranty does not apply to major sub-assemblies and other equipment, accessories, and parts manufactured by others, and such other parts, accessories, and equipment are subject only to the warranties, if any, supplied by their respective manufacturers. Q.E.D. makes no warranty concerning products or accessories not manufactured by Q.E.D. In the event of failure of any such product or accessory, Q.E.D. will give reasonable assistance to Buyer 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 Q.E.D., and Q.E.D. neither assumes nor authorizes any person to assume for it any other obligation or liability in connection with the said products, materials and/or workmanship.

It is understood and agreed that Q.E.D. 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. Q.E.D. shall be released from all obligations under all warranties if any product covered hereby is repaired or modified by persons other than Q.E.D.'s service personnel unless such repair by others is made with the written consent of Q.E.D.

If any product covered hereby is actually defective within the terms of this warranty, Purchaser must contact Q.E.D. for determination of warranty coverage. If the return of a component is determined to be necessary, Q.E.D. 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.

RESPONSIBILITY OF THE PURCHASER

The original Purchaser's sole responsibility in the instance of a warranty claim shall be to notify Q.E.D. 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 Q.E.D. and:

1. Identifying the product involved (by model or serial number or other sufficient description that will allow Q.E.D. to determine which product is defective).
2. Specifying where, when, and from whom the product was purchased.
3. Describing the nature of the defect or malfunction covered by this warranty.
4. Sending the malfunctioning component, after authorization by Q.E.D. to:

Q.E.D. Environmental Systems, Inc.

6205 Jackson Road • P.O. Box 2726
Ann Arbor, Michigan 48106 • (800) 624-2026
(313) 995-2547

Q.E.D. environmental systems inc. • (313) 995-2547 • (800) 624-2026

ATTENTION

PLEASE READ BEFORE OPERATING

This Well WizardSM sampling pump was pressure and flow tested prior to shipping. Please observe the following cautions prior to testing or examining this unit.

1. DO NOT disassemble pump prior to consulting factory. Disassembly may damage o-ring seals and void product warranty.
2. When operating the pump at less than full submergence, a small discharge of water may be observed near the top of the pump. This leakage is due to a weep hole designed to empty the sample delivery tubing after sampling, to avoid freeze-up in colder climates.

IF YOU HAVE ANY QUESTIONS REGARDING YOUR WELL WIZARD PRODUCT
PLEASE CALL 1-800-624-2026.

Version: 1
Date: 4/16/87
\\document\warning.doc

WELL WIZARD

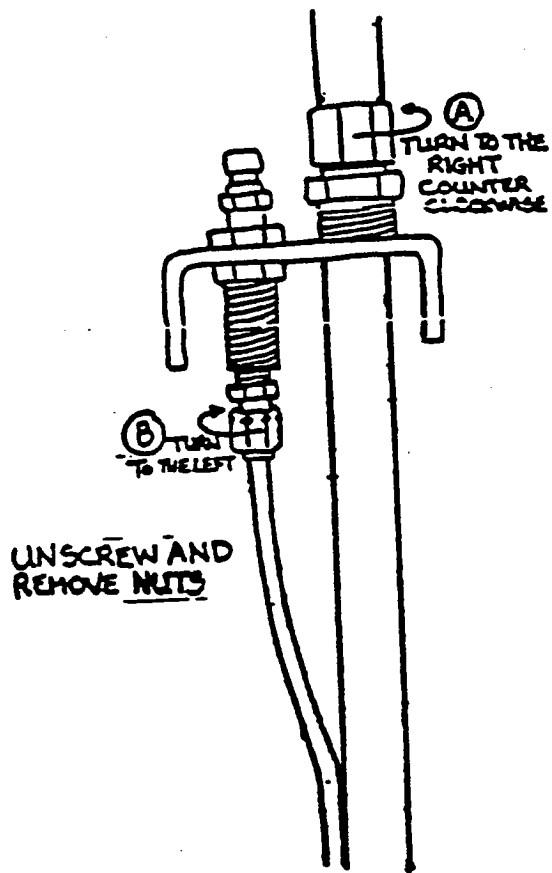
SAMPLE PRO

WELL WIZARD PUMP

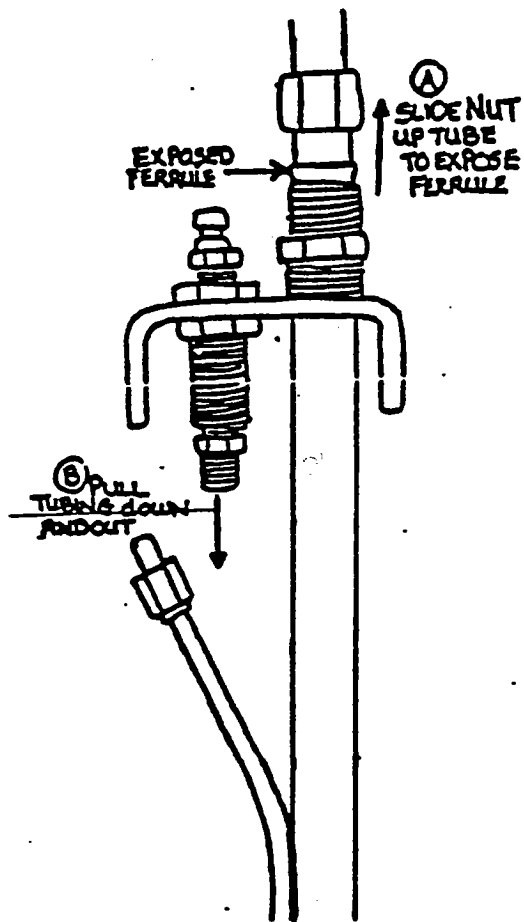
P.O. Box 3726 • Ann Arbor, Michigan 48106 • (313) 995-2547 • 1-800-624-2026

DIRECTIONS FOR FERRULE REPLACEMENT

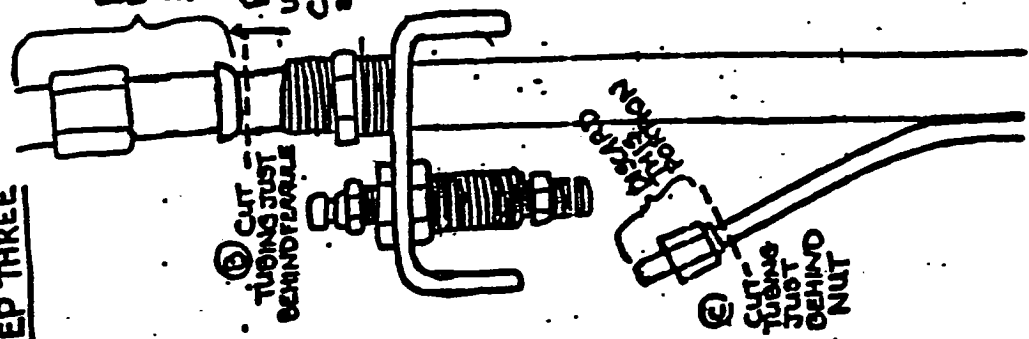
STEP ONE



STEP TWO



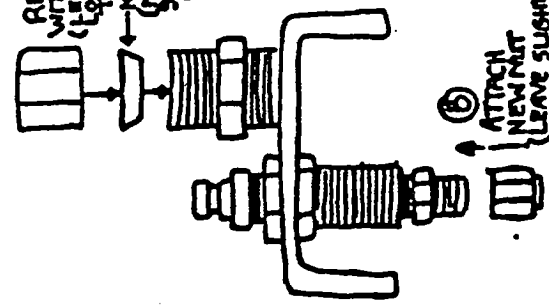
STEP THREE



① DISCARD THIS PORTION OF TUBING AND FERRULE. SAVE NUT FOR RE-USE.

② Pull tubing up through cap to allow access to ferrule.

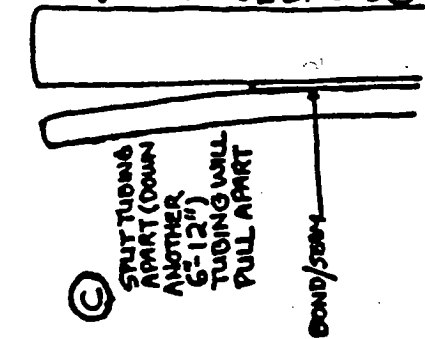
STEP FOUR



③ RE-ATTACH NUT WITH NEW FERRULE (LEAVE SLIGHTLY LOOSE TO ALLOW TUBING TO PASS THROUGH).

④ NEW FERRULE (MAKE SURE SMALLER END IS DOWN).

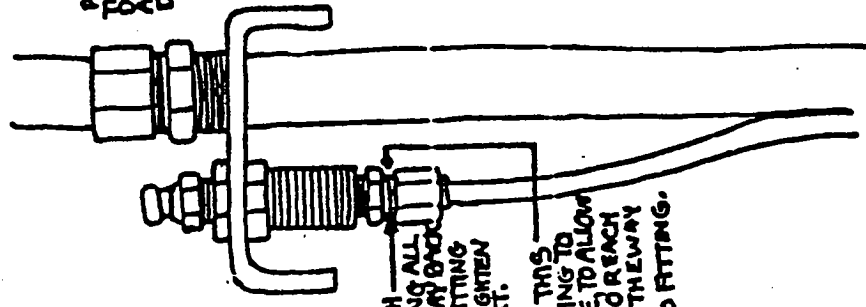
⑤ ATTACH NEW NUT (LEAVE SLIGHTLY LOOSE TO ALLOW TUBING TO PASS THROUGH).



⑥ SPUT TUBING APART (DOWN ANOTHER 6-12") TUBING WILL PULL APART.

CAUTION
PULLING TUBING APART SIDEWAYS MAY CAUSE TEAR IN THE TUBING. IT IS BEST TO HOLD THE LARGER TUBE STATIONARY WITH ONE HAND, WHILE EITHER PUSHING OR PULLING DIRECTLY TOWARD OR DIRECTLY AWAY FROM YOU, THE SMALLER TUBE WITH YOUR OTHER HAND (JUST ABOVE THE BOND (OR SEAM) OF THE TUBING).

STEP FIVE



⑦ PUSH ALL TUBING THE WAY BACK INTO FITTING AND TIGHTEN UP NUT.

⑧ CUT THIS TUBING TO ALLOW IT TO REACH ALL THE WAY INTO FITTING.

⑨ PUSH TUBING THROUGH TO DESIRED LENGTH AND THEN TIGHTEN DOWN NUT. THIS STEPS SHOULD BE DONE FIRST SO YOU WILL BE ABLE TO SEE WHERE TO CUT AIR SIDE TUBING TO ITS PROPER LENGTH.

PUMP INSTALLATION WITH BULK TUBING

1. CUT TUBING TO LENGTH.

Determine distance from desired position of pump inlet to Well Wizard cap fitting panel. From this distance subtract 36 inches to allow for pump length, plus allowance for the desired sample tube extension above the fitting panel. Cut the air supply/sample delivery tube pair to this calculated length.

2. CONNECT PUMP TO TUBING.

Separate the sample delivery (larger) tube from the air supply tube for 8-12 inches from one end. Push the air supply (smaller) tube into the matching fitting located on the pump's top end; unscrew the nut and ferrule assembly to verify full insertion of the tubing, then reattach loosely to the fitting base.

Next, cut a short length from the end of the sample delivery tube to compensate the offset height of the sample delivery tube fitting. Shortening the sample delivery tube by 3-4 inches relative to the air supply tube is generally required; the exact amount required is determined by checking both fitting nuts for full tube insertion after loose assembly. Ensure proper tube to pump fit before further assembly. Finally, tighten both fitting nuts finger tight. Then turn the nut one additional turn with a wrench while holding the fitting base with a second wrench.

3. CONNECT WELL CAP TO TUBING.

At the opposite end of the tube pair, push the sample delivery (larger) tube up through all casing adapting fittings and well cap components. Push the sample delivery tube up through the bottom of the matching fitting in the well cap until the tube extends above the fitting by the distance desired for ease of sample collection. Turn the sample delivery tube fitting nut finger tight.

Trim the air supply tube length to allow connection to the matching tubing fitting underneath the well cap panel. Insert the air supply tube into the fitting, check for full engagement, then tighten the nut one turn beyond finger tight. Move the sample delivery tube through the well cap panel slightly as necessary to provide final, even alignment of the tubing then tighten the sample delivery tubing nut one full turn past finger tight.

4. INSTALL THE PUMP, TUBING, WELL CAP ASSEMBLY.

Attach the well cap base to the well casing (for protected cap models), then lower the sample pump down the well.

PUMP CONNECTORS
I STAINLESS STEEL CONNECTOR
II BARB CONNECTOR
III POLYPROPYLENE CONNECTOR

STAINLESS STEEL CONNECTOR

NORMAL INSTALLATION PROCEDURE:
SWAGELOK TUBE FITTINGS COME TO YOU COMPLETELY ASSEMBLED, FINGERTIGHT. THEY ARE READY FOR IMMEDIATE USE (NOTE: BOTH MALE THREADS ON 1/2" AND 3/4" REQUIRE TEFLON TAPE). DISASSEMBLY BEFORE USE CAN RESULT IN DIRT OR FOREIGN MATERIAL GETTING INTO THE FITTING AND CAUSING LEAKS. SWAGELOK TUBE FITTINGS ARE INSTALLED IN THREE EASY STEPS AS SHOWN IN FIG. 1, 2, & 3.

BY USING THE SCRIBE MARK, THERE WILL BE NO DOUBT IN YOUR MIND THAT THE FITTING HAS BEEN TIGHTENED 1-1/4 TURNS* REQUIRED FOR A PROPER INSTALLATION. THIS IS A NORM, MORE THAN 1-1/4 TURNS MAY BE REQUIRED TO ASSURE PROPER INSTALLATION.

* FOR 1/16", 1/8", AND 3/16" SIZE TUBE FITTINGS. ONLY 3/4 TURN FROM FINGER-TIGHT IS NECESSARY

THE SWAGELOK TUBE FITTING CONSISTS OF FOUR PIECES:

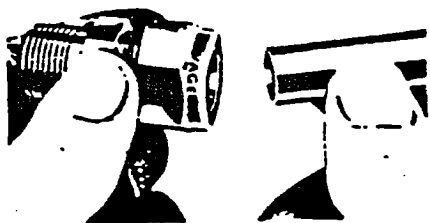


FIG. 1

STEP A - SIMPLY INSERT THE TUBING INTO THE SWAGELOK TUBE FITTING (APPROX. 5/8" FOR 1/4" O.D. TUBE UP TO 7/8" FOR 3/4" O.D. TUBE). MAKE SURE THAT THE TUBING RESTS FIRMLY ON THE SHOULDER OF THE FITTING AND THAT THE NUT IS FINGER-TIGHT.

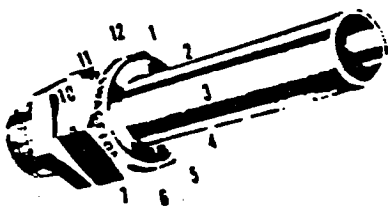
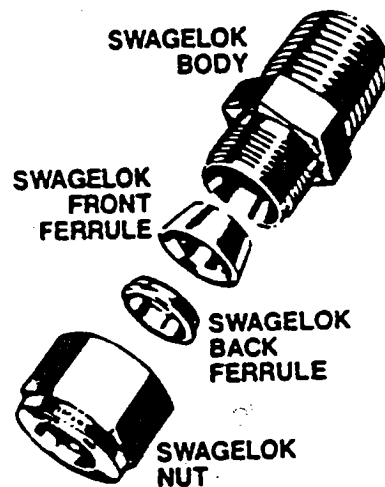


FIG. 2

STEP B - BEFORE TIGHTENING THE SWAGELOK NUT, SCRIBE THE NUT AT THE 6 O'CLOCK POSITION.

AN INSERT IS TO BE USED ON ALL TEFLON LINED TUBING AND ALL OTHER TUBING OVER 1/2" I.D. TO INSTALL JUST INSERT THE STAINLESS STEEL INSERT IN TO THE TUBING I.D., THEN FOLLOW THE NORMAL INSTALLATION PROCEDURE

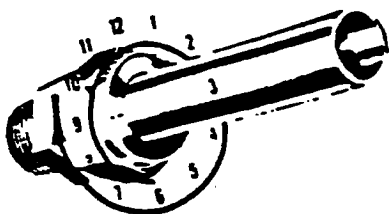
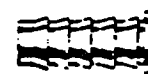


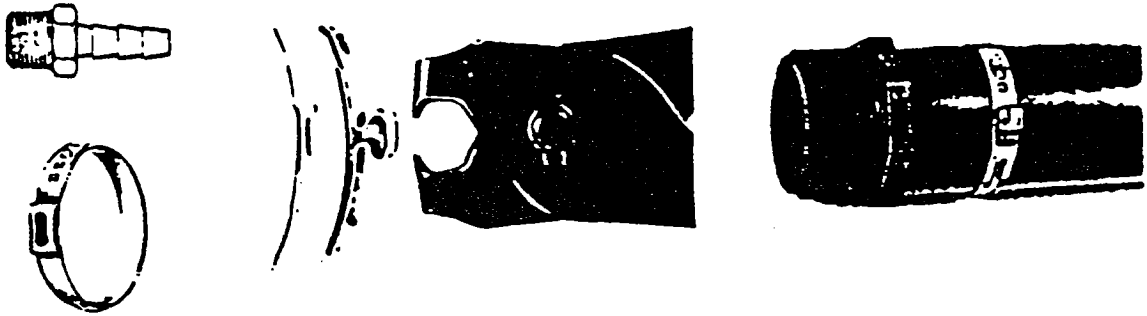
FIG. 3

STEP C - NOW, WHILE HOLDING THE FITTING BODY STEADY WITH A BACKUP WRENCH OR VISE, TIGHTEN THE NUT 1-1/4 TURNS*. WATCH THE SCRIBE MARK MAKE ONE COMPLETE REVOLUTION AND CONTINUE TO THE 9 O'CLOCK POSITION.

Insert



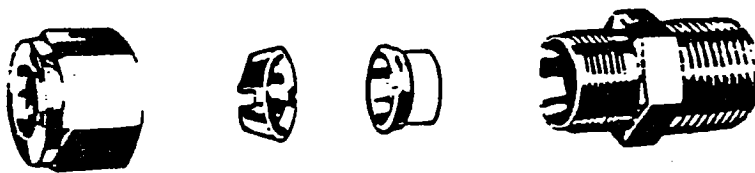
BARB AND CLAMP CONNECTOR



NORMAL INSTALLATION PROCEDURE:

- 1) CUT TUBE CLEANLY AND SQUARELY TO LENGTH.
- 2) SLIDE CLAMP(S) ONTO TUBE.
- 3) PUSH TUBE ONTO CONNECTOR UNTIL TUBE BOTTOMS AGAINST BODY HEX.
- 4) POSITION THE CLAMP ON THE TUBE WHERE THE NIPPLE BARB IS LOCATED, MAKING SURE THE HOOKS ON THE CLAMP BAND ARE ENGAGED. SQUEEZE THE EAR CLOSED WITH A PAIR OF PINCHERS (P/N 35188).
- 5) TO REMOVE CLAMP SIMPLY CUT THROUGH THE EAR WITH A PAIR OF PINCHERS.

POLYPROPYLENE CONNECTOR



NORMAL INSTALLATION PROCEDURE:

- 1) CUT TUBE CLEANLY AND SQUARELY TO LENGTH.
- 2) PUSH TUBING INTO THE COMPLETELY ASSEMBLED CONNECTOR, MAKING SURE THAT THE TUBING RESTS ON THE SHOULDER OF THE FITTING.
- 3) WRENCH TIGHTEN NUT, BUT CAREFUL NOT TO OVER TIGHTEN (NUT SHOULD NOT COME IN CONTACT WITH SHOULDER OF BODY).
- 4) IF AN INSERT IS USED, JUST INSERT IT INTO THE TUBING I.D. THEN FOLLOW THE NORMAL INSTALLATION PROCEDURE.

**PURGE PUMP/PULSE PUMP/WELL DEVELOPMENT PUMP
FLOW RATE OPTIMIZATION**

The object of optimizing a Purge Pump, Pulse Pump or Well Development Pump is to create maximum flow rates at the pump's operating conditions. To accomplish this, both the discharge and refill times must be optimized.

To optimize the discharge and refill times, the following three steps can be followed using a controller.

1. Set the refill time long (about 15 seconds). Set the discharge time short (1 second for well depths under 50', 3 seconds for wells depths 50' to 100', and 5 seconds for well depths over 100'). With these settings, it should take 5 to 15 cycles to purge the air from the discharge line depending on the pump depth. If liquid fails to discharge after 15 cycles, begin increasing the discharge times as discussed in step 2. When liquid begins to flow from the discharge line, measure the amount of liquid being discharged per cycle. At this point the volume measured is probably less than the internal volume of the pump being used. (Refer to TABLE 1 below for the internal volume of your pump.)
2. Now, increase the discharge time slightly (about 1/2 second increments) and allow the pump to cycle 3-5 times. Repeat this operations until air can be detected coming up through the discharge line in the form of bubbles. The amount of liquid being discharged per cycle should now be close to the internal volume of the pump being used. If air and water begin to burst out of the discharge line, it means that your discharge time is too long. Decrease the discharge time and repeat the initial procedure with smaller time increments (i.e. 1/4 vs. 1/2 seconds). The discharge time of the pump should now be optimized.
3. Next, decrease the refill time slightly (about 1 second increments) and allow the pump to cycle 3-5 times. Repeat this operation until air can be detected coming up through the discharge line in the form of bubbles. The amount of liquid being discharged per cycle should still be close to the internal volume of the pump being used. If air and water begin to burst out hard, it means that your refill time is now too short. Lengthen the refill time and repeat the initial procedures with smaller time increments (i.e. 1/2 vs. 1 second). Both the discharge and refill times should now be optimized.

TABLE 1

PUMP MODEL	INTERNAL VOLUME	
	LITERS	GALLONS
<u>PULSE PUMPS</u>		
LP1001	0.65	0.17
LP1201	0.65	0.17
LP1501	0.65	0.17
LP4600	3.50	0.92
LP1301	0.35	0.09
LP1401	0.35	0.09
<u>PURGE PUMPS</u>		
HR4100(P)	1.70	0.45
HR4200(P)	1.70	0.45
HR4500(P)	3.50	0.92
HR4600(P)	3.50	0.92
HR4700(P)	3.50	0.92
<u>WELL DEVELOPMENT PUMP</u>		
HR4105D	1.15	0.30

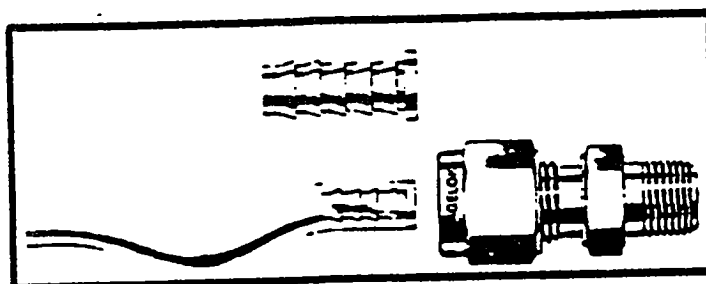
NOTE: (P) indicates that portable pumps of the same model number are also included.

If you have any additional questions on how to optimize your pump flow rates, please call our Customer Service Department at 1-800-624-2026.

TUBING INSERT INSTRUCTIONS

Tubing inserts are used with all tubing 1/2" O.D. and larger. Stainless Steel inserts are included as standard; Teflon inserts are available.

Teflon inserts are used at the KMCC Henderson plant



To use an insert, simply insert them into the I.D. of the tubing, push the tubing and insert fully into the fitting, and tighten securely.

Inserts will be used at the discharge connection on Sampling pumps, both discharge and air connections on Purging pumps (with tube fittings, not barb fittings), both connections for Drop Tubing, and at the tubing reduction connections when using 1/2" O.D. tubing and two inch Purge Mizers.

Well Wizard
Field Service Kit
Model # FS-T1112

a Product of
QED Environmental Systems, Inc.
Ann Arbor, Michigan



MODEL 350 AUTOMATIC CONTROLLER DESCRIPTION

When connected to an appropriate compressed gas source, the Model 350 controller alternately pressurizes, then vents the air supply line to the pump. The unit is powered by eight (8) double "A" ("AA") size batteries. The duration of the pressurization and vent cycles can be adjusted to maximize pumping rate.

NOTE: The controller is activated by an internal pressure switch which only turns the unit on when pressure is attached to the controller. This feature conserves battery life by energizing the circuitry only during actual controller use.

It is recommended that the compressed gas source be of high quality, such as breathing quality air or air compressed with an oilless compressor.

WARNING: Pressure applied to the controller **MUST NOT EXCEED 125 psig**. Higher pressures may create hazardous conditions and will void system warranties.

OPERATING INSTRUCTIONS

Well Purging and Sampling

1. Attach the compressed gas source hose to the long quick-connect nipple labeled Pump Pressure Inlet on the face of the controller, located in the upper right hand corner of the controller panel, using the female portion of the coupling supplied. The other end of this hose has a male 1/4 inch pipe thread fitting which should be installed in the air-cylinder regulator. Do not connect this hose directly to the output of an air compressor. The hose may fail due to the high temperatures created by the compressor. Use a thread sealant such as Teflon (TM-DuPont) tape on the 1/4 inch fitting prior to installing.
2. Attach the red controller air hose. The controller air hose has an exhaust valve connected in-line. On the exhaust valve, a short length of hose is connected to the "out" port, and a longer length of hose is connected to the "in" port. Attach the fitting on the short length of hose to the short brass quick-connect nipple on the well cap (or hose reel). Attach the fitting on the longer length of hose to the short brass quick connect nipple labeled "Pump Supply" located on the lower right hand side of the controller panel.
3. To begin operation of the pump, turn on the supply of compressed gas connected to the controller.

If, after 10-15 seconds, the controller has not begun cycling, briefly push down the battery test button, located in the middle of the controller panel. After 5 to 15 pumping cycles full water flow from the sample tube should begin.

4. The refill and discharge control knobs, which control cycle times, are located on the controller panel just to the left of the pump supply quick-connect. They should be set in a 12 o'clock position for average well depths and average pump submergence (depths of 50-75 feet, submergence of 20-30 feet). To maximize pumping efficiency for a specific well depth, the following three-step procedure can be followed:

- a. Adjust the refill and discharge cycles to 10-15 seconds each. Measure the water volume discharged in a single discharge cycle.
- b. Shorten the discharge cycle period (by counter-clockwise knob adjustment) until the end of the discharge cycle just begins to coincide with the end of water flow from the sample pump outlet.
- c. Shorten the refill cycle period until the water volume per discharge cycle decreases 10-25% from the maximum volume measured in step a.

5. To reduce water flow rate during sample collection decrease the pump supply pressure by turning the yellow knob labeled Flow Throttle in a counter-clockwise direction. This knob is located at the lower left of the controller panel. When the pump supply pressure is decreased it is necessary to increase the discharge cycle time to allow the full pump volume to exit the discharge tube.

6. Operating Guidelines

- a. Deeper wells require both the refill and discharge cycles to be lengthened, by running the control knobs in a clockwise direction.
- b. During the discharge cycle the compressed gas source is applied to the sample pump to discharge water. During the refill cycle the pump is vented to atmosphere at the controller which allows the pump to refill.
- c. When the water discharge flow rate is decreased with the flow throttle to facilitate sampling, it is often necessary to increase the discharge cycle time to deliver a full pump volume.

d. The volume of water pumped per cycle should be approximately 250-350 ml. If the volume is below this level, re-check the cycle lengths according to the three-step procedure, outlined in step 5 above. If the volume is still unsatisfactory, check all air and water fittings for leaks.

7. Flow Throttle Guidelines

a. Turning the yellow throttle control knob clockwise increases pressure supplied to the pump and increases flow rate.

b. Turning the yellow throttle control knob counter-clockwise decreases pressure supplied to the pump and decreases flow rate.

c. The yellow throttle control knob locks into place by pushing it down; in this position it can not be rotated. To rotate the knob it must be pulled up.

d. The pressure gauge on the controller shows the pressure being applied to the sample pump. During the discharge cycle the gauge will indicate pressure applied to the sample pump, during the refill cycle the gauge will fall to zero as the pressure is vented through the controller.

BATTERY CHARACTERISTICS

The Model 350 Automatic Controller is powered by eight (8) double "A" ("AA") size batteries.

Battery life will largely depend on controller duty and the temperature the controller is used in. Batteries will last longer at room temperature than they will at lower temperatures and intermittent controller usage will result in longer battery life than continuous controller usage. Obtaining 130,000 cycles from a set of batteries is typical. This would correspond to approximately fourteen (14) days of continuous 24 hour/day use. Since controller duty is normally not continuous, a battery life in excess of fourteen (14) days should be expected.

It is not necessary to pressurize the controller prior to using the battery test function.

Excess battery test button usage will lower battery life. When the indicator light only flashes for a split second or does not light while the battery test button is held down the batteries will soon need replacement. An additional 30,000 cycles after the battery test light fails to remain continuous is not unusual (four (4) days continuous operation).

Battery Guidelines

a. As controller operating temperature drops below 40-50 degrees Fahrenheit, battery life will decrease.

- b. A continuous green battery life indicator light signal while the battery test button is pushed down indicates fresh batteries.
- c. A split-second flash of green on the battery life indicator light or a dead light, while the battery test button is pushed down, indicates batteries will soon need replacement.
- d. Alkaline batteries are recommended.
- e. The battery test button is also used to "start the controller" when a sampling session is just beginning. See controller operation section.

MAINTENANCE

1. General Care and Storage

Although the controller is protected from moisture it is recommended that the unit be protected from direct rain. When storing the unit it is recommended that the temperature be kept between 40-100 degrees Fahrenheit. A dry storage area is preferable. If the controller is to be stored for an extended period, the batteries should be removed as described in #3 below.

2. Cold Weather Usage

Use of the controller in sub-freezing temperatures is possible but some complications may arise. If the controller is allowed to sit in a sub-freezing environment without cycling, condensed water in the valve may freeze. The controller will need to be warmed to above freezing before it will begin cycling; once it is cycling it may again be placed in the freezing conditions.

3. Battery Replacement

Batteries are replaced by removing the four (4) screws which hold the battery case panel on the controller front panel, removing the panel and accessing the battery holder located underneath. The battery holder may be removed from the case by unclasp the transistor battery-type connector panel. Do not pull hard when disconnecting the battery holder, to avoid damaging the battery wires.

11-11-91- 95016

QED
Ground Water
Specialists

6095 Jackson Rd.
PO Box 3726
Ann Arbor, MI 48105
800/624-2026 In Michigan, 313/995-2547

**FAX
TRANSMISSION
FORM**

DATE: 7/14/92
TO: JOEL MENCHACA
COMPANY: KERR MCGEE CHEM. CORP
FAX NO: 702 564 1228

FROM: SUNITA WHITEHEAD
FAX NO. 313-995-1170

TOTAL PAGES
INCLUDING
THIS SHEET 3

MESSAGE: JOEL,

HERE IS THE INFORMATION YOU REQUESTED
ON THE DRIVER / CONTROLLERS. IF YOU HAVE ANY QUESTIONS
CALL ME AT 1-800 624-2026.

SW

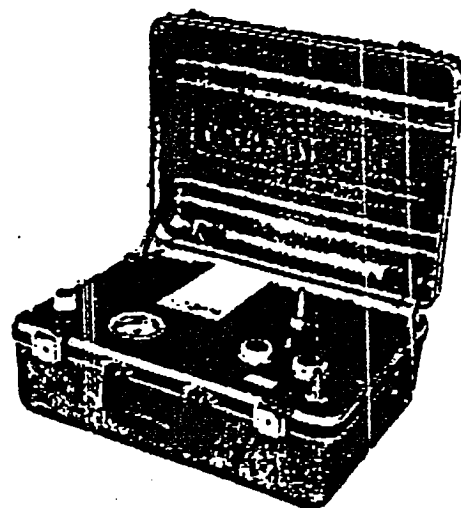
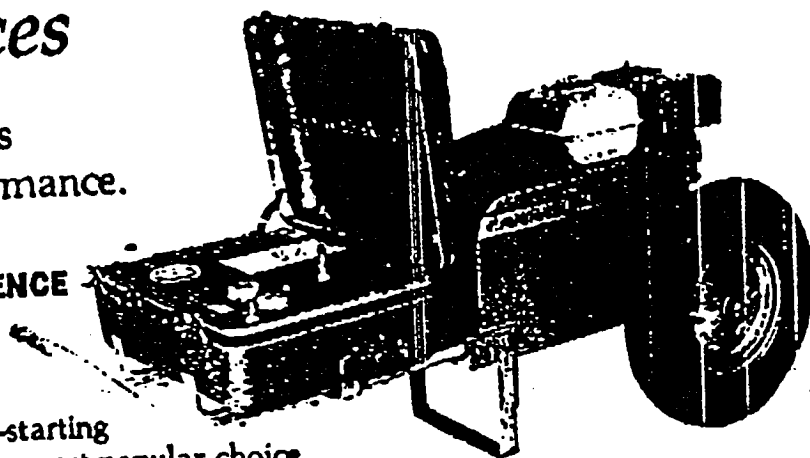
Controllers/Air Sources

Workhorse controller/compressor carts provide self-contained portable performance.

RUGGED CONSTRUCTION, PORTABLE CONVENIENCE

Most of our customers choose the 3111 series controller/compressor carts. They combine field-proven pneumatic controllers with performance-engineered compressors, powered by reliable, fast-starting 4 HP Honda gasoline engines. Model 3111LR is the most popular choice.

The most durable, portable, all-in-one pump-driving system around, the 3111 series operates every sampling and purging system we make. It's simple and self-contained, optimized for maximum performance, reliability, and ease of use. Finishing touches include oilless compressors for maximum contamination protection.



SPECIFICATIONS:

MODEL NO.	DESCRIPTION
3111LR	Standard controller/compressor cart drives pumps to 200 ft. lift; 4 HP Honda engine, high output compressor (4.3 SCFM at 100 psi), with model 3013 controller mounted on the anti-vibration braced cart, with easy wheel/handle breakdown; 89 lbs.
3111PH	High pressure model controller/compressor cart provides lifts to 320 ft. with high pressure compressor (2.1 SCFM at 165 psig) and model 3013H high pressure controller otherwise similar to model 3111LR above; 93 lbs.

Note: Economy models available with Briggs & Stratton engines: 3111PHR standard lift; 3111HP high pressure.

THE MOST RELIABLE CONTROLLERS IN THE INDUSTRY

Versatile Well Wizard 3013 series controllers are fully adjustable, can operate high-rate purge pumps at full capacity and still be throttled down to 0 psi for EPA-recommended low flow rates for sampling.

One-person portability, fast set-up, and unattended cycling greatly reduce labor costs, and QED systems come complete—no extra charges for hoses, batteries, chargers or other necessary equipment.

All standard and high pressure models are compatible with a wide range of gas sources. Optional Pump Manifold lets one controller run three sampling pumps within a 20-foot radius. High pressure models allow lifts to 1000 feet. Pneumatic design provides sophisticated control with no batteries or electrical supply. And it's tough: Well Wizard controllers have been left out in the rain, dropped from trucks, even had their lids ripped off—and still kept on working.

SPECIFICATIONS:

MODEL NO.	LOGIC	MAXIMUM SUPPLY PRESSURE (PSI)	MAXIMUM PUMP DEPTH (feet)	WEIGHT (lbs)	LENGTH (Dimensions in inches)	WIDTH	HEIGHT
3	Pneumatic	125	250	22	18	14.50	6.75
3013H	Pneumatic	300	600	26	18	14.50	6.75
3013UH	Pneumatic	300	1000	32	18	14.50	6.75

EXTRA CONTROLLER PERFORMANCE BUILT IN Pneumatic Power

3013 series controllers have all-pneumatic design for maximum reliability. No battery to drain, no long waits for recharging or replacement batteries—if you've got pressure, you've got power. Third-generation pneumatic controls provide inherent shock and moisture resistance for real ruggedness.

Electronic Efficiency

Model 350 has uniquely efficient circuits that work for 100 hours on one set of inexpensive, readily available AA batteries. Its MIL-SPEC circuit board delivers continued performance in all conditions. Warning light shows a full day's power remaining, so you won't get left out in the field.

ACCESSORIES:

MODEL NO.	DESCRIPTION
3000	Multiple Pump Manifold
3017	Low Submergence Adapter

QED GROUNDWATER SPECIALISTS

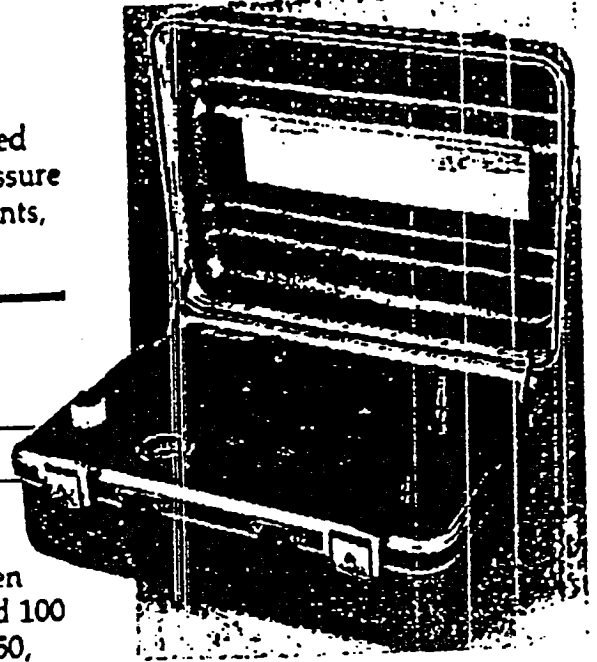
WELL WIZARD

PORTABLE, VERSATILE ELECTRONIC CONTROLLER

A lightweight that packs a real punch, the Model 350 electronic controller weighs only 11 pounds, runs pumps up to 250 ft. deep. Especially recommended for portable sampling as well as dedicated systems, Model 350 controllers are complete with flow throttle, pressure gauge, and other environmentally-sealed, weather-resistant components, enclosed in a tough, protective carrying case.

SPECIFICATIONS:

MODEL NO.	LOGIC	MAXIMUM SUPPLY PRESSURE (PSI)	MAXIMUM PUMP DEPTH (feet)	WEIGHT (lbs)	LENGTH (Dimensions in inches)	WIDTH	HEIGHT
350	Electronic	125	250	11	15	12.00	6.50

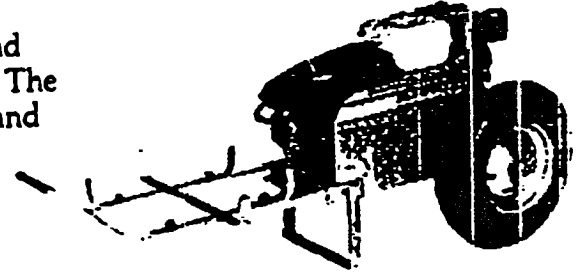


GASOLINE-POWERED AIR SOURCES

The 41000 series gasoline-driven compressors provide field-proven performance from a rugged platform that goes anywhere. Standard 100 and high-pressure 165 psi versions work with 3013 series, model 350, and other controllers.

All models come with clean-running 4-cycle Honda or Briggs and Stratton industrial/commercial engines—no sloppy oil-gas mixing. The chassis is vibration-engineered for trouble-free operation. Wheels and handle disassemble quickly and easily for transport and handling.

Don't be confused by so-called "equivalent" products. Years of field-testing and engineering refinements make QED compressor parts the most reliable, practical portable air source you can find.



12 VOLT ELECTRIC-POWERED AIR SOURCE

For wells to 60 ft. Model 302C offers reliable 100 psi compressor output and convenience in a compact, portable package (18"L x 14.5"W x 6.75"H). Designed for use with the Model 350 Electronic Controller; just connect the supplied cables to your 12 VDC truck or car battery.

Electric-powered compressors are designed for sampling pump operation only, and not intended for purge pump use.

AIR SOURCE SPECIFICATIONS:

MODEL NO.	MAXIMUM LIFT (feet)	POWER	COMPRESSOR OUTPUT (SCFM at Fixed PSIG)			WT
			100	125	165	
41012	200	Honda	4.3	—	—	89
41003	200	B&S	4.3	—	—	89
41014	320	Honda	2.2	2.2	2.1	93
41002	320	B&S	2.2	2.2	2.1	93
4100CLR*	200	Honda	4.3	—	—	87
4100CHR*	200	B&S	4.3	—	—	87
302C	75	12 VDC	.21	—	—	25

* Sample two portable air sources. Designed for use with Model 350 Electronic Controller, they do not include controller brackets (electronic controllers should not be cart-mounted because of compressor vibration).

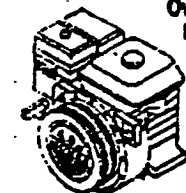
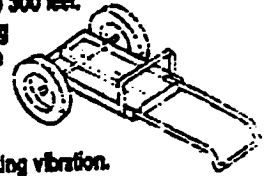
What To Look For In An Air Source Cart...



Field-proven high flotation pneumatic tires, for true one-person portability even in heavy mud or snow. Constructed to take long hours, rough terrain—

and the payloads are QED's reliable, high-power engine/compressor combinations that can operate pumps to 300 feet.

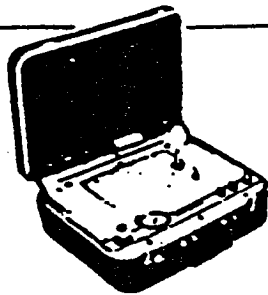
Underside bracing for long frame life. Engine/compressor stabilization to minimize competing vibration. Top-rated Honda™ quality power for first pull starting every time.



Oversized compressor—heavier-duty castings than typical units, for long life, better heat dissipation; opposable pistons to minimize vibration problems. Heavy duty belt guard

ensures safety. Need special features in your controller/compressor not shown here? Call us for custom features.

CONTROLLERS/DRIVER CONTROLLERS



MODEL 3013 (Standard & High Pressure Controller)

DESCRIPTION

- Designed to automatically cycle sampling and purge pumps, using an external compressed gas source.
- Adjustable sample flow throttle.
- Independently adjustable pump cycle times.
- Includes two, 20-foot heavy-duty industrial air supply and delivery hoses (std.) with quick-connect fittings (connection to air source uses a 1/4-inch male pipe thread fitting).
- Rugged fiberglass case.

OPTIONAL FEATURE

- Pump manifold, Model 3000, allows simultaneous operation of three sampling pumps within a 20 ft. radius of controller. Three 20 ft. hose assemblies are included with manifold.

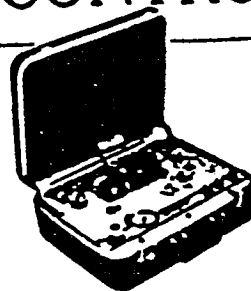
APPLICATION INFORMATION

- Can be used with all sampling pumps, Purge Mizers, Purge Masters, Purge Mizer Controllers, dedicated water level indicators and cap assemblies.
- No batteries or electric supply required.
- Pump flow performance curves for this controller are shown on page 3.

SPECIFICATIONS

Model Number*	Maximum Supply Pressure (psig)	Maximum Pump Depth (ft)	Weight (lbs)
3013	125	250	22
3013H	300	600	26
3013UH	500	1000	32

*Size for all models: 18"L x 15-1/4"W x 6-3/4"H.



MODEL 3011 (Driver-Controller)

DESCRIPTION

- Designed to power and automatically cycle sampling pumps with an internal 12 V DC compressor.
- Oilless 100 PSI Compressor.
- Adjustable sample flow throttle.
- Independently adjustable pump cycle times.
- Includes 20 feet of heavy-duty industrial air supply hose (std.) with quick-connect fittings.
- Rugged fiberglass case.
- 15 feet of quick-connect power cord with battery clamps.

OPTIONAL FEATURE

- Pump manifold, Model 3000, allows simultaneous operation of three sampling pumps within a 20 ft. radius of controller. Three 20 ft. hose assemblies are included with manifold.

APPLICATION INFORMATION

- Can be used with all sampling pumps, Purge Mizers, Purge Mizer Controllers, dedicated water level indicators, and cap assemblies. Use of external compressed air source recommended with Purge Master pumps.
- Requires external power source, 12 V DC, 11 amp.
- 75 feet maximum lift recommended for efficient purging.
- Unit can operate from external compressed air source for maximum 200-ft. lift.
- Pump flow performance curves for this driver-controller are shown on page 3.

SPECIFICATIONS

- Weight: 25 lbs.
- Size: 18"L x 15-1/4"W x 6-3/4"H
- Compressor output:
0.70 SCFM at 0 PSIG
0.43 SCFM at 40 PSIG
0.35 SCFM at 60 PSIG
0.21 SCFM at 100 PSIG

QED
GroundWater
Specialists

P.O. Box 3726 • Ann Arbor, MI 48106

July 15, 1992

Joel Menchaca
Kerr McGee Chemical Corp.
56 Lake Mead PO Box 55
Henderson, NV 89009 USA

Dear Environmental Professional:

Thanks for your interest in our ground water sampling and remediation pumping products. We've enclosed our full GroundWater Specialists catalog covering equipment for site investigation, dedicated and portable sampling, and remediation and leachate pumping.

QED GroundWater Specialists is dedicated to providing reliable, innovative sampling and pumping equipment backed by prompt, high quality technical assistance and service. Our catalog describes the performance advantages of each of our equipment lines. Our GroundWater Express service advantage includes:

1. Local representatives who are trained, experienced professionals, ready to assist with installations and even equipped with service tools and parts.
2. 24-hour service "800" HOT LINE access to our troubleshooting experts.
3. Federal Express headquarters Parts Bank loaner and service parts inventory, for delivery in as little as 6 hours.
4. Fast application assistance, fast delivery (most orders shipped with 2 days), fast repair service (same day when needed, 3-5 days standard turnaround).

For immediate assistance, contact the representative below or our factory experts at (800) 624-2026.

Sincerely,



David A. Fischer
Vice President of Sales

Area Representative:
Thompson/Quill Associates of Arizona
9034 North 23rd Avenue, Suite 12
Phoenix, AZ 85021
(602) 371-0011

HYDRAPUNCH

WELL WIZARD

SAMPLE PRO

PULSE PUMP

FAX 313-995-1170

Nº 30630



KERR-MCGEE CHEMICAL CORPORATION

POST OFFICE BOX 16 • HENDERSON, NEVADA 89008
(702) 365-8801

MATERIAL REQUEST (RFP) RM-1702-3-A

DATE 11-12-92	DATE NEEDED BY 11-30-92	IF MORE THAN ONE PAGE of 1 Pages	MR NO	PREFIX	NUMBER
DELIVER TO Stores	NOTIFY A. Gaddy	CHARGE TO ACCOUNT/CENTER/SLID/ELAC			WORK CHARGE NO 41115
USED FOR GW Plant	INPUT BY	SUGGESTED VENDOR GED			SHIP TO NO.
DELIVERY SITE Henderson, NV.	ADDRESS	HEADER MESSAGE CODES			DATE
PRIORITY <input checked="" type="checkbox"/> (Routine) <input type="checkbox"/> (Emergency) <input type="checkbox"/> (Confirming)	CITY, STATE, ZIP CODE	CONTACT PERSON			PHONE 800-624-2026
HAZARDOUS MATERIALS <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO	ROUTING	SHIP BY DATE	TERMS		
MARKS REQUIRED <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO	FRIGHT PREPAY <input type="checkbox"/> ADD TO INVOICE <input type="checkbox"/> COLLECT <input type="checkbox"/> PREPAID ALLOWED	P.O. NUMBER	FOB		
<p>NOTE: List only those items handled by one vendor on each MR. SHADED areas to be completed by Requestor.</p>					
TAX STATUS		TAXABLE at Receiving Location's Regular Rate <input type="checkbox"/>	TAXABLE OTHER (see below) <input type="checkbox"/>	EXEMPT Incorporated in a product for resale <input type="checkbox"/>	EXEMPT used or consumed in the Manufacturing Process <input type="checkbox"/>

CONFIRMING	VERBAL REQUEST BY	CONFIRMS REQUEST WITH PURCHASING	CONFIRMS ORDER WITH VENDOR
		BUYER'S NAME	REPRESENTATIVE'S NAME AND DATE

ITEM	QUANTITY	UNIT MEASURE	DESCRIPTION	ITEM I.D. NO.	UNIT PRICE
1	100'	ft.	Well Wizard Polyethylene Tubing # P-5100		\$1.35/ft.
2	1	ea	PVC Well Wizard Pump Model # P-1100		\$320.00
3	1	ea	Cap for 6 inch Well Wiz. Model # 2120-F		\$5.00

ESTIMATED TOTAL COST (whole dollars only) \$510.00	REQUESTOR'S PRINTED NAME AND INITIALS A Gaddy	APPROVED	APPROVED	APPROVED
DISTRIBUTION: WHITE COPY - PLANT PURCHASING PINK COPY - ORIGINATOR AFTER APPROVALS GREEN COPY - PURCHASING MR CONTROL YELLOW COPY - ORIGINATOR		DATE	DATE	DATE

Change Batteries 7-9-92 002
 Tape 15-2
 Hoat 17-1
 Order 18-3
 Well Wizard 19-1
 stick MAT 0012
 710W

16.7
 303059

Well Wizard T.M.
 Driver/Controller # 3020
 702-564-1228
 210w Thriftle 3,
 Pressure Gauge \$750.00
 Discharge/Refill 1150.00
 Pump Controls
 Pump Supply
 Moisture Vent
 off/on switch
 Surge Tank
 white head
 1-800-622-2024
 3020-12V DC
 Compressor
 750.00
 Controller - 350
 Electronic
 \$1150.00

OMEGA... Your Source for Process Measurement and Control

TEMPERATURE

- Thermocouple, RTD & Thermistor Probes & Assemblies
- Connector Systems and Panels
- Wire: Thermocouple, RTD and Thermistor
- Callibrators and Ice Point References
- Recorders, Controllers and Process Monitors
- Data Acquisition Modules and Data Loggers
- Computer Sensor Interface

PRESSURE/STRAIN

- Transducers
- Strain Gauges
- Load Cells
- Pressure Gauges
- Instrumentation

FLOW

- Rotameters
- Flowmeter Systems
- Air Velocity Indicators
- Turbine/Paddlewheel Systems
- Vortex Meters and Flow Computers

pH

- Electrodes
- Benchtop/Laboratory Meters
- Controllers
- Callibrators/Simulators
- Transmitters



OMEGA
ENGINEERING, INC.
An OMEGA Group Company



MODELS PHH-60/80
pH/CONDUCTIVITY METER



Operator's Manual



OMEGA
ENGINEERING, INC.
An OMEGA Group Company

One Omega Drive, Box 4047
Stamford, Connecticut 06907-0047
(203) 359-1660 Telex: 998404 Cable: OMEGA
FAX: (203) 359-7700

WARRANTY

OMEGA warrants this unit to be free of defects in materials and workmanship and to give satisfactory service for a period of 13 months from date of purchase. OMEGA Warranty adds an additional one (1) month grace period to the normal one (1) year product warranty to cover handling and shipping time. This ensures that our customers receive maximum coverage on each product. If the unit should malfunction, it must be returned to the factory for evaluation. Our Customer Service Department will issue an Authorized Return (AR) number immediately upon phone or written request. Upon examination by OMEGA, if the unit is found to be defective it will be repaired or replaced at no charge. However, this WARRANTY is VOID if the unit shows evidence of having been tampered with or shows evidence of being damaged as a result of excessive current, heat, moisture, vibration, or misuse. Components which wear or which are damaged by misuse are not warranted. These include contact points, fuses, and traces.

THERE ARE NO WARRANTIES EXCEPT AS STATED HEREIN. THERE ARE NO OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE IMPLIED WARRANTIES OF MERCHANTABILITY AND OF FITNESS FOR A PARTICULAR PURPOSE. IN NO EVENT SHALL OMEGA ENGINEERING, INC. BE LIABLE FOR CONSEQUENTIAL, INCIDENTAL OR SPECIAL DAMAGES. THE BUYER'S SOLE REMEDY FOR ANY BREACH OF THIS AGREEMENT BY OMEGA ENGINEERING, INC. OR ANY BREACH OF ANY WARRANTY BY OMEGA ENGINEERING, INC. SHALL NOT EXCEED THE PURCHASE PRICE PAID BY THE PURCHASER TO OMEGA ENGINEERING, INC. FOR THE UNIT OR UNITS OR EQUIPMENT DIRECTLY AFFECTED BY SUCH BREACH.

OMEGA
ENGINEERING, INC.
An OMEGA Group Company

One Omega Drive, Box 4047
Stamford, Connecticut 06907-0047
(203) 359-1660 Telex: 998404 Cable: OMEGA
FAX: (203) 359-7700

Printed in U.S.A.

Return Requests/Inquiries

Direct all warranty and repair requests/inquiries to OMEGA Customer Service Department, telephone number (203) 359-1660. Before returning any instrument, please contact the OMEGA Customer Service Department to obtain an authorized return (AR) number. The designated AR number should then be marked on the outside of the return package.

To avoid processing delays, also please be sure to include:

1. Returnee's name, address, and phone number.
2. Model and Serial numbers.
3. Repair instructions.

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M603/116

GENERAL DESCRIPTION

The OMEGA® PHH-60 and PHH-80 meters feature both pH and conductivity measurements in one handheld instrument. The PHH-60 measures pH from 0 to 14 and conductivity from 0 to 19,999 μ mhos, and the PHH-80 extends the conductivity capability to 199,999 μ mhos. While in use, the electrodes fold out and lock into a 90° or 180° position. When testing is completed, the electrodes are folded back into the instrument case. Recessed switches control all functions and an easy-access panel reveals adjustments for pH calibration and slope, and zero and span for conductivity.

OPERATING PROCEDURE

1. Slide back electrode compartment to release pH and conductivity electrodes. Refer to Figure 1.
2. Extend electrodes in either the 90° or 180° measurement position.
3. Energize by depressing the ON/OFF switch once.
4. Immerse electrodes in solution to be measured. For proper operation, immerse electrodes to half their length. Do not immerse below electrode caps.
5. When energized, the display will show which parameter is being measured (for example, pH, PPM μ S), or PPM (μ S) X10). Only the 200K range utilizes the X10 annunciator on the PHH-80. 20K and 2K are direct readings. Overrange conductivity is indicated by "1" on the display.
6. Agitate electrodes briefly and observe the reading.
7. To change parameters, depress the pH/PPM (μ S) switch once. The range sequence on the PHH-80 is pH-200K-20K-2K.
8. Rinse electrodes thoroughly and replace pH storage cap before returning to storage compartment; fill the cap with a small amount of pH4 buffer or tap water.
9. Remove the battery when the instrument will be stored for a long period.

CALIBRATION PROCEDURE

The PHH-60/80 has been calibrated prior to shipment. Calibration should be performed periodically with fresh pH buffers and known conductivity solutions.

pH MODE

For best results, calibrate pH with a buffer that is within 3 pH units of the test sample.

1. Rinse the pH probe in distilled water.
2. Insert in a fresh pH7 buffer solution.
3. Slide back the battery compartment cover to the first stop, exposing the adjustment pots.
4. Adjust the CAL pot until the display reads 7.00.
5. Remove probes, rinse and insert in a pH4 or pH10 buffer solution.
6. Adjust the SLOPE pot until the display reads the correct value.

CONDUCTIVITY MODE

1. Rinse probes thoroughly by agitating in pure water.
2. Wipe off conductivity probe and allow it to dry.
3. When dry, conductivity should read 0 in air.
4. Adjust ZERO pot if reading is incorrect. If the conductivity probe does not zero, it may indicate dried solids on the sensor. Clean with a mild detergent solution.
5. Immerse sensor in known conductivity solution. Choose a conductivity calibration solution that is near the samples to be measured. Adjust SPAN pot to desired conductivity value.
6. Only a single-point calibration in the 2K range is required to standardize. However, if the instrument is to be used primarily in higher ranges, it is recommended that the single-point calibration be performed near point of use for best resolution.
7. Rinse probes and return to storage compartment.

SPECIFICATIONS

pH

RANGE: 0 to 14
ACCURACY: ± 1 pH
TEMPERATURE COMPENSATION: Automatic 0 to 70°C

CONDUCTIVITY

RANGE: PHH-60: 0 to 19,999 μ mhos; PHH-80: 0 to 1,999, 0 to 19,999, 0 to 199,999 μ mhos
 10 ppm or 10 μ mhos
 $\pm 2\%$ of span
TEMPERATURE COMPENSATION: Automatic 0 to 50°C
POWER: 9V battery
DIMENSIONS: 6 1/4" x 1 1/4" x 2 1/4"
WEIGHT: 8.5 oz

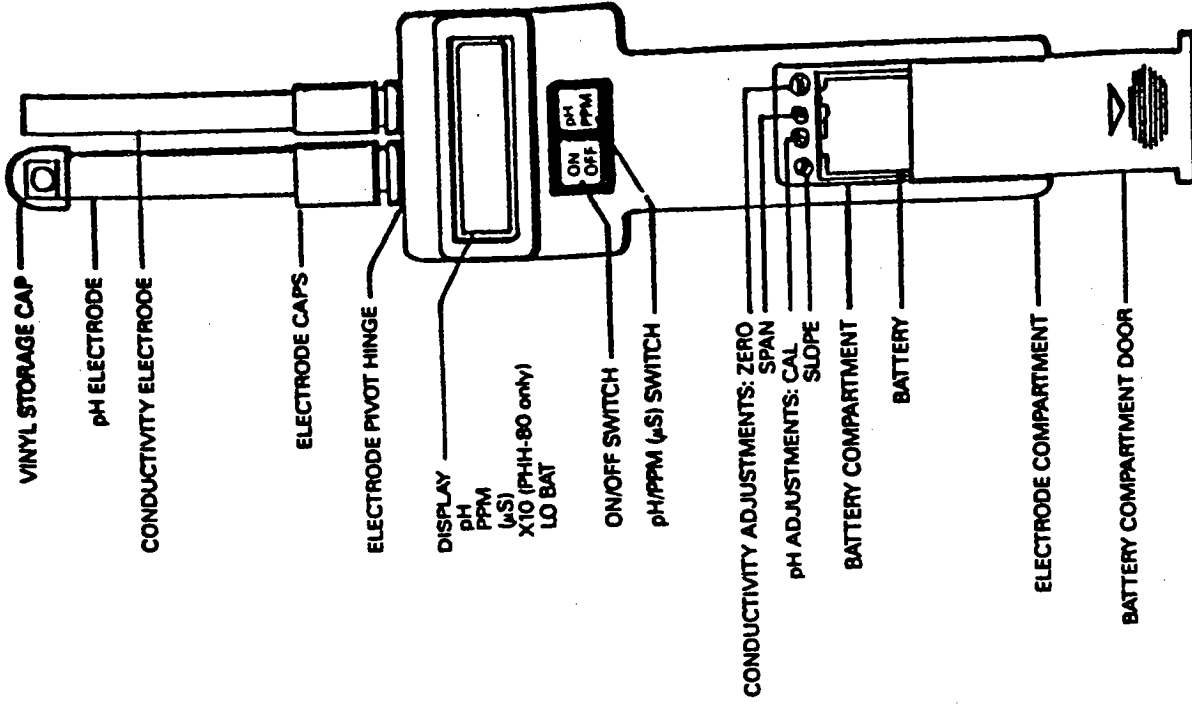


Figure 1 PHH-60/80
Front Panel Controls



P.O. Box 3726 • Ann Arbor, MI 48106

MODEL 6000 STATIC WATER LEVEL METER

General Description

The Model 6000 portable static water level meter is used to determine the depth of the static water level in groundwater wells. The meter operates by sensing the resistivity change which occurs when the probe is submerged in water. The resistance in air is much greater than the resistance in water. When this resistance change is detected, a high pitched tone sounds and a red light turns on. If the probe is moved back into the air the tone ceases and the light turns off. The meter is powered by a 9-volt transistor battery and will operate for 1 year without needing replacement under normal use and conditions.

Operations

Make sure the stainless steel probe is clean. Turn the on/off switch, clockwise, to the 'on' position. Press the red self test button to test the battery. Lower the probe into the well. When the high pitched tone sounds, stop lowering the probe. By moving the probe up and down (tone on, tone off) it is possible to accurately locate the air-water interface. Read the depth off the tape supporting the probe. The tape is marked in .05 foot intervals. When the static water level has been recorded, wind the probe and tape on the reel and lock the reel using the orange locking lever in the back of the hose reel. Rinse the probe and any tape that has contacted well water in distilled water.

Note: The meter requires conductive water to operate. The meter will not operate or may operate erratically if it is tested in distilled water.

Servicing the Battery

Place the unit on a flat surface so that the operations panel is facing up. Remove the three screws holding the operations panel down. Remove the operations panel from the reel. Take care to not allow any of the measuring tape to come off the exposed reel hub. Replace the battery which is located on the inside of the operations panel. Replace the panel on the hub and reassemble.

HYDRAPUNCH®

WELL WIZARD®

SAMPLE PRO®

PUMP

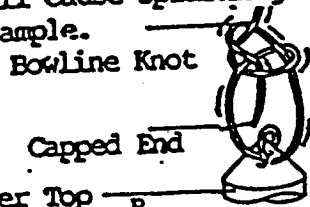
FAX 313 906 1174

1 800 621 2026

ASSEMBLY & USAGE

1. Insert the bottom ball in the bailer and screw on the bottom ball check
2. If a point source^R bailer, insert the top ball and screw on the top assembly. Water moves through the bailer until it stops moving down the well. The sample will be taken where the bailer stops moving down the well and begins to rise.
3. Tie the suspension cord to the bailer hook. Lower the bailer slowly down the well. Dropping the bailer into the water will cause splashing and may influence the quality of the sample.

Method for securing coated stainless steel suspension cord to top of bailer.



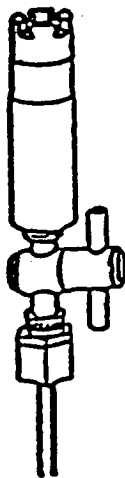
How To Tie Teflon Coated Wire

Teflon coated wire used for the suspension of equipment in a well requires the use of a firm knot to ensure that slippage does not occur during use. Follow the diagram knot for attaching the bailer, pump or other sampling device. If the wire has been cut, you may seal the ends with the heat shrink Teflon tubing provided.

4. The point source^R bailer, which has a second ball check located at the top, permits the bailer to secure a sample from a specific depth without influence from the water above. The vacuum release pin is removed before collecting the sample and is inserted before emptying the bailer.
5. Raise the bailer gently to the surface to maintain sample integrity. The closed top model, because of its conical top, will eliminate well hang up on possible loose materials in the well casing.
6. Insert the bottom emptying device, the o'ring on the unit causes a tight fit. Extra pressure may be needed for insertion. Empty the bailer contents into the sample bottle. Take care not to aerate the sample by splashing.
7. The PVC bottom emptying device with tap is controlled by a metal clip. The teflon bottom emptying device with tap has a stop cock which allows you to regulate your sample flow.



Bottom Emptying Device available in PVC and Teflon.



Teflon Bottom Emptying Device with tap. Use in the Teflon and Stainless Steel bailer. This model has the stop cock on it for flow control. Use black o'rings for stainless steel bailers and white for the teflon bailer



PVC Bottom Emptying Device with tap. Use in the Acrylic and PVC bails. This model has the metal push clip on it for flow control.

(OVER)



HANDLING & STORAGE OF TIMCO

BAILERS

The following are a few suggestions designed to help insure a long, productive life for your Timco bailers.

ASSEMBLY

When assembling threaded sections of your bailers, care should be exercised not to overtighten the joints. Overtightening may cause the female thread to mushroom over the shoulder of the male. Hand tightening is sufficient.

All bailers should be disassembled and cleaned with fresh water after each use to insure all particles that are collected during sampling, are removed from the thread joints. Doing this will insure easier assembly for you next sample.

STORAGE

When not in use all bailers should be stored either on a level surface lying flat or suspended from a cord to avoid warpage.

Avoid storing other objects against or on top of the bailers. This practice could result in a slight deformation of the product over an extended period of time.

Timco bailers should not be stored in areas where there is the possibility of contact with high temperature.

(OVER)

