

Cefalo, James

From: Cefalo, James
Sent: Tuesday, March 22, 2022 10:00 AM
To: Kristin Moore
Subject: RE: Transfer application 85706 (Steel)
Attachments: Nef & Sons Data.xlsx; Nef & Sons Flow Meter Records.pdf; Nef & Sons PCC Records.pdf

Kristin,

Attached are the PCC measurement records for the Nef well (WMIS #200114). Some of this information might not be available on the public interface. The system has been measured directly over the years. In 2015, the field examiner reported a diversion rate of 5.96 cfs and reported that the 200 hp booster pump was on and water was being supplied to three eight tower pivots at once. In 2019, the field examiner reported a diversion rate of 5.05 cfs (which almost matches the current water right diversion rate) and noted that the 200 hp booster pump was off. As would be expected, the system diverts water at a higher rate when the booster pump is on.

As we have reviewed the monthly power usage, it appears that the highest power usage occurs in July. Therefore, we have focused our analysis on the month of July. There are some years when the power usage in June is comparable to July. The data from July is sufficient, however, to demonstrate the diversion rate issue. The attached spreadsheet shows the kilowatt hours reported by Rocky Mountain Power for the month of July over the last ten years. We used the PCC collected in 2019 to estimate the volume pumped during each July over the last ten years. The volumes were converted into an average diversion rate. The 2019 PCC was low compared to previous years. At some point in the recent past, the system was equipped with a variable frequency drive. The older PCCs may not be representative of the power to volume ratio of the current system. We also used a calculated PCC for 2019 and 2020. Using the 2019 beginning of year reading from the flowmeter on the system and the 2020 end of year flow meter reading and comparing the total volume pumped to the kilowatt hours used during that two-year span, we calculated a power-to-volume ratio of 1,332.5 kwh/af. The table in the spreadsheet shows the average diversion rate using both the 2019 PCC (measured) and the 2019/2020 PCC (calculated). In both cases, the average diversion rate exceeded the authorized diversion rate in the month of July for seven out of ten years, including 2021.

As I mentioned in our phone call yesterday afternoon, I can't find my notes for how the 850 af number was calculated. It may have just been a rough estimate. As I review the data, I arrive at a slightly lower annual volume. The proposed volume limit should be based on the highest diversion volume year. In 2013, Nef used 1,347,360 kwh. Applying the PCC that was used in 2013 (1,235.5 kwh/af), Nef diverted 1,090.5 af in 2013. Using this same PCC measurement, the average flow rate of the system (at that time) was 3,068.3 gpm (6.83 cfs). It would take 80.5 days to divert 1,090.5 at a diversion rate of 6.83 cfs. If Nef were limited to pumping the proposed remaining diversion rate (4.96 cfs) for 80.5 days, the system could produce 792 af. I think there is value in looking at the operations for 2021. With the variable speed drive, the system operates more efficiently. Even though the system used less power in 2021 than in 2013, it is possible that the system diverted more water in 2021. If we focus on the data from 2021, we end up at a higher annual volume. The system used 1,118,080 kwh in 2021. Applying the 2019/2020 calculated power-to-volume ratio, the system diverted approximately 839 af in 2021. Assuming a diversion rate of 5.05 cfs (as measured in 2019), it would take 83.8 days to produce 839 af. If Nef were limited to pumping the proposed remaining diversion rate (4.96 cfs) for 83.8 days, the system could produce 824 af.

Please let me know if there is any other data I can provide to help with your analysis.