

Memorandum

March 14, 2019

TO: Historical Memo

FROM: Rick Butler, Process Control Supervisor

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

STP met all of its conventional permit limits for secondary effluent in February 2019. Flow averaged 86-mgd. The max-day flow was 128-mgd (Feb. 12). York/Brightwater flows accounted for 3.7 of the 86-mgd average monthly flow, but only 2.2-mgd of the 128-mgd max-day flow. Final effluent quality averaged 7-mg/L carbonaceous BOD (cBOD₅), 12-mg/L TSS and 12-mg/L total BOD₅. Respective removals were 97%, 94% and 95%. All flows received secondary treatment.

February was very cold with record snowfall. 20.2-inches of snow fell in February (Seatac Airport), all of it falling Feb. 3-4 and Feb. 8-11. All precipitation totaled 4.62-inches in February. Max-24hr precipitation was 1.22-inches on Feb. 11 (mainly snow) and 0.86-inches on Feb. 12 (mainly rain). Historic average precipitation for February is 3.50-inches; the monthly record is 9.11-inches (1961). Daily high and low air temperatures were 8.1°F and 5.3°F colder than normal, respectively; they averaged 41.8°F and 31.6°F, respectively. Wastewater temperatures started the month near 59-60°F, quickly dropped to 55.6°F at mid-month (due to the large snow melt), and slowly rebounded to 58-59°F by month's end.

Offsite Flows and Loads: 1.33-MG of septage were received in February, accounting for about 5.4% of STP's influent solids load. The septage total was lower than normal due to hazardous road conditions. The Southern Transfer (aka Allentown) flow averaged 9.7-mgd with a max-day of 23.4-mgd on Feb. 12. Sewage from the Brightwater service area (via York P.S.) accounted for about 5% of STP's influent load. York P.S. flow averaged 3.7-mgd with a max-day flow of 7.7-mgd (Feb. 17).

A total of 359 tons of deicer BOD was discharged to the STP on 23 days in February, for an average rate of 31, 235-lbs/day. On a monthly basis, deicer BOD accounted for about 15% of STP's influent BOD load and 21% of the BOD load to the secondary process. The max-day deicer BOD load was 49,149 lbs./day, which accounted for about 25% of STP's influent BOD load and about 35% of the secondary influent BOD load.

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. The measured influent loads were about 171,200-lbs/day for BOD, 150,200-lbs/day for CBOD and 146,100-lbs/day for TSS. The deicer, septage and Brightwater loads, along with loads and plant mass balances from recent months, show that the measured loads are similar to the loads that would be expected.

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 in February.

STP Facilities Status: STP operated in cold, snowy, winter mode in February with most process tanks in service. The secondary process was operated to grow phosphorus accumulating organisms (PAOs). The gas scrubbing system was in operation all month. Nearly all of the scrubbed gas was injected into the PSE pipeline for RINs sales. Process heat was provided by the boiler using natural gas and the two electric boilers. Reclaimed water was applied offsite to Ft. Dent Park on two days.

All 12 primary tanks, all 4 aeration tanks, 22-24 of 24 secondary clarifiers, and both chlorine contact channels (Cl_2CC) were in service all month. Five of six DAFTs were in service all month: 3 small DAFT and both large DAFTs. DAFT2 was out of service for scheduled PMs. All five anaerobic digesters were in service all month. Dewatering operated every day; centrate was valved to the DAFTs. On February 28, STP operated with all 12 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 promote the growth of phosphorus accumulating organisms (PAOs). The aeration tanks mostly operated in plug-flow mode with a ½-pass un-aerated zone in Pass-1. Step feed mode was occasionally used, e.g., during the higher flows of mid-month and during the last week when the biomass's (MLSS) ability to settle and compact started to degrade.

The secondary system's solids retention time (SRT) was usually in the 3.5-4.5 day range. The resulting MLSS concentration was usually 2600-2900 mg/L. D.O. operating setpoints were in the 1.75-2.25 mg/L range. The RAS return rate was 30-50% of the influent flow. Aeration tank air use averaged 65.5 million-ft³/day; it was usually in the range of 60-75 million-ft³/day. Biomass settling characteristics were good for most of February, though it started to degrade during the last 10-days. The sludge volume index (SVI) was usually in the 100-150 mL/g range; it climbed to 225-250 mL/g in the last week. The higher SVIs and flows resulted in several days of slightly higher effluent TSS (17-24 mg/L). The aeration tanks were moved to step feed during these higher SVIs.

Nitrogen (N) and phosphorus (P) removal averaged 19% and 61%, respectively. Over the month, effluent $\text{NH}_3\text{-N}$ and NO_2+NO_3 averaged 27-mg/L and <0.4-mg/L, respectively. Effluent Total-P averaged 1.8-mg/L. Effluent alkalinity was usually in the 120,000-145,000 lbs./day range (180-220 mg/L). Influent alkalinity was also usually in the 120,000-145,000 lbs./day as CaCO_3 range.

Disinfection: 25,486 gallons of 12.5% sodium hypochlorite (NaOCl) were used to disinfect STP's final effluent in February. This resulted in an average dose of 1.3-mg/L as Cl_2 based on effluent flow. Daily hypochlorite use ranged from about 725 to 1100 gpd, and averaged 910-gpd. Both the north and south chlorine contact channels (Cl_2CC) were in service. The “West” dosing system applies hypochlorite to the north Cl_2CC , while the “east” system doses the south Cl_2CC . RAS chlorination (for SVI control) and pre-chlorination (for influent odor control) were not practiced. The Cl_2CC 's, ETS effluent pipeline, and ETS outfall structure were usually disinfected with a slug dose of hypochlorite every two weeks.

DAFT: The DAFTs produced an average of 89 dry tons/day of thickened raw sludge (THS) to be fed to the digesters. THS flow averaged 0.38-mgd with a solids concentration of 5.7% TS. Three small DAFTs and both large DAFTs were in service all month. The solids loading rates averaged 23 lbs./d/ft² on the large DAFTs and 22 lbs./d/ft² on the small DAFTs. One fizz system per DAFT was in service all month. 12,200-lbs/month of polymer were added to the DAFT feed sludge (155-dry tons/day) for an average polymer dose of 3.0 lb-active/dry ton feed, or 5.3 lb-active/dry ton THS. Polydyne polymer WE-1531 was used in February.

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 64.6% and 56%, respectively. The digestion detention time averaged 32-days; 4 of those days were provided by Digester 5. Digester temperatures were in the 99-101°F range. The VS/TS content entering and leaving the digesters averaged 86.5% and 69.4%, respectively. Digester alkalinity levels were usually in the 7300-7600 mg/L range. 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. The digesters had some accumulation of scum/sludge on the digester covers; air-spargers on the covers were available to control the accumulation.

Dewatering/Biosolids: 4665 wet tons of biosolids (1075-dry tons @ 23.0%TS) were beneficially reused in February. All of the biosolids were ultimately applied to Eastern WA. agricultural sites; some of the biosolids were temporarily stored in Everett while the mountain passes were closed. Digested sludge production was closer to 1203 dry tons since digester inventory increased by 128 dry tons across the month. Of the 1205 dry tons produced, about 100-dry tons are associated with deicer.

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An estimated 54,633 lbs-active polymer were used for biosolids dewatering, resulting in an average polymer dose of 50.8 lb-active/dry ton hauled. The applied polymer was Polydyne WE586, a 41.5% cationic emulsion solution. Centrifuge feed rates were usually 160-gpm or 170-gpm. No less than two centrifuges were in service at any time. Three centrifuges were often operated to respond to the additional loads from deicer and Brightwater. Scrubber-water was sent to the centrate sump to provide struvite control when gas scrubbing was underway. Centrate flowed to the DAFTs all month.