

Memorandum

September 12, 2019

TO: Historical Memo

FROM: Rick Butler, Process Control Supervisor

SUBJECT: South Treatment Plant at Renton (STP)
August 2019 Operating Record

STP met all of its conventional permit limits for secondary effluent in August 2019. Flow averaged 53-mgd. The max-day flow was 56-mgd (August 21 and 22). Final effluent quality averaged 3-mg/L carbonaceous BOD (cBOD_5), 5-mg/L TSS and 7-mg/L total BOD₅. Respective removals were 99%, 98% and 98%. All flows received secondary treatment.

August was dry and slightly warmer than normal. Rainfall totaled 1.20-inches. August's historic precipitation averages 0.88-inches; the record is 4.59-inches (1975). The max-24hr rain in August was 0.38-inches on August 10. Daily high and low air temperatures averaged 78.3°F and 59.9°F, respectively, which are about 2°F and 4°F warmer than normal. Wastewater temperatures were consistently near 74°F, plus or minus 0.5°F.

Offsite Flows and Loads: 2.81-MG of septage were received in August, accounting for 11% of STP's influent solids load. August's septage loads were higher than usual because of sludge received from the City of Lynnwood while they completed repairs to their incinerators. The Southern Transfer (aka Allentown) flowed to STP all month, averaging 3.6-mgd with a max-day of 5.3-mgd on August 10. Deicer flowed from Seatac Airport to STP on 13 days but at very low loads each day (<0.1 tons BOD/day). Essentially no raw sewage and effluent flowed to STP from the Brightwater service area (via York Pump Station).

Sampling and Analyses: All permit-required samples (influent and effluent) were collected and analyzed. The final ETS effluent sample line/sampler was chlorinated every other day. Measured influent loads were about 142,000-lbs/day for BOD, 102,000-lbs/day for CBOD, and 141,000-lbs/day for TSS. These loads are in range with values expected this time of year, and when there is essentially no deicer or Brightwater loads. The effluent chlorine (Cl_2) at the ETS outfall was below the 0.75-mg/L daily average and 0.5-mg/L monthly average limits. The ETS outfall Cl_2 has been monitored using the on-line Hach CL-17 analyzer.

STP Facilities Status: STP operations was in summer mode in August with a few process tanks out of service. The secondary process was operated to avoid nitrification. The gas scrubbing system operated at reduced capacity through most of the month due to planned

maintenance and operational issues. All scrubbed gas was injected into the PSE pipeline. Process heat was provided by the boiler using natural gas. Work continued on upgrading STP's Ovation DCS (distributed control system) by replacing the power supplies of the monitoring-control panels. Reclaimed water was available for offsite application all month.

8 to 9 of the 12 primary tanks, 3 of the 4 aeration tanks, 16 to 20 of the 24 secondary clarifiers, and 1 of the 2 chlorine contact channel (Cl_2CC) were in service all month. Three south primary tanks (1-3) were out of service all month; South Primary 4 went out of service Aug. 22. Aeration Tank 1 returned to service Aug. 27 after air/diffuser system repairs. Aeration Tank 4 then went out of service for similar repairs. POD-1 went out of service on Aug. 11 to allow repairs to the flow meter. POD-5 remained out of service for planned maintenance and upgrades to the agitation air diffusers in its MLSS channel. The section of the north Cl_2CC that is west of POD-1 was out of service all month; all disinfection was performed in the south Cl_2CC using the east hypochlorite system. Five of six DAFTs were in service all month: 3 small DAFTs and both large DAFTs. DAFT4 returned to service on Aug. 20 after scheduled PMs. DAFT2 went out of service that same day for scheduled PMs. All five anaerobic digesters were in service. Dewatering operated every day. On August 31, STP operated with all 8 primary tanks, 3 aeration tanks, 16 secondary clarifiers, one chlorine contact channel, 5 of 6 DAFTs and all 5 digesters.

Secondary Treatment: The secondary process was operated to not nitrify, but to promote the growth of phosphorus accumulating organisms (PAOs). Three of the four aeration tanks were in service; Aeration Tank 1 remained out of service to allow repairs to its air/diffuser system. It returned to service at the end of August; Aeration Tank 4 was subsequently taken out of service for similar repairs. The aeration tanks operated in plug-flow mode with a $\frac{1}{2}$ -pass un-aerated zone in Pass-1. The MLSS concentration was in the 2600- 3000 mg/L range across the month (with three aeration tanks). The secondary system's solids retention time (SRT) was 3-4 days over the month. D.O. setpoints were usually 1.5-1.7 mg/L. Aeration tank air use averaged 67 million- ft^3/day , and was usually in the range of 65-75 million- ft^3/day . The RAS return rate was 60%. Biomass settling was good throughout the month; the sludge volume index (SVI) was usually in the 75-90 mL/g range.

Nitrogen (N) and phosphorus (P) removal averaged 31% and 73%, respectively. Effluent ammonia ($\text{NH}_3\text{-N}$) and nitrite plus nitrate ($\text{NO}_2\text{+NO}_3$) averaged 36-mg/L and <0.3-mg/L, respectively. Effluent Total-P averaged 2.3-mg/L for the month. Effluent alkalinity levels averaged about 100,000-lbs/day as CaCO_3 .

Disinfection: 41,794 gallons of 12.5% sodium hypochlorite (NaOCl) were used to disinfect STP's final effluent in August. This resulted in an average dose of 3.1-mg/L as Cl_2 based on effluent flow. Daily hypochlorite use was usually in the range of about 1200-1400 gpd. High short-term doses (6-10 mg/L dose for 2-hours) of hypochlorite were applied every other week to control bio-growth on the surfaces of the contact channels and ETS forebay. Even with the high short-term doses, the Cl_2 residual at the outfall was <0.2-mg/L Cl_2 . RAS

chlorination for SVI control was not operated in August. Pre-chlorination (for odor control of the influent wastewater) was practiced briefly in August due to higher than normal H₂S levels in the inlet sewer.

Only the south Cl₂CC was in service. That was achieved by installing 1) a gate in the north Cl₂CC just west of POD 1 and 2) a gate in the south Cl₂CC just downstream of the ETS “falls”. With these gates in place, all POD1-4 effluent flowed eastward in the north Cl₂CC until it entered the south Cl₂CC at POD4 where it combined with POD5-6 flows. The combined POD flows were then disinfected in the south Cl₂CC using the east hypochlorite system. When POD-1 went out of service at mid-month, the gate in the north Cl₂CC was moved to a location between POD1 and POD2. This additional section of the north Cl₂CC was drained and cleaned. The north Cl₂CC remained drained and empty for scheduled work.

DAFT: An average of 83 dry-tons/day, or 0.33-mgd at 6.1% total solids, of thickened raw sludge (THS) was produced by the DAFTs. Five DAFTs were in service: two large DAFTs and 3 small DAFTs. 18,150-lbs of polymer (Polydyne WE-1531) were added to DAFT feed sludge in August for an average dose of 7.0-lb active/dry ton THS or 3.6-lb active/dry ton DAFT feed solids. The DAFT solids loading rates averaged 24 lbs./d/ft² for both the large and small DAFTs. One fizz system per DAFT was used on the DAFTs.

Anaerobic Digestion: Time and temperature requirements for Class B biosolids were met via digestion. All four primary digesters and the fifth “blending” digester were in service. Volatile solids (VS) and total solids (TS) reductions averaged 59.4% and 51%, respectively. The digestion detention time averaged 35-days; three of those days were provided by Digester 5. Digester temperatures were in the 98.5-100.5°F range. The VS/TS content entering and leaving the digesters averaged 86.6% and 72.4%, respectively. Digester alkalinity levels were usually in the range of 7000-7500 mg/L as CaCO₃. All primary digesters were operating in parallel and fed equal amounts of THS. The digester VS loading rate averaged 0.10-lbs./day. The gas and pumped mixing systems for all digesters operated in a “normal” mode, with one gas mixing compressor in service per digester.

Dewatering/Biosolids: 5167 wet tons of biosolids (1200-dry tons @ 23.2%TS) were beneficially reused in August. Digested sludge production was closer to 1152 dry tons since digester inventory decreased by 48 dry tons across the month. About 26% of the wet tons were applied to Eastern WA agriculture sites, 66% were applied to forest sites in Western WA., and 7% was used to produce compost. An estimated 62,280 lbs-active polymer were used for dewatering, resulting in an average polymer dose of 51.9 lb-active/dry ton hauled. The applied polymer was Polydyne WE586, a 41.5% cationic emulsion solution. Biosolids were dewatered every day. Centrifuge feed rates were usually 150-gpm. Two centrifuges were usually in service, though three centrifuges were occasionally operated to manage the inventory. Centrate was sent to the DAFTs all month. Gas Scrubber return water was mixed with centrate to control struvite buildup in the centrate conveyance system.