

Update on Wichita's Aquifer Storage & Recovery (ASR) Proposed Permit Modification Request

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Equus-Walnut RAC
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ASR Permit Modification Proposal Revised Minimum Index Levels & Aquifer Maintenance Credits



City of Wichita, Kansas

Project No. 71395

3/12/2018

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Wichita ASR

The City of Wichita has the state's only active Artificial Storage and Recovery project, developed and approved in two phases.

The City has filed a series of new applications that will allow it to recover recharge credits at its existing production wells.

On March 12, 2018, the City forwarded a detailed proposal for changes to the conditions associated with its existing permits for Phase II of the project, including the new applications referenced above (see below).

Also, below is information related to the City's existing ASR permits for reference.

City of Wichita request:

Description	File Size	Document Date	Provided By
Wichita ASR permit modification proposal cover letter	634 KB	03/12/2018	Wichita
Wichita ASR permit modification proposal Attachments A-D	14 MB	03/12/2018	Wichita
Attachment E	10 MB		
Attachments F-J	24 MB		
Wichita New Applications (File Nos. 48,704 through 48,733)	Multiple	Multiple	DWR

Documents related to proposal development:

Description	File Size	Document Date	Provided By
Correspondence - Barfield to GMD2 and City, Process for Draft Proposed Permit Approvals for Initial Review	1 MB	03/22/2018	DWR
Chief Engineer's presentation at special GMD2 Board Meeting	658 KB	12/20/2017	DWR
Correspondence - Barfield to City of Wichita,	638	09/18/2017	DWR

For more information:

<http://www.agriculture.ks.gov/WichitaASR>.

Background

- The current basin storage area (BSA) bottoms, set at the 1993 levels, would prevent the City from accessing credits during such a drought.
- The City has determined that the highest value for the ASR project is to supplement their water supply in a protracted (1%) drought.
- Over the last two decades, the City's has moved 400,000 AF of use from the Equus Beds to Cheney Reservoir, contributing to the recovery of the aquifer to near-full conditions. This condition makes it impossible for the City to build the credits it needs in a protracted drought.
- Thus the City is proposing changes to the ASR terms and conditions

Changes to the Basin Storage Area (BSA) bottoms

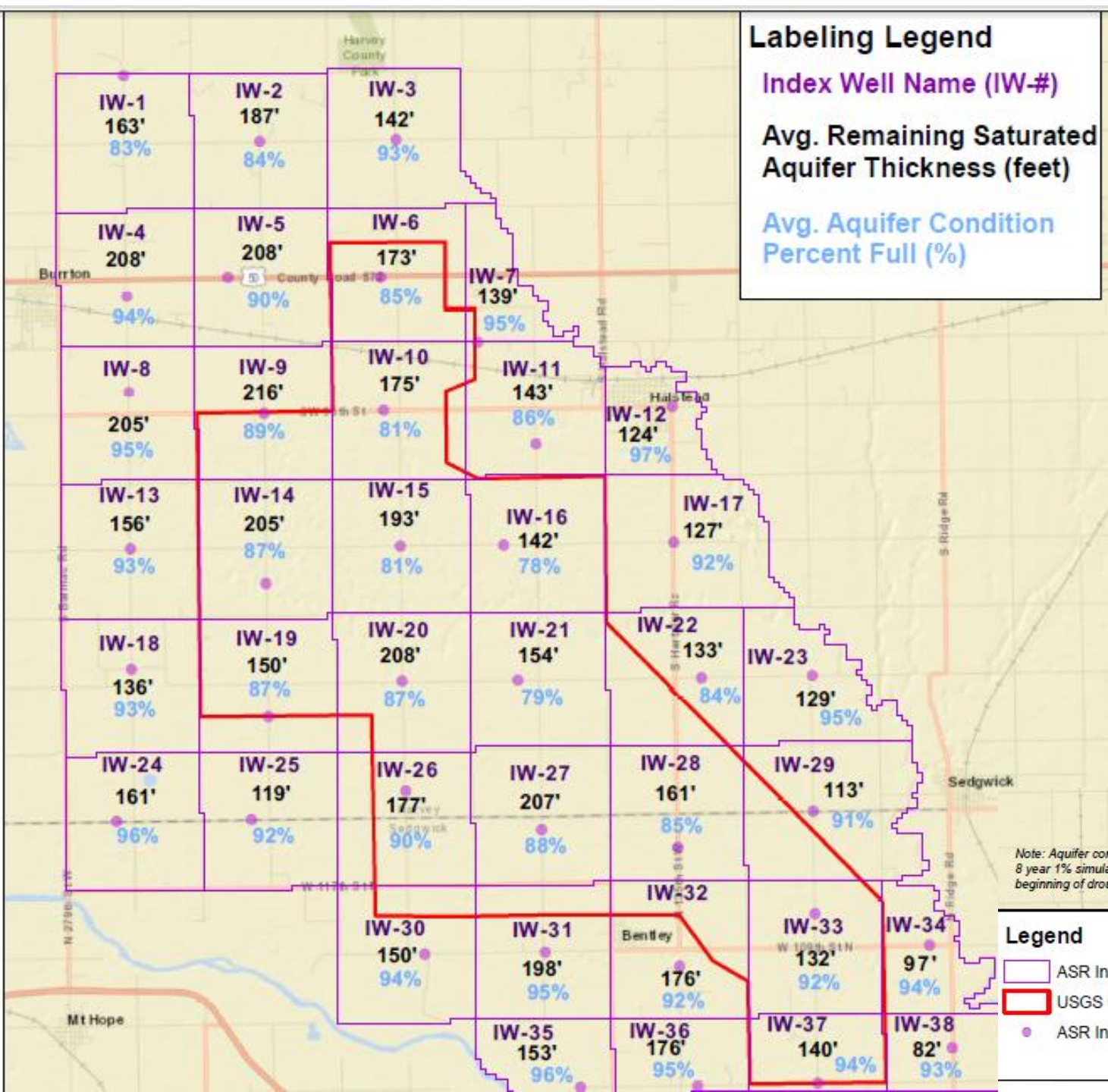
- The City has done extensive modeling to:
 - show that the existing bottoms would restrict its ability to take recharge credits during an extended drought and
 - the bottoms necessary to remedy this.
- The City projects in a 1% drought, assuming a start at less than full aquifer conditions, the aquifer would range between 78 – 94% full at the end of the drought (an average of 86% full in the well field).
- The City's requested bottoms, providing a factor of safety below these modeled results, range between 72 - 86% full.

Labeling Legend

Index Well Name (IW-#)

Avg. Remaining Saturated
Aquifer Thickness (feet)

Avg. Aquifer Condition
Percent Full (%)



Note: Aquifer conditions shown are reflective of the end of the 8 year 1% simulated drought with water levels at the beginning of drought starting at 1998 elevations.

Legend

- ASR Index Cells (Numbered)
- USGS Central Wellfield Study Area
- ASR Index Well Locations



1:130,000

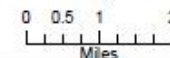
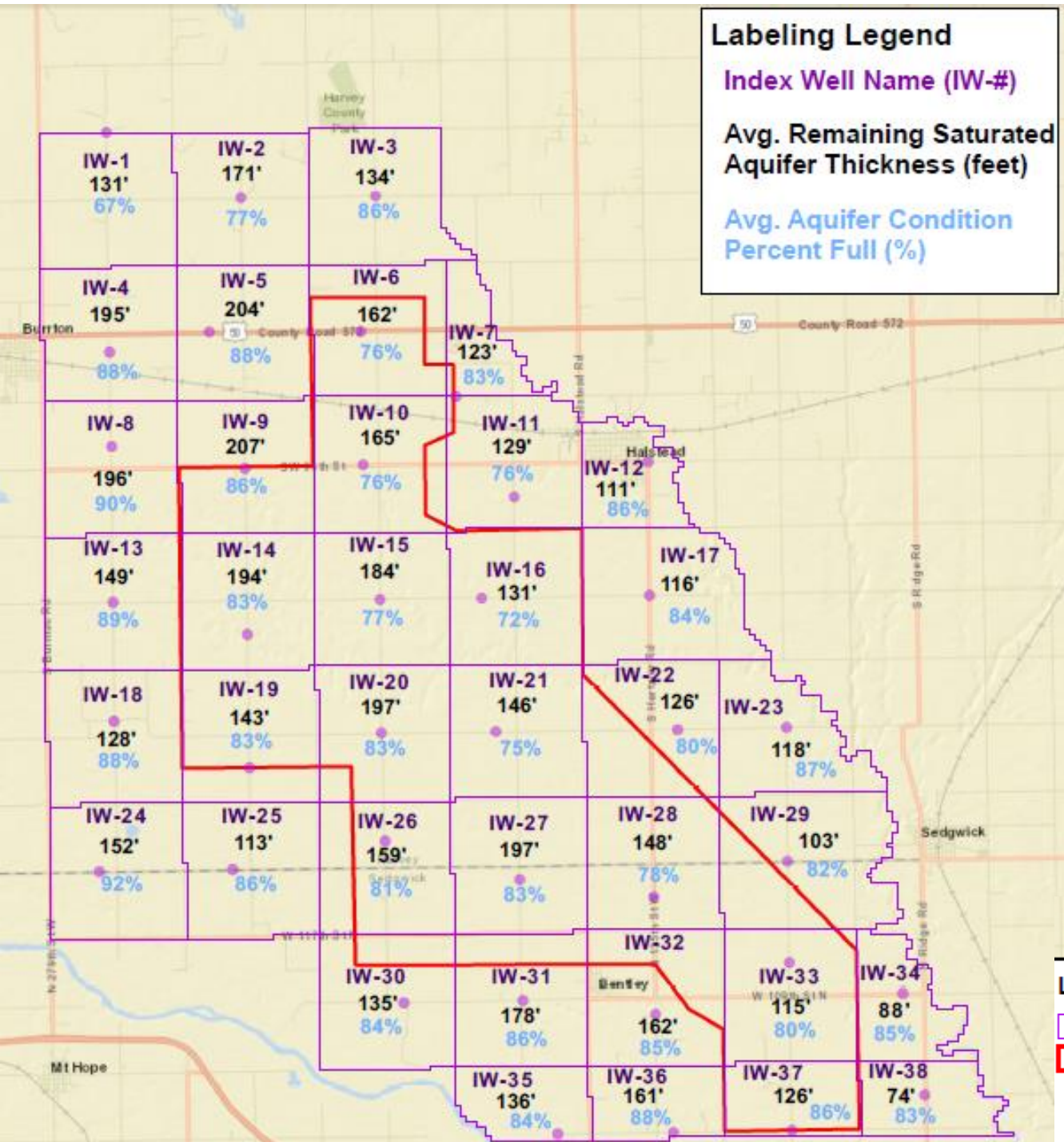


Figure 10

Average Aquifer Conditions
by Index Cell at the
End of Simulated Drought
Stress Period 8

Labeling Legend

- Index Well Name (IW-#)
- Avg. Remaining Saturated Aquifer Thickness (feet)
- Avg. Aquifer Condition Percent Full (%)



Legend

- ASR Index Cells (Numbered)
- USGS Central Wellfield Study Area
- ASR Index Well Locations

N

1:130,000

0 0.5 1 2
Miles

Figure 11

Average Aquifer Conditions
by Index Cell at
Modified ASR Minimum
Index Level Elevations

What Aquifer Maintenance Credits and Why is the City seeking them?

- AMCs would allow the City to build recharge credits for:
 - water diverted and treated via ASR infrastructure (diversion of Little Arkansas River flows)
 - when it cannot be injected into the ground as the aquifer is near full and
 - such water is taken to the City in lieu of Equus Beds water.
- AMCs allow the City's to build ASR credits needed for protracted drought while keeping the Equus Beds Aquifer full.

Table 2-3: MODSIM-DSS simulation results for the 1% drought utilizing projected 2060 demands

MODSIM-DSS Variable	Drought Year 1	Drought Year 2	Drought Year 3	Drought Year 4	Drought Year 5	Drought Year 6	Drought Year 7	Drought Year 8
Baseline City Demand (AF)	81,690	81,690	81,690	81,690	81,690	81,690	81,690	81,690
Simulated Calendar Year of Drought	1933	1934	1935	1936	1937	1938	1939	1940
Revised City Demand from Drought Response Plan (AF)	81,262	72,492	71,116	71,890	70,812	70,811	71,116	70,664
City Demand Assigned to EBWF & ASR	34,202	45,651	59,907	46,732	56,579	41,980	39,308	39,491
City Demand Assigned to Cheney Reservoir	47,060	26,841	11,209	25,158	14,233	28,831	31,808	31,173
Cheney % of Conservation Pool 12 Month Average	110%	92%	62%	59%	62%	53%	53%	63%

Wichita future base demand = 81,690 AF/year

In drought, reduced to approx. 71,000 AF/year

Wichita plans to use its 40,000 AF native rights to full extent in long term drought.

Demands > 40,000 AF to be provided from ASR credits.

Major Proposed terms and conditions

- No change in ASR Phase I (to minimize plume migration).
- Require all AMCs to be water diverted via the ASR division works and within the approved rates and quantities authorized under File No. 46,627.
- The City will seek first to store these flows in the Equus Beds Aquifer. AMC will be allowed only to the extent there is inadequate space to store or capacity of the aquifer to accept recharge in the basin storage area
- The AMCs would be subject to a 5% initial loss and annual losses depending on where they are distributed (less loss in the west; more less in the east).
- A cap of 120,000 AF total recharge credits (approx. 12% of aquifer storage).
- Domestic well protections

Other potential conditions

- Ensuring other area native rights are protected from impairment by requiring the City to use pumping rotation and timing if conflicts occur.
- Reporting frequency and form of reporting on taking of recharge credits.

Process ahead

- Initial review of the proposal through April 28 to insure as clear and complete a proposal and draft terms and conditions as possible.
- Public notice
- Public hearing, late May
- GMD review and recommendations: we will allow two board meetings plus 10 days following the public meeting to complete.
- Chief Engineer review of the record, decision on proposal as it relates to both the pending new applications and existing ASR permits

Questions?

Recurring Credit Loss %

- 1% - Western Boundary
- 3% - Central EBWF Area
- 5% - Eastern Boundary

