

# Memorandum

December 12, 2019

TO: Historical Memo

FROM: Rick Butler, Process Control Supervisor

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

STP met all of its conventional permit limits for secondary effluent in November 2019. Flow averaged 56-mgd. The max-day flow was 69-mgd (Nov. 19). Final effluent quality averaged 5-mg/L carbonaceous BOD (cBOD<sub>5</sub>), 8-mg/L TSS and 9-mg/L total BOD<sub>5</sub>. Respective removals were 98%, 97% and 97%. All flows received secondary treatment.

November was very dry, especially for the month named November. Rainfall totaled 1.71-inches. Historically, November rainfall averages 6.57-inches; the record is 15.63-inches (2006). The max-24hr rain was 0.39-inches on Nov. 19. Daily high and low air temperatures averaged 53°F and 41°F, respectively, which are both about 1°F warmer than normal. The wastewater temperature dropped across the month from about 66.5°F to 63.5°F.

**Offsite Flows and Loads:** 1.84-MG of septage were received in November, accounting for 7% of STP's influent solids load. The Southern Transfer (aka Allentown) flowed to STP all month, averaging 4.1-mgd with a max-day of 6.8-mgd on Nov. 19. Deicer flowed from Seatac Airport to STP on seven days at an average load of about 0.5-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 usually chlorinated every other day. Measured influent loads were about 156,000-lbs/day for BOD<sub>5</sub>, 116,000-lbs/day for cBOD<sub>5</sub>, and 144,000-lbs/day for TSS. These loads are in range with values expected this time of year with essentially no deicer or Brightwater loads. The effluent chlorine (Cl<sub>2</sub>) at the ETS outfall was below the 0.75-mg/L daily average and 0.5-mg/L monthly average limits.

**STP Facilities Status:** STP operations was in wet weather mode with most process units in service. The secondary process was operated to avoid nitrification. The gas scrubbing system operated at 50-65% capacity because of operational issues with stream/tower 2 and the largest gas compressor. All scrubbed gas was injected into the PSE pipeline for RINs sales. Process heat was provided by the boiler using natural gas. Work was essentially

November 7, 2019

completed on upgrade STP's Ovation DCS, including replacing the power supplies of the monitoring-control panels at the STP.

10 of 12 primary tanks, all 4 aeration tanks, all 24 secondary clarifiers, and both chlorine contact channels (CCC) were in service all month. South Primary Tanks 1 and 3 remained out of service for PMs. Five of six DAFTs were in service all month: DAFT2 remained out of service for PMs. All five anaerobic digesters were in service. Dewatering operated every day. On November 30, STP operated with 10 primary tanks, all 4 aeration tanks, all 24 secondary clarifiers, both chlorine contact channels, 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). All four aeration tanks were in service, operating in plug-flow mode with a ½-pass un-aerated zone in Pass-1. The MLSS concentration was in the 2900 - 3100 mg/L range. The secondary system's solids retention time (SRT) was controlled to about 5-days. D.O. setpoints were usually 1.7-mg/L. Aeration tank air use averaged 63 million-ft<sup>3</sup>/day, and daily use was usually in the range of 60-66 million ft<sup>3</sup>/day. The RAS return rate was 40% all month. Biomass settling was very good - maybe too good; the sludge volume index (SVI) dropped from about 70-mL/g to about 40-mL/g over the month. Such very low SVIs result in very fast settling MLSS that tends to have slightly higher effluent TSS.

Nitrogen (N) and phosphorus (P) removal averaged 32% and 49%, respectively. Effluent ammonia (NH<sub>3</sub>-N) and nitrite plus nitrate (NO<sub>2</sub>+NO<sub>3</sub>) averaged 37-mg/L and 2-mg/L, respectively. Effluent Total-P averaged 3.1-mg/L for the month. The effluent NO<sub>3</sub> and total-P values suggest that some nitrification was occurring in the secondary process. Effluent alkalinity levels averaged about 115,000-lbs/day as CaCO<sub>3</sub>.

**Disinfection:** 31,422 gallons of 12.5% sodium hypochlorite (NaOCl) were used to disinfect STP's final effluent in November. This resulted in an average dose of 2.2-mg/L as Cl<sub>2</sub> based on effluent flow. Daily hypochlorite use was usually in the range of about 950-1100 gpd. Higher 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. The Cl<sub>2</sub> residual at the outfall was essentially <0.2-mg/L Cl<sub>2</sub> at all times. RAS chlorination for SVI control was not practiced in November. Pre-chlorination (for odor control of the influent wastewater) was not practiced in November.

Both the north and south Cl<sub>2</sub> Contact Channels (CCC) all month. A gate located between the north and south CCCs at POD4 forced POD1-4 effluent to flow westward in the north CCC and to be disinfected with the west hypochlorite system. POD5-6 effluent flowed westward in the south CCC and was disinfected with the east hypochlorite dosing system.

**DAFT:** An average of 89 dry-tons/day (0.33-mgd at 6.5% TS) of thickened raw sludge (THS) was produced by the DAFTs. Two large DAFTs and three small DAFTs were in service.

18,150-lbs of polymer (Polydyne WE-1531) were added to DAFT feed sludge in November for an average dose of 7.7-lb active/dry ton THS or 3.8-lb active/dry ton DAFT feed solids. The solids loading rate (SLRs) averaged 22 lbs./d/ft<sup>2</sup> for both the larger and smaller 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 64% and 56%, respectively. The digestion detention time averaged 36-days; four of those days were provided by Digester 5. Digester temperatures were in the 96-100°F range. The VS/TS content entering and leaving the digesters averaged 87.6% and 71.5%, respectively. Digester alkalinity levels were usually in the range of 7500-7800 mg/L as CaCO<sub>3</sub>. All primary digesters were operating in parallel and fed equal amounts of THS. The digester VS loading rate averaged 0.11-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:** 4580 wet tons of biosolids (1067-dry tons @ 23.3%TS) were beneficially reused in November. Digested sludge production was closer to 1100 dry tons since digester inventory increased 23 dry tons across the month. About 42% of the wet tons were applied to Eastern WA agriculture sites, 57% were applied to forest sites in Western WA., and 1% was used to produce compost. An estimated 52,260 lbs-active polymer were used for dewatering, resulting in an average polymer dose of 49.0 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 and occasionally 170-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. The centrate sump was cleaned in November; very little struvite build-up was found.