TO: GROUNDWATER RECHARGE WORKGROUP

FROM: ED OFFICE

SUBJECT: WATER ACCOUNTING FOR PHELPS RECHARGE AND COOK RECAPTURE WELL

DATE: AUGUST 29, 2016

The ED Office prepared a water accounting spreadsheet to track recharge in the Phelps County Canal and pumping credit from the Cook recapture well. The accounting is for Program operations only and does not include recharge in the canal for the DNR/TBNRD.

Actual Accounting

Water accounting is included on a monthly basis and annual basis in the accounting spreadsheet. The accounting is based on measured recharge deliveries, measured pumping from the Cook well and modeled net accretions at the Platte River[1].

Recharge Deliveries

The volume of the Program's recharge in the Phelps County Canal is based on continuous measured deliveries at the mile post 1.6 flume, provided by the CNPPID. Since recharge occurs from the headgate to mile post 13.3[2], the ED Office calculates an estimated volume of water recharging in the canal before the measuring device (located at mile post 1.6). Recharge in the canal is assumed uniform for the purpose of this calculation. This provides a total volume of recharge from the headgate to mile post 13.3[2]. The recharge volume is then entered into the numerical model.

Cook Recapture Well Pumping Data

The pumped volume from the Cook tract recapture well (permit #TBDW-1500) is based on continuous measured data. The well is equipped with an 800 gpm pump and is anticipated to pump March – November when there are USFWS target flow shortages[3]. Water is pumped into the nearby drain and runs directly to the river for credit towards the First Increment milestone. The volume of well pumping is also added into the numerical model.

Numerical Modeling

The volume of recharge and the volume of pumping for the Program are added as input into the numerical model (48 year simulation period). The model is used to calculate the lagged net accretions/depletions at the river. The Program's operations are intended to create net accretions at the river each month.

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[1] Net accretion model based on the Program's numerical model of the Phelps County Canal site (developed in conjunction with Hahn Water Resources, LLC, ED Office Special Advisor.

[2] In the first year of operations, recharge operations ended at mile post 9.7 in the canal for feasibility testing.

[3] See well Operation Plan.

Net Credit

The net credit at the river is a combination of the numerical model output of lagged net accretions (from recharge and pumping operations) and the credit from the pumping operation (assumed instantaneous). The ED Office can evaluate credit accruing during shortages to USFWS target flows, if requested.

Projected Accounting

The ED Office also provides a projected accounting sheet to be used at the beginning of the Cook recapture well pumping season (March). The projected sheet includes a projected pumping schedule to evaluate if there are times when pumping should be curtailed during the upcoming season. Pumping should be curtailed in advance if a monthly net depletions at the river is projected. This is used for planning purposes only. Since the well pumping volume is much less than the total volume of recharge, it is not likely the well pumping will need to be curtailed; however, the ED Office will monitor this data throughout the season.

Currently, the spreadsheet includes 4 months per year of continuous well pumping through 2019, and does not assume recharge continues after spring 2016. This is a worst-case scenario, as the Program intends to continue recharge operations. The projected analysis will be updated with actual data each season & re-run with new projected future pumping volumes. Additional modeling runs can be completed, if requested.

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