

## **6.0 OPERATION PROCEDURES**

### **6.1 START/STOP TRUCKFILL – NORMAL OPERATION**

Location: START / STOP Switch located on truckfill arm or on wall inside the treatment room.

- 6.1.1 Press the START button to start fill
- 6.1.2 Press the STOP button to stop fill
- 6.1.3 Check that water drains out of arm and into the intake casing

Troubleshooting

- 6.1.4 If there is no flow
  - 6.1.4.1 Check that there is power to the plant
  - 6.1.4.2 Check that all controls are in the AUTO position
  - 6.1.4.3 Check that all manual valves are set in the correct positions
- 6.1.5 If there is no or insufficient chlorine
  - 6.1.5.1 See section on chlorine pumps
- 6.1.6 If the truckfill arm does not drain
  - 6.1.6.1 Check the operation of SV1, located on the wall by the water storage tanks

### **6.2 START/STOP TRUCKFILL – FIRE FILL**

Location: START / STOP Switch located on truckfill arm or on wall inside the treatment room.

- 6.2.1 Press the START button to start fill
- 6.2.2 Press the STOP button to stop fill
- 6.2.3 Check that water drains out of arm and into the intake casing

Troubleshooting

- 6.2.4 If there is no flow
  - 6.2.4.1 Check that there is power to the plant
  - 6.2.4.2 Check that all controls are in the AUTO position
  - 6.2.4.3 Check that all manual valves are set in the correct positions
- 6.2.5 If there is no or insufficient chlorine
  - 6.2.5.1 See section on chlorine pumps
- 6.2.6 If the truckfill arm does not drain
  - 6.2.6.1 Check the operation of SV1, located on the wall by the water storage tanks

### **6.3 RAW WATER PUMPS**

Location: VFD's and Control Panel in generator room, START/STOP stations

- 6.3.1 The raw water pumps are started by the START/STOP stations

Troubleshooting

- 6.3.2 If the pumps do not start
  - 6.3.2.1 Check that there is power to the plant
  - 6.3.2.2 Check that all controls are in the AUTO position
  - 6.3.2.3 Check that the VFD's or Control Panel do not show any errors
  - 6.3.2.4 Check that all manual valves are set in the correct positions
  - 6.3.2.5 Switch to other pump

- 6.3.3 If flow is too low
  - 6.3.3.1 Switch to other pump

## 6.4 BASKET STRAINER

Location: Treatment Room after raw water intakes

- 6.4.1 To change or empty the strainer
  - 6.4.1.1 Turn off the raw pumps
  - 6.4.1.2 Close valves immediately upstream of the strainer IV1.
  - 6.4.1.3 Depressurize the system by opening sample tap, SP1
  - 6.4.1.4 Close sample tap, SP1
  - 6.4.1.5 Unscrew top of strainer
  - 6.4.1.6 Clean strainer
  - 6.4.1.7 Open valves that were closed, IV1.

## 6.5 CARTRIDGE FILTRATION

Location: Treatment room



**Fig. 1** Swing bolt cartridge filter housings.

- 6.5.1 Filters should be changed when the pressure differential across them reaches 15-20 psi
- 6.5.2 To change the filters

### **Always Isolate And Remove Pressure From Housing Before Servicing.**

- 6.5.2.1 Turn off the raw pumps
- 6.5.2.2 Close valves before and after the filter vessel
- 6.5.2.3 Open the drain valve
- 6.5.2.4 Undo the housings bolts
- 6.5.2.5 Rotate the cover off the vessel

- 6.5.2.6 Pull out filters by the stainless steel Cartridge Handle
  - 6.5.2.7 Undo the Handle from the used filter and put it onto the new filter. Tighten securely to seal the handle to the filter
  - 6.5.2.8 Install Cartridge/Handle assembly(s) onto Stand-pipe(s). Position Cartridge/Handle assembly downward until Cartridge's Bottom End Cap contacts the housing's Tube Sheet. The Cartridge's Bottom End Cap will seal with the Stand-pipe Coupling to prevent by-passing. A slight rotating action will assist in the positioning of the Cartridge while engaging the Stand-pipe Coupling. Confirm all Cartridge/Handle assemblies are properly positioned.
  - 6.5.2.9 Inspect Housing O-ring and make sure that it is free from cracks and debris.
  - 6.5.2.10 Clean Housing and Lid O-ring mating surfaces.
  - 6.5.2.11 Place Housing O-ring into channel of Housing.
  - 6.5.2.12 Return Lid to proper closure position and lower onto Housing O-ring. Make sure O-ring stays in the channel of the Housing.
  - 6.5.2.13 Return all Swing Bolts, Eye Nuts, & Washers to their closure position.
  - 6.5.2.14 Tighten all Eye Nuts by hand in a star pattern several times until all Eye Nuts are uniformly tight.
  - 6.5.2.15 Start the flow of water by first opening the inlet valve and allow the housing to completely fill, then, open the outlet valve.
- 6.5.3 For PARALLEL operation of the 1 micron cartridge filters. (i.e. NORMAL operation)
    - 6.5.3.1 Open valves IV10 and IV11
    - 6.5.3.2 Close valve IV12
  - 6.5.4 For SERIES operation of the 1 micron cartridge filters
    - 6.5.4.1 Close valves IV10 and IV11
    - 6.5.4.2 Open valve IV12
    - 6.5.4.3 Remember to reset these valves to the parallel settings for normal operation.

## 6.6 CALCIUM HYPOCHLORITE MIXER

Location: Chlorine Room



**Fig.2** Calcium hypochlorite mixing arrangement.

6.6.1 To make solution

- 6.6.1.1 Add 2 calcium hypochlorite tablets to the top tank
- 6.6.1.2 Use water fill line to fill top tank with 50L of water
- 6.6.1.3 Turn on mixer with the START/STOP switch on the wall
- 6.6.1.4 Leave mixer on until the tablets are dissolved and the solution is well mixed
- 6.6.1.5 Turn off the mixer
- 6.6.1.6 Open valve GBL1 to transfer the solution to the bottom tank
- 6.6.1.7 Close valve GBL1

Troubleshooting

6.6.2 No water to fill

- 6.6.2.1 Check there is water in the domestic water tank
- 6.6.2.2 Check the domestic water pump under the sink
- 6.6.2.3 Check that the valve is open

6.6.3 Mixer doesn't work

- 6.6.3.1 Check for power on the wall socket
- 6.6.3.2 Replace mixer if needed

## 6.7 CALCIUM HYPOCHLORITE DOSING PUMPS

Location: Chlorine Room, Control Panel in generator room



**Fig.3** Calcium hypochlorite solution pumps.

Three dosing pumps deliver chlorine to the truck fill line, namely pump CMP1 before filtration, pump CMP3 after filtration, while pump CMP2 operates only when the fire flow mode is activated.

Assuming that a solution of 1.2 % strength is prepared (two calcium hypochlorite tablets added to 50 L of mixing tank water), the chlorine feed tank will contain  $0.012 \times 0.68$  (0.68 is solid calcium hypochlorite yield) = 0.00816 kg/L (8.16 g/L) of free chlorine. At a residual chlorine target of 1 mg/L (1 ppm) at the nominal flow of 1,350 L/min, total demand is theoretically  $0.001 \times 1,350 = 1.35$  g/min. However, actual demand will be somewhat higher dependent of the amount of organics in the raw water. Set tentatively on the HMI screen CMP1 to 0.5 ppm and CMP3 to 1 ppm. Set CMP2 to 1 ppm.

***Chlorine content should be verified regularly by sampling at the truckfill arm outlet (note that it will decay with time if staying in the solution tank for some extended time).***

6.7.1 To dose chlorine

6.7.1.1 Chlorine is automatically dosed when the water pumps are started

6.7.2 To adjust chlorine dosing quantity

6.7.2.1 Change the chlorine output levels on the HMI on the Control Panel

6.7.2.2 The chlorine pumps do not need direct adjustment

6.7.2.3 Set CMP1 to 0.5 ppm

6.7.2.4 Set CMP3 to 1.0 ppm

6.7.2.5 Set CMP2 to 1.0 ppm, this does not need to be changed

6.7.2.6 Fill the truck and take a sample

6.7.2.7 Check the chlorine concentration in the sample

6.7.2.8 Adjust CMP3 as needed to achieve the desired chlorine concentration.

6.7.2.9 If CMP3 and CMP1 cannot be adjusted to achieve the desired chlorine levels, then the chlorine solution needs to be changed.

Troubleshooting

6.7.3 Chlorine too high/low

6.7.3.1 Adjust dosing levels on the Control Panel

6.7.3.2 Check the solution strength in the chlorine tank. The tank may need to be diluted or drained and a new batch of chlorine solution made.

6.7.4 No Chlorine

6.7.4.1 Check that there is power to the pumps

6.7.4.2 Check that all controls are in the AUTO position

6.7.4.3 Check that the valves are in the correct positions

6.7.4.4 Check that there are no leaks in the chemical feed lines

**6.8 DOMESTIC WATER SUPPLY**

Location: storage tank is across from sink, pump and hot water heater are under sink

6.8.1 Open the taps as needed for water

Troubleshooting

6.8.2 There is no water in the tank

6.8.2.1 Check the solenoid valve supplying the storage tank (SV2)

6.8.2.2 Water usage may be too high

- 6.8.3 The tank is overflowing
  - 6.8.3.1 The solenoid valve supplying the storage tank (SV2) may be stuck open.
  - 6.8.3.2 Manually override and close the solenoid
  - 6.8.3.3 There may be debris in the solenoid and the solenoid needs to be disassembled and cleaned
- 6.8.4 There is no water pressure
  - 6.8.4.1 Check the water booster pump operation. All controls for the pump are internal to the pump
  - 6.8.4.2 Check for leaks in the system
- 6.8.5 There is no hot water
  - 6.8.5.1 Check that there is power to the water heater
  - 6.8.5.2 Check that the valves are in the correct positions

## **6.9 WASTE WATER SYSTEM**

Location: Sump pump and tank is under the floor next Filter #4. The waste water Storage tank is on the wall across from the sink.

- 6.9.1 Sump pump operates automatically
- 6.9.2 The waste water tank needs to be emptied when 80% full

### **Troubleshooting**

- 6.9.3 The sump pump is not emptying into the waste tank
  - 6.9.3.1 Check that there is power to the sump pump
  - 6.9.3.2 Check that the float switch on the sump pump is operational
  - 6.9.3.3 Check that there are no obstructions in the sump pump outlet line

## **6.10 FURNACE**

Location: In the space across from Filters 2 & 3

- 6.10.1 The furnace is controlled by the thermostat on the wall

### **Troubleshooting**

- 6.10.2 There is no heat
  - 6.10.2.1 Check that the thermostat is working properly
  - 6.10.2.2 Check that there is sufficient fuel in the day tank and the day tank is operational
  - 6.10.2.3 Check that the furnace is starting
  - 6.10.2.4 Check the damper on the heat vents are open

## 6.11 BACKUP POWER GENERATOR SET

Location: Generator Room



Figure 4: Automatic Transfer Switches  
ATS1 (“Load Switch”) on the right, ATS2 (“Power Switch”) on the left



Figure 5: ATS control switches

6.11.1 The generator operation is automatically controlled by the Automatic Transfer Switches

6.11.2 All switches should be in AUTO mode in regular operation

6.11.3 To manually test the Genset without switching power source to the building.

6.11.3.1 on BOTH Automatic Transfer Switch, turn the “Engine – Generator Control” switch to “Engine Start”

6.11.4 To manually switch to Hydro / Utility power

6.11.4.1 On ATS1 “Load Switch”

- 6.11.4.2 Change the “Transfer Mode” switch to MANUAL
- 6.11.4.3 Change the “Manual Control” switch to EMERGENCY

6.11.5 To manually switch to Generator Power

- 6.11.5.1 On ATS1 “Load Switch”
- 6.11.5.2 Change the “Transfer Mode” switch to MANUAL
- 6.11.5.3 Change the “Manual Control” switch to EMERGENCY
- 6.11.5.4 Change “Engine – Generator Control” switch to ENGINE START
- 6.11.5.5 On ATS2 “Power Switch”
- 6.11.5.6 Change the “Transfer Mode” switch to MANUAL
- 6.11.5.7 Change the “Manual Control” switch to EMERGENCY
- 6.11.5.8 Change “Engine – Generator Control” switch to ENGINE START

Troubleshooting

- 6.11.6 Generator doesn’t start
  - 6.11.6.1 Check that there is sufficient fuel
  - 6.11.6.2 Check the battery is charged, the battery charger is on the wall

**6.12 GENSET VENTILATION**

Location: Generator Room

- 6.12.1 The ventilation dampers are automatically controlled by the thermostat on the wall
- 6.12.2 The temperature that they open at can be adjusted using the dial on the thermostat

Troubleshooting

- 6.12.3 The dampers do not open or close as expected
  - 6.12.3.1 Check that there is power to the damper control panel
  - 6.12.3.2 Check that the damper actuators are moving

**6.13 DAYTANK AND DIESEL FUEL SUPPLY**

Location: Daytank is in generator room, main diesel storage is outside

- 6.13.1 No adjustments to the day tank are needed
- 6.13.2 To fill the diesel tank outside
  - 6.13.2.1 Open the lid on the Spill container
  - 6.13.2.2 Fill tank
  - 6.13.2.3 Pull drain on the spill container to empty any spilled diesel fuel into the tank
  - 6.13.2.4 Close lid on Spill container

Troubleshooting

- 6.13.3 There is no fuel in the day tank
  - 6.13.3.1 Check the fuel lines for leaks
  - 6.13.3.2 Check for power to the day tank