CHAPTER 6

OPERATING AND SPECIAL PROCEDURES

I N D E X

CHAPTER 6

OPERATING PROCEDURES

A. OPERATING PROCEDURES FOR WATER PUMPING SYSTEM

Step 1. Go to the "Main Switch" panel located on the wall between the circuit breaker panel "A" and the storage shelf. (See Chapter 5 for location drawing and Photo #5 & 6. Turn the Main Switch to the 'on' position to energize the system.

Step 2. In Panel "A" located immediately beside the main electrical service panel, check to see that all circuit breakers are in the 'on' position.

Note: The breakers labeled "spare" are not wired to the main power supply. Therefore, it does not matter whether they are "on" or "off".

Step 3. Inspect the chlorine solution tank to ensure that there is sufficient solution. (For instructions on filling the chlorine solution tank and on operating the chemical feed pumps, see Section "D" of this Chapter).

Step 4. Plug in the chemical feed pump and mixer into the electrical receptacle labeled "Chemical Feed Pump, Automatic". This receptacle is located on the wall directly behind the chemical pump. If for any reason, manual operation of the feed pump is required, place the plug in the receptacle labeled "Manual" which is to the left, see Photo #14.

Step 5. Insure that the sample line and hose bib (Valve No. 4) is fully closed. This is located on the green discharge pipe approximately one foot to the right of gate (Valve No. 1).

Step 6. Insure that the cold water supply valve, (Valve No. 2), to the chorine solution tank is fully closed. This valve is located on the cold water supply line approximately one foot left of gate Valve No. 1).

Step 7. Proceed to the "Water Pump Control Panel" located on the wall immediately above the inclined shaft and rotate the pump selector switch at the bottom of the panel to Pump No. 1 (P1). Refer to Chapter 5 and Photo # 7 for the location of the "Water Pump Control Panel".

OPERATING PROCEDURES

A. OPERATING PROCEDURES FOR WATER PUMPING SYSTEM

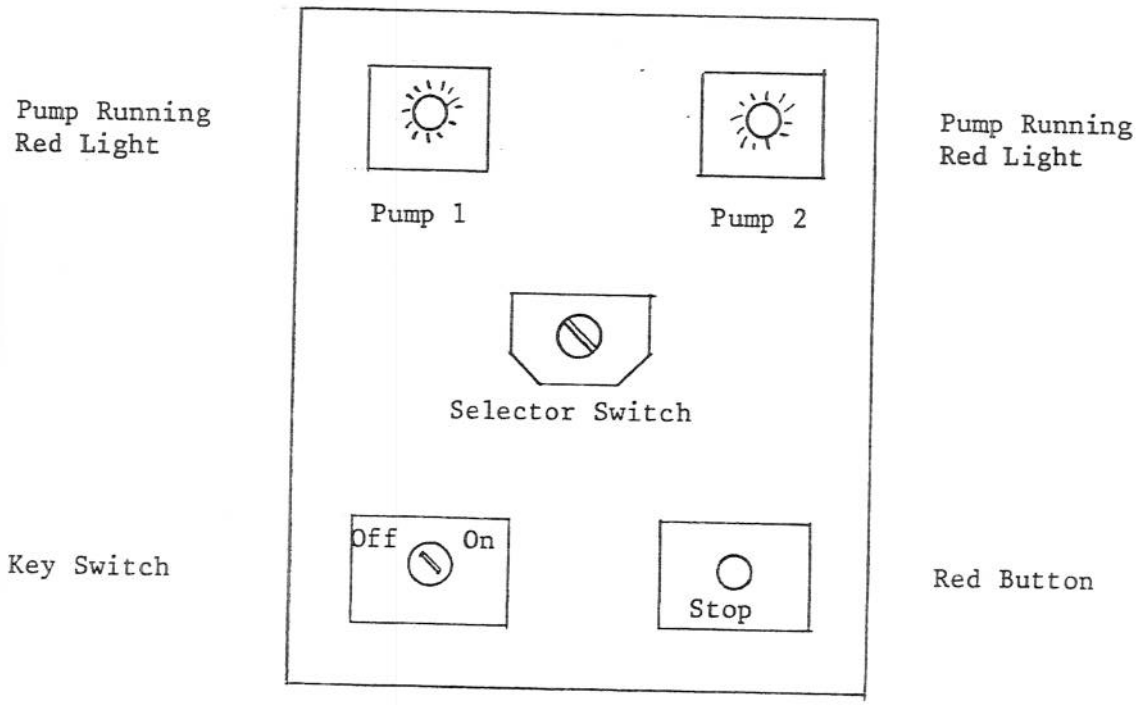
When Pump No. 1 (P1) is selected, insure that gate valve No. 1 is fully open and gate valve No. 2 is fully closed. The Pump No. 2 position provides an alternate relay only.

If Pump No. 2 (P2) is selected, two connections on the inside of the control must be changed before the alternate relay will work. This procedure is described later in "Trouble Shooting Operating Procedure" of this section.

Note: The pump can be operated manually from the "Water Pump Control Panel" if so desired. To do this, the keyed switch on the Pump Control Panel must be rotated to the "on" position. 30 seconds later, the appropriate red running light will come on indicating the pump is running. To stop the pump, rotate the key to the 'off' position and the red running light will go out.

Normal operation of the pumps should be from the "Exterior Pump Control Panel".

WATER PUMP CONTROL PANEL



Interior Control Panel

OPERATING PROCEDURES

A. OPERATING PROCEDURES FOR WATER PUMPING SYSTEM (cont'd)

Note: There is a 30 second time delay incorporated into the control panel to protect the pump against counter rotation. This means the pumps will not start for 30 seconds after the start key is turned to the "On" position.

Step 8. The driver should locate the tank truck under the filler pipe so that the hatch is aligned with the flexible hose.

Step 9. Open the door on the "Exterior Pump Control" panel which is located on the outside wall to the right of the pump house door. For the location, see the pump house piping and fitting plan

Step 10. Push the reset button on the remote totalizer to bring the reading to zero.

Step 11. Insert the key (Key #2) into the on-off switch and rotate to the "on" position.

Step 12. After a 30 second delay, the red light will light up indicating that the pump has been energized and water will begin to flow into the truck. If the red light fails to come on or the water does not flow, refer to "Trouble Shooting Procedure".

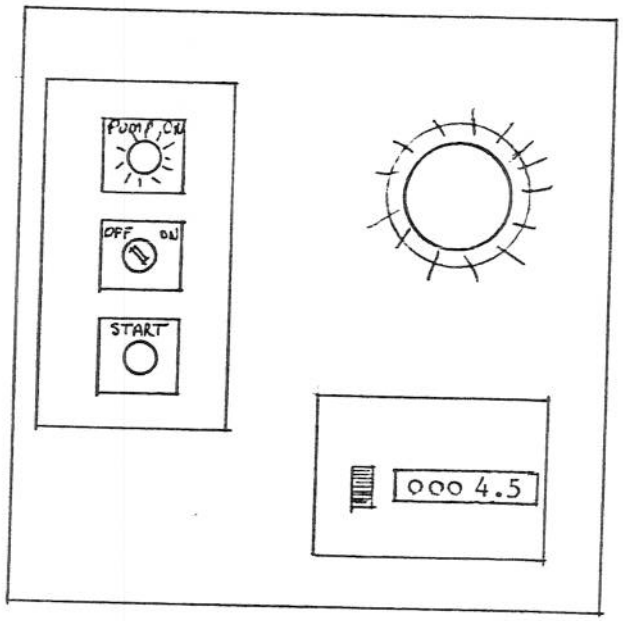
Note: There is a 30 second time delay incorporated into the control panel to protect the pump against counter-rotation. This means the pumps will not start for 30 seconds after the start key is turned to the "on" position.

Step When the truck is full, turn the key in the "Exterior Pump Control" panel to the off position, remove the key and close the door.

Note: 4,540 ℓ (1,000 Igal) the approximate full truck load is a 4.5 m^3 reading on the remote totalizer.

OPERATING PROCEDURES

A. OPERATING PROCEDURES FOR WATER PUMPING SYSTEM (cont'd)



EXTERIOR PUMP CONTROL

TROUBLE SHOOTING - OPERATION PROCEDURES

If there is no power in the building, turn the main switch to the 'off' position, open the box and replace the 100 amp fuse with the spare 100 amp fuse provided on top of the box. If there is still no power, call the N.C.P.C.

If power is not on in the building and water does not flow 30 seconds after turning the remote or the interior key switch on, check the circuits in the following locations.

Step 1. Turn exterior and interior key switches to the 'off' position and remove keys.

OPERATING PROCEDURES

A. OPERATING PROCEDURES FOR WATER PUMPING SYSTEM (cont'd)

TROUBLE SHOOTING - OPERATION PROCEDURES (cont'd)

Step 2. Go to Panel "A", the circuit breaker panel located on the north wall beside the main switch and turn circuit breaker 2 and 4 off, then on.

Step 3. Go to the Pump Control Panel located on the wall above and to the left of the intake shaft closest to the shelves, refer to Photo #7. . Release the two screw clamps holding the door and open the panel door. There are two relay blocks within the panel, each one has two white reset buttons. Push the two white reset buttons on the relay to the left hand side of the Pump Control Panel. (This relay operates when the pump selector is rotated to the Pump No. 1 position). Close the Pump Control Panel door.

Step 4. Go to the Jacuzzi capacitor box located above the intake shaft between the Pump Control Panel and the heat trace control (red box). Push the two reset buttons located on the underside of this box.

Step 5. Insert key in either exterior or interior switch and turn pump on. If water does not flow in 30 seconds, the following steps can be taken.

Step 6. Turn off circuit breakers 2 and 4 at Panel "A" and turn exterior and interior key switches off and remove the keys.

Step 7. Return and open Pump Control Panel door. A second relay on the right-hand side of the panel is available by changing the position of two wires. Disconnect the red and black wires located in the lower left-hand side of the panel and connected directly below the two black wires from the first relay. Connect the black wire over two spaces and the red wire over three spaces. They should be lined up directly below the two black wires from the second relay. Push the two white reset buttons on this relay, then close the Pump Control Panel door and turn the pump selector to Pump No. 2 position. Repeat Steps 2 and 4.

A. OPERATING PROCEDURES FOR WATER PUMPING SYSTEM (cont'd)

TROUBLE SHOOTING - OPERATING PROCEDURES (cont'd)

Step 8. Insert key in either exterior or interior switch and turn pump on. If water does not flow, see this Chapter for pump removal procedures.

OPERATING PROCEDURES

TAG AND KEY DIRECTORY

Tag No. 1: Gate Valves Exterior Line Shut-Off

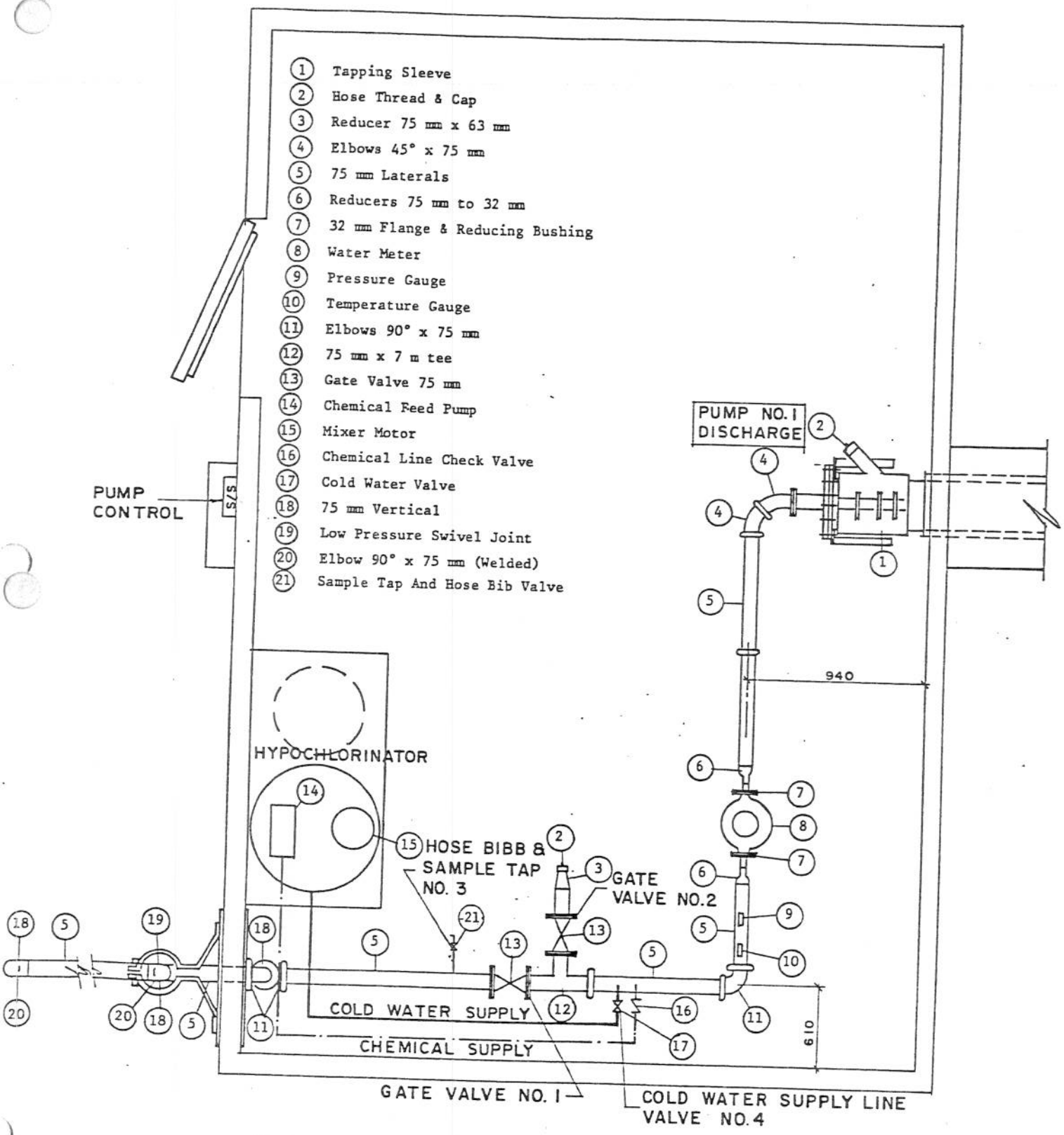
2: Gate Valves Interior 2-1/2" ø Hose Outlet Shut-Off

3: Hose Bib and Sample Line Tap Valve

4. Cold Water Supply Valve

Key No. 1: Pump Fill Station Entrance Door

2: Exterior S/S Pumps Control



PUMPHOUSE PIPING & FITTINGS

CHAPTER 6

OPERATING PROCEDURES

B. OPERATING PROCEDURES FOR HEAT TRACE SYSTEM

Note: The heat trace system although only required during freezing weather is thermostatically controlled and should accordingly be left on all year round.

Step 1. After insuring that the main power switch is "on", go to the "Breakers Panel A", located immediately beside the "Main Switch" panel and check to see that the circuit breakers for the heat trace system are in the "on" position.

Step 2. Locate the "Heat Trace Cable Control No. 1" located on the wall directly above the inclined pump shaft. The central amber light should be "on" indicating there is power to the box and the heat trace. (For location drawing, see Chapter 5 and Photo 7.

Step 3. If the temperature of the water in the inclined shaft is below 1°C (33°F), the white light on the left hand side of the control box will be "out" indicating that the heat trace cable is "on" and heating. As the cable continues to heat and raises the water temperature to between 1 and 2°C (33 to 36°F), the white light will flash indicating a normal range.

Step 4. If the temperature in the inclined shaft continues to rise above 2°C (36°F), the white light will be "on steady". If the temperature is above 29°C (85°F), the red light on the right hand side of the control box will come "on". The red and amber lights "on" at the same time with the white light out indicates an alarm condition!

Step 5. Turn on the pump and allow water to run, this should lower temperature of the intake line until the red light goes out. Turn the pump off. If the red light will not go out or comes back on, then turn off power and check the heater tape or temperature of the pipe. If it is warm, replace the complete control unit.

Note: No field adjustments should be attempted but the whole unit should be changed.

OPERATING PROCEDURES

B. OPERATING PROCEDURES FOR HEAT TRACE SYSTEM (cont'd)

Step 6. If the amber light is off, this indicates an alarm condition. There is no power getting to the heat trace cable. Go to the circuit breakers Panel "A" and turn breaker No. 12 and 14 off, then on. If the amber light does not come on, replace the complete unit.

OPERATING PROCEDURES

C. OPERATING PROCEDURES FOR HEATING & VENTILATING SYSTEM

Note: Heat for the building is normally provided by electric heater mounted near the ceiling to the left of the inclined shafts. This electric heater is automatically controlled by a thermostat located on the front of the heater unit.

Step 1. Insure that the electrical heater circuit breakers is to the "on" position in the "Breakers Panel".

Step 2. Set the thermostat located on the wall to the left of the pump house door to 15°C (59°F). This thermostat controls the warning lights only.

Step 3. The green lamp mounted outside on the mast above the pump house door will light up as long as the temperature inside the building remains above the level set on the thermostat. Should the electric heat fail and the temperature of the building falls below the preset level, then the red light on the mast will come on indicating an alarm condition.

Step 4. If the red light is "on", it will be necessary to enter the building and light the oil space heater manually (see Chapter 10-8 for detailed procedure for lighting the oil space heater).

Caution: Since the oil space heater is not automatically controlled and the building is well insulated, overheating of the building could result if the space heater is not continually supervised. The space heater should be manually run on an "on" and "off" basis levels in accordance with the temperature levels indicated on the thermometer in the thermostat.

OPERATING PROCEDURES

D. OPERATING PROCEDURES FOR HYPOCHLORINATOR

Step 1. Insure that the hypochlorinator circuit breakers #8 and #10 in the "Breaker Panel" are "ON" and the chemical pump electrical cord is plugged into the wall receptacle labeled "automatic". This will automatically turn on the chemical pump each time the water pumps are run to fill the tank truck.

Step 2. Prepare the chlorine solution in 10 gallon (45.4 litre) batches for better quality. This amount should last approximately one month. Fill the chlorine mix tank with 10 gallons of water; by opening the cold water feedline valve tag No.3 during a truck filling operation; or by closing gate valve No. 1 on the mainline and operating the pump. Five gallon intervals are marked on the side of the tank. Then add 3 cups of the chlorine granules from the 100 lb. drum provided. Plug the chemical mixer into the manual receptacle and mix for several minutes or until disolved. Repeat the mixing operating once a week when the pump is not operating.

Note: A white sediment will settle to the bottom of the mix tank. Once it reaches a depth (approx. 3", 75 mm) that can enter the pump intake, it should be dumped out of the tank.

Step 3. Turn the dial setting on the chlorine pump to six. Operate the pump a few minutes before testing the chlorine level with the test kit provided.

The following method can be used to test for a chlorine residual level of .3 mg/ℓ (i.e. the colour of the sample will match the colour of the .3 mg/ℓ circle of the test kit.)

A) During a pumping operation, open sample tap and hose bib fitting located on cold water line one foot to the right of gate valve (No. 1) and allow some water to run, before filling the two glass sample tubes to the white lines on each tube.

B) Put the two glass tubes in the square holder with the colour coded circles; one in the center and one on the left hand side.

C) Fill the eye dropper to the white line with chemical from the bottle provided and empty this into the center glass tube.

D) Wait five minutes, then compare the colour of the center tube with the coloured circles for a chlorine residual level. The coloured circle with the same colour as the center tube indicates the mg/ℓ residual chlorine level.

E) If the colour in the center tube is darker than the circle colour at the .3 mg/ℓ, turn the dial on the chlorine pump to 5 and repeat the chlorine residual test.

Lower the dial number on the chlorine pump until the center tube colour appears similar to the colour of the .3 m/ℓ circle.

F) If the colour in the center tube is lighter than the colour of the circle colour at .3 mg/ℓ turn the dial on the chlorine pump to 7 and repeat the chlorine residual test.

Raise the dial number on the chlorine pump until the center tube colour appears similar to the colour of the .3 m/ℓ circle.

Step 4. Once the desired chlorine residual level .3 mg/ℓ has been established, the test should be made in the pump house once per day. Then adjust the dial setting on the chlorine pump as required.

NOTE: Once a week the chlorine residual should be tested at the point of delivery. Test a sample from the truck while delivering to a building, this will indicate accurately the chlorine residual level. Adjustments should then be made to the dial setting on the chlorine pump to obtain .2 mg/ℓ minimum.

The American Water Works Association and the Ontario Ministry of Environment both require a .2 mg/ℓ minimum free residual chlorine level after 10 min. of contact for a complete destruction of bacteria.

CHAPTER 6

SPECIAL PROCEDURES

A. SPECIAL PROCEDURES FOR REMOVING PUMP

Step 1. Make sure the electrical power to the pumps and the heat trace system has been turned off at the "Breaker" Panel "A".

Step 2. Unplug the heat trace cable and the pump electrical cable at the receptacles mounted on the pump house wall above the inclined shafts.

Step 3. Loosen the four nuts on the flange plate at the end of the shaft to permit the rubber seal to decompress. Do not remove the nuts since the bolts may drop out into the inclined shaft.

Step 4. Remove the six bolts around the flange plate and remove the plate and the rubber seal.

Step 5. Unhook the pump pull cable from the ring bolt in the pump house floor and attach it to the winch. Under some circumstances, it may be easier to pull the pump manually rather than use the winch.

Step 6. As the winch is cranked, the discharge pipe from the pump will start to come out of the shaft and should be directed through the pump house door as the removal progresses.

Note: The pump discharge piping is approximately 46 m (150 ft.) long.

Step 7. Once the pump has been withdrawn from the shaft the power cable should be unclamped, the pull cable disconnected and the flange connecting the pump undone to release the pump. To unclamp the pull cable, undo the stainless steel band clamps holding the cable to the discharge piping. Then undo the U-bolts above the swivle to disconnect the power cable. Remove black tape then unwind copper wire connections on each wire.

Note: For detailed instructions on the pump operation and maintenance, refer to Chapter 10-2.

SPECIAL PROCEDURES

A. SPECIAL PROCEDURES FOR REMOVING PUMP (cont'd)

Step 9. To reinstall the pump, reverse the above noted steps.

NOTE: The pump only needs to be removed in the event of a loss of water caused by a pump breakdown. No other service will be required.

SPECIAL PROCEDURES

B. SPECIAL PROCEDURES FOR BACKFLUSHING INTAKE SCREENS

Note: If filling the tank truck takes longer than the normal 12 minutes or the pressure in the discharge line drops below the normal 3 p.s.i. when the pump is running, the problem may be that the intake screen is partially plugged with floating debris. Backflushing of the screen is possible as explained in the following steps.

Step 1. Turn off the electrical power at the "Breakers Panel" for Pump No. 1.

Step 2. Close Gate Valve No. 1 and Gate Valve No. 2.

Step 3. Connect fire hose from an external source such as the water tank truck or fire pumper to the hose connection on the intake shaft, (Fitting No. 2 on the plan entitled 'Pump House Piping and Fittings' included in this Chapter).

Cautions:

1. The backflush pressure should never be allowed to exceed 30 p.s.i. as measured by a pressure gauge on the hose from the external water supply. Blockages not removed by backflushing to these pressures will require the services of a diver.

2. The intake is protected against floatation only for 10 percent of its volume as air. Any backflushing procedure which could result in more than 10 percent by volume of air in the intake will result in the intake pipe floating to the surface.

CHAPTER 7

WATER SUPPLY SYSTEM
FOR
HAMLET OF IGLOOLIK - N.W.T.

LUBRICATION AND MAINTENANCE SCHEDULES

Lubrication and maintenance requirements are provided in Chapter 10 in the amnufacturer's brochures for each component.

CHAPTER 8

WATER SUPPLY SYSTEM
FOR
HAMLET OF IGLOOLIK - N.W.T.

OPERATION AND MAINTENANCE RECORDS

The contents of this chapter will be prepared by the staff of the Department of Public Works, Government of the North-west Territories.