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GOVERNOR JEFF COLYER, M. D.

JACKIE McCLASKEY, SECRETARY OF AGRICULTURE

Groundwater Management District 2
c/o Tim Boese
313 Spruce St.
Halstead, KS 67056-1925

City of Wichita
Director of Public Works & Utilities
City Hall Eighth Floor
455 N Main
Wichita, KS 67202-1606

Re: City of Wichita ASR Project
New Applications, File Nos. 48,704 through 48,733 and proposed modified Phase II approval

Dear Mr. Boese and Mr. King,

On March 12, 2018, the City of Wichita (City) transmitted its proposal, prepared by Burns & McDonnell Engineering Company, Inc., entitled "ASR Permit Modification Proposal Revised Minimum Index Levels & Aquifer Maintenance Credits", for Equus Beds Groundwater Management District No. 2 (GMD 2) to review. The proposal requests, and provides the City's analysis to support, revisions to the City's Phase II ASR project. The Phase I order is not proposed to be modified.

The principal requested changes are to: 1) lower the minimum index levels used to determine when the City can withdraw its recharge credits, and 2) to support a new type of recharge credit from project operations, Aquifer Maintenance Credits, including specific accounting methods, terms and conditions associated with such credits. Existing physical recharge credits, (PRCs) will be developed and accounted for pursuant to the existing methods.

The City considers the proposal complete. In my letter of September 18, 2017, I outlined a process and timetable for review of the proposal, starting with sending the package to GMD 2 for review, posting proposal-related documents on DWR's web site, public notice, and a hearing within 45 days of receipt of the City's proposal.

The City's proposal and supporting documents, as well as the pending new applications, have been posted on KDA's website.

To facilitate review of the proposal, and based on our understanding of the City's proposal, we have developed a **draft** set of proposed approval documents for initial review. **Please note these are draft and no decision has been made.** We have indicated sections that can only be completed after receiving input at hearing and GMD 2's recommendations later in the process. This letter and these documents will also be posted on our web site for the public's review.

To ensure that the package for the hearing is as complete as possible, we are providing an initial review period to allow GMD 2 to review the City's proposal as well as allowing both GMD 2 and the City to review KDA's draft proposed conditions.

Please provide any initial review comments including any recommended terms and conditions related to the City's proposal and KDA's draft proposed approval documents by April 27. Please note that this is not a formal request for GMD 2's recommendation; that will come during the formal review.

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Both the City and KDA will review these initial review comments to determine if there should be any change to the City's proposal or to KDA's draft approval documents prior to the hearing. Again, this initial review will not limit GMD 2's ability to provide its comments and recommendations during the formal review to follow.

In the meantime, KDA will be working toward a public hearing date in late May and will initiate public notice. I will reach out to you in the next two weeks to obtain your suggestions on a specific date and location for the hearing.

Attached please find the following drafts for initial review:

- 1) a draft proposed replacement to the existing Phase II ASR project approval,
- 2) an example of proposed permit conditions for one of the above referenced new applications, and
- 3) and an example of a findings and order amending one of the individual approvals of the existing Phase II permits.

In addition to the attached drafts, below is a summary of our proposed additional permit conditions.

KDA-DWR's will determine if the pending applications comply with applicable rules and regulations, and ensure that if approved, the applications will neither impair existing water rights nor prejudicially or unreasonably affect the public interest. If these applications are approved, they will contain multiple conditions designed to ensure that physical aquifer recharge will continue to occur when aquifer conditions are acceptable, and facilitate the Equus Beds Wellfield being managed at near full conditions.

Built on the established conditions for the current ASR appropriations, the draft proposed permit conditions include, but are not limited to the following proposed modifications and additions:

1. That the locations of the index wells and the index water levels for the basin storage area ("BSA") shall remain as set forth in Attachments 3 and 4 to the Original Order, In the Matter of the City of Wichita's Applications to Operate an Aquifer Storage and Recovery Project in Harvey and Sedgwick Counties, Kansas dated August 8, 2005, except for proposed lower index cell levels in the Phase II ASR Findings and Order__ 2018 (see Table 2-11: Proposed ASR Minimum Index Levels in the City's proposal "ASR Permit Modification Proposal Revised Minimum Index Levels & Aquifer Maintenance Credits").
2. That AMCs will be assigned to index cells annually through the following accounting methodology, unless otherwise modified by formal written approval of the Chief Engineer.
 - AMCs will be assigned by dividing the total volume of water diverted from the Little Arkansas River to the City's Main Water Treatment Plant by the total number of points of diversion (City's production wells? Only wells that have been physically converted to ASR wells?) within the Equus Beds Wellfield in service that year (excluding Phase I recharge and recovery infrastructure). This will ensure equal AMC distribution across the active production wells, which could have pumped water from the aquifer. Is this source water as measured from the Little Arkansas River surface water intake or as treated water leaving the ASR water treatment plant? This should be measured treated water leaving the ASR water treatment plant, as this is the water that would have been measured as a Physical Recharge Credit if the water was physically recharged. Using the total volume of raw water diverted from the Little Arkansas River over-estimates the amount of water that would have been physically recharged. Also, treatment of the source water from Little Arkansas must be treated at the ASR water treatment plant – raw source water from the Little Arkansas cannot be pumped directly to the City without treatment.

- A one-time, five percent (5%) initial loss will be deducted from the total number of AMCs applied in each index cell. This initial loss accounts for losses to the aquifer inherent in the injection and recovery process. **Need more clarification / justification for 5% initial loss.**
- In addition, a gradational, recurring loss to AMC's as provided in Figure 15 of the City's proposal would be applied annually across the BSA to account for the migration of recharge credits and losses from the BSA illustrated by the model and historic data. Generally, index cells on the west side would have a one percent (1%) loss, index cells in the central area a three percent (3%) loss, and index cells on the east side a five percent (5%) loss. These losses would be taken from the cumulative total beginning the year after the water is recharged, as they represent losses to migration that occur during the year. **Need more clarification / justification for gradational annual losses ranging from 1 to 5%. Page 4-2 of the ASR Permit Modification Proposal indicates that 85% of the water physically recharged by the ASR Project from 2006-2015 has been retained as recharge credits. However, data from the 2015 Annual Accounting Reports indicates that through the year 2015, there has been 6,818 AF physically recharged, but recharge credits total only 4,978 AF, which is retention of 73%, not the 85% retention rate specified in the Proposal. This may indicate the proposed 1-5% annual loss is not an accurate representation of the losses.**

3. As is provided for with respect to the accounting for physical recharge credits, that if the City develops an improved model or methodology to account for AMCs that is approved by the Chief Engineer after consideration of the recommendation by GMD 2, that the Chief Engineer may approve such improved methodology without the necessity of holding additional public hearings.
4. That the AMC's may be accumulated only when index cell water levels are at elevations that limit physical recharge into the basin storage area as provided in the ASR's operating plan. AMC accumulation rate is dependent on the quantity of water and rate of diversion authorized under Appropriation of Water, File No. 46,627, which is authorized 14,738.24 million gallons per year at a diversion rate of 41,667 gallons per minute. **Also, accumulation of AMCs must be dependent upon physical withdrawal and treatment of the Little Arkansas River source water. Should be metered treated water leaving the ASR water treatment plant, not total water withdrawn from the Little Arkansas at the surface water intake.**
5. That physical recharge activities will continue to occur when there is adequate recharge capacity within the aquifer.

***See my comments on separate page regarding when physical recharge must occur versus AMC accumulation.**

6. That AMCs may be withdrawn from a cell only when AMC's are determined to be available from that cell and the static water level at its index well is at or above the established minimum index level as measured in January of that year.
7. That the total accumulation of recharge credits through physical recharge (PRCs) and AMCs combined cannot exceed 120,000 acre-feet, which represents the estimated storage available within the ASR project area during 1993.

Why are 1993 groundwater levels used to determine overall storage capacity? This appears arbitrary based on how much storage capacity was available when the City's Integrated Local Water Supply Plan was implemented and the development of the ASR program started, but what does that have to do with how much total recharge credits the City can accumulate? The drought model runs are based on the 1998 groundwater levels, why not use 1998 groundwater levels to determine overall storage capacity and associated maximum recharge credits?

8. That the City in its June I -reporting each year, shall also report an accounting of water diverted from the ASR Phase II surface water intake, **treated**, and sent directly to the City's Main Water Treatment Plant; that the Report shall be submitted to the Chief Engineer and GMD 2. The accounting shall use the accounting methodology described herein.
9. That the final determination of available AMCs in each cell in the basin storage area shall be made by the Chief Engineer, upon consideration of the required annual report, and any recommendation by GMD 2. The Chief Engineer shall make the final determination in writing.
10. . That each AMC diversion well shall be equipped with a water flow meter, meeting the requirements of K.A.R. 5- 22-4, to separately and accurately record the total quantity of water diverted from the aquifer and counted as an AMC.
11. That the available quantity of AMCs for each index cell would be the cumulative total of AMCs accumulated during previous years, minus any recovered quantity of AMCs from the index cell, and annual losses.
12. That recovery of AMCs, similar to PRCs, will be measured as the metered recovery of a recharge credit from an authorized point of diversion.
13. That the City will develop an annual ASR Operations Plan that will be used to evaluate groundwater levels in the wellfield and the aquifer's physical recharge capacity. This information will determine when AMCs can be accumulated. The Operations Plan calculations will be based on the following parameters:
 - Static Groundwater Elevations
 - Maximum Groundwater Elevations
 - Sustainable Specific Injectivity
 - Maximum Calculated Sustainable Recharge Rate
 - Maximum Well Infrastructure Recharge Rate
 - Maximum (**Minimum?**) Well Infrastructure Recharge Rate

See my comments on separate page regarding AMC accumulation and recovery
14. That the ASR Operations Plan shall be submitted to the Chief Engineer and GMD 2 for review within 60 days (**prior?**) of approval of the new Phase II applications. **The ASR Operations Plan should be submitted prior to the approval of the new Phase II applications, as the operation plan would be an instrumental part of the permit conditions, so much so that the operations plan needs to be reviewed and approved at the same time as the permit applications. Additionally, certain aspects of the operational plan may be best identified as permit conditions.**
15. That surface water intake quantities and direct municipal supply quantities shall be reported by the City to the Chief Engineer and GMD 2 as follows:
 - a. Each month for the first year of operation;
 - b. Each calendar quarter for the second year of operation;
 - c. By March 1 each year thereafter; or
 - d. Other intervals as may be required by the Chief Engineer to properly evaluate the project.

16. That if water quality in a nearby (is this only domestic wells within 660 feet of a ASR well, or is this all domestic wells in the Basin Storage Area?), existing domestic well meets the current drinking water standards and the water quality is subsequently changed by the ASR project such that the water no longer meets the current drinking water standards, the City will provide and install a home water treatment system to bring the water back to drinking water standards or provide other appropriate remedies to replace the domestic water supply with water that meets the drinking water standard without additional cost to the resident.
17. That if a domestic water well, existing before the filing of these applications for permit, and within 660 feet of an existing or new ASR well, is adversely impacted by drawdown from such well, the City will re-drill or take other appropriate, affirmative action to restore productivity of such domestic well to the same rate and quality as existed before. **What about domestic wells farther than 660 feet from an ASR well? Because it is being proposed to lower the aquifer level at which ASR credits can be pumped, this amounts to an overall lowering of the water table in the Basin Storage Area, therefore not only is direct well to well impairment of domestic wells a concern, but so is the overall lowering of the water level.**

What about “Ensuring other area native rights are protected from impairment by requiring the City to use pumping rotation and timing if conflicts occur” as stated in the Chief Engineer’s previous PowerPoint Presentations? There appears to be no proposed condition(s) that represent this concept.

In drafting our proposed approval documents, we note that it appears that the City's proposal does not fully address necessary reporting when taking recharge credits - how and with what frequency the City will report on the source of diverted water: native, PRCs, and/or AMCs. **Also, the sequencing of water pumped from the aquifer needs to be defined. Native water rights should be pumped first, then physical recharge credits, then AMCs last.**

If you wish to discuss these specific conditions, please contact me. I would be happy to meet again with the Board to discuss these matters.

Sincerely,

Chief Engineer
Division of Water Resources
Kansas Department of
Agriculture

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