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EPA Region 8
Underground Injection Control Program
Summary of Changes to the Permit and Response to Public Comments

Class V Area Permit No. CO52407-00000
Aquifer Storage and Recovery Wells

Issued to:

East Cherry Creek Valley Water and Sanitation District
6201 South Gunn Club Road
Aurora, Colorado 80016

Final Permit Issuance Date: December 15, 2020

Background

EPA issued a draft Underground Injection Control (UIC) Class V Area Permit to East Cherry Creek Valley Water and Sanitation District (ECCV) to inject treated drinking water from alluvium, and the Dawson, Denver, Arapahoe and Laramie Fox-Hills Aquifers. The injectate will be treated to drinking water standards at the ECCV Northern Treatment Plant, Aurora Water Treatment Facilities and Water, Infrastructure and Efficiency Supply (WISE) Treatment Facilities. Water will be stored in the Arapahoe Aquifer in the south Denver area for purposes of aquifer storage and recovery (ASR).

EPA issued its draft permit decision on October 5, 2020 and requested public comment by November 4, 2020. A public notice of the comment period was published in the Colorado Sentinel and posted on EPA Region 8's website.

The permit applicant, ECCV, was the only party to provide written comments. All comments are included in the administrative record for EPA's final permit decision.

RESPONSE TO COMMENTS

COMMENT #1:

Part I. AUTHORIZATION TO CONSTRUCT AND OPERATE, *Page 1, Paragraph 4:*

Draft Permit Language: *Currently, only Well A-7R is authorized for construction within the service field area.*

ECCV Comment: Well A-7R has been constructed. This should state that it is being converted from a withdrawal well to a withdrawal and injection well.

EPA Response: EPA understands that Well A-7R is existing as a recovery well for ECCV. Paragraph 4 states: *Well A-7R, constructed in 2001, is a replacement well for Well A-7, which was constructed in 1973.* However, EPA has clarified the final permit language as noted below.

Final Permit Language: Currently, only Well A-7R is authorized for construction ***and operation, including conversion from a recovery well to a recovery and injection well,*** within the service field area ***for this ASR Project***.

COMMENT #2:

Part I. AUTHORIZATION TO CONSTRUCT AND OPERATE, *Page 2, Figure 1:*

Draft Permit Language: *Figure 1. ECCV District Boundary Map*

ECCV Comment: All the wells identified are constructed. The wells were constructed to the state engineer's rules and regulations at the time of the well construction. They are currently withdrawal wells only and will be converted to withdrawal and injection wells.

EPA Response: See EPA Response to Comment #1 above. EPA clarified the final permit language as noted below.

Final Permit Language: *Figure 1. ECCV District Boundary Map* ***with Existing Recovery Wells***

COMMENT #3: Part II. SPECIFIC PERMIT CONDITIONS, *Page 5, Section B.1:*

Draft Permit Language:

Prior to converting any additional existing drinking water supply (i.e. recovery) wells to injection wells, the Permittee shall submit the following materials to the Director:

a) *cover letter requesting authorization to convert the well referencing Area UIC Permit CO52407-00000, the well name and Colorado Division of Water Resources (DWR) permit number;*

ECCV Comment: add a) Well construction shall conform to Colorado State Engineering's rules and regulations, 2 CCR 402-2.

EPA Response: See Appendix A of the Draft Permit which includes reference to 2 CCR 402-2 and the following requirements:

"The well or wells shall be cased and cemented to prevent the movement of fluids into or between USDWs and shall be in accordance with 40 CFR §147.305 and the Colorado Office of the State Engineer's Water Well Construction Rules."

Final Permit Language: No change.

COMMENT #4:

Part II. SPECIFIC PERMIT CONDITIONS, *Page 5, Section B.2, Paragraph 1:*

Draft Permit Language: *Once EPA has confirmed that the proposed well meets the Permit conditions, the Director will authorize construction by email or other written communication to the Permittee.*

ECCV Comment: All the wells identified are constructed. The wells were constructed to the state engineer's rules and regulations at the time of the well construction. They are currently withdrawal wells only and will be converted to withdrawal and injection wells.

EPA Response: See EPA Response to Comment #1 above. In addition, this sentence is under the section heading *"Authorization to Construct Additional Injection Wells"* and applies to new wells that have yet to be authorized under this Permit. EPA clarified the final permit language as noted below.

Final Permit Language: Once EPA has confirmed the proposed well meets the permit conditions, the Director will authorize construction ***and operation, including conversion from a recovery well to a recovery and injection well*** by email or other written communication.

COMMENT #5:

Part II. SPECIFIC PERMIT CONDITIONS, *Page 6, Section B.5:*

Draft Permit Language:
Section 5. Pre-Injection Logs and Tests
Well logging and testing requirements prior to receiving authorization to inject are found in Appendix B. Well logs and tests shall be performed according to current EPA-approved procedures, or alternate procedures approved by the Director. The Director may stipulate specific test methods and criteria best suited for a specific well construction and injection operation.

ECCV Comment: Is it EPA's intent to accept the construction methods used in the area permit wells based on the Colorado State Engineer's rules and regulations (i.e. geophysical logs, e-log, gamma, density, SP)? This is the log information that ECCV has been taking for all the permitted wells.

EPA Response: Yes, as stated in Appendix A of the Draft Permit. However, the Director retains the right to stipulate specific test methods and criteria best suited for a specific well construction and injection operation.

Final Permit Language: No change.

COMMENT #6:

Part II. SPECIFIC PERMIT CONDITIONS, *Page 6, Section B.6, Paragraphs a) and b)*

Draft Permit Language:

6. Postponement of Construction or Conversion to Injection Wells

a) For the A-7R well to be initially converted, the Permit shall expire if well construction has not begun within two years of the Effective Date of the Permit.

ECCV Comment: It appears that EPA is treating A-7R and the other area permit wells as yet to be constructed. How is this language to be modified for an existing well? Should there be sub section for already constructed wells that are to be converted to ASR and new construction wells?

EPA Response: See EPA Response to Comments #1, #2 and #4 above. EPA clarified the final permit language as noted below.

Final Permit Language:
a) For the A-7R well to be initially converted, ***or future wells added to this Area Permit***

for conversion to injection, the Permit shall expire if well ***conversion*** has not begun within two years of the Effective Date of the Permit.

COMMENT #7:

Part II. SPECIFIC PERMIT CONDITIONS, *Page 7, Section B.6, Paragraph c)*

Draft Permit Language:
For wells that have begun construction or have been converted to injection, if authorization to inject has not been provided within two (2) years of spud date or the Effective Date of the Permit, respectively, the Permittee is subject to the conditions found in Part II, Section F.5.Wells Not Actively Injecting or may elect to convert the well to a non-UIC well found in Part III, Section B.2 Conversion to Non-UIC Well.

ECCV Comment: Is it clear that the 2 year time starts when we file to convert a well, and not at the time this permit is issued?

EPA Response: See EPA Response to Comments #6 for Well A-7R and other previously constructed wells. In Part II Section B.6, Paragraph c, EPA has clarified requirements for wells not yet constructed that might be added to the Permit in the future that the authorization to inject must occur within two (2) years of the spud date. As stated in Part III, Section B.2 of the Final Permit, the Permittee may also elect to convert wells back to non-UIC wells or request extensions to this time period, as explained in Part II, Section F.5.

Final Permit Language: *For future wells* ***added to this Permit that have not been constructed,*** *if authorization to inject has not been provided within* ***two (2) years of the spud date****, the Permittee is subject to the conditions found in Part II, Section F.5.Wells Not Actively Injecting or may elect to convert the well to a non-UIC well found in Part III, Section B.2 Conversion to Non-UIC Well.*

COMMENT #8:

Part II. SPECIFIC PERMIT CONDITIONS, *Page 7, Section C.3, First Sentence:*

Draft Permit Language: *Injection zone means "a geological formation, group of formations, or part of a formation receiving fluids through a well".*

ECCV Comment: Injection zone in Arapahoe Aquifer should be presumed to be the screened interval allowed by permit from the State Engineer, recognizing that the SEO has defined aquifer tops and bottoms.

EPA Response: 40 CFR § 144.3 defines an injection zone consistent with the above Draft Permit language. The DWR permit (Form GWS-25) states: "…the Arapahoe aquifer which is located 1410 feet below land surface and extends to a depth of 1944 feet". The construction log for Well A-7R shows the screened interval occurs from 1454 to 1960 feet below ground surface (bgs). According to the lithologic log, the last good sand in Well A-7R in the Arapahoe Aquifer occurs from 1933 to 1965 bgs. Injection occurring at the base of the screened interval at 1960 feet bgs will extend (by gravity) through this last sand to a depth of 1965 bgs. For the purposes of this Permit, EPA has determined the injection zone in Well A-7R extends from 1454 feet bgs (top of the screened interval) to 1965 feet bgs (base of the last good sand).

Final Permit Language: No change.

COMMENT #9:

Part II. SPECIFIC PERMIT CONDITIONS, *Page 8, Section C.6:*

Draft Permit Language: *Injection fluids are limited to fluids from those public water systems sampled and submitted as part of the application. Source of treated drinking water to be injected shall be obtained from Alluvium, Dawson, Denver, and Arapahoe Aquifers from the following four (4) sources:*

1) *ECCV's Northern Treatment Plant (from Beebe Draw wells);*
2) *ECCV's Pressure Zone 2 In-District Groundwater Wells;*
3) *Denver Water's DIA Connection; and*
4) *Water, Infrastructure, and Supply Efficiency (WISE) Water.*

ECCV Comment: The Laramie Fox Hills aquifer needs to be added as an additional source. Need to change to In-District Groundwater Wells.

EPA Response: EPA agrees and has added the Laramie-Fox Hills Aquifer and clarified reference to the Groundwater Wells.

Final Permit Language: Injection fluids are limited to fluids from those public water systems sampled and submitted as part of the application. Source of treated drinking water to be injected shall be obtained from Alluvium, Dawson, Denver, Arapahoe and ***Laramie-Fox Hills*** Aquifers from the following four (4) sources:

1) ECCV's Northern Treatment Plant (from Beebe Draw wells);
2) ***ECCV's In-District Groundwater Wells;***
3) Denver Water's DIA Connection; and

4) Water, Infrastructure and Supply Efficiency (WISE) Water.

COMMENT #10:

Part II. SPECIFIC PERMIT CONDITIONS, *Page 11, Section C.8, Paragraph 3:*

Draft Permit Language: *The Permittee shall record all operations and workovers on a Well Rework Record (EPA Form 7520-19) and submit a revised well construction diagram when the well construction has been modified.*

ECCV Comment: I assume the workovers do not include cleanings?

EPA Response: Yes. A well cleaning is not considered a "workover", as it does not change a well's specifications or construction.

Final Permit Language: No change.

COMMENT #11:

Part II. SPECIFIC PERMIT CONDITIONS, *Page 12, Section D.2, Paragraph a), Second Sentence:*

Draft Permit Language: *Well-specific conditions dictate the methods and the frequency for demonstrating MI.*

ECCV Comment: Can you clarify this statement?

EPA Response: Well specific conditions may include (but are not limited to) water flowing outside the casing annulus, changes in pressure at the wellhead, fluid movement or contamination to an Underground Source of Drinking Water (USDW). These conditions may be indicative of the loss of mechanical integrity (MI) of a well.

Final Permit Language: No change.

COMMENT #12:

Part II. SPECIFIC PERMIT CONDITIONS, *Page 12, Section D.2.a, Second Paragraph:*

Draft Permit Language: *Internal MI may be demonstrated by performing periodic visual inspections of the injection wells including the well casing. Specifically, the operator must submit documentation of all video logs previously run for each proposed injection well accompanied by a report(s) from a qualified professional analyst. Video logs shall be run*

in accordance with Appendix B conditions. Video logs shall be conducted within one (1) year of the application date. All video logs must be run from the top to the total depth of each proposed injection well. Analytical reports should include a discussion of all findings related to mechanical integrity of the well, identification of any measures taken to resolve concerns and/or maintain the well, and any issues for which monitoring is needed on a routine basis. Video logs with an analyst report must be submitted to EPA prior to injection, following the repair of a well after the loss of mechanical integrity, and during routine maintenance which is expected to occur at least every 10 years.

ECCV Comment: This seems reasonable. Do we have to re-video A-7R since it has already gone through the pilot test process? The pump, motor, and column pipe will have to be removed, since the well is actively withdrawing water (based on 11/23/2020 email update).

EPA Response: Yes, a video log will need to be run on Well A-7R, and EPA has clarified that this must be done within one year of the permit effective date. Although Pilot Cycle Testing was conducted on Well A-7R in 2015 and 2016, video logging was not conducted at that time. The most recent video log for Well A-7R was run in 2012.

Final Permit Language: Internal MI may be demonstrated by performing periodic visual inspections of the injection wells including the well casing. Specifically, the operator must submit documentation of all video logs previously run for each proposed injection well accompanied by a report(s) from a qualified professional analyst. Video logs shall be run in accordance with Appendix B conditions. Video logs shall be conducted within one (1) year of the **effective permit** date. All video logs must be run from the top to the total depth of each proposed injection well. Analytical reports should include a discussion of all findings related to mechanical integrity of the well, identification of any measures taken to resolve concerns and/or maintain the well, and any issues for which monitoring is needed on a routine basis. Video logs with an analyst report must be submitted to EPA prior to injection, following the repair of a well after the loss of mechanical integrity, and during routine maintenance which is expected to occur at least every 10 years.

COMMENT #13:

Part II. SPECIFIC PERMIT CONDITIONS, *Page 12, Section D.2.b:*

Draft Permit Language: *Part II MI shall be demonstrated by providing cement well records and/or a cement bond log (CBL).*

ECCV Comment: Are the construction cement records from A-7R enough?

EPA Response: Yes. EPA has reviewed the cement records included in the DWR permit application and found the records to be an acceptable Part II MI demonstration.

Final Permit Language: No change.

COMMENT #14:

Part II. SPECIFIC PERMIT CONDITIONS, *Page 12, Section D.3, First Paragraph:*

Draft Permit Language: *EPA approved methods shall be used to demonstrate MI. These methods may be found in documents available at https://www.epa.gov/uic/underground-injection-control-epa-region-8-co-mt-nd-sd-ut-and-wy#guidance.*

ECCV: There is no guidance for a Class V well at this website. This needs clarification. There are MIT forms and standards on this site, but it is unclear what applies to Class V Wells.

EPA Response: Since EPA has approved well video logging as an adequate demonstration of Part I MI and cement records and/or CBLs for Part II MI, EPA has removed reference to this website to avoid any confusion.

Final Permit Language: EPA approved methods shall be used to demonstrate MI. The approved methods for this ASR project are described above, Page 12, Section D.2.

COMMENT #15:

Part II. SPECIFIC PERMIT CONDITIONS, *Page 14, Section E.4.c:*

Draft Permit Language: *includes any additional wells within the area of review that have not previously been submitted. For those wells that penetrate the injection zone, a well construction diagram, cement records and/or CBL are also required.*

ECCV Comment: This information will be provided for any additional ECCV wells. For non ECCV wells, we will provide such data as is publicly available from the Colorado State Engineer.

EPA Response: EPA agrees.

Final Permit Language: No change.

COMMENT #16:

Part II. SPECIFIC PERMIT CONDITIONS, *Page 15, Section F.5:*

Draft Permit Language: *After any period of two (2) years during which there is no injection, the Permittee shall plug and abandonment the well in accordance with the requirements in this Section and Appendix E of this Permit unless the Permittee:*

ECCV Comment: Need new language here, our wells are combined injection/pumping wells and we need them for production of the native waters pursuant to Decrees. We don't want to P/A wells we have not used for injection in 2 years.

EPA Response: EPA understands Well A7-R and future proposed recovery and injection wells for this ASR project are/would be existing recovery (or production) wells. In the event a well is to be converted back to a recovery well only and will no longer be used for injection, ECCV will need to notify EPA the well is no longer being used for injection. If a well is to be converted to a non-UIC purpose, such a conversion would be subject to the conditions presented in Part III, Section B.2. of the Permit. Wells will be added or removed from the List of Wells for this ASR project as necessary. Consequently, EPA has clarified Section F.5 by moving the language in paragraph (c) of the Draft Permit into a new paragraph (d) and replacing it with the language noted below.

Final Permit Language: (c) provides written notice to the Director or his/her authorized representative of the change in use of the well from recovery and injection to recovery only.

COMMENT #17:

Part III. CONDITIONS APPLICABLE TO ALL PERMITS, *Page 16, Section B.2:*

Draft Permit Language: *Conversion to Non-UIC Well*

ECCV Comment: Our wells operate pursuant to water court decrees. If we curtail injection, we want to make sure our decrees prevail and we can keep pumping native water from the wells.

EPA Response: This section applies to wells that will be removed from EPA's UIC regulatory jurisdiction and should not affect any water court decrees.

Final Permit Language: No change.

COMMENT #18

Part III. CONDITIONS APPLICABLE TO ALL PERMITS, *Page 17, Section E;*

Draft Permit Language: *Additional Permit Requirements*

ECCV Comment: Somewhere we need language to make sure we can pump our native appropriation from the wells even if they are not used for ASR, or somehow distinguish between pumping of ASR and Native decreed water.

EPA Response: As stated in Comments #16 and 17 above, converting or removing a well from the UIC program will not affect decreed water.

Final Permit Language: No change.

COMMENT #19

Appendix A, *Page A-1, Second Paragraph:*

Draft Permit Language:
Casing and Cement
The well or wells shall be cased and cemented to prevent the movement of fluids into or between USDWs and shall be in accordance with 40 CFR §147.305 and the Colorado Office of the State Engineer's Water Well Construction Rules. The Permittee must meet all applicable requirements in these Colorado Rules including Rule 10 entitled "Minimum Construction Standards for Water Wells." This Rule is designed to ensure that "…construction prevents harm to public health, will not impair water quality or cause contamination of shared groundwater resources, and will ensure the safety of groundwater resources for Colorado's existing and future populations." …

ECCV Comment: This is good if this is the standard and no added CBLs are required. I assume this applies to all wells in the area permit, not just A-7R?

EPA Response: As for Well A-7R, and as mentioned in Comment #13 above, cement records for other proposed recovery and injection wells will be reviewed by EPA when ECCV requests to add an injection well to this Area Permit, as detailed in Part II, Section B.

Final Permit Language: No change.

COMMENT #20

Appendix A, *Page A-2, First Paragraph:*

Draft Permit Language:

Collection of water Samples
Upon request, water quality samples for new wells will be collected during well construction in accordance with Part II.B.1.d of this Permit.

ECCV Comment: We can do this if we re-drill a well, but this seems to anticipate we are drilling all new wells. We need to live with the construction, geologic, and geophysical data we have for the constructed wells. We could list the data we have available, then we do whatever quality testing they require.

EPA Response: This applies to new wells only. If a well is existing and being converted to a recovery and injection well, water quality data should be submitted during the authorization process for that well.

Final Permit Language: No change.

COMMENT #21

Appendix A, *Page A-2, Last Paragraph:*

Draft Permit Language: *No well stimulation program is proposed during well completion. In the event the Permittee wishes to conduct well stimulation, the Permittee shall follow the requirements in Part II, Section B.8. Alteration, Workover and Stimulation.*

ECCV Comment: We do well development during construction and do well cleaning using high pressure acid jetting. It should be clear that these do not constitute well stimulation as perceived by EPA. ECCV defines cleaning as returning a well to its original production capacity by jetting water, acids and dispersants. This does not include fracturing the formation.

EPA Response: EPA does not consider well development or cleaning as an "alteration, workover or stimulation". Examples of well alterations, workovers or stimulation include, but are not limited to, hydraulic fracturing, change in screening locations or the addition of cement plugs.

Final Permit Language: No change.

COMMENT #22

Appendix B, *Page B-1, First Paragraph:*

Draft Permit Language: *Well logging and tests shall be performed according to EPA approved procedures. It is the responsibility of the Permittee to obtain and use these procedures prior to conducting any well logging or test required as a condition of this Permit. These procedures can be found at https:/www.epa.gov/uic/underground-injection-control-epa-region-8-co-mt-nd-sd-ut-wy#guidance.*

ECCV Comment: These procedures don't appear to account for ECCV's use of a Baski (or similar) packer attached to tubing.

EPA Response: The reference to the EPA UIC website has been removed. Appendix B includes references to other Appendices for (e.g., pilot cycle) testing procedures.

Final Permit Language: Well logging and tests shall be performed according to EPA approved procedures. It is the responsibility of the Permittee to obtain and use these procedures prior to conducting any well logging or test required as a condition of this Permit.

COMMENT #23

Appendix B, *Page B-2, Table, Second Row:*

Draft Permit Language:

Type of Log or Test:

Pipe Analysis log or Caliper Log – To check the condition of the casing of an existing well to be converted to an ASR well CFR § 147.305(a) in Part II Section C.1

Prior to receiving authorization to inject. Run during well conversion activities.

- *Well A-7R*
- *New well (s)*

ECCV Comment: Is this required for A-7R since it is already injecting and withdrawing?

EPA Response: Yes. The current "injecting and withdrawing" refers to on-going pilot cycle testing based on an ECCV email on November 23, 2020. 40 CFR § 147.305 states:

Requirement for all wells.
(a) The owner or operator converting an existing well to an injection well shall check the condition of the casing with one of the following logging tools:

(1) A Pipe analysis log; or
(2) A Caliper log.

EPA has clarified this requirement by deleting reference to 40 CFR § 147.305(a) in Part II Section C.1 in Appendix B.

Final Permit Language:

Type of Log or Test:

Pipe Analysis log or Caliper Log –

To check the condition of the casing of an existing well to be converted to an ASR well.

Prior to receiving authorization to inject. Run during well conversion activities.

- Well A-7R
- New well (s)

COMMENT #24

Appendix D, *Page D-1, First Table, Last Row:*

Draft Permit Language: *Observe Weekly and Record Monthly – Well Injection Pressure*

ECCV Comment: Does this mean they want a pressure at the pitless and not the pump house? Follow up by ECCV on November 23, 2020: **Injection water will be fed into the well only by gravity, so the pressure will in the pitless during injection or in the pump house cannot under any circumstances exceed the pressure imposed by the 5 MG tank feeding the line (about 20 psi). Unlike deep injection wells, we are not feeding the wells through a high pressure pump, or any pump at all. The pressure in the pitless and in the well house may be 0 psi much of the time unless the well is completely filled to ground level and taking the 20 psi tank pressure. During injection the pressure in the pitless and the pressure in the pump house should be essentially identical as they are just plumbed together with a pipe.**

EPA Response: As stated in Appendix D in the Draft Permit, "*Well head injection pressure is the pressure exerted on the well head to place fluids in the subsurface."* Based on the information provided by ECCV on the above date, the pressure at the well head is the pressure collected at the pump house.

Final Permit Language: No change.

COMMENT #25

Appendix D, *Page D-2, First Table, Last Sentence in Right Column:*

Draft Permit Language: Note: *Obtain one sample for the injectate from the tap at the wellhead and analyze injectate for NDMA…*

ECCV Comment: Is the pump house good enough?

EPA Response: Yes, if the water being sampled is representative of what will be injected, and the sample is collected after blending. EPA clarified language in the final permit as noted below.

Final Permit Language: Obtain one of the samples for the injectate from the tap at the wellhead ***or the pump house, after blending has occurred, and analyze injectate for NDMA…***

COMMENT #26

Appendix D, *Page D-2, Second Table, Last Row, Left Column:*

Draft Permit Language: *Note: WELLHEAD PRESSURE (measured at wellhead)*

ECCV Comment: How close is near wellhead? I'd say anywhere along the delivery line between the well and the point the water is delivered to the system, but again clarify.

EPA Response: Please see Response to Comment #24 above.

Final Permit Language: No change.

COMMENT #27

Appendix G, *Page G-2, Last Sentence:*

Draft Permit Language: *******If cyanide is detected in the source water and alkalized (pH less than 8.5), the Permittee must remove the cyanide prior to any chloramination.*

ECCV Comment: Detected in excess of the amount identified in the table above?

EPA Response: No. Any amount of cyanide reported above the laboratory detection limit will trigger this requirement.

Final Permit Language: No change.

COMMENT #28

Appendix H, *Page H-1, First Paragraph, Last Sentence*

Draft Permit Language: *This test (Bench Scale Water Chemistry Test) may be performed in parallel to pilot cycle testing and operational use of the well due to the potential duration of this test.*

ECCV Comment: In the case of A-7R can we start using the well while the NDMA bench scale testing is going on? ECCV has been testing for NDMA the ground for over 1 year.

EPA Response: Yes. EPA has clarified the language in the Final Permit as noted below.

Final Permit Language: This test may be performed in parallel to pilot cycle testing and/**or** operational use of the well due to the potential duration of this test.