Wichita Aquifer Storage and Recovery
Modified ASR Lower Index Levels and Aquifer Maintenance Credits: An Overview

Q and A:

Q: Why is the City pursuing these changes now?
Answer: ASR provides two benefits – drought resiliency and water quality protection. The changes are being proposed to provide operating flexibility that is needed to maintain the aquifer as high as possible – like the levels are now. Current permit conditions will cause the city to have to pump ASR Credits as fast as possible during dry spells in order to prevent as many credits as possible from becoming stranded below the current lower limits – the 1993 levels. This early pumping approach will result in lower aquifer levels into the future. Current permit conditions also cause the City to have to pump the aquifer down to make room for ASR injection. Otherwise, the City will not be able to accumulate the credits needed for future use during a one percent drought. This pumping down to inject approach will result in even lower aquifer levels. The change to allow for Aquifer Maintenance Credits – credits for ASR water that is treated and sent to town for immediate use – will make it possible to run ASR when aquifer levels are high and still bank credits. This will result in higher aquifer levels being maintained in perpetuity. Higher aquifer levels at the beginning of a drought means the impacts will be less severe, and fewer wells will dry up. Higher aquifer levels also slow down salt water intrusion into areas of the Equus Beds.

Q: Will these proposed changes dry up my domestic well?
Answer: No, in fact they are designed to do the exact opposite, protect the entire water supply for all users. The changes would provide ASR operating flexibility that would result in higher aquifer levels being maintained in perpetuity. Benefits include everyone's wells in the area would be protected. Salt water intrusion would be slowed down. And higher aquifer levels at the beginning of a drought would mean fewer wells would go dry during a severe drought.

Q: Does this mean the City will no longer have to recharge the aquifer in order to accumulate credits?
Answer: No. When operating ASR, the City will be required to inject ASR water into the aquifer when levels allow for effective recharge.

Q: Does this mean the city will be able to pump more water overall, or that the City will wind up owning all of the water in the aquifer, by accumulating Aquifer Maintenance Credits in addition to their Recharge Credits?
Answer: No. In fact, a cap will be placed on the total number of credits the city will be allowed to bank. The original "void" in the aquifer that ASR was meant to fill up was 120,000 acre-feet.

So, the total amount of ASR credits will be capped at 120,000 acre-feet. Currently, there is no regulatory cap on the amount of credits the City is allowed to accumulate.

Background:

The City of Wichita has been working to refocus their ASR project from a supplemental water supply source to a long-term drought protection project.

In refocusing the ASR project, the City of Wichita seeks to: 1) manage the project so that there is enough water in the aquifer for the City and for the well field neighbors during and immediately after a drought and 2) keep the aquifer as full as possible, as long as possible.

Wichita has two major sources of water, the Equus Beds aquifer and Cheney Reservoir. During the drought of 2011-12, the City observed dropping water levels in both Cheney and the aquifer during. The City became concerned that current ASR permit limits might prevent them from accessing their recharge credits due to the lowering water table. They also decided to start using Cheney move aggressively to avoid evaporation loss.

The City now takes most of its water from Cheney, using about 20% from the aquifer. As a result, the aquifer has recovered to near pre-development conditions. This is better for everyone but undermines the ASR project under current rules.

When flows in the Little Arkansas River are high enough, and there is room in the aquifer, the ASR project treats the surface water and injects it into the portion of the Equus Beds aquifer designated as the "Basin Storage Area" for future use. It is different water than what would naturally be found in the aquifer. The basin storage area is basically a reservoir to store this water.

Losses from this underground reservoir are in the form of leakage out of the Basin Storage Area instead of the evaporation which occurs in surface water reservoirs. We look at the Basin Storage Area as the "box" the City can operate ASR in, and the box started with roughly 120,000 acre feet of storage capacity.

Two main reasons for changing the Wichita ASR terms and conditions are to:

1) adjust the minimum index cell levels (bottom of the box) so the City can access their recharge credits during long-term drought.

2) Allow the City build credits for its ASR operations when the aquifer is full via Aquifer Maintenance Credits (AMC).

Currently, in order to create recharge credits, there has to be space in the box in which to inject water. When the box is full (10 feet from surface), ASR cannot inject water into wells.

To develop needed ASR credits for the inevitable drought, the City could, with their existing water rights, divert non-ASR water from the Basin Storage Area wells thereby creating a hole in the aquifer, then inject surface water, and create recharge credits. But this is an inefficient way to operate; pumping water out to put water right back in. This approach results in lower aquifer levels overall. Realizing this, the City proposes to modify existing terms and conditions to allow for more operational flexibility and the ability to maintain higher aquifer levels overall.

The AMC is a credit for what the City could have done. **It works like this: the City diverts and treats excess surface water. If there is space in the aquifer, the City will inject the water and generate a traditional ASR credit. However, if there is no space in the aquifer, the City will divert route the water to town and get an AMC.**

This does not require them to pump a hole to refill. As a result, higher aquifer levels would be maintained in perpetuity. Thus, this approach works to help slow salt water intrusion into the Equus Beds and protects all aquifer users against the impacts of severe drought. As a result, other users wells in the area would be less likely to go dry with this approach.

Permit conditions we are currently working on include:
1) Maximum credit accumulation on the order of 120,000 AF which equals 10% of the total storage in the well field area.
2) Ensuring other area native rights are protected from impairment by requiring the City to use pumping rotation and timing if conflicts occur. 3) Sequence of priority pumping.

The City currently owns 40,000 AF of senior native rights in the aquifer. The City is planning for an 8-year drought during which recharge credits will be withdrawn over the duration of the drought during years when demand exceeds the City's annual base rights of 40,000 AF.

The City will pump their 40,000 AF of native rights first and draw from their recharge credits as needed. The 40,000 AF renews each calendar year. The recharge credits do not renew, they go away when they are either pumped or when they seep out of the Basin Storage Area.

The modeling shows worst case, at the end of an 8-year, 1% drought, the aquifer remains on average over 80% full. That is with all current pumping. This includes domestic, municipal, irrigation and the other beneficial uses operating in the well field.

It is important to understand the City has the ability to manage through a one percent drought by utilizing all of its existing resources and is prepared to proceed under the current ASR operating terms and conditions.

However, in the spirit of sound resource management, the City desires to shift to a more outcome-based approach that would benefit all aquifer users when it comes to operating ASR. **To that point, the City is proposing to modify current ASR terms and conditions. The modifications are designed to provide the needed flexibility to operate ASR in such a way that results in higher aquifer levels overall.**

<u>Higher aquifer levels provide a two pronged benefit to all users:</u>

1) Higher water levels help preserve water quality by slowing down the inevitable movement of salt water into areas of the Equus Beds.

2) Higher aquifer levels at the beginning of a drought help to lessen the severity of impacts caused by drought. This means other user's water wells would be less likely to go dry during a drought.

These are the reasons why the City believes the proposed modifications are in the best interest of not only the City of Wichita and all of its customers, but for the benefit of all aquifer users.