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Approval:

SOP No:
Revision No:
Effective Date:

SUBJECT: CxT Data Entry

Introduction and Purpose:

To provide guidance to operators on entering CxT Data.

Online spreadsheets were developed to allow operators to calculate CxT each day. Data is inputted into the spreadsheet and the CxT is calculated under worst case scenarios.

Data values can be entered from the Daily Report after verifying through SCADA.

If Daily Report is unavailable, values can be collected from SCADA Trends.

Temperature and pH values are collected during daily rounds.

Procedure:

1. Download Daily Report and verify values recorded from SCADA Trends.
2. Log onto the CxT Spreadsheet
3. Adjust date and clear values
4. Input turbidity values from the following:
 - Raw Max - Actiflo raw turbidity max when Actiflo is running.
 - Settled 1 - Actiflo #1 max turbidity reading when Actiflo #1 is running.
 - Settled 2 - Actiflo #2 max turbidity reading when Actiflo #2 is running.
 - Filter 1 Max - Max turbidity when filtering.
 - Filter 2 Max - Max turbidity when filtering.
 - Filter 3 Max - Max turbidity when filtering.
 - Filter Max - Auto generated from the values entered into each filter.
 - Finished - Max High lift turbidity reading.

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5. Paste data onto spreadsheet and enter initials.
6. Enter comments if necessary and enter initials.
7. Input CxT Data from the following:
 - Flows - Max Combined Filter Flow - Filter combined peak flow in L/s
 - Max Treated Water- High Lift peak flow in L/s
 - Cl₂ Residuals - Clearwell Cl₂ - Minimum Cl₂ reading from clearwell
 - West Reservoir - Minimum Cl₂ reading from West Reservoir
 - East Reservoir - Minimum Cl₂ reading from East Reservoir
 - Minimum Reservoir Depths - Minimum East and West Reservoir Depth if in service
 - Water Conditions - Max Treated pH
 - Minimum Treated Temp.
8. Paste data onto spreadsheet and enter initials.
9. Enter comments if necessary and enter initials.
10. Review data and graphs to confirm that CxT targets have been met.
11. Notify Senior Operator and ORO if CxT targets have not been met.

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CxT Calculation

CxT required = Target X 0.2828 X pH 2.69 X (Min Cl₂ Residual) 0.15 X 0.933(T-5)

Where:

CxT required = the required CxT to achieve the target log inactivation (mg/L*min)

Target = 0.5 log pH = Max pH

T = Minimum Temperature (°C)

CxT actual = CxT pipe + CxT reservoir

CxT pipe = Volume pipe X BF (pipe) / Flow Raw X 1440 (min/d) X Min Cl₂ Residual (mg/L)

CxT reservoir = Volume Effective / Flow Treated X 1440 (min/d) X Min Free Cl₂ Residual (mg/L)

Note: CxT is calculated for each reservoir and the minimum value used, assuming the total flow is equally split between the two reservoirs.

Where:

CxT actual = actual CxT achieved by pipe to reservoir and reservoir

Volume pipe = 55.9 m³

BF (pipe) = 1.0

Flow Raw (m³/d) Max Raw Flow Rate (L/s) X 60 (s/min) X 1440 (min/d) / (1000 L/m³)

Area = 3817.1 m² for one reservoir

Baffling Factor (BF) = 0.10

Volume Actual = Area X Min Reservoir Depth (m³)

Volume Effective = Volume Actual X BF (m³)

Flow Treated = Max Treated Flow Rate (L/s) X 60 (s/min) X 1440 (min/d) / (1000 L/m)

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