

POTABLE WATER SYSTEM

A. OPERATING PROCEDURES

Filters

Filtration is necessary in order to remove the suspended matter that remains in the water after clarification. The water flows by gravity to the filters from the recarbonation chamber. It is chlorinated just prior to entering the filters. After this chlorination and subsequent filtration, the water is ready for human consumption.

There are four filters (V-1, V-2, V-3 and V-4) of the rapid sand gravity type. They are supplied with Infilco internals and equipped with semi-automatic controls. Their capacity is 500 gpm each. Each filter is equipped with instrumentation to manually backwash and cycle it from a local board mounted outdoors above the filter battery.

A displacer type level controller is mounted on the potable water clearwell. This instrument is tied into the filter effluent controller system so as to control filter flow from clearwell level. Mounted on the control house panel board are a level indicator, high level alarm, and low level alarm. Head loss and filter effluent flow for each filter appear on two pen recorders mounted on the control house panel board. When head loss reaches an arbitrarily determined point on a filter, it must be backwashed. Head loss on each filter is alarmed in the control room after reaching a predetermined amount by high pressure alarms.

Backwashing of the filters is necessary in order to remove suspended matter that forms on and just below the surface of the sand. This mat of suspended material increases in thickness causing a corresponding resistance to flow through the filters. If allowed to thicken sufficiently, the mat will cause the filter to stop up entirely, or the mat cracks and allows the water to channel through. Before these conditions are reached as indicated by the loss of head gauges, the filter must be backwashed.

The backwash pump (BW-1) is a Peerless vertical type designed for 4500 gpm against 50 feet of head and mounted over the potable clearwell. The rate of flow of backwash water to the filters is controlled by a butterfly valve located in the discharge line from the backwash pump. The valve is controlled by a flow indicating controller mounted on the local panel board. The backwash flow is recorded by a flow recorder mounted on the control house panel board.

November, 1977

DO A 134666
CONFIDENTIAL

To wash a filter, the influent valve should be closed, and the effluent valve remains open, drawing the water on the filter down to just below the top of the backwash outlet launders after which the effluent valve must be closed. The wash to waste valve is opened, and then the surface wash valve is opened. This allows water under pressure to flow to selfpropelled revolving agitators consisting of perforated pipes mounted just above the normal working surface of the sand bed. Water flowing through the pipes causes them to rotate and at the same time the jets of water break up the suspended particles formed on the filter bed. This action allows the particles to be washed to waste during backwashing. The surface wash should continue until it is apparent the suspended particles have been dislodged from the filter bed. Open backwash inlet, start backwash pump and then open backwash valve slowly. Backwashing continues approximately 10 minutes or until filter bed is clean. The backwash valve is closed, backwash inlet is closed and then the backwash pump is shut off. The wash water is drained to waste after which the wash to waste valve is closed. Next the filter to waste valve is opened after which the influent valve is opened. After a short period of filtering to waste, the waste valve is closed and the effluent valve is opened. The filter is then in service.

The effluent from the filters goes to the potable clearwell from which it is pumped to the potable water system.

November, 1977

DO A 134667
CONFIDENTIAL

Potable Water Pumps

The five potable water pumps (PW-1, PW-2, PW-3, PW-4, PW-5) are Peerless vertical type with a capacity of 500 gpm against a head of 130 feet. Two pumps are equipped with pressure switches for automatic operation. Controls for the pumps are mounted near the pumps. The controls are designed to hold the system at a predetermined pressure. This is accomplished by starting of succeeding pumps as the pressure decreases.

In case of a power failure, the controls for the pumps should be set in the "OFF" position. This prevents any contamination of the potable water system, after the air system resumes operation, with untreated water that might have contaminated the filtration system.

Each filter has a two pen head loss and flow recorder, mounted in the control room. A flow recorder mounted on the control room panel board records the flow of water to the potable water system. Head loss indicates a need for backwashing.

November, 1977

DO A 134668
CONFIDENTIAL

B. EQUIPMENT OPERATING PROCEDURES

Filters

SERVICE (NORMAL OPERATION)

The filter inlet and outlet valves should be open during normal operation. All filter valves are operated by use of hand switches on the local filter panel board located above the filters. A Visual inspection of the valve in question will determine the position of the valve.

Set the maximum effluent rate at the desired amount by use of the hand controllers mounted on the control room panel board. The flow rate will appear on the recorder above the controller.

WASHING

The need to wash a filter is determined by the loss of head gauges mounted in the control room.

November, 1977

DO A 134669
CONFIDENTIAL

Potable Water Pumps

START-UP

Check the discharge valve of the pumps and open if necessary. Also check the motors for lubrication. "Hand-Off-Automatic" switches are provided for operation of the pumps. When the switch is in the "Hand" position, that particular pump will be in constant operation. When the switches are in the "Automatic" position, the pumps are controlled by the pressure in the system. A pump starts when the pressure in the system drops below that for which the pressure switches are set.

OPERATION

Check the pressure in the potable water system periodically for normal operating pressure. A pressure indicator is mounted in the control room. Also each pump discharge has a pressure gauge mounted on it.

SHUT-DOWN

To shut a pump down, place the switch in the "OFF" position. Inspect the check valve for leakage. If the check valve leaks, close the pump discharge valve and record in the log sheet. Tag and write MMR.

November, 1977

DO A 134670
CONFIDENTIAL

Backwash Pump

START-UP

Check the pump driver for lubrication. Operate the "Start" pushbutton located on the local panel above the filters. Start the pump with the discharge valve nearly closed. The valve is controlled from the local panel by a flow indicating controller. Gradually increase the backwash flow by operation of the controller until the desired flow is reached.

OPERATION

Check the pressure (indicated by a gauge mounted on the pump discharge) and flow (indicated on the local panel) of the pump.

SHUT-DOWN

Close the discharge valve by operation of the flow indicating controller.

Operate the "Stop" pushbutton mounted on the local filter panel.

November, 1977

DO A 134671
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