Timeline and Actions Taken: WWTF excursion: TSS 7-day concentration (limit = 23 mg/L),

Week of October 6 – 12, 2019

Springdale Water Utilities – AR0022063

10.42 inches of rainfall were recorded in less than 24 hours at the WWTF between October 5 and 6, 2019. At the same time, over 12 inches of precipitation was recorded at a USGS certified site in SWU service area. This is the equivalent of a 500-year storm event or greater. At the onset of the storm, multiple direct lightning strikes took down the SCADA systems for both the WWTF and lift stations, the telephone system, multiple computers, the gate camera and operating systems, a transformer, and much more. A pit flooded taking out the flow monitors for the extreme final clarifiers and influent pump station pumps could not be varied in speed due to a CPU going out. Staff mobilized rapidly and brought systems back up as quickly as possible as the storm raged on for hours. Ball lightning was observed the size of the warehouse on site, and an operator was blown back 2 feet by the percussion of lightning hitting the perimeter fencing as the electrical storm came on while he was in the middle of his rounds.

The empty 12.5 MG equalization basins, 7 MG process train, and two primary clarifiers totaling 0.5 MG were filled with excess influent while alum was fed to the ends of process trains to maximize throughput in the final clarifiers. RAS was sent to the empty process train as it filled, and mixers and aerators were started when water levels allowed. Influent flow peaked at 49.8 MGD with an average of 38.5 MGD for October 6. Flow peaked at 33.6 MGD on October 7 with an average of 25.9 MGD entering the already full WWTF that day.

By 5 pm on Sunday, October 6, the flow entering the WWTF was too great to pump through the plant or to the EQ basins, so the excess gravity flowed to the Extreme Final Clarifiers after going through screening and grit and scum removal, where alum was added for precipitation of solids. The overflow from this system blended with fully treated facility effluent to be oxygenated, chlorinated, dechlorinated, and discharged through the facility's permitted outfall. This discharge continued until around 1 am on October 8, 2019 when the influent flow subsided sufficiently to stop discharge to those facilities. At its sustained peak, flow entering the facilities was so great that aerators in the process trains had to be shut down for a period of time to reduce the solids entering the clarifiers preventing them from overflowing. A pH of 6.2 (limit of 6.0) was recorded on October 7 due to alum feed, so chemical feed was reduced to allow pH to climb slightly.

Jennifer Enos, Wastewater Facilities Director, called Richard Healey, ADEQ, on October 9, 2019 to report that the effluent TSS for October 6 and 7 were 92 and 94 mg/L respectively. Clearly from those two results, a 7 day TSS limit of 23 mg/L would be exceeded. The TSS on October 8 was only 1.0 mg/L, so plant recovery was complete by that date. Final analytical results yielded a 7-day average of 27 mg/L, in excess of the limit.

Per conversation with Mr. Healey, it was agreed that it would be prudent to defer submission of this written followup violation letter until CBOD results were also available to review. It is unlikely from results obtained so far for the week of October 6 – 12, 2019 that any other permit parameters will be exceeded including CBOD barring additional problems later in the month of October.

Conclusion

Despite a raging, 500-year storm event and multiple lightning strikes, SWU's WWTF was able to meet all permit parameters with the exception of the TSS 7 day concentration limit of 23 mg/L. The excursion was unlikely to have caused any environmental impact as the excess solids were discharged into a raging receiving stream already loaded with sediment from the massive runoff and washout caused by the deluge. The substantial, multi-million dollar, ongoing work done by SWU to reduce I & I into its collection system likely aided in the rapid recovery of the system and reduced the amount of flow that had to be treated. A $500K WWTF Master Plan budgeted for this fiscal year will help identify what if any improvements in the existing system might allow the facilities to better weather storm events resulting in excess flows such as that experienced October 5 and 6, 2019.

This single, isolated TSS 7-day limit excursion in over 3 decades is directly attributed to a 500 year rainfall event with no observed environmental impact and rapid recovery to full compliance.