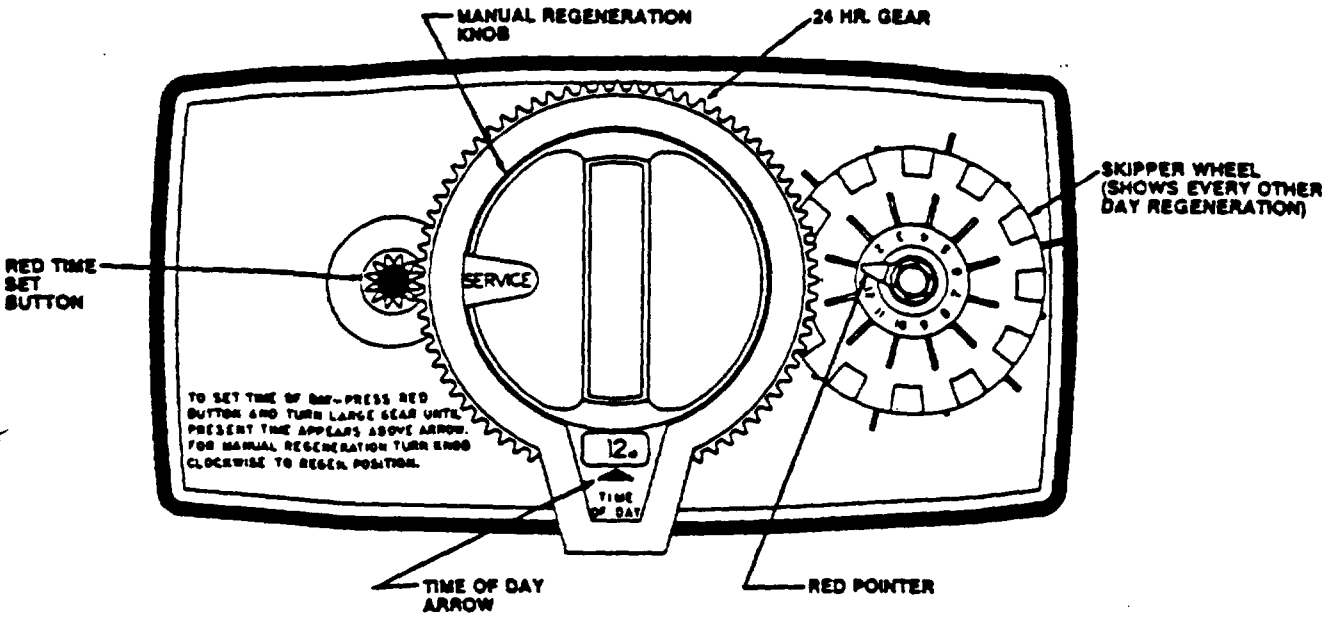
nstallation and start-up procedure

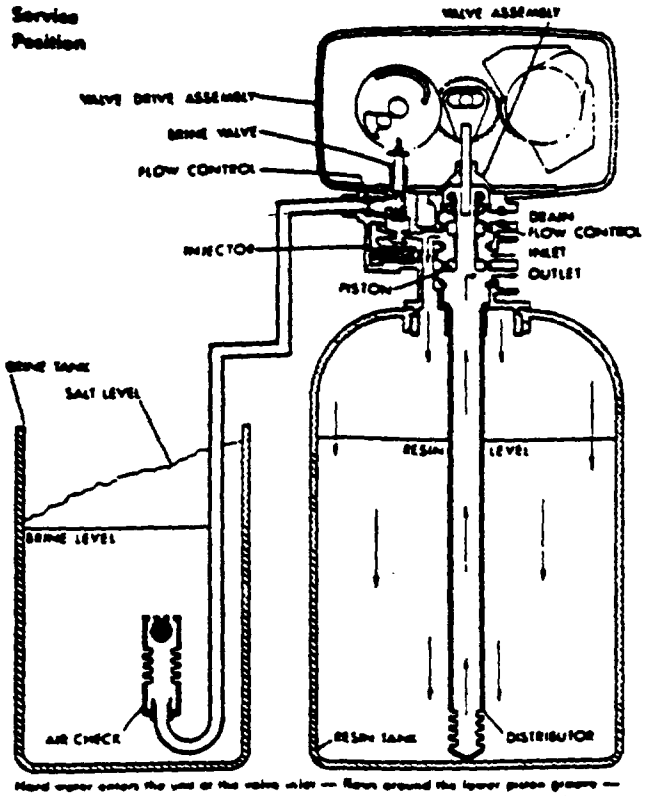
The ..ter softener should be installed with the inlet, outlet and drain connections made in accordance with manufacturer's recommendations and to meet applicable plumbing codes.



1. Manually index the softener control into the service position and let water flow into the resin tank. When the water flow stops, open a softened water tap until all air is ..ased from the lines, then close the tap.
   ..e: the various regeneration positions may be dialed manually by turning the knob on the front of the control until the indicator shows that the softener is in the desired position.
2. Manually index the control to the back-wash position and allow water to flow at the drain for 3 or 4 minutes.
3. Remove back cover plate.
4. Make sure that the salt dosage is set as recommended by the manufacturer. If necessary, set salt in accordance with the setting instruction sheet. Manually index the control to the brine fill position and allow the brine tank to fill to the top of the air check.
5. Manually index the control to the brine draw position and allow the control to draw water from the brine tank until it stops.
6. Plug in the electrical cord and look in the sight hole in the back of the motor to see that it is running. Set the days that regeneration is to occur by sliding tabs on skipper wheel outward to expose trip fingers. Each tab is one day. Finger at red pointer is tonight. Moving clockwise from red pointer, extend or retract fingers to obtain the desired regeneration schedule.
7. Manually advance the control to the beginning of the brine fill position; and allow the control to return to the service position automatically.
8. Fill the brine tank with salt.
9. Replace back cover on the control.
10. Make sure that any by-pass valving is left in the normal service position.

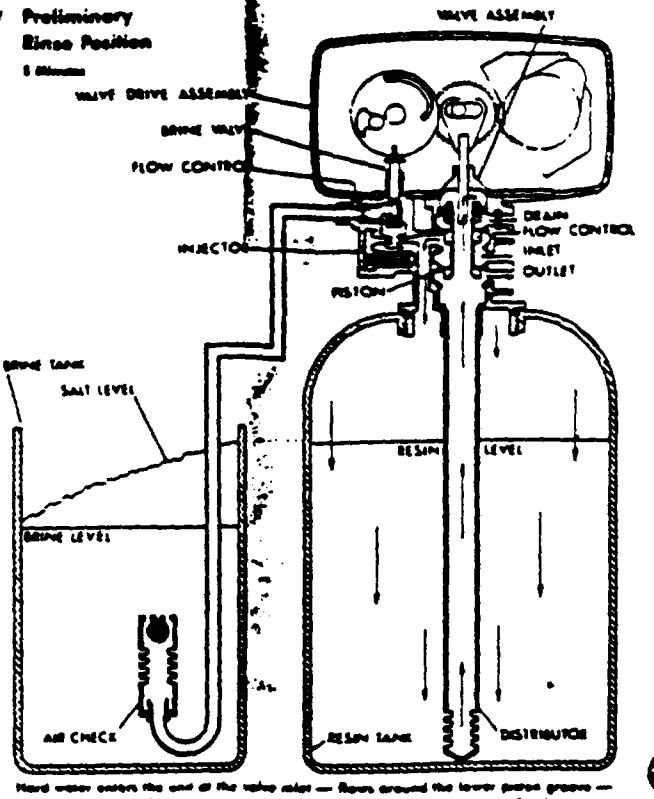
water conditioner flow diagrams

1 Service Position



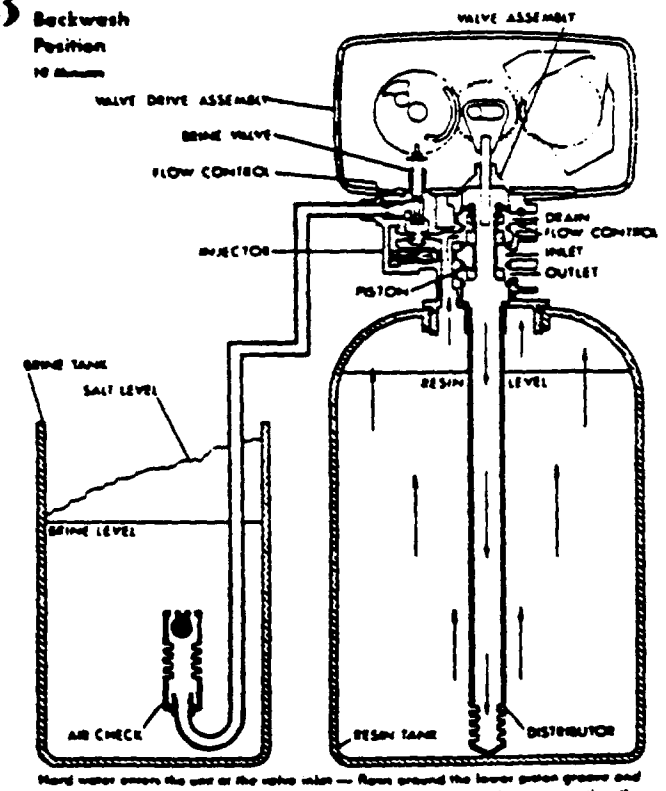
Hard water enters the unit at the valve inlet — flows around the lower piston groove — thru the passage to the top of tank — down thru the resin and enters the distributor as conditioned water. The conditioned water flows up thru the center tube to the valve outlet.

2 Preliminary Rinse Position



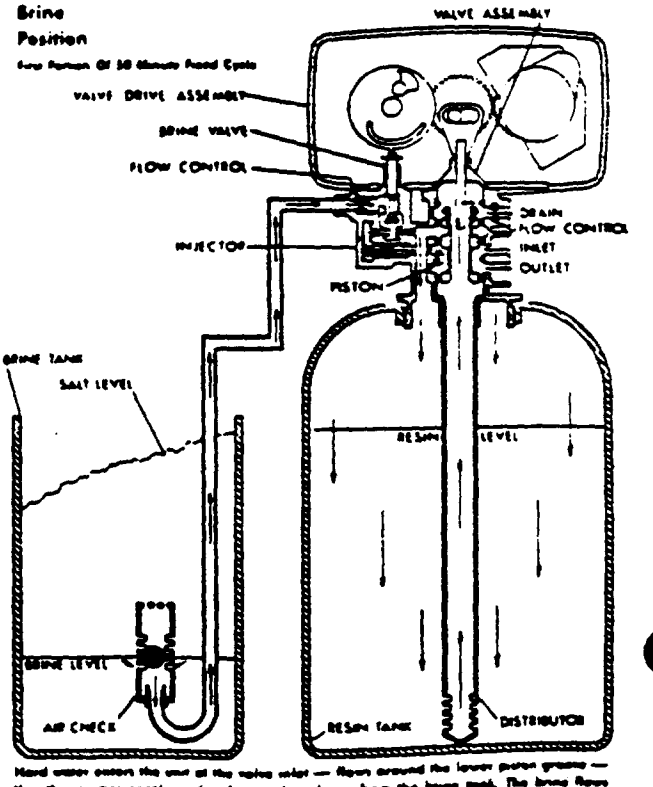
Hard water enters the unit at the valve inlet — flows around the lower piston groove — down thru the top of tank passage — downward thru the resin — up the distributor tube — thru the center hole in the piston — over the top edge of the piston and out the drain line.

3 Backwash Position



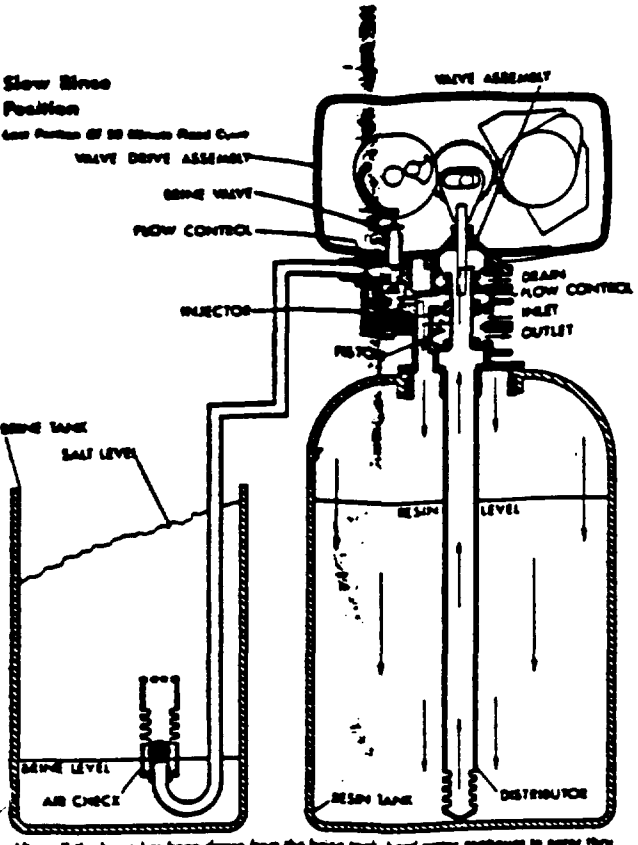
Hard water enters the unit at the valve inlet — flows around the lower piston groove and lower piston land — down thru the center tube and out the distributor — up thru the resin — thru the top of tank passage — around the upper piston groove and out the drain line.

4 Brine Position



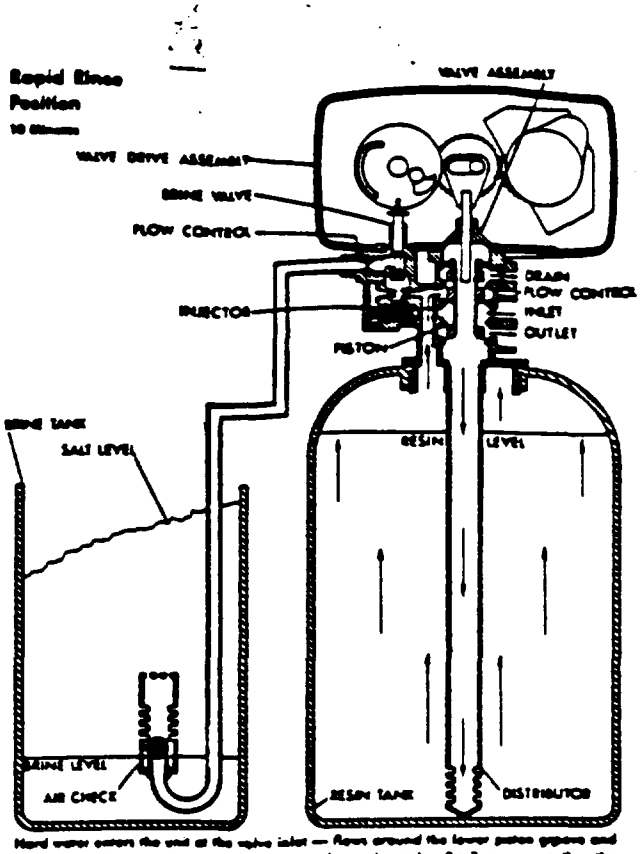
Hard water enters the unit at the valve inlet — flows around the lower piston groove — thru the eductor nozzle and orifice to draw brine from the brine tank. The brine flows down thru the resin — into the distributor — up thru the center tube — thru the center hole in the piston and out the drain line.

5 Slow Rinse Position



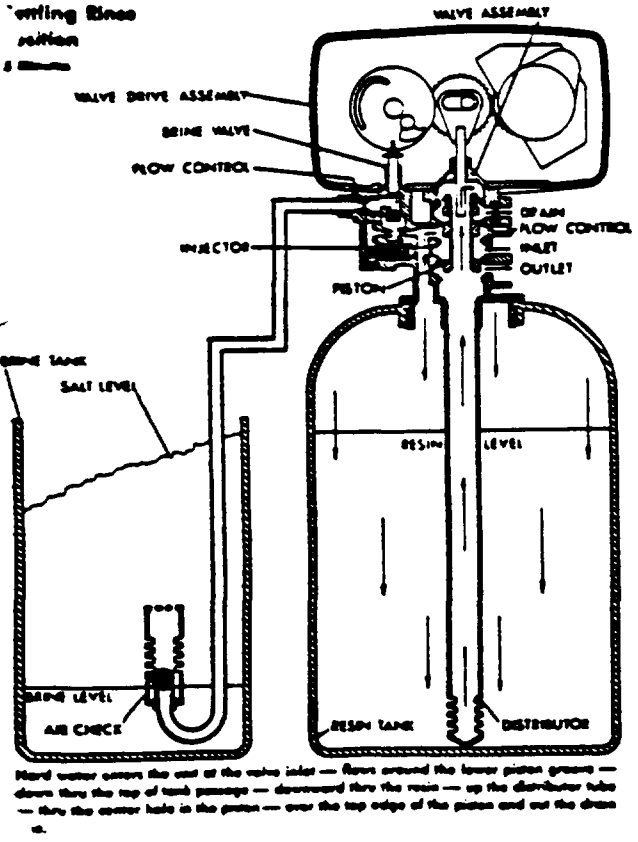
After all the brine has been drawn from the brine tank, hard water continues to enter thru the valve inlet — flows around the lower piston groove — thru the nozzle and orifice — down thru the resin and into the distributor — up thru the center tube — thru the center hole in the piston and out the drain line.

6 Rapid Rinse Position



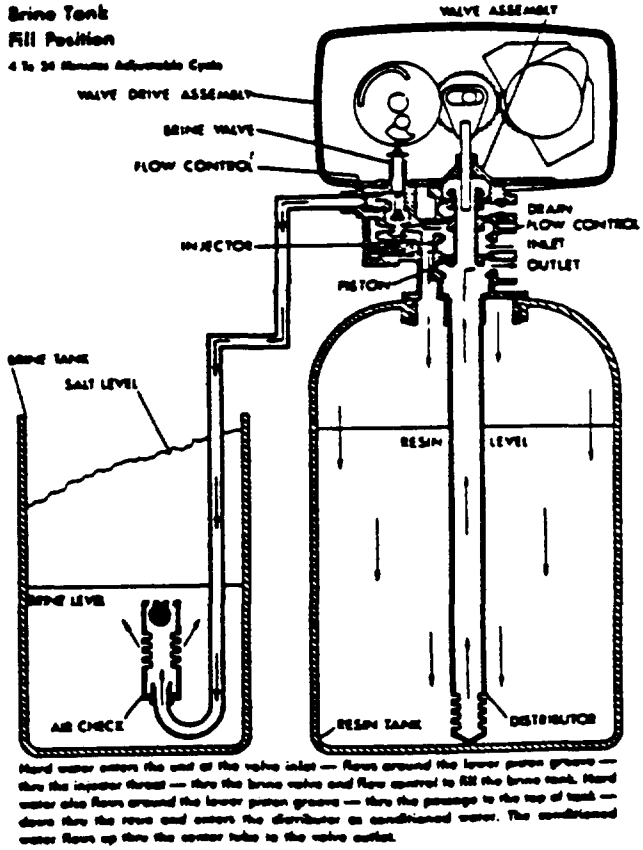
Hard water enters the unit at the valve inlet — flows around the lower piston groove and lower piston land — down thru the center tube and out the distributor — up thru the resin — thru the top of tank passage — around the upper piston groove and out the drain line.

7 Backwashing Rinse Position



Hard water enters the unit at the valve inlet — flows around the lower piston groove — down thru the top of tank passage — downward thru the resin — up the distributor tube — thru the center hole in the piston — over the top edge of the piston and out the drain line.

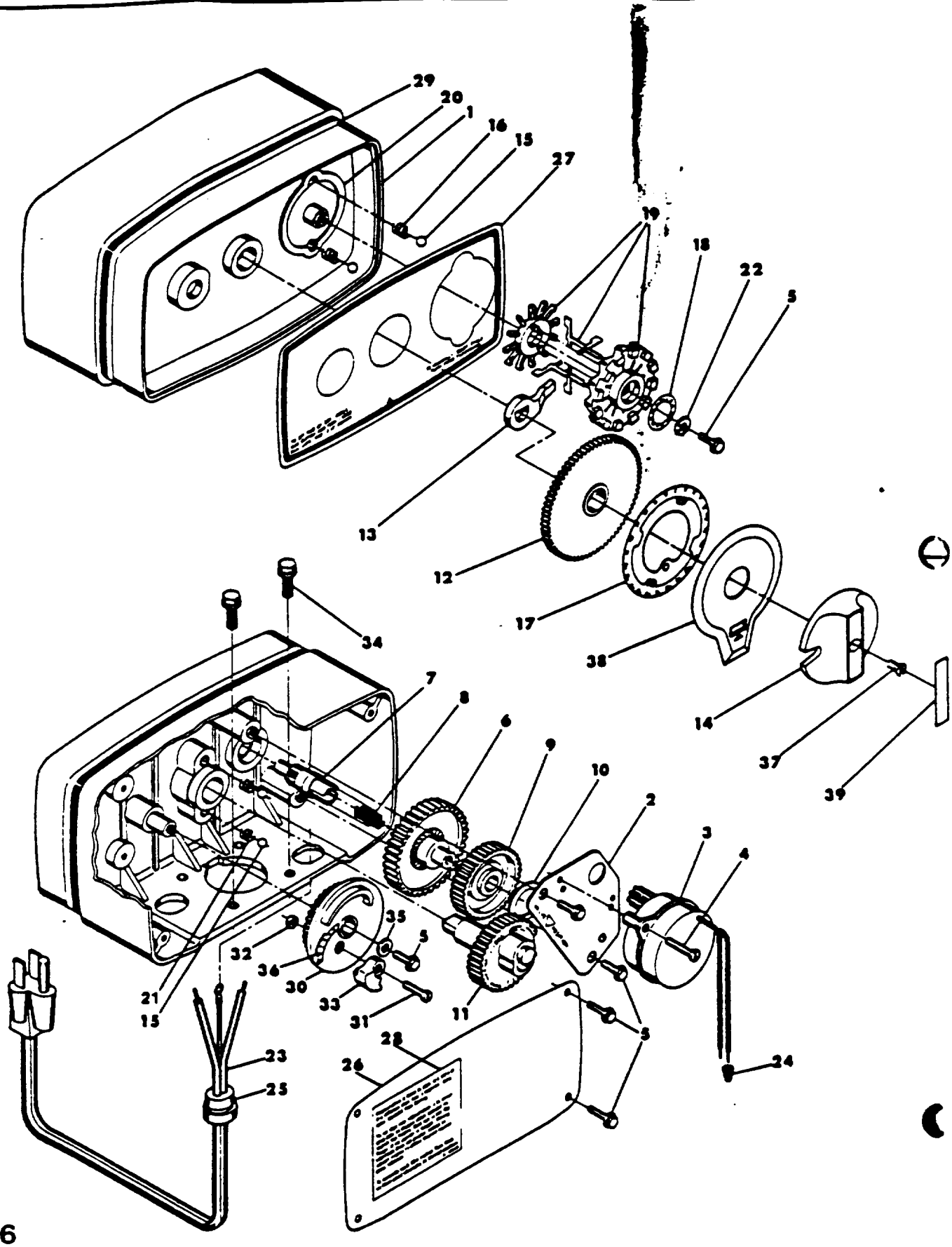
8 Brine Tank Fill Position



Hard water enters the unit at the valve inlet — flows around the lower piston groove — thru the injector throat — thru the brine valve and flow control to fill the brine tank. Hard water also flows around the lower piston groove — thru the passage to the top of tank — down thru the resin and enters the distributor as conditioned water. The conditioned water flows up thru the center tube to the valve outlet.

control valve drive assembly

(see opposite page for parts list)

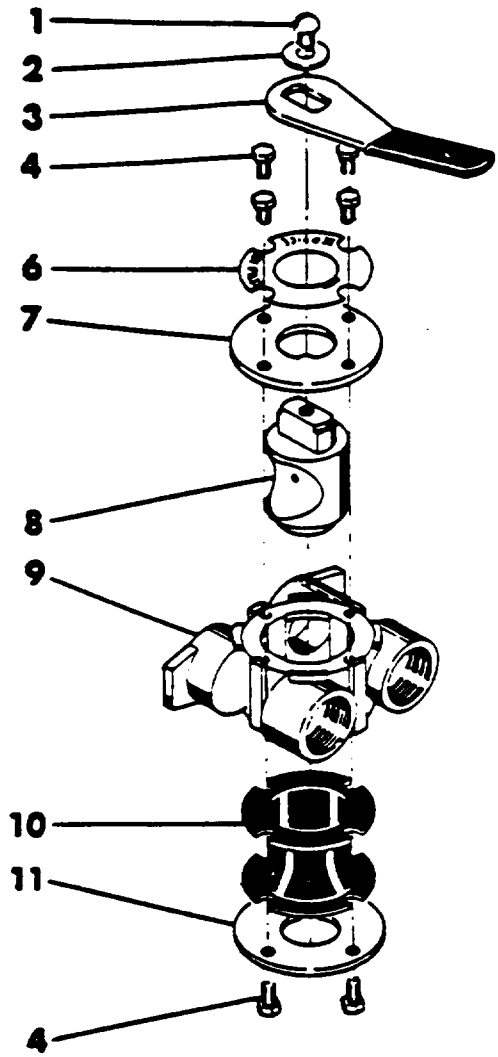


CONTROL VALVE ASSEMBLY
PARTS LIST

ITEM NO.	NO. REQ'D.	PART NO.	DESCRIPTION
1	2	13255	Adapter Clip
2	5	13242	Seal
3	1	14449	Valve Body Assembly - 1" Dist.
	1	14450	Valve Body Assembly - 1 3/16" Dist.
4	1	13304	"O" Ring - Distributor Tube - 1"
	1	10244	"O" Ring - Distributor Tube - 1 3/16"
5	1	12281	"O" Ring - Top of Tank
6			Not Assigned
7	4	14241	Spacer
8	1	13247	Piston - Standard
	1	13781	Piston - Low Water
	1	13852	Piston - Filter
9	1	10696	Piston Pin
10	1	13001	Piston Rod Assembly
11	1	12953	Piston Retainer
12	1	13446	End Plug Assembly Std. - White
	1	13446-01	End Plug Assembly Filter - Black
	1	13446-02	End Plug Assembly Low Water - Gray
13			Not Assigned
14	2	13315	Screw - Injector Mounting
15	2	13709	Adapter Coupling
16	4	13305	"O" Ring - Adapter Coupling
17	2	13314	Screw - Adapter Coupling
18	1	12638	"O" Ring - Drain
19	2	13301	"O" Ring - Injector
20	2	13302	"O" Ring - Brine Spacer
21	1	13303	"O" Ring - Injector Cover
22	1	13163	Injector Body
23	1	10913	Injector Nozzle - Specify Size
24	1	10914	Injector Throat - Specify Size
25	1	10227	Injector Screen
26	1	13166	Injector Cover
27	1	13172	Brine Valve Stem
28	1	12626	Brine Valve Seat
29	1	13165	Brine Valve Cap
30	1	13167	Brine Valve Spacer
31	1	12550	Quad Ring
32	1	11973	Spring - Brine Valve
33	1	12035	Washer - Brine Valve
34	1	11981	Retaining Ring
35	1	10329	B.L.F.C. Fitting Nut
36	1	10330	B.L.F.C. Ferrule
37	1	10332	B.L.F.C. Tube Insert
38	1	12094	B.L.F.C. Button - .25 GPM
	1	12095	B.L.F.C. Button - .50 GPM
39	1	12977	"O" Ring - B.L.F.C.
40	1	13245	B.L.F.C. Button Retainer
41	1	13244	B.L.F.C. Fitting
42	1		D.L.F.C. Button - Specify Size
43	1	13173	D.L.F.C. Button Retainer
44	1	12767	Screen - Brine Line
45	1	15348	"O" Ring - D.L.F.C. (not shown)
46	1	13497	Air Disperser
47	1	13546	End Plug Retainer
48	3	12112	Screw
49	1	13363	Washer
50	1	13296	Screw
51	1	13708	Adapter - ¾" N.P.T.
	1	13398	Adapter - 1" N.P.T.

by-pass valve assembly

(see opposite page for parts list)



MODEL 5600
BY-PASS VALVE ASSEMBLY
PARTS LIST

ITEM NO.	NO. REQ'D.	PART NO.	DESCRIPTION
1	1	11989	Round Head Machine Screw
2	1	11443	Plain Washer
3	1	11979	Valve Lever
4	8	15727	Hex. Head Machine Screw
5			Not Assigned
6	1	13604	Valve Label
7	1	11978	Side Cover
8	1	11972	Valve Plug
9	1	17290	Valve Body - ¾" N.P.T.
	1	13399	Valve Body - 1" N.P.T.
10	1	11726	Valve Seal
11	1	11986	Side Cover

A. TO REPLACE TIME BRINE VALVE, INJECTORS, AND SCREEN

1. Unplug electrical cord from outlet.
2. Turn off water supply to conditioner:
   a. If the conditioner installation has a "three valve" by-pass system, first open the valve in the by-pass line, then close the valves of the conditioner inlet and outlet.
   b. If the conditioner has an integral by-pass valve, put it in the by-pass position.
   c. If there is only a shut-off valve near the conditioner inlet, close it.
3. Relieve water pressure in the conditioner by putting the control in the backwash position momentarily. Return the control to the service position.
4. Disconnect brine tube and drain line connections at the injector body.
5. Remove the two injector body mounting screws. The injector and brine module can now be removed from the control valve. Remove and discard valve body "O" rings.

6A. To replace brine valve.

1. Pull brine valve from injector body, also remove & discard "O" ring at bottom of brine valve hole.
2. Apply silicone lubricant to new "O" ring and reinstall at bottom of brine valve hole.
3. Apply silicone lubricant to "O" ring on new valve assembly and press into brine valve hole, shoulder on bushing should be flush with injector body.

6B. To replace injectors and screen.

1. Remove injector cap and screen, discard "O" ring. Unscrew injector nozzle and throat from injector body.
2. Screw in new injector throat and nozzle, be sure they are seated tightly. Install a new screen.
3. Apply silicone lubricant to new "O" ring and install around oval extension on injector cap.

7. Apply silicone lubricant to three new "O" rings and install on protrusions on injector body.
8. Insert screws thru injector cap and injector. Place this assembly thru hole in timer housing and into mating holes in the valve body. Tighten screws.
9. Reconnect brine tube and drain line.
10. Return by-pass or inlet valving to normal service position. Water pressure should now be applied to the conditioner, and any by-pass line shut off.
11. Check for leaks at all seal areas. Check drain seal with the control in the backwash position.
12. Plug electrical cord into outlet.
13. Set time of day and cycle the control valve manually to assure proper function. Make sure the control valve is returned to the service position.
14. Make sure there is enough brine in the brine tank.
15. Start regeneration cycle manually if water is hard.

B. TO REPLACE TIMER

1. Unplug electrical cord from outlet.
2. Turn off water supply to conditioner:
   a. If the conditioner installation has a "three valve" by-pass system, first open the valve in the by-pass line, then close the valves at the conditioner inlet and outlet.
   b. If the conditioner has an integral by-pass valve, put it in the by-pass position.
   c. If there is only a shut-off valve near the conditioner inlet, close it.
3. Relieve water pressure in the conditioner by putting the control in the backwash position momentarily. Return the control to the service position.
4. Remove the control valve back cover.
5. Remove screw and washer at drive yoke. Remove timer mounting screws. The entire timer assembly will now lift off easily. (Slide forward with slight rotational movement).
6. Put new timer on top of valve. Be sure drive pin on main gear engages slot in drive yoke (rotate control knob if necessary).
7. Replace timer mounting screws. Replace screw and washer at drive yoke.
8. Return by-pass or inlet valving to normal service position. Water pressure should now be applied to the conditioner, and any by-pass line shut off.
9. Plug electrical cord into outlet.
10. Set time of day, days of regeneration, and salt usage. Cycle the control valve manually to assure proper function. Make sure the control valve is returned to the service position.
11. Replace the control valve back cover.
12. Make sure there is enough brine in the brine tank.
13. Start regeneration cycle manually if water is hard.

C. TO REPLACE PISTON ASSEMBLY

1. Unplug electrical cord from outlet.
2. Turn off water supply to conditioner.
   a. If the conditioner installation has a "three valve" by-pass system, first open the valve in the by-pass line, then close the valves at the conditioner inlet and outlet.
   b. If the conditioner has an integral by-pass valve, put it in the by-pass position.
   c. If there is only a shut-off valve near the conditioner inlet, close it.
3. Relieve water pressure in the conditioner by putting the control in the backwash position momentarily. Return the control to the service position.
4. Remove the control valve back cover.
5. Remove screw and washer at drive yoke. Remove timer mounting screws. The entire timer assembly will now lift off easily. (Slide forward with slight rotational movement.)
6. Remove screws and end plug retainer.
7. Pull upward on end of piston yoke until assembly is out of valve.
8. Inspect the inside of the valve to make sure that all spacers and seals are in place, and that there is no foreign matter that would interfere with the valve operation.
9. Take new piston assembly as furnished and push piston into valve by means of the end plug. Twist yoke carefully in a clockwise direction to properly align it with drive gear. Replace end plug retainer and tighten screws securely.
10. Place timer on top of valve. Be sure drive pin on main gear engages slot in drive yoke (rotate control knob if necessary).
11. Replace timer mounting screws. Replace screw and washer at drive yoke.
12. Return by-pass or inlet valve to normal service position. Water pressure should now be applied to the conditioner, and any by-pass line shut off.
13. Plug electrical cord into outlet.
14. Set time of day. Cycle the control valve manually to assure proper function. Make sure the control valve is returned to the service position.
15. Replace the control valve back cover.
16. Make sure there is enough brine in the brine tank.
17. Start regeneration cycle manually if water is hard.

D. TO REPLACE SEALS AND SPACERS

1. Unplug electrical cord from outlet.
2. Turn off water supply to conditioner.
   a. If the conditioner installation has a "three valve" by-pass system, first open the valve in the by-pass line, then close the valves at the conditioner inlet and outlet.
   b. If the conditioner has an integral by-pass valve. Put it in the by-pass position.
   c. If there is only a shut-off valve near the conditioner inlet, close it.
3. Relieve water pressure in the conditioner by putting the control in the backwash position momentarily. Return the control to the service position.
4. Remove the control valve back cover.
5. Remove screw and washer at drive yoke. Remove timer mounting screws. The entire timer assembly will now lift off easily. (Slide forward with slight rotational movement.)
6. Remove screws and end plug retainer.
7. Pull upward on end of piston rod yoke until assembly is out of valve.
8. Remove seals and spacers with your fingers.
9. To restuff a valve, install a seal at bottom of main bore, then alternately install spacers and seals being sure that seals are not protruding into side grooves in main bore.
10. Inspect the inside of the valve to make sure that all spacers and seals are in place, and that there is no foreign matter that would interfere with the valve operation.
11. Take new piston assembly as furnished and push piston into valve by means of the end plug. Twist yoke carefully in a clockwise direction to properly align it with drive gear. Replace and plug retainer and tighten screws securely.
12. Place timer on top of valve. Be sure drive pin on main gear engages slot in drive yoke (rotate control knob if necessary).
13. Replace timer mounting screws. Replace screw and washer at drive yoke.
14. Return by-pass or inlet valving to normal service position. Water pressure should now be applied to the conditioner, and any by-pass line shut off.
15. Plug electrical cord into outlet.
16. Set time of day. Cycle the control valve manually to assure proper function. Make sure the control valve is returned to the service position.
17. Replace the control valve back cover.
18. Make sure there is enough brine in the brine tank.
19. Start regeneration cycle manually if water is hard.

PROBLEM	CAUSE	CORRECTION
1. Softener Fails To Regenerate.	A. Electrical Service To Unit Has Been Interrupted.	A. Assure Permanent Electrical Service (Check Fuse, Plug, Pull Chain or Switch).
	B. Timer is Defective.	B. Replace Timer.
	C. Power Failure.	C. Reset Time of Day.
2. Softener Delivers Hard Water.	A. By-Pass Valve is Open.	A. Close By-Pass Valve
	B. No Salt in Brine Tank.	B. Add Salt to Brine Tank and Maintain Salt Level Above Water Level.
	C. Injectors Or Screen Plugged.	C. Replace Injectors and Screen.
	D. Excessive Water Usage.	D. Increase Frequency of Regeneration and/or Salt Setting (See Timer Instructions). Make Sure That There Is Not A Leaking Valve in The Toilet Bowl or Sinks.
	E. Insufficient Water Flowing Into Brine Tank.	E. Check Brine Tank Fill Time And Clean Brine Line Flow Control If Plugged.
	F. Hot Water Tank Hardness.	F. Repeated Flushings of the Hot Water Tank is Required.
	G. Leak At Distributor Tube.	G. Make Sure Distributor Tube Is Not Cracked. Check 'O' Ring And Tube Pilot.
	H. Internal Valve Leak.	H. Replace Seals And Spacers And/Or Piston.
3. Unit Uses Too Much Salt.	A. Improper Salt Setting.	A. Check Salt Usage And Salt Setting.
	B. Excessive Water In Brine Tank.	B. See Problem No. 7.
4. Loss of Water Pressure.	A. Iron Buildup In Line To Water Conditioner.	A. Clean Line To Water Conditioner.
	B. Iron Buildup In Water Conditioner.	B. Clean Control And Add Resin Cleaner To Resin Bed. Increase Frequency of Regeneration.

PROBLEM	CAUSE	CORRECTION
	C. Inlet of Control Plugged Due To Foreign Material Broken Loose From Pipes By Recent Work Done On Plumbing System.	C. Remove Piston And Clean Control.
5. Loss of Resin Through Drain Line.	A. Air In Water System.	A. Assure That Well System Has Proper Air Eliminator Control. Check For Dry Well Condition.
6. Iron In Conditioned Water.	A. Fouled Resin Bed.	A. Check Backwash, Brine Draw And Brine Tank Fill, Increase Frequency of Regeneration.
7A. Excessive Water In Brine Tank.	A. Plugged Drain Line Flow Control.	A. Clean Flow Control.
7B. Salt Water In Service Line.	B. Plugged Injector System	B. Clean Injector And Replace Screen.
	C. Timer Not Cycling.	C. Replace Timer.
	D. Foreign Material In Brine Valve.	D. Clean Or Replace Brine Valve.
	E. Foreign Material In Brine Line Flow Control.	E. Clean Brine Line Flow Control.
8. Softener Fails To Draw Brine.	A. Drain Line Flow Control Is Plugged.	A. Clean Drain Line Flow Control.
	B. Injector Is Plugged.	B. Clean Or Replace Injectors.
	C. Injector Screen Plugged.	C. Replace Screen.
	D. Line Pressure Is Too Low.	D. Increase Line Pressure. (Line Pressure Must Be At Least 20 PSI At All Times.)
	E. Internal Control Leak.	E. Change Seals And Spacers and/or Piston Assembly.
9. Control Cycles Continuously.	A. Faulty Timer Mechanism.	A. Replace Timer.
10. Drain Flows Continuously.	A. Foreign Material In Control.	A. Remove Piston Assembly And Inspect Bore. Remove Foreign Material & Check Control in Various Regeneration Positions.
	B. Internal Control Leak.	B. Replace Seals And/Or Piston Assembly.
	C. Control Valve Jammed In Brine Or Backwash Position.	C. Replace Piston And Seals And Spacers.
	D. Timer Motor Stopped Or Jammed.	D. Replace Timer.

AERMOTOR
WATER SYSTEMS
LIMITED WARRANTY

This warranty does not apply to SE Submersible pumps shipped outside the United States.

Your new Aermotor Pump is warranted to be free from mechanical defects in material and workmanship and to perform as claimed in descriptive literature. This warranty does NOT cover damage to controls, pipe, and accessories nor labor involved in repairing or replacing the pump. It also does NOT cover damage caused by misapplication, faulty installation or abuse of the product.

Any Aermotor Pump that becomes inoperative within the warranty period, due to defects in materials or workmanship, shall be repaired or replaced at Aermotor's option free of charge. The inoperative pump must be shipped, freight prepaid, to the nearest Aermotor branch within thirty (30) days from date of failure.

WARRANTY PERIOD — AERMOTOR 4" SUBMERSIBLES

The warranty period for all Aermotor 4" Submersible Pump Ends is twenty-four (24) months from date of installation or thirty-six (36) months from date of manufacture, whichever occurs first.

AERMOTOR JETS, CENTRIFUGALS AND 6" SUBMERSIBLES

The warranty period for Aermotor Jets, Centrifugals and 6" Submersibles is twelve (12) months from date of installation or twenty-four (24) months from date of manufacture, whichever occurs first.

MOTORS AND CONTROLS

These are warranted by Aermotor coextensive with the original manufacturer's warranty that they will be free from electrical and mechanical defects for a period of twelve (12) months from date of original installation or twenty-four (24) months from date of manufacture, whichever occurs first. Any motor or control that becomes inoperative due to an electrical or mechanical defect shall be repaired or replaced free of charge and returned freight prepaid. The defective motor or control must be shipped to an Aermotor branch within thirty (30) days from date of failure, freight charges prepaid.

IN NO EVENT SHALL AERMOTOR BE LIABLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES. Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above exclusion may not apply to you.

THE FOREGOING WARRANTIES ARE EXCLUSIVE AND IN LIEU OF ALL OTHER EXPRESS WARRANTIES, IMPLIED WARRANTIES, INCLUDING BUT NOT LIMITED TO THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, SHALL NOT EXTEND BEYOND THE DURATION OF THE APPLICABLE EXPRESS WARRANTIES PROVIDED HEREIN.

Aermotor reserves the absolute right to make changes in specifications and materials and to repair or replace the Aermotor Pump with products of comparable quality and performance.

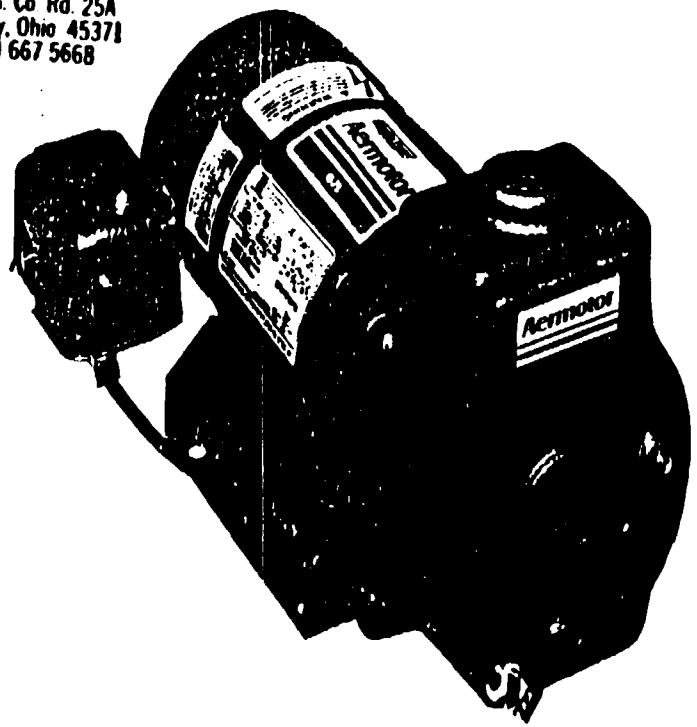
This warranty gives you specific legal rights, and you may also have other rights which vary from state to state. Contact Aermotor, Commerce & Exchange Streets, Conway, AR 72032, if you have any questions about the coverage of this warranty.

Aermotor
P.O. Box 1364
Commerce & Exchange
Conway, AR 72032
501-329-9811

3. Co. Rd 25A Tr., 45178

Jet Pump

INSTALLATION & OPERATION



Aermotor Jet Pumps

OJS • OJ/OJ-V
DMJ/DMJ-V

33099-1187

OWNER'S RECORD

Pump Model_____

HP_____ Phase_____

Date Codes: Pump_____ Motor_____

Date of Installation_____

Suction Lift Ft._____ Ejector_____

Owner_____

Installer_____

Please read thoroughly these instructions BEFORE attempting to install your new jet pump. It can not only save you time but also enable you to get the maximum performance from your water system.

HOW TO INSTALL CONVERTIBLE JET PUMPS

General Information

Convertible jet pumps install on shallow or deep wells, some vertically or horizontally, offset or over the well, 2-pipe or packer.

There are models in this series range in size from 1/3 H.P. through 1 H.P. A "V" following the Model Number indicates a vertical configuration, available on some Models.

Model	Horsepower	Suction	Pressure	Discharge
OJ-33, OJS-33	1/3	1¼"	1"	1"
OJ-50, OJS-50	1/2	1¼"	1"	1"
OJ-75, OJS-75	3/4	1¼"	1"	1"
OJ-100, OJS-100	1	1¼"	1"	1"

Model	Horsepower	Suction	Discharge
DMC-2-75	3/4	1¼"	1"
DMC-2-100	1	1¼"	1"
DMC-2-150	1½	1¼"	1"
DMC-2-200	2	1¼"	1"
DMC-2-SW-75	3/4	1¼"	1"
DMC-2-SW-100	1	1¼"	1"
DMC-2-SW-150	1½	1¼"	1"
DMC-2-SW-200	2	1¼"	1"

Model	Horsepower	Suction	Pressure	Discharge
DMJ-2-50	1/2	1¼"	1"	1"
DMJ-2-75	3/4	1¼"	1"	1"
DMJ-2-100	1	1¼"	1"	1"

Keep the static suction lift (vertical distance between the center line of the pump and the water level) to a minimum.

Mount the pump on a solid, level foundation which provides a rigid and vibration-free support. It should be located where the unit is readily accessible for service and maintenance.

Examine the unit for any visible shipping damage. Immediately report any damage to the carrier.

All pipe used should be clean and free from rust and scale.

Use pipe joint compound on all joints to avoid leaks.

This manual should be kept near the pump installation for ready reference when servicing.

All correspondence, relating to your particular pump, should include the complete Model Number. Order any required repair parts by Part Description and Part Number.

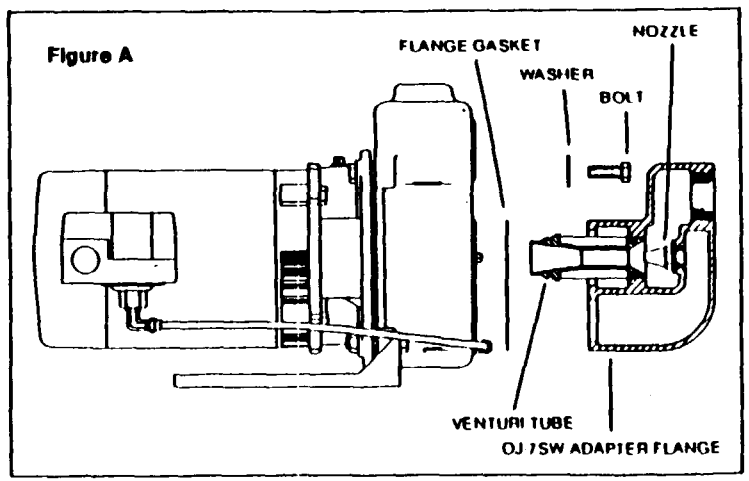
SHALLOW WELL INSTALLATION

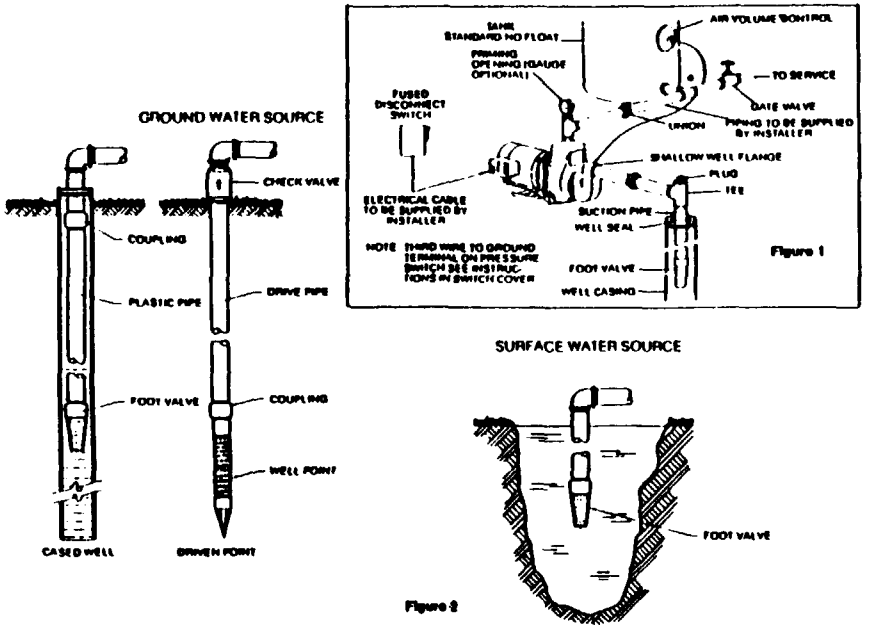
For Shallow Well Application, it requires the Basic Pump Unit of Horsepower Selected PLUS Shallow Well Package for Corresponding H.P. Size. Be certain that your are using the correct Venturi Tube and Nozzle Combination based on Pump Horsepower.

To Install The Shallow Well Adapter

1. Screw the Nozzle into the Adapter Flange and tighten. This is usually done by the factory to save you time.
2. Screw the Venturi Tube into Adapter Flange and tighten. (Be sure you have the correct Venturi Tube size for the H.P. size of pump being installed).
3. With Gasket in place bolt SW Adapter Assembly to pump case flange. Tighten bolts evenly.

Figure A





Suction Piping

SINGLE PIPE SHALLOW WELL INSTALLATION

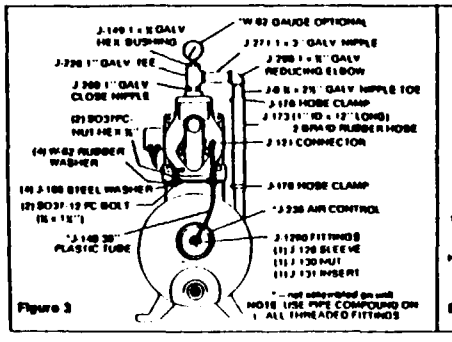
1. Use good pipe joint compound on all male pipe threads to prevent air leaks.
2. Use clean pipe. Pipe should have a gradual slope upward to the pump suction.
3. Suction is limited to a vertical lift of 20 to 25 feet. A long suction line results in additional friction losses, which reduce the effective suction lift of the pump. Do not use smaller than 1¼ inch suction pipe. On long horizontal suction line (10 to 50 feet), use 1½ inch pipe to reduce friction loss.
4. Install a foot valve and strainer on the end of the suction pipe or a check valve at the pump. (Figure 1.) A suction strainer with ⅛" mesh on the end of the suction pipe should be installed to prevent foreign matter from entering the system. Connect foot valve to end of drop pipe and lower drop pipe into the well. Make certain foot valve is at least 12 inches from bottom of well, but that it will be submerged below drawdown water level when pump is operating. For driven wells, install either a spring-dog check valve just above the well point or a horizontal check valve near the well.
5. Install well seal at top of well casing. This seal will prevent dirt or other foreign matter from contaminating the well. (See Figure 1.)
6. Attach a tee to the top of the vertical suction pipe and plug the top opening of the tee with a pipe plug. To reduce priming time later, fill suction pipe with clean water before plugging top of tee.
7. Slope all horizontal pipe continuously upward from the well pipe to the pump (approximately 1 inch for each 10 feet). Avoid dips or peaks, as they may create air pockets and make the pump difficult to prime.
8. Connect the suction tapping of the pump to the horizontal pipe. Use a union or compression type of coupling for final connection for ease of installation and service.
9. Install an air tight union in the suction line close to the pump. (Figure 1.)
10. Make certain that the unions and all fittings and joints in the suction line are air tight.
11. A foot valve, or check valve located as near as possible to the water source, is necessary and will reduce the priming time to an absolute minimum (Figure 2).

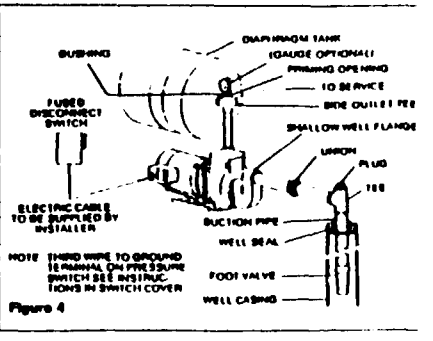
    A CHECK VALVE OR FOOT VALVE IS NOT FURNISHED WITH YOUR PUMP.

Discharge Piping

SHALLOW WELL INSTALLATION

1. Install a nipple and tee in the top of the pump. The top opening is used for initial priming. (Figure 1.)
2. It is advisable to increase the size of the discharge pipe if any appreciable run of pipe is required.
3. Provision for draining discharge lines is also recommended to prevent freezing
4. Connect the priming tee to the pressure tank. Use a union or compression type coupling for ease of installation and service. Standard OJ-SW-H12/30TF packages contain all fittings needed to connect pump to a horizontal mounted tank installation (as shown in Fig. 3.) For mounting diaphragm tank on pump, (Fig. 4.) standard package OJ-SW-X101,2,3 contains the necessary fittings.
5. Install air volume control (OJ-ACP-100 package) according to instruction furnished with control. Tanks equipped with floating discs or other air separation devices do not require an air volume control. See separate section for information on how to precharge a tank with float separator in tank.





Wiring

WARNING. DO NOT START PUMP UNTIL IT HAS BEEN FILLED WITH WATER.

1. Motor wiring should conform to national and local electrical codes.
2. Use wire of adequate size to prevent voltage drop.
3. Pump should be on a branch or separate circuit, fused or circuit breaker protected, with a manual disconnect.
4. Connect the electrical supply from the switch to the motor terminals, following the wiring diagram on the motor nameplate or terminal coverplate. The switch is connected to motor wiring. Motors and switches of ⅓ and ½ HP pumps are set for operation on 115 volt current and ¾ and 1 HP motors are set for 230 volt current. If it is necessary to change wiring on ½ HP and larger motors to accommodate voltages, refer to wiring diagrams on motor and switch.

   Check wiring and fuse charts before connecting wires to service line. Make sure the voltage and frequency of the electrical current supply agrees with that stamped on the motor nameplate. If in doubt, check with power company.

Grounding the Motor:

WIRING TO THIS PUMP MUST BE INSTALLED AND MAINTAINED IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE. IF MORE INFORMATION IS NEEDED, CALL YOUR LOCAL LICENSED ELECTRICIAN OR YOUR POWER COMPANY.

It is strongly recommended that a permanent ground connection be made from the pressure switch (hole in bottom of switch case marked GRD or to the ground terminal in the electrical service panel* or to a metal underground water pipe. Do not ground to a gas supply line. A conductor of adequate size (#12 minimum) must be used for the ground wire. **Do not connect to electric power supply until unit is permanently grounded.** Connect the ground wire to the approved ground and then connect to the terminal provided.

*A metal underground water pipe or well casing at least 10 ft. long makes the best ground electrode. If plastic pipe or insulated fittings are used, run ground wire directly to the metal well casing or use ground electrode furnished by the power company.

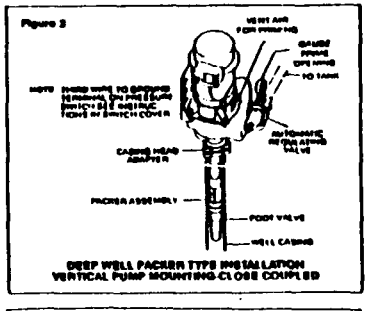
RECOMMENDED FUSING AND WIRING DATA — 60 CYCLE MOTORS

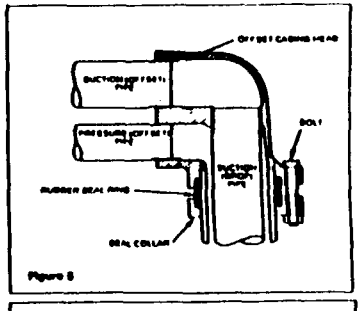
Pump Model	HP	Phase	Volt	Std. Line Plug Fuse*	Fusetron Cartridge Type Fustat-Plug Type*	Max. Feet of Copper Wire Size #14	#12	#10	#8	#6
OJ-33, OJS-33	⅓	1	115	25	—	135	205	325	512	810
			230	—	—	—	—	—	—	—
OJ-50, OJS-50	½	1	115	35	13.75	100	160	245	390	615
			230	20	7.5	390	610	970	—	—
OJ-75, OJS-75	¾	1	115	45	17.5	75	120	190	300	475
			230	25	8.75	235	375	595	950	—
OJ-100, OJS-100	1	1	115	60	21.25	50	80	135	210	330
			230	30	11.25	205	325	530	825	—

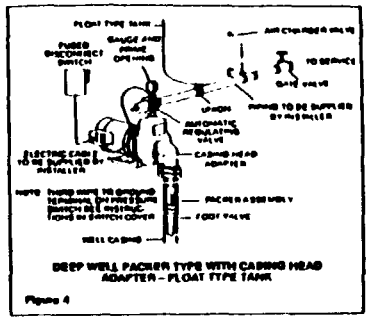
RECOMMENDED FUSING AND WIRING DATA — 60 CYCLE MOTORS

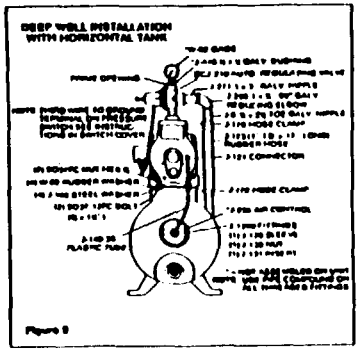
Pump Model	HP	Phase	Volt	Std Line Plug Fuse*	Fusetron Cartridge Type Fustat-Plug Type*	Max. Feet of Copper Wire Size #14	#12	#10	#8	#6
DMJ-2-50	½	1	115	35	13.75	100	160	245	390	615
			230	20	7.5	390	610	970	—	—
DMJ-2-75 DMC-2-75 DMC-2-SW-75	¾	1	115	45	17.5	75	120	190	300	475
			230	25	8.75	235	375	595	950	—
DMJ-2-100 DMC-2-100 DMC-2-SW-100	1	1	115	60	21.25	50	80	135	210	330
			230	30	11.25	205	325	530	825	—
DMC-2-150 DMC-2-SW-150	1½	1	115	60	25.0	40	60	100	150	230
			230	30	12.5	160	250	395	625	985
DMC-2-200 DMC-2-SW-200	2	1	230	40	15.0	120	190	300	475	750

*Standard Fuse Size (Amps)







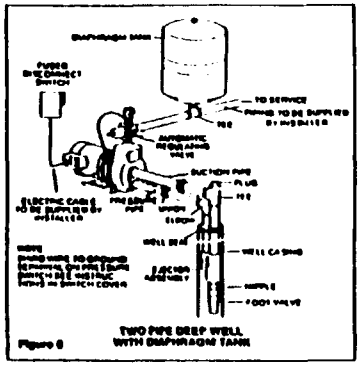


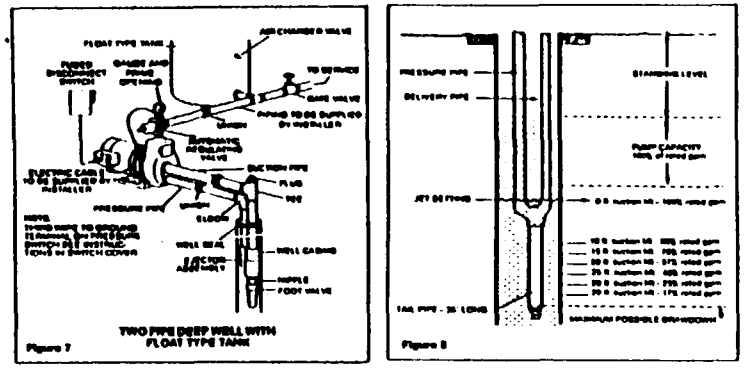
Suction Piping — Deep Well Installation

SINGLE PACKER

1. Use correct casing head adapter to conform to well size and type of installation (vertical, Figure 3, or horizontal mounting, Figure 4) and select proper packer ejector (See appropriate table)

2. Be certain to place seal collar and seal ring (Figure 5) on well casing BEFORE lowering jet assembly and BEFORE beginning any installation whatsoever.
3. Attach foot valve to Packer ejector. Attach suction piping to ejector assembly and lower to desired depth in well.
4. Screw casing head onto suction pipe.
5. Use three bolts to connect seal collar on well casing to casing head. Tighten seal collar.
6. Proceed with balance of suction line piping as described in the section "Suction Piping — Single Pipe."





Suction Piping — Deep Well Installation

2-PIPE

1. Select the proper ejector package including nozzle and venturi for pumping depth and horsepower of pump.
2. Make certain offset suction and pressure pipes both slope continuously upward from well toward pump. Use slip couplings and unions as desired for convenience in further servicing.
3. Install in well in manner described in the section "Suction Piping — Single Pipe." (Figures 6 and 7.)

NOTE: For a weak well or one with an excessive drawdown, use a tailpipe 35 feet long below the jet chamber and put the foot valve on the lower end. (Figure 8.)

With tailpipe, pump delivery remains at 100 percent of capacity down to the ejector level. If water level falls below that, flow decreases in proportion to drawdown as shown in Figure 8. When delivery equals well inflow, the water level remains constant until the pump shuts off.

Discharge Piping — Deep Well Installation

1. Install Regulating Valve, No DJ-210 in the discharge opening at the top of the pump case. (See Table for adjustment of Regulating Valve.)
2. After priming pump, connect system to pressure tank. Connect piping from the Automatic Regulating Valve to the pressure tank. Use a union of compression type coupling for ease of installation and service. The OJ-DW-H-12/30-TF package contains the fittings required to connect the pump to a horizontal mounted tank installation. (Figure 9.) For mounting a diaphragm type tank on the pump, use package OJ-DW-RX-TF. (Figure 6.)

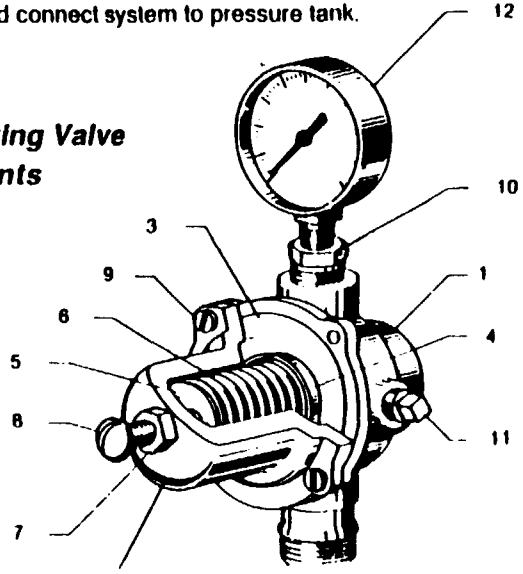
   Tanks equipped with diaphrgms or bladders or other air separation devices do not require an air volume control. If required, install air volume control (OJ-ACP-100 package) according to instructions furnished with the control. See information on how to precharge a tank with a separator in tank.

Starting the Pump

Remove pressure gauge or bushing from automatic regulating valve or priming tee. Use opening to fill pump with clean water until no more air bubbles appear. Replace pressure gauge or bushing.

Start pump at disconnect switch and allow it to pump open discharge to determine if well supply is adequate. Adjust regulating valve according to instructions, to get necessary back-pressure setting. If pump fails to deliver water within 2 to 3 minutes, pull disconnect switch and re-prime pump. If pump is operating satisfactorily, cut it off and connect system to pressure tank.

DJ-210 Regulating Valve — Components



DJ-210 Regulating Valve — Components

KEY NO.	DP NO.	DESCRIPTION
1	27419	Valve Body
2	27420	Spring Housing
3	27421	Diaphragm
4	27422	Spring Retainer
5	27423	Spring Washer
6	27424	Spring
7	27425	⅜" N.C. Hex Nylon Nut
8	27426	Rd. Hd. Brass Screw — ⅜" NC × 1¾"
9	27427	10-32 × ⅜" TapTite Pan Head Cad. Plated Steel Machine Screw
10	27533	Galvanized Bushing — ½" × ¼"
11	27061	Square Head Pipe Plug — ¼"
12	17345	Pressure Gauge

Precharging A Tank Not Factory Precharged.

Precharging increases the capacity and gallons per draw cycle, reduces the number of pump starts, increases pump life, and saves electricity.

1. Let system start and stop twice through 20 to 40 psi (or other start-stop) cycle. Stop system by shutting off at disconnect switch.
2. Drain tank down to zero pounds pressure and precharge the tank through the air valve using a compressor, air tank, or hand operated air pump. Pump air into tank until gauge reads 20 psi (or the start setting of the switch). Start pump system at the disconnect switch.

Trouble Shooting:

If motor will not run:

a. Check fused disconnect switch for blown fuse or loose wire.

b. Check power supply for correct voltage.

c. Shut off Electrical supply at Disconnect Switch and check for loose connections.

If motor runs but does not pump water:

a. Check to be sure that pump is primed.

b. Check water level to be sure foot valve is submerged when pumping.

c. If air vo' e control is used, check for proper operation. A faulty air control can cat ump to lose prime.

Adjustment of Automatic Regulating Valve

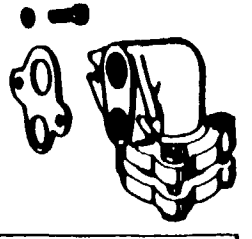
The automatic regulating valve, should be used on two pipe deep well or packer type installations, for maximum efficiency.

To adjust:

1. Turn nylon locknut (Key No. 7) counter clockwise toward screw head so adjusting screw is free for adjustment.
2. Close regulating valve by turning adjusting screw (Key No. 8) clockwise—then start pump. Make certain tank pressure is 20 psi or less. Keep faucets open or remove a plug from tank.
3. Gradually open regulating valve until pump becomes unsteady.
4. Close adjusting screw slowly until pump again is steady.
5. Lock regulating valve with nylon locknut, making certain adjusting screw does not turn while tightening locknut.

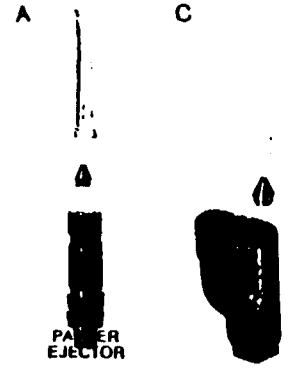
ADAPTERS AND EJECTORS

ADAPTERS FOR BASIC PUMP Vertical Pump Mounting — Close Coupled				
ADAPTER NO.	EDP NO.	WELL SIZE	TYPE OF INSTALLATION	PIPE SIZE SUCTION
DCJ-20A	66512	2"	Over the Well	1¼"
DCJ-25A	66513	2½"	Over the Well	1¼"
DCJ-30A	66514	3"	Over the Well	1½"



CASING HEAD ADAPTERS Off-Set Installation or Horizontal Pump — Close Coupled			
ADAPTER NO.	EDP NO.	WELL SIZE	HORIZONTAL TAPPING
VJ-72A	66054	2"	1¼" & 1"
VJ-725A	66053	2½"	1¼" & 1"
VJ-73A	66055	3"	1¼"

EJECTOR PACKAGES Specify Pump Model, H.P., and Pumping Depth						
	JET CHAMBER NUMBER	EDP NO.	WELL DIAMETER	PIPE SIZE		TYPE
				SUCTION	PRESSURE	
A	JC-20A**	66532	2"	1¼"		Brass
	JC-250A	66626	2½"	1¼"		Brass
	JC-30A	66531	3"	1½"		Brass
	JCI-20A**	66628	2"	1¼"		Cast Iron
C	AJ-37FP	66118	4"	1¼"	1"	Cast Iron
	AJ-37BFP	66119	4"	1¼"	1"	Brass



SERVICE GUIDE

A — PUMP WON'T START OR RUN

CAUSE OF TROUBLE	REMEDY
1. Blown fuse.	Check to see if fuse is OK. If blown, replace with fuse of proper size.
2. Low line voltage.	Use voltmeter to check pressure switch or terminals nearest pump. If voltage under recommended minimum, check size of wiring from main switch on property. If OK, contact power company.
3. Loose, broken, or incorrect wiring	Check wiring circuit against diagram. See that all connections are tight and that no short circuits exist because of worn insulation, crossed wire, etc. Rewire any incorrect circuits. Tighten connections, replace defective wires.
4. Defective motor.	Check to see that switch is closed. Repair or take to motor service station.
5. Defective pressure switch.	Check switch setting. Examine switch contacts for dirt or excessive wear. Adjust switch settings. Clean contacts with emery cloth if dirty.
6. Tubing to pressure switch plugged.	Remove tubing and blow through it. Clean or replace if plugged.
7. Impeller or seal.	Turn off power, then use screwdriver to try to turn impeller or motor. If impeller won't turn, remove housing and locate source of binding.
8. Defective start capacitor.	Use an ohmmeter to check resistance across capacitor. Needle should jump when contact is made. No movement means an open capacitor; no resistance means capacitor is shorted. Replace capacitor or take motor to service station.
9. Motor shorted out.	If fuse blows when pump is started (and external wiring is OK) motor is shorted. Replace motor.

B — MOTOR OVERHEATS AND OVERLOAD TRIPS OUT

CAUSE OF TROUBLE	REMEDY
1. Incorrect line voltage.	Use voltmeter to check at pressure switch or terminals nearest pump. If voltage under recommended minimum, check size of wiring from main switch on property. If OK, contact power company.
2. Motor wire correctly.	Check motor wiring diagram. Recor proper voltage as per wiring diagram.

SERVICE GUIDE

B Continued

CAUSE OF TROUBLE	REMEDY
3. Inadequate ventilation.	Check air temperature where pump is located. If over 100°F., overload may be tripping on external heat. Provide adequate ventilation or move pump.
4. Prolonged low pressure delivery.	Continuous operation at very low pressure places heavy overload on pump. This can cause overload protection to trip. Install globe valve on discharge line and throttle to reduce flow and to increase pressure.

C — PUMP STARTS AND STOPS TOO OFTEN

CAUSE OF TROUBLE	REMEDY
1. Leak in pressure tank.	Apply soapy water to entire surface above water line. If bubbles appear, air is leaking from tank. Repair leaks or replace tank.
2. Defective air volume control.	This will lead to a waterlogged tank. Make sure control is operating properly. If not, remove and examine for plugging. Clean or replace defective control.
3. Faulty pressure switch	Check switch setting. Examine switch contacts for dirt or excessive wear. Adjust switch settings. Clean contacts with emery cloth if dirty.
4. Leak on discharge side of system.	Make sure all fixtures in plumbing system are shut off. Then check all units (especially ballcocks) for leaks. Listen for noise of water running. Repair leaks as necessary.
5. Leak on suction side of system.	On shallow well units, install pressure gauge on suction side. On deep well systems, attach a pressure gauge to the pump. Close the discharge line valve. Then, using a bicycle pump or air compressor, apply about 30 psi pressure to the system. If the system will not hold this pressure when the compressor is shut off, there is a leak on the suction side. Make sure above ground connections are tight. Then repeat test. If necessary, pull piping and repair tank.
6. Leak in foot valve	Pull piping and examine foot valve. Repair or replace defective valve.

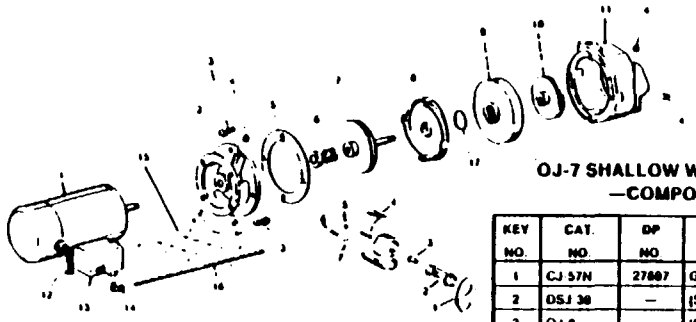
SERVICE GUIDE

D — PUMP WON'T SHUT OFF

CAUSE OF TROUBLE	REMEDY
1. Wrong pressure switch setting or setting "drift"	Lower switch setting. If pump shuts off, this was the trouble. Adjust switch to proper setting.
2. Defective pressure switch	Arcing may have caused switch contacts to "weld" together in closed position. Examine points and other parts of switch for defects. Replace switch if defective.
3. Tubing to pressure switch plugged	Remove tubing and blow through it. Clean or replace if plugged.
4. Loss of prime	When no water is delivered, check prime of pump and well piping. Reprime if necessary.
5. Low well level	Check well depth against pump performance table to make sure pump and ejector are properly sized. If undersized, replace pump or ejector.
6. Plugged ejector	Remove ejector and inspect. Clean and reinstall if dry.

E — PUMP OPERATES BUT DELIVERS LITTLE OR NO WATER

CAUSE OF TROUBLE	REMEDY
1. Low line voltage.	Use voltmeter to check at pressure switch or terminals nearest pump. If voltage under recommended minimum, check size of wiring from main switch on property. If OK, contact power company.
2. System incompletely primed.	When no water is delivered, check prime of pump and well piping. Reprime if necessary.
3. Air lock in suction line	Check horizontal piping between well and pump. If it does not pitch upward from well to pump, an air lock may form. Rearrange piping to eliminate air lock.
4. Undersized piping	If system delivery is low, the discharge piping and/or plumbing lines may be undersized. Refigure friction loss. Replace undersized piping or install pump with higher capacity.
5. Leak in air volume control or tubing	Disconnect air volume control tubing at pump and plug hole. If capacity increases, a leak exists in the tubing of control. Tighten all fittings ar lace control if necessary.



OJ-7 SHALLOW WELL ADAPTER —COMPONENTS

KEY NO.	CAT. NO.	DP NO.	DESCRIPTION
1	CJ 57N	27887	Gasket
2	DSJ 38	—	(See Pump Repair Parts)
3	OJ 8	—	(See Pump Repair Parts)
4	OJ 7	27887	Shallow Well Adapter
5	E025C	27081	Pipe Plug ¼" Plated
6	S037-12PC	16689	⅜ x 1¼" Hex Bolt — Plated
7	C037C	26688	⅜" Washer — Plated

DMJ/DMJ-V, DMC/DMC-SW Replacement Parts

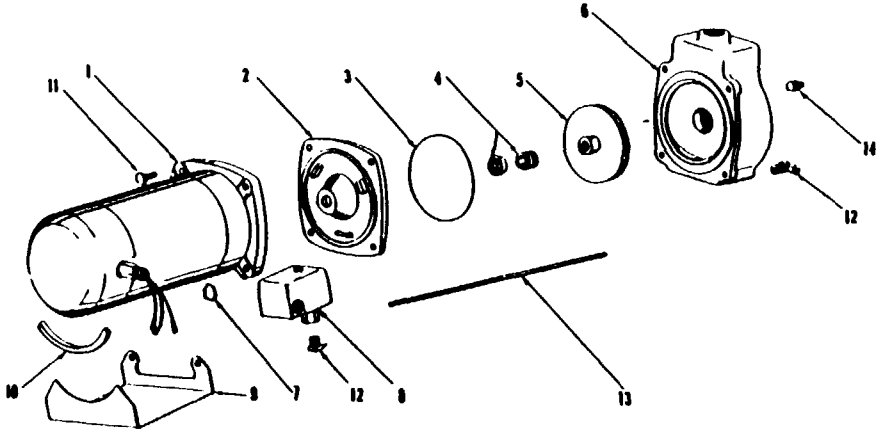
KEY NO	DP NO	DESCRIPTION	DMJ			DMJ/V			DMC			
			50	75	100	50	75	100	75	100	150	200
1	27389	½ HP Jet Motor - 1-115/230 CST	1									
1	27390	¾ HP Jet Motor - 1-115/230 CST		1					1			
1	31311	1 HP Jet Motor - 1-115/230 CST			1					1		
1	67507	½ HP Jet Motor - 1-115/230 CST				1						
1	67508	¾ HP Jet Motor - 1-115/230 CST					1					
1	67509	1 HP Jet Motor - 1-115/230 CST						1				
1	27646	1½ HP Jet Motor - 1-115/230 CST									1	
1	27811	2 HP Jet Motor - 1-115/230 CST										1
2	27433	Motor Adapter Bracket	1	1	1				1	1	1	1
2	31307	Motor Adapter Bracket				1	1	1				
3	16703	⅜" x 1" Hex Bolt - Plated	8	8	8	8	8	8	8	8	8	8
4	27081	Pipe Plug - ¼" Plated	2	2	2	3	3	3	2	2	2	2
5	26360	Case Gasket	1	1	1	1	1	1	1	1	1	1
6	17036	⅝" Shaft Seal	1	1	1	1	1	1	1	1	1	1
7	31289	Impeller - Plastic 4 27/32" Dia									1	
7	31290	Impeller - Plastic 5" Dia			1			1				1
7	31291	Impeller - Plastic 3 15/16" Dia	1			1			1			
7	31292	Impeller - Plastic 4 9/16" Dia		1			1					
7	31293	Impeller - Plastic 4¼" Dia								1		
8	26322	Diffuser - Plastic	1	1	1	1	1	1	1	1	1	1
9	86807	Diffuser Assembly	1	1	1	1	1	1	1	1	1	1
10	27385	Impeller - Plastic 3 15/16" Dia	1			1			1			
10	27387	Impeller - Plastic 4¼" Dia		1	1		1	1		1	1	1
11	27369	Pump Case	1	1	1	1	1	1	1	1	1	1
12	16672	Conduit Locknut	1	1	1	1	1	1				
13	27762	Pressure Switch Set 20/40	1	1	1	1	1	1	1*	1*	1*	1*
14	16647	¼" MPT x ¼" Plastic - 90° FTG	1	1	1	1	1	1	1*	1*	1*	1*
	16645	¼" MPT x ¼" Plastic - Straight FTG	1	1	1	1	1	1	1*	1*	1*	1*
15	31765	Pump Mounting Base	1	1	1				1	1	1	1
16	97037	¼" O.D. x 11/64" I.D. Plastic Tube	1	1	1	1	1	1	1*	1*	1*	1*
17	27673	"O" Ring (1¾" x 1 9/16" x 3/32")	1	1	1	1	1	1	1	1	1	1
	28155	Pipe Plug - 1" Plated							1	1	1	1
Tube & Nozzle Combinations for DMC Shallow Well (See Above)												
—	27923	Nozzle 16 64" I.D. - OJ 8-16							1	1	1	1
—	27398	Venturi Tube 30/64" I.D. - DSJ-39-30							1			
—	27400	Venturi Tube 34/64" I.D. - DSJ-39-34								1		
—	27401	Venturi Tube 36/64" I.D. - DSJ-39-36									1	
—	27403	Venturi Tube 38/64" I.D. - DSJ-39-38										1

* DMC Shallow Well Only

SERVICE GUIDE

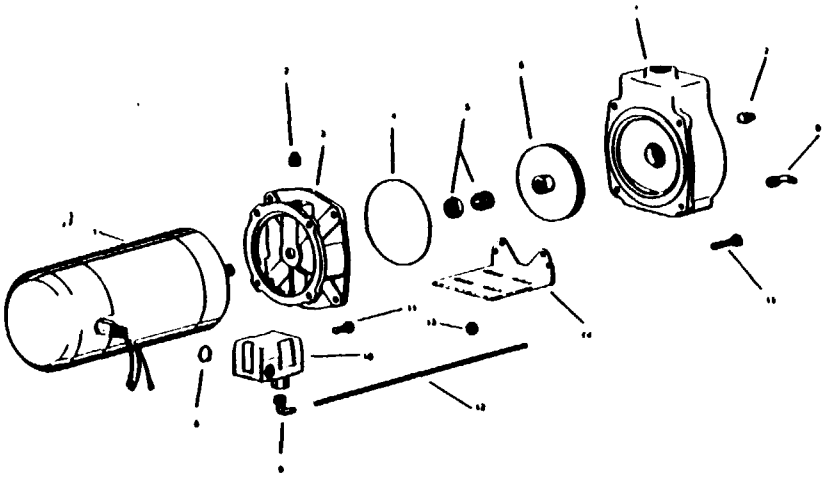
E Continued

CAUSE OF TROUBLE	REMEDY
6. Pressure regulating valve stuck or incorrectly set. (Deep well only)	Check valve setting. Inspect valve for defects. Reset, clean, or replace valve as needed.
7. Leak on suction side of system.	On shallow well units, install pressure gauge on suction side. On deep well systems, attach a pressure gauge to the pump. Close the discharge line valve. Then, using a bicycle pump or air compressor, apply about 30 psi pressure to the system. If the system will not hold this pressure when the compressor is shut off, there is a leak on the suction side. Make sure above ground connections are tight. Then repeat test. If necessary, pull piping and repair leak.
8. Low well level	Check well depth against pump performance table to make sure pump and ejector are properly sized. If undersized, replace pump or ejector.
9. Wrong pump-ejector combination	Check pump and ejector models against manufacturer's performance tables. Replace ejector if wrong model is being used.
10. Low water level in well	Shut off pump and allow well to recover. Restart pump and note whether delivery drops after continuous operation. If well is "weak," lower ejector (deep well pumps), use a tail pipe (deep well pumps), or switch from shallow well to deep well equipment.
11. Plugged ejector	Remove ejector and inspect. Clean and reinstall if dirty.
12. Defective or plugged foot valve and/or strainer	Pull foot valve and inspect. Partial clogging will reduce delivery. Complete clogging will result in no water flow. A defective foot valve may cause pump to lose prime, resulting in no delivery. Clean, repair, or replace as needed.
13. Worn or defective pump parts or plugged impeller	Low delivery may result from wear on impeller or other pump parts. Disassemble and inspect. Replace worn parts or entire pump. Clean parts if required.



OJS Jet Pump Replacement Parts

KEY NO.	DP NO.	DESCRIPTION	OJS 33	50	75	100	250
1	32370	½ HP Jet Motor-1-115/230 S.P.-1.8 S.F.	1				
1	32371	½ HP Jet Motor-1-115/230 C.S.-1.6 S.F.		1			
1	32372	¾ HP Jet Motor-1-115/230 C.S.-1.5 S.F.			1		
1	32373	1 HP Jet Motor-1-115/230 C.S.-1.4 S.F.				1	
1	32375	½ HP Jet Motor-1-115/230 C.S.-1.2 S.F.					1
2	32354	Seal Plate	1	1	1	1	1
3	27891	O-Ring (5½ × 5¼ × ⅛)	1	1	1	1	1
4	32252	Mechanical Shaft Seal - ⅝"	1	1	1	1	1
5	32355	Impeller - Plastic - 4 7/16" Dia.	1				1
5	32356	Impeller - Plastic - 4 27/32" Dia.		1			
5	32357	Impeller - Plastic - 5" Dia.			1		
5	32358	Impeller - Plastic - 4" Square				1	
6	32212	Pump Case	1	1	1	1	1
7	16672	Conduit Locknut	1	1	1	1	1
8	74508	Pressure Switch Set 3/50 psi	1	1	1	1	1
9	32363	Mounting Base	1	1	1	1	1
10	32364	Rubber Vibration Strip	1	1	1	1	1
11	32270	Bolt - 5/16 × 1¾ Hex	4	4	4	4	4
12	Q30-11-C2	¼" NPT × ¼" Plastic - 90° Elbow	2	2	2	2	2
13	Q30-6-V6	Tubing - ¼" O.D. Nylon	1	1	1	1	1
14	Q23-1-CZ	¼" NPT Pipe Plug	1	1	1	1	1
Tube & nozzle cominations for shallow well (See table for adapter, fittings & deep well components)							
	27395	Venturi Tube 24/64" I.D.	1				1
	27399	Venturi Tube 32/64" I.D.		1			
	27401	Venturi Tube 36/64" I.D.			1		
	27403	Venturi Tube 38/64" I.D.				1	
	27921	Nozzle 14/64" I.D.	1				1
	27923	Nozzle 16/64" I.D.		1	1	1	



OJ, OJ-V Jet Pump Replacement Parts

KEY NO	CAT NO	DP NO	DESCRIPTION	OJ 33	50	75	100	OJ-V 33	50	75	100
1		27360	1/2 HP Jet Motor-1-115 SP	1							
1		27360	1/2 HP Jet Motor-1-115/230 CST		1						
1		27360	3/4 HP Jet Motor-1-115/230 CST			1					
1		27430	1 HP Jet Motor-1-115/230 CST				1				
1		67360	1/2 HP Jet Motor-1-115 SP					1			
1		67367	1/2 HP Jet Motor-1-115/230 CST						1		
1		67369	3/4 HP Jet Motor-1-115/230 CST							1	
1		67370	1 HP Jet Motor-1-115/230 CST								1
2		27061	Pipe Plug - 1/4 Plated	1	1	1	1	2	2	2	2
3	OJ-3	27060	Motor Adapter Bracket	1	1	1	1				
3	OJV-3	31300	Motor Adapter Bracket Vertical					1	1	1	1
4	OJ-4	27061	O-Ring (5½ × 5¼ × ⅛)	1	1	1	1	1	1	1	1
5	S2-45	11030	5/8" Seal Seat	1	1	1	1	1	1	1	1
6	AJ-60	27060	Impeller - Plastic 4 7/16" Dia	1				1			
6	AJ-61	27061	Impeller - Plastic 4 27/32" Dia		1				1		
6	AJ-62	27062	Impeller - Plastic 5" Dia			1				1	
6	AJ-67	27437	Impeller - Plastic 4" Sq				1				1
7	OJ-1	27060	Pump Case	1	1	1	1	1	1	1	1
8	J-175	16672	Conduit Locknut	1	1	1	1	1	1	1	1
9	J-123	16647	1/4" NPT × 1/4" Plastic - 90° ELB	2	2	2	2	2	2	2	2
10	PS-2040	27762	Pressure Switch Set 20/40	1	1	1	1	1	1	1	1
11	SO3/8PC	16936	3/8 × 3/4" Hex Bolt - Plated	4	4	4	4	4	4	4	4
12	J-190-10	27032	1/4" O.D. × 10/64" I.D. Plastic Tube	1	1	1	1	1	1	1	1
13	SO3/8PC	27662	3/8" Hex Nut - Plated	4	4	4	4	4	4	4	4
14		31765	Pump Mounting Base	1	1	1	1				
15	OJ-6	27037	3/8" × 1 3/4" Hex Bolt - Plated	4	4	4	4	4	4	4	4
Tube & nozzle combinations for shallow well (See Page IV-17) for adapter, fittings & deep well components)											
	OSJ-30-24	27395	Venturi Tube 24/64" I.D.	1							
	OSJ-30-32	27399	Venturi Tube 32/64" I.D.		1						
	OSJ-30-36	27401	Venturi Tube 36/64" I.D.			1					
	OSJ-30-38	27403	Venturi Tube 38/64" I.D.				1				
	OJ-S-14	27921	Nozzle 14/64" I.D.	1							
	OJ-S-16	27923	Nozzle 16/64" I.D.		1	1	1				

SECTION N - [redacted] JET PUMP DATA

Permit # 159/1993

PRIVATE WATER SYSTEM CONTRACTOR/INSTALLER COMPLETION FORM

is form must be completed and returned to the health department prior to final approval of the private water system.
is form is required according to Ohio Revised Code 3701.34 and 3701.44; and Ohio Administrative Code 3701-28-03.

ner [redacted]

iling Address [redacted]

City TROY, OHIO Zip 45373

ocation of Property [redacted]

TROY, OHIO Township CONCORD

tractor/Installer FRONTZ DRILLING, INC. Registration # 120

mpany Name FRONTZ DRILLING, INC.

ldress 2031 MILLERSBURG ROAD

WOOSTER, OHIO 44691 Phone # 262-5301

e of Completion NOVEMBER 23, 1994

PUMP	WELL
pe Pump HJ 50 S MEYERS JET PUMP	Pitless device (check and complete applicable section)
Capacity (GPM) 8	[X] Adapter:
pth of pump setting or intake 20'	Manufacturer SNAPPY
stalller FRONTZ DRILLING, INC.	Depth below grade 48"
Registration # 120	Method of cutting hole HOLESAW
	Method of attaching casing extension (if applicable)
	[ ] Preassembled unit:
	Manufacturer
	Depth below grade
	Method of attachment

AMTROL INC.
1400 DIVISION ROAD
W. WARWICK, RHODE ISLAND 02893
(401) 884-6300

Supersedes Bul. 140-18

INSTALLATION INSTRUCTIONS
WELL-X-TROL®

Revised March 1991

ATTACHING ACCEPTANCE FITTINGS:

SKIRTLESS MODELS WX-101, 102, 103 and 200
In-line Models WX-101, 102, and 103 are conventionally installed directly in the main water supply line with a ¾" connection. For Model WX-200, a 1" fitting is used.

SKIRTED MODELS WX-201 thru WX-350
Skirted Models WX-201 thru WX-302 are equipped with an elbow for connection to the system. The WX-201 thru WX-203 has a 1" elbow; the WX-205 thru WX-302 has a 1 ¼" elbow. The WX-350 has a 1 ¼" tee for straight through piping.

PROPER WELL-X-TROL LOCATION
The WELL-X-TROL should be installed as close as possible to the pressure switch. This will reduce the adverse effects of added friction loss and differences in elevation between WELL-X-TROL and/or water supply main and switch.

ADJUSTING WELL-X-TROL PRECHARGE TO SYSTEM REQUIREMENTS
WELL-X-TROLS are shipped with a standard precharge of 20 psi for Models WX-101 and WX-102, 30 psi for Models WX-103 thru WX-203, and 38 psi for Models WX-205, WX-250, WX-251, WX-302, and WX-350. This precharge should be adjusted, when not attached to the system, as follows:

1. Remove protective air valve cap and using a suitable pressure gauge, check precharge pressure. (Tank should be at room temperature and empty of water).
2. Release or add air as necessary to make precharge pressure 1 - 2 psi below the pressure switch pump cut-in setting.
   NOTE: Pressure switch setting may be out-of-adjustment, i.e., if labeled "30/50", it may be actually 29 or 29 to 48 to 49. See "Fine Tuning Procedure", below, for correcting this situation. *Do not adjust WELL-X-TROL precharge for this variation.*
3. Replace protective air valve cap and seal with the air valve label provided. (See Figure 1) This will enable you to determine if valve has been tampered with on possible future service calls.

When the WELL-X-TROL is installed in the system, system pressure must be reduced to exhaust the tank of acceptance water before precharging. Once this has been done, follow above steps 1-3.

SYSTEM CONNECTION
1. Locate WELL-X-TROL in final desired location.
2. Level as necessary
3. Connect to pump supply line with same size pipe as from pump. Eliminate unnecessary friction loss.
4. All piping should be in accordance with prevailing local codes and standards.

FINE TUNING PROCEDURE (see chart)
Many times actual pressure switch settings will vary from the standard pressure range indicated. These variations could cause a momentary lag of water delivery as the pressure switch is not "tuned" to the WELL-X-TROL's precharge pressure.

TO "FINE TUNE", FOLLOW THESE STEPS:
1. Fill the system and WELL-X-TROL until pump cuts off.
2. Open one or more fixtures to drain WELL-X-TROL.
3. If there is a momentary pause in the water flow from the time the WELL-X-TROL is emptied and the pump starts, adjust pump switch cut-in setting upward (clockwise) slightly. (Refer to Adjustment Instructions by switch manufacturer).

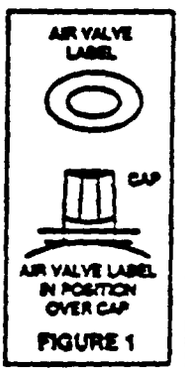


FIGURE 1

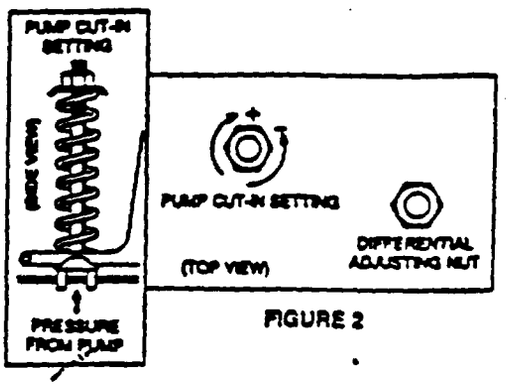


FIGURE 2

4. Close fixtures and refill WELL-X-TROL to pump cut-off. Check time to fill.
5. Open fixtures and see if pause in water is eliminated at pump cut-in. If not, continue adjusting pressure switch.

REPLACING GALVANIZED OR EPOXY LINED TANKS WITH WELL-X-TROL
Many times a defective steel tank must be replaced with a WELL-X-TROL to provide Effective System Protection, (ESP).

It is a simple procedure and the line drawing should be followed for correct connection to the system. Because the WELL-X-TROL is precharged with air, it will always occupy less space for equal amounts of pressurized water than a galvanized or epoxy lined steel tank.

It is recommended that a relief valve be installed at the WELL-X-TROL connection to ensure system protection.

Also BE SURE to plug the air port on a jet pump, as air is no longer required to be supplied to the tank.

RECOMMENDED PIPE SIZE FOR PUMP FLOWS

PIPE SIZE	FLOW GPM
¾	10
1	16
1¼	30
1½	40

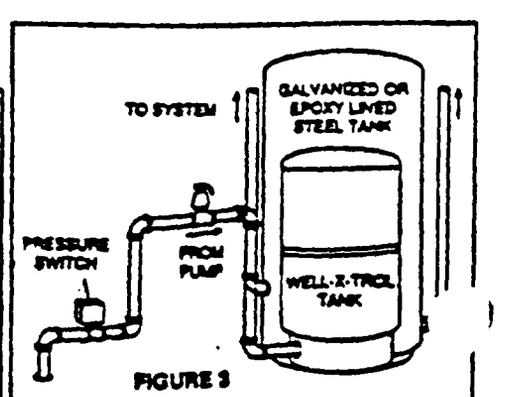
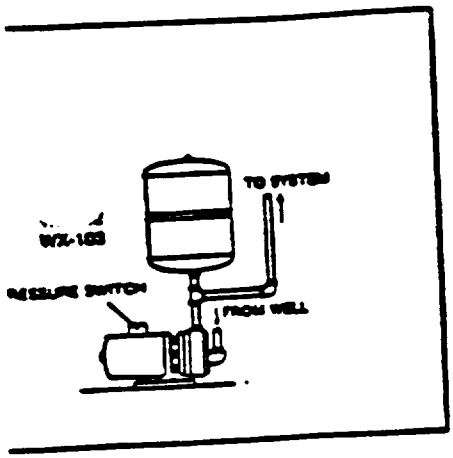
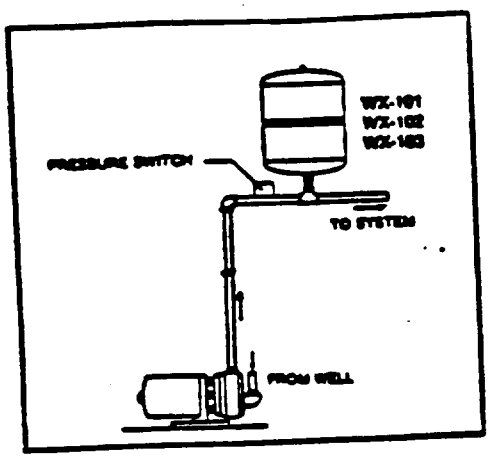


FIGURE 3

...unted at jet pump.

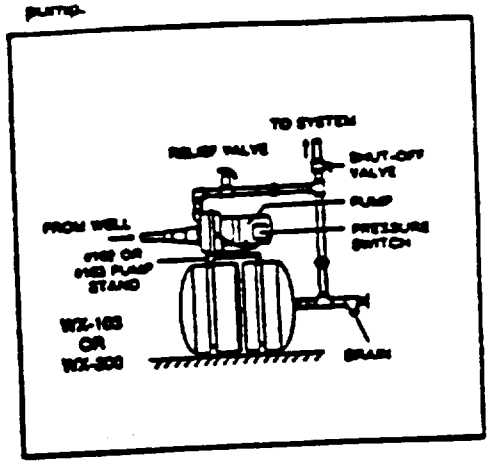


...X-201 through WX-350 WELL-X-TROL ...talled on-line with jet pump.

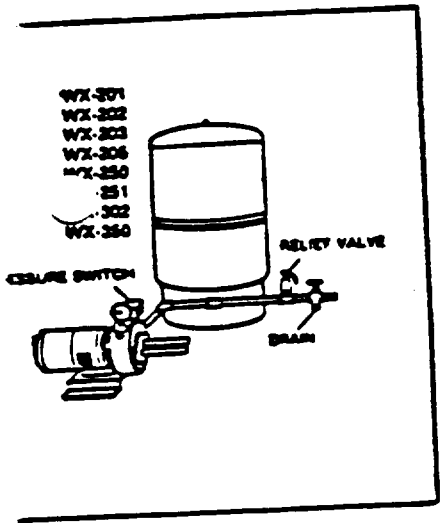


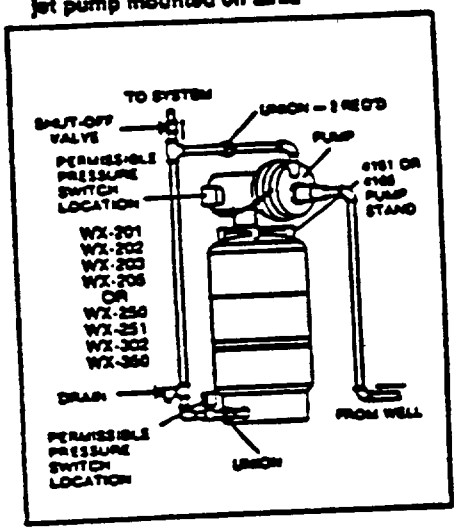
WX-201 through WX-203 using #161 pump stand. WX-205 through WX-350 using #165 pump stand. Shallow well jet pump mounted on tank.

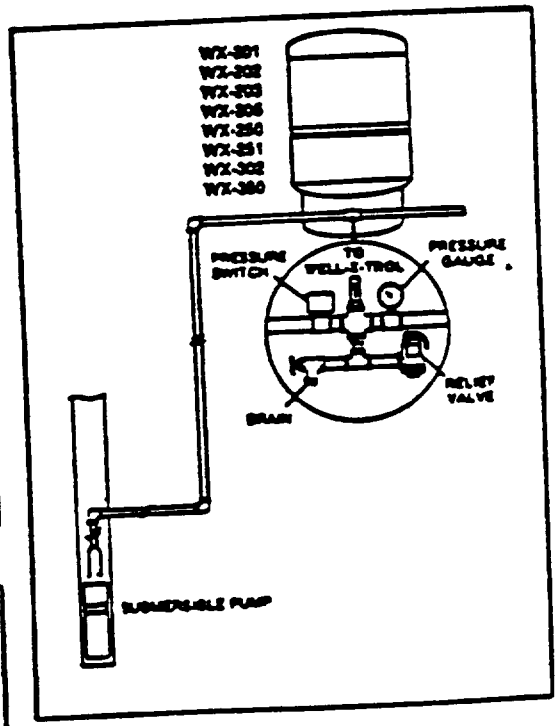
...pump.



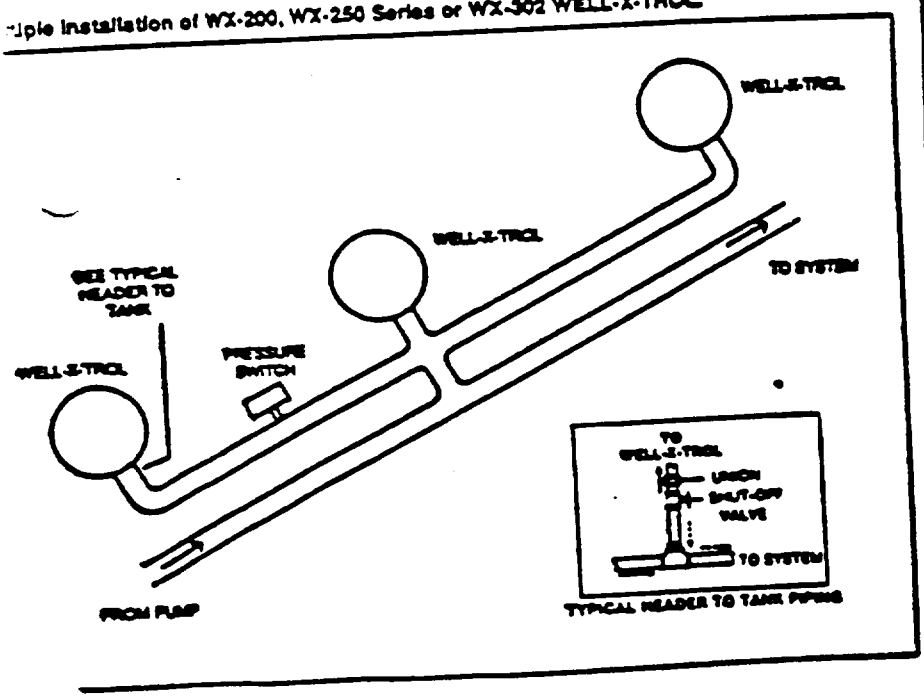
WX-201 through WX-350 WELL-X-TROL installed on-line using submersible pump.







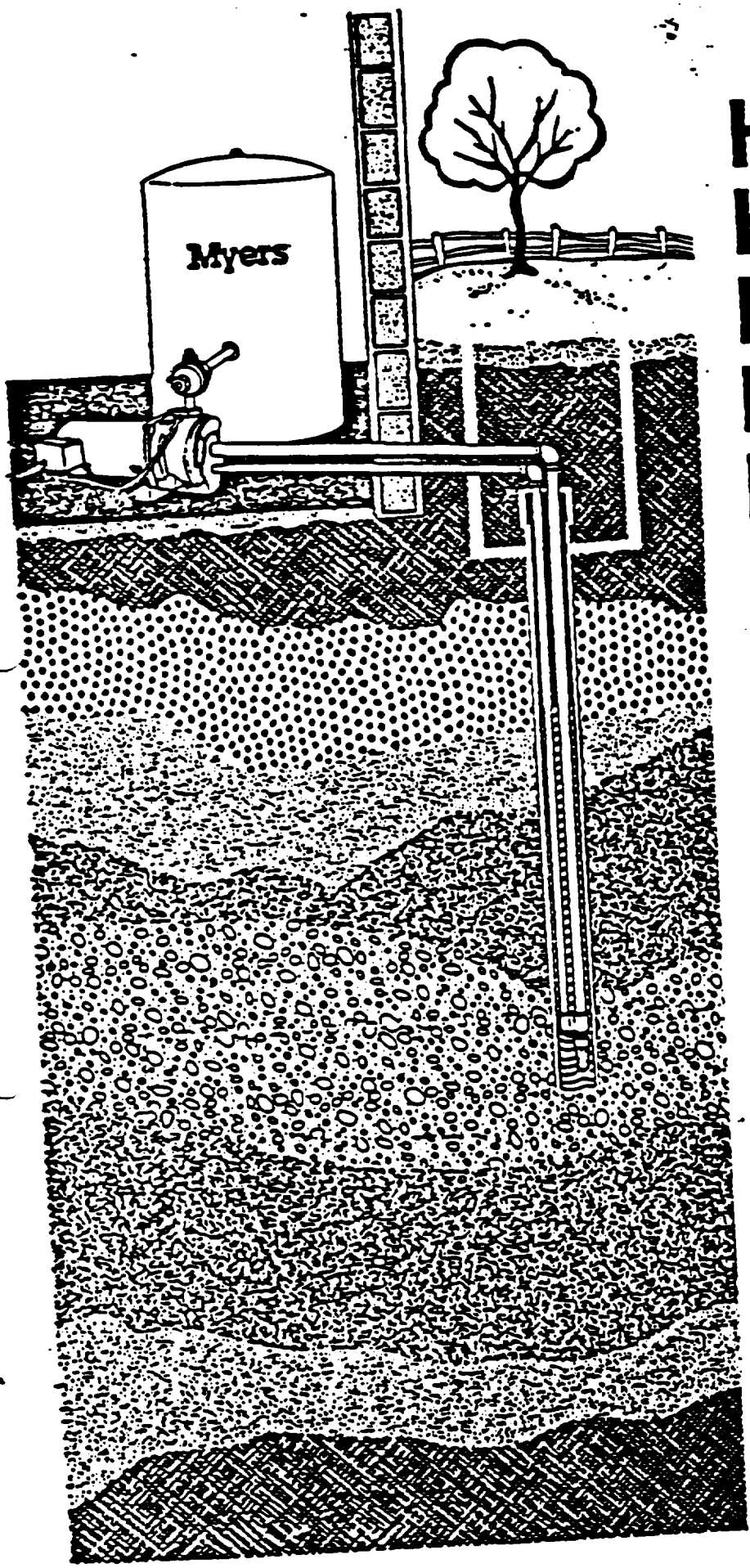
...iple installation of WX-200, WX-250 Series or WX-302 WELL-X-TROL



AMTROL INC.
WEST WARWICK, RI 02893

Part No. 140X76

Printed in U.S.A.



HJA, HJ, HR, HT Ejecto Pump Installation & Service Manual

DO NOT RUN THIS PUMP DRY

MAJOR COMPONENTS AND WHAT THEY DO

Tank and Air Volume Control

The tank serves two functions: (1) It provides a reservoir of water—some of which can be drawn through the house fixture before the pump must start. (2) It maintains a cushion of air under pressure.

When a Precharged Bladder Tank is used, no air volume control is needed. This tank contains a permanent precharge of air. See instructions with tank for proper air charge.

When a non-bladder type tank is used, an air volume control adds air to the tank as needed. The air volume control is hooked to the side of the tank, and a pressure tube is connected from the air volume control to the suction side of the pump.

Pressure Switch

The pressure switch provides for automatic operation. The pump starts when the pressure drops to the cut-in setting and stops when pressure reaches the cut-out setting.

Impeller, Jet and Pressure Regulator

The pump impeller rotates with the motor shaft, causing an increase in pressure. The rotation of the impeller creates a vacuum, allowing water to be drawn in. Part of the water is diverted back to the jet, where it again passes through the nozzle and venturi, creating additional vacuum to draw in more water and deliver it at high pressure to the impeller.

In a deep well installation, the jet assembly is submerged in the well because the vertical distance to the water level exceeds the suction lift of the pump. Adjustment of the regulator causes the right amount of water to be diverted back to the jet for the most efficient operation.

In a shallow well installation, the jet assembly is attached directly to the pump because a vacuum will lift water to the pump.

The regulator may be used to restrict the flow of water in a shallow well system if the convertible pump has the capacity to draw more water than the well can produce.

Lubrication of Motor Bearings

Follow Motor Manufacturer's recommendation for lubrication. Generally, the bearings are sufficiently lubricated for 5 years.

ELECTRICAL INFORMATION

Installation Instructions

Wiring to this pump must be installed and maintained in accordance with both the National Electrical Code and state/local codes. If more information is needed, call your local licensed electrician or your power company.

WARNING: Motor Grounding Instructions

Reduced risk of electric shock during operation of this pump requires the provision of acceptable grounding: Caution: Failure to ground this unit properly may result in severe electrical shock. If the means of connection to the supply-connection box is other than grounded metal conduit, ground the pump back to the service by connecting a copper conductor, at least the size of the circuit conductors supplying the pump, to the grounding screw provided within the wiring compartment. NOTE: National Electric Code requires pumps be grounded at installation.

Grounding the Motor: Permanently ground the motor in accordance with the National Electrical Code Article 250 and applicable local codes and ordinances. It is recommended that a permanent ground connection be made to the unit using a conductor (of appropriate size) from a metal underground water pipe or a grounded lead in the service panel. A metal underground water pipe or well casing at least 10 feet long makes the best ground electrode.

If plastic pipe or insulated fittings are used, run the ground wire directly to the metal well casing or use ground electrode furnished by the power company.

Caution: Do not ground to a gas supply line and do not connect to an electric power supply until unit is permanently grounded. Connect the ground wire to the approved ground and then connect to the terminal provided.

Important: For your safety, be sure electrical circuit to pump is shut off (disconnected) before attempting to wire pump. Pump should be connected to a separate electrical circuit directly from main switch. A fuse box or circuit breaker must be used in this line (see Fuse Chart). Plugging into existing outlets can cause low voltage at motor, resulting in blown fuses, tripping of motor overload, or burned-out motor. All wiring must follow local codes.

Note: If ever in doubt, call a licensed electrician.

HJA-HJ-HR-HT Ejecto Pump Installation and Service

Motor Voltage: 1/3 HP and 1/2 HP motors are wired for 115 volts. The 3/4 HP and 1 HP motors are wired for 230 volts, but may be converted to 115 volts by referring to instructions printed on motor. If motor is converted to 115 volts, have a qualified electrician check the entire Electrical and Power Leads System to be sure they can handle the higher AMPS.

To Wire Pump: Remove cover from pressure switch and make electrical connections (see wire size chart below) with ground. First connect bare copper ground to ground screw in pressure switch. Next make power connections onto terminals marked "Line."

Jet Pump Wire Selection Guide

Motor HP	Voltage	Name Plate AMPS	Max. Wire Length Using AWG Wire Size			
			#14	#12	#10	#8
1/3	115	6.2	148	236	370	590
1/2	115	10.8	114	180	286	454
	230	5.3	475	756	1194	1897
3/4	115	14.8	84	135	211	337
	230	7.4	339	540	846	1327
1	115	17.8	74	118	186	293
	230	8.6	307	472	749	1181

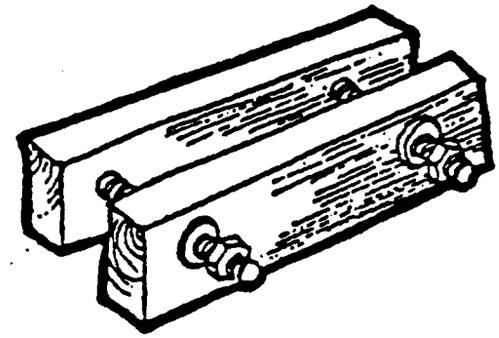
Recommended Fuse Sizes (Amps)

	*Standard Line Plug Fuse		Low Peak Cartridge Type Fusetron Cartridge Type *Fusetron—Plug Type	
HP	115V	230V	115V	230V
1/3	15	—	10	—
1/2	20	10	10	6-1/4
3/4	25	10	15	8
1	30	15	20	10

*For circuits not over 150 volts to ground.

TOOLS NEEDED FOR INSTALLATION

- Screwdriver
- Pipe Wrench
- Adjustable Wrench (medium-large)
- Hacksaw with 24-Tooth Blade for cutting plastic pipe.
- Knife or Round File for smoothing inside of all plastic pipe connections.
- Pipe Clamps. Make with two pieces of 2 × 4 board 12" long. Drill holes for 1/2" bolts about 8" long. Assemble as shown.



INSTALLATION INSTRUCTIONS

Materials Needed

- 1 can PVC cement (read manufacturer's instructions carefully)
- Foot valve
- 1-1/4" PVC adapters (2 required)
- 1-1/4" rigid PVC pipe and couplings (Couplings not required for flared pipe).
- Well seal
- 1-1/4" PVC elbow
- Discharge tee
- Pressure gauge
- 1" × 4" nipple
- 1" check valve
- Copper electric wire with ground (see Wire Selection Guide on page 4)
- Fuse box or circuit breaker

Step 1: Connect foot valve to 1-1/4" plastic pipe adapter. Cement adapter to 1-1/4" PVC rigid plastic pipe. All connections must be watertight for pump to operate properly.

Step 2: Add rigid PVC pipe sections and couplings (as required) while lowering foot valve into well. As much as 30 feet of pipe could be required. Note: Removing foot valve screen could void Warranty.

Step 3: Install well seal over rigid PVC pipe and onto well casing. Cement 1-1/4" PVC elbow to top of pipe at correct length to position foot valve 5 feet above bottom of well. Lower foot valve-piping assembly carefully into well, using pipe clamp. Draw up bolts on well seal until rubber gaskets are tight against both the well casing and the pipe.

Step 4—For Shallow Well Pumps: Cement one end of horizontal 1-1/4" pipe into elbow. Add sections to reach the pump. This pipe should slope up to the pump from the elbow. Thread 1-1/4" adapter into pump. Cement horizontal pipe into adapter that has been threaded into pump.

Step 4A—For Convertible Pumps: Install venturi into Ejector. Secure shallow well ejector assembly and gasket to pump case with bolts supplied (see diagram). Connect tube between pump case and pressure switch on pump. Thread 1-1/4" PVC adapter into shallow well ejector. Cement horizontal pipe into adapter threaded into ejector.

Step 5: Using pipe wrench, install discharge tee in pump discharge until tight.

Step 6: Important—Go to Electrical Instructions on pages 3 and 4. Make electrical connections as described.

Step 7: After electrical work is completed—and before pump is connected to pressure tank—the pump should be primed and test run. To prime, remove bushing from top of discharge tee. Fill piping and pump with water until the water overflows from top of tee. Replace bushing and tighten to seal. Install pressure gauge. Before starting pump, place large bucket or other container under check valve opening.

Step 8: Start motor. If pump is installed with a horizontal offset line of 4 feet or more, it may take several minutes to prime. If pump does not prime in 5 minutes: (1) stop motor; (2) remove discharge plug and pressure gauge; and (3) add more water.

Step 9: Allow pump to empty into container long enough to clear the well of any sand or dirt, and to be sure well is not going to run out of water.

Step 10: Stop pump and complete connections to pressure tank. Allow pump to cycle automatically several times to check pressure switch setting and operation. To adjust pressure switch settings, see instructions inside pressure switch cover. If a new pressure tank is required, follow "Pressure Tank Installation Instructions."

If pump is being used as a lawn sprinkler or irrigation pump, you MUST remove the pressure switch and wire the pump direct. Also, no pressure tank is used.

Caution: Make sure the pressure switch is set low enough to shut off the pump. If a valve is shut off and the pressure switch setting is too high, the pump will run continuously without water flow. This will overheat and damage the pump.

Note: Check valve between tank and pump can cause short cycling in the following conditions:

1) Leaky foot valve
2) Long horizontal suction line
3) Air trapped in suction line
4) Wells with gaseous water

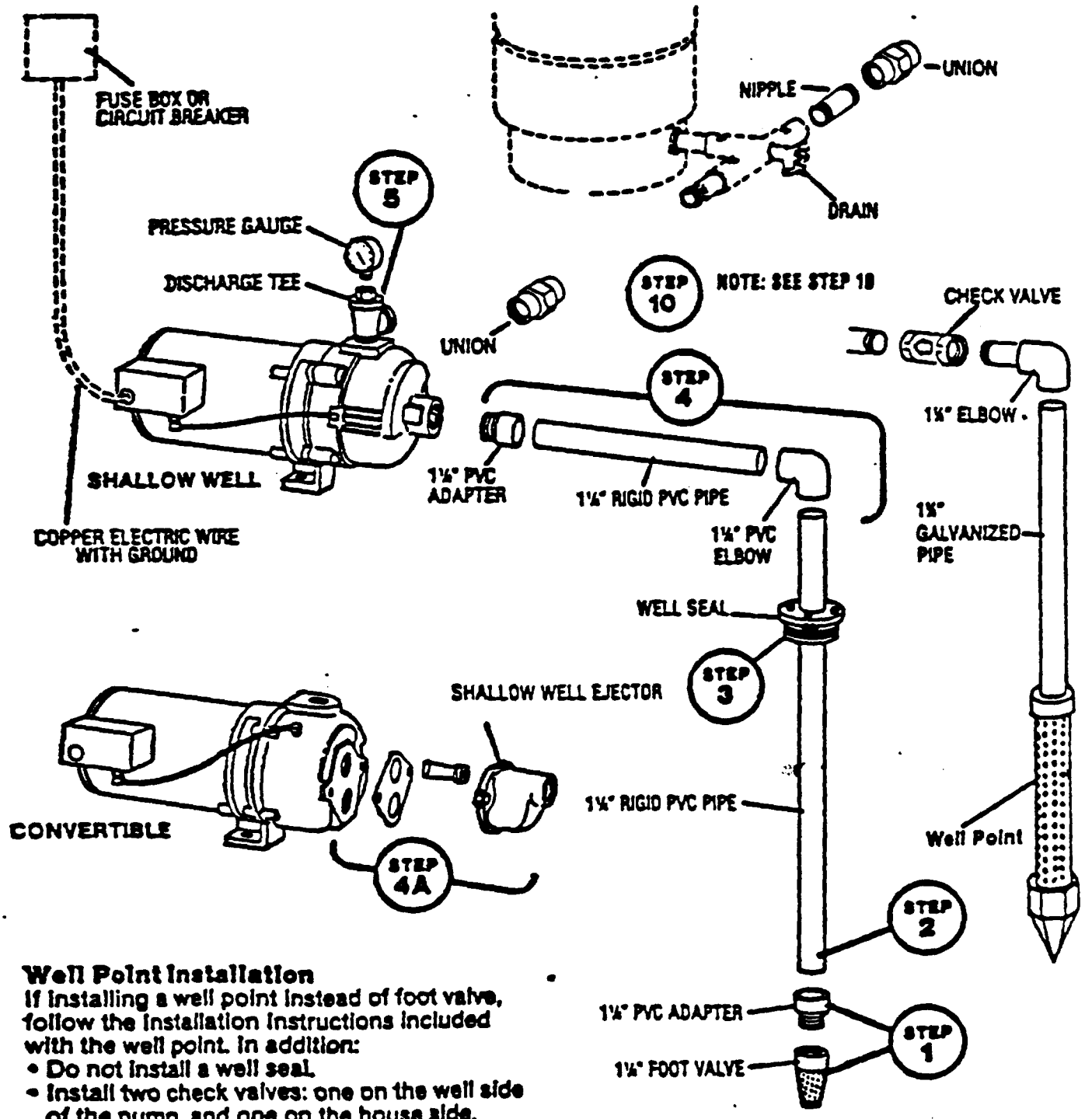
To resolve this problem you can do the following:

1) Remove the check valve completely
2) Move the check valve beyond the tank
3) Change the pressure switch. Tap to the tank tee.

Shallow Well Jet Pumps for 4" Diameter Wells

TYPICAL SHALLOW WELL PUMP INSTALLATION

Note: 1/3 HP and 1/2 HP motors are pre-wired for 115 volts. All other motors are pre-wired for 230 volts. The wiring may be converted to 115 volts; see instructions printed on motor.



Well Point Installation

If installing a well point instead of foot valve, follow the installation instructions included with the well point. In addition:

- Do not install a well seal.
- Install two check valves: one on the well side of the pump, and one on the house side. (See installation drawing.)

INSTALLATION INSTRUCTIONS

Materials Needed for Two-Pipe Well Installation

- PVC cement
  (read manufacturer's instructions carefully)
- 1" foot valve
- 1" close nipple
- Twin ejector
- 1" PVC adapter
- 1-1/4" female PVC adapter
- 1" rigid PVC pipe and couplings
- 1-1/4" PVC pipe and couplings
- Well seal
- 1" PVC elbow
- 1-1/4" PVC elbow
- 1-1/4" PVC adapter
- 1" x 4" nipple
- 1" PVC female adapter
- Pressure regulator
- Pressure gauge
- Copper electric wire with ground
  (See Wire Selection Guide on page 4)
- Fuse box or circuit breaker

Step 1: Begin installation by attaching foot valve to close nipple of corresponding size. Connect nipple/foot valve assembly to bottom of ejector body. Next install clear plastic venturi into top of ejector body. All connections must be watertight for pump to operate properly.

Step 2—For 1/3 and 1/2 HP Pumps and HJA 3/4 & 1 HP Pumps: Install 1" PVC adapter in ejector body. Then install 1-1/4" female PVC adapter on ejector body over the plastic venturi.

Step 2A—For 3/4 and 1 HP Pumps (except HJA): Install a 1-1/4" female PVC adapter on ejector body over the plastic venturi. Then install a 1-1/4" x 5" nipple in ejector body, followed by a 1-1/4" female PVC adapter.

Cement rigid PVC pipes into the pipe adapters on the ejector body. Add rigid PVC pipes and couplings (as required) while lowering ejector assembly into the well with pipe clamps.

Note: Removing foot valve screen could void Warranty.

After lowering pipes and ejector assembly into well, install well seal. Draw up bolts on well seal until the rubber gaskets are tight against the well casing and the two plastic pipes.

Step 3—For 1/3 and 1/2 HP Pumps and HJA 3/4 & 1 HP Pumps: Cut pipes at length to position foot valve 5 feet above bottom of well. Cut top of 1" pipe 2" shorter than the 1-1/4" pipe, as shown in the installation diagram.

Cement 1-1/4" PVC elbow and 1" PVC elbow to the top of each pipe. Cement 1-1/4" and 1" rigid PVC horizontal pipes to elbows. Thread 1-1/4" PVC adapter into top opening in pump face. Install 1" x 4" nipple into bottom opening of pump face. Add 1" female PVC adapter onto nipple. Cut 1" horizontal pipe 3-1/2" shorter than 1-1/4" horizontal pipe. Cement 1-1/4" and 1" horizontal pipes into these adapters. Horizontal pipes should slope up to pump from elbows.

Step 3A—For 3/4 and 1 HP Pumps (except HJA): Cut length of pipe to position foot valve 5 feet above bottom of well. Cut the top of the pressure pipe 2-1/4" shorter than delivery pipe, as shown in the installation diagram. Cement PVC elbows to each pipe. Cement rigid PVC horizontal pipes to elbows at the top of the well. Add pipe sections and couplings (as needed) to connect to the pump. Thread 1-1/4" PVC adapters into openings in pump face. Cement rigid PVC horizontal pipes into adapters. Horizontal pipes should slope up to pump from elbows.

Step 4: Install pressure regulator into pump discharge outlet. Install brass fittings and tubing to connect pressure switch to pressure regulator (see installation diagram). Install pressure gauge into pressure regulator.

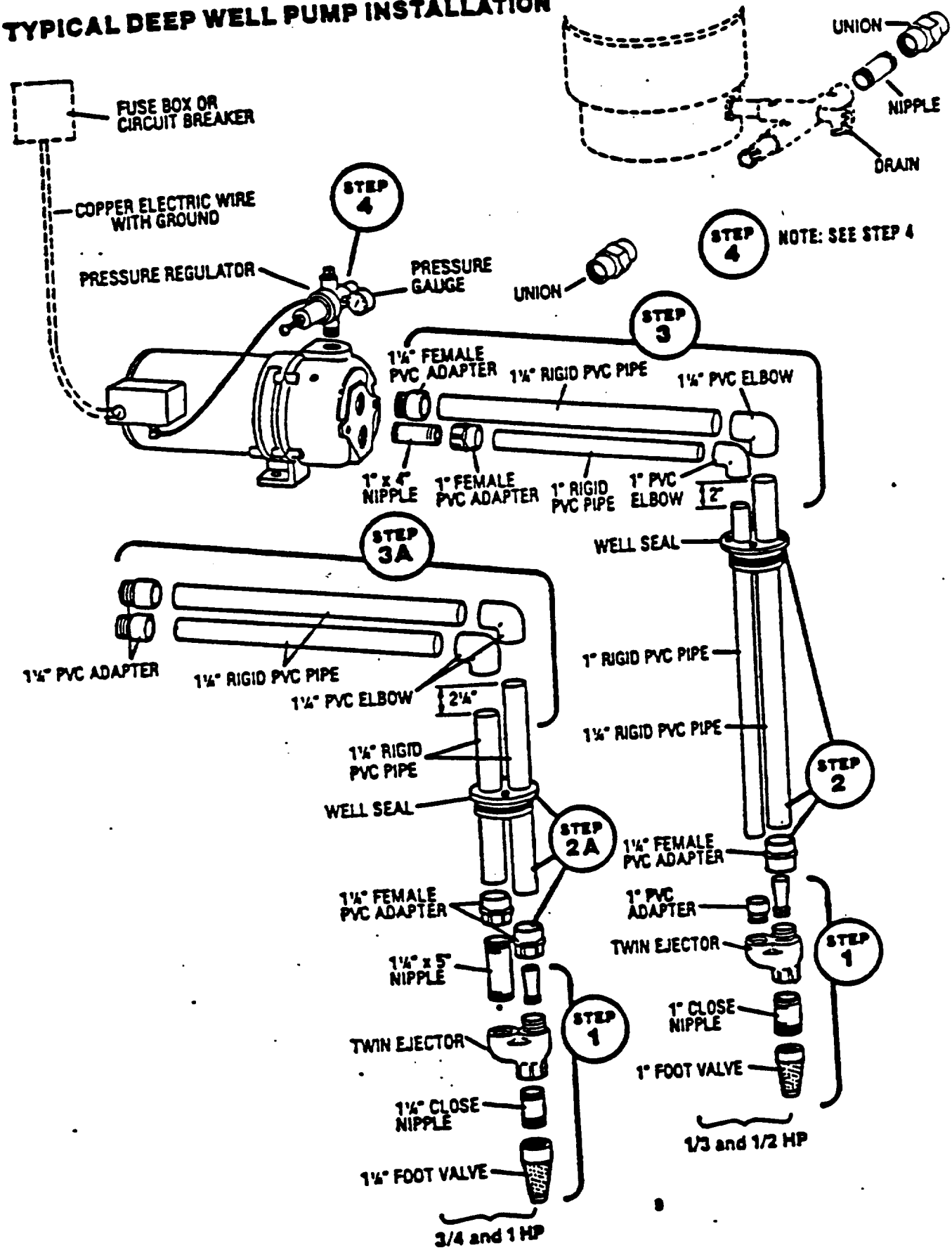
NOTE: Check valve between tank and pump can cause short cycling in the following conditions:

1) Leaky foot valve
2) Long horizontal suction line
3) Air trapped in suction line
4) Wells with gaseous water

To resolve this problem you can do the following:

1) Remove the check valve completely
2) Move the check valve beyond the tank
3) Change the pressure switch. Tap to the tank tee.

TYPICAL DEEP WELL PUMP INSTALLATION



INSTALLATION INSTRUCTIONS

Materials Needed

- 1 can PVC cement (read manufacturer's instructions carefully)
  Foot valve
- Packer ejector
- 1" PVC adapter
- 1" rigid PVC pipe and couplings (Couplings not required for flared pipe).
- 1" x 8" nipple
- 1" PVC female adapter (2 required)
- 2" Packer well adapter
- 1-1/4" x 1" PVC reducer bushing
- 1-1/4" PVC adapters
- 1-1/4" rigid PVC pipe
- 1" x 4" nipple
- Pressure regulator
- Pressure gauge
- Copper electric wire with ground (see Wire Selection Guide on page 4)
- Fuse box or circuit breaker

Step 1: Begin installation by attaching foot valve to bottom of packer ejector body. Remove brass coupling from top of ejector. Next install clear plastic venturi into top of packer body. Re-install brass coupling over venturi. All connections must be watertight for pump to operate properly.

Step 2: Thread 1" PVC adapter into brass coupling. Cement the 1" PVC rigid pipe to the pipe adapter.

Step 3: Carefully lower pipe/packer ejector assembly into well, adding PVC rigid plastic pipe sections and couplings as required. Use pipe clamps shown on page 4. Cut 1" PVC rigid pipe at length to position packer ejector assembly at least 5 feet above bottom of well casing. Note: Removing foot valve screen could void Warranty.

Step 4: Install 1" x 8" nipple into bottom of packer well adapter. Install 1" PVC female adapter onto nipple.

Step 5: Slip packer adapter compression plate and compression gasket over the PVC rigid pipe. Cement 1" female PVC pipe adapter to top of PVC rigid pipe.

Step 6: Install the 3 nuts and bolts and alternately tighten the packer adapter to the packer compression plate—sealing it with the well casing.

Step 7: If desired, pumps may be bolted directly to the well adapter. If pump is installed directly to adapter, proceed to step 9.

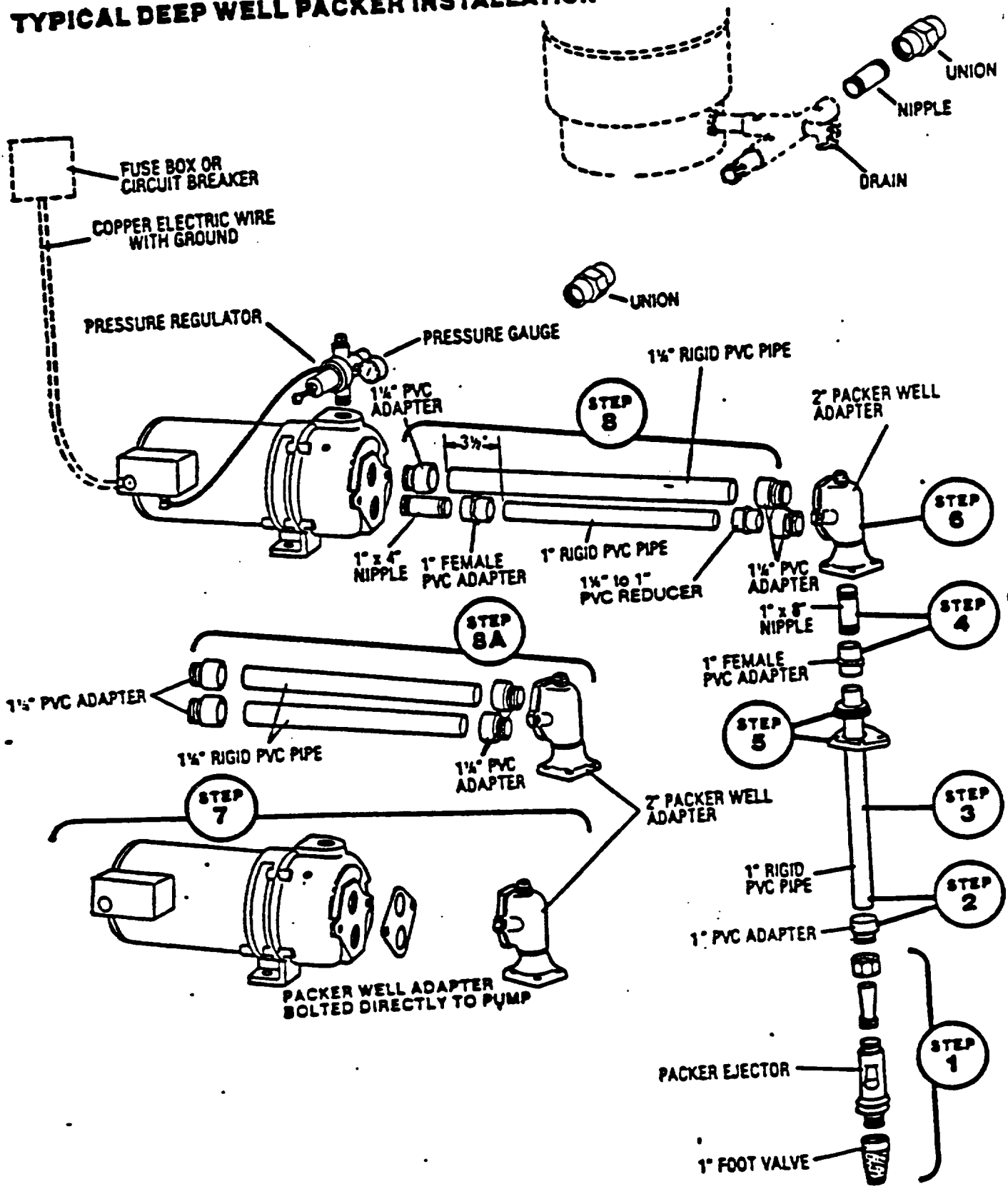
Step 8—For 1/3 and 1/2 HP Pumps and HJA 3/4 & 1 HP Pumps: Thread 1-1/4" PVC adapters into packer adapter. Cement 1-1/4" x 1" PVC reducer into lower adapter. Cement 1-1/4" and 1" rigid PVC horizontal pipes into PVC adapter and reducer. Add pipe sections and couplings (as needed) to connect to the pump. Because of different center distances, these pipes will deviate slightly.

Thread 1-1/4" PVC adapter into top opening in pump face. Install 1" x 4" nipple into bottom opening in pump face. Add 1" female PVC adapter onto nipple. Cut 1" horizontal pipe 3-1/2" shorter than 1-1/4" horizontal pipe. Cement 1-1/4" and 1" horizontal pipes into these adapters. Horizontal pipes should slope up to pump from packer adapter.

Step 8A—For 3/4 and 1 HP Pumps (except HJA): Thread 1-1/4" PVC adapters into packer adapter. Cement rigid PVC horizontal pipes into pipe adapters. Add pipe sections and couplings (as needed) to connect to the pump. Thread 1-1/4" PVC adapters into openings in pump face. Cement rigid PVC horizontal pipes into adapters. Horizontal pipes should slope up to pump from packer adapter.

Remaining Steps: To complete installation, turn to "Deep Well Jet Pumps" on page 8 and follow Steps 4 thru 9. Also read "caution" instructions on pressure switch settings.

TYPICAL DEEP WELL PACKER INSTALLATION



JET PUMP TROUBLESHOOTING CHECKLIST

This information is for checking jet pump installations which are not operating properly. It is based on the premise that the installed system will consist of a jet pump taking water from a well where the water well level is below the pump and the pump is delivering water into a pressure storage tank.

Warning: To guard against accidental personal injury, the electric power to the pump should be turned off when conducting the checking procedures outlined herein. There are obvious exceptions, however, and service personnel should take necessary safeguards against the hazard of electrical shock.

Shallow Well

PROBLEM	CHECKING PROCEDURE	
Pump will not prime	1. Stop motor, remove priming plug, and fill case with water.	4. Check for plugged venturi tube or nozzle.
	2. Make sure suction line has no leaks, and that it slopes gradually from pump to well with no high or low spots.	5. Make sure the foot valve is not sitting in sand or mud, and that it is not stuck shut.
	3. Make sure pump shaft turns clockwise when viewed from motor end opposite shaft.	
Pump delivers water for a period of time, then stops pumping	1. Make sure well water is not drawing below the foot valve. Use a water-level tester while pump is operating.	3. Check for plugged impeller parts.
	2. Check for plugged or worn nozzle or venturi tube.	
Pump does not deliver rated capacity	1. Check nozzle and venturi for wear or partial plugging.	3. Check pressure gauge. It may be defective, resulting in false readings.
	2. On 3/4 and 1 HP models, make sure diffuser "O" ring seal is in place.	
Motor overheats and shuts off (overload)	1. Make sure motor is properly wired for the correct voltage. (See Electrical Information on pages 3-4.)	3. Make sure the impeller is not rubbing against the pump case.
	2. Make sure wire is properly sized. (See Chart on page 4.)	
Motor fails or does not operate properly	1. If within Warranty, return pump/motor unit to place of purchase (with proof of purchase) for exchange.	

HT & HR

Replacing Mechanical Seal:

Before handling shaft seal parts make sure your hands are clean. Always replace both the ceramic stationary seal half and the rotating spring seal half.

1. Clean the shaft and seal cavity with water.
2. Lubricate the seal cavity and the rubber cup of the ceramic stationary seal half with soapy water.
3. Press the stationary seal in the seal cavity with fingers only.
4. Install seal plate on motor. Take care not to scratch ceramic seal.
5. Install carbon rotating seal on shaft. The carbon face should be lubricated with soapy water and should be positioned against the ceramic seal.
6. Install the impeller. Tighten with a screwdriver holding the shaft.

All pumping parts of unit can be removed from volute case without disturbing well or tank piping.

How to Dismantle: *HT & HR — Deep Well*

1. Disconnect the pressure switch tube, remove the 4 cap screws and separate the volute case from the seal plate.
2. Remove the 3 cap screws holding the diffuser to the seal plate and remove the diffuser. When replacing the diffuser use three .010" thick shims equally spaced between the impeller eye and diffuser opening. This centers the diffuser and prevents impeller rub. (Fig. 5)
3. Remove the impeller by holding the pump shaft with a screwdriver placed in the slot end of the shaft, and rotating the impeller CCW. (See Fig. 6)
4. Remove the rotating assembly of the shaft seal.
5. The seal plate may now be removed.
6. The ceramic stationary seal can be driven out using a 3/4" dowel.

How to Dismantle: *HT & HR — Shallow Well*

1. Disconnect the pressure switch tube, remove the 4 cap screws and separate the volute case from the seal plate.
2. Remove the 3 cap screws holding the diffuser to the seal plate and remove the diffuser and screen. When replacing the diffuser use three .010" thick shims equally spaced between the impeller eye and diffuser opening. This centers the diffuser and prevents impeller rub. (Fig. 5)
3. On 1/3 and 1/2 HP models unscrew venturi tube from impeller. On 3/4 and 1 HP modles venturi tube is screwed into ejecto body. (See Fig. 6 & 7)
4. Remove the impeller by holding pump shaft with a screwdriver placed in the slot end of the shaft, and rotating the impeller CCW.
5. The nozzle on the 1/3 and 1/2 HP models can be removed with a 1 1/4" socket wrench and an extension. On the 3/4 and 1 HP models the nozzle is part of the ejecto body. When replacing the nozzle and venturi use care not to cross-thread and that they are tight against the shoulder. If nozzle is not screwed completely in, the flow will be blocked by the venturi entrance. (Fig. 8)

6. Remove the rotating assembly of the shaft seal.

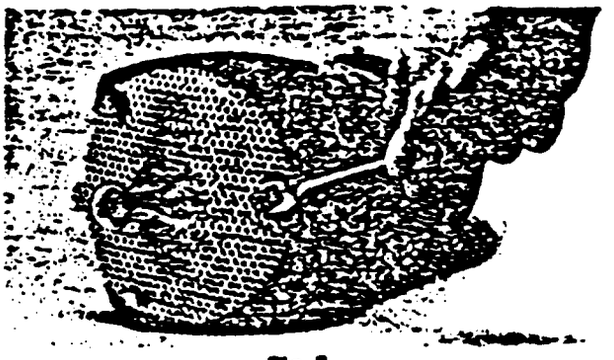


Fig. 5

7. The seal plate may now be removed.
8. Drive the ceramic stationary seal out with a 3/4" dowel.

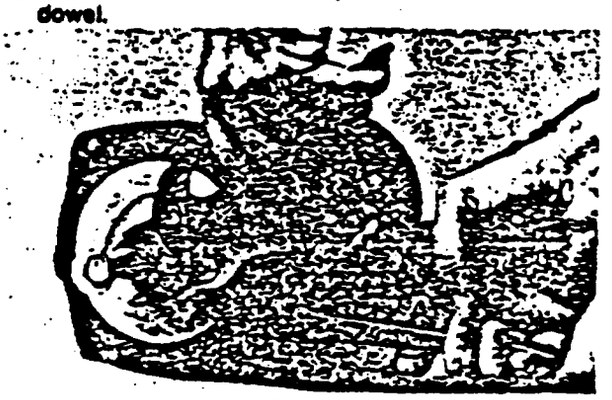


Fig. 6

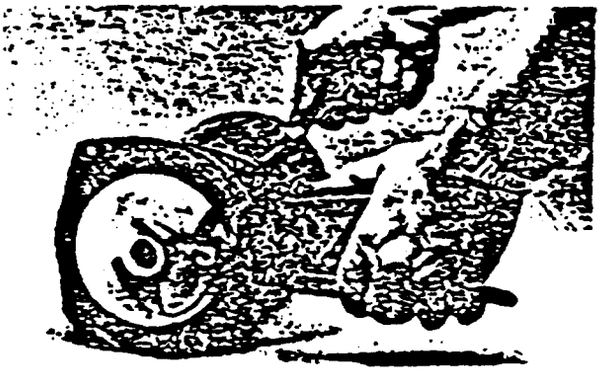


Fig. 7

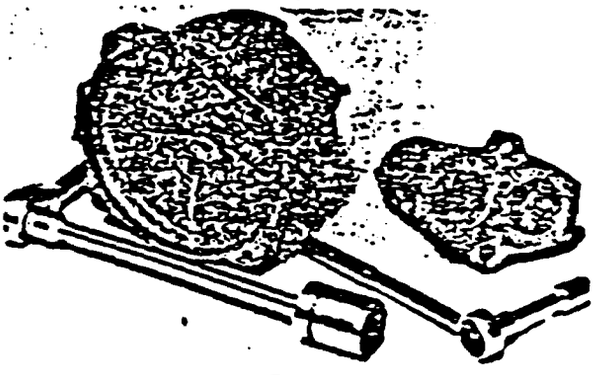


Fig. 8

When to Drain:

If system is used for seasonal periods only, pump, tank and piping must be drained when not in use to prevent freezing in winter.

DRAIN AS FOLLOWS:

1. Release pressure in system by draining at discharge outlet normally located in discharge line leading from pressure tank. Connect a section of water hose to outlet to assist in draining water to an outside area, if possible, being careful not to elevate hose higher than drain outlet. (See Fig. 9)
2. Disconnect pressure and delivery pipes for drainage. Drain below ground freeze level if pipes are not sufficiently buried.
3. Disconnect pipes from tank and lay vertical tank on side or horizontal tank on end for complete drainage. (Not required on diaphragm tanks.)
4. Remove drain plugs from pump case.

Care should be taken not to scratch finish of epoxy tanks

NOTE:

Before starting pump after long period of non-operation, be sure pump shaft turns freely. Turn shaft clockwise when facing motor end of pump. Use pliers if necessary.

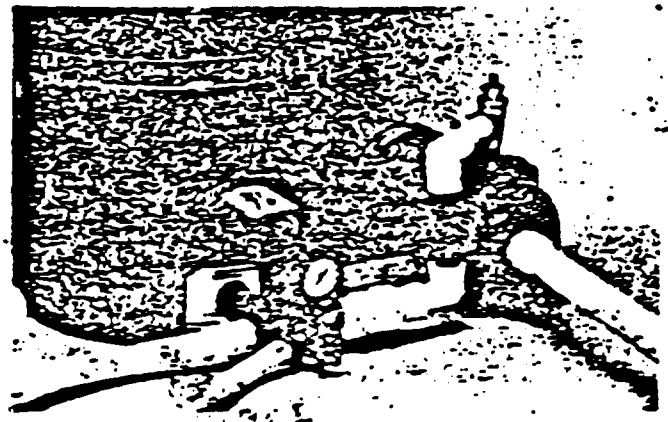


Fig. 9

Tank Mounted Units:

1. All general instructions apply to tank mounted pumps.
2. With tank mounted unit the air control must be connected at time of installation.
3. Always install air control in position shown and connect to pump in accordance with instructions given under installation Twin Type. (See Fig. 10)

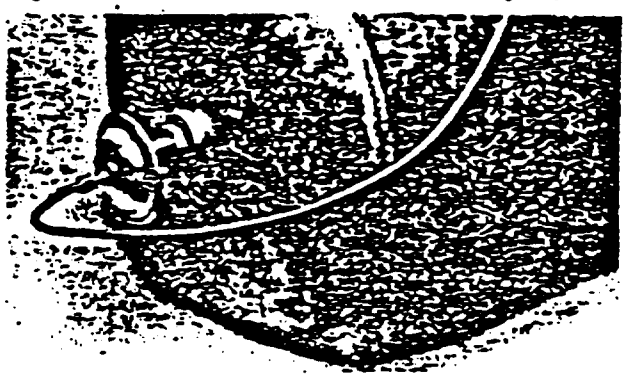


Fig. 10

Myers

F.E. Myers, 1101 Myers Parkway, Ashland, Ohio 44805-1969
419/289-1144 • Telex 99-7443 • FAX 419/289-6658

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SECTION O - USACE WATER WELL DATA

To: Jeff Hubbard CEMRO-ED-ER
From: Todd Wilson CEMRO-ED-EG TW
Jim Woolcott CEMRO-ED-EH JW

RE: Drinking Water Data from the United Scrap Lead Homeowners Water Wells.

December 6, 1993

I have reviewed the data provided by the Missouri River Division Laboratory. The water samples in question were analyzed for the water quality criteria as required by the Safe Drinking Water Act (SDWA). The only chemical of concern was determined to be iron and hardness. Samples were collected prior to and after the water softener with little to no difference between the results. Hardness was determined to be moderately elevated, and iron is elevated above the Secondary Maximum Contaminant Level. These should be corrected by the water softener. The other result of concern is the aerobic bacterial count found in the water. Coliform could not be detected due to the number of bacterial colonies found in the water. These colonies are not coliform or iron bacteria, but a non-specific type of bacteria. This bacteria may have been introduced during sampling, or may be indigenous to the site.

Suggestions:

Due to the fact that hardness data did not show a significant change from the pre and post-water softener samples, the water softener resin should be replaced. The bacteria in the water should be remedied by "shocking" with Ohic approved methods, such as chlorination, and resampled for coliform. This coliform sample should be analyzed by a Ohio certified local laboratory to eliminate possible introduction of bacterial contaminants, and reduce the shipping and incubation period prior to analysis. If the bacterial problem continues, the State of Ohio should be contacted to determine the final remedy to the situation. The presence of bacterial contamination is not due to the United Scrap Lead Site, and should not be held accountable for the bacterial contamination of the Ishamael water well.

cc: Resnik (OEPA)

For Ext Probe:

MV = 238 15.8°C

15.8° - 25° = -9.2° x 1.3mV = -11.96

238 - 11.96 = 226.04 mV

1558 Well purging begins using centrifugal

1619 Stopped well purging using centrifugal suction pump from header and began peristaltic pump. Purge rate estimated at approx. 500ml per min.

Time	Temp °C	Cond mS/cm	pH std	mV
1625	14.7	.77	6.89	-184
1627	14.7	.77	7.00	-166
1629	14.6	.79	7.06	-144
1640	14.9	.70	7.22	-145
1642	14.8	.79	7.22	-148
1645	14.7	.87	7.23	-146
1647	14.6	.87	7.23	-142
1650	14.5	.85	7.22	-139

Turbidity 9.5 NTU's.

Begin sampling at 1655.

1659 RSK-RW-002
3 - 40-ml glass
VOCs
HCl to pH<2, ice to 4°C
Water matrix

1704 RSK-RW-002
1 1-liter poly
CN
NaOH to pH >12, ice to 4°C
Water matrix

1713 RSK-RW-002
1 1-liter poly
Sulfide
4 ml Zinc acetate
NaOH to pH >9, ice to 4°C
Water matrix

1717 RSK-RW-002
3 125 ml- amber glass
Total Coliform
Water Matrix
ice to 4°C

1721 RSK-RW-002
1 1-liter poly
F, Cl, NO3, Br, PO4, SO4
Ice to 4°C
Water matrix

1725 RSK-RW-002
2 1-liter poly
Alkalinity
Color
ice to 4°C
Water matrix

MRD Lab Project No. 2313

17 DEC 1993

DEPARTMENT OF THE ARMY
MISSOURI RIVER DIVISION, CORPS OF ENGINEERS
DIVISION LABORATORY
OMAHA, NEBRASKA 68102

Subject: Certificate of Analysis

Project: United Scrap Lead, Troy, OH
Intended Use: Superfund
Source of Material:

Submitted by: Steve Ott, CEMRO-ED-EB
Date Sampled: 27 - 28 Oct 93, **Date Received:** 29 Oct 93
Method of Test or Specification: See attached test result sheets.

References: Omaha District Request No. ENE 4440 dated 29 Oct 93

-- REMARKS --

1. The samples arrived in good condition.

2. Enclosed please find the following:

   Part A: Sample Receipt Information (1 page)
   Part B: Chain-of-Custody Information (8 pages)
   Part C: Analytical Test Results (49 pages)

Submitted by:

Douglas B. Taggart

DOUGLAS B. TAGGART
Director, MRD Laboratory

LP 12/13/93
Percifield/nhv/444-4313

TEST RESULTS

1. DISCUSSION:

   a. Four (4) water samples were received by MRD Laboratory for analysis on 29 Oct 93. The samples were analyzed as follows:

      - One (1) water sample was analyzed for volatiles (VOA) by EPA method 502.2; metals (arsenic, barium, cadmium, calcium, chromium, copper, iron, lead, magnesium, manganese, mercury, potassium, selenium, silver, sodium, and zinc) by EPA methods 200.7, 206.2, 245.1, and 270.2; alkalinity by EPA method 310.1; color by EPA method 110.2; cyanide by EPA method 225.2; phenolic compounds by EPA method 420.1; total organic carbon (TOC) by SM5310C; hardness by SM2340B; sulfide by EPA method 376.2; total dissolved solids (TDS) by EPA method 160.1; bicarbonate/carbonate and chloride by SM4500; fluoride by EPA method 340.2; sulfate by EPA method 375.4; bromide by ASTM method D1246; nitrate/nitrite by EPA method 353.2; orthophosphate by EPA method 365.1, odor by EPA method 140.1; N-P pesticides by EPA method 507; pesticides/PCBs by EPA method 508; chlorinated acids by EPA method 515.1; carbonates by EPA method 531.1; total coliform by SM922B; aerobic plate count by SM9215B; and iron bacteria by SM9240B.
      - One (1) water sample was analyzed for VOA by EPA method 502.2.
      - Two (2) water samples were analyzed for lead by method 239.2.

      Appendix "A" of this report lists all of the samples received.

   b. The samples arrived in good condition.

      Appendix "B" of this report contains the chain-of-custody and sample receipt information.

   c. The samples were analyzed by Continental Analytical Services (CAS) of Salina, KS and Midwest Laboratories, Inc., of Omaha, NE.

      Appendix "C" of this report lists the analytical test results and method quality control results.

2. DATA SUMMARY:

   Refer to the test report sheets in Appendix "C".

3. METHOD QUALITY CONTROL:

   a. Method blanks were free of contamination for all analyses except 0.3 µg/L methylene chloride in one VOA blank.

   b. Surrogate spike recoveries for required methods were found to be within acceptable limits.

c. Matrix spike (MS) and matrix spike duplicate (MSD) recoveries were within acceptable limits for all methods where reported. MS and MSD analyses could not be completed for N-P pesticides, pesticides/PCBs, and chlorinated acids because of insufficient sample.

d. Relative percent differences (RPDs) for MS/MSD were within acceptable limits for all methods where reported.

e. Laboratory control sample (LCS) and laboratory control sample duplicates (LCD) were within acceptable limits for all analyses except chlorinated acids where 2,4,5-TP recoveries were low (31 and 15%).

f. RPDs for LCS/LCD were within acceptable limits for all analyses except chlorinated acids where 2,4,5-T was high (70%).

g. Holding times were met.

PART A

SAMPLE RECEIPT INFORMATION

QA/QC Table #	Customer Sample #	Date Sampled	Matrix	MRD Lab # Assigned	Tests Assigned	QA Test Results Page Number
	TRIP BLANK - 1	27 Oct 93	Water	931029-016	VOA (to CAS)	C2-C3
	USL-RW-002	28 Oct 93	Water	931029-017	VOA (to CAS)	C4-C5
				931029-018	Coliform (to A & L)	C49
				931029-018	Plate Count (to A & L)	C49
				931029-018	Iron & Sulfur Bacteria (to A & L)	C49
				931029-027	Metals (to CAS)	C6
				931029-030	Alk. (to CAS)	C10
				931029-030	Color (to CAS)	C10
				931029-031	Cyanide (to CAS)	C11
				931029-032	Hardness (to CAS)	C12
				931029-032	Phenolics (to CAS)	C12
				931029-032	TOC (to CAS)	C12
				931029-033	Hardness (to CAS)	C13
				931029-034	Sulfide (to CAS)	C14
				931029-035	Metals (to CAS)	C15
				931029-036	TDS (to CAS)	C16
				931029-037	F (to CAS)	C33
				931029-037	Cl (to CAS)	C33
				931029-037	Bromide (to CAS)	C33
				931029-037	SO4 (to CAS)	C33
				931029-037	HCO3 (to CAS)	C33
				931029-037	CO3 (to CAS)	C33
				931029-038	Ortho PO4 (to CAS)	C34
				931029-038	NO3, NO2 (to CAS)	C34
				931029-039	Odor (to CAS)	C34
				931029-040	OPP (to CAS)	C34
				931029-040	Pesticides/PCBs (to CAS)	C34
				931029-041	Herbicides (to CAS)	C35
				931029-042	Carbamates (to CAS)	C35
	AIM-RW-001	28 Oct 93	Water	931029-028	Metals (to CAS)	C8
	USL-RW-001	28 Oct 93	Water	931029-029	Metals (to CAS)	C9

PART B

CHAIN-OF-CUSTODY INFORMATION

Page No.	Chain-of-Custody No.	Date Signed
B1	2519	28 Oct 93
B2	2520	28 Sep 93
B4	4020	28 Oct 93
B7	2518	28 Sep 93

U.S. ARM .RPS OF ENGINEERS

CHAIN OF CUSTODY RECORD

PROJ. NO.	PROJECT NAME
JMS 2313	UNITED SCRAP LEAD/ARCANUM IRON & METAL

SAMPLERS (Signature)
R. Dudowski

STA. NO.	DATE 1993	TIME	COMP.	GRAB	STATION LOCATION	NO. OF CONTAINERS	SULFIDE	DISSOLVED METALS	ODOR	TOTAL DISSOLVED SLUDS	PCBS	CHLORINATED ACIDS	REMARKS
3HMGEL	10/28	1713		X	USL-RW-002	1	X						1 LITER POLY; 4 ML ZINC ACETATE; NaOH pH>9; 4°C
11	11	1815		X	11	1		X					1 LITER POLY; HNO_3 pH<2; ICED TO 4°C
11	11	1807		X	11	2			X				1 LITER AMBER GLASS; ICED TO 4°C
11	11	1804		X	11	1				X			1 LITER POLY; ICED TO 4°C
11	11	1749		X	11	2					X		1 LITER AMBER GLASS; ICED TO 4°C
11	11	1759		X	11	2						X	1 LITER AMBER GLASS; ICED TO 4°C

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
[signature]	10/28/93 2100				
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks	
		[signature]	10-29-93 0850		

Distribution: Original Accompanies Shipment; Copy to Coordinator Field Files

U.S. ARMY CORPS OF ENGINEERS

CHAIN OF CUSTODY RECORD

PROJ. NO.	PROJECT NAME
LIMS 2313	UNITED SCRAP LEAD/ARCANUM IRON & METAL

SAMPLERS: *(Signature)* R. Dudzinski

STA. NO.	DATE 1993	TIME	COMP.	GRAB	STATION LOCATION	NO. OF CONTAINERS	PESTICIDES	PCB'S/VOA'S/BN'S/POLY'S					REMARKS
ISHMAEL	10/28	1755		X	USL-RW-002	1	X						1 LITER AMBER GLASS; ICED TO 4°C
11	11	1721		X	11	1		X					1 LITER POLY; ICED TO 4°C

Relinquished by: *(Signature)*	Date / Time	Received by: *(Signature)*	Relinquished by: *(Signature)*	Date / Time	Received by: *(Signature)*
Richard R. Dudzinski	10/28/93 2100				
Relinquished by: *(Signature)*	Date / Time	Received by: *(Signature)*	Relinquished by: *(Signature)*	Date / Time	Received by: *(Signature)*
Relinquished by: *(Signature)*	Date / Time	Received for Laboratory by: *(Signature)* Connie L. Gleason	Date / Time 10-29-93 0850	Remarks	

Distribution: Original Accompanies Shipment; Copy to Coordinator Field Files

B:

COOLER RECEIPT FORM

LIMS# 2313 MRD Cooler # 840 Number of Coolers 3 of 3 Contractor Cooler _____

PROJECT: United Scrap Lead Date received: 29 Oct 93

USE OTHER SIDE OF THIS FORM TO NOTE DETAILS CONCERNING CHECK-IN PROBLEMS.

A. PRELIMINARY EXAMINATION PHASE: Date cooler opened: 29 Oct 93 C-of-C Number: 2519 2520

by (print) Conrad German (sign) Conrad K German

1. Did cooler come with a shipping slip (air bill, etc.)? ..... (YES) NO

If YES, enter carrier name & air bill number here: FEDX:

2. Were custody seals on outside of cooler? ..... (YES) NO

CUSTOMER PACKAGE TRACKING NUMBER — PULL UP PURPLE TAB 620 9661 552

How many & where: 2 - one Front - one Side seal date: 10-28-93 seal name _____

3. Were custody seals unbroken and intact at the date and time of arrival? ..... (YES) NO
4. Did you screen samples for radioactivity using the Geiger Counter..... (YES) NO
5. Were custody papers sealed in a plastic bag & taped inside to the lid? ..... (YES) NO
6. Were custody papers filled out properly (ink, signed, etc.)? ..... (YES) NO
7. Did you sign custody papers in the appropriate place? ..... (YES) NO
8. Was project identifiable from custody papers? If YES, enter project name at the top of this form. (YES) NO
9. If required, was enough ice used? ..... Type of ice: Regular ..... 1.7 (YES) NO
10. Have designated person initial here to acknowledge receipt of cooler: LP (date) 10/29/93

B. LOG-IN PHASE: Date samples were logged-in: _____

by (print) _____ (sign) _____

11. Describe type of packing in cooler: Peanuts
12. Were all bottles sealed in separate plastic bags? ..... (YES) NO
13. Did all bottles arrive unbroken & were labels in good condition? ..... (YES) NO
14. Were all bottle labels complete (ID, date, time, signature, preservative, etc.)? ..... YES NO
15. Did all bottle labels agree with custody papers? ..... YES NO
16. Were correct containers used for the tests indicated? ..... YES NO
17. Were correct preservatives added to samples? ..... YES NO
18. Was a sufficient amount of sample sent for tests indicated? ..... YES NO
19. Were bubbles absent in Volatile samples? If NO, list by QA#: _____ YES NO
20. Was the project manager called and status discussed? If YES, give details on the back of this form. YES NO

21. Who was called? By whom? (date)

U.S. A. JRPS OF ENGINEERS

CHAIN OF CUSTODY RECORD

PROJ. NO.	PROJECT NAME
LIMS 2313	UNITED SCRAP LEAD/ARCANUM IRON & METAL

SAMPLERS: *(Signature)* R. Dudkowski

STA. NO.	DATE 1993	TIME	COMP.	GRAB	STATION LOCATION	NO. OF CONTAINERS	TOTAL COLIFORM	VOCs	REMARKS
ISHMAEL	10/26	1717		X	USL-RW-002	3	X		125 ML AMBER GLASS; ICED TO 4°C
11	11	1655		X	11	3		X	40ML GLASS; HCL pH<2; ICED TO 4°C
	10/27				TRIP BLANK	2			40 ML GLASS; ICED TO 4°C

Relinquished by: *(Signature)*	Date / Time	Received by: *(Signature)*	Relinquished by: *(Signature)*	Date / Time	Received by: *(Signature)*
[signature]	10/28/93 2100				
Relinquished by: *(Signature)*	Date / Time	Received by: *(Signature)*	Relinquished by: *(Signature)*	Date / Time	Received by: *(Signature)*
Relinquished by: *(Signature)*	Date / Time	Received for Laboratory by: *(Signature)*	Date / Time	Remarks	
		[signature]	29 Oct 93 0850		

Distribution: Original Accompanies Shipment; Copy to Coordinator Field Files

254

COOLER RECEIPT FORM

B:

LIMS# 2313 MRD Cooler # 18 Number of Coolers 2 of 2 Contractor Cooler N/A

PROJECT: United Scrap Lead Date received: 29 Oct 93

USE OTHER SIDE OF THIS FORM TO NOTE DETAILS CONCERNING CHECK-IN PROBLEMS.

A. PRELIMINARY EXAMINATION PHASE: Date cooler opened: 29 Oct 93 C-of-C Number: 2578 + Not in cooler

by (print) Conrad L. German (sign) Conrad L German

1. Did cooler come with a shipping slip (air bill, etc.)? ..... (YES) NO

If YES, enter carrier name & air bill number here: FEDX: 6209661 561

2. Were custody seals on outside of cooler? ..... (YES) NO

How many & where: 2 - one each Side, seal date: 10-30-93 seal name Richard

3. Were custody seals unbroken and intact at the date and time of arrival? ..... (YES) NO

4. Did you screen samples for radioactivity using the Geiger Counter..... (YES) NO

5. Were custody papers sealed in a plastic bag & taped inside to the lid? ..... (YES) NO

6. Were custody papers filled out properly (ink, signed, etc.)? ..... (YES) NO

7. Did you sign custody papers in the appropriate place? ..... (YES) NO

8. Was project identifiable from custody papers? If YES, enter project name at the top of this form. (YES) NO

9. If required, was enough ice used? ..... Type of ice: Regular ..... 43 ..... (YES) NO

10. Have designated person initial here to acknowledge receipt of cooler: LA (date) 10/29/93

B. LOG-IN PHASE: Date samples were logged-in: 29 Oct 93

by (print) Conrad L. German (sign) Conrad L German

11. Describe type of packing in cooler: Peanuts

12. Were all bottles sealed in separate plastic bags? ..... (YES) NO

13. Did all bottles arrive unbroken & were labels in good condition? ..... (YES) NO

14. Were all bottle labels complete (ID, date, time, signature, preservative, etc.)? ..... (NO)

15. Did all bottle labels agree with custody papers? ..... (NO)

16. Were correct containers used for the tests indicated? ..... (YES) NO

17. Were correct preservatives added to samples? ..... (YES) NO

18. Was a sufficient amount of sample sent for tests indicated? ..... (YES) NO

19. Were bubbles absent in Volatile samples? If NO, list by QA#: one Sample Vial YES (NO)

20. Was the project manager called and status discussed? If YES, give details on the back of this form. YES NO

B.C

14. Trip Blank:
No Project Name
No Analysis

15. for Sample ID:

C-O-C	Label
Trip Blank	Trip Blank-1

Note: VOA (Sample) had poly "protectos" caps placed over septa-caps.
Trip Blank do not.

U.S. ARMY PS OF ENGINEERS

CHAIN OF CUSTODY RECORD

PROJ. NO.	PROJECT NAME
LINS 2313	UNITED SCRAP LEAD/ARCANUM IRON & METAL

SAMPLERS: (Signature) K. Drabowski

STA. NO.	DATE 1993	TIME	COMP.	GRAB	STATION LOCATION	NO. OF CONTAINERS	LEAD	METALS	ALKALINITY, COLOR	AMINES, PHENOLS, ORG. CHLOR	HARDNESS	CN	REMARKS
AMBERGER	10/28	1236		X	AIM-RW-001	1	X						1 LITER POLY; 1:1 HNO_3 pH <2; ICED TO 4°C
URTON/ NNIN	10/28	1341		X	ASL-RW-001	1	X						1 LITER POLY; 1:1 HNO_3 pH <2; ICED TO 4°C
ISHMAEL	10/28	1735		X	USL-RW-002	1	X						1 LITER POLY; 1:1 HNO_3 pH <2; ICED TO 4°C
11	11	1738		X	11	1		X					1 LITER POLY; 1:1 HNO_3 pH <2; ICED TO 4°C
11	11	1725		X	11	2			X				1 LITER POLY; ICED TO 4°C
11	11	1742		X	11	2				X			1 LITER AMBER GLASS; HCL pH <2; ICED TO 4°C
11	11	1727		X	USL-RW-002 (BATH TAP)	1					X		1 LITER AMBER GLASS; HCL pH <2; ICED TO 4°C
11	11	1704		X	USL-RW-002	1						X	1 LITER POLY; NAOH pH >12; ICED TO 4°C

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
[signature]	10/28/93 2100				
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks	
		[signature]	10-29-93 0850		

Distribution: Original Accompanies Shipment; Copy to Coordinator Field Files

2518

B8

COOLER RECEIPT FORM

LIMS# 2313 MRO Cooler # 8721 Number of Coolers 1 of 3 Contractor Cooler N/A

PROJECT: United Scrap Lead Date received: 29 Oct 93

USE OTHER SIDE OF THIS FORM TO NOTE DETAILS CONCERNING CHECK-IN PROBLEMS.

A. PRELIMINARY EXAMINATION PHASE: Date cooler opened: 29 Oct 93 C-of-C Number: 2518

by (print) Conrad German (sign) Conrad L German

1. Did cooler come with a shipping slip (air bill, etc.)? ..... (YES) NO

If YES, enter carrier name & air bill number here: FEDX: 589263984 1

2. Were custody seals on outside of cooler? ..... (YES) NO

How many & where: 2 one end side, seal date: 10-28-93, seal name Richard

3. Were custody seals unbroken and intact at the date and time of arrival? ..... (YES) NO

4. Did you screen samples for radioactivity using the Geiger Counter..... (YES) NO

5. Were custody papers sealed in a plastic bag & taped inside to the lid? ..... (YES) NO

6. Were custody papers filled out properly (ink, signed, etc.)? ..... (YES) NO

7. Did you sign custody papers in the appropriate place? ..... (YES) NO

8. Was project identifiable from custody papers? If YES, enter project name at the top of this form. (YES) NO

9. If required, was enough ice used? ..... Type of ice: _____ 23 ..... (YES) NO

10. Have designated person initial here to acknowledge receipt of cooler: LP (date) 10/29/93

B. LOG-IN PHASE: Date samples were logged-in: 29 Oct 93

by (print) Conrad L German (sign) Conrad L German

11. Describe type of packing in cooler: Peanuts

12. Were all bottles sealed in separate plastic bags? ..... (YES) NO

13. Did all bottles arrive unbroken & were labels in good condition? ..... (YES) NO

14. Were all bottle labels complete (ID, date, time, signature, preservative, etc.)? ..... (YES) NO

15. Did all bottle labels agree with custody papers? ..... (YES) NO

16. Were correct containers used for the tests indicated? ..... (YES) NO

17. Were correct preservatives added to samples? ..... (YES) NO

18. Was a sufficient amount of sample sent for tests indicated? ..... (YES) NO

19. Were bubbles absent in Volatile samples? If NO, list by QA#: N/A ~~YES NO~~

20. Was the project manager called and status discussed? If YES, give details on the back of this form. YES NO

(date)

Continental Analytical
SERVICES, INC.

11/12/93

US Army Corps of Engineers
Attn: Laura Percifield
420 South 18th Street
Omaha, NE 68102-2586

Date Received: 10/30/93
CAS File No.: 93-5409
CAS Order No.: 19511
Your P.O./Project No.: Work Order #89

Dear Ms. Percifield:

Enclosed are the laboratory reports for the following samples:

CAS LAB ID #	SAMPLE DESCRIPTION	DATE SAMPLED
93101951	931029-H016	10/27/93
93101952	931029-H017	10/28/93
93101953	931029-H027	10/28/93
93101954	931029-H028	10/28/93
93101955	931029-H029	10/28/93
93101956	931029-H030	10/28/93
93101957	931029-H031	10/28/93
93101958	931029-H032	10/28/93
93101959	931029-H033	10/28/93
93101960	931029-H034	10/28/93
93101961	931029-H035	10/28/93
93101962	931029-H036	10/28/93

Thank you for choosing CAS for this project. If you have any questions, please contact me at 800-535-3076.

CONTINENTAL ANALYTICAL SERVICES, INC.

Gregory J. Groene
Project Manager

1804 Glendale Road • Salina, Kansas 67401-6675
913-827-1273 • 800-535-3076 • FAX 913-823-7830

Continental Analytical
SERVICES, INC.

Client: US Army Corps of Engineers
Attn: Laura Percifield
420 South 18th Street
Omaha, NE 68102-2586

Date Sample Rptd: 11/12/93
Date Sample Recd: 10/30/93
CAS File No: 93-5409
CAS Order No: 19511
Client P.O.: Work Order #89

Lab Number: 93101951
Sample Description: 931029-H016

Date Sampled: 10/27/93
Time Sampled:

Analysis	Concentration	Units	Date Analyzed	Book/Page
Drinking Water Volatiles			11/01/93	/
1,1,1,2-Tetrachloroethane	ND(0.2)	µg/L		1533/19
1,1,1-Trichloroethane	ND(0.2)	µg/L		1533/19
1,1,2,2-Tetrachloroethane	ND(0.2)	µg/L		1533/19
1,1,2-Trichloroethane	ND(0.2)	µg/L		1533/19
1,1-Dichloroethane	ND(0.2)	µg/L		1533/19
1,1-Dichloroethene	ND(0.2)	µg/L		1533/19
1,1-Dichloropropene	ND(0.2)	µg/L		1533/19
1,2,3-Trichlorobenzene	ND(0.2)	µg/L		1533/19
1,2,3-Trichloropropane	ND(0.2)	µg/L		1533/19
1,2,4-Trichlorobenzene	ND(0.2)	µg/L		1533/19
1,2,4-Trimethylbenzene	ND(0.2)	µg/L		1533/19
1,2-Dibromo-3-Chloropropane	ND(0.2)	µg/L		1533/19
1,2-Dibromoethane	ND(0.2)	µg/L		1533/19
1,2-Dichlorobenzene	ND(0.2)	µg/L		1533/19
1,2-Dichloroethane	ND(0.2)	µg/L		1533/19
1,2-Dichloropropane	ND(0.2)	µg/L		1533/19
1,3,5-Trimethylbenzene	ND(0.2)	µg/L		1533/19
1,3-Dichlorobenzene	ND(0.2)	µg/L		1533/19
1,3-Dichloropropane	ND(0.2)	µg/L		1533/19
1,3-Dichloropropene(cis)	ND(0.2)	µg/L		1533/19
1,3-Dichloropropene(trans)	ND(0.2)	µg/L		1533/19
1,4-Dichlorobenzene	ND(0.2)	µg/L		1533/19
2,2-Dichloropropane	ND(0.2)	µg/L		1533/19
2-Chlorotoluene	ND(0.2)	µg/L		1533/19
4-Chlorotoluene	ND(0.2)	µg/L		1533/19
Benzene	ND(0.2)	µg/L		1533/19
Bromobenzene	ND(0.2)	µg/L		1533/19
Bromochloromethane	ND(0.2)	µg/L		1533/19
Bromodichloromethane	ND(0.2)	µg/L		1533/19
Bromoform	ND(0.2)	µg/L		1533/19
Bromomethane	ND(0.2)	µg/L		1533/19
Carbon Tetrachloride	ND(0.2)	µg/L		1533/19
Chlorobenzene	ND(0.2)	µg/L		1533/19
Chloroethane	ND(0.2)	µg/L		1533/19
Chloroform	ND(0.2)	µg/L		1533/19
Chloromethane	ND(0.2)	µg/L		1533/19
cis-1,2-Dichloroethene	ND(0.2)	µg/L		1533/19
Dibromochloromethane	ND(0.2)	µg/L		1533/19
Dibromomethane	ND(0.2)	µg/L		1533/19
Dichlorodifluoromethane	ND(0.2)	µg/L		1533/19

-Continued-

CONTINENTAL ANALYTICAL SERVICES, INC.

LABORATORY REPORT Page: 2

Client: US Army Corps of Engineers
Lab Number: 93101951

Analysis	Concentration	Units	Date Analyzed	Book/Page
Ethylbenzene	ND(0.2)	µg/L		1533/19
Hexachlorobutadiene	ND(0.2)	µg/L		1533/19
Isopropylbenzene	ND(0.2)	µg/L		1533/19
Methylene Chloride	ND(0.2)	µg/L		1533/19
n-Butylbenzene	ND(0.2)	µg/L		1533/19
n-Propylbenzene	ND(0.2)	µg/L		1533/19
Naphthalene	ND(0.2)	µg/L		1533/19
Xylene(Total)	ND(0.2)	µg/L		1533/19
P-Isopropyltoluene	ND(0.2)	µg/L		1533/19
sec-Butylbenzene	ND(0.2)	µg/L		1533/19
Styrene	ND(0.2)	µg/L		1533/19
tert-Butylbenzene	ND(0.2)	µg/L		1533/19
Tetrachloroethene	ND(0.2)	µg/L		1533/19
Toluene	ND(0.2)	µg/L		1533/19
trans-1,2-Dichloroethene	ND(0.2)	µg/L		1533/19
Trichloroethene	ND(0.2)	µg/L		1533/19
Trichlorofluoromethane	ND(0.2)	µg/L		1533/19
Vinyl Chloride	ND(0.2)	µg/L		1533/19

Analysis	Date Prepared	QC Batch	Analyst	Analytical Method
Drinking Water Volatiles	NA	1GC3305	DKT	502.2

Laboratory analyses were performed on samples utilizing procedures published in Title 40 of the Code of Federal Regulations, Parts 136 or 141, or in EPA Publication, SW-846, 3rd edition, September, 1986. ND(), where noted, indicates none detected with the detection limit in parentheses.

Samples will be retained for thirty days unless otherwise notified.

CONTINENTAL ANALYTICAL SERVICES, INC.

Clifford J. Baker
Laboratory Director

CAS

Continental Analytical
SERVICES, INC.

Client: US Army Corps of Engineers
Attn: Laura Percifield
420 South 18th Street
Omaha, NE 68102-2586

Date Sample Rptd: 11/12/93
Date Sample Recd: 10/30/93
CAS File No: 93-5409
CAS Order No: 19511
Client P.O.: Work Order #89

Lab Number: 93101952
Sample Description: 931029-H017

Date Sampled: 10/28/93
Time Sampled: 1655

Analysis	Concentration	Units	Date Analyzed	Book/Page
Drinking Water Volatiles			11/01/93	/
1,1,1,2-Tetrachloroethane	ND(0.2)	µg/L		1533/19
1,1,1-Trichloroethane	ND(0.2)	µg/L		1533/19
1,1,2,2-Tetrachloroethane	ND(0.2)	µg/L		1533/19
1,1,2-Trichloroethane	ND(0.2)	µg/L		1533/19
1,1-Dichloroethane	ND(0.2)	µg/L		1533/19
1,1-Dichloroethene	ND(0.2)	µg/L		1533/19
1,1-Dichloropropene	ND(0.2)	µg/L		1533/19
1,2,3-Trichlorobenzene	ND(0.2)	µg/L		1533/19
1,2,3-Trichloropropane	ND(0.2)	µg/L		1533/19
1,2,4-Trichlorobenzene	ND(0.2)	µg/L		1533/19
1,2,4-Trimethylbenzene	ND(0.2)	µg/L		1533/19
1,2-Dibromo-3-Chloropropane	ND(0.2)	µg/L		1533/19
1,2-Dibromoethane	ND(0.2)	µg/L		1533/19
1,2-Dichlorobenzene	ND(0.2)	µg/L		1533/19
1,2-Dichloroethane	ND(0.2)	µg/L		1533/19
1,2-Dichloropropane	ND(0.2)	µg/L		1533/19
1,3,5-Trimethylbenzene	ND(0.2)	µg/L		1533/19
1,3-Dichlorobenzene	ND(0.2)	µg/L		1533/19
1,3-Dichloropropane	ND(0.2)	µg/L		1533/19
1,3-Dichloropropene(cis)	ND(0.2)	µg/L		1533/19
1,3-Dichloropropene(trans)	ND(0.2)	µg/L		1533/19
1,4-Dichlorobenzene	ND(0.2)	µg/L		1533/19
2,2-Dichloropropane	ND(0.2)	µg/L		1533/19
2-Chlorotoluene	ND(0.2)	µg/L		1533/19
4-Chlorotoluene	ND(0.2)	µg/L		1533/19
Benzene	ND(0.2)	µg/L		1533/19
Bromobenzene	ND(0.2)	µg/L		1533/19
Bromochloromethane	ND(0.2)	µg/L		1533/19
Bromodichloromethane	ND(0.2)	µg/L		1533/19
Bromoform	ND(0.2)	µg/L		1533/19
Bromomethane	ND(0.2)	µg/L		1533/19
Carbon Tetrachloride	ND(0.2)	µg/L		1533/19
Chlorobenzene	ND(0.2)	µg/L		1533/19
Chloroethane	ND(0.2)	µg/L		1533/19
Chloroform	ND(0.2)	µg/L		1533/19
Chloromethane	ND(0.2)	µg/L		1533/19
cis-1,2-Dichloroethene	ND(0.2)	µg/L		1533/19
Dibromochloromethane	ND(0.2)	µg/L		1533/19
Dibromomethane	ND(0.2)	µg/L		1533/19
Dichlorodifluoromethane	ND(0.2)	µg/L		1533/19

-Continued-

C5

CONTINENTAL ANALYTICAL SERVICES, INC.

LABORATORY REPORT Page: 4

Client: US Army Corps of Engineers
Lab Number: 93101952

Analysis	Concentration	Units	Date Analyzed	Book/Page
Ethylbenzene	ND(0.2)	µg/L		1533/19
Hexachlorobutadiene	ND(0.2)	µg/L		1533/19
Isopropylbenzene	ND(0.2)	µg/L		1533/19
Methylene Chloride	ND(0.2)	µg/L		1533/19
n-Butylbenzene	ND(0.2)	µg/L		1533/19
n-Propylbenzene	ND(0.2)	µg/L		1533/19
Naphthalene	ND(0.2)	µg/L		1533/19
Xylene(Total)	ND(0.2)	µg/L		1533/19
P-Isopropyltoluene	ND(0.2)	µg/L		1533/19
sec-Butylbenzene	ND(0.2)	µg/L		1533/19
Styrene	ND(0.2)	µg/L		1533/19
tert-Butylbenzene	ND(0.2)	µg/L		1533/19
Tetrachloroethene	ND(0.2)	µg/L		1533/19
Toluene	ND(0.2)	µg/L		1533/19
trans-1,2-Dichloroethene	ND(0.2)	µg/L		1533/19
Trichloroethene	ND(0.2)	µg/L		1533/19
Trichlorofluoromethane	ND(0.2)	µg/L		1533/19
Vinyl Chloride	ND(0.2)	µg/L		1533/19

Analysis	Date Prepared	QC Batch	Analyst	Analytical Method
Drinking Water Volatiles	NA	1GC3305	DKT	502.2

Laboratory analyses were performed on samples utilizing procedures published in Title 40 of the Code of Federal Regulations, Parts 136 or 141, or in EPA Publication, SW-846, 3rd edition, September, 1986. ND(), where noted, indicates none detected with the detection limit in parentheses.

Samples will be retained for thirty days unless otherwise notified.

CONTINENTAL ANALYTICAL SERVICES, INC.

Clifford J. Baker
Laboratory Director

CAS

Client: US Army Corps of Engineers
ATTN:Laura Percifield
420 South 18th Street
Omaha, NE 68102-2586

Date Sample Rptd: 11/12/93
Date Sample Recd: 10/30/93
CAS File No: 93-5409
CAS Order No: 19511
Client P.O.: Work Order #89

Lab Number: 93101953
Sample Description: 931029-H027

Date Sampled: 10/28/93
Time Sampled: 1738

Analysis	Concentration	Units	Date Analyzed	Book/Page
Arsenic, Total	ND(0.01)	mg/L	11/11/93	1889/6
Barium, Total	0.2	mg/L	11/11/93	1868/89
Cadmium, Total	ND(0.005)	mg/L	11/11/93	1908/73
Calcium, Total	99.	mg/L	11/10/93	1829/42
Chromium, Total	ND(0.01)	mg/L	11/11/93	1909/82
Copper, Total	ND(0.02)	mg/L	11/11/93	1926/10
Iron, Total	4.1	mg/L	11/11/93	1828/71
Lead, Total	ND(0.003)	mg/L	11/11/93	1878/21
Magnesium, Total	37.	mg/L	11/10/93	1910/16
Manganese, Total	0.07	mg/L	11/11/93	1791/75
Mercury, Total	ND(0.0002)	mg/L	11/11/93	1918/25
Potassium, Total	ND(5)	mg/L	11/10/93	1757/73
Selenium, Total	ND(0.005)	mg/L	11/10/93	1854/35
Silver, Total	ND(0.01)	mg/L	11/11/93	1869/102
Sodium, Total	28.	mg/L	11/10/93	1792/71
Zinc, Total	ND(0.02)	mg/L	11/11/93	1927/11

Analysis	Date Prepared	QC Batch	Analyst	Analytical Method
Arsenic, Total	11/01/93	4	MLH	206.2/7060
Barium, Total	11/01/93	3	MAG	200.7/6010
Cadmium, Total	11/01/93	3	MAG	200.7/6010
Calcium, Total	11/01/93	3	MAG	200.7/6010
Chromium, Total	11/01/93	3	MAG	200.7/6010
Copper, Total	11/01/93	3	MAG	200.7/6010
Iron, Total	11/01/93	3	MAG	200.7/6010
Lead, Total	11/01/93	4	MLH	239.2/7421
Magnesium, Total	11/01/93	3	MAG	200.7/6010
Manganese, Total	11/01/93	3	MAG	200.7/6010
Mercury, Total	11/11/93	1	HJW	245.1/7470/7471
Potassium, Total	11/01/93	3	MAG	200.7/6010
Selenium, Total	11/01/93	4	MLH	270.2/7740
Silver, Total	11/01/93	3	MAG	200.7/6010
Sodium, Total	11/01/93	3	MAG	200.7/6010
Zinc, Total	11/01/93	3	MAG	200.7/6010

Laboratory analyses were performed on samples utilizing procedures published in Title 40 of the Code of Federal Regulations, Parts 136 or 141, or in EPA Publication, SW-846, 3rd edition, September, 1986. ND(), where noted, indicates none detected with the detection limit in parentheses.

Samples will be retained for thirty days unless otherwise notified.

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Clifford L. Baker
Clifford L. Baker
Laboratory Director

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LABORATORY REPORT

Client: US Army Corps of Engineers
Lab Number: 93101953

Analysis	Concentration	Units	Date Analyzed	Book/Page

Laboratory analyses were performed on samples utilizing procedures published in Title 40 of the Code of Federal Regulations, Parts 136 or 141, or in EPA Publication, SW-846, 3rd edition, September, 1986. ND(), where noted, indicates none detected with the detection limit in parentheses.

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Clifford J. Baker
Laboratory Director

CAS

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Continental Analytical
SERVICES, INC.

Client: US Army Corps of Engineers
Attn: Laura Percifield
420 South 18th Street
Omaha, NE 68102-2586

Date Sample Rptd: 11/12/93
Date Sample Recd: 10/30/93
CAS File No: 93-5409
CAS Order No: 19511
Client P.O.: Work Order #89

Lab Number: 93101954
Sample Description: 931029-H028

Date Sampled: 10/28/93
Time Sampled: 1236

Analysis	Concentration	Units	Date Analyzed	Book/Page
Lead, Total	ND(0.003)	mg/L	11/11/93	1878/21

Analysis	Date Prepared	QC Batch	Analyst	Analytical Method
Lead, Total	11/01/93	4	MLH	239.2/7421

Laboratory analyses were performed on samples utilizing procedures published in Title 40 of the Code of Federal Regulations, Parts 136 or 141, or in EPA Publication, SW-846, 3rd edition, September, 1986. ND(), where noted, indicates none detected with the detection limit in parentheses.

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Clifford D. Baker
Laboratory Director

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Client: US Army Corps of Engineers
Attn: Laura Percifield
420 South 18th Street
Omaha, NE 68102-2586

Date Sample Rptd: 11/12/93
Date Sample Recd: 10/30/93
CAS File No: 93-5409
CAS Order No: 19511
Client P.O.: Work Order #89

Lab Number: 93101955
Sample Description: 931029-H029

Date Sampled: 10/28/93
Time Sampled: 1341

Analysis	Concentration	Units	Date Analyzed	Book/Page
Lead, Total	ND(0.003)	mg/L	11/11/93	1878/21

Analysis	Date Prepared	QC Batch	Analyst	Analytical Method
Lead, Total	11/01/93	4	MLH	239.2/7421

Laboratory analyses were performed on samples utilizing procedures published in Title 40 of the Code of Federal Regulations, Parts 136 or 141, or in EPA Publication, SW-846, 3rd edition, September, 1986. ND(), where noted, indicates none detected with the detection limit in parentheses.

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CONTINENTAL ANALYTICAL SERVICES, INC.

Clifford J. Baker
Laboratory Director

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Continental Analytical
SERVICES, INC.

Client: US Army Corps of Engineers
Attn: Laura Percifield
420 South 18th Street
Omaha, NE 68102-2586

Date Sample Rptd: 11/12/93
Date Sample Recd: 10/30/93
CAS File No: 93-5409
CAS Order No: 19511
Client P.O.: Work Order #89

Lab Number: 93101956
Sample Description: 931029-H030

Date Sampled: 10/28/93
Time Sampled: 1725

Analysis	Concentration	Units	Date Analyzed	Book/Page
Alkalinity, Total	309.	mg/L as CaCO3	11/03/93	1527/55
Color	70.	APPARENT COLOR	11/02/93	1556/94

Analysis	Date Prepared	QC Batch	Analyst	Analytical Method
Alkalinity, Total	NA	1	MRH	310.1
Color	NA	1	HJW	110.2

Laboratory analyses were performed on samples utilizing procedures published in Title 40 of the Code of Federal Regulations, Parts 136 or 141, or in EPA Publication, SW-846, 3rd edition, September, 1986. ND(), where noted, indicates none detected with the detection limit in parentheses.

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Client: US Army Corps of Engineers
Attn: Laura Percifield
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Omaha, NE 68102-2586

Date Sample Rptd: 11/12/93
Date Sample Recd: 10/30/93
CAS File No: 93-5409
CAS Order No: 19511
Client P.O.: Work Order #89

Lab Number: 93101957
Sample Description: 931029-H031

Date Sampled: 10/28/93
Time Sampled: 1704

Analysis	Concentration	Units	Date Analyzed	Book/Page
Cyanide, Total	ND(0.01)	mg/L	11/04/93	1503/77

Analysis	Date Prepared	QC Batch	Analyst	Analytical Method
Cyanide, Total	NA	1	HJW	335.2/9010

Laboratory analyses were performed on samples utilizing procedures published in Title 40 of the Code of Federal Regulations, Parts 136 or 141, or in EPA Publication, SW-846, 3rd edition, September, 1986. ND(), where noted, indicates none detected with the detection limit in parentheses.

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Client: US Army Corps of Engineers
Attn: Laura Percifield
420 South 18th Street
Omaha, NE 68102-2586

Date Sample Rptd: 11/12/93
Date Sample Recd: 10/30/93
CAS File No: 93-5409
CAS Order No: 19511
Client P.O.: Work Order #89

Lab Number: 93101958
Sample Description: 931029-H032

Date Sampled: 10/28/93
Time Sampled: 1742

Analysis	Concentration	Units	Date Analyzed	Book/Page
Phenolic Compounds	ND(0.005)	mg/L	11/02/93	1818/25
Total Organic Carbon, Sparged	2.	mg/L	11/05/93	1824/36
Hardness (Calculated)	485.	mg/L as CaCO3	11/11/93	629 /55
Calcium, Total	88.	mg/L	11/10/93	1829/43
Magnesium, Total	34.	mg/L	11/10/93	1910/17

Analysis	Date Prepared	QC Batch	Analyst	Analytical Method
Phenolic Compounds	NA	1	MRH	420.1/9065
Total Organic Carbon, Sparged	NA	2	BLP	SM 5310C
Hardness (Calculated)	NA	1	MRH	SM 2340B
Calcium, Total	11/02/93	3	MAG	200.7/6010
Magnesium, Total	11/02/93	3	MAG	200.7/6010

Laboratory analyses were performed on samples utilizing procedures published in Title 40 of the Code of Federal Regulations, Parts 136 or 141, or in EPA Publication, SW-846, 3rd edition, September, 1986. ND(), where noted, indicates none detected with the detection limit in parentheses.

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Laboratory Director

Client: US Army Corps of Engineers
Attn: Laura Percifield
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Date Sample Rptd: 11/12/93
Date Sample Recd: 10/30/93
CAS File No: 93-5409
CAS Order No: 19511
Client P.O.: Work Order #89

Lab Number: 93101959
Sample Description: 931029-H033

Date Sampled: 10/28/93
Time Sampled: 1827

Analysis	Concentration	Units	Date Analyzed	Book/Page
Hardness (Calculated)	405.	mg/L as CaCO3	11/11/93	629 /55
Calcium, Total	75.	mg/L	11/10/93	1829/43
Magnesium, Total	33.	mg/L	11/10/93	1910/17

Analysis	Date Prepared	QC Batch	Analyst	Analytical Method
Hardness (Calculated)	NA	1	MRH	SM 2340B
Calcium, Total	11/02/93	3	MAG	200.7/6010
Magnesium, Total	11/02/93	3	MAG	200.7/6010

Laboratory analyses were performed on samples utilizing procedures published in Title 40 of the Code of Federal Regulations, Parts 136 or 141, or in EPA Publication, SW-846, 3rd edition, September, 1986. ND(), where noted, indicates none detected with the detection limit in parentheses.

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Clifford L. Baker
Laboratory Director

C14

Continental Analytical
SERVICES, INC.

Client: US Army Corps of Engineers
Attn: Laura Percifield
420 South 18th Street
Omaha, NE 68102-2586

Date Sample Rptd: 11/12/93
Date Sample Recd: 10/30/93
CAS File No: 93-5409
CAS Order No: 19511
Client P.O.: Work Order #89

Lab Number: 93101960
Sample Description: 931029-H034

Date Sampled: 10/28/93
Time Sampled: 1713

Analysis	Concentration	Units	Date Analyzed	Book/Page
Sulfide, Total	ND(0.1)	mg/L	11/03/93	1529/23

Analysis	Date Prepared	QC Batch	Analyst	Analytical Method
Sulfide, Total	NA	1	HJW	376.2

Laboratory analyses were performed on samples utilizing procedures published in Title 40 of the Code of Federal Regulations, Parts 136 or 141, or in EPA Publication, SW-846, 3rd edition, September, 1986. ND(), where noted, indicates none detected with the detection limit in parentheses.

Samples will be retained for thirty days unless otherwise notified.

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Clifford L. Baker
Laboratory Director

Continental Analytical
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Client: US Army Corps of Engineers
Attn: Laura Percifield
420 South 18th Street
Omaha, NE 68102-2586

Date Sample Rptd: 11/12/93
Date Sample Recd: 10/30/93
CAS File No: 93-5409
CAS Order No: 19511
Client P.O.: Work Order #89

Lab Number: 93101961
Sample Description: 931029-H035

Date Sampled: 10/28/93
Time Sampled: 1818

Analysis	Concentration	Units	Date Analyzed	Book/Page
Iron, Soluble	3.1	mg/L	11/11/93	1828/73
Manganese, Soluble	0.06	mg/L	11/11/93	1791/76

Analysis	Date Prepared	QC Batch	Analyst	Analytical Method
Iron, Soluble	11/01/93	1	MAG	200.7/6010
Manganese, Soluble	11/01/93	1	MAG	200.7/6010

Laboratory analyses were performed on samples utilizing procedures published in Title 40 of the Code of Federal Regulations, Parts 136 or 141, or in EPA Publication, SW-846, 3rd edition, September, 1986. ND(), where noted, indicates none detected with the detection limit in parentheses.

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Clifford L. Baker
Laboratory Director

C1

Continental Analytical
SERVICES, INC.

Client: US Army Corps of Engineers
Attn: Laura Percifield
420 South 18th Street
Omaha, NE 68102-2586

Date Sample Rptd: 11/12/93
Date Sample Recd: 10/30/93
CAS File No: 93-5409
CAS Order No: 19511
Client P.O.: Work Order #89

Lab Number: 93101962
Sample Description: 931029-H036

Date Sampled: 10/28/93
Time Sampled: 1804

Analysis	Concentration	Units	Date Analyzed	Book/Page
Solids, Total Dissolved	524.	mg/L	11/02/93	1762/61

Analysis	Date Prepared	QC Batch	Analyst	Analytical Method
Solids, Total Dissolved	NA	1	MRH	160.1

Laboratory analyses were performed on samples utilizing procedures published in Title 40 of the Code of Federal Regulations, Parts 136 or 141, or in EPA Publication, SW-846, 3rd edition, September, 1986. ND(), where noted, indicates none detected with the detection limit in parentheses.

Samples will be retained for thirty days unless otherwise notified.

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Clifford L. Baker
Laboratory Director

Continental Analytical
SERVICES, INC.

C1

11/15/93

US Army Corps of Engineers
Attn: Laura Percifield
420 South 18th Street
Omaha, NE 68102-2586

Re: CAS File Number: 93-5409
CAS Order Number: 19511
CAS Project Manager: Gregory J. Groene

Dear Ms. Percifield:

Enclosed are the following CAS Quality Control Reports for the above referenced order number:

- METHOD BLANK DATA
- LABORATORY CONTROL SAMPLE/LABORATORY CONTROL SAMPLE DUPLICATE
- SURROGATE DATA
- MATRIX SPIKE/MATRIX SPIKE DUPLICATE

A general description of the information contained in the reports is presented below:

METHOD BLANK DATA
A Method Blank is a matrix similar to that of the sample which has been prepared and analyzed by the same method as the sample. The Method Blank is used to assure that the preparation and analysis method has not introduced contamination. The CAS Method Blank Data Report provides the analytical results for all method blanks prepared and analyzed from the same batch as that of the client's samples.

LABORATORY CONTROL SAMPLE/LABORATORY CONTROL SAMPLE DUPLICATE
A Laboratory Control Sample is a matrix similar to that of the sample which has been spiked with known concentrations of analytes and prepared and analyzed by the same method as the sample. The Laboratory Control Sample (LCS) percent recovery is a measure of the accuracy of the preparation and analysis method. The Laboratory Control Sample Duplicate (LCSD) is a duplicate preparation and analysis of the LCS. The LCS and LCSD are used to calculate the relative percent difference, which is a measure of the precision of the preparation and analysis method. The CAS LCS/LCSD Report provides the analytical results for all laboratory control samples prepared and analyzed from the same batch as that of the client's sample.

SURROGATE DATA
A Surrogate is a compound that is similar to the compounds of interest, but is not normally found in environmental samples. Surrogates are added to the sample prior to preparation and analysis. The surrogate percent recovery is a measure of the effectiveness of the preparation and analysis method on the individual sample. The CAS Surrogate Data Report provides the surrogate recoveries for each sample that required organic analysis.

MATRIX SPIKE/MATRIX SPIKE DUPLICATE
A Matrix Spike is an aliquot of a sample spiked with compounds of interest and prepared and analyzed by the same method as the sample. The Matrix Spike (MS) percent recovery is a measure of the effectiveness of the preparation and analysis method on the specific sample matrix. The Matrix Spike Duplicate (MSD) is a duplicate preparation and analysis of the MS. The MS and MSD are used to calculate the relative percent difference, which is a measure of the precision of the preparation and analysis method. The CAS MS/MSD Report provides the analytical results for all matrix spike and matrix spike duplicate analyses performed on samples from the client's order.

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C

11/15/93
US Army Corps of Engineers
420 South 18th Street
Omaha, NE 68102-2586

ACCURACY AND PRECISION LIMITS
The accuracy and precision limits are method or laboratory determined limits indicating acceptable accuracy or precision for a given matrix. The accuracy limits are expressed with units of percent recovery. The precision limits are expressed with units of relative percent difference (RPD). Accuracy and precision limits are provided on the CAS LCS/LCSD Report, CAS MS/MSD Report and the CAS Surrogate Report.

QUALITY CONTROL BATCH
Each batch of twenty or fewer samples of the same matrix, prepared and analyzed at CAS, is assigned a Quality Control Batch number. The Quality Control Batch number for each sample is provided on the CAS Laboratory Report. With each batch, a Method Blank and two Laboratory Control Samples are also prepared and analyzed. The analytical results for the Method Blank and the Laboratory Control Samples are provided on the CAS Method Blank Data Report and the CAS LCS/LCSD Report, respectively.

DATE PREPARED
The date prepared is the date the sample was extracted or digested in preparation for analysis. If the extraction or digestion is performed as part of the analysis, "NA" is reported for the date prepared. The date prepared for each sample is provided on the CAS Laboratory Report.

DATE ANALYZED
The date analyzed is the date the analysis was performed on the sample. The date analyzed for each sample is provided on the CAS Laboratory Report.

If you have any questions regarding this data, please contact me or your CAS Project Manager at (800) 535-3076.

CONTINENTAL ANALYTICAL SERVICES, INC.

Clifford J. Baker

Clifford J. Baker
Laboratory Director

Enclosures
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CAS

C1

QUALITY CONTROL REPORT
METHOD BLANK DATA

Client: US Army Corps of Engineers
Attn: Laura Percifield
420 South 18th Street
Omaha, NE 68102-2586

Date Sample Rptd: 11/15/93
Date Sample Recd: 10/30/93
CAS File No: 93-5409
CAS Order No: 19511
Client P.O.: Work Order #89

Lab Number: 931101BLK1

Date Prepared: 11/01/93

Analysis	Concentration	Units	QC Batch	Book/Page
Iron, Soluble	ND(0.1)	mg/L	1	1828/74
Manganese, Soluble	ND(0.01)	mg/L	1	1791/77

Conclusion of lab number 931101BLK1

Lab Number: 931101BLK3

Date Prepared: 11/01/93

Analysis	Concentration	Units	QC Batch	Book/Page
Barium, Total	ND(0.1)	mg/L	3	1868/73
Cadmium, Total	ND(0.005)	mg/L	3	1908/48
Calcium, Total	ND(5)	mg/L	3	1829/42
Chromium, Total	ND(0.01)	mg/L	3	1909/60
Copper, Total	ND(0.02)	mg/L	3	1926/10
Iron, Total	ND(0.1)	mg/L	3	1828/71
Magnesium, Total	ND(5)	mg/L	3	1910/16
Manganese, Total	ND(0.01)	mg/L	3	1791/75
Potassium, Total	ND(5)	mg/L	3	1757/73
Silver, Total	ND(0.01)	mg/L	3	1869/83
Sodium, Total	ND(5)	mg/L	3	1792/71
Zinc, Total	ND(0.02)	mg/L	3	1927/11

Conclusion of lab number 931101BLK3

Lab Number: 931101BLK4

Date Prepared: 11/01/93

Analysis	Concentration	Units	QC Batch	Book/Page
Arsenic, Total	ND(0.01)	mg/L	4	1764/64
Lead, Total	ND(0.003)	mg/L	4	1878/14
Selenium, Total	ND(0.005)	mg/L	4	1767/76

Conclusion of lab number 931101BLK4

-Continued-

Continental Analytical
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QUALITY CONTROL REPORT
METHOD BLANK DATA

Client:US Army Corps of Engineers
Attn:Laura Percifield
420 South 18th Street
Omaha, NE 68102-2586

Date Sample Rptd: 11/15/93
Date Sample Recd: 10/30/93
CAS File No: 93-5409
CAS Order No: 19511
Client P.O.: Work Order #89

Lab Number: 931102BLK1 Date Prepared: 11/02/93

Analysis	Concentration	Units	QC Batch	Book/Page
Color	ND(1)	APPARENT COLOR	1	1556/94
Phenolic Compounds	ND(0.005)	mg/L	1	1818/24
Solids, Total Dissolved	ND(2)	mg/L	1	1762/60

Conclusion of lab number 931102BLK1

Lab Number: 931102BLK3 Date Prepared: 11/02/93

Analysis	Concentration	Units	QC Batch	Book/Page
Calcium, Total	ND(5)	mg/L	3	1829/44
Magnesium, Total	ND(5)	mg/L	3	1910/18

Conclusion of lab number 931102BLK3

Lab Number: 931103BLK1 Date Prepared: 11/03/93

Analysis	Concentration	Units	QC Batch	Book/Page
Alkalinity, Total	ND(2)	mg/L as CaCO3	1	1527/54
Sulfide, Total	ND(0.1)	mg/L	1	1529/23

Conclusion of lab number 931103BLK1

Lab Number: 931104BLK1 Date Prepared: 11/04/93

Analysis	Concentration	Units	QC Batch	Book/Page
Cyanide, Total	ND(0.01)	mg/L	1	1503/76

Conclusion of lab number 931104BLK1

-Continued-

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QUALITY CONTROL REPORT
METHOD BLANK DATA

Client: US Army Corps of Engineers
Attn: Laura Percifield
420 South 18th Street
Omaha, NE 68102-2586

Date Sample Rptd: 11/15/93
Date Sample Recd: 10/30/93
CAS File No: 93-5409
CAS Order No: 19511
Client P.O.: Work Order #89

Lab Number: 931105BLK2 — Date Prepared: 11/05/93

Analysis	Concentration	Units	QC Batch	Book/Page
Total Organic Carbon, Sparged	ND(1)	mg/L	2	1824/36

Conclusion of lab number 931105BLK2

Lab Number: 931111BLK1 — Date Prepared: 11/11/93

Analysis	Concentration	Units	QC Batch	Book/Page
Hardness (Calculated)	ND(5)	mg/L as CaCO3	1	629 /55
Mercury, Total	ND(0.0002)	mg/L	1	1918/24

Conclusion of lab number 931111BLK1

Lab Number: BLK1GC3305

Analysis	Concentration	Units	QC Batch	Book/Page
Drinking Water Volatiles			1GC3305	
1,1,1,2-Tetrachloroethane	ND(0.2)	µg/L		1533/18
1,1,1-Trichloroethane	ND(0.2)	µg/L		1533/18
1,1,2,2-Tetrachloroethane	ND(0.2)	µg/L		1533/18
1,1,2-Trichloroethane	ND(0.2)	µg/L		1533/18
1,1-Dichloroethane	ND(0.2)	µg/L		1533/18
1,1-Dichloroethene	ND(0.2)	µg/L		1533/18
1,1-Dichloropropene	ND(0.2)	µg/L		1533/18
1,2,3-Trichlorobenzene	ND(0.2)	µg/L		1533/18
1,2,3-Trichloropropane	ND(0.2)	µg/L		1533/18
1,2,4-Trichlorobenzene	ND(0.2)	µg/L		1533/18
1,2,4-Trimethylbenzene	ND(0.2)	µg/L		1533/18
1,2-Dibromo-3-Chloropropane	ND(0.2)	µg/L		1533/18
1,2-Dibromoethane	ND(0.2)	µg/L		1533/18
1,2-Dichlorobenzene	ND(0.2)	µg/L		1533/18
1,2-Dichloroethane	ND(0.2)	µg/L		1533/18
1,2-Dichloropropane	ND(0.2)	µg/L		1533/18
1,3,5-Trimethylbenzene	ND(0.2)	µg/L		1533/18
1,3-Dichlorobenzene	ND(0.2)	µg/L		1533/18
1,3-Dichloropropane	ND(0.2)	µg/L		1533/18

-Continued-

C22

Continental Analytical
SERVICES, INC.

QUALITY CONTROL REPORT
METHOD BLANK DATA

Client: US Army Corps of Engineers
Attn: Laura Percifield
420 South 18th Street
Omaha, NE 68102-2586

Date Sample Rptd: 11/15/93
Date Sample Recd: 10/30/93
CAS File No: 93-5409
CAS Order No: 19511
Client P.O.: Work Order #89

Lab Number: BLK1GC3305

Analysis	Concentration	Units	QC Batch	Book/Page
1,3-Dichloropropene(cis)	ND(0.2)	µg/L		1533/18
1,3-Dichloropropene(trans)	ND(0.2)	µg/L		1533/18
1,4-Dichlorobenzene	ND(0.2)	µg/L		1533/18
2,2-Dichloropropane	ND(0.2)	µg/L		1533/18
2-Chlorotoluene	ND(0.2)	µg/L		1533/18
4-Chlorotoluene	ND(0.2)	µg/L		1533/18
Benzene	ND(0.2)	µg/L		1533/18
Bromobenzene	ND(0.2)	µg/L		1533/18
Bromochloromethane	ND(0.2)	µg/L		1533/18
Bromodichloromethane	ND(0.2)	µg/L		1533/18
Bromoform	ND(0.2)	µg/L		1533/18
Bromomethane	ND(0.2)	µg/L		1533/18
Carbon Tetrachloride	ND(0.2)	µg/L		1533/18
Chlorobenzene	ND(0.2)	µg/L		1533/18
Chloroethane	ND(0.2)	µg/L		1533/18
Chloroform	ND(0.2)	µg/L		1533/18
Chloromethane	ND(0.2)	µg/L		1533/18
cis-1,2-Dichloroethene	ND(0.2)	µg/L		1533/18
Dibromochloromethane	ND(0.2)	µg/L		1533/18
Dibromomethane	ND(0.2)	µg/L		1533/18
Dichlorodifluoromethane	ND(0.2)	µg/L		1533/18
Ethylbenzene	ND(0.2)	µg/L		1533/18
Hexachlorobutadiene	ND(0.2)	µg/L		1533/18
Isopropylbenzene	ND(0.2)	µg/L		1533/18
Methylene Chloride	0.3	µg/L		1533/18
n-Butylbenzene	ND(0.2)	µg/L		1533/18
n-Propylbenzene	ND(0.2)	µg/L		1533/18
Naphthalene	ND(0.2)	µg/L		1533/18
Xylene(Total)	ND(0.2)	µg/L		1533/18
P-Isopropyltoluene	ND(0.2)	µg/L		1533/18
sec-Butylbenzene	ND(0.2)	µg/L		1533/18
Styrene	ND(0.2)	µg/L		1533/18
tert-Butylbenzene	ND(0.2)	µg/L		1533/18
Tetrachloroethene	ND(0.2)	µg/L		1533/18
Toluene	ND(0.2)	µg/L		1533/18
trans-1,2-Dichloroethene	ND(0.2)	µg/L		1533/18
Trichloroethene	ND(0.2)	µg/L		1533/18
Trichlorofluoromethane	ND(0.2)	µg/L		1533/18
Vinyl Chloride	ND(0.2)	µg/L		1533/18

Conclusion of lab number BLK1GC3305

-Continued-

C2

Continental Analytical
SERVICES, INC.

QUALITY CONTROL REPORT
METHOD BLANK DATA

Client: US Army Corps of Engineers
Attn: Laura Percifield
420 South 18th Street
Omaha, NE 68102-2586

Date Sample Rptd: 11/15/93
Date Sample Recd: 10/30/93
CAS File No: 93-5409
CAS Order No: 19511
Client P.O.: Work Order #89

Quality control analyses were performed on samples at time of analysis in accordance with procedures published in the Code of Federal Regulations, Part 136, July 1, 1986 or in EPA publication, SW-846, 3rd edition, Nov. 1986.

CONTINENTAL ANALYTICAL SERVICES, INC.

Clifford L. Baker
Laboratory Director

Jacqueline Cairo
Quality Assurance Officer

1804 Glendale Road • Salina, Kansas 67401-6675
913-827-1273 • 800-535-3076 • FAX 913-823-7830

C2

Continental Analytical
SERVICES, INC.

QUALITY CONTROL REPORT
LABORATORY CONTROL SAMPLE / LABORATORY CONTROL SAMPLE DUPLICATE

Client: US Army Corps of Engineers
Attn: Laura Percifield
420 South 18th Street
Omaha, NE 68102-2586

Date Sample Rptd: 11/15/93
Date Sample Recd: 10/30/93
CAS File No: 93-5409
CAS Order No: 19511
Client P.O.: Work Order #89

Lab Number: 931101LCS1

Date Prepared: 11/01/93

Analysis	QC Batch	Spike Level	Units	ACCURACY DATA (% RECOVERY) LCS	LCSD	Avg.	Limits	PRECISION DATA RPD	Limits
Iron, Soluble	1	38	mg/L	93.0	94.0	93.5	80-120	1.1	20
Manganese, Soluble	1	5.0	mg/L	89.0	93.0	91.0	80-120	4.4	20

Conclusion of Lab Number 931101LCS1

Lab Number: 931101LCS3

Date Prepared: 11/01/93

Analysis	QC Batch	Spike Level	Units	ACCURACY DATA (% RECOVERY) LCS	LCSD	Avg.	Limits	PRECISION DATA RPD	Limits
Barium, Total	3	5.0	mg/L	91.0	93.0	92.0	80-120	2.2	20
Cadmium, Total	3	0.50	mg/L	91.0	93.0	92.0	80-120	2.2	20
Calcium, Total	3	50	mg/L	98.0	100	99.0	80-120	2.0	20
Chromium, Total	3	5.0	mg/L	93.0	95.0	94.0	80-120	2.1	20
Copper, Total	3	5.0	mg/L	93.0	94.0	93.5	80-120	1.1	20
Iron, Total	3	38	mg/L	92.0	93.0	92.5	80-120	1.1	20
Magnesium, Total	3	50	mg/L	92.0	92.0	92.0	80-120	0.0	20
Manganese, Total	3	5.0	mg/L	90.0	91.0	90.5	80-120	1.1	20
Potassium, Total	3	50	mg/L	96.0	98.0	97.0	80-120	2.1	20
Silver, Total	3	0.50	mg/L	98.0	94.0	96.0	80-120	4.2	20
Sodium, Total	3	50	mg/L	94.0	96.0	95.0	80-120	2.1	20
Zinc, Total	3	5.0	mg/L	91.0	93.0	92.0	80-120	2.2	20

Conclusion of Lab Number 931101LCS3

Lab Number: 931101LCS4

Date Prepared: 11/01/93

Analysis	QC Batch	Spike Level	Units	ACCURACY DATA (% RECOVERY) LCS	LCSD	Avg.	Limits	PRECISION DATA RPD	Limits
Arsenic, Total	4	0.05	mg/L	99.0	99.0	99.0	80-120	0.0	20
Lead, Total	4	0.05	mg/L	97.0	100	98.5	80-120	3.0	20

-Continued-

C2

Continental Analytical
SERVICES, INC.

QUALITY CONTROL REPORT
LABORATORY CONTROL SAMPLE / LABORATORY CONTROL SAMPLE DUPLICATE

Client: US Army Corps of Engineers
Attn: Laura Percifield
420 South 18th Street
Omaha, NE 68102-2586

Date Sample Rptd: 11/15/93
Date Sample Recd: 10/30/93
CAS File No: 93-5409
CAS Order No: 19511
Client P.O.: Work Order #89

Lab Number: 931101LCS4 Date Prepared: 11/01/93

Analysis	QC Batch	Spike Level	Units	ACCURACY DATA (% RECOVERY) LCS	LCSD	Avg.	Limits	PRECISION DATA RPD	Limits
Selenium, Total	4	0.05	mg/L	101	101	101	80-120	0.0	20

Conclusion of Lab Number 931101LCS4

Lab Number: 931102LCS1 Date Prepared: 11/02/93

Analysis	QC Batch	Spike Level	Units	ACCURACY DATA (% RECOVERY) LCS	LCSD	Avg.	Limits	PRECISION DATA RPD	Limits
Color	1	10	APPAR	100	100	100	#	0.0	#
Phenolic Compounds	1	0.02	mg/L	98.0	94.0	96.0	90-110	4.2	20
Solids, Total Dissolved	1	500	mg/L	108	97.0	103	90-110	11.	20

- Quality control limits are currently unavailable for this analysis.

Conclusion of Lab Number 931102LCS1

Lab Number: 931102LCS3 Date Prepared: 11/02/93

Analysis	QC Batch	Spike Level	Units	ACCURACY DATA (% RECOVERY) LCS	LCSD	Avg.	Limits	PRECISION DATA RPD	Limits
Calcium, Total	3	50	mg/L	96.0	98.0	97.0	80-120	2.1	20
Magnesium, Total	3	50	mg/L	90.0	92.0	91.0	80-120	2.2	20

Conclusion of Lab Number 931102LCS3

Lab Number: 931103LCS1 Date Prepared: 11/03/93

Analysis	QC Batch	Spike Level	Units	ACCURACY DATA (% RECOVERY) LCS	LCSD	Avg.	Limits	PRECISION DATA RPD	Limits
Alkalinity, Total	1	54	mg/L	103	103	103	90-110	0.0	20

-Continued-

C2

QUALITY CONTROL REPORT
LABORATORY CONTROL SAMPLE / LABORATORY CONTROL SAMPLE DUPLICATE

Client: US Army Corps of Engineers
Attn: Laura Percifield
420 South 18th Street
Omaha, NE 68102-2586

Date Sample Rptd: 11/15/93
Date Sample Recd: 10/30/93
CAS File No: 93-5409
CAS Order No: 19511
Client P.O.: Work Order #89

Lab Number: 931103LCS1 Date Prepared: 11/03/93

Analysis	QC Batch	Spike Level	Units	ACCURACY DATA (% RECOVERY) LCS	LCSD	Avg.	Limits	PRECISION DATA RPD	Limits
Sulfide, Total	1	0.40	mg/L	106	106	106	90-110	0.0	20

Conclusion of Lab Number 931103LCS1

Lab Number: 931104LCS1 Date Prepared: 11/04/93

Analysis	QC Batch	Spike Level	Units	ACCURACY DATA (% RECOVERY) LCS	LCSD	Avg.	Limits	PRECISION DATA RPD	Limits
Cyanide, Total	1	0.10	mg/L	92.0	90.0	91.0	90-110	2.2	20

Conclusion of Lab Number 931104LCS1

Lab Number: 931105LCS2 Date Prepared: 11/05/93

Analysis	QC Batch	Spike Level	Units	ACCURACY DATA (% RECOVERY) LCS	LCSD	Avg.	Limits	PRECISION DATA RPD	Limits
Total Organic Carbon, Sp	2	8.6	mg/L	99.0	102	101	90-110	3.0	20

Conclusion of Lab Number 931105LCS2

Lab Number: 931111LCS1 Date Prepared: 11/11/93

Analysis	QC Batch	Spike Level	Units	ACCURACY DATA (% RECOVERY) LCS	LCSD	Avg.	Limits	PRECISION DATA RPD	Limits
Hardness (Calculated)	1	330	mg/L	100	104	102	90-110	3.9	20
Mercury, Total	1	0.01	mg/L	96.0	99.0	97.5	80-120	3.1	20

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Continental Analytical
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QUALITY CONTROL REPORT
LABORATORY CONTROL SAMPLE / LABORATORY CONTROL SAMPLE DUPLICATE

Client: US Army Corps of Engineers
Attn: Laura Percifield
420 South 18th Street
Omaha, NE 68102-2586

Date Sample Rptd: 11/15/93
Date Sample Recd: 10/30/93
CAS File No: 93-5409
CAS Order No: 19511
Client P.O.: Work Order #89

Lab Number: 931111LCS1

Conclusion of Lab Number: 931111LCS1

Lab Number: LCS1GC3305

Analysis	QC Batch	Spike Level	Units	ACCURACY DATA (% RECOVERY) LCS	LCSD	Avg.	Limits	PRECISION DATA RPD	Limits
Drinking Water Volatiles	1GC3305								
Benzene		5.0	µg/L	91.3	94.0	92.7	76-127	2.9	11
Chlorobenzene		5.0	µg/L	89.8	92.1	90.9	75-130	2.5	13
1,1-Dichloroethene		5.0	µg/L	91.6	93.8	92.7	61-145	2.4	14
Toluene		5.0	µg/L	90.3	95.0	92.7	76-125	5.1	13
Trichloroethene		5.0	µg/L	98.1	99.0	98.6	78-126	0.9	24

Conclusion of Lab Number LCS1GC3305

Quality control analyses were performed on samples at time of analysis in accordance with procedures published in the Code of Federal Regulations, Part 136, July 1, 1986 or in EPA publication, SW-846, 3rd edition, Nov. 1986.

CONTINENTAL ANALYTICAL SERVICES, INC.

Clifford J. Baker
Clifford J. Baker
Laboratory Director

Jacqueline Cairo
Jacqueline Cairo
Quality Assurance Officer

C2

Continental Analytical
SERVICES, INC.

QUALITY CONTROL REPORT
SURROGATE DATA

CLIENT: US Army Corps of Engineers
ATTN: Laura Percifield
420 South 18th Street
Omaha, NE 68102-2586

DATE SAMPLE RPTD: 11/15/93
DATE SAMPLE RECD: 10/30/93
CAS FILE NO: 93-5409
CAS ORDER NO: 19511
CLIENT P.O.: Work Order #89

LAB NUMBER: 93101951
SAMPLE DESCRIPTION: 931029-H016

SURROGATE DATA	DATE PREPARED	DATE ANALYZED	Q.C. RESULTS % RECOVERED	ACCEPTABLE % RECOVERY RANGE
4-BFB(GC)	NA	11/01/93	92.0 at 20	86.0 - 115

LAB NUMBER: 93101952
SAMPLE DESCRIPTION: 931029-H017

SURROGATE DATA	DATE PREPARED	DATE ANALYZED	Q.C. RESULTS % RECOVERED	ACCEPTABLE % RECOVERY RANGE
4-BFB(GC)	NA	11/01/93	86.7 at 20	86.0 - 115

ND(), where noted, indicates none detected with the detection limit in parentheses.
% Rec indicates % recovered at the indicated concentration.

Quality control analyses were performed on samples at time of analysis in accordance with procedures published in the Code of Federal Regulations, Part 136, July 1, 1986 or in EPA publication, SW-846, 3rd edition, Nov. 1986.

CONTINENTAL ANALYTICAL SERVICES, INC.

Clifford J. Baker
Laboratory Director

Jacqueline Cairo
Quality Assurance Officer

C2

Continental Analytical
SERVICES, INC.

QUALITY CONTROL REPORT
MATRIX SPIKE / MATRIX SPIKE DUPLICATE

Client: US Army Corps of Engineers
Attn: Laura Percifield
420 South 18th Street
Omaha, NE 68102-2586

Date Sample Rptd: 11/15/93
Date Sample Recd: 10/30/93
CAS File No: 93-5409
CAS Order No: 19511
Client P.O.: Work Order #89

Lab Number: 93101960

Analysis	QC Batch	Spike Level	Units	ACCURACY DATA (% RECOVERY) MS	MSD	Avg.	Limits	PRECISION DATA RPD	Limits
Sulfide, Total	1	0.40	mg/L	108	107	108	49-160	0.9	20

Quality control analyses were performed on samples at time of analysis in accordance with procedures published in the Code of Federal Regulations, Part 136, July 1, 1986 or in EPA publication, SW-846, 3rd edition, Nov. 1986.

CONTINENTAL ANALYTICAL SERVICES, INC.

Clifford L. Baker
Clifford L. Baker
Laboratory Director

Jacqueline Cairo
Jacqueline Cairo
Quality Assurance Officer

1804 Glendale Road • Salina, Kansas 67401-6675
913-827-1273 • 800-535-3076 • FAX 913-823-7830

C3(

Continental Analytical
SERVICES, INC.

QUALITY CONTROL REPORT
MATRIX SPIKE / MATRIX SPIKE DUPLICATE

Client: US Army Corps of Engineers
Attn: Laura Percifield
420 South 18th Street
Omaha, NE 68102-2586

Date Sample Rptd: 11/15/93
Date Sample Recd: 10/30/93
CAS File No: 93-5409
CAS Order No: 19511
Client P.O.: Work Order #89

Lab Number: Matrix Spike Data from Sample Batch(s)

Analysis	QC Batch	Spike Level	Units	ACCURACY DATA (% RECOVERY) MS	MSD	Avg.	Limits	PRECISION DATA RPD	Limits	Date Prepared
Drinking Water Volatiles	1GC3305									NA
Benzene		2.0	µg/L	103	101	102	76-127	2.0	11	
Chlorobenzene		2.0	µg/L	102	102	102	75-130	0.0	13	
1,1-Dichloroethene		2.0	µg/L	124	122	123	61-145	1.6	14	
Toluene		2.0	µg/L	112	111	112	76-125	0.9	13	
Trichloroethene		2.0	µg/L	117	122	120	78-126	4.2	24	
Arsenic, Total	4	0.05	mg/L	86.0	87.0	86.5	75-131	1.2	20	11/01/93
Barium, Total	3	5.0	mg/L	89.0	89.0	89.0	80-120	0.0	20	11/01/93
Calcium, Total	3	50	mg/L	82.0	85.0	83.5	70-133	3.6	20	11/01/93
Chromium, Total	3	5.0	mg/L	91.0	92.0	91.5	80-120	1.1	20	11/01/93
Copper, Total	3	5.0	mg/L	94.0	93.0	93.5	80-120	1.1	20	11/01/93
Iron, Total	3	38	mg/L	91.0	92.0	91.5	80-120	1.1	20	11/01/93
Lead, Total	4	0.05	mg/L	78.0	77.0	77.5	63-129	1.3	20	11/01/93
Magnesium, Total	3	50	mg/L	91.0	90.0	90.5	79-118	1.1	20	11/01/93
Manganese, Total	3	5.0	mg/L	89.0	89.0	89.0	80-120	0.0	20	11/01/93
Mercury, Total	1	0.01	mg/L	84.0	93.0	88.5	55-148	10.	20	11/11/93
Potassium, Total	3	50	mg/L	100	100	100	71-125	0.0	20	11/01/93
Selenium, Total	4	0.05	mg/L	84.0	84.0	84.0	67-124	0.0	20	11/01/93
Silver, Total	3	0.50	mg/L	92.0	94.0	93.0	80-120	2.2	20	11/01/93
Sodium, Total	3	50	mg/L	94.0	94.0	94.0	75-121	0.0	20	11/01/93
Zinc, Total	3	5.0	mg/L	92.0	91.0	91.5	80-120	1.1	20	11/01/93
Cyanide, Total	1	0.10	mg/L	91.0	97.0	94.0	66-134	6.4	23	NA
Calcium, Total	3	50	mg/L	110	112	111	70-133	1.8	20	11/02/93
Magnesium, Total	3	50	mg/L	100	101	101	79-118	1.0	20	11/02/93
Phenolic Compounds	1	0.05	mg/L	93.0	102	97.5	36-150	9.2	33	NA
Total Organic Carbon, Sp	2	5.0	mg/L	82.0	85.0	83.5	59-125	3.6	20	NA
Manganese, Soluble	1	5.0	mg/L	89.0	88.0	88.5	80-120	1.1	20	11/01/93
Iron, Soluble	1	38	mg/L	90.0	89.0	89.5	80-120	1.1	20	11/01/93
Solids, Total Dissolved	1	0.00	mg/L	944 *	928 *	936	#	1.7	#	NA
Cadmium, Total	3	0.50	mg/L	87.0	88.0	87.5	80-120	1.1	20	11/01/93
Sulfide, Total	1	0.40	mg/L	108	107	108	49-160	0.9	20	NA

*Result is a duplicate.

- Quality control limits are currently unavailable for this analysis.

-Continued-

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C3

Continental Analytical
SERVICES, INC.

QUALITY CONTROL REPORT
MATRIX SPIKE / MATRIX SPIKE DUPLICATE

Client: US Army Corps of Engineers
Attn: Laura Percifield
420 South 18th Street
Omaha, NE 68102-2586

Date Sample Rptd: 11/15/93
Date Sample Recd: 10/30/93
CAS File No: 93-5409
CAS Order No: 19511
Client P.O.: Work Order #89

Lab Number: Matrix Spike Data from Sample Batch(s)

Quality control analyses were performed on samples at time of analysis in accordance with procedures published in the Code of Federal Regulations, Part 136, July 1, 1986 or in EPA publication, SW-846, 3rd edition, Nov. 1986.

CONTINENTAL ANALYTICAL SERVICES, INC.

Clifford J. Baker
Laboratory Director

Jacqueline Cairo
Quality Assurance Officer

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913-827-1273 • 800-535-3076 • FAX 913-823-7830

C3

Continental Analytical
SERVICES, INC.

11/12/93

US Army Corps of Engineers
Attn: Laura Percifield
420 South 18th Street
Omaha, NE 68102-2586

Date Received: 10/30/93
CAS File No.: 93-5409
CAS Order No.: 19514
Your P.O./Project No.: Work Order #89

Dear Ms. Percifield:

Enclosed are the laboratory reports for the following samples:

CAS LAB ID #	SAMPLE DESCRIPTION	DATE SAMPLED
93101982	931029-H037	10/28/93
93101983	931029-H038	10/28/93
93101984	931029-H039	10/28/93
93101985	931029-H040	10/28/93
93101986	931029-H041	10/28/93
93101987	931029-H042	10/28/93

The footnotes contained in the attached laboratory reports are summarized below for your reference.

CAS LAB ID #	TEST NAME	SAMPLE CONC.	LAB REPORT FOOTNOTE
93101984	Odor	*	*No apparent odor

Thank you for choosing CAS for this project. If you have any questions, please contact me at 800-535-3076.

CONTINENTAL ANALYTICAL SERVICES, INC.

Gregory J. Groene
Project Manager

1804 Glendale Road • Salina, Kansas 67401-6675
913-827-1273 • 800-535-3076 • FAX 913-823-7830

C3

Continental Analytical
SERVICES, INC.

Client: US Army Corps of Engineers
Attn: Laura Percifield
420 South 18th Street
Omaha, NE 68102-2586

Date Sample Rptd: 11/12/93
Date Sample Recd: 10/30/93
CAS File No: 93-5409
CAS Order No: 19514
Client P.O.: Work Order #89

Lab Number: 93101982
Sample Description: 931029-H037

Date Sampled: 10/28/93
Time Sampled: 1721

Analysis	Concentration	Units	Date Analyzed	Book/Page
Bicarbonate	305.	mg/L as CaCO3	11/12/93	1527/60
Carbonate	ND(2)	mg/L as CaCO3	11/12/93	1527/60
Chloride	64.	mg/L	11/05/93	1584/89
Fluoride	0.3	mg/L	11/02/93	169 /95
Sulfate	69.	mg/L	11/03/93	907 /233
Bromide	0.4	mg/L	11/02/93	1913/5

Analysis	Date Prepared	QC Batch	Analyst	Analytical Method
Bicarbonate	NA	1	HJW	SM 4500-C02D
Carbonate	NA	1	HJW	SM4500-CO2D
Chloride	NA	1	HJW	SM 4500-C1-B
Fluoride	NA	1	BLP	340.2
Sulfate	NA	1	BLP	375.4/9038
Bromide	NA	1	BLP	ASTM D1246

Conclusion of Lab Number: 93101982

Lab Number: 93101983
Sample Description: 931029-H038

Date Sampled: 10/28/93
Time Sampled: 1721

Analysis	Concentration	Units	Date Analyzed	Book/Page
Nitrite, as N	ND(0.1)	mg/L as N	11/08/93	1715/209
Nitrate, as N	0.2	mg/L	11/01/93	1715/190
Orthophosphate, as P	ND(0.1)	mg/L	11/01/93	1530/70

Analysis	Date Prepared	QC Batch	Analyst	Analytical Method
Nitrite, as N	NA	1	HJW	353.2
Nitrate, as N	NA	1	BLP	353.2
Orthophosphate, as P	NA	1	BLP	365.1

Conclusion of Lab Number: 93101983

-Continued-

C3

CONTINENTAL ANALYTICAL SERVICES, INC.

LABORATORY REPORT Page: 4

Client: US Army Corps of Engineers
Lab Number: 93101987

Analysis	Concentration	Units	Date Analyzed	Book/Page
Aldicarb Sulfone	ND(2.0)	µg/L		1848/15
Aldicarb Sulfoxide	ND(2.0)	µg/L		1848/15
Carbaryl	ND(2.0)	µg/L		1848/15
Carbofuran	ND(2.0)	µg/L		1848/15
Methomyl	ND(0.5)	µg/L		1848/15
Oxamyl (Vydate)	ND(20.0)	µg/L		1848/15

Analysis	Date Prepared	QC Batch	Analyst	Analytical Method
Phase II & V Carbamates	NA	1	HSY	EPA 531.1

Conclusion of Lab Number: 93101987

Laboratory analyses were performed on samples utilizing procedures published in Title 40 of the Code of Federal Regulations, Parts 136 or 141, or in EPA Publication, SW-846, 3rd edition, September, 1986. ND(), where noted, indicates none detected with the detection limit in parentheses.

Samples will be retained for thirty days unless otherwise notified.

CONTINENTAL ANALYTICAL SERVICES, INC.

Clifford L. Baker
Laboratory Director

CAS

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Continental Analytical
SERVICES, INC.

11/15/93

US Army Corps of Engineers
Attn: Laura Percifield
420 South 18th Street
Omaha, NE 68102-2586

Re: CAS File Number: 93-5409
CAS Order Number: 19514
CAS Project Manager: Gregory J. Groene

Dear Ms. Percifield:

Enclosed are the following CAS Quality Control Reports for the above referenced order number:

- METHOD BLANK DATA
- LABORATORY CONTROL SAMPLE/LABORATORY CONTROL SAMPLE DUPLICATE
- SURROGATE DATA
- MATRIX SPIKE/MATRIX SPIKE DUPLICATE

A general description of the information contained in the reports is presented below:

METHOD BLANK DATA
A Method Blank is a matrix similar to that of the sample which has been prepared and analyzed by the same method as the sample. The Method Blank is used to assure that the preparation and analysis method has not introduced contamination. The CAS Method Blank Data Report provides the analytical results for all method blanks prepared and analyzed from the same batch as that of the client's samples.

LABORATORY CONTROL SAMPLE/LABORATORY CONTROL SAMPLE DUPLICATE
A Laboratory Control Sample is a matrix similar to that of the sample which has been spiked with known concentrations of analytes and prepared and analyzed by the same method as the sample. The Laboratory Control Sample (LCS) percent recovery is a measure of the accuracy of the preparation and analysis method. The Laboratory Control Sample Duplicate (LCSD) is a duplicate preparation and analysis of the LCS. The LCS and LCSD are used to calculate the relative percent difference, which is a measure of the precision of the preparation and analysis method. The CAS LCS/LCSD Report provides the analytical results for all laboratory control samples prepared and analyzed from the same batch as that of the client's sample.

SURROGATE DATA
A Surrogate is a compound that is similar to the compounds of interest, but is not normally found in environmental samples. Surrogates are added to the sample prior to preparation and analysis. The surrogate percent recovery is a measure of the effectiveness of the preparation and analysis method on the individual sample. The CAS Surrogate Data Report provides the surrogate recoveries for each sample that required organic analysis.

MATRIX SPIKE/MATRIX SPIKE DUPLICATE
A Matrix Spike is an aliquot of a sample spiked with compounds of interest and prepared and analyzed by the same method as the sample. The Matrix Spike (MS) percent recovery is a measure of the effectiveness of the preparation and analysis method on the specific sample matrix. The Matrix Spike Duplicate (MSD) is a duplicate preparation and analysis of the MS. The MS and MSD are used to calculate the relative percent difference, which is a measure of the precision of the preparation and analysis method. The CAS MS/MSD Report provides the analytical results for all matrix spike and matrix spike duplicate analyses performed on samples from the client's order.

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11/15/93
US Army Corps of Engineers
420 South 18th Street
Omaha, NE 68102-2586

ACCURACY AND PRECISION LIMITS
The accuracy and precision limits are method or laboratory determined limits indicating acceptable accuracy or precision for a given matrix. The accuracy limits are expressed with units of percent recovery. The precision limits are expressed with units of relative percent difference (RPD). Accuracy and precision limits are provided on the CAS LCS/LCSD Report, CAS MS/MSD Report and the CAS Surrogate Report.

QUALITY CONTROL BATCH
Each batch of twenty or fewer samples of the same matrix, prepared and analyzed at CAS, is assigned a Quality Control Batch number. The Quality Control Batch number for each sample is provided on the CAS Laboratory Report. With each batch, a Method Blank and two Laboratory Control Samples are also prepared and analyzed. The analytical results for the Method Blank and the Laboratory Control Samples are provided on the CAS Method Blank Data Report and the CAS LCS/LCSD Report, respectively.

DATE PREPARED
The date prepared is the date the sample was extracted or digested in preparation for analysis. If the extraction or digestion is performed as part of the analysis, "NA" is reported for the date prepared. The date prepared for each sample is provided on the CAS Laboratory Report.

DATE ANALYZED
The date analyzed is the date the analysis was performed on the sample. The date analyzed for each sample is provided on the CAS Laboratory Report.

If you have any questions regarding this data, please contact me or your CAS Project Manager at (800) 535-3076.

CONTINENTAL ANALYTICAL SERVICES, INC.

Clifford J. Baker

Clifford J. Baker
Laboratory Director

Enclosures
JAC/si

CAS

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Continental Analytical
SERVICES, INC.

QUALITY CONTROL REPORT
METHOD BLANK DATA

Client: US Army Corps of Engineers
Attn: Laura Percifield
420 South 18th Street
Omaha, NE 68102-2586

Date Sample Rptd: 11/15/93
Date Sample Recd: 10/30/93
CAS File No: 93-5409
CAS Order No: 19514
Client P.O.: Work Order #89

Lab Number: 931101BLK1

Date Prepared: 11/01/93

Analysis	Concentration	Units	QC Batch	Book/Page
Nitrate, as N	ND(0.1)	mg/L	1	1715/190
Orthophosphate, as P	ND(0.1)	mg/L	1	1530/70

Conclusion of lab number 931101BLK1

Lab Number: 931102BLK1

Date Prepared: 11/02/93

Analysis	Concentration	Units	QC Batch	Book/Page
Phase II & V Chlorinated Acids			1	
2,4,5-TP(Silvex)	ND(5.0)	µg/L		1691/96
2,4-D	ND(7.0)	µg/L		1691/96
Dalapon	ND(20.0)	µg/L		1691/96
Dicamba	ND(0.1)	µg/L		1691/96
Dinoseb	ND(0.7)	µg/L		1691/96
Pentachlorophenol	ND(0.1)	µg/L		1691/96
Picloram	ND(50.0)	µg/L		1691/96
Phase II & V Pesticides/PCBS			1	
Aldrin	ND(0.1)	µg/L		1810/39
Chlordane	ND(0.2)	µg/L		1810/39
Dieldrin	ND(0.02)	µg/L		1810/39
Endrin	ND(0.2)	µg/L		1810/39
Heptachlor	ND(0.04)	µg/L		1810/39
Heptachlor Epoxide	ND(0.02)	µg/L		1810/39
Hexachlorobenzene	ND(0.1)	µg/L		1810/39
Hexachlorocyclopentadiene	ND(5.0)	µg/L		1810/39
Lindane	ND(0.02)	µg/L		1810/39
Methoxychlor	ND(4.0)	µg/L		1810/39
Propachlor	ND(0.5)	µg/L		1810/39
Toxaphene	ND(0.6)	µg/L		1810/39
PCB-1016	ND(0.08)	µg/L		1810/39
PCB-1221	ND(20.0)	µg/L		1810/39
PCB-1232	ND(0.5)	µg/L		1810/39
PCB-1242	ND(0.3)	µg/L		1810/39
PCB-1248	ND(0.1)	µg/L		1810/39
PCB-1254	ND(0.1)	µg/L		1810/39
PCB-1260	ND(0.2)	µg/L		1810/39
Fluoride	ND(0.1)	mg/L	1	169 /95

-Continued-

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Continental Analytical
SERVICES, INC.

QUALITY CONTROL REPORT
METHOD BLANK DATA

Client: US Army Corps of Engineers
Attn: Laura Percifield
420 South 18th Street
Omaha, NE 68102-2586

Date Sample Rptd: 11/15/93
Date Sample Recd: 10/30/93
CAS File No: 93-5409
CAS Order No: 19514
Client P.O.: Work Order #89

Lab Number: 931102BLK1 — Date Prepared: 11/02/93

Analysis	Concentration	Units	QC Batch	Book/Page
Bromide	ND(0.1)	mg/L	1	1913/5

Conclusion of lab number 931102BLK1

Lab Number: 931102BLK2 — Date Prepared: 11/02/93

Analysis	Concentration	Units	QC Batch	Book/Page
Phase II & V N-P Pesticides			2	
Alachlor	ND(0.2)	µg/L		1670/59
Atrazine	ND(0.3)	µg/L		1670/59
Butachlor	ND(1.0)	µg/L		1670/59
Metolachlor	ND(1.0)	µg/L		1670/59
Metribuzin	ND(0.2)	µg/L		1670/59
Simazine	ND(0.4)	µg/L		1670/59

Conclusion of lab number 931102BLK2

Lab Number: 931103BLK1 — Date Prepared: 11/03/93

Analysis	Concentration	Units	QC Batch	Book/Page
Sulfate	ND(10)	mg/L	1	907 /233

Conclusion of lab number 931103BLK1

Lab Number: 931105BLK1 — Date Prepared: 11/05/93

Analysis	Concentration	Units	QC Batch	Book/Page
Chloride	ND(2)	mg/L	1	1584/88

Conclusion of lab number 931105BLK1

-Continued-

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Continental Analytical
SERVICES, INC.

QUALITY CONTROL REPORT
METHOD BLANK DATA

Client: US Army Corps of Engineers
Attn: Laura Percifield
420 South 18th Street
Omaha, NE 68102-2586

Date Sample Rptd: 11/15/93
Date Sample Recd: 10/30/93
CAS File No: 93-5409
CAS Order No: 19514
Client P.O.: Work Order #89

Lab Number: 931108BLK1 — Date Prepared: 11/08/93

Analysis	Concentration	Units	QC Batch	Book/Page
Nitrite, as N	ND(0.1)	mg/L	1	1715/209

Conclusion of lab number 931108BLK1

Lab Number: 931110BLK1 — Date Prepared: 11/10/93

Analysis	Concentration	Units	QC Batch	Book/Page
Phase II & V Carbamates			1	
3-Hydroxycarbofuran	ND(2.0)	µg/L		1848/13
Aldicarb	ND(1.0)	µg/L		1848/13
Aldicarb Sulfone	ND(2.0)	µg/L		1848/13
Aldicarb Sulfoxide	ND(2.0)	µg/L		1848/13
Carbaryl	ND(2.0)	µg/L		1848/13
Carbofuran	ND(2.0)	µg/L		1848/13
Methomyl	ND(0.5)	µg/L		1848/13
Oxamyl (Vydate)	ND(20.0)	µg/L		1848/13

Conclusion of lab number 931110BLK1

Lab Number: 931112BLK1 — Date Prepared: 11/12/93

Analysis	Concentration	Units	QC Batch	Book/Page
Bicarbonate	ND(2)	mg/L as CaCO3	1	1527/60
Carbonate	ND(2)	mg/L as CaCO3	1	1527/60

Conclusion of lab number 931112BLK1

Quality control analyses were performed on samples at time of analysis in accordance with procedures published in the Code of Federal Regulations, Part 136, July 1, 1986 or in EPA publication, SW-846, 3rd edition, Nov. 1986.

CONTINENTAL ANALYTICAL SERVICES, INC.

Clifford J. Baker
Laboratory Director

Jacqueline Cairo
Quality Assurance Officer

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Continental Analytical
SERVICES, INC.

QUALITY CONTROL REPORT
LABORATORY CONTROL SAMPLE / LABORATORY CONTROL SAMPLE DUPLICATE

Client: US Army Corps of Engineers
Attn: Laura Percifield
420 South 18th Street
Omaha, NE 68102-2586

Date Sample Rptd: 11/15/93
Date Sample Recd: 10/30/93
CAS File No: 93-5409
CAS Order No: 19514
Client P.O.: Work Order #89

Lab Number: 931101LCS1

Date Prepared: 11/01/93

Analysis	QC Batch	Spike Level	Units	ACCURACY DATA (% RECOVERY) LCS	LCSD	Avg.	Limits	PRECISION DATA RPD	Limits
Nitrate, as N	1	2.0	mg/L	100	95.0	97.5	90-110	5.1	20
Orthophosphate, as P	1	1.0	mg/L	100	100	100	90-110	0.0	20

Conclusion of Lab Number 931101LCS1

Lab Number: 931102LCS1

Date Prepared: 11/02/93

Analysis	QC Batch	Spike Level	Units	ACCURACY DATA (% RECOVERY) LCS	LCSD	Avg.	Limits	PRECISION DATA RPD	Limits
Bromide	1	1.0	mg/L	91.0	92.0	91.5	90-110	1.1	20
Fluoride	1	1.0	mg/L	103	105	104	90-110	1.9	20
Phase II & V Chlorinated	1								
2,4,5-TP(Silvex)		0.50	µg/L	31 N.	15 N.	23.0	40-135	70.N	25
Pentachlorophenol		0.10	µg/L	71.0	65.0	68.0	#	8.8	#
Dinoseb		0.50	µg/L	71.0	57.0	64.0	#	22.	#
Picloram		0.50	µg/L	10.0	15.0	12.5	#	40.	#
Phase II & V Pesticides/	1								
Heptachlor		0.05	µg/L	57.0	56.0	56.5	40-131	1.8	20
Aldrin		0.10	µg/L	91.0	86.0	88.5	40-120	5.6	22
Dieldrin		0.10	µg/L	96.0	87.0	91.5	52-126	9.8	18
Endrin		0.10	µg/L	107	87.0	97.0	56-121	21.	21

N-Data exceeds precision control limits. Data meets accuracy control limits. All other associated quality control is within the quality control limits.

- Quality control limits are currently unavailable for this analysis.

Conclusion of Lab Number 931102LCS1

Lab Number: 931102LCS2

Date Prepared: 11/02/93

Analysis	QC Batch	Spike Level	Units	ACCURACY DATA (% RECOVERY) LCS	LCSD	Avg.	Limits	PRECISION DATA RPD	Limits
Phase II & V N-P Pestici	2								
Alachlor		2.0	µg/L	84.0	75.0	79.5	43-162	11.	57

-Continued-

Continental Analytical
SERVICES, INC.

QUALITY CONTROL REPORT
LABORATORY CONTROL SAMPLE / LABORATORY CONTROL SAMPLE DUPLICATE

Client: US Army Corps of Engineers
Attn: Laura Percifield
420 South 18th Street
Omaha, NE 68102-2586

Date Sample Rptd: 11/15/93
Date Sample Recd: 10/30/93
CAS File No: 93-5409
CAS Order No: 19514
Client P.O.: Work Order #89

Lab Number: 931102LCS2

Date Prepared: 11/02/93

Analysis	QC Batch	Spike Level	Units	ACCURACY DATA (% RECOVERY) LCS	LCSD	Avg.	Limits	PRECISION DATA RPD	Limits
Atrazine		1.0	µg/L	75.0	69.0	72.0	36-156	8.3	47
Butachlor		5.0	µg/L	88.0	79.0	83.5	#	11.	#
Metolachlor		2.0	µg/L	83.0	71.0	77.0	#	16.	#
Metribuzin		1.0	µg/L	75.0	63.0	69.0	#	17.	#
Simazine		1.0	µg/L	62.0	59.0	60.5	#	5.0	#

- Quality control limits are currently unavailable for this analysis.

Conclusion of Lab Number 931102LCS2

Lab Number: 931103LCS1

Date Prepared: 11/03/93

Analysis	QC Batch	Spike Level	Units	ACCURACY DATA (% RECOVERY) LCS	LCSD	Avg.	Limits	PRECISION DATA RPD	Limits
Sulfate	1	200	mg/L	105	93.0	99.0	90-110	12.	20

Conclusion of Lab Number 931103LCS1

Lab Number: 931105LCS1

Date Prepared: 11/05/93

Analysis	QC Batch	Spike Level	Units	ACCURACY DATA (% RECOVERY) LCS	LCSD	Avg.	Limits	PRECISION DATA RPD	Limits
Chloride	1	40	mg/L	108	109	109	90-110	0.9	20

Conclusion of Lab Number 931105LCS1

Lab Number: 931108LCS1

Date Prepared: 11/08/93

-Continued-

Continental Analytical
SERVICES, INC.

QUALITY CONTROL REPORT
LABORATORY CONTROL SAMPLE / LABORATORY CONTROL SAMPLE DUPLICATE

Client: US Army Corps of Engineers
Attn: Laura Percifield
420 South 18th Street
Omaha, NE 68102-2586

Date Sample Rptd: 11/15/93
Date Sample Recd: 10/30/93
CAS File No: 93-5409
CAS Order No: 19514
Client P.O.: Work Order #89

Lab Number: 931108LCS1

Date Prepared: 11/08/93

Analysis	QC Batch	Spike Level	Units	ACCURACY DATA (% RECOVERY) LCS	LCSD	Avg.	Limits	PRECISION DATA RPD	Limits
Nitrite, as N	1	10	mg/L	110	110	110	90-110	0.0	20

Conclusion of Lab Number 931108LCS1

Lab Number: 931110LCS1

Date Prepared: 11/10/93

Analysis	QC Batch	Spike Level	Units	ACCURACY DATA (% RECOVERY) LCS	LCSD	Avg.	Limits	PRECISION DATA RPD	Limits
Phase II & V Carbamates	1								
Aldicarb		10	µg/L	98.7	103	101	#	4.3	#
Aldicarb Sulfone		10	µg/L	98.2	101	99.6	#	2.8	#
Aldicarb Sulfoxide		10	µg/L	98.2	101	99.6	#	2.8	#
Carbofuran		10	µg/L	100	102	101	#	2.0	#
Oxamyl (Vydate)		10	µg/L	98.8	104	101	#	5.1	#
Carbaryl		10	µg/L	96.8	84.5	90.7	#	14.	#
3-Hydroxycarbofuran		10	µg/L	99.7	103	101	#	3.3	#
Methomyl		10	µg/L	99.3	102	101	#	2.7	#

- Quality control limits are currently unavailable for this analysis.

Conclusion of Lab Number 931110LCS1

Quality control analyses were performed on samples at time of analysis in accordance with procedures published in the Code of Federal Regulations, Part 136, July 1, 1986 or in EPA publication, SW-846, 3rd edition, Nov. 1986.

CONTINENTAL ANALYTICAL SERVICES, INC.

Clifford J. Baker
Laboratory Director

Jacqueline Cairo
Quality Assurance Officer

C4

Continental Analytical
SERVICES, INC.

QUALITY CONTROL REPORT
SURROGATE DATA

CLIENT: US Army Corps of Engineers
ATTN: Laura Percifield
420 South 18th Street
Omaha, NE 68102-2586

DATE SAMPLE RPTD: 11/15/93
DATE SAMPLE RECD: 10/30/93
CAS FILE NO: 93-5409
CAS ORDER NO: 19514
CLIENT P.O.: Work Order #89

LAB NUMBER: 93101985
SAMPLE DESCRIPTION: 931029-H040

SURROGATE DATA	DATE PREPARED	DATE ANALYZED	Q.C. RESULTS % RECOVERED	ACCEPTABLE % RECOVERY RANGE
1,3-Dimethyl-2-Nitrobenz	11/02/93	11/04/93	47.0 at 13	21.4 - 125
4,4-Dichlorobiphenyl	11/02/93	11/10/93	85.0 at 0.25	45.7 - 150

LAB NUMBER: 93101986
SAMPLE DESCRIPTION: 931029-H041

SURROGATE DATA	DATE PREPARED	DATE ANALYZED	Q.C. RESULTS % RECOVERED	ACCEPTABLE % RECOVERY RANGE
2,4-Dichlorophenylacetic	11/02/93	11/09/93	136 at 5.0	36.2 - 177

LAB NUMBER: 93101987
SAMPLE DESCRIPTION: 931029-H042

SURROGATE DATA	DATE PREPARED	DATE ANALYZED	Q.C. RESULTS % RECOVERED	ACCEPTABLE % RECOVERY RANGE
BDMC	NA	11/10/93	72.8 at 10	41.0 - 127

ND(), where noted, indicates none detected with the detection limit in parentheses.
% Rec indicates % recovered at the indicated concentration.

Quality control analyses were performed on samples at time of analysis in accordance with procedures published in the Code of Federal Regulations, Part 136, July 1, 1986 or in EPA publication, SW-846, 3rd edition, Nov. 1986.

CONTINENTAL ANALYTICAL SERVICES, INC.

Clifford J. Baker
Laboratory Director

Jacqueline Cairo
Quality Assurance Officer

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C46

Continental Analytical
SERVICES, INC.

QUALITY CONTROL REPORT
MATRIX SPIKE / MATRIX SPIKE DUPLICATE

Client: US Army Corps of Engineers
Attn: Laura Percifield
420 South 18th Street
Omaha, NE 68102-2586

Date Sample Rptd: 11/15/93
Date Sample Recd: 10/30/93
CAS File No: 93-5409
CAS Order No: 19514
Client P.O.: Work Order #89

Lab Number: 93101982

Analysis	QC Batch	Spike Level	Units	ACCURACY DATA (% RECOVERY) MS	MSD	Avg.	Limits	PRECISION DATA RPD	Limits
Sulfate	1	50	mg/L	102	106	104	52-158	3.8	20
Bromide	1	1.0	mg/L	73.0	67.0	70.0	#	8.6	#

- Quality control limits are currently unavailable for this analysis.

Conclusion of Lab Number 93101982

Lab Number: 93101983

Analysis	QC Batch	Spike Level	Units	ACCURACY DATA (% RECOVERY) MS	MSD	Avg.	Limits	PRECISION DATA RPD	Limits
Nitrate, as N	1	1.0	mg/L	100	100	100	69-128	0.0	20

Conclusion of Lab Number 93101983

Lab Number: 93101987

Analysis	QC Batch	Spike Level	Units	ACCURACY DATA (% RECOVERY) MS	MSD	Avg.	Limits	PRECISION DATA RPD	Limits
Phase II & V Carbamates	1								
3-Hydroxycarbofuran		10	µg/L	106	113	110	#	6.4	#
Aldicarb		10	µg/L	107	110	109	#	2.8	#
Aldicarb Sulfone		10	µg/L	112	112	112	#	0.0	#
Aldicarb Sulfoxide		10	µg/L	112	112	112	#	0.0	#
Carbaryl		10	µg/L	112	96.1	104	#	15.	#
Carbofuran		10	µg/L	103	108	106	#	4.7	#
Methomyl		10	µg/L	111	113	112	#	1.8	#
Oxamyl (Vydate)		10	µg/L	103	114	109	#	10.	#

- Quality control limits are currently unavailable for this analysis.

-Continued-

C4

Continental Analytical
SERVICES, INC.

QUALITY CONTROL REPORT
MATRIX SPIKE / MATRIX SPIKE DUPLICATE

Client: US Army Corps of Engineers
Attn: Laura Percifield
420 South 18th Street
Omaha, NE 68102-2586

Date Sample Rptd: 11/15/93
Date Sample Recd: 10/30/93
CAS File No: 93-5409
CAS Order No: 19514
Client P.O.: Work Order #89

Lab Number:

Quality control analyses were performed on samples at time of analysis in accordance with procedures published in the Code of Federal Regulations, Part 136, July 1, 1986 or in EPA publication, SW-846, 3rd edition, Nov. 1986.

CONTINENTAL ANALYTICAL SERVICES, INC.

Clifford J. Baker
Laboratory Director

Jacqueline Cairo
Quality Assurance Officer

1804 Glendale Road • Salina, Kansas 67401-6675
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C4

Continental Analytical
SERVICES, INC.

QUALITY CONTROL REPORT
MATRIX SPIKE / MATRIX SPIKE DUPLICATE

Client: US Army Corps of Engineers
Attn: Laura Percifield
420 South 18th Street
Omaha, NE 68102-2586

Date Sample Rptd: 11/15/93
Date Sample Recd: 10/30/93
CAS File No: 93-5409
CAS Order No: 19514
Client P.O.: Work Order #89

Lab Number: Matrix Spike Data from Sample Batch(s)

Analysis	QC Batch	Spike Level	Units	ACCURACY DATA (% RECOVERY) MS	MSD	Avg.	Limits	PRECISION DATA RPD	Limits	Date Prepared
Fluoride	1	0.40	mg/L	99.0	94.0	96.5	79-121	5.2	20	NA
Chloride	1	40	mg/L	104	101	103	72-130	2.9	20	NA
Bromide	1	1.0	mg/L	73.0	67.0	70.0	#	8.6	#	NA
Sulfate	1	50	mg/L	102	106	104	52-158	3.8	20	NA
Nitrate, as N	1	1.0	mg/L	100	100	100	69-128	0.0	20	NA
Orthophosphate, as P	1	0.50	mg/L	100	100	100	65-141	0.0	20	NA
Phase II & V Carbamates	1									/ /
Aldicarb		10	µg/L	107	110	109	#	2.8	#	
Aldicarb Sulfone		10	µg/L	112	112	112	#	0.0	#	
Aldicarb Sulfoxide		10	µg/L	112	112	112	#	0.0	#	
Carbofuran		10	µg/L	103	108	106	#	4.7	#	
Oxamyl (Vydate)		10	µg/L	103	114	109	#	10.	#	
Carbaryl		10	µg/L	112	96.1	104	#	15.	#	
3-Hydroxycarbofuran		10	µg/L	106	113	110	#	6.4	#	
Methomyl		10	µg/L	111	113	112	#	1.8	#	
Nitrite, as N	1	1.0	mg/L	100	100	100	85-131	0.0	20	NA

MS/MSD data is unavailable for Phase II & V N-P Pesticides for QC Batch 2 of 11/02/93 due to insufficient sample volume.

MS/MSD data is unavailable for Phase II & V Pesticides/PCB and Chlorinated Acids for QC Batch 1 of 11/02/93 due to insufficient sample volume.

- Quality control limits are currently unavailable for this analysis.

Quality control analyses were performed on samples at time of analysis in accordance with procedures published in the Code of Federal Regulations, Part 136, July 1, 1986 or in EPA publication, SW-846, 3rd edition, Nov. 1986.

CONTINENTAL ANALYTICAL SERVICES, INC.

Clifford J. Baker
Laboratory Director

Jacqueline Cairo
Quality Assurance Officer

1804 Glendale Road • Salina, Kansas 67401-6675
913-827-1273 • 800-535-3076 • FAX 913-823-7830

Midwest Laboratories, Inc.
13611 "B" Street • Omaha, Nebraska 68144-3693 • (402) 334-7770 • FAX (402) 334-9121

REPORT NUMBER 3-307-1595

Date: 11/3/93 M5

SUBJECT: Report of Analysis

Corps of Engineers #7140
MRD Lab Order #DACW4593A0041
420 South 18th Street
Omaha NE 68102-2501

Project Name: United Scrap Lead
Location: Troy OH
Customer: Omaha
Project Number: 2313
Project Type: SUPERFUND
Work Order Number: 34
Date Received: 10-29-93

Laboratory Number	Sample Identification	Analysis	Level Found	Detection Limit	Method
87254	28 Oct 93 1717 Grab 931029-H018	Total Coliform	TNTC/Negative	1 CFU/100 ml	SM 922B
		Aerobic Plate Count	105 CFU/1 ml	1 CFU/1 ml	SM 9215B
		Iron Bacateria	Not Detected	---	SM 9240B

Date Tested: 10-29-93 16:30
#1) Holding/Transit time between sampling and analysis cannot exceed 48 hours. *If this time has been exceeded, the results are invalid.*

#3) TNTC: Too numerous to count is defined as greater than 200 bacterial colonies (non-coliform) per 100 ml of sample. At this time the sanitary significance of non-coliform bacteria present in a sample has not been defined. However, due to the excessive numbers of bacteria present, it cannot be determined if the sample meets the bacteriological standard for purity (less than 1 coliform per 100 ml).

#7) A new sample should be resubmitted indicating that the sample is to be retested so that different measures can be taken to determine an accurate count. *

**Note: There will be a charge for the coliform test performed on the resubmitted sample.*

Respectfully submitted,

Heather Ramig

Lisa Dworak/Heather Ramig
Client Services

The above analytical results apply only to the sample(s) submitted.

MRD Lab Project No. 2777

DEPARTMENT OF THE ARMY
MISSOURI RIVER DIVISION, CORPS OF ENGINEERS
DIVISION LABORATORY
OMAHA, NEBRASKA 68102

09 AUG 1994

Subject: Certificate of Analysis

Project: United Scrap Lead, Troy, OH
Intended Use: Superfund RA
Source of Material:

Submitted by: Steve Ott, CEMRO-ED-EB
Date Sampled: 18 Jul 94 , **Date Received:** 19 Jul 94
Method of Test or Specification: See attached test result sheets.

References: Omaha District Request No. ENE 4456 dated 18 Jul 94

-- REMARKS --

1. The samples arrived in good condition.

2. Enclosed are the following:

   Part A: Sample Receipt Information (1 page)
   Part B: Chain-of-Custody Information (2 pages)
   Part C: Analytical Test Results (7 pages)

Submitted by:

Douglas B. Taggart

DOUGLAS B. TAGGART
Director, MRD Laboratory

LP 8-9-94
Percifield/glm/444-4313

TEST RESULTS

1. DISCUSSION

   a. Three water samples were received by MRD Laboratory on 19-Jul-94. The samples were analyzed for lead by EPA method 7421.

      The method is from SW-846 (1986), "Test Methods for Evaluation of Solid Waste."

      Part "A" of this report lists all of the samples received.

   b. The samples arrived in good condition.

      Part "B" of this report contains the chain-of-custody information.

   c. The samples were analyzed by MRD Laboratory.

      Part "C" of this report lists the analytical test results.

2. DATA SUMMARY

   See the attached data report sheets.

3. METHOD QUALITY CONTROL FOR LEAD

   a. The method blank was free of contamination.
   b. Laboratory duplicate results matched the results from the original field sample.
   c. Matrix spike/matrix spike duplicate recoveries and associated relative percent differences were within acceptable limits.
   d. Laboratory check sample recoveries were within acceptable limits.
   e. Holding times were met for all samples.

4. QUALITY ASSURANCE/ANALYTICAL RESULT DATA COMPARISON

   No quality assurance samples associated with this project.

PART A

SAMPLE RECEIPT INFORMATION

Sample Number	Customer Sample ID	Date Sampled	Matrix	MRD Lab # Assigned	Tests Assigned	QA Test Results Page Number
001	AIM-RW-001	18 Jul 94	Water	940719-037	Lead	C1
002	USL-RW-001	18 Jul 94	Water	940719-038	Lead	C2
003	USL-RW-002	18 Jul 94	Water	940719-039	Lead	C3

PART B

CHAIN-OF-CUSTODY INFORMATION

Page No.	Chain-of-Custody No.	Date Signed
B1	3283	18 Jul 94

U.S. ARMY CORPS OF ENGINEERS

Q

CHAIN OF CUSTODY RECORD

PROJ. NO.	PROJECT NAME
LIMS 2777	UNITED SCRAP LEAD/ARCANUM IRON & METAL

SAMPLERS: (Signature) R. Dudowski

STA. NO.	DATE 1994	TIME	COMP.	GRAB	STATION LOCATION	NO. OF CONTAINERS	LEAD	REMARKS
HANSBERGER	7/18	1519		X	AIM-RW-001	1	X	1 LITER POLY; 1:1 HNO_3 pH<2; ICED TO 4°C
BURTON/MAUPIN	7/18	1622		X	USL-RW-001	1	X	1 LITER POLY; 1:1 HNO_3 pH<2; ICED TO 4°C
ISHMAEL	7/18	1656		X	USL-RW-002	1	X	1 LITER POLY; 1:1 HNO_3 pH<2; ICED TO 4°C

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
R. Dudowski	7/18/94 1730				
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks	
		Susan Sinagusa	7/19/94 0900		

Distribution: Original Accompanies Shipment; Copy to Coordinator Field I...

2000

COOLER RECEIPT FORM

LIMS# 3777 MRD Cooler # 2? - Number of Coolers 1 Contractor Cooler N/A

PROJECT: United Scrap Metal/Aluminum Iron Metal Date received: 7 18 94

USE OTHER SIDE OF THIS FORM TO NOTE DETAILS CONCERNING CHECK-IN PROBLEMS.

A. PRELIMINARY EXAMINATION PHASE: Date cooler opened: 7/18/94 C-of-C Number: 283

by (print) Susan S. Sraguso (sign) Susan Sraguso

1. Did cooler come with a shipping slip (air bill, etc.)? ..... (YES) NO

If YES, enter carrier name & air bill number here: FedX 589 648 191

2. Were custody seals on outside of cooler? ..... (YES) NO

How many & where: 2 - front side, seal date: 7.18.94, seal name: R. Giabonoli

3. Were custody seals unbroken and intact at the date and time of arrival? ..... (YES) NO

4. Did you screen samples for radioactivity using the Geiger Counter..... (YES) NO

5. Were custody papers sealed in a plastic bag & taped inside to the lid? ..... (YES) NO

6. Were custody papers filled out properly (ink, signed, etc.)? ..... (YES) NO

7. Did you sign custody papers in the appropriate place? ..... (YES) NO

8. Was project identifiable from custody papers? If YES, enter project name at the top of this form. (YES) NO

9. If required, was enough ice used? ..... Type of ice: regular ..... 2.5°C ..... (YES) NO

10. Have designated person initial here to acknowledge receipt of cooler: RP (date) 7/20/94

B. LOG-IN PHASE: Date samples were logged-in: 19 July 94

by (print) Conrad L. German (sign) Conrad L. German

11. Describe type of packing in cooler: peanuts

12. Were all bottles sealed in separate plastic bags? ..... (YES) NO

13. Did all bottles arrive unbroken & were labels in good condition? ..... (YES) NO

14. Were all bottle labels complete (ID, date, time, signature, preservative, etc.)? ..... (YES) NO

15. Did all bottle labels agree with custody papers? ..... (YES) NO

16. Were correct containers used for the tests indicated? ..... (YES) NO

17. Were correct preservatives added to samples? ..... (YES) NO

18. Was a sufficient amount of sample sent for tests indicated? ..... (YES) NO

19. Were bubbles absent in Volatile samples? If NO, list by QA#: N/A ~~YES~~ ~~NO~~

20. Was the project manager called and status discussed? If YES, give details on the back of this form. YES NO

21. Who was called ? _____ By whom ? _____ (date)_____

PART C

ANALYTICAL TEST RESULTS

C1

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Perkin Elmer AAGF Metals

FAMIS Number: 2777
Project Name: United Scrap Lead

Sample Description: Water
MRD Lab Sample No.: 940719-H037
Client Sample No.: AIM-RW-001
Analyst: A. Hindemith

Date Sample Taken: 18 Jul 94
Date Sample Received: 19 Jul 94
Date Digested: 29 Jul 94
Batch: 9408040939

RESULTS (µg/L)

Analyte		EPA Method	Result	Detection Limit	Date Analyzed
Lead	(Pb)	7421	u	2	04 Aug 94

u: Below Detection Limit

Laboratory Comments:

Approved By: Prem N. Arora AMH Date: 8-6-94

C6

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Perkin Elmer AAGF Metals

FAMIS Number: 2777
Project Name: United Scrap Lead

Sample Description: Water
MRD Lab Sample No.: 940719-H038
Client Sample No.: USL-RW-001
Analyst: A. Hindemith

Date Sample Taken: 18 Jul 94
Date Sample Received: 19 Jul 94
Date Digested: 29 Jul 94
Batch: 9408040939

RESULTS (µg/L)

Analyte		EPA Method	Result	Detection Limit	Date Analyzed
Lead	(Pb)	7421	u	2	04 Aug 94

u: Below Detection Limit

ratory Comments:

pproved By: Prem N. Arora (Amt) Date: 8-6-94

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Perkin Elmer AAGF Metals

FAMIS Number: 2777
Project Name: United Scrap Lead

Sample Description: Water
MRD Lab Sample No.: 940719-H039
Client Sample No.: USL-RW-002
Analyst: A. Hindemith

Date Sample Taken: 18 Jul 94
Date Sample Received: 19 Jul 94
Date Digested: 29 Jul 94
Batch: 9408040939

RESULTS (µg/L)

Analyte		EPA Method	Result	Detection Limit	Date Analyzed
Lead	(Pb)	7421	u	2	04 Aug 94

u: Below Detection Limit

Laboratory Comments:

Approved By: Prem N. Arora AMH Date: 8.6.94

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Perkin Elmer AAGF Metals

FAMIS Number: 2777
Project Name: United Scrap Lead
QC Identifier: Method Blank

Sample Description: Water **Batch:** 9408040939
Analyst: A. Hindemith

RESULTS (µg/L)

Analyte	EPA Method	Result	Detection Limit	Date Analyzed
Lead (Pb)	7421	u	2	04 Aug 94

u: Below Detection Limit

Laboratory Comments:

Approved By: Prem N. Arora AMH Date: 8.6.94

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Perkin Elmer AAGF Metals

FAMIS Number: 2777
Project Name: United Scrap Lead
QC Identifier: Laboratory Matrix Duplicate

Sample Description: Water
MRD Lab Sample No.: 940719-H038
Client Sample No.: USL-RW-001
Analyst: A. Hindemith

Date Sample Taken: 18 Jul 94
Date Sample Received: 19 Jul 94
Date Digested: 29 Jul 94
Batch: 9408040939

RESULTS (µg/L)

Analyte	EPA Method	Sample Result	Duplicate Result	RPD	Detection Limit	Date Analyzed
Pb	7421	u	u	NC	2	04 Aug 94

u: Below Detection Limit
NC: Not Calculable
Control Limits: ± 20 (for >5X CRDL)

atory Comments:

Approved By: Prem N. Arora AMH Date: 8-6-94

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Perkin Elmer AAGF Metals

FAMIS Number: 2777
Project Name: United Scrap Lead
QC Identifier: Matrix Spike, Matrix Spike Duplicate

Sample Description: Water
MRD Lab Sample No.: 940719-H038
Client Sample No.: USL-RW-001
Analyst: A. Hindemith

Date Sample Taken: 18 Jul 94
Date Sample Received: 19 Jul 94
Date Digested: 29 Jul 94
Batch: 9408040939

RESULTS (µg/L)

Analyte	Sample Result	Spike Added	Conc MS	%Rec MS	Conc MSD	%Rec MSD	RPD
Pb	u	20	20	100	20	100	0.0

u: Below Detection Limit
%Rec: Percent of the spike recovered from the matrix
Control Limits: 75-125 (if [spike added] > [sample]/4)

Analyte	EPA Method	Detection Limit	Analysis Date MS	Analysis Date MSD
Lead (Pb)	7421	2	04 Aug 94	04 Aug 94

Laboratory Comments:

Approved By: Prem N. Arora Date: 8.6.94
Asst

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Perkin Elmer AAGF Metals

FAMIS Number: 2777
Project Name: United Scrap Lead
QC Identifier: Laboratory Control Sample (LCS)

Sample Description: Water
LCS Source: VHG Labs, Inc. **MRD Lab Code:** PEGF3
Lot Number: 400723D 400723E **Expiration Date:** 30 Apr 95
Analyst: A. Hindemith **Batch:** 9408040939

RESULTS (µg/L)

Analyte	EPA Method	True Value	Result	%Rec	Detection Limit	Date Analyzed
Pb	7421	20	19	95	2	04 Aug 94

Laboratory Comments:

ed By: Prem.N.Arora Date: 8.6.94
PNA

MRD Lab Project No. 3057

DEPARTMENT OF THE ARMY
MISSOURI RIVER DIVISION, CORPS OF ENGINEERS
DIVISION LABORATORY
OMAHA, NEBRASKA 68102

Subject: Certificate of Analysis

Project: United Scrap Lead - Long Term Monitoring, Troy, OH
Intended Use: Superfund
Source of Material:

Submitted by: Jeff Hubbard, CEMRO-ED-ER
Date Sampled: 22 Nov 94 , **Date Received:** 25 Nov 94
Method of Test or Specification: See attached test result sheets.

References: Omaha District Request No. ENE 5704 dated 20 Dec 94

-- REMARKS --

1. Three (3) water samples were received at MRD Laboratory for lead analysis.

2. Detailed results can be found in the attached pages of narrative and in the following appendices:

   Part A: Sample Receipt Information (1 page)
   Part B: Chain-of-Custody Information (2 pages)
   Part C: Quality Control Test Results (11 pages)

Submitted by:

Douglas B. Taggart

DOUGLAS B. TAGGART
Director, MRD Laboratory

SM for LP 12-23-94
Percifield/glm/444-4313

TEST RESULTS

1. DISCUSSION

   a. Three water samples were received by MRD Laboratory on 22 Nov 94. The samples were analyzed for lead by EPA method 6010.

      The method is from SW-846 (1986), "Test Methods for Evaluation of Solid Waste."

      Part "A" of this report lists all of the samples received.

   b. The samples arrived in good condition with proper documentation.

      Part "B" of this report contains the chain-of-custody information.

   c. The samples were analyzed by MRD Laboratory.

      Part "C" of this report lists the analytical test results.

2. DATA SUMMARY

   See the attached data report sheets.

3. METHOD QUALITY CONTROL FOR LEAD

   a. The method blank was free of contamination.
   b. Laboratory duplicate results matched the results from the original field sample.
   c. Matrix spike/matrix spike duplicate recoveries and associated relative percent differences were within acceptable limits.
   d. Laboratory check sample recoveries were within acceptable limits.
   e. Holding times were met for all samples.

4. QUALITY ASSURANCE/ANALYTICAL RESULT DATA COMPARISON

   No quality assurance samples associated with this project.

PART A

SAMPLE RECEIPT INFORMATION

Sample Number	Customer Sample #	Date Sampled	Matrix	MRD Lab # Assigned	Tests Assigned	Test Results Page Number
001	AIM-RW-001	22 Nov 94	Water	941128-009	Lead	C1
002	USL-RW-002	22 Nov 94	Water	941128-010	Lead	C6
003	USL-RW-001	22 Nov 94	Water	941128-011	Lead	C7

PART B

CHAIN-OF-CUSTODY INFORMATION

Page No.	Chain-of-Custody No.	Date Signed
B1	4023	22 Nov 94

U.S. ARMY CORPS OF ENGINEERS

CHAIN OF CUSTODY RECORD

PROJ. NO.	PROJECT NAME
Lims 3057	U.N.ED SCRAP LEAD/ARCANUM IRON & METAL

SAMPLERS: *(Signature)* R. Gralowski

STA. NO.	DATE 1994	TIME	COMP.	GRAB	STATION LOCATION	NO. OF CONTAINERS	LEAD	REMARKS
HAMBERGER	11/22	1320		X	AIM-RW-001	1	X	1 LITER Poly; 1:1 HNO_3 pH<2; ICE TO 4°C
ISHMAEL	11/22	1510		X	USL-RW-002	1	X	1 LITER Poly; 1:1 HNO_3 pH<2; ICE TO 4°C
RAMON MARTIN	11/22	1541		X	USL-RW-001	1	X	1 LITER POLY; 1:1 HNO_3 pH<2; ICE TO 4°C

Relinquished by: *(Signature)*	Date / Time	Received by: *(Signature)*	Relinquished by: *(Signature)*	Date / Time	Received by: *(Signature)*
R. Gralowski	11/22/94 1630				
Relinquished by: *(Signature)*	Date / Time	Received by: *(Signature)*	Relinquished by: *(Signature)*	Date / Time	Received by: *(Signature)*
Relinquished by: *(Signature)*	Date / Time	Received for Laboratory by: *(Signature)* David E. Splichal	Date / Time 11/25/94 0903	Remarks	

Distribution: Original Accompanies Shipment;) to Coordinator Fiel)

B

COOLER RECEIPT FORM

LIMS# 3057 MRD Cooler # 451 Number of Coolers 1 Contractor Cooler ~~451~~ N/A

PROJECT: United Scrap Lead Date received: 11/25/94

USE OTHER SIDE OF THIS FORM TO NOTE DETAILS CONCERNING CHECK-IN PROBLEMS.

A. PRELIMINARY EXAMINATION PHASE: Date cooler opened: 11/25/94 C-of-C Number: 4023

by (print) David Splichal (sign) David E. Splichal

1. Did cooler come with a shipping slip (air bill, etc.)? Sent Tuesday 11/22, Rec'd Friday 11/25 (YES) NO

If YES, enter carrier name & air bill number here: Fed X 819 3585006

2. Were custody seals on outside of cooler? ..... (YES) NO

How many & where: 2 → Front + Back seal date: 11/22/94 seal name R. Grabowski

3. Were custody seals unbroken and intact at the date and time of arrival? ..... (YES) NO

4. Did you screen samples for radioactivity using the Geiger Counter..... (YES) NO

5. Were custody papers sealed in a plastic bag & taped inside to the lid? ..... (YES) NO

6. Were custody papers filled out properly (ink, signed, etc.)? ..... (YES) NO

7. Did you sign custody papers in the appropriate place? ..... (YES) NO

8. Was project identifiable from custody papers? ..... (YES) NO

9. Type of ice: Regular Temperature: 4.3°C Date temperature measured: 11/25/94

10. Describe type of packing in cooler: Peanuts

11. Were all bottles sealed in separate plastic bags? ..... (YES) NO

B. LOG-IN PHASE: Date samples were logged-in: 11/28/94

by (print) Shelly Swink (sign) Shelly Swink

12. Did all bottles arrive unbroken & were labels in good condition? ..... (YES) NO

13. Were all bottle labels complete (ID, date, time, signature, preservative, etc.)? ..... (YES) NO

14. Did all bottle labels agree with custody papers? ..... (YES) NO

15. Were correct containers used for the tests indicated? ..... (YES) NO

16. Were correct preservatives added to samples? ..... (YES) NO

17. Was a sufficient amount of sample sent for tests indicated? ..... (YES) NO

18. Was headspace absent in Volatile samples? If NO, list by QA#: N/A YES NO

QA # (cont.) _____

19. Were the custody papers checked against the sample receipt form? By whom? LP Date: 11/28/94

PART C

ANALYTICAL TEST RESULTS

C1

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Thermo Jarrell Ash ICAP Metals

FAMIS Number: 3057
Project Name: United Scrap Lead - Long Term Monitoring

Sample Description: Water
MRD Lab Sample No.: 941128-H009
Client Sample No.: AIM-RW-001
Method: EPA Method 3005/6010
Analyst: T. Shannon

Date Sample Taken: 22 Nov 94
Date Sample Received: 25 Nov 94
Date Digested: 08 Dec 94
Date Analyzed: 13 Dec 94
Batch: 9412130828
Sequence: 9412130828

RESULTS (µg/L)

Analyte	Result	Method Det Limit
Pb	u	20

u: Below Method Detection Limit (MDL)

Laboratory Comments:

Approved By: Glenn v Arm Date: 12.14.94

TLS

C2

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Thermo Jarrell Ash ICAP Metals

FAMIS Number: 3057
Project Name: United Scrap Lead - Long Term Monitoring
QC Identifier: Method Blank

Sample Description: Water
Method: EPA Method 3005/6010
Analyst: T. Shannon

Date Analyzed: 13 Dec 94
Batch: 9412130828
Sequence: 9412130828

RESULTS (µg/L)

Analyte	Result	Det Limit
Pb	u	20

u: Below Detection Limit

:tory Comments:

:pproved By: Pam. N. Brown Date: 12.14.94

TCS

C3

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Thermo Jarrell Ash ICAP Metals

FAMIS Number: 3057
Project Name: United Scrap Lead - Long Term Monitoring
QC Identifier: Laboratory Matrix Duplicate

Sample Description: Water
MRD Lab Sample No.: 941128-H009
Client Sample No.: AIM-RW-001
Method: EPA Method 3005/6010
Analyst: T. Shannon

Date Sample Taken: 22 Nov 94
Date Sample Received: 25 Nov 94
Date Digested: 08 Dec 94
Date Analyzed: 13 Dec 94
Batch: 9412130828
Sequence: 9412130828

RESULTS (µg/L)

Analyte	Sample Result	Duplicate Result	RPD	Method Detection Limit
Pb	u	u	NC	20

u: Below Method Detection Limit (MDL)
NC: Not Calculable
Control Limit: ± 20% (RPD could be higher if the sample results are low)

Laboratory Comments:

Approved By: Prem N. Arora Date: 12.14.94

TC

C4

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Thermo Jarrell Ash ICAP Metals

FAMIS Number: 3057
Project Name: United Scrap Lead - Long Term Monitoring
QC Identifier: Matrix Spike, Matrix Spike Duplicate

Sample Description: Water
MRD Lab Sample No.: 941128-H009
Client Sample No.: AIM-RW-001
Method: EPA Method 3005/6010
Analyst: T. Shannon

Date Sample Taken: 22 Nov 94
Date Sample Received: 25 Nov 94
Date Digested: 08 Dec 94
Date Analyzed: 13 Dec 94
Batch: 9412130828
Sequence: 9412130828

RESULTS (µg/L)

Analyte	Sample Result	Spike Added	Conc MS	%Rec MS	Conc MSD	%Rec MSD	RPD
Pb	u	500	522	104	534	107	2.3

u: Below Method Detection Limit (MDL)
%Rec Control Limit: 75-125
RPD Control Limit: ± 20% (RPD could be higher if the sample results are low)

Laboratory Comments:

Approved By: Brenda Arens Date: 12.14.94

YC9

C5

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Thermo Jarrell Ash ICAP Metals

FAMIS Number: 3057
Project Name: United Scrap Lead - Long Term Monitoring
QC Identifier: Laboratory Control Sample (LCS)

Sample Description: Water
LCS Source: VHG Labs, Inc.
Lot Number: 400723A,400723B,301500
Method: EPA Method 3005/6010
Analyst: T. Shannon

Date Analyzed: 13 Dec 94
MRD Lab Code: ICPW4
Expiration Date: 30 Apr 95
Batch: 9412130828
Sequence: 9412130828

RESULTS (µg/L)

Analyte	Result	True Value	%Rec	Method Detection Limit
Pb	2090	2000	105	20

u: Below Method Detection Limit (MDL)
NC: Not Calculable
Control Limit: 75 to 125

Laboratory Comments:

Approved By: Prem N. Arora Date: 12.14.94

TLS

C6

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Thermo Jarrell Ash ICAP Metals

FAMIS Number: 3057
Project Name: United Scrap Lead - Long Term Monitoring

Sample Description: Water
MRD Lab Sample No.: 941128-H010
Client Sample No.: USL-RW-002
Method: EPA Method 3005/6010
Analyst: T. Shannon

Date Sample Taken: 22 Nov 94
Date Sample Received: 25 Nov 94
Date Digested: 08 Dec 94
Date Analyzed: 13 Dec 94
Batch: 9412130828
Sequence: 9412131242

RESULTS (µg/L)

Analyte	Result	Method Det Limit
Pb	u	20

u: Below Method Detection Limit (MDL)

Laboratory Comments:

Approved By: Prem. N. Arora Date: 12.14.94

TC

C-1

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Thermo Jarrell Ash ICAP Metals

FAMIS Number: 3057
Project Name: United Scrap Lead - Long Term Monitoring

Sample Description: Water
MRD Lab Sample No.: 941128-H011
Client Sample No.: USL-RW-001
Method: EPA Method 3005/6010
Analyst: T. Shannon

Date Sample Taken: 22 Nov 94
Date Sample Received: 25 Nov 94
Date Digested: 08 Dec 94
Date Analyzed: 13 Dec 94
Batch: 9412130828
Sequence: 9412131242

RESULTS (µg/L)

Analyte	Result	Method Det Limit
Pb	u	20

u: Below Method Detection Limit (MDL)

Laboratory Comments:

Approved By: Prem N. Arora Date: 12.14.94

TCS

C8

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Thermo Jarrell Ash ICAP Metals

FAMIS Number: 3057
Project Name: United Scrap Lead - Long Term Monitoring
QC Identifier: Method Blank

Sample Description: Water
Method: EPA Method 3005/6010
Analyst: T. Shannon

Date Analyzed: 13 Dec 94
Batch: 9412130828
Sequence: 9412131242

RESULTS (µg/L)

Analyte	Result	Det Limit
Pb	u	20

u: Below Detection Limit

tory Comments:

Approved By: Prem N. Arora Date: 12.14.94

TLS

C9

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Thermo Jarrell Ash ICAP Metals

FAMIS Number: 3057
Project Name: United Scrap Lead - Long Term Monitoring
QC Identifier: Laboratory Matrix Duplicate

Sample Description: Water
MRD Lab Sample No.: 941128-H010
Client Sample No.: USL-RW-002
Method: EPA Method 3005/6010
Analyst: T. Shannon

Date Sample Taken: 22 Nov 94
Date Sample Received: 25 Nov 94
Date Digested: 08 Dec 94
Date Analyzed: 13 Dec 94
Batch: 9412130828
Sequence: 9412131242

RESULTS (µg/L)

Analyte	Sample Result	Duplicate Result	RPD	Method Detection Limit
Pb	u	u	NC	20

u: Below Method Detection Limit (MDL)
NC: Not Calculable
QC Control Limit: ± 20% (RPD could be higher if the sample results are low)

Laboratory Comments:

Approved By: Brian N. Arrow Date: 12.14.94

TC

C/C

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Thermo Jarrell Ash ICAP Metals

FAMIS Number: 3057
Project Name: United Scrap Lead - Long Term Monitoring
QC Identifier: Matrix Spike, Matrix Spike Duplicate

Sample Description: Water
MRD Lab Sample No.: 941128-H010
Client Sample No.: USL-RW-002
Method: EPA Method 3005/6010
Analyst: T. Shannon

Date Sample Taken: 22 Nov 94
Date Sample Received: 25 Nov 94
Date Digested: 08 Dec 94
Date Analyzed: 13 Dec 94
Batch: 9412130828
Sequence: 9412131242

RESULTS (µg/L)

Analyte	Sample Result	Spike Added	Conc MS	%Rec MS	Conc MSD	%Rec MSD	RPD
Pb	u	500	521	104	521	104	0.0

u: Below Method Detection Limit (MDL)
%Rec Control Limit: 75-125
RPD Control Limit: ± 20% (RPD could be higher if the sample results are low)

Laboratory Comments:

Approved By: Prem N. Arora Date: 12.14.94

TC

C11

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Thermo Jarrell Ash ICAP Metals

FAMIS Number: 3057
Project Name: United Scrap Lead - Long Term Monitoring
QC Identifier: Laboratory Control Sample (LCS)

Sample Description: Water
LCS Source: VHG Labs, Inc.
Lot Number: 400723A,400723B,301500
Method: EPA Method 3005/6010
Analyst: T. Shannon

Date Analyzed: 13 Dec 94
MRD Lab Code: ICPW4
Expiration Date: 30 Apr 95
Batch: 9412130828
Sequence: 9412131242

RESULTS (µg/L)

Analyte	Result	True Value	%Rec	Method Detection Limit
Pb	2150	2000	108	20

u: Below Method Detection Limit (MDL)
NC: Not Calculable
Control Limit: 75 to 125

Laboratory Comments:

Approved By: Prem N. Arora Date: 12.14.94

TC

Section P-Leachfield System and Well Connection Inspection Report

Memo

OHM Remediation Services Corp.
A Subsidiary of OHM Corporation

16406 U.S. Route 224 East • Findlay, Ohio 45840 *Midwest Region*

TO: Gerry Resnik

FROM: John O'Toole

PC: Fred Haas

DATE: 11-22-94

SUBJECT: Site Visit and Inspection
United Lead, Troy, Ohio.

This report presents the results of my site visit to the Troy United Scrap Lead site on Friday, November 18, 1994, and on Monday, November 21, 1994. The inspection covered the installation of a leachfield, and the connection of a well to an existing garage.

The leachfield was also inspected by John Spitler of the Ohio EPA, and an approval notice was given.

At the conclusion of the site visit, the following items are outstanding and will require additional attention to complete the project:

1: The conditions of the permit for the leachfield installation require that the Design Professional provide a verification report after 12 months of operation. Provisions should be mate to accommodate this requirement, including the accounting aspects of this requirement.

2: The well installation specifications require a submittal for the operation and maintenance instructions for the well pump. A copy of this information is attached to this report.

During the inspections, the following deviations were noted and corrected:

1: The leachfield Contractor installed water pipe instead of rigid electrical conduit. This violates the National Electric Code. The corrective action was that the Contractor removed the water pipe and replaced it with the specified conduit. No further corrective action is required.

LEACHFIELD CONSTRUCTION

The leachfield was constructed by Municipal Specialty Services Inc. of New Carlisle, Ohio, OHM PO# 200108. By the time I arrived on site on November 18, the contractor had excavated the leachfield and had backfilled with the sand. The equipment used by the Subcontractor was a Case 580K hoe and a New Holland L445 bobcat. The excavation for the stone was executed by hand using shovels. Grade was controlled using a self levelling laser. The stone was placed using the Case hoe, and spread by hand using shovels. Overall dimensions were verified to be in compliance with the design drawings.

The installed pipe was 1" Freedom PVC 1120 Sch 40 ASTM D-1785 NSF-PW 450 PSI @ 73F FG 099-4. 1/4" holes were drilled every 24", and placed facing downwards.

As of 17:00 hours on November 21, 1994, the installation was complete except for the topsoil placement, and the permanent electrical tie in. A temporary electrical connection was made to verify the operation of the pump.

Attached to this report is a copy of the Ohio EPA approval, the electrical permit, the Zoller pump operating instructions, the wiring diagram for the float controls, the delivery receivers for the sand and stone used in the construction, and a gradation for the sand verifying compliance with the specifications.

DEVIATIONS TO THE PLANS:

1: The dosing chamber was an "or equal" to the Duracrete model specified in the drawings.

2: The grounded GFI outlet was installed in a separate chamber rather than in the dosing chamber as shown on the drawings. This modification was made compliance with the current Electrical Code.

WATER WELL TIE IN:

The well tie in was installed by Frontz Drilling of Wooster, OH, OHM PO# 200298. The connection was made using 1" ENDOT/YARDLEY 100 PSI 73F GOLDEN JET PIPE SIDR 17.5 PE 3406 ASTM 2239 6 79453ASYK-24-C3 pipe. The pump was a Meyers HJA505 pump, SN SKC39HN2701BX which was installed in the garage at the location of the existing pump. The pump had a 100 PSI pressure gauge, marked in 2 PSI increments, and powered by a plug in to an existing outlet.

The specifications were developed with a submersible pump and the unit installed was an above ground jet pump. No attempt was made to enforce the submersible pump testing requirements for the above ground pump, with the exception of the disinfection, which was completed.

Attached to this report is a copy of the operations and maintenance instructions for the Meyers pump, and the hydromatic chamber.

APPENDIX

I

APPENDIX I

LEACH FIELD INSTALLATION REPORT

APPENDIX I

LEACHFIELD INSTALLATION REPORT

Leachfield Installation Report and Associated Documents
Table of Contents

Section A-Leachfield System and Well Connection Inspection Report

Memo

OHM Remediation Services Corp.
A Subsidiary of OHM Corporation

16406 U.S. Route 224 East • Findlay, Ohio 45840 Midwest Region

TO: Gerry Resnik

FROM: John O'Toole

PC: Fred Haas

DATE: 11-22-94

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The specifications were developed with a submersible pump and the unit installed was an above ground jet pump. No attempt was made to enforce the submersible pump testing requirements for the above ground pump, with the exception of the disinfection, which was completed.

Attached to this report is a copy of the operations and maintenance instructions for the Meyers pump, and the hydromatic chamber.

Section B-Ohio EPA Approval

P.O. Box 1049, 1800 WaterMark Dr.
Columbus, Ohio 43266-0149
(614) 644-3020
(614) 644-2329

George V. Voinovich
Governor

May 27, 1994

Re: Troy
Miami County
Application No. 05-6371
Application for Mound System for Pro Car Care & Used Cars, Inc.
Plans Received August 2, 1993;
Revised Plans Received April 14, 1994
From Thomas Winemiller & Associates, Inc.

CERTIFIED MAIL

U. S. EPA
77 West Jackson Boulevard (5HSRM-65)
Chicago, IL 60604

Ladies and Gentlemen:

Enclosed is the Ohio EPA Permit to Install which will allow you to install the described source in the manner indicated in the permit. Because this permit contains several conditions and restrictions, I urge you to read it carefully.

You are hereby notified that this action of the director is final and may be appealed to the Environmental Board of Review pursuant to Section 3745.04 of the Ohio Revised Code by any person who was a party to this proceeding. The appeal must be in writing and set forth the action complained of and the grounds upon which the appeal is based. It must be filed with the Environmental Board of Review within thirty (30) days after notice of the director's action. A copy of the appeal must be served on the director of the Ohio Environmental Protection Agency and the Environmental Law Division of the Office of the Attorney General within three (3) days of filing with the board. An appeal must be filed with the Environmental Board of Review at 236 East Town Street, Room 300, Columbus, OH 43266-0557.

You should note that a general condition of your permit states that issuance of the permit does not relieve you of the duty of complying with all applicable federal, state, and local laws, ordinances, and regulations.

If you have any questions, please contact the Ohio EPA district office to which you submitted your application.

Sincerely

Robert E. Phelps, P.E., Manager
Permit Administration Section
Division of Surface Water

REP/rk

Enclosure

cc: Southwest District Office
Miami County Health Department
Thomas Winemiller & Associates, Inc.

Roof drains, foundation drains, and other clean water connections to the disposal system are prohibited.

No liquids, sludges, or toxic or hazardous substances other than those set forth in the approved permit shall be accepted for disposal without the prior written approval of the Ohio Environmental Protection Agency.

Construction of any wastewater treatment works shall be completed and operation of the facility approved by the Ohio Environmental Protection Agency before sewage or other wastewater is generated by the applicant or is discharged to the wastewater disposal system.

The treatment works shall be abandoned and the sanitary severs connected to the public sanitary severage system whenever such system becomes available.

The sanitary control of the area shall be maintained within a 100 foot radius of each water supply well.

The tile field shall not be constructed during periods when the ground is frozen or when the moisture content will cause smearing of the trench walls and/or trench bottom.

A report supporting the twelve month effectiveness of the disposal system design shall be submitted by the design engineer to the Ohio Environmental Protection Agency Southwest District Office within 30 days after one year of operation.

The Northwest District Office of the Ohio Environmental Protection Agency shall be notified prior to the start of construction so that construction of this system can be routinely inspected and approved by the Ohio EPA. The final request for inspection and approval of this installation shall be made at least twenty-four (24) hours in advance of its being covered with earth and/or placed into operation.

Excavation of the leaching trenches shall proceed only when the moisture content is below the soil's plastic limit. If a sample of soil taken at the depth of the proposed bottom of the trench forms a wire instead of crumbling when attempting to roll it between the hands, the soil is too wet.

Special Condition

No parking of vehicles will be allowed over this system.

Section C-Electrical Permit

201 W. Main St. Troy, Ohio 45373
Phone: 332-6996 332-6851

Electrical Permit

Tim Carlson 4 Wheel Cars Address Phone

Actual Location 2145 W. State Rd 25-S Lot No.

Township Bethel

Plat or Subdivision

Contractor Brown, Russ - Nat Gas Power Company Phone 698-5481

Address

Class of Occupancy

☐ Dwelling ☐ Two Family Dwelling ☐ Three Family Dwelling ☐ Other

Type of Installation

☐ New Building ☐ Existing Building ☐ Rough Ready ☐ Will Call ☐ Final Ready ☐ Will Call

	No	Price	Amount
Minimum fee of $10 00			
New Service (1st 200 Amps.) Each Additional 100 Amps. Service Change		$ 20.00 $5 00 $ 20.00	
Temporary (Pole) Service		$ 20.00	
2 Wire Circuits		$ 2.00	
___e Circuits		$ 3.00	
Openings of existing building*		$ 20.00	
Additions, Alt or Extensions of			
___ting Wiring *		$ 20.00	
Heat $10 00 per residence**		$ 20.00	
___itioning 5 tons or less		$ 20.00	
Pre-heat (system)		$ 20.00	
Total			

	No	Price	Amount
Electric Heat (system) Central**		$ 20.00	
Elec heating ductwork (system)**		$ 20.00	
Swimming pool		$ 20.00	
Swimming pool bonding		$ 20.00	
Final Inspection**		$ 20.00	
Special or Commercial Inspection	2	$25 00	50.00
Penalty proceeding without permit			
E.E.L. Fund Electric			1.50
Processing Fee	1		
New House		$10 00	
Other		$5 00	
Total			
Grand Total			51.50

By Check ___ By Cash ___

Received by ___

* For 1 to 5 openings
Each additional opening 50c

accompanied by other wiring Add $5 00 if
work is done alone

Permit issued to install electrical equipment and or wiring within the jurisdiction of the Department of Building Inspection Miami County, Ohio such installation shall be in accordance with the National Electrical Code, latest edition, the provisions of the Miami County Building Code and or the Ohio Building Code

A penalty fee of $12 50 is assessed for each re-inspection necessary after the initial attempt to inspect reveals an incomplete or not ready condition, or conditions that preclude an inspection being completed

It is understood and agreed that the structure for which electrical service has been permitted under a precast arrangement through this permit, issued by Miami County, Ohio, located at the above project address shall not be occupied or otherwise used until final building and electrical inspections have been successfully passed and an occupancy permit issued by said County.

It is further understood and agreed that the use or occupancy of the aforementioned structure prior to the successful completion of all required inspections will result in the disconnection of electrical service and that neither Miami County nor the utility company will be held responsible in any way for any damage which may occur as a result of the disconnection

X Tim Carlson Inc. ___ 19 ___
Applicant Signature Date

11-21 19 94
Building Official Signature Date

Section D-National Electrical Code Verification of Noncompliance
Replacement of Electrical Conduit

(6.36 mm) in a straight run between securely mounted items such as boxes, cabinets, elbows, or other conduit terminations, an expansion joint shall not be required.

(FPN): See Table 10 in Chapter 9 for expansion characteristics of PVC rigid nonmetallic conduit.

347-10. Minimum Size. No conduit smaller than ½-inch electrical trade size shall be used.

347-11. Number of Conductors. The number of conductors permitted in a single conduit shall not exceed the percentage fill specified in Table 1, Chapter 9.

(FPN): For conductor cross-sectional area, see Tables 5, 5A, 6, and 8 and the applicable Notes to Tables at the beginning of Chapter 9.

347-12. Bushings. Where a conduit enters a box or other fitting, a bushing or adapter shall be provided to protect the wire from abrasion unless the design of the box or fitting is such as to provide equivalent protection.

(FPN): See Section 373-6(c) for the protection of conductors No. 4 and larger at bushings.

347-13. Bends — How Made. Bends of rigid nonmetallic conduit shall be so made that the conduit will not be damaged and that the internal diameter of the conduit will not be effectively reduced. Field bends shall be made only with bending equipment identified for the purpose, and the radius of the curve of the inner edge of such bends shall not be less than shown in Table 346-10.

347-14. Bends — Number in One Run. There shall not be more than the equivalent of four quarter bends (360 degrees total) between pull points, e.g., conduit bodies and boxes.

347-15. Boxes and Fittings. Boxes and fittings shall comply with the applicable provisions of Article 370.

347-16. Splices and Taps. Splices and taps shall be made only in junction boxes, outlet boxes, device boxes, or conduit bodies. See Article 370.

B. Construction Specifications

347-17. General. Rigid nonmetallic conduit shall comply with the following:

Marking. Each length of nonmetallic conduit shall be clearly and durably marked at least every 10 feet (3.05 m) as required in the first sentence of Section 110-21. The type of material shall also be included in the marking unless it is visually identifiable. For conduit recognized for use aboveground, these markings shall be permanent. For conduit limited to underground use only, these markings shall be sufficiently durable to remain legible until the material is installed. Conduit shall be permitted to be surface marked to indicate special characteristics of the material.

(FPN): Examples of these optional markings include but are not limited to "LS" for limited-smoke and markings such as "sunlight-resistant."

ARTICLE 348 — ELECTRICAL METALLIC TUBING

348-1. Use. The use of electrical metallic tubing shall be permitted for both exposed and concealed work. Electrical metallic tubing shall not be used (1) where, during installation or afterward, it will be subject to severe physical damage; (2) where protected from corrosion solely by enamel; (3) in cinder concrete or cinder fill where subject to permanent moisture unless protected on all sides by a layer of noncinder concrete at least 2 inches (50.8 mm) thick or unless the tubing is at least 18 inches (457 mm) under the fill; (4) in any hazardous (classified) location except as permitted by Sections 502-4, 503-3, and 504-20; or (5) for the support of fixtures or other equipment. Where practicable, dissimilar metals in contact anywhere in the system shall be avoided to eliminate the possibility of galvanic action.

Exception: Aluminum fittings and enclosures shall be permitted to be used with steel electrical metallic tubing.

Ferrous or nonferrous electrical metallic tubing, elbows, couplings, and fittings shall be permitted to be installed in concrete, in direct contact with the earth, or in areas subject to severe corrosive influences where protected by corrosion protection and judged suitable for the condition.

(FPN): See Section 300-6 for protection against corrosion.

348-2. Other Articles. Installations of electrical metallic tubing shall comply with the applicable provisions of Article 300.

A. Installation

348-4. Wet Locations. All supports, bolts, straps, screws, etc., shall be of corrosion-resistant materials or protected against corrosion by corrosion-resistant materials.

(FPN): See Section 300-6 for protection against corrosion.

348-5. Size.

(a) Minimum. Tubing smaller than ½-inch electrical trade size shall not be used.

Exception: For enclosing the leads of motors as permitted in Section 430-145(b).

(b) Maximum. The maximum size of tubing shall be the 4-inch electrical trade size.

348-6. Number of Conductors in Tubing. The number of conductors permitted in a single tubing shall not exceed the percentage fill specified in Table 1, Chapter 9.

(FPN): For conductor cross-sectional area, see Tables 5, 5A, 6, and 8 and the applicable Notes to Tables at the beginning of Chapter 9.

348-7. Threads. Electrical metallic tubing shall not be threaded. Where integral couplings are utilized, such couplings shall be permitted to be factory threaded.

Section E-Aggregate Records

PLANT TROY GRAVEL - # 433
PHONE (800)331-4242

DATE	TIME OUT	CUST. NO.	SOLD TO
11/17/94	13:00	05433	CASH SALES PLANT 433
TICKET NO.	**P.O. NUMBER**	**JOB NO.**	**JOB DESCRIPTION**
387611			

DIRECTIONS TO JOB: 2045 25A

		TRUCK IDENTIFICATION		PRODUCT CODE	PRODUCT DESCRIPTION		
65400	LBS. GROSS	715	00	703B	MASON SAND RESALE		
		TONS		UNIT PRICE	EXT. AMT.	TAX	TOTAL
24100	LBS. TARE	20.65		11.000	227.15	14.20	241.35
		TONS		HAUL RATE	EXT. AMT.	TAX	TOTAL
41300	LBS. NET	20.65		2.050	42.33	0.00	42.33
				MISC. CHG.	EXT. AMT.	TAX	TOTAL
OH-295411							

WEIGHED BY: HAVE A GOOD DAY! BECKY

TOTAL AMOUNT 283.68

Denny

DRIVER'S SIGNATURE RECEIVED BY

CUSTOMER COPY

SCALE TICKET

American Aggregates

PLANT TROY GRAVEL - # 433
PHONE (800)331-4242

DATE	TIME OUT	CUST. NO.	SOLD TO
11/17/94	13:02	05433	CASH SALES PLANT 433
TICKET NO.	**P.O. NUMBER**	**JOB NO.**	**JOB DESCRIPTION**
387612			

DIRECTIONS TO JOB: 2045 RT. 25A

		TRUCK IDENTIFICATION		PRODUCT CODE	PRODUCT DESCRIPTION		
60800	LBS. GROSS	1051	00	004	#4 ROOFING GRAVEL		
		TONS		UNIT PRICE	EXT. AMT.	TAX	TOTAL
23600	LBS. TARE	18.60		7.500	139.50	8.72	148.22
		TONS		HAUL RATE	EXT. AMT.	TAX	TOTAL
37200	LBS. NET	18.60		2.050	38.13	0.00	38.13
				MISC. CHG.	EXT. AMT.	TAX	TOTAL
OH-295412							

WEIGHED BY: HAVE A GOOD DAY! BECKY

TOTAL AMOUNT 186.35

Steve

DRIVER'S SIGNATURE RECEIVED BY

CUSTOMER COPY

Section F-Zoller Pump Information

Quality Pumps Since 1939

Product information presented here reflects conditions at time of publication. Consult factory regarding discrepancies or inconsistencies.

ZOELLER PUMP CO.

MAIL TO: P.O. BOX 16347 • Louisville, KY 40256-0347
SHIP TO: 3280 Old Millers Lane • Louisville, KY 40216
(502) 778-2731 • FAX (502) 774-3624

Supersedes 6/91

WARNING: All wiring shall be installed in accordance with the National Electrical Code (NEC) and all other applicable codes.

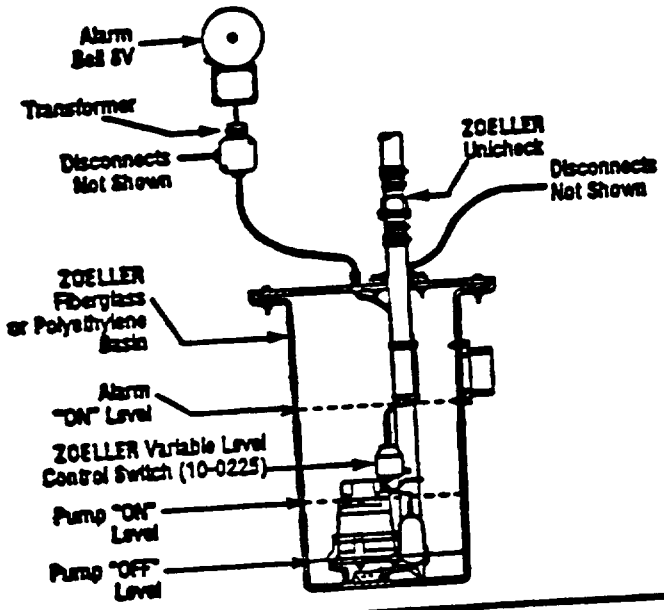
TYPICAL INSTALLATION AND WIRING INSTRUCTIONS FOR "A-PAK" (115V OR 230V)

NOTICE: • P/N 10-0015 A-PAK 115V/1Ph and P/N 10-0016 A-Pak 230V/1Ph includes bell and transformer. Utility box, cordage and float switch must be purchased separately.

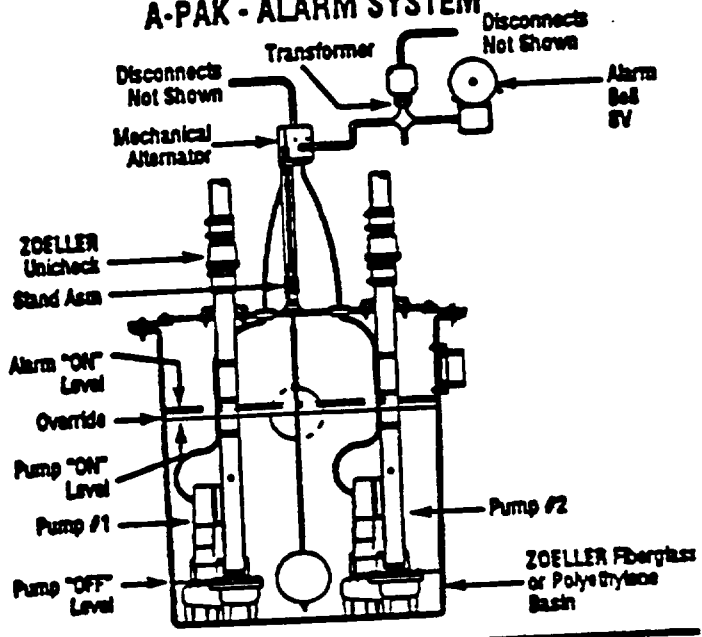
NOTICE: • P/N 10-0028 Residential A-Pak 115V/1Ph includes bell, transformer and float switch. Utility box and cordage must be purchased separately.

NOTICE: P/N 10-0053 A-Pak Alarm System 120V/1Ph includes all components. (See other side).

*TYPICAL SIMPLEX SYSTEM WITH A-PAK - ALARM SYSTEM



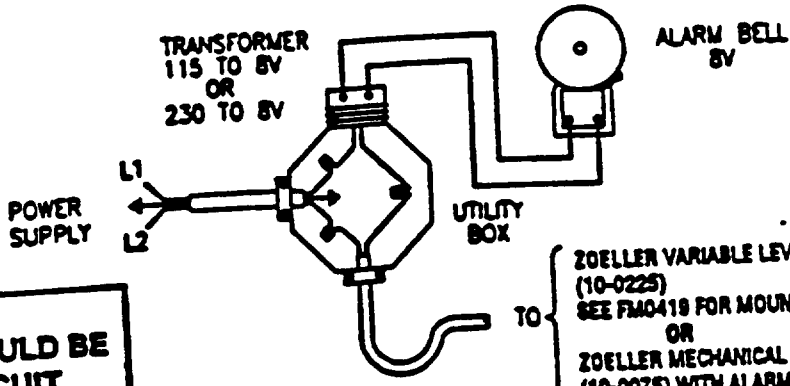
*TYPICAL DUPLEX SYSTEM WITH MECHANICAL ALTERNATOR AND A-PAK - ALARM SYSTEM



WIRING DIAGRAM

(10-0015)
(10-0016)
(10-0028)

DISCONNECT NOT SHOWN



NOTE:
ALARM SYSTEM SHOULD BE ON A SEPARATE CIRCUIT FROM PUMPS.

10-0053 "A-PAK" ALARM SYSTEM INSTALLATION

Installer must provide proper length of "two conductor wires which connects the control switch to the alarm panel. (*When used underground, wire must be approved for underground use. For example: 14-2 type UF.)

ALARM PANEL INSTALLATION

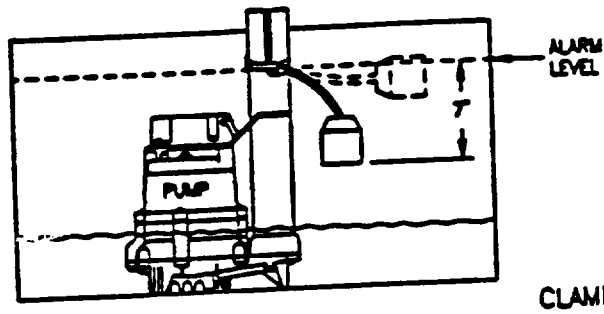
A alarm panel inside building. Mount with screw supplied and hang on keyhole in back of alarm panel.
Connect the "two conductors from the control switch to either of the terminations on the bottom of the alarm panel.
WARNING:FOR YOUR PROTECTION ALWAYS DISCONNECT FROM POWER SOURCE BEFORE HANDLING. This unit is supplied with a 3-prong grounded plug to help protect you against the possibility of electrical shock. DO NOT UNDER ANY CIRCUMSTANCES REMOVE THE GROUND PIN. The 3-prong plug must be inserted into a mating 3-prong grounded receptacle. If the installation does not have such a receptacle, it must be changed to the proper type, wired and grounded in accordance with the National Electrical Code and all applicable local codes and ordinances.

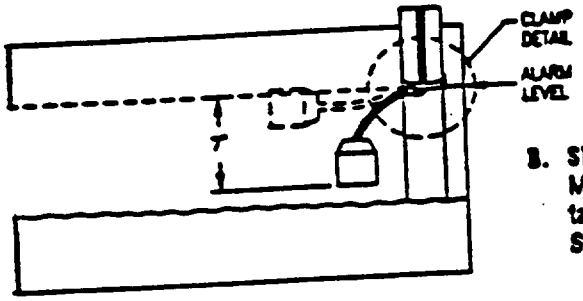
NOTE:The alarm panel plugs into a standard household 120V A.C. socket. DO NOT plug "A-Pak" Alarm System into the same circuits as the pump. The "A-Pak" Alarm System should be connected to a circuit separate from the pump circuit. Push test button to check alarm panel for operation.

CONTROL SWITCH INSTALLATION

The control switch operates on low voltage and is isolated from the 120V power line to reduce shock hazards.
NOTE: When installing the control switch, a cable strain relief must be used to secure control switch on entry into tank.
TO SET ALARM LEVEL: The control switch must be suspended seven inches below desired alarm level. See figures A or B.

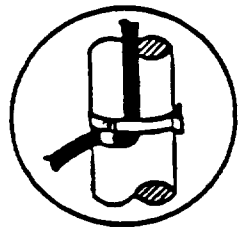
A. LIFT PUMP HIGH LEVEL FLOAT APPLICATION:
MODEL 10-0053 (refer to fig. A). Suspend control switch above pump turn-on level. If a pump failure causes a high level condition, the "A-Pak" Alarm System will activate.





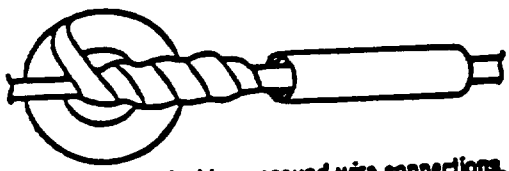
B. SEWAGE HOLDING TANK HIGH LEVEL FLOAT APPLICATION:
MODEL 10-0053 (refer to fig. B). Suspend control switch into tank seven inches below desired alarm level. "A-Pak", Alarm System will activate if float ascends to alarm level.

CLAMP DETAIL

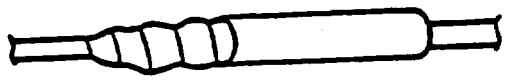


DIRECTIONS FOR UNDERGROUND SPLICE CONNECTION-LOW VOLTAGE ONLY

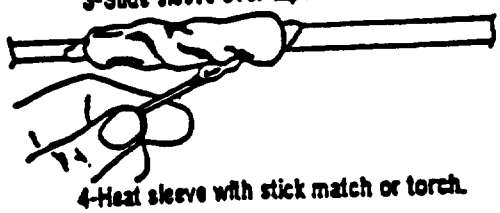
1-Make wire nut connections.



2-Wrap electrical tape around wire connections.



3-Slide sleeve over taped connection.



4-Heat sleeve with stick match or torch.

Check and test your installation by tipping the float manually. The alarm panel should indicate an alarm condition. The Zoeller Pump Company cannot be responsible for damages caused by the faulty or negligent installation of this device. We respectfully suggest you engage the services of a qualified licensed electrician or serviceperson.

CAUTION: All electrical systems must be installed by a qualified licensed electrician according to the National Electrical Code.

Section G-Meyers Pump Information

HJA-HJ-HR-HT Ejecto Pump Installation and Service

Motor Voltage: 1/3 HP and 1/2 HP motors are wired for 115 volts. The 3/4 HP and 1 HP motors are wired for 230 volts, but may be converted to 115 volts by referring to instructions printed on motor. If motor is converted to 115 volts, have a qualified electrician check the entire Electrical and Power Leads System to be sure they can handle the higher AMPS.

To Wire Pump: Remove cover from pressure switch and make electrical connections (see wire size chart below) with ground. First connect bare copper ground to ground screw in pressure switch. Next make power connections onto terminals marked "Line."

Jet Pump Wire Selection Guide

Motor HP	Voltage	Name Plate AMPS	Max. Wire Length Using AWG Wire Size			
			#14	#12	#10	#8
1/3	115	5.2	140	230	370	590
1/2	115	10.0	110	180	290	464
	230	5.3	475	750	1194	1897
3/4	115	14.0	84	135	211	331
	230	7.4	330	540	845	1327
1	115	17.3	74	110	165	260
	230	8.5	297	472	749	1181

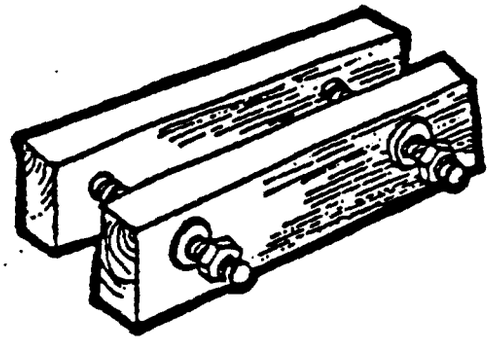
Recommended Fuse Sizes (Amps)

HP	*Standard Line Plug Fuse		Low Peak Cartridge Type Fusetron Cartridge Type *Fusetron—Plug Type	
	115V	230V	115V	230V
1/3	15	—	10	—
1/2	20	10	10	6-1/4
3/4	25	10	15	6
1	30	15	20	10

*For circuits not over 150 volts to ground.

TOOLS NEEDED FOR INSTALLATION

- Screwdriver
- Pipe Wrench
- Adjustable Wrench (medium-large)
- Hacksaw with 24-Tooth Blade for cutting plastic pipe.
- Knife or Round File for smoothing inside of all plastic pipe connections.
- Pipe Clamps. Make with two pieces of 2 × 4 board 12" long. Drill holes for 1/2" bolts about 8" long. Assemble as shown.



INSTALLATION INSTRUCTIONS

Materials Needed

- 1 can PVC cement (read manufacturer's instructions carefully)
- Foot valve
- 1-1/4" PVC adapters (2 required)
- 1-1/4" rigid PVC pipe and couplings (Couplings not required for flared pipe).
- Well seal
- 1-1/4" PVC elbow
- Discharge tee
- Pressure gauge
- 1" x 4" nipple
- 1" check valve
- Copper electric wire with ground (see Wire Selection Guide on page 4)
- Fuse box or circuit breaker

Step 1: Connect foot valve to 1-1/4" plastic pipe adapter. Cement adapter to 1-1/4" PVC rigid plastic pipe. All connections must be watertight for pump to operate properly.

Step 2: Add rigid PVC pipe sections and couplings (as required) while lowering foot valve into well. As much as 30 feet of pipe could be required. Note: Removing foot valve screen could void Warranty.

Step 3: Install well seal over rigid PVC pipe and onto well casing. Cement 1-1/4" PVC elbow to top of pipe at correct length to position foot valve 5 feet above bottom of well. Lower foot valve-piping assembly carefully into well, using pipe clamp. Draw up bolts on well seal until rubber gaskets are tight against both the well casing and the pipe.

Step 4—For Shallow Well Pumps: Cement one end of horizontal 1-1/4" pipe into elbow. Add sections to reach the pump. This pipe should slope up to the pump from the elbow. Thread 1-1/4" adapter into pump. Cement horizontal pipe into adapter that has been threaded into pump.

Step 4A—For Convertible Pumps: Install venturi into Ejector. Secure shallow well ejector assembly and gasket to pump case with bolts supplied (see diagram). Connect tube between pump case and pressure switch on pump. Thread 1-1/4" PVC adapter into shallow well ejector. Cement horizontal pipe into adapter threaded into ejector.

Step 5: Using pipe wrench, install discharge tee in pump discharge until tight.

Step 6: Important—Go to Electrical Instructions on pages 3 and 4. Make electrical connections as described.

Step 7: After electrical work is completed—and before pump is connected to pressure tank—the pump should be primed and test run. To prime, remove bushing from top of discharge tee. Fill piping and pump with water until the water overflows from top of tee. Replace bushing and tighten to seal. Install pressure gauge. Before starting pump, place large bucket or other container under check valve opening.

Step 8: Start motor. If pump is installed with a horizontal offset line of 4 feet or more, it may take several minutes to prime. If pump does not prime in 5 minutes: (1) stop motor; (2) remove discharge plug and pressure gauge; and (3) add more water.

Step 9: Allow pump to empty into container long enough to clear the well of any sand or dirt, and to be sure well is not going to run out of water.

Step 10: Stop pump and complete connections to pressure tank. Allow pump to cycle automatically several times to check pressure switch setting and operation. To adjust pressure switch settings, see instructions inside pressure switch cover. If a new pressure tank is required, follow "Pressure Tank Installation Instructions."

If pump is being used as a lawn sprinkler or irrigation pump, you MUST remove the pressure switch and wire the pump direct. Also, no pressure tank is used.

Caution: Make sure the pressure switch is set low enough to shut off the pump. If a valve is shut off and the pressure switch setting is too high, the pump will run continuously without water flow. This will overheat and damage the pump.

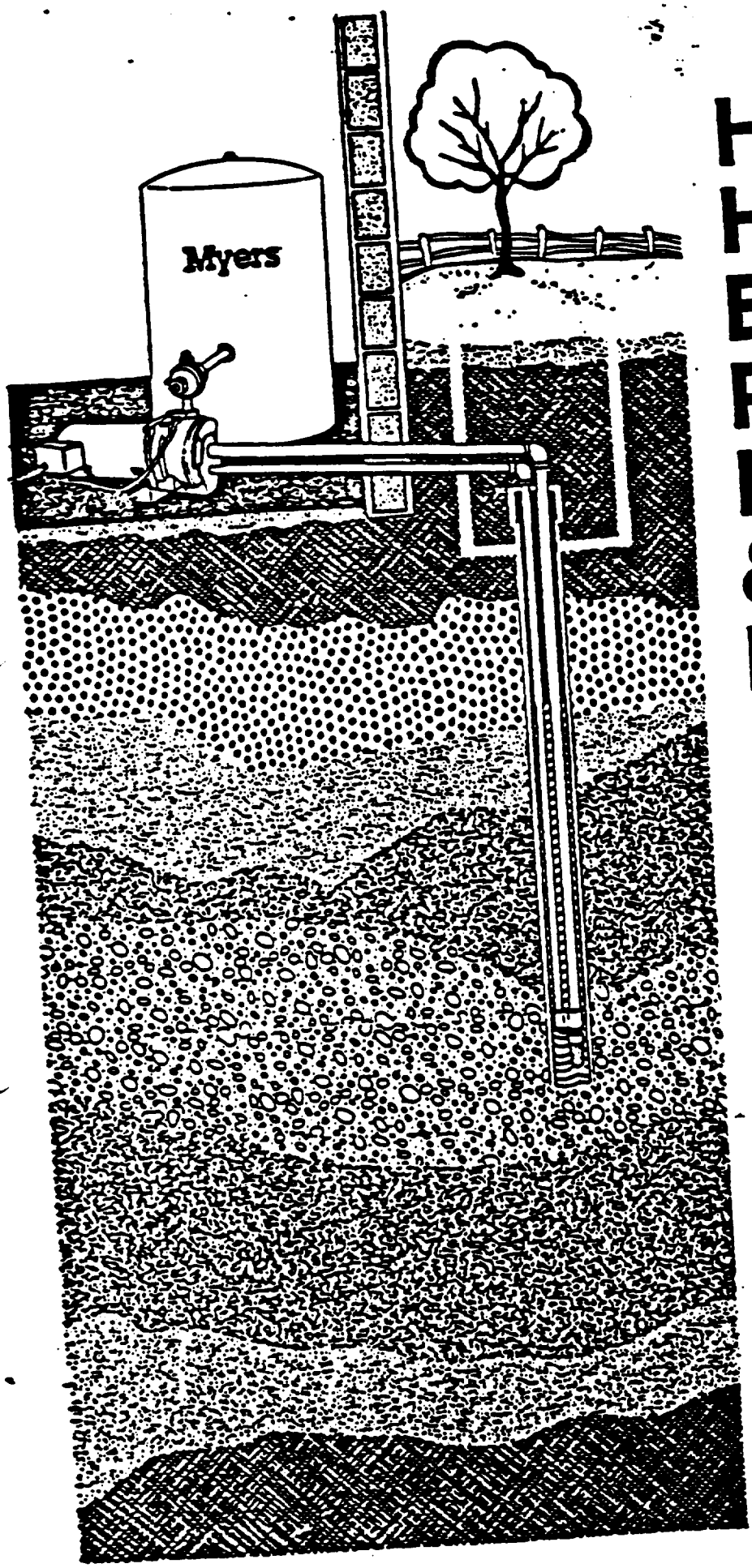
Note: Check valve between tank and pump can cause short cycling in the following conditions:

1) Leaky foot valve
2) Long horizontal suction line
3) Air trapped in suction line
4) Wells with gaseous water

To resolve this problem you can do the following:

1) Remove the check valve completely
2) Move the check valve beyond the tank
3) Change the pressure switch. Tap to the tank tee.

Section H-Record Drawing



HJA, HJ, HR, HT Ejecto Pump Installation & Service Manual

DO NOT RUN THIS PUMP DRY

AMTROL INC.
1400 DIVISION ROAD
W. WARWICK, RHODE ISLAND 02893
(401) 884-6300

INSTALLATION INSTRUCTIONS
WELL-X-TROL®

Revised March 1991

ATTACHING ACCEPTANCE FITTINGS:

SKIRTLESS MODELS WX-101, 102, 103 and 200
In-line Models WX-101, 102, and 103 are conventionally installed directly in the main water supply line with a ¾" connection. For Model WX-200, a 1" fitting is used.

SKIRTED MODELS WX-201 thru WX-350
Skirted Models WX-201 thru WX-302 are equipped with an elbow for connection to the system. The WX-201 thru WX-203 has a 1" elbow; the WX-205 thru WX-302 has a 1 ¼" elbow. The WX-350 has a 1 ¼" tee for straight through piping.

PROPER WELL-X-TROL LOCATION
The WELL-X-TROL should be installed as close as possible to the pressure switch. This will reduce the adverse effects of added friction loss and differences in elevation between WELL-X-TROL and/or water supply main and switch.

ADJUSTING WELL-X-TROL PRECHARGE TO SYSTEM REQUIREMENTS
WELL-X-TROLS are shipped with a standard precharge of 20 psi for Models WX-101 and WX-102, 30 psi for Models WX-103 thru WX-203, and 38 psi for Models WX-205, WX-250, WX-251, WX-302, and WX-350. This precharge should be adjusted, when not attached to the system, as follows:

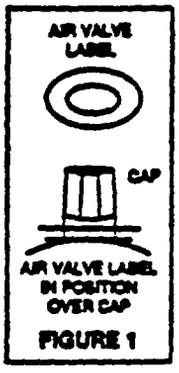
1. Remove protective air valve cap and using a suitable pressure gauge, check precharge pressure. (Tank should be at room temperature and empty of water).
2. Release or add air as necessary to make precharge pressure 1 - 2 psi below the pressure switch pump cut-in setting.
   NOTE: Pressure switch setting may be out-of-adjustment, i.e., if labeled "30/50", it may be actually 28 or 29 to 48 to 49. See "Fine Tuning Procedure", below, for correcting this situation. *Do not adjust WELL-X-TROL precharge for this variation.*
3. Replace protective air valve cap and seal with the air valve label provided. (See Figure 1) This will enable you to determine if valve has been tampered with on possible future service calls.

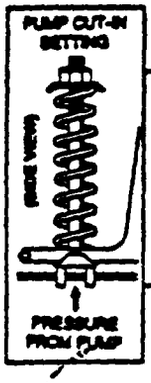
When the WELL-X-TROL is installed in the system, system pressure must be reduced to exhaust the tank of acceptance water before precharging. Once this has been done, follow above steps 1-3.

SYSTEM CONNECTION
1. Locate WELL-X-TROL in final desired location.
2. Level as necessary
3. Connect to pump supply line with same size pipe as from pump. Eliminate unnecessary friction loss.
4. All piping should be in accordance with prevailing local codes and standards.

FINE TUNING PROCEDURE (see chart)
Many times actual pressure switch settings will vary from the standard pressure range indicated. These variations could cause a momentary lag of water delivery as the pressure switch is not "tuned" to the WELL-X-TROL's precharge pressure.

TO "FINE TUNE", FOLLOW THESE STEPS:
1. Fill the system and WELL-X-TROL until pump cuts off.
2. Open one or more fixtures to drain WELL-X-TROL.
3. If there is a momentary pause in the water flow from the time the WELL-X-TROL is emptied and the pump starts, adjust pump switch cut-in setting upward (clockwise) slightly. (Refer to Adjustment Instructions by switch manufacturer).





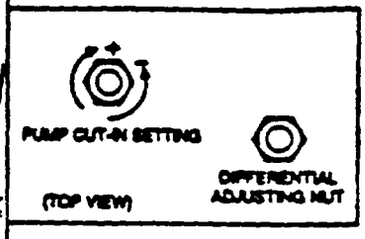


FIGURE 2

4. Close fixtures and refill WELL-X-TROL to pump cut-off. Check time to fill.
5. Open fixtures and see if pause in water is eliminated at pump cut-in. If not, continue adjusting pressure switch.

REPLACING GALVANIZED OR EPOXY LINED TANKS WITH WELL-X-TROL
Many times a defective steel tank must be replaced with a WELL-X-TROL to provide Effective System Protection, (ESP).

It is a simple procedure and the line drawing should be followed for correct connection to the system. Because the WELL-X-TROL is precharged with air, it will always occupy less space for equal amounts of pressurized water than a galvanized or epoxy lined steel tank.

It is recommended that a relief valve be installed at the WELL-X-TROL connection to ensure system protection.

Also BE SURE to plug the air port on a jet pump, as air is no longer required to be supplied to the tank.

RECOMMENDED PIPE SIZE FOR PUMP FLOWS

PIPE SIZE	FLOW GPM
¾	10
1	16
1¼	30
1½	40

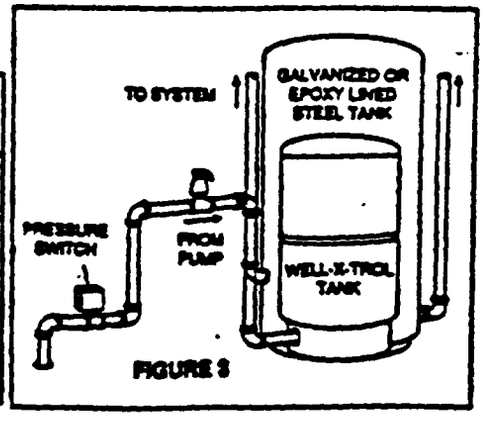
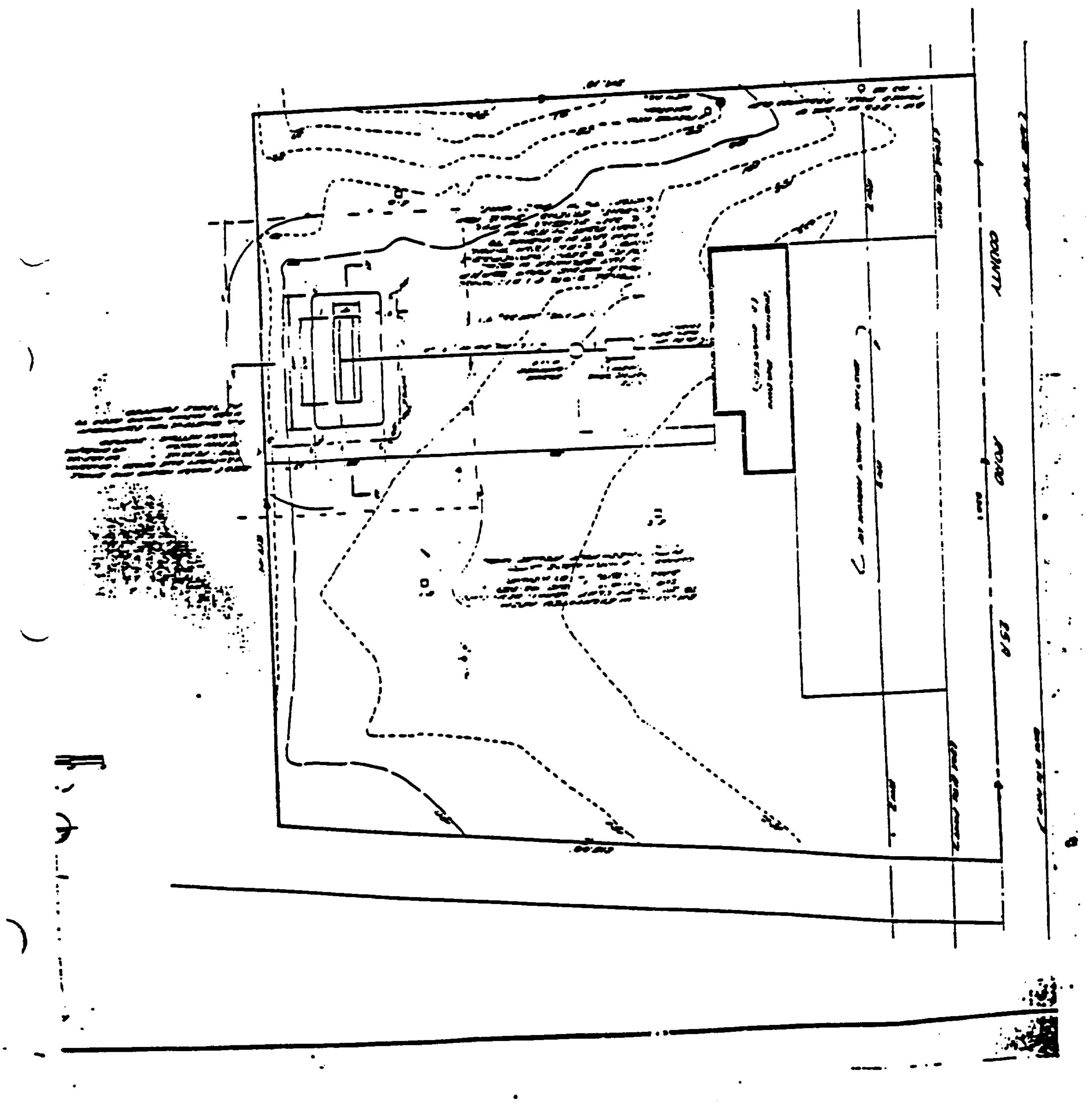
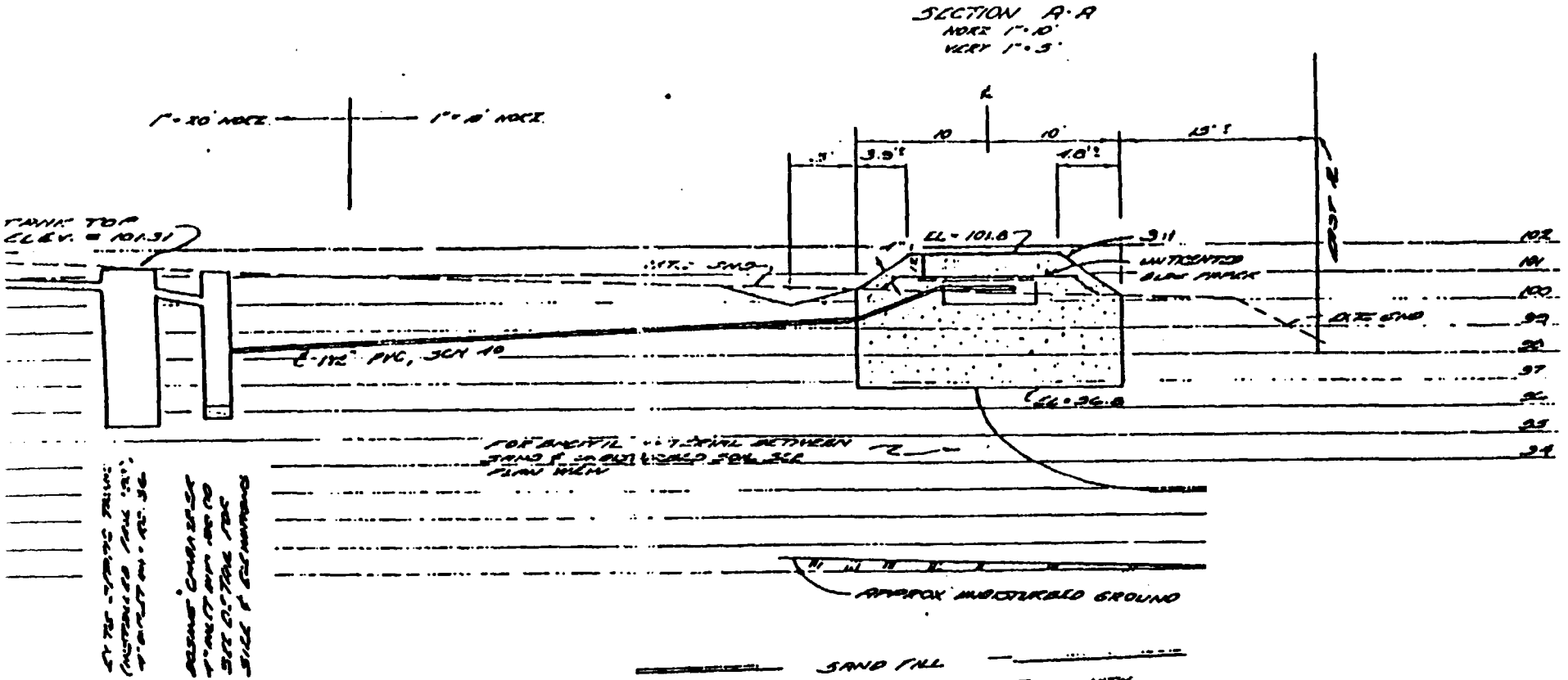


FIGURE 3

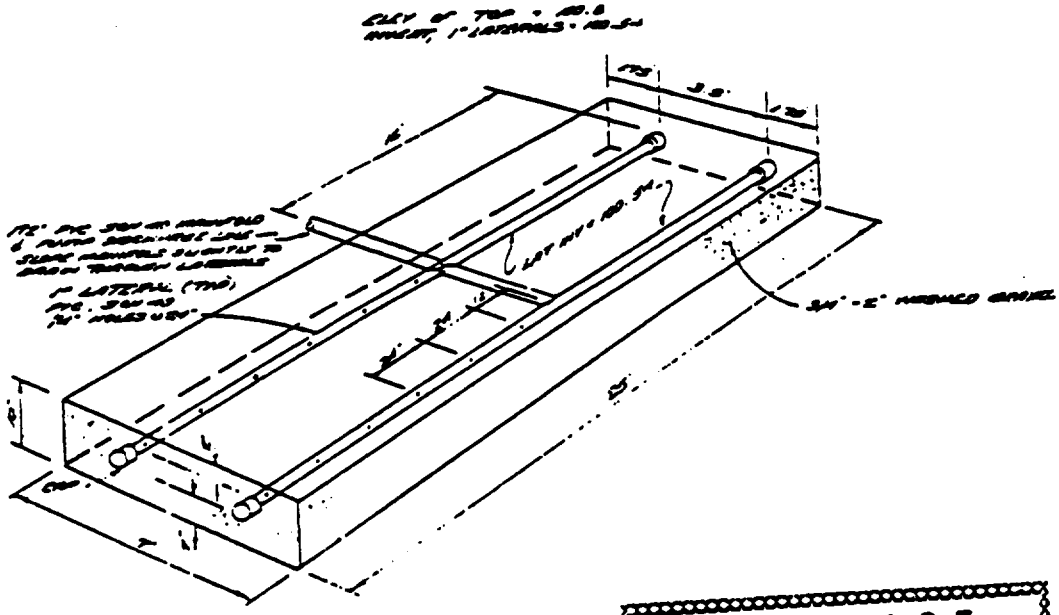
Section I-Approved Design




SECTION A-A
HORZ 1"=10'
VERT 1"=5'
1"=10' HORZ.
1"=5' HORZ.
10'
10'
13'±
3.5'±
4.0'±
TANK TOP
ELEV. = 101.31
EL = 101.8
3:1
UNTREATED
SLOPE PROTECTION
EXIST. SAND
EXIST GRADE
12" PVC, SCH 40
EL = 96.8
FOR BACKFILL AND EMBANKMENT BETWEEN
SAND FILL AND EXISTING SOIL USE
FILL MATERIAL
APPROX UNDISTURBED GROUND
SAND FILL
TO MEET ASTM C-33 SPECIFICATION, WITH LESS THAN 50% BY WEIGHT BETWEEN 3/8 INCH & #4 SIEVE AND LESS THAN 5% BY WEIGHT SILT & CLAY (<0.053 MM.).
SAND-SOIL INTERFACE AT BOTTOM OF SAND BED TO BE LIGHTLY SCARIFIED.

AGGREGATE BED DETAIL

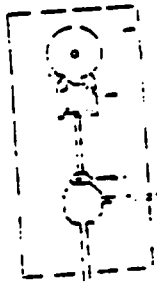
NO SCALE

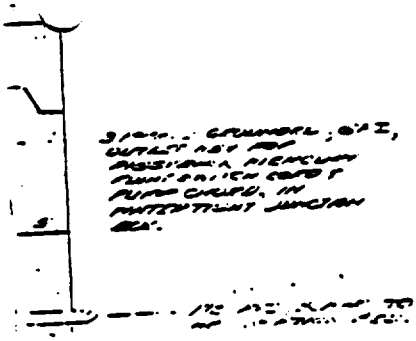


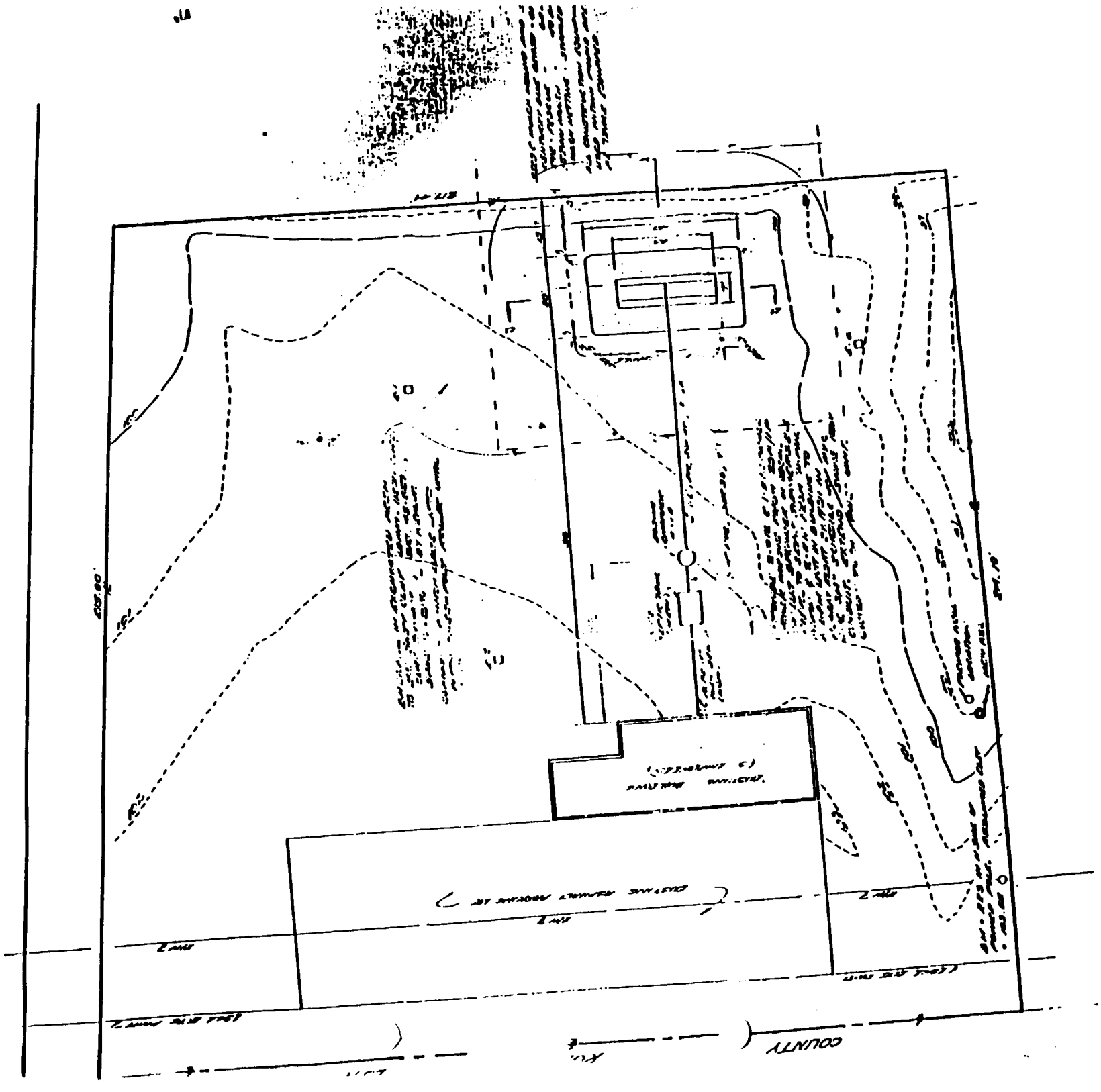
SEWERAGE

APPROVED

AS EVIDENCED BY LETTER OF APPROVAL HERETO ATTACHED







Section J-Application for Permit to Install

Application for Permit to Install

New Source Treatment Works (includes Septic Systems)

_ odification of existing stewater Treatment Works

__ Pretreatment Only

__ Other (Sewers, Pump Stations, etc.)

For Office Use Only	
PTI Application No	
Date Received	
PAID	
Amount	Date
Check #	Date

a) Owner/Responsible Official United States Environmental Protection Agency/Anita Boseman

b) Mailing Address Region V (5HSRM-65), 77 West Jackson Blvd.

Chicago, Illinois 60604 Telephone (312) 886-6941

c) Name of Project/Facility Pro Car Care and Used Cars, Inc.

d) Project/Facility Location Description (List street/road address, township, county) if possible) East side, County Road 25-A, 0.3 miles south of Swailes Road, Concord Township, Miami County, Ohio (2045 County Road 25-A, Troy, Ohio 45373

e) Treatment Works to or Receiving Stream to Receive Waters N/A

f) Person to Contact: Name: Gerard S. Reznik, OHM Remediation Service Corp.

Title Project Manager, Midwest Reg Phone: (419) 423-3526

) Operator of facility Pro Car Care and Used Cars, Inc.

a) Reason for project: Soil at site is contaminated with lead. Project on US EPA Superfund list. OHM Corp. is contracted with the US Army Corp of Engineers to perform clean-up activities at site. Since soil will be excavated this manadates replacement of ext'g syster

	Y	N	Permit #
b) Is this facility regulated under an effective NPDES Permit?		X	

*Is this application filed in compliance with Ohio EPA Findings and Orders or a Consent Order | Y | N | Date:
| | | X | |

3. a) Designed by: THOMAS WINEMILLER & ASSOCIATES, INC. Engineers/Planners/Surveyors
b) Address: 34 East National Road, Vandalia, Ohio Phone: (513) 898-5862

4. Project Costs: $ 6,000.00 (Amount) (X estimated (Check one) _____ bid _____ invoiced)

*If the answer is yes, fill in the effective date of the Finding and Orders.

5. Estimated schedule
a) Construction: begin July, 1993 complete July, 1993 (estimated)
b) Operation: start July, 1993 compliance immediate

VM

____ Groundwater ...
____ Livestock Waste Management Plan
____ Certificate of Supervision for installation, and operation of Package Sewage Treatment Plant
____ Engineering Report
____ Other: _____

11. Under OAC 3745-31-04, these signatures shall constitute personal affirmation that all statements or assertions of fact made in the application and attachments thereto are true and complete, comply fully with applicable state requirements, and shall subject the signatory to liability under applicable state laws forbidding false or misleading statements.

Authorized Signature (of facility) * ** Date

Title

Address

For Wastewater Treatment Plants: Signature of General Contractor or Agency Performing installation, if selected.* Date

Company

Address

* Photostatic copies of signatures are not acceptable.
** Signature of owner or responsible official of applying company required. (See OAC 3745-31-04)

11. Fees payable to "Treasurer, State of Ohio" through the appropriate District Office (To accompany each application).

a.	Application Fee	~~$ 15.00~~	NOW ONE FLAT FEE: $239.00
b.	Plan Review Fee	~~$ 112.00~~	(0.002 x Project costs) + $100
	Permit Fee		(Not to Exceed $5,000.00)
c.	~~Total (a and b)~~	~~$ 127.00~~	(Not to exceed $5,015.00)

12. Fees payable to "Treasurer, State of Ohio," through the OEPA Central Office at the following address.

Ohio Environmental Protection Agency
Division of Finance/Permit Bookkeeping
1800 Watermark Drive
Columbus, Ohio 43266

Additional Information for
Septic System Installtion at
2045 County Road 25-A
Troy, Ohio

A. The occupant of this existing building is Pro Car Care and Used Cars, Inc. They buy and sell used cars. They currently anticipate 5 employees using the septic system.

B. Product produced from the facility will be normal human sewage from the buildings sole restroom (one toilet and sink).

C. Application is being made for the new installation of the following: one 1000 gallon septic tank, one diversion device and two 200 hundred feet leech beds. The soil at the site is contaminated by lead and The OHM Corporation will be performing remedial activites at the site. Since soil removal/replacement will be rquired the existing septic system must also be removed and replaced. This site is a US EPA Superfund Cleanup site.

D. No known PTI for a septic system for this facility has been submitted.

E. All applicable rules and regulations of the US EPA and Ohio EPA will be complied with.

F. Wastewater pollutant is normal human sewage from the facilities single restroom.

G. Anticpated flow rate 35gal/employee/day = 175 gallons/day. (5 employees)
Minimum storage for settling = 438 gallons.

Proposed septic system consist of:

1000 gallon septic tank to settle solids
One - concrete diverseion device
Two - leach beds (200 LF of line per bed - minimum). Have designed trenches at a width of 24" to compensate for possible soil consolidation from automobile parking after installation

H. N/A

I. N/A

J. N/A

K. N/A

L. N/A

OHM Corporation

CHECK REQUEST

Accounting
Rev. 05/93

Date: 07 / 20 / 93

Payable to: TREASURER STATE OF OHIO

Complete 1 of the following 5

Charge to Job: J 12622

☒ Billable ☐ Non-Billable

Remit to Address:

OHIO EPA

SOUTHWEST DISTRICT OFFICE

40 SOUTH MAIN STREET, DAYTON

State OHIO Zip 45402

Charge to Bids & Proposal: BP _ _ _ _ _ _ _ _

Charge to Asset: EC _ _ | _ _ _ _ _ | _ _ | _ _ _

Charge to R & D: RD _ _ | _ _ _ _ _ | _ _ | _ _ _

Charge to Department: DD _ _ | _ _ | _ _ _ | _ _ | _

Account No. _ _ _ _ (must be completed)

COMPANY:

☒ OHM Remediation Services Corp.
☐ OHM Solvent Processors & Reclaimers Corp.
☐ OHM Corporation
☐ OHM Remediation Services Corp. of Canada

Amount: $ 239.00

☒ U.S. Dollar
☐ Canadian Dollar
☐ Certified Check

Date Required: 07 / 21 / 93

Inv # _____

Inv. Date: ___ / ___ / ___

DESCRIPTION

PERMIT APPLICATION, REVIEW, AND ISSUANCE FEE FOR LEACHFIELD SYSTEM AT UNITED SCRAP LEAD SITE

Disposition of Check:

☐ Regular U.S. Mail ☒ Return To: JOHN SWANSON

☐ By Interoffice Mail ☒ Will pick up, call ext. 4120 when ready.

Prepared By:	Approved By:	Reviewed By (Accounting):
[signature]	[signature]	

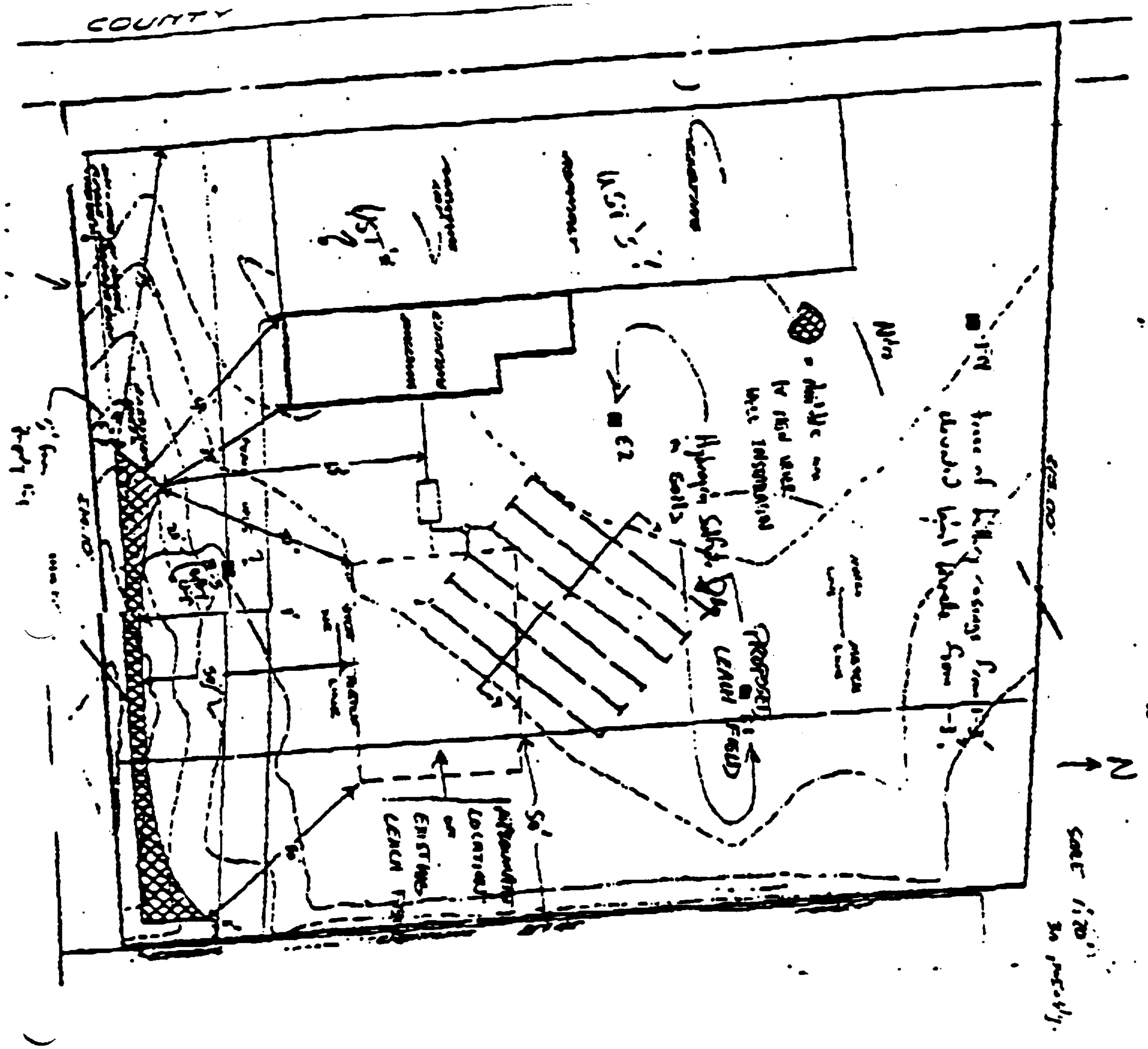
Accounting Use Only

Voucher No.: _____ Vendor No.: _____

Original Invoice must be attached to White Copy

White — Accounts Payable Canary — Preparer's Copy

Section K-Final Leachate System Electrical Inspection


COUNTY
PROPOSED LEACH FIELD
APPROXIMATE LOCATION OF EXISTING LEACH FIELD
N

SECTION L

OHIO EPA PERMIT TO INSTALL REQUIREMENT - FIELD INSPECTION OF SEWAGE DISPOSAL SYSTEM

THOMAS WINEMILLER & ASSOCIATES, INC.
CONSULTING CIVIL ENGINEERS
Civil Engineering • Land Planning • Surveying

OHIO
34 East National Road
Vandalia, Ohio 45377

Telephone
(513) 898-5862

INDIANA
1825 West Main Street
Richmond, Indiana 47374

Telephone
(317) 966-6274

November 21, 1995

Mr. Jerry Resnik
OHM Remediation Services Corporation
CS 2800
Findlay, Ohio 45839-2800

RE: Troy Car Care site, Troy, Ohio

Dear Mr. Resnik:

At the request of Mr. Greg Hall and as required by the Ohio EPA permit to install, a field inspection of the sewage disposal system for this facility was made on November 20, 1995.

Mr. Dan Burton, part owner of the facility, stated no problems with the system has been experienced since its installation.

The tile field area, a mound, was well protected by 8 concrete post, was not being used for parking, was well drained, and did not show any signs of failure.

From the activity observed during this inspection the allowable daily flow of 175 gallons was not being exceeded.

Very truly yours,
THOMAS WINEMILLER & ASSOCIATES, INC.

T. E. Winemiller

Thomas E. Winemiller

TEW/mr
cc: File