

## **OPERATOR DUTIES**

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### **WEEKDAY SHIFT**

All lab tests are to be run at least every four hours when treating water. The bench top turbidimeter should be calibrated each morning. Any preventative maintenance should be performed as required. Filters, which are due to be backwashed, should be backwashed when clearwell has enough water. If no backwashing is needed or due, Do Not Overflow the Clearwell, shut down part or all of the plant. Clean the lab if needed. The chemical room should be swept daily on both shifts. The Clearwell should be full before leaving.

### **WEEKEND SHIFT**

The weekend operator will perform all duties required of morning and night shift. This is to include lab tests, cleaning, backwashing and any necessary maintenance. The grounds should be kept clean. The grounds should also be mowed and trimmed if needed. The Lab should be swept and mopped every weekend. The lab should be cleaned more often if needed.

### **ALL SHIFTS**

All shifts will share the workload and responsibilities. If you see something that needs doing, do it. The plant should be kept clean at all times. If chemicals or lab supplies are needed, let CPO know. Call for assistance or, if possible, wait until a shift change. Operators on all shifts should fill out the Water Quality Parameter worksheet, preferably hourly. To insure accuracy, calibration should be checked on the bench top turbidimeter during each shift. The chief operator or his/her designee will complete the monthly reports including MOR, Turbidity report, Disinfection report, Pumpage report and DMR, and send them to the appropriate state office by the 10<sup>th</sup> of each month. The Church Ave tank should be filled to a level of 56.0’.

### **START UP**

1. In filter hour book record:
  - High service pumps and raw water pump that are being used for the day.  
1 small 1400 raw pump (#1 or 2) and 2800 raw pump (#3) are run each day. The small pumps are alternated each month.
  - Record what time each filter is being started.
  - Every morning record the reading from # 4 high service pump on daily work sheet.
2. Clear the counter. Flip alarm switch to “on” position. If alarm goes off- push acknowledge button after you look at board to see what alarm is activated and correct the alarm.
  - #1 valve is used to operate old side plant it will show 1600 gpm chart.
  - #2 valve is used to operate new side plant it will show 3400 gpm chart.
3. Push # 1 or # 2 raw pump to open manually at your valve control switch
  - (#1 and #2 raw pump works on water #1 valve )

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4. Open to 1300. This is done by pressing the R button under valve control. Hold till gauge reads 1300
5. Push # 3 raw water pump to open manually at your valve control switch
  - (#2 raw pump works on water #2 valve)
6. Open to 2800. This is done by pressing the R button under valve control. Hold till gauge reads 2800
7. Start all 3 Dypac 5759 chemical pumps.
8. Start all 6 flash mixers.
9. Start all 14 flocculators.
10. Open all 6 filters on the Honeywell control by pushing button from Man(manual) to A(automatic). Digital read will show either A or Man.
11. Turn 2 Carry Water pumps on
12. Turn 2 Bleach pumps on (wait about 5-10 seconds in between turning pumps on)
13. Turn 2 fluoride feed pumps on
14. Turn 2 phosphate 7390 feed pumps on
15. At approximately 30 minutes after start up start 2800 (#1) high service pump  
**OR**
16. When clearwell indicator reaches approximately 11.0 start (#2 or # 3) high service pump.
17. At this time, 2 raw pumps and 3 high service pumps are operating.

Your goal is to get tank level and clearwell level full at about the same time.

- Church Ave -full and over flows at level 57.0(just fill to 56.0)
- Clearwell- full level is 15.2
- During heavy rain events, fill clearwell to 14.6.

## **DAILY OPERATIONS**

- Make sure your flows remain at 1300 gpm and 2800 gpm. Adjustments may be necessary periodically during the day.
- Go down stairs check all your chemical feed pumps to assure they are operating.
- Inside of Bleach room check both feed rate and make sure bleach is feeding.
- Then go to high service building unlock and make sure everything looks normal (no water coming in, etc.)

## **SHUT DOWN**

- 1) Larger (#1) high service pump will shut automatically.
  - Turn switch to off position. Be sure to let pressure stabilize in between each high service pump being shut down to prevent water hammer.
- 2) Switch to the off position one small high service pump.
- 3) Push stop button on # 3 (2800gpm) raw water pump.
- 4) As #3 raw pump begins shut down, push small #1 or #2 (1300 gpm) raw pump stop button.
- 5) Go to the control and press and hold the “L” button till the light gets brighter on #2. When you see, the valves start to close on the small raw water #1 or #2 go to the control and press and hold the L button till the orange light turns a dim color.
- 6) These valves (small raw water valve #1 and # 2)



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## STANDARD OPERATING PROCEDURE

- #1 which operates pumps #1 or #2 the 1300 gpm pumps
- #2 which operates pumps #3
- High service #3 is operating new side filters (3, 4, 5, 6) during normal operation and
- High service # 1 and #2 are operating the old side filters (1, 2)

As you shut pumps down, close filters also.

- 7) On the Honeywell controls switch back to M (manual) from A (automatic) and push the down button till filter show out.
- 8) Turn 2 chlorine feed pumps off
- 9) Turn 3 delta feed pumps off
- 10) Turn 2 fluoride feed pumps off
- 11) Turn 2 phosphate 7390 feed pumps off
- 12) Turn 6 flash mixers off
- 13) Turn 14 flocculators off
- 14) Go downstairs and confirm all chemical feed pumps are off.
- 15) Record your fluoride weight from day tank.
  - If needed, fill day tank up. Set scales to 300lbs turn valve by day tank to open, go to your bulk tank and open valve.
  - If bulk tank is full, day tank will fill quickly so you must monitor closely.
  - If bulk tank is  $\geq$  half full you will have time to go to chlorine rooms.
- 16) Confirm bleach is off and get your bleach weights from scales in bleach room.
- 17) Go check your high service building. Make sure all pumps are shut off and all valves closed. Then lock building. Be sure to turn valves on-Fluoride feed line to close when the 300-lb. limit is reached. When limit is reached, the arm will be balance between top and bottom rail.

### BACKWASH

- 1) Cut raw water flow back to one filter depending which side backwashing.
  - Old side will be cut back to approximately 700 and new side approximately 2100.
- 2) Turn off influent.
- 3) Turn filter control from remote to local. (effluent and rate of flow will close)
- 4) Open waste water: new side 60% old side 80%.
- 5) Open surface wash: new side 60% old side 80%.
- 6) Start backwash flow.
- 7) Start wash water: do this step slow about 10% at a time until air calms down then open more to 30% at a time.
  - New side: 3200 old side: 2700.
  - If water starts backing up, turn your flow down.
- 8) Take hose and spray walls etc. down.
- 9) Steps 10 & 11 should be completed simultaneously.
- 10) Close waste water.
- 11) Close wash water.
- 12) Stop backwash pump.
- 13) Open influent.



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- 14) Open rewash new side 30% old side 60% let rewash a minimum of 5 minutes let turbidity start coming down need to be below a .3 NTU
- 15) Close rewash.
- 16) Turn filter control from local to remote (effluent and rate of flow will open).
- 17) Make sure all control knobs are in off position.
  - Influent should be at 100% and filter control should be on remote.
- 18) Return to control room start pumps back and adjust your flows back to where they should be (at start up).
- 19) Record backwash reading on figure sheet.
- 20) Mark your turbidity chart with backwash and rewash, date and your initials.

### **CN-1196 Individual Filter Exceedance Report**

- Exceedance report is required by the SWTR (CN 1196)
- The Exceedance report must be submitted anytime an individual filter exceeds 0.50 NTU after four hours of startup or a filter backwash.
- If a filter is shut down due to turbidity limits, it must be backwashed before being placed back into service.
- It is not a violation to exceed the 0.50 NTU limit, but it is a reporting violation for not submitting the Individual Exceedance Report.
- The exceedance report must include either an obvious reason for the turbidity event or provide a filter profile. A filter profile is a graphical representation of the filter from backwash to backwash with designation of other filters backwashed.
- A statement detailing the obvious reason must be included as a part of the submittal.

## **EQUIPMENT MAINTENANCE**

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### **ROUTINE MAINTENANCE**

All equipment should be checked regularly. This includes pumps, flocculators, mud paddles, feeders and any other essential equipment. Chlorinators should be checked regularly for leaks and to ensure proper operation. Repairs to chlorinators, which could result in the release of chlorine gas, should not be attempted with only one operator present. Oil should be checked in gear reduction units daily. Gear reduction units should be greased quarterly. Grit chambers should be flushed at least bi-weekly and more often if necessary. Pump motors should be greased every six months. *Don't assume someone else will take care of routine maintenance, it is a responsibility to be shared by maintenance technician and all operators.*

### **MONITORING EQUIPMENT**

The in-line turbidimeters should be cleaned at least monthly. The in-line chlorine residual monitor should be cleaned as needed. The bench top turbidimeter should be calibrated the second month of each quarter to assure the 90 days +/- 2 days' rule is met. The secondary standards calibration should be checked during each shift. If at any time a piece of continuous monitoring equipment is down, tests should be performed regularly on bench top equipment until repairs can be made.



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## STANDARD OPERATING PROCEDURE

### BREAKDOWNS

If any equipment breaks down on your shift, repair it or call Plant Director for a P.O. and contact someone who can make the needed repairs. If repairs cannot be made on your shift, be sure to notify the operator on the next shift of the breakdown. The Plant Director and/or Chief Operator should be notified of the breakdown of any equipment, which could adversely affect the quality or quantity of the finished water.

### FILTERS AND TURBIDITY

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#### FILTERS

Routinely filters 1 and 2 should be backwashed and then a combination of filters 3,4,5,6. Filter effluent turbidity should be checked regularly. Any filter with an effluent turbidity of 0.2 NTU or greater should be backwashed to improve the water quality. Any filters with the rate of flow not filtering at appropriate rates shall also be backwashed.

#### TURBIDITY

The bench top turbidimeter should be calibrated Quarterly. Calibration should be checked during each shift. At any time, the raw turbidity begins to rise, the operator on duty should check the floc at least every 30 minutes and adjust the Dypac 5759 accordingly.

At any time, the FINISHED WATER TURBIDITY reaches 0.2 NTU or greater, the following actions should be taken:

At any time, the FINISHED WATER TURBIDITY reaches 0.3 NTU or greater, the following action should be taken:

- Backwash any filter which needs it.
- Check all chemical feeders for proper operation and feed rates.
- Check floc and make any necessary feed adjustments.
- Monitor finished water turbidity every 15 minutes.

At any time, the FINISHED WATER TURBIDITY reaches 0.45 NTU or greater, the following action should be taken:

- Shut off High Service Pumps.
- Follow the steps listed above to correct the problem.
- Monitor clearwell turbidity every 15 minutes.
- High Service Pumps should not be started until the clearwell turbidity falls to 0.3 NTU or less and remains there for at least 30 minutes.
- Accurate records of all analysis results should be maintained.
- Inform the operator on the following shift about the problems you experienced. Communication between operators is important.
- Notify the Plant Director so the filter exceedance form can be filled out.



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At any time, the CLEARWELL TURBIDITY reaches 0.5 NTU or greater, the following action should be taken:

- ❑ Waste the clearwell water using one of the following methods:
  - Use the clearwell drain.
  - Overflow the clearwell.
  - Filters may be backwashed while the rewash valve is open.
- ❑ Do Not Run High Service Pumps
- ❑ Contact the Plant Director and /or chief operator.
- ❑ Monitor the Clearwell turbidity every five minutes.
- ❑ Continue to waste or overflow the clearwell until a Clearwell turbidity of 0.3 NTU can be maintained for at least 30 consecutive minutes.
- ❑ Restart the High Service Pumps.
- ❑ Continue to monitor the Finished Water turbidity every 15 minutes for at least one hour.

## CHEMICALS AND FEEDERS

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### DYPAC 5759 SOLUTION

Adjustments should be made as necessary to maintain a good floc. Should an adjustment be necessary, the Chemical feed pumps should be adjusted only 10 mg/l at a time. Wait two hours after making an adjustment before further adjusting the feed rate.

### CHLORINE

The chlorine dosage should be monitored closely. The following dosages should be used as a guideline:

- ❑ When the outside temperature is 70° Fahrenheit or below, the dosage should be kept between 2.0 mg/l and 2.5 mg/l.
- ❑ When the outside temperature is above 70° Fahrenheit, the dosage should be kept between 2.5 mg/l and 3.0 mg/l.

Under no circumstances should the operator allow the finished water free chlorine residual to fall below 1.5 mg/l or rise above 3.5 mg/l.

### PHOSPHATE

Make sure all chemical feed pumps are pumping.

### KMnO<sub>4</sub>

Check flashmix every 3 hours for slight pink tint in water to assure that chemical is feeding. Go to Raw Water Building on Tuesday and Friday to top off levels. If no pink tint is seen in flashmix during routine rounds go to raw water to assure chemical is feeding. Do a KMnO<sub>4</sub> demand test daily from March to June to assure dosage is accurate for taste and odor.

### FLUORIDE

The concentration of fluoride in the finished water must be maintained between 0.5 mg/l and 0.7 mg/l based on the monthly average. It should never be allowed to reach 2.0 mg/l. Operators



# ROCKWOOD WATER TREATMENT PLANT STANDARD OPERATING PROCEDURE

should strive to maintain a concentration 0.7 mg/l. Should an adjustment be necessary, the Chemical feed pumps should be adjusted only one notch at a time. Wait two hours after making an adjustment before further adjusting the feed rate.

## **EMERGENCIES OR UNUSUAL CONDITIONS**

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Any operator who experiences a problem or unusual situation on his shift, which cannot be solved by the end of the shift, or which may reoccur, should advise the other operators.

If any emergency should arise or if an unusual condition develops that the operator does not feel comfortable handling, the operator on duty should contact the Plant Director and/or Chief Operator or another certified operator immediately. At any time there is a situation, which could affect public health, such as but not limited to high turbidity or low chlorine residual, the Plant Director and/or Chief Operator should be contacted immediately. *Remember, the health of all of our customers is in your hands!*

## **NOTIFYING THE STATE**

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The Knoxville Environmental Assistance Center (field office) should be notified when any of the following conditions occur:

- ❑ As soon as possible, but no later than the close of the next business day, any time the turbidity exceeds 5.0 NTU.
- ❑ As soon as possible, but no later than the close of the next business day, any time the chlorine residual falls below 0.2 mg/l in the water entering the distribution system.
- ❑ Immediately when any major breakdown or failure of equipment in water treatment process occurs which affects the quality or quantity of the water leaving the treatment plant.
- ❑ Immediately when any situation with the water system occurs, which presents or may present an imminent and substantial endangerment to health.

*The Plant Director and/or Chief Operator should also be notified immediately when any of these conditions occur.*

## **FILLING BLEACH DAY TANKS**

- 1) Open valve on desired day tank.
- 2) Open Bulk Tank Valve.
- 3) Start Transfer pump.
- 4) Fill to desired level on desired tank.
- 5) If filling 1 tank shut valve on day tank.
- 6) If filling both tanks do step 5 then when desired weight on second tank is reached then turn transfer pump off then, close bulk tank valve then close day tank valve.



# ROCKWOOD WATER TREATMENT PLANT STANDARD OPERATING PROCEDURE

## **APPROVAL**

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Approved on: \_\_\_\_\_

Approved By:

Plant Director or Chief Operator: \_\_\_\_\_

General Manager: \_\_\_\_\_

## **OPERATORS**

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I have read and understand the procedures outlined in this SOP. I agree to adhere to these procedures at all times.

Operator: \_\_\_\_\_ Date: \_\_\_\_\_

Operator: \_\_\_\_\_ Date: \_\_\_\_\_

Operator: \_\_\_\_\_ Date: \_\_\_\_\_

Operator: \_\_\_\_\_ Date: \_\_\_\_\_

